SENSE

Sense & Control Technologies
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wall type

Carbon Monoxide Transmitter

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Features

- Replaceable 20mm Round Type Electrochemical Cell
- Single-point Calibration
- Lineer output
- CO ranges, standard: 50ppm, 100ppm and 300ppm
- CO ranges, extended: 100ppm, 300ppm and 1.000ppm
- Operating voltage 24 V AC/DC
- CO output signal 0...10 Vdc, 0…5 Vdc and 4-20 mA
- Fixed or field selectable output types
- Simple and fast mounting
- 2 universal input option
- Modbus – RS485 port
- Relay option
- LCD Display

Applications

- Vehicle exhaust measuring at garages, auto parks
- Early fire detection
- Air quality applications: measuring CO concentrations as of odors; tobacco smoke, body odor, or material fumes in cinema/theatre halls, exhibition halls, restaurants, canteens, shopping malls and conference rooms etc

Type Summary

Mounting Type [1]	Selectable Ranges (ppm)[2]	Output [3] [4]	Options	Advanced Options
SCM.W *wall type*	*standard:* 50, 100, 300 *extended:* 100, 300, 1.000	0…10 Vdc 0…5 Vdc 4…20 mA	Modbus LCD Relay	PID Universal Input [5]

[1] Room and Duct types are under development, will ready very soon
[2] For extended ranges please inform us while ordering, other ranges on request
[3] Outputs can be fixed or field selectable
[4] Other output types: 2…10 Vdc, 1…5 Vdc, field selectable 0…10V/4…20mA
[5] 2 universal inputs, both can be NO/NC dry contact, 0…5V, 0…10 Vdc, PT1000 or NTC10k, MOQ 100pcs

Ordering

sample order code: SCM.W10 .ML

options: Modbus and LCD

Wall type, output1: 0…10 Vdc, no output2

SENSE CO Transmitter

model	*mounting type*	*output 1*	*output 2*	*options*
SCM	W wall	0 no output 1 0…10 Vdc 2 2…10 Vdc 3 0…5 Vdc 4 1…5 Vdc 5 4…20 mA F 0…10Vdc or 4…20mA, *field selectable*	0 no output 1 0…10 Vdc 2 2…10 Vdc 3 0…5 Vdc 4 1…5 Vdc 5 4…20 mA F 0…10Vdc or 4…20mA, *field selectable*	M modbus L LCD R relay P PID out 1 1 input 2 2 inputs E extended ranges

Ordering Notes

1. Relay option can be ordered with LCD or Modbus option otherwise Relay is set with a simple trimmer
2. PID option can be ordered with LCD or Modbus option
3. Universal inputs are only factory set as 0…5V, 0…10V, NO/NC dry-contact or NTC10k
4. Standard sub-ranges are 0…50ppm, 0…100ppm and 0…300ppm
5. Extended sub-ranges are 0…100ppm, 0…300ppm and 0…1.000ppm
6. For extended ranges, please choose option “E” while ordering
7. For your special needs, please request from info@senseandcontrol.com

General Notes

1. High density of some other gasses may effect the reading.
2. Observe maximum permissible cable lengths.
3. If cable runs parallel to the mains cable: Use shielded cables.
4. Test only with certified calibration gasses.
5. The cable entry always should have to be pointing downwards.
6. The data indicated under 'Technical Data' apply only to vertically mounted transmitters.
7. Wall type transmitters should have to be mounted in the center of wall but not near to any doors and windows.

Cross Sensitivity

The values given are only for information and should not be used as a basis for cross calibration.

Cross sensitivities may not be linear and should not be scaled either.

Datas based on gassing for 5 minutes using test equipment.

Test Gas	Test Gas Concentration	CO Equivalent
Carbon Monoxide	100	100
Hydrogen Sulfide	50	0
Sulphur Dioxide	20	0
Hydrogen	100	< 35
Nitric Oxide	50	< 10
Ethanol	200	< 1
Ammonia	50	0
Chlorine	15	< 1
Ethylene	100	96

Output Jumpers

1. There is no output jumper for the fixed output types
2. Please check if there is any special Jumper Instruction inside the enclosure
3. Range Jumpers for AO1 and AO2 have same specifications

AO1	Output 1
no jumpers	fixed at the factory *according to your request*
	0…10V *jumper selection*
	4…20mA *jumper selection*

AO2	Output 2
no jumpers	fixed at the factory *according to your request*
	0…10V *jumper selection*
	4…20mA *jumper selection*

CONFIG Jumpers

1. Never use the jumper X at CONFIG..!
2. Please check if there is any special Jumper Instruction in the enclosure
3. There is no jumper for fixed range models
4. Calibration Mode, Response selection is ignored and response time is 1 sec

RANGE	SCM.xxx for Standard Range
	0…50 ppm
	0…100 ppm
	0…300 ppm

RANGE	Calibration Modes
	0…50 ppm, response time 1 sec
	0…100 ppm, response time 1 sec
	0…300 ppm, response time 1 sec

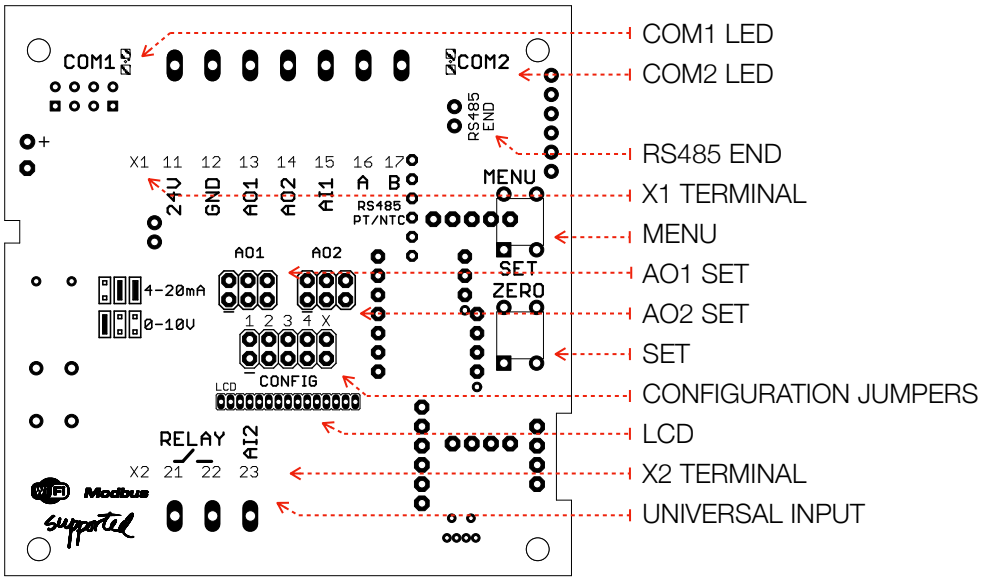
RANGE	SCM.xxx for Extended Range
	0…100 ppm
	0…300 ppm
	0…1.000 ppm

RANGE	Calibration Modes
	0…100 ppm, response time 1 sec
	0…300 ppm, response time 1 sec
	0…1.000 ppm, response time 1 sec

RESPONSE	SCM.xxx for all types
	5 sec.
	60 sec.

Technical Data

Electrical	Power Supply	AC 24V (± %5), 50-60 Hz DC 15…35 V
	Power Consumption	< 2.5 W
Outputs	Current Output	4…20 mA, maximum 500 Ω
	Voltage Output	0…10 Vdc, minimum 1.000 Ω 0…5 Vdc, minimum 1.000 Ω
	Relay Output	max. rating 1A @ 220 Vac
Accuracy	CO	±3 %
Sensor	t90	< 50 sec.
	life time	> 6 years expected
	drift	< 5% per year
	resolution	0.5 ppm
	repeatability	± 2%
	baseline	< 5 ppm
	filter capacity	> 20.000 ppm per hour
	Operating Temperature	-20 …+50°C
	Operating Humidity	15…90 %rH
	Operating Pressure	800…1.200 mbar
General Data	Sensing Element	Electrochemical Cell
	Media	Air or non-aggressive gasses
	Storage Temperature	0 …+20°C recommended
Ranges	CO	0…50, 0…100 and 0…300 ppm for standard range models 0…100, 0…300 and 0…1.000 ppm for extended range models
Connections	Terminals	Pluggable screw terminal
	Cable	maximum 1.5mm2
	Cable Gland	M16
Protection	SCM.W series	IP41 or NEMA 3
Standards	EMC Directive	EN 61326-1
	CE Conformity	CE1701
Dimensions	SCM.W series	enclosure 98.0 x 81.5 x 45.5 mm probe ⌀ 12 mm x 46.5 mm
Weight Packed	SCM.W series	229 gr



COM1 LED without relay option, Bead LED, periodically lights ON and OFF
with relay option, shows the relay position, lights when contact is closed (X2:21-22)

COM2 LED modbus communication LED, blinks when there is communication

RS485 END modbus ending jumper to connect internal 120ohm resistor to the RS485 line

X1 TERMINAL

11	power	15…35 Vdc or 24 Vac (± %5, 50-60 Hz)
12	GND	ground for power and reference for outputs and inputs
13	output 1	analog output for main measurement
14	output 2	analog output for other measurement or duplicated output1 for third party devices
15	input 1	universal input for nearby passive field devices
16	A modbus	modbus communication positive pair
17	B modbus	modbus communication negative pair

MENU BUTTON press and wait to enter MENU, click to navigate between sub menus one by one
after all parameters turns back to main screen

AO1 & AO2 SET output set as 0…10 Vdc or 4…20 mA with jumpers, only for output selectable products,
for the fixed output models there is no jumpers,
please be sure about the output type and electrical connections

SET BUTTON click to change parameters, parameters are automatically set while exiting menu

CONFIGURATION JUMPERS jumpers to set output range and delay time
please refer to the “jumper reference” sticker on PCB or inside of cover

CAUTION never use jumper X..!

LCD 12x2 LCD for monitoring and setting parameters

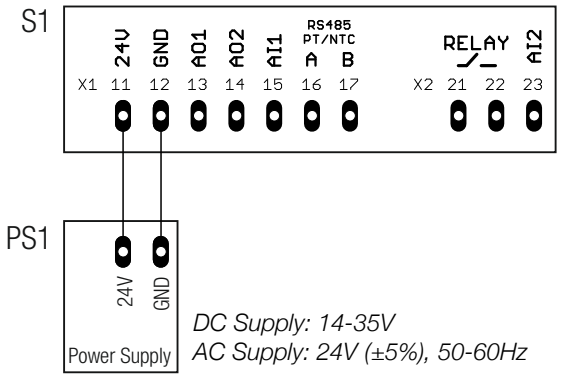
contrast	adjust the contrast from MENU for a better performance
brightness	adjust the brightness from MENU for a better performance

X2 TERMINAL

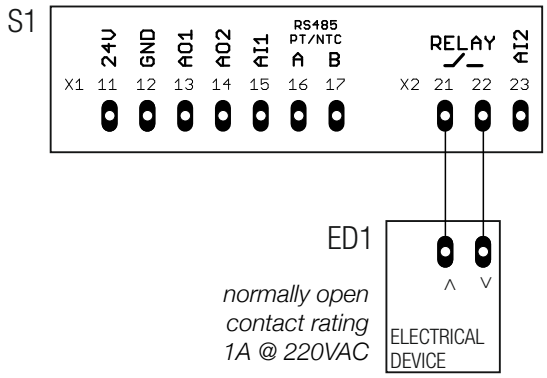
21	NO contact	relay dry contact max. rating 1A @ 220 Vac
22	NO contact	relay dry contact max. rating 1A @ 220 Vac
23	input 2	universal input for nearby passive field devices

UNIVERSAL INPUT universal inputs (X1:15 and X2:23) can be digital input as dry contact or
analog input as NTC10k, PT1000, 0…10 Vdc or 0…5 Vdc
universal input is an advanced option, please contact us for more details

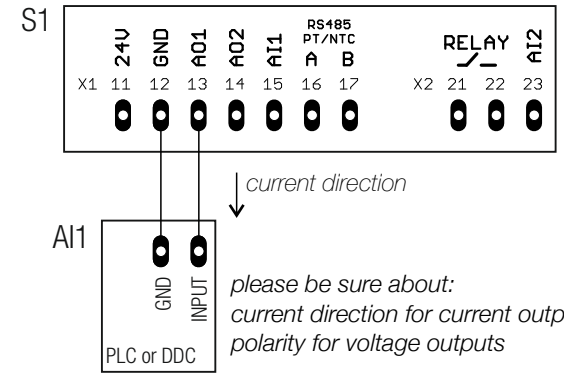
Electrical Connections



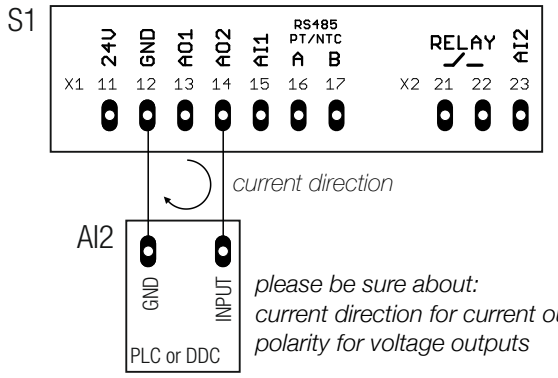
DC Supply: 14-35V
AC Supply: 24V (±5%), 50-60Hz



normally open
contact rating
1A @ 220VAC



please be sure about:
current direction for current outputs
polarity for voltage outputs



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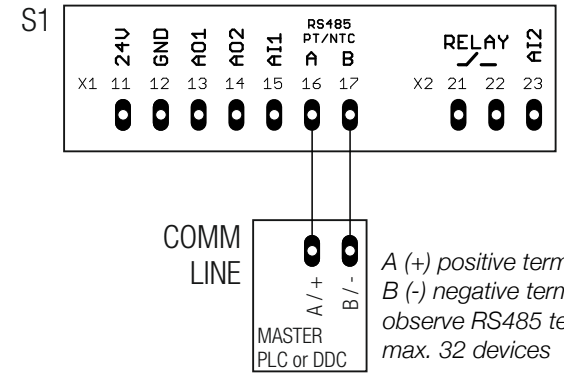
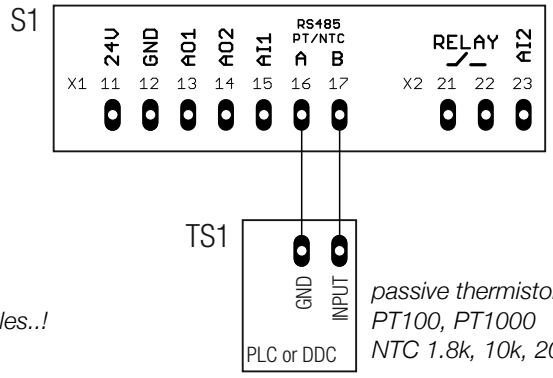
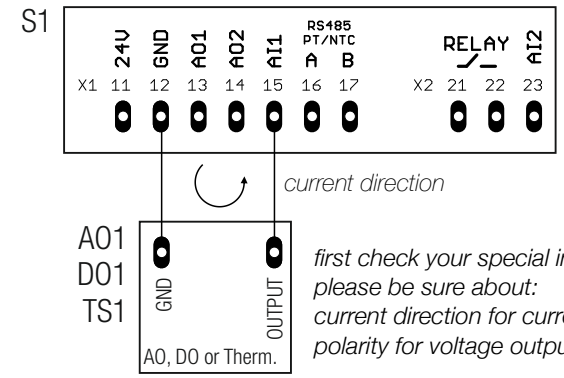


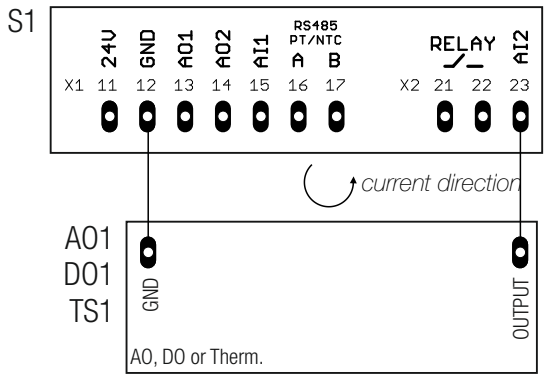
A (+) positive terminal
B (-) negative terminal
observe RS485 termination rules..!
max. 32 devices



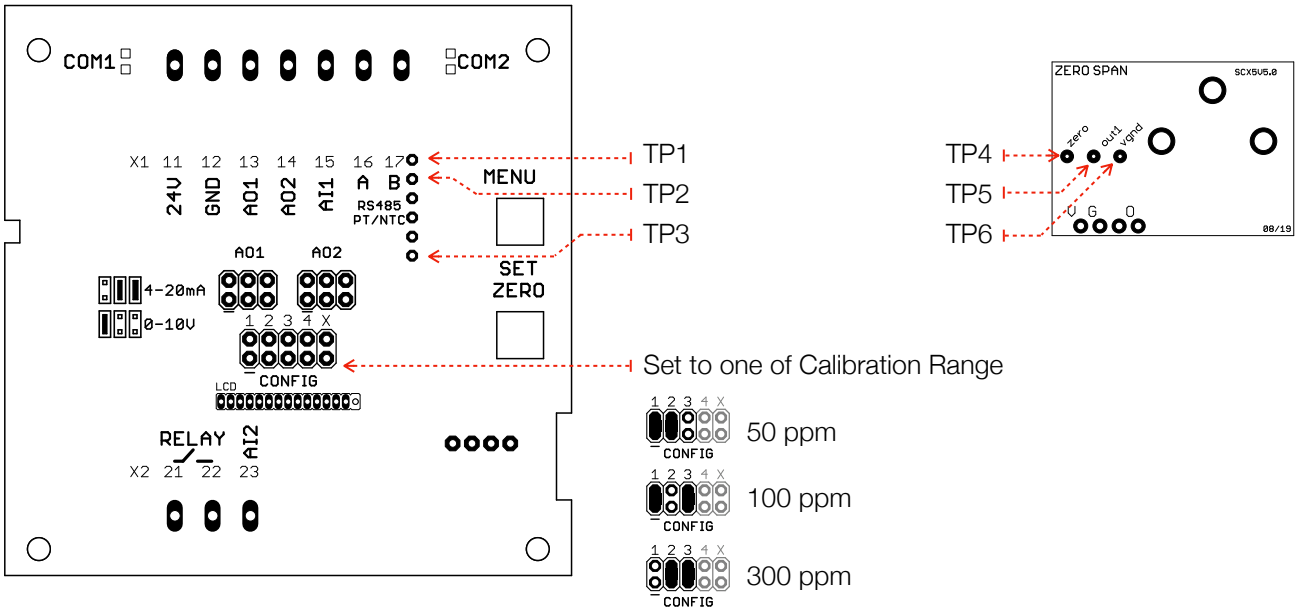
passive thermistor
PT100, PT1000
NTC 1.8k, 10k, 20k



first check your special instructions
please be sure about:
current direction for current outputs
polarity for voltage outputs



Calibration - General Information



Before the process;

1. Please keep the unit working for minimum 10 minutes at fresh air for settling the baseline.
2. Please use certified calibration CO Test Gasses.
3. Please use a precision multimeter,
   - ⊖ is showing Negative/Reference Point,
   - ⊕ is showing Positive Measurement Point.
4. Set the best range according to calibration gas.
5. Single point calibration is enough for any range.
6. Calibration steps: Check the typical values, Set ZERO, Set SPAN.

Check Typical Values

1. TP1⊖ vs TP2⊕ is about 5 VDC
2. TP1⊖ vs TP6⊕ is about 455 mV DC
3. TP6⊖ vs TP5⊕ is lower than 5 mV DC

ZERO Calibration

1. Use ZERO Trimmer for setting below values,
2. TP1⊖ vs TP4⊕ should be closest to 455 mV DC,
3. TP6⊖ vs TP4⊕ should be closest to 0 VDC,
4. TP6⊖ vs TP3⊕ should be closest to 0 VDC,

SPAN Calibration

1. Use SPAN Trimmer for calibration.
2. Before applying the Test Gas, measure output as AO1⊕ vs GND⊖, should be very close to 0ppm.
3. Apply the test gas for min. 1 minute with 0.5 lt/min. flow rate,
4. Start calibration with SPAN trimmer,
5. Analog output should show the test gas concentration value (AO1⊕ vs GND⊖).
6. Applying test gas for 3 minutes is enough for a standard calibration.
7. For best calibration, you can apply the test gas for 5 minutes.
8. Applying the test gas for longer and for many times, reduces the CO Sensing Element life.

Menu

SENSE & CONTROL	intro screen duration 2 seconds
CO ppm 8	Main screen, measuring value normal operating mode
ENTER MENU >>>>>>>	press and hold MENU button for entering menu if you skip pressing MENU button before seeing OK, you will be back to main screen
ENTER MENU OK	now you are in MENU
M1 Relay EnterSetting	RELAY_MENU, press SET button for entering RELAY_MENU, press MENU button to skip RELAY_MENU and pass to M2_RANGE
M1a Min.Set 10 ppm <>	you can set Min.Set for RELAY_MENU while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the Min.Set
M1a Min.Set 12 ppm	wait for 3 sec. after pressing to any button, the arrows (< >) are hidden, press MENU button to pass Max.Set, press SET button for editing Min.Set
M1b Max.Set 22 ppm <>	Max.Set setting is same as Min.Set setting
M1c Mode Set Closed 0.I.0	relay contact action according to min. and max. set points, select with SET button, skip or pass to next screen with MENU button
M2 RANGE 0...100 ppm	select the RANGE with SET button, skip or pass to next screen with MENU button
M3 RESPONSE SLOW (60sec)	select the RESPONSE time with SET button, skip or pass to next screen with MENU button
M4 CONTRAST 5	set the CONTRAST between 0 to 10 with SET button, default is 5, skip or pass to next screen with MENU button
M5 BRIGHTNES 5	set the BRIGHTNESS between 0 to 10 with SET button, default is 5, skip or pass to next screen with MENU button
M6 OUTP. set EnterSetting	OUTPUT_MENU, press SET button for calibration Analog Outputs, press MENU button to skip this menu and pass to M7_MODBUS
M6a out1.min 780	calibration AO1 for min. value, you can set it while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the value
M6b out1.max 3920	calibration AO1 for max. value, you can set it while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the value
M6c out2.min 0	calibration AO2 for min. value, you can set it while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the value
M6d out2.max 3910	calibration AO2 for max. value, you can set it while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the value

M7 MODBUS EnterSetting	MODBUS_MENU, press SET button for setting Modbus Parameters, press MENU button to skip this menu and EXIT
M7a MB ID 1	Modbus ID, you can set it while arrows (< >) are on screen, press SET button for decreasing or MENU button for increasing the value
M7b MB Baudr 9600	select the MODBUS BAUDRATE with SET button, skip or pass to next screen with MENU button
M7c MB B-P-S 8 None 1	BIT - PARITY - STOP BIT settings, select with SET button, skip or pass to next screen with MENU button
MB Set: 1 9600 8N1	no settings, just showing the Modbus Parameters, press MENU button for EXIT
CO ppm 1	Main screen, measuring value normal operating mode

Modbus Protocol

Use Function 3 for Reading and Function 6 for Writing Holding Registers.
Register Table starts from Base 1. Default Settings: Modbus ID:1, 9600, 8bit, None, 1.

Register	R/W	Range	Description
1	R & W	1…254	Modbus Address
2	R & W	0…4	Baudrate, *0: 9.600, 1: 19.200, 2: 38.400, 3: 57.600, 4: 115.200*
3	R & W	0…3	Bit_Parity_Stop, *0: 8bit_None_1, 1: 8bit_None_2, 2: 8bit_Even_1, 3: 8bit_Odd_1*
4	R	0…1.000	CO level as ppm
5	R	0…1.000	CO level as ppm
6	R	0 or 1	Relay contact position, *0: OFF/Open, 1: ON/Close*
7	R & W	0 to 4	Relay Mode, *0:Closed, 1:Open, 2:HighOn, 3:LowOn, 4:Off*
8	R & W	0…1.000	MIN SET for Relay
9	R & W	0…1.000	MAX SET for Relay
10	R & W		Blank
11	R & W		Blank
12	R & W		Blank
13	R & W		Blank
14	R & W		Blank
15	R & W		Blank
16	R & W		Blank
17	R & W		Blank
18	R & W		Blank
19	R & W		Blank
20	R & W		Blank

Relay

Relay Mode	< Min. Set	between Min. & Max. Set	> Max. Set
Closed / 0.I.0	OPEN	CLOSED	OPEN
Open / I.0.I	CLOSED	OPEN	CLOSED
HighOn / 0.X.I	OPEN	HYSTERESIS	CLOSED
LowOn / I.X.0	CLOSED	HYSTERESIS	OPEN
Off / 0.0.0	OPEN	OPEN	OPEN

0 : Relay Contact is at OPEN position
I : Relay Contact is at CLOSED position
X : Relay Contact is at HYSTERESIS position, OPEN if previous position open, CLOSED if previous position closed,

Drawings