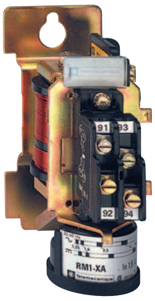
		Machine protection		Motor and machine protection	
Protection of slip ring motors and of circuits without current peaks	**Protection of resistors, bearings, capacitors**	**Specific motor protection**		**Protection and control**	
					
- Strong overcurrent - Stalling	- Frequent starting - Harsh environments	- Overtorque - Mechanical shocks - Locked rotor - Phase failure	- Overtorque - Mechanical shocks	- Thermal overload - Phase imbalance and phase failure - Motor stalling - Long starting times - Earth fault	- Thermal overload - Phase imbalance and phase failure - Locked rotor - Long starting times - Phase reversal - Earth fault
–				Classes 5 to 30	Classes 5 to 30
–				AS-Interface, Modbus, CANopen, Advantys STB	Modbus, CANopen, DeviceNet, Profibus DP
All contactors					
0.7…630 A	Unlimited	0.3…38 A	0.3…60 A	0.35…800 A	0.4…810 A
RM1 XA	**LT3 S**	**LR97D**	**LT47**	**LUTM ●0BL**	**LTM R**
Please consult our catalogue “Motor starter solutions”.					Please consult our catalogue “Motor Management System - TeSys T”.

TeSys protection components
TeSys d 3-pole thermal overload relays

Presentation

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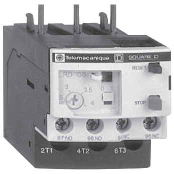
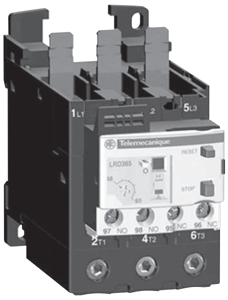
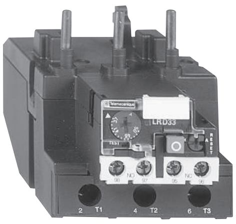

LRD 08●●

567967

LRD 365

EverLink®

567966

LRD 33●●

TeSys d thermal overload relays are designed to protect a.c. circuits and motors against:
- overloads,
- phase failure,
- protracted starting times,
- prolonged stalled rotor condition.

Connection

LRD 01 to LRD 35

LRD 01 to 35 relays are designed for connection by screw clamp terminals.
They can be supplied for connection by lugs.

LRD 313 to LRD 365

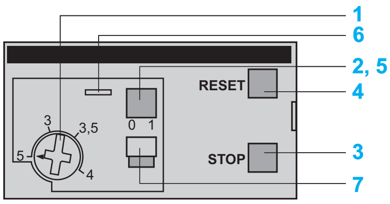
LRD 313 to 365 relays are for connection by BTR screw connectors (hexagon socket head).
The screws are tightened by means of a size 4, insulated Allen key.
This type of connection uses the **Ever**Link® system with creep compensation *(1)* (Schneider Electric patent).
This technique makes it possible to achieve accurate and durable tightening torque.

These relays are also available for connection by lugs.
This type of connection meets the requirements of certain Asian markets and is suitable for applications subject to strong vibration, such as railway transport.

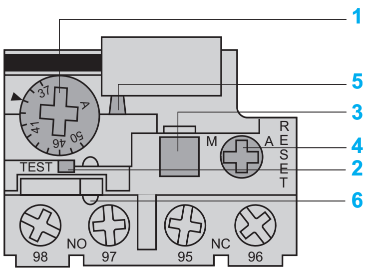
LRD 3361 to 4369, LRD 2

LRD 3361 to 4369 and LR2 D relays are designed for connection by screw clamp terminals. They can be supplied for connection by lugs.

Description



LRD 01…35 and LRD 313…LRD 365



LRD 3361…4369, LR2 D

TeSys d 3-pole thermal overload relays are designed to protect a.c. circuits and motors against overloads, phase failure, long starting times and prolonged stalling of the motor.

1 Adjustment dial Ir.
2 Test button.
  Operation of the Test button allows:
  - checking of control circuit wiring,
  - simulation of relay tripping (actuates both the N/O and N/C contacts).
3 Stop button. Actuates the N/C contact; does not affect the N/O contact.
4 Reset button.
5 Trip indicator.
6 Setting locked by sealing the cover.
7 Selector for manual or automatic reset.

LRD 01 to 35 relays are supplied with the selector in the manual position, protected by a cover. Deliberate action is required to move it to the automatic position.

(1) Creep: normal crushing phenomenon of copper conductors, that is accentuated over time.

References: page 204
Dimensions, mounting : page 210
Schemes: page 213

Environment

Conforming to standards			IEC/EN 60947-4-1, IEC/EN 60947-5-1, UL 508, CSA C22.2 n° 14. ATEX directive 94/9/EC *(1), (2)*
Product certifications			UL, CSA. CCC *(2)*. GL, DNV, RINA, BV, LROS *(2)*. ATEX INERIS *(1), (2)*.
Degree of protection	Conforming to VDE 0106		Protection against direct finger contact IP 2X
Protective treatment	Conforming to IEC 60068		"TH"
Ambient air temperature around the device	Storage	°C	- 60…+ 70
	Normal operation, without derating (IEC 60947-4-1)	°C	- 20…+ 60
	Min. and max. operating temperatures (with derating)	°C	- 40…+ 70
Operating positions without derating	In relation to normal vertical mounting plane		Any position. When mounting on a vertical rail, use a stop.
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		15 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6		6 gn
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV	6
Surge withstand	Conforming to IEC 60801-5	kV	6

Auxiliary contact characteristics

Conventional thermal current		A	5					
Maximum sealed consumption of controlled contactor coils (Occasional operating cycles of contact 95-96)	a.c. supply, AC-15	V	120	240	380	480	500	600
		A	3	1.5	0.95	0.75	0.72	0.12
	d.c. supply, DC-13	V	125	250	440			
		A	0.22	0.1	0.06			
Short-circuit protection	By gG, BS fuses. Max. rating or by **GB2** circuit-breaker	A	5					
Connection to screw clamp terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 or 2 conductors	mm²	1/2.5					
Flexible cable with cable end	1 or 2 conductors	mm²	1/2.5					
Solid cable without cable end	1 or 2 conductors	mm²	1/2.5					
Tightening torque		N.m	1.7					
Connection to spring terminals (Min/max c.s.a.)								
Flexible cable without cable end	1 or 2 conductors	mm²	1/2.5					
Flexible cable with cable end	1 or 2 conductors	mm²	1/2.5					

Electrical characteristics of power circuit

Relay type			**LRD 01 …16, LR3 D01 …D16**	**LRD 15●●**	**LRD 21 …35, LR3 D21 …D35**	**LRD 313 …365**	**LRD 313L …365L**	**LRD 3322 …33696 LR3 D3322 …D33696**	**LR2 D35●●**	**LRD 4365 …4369**
Tripping class	Conforming to UL 508, IEC 60947-4-1		10 A	20	10 A	10 A	20	10 A	20	10 A
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	V	690		690	690	690	1000		1000
	Conforming to UL, CSA	V	600		600	600	600	600		600 ex. LRD 4369
Rated impulse withstand voltage (Uimp)		kV	6		6	6	6	6		6
Frequency limits	Of the operational current	Hz	0…400		0…400	0…400	0…400	0…400		0…400
Setting range	Depending on model	A	0.1…13		12…38	9…65	9…65	17…104		80…140
Connection to screw clamp terminals (Min/max c.s.a.)										
Flexible cable without cable end	1 conductor	mm²	1.5/10		1.5/10	1/35	1/35	4/35		4/50
Flexible cable with cable end	1 conductor	mm²	1/4		1/6 ex. LRD21: 1/4	1/35	1/35	4/35		4/35
Solid cable without cable end	1 conductor	mm²	1/6		1.5/10 ex. LRD21: 1/6	1/35	1/35	4/35		4/50
Tightening torque		N.m	1.7	1.85	2.5	1/25: 5 35: 8	1/25: 5 35: 8	9	9	9
Connection to spring terminals (Min/max c.s.a.)										
Flexible cable without cable end	1 conductor	mm²	1.5/4	–	1.5/4	–	–	–	–	–
Flexible cable with cable end	1 conductor	mm²	1.5/4	–	1.5/4	–	–	–	–	–

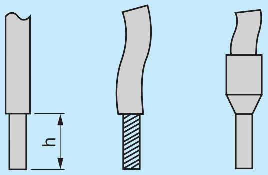
(1) For LRD01 to LRD365 relays.
(2) Pending for relays LRD313 to LRD365.

References: page 204
Dimensions, mounting : page 210
Schemes: page 213

Control circuit connection characteristics

Connection to screw clamp terminals or spring terminals

Bare cables

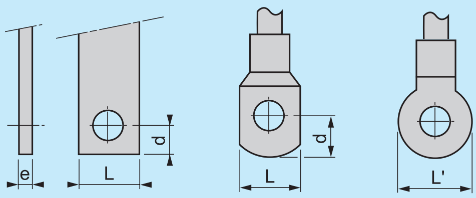


Relay type			LRD 01 …16, LR3 D01 …D16	LRD 15●●	LRD 21 …35, LR3 D21 …D35	LRD 313 …365	LRD 313L …365L	LRD 3322 …33696 LR3 D3322 … D33696	LR2 D35●●	LRD 4365 …4369
Connection to screw clamp terminals *(1)* (Max. number of conductors X min - max c.s.a.)	Solid cable without cable end	**mm²**	1/2.5							
	Flexible cable without cable end 1 or 2 conductors	**mm²**	1/2.5							
	Flexible cable with cable end, 1 or 2 conductors	**mm²**	1/2.5							
Tightening torque		**N.m**	1.7							
Connection to spring terminals (Min/max c.s.a.)	Solid cable	**mm²**	1/2.5							
	Flexible cable without cable end	**mm²**	1/2.5							

Power circuit connection characteristics

Connection by bars or lugs

Bars or lugs



Relay type			**LRD 313●6…LRD 365●6**
Pitch	Without spreaders	**mm²**	17.5
	With spreaders	**mm**	–
Bars or cables with lugs	**e**	**N.m**	⩽ 6
	L	**mm²**	⩽ 13.5
	L'	**mm²**	⩽ 16.5
	d		⩽ 10
Screws			M6
	Tightening torque	**N.m**	6
Cable (copper or aluminium), **bare, with connectors**	Height (h)	**mm**	–
	C.s.a.	**mm²**	–
	Tightening torque	**N.m**	–

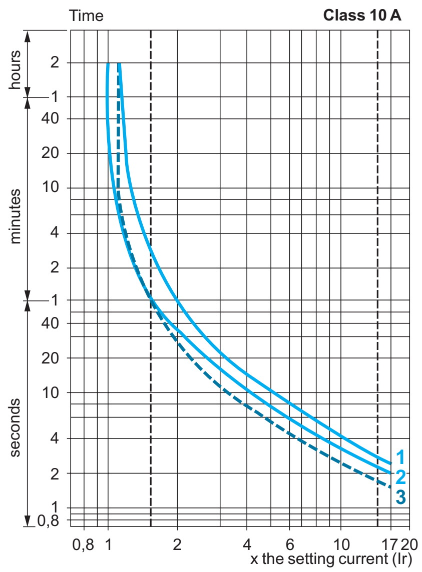
*(1) For LRD 313 to 365 relays: BTR hexagon socket head screws **Ever**Link® system in accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 173).*

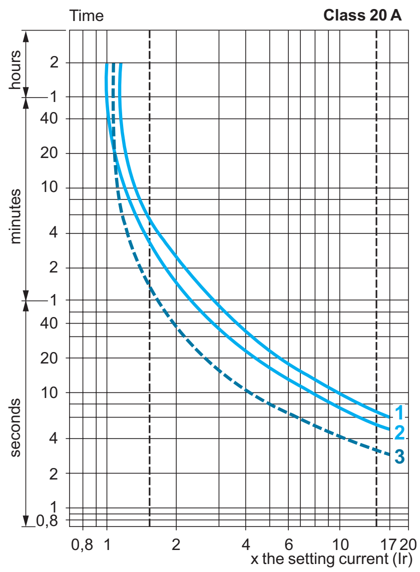
Operating characteristics

Relay type			LRD 01 …16, LR3 D01 …D16	LRD 15●●	LRD 21 …35, LR3 D21 …D35	LRD 313 …365	LRD 313L …365L	LRD 3322 …33696 LR3 D3322 … D33696	LR2 D35●●	LRD 4365 …4369
Temperature compensation		°C	- 20…+ 60		- 30…+ 60	- 20…+ 60		- 30…+ 60		- 20…+ 60
Tripping threshold	Conforming to EC 60947-4-1	A	1.14 ± 0.06 Ir							
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping current I 30 % of Ir on one phase, the others at Ir.							

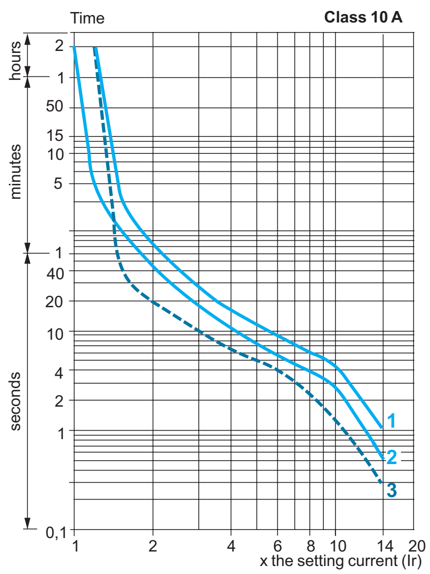
Tripping curves
Average operating time related to multiples of the setting current

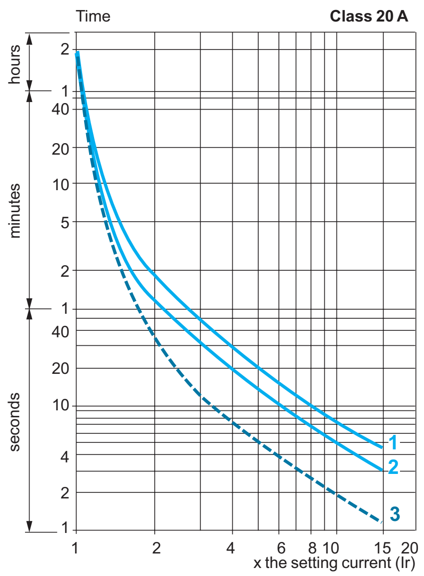
LRD 33●●, LR2 D





LRD 3





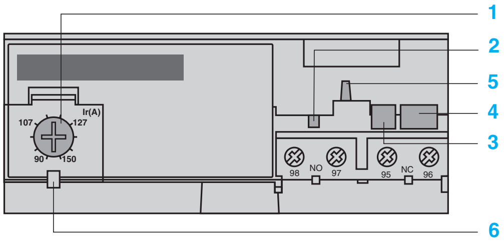
1 Balanced operation, 3-phase, from cold state.
2 2-phase operation, from cold state.
3 Balanced operation, 3-phase, after a long period at the set current (hot state).

References:
page 204
Dimensions, mounting :
page 210
Schemes:
page 213

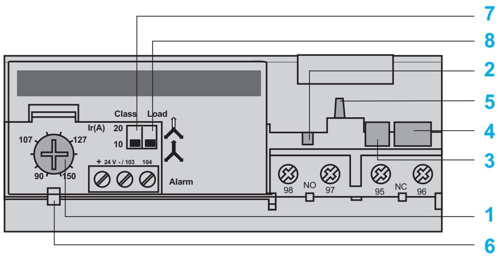
TeSys protection components

3-pole electronic thermal overload relays, TeSys LR9 D

Description



LR9 D5367…D5569



LR9 D67 and D69

LR9 D electronic thermal overload relays are designed for use with contactors LC1 D115 and D150.

In addition to the protection provided by TeSys d thermal overload relays (see page 24516/2), they offer the following special features:
- protection against phase imbalance,
- choice of starting class,
- protection of unbalanced circuits,
- protection of single-phase circuits,
- alarm function to avoid tripping by load shedding.

1 Adjustment dial Ir.
2 Test button.
3 Stop button.
4 Reset button.
5 Trip indicator.
6 Setting locked by sealing the cover.
7 Class 10/class 20 selector switch.
8 Switch for balanced load /unbalanced load

Environment

Conforming to standards			IEC 60947-4-1, 255-8, 255-17, VDE 0660 and EN 60947-4-1
Product certifications			UL 508 , CSA 22-2
Degree of protection	Conforming to IEC 60529 and VDE 0106		IP 20 on front panel with protective covers **LA9 D11570●** or **D11560●**
Protective treatment	Standard version		"TH"
Ambient air temperature around the device (Conforming to IEC 60255-8)	Storage	°C	- 40…+ 85
	Normal operation	°C	- 20…+ 55 *(1)*
Maximum operating altitude	Without derating	m	2000
Operating positions without derating	In relation to normal vertical mounting plane		Any position
Shock resistance	Permissible acceleration conforming to IEC 60068-2-7		13 gn - 11 ms
Vibration resistance	Permissible acceleration conforming to IEC 60068-2-6		2 gn - 5…300 Hz
Dielectric strength at 50 Hz	Conforming to IEC 60255-5	kV	6
Surge withstand	Conforming to IEC 61000-4-5	kV	6
Resistance to electrostatic discharge	Conforming to IEC 61000-4-2	kV	8
Immunity to radiated radio-frequency disturbance	Conforming to IEC 61000-4-3 and NF C 46-022	V/m	10
Immunity to fast transient currents	Conforming to IEC 61000-4-4	kV	2
Electromagnetic compatibility	Draft EN 50081-1 and 2, EN 50082-2		Meet requirements

Electrical characteristics of auxiliary contacts

Conventional thermal current		A	5					
Maximum sealed current consumption of controlled contactor coils (Occasional operating cycles of contact 95-96)	a.c. supply	V	24	48	110	220	380	600
		VA	100	200	400	600	600	600
	d.c. supply	V	24	48	110	220	440	–
		W	100	100	50	45	25	–
Short-circuit protection	By gG or BS fuses or by circuit-breaker **GB2**	A	5					
Connection Flexible cable without cable end	1 or 2 conductors	mm²	Minimum c.s.a.: 1					
			Maximum c.s.a.: 2.5					
	Tightening torque	Nm	1.2					

(1) For operating temperatures up to 70 °C, please consult your Regional Sales Office.

References:
page 204

Dimensions, mounting :
page 210

Schemes:
page 213

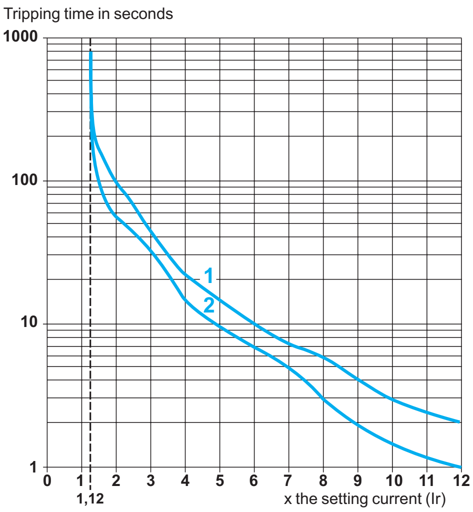
TeSys protection components

3-pole electronic thermal overload relays, TeSys LR9 D

Relay type			LR9 D
Electrical characteristics of power circuit			
Tripping class	Conforming to UL 508, IEC 60947-4-1	**A**	10 or 20
Rated insulation voltage (Ui)	Conforming to IEC 60947-4-1	**V**	1000
	Conforming to UL, CSA	**V**	600
Rated impulse withstand voltage (Uimp)		**Hz**	8
Frequency limits	Of the operating current	**Hz**	50…60 *(1)*
Setting range	Depending on model	**A**	60…150
Power circuit connections	Width of terminal lug	**mm**	20
	Clamping screw		M8
	Tightening torque	**N.m**	18
Operating characteristics			
Temperature compensation		**°C**	- 20…+ 70
Tripping thresholds	Conforming to IEC 60947-4-1		
	Alarm	**A**	1.05 ± 0.06 In
	De-energisation	**A**	1.12 ± 0.06 In
Sensitivity to phase failure	Conforming to IEC 60947-4-1		Tripping in 4 s ± 20 % in the event of phase failure
Alarm circuit characteristics			
Rated supply voltage	d.c. supply	**V**	24
Supply voltage limits		**V**	17…32
Current consumption	No-load	**mA**	⩽ 5
Switching capacity		**mA**	0…150
Protection	Short-circuit and overload		Self protected
Voltage drop	Closed state	**V**	⩽ 2.5
Connection	Flexible cable without cable end	**mm²**	0.5…1.5
Tightening torque		**N.m**	0.45

(1) For applications involving the use of these overload relays with soft starters or variable speed drives, please consult your Regional Sales Office.

LR9 D tripping curves



Average operating time related to multiples of the setting current

1 Cold state curve
2 Hot state curve

References: page 204
Dimensions, mounting : page 210
Schemes: page 213

TeSys protection components

TeSys d 3-pole thermal overload relays

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LRD 08●●

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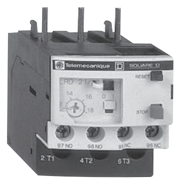
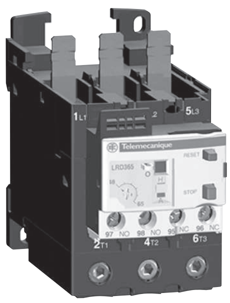


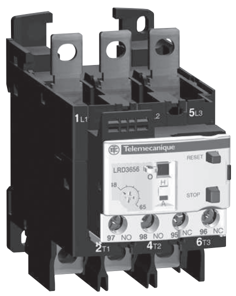
LRD 21●●

536762



LRD 3●●

107651



LRD 3●●6

Differential thermal overload relays

for use with fuses and magnetic circuit-breakers GV2 L and GV3 L

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference	Weight kg
	aM (A)	gG (A)	BS88 (A)			
Class 10 A *(1)* **for connection by screw clamp terminals or connectors**						
0.10…0.16	0.25	2	–	D09…D38	**LRD 01**	0.124
0.16…0.25	0.5	2	–	D09…D38	**LRD 02**	0.124
0.25…0.40	1	2	–	D09…D38	**LRD 03**	0.124
0.40…0.63	1	2	–	D09…D38	**LRD 04**	0.124
0.63…1	2	4	–	D09…D38	**LRD 05**	0.124
1…1.6	2	4	6	D09…D38	**LRD 06**	0.124
1.6…2.5	4	6	10	D09…D38	**LRD 07**	0.124
2.5…4	6	10	16	D09…D38	**LRD 08**	0.124
4…6	8	16	16	D09…D38	**LRD 10**	0.124
5.5…8	12	20	20	D09…D38	**LRD 12**	0.124
7…10	12	20	20	D09…D38	**LRD 14**	0.124
9…13	16	25	25	D12…D38	**LRD 16**	0.124
12…18	20	35	32	D18…D38	**LRD 21**	0.124
16…24	25	50	50	D25…D38	**LRD 22**	0.124
23…32	40	63	63	D25…D38	**LRD 32**	0.124
30…38	40	80	80	D32 and D38	**LRD 35**	0.124
Class 10 A *(1)* **for connection by EverLink®, BTR screw connectors** *(3)*						
9…13	16	25	25	D40A…D65A	**LRD 313**	0.375
12…18	20	32	35	D40A…D65A	**LRD 318**	0.375
16…25	25	50	50	D40A…D65A	**LRD 325**	0.375
23…32	40	63	63	D40A…D65A	**LRD 332**	0.375
25…40	40	80	80	D40A…D65A	**LRD 340**	0.375
37…50	63	100	100	D40A…D65A	**LRD 350**	0.375
48…65	63	100	100	D50A…D65A	**LRD 365**	0.375
Class 10 A *(1)* **for connection by screw clamp terminals or connectors**						
55…70	80	125	125	D50…D95	**LRD 3361**	0.510
63…80	80	125	125	D65…D95	**LRD 3363**	0.510
80…104	100	160	160	D80 and D95	**LRD 3365**	0.510
80…104	125	200	160	D115 and D150	**LRD 4365**	0.900
95…120	125	200	200	D115 and D150	**LRD 4367**	0.900
110…140	160	250	200	D150	**LRD 4369**	0.900
80…104	100	160	160	*(2)*	**LRD 33656**	1.000
95…120	125	200	200	*(2)*	**LRD 33676**	1.000
110…140	160	250	200	*(2)*	**LRD 33696**	1.000

Class 10 A *(1)* **for connection by lugs**

Select the appropriate overload relay with screw clamp terminals or connectors from the table above and add one of the following suffixes:

- figure **6** for relays LRD 01 to LRD 35 and relays LRD 313 to LRD 365.
- **A66** for relays LRD 3361 to LRD 3365.

Relays LRD 43●● are suitable, as standard, for use with lug-clamps.

Thermal overload relays for use with unbalanced loads

Class 10 A *(1)* **for connection by screw clamp terminals or lugs**

In the references selected above, change the prefix **LRD** (except **LRD 4●●●**) to **LR3 D**.
Example: **LRD 01** becomes **LR3 D01**.
Example with screw clamp connections: **LRD 340** becomes **LR3D 340**.
Example with lugs: **LRD 3406** becomes **LR3 D 3406**.

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R :
class 10 A: between 2 and 10 seconds
(2) Independent mounting of the contactor.
*(3) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 173).*

Characteristics:
page 199

Dimensions:
page 210

Schemes:
page 213

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LRD ●●3

Differential thermal overload relays

for use with fuses and magnetic circuit-breakers GV2 L and GV3 L (continued)

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference	Weight kg
	aM (A)	gG (A)	BS88 (A)			
Class 10 A *(1)* **for connection by spring terminals (only for direct mounting beneath the contactor)**						
0.10…0.16	0.25	2	–	D09…D38	**LRD 013**	0.140
0.16…0.25	0.5	2	–	D09…D38	**LRD 023**	0.140
0.25…0.40	1	2	–	D09…D38	**LRD 033**	0.140
0.40…0.63	1	2	–	D09…D38	**LRD 043**	0.140
0.63…1	2	4	–	D09…D38	**LRD 053**	0.140
1…1.6	2	4	6	D09…D38	**LRD 063**	0.140
1.6…2.5	4	6	10	D09…D38	**LRD 073**	0.140
2.5…4	6	10	16	D09…D38	**LRD 083**	0.140
4…6	8	16	16	D09…D38	**LRD 103**	0.140
5.5…8	12	20	20	D09…D38	**LRD 123**	0.140
7…10	12	20	20	D09…D38	**LRD 143**	0.140
9…13	16	25	25	D12…D38	**LRD 163**	0.140
12…18	20	35	32	D18…D38	**LRD 213**	0.140
16…24	25	50	50	D25…D38	**LRD 223**	0.140
Class 10 A for power connection by EverLink®, BTR screw connectors *(2)* **and control by spring terminals**						
9…13	16	25	25	D40A…D65A	**LRD 3133**	0.375
12…18	20	32	35	D40A…D65A	**LRD 3183**	0.375
16…25	25	50	50	D40A…D65A	**LRD 3253**	0.375
23…32	40	63	63	D40A…D65A	**LRD 3323**	0.375
25…40	40	80	80	D50A…D65A	**LRD 3403**	0.375
37…50	63	100	100	D40A…D65A	**LRD 3503**	0.375
48…65	63	100	100	D50A…D65A	**LRD 3653**	0.375

Thermal overload relays for use with unbalanced loads

Class 10 A *(1)* **for power connection by BTR screw connectors** *(2)* **and control by spring terminals**

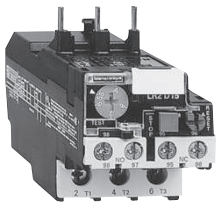
In the references selected above, replace **LRD 3** with **LR3 D3**.
Example: **LRD 3653** becomes **LR3D 3653**.

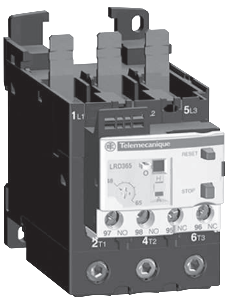
Thermal overload relays for use on 1000 V supplies

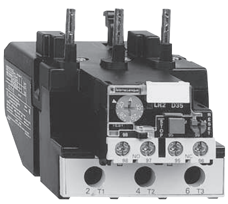
Class 10 A *(1)* **for connection by screw clamp terminals**

For relays LRD 06 to LRD 35 only, for an operating voltage of 1000 V, and only for independent mounting, the reference becomes **LRD 33●●A66**.
Example: **LRD 12** becomes **LRD 3312A66**.
Order an **LA7 D3064** terminal block separately, see page 209.

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 10 A: between 2 and 10 seconds
*(2) BTR screws: hexagon socket head. In accordance with local electrical wiring regulations, a size 4 insulated Allen key must be used (reference **LAD ALLEN4**, see page 173).*

810468

LRD 15●●

536762

LRD 3●●L

536765

LR2 D35●●L

Differential thermal overload relays
for use with fuses and magnetic circuit-breakers GV2 L and GV3 L (continued)

- Compensated relays with manual or automatic reset,
- with relay trip indicator,
- for a.c. or d.c.

Relay setting range (A)	Fuses to be used with selected relay			For use with contactor LC1	Reference	Weight kg
	aM (A)	gG (A)	BS88 (A)			
Class 20 *(1)* **for connection by screw clamp terminals**						
2.5…4	6	10	16	D09…D32	**LRD 1508**	0.190
4…6	8	16	16	D09…D32	**LRD 1510**	0.190
5.5…8	12	20	20	D09…D32	**LRD 1512**	0.190
7…10	16	20	25	D09…D32	**LRD 1514**	0.190
9…13	16	25	25	D12…D32	**LRD 1516**	0.190
12…18	25	35	40	D18…D32	**LRD 1521**	0.190
17…25	32	50	50	D25 and D32	**LRD 1522**	0.190
23…28	40	63	63	D25 and D32	**LRD 1530**	0.190
25…32	40	63	63	D25 and D32	**LRD 1532**	0.190
9…13	20	32	35	D40A…D65A	**LRD 313L**	0.375
12…18	25	40	40	D40A…D65A	**LRD 318L**	0.375
16…25	32	50	50	D40A…D65A	**LRD 325L**	0.375
23…32	40	63	63	D40A…D65A	**LRD 332L**	0.375
25…40	50	80	80	D40A…D65A	**LRD 340L**	0.375
37…50	63	100	100	D40A…D65A	**LRD 350L**	0.375
48…65	80	125	125	D40A…D65A	**LRD 365L**	0.375
55…70	100	125	125	D65…D95	**LR2 D3561**	0.535
63…80	100	160	125	D80 and D95	**LR2 D3563**	0.535

(1) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 20: between 6 and 20 seconds

Differential thermal overload relays
for use with fuses and magnetic circuit-breakers GV2 L and GV3 L (continued)

- Compensated relays, with relay trip indicator,
- for a.c.,
- for direct mounting or independent mounting *(1)*.

Relay setting range (A)	Fuses to be used with selected relay		For mounting beneath contactor LC1	Reference	Weight kg
	aM (A)	gG (A)			
Class 10 or 10A *(2)* **for connection using bars or connectors**					
60…100	100	160	D115 and D150	**LR9 D5367**	0.885
90…150	160	250	D115 and D150	**LR9 D5369**	0.885
Class 20 *(2)* **for connection using bars or connectors**					
60…100	125	160	D115 and D150	**LR9 D5567**	0.885
90…150	200	250	D115 and D150	**LR9 D5569**	0.885

Electronic thermal overload relays for use with balanced or unbalanced loads

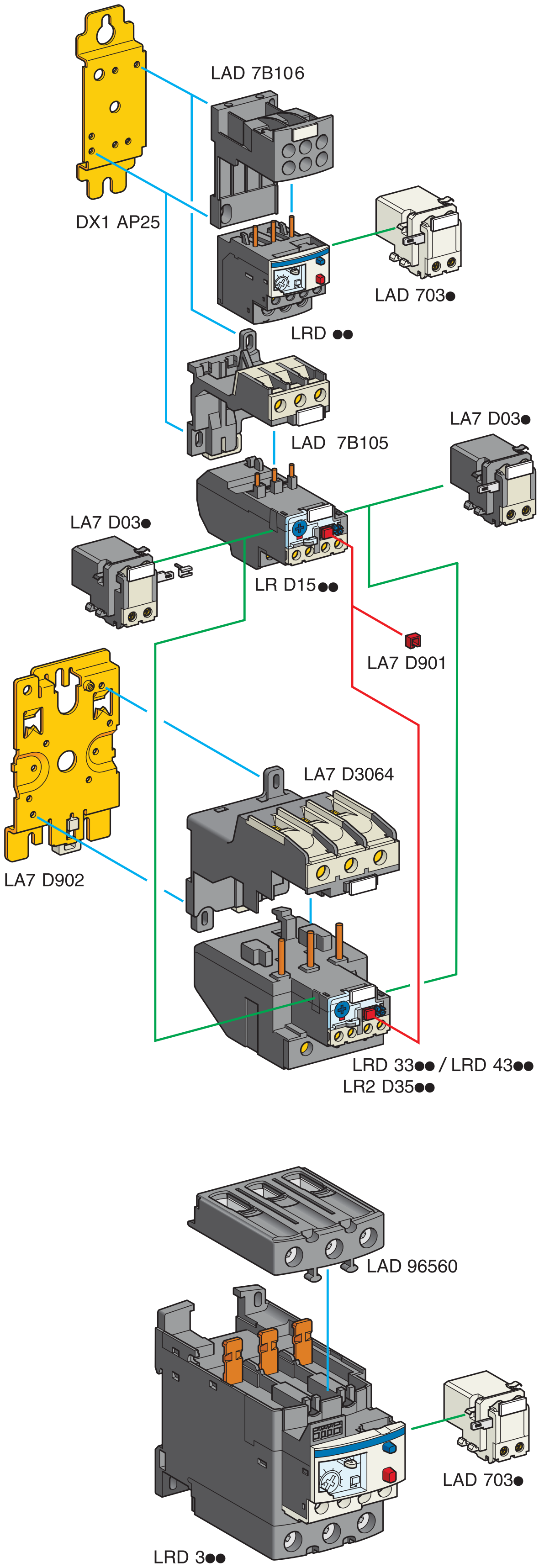
- Compensated relays,
- with separate outputs for alarm and tripping.

Relay setting range (A)	Fuses to be used with selected relay		For mounting beneath contactor LC1	Reference	Weight kg
	aM (A)	gG (A)			
Class 10 or 20 *(2)* **selectable, for connection using bars or connectors**					
60…100	100	160	D115 and D150	**LR9 D67**	0,900
90…150	160	250	D115 and D150	**LR9 D69**	0,900

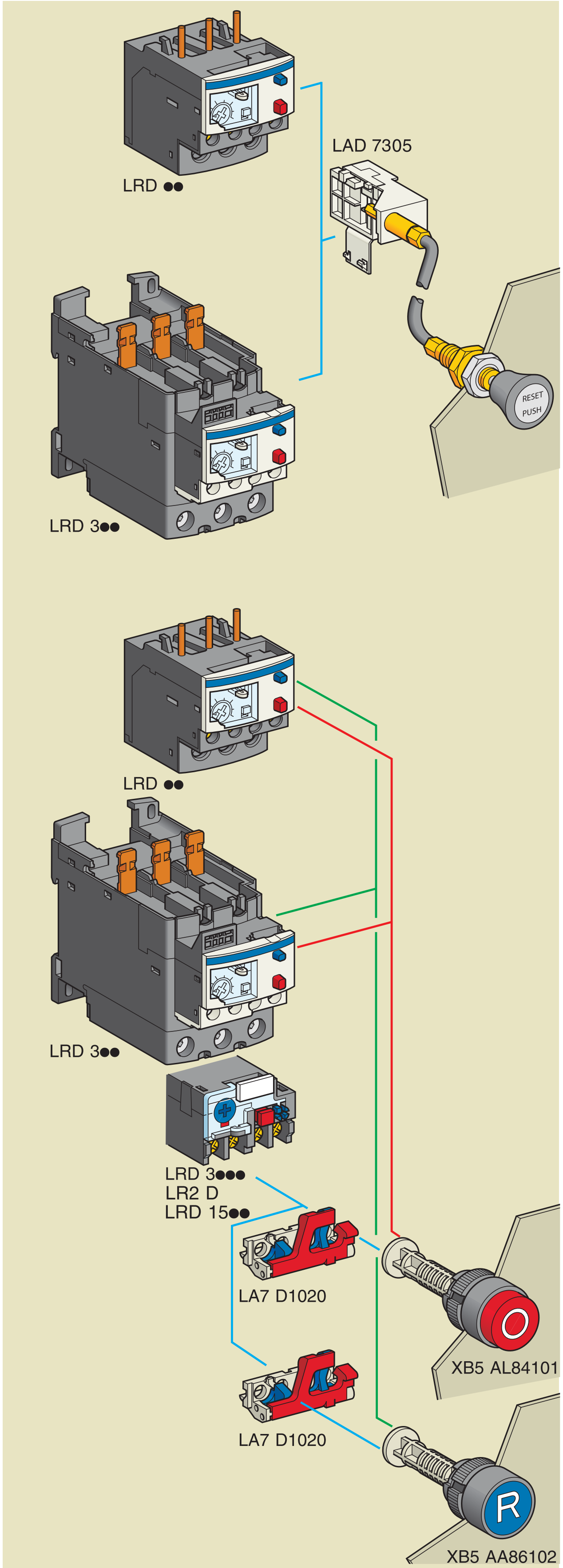
(1) Power terminals can be protected against direct finger contact by the addition of covers and/or insulated terminal blocks, to be ordered separately (see page 172).
(2) Standard IEC 60947-4-1 specifies a tripping time for 7.2 times the setting current I_R:
class 10: between 4 and 10 seconds,
class 10 A: between 2 and 10 seconds,
class 20 A: between 6 and 20 seconds

Other versions

Thermal overload relays for resistive circuits in category AC-1.
Please consult your Regional Sales Office.

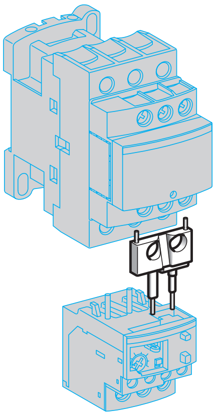


LAD 7B106
DX1 AP25
LAD 703●
LRD ●●
LAD 7B105
LA7 D03●
LA7 D03●
LR D15●●
LA7 D901
LA7 D3064
LA7 D902
LRD 33●● / LRD 43●●
LR2 D35●●
LAD 96560
LAD 703●
LRD 3●●

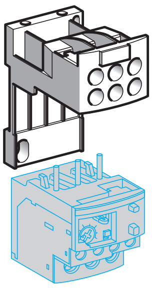


LRD ●●
LAD 7305
RESET
PUSH
LRD 3●●
LRD ●●
LRD 3●●
LRD 3●●●
LR2 D
LRD 15●●
LA7 D1020
XB5 AL84101
LA7 D1020
R
XB5 AA86102

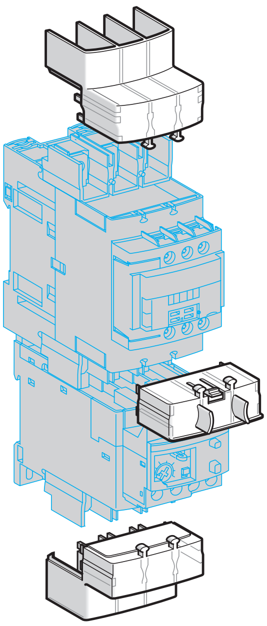
TeSys protection components
TeSys d 3-pole thermal overload relays



LAD 7C●



LAD 7B106



LAD 96570

LAD 96575

Separate components for relays

Description	For use with	Sold in lots of	Unit reference	Weight kg
Pre-wiring kit allowing direct connection of the N/C contact of relay LRD 01…35 or LR3 D01…D35 to the contactor	LC1 D09…D18	10	**LAD 7C1** *(1)*	0.002
	LC1 D25…D38	10	**LAD 7C2** *(1)*	0.003
Terminal block *(2)* for clip-on mounting on 35 mm rail (AM1 DP200) or screw fixing; for fixing centres, see page 210 to 212	LRD 01…35 and LR3 D01…D35	1	**LAD 7B106**	0.100
	LRD 1508…32	1	**LAD 7B105**	0.100
	LRD 33●●●, LR3 D33●●●, LR2 D35●●	1	**LA7 D3064** *(3)*	0.370
EverLink® terminal block for independent mounting	LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LAD 96560**	0.087
Size 4 Allen key, insulated , 1000 V	LRD 3●●, LRD 3●●L and LR3 D3●●	5	**LAD ALLEN4**	0.026
Terminal block adapter for mounting a relay beneath an LC1 D115 or D150 contactor	LRD 3●●, LR3 D3●●●, LRD 35●●	1	**LA7 D3058** *(3)*	0.080
Mounting plates *(4)* for screw fixing **on 110 mm centres**	LRD 01…35, LR3 D01…D35, LRD 1508…32	10	**DX1 AP25**	0.065
	LRD 3●●●, LR3 D3●●●, LR2 D35●●	1	**LA7 D902**	0.130
Marker holders, snap-in 8 x 18 mm	LRD 3●●	100	**LAD 90**	0.001
	All relays except LRD 01…35, LR3 D01…D35, **LRD 3●●**, LRD 3●●L and LR3 D3●●	100	**LA7 D903**	0.001
Bag of 400 blank legends (self-adhesive, 7 x 16 mm)	All relays	1	**LA9 D91**	0.001
Stop button locking device	All relays except LRD 01…35, LR3 D01…D35, LR9 D and LRD 313…LRD 365	10	**LA7 D901**	0.005
Remote Stop or electrical reset device *(5)*	LRD 01…35, LR3 D01…D35 and LRD 313…LRD 365	1	**LAD 703●** *(6) (7)*	0.090
Remote tripping or electrical reset device *(5)*	All relays except LRD 01…35, LR3 D01…D35, LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LA7 D03●** *(6)*	0.090
Block of insulated terminals	LR9 D	2	**LA9 F103**	0.560
IP 20 cover for lug type terminals for independent mounting	LRD 3136…3656	1	**LAD 96570**	0.021
IP 20 cover for lug type terminals for mounting with contactor LC1 D40A6…D65A6	LRD 3136…3656	1	**LAD 96575**	0.010
Terminal block for lug type terminals for independent mounting	LRD 3136…3656	1	**LAD 96566**	0.010

Remote control

"Reset" function

Description	For use with	Sold in lots of	Unit reference	Weight kg
By flexible cable (length = 0.5 m)	LRD 01…35, LR3 D01…D35 and LRD 313…LRD 365	1	**LAD 7305** *(7)*	0.075
	All relays except LRD 01…35, LR3 D01…D35, LRD 3●●, LRD 3●●L and LR3 D3●●	1	**LA7 D305**	0.075

"Stop" and/or "Reset" functions

The terminal protection shroud must be removed and the following 3 products must be ordered separately:

Adapter for door mounting	LRD 33●●, LR2 D and LRD 15●●.		1	**LA7 D1020**	0.005
Operating heads for spring return pushbutton	Stop	All relays	1	**XB5 AL84101**	0.027
	Reset	All relays	1	**XB5 AA86102**	0.027

(1) These pre-wiring kits cannot be used with reversing contactors.
(2) Terminal blocks are supplied with terminals protected against direct finger contact and screws in the open, "ready-to-tighten" position.
(3) To order a terminal block for connection by lugs, the reference becomes ***LA7 D30646****.*
(4) Remember to order the terminal block corresponding to the type of relay.
(5) The time for which the coil of remote tripping or electrical resetting device ***LA7 D03*** *or* ***LAD 703*** *can remain energised depends on its rest time: 1 s pulse duration with 9 s rest time; 5 s pulse duration with 30 s rest time; 10 s pulse duration with 90 s rest time; maximum pulse duration 20 s with a rest time of 300 s. Minimum pulse time: 200 ms.*
(6) Reference to be completed by adding the code indicating the control circuit voltage.
Standard control circuit voltages (for other voltages, please consult your Regional Sales Office) :

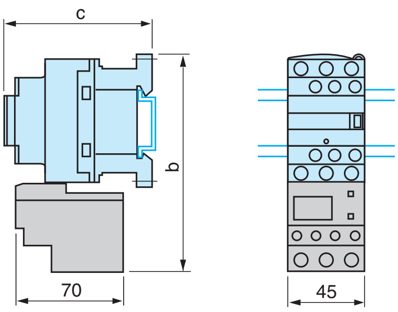
Volts	12	24	48	96	110	220/230	380/400	415/440
50/60 Hz	–	B	E	–	F	M	Q	N
Consumption, inrush and sealed: < 100 VA								
⎓	J	B	E	DD	F	M	–	–
Consumption, inrush and sealed: < 100 W.								

(7) Not compatible with 3-pole relays fitted with spring terminals.

TeSys protection components

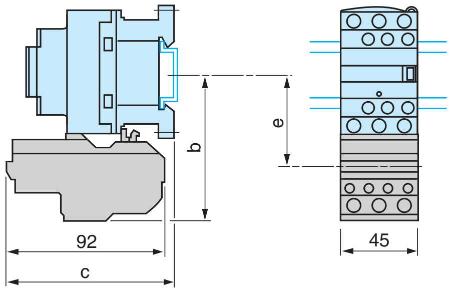
TeSys d thermal overload relays

LRD 01…35
Direct mounting beneath contactors with screw clamp connections



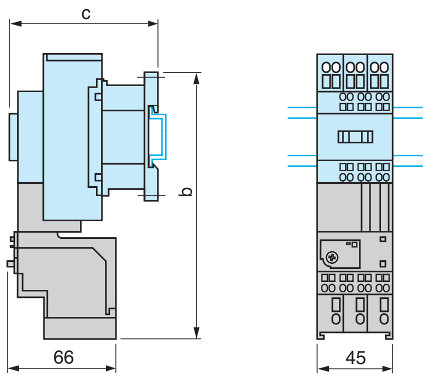
LC1	D09…D18	D25…D38
b	123	137
c	See pages 180 and 181	

LRD 1508…32
Direct mounting beneath contactors with screw clamp connections



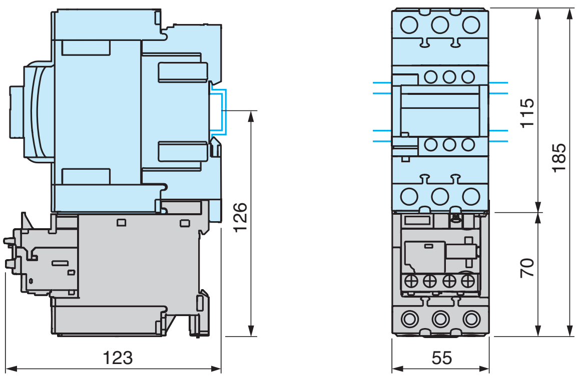
LC1	∿ D09… D18	∿ D25… D38	⎓ D09… D18	⎓ D25… D38
b	90	97	90	97
c	97	96	107	106
e	53	60	53	60

LRD 013…223
Direct mounting beneath contactors with spring terminal connections

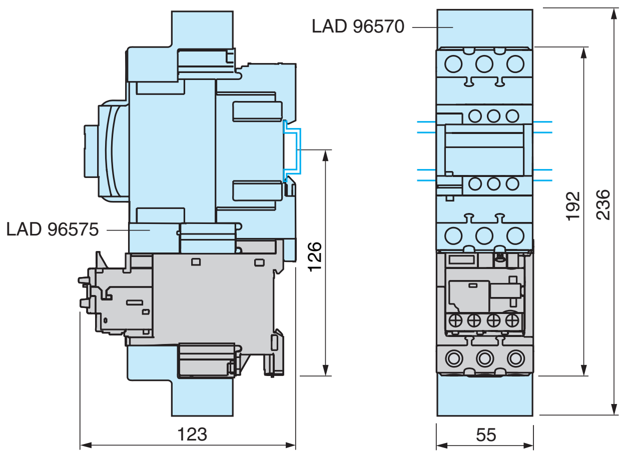


LC1	D093…D253
b	168
c	See pages 180 and 181

LRD 313 …365
Direct mounting beneath contactors LC1 D40A…D65A with screw clamp connections or EverLink® connectors



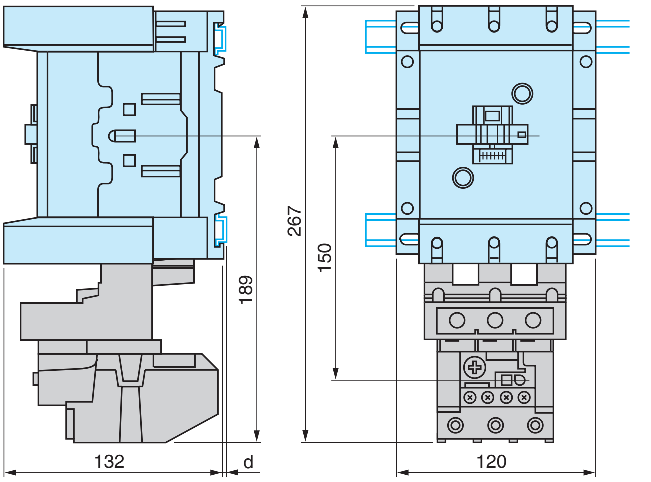
LRD 3136 …3656
Direct mounting beneath contactors LC1 D40A6…D65A6 with lugs



Characteristics :
page 199
References :
page 204
Schemes :
page 213

LRD 4●●●

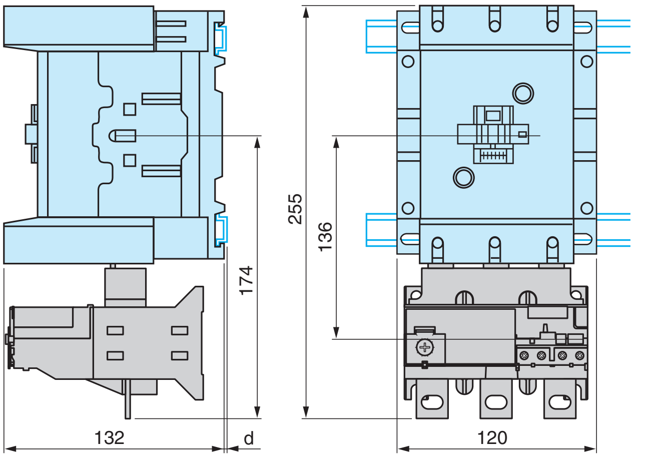
Direct mounting beneath contactors LC 1D115 and D150



AM1	DL200 and DR200	DE200 and ED●●●
d	2.5	10.5

LR9 D

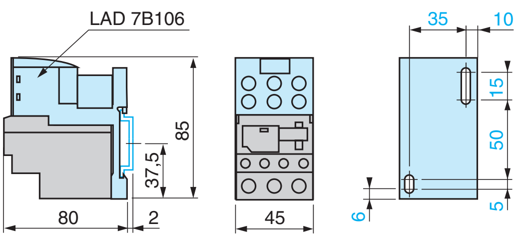
Direct mounting beneath contactors LC 1D115 and D150



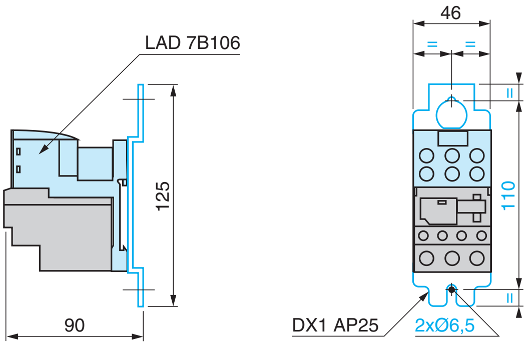
AM1	DP200 and DR200	DE200 and ED●●●
d	2.5	10.5

LRD 01…35

Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



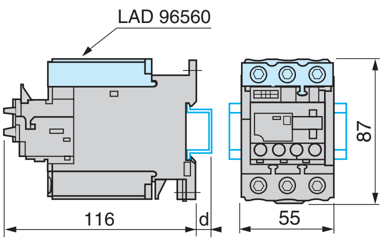
Independent mounting on 110 mm centres



LRD 313 …365

Mounting on rail AM1 D●200 or ED200

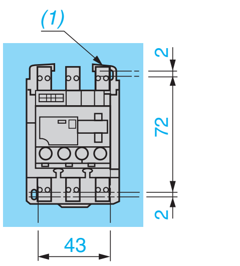
With terminal block LAD 96560



AM1	DP200	DE200	ED200
d	2	9.5	9.5

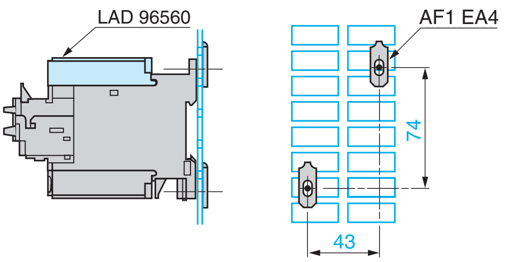
Panel mounting

Outgoing terminal block not shown



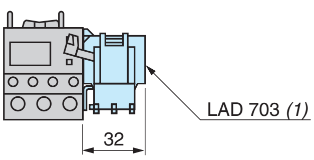
(1) 2 elongated holes Ø 4.2 x 6.

Mounted on plate AM1 P



LRD 01…35 and LRD 313…365

Remote tripping or electrical reset



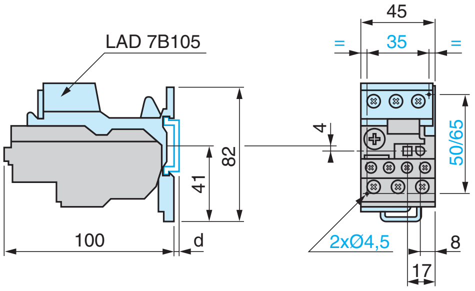
(1) Can only be mounted on RH side of relay LRD01…35 and LRD313…365

Characteristics : page 199
References : page 204
Schemes : page 213

TeSys protection components
TeSys d thermal overload relays

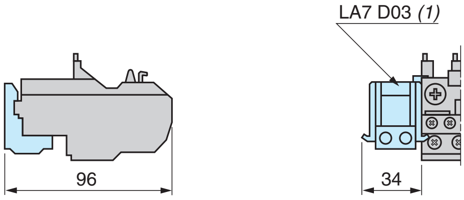
LRD 15●●

Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



AM1	DP200	DE200
d	2	9.5

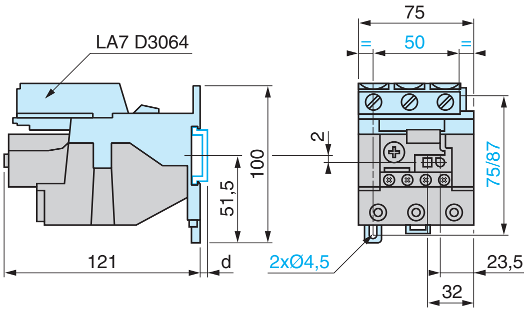
Remote tripping or electrical reset



(1) Can be mounted on RH or LH side of relay LR2 D15.

LRD 3●●● and LR2 D35●●

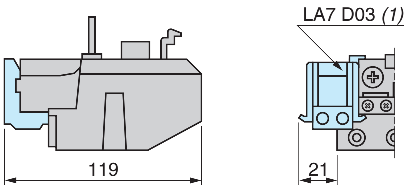
Independent mounting on 50 mm centres or on rail AM1 DP200 or DE200



AM1	DP200	DE200
d	2	9.5

LRD 3●●●, LR2 D35●● and LR9 D

Remote tripping or electrical reset

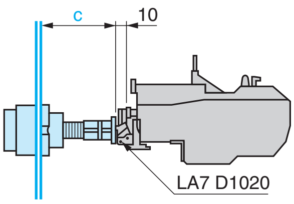


(1) Can be mounted on RH or LH side of relay LRD 3●●●, LR2 D35●● or LR9 D.

LRD 15 and LRD 3●●●

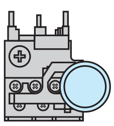
Adapter for door mounted operator

LA7 D1020

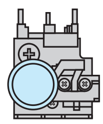


c : adjustable from 17 to 120 mm

Stop



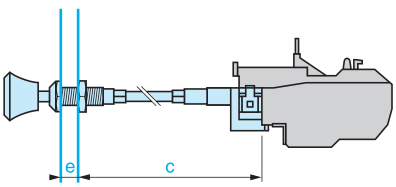
Reset



LRD, LRD 313…365, LRD 15 and LR9 D

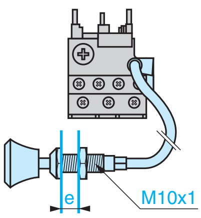
“Reset” by flexible cable

LA7 D305 and LAD 7305
Mounting with cable straight



e : up to 20 mm
c : up to 550 mm

Mounting with cable bent

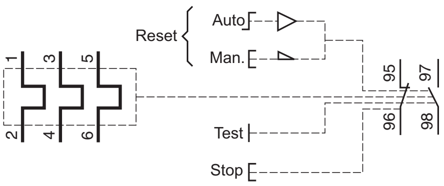


e : up to 20 mm

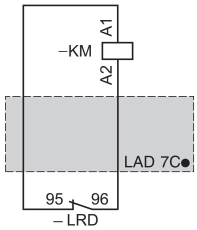
Characteristics : page 199
References : page 204
Schemes : page 213

TeSys protection components
TeSys d thermal overload relays

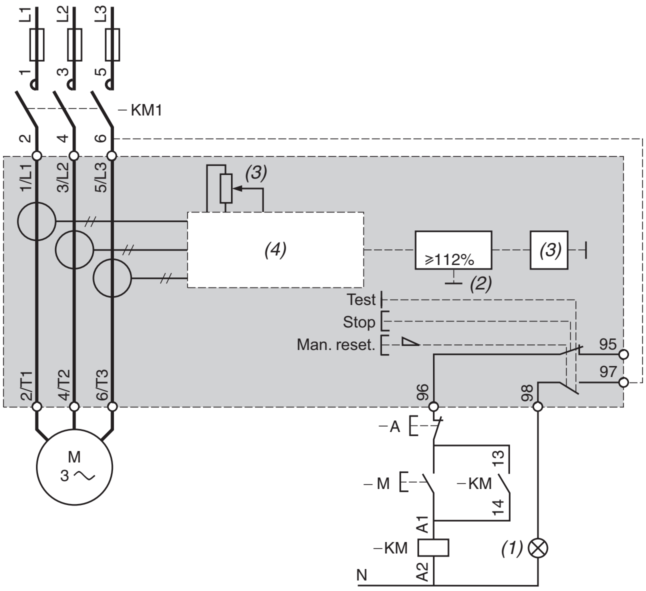
LRD ●●, LRD 3●● and LR2 D●●



Pre-wiring kit LAD 7C1, LAD 7C2

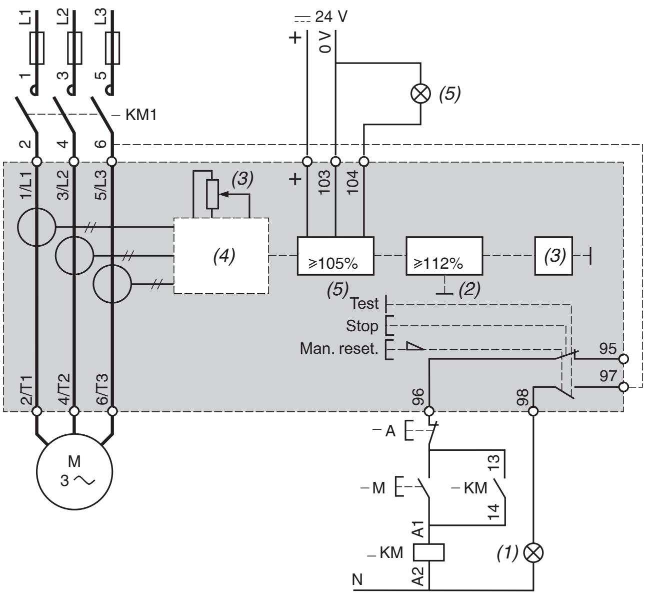


LR9 D5●●●



(1) Tripped.
(2) Overload.
(3) Setting current.
(4) Specialised circuit.

LR9 D67 and LR9 D69



(1) Tripped.
(2) Overload.
(3) Setting current.
(4) Specialised circuit.
(5) Alarm.

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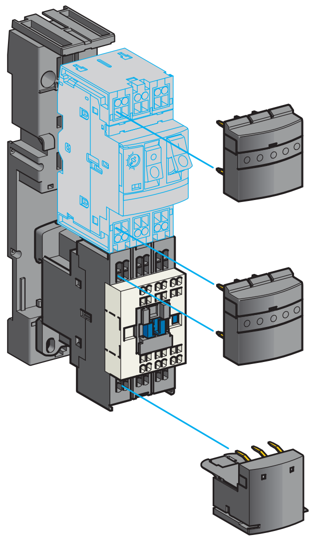
Contents

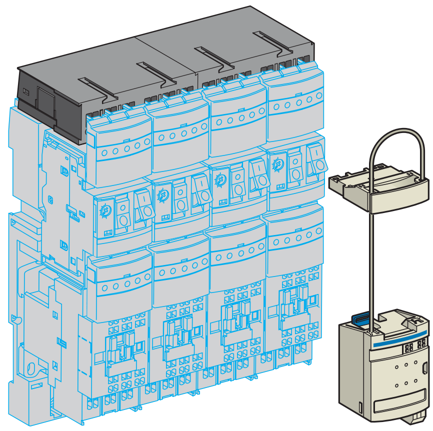
Motor starters up to 150 A

Installation system, power distribution in control panels

Installation system
TeSys Quickfit for motor starter components
Components with spring terminals

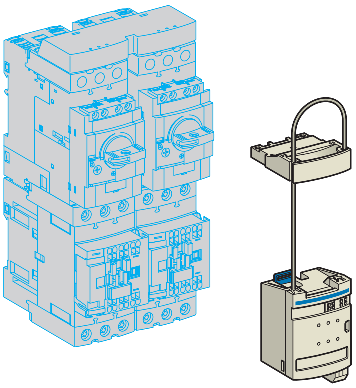
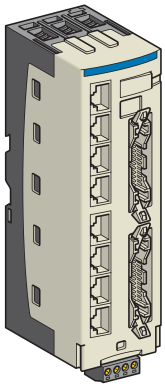
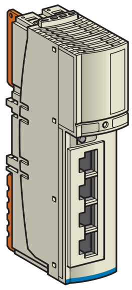
Functions	**Assembly and connection of motor starter components with spring terminals, without using tools**				
Product type	**Power circuit pre-wiring components**	**Control-command pre-wiring components for TeSys motor circuit-breakers GV2 ME**			





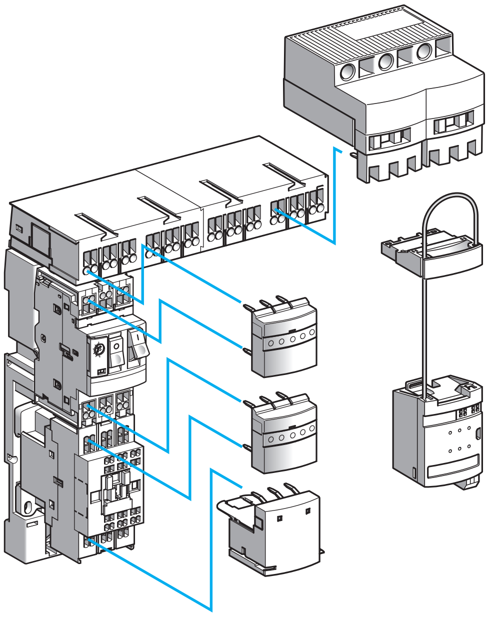
For contactors	TeSys d (9 to 25 A)				
Type of starter	Direct and reversing	Direct		Reversing	
Coil control	–	Yes	No	Yes	No
Use with motor starters	Limited to 60 A (Ith) Limited to 8 starters *(1)*	–			
Number of motor starters	1	–			
Type of connection or bus	–	–			
Number of channels	–	–			
References	**LAD 3●**	**LAD 9AP3●●**			
Pages	223	225			

(1) With TeSys circuit-breakers GV2 ME and upstream terminal block LAD 3B1.

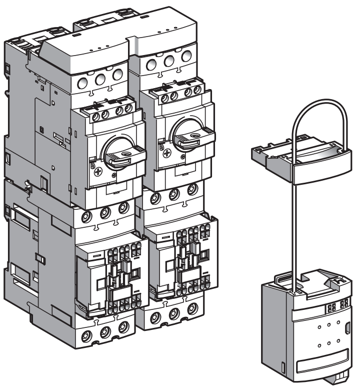
		Communication with the processing part	
Control-command pre-wiring components for TeSys motor circuit-breakers GV3 P		Splitter box	Parallel interface module, with Advantys STB network interface module
			
TeSys d (40 to 65 A)		–	–
Direct	Reversing	–	–
Yes	Yes	–	–
–		–	–
–		8 starters per splitter box	4 starters per module
–		HE 10	Modbus Plus, Fipio, CANopen, Ethernet, TCP/IP, Profibus DP, INTERBUS, DeviceNet
–		16 inputs/12 outputs	–
		LU9 G02	**STB EPI2145**
		225	225

Installation system

TeSys Quickfit for motor starter components
Components with spring terminals



Motor starter with GV2 ME circuit-breakers



Motor starter with GV3 P circuit-breakers

TeSys Quickfit is a modular system which standardises and simplifies setting up of motor starters with its pre-wired control and power circuits.
Installation of a motor starter is therefore quick, simple, safe and flexible. In addition, this system:
- enables the motor starter to be customised at a later date,
- reduces maintenance time and
- optimises panel space by reducing the number of terminals and intermediate interfaces and the amount of ducting.

System for motor starters with spring terminals

Motor starters with TeSys GV2 ME circuit-breakers

- From 0 to 18 A max.,
- TeSys GV2 ME circuit-breakers combined with LC1 D contactors from 9 to 25 A (spring terminal version),
- Quickfit pre-wired power and control connections.

Motor starters with TeSys GV3 P circuit-breakers

- From 9 to 65 A max.,
- TeSys GV3 P circuit-breakers combined with LC1 D contactors from 40 to 65 A (spring terminal version),
- Quickfit pre-wired control connections only,
- For pre-wired power connections, use busbar sets from the TeSys d 40 to 65 A contactor range (see page 173).

This range comprises pre-wiring components for:
- the power circuits,
- the control circuits.

Power circuit pre-wiring components
(motor starters with TeSys GV2 circuit-breakers only)

- **a power circuit connection kit** comprising, for each starter, a plate for mounting the contactor and the circuit-breaker and two power connection modules,
- **a power splitter box** for 2 or 4 starters,
- **an upstream terminal block** for a power supply up to 60 A (16 mm^2),
- **an outgoing terminal block** for connection of the motor power supply cables and the earth cables (6 mm^2).

Note: with GV3 circuit-breakers, no accessories are required for pre-wiring of the power circuit. The GV3 P●● outgoing terminal block can be removed.
This circuit-breaker is also sold with only one terminal block (reference: GV3 P●●1).

Control circuit pre-wiring components
(motor starters with TeSys GV2 and GV3 circuit-breakers)

- **a control circuit connection module** which plugs directly into the contactor and the circuit-breaker on each starter. This module incorporates status and control data for this motor starter.
- **a parallel wiring module** which concentrates the data of each motor starter:
  - □ **HE 10** connector, for centralised applications. Data is transmitted to the PLC via the Advantys Telefast pre-wired system.
  - □ **STB**, designed for decentralised automation architectures. This module is suitable for use in an Advantys STB configuration for connection to the PLC via a field bus.

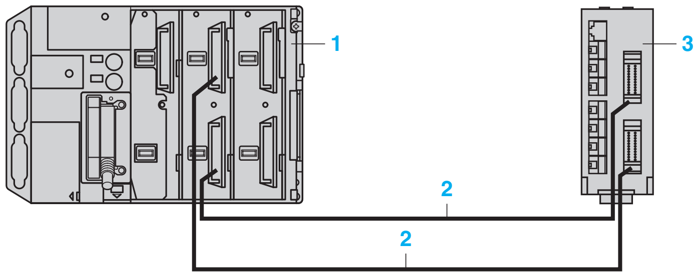
Installation system

TeSys Quickfit for motor starter components

Components with spring terminals

Control/command

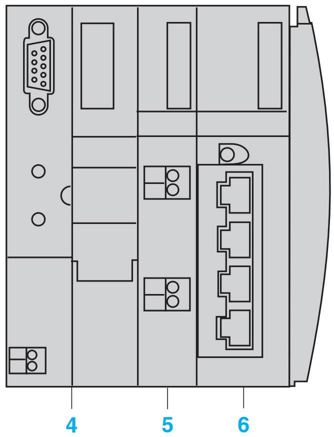
HE 10 connection



1 Automation platform
2 Connection cable **TSXCDP●●** or **ABFH20●●**
3 Splitter box **LU9 G02**

Connection on bus using Advantys STB *(1)*

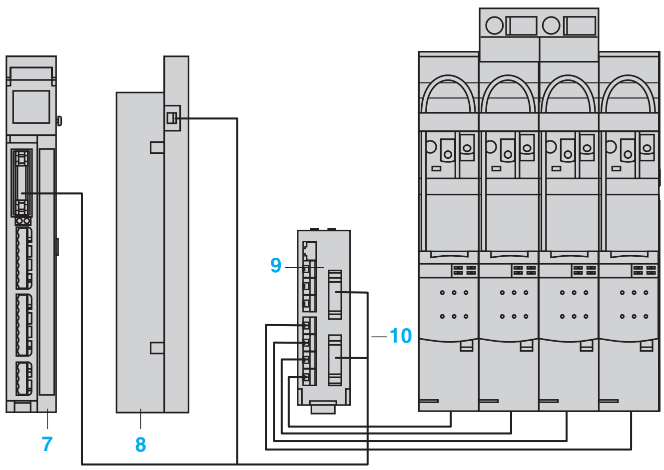
Configuration example (for motor starter applications only):



4 Network interface module
5 Supply module
6 Parallel interface module

Power supply module	
Module	STB PDT 3100
Connection base	STB XBA 2200
Terminal block	STB XTB 1130
Parallel interface module *(2)*	
Module	STB EPI 2145
Connection base	STB XBA 3000
Network interface module *(3)*	
CANopen	STB NCO 1010 *(4)*
Fipio	STB NFP 2210
Ethernet TCP/IP	STB NIP 2210
InterBus	STB NIB 1010 *(4)*
Profibus DP	STB NDP 1010 *(4)*
DeviceNet	STB NDN 1010 *(4)*
Modbus Plus	STB NMP 2210
Terminal block	STB WTS 2120

TeSys Quickfit LAD 9AP3 ●● used with modules APP1 C●●

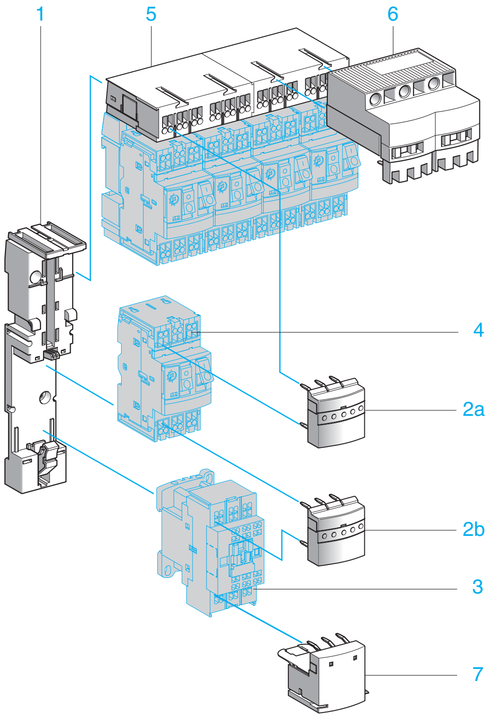


7 TeSys Quickfit module
8 Adapter plate **APP 2CX**
9 Splitter box **LU9 G02** for 8 direct motor starters, with channel connections on the **APP 1C** module side by two HE 10 connectors (20-way) and on theTeSys Quickfit side, by RJ45 connectors
10 Connection cable **APP 2AH40H060**

The motor starter is connected to an **APP 1C●** module 7 using an adapter plate **APP 2CX** 8 and a connection cable **APP 2AH40H060** 10.
Information is available on the module for each motor starter:
- 1 output: motor control,
- 2 inputs: circuit-breaker status and contactor status.

(1) Please consult our catalogue "Advantys STB I/O. The open solution".
(2) For 4 direct or 2 reversing motor starters.
(3) Reference to be selected according to the network used.
(4) Optimised version.

Installation system
TeSys Quickfit for motor starter components
Components with spring terminals



Power components
(only for motor starters with TeSys GV2 circuit-breakers)

Power kits LAD 3●

Each motor starter requires a power kit which consists of a plate **1** and two Quickfit technology power connection modules **2**.
The plate is used for mounting TeSys d contactors **3** (9 to 25 A, direct or reversing, with spring terminals and fitted with a.c. or d.c. coil) and the GV2 ME circuit-breaker **4** only. This plate is mounted on two 35 mm ⌴ rails or is screwed onto a base plate.
The two power connection modules **2a** and **2b** are identical, whatever the rating of the contactor up to 18 A.
The upper power connection module **2a** connects the power between the splitter box and the circuit-breaker.
The lower power connection module **2b** connects the power between the circuit-breaker and the contactor.

Splitter boxes LAD 32●

Splitter boxes **5** are available for 2 or 4 starters.
They can be combined to create motor starters up to 60 A per power supply.
A reversing starter occupies a width equivalent to that of 2 direct starters.
Direct supply of power to the splitter boxes is possible up to 25 A (4 mm^2).

Upstream terminal block LAD 3B1

The upstream terminal block **6** performs two functions:
- power supply up to 60 A (16 mm^2),
- power supply between two connected splitter boxes.

The upstream terminal block connects to the splitter box using Quickfit technology. It is positioned on the splitter box or straddling two splitter boxes and takes up a width equivalent to two motor starters.

Outgoing terminal block LAD 331

The outgoing terminal block **7** performs two functions:
- connection of the motor power supply cables up to 6 mm^2,
- connection of the motor earth cables.

In addition, the terminal block enables quick connection and disconnection for maintenance, avoiding the risk of phase reversal.
The outgoing terminal block connects to the downstream spring terminals on the contactor, using Quickfit technology.

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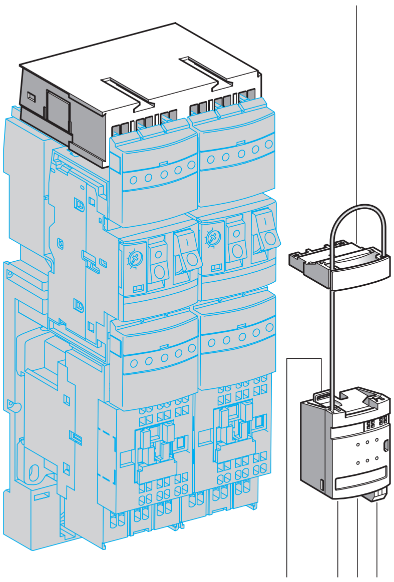
Installation system
TeSys Quickfit for motor starter components
Components with spring terminals



Control/command components

Control circuit connection modules LAD 9 AP3 ●●

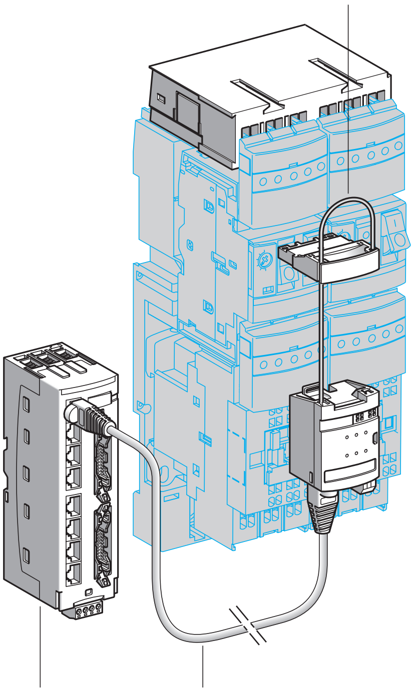
The control circuit connection module **1** plugs directly into the control terminals on the contactor and on the TeSys GV2 ME or TeSys GV3 P motor circuit-breaker, in the location provided for the front-mounting block.
It is compatible with all contactor ratings up to 18 A for TeSys GV2 ME and 65 A for TeSys GV3 P.
Mechanical locking **2** of the system onto the top of the contactor ensures a perfect connection, whatever the operating conditions (vibrations, knocks, etc.).
These modules are available in 4 versions: for direct or reversing starter, with or without contactor coil interface relay.
The coil control can be a.c. or d.c., up to ∿ 250 V and ⎓ 130 V.
The version without relay is designed to control the contactor coils with no interface, at 24 V d.c.
The version with relay has a connector for connecting the contactor power supply.

Module **LAD9 AP3●●** incorporates, in its lower part, several external connectors:
3 RJ45 connector, for connecting the automation system.
4 2-way connector, for connecting the contactor power supply (only on versions with relay).
5 2-way connector, for connecting an external contact in series with the contactor coil (supplied complete with shunt)

Parallel wiring modules

The parallel wiring system makes it possible to connect motor starters which incorporate TeSys Quickfit technology to the processing unit (PLC) quickly and without any need for tools. The parallel wiring module provides the status and command information for each motor starter.
Control connection modules **LAD9 AP3●●** are connected to the parallel wiring modules using RJ45 cables **LU9R●● 6**, which are available in different lengths.
The following information is available for each motor starter:
- 2 inputs: circuit-breaker status and contactor status,
- 1 output: contactor coil control.

A direct motor starter uses one RJ45 channel.
A reversing motor starter uses **two RJ45 channels**.



***Note**: for motor starters built using TeSys GV3 circuit-breakers and TeSys d contactors, the Quickfit pre-wired system allows the contactor to be mounted below the circuit-breaker or mounting of the two devices side by side.*

Parallel wiring module LU9 G02

This module **7** enables connection of up to 8 direct or 4 reversing motor starters directly to the I/O modules of PLCs. It is used with the Advantys Telefast pre-wiring system *(1)*.
This splitter box is optimised for use with card **TSX DMZ28DTK**.

Dedicated parallel interface module STB EPI 2145 *(2)*

This module enables 4 direct or 2 reversing motor starters to be connected via the Advantys STB distributed I/O solution. With STB network interface modules, motor starters can be connected to the following communication networks: Modbus Plus, FIPIO, CANopen, Ethernet TCP/IP, Profibus DP, INTERBUS and DeviceNet.

(1) Please consult our catalogue “Power supplies, splitter boxes and interfaces”.
(2) Please consult our catalogue "Advantys STB I/O. The open solution".

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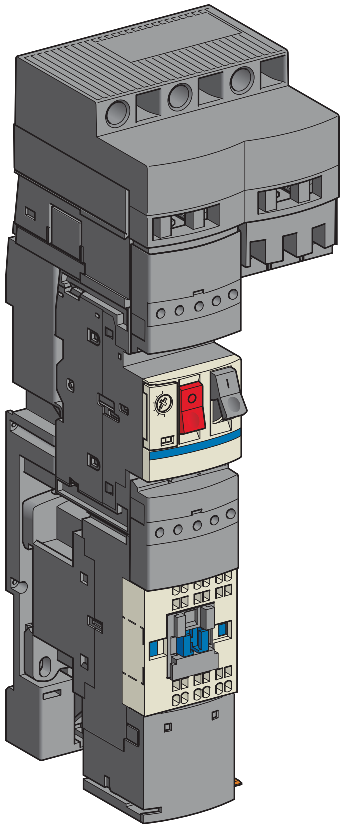
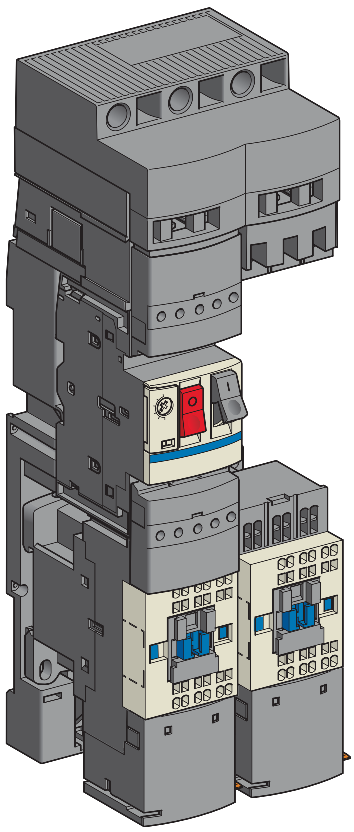
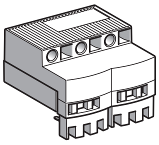
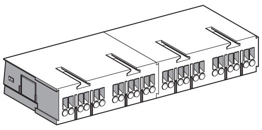
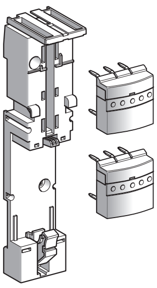


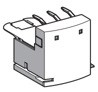


Installation system
TeSys Quickfit for motor starter components
Components with spring terminals


LAD 3B1


LAD 324


LAD 352


LAD 331

Power circuit pre-wiring components (only for motor starters with TeSys GV2 circuit-breakers)

Description	Maximum connection c.s.a.	Application	Sold in lots of	Reference	Weight kg
Upstream terminal block	16 mm² *(1)*	Power supply of 1 or 2 power splitter boxes	1	**LAD 3B1**	0.212

Description	Extension by	Number of starters	Reference	Weight kg
Power splitter box, 60 A	LAD 32●	2	**LAD 322**	0.120
		4	**LAD 324**	0.240

Description	Composition	Reference	Weight kg
Direct starter			
Power connection kit	1 plate LAD 311 for GV2 ME and 2 power connection modules LAD 341	**LAD 352**	0.078

Reversing starter

To build a reversing starter, order 2 kits **LAD 352**

Description	Maximum connection c.s.a.	Application	Sold in lots of	Reference	Weight kg
Outgoing terminal block	6 mm²	Connection of motor cables	10	**LAD 331**	0.050

Description	No. of starters	Sold in lots of	Unit reference	Weight kg
Plate for mounting a GV2 ME circuit-breaker and a contactor	1	10	**LAD 311**	0.042
Power connection module	1	10	**LAD 341**	0.018

(1) Cables with one end pre-crimped are available to allow fast connection. References:
*1 set of 3 x 6 mm² cables (length 1 m: **LAD 3B061**, length 2 m: **LAD 3B062** and length 3 m: **LAD 3B063)**,*
*1 set of 3 x 10 mm² cables (length 1 m: **LAD 3B101**, length 2 m: **LAD 3B102** and length 3 m: **LAD 3B103)**,*
*1 set of 3 x 16 mm² cables (length 1 m: **LAD 3B161**, length 2 m: **LAD 3B162** and length 3 m: **LAD 3B163)**.*

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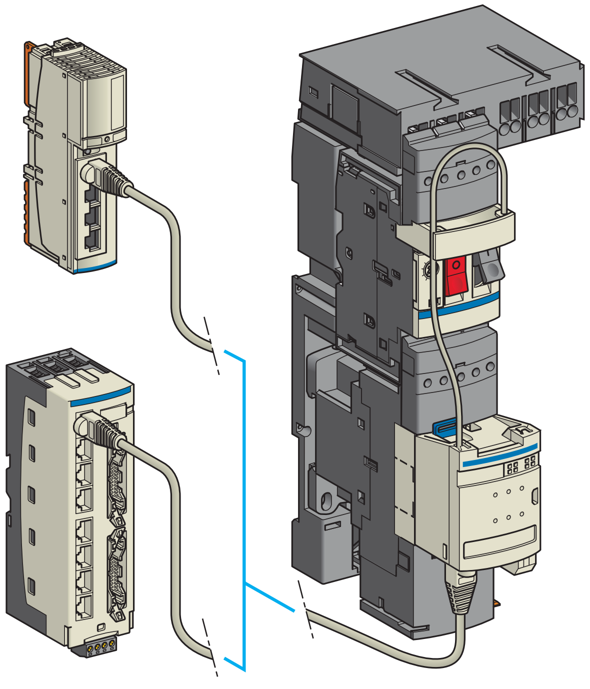
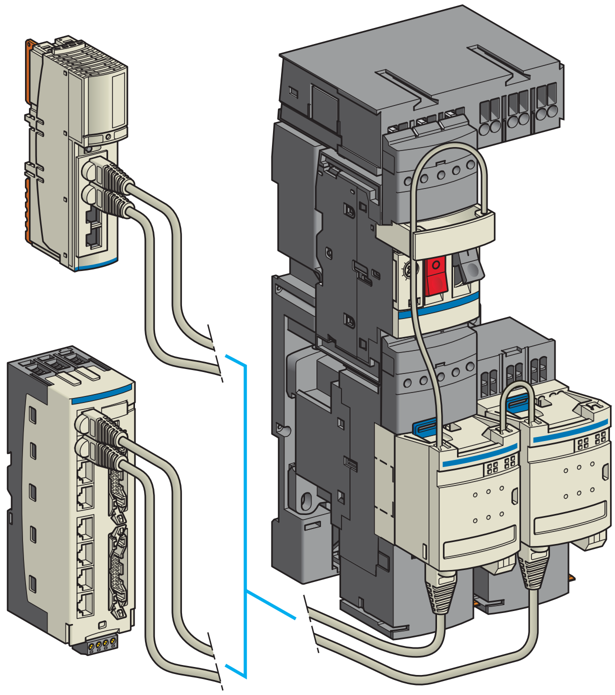
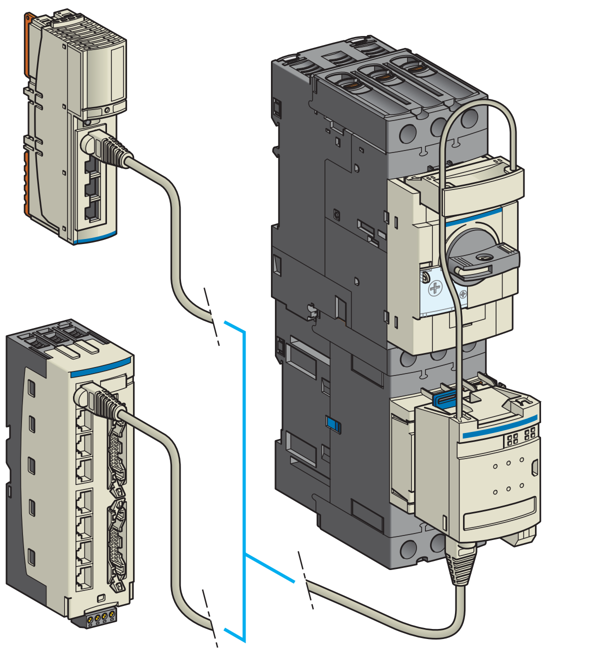
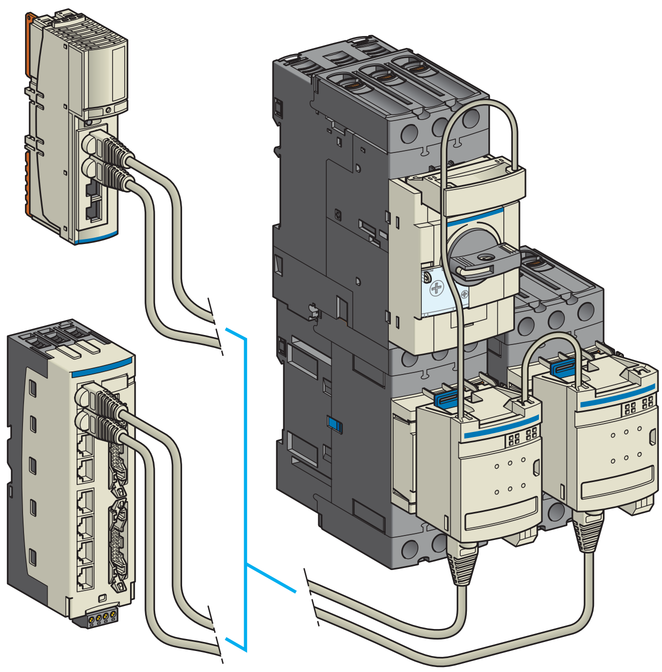




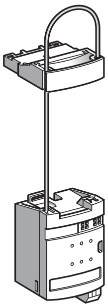




Note: *Circuit-breakers TeSys GV3 P and contactors LC1 D40A3 to 65A3 can be mounted side by side, using a set of S-shape busbars (GV3 S).*

Installation system

TeSys Quickfit for motor starter components
Components with spring terminals



LAD 9AP3●

Control-command pre-wiring components

Description	TeSys d coil voltage	Type of coil control relay	Type of starter	Reference	Weight kg
Control connection modules	∼ 12... 250 V or ⎓ 5...130 V	Electromechanical	Direct	**LAD 9AP31**	0.150
			Reversing	**LAD 9AP32**	0.200
	⎓ 24 V	Without relay	Direct	**LAD 9AP3D1**	0.140
			Reversing	**LAD 9AP3D2**	0.190

Parallel wiring modules (⎓ 24 V)

Description	Connectors		Reference	Weight
	PLC side	Motor starter side		kg
Splitter box	2 x HE 10 20-way	8 x RJ45	**LU9 G02**	0.260

Description	Connectors		Reference	Weight
	PLC side	Motor starter side		kg
Advantys STB parallel interface module	–	4 x RJ45	**STB EPI 2145**	0.165

Connection cables

Between the control connection module and the splitter box LU9 G02 or STB EPI 2145

Connectors	Length	Reference	Weight
	m		kg
2 x RJ45 connectors	0.3	**LU9 R03**	0.045
	1	**LU9 R10**	0.065
	3	**LU9 R30**	0.125

Between splitter box LU9 G02 and the PLC

Type of connection		Gauge	C.s.a.	Length	Reference	Weight
PLC side	Splitter box side					
		AWG	mm²	m		kg
HE 10 20-way	**HE 10 20-way**	22	0.324	0.5	**TSX CDP 053**	0.085
				1	**TSX CDP 103**	0.150
				2	**TSX CDP 203**	0.280
				3	**TSX CDP 303**	0.410
				5	**TSX CDP 503**	0.670
		28	0.080	1	**ABF H20 H100**	0.080
				2	**ABF H20 H200**	0.140
				3	**ABF H20 H300**	0.210
Bare wires	**HE 10 20-way**	22	0.324	3	**TSX CDP 301**	0.400
				5	**TSX CDP 501**	0.660

Separate components

Description	Characteristics	Sold in lots of	Unit reference	Weight kg
Spring terminal connections for: ■ the external contact ■ the auxiliary power supply	2-way, 5 mm pitch Wire c.s.a.: 0.2…2.5 mm²	10	**APE 1PRE21**	0.020
Self-stripping connector for: ■ the external contact ■ the auxiliary power supply	2-way, 5 mm pitch Wire c.s.a.: 0.75 mm²	16	**APE 1PAD21**	0.020
Connecting cable between module APP 1C● and splitter box LU9 G02 (length: 0.6 m)	Connectors: 1 x HE 10, 30-way 2 x HE 10, 20-way	1	**APP 2AH40H060**	0.400

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Installation system

TeSys Quickfit for motor starter components
Components with spring terminals

Type of control connection module				LAD 9AP3●●
General environment				
Standard				IEC 60439-1
Certifications				UL, CSA
Degree of protection		Conforming to IEC 60529		IP 40 (mounted assembly)
Resistance to incandescent wire		Conforming to IEC 60695-2-1	°C	960
Shock resistance		Conforming to IEC 60068-2-27		11 ms and 15 gn (half sine wave)
Vibration resistance		Conforming to IEC 60068-2-6 and BV/LR	gn	2…100 Hz : 4 and 3…100 Hz: 0,7
Resistance to electrostatic discharge		Conforming to IEC 61000-4-2		Level 3
Resistance to radiated fields		Conforming to IEC 61000-4-3	V/m	10 (26…1000 MHz)
Immunity to fast transient currents		Conforming to IEC 61000-4-4		Level 3
Surge withstand		Conforming to IEC 61000-4-5	kV	2 in common mode, 0.6 in differential mode Wave form: 1.2/50 µs - 8/20 µs
Immunity to radioelectric fields		Conforming to IEC 61000-4-6	V	10 (0.15...80 MHz)
Ambient air temperature		Operation in floor-standing enclosure	°C	- 5…+ 60
		Operation in wall-mounted enclosure	°C	- 5…+ 40
		Storage	°C	- 40…+ 70
Space required around mounted assembly		For inserting cables and heat dissipation	mm	> 30
Degree of pollution				3
Assembly fixing (with TeSys GV2 circuit-breakers only)				On 2 x 35 mm rails or with 2 x Ø 5.5 mm screws on plate for GV2 ME
Suitable wire c.s.a.	Voltage supply for power	Number of wires		3
		Flexible cable with cable end	mm²	16
		Flexible cable without cable end	mm²	25
		Solid cable	mm²	25
	Voltage supply for contactor coil control	Number of wires		2
		Flexible cable with cable end (max)	mm²	1.5
		Flexible cable without cable end (max)	mm²	2.5
		Solid cable (max)	mm²	2.5
3-phase power circuit characteristics				
Maximum current	Per power supply	Conforming to IEC 60439-1	A	60 (single power supply to one or more sub-bases or splitter boxes)
	Per sub-base	Conforming to IEC 60439-1	A	60
GV2 operating limit				80 % of Imax at 60° C ambient temperature (see table on opposite page)
Maximum current per starter			A	18 (with an empty slot between two starters)
Insulation voltage			V	750
Operational voltage			V	690
U imp			kV	6
Rated operational frequency			Hz	50-60
Rated short-circuit current conditional Isc at 415 V		Conforming to IEC 60439-1	kA	50
Permissible short-time rating Icw		Conforming to IEC 60439-1	kA	9.1 (for 70 ms)
Control circuit characteristics				
Contactor coil control voltage			V	∿ 12…250 (with interface relay)
			V	⎓ 5…24 (without interface relay)
			V	⎓ 5…130 (with interface relay)

Installation system

TeSys Quickfit for motor starter components
Components with spring terminals

Table of GV2 circuit-breaker current limitation at 60°C ambient temperature with TeSys Quickfit

Circuit-breaker reference	GV2 ratings *(1)*	Maximum current of GV2 with TeSys Quickfit
GV2 ME06	1 - 1.6 A	1.28 A
GV2 ME07	1.6 - 2.5 A	2 A
GV2 ME08	2.5 - 4 A	3.2 A
GV2 ME10	4 - 6.3 A	5 A
GV2 ME14	6 - 10 A	8 A
GV2 ME16	9 - 14 A	11.2 A
GV2 ME20	13 - 18 A	14.4 A
GV2 ME21	17 - 23 A	18 A

Electromechanical relay characteristics

Type of control connection module			LAD 9AP31, LAD 9AP32
Characteristics of the electromechanical relay control circuit (PLC side)			
Rated voltage at Us		**V**	⎓ 24
Energisation threshold at 40 °C		**V**	⎓ 19.2
Drop-out voltage at 20 °C		**V**	⎓ 2.4
Maximum operational voltage		**V**	⎓ 30
Maximum current at Us		**mA**	15
Drop-out current at 20 °C		**mA**	1
Maximum power dissipated at Us		**W**	0.36
Supply failure		**ms**	5
Characteristics of the electromechanical relay output circuit			
Type of contact			1F
Maximum switching voltage		**V**	~ 250
		V	⎓ 130
Frequency of the operating current		**Hz**	50/60
Maximum current of the contact		**A**	4
Other characteristics of the electromechanical relay			
Maximum operating time at Us (including bounce)	Between coil energisation and closing of the contact	**ms**	10
	Between coil de-energisation and opening of the contact	**ms**	5
Maximum operating ratet	No load	**Hz**	10
	At Ie	**Hz**	0.5
Mechanical life	In millions of operating cycles		20
Dielectric strength		**V**	1000 (50/60 Hz) - 1 mn
Rated impulse withstand voltage (Uimp)		**kV**	2.5
Primary/secondary rated insulation voltage		**V**	300
Maximum current for 500 000 operations	24 V - DC13	**A**	0.6
	230 V - AC15	**A**	0.9

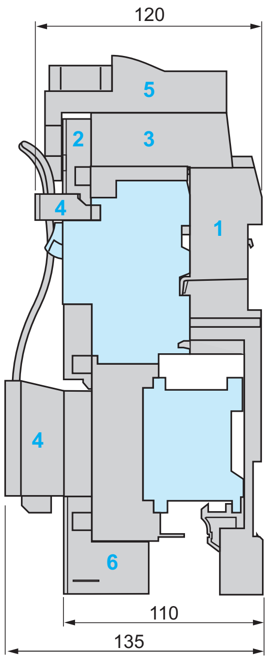
(1) Thermal trip setting range.

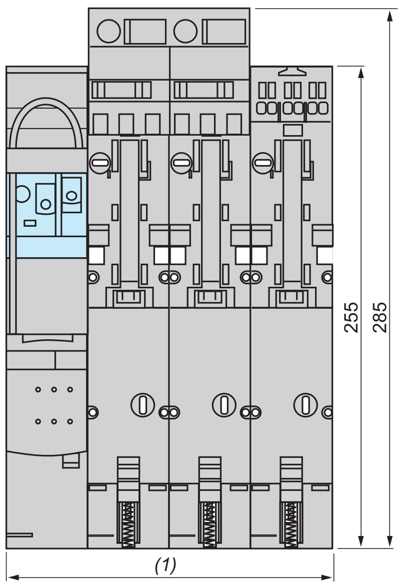
Installation system

TeSys Quickfit for motor starter components
Components with spring terminals

Dimensions

Mounted assembly, with TeSys GV2 ME circuit-breakers and TeSys d contactors



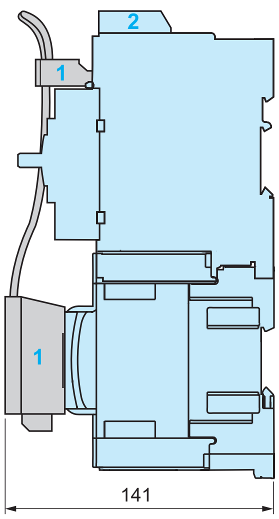


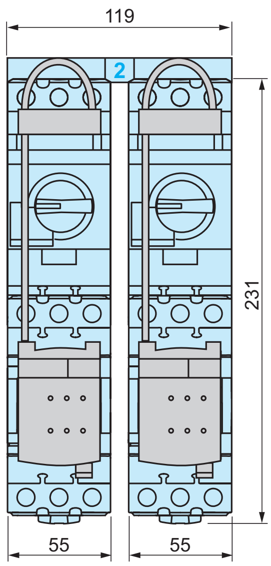
1 Circuit-breaker and contactor support plate
2 Power connection module
3 Power splitter box
4 Control splitter box
5 Upstream terminal block
6 Outgoing terminal block

(1) 2 starters: 90 mm, 4 starters: 180 mm, 8 starters: 360 mm.

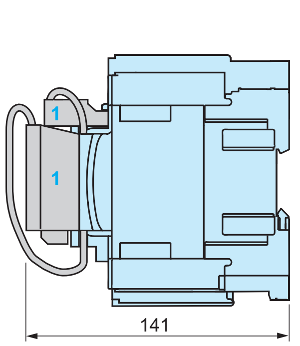
Mounted assembly with TeSys GV3 P circuit-breakers and TeSys d contactors (LC1 D40A3… LC1 D65A3)

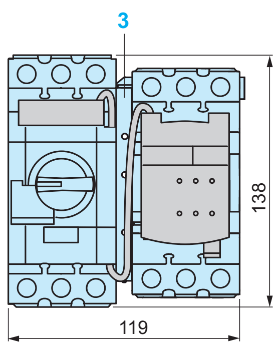
Vertical mounting





Side by side mounting



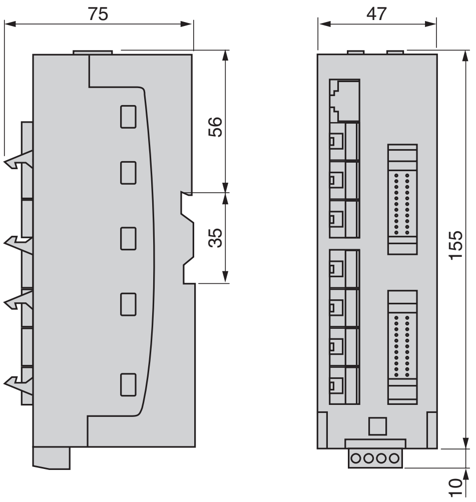


1 Control splitter box
2 Set of GV3 G264 busbars
3 Set of S-shape busbars GV3 S

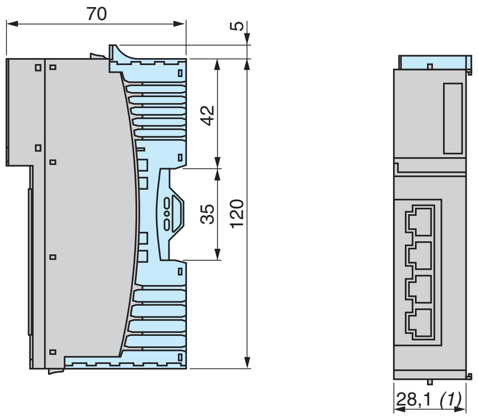
Dimensions

Parallel wiring modules

Splitter box LU9 G02

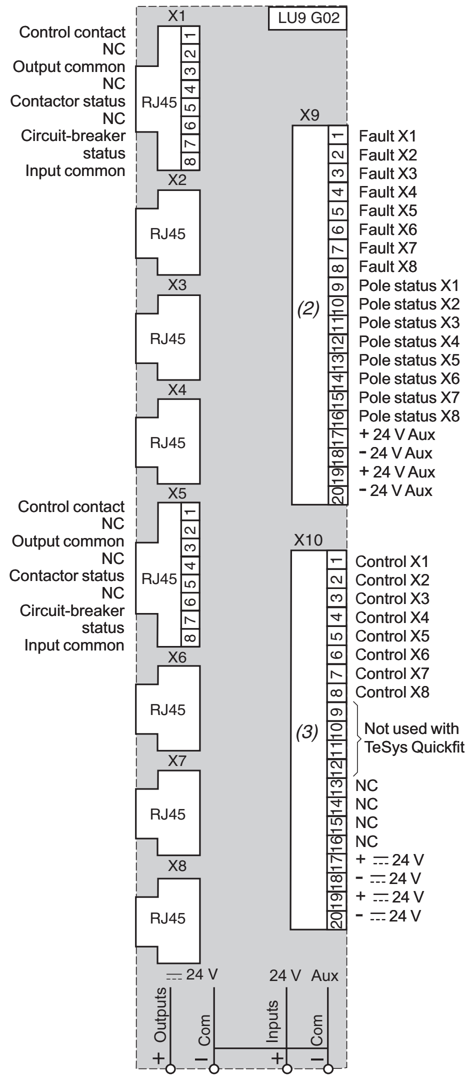


Parallel wiring module Advantys STB EPI 2145



Schemes

Splitter box LU9 G02



Colours of TSX CDP●●● connection cable wires *(4)*
1 White
2 Brown
3 Green
4 Yellow
5 Grey
6 Pink
7 Blue
8 Red
9 Black
10 Violet
11 Grey-pink
12 Red-blue
13 White-green
14 Brown-green
15 White-yellow
16 Yellow-brown
17 White-grey
18 Grey-brown
19 White-pink
20 Pink-brown

(2) 20-way HE10 input connector.
(3) 20-way HE10 output connector.
(4) Wire colours and corresponding HE10 connector pin numbers.

Installation system

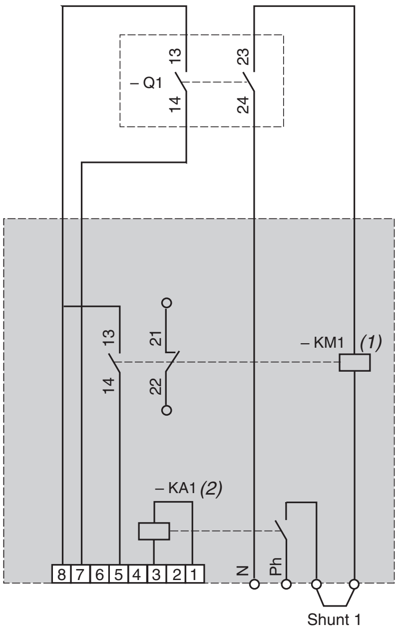
TeSys Quickfit for motor starter components

Components with spring terminals

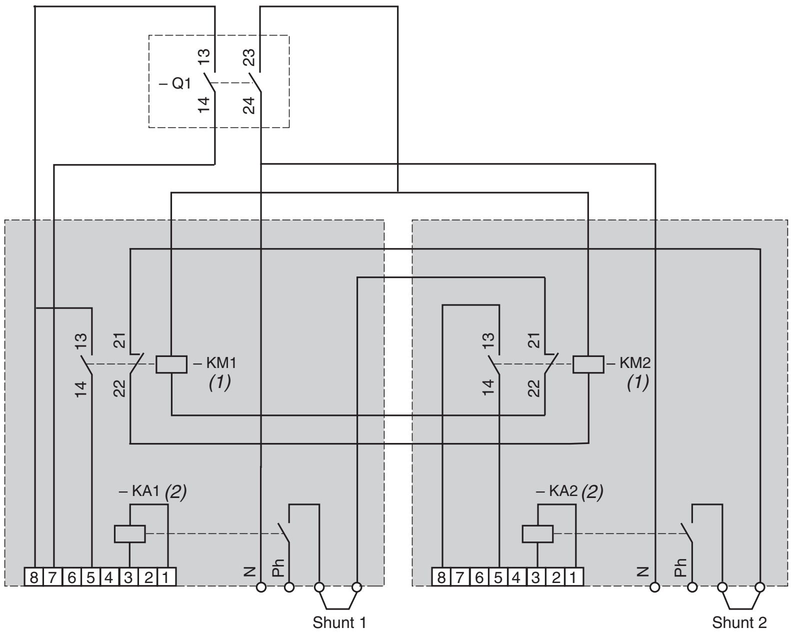
Wiring schemes

With relay

LAD9 AP31



LAD9 AP32



Q1 Thermal-magnetic motor circuit-breaker.
(1) Contactor coil.
(2) Interface relay.

Installation system

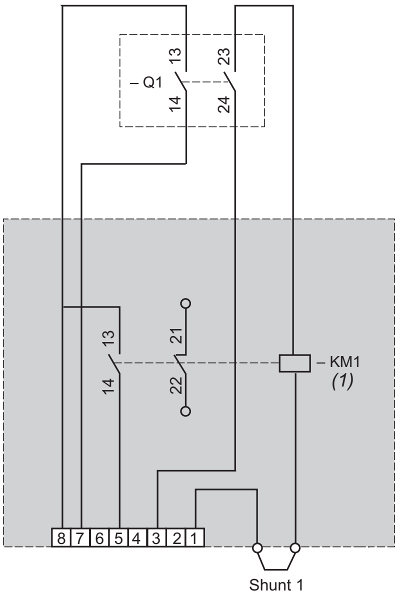
TeSys Quickfit for motor starter components

Components with spring terminals

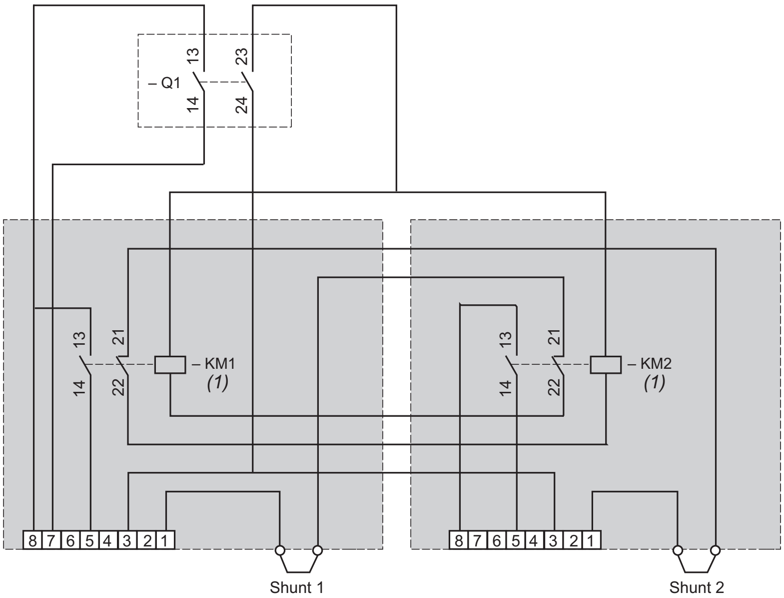
Wiring schemes (continued)

Without relay

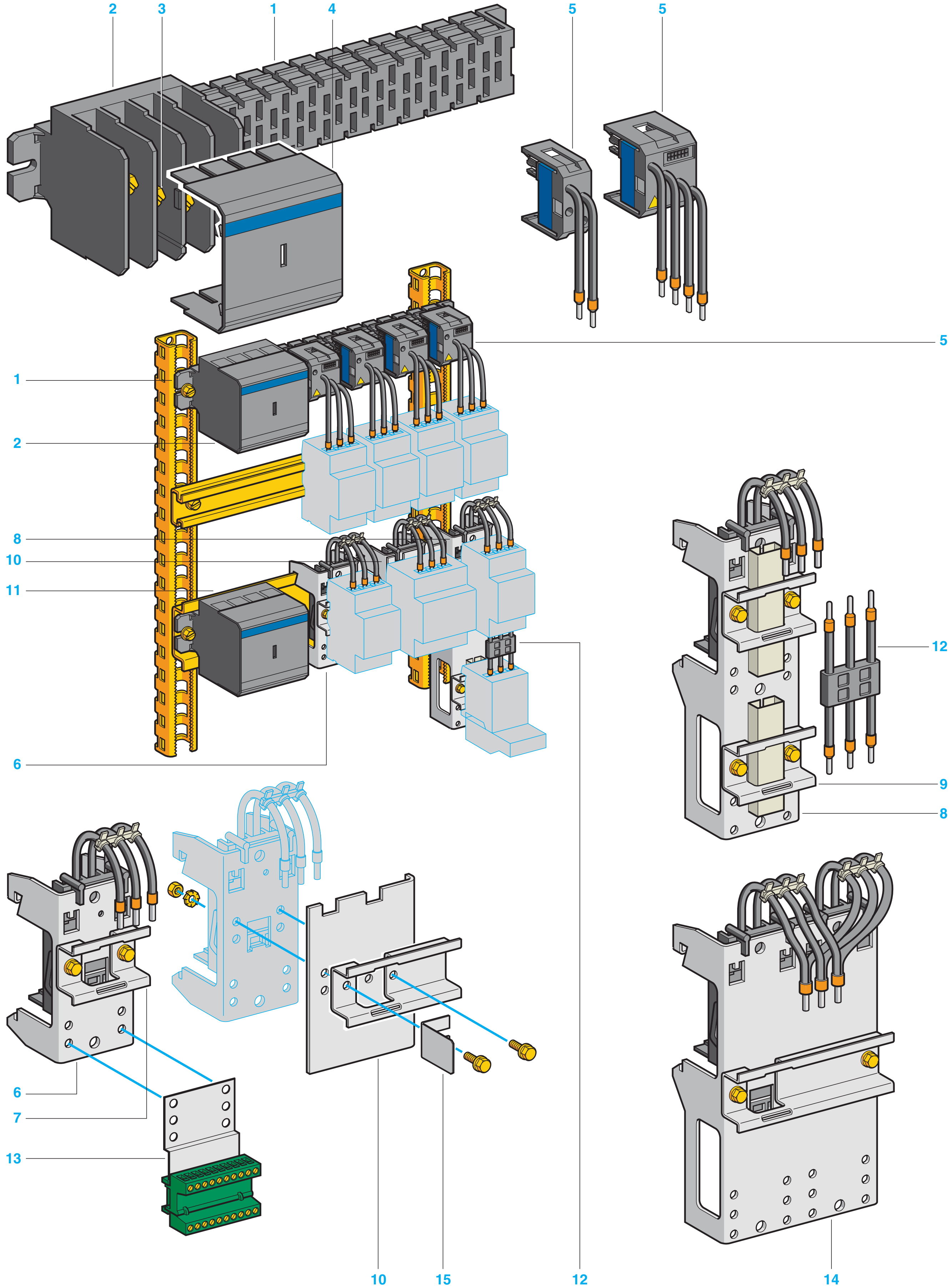
LAD9 AP3D1



LAD9 AP3D2



Q1 Thermal-magnetic motor circuit-breaker.
(1) Contactor coil.


2
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14

Power distribution in control panels

Pre-assembled panel busbar system AK5

The assembly of automated control and distribution panels requires the use of products that are not only safe but also simple and quick to mount and cable.

The AK5 pre-assembled busbar system meets all these criteria by incorporating prefabricated components which cater for 3 principal functions:

Carrying of electric current

By the pre-assembled 4-pole busbar system **1**, 160 A at 35 °C.

4-pole busbar systems can be used for 3-phase + Neutral or 3-phase + Common.

The busbar systems are available in 6 lengths: 344, 452, 560, 668, 992, 1100 mm.

An incoming supply terminal block **2** is located at the extreme left of the busbar system.

"Knock-out" partitions allow connection of the power supply from above or below to connectors **3** which are protected by a removable cover **4**.
Upstream protection of the busbar system is shown on page 234.

Current distribution

Tap-off units **5** (factory assembled) are available in 4 versions:
- 2-pole,
- 3-pole,
- 4-pole (3-phase + Neutral),
- 4-pole (3-phase + Common).

The tap-offs clip onto the busbar system with instantaneous mechanical and electrical connection to the busbars.
2 ratings are available: 16 and 32 A.
The tap-off units ensure not only rapid mounting, but also a neat appearance for the power distribution system and complete safety when accessing under live circuit conditions.

Component mounting

Component mounting plates with incorporated tap-off allow mounting of and supply of power to components.
They are available in 25 A or 50 A ratings.

These mounting plates clip onto the mounting rail **11**, which also supports the busbar system, and at the same time make electrical connection via the incorporated tap-off.

2 types of mounting plate are available:
- single plates **6** (height 105 mm), with bolt-on 35 mm wide ⊔ rail **7**, which may be bolted on in one of two positions, allowing height adjustment of 10 mm.
- double plates **8** and **14** (height 190 mm), with two bolt-on, 35 mm wide ⊔ rails **9** mounted on 100 mm fixing centres; each rail may be bolted on in one of 4 positions, allowing height adjustment in 10 mm steps. These plates are supplied with connectors **12** to allow wiring between control and protection devices.

Single mounting plates enable the following types of distribution:
- 2-pole (Ph + N) and (Ph + Ph)
- 3-pole,
- 4-pole (3 Ph + N or 3 Ph + common).

Double mounting plates enable the following types of distribution: 2-pole (Ph + N, Ph + Ph), 3-pole or 4-pole (3Ph+N and 3Ph + common).

Extension plates **10** can be bolted onto single and double mounting plates to enable mounting of wider components. Using a side stop **15** in conjunction with these extension plates also supports the AK5 JB busbar system when used vertically.

A control terminal block **13** comprising a support plate bolted onto the single or double mounting plates and a 10-pole plug-in block, enables connection of the control circuit wires (c.s.a. 1.5 mm^2 max).

Characteristics : page 234
References : page 238
Dimensions : page 240
Mounting possibilities : page 236

Power distribution in control panels

Pre-assembled panel busbar system AK5

Busbar system characteristics

Conforming to standards			IEC 60439					
Product certifications			UL, CSA, DNV, LROS					
Degree of protection	Against access to live parts		IP XXB conforming to IEC 60529					
Flame resistance	Conforming to IEC 60695	**°C**	850 (incandescent wire)					
	Conforming to standard UL 94		V0					
Number of conductors	AK5 JB14●		4					
Supply current			∼					
Rated operational frequency		**Hz**	50 or 60					
Rated operational current	Ambient temperature 35 °C	**A**	160					
	Coefficient K to be applied according to the ambient temperature	**°C**	35	40	45	50	55	60
		K	1	0.96	0.92	0.88	0.83	0.78
Rated insulation voltage	Conforming to IEC 60439-1	**V**	690					
	Conforming to UL and CSA	**V**	600					
Operational voltage			Off-load plugging-in and unplugging, with supply switched on					
	Conforming to IEC 60439-1	**V**	400					
	Conforming to UL, CSA	**V**	480					
			Plugging-in and unplugging, with supply switched off					
	Conforming to IEC 60439-1	**V**	690					
	Conforming to UL, CSA	**V**	600					
Maximum permissible peak current		**kA**	25					
Maximum let-through energy		**A^2s**	1×10^7					
Upstream short-circuit *(1)* **and overload protection**	Type of protection		Merlin Gerin circuit-breaker		Fuses			
			NS 160 H	NS 160 H	aM	gF		
	Rating	**A**	160	160	160	160		
	Prospective short-circuit current	**kA**	36	70	100	100		
	Operational current	**A**	160	160	160	160		
Cabling			Maximum c.s.a.		Minimum c.s.a.			
	Flexible cable with cable end	**mm^2**	70		2.5			
	Solid cable	**mm^2**	70		2.5			
	Tightening torque	**Nm**	10					
Mounting position	Horizontal or vertical *(2)*		Fixing with screws provided					

(1) For conditions where conditional short-circuit current exceeds 25 kA.
(2) Using side stop **AK5 BT01** *on mounting plates* **AK5 PA**.

Présentation : page 233 | References : page 238 | Dimensions : page 240 | Mounting possibilities : page 236

Tap-off characteristics

Type		AK5 PC12	AK5 PC12PH	AK5 PC13	AK5 PC14	AK5 PC131	AK5 PC32L	AK5 PC32LPH	AK5 PC33 PC33L	AK5 PC34 PC34L	AK5 PC331
Conforming to standards		IEC 60439									
Product certifications		UL, LROS, CSA, DNV									
Degree of protection		Against access to live parts: IP XXB conforming to IEC 529									
Polarity		Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common	Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common
Conductor c.s.a. (UL cables)	mm²	2 x 2.5	2 x 2.5	3 x 2.5	4 x 2.5	3 x 2.5 1 x 1.5	2 x 4	2 x 4	3 x 4	4 x 4	3 x 4 1 x 1.5
Conductor colours		Black Blue (Neutral)	Black	Black	Black Blue (Neutral)	Black White (Common)	Black Blue (Neutral)	Black	Black	Black Blue (Neutral)	Black White (Common)
Permissible current	A	16	16	16	16	16 10 (Common)	32	32	32	32	32 10 (Common)
Rated insulation voltage	V	690 conforming to IEC 60439-1									
Rated peak current	kA	6									
Maximum let-through energy	A²s	100 000					200 000				
Type of conductor insulation		PVC 105 °C									

Tap-off characteristics

Type		AK5 PA211N1 PA211N2 PA211N3 PA212N1 PA212N2 PA212N3	AK5 PA211PH12 PA211PH13 PA211PH23 PA212PH12 PA212PH13 PA212PH23	AK5 PA231 PA232 PA232S	AK5 PA241 PA242	AK5 PA2311 PA2312 PA2312S	AK5 PA532	AK5 PA542	AK5 PA5312
Conforming to standards		IEC 60439							
Product certifications		UL, LROS, CSA, DNV							
Degree of protection		Against access to live parts: IP XXB conforming to IEC 60529							
Polarity		Phase + Neutral	Phase + Phase	3-phase	3-phase + Neutral	3-phase + Common	3-phase	3-phase + Neutral	3-phase + Common
Conductor c.s.a. (UL cables)	mm²	2 x 4	2 x 4	3 x 4	4 x 4	3 x 4 1 x 1.5	2 x (3 x 4)	2 x (4 x 4)	2 x (3 x 4) 1 x 1.5
Permissible current	A	25	25	25	25	25 10 (Common)	50	50	50 10 (Common)
Rated insulation voltage	V	690 conforming to IEC 60439-1							
Rated peak current	kA	6							
Maximum let-through energy	A²s	200 000							
Type of conductor insulation		PVC 105 °C							

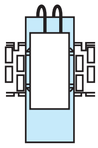
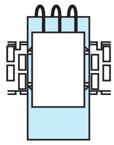
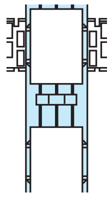
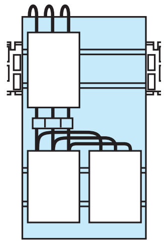
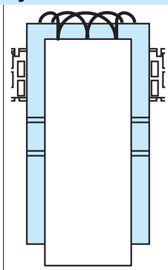
Characteristics of mounting rails AM1 DL201 and AM1 DL2017

Type		Omega (width 75 mm, depth 15 mm)
Material		2 mm sheet steel
Surface treatment		Galvanized

Power distribution in control panels

Pre-assembled panel busbar system AK5

Component mounting plates incorporating tap-off mounted on AK5 JB busbar system

Note: *if the equipment is wider than the mounting plate, an extension plate can be used to increase the width of the support plate.*

(1) 3-pole + common

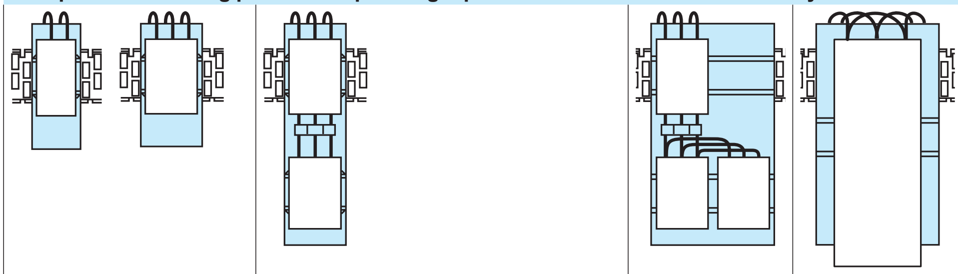
		AK5 PA211N1 PA211N2 PA211N3	**AK5 PA231 PA2311** *(1)*	**AK5 PA241**	**AK5 PA212N1 PA212N2 PA212N3**	**AK5 PA212PH12 PA213PH13 PA212PH23**	**AK5 PA232 PA2312** *(1)*	**AK5 PA242**	**AK5 PA232S PA2312S** *(1)*	**AK5 PA532 PA5312** *(1)*	**AK5 PA542**
Mounting plate incorporating tap-off	Width in mm	54	54	54	54	54	54	54	108	108	108
	Height in mm	105	105	105	190	190	190	190	190	190	190
	No. of 18 mm pitches	3	3	3	3	3	3	4	6	6	6
	Thermal current	25 A	25 A	25 A	25 A	25 A	25 A	25 A	25 A	50 A	50 A
	Application	Ph + N	3-pole	3-pole + N	Ph + N	Ph + Ph	3-pole	3-pole + N	3-pole	3-pole	3-pole + N
Motor starter type	Minimum centres with 60 mm ducting	Number of points used on the busbar system									
Fuses, contactors and thermal overload relay											
LS1 D25	170	4	4	–	–				–	–	
LS1 D25 + LA8 D254	170	–	–	5	–				–	–	
LS1 D25 + LC1 -D09 to D25 and overload relay up to LR2 D1322	320	–	–	–	4				–	–	
LS1 D25 + LC1 D09 to D25 (with 1 add-on block LA8 D) + overload relay up to LR2 D1322	320	–	–	–	4				–	–	–
Fuses, reversing contactors + thermal overload relay											
LS1 D25 + LC2 D09 to D18 (with 1 add-on block LA8 D) + overload relay up to LR2 D1322	320	–	–	–	–				6	–	
LS1 D25 + LC2 D25 with 1 add-on block LA8 D) + overload relay up to LR2 D1322	320	–	–	–	–				7	–	
Optimal breaker switch											
GK2 CF03 to CF22	170	–	3	–	–				–	–	
GK2 CF03 to CF22 + 4 blocks GK2 AX	170	–	5	–	–				–	–	
GK3 EF40	270	–	–	–	–				–	6	
GK3 EF40 + 4 blocks GK2 AX	270	–	–	–	–				–	6	
Optimal breaker switch + contactor + thermal overload relay											
GK2 CF03 to CF21 + LC1 D09 to D18 + overload relay up to LR2 D1322	320	–	–	–	3				–	–	
GK2 CF03 to CF22 + LC1 D09 to D25 + overload relay up to LR2 D1322	320	–	–	–	4				–	–	
GK2 CF03 to CF22 + 4 blocks GK2-AX + LC1 D09 to D18 with 1 block LA8 D + overload relay up to LR2 D1322	320	–	–	–	5				–	–	
Optimal breaker switch + reversing contactor + thermal overload relay											
GK2 CF03 to CF22 + 4 blocks GK2 AX + LC1 D09 to D18 with 1 block LA8 D + overload relay up to LR2 D1322	320	–	–	–	–				6	–	
GK2 CF03 to CF22 + 4 blocks GK2 AX + LC2 D25 with 1 block LA8 D + overload relay up to LR2 D1322	320	–	–	–	–				7	–	

Power distribution in control panels

Pre-assembled panel busbar system AK5

Note 1: if the equipment is wider than the mounting plate, an extension plate can be used to increase the width of the support plate.
Note 2: for upstream protection, see page 13230/4
(1) 3-pole + common

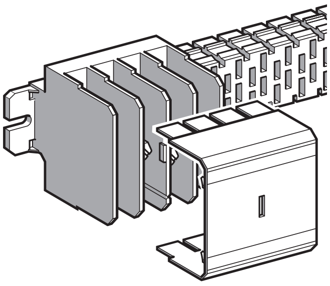
Component mounting plates incorporating tap-off mounted on AK5 JB busbar system



		AK5 PA211N1 PA211N2 PA211N3	AK5 PA231 PA2311 *(1)*	AK5 PA241	AK5 PA212N1 PA212N2 PA212N3	AK5 PA212PH12 PA213PH13 PA212PH23	AK5PA 232 PA2312 *(1)*	AK5 PA242	AK5 PA232S PA2312S *(1)*	AK PA532 PA5312 *(1)*	AK5 PA542
Mounting plate incorporating tap-off	Width in mm	54	54	54	54	54	54	54	108	108	108
	Height in mm	105	105	105	190	190	190	190	190	190	190
	No. of 18 mm pitches	3	3	3	3	3	3	4	6	6	6
	Thermal current	25 A	25 A	25 A	25 A	25 A	25 A	25 A	25 A	50 A	50 A
	Application	Ph + N	3-pole	3-pole + N	Ph + N	Ph + Ph	3-pole	3-pole + N	3-pole	3-pole	3-pole + N
Motor starter type	Minimum centres with 60 mm ducting	Number of points used on the busbar system									
Motor circuit-breaker (type 1 coordination)											
GV2●06 to ●22	170	–	3	–	–				–	–	
GV3M01 to M40	270	–	–	–	–				–	6	
Motor circuit-breaker + contactor											
GV2●06 to ●16 + LC1 D09 or D12 with 1 add-on block LA8 D	270	–	–	–	4				–	–	
GV2●06 to ●20 + LC1 D09 to D18	270	–	–	–	3				–	–	
GV2●06 to ●22 + LC1 D09 or D12 with 1 add-on block LA8 D	270	–	–	–	4				–	–	
GV3M01 to M40 with GV1A●● + LC1D09 to D32	270	–	–	–	–				–	7	
GV3M01 to M40 + LC1 D09 to D32 with 1 add-on block LA8 D	270	–	–	–	–				–	8	
Motor circuit-breaker + reversing contactor											
GV2●06 to ●20 + LC2-D09 to D18 with or without add-on block LA8 D	270	–	–	–	–				6	–	
GV2●22 with 1 add-on block LA8-D	270	–	–	–	–				7	–	
Integral contactor breaker + protection module											
LD1 LB030 + LB1 LB03P●● (integral 18)	270	–	3	–	–				–	–	
LD1 LB030 with 2 add-on blocks LA1 -LB + LB1 LB30P (integral 18)	270	–	4	–	–				–	–	
LD1 LB030 with 4 add-on blocks LA1 LB + LB1 LB03P (integral 18)	270	–	–	–	–				6	–	
LD1 LC030 + LB1 LC03M (integral 32)	270	–	–	–	–				–	6	
LD1 LC030 + LB1 LC03M (integral 32) with 1 add-on block LA1 LC and 1 reset device LA1 LC052●	270	–	–	–	–				–	7	
LD1 LC030 with 2 add-on blocks LA1 LB + LB1 LC03M (integral 32)	270	–	–	–	–				–	6	
Reversing contactor breaker integral 18 + protection module											
LD5 LB130 + LB1 LB03P●●	270	–	–	–	–				6	–	
LD5 LB130 with 3 add-on blocks LA1 LB + LB1 LB03P	270	–	–	–	–				8	–	
Merlin Gerin C 60 circuit-breaker for circuit protection											
2369●	170	2	–	–	2	2	–	–	–	–	–
2370●	170	–	3	–	–	–	3	–	3	3	–
2371● and 2372●	170	–	–	4	–	–	–	4	–	–	4

Power distribution in control panels

Pre-assembled panel busbar system AK5



Busbar systems

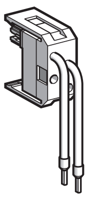
The busbar system can be screw-mounted onto any type of support. However. if it is to be used in conjunction with component mounting plates incorporating a tap-off, it is essential that it is mounted on the AM1 DL201 rail.
When mounting tap-offs, the rated operational current of the busbar system should be taken into account: 160 A at 35 °C.

Number of conductors	Number of tap-offs at 18 mm intervals	Length	Suitable for mounting in enclosure width	Reference	Weight
		mm	mm		kg
4 *(1)*	12	344	600	**AK5 JB143**	0.700
	18	452	800	**AK5 JB144**	0.900
	24	560	800	**AK5 JB145**	1.100
	30	668	800	**AK5 JB146**	1.300
	48	992	1200	**AK5 JB149**	1.900
	54	1100	1200	**AK5 JB1410**	2.100

Omega rail, width 75 mm

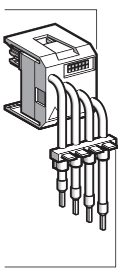
This rail is designed to accommodate the busbar system when it is used with AK5 PA mounting plates incorporating tap-offs. It supportsthe busbar system. The plates simply clip onto the rail.

Material and surface treatment	Depth	Length	Sold in lots of	Unit reference	Weight
	mm	mm			kg
2 mm sheet steel	15	2000 *(4)*	6	**AM1 DL201**	3.000



Removable power sockets

Use	Number of points used on the busbar system	Thermal current	Cable lengths	Sold in lots of	Unit reference	Weight
		A	mm			kg
Single-phase + Neutral	1	16	200	6 *(2)*	**AK5 PC12**	0.035
		32	1000	6 *(2)*	**AK5 PC32L**	0.040
2-phase	1	16	200	6 *(3)*	**AK5 PC12PH**	0.035
		32	1000	6 *(3)*	**AK5 PC32LPH**	0.040
3-phase	2	16	200	6	**AK5 PC13**	0.040
		32	250	6	**AK5 PC33**	0.045
			1000	6	**AK5 PC33L**	0.060
3-phase + Neutral	2	16	200	6	**AK5 PC14**	0.045
		32	250	6	**AK5 PC34**	0.050
			1000	6	**AK5 PC34L**	0.065
3-phase + common	2	16 10 (common)	200	6	**AK5 PC131**	0.045
		32 10 (common)	250	6	**AK5 PC331**	0.050



Accessories

Description	Maximum no. of connections	C.s.a. mm²	Sold in lots of	Unit reference	Weight kg
Cable guide	4	2.5 or 4	20	**AK5 GF1**	0.300

(1) 4-pole: 3-phase + Neutral or 3-phase + Common.
(2) Total of 6 sockets supplied: 2 sockets (N + L1), 2 sockets (N + L2). 2 sockets (N + L3).
(3) Total of 6 sockets supplied: 2 sockets (L1 + L2), 2 sockets (L1 + L3). 2 sockets (L2 + L3).
(4) Cut and drill to suit use.

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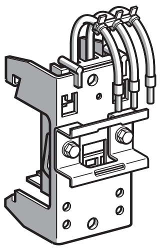
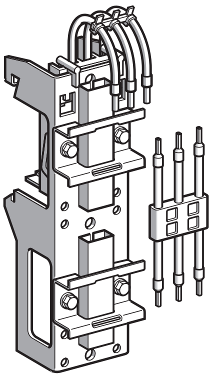
Component mounting plates incorporating tap-off



AK5 PA231

Single plate (height 105 mm)

Use	No. of 18mm points used on the busbar system	Phase	Thermal currentA	Number of ⊔ rails for component support	Reference	Weight kg
Single-phase + neutral	3	Ph1+N	25	1	**AK5 PA211N1**	0.135
		Ph2+N	25	1	**AK5 PA211N2**	0.135
		Ph3+N	25	1	**AK5 PA211N3**	0.135
2-phase	3	Ph1+Ph2	25	1	**AK5 PA211PH12**	0.135
		Ph1+Ph3	25	1	**AK5 PA211PH13**	0.135
		Ph2+Ph3	25	1	**AK5 PA211PH23**	0.135
3-phase	3	–	25	1	**AK5 PA231**	0.140
3-phase + common	3	–	25	1	**AK5 PA2311**	0.145
3-phase + neutral	3	–	25	1	**AK5 PA241**	0.145



Double plate (height 190 mm)

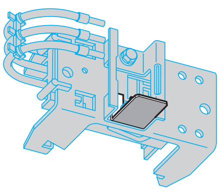
Prefabricated 25 A connectors are supplied for connecting the 2 protection and control devices.

Use	No. of 18mm points used on the busbar system	Phase	Thermal currentA	Number of ⊔ rails for component support	Reference	Weight kg
Single-phase + neutral	3	Ph1+N	25	2	**AK5 PA212N1**	0.135
		Ph2+N	25	2	**AK5 PA212N2**	0.135
		Ph3+N	25	2	**AK5 PA212N3**	0.135
2-phase	3	Ph1+Ph2	25	2	**AK5 PA212PH12**	0.135
		Ph1+Ph3	25	2	**AK5 PA212PH13**	0.135
		Ph2+Ph3	25	2	**AK5 PA212PH23**	0.135
3-phase	3	–	25	2	**AK5 PA232**	0.230
	6	–	25	2	**AK5 PA232S**	0.600
			50	1	**AK5 PA532**	0.700
3-phase + neutral	3	–	25	2	**AK5 PA242**	0.230
3-phase + common	3	–	25 (10 common)	2	**AK5 PA2312**	0.235
	6	–	25 (10 common)	2	**AK5 PA2312S**	0.610
			50 (10 common)	1	**AK5 PA5312**	0.710
3-phase + neutral	6	–	50	1	**AK5 PA542**	0.715

Extension plates

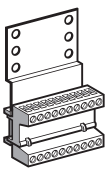
These plates bolt onto the equipment support plates, after having removed them from the rails, to be able to mount wider components.

Use		Number of tap-offs at 18 mm intervals	Reference	Weight kg
For mounting plates incorporating tap-off	Single	4	**AK5 PE17**	0.100
	Double	4	**AK5 PE27**	0.150



Side stop (AK5 JB mounted vertically)

Use	Sold in lots of	Unit reference	Weight kg
For extension plate	50	**AK5 BT01**	0.005



Control terminal blocks

Description	Thermal current A	Sold in lots of	Unit reference	Weight kg
10-pole terminal blocks, for screwing onto plate AK5 PA●●●				
	10	10	**AK5 SB1**	0.065
10-pole front connecting plug-in terminal blocks which can be clipped onto ⊔ ⊔ ⊔ rails				
Fixed part	10	10	**AB1 DV10235U**	0.047
Moving part	10	10	**AB1 DVM10235U**	0.021

Accessories

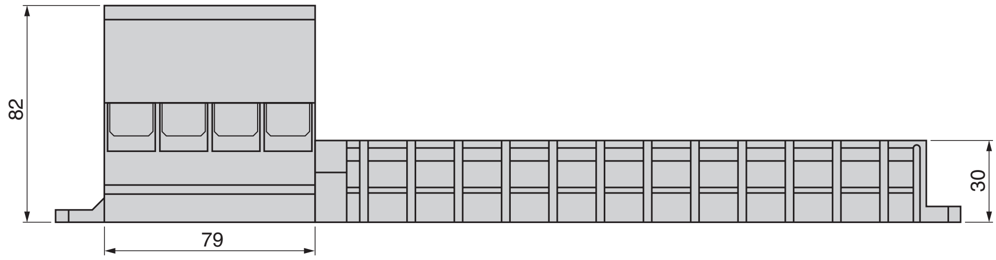
Description	Marking	Sold in lots of	Unit reference	Weight kg
Strips of clip-in markers	0…9	25	**AB1 R●** *(1)*	0.050
10 identical numbers, signs or	+	25	**AB1 R12**	0.050
capital letters per strip	–	25	**AB1 R13**	0.050
	A…Z	25	**AB1 G●** *(1)*	0.050

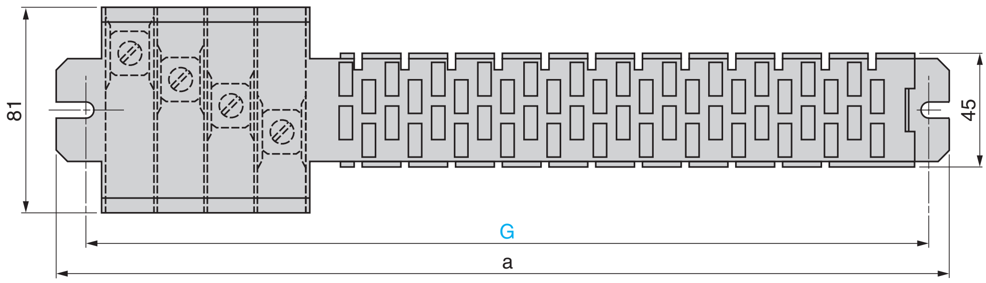
(1) Replace the ● in the selected reference with the number or letter required. Example: ***AB1 R1*** *or* ***AB1 GA.***

Power distribution in control panels

Pre-assembled panel busbar system AK5

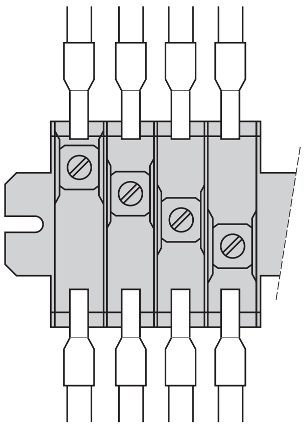
Busbar systems
AK5 JB●●●





AK5	a	G	No. of 18 mm points
JB143	344	330	12
JB144	452	438	18
JB145	560	546	24
JB146	668	654	30
JB149	992	978	48
JB1410	1100	1086	54

Busbar feed units
AK5 JB●●●

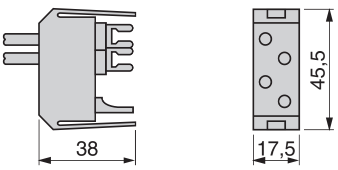


Installation of AK5 JB●●● busbar systems

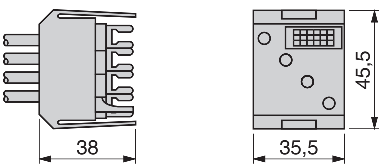
Connection	C.s.a. in mm² min	max
Flexible cable with or without cable end	1 x 2.5 2 x 2.5	1 x 70 *(1)* 2 x 35
Flexible bar	–	2 x (9 x 4)
Flexible bar + flexible cable with or without cable end	9 x 4 + 1 x 2.5	9 x 4 + 1 x 35

(1) Maximum c.s.a. or connection of conductor without cable end.

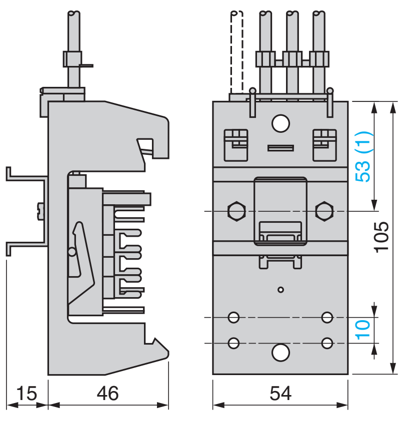
Removable power sockets 16 and 32 A
AK5 PC12●. AK5 PC32L●



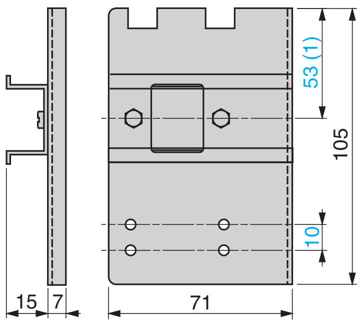
AK5 PC●3. AK5 PC33L
AK5 PC●4. AK5 PC34L
AK5 PC●31



Mounting plates incorporating tap-offs, 25 A
AK5 PA2●1. AK5 PA2311. AK5 PA211●●●●



Single width extension plates
AK5 PE17



Note: *It is recommended that the power sockets or the removable plates are connected as close as possible to the busbar feed unit.*
(1) Can be fixed at 43 mm

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Characteristics : page 234
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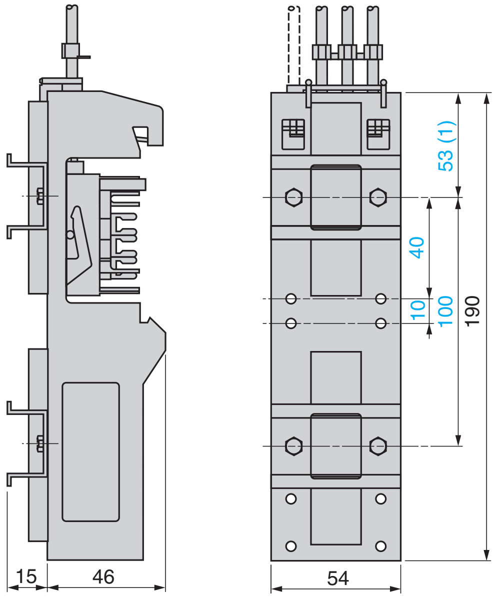
Mounting possibilities : page 236

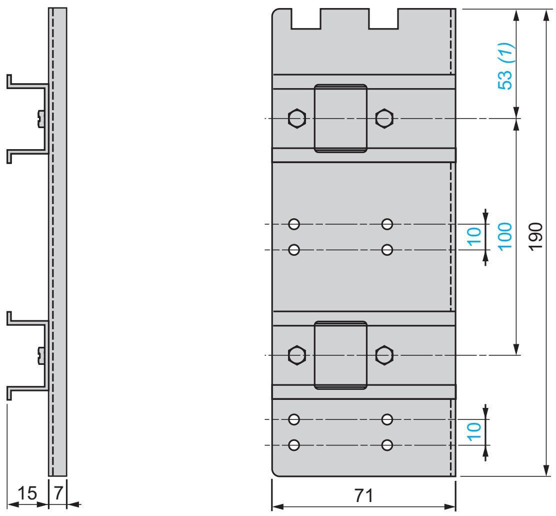
Component mounting plates incorporating tap-off

AK5 PA232. AK5 PA2312. AK5 PA242



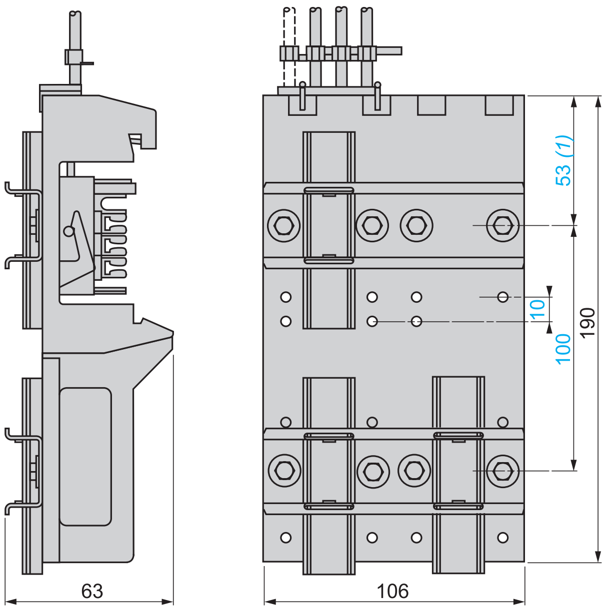
Double extension plate

AK5 PE27

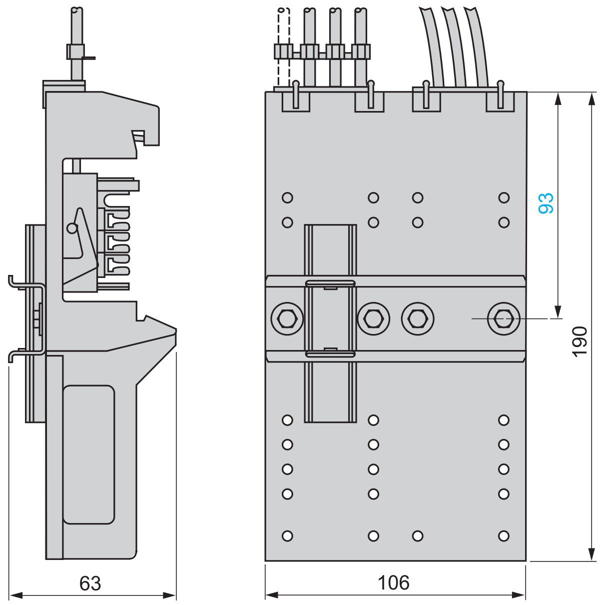


Component mounting plates incorporating tap-off

AK5 PA232S. AK5 PA2312S

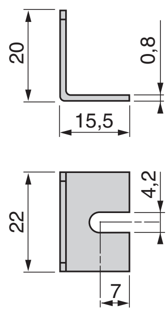


AK5 PA532. AK5 PA5312. AK5 PA542



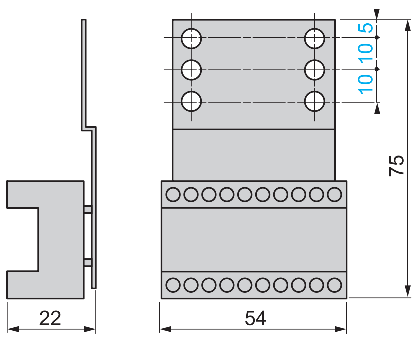
Side stop

AK5 BT01



Control terminal block

AK5 SB1



(1) Can be fixed at 43 mm

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Contents

Motor starters up to 150 A

Technical information

Altitude

The rarefied atmosphere at high altitude reduces the dielectric strength of the air and hence the rated operational voltage of the contactor. It also reduces the cooling effect of the air and hence the rated operational current of the contactor (unless the temperature drops at the same time).

No derating is necessary up to 3000 m.

Derating factors to be applied above this altitude for main pole operational voltage and current (a.c. supply) are as follows.

Altitude	3500 m	4000 m	4500 m	5000 m
Rated operetional voltage	0,90	0,80	0,70	0,60
Rated operational current	0,92	0,90	0,88	0,86

Ambient air temperature

The temperature of the air surrounding the device, measured near to the device.
The operating characteristics are given :
- with no restriction for temperatures between - 5 and + 55 °C,
- with restrictions, if necessary, for temperatures between - 50 and + 70 °C.

Rated operational current (Ie)

This is defined taking into account the rated operational voltage, operating rate and duty, utilisation category and ambient temperature around the device.

Rated conventional thermal current (Ith) *(1)*

The current which a closed contactor can sustain for a minimum of 8 hours without its temperature rise exceeding the limits given in the standards.

Permissible short time rating

The current which a closed contactor can sustain for a short time after a period of no load, without dangerous overheating.

Rated operational voltage (Ue)

This is the voltage value which, in conjunction with the rated operational current, determines the use of the contactor or starter, and on which the corresponding tests and the utilisation category are based. For 3-phase circuits it is expressed as the voltage between phases.
Apart from exceptional cases such as rotor short-circuiting, the rated operational voltage Ue is less than or equal to the rated insulation voltage Ui.

Rated control circuit voltage (Uc)

The rated value of the control circuit voltage, on which the operating characteristics are based. For a.c. applications, the values are given for a near sinusoidal wave form (less than 5% total harmonic distortion).

Rated insulation voltage (Ui)

This is the voltage value used to define the insulation characteristics of a device and referred to in dielectric tests determining leakage paths and creepage distances. As the specifications are not identical for all standards, the rated value given for each of them is not necessarily the same.

Rated impulse withstand voltage (Uimp)

The peak value of a voltage surge which the device is able to withstand without breaking down.

Rated operational power (expressed in kW)

The rated power of the standard motor which can be switched by the contactor, at the stated operational voltage.

Rated breaking capacity *(2)*

This is the current value which the contactor can break in accordance with the breaking conditions specified in the IEC standard.

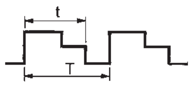
Rated making capacity *(2)*

This is the current value which the contactor can make in accordance with the making conditions specified in the IEC standard.

On-load factor (m)

This is the ratio between the time the current flows (t) and the duration of the cycle (T)

$$m = \frac{t}{T}$$



Cycle duration: duration of current flow + time at zero current

Pole impedance

The impedance of one pole is the sum of the impedance of all the circuit components between the input terminal and the output terminal.
The impedance comprises a resistive component (R) and an inductive component ($X = L\omega$).
The total impedance therefore depends on the frequency and is normally given for 50 Hz.
This average value is given for the pole at its rated operational current.

Electrical durability

This is the average number of on-load operating cycles which the main pole contacts can perform without maintenance. The electrical durability depends on the utilisation category, the rated operational current and the rated operational voltage.

Mechanical durability

This is the average number of no-load operating cycles (i.e. with zero current flow through the main poles) which the contactor can perform without mechanical failure.

(1) Conventional thermal current, in free air, conforming to IEC standards.
(2) For a.c. applications, the breaking and making capacities are expressed by the rms value of the symmetrical component of the short-circuit current. Taking into account the maximum asymmetry which may exist in the circuit, the contacts therefore have to withstand a peak asymmetrical current which may be twice the rms symmetrical component.
***Note** : these definitions are extracted from standard IEC 60947-1.*

Contactor utilisation categories conforming to IEC 60947-4

The standard utilisation categories define the current values which the contactor must be able to make or break.

These values depend on:
- the type of load being switched : squirrel cage or slip ring motor, resistors,
- the conditions under which making or breaking takes place: motor stalled, starting or running, reversing, plugging.

a.c. applications

Category AC-1

This category applies to all types of a.c. load with a power factor equal to or greater than 0.95 ($\cos\varphi \geqslant 0.95$).

Application examples: heating, distribution.

Category AC-2

This category applies to starting, plugging and inching of slip ring motors.
On closing, the contactor makes the starting current, which is about 2.5 times the rated current of the motor.
On opening, it must break the starting current, at a voltage less than or equal to the mains supply voltage.

Category AC-3

This category applies to squirrel cage motors with breaking during normal running of the motor.
On closing, the contactor makes the starting current, which is about 5 to 7 times the rated current of the motor.
On opening, it breaks the rated current drawn by the motor; at this point, the voltage at the contactor terminals is about 20% of the mains supply voltage. Breaking is light.
Application examples: all standard squirrel cage motors: lifts, escalators, conveyor belts, bucket elevators, compressors, pumps, mixers, air conditioning units, etc... .

Category AC-4

This category covers applications with plugging and inching of squirrel cage and slip ring motors.
The contactor closes at a current peak which may be as high as 5 or 7 times the rated motor current. On opening it breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage. Breaking is severe
Application examples: printing machines, wire drawing machines, cranes and hoists, metallurgy industry.

d.c. applications

Category DC-1

This category applies to all types of d.c. load with a time constant (L/R) of less than or equal to 1 ms.

Category DC-3

This category applies to starting, counter-current braking and inching of shunt motors.
Time constant $\leqslant$ 2 ms.
On closing, the contactor makes the starting current, which is about 2.5 times the rated motor current.
On opening, the contactor must be able to break 2.5 times the starting current at a voltage which is less than or equal to the mains voltage. The slower the motor speed, and therefore the lower its back e.m.f., the higher this voltage.
Breaking is difficult.

Category DC-5

This category applies to starting, counter-current braking and inching of series wound motors.
Time constant $\leqslant$ 7.5 ms.
On closing, the contactor makes a starting current peak which may be as high as 2.5 times the rated motor current. On opening, the contactor breaks this same current at a voltage which is higher, the lower the motor speed. This voltage can be the same as the mains voltage.
Breaking is severe.

Utilisation categories for auxiliary contacts & control relays conforming to IEC 60947-5

a.c. applications

Category AC-14 *(1)*

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is less than 72 VA.

Application example: switching the operating coil of contactors and relays.

Category AC-15 *(1)*

This category applies to the switching of electromagnetic loads whose power drawn with the electromagnet closed is more 72 VA.

Application example: switching the operating coil of contactors.

d.c. applications

Category DC-13 *(2)*

This category applies to the switching of electromagnetic loads for which the time taken to reach 95% of the steady state current (T = 0.95) is equal to 6 times the power P drawn by the load (with P $\leqslant$ 50 W).

Application example: switching the operating coil of contactors without economy resistor.

(1) Replaces category AC-11.
(2) Replaces category DC-13.

Technical information
Product standards and certifications

Standardisation

Conformity to standards

Telemecanique brand products satisfy, in the majority of cases, national (for example: BS in Great Britain, NF in France, DIN in Germany), European (for example: CENELEC) or international (IEC) standards. These product standards precisely define the performance of the designated products (such as IEC 60947 for low voltage equipment).
When used correctly, as designated by the manufacturer and in accordance with regulations and correct practices, these products will allow users to build equipment, machine systems or installations that conform to their appropriate standards (for example: IEC 60204-1, relating to electrical equipment used on industrial machines).
Schneider Electric is able to provide proof of conformity of its production to the standards it has chosen to comply with, through its quality assurance system.
On request, and depending on the situation, Schneider Electric can provide the following:

- a declaration of conformity,
- a certificate of conformity (ASEFA/LOVAG),
- a homologation certificate or approval, in the countries where this procedure is required or for particular specifications, such as those existing in the merchant navy.

Code	Certification authority		Country
	Name	Abbreviation	
ANSI	American National Standards Institute	ANSI	USA
BS	British Standards Institution	BSI	Great Britain
CEI	Comitato Elettrotecnico Italiano	CEI	Italy
DIN/VDE	Verband Deutscher Electrotechniker	VDE	Germany
EN	Comité Européen de Normalisation Electrotechnique	CENELEC	Europe
GOST	Gosudarstvenne Komitet Standartov	GOST	Russia
IEC	International Electrotechnical Commission	IEC	Worldwide
JIS	Japanese Industrial Standard	JISC	Japan
NBN	Institut Belge de Normalisation	IBN	Belgium
NEN	Nederlands Normalisatie Institut	NNI	Netherlands
NF	Union Technique de l'Electricité	UTE	France
SAA	Standards Association of Australia	SAA	Australia
UNE	Asociacion Española de Normalizacion y Certificacion	AENOR	Spain

European EN standards

These are technical specifications established in conjunction with, and with approval of, the relative bodies within the various CENELEC member countries (European Union, European Free Trade Association and many central and eastern European countries having «member» or «affiliated» status). Prepared in accordance with the principle of consensus, the European standards are the result of a weighted majority vote. Such adopted standards are then integrated into the national collection of standards, and contradictory national standards are withdrawn.
European standards incorporated within the French collection of standards carry the prefix NF EN. At the 'Union Technique de l'Electricité' *(Technical Union of Electricity)* (UTE), the French version of a corresponding European standard carries a dual number: European reference (NF EN …) and classification index (C …).
Therefore, the standard NF EN 60947-4-1 relating to motor contactors and starters, effectively constitutes the French version of the European standard EN 60947-4-1 and carries the UTE classification C 63-110.
This standard is identical to the British standard BS EN 60947-4-1 or the German standard DIN EN 60947-4-1.
Whenever reasonably practical, European standards reflect the international standards (IEC).
With regard to automation system components and distribution equipment, in addition to complying with the requirements of French NF standards, Telemecanique brand components conform to the standards of all other major industrial countries.

Regulations

European Directives

Opening up of European markets assumes harmonisation of the regulations pertaining to each of the member countries of the European Union.
The purpose of the European Directive is to eliminate obstacles hindering the free circulation of goods within the European Union, and it must be applied in all member countries. Member countries are obliged to transcribe each Directive into their national legislation and to simultaneously withdraw any contradictory regulations. The Directives, in particular those of a technical nature which concern us, only establish the objectives to be achieved, referred to as "essential requirements".
The manufacturer must take all the necessary measures to ensure that his products conform to the requirements of each Directive applicable to his production.
As a general rule, the manufacturer certifies conformity to the essential requirements of the Directive(s) for his product by affixing the CE mark.
The CE mark is affixed to Telemecanique brand products concerned, in order to comply with French and European regulations.

Significance of the CE mark

- The CE mark affixed to a product signifies that the manufacturer certifies that the product conforms to the relevant European Directive(s) which concern it; this condition must be met to allow free distribution and circulation within the countries of the European Union of any product subject to one or more of the E.U. Directives.
- The CE mark is intended solely for national market control authorities.
- The CE mark must not be confused with a conformity marking.

Technical information

Product standards and certifications

European Directives (continued)

For electrical equipment, only conformity to standards signifies that the product is suitable for its designated function, and only the guarantee of an established manufacturer can provide a high level of quality assurance.
For Telemecanique brand products, one or several Directives are likely to be applicable, depending on the product, and in particular:
- the Low Voltage Directive 73/23/EEC amended by Directive 93/68/EEC: the CE mark relating to this Directive has been compulsory since 1st January 1997.
- the Electromagnetic Compatibility Directive 89/336/EEC, amended by Directives 92/31/EEC and 93/68/EEC: the CE mark on products covered by this Directive has been compulsory since 1st January 1996

ASEFA-LOVAG certification

The function of ASEFA (Association des Stations d'Essais Française d'Appareils électriques - *Association of French Testing Stations for Low Voltage Industrial Electrical Equipment)* is to carry out tests of conformity to standards and to issue certificates of conformity and test reports.
ASEFA laboratories are authorised by the French authorisation committee (COFRAC).
ASEFA is now a member of the European agreement group LOVAG (Low Voltage Agreement Group). This means that any certificates issued by LOVAG/ASEFA are recognised by all the authorities which are members of the group and carry the same validity as those issued by any of the member authorities.

Quality labels

When components can be used in domestic and similar applications, it is sometimes recommended that a "Quality label" be obtained, which is a form of certification of conformity.

Code	Quality label	Country
CEBEC	Comité Electrotechnique Belge	Belgium
KEMA-KEUR	Keuring van Electrotechnische Materialen	Netherlands
NF	Union Technique de l'Electricité	France
ÖVE	Österreichischer Verband für Electrotechnik	Austria
SEMKO	Svenska Electriska Materiel Kontrollanatalten	Sweden

Product certifications

In some countries, the certification of certain electrical components is a legal requirement. In this case, a certificate of conformity to the standard is issued by the official test authority.
Each certified device must bear the relevant certification symbols when these are mandatory:

Code	Certification authority	Country
CSA	Canadian Standards Association	Canada
UL	Underwriters Laboratories	USA
CCC	China Compulsory Certification	China

Note on certifications issued by the Underwriters Laboratories (UL). There are two levels of approval:

"Recognized" (RU) The component is fully approved for inclusion in equipment built in a workshop, where the operating limits are known by the equipment manufacturer and where its use within such limits is acceptable by the Underwriters Laboratories.
The component is not approved as a "Product for general use" because its manufacturing characteristics are incomplete or its application possibilities are limited.
A "Recognized" component does not necessarily carry the certification symbol.

"Listed" (UL) The component conforms to all the requirements of the classification applicable to it and may therefore be used both as a "Product for general use" and as a component in assembled equipment. A "Listed" component must carry the certification symbol.

Marine classification societies

Prior approval (= certification) by certain marine classification societies is generally required for electrical equipment which is intended for use on board merchant vessels.

Code	Classification authority	Country
BV	Bureau Veritas	France
DNV	Det Norske Veritas	Norway
GL	Germanischer Lloyd	Germany
LR	Lloyd's Register	Great Britain
NKK	Nippon Kaiji Kyokaï	Japan
RINA	Registro Italiano Navale	Italy
RRS	Register of Shipping	Russia

Note

For further details on a specific product, please refer to the "Characteristics" pages in this catalogue or consult your Regional Sales Office.

Technical information

Tests according to standard utilisation categories conforming to IEC 60947-4-1 and 5-1

based on rated operational current Ie and rated operational voltage Ue

Contactors

a.c. supply

		Electrical durability: making and breaking conditions						Occasional duty: making and breaking conditions					
Typical applications	**Utilisation category**	**Making**			**Breaking**			**Making**			**Breaking**		
		I	**U**	**cos φ**	**I**	**U**	**cos φ**	**I**	**U**	**cos φ**	**I**	**U**	**cos φ**
Resistors, non inductive or slightly inductive loads	**AC-1**	Ie	Ue	0.95	Ie	Ue	0.95	1.5 Ie	1.05 Ue	0.8	1.5 Ie	1.05 Ue	0.8
Motors													
Slip ring motors: starting, breaking.	**AC-2**	2.5 Ie	Ue	0.65	2.5 Ie	Ue	0.65	4 Ie	1.05 Ue	0.65	4 Ie	1.05 Ue	0.65
Squirrel cage motors: starting, breaking whilst motor running.	**AC-3**												
	Ie ⩽ *(1)*	6 Ie	Ue	0.65	1 Ie	0.17 Ue	0.65	10 Ie	1.05 Ue	0.45	8 Ie	1.05 Ue	0.45
	Ie > *(2)*	6 Ie	Ue	0.35	1 Ie	0.17 Ue	0.35	10 Ie	1.05 Ue	0.35	8 Ie	1.05 Ue	0.35
Squirrel cage motors: starting, reversing, inching	**AC-4**												
	Ie ⩽ *(1)*	6 Ie	Ue	0.65	6 Ie	Ue	0.65	12 Ie	1.05 Ue	0.45	10 Ie	1.05 Ue	0.45
	Ie > *(2)*	6 Ie	Ue	0.35	6 Ie	Ue	0.35	12 Ie	1.05 Ue	0.35	10 Ie	1.05 Ue	0.35

d.c. supply

Typical applications	**Utilisation category**	**Making**			**Breaking**			**Making**			**Breaking**		
		I	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)
Resistors, non inductive or slightly inductive loads	**DC-1**	Ie	Ue	1	Ie	Ue	1	1.5 Ie	1.05 Ue	1	1.5 Ie	1.05 Ue	1
Shunt wound motors: starting, reversing, inching	**DC-3**	2.5 Ie	Ue	2	2.5 Ie	Ue	2	4 Ie	1.05 Ue	2.5	4 Ie	1.05 Ue	2.5
Series wound motors: starting, reversing, inching	**DC-5**	2.5 Ie	Ue	7.5	2.5 Ie	Ue	7.5	4 Ie	1.05 Ue	15	4 Ie	1.05 Ue	15

Control relays and auxiliary contacts

a.c. supply

		Electrical durability: making and breaking conditions						Occasional duty: making and breaking conditions					
Typical applications	**Utilisation category**	**Making**			**Breaking**			**Making**			**Breaking**		
		I	**U**	**cos φ**	**I**	**U**	**cos φ**	**I**	**U**	**cos φ**	**I**	**U**	**cos φ**
Electromagnets													
⩽ 72 VA	**AC-14**	–	–	–	–	–	–	6 Ie	1.1 Ue	0.7	6 Ie	1.1 Ue	0.7
> 72 VA	**AC-15**	10 Ie	Ue	0.7	Ie	Ue	0.4	10 Ie	1.1 Ue	0.3	10 Ie	1.1 Ue	0.3

d.c. supply

Typical applications	**Utilisation category**	**Making**			**Breaking**			**Making**			**Breaking**		
		I	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)	**I**	**U**	**L/R** (ms)
Electromagnets	**DC-13**	Ie	Ue	6 P *(3)*	Ie	Ue	6 P *(3)*	1.1 Ie	1.1 Ue	6 P *(3)*	1.1 Ie	1.1 Ue	6 P *(3)*

(1) Ie ⩽ 17 A for electrical durability, Ie ⩽ 100 A for occasional duty.
(2) Ie > 17 A for electrical durability, Ie > 100 A for occasional duty.
(3) The value 6 P (in watts) is based on practical observations and is considered to represent the majority of d.c. magnetic loads up to the maximum limit of P = 50 W i.e. 6 P = 300 ms = L/R.
Above this, the loads are made up of smaller loads in parallel. The value 300 ms is therefore a maximum limit whatever the value of current drawn.

Technical information

Current of asynchronous squirrel cage motors at nominal load

3-phase 4-pole motors

Current values for power in kW

Rated operational power *(1)*	Indicative rated operational current values at: 230 V	400 V	500 V	690 V
kW	A	A	A	A
0.06	0.35	0.2	0.16	0.12
0.09	0.52	0.3	0.24	0.17
0.12	0.7	0.44	0.32	0.23
0.18	1	0.6	0.48	0.35
0.25	1.5	0.85	0.68	0.49
0.37	1.9	1.1	0.88	0.64
0.55	2.6	1.5	1.2	0.87
0.75	3.3	1.9	1.5	1.1
1.1	4.7	2.7	2.2	1.6
1.5	6.3	3.6	2.9	2.1
2.2	8.5	4.9	3.9	2.8
3	11.3	6.5	5.2	3.8
4	15	8.5	6.8	4.9
5.5	20	11.5	9.2	6.7
7.5	27	15.5	12.4	8.9
11	38	22	17.6	12.8
15	51	29	23	17
18.5	61	35	28	21
22	72	41	33	24
30	96	55	44	32
37	115	66	53	39
45	140	80	64	47
55	169	97	78	57
75	230	132	106	77
90	278	160	128	93
110	340	195	156	113
132	400	230	184	134
160	487	280	224	162
200	609	350	280	203
250	748	430	344	250
315	940	540	432	313
355	1061	610	488	354
400	1200	690	552	400
500	1478	850	680	493
560	1652	950	760	551
630	1844	1060	848	615
710	2070	1190	952	690
800	2340	1346	1076	780
900	2640	1518	1214	880
1000	2910	1673	1339	970

Current values for power in hp

Rated operational power *(2)*	Indicative rated operational current values at: 110 - 120 V	200 V	208 V	220 - 240 V	380 - 415 V	440 - 480 V	550 - 600 V
hp	A	A	A	A	A	A	A
1/2	4.4	2.5	2.4	2.2	1.3	1.1	0.9
3/4	6.4	3.7	3.5	3.2	1.8	1.6	1.3
1	8.4	4.8	4.6	4.2	2.3	2.1	1.7
1 1/2	12	6.9	6.6	6	3.3	3	2.4
2	13.6	7.8	7.5	6.8	4.3	3.4	2.7
3	19.2	11	10.6	9.6	6.1	4.8	3.9
5	30.4	17.5	16.7	15.2	9.7	7.6	6.1
7 1/2	44	25.3	24.2	22	14	11	9
10	56	32.2	30.8	28	18	14	11
15	84	48.3	46.2	42	27	21	17
20	108	62.1	59.4	54	34	27	22
25	136	78.2	74.8	68	44	34	27
30	160	92	88	80	51	40	32
40	208	120	114	104	66	52	41
50	260	150	143	130	83	65	52
60	–	177	169	154	103	77	62
75	–	221	211	192	128	96	77
100	–	285	273	248	165	124	99
125	–	359	343	312	208	156	125
150	–	414	396	360	240	180	144
200	–	552	528	480	320	240	192
250	–	–	–	604	403	302	242
300	–	–	–	722	482	361	289
350	–	–	–	828	560	414	336
400	–	–	–	954	636	477	382
450	–	–	–	1030	–	515	412
500	–	–	–	1180	786	590	472

(1) Values conforming to standard IEC 60072-1 (at 50 Hz).
(2) Values conforming to standard UL 508 (at 60 Hz).

Nota : *These values are given as a guide. They may vary depending on the type of motor, its polarity and the manufacturer.*

TeSys contactors

Long distance remote control

Voltage drop caused by the inrush current

When the operating coil of a contactor is energised, the inrush current produces a voltage drop in the control circuit cable caused by the resistance of the conductors, which can adversely affect closing of the contactor.
An excessive voltage drop in the control supply cables (both a.c. and d.c.) can lead to non closure of the contactor poles or even destruction of the coil due to overheating.
This phenomenon is aggravated by:

- a long line,
- a low control circuit voltage,
- a cable with a small c.s.a.,
- a high inrush power drawn by the coil.

The maximum length of cable, depending on the control voltage, the inrush power and the conductor c.s.a., is indicated in the graphs below.

Remedial action

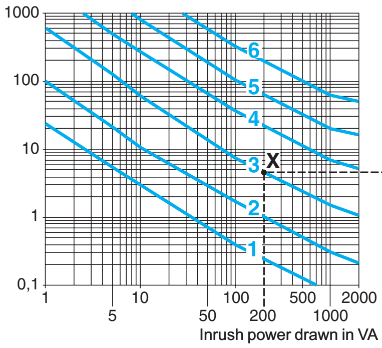
To reduce the voltage drop at switch-on:

- increase the conductor c.s.a.,
- use a higher control circuit voltage,
- use an intermediate control relay.

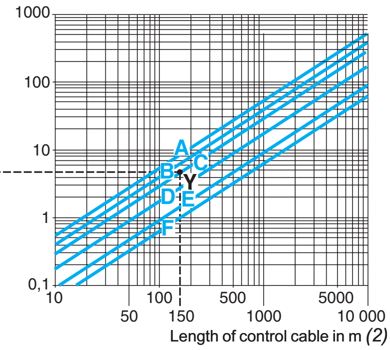
Selection of conductor c.s.a.

These graphs are for a maximum line voltage drop of 5%. They give a direct indication of the copper conductor c.s.a. to be used for the control cable, depending on its length, the inrush power drawn by the contactor coil and the control circuit voltage (see example page 251).

Total resistance of the 2 conductors in the control cable in Ω *(1)*



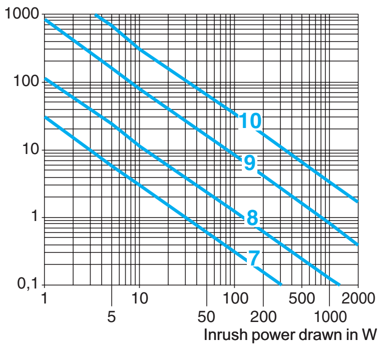
Total resistance of the 2 conductors in the control cable in Ω *(1)*



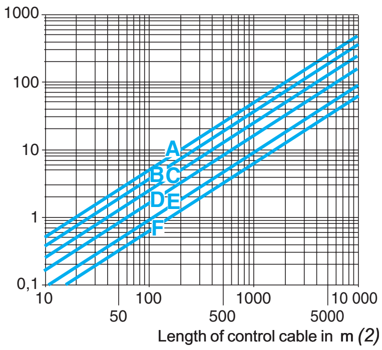
1 ∼ 24 V	3 ∼ 115 V	5 ∼ 400 V
2 ∼ 48 V	4 ∼ 230 V	6 ∼ 690 V

C.s.a. of copper cables		
A 0.75 mm²	C 1.5 mm²	E 4 mm²
B 1 mm²	D 2.5 mm²	F 6 mm²

Total resistance of the 2 conductors in the control cable in Ω *(1)*



Total resistance of the 2 conductors in the control cable in Ω *(1)*



7 ⎓ 24 V	9 ⎓ 125 V
8 ⎓ 48 V	10 ⎓ 250 V

C.s.a. of copper cables		
A 0.75 mm²	C 1.5 mm²	E 4 mm²
B 1 mm²	D 2.5 mm²	F 6 mm²

(1) For 3-wire control, the current only flows in 2 of the conductors.
(2) This is the length of the cable comprising 2 or 3 conductors. (Distance between the contactor and the control device).

TeSys contactors
Long distance remote control

Voltage drop caused by the inrush current (continued)

What cable c.s.a. is required for the control circuit of an LC1 D40A, 115 V contactor, operated from a distance of 150 metres?

■ Contactor LC1 D40A, voltage 115 V, 50 Hz: inrush power: 200 VA

On the left-hand graph on the page opposite, point X is at the intersection of the vertical line corresponding to 200 VA and the ∼ 115 V voltage curve.

On the right-hand graph on the page opposite, point Y is at the intersection of the vertical line corresponding to 150 m and the horizontal line passing through point X.

Use the conductor c.s.a. indicated by the curve which passes through point Y, i.e.: 1.5 mm^2.

If point Y lies between two c.s.a. curves, choose the larger of the c.s.a. values.

Calculating the maximum cable length

The maximum permissible length for acceptable line voltage drop is calculated by the formula:

$$L = \frac{U^2}{SA}.s.K$$

where:

L : distance between the contactor and the control device in m (length of the cable),
U : supply voltage in V,
SA : apparent inrush power drawn by the coil in VA,
s : conductor c.s.a. in mm^2,
K : factor given in the table below.

a.c. supply	SA in VA	20	40	100	150	200
	K	1.38	1.5	1.8	2	2.15

d.c. supply	Irrespective of the apparent inrush power SA, expressed in W
	K = 1.38

Residual current in the coil due to cable capacitance

When the control contact of a contactor is opened, the control cable capacitance is effectively in series with the coil of the electromagnet. This capacitance can cause a residual current to be maintained in the coil, with the risk that the contactor will remain closed.

This only applies to contactors operating on an a.c. supply.

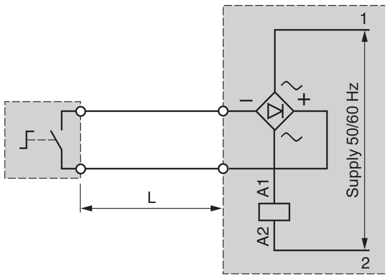
This phenomenon is aggravated by:
- a long line length between the coil control contact and the contactor, or between the coil control contact and the power supply,
- a high control circuit voltage,
- a low coil consumption, sealed,
- a low value of contactor drop-out voltage.

The maximum control cable length, according to the contactor coil supply voltage, is indicated in the graph on the page opposite
.

Remedial action

Various solutions can be adopted to avoid the risk of the contactor remaining closed due to cable capacitance:
- use a d.c. control voltage, or,
- add a rectifier, connected as shown in the scheme below, but retaining an a.c. operating coil: in this way, rectified a.c. current flows in the control cable.

When calculating the maximum cable length, take the resistance of the conductors into account.
.



- Connect a resistor in parallel with the contactor coil *(1)*.

Value of the resistance :

$$R\,\Omega = \frac{1}{10^{-3}\,C\,(\mu F)} \qquad \text{(C capacitance of the control cable)}$$

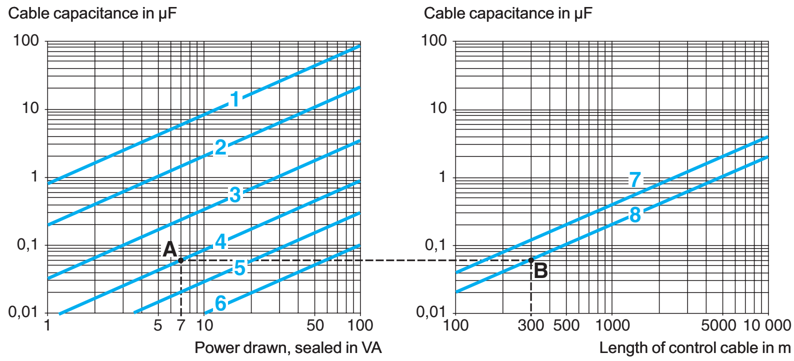
Power to be dissipated :

$$PW = \frac{U^2}{R}$$

(1) To avoid increasing the voltage drop due to inrush current, this resistor must be brought into operation after the contactor has closed by using an N/O contact.

Residual current in the coil due to cable capacitance (continued)

These graphs are for a capacitance, between 2 conductors, of 0.2 µF/km. They make it possible to determine whether there is a risk of the contactor remaining closed due to the power drawn by the coil when sealed, as well as the control circuit voltage, according to the length of the control cable.



1	~ 24 V	3	~ 115 V	5	~ 400 V	7	3-wire control
2	~ 48 V	4	~ 230 V	6	~ 690 V	8	2-wire control

In the zones below the straight lines for 3-wire and 2-wire control respectively, there is a risk of the contactor remaining closed.

Examples

What is the maximum length for the control cable of an LC1 D12 contactor, operating on 230 V, with 2-wire control?

- Contactor LC1 D12, voltage 230 V, 50 Hz: power sealed 7 VA.

On the left-hand graph, point A is at the intersection of the vertical line for 7 VA with the ~ 230 V voltage curve.

On the right-hand graph, point B is at the intersection of the horizontal line with the 2-wire control curve.

The maximum cable length is therefore 300 m.

In the same example, with a 600 m cable, the point lies in the risk zone. A resistor must therefore be connected in parallel with the contactor coil.

Value of this resistance :

$$R = \frac{1}{10^{-3}\,.\,C} = \frac{1}{10^{-3}\cdot 0.12} = 8.3\ \Omega$$

Power to be dissipated :

$$P = \frac{U^2}{R} = \frac{(220)^2}{8300} = 6\ W$$

Alternative solution: use a d.c. control supply.

Calculating the cable length

The maximum permitted length of control cable to avoid the effects of capacitance is calculated using the formula:

$$L = 455\ .\ \frac{S}{U^2.Co}$$

L : distance between the contactor and the control device in km (length of the cable),
S : apparent power, sealed, in VA,
U : control voltage in V,
Co : line capacitance of the cable in µF/km.

TeSys protection components
Motor circuit-breakers and accessories

Thermal-magnetic motor circuit-breakers GV3 ME

Old reference	Icu / 400 V	New reference	Icu / 400 V	Ir
GV3 ME06	100 kA	**GV2 P06**	> 100 kA	1…1.6 A
GV3 ME07	100 kA	**GV2 P07**	> 100 kA	1.6…2.5 A
GV3 ME08	100 kA	**GV2 P08**	> 100 kA	2.5…4 A
GV3 ME10	100 kA	**GV2 P10**	> 100 kA	4…6 A
GV3 ME14	100 kA	**GV2 P14**	> 100 kA	6…10 A
GV3 ME20	100 kA	**GV3 P13**	100 kA	9…13 A
		GV3 P18	100 kA	12…18 A
GV3 ME25	100 kA	**GV3 P25**	100 kA	17…25 A
GV3 ME40	35 kA	**GV3 P32**	100 kA	23…32 A
		GV3 P40	50 kA	30…40 A
GV3 ME63	35 kA	**GV3 P50**	50 kA	37…50 A
		GV3 P65	50 kA	48…65 A

Magnetic motor circuit-breakers GK3 EF

Old reference	Icu / 400 V	New reference	Icu / 400 V	Ie
GK3 EF40	50 kA	**GV3 L25**	100 kA	25 A
		GV3 L32	100 kA	32 A
		GV3 L40	50 kA	40 A
GK3 EF65	35 kA	**GV3 L50**	50 kA	50 A
		GV3 L65	50 kA	65 A

Enclosed motor circuit-breakers GV3 ME

Old reference	Type of operator (not included)	New reference	Type of handle included
GV3 CE01	GV1K0●	**GV3 PC01**	LU9 AP11 (black)
		GV3 PC02	LU9 AP12 (red)

Contact blocks *(1)*

Old reference	For circuit-breaker	New reference	For circuit-breaker
GV3 A01	GV3 ME	**GV AE11** or **GV AN11**	GV2, GV3 P and GV3 L
GV3 A02	GV3 ME	**GV AE20** or **GV AN20**	GV2, GV3 P and GV3 L
GV3 A03	GV3 ME	**GV AE1** + **GV AN20**	GV2, GV3 P and GV3 L
GV3 A05	GV3 ME	**GV AE1** + **GV AN20**	GV2, GV3 P and GV3 L
GV3 A06	GV3 ME	–	–
GV3 A07	GV3 ME	–	–
GV3 A08	GV3 ME	**GVA D0110** or **GVA D0101**	GV2, GV3 P and GV3 L
GV3 A09	GV3 ME	**GVA D1010** or **GVA D1001**	GV2, GV3 P and GV3 L
		GVA ED101 or **GVA ED011**	GV3 P and GV3 L
GK2 AX10	GK3 EF	**GVA E1**	GV2, GV3 P and GV3 L
GK2 AX20	GK3 EF	**GVA E20** or **GVA N20**	GV2, GV3 P and GV3 L
GK2 AX50	GK3 EF	**GVA E11** or **GVA N11**	GV2, GV3 P and GV3 L
GK2 AX12	GK3 EF	**GVA D1010** or **GVA D1001**	GV2, GV3 P and GV3 L
		GVA ED101 or **GVAED011**	GV2, GV3 P and GV3 L
GK2 AX22	GK3 EF	–	–
GK2 AX52	GK3 EF	**–**	–

Electric trips *(1)*

Old reference	For circuit-breaker	New reference	For circuit-breaker
GV3 B11 (50 Hz)	GV3 ME	**GVA U115 or GVA U125**	GV2, GV3 P and GV3 L
GV3 B11 (60 Hz)	GV3 ME	**GVA U115**	GV2, GV3 P and GV3 L
GV3 B22 (50 Hz)	GV3 ME	**GVA U225**	GV2, GV3 P and GV3 L
GV3 B38	GV3 ME	**GVA U385 or GVA U415**	GV2, GV3 P and GV3 L
GV3 D11 (50 Hz)	GV3 ME	**GVA S115 or GVA S125**	GV2, GV3 P and GV3 L
GV3 D11 (60 Hz)	GV3 ME	**GVA S115**	GV2, GV3 P and GV3 L
GV3 D22 (50 Hz)	GV3 ME	**GVA S225**	GV2, GV3 P and GV3 L
GV3 D38 (50/60 Hz)	GV3 ME	**GVA S385 or GVA S415**	GV2, GV3 P and GV3 L

Padlocking devices and external operator *(1)*

Old reference	For circuit-breaker	New reference	For circuit-breaker
GV1 V02	GV3 ME	**GV2 V03**	GV2, GV3 P and GV3 L
GK3 AV01	GK3 EF	**GV2 V03**	GV2, GV3 P and GV3 L
GK3 AP03	GK3 EF	**GV3 AP02**	GV3 P and GV3 L

(1) The old references are still available for circuit-breakers GV3 ME80 and GK3 EF80.

3-pole contactors, 40 to 65 A

Power (kW) at 400 V / AC3	Old reference	Power connection	Control connection	Type of coil	New reference	Power connection	Control connection	Type of coil
18.5	**LC1D40●●**	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1D40A●●**	EverLink	Screw clamp terminals	~/⎓
18.5	**LC1D4011●●**	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1D40A●●**	EverLink	Screw clamp terminals	~/⎓
18.5	**LC1D405●●**	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1D40A5●●TQ** *(1)*	EverLink	Screw clamp terminals	~/⎓
18.5	**LC1D406●●**	Lug type terminals	Lug type terminals	~/⎓	**LC1D40A6●●**	Lug type terminals	Lug type terminals	~/⎓
18.5	**LC1D40116●●**	Lug type terminals	Lug type terminals	~/⎓	**LC1D40A6●●**	Lug type terminals	Lug type terminals	~/⎓
22	**LC1D50●●**	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1D50A●●**	EverLink	Screw clamp terminals	~/⎓
30	**LC1D65●●**	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1D65A●●**	EverLink	Screw clamp terminals	~/⎓

4-pole contactors, 60 to 80 A

Maximum current in AC1	Old reference	Power connection	Control connection	Type of coil	New reference	Power connection	Control connection	Type of coil
60	LC1D40004●●	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1DT60A●●**	EverLink	Screw clamp terminals	~/⎓
60	LC1D400046●●	Lug type terminals	Lug type terminals	~/⎓	**LC1DT60A6●●**	Lug type terminals	Lug type terminals	~/⎓
60	LP1D40008●●	Screw clamp terminals	Screw clamp terminals	~/⎓	–	–	–	–
60	LP1D400086●●	Lug type terminals	Lug type terminals	~/⎓	–	–	–	–
80	LC1D65004●●	Screw clamp terminals	Screw clamp terminals	~/⎓	**LC1DT80A●●**	EverLink	Screw clamp terminals	~/⎓
80	LC1D650046●●	Lug type terminals	Lug type terminals	~/⎓	**LC1DT80A6●●**	Lug type terminals	Lug type terminals	~/⎓
80	LP1D65008●●	Screw clamp terminals	Screw clamp terminals	~/⎓	–	–	–	–
80	LP1D650086●●	Lug type terminals	Lug type terminals	~/⎓	–	–	–	–

Coil voltage: example with a 40 A contactor

Power (kW) at 400 V / AC3	Old reference	Connector plate width	Frequency Hz	Type of coil	New reference	Connector plate width	Frequency Hz	Type of coil
18.5	LC1D40●5	–	50	~	LC1D40A●7	–	50/60	~
18.5	LC1D40●6	–	60	~	LC1D40A●7	–	50/60	~
18.5	LC1D40●7	–	50/60	~	LC1D40A●7	–	50/60	~
18.5	LC1D40●D	Standard	–	⎓	LC1D40A●D	Wide	–	⎓
18.5	LC1D40●W	Wide	–	⎓	LC1D40A●D	Wide	–	⎓
18.5	LP1D40●D	Standard	–	⎓	LC1D40A●D	Wide	–	⎓
18.5	LP1D40●W	Wide	–	⎓	LC1D40A●D	Wide	–	⎓

(1) Packed in lots of 10.

TeSys contactors

TeSys d contactors

3-pole reversing contactors, 40 to 65 A

Power (kW) at 400 V / AC3	Old reference	Power connection	Control connection	Type of coil	New reference	Power connection	Control connection	Type of coil
18.5	**LC2D40●●**	Screw clamp terminals	Screw clamp terminals	∿/⎓	**LC2D40A●●**	EverLink	Screw clamp terminals	∿/⎓
18.5	**LC2D4011●●**	Screw clamp terminals	Screw clamp terminals	∿/⎓	**LC2D40A●●**	EverLink	Screw clamp terminals	∿/⎓
18.5	**LC2D405●●**	Screw clamp terminals	Screw clamp terminals	∿/⎓	**LC2D40A●●**	EverLink	Screw clamp terminals	∿/⎓
22	**LC2D50●●**	Screw clamp terminals	Screw clamp terminals	∿/⎓	**LC2D50A●●**	EverLink	Screw clamp terminals	∿/⎓
30	**LC2D65●●**	Screw clamp terminals	Screw clamp terminals	∿/⎓	**LC2D65A●●**	EverLink	Screw clamp terminals	∿/⎓

4-pole reversing contactors, 60 to 80 A

Maximum current in AC1	Old reference	Power connection	Control connection	Single and dual frequency coil	New reference
60	LC2D40004●●	Screw clamp terminals	Screw clamp terminals	∿	For customer assembly 2 x LC1 DT60A●● + LAD 4CM
80	LC2D65004●●	Screw clamp terminals	Screw clamp terminals	∿	For customer assembly 2 x LC1 DT80A●● + LAD 4CM

Star-delta contactors, 40 to 50 A

Power (kW) at 400 V / AC3	Old reference	Power connection	Control connection	Single and dual frequency coil	New reference
37	LC3D40●●	Screw clamp terminals	Screw clamp terminals	∿	For customer assembly: 3 x LC1 D40A●● + LAD 9SD3 (star-delta kit)
55	LC3D50●●	Screw clamp terminals	Screw clamp terminals	∿	For customer assembly: 3 x LC1 D50A●● + LAD 9SD3 (star-delta kit)

TeSys contactors

TeSys d contactors

Coils for ~ contactors, 40 to 65 A

Voltage V	Old reference	Type of current	Frequency Hz	New reference	Type of current	Frequency Hz
12	LX1D6J5	~	50	**LXD3J5**	~	50
20	LX1D6Z5 or Z6 or Z7	~	50 or 60 or 50/60	–	~	50/60
24	LX1D6B5 or B6 or B7	~	50 or 60 or 50/60	**LXD3B7**	~	50/60
32	LX1D6C5	~	50	**LXD3C7**	~	50/60
42	LX1D6 or D5 or D7	~	50 or 50/60	**LXD3D7**	~	50/60
48	LX1D6E5 or E6 or E7	~	50 or 60 or 50/60	**LXD3E7**	~	50/60
100	LX1D6K7	~	50/60	**LXD3K7**	~	50/60
110	LX1D6F5 or F6 or F7	~	50 or 60 or 50/60	**LXD3F7**	~	50/60
115	LX1D6FE7	~	50/60	**LXD3FE7**	~	50/60
120	LX1D6G5 or G8 or G7	~	50 or 60 or 50/60	**LXD3G7**	~	50/60
155	LX1D6GG5	~	50	–	~	50/60
200	LX1D6 L7	~	50/60	**LXD3L7**	~	50/60
208	LX1D6L6 or LE7	~	60 or 50/60	**LXD3LE7**	~	50/60
220	LX1D6M5 or M6 or M7	~	50 or 60 or 50/60	**LXD3M7**	~	50/60
230	LX1D6P5 or P7	~	50 or 50/60	**LXD3P7**	~	50/60
240	LX1D6U5 or U6 or U7	~	50 or 60 or 50/60	**LXD3U7**	~	50/60
256	LX1D6W5	~	50	–	~	50/60
277	LX1D6W6	~	60	**LXD3W7**	~	50/60
380	LX1D6Q5 or Q6 or Q7	~	50 or 60 or 50/60	**LXD3Q7**	~	50/60
400	LX1D6V5 or V7	~	50 or 50/60	**LXD3V7**	~	50/60
415	LX1D6N5 or N6 or N7	~	50 or 60 or 50/60	**LXD3N7**	~	50/60
440	LX1D6R5 or R6 or R7	~	50 or 60 or 50/60	**LXD3R7**	~	50/60
480	LX1D6T6	~	60	**LXD3T7**	~	50/60
500	LX1D6S5	~	50	**LXD3S7**	~	50/60
550	LX1D6SF5	~	50	–	~	50/60
575	LX1D6S7	~	50/60	**LXD3SC7**	~	50/60
600	LX1D6X6	~	60	**LXD3X7**	~	50/60
660	LX1D6Y5	~	50	**LXD3YC7**	~	50/60

TeSys protection components

TeSys d relays

Thermal overload relays up to 65 A

Old reference	Setting range Ir A	Class	Type	Power connection	New reference	Setting range Ir A	Class	Type	Power connection
LRD3306	1…1.6	10	Differential	Screw clamp terminals	**LRD06**	1…1.6	10A	Differential	Screw clamp terminals
LRD3307	1.6…2.5	10	Differential	Screw clamp terminals	**LRD07**	1.6…2.5	10A	Differential	Screw clamp terminals
LRD3308	2.5…4	10	Differential	Screw clamp terminals	**LRD08**	2.5…4	10A	Differential	Screw clamp terminals
LRD3310	4…6	10	Differential	Screw clamp terminals	**LRD10**	4…6	10A	Differential	Screw clamp terminals
LRD3312	5.5…8	10	Differential	Screw clamp terminals	**LRD12**	5.5…8	10A	Differential	Screw clamp terminals
LRD3314	7…10	10	Differential	Screw clamp terminals	**LRD14**	7…10	10A	Differential	Screw clamp terminals
LRD3316	9…13	10	Differential	Screw clamp terminals	**LRD313**	9…13	10A	Differential	EverLink
LRD3321	12…18	10	Differential	Screw clamp terminals	**LRD318**	12…18	10A	Differential	EverLink
LRD3322	17…25	10	Differential	Screw clamp terminals	**LRD325**	17…25	10A	Differential	EverLink
LRD3353	23…32	10	Differential	Screw clamp terminals	**LRD332**	23…32	10A	Differential	EverLink
LRD3355	30…40	10	Differential	Screw clamp terminals	**LRD340**	30…40	10A	Differential	EverLink
LRD3357	37…50	10	Differential	Screw clamp terminals	**LRD350**	37…50	10A	Differential	EverLink
LRD3359	48…65	10	Differential	Screw clamp terminals	**LRD365**	48…65	10A	Differential	EverLink
LR2D33●●	1…65	10	Differential	Screw clamp terminals	**LRD3●●**	9…65	10A	Differential	EverLink
LRD33●●A66	1…65	10	Differential	Lug type terminals	**LRD3●●6**	9…65	10A	Differential	Lug type terminals
LR2D33●●A66	1…65	10	Differential	Lug type terminals	**LRD3●●6**	9…65	10A	Differential	Lug type terminals
LR2D35●●	17…65	20	Differential	Screw clamp terminals	**LRD3●●L**	9…65	20	Differential	EverLink
LR3D33●●	17…65	10	Non differential	Screw clamp terminals	**LR3D3●●**	9…65	10A	Non differential	EverLink
LR3D35●●	17…65	20	Non differential	Screw clamp terminals	–	–	–	–	–

TeSys protection components

Suppressor modules for TeSys d contactors

Suppressor modules for contactors, 40 to 65 A

Setting range V	Old reference	Type of current	Type	New reference	Type of current	Type
24…48	LA4DA1E	∿	RC circuit	**LAD4RC3E**	∿	RC circuit
110 … 240	LA4DA1U	∿	RC circuit	**LAD4RC3U**	∿	RC circuit
24 … 48	LA4DA2E	∿	RC circuit	**LAD4RC3E**	∿	RC circuit
50 … 127	LA4DA2G	∿	RC circuit	**LAD4RC3G**	∿	RC circuit
380 … 415	LA4DA2N	∿	RC circuit	**LAD4RC3N**	∿	RC circuit
> 24	LA4DB2B	∿	Bidirectional peak limiting diode	**LAD4T3B**	∿/⎓	Bidirectional peak limiting diode
25 … 72	LA4DB2S	∿	Bidirectional peak limiting diode	**LAD4T3G**	∿/⎓	Bidirectional peak limiting diode
> 24	LA4DB3B	⎓	Bidirectional peak limiting diode	**LAD4T3B**	∿/⎓	Bidirectional peak limiting diode
25 … 72	LA4DB3S	⎓	Bidirectional peak limiting diode	**LAD4T3G**	∿/⎓	Bidirectional peak limiting diode
24 … 250	LA4DC3U	⎓	Flywheel diode	**LAD4D3U**	⎓	Flywheel diode
24 … 48	LA4DE2E	∿	Varistor	**LAD4V3E**	∿/⎓	Varistor
50 … 127	LA4DE2G	∿	Varistor	**LAD4V3G**	∿/⎓	Varistor
110 … 250	LA4DE2U	∿	Varistor	**LAD4V3U**	∿/⎓	Varistor
24 … 48	LA4DE3E	⎓	Varistor	**LAD4V3E**	∿/⎓	Varistor
50 … 127	LA4DE3G	⎓	Varistor	**LAD4V3G**	∿/⎓	Varistor
110 … 250	LA4DE3U	⎓	Varistor	**LAD4V3U**	∿/⎓	Varistor

TeSys protection components

TeSys d contactors and relays

Accessories for contactors and relays, 40 to 65 A

Old reference	Description	New reference	Notes
LA4DT0U	Electronic serial timer module, 0.1 to 2 s. 24…250V	**LA4DT0U**	Use accessory LAD4BB3
LA4DT2U	Electronic serial timer module, 1.5 to 30 s. 24…250V	**LA4DT2U**	Use accessory LAD4BB3
LA4DT4U	Electronic serial timer module, 25 to 500 s. 24…250V	**LA4DT4U**	Use accessory LAD4BB3
LA6DK10B	Mechanical latch block 24 V ~	**LAD6K10B**	
LA6DK10E	Mechanical latch block 42/48 V ~	**LAD6K10E**	
LA6DK10F	Mechanical latch block 110/127 V ~	**LAD6K10F**	
LA6DK10M	Mechanical latch block 220/240 V ~	**LAD6K10M**	
LA6DK10Q	Mechanical latch block 380/415 V ~	**LAD6K10Q**	
LA7D03B	Remote electrical reset 24 V	**LAD703B**	
LA7D03DD	Remote electrical reset 96 V	**LAD703DD**	
LA7D03E	Remote electrical reset 48 V	**LAD703E**	
LA7D03F	Remote electrical reset 110 V	**LAD703F**	
LA7D03J	Remote electrical reset 12 V	**LAD703J**	
LA7D03M	Remote electrical reset 220/230 V	**LAD703M**	
LA7D03N	Remote electrical reset 415/440 V	**LAD703N**	
LA7D03Q	Remote electrical reset 380/400 V	**LAD703Q**	

Accessories for contactors and relays, 40 to 65 A (continued)

Old reference	Description	New reference	Notes
LA7D03Q	Remote electrical reset 380/400 V	**LAD703Q**	
LA7D1020	Adapter for door mounted operator	–	No equivalent - Not necessary with the new range.
LA7D305	Remote control by flexible cable	**LAD7305**	
LA7D3058	Terminal block adapter for mounting a relay beneath a contactor	–	No equivalent
LA7D3064	Terminal block for clip-on mounting of a relay on 35 mm rail	**LAD96560**	EverLink terminal block
LA7D901	Stop button locking device	–	No equivalent
LA7D902	Mounting plate	–	No equivalent - Not necessary with the new range.
LA7D903	Marker holder for contactor	**LAD90**	
LA9D09966	Retrofit coil for 3-pole contactor	**LAD4BB3**	
LA9D4002	Mechanical interlock for reversing contactors	**LAD4CM**	
LA9D40961	Link for parallel connection for 2 poles	**LAD9P32**	
LA9D40963	Link for parallel connection for 4 poles	**2 x LAD9P33**	
LA9D50978	Kits for assembly of reversing contactors, 40 to 65 A	**LAD9R3**	
LA9D6567	Control circuit take-off from main pole	–	No equivalent
LA9D6569	Set of power connections for contactor	**LA9D65A69**	
LA9D92	Marker holder for contactor	**LA9D90**	
LAD9ET2	Safety cover	**LAD9ET1**	
XB5 AA86102	Operating head for spring return pushbutton. Reset	**XB5 AA86102**	Same product
XB5 AL84101	Operating head for spring return pushbutton. Stop	**XB5 AL84101**	Same product

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