



PT2060/12 SMART Module

Pro vibTech's PT2060/12 SMART module is a 4 channels module which processes the incoming signal from the proximity probe system, accelerometer, velocity sensors, seismic sensor, magnetic speed sensor and LVDT. It will do the following signal processing:

- ✓ Radial Vibration: monitoring shaft vibration, single or dual XY **(4 channels)**
- ✓ Axial/ Thrust Position: monitoring shaft thrust position, with 5mm, 8mm, and 11 mm proximity probes **(4 channels)**
- ✓ Eccentricity **(2 channels)**
- ✓ Differential Expansion **(4 channels)**
- ✓ Complimentary Differential Expansion **(2 channels)**
- ✓ Low-frequency Vibration **(4 channels)**
- ✓ Speed Output **(2 channels)**
- ✓ Zero Speed and Speed **(2 channels)**
- ✓ Reverse Rotational Protection Output **(2 channels)**
- ✓ Case Vibration, Includes Acceleration, Velocity and Displacement **(4 channels)**
- ✓ Case Expansion **(4 channels)**

The PT2060/12 SMART module has the ability to be grouped into 2 groups. Each group can be programmed independently and used for different functions. For example, channel one and channel two can be a XY measurement for radial shaft vibration and channels three and four can be programmed to measure eccentricity.

The PT2060/12 SMART module is designed to work with virtually any proximity probe systems (including from other manufacturers). Proximity probe systems which are compatible with the PT2060/12 SMART module include: TM0105, TM0180, TM0110, TM0120, 3000, 7200, 3300 and 3300XL series of proximity probe systems with the following probe tip sizes: 5mm, 8mm, 11mm, 25mm and 50mm.

The PT2060/12 SMART module will process case

vibration signal with the range from 0.5 - 30KHz. It is capable of supply peak, rms, Smax with customer field programmable band pass filter, tracking filter that can do 1X, 2X, Not 1X.



The PT2060/12 SMART module also provides additional information such as GAP/Bias voltages, module status, alarm status, alarm history and system events. This information can be accessed via Modbus or the configuration software.

The PT2060/12 SMART module is also equipped with local status indication. There are three LEDs which display the status of the monitoring channels.

- ✓ OK / IO LED indicates that both the module and the proximity probe systems in the field are working
- ✓ Alarm LED indicates the current alert and danger



- status of the module.
- ✓ Bypass LED indicates the channels have been programmed to be in the Bypass mode.

- 2X and phase
- Not 1X
- GAP/Bias V

Specifications

Electrical

Power Supply:

Internally converted by the rack power supply module

8.0W total typical for this module

Probe System:

- 8mm and 5mm probes: 8.0 mV/μm (200mV/mil)
- 11mm probe: 4.0 mV/μm (100mV/mil)
- 25mm probe: 0.8 mV/μm (20mV/mil)

Or any other probes chosen by customer

Power supply: -24V@35mA, nominal

Case Vibration Sensor:

Accelerometer, and velocity sensor

Or any other sensor chosen by customer

Power supply: +22VDC @4mA nominal

LVDT Sensor:

Power supply: -15VDC nominal

Overall in 4-20mA Output:

Maximum Distance:
300m (1000ft)

Proportional to monitor's full-scale. Each channel has its own overall vibration output. The short of the 4-20mA will not affect system performance.

Maximum load:

300Ω

Resolution:

Less than 0.33% FS

Buffered Output:

On PT2060/12 front panel, each channel has one BNC connector. The output is the unfiltered raw signal.

Output Impedance:
550Ω

Maximum Distance:
300m (1000ft)

Alarm:

Alarm Definition:

Alarms can be defined as one of combination of more parameters.

- Overall
- Smax
- 1X and phase

Alarm Set-point:

Each channel has two alarm set-points which can be field adjusted from 0 to 100% FS.

Set-point Accuracy:

Better than 0.5% FS

Set-point Repeatability:

Within 0.5% FS

Alarms Logic:

Normally latching or normally non-latching

Alarm delay:

Alert delay can be set from 1 to 60 seconds with time interval of 1 second.

Danger delay can be set from 1 to 60 seconds with time interval of 1 second.

Danger delay also includes a 0.1 second option.

LED Indicators:

OK / IO: green. on, off, flash

Alarms: yellow, red

Bypass: red

Approvals (Pending):

CE;

CSA: Non-incendive, class I, div.2, Grps.ABCD,
T4@Ta= -40°C to +75°C

Signal Conditioning

Anti-aliasing Filter

2 Orders Lowpass Filter , -3dB at 25KHz

AD Samping Rate

62.5K SAmpe per Second
24Bit

Input Signal Range

-20V to +20V

Radial Vibration

Sensor:

Proximity probe(-24V)

Direct Filter:

User-programmable, 12 Orders Bandpass Filter



PT2060 Monitor

Programmable Range:

Normal: 3 Hz to 4000 Hz
Low Frequency: 0.5 Hz to 600 Hz

Gap Filter:

-3 dB at 0.5 Hz, 2 orders low-pass filter,

component vs. phase reference.

Not 1X Filter:

1Hz to 20KHz, Constant Q notch filter, Minimum rejection in stop-band of -45 dB.

Not 1X Amp:

Vibration component that correspond to exception of fundamental rotation speed.

Smax:

Same as Direct Filter

Smax Amp:

Single peak measurement of unfiltered XY (orthogonal) probes, in the measurement planes, against a calculated "quasi zero" point. Only one Smax, Amp value is returned per channel pair (channel 1 or channel 3)

1X Vector Filter:

Constant Q. Central frequency is 2X of phase reference frequency. 6 Orders filter. Minimum rejection in stop-band of -50 dB. Stop-band start from 2 or 1/2 times phase reference frequency

Accuracy

2X Vector Filter:

Constant Q. Central frequency is 2X of phase reference frequency. 6 Orders filter. Minimum rejection in stop-band of -50 dB. Stop-band start from 2 or 1/2 times phase reference frequency

Direct and Gap:

Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

1X & 2X & NOT1X:

Within $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

Smax:

Within $\pm 2\%$ maximum.

1X & 2X Vector, Not 1X are valid for machine speeds of 60 rpm to 120,000 rpm.

Modbus & 4-20mA Output

Shaft Position & Differential Expansion

Can be any of the following parameter. Field programmable

Sensor:

Proximity probe (-24V)

Direct Filter:

-3 dB at 1.2 Hz. 2 orders low-pass filter

Gap Filter:

-3 dB at 0.5 Hz, 2 Orders Low-pass Filter,

Adjust Zero Position:

Adjust the Zero Position voltage (field programmable).

Transducer Direction:

Towards or away from the target.

Overall:

Data which represents the overall peak to peak vibration. All frequencies within the selected Direct Frequency Response are included in this proportional value.

Gap:

The distance between the surface of a proximity probe tip and the observed target surface.

1X Amp:

Vibration component that correspond to fundamental rotation speed.

Modbus & 4-20mA Output

Can be any of the following parameter. Field programmable.

1X Phase Lag:

Phase difference between 1X of vibration component vs. phase reference.

Overall:

Data which represents the overall peak to peak vibration. All frequencies within the selected Direct Frequency Response are included in this proportional value.

2X Amp:

Vibration component that correspond to 2nd harmonics of rotation speed.

Gap:

The distance between the surface of a

2X Phase Lag:

Phase difference between 2X of vibration



proximity probe tip and the observed target surface.

Accuracy

Direct and Gap:

Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

Differential Expansion (Dual-probe)

Utilize dual probe to extend the measurement range of the differential expansion.

Sensor:

Proximity probe (-24V)

Direct Filter:

-3 dB at 1.2 Hz. 2 orders low-pass filter

Gap Filter:

-3 dB at 0.5 Hz, 2 Orders Low-pass Filter,

Adjust Zero Position:

Adjust the Zero Position voltage (field programmable).

Transducer Direction:

Mounting angle definition.

Modbus & 4-20mA Output

Can be any of the following parameter. Field programmable.

Overall:

Data which represents the overall peak to peak vibration. All frequencies within the selected Direct Frequency Response are included in this proportional value.

Gap:

The distance between the surface of a proximity probe tip and the observed target surface.

Accuracy

Direct and Gap:

Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

Eccentricity

Sensor:

Proximity Probe (-24V)

Phase reference CH1 or CH2

Direct Filter:

-3 dB at 20 Hz. 2 orders low-pass filter

Gap Filter:

-3 dB at 0.5 Hz, 2 orders Low-pass Filter,

Modbus & 4-20mA Output

Can be any of the following parameter. Field programmable.

Overall (peak-peak):

Data which represents the overall peak to peak vibration. All frequencies within the selected Direct Frequency Response are included in this proportional value.

Real-time GAP:

The distance between the surface of a proximity probe tip and the observed target surface in real-time.

Accuracy

Direct and Gap:

Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

Acceleration & Velocity & Displacement

Transducer power:

Nominal +24V @4mA

Direct Filter:

User programmable high-pass & low-pass filter.

Output Type	Without Filter, Low or High-Pass Filter	With Integration
RMS	1 to 30,000 Hz	10 to 30,000 Hz
Peak	1 to 30,000 Hz	10 to 30,000 Hz

High-pass

6pole (120 dB per decade, 36 dB per octave).

Low-pass

6pole (120 dB per decade, 36 dB per octave).

Gap Filter:

-3 dB at 0.5 Hz, 2 Orders Low-pass Filter,



2X Phase Lag:

Phase difference between 2X of vibration component vs. phase reference.

Not 1X Filter:

1Hz to 20KHz , Constant Q notch filter ,Minimum rejection in stop-band of -45 dB.

1X Vector Filter:

Constant Q. Central frequency is 2X of phase reference frequency. 6 Orders filter. Minimum rejection in stop-band of -50 dB. Stop-band start from 2 or 1/2 times phase reference frequency

2X Vector Filter:

Constant Q. Central frequency is 2X of phase reference frequency. 6 Orders filter. Minimum rejection in stop-band of -50 dB. Stop-band start from 2 or 1/2 times phase reference frequency

1X & 2X Vector, Not 1X are valid for machine speeds of 60 rpm to 120,000 rpm.

Modbus & 4-20mA Output

Can be any of the following parameter. Field programmable

Overall:

Data which represents the overall peak to peak vibration. All frequencies within the selected Direct Frequency Response are included in this proportional value.

Gap:

The distance between the surface of a proximity probe tip and the observed target surface.

1X Amp:

Vibration component that correspond to fundamental rotation speed.

1X Phase Lag:

Phase difference between 1X of vibration component vs. phase reference.

2X Amp:

Vibration component that correspond to 2nd harmonics of rotation speed.

Accuracy

Direct and Gap:

Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

1X & 2X & NOT1X:

Within $\pm 0.33\%$ of full-scale typical, $\pm 1\%$ maximum.

Smax:

Within $\pm 2\%$ maximum.

Speed, Zero Speed and Reverse Rotation Protection

Sensor:

Proximity probe(-24V) or Magnetic speed sensor

Trigger:

Manual trigger
Auto trigger
Hysteresis
Teeth per cycle
Modbus & 4-20mA Output
Speed, zero speed

Accuracy

Speed < 10000rpm
Within $\pm 1\text{rpm}$ of full scale. Typical
Speed > 10000rpm
Within $\pm 0.01\%$ of full scale. typical

Case Expansion

Sensor:

LVDT Probe(+20V)

Direct Filter:

-3 dB at 1.2 Hz. 2 Orders Low-pass Filter

Adjust Zero Position:

Field programmable

Transducer Direction:

Towards or away.
Modbus & 4-20mA Output
Overall
Accuracy



PT2060 Monitor

Overall and Gap:
Within $\pm 0.33\%$ of full scale typical, $\pm 1\%$ maximum.

Environmental

Temperature:
Operation: -20°C to +65°C
Storage: -40°C to +85°C
Humidity:
95% non-condensing

Physical

Each module comes with two components: the front panel assembly and the back panel assembly.

Dimensions and Location:
241mm (9.5in) X 24.5mm (0.96in)

For 19" rack, they can be mounted in any slot from 1 to 12.

For 12" rack, they can be mounted in any slot from 1 to 6.

Weight:
2.0 kg (2.0 lbs)

Ordering Information

PT2060/12-AX
AX: Back-panel IO module
A0: Basic IO module

Optional Accessories:

PT2060-001200: PT2060/12 Front panel
PT2060-001201: PT2060/12 Back panel

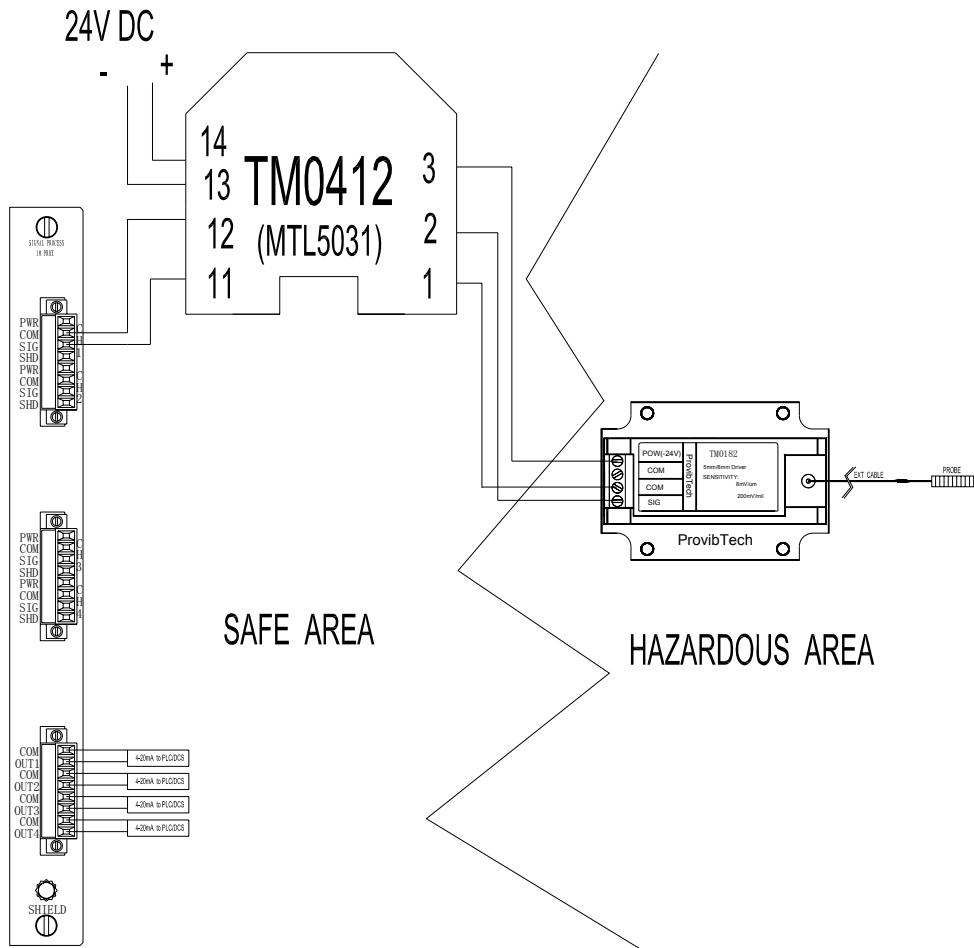
Back Panel Connectors Layout





Field-wiring Diagram for Hazardous Area Application

TM0412 used as the barrier. For other barriers, please consult ProviTech for tech support.





Field-wiring Diagram for Hazardous Area Application

