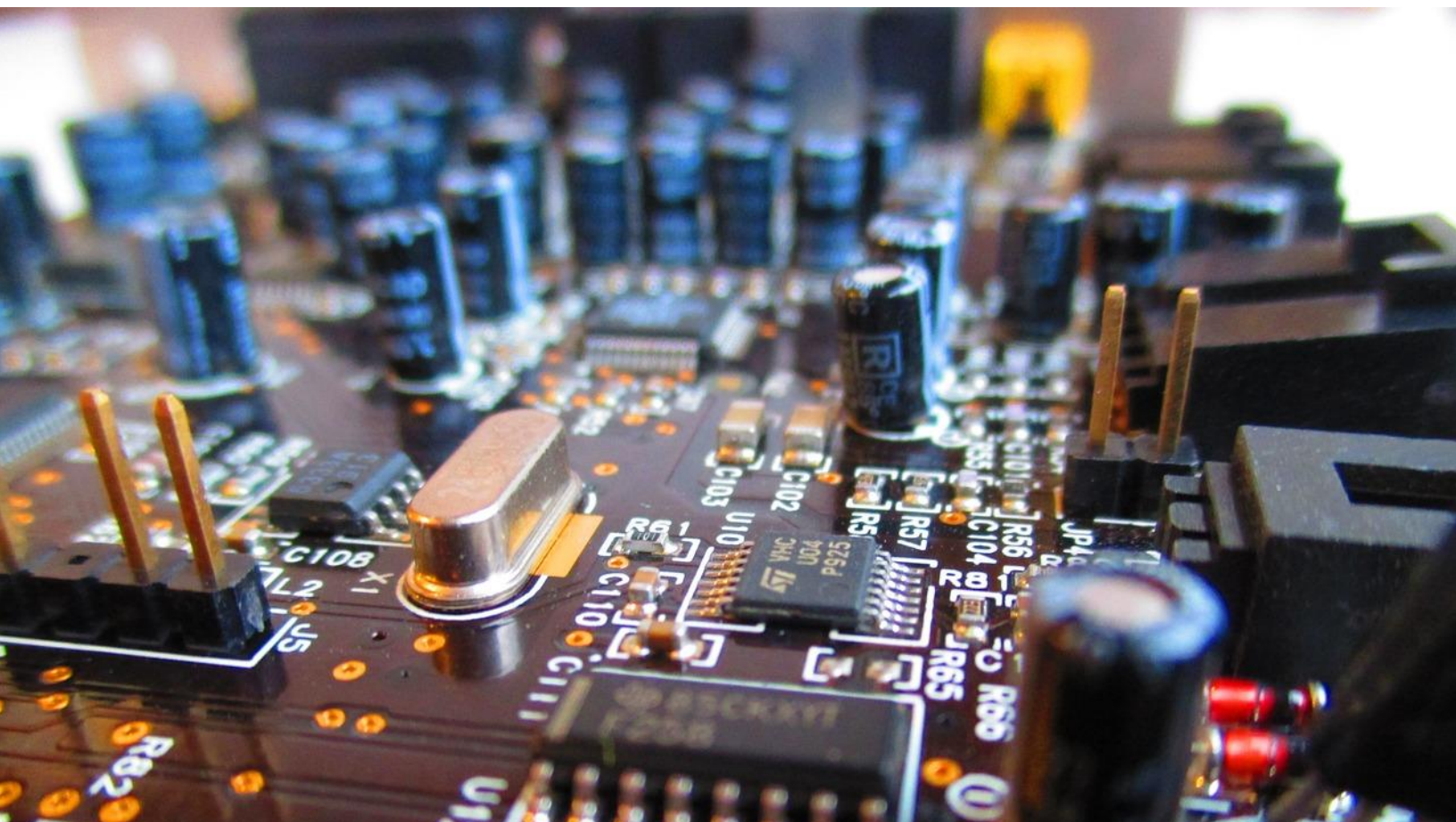




Solar PV Monitoring & Analytics

DATASHEET & USER MAN

6 CH Analog to Modbus Converter [TR621]



A product of Free Spirits **Green** Labs

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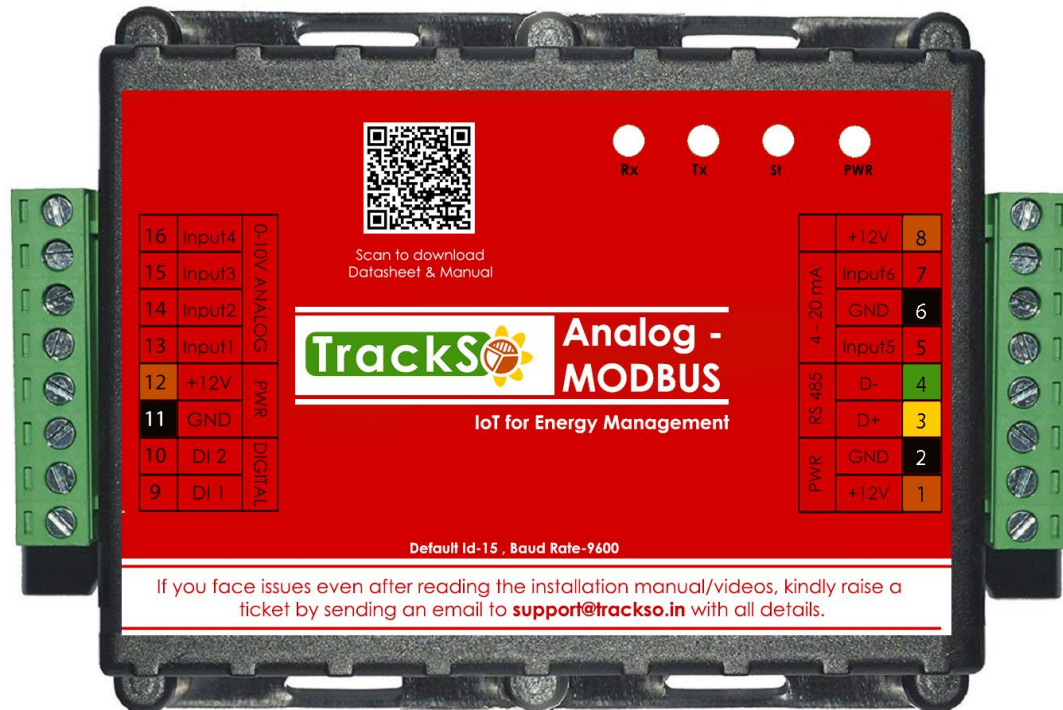
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MODEL

TR621

DATASHEET**Introduction**

Module allows to measure analog values from 4 Voltage and 2 current via the RS-485 connection. The voltage version will accept any voltage between 0-10 Vdc and the current version will accept a 4-20mA input.

**Specifications**

- CPU: ARM Cortex
- SRAM: 32 Kbytes
- Flash Memory: 256 Kbyte
- Power supply voltage: 12-24 V DC
- Number of Analog Inputs: 6
 - 4 voltage 0-10 V
 - 2 current 4-20 mA
- Number of Digital Inputs: 2 (up to 24 V DC)
- Baud rate range: 1200 - 115200 bit/sec.
- Modbus ID range: 1- 15
- Parity: Odd, Even, None
- Stop Bits: 1,2
- Communication interface: RS-485
- Transmission protocol: Modbus RTU
- Operating temperature: 0°C ÷ +50°C
- Storage temperature: -10°C ÷ +70°C (standard),
- Humidity: 5 ~ 95% RH, non-condensing
- Protection class: IP 20 (housing and connection clips)
- Case dimensions: 85mm x 100mm x 30mm

Default Settings: Id/Address -15, Baud rate: 9600 bit/sec, Parity: None, Stop Bits-1

Pin out Details

0-10V Analog 4 <- 16
 0-10V Analog 3 <- 15
 0-10V Analog 2 <- 14
 0-10V Analog 1 <- 13
 +12V <- 12
 GND <- 11
 Digital input 2 <- 09
 Digital input 1 <- 10

16
15
14
13
12
11
10
9

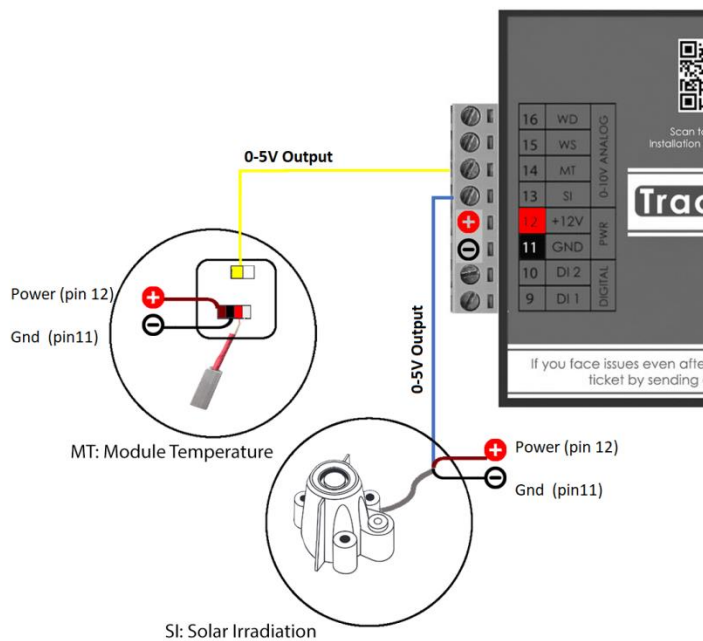


8 -> +12V (-)
 7 -> 4-20ma (+) (Current 2)
 6 -> GND (-)
 5 -> 4-20ma (+) (Current 1)
 4 -> D-
 3 -> D+
 2 -> GND
 1 -> +12V

Notes: Converter can be powered using pin 1 & 2 by a 12V/1A source, after which sensors can be powered using 12V output available at pin 12 & 11, Pin 8 & 6

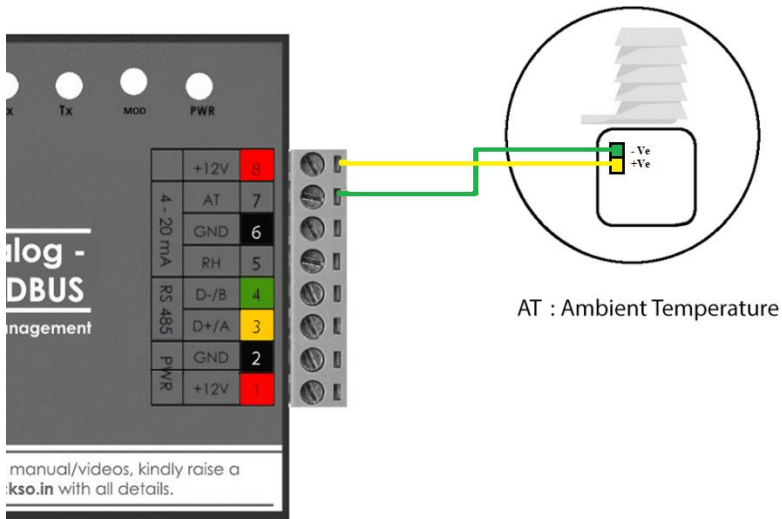
Sample Connections

0-10V Analog



- 1) Power up sensor using 12V source
- 2) Connect the Output of the Sensor on Analog ports as shown in image on left side

4-20ma Analog



- 1) Power up sensor using 12V source (pin 8)
- 2) Connect the Output of the Sensor on 4-20ma Analog ports as shown in image on left side

Modbus Output

Modbus Output is available on Pin 3 & 4

For understanding how to read Modbus output on a laptop kindly check <https://trackso.in/read-data-solar-inverter-meter-windows-pc/>

Register Mapping

Default Modbus Id- 15
Default Baud Rate- 9600

Default Parity- None
Default Stop Bits- 1

For reading Analog input data- >

Holding Register - 0x03

S. No	Address (Dec)	Description	Type	Min	Max	Multiplying Factor
1	40002	Digital Input-1	unsigned int	0	1	-
2	40003	Digital Input-2	unsigned int	0	1	-
3	40008	Analog Input-1	float	0	10	As per Sensor Output & range
4	40010	Analog Input-2	float	0	10	
5	40012	Analog Input-3	float	0	10	
6	40014	Analog Input-4	float	0	10	
7	40016	4-20ma current-1	float	4	20	
8	40018	4-20ma current-2	float	4	20	

Note: Above register mapping is fixed and cannot be changed.

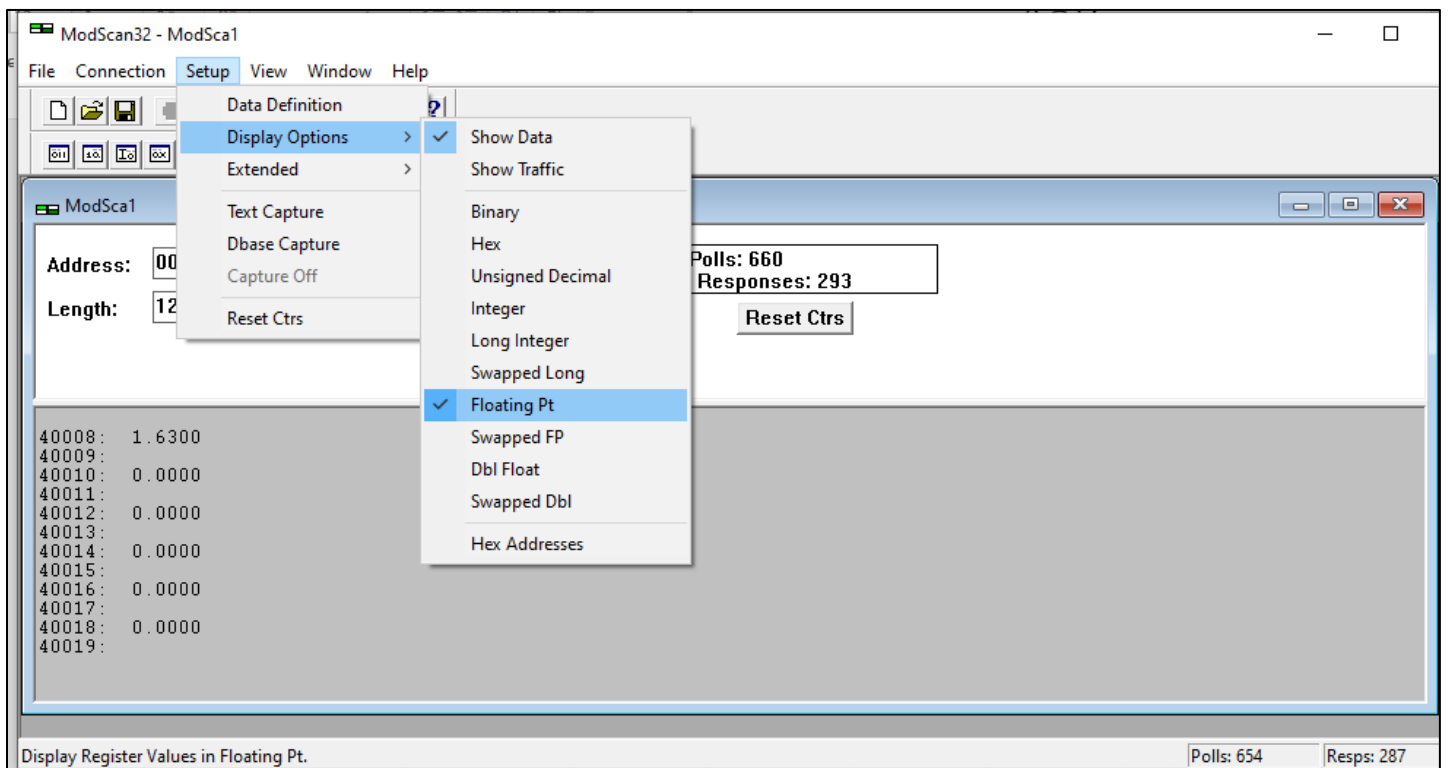
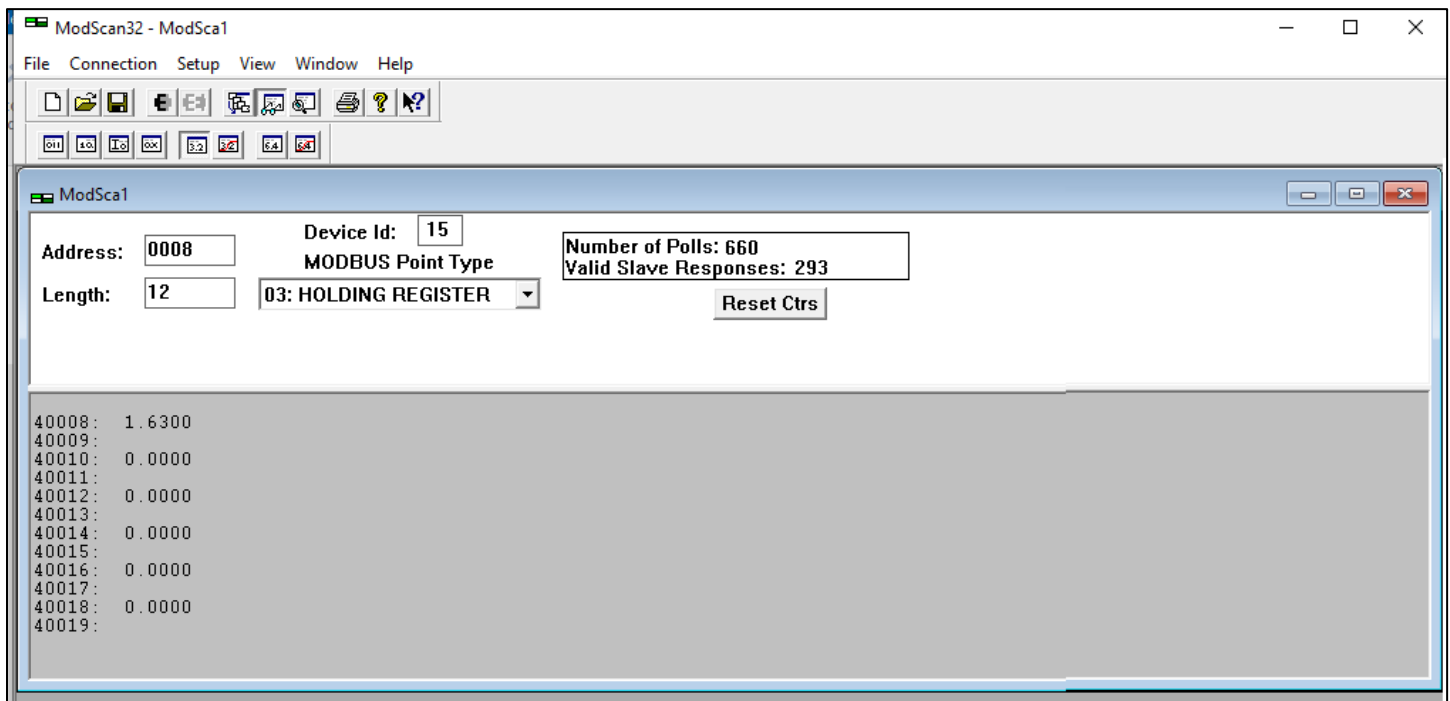
Multiplying Factors- No facility available within Analog to Converter to input multiplying factors. Multiplying factors need to be configured in the datalogger or platform being used to monitor the converter.

For modifying Data Logger Modbus Settings ->

Read Holding Register - 0x03			Write Multiple Register-0x10	
S. No	Address (Dec)	Description	Type	Comments
9	40101	Device ID	unsigned int	Range: 1- 250
10	40102	Baud Rate	unsigned int	0: 2400 4: 38400 1: 4800 5: 57600 2: 9600 6: 115200 3: 19200 7: 1200
11	40103	Bits	unsigned int	0
12	40104	Parity	unsigned int	0: None, 1: Even, 2: Odd
13	40105	Stop	unsigned int	0, 1, 2
14	40106	Interchar Timeout (x10ms)	unsigned int	Range: 2-20

Sample Testing via PC Based Software

Software- Modscan



Command Format Example

If Modbus Id: 15, Start Register: 8, Length: 12 is , Register Type: Holding (0x03)

Sample TX: 0f 03 00 07 00 0c

Sample RX: 0f 03 18 47 ae 3f 21 99 9a 3f d9 00 00 00 00 00 00 00 00 00 00 00 00 51 ec 41 0c 92 d9

FAQ's

Q: How to update Modbus ID using physical switch in the converter?

A: If you wish to set/change Modbus ID in range of 1-15 the you can use the DIPP switch settings.

Note: Id set via DIPP Switch overrides the id set in converter via Modbus register

DIP SWITCH SETTINGS for updating Modbus ID		ON/OFF 0 - OFF 1 - ON	
4321	Modbus ID / Address		
0000	0 → Corresponds to Id Set via Modbus Write explained here		
0001	1		
0010	2		
0011	3		
0100	4		
0101	5		
0110	6		
0111	7		
1000	8		
1001	9		
1010	10		
1011	11		
1100	12		
1101	13		
1110	14		
1111	15		

Example- Switching on all DIPP switches corresponds to 1111 = Id-15

Q: How to update Modbus ID, Baud rate, Parity and any other communication related settings in the converter?

A: Follow the steps mentioned on this link with screenshots to update Modbus Id (Range 1-250), Baud rate (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200) , Parity (Odd, even or none) or any other communication settings related parameter (stop bit etc) - <https://trackso.in/knowledge-base/update-modbus-idbaud-rate-parity-of-trackso-tr621-analog-to-modbus-converter/>

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