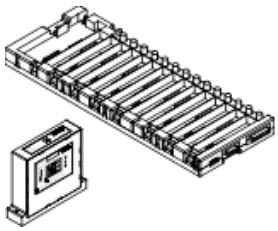
FieldMonitor* Hazardous Area Solutions



Description

The 1701/06 Isolator Terminal Base (ITB) and 170190 Dual Galvanic Isolator are the FieldMonitor* hazardous area solutions that support intrinsically safe transducer installations without external safety barriers. You must locate the FieldMonitor ITB and its associated modules in non-hazardous, Division 2, or Zone 2 areas while the connected transducers may be located in Division 1, Zone 1, or Zone 0 areas.

The 170190 Dual Galvanic Isolator installs directly into the ITB. This module eliminates the need to specify, install, and wire external safety barriers, or establish and maintain an intrinsically safe ground that zener safety barriers require. Two Galvanic Isolator versions are available:

- The 170190-01 is compatible with the 170133 and 170172 Internal Dual Proximitor* sensors. It also works with most of our standard Bently Nevada* external Proximitor sensors, velocity transducers, Velomitor* sensors, and accelerometers that use the 170180 transducer I/O modules.
- The 170190-02 was especially designed to be used with the CEC 4-131 and equivalent Velocity Transducers.

Note: An optional cable assembly (p/n 138925) is available when buffered dynamic outputs need to be routed to an external patch panel, or any other device requiring dynamic signals.

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Specifications

All Specifications are at 23°C ± 2°C, (73.4°F ± 3.6°F)

Electrical

Primary Power Input Range:

+19 Vdc to + 33 Vdc

Power Dissipation:

36 Watts at +24 V, typical for a complete system (4 monitors, 5 isolators, 5 Transducer I/O Modules or Internal Proximitor Modules)

Installation

Install per Control Drawing 141265 in a safe area, CSA Zone 2 IIC and Class 1 Division 2, Group A, B, C, D, or Cenelec Zone 2 IIC

1701/06 Isolator Terminal Base

Inputs/Outputs	Quantity
16-pin female Flexbus connector for connection directly to another Flex module	*1*
16-pin male Flexbus connector for connection directly to Flexbus using Flex extender cable	*1*
25-pin DSUB. Buffered dynamic output signals	*1*
Coaxial connectors for Buffered dynamic output signals	*8*
Coaxial connector for Buffered Keyphasor* output signal	*1*
2 conductor Euro terminal for Buffered Keyphasor output signal	*1*
2 conductor Euro terminal for primary power input, + and - connections, 14 to 18 AWG.	*1*
8 conductor Euro terminals for transducer field wiring for 8 monitor channels, 16 to 18 AWG. These connections are intrinsically safe when galvanic isolators are installed.	*4*
8 conductor Euro terminal for Keyphasor field wiring for one channel, 16 to 18 AWG. This connection is intrinsically safe when a galvanic isolator is installed	*1*
Wiring stud for hazardous area earth connection	*1*
Wiring stud for instrument earth connection	*1*

Module Capacity

FieldMonitor Module	1701/06 Capacity
Power Supply	*1*
2-channel Transducer I/O Module for Keyphasor input **Note:** A separate terminal base is needed for each shaft rotative speed as each terminal base can accommodate only one Keyphasor transducer.	*1*
170190-01 Dual Galvanic Isolator for Keyphasor module	*1*
1701/22 FieldMonitor Management Interface Module	*1*
2-channel monitor module	Up to 4
170190-XX Dual Galvanic Isolators (one per monitor)	Up to 4
2-channel Transducer I/O Modules (one per monitor)	Up to 4

Physical

1701/06

Dimensions: (HxWxD) (modules installed)

12.7 cm x 20.32 cm x 50.80 cm (5 in x 8.0 in x 20.00 in). See figures 1 and 2.

Weight: (no modules installed)

1.6 kg (3.5 LB)

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Mounting:

Bulkhead. 6 #10 bolts. Can mount over top of 35 mm low profile DIN rails.

Environmental Limits

1701/06

Operating Temperature:

-20°C to +70°C (-4°F to +158°F)

ambient air temperature next to modules

Storage Temperature:

-40°C to + 85°C (-40°F to +185°F)

Operating and Storage Humidity:

5% to 95% relative non-condensing

Hazardous Area Approvals

CSA/NRTL/C

Ex ia IIC : Class I, Zone 0:

Class I, Div 1, Groups A, B, C, D

Ex nA IIC Class I, Zone 2

Class I, Div 2, Groups A, B, C, D

T4 @ Ta = 70 °C max

When installed per drawing number 141265

ATEX

II 3G Ex nA[L] IIC T4 Gc

-30°C ≤ Ta ≤ 70°C

II 1/3 G Ex nA [ia] ia IIC T4 Ga

-30°C ≤ Ta ≤ 70°C

When installed per drawing number 141265

Brazil

DNV 12.0020X

Class I, Division 1, Groups A, B, C, D

Ex ia [ia Ga] nA IIC T4 Gc

170190 Dual Galvanic Isolator Specifications

All Specifications are at 23° ±2°C, (73.4°F ±3.6° F)

Signal Inputs

170190

The 170190 isolator interfaces to two transducers and works with either internal or external transducers. When an external transducer is used a Transducer I/O Module is installed in the terminal base.

Transducers that are not listed can be used with the isolator if they are approved and their entity parameters are within the isolator's specification. See the Safety and Entity Parameters section below. Refer to transducer specifications and ordering information sheets for exact ordering information.

Input Type	Transducer I/O Module or Internal Transducer	Transducer
Two external -24 Volt Proximitor sensors	170180-01-05	-24 Volt Proximitor transducers: 330100 330800 330801 330900 7200 5 mm, 8 mm 7200 14 mm
Internal Dual Proximitor (2-channels) transducer	170133-050-05 170133-090-05 170133-140-05 170172-050-05 170172-090-05	Not applicable
Two Acceleration sensors	170180-01-05	-24 Volt Acceleration sensors: 330400 330425 23733 49578 24145
Two Velocity sensors	170180-02-05	9200 74712
Two Velocity sensors	170180-02-05 used with 170190-02	CEC 4-131 and equivalent
Two Velomitor sensors	170180-03-05	330500 330525 330750 330752

Input Type	Transducer I/O Module or Internal Transducer	Transducer
Velomitor sensor on channel A and a Velocity sensor on channel B.	170180-04-05	Channel A: 330500 330525 330750 Channel B: 9200 74712

Environmental Limits

170190

Operating Temperature:

-20°C to +70°C (-4°F to +158°F) ambient air temperature next to modules

Storage Temperature:

-40°C to +85°C (-40°F to +185°F)

Operating and Storage Humidity:

5% to 95% relative non-condensing

Weight:

200g (0.44 LB) typical

Power Input

170190

+24 Volt dc input from terminal base:

+18 to +32 Vdc at input to isolator

+24 Volt Power:

97 mA at +24 V

-Vt Power with no transducers connected:

29 mA per channel. (this is power drawn by the isolator from the system)

ac Performance

170190

ac Amplitude:

Specification is input to output of isolator in percent of the monitors full scale range.

Frequency Range	Full Scale Ranges less than 200 mV peak		Full Scale Ranges greater than 200 mV peak	
	Pk or pk-pk signal processing	rms signal processing	Pk or pk-pk signal processing	rms signal processing
1 Hz to 5 kHz:	+4 to +2%	+1 to –2%	+1 to –2%	+1 to –2%
5 kHz to 10 kHz:	+3 to +1%	0 to –2%	- 1 to –4%	-1 to –3%
10 kHz to 20 kHz:	+3 to -2%	0 to –4%	-3 to –10%	-2 to –7%

ac Ripple:

14 mV rms, 20 kHz bandwidth

ac Phase:

(Delay is equal to or less than 12.5 microseconds)

0 Hz to 200 Hz:

Less than or equal to 0.86 degrees

200 Hz to 600 Hz:

Less than or equal to 2.6 degrees

600 Hz to 1 kHz:

Less than or equal to 4.3 degrees

1 kHz to 10 kHz:

Less than or equal to 43.2 degrees

10 kHz to 20 kHz:

Less than or equal to 90 degrees

dc Performance

170190

Specification is for inputs to the isolator between –2.0 Vdc and –20 Vdc to output of isolator

dc error:

±100 mVdc

Hazardous Area Approvals

170190

The system, including the isolator, transducer I/O modules, and internal Proximitor sensors must install in a safe area or Div 2 / Zone 2. The interface to external transducers and the proximity probe connectors on the internal Proximitor sensors are intrinsically safe and have the approvals shown.

170190-01 and
170190-02 Dual
Galvanic Isolators:

CSA/NRTL/C

Ex ia IIC : Class I, Zone 0

Class I, Division 1, Groups A, B, C, D

Ex nA IIC Class I, Zone 2

Class I Division 2, Groups A, B, C, D
T4 at Ta=70°C

ATEX

CE_{1180}

II 3G Ex nA[L] IIC T4 Gc

-30°C ≤ Ta ≤ 70°C

II 1/3 G Ex nA [ia] ia IIC T4 Ga

-30°C ≤ Ta ≤ 70°C

Safety Parameters: maximum output voltage and current per channel

(The safety parameters are the maximum output voltage and current into the hazardous area.)

This specification gives U_O and I_O, the maximum voltage and current at the intrinsically safe field wiring terminals on the terminal base when the 170190 isolator is used with the Transducer I/O Modules indicated. These two parameters are derived from the combination of the signal and power interface to a single transducer.

Transducer I/O Module or Internal Transducer	U_O, Volts	I_O, mA
170180-01-05	26.8	119.8
170180-02-05 with 170190-01	26.8	19
170180-02-05 with 170190-02	23.7	13.85
170180-03-05	26.8	119.8
170180-04-05, Channel A	26.8	119.8
170180-04-05, Channel B	26.8	19
170133-xxx-05	26.8	119.8
170172-xxx-05	26.8	119.8

Entity Parameters: maximum external capacitance and inductance per channel

(Entity parameters are used to determine if a system composed of individual approved components, such as a sensor, cabling, signal conditioning, and isolator, is within safe limits when it is connected as a system.)

This specification gives the limits for combined cable/sensor capacitance and inductance when the 170190 isolator is used with the Transducer I/O Modules indicated.

Note: Entity parameters apply to all I/Os with a 170190-01 isolator except for the 170180-02-05 I/O that can be used with the 170190-01 or the 170190-02 isolators.

Transducer I/O Module	IIC		IIB		IIA	
	C_o, nF	L_o, mH	C_o, nF	L_o, mH	C_o, nF	L_o, mH
170180-01-05 170180-03-05	74	2.73	680	11.10	2,330	22.25
170180-02-05 w/ 170190-01	70	110	698	443	2348	886
170180-02-05 w/ 170190-02	106	207	938	833	3438	1667
170180-04-05, Channel A	52	2.73	680	11.10	2,330	22.25
170180-04-05, Channel B	70	110	698	443	2348	886

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Null Input Offset Error

(Null Input Offset Error [NIOE] is the signal reading when there is no dynamic vibration from the connected sensor.)

This specification gives the typical values of NIOE measured using the digital scaled value returned by the vibration monitor connected to the Isolator. The effect of Null Input Offset Error on the displayed reading can be reduced by decreasing channel bandwidth and by selecting rms full-scale ranges when using velocity or acceleration sensors.

The following table shows NOIE as a function of full-scale range type and transducer type.

Full Scale Range Type	Transducer Type	Null Input Offset Error
Peak-to-Peak Displacement	200 mV/mil (7.87 mV/um) Proximitor Sensor	0.03 mil peak-to-peak (pp) (0.8 micrometer pp)
Peak Velocity	100 mV/in/s pk (3.93 mV/mm/s pk) Velomitor transducer	0.04 in/s pk (1.0 mm/s pk)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velomitor transducer	0.048 in/s pk (1.2 mm/s pk)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velocity transducer	0.04 in/s pk (1.0 mm/s pk)
	500 mV/in/s pk (19.68 mV/mm/s pk) Seismoprobe* transducer	0.01 in/s pk (0.25 mm/s pk)
RMS Velocity	100 mV/in/s pk (3.93 mV/mm/s pk) Velomitor transducer	0.01 in/s rms (0.25 mm/s rms)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velomitor transducer	0.01 in/s rms (0.25 mm/s rms)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velocity transducer	0.005 in/s rms (0.13 mm/s rms)
	500 mV/in/s pk (19.68 mV/mm/s pk) Seismoprobe transducer	0.002 in/s rms (0.05 mm/s rms)
Peak-to-Peak Displacement (Integrated Velocity)	100 mV/in/s pk (3.93 mV/mm/s pk) Velomitor transducer	0.10 mil peak-to-peak (pp) (2.5 micrometer pp)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velomitor transducer	0.08 mil pp (2.0 micrometer pp)
	145 mV/in/s pk (5.71 mV/mm/s pk) Velocity sensors	0.10 mil pp (2.5 micrometer pp)
	500 mV/in/s pk (19.68 mV/mm/s pk) Seismoprobe transducer	0.02 mil pp (0.5 micrometer pp)
Peak Acceleration	100 mV/g Accelerometers	0.10 g pk (1.0 m/s^2 pk)
	25 mV/g Accelerometers	0.50 g pk (4.9 m/ s^2 pk)
RMS Acceleration	100 mV/g Accelerometers	0.02 g rms (0.20 m/s^2 rms)
	25 mV/g Accelerometers	0.10 g rms (1.00 m/s^2 rms)
Peak Velocity (Integrated Acceleration)	100 mV/g Accelerometers	0.009 in/s pk (0.23 mm/s pk)
	25 mV/g Accelerometers	0.043 in/s pk (1.10 mm/s pk)
RMS Velocity (Integrated Acceleration)	100 mV/g Accelerometers	0.003 in/s rms (0.08 mm/s rms)
	25 mV/g Accelerometers	0.012 in/s rms (0.3 mm/s rms)

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dc Output with Input Open

This specification gives the minimum dc output voltage from the isolator with the input signal connected to common or open circuit when using an external or internal Proximitor transducer.

Transducer I/O Module or Internal Proximitor Module

Equal to or more positive than –1.00 Vdc

Ordering Information

1701/06-01

Isolator Terminal Base

170190-01

Dual Galvanic Isolator

170190-02

Dual Galvanic Isolator (used only with CEC 4-131 transducer or equivalent)

170180-xx-05

Transducer I/O Modules. Use the B=05, Multi Agency Approval Option

170133-xxx-05

3300 Series Dual Internal Proximitor module. Use the B=05, Multi Agency Approval Option

170172-xxx-05

7200 Series Dual Internal Proximitor module. Use the B=05, Multi Agency Approval Option

Accessories

139193-01

Blank Slot Cover Kit. Used to cover unused monitor, transducer I/O, or isolator slots in the terminal base.

FieldMonitor Buffered Dynamic Cable

138925–AAA-BB

Option Description

A: Cable Length

0 0 5	5 ft (1.5 m)
0 0 7	7 ft (2.1 m)
0 1 0	10 ft (3 m)
0 2 5	25 ft (7.6 m)
0 5 0	50 ft (15.2 m)
1 0 0	100 ft (30.5 m)

B: Cable Assembly

0 0	Unassembled
0 2	Assembled

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Dimensional Drawings

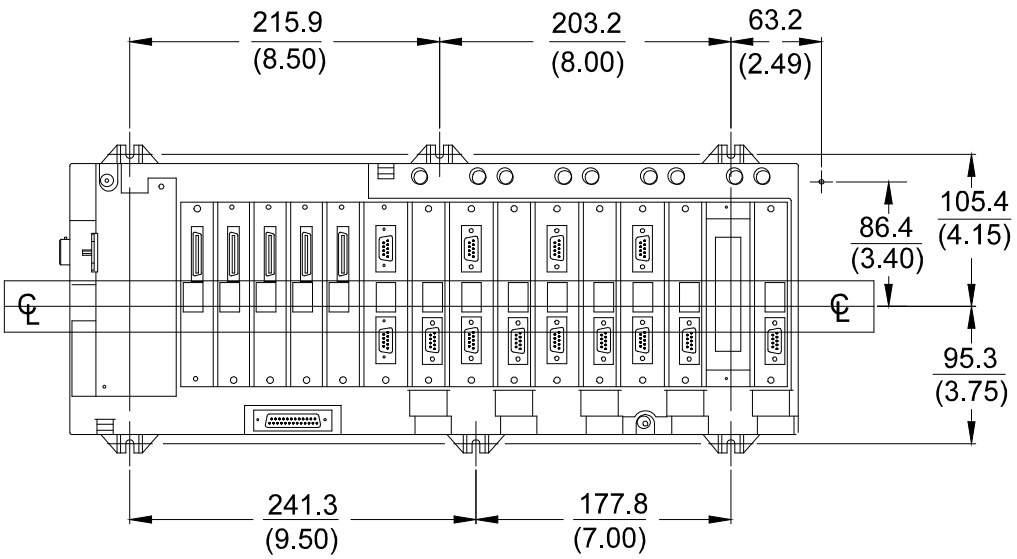

Figure 1: 1701/06 FieldMonitor Isolator Terminal Base
Dimensions are in millimetres (inches)

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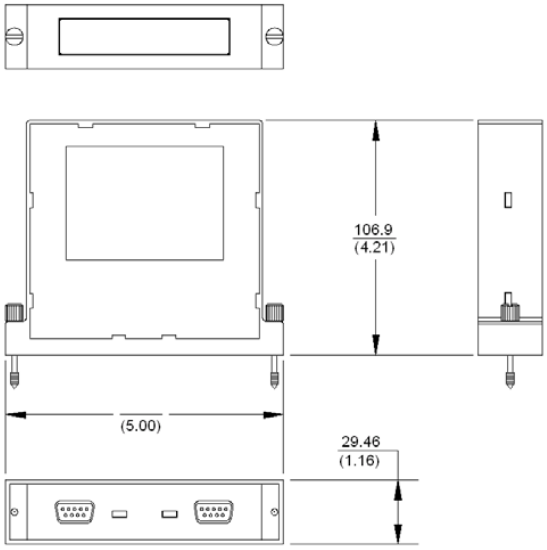

Figure 2: 170190 Dual Galvanic Isolator

Dimensions are in millimetres (inches)

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