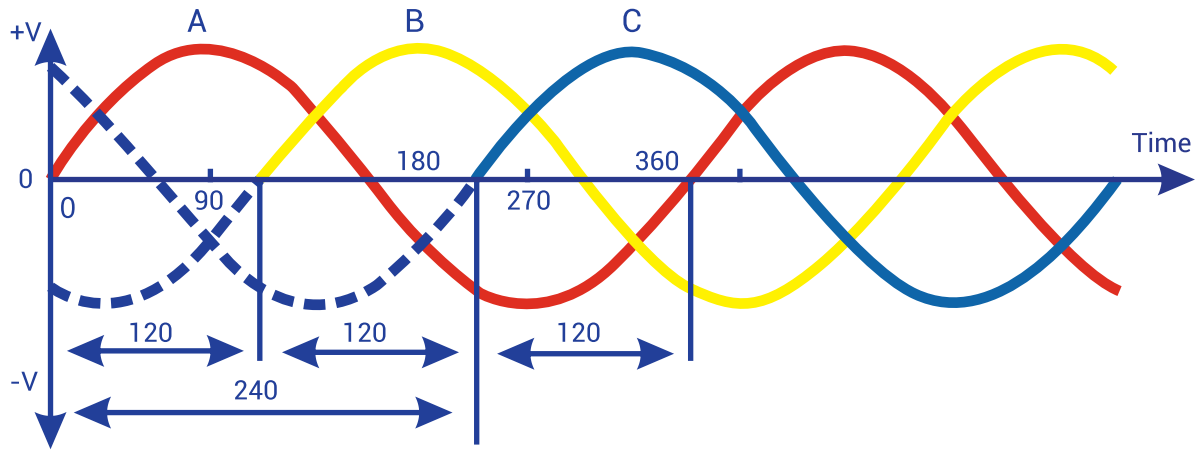
masibus

A Sonepar Company

Electrical Transducer & Meters

POWER PARAMETERS



- AC Voltage - V
- AC Current -A
- Frequency - Hz
- Power factor - cos θ
- Phase Angle - θ
- Active power -KW
- Reactive power-KVAR
- Apparent Power-KVA
- Active Energy -KWh
- Reactive Energy- KVARh
- Apparent Energy- KVAh
- Maximum Power Demand
- Harmonics & THD

Demand

- Maximum demand register (kW or kVA). This is the maximum power value, usually the average of 15 minutes, reached during the billing period (this average time may vary depending on the country). Once the value is higher than the contracted power, the customer will pay a penalty on the electricity bill.

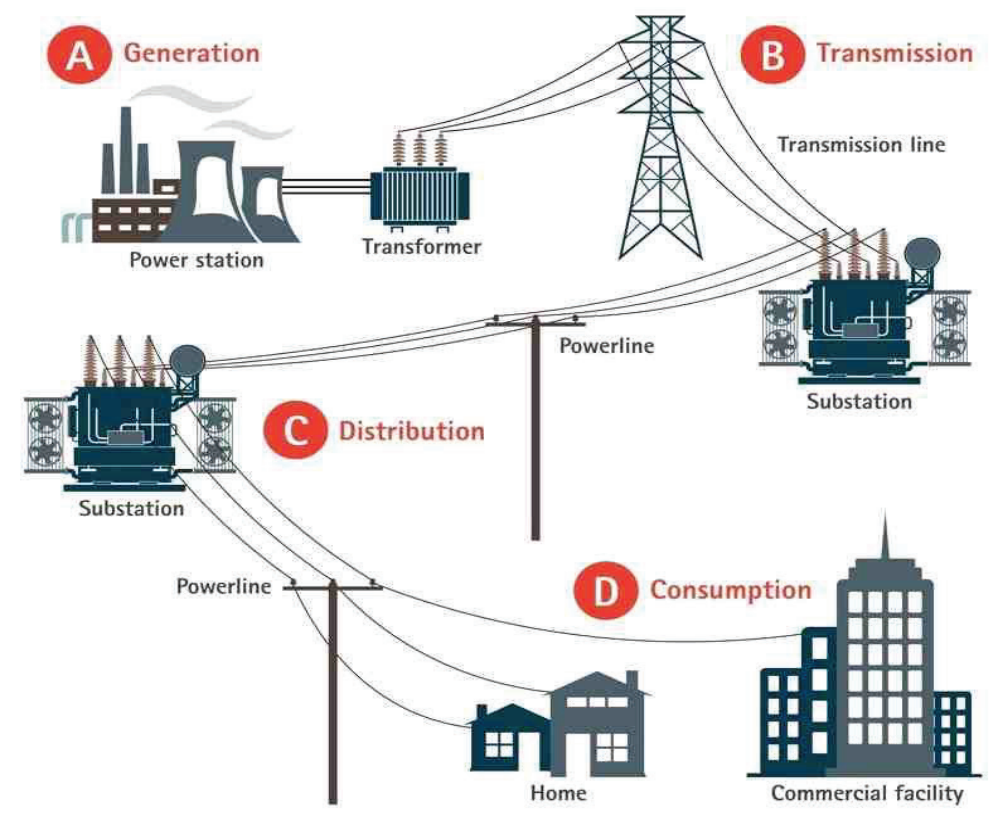
Harmonics & THD

- In an electric power system, a harmonic of a voltage or current waveform is a sinusoidal wave whose frequency is an integer multiple of the fundamental frequency. Harmonic frequencies are produced by the action of non-linear loads such as rectifiers, discharge lighting or saturated electric machines.
- Total harmonic distortion (THD) is the amount of harmonics on a line compared to the line fundamental frequency, eg. 50Hz or 60Hz. The THD considers all of the harmonic frequencies on a line.

Accuracy Class

- Since Accuracy depends on the load of the system, IEC/IS have developed different standards to define accuracy under different load conditions, known as “Accuracy Class”

BENEFITS OF POWER MONITORING



POWER SYSTEM

- It identifies the inefficiency in the system
- It notifies about the impending maintenance
- It will help reduc peak demand
- It ensures safety
- Environmental benefits
- It saves cost

PDA/PDV - PROGRAMMABLE AC CURRENT / VOLTAGE TRANSDUCER

PDA - PROGRAMMABLE CURRENT TRANSDUCER

PDV - PROGRAMMABLE VOLTAGE TRANSDUCER

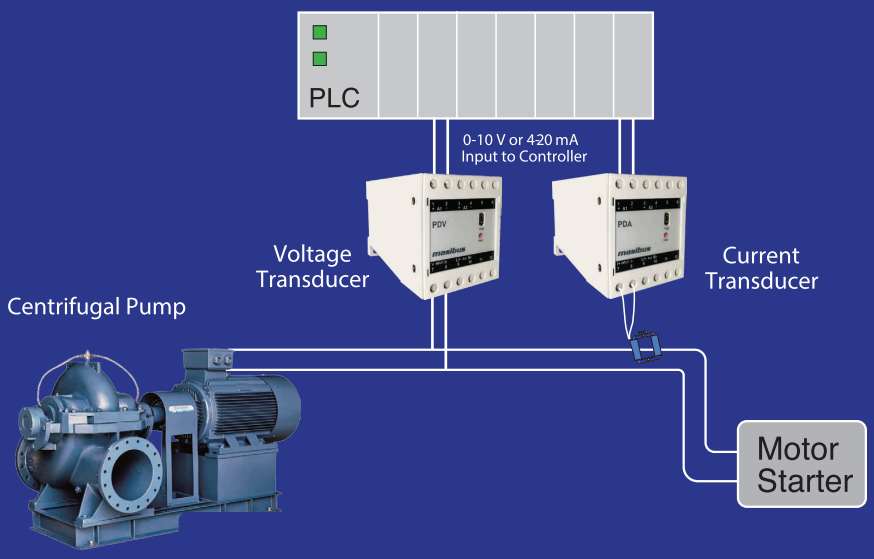
USP

- High accuracy class 0.2 as per IEC60688 standard
- Programmable input rating for PDA, 1A & 5A site selectable and for PDV, 57.7V to 415V AC site selectable
- Expanded or Suppressed input & output ranges for inrush current measurement
- Common inventory for input current (1A/5A) or Voltage (57.7V to 415V AC) ranges as well as for selectable output types (4-20mA DC, 0-20mA DC, 0-10V DC, 0-5V DC, 1-5V DC)

TECHNICAL SPECIFICATIONS	
AC Current Input	
Nominal Input Current (In)	1A to 5A AC
Measuring Current Range	0 to 150 % In
Burden	<0.2VA at In
Maximum Overload Current	2 x In continuously 20 x In for 1 s, with up to 10 repetitions at 100 s intervals
AC Voltage Input	
Nominal Input Voltage(Un)	57.7 V to 415 V AC
Measuring Voltage Range	0 to 130 % Un
Burden	<0.3VA at Un
Maximum Overload Voltage	1.3 x Un continuously 2 x Un for 1 s, with up to 10 repetitions at 10 s intervals
CT/PT Ratio	1 to 9999.999 Programmable
Frequency	45 to 65 Hz

PDA/PDV - PROGRAMMABLE AC CURRENT / VOLTAGE TRANSDUCER

TECHNICAL SPECIFICATIONS	
Power Supply	Universal aux. supply : 85-265VAC, 50/60Hz or 100-300VDC Burden : < 5.5VA (2.2W)
	DC aux. Supply : 20-60VDC Burden : < 2.2W
Analogue Output	
No. of Outputs	2
Output Type	4-20mA, 0-20mA, 0-10V, 0-5V, 1-5V DC
Maximum Load Resistance	≤750 Ω for 20 mA, ≥ 2 k Ω for 10 V (for each output)
Response Time	<500mS
Ripple	<0.4% peak to peak
Isolation	3KV AC for one minute
Impulse voltage tests	5 kV, 1.2/50 uS as per IEC60688
General Specifications	
Operating Temperature	0 to 55 °C
Relative Humidity	25-95% non-condensing
Ingress Protection	Housing : IP40, terminals : IP20
Mounting Type	DIN-Rail
Dimension (in mm)	71H x 61W x 112D
Connector Type	Metal screw
Conductor Size for Terminals	≤ 4 mm2
Configuration Port	Mini USB type



CURRENT MONITORING FOR SPIN PUMP APPLICATION

MULTIFUNCTION TRANSDUCERS

MFT20

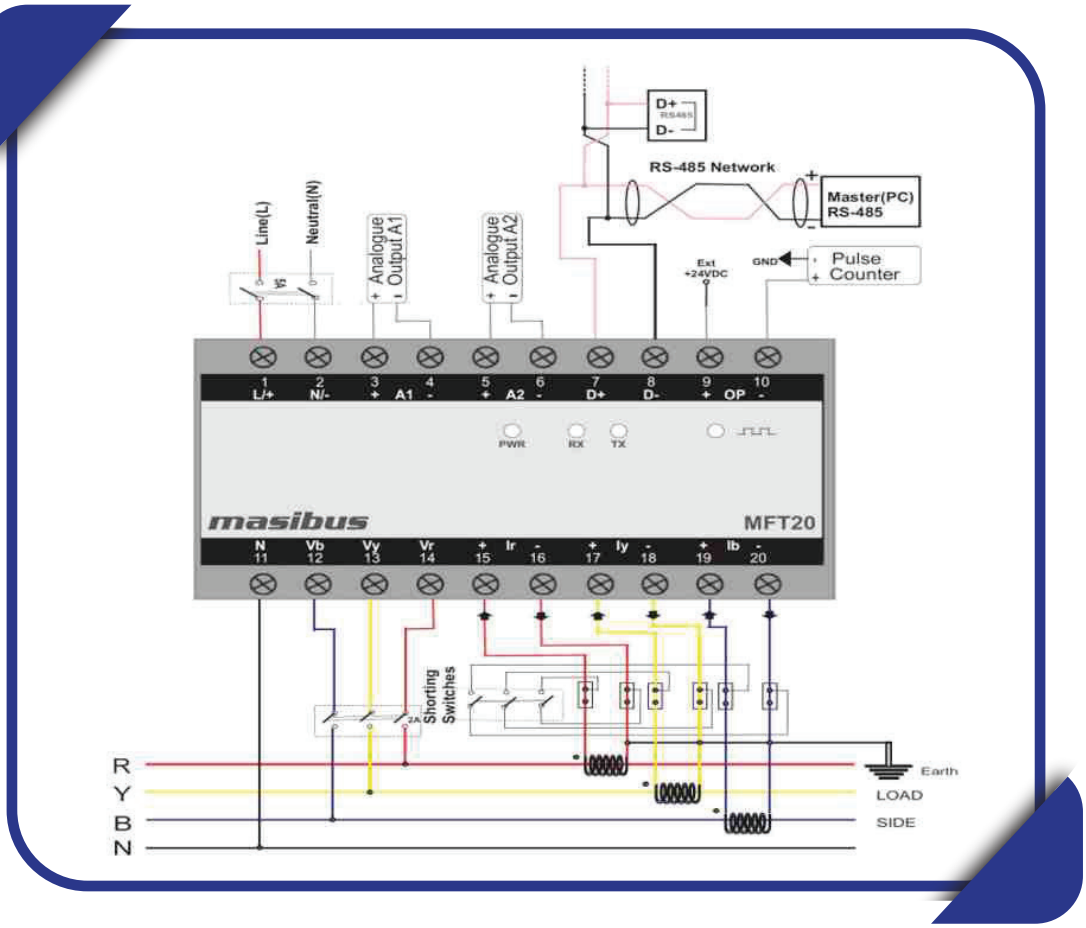
MFT

RoHS

USP

- Available in accuracy class 0.5 or 0.2 as per IEC 60688 standard
- EMI/EMC compiled as per IEC 61326-1 standard
- 28 Electrical parameters can be mapped to analogue O/P
- User Assignable Modbus Registers map

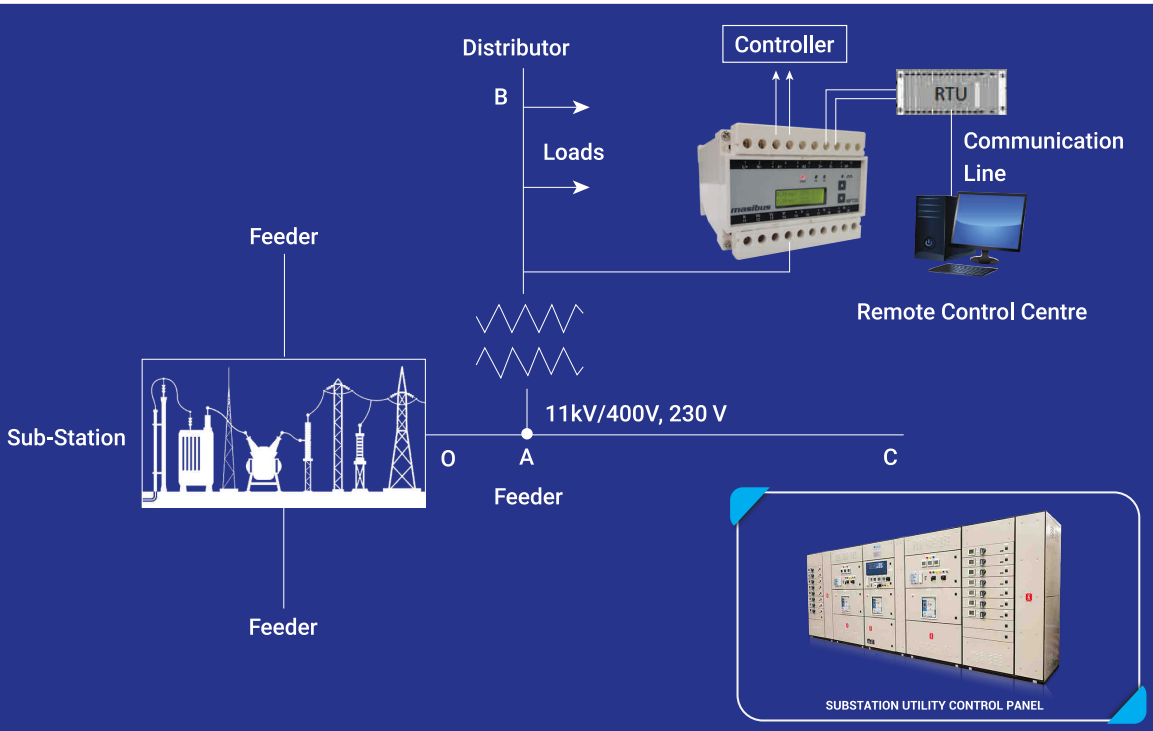
CONNECTION DIAGRAM



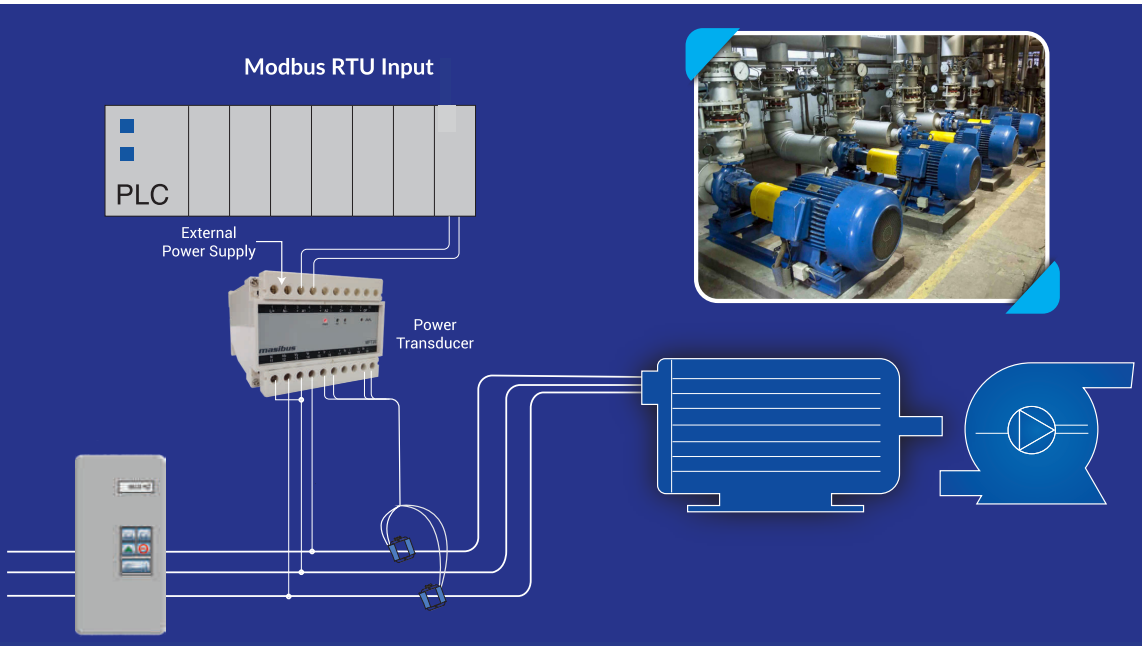
MULTIFUNCTION TRANSDUCERS

TECHNICAL SPECIFICATIONS	
System Type	3Ph4W / 3Ph3W (Site selectable)
AC Current Input	
Nominal Input Current (In)	1A / 5A AC Site selectable
Measuring Current Range	0.01A to 6A
Burden	<0.2VA per phase
AC Voltage Input	
Nominal Input Voltage(Un)	63.5VL-N to 240VL-N
Measuring Voltage Range	20VL-N to 300VL-N (34VL-L to 520VL-L) Self Powered : 63.5VL-N to 240VL-N
Burden	<0.2 VA per phase
CT/PT Ratio	1 to 9999.999 Programmable
Frequency	45 to 65 Hz
Standard Compliance	IEC 60688, IEC 61326-1
Power Supply	Aux. Powered 85-265VAC/ 100-300VDC Burden : < 3VA (Without Analog O/P) < 7VA (With Analog O/P)
Analogue Output	
No. of Outputs	2 (MFT20), 4 (MFT)
Output Type	4-20mA, 0-20mA, 0-10V, 0-5V, 1-5V DC
Maximum Load Resistance	< 550 Ω for mA O/P > 2 k Ω for V O/P
Response Time	< 600mS
Ripple	<0.4% peak to peak
General Specifications	
Operating Temperature	-10 to 60°C
Relative Humidity	Up to 95% non-condensing
Ingress Protection	Housing : IP40, terminals : IP20
Case Material	ABS
Mounting Type	DIN-Rail mounting / Wall mounting
Dimension (in mm)	70H x 100W x 112D
Connector Type	Metal screw
Terminations	Metal screw can accept up to two 2.5 mm^2 wire or single 4.0 mm^2 wire

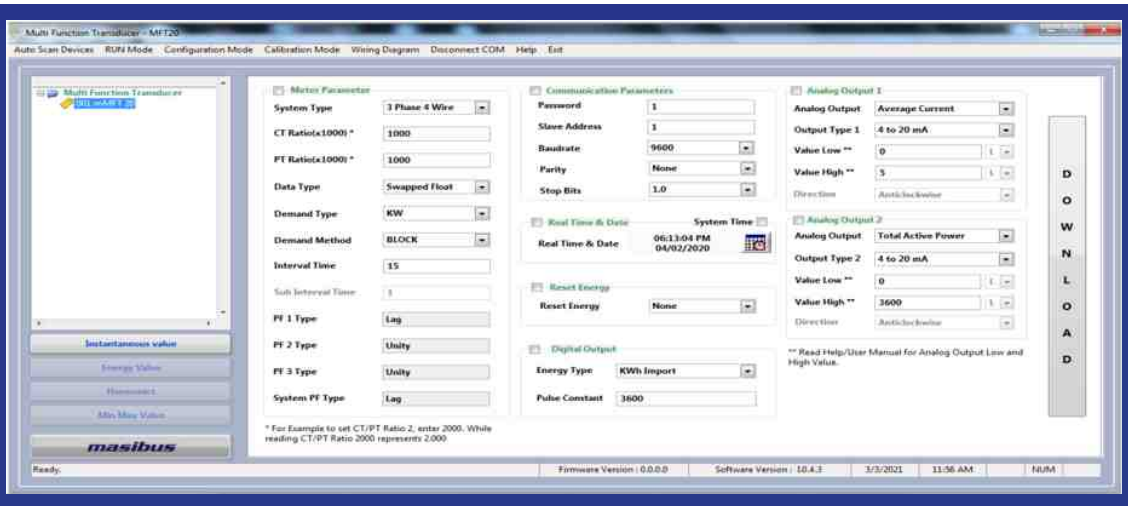
FEEDER MONITORING IN UTILITY SUBSTATION



POWER MONITORING OF MOTOR & PUMP



FREE CONFIGURATION SOFTWARE FOR MFT



MAPPING PARAMETERS LIST

SR.NO	AO PARAMETER MAPPING	
	3P4W	3P3W
1	System Frequency	System frequency
2	R Phase PF	-
3	Y Phase PF	-
4	B Phase PF	-
5	System PF	System PF
6	R Phase Voltage	RY Phase Voltage
7	Y Phase Voltage	BR Phase Voltage
8	B Phase Voltage	BY Phase Voltage
9	Average Voltage	Average Voltage
10	R_Y Phase Voltage	-
11	B_R Phase Voltage	-
12	B_Y Phase Voltage	-
13	R Phase Current	R Phase Current
14	Y Phase Current	-
15	B Phase Current	B Phase Current
16	Average Current	Average Current
17	R Phase Active Power	RY Phase Active Power
18	Y Phase Active Power	-
19	B Phase Active Power	BY Phase Active Power
20	Total Active Power	Total Active Power
21	R Phase Reactive Power	RY Phase Reactive Power
22	Y Phase Reactive Power	-
23	B Phase Reactive Power	BY Phase Reactive Power
24	Total Reactive Power	Total Reactive Power
25	R Phase Apparent Power	RY Phase Apparent Power
26	Y Phase Apparent Power	-
27	B Phase Apparent Power	BY Phase Apparent Power
28	Total Apparent Power	Total Apparent Power

2330 & 2310 - VAF METER / VOLTMETER / AMMETER / FREQUENCY METER

RoHS

0.56" [14mm] height seven segment
4 digit, Three line display(2330)
4 digit, Single line display(2310)

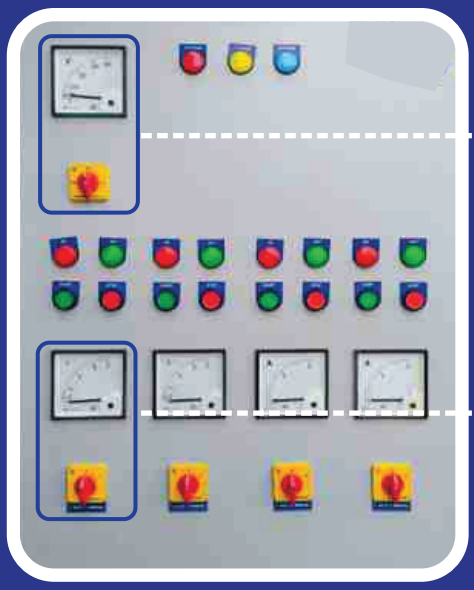
2310 **2330**

USP

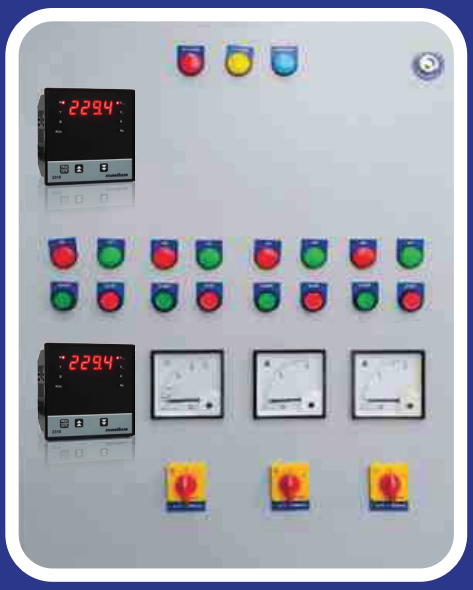
- 1A/5A field selectable CT
- RPM measurements to monitoring the speed of motors, conveyors, turbines and other rotating equipments
- Run hour & power interruption count
- Maximum voltage and current value

TECHNICAL SPECIFICATIONS	
System Type	3P4W / 3P3W /1P2W
AC Current Input	
Nominal Input Current (In)	1A to 5A
Measuring Current Range	50mA to 6A
Burden	< 0.25VA per phase
AC Voltage Input	
Nominal Input Voltage(Un)	63.5V L-N to 240V L-N
Measuring Voltage Range	0 to 550V L-N
Burden	<0.5 VA per phase
CT/PT Ratio	1 to 9999 Programmable
Frequency	45 to 65 Hz
Power Supply	Aux. Powered 90-270VAC, 50/ 60Hz or 100-300VDC Burden : < 3VA
Accuracy	
Voltage	± 0.5% of F.S. ± 1 Digit
Current	± 0.5% of F.S. ± 1 Digit
Frequency	+/- 0.5% of Reading (>40V Input)

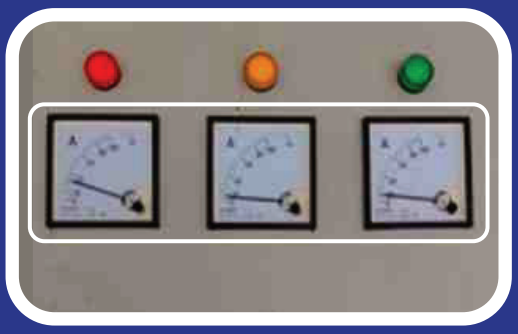
APPLICATION TARGET - VOLTMETER/AMMETER/VAF METER



ANALOG METER + SWITCH



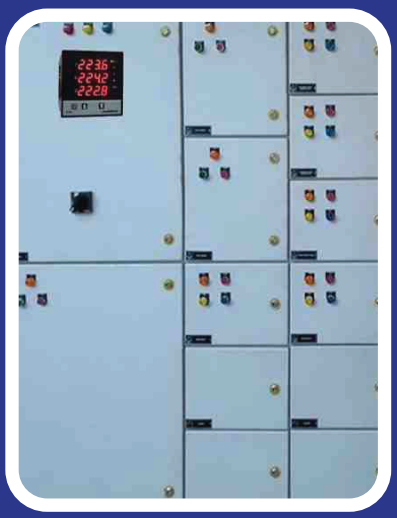
DIGITAL METER - 2310
(VOLTMETER & AMMETER)



3 NOS. ANALOG AMMETERS

DIGITAL AMMETER - 2330

ANALOG VOLTMETER +
AMMETERS + 2 NOS. SWITCH



DIGITAL VAF METER - 2330

PM2140 - POWER METERS & EM2140 - DUAL SOURCE ENERGY METER

EM 2140

PM 2140

USP EM2140

- Measure two different (EB & DG) source energy using single instrument
- Phase healthy & reversal Indication
- Display configuration for parameters selection & sequence
- 8-Digit energy resolution with life timer for energy

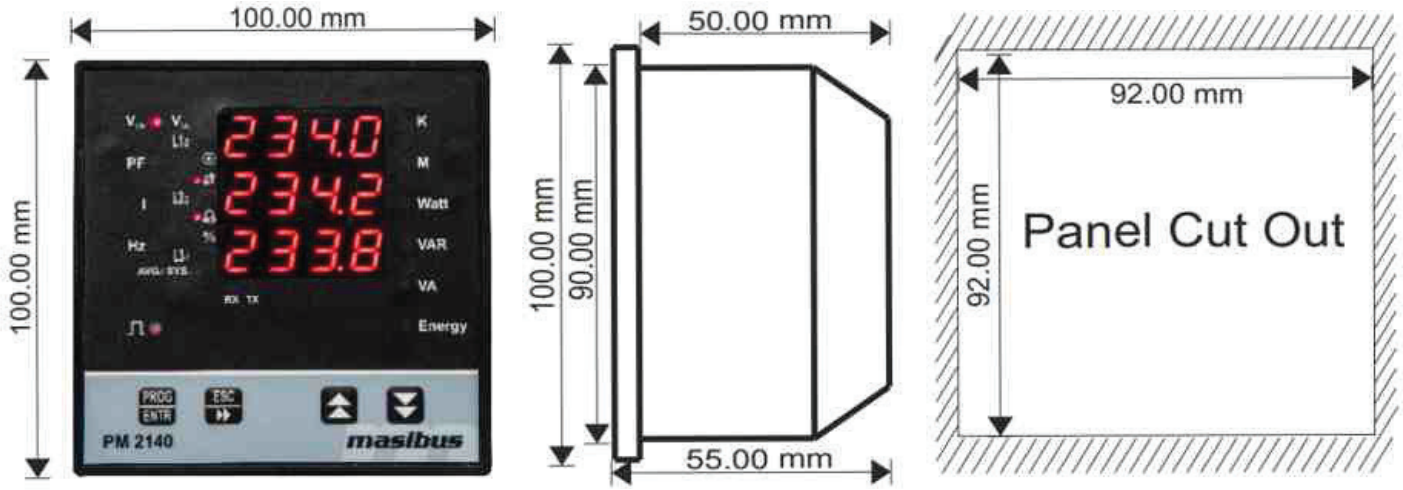
USP PM2140

- Energy accuracy class 1.0 as per IS 13779/ IEC 62053-21
- Positive energy accumulation even with CT polarity reversal
- Independent programmable relay output for alarm trip

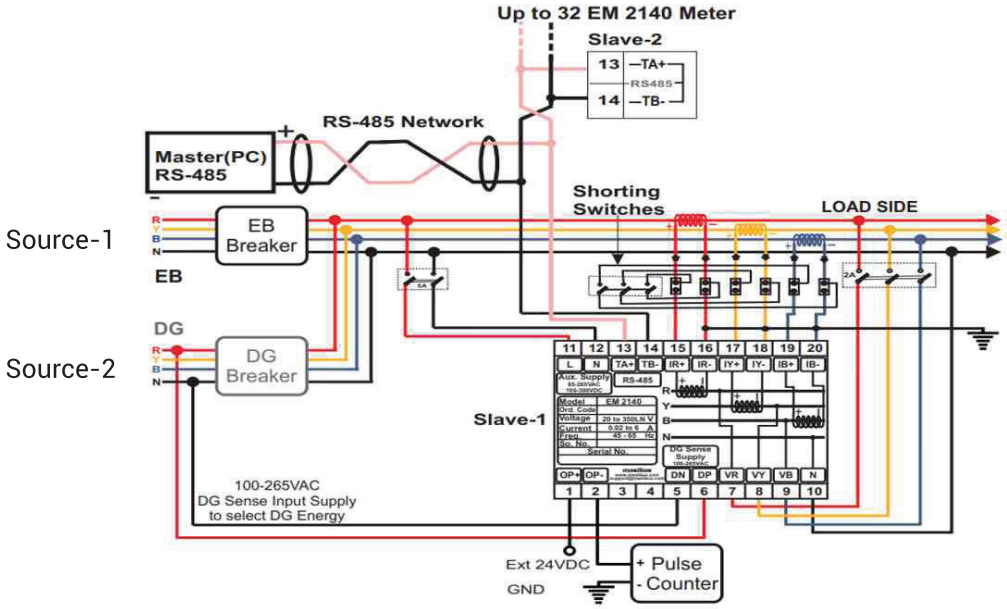
PM2140 & EM2140 - SPECIFICATION

TECHNICAL SPECIFICATIONS	
System Type	3Ph4W / 3Ph3W (Site selectable)
AC Current Input	
Nominal Input Current (In)	1A to 5A
Measuring Current Range	0.02A to 6A
Burden	< 0.25VA per phase
AC Voltage Input	
Nominal Input Voltage(Un)	63.5V L-N to 240V L-N
Measuring Voltage Range	20V to 350V (L-N) or 34V to 620V (L-L)
Burden	<0.5 VA per phase
CT/PT Ratio	1 to 9999.999 Programmable
Frequency	45 to 65 Hz
DG Sense	100-265VAC (to select DG Energy)
Power Supply	Aux. Powered 85-265VAC/ 100-300VDC Burden : < 3VA
Communication Output RS485	
Interface	Rs485 Modbus RTU
Baud Rate	9600, 19200, 38400 (Selectable)
Parity bit	None, Odd, Even (Selectable)
Stop bit	1, 2 (Selectable)
Relay Output (Optional) for PM2140 & EM2140	
AC/DC Rating	AC - 250V, 5A, DC - ±30V, 5A
Relay Set Point	High Side or Low Side Option
Relay O/P Parameters [Field Selectable]	Phase Volt / Avg. Volt / Phase Current / Avg. Current / Sys. Freq. / Phase Watt / Sys. Watt / Phase VAR / Sys. VAR / Phase VA / Sys. VA / Phase PF / Sys. PF
Relay Contact Type	SPNO [Factory Default], SPNC [Contact Factory]
Pulse Output (Optional in lieu of relay O/P) for EM2140	
Rating	24 VDC @ 20 mA
Pulse rate	3600 pulses per KWh
Pulse duration	40 mSec ± 10%
Output Type	Open collector [External Excitation Required]
Analog Output (Optional in lieu of Relay O/P) for PM2140	
Output Type [Factory Set]	Current O/P: 4-20 mA DC Voltage O/P: 0-10 V DC
Response Time	< 1 Sec
Output Impedance	< 550 Ohms for 4-20 mA DC o/p > 2K for 0-10 V DC o/p
Analog O/P Parameters [Field Selectable]	Phase Volt / Avg. Volt / Phase Current / Avg. Current / Sys. Freq. / Phase Watt / Sys. Watt / Phase VAR / Sys. VAR / Phase VA / Sys. VA / Phase PF / Sys. PF

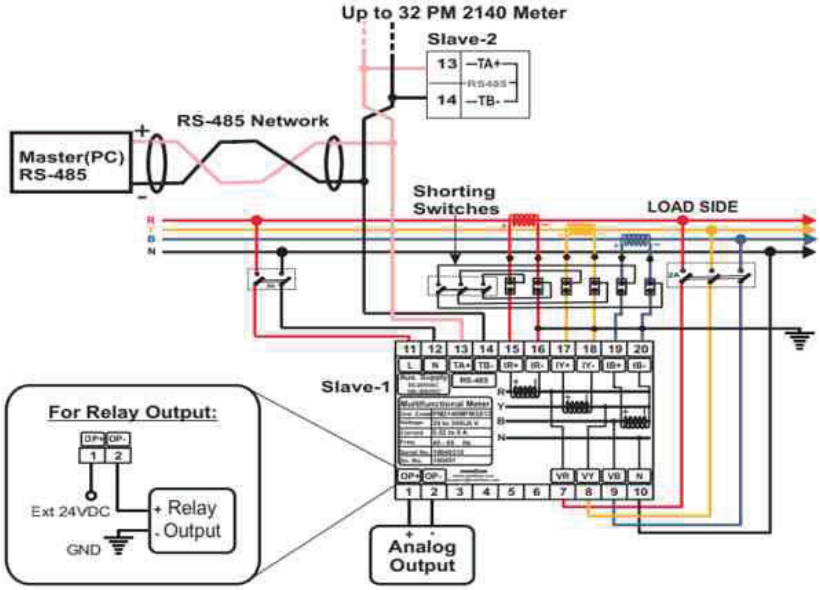
PM2140 & EM2140 - DIMENSIONAL DRAWING



EM2140 CONNECTION DIAGRAM

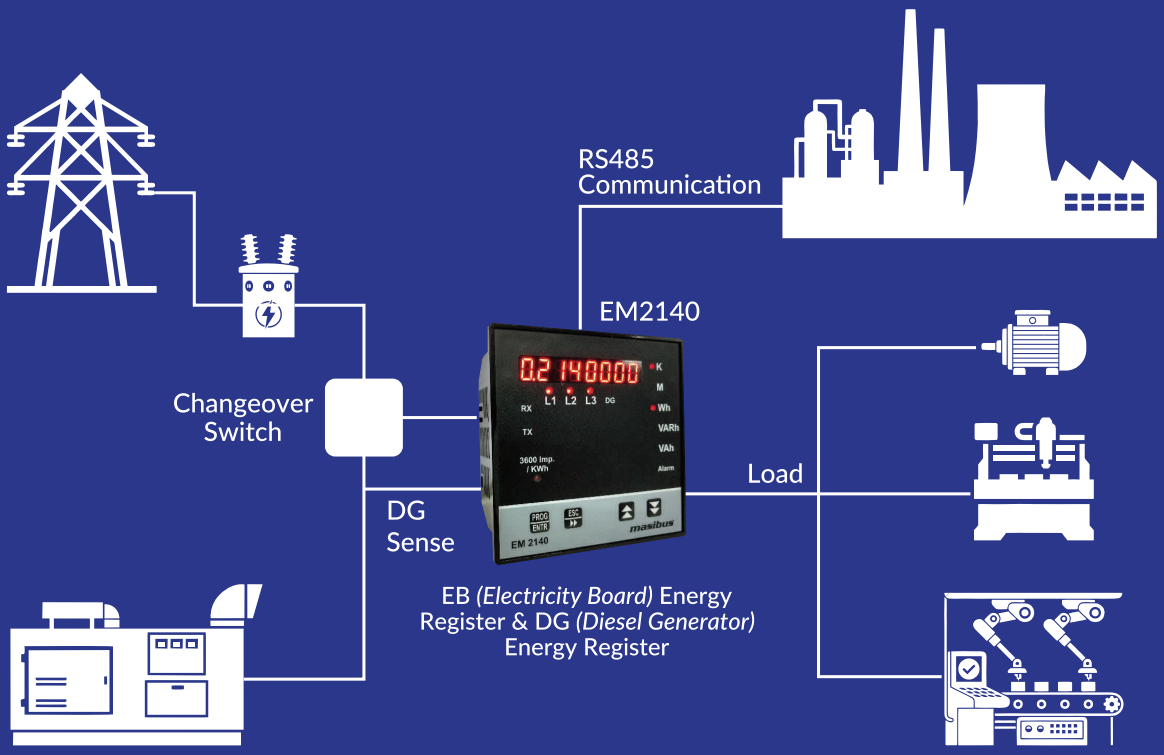


PM2140 CONNECTION DIAGRAM



EM2140 APPLICATION - MONITORING OF DUAL SOURCE USAGE

Dual Source Energy Measurement



MONITORING FOR EB/DG USE & MEASUREMENT OF GENERATOR OVERLOADING

EB-DG CHANGEOVER PANEL

2160-A MULTIFUNCTION METERS

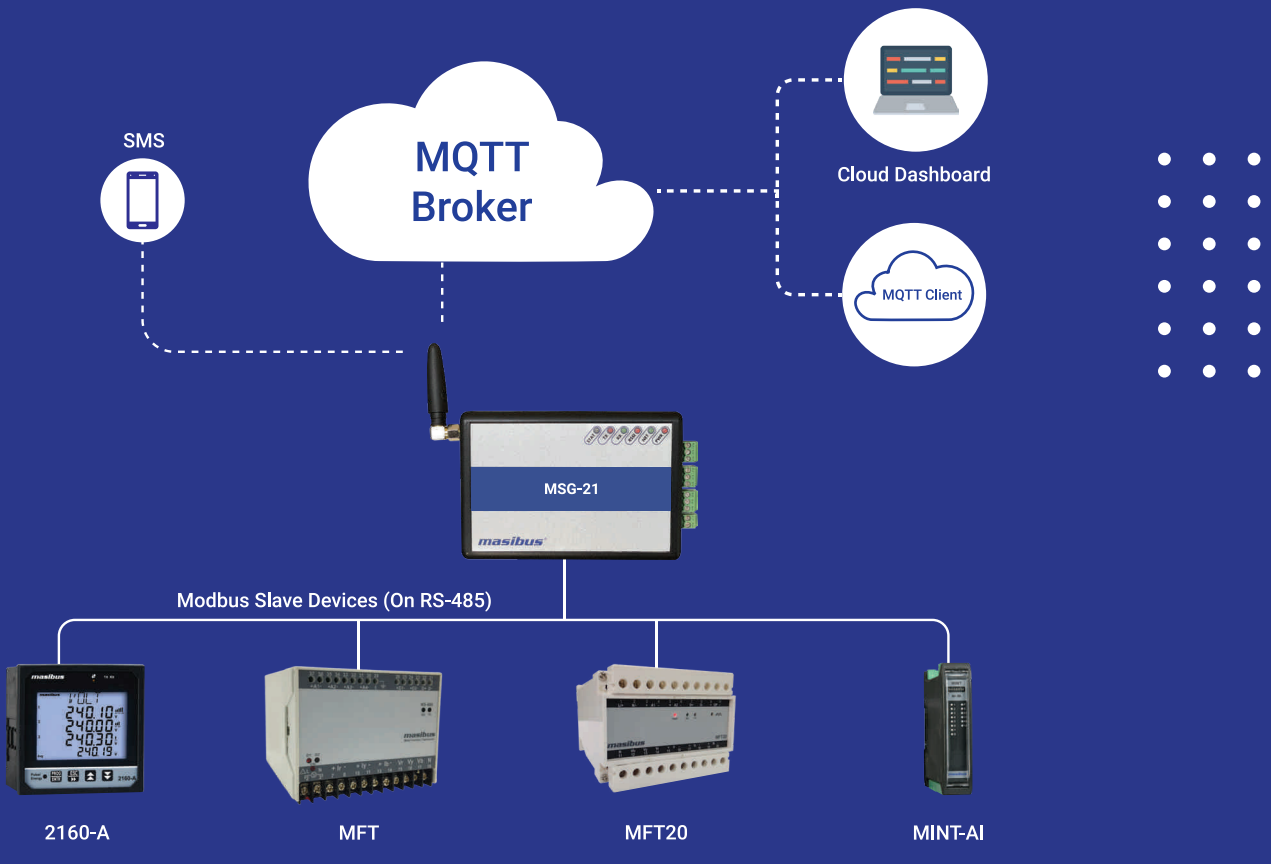
2160 - A
LCD DISPLAY

2160 - A
LED DISPLAY

RoHS

USP

- Available Accuracy Class 1.0, 0.5s, 0.2s for all Active, Reactive & Apparent Energy
- Four Quadrant measurement
- Digital pulse output and also available front Pulse LED for site calibration for selected type of energy
- Maximum Demand and THD Measurement
- Last day Energy, Min-Max Value measurement



REMOTE MONITORING OF ELECTRICAL SYSTEMS - IIOT APPLICATION

MULTIFUNCTION METER- 2160 A

TECHNICAL SPECIFICATIONS	
System Type	3Ph4W / 3Ph3W (Site selectable)
AC Current Input	
Nominal Input Current (In)	1A / 5A AC Site selectable
Measuring Current Range	1mA to 6A
Burden	<0.2VA at per phase
AC Voltage Input	
Nominal Input Voltage(Un)	63.5V L-N, 110V L-N or 240V L-N (Site selectable)
Measuring Voltage Range	20 to 350V (L-N) or 34V to 620V (L-L))
Burden	<0.2 VA per phase
CT/PT Ratio	1 to 9999.999 Programmable
Frequency	45 to 65 Hz
Starting Current	0.1% of Nominal Current
Power Supply	Aux. Powered 85-265VAC/ 100-300VDC Burden : < 4VA for LED Display < 3VA for LCD Panel with Backlight
Communication Output RS485	
Interface	Rs485 Modbus RTU
Baud Rate	9600, 19200, 38400 (Selectable)
Parity bit	None, Odd, Even (Selectable)
Stop bit	1, 2 (Selectable)
Pulse Output (Optional)	
Type	WH/ VARH/ VAH
AC/DC Ratings	24VDC, 20mA
Pulse rate	Programmable from 100 to 60000 pulses per Energy
Pulse duration	20 mSec ± 10%
Output Type	Open collector [External Excitation Required]

PCC PANEL / SWITCHGEAR PANEL

MULTIFUNCTION MTER- 2160 A

Measured Parameters

Voltage	L1-L2, L2-L3, L1-L3, Avg L1-N, L2-N, L3-N, Avg
Current	I1,I2,I3,Avg & In
Frequency	System Frequency
Power Factor	Phase wise PF & Avg
Phase Angle	Phase wise
Power (Phase wise & Total)	Active, Reactive, Apparent
Energy (Phase wise & Total)	Active Energy for Import & Export Reactive Energy for Import & Export Apparent Energy
Demand	Maximum Demand on KW/KVA (Block/Sliding)
THD	Voltage & Current
Real clock & date	
Percentage Voltage & Current Unbalance	
ON hour, RUN hour, IDLE hour,Power Interruption count	
Last day Energy, Min-Max Value	
Accuracy Class	Class 1.0, 0.5s, 0.2s as per IS13779 / IEC62053-21, IS14697 / IEC62053-22

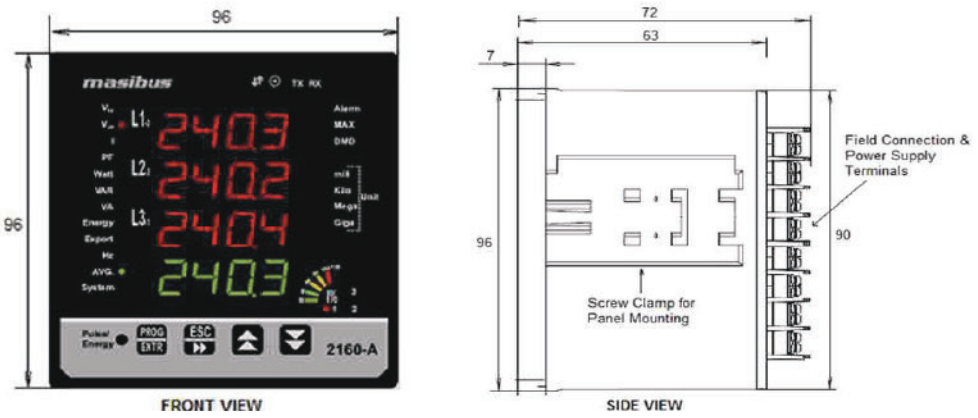
EMI/EMC Test

- Electrostatic Discharge IEC 61000-4-2 [As per IEC61326-1 & IEC62052-11]
- Fast Transient Burst IEC 61000-4-4 [As per IEC61326-1]
- Surge Voltage IEC 61000-4-5 [As per IEC61326-1 & IEC62052-11]
- Conducted Susceptibility IEC 61000-4-6 [As per IEC61326-1 & IEC62052-11]
- Power Frequency Magnetic Field IEC 61000-4-8 [As per IEC61326-1]
- Voltage Dip and Short Interruption IEC 61000-4-11 [As per IEC61326-1]
- Conducted Emission CISPR11 [As per IEC61326-1], CISPR22 [As per IEC62052-11]
- Radiated Emission CISPR11 [As per IEC61326-1], CISPR22 [As per IEC62052-11]
- Impulse Voltage IEC 60060-1

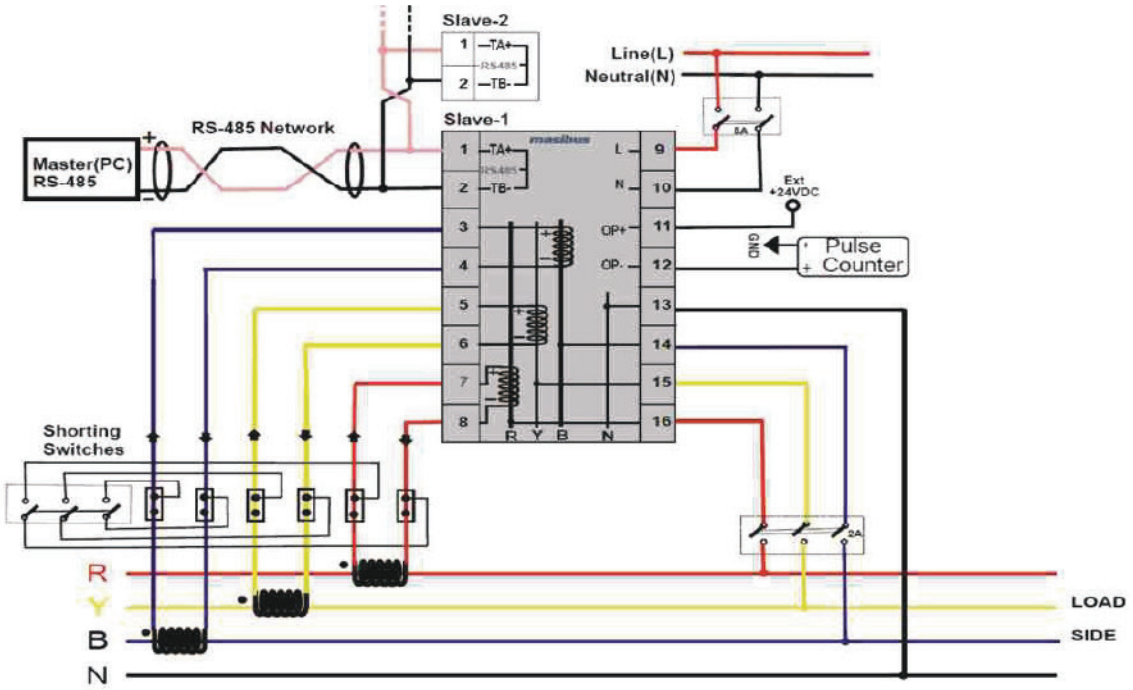
GENERAL SPECIFICATIONS

Mounting Type	Panel mount
Size (in mm)	96 (H) x 96(W) x 64 (D)
Material	ABS
Enclosure Protection	IP-51 (Front Fascia), IP-20 Over all
Working temperature	0 to 55 °C
Terminal	Barrier Type terminal

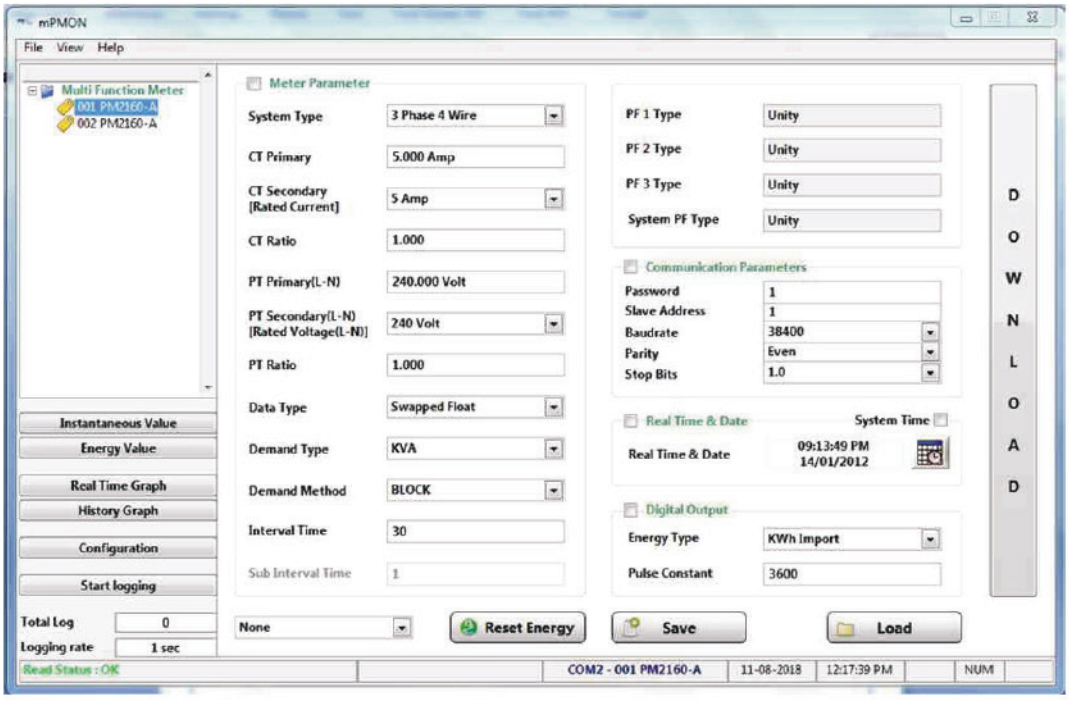
DIMENSIONAL DRAWING



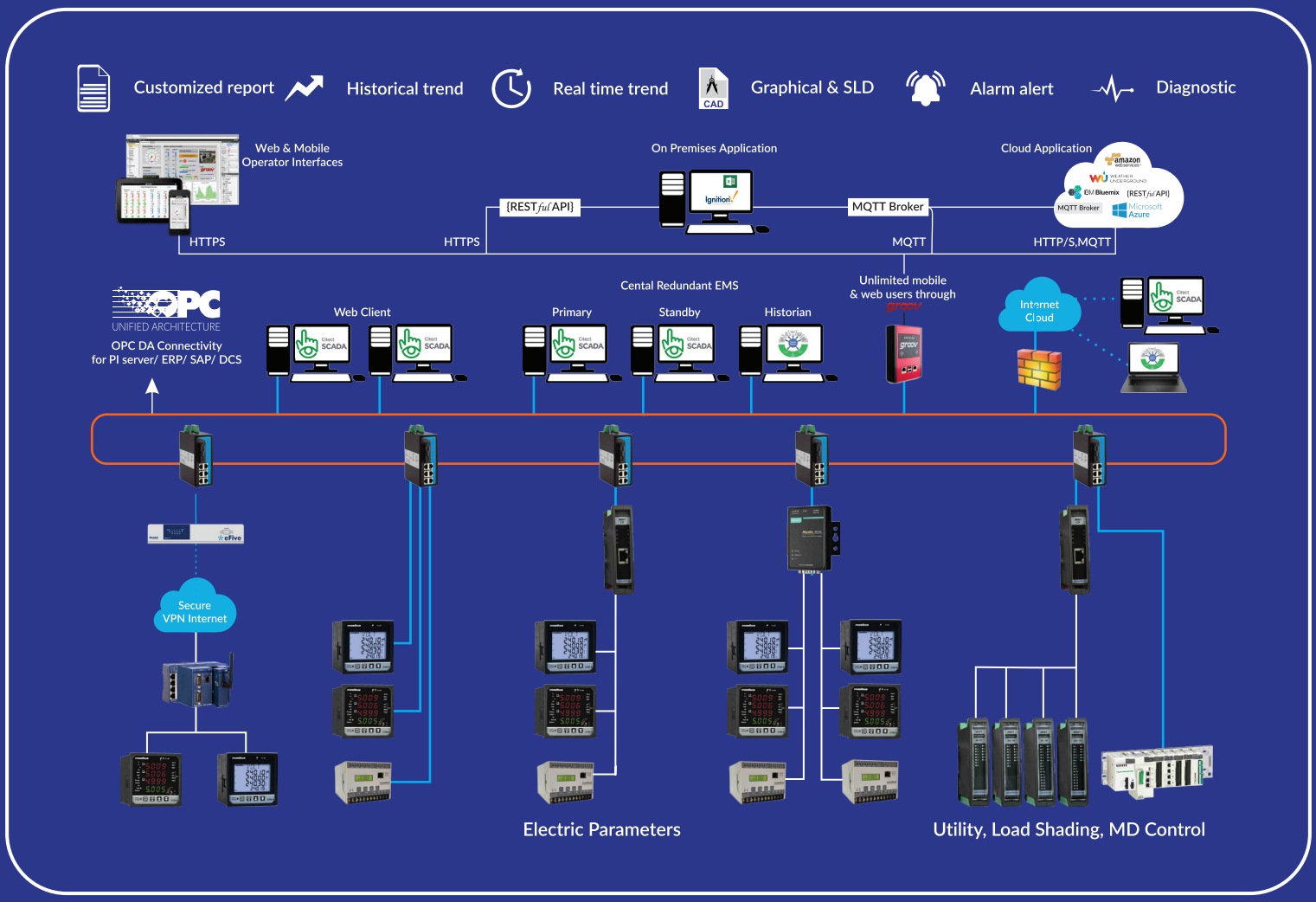
CONNECTION DIAGRAM



FREE CONFIGURATION SOFTWARE FOR MFM



ENERGY MONITORING SYSTEM



- Savings from max demand heavy penalty
- Minimize production loss
- Load balance
- Preventive maintenance
- Man power & resource planning
- Energy cost vs production analysis
- Accurate MIS reporting
- Monitor equipment efficiency

MFT / MFM

User Assignable Modbus Register

- The MFT / MFM contains the 60 user assignable registers in the address range of 2001 to 2119, any of which you can map to either register address accessible in the instrument. Registers that reside in different locations may be accessed by a single request by re-mapping them to adjacent addresses in the user assignable registers area.

- Master can read all required data in a single request to reduce the burden of the master device(PLC, DCS SCADA, RTU) as well as data traffic on communication bus.

What is Transducer (MFT) ?

- The transducer is suitable for measuring, monitoring and analysing Single / three-phase industrial and supply applications. It is available with up to four analogue outputs and can accurately measure electrical quantities such as current, voltage, active power, reactive power and power factor by converting them into proportional DC current or voltage analogue signals (For e.g. 0-10 V, 0-20mA, 4-20 mA etc.). The output signal that is generated is proportional to the true RMS value of the input signal.

What does the 's' on the MFM Accuracy class 0.2s & 0.5s mean?

- IEC Standard 62053-11 covers Accuracy Class 0.5, 1.0 & 2 for electro mechanical meters for active energy (watt-hours) which means the accuracy as a percentage from reading based on full load conditions and unity power factor. However the accuracy deteriorates under lower load conditions, power factor less than unity along with the presence of harmonics.

- IEC Standard 62053-22 covers a higher Accuracy Standard of 0.2S and 0.5S for static/electronic for active energy (watt-hours) providing a higher "Accuracy Standard" under full load conditions and unity power factor in addition to better accuracy readings at much lower load currents, power factor

2160 - A LCD DISPLAY

2160 - A LED DISPLAY

MFT20

MFT20

MFT

DCM23 - DC Energy Meter

DCM23 - DC Energy Meter

USP

- 1 voltage and 4 current input channels
- Bi-directional current measurement
- Programmable CT Primary for all channels up to 400A - Through Hall Effect CT
- RS-485 Modbus communication
- Optional Energy Data logging (upto 60 days with time stamp)

TECHNICAL SPECIFICATIONS	
Input	
Voltage Input Range	5V to 60V DC
Current Input Range	Through Hall Effect CT, Up to 400A
No. of channels	1 voltage channel and 4 current channels
Supply	
Aux supply	DC Supply: 18-60VDC
Power Consumption	< 1.5W
Accuracy	
Reference Conditions	23 °C ± 2 °C
Voltage, Current, Power	± 0.5 % of FS
Energy	Class 1.0
Temperature Drift	0.05 % / °C
Display	
Display & Keys	128 x 64 Graphical LCD with Backlight 3 Front keys for configuration
Displayed Parameters	
Voltage (V)	Common Voltage 1-channel
Current (A), Power (KW), Energy (KWh)	All 4 channels
RTC & Data logging (Optional)	
Data logging	Day wise and month wise energy consumption logging for 60 day & 12 month data capacity.

Utilities vs Electrical Parameters Requirements

Utilities		Watts	VARs	Current	Voltage	Frequency	Phase Angle	Ground Faults	Trans-former Temp.	Ambient Temp.	Watt/ Watt-hour	VAR/ VAR-hour	Billing Allocation	DC Voltage
Generating Station	Per Generator	●	●	●	●	●	●							
	General Use							●	●	●				●
Transmission Station	Incoming Line	●	●	●	●									
	Outgoing Line	●	●	●	●			●	●	●				●
	General													
Transformer Station	Incoming Line				●									
	Station Bus			●	●						●	●		
	Feeder	●	●	●										
	General							●	●	●				●
Distribution Station	Incoming Line				●									
	Station Bus	●	●	●	●									
	Feeder			●										
	General							●	●	●				●
Process Users	Motors	●	●	●	●		●							
	Energy Management													
	Uninteruptible Power Systems	●	●	●	●	●	●							●

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