Automation Products Series

Hardware Manual Applicable to Super32 Series RTU

Super32 RTU Manual

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About Manual

- **Content**

The manual is applicable to Super32 Series RTU. Mainly include product introduction, installation application, technical service, etc.:

- **Product Introduction**

Introduce product configuration, parameter settings, performance target, etc.

- **Installation and Application**

Introduce product installation, program development, application method, etc.

- **Technical Service**

Introduce technical support, after service, etc.

The Potential Readers

Reading ***Super32 RTU Manual*** needs certain engineering knowledge. The manual is written for product application engineers, etc.

How to Use the Manual

If using **Super32 RTU** for the first time, please read through the manual. If you are an experienced user, can search corresponding information through chapters. Manual content arranged in following chapters:

Chapter 1. Summary

Chapter 2. Dimensions and Mounting

Chapter 3. Field Wiring

Chapter 4. Operation

Chapter 5. Controller Specification

Appendix A. Program Development of Controller

Appendix B. Field Wiring Of All Super32 Types

Other Help Information

- **Electronic Manual**

While supplying products, we will also supply CD including Super32 Series RTU and help, etc., please install it on computer for use.

- **Development Help**

After completing control system, users can adopt EOpen software by ECHO to develop **Super32** controller, application methods see our corresponding user manuals.

- **Product Debugging**

A series of product debugging programs are included into the CD to help understanding product features as quickly as possible. These debugging programs can be obtained from our website.

- **Technical Support**

For technical consultation, product application training and common difficult problem, please contact us or access our website.

- **Sale Service**

For product purchase, order and repair, please contact us and our product agents. After receiving products, to ensure your basic benefit, please timely fill in and return product warranty card to us.

Table of Contents

Chapter 1. Summary

The **Super32 RTU** is a series of new style common programmable controllers, responsible for signal acquisition and equipment control in situ oriented. With advanced MCU, the products can not only fulfill logic, timing control but also realize data processing, high speed counting, analog quantity control, PID, RTD, TC, communication, networking and so on.

The **Super32 RTU** adopt the standard open design. By comparing with other common programmable controllers, the products have the following characteristics: larger memory capacity, stronger calculation function, simple and convenient programming; powerful communication and network integration capacities which are easy to integrate the network control system with the upper computer and realize distribution control; multiple configurations and function selections which can be ordered according to user needs (system integration, developing and application); superexcellent temperature characteristic and stronger adaptive capacity to environment enable the products to work normally in ill-being. In a word, the series products have the merits of reliable performance, comprehensive functions, flexible applications and high cost-performance ratio. The series products have been widely used in the fields such as petrochemical industry, electric power, metallurgical industry, heat supply, boiler, atmospheric environment, water regime, water supply, sewage disposal, street lamp monitoring, intelligent building and municipal works.

1.1 Product Characteristics

- Advanced 32-bit ARM chip (ARM technology), embedded real-time multitasking operating system (RTOS).
- Conform to IEC61131-3; support LD, FBD, IL, ST and SFC programming languages; provide the standard C language program interface.
- Support I/O signal data collection, logical control and process control; there are several controllers available to meet users' different kinds of demands, the I/O quantities also can be ordered according to user requirements.
- Support communication protocols such as Modbus RTU/ASCII/TCP, DNP3, have communication interfaces such as RS232, RS485, Ethernet and Hart.
- The power supply, the signal output and input terminals have been adopted insulation blocking and isolated from the main control circuit.
- Data power-off protection function, which can store parameters and history data for a long term.
- The industrial standard design and the DIN guide rail installation structure are convenient for field installation and configuring interior hardware.
- Premium components and parts that have been checked and screened strictly.
- Working temperature: - 40 ~70ºC, humidity: 5 ~ 95%RH, applicable for connection of controllers in different kinds of ill-being.

1.2 Application Requirements

The Selection of the Super32 series RTU should according to the practical requirements which can be divided into several aspects as follows:

- Program requirements
- Communication requirements
- I/O requirements
- Power supply requirement

1.2.1 Programming Requirements

A programmable RTU controller, such as **Super32-L201, Super32-L**202**, Super32-M201** is required when:

- The controller can execute local or remote program control.
- If there is more than one slave station, the controller is a master station.
- Data must be saved, processed or stored in the controller in the form of log.

A non-programmable controller may be used when:

- The application System is a terminal-terminal target system.
- The controller is used for the Remote I/O or subsidiary I/O of a master controller.
- Without demand such as local control or judgement.

1.2.2 Communication Requirements

The communication requirement includes the required kinds and quantities of COM ports of controller. The controller may have any one or several kinds of representative communication modes as follows:

- Remote slave station

- Remote master station
- A local HMI (human machine interface)
- Local or remote program software
- Precise measurement equipment
- Other controllers in the station

The type of the COM port is the other necessary condition besides the quantity of serial ports.

The following table has shown every kind of port configuration of controller.

Series Number	Port Configuration		
	RS232	RS485/RS232	Ethernet
Super32-M201	1	1	0
Super32-L201	1	1	1
Super32-L202	1	1	1
Super32-L203	1	1	1
Super32-L205	1	1	1

1.2.3 I/O Requirements

Generally, the controller is asked to monitor and control digital and analog input/output (I/O). The input and output include transmitting and indicating the electric level, analog, impulse, connection point and other signals.

The **Super32** series RTU use integrated I/O to monitor and control field apparatus. Generally, the applied points of RTU, namely the quantity of I/O points, determine what kind of RTU should be used.

The following table has shown the I/O quantity of every type of RTU:

Series Number	Digital Input	Digital Output	Analog Input	Analog Output	Pulse Input	Pulse Output
Super32-M201	8	4	6	0	0	0
Super32-L201	8	0 (4)	6	0	0	0
Super32-L202	8	4	8	2	3	0
Super32-L203	8 (8/16)	4	8 (4/8)	2 (4)	3	0

Super32-L205	8	8	8	0	3	3

Note: 1) the number in the bracket of this table are of extended channel number.

2) the new types of I/O configurations are increased ceaselessly. See Appendix B for detail.

1.2.4 Power Supply Requirements

The power supply of the **super32** series RTU is 24V DC, which's consumption as below:

Series Number	Power consumption
Super32-M201	<40mA
Super32-L201	<50mA
Super32-L202	<60mA
Super32-L203	<60mA
Super32-L205	<60mA

Note: the power supply 12VDC is in need of customizing.

1.2.5 Controller Selection

When selecting the model, you should ask the following questions:

- What kind of applied controller is needed, a programmable one or a controller without program function?
- What type of and how many COM ports are required?
- How many I/O points are required?
- What kind of voltage should be provided for controller?

Chapter 2. Dimensions and Mounting

2.1 Outline Dimensions

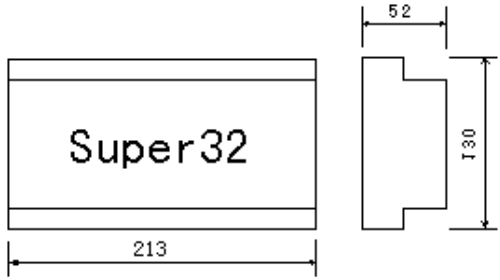


Fig. 2-1

2.2 Mounting Controller

Super32 controllers mount on 7.5mm by 35mm DIN type rails, as following picture show:

Fig. 2-2 DIN Type Guide Rail

2.2.1 Mounting Guidelines

Follow these guidelines for mounting modules:

- DIN rails mount horizontally or vertically, where generally mount horizontally. Modules are easier to install on horizontal rails. Cooling is optimal when mounted horizontally.
- All the components of **Super32** controllers pass the electric certification.

2.2.2 Mounting Procedure

Following is the back of Super32 controller:

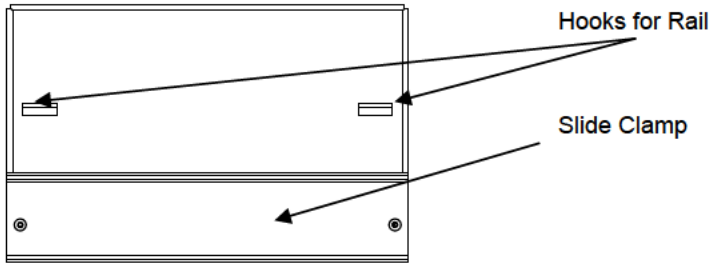


Fig. 2-3 Back of Super32

Follow these guidelines for mounting modules:

1. There are two clamp screws accessible through notches on either side of the circuit board. Loosen the clamp screws until the clamp is slidable. Do not remove the screws from the clamp, as they can be lost inside the case.

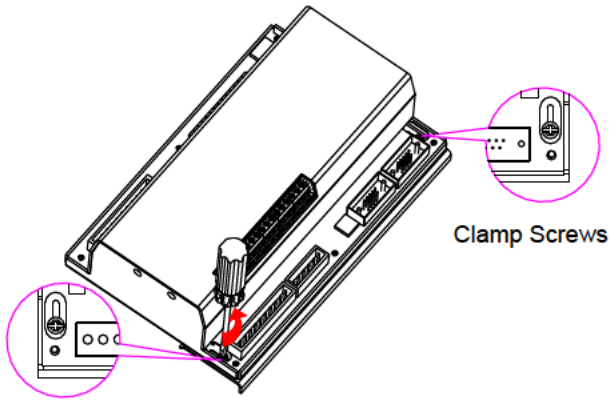


Fig. 2-4

2. Slide the clamp outward, the bottom of the clamp will be outside of the bottom of **Super32**, as following picture show:

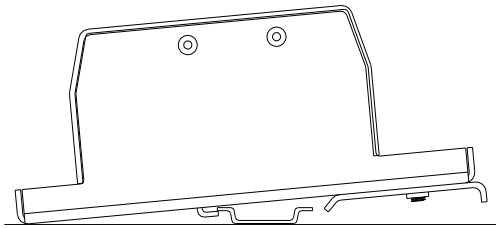


Fig. 2-5

3. Drag the controller outward, until the hooks is over the inward lip of the DIN rail, as following pictures show:

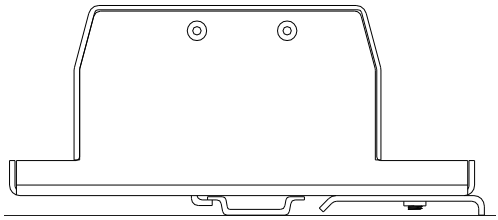


Fig. 2-6

4. Slide the clamp inward until it meets the outward lip of the rail. The lower edge of the clamp will be flush with the bottom of the controller, as following pictures show:

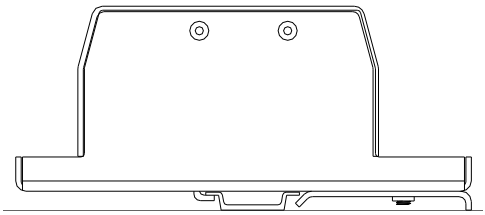


Fig. 2-7

5. Tighten the clamp screws, as following pictures show:

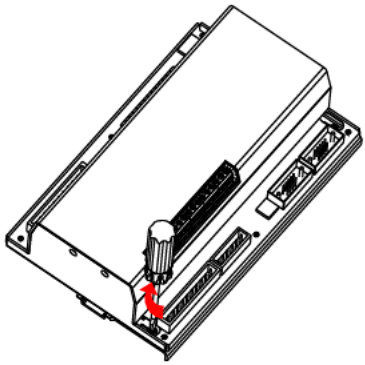


Fig. 2-8

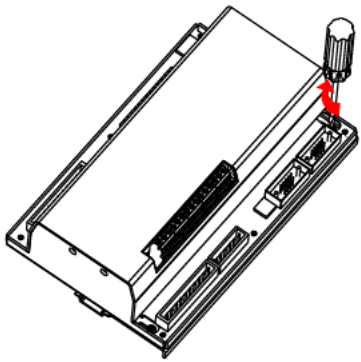


Fig. 2-9

2.3 Dismantlement

When dismantle the controller, you should firstly loosen the clamp screws, until the controller can be removed from the rail.

Note to avoid the clamp screws too loose to leave from the slide clamp.

Chapter 3. Field Wiring

3.1 Outline

The following figure has displayed the outline of **Super32-L202** RTU.

Fig. 3-1 The Outline of Super32-L202

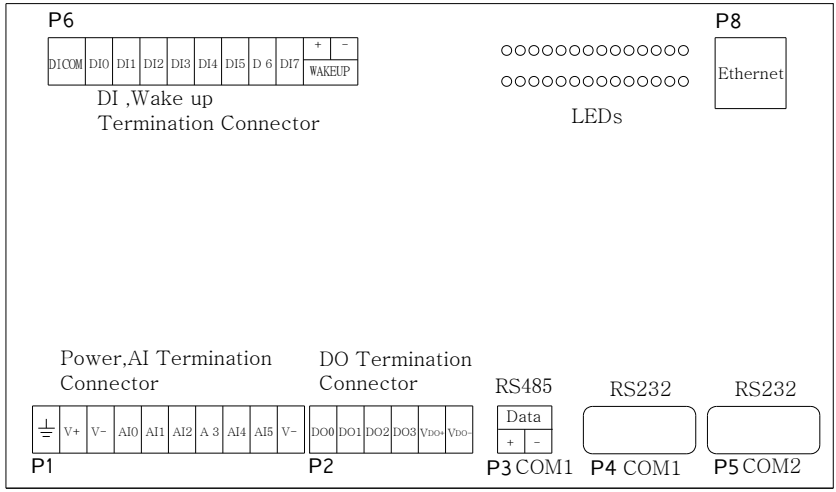
3.2 Field Wiring Connectors

The connecting terminal of **Super32 RTU** can be divided into three parts:

- Power supply input terminal.
- I/O signal wire connecting terminal, such as AI, DI , DO,AO, PI, PO, Wake up, HART etc.
- Local/Remote communication terminal, such as COM1(RS232/RS485), COM2 (RS232) and the Ethernet interface.

Super32-L202 for example, the distribution of terminal groups has been shown as follows:

1) Down Board



Super32-L202 Down Board

Fig. 3-2

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig. 3-3

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV_+	DOV-

Fig. 3-4

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig. 3-5

P4 terminal (including RS232 communication terminal) has been shown in the figure.

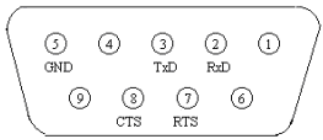


Fig. 3-6

Note：P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

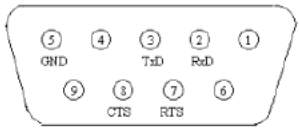


Fig. 3-7

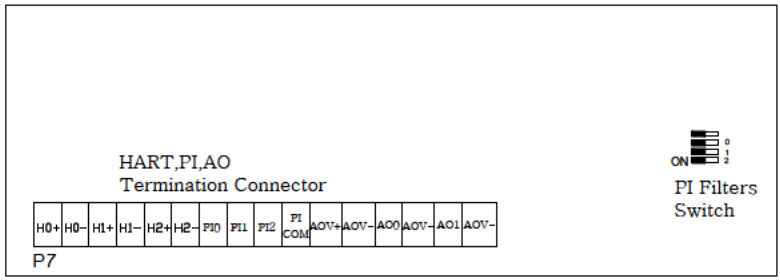
P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig. 3-8

2) Upper Board



Super32-L202 Upper Board

Fig. 3-9

P7 terminal (including HART, PI, AO signal terminal) has been shown in the figure.

P7

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
H0+	H0-	H1+	H1-	H2+	H2-	PI0	PI1	PI2	PI COM	AOV_+	AOV-	AO0	AOV-	AO1	AOV-

Fig. 3-10

3.3 Connection Mode

3.3.1 Power Supply Input Wiring

The power supply mode of **Super32 RTU** is DC24V.

1	2	3
	V+	V-

Fig. 3-11

 "⊥" terminal, is **Super32 RTU** grounding terminal.

In most of application, the best system grounding method is connecting the ground of the system power supply to the ground of chassis or panel of the cabinet. As far as **Super32** concerned, after connected  terminal with the chassis or earth ground, the grounding work of controller has been completed.

Connect "V+" terminal to the "+" end of24V DC.

Connect "V-" terminal to the "-" end of 24V DC.

3.3.2 Analog Input（AI）Wiring

The AI signal input end has equipped with overvoltage and overcurrent protection to avoid spoilage because of false field connection. The field connection can be divided into two-wire system and three-wire system.

The connection mode has been shown as follows:

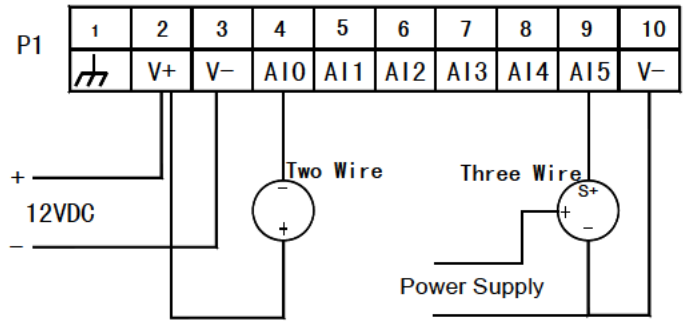


Fig. 3-12

3.3.3 Analog Output（AO）Wiring

AO has the 0 ~ 20mA and 4 ~ 20mA two kinds of output ranges. The output end has equipped with short-circuit protection. It can be used to control transducer, control valve, temperature controller and other equipments which need analog signal control.

The connection mode has been shown as follows:

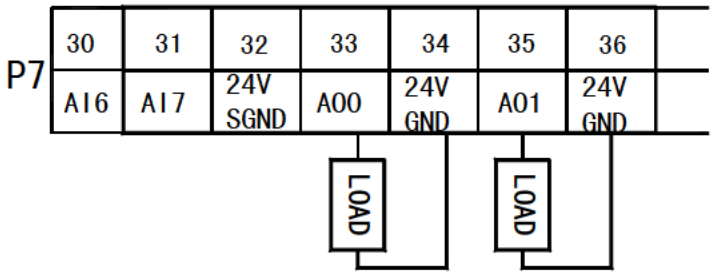


Fig. 3-13 Current Control Unit Field Wiring

3.3.4 Digital Input（DI）Wiring

DI effective high level input voltage range should be kept in 15 ~ 32V. It can be used to measure digital quantity such as on/off state.

The connection mode has been shown as follows:

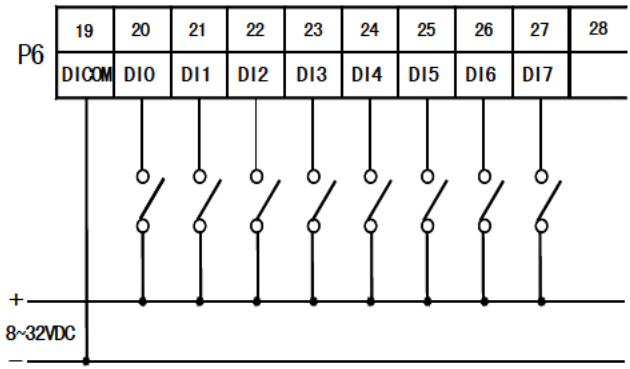


Fig. 3-14

3.3.5 Digital Output（DO）Wiring

DO output type is FET outputs. The FET outputs capacity is 24VDC@200mA.

DOs array are DO0、DO1…DO7 on the connecting terminal, the connection mode has been shown as follows:

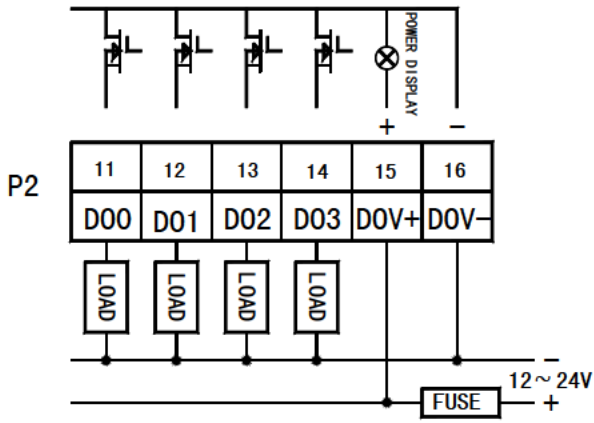


Fig. 3-15 DO (FET Outputs) Field Wiring

Caution!

On the occasion of requiring high Voltage or large current, the intermediate relay should be connected .

3.3.6 Counter Input（PI）Wiring

Counter inputs operate as DC inputs or as high-speed counter inputs. The PI field wiring figure shows how to wire these inputs.

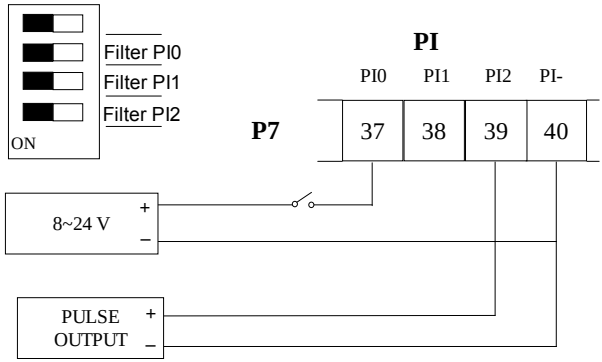


Fig. 3-16 PI Field Wiring

Every counter input has a jumper wire selected filter which limits the maximum input frequency. Use a filter with 50 or 60 HZ AC digital inputs to eliminate contact bounce. The factory default state of this jumper wire selected filter is disabled.

3.3.7 Counter Output（PO）Wiring

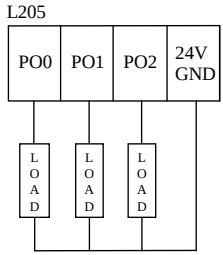


Fig. 3-17

3.3.8 RS232 Serial Communications Wiring

In the **Super32** controllers, RS232 wiring must use shielded cable. The shield should be connected to chassis ground at one point. Failure to properly shield the cable may result in the installation not complying with FCC or DOC wireless electromagnetism interference regulations.

The following table shows the serial and protocol communication parameters supported by RS232 Serial port. These parameters are set from **ESet** configuration tools of **EOpen** software (see the chapter **Controller Communication Settings** of **ESet manual**) or from **OpenPCS** program running in **CPU** module.

Parameter	Engineering value
Baud Rate (bps)	2400, 4800, 9600, 19200, 38400, 57600
Communication Duplex Mode	Full-Duplex, Half-Duplex
Parity	Odd, None or Even
Data Bits	7 or 8 Bits
Stop Bits	1 or 2 Bits
Communication protocol	Modbus RTU, Modbus ASCII, DNP3
Protocol mode	Master, Slave, Master / Slave, Storage/Retransmit
Connecting type	DB-9P

3. 3. 8. 1 RS232 DB-9P Connector

RS232 ports are 9-Pin male D-sub-miniature (DB - 9P) connectors configured as Data Terminal Equipment (DTE). A maximum cable length of 15m) is allowed. Fig. 3-17 shows the pin definitions of the RS-232 DB - 9P connectors.

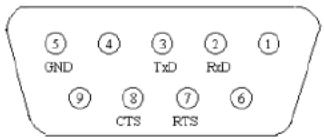


Fig. 3-18 RS232 Port Connector

In the following table an EFFECTIVE level means a voltage of +3V or greater; a LEISURE level means a voltage of –3V or less.

Pin	Function	Type	Description
Pin-1	DCD	NC	This pin is not connected.
Pin-2	RXD	Input	LEISURE for being in waiting state. EFFECTIVE for receiving data, and the RXD LED will be blinking.
Pin-3	TXD	Output	LEISURE for being in waiting state. EFFECTIVE for transmitted data, and the TXD LED will be blinking.
Pin-4	DTR	NC	This pin is not connected.
Pin-5	GROUND	GND	The pin is connected to the system ground.
Pin-6		NC	The pin is not connected.
Pin-7	RTS	Output	EFFECTIVE if full-duplex operation selected for the port. EFFECTIVE just before and during transmission of data if half-duplex operation selected. LEISURE when no data being transmitted. RTS LED is lighting for an EFFECTIVE level.
Pin-8	CTS	Input	EFFECTIVE for the communication port to transmit data. When the attached device does not provide this signal, the controller keeps the level at an EFFECTIVE. When the attached device does provide this signal, it must set CTS to EFFECTIVE to allow the controller to transmit data. CTS LED is lighting for an EFFECTIVE level.
Pin-9		NC	This pin is not connected.

All of the peripheral connecting wires of RS232 should be shielded cables. The shielding layer should be connected with the shell at one point; the metal shell of DB-9P is a good grounding point.

There are several methods to connect RS232 port with DTE and DCE (data communication equipment). The simplest connection method is three-wire system connection: RXD, TXD and signal ground.

3. 3. 8. 2 RS232 DTE to RS232 DTE without Handshaking

The following figure has shown a standard connection mode between RS232 port and DTE without handshaking signal

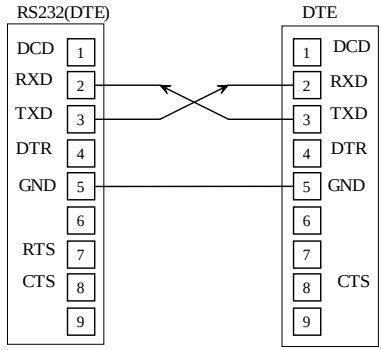


Fig. 3-19 RS232 DTE to RS232 DTE without Handshaking

3. 3. 8. 3 RS232 DTE to RS232 DTE with Handshaking

Some DTE (Data Terminal Equipments) need handshaking signal wires. The common wires are CTS and RTS, DTR and DCD are used rarely. The controller has no need of these wires. For details, please refer to the relevant manuals of DTE.

The following figure has shown a standard connection mode between RS232 port and DTE with handshaking signal.

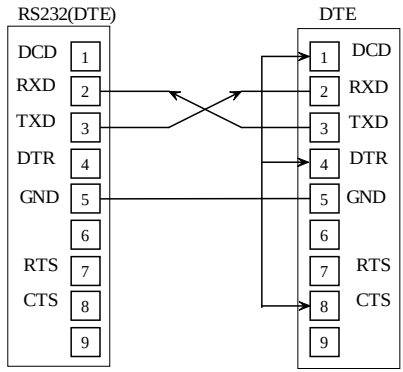


Fig. 3-20 RS232 DTE to RS232 DTE with Handshaking

3. 3. 8. 4 RS232 DTE to RS232 DCE with Handshaking

DCE (data communication equipment) needs different signal wires, but in the most general case, DCE must be connected with handshaking signal wire. Note: a majority of DCE belongs to half-duplex communication; when using these equipments, half-duplex should be selected.

The following figure has shown a representative connection mode between RS232 port and DCE with handshaking signal.

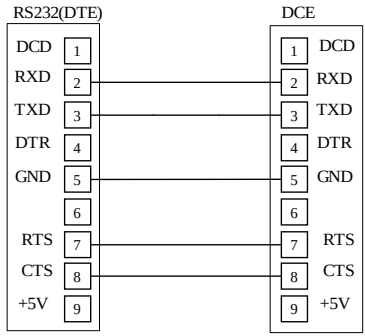


Fig. 3-21 RS232 DTE to RS232 DCE

3.3.9 RS485 Serial Communications Wiring

3. 3. 9. 1 RS485 Port

The following table shows the serial and protocol communication parameters supported by RS485 Serial port. These parameters are set from **ESet** configuration tools of **EOpen** software (see the chapter **Controller Communication Settings** of **ESet manual**) or from **OpenPCS** program running in **CPU** module.

Parameter	Engineering Value
Baud Rate	2400, 4800, 9600, 19200, 38400, 57600
Communication Duplux Mode	Half-Duplex
Parity	Odd, None or Even
Data Bits	7 or 8 Bits
Stop Bits	1 or 2 Bits
Receive Flow Control	None or Modbus RTU
Transmit Flow Control	None or Modbus RTU
Protocol	Modbus RTU, Modbus ASCII, DNP3
Protocol Mode	Master, Slave, Master/Slave

RS485 port receives and dispatches microvolt of voltage to other RS485 equipments, RS485 are allowed to connect with up to 32 equipments. The maximal recommended transmission distance is 1200m and the two ends should have terminal resistance.

The signal grounds of RS485 equipments are not connected together but grounding according to their respective electricity. There should be several volts discrepancy between each RS485 equipment grounding voltage.. The function mode of RS485 port is two-wire.

Note!

When use the shielded cable, the shielding layer is adopted the single

end grounding

3. 3. 9. 2 RS485 Two-wire Connection Mode

When RS485 port adopts 2-bit fixed connecting terminal to connect with RS485 network, the primary running mode is two-wire system.

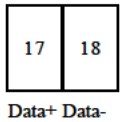


Fig. 3-22 RS485 Termination

The following table has described each termination signal of RS485 port

Termination	Function	Description
17	Data+	The terminal is the differential input/output positive terminal of RS485 criterion
18	Data-	The terminal is the normative differential input/output negative terminal of RS485 criterion.

When the two-wire connection has been adopted, a pair of wires is used for sending and receiving data.

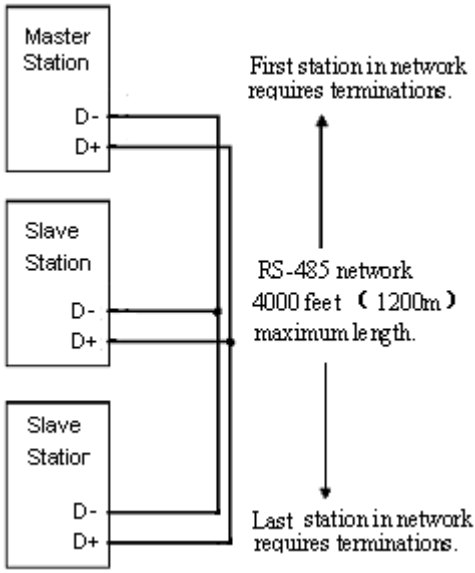


Fig. 3-23 RS485 Field Wiring —Two-wire Mode

3. 3. 9. 3 Termination Resistors

Termination resistors of 120Ω are required on both physical end on one network segment ,it also means that the two communication ports which on the physical end position of one network segment must be connected with termination resistors, other communication ports of this net segment should not be connected with termination resistors. See Fig. 3-23 RS485 Field Wiring —Two-wire Mode.

These termination resistors are installed to make sure the receive data can still be right for the following conditions on the RX line:

- Open inputs
- Terminated inputs
- Sudden inputs (shorted circuit)

3.3.10 HART Communications Wiring

Super32 controller contains 3 HART protocol communication ports ,one of these is multi-branched port which can connect 13 HART protocol meters. The other two are point to point port which can not only connect HART protocol meters but also collect 4~20mA signals to meet different user's requirements.

Wiring Mode：

1. multi-branched port wiring mode

Controller's HART0 communication port is multi-branched port.

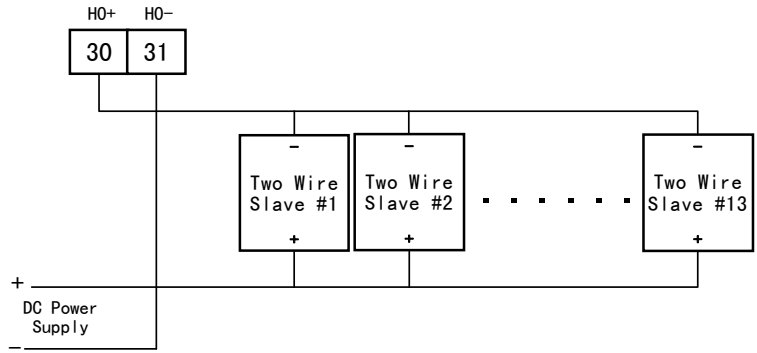


Fig. 3-24 HART0 Field Wiring of Passive Meters

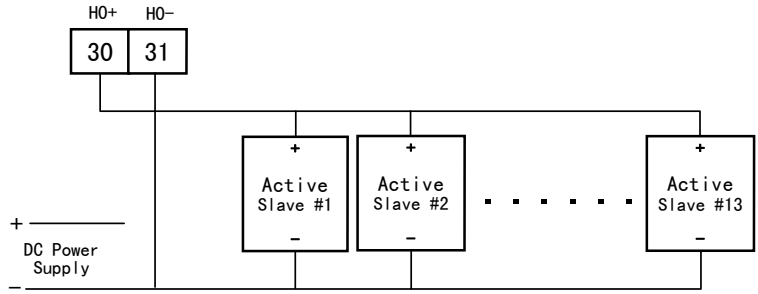


Fig. 3-25 HART0 Field Wiring of Active Meters

2. Point to point wiring mode of HART1, HART2

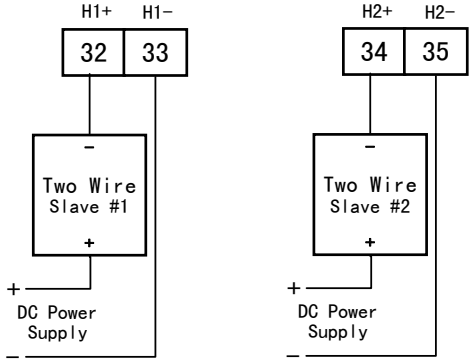


Fig. 3-26 HART1, HART2 Field Wiring of Passive Meters

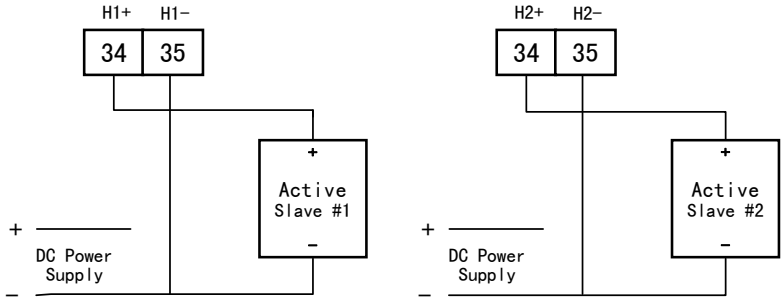


Fig. 3-27 HART1, HART2 Field Wiring of Active Meters

3.3.11 Ethernet Communication Port

The **Super32** controllers have been equipped with built-in Ethernet communication module, before leaving factory.

It is recommended that the connecting cable of the Ethernet interface belongs to category 5E cable. The protocols and communication parameters and indices of Ethernet interface have been shown in the table as follows. These parameters are set by **ESet** tool of **EOpen** software (see the **ESet** manual) or running the **OpenPCS** program in CPU module.

Parameter	Engineering value
IP address setup	Set it up according to different demands, default as 192.168.100.75
Port number	Set it up according to different demands, default as 500
Physical address	XXX.XXX.XXX.XXX.XXX.XXX 6 integers, value range of each:0~255 For example 00-80-235-03-181-25
Protocol	Modbus TCP Modbus in TCP Modbus in UDP
Connecting device	Slave device
Network mask	Default value: no setup

3. 3. 11. 1 Ethernet RJ-45 Connector

The receptacle (P8) of RJ-45 module is the connection terminal of Ethernet. The receptacle of RJ-45 module is matching with its 8-pin connector and adopts 10BASE-T Unshielded Twisted Paired. Pin 1 and pin 2 are used for transmitting data, pin 3 and pin 6 are used for receiving data, pin 4, 5, 7 and 8 are spare.

Ethernet RJ-45 connector has been shown in the figure as follows:

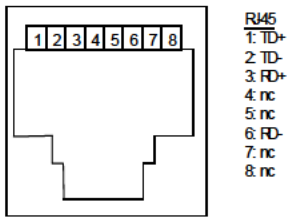


Fig. 3-28 The Ethernet RJ-45 Connector

The RJ - 45 port definition of Ethernet:

Terminal	Function
1	Transmit data TD+
2	Transmit data TD-
3	Receive data RD+
4	NC
5	NC
6	Receive data RD-
7	NC
8	NC

3. 3. 11. 2 Ethernet Cable

1. The Ethernet cable connected with PC and RJ-45 connector of controller is adopted 10BASE-T standard non- shielded twisted pair. The following figure shows the array mode of the Ethernet cable.

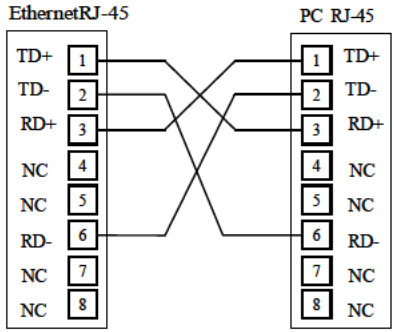


Fig. 3-29 Ethernet to PC

2. The Ethernet cable connected with Ethernet Switch machine and RJ-45 connector of controller is adopted 10BASE-T standard non- shielded twisted pair. The following figure shows the array mode of the Ethernet cable.

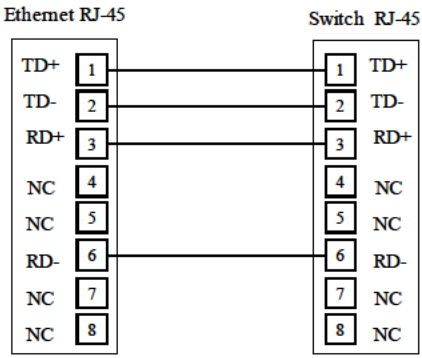


Fig. 3-30 Ethernet to Switch

3.3.12 Wake Up Wiring

Super32 controller can be waken up and come into work state by exterior trigger when sleep.

Wake up wiring has been shown in the figure as follows:.

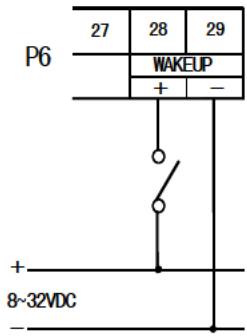


Fig. 3-31

3.3.13 CAN Bus Wirings

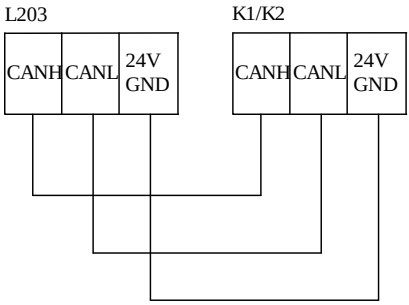


Fig. 3-32

Chapter 4. Operation

4.1 Operating Modes

Super32 controllers may start up in RUN and SERVICE mode. Starting the controller in RUN mode automatically executes **OpenPCS** programs in the controller memory. Starting the controller in SERVICE mode allow controller initialization.

4.1.1 Run Mode

The RUN mode is the normal or default operating mode of the **Super32** Controller. No action is required to select RUN mode. When power is applied to the controller board:

- The user defined serial communication parameters, for all COM ports are used.
- If an **OpenPCS** program is loaded in RAM, it is executed.

4.1.2 Service Mode

SERVICE mode is used during application programming and maintenance work. Using the following procedure to select SERVICE mode:

- Remove power from the controller.
- Connect PC to COM2 port of the controller throw a serial line.
- Executing **OpenPCS** program, choose [***Extras***]→[***Tools***]→[***PC Communication***

Settings] in the menu., and the dialog [*ESI*] will pop up, then select "Connect controller".

- Power up the controller, the it will run in Service Mode.

When the **Super32** controller starts in SERVICE mode, following functions can be achieved through configuration, see ***Eset Manual*** for more details.

- Clear **OpenPCS** program.
- Initialize controller communication parameter.
- Initialize Register.
- Test Communication.

4.2 Sleep Mode

Super32 Controllers are capable of extremely low power operation when in sleep mode. During sleep mode the following happen:

- All programs stop executing.
- The power supply of 3.3V which supply power for circuit shut down.
- The real-time clock and timer continue to function.
- 12V DC power is not affected.

Super32 controllers can switch to sleep mode under control of the application program. One of the following conditions occur to will make the controller switch to sleep mode.

- A real time clock alarm, defined by application program, occurs.
- A signal is applied to the WakeUp input.

4.3 LEDs Indicators

Super32-L202 for example is here.

4.3.1 Distribution

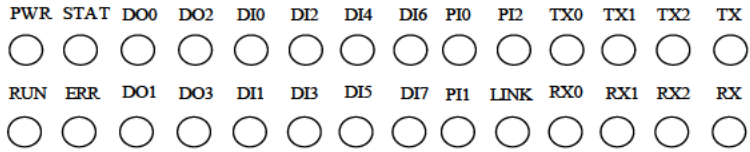


Fig. 4-1

4.3.2 Description

4. 3. 2. 1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

4. 3. 2. 2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.
DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.

DI7	Green	ON when the corresponding input voltage is more than 18V.

4. 3. 2. 3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

4. 3. 2. 4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	ON when the corresponding input voltage is more than 5V.
PI1	Green	ON when the corresponding input voltage is more than 5V.
PI2	Green	ON when the corresponding input voltage is more than 5V.

4. 3. 2. 5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Blinking when transmitting data on the HART port.
RX0	Green	Blinking when receiving data on the HART port.
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

4. 3. 2. 6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	ON when the controller not connected with Ethernet.
TX	Red	Blinking when transmitting data on the Ethernet port.
RX	Green	Blinking when receiving data on the Ethernet port.

4.4 Power Control

4.4.1 LED Power Control

Lightening the LEDs on the Super32 controller board will consume a lot of power. Controller can shut these LEDs to conserve power. This feature is particularly useful when the Super32 is using solar powered system or unattended work stations.

The ESet configuration sets the default state of the LED power. Application programming can change the enable/disable status. See ***ESet Manual*** for detail.

The LED power provides power for LEDs if enabled.

PWR、RUN are not controlled by the LED power enable/disable status.

4.4.2 COM1 Power Control

The insulating power of COM1 port on the Super32 controller board will consume a lot of power. If the controller does not connect with a serial equipment, controller can shut the COM1port to conserve power. This feature is particularly useful when the Super32 is using solar power.

The enable/disable status of COM1 power is set by the ESet configuration tool. The application programming may change the enable/disable status. See ***ESet Manual*** for detail.

TheCOM1 power provides power for COM1 if enabled.

COM2 is not controlled by the COM1 power enable/disable status.

4.4.3 Ethernet Power Control

Ethernet port on the Super32 controller board will consume more power. If the controller does not connect with an equipment through Ethernet port, controller can shut the Ethernet port to conserve power. This feature is particularly useful when the Super32 is using solar powered.

The enable/disable status of Ethernet port power is set by the ESet configuration tool.. The application programming may change the enable/disable status. See ***ESet Manual*** for detail.

The Ethernet port power provides power for Ethernet port if enabled.

4.5 Counter Input Filters

Each of the three counter inputs on the Super32 controller can be filtered. Filtering limits the maximum digital input or counter frequency to approximately 30 Hz. Pulse inputs uses filter to resolve for the problems of contact bounce in low speed counting applications.

The FILTER 1, FILTER2, FILTER3 switches control the input filter functions:

- Remove the module cover and set the configuration switches. See Fig. 3-9 **Super32** Controller Layout for switch location.
- To disable a filter, dial the switch to the right side. (open)
- To enable a filter, dial the switch to the left side. (closed)

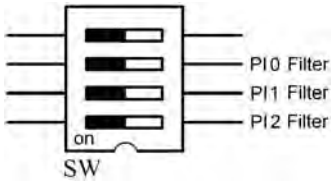


Fig. 4-2

4.6 Real Time Clock

The Real Time Clock of **Super32** controller provides independently the time and date for the operating system。The time and date remain correct during power off. The calendar automatically manages leap years.

Real time clock can be saved into register by reading through OpenPCS function block [CLOCK_GET]. The values for the data and time date are stored in single registers as two digit values.

For example the date and time:17：32：23, 2004-07-13 would be stored as ：

Hour	Minute	Second	Year	Month	Day
17	32	23	04	7	13

For example the date and time:00：00：01, 2000-01-01 would be stored as：

Hour	Minute	Second	Year	Month	Day
00	00	01	00	01	01

Application programs that use the date and time data must ensure that the rollover from year 99 to year 00 is accounted for in the program.

4.7 Modbus Register Assignment

There are four types of internal register in controller, as follows:

Coil_Register;

State_Register;

Input_Register;

Hold_Register.

Coil_Register and State_Register are bit registers, every register address of which is accorded with a binary bit.

Input_Register and Hold_Register are 16-bit registers.

The following table shows the modbus address range of controller.

Register name	Modbus address	Features
Coil_Register	00001-04096	1bit
State_Register	10001-14096	1bit
Input_Register	30001-31024	16bit
Hold_Register	40001-49999	16bit

4.8 Assigned Modbus Register Address of I/O Signals

Different RTU of **Super32** have different I/O points and signal types. The I/O points of **Super32-L202** controller are

6AI-3HART-8DI-4DO-2AO-3PI-1RS232-1RS232/1RS485-1Ethernet-24VDC.

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

Signal	Registers	Value range	Meaning
8AI	30001~30008	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
4DO	00001~00004	1,0	BOOL data, readable or writable
2AO	40001~40002	10000~50000	Unsigned short data, Standard value readable or writable
3PI	30100~30106	32-bit int	Unsigned int data, readable only

4.9 Data Format

8AI (4~20mA) :

Current value	standard value
4 .00mA	10000
8.00mA	20000
12.00mA	30000
16.00mA	40000
20.00mA	50000

6 AI (0~10V):

Voltage value	standard value
0.000V	10000
2.500V	20000
5.000V	30000
7.500V	40000
10.000V	50000

2AO(4~20mA)：

standard value	Current value
10000	4 .00mA
20000	8.00mA
30000	12.00mA
40000	16.00mA
50000	20.00mA

4.10 Scan Settings of Equipments Connected with COMs

There are 1RS232/1RS485-1RS232 Serial Communications on the **Super32** controller. Only by configuration, the CPU of the controller can read/write data from equipments connected with the two COMs.

Read mode:

Read serial equipment data through configuring scan data block (US1 Block, US2 Block).

Read serial equipment data through application program

For configuration details, please see chapter Examples of Super32 Configuration of ***ESet Manual.***

4.11 RS485/RS232 Switch Settings

According to the local requirement, the serial communication port COM1 of **Super32** is designed as RS485/RS232. Configuration or application program can change COM1 function. See chapter **Controller Communication settings** of ***Eset Manual*** for detail.

Note!

COM1 is the common communication port for RS485/RS232. Only one function can be used when connecting serial communication equipment. Can not connect RS485 and RS232 communication equipment at the same time or it will make communication failure.

4.12 Communication Parameters

The configuration for the parameters of controller should according to the requirements in situ. The primary configurations are parameters of serial communications, Ethernet IP and some other parameters which are relevant to control. For details, please see chapter **Controller Communication Settings** of ***ESet Manual***.

4.13 Lithium Battery

A small lithium battery powers real-time clock when input power is removed. The voltage of a functioning battery should be greater than 2.0V. Application programming can monitor this voltage. If an application program will use the sleep function of controller, please notice about whether it is the voltage of the battery lower than 2.0V.Otherwise, the controller may not be awakened. Refer to the ***ESet Manual*** for details.

The battery need not be replaced under normal conditions. The using life of the battery is 10 years. The battery is rated to maintain the real-time clock and RAM data for two years with the power off. Accidental shorting or extreme temperatures may damage the battery.

The battery is fixed on the circuit board. If necessary, a battery with same performance can be replaced battery seat needn't to be changed.

Chapter 5. Controller Specification

5.1 CPU Module

Item	index
Processor	32-bit ARM processor, 30MHz clock frequency, integrated watchdog timer
Memory	2M (program Flash)+4M (data Flash)+1M(data SRAM)+32K FRAM
Non-volatile RAM	With no power, the Flash storage with lithium battery retains data for ten years.
Clock calendar	±1 minute/month
Integrated Function	Watchdog timer, clock and calendar, 32-channel PIDs, 32-channel timers

5.2 Power Supply

Product Series	Power Supply	Power Consumption
Super32-M201	24VDC	<40mA
Super32-L201		<50mA
Super32-L202		<60mA
Super32-L203		<60mA
Super32-L205		<60mA

5.3 Analog Iutput（AI）

Item	Index
A/D Resolution	16-bit
Input Impedance	100KΩ for 10VDC inputs 170Ω for 20mA inputs
Convert type	Successive Approximation
Accuracy	±0.1% of full scale at 25℃ ±0.3% of full scale over temperature range
Type	Single ended
Over limited voltage	115VAC (only to burn out the 20mA current resistance component and transient variety restrained component when up to 115VAC. And the continuous input not exceed 60% of the range will not do any harm to system.)
Isolation	500VAC from the logic power supply
Transient variety Protection	600W (The transient variety restrained component is installed in each signal input terminal)
Upload Time	10ms
Response Time	10ms (10% to 90% change of the signal)

5.4 Analog Output（AO）

Item	Index
Power Supply	12~24V
D/A Resolution ratio	16-bit
Output Signal Range	4~20 mA
Maximal Load Impedance	1000Ω with 24VDC loop power 400Ω with 12VDC loop power
Output Type	Single-ended regulation on positive side with common negative return
Isolation	70VAC/100VDC (From the logic power supply and the soleplate)
Absolute Accuracy	±0.1% (25℃ with 250Ω load) ±0.5%(full temperature range, 0~1000Ω load)
Noise and Ripple	0.04% Maximum
Transient Protection	600W (The transient variety restrained component is installed in each signal output terminal)
Response Time	100ms typical for 10% ~ 90% change of the signal

5.5 Digital Input （DI）

Item	Index
The maximal input	30VDC
The minimal ON input	8VDC
The maximal OFF input	2VDC
Standard on-off limit	4~6VDC
Standard input lag	0.3VDC
Standard input current	5mA@12VDC 12mA@24VDC

5.6 Digital Onput （DO）

Item	Index
Power supply	12~24VDC
Output signal type	FET
Execution Time	Max. 1ms
Release Time	Max. 1ms
Output Contact Capacity	DC24V@200mA
Contact Isolation	AC1000V
Isolation between Input and Output	Superior to AC1500V

5.7 Counter Input (PI)

Item	Index
The maximal input	30VDC
The minimal input	5VDC
The maximal OFF input	24VDC
typical on-off limit voltage	4~6VDC
typical input lag	0.3VDC
typical input current	5mA@10VDC 12mA@24VDC
Input Frequency	10KHz with filters off 30Hz with filters on

5.8 Counter Output (PO)

Item	Index
Output Signal	High Level >4.5V Low Level <0.5V
Output Load Current	5mA
Output Frequency	125Hz

5.9 RS232

Item	Index
COM PORT	RS232 Serial port (COM1~2) Data Terminal Equipment (DTE) DB-9P
Baud Rate	2400, 4800, 9600, 19200, 38400, 57600
Parity	None, Odd, or Even
Data Bits	7 or 8 Bits
Stop Bit	1 or 2 Bits
Duplex	Half-Duplex or Full-Duplex (with RTS/CTS control)
Cable Length	Max. 15.2m
Protocol	Modbus RTU/ASCII,DNP3, user-defined protocol
Protocol Mode	Master, Slave

5.10 RS485

Item	Index
COM PORT	RS485 Serial port (COM0) Data Terminal Equipment (DTE)
Baud Rate	2400, 4800, 9600, 19200, 38400, 57600
Parity	None, Odd, or Even
Data Bits	7 or 8 Bits
Stop Bit	1 or 2 Bits
Duplex	Half-Duplex (with RTS/CTS control)
Cable Length	RS485 (Max. 1200m)

Protocol	Modbus RTU/ASCII, DNP3, user-defined protocol
Protocol Mode	Master,Slave

5.11 HART

Item	Index
Modulation	Frequency Shift Keying (FSK) Effecitve = 1200 Hz. Leisure = 2200 Hz.
Data Rate	1200 bps
Transmit Level	500mVp-p / 250Ω
Receive Sensitivity	120mVp-p / on 80mVp-p / off
Output Impedance	300Ω transformer isolated
Input Impedance	4000Ω transformer isolated
Load Resistor	250Ω, 1 Watt maximum.
Visual Indicators	TX0: Transmitted data LED RX0: Received data LED

5.12 Ethernet

Item	Index
COM PORT	RJ45
Communication Rate	10~100Mbit/s
Cable Length	Max. 100m
Communication Mode	Full-Duplex
Protocol	Modbus TCP Modbus in TCP Modbus in UDP DNP3 in TCP DNP3 in UDP
Protocol Mode	Slave

Appendix A Program Development of Controller

A.1 Method of Development

The **Super32** RTU are programmable controllers which support secondary development to order user's required controllers. The required software for the development of control program is **EOpen,** which conforms to **IEC61131-3**.

EOpen supports **IL**, **LD**, **ST**, **SFC** and **FBD/CFC** programming languages, which conform to IEC61131-3. According to the characteristics and requirements of project, users and programmers can select any one or several languages to program and engineers can complete the construction of automation engineering quickly and effectively.

EOpen supports monitoring and debugging on-line, simulating off-line. It has strong functions of engineering applications such as controller parameters setup, I/O port read-write, monitoring database.

For details, please see **OpenPCS manual** and **ESet manual**.

A. 2 Flow of Development

A.2.1 Read up the Communication Settings of Controller

When given a **Super32 RTU**, we don't know its communication settings such as the baud rate of serial port and the IP of Ethernet. Please see the chapter **Test Communication** of ***ESet manual*** to build up the connection.

A.2.2 RS232 Connection Setup

The procedure to build up RS232 connection in **OpenPCS** is as follows:

Choose***[PLC]→[Connections..]*** in the menu. A dialog will pop up:

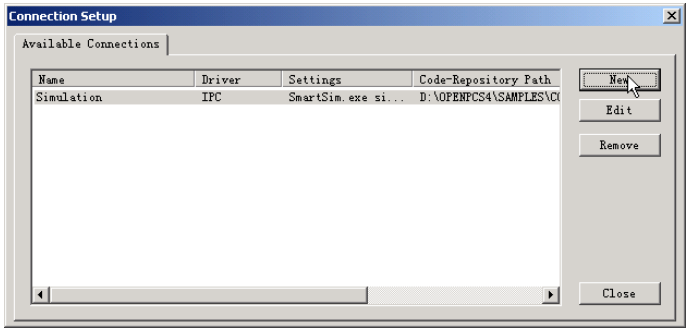


Fig.A- 1

Click *[new]*, the dialog *[Edit Connection]* will pop up:

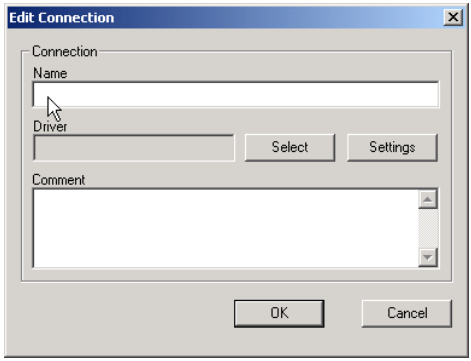


Fig.A- 2

Input a connection name in the *[name]* block (my_RS232 for example), See Fig.A-3.

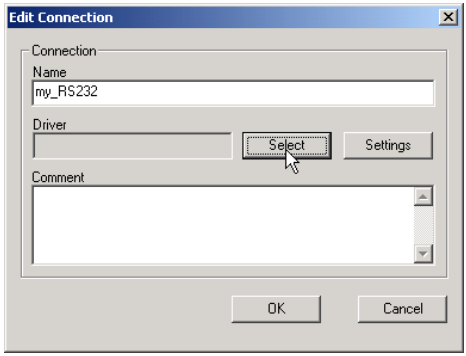


Fig.A- 3

Click *[Select]*, and the dialog [Select Driver] will pop up. See Fig.A-4. Select **RS232** driver, and click *[OK]*.

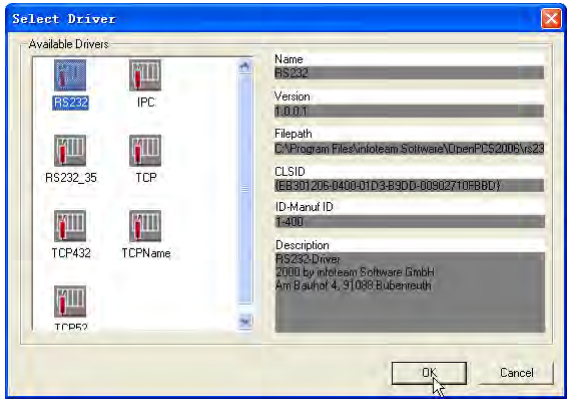


Fig.A- 4

Click *[Settings]*, and the dialog *[RS232 Settings]* will pop up. See Fig.A- 6.

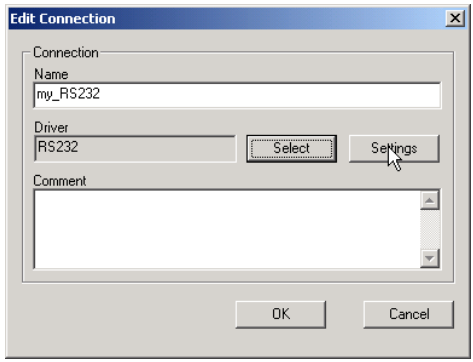


Fig. A- 5

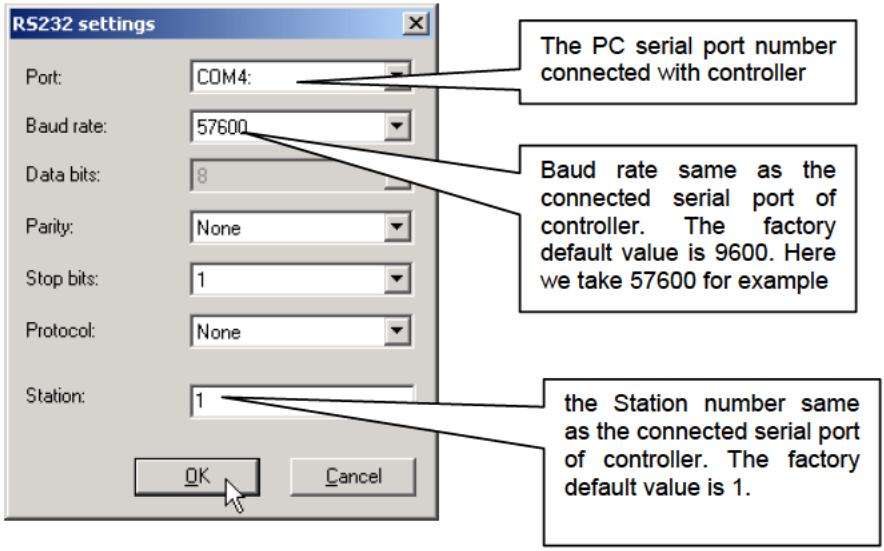


Fig. A- 6

Note!

The PC RS232 settings should be accorded with the connected serial port communication settings of controller..

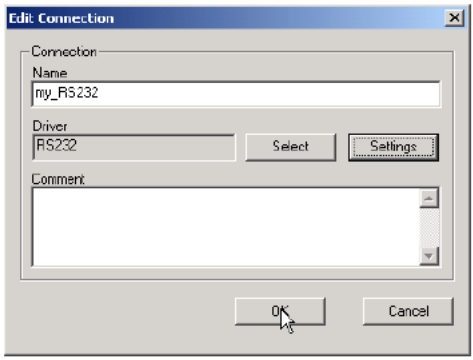


Fig. A- 7

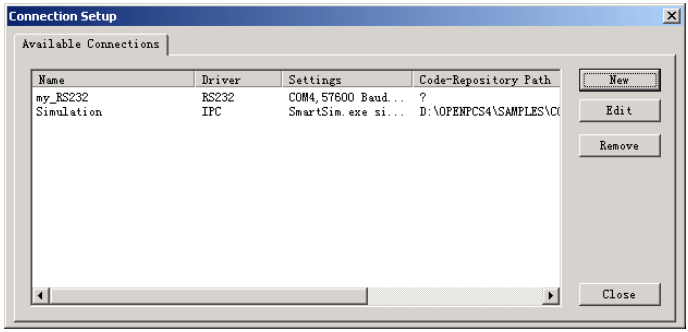


Fig.A- 8

Thus, the RS232 connection has been built up in **OpenPCS**.

A.2.3 TCP Connection Setup

The procedure to build up TCP connection in **OpenPCS** is as follows:

Choose ***[PLC]→[Connections..]*** in the menu. A dialog will pop up:

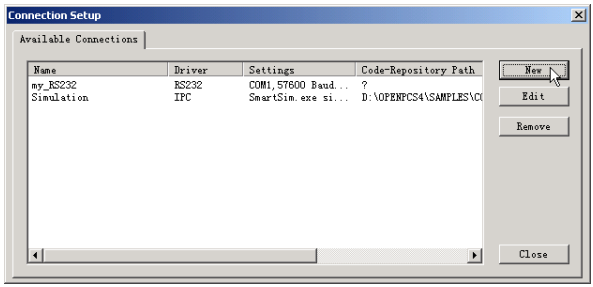


Fig.A- 9

Click *[new]*, the dialog *[Edit Connection]* will pop up, Input a connection name in the [name] block (my_TCP for example), see below.

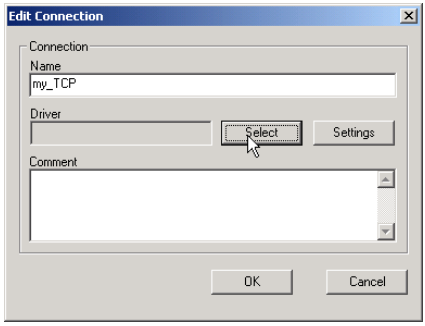


Fig. A- 10

Click *[Select]*, and the dialog [Select Driver] will pop up. See Fig.A-11. Select **TCP432** driver, and click *[OK]*.

Note to select the TCP432 driver when using Ethernet communication port, not TCP.

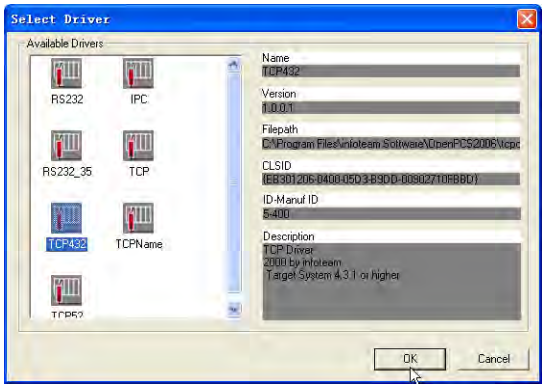


Fig. A- 11

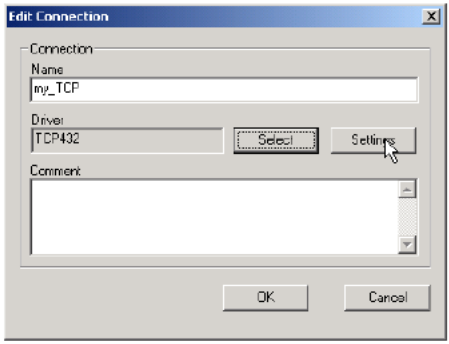


Fig. A- 12

Click [settings], and the dialog [TCP Settings] will pop up. See Fig.A-13.

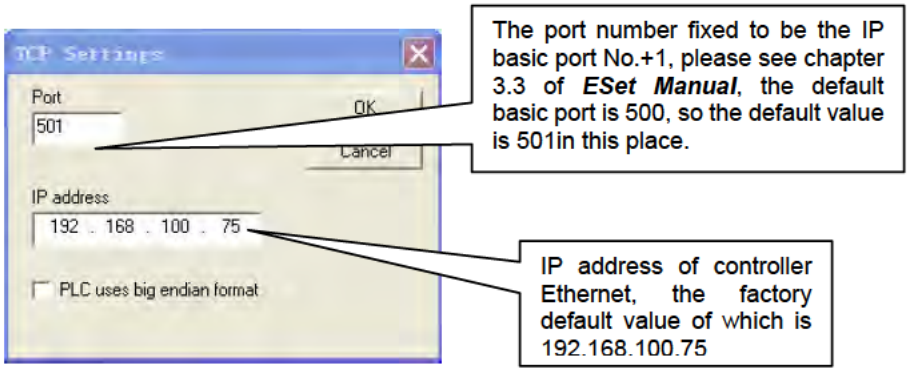


Fig. A- 13

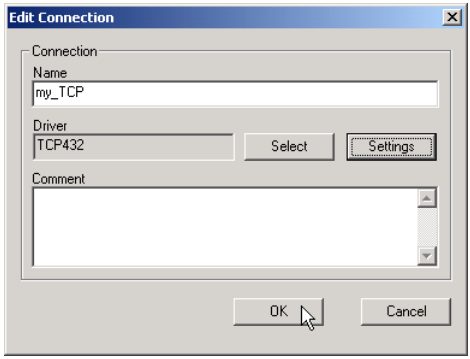


Fig.A- 14

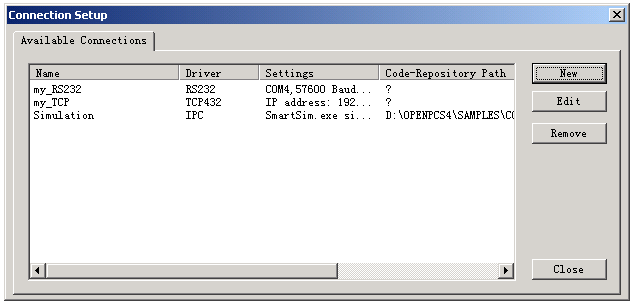


Fig.A- 15

Thus, the TCP connection has been built up in **OpenPCS**.

A.2.4 OpenPCS Programming

We use ST language for example to edit a program.

1、create a new project named Super32_DO.

Start **OpenPCS** , choose *[File]→[New]* in the menu, click [*project]*, and select *[Empty*

Project]. See below：.

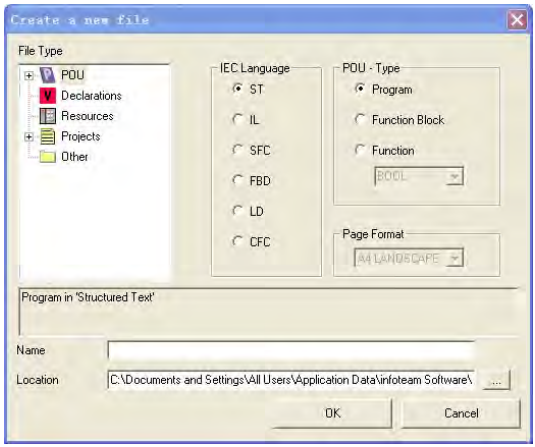


Fig.A- 16

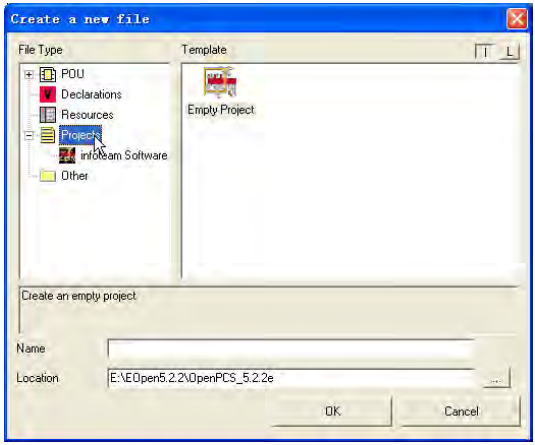


Fig.A- 17

Input a project name in the [name] block (Super32_DO for example), See below.

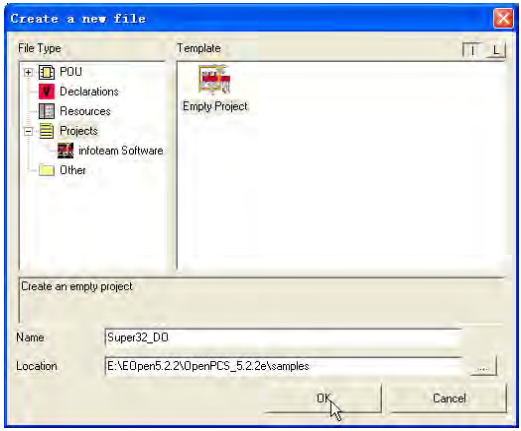


Fig.A- 18

Now the browser contains the new project. You can find the project name in the files pane. See below.

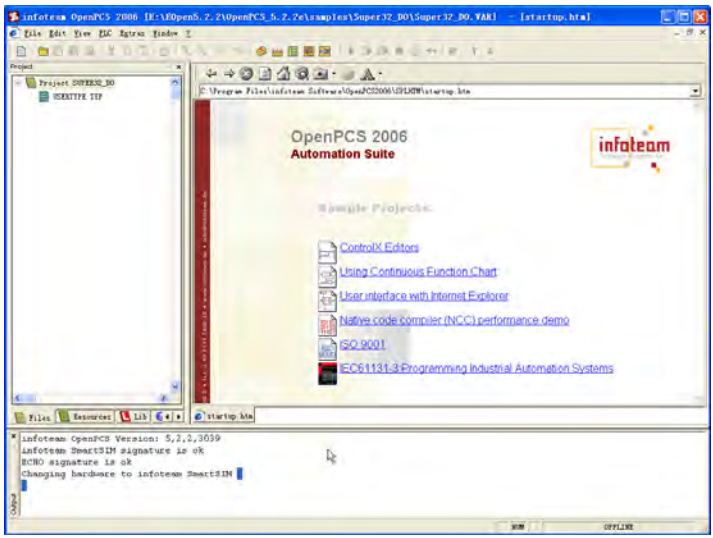


Fig.A- 19

2、Create a new program file named DO_ON.ST

Choose [*File*]→[*New*] in the menu, select **ST Program**. Select [POU], and input a file name in the [name] block. See below.

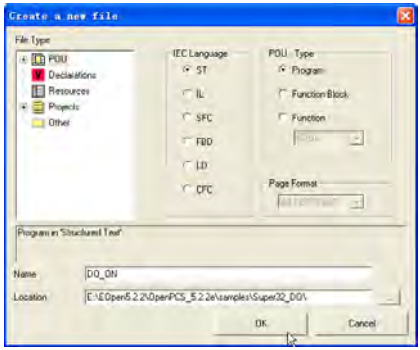


Fig.A- 20

There may pop up a dialog inquiring whether adding this file to the active resource or not. Click [yes]. See below.

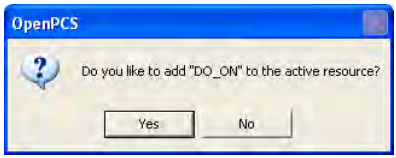


Fig.A- 21

You can find the program file name DO_ON.ST in the files pane of the browser. See below.

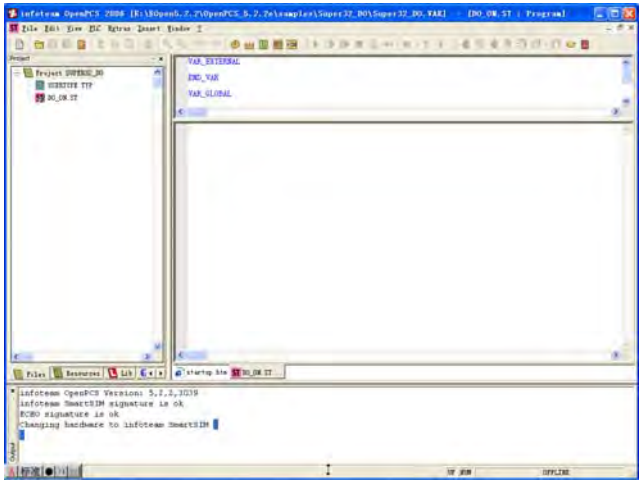


Fig.A- 22

3、Create a new Direct Global declaration file named DO_DirectAddress.POE

Choose *[File]→[New]* in the menu, click *[Declarations]*, select [Direct Global], and input a name in the [name] block (DO_DirectAddress), then click [*OK*]. See below.

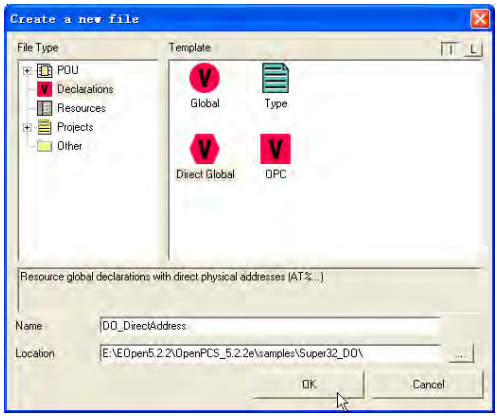


Fig.A- 23

There may pop up a dialog inquiring whether adding this file to the active resource or not. Click *[yes]*. See below.

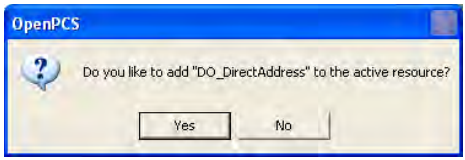


Fig.A- 24

You can find the program file name DO_DirectAddress.POE in the files pane of the browser. See below.

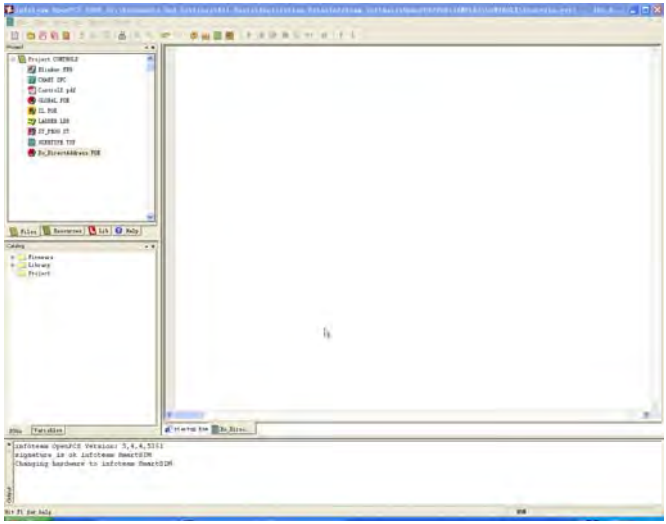


Fig.A- 25

4、Edit DO_DirectAddress.POE

Click the file name DO_DirectAddress.POE in the file pane of the browser. And edit the direct global file in the right window.

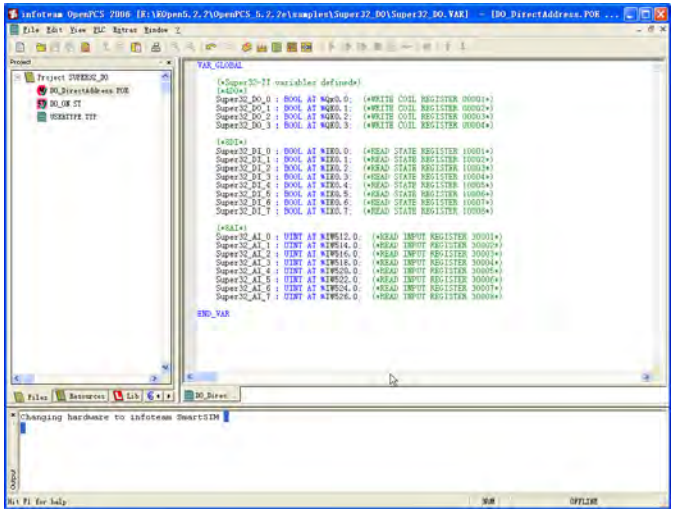


Fig.A- 26

The source code, please see ***Appendix A.3***.

5、Edit DO_ON.ST

Click the file name DO_ON.ST in the file pane of the browser. And edit the ST program file in the right window. The variable declaration is in the upper window, and the executed code is in the lower window.

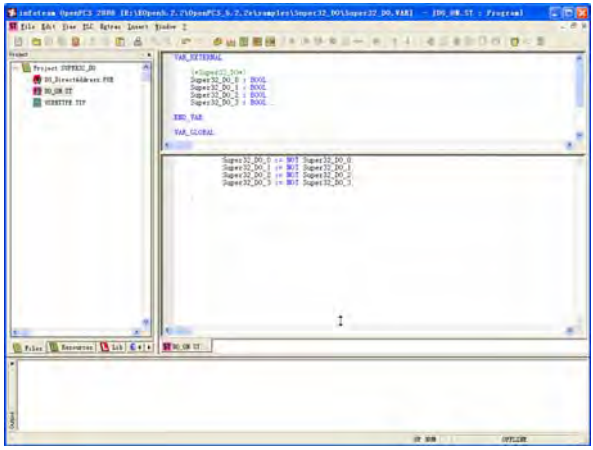


Fig.A- 27

The source code, please see ***Appendix A.3***

.

6、Edit resources properties

The default resource will need to be configured properly for controller.

Open the resources-pane in the left window.

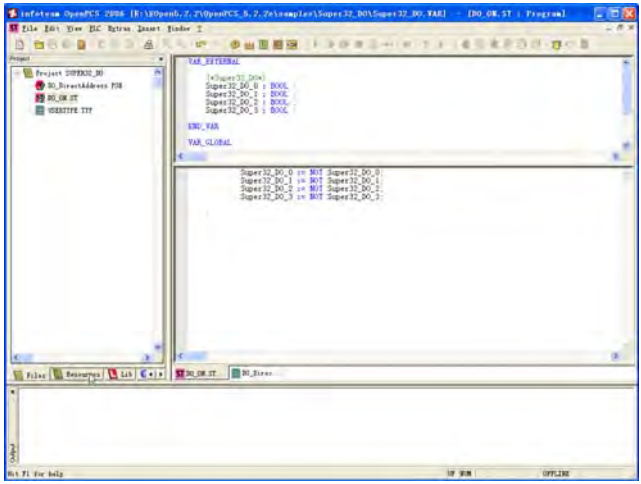


Fig.A- 28

Find the ‘Resource’ entry in the Resource-Pane, and right-click it to show the context menu, and select ‘Properties’, see below:

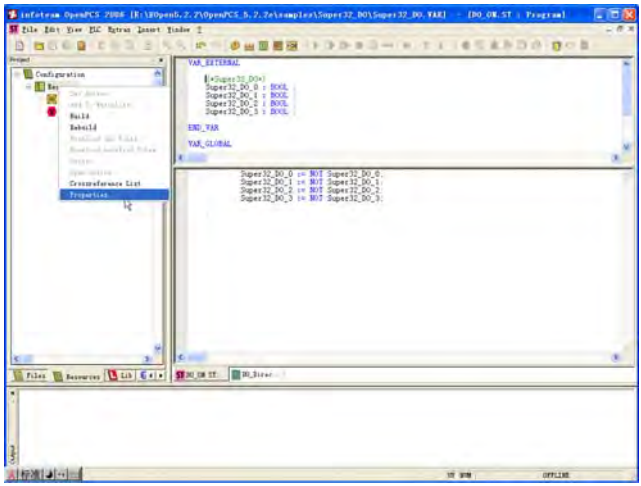


Fig.A- 29

[Edit Resource Specifications] dialog will pop up. Select “ECHO” in the [hardware module]. For the “network connection” item, you should select “my_RS232” when the hardware is RS232 serial connection (see Fig.A- 30) or select “my_TCP” when the hardware is TCP432 connection (See Fig.A- 31). Under ‘Optimization’, select ‘Size only’. Then click [OK].

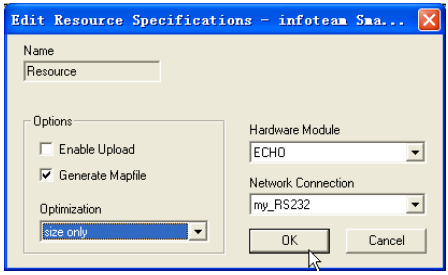


Fig.A- 30

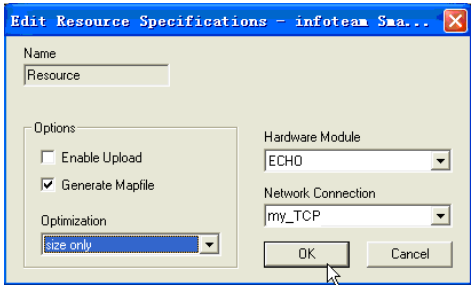


Fig.A- 31

Note to avoid more than one software occupy the same serial port of controller when you use RS232 serial connection.

7、Edit task properties

In this example, we want to let the DO_ON task execute one time every second. so

the DO_ON task will need to be configured to second interruption.

Find the 'DO_ON' entry in the Resource-Pane, and right-click it to show the context menu, and select 'Properties', see below:

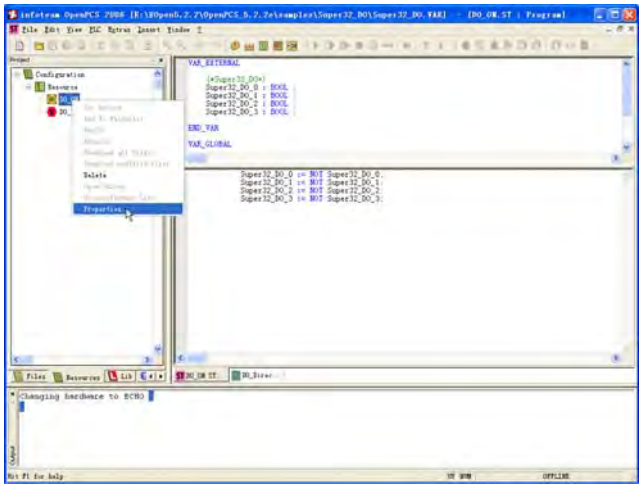


Fig.A- 32

The [Edit Task Specifications] dialog will pop up. Select "interrupt" In the "Task Type", and Select "RTC_SEC" In the "Interrupt". Click *[OK]*. See below.

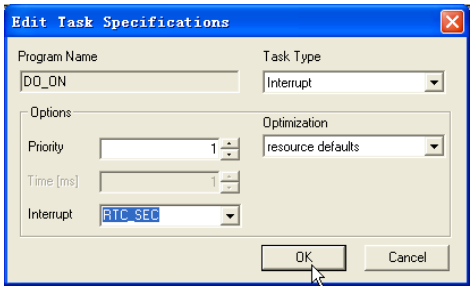


Fig.A- 33

8、Compile

Choose [***PLC***]→[*Build Active Resource*] in the menu, or click [*Build Active Resource*] button in the toolbars. See below.

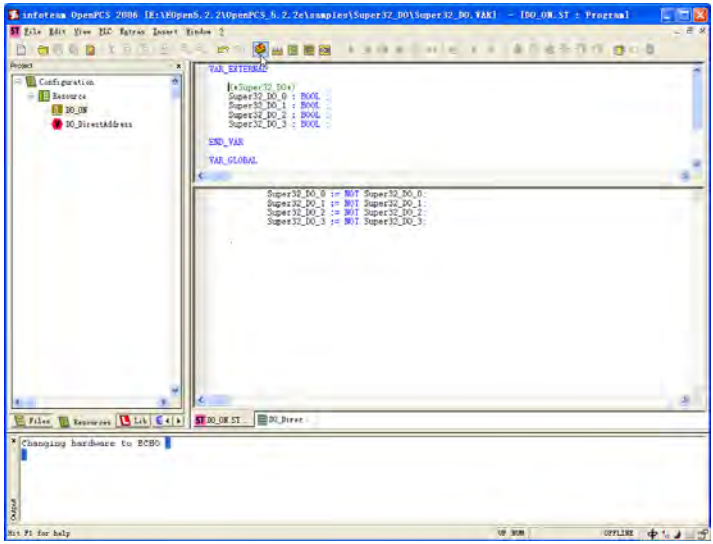


Fig.A- 34

You can see the compiling be running in the diagnostic output window. The last results will be displayed on the diagnostic output window.

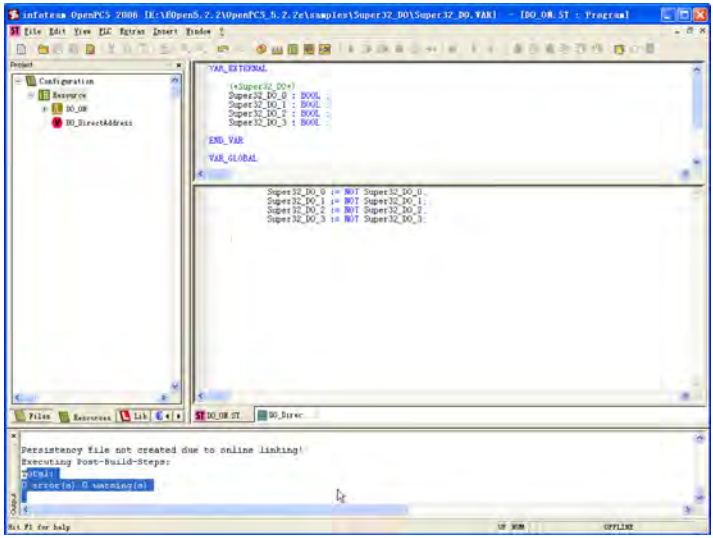


Fig.A- 35

9、Online

After compiling finished, choose *[PLC]* → *[Online]* in the menu, or click *[Online/offline]* button in the toolbars to connect the controller.

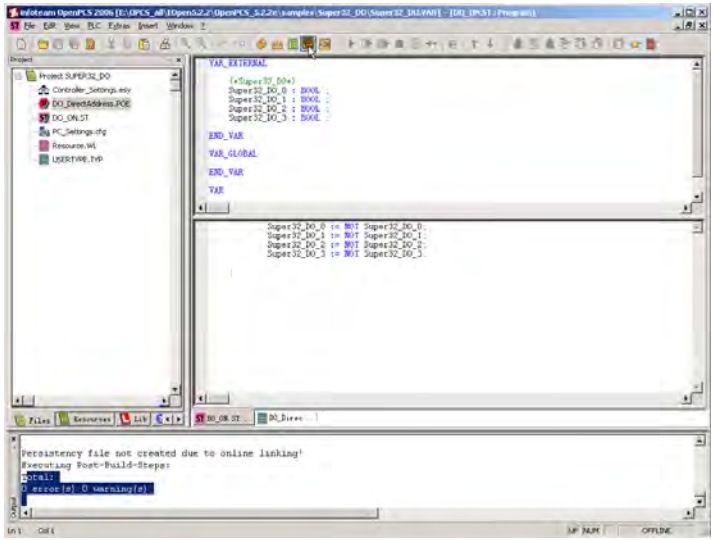


Fig.A- 36

10、Download

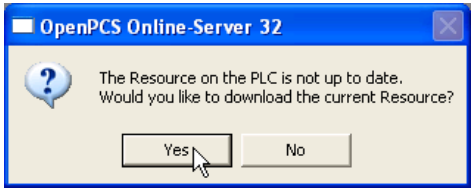


Fig.A- 37

11、Debug

Double click variables which under DO_ON entry in turn to add them to the variable watch list.

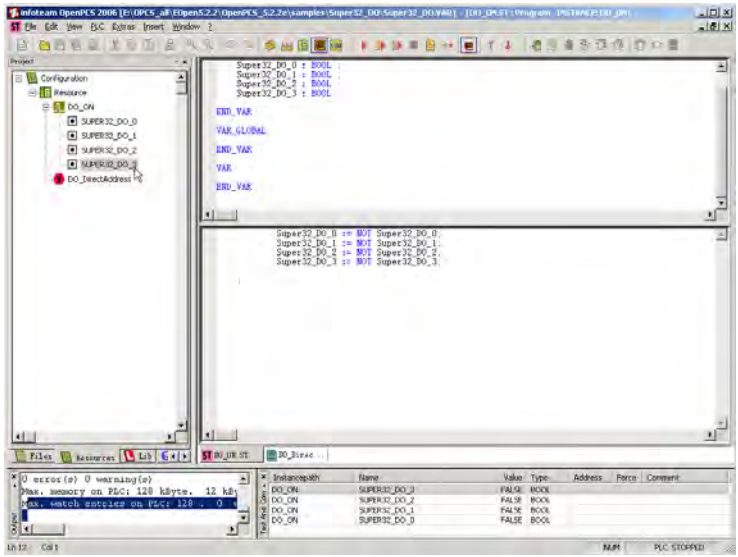


Fig.A- 38

12、Run

Choose [***PLC***]→*[Coldstart]* in the menu, or click *[Coldstart*] button in the toolbars to reset all variables initial value.

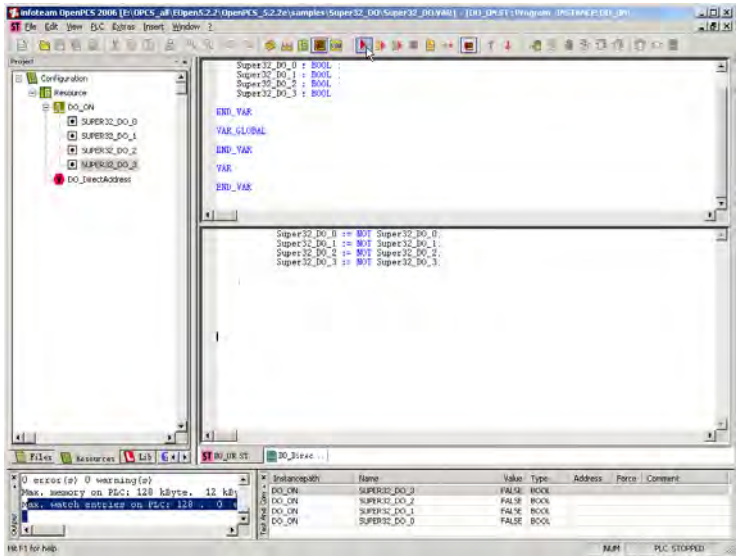


Fig.A- 39

A.2.5 Configuration

The controller will not do any operation, because you have not done any configuration. We have set the DO_ON.ST task type as RTC_SEC interrupt (see Fig.A- 33), and now we should use **ESet** configuration software to enable the RTC_SEC event interrupt.

1. Build up connection with **ESet**:

Note that, if you use serial connection between ESet tools and the controller, you should firstly be offline in OpenPCS, because the controller can't communicate with the two software at the same time. So click the [online/offline] button again, to turn to offline state.

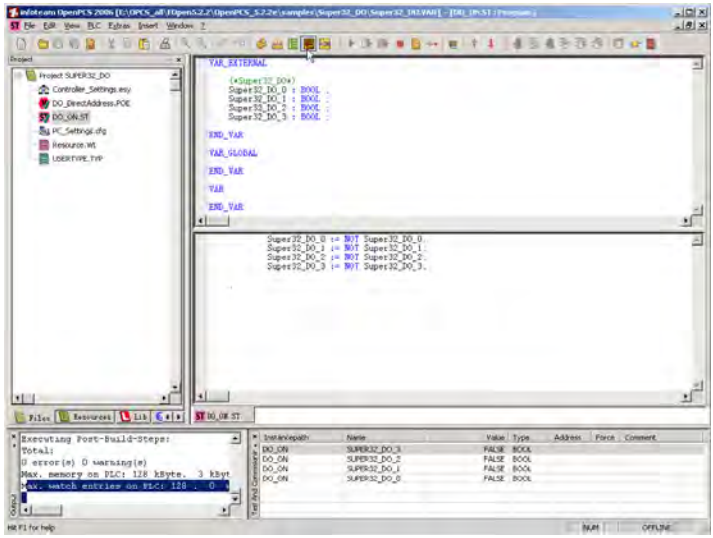


Fig.A- 40

Choose [***Extras***]→[***Tools***]→[***PC Communication Settings***] in the menu. Set the PC baud rate the same as the connected serial port of controller, COM2, 57600 for example. As follows:

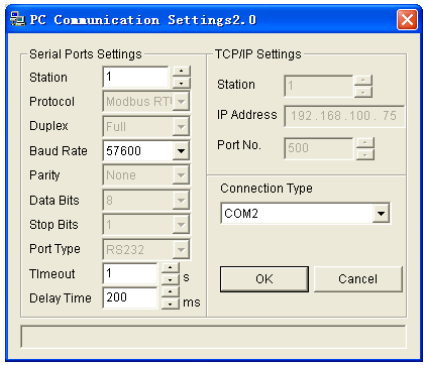


Fig.A- 41

If you use TCP connection between **ESet** tools and the controller, you need to select "TCP/IP Server" in the "Connection Type".

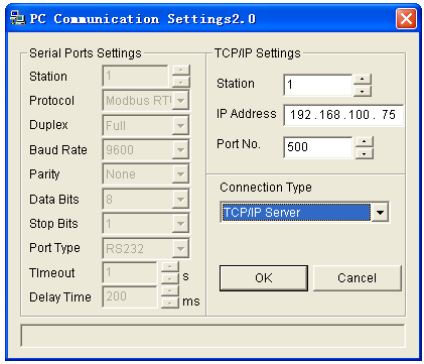


Fig.A- 42

2. Enable the task interrupt:

We use Event Settings to enable the Second Event. You can see the start sentences in chapter ***Event Settings*** of ***ESet Manual*** for the corresponding relationship between the task interrupt and the Event.

Choose [*Extras*]→[*Tools*]→[*Event Settings*] in the menu. The *[Event Settings]* dialog will pop up. See below.

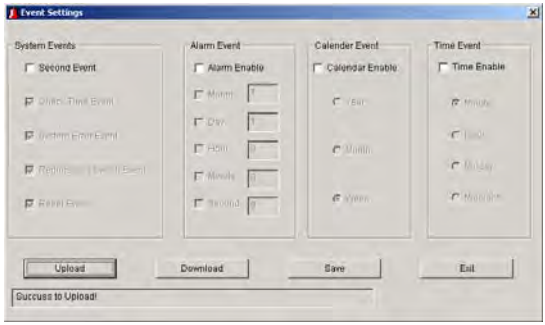


Fig.A- 43

Check the ***Second Event*** check box to enable the second event and *[Download]* to write the event settings to the controller. See below.

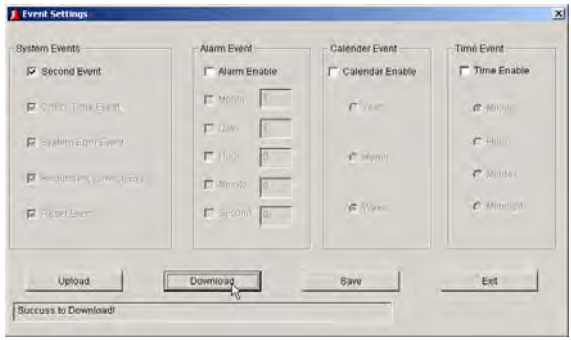


Fig. A- 44

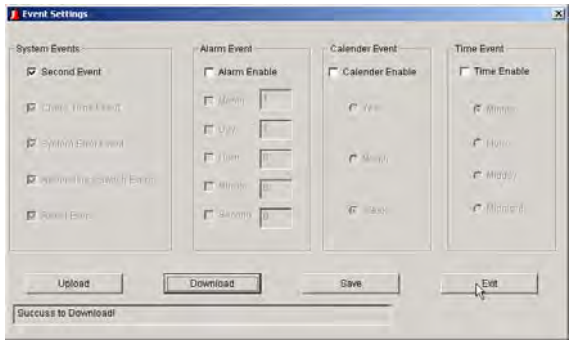


Fig. A- 45

A.2.6 Controller Operation

Now, you will find that the controller start to execute the OpenPCS program to operate the On/Off switch secondly.

A. 3 Source Code Of The Example

1. source code of DO_DirectAddress.POE

```
VAR_GLOBAL
(*Super32-II variables defined*)
(*4DO*)
Super32_DO_0 : BOOL AT %QX0.0; (*WRITE COIL REGISTER 00001*)
Super32_DO_1 : BOOL AT %QX0.1; (*WRITE COIL REGISTER 00002*)
Super32_DO_2 : BOOL AT %QX0.2; (*WRITE COIL REGISTER 00003*)
Super32_DO_3 : BOOL AT %QX0.3; (*WRITE COIL REGISTER 00004*)
(*8DI*)
Super32_DI_0 : BOOL AT %IX0.0; (*READ STATE REGISTER 10001*)
Super32_DI_1 : BOOL AT %IX0.1; (*READ STATE REGISTER 10002*)
Super32_DI_2 : BOOL AT %IX0.2; (*READ STATE REGISTER 10003*)
Super32_DI_3 : BOOL AT %IX0.3; (*READ STATE REGISTER 10004*)
Super32_DI_4 : BOOL AT %IX0.4; (*READ STATE REGISTER 10005*)
Super32_DI_5 : BOOL AT %IX0.5; (*READ STATE REGISTER 10006*)
Super32_DI_6 : BOOL AT %IX0.6; (*READ STATE REGISTER 10007*)
Super32_DI_7 : BOOL AT %IX0.7; (*READ STATE REGISTER 10008*)

(*8AI*)
Super32_AI_0 : UINT AT %IW512.0; (*READ INPUT REGISTER 30001*)
Super32_AI_1 : UINT AT %IW514.0; (*READ INPUT REGISTER 30002*)
Super32_AI_2 : UINT AT %IW516.0; (*READ INPUT REGISTER 30003*)
```

```
Super32_AI_3 : UINT AT %IW518.0; (*READ INPUT REGISTER 30004*)
Super32_AI_4 : UINT AT %IW520.0; (*READ INPUT REGISTER 30005*)
Super32_AI_5 : UINT AT %IW522.0; (*READ INPUT REGISTER 30006*)
Super32_AI_6 : UINT AT %IW524.0; (*READ INPUT REGISTER 30007*)
Super32_AI_7 : UINT AT %IW526.0; (*READ INPUT REGISTER 30008*)

(*4AO*)
Super32_AO_0 : UINT AT %Q512.0; (*WRITE HOLD REGISTER 40001*)
Super32_AO_1 : UINT AT %Q514.0; (*WRITE HOLD REGISTER 40002*)
Super32_AO_2 : UINT AT %Q516.0; (*WRITE HOLD REGISTER 40003*)
Super32_AO_3 : UINT AT %Q518.0; (*WRITE HOLD REGISTER 40004*)
END_VAR
```

2. source code of DO_ON.ST

```
(*variables declaration*)
VAR_EXTERNAL
(*Super32_DO*)
Super32_DO_0 : BOOL ;
Super32_DO_1 : BOOL ;
Super32_DO_2 : BOOL ;
Super32_DO_3 : BOOL ;

END_VAR
VAR_GLOBAL
END_VAR
VAR
```

```
END_VAR
(*executing code*)
Super32_DO_0 := NOT Super32_DO_0;
Super32_DO_1 := NOT Super32_DO_1;
Super32_DO_2 := NOT Super32_DO_2;
Super32_DO_3 := NOT Super32_DO_3;
```

A. 4 OpenPCSDirect Variable Address Definiens

The corresponding relation of **OpenPCS** direct variable address and **Modbus** register address is shown as below:

Signal	Register number	OpenPCS direct variable address	Modbus register address
DI	4096	%IX0.0～%IX511.7	10001～14096
AI	1024	%IW512.0～%IW2558.0	30001～31024
DO	4096	%QX0.0～%QX511.7	00001～04096
AO	9999	%QW512.0～%QW20508.0	40001～49999

Suppose the OpenPCS direct addressee is %x..y，Modbus address is register，the conversion formula is :

0 section：x*8+y=regist – 1 （y≤7）

1 section：x*8+y=regist – 10001 （y≤7）

3 section：(x – 512)/2 = regist - 30001

4 section：(x – 512)/2 = regist - 40001

Example：

%Q 0.0～ %Q 0.7 means:00001～00007

%I 0.0 ～ %I 0.7 means:10001～10007

%I 512.0～%I 512.7 and %I 513.0～%I 513.7 mean:30001

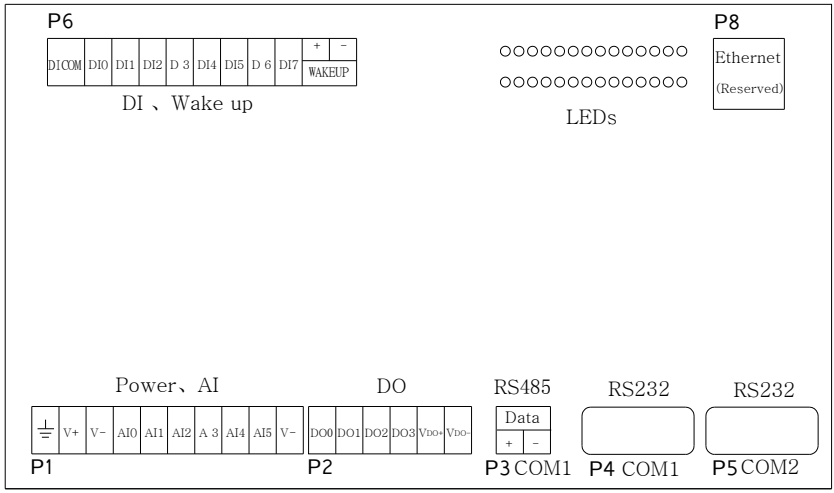
%Q 512.0～%Q 512.7 and %Q 513.0～%Q 513.7 mean:40001

Appendix B Field Wiring of all Super32 Types

B. 1 Super32-M201

B.1.1 Field Wiring Connectors

The distribution of **Super32-M201** terminal groups shown as follows:



Super32-M201

Fig.B- 1

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
⏚	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig.B- 2

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV+	DOV-

Fig.B- 3

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig.B- 4

P3 terminal (including RS232 communication terminal) has been shown in the figure.

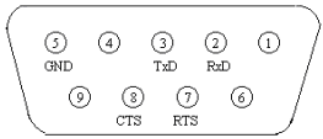


Fig.B- 5

Note: P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

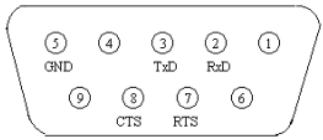


Fig.B- 6

P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig.B- 7

B.1.2 LEDs Indicators

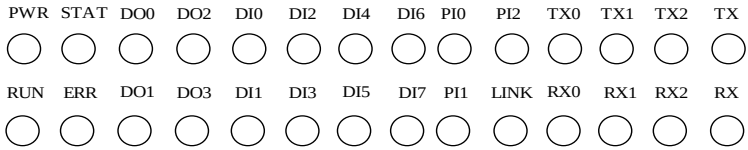


Fig.B- 8

B.1.3 LEDs Description

B.1.3.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.1.3.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.
DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.
DI7	Green	ON when the corresponding input voltage is more than 18V.

B.1.3.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

B.1.3.4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	Reserved
PI1	Green	Reserved
PI2	Green	Reserved

B.1.3.5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Reserved
RX0	Green	Reserved
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

B.1.3.6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	Reserved
TX	Red	Reserved
RX	Green	Reserved

B.1.4 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-M201** controller are

6AI-8DI-4DO-1RS232-1RS232/1RS485-24VDC.

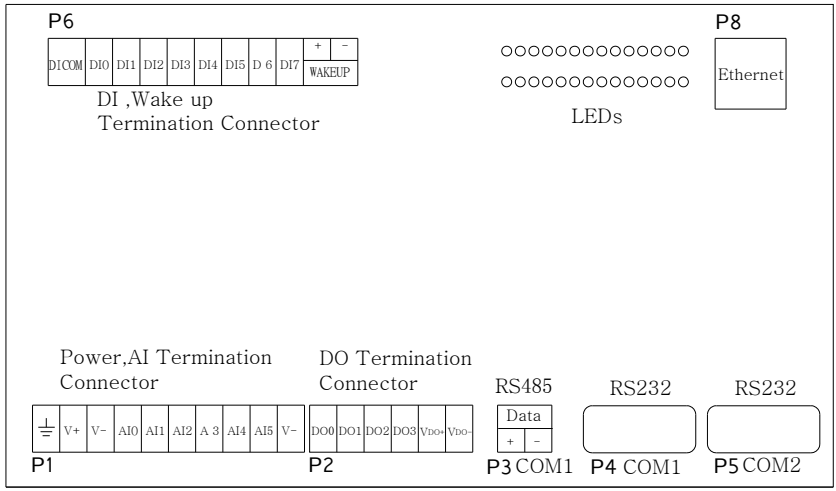
When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

Signal	Registers	Value range	Meaning
6AI	30001~30006	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
4DO	00001~00004	1,0	BOOL data, readable or writable

B. 2 Super32-L201

B.2.1 Field Wiring Connectors

The distribution of **Super32-L201** terminal groups shown as follows:



Super32-L201 Down Board

Fig.B- 9

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
⏚	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig.B- 10

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV_+	DOV-

Fig.B- 11

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig.B- 12

P4 terminal (including RS232 communication terminal) has been shown in the figure.

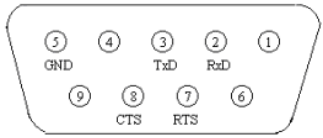


Fig.B- 13

Note：P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

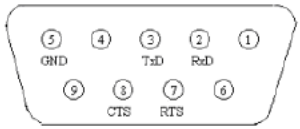


Fig. B- 14

P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig. B- 15

B.2.2 LEDs Distribution

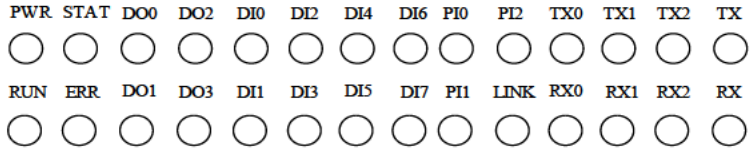


Fig. B- 16

B.2.3 LEDs Description

B.2.3.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.2.3.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.
DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.
DI7	Green	ON when the corresponding input voltage is more than 18V.

B.2.3.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

B.2.3.4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	Reserved
PI1	Green	Reserved
PI2	Green	Reserved

B.2.3.5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Reserved
RX0	Green	Reserved
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.

RX2	Green	Blinking when receiving data on the serial port 2.

B.2.3.6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	ON when the controller not connected with Ethernet.
TX	Red	Blinking when transmitting data on the Ethernet port.
RX	Green	Blinking when receiving data on the Ethernet port.

B.2.4 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-L201** controller are

6AI-8DI-4DO-1RS232-1RS232/1RS485-1Ehernet-24VDC.

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

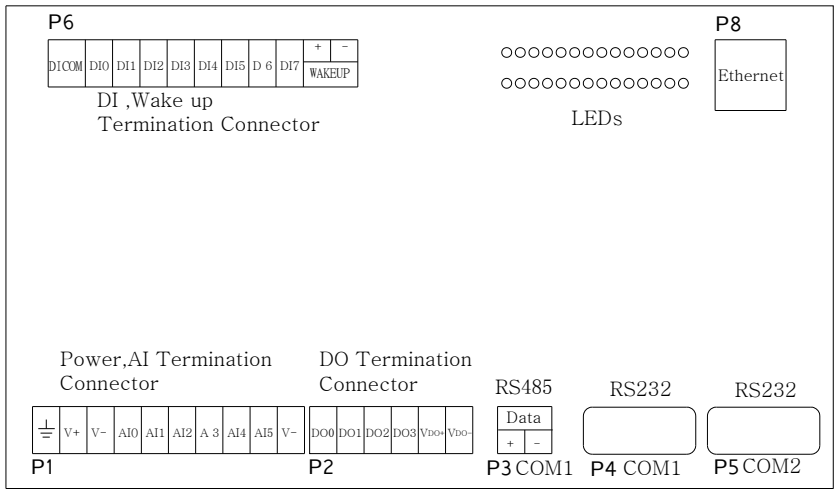
Signal	Registers	Value range	Meaning
6AI	30001~30006	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
4DO	00001~00004	1,0	BOOL data, readable or writable

B. 3 Super32-L202

B.3.1 Field Wiring Connectors

The distribution of **Super32-L202** terminal groups shown as follows:

1) Down Board



Super32-L202 Down Board

Fig. B- 17

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
⏚	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig. B- 18

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV_+	DOV-

Fig.B- 19

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig.B- 20

P4 terminal (including RS232 communication terminal) has been shown in the figure.

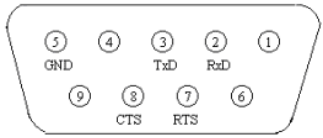


Fig.B- 21

Note：P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

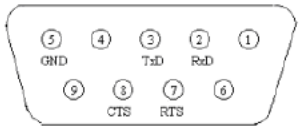


Fig. B- 22

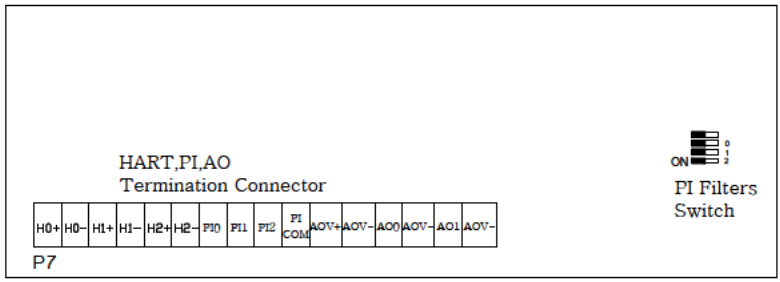
P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig. B- 23

2) Upper Board



Super32-L202 Upper Board

Fig. B- 24

P7 terminal (including HART, PI, AO signal terminal) has been shown in the figure.

P7

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
H0+	H0-	H1+	H1-	H2+	H2-	PI0	PI1	PI2	PI COM	AOV+	AOV-	AO0	AOV-	AO1	AOV-

Fig. B- 25

B.3.2 LEDs Distribution

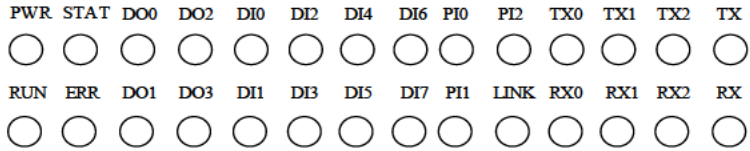


Fig. B- 26

B.3.3 LEDs Description

B.3.3.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.3.3.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.

DI4	Green	ON when the corresponding input voltage is more than 18V.
DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.
DI7	Green	ON when the corresponding input voltage is more than 18V.

B.3.3.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

B.3.3.4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	ON when the corresponding input voltage is more than 5V.
PI1	Green	ON when the corresponding input voltage is more than 5V.
PI2	Green	ON when the corresponding input voltage is more than 5V.

B.3.3.5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Blinking when transmitting data on the HART port.
RX0	Green	Blinking when receiving data on the HART port.
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

B.3.3.6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	ON when the controller not connected with Ethernet.

TX	Red	Blinking when transmitting data on the Ethernet port.
RX	Green	Blinking when receiving data on the Ethernet port.

B.3.4 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-L202** controller are

6AI-3HART-8DI-4DO-2AO-3PI-1RS232-1RS232/1RS485-1Ethernet-24VDC.

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

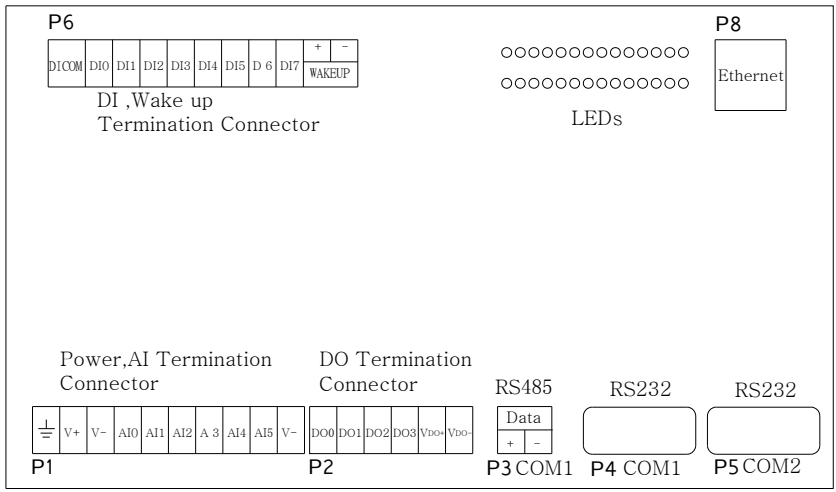
Signal	Registers	Value range	Meaning
8AI	30001~30008	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
4DO	00001~00004	1,0	BOOL data, readable or writable
2AO	40001~40002	10000~50000	Unsigned short data, Standard value readable or writable
3PI	30100~30106	32-bit int	Unsigned int data, readable only

B. 4 Super32-L203

B.4.1 Field Wiring Connectors

The distribution of **Super32-L203** terminal groups shown as follows:

1) Down Board



Super32-L203 Down Board

Fig. B- 27

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig. B- 28

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV_+	DOV-

Fig.B- 29

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig.B- 30

P4 terminal (including RS232 communication terminal) has been shown in the figure.

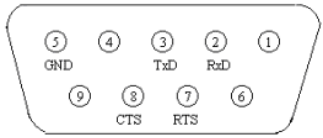


Fig.B- 31

Note：P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

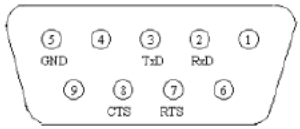


Fig. B- 32

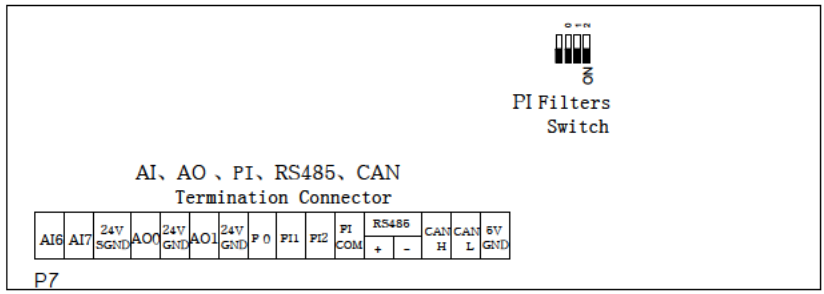
P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig. B- 33

2) Upper Board



Super32-L203 Upper Board

Fig. B- 34

P7 terminal (including AI, AO, PI, RS485, CAN signal terminal) has been shown in the figure.

P7

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
AI6	AI7	24V SGND	AO0	24V GND	AO1	24V GND	PI0	PI1	PI2	PICOM	RS485 +	RS485 -	CANH	CANL	5V GND

Fig. B- 35

B.4.2 LEDs Distribution

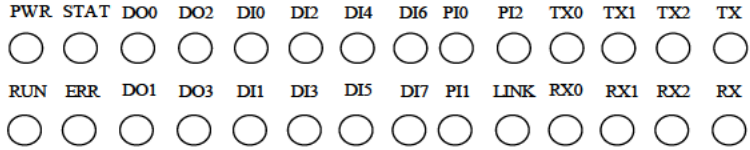


Fig. B- 36

B.4.3 LEDs Description

B.4.3.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.4.3.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.

DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.
DI7	Green	ON when the corresponding input voltage is more than 18V.

B.4.3.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

B.4.3.4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	ON when the corresponding input voltage is more than 5V.
PI1	Green	ON when the corresponding input voltage is more than 5V.
PI2	Green	ON when the corresponding input voltage is more than 5V.

B.4.3.5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Reserved
RX0	Green	Reserved
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

B.4.3.6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	ON when the controller not connected with Ethernet.
TX	Red	Blinking when transmitting data on the Ethernet port.

RX	Green	Blinking when receiving data on the Ethernet port.

B.4.4 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-L203** controller are

8AI-8DI-4DO-2AO-3PI-1RS232-1RS232/1RS485-1RS485-1Ethernet-1CAN-24VDC

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

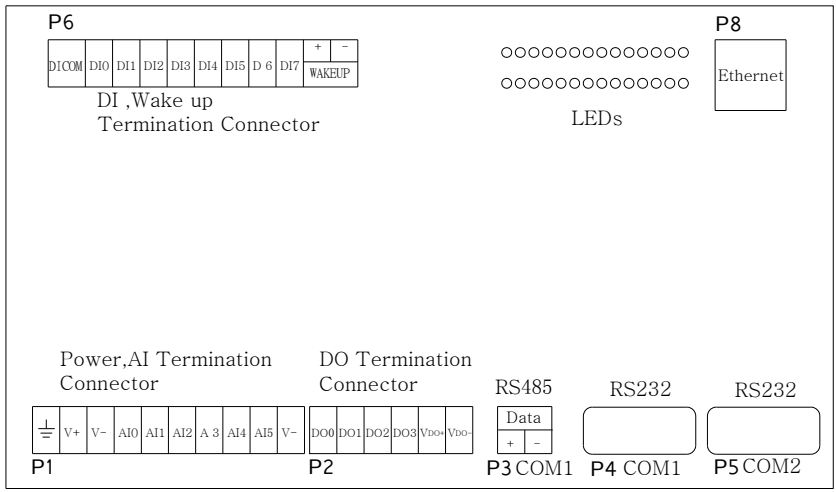
Signal	Registers	Value range	Meaning
8AI	30001~30008	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
4DO	00001~00004	1,0	BOOL data, readable or writable
2AO	40001~40002	10000~50000	Unsigned short data, Standard value readable or writable
3PI	30100~30105	32-bit int	Unsigned int data, readable only

B. 5 Super32-L205

B.5.5 Field Wiring Connectors

The distribution of **Super32-L205** terminal groups shown as follows:

1) Down Board



Super32-L205 Down Board

Fig. B- 37

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
⏚	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig. B- 38

P2 terminal (including DO signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16
DO0	DO1	DO2	DO3	DOV_+	DOV-

Fig.B- 39

P3 terminal (including RS485 communication terminal) has been shown in the figure.

P3

17	18
Data	
+	−

Fig.B- 40

P4 terminal (including RS232 communication terminal) has been shown in the figure.

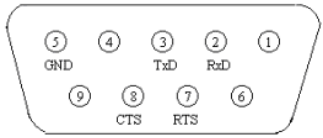


Fig.B- 41

Note：P3 and P4 are both COM1 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

P5 terminal (including RS232 communication terminal) has been shown in the figure, it belongs to COM2.

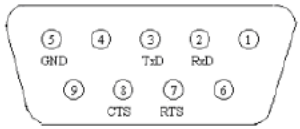


Fig. B- 42

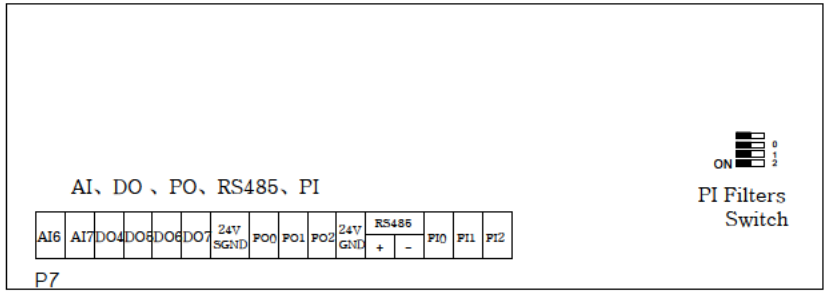
P6 terminal (including DI , Wake Up signal terminal) has been shown in the figure.

P6

19	20	21	22	23	24	25	26	27	28	29
DICOM	DI0	DI1	DI2	DI3	DI4	DI5	DI6	DI7	WAKE UP	
									+	-

Fig. B- 43

2) Upper Board



Super32-L205 Upper Board

Fig. B- 44

P7 terminal (including AI, DO, PO, RS485, PI signal terminal) has been shown in the figure.

P7

30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
AI6	AI7	DO0	DO1	DO2	DO3	24V SGND	PO0	PO1	PO2	24V GND	RS485 +	RS485 -	PI0	PI1	PI2

Fig. B- 45

B.5.6 LEDs Distribution

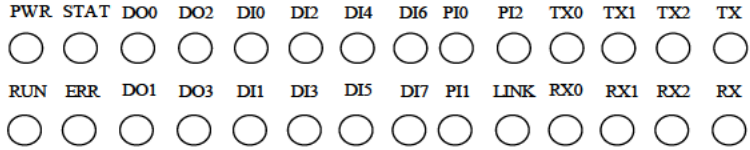


Fig. B- 46

B.5.7 LEDs Description

B.5.7.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.5.7.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.

DI5	Green	ON when the corresponding input voltage is more than 18V.
DI6	Green	ON when the corresponding input voltage is more than 18V.
DI7	Green	ON when the corresponding input voltage is more than 18V.

B.5.7.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.

B.5.7.4 PI Channel Status LEDs

LED	Color	Function
PI0	Green	ON when the corresponding input voltage is more than 5V.
PI1	Green	ON when the corresponding input voltage is more than 5V.
PI2	Green	ON when the corresponding input voltage is more than 5V.

B.5.7.5 Serial Communications LEDs

LED	Color	Function
TX0	Red	Reserved
RX0	Green	Reserved
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

B.5.7.6 Ethernet Communications LEDs

LED	Color	Function
LINK	Yellow	ON when the controller not connected with Ethernet.
TX	Red	Blinking when transmitting data on the Ethernet port.
RX	Green	Blinking when receiving data on the Ethernet port.

B.5.8 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-L205** controller are

8AI-8DI-8DO-3PI-3PO-1RS232-1RS232/1RS485-1RS485-1Ethernet-24VDC

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

Signal	Registers	Value range	Meaning
8AI	30001~30008	10000~50000	Unsigned short data, Standard value, readable only
8DI	10001~10008	1,0	BOOL data, readable only
8DO	00001~00008	1,0	BOOL data, readable or writable
3PI	30100~30106	32-bit int	Unsigned int data, readable only
3PO	40101~40106	32-bit int	Unsigned int data, readable or writable

B. 6 Super32-L306

B.6.1 Field Wiring Connectors

The distribution of **Super32-L306** terminal groups shown as follows:

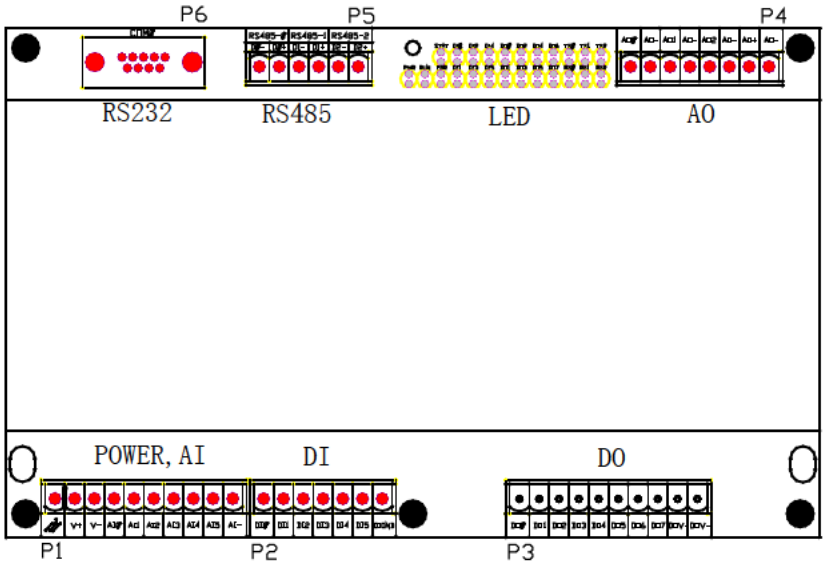


Fig. B- 47

P1 terminal (including power supply, AI output terminal) has been shown in the figure.

P1

1	2	3	4	5	6	7	8	9	10
	V+	V-	AI0	AI1	AI2	AI3	AI4	AI5	V-

Fig. B- 48

P2 terminal (including DI signal terminal) has been shown in the figure.

P2

11	12	13	14	15	16	17
DI0	DI1	DI2	DI3	DI4	DI5	DIGND

Fig. B- 49

P3 terminal (including DO terminal) has been shown in the figure.

P3

18	19	20	21	22	23	24	25	26	27
DO0	DO1	DO2	DO3	DO4	DO5	DO6	DO7	DOV-	DOV+

Fig.B- 50

P4 terminal (including AO terminal) has been shown in the figure.

P4

28	29	30	31	32	33	34	35
AO0	AO-	AO1	AO-	AO2	AO-	AO+	AO-

Fig.B- 51

P5 terminal (including RS485 communication terminal) has been shown in the figure.

P5

36	37	38	39	40	41
RS485-0		RS485-1		RS485-2	
D0-	D0+	D1-	D1+	D2-	D2+

Fig.B- 52

P6 terminal (including RS232 communication terminal) has been shown in the figure. It belongs to COM0.

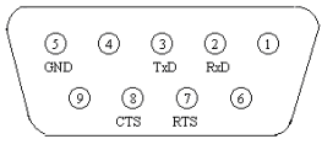


Fig.B- 53

Note：RS485-0 in P5 and P6 are both COM0 serial ports, they can not be used in RS485 and RS232 at the same time. Only one of them can be selected.

B.6.2 LED Distribution

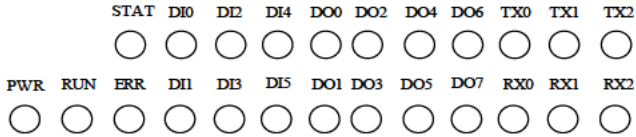


Fig. B- 54

B.6.3 LEDs Description

B.6.3.1 System State LEDs

LED	Color	Function
PWR	Green	ON when 5V power is present.
RUN	Green	ON when the controller is running normally.
STAT	Red	Blinking when running OpenPCS program
ERR	Yellow	ON when an error exists.

B.6.3.2 DI Channel Status LEDs

LED	Color	Function
DI0	Green	ON when the corresponding input voltage is more than 18V.
DI1	Green	ON when the corresponding input voltage is more than 18V.
DI2	Green	ON when the corresponding input voltage is more than 18V.
DI3	Green	ON when the corresponding input voltage is more than 18V.
DI4	Green	ON when the corresponding input voltage is more than 18V.
DI5	Green	ON when the corresponding input voltage is more than 18V.

B.6.3.3 DO Channel Status LEDs

LED	Color	Function
DO0	Green	ON when the corresponding output is on.
DO1	Green	ON when the corresponding output is on.
DO2	Green	ON when the corresponding output is on.
DO3	Green	ON when the corresponding output is on.
DO4	Green	ON when the corresponding output is on.
DO5	Green	ON when the corresponding output is on.
DO6	Green	ON when the corresponding output is on.
DO7	Green	ON when the corresponding output is on.

B.6.3.4 Serial Communications LEDs

LED	Color	Function
TX0	Red	Blinking when transmitting data on the serial port0.
RX0	Green	Blinking when receiving data on the serial port0.
TX1	Red	Blinking when transmitting data on the serial port 1.
RX1	Green	Blinking when receiving data on the serial port 1.
TX2	Red	Blinking when transmitting data on the serial port 2.
RX2	Green	Blinking when receiving data on the serial port 2.

B.6.4 Assigned Modbus Register Address of I/O Signals

The I/O points of **Super32-L306** controller are

6AI-6DI-8DO-3AO-1RS232/1RS485-2RS485-24VDC.

When we read/write those signals, we only need to read/write the registers as the following tables have been shown.

Signal	Registers	Value range	Meaning
6AI	30001~30008	10000~50000	Unsigned short data, Standard value, readable only
6DI	10001~10008	1,0	BOOL data, readable only
8DO	00001~00004	1,0	BOOL data, readable

			or writable
3AO	40001~40002	10000~50000	Unsigned short data, Standard value readable or writable