

PPT 802, Proximity Probe Transducer System



PPH 080 : Proximity Probe Head

PEC 036 : Probe Extension Cable

PRD 020 : Proximity Probe Driver

Feature

- ◇ Non-contacting measurement system based on eddy current principle
- ◇ PPT 802 conforms to API 670 recommendations
- ◇ 1m, 5m, 9m, 10m systems
- ◇ Temperature compensated system
- ◇ Voltage output with protection against short circuits
- ◇ Measurement range : 2mm (0.25 to 2.25mm)
- ◇ Temperature range : -40 to + 180°C
- ◇ Frequency range : DC to 20kHz (-3dB)
- ◇ Sensitivity : 8mV/μm (±5%)
- ◇ Power supply : -18 to -30VDC (12mA max)



Description

The PPT 802 Proximity Probe Transducer System consists of 8mm Proximity Probe Head, Extension Cable and Probe Driver. Together, these form a calibrated proximity system in which each component is interchangeable.

The system provides an output voltage directly proportional to the distance between the probe tip and the observed conductive material. It is capable of both position and vibration measurements. And the standard PPT 802 system is 100% compliant with the American Petroleum Institute's (API) 670 Standard (4th Edition) for such transducers.

The active part of the transducer is a coil of wire that is molded inside the tip of the device, which is made of PTFE. The transducer body is made of stainless steel 316L. The cable is tri-axial construction which core is signal, inner screen is common and outer screen is protection from mechanical damage.

The probe driver contains a radio frequency modulator and demodulator that supplies a driving signal to the transducer. This generates the electromagnetic field used to measure the gap. The driver circuit is made of high-quality, industrial grade components and is mounted in aluminum die-casting body.

The proximity probe transducer system measure the distance between probe head and moving or stationary machine part contactless. The target material must be metallic such as steel, stainless steel, aluminum, copper, stainless steel etc. It is best for measuring the relative vibration or axial position of rotating machinery shaft such as those found in steam, gas and hydro turbines as well as compressors, pumps and fans.

The transducer can be used for measuring the speed reference per revolution, rotating speed of

rotor and rod position of reciprocating compressor.

The transducer body is available with metric or English thread. There are straight type and reverse mount type head. The probe head has a integral tri-axial cable, terminated with an gold-plated stainless steel AMP-type connector. Various cable lengths (integral and extension) can be ordered to match driver system length.

SPECIFICATIONS

OPERATION

Sensitivity

Voltage Output : 8mV/ μ m (200mV/mil)

Current Output : 2.5 μ A/ μ m (62.5 μ A/mil)

Linear measuring range (typical)

Voltage Output : 0.25 ~ 2.25 mm
(-1.6V to -17.6V)

Current Output : 0.25 ~ 2.25 mm
(15.5mA to 20.5mA)

Frequency Response : DC to 20kHz (-3dB)

Interchangeability of elements : All components in system are interchangeable

ENVIRONMENTAL

Use in explosive atmospheres

EC type examination certificate : LCIE 02
ATEX 6086 X II 2 G (Zones 1, 2) Ex ib
IIC T6 to T3 (Pending)

Voluntary type examination certificate :
LCIE 07 ATEX 6079 X II 3 G (Zone 2) Ex
nA IIC T6 to T3 (Pending)

CSA standard : Certificate 1514309 (LR
62075-5), Class I, Division 1 and 2,
Groups A, B, C, and D Ex ia or Class I,
Division 2, Groups A, B, C and D
(Pending)

SYSTEM CALIBRATION

Calibration temperature : +23°C $\pm$ 5°C

Calibration humidity : 60% $\pm$ 10%

Target material : AISI 4140 steel, ϕ 50mm
with 10mm thick (SCM 440)

PPH 080 Proximity Probe

Transducer input requirement : High-frequency power source via matching probe driver

ENVIRONMENTAL

Temperature ranges

Transducer : -40°C to +180°C with drift 5%

Cable : -100°C to +200°C

Connector : -65°C to +180°C

Heat shrinkable sleeve : -55°C to + 200°C

Protection class (IEC 529)

Tip : IP68

Connector : IP64 without connector
protector
IP65 with connector
protector

Connector material : Gold-plated brass

Cable Protection : AISI 304 stainless steel flexible tube with PVDF heat shrinkable sleeve

Probe DC resistance (nominal)

Probe Length	Resistance between the Center Conductor and Outer Conductor (ohms)
0.5	6.53 ± 0.05
1.0	6.86 ± 0.06
1.5	7.19 ± 0.07
2.0	7.52 ± 0.08
5.0	10.50 ± 0.20
7.0	11.82 ± 0.25
9.0	13.14 ± 0.30
10.0	13.80 ± 0.30

Extension Cable DC resistance (nominal)

Extension Cable Length	Resistance between the Center Conductor and Center Conductor (ohms)	Resistance between the Outer Conductor and Outer Conductor (ohms)
3.0	2.00 ± 0.21	0.09 ± 0.01
3.5	2.35 ± 0.21	0.10 ± 0.01
4.0	2.69 ± 0.22	0.12 ± 0.02
4.5	3.00 ± 0.22	0.14 ± 0.02
7.0	4.70 ± 0.23	0.21 ± 0.03
7.5	5.04 ± 0.23	0.23 ± 0.03
8.0	5.38 ± 0.24	0.24 ± 0.04
8.5	5.71 ± 0.24	0.26 ± 0.04
9.0	6.05 ± 0.25	0.27 ± 0.05
9.5	6.39 ± 0.25	0.28 ± 0.05

Transducer construction

Wire coil $\phi 8\text{mm}$, PTFE tip, encapsulated in stainless steel body (AISI 316L) with high temperature epoxy silicon

Integral Cable : PTFE covered 75 Ω tri-axial cable, $\phi 3.6\text{mm}$

* Option : Stainless steel flexible protection tube. The flexible protection tube is not leak tight and the heat shrinkable sleeve is splash proof only

Connector : Miniature coaxial male connector type AMP 1-330 723-0 style or push lock style Gold plated brass.

PEC 036 Extension Cable

PTFE covered 75 Ω tri-axial cable, $\phi 3.6\text{mm}$

* Option : Stainless steel flexible protection tube. The flexible protection tube is not leak tight and the heat shrinkable sleeve is splash proof only

Conductor : Silver plated copper covered steel

Dielectric : Solid PTFE

Inner braid : Silver plated copper

Inner jacket : FEP, Transparent

Outer braid : Silver plated copper

Outer jacket : FEP, Light blue ($\phi 3.6$)

Weight : 31g/m

Temperature rating : -55 to +200°C

Capacitance : 63 pF/m

Impedance : 75 ± 3 Ω

Working voltage, AC r.m.s. : 900 max.

Working voltage, DC : 1800 max.

Minimum bend radius, single : 20mm

Minimum bend radius, multiple : 40mm

Flame resistance : IEC 60332-3-24

Flammability : UL 94-V-0

Connector material : Gold-plated brass

Connector-to-connector torque : 0.56 N·m

Cable Protection : AISI 304 stainless steel flexible tube with PVDF heat shrinkable sleeve

PRD 020 Probe Driver

OUTPUT CHARACTERISTICS

Voltage output, 3-wire configuration

Voltage at min, GAP : -2.0V

Voltage at max, GAP : -18.0V

Dynamic range : 16V

Output impedance : 500Ω

Short-circuit current : 45mA

Output capacitance : 1nF

Output inductance : 100μH

Supply Power

Voltage : -18V to -30VDC

Current : 8±1 mA (12mA max.)

Supply input capacitance : 1nF

Supply input inductance : 100μH

Supply Sensitivity : Less than 2mV change in output voltage per volt change in input voltage

Field wiring : 0.2 to 1.5 mm² (16 to 24 AWG)

Recommend using three-conductor shielded triad cable. Maximum length of 300m (1000ft) between probe driver and monitoring system.

Linear range : 2mm (80mils)

0.25 ~ 2.25 mm

Recommended gap setting : 1.27mm (50mils)

Incremental Scale Factor (ISF) : 8mV ± 5%

including interchangeability error

Deviation from best fit straight line (DSL) :

Less than ±0.025mm (±1mils)

Frequency response : DC to 20kHz, -3dB with up to 200 meters of field wiring

DC to 10kHz, -3dB with up to 300 meters of field wiring

Minimum target size : Φ15.2mm (0.6 in), flat

Shaft diameter : minimum 50.8 mm (2 in)

Recommended : 75.2mm (3 in)

Connector torque : 0.56N·m

Panel Mounting Screw : M4x0.7, L=12

DIN rail size : 35mm

ENVIRONMENTAL CHARACTERISTICS

Temperature range

Operation : -35°C to +85°C

Storage : -51°C to +100°C

Humidity

Operation : 10 to 95% non condensing

Storage : 0 to 95% non condensing

Vibration

Operation : 5g peak between 10Hz and 500Hz

Storage : 5g peak between 10Hz and 500Hz

Protection class : IP 40

PHYSICAL CHARACTERISTICS

Construction material : die-casing aluminum

ELECTRICAL CONNECTIONS

Input : Gold plated stainless steel coaxial female socket

Output and power : Screw terminal strip

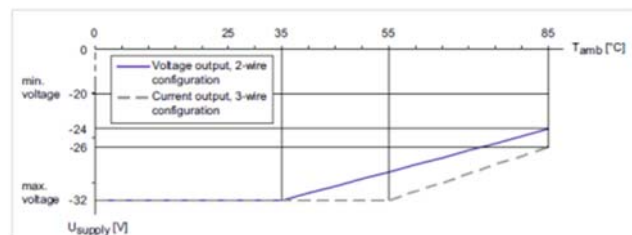
WEIGHT

Standard version : Approx. 170g

Exi version : Approx. 250g

THERMAL CONSIDERATIONS

The PRD 020 probe driver will operate at ambient temperatures as high as 85°C, but to do so, it requires derating of the maximum input voltage. The probe driver operates between the minimum supply voltage and the maximum supply voltage, as shown on the following graph.



ORDERING INFORMATION

PPH 080 8mm Proximity Probe, Metric M10x1 Thread

P/N 111-080-020-101-AAA-BBB-CCC-DD-EE-FF

Option Descriptions

A : Overall case length

Order in increments of 2mm

Minimum length : 20mm

Maximum length : 250mm

Example : 062 = 62mm

B : Unthreaded length

Order in increments of 2mm

Minimum length : 0mm

Maximum length : 230mm

C : Cable length

005 : 0.5 meter

010 : 1.0 meter

015 : 1.5 meter

020 : 2.0 meter

050 : 5.0 meter

090 : 9.0 meter

100 : 10.0 meter

D : Connector and cable type

00 : Connector provided not assembled

01 : Miniature coaxial connector

02 : Push-on Lock connector

E : Cable protection

00 : Non-armored

01 : Armored with stainless steel tube

02 : Armored with stainless steel tube with
PVDF sleeve

F : Agency approval

00 : None

01 : CE Approval

05 : Explosion Proof Approvals

PPH 080 8mm Proximity Probe, English

3/8-24 UNF Thread

P/N 111-080-020-201-AAA-BBB-CCC-DD-EE-FF

Option Descriptions

A : Overall case length

Order in increments of 0.1 in

Minimum length : 0.8 in

Maximum length : 9.8 in

Example : 024 = 2.4 in

B : Unthreaded length

Order in increments of 0.1 in

Minimum length : 0 in

Maximum length : 9.0 in

Example : 010 : 1.0 in

C : Cable length

005 : 0.5 meter

010 : 1.0 meter

015 : 1.5 meter

020 : 2.0 meter

050 : 5.0 meter

090 : 9.0 meter

100 : 10.0 meter

D : Connector and cable type

00 : Connector provided not assembled

01 : Miniature coaxial connector

02 : Push-on Lock connector

E : Cable protection

00 : Non-armored

01 : Armored with stainless steel tube

02 : Armored with stainless steel tube with
PVDF sleeve

F : Agency approval

00 : None

01 : CE Approval

05 : Explosion Proof Approvals

**PPH 080 8mm Proximity Probe, Reverse Mount
Metric, M10x1 Thread**

P/N 111-080-020-301-AAA-BBB-CCC-DD-EE-FF

Option Descriptions

A : Overall case length

030 : 30mm

B : Unthreaded length

000 : 0 mm

C : Cable length

005 : 0.5 meter

010 : 1.0 meter

015 : 1.5 meter

020 : 2.0 meter

050 : 5.0 meter

090 : 9.0 meter

100 : 10.0 meter

D : Connector

00 : Connector provided not assembled

01 : Miniature coaxial connector

02 : Push-on Lock connector

E : Cable protection

00 : Non-armored

F : Agency approval

00 : None

01 : CE Approval

05 : Explosion Proof Approvals

**PPH 080 8mm Proximity Probe, Reverse Mount
3/8-24 UNF Thread**

P/N 111-080-020-401-AAA-BBB-CCC-DD-EE-FF

Option Descriptions

A : Overall case length

012 : 1.2 in

B : Unthreaded Length

000 : 0 mm

C : Cable length

005 : 0.5 meter

010 : 1.0 meter

015 : 1.5 meter

020 : 2.0 meter

050 : 5.0 meter

090 : 9.0 meter

100 : 10.0 meter

D : Connector

00 : Connector provided not assembled

01 : Miniature coaxial connector

02 : Push-on Lock connector

E : Cable protection

00 : Non-armored

F : Agency approval

00 : None

01 : CE Approval

05 : Explosion Proof Approvals

PPH 080 8mm Proximity Probe, Smooth Case
P/N 111-080-020-501-AAA-BBB-CCC-DD-EE-FF

Option Descriptions

A : Overall case length

Order in increments of 2mm
Minimum length : 20mm
Maximum length : 250mm
Example : 062 = 62mm

B : Unthreaded length

Order in increments of 2mm
Minimum length : 0mm
Maximum length : 230mm
Example : 050 : 50mm

C : Cable length

005 : 0.5 meter
010 : 1.0 meter
015 : 1.5 meter
020 : 2.0 meter
050 : 5.0 meter
090 : 9.0 meter
100 : 10.0 meter

D : Connector

00 : Connector provided not assembled
01 : Miniature coaxial connector
02 : Push-on Lock connector

E : Cable protection

00 : Non-armored
01 : Armored with stainless steel tube
02 : Armored with stainless steel tube with
PVDF sleeve

F : Agency approval

00 : None
01 : CE Approval
05 : Explosion Proof Approvals

PEC 036 Extension Cable
P/N 936-036-000-001-AAA-BB-CC-DD

Option Descriptions

A : Cable length

030 : 3.0 meter
035 : 3.5 meter
040 : 4.0 meter
045 : 4.5 meter
050 : 5.0 meter
060 : 6.0 meter
065 : 6.5 meter
080 : 8.0 meter
085 : 8.5 meter
090 : 9.0 meter
095 : 9.5 meter

B : Connector

00 : Connector provided not assembled
01 : Miniature coaxial connector
02 : Push-on Lock connector

C : Cable protection

00 : Non-armored
01 : Armored with stainless steel tube
02 : Armored with stainless steel tube with
PVDF sleeve

D : Agency approval

00 : None
01 : CE Approval
05 : Explosion Proof Approvals

PRD 020 2mm Range Proximity Probe Driver**P/N 240-020-000-001-AA-BB-CC**

Option Descriptions

A : Total length

- 01 : 1.0 meter
- 05 : 5.0 meter
- 09 : 9.0 meter
- 10 : 10.0 meter

B : Connector

- 00 : Miniature coaxial connector
- 01 : Push-on Lock connector

C : Mounting

- 00 : Panel mount
- 01 : DIN Rail mount

D : Agency approval

- 00 : None
- 01 : CE Approval
- 05 : Explosion Proof Approvals

PRD 040 4mm Range Proximity Probe Driver**P/N 240-040-000-001-AA-BB-CC**

Option Descriptions

A : Total length

- 01 : 1.0 meter
- 05 : 5.0 meter
- 09 : 9.0 meter
- 10 : 10.0 meter

B : Connector

- 00 : Miniature coaxial connector
- 01 : Push-on Lock connector

C : Mounting

- 00 : Panel mount
- 01 : DIN Rail mount

D : Agency approval

- 00 : None
- 01 : CE Approval
- 05 : Explosion Proof Approvals

PRD 020 2mm Range Proximity Probe Driver**TARGET MATERIAL MODIFICATIONS****ASTM A276 S31603 (SUS316L) :****P/N 240-020-316-001-AA-BB-CC****PRD 040 4mm Range Proximity Probe Driver****TARGET MATERIAL MODIFICATIONS****ASTM A276 S31603 (SUS316L) :****P/N 240-040-316-001-AA-BB-CC**

Accessories

Proximity Probe Installation Manual

P/N 032-111-936-240

Field Wiring Cable

P/N 923-015-010-300

TFR-CVV-SB, 1.5mm² (15AWG), 3 conductor, twisted, shielded cable with aluminum Mylar tape drain wire, 300m roll

Silicone self-fusing tape

P/N 809-020-091-001

9 meter roll of silicone tape to protect connectors. It is easy to install and provides excellent electrical isolation and protection from the environment. It is recommended for use inside probe mounting adapter not machine.

Miniature Coaxial Connector

P/N 812-936-010-001

Used on PPT 802 8mm probes and extension cables with threaded lock. Contains one pair of male and female connector.

Push-on Lock Connector

P/N 812-936-020-001

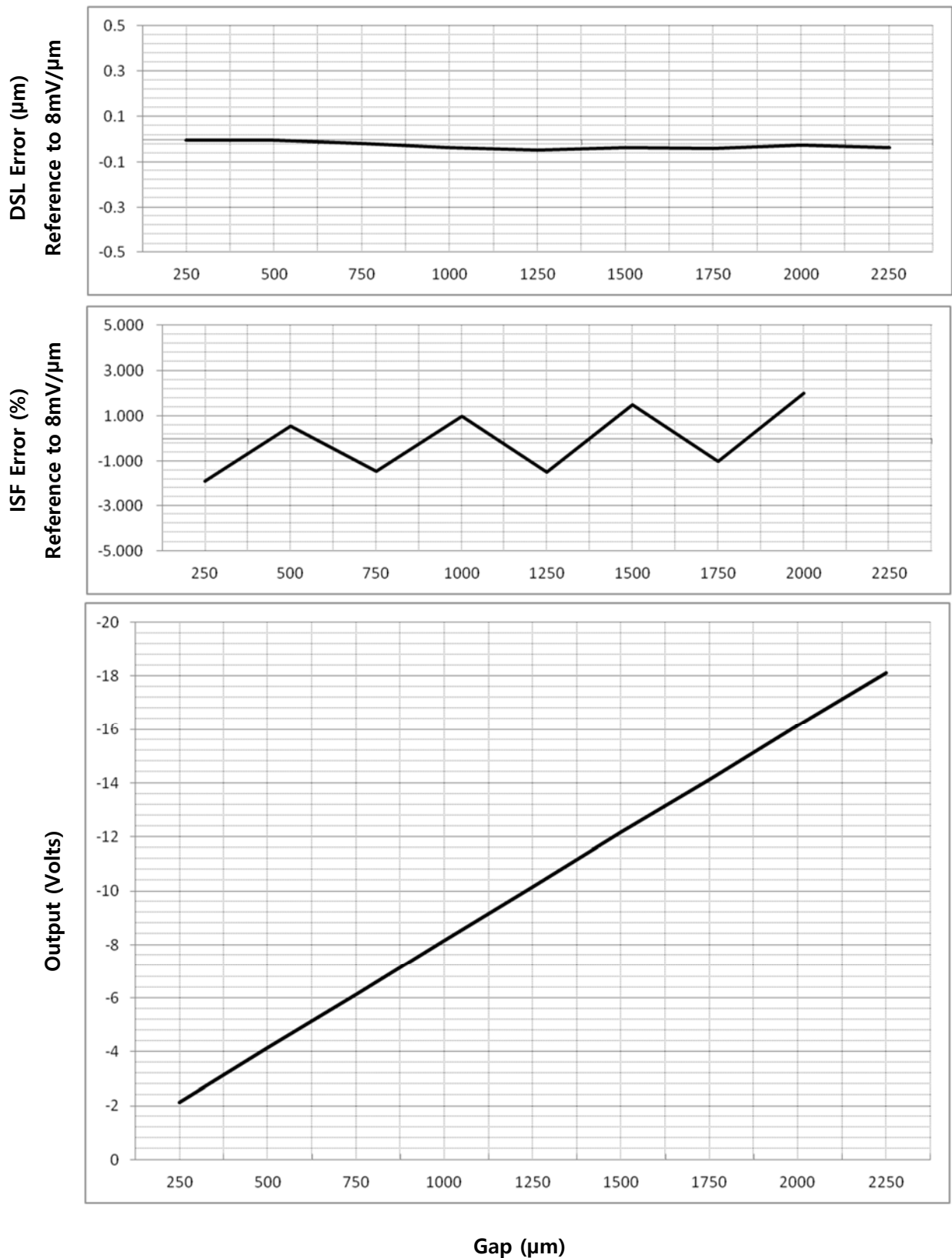
Used on PPT 802 8mm probes and extension cables with push-on lock mechanism. Contains one pair of male and female connector.

Connector Crimp Tool

P/N 264-936-001-001

Includes one set of multi-connector inserts and connector installation instructions. Compatible only with 812-936-010-001 connector kits. Supplied with carrying case.

PERFORMANCE CURVE



Supply Voltage : -24VDC Temperature : 23°C Humidity : 60% Target : AISI 4140

Figure 1. Typical PPT 0802 8mm Probe, 5m System over API 670 Testing Range

DIMENSIONS

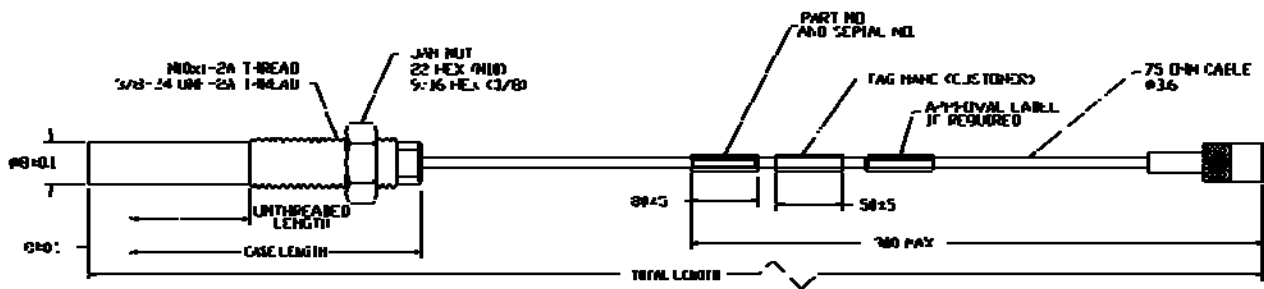


Figure 2. 8mm Proximity Probe, Standard Mount, Non-Armored

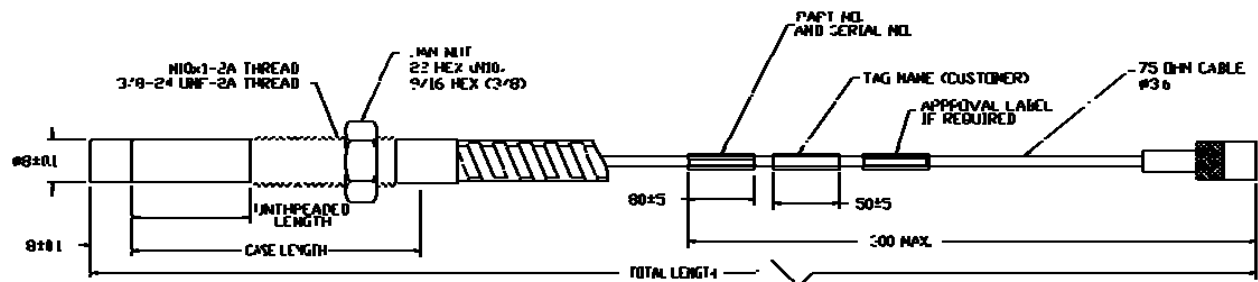


Figure 3. 8mm Proximity Probe, Standard Mount, Armored

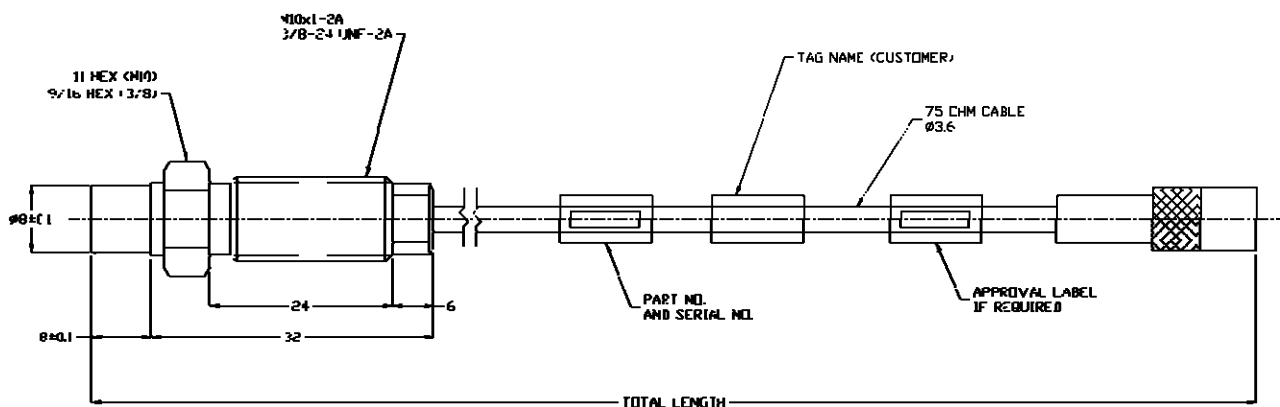


Figure 4. 8mm Proximity Probe, Reverse Mount

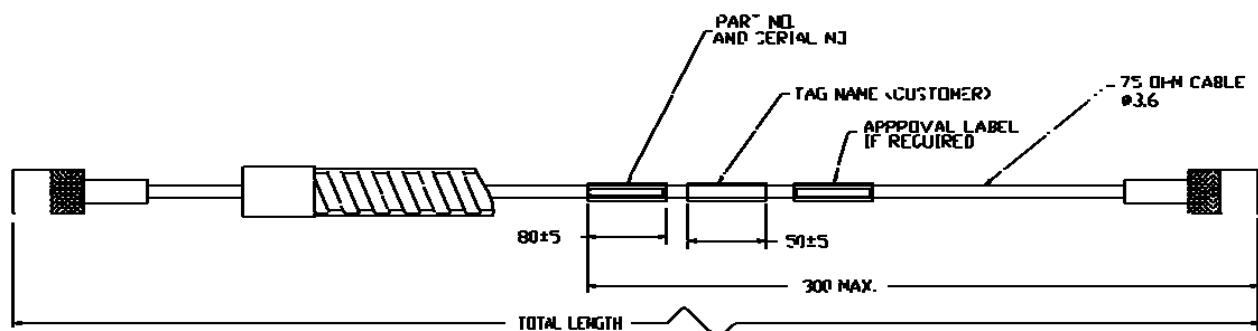


Figure 5. Extension Cable

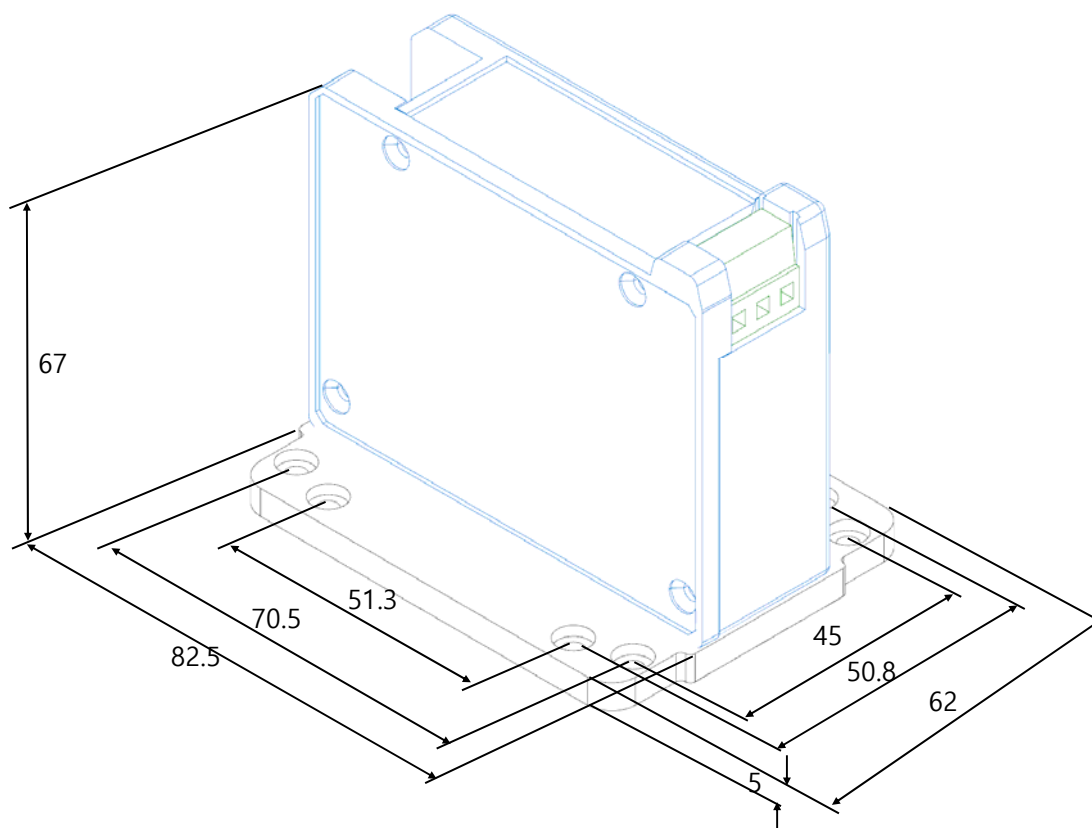


Figure 6. Probe Driver — Panel Mounting

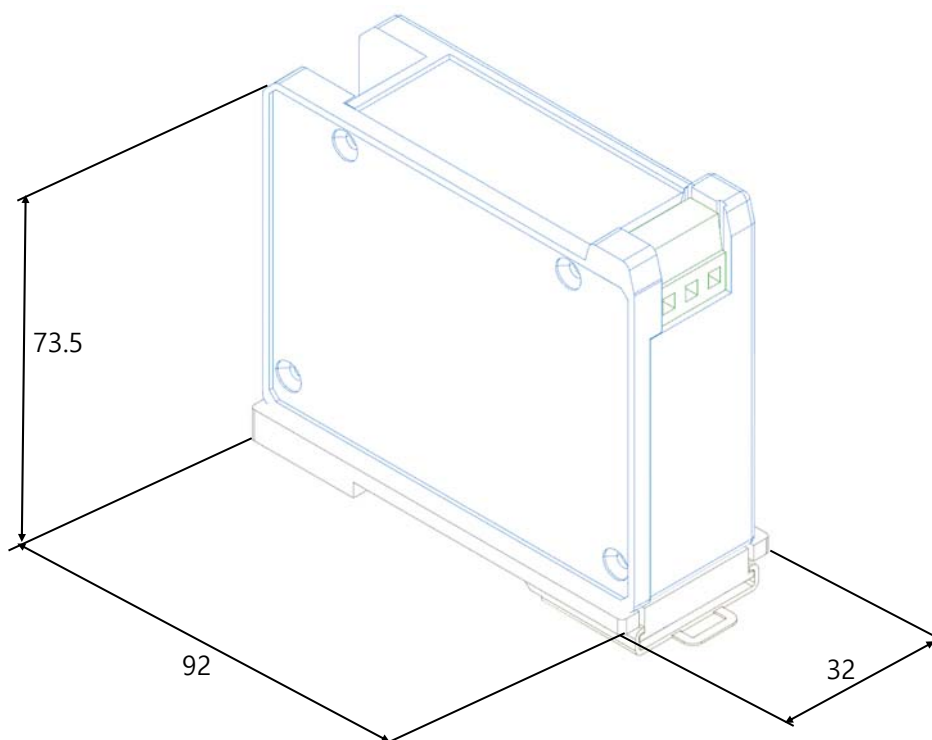


Figure 7. Probe Driver — DIN Rail Mounting (35mm)