Series 35-9X Modulating Platform Ignition Module (PIM®)

FENWAL CONTROLS

F-35-2000
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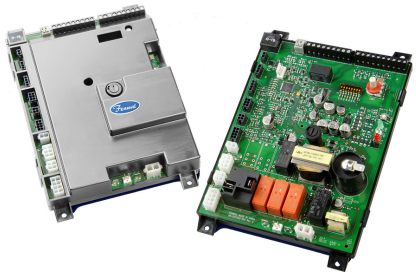
OPERATION AND INSTALLATION INSTRUCTIONS

DESCRIPTION

The Fenwal Controls Platform Ignition Module (PIM®) integrates the functions of Automatic Ignition Control with temperature regulating and control functions. The PIM is designed for a range of hydronic boilers including both staged systems and modulating types. The PIM can be configured as a direct spark ignition (DSI), intermittent pilot (IP) or Hot Surface Ignition (HSI) to provide safe lighting and supervision of the burners in an appliance. The PIM is also designed to connect to and receive commands from the tekmar®[1] Host Controller. When connected to a Host Controller, the PIM offers expanded control functionality including Domestic Hot Water, outdoor reset, diagnostic messages, and other system capabilities.



APPLICATIONS

The PIM and Host Controller system is suited to a wide variety of gas-fired hydronic heating systems including:

- High-efficiency Modulating Condensing Boilers
- Fan-assisted single and multi-staged Boilers
- Multiple Boiler Installations using intelligent sequencing
- Intermittent Pilot based Hydronic appliances
- Water Heaters
- Pool and Spa Heaters

AGENCY APPROVALS

CSA Design certified to ANSI Z21.20, CAN/CSA C22.2 No. 199-M99 and ANSI Z21.20-2014 CAN/CSA C22.2 No. 60730-2-5-14

CE Approved to EN 298-2012[2]

1.The tekmar BTCII Boiler Controller is fully compatible with the Fenwal PIM and provides complete hydronic boiler operation. For more information, contact tekmar controls at (250) 545-7749.
2. EMC Emission testing to be verified after incorporation into end use appliance.

SPECIFICATIONS

WARNING	Installing or operating the product inconsistent with these instructions or specifications could cause serious property damage, injury or death.

Specification	Value
Input Power	Control: 18-30 VAC 50/60 Hz (Class 2 Transformer)
Input Current Drain	400 mA @ 24 VAC with gas and blower relays energized (Control only)
Gas Valve Relays	5.0A max (continuous)
Combustion Blower	5.0 A max for standard (J2) connection 15.0 A max for heavy-duty (K5 relay) terminals
Hot Surface Igniter	5.0 A max, 120/240 VAC
Pump Relays	5.0 A max (continuous)
Alarm Relay	2.0 A, 30 VDC or 30 VAC max
Operating Temperature	-40°F to + 165°F (-40°C to +74°C)
Storage Temperature	-40°F to + 185°F (-40°C to +85°C)
Sensor Temperature Range	-22°F to + 260°F (-30°C to +126°C)
Flame Sensitivity	0.7 µA minimum
Flame Failure Response or Reignition Time	0.8 seconds maximum
Flame Detector Self-check Rate	Once per second minimum
Flame Failure Lockout Time	Varies by model
Types of Gas	Natural, LP, or manufactured
Spark Rate	Remote sense (50/60 Hz) Local sense (25/30 Hz)
Size (LxWxH)	8.50 x 6.50 x 2.50 inches (21.59 x 16.51 x 6.35 cm)
Ingress Protection	Not rated, protection provided by appliance in which it is installed.
Moisture Resistance	Conformal coated to operate non-condensing to 95% R.H.
Tries for Ignition	One or three try versions available
Trial for Ignition Period	1 to 30 seconds, up to 300 seconds (IP)
Pre-purge Timings	1 to 255 seconds
Inter-purge Timings	1 to 255 seconds

FEATURES

The PIM provides the following features:

- Integrated UL353 High Limit using Thermistor Sensor
- Configuration parameters selected through a unique Identification Card
- Communicates via (RS485) with Host Controller
- Supports tN4 signals when using tekmar Host Controller
- Measures Inlet, Outlet, Limit, and Vent temperatures using NTC curve
  J Thermistors, 10 KΩ (β3892) at 25°C (12 KΩ Thermistors optional).
- Optional signals from DHW, System, and Outdoor Air sensors to Host Controller for Outdoor Reset and DHW functions.
- Supports external input (0-10 VDC or 4-20 mA) from an Energy Management System
- Controls the Boiler, System, and DHW pumps
- Controls the gas ignition sequence in response to space heating or DHW demand
- Pulsed Water Flow sensor input for optimizing DHW performance
- Modulates the boiler firing rate using combustion blower speed control, providing a PWM output or a 4-20 mA signal.
- Closed-loop control of blower speed (RPM) through tachometer signal monitoring
- Optional support for two-stage blowers by re-assigning the DHW pump relay
- Low-voltage detection and safe shutdown below 18.0VAC supply input
- Hot Surface or Direct Spark Ignition (also allows for external HV transformer)
- Intermittent Pilot Ignition (single stage only)
- Fail-safe Control for one or two stages of gas valves
- Optional Isolated (Dry) Contact Gas Valve operation
- Airflow, water flow and gas pressure switch monitoring and diagnostics
- Optional automatic reset after ignition lockout (one hour or as defined)
- Safe-Start and full-time Flame sensing
- Local (through the HSI or DSI element) or Remote Flame sensing
- Configurable as needed to meet CSD-1 applications
- System and Control Diagnostics through use of on-board or remote LED
- Communication of Diagnostic status to Host Controller
- Manual Reset for Ignition Lockout or Hi-Limit (on-board or remote)
- Field Test/pump exercise capability
- Dry contact relay output for Alarm and Alert conditions
- Capability of two PIM operation to support up to 4 gas valve stages using a master/member configuration

SENSORS

The PIM provides standard support for 10K ohm @ 77°F NTC curve J Thermistor probes (β=3892). Special OEM models may support other sensor types as outlined in the specific appliance manuals. Optional 12k Ohm thermistor are available, consult factory for details.

The Inlet, Outlet, Hi-Limit, and Vent (exhaust stack) sensors are directly processed by the PIM. The optional System, Outdoor, and DHW tank sensors are also connected to the PIM but passed through to the tekmar Host Controller which is required to provide those additional features.

ID CARD

The PIM determines its operating parameters by reading the identification code of an external plug-in ID card.

Note: This ID card must be present for the PIM and appliance to operate.

A total of up to 126 unique codes are supported. This card selects the proper settings in the PIM's memory for appliance models. These parameters include ignition timings and operation; and system and OEM configuration settings.

Fenwal supplies the PIM with its internal ID card settings blank. The first time a PIM is powered-up attached to an ID card, the PIM stores the ID card setting in non-volatile memory. Once set, the PIM only operates with the correct ID card installed that matches the PIM's internal ID settings. The PIM verifies the ID card at power-up.

WARNING	The ID card must remain with the appliance for its entire service life. In the event of an ID Card failure, replacement must be performed by a qualified technician and must be replaced with an ID card of the same number. ID Cards cannot be interchanged between appliances.

If a PIM needs to be re-configured for another ID card, such as during service or replacement, its internal ID card settings must be cleared. Contact the manufacturer for ID card reset process.

SEQUENCE OF OPERATION

Install the ID Card

The PIM must always have the proper ID card attached for operation. The ID card is connected to J6 and determines the correct configuration parameters and system timings for a particular application. The ID card must always remain with the appliance, even if the PIM needs to be replaced.

Potentiometer (Operator Setpoint)

The operating setpoint for PIM stand-alone mode is selected by manually adjusting a potentiometer. The operating point for outlet water temperature is settable from 110°F to 210°F.

Note: The operating setting used by the software limits the maximum setpoint to the configured operator safeguard (delta below the configured high limit setpoint) to avoid nuisance trips regardless of the potentiometer position.

Configuration (DIP Switch Settings)

The PIM includes an 8-position DIP switch, located near the field wiring terminals. Use this DIP switch to set field configurable items when commissioning. The switch positions are listed in the following table.

Table 1-1. DIP Switch Settings

Position	Switch	Description
1	Operator Differential	(Manual/Auto Differential)
2	Analog Input Type	(Direct Drive/Target Temperature)
3	Pump Post Purge	(On/Off)
4	Pump Exercise Enable	(On/Off)
5	EMS/Demands	(PIM uses analog input only/ Host Controller or PIM demands)
6	EMS Signal Type	(4-20mA/0-10Vdc) * * 4-20mA setting requires use of external 500Ω, 1/2W resistor.
7	Freeze Protection	(On/Off)
8	Commission Test	(On/Off)

The default factory setting for each switch is the second selection (off position).

Note: When a Host Controller is connected, higher level functions for these options must be enabled first using the DIP switch settings.

Start-Up

1. Upon application of 24 VAC power, the PIM resets with all outputs in the off state.
2. The PIM performs a processor and memory self-test to insure proper operation.
3. The PIM confirms the presence of a valid ID card which matches the configuration previously stored in memory. If the valid ID card is not present, the PIM generates a diagnostic fault.
4. The PIM reads the DIP switch settings and configures itself for the desired operation.
5. The Host Controller communications are scanned to determine if a Host Controller device is present. If found, system operation is controlled by the Host Controller.
6. The non-volatile memory is checked for an active lockout condition. A lockout indicates the previous attempt to light was unsuccessful, or a hi-limit or other system fault occurred. The PIM stays in lockout until a manual reset is performed.

Standby/Call for Heat

1. The PIM continuously monitors the flame status to verify no flame is present during Standby. If an erroneous flame is detected, the PIM generates a flame error fault.
2. The PIM verifies that the optional exhaust vent sensor below the vent temperature limit before burner operation can occur. If the vent temperature exceeds the limit, the PIM performs a Post-purge and proceeds to a Hard Lockout.
3. A Call for Heat is initiated by the presence of any one or more of the four sources below:
   - A heat demand (contact closure) on the TH field wiring terminals
   - A voltage greater than 0.5Vdc on the analog 0-10Vdc EMS signal input
   - A heat demand present on the DHW field wiring terminals
   - A heat demand from the Host Controller based on the DHW sensor temperature
4. The PIM initializes the Trial for Ignition (TFI) counter to the programmed number of trials and proceeds to Pump Purge mode.

Pump Purging

Note: If a Host Controller is present, the PIM responds to pump commands via the communication bus. When the Host Controller determines the boiler needs to fire, it sends a firing rate command to the PIM and operation proceeds to Blower Pre-purge.

If the PIM is in stand-alone mode, the pumps operate as follows:

1. A call for space heating energizes the boiler and system pump outputs.
2. The heat exchanger is purged providing flow past the water pressure switch.
3. The pump pre-purge time begins after the water pressure switch is proven.
4. If burner operation is required to meet the operating setpoint, the PIM proceeds to Blower Pre-purge.

Blower Prepurge

1. The Gas Pressure switch(es) are verified closed.
2. The Airflow switch is verified open (shorted switch detection).
3. The Combustion Blower is energized, and set to the purge speed (if modulating).
4. The Airflow switch is verified to close within 60 seconds to prove flow.
5. The configured ignition pre-purge delay takes place.
6. The voltage level of the 24 VAC supply input is confirmed to be above 18.0 VAC.
7. If all checks are passed, the PIM proceeds to Ignition.

Ignition (DSI Models)

1. The PIM re-initializes the ignition counter to the configured number of trials.
2. The High Limit sensor is confirmed to read below the High Limit Set Point.
3. The blower light-off RPM speed is verified (modulating type only).
4. The gas valve relay contacts are verified open (except isolated valve models).
5. The Combustion Blower is set to the Ignition light-off speed (if modulating).
6. The gas valve output is enabled for the trial for ignition time to light the burner.
7. The HV spark output is enabled for the configured trial-for-ignition time.
8. The flame sense is checked for successful lighting of the burner. When a valid flame is detected during the TFI period, sparking is terminated and the main gas valve, operating pumps, and blower relay remain energized and the PIM proceeds to the Heating mode.
9. If flame is not detected during the TFI period see "Failure to Light - Lockout".

Ignition (HSI Models)

1. The PIM re-initializes the ignition counter to the configured number of trials.
2. The High Limit sensor is confirmed to read below the High Limit Set Point.
3. The blower light-off RPM speed is verified (modulating type only).
4. The gas valve relay contacts are verified open (except isolated valve models).
5. The HSI Element proving current is verified to be above the configured value. (proven hot-surface models only)
6. The configured heat-up delay takes place to allow the hot surface element to reach ignition temperature.
7. The gas valve output is enabled for the trial-for-ignition time to light the burner.
8. The hot surface element is de-energized during the last second of the TFI period.
9. The flame sense is checked for successful lighting of the burner. If a valid flame is detected during the TFI period, the main gas valve, operating pumps, and blower relay remain energized and the PIM proceeds to the Heating mode.
10. If flame is not detected during the TFI period see "Failure to Light - Lockout".

Ignition (IP Models)

1. The PIM re-initializes the ignition counter to the configured number of trials.
2. The High Limit sensor is confirmed to read below the High Limit Set Point.
3. The blower light-off RPM speed is verified (modulating type only).
4. The gas valve relay contacts are verified open (except isolated valve models).
5. The Combustion Blower is set to the Ignition light-off speed (if modulating).
6. The Pilot gas valve output is enabled for the trial for ignition time.
7. The HV spark output is enabled for the configured trial-for-ignition time.
8. The flame sense is checked for successful lighting of the burner. When a valid Pilot flame is detected during the TFI period, sparking is terminated and the main gas valve is energized. The Pilot valve, operating pumps, and blower relay remain energized and the PIM proceeds to the Heating mode.
9. If flame is not detected during the TFI period see "Failure to Light - Lockout".

Heating

1. The flame status, airflow switch, LWCO switch, water pressure switch and other safety switches are continually monitored for proper state.
2. The High Limit sensor is confirmed to read below the High Limit setpoint.
3. The boiler operating water temperature is monitored against the target temperature to determine the proper firing rate or staging level.
4. The PIM remains in heating mode until the staging reaches 0% or the firing rate drops below the configured minimum value for the burner.
5. A Blower Post-purge is completed and the control proceeds to Standby mode.

Heat Demand Satisfied

1. The thermostat signal becomes inactive indicating the call for heat is satisfied.
2. The gas valve(s) are immediately disabled.
3. A Blower and Pump Post-purge is completed before returning to Standby mode.

FAILURE TO LIGHT - LOCKOUT

Single Trial Model

Should the burner fail to light or if flame is not detected during the trial for ignition period, the control performs the following:

1. The control enters ignition lockout.
2. The gas valve(s) are de-energized immediately.
3. The LED indicates the fault code for ignition lockout.

Multi Trial Model

Should the burner fail to light or if flame is not detected during the first trial for ignition period, the control performs the following actions:

1. The gas valve(s) are de-energized.
2. The control then goes through an interpurge delay before another ignition attempt.

3. The control attempts two additional ignition trials before going into lockout and the gas valve relay(s) are de-energized immediately.
4. The LED indicates the fault code for ignition lockout.

Lockout Reset

Volatile Reset Models

Recovery from lockout requires either pressing manual reset, recycling the call for heat, or removing 24 volts for a period of 5 seconds. On models with automatic reset, if the call for heat is still present after the configured reset time, the control will automatically reset and attempt to start a new heating cycle.

Manual Reset Models

Recovery from lockout requires activation of the manual reset switch or remote reset input.

High Limit Fault Reset

If the High Limit sensor detects a temperature above the High Limit setpoint, the PIM will enter lockout. Recovery from a High Limit fault requires activation of the manual reset switch or remote reset input.

FLAME FAILURE RESPONSE

Recycle Mode

With "recycle after loss of flame", upon loss of flame, the gas valve is de-energized within 0.8 seconds. After the flame recycle delay, the control attempts to relight the burner. Multi-try models allow three tries for ignition including inter-purges. If the pilot burner relights, normal operation resumes. If the burner does not relight, the control will go into lockout as described in "Failure to Light - Lockout".

Re-ignition Mode (Spark Models Only)

If the established flame signal is lost while the burner is operating, the control responds within 0.8 seconds by energizing the HV spark for the TFI period in an attempt to relight the burner. If the flame is re-established, normal operation resumes. If the burner does not light within the TFI, the gas valve is de-energized immediately and on multi-try models a new TFI sequence begins. Multi-try models will make 2 more attempts to light the burner.

If the burner does not relight, the control will lockout as previously described in "Failure to Light - Lockout".

OEM FACTORY WIRING

Supplying Power

The PIM requires 24 VAC on Connector J11 to operate its microprocessor circuits, the safety switch connections, and the field demand inputs. An onboard fuse protects the 24 VAC circuits and if configured for direct gas valve power, the 24 VAC relay outputs to the gas valves.

Sensor Inputs

The PIM requires an outlet thermistor sensor for burner control and a high-limit thermistor sensor for the integrated UL353 high-limit function. These two thermistors must be independent but co-located so they provide similar readings. The vent sensor and inlet sensor are optional and if used should be enabled by the parameter table settings.

Isolated Valve Contacts

If the optional isolated valve configuration is used, the valve power and return must be separately supplied to J12 and the valve outputs are not protected.

Combustion Blower Connections

The blower motor is connected to J13 operating off the power supplied to L1, which can be 120VAC or 240VAC. If a modulating blower is used, PWM or 4-20 mA signals are provided by connection to J10. The blower motor tachometer signal is required when configured for closed-loop fan speed control.

High-Current Blower Option

If provided, the relay contacts of K5 must be used to connect the blower. The QC dry-contact terminals on top of the relay are used for the blower output and supply voltage, which may be 120VAC or 240VAC. The maximum current rating is 15.0A.

Pump Outputs

The pump circuits are operated off the power supplied to L1 and L1-S, which can be 120VAC or 240VAC. The boiler pump and DHW pump are sourced from L1, while the supply pump (if used) must be powered by L1-S.

Ignition Outputs

The PIM is capable of DSI, IP, or HSI ignition depending on configuration. For spark ignition (DSI or IP) the electrode is connected to the T3 ignition coil. For HSI the igniter element connects to P1 and is driven off the L1 supply voltage.

If configured, an external spark ignition transformer can be used by connecting it to P1. It is powered by L1 and the spark output on T3 will be disabled.

SYSTEM CONNECTIONS (FIELD WIRING)

If used, the Host Controller must be connected to J4. The RJ-45 style 8-pin jack provides power, communications, and sensor information to the Host Controller.

The PIM also acts as the central wiring point of a hydronic system. Field wiring terminals on J1 and J2 allow connection of optional DHW, outdoor, and system sensors, Host Controller, EMS analog demand signal, LWCO, remote reset, water flow switch, and the space thermostat and DHW demand inputs.

MOUNTING AND WIRING

The PIM enclosure is designed to facilitate mounting within a control box by the appliance OEM.

The PIM is not position sensitive and can be mounted vertically or horizontally. The case may be mounted on any surface using four standard #8 sheet metal screws.

WARNING	The PIM must be mounted and located in a manner which protects components from exposure to water (dripping, condensate, spraying, rain). Any control that has been exposed to water must be replaced.
WARNING	All wiring must be done in accordance with both local and national electrical code. Wiring must be at least #18 AWG rated for 105°C or higher.
WARNING	The PIM uses voltages of shock hazard potential. Wiring and initial operation must be done by qualified service technician.
WARNING	Operation outside specifications could result in failure of the Fenwal product and other equipment with injury to people and property.

HIGH VOLTAGE AND REMOTE SENSE CABLE REQUIREMENTS

The HV Ignition Cable must meet a voltage rating of 25 KV and an insulation rating of 200 °C. Recommend length of 3ft (.9m) or less. Consult factory for longer lengths.

Remote flame sense cable must meet a voltage rating of 250V and an insulation rating of 200 °C. Recommended length of 10ft (3m) or less. Consult Factory for longer lengths.

INDICATORS

The PIM has three LED indicators to display operational status and to help diagnose system error conditions.

- **Power**: Green LED indicating the PIM module is receiving 24 VAC power.
- **Alarm/Test**: Amber LED which indicates the PIM is in Commission Test Mode or that a diagnostic alarm (fault) is present.
- **Diagnostic Code**: Red LED that is normally off. During a control or system fault condition, this LED flashes the error codes. Refer to the following table for additional details.

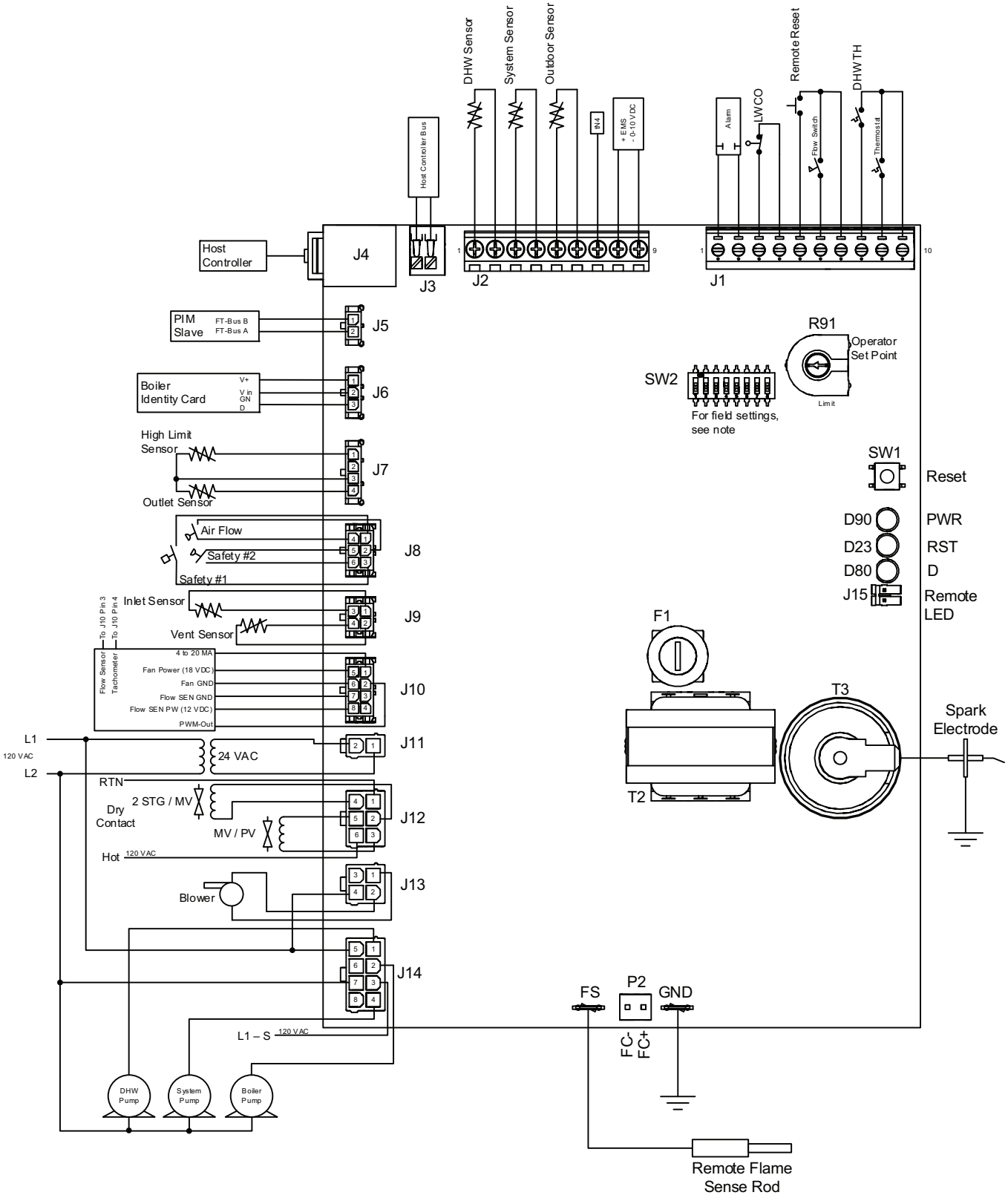
LED ERROR CODE LISTING

The following table lists the errors detected by the control and the associated LED indications

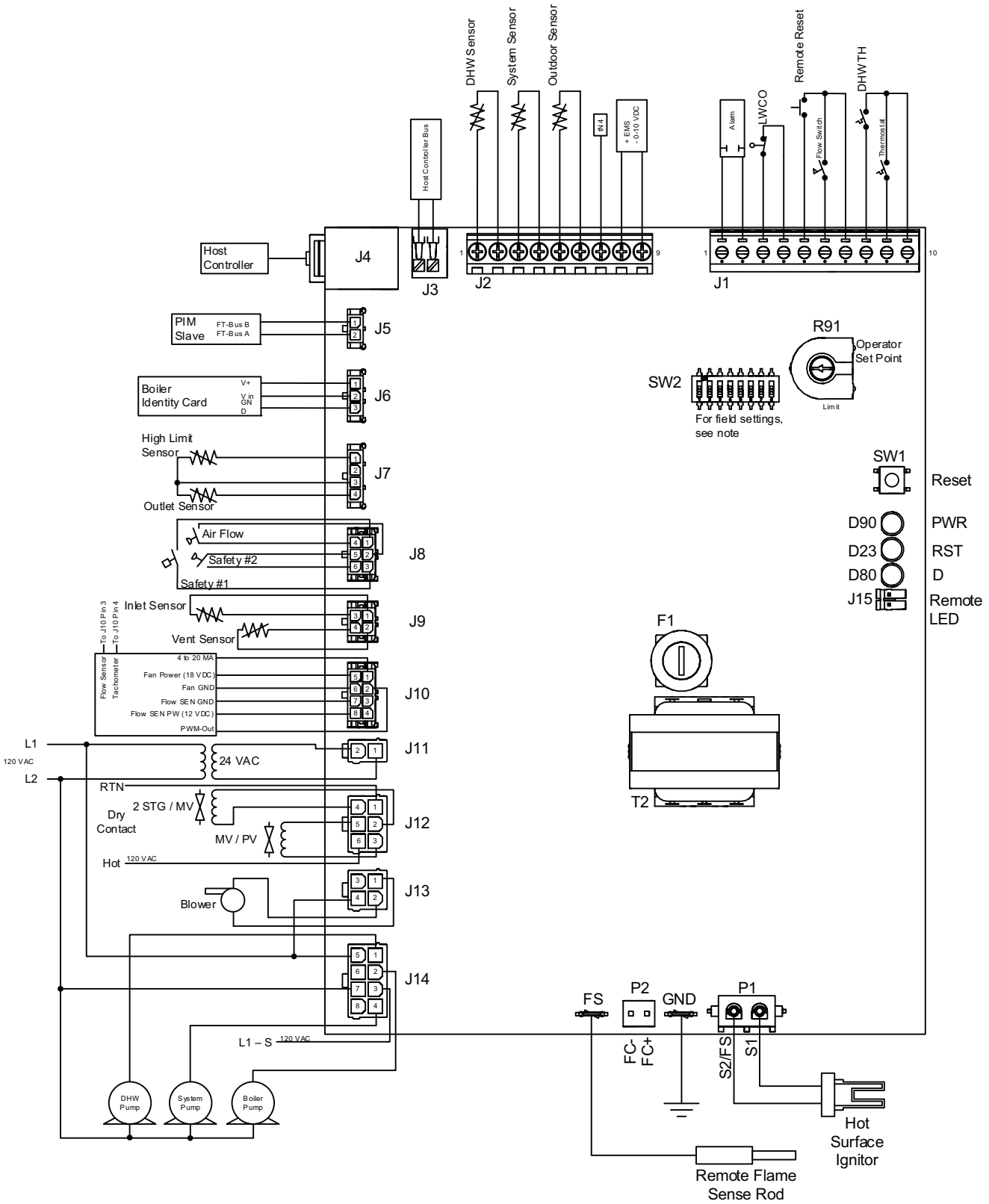
Error Mode	LED Code	Recommended Troubleshooting
Normal Operation	Off	
ID Card Fault	Red LED Steady ON, Green Power LED OFF	Check that the proper ID card is securely connected. Perform a power and system reset.
Internal Control Failure	Steady ON	Perform a power and system reset. If fault remains, replace the PIM.
Airflow Fault	1 flash	Check Blower operation and airflow switch.
False Flame Error	2 flashes	Check for proper gas valve closure. Clean burner and electrodes.
Ignition Lockout Fault	3 flashes	Check the gas supply.
Ignition Proving Current Fault	4 flashes	Check HSI element. Replace with a new element of the proper rating.
Low Voltage Fault	5 flashes	Check the 24 VAC input voltage. The voltage must be above 18.0 VAC
Vent Temperature Fault	6 flashes	Check for a blocked flue. Check the vent sensor and connections.
Hi-Limit Fault	7 flashes	Check for proper water flow. Check hi-limit and outlet sensors.
Sensor Fault	8 flashes	See Host Controller for fault identification. Check sensors and wiring.
Safety #1 Fault	9 flashes	Check gas pressure. Verify proper safety switch operation.
Water Pressure Fault	10 flashes	Check piping for leaks. Check pressure switch and connections.
Blower Speed Fault	11 flashes	Verify tachometer signal and connection on J5.
LWCO Fault	12 flashes	Check LWCO switch and connections. Check the water level.
Hi-Temperature Delta Fault	13 flashes	Check pump operation. Confirm proper water flow across heat exchanger.
Ft-bus Communications Fault	14 flashes	Verify Host Controller is connected and operating. Check the cable between the Host Controller and J1.
Safety #2 Fault	15 flashes	Check gas pressure. Verify proper safety switch operation.

WIRING DIAGRAMS

DSI Wiring Diagram



HSI Wiring Diagram



WIRING TABLES

OEM Factory Low-Voltage Wiring Connections (30 VAC Max)

Connector	Pin	Function	Type and Rating
J5	1	Ft-bus B (PIM to PIM)	Molex Micro-Fit, 20-30AWG, 2.0A
J5	2	Ft-bus A (PIM to PIM)	Molex Micro-Fit, 20-30AWG, 2.0A
J6	1	ID Card Power (3.3Vdc)	Molex Micro-Fit, 20-30AWG, 2.0A
J6	2	ID Card Signal	Molex Micro-Fit, 20-30AWG, 2.0A
J6	3	ID Card Ground	Molex Micro-Fit, 20-30AWG, 2.0A
J7	1	Hi-Limit Sensor	Molex Micro-Fit, 10K Thermistor J curve
J7	2	Sensor Common	Molex Micro-Fit, 10K Thermistor J curve
J7	3	Sensor Common	Molex Micro-Fit, 10K Thermistor J curve
J7	4	Outlet Sensor	Molex Micro-Fit, 10K Thermistor J curve
J8	1	Safety #1 switch	Molex Micro-Fit, 20-30AWG, 2.0A
J8	2	Airflow switch	Molex Micro-Fit, 20-30AWG, 2.0A
J8	3	Safety #1 return	Molex Micro-Fit, 20-30AWG, 2.0A
J8	4	Airflow return	Molex Micro-Fit, 20-30AWG, 2.0A
J8	5	Safety #2 switch	Molex Micro-Fit, 20-30AWG, 2.0A
J8	6	Safety #2 return	Molex Micro-Fit, 20-30AWG, 2.0A
J9	1	Inlet Sensor	Molex Micro-Fit, 10K Thermistor J curve
J9	2	Vent Sensor	Molex Micro-Fit, 10K Thermistor J curve
J9	3	Sensor Common	Molex Micro-Fit, 10K Thermistor J curve
J9	4	Sensor Common	Molex Micro-Fit, 10K Thermistor J curve
J10	1	4-20 mA Out (modulation %)	Molex Micro-Fit, 20-30AWG, 2.0A
J10	2	PWM Out (modulation %)	Molex Micro-Fit, 20-30AWG, 2.0A
J10	3	Flow Sensor Signal	Molex Micro-Fit, 20-30AWG, 2.0A
J10	4	Tachometer Input	Molex Micro-Fit, 20-30AWG, 2.0A
J10	5	Fan Power (18VDC)	Molex Micro-Fit, 20-30AWG, 2.0A
J10	6	Fan Ground	Molex Micro-Fit, 20-30AWG, 2.0A
J10	7	Flow Sensor Ground	Molex Micro-Fit, 20-30AWG, 2.0A
J10	8	Flow Sensor Power (12VDC)	Molex Micro-Fit, 20-30AWG, 2.0A
J11	1	24VAC Power (R)	Molex Mini-Fit Jr. 30VAC, 8A
J11	2	24VAC Common	Molex Mini-Fit Jr. 30VAC, 8A

OEM Factory Line-Voltage Wiring Connections

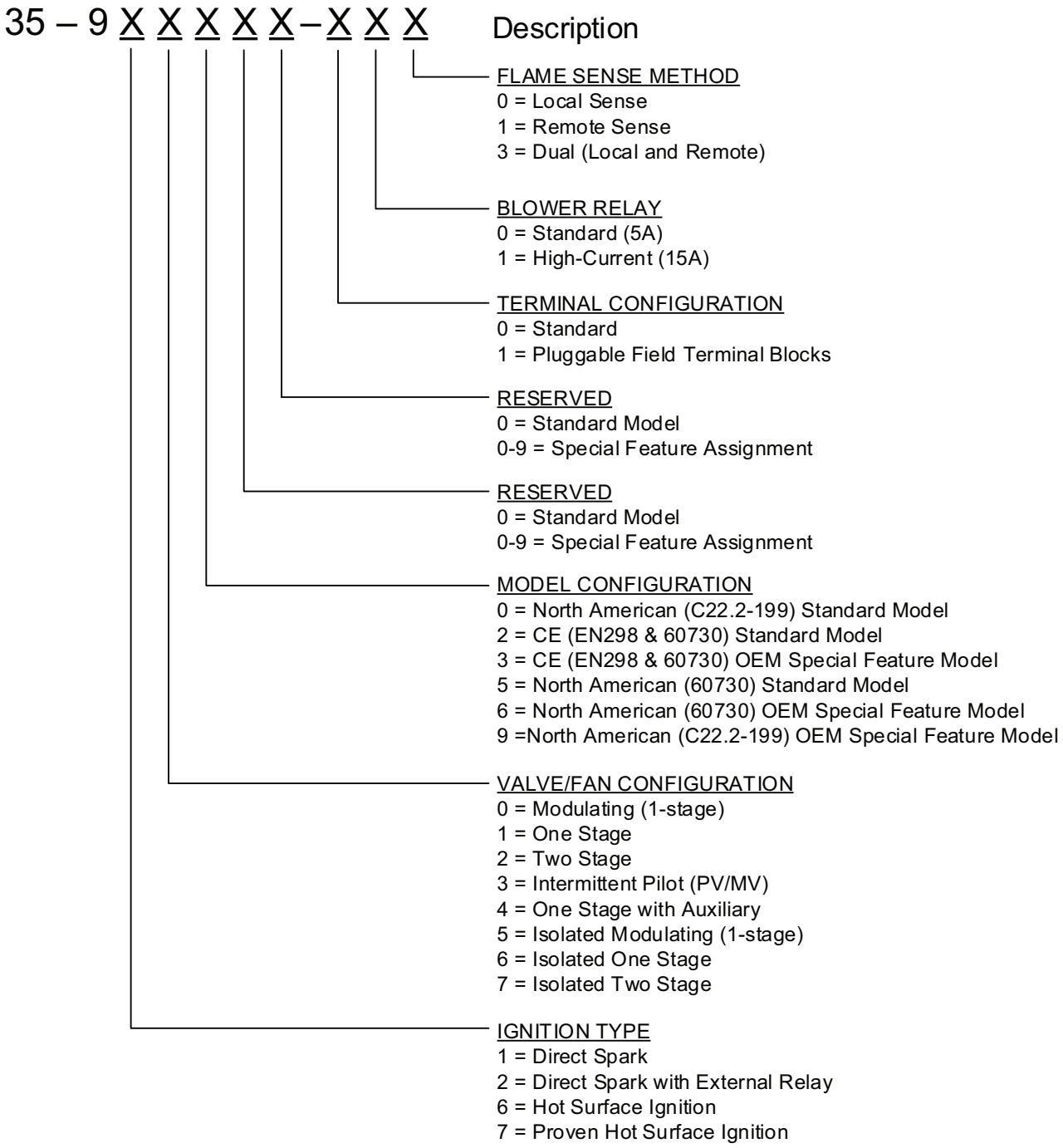
Connector	Pin	Function	Type and Rating
J12	1	Valve common (isolated contact)	Molex Mini-Fit Jr. 120/240VAC, 8A
J12	2	2nd stage Valve	Molex Mini-Fit Jr. 120/240VAC, 5A
J12	3	Gas Valve Return	Molex Mini-Fit Jr. 120/240VAC, 5A
J12	4	2nd Stage Valve Return	Molex Mini-Fit Jr. 120/240VAC, 5A
J12	5	Gas Valve (MV/PV)	Molex Mini-Fit Jr. 120/240VAC, 5A
J12	6	Valve Power (isolated contact)	Molex Mini-Fit Jr. 120/240VAC, 8A
J13	1	Blower Output (L1)	Molex Mini-Fit Jr. 120/240VAC, 5A
J13	2	Blower Return (L2)	Molex Mini-Fit Jr. 120/240VAC, 5A
J13	3	Blower Ground	Molex Mini-Fit Jr. 120/240VAC, 8A
J13	4	L1 supply input	Molex Mini-Fit Jr. 120/240VAC, 8A
K5 Relay		F1 and F2 terminals	.250" QC terminals, 120/240VAC, 15A
J14	1	DHW Pump	Molex Mini-Fit Jr. 120/240VAC, 5A
J14	2	Boiler Pump	Molex Mini-Fit Jr. 120/240VAC, 5A
J14	3	L1s – System Pump Supply	Molex Mini-Fit Jr. 120/240VAC, 8A
J14	4	System Pump	Molex Mini-Fit Jr. 120/240VAC, 5A
J14	5	L1 Supply power	Molex Mini-Fit Jr. 120/240VAC, 8A
J14	6	Not used	Molex Mini-Fit Jr.
J14	7	L2 (neutral)	Molex Mini-Fit Jr. 120/240VAC, 8A
J14	8	Pumps GND	Molex Mini-Fit Jr. 120/240VAC, 8A
HV		Spark Output (T3 coil)	.250" QC terminal, 25kV
GND		Burner Ground	.250" QC terminal
S1		Hot Surface Element	.250" QC terminal, 5.0A Max
S1/FS		Hot Surface Element	.250" QC terminal, 5.0A Max
FS		Flame Sense Rod	.250" QC terminal
P2	FC+	Flame Current Measurement	.156" pin header
P2	FC-	Flame Current Measurement	.156" pin header

Low-Voltage Field Wiring Connections (30 VAC Max)

Connector	Pin	Function	Type and Rating
J4	1	DHW sensor (to Host Controller)	RJ45
J4	2	System sensor (to Host Controller)	RJ45
J4	3	Outdoor sensor (to Host Controller)	RJ45
J4	4	Host Controller	RJ45
J4	5	Host Controller	RJ45
J4	6	Host Controller	RJ45
J4	7	24VAC Common	RJ45
J4	8	24VAC Power (to Host Controller)	RJ45
J3	1	Host Controller Bus	22AWG twisted pair
J3	2	Host Controller Bus	22AWG twisted pair
J2	1	DHW Sensor	10K Thermistor J curve
J2	2	DHW Sensor Common	10K Thermistor J curve
J2	3	System Supply Sensor	10K Thermistor J curve
J2	4	System Sensor Common	10K Thermistor J curve
J2	5	Outdoor Sensor	10K Thermistor J curve
J2	6	Outdoor Sensor Common	10K Thermistor J curve
J2	7	tN4 Communications	Network Signal
J2	8	0-10Vdc Analog EMS Input	0-10 VDC or 4-20mA
J2	9	Common	GND
J1	1	Alarm Contacts	0-30VAC, 2.0A Max Dry contact
J1	2	Alarm Contacts	0-30VAC, 2.0A Max Dry contact
J1	3	Low Water Switch (LWCO)	0-30VAC, 2.0A Max
J1	4	24VAC out (R)	18-30VAC, 2.0A Max
J1	5	Remote Reset	0-30VAC, 2.0A Max
J1	6	Water Pressure Switch	0-30VAC, 2.0A Max
J1	7	24VAC out (R)	18-30VAC, 2.0A Max
J1	8	DHW Call (DHW)	0-30VAC, 2.0A Max
J1	9	Heat Call (TH)	0-30VAC, 2.0A Max
J1	10	24VAC out (R)	18-30VAC, 2.0A Max

PIM PART NUMBER

The following image explains the meaning of the various digits in the part number. Use this information to order the correct board.



EXPORT INFORMATION (USA)
Jurisdiction: EAR
Classification: EAR99
This document contains technical data subject to the EAR.

Fenwal Controls, Kidde-Fenwal Inc.
400 Main Street
Ashland, MA 01721
Tel: 800-FENWAL-1
Fax: 508-881-7619
www.fenwal.com

F-35-2000 Rev AB

Fenwal Controls
400 Main Street
Ashland, MA 01721
Tel. (508) 881-2000

EU DECLARATION OF CONFORMITY

We

Company Name:	Kidde-Fenwal Inc.
Postal Address:	400 Main Street
City and Post Code:	Ashland, MA 01721
Tel:	508-881-2000

Declare that the DoC is issued under sole responsibility and belongs to the following product:

Apparatus Model(s)	Series 35-40, 35-53, 35-60, 35-61, 35-63, 35-608, 35-65, 35-66, 35-9X
Type:	Fitting
Batch Number	Date code and Revision Level Assigned per production lot, (YYWW RR)

Object of the Declaration:

Series 35-40, 12/24Vdc Direct Spark Automatic Gas Ignition Controllers
Series 35-53, 12Vdc Direct Spark Automatic Gas Ignition Controllers
Series 35-60, 35-61, 35-63, 35-608 24Vac Direct Spark Automatic Gas Ignition
Series 35-65 & 35-66 24Vac Hot Surface Automatic Gas Ignition Controllers
Series 35-9X Platform Ignition Module


SERIES 35-40


SERIES 35-53


SERIES 35-60/61/63/608


SERIES 35-65/66


SERIES 35-9X

The object of the declaration described above is in conformity within the relevant union harmonization legislation:

Gas Appliance Regulation**:**	**(EU) 2016/426**	*Low Voltage Directive:*	**2014/35/EC**
EMC Directive:	**2014/30/EC**	*Rohs*	**2011/65/EU**

The following harmonized standards and technical specifications have been applied:

EN298:2012:	Automatic Burner Control systems for Burners and appliances burning gaseous or liquid fuels.
EN13611:2007_A2:2011:	Safety and control devices for Gas Burners and Gas burning appliances – General Requirements.

Name of Notified Body & Number: BSI Group, 0086, EU Type Examination Certification

Notified Body Certificate No.:

Series 35-40:	CE682407
Series 35-53	CE682404
Series 35-60/61/63/608	CE682405
Series 35-65/66	CE682406
Series 35-9x	CE690652

Surveillance Audit Notified Body: BSI Group

For copies of the Installation Instructions and the EU DoC, got to www.fenwalcontrols.com, - Document Library - Data sheets.

Paul Finn

Kidde-Fenwal, Inc. Ashland, MA USA	01 Oct 2018	Paul Finn, Certification Engineer
Place of Issue:	Date of Issue	Name