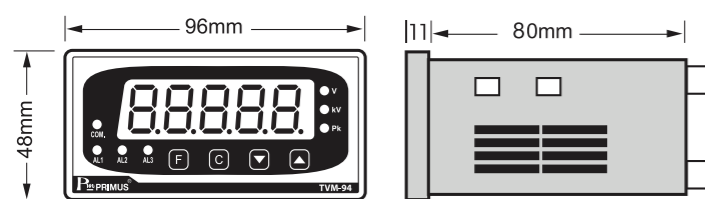




TECHNICAL SPECIFICATION

Model	TVM-94N-1	TVM-94N-2
Power Supply	100 - 250 VAC 50/60 Hz 24 VAC/VDC ±15%	
Power Consumption	3 VA	
Display	7-Segment, Size 0.56 Inch, 5 Digit 3 LED (Show Alarm Relay) 1 LED (Show Communication)	
Input	Voltage	AC Voltage DC Voltage
	Accuracy	± 0.25 % of Measurement Range at 25 °C
Output	Relay Alarm	3 Alarm 5A/250VAC
	Transfer Current	4 - 20 mA
	Transfer Voltage	0 - 10 VDC
	Output Impedance	Load 500 Ω for 4 - 20 mA Output Load 1 kΩ for 0 - 10 VDC Output
Communication	Accuracy	± 0.25 % of Output Range
	Protocol	MODBUS RTU
	Address	1 - 127
	Baud Rate	2400, 4800, 9600, 19200, 38400 bps
	Parity	None, Even, Odd
	Data Bit	8 bit
	Stop Bit	1, 2
Ambient Operation	Temperature	-10 °C to 60 °C
Ambient Storage	Humidity	85 % RH Non-Condensing
	Temperature	-20 °C to 80 °C
Protection Degree	Humidity	85 % RH Non-Condensing
	Front Protection Rating	IP52
Installation	Case Protection Rating	IP30
	Material	Panel, Mounting
Size	96 x 80 x 48 mm.	
Weight	240 g.	

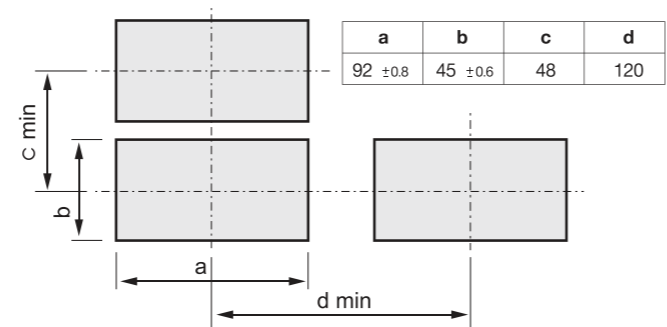
DIMENSION



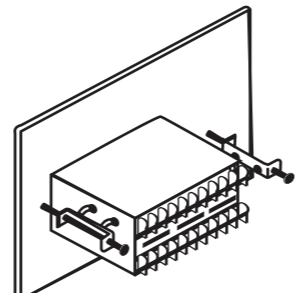
- AL1 ● ใช้การทำงานของ Alarm 1
- AL2 ● ใช้การทำงานของ Alarm 2
- AL3 ● ใช้การทำงานของ Alarm 3
- COM ● ใช้สถานะของการสื่อสาร
- V ● ใช้หน่วยวัดองศา Volt
- kV ● ใช้หน่วยวัดองศา kVolt
- Pk ● ใช้หน่วยวัด PV Peak

- กดเพื่อเข้าไปเมนู
- กดเพื่อค่า Peak
- กดเพื่อค่า หรือ เลือกค่าไม่รวม
- กดเพื่อค่า หรือ เลือกค่าไม่รวม

CUTTING PANEL



INSTALLATION



DESCRIPTION

- Measure and display device for DC and AC Voltage at frequency 50/60 Hz.
- Range
 - (AC Voltage 5-500 VAC (DIRECT), 0-20,000 VAC (With PT).
 - (DC Voltage 0-500 VDC (DIRECT).
- When it connects to Potential Transfer (PT) of High Voltage system can set multiplier follow PT Ratio.
- Display by 7-Segment 5 digit size 0.56 inch made it can display high voltage.
- 3 Alarm Relay Output by 4 function to setting.
- Can communicate with computer via RS-485 MODBUS RTU PROTOCOL.
- Transfer Output 4-20 mA and 0-10 VDC both of Direct and Inverse.
- Lock Function to protect value has changed from screen setting.
- ON-OFF Delay Time for Alarm Output.
- Manual Transfer Output Function can supply signal volume as require by buttons.
- Absolute Input Function show positive value all the time although connect terminal +/- switch or not for TVM-94N-2.
- Function Peak Hold show maximum voltage value.

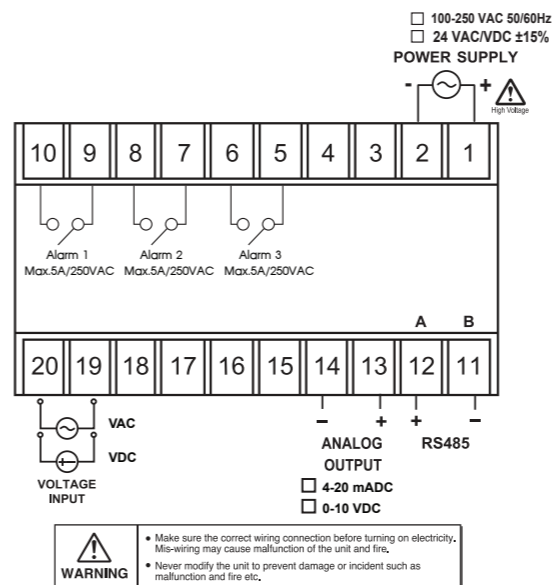
GENERAL DESCRIPTION

TVM-94N is indicator voltage in DC and AC system by connect with Potential Transformer (PT) and set the multiplier follow PT-Ratio for show voltage in High Voltage. It can collect and save data to computer via communication port RS-485 MODBUS RTU and can bring Analog Transfer Output connect with other devices. It can operate in Direct is Output directly variable by Input and Inverse is Output change inverse variable by Input and order Manual to send signal volume as require by buttons. There are 3 Alarm Relay Output to cut on-off follow function as require.

TVM-94N suit to install in MDB for show voltage of system or install machine.

Application suitable with MDB cabinet, and machine control box.

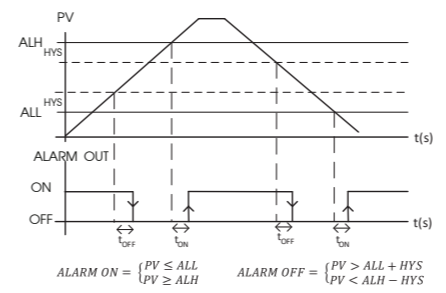
WIRING DIAGRAM



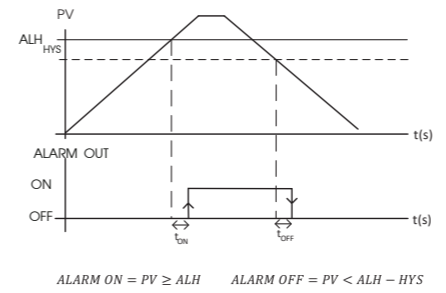
ALARM OUTPUT : Process value (PV) to be used as Alarm Output

Stand-by Sequence : After Starting Operation of Step, Alarm Output Does not Turn On Unless The Process Value Reach the Value of OFF Position of Alarm Output.

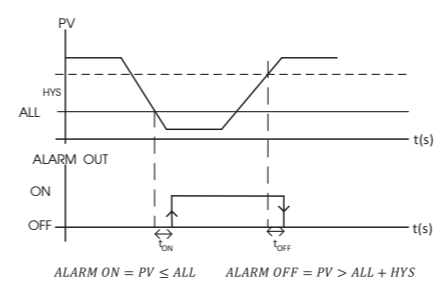
1. Absolute value High Low Band Alarm (ALF = X1)



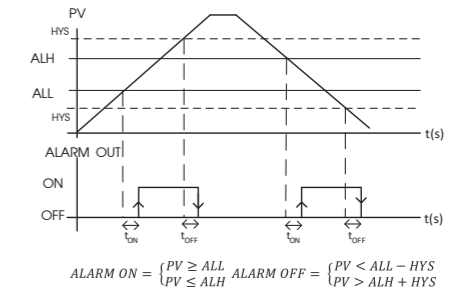
2. Absolute value High Alarm (ALF = X2)



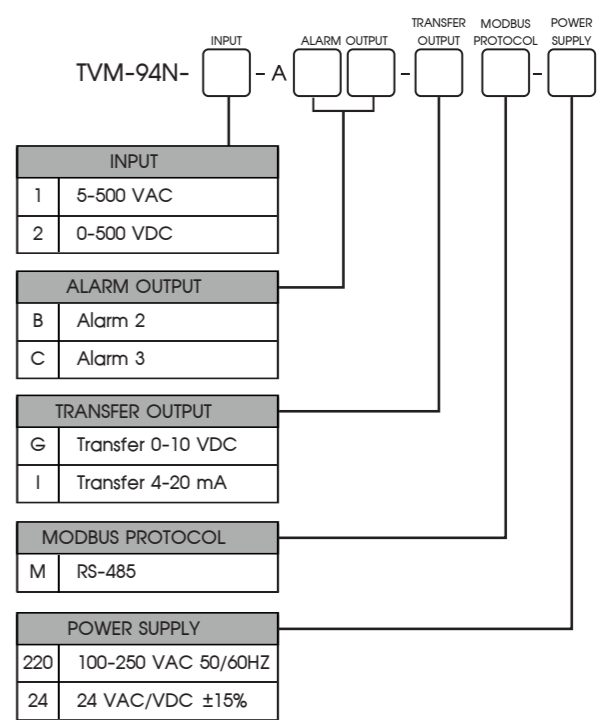
3. Absolute value Low Alarm (ALF = X3)



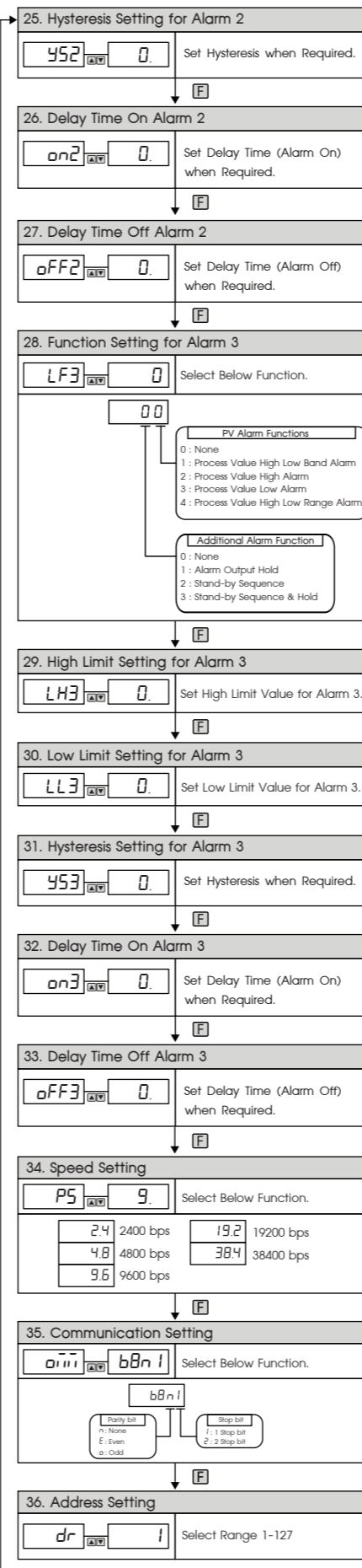
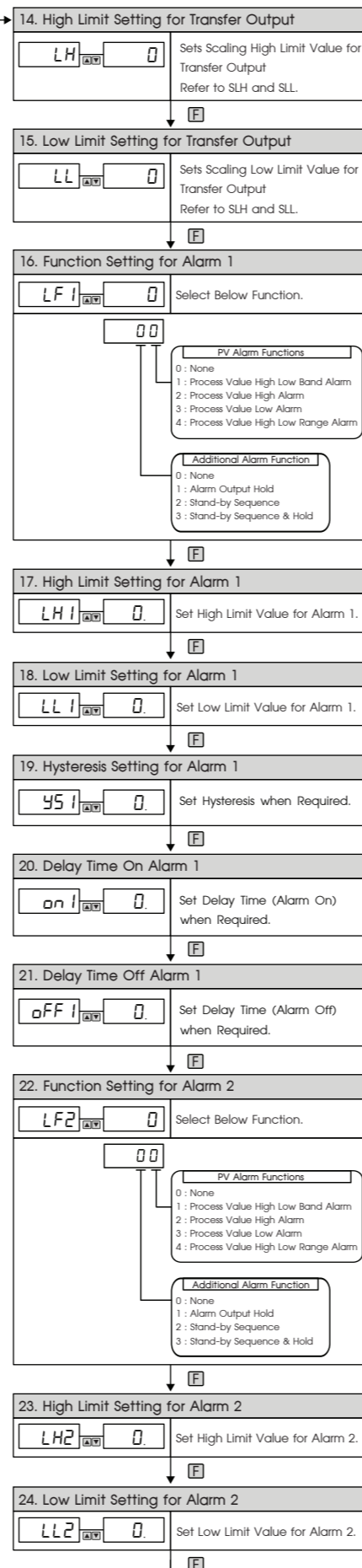
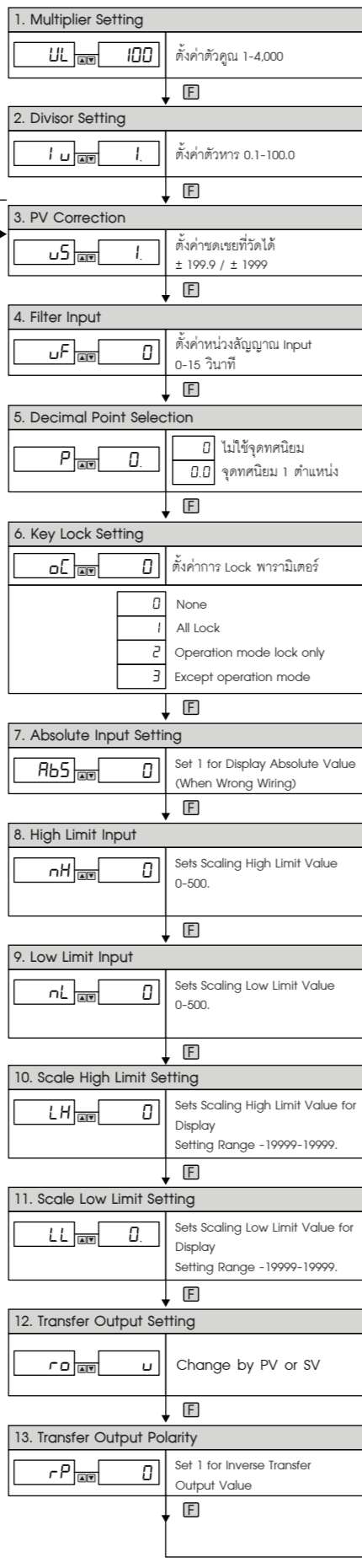
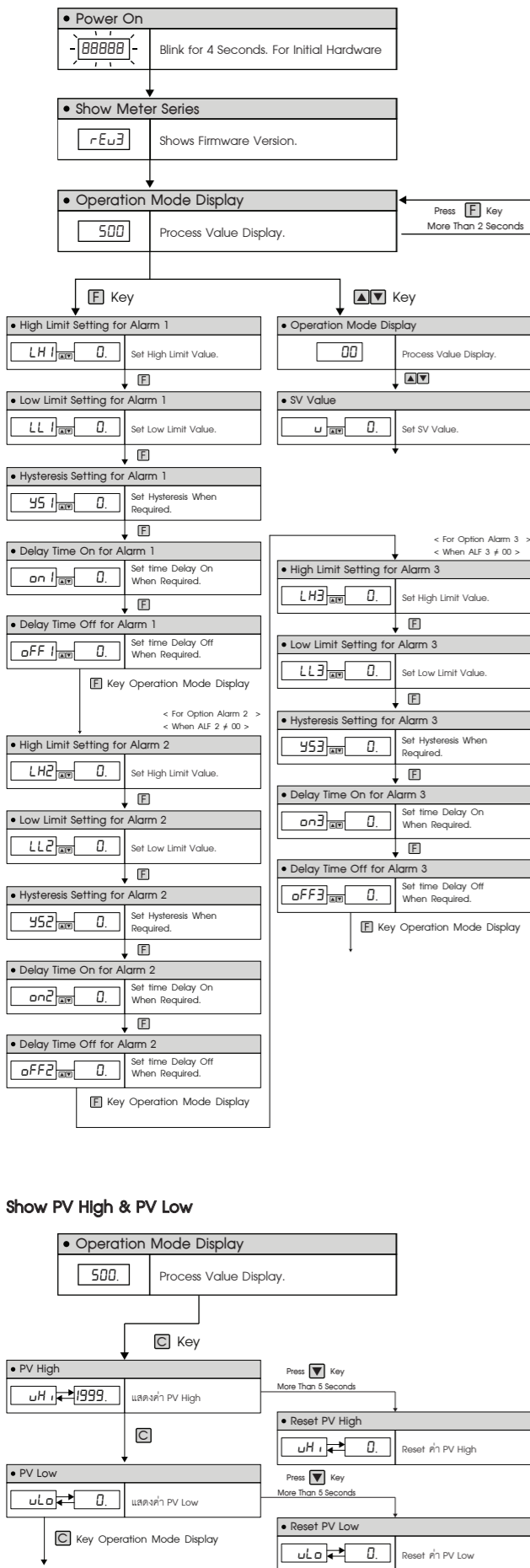
4. Absolute value High Low Range Alarm (ALF = X4)



ORDERING CODE

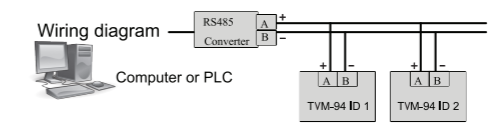


OPERATION SETTING



SERIAL COMMUNICATION

The TVM-94N, TCM-94N are Equipped With a RS-485 Serial Communications Interface to Allow Connection to Computers or PLCs. MODBUS Protocol is Provided as Standard Communication. The User Can Connect TVM-94N TCM-94N as Network Up to 255 Meter



Modbus Function Code

Function code	Operation	Broadcast
04	Read Multiple Registers	No
06	Preset Single Register	Yes
08	Loop Back Diagnostic	No

Modbus Exception Code

Code	Name	Meaning
01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the server (or slave).
02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the server (or slave).
03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for server (or slave).

Modbus RTU Table TVM-94N

Address	Contents		Format	Word	Access
	Decimal	Hex			
0	0	Status of Alarm	int	1	Read
1	1	PV	long	2	Read Only
2	2				
3	3	PV Peak Hold	long	2	Read Only
4	4	SV	int	1	Read/Write
5	5	Multiplier	int	1	Read/Write
6	6	Divisor	int	1	Read/Write
7	7	PV Adjust	int	1	Read/Write
8	8	PV Filter	int	1	Read/Write
9	9	Decimal Point	int	1	Read/Write
10	A	Lock Key Function	int	1	Read/Write
11	B	Analog Input Absolute	int	1	Read/Write
12	C	Analog Input High Limit	int	1	Read/Write
13	D	Analog Input Low Limit	int	1	Read/Write
14	E	Setting Limit High	int	1	Read/Write
15	F	Setting Limit Low	int	1	Read/Write
16	10	Analog Output	int	1	Read/Write
17	11	Analog Output Inverse	int	1	Read/Write
18	12	Analog Output High Limit	int	1	Read/Write
19	13	Analog Output Low Limit	int	1	Read/Write
20	14	Function Alarm 1	int	1	Read/Write
21	15	Function Alarm 2	int	1	Read/Write
22	16	Function Alarm 3	int	1	Read/Write
23	17	High Alarm 1	int	1	Read/Write
24	18	Low Alarm 1	int	1	Read/Write
25	19	Hysteresis Alarm 1	int	1	Read/Write
26	1A	Delay On Alarm 1	int	1	Read/Write
27	1B	Delay Off Alarm 1	int	1	Read/Write
28	1C	High Alarm 2	int	1	Read/Write
29	1D	Low Alarm 2	int	1	Read/Write
30	1E	Hysteresis Alarm 2	int	1	Read/Write
31	1F	Delay On Alarm 2	int	1	Read/Write
32	20	Delay Off Alarm 2	int	1	Read/Write
33	21	High Alarm 3	int	1	Read/Write
34	22	Low Alarm 3	int	1	Read/Write
35	23	Hysteresis Alarm 3	int	1	Read/Write
36	24	Delay On Alarm 3	int	1	Read/Write
37	25	Delay Off Alarm 3	int	1	Read/Write
38	26	Delay Off Alarm 3	int	1	Read/Write

MODBUS PROTOCOL

This MODBUS Protocol has been Implement in Accordance With MODBUS. ORG MODBUS Application Protocol Specification V1.1 With The Following Conditions Applying. The Following Conditions Apply Baudrate can Selected Refer 18. Speed The Format is MODBUS RTU UART Data can Selected Refer 19. Communication Setting Data is Considered to be Half Duplex Using 2 Wire.

22. Speed Setting

The Format is MODBUS RTU UART Data Can Select Refer 23. Communication Setting Data is Considered to be Half Duplex Using 2 Wire.

Example of a Client Request and Server Exception Response

Request	Response
Field Name	(Hex) Field Name (Hex)
Slave Address	01 Slave Address 01
Function	04 Function 84
Starting Address Hi	00 Exception Code 02
Starting Address Lo	00 CRC Hi C2
Quantity of Input Reg. Hi	00 CRC Lo C1
Quantity of Input Reg. Lo	1E
CRC Hi	70
CRC Lo	02

Here is an Example of a Request to Write Input Register 2 to 00 08 hex:

Request	Response
Field Name	(Hex) Field Name (Hex)
Slave Address	01 Slave Address 01
Function	06 Function 06
Register Address Hi	00 Register Address Hi 00
Register Address Lo	04 Register Address Lo 00
Register Value Hi	03 Register Value Hi 03
Register Value Lo	E8 Register Value Lo E8
CRC Hi	C8 CRC Hi C8
CRC Lo	B5 CRC Lo B5



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