

50F06-843
Universal Furnace Electronic Fan
Timer 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.**

PARTS INCLUDED

- 50F06-843 Electronic Fan Timer Control Board
- 2 - Main Harness Assemblies (ST9101, ST9141)
- 1 - Jumper Harness (ST9160)
- 2 - 7" Long Transformer Wiring Extensions (EXT)
- 2 - 3/16" QC crimp on terminals for optional use with Wiring Extensions
- 4 - 1" Sheet Metal Mounting Screws (for mounting tray corner locations)
- 2 - 1/2" Sheet Metal Mounting Screws (for mounting tray center tabs)
- 2 - Wire Ties
- Troubleshooting Label
- Installation Instructions

DESCRIPTION

The 50F06-843 is an aftermarket universal replacement fan timer control kit for single stage furnaces with PSC inducer and blower motors.

TWINNING: 50F06-843 can be twinned. Both control boards must be from the same manufacturer for proper functionality.

SPECIFICATIONS

ELECTRICAL RATINGS:

Input Low Voltage: 25 VAC, 60 Hz

Input Line Voltage: 115/230VAC, 60 Hz, 1 ϕ

Max Input Current: 800mA @ 25 VAC

Relay Contact Ratings:

Inducer Output: 1.5 FLA @ 115 VAC
.75A @ 230 VAC

Blower Output: 15 FLA @ 115 VAC
7.5A FLA @ 230VAC

Humidifier and EAC Load: .8A FLA @ 115 VAC
.4A FLA @ 230VAC

POST PURGE TIMING:

5 seconds

LOCKOUT AUTO RESET TIMING:

60 minutes

OPERATING TEMPERATURE RANGE:

-40° to 176°F (-40° to 80°C)

HUMIDITY RANGE:

5 to 95% relative humidity (non-condensing)

GASES APPROVED: Natural, Manufactured, Mixed, Liquid Petroleum, and LP Gas Air Mixtures.

⚠ CAUTION





	Risk of Electric Shock. Disconnect electric power to system until installation is complete. Do not use on circuit exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard
	
	This control is not intended for use in locations where it may come in contact with water.
	May cause flame rollout. Shut off main gas to heating system until installation is complete.

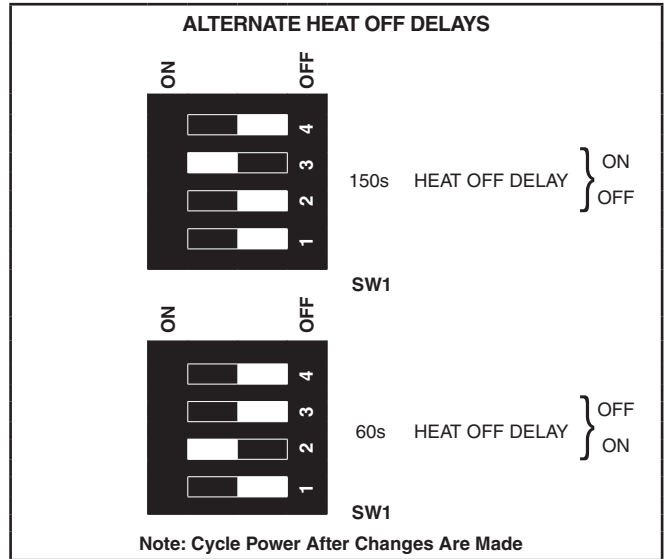
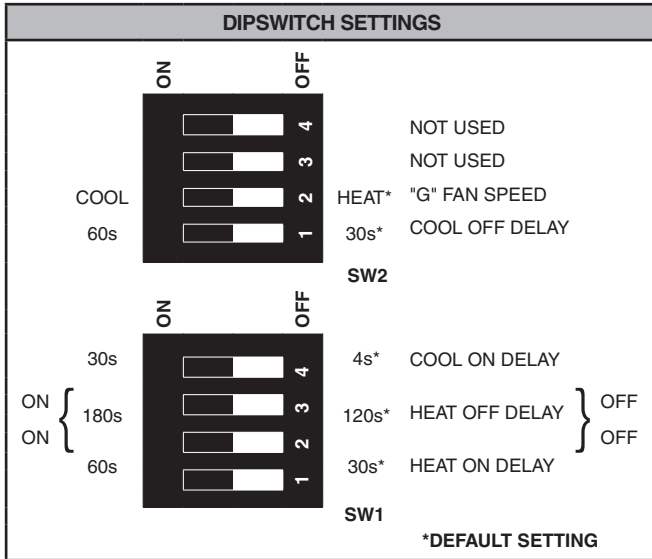
TABLE 1: CROSS REFERENCE, HARNESS SELECTION, DIPSWITCH SETTINGS
(Harness Part Numbers Match Control Model Being Replaced for Easy Identification)

Honeywell, ICM, Robertshaw Control Model	Appliance OEM	OEM Part	Alt OEM Part(s)	Harness Req'd	Original Delay Timing				50F06-843 Suggested Delays								
					Heat		Cool		Heat				Cool				
					ON	OFF	ON	OFF	ON		OFF		ON		OFF		
					seconds		sw1-1	sec	sw1-2	sw1-3	sec	sw1-4	sec	sw2-1	sec		
ST9101A1006	Rheem			ST9101	30	100	4	0	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9101A1014	Rheem	47-22827-xx	47-22693-xx, 47-22828-xx, 47-22830-xx	ST9101	30	100	4	0	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9101A1022	Trade			ST9101	30	100	4	0	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9120A1006	Armstrong			N/A	30	100	4	0	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9120A2004	Armstrong	40403-001		N/A	30	140	4	0	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9120B1005	Ducane			N/A	30	60	4	0	OFF	30	ON	OFF	60	OFF	4	OFF	30
ST9120C1012	Snyder Gen			N/A	60	100	4	0	ON	60	OFF	OFF	120	OFF	4	OFF	30
ST9120C1020	Nordyne			N/A	60	100	4	0	ON	60	OFF	OFF	120	OFF	4	OFF	30
ST9120C2002	York	031-01237-000	031-02959-000	N/A	30	100	4	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9120C2010	Ducane	20054502	CAR20054502	N/A	30	100	4	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9120C2028	Armstrong	40403-001	40403-002, 40403-003, 025-32816-000, 87H88	N/A	30	100	4	60	OFF	30	OFF	OFF	120	OFF	4	ON	60
ST9120C3000	ICP	HQ1010031HW	1010031	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120C3018	Bard			N/A	60	100	4	60	ON	60	OFF	OFF	120	OFF	4	ON	60
ST9120C4008	ICP			N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120C4016	ICP	HQ1009836HW	1009836	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120C4040	ICP	HQ1011179HW	1011179	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120C4057	ICP	HQ1011927HW	1011927	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
*ST9120C5005	ICP	HQ1084197HW	1084197	N/A	30	140	4	30	OFF	30	OFF	ON	150	OFF	4	OFF	30
*ST9120C5013	ICP	HQ1170063HW	1170063, 1008786, 1009837, 1011543, 1012106, 1150489, 1160192, 1138-200	N/A	30	140	4	30	OFF	30	OFF	ON	150	OFF	4	OFF	30
*ST9120D3009	Goodman	B18099-11(S)	CARB1809911, CARL38267	N/A	30	140	4	60	OFF	30	OFF	ON	150	OFF	4	ON	60
ST9120G2008	ICP	HQ1008773HW	1008773	N/A	60	100	30	0	ON	60	OFF	OFF	120	ON	30	OFF	30
ST9120G2016	ICP			N/A	30	100	30	30	OFF	30	OFF	OFF	120	ON	30	OFF	30
ST9120G2024	Skymark			N/A	30	60	30	30	OFF	30	ON	OFF	60	ON	30	OFF	30
ST9120G2032	Skymark			N/A	30	60	4	100	OFF	30	ON	OFF	60	OFF	4	ON	60
ST9120G4004	ICP	HQ1009838HW	1009838, HG1009838HW	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120G4012	ICP	HQ1009836HW	1009836	N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120G4038	Trade			N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9120U1003	Trade			N/A	30	140	4	30	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9120U1011				N/A	30	120	4	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9141A1002	Consolidated	406650	Weil-McLain 4116000	ST9141	30	140	6	60	OFF	30	OFF	ON	150	OFF	4	ON	60
ST9141A1028	Consolidated			ST9141	30	140	6	60	OFF	30	OFF	ON	150	OFF	4	ON	60
ST9141B1001	Consolidated			ST9141	75	180	6	60	ON	60	ON	ON	180	OFF	4	ON	60
ST9150A1003**	Consolidated			N/A	36	168	7	72	OFF	30	ON	ON	180	OFF	4	ON	60
ST9150B2000**				N/A	36	144	7	0	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9150B2018**	ICP			N/A	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9150B2026**	Ducane			N/A	36	144	7	36	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9150B2034**				N/A	36	144	7	36	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9160A1002	Armstrong	45392-001		ST9160	30	90	6	60	OFF	30	OFF	OFF	120	OFF	4	ON	60
ST9160B1001				ST9160	30	120	6	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9160B1019				ST9160	30	120	6	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9160B1027				ST9160	30	120	6	60	OFF	30	OFF	OFF	120	OFF	4	ON	60
ST9160B1035				ST9160	30	120	6	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9160B1043	ICP			ST9160	30	140	6	30	OFF	30	OFF	ON	150	OFF	4	OFF	30
ST9160B1050	ICP	HQ1012358HW	1012358	ST9160	30	140	6	60	OFF	30	OFF	ON	150	OFF	4	ON	60
ST9160B1068	Armstrong	45692-001		ST9160	30	120	6	60	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9160B1076	Ducane	2043081	28M99(01)	ST9160	30	120	6	30	OFF	30	OFF	OFF	120	OFF	4	OFF	30
ST9160B1084	ICP	1014460		ST9160	30	140	6	90	OFF	30	OFF	ON	150	OFF	4	ON	60
ST9160C1000				ST9160	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ST9160C1018				ST9160	30	140	30	30	OFF	30	OFF	ON	150	ON	30	OFF	30
ICM270	Evcon	2702-300	2895-3001, 026-34030-000	ST9101	Check Unit Documentation or Existing Control				OFF	30	OFF	OFF	120	OFF	4	OFF	30
ICM270	Rheem	47-22827-xx	47-22693-xx, 47-22828-xx, 47-22830-xx	ST9101					OFF	30	OFF	OFF	120	OFF	4	OFF	30
695-003	Rheem	47-22828-xx	(Robertshaw)	ST9101					OFF	30	OFF	OFF	120	OFF	4	OFF	30

* Heat Fan Off Delay setting may need adjustment based on performance
** Replacement requires 60Hz power supply

BLUE SHADING = A CHANGE FROM DEFAULT SELECTION IS REQUIRED

DIPSWITCH CONFIGURATION

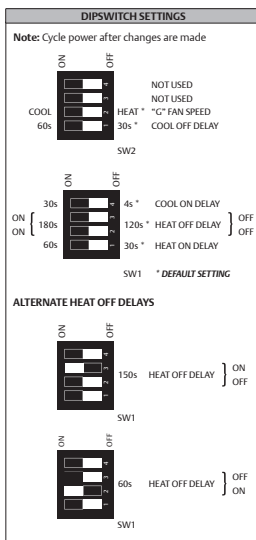


Notes:

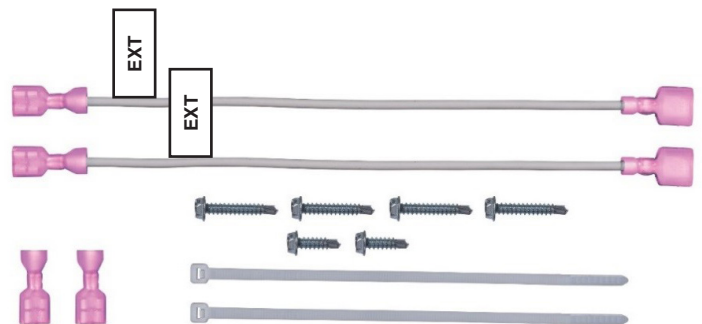
- To change settings break through yellow protective plastic film and make required adjustments
- See **Table 1** for dipswitch setting recommendations by control board part number (any changes to be made from 50F06-843 defaults will be highlighted in BLUE)
- Cycle power after making any changes

INSTALLATION ACCESSORIES

- 7" long wiring extensions **EXT** can be used if existing transformer wires do not easily reach the new control board connections. Extension wires have 1/4" male x 1/4" female spades
- 3/16" male crimp-on quick connects can be used to modify the **EXT** extension leads if they are needed for units having smaller transformer connections
- Mounting screws can be used with the plastic tray CORNER HOLES (4x long) or MOUNTING TABS (2x short)
- Wire ties can be used to secure any wiring as needed
- Troubleshooting label can be placed on furnace access panel for referencing dipswitch setup and LED codes



TROUBLESHOOTING			SYSTEM TYPE			
GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ST9101	ST9120	ST9141	ST9160
Up to 5 flash codes stored in memory (auto-erased after 14 days)						
1			X	X		
2				X		
3				X		
4				X		
7			X	X	X	X
8				X		
9			X	X	X	X
Flash codes NOT stored in memory						
Other	Solid	OFF				X
OFF	OFF	OFF				
Alternate	Alternate	Alternate				
Rapid						
Solid						
Continuous						
1						
2						
6						
SELF-TEST - Power cycle control, press FAULT button 2x during rapid green flash FAULT RECALL - In standby, hold FAULT button > 5 seconds FAULT ERASE - In standby, hold FAULT button > 5 seconds but < 10 seconds CONTROL LOCKOUT RESET - Remove 24VAC power > 10 Seconds						
JUMPER HARNESS						
Place Jumper Harness ST9160 in connector J1 for ALL ST9160 replacements. This Harness is NOT USED for any other replacements						



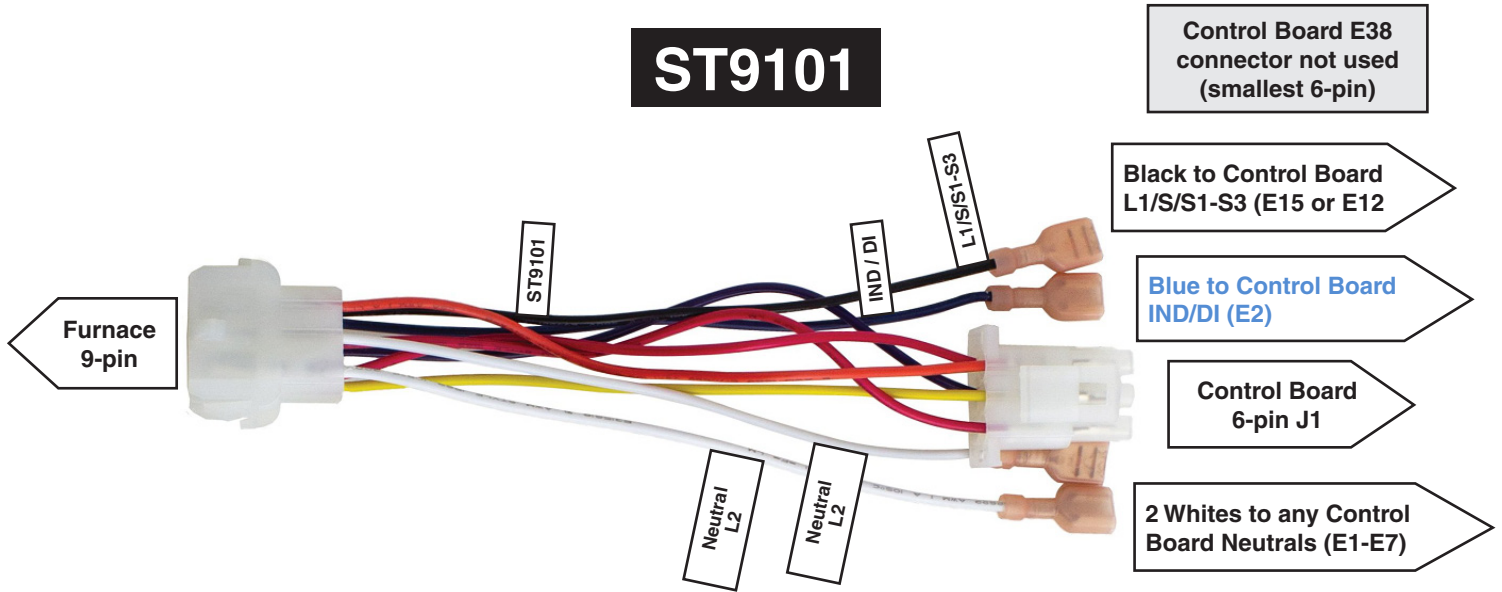
50F06-843



ADAPTER HARNESSES, JUMPER PLUG, AND WIRING NOTES

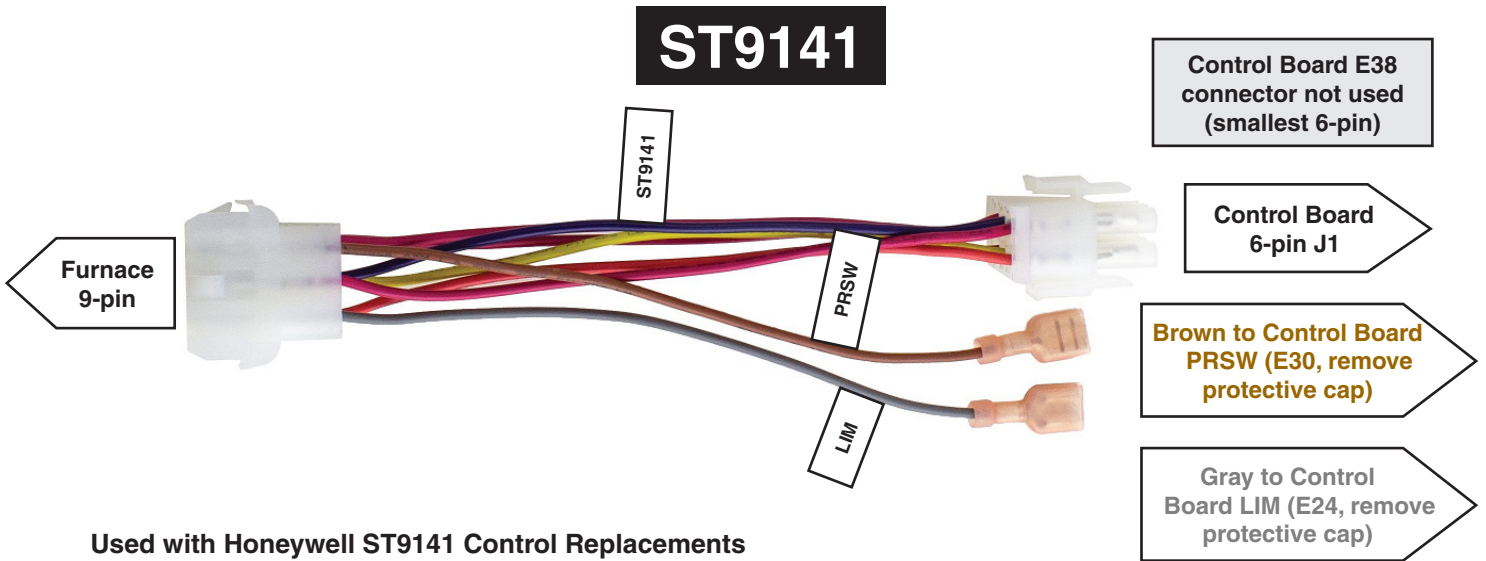
(Harness Part Numbers Match Control Model Being Replaced for Easy Identification)

ST9101



Used with Honeywell ST9101, ICM270, and Robertshaw 695-003 Control Replacements

ST9141

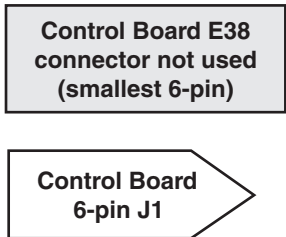


Used with Honeywell ST9141 Control Replacements

ST9120

These Control Replacements install without the use of a wiring harness.

Plug factory wiring into



For additional details please see WIRING DIAGRAM and original appliance schematic

ADAPTER HARNESES, JUMPER PLUG, AND WIRING NOTES

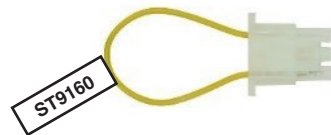
(Harness Part Numbers Match Control Model Being Replaced for Easy Identification)

ST9160

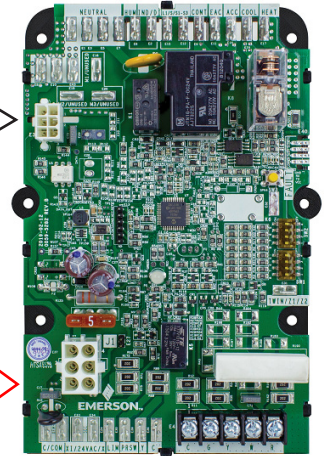
Plug factory wiring into

Control Board E38
(smallest 6-pin)

Jumper Harness required on all ST9160 Systems. Failure to install will disable furnace operation and produce a **Solid Amber** LED code.



Jumper plugs into
Control Board
6-pin J1



For additional details please see **WIRING DIAGRAM** and original appliance schematic

INSTALLATION

MOUNTING AND WIRING

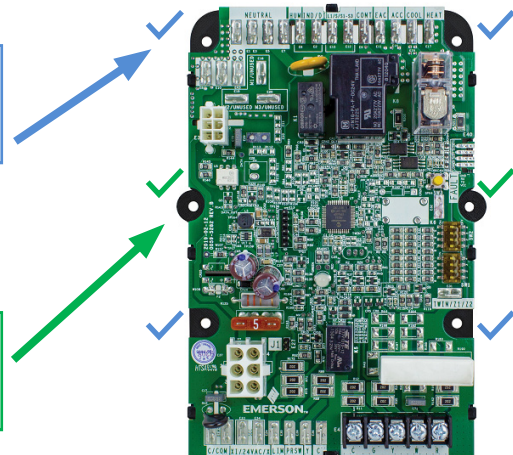
NOTE: All wiring should be installed according to local and national electrical codes and ordinances.

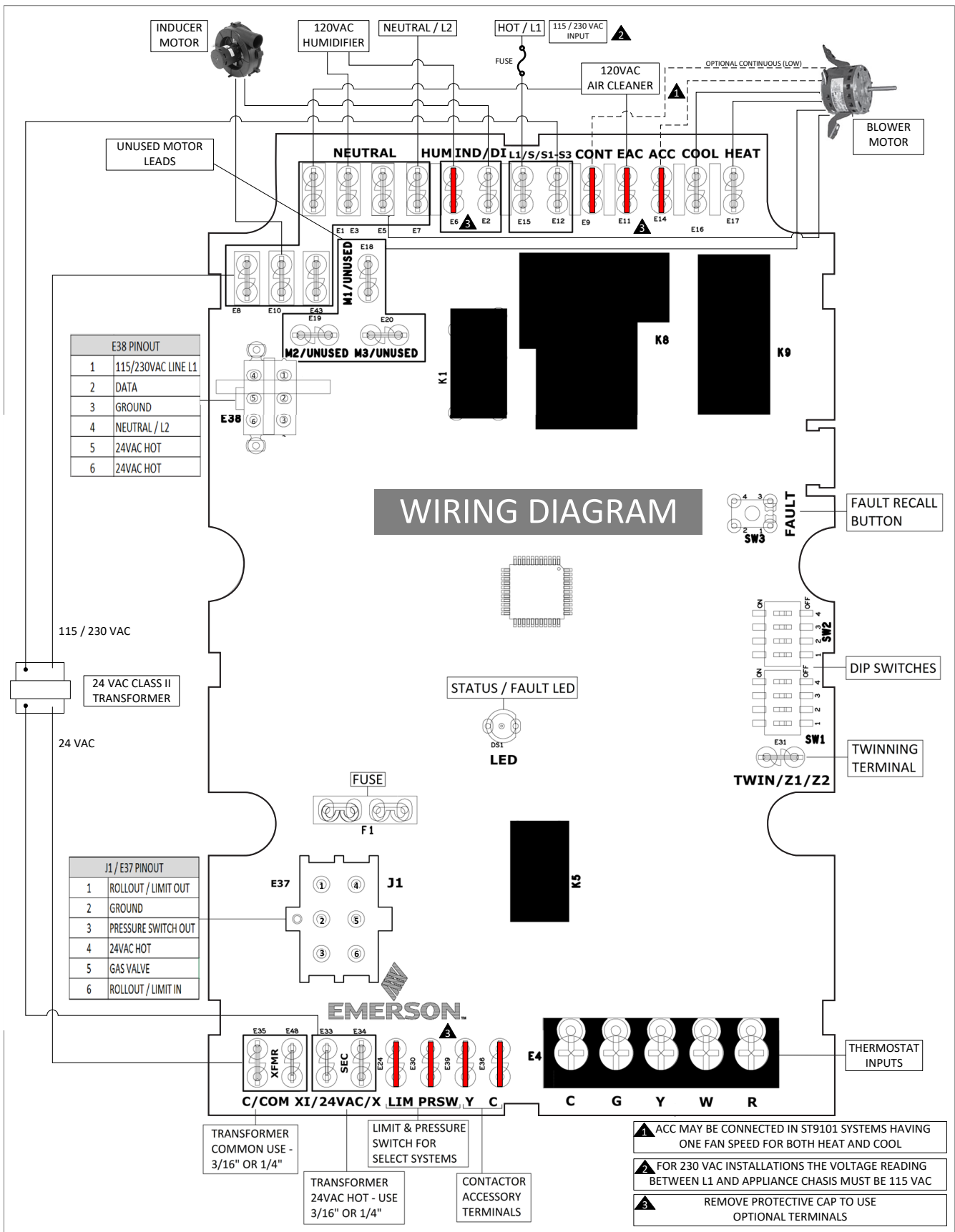
1. Disconnect electrical power and gas supply to unit, then remove unit access panels.
2. Mark and disconnect all wires from the existing control, then remove control. **TIP:** first take a picture or two for reference.
3. 50F06-843 can be mounted in any orientation. Select a location that will not damage, obstruct or place any stress on the terminations or harnesses.
4. Mount 50F06-843 in the unit using one of the two mounting tray options noted below. Be certain not to damage any components such as transformers, wire harness or blower wheels when drilling or installing screws.
5. Refer to **Table 1** and select the proper wire adapter(s) or jumper needed to replace the existing control board (if applicable).
6. Adjust Cool ON, Cool OFF, Heat ON, and Heat OFF delay dipswitches if needed per **Table 1** and “**Dipswitch Configuration**” section.
7. Reconnect all wires to 50F06 control board referencing “**Adapter Harnesses, Jumper Plug, and Wiring Notes**”, “**Wiring Diagram**”, and “**Blower, Accessory, and System Operation**” sections as needed.
8. Ensure all wires are secure to the control board and unused blower speed wires are attached to the M1, M2, M3 / Unused terminals. Apply wire ties as needed to secure wiring.
9. Install provided Troubleshooting Label in a suitable location for easy viewing.
10. Reinstall unit access panels and reconnect electric power and gas supply to the unit.
11. Verify unit operation in Heat, Cool, and Fan modes.

Corner Holes will match many existing OEM locations with no drilling required. Use 4 x 1” screws. Tray can also be used as template for drilling new locations if needed.



Universal Tab Drill Holes. Use tray as template and 2 x 1/2” screws for mounting.





Additional Notes:

- ST9101 systems (also ICM270/RS 695) have INDUCER MOTOR, HOT / L1, and NEUTRAL / L2 connected through adapter harness
- ST9141 systems have Limit and Pressure Switch connected through adapter harness to E24 (LIM) and E30 (PRSW) terminals
- ST9160 systems have INDUCER MOTOR connected to Gas Valve control

50F06-843 is equipped with a self-test routine that checks the functionality of the control, blower, and inducer to verify they are in proper working order. Ensure thermostat is turned OFF or thermostat wires are disconnected to enable.

ENTER SELF-TEST BY:

- Turn on power and/or manually close blower door switch
- Wait 1 second
- Slowly double-click "FAULT" button within ~3 seconds

SEQUENCE IS AS FOLLOWS:

- LED will flash in **red** the five last stored fault codes
- Afterward, the LED will slowly flash alternate colors (**red, amber, green**) to indicate Self-Test is active and continue until Self-Test is complete
- For **ST9160** furnaces using **E38** primary connector:
 1. Blower operates HEAT speed for 10 seconds

NOTE

Self-Test is available after power up and until a **solid green LED is present (5 seconds after power up)**. During this time, the control will ignore all active calls. If a **solid green LED is present, disconnect power for 10 seconds before starting Self-Test routine.**

2. Blower operates COOL speed for 10 seconds
 3. Blower shuts off and control goes to Standby
- For all **ST9101, ST9120, and ST9141** Furnaces using **J1** primary connector:
 1. Inducer operates for 7 seconds
 2. Blower operates HEAT speed for 10 seconds, inducer continues to run
 3. Blower operates COOL speed for 10 seconds, inducer is off
 4. Blower shuts off and control goes to Standby

BLOWER, ACCESSORY, AND SYSTEM OPERATION DETAILS

Action	System & Control Response - All Models
"Y" call for cool from thermostat	- Contactor is energized - Cool ON delay timer, then blower energized at COOL speed
"Y" call for cool removed	- Contactor is de-energized - Cool OFF delay timer, then blower is de-energized
"G" call for fan from thermostat	- Blower is energized without delay at HEAT speed (default) or at COOL speed (optional - if selected by dipswitch) - If a call for heat occurs, blower runs at HEAT speed - If a call for cool occurs, blower runs at COOL speed
"G" call for fan removed	- Blower is de-energized without delay
CONT continuous blower fan - option to connect blower low speed tap	- Always energized with no call for HEAT "W", COOL "Y", or FAN "G" - If blower operation is required for HEAT, COOL, or FAN then control switches to appropriate speed
EAC electronic air cleaner - optional line voltage accessory	- EAC terminal is energized with blower HEAT or COOL output, EAC is not energized when CONT blower terminal is energized
HUM humidifier - optional line voltage accessory	- HUM terminal is energized with inducer output
ACC single speed blower	- ACC terminal is energized with "Y" or "W" and is a convenience terminal for ST9101 systems using the same blower speed for HEAT and COOL

Action	System & Control Response – ST9101 & ST9120 Models
"W" call for heat from thermostat	- Inducer energized - Pressure switch makes - Ignition system energized - Gas valve opens, main burner lights - Heat ON delay timer, then blower energized at HEAT speed
"W" call for heat removed	- Ignition system de-energized, gas valve closes - 5 second postpurge timer, then inducer is de-energized - Heat OFF delay timer, then blower is de-energized

BLOWER, ACCESSORY, AND SYSTEM OPERATION DETAILS

Action	System & Control Response – ST9101 & ST9120 Models cont.
Limit switch string opens	<ul style="list-style-type: none"> - Ignition system is de-energized - Gas valve closes - Inducer energized, blower energized at HEAT speed - Red fault LED flashes once
Limit switch string remakes	<ul style="list-style-type: none"> - Inducer energized for 5 second postpurge timer - Blower remains energized for dipswitch selected HEAT off delay timer - Normal operation resumes

Action	System & Control Response - ST9141 Models
"W" call for heat from thermostat	<ul style="list-style-type: none"> - Pressure switch confirmed in no airflow position, otherwise Red fault LED flashes three times - Inducer energized - Pressure switch makes. If pressure switch shows no airflow >30 seconds Red fault LED flashes three times - Ignition system energized - Gas valve opens, main burner lights - Heat ON delay timer, then blower energized at HEAT speed
"W" call for heat removed	<ul style="list-style-type: none"> - Ignition system de-energized - Gas valve closes - 5 second postpurge timer, then inducer is de-energized - Heat OFF delay timer, then blower is de-energized
Primary limit switch string opens	<ul style="list-style-type: none"> - Ignition system is de-energized - Gas valve closes - Inducer de-energized, blower energized at HEAT speed - Red fault LED flashes twice
Primary limit switch string closes	<ul style="list-style-type: none"> - Blower de-energized after HEAT off delay timer - Normal operation resumes
Primary limit string open >150 seconds for 3 consecutive cycles	<ul style="list-style-type: none"> - Inducer, blower, and ignition system de-energized. Control lockout until 24VAC reset >10 seconds. Red fault LED flashes four times
Burner limit switch string opens	<ul style="list-style-type: none"> - Ignition system de-energized - Gas valve closes - Inducer energized, blower energized at HEAT speed - Red fault LED flashes once
Burner limit switch string remakes	<ul style="list-style-type: none"> - Inducer energized for 5 second postpurge timer - Blower remains energized for dipswitch selected HEAT off delay timer - Normal operation resumes

Action	System & Control Response - ST9160 Models
"W" call for heat from thermostat	<ul style="list-style-type: none"> - 50F06-843 control detects SVII system via data line at power up - Request for HEAT passed to SVII system control (gas valve) on data line - Main burner lights - Heat ON delay timer, then blower energized at HEAT speed
"W" call for heat removed	<ul style="list-style-type: none"> - Request for HEAT removed from SVII system control (gas valve) on data line - Heat OFF delay timer, then blower is de-energized
Limit switch opens at SVII system control (gas valve)	<ul style="list-style-type: none"> - Blower will remain energized at HEAT speed. Valve green LED flashes 4 times
Limit switch open condition removed at SVII system control (gas valve)	<ul style="list-style-type: none"> - Blower remains energized for dipswitch selected HEAT off delay timer. Normal operation resumes. Valve green LED displays bright/dim heartbeat

TROUBLESHOOTING, FAULT AND STATUS CODES

The LED will indicate fault or status codes as shown in the table below:

TROUBLESHOOTING								
GREEN LED FLASH	AMBER LED FLASH	RED LED FLASH	ERROR / CONDITION			SYSTEM TYPE		
Up to 5 flash codes stored in memory (auto-erased after 14 days)						ST9101 ST9120	ST9141	ST9160
		1	Limit switch, burner limit switch, or fuse is open			X	X	
		2	Primary limit switch is open				X	
		3	Pressure switch improperly closed, or open when inducer has been running >30 seconds				X	
		4	Overheated due to air not circulating (lockout). Three consecutive primary limit open events >150 seconds.				X	
		7	Wrong 24VAC supply condition <18VAC or >30VAC for more than 10 seconds. Not detected with fault 9. Operation resumes with 120 seconds proper voltage.			X	X	X
		8	Gas valve sensed energized when it should be off				X	
		9	Reversed 120VAC polarity / grounding			X	X	X
Other			Additional codes displayed on gas valve LED					X
Flash codes NOT stored in memory								
	Solid		ST9160 jumper missing, plug into connector J1					X
OFF	OFF	OFF	Check power / internal control fault			ALL		
Alternate	Alternate	Alternate	Self-test mode active					
Rapid			Control power up					
Solid			Standby					
Continuous			Fan only call (G)					
1			Call for cool (Y)					
	2		Call for heat (W)					
		6	Twinning error					
SELF-TEST - Power cycle control, press FAULT button 2x during rapid green flash FAULT RECALL - In standby, hold FAULT button < 5 seconds FAULT ERASE - In standby, hold FAULT button > 5 seconds but < 10 seconds CONTROL LOCKOUT RESET - Remove 24VAC power > 10 seconds								

FAULT RECALL

When the control is in Standby mode (no call for heat or cool), press the fault button for approximately 2 to 5 seconds or until the diagnostic LED turns off. Up to 5 fault codes are stored.

NOTE: While displaying the stored fault codes, the control will ignore any new call for heat, cool or fan.

FAULT CODE ERASE & RESET

When the control is in Standby mode (no call for heat or cool), press the fault button for 5 to 10 seconds or until the diagnostic LED begins to rapid flash.

NOTE: If the button is pressed for over 10 seconds the rapid flash will stop and the control will return to Standby.

CONTROL LOCKOUT RESET

Control automatically resets after 1 hour in lockout. Removing 24VAC power to the control for greater than 10 seconds will reset the control.

TWINNING

- Connect **Twin/Z1/Z2** terminal between two boards using an 18ga wire. Boards must be from same manufacturer.
- Board with thermostat connected has full functionality including LED and dipswitch settings. Twinned board will operate blower only simultaneously (LED showing Standby) unless "W" or "Y" are powered to it.
- Twinned unit can be wired for Heat by utilizing the "W" terminal either with the 1st unit or as a 2nd stage.

TECHNICAL SUPPORT: 1-888-725-9797

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