

## Blind Measuring Module

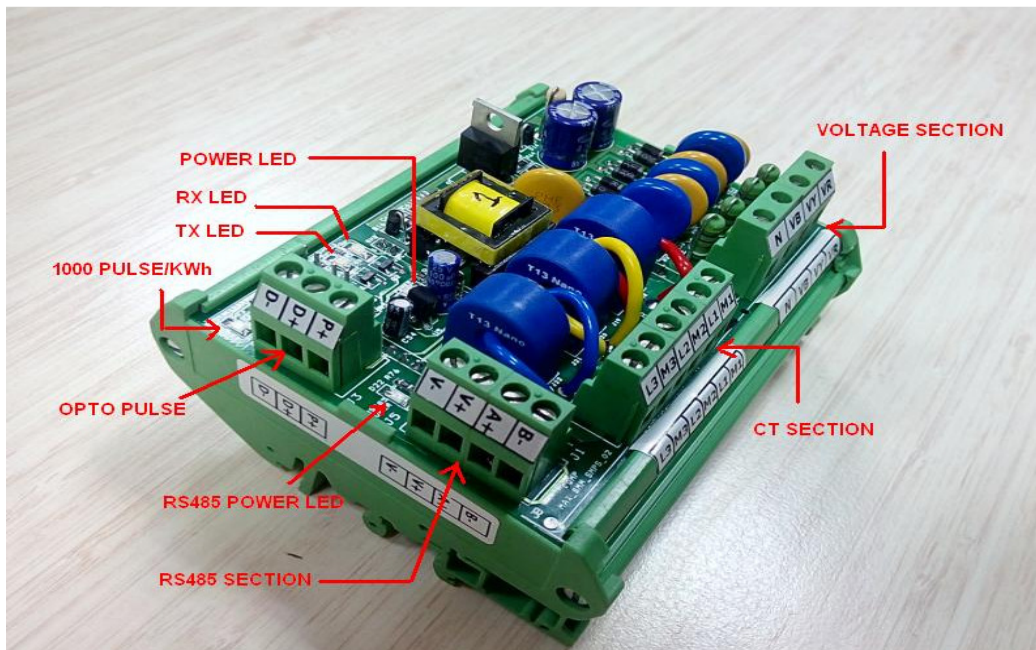


Figure 1 BMM – Onboard 5A CT

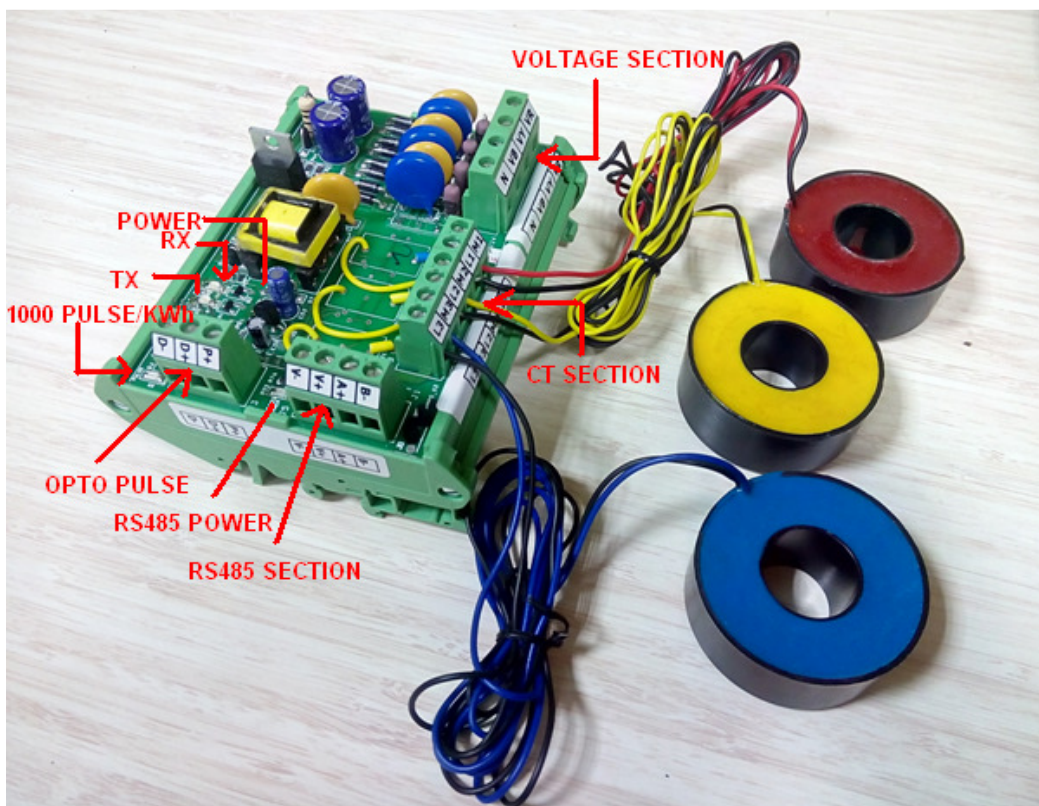


Figure 2 BMM – External Whole Current CT

BMM (Blind Measuring Module) is multi functional unit which supports only 3P4W installation. BMM take 3 Voltage inputs & 3 Amps inputs for measurement. BMM measures phase wise Voltage, Amps, PF, Power as well as System Power, Energy, Frequency. For demand calculation BMM has Fixed 30 Minute window, based on Real Time Clock for KW as well as KVA. BMM provides one RS485 port with Modbus-RTU protocol to communicate with external world. As BMM receive any data over RS485 then “RxD” led will glow and if BMM is responding over RS485 then “TxD” led will glow. As unit power up, “POWER” led glows. BMM provides pulse on led (1000 Pulse/KWh) as well as on isolated opto coupler.

## Voltage Connection:



As per PCB, this is a J7. Make ensure that 1 Amps rated fuse should connected on 3 phase voltages to protect hardware from unintentional damage.

## CT Connection:

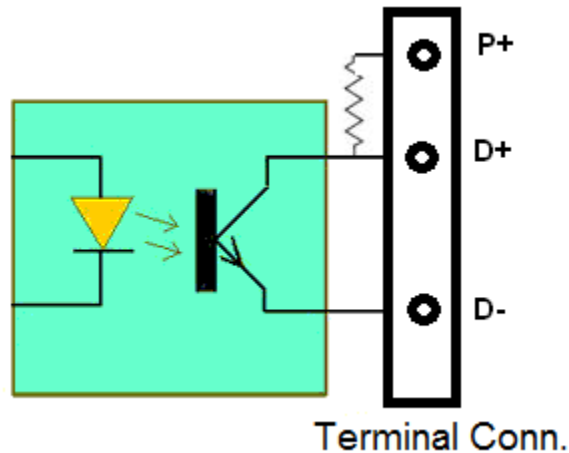


Connect the two wires from the R-phase CT to terminals marked M1 & L1 such that S1 from CT goes to M1 on the unit.

Connect the two wires from the Y-phase CT to terminals marked M2 & L2 such that S1 from CT goes to M2 on the unit.

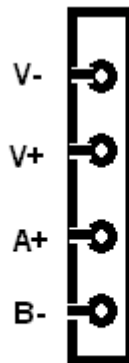
Connect the two wires from the B-phase CT to terminals marked M3 & L3 such that S1 from CT goes to M3 on the unit

## Opto Terminal Connection:



As per PCB, this is a J3. There is on board 1K $\Omega$  (0.125 Watt) register between P+ & D+ Terminal. Maximum Voltage between Collector to Emitter is 20 Volt DC. If don't want to use on board register then ignore P+ terminal.

## RS485 Connection:



As per PCB, this is a J8. RS485 requires external power supply V+(Vcc) & V-(Gnd) (8V to 20V DC). Make ensure that supply connection should not reverse otherwise it can damage the hardware.

Unit has no display so RS485 is very important part to view all measurement data. It supports MODBUS-RTU protocol to connect with SCADA or EMS Software. Each unit should have unique station id over RS485 bus. The data which can be read using MODBUS query # 3 (Read Holding Registers) is provided in an address map.

Communication line parameters: 9600/8/N/1

All addresses are in decimal whose parameters are float (32-bit). If illegal address is sent in query or host, try to read more than 232 bytes of data in one query except message is generated. The parameters name and address are mentioned below.

<b>ADDRESS MAP</b>		
<b>ADDRESS</b>	<b>PARAMETERS</b>	<b>Type</b>
200	VRN	Float – 32 Bit
202	VYN	
204	VBN	
206	AVG.PN	
208	VRV	
210	VYB	
212	VBR	
214	AVG.PP	
216	IR	
218	IY	
220	IB	
222	AVG.AMP	
224	KVA_R	
226	KVA_Y	
228	KVA_B	
230	KW_R	
232	KW_Y	
234	KW_B	
236	KVAR_R	
238	KVAR_Y	
240	KVAR_B	
242	PF_R	
244	PF_Y	
246	PF_B	
248	SYS.PF	
250	SYS.KVA	
252	SYS.KW	
254	SYS.KVAR	
256	FREQUENCY	
258	SYS.KWH	
260	SYS.KVAH	
262	SYS.KVARH	
264	KW_DEMAND	

266	MAX_KW_DEMAND
268	MAX_DEMAND_KW_YEAR
270	MAX_DEMAND_KW_MONTH
272	MAX_DEMAND_KW_DATE
274	MAX_DEMAND_KW_HOUR
276	MAX_DEMAND_KW_MINUTE
278	MAX_DEMAND_KW_SEC
280	KVA DEMAND
282	MAX_KVA_DEMAND
284	MAX_DEMAND_KVA_YEAR
286	MAX_DEMAND_KVA_MONTH
288	MAX_DEMAND_KVA_DATE
290	MAX_DEMAND_KVA_HOUR
292	MAX_DEMAND_KVA_MINUTE
294	MAX_DEMAND_KVA_SEC
296	RTC_YEAR
298	RTC_MONTH
300	RTC_WEEK_DAY
302	RTC_DATE
304	RTC_HOUR
306	RTC_MINUTE
308	RTC_SEC
310	FEATURE USE
312	*CT PRIMARY
314	*CT SECONDARY

Real Time Clock, CT Primary and CT Secondary can be set over RS485 using MODBUS query # 6. Addresses for RTC are shown in below table.

<b>ADDRESS MAP over Query: 06</b>		
<b>ADDRESS</b>	<b>PARAMETERS</b>	<b>RANGE</b>
388	RTC Second	0 to 59
389	RTC Minute	0 to 59
390	RTC Hour	0 to 23
391	RTC Date	1 to 31
392	RTC Month	1 to 12
393	RTC Year	0 to 99
394	RTC Weekday	0 to 6, 0 for Sunday, 6 for Saturday
395	*CT PRIMARY	5 to 5000
396	*CT SECONDARY	1 or 5

**Note : CT Primary and CT Secondary selection not applicable for whole current BMM.**

Each BMM unit should have unique station id to communicate over RS485 bus. To program station id, we are providing utility as shown in screen shot. While applying command “APPLY” make sure that only one unit has jumper at “AMP”. Without jumper it will ignore “PROGRAM STATION ID” command. Ensure that at a time only one unit have jumper.

The screenshot displays the BMM software interface with the following configuration details:

- Meter ID:** 1
- COM PORT:** 1
- CONNECT** button
- TYPE:** 5A
- Voltage:** R-Phase, Y-Phase, B-Phase (input fields)
- Amps:** R-Phase, Y-Phase, B-Phase (input fields)
- PROGRAM STATION ID:** Meter ID: 1, **APPLY FORCE** button, **APPLY-06** button
- KW:** R-Phase, Y-Phase, B-Phase (input fields)
- KVAR:** R-Phase, Y-Phase, B-Phase (input fields)
- Energy:** KWh, KVAh, KVARh (input fields)
- Others:**
  - Vry, Vyb, Vbr (input fields)
  - PF\_R, PF\_Y, PF\_B (input fields)
  - Sys.PF, Sys.KW, Sys.KVA, Sys.KVAR (input fields)
  - KW-D, KW-MD, KVA-D, KVA-MD (input fields)
  - Avg.VLN, Avg.VLL, Avg.AMPS (input fields)
  - KVA\_R, KVA\_Y, KVA\_B (input fields)
  - Hz, CT-PRM, CT-SEC (input fields)
- RTC:** Date and Time input fields, **APPLY** button
- Other:** CT PRIMARY, CT SECONDARY (input fields), **APPLY** buttons
- PROG QUERY STATUS** label at the bottom.

## Technical Specifications:

Parameters			
Type	Name	Statistics	
INPUT	Three Phases and Neutral of a 3P4W system		
	Voltage	Direct Voltage Input : Up to 300V L-N PT Ratio : 1 Burden : 1 VA	
	Current	<u>For 5A CT</u> Secondary Current Input: 5A or 1A(Site Selectable) CT Ratio : Site Selectable Range of Reading : 5 – 5000 A For 5A Burden : < 1.0VA Overload : 5A CT = 6A RMS Continuous :1A CT = 1.2A RMS Continuous	
		<u>For Whole Current CT</u> Range of Reading : up to 70 Amps Burden : < 1.0VA Overload : 75A RMS Continuous	
Power Supply	Auxiliary Supply: 90 - 270 VAC (P-N), 50-60 Hz. (Power Up from 3 Phase Voltage Input)		
MEASUREMENT	True RMS Basic Parameters	Voltage (Volts L-N & L-L)	VL-N Accuracy : 0.5% of Reading VL-L Accuracy : 1.0% of Reading
		Current (Amps IR, IY, IB)	Accuracy : 1% of Reading
		Line Frequency	46.5 to 63.5 Hz, Accuracy : 0.3% of Reading
	Power	Active Power (P)	Accuracy : 1% of Reading (For IPFI>0.5)
		Reactive Power (Q)	Accuracy : 1.5% of Reading (Between 0.5 Lag to 0.8 Lead)
		Apparent Power (S)	Accuracy : 1% of Reading
		Power Factor	For Individual phases and System. Accuracy : 1.0% of Reading (IPFI≥0.5) Range of Reading : 0.05 to 1.00 Lag/Lead
	Energy	Total Active Energy (KWh)	Range of Reading : 0 to 9999999.9 KWh Accuracy : Class 1 as per IS13779
		Total Apparent Energy (KVAh)	Range of Reading : 0 to 9999999.9 KVAh Accuracy : Class 1
		Total Reactive Energy (KVARh)	Range of Reading : 0 to 9999999.9 KVARh Accuracy : Class 1
	Demand	Active Power & Apparent Power Demand – 30 Minute Fixed Window.	