masibus
A Sonepar Company

MFM2160

Multifunction Meter

% Load Bar | Aux. Supply | RTC | MD | THD

Modbus Over RS485

RoHS

The MFM2160 Multifunction Meter is a device used in electrical systems to measure and monitor various electrical parameters (voltage, current, power, frequency, Energy etc.) Meters are widely used across commercial and industrial sectors, providing critical data for energy management and system optimization. Its multi-line backlit LCD display allows for the simultaneous display of four parameters.

MFM2160 provides RS485 port supporting Modbus-RTU protocol for communication with THD, Individual Harmonics measurements, Maximum Demand, RTC, Min-Max readings. More than basic metering, it optionally provides Energy pulse output and Data logging features.

The MFM2160 can interface with Masibus mLogiView software, allowing users to Configure parameters such as system settings and data logging, and retrieve logged data through the software.

Features

- Available in Accuracy Class 1.0 & Class 0.5s
- True RMS measurement
- Four-line alphanumeric LCD display with 7 digits for energy and 5 digits for instantaneous parameters
- Field Programmable CT/PT Primary & Secondary
- Four Quadrant measurement with identification
- Isolated RS485 Modbus Communication (Modbus-RTU protocol)
- Available front Pulse LED for site calibration for selected type of energy.
- THD measurement for voltage and current, up to 31st harmonics
- Current and power demand monitoring
- Display of minimum and maximum values
- 'OLD' register to store the previously cleared energy value
- Monitors Run hours & On hours.
- Auto Scaling from Kilo to Mega to Giga
- Auto Scrolling feature for easy readability for all parameters
- Favourite page Store feature
- User programmable password protection for Setup mode
- User Assignable Modbus registers for ease of integration
- Energy Pulse Output - Optional
- Data Logging - Optional

Applications

- Commercial and industrial sub-metering
- EMS & BMS applications
- Electrical installation remote monitoring.
- High, medium and low-voltage switchgear panels
- Panel instrumentation
- Power control Centre (PCC) panels
- Motor control Centre (MCC) panels
- LV distribution panels
- Control and relay panels
- Automation and monitoring systems

TECHNICAL SPECIFICATIONS

Type of Measurement	TRUE RMS
Sampling Rate	82 Samples/Cycle
Connection Type	3P4W / 3P3W (Site selectable)

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)
Burden	<0.2VA per phase
Over Voltage	120% of Un Continuous
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
Burden	1A: <0.1 VA per phase; 5A: <0.2VA per phase
Overload	150% of In Continuous
Short-time Over Current	20 x Imax for 1 sec., 10 x Imax for 3 sec., 7 x Imax for 10 sec.
Suppression Current	A minimum current detection threshold of 1 to 99 mA can be configured to ignore induced or insignificant current flowing in the circuit; 5 mA is the default
Frequency	45 to 65Hz

Measurement Accuracy

Voltage	±0.5%
Current	±0.5%
Frequency	±0.05%
Power Factor	±0.01 for Class 1.0 and ± 0.005 for Class 0.5s
Power	±1.0% for Class 1.0 and ± 0.5% for Class 0.5s
Active Energy	Class 1.0 as per IEC 62053-21 and Class 0.5s as per IEC 62053-22
Reactive Energy	Class 1.0 & Class 0.5s as per IEC 62053-24
Apparent Energy	Class 1.0 & Class 0.5s

Display & Keys

LCD	Large multi-line backlit LCD Display 3 lines of 5 digits – Height: 9.10 x Width: 5.33 mm last line of 7 digits – Height: 7.00 x Width: 3.97 mm Bar Graph for % Load for each phase
Keypad	3 buttons for navigation to performing configuration setup & Operation
Protection Features	Password protected for set-up & clearing energy and Min. / Max. data
Green LED Indication	RS485 Communication Activity
Red LED Indication	Energy Pulse

Auxiliary Power Supply

Power Supply	Standard: 85-265VAC, 50/60Hz or 100-300VDC Optional: 20-60 VDC
Burden	< 3.5VA / <1.5W

Environmental

Operating Temperature	-10°C to +60°C
Storage Temperature	-25°C to +70°C
Relative Humidity	Up to 95% non-condensing
IP degree of Protection	IP51 front side, IP30 meter body
Isolation	4 kV RMS, 1 minute
Impulse withstand	6 kV
Pollution Degree	2

Mechanical

Mounting Type	Panel mount
Size	100(W) x 100(H) x 55(D) mm
Panel Cut out	92(W) x 92(H) mm
Material	ABS
Accessory	2 Panel mount clamps
Weight	0.4 kg (Approx.)
Terminal & Cable Size	Barrier type terminal U-type / ring-type termination: maximum up to 4 mm² Cable

Output

Modbus Communication	
Interface & Protocol	RS485 Port and Modbus RTU: 2 Wires, Half-duplex
Baud Rate	2400, 4800, 9600, 19200, 38400 bps (Default 9600 bps)
Parity Bit	None with 1 or 2 stop bit, Odd or Even with 1 or 2 stop bit
Firmware Update	Firmware update through communication port
Energy Pulse Output - Optional	
Type	Wh / VARh / VAh
Rating	24VDC, 20mA
Pulse Rate	Programmable from 100 to 60000 pulses per Energy
Pulse Duration	20 mSec ± 10%
Output Type	Open collector [External Excitation Required]

Demand Parameters

Total Active Power	Rising, Maximum and Maximum Demand Time Stamp
Total Reactive Power	Rising, Maximum and Maximum Demand Time Stamp
Total Apparent Power	Rising, Maximum and Maximum Demand Time Stamp
Average Current	Rising, Maximum and Maximum Demand Time Stamp
Demand Intervals	Programmable from 1 to 60 minutes
Demand Calculation Method	Block & Sliding
Demand Sync. Method	RTC based Sync

Data Logging - Optional

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)

Electromagnetic compatibility (as per IEC 61326-1)

Electrostatic Discharge	IEC 61000-4-2
Immunity to Fast transient	IEC 61000-4-4
Immunity to surge waves	IEC 61000-4-5
Immunity to magnetic fields	IEC 61000-4-8
Immunity to voltage dips and interruptions	IEC 61000-4-11
Conducted emissions	CISPR 11
Radiated emissions	CISPR 11

Rear View

TECHNICAL SPECIFICATIONS

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)	
THD Current (L1, L2, L3)	

Ordering Code

Model	Accuracy		Power Supply		Data Logging		Pulse Output	
MFM2160	X		X		X		X	
	S	Class 1.0	U1	Aux. Powered 85-265VAC/ 100-300VDC	N	None	N	None
	1	Class 0.5s	U2	Aux. Powered 20-60VDC	Y	Required	Y	Required

Head Office: Masibus Automation And Instrumentation Pvt. Ltd.
B-30, GIDC Electronics Estate, Sector-25, Gandhinagar-382016, Gujarat, India.
Tel: +91 79 23287275-77, Fax: +91 79 23287281.
E-mail: sales@masibus.com Website: www.masibus.com

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