

Operator: Save these instructions for future use!

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

DESCRIPTION

The 50D50-843 is a universal replacement Spark control designed for maximum compatibility with existing systems.

It features:

- A card port and ten program keys to select the Safety Time, Retries, Prepurge and Recycle timings.
- A Jumper to accommodate systems using Direct Sense (sensing through ignitor) or Indirect Sense (using a Flame Sensor)
- LED indicator for quick system and module diagnostics and troubleshooting.



PRECAUTIONS

⚠ GENERAL PRECAUTION

Application of this type of control may cause flame rollout on initial startup and could cause personal injury and/or property damage.

Check product specification and cross reference before replacing existing module. Do not use if existing module is not listed. Use of a program key other than listed can result in appliance malfunction.

If in doubt about whether your wiring is millivolt, line, or low voltage, have it inspected by a qualified heating and air conditioning contractor or licensed electrician.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

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⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

This control is not intended for use in locations where it may come in contact with water. Suitable protection must be provided to shield the control from exposure to water (dripping, spraying, rain, etc.).

⚠ WARNING

Do not use on circuits exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

Do not short out terminals on gas valve or primary control to test. Short or incorrect wiring will damage thermostat and could cause personal injury and/or property damage.

SPECIFICATIONS

ELECTRICAL RATINGS:

Input Voltage: 18 to 30 VAC, 60 Hz

Current: 0.2 amp + MV + PV @ 25°C

Relay Contact Ratings:

Pilot Valve Relay: 1.5 amp @ 25 VAC 60 Hz

Main Valve Relay: 1.5 amp @ 25 VAC 60 Hz

Spark Output:

Gap: 0.1" - 0.2", 15kV 25Hz

Max cable length 3ft (0.9m)

Flame Current Requirements:

Minimum current to insure flame detection: 2 µA DC*

Maximum current for non-detection: 0.2 µA DC

Maximum allowable leakage resistance: 100 M ohms

* Measured with a DC microammeter in series with the flame probe lead

OPERATING TEMPERATURE RANGE:

-40° to 175°F (-40° to 80°C)

HUMIDITY RANGE:

To 95% relative humidity (non-condensing)

MOUNTING:

Surface mount or 4" x 4" junction box

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

Program Key Timing Specifications Quick Reference

Timing and Retry				
PROGRAM KEY (COLOR)	PRE-PURGE TIME	RESET TIME	RETRIES	SAFETY TIME
A (blue)	0 Sec.	300 Sec.	Continuous	90 Sec.
B (red)	30 Sec.	300 Sec.	Continuous	90 Sec.
C (green)	0 Sec.	300 Sec.	Continuous	30 Sec.
D (violet)	30 Sec.	300 Sec.	Continuous	30 Sec.
E (orange)	0 Sec.	300 Sec.	2	60 Sec.
F (yellow)	30 Sec.	300 Sec.	2	60 Sec.
G (blue/red)	0 Sec.	300 Sec.	Continuous	15 Sec.
H (red/green)	30 Sec.	N/A	N/A	Continuous
I (green/orange)	0 Sec.	300 Sec.	Continuous	4 Sec.
J (violet/blue)	30 Sec.	300 Sec.	Continuous	4 Sec.



Fig. 1 – Program Key installation/Jumper link for models with direct sense

INSTALLATION

MOUNTING AND WIRING

⚠ WARNING

Do not use on circuits exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete. Failure to earth ground the appliance or reversing the neutral and hot wire connection to the line can cause shock hazard.

Shut off main gas to heating system until installation is complete.

Route and secure all wiring as far from flame as practical to prevent fire and/or equipment damage.

NOTE

Replace control as unit – no user serviceable parts.

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

The control may be mounted in any orientation on a convenient surface using two #6 x 5/8" sheet metal screws. If desired, control can be mounted on a 4" x 4" junction box using two #8-32 x 5/8" machine screws. The control must be secured to an area that will experience a minimum of vibration and remain below the maximum ambient temperature rating of 175°F. The control is approved for minimum ambient temperatures of -40°.

Refer to the wiring diagrams and wiring table when connecting the control to other components of the system.

UL approved 105°C rated 18 gauge minimum wire is recommended for all low voltage connections. UL approved 105°C rated 16 gauge minimum wire is recommended for all line voltage connections.

After installation or replacement, follow appliance manufacturer's recommended installation/service instructions to insure proper operation.

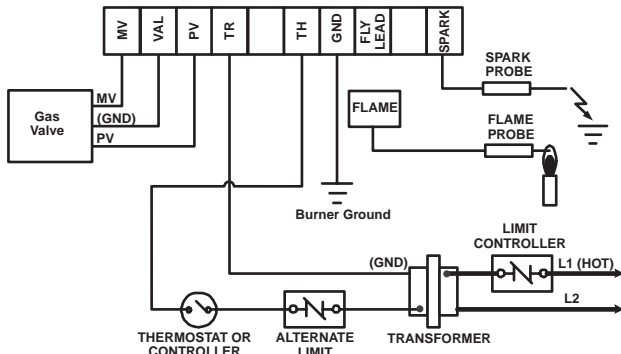


Fig. 2 – Typical hookup for White-Rodgers replacement with separate flame-sense and spark probes

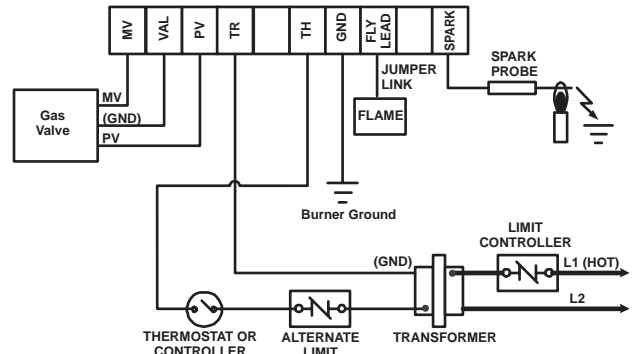


Fig. 3 – Typical hookup for White-Rodgers replacement with direct flame sense through single spark/sense probe

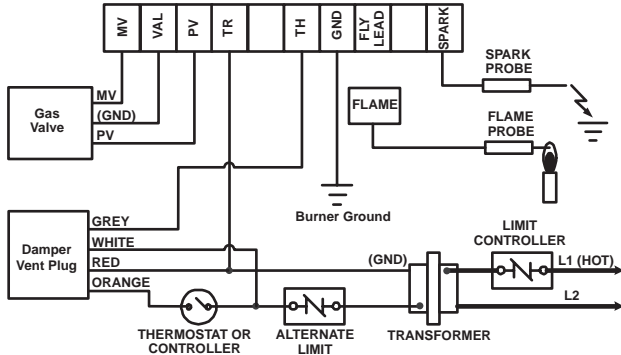


Fig. 4 – Typical hookup for White-Rodgers replacement with damper vent and separate flame-sense and spark probes

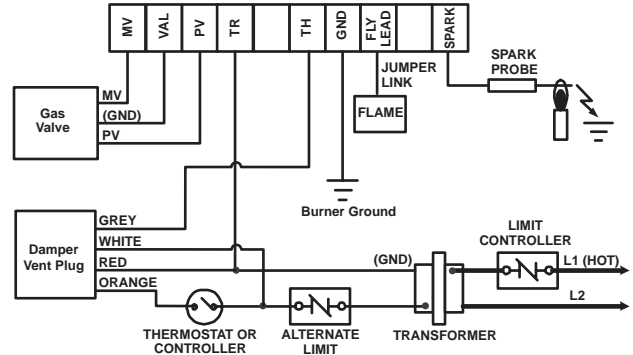


Fig. 5 – Typical hookup for White-Rodgers replacement with damper vent and direct flame sense through single spark/sense probe

NOTE: Max length of spark cable should be less than 3ft (0.9m) and rated at 15kV. The cable must not run in continuous contact with any metal surface or spark voltage is greatly reduced. Use ceramic or plastic standoff insulators as required. Ensure burner is grounded directly to module for spark return path.

INSTALL PROGRAM KEY

The control replaces all listed models with the following features:

- proven pilot spark ignition
- three or more ignition tries
- pre-purge of 30 seconds or less
- remote rod flame sense or direct flame sense through ignitor
- four to ninety second safety time

Ten program keys are provided for different applications. Timings and Retries for each program key are shown in the Specifications section on page 2 of this installation manual. Choose the proper program key for the application. Install the selected program key in the slot on the left side of the module (see figure 1) and fit the timing label on the cover.

If the module you are replacing is not listed in the table contact the manufacturer of the appliance for a recommended replacement or retrofit.

After inserting the proper program key, dispose of the remaining keys to ensure the correct key remains in the module. If control fails to operate see troubleshooting guide for remedy.

TABLE 2. Cross Reference for Program Key and Wiring Instruction

MANUFACTURER	MODEL	KEY	WIRING	MANUFACTURER	MODEL	KEY	WIRING
Camstat	IPI-24-00	A (blue)	Fig 2	Honeywell	S86D1005	A (blue)	Fig 3
Fenwal	05-203025-005	A (blue)	Fig 3	Honeywell	S86D1021	A (blue)	Fig 3
Fenwal	05-203026-005	A (blue)	Fig 3	Honeywell	S86E1002	A (blue)	Fig 3 / 5
Honeywell	S86A1001	A (blue)	Fig 3	Honeywell	S86E1010	A (blue)	Fig 3 / 5
Honeywell	S86A1019	A (blue)	Fig 3	Honeywell	S86E1028	A (blue)	Fig 3 / 5
Honeywell	S86A1027	A (blue)	Fig 3	Honeywell	S86E1036	A (blue)	Fig 3 / 5
Honeywell	S86A1035	A (blue)	Fig 3	Honeywell	S86E1044	A (blue)	Fig 3 / 5
Honeywell	S86B1009	A (blue)	Fig 3	Honeywell	S86E1051	A (blue)	Fig 3 / 5
Honeywell	S86B1017	A (blue)	Fig 3	Honeywell	S86E1069	A (blue)	Fig 3 / 5
Honeywell	S86B1025	A (blue)	Fig 3	Honeywell	S86E1077	A (blue)	Fig 3 / 5
Honeywell	S86C1007	A (blue)	Fig 3	Honeywell	S86E1101	A (blue)	Fig 3 / 5
Honeywell	S86C1015	A (blue)	Fig 3	Honeywell	S86E1119	A (blue)	Fig 3 / 5
Honeywell	S86C1031	A (blue)	Fig 3	Honeywell	S86E1127	A (blue)	Fig 3 / 5
Honeywell	S86C1049	A (blue)	Fig 3	Honeywell	S86F1000	A (blue)	Fig 3 / 5
Honeywell	S86C1056	A (blue)	Fig 3	Honeywell	S86F1018	A (blue)	Fig 3 / 5

TABLE 2. (contd.) Cross Reference for Program Key and Wiring Instruction

MANUFACTURER	MODEL	KEY	WIRING	MANUFACTURER	MODEL	KEY	WIRING
Honeywell	S86F1026	A (blue)	Fig 3 / 5	Johnson Controls	CSA46A-600R	C (green)	Fig 2 / 4
Honeywell	S86F1042	A (blue)	Fig 3 / 5	Johnson Controls	CSA48A-600R	C (green)	Fig 2 / 4
Honeywell	S86F1059	A (blue)	Fig 3 / 5	Johnson Controls	CSA49A-600R	C (green)	Fig 2 / 4
Honeywell	S86F1067	A (blue)	Fig 3 / 5	Johnson Controls	CSA49A-605R	C (green)	Fig 2 / 4
Honeywell	S86F1075	A (blue)	Fig 3 / 5	Johnson Controls	CSA51A-601R	C (green)	Fig 2 / 4
Honeywell	S86F1083	A (blue)	Fig 3 / 5	Johnson Controls	CSA52A-600R	C (green)	Fig 2 / 4
Honeywell	S86F1091	A (blue)	Fig 3 / 5	Johnson Controls	G60AAA-1	C (green)	Fig 2
Honeywell	S86G1008	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-1	C (green)	Fig 2
Honeywell	S86G1016	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-2	C (green)	Fig 2
Honeywell	S86G1032	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-3	C (green)	Fig 2
Honeywell	S86G1057	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-4	C (green)	Fig 2
Honeywell	S86G1073	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-5	C (green)	Fig 2
Honeywell	S86H1006	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-6	C (green)	Fig 2
Honeywell	S86H1022	A (blue)	Fig 3 / 5	Johnson Controls	G60AAG-7	C (green)	Fig 2
Honeywell	S86H1048	A (blue)	Fig 3 / 5	Johnson Controls	G60CAA-1	C (green)	Fig 2
Honeywell	S86H1089	A (blue)	Fig 3 / 5	Johnson Controls	G60CAA-3	C (green)	Fig 2
Honeywell	S86H1097	A (blue)	Fig 3 / 5	Johnson Controls	G60CAG-1	C (green)	Fig 2
Honeywell	S86H1105	A (blue)	Fig 3 / 5	Johnson Controls	G60CAG-2	C (green)	Fig 2
Honeywell	S86H1121	A (blue)	Fig 3 / 5	Johnson Controls	G60CAG-3	C (green)	Fig 2
Honeywell	S86H1147	A (blue)	Fig 3 / 5	Johnson Controls	G60CAG-4	C (green)	Fig 2
Honeywell	S90A1005	A (blue)	Fig 2 / 4	Johnson Controls	G60CAG-5	C (green)	Fig 2
Honeywell	S90B1003	A (blue)	Fig 2 / 4	Johnson Controls	G60CAG-6	C (green)	Fig 2
Honeywell	S90B1011	A (blue)	Fig 2 / 4	Johnson Controls	G60CAG-7	C (green)	Fig 2
Honeywell	S8600A1001	A (blue)	Fig 2 / 4	Johnson Controls	G60CAG-8	C (green)	Fig 2
Honeywell	S8600B1009	A (blue)	Fig 2 / 4	Johnson Controls	G60CAG-9	C (green)	Fig 2
Honeywell	S8600C1015	A (blue)	Fig 2 / 4	Johnson Controls	G60CBA-1	C (green)	Fig 2
Honeywell	S8600F1000	A (blue)	Fig 3 / 5	Johnson Controls	G60CBA-2	C (green)	Fig 2
Honeywell	S8600F1034	A (blue)	Fig 3 / 5	Johnson Controls	G60CBA-3	C (green)	Fig 2
Honeywell	S8600F1042	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-1	C (green)	Fig 2
Honeywell	S8600H1006	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-2	C (green)	Fig 2
Honeywell	S8600H1022	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-3	C (green)	Fig 2
Honeywell	S8600H1048	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-4	C (green)	Fig 2
Honeywell	S8600H1055	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-5	C (green)	Fig 2
Honeywell	S8600H1089	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-6	C (green)	Fig 2
Honeywell	S8600H1105	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-7	C (green)	Fig 2
Honeywell	S8600M1005	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-8	C (green)	Fig 2
Honeywell	S8600M1013	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-9	C (green)	Fig 2
Honeywell	S8600A1009	A (blue)	Fig 2 / 4	Johnson Controls	G60CBG-10	C (green)	Fig 2
Honeywell	S8610B1007	A (blue)	Fig 2 / 4	Johnson Controls	G60CBG-11	C (green)	Fig 2
Honeywell	S8610B1015	A (blue)	Fig 2 / 4	Johnson Controls	G60CBG-12	C (green)	Fig 2
Honeywell	S8610C1005	A (blue)	Fig 2 / 4	Johnson Controls	G60CBG-13	C (green)	Fig 2
Honeywell	S8610F1008	A (blue)	Fig 2 / 4	Johnson Controls	G60CBG-14	C (green)	Fig 2
Honeywell	S8610F1016	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-15	C (green)	Fig 2
Honeywell	S8610F1024	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-16	C (green)	Fig 2
Honeywell	S8610F1032	A (blue)	Fig 3 / 5	Johnson Controls	G60CBG-17	C (green)	Fig 2
Honeywell	S8610H1012	A (blue)	Fig 3 / 5	Johnson Controls	G60CCA-1	C (green)	Fig 2
Honeywell	S8610H1038	A (blue)	Fig 3 / 5	Johnson Controls	G60CCG-1	C (green)	Fig 2
Honeywell	S8610H1046	A (blue)	Fig 3 / 5	Johnson Controls	G60CPG-1	C (green)	Fig 2
Honeywell	S8610H1053	A (blue)	Fig 3 / 5	Johnson Controls	G60DBG-1	C (green)	Fig 2
Honeywell	S8610H1079	A (blue)	Fig 3 / 5	Johnson Controls	G60DCG-1	C (green)	Fig 2
Honeywell	S8610M1003	A (blue)	Fig 3 / 5	Johnson Controls	G60DCG-2	C (green)	Fig 2
Honeywell	S8610M1029	A (blue)	Fig 3 / 5	Johnson Controls	G60DCG-3	C (green)	Fig 2
Honeywell Generic	S8610u1003	A (blue)	Fig 2/3/4/5	Johnson Controls	G60DCG-4	C (green)	Fig 2
Honeywell	S8620H1002	A (blue)	Fig 3 / 5	Johnson Controls	G60PAG-1	C (green)	Fig 2
Honeywell	S8620H1028	A (blue)	Fig 3 / 5	Johnson Controls	G60PAG-2	C (green)	Fig 2
HSC	1003-3	A (blue)	Fig 2	Johnson Controls	G60PAG-3	C (green)	Fig 2
HSC	1003-300	A (blue)	Fig 2	Johnson Controls	G60PAG-4	C (green)	Fig 2
Johnson Controls	CSA35A-617R	C (green)	Fig 2	Johnson Controls	G60PAG-5	C (green)	Fig 2
Johnson Controls	CSA35A-618R	C (green)	Fig 2	Johnson Controls	G60PAG-6	C (green)	Fig 2
Johnson Controls	CSA42A-600R	C (green)	Fig 2	Johnson Controls	G60PAJ-1	C (green)	Fig 2 / 4
Johnson Controls	CSA42A-601R	C (green)	Fig 2	Johnson Controls	G60PAK-1	C (green)	Fig 2 / 4
Johnson Controls	CSA42A-602R	C (green)	Fig 2	Johnson Controls	G60PAK-2	C (green)	Fig 2 / 4
Johnson Controls	CSA42A-603R	C (green)	Fig 2	Johnson Controls	G60PFH-1	C (green)	Fig 2
Johnson Controls	CSA42A-604R	C (green)	Fig 2	Johnson Controls	G60PFH-2	C (green)	Fig 2
Johnson Controls	CSA43A-600R	C (green)	Fig 2	Johnson Controls	G60PFL-1	C (green)	Fig 2 / 4
Johnson Controls	CSA44A-600R	C (green)	Fig 2 / 4	Johnson Controls	G60PFQ-1	A (blue)	Fig 2 / 4
Johnson Controls	CSA45A-601R	C (green)	Fig 2 / 4	Johnson Controls	G60PVL-1	C (green)	Fig 2 / 4
Johnson Controls	CSA45A-602R	C (green)	Fig 2 / 4	Johnson Controls	G60QAG-1	C (green)	Fig 2
Johnson Controls	CSA46A-600R	C (green)	Fig 2 / 4	Johnson Controls	G60QAG-2	C (green)	Fig 2

TABLE 2. (cont.) Cross Reference for Program Key and Wiring Instruction

MANUFACTURER	MODEL	KEY	WIRING	MANUFACTURER	MODEL	KEY	WIRING
Johnson Controls	G770LHA-1	C (green)	Fig 2 / 4	Johnson Controls	Y79ABC-2	C (green)	Fig 2 / 4
Johnson Controls	G770LHA-2	C (green)	Fig 2 / 4	Johnson Controls	Y79ABC-3	C (green)	Fig 2 / 4
Johnson Controls	G770LHC-1	C (green)	Fig 2 / 4	Johnson Controls	Y79ABC-4	C (green)	Fig 2 / 4
Johnson Controls	G770MGA-1	C (green)	Fig 2	Johnson Controls	Y79ABC-5	C (green)	Fig 2 / 4
Johnson Controls	G770MGA-2	C (green)	Fig 2	Johnson Controls	Y79ABC-6	C (green)	Fig 2 / 4
Johnson Controls	G770MGA-3	C (green)	Fig 2	Johnson Controls	Y79ABC-7	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-1	C (green)	Fig 2	Johnson Controls	Y79ABD-1	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-2	C (green)	Fig 2	Johnson Controls	Y79ABCD-2	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-3	C (green)	Fig 2	Johnson Controls	Y79BBA-1	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-4	C (green)	Fig 2	Johnson Controls	Y79BBA-2	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-5	C (green)	Fig 2	Johnson Controls	G779	C (green)	Fig 2 / 4
Johnson Controls	G770MGC-6	C (green)	Fig 2	Robertshaw	780-001	A (blue)	Fig 2 / 3 / 4 / 5
Johnson Controls	G770MHA-1	C (green)	Fig 2 / 4	Robertshaw	780-002	A (blue)	Fig 2 / 3 / 4 / 5
Johnson Controls	G770MHA-2	C (green)	Fig 2 / 4	Robertshaw	780-003	F (yellow)	Fig 2 / 3 / 4 / 5
Johnson Controls	G770MHC-1	C (green)	Fig 2 / 4	Robertshaw	780-845	A (blue)	Fig 2 / 3 / 4 / 5
Johnson Controls	G770NGA-1	C (green)	Fig 2	Robertshaw	780-715	A (blue)	Fig 2
Johnson Controls	G770NGC-1	C (green)	Fig 2	Robertshaw	780-735	A (blue)	Fig 2
Johnson Controls	G770NGC-5	C (green)	Fig 2	Robertshaw	780-736	A (blue)	Fig 2
Johnson Controls	G770NGC-6	C (green)	Fig 2	Robertshaw	780-737	A (blue)	Fig 2
Johnson Controls	G770NGC-7	C (green)	Fig 2	Robertshaw	SP715	A (blue)	Fig 2
Johnson Controls	G770NHA-1	C (green)	Fig 2	Robertshaw	SP715A	A (blue)	Fig 2
Johnson Controls	G770NHC-1	A (blue)	Fig 2 / 4	Robertshaw	SP735	A (blue)	Fig 2
Johnson Controls	G770RGA-1	C (green)	Fig 2	Robertshaw	SP735D	A (blue)	Fig 2
Johnson Controls	G770RHA-1	C (green)	Fig 2 / 4	Robertshaw	SP735L	A (blue)	Fig 2
Johnson Controls	G770RHA-2	C (green)	Fig 2 / 4	Robertshaw	USI715U	A (blue)	Fig 2 / 3 / 4 / 5
Johnson Controls	G775GA-1	C (green)	Fig 2	White-Rodgers	50D49-350	A (blue)	Fig 2
Johnson Controls	G775RHA-1	C (green)	Fig 2 / 4	White-Rodgers	50D49-360	A (blue)	Fig 2
Johnson Controls	G775RHA-2	C (green)	Fig 2 / 4	White-Rodgers	50D49-361	B (red)	Fig 2
Johnson Controls	Y79ABC-1	C (green)	Fig 2 / 4	White-Rodgers	50D49-401	A (blue)	Fig 2

OPERATION

TYPICAL FURNACE INSTALLATION

In a typical application the 50D50-843 is designed to generate sparks and energize the gas valves and monitor the flame sensor. It is a 100% shut off design that locks out the gas valve if the burner does not light within the safety time. The ignition sequence begins with a call for heat from the room thermostat. The thermostat applies power to the control. After pre-purge interval, the pilot valve is energized and sparks are generated for the selected safety time. If the burner lights within the allowed period the pilot gas valve will remain open and the main valve will be energized until the call for heat is satisfied. If the burner does not light, the control will either continuously retry after the reset time or make two more ignition retries depending on the options selected. The control can be reset from lockout by cycling the thermostat to remove power for a minimum of 10 seconds. It includes a system analysis/troubleshooting LED that indicates normal operation, lockout, or control fault.

TROUBLESHOOTING

For proper control operation, the control must be electrically connected to the gas valve and all the ignition wiring connectors plugged in. Gas valves with an electric "ON/OFF" switch must have the switch set to "ON".

The light on the control provides a self-diagnosis indication. If the red light on the module is off continuously, the fault is likely to be internal to the module. To make sure, interrupt the line or 24 volt thermostat power for 10 seconds, check program key installation and then restore. If the internal fault is indicated again, and flame sensor is not shorted to ground, replace the control. A flashing light indicates the problem is most likely in the external components or wiring (see chart below). Proceed as follows:

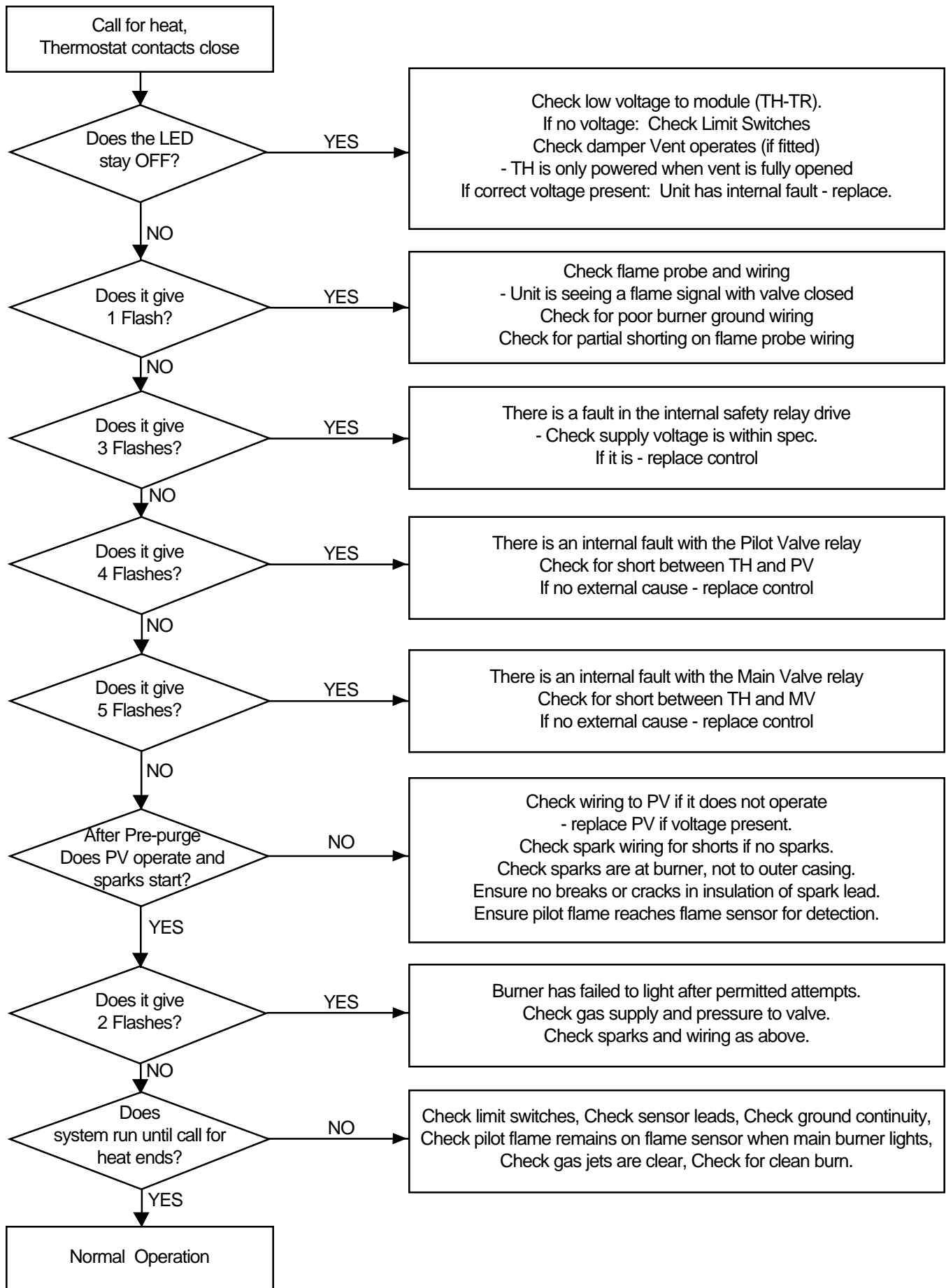
Visual checks

- 1) After the purge delay (if applicable) the pilot valve opens and the ignition (sparks) starts
- 2) The pilot burner flame will light
- 3) The ignition (sparks) stops and the main valve opens
- 4) The main burner flame will ignite

Troubleshooting the system consists of checking for these visual indications. The chart on the next page defines the proper action if any of these indications does not occur.

LED	Condition
Solid On	Normal - Control ON
One Flash	False flame signal
Two Flashes	No Flame Detected
Three Flashes	Safety Drive Fault
Four Flashes	PV Drive Fault
Five Flashes	MV Drive Fault
OFF	No Power / Internal Fault

TROUBLESHOOTING



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