White-Rodgers

50M56U-801

Single Stage | Direct | HSI
Integrated Furnace Control Kit

INSTALLATION INSTRUCTIONS

FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE PERSONAL INJURY AND/OR PROPERTY DAMAGE.

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DESCRIPTION

The 50M56U-801 kit is a HSI Integrated Furnace Control designed to replace virtually all 120V Lennox HSI single stage furnace controls using a PSC blower motor. It employs a microprocessor to continually monitor, analyze, and control the proper operation of the gas burner, inducer, and fan. The Kit contains:

- **50M56-801 Integrated Furnace Control**
- **2 Harness Assemblies**
- **Control Label**
- **Wire Ties**
- **Installation Instructions**

ELECTRICAL SPECIFICATIONS

Electrical Specification [@77 deg F (25 deg C)]	
Input Voltage	25 VAC 60Hz
Max Input Current	.45A @ 25 VAC
Gas Valve Relay	1.5 amp 0.6 PF @ 30 VAC
Ignitor Relay	1.2 amp @ 120 VAC
Inducer Relay	2.8 amp @ 120 VAC
Circulator Relay	10 amp FLA @ 120 VAC
Circulator Relay	25 amp LRA @ 120 VAC
Humidifier Load	1.0 amp @ 24 VAC or 120 VAC
Electronic Air Cleaner	1.0 amp @ 120 VAC
Minimum current to insure flame detection	0.25 µa DC*
Maximum current for non-detection	0.1 µa DC*
Maximum allowable leakage resistance	100 M ohms
Operating Temperature Range	
-40° to 175°F (-40° to 80°C)	
HUMIDITY RANGE:	
5% to 93% relative humidity (non-condensing)	
MOUNTING	
Surface mount standoffs	
Gases Approved	
Natural, Manufactured, Mixed, Liquefied Petroleum, and LP Gas Air Mixtures are all approved for use.	
Timing Specification	
Flame Establishing Time	0.8 sec
Flame Failure Response Time	2.0 sec

*Measured with a DC microammeter in the flame probe lead

INSTALLATION

⚠ WARNING

Failure to comply with the following warnings could result in personal injury or property damage.

FIRE HAZARD
- **Do not exceed the specified voltage.**
- **Replace existing control with exact model and dash number.**
- **Protect the control from direct contact with water (dripping, spraying, rain, etc.).**
- **If the control has been in direct contact with water, replace the control.**
- **Label all wires before disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.**
- **Route and secure wiring away from flame.**

SHOCK HAZARD
- **Disconnect electric power before servicing.**
- **Ensure proper earth grounding of appliance.**
- **Ensure proper connection of line neutral and line hot wires.**

EXPLOSION HAZARD
- **Shut off main gas to appliance until installation is complete.**

⚠ WARNING

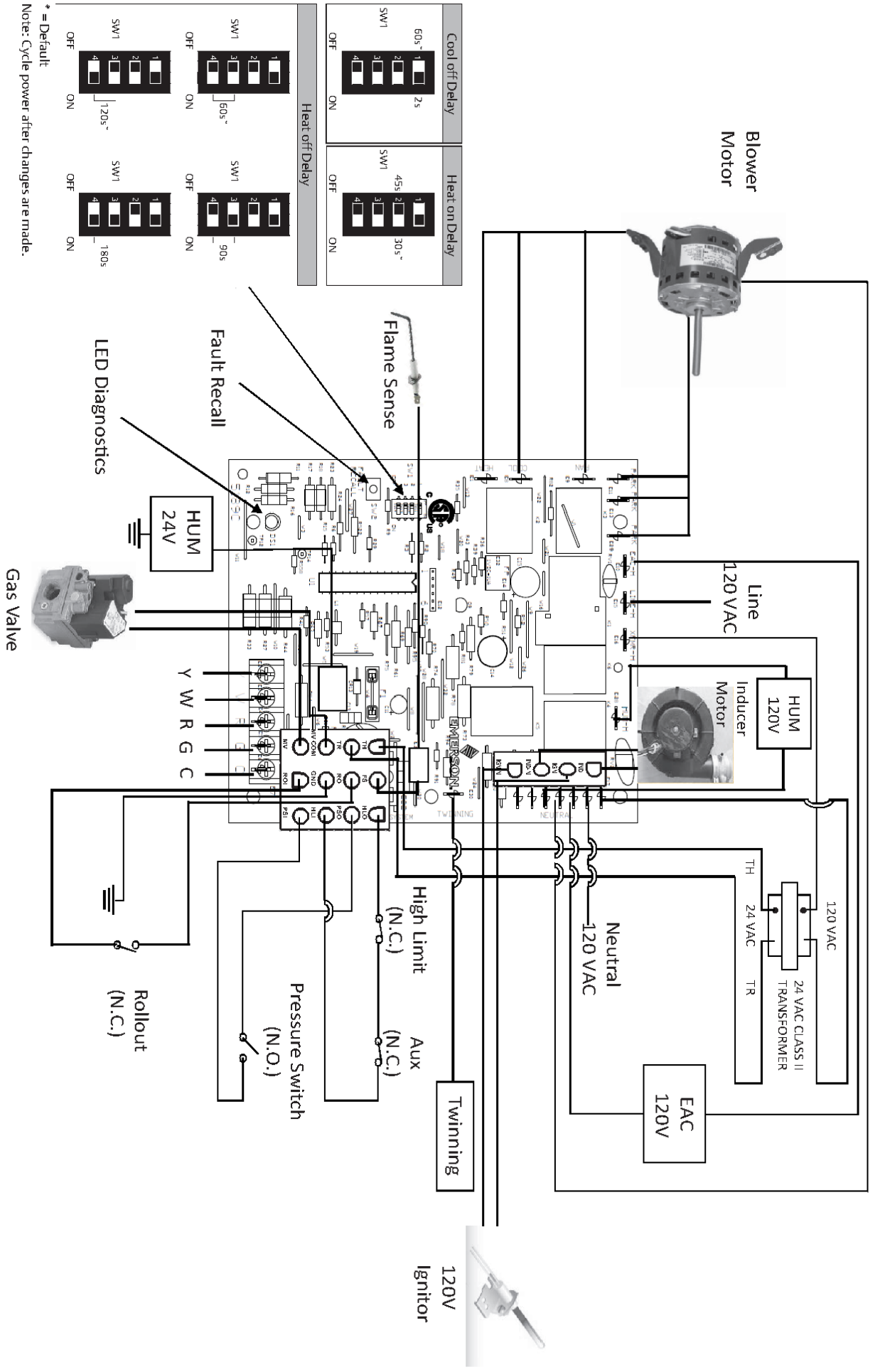
All installation procedures should be carried out ONLY by a qualified Heating and Air Conditioning contractor or licensed electrician, according to Local and National Electrical codes and Ordinances.

OEM REPLACEMENT INSTRUCTIONS - 50M56U-801

Lennox Model Furnace using control:	NOTE: Ignitor must be replaced with 120V Ignitor (Recommend 21D64-2) 75M21 Ignitor - Remove existing control and verify part number to be replaced - Reference Wiring diagram - Install harness **0115-0303** into the Inducer and Ignitor 4-pin connector - Plug in remaining connections
81W03	
1012-969A	
17W70	
100973-01,02	
1012-969	
78M4701	
78M1701	
75M1701	
Lennox, Armstrong, Ducane Furnaces using control:	- Remove existing control and verify part number to be replaced - Reference Wiring diagram - Plug in all connections.
56W19	
94W83	
R47582-001	
103085-01	
1012-967	
103085-02	
103085-03	
1012-83-9673A	
1012-977A	
81W11	
56L8501	
12L4201	
50A55-120	
80M2701	
1012-968	
Lennox Model Furnace using control:	- Remove existing control and verify part number to be replaced - Reference Wiring Diagram - Install harness **0115-0303** into the Inducer and Ignitor 4-pin connector. - Install harness **0115-0302** into the main 12-pin connector. - Plug in remaining connections.
74W03	
103098-01	
1195-100	
1195-83-100A	

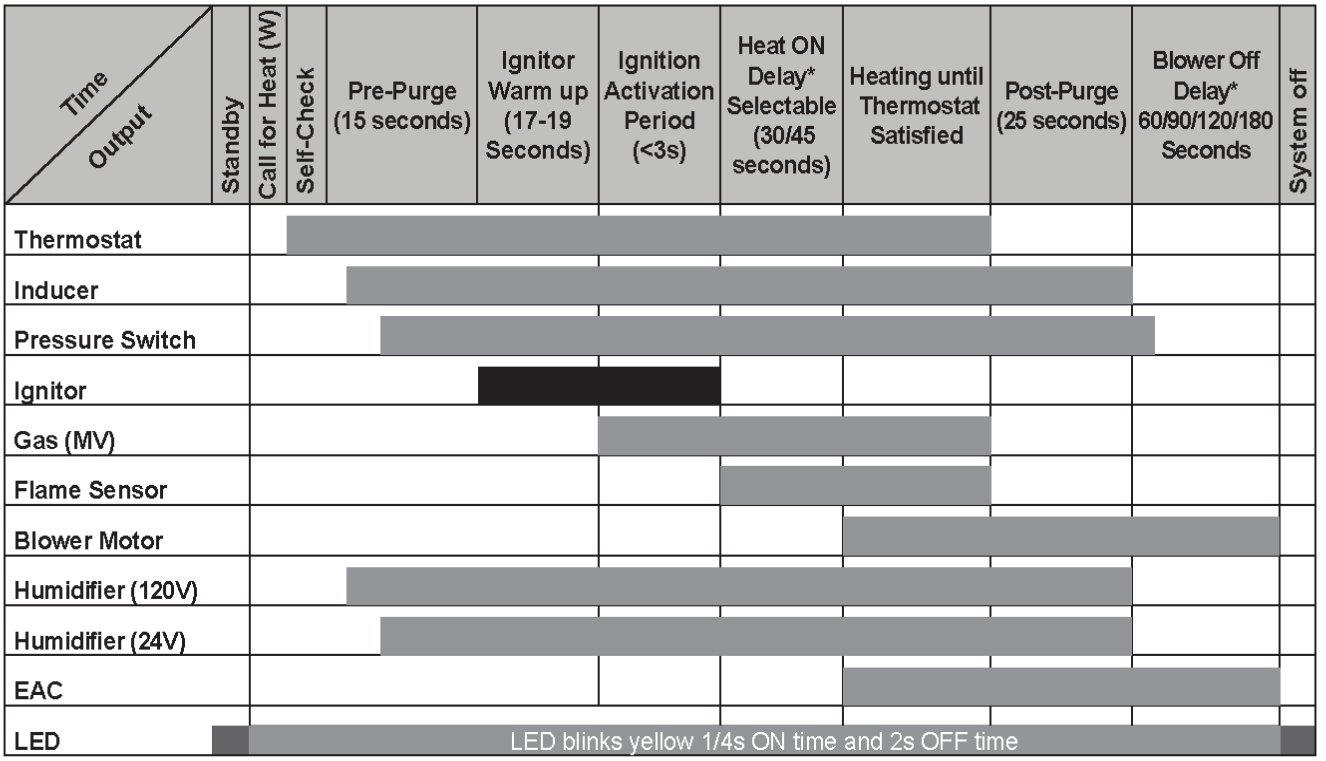
Follow Appliance Manufacturer's recommended installation or service instructions to ensure proper operation after installation

WIRING DIAGRAM



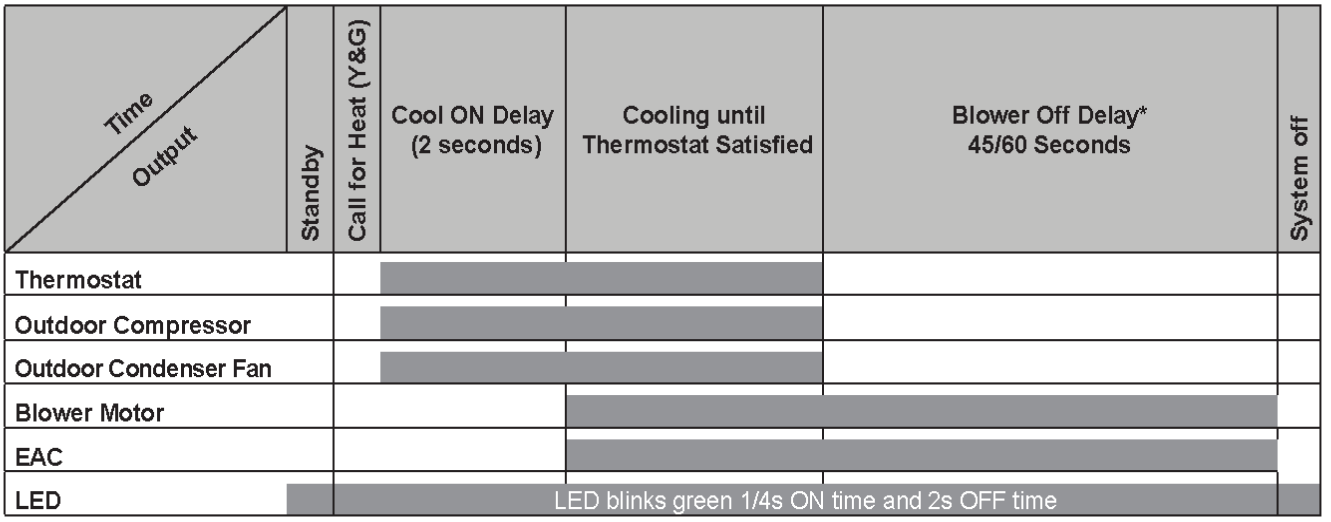
OPERATION

HEAT MODE



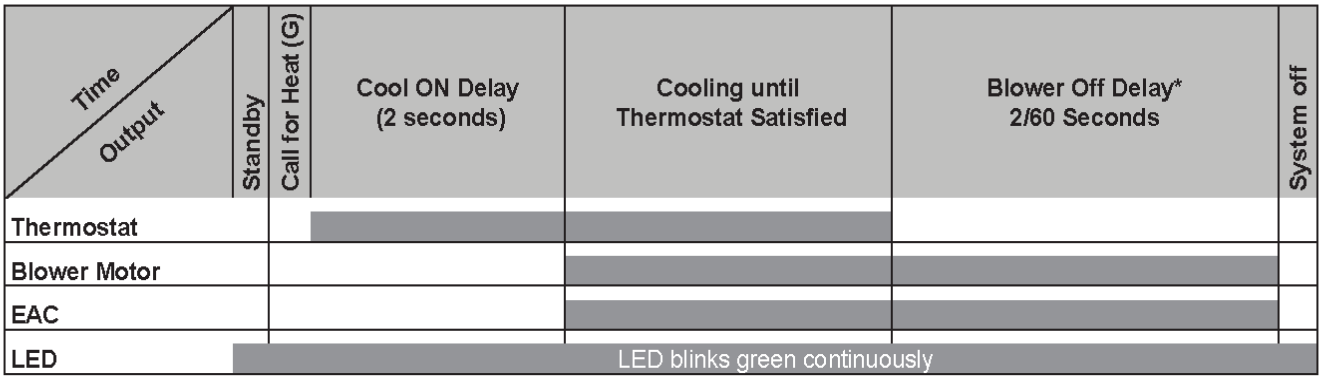
*All Dipswitch timing changes made during an active call will not go into effect until the next active call.

COOL MODE



*All Dipswitch timing changes made during an active call will not go into effect until the next active call.

FAN MODE



*All Dipswitch timing changes made during an active call will not go into effect until the next active call.

SYSTEM LOCKOUT FEATURES

When system lockout occurs,

1. Diagnostic LED will flash or glow continuously to indicate system status.
2. Gas valve is de-energized.
3. Circulator blower is energized at heat speed, and, if
4. Flame is sensed, the inducer blower is energized.

(System lockout will never override the precautionary features.)

To RESET the control after System Lockout

- Interrupt the call for Heat or Cool at the thermostat for at least 1 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.)

OR

- Interrupt the 24 VAC power at the control for at least 1 second. You may also need to reset the **Flame Rollout Sensor switch.**

Serviceable Parts

50M56U-801 has only one serviceable part –an automotive type fuse, which protects the low voltage transformer from damage if the output is short-circuited.

- If the fuse has opened up, remove whatever caused the short circuit and replace the fuse with only a 3 Amp automotive type fuse.
- If the fuse does not correct the condition, REPLACE the entire 50M56U-801 control. There are no other user serviceable parts.

DIAGNOSTIC FEATURES

The 50M56U-801 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 on page 5 in flash – pause sequences.
- Flash will last approximately for 0.25 seconds, and each pause will last approximately 2 seconds.

FAULT RECALL

Control must be in STANDBY mode (no call for heat or cool)

- Last 5 fault codes stored can be displayed on the Diagnostic LED.
- Press the FAULT RECALL switch for approximately 2 seconds or until the LED turns off.
- Release the switch and the LED will remain off for 2 seconds.
- Fault codes will display beginning with the most recent fault first with a 2 second pause between codes.
- After the stored fault codes have all displayed, the LED will remain off for 2 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 CODES RESET Automatically after 14 days. To manually reset see steps below.

Control must be in STANDBY switch mode (no call for heat or cool)

Press the FAULT RECALL switch for approximately 5-10 seconds or until the LED begins to rapid flash.

- Release the switch and the LED will turn off for 2 seconds indicating that the codes are erased.
- After 2 seconds, the LED will turn on to indicate return to normal status.
- If the switch is held pressed for over 10 seconds, the rapid flash will stop and the LED will turn on to indicate return to normal status and the fault codes will not be erased.

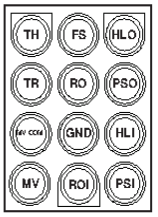
TROUBLESHOOTING

Green LED Flash	Amber LED Flash	Red LED Flash	Error/Condition	Comments/Troubleshooting
Below flash codes shall be stored if fault occurs				
		1	Flame Present Without Gas Valve Energized	- Verify the gas valve is operating and shutting down properly. - Flame in burner assembly should extinguish promptly at the end of the cycle. - Check orifices and gas pressure.
		2	Pressure Switch Stuck Closed / Inducer Error	- Check switch function, verify inducer is turning off. - Refer to wiring diagram, terminals PSI / PSO
		3	Pressure Switch Stuck Open / Inducer Error	- Check pressure switch function and tubing. - Verify inducer is turning on and pulling sufficient vacuum to engage switch. - Refer to wiring diagram, terminals PSI / PSO.
		4	High Limit Switch Open	- Verify continuity through limit switch circuit. - Refer to wiring diagram terminals, HLI / HLO.

TROUBLESHOOTING

Green LED Flash	Amber LED Flash	Red LED Flash	Error/Condition	Comments/Troubleshooting
Below flash codes shall NOT be stored				
		5	Open Flame Rollout Switch or fuse	- Verify continuity through rollout switch circuit. Refer to wiring diagram terminals, RO IN / RO OUT. - Verify continuity of fuse which protects the low voltage Transformer from damage if the output is short-circuited. - If the fuse has opened up, remove whatever caused the short circuit and replace the fuse with only a 3 Amp automotive type fuse. - If the fuse does not correct the condition, REPLACE the entire control.
		6	Pressure Switch Open Lockout	- Check pressure switch function and tubing. - Refer to wiring diagram, terminals PSI/PSO - Repair or replace pressure switch
		7	Retry - External Lockout	Often caused by carbon deposits on the flame sensor, a disconnected or shorted flame sensor lead or a poorly grounded furnace. - Carbon deposits can be cleaned with emery cloth. - Verify sensor is not contacting the burner and is located in a good position to sense flame. - Check sensor lead for shorting and verify furnace is grounded properly. - Verify gas supply to valve, gas valve in "On" position and appliance lighting properly. - Verify flame reaches flame sensor during ignition attempts and gas pressures are correct.
		8	Recycle- External Lockout	See Troubleshooting comments for Retry- External Lockout
		9	Reversed 120 VAC Line Polarity or Bad Ground	- Verify the control and furnace is properly grounded. - Check and reverse polarity (primary or secondary) if incorrect.
		10	Gas Flow with No Call for Heat	
		12	Ignitor Relay Failure	Indicates the Ignitor relay contacts on the ignition module are not functioning properly. - Replace the ignition module.
	Rapid		Weak Flame Sensed	Often caused by carbon deposits on the flame sensor, a poorly grounded furnace or a mis-aligned flame sense probe. - Carbon deposits can be cleaned with emery cloth. Check or improve furnace and module ground. - Verify sensor is located in or very near flame as specified by the appliance manufacturer. - Refer to wiring diagram FS terminal and GND.
		Blink Continuous	Twinning error	- Verify field installed wiring is connected correctly - Verify both controls are model 50M56-801
		Solid	Internal Fault	- Indicates a control fault that cannot be serviced - Replace Control
	1		Normal Heat Mode Operation	No Fault
	4		Y present with no G call	No Fault
Solid			Standby mode	No Fault
Blink continuous			Normal Fan Mode Operation (G)	No Fault
1			Normal Operation with call for cool (Y + G)	No Fault
2 sec ON then OFF			Control Power ON Display Indication	No Fault
off	off	off	No Power	- Verify Power to the control - Replace control
Note: Continuous Blink flash code shall use 250ms ON time and 250ms OFF time for LED blink.				

DEFINITION OF TERMS & TIMING SPECIFICATION

Term	Location	Definition	Value
Y	Terminal block with captive screws	INPUT – low voltage thermostat Y terminal (or equivalent)	24 VAC
W		INPUT – low voltage thermostat W terminal (or equivalent)	24 VAC
R		OUTPUT – low voltage thermostat R terminal (or equivalent)	24 VAC
G		INPUT – 24 VAC low voltage thermostat G terminal (or equivalent)	24 VAC
C		COMMON – 24 VAC neutral side of compressor contactor coil	N/A
HLO (Pin1)		OUTPUT – High limit	
FS (Pin2)		INPUT – Flame Sense	See Electrical Specs
TH (Pin 3)		INPUT – Transformer (low voltage HIGH side)	24 VAC
PSO (Pin 4)		OUTPUT – Pressure Switch Output used to power external normally open	24 VAC
RO (Pin 5)		OUTPUT – Rollout switch OUTPUT	24 VAC
TR (Pin 6)		INPUT – 24 VAC transformer (low voltage Neutral side)	N/A
HLI (Pin 7)		INPUT – High limit	24 VAC
GND (Pin 8)		GND – MUST BE RELIABLY GROUNDED TO CHASSIS	N/A
MV COM (Pin 9)		COMMON – Gas Valve	N/A
PSI (Pin 10)		INPUT – Pressure Switch	24 VAC
ROI (Pin 11)		INPUT – Roll out	24 VAC
MV (Pin 12)		OUTPUT – Gas Valve	24 VAC
IND		OUTPUT – Inducer	120 VAC
IGN		OUTPUT – IGNITOR	120 VAC
IND-N		COMMON – Inducer	N/A
IGN-N		COMMON – Ignitor	N/A
Fault Recall Button	FAULT RECALL	Reference SYSTEM LOCKOUT & DIAGNOSTIC FEATURES section	N/A
HEAT	1/4" spade terminal	OUTPUT- circulator blower HEAT SPEED terminal	120 VAC
COOL	1/4" spade terminal	OUTPUT-circulator blower COOL SPEED terminal	120 VAC
FAN	1/4" spade terminal	OUTPUT-circulator blower FAN SPEED terminal	120 VAC
PARK (3 terminals)	1/4" spade terminal	Unused circulator blower terminals	N/A
LINE-H	1/4" spade terminal	INPUT- Line Voltage	120 VAC
XFMR-H	1/4" spade terminal	INPUT- transformer HOT side	24 VAC
EAC-H (optional)	1/4" spade terminal	OUTPUT- Electronic Air Cleaner	120 VAC
HUM-H (optional)	1/4" spade terminal	OUTPUT- Humidifier	120 VAC
24V HUM (optional)	1/4" spade terminal	OUTPUT- Humidifier	24 VAC
NEUTRAL (7 terminals)	1/4" spade terminal	Terminals for 120 Volt NEUTRAL for line, transformer, circulator, electronic air cleaner and humidifier	N/A
Flame Sense (FS)	3/16" spade terminal	INPUT-Remote Flame Sensor used on 81W03 and 74W03	See Electrical Spec
Twinning (optional)	3/16" spade terminal	The "TWINNING" terminal shall be capable of providing the control to be twinned with a same model control produced by White-Rodgers. Connection of the "TWINNING" terminals of each control together will allow for simultaneous operation of two (2) furnaces or more and forces the indoor blower motors of each furnace to operate synchronously into a common ducting system. Enabling the twinning function will require only field installed wiring with no external kits or parts and no DIP switches will need to be changed.	N/A

DEFINITION OF TERMS & TIMING SPECIFICATION

Term	Location	Definition	Value
Pre-purge Time	N/A	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.	15 sec
Adaptive Ignitor Warm up time	N/A	Adaptive algorithm that adjusts the duration of ignitor warm-up for the purpose of extending ignitor life. Following application of power, the warm-up time will be 17 seconds for the first 64 successful ignitions. Each subsequent warm-up time will be decreased by 1 second until flame fails to be achieved (resulting in a retry) or until the minimum 5 second warm-up period is achieved	17-19 sec
Trial for Ignition Period (TFI)	N/A	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.	4 sec
Ignition Activation Period (IAP)	N/A	Time between energizing the main gas valve and deactivation of the ignition means prior to the end of TFI.	3 sec
Flame Failure Response Time (FFRT)	N/A	Time between loss of the supervised main burner flame and the action to shut off the gas supply.	2 sec
Recycles	N/A	The additional attempts within the same thermostat cycle for ignition after loss of the supervised ignition source or the supervised main burner flame.	5 attempts
Retries	N/A	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. The retry sequence will follow the inter-purge time.	4 attempts
Inter-purge	N/A	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.	60 sec
Post-purge Time	N/A	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.	5 sec
Auto Restart	N/A	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.	60 min
Heat On Delay	N/A	Time between proof of the supervised main burner flame and the activation of the blower motor at Heat speed.	45/30* sec
Heat Off Delay	N/A	Time between the loss of a call for heat and the deactivation of the blower motor at Heat speed.	60/90/120*/ 180 sec
Cool On Delay	N/A	Time between a thermostat demand for cool and energizing the circulator blower motor at Cool speed.	2 sec
Cool Off Delay	N/A	Time between the loss of a call for cool and the deactivation of the blower motor at Cool speed.	60*/2 sec

* = Default

TECHNICAL SUPPORT: 1-888-725-9797

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