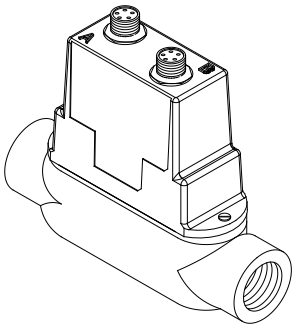
Описание на модуль расширения. Модель 200250 proTIM-C

BENTLY
Nevada

200250 proTIM-C Module

Bently Nevada* Asset Condition Monitoring



Description

The 200250 dual-input proTIM-C (conduit mount) provides 2 channels of measurement. All acceleration-to-velocity (A-V) channels condition the signal from an accelerometer and integrate it to velocity units. The low frequency A-V channels are better suited for slower speed applications. A-V with Acceleration Enveloping (AE) channels provide both integrated velocity units and advanced AE signal conditioning. Temperature channel types include K-type thermocouples and 100Ω Platinum (Pt) RTDs with electrical isolation. Each channel is independent and specified when the proTIM is ordered.

Table 1: proTIM Measurement Types and Transducers

Measurement Type	Interfaced Transducer
Acceleration-to-Velocity (General Purpose)	200150
Low Frequency Acceleration-to-Velocity	200155
Acceleration-to-Velocity with AE	200157
K-type Thermocouple	200125[2]
2-, 3-, or 4-Wire Platinum RTD	Industry standard
Rack Buffered Output (RBO)	Monitor
Process Variable (PV)	Monitor
Pressure	200132
Keyphasor Rotational Speed	330101/330103
Displacement	330101/330103

[2]The 200125 is the recommended Trendmaster sensor for temperature measurements when the range of a K-type thermocouple is adequate. We do not recommend the use of other K-type thermocouples due to the unique electrical isolation requirements of the Trendmaster system, and highly recommend the use of only non-grounded RTDs and non-grounded tip thermocouples to prevent ground loops. Failure to comply may result in Not OK or NO DATA conditions, inaccurate readings, or proTIM-C damage. Consult the factory for further information.

Specifications

All specifications are at +25 ± 5 °C (+77 ± 9 °F) unless otherwise specified.
Operation outside the specified limits will result in false or inaccurate readings.

Table 2: ProTIM and Transducers Frequency Responses

Device	Lower Freq	Upper Freq
200250-01	1 Hz	1 KHz
200250-05	1 Hz	1 KHz
200250-06 AV	1 Hz	1 KHz [1]
200250-06 AE	1 Hz	500 Hz[1]
200150 XDCR	10 Hz	1 KHz
200155 XDCR	3 Hz	10 KHz[2]
200157 XDCR	10 Hz	10 KHz

[1] 2002XX-06 ProTIM AE circuitry allows enveloping input frequency up to 10 KHz.

[2] 200155 has a long settling time. Therefore, it should only be used for low frequency acceleration to velocity channel types.

200250 proTIM-C and 200150, 200155, 200157 or 200125 transducer systems

For detailed specification on the transducers, refer to the individual transducer data sheets.

Electrical: A–V (General Purpose) Channels (with 200150)

Measurement Range

0 to 50 mm/s pk (0 to 2 in/s pk)

Over Range

63 mm/s pk (2.5 in/s pk)

Resolution

0.025 mm/s (0.001 in/s pk) nominal

Accuracy

±15% at 80 Hz

Frequency Response[1]

10 Hz to 1 kHz (600 cpm to 60,000 cpm) ±20% (± 2 dB).

[1] This Frequency response represents the System ProTIM & Transducer. For details on individual device frequency response refer to Table 2

Not OK Range

Open transducer signal, power, or common is “Not OK”. Shorted leads are “Not OK” except for SIG+ shorted to SIG- or common shorted to shield.

Electrical: Low Frequency A–V Channels (with 200155)

Measurement Range

0 to 50 mm/s pk (0 to 2 in/s pk)

Over Range

63 mm/s pk (2.5 in/s pk)

Resolution

0.025 mm/s (0.001 in/s pk) nominal

Accuracy

±15% at 80 Hz

Frequency Response[1]

3 Hz to 1 kHz (180 cpm to 60,000 cpm) ± 10% (±0.9 dB) [2].

[1] This Frequency response represents the System ProTIM & Transducer. For details on individual device frequency response refer to Table 2

[2] The A-V circuitry attenuates frequencies above 1 kHz. Use of the 200155 transducer to obtain higher frequency information will be ineffective.

Not OK Range

Open transducer signal, power, or common is “Not OK”. Shorted leads are “Not OK” except for SIG+ shorted to SIG- or common shorted to shield.

Electrical: A–V w/ AE Channels (with 200157)

Measurement Range

0 to 50 mm/s pk (0 to 2 in/s pk)

Over Range

63 mm/s pk (2.5 in/s pk)

Resolution

0.025 mm/s (0.001 in/s pk) nominal

Accuracy

±15% at 80 Hz

Frequency Response[1]

A-V

10 Hz to 1 kHz (600 cpm to 60,000 cpm) ± 20% (± 2.0 dB) [2]. *See* Table 2

AE

10 Hz to 500 Hz (600 cpm to 30,000 cpm) ± 20% (±2.0 dB) [3]

[1] This Frequency response represents the System ProTIM & Transducer. For details on individual device frequency response refer to Table 2

[2] The A-V circuitry attenuates frequencies above 1 kHz. Use of the 200157 transducer to obtain higher frequency information will be ineffective. AE signals up to 10 kHz are processed at the proTIM.

[3] The 500 Hz filter has a 4-pole attenuation slope. The enveloped signal will range between 1Hz to 500 Hz.

Not OK Range:

Open transducer signal, power, or common is "Not OK". Shorted leads are "Not OK" except for SIG+ shorted to SIG- or common shorted to shield.

Table 3: ProTIM and Transducers Compatibility

Device	200150	200155	200157
200250-01	Great	N/A	OK[1]
200250-05	OK[2]	Great	OK[2]
200250-06	OK[3]	N/A	Great

[1] ProTIM does not offer AE capability and will only accept frequencies up to 1 KHz whereas 200157 will go up to 10 KHz.

[2]Lower transducer limit is 10 Hz, whereas 200155 will operate down to 3 Hz.

[3] ProTIM's AE circuit accepts frequencies up to 10 KHz, but 200150 operates only up to 1 KHz.

Electrical: Temperature Channels

Measurement Range

-18 °C to +204 °C (0 °F to +400 °F)

Resolution

0.07 °C (0.12 °F)

Accuracy

K-Type TC

±8 °C (±14 °F), including proTIM-C, thermocouple & lead wire error, maximum length of 6 meters.

RTD

±4.45 °C (±8 °F), RTD lead wire error not included

OK Range

-31 °C to +213 °C (-25 °F to +415 °F)

Not OK Condition

Temperatures outside the OK Range

Open RTD or thermocouple wires are "Not OK"

RTD Compensation Coefficient Alpha in Ω/Ω/°C

European

0.00385

US Industrial

0.00392

Software Compensation

At host computer

Electrical: Rack Buffered Output Channels

Measurement Range

AC: 1Vpp to 8Vpp full scale
DC: 0 to –20Vdc (See Table 2)

Table 2:Input Signal and Range

Input Signal	Full Scale	Overrange
LOAC_IN	1.6Vpp	1.92Vpp
HIAC_IN	8Vpp	9.6Vpp
DCGAP_IN	DC: -20VDC AC: 1Vpp	DC: -24VDC AC: 5.3Vpp

Resolution

AC: ±1% of full-scale value at 100Hz
DC: ±100 mV, absolute accuracy

Frequency Response

10Hz to 3 KHz (+0 to –5%)

Not OK Range

Input signal is out of range,
Input signal miswired.

Electrical: Process Variable Channels

Measurement Range

Current: +4mA to +20mA
Voltage: +1Vdc to 5Vdc

Over Range

Current: <+3mA or >+22mA
Voltage: <+0.8Vdc or >+5.5Vdc

Resolution

±1% of full-scale value Typical

OK Range

Current: Over +3.2mA
Voltage: Over 0.8Vdc

Frequency Response

DC to 3 KHz

Electrical: Pressure Channels

Measurement Range

0 to 50mV

Resolution

±8.5% of the transducer full-scale rating (transducer accuracy not included)

OK Range

1Vdc to 3Vdc Bias from transducer

Frequency Response

Less than 3 KHz

Keyphasor Rotational Speed Channels (with 330101/330103)

Measurement Range

0.1 to 600 Hz (6 to 36000 RPM)

Transducer Range

10 to 50 mils (0.254 to 1.27 mm)

Resolution

1 RPM

Accuracy

Within 0.015% of true RPM.

Frequency Response

Minimum Trigger Width 9.0 mm (0.35 in)

Minimum Trigger Relief 1.25 mm (0.05 in)

Not OK Range

Open/short transducer signal, Power or common is "Not OK".

Displacement Channels (with 330101/330103)

Input

Used with our 3300 XL 8 mm probe or 3300 5 mm probe and extension cable (5 metre system) only.

Output Voltage Range

-3.0 to 3.0 V (Over Specified linear range)

Transducer Linear Range

10 to 50 mils (0.254 to 1.27 mm)

Scale Factor

120 mV/mil +/-10%

Accuracy Over gap Range

+/-1.2 mils @ mid-scale range.

Frequency Response

DC to 3 KHz (0 to 180,000 cpm).

Minimum Target size

15.2 mm (0.6in) diameter (flat target)

Shaft Diameter:

Minimum: 50.8 mm (2 in)

Recommended minimum: 76.2 mm (3 in)

Measurements on shaft diameters smaller than 50 mm (2 in) usually require close spacing of radial vibration or axial position transducers with the potential for their electromagnetic emitted fields to interact with one another (cross-talk), resulting in erroneous readings. Care should be taken to maintain minimum separation of transducer tips, generally at least 40 mm (1.6 in) for axial position measurements or 74 mm (2.9 in) for radial vibration measurements. Radial vibration or position measurements on shaft diameters smaller than 76.2 mm (3 in) will generally result in a change in scale factor. Consult Performance Specification 159484 for additional information.

Not OK Range

Open/short transducer signal, Power or common is "Not OK".

Environmental Limits

Operating Temperature

-40 °C to +85 °C (-40 °F to +185 °F)

Storage Temperature

-40°C to +100°C (-40 °F to +212 °F)

Humidity

100% condensing on exposed surfaces.

100% noncondensing on surface inside conduit.

Note: Apply DC4 grease on connecter contacts to improve environmental performance and prevent corrosion.

Enclosure Type

Type 4

Mechanical

Housing Material

Powder-coated Aluminum

Weight

620 g (22 oz) not including conduit body

Dimensions

See diagram

Electromagnetic Compatibility

Standards

EN 61000-6-2 Immunity for Industrial Environments.

EN 61000-6-4 Emissions for Industrial Environments.

EN 55011 (2007), ISM Equipment.

European Community Directives

EMC Directive 2004/108/EC.

For further certification and approvals information please visit the following website:
www.ge-mcs.com/bently

Hazardous Area Approvals

CSA

Installed with intrinsically safe zener barriers per drawing 162084

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

Class II, Div 1 Groups E, F & G

Class III, Div 1

AEx ia/Ex ia IIC; Class I Zone 0 T4

T4 @ -40 °C ≤ Ta ≤ +100 °C

Installed without barriers per drawing 162085

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

AEx nA/Ex nA IIC, Class I Zone 2 T4

T4 @ -40 °C ≤ Ta ≤ +100 °C

ATEX Approvals

Installed with intrinsically safe zener barriers per drawing 162084

II 1 G

Ex ia IIC T4 Ga

T4 @ -40 °C ≤ Ta ≤ +100 °C

Installed without barriers per drawing 162085

II 3 G

Ex nA IIC T4 Gc

T4 @ -40 °C ≤ Ta ≤ +100 °C

IEC Ex Approvals

Installed with intrinsically safe zener barriers per drawing 162084

Ex ia IIC T4 Ga

T4 @ -40 °C ≤ Ta ≤ +100 °C

Installed without barriers per drawing 162085

Ex nA IIC T4 Gc

T4 @ -40 °C ≤ Ta ≤ +100 °C

Brazil

BR-Ex ia IIC T4

MC, AEX-8307-X

BR-Ex nA II T4

AEX-12678-X

T4 @ -40 °C ≤ Ta ≤ +100 °C

Intrinsically safe entity parameters

Maximum Number of ProTIMs Per Line

32 (all gas groups)

Power Supply Requirements

$U_i \leq 15V$ $C_i \approx 0$ (negligible)

$I_i \leq 150$ mA $L_i \approx 0$ (negligible)

Signal Terminals

$U_i \leq 12V$ $I_i \leq 12$ mA

Field Wiring Parameters

See Table 4 .

Table 4: ProTIM-C Field Wiring Parameters

Gas Group	Capacitance (µF)	Inductance (mH)	L/R (µH/ohm)
IIC	0.09	2	16
IIB	0.705	8	64
IIA	2.23	16	130

Non-incendive (Zone 2 or Div 2) entity parameters

Power Supply Requirements

U_n = 12 V to 15 V (nominal)

I_n = 50 mA (nominal)

Maximum Cable Length

See Table 5 .

Maximum Number of ProTIMs per Line

See Table 5.

Table 5: Maximum Cable Length and Number of proTIMs per Line

Gas Group	Maximum Cable Length	Maximum Number of ProTIMs per line
IIC	1000	125
IIB	3599	127
IIA	4876	127

For further certification and approvals information please visit the following website:
www.ge-mcs.com/bently

200151 Transducer Cables

Used to connect the 200150, 200150, and 2000157 transducers to the proTIM-C.

Operating Temperature

-20 °C to +100 °C (-4 °F to +212 °F).

Note: These cables may be used at lower temperatures down to –40 °C (-40 °F), if the cable is not allowed to move or flex. Flexing these cables at temperatures below –20 °C (-4 °F) may damage them.

Minimum Bend Radius

63.5 mm (2.5 in)

Construction

4-conductor (22 AWG) with foil shield and drain wire (100% coverage), polyvinyl chloride (PVC) outer jacket.

Connectors

Screw-on, 5-pin, keyed connector on the ProTIM-C end and a PT06F8-4S (or equivalent) on the transducer end. Connector coupling nuts consist of 1/2-20 UNF-threaded 2011 T3 aluminum or UV-stabilized black nylon. Contact material is gold-plated nickel-coated brass.

Classifications:

Cable assembly meets UL 2238.

Cable meets IP67 ingress protection.

85033 Trendmaster SPA/TIM line cable

Use to connect a SPA to the proTIM-C.
For substitutions, reference guide 101206.

Operating Temperature

-70 °C to +200 °C (-94 °F to +392 °F).

Conductors

4x 18 AWG stranded tinned copper

1x 18 AWG stranded copper, tinned overcoat uninsulated drain wire

Shielding

100% aluminum mylar foil out with helically applied drain wire

85% braided tinned copper

Insulation

Conductors

Fluoroethylene propylene (FEP) Teflon® insulation 0.25 mm (0.010 in) thick

Outer

FEP Teflon insulation 0.38 mm (0.015 in) thick

Classifications

NEC article 725 class 3

UL Listed

Voltage rating

300 Vrms

Capacitance

Between Conductors

131 pF/m (40 pF/ft)

Between Conductor and Drain Wire

262 pF/m (80 pF/ft)

Ordering Information

(All conduit bodies have 1-inch hubs.)

proTIM-C

200250-AXX-BXX-CXX-DXX

A: Channel A Input Option

- **0 1** Acceleration to Velocity (200150)
- **0 2** K-Type Thermocouple (200125)
- **0 3** 2 or 3 Wire Pt. RTD
- **0 4** 4 Wire Pt. RTD
- **0 5** Low Freq Accel-to-Velocity (200155)
- **0 6** Accel to Velocity w/ AE (200157)
- **07** Rack buffered Output
- **08** Process Variable
- **09** Pressure (200132)
- **1 0** Keyphasor (330101/330103)
- **11** Displacement (330101/330103)

B: Channel B Input Option

- **0 1** Acceleration to Velocity (200150)
- **0 2** K-Type Thermocouple (200125)
- **0 3** 2 or 3 Wire Pt. RTD
- **0 4** 4 Wire Pt. RTD
- **0 5** Low Freq Accel-to-Velocity (200155)
- **0 6** Accel to Velocity w/ AE (200157)
- **07** Rack buffered Output
- **08** Process Variable
- **09** Pressure (200132)
- **1 0** Keyphasor (330101/330103)
- **11** Displacement (330101/330103)

Note: BXX option availability is dependent on AXX options chosen. Not all BXX options are available with each AXX option.

C: Approvals

- **0 0** CSA: Class 1 DIV 2, No Barriers
  ATEX: Zone 2, No Barriers
- **0 5** Multi – Approvals

D: Conduit Body Style

0 0	No conduit body
0 1	Appleton® Style C body, malleable iron
0 2	Appleton Style E body, malleable iron
0 3	Appleton Style C body, aluminum
0 4	Appleton Style E body, aluminum
0 5	Weatherproof housing mount

Transducer Cable (for use with 200150, 200150, and 200157 accelerometers)

200151-AA-BB-CC

Note: Use the 200151 with the 200250 proTIM only with applications using either a 142485 Housing Cable Adapter or a 141887 Conduit Cable Adapter

A: Cable Length:

2 0	2.0 metre (6.6 feet) cable
4 0	4.0 metre (13.1 feet) cable
6 0	6.0 metre (19.7 feet) cable

B: Armor Option:

0 2	Standard cable, unarmored.
0 3	Stainless steel over braid (armored) cable

C: Nut Option:

0 0	Standard aluminum coupling nut
0 2	Nylon coupling nut
1 0	Knurled aluminum coupling nut

Note: C01, environmental boot option, is no longer available and is not necessary for use with all 3 existing stainless steel accelerometers, but may be used with previous plastic 200150 sensors.

Pressure Transducer

200132-AXXX

A: Pressure rating

0030	0 to 30 PSI SG
0050	0 to 50 PSI SG
0100	0 to 100 PSI SG
0300	0 to 300 PSI SG
0500	0 to 500 PSI SG
1000	0 to 1000 PSI SG
1500	0 to 1500 PSI SG
2000	0 to 2000 PSI SG

Accessories

161934-01

proTIM-C Installation Manual.

162411

Trendmaster System Manual.

149831-01

Trendmaster DSM Datasheet.

01620085

Extra Terminal Plugs. For SPA line connection. 3 terminal plugs provided with each proTIM-C module

149326-01

The 200151 Accel Cable Environmental Boot Field Installation Kit. Contains everything needed to install the boot in the field. It includes 10 sets of boots and clamps, silicone lubricant, easy-to-use installation tool, and an instruction sheet. You can purchase additional boots and clamps separately (see part number below). The kit is not compatible with armored cables and only compatible with older, plastic versions of accelerometers; not compatible with existing stainless steel accelerometers.

04500006

Dow Corning® 4, Electrical Insulating Compound (5.3 Oz).

03814231

Compression Fitting. For 1-inch conduit body hubs. Seals for cables when installing proTIM-C modules without conduit.

85033-02-00

300 Meter (1000 ft) Cable. For TIM line.

85033-01-00

150 Meter (500 ft) Cable. For TIM line

162454

Dust Cap. For temperature channel connectors.

04400000

Dust Cap. For accelerometer channel connectors.

141888

Hardware Mounting Kit. For mounting proTIM-C modules to weather-proof housings

03810116

Red Silicone Rubber Gasket. Use between proTIM-C and weatherproof housing.

163996-01

proTIM-C Conduit Gasket/Cable Seal Installation Kit. Consists of a black silicone rubber gasket/seal, three nylon hose clamps, electrical insulating compound, and instructions for installation.

162438-01

Thermocouple and RTD Connector. With smaller cable crimp seal.

02180005

Jumpers. For the proTIM-C thermocouple or RTD terminals.

330101/330103

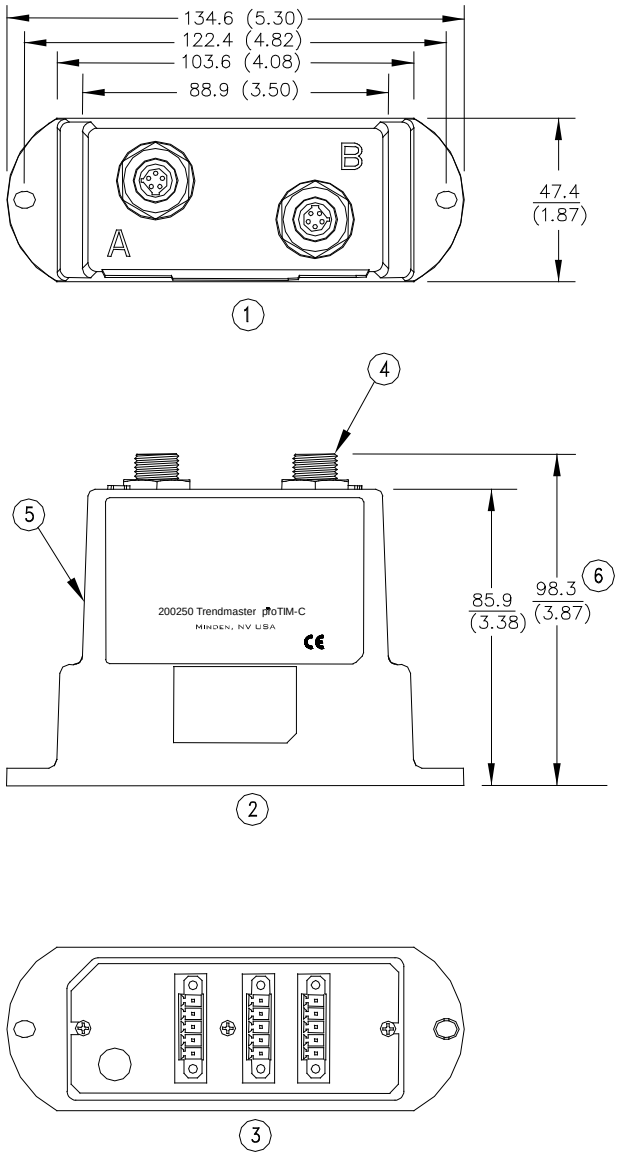
3300XL Proximity Probe. For the proTIM-C Keyphasor channel type.

Table 6: Channel types Cross- Compatibility

			Channel A										
	The **200200 dual-input ProTIM-R** (DIN rail mount) provides 2 channels of measurement. The **200250 dual-input ProTIM-C** (Conduit mount) provides 2 channels of measurement.		Acceleration to Velocity	K-Type Thermocouple	2 or 3 Wire Pt. RTD	4 Wire Pt. RTD	Low Freq Accel-to-Velocity	Accel to Velocity w/AE	Rack buffered Output	Process Variable	Pressure	Keyphasor	Displacement
			01	02	03	04	05	06	07	08	09	10	11
Channel B	**Acceleration to Velocity**	**01**	OK										
	K-Type Thermocouple	**02**	OK	OK			OK	OK					
	2 or 3 Wire Pt. RTD	**03**	OK		OK		OK	OK					
	4 Wire Pt. RTD	**04**	OK			OK	OK	OK					
	Low Freq Accel-to-Velocity	**05**	OK				OK	OK					
	Accel to Velocity w/AE	**06**						OK					
	Rack buffered Output	**07**							OK				
	Process Variable	**08**								OK			
	Pressure	**09**									OK		
	Keyphasor	**10**										OK	OK
	Displacement	**11**										OK	OK

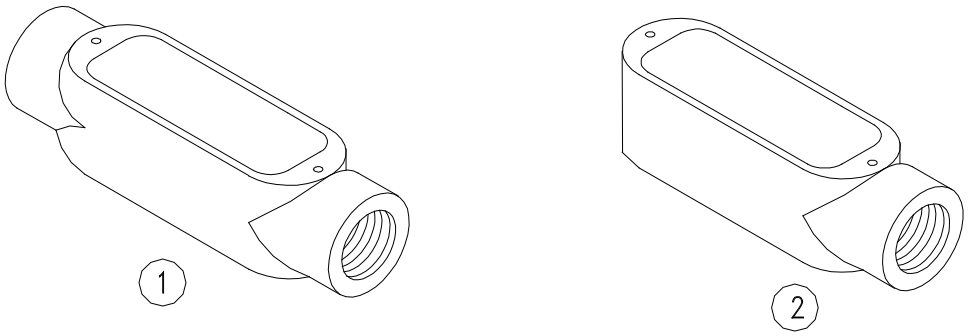
Dimensional Diagram

Note: All dimensions in millimetres (inches) except as noted.



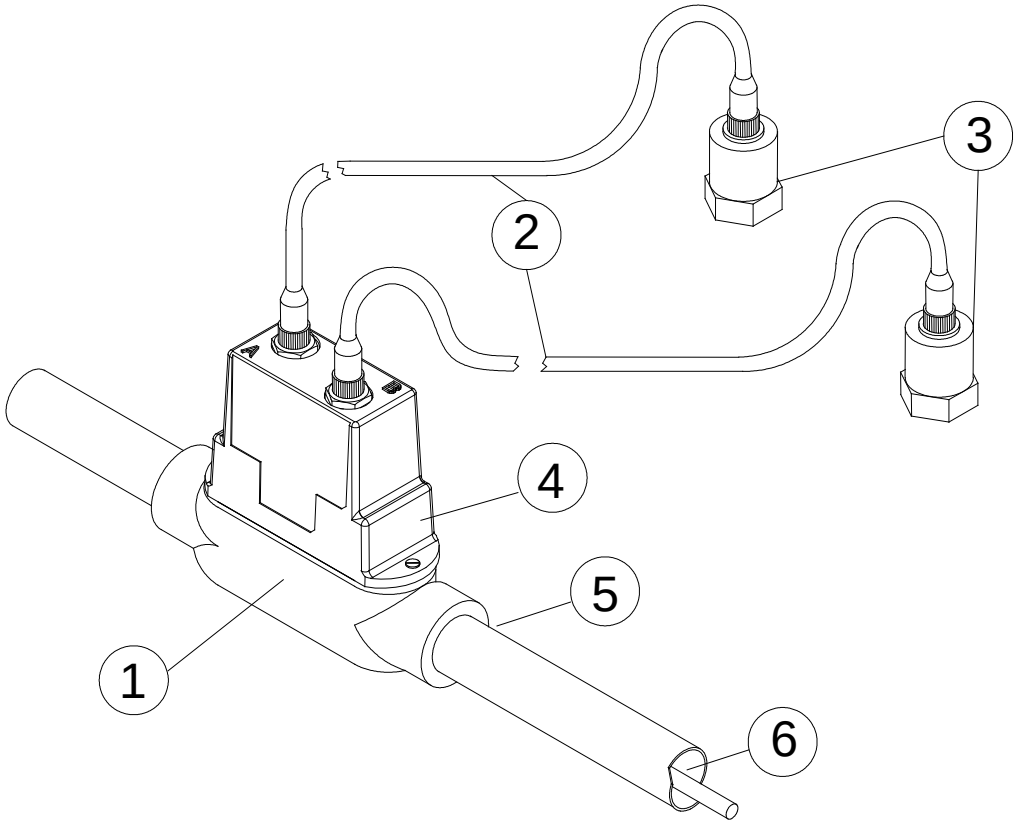
1. Top view
2. Front view
3. Bottom view
4. 1/2-20 5-pole female receptacle
5. Powder-coated aluminum housing
6. Allow 127 mm (5 in) for total height with connector and cable bend

Figure 1: Dimensional Diagram and Wiring Connection Details



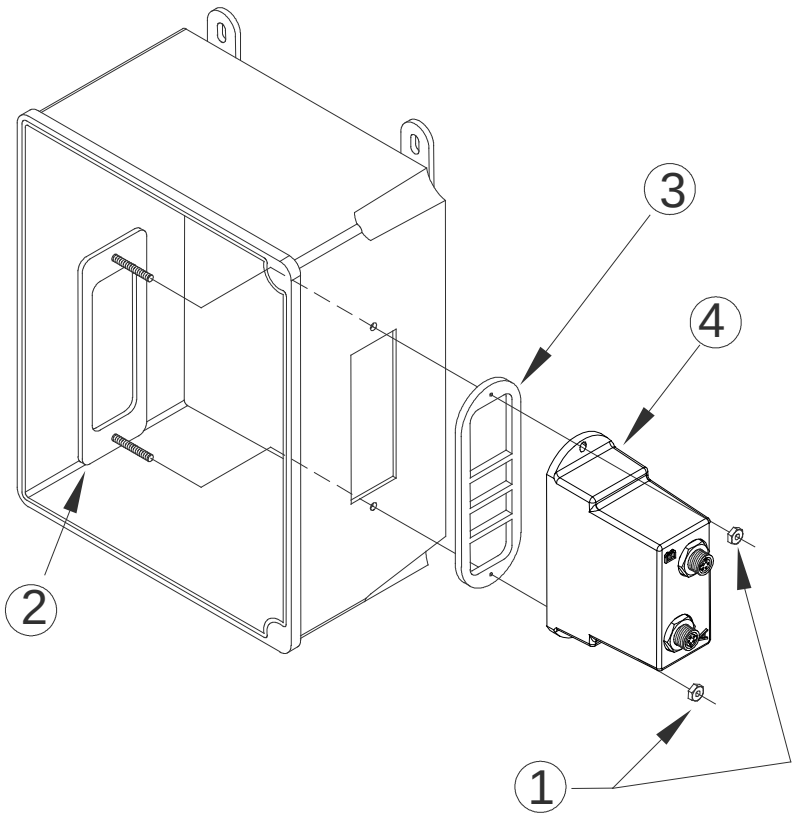
1. Style C conduit body
2. Style E conduit body

Figure 2: Conduit Body Styles Provided With the proTIM -C



1. Style C conduit body
2. Transducer cables
3. Transducers
4. ProTIM-C module
5. Rigid conduit
6. SPA line

Figure 3: Installed proTIM -C in Style C Conduit Body



1. Retention nuts (2 places)
2. Reinforcing plate
3. Gasket
4. proTIM-C module

Figure 4: Installed proTIM -C Module with Weatherproof Housing

По вопросам продаж и поддержки обращайтесь: btn@nt-rt.ru www.bently.nt-rt.ru

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Белгород(4722)40-23-64,
Брянск(4832)59-03-52,
Владивосток(423)249-28-31,
Волгоград(844)278-03-48,
Вологда(8172)26-41-59,
Воронеж(473)204-51-73,
Екатеринбург(343)384-55-89
, Иваново(4932)77-34-06,
Ижевск(3412)26-03-58,
Казань(843)206-01-48,
Калининград(4012)72-03-81,
Калуга(4842)92-23-67,
Кемерово(3842)65-04-62,
Киров(8332)68-02-04,
Краснодар(861)203-40-90,
Красноярск(391)204-63-61,
Курск(4712)77-13-04,
Липецк(4742)52-20-81,
Магнитогорск(3519)55-03-13,
Москва(495)268-04-70,
Мурманск(8152)59-64-93,
НабережныеЧелны(8552)20-53-41
, НижнийНовгород(831)429-08-12,
Новокузнецк(3843)20-46-81,
Новосибирск(383)227-86-73,
Орел(4862)44-53-42,
Оренбург(3532)37-68-04,
Пенза(8412)22-31-16,
Пермь(342)205-81-47,
Ростов-на-Дону(863)308-18-15,
Рязань(4912)46-61-64,
Самара(846)206-03-16,
Санкт-Петербург(812)309-46-40,
Саратов(845)249-38-78,
Смоленск(4812)29-41-54,
Сочи(862)225-72-31,
Ставрополь(8652)20-65-13,
Тверь(4822)63-31-35,
Томск(3822)98-41-53,
Тула(4872)74-02-29,
Тюмень(3452)66-21-18,
Ульяновск(8422)24-23-59,
Уфа(347)229-48-12,
Челябинск(351)202-03-61,
Череповец(8202)49-02-64,
Ярославль(4852)69-52-93

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