

VPD-1xx-IRT User Manual

Version 1.1

Jun 2024



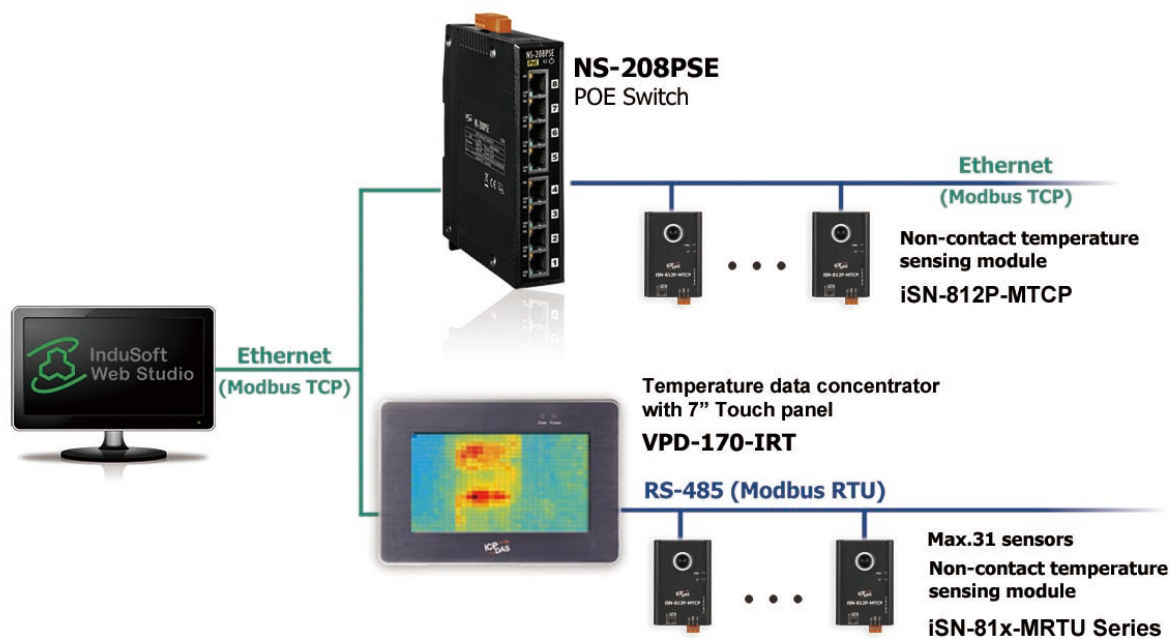
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1 Introduction

1.1 Product Information

VPD-1xx-IRT series provides Modbus TCP connection to allow the remote monitoring host to connect to VPD-1xx-IRT using Ethernet and access multiple VPD-1xx-IRT's temperature data at once. User can set VPD-1xx-IRT's various functions from the touch screen, and can also see the thermography of the measured object in real time. Through the convenient connection and communication capabilities of VPD-1xx-IRT temperature data concentrator and Ethernet, user can quickly establish a remote monitoring system and centrally manage temperature data.



● VPD-1xx-IRT series

Model	Display size(diagonal)
VPD-170-IRT	7"

1.2 Features

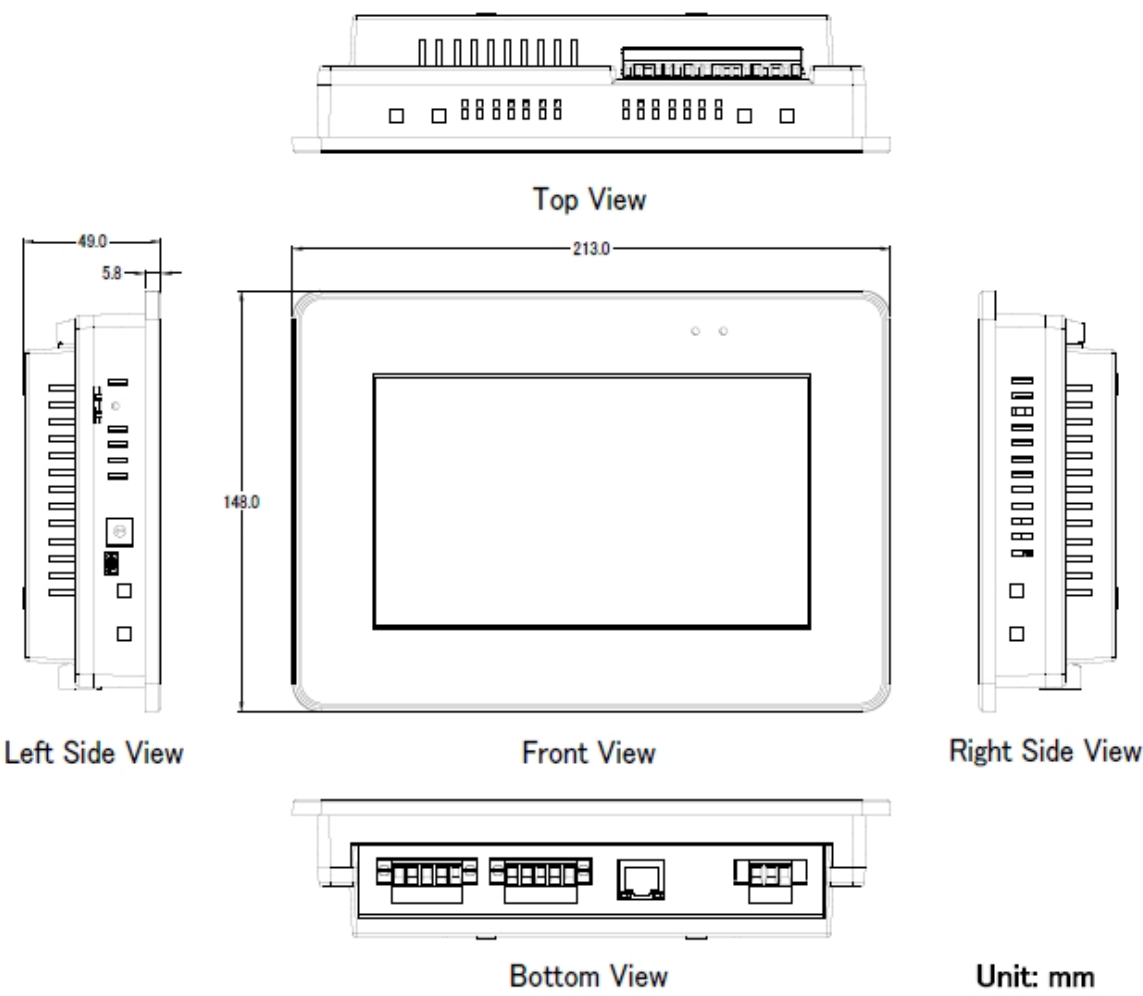
- High-resolution color touch screen
- Front Panel: IP65 Waterproof
- Provide setting Temperature threshold value function
- 9 Signal Relay Output channels for Alarm
- Provide Thermography
- Connect up to 31 iSN-81x-MRTU series module
- Provide Modbus TCP server protocol for SCADA connection
- Provide Modbus RTU master protocol to connect iSN-81x-MRTU modules

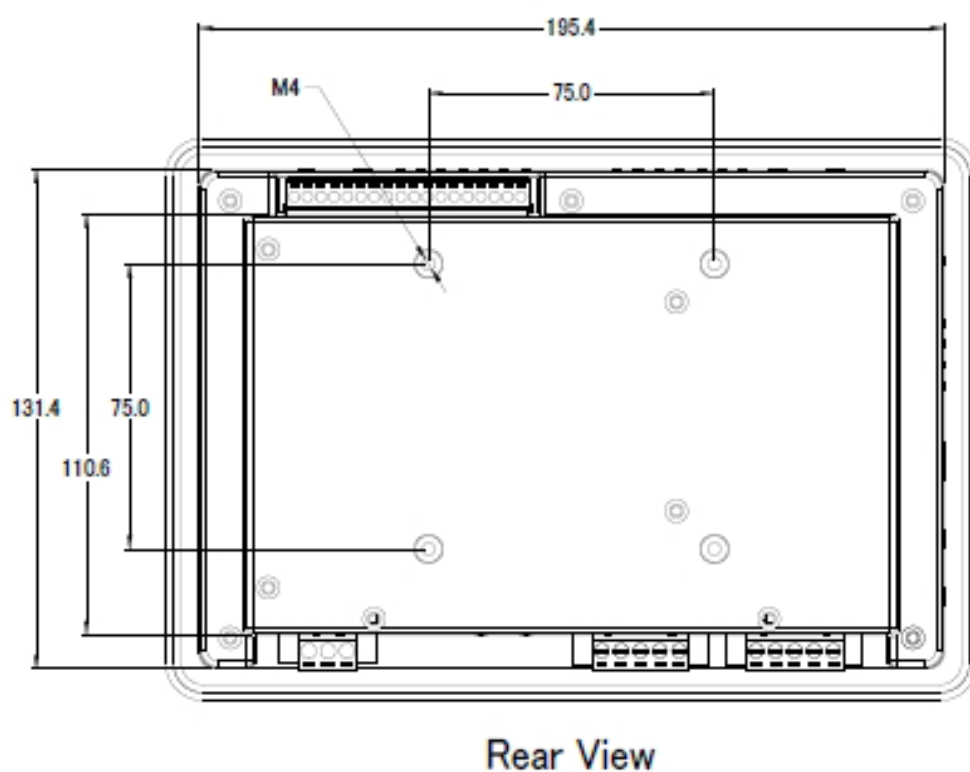
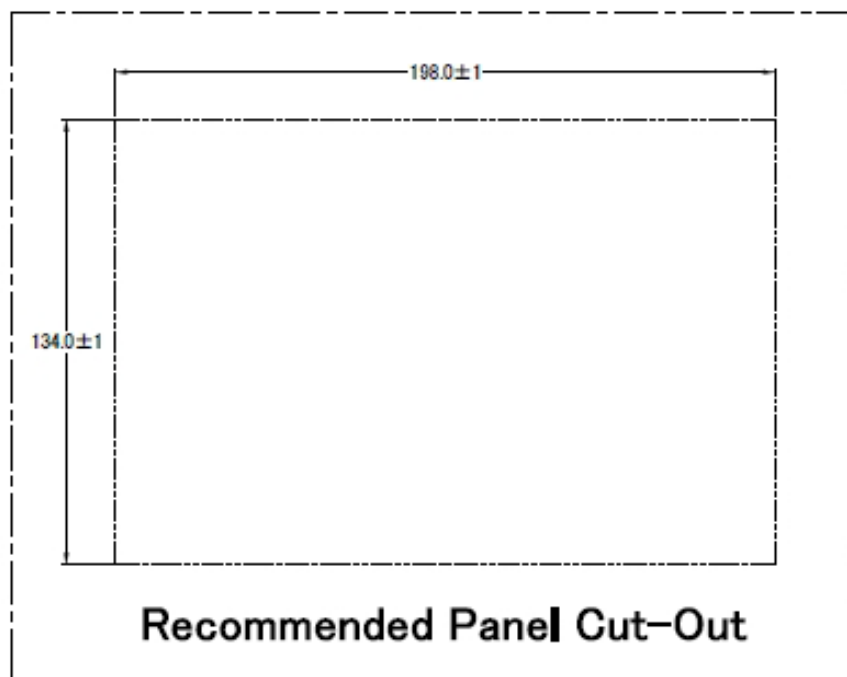
1.3 Specifications

型號	VPD-170-IRT
COM Ports	
Baudrate	115200 bps Max.
Data format	None Parity, 8 Data bit, 1 Stop bit
Ports	2 x RS-485
Protocol	Modbus RTU
Ethernet	
Ports	RJ-45 x 1, 10/100 Base-TX
Protocol	Modbus TCP
USB	
Connector	Mini-B
Specification	USB 1.1 Client (Firmware updates only)
LED Indicators	
Status	2 LED

Display	
Type	LCD 7" TFT (Resolution 800 x 480, 65535 colors),defective pixels <= 3
Touch Panel	Yes
Brightness	400 cd/m2
Backlight Life	20,000 hours
Main Unit	
CPU	32-bit RISC CPU
Storage	64 MB SDRAM/64 MB Flash
Relay Output	
Channels	9
Type	Signal Relay (Form A)
Contact Rating	2 A @ 30 VDC 0.24 A @ 220 VDC 0.25 A @ 250 VAC
Power	
Input Range	+12~+48VDC
Consumption	3.6W
Powered from PoE	IEEE 802.3af, Class1 (48 V)
Mechanical	
Dimensions (mm)	217x153x33
Ingress Protection	Front Panel: NEMA 4 /IP65
Environment	
Operating Temperature	-10~+60℃
Storage Temperature	-20~+70℃
Humidity	10~90% RH, Non-condensing

1.4 Dimensions

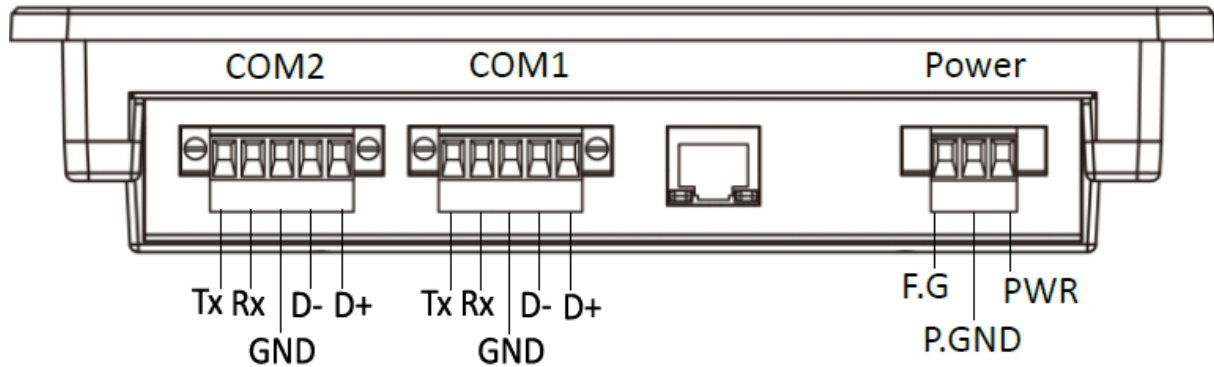




2 Configured by Hardware

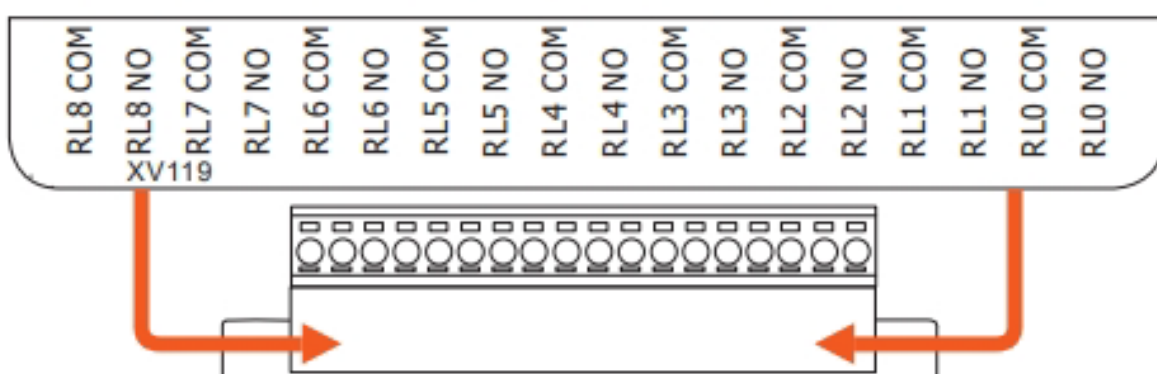
2.1 Pin assignments

1. Serial Port



Pin		Description
COM2 & COM1	Tx	The pin of transmitted data of the RS-232
	Rx	The pin of received data of the RS-232
	GND	Ground pin
	D-	The pin of transmitted data of the RS-485
	D+	The pin of received data of the RS-485
Power	F.G.	Frame Ground. F.G. is connected to the inside EMI or ESD suppression circuits. Make sure that F.G. is connected to the Earth
	P.GND	Connected to the power supply's ground pin
	PWR	DC input Voltage (+12VDC ~ +48VDC)

2. Relay Output



Singal Relay	Readback as 1	Readback as 0
Relay Output		

2.2 Rotary Switch

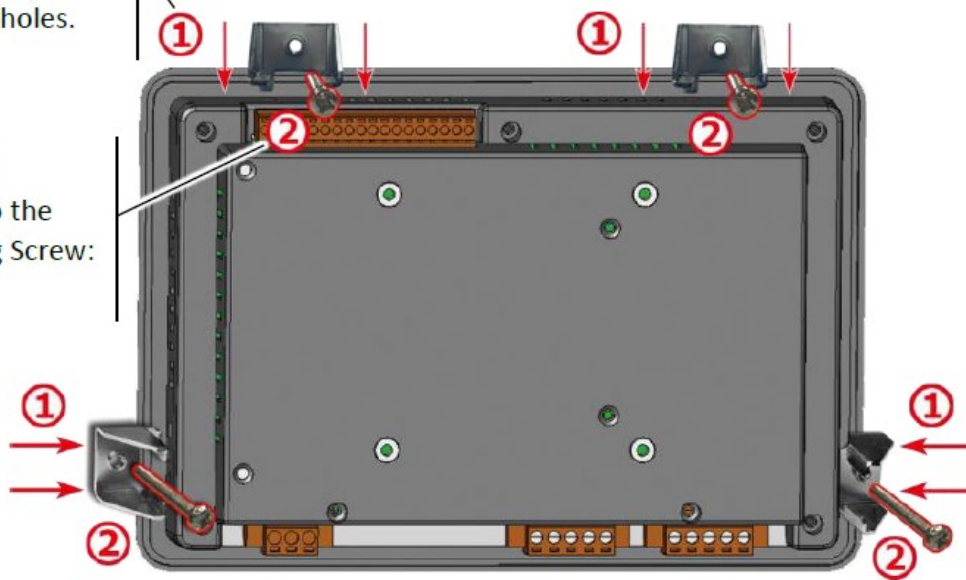
Picture	Value	Mode	Description
	0,2	RUN	Run the program
	1	Ethernet Force Update	Update a new application to the VPD-1xx-IRT through Ethernet
	9	USB Force Update	Update a new application to the VPD-1xx-IRT through USB

2.3 Installation

- The panel mounting of VPD-1xx-IRT

Insert the panel mounting clips into the upper and lower ventilation holes.

Screw the panel mounting clips to the panel. (Mounting Screw: M4 x 30L)

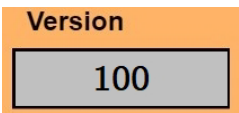
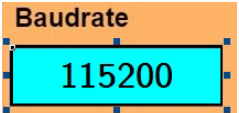
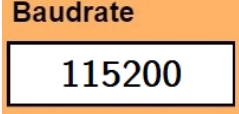


3 Screen

VPD-1xx-IRT has 5 pages.

- Main
- Thermography
- Area
- Global Setting
- Relay Setting

1. Some item can be modified in VPD-1xx-IRT, as shown in the following table.

icon	Background color	Enable to modify	Status
	Gray	No	None
	Sky Blue	Yes	This item is selected
	White	Yes	This item isn't selected

2. Panel key has two modes. Read mode and Write mode. Panel key might have different function in different mode, as shown in the following table.

Mode	introduce
Read mode	None item is selected.
Write mode	One item is selected.

3.1 Main

- Function: Show the connection status of iSN-81x-MRTU.

The screenshot shows a web interface with a table of iSN-81x-MRTU connection status. The table has 32 rows (ID 1 to 32) and 8 columns. The background color of each cell indicates the connection status: Green (Online, no diagnostic), Yellow (Online, Temperature is over than warning value), Red (Online, Temperature is over than danger value), Blue (VPD-1XX-IRT is communicating this iSN-81x-MRTU), and Gray (Offline). The bottom control bar contains several icons and buttons: a left arrow (labeled 2), a 'MidTemp' button, a right arrow (labeled 2), a temperature unit '°C', a square icon (labeled 3), a 'Main' button, a 'Setting' button (labeled 4), and a 'Relay' button (labeled 5). The table data is as follows:

ID	1	2	3	4	5	6	7
Info	23.5	24.3	None	None	None	85.3	None
8	9	10	11	12	13	14	15
None	None	None	None	None	None	None	None
16	17	18	19	20	21	22	23
None	None	44.7	None	None	None	None	None
24	25	26	27	28	29	30	31
None	None	None	None	None	55.3	None	None

1. iSN-81x-MRTU information. If this iSN-81x-MRTU is online, you can click it and go to “Thermography page”. Background color is the connection status, as shown in the following table.

Background Color	iSN-81x-MRTU status
Green	Online, no diagnostic.
Yellow	Online, Temperature is over than warning value.
Red	Online, Temperature is over than danger value.
Blue	VPD-1XX-IRT is communicating this iSN-81x-MRTU
Gray	Offline.

2. Choose the item which need to be shown. User can modify it via  and .

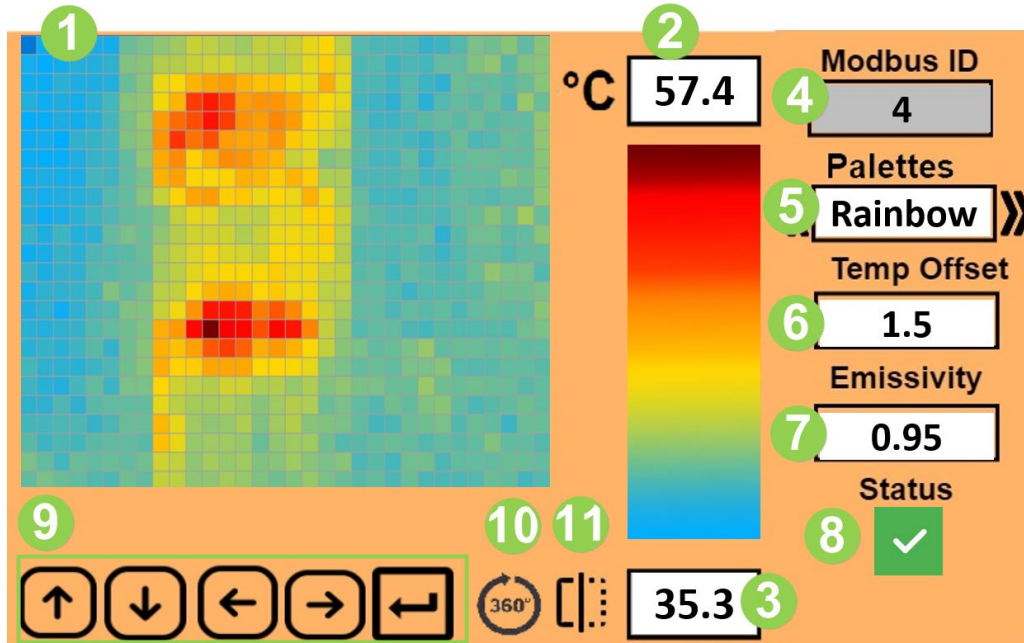
3. Scanning all iSN-81x-MRTU in bus.  : Start Scanning.  : Stop Scanning.

4. Click “Setting” and go to “Global Setting Page”.

5. Click “Relay” and go to “Global Setting Page”.

3.2 Thermography

- Function: Show thermography and some temperature parameter.



1. Thermography: show the temperature distribution which iSN-81x-MRTU shoot.
2. iSN-81x-MRTU Max Temperature
3. iSN-81x-MRTU Min Temperature
4. iSN-81x-MRTU Modbus ID
5. Different color palettes for easy identification of the measurement object.
6. iSN-81x-MRTU Temperature offset value. If iSN-81x-MRTU measures temperature is different to the temperature of target. User can set this value to adjust the temperature.
7. iSN-81x-MRTU emissivity, different material of target has different emissivity.

8. iSN-81x-MRTU connection status. :Online :Offline

9. Panel Key:

Key	Read Mode	Write Mode
Up	None	Add value
Down	None	Reduce value
Left	Go to "Main Page"	Add one unit (+1 -> +10)
Right	Go to "Area Page"	Reduce one unit (+10 -> +1)
Enter	None	Modify the value of iSN-81x-MRTU

10. Flipping Thermography

11. Rotating Thermography

3.3 Area

- Function: shows each area temperature of iSN-81x-MRTU.

The screenshot shows the 'Area' configuration screen for the iSN-81x-MRTU. It features a 4x4 grid of area status indicators (1-16) with background colors representing temperature status. To the right of the grid are fields for Modbus ID (4), Status (checkmark), Sensor (checkmark), Area selection (7), Threshold Switch (ON), Warning High/Low (75.0/30.0), Danger High/Low (80.5/20.3), and High/Low/Avg temperature (93.5/40.7/81.3). Navigation buttons are at the bottom.

1. Show each area status. Background color is area temperature status.

Color	Status
Green	Temperature normal
Yellow	Temperature is higher than warning value (When threshold Type is Up)
Red	Temperature is higher than danger value (When threshold Type is Up)
Sky Blue	Temperature is lower than warning value (When threshold Type is Down)
Blue	Temperature is higher than danger value (When threshold Type is Down)

2. iSN-81x-MRTU Modbus ID

3. iSN-81x-MRTU Connection status : Online. : Offline.

4. iSN-81x-MRTU Sensor status : Normal. : Error.

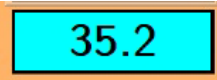
5. Change the area number. User can change it via and .

6. Threshold Switch of this area. Enable or disable this threshold function in this area.

7. Threshold Type of this area.
 - warning threshold value: when the temperature exceeds the warning value and the valve switch is turned on, the screen displays yellow color
 - dangerous threshold value: When the temperature exceeds the dangerous value and the threshold switch is turned on, the screen displays red color
8. Max temperature in this area.
9. Min temperature in this area.
10. Average temperature in this area.
11. Panel Key

Key	Read Mode	Write Mode
Up	None	Add value
Down	None	Reduce value
Left	Go to "Thermography Page"	Add one unit (+1 -> +10)
Right	None	Reduce one unit (+10 -> +1)
Enter	None	Modify the value of iSN-81x-MRTU

- Example: Set Danger value from 30.2 to 55.2

- (1) Click Danger, background color change to sky blue. 
- (2) Click  five times, Danger value change to 35.2. 
- (3) Click  one time, +1 -> +10.
- (4) Click  two times, Danger value change to 55.2. 
- (5) Click  one time, VPD-1xx-IRT send the danger value to iSN-81x-MRTU.

3.4 Global Setting

- Function: The parameter of VPD-1xx-IRT

Global Setting

1. MAC: 12:34:56:78:9A:BC

2. IP Address: 192.168.255.1

3. Mask: 255.255.0.0

4. Gateway: 192.168.0.254

5. Baudrate: 115200

6. Version: 100

7. Main

8. Relay

9. Navigation Keys: Up, Down, Left, Right, Enter

1. VPD-1xx-IRT MAC
2. VPD-1xx-IRT IP Address
3. VPD-1xx-IRT Mask
4. VPD-1xx-IRT Gateway
5. VPD-1xx-IRT Baudrate
6. The firmware version of VPD-1xx-IRT
7. Click Main and go to "Main Page"
8. Click Relay and go to "Relay Page"
9. Panel Key

Key	Read Mode	Write Mode
Up	None	Add value
Down	None	Reduce value
Left	None	Add one unit (+1 -> +10)
Right	None	Reduce one unit (+10 -> +1)
Enter	None	Modify the parameter of VPD-1xx-IRT

3.5 Relay Setting

- Function: The parameter of Relay output.

Relay Setting

1	Enable	1	2	3	4	5	6	7	8	9
2	Status	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON
3	ID Range	2 12	5 25	1 31	1 31	10 20	1 31	1 31	1 31	7 27
4	Function	Setting	Danger	Setting	Setting	Warning	Setting	Danger	Setting	Setting
5	↑ ↓ ← → ↶ Main Setting Relay									

6 7

1. Enable Relay output (include Relay number). Green: Enable, White: disable
2. Relay status
3. iSN-81x-MRTU Modbus ID range. Only iSN-81x-MRTU in this range will let Relay set ON.
4. Choose which type of diagnostic message. When iSN-81x-MRTU has this type of diagnostic message, Relay set ON.
 - System: System message
 - Warning: The diagnostic message (Temperature is over than warning value)
 - Danger: The diagnostic message (Temperature is over than danger value)
5. Panel Key

Key	Read Mode	Write Mode
Up	None	Add value
Down	None	Reduce value
Left	None	Add one unit (+1 -> +10)
Right	None	Reduce one unit (+10 -> +1)
Enter	None	Modify the parameter of Relay output

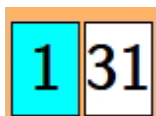
6. Click Main and go to “Main Page”
7. Click Setting and go to “Global Setting Page”

Example: Modify Relay 2 setting, as shown in the below.

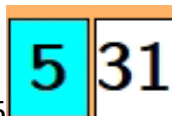
- Enable: OFF->ON
- ID Range: 1~31 -> 5~25
- Function: System -> Danger



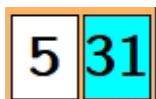
- (1) Click “Enable” the second item(number 2), background color change to green.
- (2) Click “ID Range” the second item(the left one),background color change to sky blue.



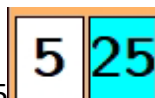
- (3) Click  four times, ID 1->ID 5



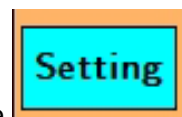
- (4) Click “ID Range” the second item(the right one), background color change to sky blue.



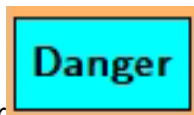
- (5) Click  six times, ID 31->ID 25



- (6) Click “Function” the second item, background color change to sky blue.



- (7) Click  two times, System -> Danger



- (8) Click  one time, modify the parameter of Relay2.

4 Modbus Command

4.1 Function code

Modbus master can use the following function code to read or write data to VPD-1xx-IRT. FC 3 and FC4 can read data from registers. FC6 and FC16 can write data to the register.

Function Code	Description
3	Read multiple registers
4	Read multiple registers
6	Write Single register
16	Write multiple registers

4.2 Modbus Register Table

- VPD-1xx-IRT assigns 1200 words Modbus address to each iSN-81x-MRTU.
- The sequence of VPD-1xx-IRT Modbus data is same as iSN-81x-MRTU Modbus data.
- About the description of iSN-81x-MRTU Modbus address, please refer to iSN-81x-MRTU user manual.

iSN-81x-MRTU Modbus ID	VPD-1xx-IRT Modbus Address	Read/Write	Data length
Modbus Holding Registers (4xxxxx,0 based)			
1	0~1199	Read/Write	1200words
2	1200~2399	Read/Write	1200words
...	...	Read/Write	...
30	34800~35999	Read/Write	1200words
31	36000~37199	Read/Write	1200words