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/LED display allows for the simultaneous display of Multiple 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
- 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 odd 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 (LCD Display Only)
- 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 for LCD Display only
- Data Logging - Optional for LCD Display only

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 Display	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 Four-line alphanumeric LCD display with 7 digits for energy and 5 digits for instantaneous parameters
LED Display	LED Display : 3 line 4-digit Red LED Display with 0.56" [14.2mm] height, LED Display - 12 digit for energy & 4 digit for Instantaneous parameters
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 mm^2 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, Odd, Even with 1 or 2 stop bit
Firmware Update	Firmware update through communication port

Energy Pulse Output - Optional for LCD Display only

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

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)

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

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

Note * : Demand Time stamp is not available in LED Display

Ordering Code

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

Note #: Data Logging & Pulse output options are not applicable in LED Display

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Doc. Ref. MFM2160/R1F/0825