



ICM290A

Low cost, replacement ignition control



- Universal intermittent pilot gas ignition control
- Patented circuitry for enhanced operation
- Provides ignition sequence, flame monitoring and safety shutoff for single/dual rod intermittent pilot control applications
- For gas fired furnaces, boilers and other heating applications
- Switch selectable pre-purge and ignition trials with permanent lock
- Works with or without vent damper connected
- Works with both Natural and LP gas systems

Installation, Operation & Application Guide

For more information on our complete range of American-made products – plus wiring diagrams, troubleshooting tips and more, visit us at www.icmcontrols.com



Specifications

Operating Temperature:

- Minimum ambient temperature rating is -40°F (-40°C)
- Maximum ambient rating when used with 2.0 A main valve is 165°F (74°C)

Status LEDs:

- Green Status provides system status and error codes
- Yellow Flame LED indicates flame presence and flame strength

Control Voltage: Line 24 VAC (18-30 VAC) 50/60 Hz

Flame Current: Typical

Anticipator Setting: 0.3 A plus valve load @ 24 VAC

Trial for Ignition: See Table 1 on reverse side

Prepurge: See Table 1 on reverse side

Flame Failure Response Time: 2 seconds maximum

Typical Gas Control: Honeywell models VR8204 and VR8304

Relative Humidity: 0% to 95% non condensing

Note: The ICM290A flame sensor operates off of 24 VAC directly; flame currents of less than one micro ampere are typical.

Application

The ICM290A Universal Intermittent Pilot Gas Ignition Control Module replaces many popular flame rectification type of intermittent pilot ignition (IPI) modules, including those manufactured by Honeywell, Robertshaw, and Johnson Controls. Replaces modules that feature:

- Natural or LP gas
- With or without integral damper connector
- Non-100 percent shutoff, 100 percent shutoff/lockout, or 100 percent shutoff/continuous retry
- Pilot burners with flow rates of 1,500 Btu/h or less
- Single (local sense) or dual (remote sense) rod flame sensing
- Shutoff/lockout times of 15 seconds or longer
- Prepurge configurable to 30 seconds or no prepurge

For more details on the key features included in the ICM290A control, as well as a cross reference list of controls that the ICM290A will replace, please see Table 1 and Table 2 on the back of this guide, or visit our web site at www.icmcontrols.com.

Package Contents

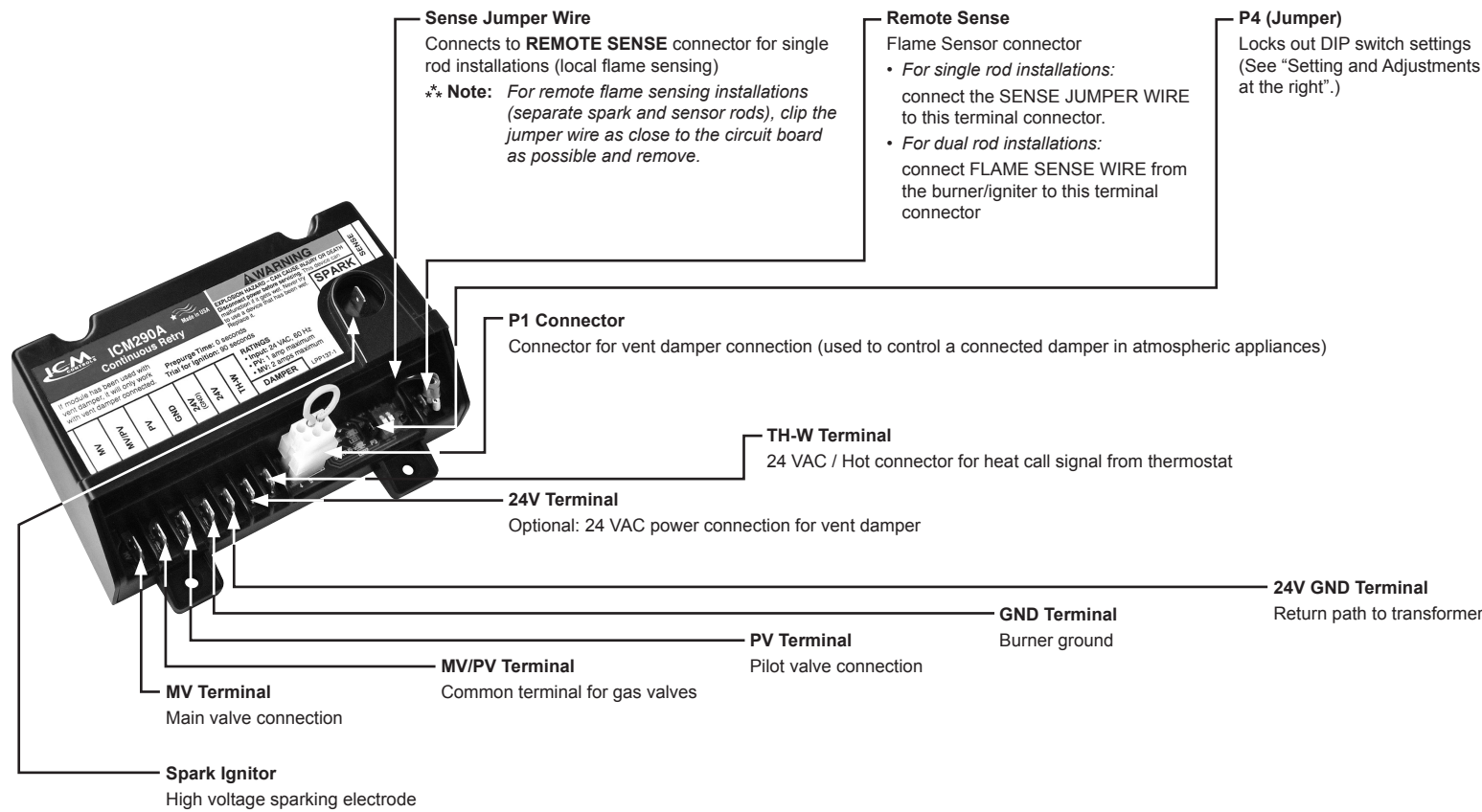
The following is included in the package with the ICM290A control:

- Easy-to-use instructions
- Accessories required to adapt the existing spark cable (Rajah adapter) to the spark terminal on the control module
- Fault code LED label to affix to the appliance

The ICM290A control also features the following:

- High voltage spark, pilot burner ignition control
- Flame rectification circuit for monitoring flame presence
- Monitoring of 24 VAC, pilot, and main gas valve
- Two status LEDs to aid in operation and troubleshooting
- Vent Damper connection

ICM290A Typical Wiring Connections



Mounting and Installation

- If possible, mount the ICM290A control in the same position and using the same mounting holes as the unit you are replacing. If you need to reposition the control, mount the ICM290A using four screws and at a distance no greater than 3 ft. away from the pilot burner and in a place that allows for the most direct spark cable route.
- Connect the thermostat wire (used for a heat call) to the TH-W terminal. The heat call powers the unit.
- Connect common from the control transformer to 24V GND terminal
- Make the remaining PV, MV/PV and MV gas control connections to the appropriate terminals on the control module

Spark cable specifications

- Spark Cable Length: 36" maximum
- Spark Cable Voltage Rating: >10,000 (preferably higher)
- To ensure maximum spark voltage, plastic or ceramic insulators should be used to ensure the spark cable does not come in direct contact with a metal surface
- If necessary, use the Rajah adapter to make the connection to the spark terminal on the control module
- For added safety, both ends of the spark cable should be protected with insulated boots

Grounding

- Make a ground connection from burner bracket mounting screw to BRN GND terminal on the board

Burner

- Ensure that the spark gap is close to 1/8 in.

Pilot flame

- Make sure it is blue, steady and envelopes 3/8 to 1/2 in. of the flame rod. If necessary adjust pilot flame by turning the pilot adjustment screw on the gas control

Damper

- If part of the system, plug the damper cable to P1 connector on the control module
- If the plug is removed and the vent damper connector is plugged in instead, then an internal fuse will blow on power up. The control will not operate without a vent damper or with the plug.
- Connect 24 VAC hot from the control transformer to 24V terminal on the control module when the Damper assembly is used

Operation

Trial for Pilot Ignition

1. When the thermostat initiates a call for heat, the spark source and the pilot valve relay become energized.
2. The pilot valve opens; gas flows to the pilot burner for the ignition trial time.
3. The control module initiates a spark and attempts to light the pilot flame.
4. A flame rectification circuit checks for the presence of the pilot flame.
5. Upon flame detection, the spark source is shut off and the main valve relay is energized.

Main Burner Operation

1. The main valve opens, allowing gas to flow to the main burner. Here, the pilot flame ignites the gas.
** Note: A short delay occurs when main valve opens in order to allow the pilot flame to stabilize as the main gas lights.
2. With the system in run mode, the flame rectification circuit will continuously monitor for the presence of the pilot flame.
3. In the event of pilot flame loss, the ICM290A will shut off both the pilot valve relay and the main valve relay for 100% gas shutoff.

Failed Trial for Pilot Ignition

1. The ICM290A is designed to operate with multiple trials for ignition (TFI).
2. When no pilot flames is sensed during the TFI period, the ignition control shuts off the spark and pilot gas (100% shutoff).
3. The control will enter a five-minute lockout period before the next TFI cycle will begin.
** Note: Continuous TFI attempts will be made until a flame is sensed or the call for heat is satisfied.

While NOT recommended, the five-minute lockout period can be bypassed by manually ending the call for heat or removing and restoring system power.

ICM290A Settings and Adjustments

Settings and Adjustments

DIP Switch (S1) Settings:

- Many ignition controls may be replaced with the ICM290A control. The DIP switch settings for the most popular competitive models can be found in Table 2 on the reverse side of this guide.
- The table to the right shows lockout control of DIP switch timing settings.
- **WARNING:** Ignition control should not be powered before setting the DIP switches.

Prepurge and Trial for Ignition Parameters

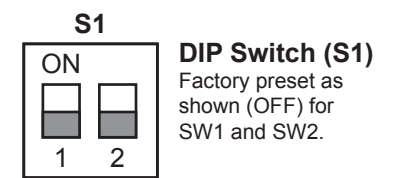
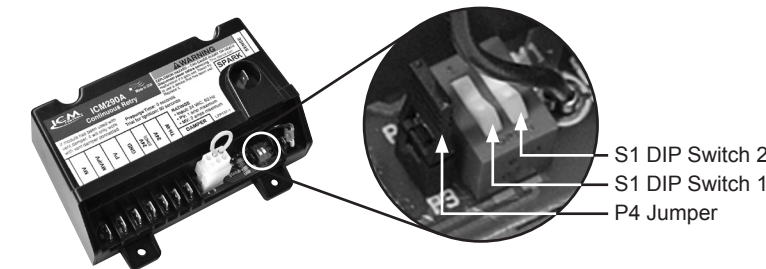
- Table to the right displays preferred times for Prepurge (SW1) and Trial for Ignition (SW2).

Jumper	Action to lock the control's operating sequence
P4	The P4 Jumper locks in the operating sequence selected by the DIP switch settings. Following installation and checkout, pull the P4 jumper to lock the DIP switch settings and ensure proper system operation. ** Note: For safety, the ignition control locks the DIP switch settings after the 10th "heat call" cycle regardless of the jumper being removed.

IMPORTANT: Reinstalling the jumper once it has been removed and/or the DIP switch settings have been locked will not reset the DIP switch settings.

Prepurge	Trial For Ignition	SW1	SW2
None	90 seconds	OFF	OFF
30 seconds	90 seconds	ON	OFF
None	15 seconds	OFF	ON
30 seconds	15 seconds	ON	ON

** Note: The default factory settings are in bold.



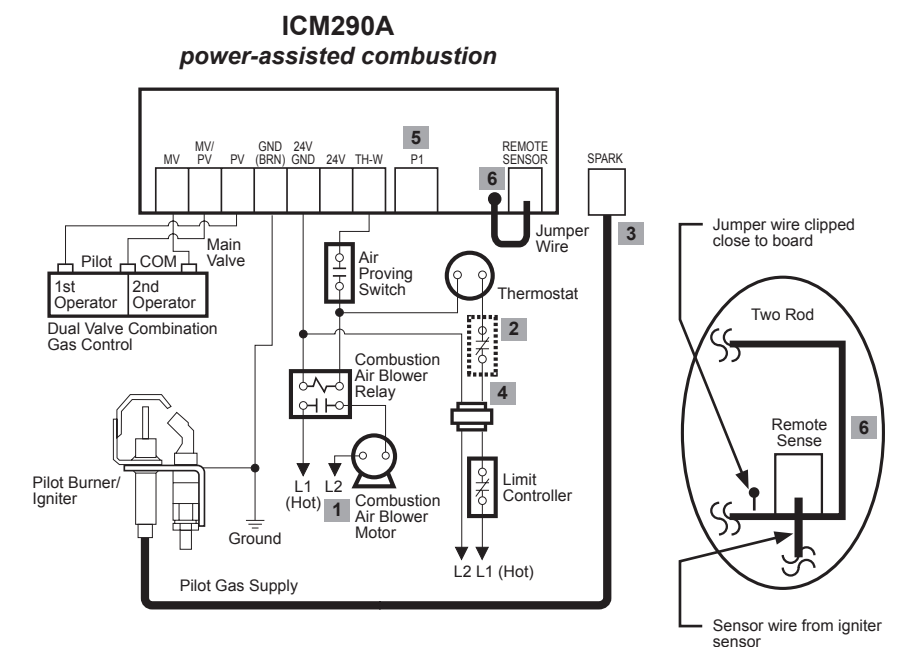
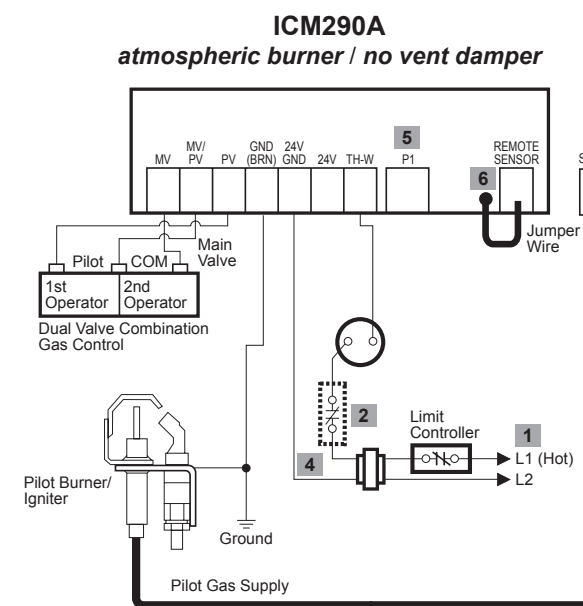
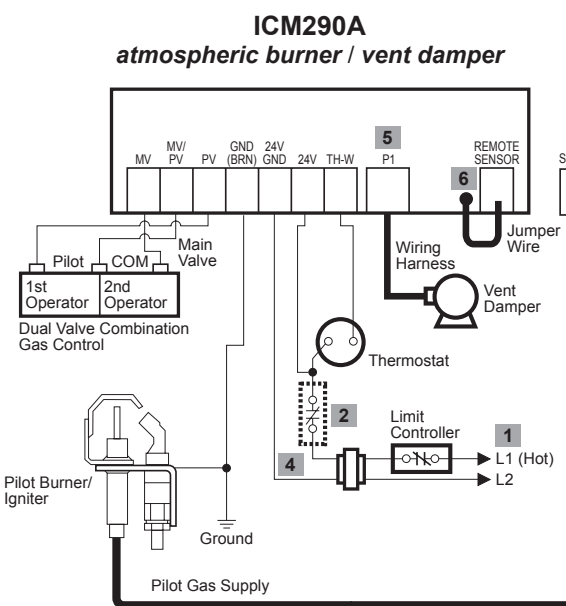
Wiring Diagrams

- 1 Power supply – provide disconnect means and overload protection as required.
- 2 Alternate limit controller location.
- 3 Maximum cable length: 3 Ft. [0.9 M].
- 4 Controls in 24V circuit (**NOTE:** must not be in ground leg to transformer).

- 5 Substitute board plug with damper plug in a system with a vent damper.
- 6 Jumper Wire:

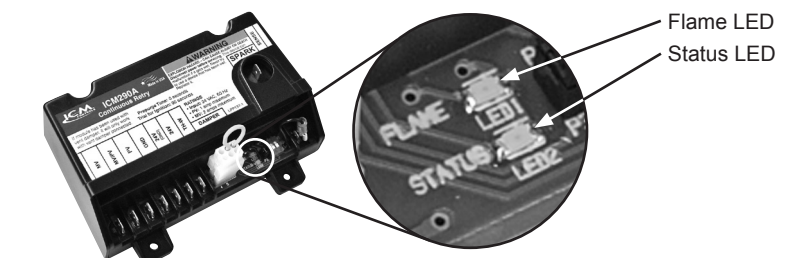
For single rod applications: connect to remote sense connector.

For dual rod applications: remove (clip as close to board as possible) and discard; firmly attach sensor wire from the igniter/sensor assembly to remote sense connector.



Flame and Status LED Locations

The ICM290A has two LEDs; one for flame sensing (Yellow) and one for system status (Green). Refer to the Flame Code charts on the reverse side of this application for more details.



Yellow and Green LED Status Codes

Yellow LED Flame Strength Codes

Yellow LED Flash Code*	Indicates	Recommended Service Action
Steady (1/2 sec.)	Flame signal OK	N/A
2	<ul style="list-style-type: none"> Flame signal is weak May also show for few seconds on pilot flame light off 	Routine maintenance is recommended to prolong system work without service-clean the flame rod, ensure steady pilot flame and enveloping the flame rod
1	<ul style="list-style-type: none"> Flame signal is marginal May also show for few seconds on pilot flame light off 	Maintenance is recommended to avoid service in a near future-clean the flame rod, ensure steady pilot flame and enveloping the flame rod, ensure good burner ground connection and flame sense wiring
OFF	Flame signal is below threshold	Check for burner ground connection and flame sense wiring, clean the flame rod, ensure steady pilot flame and enveloping the flame rod

- * **Flash Code Key:**
 – Steady: Constant ½ second bright.
 – LED flashes “X” times, followed by two seconds off before sequence repeats.

Green LED Flame Codes

Green LED flash Code (X+Y)	Indication	Recommended Service
OFF	No call for heat from the thermostat	N/A
Steady (1/2 sec.)	Heat call, normal operation	N/A
2	Flame wasn't sensed during trial for ignition-unit in five minute retry period	Remove the heat call and check the following: burner gas supply, spark wiring, flame sense wiring, and burner ground to unit GND connection. Clean the flame rod. Initiate a call for heat and ensure a steady pilot flame enveloping the flame rod
3	Flame out during run mode	Ensure steady pilot flame enveloping the flame rod. Check burner ground to unit GND connection. Clean the flame rod.
4	Flame out of sequence	<ul style="list-style-type: none"> Replace gas valve if pilot flame is present Recycle call for heat. Replace the unit if pilot flame is not present and unit senses flame
5	Damper related error: - Required but not present - Failed to open within a minute - Failed to close within a minute	<ul style="list-style-type: none"> Check 24 VAC connection to 24V on the unit and damper connection Remove the heat call, pause for a minute, and apply the heat call. If problem persists replace the damper
7	Flame rod grounded or leakage to ground	Check flame sense lead wire for isolation from ground. Check flame rod ceramic body for damages or cracks
8	Low control voltage (below 19 VAC)	Check transformer voltage when fully loaded. Ensure 24 VAC between TH-W and GND when pilot and main valve are closed
6+2	Flame wasn't sensed for three consecutive trials for ignition on the same call for heat- unit in five minute retry period	Same as for 2 above
6+3	Flame out during run mode six times on a same call for heat	Same as for 3 above
6+4	Flame out of sequence for longer than 10 seconds	Same as for 4 above
Constant ON	Error not listed above detected during self-test diagnostic check	Control can be RESET by initiating a "Heat Call". If problem persists, control should be replaced.

- * **Flash Code Key:**
 – Steady: Constant ½ second bright.
 – Single Flash Code: LED flashes “X” times followed by two seconds off, before sequence repeats.
 – X + Y Flash Code: LED flashes “X” times followed by two seconds off, then flashes “Y” times followed by three seconds off, before the sequence repeats.

Table 1 – ICM290A Universal Intermittent Pilot Gas Ignition Controls

Igniter-Sensor Type	Valve Current Rating @ 24 VAC	Prepurge Timing	Trial for Pilot Ignition	Ignition Sequence Type	Ignition Sequence (after prepurge if prepurge is selected)	Integral Damper Connector
Combination (single rod; local flame sensing), or Separate (dual rod; remote flame sensing).	1.0 A Pilot, and, 2.0 A Main	None or 30 seconds (field selectable)	15 or 90 seconds (field selectable)	Retry	Spark / pilot gas ON until light off or trial for ignition (TFI) ends: <ul style="list-style-type: none"> Pilot gas and spark OFF (100% shutoff) if pilot fails to light; unit enters five minute lockout before a new TFI is initiated. This sequence continues until light off, or heat call ends. Trial for ignition restarts immediately if established flame is lost. 	Included for use as needed: <ul style="list-style-type: none"> If initially installed with damper attached, unit must always have a vent damper connected.

Table 2 – ICM290A Replaces the follow controls:

Camsat			
Vendor / Model	SW1	SW2	
IP1-24-00	OFF	OFF	

Fenwall			
Vendor / Model	SW1	SW2	
05-203025-005, 05-203026-005	OFF	OFF	

Honeywell			
Vendor / Model	SW1	SW2	
S86A1001, S86A1019, S86A1027, S86A1035, S86B1009, S86B1017, S86B1025, S86C1007, S86C1015	OFF	OFF	
S86C1023	OFF	ON	
S86C1031, S86C1049, S86C1056, S86D1005	OFF	OFF	
S86D1013	OFF	ON	
S86D1021, S86E1002, S86E1010, S86E1028, S86E1036, S86E1044, S86E1051, S86E1069, S86E1077, S86E1101, S86E1119, S86E1127, S86F1000, S86F1018, S86F1026, S86F1042, S86F1059, S86F1067, S86F1075, S86F1083, S86F1091, S86G1008, S86G1016	OFF	OFF	
S86G1024	OFF	ON	
S86G1032, S86G1057, S86G1073, S86H1006	OFF	OFF	
S86H1014	OFF	ON	
S86H1022, S86H1048, S86H1055	OFF	OFF	
S86H1063	OFF	ON	
S86H1089, S86H1097, S86H1105	OFF	OFF	
S86H1113	OFF	ON	
S86H1121	OFF	OFF	
S86H1139	OFF	ON	
S86H1147, S90A1005, S90B1003, S90B1011	OFF	OFF	
S860C1000, S860D1009	ON	OFF	
S860D1017	ON	ON	
S8600A1001, S8600B1009	OFF	OFF	
S8600B1025, S8600B3005	OFF	ON	
S8600B3013, S8600C1015, S8600C3003, S8600F1000, S8600F1034, S8600F1042, S8600H1006	OFF	OFF	
S8600H1014	OFF	ON	
S8600H1022, S8600H1048, S8600H1055	OFF	OFF	
S8600H1063	OFF	ON	
S8600H1071, S8600H1089, S8600H1097, S8600H1105, S8600H3002	OFF	OFF	
S8600H3010	OFF	ON	
S8600M1005, S8600M1013, S8600M1021, S8600M2003, S8600M3001, S8600M4009, S8610A1009, S8610B1007, S8610B1015	OFF	OFF	
S8610B1023, S8610B3003	OFF	ON	
S8610C1005, S8610C1013, S8610C3001, S8610F1008, S8610F1016, S8610F1024, S8610F1032	OFF	OFF	
S8610H1004	OFF	ON	
S8610H1012	OFF	OFF	
S8610H1020	OFF	ON	
S8610H1038, S8610H1046, S8610H1053	OFF	OFF	
S8610H1061	OFF	ON	
S8610H1079, S8610H1095, S8610H3000	OFF	OFF	
S8610H3018	OFF	ON	
S8610H3026, S8610M1003	OFF	OFF	
S8610M1011	OFF	ON	
S8610M1029, S8610M3009	OFF	OFF	
S8610M3017	OFF	ON	
ICM2901003, ICM2901011	OFF	OFF	
S8620C1003, S8620C1011	OFF	ON	
S8620H1002	OFF	OFF	
S8620H1010	OFF	ON	
S8620H1028	OFF	OFF	
S8660D1002	ON	OFF	
S8660D1010	ON	ON	
S8660J1008, S8660J1016, S8660J1024, S8660K1006, S8660K1014, S8660K1022, S8670D1000, S8670D1018	ON	OFF	
S8670D1026, S8670D3006	ON	ON	
S8670D3014, S8670E1007, S8670E3003	ON	OFF	
S8670J3002	ON	ON	
S8670J3010, S8670K3000	ON	OFF	
S8680J1004	ON	ON	

HSC			
Vendor / Model	SW1	SW2	
1003-3, 1003-300	OFF	OFF	

Johnson Controls			
Vendor / Model	SW1	SW2	
CSA35A-617R, CSA35A-618R, CSA42A-600R, CSA42A-601R, CSA42A-602R, CSA42A-603R, CSA42A-604R, CSA43A-600R, CSA44A-600R, CSA45A-601R, CSA45A-602R, CSA46A-600R, CSA48A-600R, CSA49A-600R, CSA49A-605R, CSA51A-601R, CSA52A-600R	OFF	OFF	
G60AAA-1, G60AAG-1, G60AAG-2, G60AAG-3, G60AAG-4, G60AAG-5, G60AAG-6, G60AAG-7, G60CAA-1, G60CAA-3, G60CAG-1, G60CAG-2, G60CAG-3, G60CAG-4, G60CAG-5, G60CAG-6, G60CAG-7, G60CAG-8, G60CAG-9, G60CBA-1, G60CBA-2, G60CBA-3, G60CBG-1, G60CBG-2, G60CBG-3, G60CBG-4, G60CBG-5, G60CBG-6, G60CBG-7, G60CBG-8, G60CBG-9, G60CBG-10, G60CBG-11, G60CBG-12, G60CBG-13, G60CBG-14, G60CBG-15, G60CBG-16, G60CBG-17, G60CCA-1, G60CCG-1, G60CPG-1, G60DBG-1, G60DCG-1, G60DCG-2, G60DCG-3, G60DCG-4, G60PAG-1, G60PAG-2, G60PAG-3, G60PAG-4, G60PAG-5, G60PAG-6, G60PAJ-1, G60PAK-1, G60PAK-2, G60PFH-1, G60PFH-2, G60PFL-1, G60PFQ-1, G60PVL-1, G60QAG-1, G60QAG-2, G60QAG-3,	OFF	OFF	
G60QAG-4, G60QAK-1, G60QBG-1, G60QBG-2, G60QBG-3, G60QBG-4, G60QBG-5, G60QBG-6, G60QBG-7, G60QBG-8, G60QBG-9, G60QBH-1, G60QBK-1, G60QBK-2, G60QBL-1, G60QBL-2, G60QCG-1, G60QCL-1, G60QCL-2, G60QDL-1, G60QDL-2, G60QDL-3, G60QDL-4, G60QDL-5, G60QDL-6, G60QDL-7, G60QDL-8, G60QDL-9, G60QDL-10, G60QDL-11, G60QDL-12, G60QDL-13, G60QDL-14, G60QDL-15, G60QDL-16, G60QDL-17, G60QDL-18, G60QDL-19, G60QDL-20, G60QDL-21, G60QDL-22, G60QDL-23, G60QDL-24, G60QDL-25, G60QDL-26, G60QDL-27, G60QDL-28, G60QDL-29, G60QDL-30, G60QDL-31, G60QDL-32, G60QDL-33, G60QDL-34, G60QDL-35, G60QDL-36, G60QDL-37, G60QDL-38, G60QDL-39, G60QDL-40, G60QDL-41, G60QDL-42, G60QDL-43, G60QDL-44, G60QDL-45, G60QDL-46, G60QDL-47, G60QDL-48, G60QDL-49, G60QDL-50, G60QDL-51, G60QDL-52, G60QDL-53, G60QDL-54, G60QDL-55, G60QDL-56, G60QDL-57, G60QDL-58, G60QDL-59, G60QDL-60, G60QDL-61, G60QDL-62, G60QDL-63, G60QDL-64, G60QDL-65, G60QDL-66, G60QDL-67, G60QDL-68, G60QDL-69, G60QDL-70, G60QDL-71, G60QDL-72, G60QDL-73, G60QDL-74, 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