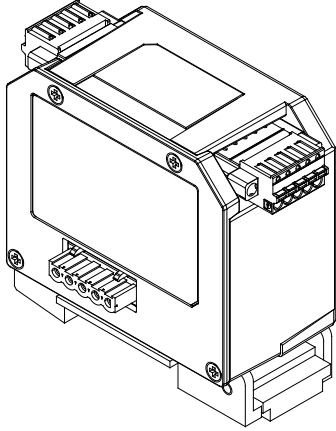


200200 proTIM-R Module

Bently Nevada* Asset Condition Monitoring



Description

The 200200 dual-input proTIM-R (DIN rail 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 ¹
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

¹The 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-R damage. Consult the factory for further information.



Specifications

All specifications are at $+25 \pm 5$ °C ($+77 \pm 9$ °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
200200-01	1 Hz	1 KHz
200200-05	1 Hz	1 KHz
200200-06 AV	1 Hz	1 KHz ¹
200200-06 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.

200200 proTIM-R 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

$\pm 15\%$ at 80 Hz

Frequency Response¹

10 Hz to 1 kHz (600 cpm to 60,000 cpm) $\pm 20\%$ (± 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

$\pm 15\%$ at 80 Hz

Frequency Response¹

3 Hz to 1 kHz (180 cpm to 60,000 cpm) $\pm 10\%$ (± 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 Response¹
A-V
10 Hz to 1 kHz (600 cpm to 60,000 cpm) ± 20% (± 2.0 dB)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

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.

Accuracy
K-Type TC

±8 °C (±14 °F), including proTIM-R, 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

Device	200150	200155	200157
200200-01	Great	N/A	OK ¹
200200-05	OK ²	Great	OK ²
200200-06	OK ³	N/A	Great

At host computer

Electrical: Temperature Channels

Measurement Range
-18 °C to +204 °C (0 °F to +400 °F)

Resolution
0.07 °C (0.12 °F)

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: $\pm 1\%$ 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

$\pm 1\%$ 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

$\pm 8.5\%$ 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% non-condensing

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

Enclosure Type

Type 4

Mechanical

Housing Material

Powder-coated Aluminum

Weight

545 g (19 oz)

Dimensions

See **Figure 2** or **Figure 3**.

Compliance and Certifications

EMC

Standards:

EN 61000-6-2 Immunity for Industrial Environments

EN 61000-6-4 Emissions for Industrial Environments

European Community Directives:

EMC Directive 2004/108EC

For further declaration of conformance information please visit the following website:
www.ge-mcs.com/bently

Hazardous Area Approvals

CSA

Installed with intrinsically safe zener barriers per drawing 164160


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 164161


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

Installed with intrinsically safe zener barriers per drawing 164160

 II 1 G
 Ex ia IIC T4 Ga
 T4 @ -40 °C ≤ Ta ≤ +100 °C

Installed without barriers per drawing 164161

 II 3 G
 Ex nA IIC T4 Gc
 T4 @ -40 °C ≤ Ta ≤ +100 °C

IEC Ex

Installed with intrinsically safe

zener barriers per drawing 164160

Ex ia IIC T4 Ga
 T4 @ -40 °C ≤ Ta ≤ +100 °C

Installed without barriers per drawing 164161

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

Signal Terminals

$U_i \leq 12V$ $I_i \leq 12 \text{ mA}$

Field Wiring Parameters

See Table 2.

Table 4: ProTIM-R 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*

$U_n = 12\text{ V to }15\text{ V (nominal)}$

$I_n = 50\text{ mA (nominal)}$

*Maximum Cable
Length*

See Table 3.

*Maximum Number
of ProTIMs per
Line*

See Table 3.

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:
<http://www.ge-mcs.com/en/bently-nevada.html>

200151 and 200152 Transducer Cables

Used to connect the acceleration transducers to the proTIM-R.

**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

200151 Cables

Screw-on, 5-pin, keyed connector on the ProTIM-R 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.

200152 Cables

PT06F8-4S (or equivalent) on the transducer end; stripped stranded wire at proTIM end. Connector coupling nut material is 1/2-20 2011 T3 aluminum or UNF-threaded nickel-plated brass. Connector contact material is gold-plated brass.

Classifications:

Cable assembly meets UL 2238. Cable meets IP67 ingress protection.

85033 Trendmaster SPA/TIM line cable

Use to connect a Signal Processing Adapter (SPA) to the proTIM. 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® material 0.25 mm (0.010
in) thick

Outer

FEP Teflon® material 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)

- 03 2 or 3 Wire Pt. RTD
- 04 4 Wire Pt. RTD
- 05 Low Freq Accel-to-Velocity
(200155)
- 06 Accel to Velocity w/AE
(200157)
- 07 Rack buffered Output
- 08 Process Variable
- 09 Pressure (200132)
- 10 Keyphasor (330101/330103)
- 11 Displacement (330101/330103)

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

C: Approvals

- 05 Multiple Approvals

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

200151-AA-BB-CC

Note: Use the 200151 with the 200200 proTIM
only with applications using either a 142485
Housing Cable Adapter or a 141887 Conduit
Cable Adapter

A: Cable Length:

- 20 2.0 metre (6.6 feet) cable
- 40 4.0 metre (13.1 feet) cable
- 60 6.0 metre (19.7 feet) cable

B: Outer Jacket Option:

- 02 Blue, unarmored
- 03 Blue, armored

C: Additional Features:

- 00 Standard coupling nut
- 02 Nylon coupling nut
- 10 Knurled coupling nut

Ordering Information

ProTIM-R

200200-AA-BB-CC

A: Channel AA Input Option

- 01 Acceleration to Velocity
(200150)
- 02 K-Type Thermocouple (200125)
- 03 2 or 3 Wire Pt. RTD
- 04 4 Wire Pt. RTD
- 05 Low Freq Accel-to-Velocity
(200155)
- 06 Accel to Velocity w/AE
(200157)
- 07 Rack buffered Output
- 08 Process Variable
- 09 Pressure (200132)
- 10 Keyphasor (330101/330103)
- 11 Displacement (330101/330103)

B: Channel BB Input Option

- 01 Acceleration to Velocity
(200150)
- 02 K-Type Thermocouple (200125)

Transducer Cable (for use with 200150, 100255 and 200157 accelerometers)

200152-AA-BB

A: Cable Length:

- 04 4.0 metre (13.1 feet) cable
- 15 15.0 metre (49.2 feet) cable
- 25 25.0 metre (82.0 feet) cable (for
use with 200150 only)

B: Additional Features:

- 00 Standard coupling nut
- 10 Knurled coupling nut

Transducer Cable for use with 200132 pressure transducer
286184

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

136806-01

T-TIM Assembly.

141887-01

Single Conduit Cable Adapter.

141887-02

Double Conduit Cable Adapter.
See **Figure 5.**

142485-01

Housing Cable Adapter. See
Figure 4.

149831-01

Trendmaster DSM Datasheet.

163986-01

ProTIM-R Installation Manual.

164045

Extra Female Terminal Plugs. For
TIM line connections.

164046

Extra Male Terminal Plugs. For
TIM line connections.

164352

T-Connector. For splitting TIM line
cable into 2 directions.

85033-01-00

150 Meter (500 ft) Cable. For TIM
line, no connectors.

85033-02-00

300 Meter (1000 ft) Cable. For
TIM line, no connectors.

88312-01

4-unit IS Polyester W/P Housing.
Div 1, Type 4X. Houses 4 proTIM-
R units maximum. See **Figure 2.**

88313-01

2-unit IS Polyester W/P Housing.
Div 1, Type 4X. Houses 2 proTIM-
R units maximum. See **Figure 2.**

88314-01

4-unit IS SST W/P Housing. Div1,
Type 4X, Houses 4 TIMs
maximum. See **Figure 3.**

88315-01

2-unit IS SST W/P Housing. Div 1,
Type 4X. Houses 2 TIMs
maximum. See **Figure 3.**

85716-01

2-unit Polyester W/P Housing.
Div 2, Type 4X. Houses 2 proTIM-
R units maximum. See **Figure 2.**

85717-01

4-unit Polyester W/P Housing.
Div 2, Type 4X., Houses 4 proTIM-R
units maximum. See **Figure 2.**

00500128

Terminal Connector. For
Transducer inputs into proTIM-R.

02180005

Jumper. For the RTD proTIM-R
terminals.

03814237

Conduit Hub. 1/2-14 NPT.

03817040

Bonding and Ground Wedge. 1/2
NPT.

03839129

Conduit Fitting. 1/2-14 NPT.

03839240

Cable Seal. 1/4-12 NPT. Diameter 5.0 to 6.7 mm (0.20 to 0.26 in); Use with 200152 cable.

03839241

Cable Seal. 1/4-12 NPT. Diameter 1.9 to 3.4mm (0.07 to 0.13 in).

03839242

Cable Seal. 1/4-12 NPT. Diameter 3.4 to 5.0 mm (0.13 to 0.20 in). Use with 200125 armored thermocouple.

03839243

Cable Seal. 1/2-14 NPT. Diameter 6.4 to 7.9 mm (0.25 to 0.31 in).

03840490

Thread Seal. For 1/4 -12 NPT fittings.

03880243

Square Cut O-ring. For 1/2-14 NPT fittings.

04500006

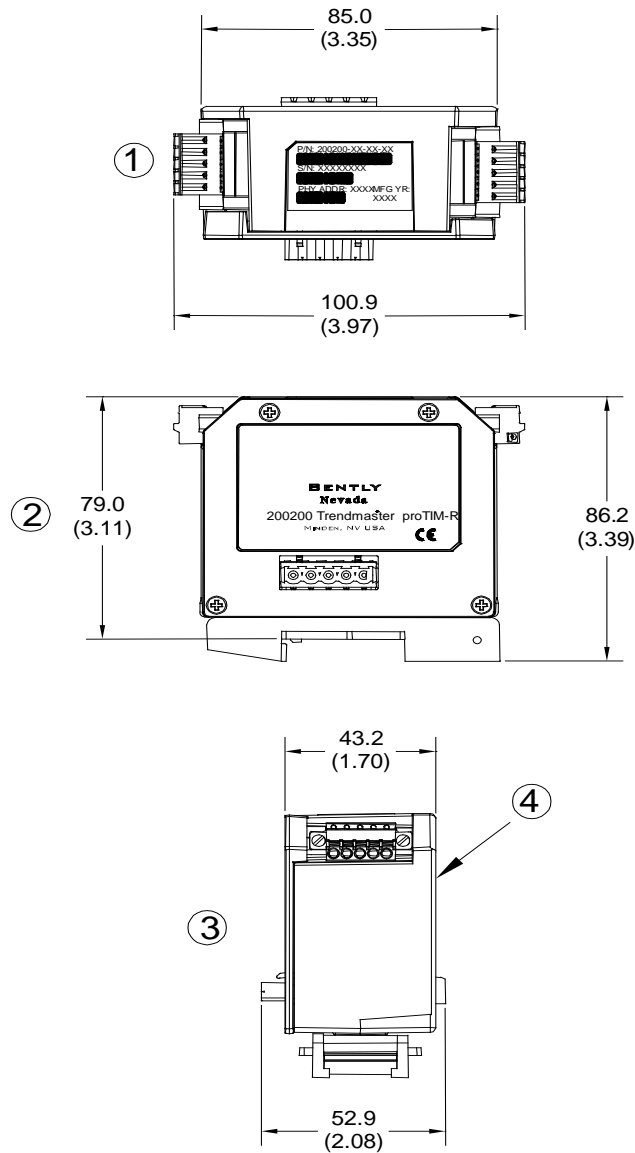
Dow Corning® 4, Electrical Insulating Compound (5.3 Oz).

Table 6: Channel types Cross- Compatibility

		Channel A											
		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	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	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	

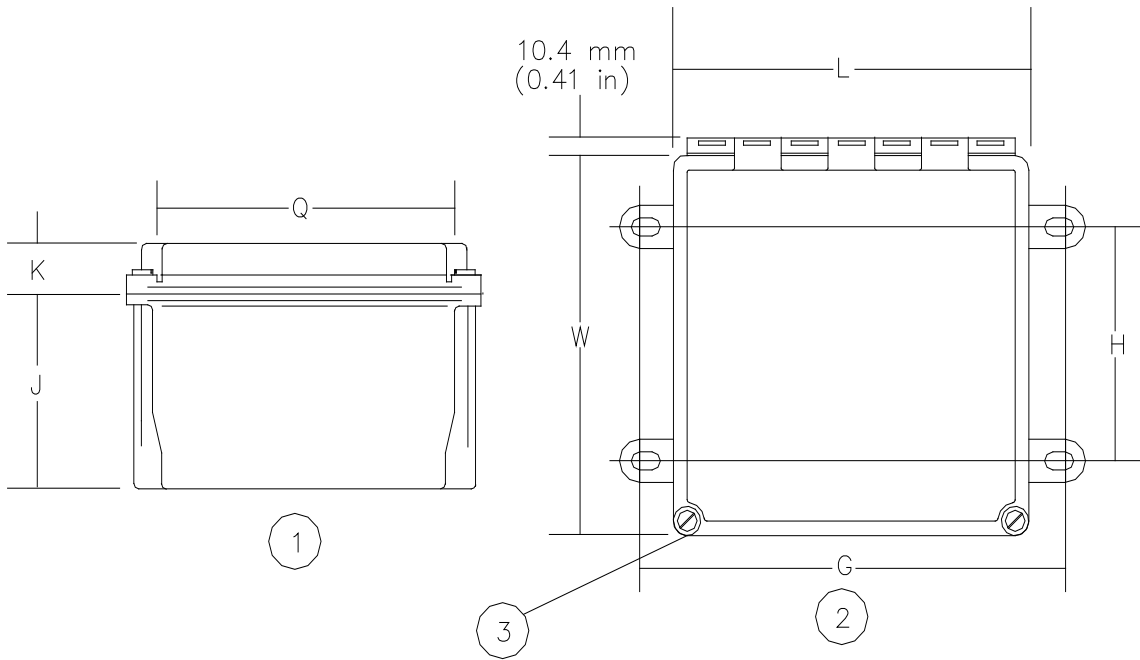
Dimensional Diagram

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



1. Top view
2. Side view
3. Side view #2
4. Powder coated aluminum housing

Figure 1: ProTIM Dimensional Diagram

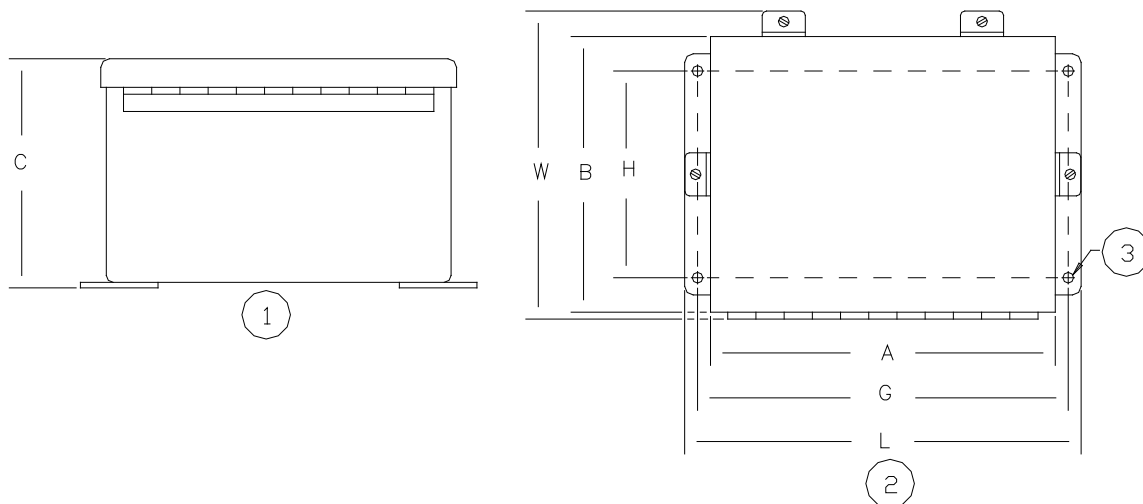


1. Side view. See Table 4 for dimensions.
2. Top view. See Table 4 for dimensions.
3. If not using Quick Release, use 10-32 pan head screw (2 places).

Figure 2: Polyester Housing Dimensions

Table 6: ProTIM Enclosure Dimensions

Part number	Overall (L x W)	Mounting (G x H)	J	K	Q
85716-01 (2-position)	165 x 165 (6.50 x 6.50)	171 x 102 (6.75 x 4.00)	82.5 (3.25)	25.4 (1.00)	143 (5.64)
88313-01 (2 position)	165 x 165 (6.50 x 6.50)	171 x 102 (6.75 x 4.00)	82.5 (3.25)	25.4 (1.00)	143 (5.64)
85717-01 (4 position)	267 x 216 (10.50 x 8.50)	273 x 152 (10.75 x 6.00)	125 (4.94)	33.3 (1.31)	244 (9.61)
88312-01 (4 position)	267 x 216 (10.50 x 8.50)	273 x 152 (10.75 x 6.00)	125 (4.94)	33.3 (1.31)	244 (9.61)



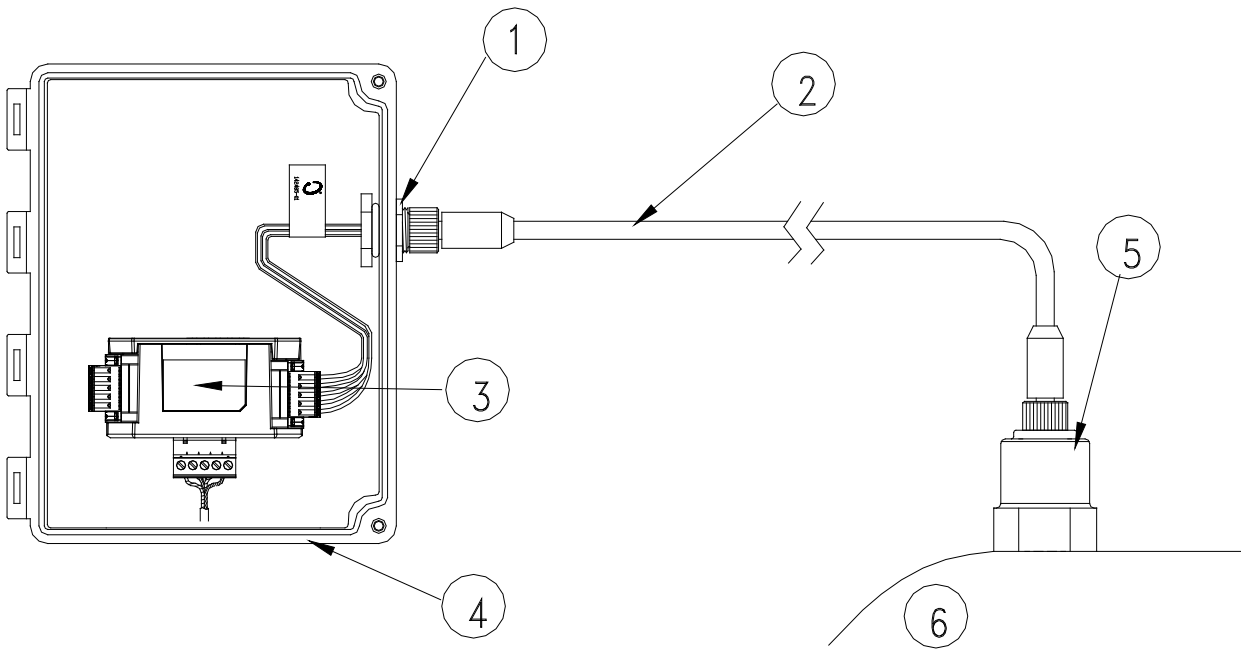
1. Side view. See Table 5 for dimensions.
2. Top view. See Table 5 for dimensions.
3. 8 mm (0.31 in) diameter, 4 places

Note: The number of clamps and the placement is shown for the large enclosure. The small enclosure has only one clamp, centered on the side opposite the hinge.

Figure 3: Stainless Steel Housing Dimensions

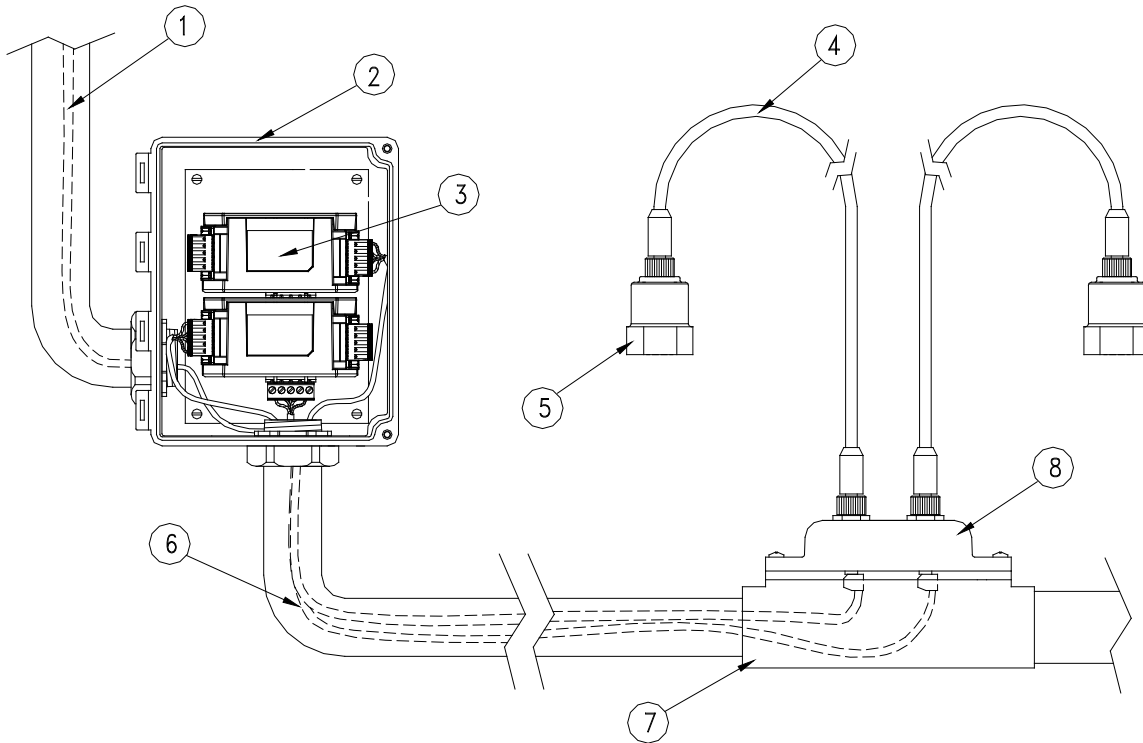
Table 7: Stainless Steel ProTIM Enclosure Dimensions

Part number	Overall (L x W)	Mounting (G x H)	Box Size (A x B x C)
88315-01 (2-position)	191 x 176 (7.50 x 6.94)	171 x 102 (6.75 x 4.00)	152 x 152 x 102 (6.00 x 6.00 x 4.00)
88314-01 (4 position)	292 x 227 (11.50 x 8.94)	273 x 152 (10.75 x 6.00)	254 x 203 x 152 (10.00 x 8.00 x 6.00)



1. Housing cable adapter, 142485-01
2. 200151 cable
3. Accel to Velocity proTIM-R
4. TIM housing
5. 200150 accelerometer
6. Machine casing

Figure 4: Housing Cable Adapter



1. To SPA
2. TIM housing
3. Accel to Velocity proTIM-R
4. 200151 cable
5. 200150 accelerometer
6. Wiring in rigid conduit
7. 1-inch conduit body near machine
8. 141887-02 Conduit Cable Adapter

Figure 5: Dual Conduit Cable Adapter

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