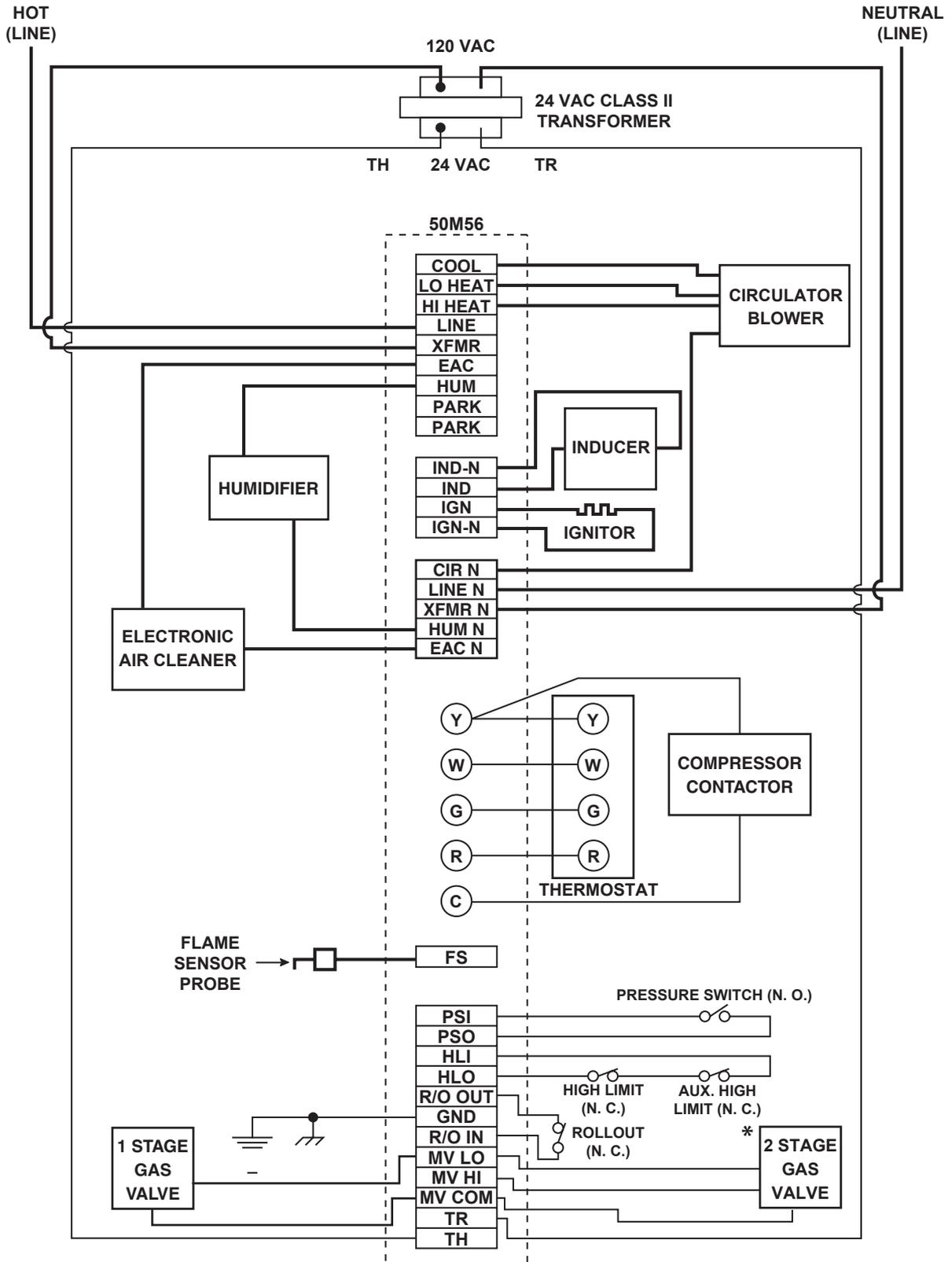


**50M56U-843 TYPICAL WIRING DIAGRAM**



LEGEND	
—	Low Voltage (24 VAC)
—	Line Voltage (120 VAC)
N. C.	= Normally closed switch
N. O.	= Normally open switch

\*For Goodman 50M56-289 Application

TECHNICAL HELP

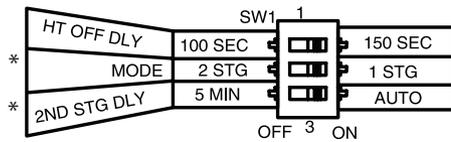
**50M56U-843 TYPICAL WIRING DIAGRAM**

50M56 TERMINAL	TERMINAL TYPE	SYSTEM COMPONENT CONNECTION
W G R Y  C	Terminal block with captive screws	low voltage thermostat W terminal (or equivalent) low voltage thermostat G terminal (or equivalent) low voltage thermostat R terminal (or equivalent) low voltage thermostat Y terminal (or equivalent) (2nd wire from Y terminal goes to 24 VAC HOT side of compressor contactor coil) 24 VAC COMMON side of compressor contactor coil
HLO (1) MV LO (2) TH (3) PSO (4) R/O OUT (5) TR (6) HLI (7) GND (8) MV COM (9) PSI (10) R/O IN (11) MV HI (12)	12-pin connector & harness	high limit OUTPUT gas valve first stage 24 VAC transformer (low voltage HIGH side) pressure switch OUTPUT rollout switch OUTPUT 24 VAC transformer (low voltage COMMON side) high limit INPUT MUST BE RELIABLY GROUNDED TO CHASSIS gas valve COMMON pressure switch INPUT rollout switch INPUT gas valve second stage
IND (1) IGN (2) IND-N (3) IGN-N (4)	4-pin connector & harness	inducer HOT side ignitor HOT side inducer NEUTRAL side ignitor NEUTRAL side
COOL	spade terminal	circulator blower COOL SPEED terminal
LO HEAT	spade terminal	circulator blower LO HEAT SPEED terminal
HI HEAT	spade terminal	circulator blower HI HEAT SPEED terminal
PARK (2 terminals)	spade terminal	unused terminals
LINE	spade terminal	input voltage (120 VAC) HOT side
XFMR	spade terminal	24 VAC transformer line voltage HOT side
EAC (optional)	spade terminal	electronic air cleaner HOT side
HUM (optional)	spade terminal	humidifier HOT side
CIR N	spade terminal	circulator blower NEUTRAL terminal
LINE N	spade terminal	input voltage (120 VAC) NEUTRAL side
XFMR N	spade terminal	24 VAC transformer line voltage NEUTRAL side
EAC N (optional)	spade terminal	electronic air cleaner NEUTRAL side
HUM N (optional)	spade terminal	humidifier NEUTRAL side
FS	spade terminal	flame sensor probe <sup>†</sup>

<sup>†</sup> Maximum recommended flame probe wire length is 36 inches.

## OPTION SWITCHES

The option switches on the 50M56U-843 control are used to determine the length of the heat delay-to-fan-off period, the mode of operation, and the 2nd stage delay period. The following illustration shows the options and the selections of the switch positions. The switches are shown in the factory default positions.



\*MODE and 2ND STG DLY for Goodman 50M56-289 only

## HEAT MODE

When heat is required, the thermostat will send a call for heat to the control. This starts the controls heating sequence. The ignitor and humidifier (optional) are powered. The ignitor is powered after the pre-purge period.

Upon initial application of power, the warm-up time is 17 seconds. The ignitor on-time will then be increased depending on whether or not flame is achieved. The warm-up time is limited to a maximum of 19 seconds. During the first 64 warm-up periods following power-up, the warm-up time may not be less than 17 seconds.

In the event of a retry, the warm-up time will be increased by one second and locked in at that duration. Once the warm-up time is locked, it remains fixed until another call for heat results in a retry, in which case the warm-up time is again increased by one second and remains locked.

In the event of two successive retry attempts, the warm-up time will be unlocked and set to 19 seconds. If flame is then achieved, the warm-up time will begin adapting again with the next call for heat. If, however, this third attempt fails to achieve flame, the control will go into system lockout.

After the ignitor warm-up period, MV LO (first stage) and MV HI (second stage) are both energized to the gas valve. Flame must be detected within 4 seconds. If flame is detected, the 30-second HEAT delay-to-fan-on period begins. The circulator and electronic air cleaner (optional) will also energize at this time.

**1 Stage operation** – If the Option Switch MODE (SW1-2) is set to the 1 STG position, both MV LO and MV HI will remain energized.

**2 Stage operation (Goodman 50M56-289 Application only)** – If the Option Switch MODE is set to 2 STG, MV HI will de-energize after 5 seconds, leaving MV LO energized. If the MODE is in the 2 STG position, 2nd STG DLY (SW1-3) will determine the second stage- on delay as follows:

**5 MIN** – On call for heat, the 5 minute 2nd stage recognition timer begins. After the 5-minute delay, the second stage heat (MV HI) is energized.

**AUTO** – On call for heat, the automatic second stage will determine the optimum timing between stages for comfort. Auto will adapt the delay to energize MV HI from instantly to up to 12 minutes.

When the thermostat is satisfied, the gas valve is de-energized. After proof of flame loss, the heat delay-to-fan-off period begins and the inducer blower remains energized to purge the system for 25 seconds. When the purge is complete, the inducer blower is de-energized. After the delay-to-fan-off period ends, the circulator fan and electronic air cleaner are de-energized.

If flame is not detected, both valves are de-energized, the ignitor is turned off, and the 50M56U-843 control goes into the “retry” sequence. The “retry” sequence provides a 60-second wait following an unsuccessful ignition attempt (flame not detected). After this wait, the ignition sequence is restarted with an additional 1 second of ignitor warm-up time.

If flame is established for more than 10 seconds after ignition, the 50M56U-843 controller will clear the ignition attempt (or retry) counter. If flame is lost after 10 seconds, it will restart the ignition sequence.

During burner operation, a momentary loss of power of 50 milliseconds or longer will de-energize the main gas valve. When power is restored, the gas valve will remain de-energized and a restart of the ignition sequence will begin immediately.

A momentary loss of gas supply, flame blowout, or a shorted or open condition in the flame probe circuit will be sensed within 2.0 seconds. The gas valve will de-energize and the control will restart the ignition sequence. Recycles will begin and the burner will operate normally if the gas supply returns, or the fault condition is corrected.

If the control has gone into system lockout, it may be possible to reset the control by a momentary power interruption of one second or longer. Refer to **SYSTEM LOCKOUT FEATURES**.

## COOL MODE

In a typical system, a call for cool is initiated by closing the thermostat contacts. This energizes the 50M56U-843 control and the compressor. The cool delay-to-fan-on period begins. After the delay period ends, the optional electronic air cleaner is energized, and the circulator fan is energized at cool speed. After the thermostat is satisfied, the compressor is de-energized and the cool mode delay-to-fan-off period begins. After the delay-to-fan-off period ends, the circulator fan and electronic air cleaner (optional) are de-energized.

## MANUAL FAN ON MODE

If the thermostat fan switch is moved to the ON position, the circulator fan (low heat speed) and optional electronic air cleaner are energized. When the fan switch is returned to the AUTO position, the circulator fan and electronic air cleaner (optional) are de-energized.

## SYSTEM LOCKOUT AND DIAGNOSTIC FEATURES

### SYSTEM LOCKOUT FEATURES

When system lockout occurs, the gas valve is de-energized, the circulator blower is energized at heat speed, and, if flame is sensed, the inducer blower is energized. The diagnostic indicator light will flash or glow continuously to indicate system status. **(System lockout will never override the precautionary features.)**

**To reset the control after system lockout, do one of the following:**

1. Interrupt the call for heat or cool at the thermostat for at least one second but less than 20 seconds (if flame is sensed with the gas valve de-energized, interrupting the call for heat at the thermostat will not reset the control).
2. Interrupt the 24 VAC power at the control for at least one second. You may also need to reset the flame rollout sensor switch.
3. After one hour in lockout, the control will automatically reset itself.

**DIAGNOSTIC FEATURES**

The 50M56U-843 control continuously monitors its own operation and the operation of the system. If a failure occurs, the LED will indicate a failure code as shown below. **If the failure is internal to the control, the light will stay off. In this case, the entire control should be replaced, as the control is not field-repairable.**

If the sensed failure is in the system (external to the control), the LED will flash in the following flash-pause sequences to indicate failure status (each flash will last approximately 0.25 seconds, and each pause will last approximately 2 seconds).

**DIAGNOSTIC INDICATOR FLASH CODES**

**FLASH**

- 1 System Lockout (Retries Exceeded)
- 2 Pressure Switch Stuck Closed
- 3 Pressure Switch Stuck Open
- 4 Open High Temperature Limit Switch
- 5 Flame Sensed with Gas Valve De-energized
- 6 Open Rollout Switch
- 7 Low Flame Sense Signal
- 8 Ignitor Relay Fault

- Rapid Flash** Reverse Polarity
- Continuous On** Normal Operation
- Off** Control Failure

**INSTALLER MUST READ FOR PROPER INSTALLATION**

**IMPORTANT:** For continuous fan speed operation, one of the unused parked motor taps must be connected to the low heat speed terminal. Failure to do this will result in the blower not energizing in the constant fan mode operation. Refer to figure 1.

**FOR ALL TRANE AND AMERICAN STANDARD APPLICATIONS ONLY:** Install jumper 0151 290600 (included in this package) in the furnace 12 pin connector harness, pin 5 and pin 11 positions. Make sure jumper snaps into the connector securely. Refer to figure 1.

**DEFINITION OF TERMS**

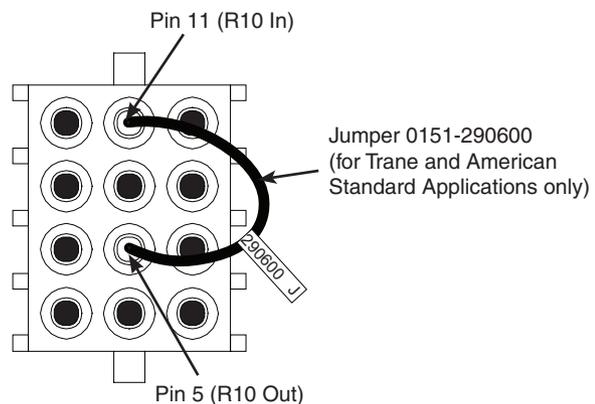
- Auto Restart** – After one (1) hour of internal or external lockout, the control will automatically reset itself and go into an auto restart purge for 60 seconds.
- Cool Delay-To-Fan-Off** – The period of time between the loss of a call for cool and the deactivation of the blower motor at Cool speed.
- Cool Delay-To-Fan-On** – The period of time after a thermostat demand for cool before energizing the circulator blower motor at Cool speed.
- Flame Failure Response Time (FFRT)** – The period of time between loss of the supervised main burner flame and the action to shut off the gas supply.
- Heat Delay-To-Fan-Off** – The period of time between the loss of a call for heat and the deactivation of the blower motor at Heat speed.
- Heat Delay-To-Fan-On** – The period of time between proof of the supervised main burner flame and the activation of the blower motor at Heat speed.
- Igniter Warm-up Time** – The length of time allowed for the igniter to heat up prior to the initiation of gas flow.
- Ignition Activation Period (IAP)** – The period of time between energizing the main gas valve and deactivation of the ignition means prior to the end of TFI.

**FAULT RECALL**

The last five fault codes stored can be displayed on the diagnostic LED. When the control is in standby mode (no call for heat or cool), press the FAULT RECALL switch for approximately two seconds or until the diagnostic LED turns off. Release the switch and the LED will remain off for two seconds. Then the fault codes will display beginning with the most recent fault first with a two second pause between codes. After the stored fault codes have all displayed, the LED will remain off for two seconds and then turn on to indicate return to normal status. While displaying the stored fault codes, the control will ignore any new call for heat, cool or fan.

**FAULT CODE RESET**

The stored fault codes can be erased from memory. When the control is in standby mode (no call for heat or cool), press the FAULT RECALL switch for five to ten seconds or until the diagnostic LED begins to rapid flash. When the switch is released, the LED will turn off for two seconds to indicate the codes are erased. After two seconds the LED will turn on to indicate return to normal status. If the switch is held pressed for over ten seconds the rapid flash will stop and the LED will be on to indicate return to normal status.



- Inter-purge** – The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion between the failed trial for ignition and the retry period.
- Post-purge Time** – The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion at the end of a furnace burner operating cycle. Post-purge begins at the loss of flame sense.
- Pre-purge Time** – The period of time intended to allow for the dissipation of any unburned gas or residual products of combustion at the beginning of a furnace operating cycle prior to initiating ignition.
- Recycles** – The additional attempts within the same thermostat cycle for ignition after loss of the supervised ignition source or the supervised main burner flame.
- Retries** – The additional attempts within the same thermostat cycle for ignition when the supervised main burner flame is not proven within the first trial for ignition period.
- Trial for Ignition Period (TFI)** – The period of time between initiation of gas flow and the action to shut off the gas flow in the event of failure to establish proof of the supervised ignition source or the supervised main burner flame.