

# TECHNICAL ARTICLE

## Fenwal 35-40 Communication Capabilities

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### COMMUNICATIONS WITH THE 35-40

The Fenwal Controls 35-40 gas ignition control offers two optional modes of transmitting data in addition to the LED and Alarm out. There is an available Universal Asynchronous Receiver Transmitter (UART) or a digital output signal. This document provides information on how these modes can be configured.



### UART COMMUNICATION

UART communication is an interactive method of receiving real time operational data from the Fenwal Controls 35-40 gas ignition control. Upon request for information, the control responds with an eight byte data packet that can be configured with the critical information your device needs to know.

#### Standard responses include:

**Current Operation Mode:** Standby, Purge, Ignition, Burn and Lockout

**Error Codes for:** False Flame, Ignition Lock-Out, Reset Error and Hardware Error

#### Optional responses may include:

Up to three additional types of data can be included in the message returned to your device.

**Flame Current:** Flame current provides general feedback to flame quality and is between 0.4uA and 6.0uA.

(Ex: 0=No Flame, 4=0.4uA, 60=6.0uA)

**Model Number:** Ability to know the ignition controller installed in your appliance to ensure proper configuration and compatibility. (Integer range 0-255)

**Firmware Revision:** Ability to know the version firmware is installed in the ignition controller in your appliance to ensure proper configuration and compatibility. (Integer range 0-255)

**Custom Code:** Ability to transmit data critical to the operation to your appliance from the ignition controller.

#### Communication Protocol

UART configuration	
Baud Rate	9600
Start Bit	1
Stop Bit	1
Data Bits	8
Parity	None
Input message	
Rx Input Voltage	0 Volts – Logic Low 5-24 VDC Logic High
Rx Request for Data	0xAF (All other messages ignored)
Output message	
Tx Output Voltage	0 Volts – Logic Low 12/24 VDC (Depending on power to board)
Tx Byte 1 – STX character	0x02 – Start of Message
Tx Byte 2 – Error Codes	0x00 – No Error 0x02 – False Flame 0x03 – Ignition Lock-Out 0x04 – Reset Error 0xFF – Hardware Error
Tx Byte 3 – Operation Mode	0x00 – Standby 0x01 – Purge (pre or inter) 0x02 – Ignition 0x03 – Burn 0x04 – Lockout
Tx Byte 4 – Configurable	Flame Current
Tx Byte 5 – Configurable	Firmware Revision
Tx Byte 6 – Configurable	Model Number
Tx Byte 7 – ETX character	0x03 – End of Message
Tx Byte 8 – CRC message	0x0 – 0xFF CRC-8 of preceding 7 bytes

## DIGITAL OUTPUT COMMUNICATIONS

Digital Output is a simple way of transmitting data about the Fenwal Controls 35-40 gas ignition control status directly into your appliance. Data is continuously transmitted depending on the status of the control in a simple 0 or 5 VDC (Low/High) signal.

Up to seven unique messages can be programmed.

### Standard data includes:

**Ignition Lockout:** Appliance fails to ignite after trial for ignition period, single or multiple tries, re-ignition or recycle modes are unsuccessful

### Optional data may include:

**Standby:** Control is powered, waiting for call-for-heat.

**Flame Without Call-For-Heat:** Presence of flame detected before gas valve is opened.

**Burn:** Control has a call-for-heat, gas valve is open and flame is detected.

**Low Flame Current:** Flame current below a user defined current, typically 1uA.

### Output Protocol

Digital output configuration	
Output Voltage	0 VDC (Low) 5 VDC (High) Open Collector Circuit
Current Limit	2 mA
Output message	
Steady On (5 VDC)	Ignition Lockout
Continuous Pulsing	Burn
1 Pulse	Call-for-heat
2-7 Pulses	Configurable

**Note:** Pulses will toggle high for 100mS and low for 100mS as needed to indicate a message. The code will repeat every 3.2 seconds.

Removing power from the control will clear the code.

## DIGITAL OUTPUT COMMUNICATIONS

Diagnostic red LED or optional remote LED connector can signal a variety of conditions similar to the Digital Output \*. For remote LED a 12/24 VDC \*\* current limited signal is available.

\* Additional pulse patterns are available for options described above.

\*\* 12/24 VDC based on input voltage to the control.

### LED Flash Pattern

LED Patterns	
2 Pulses	Flame Without Call-For-Heat
3 Pulses	Ignition Lockout
5 Pulses	Standby
6 Pulses	Burn

**Note:** Pulses will toggle on for 1/4 second and off for 1/4 second as needed to indicate a message. The code will repeat every 3.2 seconds.

## ALARM OUT

A standard alarm out signal can be used to communicate lockout \*. Knowing the control has gone into a lockout state is a simple method of knowing there is an issue.

\* Open collector output pulled to ground for on condition.

### Alarm Codes

Alarm Codes	
Off	Normal Operation
On	Ignition Lockout

## SUMMARY

Fenwal Controls can customize any of these solutions to meet the needs of your device. Contact your Fenwal Controls sales representative to create a configuration to meet your needs.

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