



JB has always been proudly Made in the USA since our inception in 1967. In today's economic climate, sometimes it is easy to just buy something based on price and not really care from where it comes. However, those cheap imports have a hidden price that can undermine the US economy and delay any real relief in pulling us out of the deepest recession in recent history.

Lured by lower manufacturing and labor costs, many U. S. manufacturers relocated their production facilities overseas, particularly to China. In fact, over the last 10 years, over five and a half million manufacturing jobs have been relocated to China and other low wage nations. Over 42,000 factories have shut down since 2000. Throughout our catalog, we look at that impact on the US economy and how small changes in Americans' purchasing decisions drastically impacts the entire nation. For example, for every one US auto worker job created, nine other jobs are created to support that job. Everyday, we hear about getting squeezed in the middle with a ballooning lower class and a disappearing middle class. Those 5,500,000 manufacturing jobs were middle class jobs and without them, those 5,500,000 workers and their families teeter on the edge of slipping down on to public assistance and create a greater strain on the economy. Those figures are just for manufacturing job losses, add in other sectors such as customer service call centers relocated to India and the issues compound. Among the advanced nations tracked by The Organization for Economic Cooperation and Development, the US poverty rate is the third WORST; we are ahead of only Mexico and Turkey.

Years ago, JB was tempted to consider manufacturing overseas, but our uncompromising quality standards, our skilled workforce with average tenures of over 20 years, and our customers who deserve a level of support that an overseas operation cannot achieve, instead we decided to double down in our commitment to remain Made in the USA. Our Aurora, Illinois facility provides for fast turn around times which allow our customers to reduce inventories, low shipping costs, and proven quality with unprecedented warranty policies all propel JB as one of the fastest growing manufacturers of tools and accessories in HVACR. While we would like 100% of our product to be US made, the reality is we make every effort to use domestic parts and components but a few parts and pieces are just not made anywhere in the US. When we need to source outside of our border, we make sure that the quality and consistency meets our high standards.

We are seeing a Made in America revolution. Slowly, a growing list of manufacturers is relocating back to the U.S. The initial advantages of relocating overseas such as low labor and shipping costs are now deteriorating. Inflationary pressures have significantly increased wages and shipping costs, productivity of the foreign work force significantly lags their American counterpart, long turnaround time, inventory requirements and continuing quality control issues all impact the decision to bring the work back home to US soil. More needs to happen but at least we are moving, albeit very slowly, in the right direction.

Please look for the "Made in USA" label in whatever you buy and know that at JB, your dollars are staying here in the US and truly supporting the hundreds of people in our JB family.

Finally, as always, many thanks to our customers, employees and representative/distributor network for the loyalty and support afforded JB over the years. JB's goal is to be recognized as "Just Better" in all that we do and with your continued support we will get there. We consider it a privilege to work with you and provide products and services to meet your needs. All the best for a successful 2012.

**Jeff Cherif - President** 

**REPAIR PARTS** 

ND⇒X

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-

#### **TETHERED SAFETY CAP PREVENTS OIL** SPILLS DURING TRANSPORT

**BLANK OFF ISOLATION VALVE ISOLATES THE PUMP FROM THE SYS-TEM TO DETERMINE** LEAKS

**1/2 HP CAPACITOR START MOTOR WITH THERMAL OVERLOAD PROTECTION** 

WELL-PROTECTED DRAIN VALVE

GAS BALLAST INCREASES PUMP DOWN SPEED AND **KEEPS OIL CLEANER** 

The number of

factories that

have shut down

since 2000

(Manufacture Institute 2010)

**STAINLESS STEEL VALVING RE-**SISTS CORROSION FOR LON-**GER PUMP LIFE** 

**2 STAGE DIRECT DRIVE TO** ACHIEVE DEEP 15 MICRON VACUUM

AVAILABLE DOMESTIC 115 VOLT. INTERNATIONAL 230 **VOLT, AND DUAL VOLTAGE** 

**CHECK VALVE PREVENTS OIL BACK FLOW DURING POWER** FAILURE

LOW PROFILE ROCKER SWITCH

**ALL METAL CONSTRUCTION INCLUDING ALL BRASS FIT-**TINGS

LIGHTER WEIGHT FINNED ALUMINUM HOUSING REDUCES HEAT DURING

**OPERATION** 

SEALED WITH O-RING TO PREVENT LEAKS

MADE IN USA

1/2"NPT BREAK (RESISTANT HANDLE

ENCOMPASSES EXHAUST

**15** MICRON

PLATINUM

B

7 CFM

DV-200N

**ULT RING** 

DEEP VACUUM

ACCESS VALVES **TOOLS & ACCESSORIES** 

INDEX

PAGE 4

**REPAIR PARTS** 

Operating instructions available on our web site at www.jbind.com \*\*Subject to warranty as set forth on page 73 and warranty and terms and conditions of sales set forth at www.jbind.com

JB Industries' PLATINUM® Series Vacuum pump is the best pump in the industry. Designed for the serious air conditioning and refrigeration technician, the PLATINUM vacuum pump features a gas ballast and blank off valve . American made and subjected to JB's rigorous performance standards, the PLATINUM® Series is

the top of the line for both quality and durability. Backed by an unprecedented \*\*24 month over-the-counter warranty, there is no better pump on the market. Because each PLATINUM® pump is made at our facility in Aurora, Illinois, quality and dependability are woven in with hard working American pride. Completely field repairable, our PLATINUM® series is designed to last. Turn to page 76 for a complete list of repair parts.

MP IN THE INDUS

PLA	TIN	UM® S	ERIES	S VACI	JUM P	UMPS
	UNIT	ED KINGDOM	INTERNATIO ® RAD	NAL	5,500, The num manufactur lost since (Buresu of Labor St	ring jobs 2000
1.23	US DOMESTIC	DV-42N	DV-85N	DV-142N	DV-200N	DV-285N
- 10		1.5 CFM (42 l/m)	3 CFM (85 l/m)	5 CFM (142 l/m)	7 CFM (200 l/m)	10 CFM (285 l/m)
	MOTOR	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM
5	VOLTAGE	115v, 60Hz	115v, 60Hz	115v, 60Hz	115v, 60Hz	115v, 60Hz
	PLUG	Std. U.S. 110v	Std. U.S. 110v	Std. U.S. 110v	Std. U.S. 110v	Std. U.S. 110v
2	INTAKE PORT	1/4"	1/4" x 3/8"	1/2" x 1/4" x 3/8"	1/2" x 1/4" x 3/8"	1/2" x 1/4" x 3/8"
X	OIL CAP	27 oz. (798 cc)	27 oz. (798 cc)	23 oz. (680 cc)	23 oz. (680 cc)	24 oz. (709 cc)
IS DOMESTIC	SHIP DIMENS.	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)
	WEIGHT	29 lbs. (13.2 Kg)	30 lbs. (13.6 Kg)	32 lbs. (14.5 Kg)	32 lbs. (14.5 Kg)	34 lbs. (15.4 Kg)
	DUAL	Provide State				
	DUAL VOLTAGE MOTOR	DV-42N-250 1/2 HP 1725/1425 RPM	DV-85N-250 1/2 HP 1725/1425 RPM	DV-142N-250 1/2 HP 1725/1425 RPM	DV-200N-250 1/2 HP 1725/1425 RPM	DV-285N-250 1/2 HP 1725/1425 RPM
DUA	VOLTAGE	115v/60Hz, 230v/50Hz	115v/60Hz, 230v/50Hz	115v/60Hz, 230v/50Hz	115v/60Hz, 230v/50Hz	115v/60Hz, 230v/50Hz
	PLUG	Std. U.S. 220v	Std. U.S. 220v	Std. U.S. 220v	Std. U.S. 220v	Std. U.S. 220v
	FUDO		1994 1925 Hee			
0	EURO	DV-42N-250EU	DV-85N-250EU	DV-142N-250EU		
64		1/2 HP, 1425 RPM 230v, 50Hz	1/2 HP, 1425 RPM 230v, 50Hz	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM 230v, 50Hz
EURO	PLUG		Euro	Euro	230V, 50Hz	Euro
	. 200					
	UNITED KINGDOM	DV-42N-250UK	DV-85N-250UK	DV-142N-250UK	DV-200N-250UK	DV-285N-250UK
X	MOTOR	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM
E	VOLTAGE	230v, 50Hz	230v, 50Hz	230v, 50Hz	230v, 50Hz	230v, 50Hz
	PLUG	UK	UK	UK	UK	UK
		HELITS		Operating Temp	erature 150°F +/- 18	° F (60° C +/- 10°C)

To check vacuum accurately, use the new DV-40 SUPERNOVA or the DV-22N (see pages 10 & 11). \*One Micron On A U-Tube Manometer. 25,400 Microns = 1"

PAGE 5

**ACCESS VALVES** 

**TOOLS & ACCESSORIES** 

**BRASS FITTINGS** 

**REPAIR PARTS** 

China's share of the total U.S. non-oil trade deficit as of 2010. (EPI Briefing 2010)

MADE IN USA

LARGER 1/2" HANDLE NOW MORE ERGONOMIC

TETHERED SAFETY CAP PREVENTS OIL SPILLS DURING TRANSPORT

1/2 HP CAPACITOR START MOTOR WITH THERMALOVERLOAD PROTECTION



**INCREASED SPACING BETWEEN INTAKE** TEE/AND HANDLE FOR MORE ROOM

> OIL FILL IS NOW ISOLATED ON COVER FOR EASY FILL

LARGE, EASY=TO-SEE SIGHT GLASS ENSURES **PROPEROIL LEVEL** 

**2 STAGE DIRECT DRIVE TO** ACHIEVE DEEP 25 MICRON VACUUM

AVAILABLE DOMESTIC 115 **VOLT, INTERNATIONAL** 230 **VOLT, AND DUAL VOLTAGE** 

**CHECK VALVE PREVENTS OIL BACK FLOW DURING POWER** FAILURE

LOW PROFILE ROCKER SWITCH

**ALL METAL CONSTRUCTION IN-CLUDING ALL BRASS FITTINGS** 

USA

WELL-PROTECTED DRAIN VALVE SEALED WITH O-RING TO PREVENT LEAKS **INCREASED OIL CAPACITY FOR** 

NEW/HEAVY/DUTY

**HAMMERTONE** PAINT COLOR

**COOLER RUNNING TEMPERATURE** AND REDUCED CONTAMINATION

### AMERICAN MADE ECONOMY

Built for the Air Conditioning Serviceman who wants a high quality, dependable vacuum pump, the ELIMINA-TOR® Series offers many higher end features without the higher end price. American made, 100% tested to JB's stringent quality standards, backed by an unparalleled \*\*24 month over-the-counter warranty, the ELIMI-NATOR® is the best economy vacuum pump in the industry. This is the only American made economy vacuum pump on the market and because each ELIMINATOR® is made at our factory in Aurora, Illinois American pride is built into each one of these workhorses. Completely field repairable, these pumps are built to withstand the toughest jobs. Please refer to page 78 for a complete list of repair parts.

PAGE 6

Operating instructions available on our web site at www.jbind.com \*Subject to warranty as set forth on page 73 and warranty and terms and conditions of sales set forth at www.jbind.com

# ELIMINATOR<sup>®</sup> SERIES VACUUM PUMPS HOW TO CHOOSE THE RIGHT SIZE PUMPS

CFM<sup>2</sup>= maximum tonnage rating. Therefore take the CFM rating of a pump and multiply it by that number to find the maximum number of tons the pump is rated for. Therefore, a 3 CFM pump (3 x 3) is rated for 9 tons. A 7 CFM pump (7 x 7) is rated for 49 tons. In many cases, depending on the system line sizes of large tonnage systems, it is better to put two or more smaller, easily maneuverable pumps at different locations. This will overcome some of the pressure drop problems and actually evacuate faster than a single, large pump. Pumps in the 1.5 to 10 CFM class are adequate to handle 99% of the work.

10		and the second			
	US Domestic	DV-3E	DV-4E	DV-6E	
	CFM	3 CFM (85 l/m)	4 CFM (113 l/m)	6 CFM (170 l/m)	LISTED ®
US JUMESTIC	MOTOR	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM	1/2 HP, 1725 RPM	
	VOLTAGE	115v, 60Hz	115v, 60Hz	115v, 60Hz	
	PLUG	Std. U.S. 110v	Std. U.S. 110v	Std. U.S. 110v	20 00
	NTAKE PORT	1/4" x 3/8"	1/4" x 3/8"	1/4" x 3/8"	
R	OIL CAP	28 oz. (827 cc)	25 oz. (739cc)	25 oz. (739 cc)	The last inch of pressure
SI	HIP DIMENS.	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)	17-5/8" (h) x 9-1/8" (w) x 14" (l)	as indicated
	WEIGHT	29 lbs. (13.1 Kg)	30 lbs. (13.6 Kg)	30 lbs. (13.6 Kg)	on the gauge is 25,400 microns.
		20 1001 (1011 119)			
	DUAL	DV-3E-250	DV-4E-250	DV-6E-250	HOW TO MEASURE EVACUATION
	VOLTAGE Motor	1/2 HP 1725/1425 RPM	1/2 HP, 1725/1425 RPM	1/2 HP 1725/1425 RPM	A micron is a unit of pressure starting from a perfect vacuum (no pressure) expressed in linear increments. One
	VOLTAGE	115v/230v 50/60Hz	115v/230v 50/60Hz	115v/230v 50/60Hz	inch equals 25,400 microns. That last inch of pressure below zero on the low side compound gauge (see illustra-
	PLUG	Std. U.S. 220v	Std. U.S. 220v	Std. U.S. 220v	tion) is 25,400 microns. A compound gauge only indicates that a vacuum is
			AT ADDRESS OF A DESCRIPTION OF		being produced, but does not tell you if
	EURO	DV-3E-250EU	DV-4E-250EU	DV-6E-250EU	moisture or contaminants are still in the system. Evacuation is complete when
	MOTOR	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	a system holds 500 microns to ensure dehydration is complete. Therefore,
	VOLTAGE	230v, 50Hz	230v, 50Hz	230v, 50Hz	there is a small fraction of an inch dif- ference between a complete evacu-
	PLUG	Euro	Euro	Euro	ation and an inadequately evacuated system. A compound gauge cannot
			and the second		measure this pressure at these levels
	UNITED KINGDOM	DV-3E-250UK	DV-4E-250UK	DV-6E-250UK	accurately. Only a micron gauge like the new SUPERNOVA DV-40 or our
2	MOTOR	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	1/2 HP, 1425 RPM	DV-22 (refer to pages 10 and 11) can
	VOLTAGE	230v, 50Hz	230v, 50Hz	230v, 50Hz	accurately read the low pressures pro- duced when evacuation / dehydration
	PLUG	UK	UK	UK	is complete.
C	porating To	mperature 150°F	/- 18° E (60° C + /- 10		Statement and a statement and and and a statement

Operating Temperature 150°F +/- 18° F (60° C +/- 10°C)

To check vacuum accurately, use the new DV-40 SUPERNOVA or the DV-22N (see pages 10 & 11). One Micron On A U-Tube Manometer. 25,400 Microns = 1

DEEP VACUUM

**CHARGING EQUIPMENT** 

### DEEP VACUUM PUMP ACCESSORIES BEST OIL IN THE INDUSTRY

Black Gold Vacuum Pump Oil is the Gold Standard in Vacuum pump care. For use in any vacuum pump, Black Gold is extremely pure and non-detergent. Our Black Gold is hydro processed which means it goes through a series of catalytic steps rendering the oil extremely refined, more viscous, and more stable. The result is clear mineral oil which will alert you to contamination sooner as it becomes cloudy or milky. In extreme temperatures, the oil will be more resistant to contaminants. We still recommend, however, that the oil be changed after every evacuation for maximum performance and pump efficiency.

The best test to see if your oil is contaminated is through a micron gauge. With a leak-free system, if your DV-22N micron gauge is still not reading a deep vacuum, the oil is too contaminated and should be changed. If the micron gauge pulls down to about 50 microns the oil is good. Viscosity is a measure of the weight of the oil. For industrial oil, the viscosity is an ISO grading at 40°C. Black Gold vacuum pump oil is an ISO 41, a special to this type of application.



MSDS INFORMATION FOR OUR BLACK GOLD PUMP OIL CAN BE FOUND UNDER TECHNICAL INFORMATION ON OUR WEB SITE AT www.jbind.com.

PART NO.	DESCRIPTION	CTN. QTY.	SHIPPING WEIGHT	CARTON DIMENS.
DVO-1	Pint Bottle	24	25 Lbs /11.4 kg	9" x 14-1/4" x 12-1/2"
DVO-12	Quart Bottle	12	24 Lbs /10.9 kg	11" x 13" x 10"
DVO-24	Gallon Bottle	6	47 Lbs /21.4 kg	12-1/2" x 15-1/2" x 12-1/2
Constant Sector			A CONTRACTOR OF A CONTRACTOR O	And a second

#### FLEXIBLE METAL LINE

Unlike charging hose, our flexible metal lines will not permeate under vacuum. Our metal lines feature finger-tight O-ring coupler ends.

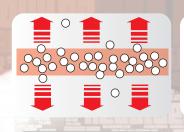
#### PART NO. DESCRIPTION

D10436	1/4" x 36" flexible metal line (one 45° fitting)
D10472	1/4" x 72" flexible metal line (one 45 $^{\circ}$ fitting)
D10636	$3/8" \times 36"$ flexible metal line (one $45^{\circ}$ fitting)
D10660	$3/8" \times 60"$ flexible metal line (one $45^{\circ}$ fitting)
DV-294	1/4" x 10" flexible metal line (straight fittings)
P90009	1/4" replacement O-ring (10 pack)
P90012	3/8" replacement O-ring (10 pack)

DIRECTION OF PERMEATION THROUGH HOSE WALL

Even with the advanced technology of today's hoses, permeation through the hose compound still exists.

When checking pressure rise, the atmosphere will permeate to the lower pressure in the hoses and the micron reading will slowly rise.



Charging System

Gas under pressure in the hose will permeate

to the lower pressure

of the atmosphere.

#### Evacuation

The atmosphere which has a higher pressure permeates to the lower pressure in the hose.

ACCESS VALVES

**DEEP VACUUM** 

**CHARGING EQUIPMENT** 

### **DEEP VACUUM PUMP ACCESSORIES**

#### SWIVEL COUPLERS Features an O-ring Seal.



PART NO.	DESCRIPTION
D10244	1/4" female swivel coupler
D10266	3/8" female swivel coupler
P90009	1/4" replacement O-ring (10 pack)
P90012	3/8" replacement O-ring (10 pack)

### SHUT OFF VALVE

Our O-ring quick coupler valves are great for blanking off any vacuum system and work for pressures up to 800 lbs.





**OC-E64** 

PART NO.

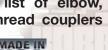
DESCRIPTION

D10162

1/4" Fe QC x 1/4" flare

### **QUICK COUPLERS**

Features an O-ring seal and no depressor. Please refer to page 52 for a complete list of elbow, straight, and FTP thread couplers and valves.



#### PART NO. DESCRIPTION

3/8" QC x 1/4" SAE elbow
3/8" QC x 1/4" SAE straight
1/4" replacement O-ring (10 pack)
3/8" replacement O-ring (10 pack)

#### **TETHERED SAFETY CAP**

Designed to prevent oil spills during transport. 3/8" fits pre-2008 Platinums and pre-2011 Eliminators.

PART NO.	DESCRIPTION
DV-EP6	Tethered Cap 3/8"
DV-EP8	Tethered Cap 1/2"

### OIL MIST FILTER

Eliminates oil mist from pump, handle. DV-F8 fits 1/2" exhaust pipe in 2008+ model Platinums and 2011+ Eliminators, while DV-F6 fits 3/8" exhaust pipe for all pre-2011 Eliminator series and pre-2008 model Platinums.

DV-F8

PART NO.	DESCRIPTION
DV-F6	Oil Mist Filter 3/8"
DV-F8	Oil Mist Filter 1/2"

#### ECONONY DEEP VACUUM D10053

Ideal for use in domestic service, 🦔 the deep vacuum manifold features separate valves for isolating the system from the pump and charging and/or performing pressure drop tests. The manifold can be hooked up for charging, to a micron gauge, and to charging hoses as well as quickly connecting to a pump with a 3/8" intake port. Use P90018 as replacement O-rinas.



D10160

#### Blank-Off Manifold valves isolate the pump from **USA** designed and necessary for all pumps without an internal blank-off valve like the Eliminator®. The 3/8" QC connects to the center manifold port, the 3/8" SAE flare port is for the hose connection from the pump, and the 1/4" ports are for the refrigerant line and the micron gauge.

D10053

DEEP VACUUM

**CHARGING EQUIPMENT** 

**REPAIR PARTS** 

INDEX

PAGE G

# DEEP VACUUM **CHARGING EQUIPMENT**

ACCESS VALVES

PART NO.

**DV-40** 





LARGE, EASY TO READ LCD SCREEN

**BRASS FITTING ON LENGTHY** FLEXIBLE CORD FOR HARD **TO REACH PLACES** 

**DV-40** 

**PROGRAMMABLE SHUT-OFF** 

**SUPERNOVA** 

MICRONS

0

DEALER DESIGN AWARDS

the NEWS

\*The DV-40 is not recommended for connection to vacuum pump when blanking off isolation valve. The preferred hook-up uses the DV-29 when the blank-off valve is engaged as illustrated on page 16.

#### 40 DIGITAL MICKON GAUGE

# INNOVATION AT ITS BEST

Hand held digital vacuum gauge

DESCRIPTION

JB Industries' SUPERNOVA gauge allows a service technician to be certain when a system is properly evacuated of air and moisture before charging with refrigerant. The SUPERNOVA is accurate from 12,000 microns down to 10 microns. The unit features many user-defined programmable options such as duration of the backlight, programmed shut-off, and the ability to set alarms when system reaches defined mark. The service technician can customize the SUPERNOVA to fit work habits. Make service calls more efficient without sacrificing quality. The SUPERNOVA has been named a Bronze winner for the 2009 Dealer Design in tools.

PROGRAMMABLE ALARM

**OTHER TASKS** 

**PROGRAMMABLE ALARM ALLOWS YOU TO PERFORM** 

THE FEMALE CONNECTION ON THIS UNIT **ALLOWS FOR DIRECT CONNECTION TO** 

THE A/C UNIT WITHOUT NEED OF HOSE **CONNECTION. JB DOES NOT RECOM-**MEND CONNECTION THROUGH A HOSE

AS IT NEGATIVELY AFFECTS ACCURACY.

1		i lana no	a aignai raoaani gaago			U
	DV-41	DV-40 wi	th protective carrying case a	nd AC adapter		MEASURES
£	DV-40C	Protectiv	e carrying case and adapter	only		INHG, PAS
	DV-40AC	A/C Ada	oter (NOT A BATTERY CHARG	BER)		
	DV-40HK	Replacer	ment Hanging Hook		THE DE	IF SENSOR CLEAN WITH
	A34000D	1/4" QC x	1/4" Access tee (with depressor	)		
	P90009	Replacer	ment O-ring (10 pack)		ÉT.	OPERATES (NOT INCLU
		-	DURATION OF BACKLIGHT I PROGRAMMABLE	IS		
	PROGRAMMA		just port	JU	ST B B	ETTER
-	FILOUIDAMINIA			30.		

POWER

MODE

FACTORY CALIBRATED AND RE-**OUIRES NO ADDITIONAL CALIBRA-**TION

IN MICRONS, PSIA, CALS, TORR, MTORR,

GETS CONTAMINATED, **H SIMPLE ALCOHOL** 

**ON 3 AA BATTERIES** UDED)

SCROLL UP

SCROLL DOWN

INDEX

# **DIGITAL MICRON GAUGES**

# DV-22N DIGITAL GAUGE

JB's DV-22 reads vacuum in 7 international units: Microns, PSIA, InHg, mBars, Pascals, Torr, and mTorr. The DV-22 has a micron range of 20 to 9,000 microns. It is a good idea to attach the micron gauge to the vacuum pump before evacuation to make sure the pump pulls down to at least 50 microns. If it doesn't, your pump oil is contaminated and should be changed. A compound gauge only indicates that a vacuum is being produced, but does not tell you if moisture and acids are still present in the system. Micron gauges are the only tool to accurately read the low pressure produced when evacuation/ dehydration is complete. Refer to page 7 under "How to Measure Evacuation" for more information.



\*The DV-22N is not recommended for connection to vacuum pump when blanking off isolation valve. The preferred hook-up uses the DV-29 when the blank-off valve is engaged as illustrated on page 16. INDEX

### **D-5000 REFRIGERANT LEAK DETECTOR**

# **CHARGING EQUIPMEN**

### D-5000 REFRIGERANT LEAK DETECTOR **ELECTROCHEMICAL SENSOR LIFETESTED**

### 5700 / MA

The amount the average US adult consumes per month in imported goods. If that were reduced to \$517 per month, the trade deficit could go away and bring unemployment down to 3 or 4%

(US Department of Commerce 2010).

OPERATES ON 4/AA BATTERIES FOR 10 **CONTINUOUS HOURS** 

MADE IN USA

**CERTIFICATIONS INCLUDE CE,** EN 14624, AND SAE J2791

177 FLEXIBLE PROBE

TO BE GREATER THAN LOYEARS

WARM UPTIME & SOSECONDS/AND **RESPONSETIME IS IMMEDIATE** 

SAFETOUSE IN COMBUSTIBLE **ATMOSPHERE** 

VIBRATING HANDLE/ALERTS TOLEAKS

BACKLIT LCD SCREEN TILTS

UPWARD FOR EASY VIEWING

AT/ANY/ANGLE

BARGRAPH SHOWS INTENSITY OF LEAK

**ALERTS TO LEAK THROUGH** VIBRATING HANDLE, AUDIBLE ALARM, AND BAR GRAPH

**AUTOMATIC ZERO** 

**SENSITIVITY CAN BE SET TO** HIGH, MEDIUM, AND LOW

HIGHLY SENSITIVE AND ACCURATE FOR ALL HFC, HCFC, BLENDS, AND HFO REFRIGERANTS INCLUDING BUT **NOT LIMITED TO :** 

	R-410A	0.05 OZ/YR	R-404A	0.05 OZ/YR	R-22	0.025 <b>0Z/YR</b>
	R-497A	0.05 OZ/YR	R-427A	0.05 OZ/YR	R-1344	0.05 <b>02/YR</b>
Ċ	R-1234¥F	0.0125 0Z/YR			- 1.5	

\* R-1234yf is a replacement for all HFC (134a) and HCFC (R22) refrigerants that are currently being phased out. It is an A2L flammable refrigerant as defined by ASHRAE 34.

PAGE 12

ACCESS VALVES

INDEX

## **LD-5000 REFRIGERANT LEAK DETECTOR**









### **000 REFRIGERANTLEAK DETECTOR**

JB Industries is proud to unveil the new, revolutionary LD 5000 PROWLER refrigerant gas leak detector. Using our new proprietary JB Electrochemical sensor technology for unparalleled accuracy coupled with the unique user features; there simply is no better hand held probe type service leak detector system on the market. The sensor is durable and will not be damaged by overexposure to refrigerant gas or contaminated by condensate water. Its new slim-line design makes it easy to probe difficult to search areas. The sensitivity is extremely accurate for all HFC, HCFC and blended refrigerants as well as the new HFO refrigerants. The technology provides for low battery consumption, excellent circuit stability, extremely long sensor life, and the electrochemical function of the sensor does not diminish over time with use. The sensor life has been tested to be greater than ten years, which is unique in the industry and it is safe to use in a combustible atmosphere. The **PROWLER** features a large LCD screen that flips upward so that the user can adjust the screen position for better visibility. The bar graph shows the intensity of a leak to help pinpoint the source of the leak. The sensitivity can be programmed from high to medium to low. If a leak is detected, there is an audible alarm that will sound, vibration in handle, and bar graph on the screen. The LCD display also indicates the amount of remaining battery life. The PROWLER does not require rechargeable batteries. Operates on 4 AA batteries (included).

The number of factories that closed everyday in 2009 and 2010, this includes weekends and holidays. Since 2001, the US has lost an average of 15 factories a day. (Bureau of Labor Statistics 2011).

#### FEATURES INCLUDE

- EXTREMELY ACCURATE FOR ALL HFC. HCFC AND **BLENDED REFRIGERANTS AS WELL AS NEW HFO** REFRIGERANTS
- LEAK INDICATOR BAR GRAPH, AUDIBLE ALERT, **AND VIBRATION IN HANDLE**
- SENSOR LIFE TESTED TO BE GREATER THAN 10 YEARS, UNIQUE IN INDUSTRY
- SAFE TO USE IN COMBUSTIBLE ATMOSPHERE
- LOW BATTERY CONSUMPTION, EXCELLENT CIR-CUIT STABILITY, EXTREMELY LONG SENSOR LIFE, AND ELECTROCHEMICAL FUNCTION OF SENSOR DOES NOT DIMINISH OVER TIME OR WITH USE
- SENSITIVITY CAN BE PROGRAMMED TO HIGH, ME-**DIUM. LOW**
- AUDIBLE ALARM CAN BE MUTED

DEEP VACUUN

EQUIPMEN

ACCESS VALVES

**TOOLS & ACCESSORIES** 

**BRASS FITTINGS** 

PART NO.	DESCRIPTION
LD-5000	Prowler Leak Detector in Case
LD-S100	Replacement Sensor
LD-RF5	Replacement Filters (5 pack)
LD-TV	Replacement Leak Test Vial
LD-PK	Parts Kit (sensor, filter kit, test vial)
LD-CS	Carrying Case

### **ATLAS REFRIGERANT CHARGING SCALE** FAVYWEIGHT CHAMPION

The JB ATLAS refrigerant charging scale is designed for the HVAC/R industry. Every day users will appreciate the advanced solid state load cell for superior sensitivity (0.25 oz/ 10 gm) and accuracy. The ATLAS's 220 pound (100 kg) weight capacity, all metal construction, heavy duty plastic storage case, and easy to read hand held combine to make the ATLAS the best overall package in the industry. Pound for Price our 220 pound scale competes at a 110 pound price. Operates with a 9 volt battery (included).

220 LB (100 KG) CAPACITY

**PIECES ARE MODULARIZED SO** PARTS ARE EASILY REPLACED WITHOUT NEED TO PURCHASE **ENTIRELY NEW UNIT** 

**DISPLAYS WEIGHT IN DECIMAL POUNDS, POUNDS & OUNCES,** AND KILOGRAMS

**AUTO SHUT OFF AFTER 30 MIN-UTES TO PRESERVE BATTERY** AND CAN BE DISABLED

DEALER DESIGN AWARDS the NEWS B

DS-20000

10GM WITHOUT NEED OF **GYLINDER DIRECTLY ON CENTEROFWEIGHING PLATFORM** 

SOUDSTATELOADCEU

ACCURATETO 025077

LCD SCREEN ON HAND-HELD CAN BE READ FROM A DISTANCE OR IN DIRECT SUNLIGHT

TECHNICAL INFORMATION

Usage	Indoor/Outdoor Not waterproof
Operating Temp.	+32°F to 122°F (0°C to +50°C)
Storage Temp.	+14°F to 140°F
	(-10°C to +60°C)
Humidity	85% RH @113°F (45°C), Non Condensing
Altitude	6500 feet (2000 meters)
Battery Life	Approximately 60 hours
Pollution Degree	2
<b>Over Voltage Category</b>	2

	TTLAS	
-	000	
5		
	B	

**OPTIONAL CHARGING MODULE (DS-MOD)** TURNS THE ATLAS INTO A CHARGING STA-TION WITHOUT THE CYLINDER EVER LEAVING THE WEIGHING PLATFORM. TRANSFERS UP **TO 999 POUNDS IN CHARGING INCREMENTS** OF 0.25 0Z ((10GM)). CONNECTION IS A 1/4" FIARE

PART NO.	DESCRIPTION
DS-20000	220 lb weight capacity ATLAS scale
DS-MOD	Charging Module
DSR-10	Replacement communication cable
DSR-20	Replacement handheld remote
DSR-30	Replacement weighing platform

ACCESS VALVES

**TOOLS & ACCESSORIES** 

**BRASS FITTINGS** 

**REPAIR PARTS** 

PAGE 14

XEIQNI

### SUPERHEAT SUBCOOLING GAUGES

### PERHEAT SUBC Our Superheat and Subcooling Gauge saves high, low, and average values for detailed analysis. The SH-35N's

gauges features the pressure/ temperatures of 32 of the most common refrigerants. Included with gauge is an A34000 access tee, a 6' (1.8m) dry/wet bulb temperature sensor, and 5 socks in a convenient carrying case.

**ONS PROTECT** 

NST DIRTAND DUST

HIGH / LOW / AVERAGE DISPLA	Presso	AU 17
SH-35N SUPERHEAT, SUBCO SUPERSURE, TEMPER	OLING STALED	TOUCH
SUPERHEAT, SUBCO PRESSURE, TEMPER	DUILUIDI	ROTEC
	AGAINST D	
push to s	SUPERHEAT	
BETWEEN S PUSH 2X HIGH. LOW HOLD TO	FOR & AVG. CLEAR	1
HOLD	TO TURN OFF	ART NO
PRES	STO TO TO ANTS	1-35N
PL	USH 2X FOR	1-36N
		84000
	TRUTTER & DISC	1-54
12 MONTH	SH	1-58
12 MONTH WARRANTY	SH	1-55
	SH	1-56
	CL.	1_51

#### SH-35 AND SH-36 REFRIGERANT KEYS

For prior SH-35 and SH-36 models without the 32 refrigerants built-in, keys are available.

	PART NO. °F	PART NO. °C
R-12	SK-40012	SK-50012
R-134A	SK-40134A	SK-50134A
R-404A	SK-40404A	SK-50404A
R-410A	SK-40410A	SK-50410A
R-502	SK-40502	SK-50502
R-507	SK-40507	SK-50507
MULTI	SK-35N	SK-36N

#### MADE IN USA

**32 REFRIGERANTS BUILT-IN** 

**1 AND 24-HOUR MEMORY** 

SAVES HIGH, LOW, AND AVERAGE VALUES FOR **DETAILED ANALYSIS** 

LOW BATTERY INDICATOR ALERTS REPLACING 9-VOLT BATTERY (NOT INCLUDED)

**PULSATION PROOF AND ACCURATE TO ANY EL-EVATION UP TO 16,000 FEET WITHOUT ADJUST-MENT FOR USE IN MOST GEOGRAPHICAL APPLICATIONS** 

PART NO.	DESCRIPTION
SH-35N	Superheat/Subcooling gauge (F°) in case
SH-36N	Superheat/Subcooling gauge (C°) in case
A34000	1/4" QC x 1/4" access tee
SH-54	6' (1.8m) temperature sensor
SH-58	Temperature clamp
SH-55	Plastic carrying case
SH-56	Socks (5 pack)
SH-51	28' (8.5m) temperature sensor extension
A31992	Replacement plastic 1/4" SAE cap
<b>DV-18</b>	AC Adapter

### FECHNICAL INFORMATION

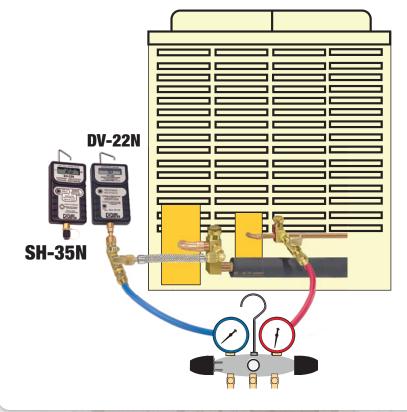
	STANDARD	METRIC
Pressure Disp. Range	29 InHg to	(-98 kPa to
	600 psig	4134 kPa)
Temp Display Range	-40° F to 200° F	-40° C to 93° C
Operating Temp	32° F to 176° F	0° C to 80° C
Max. Overpressure	800 psig	5512 kPa

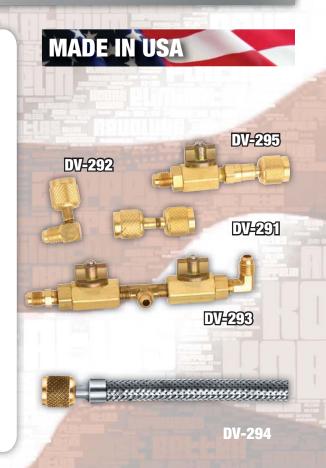
Refrigerant data source from NIST REFRPRO software and manufacturers data.

### **SUPERHEAT SUBCOOLING GAUGES**

### DV-29 MICRON AND SUPERHEAT GAUGE HOOKUP TEST UNIT

Used in conjunction with our micron gauges DV-40 or DV-22N and our superheat/ subcool gauge the SH-35N, the DV-29 ensures a leak proof setup. JB's DV-29 works with all micron gauges and creates a closed system, eliminating any leakage under deep vacuum. The DV-29 eliminates other problems when attaching the micron gauge into the system. If the micron gauge is attached directly to the vacuum pump or with a 3' (91.4 cm) dedicated hose, you will get a lower reading as the gauge is sensing what the pump is doing and not what the pump is doing to the system.





and the second second		
PART NO.	DESCRIPTION	
DV-29	Entire hook up system	
DV-291	Replacement 1/4" SAE swivel coupler	
DV-294	Replacement 10" (25.4 cm) metal hose with O-ring	
DV-295	Replacement Ball Valve with O-ring QC	
	and depressor	
DV-292	Replacement 90° male flare with 1/4" O-ring QC	
DV-293	Replacement valve assembly 1/4" MFL connector	
P90009	Replacement O-ring (10 pack)	

USED IN CONJUNCTION WITH OUR DV-22N AND SH-35N, THE DV-29 ENSURES A LEAK PROOF SETUP THE DV-29 CONSISTS OF ONE EACH OF THE FOLLOWING:

- 10" (25.4 CM) METAL HOSE WITH O-RING QUICK COUPLERS (DV-294)
- 90° MALE FLARE WITH 1/4" O-RING QUICK COU-PLER (DV-292)
- BALL VALVE WITH O-RING QUICK COUPLER WITH DEPRESSOR (DV-295)
- VALVE ASSEMBLY WITH 1/4" MALE FLARE CONNECTIONS (DV-293)

PAGE 16

**REPAIR PARTS** 

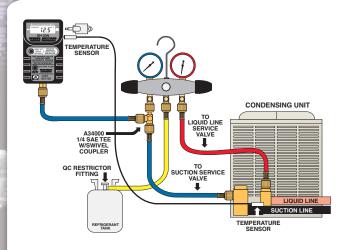
# CHARGING AND TESTING METHODS

# **CHARGING METHODS**

CHARGING BY SUPERHEAT METHOD residential a/c or refrigeration systems equipped

WITH TXV AND RECEIVER, CAPILLARY TUBE, OR METERING DEVICE

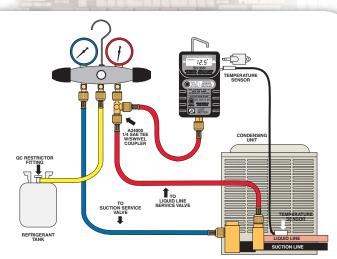
CONTACT MANUFACTURER OR WHOLESALER FOR SUPER-HEAT NUMBER.



#### CHARGING BY SUBCOOLING WETHOD CONTACT MANUFACTURER OR WHOLESALER FOR SUBCOOL-

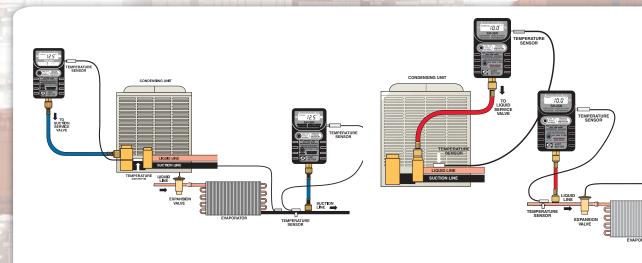
CONTACT MANUFACTURER OR WHOLESALER FOR SUBCOOL-ING NUMBER.

Average Subcooling value is 10°-12°F.



# TESTING FOR CHARGE BY SUPERHEAT

#### TESTING FOR CHARGE BY SUBCOOLING

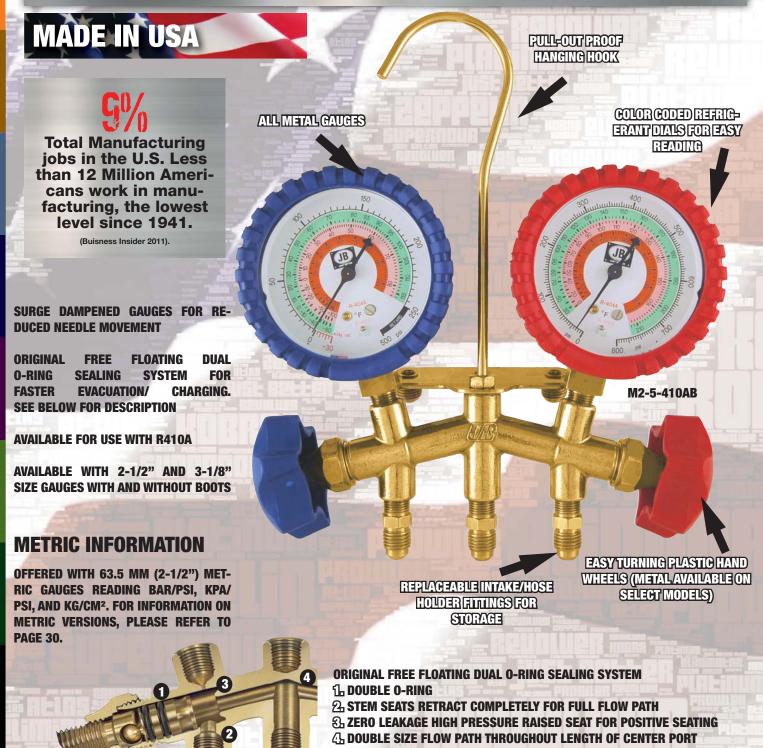


Operating instructions available under Technical Information at www.jbind.com

### **STANDARD BRASS 2-VALVE MANIFOLD**

### THE INDUSTRY STANDARD

An industry standard for countless years, the JB M2 series of manifolds features our full flow design for faster evacuation/ charging. Coupled with an angled bar for better knuckle clearance in rotating the hand wheels and the original free flowing dual O-ring sealing system, the M2 is the classic American made manifold. All of JB's brass manifolds are equipped with heavy-duty metal gauge cases for added durability.



**BRASS FITTINGS** 

**REPAIR PARTS** 

XEDNI

### **STANDARD BRASS 2-VALVE MANIFOLD**

#### **TO FIND THE RIGHT MANIFOLD**

- **1. CHOOSE THE DESIRED REFRIGERANT COMBINATION**
- 2. SELECT THE HOSE SET THAT SUITS YOUR NEEDS
- 3. MOVE ACROSS THE CHART TO FIND THE GAUGES AND YOUR MODEL NUMBER

a 4 1	Includes (3) 60" hoses unless otherwise noted	Standard 2-1/2" gauges	2-1/2" gauges with boots	Glow-in-the-dark 3-1/8" gauges	<b>3-1/8" gauges with</b> 1% accuracy
R-12	NO HOSE SET	M2-8	M2-8B		
R-22	CL (36" RB, 60" Y)	M2-6	M2-6B		
R-502	CCL 60" STANDARD	M2-5	M2-5B		
	CCL 36" STANDARD	M2-36	M2-36B		
-		a menne distant			THE R. LO. LO. LOW CO.
R-22	NO HOSE SET	M2-21125	M2-21125B	M2-22125	M2-23125
R-BAA	CCLE 60" KOBRA® HOSE	M2-21131	M2-21131B	M2-22131	M2-23131
R-404A					1
	ALIAN ALIAN				
<b>Ia</b> . 99	NO HOSE SET	M2-8-410A*	M2-8-410AB	M2-2225	M2-23225
R-404A	CCLE 60" KOBRA® HOSE	M2-5-410A*	M2-5-410AB	M2-22231	M2-23231
R-ANA	CCLS 60" KOBRA® HOSE UL R-410A SECURE SEAL	M2-5-410A-SS		M2-22244	
	* AVAILABLE WITH SI	VER METAL HANDLES	, PLEASE ORDER M2	-8-410AM AND M2-5-410	AM RESPECTIVELY.
				and the second se	

R-410A	NO HOSE SET CCLE 60" KOBRA® HOSE	M2-21525 M2-21531	M2-21525B M2-21531B	M2-22525 M2-22531	
<b>R-427</b> A R-422B R-407A	NO HOSE SET			M2-22325	
R-22 R-410A R-407G	NO HOSE SET			M2-22425	

GAUGE FEATURES AND REPLACEMENTS ARE DETAILED ON PAGE 33-35. GAUGE BOOTS ARE FEATURED ON PAGE 36. METRIC REPLACE-MENT GAUGE VERSIONS ARE DETAILED ON PAGE 36. KOBRA HOSES ARE DETAILED BEGINNING ON PAGE 38. REFER TO "MANIFOLD RE-PAIR PARTS" BEGINNING ON PAGE 79 FOR ALL JB MANIFOLD REPAIR PARTS. IF YOU DO NOT SEE A REFRIGERANT COMBINATION, PLEASE CONTACT US AT 800-323-0811

INDEX

### 1/4" PREMIUM BRASS 2-VALVE ZEPPELIN®

### 2-VALVE PREMIUM BRASS MANIFOLD MADE IN USA

**COLOR GODED REFRIGERANT** 

DIALS FOR EASY READING

PULL-OUT PROOF HANGING HOOK

JB)

7EDDELIN

AULMETALGAUGES

28925

**REPLACEABLE INTAKE/HOSE** 

**HOLDER FITTINGS FOR STORAGE** 

### 500,000

The amount of jobs estimated to be lost this year if the trade deficit with China continues to grow at its current pace

SURGE DAMPENED GAUGES FOR RE-DUCED NEEDLE MOVEMENT

ORIGINAL FREE FLOATING DUAL O-RING SEALING SYSTEM FOR FASTER EVACUATION/CHARGING. SEE PAGE 18 FOR DESCRIPTION

> HEAVYADUTY FORGED BRASS BODY IS RUGGED AND DURABLE

**AVAILABLE FOR USE WITH R410A** 

AVAILABLE WITH 2-1/2" AND 3-1/8" SIZE GAUGES

ALL MODELS AVAILABLE WITH AND WITHOUT SIGHT GLASS

SOFT GRIP RUBBER HAND WHEELS REDUCE TURNING TO OPEN/CLOSE

### -VALVE PREMILIM BRASS MANIFOLD

The American made Zeppelin® series of brass manifolds feature durable molded "Soft Grip" rubber handles with fingertip grooves that eases opening and closing while the improved stem design means "Full Open" in only 2½ turns. The brass Zeppelin® series, available only in 2-valve, also incorporates cutting edge styling and technology to significantly reduce the weight of the manifold.

In addition, JB also offers an increased selection of gauges in metal cases and refrigerant combinations. Standard 2-1/2", large glow-in-the-dark 3-1/8", and liquid-filled 3-1/8" gauges can be coupled with different refrigerant combinations and JB's multiple hose options to serve any application. All manifolds include a 60" (152.3 cm) hose set unless noted otherwise.

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**BRASS FITTINGS** 

### 1/4" PREMIUM BRASS 2-VALVE ZEPPELIN®

#### **TO FIND THE RIGHT MANIFOLD**

- **1. CHOOSE THE DESIRED REFRIGERANT COMBINATION**
- 2. SELECT THE HOSE SET THAT SUITS YOUR NEEDS
- 3. MOVE ACROSS THE CHART TO FIND THE GAUGES AND YOUR MODEL NUMBER

A 7 1	Includes (3) 60" hoses unless otherwise noted	Standard 2-1/2" gauges	3-1/8" Liquid filled gauges	Glow-in-the-dark 3-1/8" gauges	
R-12	NO HOSE SET	23000	23050	23025	
N IG	CCL STANDARD HOSE SET	23004		23029	
K-22	CCLE KOBRA® HOSE SET	23006	23056	23031*	
R-502	CCLBV KOBRA® HOSE W/ BALL VALVE	23013	23063	23038	
	CCLS KOBRA® HOSE W/ UL R-410A SECURE	23017	23067	23042	
(Replaces M8 series)	SEAL	*2	3031 available with sig	ht glass, order 23033	
	7 7 7 1	In the second	Toront and and a work of a	Contraction of the local division of the loc	
13 00		00100	1 00150	00405	
K-EE	NO HOSE SET CCLE KOBRA® HOSE SET	23100	23150	23125	
R-1344	CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE	23106 23113	23156	23131* 23138	
	CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE W/ UL R-410A SECURE		23163	23138	
R-404A	SEAL		23131 available with sig		
		and the second second		3	
R-22	NO HOSE SET	23200	23250	23225	
D-ABAA	CCLE KOBRA® HOSE SET	23206	23256	23231*	
N TRAVER	CCLBV KOBRA® HOSE W/ BALL VALVE	23213	23263	23238	
R-490A	CCLS 60" KOBRA® HOSE W/ UL R-410A		23244		
President of the second	SECURE SEAL *23231 available with sight glass, order 23233				
		and the set	and the second second		
P-19/1	NO HOSE SET	23300		23325	
	CCLE KOBRA® HOSE SET	23306		23331	
K-4114/A	CCLBV KOBRA® HOSE W/ BALL VALVE	23313		23338	
R-5077	CCLS KOBRA® HOSE W/ UL R-410A SECURE	23317		23342	
	SEAL		1	1	
(Replaces M5 series)		and the second second		GAUGES DO NOT ILLUMINATE.	
74 - 44 - 1	NO HOSE SET	23500		23525	
R-418A	1/4" & 5/16" CCLE KOBRA® HOSE SET	23510		23535	
	CCLE KOBRA® HOSE SET	23506		23531*	
(Replaces	CCLBV KOBRA® HOSE W/ BALL VALVE	23513		23538*	
M7 series)	CCLV KOBRA® HOSE W/ WHIP END	23521		23546	
			3531 available with sig		
		*2	3238 available with sigh	nt glass, order 23540	

GAUGE FEATURES AND REPLACEMENTS ARE DETAILED ON PAGE 33-35. GAUGE BOOTS ARE FEATURED ON PAGE 36. KOBRA HOSES ARE DETAILED BEGINNING ON PAGE 38. REFER TO "MANIFOLD REPAIR PARTS" BEGINNING ON PAGE 79 FOR ALL JB MANIFOLD REPAIR PARTS. IF YOU DO NOT SEE A REFRIGERANT COMBINATION, PLEASE CONTACT US AT 800-323-0811

DEEP VACUUM

### 1/4" ALUMINUM 2-VALVE ZEPPELIN®

### 2-VALVE ALUMINUM MANIFOLD MADE IN USA

#### COLOR CODED REFRIGERANT DIALS FOR EASY READING

PULL-OUT PROOF HANGING HOOK

ALL METAL GAUGES

#### The amount theU.S. spends on Chinese imports for every \$1 China spends on U.S. goods (Buisness Insider 2011).

SURGE DAMPENED GAUGES FOR RE-DUCED NEEDLE MOVEMENT

ORIGINAL FREE FLOATING DUAL O-RING SEALING SYSTEM FOR FAST-ER EVACUATION AND CHARGING. SEE PAGE 18 FOR DESCRIPTION

**AVAILABLE FOR USE WITH R410A** 

AVAILABLE WITH 2-1/2" AND 3-1/8" SIZE GAUGES

#### **METRIC INFORMATION**

OFFERED WITH 63.5 MM (2-1/2") METRIC GAUGES READING BAR/ PSI, KPA/PSI, AND KG/CM<sup>2</sup>. FOR IN-FORMATION ON METRIC VERSIONS, PLEASE REFER TO PAGE 31.

PREGISELY MACHINED ANODIZED

2225

SOFT GRIP RUBBER HAND WHEELS REDUCE TURNING TO OPEN/CLOSE

REPLACEABLE INTAKE/HOSE HOLDER FITTINGS FOR STORAGE

### 2-VALVE ALUMINUM MANIFOLD

The American made aluminum Zeppelin® series of manifolds feature durable molded "Soft Grip" rubber handles with fingertip grooves that ease opening and closing while the improved stem design means "Full Open" in only 2½ turns. The aluminum Zeppelin® series, available in 2-valve and 4-valve, also incorporates cutting edge styling and technology to significantly reduce the weight of the manifold.

In addition, JB also offers an increased selection of gauges in metal cases and refrigerant combinations. Standard 2-1/2", large glow-in-the-dark 3-1/8", and liquid-filled 3-1/8" gauges can be coupled with different refrigerant combinations and JB's multiple hose options to serve any application. All manifolds include a 60" (152.3 cm) hose set unless noted otherwise.

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**REPAIR PARTS** 

### 1/4" ALUMINUM 2-VALVE ZEPPELIN®

	and it provides the set of the		
Includes (3) 60" hoses unless otherwise noted	Standard 2-1/2" gauges	3-1/8" Liquid filled gauges	Glow-in-the-dark 3-1/8" gauges
NO HOSE SET			24025
CCLE KOBRA® HOSE SET	24008	24058	24033
CCLBV KOBRA® HOSE W/ BALL VALVE		24065	24040
CCLS KOBRA® HOSE W/ UL R-410A		24069	24044
SECURE SEAL		I	
			24125
	24108		24133
		24165	24140
		24169	24144
SECURE SEAL			
NO HOSE SET	24200	24250	24225
CCLE KOBRA® HOSE SET	24208	24258	24233
CCLV KOBRA® HOSE W/ WHIP END		24265	24240
CCLS KOBRA® HOSE W/ UL R-410A			24244
SECURE SEAL	I		
			GAUGES DO NOT ILLUMINATE.
NO HOSE SET	24500		24525
	24508		24533
		24600	
		24608	
CCLBV KOBRA® HOSE W/ BALL VALVE		24615	
	Standard Concerning		
			04005
NO HOSE SET			24325
and the second se			
NO HOSE SET			24425
NO HOSE SET			24425
NO HOSE SET			24425
	unless otherwise noted NO HOSE SET CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL NO HOSE SET CCLE KOBRA® HOSE SET CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL NO HOSE SET CCLV KOBRA® HOSE SET CCLV KOBRA® HOSE SET CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL NO HOSE SET CCLE KOBRA® HOSE SET	Unless otherwise noted2-1/2" gaugesNO HOSE SET24000CCLE KOBRA® HOSE SET24008CCLBV KOBRA® HOSE W/ BALL VALVECCLS KOBRA® HOSE W/ UL R-410ASECURE SEAL24100NO HOSE SET24108CCLBV KOBRA® HOSE W/ BALL VALVECCLS KOBRA® HOSE W/ UL R-410ASECURE SEAL24200NO HOSE SET24200CCLE KOBRA® HOSE W/ UL R-410ASECURE SEAL24200NO HOSE SET24208CCLS KOBRA® HOSE W/ UL R-410ASECURE SEAL24208NO HOSE SET24208CCLS KOBRA® HOSE W/ UL R-410ASECURE SEAL24508NO HOSE SET24508NO HOSE SET24508NO HOSE SET24508NO HOSE SET24508CCLE KOBRA® HOSE SETCCLE KOBRA® HOSE SETCLE KOBRA® HOSE SETCLEBV KOBRA® HOSE W/ BALL VALVECLEBV KOBRA® HOSE W/ BALL VALVE	unless otherwise noted2-1/2" gaugesfilled gaugesNO HOSE SET2400024050CCLE KOBRA® HOSE W/ BALL VALVE2400824058CCLS KOBRA® HOSE W/ UL R-410A2406524069SECURE SEAL2410024150NO HOSE SET2410824158CCLS KOBRA® HOSE W/ BALL VALVE24165CCLS KOBRA® HOSE W/ BALL VALVE24165CCLS KOBRA® HOSE W/ UL R-410A24169SECURE SEAL24200NO HOSE SET24200CCLS KOBRA® HOSE W/ UL R-410A24250CCLE KOBRA® HOSE W/ UL R-410A24265CCLS KOBRA® HOSE W/ UL R-410A24265CCLS KOBRA® HOSE SET24200CCLE KOBRA® HOSE SET24508CLURE SEAL0NO HOSE SET24500CCLE KOBRA® HOSE SET24500CCLE KOBRA® HOSE SET24500CCLE KOBRA® HOSE SET24500CCLE KOBRA® HOSE SET24508NO HOSE SET24508CLE KOBRA® HOSE SET24500CLE KOBRA® HOSE SET24500CLE KOBRA® HOSE SET24508NO HOSE SET24600CCLE KOBRA® HOSE W/ BALL VALVE24608CLBV KOBRA® HOSE W/ BALL VALVE24605

GAUGE FEATURES AND REPLACEMENTS ARE DETAILED ON PAGE 33-35. GAUGE BOOTS ARE FEATURED ON PAGE 36. METRIC REPLACE-MENT GAUGE VERSIONS ARE DETAILED ON PAGE 36. KOBRA HOSES ARE DETAILED BEGINNING ON PAGE 38. REFER TO "MANIFOLD RE-PAIR PARTS" BEGINNING ON PAGE 79 FOR ALL JB MANIFOLD REPAIR PARTS. IF YOU DO NOT SEE A REFRIGERANT COMBINATION, PLEASE CONTACT US AT 800-323-0811

### 1/4" BRASS ECONOMY 4-VALVE

#### NEW ECONOMY 4-VALVE Designed from our industry standard two valve model, the M4 features the same free flowing dual O-ring scaling system. This American made manifold is rugged and du-**PULL-OUT PROOF HANGING MADE IN USA** HOOK AULIMETALGAUGES **COLOR CODED REFRIGERANT** SURGE DAMPENED GAUGES FOR RE-DIALS FOR EASY READING **DUCED NEEDLE MOVEMENT ORIGINAL FREE FLOATING DUAL O-RING SEALING SYSTEM FOR FASTER EVACUATION/CHARGING. SEE BELOW FOR DESCRIPTION**

**AVAILABLE FOR USE WITH R410A** 

AVAILABLE WITH 2-1/2" AND 3-1/8" SIZE GAUGES WITH AND WITHOUT BOOTS

e monthly trade deficit for 2010. These dollars leave the US each month for good.

(Buisness Insider 2011).

M4-22231

REPLACEABLE INTAKE/HOSE HOLDER **FITTINGS FOR STORAGE** 

M4-5-410AB

Includes (4) 60" hoses unless otherwise noted	Standard 2-1/2" gauges	2-1/2" gauges with boots	Glow-in-the-dark 3-1/8" gauges
NO HOSE SET	M4-8	M4-8B	
CCL 60" STANDARD	M4-5	M4-5B	
CCL 36" STANDARD	M4-36	M4-36B	
NO HOSE SET	M4-21125	M4-21125B	M4-22125
NO HOSE SET CCLE 60" KOBRA® HOSE	M4-21125 M4-21131	M4-21125B M4-21131B	M4-22125 M4-22131

M4-5-410A

M4-22225

**EASYTURNING PLASTIC** 

HANDWHEELS

0



CCLE 60" KOBRA® HOSE

rable.

**BRASS FITTINGS** 

**REPAIR PARTS** 

INDEX

# 1/4" ALUMINUM 4-VALVE ZEPPELIN® 4 VALVE LIMITED EDITION MANIFOLD +18%

The annual increase in the trade deficit with China. An 18% increase every year since 2001. Total trade defict with China now over \$300 Billion (EPI Briefing 2010)

#### 40% FASTER THAN THE LEADING 4-VALVE MANIFOLD

INCLUDES SET OF 5 FOOT EVACX KOBRA HIGH PRESSURE HOSES WITH CHROME COLORED FITTINGS

AVAILABLE WITH AND WITHOUT HEAVY DUTY BLACK RUBBER GAUGE BOOTS

FULL 3/8<sup>m</sup> BORE EVACUATES

CONTOURED RUBBER SOFT GRIP HANDLES

ALL METAL GAUGES

FORGED ALUMINUM CONSTRUCTION

CCLE 60" KOBRA® HOSE

STEM SEATS RETRACT COMPLETELY FOR FULL UNRESTRICTED FLOW

with boots

25233B-BK

CHROME COLORED FITTINGS

without boots

25233-BK

3

**ACCESS VALVES** 

TOOLS & ACCESSORIES

DEEP VACUUM

**GEQUIPMENT** 

INDEX

### **3/8" ALUMINUM 4-VALVE ZEPPELIN®**

### VALVE ALUMINUM MANIFOLD MADE IN USA

**COLOR CODED REFRIGERANT DIALS FOR EASY READING** 

SIGHT GLASS STANDARD ON/ALL

**4-VALVE MODLES** 

SOFT GRIP RUBBER HAND

TO OPEN/CLOSE

**REPLACEABLE INTAKE/HOSE HOLDER** 

**FITTINGS FOR STORAGE (ON BACK)** 

FULL 3/8" BORE **EVACUATES 40% FASTER** PULL-OUT PROOF HANGING HOOK

25708

The number of US jobs created for every one auto worker job. 25 years ago there were 65 auto plants in the US. In the last 10 years we have lost 33% of those factories (ABC News 2011).

SURGE DAMPENED GAUGES FOR RE-**DUCED NEEDLE MOVEMENT** 

FULL 3/8" BORE EVACUATES 40% FASTER THAN THE COMPETING **4-VALVE MANIFOLD** 

AVAILABLE WITH 2-1/2". 3-1/8". **AND 4" SIZE GAUGES** 

#### METRIC INFORMATION

**OFFERED WITH 63.5 MM (2-1/2")** METRIC GAUGES READING BAR/ PSI, KPA/PSI, AND KG/CM<sup>2</sup>. FOR IN-FORMATION ON METRIC VERSIONS. PLEASE REFER TO PAGE 32.

ACCESS VALVES

INDEX

### AEVE ALUMINUM MANIFOLD

The American-made 4-valve aluminum Zeppelin® series of manifolds features durable molded "Soft Grip" rubber handles with fingertip grooves that ease opening and closing while the improved stem design means "Full Open" in only 21/2 turns. The aluminum Zeppelin® series, available in 2- and 4- valve, also incorporates cutting edge styling and technology to significantly reduce the weight of the manifold.

HEAVY=DUTY FORGED ALUMINUM

**BODY IS RUGGED AND DURABLY** 

In addition, JB also offers an increased selection of gauges in metal cases and refrigerant combinations. Standard 2-1/2", large 3-1/8" glow-in-the-dark, large 3-1/8" liquid-filled gauges, and a four refrigerant 4" gauge (available only on the 4-valve Zeppelin) can be coupled with different refrigerant combinations and JB's multiple hose options to serve any application. All manifolds include a 60" (152 cm) hose set unless noted otherwise.

### 3/8" ALUMINUM 4-VALVE ZEPPELIN®

	Includes (4) 60" hoses	Standard	3-1/8" Liquid	Glow-in-the-dark
	unless otherwise noted	2-1/2" gauges	filled gauges	3-1/8" gauges
R-12	NO HOSE SET	25000	25050	25025
R-22	CCLE KOBRA® HOSE SET	25008	25058	25033
	CCLBV KOBRA® HOSE W/ BALL VALVE		25065	25040
R-502	CCLS KOBRA® HOSE W/ UL R-410A		25069	25044
à l	SECURE SEAL			
R-77	NO HOSE SET	25100	25150	25125
B. 19.1	CCLE KOBRA® HOSE SET	25108	25158	25133
K-13493	CCLBV KOBRA® HOSE W/ BALL VALVE		25165	25140
R-404A	CCLS KOBRA® HOSE W/ UL R-410A		25169	25144
	SECURE SEAL	I	1	
13 00		1 05000		05005
K LL		25200	25250 25258	25225
R-404A	CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE	25208	25258	25233 25240
	CCLDV KOBRA® HOSE W/ BALL VALVE		25265	25240
N-49101A	CCLV KOBRA® HOSE W/ WHIP END CCLS KOBRA® HOSE W/ UL R-410A		23209	25244
	SECURE SEAL			25240
R-427A				
D_/199D	NO HOSE SET			25325
N-42AD				
R-407A				
10- 				
R 44	NO HOSE SET			25425
R-410A				
D-ARTAP		1	1	
N WWW			(Trees and the second	
			And the second s	GAUGES DO NOT ILLUMINATE.
-	NO HOSE SET	25500	25550	25525
R-410A	CCLE KOBRA® HOSE SET	25508	25558	25533
	CCLV KOBRA® HOSE W/ WHIP END	25523	25573	25548
	NFWI	THE TRANSPORT		

INC. W! EXCLUSIVE 4" REFRIGERANT GAUGE WITH 4 REFRIGERANTS. REPLACEMENT GAUGE INFORMATION FOUND ON PAGE 37.

-1244		4" gauges
	CCLE KOBRA® HOSE SET	25708
5-420422	CCLV KOBRA® HOSE W/ WHIP END	25713

GAUGE FEATURES AND REPLACEMENTS ARE DETAILED ON PAGE 33-35. GAUGE BOOTS ARE FEATURED ON PAGE 36. METRIC REPLACE-MENT GAUGE VERSIONS ARE DETAILED ON PAGE 36. KOBRA HOSES ARE DETAILED BEGINNING ON PAGE 38. REFER TO "MANIFOLD RE-PAIR PARTS" BEGINNING ON PAGE 79 FOR ALL JB MANIFOLD REPAIR PARTS. IF YOU DO NOT SEE A REFRIGERANT COMBINATION, PLEASE CONTACT US AT 800-323-0811

### **4-VALVE BALL-VALVE MANIFOLD**

VALVE BALL VALVE MANIFO M DE IN USA

### REVOLVER

JB introduces the latest addition to our manifold family, the Revolver<sup>™</sup>. Four internal metering ball valves adjust to do finite openings for liquid charging. Sturdy brass construction with hose holders that swivel to the front or back for greater flexibility. Handles are a quarter turn to full open and close with gradient marks to help in liquid charging. The full 3/8" bore lets you work quickly and efficiently. As always the REVOLVER<sup>™</sup> is made in the usa.

**BRASS FITTINGS** 

**REPAIR PARTS** 

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DEEP VACUUM

**CHARGING EQUIPMENT** 

METERING BALL VALVE ADJUST TO DO FINITE OPENINGS FOR LIQUID CHARGING
1/4 TURN FULL OPEN/ GLOSE HANDLE
FOUR INTERNAL BALL VALVES
3/8<sup>III</sup> PORT FOR FASTER EVACUATION
HOSE HOLDERS SWIVEL TO THE FRONT AND REAR FOR FUEXIBILITY

Includes (4) 60" hoses unless otherwise noted	Standard 2-1/2" gauges	Glow-in-the 3-1/8" gauges
NO HOSE SET CCLE KOBRA® HOSE SET	26000 26008	26025 26033
CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL		26040 26044
NO HOSE SET CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL	26100 26108 	26125 26133 26140 26144
NO HOSE SET CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE CCLV KOBRA® HOSE W/ WHIP END CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL	26200 26208 	26225 26233 26240 26244 26246
	Unless otherwise noted NO HOSE SET CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE W/ UL R-410A SECURE SEAL NO HOSE SET CCLE KOBRA® HOSE SET CCLBV KOBRA® HOSE W/ BALL VALVE CCLS KOBRA® HOSE SET CCLE KOBRA® HOSE SET CCLE KOBRA® HOSE SET CCLE KOBRA® HOSE SET CCLEV KOBRA® HOSE W/ BALL VALVE CCLV KOBRA® HOSE W/ WHIP END	unless otherwise noted2-1/2" gaugesNO HOSE SET26000CCLE KOBRA® HOSE SET26008CCLBV KOBRA® HOSE W/ BALL VALVECCLS KOBRA® HOSE W/ UL R-410A SECURE SEALNO HOSE SET26100CCLE KOBRA® HOSE SET26108CCLBV KOBRA® HOSE W/ BALL VALVECCLS KOBRA® HOSE W/ UL R-410A SECURE SEALNO HOSE SET26200CCLS KOBRA® HOSE SET26200CCLE KOBRA® HOSE SET26208CCLBV KOBRA® HOSE SET26208CCLBV KOBRA® HOSE W/ BALL VALVECCLBV KOBRA® HOSE W/ BALL VALVECCLV KOBRA® HOSE W/ WHIP END

### **M2-HEAT PUMP MANIFOLD**

### M2-HEAT PUMP MANIFOLD

Heat pumps use the same refrigeration cycle for heating and cooling. A heat pump can change which coil is the condenser and which is the evaporator by way of a reversing valve. Using a traditional manifold to service a heat pump is not advisable as the low side of the gauge will be damaged when the system goes into heating mode. Therefore, both gauges of the manifold must be designed to handle the high pressures of the heating mode. The JB heat pump manifold has two 3-1/8" glow-in-the-dark Class One 1% accuracy gauges designed with 800 psi to handle the heat pump pressures. Because of the significant temperature glide on R-407C, the pressure-temperature scale has two sections. For temperatures below 50 degrees, the scale is based on saturated vapor (dew point DP). For temperatures above 50 degrees, the scale is based on saturated liquid (bubble point BP). Use the DP for superheat calculations and the BP for subcooling calculations.

### MADE IN USA

### 200,000 The number of jobs

that would instantly be created if Americans bought 1% more of Made in the USA goods. (ABC NEWS 2011)

AVAILABLE WITH AND WITHOUT SET OF KOBRA HIGH PRESSURE **BLACK HOSES** 

TWO GLASS ONE 1% ACCURACY GLOWHIN-THE-DARK METAL GAUGES DESIGNED FOR 800 PSI HEAT PUMP PRESSURES

> **CLASSIC FORGED** BRASS BODY

REPLACEABLE INTAKE/AND HOSE HOLDER FITTINGS

**TOOLS & ACCESSORIES** BRASS FITTINGS



INDEX

Includes (3) 60" hoses unless otherwise noted

**NO HOSE SET CCLE KOBRA® HOSE SET**  **Class One Glow-in the-dark** 3-1/8" gauges

> M2-HP M2-5-HP

PAGE 29

**DEEP VACUUM** 

**CHARGING EQUIPMENT** 

### **METRIC M2 BRASS MANIFOLD**

M2 METRIC BRASS MANIFOLD

JB's classic forged brass manifold is offered with 63.5 mm (2-1/2") metric gauges in BAR/PSI, kPA/PSI, and kg/cm<sup>2</sup> as well as Standard CL and Kobra® CLE series hoses. Look to page 18 for all the features of JB's brass manifold.

Available with 80 mm (3-1/8") metric gauges in select quantities. For more information, please contact sales@jbind.com or 800.323.0811.

MADE IN USA

Includes (3) 60" hoses (unless noted)

1214	No hose set	28502	28202	28102
JUHN	CCLA standard hose with quick couplers	28505	28205	28105
12	No hose set	28572	28272	28172
	CCL standard hose set (36"/91 cm hose)	28570	28270	28170
22	CCL standard hose set (60"/152 cm hose)	28574	28274	28174
502	CCLS Kobra® hose with UL R-410A secure seal	28576	28276	28176
<b>WU</b> <u>Z</u>	(60"/152 cm hose)	I	I	1
		100- 1-	1144 1144	
MAR	No hose set	28582	28282	28182
13492	CCL standard hose set (36"/91 cm hose)	28580	28280	28180
ADAA	CCL standard hose set (60"/152 cm hose)	28584	28284	28184
AN-DAI	CCLE Kobra® hose (60"/152 cm hose)	28586	28286	28186
5017	CCLS Kobra® hose with UL R-410A secure seal	28588	28288	28188
WWD	(60"/152 cm hose)			

**BAR/PSI** 

kg/cm<sup>2</sup>

**kPA/PSI** 

-22	No hose set	28592	28292	28192
1010	CCLE Kobra® hose set	28596	28296	28196
-4,04,A	5/16", 1/4", 5/16" CCLE Kobra® hose set	28597	28297	28197
-4164	CCLBV Kobra® hose set with ball valve	28599	28299	28199

R-1

R-

R-

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### **METRIC ZEPPELIN® MANIFOLD**

0

### METRIC ALUMINUM ZEPPELING

JB's Zeppelin® manifold is offered with 63.5 mm (2-1/2") metric gauges in BAR/PSI, kPA/PSI, and kg/cm<sup>2</sup> as well as Standard CL and Kobra® CLE series hoses. Look to page 22 for all the features of JB's 2-valve aluminum manifold.

Available with 80 mm (3-1/8") metric gauges in select quantities. For more information, please contact sales@jbind. com or 800.323.0811.

MADE IN USA

	Includes (3) 60" hoses (unless noted)	BAR/PSI	kPA/PSI	kg/cm²
D_19/1	No hose set	28732	28832	28932
N 104M	CCLA standard hose with quick couplers	28735	28835	28935
R-22	No hose set	28752	28852	28952
R-AMAA	CCLE Kobra® hose set	28754	28854	28954
	CCLBV Kobra® hose set with ball valve	28759	28859	28959
R-490A				
		and the second		
R-12	No hose set	28772	28872	28972
-	CCL standard hose set (36"/91 cm hose)	28770	28870	28970
R-22	CCL standard hose set (60"/152 cm hose)	28774	28874	28974
ID_EAA	CCLS Kobra® hose with UL R-410A secure seal	28776	28876	28976
RJUZ	(60"/152 cm hose)	I	1	
			NAME OF TAXABLE	
10 40 A IL	No hose set	28782	28882	28982
K-134A	CCL standard hose set (36"/91 cm hose)	28780	28880	28980
P-ARAA	CCL standard hose set (60"/152 cm hose)	28784	28884	28984
ARPERP 00	CCLE Kobra® hose (60"/152 cm hose)	28786	28886	28986
R-5077	CCLS Kobra® hose with UL R-410Asecure seal	28788	28888	28988
	(60"/152 cm hose)		I	1

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### **METRIC 4-VALVE ZEPPELIN® MANIFOLD**

### 4-VALVE METRIC ALUMINUM ZEPPELING

Evacuate, charge, or test your system without disconnecting hoses with JB's 4-valve aluminum manifold. This manifold is offered with 63.5 mm (2-1/2") metric gauges and CL and Kobra® CLE series hoses. See page 26 for all the features of the 4-valve manifold. JB's four valve is a full 3/8" bore which renders it 40% faster than the leading competitor.

Available with 80 mm (3-1/8") metric gauges in select quantities. For more information, please contact sales@jbind.com or 800.323.0811.

		1			
1 1		17 -		US	
	141	보네			
			and the second se		

	Includes (4) 60" hoses (unless noted)	<b>BAR/PSI</b>	<b>kPA/PSI</b>	kg/cm²
	No hose set	27772	27872	27972
2	CCL standard hose set (36"/91 cm hose)	27770	27870	27970
12	CCL standard hose set (60"/152 cm hose)	27774	27874	27974
	CCLS Kobra® hose with UL R-410A secure seal	27776	27876	27976
-	(60"/152 cm hose)			
2	No hose set	27752	27852	27952
ALA	CCLE Kobra® hose set	27754	27854	27954
JAYA	CCLBV Kobra® hose set with ball valve	27759	27859	27959
MA				
WA		and the same of th	Contraction of the	the later
		Contraction of the local division of the loc		
AM	No hose set	27782	27882	27982
49	CCL standard hose set (36"/91 cm hose)	27780	27880	27980
AA	CCL standard hose set (60"/152 cm hose)	27784	27884	27984

27786

27788

27886

27888

27986

27988

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### 2-1/2" STANDARD GAUGES

### MADE IN USA

REFRIGERANTSCOMPOUND STEEL CASEPRESSURE STEEL CASER-12, R-22, R-502**M2-250M2-500R-22, R-134a, R-404AM2-430M2-435R-22, R-404A, R-410A**M2-460M2-465R-134a, R-404A, R-507M2-420M2-425R-134aM2-350M2-355R-134aM2-410M2-415			
R-22, R-134a, R-404AM2-430M2-435R-22, R-404A, R-410A**M2-460M2-465R-134a, R-404A, R-507M2-420M2-425R-134aM2-350M2-355	REFRIGERANTS		
R-22, R-404A, R-410A**M2-460M2-465R-134a, R-404A, R-507M2-420M2-425R-134aM2-350M2-355	R-12, R-22, R-502**	M2-250	M2-500
R-134a, R-404A, R-507M2-420M2-425R-134aM2-350M2-355	R-22, R-134a, R-404A	M2-430	M2-435
R-134a M2-350 M2-355	R-22, R-404A, R-410A**	M2-460	M2-465
	R-134a, R-404A, R-507	M2-420	M2-425
R-410A M2-410 M2-415	R-134a	M2-350	M2-355
	R-410A	M2-410	M2-415

\*\* AVAILABLE IN BRASS OR CHROME. ADD SUFFIX "B" FOR BRASS OR "C" FOR CHROME I.E. M2-460B.



#### R-134a, R-404A and R-507 Refrigerant Gauges

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi



#### **R-410A** Refrigerant Gauges

Compound Gauge: 30" vacuum to 250 psi, retard to 500 psi. Pressure Gauge: 0 to 800 psi



#### R-22, R-404A, R-410A Refrigerant Gauges

Compound Gauge: 30" vacuum to 250 psi, retard to 500 psi. Pressure Gauge: 0 to 800 psi Available with Brass or Chrome Cases Compound M2-460B or M2-460C and Pressure M2-465B or M2-465C

#### 2-1/2" (63.5 MM) METAL GAUGES

These high quality, all steel case standard gauges are identical to the gauges used on our manifold sets. They are surge dampened for accuracy. Gauges are sensitive instruments and therefore should not be subjected to pressures beyond scale.

- High impact clear view Lexan lens
- Recalibration screw
- Full size brass movements
- 1/8" MPT connections



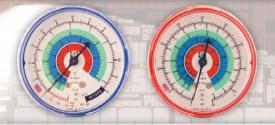
#### R-12, R-22 and R-502 Refrigerant Gauges

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi Available with Brass or Chrome Cases Compound M2-250B or M2-250C and Pressure M2-500B or M2-500C



#### **R-134a Refrigerant Gauges**

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi



#### R-22, R-134a, R-404A Refrigerant Gauges

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi

**BRASS FITTINGS** 

INDEX

### 3-1/8" GAUGES

### ILLUMINATED GAUGES

JB offers 3-1/8" (80 mm) illuminated gauges. The glow-in-the-dark dials store energy to emit light in dimly lit or dark applications. The R-410A only gauge are not glow-in-the-dark due to their pink dial. The illuminated large gauges are also available a with 1% accuracy rating. Please refer to the 1% accuracy area on the manifold charts for refrigerant combination availability.



### MADE IN USA

REFRIGERANTS	COMPOUND STEEL CASE ILLUMINATED	PRESSURE STEEL CASE ILLUMINATED
R-12, R-22, R-502	M2-800	M2-805
R-22, R-134a, R-404A	M2-851	M2-856
R-22, R-404A, R-410A	M2-820	M2-825
R-410A	M2-810	M2-815
R-22, R-410A, R-407C	M2-830	M2-831
R427A, R422B, R407A	M2-828	M2-829
R-22, R-404A, R-410A	1% M2-924	M2-925
R-22, R-134a, R-404A	1% M2-951	M2-956

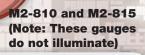
M2-851 and M2-856

#### R-22, R-134a, and R-404A Refrigerant Gauges

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi Also available in Class One 1% certified accuracy gauges. M2-951 Compound and M2-956 Pressure.



R-22, R-410A and R-407C Refrigerant Gauges Compound Gauge: 30" vacuum to 250 psi, retard to 500 psi. Pressure Gauge: 0 to 800 psi



#### **R-410A** Refrigerant Gauges

Compound Gauge: 30" vacuum to 250 psi, retard to 500 psi. Pressure Gauge: 0 to 800 psi



M2-820 and M2-825

#### R-22, R-404A, R-410A Refrigerant Gauges

Compound Gauge: 30" vacuum to 250 psi, retard to 500 psi. Pressure Gauge: 0 to 800 psi Also available in Class One 1% certified accuracy gauges. M2-924 Compound and M2-925 Pressure.





#### R-12, R-22 and R-502 Refrigerant Gauges

Compound Gauge: 30" vacuum to 120 psi, retard to 350 psi. Pressure Gauge: 0 to 500 psi

GAUGES

INDEX

### **3-1/8" LIQUID FILLED GAUGES**

### 3-1/8" (80 MMI) LIQUID-FILLED GAUGES

Made with European craftsmanship and quality standards, these Class 1 gauges are +/- 1% accuracy. These liquid filled gauges are offered with an exclusive four refrigerant combination dial for most applications.

- CLASS 1 GAUGES FOR 1% ACCURACY
- RECALIBRATION SCREW
- HEAVY-DUTY CASE WITHSTANDS DAILY USE
- NO LEAK SYSTEM PREVENTS GLYCERIN LOSS



REFRIGERANTS	COMPOUND LIQUID-FILLED	PRESSURE LIQUID-FILLED
R-22, R-134a, R-404A , R-410A	M2-860	M2-865

### 3-1/8" (80 MMI) LIQUID-FILLED GAUGES

These 3-1/8" (80 mm) American-made liquid-filled gauges are simply the toughest in the industry and are backed by an extended warranty. Features an internal "breathing diaphragm" that eliminates air bubbles which can distort the reading. Thus, calibration is unnecessary. The seal on the internal diaphragm prevents freezing and corrosion.

### MADE IN USA

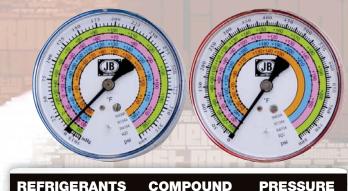
<ul> <li>HIGHLY ACCURATE T</li> </ul>
---------------------------------------

- 1/8" MPT FITTING
- TOUGH, IMPACT-RESISTANT ZYTEL CASING WITH **OVER 10,000 POUND TENSILE STRENGTH**
- TEMPERATURE COMPENSATED FOR CHANGES IN **CASE PRESSURE FOR ACCURACY**

#### REFRIGERANTS COMPOUND PRESSURE LIQUID-FILLED LIQUID-FILLED M2-870 R-12, R-22, R-502 M2-875 R-22, R-134a, R-404A M2-880 M2-885 R-22, R-404A, R-410A M2-890 M2-895

#### **NEW! CLASS ONE 4 INCH GAUGES** WITH 4 REFRIGERANTS

These 4" gauges feature 1% accuracy and illuminate in low and dimly lit areas. Features the four most common refrigerants in use today. Available on the ZEPPELIN four valve manifold (see page 31). Please note, gauges may not fit on all manufacturer's manifold bodies due to the width of these gauges.



R-22, R-134a, R-404A , R-410A	M2-400	M2-405
11-404A, 11-410A		

DEEP VACUUM

ACCESS VALVES

GAUGES

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INDEX

### **METRIC GAUGES**

### 63.5 MM (2-1/2") METRIC GAUGES

These high quality metric gauges are identical to the gauges used on our manifold sets. Featuring high impact Lexan lenses for better durability and visibility. Gauges are sensitive instruments and therefore should not be subjected to pressures beyond scale. Please refer to pages 32-34 for product information on metric manifolds.

- AVAILABLE IN BAR/PSI, KPA/PSI, AND KG/CM<sup>2</sup> MEASUREMENTS
- FULL SIZE BRASS MOVEMENTS
- FULL SIZE BRASS MOVEMENTS
- RECALIBRATION SCREW
- 1/8" MPT CONNECTION

### MADE IN USA



MR-592 and MR-591

Refrigerant Combination	Compound BAR/PSI	Pressure BAR/PSI	Compound kPA/PSI	Pressure kPA/PSI	Compound kg/cm2	Pressure kg/cm2
R-12, R-22, R-502	29280	29285	29260	29263	29384	29385
R-22, R-404, R-410A	29310	29315	29311	29316	29312	29317
R-134a, R-404A, R-410A	29290	29295	29291	29296	29292	29297
R-134a	29330	29335	29331	29336	29332	29337
R-22, R-134a, R-404A	29333	29338				

FOR SAFETY REASONS, GAUGES AND HOSES NOT SPECIFIED FOR R410 CAN DAMAGE PRODUCT AND CAUSE INJURY.

### PROTECTIVE GAUGE BOOTS

Protective gauge boots add even more durability to both 2-1/2" (63.5 mm) and 3-1/8" (80 mm) gauges on your manifold. They are not required on liquid-filled gauges.

#### PART NO. DESCRIPTION 2-1/2" Red boot **MR-591** 2-1/2" Blue boot **MR-592 MR-597** Set of red and blue 2-1/2" boots **MR-594** 3-1/8" Red four refrigerant liquid gauge boot MR-595 3-1/8" Blue four refrigerant liquid qauge boot **MR-593** 3-1/8" Black boot **MR-596** Set of two 3-1/8" black boots

MR-595 and MR-594

NEINS -----

**MR-593** 

CHARGING EQUIPMENT GAUGES

DEEP VACUUM

PAGE 36

**REPAIR PARTS** 

# **MANIFOLD ACCESSORIES**

# CONTROLS PLIMP

### 40200

The controls pump is used in conjunction with a gauge manifold to quickly and accurately test and set single or dual pressure controls to 350 psi and 25" of vacuum.





ļ	PART NO.	DESCRIPTION
	40200	Controls pump with 40201
	40201	Replacement Adapter with O-ring
	40202	Replacement Adapter O-ring
	40203	Replacement Pressure access valve with
		35 psi core
	40204	Replacement Piston O-ring
	40205	Replace Pressure valve core 35 psi
	40206	Replace Vacuum valve core 3 psi
	40207	Replacement Vacuum access valve with
1		3 psi core

### LIQUID CHARGING ADAPTERS

Metering element reduces liquid flow to a level below capacity of compressor. This assures a safe, fast charge without damaging the compressor. Accepts liquid refrigerant from the cylinder and discharges into low side of the system. Liquid charging is recommended when charging blends into refrigeration and air conditioning systems, and a liquid charger adapter is necessary for safe and fast liquid charging through the low side of a system. Eliminates the time and effort of heating cylinders.

LC-5

1	<b>US</b>	Å
	PART NO.	DESCRIPT
0	LC-4	1/4" Liquid Charg

1/4" Liquid Charging Adapter 5/16" Liquid Charging Adapter

ON

## MANIFOLD REBUILD KITS

Rebuild kits are now available for our manifold series. Standard rebuild kits include a stem, nut, piston with seat, and O-rings. Premium rebuild kits feature 2 standard kits plus 2 handwheels and screws. For a complete list of manifold repair parts, please refer to the manifold repair parts section beginning on page 79.



PART NO.	DESCRIPTION
M2R-S	Standard M2 rebuild
	(also fits M5 thru M9 series)
M2R-P	Premium M2 rebuild
	(fits M2 series only)
M4R-S	Standard M4 rebuild
M4R-P	Premium M4 rebuild
2VZR-S	Standard Zeppelin 2-valve rebuild
	(fits both Aluminum and brass)
2VZR-P	Premium Zeppelin 2-valve rebuild
	(fits both aluminum and brass)
4VZR-S	Standard Zeppelin 4-valve rebuild
4VZR-P	Premium Zeppelin 4-valve rebuild

FOR SAFETY REASONS, GAUGES AND HOSES NOT SPEC-IFIED FOR R-410A CAN DAMAGE PRODUCT AND CAUSE INJURY. FOR MANIFOLD REPLACEMENT PARTS, PLEASE REFER TO "MANIFOLD REPAIR PARTS" BEGINNING ON PAGE 79.

### REPLACEMENT LENS

PART NO.	DESCRIPTION
MR-517	2-1/2" (63.5 mm) screw-on lens (one) fits plastic and metal
MR-533	80 mm snap-on lens (one)

GAUGE MOUNTING BRACKET					
PART NO.	DESCRIPTION				
M2-106	1/8" FPT	NIT:			
M2-108	1/4" FPT	1.10			

REPAIR PARTS

INDEX

## **KOBRA® HIGH PRESSURE HOSE**

INDEX

PAGE 38

parts listed with each series.

### ANATOMY OF THE KOBRA™ CHARGING HOSE NITRILE COVER **KEVLAR BRAID** RUBBER **VENEER TUBE**

Provides a 5 to 1 safety factor - beats industry standard of 4-1

### full circumference of the hose, yielding a maximum hold and uniform seal that prevents leaks and busts. Kobra® hoses feature a nitrile cover which is better than neoprene because it is more resistant to oil, giving the hoses a longer life. With a pressure rating of 800 psi working and 4000 psi burst, these hoses can be used with ALL common refrigerants except ammonia. JB hoses are repairable, please see replacement MADE IN USA

### MAXIMUM FLOW. NO BLOWOUTS. BEST HOSE IN THE INDUSTRY

HGH PRESSURE

JB introduces two revolutionary patent pending design improvements to our American-made Kobra series of high pressure hoses. The first change is incorporated into our CCLE environmental KOBRA hose which features internal enhancements that significantly reduce blowouts, provide maximum flow, and are the best hoses available on the market. We have redesigned the gasket, the barb, the depressor, and the cup as a complete upgrade to the existing hose fitting.

The second change is incorporated into our CCLS secure seal KOBRA hose which features a new low loss fitting that is the industry's ONLY UL recognized fitting approved for R-410A. The secure seal fitting traps refrigerant inside the hose to help meet non-venting requirements. The low loss fitting is also completely repairable.

In addition, all of JB's Kobra® series of refrigerant hoses are made from Kevlar®—the same material that stops bullets in bullet-proof vests. The hoses are incredibly strong and flexible. A common crimp grips the

> KOBRA HOSES SOLD IN SETS COME IN A UV **PROTECTIVE BAG TO**

> > **RESIST FADING.**

# **KOBRA® HIGH PRESSURE HOSE**

**UL Approved for R-410A** 

Stainless steel thrust washer insures free

MADE IN

rotation even under high pressure

Three point contact on depressor

Rebuildable **Opens to full flow** 

**Improved flow** 

### SECURE SEAL UL APPROVED FOR R-410A

JB is proud to announce that our Secure Seal hose is now UL recognized for use with R-410A. The ONLY hose in the industry that is UL recognized for R-410A. Our CCLS series of KOBRA hoses open to full flow and have a low loss fitting that traps the refrigerant inside the hose to help meet non-venting requirements. The

internal thrust washer ensures free rotation. The secure seal fitting itself is rebuildable with parts kit. The low loss fitting is offered on our KOBRA high pressure hose with 800 PSI working pressure and 4000 PSI burst. As with all JB hoses, the CCLS KOBRA hose is manufactured, assembled, and tested in the USA.



**CHARGING EQUIPMENT** 

DEEP VACUUM

ACCESS VALVES

**TOOLS & ACCESSORIES** 

### KOBRAR PLS SERIES WITH UL RECOGNIZED LOW LOSS FITTING

USE REBUILD KIT 33112RK **PS0022 REPLACEMENT O-RING** 

LENGTH	BLUE	YELLOW	RED	<b>BYR SET</b>	4 PACK	
36" (91 cm)	CLS-36B	CLS-36Y	CLS-36R	CCLS-36	CCLS4-36	NEW FOUR PA
48" (122 cm)	CLS-48B	CLS-48Y	CLS-48R	CCLS-48	CCLS4-48	3/8" KOBRA
60" (152 cm)	CLS-60B	CLS-60Y	CLS-60R	CCLS-60	CCLS4-60	
72" (182 cm)	CLS-72B	CLS-72Y	CLS-72R	CCLS-72	CCLS4-72	
10' (3 m)	CLS-120B	CLS-120Y	<b>CLS-120R</b>			000 14
25' (7.6 m)	CLS-300B	CLS-300Y	<b>CLS-300R</b>			800 W
50' (15.2 m)	CLS-600B	CLS-600Y	CLS-600R			4000 E
75' (22.8 m)	CLS-900B	CLS-900Y	CLS-900R			-1000 L
100' (30.5 m)	CLS-1200B	CLS-1200Y	CLS-1200R			



### KOBRAR CLS SERIES LARGE NUT (NOT UL APPROVED) P90024 REPLACEMENT O-RING

**USE REBUILD KIT 33112RKB** 

LENGTH	BLUE	YELLOW	RED	BYR SET	
36" (91 cm)	CLSB-36B	CLSB-36Y	CLSB-36R	CCLSB-36	
48" (122 cm)	CLSB-48B	CLSB-48Y	CLSB-48R	CCLSB-48	
60" (152 cm)	CLSB-60B	CLSB-60Y	CLSB-60R	CCLSB-60	
72" (182 cm)	CLSB-72B	CLSB-72Y	CLSB-72R	CCLSB-72	

Not UL approved for R-410A **Tighter internally making repair** more difficult than our other version

Please note, when the depressor is down, this fitting is more restrictive in flow

# ACK INCLUDES **BLACK HOSE**

ORKING BURST

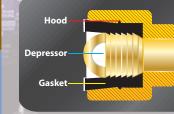
ND∋X

# **KOBRA® HIGH PRESSURE HOSE**

### KOBRA CLE SERIES WITH GASKET SEAL FITTING

Our KOBRA CLE series fearures a blowout resistant gasket. Our patent pending design of the fittings features a hood that locks the gasket into the fitting with a straight edge to straight edge force that eliminates the blowout of the gasket. The barbed depressor locks into the gasket exuding more outward force pushing the gasket further into place. The depressor is precisely machined and has a dimple that guides the valve core into place. The depressor is designed to provide maximum flow. Maximum Flow, No Blowouts, the JB Difference.

### **CLE KOBRA™ CUT AWAY**



Gasket features a hood with a straight edge that snaps into straight edge of barb. This straight edge to straight edge force eliminates blow outs.

Depressor is barbed, locking into gasket. Outward force of depressor pushes gasket further into place resulting in no blow outs

### P90514 REPLACEMENT DEPRESSOR P511 REP

OR	P511	REPL	ACEMENT	GASKET
	and the second se			

f	LENGTH	BLUE	YELLOW	RED	<b>BYR SET</b>	BLACK	4 PACK	NEW FOUR
	36" (91 cm)	CLE-36B	CLE-36Y	CLE-36R	CCLE-36	CLB-36	CCLE4-36	PACK
	48" (122 cm)	CLE-48B	CLE-48Y	CLE-48R	CCLE-48	CLB-48	CCLE4-48	TAGA
	60" (152 cm)	CLE-60B	CLE-60Y	CLE-60R	CCLE-60	CLB-60	CCLE4-60	INCLUDES
	72" (182 cm)	CLE-72B	CLE-72Y	CLE-72R	CCLE-72	CLB-72	CCLE4-72	2 /0"
	10' (3 m)	CLE-120B	CLE-120Y	CLE-120R				3/8"
	25' (7.6 m)	CLE-300B	CLE-300Y	CLE-300R				KOBRA
	50' (15.2 m)	CLE-600B	CLE-600Y	CLE-600R				
1	75' (22.8 m)	<b>CLE-900B</b>	<b>CLE-900Y</b>	CLE-900R				BLACK
	100' (30.5 m)	CLE-1200B	CLE-1200Y	CLE-1200R				HOSE

**KOBRA CLBV SERIES WIFH BALL VALVES** Our KOBRA CLBV sereis features 1/4 turn lever style ball valves at one end to trap refrigerant in hose. Helps meet non-venting requirements.

P90514 REPLACEMENT DEPRESSOR

DR P511 REPLACEMENT GASKET

	LENGTH	BLUE	YELLOW	RED	<b>BYR SET</b>
and the second se	36" (91 cm)	CLBV-36B	CLBV-36Y	CLBV-36R	CCLBV-36
l	48" (122 cm)	CLBV-48B	CLBV-48Y	CLBV-48R	CCLBV-48
1	60" (152 cm)	CLBV-60B	CLBV-60Y	CLBV-60R	CCLBV-60
1	72" (182 cm)	CLBV-72B	CLBV-72Y	CLBV-72R	CCLBV-72

800 WORKING 4000 BURST

**REPAIR PARTS** 

**INDEX** 

# HIGH PRESSURE KOBRA HOSE

### KOBRA CLV SERIES WITH BALL VALVE WHIP ENDS

Our KOBRA CLV sereis features 1/4 turn lever style ball valves on 6" whip ends to trap refrigerant in hose. Helps meet non-venting requirements. To replace the whip end without the ball valve, order CLP series. To include the ball valve, order the CLV-6 series. The CLV-6 also retrofit CLE series to create a non-venting set of hoses.

MADE US			-	ON A DESIGN THAT AND A				USA
P90514 REPLACE	VENT DEPRE	SSOR P511	REPLACEMEN	IT GASKET	WHIP EN	) ONLY	MPT FITT	ING
LENGTH	BLUE	YELLOW	RED	BYR SET				
36" (91 cm) 48" (122 cm)	CLV-36B CLV-48B	CLV-36Y CLV-48Y	CLV-36R CLV-48R	CCLV-36 CCLV-48	REPLACEMENT	FOR CLV HOSE		-
48 (122 cm) 60" (152 cm)	CLV-40B	CLV-481 CLV-60Y	CLV-40R CLV-60R	CCLV-40	LENGTH	BLUE	YELLOW	RED
72" (182 cm)	CLV-72B	CLV-72Y	CLV-72R	CCLV-72	6" (15 cm)	CLP-6B	CLP-6Y	CLP-6R
. ,								
WHIP END	· YEAO I	WITH BA	Itt VAH	Æ	-			
CONNECTS TO HOS	SE FITTING		-		-		and and a second	

LENGTH	BLUE	YELLOW	RED	BYR SET	BLACK
1/4" X 6" (15 cm) 3/8" X 6" (15 cm)	CLV-6B	CLV-6Y CLV6-6Y	CLV-6R	CCLV-6	CLV-6BL CLV6-6BL

### 3/8" KOBRA BLACK AND YELLOW CHARGING HOSE

Available in yellow and black, these hoses feature gasket seal fittings. Both colors of charging hose have a 600 psi working pressure and 3000 psi burst. Lined with Kevlar, these hoses are tough and dependable. Black hoses are available with and without UL approved Shut-off ball valve.

LENGTH	BLACK WITH BALL VALVE SHUT-OFF		YELLOW
36" (91 cm)	CLV6-36	CL6-36	CL6-36Y
48" (122 cm)	CLV6-48	CL6-48	CL6-48Y
60" (152 cm)	CLV6-60	CL6-60	CL6-60Y
72" (182 cm)	CLV6-72	CL6-72	CL6-72Y



# **CHARGING AND EVACUATION HOSE**

# 1/4", 3/8" AND 1/2" HEAVY-DUTY BLACK CHARGING HOSE

New heavy-duty charging hose reduces permeation and handle 900 psi working, 3500 psi burst. Available in black only. Straight fittings by straight fittings.

LENGTH	1/4"	3/8"	1/2"
36" (91 cm)	CL4HD-36	CL6HD-36	CL2HD-36
48" (122 cm)	CL4HD-48	CL6HD-48	CL2HD-48
60" (152 cm)	CL4HD-60	CL6HD-60	CL2HD-60
72" (182 cm)	CL4HD-72	CL6HD-72	CL2HD-72



3/8" AND 1/2" EVACUATION HOSE New heavy-duty evacuation hose features no vacuums. The fittings are different on each end and handle 900 psi working, 3500 psi burst. Available in black

only. Straight fittings by straight fittings.

DEEP VACUUM FLEXIBLE METAL

metal lines will not permeate under vacuum. Our metal lines feature finger-tight O-ring coupler

HOSES Unlike charging hose, our flexible

\*

ends.

### **EVACUATION HOSE**

LENGTH	1/4" x 1/2"	1/4" x 3/8"
60" (152 cm)	CL84-60	CL64-60

#### PART NO. DESCRIPTION

D10436	1/4" x 36" flexible metal line (one 45° fitting)
D10472	1/4" x 72" flexible metal line (one 45° fitting)
D10636	3/8" x 36" flexible metal line (one 45° fitting)
D10660	3/8" x 60" flexible metal line (one 45° fitting)
P90009	1/4" replacement O-ring (10 pack)
P90016	3/8" replacement gasket (10 pack)
P90008	1/2" replacement gasket (5 pack)

### 1/4" STANDARD CHARGING HOSE

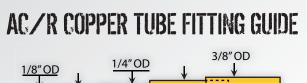
With a pressure rating of 750 psi working and 3000 psi burst, these hoses are ideal or use with all standard refrigerants (except high pressure refrigerants). Permeation can be detected and will vary with refrigerant type and time of exposure.

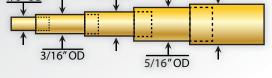
LENGTH	BLUE	YELLOW	RED	BYR SET
36" (91 cm)	CL-36B	CL-36Y	CL-36R	CCL-36
48" (122 cm)	CL-48B	CL-48Y	CL-48R	CCL-48
60" (152 cm)	CL-60B	CL-60Y	CL-60R	CCL-60
72" (182 cm)	CL-72B	<b>CL-72Y</b>	CL-72R	CCL-72

### 750 WORKING **3000 BURST**

XEIQNI

JB machines access valves at their Aurora, Illinois facility using brass of the highest content, 65% copper and 35% zinc. This gives our brass fittings and access valves high tensile strength while resisting corrosion. If you are not buying American made brass fittings, ask yourself what is the metal content used in the imported versions, do you trust it, and can you afford to have them fail? We also machine all of our valves according to the strict specifications of ARI to ensure proper sealing of valve and core surfaces. Quality and dependability from American made products.





# ODS AND ODF FIT DESCRIPTIONS

Descriptions for solder/braze access valves specify the connecting tube OD. Size and type fit illustrated below are the types of fit for A31723 valve.

### 1/4" ODF FIT

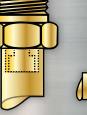
Connecting line slips around access fitting. Look under the ODF heading in the AC/R Copper Tube chart above.

There are two types. JB Access Valve description for ODF is always "swage fit." The connecting tube OD is the same OD as the fitting end. Therefore A31723 above will also slip into 5/16" OD tube.

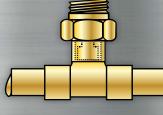
If connecting to wrot copper fitting, use ODF swage size.



Swage



5/16" Tube 1/4" OD Tube



Wrot Copper Fitting 1/4 x 1/4 x 1/4 Tee

PART NO.	DESCRIPTION
	TYPE OF FIT
A31723	3/16" ODS X 1/4" ODF

MADE IN USA

INTERNAL

TUBE FIT

ODS

--

1/8

3/16

1/4

5/16

CONNECTING TUBE SIZE

ODF

EXTERNAL

**TUBE FIT** 

3/16

1/4

5/16

3/8

---

### 3/16" OD FIT

OD

TUBE

1/8

3/16

1/4

5/16

3/8

SIZE

Connecting line slips into solder cup. Note extra depth solder cups on copper solder tees.

**Internal Solder Cup** 

3/16" OD Tube

#### Nomenclature:

FOR EASY REFERENCE, THE LAST TWO NUMERALS OF OUR FLARE FITTINGS CORRESPOND TO THEIR RESPECTIVE TUBE SIZES:

	the second	and the second se	
NUM	TUBE SZ.	NUM	TUBE SZ.
02	1/8"	08	1/2"
03	3/16"	10	5/8"
04	1/4"	12	3/4"
05	5/16"	14	7/8"
06	3/8"	18	1-1/8"
			and a second

The number of U.S. Safety reacalls of **Chinese products in** 2010 (NERA 2010).

ODF

FIT

--

3/16

1/4

5/16

3/8

SWAGE

PAGE 43

### SPECIFICATIONS

ARI Standard	720-2002
ARI Torque	3.0 - 5.0 inches/pound
Temp Range	-40 F° to 250 F° (-40 C° to 121 C°
Valve Bodies	Brass
Valve Core	Stainless steel and brass for use

Stainless steel and brass for use with all refrigerants such as R-12, R-22, R-134a, R-410A, and R-502. Resistant to oils, alkalites, and diluted mineral acids.

**GENEROUS COUNTER BORE ALLOWS** 

REMOVAL OF CORE IF FLARE BECOMES DAMAGED.

ALL TEES AND CROSSES ARE TAPPED TO RECEIVE AN ACCESS CORE IN ALL 1/4" SAE FLARE ENDS.

**ALL PIPE CONNECTIONS HAVE** 

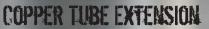
**TUBE APPLICATIONS.** 

**INTERNAL BRAZE CUPS FOR DIP** 

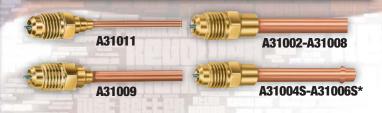
**ALL VALVES ARE EQUIPPED WITH** 

**TYPE LOOSELY ASSEMBLED).** 

**CAP AND ONE VALVE CORE (BRAZE** 



Use these fittings with Sil-phos alloy and copper fittings. Install through the side of the larger line to extend length approximately two inches. Includes cap (NFT5-4) and valve core. 1/4" ID.



PART NO.	TUBE EXT. SIZE	<b>BLISTER PKG.</b>
A31002	1/8" OD	5
A31003	3/16" OD X 1/8" ID	5
A31004	1/4" OD X 3/16" ID	5
A31005	5/16" OD X 1/4" ID	5
A31006	3/8" OD X 5/16" ID	5
A31008	1/2" OD	3
A31004S	1/4" OD	5
A31006S	3/8" OD	5

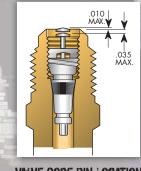
NOTE: OD X ID sizes are for copper tube extension. For connecting line size, see chart on left for ODS and ODF fit.

### COPPER SADDLE BRAZE/TAPPER



The new A32800 series of saddles offer the best protection from leaks. Once brazed on, you can check for leaks before piercing the tube. The steel pin is inserted and the cap is tightened down to pierce the tube. Body sizes are contoured to match specific tube sizes. The Braze/Tapper has a hardened steel-piercing needle and is furnished with a cap.

			-5		•
	A	32800			A32900
PART NO.	TUBE SIZE	BLISTER PKG.	PART NO.	TUBE SIZE	BLISTER
*A32804	1/4"	5	*A32904	1/4"	5
*A32805	5/16"	5	*A32905	5/16"	5
*A32806	3/8"	5	*A32906	3/8"	5
*A32808	1/2"	3	*A32908	1/2"	3
*A32810	5/8"	3	*A32910	5/8"	3
*A32812	3/4"	2	*A32912	3/4"	2
*A32814	7/8"	2	*A32914	0/∓ 7/8"	2
*A32818	1-1/8"	2	AVEVIT	1/0	~



VALVE CORE PIN LOCATION After valve installation, replace valve core with valve core tool. Torque to ARI specifications.



PART NO.	TUBE EXT SIZE	BLISTER PKG.
A31009	1/8" OD EXT; 3/16", 1/4" and 5/16" ODF body	3 steps
A31011	3/16" OD EXT; 1, and 3/8" ODF bo steps	

PAGE 44

\*Core pre-torqued to ARI specifications torque flare nut to 8 to 10 ft. lbs.

**TOOLS & ACCESSORIES** 

**REPAIR PARTS** 

### **COPPER BRAZE TEES**

- BEND, CUT, FLARE, SWAGE OR PINCH
- EXTRA DEPTH SLIP FIT BRAZE CUPS
- SIMPLE INSTALLATION **ANYWHERE ALONG LINE**

PART

A31134

A31135

A31136

A31138

A31140

A31142

A31144

A31148

A31154

A31155

A31156

NO.



OAL

2-1/8"

2-1/8"

2-1/8"

2-1/8"

2-1/2"

3-1/2"

3-13/16"

3"

**4**"

4"

4"

**SEE PAGE 43 FOR FORGED BRASS TEES** 

**SLIP FIT** 

CONNECT

LINE SIZE

1/2" ODS

5/8" ODS

3/4" ODS

7/8" ODS

1-1/8" ODS

1/4" ODS X 5/16" ODF

5/16" ODS X 3/8" ODF

3/8" ODS X 1/2" ODF

3/16" ODS X 1/4" ODF

1/4" ODS X 5/16" ODF

5/16" ODS X 3/8" ODF

**COPPER ACCESS UNION** 

INSTALL VALVE IN ANY POSITION

CONNECTING LINE SIZE FOR ODS

AND ODF EXTERNAL TUBE ENDS

USE SIL-PHOS ALLOY

**SEE PAGE 43 FOR FORGED** 

**BRASS TEES** 

## SWAGED COPPER BRAZE TEES

 SIMPLE INSTALLATION ANYWHERE **ALONG LINE** 

**SLIP FIT** 

CONNECT

LINE SIZE

1/4" OD

5/16" OD

3/8" OD

1/2" OD

5/8" OD

3/4" OD

7/8" OD

1-1/8" OD

EL PRIM

**TUBE EXTENSION SIZE** 



BLISTER

3

3

3

3

1

1

1

1

PKG.

OAL

2- 1/8"

2 -1/8"

2-1/8"

2-1/8"

2 -1/2"

3-1/2"

3 -13/16"

3"

- BRAZE CUP ENDS
- USE SIL-PHOS ALLOY
- **SEE PAGE 43 FOR FORGED BRASS TEES**

PART

A31334

A31335

A31336

A31338

A31340

A31342

A31344

A31348

MULTI-STEP

COPPER SI

NO.

DEEP VACUUM

**CHARGING EQUIPMENT** 

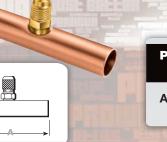
ISA

BLISTER

**TOOLS & ACCESSORIES** BRASS FITTINGS

PAGE 45

		Pr	G.	
1/8" e	ext. 1/8" an	d 3/16" tube 3	3	REPA
30°	ELBOW		SA	REPAIR PARTS
		CONNECTING LINE SIZE	PKG.	
-1	A31160	5/8" ODS	1	INDEX
	A31162	3/4" ODS	1	×
	A31164	7/8" ODS	1	
	A31168	1-1/8" ODS	1	



CONNECTING LINE SIZE	A ( OAL)	B (MIN)	BLISTER PKG.
1/4" OD	2-3/8"	5/16"	2
3/8" OD	2-3/4"	5/16"	2
1/2" OD	3"	3/8"	2
5/8" OD	3-1/4"	1/2"	2
7/8" OD	3-3/4"	3/4"	2
	1/4" OD 3/8" OD 1/2" OD 5/8" OD	LINE SIZE           1/4" OD         2-3/8"           3/8" OD         2-3/4"           1/2" OD         3"           5/8" OD         3-1/4"	1/4" OD       2-3/8"       5/16"         3/8" OD       2-3/4"       5/16"         1/2" OD       3"       3/8"         5/8" OD       3-1/4"       1/2"

**USA** 





LENGTH

"A"

1"

1"

1"

1"

1"

1-1/4"

1-1/2"

1-5/8"

1-15/16"

1-15/16"

1-15/16"

BLISTER

3

3

3

3

1

1

1

1

2

2

2

PKG.

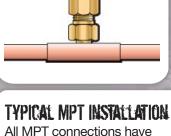
# SWHEL FLARE CONNECTION

Add multiple ports with just one fitting. These valves offer a safe, simple installation without the need for brazing. All of the flare ends are tapped to receive access core. JB provides a full range of various end configurations to provide greater flexibility. One core and cap are packaged with each valve.

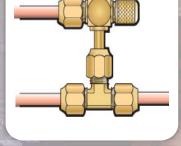
### TYPICAL SWIVEL FLARE INSTALLATION

Swivel flare with core depressor installed on existing access valve. Add a new line or control. No refrigerant loss on charged system.

without Valve depressor installed on flare fitting. ports provide Multiple additional line or controls and access site.



internal braze cup for dip tube installation.



Dip tube

1

Pipe tap 🔿

All MPT connections have

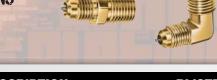


PART NO. DESCRIPTION **BLISTER PKG** A31522 1/8" MPT cross



PART NO.	DESCRIPTION	BLISTER PKG.
A31452	1/8" MPT branch	3
A31454	1/4" MPT branch	3
A31512	1/8" MPT run	3
A31514	1/4" MPT run	3

### MPT CONNECTIONS USA USA



PART NO.	DESCRIPTION	BLISTER PKG.
*A31482	1/8" MPT half union	5
*A31484	1/4" MPT half union	5
*A31492	1/8" MPT elbow	3
*A31494	1/4" MPT elbow	3
	*A31482 *A31484 *A31492	*A31484 1/4" MPT half union *A31492 1/8" MPT elbow

### SWIVEL TEE WITH DEPRESSOR

<b>USA</b>	A31851 A31864 (no depressor)	
PART NO.		LISTER KG.
A31851 A31852	1/4" Fe SAE swivel nut on run 1/4" Fe SAE swivel nut on branch	3 3

### SWIVEL TEE WITHOUT DEPRESSOR

USA USA

A31852 A31854 (no depressor)

PART NO.	DESCRIPTION	BLISTER PKG.
A31854	1/4" Fe SAE swivel nut on branch	n 3
A31864	1/4" Fe SAE swivel nut on run	3
SWIVEL 3/8"	SAE TEE	
PART NO.	DESCRIPTION	BLISTER

		PKG.
A31853	3/8" SAE X 3/8" Fe SAE swivel nut X 1/4" access	1
A31856	3/8" SAE X 1/4" access X 3/8" Fe SAE swivel nut	1

DEEP VACUUM

**CHARGING EQUIPMENT** 

INDEX

ŦFF

PAGE 46

**BRASS FITTINGS** 

FORGED BRASS BRAZE TEES

DESCRIPTION

1/4" ODS x 3/8" ODF

5/16" ODS x 3/8" ODF

3/8" ODS x 1/2" ODF

MADE IN

PART NO.

A31234

A31235

A31236

BLISTER

3

3

3

PKG.

INDEX

PAGE 47

LARED THE CONNECTION		All A	A31238 A31544	1/2" ODS x 5/8" ODF 1/4" ODS	3 3
Core pre-torqu	A A31	444	BRASS BOOM	IN 🤤 📃	
PART NO. *A31424	DESCRIPTION 1/4" Fe SAE union w/ flare n	BLISTER PKG. ut 3	PART NO.	DESCRIPTION	BLISTE PKG.
A31424 A31444	1/4" Fe SAE tee w/ nuts	3	A31722	1/8" ODS x 1/4" ODF	3
-	ALLES -		A31723	3/16" ODS x 1/4" ODF	3
8 18 19 <i>(</i> 6,4% a fa			A31724	1/4" ODS x 3/8" ODF	3
ARE CONN			A31725	5/16" ODS x 1/2" ODF	3
<b>VD FLARE</b>	FITTING A31734	Aline Column of	A31726	3/8" ODS x 1/2" ODF	3
DAPTER			A31728	1/2" ODS x 5/8" ODF	3
Core pre-torqu PART NO.		flare fitting adapter BLISTER	MULTI STEP		
PART NO. A31614	DESCRIPTION 1/4" Fe SAE w/ copper gaske	BLISTER PKG.			BLISTE
PART NO. A31614	DESCRIPTION	BLISTER PKG.			BLISTE PKG.
PART NO. A31614	DESCRIPTION 1/4" Fe SAE w/ copper gaske	BLISTER PKG.			PKG.
PART NO. A31614 A31734	DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de	BLISTER PKG.	PART NO.	DESCRIPTION	PKG. F steps 5
PART NO. *A31614 *A31734	DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de	BLISTER PKG.	PART NO. A31720	DESCRIPTION 3/16" ODS x 1/4" or 3/8" ODF	F steps 5 steps 3
PART NO. *A31614 *A31734	DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de	BLISTER PKG.	<b>PART NO.</b> A31720 A31729 A31736	Description           3/16" ODS x 1/4" or 3/8" ODF s           3/16", 1/4", 5/16", 1/2" ODF s           1/8" ODS x 3/16", 1/4" or 5/14	PKG. F steps 5 steps 3
PART NO. *A31614 *A31734	ed to ARI DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de NOUINTING	BLISTER PKG.	<b>PART NO.</b> A31720 A31729 A31736	ODESCRIPTION           3/16" ODS x 1/4" or 3/8" ODF 3/16", 1/4", 5/16", 1/2" ODF s 1/8" ODS x 3/16", 1/4" or 5/14           1/8" ODS x 3/16", 1/4" or 5/14	PKG. F steps 5 steps 3
PART NO. A31614 A31734	ed to ARI DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de NOUINTING	BLISTER PKG.	PART NO. A31720 A31729 A31736 ACCESS WAT DEPRESSOR Quickly add	DESCRIPTION 3/16" ODS x 1/4" or 3/8" ODF 3/16", 1/4", 5/16", 1/2" ODF s 1/8" ODS x 3/16", 1/4" or 5/10 WE COUPLER WITH WE COUPLER WITH DESCRIPTION CONTROLS OF DEALCH LINE TO SERVE	PKG. F steps 5 steps 3 6" ODF 3
	DESCRIPTION 1/4" Fe SAE w/ copper gaske 1/4" Fe SAE swivel nut w/ de MOUNTING MOUNTING Composition of the second sec	BLISTER pkg. at 5 pressor 3	PART NO. A31720 A31729 A31736 ACCESS WAT DEPRESSOR Quickly add	OBJECT           DESCRIPTION           3/16" ODS x 1/4" or 3/8" ODF           3/16", 1/4", 5/16", 1/2" ODF s           1/8" ODS x 3/16", 1/4" or 5/10	PKG. F steps 5 steps 3 6" ODF 3

### SWIVEL CROSS WITH DEPRESSOR USA



**BLISTER PKG.** DESCRIPTION PART NO. A31520 1/4" Fe SAE swivel nut x access 1 FLARE COMME

F

A A E \*C

PART NO.	DESCRIPTION	BLISTER PKG.
*A31424	1/4" Fe SAE union w/ flare n	ut 3
A31444	1/4" Fe SAE tee w/ nuts	3
1		

LARE CONNECTION		
ND FLARE FITTING Dapter	A31734	
Core pre-torqued to ARI		flare fitting adapte

PART NO.	DESCRIPTION BL PK	ISTER G.
*A31614	1/4" Fe SAE w/ copper gasket	5
*A31734	1/4" Fe SAE swivel nut w/ depressor	3

### SAE 45° BRASS FLARED TUBE FITTINGS



PART NO.	DESCRIPTION	BLISTER PKG.
NS4-4-5	1/4"	5
A32601	5/16" (NS4-5)	5
NS4-6-5	3/8"	5
NS4-8-5	1/2"	5
NS4-10-5	5/8"	5
A32605	3/4" (NS4-12)	2

### SWIVEL FE FLARE X SOLDER ADAPTER

**DOUBLE DEEP SOLDER CUTS** 

USA

A32700-04

PART NO.	DESCRIPTION	BLISTER PKG.
A32700	1/4" x 1/4" (US5-44)	4
A32701	3/8" x 3/8" (US5-66)	4
A32702	1/2" x 1/2" (US5-88)	4
A32703	5/8" x 5/8" (US5-1010)	2
A32704	3/4" x 3/4"(US5-1212)	2
	And and a second second second second second second	A REAL PROPERTY AND ADDRESS OF TAXABLE PROPERTY.

### ACCESS VALVE SERVICE KIT

NEW for 2011, JB has taken the most popular access fittings used on service calls and created an access valve service kit with convenient storage case. Each kit is compartmentalized to house the following: A31002, A31003, A31004, A31005, A31006, NFT5-4, A31851, A31852, A32004 valve core tool with cores, plastic core removers, and A33500 thumbscrew core depressor. The interior of the label includes part numbers to make individual reordering and stocking convenient.

### BULL FITTING JARS

NEW for 2011, JB has taken a few of the best selling access valves and packaged them in a convenient display jar. Featuring individual labels with unique bar codes, the item can be scanned at the top of the jar rather than looking it up in the computer. Saves counter personnel time to directly sell single units without having to look up part numbers in the system. Order the jar once, then just restock as needed.

PART NO.	DESCRIPTION
A31004-CJ	1/4" OD X 3/16" ID Copper Tube Extension with bulk jar (250 pcs.)
NFT5-4-CJ	1/4" SAE cap with bulk jar (500 pcs.)

### EVACUATION AND CORE REMOVER TOOLS

Specifically designed to valve off the system to remove valve core, these tools feature a quarter turn ball valve shut-off and O-ring seals. The valve core can be completely removed and replaced without losing system charge. Speed-up evacuation, recovery, or recharging time through the full flow port. Both tools have a storage area to house spare valve cores.



A32500N	1/4" Valve core remover
A32505N	5/16" Valve core remover
A32525N	1/4" Valve core remover w/ access port
A32501N	Core remover bit for A32500N replacement
A32504	Core remover bit for A32525N replacement

300%

The percentage increase in America's trade

deficit with China from 2000-2009 (US Census 2010)

PART NO. DESCRIPTION

AVK-001

**PAGE 48** 

Access Valve Service Kit in Storage Case

DEEP VACUUN

**CHARGING EQUIPMENT** 

**REPAIR PARTS** 

# **VALVE CORE TOOLS**

### EVACUATION CORE REMOVER AND SUPERHEAT THERMOMETER TOOL SET

This combo set calculates superheat from -58°F to +302°F (-50°C to 150°C) with the temperature/pressure tool. All items have O-ring seals and the core remover tool has a quarter turn ball valve shut-off.

PART NO.	DESCRIPTION
A32550N	Evacuation core remover and superheat tool set
A32504	Core remover bit replacement part

### EVACUATION / RECOVERY TOOL

Our evacuation/recovery tool is a plier-type tool with a quick release trigger which punctures large holes into the line for discharge of a recovery unit. Fits 3/16" to 7/8" OD hard tubing.

PART NO.	DESCRIPTION	
A32100	Evacuation/Recovery tool	
A32101	Hardened steel needle and gasket	

### VALVE CORE TORQUE TOOL

The rotary torque mechanism prevents over-torquing of valve core.

PART NO.	DESCRIPTION
32002	1/4" Valve core torque tool
32003	Core remover bit replacement part

### 1/4" VALVE CORE TOOL

Complete with a hollow handle for storage of the 6 extra valve cores.

#### 

PART NO.	DESCRIPTION
A32004	1/4" Valve core tool

### VALVE CORE TORQUE TOOL

JB is proud to announce a revolutionary new tool that will become the must have item for every technician. Our new valve core torque tool automatically sets proper torque to 5" pounds. Calibrated to precise torquing requirements for core valves, the tool will no longer tighten once proper torque is achieved. Eliminates guess work which results in under and over torquing. Works with all Schrader valve cores.

# PART NO.DESCRIPTIONA32008Valve Core Torque ToolA32008-BValve Core Torque Tool Bulk (12 pack)A32008-BXValve Core Torque Tool in Diplay Box (12 pack)

### CORE REMOVERS

JUST BETTER

A31997 is a 1/4" SAE gasket seal cap with core remover feature. A31998 is a 1/4" plastic core remover.

PART NO.	DESCRIPTION
A31997	1/4" SAE gasket seal caps with core removers (10 pack)
A31998	1/4" plastic core removers (5 pack)

### 1/4" VALVE CORES

PTFE/ neoprene seal replacement valve core. Max 800 psi and 220°F (104°C).



PART NO.	DESCRIPTION
A31999	1/4" Valve Core (5 pack)
A31999-25	1/4" Valve Core (25 pack)
A31999-100	1/4" Valve Core (100 pack)

ACCESS VALVES

A31997

A31998

DEEP VACUUM

**CHARGING EQUIPMENT** 

# CAPS

### **O-RING QUICK SEAL CAPS**

Deep Vacuum and A/C Refrigeration. Finger tight sealing for all male SAE connections.



### **O-RING SEAL LINE PIERCING**

Our spring loaded needle automatically back-seats, forming a leak proof seal. A simple installation that is 100% restriction free. Both models fit 1/4", 5/16", 3/8", 1/2", and 5/8" OD tubing.



	PART NO.	DESCRIPTION	
	LT-456	1/4" – 3/8" Line piercing valve	
1	LT-810	1/2" – 5/8" Line piercing valve	

### E-Z TAPPER

The back-seating stem eliminates line restriction when servicing through access port or use the valve

PART NO	DESCRIPTION
or flow contro	ol.

EZ-40288	E-Z topper piercing valve
EZ-40288-126	E-Z tapper gasket (5 pack)

### BACK SEATING CONTROL VALVE

Ideal for use on pre-charged line sets. Eliminates spraying of leak detection dye and refrigerant. Compact brass body for long service. Swivel coupler with double safety grooves.



#### PART NO. DESCRIPTION

A33000 P90009

1/4" SAE x 1/4" O-ring quick coupler Replacement O-ring (10 pack)

The percentage of total US. Safety recalls for products Made in China (NERA 2010)

PART NO. DESCRIPTION 1/4" SAE cap (10 pack) NFT5-4

	In the oup (to puol)
NFT5-6	3/8" SAE cap (3 pack)
NFT5-4-100	1/4" SAE cap (100 pack)
NFT5-6-100	3/8" SAE cap (100 pack)
P90010	Replacement 1/4" O-ring (5 pack)
P90011	Replacement 3/8" O-ring (5 pack)

### **OUICK SEAL GASKET CAPS**

For A/C Refrigeration service. Finger tight sealing for all male SAE connections.



A case of	PART NO.	DESCRIPTION
I	A31985	1/4" SAE cap (10 pack)
l	A31985-100	1/4" SAE cap (100 pack)
l	P509	Replacement gasket (10 pack)
l	P509-25	Replacement gasket (25 pack)

### WRENCH STYLE SEAL CAP



For A/C Refrigeration service. Brass to brass positive seal and permanent installation.

PART NO.	DESCRIPTION
A31986	1/4" SAE cap (5

pack)

SPECIALTY CAPS AND 1/2 16 ACME CAPS.

#### PART NO. DESCRIPTION

A31992	1/4" SAE cap (5 pack)
A31992-100	1/4" SAE cap (100 pack)
13493	Plastic cap with retainer strap (2 pack)
13494	Plastic cap (1 pack)

DEEP VACUUM

**CHARGING EQUIPMENT** 

XEDNI

PAGE 50

**BRASS FITTINGS** 

# **NOVENT® REFRIGERANT LOCKING CAPS**

# NOVENT REFRIGERANT LOCKING CAPS

JB Industries is proud to announce a distribution partnership with NOVENT to provide refrigerant locking caps to the HVAC/R market. NOVENT was created by industry professionals after evidence of refrigerant theft, many times resulting in brain damage or death, after inhaling or "huffing" refrigerant. NOVENT created the original tamper resistant refrigerant locking caps for the service valve on all air conditioning and mini split systems. NOVENT caps are patented and precisely machined from high grade brass and encompassed within a protective refrigerant color-coded aluminum casing. These caps are corrosion resistant and have an O-ring seal to provide a positive back-up for leaking service valves. The caps are secured on to a unit with a special key sold only to certified HVAC technicians and provide a tamper resistant barrier to reduce theft, vandalism, and the accidental mixing of refrigerant. NOVENT supports all EPA Management Programs. The use of refrigerant locking caps has been added to the 2009 IMC (international Mechanical Code) and 2009 IRC (International Residential Code) for installation on all exposed refrigeration units to help prevent unauthorized access. IAPMO also adopted the code in 2011. The products are a must for companies and technicians to comply with local codes as well as liability concerns connected with refrigerants.

NC-RS

ADDED TO THE 2009 IMC AND IRC SECTIONS OF BUILDING CODE

DETERS REFRIGERANT THEFT TO HELP REDUCE "HUFFING"

LOCKS AND UNLOCKS USING Special Key Sold Only To Certified HVAC Technicians

COLOR-CODED PERMANENTLY STAMPED ALUMINUM CASING FOR EASY IDENTIFICA-TION HELPS PREVENT ACCIDENTAL MIXING OF REFRIGERANT

PATENT NUMBER 6,612,455

NC-KEY

RT NO.	DESCRIPTION	PART NO.	DESCRIPTION
81004	Universal Cap on 1/4" extension (5 pack)	NCP-CJ	Novent Locking Cap R-410A in di
-4	Novent Locking Cap Universal (4 pack)		(150 bulk and jar)
P-4	Novent Locking Cap R-410A (4 pack)	NCG-CJ	Novent Locking Cap R-22 in disp bulk and jar)
à-4	Novent Locking Cap R-22 (4 pack)	NCM-CJ	Novent Locking Cap Assorted in
CE-4	5/16" Novent Locking Cap for R-410A mini		(50 Universal, 50 R-410A, 50 R-22
	split systems (4 pack)	NCU-50	Novent Locking Cap Universal (5
CU-12	Novent Locking Cap Universal (12 pack)	NCP-50	Novent Locking Cap R-410A (50
CP-12	Novent Locking Cap R-410A (12 pack)	NCG-50	Novent Locking Cap R-22 (50 bul
CG-12	Novent Locking Cap R-22 (12 pack)		<b>U I I</b>
CM-12	Novent Locking Cap Assorted (12 pack)	NC-KEY	Pocket Key for all Novent Locking
		NC-RS	Screwdriver style key for R-410A
CU-CJ	Novent Locking Cap Universal in display jar	NC-GS	Screwdriver style key for R-22 an
	(150 bulk and jar)	1	Caps

OEM BULK QUANTITES AS WELL AS 100 BULK PACKS ARE AVAILABLE UPON REQUEST. PLEASE CALL CUSTOMER SERVICE AT 800-323-0811

DEEP VACUUM

NC-GS

NCP FOR

**R-410A** 

NCU FOR

UNIVERSAL

NCG

**FOR R-22** 

INDEX

### **COUPLERS**

### **QUICK COUPLERS QC-S5**

5/16" female x 1/4" male adapter is designed to give the end user the ability to connect their standard refrigeration hoses to 5/16" (1/2" UNF) fittings being used on most R-410A minisplits. Swiveled so the adapter can remain on hoses for easy on/off application and installation.

3/8" couplers with patented O-ring seal for deep vacuum. No depressor.

3/16" couplers with valve depressor, safety core channels and O-ring seal



For410A5/16" connections.

1/4" and 5/16" couplers with valve core depressor, safety channels and rubber gasket seal

### STRAIGHT

use QC-S5

PART NO.	DESCRIPTION	
QC-S3	3/16" QC x 1/4" SAE	
QC-S4	1/4" QC x 1/4" SAE	Shine Contractor
QC-S46	1/4" QC x 3/8" SAE	0
QC-S5	5/16" QC x 1/4" SAE	QC-S3
QC-S5S	5/16" QC x 1/4" SAE (no de	pressor)
QC-S64	3/8" QC x 1/4" SAE (no dep	oressor)
QC-S65	3/8" QC x 5/16" SAE (no de	epressor)

FTP THREAD USA

MADE IN

USA USA

### DESCRIPTION 1/4" QC X 1/8" FTP 1/4" QC X 1/4" FTP



OC-E3

ELBOW

PART NO.

QC-S4A

QC-S4B

	and the second se
PART NO.	DESCRIPTION
QC-E3	3/16" QC X 1/4" SAE elbow
QC-E4	1/4" QC X 1/4" SAE elbow
QC-E5	5/16" QC X 1/4" SAE elbow
QC-E64	3/8" QC X 1/4" SAE elbow (no depressor)

#### **OUICK COUPLER SHUT-OFF FITTINGS**

Use with existing charging hose. Immediately traps refrigerant discharge from hose when disconnected from access fitting.

**F**I



PART NO.	DESCRIPTION
33112N	1/4" QC x 1/4" SAE
33113N	1/4" QC x 1/4" SAE 90°
3311RK	Replacement kit to rebuild
3311RKB	Replacement kit to rebuild

#### **OUICK COUPLER ACCESS TEE**

O-ring seal quick coupler. Furnished with cap and valve core.



PART NO.	DESCRIPTION
A34000	1/4" QC x 1/4" access branch tee
P90009	Replacement O-ring (10 pack)

### SWIVEL CYLINDER VALVE

Finger tight seal. Includes gasket.



PART NO.	DESCRIPTION
CV-20004	3/4" NPS x 1/4" M flare
CV-20006	3/4" NPS x 3/8" M flare

CORE DEPRESSOR



	SA
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PART NO.	DESCRIPTION
A33500	1/4" thumbscrew core depressor

**REPLACEMENT PARTS FOR QUICK COUPLERS** 

PART NO.	DESCRIPTION
P90009	1/4" O-ring (10 pack)
P509	1/4" gasket (6 pack)
P90513	Depressor for 1/4" QC (5 pack)
P90012	3/8" O-ring (10 pack)

**REPAIR PARTS** 

ACCESS VALVES

**TOOLS & ACCESSORIES** 

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# AUTOMOTIVE

# DEEP VACUUM CHAR

CHARGING EQUIPMENT

PAGE 53

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### 134A AUTOMOTIVE COUPLERS

Quick connect/ disconnect valve actuation without refrigerant venting. Safety sleeve holds coupler securely to service port. Color coded knobs.



PART NO.	DESCRIPTION
AC-13430	High side 90 degree snap coupler x 14 mm
AC-13435	Low side 90 degree snap coupler x 14 mm
AC-15530	High side 90 degree snap coupler x 1/4" SAE
AC-15535	Low side 90 degree snap coupler x 1/4" SAE

### 134A AUTOMOTIVE QUICK ADAPTER

Retrofit existing SAE flare fitting for 134a

### QC-134

QC-13445-134a

### USA

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PART NO.	DESCRIPTION	QC
		GASKET
QC-S4A-134a	1/4" QC x 1/2" male ACME thread	P509
QC-13445-134a	1/2" ACME QC x 1/4" male flare	P510

### 1/2 ACME THREAD HALF UNION

PART NO.	DESCRIPTION
AF-13450	1/8" NPTF
AF-13451	1/4" NPTF
AF-13452	3/8" NPTF
AF-13455	1/4" Fe SAE
AF-13457	3/8" Fe SAE



### SIDE CAN TAP SCT-1030

The design of our side can tap allows you to easily adjust from R-12 to R134a refrigerant cylinders for quick and easy charging. Slide handles with proper collar around can and close to pierce. Do not use with other refrigerants. Features a 1/4" x 1/2" ACME thread fitting.



### AF-13550 1/2" ACME

### OIL TAP TUBE

A33600

End the mess in oil changes and save time on service calls with JB's oil tap access tube. This access tube reduces motor burnout by simplifying acid tests and can be left in place for future tests and changes.

DESCRIPTION
Oil Tap Tube
Replacement Gasket

2025 a will overtake

The year China will overtake the US as the largest economy in the world. By 2050, India will overtake the US for second place. (Daily Finance 2011)

## **REFRIGERANT BALL VALVES**

### FULL FLOW BALL-REFRIGERATION

JB's ball-refrigeration valves have a large port design that provides a minimum pressure drop with straight through flow. Copper end fittings reduce installation time without disturbing valve. We have two types of ball valves to suit your needs. Our traditional ball valves have brass actuators and a working pressure rating of 500 psi. Our new addition ball valve features stainless steel actuators and a working pressure rating of 700 psi. We differentiate the two types here by "Brass" and "Steel". Both are UL listed.

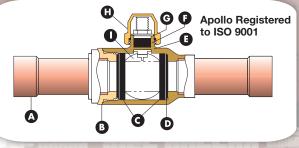
BRASS NO PORT	STEEL NO PORT	BRASS WITH PORT	STEEL WITH PORT	DESCRIPTION
	V34350		V34525	1/4" ODS extensions
V34200	V34300	V34400	V34500	3/8" ODS extensions
V34201	V34301	V34401	V34501	1/2" ODS extensions
V34202	V34302	V34402	V34502	5/8" ODS extensions
V34203	V34303			3/4" ODS extensions
V34204	V34304	V34404	V34504	7/8" ODS extensions
V34206	V34306	V34406	V34506	1-1/8" ODS extensions
V34207	V34307	V34407	V34507	1-3/8" ODS extensions
V34208	V34308	V34408	V34508	1-5/8" ODS extensions
V34209	V34309	V34409	V34509	2-1/8" ODS extensions
V34210	V34310		V34510	2-5/8" ODS extensions
V34211	V34311		V34511	3-1/8" ODS extensions

STAINLESS STEEL Actuators Pressure to 700 PSI UL LISTED 32DC

BRASS ACTUATORS PRESSURE TO 500 PSI UL LISTED 57R7

# BRASS" BALL VALVE FEATURES

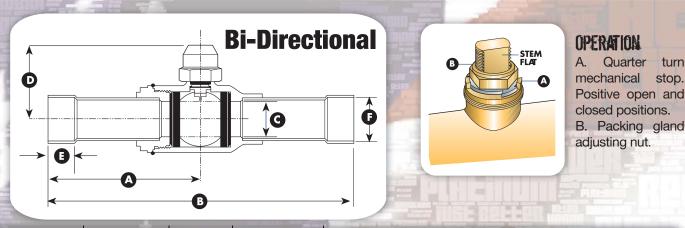
- A. COPPER TUBE EXTENSIONS
- B. HERMETIC WELDED AND BRAZED JOINTS
- C. REINFORCED TEFLON\* SEATS
- D. ONE PIECE FORGED BRASS BODY
- E. BEARING WASHER
- F. CHANGEABLE REINFORCED PTFE STEM PACKING
- G. PACKING GLAND
- H. STEM CAP ASSEMBLY WITH NEOPRENE SEAL
- I. CHROMIUM PLATED BALL WITH VENTED VALVE



- 500 PSI WORKING PRESSURE
- UP TO +500° F WORKING TEMPERATURE AT 0 PSI
- UP TO +300° F WORKING TEMPERATURE AT 500 PSI
- NO BOLTED OR SCREWED BONNETS OR FLANGES TO LEAK

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# **REFRIGERANT BALL VALVES**



Part No.	0.D.	Cv(1)	Equivalent	Reference dimensional data					
	Tube Siz	2e	Length (2)	A	B	C	D	E	F
V34200 V34400	3/8"	2.9"	10.8"	3.18"	6.09"	.3"	1.55"	3/8"	3/8"
V34201 V34401	1/2"	5.6"	13.3"	3.18"	6.09"	.45"	1.55"	3/8"	1/2"
V34202 V34402	5/8"	13.1"	10.4"	3.43"	6.59"	.5"	1.55"	1/2"	5/8"
V34203	3/4"			3.45"	7.27"	.69"	1.89"	3/4"	3/4"
V34204 V34404	7/8"	31.9"	11.2"	3.69"	7.07"	.75"	1.83"	3/4"	7/8"
V34206 V34406	1-1/8"	68"	10.7"	4.20"	8.00"	1.00"	2.01"	2-9/32"	1-1/8"
V34207 V34407	1-3/8"	109"	11.6"	4.54"	8.63"	1.25"	2.61"	3-1/32"	1-3/8"
V34208 V34408	1-5/8"	152"	13.2"	4.47"	8.85"	1.5"	<b>2.79</b> "	1-3/32"	1-5/8"
V34209 V34409	<b>2-1/8</b> "	275"	15.1"	4.84"	9.59"	2.00"	3.17"	1-11/32"	<b>2-1/8</b> "
V34210	<b>2-5/8</b> "	349"	21.1"	5.00"	10.00"	2.43"	3.90"	1-31/64"	<b>2-5/8</b> "
V34211	3-1/8"	391"	30.1"	7.00"	14.00"	2.50"	3.90"	1-43/64"	3-1/8"

2

1 This is the most commonly used flow coefficient used by piping engineers in the design of piping systems. It is defined as "the number of US gallons of water per minute at 70° F (21° C) that will flow through a valve at a pressure drop (P1-P2) of 1 psi."

### REFRIGERATION SHUT-OFF BALL VALVES

Ideal for building your own vacuum or charging system, our straight through flow design has no restriction. A quarter turn and the valve is fully open or closed.

PART NO.	DESCRIPTION
V34900	1/8" FPT x 1/8" FPT
V34910	3/8" FPT x 3/8" FPT
STREET, STREET	

PART NO.	DESCRIPTION
V34901	1/4" SAE x 1/8" MPT
V34905	1/4" SAE x 1/4" MPT

Most engineers, contractors, and others engaged in the layout and installation of refrigeration and/ or air conditioning systems will normally use the "equivalent length" method of determining the pressure drop through the systems. Since proper line sizing is critical to all installations, it is important to be able to determine the pressure drop through each component that makes up the system. "Equivalent length" figures are readily available through a number of sources for fittings, valves, etc.



17	COMP X COMP
	PART NO.
	NV62-4

**MEEDLE VALVES** The packing used in the needle seat valves is

resistant to gasoline, oils, and water while providing excellent sealing characteristics over the life of the valve. Metal to Metal seating provides ease in shutoff to working pressures of 105 psi.

DESCRIPTION	5
/4" X 1/4"	n a
	1

turn

stop.



### IN EXCLUSIVE PARTNERSHIP WITH



The partnership of **ROTHENBERGER** and JB brings together the best of German engineering and European craftsmanship with American distribution to create the highest quality tools in the HVAC/R marketplace.

**ROTHENBERGER** tools are made of the highest quality materials and to the strictest quality standards to ensure that these tools will not fail when you need them the most. Backed by a 24 month over-the-counter warranty, JB and ROTHENBERGER are dedicated to standing behind their products. We have seen a tremendous growth and acceptance in the marketplace. Through the JB distribution channel, ROTHENBERGER is now available in over 900 HVAC/R branch locations nationwide. Once you get your hands on these tools, you can immediately feel the quality and see why ROTHENBERGER tools are Just Better. We are proud to present our collection for your review. Should you not see a particular tool of interest, please contact us at 800-323-0811. The entire **ROTHENBERGER** product line and technical features can be viewed at our web site www.jbind.com.



### MINI TUBE CUTTERS

Used for cutting copper tubes, these mini tube cutters have a large knurled knob and handy design to produce fatigue-free pressure control. The two guide rollers with recess assist with cutting close to flares. Compatible with Yellow Jacket 60120 cutting wheels.



RT70402

**RT70105** 

RT70015

	PART NO.	DESCRIPTION	
	RT70401	Copper 1/8" to 5/8" OD	
	RT70402	Copper 1/4" to 7/8" OD	
	RT70105	Copper MINICUT 1/8" to 7/8" OD	
	RT70015	Copper MINI MAX 1/8" to 1-1/8" OD	
1	RT70017B	Replacement cutter wheel (2 pack)	
	RT70017D	Replacement cutter wheel (5 pack)	

#### **ROTRAC PLUS**

New JB precision tube cutters for copper tube are manufactured by ROTHENBERGER for JB and designed with smoothrunning telescopic action for a consistent working radius. Features include a rolling stop which protects the cutter wheel, a protected screw spindle to shield against dirt and jamming, and a lightweight cast aluminum body. The deburrer swivels up, and the spare cutter wheel is stored in the handle, making them always within reach. Compatible with Yellow Jacket 60120 cutting wheels.



PART NO.	DESCRIPTION
RT70020	Copper tube 1/8" to 1-1/8" OD
RT70021	Copper tube 1/4" to 1-5/8" OD
RT70007B	Replacement cutter wheel (2 pack)
RT70007X	Replacement cutter wheel (10 pack)
RT99016	Replacement clip and axle

#### PROFESSIONAL TUBE CUTTER

For tubes made out of copper, brass, aluminum, this tube cutter features a retractable deburrer blade and a spare cutter wheel in the handle. The smooth adjustment knob allows for quick adjustment. Compatible with Yellow Jacket 60124 cutting wheels.

PART NO.	DESCRIPTION
RT70027	1/4" to 1-3/8" OD copper, aluminum pipe
RT70029	1/4" to 1-5/8" OD copper, aluminum pipe
RT21652B	Replacement deburring blade (10 pack)
RT70017B	Replacement cutter wheel (2 pack)
RT70017D	Replacement cutter wheel (5 pack)
RT70056D	Replacement cutter wheel for stainless steel
	(5 pack)

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**BRASS FITTINGS** 

#### RATCHET TUBE CUTTER

For copper, brass, aluminum, thin-walled steel, and plastic coated tubes, this ratchet tube cutter has a retractable internal deburring tool and spare cutter wheel in the handle so they are always within reach. The ratchet

telescopic guide with automatic spring-driven withdrawal allows for quick adjustment and fast opening. RT70030 is compatible with Yellow Jacket 60120 cutting wheels.



	PART NO.	DESCRIPTION
1111	RT70030	1/8" to 2-5/8" OD
	RT70142	2" to 5" OD
1	RT70017B	Replacement cutter wheel for RT70030 (2 pack)
	RT70017D	Replacement cutter wheel for RT70030 (5 pack)
	RT70057D	Replacement cutter wheel for RT70142 (2 pack)
	RT21652B	Replacement deburring blade (10 pack)

#### CHAIN TUBE CUTTER

For copper, brass, aluminum, thin-walled steel tubes, and plastic coated tubes 1" to 2" OD. The stable chain with 15 mini cutter wheels has a

two-step adjustment. Ideal for working in confined spaces like parallel-running tubes.

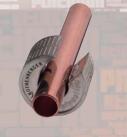


#### PART NO. DESCRIPTION

RT702851" to 2" OD chain tube cutterRT70286Replacement cutter wheel chain

#### PIPE SLICE

Cut tubes with less turns with this tube cutter. The self-clamping and self alignment feature make readjustment unnecessary. Ideal for those hard to reach places. Made of cast aluminum.



	PART NO.	DESCRIPTION
1	RT88807	Nominal 3/8" OD 1/2"
	RT88810	Nominal 1/2" OD 5/8"
	RT88808	Nominal 5/8" OD 3/4"
	RT88802	Nominal 3/4" OD 7/8"
	RT88814	Nominal 1" OD 1-1/8"

### PLASTICUT PEX CUTTER

For cutting pipes made of MDPE, PE, PP, HEP20, PEX. This cutter is ideal for use in confined spaces. The unique, patented design cuts clean and square using no force to operate. The lightweight, simple to use tool is highly efficient with no moving parts.



# PART NO.DESCRIPTIONRT590601/2" PlastiCut PEX cutterRT590703/4" PlastiCut PEX cutterRT590801" PlastiCut PEX cutterRT59000Replacement Blades for 1/2" and 3/4"RT59001Replacement Blades for 1"

### STEEL PIPE CUNTERS

The easy pressure control of our pipe cutters yields optimum force transmission onto the tube. The burr-free external cutting action makes it possible to thread without

deburring. Wide rollers securely guide the cutter wheel on the tube. For 1/8" to 4" OD steel pipe.



PART NO.	DESCRIPTION
RT70045	1/8" to 2" OD steel pipe cutter
RT70060	2" to 4" OD steel pipe cutter
RT70051D	Replacement cutter wheel RT70045 (3 pack)
RT70061D	Replacement cutter wheel RT70060 (2 pack)

### **ROCUT 63 PIPE SHEARS**

For precise cutting of PVC, PP, PE, PEX, PB, CPVC, and PVDF, our pipe shears are the finest you can find. The rugged precision shears for effortless cutting



of plastic pipes. The double-sided blade and ratchet support apply precise force transfer as well as precise guided cutter feed. The shears feature a stainless steel blade with a v-edge that offers pin-point precision without deformation of pipe. The ideally meshed cutting curve allows for minimum effort. The shear arms lock for transport.

PART NO.	DESCRIPTION	
RT52030	For 2" PVC Max OD 2-1/2"	
RT50063	Replacement blade for RT52030	

BRASS FITTI

### PIPE SHEARS

For precise cutting of PVC, PP, PE, PEX, PB, CPVC and PVDF, our pipe shears are the finest you can find. The quick release lever provides automatic opening of the blade at the push of a button. A double-sided stainless steel blade with v-shaped edges pierce the pipe to prevent deformation. The wide pipe rest ensures a square cut every time. A locking lever secures the blade during transport.

RT52010 RT52000

DESCRIPTION
Max. OD 1-5/8", Sched. 40 PVC 1-1/4"
Max. OD 2", Sched. 40 PVC 1-1/2"
Replacement blade for RT52010
Replacement blade for RT52000

### **RO-GRIP**

#### RT70558

With a perfect grip and better leverage, our self-adjusting pliers offer many advantages over conventional pliers. Made of drop forged chrome vanadium steel, the rhombus-shaped jaws securely grab round, hex, sheets, and other shapes up to 1-5/8" OD.



### ROLOCK

Professional-grade water pump pliers with a jaw locking system providing a secure grip on round, square, or hex-shaped items with a push of a button. The ROLOCK has 14 groove opening positions with an opening capacity of

2-1/3".



Internal/External deburring tools for copper and plastic tubes.



PART NO.	DESCRIPTION	
RT70531	ROLOCK 7"	
RT70532	ROLOCK 9"	
RT70533	ROLOCK 12"	

**PT70533** 

### WATER PUMP PLIERS

Complies with DIN 5321 D, these pliers are made with heavy-duty box joint, chrome vanadium steel, drop forged, tempered, and polished head and joint. The longer, thinner pliers with measurements for corners are ideal for hard to reach places. The self-clamping jaws will not slip, even on smooth surfaces.



PART NO.	DESCRIPTION
RT11006	Copper and stainless steel internal/external reamer 1/8" to 1-5/8" OD
RT70075	Copper and stainless steel internal/external reamer 1/8" to 2" OD
RT21660	Deburring tool (blade non-replaceable)
RT21655	Deburring tool
RT21652B	Replacement deburring blade for RT21655 (10 pack)

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PART NO.	DESCRIPTION	
RT70521	7" Pliers Max. 1" OD	
RT70522	10" Pliers Max. 1-1/4" OD	L
RT70523	12" Pliers Max. 1-1/2" OD	r

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RT24504

#### PIPE WRENCHES

Monoblock cast body with high strength, double T profile, these wrenches feature a forged jaw and hook, fine-polished teeth set against turning direction, anti-slip adjustment screw and spring supported hook. With features similar to the Heavy-duty style, the aluminum wrenches are made of high strength alloy and 40% lighter. Both styles conform to US Standard GGG-W-651 Type 1 Class A (Class B for Aluminum).



PART NO.	DESCRIPTION
RT70150	8" Heavy-duty Wrench Max. 1" OD
RT70151	10" Heavy-duty Wrench Max. 1-1/2" OD
RT70152	12" Heavy-duty Wrench Max. 2" OD
RT70153	14" Heavy-duty Wrench 2" OD
RT70154	18" Heavy Duty Wrench Max. 2-1/2" OD
RT70159	10" Aluminum Wrench Max. 1-1/2" OD
RT70160	14" Aluminum Wrench Max. 2" OD
RT70161	18" Aluminum Wrench Max. 2-1/2" OD

#### CHAIN PIPE WRENCH RT70235

With a double-sided teeth surface set against turning direction, this chain pipe wrench works in both directions without re-inserting. The wrench is 12" with a maximum OD of 4".



RT90614

#### HAND TUBE BENDER RT90614

This universal hand bender provides bending of 1/2", 5/8", 3/4" and 7/8" OD soft copper, aluminum, and light grade stainless steel tubing.

#### ROBEND® H+W PLUS RT24504

For exact cold bending up to 180° of soft and hard copper, thin-walled coated copper, aluminum and brass, precision steel, and coated, seamless stainless steel tubes. Unique design provides bending

without deforming the pipe. Guide shoes and formers are anti-stick for less friction and bending effort. Base plate can be attached to vice for easy, free-hand bending. Set includes bending spray, 1/2", 5/8", 7/8" formers and steel carry case.

#### MINIBEND® TUBE BENDER RT25151

For exact, two-handed bending up to 180° for tubes made out of soft copper, brass, aluminum, and precision steel. 1/4", 5/16", and 3/8" OD.

RT25151

### STANDARD TUBE BENDER

For exact bending radius up to 180° for tubes made up of soft copper, aluminum, and precision steel. The light construction results in fatigue-free hand operation. The clamp mechanism better holds the tube and enables the bending of even the

shortest of tube pieces. The Tube Bender Pro is for 1/2" and 3/4" semi-hard and hard copper pipes and features a case iron body for longer life along with self adjusting shoe.

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	RT25140	

PART NO.	DESCRIPTION
RT25140	1/4" OD Radius (0.71")
RT25131	5/16" OD Radius (0.95")
RT25141	3/8" OD Radius (1.18")
RT25913	Tube Bender Pro 1/2" OD Radius
RT25914	Tube Bender Pro 3/4" OD Radius
RT25142	3/4" OD Radius
RT25136	5/8" OD Radius (2.28")

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### TUBE BENDER SET RT24134

The ratchet feed of this tube bender is ideal for rapid, exact bending of small diameter soft copper and aluminum up to 90°. Designed for one hand operation, the compact design fits in even the tightest spaces. The open bending frame allows for the production of repeated alternate angled bends. Set includes bending tool, formers for ODs of 1/4", 5/16", 3/8", 1/2", and steel case.





#### MAXI TUBE BENDER SET rt23022x

The smooth-running feed lever of this tube bender makes it ideal in restricted spaces and one-handed operations. The side lever allows for quick release and reset of bending former. The pliers feature a bayonet catch to easily change bending formers. The open bending frame makes it possible to repeatedly produce alternate angled bends. The set consists of the basic tool, bending support, bending formers, and steel case. For use on copper and soft aluminum 3/8", 1/2", 5/8", 3/4", and 7/8" OD.



### PINCH-OFF TOOL

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This plier-type pinch-off tool temporarily closes off line while making repairs. The quick release trigger and rounded jaws prevent cutting while allowing for reopening and rounding using a standard flare bar. For 1/8" to 5/8" OD (1/8" to 1/2" Nominal).

### SPRING TYPE TUBE BENDER

Ideal for irregular bends, these spring type benders are available in single springs and packaged sets. Used for soft copper, aluminum, brass, and steel.



### PACKAGED SETS

PART NO.	DESCRIPTION
BS-55	1/4", 5/16", 3/8", 1/2", and 5/8" in pouch
BS-77	All seven sizes in pouch

### SINGLE SPRINGS

(			
PART NO.	TUBE O.D.	NOM	
BS-4	1/4"	1/8"	
BS-5	5/16"		
BS-6	3/8"	1/4"	
BS-7	7/16"		
BS-8	1/2"	3/8"	
BS-10	5/8"	1/2"	
BS-12	3/4"	5/8"	

### SINGLE SIZE SWAGE SIZE STAMPED OD AND NOMINAL



PART NO.	TUBE O.D.	
T21002	1/8"	1
T21003	3/16"	P
T21004	1/4" Nom. 1/8"	T2
T21005	5/16"	Pa
T21006	3/8" Nom. 1/4"	Se
T21007	7/16"	3/
T21008	1/2" Nom. 3/8"	Th
T21010	5/8" Nom. 1/2"	1/
T21012	3/4" Nom. 5/8"	1/
T21014	7/8" Nom. 3/4"	
T21018	1-1/8" Nom. 1"	

### PACKAGED SET

Packaged swage set. Tube OD 1/4", 3/8", 1/2", and 5/8". The nominals are 1/8", 1/4", 3/8", and 1/2".

DEEP VACUUM

**CHARGING EQUIPMENT** 

**BRASS FITTINGS** 

# CHARGING EQUIPMENT

GAUGES

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MULTI-SWAGE T21000

T21000 consists of three pieces that work with OD sizes including 3/16", 3/4", and 7/8" producing perfect solder cups for 9 OD tube sizes. OD sizes are 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", and 7/8". Nominal 1/8", 1/4", 3/8", 1/2", 5/8", and 3/4".

### T21000

#### MULTI-SWAGE T20095

Handy all-in-one tool. T20095 is a single piece that works with 1/4", 5/16", 3/8", 7/16", 1/2", and 5/8" OD.

T20095

#### 45° FLARE / SWAGE T20275

Heavy-duty wide-range bar type flaring tool. The rugged, forged steel slip-on self centering yoke has a hardened chrome plate swivel type cone to form quality flares with minimal effort. Hardened bars provide positive clamping action with minimum distortion and are fully hinged with king-sized forged steel wing nuts for easy use. The second bar extends our flaring tool to 9 OD tube sizes.



PART NO.	TUBE O.D.	NOM
T20275	<b>Flare:</b> 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", and 3/4"	<b>Nominal Flare:</b> 1/8", 1/4", 1/2", 5/8"
	<b>Swage:</b> 3/16", 1/4", 5/16", 3/8" 1/2", 5/8", and 3/4"	<b>Nominal Swage:</b> 1/8", 1/4", 3/8", 1/2", and 5/8"

PART NO.	TUBE O.D.
T20195	3/16", 1/4", 5/16", 3/8", 7/16", (nom. 1/8", 1/4", 3/8", and 1/2")
T20203	5/8", 3/4", 7/8", and 1-1/8" OD
T20500	3/16", 1/4", 5/16", 3/8", 1/2", and 5/8" OD
RT222402	1/8", 1/16", 1/4", 5/16", 3/8", 1/2", 5/8", 3/4" OD
RT222601	Adjustable from 3/16" to 5/8" OD

222402

### 45° FLARING TOOL Rt26036 Single Flare

FLARING TOOLS

T20195



For making precise 45° flares on copper, brass, aluminum, and precision steel tubes up to 0.04" (1 mm) in wall thickness. The special screw thread allows proper, efficient handling of material.

The "Multiblock" multi-clamping calipers provide a firm, quick off-center clamping of the tube and automatic selfcentering. Flares 3/16", 1/4", 5/16", 3/8", 1/2", and 5/8".



#### SWAGING KIT RT26715

For precise 45° single flares and sockets on copper, brass, aluminum, and steel tubes. Set includes flaring tool, 45° cone, expander pin, internal/external deburrer, tube cutter, and plastic case. Includes swages for 3/16", 1/4", 5/16", 3/8", 1/2", and 5/8".



### TEE EXTRACTOR SET RT22124

Extract your own tees on soft, semi-hard and hard copper or aluminum and save time and money saved on T-pieces. The ergonomic, compact design fits into the tightest spaces. The set includes tee-extractors for 1/2", 5/8", 7/8" and 1-1/8", ratchet handle, cam pincer, high-speed drill, and steel case.



### SUPER CUT RATCHET HAND THREADER RT70905X

Precision thread cutting 1/4" to 2" diameter to approved standards. Slim and compact shape with excellent overall size requiring an angle of 22.5° to reach those difficult positions. The quick change die heads have a positive octagonal universal drive for a secure hold. The long pipe guide results in perfect centering. Set includes ratchet handle, die heads for 1/2", 3/4", 1", 1-1/4", 1-1/2", and 2" NPT for steel pipe, and plastic case.

### TUBE EXPANDER KIT

#### RT12318

The high strength, forged aluminum body make for lower weight and easy handling of our expander set. The longer lever arms reduce effort and the automatic pin guide retracts for faster operation. The set includes expander with riveted expander heads in 3/8", 1/2", 5/8", 3/4", 7/8", and 1-1/8", internal/external deburring tool, steel case. Replacement heads are interchangeable with Yellow Jacket and Ridgid tube expanders.



#### PEX CRIMPER COMBO

#### RT12428

Constructed of hardened steel with Ultra-Lite fiberglass reinforced handle, this PEX crimper is ideal for making copper crimp ring connections in potable water and radiant heating applications. Each tool is supplied with a go/no go gauge. The crimp cavity does not skive the copper ring or cause it to fishtail during crimping process. Glass-filled composite handles reduce

fatigue especially when working overhead. Minimal calibration adjustments. Meets ASTM F1807 Specifications. 1/2" and 3/4".





#### SUPERTRONIC 1250 RT71453

RT71453

This power threader features a heavy-duty helicoidal power transmission for 50% longer life. The SUPERTRONIC 12500 is constructed of durable, lightweight aluminum body and heavy-duty fiberglass reinforced plastic motor covers. Our electrical reverse reduces weight and increases portability. Maximum threading capacity of 1-1/4" is perfect for maintenance, repair, gas lines, and boiler installations. The set includes 1/2", 3/4", 1", and 1-1/4" die heads.

**REPAIR PARTS** 

XEIGNI

**PAGE 62** 

**DEEP VACUUM** 

**CHARGING EQUIPMENT** 

### ROPRESS PRESS TOOLS CORDED AND CORDLESS PRESS TOOL

Redesigned for 2010, the ROPRESS is a 12-ton dieless stateof-the-art crimping tool. The dieless tool greatly simplifies the crimping of color coded lugs and splices. There are no dies to select. Featuring a 24,000 pound crimp force and weighing 15 pounds, both the corded and cordless versions offer maximum force with minimal effort. The Cordless ROPRESS has a 18 volt Lithium-Ion battery that lasts longer than NiMH batteries and weighs less. Interchangeable crimping jaws are flexible and cost effective. The LED display shows tool information while the sleek lightweight pistol design offers effortless repeated crimping. The Corded ROPRESS requires no batteries and delivers the same quality crimping as the cordless version. Both tools are compatible with Viega, Elkhart and NIBCO press fittings. Please see Information Sheets under the Technical section at www.jbind.com to view compatibility statements from each company. Press rings are available in 2-1/2", 3", and 4" upon request.



#### PART NO. DESCRIPTION

RT16101	Cordless Tool only NO jaws
RT16102	Cordless Tool, 6 copper jaws 1/2", 3/4", 1", 1-1/4", 1-1/2", and 2", battery and charger
RT16201	Corded Tool, NO jaws
RT16202	Corded Tool, 6 copper jaws 1/2", 3/4", 1", 1-1/4", 1-1/2", and 2"
RT15222X	Press Jaw 1/2" copper
RT15223X	Press Jaw 3/4" copper
RT15224X	Press Jaw 1" copper
RT15225X	Press Jaw 1-1/4" copper
RT15226X	Press Jaw 1-1/2" copper
RT15227X	Press Jaw 2" copper
RT52176	18V Lithium Battery, 3 amp
RT52178	18V Lithium Battery Charger 120 V

# ROPRESS COMPACT

The ROPRESS Compact light-weight, batterypowered press tool weighs only 5.4 lbs and connects 1/2", 3/4", and 1" copper tube and fittings in about 6 seconds. The slim profile allows one hand operation of the tool leaving the other hand free to hold and position the fitting. The 350° rotation of the jaw fixture and slim design easily reaches into tight spaces. When a press is complete, the jaws automatically

release signaling the tool is ready for the next press. The ROMAX Pressliner is compatible with Viega, Elkhart, and NIBCO press fittings. Please see Information Sheets under the Technical section at www.jbind.com to view compatibility statements from each company.



PART NO.	DESCRIPTION
RT16001	Compact Tool only NO jaws
RT16002	Compact Press Tool, 3 copper jaws 1/2", 3/4", 1", battery, charger
RT15031V	Compact Press Jaw 1/2" copper
RT15032V	Compact Press Jaw 3/4" copper
RT15033V	Compact Press Jaw 1" copper
RT52176	18V Lithium Battery, 3 amp
RT52178	18V Lithium Battery Charger, 120V

### FIN STRAIGHTENERS

T20352 Stainless steel fin straightener.

**T20351** For 8, 9, 10, 12, 14, and 15 spacings per inch.

**T20353** Stainless steel fin straightener with larger, easy to grip handle.

DEEP VACUUM

Nit for

BRAZE-RITE ADAPTER BRZ1000

for ACR pipe. Quickly connects to manifold gauge hose, and slips easily and securely into pipe. Allows for bleed of



nitrogen through pipe being brazed, keeping the pipes clean and oxide-free. Stepped to fit most common ACR pipe sizes, making it fast to go from one tube to the next. Saves time and money and helps maintain equipment manufacturer's system performance and installation guidelines. No more duct taping your hose to the pipe!

### OIL TRANSFER PLIMP T30251

Designed to pump oil into the system while unit is operating without shutting down for charging. Smoothly pumps oil into the compressor on the down stroke while system is under pressure resulting in easier pumping on the positive stroke. The universal tapered rubber adapter is designed to fit all 1, 2-1/2, and 5 gallon containers without additional adapters. Works against 200 psi of pressure and is compatible with all oil types including synthetic, mineral, and polyol ester. Pumps 2.6 ounces (78 ml) per stroke.

T30251

ACCESS VALVES

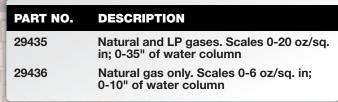
# GS REPAIR PARTS

Keloni

GAS PRESSURE TEST KIT

This diaphragm gauge scale comes complete in case with hose and hook-up fitting.





#### GAS TEST GAUGE

To test system pressure for leaks in new installs, use these 3-1/2" easy to read test gauges. Fits 3/4" and 1" pipes.



PART NO.	DESCRIPTION
GTBG-12	3-1/2" Test gauge 0-30 lb. 3/4" end
GTBG-16	3-1/2"Test gauge 0-30 lb. 1" end

#### SERVICE WRENCHES

Double end reversible ratchet wrenches feature accurately broached multiple openings and offer the greatest number of uses in a single unit. Choose offset or hex and square ends. Items ending in "U" denote Made in the USA



#### PART NO. DESCRIPTION

T21124	3/16", 1/4" square end and 1/2", 9/16" hex port end
T21127	1/4", 3/16" on one end 3/8", 5/16" on other end
T21127U	1/4", 3/16" on one end 3/8", 5/16" on other end
T21126U	Offset 1/2", 3/16" on one end 3/8", 5/16" on other end
T21125U	3/8" square end and 1/2" square end

#### HEX KEY ADAPTER T2-HKA

Heat treated black oxide plated hex key adapter for accessing liquid and suction based valves. Works for 3/16" and 5/16" hex valves.



### STEEL STRAP

Our Steel Straps are zinc plated and alternate between nail and bolt holes.

MADE IN

	USA
PART NO.	DESCRIPTION
PS-10	10' (3 m) steel strap
PS-25	25' (7.6 m) steel strap
PS-50	50' (15 m) steel strap



### **CAP TUBE**

PAGE 65

ACID BRUSHES

Our acid brushes are ideal for thread sealant, flux, and past solders. Made of 100% long and stiff horsehair bristles that are evenly placed and securely crimped into tinned acid-resisting handles.

# PART NO.DESCRIPTIONC338041/4" flux brush (12 pack)C338081/2" flux brush (10 pack)

C33808-CTN 1/2" flux brush (144 bulk)

### CAPILLARY TUBING

Short coils are boxed with application charts. Cut from 100' (30.5 m) sealed and dehydrated tube.

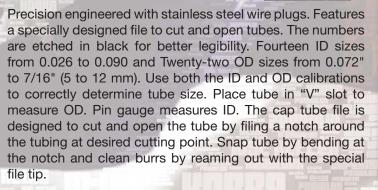
S/B 100' (30.5 m) Coils are boxed with conversion and application charts.

Available in cartons of 10. Add suffix -101 to part number.

### GAUGE FILE AND CUTTING TOOL

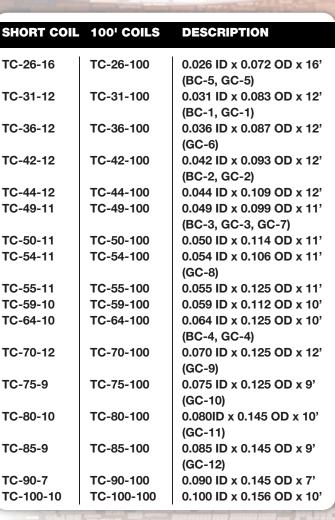
A10971 cap tube and file in pouch

#### A10972 cap tube file



#### CAP TUBE CUTTING TOOL A10973

The sturdy design of our cap tube cutter results in no collapsing of the tube, clean cuts, and no chips.



Pressure/Temperature charts can be found on our website at www.jbind.com under Instruction Sheets. Please see the Copper Capillary Tubing section for the conversion charts.



### **CAP TUBE**

Part No. Tube ID	TC-26 0.026 ID	TC-31 0.031 ID	TC-36 0.036 ID	TC-42 0.042 ID	TC-44 0.044 ID	TC-49 0.049 ID	TC-50 0.050 ID	TC-54 0.054 ID	TC-55 0.055 ID	TC-59 0.059 ID	TC-64 0.064 ID	TC-70 0.070 ID	TC-75 0.075 ID	TC-80 0.080 ID	TC-85 0.085 ID	TC-90 0.090 II
0.024 0.025 0.026 0.028 0.030 0.031 0.032 0.033 0.034 0.035 0.036 0.037 0.038 0.037 0.038 0.039 0.039 0.039 0.040 0.041 0.044	1.44 1.20 0.72 0.52 0.45	$\begin{array}{c} 2.24 \\ 1.59 \\ 1.16 \\ 1.00 \\ 0.86 \\ 0.58 \\ 0.58 \\ 0.58 \\ 0.39 \\ 0.31 \\ 0.28 \\ 0.25 \\ 0.23 \\ 0.20 \\ 0.20 \\ \end{array}$	2.00 1.75 1.54 1.35 1.16 1.00 0.90 0.80 0.71 0.62 0.56 0.50 0.45 0.39	2.31 2.10 1.79 1.59 1.41 1.12 1.12 1.00 0.87 0.81	2.22 1.92 1.75 1.55 1.55 1.24 1.24 1.11 1.00	<ul> <li>2.22</li> <li>2.22</li> <li>2.22</li> <li>1.25</li> <li>2.51</li> <li>2.51<th>factor ap tube be will g</th><th colspan="2">or be by Il give</th></li></ul>								factor ap tube be will g	or be by Il give	
0.045 0.044 0.047 0.048 0.050 0.051 0.052 0.053 0.055 0.056 0.055 0.056 0.057 0.058 0.057 0.058 0.059 0.060 0.064 0.070 0.064 0.070 0.080 0.085 0.090 0.095 0.095 0.095 0.095			0.35	0.73 0.67 0.59 0.54 0.49 0.45 0.41	0.90 0.82 0.74 0.67 0.61 0.56 0.51 0.47 0.43 0.39 0.36	1.47 1.20 1.20 1.00 0.91 0.84 0.76 0.65 0.59 0.50 0.46 0.42 0.39	1.60 1.47 1.31 1.20 1.09 1.00 0.30 0.85 0.70 0.64 0.60 0.55 0.51 0.47 0.43 0.32	2.32 2.08 1.89 1.72 1.55 1.43 1.31 1.19 1.00 0.92 0.85 0.79 0.67 0.67 0.62 0.47 0.30	$\begin{array}{c} 2.27\\ 2.06\\ 1.87\\ 1.69\\ 1.56\\ 1.44\\ 1.32\\ 1.00\\ 1.09\\ 1.00\\ 0.94\\ 0.87\\ 0.80\\ 0.73\\ 0.67\\ 0.50\\ 0.33\\ \end{array}$	2.14 1.96 1.78 1.64 1.52 1.38 1.27 1.07 1.00 0.93 0.69 0.46	2.18 2.00 1.85 1.72 1.56 1.44 1.33 1.00 0.67 0.48	2.18 2.04 1.50 1.00 0.73 0.54	2.07 1.37 1.00 0.74 0.57 0.43	1.84 1.37 1.00 0.76 0.62 0.46	1.75 1.32 1.00 0.76 0.60 0.48	1.71 1.29 1.00 0.79 0.62 0.49

EXAMPLE: Locate 0.040 in left hand column and reading across gives the following conversion factor: No. TC-36 cap tube (0.036 ID) -0.62 and No. TC-42 cap tube (0.042 ID) -1.25. Multiply the recommended cap tube length of 9' by the conversion factor gives the following results: 5.5' - 0.036 ID and 11.25 - 0.042 ID. Either of these two cap tubes will give the same results as the original cap tube of 9' -0.40 ID.

Every precaution should be taken to prevent chips, dirt, flux, moisture, etc., from entering the system when changing the cap tube. Most cap tube has very small holes that do not require much debris to plug flow.

The size of the cap tube is critical to its application. While some variation from the ideal can be tolerated, it is important to understand those factors which the service engineer can control. Unlike orifices such as expansion valve seats, capillary tubing depends on its length as well as its diameter to determine the total restriction. A change in diameter on a percentage basis, can change the flow more than an equal change in length. For example, changing the diameter by 0.005" as between 0.026" ID and 0.031" ID can double the flow.

The length of the cap tube is the one factor over which the service engineer has the easiest and most immediate control. The best known method of changing the restriction of a cap tube is to change its length. Cut off a piece and its restriction is reduced. Substitute a longer tube and increase the restriction. However, there are factors that are not generally understood that limit the amount of lengthening or shortening.

As a general rule, keep the cap tube no shorter than 5 feet and no longer than 16 feet to eliminate many problems. Only plug drawn capillary tubing should be used in refrigeration and air conditioning application. JB capillary tubing is drawn to a plus or minus 0.001" on the ID, the finest attainable. Therefore, we recommend using JB cap tubing and the application charts included in the packaging.

The "Capillary Tubing Length Conversion Chart" was developed to enable users of capillary tubing to use standard tubing sizes which are widely available. While many OEMs recommend specific lengths and diameters of cap tube for their units, these tube sizes are not always readily available and may have to be special ordered.

This conversion chart enables the user to translate the recommended length into that of a tube diameter that can be quickly obtained. In using the chart, it is recommended that conversions be made using factors within the shaded area. In addition, it is highly recommended that the minimum length of capillary tubing used by 5 feet.

INDEX

# **LA-CO PRODUCTS**

PIPETITE-STIKIN

11175

SA

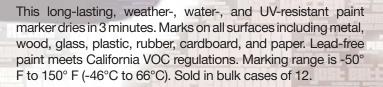
ICO. Heat Barrier Spra

### COOL GEL™ HEAT DISSIPATING SPRAY

#### 11509

Heat dissipating spray helps prevent heat damage to components and surrounding materials during soldering, brazing, and welding. It protects painted and finished surfaces from discoloration due to adjacent torch operations. This product also reduces the danger of fire to surrounding surfaces such as studs, drywall, and insulation. The unique non-staining gelled formula sticks to surfaces without dripping or running off and leaves no residue. Safe, nontoxic, and odorless spray liberally on adjacent surfaces needing protection. The spray pattern is adjustable from stream to mist. One quart spray bottles sold in cases of 12.





### SLIC-TITER PASTE WITH PTFE 42019

Premium thread sealant for sealing water, air, steam, natural gas, LP gas, refrigerants, ammonia, gasoline, and oil. For use on metal, PVC, CPVC, and ABS plastic threads. Do not use on Oxygen service, use PTFE tape or LA-CO Oxytite®. Sealing temperature -50° F to 500° F (-46° C to 260° C). Pressures 3,000 psi (204 bar) for gas, 10,000 psi (680 bar) for liquid. NSF, UPC, CSA, cULus, FGG/BM/CZ approved. 1/2 pints sold in cases of 12.



Non-toxic and lead-free, the Pipetite Stik is for use for water, steam, air, natural gas, and LP gas. Use on metal threads. Do not use on Oxygen service; use PTFE tape or LA-CO Oxytite®. Sealing temperature is up to 350° F (177° C) and pressures to 2,000 psi (136 bar) for liquids and 350 psi (24 bar) for gasses. Certified by NSF to meet ANSI/NSF Standard 61 for use on potable water. 1-1/4 Oz. sticks sold in cases of 12.

HEAT-SEAL STIKE PREMIXED EPOXY SEALER

HEAT-SEAI STIK

PIPETITE Stik

Ideal for use on high and low side of refrigeration systems, the Heat-Seal Stik can be used on aluminum, copper, other metals, glass, and ceramics. Works on R-410A based systems. Sticks, melts, seals, and cures in one 90 second operation. One part epoxy, there is no mixing or measuring needed. Sealing temperature is up to 350° F (177° C) and pressures to 450 psi (31 bar). 3/8 Oz, sticks sold in cases of 12.

# BLOC-ITM HEAT ABSORBING PASTE

Heavy paste effectively absorbs surface heat and protects adjoining surfaces that may be damaged by excessive heat. Typically used to protect rubber, plastic, distortion, painted and finished surfaces during soldering, brazing or welding. Safe to use, Bloc-It is nontoxic, harmless to skin, odorless, and does not contain asbestos. Wipe off with cloth or wash with water, Bloc-It will not leave stains. 10 oz. tubes sold in cases of 24. NSE

ISA

NSF

JB's American-made brass SAE 45° flared tube fittings may be used with copper, brass, aluminum, steel, and plastic tube provided an acceptable flare could be generated with the material.

Vacuum and pressures of 5,000 psi can be handled depending upon the size, material, and conditions. Using a 4:1 safety factor, the following general rule (excluding plastic tube) is used:

3,000 psi to ¼" 2,000 psi to ½" 1,500 psi to 1"



Long nuts are recommended when vibration is a factor. Tubing should be double flared in extreme applications to minimize flare thinning on over-tightening.

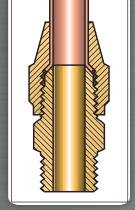
Fittings listed generally comply with SAE, ASA, ASME, and MS standards, however when design makes dimensions critical, please contact us at 800-323-0811 for samples and/or prints for testing and evaluation.

Tube sizes listed are OD (outside diameter). To determine nominal (water tube) size, subtract 1/8", thus 5/8" OD =1/2" nominal.

Pipe sizes listed are standard nominal pipe size and threads are to Dryseal Taper Pipe Standards.

JB will provide flare fitting to SAE Standard J513 whenever possible. In some cases, slight deviations will occur when full compliance fittings are not available.

- Make and break
- Good vibration resistance (improved by using long nuts)
- Low cost
- Easy assembly
- Wide selection



Heavy-duty ACR tube fittings generally conform to SAE, ASA, and ARI Standards for hydraulic, marine, and refrigeration service. Long dryseal pipe threads minimize leakage and provide more clearance for tightening flare nuts. Shapes, elbows, tees, etc., are made from brass forgings to maximize strength and eliminate cracks.

#### ASSEMBLY INSTRUCTIONS

- 1. Cut tube square and remove cut-off burr
- 2. Slide nut on tube, threaded end facing end of tube
- 3. Flare tube following flaring tool manufacturers instructions (check flare quality)
- 4. Thread nut on to fitting body "hand tight"
- 5. With proper wrench, tighten to a solid feel

**CAUTION:** Over tightening and dirt can damage fittings and/or tube causing leaks.

**NOTE:** Lubrication of flare faces and threads is recommended when practical.

#### THREAD SIZE OF TUBE ENDS

O.D. TUBE	SAE/FLARE	O.D. TUBE	SAE/FLARE
1/8"	5/16–24	1/2"	3/4–16
3/16"	3/8–24	5/8"	7/8–14
1/4"	7/16–20	3/4"	1 -1/16–14
5/16"	1/2–20	7/8"	1 -1/4–12
3/8"	5/8–18	1"	1 -3/8–12
7/16"	11/16–16		

### TORQUE POUNDS FOR FLARE FITTING (DRY THREAD)

SIZE	FT. LBS
1/4"	8-10
3/8"	15-25
1/2"	25-35
5/8"	40-55
3/4"	50-60

Copper Seal gaskets

(B2) series furnished

with all female flares

50,000/NO

ing jobs lost each month since China joined the World Trade Organization in 2001 (Bureau of Labor Statistics 2011).



Fiber gaskets (K1 and D/E) furnished with all drum adapters (K1-1 through 8)

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**BRASS FITTINGS** 

PAGE 68

**REPAIR PARTS** 

USA

PKG

PKG

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PKG

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PKG

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3/8" x 3/8"

1/2" x 1/2"

E4-66

E4-88

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|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ren 4    |                |                |                            |                       |                | In the second second |
|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------|----------------|----------------------------|-----------------------|----------------|----------------------|
|   | COPPER FLAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | E BONNE  |                | FLARE X        |                            |                       | REDUCING       | MADE                 |
|   | Use with Flare i<br>to cap a fitting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | nut      | - 1            | PIPE Ett       |                            |                       | PART NO.       | SIZE P               |
|   | to cap a nung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          | 4-             | MA             | DE IN                      |                       | ER2-64         | 3/8" x 1/4"          |
|   | MADE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | N        |                | <b>U</b>       | SA                         |                       | ER2-84         | 1/2" x 1/4"          |
|   | USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.00     |                |                |                            |                       |                |                      |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                |                | 1                          |                       | ER2-86         | 1/2" x 3/8"          |
|   | PART NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIZE     | PKG            | PART NO        | ). SIZE I                  | PKG                   | ER2-108        | 5/8" x 1/2"          |
|   | B1-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3/16"    | 5              | E1-2A          | 1/8" x 1/8"                | 5                     |                |                      |
|   | B1-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1/4"     | 25             | E1-3A          | 3/16" x 1/8"               | 2                     | FLARE X FE     |                      |
|   | B1-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3/8"     | 5              | E1-4A          | 1/4" x 1/8"                | 10                    | SOLDER ELL     |                      |
|   | B1-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1/2"     | 5              | E1-4B          | 1/4" x 1/4"                | 10                    | MADE           |                      |
|   | B1-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5/8"     | 10             |                |                            |                       | _05            | A                    |
|   | B1-12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3/4"     | 5              | E1-4C          | 1/4" x 3/8"                | 5                     | PART NO.       | SIZE P               |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.00     | and the second | E1-5A          | 5/16" x 1/8"               | 5                     | ES2-44         | 1/4" x 1/4"          |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                | E1-5B          | 5/16" x 1/4"               | 5                     | ES2-66         | 3/8" x 3/8"          |
|   | <b>COPPER FLA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RE GASKE | T              | E1-5C          | 5/16" x 3/8"               | 5                     | ES2-68         | 3/8" x 1/2"          |
|   | Used on brass to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | D        |                | E1-6A          | 3/8" x 1/8"                | 5                     |                |                      |
|   | brass or brass t                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -        |                | E1-6B          | 3/8" x 1/4"                | 10                    | ES2-88         | 1/2" x 1/2"          |
|   | steel connection<br>to prevent leaks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |                | E1-6C          | 3/8" x 3/8"                | 10                    |                |                      |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                | E1-6D          | 3/8" x 1/2"                | 5                     | FLARE X FE     | MALE                 |
|   | and the second s |          |                | E1-6E          | 3/8" x 3/4"                | 2                     | PIPE Ett       |                      |
|   | MADE I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N        |                | E1-8B<br>E1-8C | 1/2" x 1/4"<br>1/2" x 3/8" | 5                     | MADE           | TR 🥘 🗲 🥼             |
|   | <b>05</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |                | E1-8D          | 1/2 x 3/8<br>1/2" x 1/2"   | 5<br>10               | -05            | A                    |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _        |                | E1-8E          | 1/2 x 1/2<br>1/2" x 3/4"   | 2                     | PART NO.       | SIZE PI              |
|   | PART NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIZE     | PKG            | E1-0E          | 5/8" x 3/8"                | 2                     | E3-4A          | 1/4" x 1/8"          |
|   | B2-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3/16"    | 5              | E1-10D         | 5/8" x 1/2"                | 2                     | E3-4B          | 1/4" x 1/4"          |
|   | B2-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1/4"     | 25             | E1-10E         | 5/8" x 3/4"                | 2                     | E3-5B          | 5/16" x 1/4"         |
|   | B2-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5/16"    | 5              | E1-12D         | 3/4" x 1/2"                | 2                     | E3-6A          | 3/8" x 1/8"          |
| 1 | B2-6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3/8"     | 25             | E1-12E         | 3/4" x 3/4"                | 2                     | E3-6B          | 3/8" x 1/4"          |
|   | B2-8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1/2"     | 25             |                |                            | -                     | E3-6C          | 3/8" x 3/8"          |
|   | B2-10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5/8"     | 10             |                |                            |                       | E3-6D          | 3/8" x 1/2"          |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                |                |                            | E Star                | E3-8C          | 1/2" x 3/8"          |
|   | B2-12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 3/4"     | 10             |                |                            |                       | E3-8D          | 1/2" x 1/2"          |
|   | I I I F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          |                | FLARE EI       | 1                          | and the second second | E3-8E          | 1/2" x 3/4"          |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                |                |                            |                       | E3-10D         | 5/8" x 1/2"          |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                |                | Chine of                   | <b>U</b>              | E3-10E         | 5/8" x 3/4"          |
|   | CROSS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |                | -              |                            |                       | the local days |                      |
|   | 61033                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |          |                | M.             | SA                         |                       | FEMALE FL      | ARE                  |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                |                | <b>JH</b>                  |                       | X FLARE EL     | t                    |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                | PART N         | O. SIZE                    | PKG                   |                |                      |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -        |                | E2-2           | 1/8"                       | 5                     |                |                      |
|   | USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ň        |                | E2-3           | 3/16"                      | 5                     | Includes copp  | er MAD               |
|   | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          | -              | E2-4           | 1/4"                       | 5                     | gasket         |                      |
|   | PART NO.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SIZE     | PKG            | E2-5           | 5/16"                      | 5                     | PART NO.       | SIZE PI              |
|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1/4"     |                | E2-6           | 3/8"                       | 5                     |                |                      |
|   | C1-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1/4"     | 2              | E2-8           | 1/2"                       | 5                     | E4-44          | 1/4" x 1/4"          |
|   | 114 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -1/(1)   | 0              |                |                            |                       | = 4 00         | A (A II A (A II      |

C1-6

3/8"

2

1

E2-10

E2-12

5/8"

3/4"

|   | FLARE ELL |             |
|---|-----------|-------------|
| G |           |             |
| 5 | MAL       |             |
| 2 |           | JA          |
| 5 | PART NO.  | SIZE PI     |
| 2 | ES4-44    | 1/4" x 1/4" |
| - | ES4-66    | 3/8" x 3/8" |
|   | ES4-88    | 1/2" x 1/2" |
|   | ES4-1010  | 5/8" x 5/8" |
|   | ES4-1212  | 3/4" x 3/4" |
| G |           | F. D4110    |

SWIVEL FEMALE FLARE X



| PART NO. | SIZE | PKG |
|----------|------|-----|
| 168° F   |      |     |
| FP-A-168 | 1/8" | 5   |
| FP-B-168 | 1/4" | 5   |
| FP-C-168 | 3/8" | 2   |
| 210° F   |      |     |
| FP-A-210 | 1/8" | 5   |
| FP-B-210 | 1/4" | 5   |
| FP-C-210 | 3/8" | 2   |
| 283° F   |      |     |
| FP-A-283 | 1/8" | 5   |
| FP-B-283 | 1/4" | 2   |
| FP-C-283 | 3/8" | 2   |
|          |      |     |

#### **REFRIGERANT DRUM** ADAPTER

**NPS CYLINDER** X MALE FLARE. **FURNISHED WITH FIBER GASKET.** MADE IN

| USA      |             |     |  |
|----------|-------------|-----|--|
| PART NO. | SIZE        | PKG |  |
| K1-1 -1  | 3/4" x 1/4" | 1   |  |
| K1-3     | 3/4" x 3/8" | 2   |  |
| K1-5     | 3/4" x 1/2" | 2   |  |
| K1-8     | 1/2" x 1/4" | 2   |  |

PKG

2

2

2

2

2

ACCESS VALVES

**TOOLS & ACCESSORIES** 

BRASS FITTINGS

INDEX

| FIBER DRUM ADAPTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    |                                                                                                                                          |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SEAL GASKET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | FLARE CAP                                                                                                                                                                                                                              | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    | REDUCING                                                                                                                                 |                                                                                                                                          | SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| the second se                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MADE                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | D                                                                  | PART NO.                                                                                                                                 | SIZE                                                                                                                                     | PKG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    | NRS4-43                                                                                                                                  | 1/4" x 3/16"                                                                                                                             | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| USA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PART NO.                                                                                                                                                                                                                               | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PKG                                                                | NRS4-54                                                                                                                                  | 5/16" x 1/4"                                                                                                                             | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N5-3                                                                                                                                                                                                                                   | 3/16"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5                                                                  | NRS4-64                                                                                                                                  | 3/8" x 1/4"                                                                                                                              | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PART NO. SIZE PKG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | N5-4-5                                                                                                                                                                                                                                 | 1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 5                                                                  | NRS4-65                                                                                                                                  | 3/8" x 5/16"                                                                                                                             | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| K1-D 1/2" 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N5-5                                                                                                                                                                                                                                   | 5/16"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5                                                                  | NRS4-86                                                                                                                                  | 1/2" x 3/8"                                                                                                                              | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| K1-E 3/4" 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | N5-6                                                                                                                                                                                                                                   | 3/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 25                                                                 | NRS4-108                                                                                                                                 | 5/8" x 1/2"                                                                                                                              | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N5-8                                                                                                                                                                                                                                   | 1/2"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10                                                                 | NRS4-1210                                                                                                                                | ) 3/4" x 5/8"                                                                                                                            | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | N5-10                                                                                                                                                                                                                                  | 5/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10                                                                 | ON D CTVAT                                                                                                                               |                                                                                                                                          | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FUSIBLE 🔊 🛞                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | NE 10                                                                                                                                                                                                                                  | 3/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                                                                  | OLD STYLE                                                                                                                                |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FLARE X PIPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | D 143-12                                                                                                                                                                                                                               | 3/4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                                                                  | EXTRA HE                                                                                                                                 |                                                                                                                                          | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ADAPTER Market                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 100                                                                | PRE-1968                                                                                                                                 |                                                                                                                                          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| MADE IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FINGER TIGH                                                                                                                                                                                                                            | F 🦽                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                    | US MADE                                                                                                                                  | A                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | FLARE CAP                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    |                                                                                                                                          |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| PART NO. SIZE PKG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | MADE                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    | HNS4-4                                                                                                                                   | 1/4"(3/4" hex)                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 168° F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                        | A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    | HNS4-6                                                                                                                                   | 3/8"(7/8" hex)                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FU-4B-168 1/4" x 1/4" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NEOPRENE SE                                                                                                                                                                                                                            | AL. SEE PAG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | E 45                                                               | HNS4-8                                                                                                                                   | 1/2"(1" hex)                                                                                                                             | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FU-4C-168 1/4" x 3/8" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I ON SINGLE IN                                                                                                                                                                                                                         | FORMATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                    | HNS4-10                                                                                                                                  | 5/8"(1 1/8" he                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FU-6C-168 3/8" x 3/8" 2<br>210° F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1.00                                                                                                                                                                                                                                   | 0175                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>DKO</b>                                                         | HNS4-12                                                                                                                                  | 3/4"(1 3/8" he                                                                                                                           | x) 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>FU-4B-210</b> 1/4" x 1/4" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | PART NO.                                                                                                                                                                                                                               | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PKG                                                                |                                                                                                                                          |                                                                                                                                          | 1-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FU-4C-210 1/4" x 3/8" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NF 13-4-101                                                                                                                                                                                                                            | 1/4"<br>2/9"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1000                                                               | FROST-PROM                                                                                                                               |                                                                                                                                          | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FU-6C-210 3/8" x 3/8" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NF13-0-101                                                                                                                                                                                                                             | 3/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 500                                                                | REFRIGERA                                                                                                                                |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 283° F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CUGDT FODO                                                                                                                                                                                                                             | -0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1 1                                                                | HOLES RELIEVE                                                                                                                            |                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| FU-4B-283 1/4" x 1/4" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SHORT FORG                                                                                                                                                                                                                             | and the second se |                                                                    | MAD                                                                                                                                      | FIN A                                                                                                                                    | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FU-4C-283 1/4" x 3/8" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | REFRIGERATI                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -                                                                  | US                                                                                                                                       | a 🧐                                                                                                                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FU-6C-283 3/8" x 3/8" 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | NUT                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    |                                                                                                                                          |                                                                                                                                          | and the second se |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | BAADE                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                    |                                                                                                                                          | 0175                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MADE<br>US                                                                                                                                                                                                                             | Ä                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                    | NST4-4                                                                                                                                   | 1/4"                                                                                                                                     | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| LONG FORGED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PART NO.                                                                                                                                                                                                                               | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PKG                                                                | NST4-4<br>NST4-6                                                                                                                         | 1/4"<br>3/8"                                                                                                                             | 5<br>5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>РКС</b><br>10                                                   | NST4-4<br>NST4-6<br>NST4-8                                                                                                               | 1/4"<br>3/8"<br>1/2"                                                                                                                     | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REFRIGERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PART NO.                                                                                                                                                                                                                               | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                    | NST4-4<br>NST4-6                                                                                                                         | 1/4"<br>3/8"                                                                                                                             | 5<br>5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| REFRIGERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PART NO.<br>NS4-3                                                                                                                                                                                                                      | SIZE<br>3/16"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10                                                                 | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10                                                                                                    | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REFRIGERATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>PART NO.</b><br>NS4-3<br>NS4-4                                                                                                                                                                                                      | SIZE<br>3/16"<br>1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 10<br>25                                                           | NST4-4<br>NST4-6<br>NST4-8                                                                                                               | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| LONG FORGED<br>REFRIGERATION<br>NUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS                                                                                                                                                                                                 | SIZE<br>3/16"<br>1/4"<br>1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10<br>25<br>1000                                                   | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10                                                                                                    | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REFRIGERATION<br>NUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS<br>NS4-5                                                                                                                                                                                        | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10<br>25<br>1000<br>10                                             | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10                                                                                                    | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REFRIGERATION<br>NUT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS<br>NS4-5<br>NS4-6<br>NS4-6-CS                                                                                                                                                                   | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10<br>25<br>1000<br>10<br>25                                       | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10                                                                                                    | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| REFRIGERATION<br>NUT<br>EXAMPLE IN<br>INCREASE VIBRATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS<br>NS4-5<br>NS4-6<br>NS4-6<br>NS4-6-CS<br>NS4-8                                                                                                                                                 | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10<br>25<br>1000<br>10<br>25<br>500                                | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br>FLARE PLU                                                                                       | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10<br>2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| REFRIGERATION<br>NUT<br>EXAMPLES AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS<br>NS4-5<br>NS4-6<br>NS4-6<br>NS4-6-CS<br>NS4-8                                                                                                                                                 | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"<br>1/2"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10<br>25<br>1000<br>10<br>25<br>500<br>25                          | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br>FLARE PLU<br>EXECUTE<br>PART NO.                                                                | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10<br>2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| REFRIGERATION<br>NUT<br>EXAMPLES AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PART NO.<br>NS4-3<br>NS4-4<br>NS4-4-CS<br>NS4-5<br>NS4-6<br>NS4-6<br>NS4-6-CS<br>NS4-8<br>NS4-8<br>NS4-8<br>S<br>NS4-8<br>NS4-8<br>NS4-8<br>NS4-8<br>NS4-10                                                                            | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"<br>1/2"<br>1/2"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10<br>25<br>1000<br>10<br>25<br>500<br>25<br>350                   | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br>FLARE PLU<br>EXECT:<br>PART NO.<br>P2-3                                                         | 1/4"<br>3/8"<br>1/2"<br>5/8"                                                                                                             | 5<br>5<br>10<br>2<br>2<br>PKG<br>5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| PART NO.       SIZE       PKC         N4-4       1/4"       10         N4-5       5/16"       4         N4-6       3/8"       10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | PART NO.           NS4-3           NS4-4           NS4-4-CS           NS4-5           NS4-6           NS4-6-CS           NS4-8           O           NS4-8-CS           NS4-10           NS4-10-CS                                     | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"<br>1/2"<br>1/2"<br>5/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10<br>25<br>1000<br>25<br>500<br>25<br>350<br>10<br>200            | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br><b>FLARE PLU</b><br><b>DECENSION</b><br><b>PART NO.</b><br>P2-3<br>P2-4<br>P2-5<br>P2-6         | 1/4"<br>3/8"<br>1/2"<br>5/8"<br><b>G</b><br><b>SIZE</b><br>3/16"<br>1/4"<br>5/16"<br>3/8"                                                | 5<br>5<br>10<br>2<br>2<br>PKG<br>5<br>10<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| REFRIGERATION<br>NUT<br>NUT<br>NATE OF CONTROL ON CONTROL OF CONTROL ON CON | PART NO.           NS4-3           NS4-4           NS4-4-CS           NS4-5           NS4-6           NS4-6-CS           NS4-8           0           NS4-8-CS           5           NS4-10           0           NS4-10-CS           5 | SIME<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"<br>1/2"<br>1/2"<br>5/8"<br>5/8"<br>3/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10<br>25<br>1000<br>10<br>25<br>500<br>25<br>350<br>10<br>200<br>5 | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br><b>FLARE PLU</b><br><b>DECEMBEND</b><br><b>PART NO.</b><br>P2-3<br>P2-4<br>P2-5<br>P2-6<br>P2-8 | 1/4"<br>3/8"<br>1/2"<br>5/8"<br><b>G</b><br><b>S</b><br><b>S</b><br><b>S</b><br><b>S</b><br><b>S</b><br><b>S</b><br><b>S</b><br><b>S</b> | 5<br>5<br>10<br>2<br>2<br><b>PKG</b><br>5<br>10<br>5<br>10<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| PART NO.         SIZE         PKC           N4-4         1/4"         10           N4-5         5/16"         4           N4-6         3/8"         10           N4-8         1/2"         4           N4-10         5/8"         4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | PART NO.           NS4-3           NS4-4           NS4-4-CS           NS4-5           NS4-6           NS4-6-CS           NS4-8           O           NS4-8-CS           NS4-10           NS4-10-CS                                     | SIZE<br>3/16"<br>1/4"<br>1/4"<br>5/16"<br>3/8"<br>3/8"<br>1/2"<br>1/2"<br>5/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10<br>25<br>1000<br>25<br>500<br>25<br>350<br>10<br>200            | NST4-4<br>NST4-6<br>NST4-8<br>NST4-10<br><b>FLARE PLU</b><br><b>DECENSION</b><br><b>PART NO.</b><br>P2-3<br>P2-4<br>P2-5<br>P2-6         | 1/4"<br>3/8"<br>1/2"<br>5/8"<br><b>G</b><br><b>SIZE</b><br>3/16"<br>1/4"<br>5/16"<br>3/8"                                                | 5<br>5<br>10<br>2<br>2<br>PKG<br>5<br>10<br>5<br>10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

| FLARE X FLARE<br>X MALE PIPE TEE |                       |     |  |
|----------------------------------|-----------------------|-----|--|
| <b>N</b>                         | SA 🔨                  |     |  |
| PART NO                          | ). SIZE I             | PKG |  |
| T1-4A                            | 1/4" x 1/4"           | 10  |  |
|                                  | x 1/8"                |     |  |
| T1-4B                            | 1/4" x 1/4"           | 10  |  |
|                                  | x 1/4"                |     |  |
| T1-4C                            | 1/4" x 1/4"           | 2   |  |
|                                  | x 3/8"                |     |  |
| T1-5B                            | 5/16"x 5/16"          | 2   |  |
|                                  | x 1/4"                |     |  |
| T1-6B                            | 3/8"x 3/8"            | 5   |  |
|                                  | x 1/4"                |     |  |
| T1-6C                            | 3/8" x 3/8"           | 5   |  |
|                                  | x 3/8"                |     |  |
| T1-6D                            | 3/8" x 3/8"           | 2   |  |
|                                  | x 1/2"                |     |  |
| T1-8B                            | 1/2" x 1/2"           | 2   |  |
|                                  | x 1/4"                |     |  |
| T1-8C                            | 1/2" x 1/2"           | 2   |  |
|                                  | x 3/8"                |     |  |
| T1-8D                            | 1/2" x 1/2"<br>x 1/2" | 2   |  |
| T1-10C                           | 5/8" x 5/8"<br>x 3/8" | 2   |  |
| T1-10D                           | 5/8" x 5/8"<br>x 1/2" | 2   |  |
|                                  |                       |     |  |

FLARE TEE

PART NO.

T2-3

T2-4

T2-5

T2-6

T2-8

T2-10

T2-12

USA

SIZE

3/16"

1/4"

5/16"

3/8"

1/2"

5/8"

3/4"

PKG

5

10

5

10

5

2

2

**REPAIR PARTS** 

DEEP VACUUM

CHARGING EQUIPMENT

ACCESS VALVES

**TOOLS & ACCESSORIES** 

BRASS FITTINGS



| PART NO. | SIZE        | PKG |
|----------|-------------|-----|
| TR2-446  | 1/4" x 1/4" | 5   |
|          | x 3/8"      |     |
| TR2-664  | 3/8" x 3/8" | 5   |
|          | x 1/4"      |     |
| TR2-668  | 3/8" x 3/8" | 2   |
|          | x 1/2"      |     |
| TR2-886  | 1/2" x 1/2" | 2   |
|          | x 3/8"      |     |

USA USA

FLARE X MALE

PIPE ADAPTER

FLARE X MALE PIPE X FLARE TEE



| PART N | O. SIZE      | PKG |
|--------|--------------|-----|
| T3-4A  | 1/4" x 1/8"  | 5   |
|        | x 1/4"       |     |
| T3-4B  | 1/4" x 1/4"  | 5   |
|        | x 1/4"       |     |
| T3-5B  | 5/16" x 1/4" | 2   |
|        | x 5/16"      |     |
| T3-6B  | 3/8" x 1/4"  | 5   |
|        | x 3/8"       |     |
| T3-6C  | 3/8" x 3/8"  | 2   |
|        | x 3/8"       |     |
| T3-6D  | 3/8" x 1/2"  | 2   |
|        | x 3/8"       |     |
| T3-8C  | 1/2" x 3/8"  | 2   |
|        | x 1/2"       |     |
| T3-8D  | 1/2" x 1/2"  | 2   |
|        | x 1/2"       |     |
| T3-10D | 5/8" x 1/2"  | 2   |
|        | x 5/8"       |     |
|        |              |     |

### FLARE X FLARE X FEMALE FLARE TEE MADE IN

| PART NO. | SIZE | PKG |
|----------|------|-----|
| T6-4     | 1/4" | 2   |

|          | SA           |     |
|----------|--------------|-----|
|          |              |     |
| PART NO. | SIZE         | PKG |
| U1-2A    | 1/8" x 1/8"  | 5   |
| U1-3A    | 3/16" x 1/8" | 5   |
| U1-3B    | 3/16" x 1/4" | 5   |
| U1-4A    | 1/4" x 1/8"  | 25  |
| U1-4B-5  | 1/4" x 1/4"  | 5   |
| U1-4C-5  | 1/4" x 3/8"  | 5   |
| U1-4D    | 1/4" x 1/2"  | 10  |
| U1-5A    | 5/16" x 1/8" | 5   |
| U1-5B    | 5/16" x 1/4" | 5   |
| U1-5C    | 5/16" x 3/8" | 5   |
| U1-6A    | 3/8" x 1/8"  | 10  |
| U1-6B    | 3/8" x 1/4"  | 10  |
| U1-6C    | 3/8" x 3/8"  | 10  |
| U1-6D    | 3/8" x 1/2"  | 10  |
| U1-6E    | 3/8" x 3/4"  | 5   |
| U1-8A    | 1/2" x 1/8"  | 2   |
| U1-8B    | 1/2" x 1/4"  | 5   |
| U1-8C    | 1/2" x 3/8"  | 10  |
| U1-8D    | 1/2" x 1/2"  | 10  |
| U1-8E    | 1/2" x 3/4"  | 5   |
| U1-10B   | 5/8" x 1/4"  | 5   |
| U1-10C   | 5/8" x 3/8"  | 5   |
| U1-10D   | 5/8" x 1/2"  | 10  |
| U1-10E   | 5/8" x 3/4"  | 5   |
| U1-12C   | 3/4" x 3/8"  | 2   |
| U1-12D   | 3/4" x 1/2"  | 2   |
| U1-12E   | 3/4" x 3/4"  | 2   |
| U1-14E   | 7/8" x 3/4"  | 2   |

### FLARE UNION

U2-10

U2-12

U2-14

| PART NO. | SIZE  | PKG |  |  |
|----------|-------|-----|--|--|
| U2-2     | 1/8"  | 5   |  |  |
| U2-3     | 3/16" | 5   |  |  |
| U2-4-5   | 1/4"  | 5   |  |  |
| U2-5     | 5/16" | 10  |  |  |
| U2-6-5   | 3/8"  | 5   |  |  |
| U2-8     | 1/2"  | 10  |  |  |

5/8"

3/4"

7/8"

10

2

2

| REDUCING |   |
|----------|---|
| US/      | N |

| PART NO. | SIZE         | PKG |
|----------|--------------|-----|
| UR2-43 1 | /4" x 3/16"  | 5   |
| UR2-54   | 5/16" x 1/4" | 5   |
| UR2-64   | 3/8" x 1/4"  | 10  |
| UR2-65   | 3/8" x 5/16" | 5   |
| UR2-84   | 1/2" x 1/4"  | 5   |
| UR2-86   | 1/2" x 3/8"  | 10  |
| UR2-106  | 5/8" x 3/8"  | 5   |
| UR2-108  | 5/8" x 1/2"  | 5   |
| UR2-128  | 3/4" x 1/2"  | 2   |
| UR2-1210 | 3/4" x 5/8"  | 2   |

FLARE X FEMALE PIPE ADAPTER



| PART NO. | SIZE         | PKG |       |
|----------|--------------|-----|-------|
| U3-2A    | 1/8" x 1/8"  | 5   |       |
| U3-3A    | 3/16" x 1/8" | 5   | A LOU |
| U3-4A    | 1/4" x 1/8"  | 10  |       |
| U3-4B    | 1/4" x 1/4"  | 10  |       |
| U3-4C    | 1/4" x 3/8"  | 5   |       |
| U3-5A    | 5/16" x 1/8" | 5   |       |
| U3-5B    | 5/16" x 1/4" | 5   |       |
| U3-6A    | 3/8" x 1/8"  | 5   |       |
| U3-6B    | 3/8" x 1/4"  | 5   |       |
| U3-6C    | 3/8" x 3/8"  | 5   |       |
| U3-6D    | 3/8" x 1/2"  | 5   |       |
| U3-8B    | 1/2" x 1/4"  | 5   |       |
| U3-8C    | 1/2" x 3/8"  | 5   |       |
| U3-8D    | 1/2" x 1/2"  | 5   |       |
| U3-8E    | 1/2" x 3/4"  | 2   | 1     |
| U3-10C   | 5/8" x 3/8"  | 5   |       |
| U3-10D   | 5/8" x 1/2"  | 5   |       |
| U3-10E   | 5/8" x 3/4"  | 2   | 1     |
|          |              |     |       |

| FEMAL | EFU  | RE  |
|-------|------|-----|
| FLARE | ADAF | TER |

MADE IN USA

**INCLUDES COPPER GASKET** 

| PART NO. | SIZE         | PKG |
|----------|--------------|-----|
| UR3-43   | 1/4" x 3/16" | 2   |
| UR3-46   | 1/4" x 3/8"  | 10  |
| UR3-48   | 1/4" x 1/2"  | 5   |
| UR3-64   | 3/8" x 1/4"  | 20  |
| UR3-68   | 3/8" x 1/2"  | 10  |
| UR3-84   | 1/2" x 1/4"  | 10  |
| UR3-86   | 1/2" x 3/8"  | 10  |
| UR3-810  | 1/2" x 5/8"  | 10  |
| UR3-108  | 5/8" x 1/2"  | 5   |
| UR3-1012 | 5/8" x 3/4"  | 2   |
| UR3-1210 | 3/4" x 5/8"  | 2   |
|          |              |     |

FLARE X SOLDER ADAPTER

SIZE

1/4" x 1/4"

1/4" x 5/16"

1/4" x 3/8"

3/8" x 1/4"

3/8" x 5/16"

3/8" x 3/8"

3/8" x 1/2"

3/8" x 5/8"

1/2" x 3/8"

1/2" x 1/2"

1/2" x 5/8"

5/8" x 1/2"

5/8" x 5/8"

5/8" x 3/4"

5/8" x 7/8"

3/4" x 3/4"

3/4" x 7/8"

PKG

10

5

5

5

5

10

5

5

2

5

2

2

5

2

2

5

2

**FURNISHED WITH** 

**COPPER GASKET** 

PART NO.

US3-44

US3-45

**US3-46** 

**US3-64** 

US3-65

US3-66

**US3-68** 

**US3-610** 

**US3-86** 

US3-88

US3-810

US3-108

US3-1010

US3-1012

US3-1014

US3-1212

US3-1214

USA

INDEX

| re X Femal<br>Ector | £   | SWIVEL FEI<br>Solder Ad     | MALE FLARE<br>APTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | X        |
|---------------------|-----|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| rs 🚽                |     | A32700 SERIE                | S PG 48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2        |
|                     |     | <b>E</b> US                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |
| SIZE                | PKG | PART NO.<br>US5-44          | <b>SIZE</b><br>1/4" x 1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | PKG<br>5 |
| 1/4"                | 10  | US5-66                      | 3/8" x 3/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5        |
| 3/8"                | 10  | US5-88                      | 1/2" x 1/2"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5        |
| 1/2"                | 2   | US5-1010                    | 5/8" x 5/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5        |
| 5/8"                | 2   | US5-1212                    | 3/4" x 3/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2        |
| 3/4"                | 2   | -                           | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
| IALE FLARE          |     | Female Fl<br>Pipe Adap      | ARE X FEMI<br>TER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ALE      |
|                     |     | INCLUDES COI<br>SEAL GASKET | PPER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0        |
| Ä                   | 7   |                             | SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |
| SIZE                | PKG | PART NO.                    | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PKG      |
| 1/4"                | 10  | U6-4A                       | 1/4" x 1/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2        |
| 5/16"               | 5   | U6-4B                       | 1/4" x 1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2        |
| 3/8"                | 10  |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |
| 1/2"                | 10  | EXTRA LAN                   | G FLARE X I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | WATE     |
| 5/8"                | 5   | PIPE ADAP                   | The state of the second s | VIPALAL  |
| RE X MALE           |     | <b>W</b> US                 | X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |
|                     |     | PART NO.                    | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PKG      |
|                     |     | UX1-4A                      | 1/4" x 1/8"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2        |
| Å                   |     | UX1-4B                      | 1/4" x 1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 5        |
| SIZE                | PKG |                             | frank a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 14       |
| 1/4" x 1/8"         | 5   | EXTRA LOA                   | IG FLARE UN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | lion     |
| 1/4" x 1/4"         | 10  |                             | E IN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7        |
| 3/8" x 1/4"         | 5   | US                          | SA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |
| 1/2" x 3/8"         | 2   | PART NO.                    | SIZE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PKG      |
| 1/2" x 1/2"         | 2   | UX2-4                       | 1/4"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 5        |
| neurs               |     |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |

### BRASS PIPE FITTINGS

JB's American made forged brass pipe fittings are manufactured from CA 377 alloy and are threaded to Dryseal Taper Pipe Standards to generally comply with SAE, ASA, ASME, and MS Standards. Forgings can be used on vacuums to pressures of 5,000 psi depending on size, material, and conditions.

#### Features:

- Good vibration resistance (improved by using long nuts)
- Low cost
- Easy assembly
- American made quality
- Wide selection

JB recommends the use of a compatible thread sealant and tightening 2 1/2 full turns past hand tight.

Vacuum and pressures of 5,000 psi can be handled depending upon the size, material, and conditions.

Caution: Over-tightening and dirt can damage fittings

JB brass fittings are sold in box quantities only. For more information, please contact sales@jbind.com or 800.323.0811.

### NOMINAL PIPE SIZE THREADS

| NOM.<br>PIPE |      | NOM.<br>PIPE |      |
|--------------|------|--------------|------|
| 1/16"        | 27   | 2"           | 11.5 |
| 1/8"         | 27   | 2-1/2"       | 8    |
| 1/4"         | 18   | 3"           | 8    |
| 3/8"         | 18   | 3-1/2"       | 8    |
| 1/2"         | 14   | 4"           | 8    |
| 3/4"         | 14   | 5"           | 8    |
| 1"           | 11.5 | 6"           | 8    |
| 1-1/4"       | 11.5 | 8"           | 8    |
| 1-1/2"       | 11.5 |              |      |



| (        |      |     |
|----------|------|-----|
| PART NO. | SIZE | PKG |
| 101-A    | 1/8" | 5   |
| 101-B    | 1/4" | 10  |
| 101-C    | 3/8" | 5   |
| 101-D    | 1/2" | 2   |
| 101-E    | 3/4" | 2   |



| PART NO. | SIZE                             | PKG                                                                           | PART NO.                                                                                              |
|----------|----------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 100-A    | 1/8"                             | 5                                                                             | 1103-A                                                                                                |
| 100-B    | 1/4"                             | 5                                                                             | 103-B                                                                                                 |
| 100-C    | 3/8"                             | 5                                                                             | 103-C                                                                                                 |
| 100-D    | 1/2"                             | 2                                                                             | 103-D                                                                                                 |
| 100-E    | 3/4"                             | 2                                                                             | 103-E                                                                                                 |
|          | 100-A<br>100-B<br>100-C<br>100-D | 100-A     1/8"       100-B     1/4"       100-C     3/8"       100-D     1/2" | 100-A     1/8"     5       100-B     1/4"     5       100-C     3/8"     5       100-D     1/2"     2 |



|          | and an American |     |
|----------|-----------------|-----|
| PART NO. | SIZE            | PKG |
| 1103-A   | 1/8"            | 5   |
| 103-B    | 1/4"            | 10  |
| 103-C    | 3/8"            | 5   |
| 103-D    | 1/2"            | 5   |
| 103-F    | 3/4"            | 5   |

**DEEP VACUUM** 

**CHARGING EQUIPMENT** 

FEMALE FLA

FLARE CONN

**INCLUDES TWO** 

**COPPER GASKET** 

PART NO.

U4-4

U4-6

U4-8

U4-10

U4-12

SWIVEL FEN

CONNECTOR

US

PART NO.

FEMALE FLA PIPE ADAPTI INCLUDES COPP SEAL GASKET

US

**PART NO.** U5-4A U5-4B

U5-6B U5-8C U5-8D

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**US4-4** 

US4-5 US4-6 US4-8 US4-10

MADE

**REPAIR PARTS** 

## **BRASS FITTINGS**

| HEX BRUSH<br>(R1) |                      |        | LONG NIPPL         | £                               |        | STREET       |             |     | <b>HEX NIPPLE</b><br>(U10) |               |     |
|-------------------|----------------------|--------|--------------------|---------------------------------|--------|--------------|-------------|-----|----------------------------|---------------|-----|
| PART NO.          | SIZE                 | PKG    |                    | A                               |        |              | SA          |     |                            |               |     |
| 110-BA            | 5//4=<br>1/4" x 1/8" | 10     |                    |                                 |        | PART NO      | ). SIZE     | PKG |                            |               |     |
| 110-DA            | 3/8" x 1/8"          | 5      | PART NO.           | SIZE P                          | KG     | 116-A        | 1/8" forged | 5   | US                         | Ä             |     |
| 110-CA            | 3/8" x 1/4"          |        | 113-A15            | 1/8" x 1-1/2"                   | 5      | 116-B        | 1/4" closed | 5   |                            | C. Contractor |     |
|                   |                      | 10     | 113-A2             | 1/8" x 2"                       | 5      |              | forged      |     | PART NO.                   | SIZE          | PKG |
| 110-DA            | 1/2" x 1/8"          | 5      | 113-A25            | 1/8" x 2-1/2"                   | 5      | 116-C        | 3/8" closed | 5   | 122-A                      | 1/8"          | 5   |
| 110-DB            | 1/2" x 1/4"          | 10     | 113-A3             | 1/8" x 3"                       | 5      |              | forged      |     | 122-B                      | 1/4"          | 10  |
| 110-DC            | 1/2" x 3/8"          | 10     | 113-A35            | 1/8" x 3-1/2"                   | 5      | 116-D        | 1/2" forged | 2   | 122-C                      | 3/8"          | 5   |
| 110-EA            | 3/4" x 1/8"          | 2      | 113-B15            | 1/4" x 1-1/2"                   | 5      | -            |             | -   | 122-D                      | 1/2"          | 5   |
| 110-EB            | 3/4" x 1/4"          | 5      | 113-B2             | 1/4" x 2"                       | 5      | HUTAT HUT AJ |             |     | 122-E                      | 3/4"          | 5   |
| 110-EC            | 3/4" x 3/8"          | 5      | 113-B25            | 1/4" x 2 -1/2"                  | 5      | HEX HEA!     |             |     |                            |               | -   |
| 110-ED            | 3/4" x 1/2"          | 5      | 113-B3<br>113-B35  | 1/4" x 3"<br>1/4" x 3-1/2"      | 5<br>5 | PLUG (P3     | )           |     | Ser Barriston              |               |     |
| 110-FD            | 1" x 1/2"            | 2      | 113-Б35<br>113-С15 | 1/4" x 3-1/2"<br>3/8" x 1- 1/2" | 5      |              | NEW         |     | COMPRESS                   | ION           |     |
| 110-FE            | 1" x 3/4"            | 2      | 113-C15            | 3/8" x 2"                       | 5      |              | SA          |     | BREAK-OFF                  |               |     |
| <b>CLOSE NIPP</b> | HE 1000              | ADE IN | 113-C2             | 3/8" x 2 -1/2"                  | 5      |              |             |     | SLEEVE (PI                 | LOT) NUT      |     |
| GLOOL WITT        | ы. 🚬 О               | SA     | 113-C3             | 3/8" x 3"                       | 5      | PART NO      | . SIZE      | PKG |                            |               |     |
| PART NO.          | SIZE                 | PKG    | 113-C35            | 3/8" x 3 -1/2"                  | -      | 121-A        | 1/8"        | 10  | MAD                        |               |     |
| 112-A             | 1/8"                 | 5      | 113-D15            | 1/2" x 1-1/2"                   | 5      | 121-B        | 1/4"        | 10  | US                         | A             |     |
| 112-B             | 1/4"                 | 10     | 113-D2             | 1/2" x 2"                       | 5      | 121-C        | 3/8"        | 5   | and and an open set        |               |     |
| 112-C             | 3/8"                 | 5      | 113-D25            | 1/2" x 2-1/2"                   | 5      | 121-D        | 1/2"        | 5   | PART NO.                   | SIZE          | PKG |
| 112-D             | 1/2"                 | 5      | 113-D3             | 1/2" x 3"                       | 2      | 121-E        | 3/4"        | 5   | 81LB-4                     | 1/4"          | 10  |
| 112-E             | 3/4"                 | 5      | 113-D35            | 1/2" x 3-1/2"                   | 2      | 121-F        | 1"          | 2   |                            | -             | TT  |

## LIMITED WARRANTY

The entire limited warranty and OTC warranty can be found at www.jbind.com. Products sold by JB Industries, Inc. are warranted for a period of 12 months from the date of sale with the following exceptions:

- Vacuum pumps are warranted 24 months LIMITED over-the-counter. Not changing the oil will void the over the counter warranty.
- Digital gauges are warranted 12 months ATLAS scale 24 months
- ROTHENBERGER tools are warranted 24 months

JB limits this warranty to the repair, replacement or credit at invoice price (JB's option) of products that in JB's opinion are defective due to defects in workmanship and/or materials. Warranty claims resulting from obvious product abuse, misuse such as broken parts or lack of maintenance including failure to keep the vacuum pump filled with clean oil, abnormal use or normal wear and tear will not be honored as warranty repair and will be subject to JB's published repair costs. This express warranty is in lieu of and excludes all other warranties, guarantees and/or representations, express or implied, of JB and/or the manufacturer of such products that make NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. Technical information, recommendations and advice as to properties and usages of materials, design, installation and use of products, engineering and other matters are provided as an accommodation and are intended only as suggestions. Although they are believed to be accurate, based on JB's knowledge and experience, JB assumes no obligation or liability for any results obtained in their use or application, and they are not to be construed as establishing any warranty, express or implied. In no event shall JB be liable for claims for any damages whatsoever (whether direct, foreseeable, consequential or special) suffered by buyer or anyone else arising out of any breach by JB. JB makes no warranty to those defined as consumers in the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act.

Disclaimers: All product items pictured, described, or otherwise displayed herein are subject to changes, alterations, and/or modifications at anytime by JB Industries, Inc. The terms and conditions for the purchase of JB Industries, Inc. products are subject to changes, alterations, and/or modifications at any time by JB Industries, Inc. and will be made available upon request to JB Industries and shall be provided to customers of JB Industries, Inc. at time of purchase.

DEEP VACUUM

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### WARRANTY

### **VACUUM PUMPS: 24 MONTHS**

### CHANGE THE OIL!!! MOST PUMPS SIMPLY NEED AN OIL CHANGE!!!!!! NOT CHANGING OIL WILL VOID WARRANTY

Pumps that are in warranty are examined as soon as they arrive at the warehouse so that we may contact the wholesaler regarding our determination. The over-thecounter warranty applies only to the manufacturing defects and is VOID if the problem has been determined to be abuse.

Check for Signs of Abuse:

- A. Bell back housing area
- B. Side of trap
- C. Base is broken or missing corners
- D. Damage to protective fins and drain valve
- E. Flat hit marks on top and bottom of corners
- F. Handle bent down or broken
- G. Intake damaged or missing



### **MANIFOLDS: LIFETIME BAR ONLY**

Manifolds carry a lifetime warranty on the bar only and does not include coverage of any parts. The 12 month over-the-counter warranty covers manufacturing defects only, not abuse. Signs of abuse include lens cracked or missing, gauges that can be loosened by hand, and drop marks on manifolds or unions. Check calibration with the set screw on the gauge as well.

### DIGITAL INSTRUMENTS (Gauges, Manifolds): 12 Months, Atlas Scale: 24 Months

Check the batteries. The product will provide a low battery warning with flashing dots at the bottom of the display. Plug in and toggle through the settings as well as the temperature setting to check if the sensors are working. If the sensors are working, push the on/ off button to auto cal to see if it will return to zero. If any of the readings are off, check to see what the temperature sensor is for both sensors. A few degrees difference between the two can cause a problem with the readings. Check for signs of abuse which include a cracked case, drop marks on fittings, display is dimmed or damaged, sensor is pinched or sliced, and the hook is bent or missing.

For our Digital Micron gauge, DV-22N, check the last recorded vacuum and then press twice to clear the last recorded vacuum to see if it resets (if the numbers are jumping around, it may be a cold pump or oil contaminant inside the thermistor). If the numbers are jumping around after you have disconnected the gauge from the vacuum and it will not return to one, wait until the gauge auto calibrates. Unit will display JB and turn off before it reads 1 if batteries are low. Check for signs of abuse which include a cracked case, the coupler is loose at the base of the case, the O-ring/gasket is chewed up or damaged or missing, there are pliers or channel locks on couplers, and the hook is broken or missing.

### **ROTHENBERGER TOOLS: 24 MONTHS**

Check for signs of abuse

### **HOW TO RETURN PRODUCT**

Prior to returning any product to JB, you are required to obtain a Return Goods Authorization number (RGA). Contact customer service at 800-323-0811 to obtain your RGA. Insure that all returned products are packed adequately to avoid damage during shipment as we will not honor warranty claims for items damaged in transit. The recommended packing procedure for pumps is detailed below. Paperwork should be placed in a separate plastic bag and should include your assigned RGA, a description of the problem , a copy of the invoice, and any customer assigned repair or purchase order number (if applicable). Please provide contact information of whom to inform of package receipt as well as the person authorized to accept repair charges should the warranty be void.

- 1. Completely drain oil and close all valves
- 2. Place pump in plastic bag and seal
- 3. Cushion bottom of carton with packing paper or crumpled newspaper before placing pump in carton and fill in along sides and top. DO NOT USE PEANUTS
- 4. Place paperwork in a separate plastic bag and seal. Include the RGA and detail of problem
- 5. If estimate is required before repair, be certain this is highlighted and clearly specified
- 6. Depending on time of year, allow 2-4 weeks for repair service

Ship repairs to: JB Industries 601 N. Farnsworth Ave. Aurora, IL 60505 Merced Wholesale 805 S. Fremont Alhambra, CA 91803 Phone 626-293-5710 Fax 626-289-1196

### FOR VACUUM PUMPS ONLY:

AK, AZ, CA, ID, MT, NV, OR, UT, and WA customers have the option of also using Merced Wholesale for pump repair. For customers choosing the Merced facility, prices and terms of condition must be obtained from Merced.

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**BRASS FITTINGS** 

## **POP MARKETING AND MERCHANDISING**



JUST BETTER

LAMINATED WITH A DURABLE RUBBER BACKING.

34.5" X 23.5" EACH.

36" X 47.5" EACH.

**BACKING FOR SLATWALL 2 PANELS** 

MKDS05

MKDS03 FLAT HEADER 12" X 36".

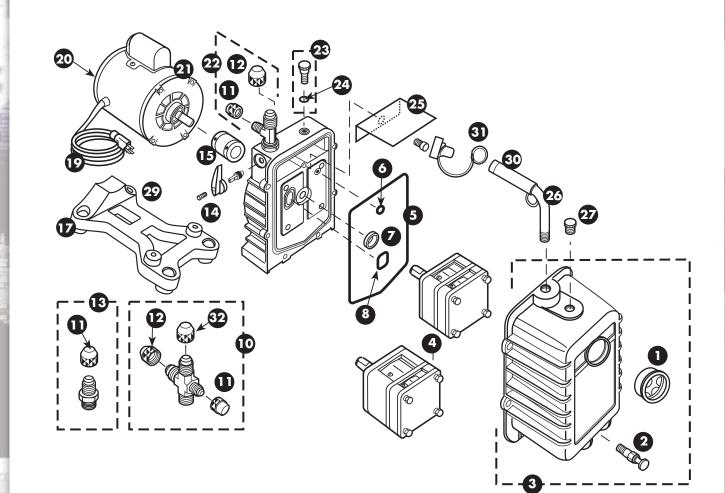
MKDS02 HEADER FOR END CAPS 12" X 36" with a 2" bend to attach to gondolas **REPAIR PARTS** 

**DEEP VACUUM** 

BRASS FITTINGS

## VACUUM PUMP REPAIR

DV-42N THROUGH DV-285N SERIES



WHEN ORDERING, PLEASE PROVIDE THE FOLLOWING INFORMATION: • MODEL NUMBER

- FOUR DIGIT SERIAL NUMBER
- PART NUMBER AND DESCRIPTION

FOR REPAIR PARTS FOR DV-42 AND DV-42N SERIES PUMPS MANUFACTURED PRIOR TO JANUARY 2001 SEE PAGE 70.

OPERATING INSTRUCTIONS FOR ALL PUMPS MANUFACTURED SINCE 1980 AVAILABLE UNDER "TECHNICAL INFORMATION" AT WWW.JBIND.COM.

### NEW:

NOTE : ON FLEXIBLE COUPLER (15) FLEBIBLE SECTION IS AVAILABLE AS PR-308

### NEW:

PR-209 NOW INCLUDES STEM WITH O-RINGS AND RETAINER

NEW:

PR-56 - ADAPTOR NUT WITH O-RING

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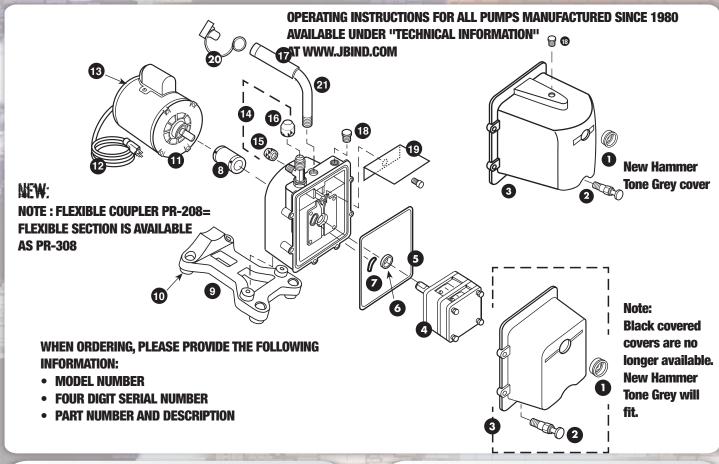
## VACUUM PUMP REPAIR

| REFERENCE | PART NO.           | DESCRIPTION                                                                             | REFERENCE                                                                                                  | PART NO.           | DESCRIPTION                                                           |
|-----------|--------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------------|
| 1         | PR-1               | Sight Glass                                                                             | 15                                                                                                         | PR-208             | Flexible Coupler                                                      |
| 2         | PR-2               | Drain Valve                                                                             | 15                                                                                                         | PR-308             | Flexible Section Only                                                 |
| 3         | <b>PR-300</b>      | DV-42N Through DV200N                                                                   | 16                                                                                                         | PR-42              | Motor Foot With Screw                                                 |
|           |                    | Cover Assy. w/ Sight Glass<br>And Drain Valve                                           | 17                                                                                                         | PR-59              | Base Foot                                                             |
| 3         | PR-301             | DV-285N Cover Assy. w/                                                                  | 19                                                                                                         | PR-31              | Line Cord (Emerson Motor)                                             |
| -         |                    | Sight Glass And Drain Valve                                                             | 19                                                                                                         | PR-58              | Line Cord (Marathon Motor)                                            |
| 3         | PR-200             | No Longer Available.<br>Can Substitute PR-201                                           | 20                                                                                                         | PR-35              | Rocker Switch With Prongs<br>(Marathon 1101-0105)                     |
| 3         | <u>PR-201</u>      | DV-142N & DV-200N Cover<br>Assy. w/ Sight Glass, Drain<br>Valve & Guard                 | 20                                                                                                         | PR-54              | Rocker Switch With Wire<br>Leads (Emerson)                            |
| 4         | PR-202<br>OBSOLETE | DV-85N Cartridge w/ O-rings<br>And Seal                                                 | 21                                                                                                         | PR-206             | 1/2 Hp, 115v, 60 Hz Motor<br>With Line Cord And Switch                |
| 4         | PR-203<br>OBSOLETE | DV-142N Cartridge w/<br>O-rings And Cover Seal                                          | 21                                                                                                         | PR-207             | 1/2 Hp, 115/230v, 50/60 Hz<br>Motor W/ Line Cord And<br>Switch        |
| 4         | PR-204             | DV-200N Cartridge w/O-rings                                                             | 22                                                                                                         | PR-5               | Intake Tee With Caps                                                  |
| 4         | OBSOLETE<br>PR-214 | And Cover Seal DV-285N Cartridge w/                                                     | 23                                                                                                         | PR-7               | Gas Ballast Valve With<br>O-ring                                      |
| I.        | OBSOLETE           | O-rings And Cover Seal                                                                  | 24                                                                                                         | P90009             | O-ring, Gas Ballast Valve                                             |
| 4         | PR-302             | DV-85N Cartridge w/<br>O-rings And Cover Seal                                           | 25                                                                                                         | PR-40              | Splash Guard And Screw<br>(Excludes 3cfm Manufactured                 |
| 4         | PR-305<br>OBSOLETE | DV-42N after 1200 Cartridge<br>w/O-rings And Cover Seal                                 | 26                                                                                                         | PR-75              | Before 1/01. Use PR-39.)<br>Cushioned Handle With Lift                |
| 4         | PR-303             | DV-142N Cartridge w/<br>O-rings And Cover Seal                                          |                                                                                                            |                    | Ring 1/2" NPT And DV-EP-8<br>As Of 2008                               |
| 4         | PR-304             | DV-200N Cartridge w/<br>O-rings And Cover Seal                                          | 26                                                                                                         | PR-205             | Cushioned Handle 3/8" NPT                                             |
| 4         | PR-314             | DV-285N Cartridge w/                                                                    | 27                                                                                                         | PR-22              | Oil Fill Plug with O-ring                                             |
|           | <u></u>            | O-rings And Cover Seal                                                                  | 28                                                                                                         | PR-56              | Adapter nut with O-ring                                               |
| 5         | PR-216             | Cover Seal                                                                              | 29                                                                                                         | PR-62              | Pump Base (Includes Feet)                                             |
| 5         | PR-311             | Cover Seal                                                                              | 30                                                                                                         | PR-500             | Cushion And Cap 3/8" NPT                                              |
| 6         | PR-211             | Trap O-ring, Gas Ballast                                                                | 30                                                                                                         | PR-501             | Cushion And Cap 1/2" NPT                                              |
| 7         | PR-3               | Shaft Seal                                                                              | 31                                                                                                         | DV-EP6             | Tethered Safety Cap 3/8"                                              |
| 8         | PR-215             | Trap O-ring, Intake                                                                     | 31                                                                                                         | DV-EP8             | Tethered Safety Cap 1/2"                                              |
| 8         | PR-315             | Trap O-ring, Intake                                                                     | 32                                                                                                         | NFT5-8             | 1/2 Cap with O-ring                                                   |
| 9         | PR-4               | Rubber Foot & Screw<br>Assembly (1 Per Package)                                         | Not Shown                                                                                                  | PR-18              | Cartridge Valve Repair Kit<br>(Includes DV-285N As Of<br>2007 Models) |
| 10        | PR-76              | Intake Caps With Cross                                                                  | Not Shown                                                                                                  | PR-52              | DV-285N Cartridge Valve                                               |
| 11        | NFT5-4             | 1/4" O-ring, Intake                                                                     |                                                                                                            |                    | Repair Kit Prior To 2007                                              |
| 12        | NFT5-6             | 3/8" O-ring Cap                                                                         | Net Chevre                                                                                                 | DD 45              | Models                                                                |
| 12A       | NFT5-8             | 1/2" O-ring Cap                                                                         | Not Shown                                                                                                  | PR-45              | Pump Repair Kit: PR-1, PR-2,<br>PR-4(2), PR-42, PR-208                |
| 13        | PR-32              | 1/4" Intake With Cap                                                                    |                                                                                                            |                    |                                                                       |
| 14        | PR-209             | Plastic Isolation Valve Handle<br>And Screw w/Stem and<br>Retainer (Not Interchangeable | Plain type: All pumps                                                                                      |                    | d beginning January 2001                                              |
|           |                    | w/ PR- 210)                                                                             | Underlined: Pumps manufactured before January 200<br>PR-62 will fit all pumps with serial #0101 and higher |                    |                                                                       |
| 14        | PR-210             | Metal Isolation Valve                                                                   | PH-02 W                                                                                                    | m ni an pumps with | senai #0101 and nigher                                                |
|           |                    | Handle And Screw                                                                        |                                                                                                            |                    |                                                                       |

1

## **PUMP REPAIR PARTS**

### DV-3E, DV-4E AND DV-6E ELIMINATOR® SERIES



#### REFERENCE PART NO. DESCRIPTION

| 1         | PR-1   | Sight glass                                                                                  |
|-----------|--------|----------------------------------------------------------------------------------------------|
| 2         | PR-2   | Drain valve                                                                                  |
| 3         | PR-10  | DV-3E, DV-4E and DV-6E<br>Cover assembly includes sight<br>glass, drain valve, oil fill plug |
| 4 NEW     | PR-403 | DV-3E Cartridge complete<br>with O-rings and cover seal                                      |
| 4 NEW     | PR-404 | DV-4E Cartridge complete<br>with O-rings and cover seal                                      |
| 4 NEW     | PR-406 | DV-6E Cartridge complete<br>with O-rings and cover seal                                      |
| 5 NEW     | PR-217 | Cover seal                                                                                   |
| 6         | PR-3   | Shaft seal                                                                                   |
| 7         | PR-315 | Trap intake O-ring                                                                           |
| 8         | PR-208 | Flexible coupler                                                                             |
| 9         | PR-62  | Pump base<br>(includes rubber feet)                                                          |
| 10        | PR-59  | Rubber foot                                                                                  |
| Not shown | PR-18  | Cartridge valve repair kit                                                                   |

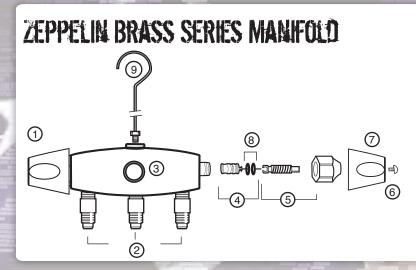
#### **REFERENCE PART NO.** DESCRIPTION

| 11            | PR-207 | 1/2 HP, 115/230 V, 50/60 HZ<br>Motor with line cord and<br>switch |
|---------------|--------|-------------------------------------------------------------------|
| 11            | PR-206 | 1/2 HP Motor with line cord and switch                            |
| 12            | PR-31  | Line cord (Emerson motor)                                         |
| 12 NEW        | PR-58  | Line Cord (Marathon motor)                                        |
| 13            | PR-54  | Motor switch, rocker                                              |
| 14            | PR-63  | Intake tee with cap                                               |
| 15            | NFT5-4 | 1/4" O-ring cap                                                   |
| 16            | NFT5-6 | 3/8" O-ring cap                                                   |
| 17 Black      | PR-205 | Cushioned handle 3/8" NPT                                         |
| 17 Hammertone | PR-65  | Cushioned handle 1/2" NPT                                         |
| 18            | PR-22  | Oil fill plug with O-ring                                         |
| 19            | PR-39  | DV-3E splash guard with screw                                     |
| 19            | PR-40  | DV-4E and DV6E splash guard with screw                            |
| 20 Black      | DV-EP6 | Tethered safety plug 3/8"                                         |
| 20 Hammertone | DV-EP8 | Tethered satety plug 1/2"                                         |
|               |        |                                                                   |

REPAIR PARTS

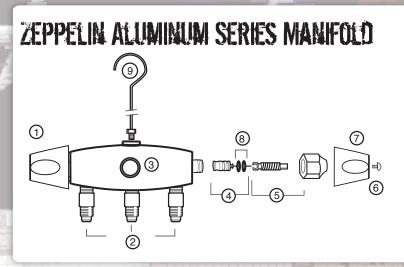
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## **MANIFOLD REPAIR PARTS**



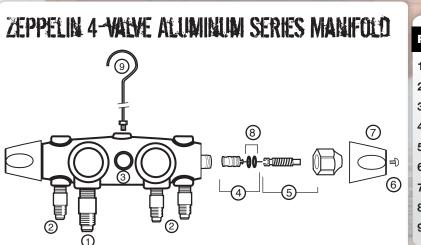
| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | MR-601   | Hand wheel and screw         |
| 2         | U1-4A    | 1/4" Intake                  |
| 3         | MR-520   | Sight glass                  |
| 4         | MR-505   | Piston with seat and O-rings |
| 5         | MR-606   | Stem and nut                 |
| 6         | MR-601   | Hand wheel and screw         |
| 7         | MR-503   | Hand wheel screws (two)      |
| 8         | MR-509   | O-rings (two)                |
| 9         | M2-102N  | Hanging hook                 |
|           |          |                              |

SEE PAGE 37 FOR MANIFOLD REBUILD KITS



| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | MR-601   | Hand wheel and screw         |
| 2         | U1-4A    | 1/4" Intake                  |
| 3         | MR-520   | Sight glass                  |
| 4         | MR-505   | Piston with seat and O-rings |
| 5         | MR-606   | Stem and nut                 |
| 6         | MR-601   | Hand wheel and screw         |
| 7         | MR-503   | Hand wheel screws (two)      |
| 8         | MR-509   | O-rings (two)                |
| 9         | M2-102N  | Hanging hook                 |

### SEE PAGE 37 FOR MANIFOLD REBUILD KITS

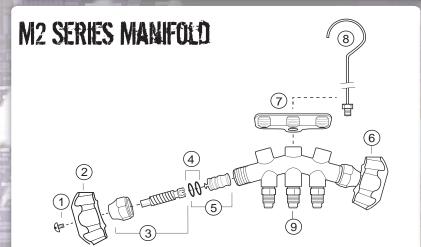


| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | U1-6B    | 3/8" Intake                  |
| 2         | U1-4A    | 1/4" Intake                  |
| 3         | MR-520   | Sight glass                  |
| 4         | MR-605   | Piston with seat and O-rings |
| 5         | MR-607   | Stem and nut                 |
| 6         | MR-601   | Hand wheel and screw         |
| 7         | MR-503   | Hand wheel screws (two)      |
| 8         | MR-409   | O-rings (two)                |
| 9         | M2-102N  | Hanging hook                 |
|           |          |                              |

**CCESS VALVES** 

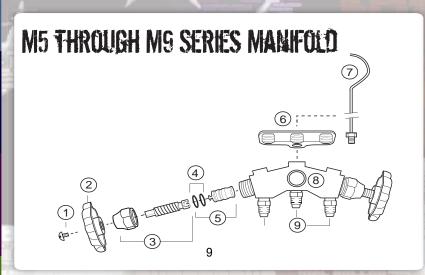
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## **MANIFOLD REPAIR PARTS**

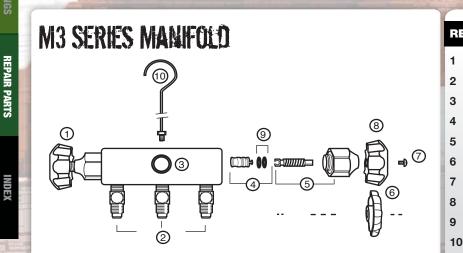


| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | MR-503   | Hand wheel screw (two)       |
| 2         | MR-501B  | Blue Hand wheel and screw    |
| 3         | MR-516   | Stem and nut                 |
| 4         | MR-509   | O-ring (two)                 |
| 5         | MR-505   | Piston with seat and O-rings |
| 6         | MR-501R  | Red Hand wheel               |
| 7         | M2-300   | Hose holder                  |
| 8         | M2-102N  | Hanging hook                 |
| 9         | U1-4A    | Intake                       |

SEE PAGE 37 FOR MANIFOLD REBUILD KITS FOR M2 ONLY



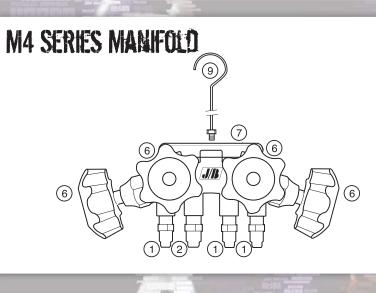
| REFERENCE I | PART NO. | DESCRIPTION                  |
|-------------|----------|------------------------------|
| 1           | MR-503   | Hand wheel screw (two)       |
| 2           | MR-508   | Metal hand wheel and screw   |
| 3           | MR-516   | Stem and nut                 |
| 4           | MR-509   | O-ring (two)                 |
| 5           | MR-505   | Piston with seat and O-rings |
| 6           | M2-300   | Hose holder                  |
| 6           | MR-521   | ACME thread hose holder      |
| 7           | M2-102N  | Hanging hook                 |
| 8           | MR-520   | Sight glass                  |
| 9           | U1-4A    | Intake                       |
| 9           | AF-13450 | ACME Intake                  |



| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | MR-501B  | Blue Hand wheel and screws   |
| 2         | MR-550   | 1/4" Intake and hose holder  |
| 3         | MR-520   | Sight glass                  |
| 4         | MR-505   | Piston with seat and O-rings |
| 5         | MR-560   | Stem and nut                 |
| 6         | MR-508   | Metal hand wheel and screw   |
| 7         | MR-503   | Hand wheel screws (two)      |
| 8         | MR-501R  | Red Hand wheel               |
| 9         | MR-509   | O-rings (two)                |
| 10        | M2-102N  | Hanging hook                 |

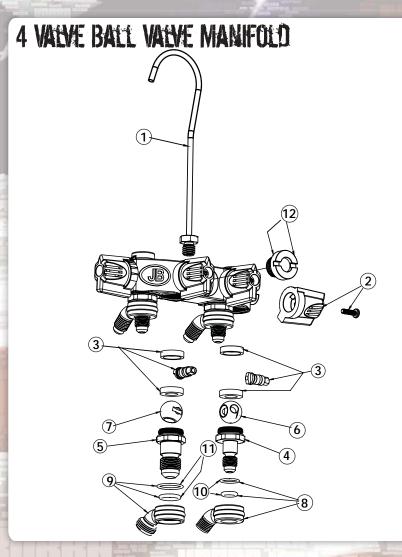
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## **MANIFOLD REPAIR PARTS**



| REFERENCE | PART NO. | DESCRIPTION                  |
|-----------|----------|------------------------------|
| 1         | U1-4A    | 1/4" Intake                  |
| 2         | U1-6A    | 3/8" Intake                  |
| 3         | MR-505   | Piston with seat and O-rings |
| 4         | MR-516   | Stem and nut                 |
| 5         | MR-503   | Handwheel screws             |
| 6         | MR-501B  | Blue Hand wheel and screw    |
|           | MR-501Y  | Yellow Handwheel and screw   |
|           | MR-504B  | Black Handwheel and screw    |
|           | MR-501R  | Red Handwheel and screw      |
| 7         | MR-531   | Hose holder                  |
| 8         | MR-509   | O-ring (2)                   |
| 9         | M2-102N  | Hanging hook                 |
|           |          |                              |
|           |          |                              |

SEE PAGE 37 FOR MANIFOLD REBUILD KITS FOR M4 ONLY



| REFERENCE    | PART NO.     | DESCRIPTION                            |
|--------------|--------------|----------------------------------------|
| 26XXX Series | Ball Valve M | lanifold Repair Parts                  |
| 1            | M2-102N      | Hanging Hook                           |
| 2            | MR-502       | Handle & Screw                         |
| 3            | MR-BVK       | Ball Valve Kit Including               |
|              | (2) Seals    |                                        |
|              | (1) Stem     |                                        |
|              | (2) O-rings  |                                        |
|              | (1) Washer   |                                        |
| 4            | MR-444       | 1/4" Retainer Fitting                  |
| 5            | MR-446       | 3/8" Retainer Fitting                  |
| 6            | M6-611       | Throttle Ball                          |
| 7            | MR-610       | Ball                                   |
| 8            | MR-544       | 1/4" Hose Holder Sleeve<br>with O-ring |
| 9            | MR-546       | 3/8" Hose Holder Sleeve<br>with O-ring |
| 10           | MR-504       | 1/4" Hose Holder Sleeve<br>O-ring      |
| 11           | MR-506       | 3/8" Hose Holder Sleeve<br>O-ring      |
| 12           | MR-525       | Sightglass with O-ring                 |

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**TOOLS & ACCESSORIES** 

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|       | 100-B              | 72 11511             | 67 24033                    | 23 25325             | 27 28102             | 30 28880                | 31       |
| e     | 100-C<br>100-D     | 72 11575<br>72 13493 | 67 24040<br>50 24044        | 23 25425<br>23 25500 | 27 28105<br>27 28170 | 30 28882<br>30 28884    | 31<br>31 |
| 16    | 100-E              | 72 13494             | 50 24050                    | 23 25508             | 27 28172             | 30 28886                | 31       |
|       | 101-A              | 72 2VZR-P            | 37 24058                    | 23 25523             | 27 28174             | 30 28888                | 31       |
| 5     | 101-B              | 72 2VZR-S            | 37 24065                    | 23 25525             | 27 28176             | 30 28932                | 31       |
| 9     | 101-C<br>101-D     | 72 23000<br>72 23004 | 21 24069<br>21 24100        | 23 25533<br>23 25548 | 27 28180<br>27 28182 | 30 28935<br>30 28952    | 31<br>31 |
|       | 101-E              | 72 23004             | 21 24108                    | 23 25548             | 27 28184             | 30 28952                | 31       |
|       | 103-A              | 72 23013             | 21 24125                    | 23 25558             | 27 28186             | 30 28959                | 31       |
| 4     | 103-B              | 72 23017             | 21 24133                    | 23 25573             | 27 28188             | 30 28970                | 31       |
|       | 103-C<br>103-D     | 72 23025<br>72 23029 | 21 24140<br>21 24144        | 23 25708<br>23 25713 | 27 28192<br>27 28196 | 30 28972<br>30 28974    | 31       |
|       | 103-D<br>103-E     | 72 23029             | 21 24144                    | 23 25713             | 28 28196             | 30 28974                | 31<br>31 |
|       | 110-BA             | 73 23033             | 21 24158                    | 23 26008             | 28 28199             | 30 28980                | 31       |
|       | 110-CA             | 73 23038             | 21 24165                    | 23 26025             | 28 28202             | 30 28982                | 31       |
|       | 110-CB             | 73 23042             | 21 24169                    | 23 26033             | 28 28205             | 30 28984                | 31       |
|       | 110-DA<br>110-DB   | 73 23050<br>73 23056 | 21 24200<br>21 24208        | 23 26040<br>23 26044 | 28 28270<br>28 28272 | 30 28986<br>30 28988    | 31<br>31 |
|       | 110-DB<br>110-DC   | 73 23056             | 21 24208                    | 23 26044             | 28 28272 28 28274    | 30 28988                | 31       |
|       | 110-EA             | 73 23067             | 21 24233                    | 23 26108             | 28 28276             | 30 29263                | 36       |
| 3     | 110-EB             | 73 23100             | 21 24240                    | 23 26125             | 28 28280             | 30 29280                | 36       |
|       | 110-EC             | 73 23106             | 21 24244                    | 23 26133             | 28 28282             | 30 29285                | 36       |
| 1     | 110-ED<br>110-FD   | 73 23113<br>73 23117 | 21 24250<br>21 24258        | 23 26140<br>23 26144 | 28 28284<br>28 28286 | 30 29290<br>30 29291    | 36<br>36 |
|       | 110-FE             | 73 23125             | 21 24265                    | 23 26200             | 28 28288             | 30 29292                | 36       |
|       | 112-A              | 73 23131             | 21 24325                    | 23 26208             | 28 28292             | 30 29295                | 36       |
| -     | 112-B              | 73 23133             | 21 24425                    | 23 26233             | 28 28296             | 30 29296                | 36       |
|       | 112-C              | 73 23138             | 21 24500                    | 23 26240             | 28 28297             | 30 29297                | 36       |
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|       | 112-E              | 73 23156             | 21 24525                    | 23 26255             | 28 28502             | 30 29312                | 36       |
|       | 113-A2             | 73 23163             | 21 24600                    | 23 27752             | 32 28570             | 30 29315                | 36       |
|       | 113-A25            | 73 23167             | 21 24608                    | 23 27754             | 32 28572             | 30 29316                | 36       |
|       | 113-A3             | 73 23200             | 21 24615                    | 23 27759             | 32 28574             | 30 29317                | 36       |
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|       | 116-B              | 73 23342<br>73 23500 | 21 25158<br>21 25165        | 27 27882             | 32 28774             | 31 3311RK               | 52       |
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|     | A10972                 |    | A31728               | 47     | AF-13457             | 53 | CL-60Y               | 42       | <b>CLE-1200Y</b>     | 40                    | D10160                  | 9        |                    |
| ŝ,  | A10973                 | 65 | A31729               | 47     | AF-13550             | 53 | CL-72B               | 42       | CLP-6B               | 41                    | D10162                  | 9        |                    |
| e.  | A31002                 | 44 | A31734               | 47     | AVK-001              | 48 | CL-72R               | 42       | CLP-6R               | 41                    | D10244                  | 9        |                    |
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|     | A31484 46              |    | A32912               |        | CCLSB-48             |    | CLE-72R              |          | CLV-48Y              |                       | DV-200N-250             | 5        |                    |
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|     | A31722 47              |    | AC-15530             |        | CL-36Y               |    | CLE-600Y             |          | CLV6-48              |                       |                         | B, 16    | 100                |
| -   | A31723 47              |    | AC-15535             |        | CL-48B               |    | CLE-900B             | 40       | CLV6-60              |                       | DV-295                  | 16       | 10.1               |
|     | A31724 47              |    | AF-13450             | 53, 80 | CL-48R               | 42 | <b>CLE-900R</b>      | 40       | CLV6-72              | 41                    | DVO-1                   | 8        |                    |
|     | A31725 47              |    | AF-13451             | 53     | CL-48Y               | 42 | CLE-900Y             | 40       | CV-20004             | 52                    | DVO-12                  | 8        |                    |
|     | A31726 47              |    | AF-13452             | 53     | CL-60B               | 42 | CLE-1200B            | 40       | CV-20006             | 52                    | DVO-24                  | 8        |                    |

**CHARGING EQUIPMENT** 

GAUGES

ACCESS VALVES

TOOLS & ACCESSORIES BRASS FITTINGS

**REPAIR PARTS** 

NDEX.

<sup>8</sup> PAGE 83

| PART #         PG         PART #         PG <th< th=""><th></th><th></th><th>100</th><th>2</th><th></th><th></th><th></th><th>and hitself in pr</th><th></th><th>Acres 100</th><th></th><th></th><th></th><th></th></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| I = AA         GP         FU-AB-126         70         M2-460         33         M4-21131B         24         NS-10         70         PS000         8-11         60           I = AB         GP         FU-AB-228         70         M2-465B         33         M4-22131         24         NS-1004         51         462,60,82,71         16         60         60         8-11,16         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         60         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| I +4A         C         FU-4B-210         70         M2-46B         33         M4-22125         24         M5-12         77         P90006         +11         62           I +4C         C         FU-4C-168         TO         M2-465B         S3         M4-22225         44         CC-65         F         FU-4C-168         FU-4C-168<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| I +4B         66         FU-4B-223         70         M2-465         33         M4-22131         24         NC-31004         51         P00000         8-111, 16.           I +5A         66         FU-4C-210         70         M2-465C         33         M4-22231         24         NC-KFY         5         P00010         50           I +5C         67         FU-4C-210         70         M2-405C         33         MIND303         75         NC-KFY         5         P00011         5.0           I +5C         67         FU-4C-210         70         M2-400C         33         MIND303         75         NC-4         12         P00012         5.3           I +5C         67         FU-6-233         70         M2-405         34         MIND323         75         NC-4         15         P00011         5.0           I +5C         67         FU-6         64         M2-405         34         MIND324         75         NC-4         15         P00016         42           I +5C         67         FU-6         70         M2-453         34         MIND325         75         NC-4         15         P00116         5.0         25         P0016 <td< td=""><td>A. Harris</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | A. 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| I = 4C         (b)         PL=4C-168         (b)         (b)         (b)         (c)         (c) </td <td>1</td> <td></td> <td>~~</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| 15.8.       60       FU-4C-210       70       MX-850C       33       MM-22231       24       NC-KEY       51       PB0010       50         15.6C       60       FU-6C-108       70       MX-800C       33       MMXDS03       77       NC-6-4       51       PB0012       5.9         11.6C       60       FU-6C-108       70       MX2-800C       33       MMXDS02       77       NC-6-4       51       PB0012       5.9         11.6C       60       FU-6C-108       70       MX2-800C       33       MMXDS02       77       NC-6-4       51       PB0012       33         11.6C       60       HX5-44       70       MX2-810       34       MKDS22       77       NC-6-1       51       PB0012       35         11.6C       60       HX5-4       70       MX2-820       34       MKDS23       78       NCP-12       51       PR-1       77       77         11.0D       60       K1-1       70       MX2-820       34       MKDS23       78       NCP-12       51       PR-14       77       77       PR-14       77       77       PR-14       77       77       PR-14       77       77 <td< td=""><td>w</td><td></td><td>~~</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| 1         51-50         60         FU-6C-163         70         MX-5000B         33         MKDB03         75         NCE-4         61         69         60012         5.9           81-66         60         FU-6C-233         70         MX-8000         34         MKDB05         75         NCG-40         61         P90012         5.9           81-60         60         FU-6C-233         70         MX-8000         34         MKDB22         75         NCG-40         61         P90022         39           81-60         60         FU-6C-233         70         MX-800         34         MKDB22         77         NCG-40         61         P90022         39           81-60         60         HH3+1         70         MX-828         34         MKDB25         75         NCP-41         61         PH-1         77           81-100         60         HH3+1         70         MX-828         34         MKDB26         75         NCP-41         61         PH-2         77           81-100         60         HH3+31         MKD866         34         MKD856         75         NCP-41         51         PH-2         777         FE         FE <t< td=""><td>P</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>, . , . ,</td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| 1         6.6         FU-GC-210         7.0         MM-SOUCL         3.0         MKDS04         7.5         NCG-4         6.5         PP00112         52           1         6.6         6.7         GCG-12         5.7         NCG-40         5.7         NCG-40         5.7         NCG-40         5.7         PP0022         39           1         6.6         0.756-12         6.4         MM-S02         7.5         NCG-40         5.7         PP0023         39           1         6.8         1.756-12         6.4         MM-S02         3.4         MKDS22         7.5         NCG-40         5.7         PP0023         39           1         1.90         6.8         MM-S4         7.0         MM-S203         3.4         MKDS26         7.5         NCH-41         5.7         PP0015         6.7         PP0024         5.7         PP0024         5.7         PP0016         6.7         PP0024         5.7         PP0016         6.7         PP0024         5.7         PP0016         6.7         PP0024         5.7         PP0024         5.7         PP0016         6.7         PP0024         5.7         PP0016         6.7         PP00216         6.7         PP0016         6.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Field         OF         FU-GC-233         70         MK-800         34         MKDS05         75         NCC-12         61         P00016         42           Field         66         OTBC-12         64         MK-810         34         MKDS24         75         NCC-50         51         P00021         39           Field         66         MK844         70         MK-810         34         MKDS24         75         NCC-12         51         P00014         39           Field         66         MK844         70         MK-820         34         MKDS51         75         NCM-12         51         P0014         40           Field         68         MK844         70         MK-820         34         MKDS55         75         NCL-12         51         PR-1         77           Field         68         MK441         10         MK8450         34         MKDS55         75         NCL-12         51         PR-1         77           Field         68         MK440         61         MK754-100         50         PR-3         77, 78           Field         75         MCL-12         61         PR-4         77         PR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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                                                                                                                                                                                                                                                                                                                                                                                                                   | E1-5C    | 69  | FU-6C-168  | 70  | M2-500B    | 33 | MKDS03            |    |           |          |               | 8,9       | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| E1+6C         60         0TBC-12         64         MX-B0C         34         MKDS22         75         NCC-60         61         P90022         99           E1+6E         66         HMS4-4         70         MX-B15         34         MKDS27         75         NCC-60         51         P900214         39           E1+8B         69         HMS4-6         70         MX-B22         34         MKDS27         75         NCM-12         51         P900114         35           E1-8D         69         HMS4-6         70         MX-B22         34         MKDS53         75         NCP-12         65         PR-1         77           E1-10C         60         K1-11         70         MX-B30         34         MKDS53         75         NCU-4         65         PR-1         77           E1-10D         60         K1-1         70         MX-B40         34         MKDS53         75         NCU-4         65         PR-10         76           E1-12E         60         K1-6         70         MX-B40         34         MKDS63         75         NCU-4         65         PR-10         77           E1-12E         60         L-24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| E1-6D         69         CTBC-16         64         M28-10         34         MKDS24         76         NCM-12         51         P90513         52           E1-8B         69         HNS-46         70         M22-820         34         MKDS51         76         NCM-12         51         P90513         40           E1-8D         69         HNS-410         70         M22-820         34         MKDS55         75         NCH-12         51         PP1-2         77.78           E1-8D         69         HNS-410         70         M22-820         34         MKDS55         75         NCH-12         51         PP1-2         77.78           E1-10D         66         K1-1         69         M22-820         34         MKDS55         75         NCH-12         51         PP1-7         77           E1-10D         69         K1-8         69         M22-800         35         MH-40         71         NCH-10         77         PP1-10         77           E2-4         69         LC-4         37         M22-875         35         MH-44         81         NFT6-4-CJ         46         PP1-0         77         PP1-2         77         P22-4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| Example         Bis A         TO         NU2 and S         S         MICRS27         TP         DCM-L2         ST         PD0513         E2           Example         G         MISA-6         TO         MISA-8         MISA-8         MISA-8         MISA-8         MISA-8         MISA-8         MISA-8         TO         MISA-8         TO         MISA-8         TO         MISA-8         TO         MISA-8         TO         MISA-8         TO <td>DE .</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| E1-8B         69         HNS-6         70         M2-820         34         MKDS51         75         NCH-2         51         PP0-14         40           E1-8D         69         HNS-10         70         M2-828         34         MKDS52         75         NCH-2         51         PP-1         77           E1-8D         69         HNS-12         70         M2-828         34         MKDS55         75         NCH-2         51         PP-1         77           E1-10C         69         K1-3         69         M2-831         34         MKDS59         75         NCH-2         51         PP-1         77           E1-10E         69         K1-3         69         M2-881         34         MKDS63         75         NCH-2         51         PP-10         77         77           E1-12E         69         K1-3         70         M2-860         35         MH-444         61         NTF3-4         50         77         PP-30         77           E2-4         60         L-6         37         M2-800         35         MH-501         90         NTF3-4         77         PR-4         77         R2         P2-6         60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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| E1-8D         69         HNS-10         70         M2-828         34         MKDS55         75         MCP-30         57         FP-3         77         78           E1-8D         69         HNS-12         70         M2-828         34         MKDS56         75         NCP-30         57         FP-3         77         77         77           E1-10C         69         K1-3         60         M2-831         34         MKDS56         75         NCL-4         57         FP-1         77           E1-12D         69         K1-6         60         M2-861         34         MKD563         76         NCL-2         57         PP-10         77         78           E2-2         69         K1-6         70         M2-860         35         MH-440         81         NTF6-4-101         70         PR-33         77           E2-4         60         L0-500         13         M2-860         35         MH-440         81         NTF6-4-101         70         PR-33         77         78           E2-4         60         L0-50         13         M2-861         34         MR-502         74         HT56-4         50         77         76<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| E1-8E         69         NHS-12         70         N2-828         34         MKDS58         75         NCP-CJ         51         PR-3         77, 78           E1-10D         68         K1-3         69         M2-831         34         MKDS58         75         NCU-4         51         PR-5         77           E1-10D         68         K1-5         69         M2-835         34         MKDS58         75         NCU-12         51         PR-7         77           E1-12D         68         K1-5         69         M2-855         34         MR-409         77         NCU-CJ         51         PR-13         77, 78           E2-3         60         LC-4         37         M2-875         35         MR-446         61         NT5-4-101         70         PR-33         77           E2-4         60         LD-500         31         M2-885         35         MR-601         80, 81         MT5-4-101         70         PR-33         77           E2-4         60         LD-5100         31         M2-885         35         MR-601         80, 81         MT5-6-101         70         PR-43         77           E2-40         60 <td< td=""><td>Contra Contra Co</td><td>E1-8C</td><td>69</td><td>HNS4-8</td><td>70</td><td>M2-825</td><td>34</td><td>MKDS52</td><td>75</td><td>NCP-4</td><td>51</td><td>PR-1</td><td>77</td><td></td></td<> | Contra Co | E1-8C    | 69  | HNS4-8     | 70  | M2-825     | 34 | MKDS52            | 75 | NCP-4     | 51       | PR-1          | 77        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| E1-10C         69         K1-1         69         M2-830         34         MKDS59         75         NCP-LJ         51         PR-4         77           E1-10D         66         K1-5         69         M2-851         34         MKDS59         75         NCU-LJ         51         PR-7         77           E1-12E         66         K1-5         69         M2-850         35         MR-409         79         NCU-LJ         51         PR-10         77         78           E2-2         68         K1-5         77         M2-870         35         MR-444         81         NT5-4-510         55         PR-10         77         78         72         77         78         77         78         77         78         77         78         77         77         77         78         77         77         78         77         77         78         77         77         78         77         77         78         77         78         77         77         78         77         78         77      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| I + 10D         69         N1-3         69         M2-831         34         MIXDS53         75         NCU-4         51         PR-5         77           E1 + 12D         60         K1-5         69         M2-856         34         MIR-BVK         61         NCU-12         51         PR-16         77         78           E2-2         60         K1-1         70         M2-865         35         MIR-409         77         NCU-12         77         78           E2-4         60         LC-4         37         M2-870         35         MIR-446         81         NTT5-4-101         70         PR-8.5         77           E2-4         60         LC-5         37         M2-875         35         MIR-460         30         NTT5-4-101         70         PR-8.5         77           E2-6         60         LD-FK         13         M2-805         35         MIR-501         80         NTT5-6-101         70         PR-8.5         77           E2-10         60         LD-FF5         13         M2-805         36         MIR-501         81         NTS-6-101         70         PR-8.5         77         77         E3-48         60         L                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| E1-10E         69         N2-851         34         MKDS63         75         NCU-12         51         PR-7         77           E1-12E         69         K1-8         70         M2-860         35         MR-409         79         NCU-6J         51         PR-10         78           E2-2         69         K1-E         70         M2-860         35         MR-446         81         NTF54-100         50         PR-31         77,78           E2-4         69         LC-5         37         M2-870         35         MR-460         81         NTF54-101         60         PR-31         77,78           E2-6         69         LO-5K         13         M2-880         35         MR-501B         80,81         NTF54-101         60         PR-40         77,78           E2-6         69         LO-FK         13         M2-890         35         MR-501B         80,81         NTF54-101         60         PR-40         77,78         PR-42         77,78           E2-10         69         LD-FK         13         M2-890         36         MR-506         81         NR54-64         70         PR-52         77,78           E2-10         60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| E1-12D         69         K1-B         69         M2-856         34         MR-80V         81         MCU-D0         51         PR-10         77           E2-2         69         K1-E         70         M2-865         35         MR-444         81         NTF54-50,77,78         PR-22         77,78           E2-3         69         LC-6         37         M2-875         35         MR-460C         33         NTF54-101         70         PR-32         77           E2-5         69         LD-5000         13         M2-803         35         MR-601         80,81         NTF54-101         70         PR-32         77           E2-6         69         LD-FK         13         M2-803         35         MR-601         80,81         NTF56-50,77,79         PR-32         78           E2-10         69         LD-FK         13         M2-895         35         MR-502         81         NTF56-50,77,79         PR-32         77           E3-48         69         LT-810         50         M2-951         34         MR-504         81         NR544         70         PR-56         77,78           E3-48         69         LD-FK         13 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| E1-12E         69         K1-D         70         M2-860         35         MR-409         79         MCU-UJ         51         PR-18         77,78           E2-3         69         LC-4         37         M2-370         35         MR-446         81         NTF54-100         50         PR-31         77,78           E2-4         69         LC-6         37         M2-370         35         MR-460         31         NT54-101         70         PR-32         77,78           E2-6         69         LD-C5         13         M2-880         35         MR-501B         80,81         NT54-C1         64         PR-35         77           E2-6         69         LD-PK         13         M2-880         35         MR-501B         80,81         NT54-C1         60         PR-42         77,78           E2-10         69         LD-FK         13         M2-880         35         MR-501B         80,81         NT54-C1         60         PR-42         77,78           E2-10         69         LD-FK         13         M2-863         79-81         MR-506         79-81         MR444         10         PR-52         77,78           E2-10         69<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| E2-2         69         K1-E         70         M2-665         35         MR-444         81         NTF6-4         50, 77, 78         PR-22         77, 78           E2-4         69         LC-5         37         M2-375         35         MR-460C         33         NTF5-4-101         70         PR-32         77           E2-6         69         LD-500         13         M2-885         35         MR-501B         80, 81         NTF5-4-101         70         PR-32         77           E2-6         69         LD-FK         13         M2-895         35         MR-501B         80, 81         NTF5-6-101         0         PR-42         77         78           E2-10         69         LD-FK         13         M2-995         34         MR-503         79-81         NTF5-6-101         0         PR-42         77         78           E3-48         60         LT-545         50         M2-951         34         MR-504         79         NR-445         77         77         78           E3-68         60         LT-456         50         M2-911         MR-506         81         MR5444         70         PR-52         77, 78           E3-64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| E2-4         69         LC-5         37         M2-876         35         MR-400C         33         MFT5-4-101         70         PR-32         77           E2-6         69         LD-CS         13         M2-880         35         MR-501R         80, 81         HFT5-4-CJ         46         PR-35         77           E2-6         69         LD-CS         13         M2-880         35         MR-501R         80, 81         HFT5-4-101         70         PR-42         77, 78           E2-10         65         LD-RF5         13         M2-990         35         MR-504         81         HFT5-6-100         70         PR-42         77, 78           E2-41         66         LD-TY         13         M2-925         34         MR-504         81         HR54-43         70         PR-45         77           E3-48         69         M2-HP         29         M2-24125         19         MR-504         81         HR34-46         70         PR-45         77         78           E3-68         69         M2-87         71         M2-21125         19         MR-504         80         NR34-4120         70         PR-45         77         78         82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| E2-6         69         LD-G000         13         M2-880         35         MR-501B         80, 81         HT5-4-CJ         46         PR-35         77           E2-4         69         LD-PK         13         M2-890         35         MR-501B         80, 81         HT5-6-100         50         PR-35         77           E2-10         69         LD-PK         13         M2-895         35         MR-5012         81         HT5-6-100         50         PR-42         77           E2-12         69         LD-TV         13         M2-892         34         MR-504         81         NT5-6-107         77         78           E3-4A         69         LT-510         50         M2-8225         34         MR-504         81         NT54-64         70         PR-56         77           E3-6A         69         M2-H7         37         M2-21125         19         MR-506         80         NRS4-65         70         PR-58         77, 78           E3-6B         69         M2-F1         37         MR-516         80         NRS4-108         70         PR-57         77           E3-6D         69         M2-5-410A         19         M2-213                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| E2-6         66         LD-CS         13         M2-885         35         MR-501R         80.81         NTT5-6-100         FD-39         78           E2-10         60         LD-RF5         13         M2-890         35         MR-501         81         NTT5-6-101         70         PR-42         77           E3-44         66         LD-TV         13         M2-924         34         MR-503         79-81         NTT5-6-101         70         PR-42         77           E3-48         66         LD-TV         13         M2-925         34         MR-504         81         NTT5-6-101         70         PR-42         77           E3-64         66         LT-456         50         M2-951         34         MR-506         81         NTS4-64         70         PR-56         77         78           E3-65         66         M2-85         19         M2-21131         19         MR-506         81         NTS4-108         70         PR-62         77, 78           E3-65         66         M2-6-410A-55         19         M2-21131         19         MR-517         37         NS4-3         70         PR-65         78           E3-65 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| E2-8         65         LD-PK         13         M2-890         35         MR-501Y         81         NTT5-6-100         60         PR-40         77, 78           E2-12         66         LD-RF5         13         M2-924         34         MR-503         79-81         NTT5-6-101         PR-42         77           E3-44         66         LD-TY         13         M2-924         34         MR-504         81         NTT5-6-100         60         PR-42         77           E3-48         60         LT-310         50         M2-925         34         MR-504         81         NTS4-34         70         PR-54         77, 78           E3-60         69         M2-HP         29         M2-21125         10         MR-506         01         NTS4-65         70         PR-56         77, 78           E3-60         69         M2-54         19         M2-21131B         19         MR-516         80, 81         NTS4-120         70         PR-63         78, 79           E3-60         69         M2-54         10         M2-21525         19         MR-517         81         NS4-4         70         PR-75         77           E3-60         69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| E2-10         69         LD-RF5         13         M2-895         35         MR-502         11         MFT5-6.101         70         PR-42         77           E3-4A         69         LD-TY         13         M2-925         34         MR-504         81         NR54-53         70         PR-52         77           E3-4B         69         LT-410         50         M2-925         34         MR-5048         81         NR54-54         70         PR-52         77           E3-4B         69         LT-410         50         M2-925         34         MR-5048         81         NR54-65         70         PR-56         77           E3-6C         69         M2-F         37         M2-21125         19         MR-506         80         NR54-86         70         PR-58         77, 78           E3-6C         69         M2-5-         19         M2-21131         19         MR-517         37         NS4-3         70         PR-65         78           E3-8D         69         M2-5-410A         19         M2-21531         19         MR-525         81         NS4-4         60         PR-20         77           E3-8D         69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| E2-12         69         LD-5100         13         M2-924         34         MR-503         79         81         NF5-8         77         PR-45         77           E3-48         69         LT456         50         M2-956         34         MR-5048         81         NR54-64         70         PR-52         77           E3-68         69         LT4910         50         M2-956         34         MR-506         81         NR54-64         70         PR-56         77           E3-68         69         M2R-P         37         M2-21128         19         MR-506         81         NR54-65         70         PR-56         77, 78           E3-60         69         M2-5         19         M2-211318         19         MR-506         80         NR54-86         70         PR-56         77           E3-60         69         M2-5-410A         19         M2-21528         19         MR-520         79, 80         NS4-4         70         PR-75         77           E3-60         69         M2-5-410AM         19         M2-21528         19         MR-523         37         NS4-3         70         PR-200         77           E3-10D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| E3-4A         C9         D-TV         13         N2-925         34         MR-504         81         NR54-54         70         PR-52         77           E3-5B         C6         LT-456         50         M2-956         34         MR-505         79-81         NR54-54         70         PR-56         77         77         78           E3-6B         C6         M2-HP         29         M2-21125         19         MR-506         81         NR54-65         70         PR-58         77, 78           E3-6C         C6         M2-F         19         M2-21131         19         MR-516         80, 81         NR54-100         70         PR-63         78, 78           E3-6C         C6         M2-5-         19         M2-21525         19         MR-517         37         NS4-3         70         PR-65         78           E3-8E         C6         M2-5-410A         19         M2-21521         19         MR-521         80         NS4-4-5         48         PR-76         77           E3-8E         C6         M2-5-5         19         M2-21531         19         MR-533         81         NS4-6         70         PR-201         77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| E3-5B         66         LF-810         50         M2-956         34         MR-505         79-81         NRS4-64         70         PR-56         77           E3-6A         66         M2-HP         29         M2-21125         19         MR-506         81         NRS4-65         70         PR-59         77, 78           E3-6D         69         M2R-5         19         MR-516         80, 81         NRS4-64         70         PR-52         77, 78           E3-6D         69         M22-5         19         MR-516         80, 81         NRS4-108         70         PR-63         77, 78           E3-8D         69         M22-5-410A         19         M2-21525         19         MR-520         79, 80         NS44         70         PR-56         77           E3-8D         69         M2-5-410AB         19         M2-21525         19         MR-520         79, 80         NS44-5         64         PR-75         77           E3-10E         69         M2-5-410AB         19         M2-22131         19         MR-531         81         NS44-5         70         PR-201         77           E4-46         69         M2-56         19         M2-22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| E3-6A         69         M2-HP         29         M2-21125         19         MR-506         61         MR54-65         70         PR-58         77, 78           E3-6C         69         M2R-5         37         M2-21131         19         MR-509         79-81         NR54-108         70         PR-58         77, 78           E3-6C         69         M2-5         19         M2-21131B         19         MR-517         37         NS4-30         70         PR-63         78, 79           E3-8C         69         M2-5-410A         19         M2-21525         19         MR-521         80         NS4-4         70         PR-63         77, 78           E3-8D         69         M2-5-410A         19         M2-21525         19         MR-521         80         NS4-4         70         PR-75         77           E3-10D         69         M2-5-410A         19         M2-21251         19         MR-521         80         NS4-4         70         PR-75         77           E3-10D         69         M2-5         81         9         M2-22131         19         MR-533         37         NS4-6         70         PR-200         77         77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| B3-6B         69         M2R-P         37         M2-21125B         19         MR-509         70-81         NR54-86         70         PR-59         77, 78           B3-6C         69         M2R-S         37         M2-21131B         19         MR-509         79-81         NR54-108         70         PR-62         77, 78           B3-6D         69         M2-5-410A         19         M2-21525B         19         MR-516         80, 61         NR54-1210         70         PR-63         78           B3-8D         69         M2-5-410A-S5         19         M2-21525B         19         MR-520         79, 60         N54-4         70         PR-65         77           B3-8D         69         M2-5-410A         19         M2-21531B         19         MR-522         81         N54-5         70         PR-201         77           E3-10E         69         M2-5         19         M2-22131         19         MR-5331         61         N54-5         70         PR-201         77           E4-466         69         M2-6         19         M2-222151         19         MR-550         60         N54-6         70         PR-201         77         78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| E3-6C       69       M2R-S       37       M2-21131       19       MR-506       79-81       MR54-108       70       PR-62       77,78         E3-6D       69       M2-5       19       M2-21131B       19       MR-516       80,81       NRS4-101       70       PR-63       78,79         E3-8D       69       M2-5-410A       19       M2-21525       19       MR-521       30       NS4-4       70       PR-76       77         E3-8L       69       M2-5-410AM       19       M2-215251       19       MR-521       80       NS4-4       70       PR-76       77         E3-10D       69       M2-5-410AM       19       M2-21521       19       MR-523       81       NS4-4       70       PR-76       77         E3-10D       69       M2-5410AM       19       M2-21321       19       MR-533       31       NS4-6       70       PR-202       77         E4-44       69       M2-6E       19       M2-222251       19       MR-546       81       NS4-6-CS       70       PR-202       77,78         ER2-84       69       M2-8410A       19       M2-22425       19       MR-550       80       NS4-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| E3-6D       69       M2-5       19       M2-21131B       19       MR-517       37       NS4-3       70       PR-63       78, 79         E3-8D       69       M2-5-410A-S3       19       M2-21525B       19       MR-520       79, 80       NS4-4       70       PR-65       78         E3-8D       69       M2-5-410AS       19       M2-21525B       19       MR-521       80       NS4-4-5       48       PR-75       77         E3-10D       69       M2-5-410AS       19       M2-21525       19       MR-531       81       NS4-4-5       48       PR-200       77         E3-10E       69       M2-5-11P       29       M2-22125       19       MR-531       81       NS4-4-5       48       PR-200       77         E4-66       69       M2-6       19       M2-22215       19       MR-544       81       NS4-6-5       70       PR-203       77         E4-66       69       M2-68       19       M2-222251       19       MR-550       80       NS4-8-5       48       PR-206       77, 78         ER2-84       69       M2-8-410A       19       M2-224251       19       MR-593       36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| E3-BC         66         M2-5-410A         19         M2-21525         19         MR-517         37         N54-3         70         PR-65         78           E3-8D         69         M2-5-410A-SS         19         M2-21531         19         MR-520         79,80         N54-4         70         PR-75         77           E3-8E         69         M2-5-410AM         19         M2-21531B         19         MR-525         81         N54-4-5         70         PR-70         77           E3-10E         66         M2-5-1HP         29         M2-22125         19         MR-533         37         N54-6         70         PR-200         77           E4-46         69         M2-6         19         M2-22215         19         MR-533         37         N54-6         70         PR-203         77           E4-88         69         M2-6B         19         M2-22231         19         MR-550         80         N54-8-5         40         PR-204         77         78           ER2-64         69         M2-8         19         M2-22225         19         MR-591         36         N54-8-5         70         PR-207         77,78         R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| E3-8D         69         M2-5-410A-SS         19         M2-21525B         19         MR-520         79,80         NS4-4         70         PR-75         77           E3-8D         69         M2-5-410AB         19         M2-21531         19         MR-521         80         NS4-4-5         46         PR-76         77           E3-10E         69         M2-5-HP         29         M2-22125         19         MR-533         31         NS4-6         70         PR-200         77           E4-46         60         M2-6         19         M2-22125         19         MR-533         37         NS4-6         70         PR-202         77           E4-66         60         M2-6         19         M2-22225         19         MR-560         80         NS4-8         70         PR-205         77,78           ER2-64         60         M2-8         19         M2-22225         19         MR-590         36         NS4-8.5         70         PR-206         77,78           ER2-84         69         M2-8-410A         19         M2-222525         19         MR-592         36         NS4-10         70         PR-206         77,78           ES2-66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| E3-8E       69       M2-5-410AB       19       M2-21531       19       MR-521       80       NS4-4-5       48       PR-76       77         E3-10D       69       M2-5-410AM       19       M2-21531B       19       MR-525       81       NS4-4-CS       70       PR-200       77         E4-44       69       M2-5B       19       M2-22131       19       MR-533       37       NS4-6       70       PR-201       77         E4-66       69       M2-6       19       M2-22235       19       MR-534       81       NS4-6       70       PR-204       77         E4-68       69       M2-6B       19       M2-22231       19       MR-550       80       NS4-8       70       PR-205       77, 78         ER2-84       69       M2-8-410A       19       M2-22225       19       MR-590       80       NS4-8-5       70       PR-205       77, 78         ER2-86       69       M2-8-410AB       19       M2-22252       19       MR-591       36       NS4-10       70       PR-207       77       78         ER2-86       69       M2-36B       19       M2-23131       19       MR-593       36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| E3-10E       69       M2-5-HP       29       M2-22125       19       MR-531       81       NS4-5       70       PR-201       77         E4-44       69       M2-5B       19       M2-22131       19       MR-533       37       NS4-6       70       PR-202       777         E4-66       69       M2-6       19       M2-22225       19       MR-544       81       NS4-6-5       48       PR-202       77         E4-88       69       M2-6B       19       M2-222231       19       MR-560       80       NS4-8-5       48       PR-205       77, 78         ER2-64       69       M2-8       19       M2-222325       19       MR-550       80       NS4-8-5       48       PR-207       77, 78         ER2-86       69       M2-8-410AB       19       M2-222525       19       MR-593       36       NS4-10-55       48       PR-207       77, 78         ES2-64       69       M2-8-410AB       19       M2-222531       19       MR-593       36       NS4-10-CS       70       PR-210       77         ES2-66       69       M2-36B       19       M2-23131       19       MR-593       36       NS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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| E4-44       69       M2-5B       19       M2-22131       19       MR-533       37       NS4-6       70       PR-202       77         E4-66       69       M2-6B       19       M2-22225       19       MR-546       81       NS4-6-5       48       PR-203       77         ER2-64       69       M2-8       19       M2-222241       19       MR-566       81       NS4-6-5       70       PR-204       77         ER2-64       69       M2-8       19       M2-222241       19       MR-500       80       NS4-8-5       48       PR-206       77, 78         ER2-86       69       M2-8-410A       19       M2-222525       19       MR-591       36       NS4-8-5       70       PR-206       77, 78         ER2-86       69       M2-8-410AH       19       M2-222525       19       MR-593       36       NS4-10-5       48       PR-209       77         ES2-66       69       M2-36B       19       M2-223125       19       MR-593       36       NS4-10-CS       70       PR-210       77         ES2-68       69       M2-102N       79-81       M2-232321       19       MR-595       36       N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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| E4-66       69       M2-6       19       M2-22225       19       MR-544       81       NS4-6-5       48       PR-203       77         E4-88       69       M2-6B       19       M2-22221       19       MR-546       81       NS4-6-5       48       PR-204       77         ER2-64       69       M2-8       19       M2-222244       19       MR-550       80       NS4-8       70       PR-204       77,78         ER2-84       69       M2-8       19       M2-22325       19       MR-550       80       NS4-8-5       48       PR-206       77,78         ER2-86       69       M2-8-410A       19       M2-22325       19       MR-591       36       NS4-10-5       48       PR-207       77,78         ES2-44       69       M2-8-410AM       19       M2-223125       19       MR-592       36       NS4-10-5       48       PR-207       77         ES2-66       69       M2-36       19       M2-23125       19       MR-593       36       NS4-10-5       70       PR-210       77         ES2-66       69       M2-102   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| E4-88       69       M2-6B       19       M2-22231       19       MR-546       81       NS4-6-CS       70       PR-204       77         ER2-64       69       M2-8       19       M2-22244       19       MR-550       80       NS4-8-5       70       PR-205       77,78         ER2-84       69       M2-8       19       M2-22225       19       MR-550       80       NS4-8-5       70       PR-207       77,78         ER2-86       69       M2-8-410A       19       M2-22225       19       MR-591       36       NS4-8-CS       70       PR-207       77,78         ES2-44       69       M2-8-410A       19       M2-22525       19       MR-593       36       NS4-10-5       48       PR-208       77,78         ES2-46       69       M2-36       19       M2-22121       19       MR-593       36       NS4-10-5       48       PR-201       77         ES2-66       69       M2-368       19       M2-23131       19       MR-595       36       NS4-12       70       PR-214       77         ES2-68       69       M2-106       37       M2-23225       19       MR-597       36       NS4-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| ER2-64       69       M2-8       19       M2-22244       19       MR-550       80       NS4-8       70       PR-205       77, 78         ER2-84       69       M2-88       19       M2-22325       19       MR-591       36       NS4-8-5       48       PR-206       77, 78         ER2-86       69       M2-8-410AB       19       M2-22225       19       MR-591       36       NS4-8-CS       70       PR-207       77, 78         ER2-108       69       M2-8-410AB       19       M2-22253       19       MR-593       36       NS4-10-5       48       PR-209       77         ES2-66       69       M2-36       19       M2-23125       19       MR-593       36       NS4-10-CS       70       PR-210       77         ES2-68       69       M2-368       19       M2-23125       19       MR-595       36       NS4-12       70       PR-211       77         ES2-68       69       M2-102N       79-81       M2-232231       19       MR-595       36       NS4-14       70       PR-216       77         ES4-86       69       M2-106       37       M4R-P       37       MR-607       79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| ER2-84       69       M2-8B       19       M2-22325       19       MR-560       80       NS4-8-5       48       PR-206       77, 78         ER2-86       69       M2-8-410A       19       M2-22425       19       MR-591       36       NS4-8-CS       70       PR-207       77, 78         ER2-108       69       M2-8-410AB       19       M2-22251       19       MR-592       36       NS4-10-5       48       PR-209       77         ES2-44       69       M2-36       19       M2-22531       19       MR-593       36       NS4-10-5       48       PR-209       77         ES2-66       69       M2-36       19       M2-23125       19       MR-595       36       NS4-10-CS       70       PR-210       77         ES2-68       69       M2-102N       79-81       M2-23225       19       MR-595       36       NS4-12-CS       70       PR-214       77         ES4-66       69       M2-102N       79-81       M2-23231       19       MR-597       36       NS4-14       70       PR-216       77         ES4-444       69       M2-108       37       M4R-S       37       MR-601       79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| ER2-108       69       M2-8-410AB       19       M2-22525       19       MR-592       36       NS4-10       70       PR-208       77, 78         ES2-44       69       M2-8-410AM       19       M2-22531       19       MR-593       36       NS4-10-5       48       PR-209       77         ES2-66       69       M2-36       19       M2-23125       19       MR-595       36       NS4-10-5       48       PR-209       77         ES2-68       69       M2-36B       19       M2-23125       19       MR-595       36       NS4-12       70       PR-214       77         ES2-68       69       M2-102N       79-81       M2-23225       19       MR-596       36       NS4-12       70       PR-214       77         ES4-46       69       M2-106       37       M2-232231       19       MR-597       36       NS4-14       70       PR-215       77         ES4-46       69       M2-250       33       M4R-5       37       MR-607       79       NST4-6       70       PR-310       77         ES4-1010       69       M2-250C       33       M4-5       24       MR-610       81       NST4-10 </td <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| ES2-44       69       M2-8-410AM       19       M2-22531       19       MR-593       36       NS4-10-5       48       PR-209       77         ES2-66       69       M2-36       19       M2-23125       19       MR-594       36       NS4-10-CS       70       PR-210       77         ES2-68       69       M2-36B       19       M2-231231       19       MR-595       36       NS4-12       70       PR-211       77         ES2-68       69       M2-102N       79-81       M2-232225       19       MR-596       36       NS4-12       70       PR-214       77         ES4-44       69       M2-106       37       M2-232231       19       MR-597       36       NS4-12       70       PR-215       77         ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-216       77         ES4-1010       69       M2-250C       33       M4-5       24       MR-610       81       NST4-10       70       PR-300       77         ES4-1212       69       M2-300     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| ES2-66       69       M2-36       19       M2-23125       19       MR-594       36       NS4-10-CS       70       PR-210       77         ES2-68       69       M2-36B       19       M2-23131       19       MR-595       36       NS4-12       70       PR-211       77         ES2-88       69       M2-102N       79-81       M2-23225       19       MR-596       36       NS4-12-CS       70       PR-214       77         ES4-46       69       M2-108       37       M2-23231       19       MR-597       36       NS4-14       70       PR-215       77         ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-217       78         ES4-1010       69       M2-250B       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5       24       MR-610       81       NST4-10       70       PR-301       77         EZ-40288       50       M2-300       80   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| ES2-68       69       M2-36B       19       M2-23131       19       MR-595       36       NS4-12       70       PR-211       77         ES2-88       69       M2-102N       79-81       M2-23225       19       MR-596       36       NS4-12-CS       70       PR-214       77         ES4-44       69       M2-106       37       M2-23231       19       MR-597       36       NS4-14       70       PR-215       77         ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-216       77         ES4-88       69       M2-250       33       M4R-S       37       MR-601       79       NST4-6       70       PR-217       78         ES4-1010       69       M2-250C       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-10       70       PR-303       77         EZ-40288       50       M2-350       33   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| ES2-88       69       M2-102N       79-81       M2-23225       19       MR-596       36       NS4-12-CS       70       PR-214       77         ES4-44       69       M2-106       37       M2-23231       19       MR-597       36       NS4-14       70       PR-215       77         ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-216       77         ES4-88       69       M2-250       33       M4R-S       37       MR-605       79       NST4-6       70       PR-217       78         ES4-1010       69       M2-250C       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5       24       MR-610       81       NST4-10       70       PR-301       77         EZ-40288       50       M2-300       80       M4-58       24       N4-61       70       PZ-33       70       PR-303       77         FP-A.168       69       M2-355       33       M4-8       24       N4-6       70       P2-4       70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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| ES4-44       69       M2-106       37       M2-23231       19       MR-597       36       NS4-14       70       PR-215       77         ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-216       77         ES4-88       69       M2-250       33       M4R-S       37       MR-605       79       NST4-6       70       PR-217       78         ES4-1010       69       M2-250E       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-10       70       PR-301       77         ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-10       70       PR-301       77         EZ-40288       50       M2-300       80       M4-5-410AB       24       N4-4       70       NV62-4       55       PR-302       77         F2-40288-126       50       M2-355       33       M4-8       24       N4-6       70       P2-3       7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| ES4-66       69       M2-108       37       M4R-P       37       MR-601       79       NST4-4       70       PR-216       77         ES4-88       69       M2-250       33       M4R-S       37       MR-605       79       NST4-6       70       PR-216       77         ES4-1010       69       M2-250B       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-10       70       PR-300       77         EZ-40288       50       M2-300       80       M4-5-410AB       24       N4-4       70       NV62-4       55       PR-302       77         EZ-40288-126       50       M2-350       33       M4-5B       24       N4-55       70       P2-3       70       PR-303       77         FP-A.168       69       M2-355       33       M4-8       24       N4-6       70       P2-5       70       PR-305       77         FP-A.203       69       M2-405       35       M4-8410A       24       N4-8       70       P2-6       70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| ES4-1010       69       M2-250B       33       M4-5       24       MR-607       79       NST4-8       70       PR-300       77         ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-8       70       PR-301       77         EZ-40288       50       M2-300       80       M4-5-410AB       24       N4-4       70       NV62-4       55       PR-302       77         EZ-40288-126       50       M2-350       33       M4-5B       24       N4-5-5       70       P2-3       70       PR-303       77         FP-A-168       69       M2-355       33       M4-8       24       N4-6       70       P2-3       70       PR-303       77         FP-A-168       69       M2-400       35       M4-8410A       24       N4-8       70       P2-5       70       PR-305       77         FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       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| ES4-1212       69       M2-250C       33       M4-5-410A       24       MR-610       81       NST4-10       70       PR-301       77         EZ-40288       50       M2-300       80       M4-5-410AB       24       N4-4       70       NV62-4       55       PR-302       77         EZ-40288-126       50       M2-350       33       M4-5B       24       N4-5-5       70       P2-3       70       PR-303       77         FP-A-168       69       M2-355       33       M4-8       24       N4-6       70       P2-4       70       PR-304       77         FP-A-168       69       M2-400       35       M4-8-410A       24       N4-8       70       P2-5       70       PR-305       77         FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-12       70       P2-8       70       PR-311       77         FP-B-210       69       M2-415       33       M4-36       24       N5-3       70       P2-10       70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| EZ-4028850M2-30080M4-5-410AB24N4-470NV62-455PR-30277EZ-40288-12650M2-35033M4-5B24N4-5-570P2-370PR-30377FP-A-16869M2-35533M4-824N4-670P2-470PR-30477FP-A-21069M2-40035M4-8-410A24N4-870P2-570PR-30577FP-A-28369M2-40535M4-8-410AB24N4-1070P2-670PR-30877FP-B-16869M2-41033M4-8B24N4-1270P2-870PR-31177FP-B-21069M2-41533M4-3624N5-370P2-1070PR-31477FP-B-28369M2-42033M4-36B24N5-470P2-1270PR-31577, 78FP-C-16869M2-42533M4-2112524N5-570P50950, 52, 53PR-40378FP-C-21069M2-43033M4-21125B24N5-670P509-2550PR-40478                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| EZ-40288-126       50       M2-350       33       M4-5B       24       N4-5-5       70       P2-3       70       PR-303       77         FP-A-168       69       M2-355       33       M4-8       24       N4-6       70       P2-4       70       PR-304       77         FP-A-210       69       M2-400       35       M4-8-410A       24       N4-8       70       P2-5       70       PR-305       77         FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-12       70       P2-8       70       PR-311       77         FP-B-210       69       M2-415       33       M4-36       24       N5-3       70       P2-10       70       PR-314       77         FP-B-283       69       M2-420       33       M4-36B       24   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| FP-A-168       69       M2-355       33       M4-8       24       N4-6       70       P2-4       70       PR-304       77         FP-A-210       69       M2-400       35       M4-8-410A       24       N4-8       70       P2-5       70       PR-305       77         FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-12       70       P2-8       70       PR-311       77         FP-B-210       69       M2-415       33       M4-36       24       N5-3       70       P2-10       70       PR-314       77         FP-B-283       69       M2-420       33       M4-36B       24       N5-4       70       P2-12       70       PR-315       77, 78         FP-C-168       69       M2-425       33       M4-21125       24       N5-5       70       P509       50, 52, 53       PR-403       78         FP-C-210       69       M2-430       33       M4-21125B       24       N5-6       70       P509-25       50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| FP-A-210       69       M2-400       35       M4-8-410A       24       N4-8       70       P2-5       70       PR-305       77         FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-12       70       P2-8       70       PR-311       77         FP-B-210       69       M2-415       33       M4-36       24       N5-3       70       P2-10       70       PR-314       77         FP-B-283       69       M2-420       33       M4-36B       24       N5-4       70       P2-12       70       PR-315       77, 78         FP-C-168       69       M2-425       33       M4-21125       24       N5-5       70       P509       50, 52, 53       PR-403       78         FP-C-210       69       M2-430       33       M4-21125B       24       N5-6       70       P509-25       50       PR-404       78                                                       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| FP-A-283       69       M2-405       35       M4-8-410AB       24       N4-10       70       P2-6       70       PR-308       77         FP-B-168       69       M2-410       33       M4-8B       24       N4-12       70       P2-8       70       PR-311       77         FP-B-210       69       M2-415       33       M4-36       24       N5-3       70       P2-10       70       PR-314       77         FP-B-283       69       M2-420       33       M4-36B       24       N5-4       70       P2-12       70       PR-315       77, 78         FP-C-168       69       M2-425       33       M4-21125       24       N5-5       70       P509       50, 52, 53       PR-403       78         FP-C-210       69       M2-430       33       M4-21125B       24       N5-6       70       P509-25       50       PR-404       78                                                                                                                                                                                              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| FP-B-168         69         M2-410         33         M4-8B         24         N4-12         70         P2-8         70         PR-311         77           FP-B-210         69         M2-415         33         M4-36         24         N5-3         70         P2-10         70         PR-314         77           FP-B-283         69         M2-420         33         M4-36B         24         N5-4         70         P2-12         70         PR-315         77, 78           FP-C-168         69         M2-425         33         M4-21125         24         N5-5         70         P509         50, 52, 53         PR-403         78           FP-C-210         69         M2-430         33         M4-21125B         24         N5-6         70         P509-25         50         PR-404         78                                                                                                                                                                                                                 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| FP-B-210         69         M2-415         33         M4-36         24         N5-3         70         P2-10         70         PR-314         77           FP-B-283         69         M2-420         33         M4-36B         24         N5-4         70         P2-12         70         PR-315         77, 78           FP-C-168         69         M2-425         33         M4-21125         24         N5-5         70         P509         50, 52, 53         PR-403         78           FP-C-210         69         M2-430         33         M4-21125B         24         N5-6         70         P509-25         50         PR-404         78                                                                                                                                                                                                                                                                                                                                                                             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| FP-C-168         69         M2-425         33         M4-21125         24         N5-5         70         P509         50, 52, 53         PR-403         78           FP-C-210         69         M2-430         33         M4-21125B         24         N5-6         70         P509-25         50         PR-404         78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| FP-C-210         69         M2-430         33         M4-21125B         24         N5-6         70         P509-25         50         PR-404         78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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|    | PART #                | PG | PART #                | PG           | PART #                | PG | PART #                 | PG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PART #               | PG       | PART #             | PG             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | PR-406                |    | RT59001               |              | SK-50404A             |    | TC-44-100              | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-3A                | 71       |                    | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1  | PR-500                |    | RT59060               |              | SK-50410A             |    | TC-44-12               | 65<br>65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U3-4A<br>U3-4B       | 71       | US4-8              | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| i. | PR-501<br>PS-10       |    | RT59070<br>RT59080    |              | SK-50507<br>T1-44     |    | TC-49-100<br>TC-49-11  | 65<br>65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U3-4B<br>U3-4C       | 71       | US4-10<br>US5-44   | 72<br>72       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | PS-10<br>PS-25        |    | RT70007B              | • •          | T1-4A                 |    | TC-49-11<br>TC-50-100  | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-40                | 71       | US5-66             | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1  | PS-50                 |    | RT70007X              |              | T1-4C                 |    | TC-50-11               | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-5B                | 71       |                    | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | QC-13445-134a         |    |                       |              | T1-5B                 |    | TC-54-100              | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-6A                | 71       | US5-1010           | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | QC-E3                 |    | RT70017B              |              |                       |    | TC-54-11               | 65<br>65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U3-6B                | 71       | US5-1212<br>UX1-44 | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | QC-E4<br>QC-E5        |    | RT70017D<br>RT70020   | 56, 57<br>56 | T1-6C<br>T1-6D        |    | TC-55-100<br>TC-55-11  | 65<br>65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U3-6C<br>U3-6D       | 71       | UX1-4A<br>UX1-4B   | 72<br>72       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    |                       |    | RT70021               |              | T1-8B                 |    | TC-59-10               | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-8B                | 71       |                    | 72             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | QC-S3                 |    | RT70027               |              | T1-8C                 |    | TC-59-100              | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-8C                | 71       | V34200             | 54-55          | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|    | QC-S4                 |    | RT70029               |              | T1-8D                 |    | TC-64-10               | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-8D                | 71       | V34201             | 54-55          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|    | QC-S4A<br>QC-S4A-134a |    | RT70030<br>RT70045    |              | T1-10C<br>T1-10D      |    | TC-64-100<br>TC-70-100 | 65<br>65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | U3-8E<br>U3-10C      | 71       | V34202<br>V34203   | 54-55<br>54-55 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|    | QC-S4A-134a<br>QC-S4B |    | RT70045               |              | T1-10D<br>T2-3        |    | TC-70-100<br>TC-70-12  | 65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | U3-10C               | 71       |                    | 54-55<br>54-55 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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