TRIOU(Temperature Remote I/O Unit)

Before using the product, be sure to read "Safety Cautions," and use exactly as described.

After reading the user manual, keep it in a place where users of the product have easy access to it.

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☞ Safety Precautions

Before installing, operating, and maintaining this product, in order to familiarize yourself with the product, please read this manual carefully and examine the product thoroughly. The purpose of the following special messages that may appear in this user manual are for attention on additional information for simplifying and clarifying danger warnings and every procedure.

After reading the user manual, keep it in a place where users of the product have easy access to it.

The safety precautions are classified as "WARNING" and "CAUTION", and their meanings are as follows:

⚠ **WARNING**   This symbol indicates possibility of death or serious injury

⚠ **CAUTION**   This symbol indicates possibility of minor injury or damage to property

⚠ WARNING

1. Make sure that the power is off before installation. (Otherwise electric shock may seriously injure or death.)
2. Always work from equipments with power removed. (Otherwise electric shock or short circuit accidents may occur.)
   When conducting any testing, maintenance or repair, first remove power and then disassemble from the equipment.
3. Do not install the product unless you are a holder of a national certificate and have received relevant training on the product.
   (Otherwise electric shock or short-circuit accidents may occur, leading to death.)

⚠ CAUTION

1. Pre-power-on checklist
   1) Before installation, make sure the voltage used is the rated voltage.
   2) When installing this product or testing it, make sure to check ratings and specifications.
   3) Do not disassemble the product when it is powered on and operating.

2. General matters of attention
   1) Use the product in places without rain, wind, dust, moisture, and in which vibration and shock levels are low.
   2) Store in a place without moisture and dust.
   3) In airtight space, avoid the area exposed to direct sunlight.
   4) Do not disassemble the product at discretion

3. Matters of attention when discarding
   1) When discarding, handle it as industrial waste.

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☞ 1. Outline

1) Temperature & Remote I/O Unit (henceforth referred to as TRIO Unit) has remote closing, breaking, and temperature monitoring functionalities of Susol/Metasol ACB.

2) TRIO Unit uses open networks based on international-standard communication protocols.

3) TRIO Unit can transmit data collected at ACB to the upper level using RS-485/MODBUS, and Profibus-DP communication.

☞ 2. Product type

Product type	Temperature monitoring function	Communication method	Remote closing and breaking
NM-TYPE	X	MODBUS	
NP-TYPE	X	Profibus-DP	Offering all type
TM-TYPE	O	MODBUS	
TP-TYPE	O	Profibus-DP	

☞ 3. Rated Input/Output and specification

| Input items	Range of application	Remark
Rated control power	AC/DC 100~250V	Free Voltage
Rated frequency	60Hz	
The status of CB Using General DI	TTL, Dry Type [3.3V~5V]	
Power Consumption	Normal : less than 5W, When operating : less than 10W	Output –Relay when operating

Output items		Range of application	Remark
CB control Relay	Switching capacity of contact	AC230V 16A / DC30V 16A	
	Max. value of Switching capacity	3680VA, 480W	
Alarm, Using control Relay	Switching capacity of contact	AC230V 6A / DC25V 6A	Inductive load (cosΦ=0.4,L/R=7ms)
	Max. value of Switching capacity	1880VA, 150W	

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☞ 4. Wiring Diagram(ACB and TRIO Unit)

• Circuit diagram of remote closing/breaking

ACB closing, trip coil ←→Wiring TRIO Unit
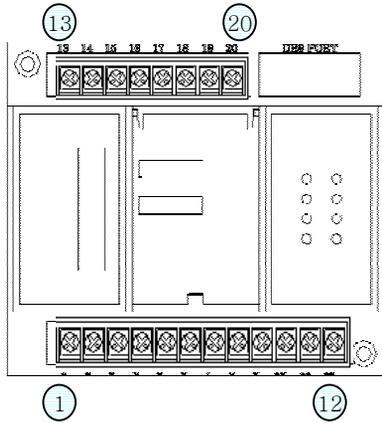
Number of TRIO Unit terminal
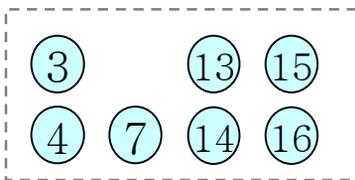
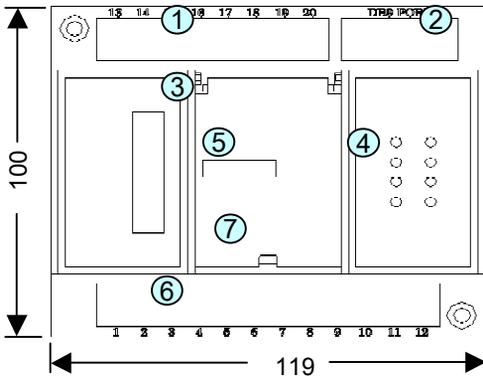Number of ACB Auto-con terminal
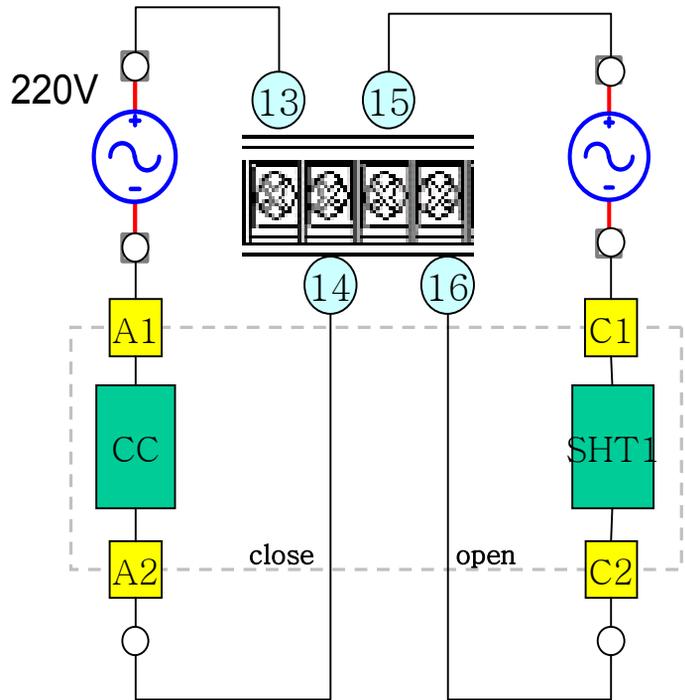
ACB Aux. contact (the status of closing/breaking) ←→Wiring TRIO Unit
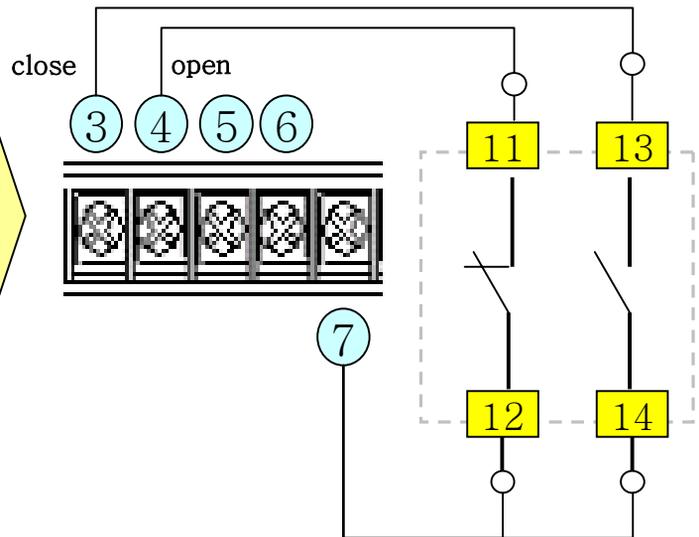
For the operation of TRIO Unit (remote closing and breaking module), the status of ACB (closing/breaking) has to be inputted.

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■ Exterior

|	Item	Function
1	Communication terminal block	CB control and DO control, Communication(MODBUS)
2	RS-485	Profibus-DP, MODBUS
3	LED	Shows temperature
4	LED	Shows CB status, DO status and TRIOU status
5	DIP Switch	Sets communication speed (MODBUS mode), address, and temperature
6	Power terminal block	Power control, DI, temperature sensor terminal
7	RESET	Resets when set alarm temperature has been exceeded and relay is in operation.

■ Set of DIP Switch
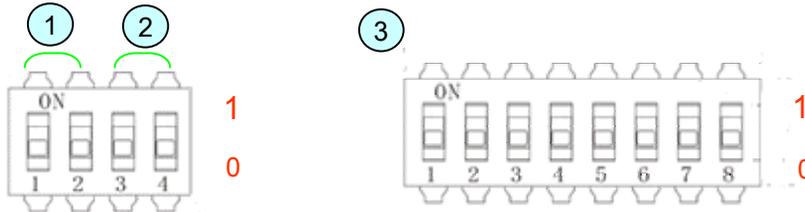
No	Function		Description
1	Set of alarm temperature		11 : 150℃ 10 : 135℃ 01 : 120℃ 00 : 105℃
2	Set of Baud Rate*		11 : 38400 bps 10 : 19200 bps 00 : 9600 bps
3	Set of Address	Modbus	1~255 (decimal)
		Profibus-DP	3~124 (decimal)

* Supported when using MODUBUS communication.

 (Profibus-DP gets set automatically according to the master, With factory set maintenance(00))

* You should de-energize the TRIO Unit if you want to change value of Dip switches of

 the TRIO Unit . If not the TRIO Unit cannot be applied with updated value of Dip switches.

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■ Composition of terminal 1
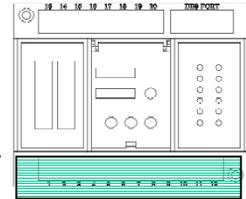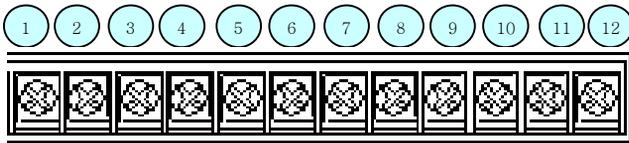
No	Mark	Description
1	Power(+)	Power input terminal(+)
2	Power(-)	Power input terminal (-)
3	CB Close (+)	Input terminal of the status of CB Close (+)
4	CB Open (+)	Input terminal of the status of CB Open (+)
5	Digital input #1 (+)	Digital Input No.1 terminal (+) / user wiring
6	Digital input #2 (+)	Digital Input No. 2 terminal (+) / user wiring
7	CB, Digital Input Com	CB, Digital Input common terminal
8	Temperature sensor #1	Temperature sensor
9	Temperature sensor #2	Temperature sensor
10	Temperature sensor #3	Temperature sensor
11	Temperature sensor #4	Temperature sensor
12	Temperature sensor COM	Common terminal of temperature sensor

■ Composition of terminal 2
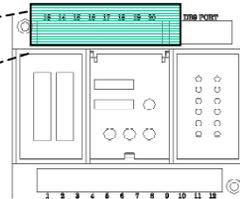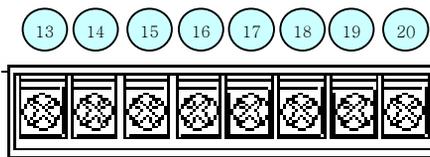
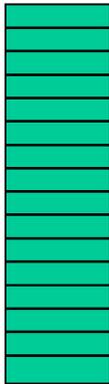| No	Mark	Description
13	CB Close Relay (+)	Circuit Breaker Close Relay terminal (+)
14	CB Close Relay (-)	Circuit Breaker Close Relay terminal (-)
15	CB Open Relay (+)	Circuit Breaker Open Relay terminal (+)
16	CB Open Relay (-)	Circuit Breaker Open Relay terminal (-)
17	Digital Out Relay (+)	Digital Out Relay (+) / using alarm of temperature monitoring
18	Digital Out Relay (-)	Digital Out Relay (-) / using alarm of temperature monitoring
19	RS-485 (-)	Terminal connection to communication RS-485(-)
20	RS-485 (+)	Terminal connection to communication RS-485 (+)

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■ Composition of terminal 3
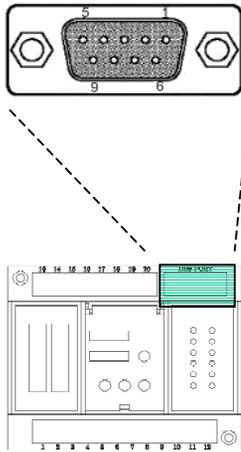
No	Pin	Description	
		MODBUS	Profibus - DP
Female	1	No use	No use
	2	No use	No use
	3	Tx (+)	RED B
	4	No use	RTS*
	5	No use	GND
	6	No use	5V (+)
	7	No use	No use
	8	Tx (-)	Green A
	9	No use	No use

* Connect it only when using repeater.

■ Composition of LED

LED 1

Warning
150
:
:
:
:
:
20
10

LED 2

LED 2

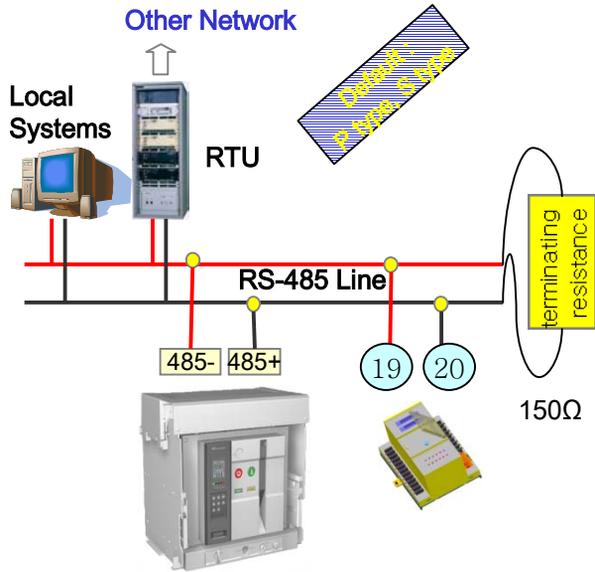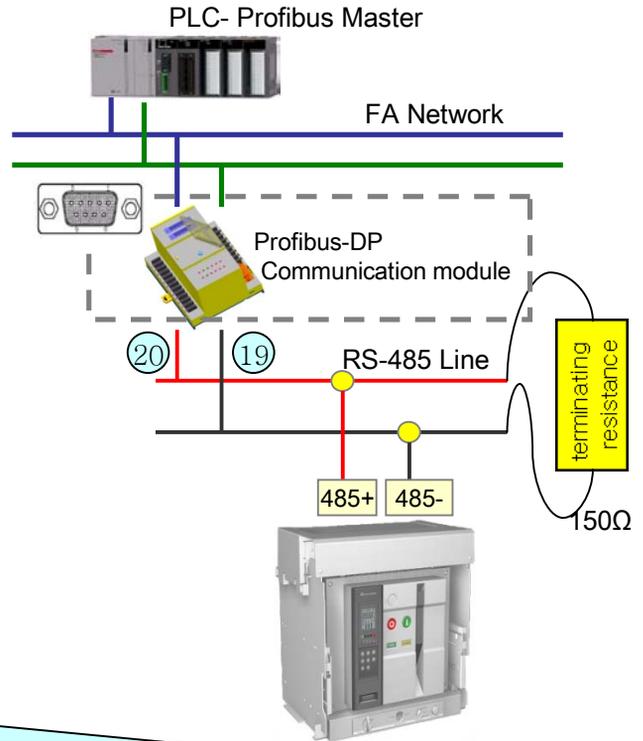| No	Mark	Description
1	DI1	Display the status of Digital Input No. 1 (User wiring of composition of terminal 1)
2	DI2	Display the status of Digital Input No.2 (User wiring of composition of terminal 1)
3	DO ON	Display the status of Digital Out Close (using alarm of temperature monitoring of composition of terminal 2)
4	DO OFF	Display the status of Digital Out Open (using alarm of temperature monitoring of composition of terminal 2)
5	CB ON	Display the status of Circuit Breaker Close
6	CB OFF	Display the status of Circuit Breaker Open
7	RUN LED	The status of TRIO Unit operating(Always lighting)
8	CB ERROR	Display the status of disconnecting circuit breaker terminal and control Error

LED 1

Mark	Description
10~150, Warning	Display the Max. value of temperature

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☞ 6. Diagram of communication circuit

■ MODUBUS Communication

Other Network

Local
Systems

RTU

RS-485 Line

485- | 485+

19 | 20

terminating resistance

150Ω

■ Profibus-DP Communication

PLC- Profibus Master

FA Network

Profibus-DP
Communication module

20 | 19

RS-485 Line

485+ | 485-

terminating resistance

150Ω

For detailed information for MODUBUS communication and Profibus-DP
communication, please refer to "TRIO Unit Protocol Manual" located in the
download section of our web site.

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