DUAL CHANNEL 75A BIDIRECTIONAL DC CURRENT SENSOR MODULE

FEATURES

- 2 Current Channels
- Hall Effect sensor based
- 12-bit ADC accuracy
- +75 to -75A DC measurement range
- 1 kHz measurement
- RS-485 MODBUS RTU Compatible

DESCRIPTION

The C752 module is used to measure bidirectional DC currents of up to 75A and is ideal for off grid setups. Using one channel to measure solar current and one channel for load measurement, it is possible to create a coulomb counting based algorithm to accurately measure battery capacity. It can interface with any Modbus-compliant server over RS-485.

CONNECTOR DETAILS

Pin	Name	Description
1-4	NC	Not connected
5	5V	5V output. This can be used to power the sensor if it does not consume more than 100 mA
6	GND	Ground
7	PULSE	Pulse input to measure. This would typically be a square wave of 0-5V
8	NC	Leave this unconnected.

MODBUS INTERFACE

This module is Modbus RTU compatible. It requires a baud rate of 9600 bps, no parity, and 1 stop bit for correct operation. The default slave ID of this module is set to 1 but can be changed via a Modbus register.
The two RJ45 sockets are connected in parallel, and are used for providing power and interfacing with the RS-485 bus. Devices can be daisy chained together easily using this method. When used in conjuction with the Wattmon controller any standard Ethernet patch cable (straight through) can be used to connect with the Wattmon master. One connector has two LED indicators. One indicates that the module is powered, and the other blinks when a packet is send or received. The second LED will start blinking slowly if Modbus communication stops for over 30 seconds.
When using this device with a third party Modbus master, use the following table for proper connection.

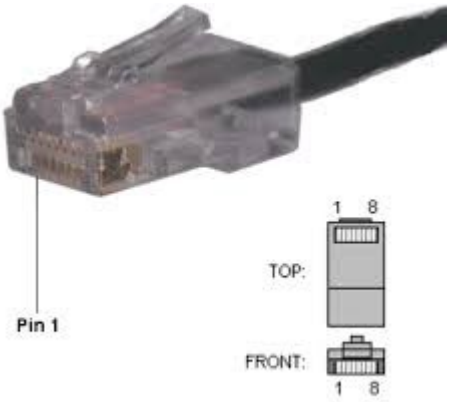

Figure 1: RJ-45 Pinouts

PIN	**Description**
1,2	GND
3	Not connected
4	A (-)
5	B (+)
6	Not connected

7,8	5V DC

MODBUS PROTOCOL

This device supports the following functions:

FUNCTION 3, READ HOLDING REGISTERS
FUNCTION 4, READ INPUT REGISTERS
FUNCTION 6, WRITE SINGLE REGISTER
FUNCTION 16, WRITE MULTIPLE REGISTERS
FUNCTION 17, REPORT SLAVE ID

MODBUS INPUT REGISTERS

Address	**Name**	**Description**
3000	CURRENT1	Channel 1 Current (Calibrated)
3001	CURRENT1RAW	Channel 1 ADC value for calibration
3002	CURRENT2	Channel 2 Current (Calibrated)
3003	CURRENT2RAW	Channel 2 ADC value for calibration

MODBUS HOLDING REGISTERS

4000	CH1OFFSET	Zero offset for channel 1. This is normally factory calibrated but may vary slightly depending on conditions and cable length.
4001	CH1MUL	Multiplier value for current 1
4002	CH1DIV	Divisor for current 1
4003	CH1INVERT	Invert current direction
4004	CH2OFFSET	Zero offset for channel 2
4005	CH2MUL	Channel 2 Multiplier
4006	CH2DIV	Channel 2 Divisor
4007	CH2INVERT	Invert Channel 2current direction

10000	ADDR	Slave Address. This can be set using WRITE SINGLE REGISTER (Function 6) to set the slave address and is Write Only. To read the slave address, use the REPORT SLAVE ID function.

DEVICE CALIBRATION AND OPERATION

In order to get accurate results you may need to calibrate the current sensors. They come factory calibrated and usually do not require adjustment other than a possible small change to the zero-offset.
To set the zero-offset, make sure there is no current flowing through the wire, and read the CURRENTxRAW register value. Save this value in the CHxOFFSET register.
The default multiplier and divider give a range of +75A to -75A DC. The CURRENT1 register contains a positive value for currents flowing from up to down (Charge to battery or Load-battery) and a negative value for current flowing in the opposite direction. The register is calibrated with a multiplier of 100 (1A = 100). The sensors themselves give a maximum accuracy of about 30 mA with the 12-bit ADC.
Measurements are taken at approximately 1 kHz and once a second the current output values are recalculated using the following formula (replace x with 1 or 2 for the respective channel):

*CURRENTx = (ADC Reading – CHxOFFSET) * CHxMUL / CHxDIV*

Additionally, if the CHxINVERT register is set to 1, CURRENTx is multipled by -1. If CHxINVERT is set to 0, no additional processing happens.