MIC-2 Multi-instrument
DATA SHEET



Measurements
- All 3-phase AC measurements
- True RMS
- 4-Quadrant energy
- Power Quality Analysis
- Replaces analogue meters

Communication
- RS-485 Modbus RTU protocol
- TCP/IP Modbus (optional)
- Profibus DP (optional)

I/O modules optional
- Analogue Input/Output
- Digital Input/Output
- Relay

Accuracy
- U, I and f class 0.2
- Other values class 0.5

Display
- 5 display rows
- 96 x 96 mm
- White backlight

Intelligent
- Suitable for 2 and 3-phase network topologies

Installation
- Compact dimensions
- Simple wiring

Utility software
- Data logging
- Remote reading
- Easy setting up

Alarms
- Up to 16 configurable alarms

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Application

The MIC-2 multi-instrument is a microprocessor-based measuring unit providing measurement of most electrical quantities on a 2- or 3-phase electric energy distribution network. The measurements are shown on the built-in display.

MIC-2 can be used as a data logging device for an intelligent Power Distribution System or Plant Automation System. All measurements are monitored and data is available via the RS-485 Modbus port. Other communication types as Ethernet (Web page, TCP/IP Modbus and emails transfer) and Profibus DP are available options.

True RMS values are measured with/without neutral and with both balanced and unbalanced load.

A large number of standard analogue instruments can be replaced by the MIC-2 in all electrical measuring applications. The MIC-2 contains all necessary measuring circuits and presents all values on a display with white backlight. The display has 4-digits resolution for all measurements. The backlight duration is selectable.

Operating the MIC-2 is very easy. It is a flexible and logical measuring unit that enables the user to easily adapt the instrument to individual applications. Password protection of KWh counter reset and change of settings is possible.

Measured and calculated values

Voltage
True RMS – each phase, line-to-line voltage and average.

Current
Each phase, average and neutral.

Active power (P)
Each phase, total power.

Reactive power (Q)
Each phase, total power.

Apparent power (S)
Each phase total power.

Power factor
Each phase and total power factor.

Frequency
Actual frequency

Load nature
Inductive/Capacitive/Resistive.

THD (up to 31st harmonics)
Voltage THD of each phase, current THD of each phase.

Maximum Demand
Demand of Active (P), Reactive (Q) and Apparent (S) power.

Energy counter
Import and export of energy, inductive and capacitive of reactive energy. Apparent energy

Energy pulse output (optional)
Two ports of pulse output (assign to any energy (P, Q and S) counter.

Statistics
Max/min of voltage, current, Power (P, Q, S) total, PF total, Frequency, Unbalance factor and THD values with time stamps.

Running hour indication.

Unbalance factor
Voltage and current.
Based on the positive and the negative sequence

Connection

The MIC-2 can be used in 2- and 3-phase network topologies with/without neutral and with both balanced and unbalanced load, including the US split phase system. The voltage and current input wiring modes are set separately in the parameter setting process. The voltage wiring mode can be:

3LN	3-phase 4-line Y and 3-line (split phase)
2LL	3-phase 3-line open delta
3LL	3-phase 3-line delta

*Preferred on an IT network e.g. ships. Notice max. 400 V phase-to-phase voltage using coupling 2LL.

The current input wiring mode can be:

3CT	Unbalance system (split phase)
2CT	Unbalance system without N

Any voltage mode can be grouped with any of the current modes.

Options

Communication

- Ethernet - TCP/IP Modbus
- Profibus DP/VO

Input/Output

- Analogue input (AI)
- Analogue output (AO)
- Digital input/output (DI/DO)
- Relay output (RO)

I/O Module	*DI*	*DO*	*RO*	*AI*	*AO*
AXM-IO1	***6***		***2***		
AXM-IO2	***4***	***2***			***2***
AXM-IO3	***4***		***2***	***2***	

AXM-IO1 has a 24V DC power supply for DI.
A maximum of 1 communication and 2 input/output modules can be used for each MIC-2.

Technical specifications

Voltage inputs

Nominal voltage U_N	L-N 400V AC L-L 690V AC
Measuring range	0 to 1.2 x U_N
Overload capacity	1500 V continuous 3250 V for 1min
VT primary	220 V…500 kV
VT secondary	100 V…400 V
Fuse	1 A slow blow

Current inputs

Nominal current I_N	5A AC
Measuring range	0 to 10 A
Overload capacity	20 A continuous 100 A for 1 s
CT primary	5 A…50 kA
CT secondary	5 A
Load	0.5 VA

Frequency

Nominal frequency f_N	50/60 Hz
Measuring range	45 Hz to 65 Hz
Measuring point	V1 phase voltage

Accuracy

Voltage	0.2%
Current	0.2%
Power	0.5%
Power factor	0.5%
Frequency	0.2%
Energy	0.5%
Harmonic	2.0%

Standard IEC 60051

Auxiliary power supply

Universal AC/DC power supply

Supply voltage	100…415V AC +/-10% 50/60 Hz 100…300V DC +/-10%
Consumption	≤ 5 VA
Fuse	1 A slow blow

Communication

RS 485 Modbus RTU

Number of devices	Max. 32 units
Cable type	Belden 3105 A or equivalent (twisted pair and shielded)
Maximum cable length	up to 1000 m
Data rate	1200 to 38400 bits/s

Vibration 3…13.2 Hz: 2 mmpp
13.2…100 Hz: 0.7 g
To IEC 60068-2-6
To IACS UR E10

Environmental conditions

Operation temperature	-25…70°C
Storage temperature	-40…85°C
Humidity, relative	5-95% non-condensing
Standard	IEC 60068-2

Connections

Measuring inputs	Current input fixed block, Wire max. 5mm²
Screw torque	0.5 Nm/5.5 lb-inch
Other	Pluggable block
Wire max.	1.5 mm²
Screw torque	0.25 Nm/2.2 lb-inch

Mounting

Panel mounted	Max. 6 mm thick
Panel cutout	92 x 92 mm +0.8 mm (3.62” x 3.62”) 4” round

Protection

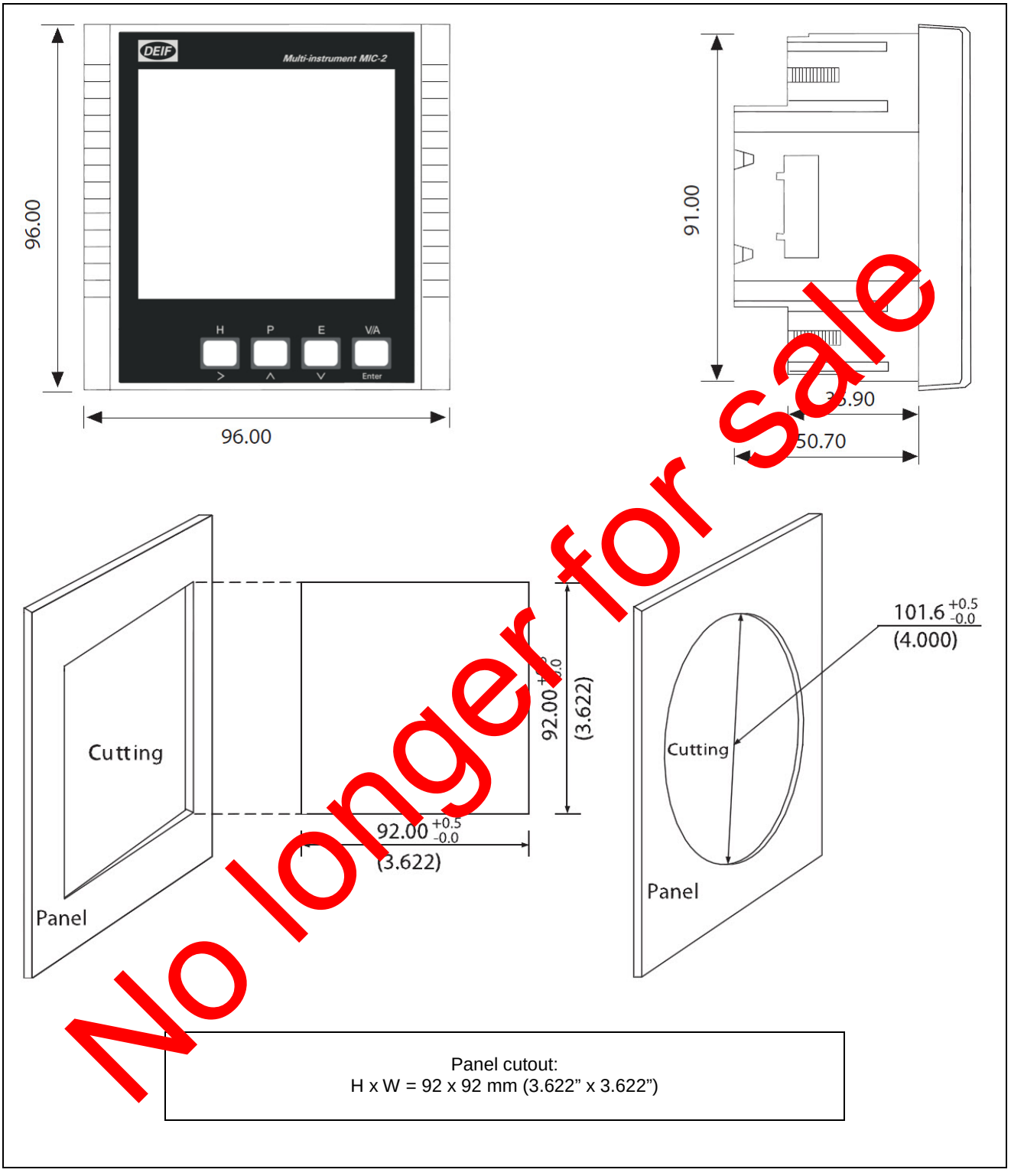
Front	IP52 (EN 60529)
Rear	IP30 (EN 60529)

Safety IEC 61010-1,
UL 61010-1
480 V installation cat. III, pollution degree 2
690 V installation cat. II, pollution degree 2

Weight 350 g (0.8 lbs)

EMC IEC 61000-4/-2-3-4-5-6-8-11
CISPR 16

Unit dimensions in mm (inches)



Panel cutout:
H x W = 92 x 92 mm (3.622” x 3.622”)

Technical specifications – optional modules

Communication modules

Ethernet TCP/IP module – AXM-NET
10 M/100 M self-adaptable,
RJ45 Jack
TCP/IP Modbus Protocol,
HTTP Web page browse
E-mail sending on time interval or on event.

Profibus module – AXM-PROFI
Profibus-DP/V0
Input Byte (typical): 32 bytes
Output Byte (typical): 32 bytes
EN50170 vol.2 compliance
Profibus slave mode, baud rate self-adaptable up to 12M

I/O modules

AXM-IO1	6 digital inputs (DI), 2 relay output (RO), 24V DC isolated voltage output
AXM-IO2	4 digital inputs (DI), 2 digital outputs (DO), 2 analogue output (AO)
AXM-IO3	4 digital inputs (DI), 2 relay output (RO), 2 analogue input (AI)

Digital Input (DI)
Input voltage range 20~250V AC/DC
Input current (max) 2 mA
"1" voltage level 15 V
"0" voltage level 5 V
Switch response time <1 ms
Pulse frequency (max) 100 Hz, 50% duty ratio (5 ms ON and 5 ms OFF)
Power supply for digital Input (DI)
Output voltage 24V DC
Output current 42 mA
Load (max) 21 DI

Digital Output (DO) (Photo-MOS)
Voltage range 0~250V AC/DC
Load current 100 mA (Max)
Output frequency 25 Hz, 50% Duty Ratio (20 ms ON, 20 ms OFF)
Isolation voltage 2500 V

Relay Output (RO)
Switching voltage (Max) 250V AC, 30V DC
Load current 3 A
Set time 10ms (Max)
Contact resistance 100 mΩ (Max)
Isolation voltage 2500 V
Mechanical life $1.5x10^7$

Analogue Input (AI)
Input range, 0~20 mA/4~20 mA
Accuracy 0.2%
Temperature drift 50ppm/°C typical
Isolation voltage 500 V
Impedance: 100 Ω

Analogue Output (AO)
Output range, 0~20 mA/4~20 mA
Accuracy 0.5%
Response time 300 ms
The max load resistance is 500Ω
Temperature drift 50ppm/°C typical
Isolation voltage 500 V

Note: Predefined output, see "Description of options, I/O modules user's manual", document no. 4189320032, for more information.

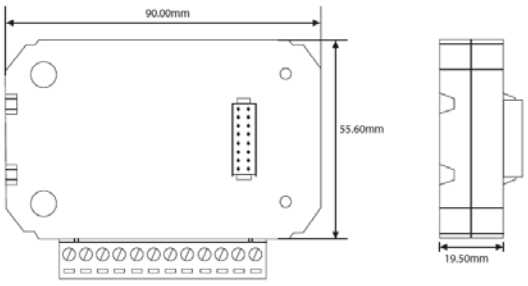
Consumption

	AXM-NET: 1 W
	AXM-PROFI: 1 W
	AXM-IO1: 1 W
	AXM-IO2: 1.3 W
	AXM-IO3: 0.8 W

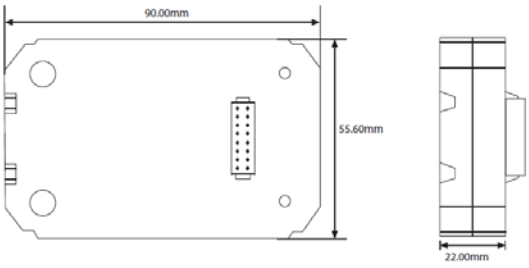
Environmental conditions

Operation temperature	-25…70°C
Storage temperature	-40…85°C
Humidity, relative	5-95% non-condensing
Standard	IEC 60068-2

Safety	IEC 61010-1, UL 61010-1 480 V installation cat. III, pollution degree 2 690 V installation cat. II, pollution degree 2
Weight	AXM-NET: 65 g AXM-PROFI: 65 g AXM-IO1: 90 g AXM-IO2: 80 g AXM-IO3: 85 g
EMC	IEC 61000-4/-2-3-4-5-6-8-11 CISPR 16



IO Module dimensions



Communication Module dimensions

Available accessories

Type	Description	Item no.
Accessory for MIC-2	Bracket for DIN rail mounting	2232700011

Order specifications

Optional modules

MIC-2

690V AC (L-L) 5A
RS485 Modbus RTU com.
Aux. supply: 100-415V AC
200V DC

DEIF no. 1211020012
EAN no. 5703727109739

Communi-cation module

AXM-NET
TCP/IP Modbus com.
DEIF no. 1211020016
EAN no. 5703727109746

AXM-PROFI
PROFI-BUS DP/VO
DEIF no. 1211020017
EAN no. 5703727109753

I/O module 1

AXM-IO1
DEIF no. 1211020013
EAN no. 5703727109760

AXM-IO2
DEIF no. 1211020014
EAN no. 5703727109777

AXM-IO3
DEIF no. 1211020015
EAN no. 5703727109784

I/O module 2

AXM-IO1 (2)
DEIF no. 1211020018
EAN no. 5703727110001

AXM-IO2 (2)
DEIF no. 1211020019
EAN no. 5703727110018

AXM-IO3 (2)
DEIF no. 1211020020
EAN no. 5703727110025

A maximum of 1 communication and 2 input/output modules can be used for each MIC-2.

Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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