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Warning! Installation by person with electrotechnical expertise only.

M1M 10

1. FEATURES

- STAR (Wye)/ DELTA/1 phase programmable
- Universal Auxiliary (80 - 300 VAC / DC) supply
- PT ratio / CT ratio programmable including CT secondary
- User configurable (editable) password
- Simultaneous sampling of Volts & Amps
- True RMS measurement
- Universal Voltage Input (50 - 550 VAC) and
- Current Secondary (0.05 to 6A)

2. UNIQUE FEATURES

- Optional Programmable relay output maximum 2 (up to 6 threshold parameters) and tripping time up to180 seconds.
- 3 row, 4 digit display for better readability.
- Auto-scaling of kilo & mega, decimal point.
- Compact size and weight

3. KEY FUNCTIONS

Key	In SET (Programming) mode	In RUN (Measurement) mode
DOWN	To select the value and accept the value	To scroll pages to look at different parameters
UP	To edit the value/ system type in edit mode and scroll through the parameters	To scroll pages to look at different parameters

4. LED INDICATIONS

LED status	Meaning
KILO – ON	Kilo
KILO – OFF	Direct reading
VLL - ON	Voltage line to line
VLN - On	Voltage line to Neutral
A - ON	Amps
Hz - ON	Frequency

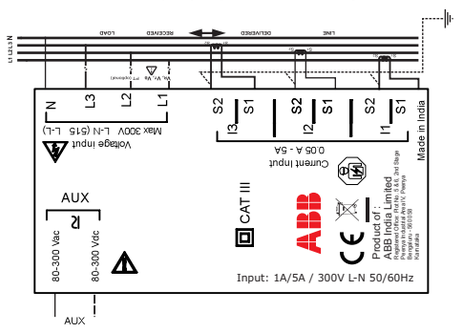
5. ENABLING AND DISABLING

Enabling auto scrolling: Press UP key continuously for 5 seconds or until display shows **EnbL Auto.Sc** for upward scrolling. Press Down key continuously for 5 seconds or until display shows **EnbL Auto.Sc** for downward scrolling.

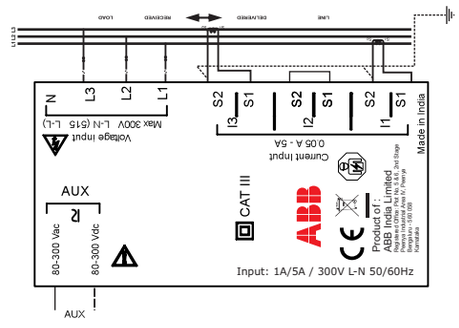
Disabling auto scrolling: Press any key (UP/DOWN), display show **dSbL Auto.Sc** and returns to normal mode.

6. WIRING DIAGRAM

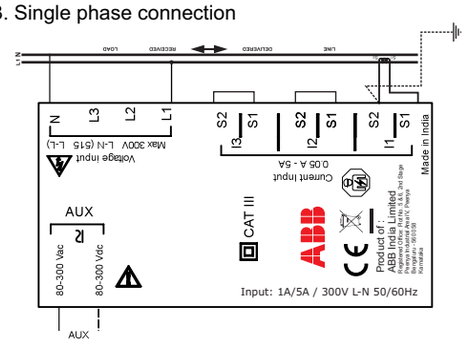
6.1. Star connection (3E) 3 phase 4 wire system



6.2. Delta connection (2E) 3 phase 3 wire system



6.3. Single phase connection



Note: Wiring should be in accordance with the National Electrical Code and/or the Canadian Electrical Code, Part I.

For DC AUX Voltage, +/-ve can be connected anyway.

7. CONFIGURE (SETUP MODE)

To configure the setup parameters through front panel, the following steps can be followed.

Step	Actions	Display Reads	Range/Options/ Comments
1	Press UP & DOWN keys together to enter SETUP	0000 Row 1: 0000 with first digit "0" blinking SEtP Row 2:SEtP (SETUP)	Default password '1000'.
2	Press UP key to decrement the first digit to "9" sequentially come to digit "1"	1000 Row 1: 1000 with first digit "1" blinking SEtP Row 2:SEtP (SETUP)	Press UP key to decrement the first digit to '9' sequentially come to digit '.1'
3	Press UP key	1000 SEtP	
4	Press DOWN key four times to accept the password.	StAr Row 1: StAr ELEn Row 2: ELEm (ELEMENT)	Defines the power system configuration. Options: STAR /DELTA/ SINGLE PHASE
5	Press DOWN key to select STAR/DELTA/1. PHASE	StAr Row 1: StAr/ dELt/ 1.Phase ELEn Row 2: ELEm Options can be changed by pressing UP key.	selected system blinks
6	Press DOWN key to accept the selected mode	StAr Row 1: StAr/ dELt/ 1.Phase ELEn Row 2: ELEm	Selected system stabilizes
7	Press UP key	415.0 Row 1: xxxx (415.0 -default /factory set) P.Pri Row 2: P. Pri(PT Primary)	
8	Press DOWN key to set the PT primary value	415.0 Row 1: First digit blinks.Edit the digit using UP key. P.Pri Row 2 : P. Pri (PT Primary)	
9	Press DOWN key to accept the edited value for first digit.	415.0 Row 1:Second digit blinking, can be edited using UP key. Press DOWN key to accept the edited value. Continue the same method till fourth digit. P.Pri Row 2: P. Pri (PT Primary)	Program Range for PT Primary : 100V to 999kV Comment: If value set is above the limit, display returns to maximum PT Pri value.
10	Press DOWN key.	415.0 Row 1:Decimal point blinking. Can be set at appropriate location using UP key. Ascertain the correct scale (Kilo/Mega) is selected by Letter K/M. Press DOWN key to accept the edited value. P.Pri Row 2 : P. Pri (PT Primary)	E.g.: To set 11.00kV Set first four digits(1100)as explained above keep pressing UP key to place decimal point at appropriate location. Letter K/M will indicate the Kilo/Mega.
11	Press DOWN key.	415.0 Row 1:Decimal point blinking. Can be set at appropriate location using UP key. Ascertain the correct scale (Kilo/Mega) is selected by Letter K/M. DOWN key to accept the edited value. P.Pri Row 2 : P. Pri (PT Primary)	E.g.: To set 11.00kV Set first four digits(1100)as explained above keep pressing UP key to place decimal point at appropriate location. Letter K/M will indicate the Kilo/Mega.
12	Press UP key	415.0 Row 1: xxxx (415.0 -default /factory set) P.SEC Row 2: P.SEC (PT Secondary). Follow the procedure as described in steps 7 to 13.	Range: 50V to 550V If value set is above the limit, display returns to the maximum PT sec value.
13	Press UP key	5.000 Row 1: xxxx (5.000-default/ factory set) C.Pri Repeat steps 7 to 13 to change the settings. Row 2: C. Pri (CT Primary)	Program Range for CT Primary 0.5A to 99kA
14	Press UP key	5.000 Row 1: xxxx (5.000 –default / factory set) C.SEC Row 2: C.SEC (CT Secondary).	Range: 0.5A to 6A Repeat steps 7 to 13.
15	Press UP key	---- Row 1: ---- PWd Row 2: PWd (Password user definable). **CAUTION**: memorize the Password.Use the same Password for next time. Instruments will reject other Passwords.	Range: 1000-9999. CAUTION: Password can be reset only at the factory.
16	Press UP key	4.000 Row 1: 4.000 POLS Row 2: POLS (POLES)	Range: 1-28 (FOR RPM).
17	Press UP key	15.00 Row 1: 15.00 U.SUP Row 2: voltage suppression	Range: 10-80.

18	Press UP key	SAVE Y Row 1: S A V E Row 2: "Y" blinking	If "n"(no) is selected then Meter enters into RUN mode without affecting any edited Values in the setup
19	Press UP key	Row 1 : xxxx Row 2 : xxxx Row 3 : xxxx	

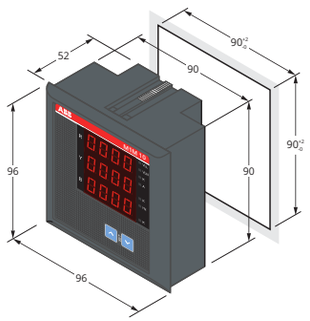
Once the required parameter is programmed press the UP key continuously till it reaches SAVE page directly.

CAUTION: Memorize the Password. Use the same password for next time. Instruments will reject other Passwords.
"Please notice that configuration pages related to Digital Outputs (d1.Pr, d1.th, d2.Pr, d2.th, ddel, POP.t) are not available in M1M 10"

7.1 The List of parameters can be configured and the range is given below

Sl.No.	Parameter	Default setup	Range / Options
1	Connection mode(ELEm)	STAR	STAR/ DELTA/ 1.Phase
2	PT Primary (P.Pri)	415.0	100V- 999kV
3	PT Secondary (PT SEC)	415.0	50V - 550V
4	CT Primary (C.Pri)	5.000	0.5A - 99kA
5	CT Secondary (C.SEC)	5.000	0.5A - 6A
6	Password (PWd)	1000	1000 to 9999
7	No of Poles (POLES)	4.000	1.000 to 28.00
8	Voltage Suppression	15.00	10.00 to 80.00

8. MECHANICAL SPECIFICATION



CAUTION : Use MCB to connect and disconnect the device for auxiliary and measurement circuit.

9. TECHNICAL SPECIFICATION

Auxiliary power supply	
Range	80V to 300 V AC or DC
Frequency	50 - 60Hz
Burden	5VA Max
Installation category	CAT III
Protection fuse	200mA

Measurement accuracy	
Voltage	±1,0%
Current	±1,0%

Voltage measurement inputs	
Measurement range	80-300V AC (p-n)
Measurement category	CAT III
Rated frequency	50 - 60Hz
Max. VT Primary	999 Kv
Burden	0.2VA Max. per phase

Current measurement inputs	
Number of current inputs	3 (L1, L2, L3)
CT secondary	1A or 5A
Measurement range without accuracy derating	50mA-6A (5%-120% as per standard. From 50mA onwards, it will measure)
Max. CT Primary	99 kA
Burden	0.2VA Max. per phase

User Interface	
Access to device	2 pushbuttons
Display type	LED display
LED Digit height	10 mm

Mechanical characteristics	
Overall dimensions	96 X 96 X 58 mm (52 mm depth inside the switchboard)
IP degree of protection	IP51 (IEC 60529)
Weight	0,300 kg

Climatic conditions	
Operating temperature	-10°C to +60°C
Storage temperature	-25°C to +70°C
Relative humidity	5% to 95% non condensing
Pollution degree	2
Altitude	Below 2000ms

Terminal characteristics	
Current inputs	6 terminals, 3 inputs, 5A with S1 and s2 on each input
Voltage inputs	4 terminals. 80-520V LL

Standards	
Electrical safety	IEC 61010
EMC	IEC 61000 4-2,4-3,4-6,4-8,4-4,4-11, CISPR-22

Note:
Accuracy class note for current: **For input current below 250mA, additional error of 0.1% of full scale.**

Accuracy class error for Temperature: **Below 10°C, mean temperature coefficient for the meter is 0.15%/K**

TROUBLESHOOTING

Due to programming error, site conditions, some problems can cause the Meter malfunction. The fault symptoms and their remedial action for correction is given below.

1. If the display does not turn ON:
a) Check that there is at least 80 volts available to the power supply (L and N connections) on the Aux supply terminals. If the above steps do not solve the problem, Contact us.

2. If the voltage or current readings are incorrect:
a) Check that the Connection mode (star/delta) is properly programmed.
b) Check that the voltage and current ratios are properly set.
c) Check the output of the CT's and PT's being used.

3. If the kW or Power Factor readings are incorrect but voltage and current readings are correct:
a) Make sure that the phase relationship between voltage and current inputs are correct by comparing the wiring with the appropriate wiring diagram.
b) CT reversal can be observed by either seeing the phase wise kW. Negative kW is shown where the current polarity is reversed, need to be corrected. Model where kW information is not available, you may check Amps Phase angle.

Precautionary Measures to be taken while Wiring the Circuit:

- ☐ Turn OFF the power to the circuit, when wiring the circuit. Connecting or removing measurement cables while the power is turned ON is dangerous.
- ☐ Take special caution not to wire a current measurement circuit to the voltage input terminal or vice-versa.
- ☐ Strip the insulation cover of the measurement cable so that when it is wired to the input terminal, the conductive parts (bare wires) do not protrude from the terminal. It is recommended to use appropriate pre lug after crimping the wire. Also, make sure to fasten the input terminal screws securely so that the cable does not come loose.
- ☐ Use cables with safety terminals that cover the conductive parts for connecting to the voltage input terminals. Using a terminal with bare conductive parts is dangerous if the terminal comes loose.
- ☐ After connecting the measurement cable, attach the current input protection cover for your safety. Make sure that the conductive parts are not exposed from the protection cover.
- ☐ Use the suitable star screw driver and apply optimum torque to prevent damage to the meter terminals.

CAUTION : During normal operation of this instrument, hazardous voltages are present at the rear terminals, which can cause severe injury or death. These voltages are present throughout the potential transformer (PT), current transformer (CT) auxiliary supply, communication & Input / Output terminal. Installation, disconnection or removal of the meter should be carried out only by qualified, properly trained personnel, after de-energizing connected circuits. Improper installation, including improper wiring and/or improper grounding will void warranty.

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