

**Table 6. Conversion from Johnson Controls CSA — (All), G60, G65, G66, G67, G600, G670 and G770.**

Terminal Function	Replacement Control	Old Control				Procedural Notes
	S8610U	CSA45A-60R <sup>a</sup> , G60, G65, G66, G67, G600, or G670 Installation with Lockout Modules as follows:			G770	
		None (Y79)	Y79A module <sup>b</sup>	Y79A module <sup>c</sup>		
Main Valve Operator	MV	3	3	Y79B MV	MV (3)	—
Main Valve and Pilot Common	MV/PV	GR	GR	GR	GROUND (5)	—
Pilot Valve Operator	PV	1	1	Y79B PV	PV (1)	—
Burner Ground Connection	GND (BURNER)	GR	GR	GR	GROUND	—
Transformer Secondary (unswitched leg)	24V GND	GR	GR	GR	GROUND	—
Transformer Secondary (switched leg)	TH-W *	2 <sup>d</sup>	Y79 THS	2	TH-S (2)	—
	24V **	No Connection **	No Connection **	No Connection **	No Connection **	
Flame Sensor	SENSE *	4 <sup>e</sup>	4 <sup>e</sup>	4 <sup>e</sup>	SENSE (4) <sup>e</sup>	—
Igniter / Sensor	SPARK	IGN COIL	IGN COIL	IGN COIL	IGN COIL	It might be necessary to cut off the Rajah connector and/or attach an insulated, 1/4 inch quick connect.

<sup>a</sup> CSA code numbers (for example, CSA45A-600R) are equivalent to G600 and use the same wiring information tables.

<sup>b</sup> Discard wires between Y79A and module as follows: Red to 3, Black to 2, White to GR. Discard wire between transformer and 6.

<sup>c</sup> Discard wires between Y79B and module as follows: White to 3, Black to 1, Brown to GR. Discard wire between transformer and 6.

<sup>d</sup> Discard wire between transformer and terminal 5 (G60) or 6 (G600); otherwise, use existing harness for wiring.

<sup>e</sup> **Important:** Remove black jumper quick connect from Remote Sense terminal of S8610U. Cut jumper wire at circuit board and discard.

**\* IF INSTALLATION DOES NOT INCLUDE VENT DAMPER WITH PLUG CONNECTION TO MODULE:**

1. Connect the "Call for Heat" thermostat wire to the TH-W terminal.

**\*\* IF INSTALLATION INCLUDES VENT DAMPER WITH PLUG CONNECTION TO MODULE:**

1. Connect the vent damper's Molex connector to the vent damper connector (P1) on the module.
2. Connect the thermostat W wire to TH-W.
3. Run wire from switched leg of transformer secondary to both thermostat R and S8610U Module 24V terminals.

**Table 7. Conversion from Robertshaw SP715 and SP735C (includes 780-XXX and USI715U).**

Terminal Function	Replacement Control	Old Control <sup>a</sup>			Procedural Notes
	S8610U	7000D Valve <sup>b</sup>	7100D Valve	7100K Valve	
Main Valve Operator	MV	MV (to Valve TH)	MV (to Valve M)	MV (to Valve TR)	—
Main Valve and Pilot Common	MV/PV	MV/PV (to Valve TR)	MV/PV (to Valve C)	MV/PV (to Valve C and TH)	—
Pilot Valve Operator	PV	PV (to Valve Pilot*)	PV (to Valve P)	PV (to Valve Pick and Hold)	* This is the terminal, which is not jumpered to TR.
Burner Ground Connection	GND (BURNER)	GND	GND	GND	—
Transformer Secondary (unswitched leg)	24V GND	TR	TR	TR	—
	24V	No connection	No connection	No connection	
Transformer Secondary (switched leg)		E3 <sup>c</sup>	E3 <sup>c</sup>	E3 <sup>c</sup>	When supplied, E3 provides connection to Lockout Timer
	TH-W	TH	TH	TH	If LO-15 is part of the installation, use the wire disconnected from E1, which is tagged <i>Thermostat</i> .
Flame Sensor	SENSE <sup>d</sup>	e	d	d	—
Igniter / Sensor	SPARK	IGN	IGN	IGN	—

<sup>a</sup> 780-715 and USI 715U are equivalent to SP715; 780-735 and 780-737 are equivalent to SP735.

<sup>b</sup> On 7000D series valve, retain (or install) white jumper between valve TR and pilot solenoid.

<sup>c</sup> If LO-15 Lockout timer is not installed, E3 connector provided on SP715 is not used.

<sup>d</sup> **Important:** If the USI 715U with combination igniter-sensor is not used, remove black jumper quick connect from Remote Sense terminal of S8610U. Cut jumper wire at circuit board and discard.

<sup>e</sup> Labeled OPT. SENSOR on USI 715U. No external connection if combination igniter-sensor is used.

**NOTE:** Use existing wiring harness to make connections to S8610U per Table 7. **IMPORTANT**

*If installation includes LO-15 Lockout Timer, discard wires to E3 and TH. Disconnect and retain wire to LO-15 terminal E1. Tag wire, Thermostat. Discard LO-15.*

**Table 8. Conversion from Camstat, Fenwal, or HSC.**

Terminal Function	Replacement Control	Old Control			Procedural Notes
	S8610U	CAMSTAT IPI-24-00 <sup>a</sup>	FENWAL 05-20X <sup>b</sup>	HSC 1003-3 and 1003-300 <sup>a</sup>	
Main Valve Operator	MV	MV	MAIN VALVE	MV	—
Main Valve and Pilot Common	MV/PV	GND	GROUND	GND/COM	<b>Fenwal only:</b> run separate lead to S8610U valve common terminal, MV/PV.
Pilot Valve Operator	PV	PV	PILOT VALVE	PV	—
Burner Ground Connection	GND (BURNER)	GND	—	—	To assure a good ground, run separate wire from the pilot burner to the S8610U GND (BURNER) connector.
Transformer Secondary (unswitched leg)	24V GND	T2	GROUND	GND/COM	—
	24V	No connection	No connection	No connection	
Transformer Secondary (switched leg)	TH-W	T1	POWER	24 VAC	—
Flame Sensor	SENSE	S <sup>c</sup>	—	SENSOR <sup>c</sup>	—
Igniter / Sensor	SPARK	IGN	H.V.	IGN COIL	Strip module end of ignition cable as necessary and attach an insulated, 1/4 in. quick connect for the connection to the S8610U.

<sup>a</sup> Use existing wiring harness to make connections to S8610U.

<sup>b</sup> Tag all wires at the module connector with terminal designations. Cut wires at connector, attach quick connects, and connect to S8610U per Table 8.

<sup>c</sup> **Important:** Remove black jumper quick connect from Remote Sense terminal of S8610U. Cut jumper wire at circuit board and discard.

### Make Flame Sense Connection

For an ignition module used in remote flame sensing (separate igniter and sensor rods) applications, the sense jumper wire is not used. See Fig. 2 and Table 9 on page 11 and perform the following:

- Clip the sense jumper wire as close as possible to the base of the ignition control module and discard the clipped end.
- Attach the flame sensor wire from the Pilot burner/igniter to the REMOTE SENSE connector.

For an ignition module used in local flame sensing (single rod) applications, see Fig. 2 and Table 9 on page 11 and perform the following:

- Attach the sense jumper wire to the REMOTE SENSE connector.

### Connect Gas Control

Use No. 18 gauge solid or stranded wire. Use 1/4 in. female quick connects for control connections. Connect to gas control terminals as shown in wiring diagrams, using terminals appropriate to the gas control.

### Ground the Control System

The igniter, flame sensor, and ignition control module must share a common ground with the pilot burner. Use thermoplastic insulated wire with a minimum rating of 221°F (105°C) for the ground wire; asbestos insulation is not acceptable. If necessary, use a shield to protect the wire from radiant heat generated by the burner. Connect the ground wire as follows:

1. Fit one end of the ground wire with a female 1/4 in. quick-connect terminal and connect it to the male quick-connect BRN GND terminal on the ignition control module.
2. Strip the other end of the wire and fasten it under the pilot burner bracket mounting screw. If necessary, use a shield to protect the ground wire from radiant heat.
3. The pilot burner serves as the common grounding area. If there is not good metal-to-metal contact between the pilot burner and ground, run a lead from the pilot burner to ground.

NOTE: Earth ground is not required.

### Wiring Connections

Use Fig. 2 and Table 9 to make the remaining wiring connections. Fig. 3–Fig. 5 beginning on page 12 illustrate typical wiring connections in heating systems with atmospheric burners and with power-assisted combustion.

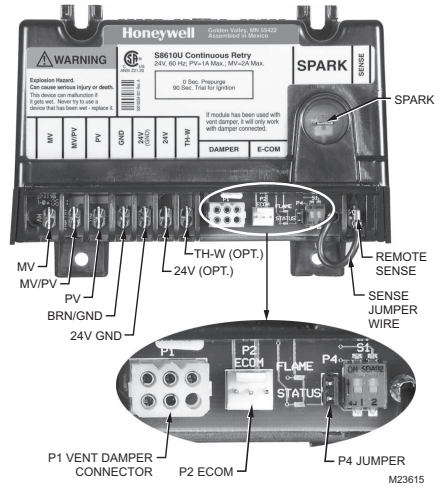


Fig. 2. Typical wiring connections.

Table 9. Typical Wiring Connections.

Connector Label	Size or Type	Description
MV	1/4 inch	Main Valve connection
MV/PV	1/4 inch	Common terminal for gas valves
PV	1/4 inch	Pilot Valve connection
BRN GND	1/4 inch	Burner Ground
24V GND	1/4 inch	Return path to transformer
24V	1/4 inch	Optional—24 Vac power connection for Vent Damper
TH-W	1/4 inch	Connector for "Call for Heat" signal from thermostat
P1	6-pin keyed plug	Connector for Vent Damper connection (used to control a connected damper in atmospheric appliances)
P2 ECOM	3-pin	EnviraCOM™ communications connector
P4 (Jumper)	Jumper	Provides a lockout for the DIP switch settings (See "Jumper" on page 15.)
SENSE JUMPER WIRE	Wire with 3/16 inch quick connect	Connects to the REMOTE SENSE connector for installations with a single spark rod (local flame sensing)  NOTE: For installations with remote flame sensing (separate spark and sensor rods), this jumper wire is clipped as close to the circuit board as possible and the wire is discarded.
REMOTE SENSE	3/16 inch	Flame Sensor connector  For single rod installations, connect the SENSE JUMPER WIRE to this terminal connector.  For dual rod installations, connect the flame sense wire from the burner/igniter to this terminal connector.
SPARK	1/4 inch	High voltage sparking electrode