



MFM2160

Multifunction Meter



% Load Bar



Aux. Supply



RTC



MD



THD



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 1.0/0.5s/0.2s
- 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 / 1P2W (Site selectable)

Input		Output	
Voltage Input		Modbus Communication	
Measuring Voltage Range	20VL-N to 300VL-N (34VL-L to 520VL-L)	Interface & Protocol	RS485 Port and Modbus RTU: 2 Wires, Half-duplex
PT(VT) Primary	100 V to 1000 KV AC (L-L) (Programmable)	Baud Rate	2400, 4800, 9600, 19200, 38400 bps (Default 9600 bps)
Nominal Voltage range (Un) (PT/VT Secondary)	57.5VL-N to 240VL-N (100VL-L to 415VL-L)	Parity Bit	None, Odd, Even with 1 or 2 stop bit
Burden	<0.2VA per phase	Firmware Update	Firmware update through communication port
Over Voltage	120% of Un Continuous	Energy Pulse Output - Optional for LCD Display only	
Current Input		Type	Wh / VARh / VAh
Measuring Current Range	5mA to 6A	Rating	24VDC, 20mA
CT Ratings Primary	1A/5A to 15000 A (Programmable)	Pulse Rate	Programmable from 100 to 60000 pulses per Energy
Nominal Current range (In) (CT Secondary)	1A or 5A	Pulse Duration	20 mSec ± 10%
Burden	1A: <0.1 VA per phase; 5A: <0.2VA per phase	Output Type	Open collector [External Excitation Required]
Overload	150% of In Continuous	Demand Parameters	
Short-time Over Current	20 x I _{max} for 1 sec., 10 x I _{max} for 3 sec., 7 x I _{max} for 10 sec.	Total Active Power	Rising, Maximum and Maximum Demand Time Stamp*
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	Total Reactive Power	Rising, Maximum and Maximum Demand Time Stamp*
		Total Apparent Power	Rising, Maximum and
Frequency	45 to 65Hz		

	Class 1.0	Class 0.5s	Class 0.2s
Voltage	$\pm 0.5\%$		$\pm 0.2\%$
Current	$\pm 0.5\%$		$\pm 0.2\%$
Frequency		$\pm 0.05\%$	
Power Factor	± 0.01		± 0.005
Active Power	$\pm 1.0\%$	$\pm 0.5\%$	$\pm 0.2\%$
Reactive Power	$\pm 1.0\%$	$\pm 0.5\%$	
Apparent Power	$\pm 1.0\%$	$\pm 0.5\%$	$\pm 0.2\%$
Active Energy	Class 1 As per IEC 62053-21	Class 0.5s As per IEC 62053-22	Class 0.2s As per IEC 62053-22
Reactive Energy	Class 1 As per IEC 62053-24	Class 0.5s As per IEC 62053-24	Class 0.5s As per IEC 62053-24
Apparent Energy	Class 1.0	Class 0.5s	Class 0.2s

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 : 3 line 4-digit Red LED Display with 0.56" [14.2mm] height, LED Display - 12 digit for energy & 4 digit for Instantaneous parameters
LED Display	
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

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
	2	Class 0.2s								

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