

PRELIMINARY DATASHEET



96 x 96mm

Features :

- True RMS measurement
- Universal measuring meter - Voltage, Current, Power, Power factor, Frequency^{#1}
- Touch keys for Robust operation
- Universal Auxiliary supply - 85 - 300V AC / DC
- Auto Scaling of decimal point
- Programmable CT & PT - ensures HT / LT application
- Communication and Relay output^{#2}

Certifications :

Display specifications

Type	4 digit 7 segment
Digits	Bright LED display with parameters integrated within display
Digit height	12mm
Colour	Red
Display parameters	Voltage, Current, Power factor, Frequency, Power (Active, Reactive, Apparent)

Input specifications

Rated input voltage	20 - 300V AC (L - N) 34 - 519V AC (L - L)
Rated input current range	40mA - 5A
Frequency	45 - 65 Hz
Power factor	1.00 to -1.00
Current overload	120%
Key specification	
No. of keys	3
Type of keys	Capacitive touch keys
Programmable parameters	
Display parameter selection	Through DIP switch
CT Primary	5A - 9999A
CT Secondary	5A
PT Primary	100V to 500kV AC
PT Secondary	100V to 500V AC
Configuration	
DIP Key configuration	

DIP Switch Configuration

Key Configuration			Parameter
Key - 1	Key - 2	Key - 3	
0	0	0	Normal mode - auto / manual
0	0	1	Voltage
0	1	0	Current
0	1	1	Power factor
1	0	0	Active power
1	0	1	Reactive power
1	1	0	Apperant power
1	1	1	frequency

Accuracy

Voltage	±0.5% of Full scale
Current	±0.5% of Full scale
Frequency	± 1% For L - N voltage : 50V For L - L voltage : 87V
Power factor	± 0.01
Active power	± 1%
Reactive power	± 2%
Apparent power	-

Auxiliary supply specifications

Input Voltage range	85 - 300V AC / DC
Consumption	8 VA max
Frequency	50 / 60Hz ±10%

Output Specifications^{#2}

No of relay	1
Type of relay	SPST
Relay rating	5A@230V AC

Alarm^{#2 #3}

Alarm outputs	
Over voltage	60V to 519V
Under voltage	50V to 509V
Over current	1.1A to 6A
Under current	0.1A to 5A
Hysteresis	
Voltage	0.1 to 10V
Current	0.1 to 1A
Trip setting	
Trip time delay	0 to 300sec

Communication^{#2}

Communication Interface	RS485 2 wire output
Protocol	Modbus RTU
Isolation	4KV Isolated

Environmental Specification

Temperature	Operating : -10 to 55°C Storage : -20 to 75°C
Humidity	85% non-condensing
Usage	Indoor
Altitude	Upto 2000 meter
Pollution Degree	II

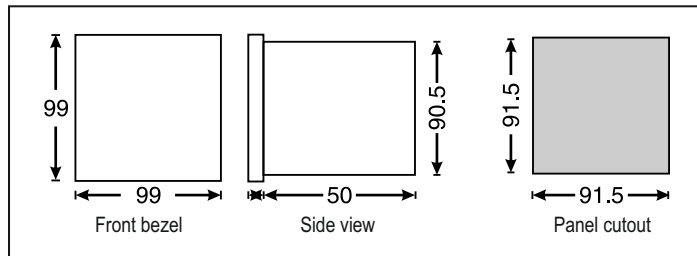
Mechanical Specification

Mounting	Panel
Dimension (mm)	96mm x 96mm
Torque	Terminal : 0.79 N-m (max) Screw clamp : 0.1 N-m (max)
IP rating	Facia : IP51 Terminal : IP20

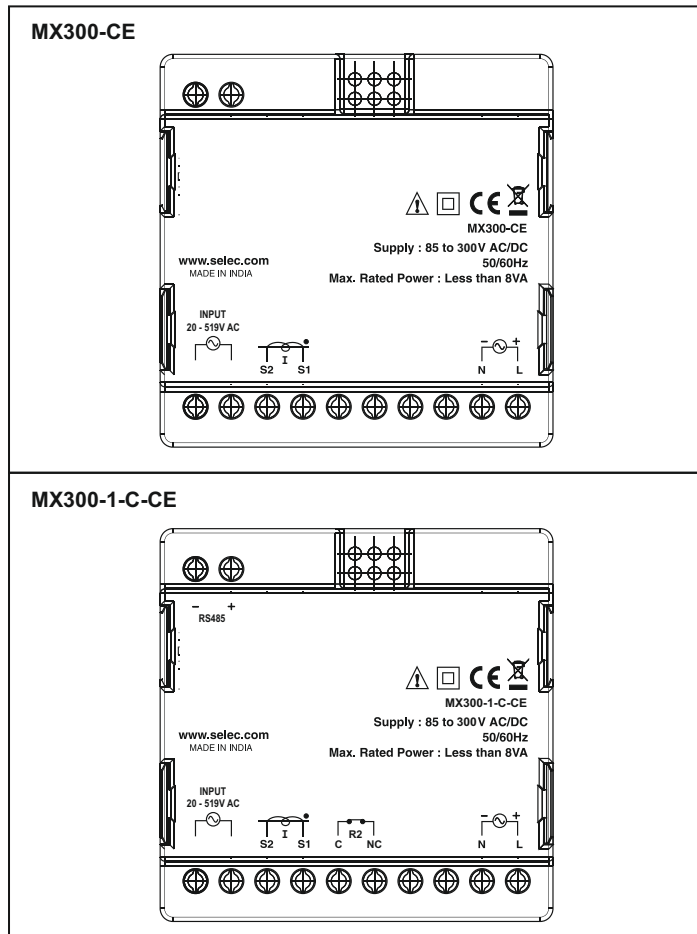
Packaging

Packing material	Corrugated box
Weight	Unpacked : 192gms Packed : 234gms

Dimensions (in mm)



Terminal Connection (in mm)



Compliance

Applicable product standard IEC 61326-1		
Category		Standards compliance
Radiated Emission (RE)	CISPR 11	For Class A, Group 1 equipment 10m Measuring Distance: 30-230MHz = 40dB (uV/m) 230 - 1000MHz = 47dB (uV/m)
Conducted Emission (CE)	CISPR 11	For Class A, Group 1 equipment 0.15 - 0.50MHz Quasi Peak = 79dB (uV), Avg = 66dB (uV) 0.5 - 5.0MHz Quasi Peak = 73dB (uV), Avg = 60dB (uV) 5 - 30MHz Quasi Peak = 73dB (uV), Avg = 60dB (uV)

EMI/EMC test compliance		
Category		Standards compliance
Electrostatic discharge test (ESD)	IEC 61000-4-2	8 kV air discharge & Contact Discharge 6kV Performance Criteria A
Radiated radio-frequency electromagnetic field immunity test (RS)	IEC 61000-4-3	8 kV air discharge & Contact Discharge 6kV Performance Criteria A
Electrical fast transient test (EFT)	IEC 61000-4-4	10 V/m (80 MHz to 2.7 GHz) Performance criteria A
Surge immunity test	IEC 61000-4-5	2kV on auxiliary supply and 2kV on measuring, 5kHz Performance Criteria A
Conducted radio-frequency immunity test (CS)	IEC 61000-4-6	2kV on input Auxiliary Performance Criteria A
Voltage dips & interruptions immunity test (VDI)	IEC 61000-4-11	3Vrms (150 kHz to 80 Mhz) Performance Criteria A Dips : 0 % during 1 cycle 40 % during 10/12 cycles 70 % during 25/30 cycles 80 % during 250 cycles Short interruptions : 0 % during 250/300 cycles, C

Ordering information

Product code	Description	Certification
MX300-CE	Universal digital panel meter in 96 x 96mm size	CE
MX300-1-C-CE	Universal digital panel meter in 96 x 96mm size. 1 Relay output and modbus communication	CE

Note :

- #1 - Only 1 parameter can be selected using DIP switch
- #2 - Only available in MX300-1-C-CE model
- #3- Applicable along with CT PT ratio

selec**MX300-CE**
Operating Instructions

SPECIFICATIONS

DISPLAY

- 1 row of 4 digits to show electrical parameters
- 7 segment LED display
- Digit integrated with parameter units.

INDICATIONS

- K : Kilo
- M : Mega
- V : Voltage
- A : Current
- W : Active power
- VAr : Reactive power
- VA : Apparent power
- PF : Power factor
- Hz : Frequency

RATED INPUT VOLTAGE

- 20 to 300V AC (L-N)
- 34 to 519V AC (L-L)
- Installation Category II

FREQUENCY RANGE

- 45-65 Hz

RATED INPUT CURRENT

- Nominal 5A AC (Min-40mA, Max-6A)

BURDEN

- 0.1 VA@5A

CT PRIMARY

- 5A to 9999A
- (Programmable for Any Value)

CT SECONDARY

- 5A

PT PRIMARY

- 100V to 500kV
- (Programmable for any value)

PT SECONDARY

- 100V to 500V AC (L-L)
- (Programmable for any value)

DISPLAY UPDATE TIME

- 1 sec. for all parameters

DISPLAY SCROLLING

- Automatic or Manual (Programmable)

POWER CONSUMPTION

- Less than 8VA

ENVIRONMENTAL CONDITIONS

- Indoor
- Altitude of up to 2000m
- Pollution degree II

TEMPERATURE

- Operating : -10C to 55°C
- Storage : -20°C to 75°C
- Humidity : Up to 85% non-condensing

MOUNTING

- Panel mounting

WEIGHT

- 192gms

ORDER CODE INFORMATION		
Product	Supply	Certification
MX300-CE	85V AC to 300V AC	CE

ACCURACY

Measurement	Accuracy
Voltage V_{L-N}	$\pm 0.5\%$ of Full scale
Current	$\pm 0.5\%$ of Full scale
Frequency	$\pm 0.1\%$ For L-N voltage : $\geq 50V$ For L-L voltage : $\geq 87V$
Power Factor	± 0.01
Active Power	1%
Reactive Power	2%
Apparent power	---

- NOTE :** 1) For Voltage, Current and Power resolution is automatically adjusted.
2) For power factor, resolution is 0.001

POWER RESOLUTION

Power Value (W)	Display (W)
<10k	9999
<100k	99.99k
<1M	999.9k
<10M	9999k
<100M	99.99M
<1000M	999.9M
<10000M	9999M

SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating personnel as well as the instrument.

If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

Do not use the equipment if there is any mechanical damage.

Ensure that the equipment is supplied with correct Voltage.

CAUTION :

1. Read complete instructions prior to installation and operation of the unit.
2. Risk of electric shock.
3. The equipment in its installed state must not come in close proximity to any heating sources, oils, steam, caustic vapors or other unwanted process by products.

WIRING GUIDELINES

WARNING :

1. To prevent the risk of electric shock, power supply to the equipment must be kept OFF while doing the wiring arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.

6. Cable used for connection to power source, must have a cross section of 1mm^2 to 2.5mm^2 (20 to 14AWG ; $75^\circ\text{C}(\text{min})$). These wires shall have current carrying capacity of 6A.

INSTALLATION GUIDELINES

CAUTION :

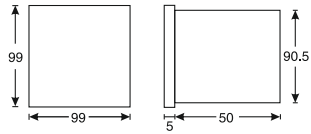
1. This equipment being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. Circuit breaker or mains switch must be installed between power source and supply terminals to facilitate power 'ON' or 'OFF' function. However this switch or breaker must be installed in a convenient position normally accessible to the operator.
4. Before disconnecting the secondary of the external current transformer from the equipment, make sure that the current transformer is short circuited to avoid risk of electrical shock and injury.
5. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
6. The equipment does not have a built-in-type fuse. Installation of external fuse of rating 276V AC/0.5Amp for electrical circuitry / battery is highly recommended.

MECHANICAL INSTALLATION

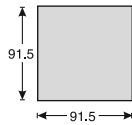
For installing the meter

1. Prepare the panel cutout with proper dimensions as shown below.
 2. Push the meter into the panel cutout. Secure the meter in its place by fitting the clamp on the rear side. Fit clamps on both sides in diagonally opposite location for optimum fitting.
 3. For proper sealing, tighten the screws evenly with required torque.
- Terminal screw tightening torque :
0.68 N-m to 0.79 N-m
(6.018 In-Lb to 6.992 In-Lb)
Screw clamp tightening torque :
0.1N-m (0.885 Lb-inch)

OUTLINE Dimensions (in mm)



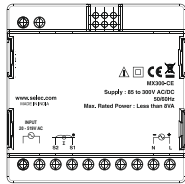
PANEL CUTOUT Dimensions (in mm)



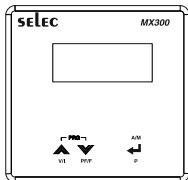
MAINTENANCE

- The equipment should be cleaned regularly to avoid blockage of ventilating parts.
 - Clean the equipment with a clean dry or damp cloth.
- Do not use any cleaning agent other than water.

TERMINAL CONNECTIONS



FRONT PANEL DESCRIPTION



ONLINE PAGE DESCRIPTION

There are 3 dedicated keys labelled as INC, DEC, ENTER respectively. Simply press these keys to read the parameters. Units of corresponding parameter on display will automatically glow.

1) Key-1	▲
2) Key-2	▼
3) Key-3	↵

KEY PRESS	PAGE DESCRIPTION	
1P2W		
▲	Page1	Displays Phase Voltage
▲	Page2	Displays Phase Current
▼	Page1	Displays Power Factor
▼	Page2	Displays Frequency
↵	Page1	Displays Active Power
↵	Page2	Displays Reactive Power
↵	Page3	Displays Apperant Power

SERIAL NUMBER DESCRIPTION

Press ▲ key for 10 sec. to display 8 digit serial number only for 5 sec.

CONFIGURATION

There are three dedicated keys with ▲ ▼ ↵ symbol

Note : Setting should be done by professional after going through this user manual and having understood the application situation.

For the configuration setting mode :

- Use ▲▼ key for 3 sec to enter and exit from configuration menu.
- Use ▲ key to increment the value.
- Use ▼ key to edit the value and shift the cursor for next digit to edit .
- Press ↵ key to save the value and go to next page.

Config. page	Function	Range or Selection	Factory Setting
1	Password	0000 to 9998	1000
2	Change Password	No / Yes	No
3	New Password	0000 to 9998	1000
4	CT Secondary	5A	5
5	CT Primary	Upto 9999A	5
6	PT Secondary	100V to 500V	350
7	PT primary	100V to 500kV	350
8	Factory Default	No / Yes	No

PT PRIMARY SETTING

Example :- PT.PR 123456

"K" ON	123 will get displayed on first screen
"K" OFF	456 will get displayed on second screen

* Use "▼" to shift cursor as well as to toggle between two screens.

AUTOMATIC / MANUAL MODE DESCRIPTION

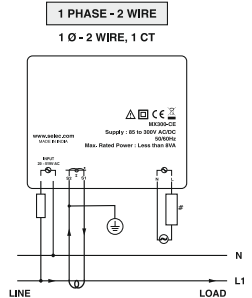
Press ↵ key for 5 seconds to toggle between Automatic and Manual mode. But DIP switch configuration must be kept at 000 to turn this function ON.

Note : By default unit operates in automatic mode. In automatic mode online pages scroll automatically at the rate of 5 seconds per page. In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed, also if any key is not pressed for 5 sec, unit resumes automatic mode.

DIP SWITCH CONFIGURATION

Key configuration			Parameter
Key-1	Key-2	Key-3	
0	0	0	Auto / Manual mode
0	0	1	Voltage
0	1	0	Current
0	1	1	Power factor
1	0	0	Active power
1	0	1	Reactive power
1	1	0	Apperant power
1	1	1	Frequency

TYPICAL WIRING DIAGRAM



All fuse types: 0.5A class CC UL type
0.5A fast acting 600V

(Specifications are subject to change, since development is a continuous process.)

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