▲ DET-TRONICS ®

DESCRIPTION

The R8471 Controllers, designed for use with Det-Tronics C706X electrochemical sensors, include the following models:

• R8471B for Hydrogen Sulfide (H_2S)

• R8471C for Oxygen (O_2)

• R8471D for Chlorine (Cl_2)

• R8471E for Carbon Monoxide (CO)

• R8471F for Sulfur Dioxide (SO_2)

• R8471G for Nitrogen Dioxide (NO_2)

The single channel, rack mounted controller provides a continuous reading of the sensor input and operates in a variety of ranges depending on the detection range of the electrochemical sensor. Table 1 provides a listing of the available ranges for the different models of the R8471 Toxic and Oxygen Gas Controllers.

Controller response includes actuation of solid state or optional relay outputs for direct control of field response devices, a full array of faceplate indicators, as well as an optional 4 to 20 milliampere output for transmitting system information to other equipment. Three independent alarm outputs with field selectable setpoints are provided.

Table 1—Controller Operating and Setpoint Ranges

Controller	Gas	Operating Range	Low Alarm Setpoint Range	High Alarm Setpoint Range	Auxiliary Alarm Setpoint Range
R8471B	H_2S	0 to 100 ppm	5.0 to 50 ppm	10 to 90 ppm	5.0 to 90 ppm
R8471C	O_2	0 to 25% 15 to 25%	1.0 to 20.7% 16 to 20.7%	21.1 to 25% 21.1 to 25%	1.0 to 25% 16 to 20.7% or 21.1 to 25%
R8471D	Cl_2	0 to 10 ppm	0.5 to 5.0 ppm	1 to 9.0 ppm	0.5 to 9.0 ppm
R8471E	CO	0 to 100 ppm 0 to 500 ppm 0 to 1000 ppm	5.0 to 50 ppm 25 to 250 ppm 50 to 500 ppm	10 to 90 ppm 50 to 450 ppm 100 to 900 ppm	5.0 to 90 ppm 25 to 450 ppm 50 to 900 ppm
R8471F	SO_2	0 to 100 ppm	5.0 to 50 ppm	10 to 90 ppm	5.0 to 90 ppm
R8471G	NO_2	0 to 20 ppm	0.5 to 10 ppm	1.0 to 18 ppm	0.5 to 18 ppm

FEATURES

- Digital display, bar graph display, and high intensity LEDs indicate important system status information.

- Microprocessor based controller allows easy field programming of calibration gas concentration and alarm setpoint levels.

- Continuous automatic self-diagnostics, with detected fault identified on digital display.

- Current output is selectable for isolated/non-isolated operation.

- Controller indicates when sensor is approaching end of life.

- Compatible with most sensors or sensor/transmitter combinations that generate a 4 to 20 ma input.

- Rack compatible with Det-Tronics R7400 series flame controllers (4U height configuration only).

- Models available for use with the Det-Tronics Combustible Gas Sensor and PointWatch™ PIR9400 Gas Detector.

SPECIFICATIONS

SENSOR
Refer to Table 2.

CONTROLLER

OPERATING VOLTAGE—
24 vdc. Can operate in the range of 18 to 32 vdc.

POWER CONSUMPTION (Controller only)—

Base model: 0.7 watts nominal, 1.3 watts maximum (25 ma nominal, 50 ma maximum at 24 vdc).

Premium model: 1.2 watts nominal, 3.5 watts maximum (50 ma nominal, 145 ma maximum at 24 vdc).

Maximum startup current is 0.6 ampere for 10 milliseconds. Power supplies with fold back current limiting are not recommended.

MAXIMUM RIPPLE—
Not to exceed 5 volts peak-to-peak.

TEMPERATURE RANGE—
Operating: +32°F to +140°F (0°C to +60°C)
Storage: -49°F to +185°F (-45°C to +85°C).

SOLID STATE OUTPUTS (Base model only)—
The outputs are open collector transistors with a 100K resistor from the collector to emitter with the emitter grounded, rated 100 milliamperes at 32 vdc maximum.

Table 2—Electrochemical Sensor Specifications

Controller	R8471B	R8471C	R8471D	R8471E	R8471F	R8471G
Gas	H_2S	O_2	Cl_2	CO	SO_2	NO_2
Temperature Range (Operating)	-40° to +122°F (-40° to +50°C)	-4° to +122°F (-20° to +50°C)	-4° to +122°F (-20° to +50°C)	-4° to +122°F (-20° to +50°C)	-4° to +122°F (-20° to +50°C)	-4° to +122°F (-20° to +50°C)
Temperature Range (Storage):	+32° to +68°F (0° to +20°C)	+32° to +68°F (0° to +20°C)	+32° to +68°F (0° to +20°C)	+32° to +68°F (0° to +20°C)	+32° to +68°F (0° to +20°C)	+32° to +68°F (0° to +20°C)
Enclosure Material:	Stainless Steel	Aluminum	Aluminum	Aluminum	Stainless Steel	Stainless Steel
Sensor Rating:	Intrinsically Safe[1]	Explosion Proof[2]	Intrinsically Safe[1]	Explosion Proof[2]	Explosion Proof[2]	Explosion Proof[2]
Dimensions:	See Figure 1	See Figure 1	See Figure 1	See Figure 1	See Figure 1	See Figure 1

[1] Intrinsically safe sensors are designed to meet FM and CSA intrinsic safety requirements for Class I, Division 1, Groups A, B, C and D; and CENELEC EEx ia IIC T6. In order to maintain the intrinsically safe rating of the sensor, the device must be powered through an approved IS barrier.

[2] Explosion Proof sensors are designed to meet FM and CSA requirements for Class I, Division 1, Groups C and D; CENELEC EEx d IIB + H_2 T6.
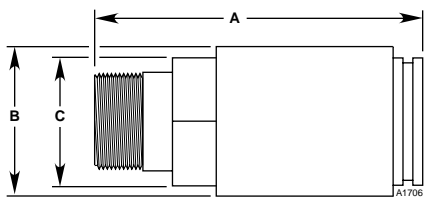
Sensor	A	B	C
H_2S	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
O_2	6.1 (15.5)	2.2 (5.6)	1.1 (2.8)
CO	5.0 (12.7)	2.2 (5.6)	1.1 (2.8)
Cl_2	5.0 (12.7)	2.2 (5.6)	1.1 (2.8)
SO_2	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
NO_2	3.75 (9.6)	2.0 (5.0)	1.75 (4.5)
Available thread sizes = 3/4 inch NPT or 20 mm			

Figure 1—Sensor Dimensions in Inches (Centimeters)

RELAY CONTACTS (Premium model only)—
SPST relays with selectable normally open/normally closed contacts, rated 5 amperes at 30 vdc/250 vac.

CURRENT OUTPUT (Premium model only)—
4 to 20 milliamperes, with a maximum external loop resistance of 600 ohms at 20 to 32 vdc. Can be configured for isolated or non-isolated operation.

DIMENSIONS—
See Figure 2.

SHIPPING WEIGHT (Approximate) –
2.0 pounds (0.9 kilogram).

WARRANTY—
Limited warranty 12 months on hardware, 24 months on sensor cell.

SYSTEM OPERATION

C706X SERIES SENSOR/TRANSMITTER

The Det-Tronics toxic and oxygen sensors consist of a sensor housing and a field replaceable electrochemical sensor cell. The transmitter circuitry for generating a 4 to 20 mA output signal is contained within the sensor housing, eliminating the need for a separate transmitter. The linear 4 to 20 mA dc output signal corresponds to the detection range for the sensor (See Table 1).

The housing for the H_2S and Cl_2 sensors are intrinsically safe (when used with an approved intrinsically safe barrier) and are designed for use in Class I, Division 1, Groups A, B, C and D locations.

The housing for the CO, SO_2, NO_2, and Cl_2 sensors are explosion-proof and are designed for use in Class I, Division 1, Groups C and D locations.

SETPOINTS

The R8471 Controller has three independent alarm outputs with field selectable setpoints. The alarm setpoints can be checked and/or changed using pushbuttons located on the faceplate of the controller. The calibration gas value is displayed and adjusted along with the alarm setpoints. The adjustment ranges are provided in Table 1.

CONTROLLER OUTPUTS

The R8471 Controllers are available in a Base model and a Premium model.

Base Model

The base controller is furnished with solid state (open collector transistor) outputs for the Low alarm, High alarm, Auxiliary alarm, and Fault circuits. The normally de-energized alarm outputs are energized when their corresponding setpoints are reached. The fault output is normally energized and becomes de-energized upon detection of a system fault.

Premium Model

The premium model is furnished with a set of four SPST relays in place of the four solid state outputs. This model also includes a 4 to 20 ma current output, which can be calibrated in the field to ensure maximum accuracy and can be configured for isolated or non-isolated operation.
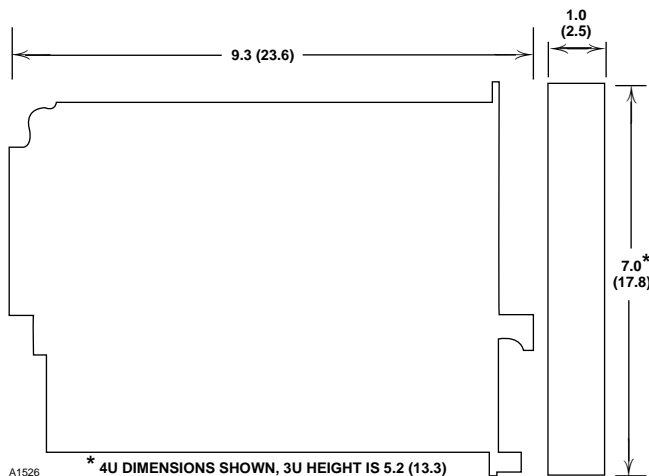

Figure 2—Controller Dimensions in Inches (Centimeters)

Table 3—Field Selectable Relay Options

Relay	Selectable Normally Open/Closed	Selectable Normally Energized/De-Energized	Selectable Latching/Non-Latching
Low	Y	Y[1]	Y[1]
High	Y	Y[1]	N[2]
Auxiliary	Y	Y[1]	Y[1]
Fault	Y	N[3]	N[4]

Y = Yes   N = No
[1]Selectable as a group, not individually   [2]Latching only
[3]Normally energized only   [4]No latching option

Programming Options (Premium model only)

Refer to Table 3.

AUTOMATIC DIAGNOSTICS AND FAULT IDENTIFICATION

The microprocessor based controller features self-testing circuitry that continuously checks for various problems. If a system fault is detected, the current output drops to less than 1.0 ma, the fault output is de-energized, and the digital display identifies the nature of the fault using an alpha-numeric code.

OPERATING MODES

In addition to the Normal mode, the controller can operate in other modes that are selected by pressing the appropriate pushbutton(s) located on the controller front panel. These modes include system reset, displaying and programming alarm setpoints, calibration of the 4 to 20 ma output, and sensor replacement.

CALIBRATION

The R8471 Controller uses a fully automatic calibration procedure in which all "adjustments" are made by the microprocessor in the controller. Upon completion of a successful calibration, the controller automatically returns to the Normal operating mode. If a successful calibration cannot be completed, the microprocessor will automatically return to the Normal mode and continue to use the previous calibration data. A calibration fault will be indicated on the digital display.

NOTE
The actual calibration procedure varies depending on the controller model. Refer to the controller instruction manual for complete calibration information.

ORDERING INFORMATION

Sensors must be ordered separately from the controller. When ordering please specify:

R8471B H_2S Controller

- 0 to 20 ppm
- 0 to 50 ppm
- 0 to 100 ppm

R8471C O_2 Controller

- 0 to 25%
- 15 to 25%

R8471D Cl_2 Controller

R8471E CO Controller

- 0 to 100 ppm
- 0 to 500 ppm
- 0 to 1000 ppm

R8471F SO_2 Controller

R8471G NO_2 Controller.

Also specify:

- Base or premium model
- 3U or 4U height.

NOTE
Operating ranges are not field selectable and must be specified when ordering. Operating ranges for the controller and sensor must match to ensure proper operation.

MOUNTING RACKS

A mounting rack is required for housing the controller. Q4003 (3U model) and Q4004 (4U model) Mounting Racks are recommended for ease of installation and servicing. 4U racks can house gas and/or flame controllers in any combination.

Q1050 SERIES WALL MOUNT ENCLOSURE

Offers up to six channels of R8471 gas controllers, mounted in a fiberglass wall mount enclosure, with full view window. Designed to meet NEMA 4X rating. Includes the same technology and features as the standard R8471 series. Any combination of R8471 gas controllers is available. A self-contained power supply is available.

For additional information, please refer to the Det-Tronics Product Catalog or visit our web site at www.detronics.com.

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