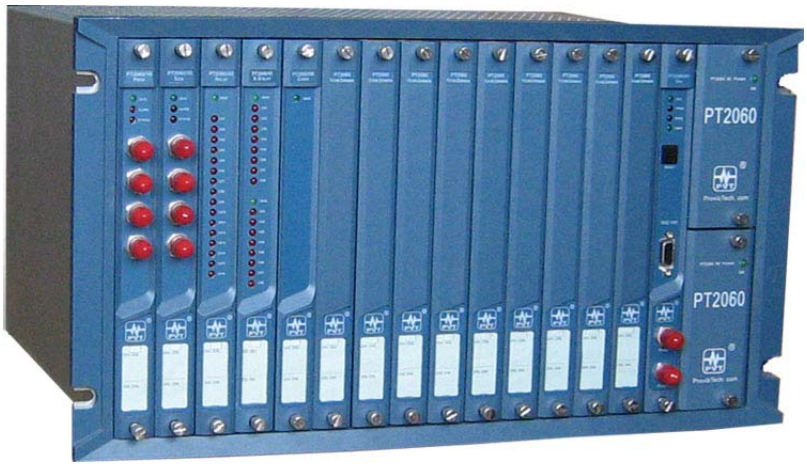
PT2060 Monitor

PT2060/96 COMM Communication Module

User Manual

Installation, Operation, Maintenance



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PT2060-96-USR-A-10

Contents

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 made without delay against the shipper within 2 weeks after receipt of shipment at site.

Handling and Storing Considerations

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

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

- ✓ Please pay attention to 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 is necessary to discharge any static electricity from yourself and your clothing before handling the rack.
- ✓ Always keep the module in the protective antistatic bag whenever it is not installed in a system.

Module Introduction

General Information

ProvibTech's PT2060/96 COMM communication module is a communication and system monitoring module. The PT2060/96 COMM communication module provides serial communications between the PT2060 Monitor System and any plant information system such as a distributed control system (DCS) or a programmable logic controller (PLC). The COMM communication 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.

Figure 1

The PT2060/96 COMM communication module is also able to communicate via Ethernet with the host. Host can be Modbus TCP protocol based or computers with PT2060 Rack Configuration and Data Acquisition software.

ProvibTech's PT2060/96 COMM communication module is a complimentary module. A PT2060/96 COMM communication module should be added if two communications outputs are required for the system :

- ✓ 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

Communication Ports:

- ✓ Rear Panel RS-485 Port
- ✓ Rear Panel RS-232 Port
- ✓ Rear Panel Ethernet Port

Redundant Communication

Redundant communications is needed to create a more reliable digital communication system . The PT2060/96 COMM communication module can provide redundant communications port.

More than one Communication is required

Since the PT2060/91 SIM module can use only one communication output, to connect additional hardware, such as a display unit, another communication board is required. Thus the PT2060/96 COMM communication module is used when two communications outputs are required.

Virtual address configuration

In addition to pre-assigned Modbus registers, the data of the dispersed channel's measured value can be arbitrarily mapped to continuous virtual register addresses by the PT2060-CFG software. This can help improve the setup and communication efficiency and accuracy.

Modbus TCP

The PT2060/96 COMM communication module has both Modbus RTU and Modbus TCP protocols. The Modbus TCP will be connected via an Ethernet port.

Other Information

The slots in a standard 19″ rack are numbered from 1 to 16, counting from left to right. The PT2060/96 COMM communication module can be mounted in an slot from 1 to 12. The slots in an 12″ rack are numbered from 1 to 8, counting from left to right. The PT2060/96 COMM communication module can be mounted in an slot from 1 to 6.

Hardware

OK/IO LED

The LEDs on the front panel of PT2060/96 COMM communication Module indicate the operating status of the module.

Flash:	Self-test is ok. Digital communication is ok.
On without flash:	Self-test is ok but no digital communication.
Off:	Self-test is not ok.

Software

Signal Channel's Status (Read Only)

Address: 10139 - 12186

Channel's first address: 10139+128(slot-1) + 8(ch-1)

Each module takes up to 128 data address.

Each module can have up to 16 channels.

Each channel takes up to 8 data address that is 8 statuses.

Slot = 1-16

Ch = 1-16 (channel)

Example: First channel at first slot.

10139=0/1	OK/NOT OK
10140=0/1	NOT Alert/Alert
10141=0/1	NOT Danger/Danger
10142=0/1	NOT Bypass/Bypass
10143=0/1	NOT Trip Multiply/Trip Multiply
10144=0/1	NOT Off/Off

10145=0/1	Gap Ok/Gap Not Ok
10146	Un-used

Reading Real-time Measured Value

Observing the real time measured value and GAP voltage may help you master the running state of the instrument.

Overall and Gap Voltage (Read Only)

address = 30501+32(slot-1)+2(ch-1)+ n

slot： 1-16

ch： 1-16

n： parameters.

0: Overall

1: Gap voltage

Example:

REG=30501: overall of the first channel on the first slot

REG=30502: gap voltage of the first channel on the first slot

The unit of the gap voltage is in mV. It can be from 0 to full scale

The value to PLC = Full scale range * (overall – full scale low) / (full scale high – full scale low).

Specifications

Electrical

Power supply:

Internally converted by the rack power supply module

3.7W total typical for each module

Phase reference signal Input:

Input impedance: > 20KΩ

Input voltage range:

magnetic pickup: +15VDC ~ -15VDC

Proximity probes: 0 ~ -24VDC

Input signal frequency: 0~20kHz

Sensors for Phase reference:

Proximity probes; magnetic pickup sensor

Parameters for Proximity probes:

Input frequency: The PT2060/96 module supports 1 - 255 events per revolution with a maximum full scale range of 60000 rpm.
Valid frequency: >0.0167Hz

Threshold:

Auto: > 2.0V pk-pk signal amplitude (at least 2Hz), Trigger level is calculate automatically.

Manual: > 0.6V pk-pk signal amplitude (at least 0.017Hz). Trigger level programmable from -17VDC to -3VDC.

Hysteresis: 0.5 - 2.5 V user selectable

Power supply: -24VDC for proximity probe driver.
current limited. Less than 50mA on each channel

Parameters for magnetic pickup:

Input frequency: The PT2060/96 module supports 1 - 255 events per revolution with a maximum full scale range of 60000 RPM.
Valid frequency: >3.3Hz（least 2Vpkpk）

Hysteresis: 0.5 - 2.5 V user selectable

Power supply: Need no power.

Phase Reference buffer:

On the front panel, each channel has one BNC connector. Original phase reference signal can be selected to output. modulated square wave can be selected to output. Meanwhile, original phase reference signal can be output via PT2060-80 module.

amplitude of signal: -23V~14V

Output Impedance: 150Ω

Speed output:

The PT2060/96 module provides the function to measure machine speed in RPM from the two transducers. Input range of 1 to 1,200,000 RPM (0.017 Hz

to 20 kHz), the measurable RPM scale is from 1 to 60000 RPM (0.017 Hz to 1000 Hz), The real-time updating RPM can be observed from the PT2060 Configuration software.

Accuracy:

±1 RPM

Pk to Pk value:

When the input frequency of transducer is more than 0.1 Hz, the PT2060/96 module will automatically calculate the peak-to-peak swing of the sensor's signal, and display the Pk to Pk Value via PT2060-CFG.

Gap voltage:

When frequency of the input Proximity transducer's signal is more than 0.5 Hz, the PT2060/96 module will display the gap voltage of the Proximity transducer via PT2060-CFG., otherwise, display the real time Value when frequency of the input Proximity sensor's signal is less than 0.5 Hz.

LED Indicators:

OK/IO: green

Modbus communication:

RS-232: on back panel of module.

RS-485: on the back panel of module. The available baud rate values are: 1200, 2400, 4800, 9600, 19.2 k, 38.4 k and 115.2 k baud. RS-485 cable can run up to maximum 1220 meters (4000 ft).

Ethernet : on the back panel of module, 10Mbps, IEEE802.3. There is only (1) active Modbus communication port.

Approvals:

CE;

CSA:

Non-incendive,classI,div.2,Grps.ABCD,T4@Ta= -40℃ to +75℃

Certificate Number: 2011996

Environmental

Temperature:

Operation: -20 ℃ to +65℃

Storage: -40℃ to +85℃

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)

Mount in any of the 12 remaining slots. Slots 15 and 16 of system rack are reserved for the SIM modules and the Power Supply.

Weight:

1.2kg (2.6 lbs)

Configuration Settings and Application

This section describes how the PT2060/96 COMM communication module is configured using the PT2060 System Configuration software through the PT2060/91 SIM system interface module. It also describes any configuration considerations associated with this module.

To fulfill these functions, the PT2060/96 COMM communication module and the PT2060 System Configuration software need to work together.

Application Alert

One module can't use Modbus RS-232/RS-485 and Modbus TCP at the same time! It can only use one mode at a time!

Modbus TCP

Modbus TCP is an Internet protocol. Ethernet is a long-standing office networking protocol that has gained universal world-wide acceptance. It is also an open standard that is supported by many manufacturers and its infrastructure is widely available and largely installed. Consequently, its TCP/IP suite of protocols is used world-wide and even serves as the foundation for access to the World Wide Web, as many devices already support Ethernet.

The PT2060/96 COMM Communication Module, needs an Ethernet Cross cable to connect the system to the PC directly. The Rate of communication between them can be 10Mb/s. PT2060/96 COMM Communication Module is able to communicate via Ethernet with up to five hosts. Hosts can be Modbus TCP protocol based.

Factory Default Setting

Modbus RS-232/RS-485

Communication setting:	19200BPS, 8 data bits, no parity, 2 stop bits
Communication Address setting:	PT2060/96 module's communication Address is 1.

Modbus TCP

IP Address setting:	192.168.1.212
Subnet Mask setting:	255.255.255.0
Gateway Address setting:	192.168.1.1
Communication Address setting:	PT2060/96 module's communication Address is 1.

Hardware Configuration

The PT2060/96 COMM communication module has a RS-232 port, a RS-485 port and an Ethernet port, through which communications with a PC can be established.

This section describes how to use the connectors on the PT2060/96 back panel and how to wire.

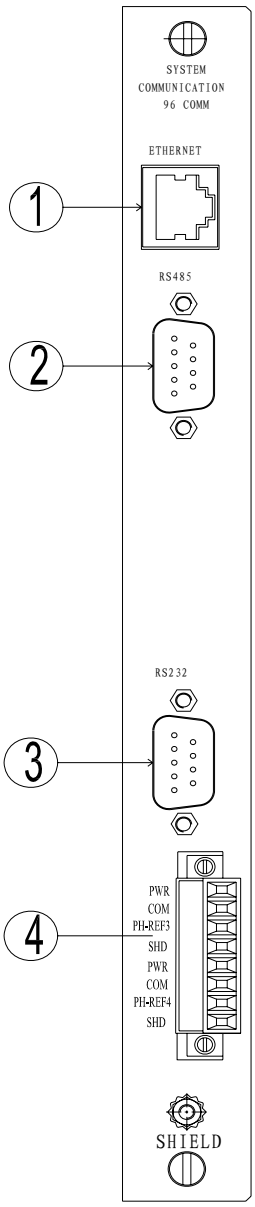


Figure 2

1. Ethernet

The PT2060/96 COMM communication module can be connected to Ethernet through the standard RJ45 connector. TCP/IP protocol is supported by the module. If you want to connect to multiple machines, you may need a Switch / Hub.

2. RS-485

The PT2060/96 COMM communication module can be connected with the PT2060-CFG software through RS-485. PT2060 provides two pairs of RS-485, 485A1-485B1 and 485A2-485B2.

Connect 485A1 with the Modbus RS-485 I/O converter 485-A and 485B1 with the Modbus RS-485 I/O converter 485-B, and choose a corresponding baud rate. The host computer can now communicate with the PT2060/96 COMM communication module. 485A2-485B2 can also be used to connect with other Modbus RS-485 I/O converters.

When connecting the Modbus RS-485 I/O converter to a host device or to another I/O module, the connections are made as per the diagram below. See the following table for connector designations.

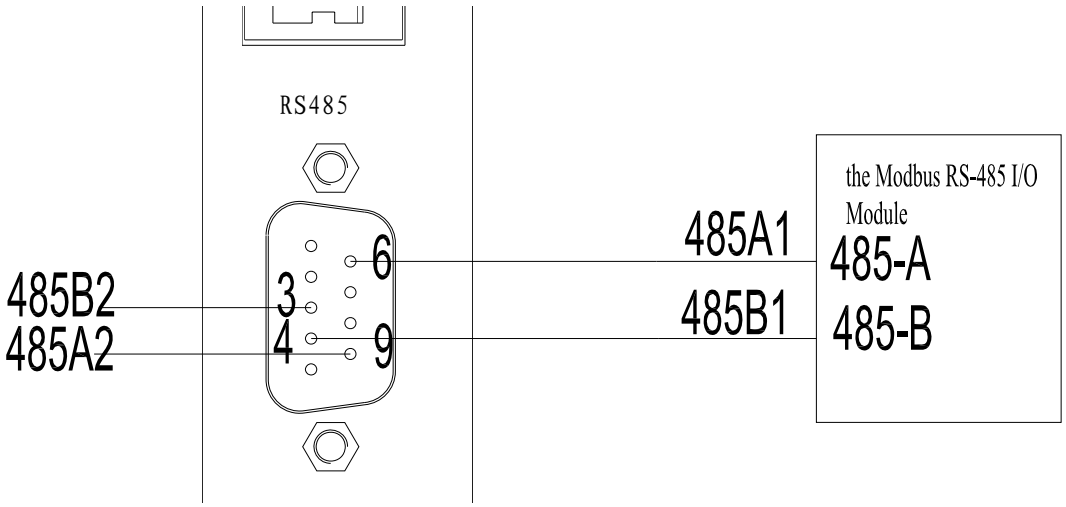


Figure 3

3. RS-232

The PT2060/96 COMM communication module can connect with the upper-level controller via RS232. The cable will go between the RS-232 connector on PT2060/96 COMM communication module and the HOST computer.

Choose the corresponding baud rate. Communication can be established between the host computer and the PT2060/96 COMM communication module, and you can get parameters of PT2060/96 COMM module.

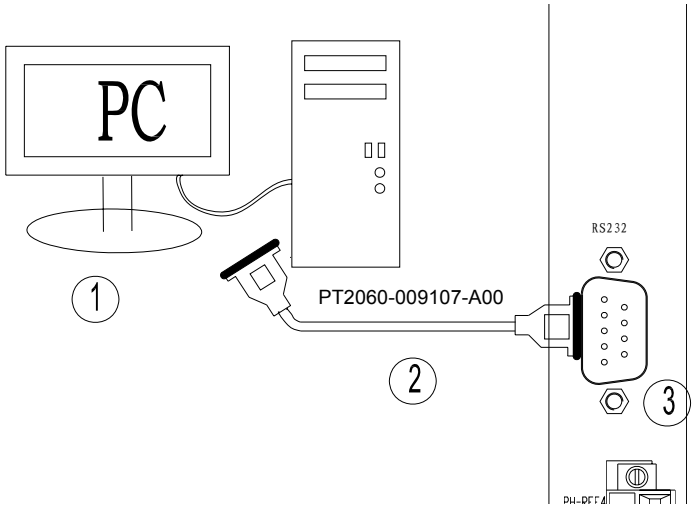


Figure 4

1) The Host Computer
2) Cross serial communication cable
3) RS-232 Port

RS-232 pin definitions

Pin(9p)	Name	Description
2	RX	Receiving data
3	TX	Transmitting data
5	COM	Common reference

4. Phase reference input port

The PT2060/96 has two phase reference input channels as shown below. Phase reference outputs can be observed with an oscilloscope from the BNC which is fixed in the front panel, Meanwhile, the user can acquire two phase reference buffer outputs via PT2060/80 module.

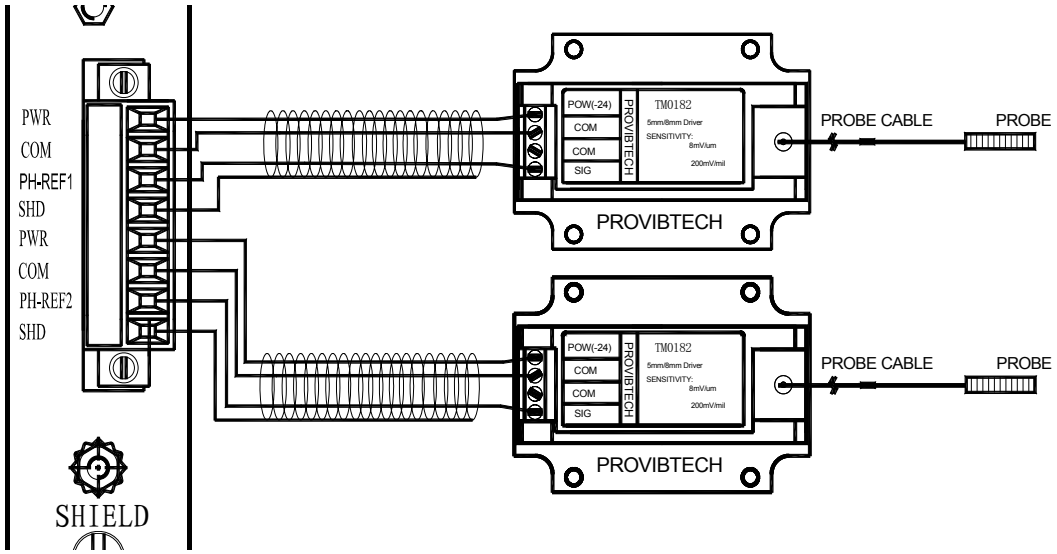


Figure 5

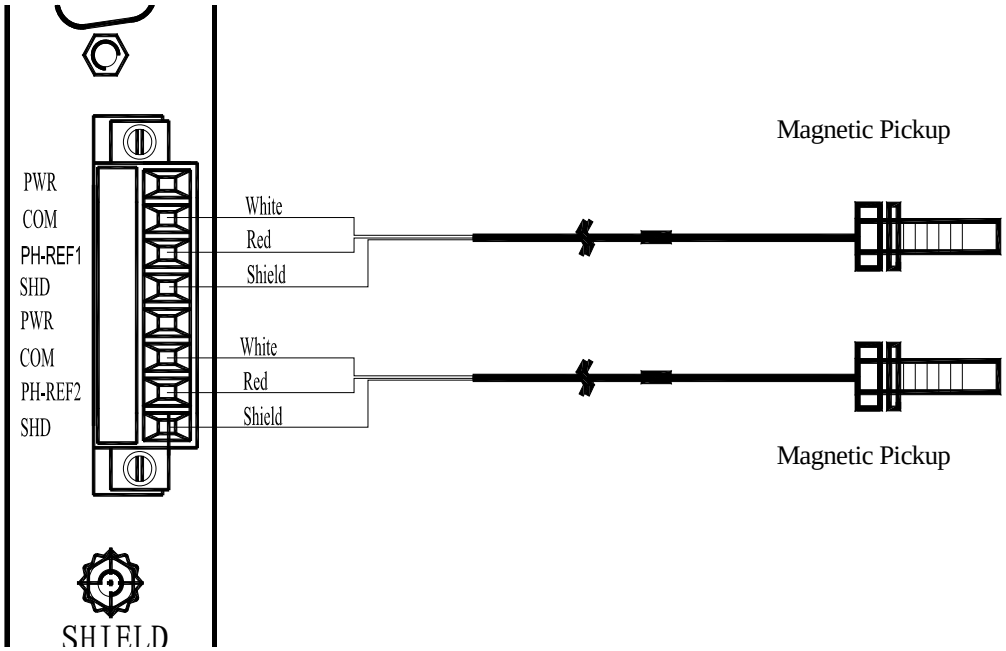


Figure 6

Functions and Configuration Setting

Software Operation

The PT2060 System Configure software is an important part of performing test and maintenance of the PT2060 system. Via the software, all PT2060 parameters are configured and the running status is displayed. For more detailed information, please refer to PT2060 System Configure software user manual.
The figure below is the main rack window of the software. There are seven main items in the window.

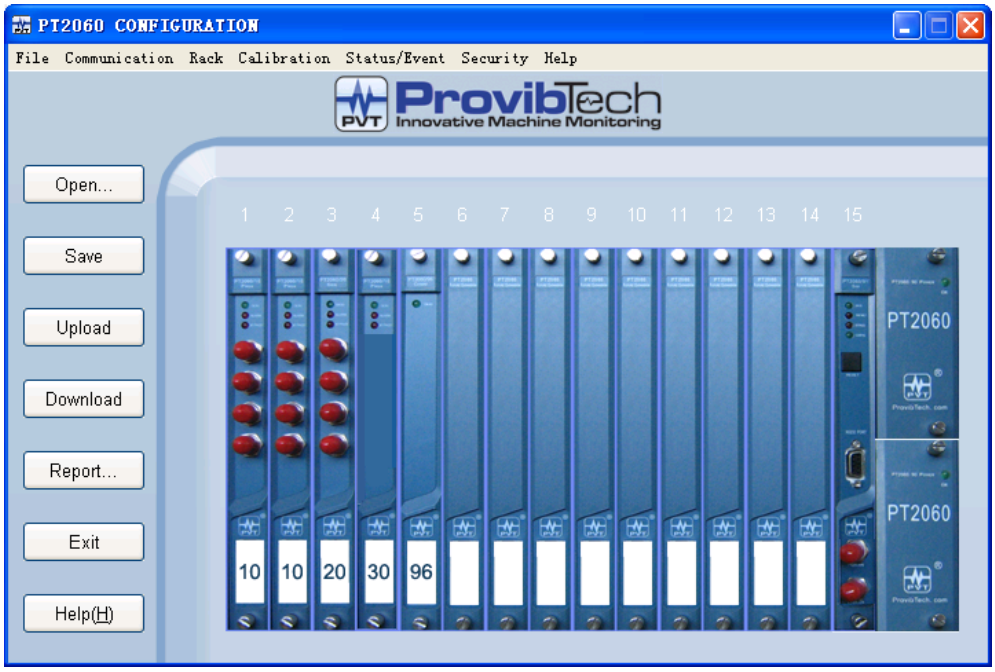


Figure 7

Parameter Configuration

After connecting the host computer with the PT2060/91, the PT2060 System Configuration software can be started. Click the button *Upload* and the parameters of the PT2060 will be uploaded to the software with PT2060/91 SIM system interface module. The PT2060 COMM communication module's parameters are configured by the PT2060/91 SIM system interface module.

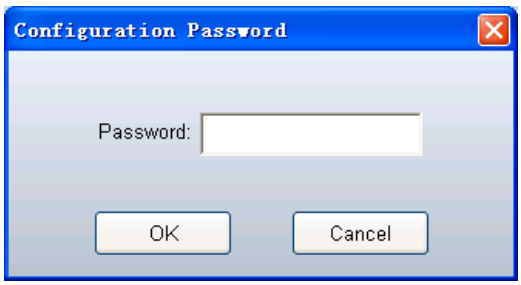


Figure 8

In the configuration window, right clicking on the picture of the module you want to configure will open a configuration window for that module, where all parameters can be edited.

Application Advisory

ProvibTech **recommends strongly** that the original configuration settings must be uploaded and saved before performing any modifications to PT2060/96 inner parameters.

Communication with Modbus RTU

The PT2060/96 COMM communication Module's communication parameters can be set through RS-232 Port or RS-485 via the PT2060-CFG software.

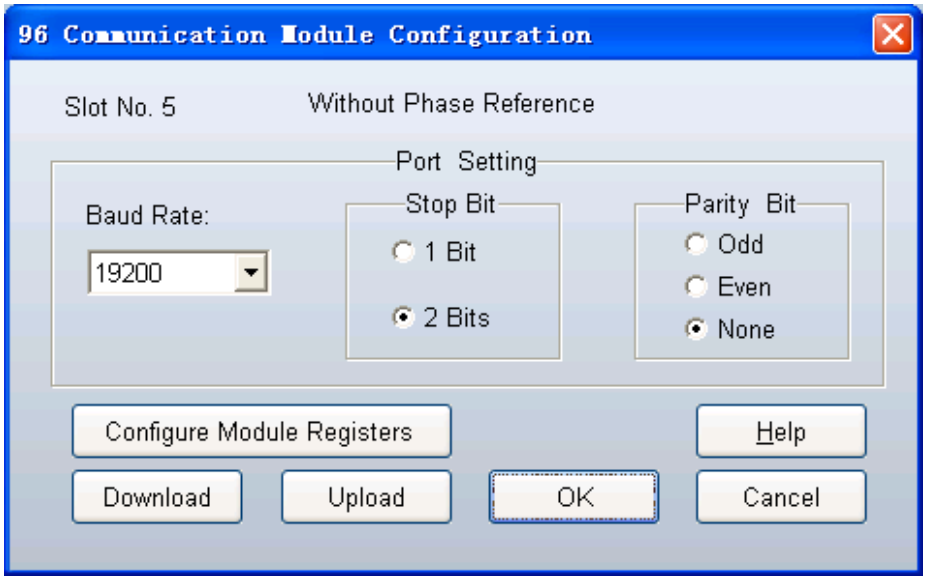


Figure 9

Communication with Modbus RTU

Parity Used for error checking

None: No parity error checking is used.

Odd: Each word has an odd number of 1 bit

Even: Each word has an even number of 1 bit.

Baud Rate: Rate of communication between the System Interface Module and the DCS.

The available values are: 1200, 2400, 4800, 9600, 19.2k, 38.4k, and 115.2 k baud.

Stop Bits: Signifies the end of the character. One or two bits can be used.

Communication with Modbus TCP

The PT2060/96 COMM communication Module communication parameters can be set through the Ethernet Port on board, or through PT2060/91 SIM System interface module.

IP Address

IP (Internet Protocol) Address is the unique address for an Ethernet network device. The IP address is a string of 4 numbers each from 0 to 255. For networks managed through an Information Systems department, consult the network administrator for a valid IP address.

For example: 192.168.1.211

Subnet Mask

The Subnet Mask identifies which bits of the IP address are address bits for the physical network. Typically, the Subnet Mask is the same for the LAN (local area network); however, consult the network administrator for valid settings.

For example: 255.255.255.0

Gateway Address:

The gateway is a protocol convertor used in some network systems. This mat or may not be used.

For example: 192.168.1.1

Uploading parameters of module

Via the software, The PT2060/96 COMM communication module can upload parameters of module, but can not modify the parameters of module. The user can check the module channel's parameter expediently via the PT2060/96 COMM communication module.

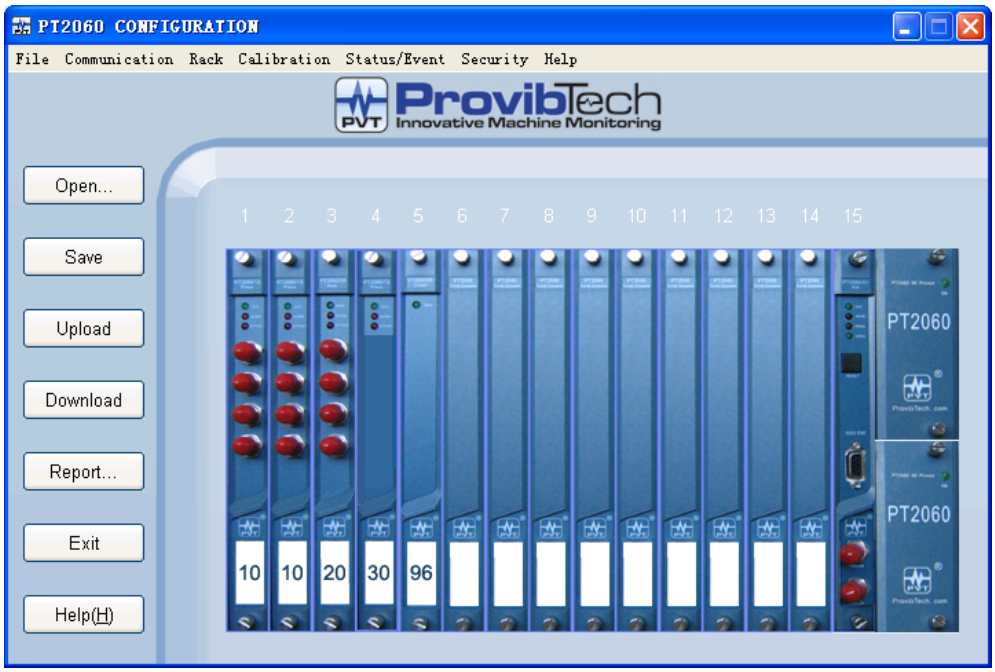


Figure 10

Mapping Modbus Registers

The real address of the dispersed channel measured value can be arbitrarily mapped to continuous virtual register addresses by PT2060-CFG. It improves the communication efficiency and realizes the data monitoring rapidly and perfectly.

Mapping Modbus Registers is a reserved area of the Modbus register map that consists of 512 registers. These registers allow you to assign important status to consecutive registers so that the communication with the PT2060 rack is more efficient and the need for supporting hardware is reduced.

Users can click the channel or slot that you want to configure in the left window, and drag and drop the mouse to the responding virtual address in the right hand window. Consequently, click the Download button when you finish the configuration of registers, assign all dispersed registers to a set of consecutive registers, and get all values from virtual addresses configured expediently. If you want to check the configuration of the modbus registers, you can click the Upload button to get the current configuration of modbus registers.

For example, we can configure Slot3_Channel1's register 30565 to any register between 31501 and 32012 and its Channel's status register 44049 can be also configured to the corresponding register between 45017 and 45272. Please refer to the following picture.

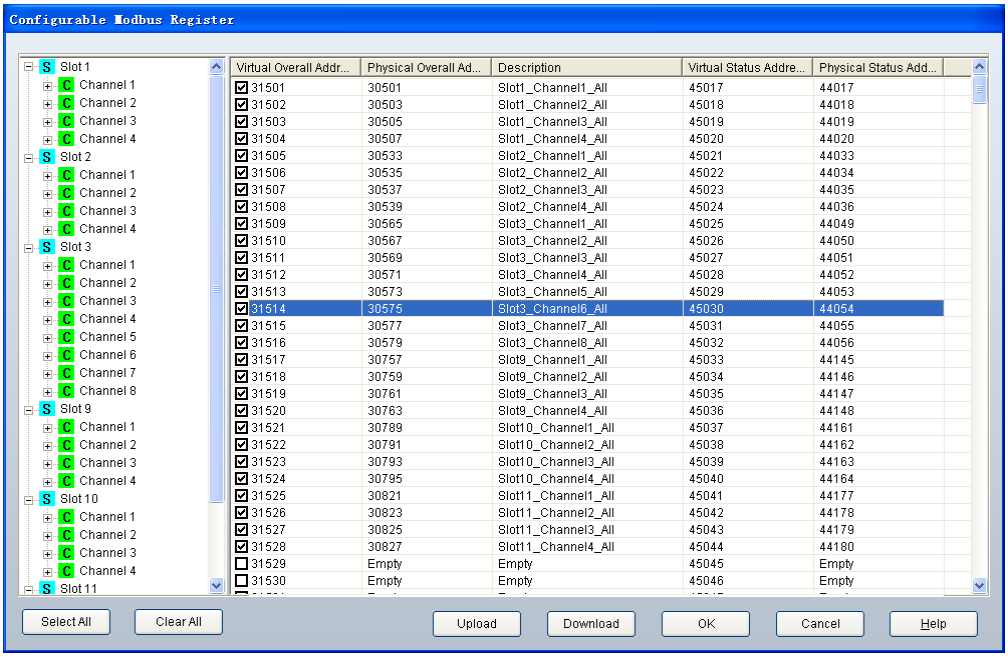


Figure 11

Configure a Communication interface Module by using the PT2060 Rack Configuration Software to complete the following tasks:

- ✓ Set the communication parameters for the ports on the System interface Module.
- ✓ Assign data from rack modules to reserved addresses (Configurable Modbus Registers) in the System interface Module.

Full Scale Data Range

A value between 128 and 16384 is the maximum value in the full-scale range. The Current Proportional Values and the Primary Values will be scaled between 0 and the selected value and the result will be given via modbus. The default is 16384.

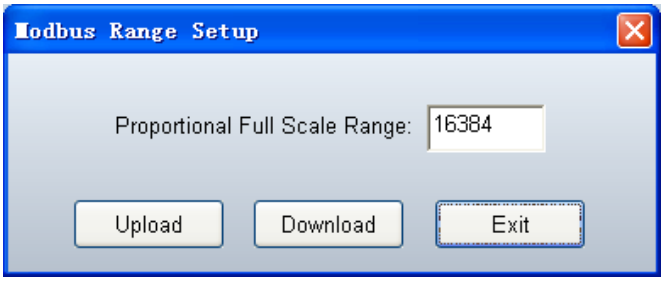


Figure 12

Overall = Modbus Output (full scale high – full scale low) / Proportional full scale range + full scale low.

or example, for a monitor channel that is operating as shown in the following table

Parameter	Value
Direct Full-scale range	0 – 10 mil
Modbus output	8192
Proportional Full-scale Range	16384

Calculate the output as follows:

Overall = 8192 * (10 – 0) /16384 + 0 = 5 mil

As another example lets say that we have a range of 0-10mils and we are reading 4 mils. Then way can say that:

Parameter	Value
Direct Full-scale range	0 – 10 mil
Overall	4 mil
Proportional Full-scale Range	16384

Output = Full scale range * (overall – full scale low) / (full scale high – full scale low)

Output = 16384(4-0)/(10-0)

= 16384 (0.4)

= 6553.6 (or 6554)

So the value sent to the PLC will be 6554.

Parameter Setting for the Dual Channels Phase Reference

Phase reference works in two modes, manual and auto.

Channel Parameter setup:

Channel No

PT2060/96 COMM module has two phase reference channels. Choose any one to configure.

Channel Enable

This check box enables or disables a phase reference channel. If no phase reference transducer is connected to this channel, then this box should be unchecked.

Trigger voltage

The Trigger Value is the nominal voltage that the peak-to-peak swing of the sensor's signal is centered about. If Auto threshold is selected, the module will automatically determine the peak-to-peak swing of the sensor's signal and set the Trigger value to the mid point. If Manual Threshold is selected, the user can input the Trigger value for the module to use.

Teeth per cycle

It refers to the teeth number on the gear. The integer number of input pulses per shaft revolution when observing an integral multi-event signal source, such as a gear. The Events per Revolution may be specified as an integer between 1 and 255. By default it is1.

Hysteresis voltage

It is the voltage level above and below the threshold value which is required to trigger the input signal from the transducer. The larger the hysteresis, the greater the immunity to noise on the input signal. When the input signal passes the threshold voltage plus 1/2 of the Hysteresis voltage, the signal goes high. When the input signal returns to the threshold voltage minus 1/2 of the Hysteresis voltage, the signal goes low. By default it is 1V. The User could modify it in the range of 0.5V-2.5V. This item has no relation to shaft vibration measuring.

GAP Value

For proximity probes, this stands for the distance between the top of the probes and the measured surface. Default factory setting of GAP high is -24V, GAP low -1V.

Transducer Degrees

This specifies the transducer location on the machine. The Transducer angle is 0 to 180 degrees left or right , The following figure shows this for horizontal shafts.

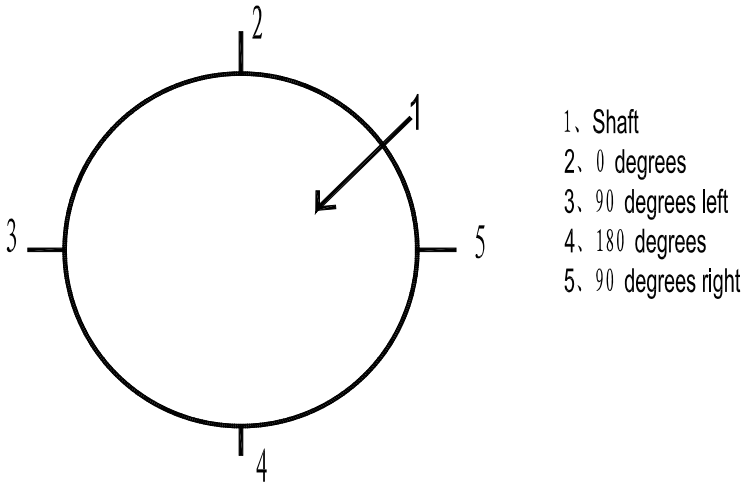


Figure 13

Threshold type

For proximity probes, the threshold options can be Auto threshold or Manual threshold. For magnetic pickup, threshold is only Auto threshold.

Auto: The trigger threshold is automatically set to a value that is midway between the most positive peak and the most negative peak of the input signal. This value tracks any changes in the input signal. Auto threshold requires minimum signal amplitude of 2Vpp and minimum frequency of 2 Hz.

Threshold type

For proximity probes, the threshold options can be Auto threshold or Manual threshold. For magnetic pickup, threshold is only Auto threshold.

Signal Polarity

Notch: An output pulse, produced for use by the monitors that is triggered by the leading edge of a negative-going pulse in the input signal. If a magnetic pickup is used, set Notch/Projection setting to Notch.

Projection: An output pulse, produced for use by the monitors that is triggered by the leading edge of a positive-going pulse in the input signal.

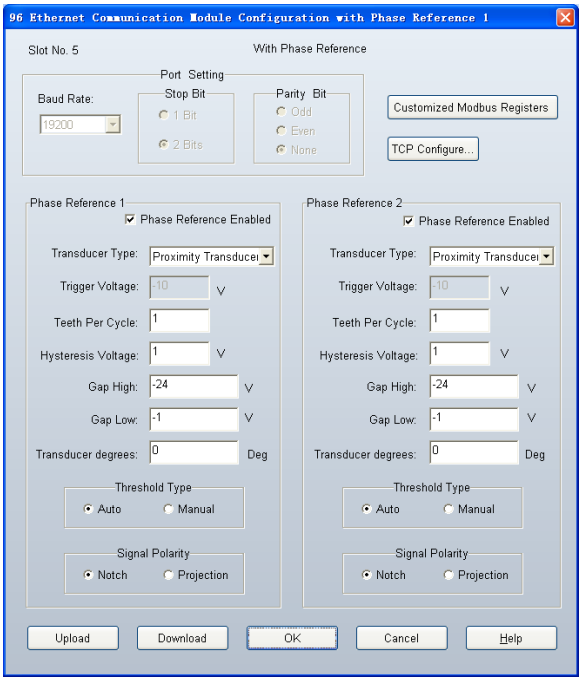


Figure 14

Manual: The trigger threshold is set by the user to any value in the range of -3V to -17 volts. Manual threshold requires minimum signal amplitude of 0.6 VPP.

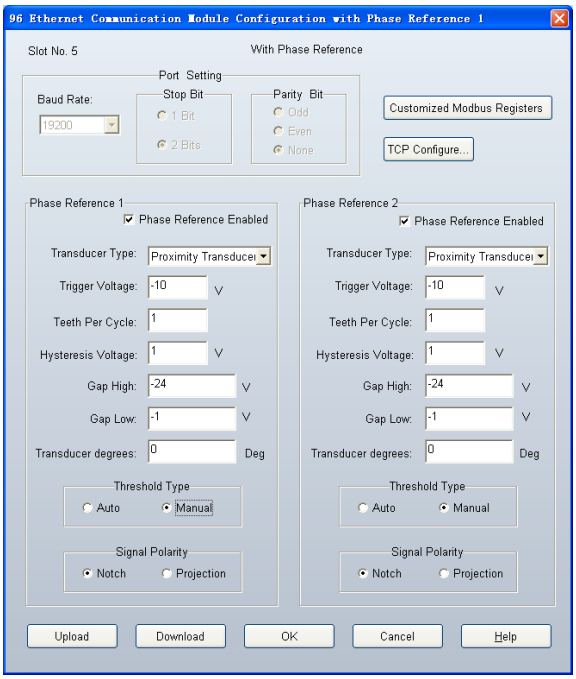


Figure 15

At first, measure and observe the phase signal which you want to use by oscilloscope, record the maximum voltage and minimum voltage.

Then, calculate the Trigger voltage value. Trigger voltage value = (maximum voltage + minimum voltage)

/ 2. Select Manual item and choose Channel no. in the window above.
At last, input Trigger voltage value, click Download button to set the parameters.

It is recommended that parameters should be verified after they have been configured.

Hardware Module Operation

Front, Back Panel and Functions

Front Panel

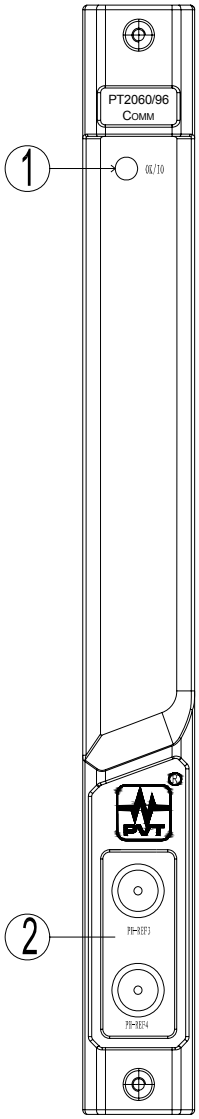


Figure 16

1. OK/IO LED
   - Flashing: self-test is ok. Digital communication is ok.
   - On without flash: self-test is ok but no digital communication.
   - Off: self-test is not ok.
2. BNC connector: Phase Reference buffer output

Back Panel

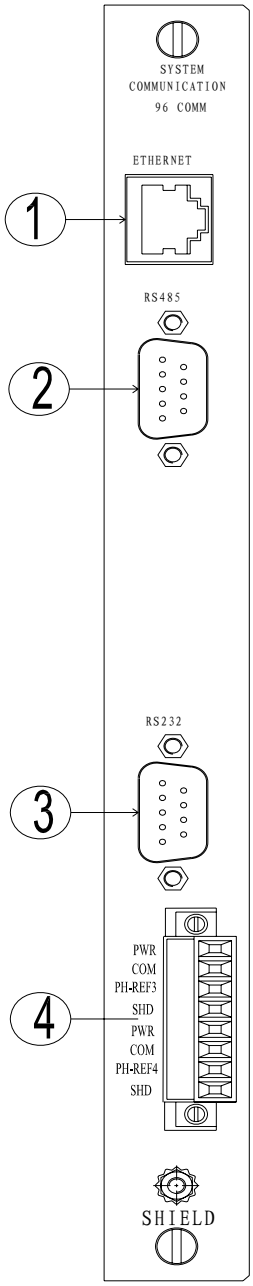


Figure 17

1. Ethernet
   The PT2060 could be connected with the network by this.

2. RS-485
   The PT2060 could be connected with the upper-level controller by this.
3. RS-232
   The PT2060 could be connected with the upper-level controller by this.
4. Phase reference
   There are two Phase reference input ports in PT2060/96 module with Phase reference as shown in the following figure. Phase reference signals of the two channels are input from the two ports. The method of the transducer connection is shown in the following figures.

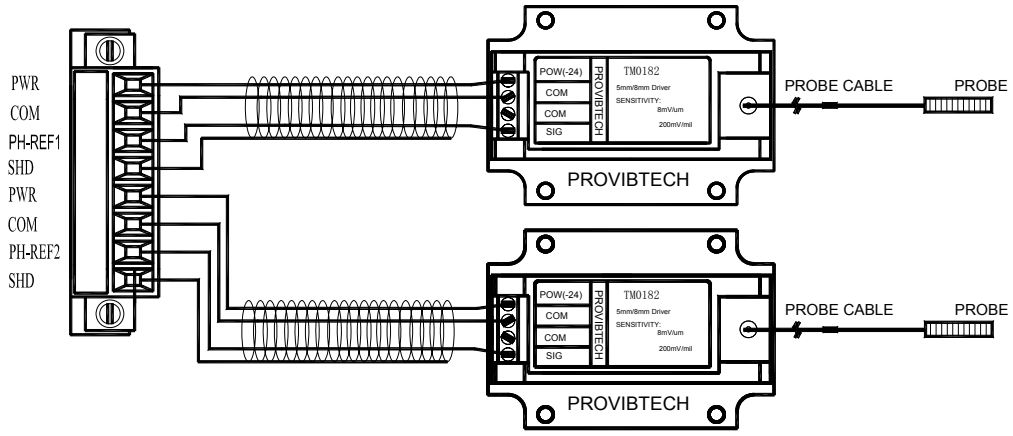


Figure 18

List for available transducers：

Proximity probes	TM0180/5m TM0180/9m TM0105/5m TM0105/9m
magnetic pickup	TM0605

Jumper for transducer selection.

Phase reference channels accept two different transducers, Proximity probes or magnetic pickup. Each can be selected by setting the Jumper which is fixed on the front panel. As the following figure shown, jumper S901 is for the first channel, S903 is for the second channel. The factory default is Proximity probes.

Following are basic steps for jumper setting:

1 Make sure the power is off, remove the front panel from PT2060 rack.
2 Remove the aluminum cover of the front panel.
3 Setup the jumpers. Short circuit (left side) is for Proximity probes, right side is for magnetic pickup.
4 Re-assembly the aluminum cover and insert the front panel into PT2060 system.

5 Power on, and change the response phase channel's parameters base on hardware configuration.

6 The operation is completed.

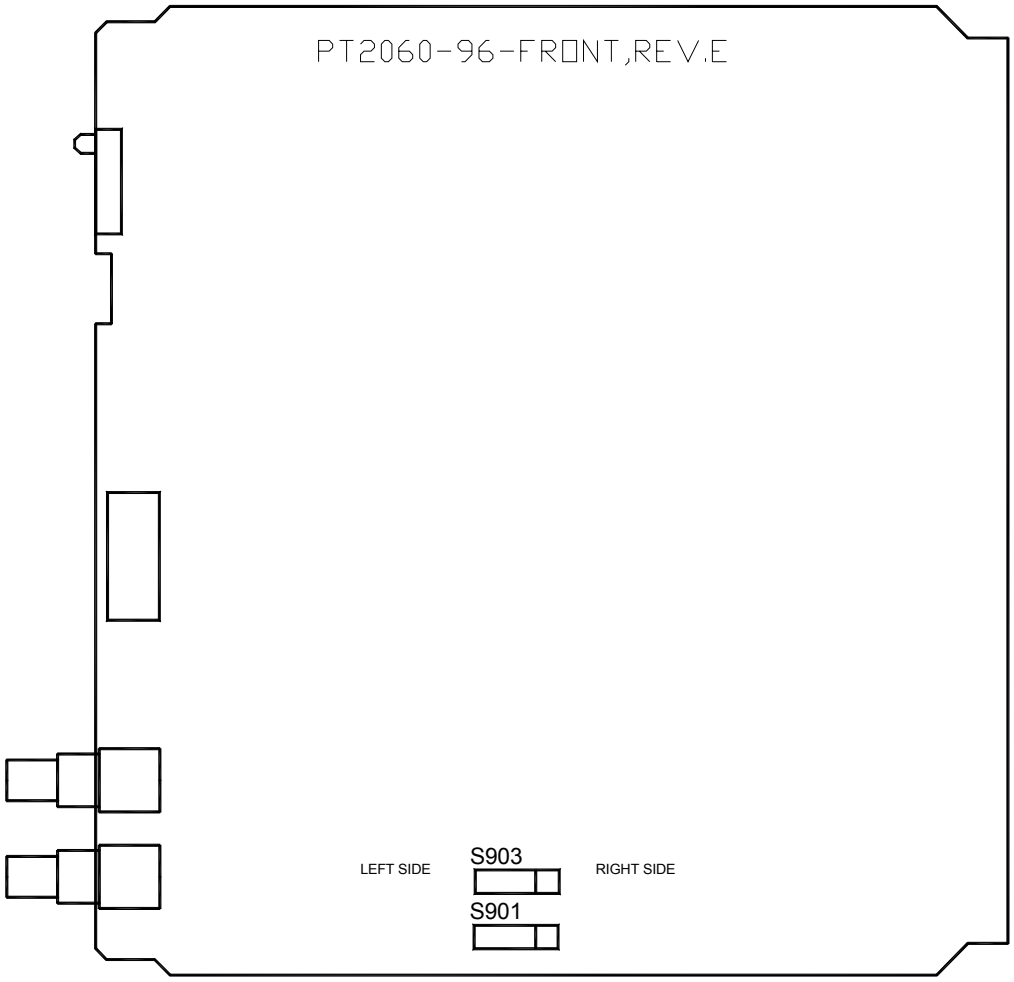


Figure 19

Field-wiring Diagram

Modbus TCP for DCS, PLC communication

The PT2060/96 COMM communication module has two options: one with Modbus TCP, another with Modbus RTU.

The user can connect all the PT2060/96 COMM communication modules on the different PT2060 Racks with one Switch and communicate with any PT2060/96 COMM via their respective IP Addresses.

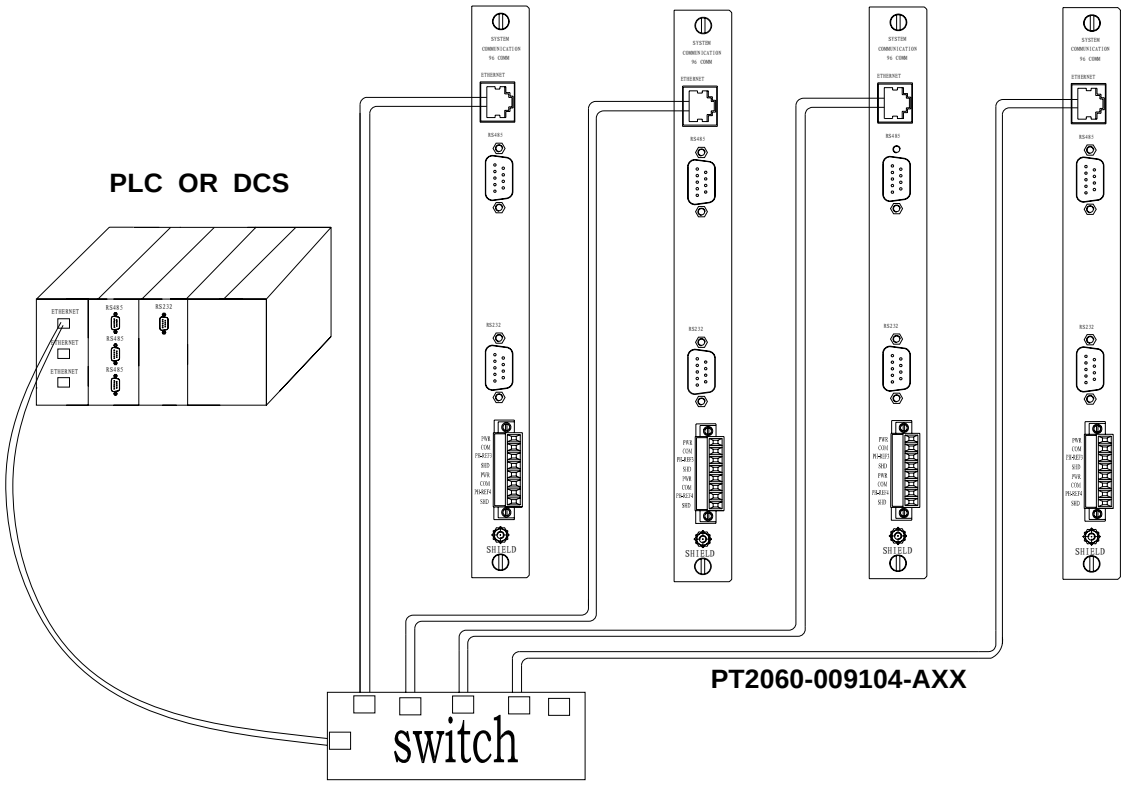


Figure 20

Modbus RS485 or RS232 for PLC, DCS communication

Modbus RTU RS-485 / RS-232:

The user can connect one or several PT2060/96 COMM communication modules via the RS-485 or RS-232 Port. For More details refer to the following diagram.

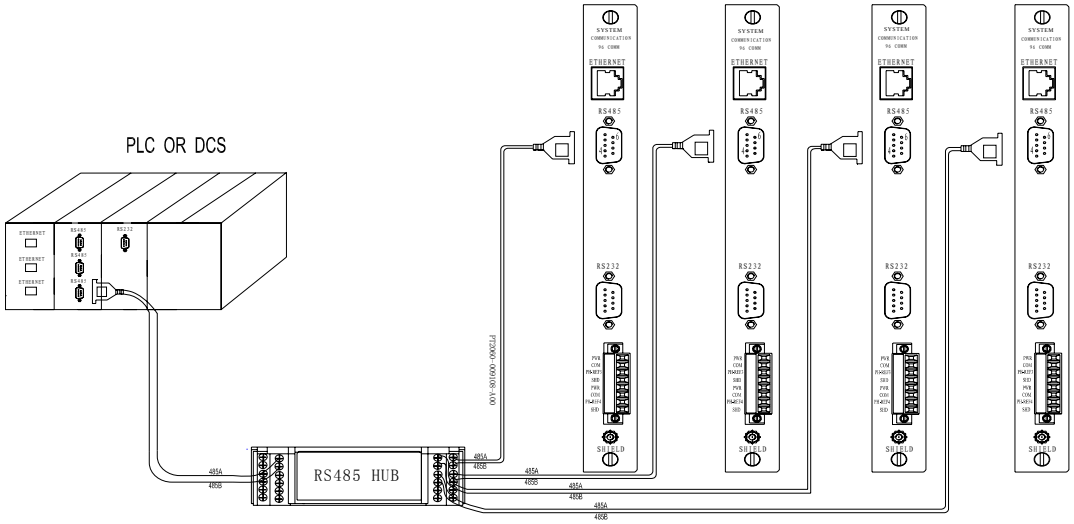


Figure 21

Connect PT2060/98 with PT2060/96 via Ethernet

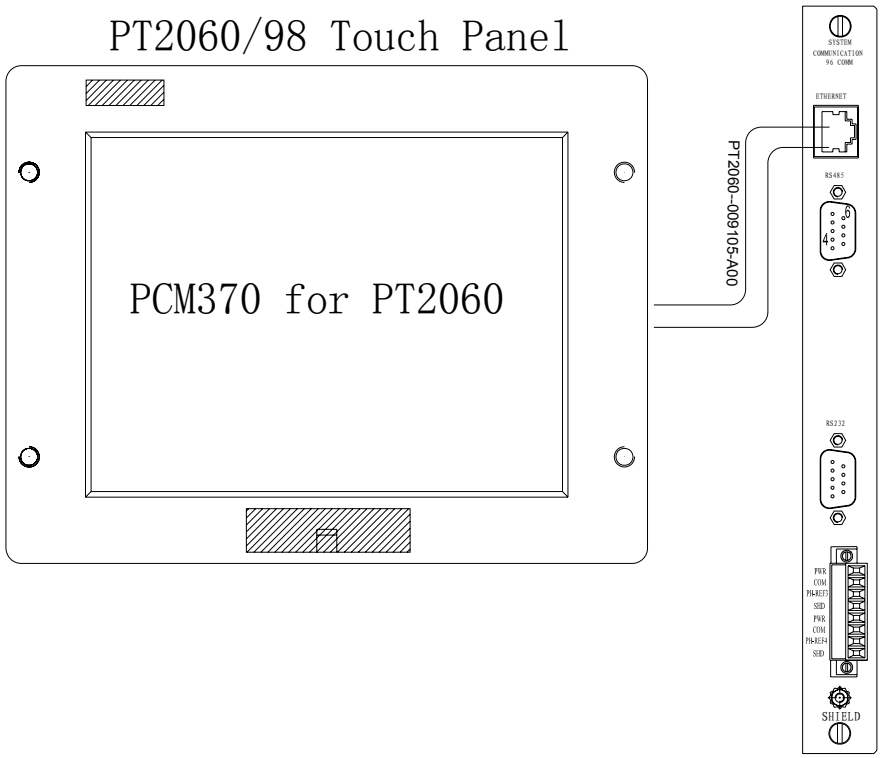


Figure 22

Connect PT2060/98 with PT2060/96 via USB to RS485 converter

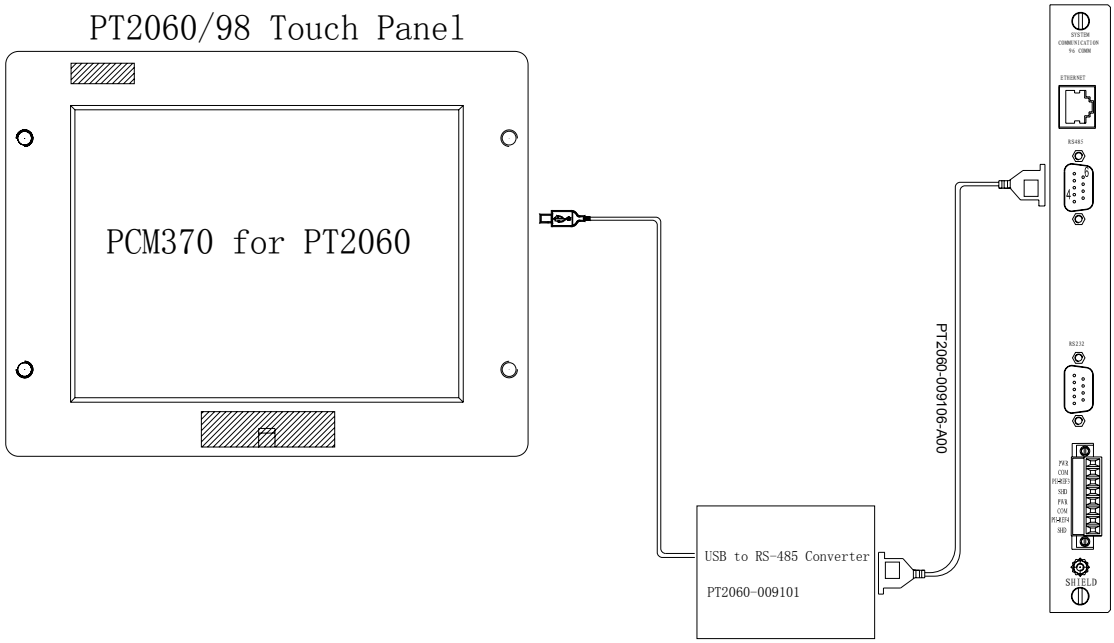


Figure 23

Modbus Protocols

Register Map

This document describes the function codes, addressing notation, and registers supported by the Communication Module.

Supported Function Codes

Modbus Function Code		Communication Module Data
Code	Meaning	
02	Read Input Status	Rack, Module, and Channel Status.
03	Read Holding Registers	Full-scale Data Range, Module Type ,Password Setup Success, Get time from the Monitor.
04	Read Input Registers	Overall and GAP Voltage, Time for the Last Reading.
06 And 16	Preset Single Register And Preset Multiple	Channel Configuration, Monitor Trip Multiply, Monitor Alarm Inhibit, Monitor Reset, Communication Baud-rate, Stop Bit, Parity Bit, IP Address Setup Monitor Time and Date ,Password Setup.
17	Report Slave ID	Family ID.

Register allocation

Data Type	Function Code	Format of the request address (0 is the base)	Address allocation MODBUS format (1 is the base)
Overall and GAP Voltage	4	500-1011	30501-31012
Channel Status	2	138-2185	10139-12186
Full-scale Data Range	3	113	40114
Real-time Value (virtual register)	4	1500-2011	31501-32012
Channel Status (virtual register)	3	5016-5271	45017-45272
Repeated Channel Status Repeated Overall and GAP Voltage	3 3	4016-4271 1000-1512	44017-44272 41001-41512

Overall and Gap Voltage (Read Only)

Address = 30501+32(slot-1)+2(ch-1)+ n
slot: 1-16
ch: 1-16

Slot number(1-16)	Channel number(1-16)	Start address	Description
1	1	30501	overall of the first channel on the first slot.
		30502	gap voltage of the first channel on the first slot.
	2	30503	overall of the second channel on the first slot.
		30505	gap voltage of the second channel on the first slot.

Example:

The unit of the gap voltage is in mV. It can be from 0 to full scale.

The value to PLC = Full scale range * (overall – full scale low) / (full scale high – full scale low).

Status List

Signal channel's status (Read Only)

Address: 10139- 12186

Channel's first address =10139+128(slot-1) +8(ch-1)

Each slot takes up to 128 data address. Each module can have up to 16 channels.

Each channel takes up to 8 data address, i.e. 8 status.

Slot = 1-16

Ch = 1-16 (channel)

Example: First channel at first slot.

10139=0/1	OK/NOT OK
10140=0/1	NOT Alert/Alert
10141=0/1	NOT Danger/Danger
10142=0/1	NOT Bypass/Bypass
10143=0/1	NOT Trip Multiply/Trip Multiply
10144=0/1	NOT Off/Off
10145=0/1	Gap Ok/Gap Not Ok
10146	Un-used

Status parameter:

NOT OK: channel not working right

Alert: channel in the first alarm status (alert)

Danger: channel in the second alarm status (danger)

Bypass: channel is in bypass status. Alarms will not be engaged (inhibit)

Trip Multiply: the set point of the alarms has been increased to double or triple depend on configuration parameter.

Gap not ok : the sensor is not working properly

Bit	Channel Statuses
0	Channel not OK
1	Channel Alert / Alarm 1
2	Channel Danger / Alarm 2
3	Channel In Bypass Mode
4	Channel Trip Multiply Mode
5	Channel Off
6	Channel Gap
7	----

Starting Addresses for Channel Statuses

PT2060 Rack Slot Number	Modbus PC Format	Query Format
1	10139	138
2	10267	266
3	10395	394
4	10532	531
5	10651	650
6	10779	778
7	10907	906
8	11035	1034
9	11163	1162
10	11291	1290
11	11419	1418
12	11547	1546
13	11675	1674
14	11803	1802
15	11931	1930
16	12059	2058

Real-time Value (Virtual Register)

The Real-time Value (Virtual register) can be mapped arbitrarily by The PT2060 CFG, The real address of the dispersed channel measured value can be configured in the continuous virtual register address via PT2060-CFG, in order to increase communication efficiency.

REG=31501 [bit15-0] - REG=32012 [bit15-0]

Channel Status (Virtual Register)

Channel Status (Virtual register) can be mapped arbitrarily by PT2060-CFG, For the convenience of the user the real address of channel status can be configured in the continuous virtual register address via PT2060-CFG.

REG=45017 [bit15-0] - REG=45272 [bit15-0]

Repeated Channel Status

The repeated data registers contain duplicated data in different registers for some Modbus devices that only support the 4XXXX series registers, so that we can get channel status data expediently.

Repeated Overall and GAP Voltage

The repeated data registers contain duplicated data in different registers for some Modbus devices that only support the 4XXXX series registers, so that we can get Overall and GAP Voltage expediently.

Maintenance

Instruction

This section shows how to verify whether the PT2060/96 COMM communication module is operating correctly.

Periodic Maintenance

It is recommended to perform a yearly maintenance with the modules to ensure they are working reliably. However, the maintenance interval should be adjusted according to operating conditions / plant procedures.

The steps for testing the PT2060/96 COMM communication module are as follows.

Preparation Work

Tool Preparations

The following instruments are needed for PT2060/96 COMM module maintenance:

- ✓ Personal computer
- ✓ Some terminals
- ✓ Cross serial communication cable
- ✓ Ethernet Cross Cable
- ✓ RS-232 or RS-485 device

Build of the Maintenance Environment

Typical maintenance environment can be built following these steps.

1. Install the PT2060 System Configuration software on a PC.
2. Save PT2060 configuration settings to a file, Power off the PT2060, demount it from the equipment and transfer it to a workbench.

Application Advisory

ProvibTech **recommends strongly** that the original configuration settings must be uploaded and saved before performing any modification to it and restore it after maintenance has been done!

3. Connect PC serial port to PT2060 with a communication cable.

Software Preparation

On powering on, the system will upload PT2060 configuration settings automatically via the PT2060/91 SIM system interface module. This can also be done by clicking the Upload button. After setting the parameters, click the *Download* button to send data to PT2060 or save it to a file.

Troubleshooting

Assessing the PT2060/96 COMM communication module status and troubleshooting operations by analyzing the status of LED, System event list, Alarm event list are described in this chapter.

Power-on Self-test

The LED on the front panel of PT2060 Communication module goes on for three seconds at power-on. The whole procedure of self-test needs ten seconds before communication can be started.

The rack can not be communicated with while it is performing power on self test mode.

System Event List

The System event list can be seen in the PT2060/91 System interface module. Upload all System events with the PT2060 System configuration software. This list contains the most recent 500 events.

Click menu item *Status/Event->System Event* of the software to open a new window like the figure below.

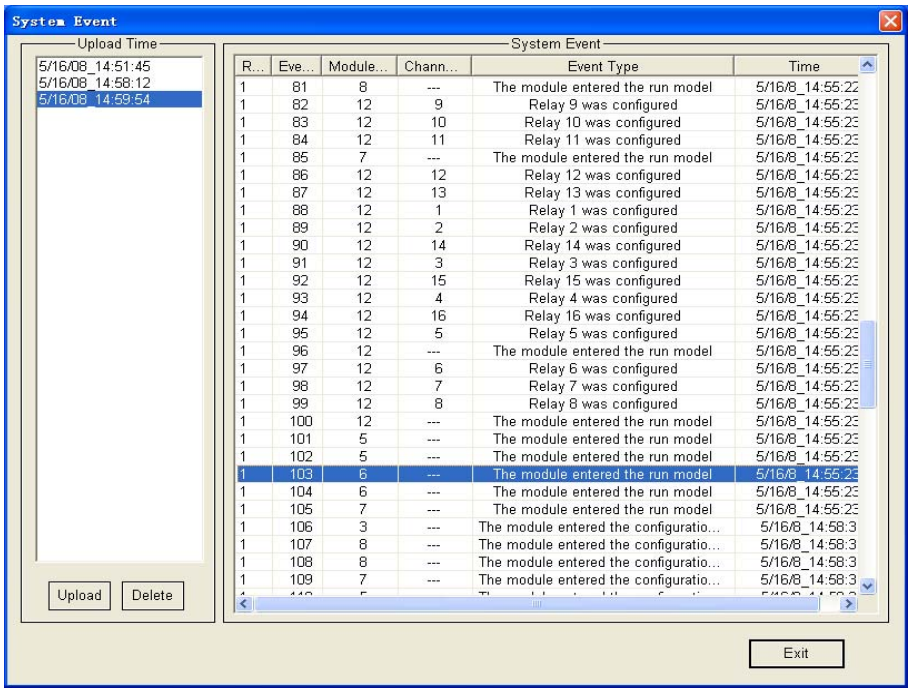


Figure 24

Click the Upload button at left-bottom corner of the window to obtain the new System events. In the left area there is a list of upload times which are the times you performed an upload from the PT2060 rack. Click one of these items to get its detailed event list in the right field. Event without channel numbers means it does not concern any particular channel.

If you cannot solve the problem by yourself, please save these message for our service staff.

Alarm Event List

Like the System event list, the software deals with alarm event list in the same way. It also keeps the 500 most recent alarm events.

Click menu item *Status/Event->Alarm Event* of the software to open a new window like the figure below.

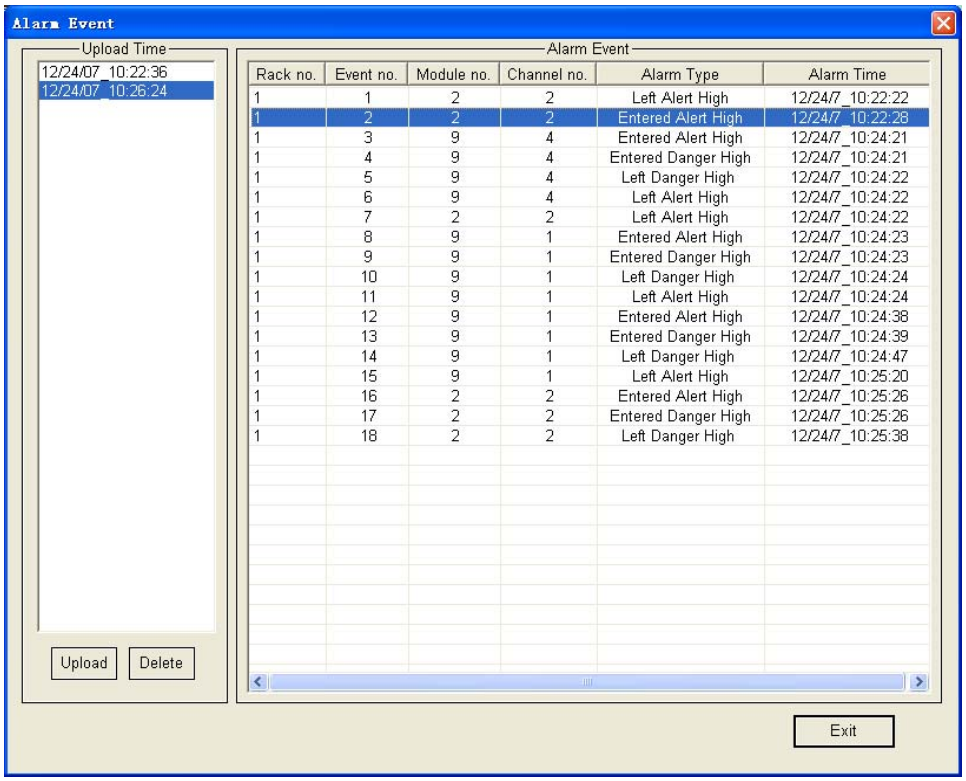


Figure 25

Click the Upload button at left-bottom corner of the window to obtain the new Alarm events. In the left field, there is a list of upload times which are the times you performed an upload from the PT2060 rack. Click one of these items to get its detailed event list in the right field.

If you could not solve the problem by yourself, please save these message for our service staff.

Exceptional Module Treatment

If any problems are discovered in the above test, Please contact the closer ProvibTech office.

Additional Information

Ordering Information

Each PT2060/96 COMM module consists of two boards, front panel and back panel. Please make your orders using the code listed below.

PT2060/96-AX-BX

AX: System IO Type

A0: Modbus RTU RS-485/ RS-232 module (with PT2060-009108-A00)

A1: Modbus TCP module

BX: Phase Reference Type

B0: Without Phase Reference

B1: With Phase Reference 1(configured with 1 ~ 2 channels)

B2: With Phase Reference 2(configured with 3 ~ 4 channels)

Accessories

Optional Accessories:

PT2060-009100

SCALANCE X-108: 8-port industrial unmanaged Ethernet switch, wide temp. produced by Siemens Co., Ltd. The switch is used to connect many computers and other network device. It can provide 8 Ethernet ports, and support 10/100M. Provibtech suggests that user should choose two TM900 which provide redundancy 24VDC power for PT2060-009100(SCALANCE X-108).

Features:

- Provides 8 Fast Ethernet ports with Auto MDI/MDI-X.
- Supports 10/100Mbps Auto Negotiation.
- Provides compact size with DIN-rail/Wall mount.
- Supports redundant 18~32 VDC power input.
- Diagnosis on device by means of LEDs (power, link status, data traffic) and signal contact.
- Simple fault signal contact set-up using the SET button.
- Supports wide operating temperatures from -20~70℃.

TM900-GX

TM900 is used to provide 24VDC power with PT2060-009100(SCALANCE X-108), The output of the power converter is isolated from its input. Additionally, the output is short-circuit protected and the input is ESD and fuse protected.

GX: Mount

G0: 35mm DIN-rail mount

G1: Plate mount

Electrical

AC Power Input:

90-250VAC@200mA

Power Output:

Voltage: 24VDC±5%
Current: 800mA
Isolation:
1000VAC
Fuse:
2.0A, 250VAC

Figure 26

Physical

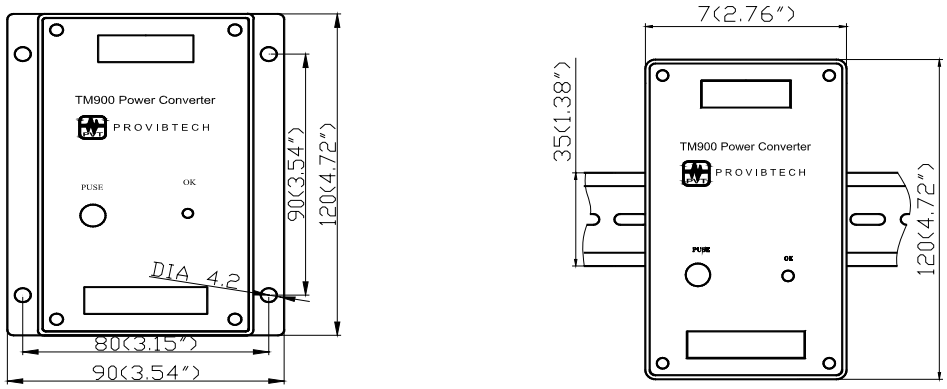
Dimensions:
Height: 75mm (2.95”)
Weight: 1.0kg (2.0 lbs)

Environmental

Temperature:
Operation: -40°C to +75°C.
Storage: -50°C to +100°C
Humidity:
90% non-condensing

Certification

CE certified with EMC compliance



TM900 Plate Mounting TM900 DIN Rail Mounting

Figure 27

PT2060-009101
USB to RS-485 Converter with PT2060-09106-A00 communication Cable

PT2060-009102
USB to RS-232 Converter with PT2060-009107-A00 cross communication cable.

PT2060-009103
RS-485 HUB.

PT2060-009104-AXX
Switch to PT2060/91/96 Ethernet internet Cable RJ45

AXX Cable length
A00 3 meters (9.8 feet)
A01 15 meters (49.2 feet)
A02 75 meters (246 feet)

PT2060-009105-AXX
PLC, DCS to Pt2060/91/96 Ethernet direct communication Cable RJ45 Port
AXX Cable length
A00 3 meters (9.8 feet)
A01 15 meters (49.2 feet)
A02 75 meters (246 feet)

PT2060-009106-AXX
USB to RS-485 Converter to PT2060/91/96 serial communication Cable RS-485
AXX Cable length
A00 3 meters (9.8 feet)
A01 15 meters (49.2 feet)
A02 100 meters (328 feet)

PT2060-009107-AXX
PC to PT2060/91/96 cross serial communication Cable RS-232
AXX Cable length
A00 1.5 meters (5 feet)

PT2060-009108-AXX
PT2060/91/96 to RS485 HUB cable RS-485
AXX Cable length
A00 3 meters (9.8 feet)
A01 15 meters (49.2 feet)
A02 100 meters (328 feet)

PT2060-009600-AX
AX Panel type
A0 PT2060/96 Modbus RTU RS-485/ RS-232 Front panel
A1 PT2060/96 Modbus TCP Front panel

PT2060-009601-AX
AX Panel type
A0 PT2060/96 Modbus RTU RS-485/ RS-232 back panel
A1 PT2060/96 Modbus TCP back panel

TM900-GX
TM900 is used to provide 24VDC power with PT2060-009100(SCALANCE X-108). Please refer to the appendix for details.
GX: Mount

G0: 35mm DIN-rail mount

Rack Address Setting

If the user wants to communicate with more than one PT2060, we must configure the individual racks with individual0 rack addresses .

The following steps need to be followed to set the Rack Address.

Power off the PT2060 rack.

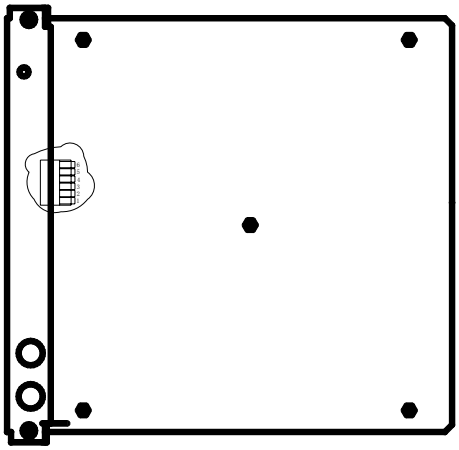
Remove PT2060/96 front board from the PT2060 rack.

Remove the front cover board from PT2060/96 front board, please refer to the following Figure.

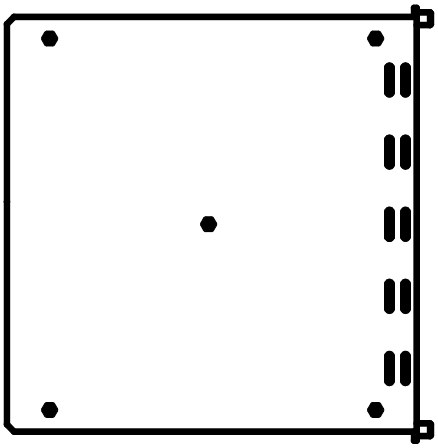
Configure the switch state according to user's requirement (see below).

Install the front cover board of PT2060/96 module.

Insert PT2060/96 front board into PT2060 rack to finish the modification of rack address switch state.



The front board of PT2060/96 module



The front cover board of PT2060/96 module

Figure 28

There is a switch with 6 Pins on the front board, refer to the following picture, the rack address is 1.

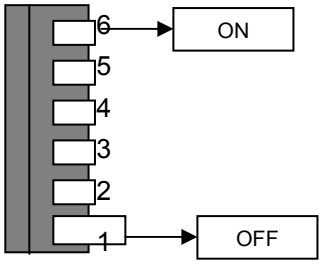


Figure 29

The detail of calculating rack address refers to the following chart.

	Pin number						Calculate rack address	Rack address
	1	2	3	4	5	6		
Switch Current State	OFF	ON	ON	ON	ON	ON	$2^{(1-1)} = 1$	1
	ON	OFF	ON	ON	ON	ON	$2^{(2-1)} = 2$	2
	OFF	OFF	ON	ON	ON	ON	$2^{(2-1)} + 2^{(1-1)} = 3$	3
	ON	ON	OFF	ON	ON	ON	$2^{(3-1)} = 4$	4
	OFF	ON	OFF	ON	ON	ON	$2^{(3-1)} + 2^{(1-1)} = 5$	5
	ON	OFF	OFF	ON	ON	ON	$2^{(3-1)} + 2^{(2-1)} = 6$	6
	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	OFF	OFF	OFF	OFF	OFF	OFF	$2^{(6-1)} + 2^{(5-1)} + 2^{(4-1)} + 2^{(3-1)} + 2^{(2-1)} + 2^{(1-1)} = 63$	63