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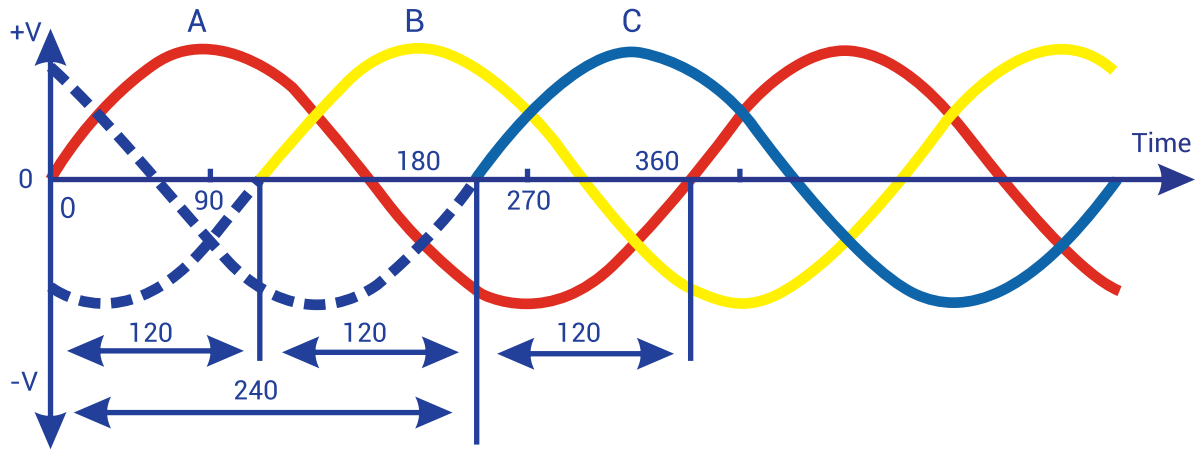
masibus

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.

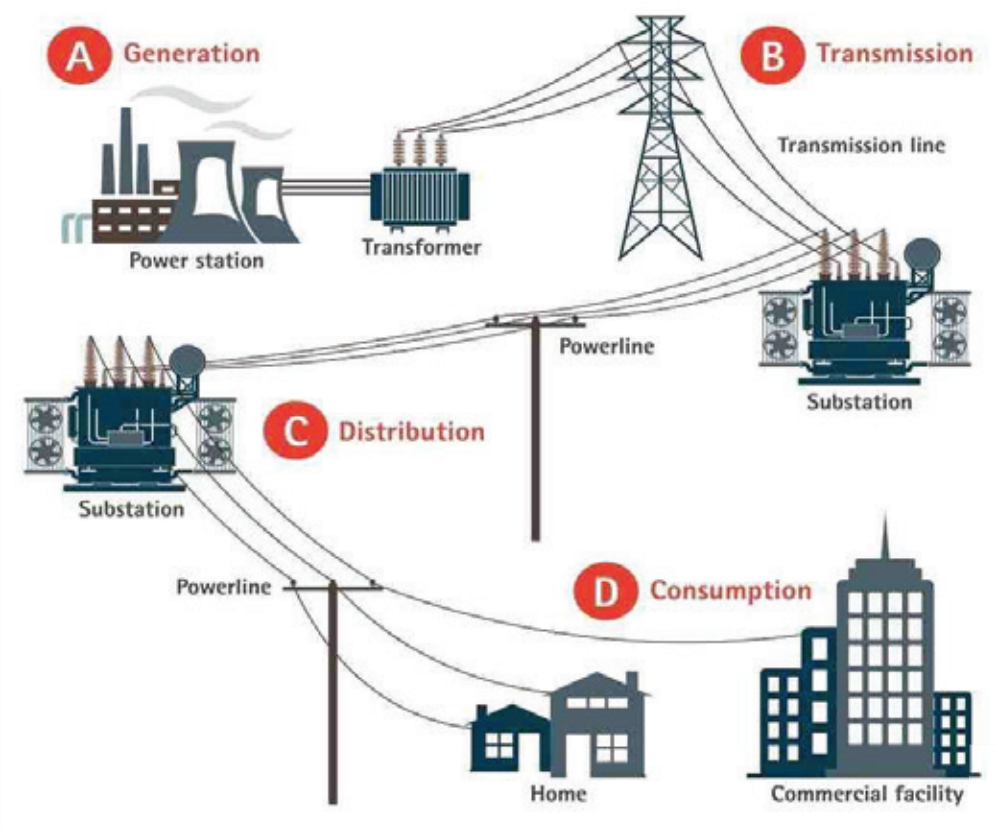
Harmonics & THD

- 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/PDH - PROGRAMMABLE AC CURRENT / VOLTAGE / FREQUENCY TRANSDUCER

PDA - CURRENT TRANSDUCER

PDV - VOLTAGE TRANSDUCER

PDH - FREQUENCY TRANSDUCER

USP

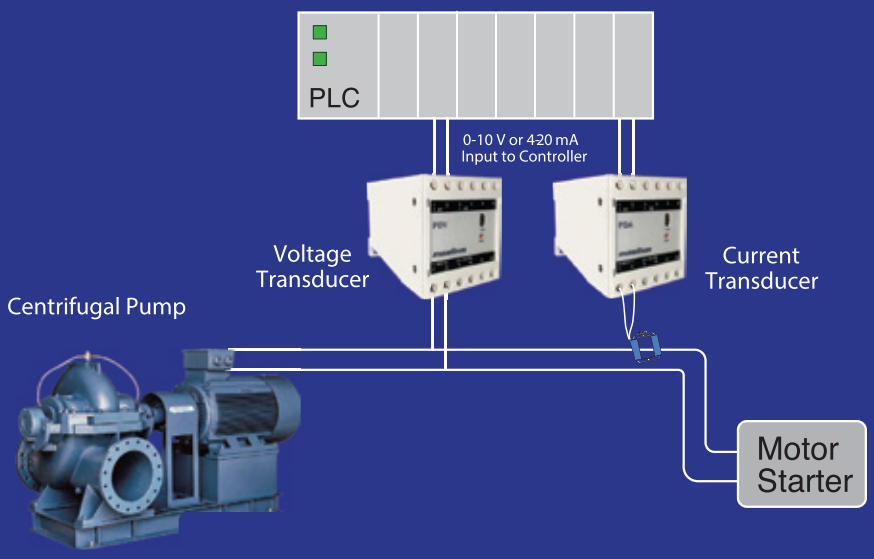
- High accuracy class 0.2 as per IEC60688 standard
- Programmable input rating for PDA, 1A & 5A site selectable
  Programmable input rating for PDV, 0 to 415V AC Site Selectable
  Programmable input rating for PDH, 40 to 70Hz Site Selectable
- Expanded or Suppressed input & output ranges for inrush current 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/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)	0 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
Frequency Input	
Measuring Frequency Range	40 to 70 Hz
Nominal Input Voltage (Un)	57.7 V to 500 VAC

PDA/PDV/PDH - PROGRAMMABLE AC CURRENT / VOLTAGE / FREQUENCY 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 ºC
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

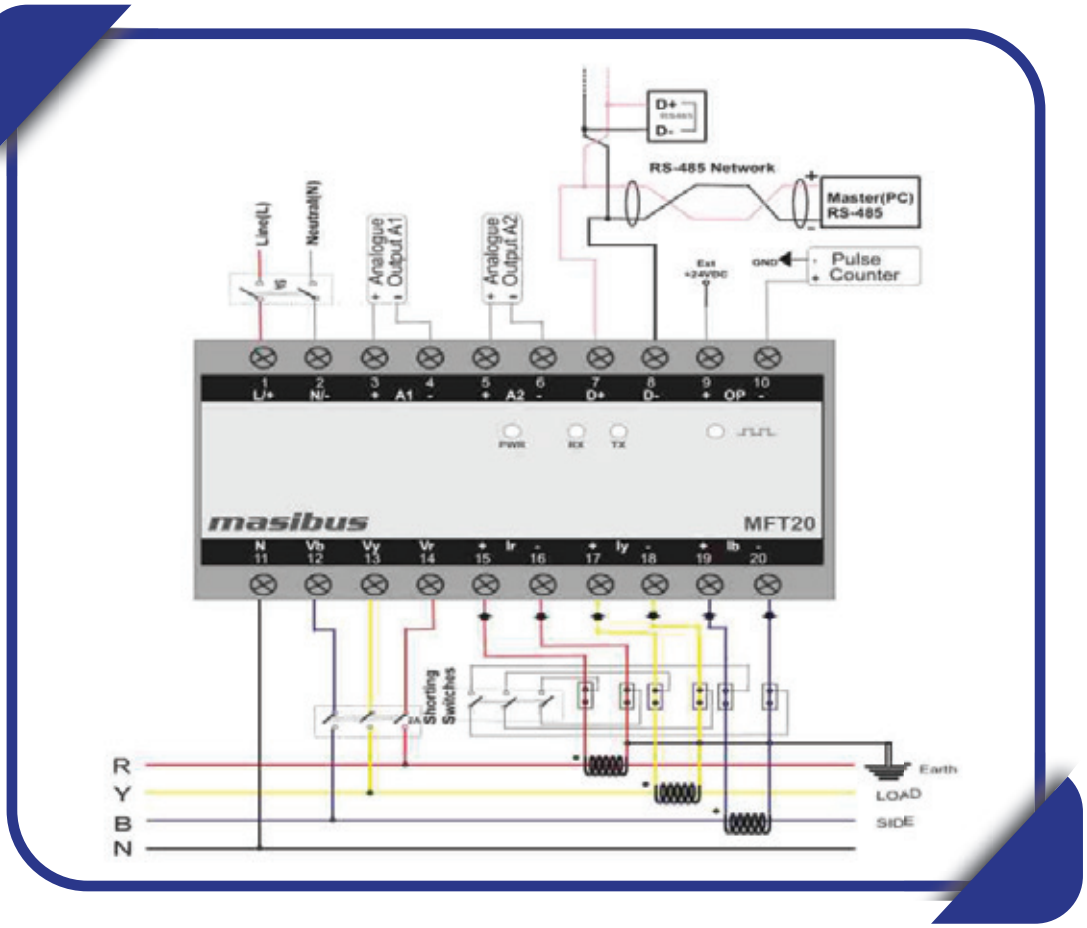
MFT20 - MULTIFUNCTION TRANSDUCERS

MFT20

USP

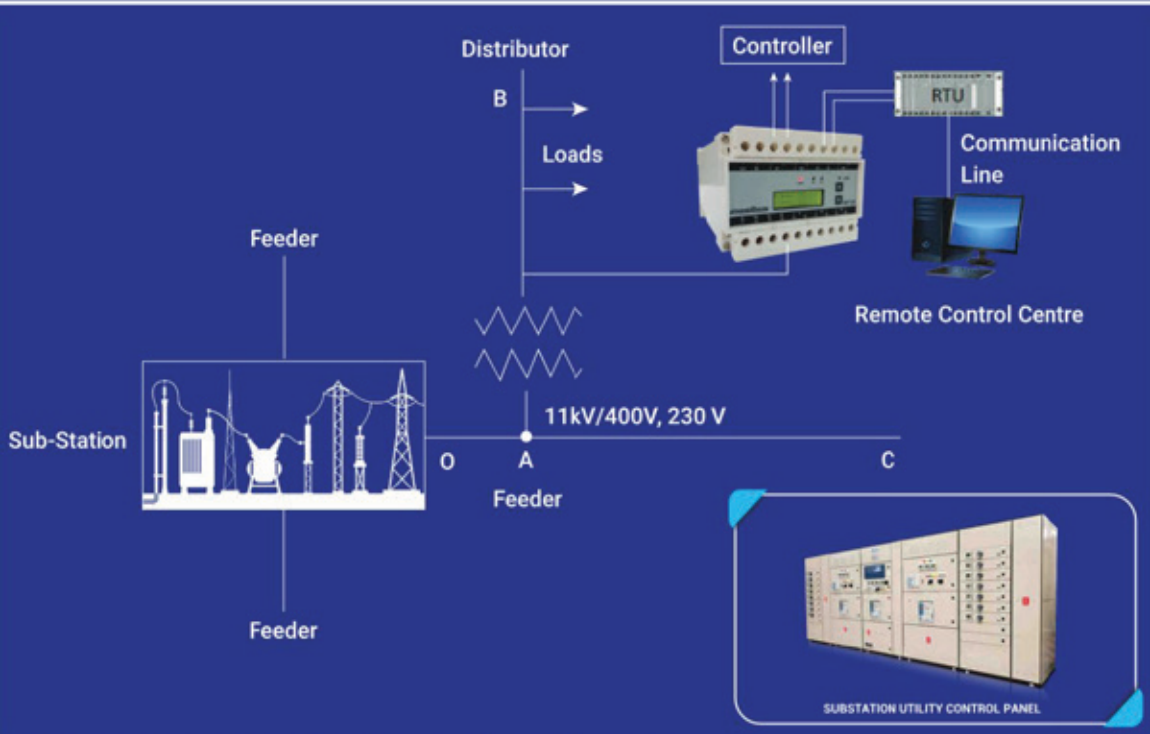
- Available in accuracy class 0.5 or 0.2 as per IEC 60688 standard
- EMI/EMC compiled as per IEC 61326-1 standard
- 28 Electrical parameters can be mapped to analogue O/P
- User Assignable Modbus Registers map

CONNECTION DIAGRAM

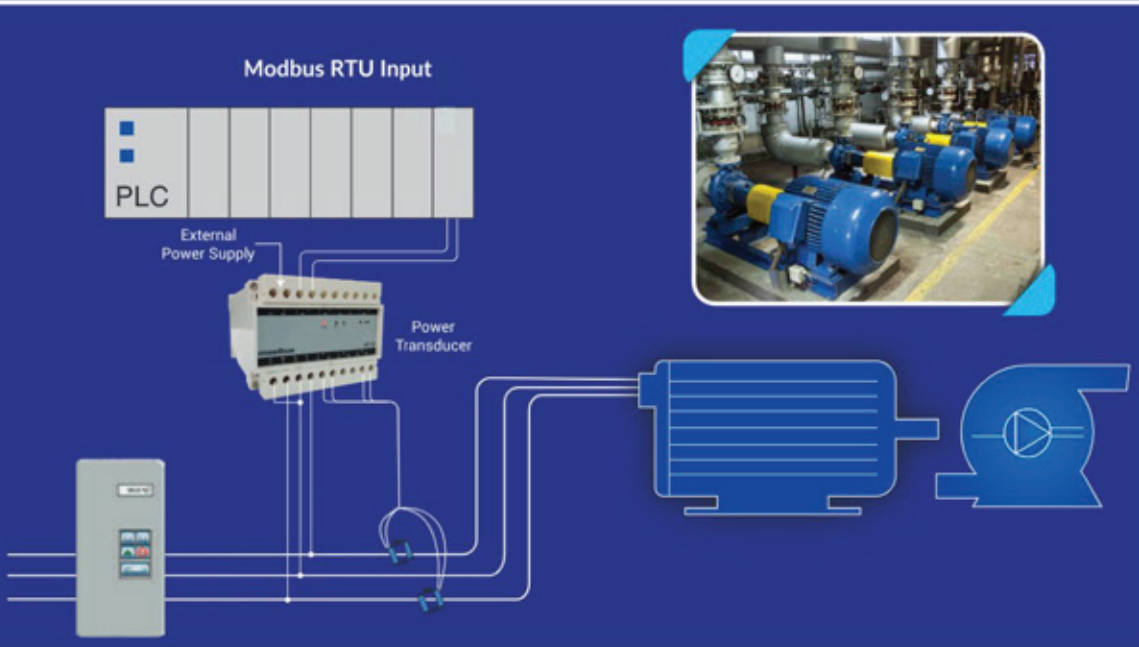


TECHNICAL SPECIFICATIONS	
System Type	3Ph4W / 3Ph3W (Site selectable)
AC Current Input	
Nominal Input Current (In)	1A / 5A AC Site selectable
Measuring Current Range	0.01A to 6A
Burden	<0.2VA per phase
AC Voltage Input	
Nominal Input Voltage(Un)	63.5VL-N to 240VL-N
Measuring Voltage Range	20VL-N to 300VL-N (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
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

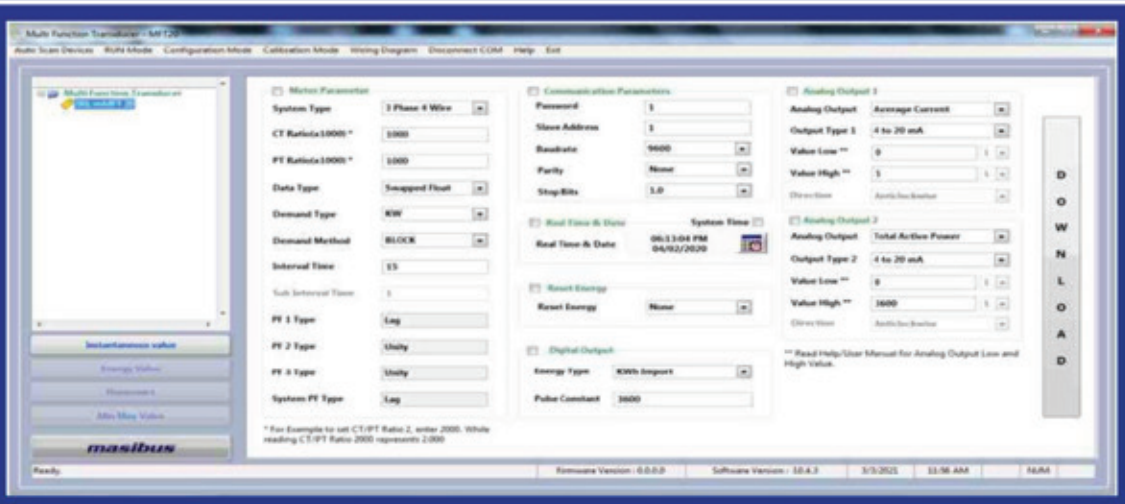
MFT20 - FEEDER MONITORING IN UTILITY SUBSTATION



POWER MONITORING OF MOTOR & PUMP



FREE CONFIGURATION SOFTWARE FOR MFT



MFT20 - 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

MFM2160 - MULTIFUNCTION METER

MFM2160
LCD DISPLAY

MFM2160
LED DISPLAY

USP

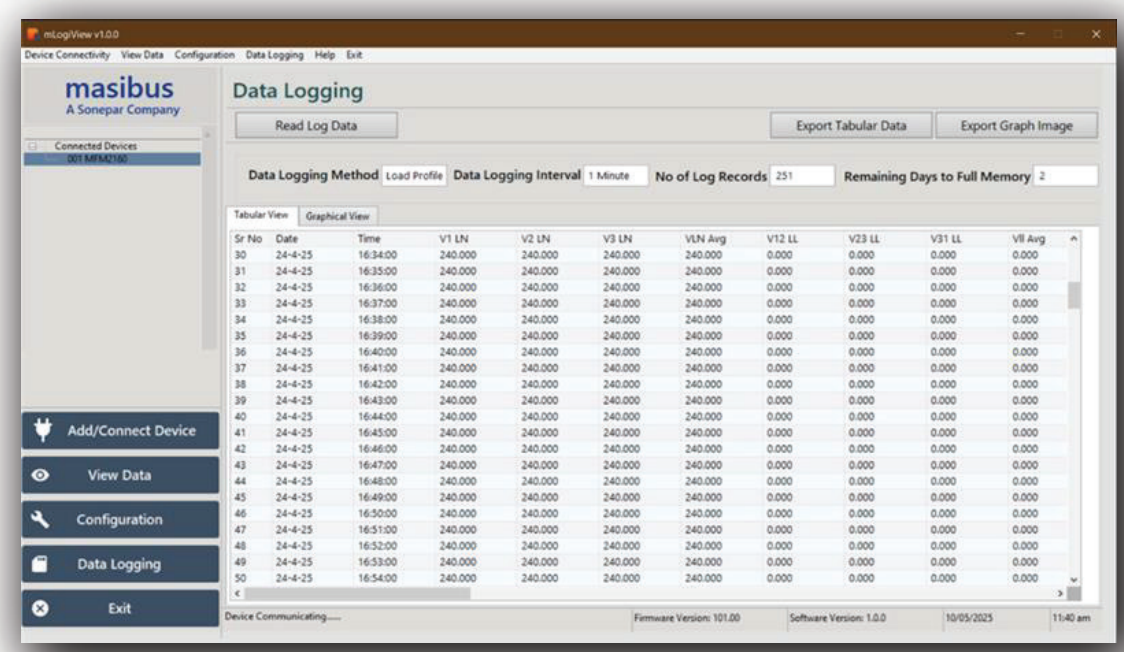
- Accuracy Class 1.0/0.5s/0.2s as per IEC62053-22/24
- Isolated RS485 Modbus Communication (Modbus-RTU protocol)
- MD & THD
- Data Logging
- User Assignable Modbus registers

TECHNICAL SPECIFICATIONS	
Type of Measurement	TRUE RMS
Sampling Rate	82 Samples/Cycle
Input	
Voltage Input	
Measuring Voltage Range	20VL-N to 300VL-N (34VL-L to 520VL-L)
PT(VT) Primary	100 V to 1000 KV AC (L-L) (Programmable)
Nominal Voltage range (Un) (PT/VT Secondary)	57.5VL-N to 240VL-N (100VL-L to 415VL-L)
Current Input	
Measuring Current Range	5mA to 6A
CT Ratings Primary	1A/5A to 15000 A (Programmable)
Nominal Current range (In) (CT Secondary)	1A or 5A
Frequency	45 to 65Hz
Measurement Accuracy	
Voltage	±0.5% for Class 1.0 & 0.5s and ± 0.2% for Class 0.2s
Current	±0.5% for Class 1.0 & 0.5s and ± 0.2% for Class 0.2s
Frequency	±0.05%
Power Factor	±0.01 for Class 1.0 and ± 0.005 for Class 0.5s & 0.2s
Active Power	±1.0% for Class 1.0 and ± 0.5% for Class 0.5s and ± 0.2% for Class 0.2s
Reactive Power	±1.0% for Class 1.0 and ± 0.5% for Class 0.5s & 0.2s
Apparent Power	±1.0% for Class 1.0 and ± 0.5% for Class 0.5s and ± 0.2% for Class 0.2s

Active Energy	Class 1.0 as per IEC 62053-21 and Class 0.5s/0.2s as per IEC 62053-22
Reactive Energy	Class 1.0 & Class 0.5s/0.2s as per IEC 62053-24
Apparent Energy	Class 1.0 & Class 0.5s & Class 0.2s
Auxiliary Power Supply	
Power Supply	Standard: 85-265VAC, 50/60Hz or 100-300VDC Optional: 20-60 VDC
Burden	< 3.5VA / <1.5W
Data Logging - Optional for LCD Display Only	
Method	Periodic Time Based, Load Profile based
Time Interval	1min, 5min,10min,15min, 30min, 45min, 60min, 8h,12h, 24h.
Parameters (Programmable up to 34 Parameters)	Voltage, Current, Power Factor, Frequency, Total Power & Energy (Active, Reactive, Apparent) with Time stamp
No. of Records	524288 / ((No of Parameters + 2) * 8)

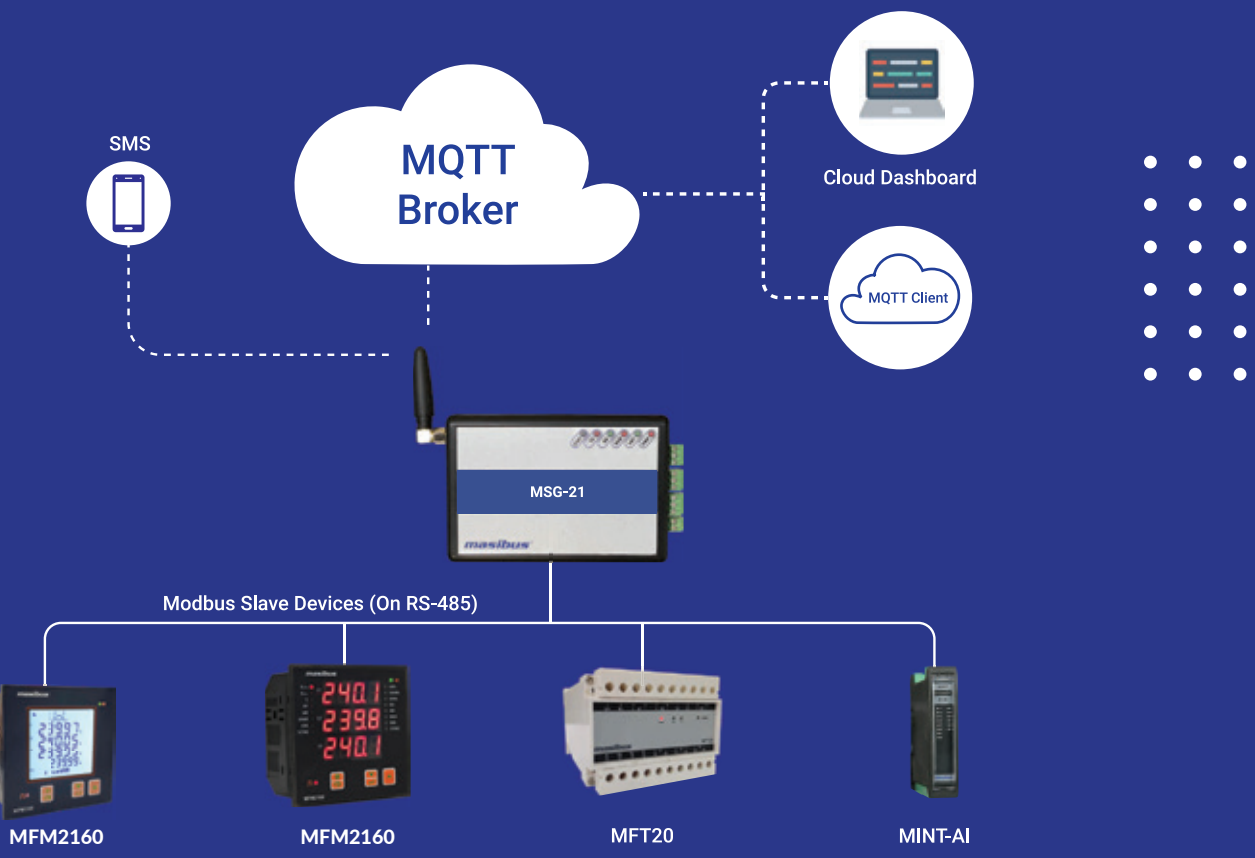
Measured Parameters	
Phase-to-neutral voltage (L1, L2, L3)	Active Import Energy
Phase-to-phase voltage (L12, L23, L31)	Active Export Energy
Average voltage	Active Net Energy (Import – Export)
Line current (L1, L2, L3)	Active Total Energy (Import + Export)
Average current	Apparent Import Energy
Neutral current	Apparent Export Energy
System frequency	Apparent Net Energy (Import – Export)
Power factor (L1, L2, L3)	Apparent Total Energy (Import + Export)
Average power factor	Reactive Import Energy
Phase Angle (L1, L2, L3)	Reactive Export Energy
V, A, PF, P phase-wise & Average/Total	Reactive Net Energy (Import – Export)
Active power (L1, L2, L3)	Reactive Total Energy (Import + Export)
Total active power	Reactive Lag Energy
Apparent power (L1, L2, L3)	Reactive Lead Energy
Total apparent power	Reactive Inductive Import Energy – Q1
Reactive power (L1, L2, L3)	Reactive Capacitive Import Energy – Q2
Total Reactive power	Reactive Inductive Export Energy – Q3
Average Current demand (A)	Reactive Capacitive Export Energy – Q4
Total Power demand (KW, KVAR, KVA)	Min. / Max. values (V, A, PF, Hz, KW, KVAR, KVA)
RPM [Pole (2-48) and slip (0.0 to 99.99%)]	Percentage Voltage & Current Unbalance
On hours, Run hours, Power Interruption Count	Real time clock & date
THD Voltage (L1, L2, L3)	Energy Pulse output
THD Current (L1, L2, L3)	Data logging

Free Configuration/Retrieve logged data software for MFM2160



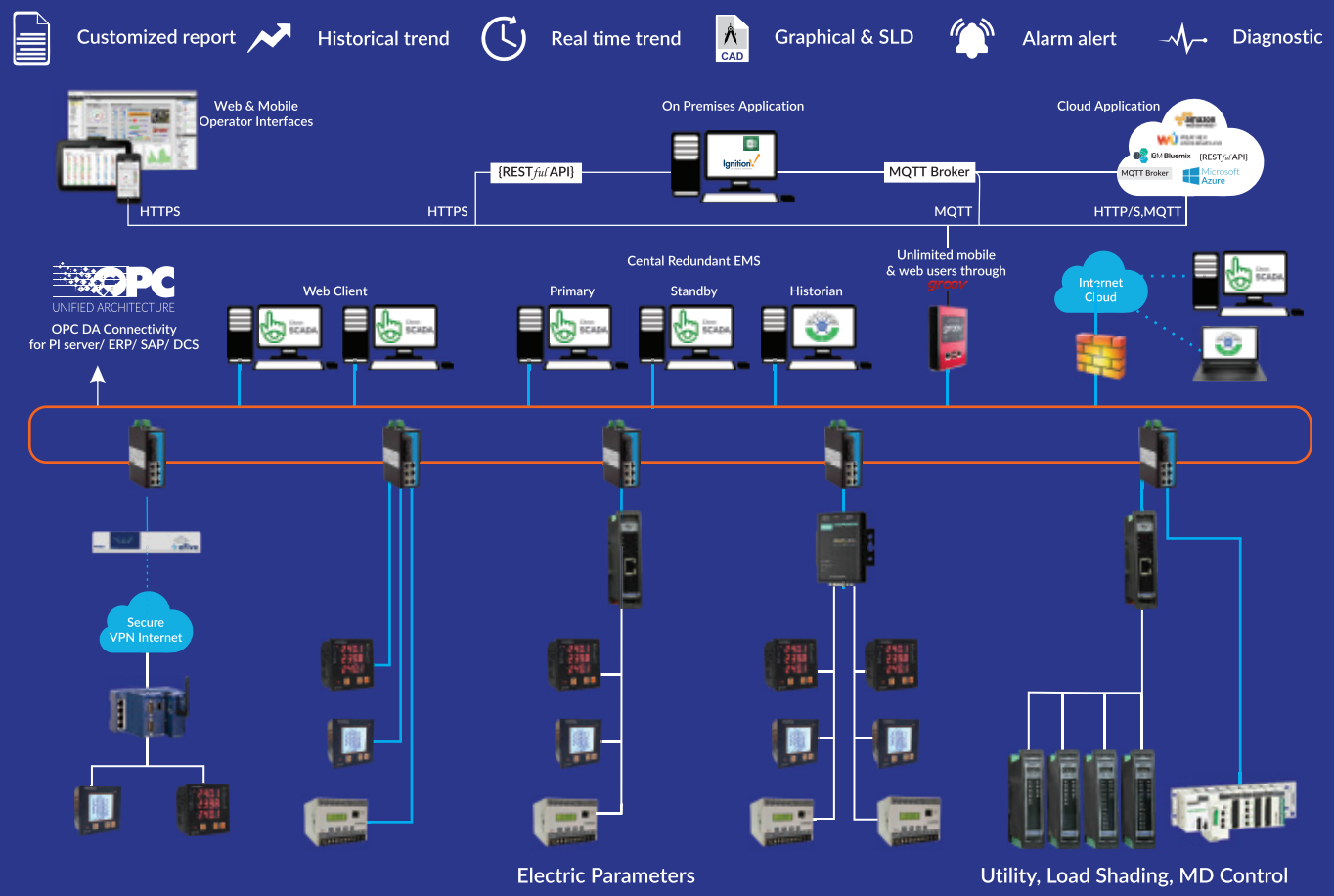
RoHS

PCC PANEL / SWITCHGEAR PANEL



REMOTE MONITORING OF ELECTRICAL SYSTEMS - IIOT APPLICATION

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

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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