

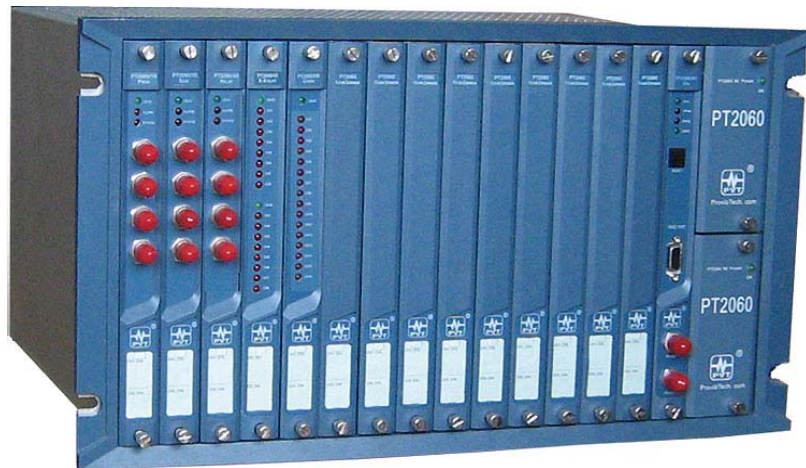


ProvibTech
Innovative Machine Monitoring

PT2060 Monitor System

User Manual

Installation, Operation, Maintenance



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PT2060-SYSTEM -USR-A-12

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Receiving Inspection and Handling Guide

Inspection

Check the devices for possible damage that may have occurred from improper transport. Damages in transit must be recorded on the transport documents. All claims for damages must be claimed without delay against the shipper and before the installation.

If no damage is found and the system does not work properly, please check the user manual first. If the problem can not solve, please contact the ProvibTech office location.

Handling and Storing Considerations

PT2060 should be handled with care during unpacking and installation. Damage to PT2060 is typically caused by rough handling, shock, or electrostatic discharge (ESD).

Be aware of the following precautions when unpacking and handling PT2060 Rack or any module.

- ✓ Please have attention about the sharp corners/sides of the rack to avoid any of injuries during the installation, transporting and un-installation.
- ✓ All circuit boards and electronic modules associated with this rack contain components which are susceptible to damage caused by electrostatic discharge. It should be necessary to discharge any static electricity from yourself and your clothing before handling the rack.
- ✓ Whenever the module is not installed in a system, always keep it in the protective antistatic bag.



PT2060 Monitor System

PT2060 Monitor System Introduction

PT2060 is ProvibTech's newly released monitor that highly reliable, fully digital and modbus ready. PT2060 utilizes the advanced electronics technology and adopt the concept of programmable logic controller. PT2060 is integrated highly, with high channel density, and multiple redundancies.

There are two kinds of PT2060 rack: a standard 19" rack and a 12" rack. For a standard 19" rack, it is capable of supporting up to 48 channels. The PT2060 provides the industry's highest channel density in a standard 19" rack. For 12" rack, it can contain 24 channels at most. PT2060 monitor system uses the standard PLC logic, it make configuration easy. With full

API 670 compliance, triple channel redundancy and redundancy for power supply inputs, communications and relay outputs, the PT2060 monitor provides a level of reliability that is unsurpassed.



Figure 1

The newly released PT2060 has both the analog interface with 4-20mA output, Buffered output, Trip-multiply, Alarm-inhibit, and also digital interface with Modbus connection. Modbus will offer to our customer additional information such as: sensors status, alarm status, full-scale range, up-level controller changing set-point, gap voltage, alarm list and system event list. All these are added value to our customer. Let customer better understanding their system status and better control the system performance.

Easy to Program

The PT2060-CFG is the "easy to use" system configuration software tool used to set up and monitor the PT2060 system.

Stand Alone or Networked Rack Interconnection

The PT2060 can operate as a single rack or multiple system racks may be networked together via Modbus.

Redundancy

The PT2060 is designed for redundant power supply inputs, relay outputs and communications with an option for triple redundant channels.

PT2060 Monitor System Features

- ✓ Fully digital
- ✓ Highest channel in a standard 19" rack - 48 channels(12" rack - 24 channels)
- ✓ Triple redundant channels



PT2060 Monitor System

- ✓ Redundancy for relays, power supply inputs communications
- ✓ Modbus communication port(RS-232, RS-485, Ethernet port)
- ✓ Compatible with most sensors and probes (regardless of manufacturer)
- ✓ Intuitive and easy to configure
- ✓ Programmable 16 channel relay modules
- ✓ Programmable 16 channel transmitter modules
- ✓ Optional local panel display
- ✓ Standard four channel module
- ✓ Meet or exceed API670 standard
- ✓ Integrated condition monitoring module for dynamic and transient data analysis

PT2060 System Components

Model Number	PT2060/99	PT2060/90	PT2060/91	PT2060/96	PT2060/98	PT2060-CFG
	System Rack	Power Supply Module	System Interface Module	Comm/Phase Reference Module	Display System	Configuration Software
Required system component	•	•	•	Optional	Optional	•
There are two sorts of PT2060 rack: a standard 19" rack and a 12" rack	•					
Provides system power to the PT2060/99 system rack and all modules installed in the system rack. (2) PT2060/90 Power supply modules are required for redundancy		•				
This module provides (1) active Modbus communication port and Ethernet port, (2) phase reference channels and historical buffer for the PT2060 system rack			•			
This module provides (1) additional Modbus communication port (either RS232 or RS485) and Ethernet port, (2) phase reference channels and historical buffer for the PT2060 system rack				•		
This is a touch-panel display loaded with PCM370 vibration analysis system software					•	



PT2060 Monitor System

System configuration software tool used to configure and monitor the PT2060 system						•
--	--	--	--	--	--	---

Model Number	PT2060/10	PT2060/20	PT2060/53	PT2060/40	PT2060/43
Process Signal and Relay Modules	Proximity	Seismic	Over speed	Relay	Redundant Relay
Channels per Card	4	4	1*	16	8
Type of Measurement and (Sensor)					
Radial Shaft Vibration (Proximity)	•				
Axial Thrust Position (Proximity)	•**				
Rotation Speed (Proximity) *2	•				
Differential Expansion (Proximity)	•**				
Eccentricity (Proximity) *2	•				
Low Frequency Oscillation (Proximity)	•				
Acceleration (Accelerometer)		•			
Velocity (Accelerometer, Velocity)		•			
Displacement (Velocity , Low Frequency vibration Displacement Transducer)		•			
Case Expansion (LVDT Sensor)		•			
Over Speed Protection (Proximity and/or Magnetic Sensor)			•		
Relay Output (16 SPDT Relays)				•	
Redundant Relay Output (8 DPDT)					•

Model Number	PT2060/31	PT2060/35	PT2060/36			
Process Signal and Transmitter Modules	Temperature	Process	Transmitter			
Channels per Card	8	16	16			
Type of Measurement and (Sensor)						
Temperature (RTD)	•					
Temperature (TC)	•					
Process (Voltage Transducer)		•				
Process (Current Transducer)		•				
Transmitter (16 Output Channels)			•			

Notes:

- * 2 Indicates for this measurement there are only (2) channels per module.
- * Indicates that channel 3 and 4 of PT200/53 module can be used as PT2060/10 module channel.
- **Indicates that only with one probe option is available.

PT2060/10 PROX Proximity Module

PROX module will condition and process most of the proximity probe input signals. Includes

- ✓ Radial vibration: Monitoring shaft vibration, single or dual XY.
- ✓ Thrust position: Monitoring shaft thrust position, with 5/8/11 mm proximity probes.



- ✓ Eccentricity: Monitoring shaft eccentricity, eccentricity measurements indicate whether rotor eccentricity is small enough to allow machine startup without causing damage.
- ✓ Differential Expansion: Monitoring turbine differential expansion.
- ✓ Low-frequency Vibration: Monitoring low frequency machines. Such as hydro-turbine. Frequency starts from 0.5Hz to 100Hz.
- ✓ Speed: Monitoring rotation speed.
- ✓ Zero Speed: Monitoring rotation speed. When the value is low than a specified value, the monitor will give the alarm status.
- ✓ Reverse Rotation Speed: Monitoring rotation of reverse or forward status. When the rotation in the reverse status, the monitor will give the alarm status immediately.

PT2060/20 SEIS Seismic Module

SEIS module will process most of the seismic input, and some other signals. Then it can output lots of signals, as follows:

- ✓ Acceleration and Velocity output: Any current mode seismic sensors (TM0782A, TM0793V etc).
- ✓ Velocity or Displacement: Any current mode seismic sensors (TM0793V etc).
- ✓ Low frequency Displacement: Any low frequency sensors (TM079VD etc).
- ✓ Case Expansion: LVDT differential expansion transducer, this style include paired LVDT input and single LVDT input.

The module has a build-in integrator that will convert an input accelerometer signal to velocity or a velocity sensor input into a displacement.

Note: Integrator type can not work in low frequently condition.

PT2060/31 TEMP Temperature Module

TEMP module will process many temperature sensor of RTD input and TC input, Includes

RTD:

PT100	3-wire & 4-wire platinum RTD, (alpha = 0.00385): -200°C to 850°C
PT100	3-wire & 4-wire platinum RTD, (alpha = 0.00392): -200°C to 700°C
NI120	3-wire & 4-wire nickel RTD: -80°C to 260°C
CU10	3-wire & 4-wire copper RTD: -100°C to 260°C

TC:

Type E	-100°C to 1000°C
Type J	-18°C to 760°C
Type K	-18°C to 1370°C
Type T	-160°C to 400°C

PT2060/35 PROC Process Module

ProvibTech's PT2060/35 PROC process module has 16 channels. Each channel on the PT2060/35 PROC process module can processes the incoming voltage and current sensor signals, Includes

Voltage:

-10 to +10 Vdc input



Current:

4 to 20 mA input

PT2060/36 TRO Transmitter Module

ProvibTech's PT2060/36 TRO transmitter module has 16 channels. Each channel on the PT2060/36 TRO transmitter module can be fully programmed to perform needed current output to realize 4 to 20 mA transmitter output function for other modules. The main task for PT2060/36 TRO transmitter module is to process the incoming signal and status information, perform the logic and output the appropriate current.

PT2060/40 RELAY Module

RELAY module is a programmable relay module that can be programmed with any status parameters (alarms/ok) of any channel. The status of all channels can be programmed with ladder logic. The function is similar to PLC functions. Each RELAY module holds up with 16 relays.

PT2060/43 R-RELAY Redundant- Relay Module

The function is similar to PLC functions. Each R-RELAY module has two independent circuits that work independently. It performs two-out-of-three voting mode with the three independent alarm signals. When the system reliability is highly critical, PT2060/43 R-REALY redundant relay module is recommended.

PT2060/53 O-SPEED Over-speed Module

Each O-SPEED module contains one speed channel. Three of the O-SPEED module together with PT2060/43 redundant relay module compose of an Over-speed protection system. The system takes up total four slots. PT2060/53 O-SPEED Over-speed module can accept both proximity probe and magnetic pickup signal input. Channel 3 and channel 4 of PT200/53 module can be used as PT2060/10 module channel.

PT2060/80 CM Condition Monitoring Module

ProvibTech's PT2060/80 CM condition monitoring module is a 24 channels data collector, and processing unit. Each of the PT2060/80 modules can accept any signal input from the corresponding signal module, analyze it, and output it.

PT2060/90 POWER Power Module

POWER module includes two redundant half-height modules. Usually, one half-height power supply module is sufficient for normal operation. Power supply redundancy can be realized by uses both half-height modules.

PT2060/91 SIM System Interface Module

SIM module has the following function:

- ✓ System configuration: Configure all the signal channels, system parameters, communication parameters etc.
- ✓ Modbus communication: Communicate with PLC/DCS, control system reset, alarm multiply, alarm inhibit.
- ✓ Dual phase references: Connect to phase reference proximity probe, and distribute the phase



information over the system.

- ✓ Rack interconnection with communication.
- ✓ Virtual address configuration
- ✓ Ethernet Modbus TCP is required.
- ✓ Speed output

The System Interface Module collects data from the other modules in the rack over a high-speed internal network and sends this data to the information system upon request.

The System Interface Module is also able to communicate via Ethernet with host. Host can be Modbus protocol based or computers with PT2060 Rack Configuration and Data Acquisition software.

PT2060/96 COMM Communication Module

COMM module is a complimentary module in communication with Modbus. It has similar function as the communication part of SIM. The function and features:

- ✓ Redundant Modbus communication.
- ✓ PT2060/96 COMM communication module has been used with the Modbus connection, as additional communication is required.
- ✓ Ethernet Modbus TCP is required.
- ✓ Virtual address configuration.
- ✓ Upload the other module's parameter.
- ✓ Dual phase references.
- ✓ Speed output.
- ✓ Signal of phase reference output with peak to peak
- ✓ Gap voltage output

PT2060/98 DISP Display Module

ProvibTech's PT2060/98 DISP display system is a powerful touch-panel display loaded with PCM370 vibration analysis system software. The PT2060/98 DISP connects to the PT2060 system via Modbus. The PCM370 software will collect, store, analyze and display the machinery status data locally or to a wide area network.

PT2060/99 System Rack

Standard 19" rack can hold up to 48 channels or total of 12 modules. A 12" rack can hold up to 24 channels.

PT2060-CFG System Configuration Software

CONFIG software will configure all the modules in the system. It will also configure the system parameters for interface to up-level PLC/DCS or another rack.

PT2060/80 CM Condition Monitoring Module



General Information

PT2060/80 CM module can realize the following function:

- ✓ Dynamic data processing
- ✓ Transient data processing
- ✓ Interface to PCM360 condition monitoring software and database system

Each PT2060/80 CM module can process up to 24 channels of input signal and 2 channels of phase reference signal. When there is no pt2060/91 module in the PT2060 rack, the phase reference output channels of PT2060/80 module can not be used. A standard 19" PT2060 rack can hold up to two PT2060/80 CM modules. PT2060/80 CM module in left slot can receive the signal that come from signal module slot1-6, and the right one supports slot7-12. User can choose one PT2060/80 CM module or two as requirement. A 12" PT2060 rack can contain one PT2060/80 CM module only.

PT2060/80 receives signal through internal bus of the rack. Every Slot of the rack has 4 channels of analog signal connected to PT2060/80 CM module through internal bus. Four channels in slot 1 of the 19" rack are corresponding with 1-4 channels of PT2060/80 CM module installed in the slot 13; Four channels in slot 2 are corresponding with 5-8channels of PT2060/80 CM module installed in the slot 13, and the same, four channels in slot 6 are corresponding with channels 21-24 of PT2060/80 CM module installed in the slot 13; Four channels of slot 7 are corresponding with channels 25-28 of PT2060/80 CM module installed in the slot 14, while four channels in of slot 8 are corresponding with channels 29-32 of PT2060/80 CM module installed in the slot 14. And then, four channels of slot 12 are corresponding to channels 45-48 of PT2060/80 CM module installed in the slot 14. Four channels in slot 1 of 12" rack are corresponding with channels 1-4 of PT2060/80 CM module installed in the slot 7, while four channels in slot 2 are corresponding with channels 5-8 of PT2060/80 CM module installed in slot 7. And then, four channels in slot 6 are corresponding with 21-24 channels of PT2060/80 CM module installed in slot 7.

One slot of the PT2060 rack will be used by PT2060/31 module, if there is a PT2060/31 module in the rack, and there is no initial signal connected to PT2060/80 CM module. Four channels of PT2060/80 module corresponding to the slot that 31 module installed in will not be used though 31 module has 8 channels. As the same to PT2060/31, four channels of 80 CM module corresponding to PT2060/35/36/40/43 module will not be used. Also, four channels of PT2060/80 CM module corresponding to PT2060/96 module will not be used too. For example, if PT2060/31 is installed in slot 5, channels 17-20 of PT2060/80 CM module in slot 13 (slot 7 for 12" rack) corresponding to slot 5 will not be used.

ProvibTech recommend that the modules needed for condition monitoring are put on the left of the rack near to slot 1 as possible as you can. As possible as you can, put PT2060/31/35/36/40/43/96 modules on the right of the modules which need condition monitoring. This can reduce the number of PT2060/80 CM module.

To the maximum, the two wire terminals of every PT2060/80 CM module can output 24 channels of analog signal and 2 channels of phase reference signal. The top terminal outputs analog signals of 1-12 channels and 2 channels of phase reference signal, while the terminal below outputs analog signals of 13-24 channels and 2 channels of phase reference signal. The signal output amplitude of PT2060/80 CM module is about half



of the original signal output by sensor. If sensor original signal is needed, please connect the output signal of BNC terminal on the front panel of the module.

The main purpose of GP for PT2060/80 CM module is to make users conveniently to connect other condition monitoring system. Please refer to the following wiring diagram for the definition of wire connection terminal.

Field-wiring Diagram

Connect to PCM360 System

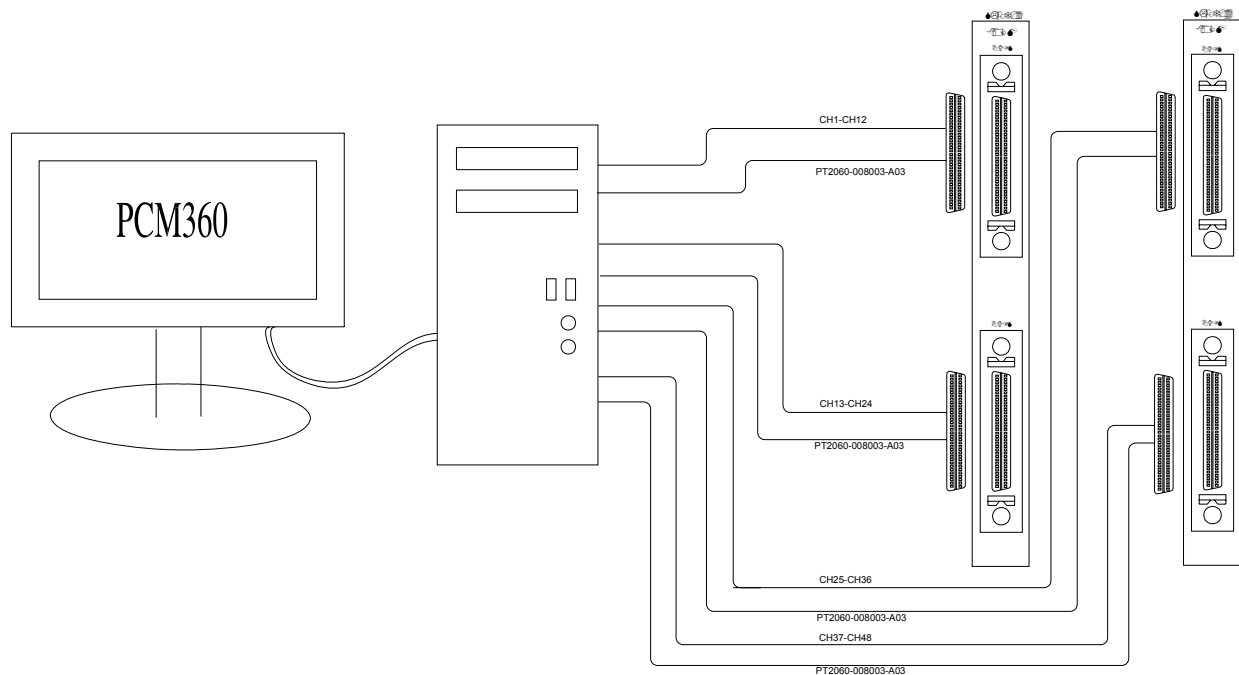


Figure 2



Connect to GP

Connection Diagram

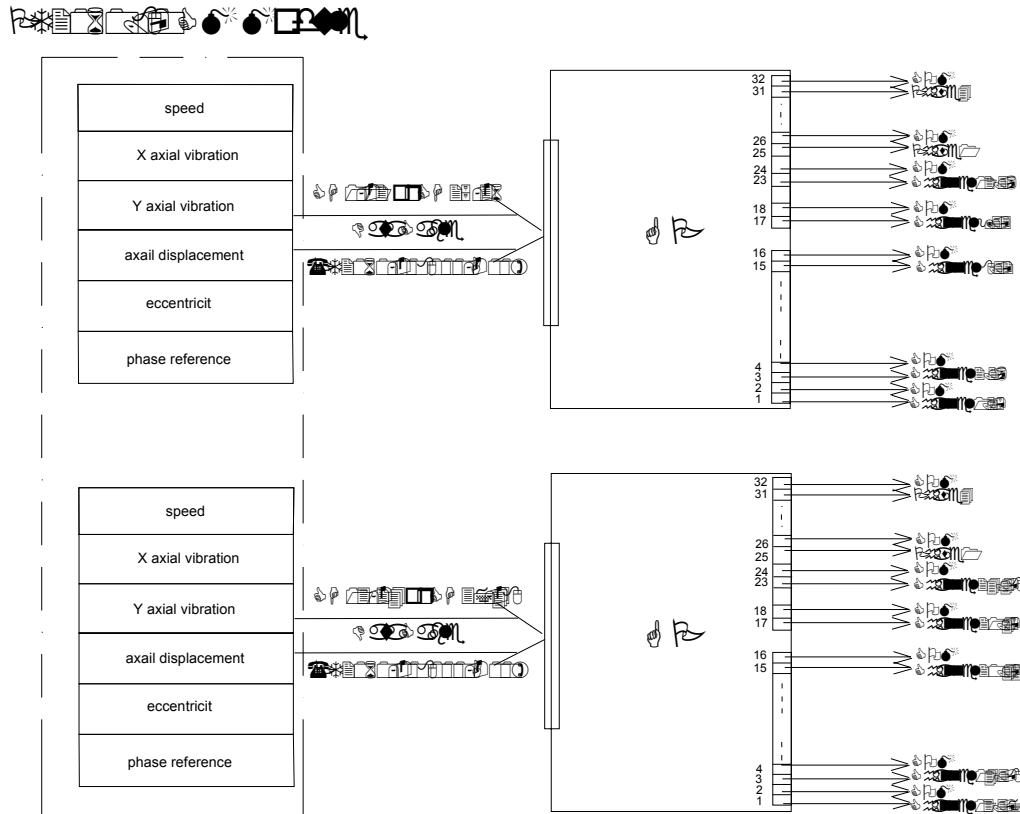


Figure 3

Dimension of GP

GP is a general port transform tool. One port of it can connect to PT2060-008000 data wire, and the other port can connect to other system or equipment. It can be fixed on the DIN rail.

The signal come from PT2060/80 CM module enter into one GP port and go out by the other port, but it is without any changes.

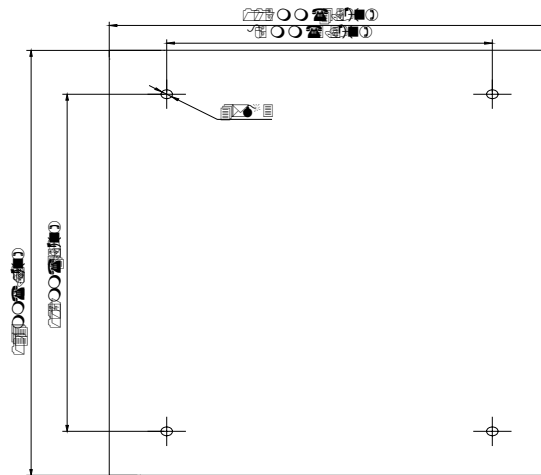


Figure 4



Figure 5 Top View of GP

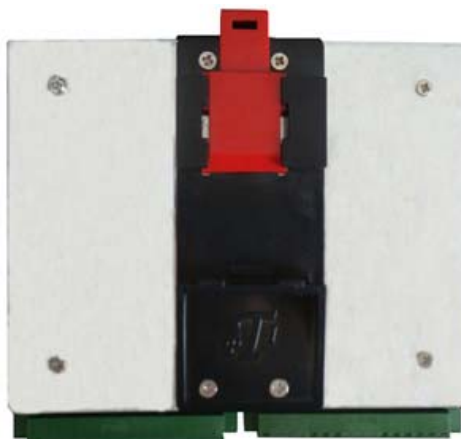


Figure 6 Bottom View of GP



Ordering Information

PT2060/80-AX

AX: Back-panel IO module

A0: Basic IO module for standard 19" Rack

A1: Basic IO module for standard 12" Rack

Optional Accessories:

PT2060-008000-AXX: Cable

It connects PT2060/80 CM to PCI6013 DAQ card or GP.

A00 2 meters (6.6 feet)

A01 10 meters (32.8 feet)

PT2060-008001: GP for PT2060/80 CM module

It is a special tool of port transform. If PT2060/80 CM module can't connect with other equipment by PT2060-008000 data wire directly, GP will be used.

PT2060-008003-AXX: Cable

It connects PT2060/80 CM to PCI6220 or PCI6250 DAQ card.

A00 2 meters (6.6 feet)

A01 10 meters (32.8 feet)

Back Panel Connectors Layout



Figure 7



PT2060/98 DISP Display Module

General Information

ProvibTech's PT2060/98 DISP display system is a powerful touch-panel display loaded with PCM370 vibration analysis system software. The PT2060/98 DISP connects to the PT2060 system via Modbus. The PCM370 software will collect, store, analyze and display the machinery status data locally or to a wide area network.

- ✓ ID each channel, and arrange the routing
- ✓ Setup data collection strategy
- ✓ Display machine photo and real-time data and status on top of the photo
- ✓ Real-time bar graph/ status list/ alarm status of each channel
- ✓ Alarm events
- ✓ Trend plot on each channel
- ✓ Touch-panel for easy operation
- ✓ Network to control systems (PLC/DCS or Historian) via Modbus

The figure below gives an interface of PCM370 For PT2060 software.



Figure 8

Specifications

Electrical

Touch Screen PC power supply:

100 - 240 VAC @ 50 ~ 60 Hz, 4 - 2 A

Physical

Touch panel, color 15" PC

Mounting size:

Front Panel: 450 x 315.6 x 6 mm

Control Box: 422.4 x 219.4 x 97/112.2 mm

Cut out Dimension: 428 x 297 mm

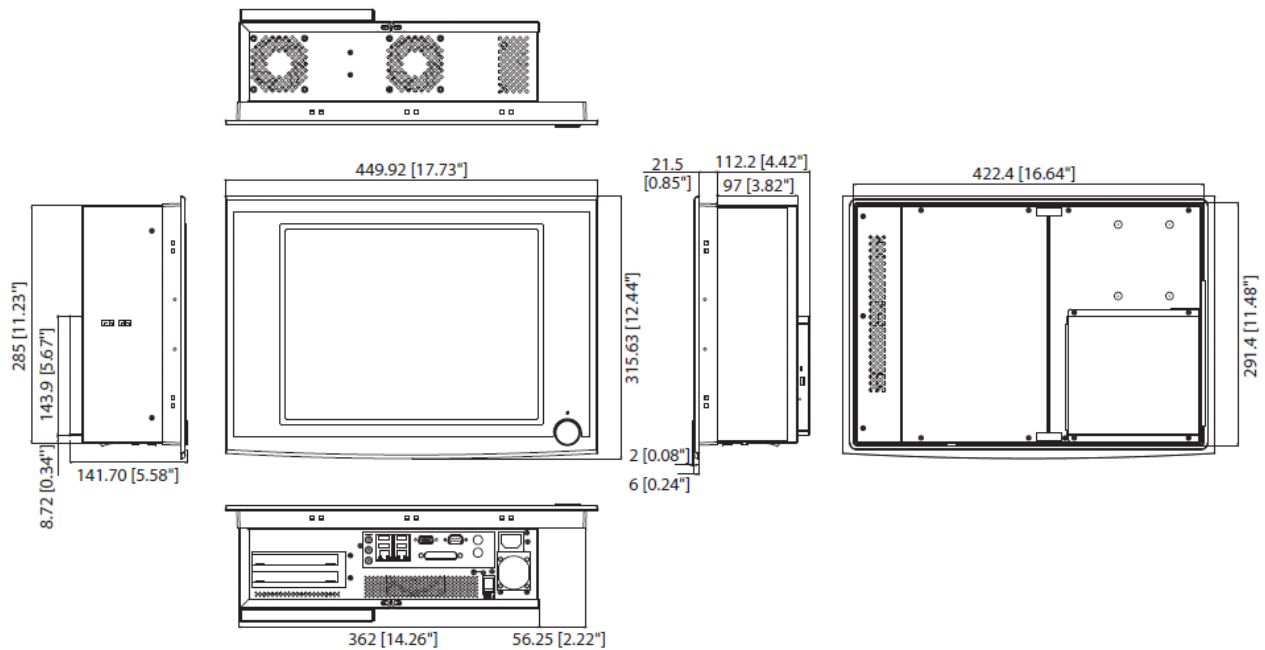


Figure 9 Panel Cut-out Dimensions: 428×297mm

Field-wiring Diagram

Connect with PT2060/91 COMM Module via Ethernet

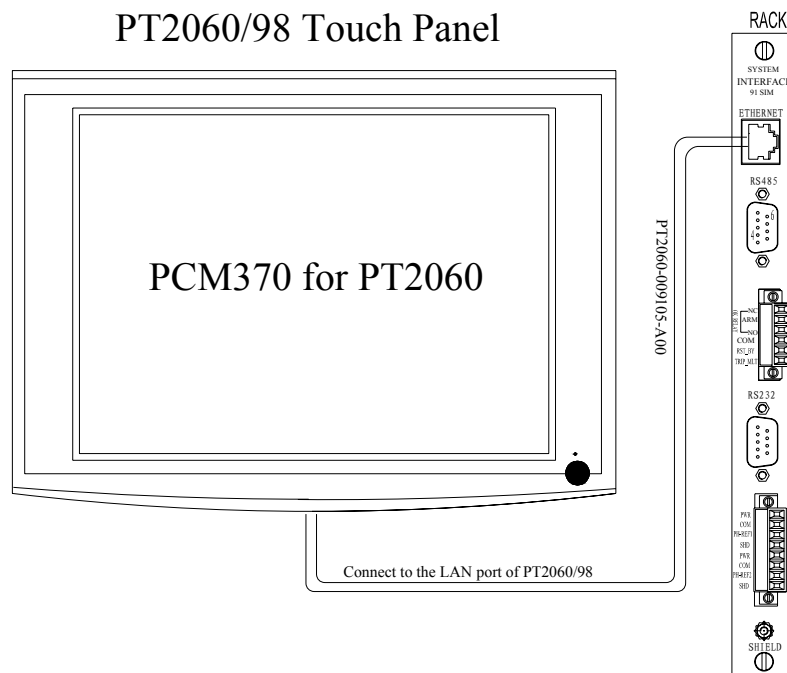


Figure 10



Connect with PT2060/96 COMM Module via RS232

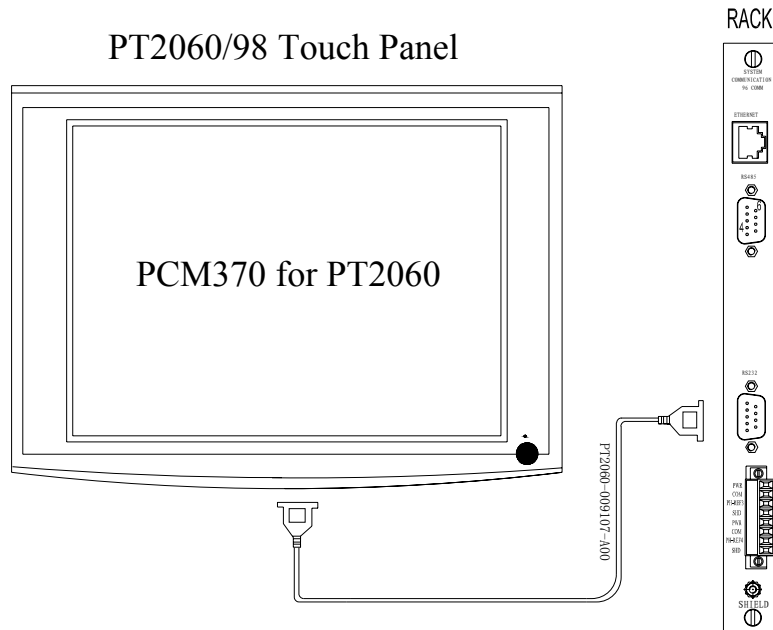


Figure 11

Ordering Information

Warning: Only work with PT2060/91 or PT2060/96 module

PT2060/98-BX

BX: Touch panel with PCM370 for PT2060 software

B0: No touch panel (only include PCM370 for PT2060 software)

B1: IPPC-6152A-ROAE 15" Touch panel with 100 - 240 VAC power (include two power cables, a RS232 cross cable PT2060-009107 and a cross Ethernet cable PT2060-009105)

Optional Accessories:

PT2060-009800: HP dvd1040e external DVD writer

PT2060-009801: Windows XP English version

PT2060/99 System Rack

There are two sorts of PT2060 rack: a standard 19" rack and a 12" rack.

The standard 19" rack is a rack with the same dimensions as a standard 19" industrial rack.



Specifications

Environmental

Temperature:

Operation:

-20°C ~ +65°C

Storage:

-40°C ~ +85°C

Humidity:

95% non-condensing

Physical

A 19" standard rack has 16 slots. A 12" rack has 9 slots.

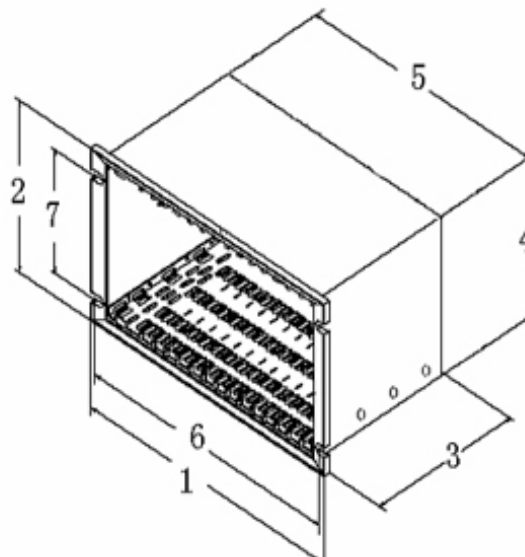


Figure 12

A 19" standard rack mount, dimensions, please refer to the figure above. All data list below:

1. 483mm (19.0")
2. 266mm (10.5")
3. 355mm (14.0")
4. 246mm (9.7")
5. 442mm (17.4")
6. 465mm (18.3")
7. 190mm (7.5")

12" rack is similar to the 19" standard rack, some data are different only. The data list below:

1. 305 mm (12.0")



2. 266mm (10.5")
3. 355mm (14.0")
4. 246mm (9.7")
5. 264mm (10.4")
6. 287mm (11.3")
7. 190mm (7.5")

Ordering Information

PT2060/99-AX:

A0: Standard 19" rack

A1: Standard 12" rack

Optional Accessories:

PT2060-009900: Plastic frame for 19" Rack

PT2060-009901: Plastic frame for 12" Rack

PT2060-009902: Rack cover for 19" Rack

PT2060-009903: Rack cover for 12" Rack

PT2060-009904: Bolt for all front panel

PT2060-009905: Front blank panel

PT2060-009906: Back blank panel



Figure 13

PT2060 System Configuration Software

PT2060 System Configuration software is an important part of PT2060 monitor system. Via the software, PT2060 parameters are configured and the running status is displayed.

General Information

The figure below is the main rack window of the software. There are seven main items in the window.

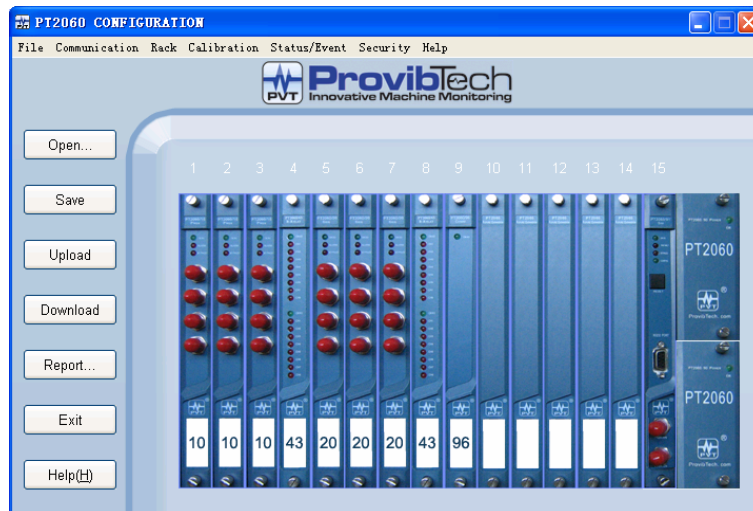


Figure 14

Ordering Information

PT2060-CFG-AX

A0: Configuration software CD include USB to RS232 converter driver
User Manual



PT2060 Monitor Installation

Mounting

Module Slot List

Standard 19" Rack

Module number	No redundancy	Redundancy*
PT2060/10	Slot 1-12	Slot 1-3, Slot 5-7, Slot 9-11
PT2060/20	Slot 1-12	Slot 1-3, Slot 5-7, Slot 9-11
PT2060/31	Slot 1-12	-----
PT2060/35	Slot 1-12	-----
PT2060/36	Slot 1-12	-----
PT2060/53	-----	Slot 1-3, Slot 5-7, Slot 9-11
PT2060/40	Slot 1-12	-----
PT2060/43	-----	Slot 4, 8, 12
PT2060/80	Slot 13, 14 (back only)	-----
PT2060/91	Slot 15	-----
PT2060/96	Slot 1-12	-----
PT2060/90	Slot 16 (Comment redundancy strongly)	Slot 16 (Double PT2060/90, up and down)

* For redundancy, all signal modules must be installed in adjacent slots.

Standard 12" Rack

Module number	No redundancy	Redundancy*
PT2060/10	Slot 1-6	Slot 1-3
PT2060/20	Slot 1-6	Slot 1-3
PT2060/31	Slot 1-6	-----
PT2060/35	Slot 1-6	-----
PT2060/36	Slot 1-6	-----
PT2060/53	-----	Slot 1-3
PT2060/40	Slot 1-6	-----
PT2060/43	-----	Slot 4
PT2060/80	Slot 7 (back only)	-----
PT2060/91	Slot 8	-----
PT2060/96	Slot 1-6	-----
PT2060/90	Slot 9 (Comment redundancy strongly)	Slot 9 (Double PT2060/90, up and down)

* For redundancy, all signal modules must be installed in adjacent slots.



Rack Module Mounting

Front-panel Mounting

There is a front-panel picture of 19" rack below. The first and second slots from left have no modules. We can see the bus PCB board directly. One slot has two connectors like that. Every front-panel module must connect to its connectors tightly.



Figure 15

1. Insert the module into corresponding slot as the figure below.



Figure 16

2. Push the module firmly into the slot, make sure the two connectors been connected to the corresponding connectors on the bus PCB board.
3. Fasten the screws on top and bottom of the front-panel. A screwdriver is necessary.
4. Verify if the module is secure after the module installed.

Back-panel Mounting

There is a back-panel picture of 19" rack below. Several slots on right have no modules. We can see the bus



PCB board directly. One slot has two connectors like that. Every back-panel module must connect to its connectors tightly. Back-panel must match its front-panel.



Figure 17

1. Insert the module into corresponding slot.



Figure 18

2. Push the module firmly into the slot, make sure the two connectors been connected to the corresponding connectors on the bus PCB board. See figure below.

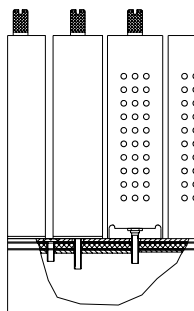


Figure 19

3. Fasten the screws on top and bottom of the back-panel. A screwdriver is necessary.
4. Verify if the back panel is secure after the module is installed.



Warning

The metal frame must be earth grounding. Otherwise, high voltage may exist on the rack frame.

Digital Communication

Please refer to *PT2060/91 SIM system interface module user manual* for detail.



PT2060 Monitor Operation

General Operation Information

According to the information of *PT2060 Monitor Installation* to connect the PT2060 rack, open the configuration software to upload all the information.

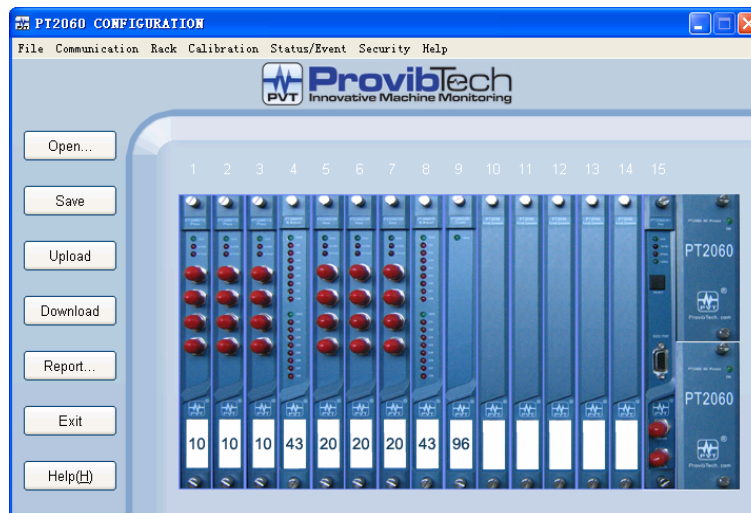


Figure 20

The figure above is the PT2060 System Configuration interface. It shows all the modules which is inserted into PT2060's rack.

For more information, please click the module picture available on the rack interface, user can get configuration setting window and do the modules parameters viewing or modification. More detailed operation information, please refer to PT2060-CFG Configuration Software for PT2060 Monitor User Manual.

If the communication wasn't set up auto, click "Communication->Communication Setup" to set up the parameters:

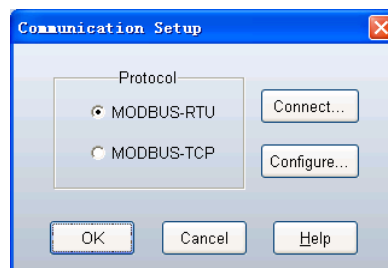


图 21

If communication establishment succeed, click the button *Configure* to open the window *Communication Parameter* to alter it. Set the parameters and download the setting to the PT2060. Default setting:

Baud rate: 19200



Stop bit: 2
Parity: None

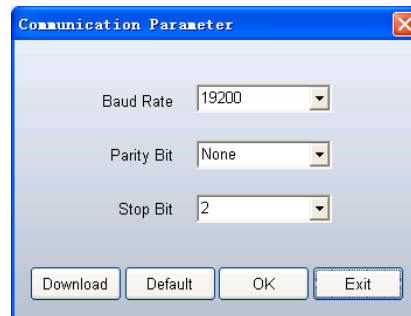


Figure 22

Click the button *Connect* to open the window *Communication Setting*. Enter correct ID(Slave address, 1 for default setting). Select the right port number to communicate.

Following the procedure to obtain the COM port number: "My PC -> Property -> Device Manager -> Hardware -> Ports". See more details in the previous section.

Make sure that the PT2060-CFG only connects to one PT2060.

Enter correct Rack address ID (default value is 1).

Click "Auto Scan" or "Scan" button to upload communication parameters..

Real-time Value and Status

Affirming the parameters what are configured, if they are very proper, then click "Status/Event -> Real-Time Value And Status", the figure as below:

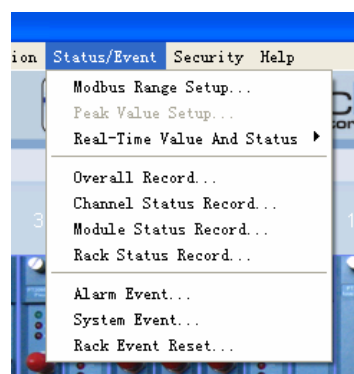


Figure 23

Then will display the figure of *Real-time and Value And Status* in the below figure.



Real-time Value And Status							
Rack	Slot	Channel	Real-time value	GAP value	Alert	Danger	GAP not OK
1	1	1	0 um	-11.9 v	False	False	False
1	1	2	0 um	-10.0 v	False	False	False
1	1	3	0 um	-0.2 v	False	False	True
1	1	4	0 um	-0.5 v	False	False	True
1	2	1	0 um	-0.2 v	False	False	True
1	2	2	0 um	-0.2 v	False	False	True
1	2	3	0 um	-0.3 v	False	False	True
1	2	4	0 um	-0.3 v	False	False	True
1	3	1	0.0 RPM	-5.1 v	False	False	False
1	3	2	0.0 RPM	-20.6 v	False	False	False
1	3	3	0 mm	-10.0 v	False	False	False
1	3	4	-0.24 mm	-11.9 v	False	False	False
1	5	1	0 mm/s	8.0 v	False	False	False
1	5	2	0 mm/s	8.0 v	False	False	False
1	5	3	2 um	8.1 v	False	False	False
1	5	4	2 um	8.0 v	False	False	False
1	6	1	4 um	7.9 v	False	False	False
1	6	2	2 um	7.9 v	False	False	False
1	6	3	0 mm/s	8.0 v	False	False	False
1	6	4	0 mm/s	8.0 v	False	False	False
1	7	1	0 mm/s	8.1 v	False	False	False
1	7	2	0 mm/s	8.0 v	False	False	False
1	7	3	0 mm/s	8.1 v	False	False	False
1	7	4	0 mm/s	8.1 v	False	False	False

Figure 24

This window above can dynamically display monitored real-time value, alarm status, gap not ok status and gap voltage value.

Note: For the detailed content of how to operate PT2060's configuration software, please refer to *PT2060-CFG Configuration Software for PT2060 Monitor User Manual*.



PT2060 Maintenance

General Maintenance Instruction

The boards inside of PT2060 modules cannot be repaired in the field. Maintaining a PT2060 rack consists of rack maintenance and module maintenance.

The maintenance interval is very important for the PT2060 monitor system maintenance. Usually, a yearly maintenance is sufficient. If it works in extraordinary circumstance, user should shorten the interval according to the actual situation.

Extraordinary circumstance means that

- ✓ PT2060 is used to monitor some critical equipment
- ✓ PT2060 works in high temperature, high humidity, and corrosive environment

Besides, maintenance interval should be adjusted according to plant maintenance period.

Rack Maintenance

There is something must to do.

1. Power off the PT2060, demount it from the equipment and transfer it to a workbench.
2. Check every module and every screw on rack, if any looseness is found, fasten it again. This job is important.
3. Check all power wires, and ensure their safety.

Module Maintenance

Module maintenance is done to verify that the module operates correctly. There are many jobs must to do, LED check, BUF check and voltage check are introduced simply in this section. More check means and more detailed job, please refer to each module user manual.

LED Check

PT2060/10/20/31/35/53 Signal Process Modules

LED	On/Flashing	OK Off/Not flashing	Trouble solution
OK/IO	Normally working (communicating)	Module failure Communication failure	Well connect module with rack again. Restart system. Check probe driver and cable.
ALARM	Alarm state	Driver failure Cable connection wrong, short or open.	
BYPASS	Bypass state	Probe is not properly gapped	



PT2060/40/43 Relay Modules

LED	On/flashing	OK, TX/RX Off/Not flashing	Trouble solution
OK	Normally working	Module failure Communication failure	Well connect module with rack again. Restart system.
CH1~CH16	Relay energized		

PT2060/90 POWER Power Supply Modules

LED	Constant on	Off	Normal trouble solution
OK	Normally working	Power-down Wiring failure Module failure	Power-up Check input wire Use back-up module or connect with ProvibTech engineers

PT2060/91 SIM System Interface Module

LED	On/flashing	OK Off/Not flashing	Trouble solution
OK	Normally working	Module failure or Communication failure or Phase reference not OK	Well connect module with rack again. Check probe driver and cable of Phase reference.
ALM_MLT	Alarm-multiple state		
BYPASS	Alarm-bypass state		
CONFIG	Configuration		

PT2060/36/96 Module

LED	On/flashing	OK Off/Not flashing	Trouble solution
OK	Normally working	Module failure or Communication failure	Well connect module with rack again.

Buffered Out Check

Once PT2060 fail to work as usual, user can do a simple test to see if the problem comes from board. Using the oscilloscope to test Buffered Output signal, and see whether signal is the corresponding with added one, please refer to below picture.

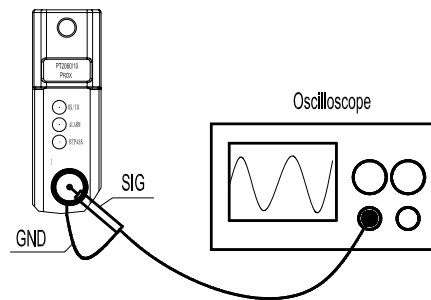


Figure 25

The noise signal PK-PK value should be less than 50mV. When test, please connect GND of oscilloscope to GND of testing Channel.

Verifying Voltage of Back Panel

PT2060/10 Back Panel

Back panel voltage value measured with multimeter without connecting transducers. It is about -24 V for PWR and COM.

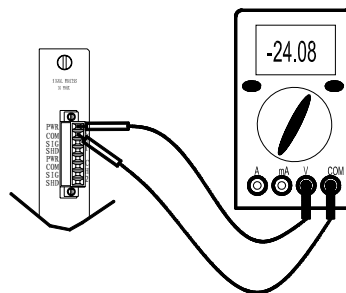


Figure 26

PT2060/20 Back Panel

Connected with Seismic Transducer

When seismic transducers are connected, please test the power as shown in the figure below, channel current should be at about 4.00mA.

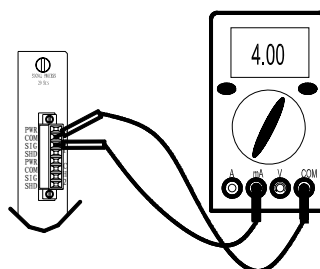


Figure 27



Connected with LVDT Transducer

Voltage value is about 19V for connection PWR and COM on back panel.

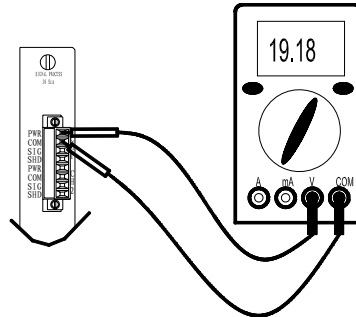


Figure 28

PT2060/91 Back Panel

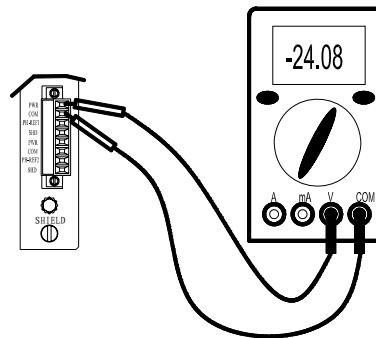


Figure 29

As picture above indicating of two phases input terminals, measured value is about -24V.

General Calibration

If the linearity of some channels does not satisfy the requirement, user could re-calibrate these channels.

4-20mA Current calibration, follows these steps.

1. Connect a multimeter to the current output port in serial. Plug Red pen into OUT and black pen into COM.
2. Click menu item *Calibration->User Calibration*, enter password to open calibration window. See the following figure. Select the slot number and channel number to be calibrated.

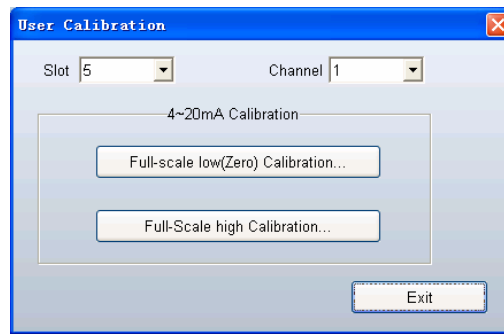


Figure 30

3. The whole procedure is implemented in the 4-20mA Calibration. Click the button *Full-scale low(Zero) Calibration* to open the zero calibration window (figure 31). Follow the steps showed in the window to implement calibration. First, click the button *Start Calibration* in step1. Wait till the multimeter outputs a right value, then read the output current value from multimeter after it settled down. Enter this value (three significant decimal digits) into the text area in step2. After that, click the button *Full-scale low Calibration* in step3 to download. Click Exit to exit the zero calibration.

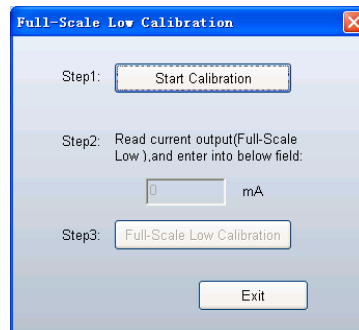


Figure 31

4. Click the button *Full-scale high Calibration*. Click OK button in the WARNING window (figure 32). Enter YES in the Warning dialogue (figure 33) and click OK to open the calibration window (figure 34). Follow the steps showed in the window to implement calibration. First, click the button *Start Calibration* in step1, Wait till the multimeter outputs a right value, then read the output current value from multimeter after it settled down. Enter this value (three significant decimal digits) into the text area in step2. After that, click the button *Full-scale high Calibration* in step3 to download. Click Exit to exit the high calibration.

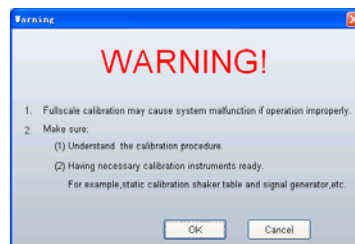


Figure 32

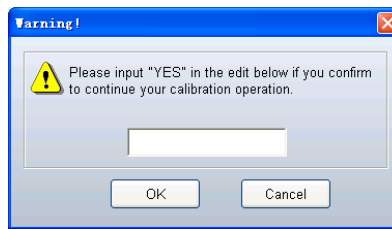


Figure 33

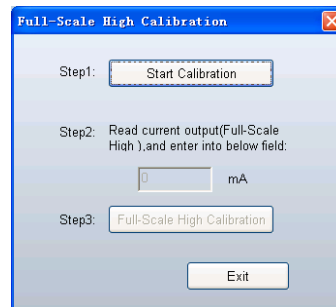


Figure 34

5. Click the button *Exit* to go back to the RUN state. You could optionally do linearity test again to check the calibrating result. If you does not satisfy, you could redo it.