Power Monitoring of Existing Equipment

Compact module can be squeezed into a tight space inside existing distribution boards

Multi Power Transducer

As calls for becoming carbon neutral increase, visualization of CO_2 emissions intensity has become essential.
Multi Power Transducers, thanks to their compact package, can fit into a tight space
of both new and existing panels or manufacturing equipment.
They realize easily a detailed energy consumption monitoring via Modbus communication.

Model: M50EXWTU

- Modbus communication
- CO_2 emissions (energy conversion value) can be calculated.
- Modbus plus two energy count pulse outputs
- Max. 480 V AC direct input
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system
- Supporting three-phase/4-wire system connection
- Equipped with OEL display

See Page 6-7 for detailed information

Model: M50XWTU

- Modbus communication
- CO_2 emissions (energy conversion value) can be calculated.
- Modbus plus two energy count pulse outputs
- Max. 480 V AC direct input
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system
- Supporting three-phase/4-wire system connection

See Page 6-7 for detailed information

Model: M5XWTU

- Modbus communication
- You can choose one of the following output options: Modbus communication, analog output, or energy count pulse/alarm output.
- Max. 240 V AC direct input
- 290 measured variables (three-phase/3-wire system)

Model: M5XWT

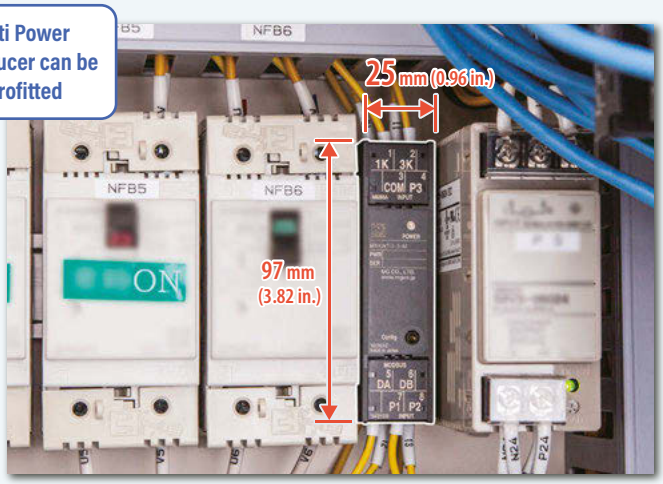
- Modbus communication
- Modbus communication output
- Max. 240 V AC direct input
- 104 measured variables except harmonic contents (three-phase/3-wire system)

Installation

Compact size

Multi Power Transducers, featuring the 41 mm (1.61 in.) deep (55 mm or 2.17 in. for M50EXWTU), terminal block style housing, are suitable for installation in a tight space of breaker boxes or wall-mounted panels.

Multi Power Transducer can be retrofitted



M5XWTU, M5XWT

M50XWTU

M50EXWTU

Installation

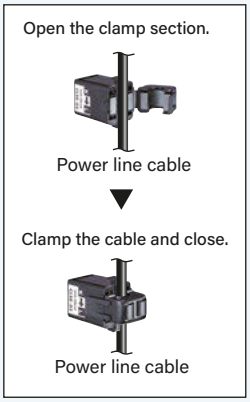
Easy installation with clamp-on current sensors

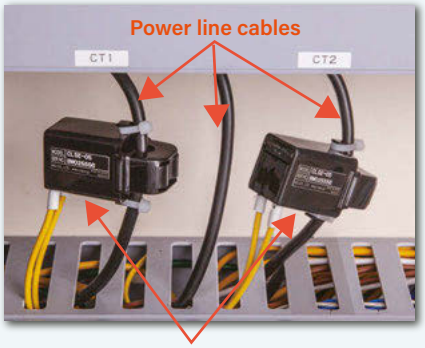
The current inputs are connected in one touch by using **Clamp-on Current Sensors** (Model: **CLSE**), needing no live cable modification.
Furthermore, the **M5XWTU** and **M5XWT** use the voltage input to drive their internal circuits, needing no auxiliary power supply connection.

Power line cable

Easy Retrofitting Clamp-on Current Sensor CLSE Series

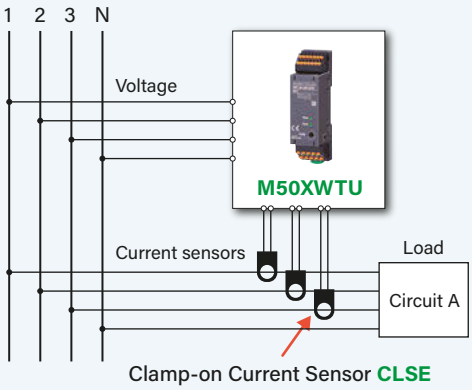
Clamp-on current sensors can be retrofitted with no power line modification





The current sensors can be installed without modifying existing power lines.

■ **Three-phase/4-wire connection for M50XWTU**



Clamp-on Current Sensor **CLSE**

CLAMP-ON CURRENT SENSOR

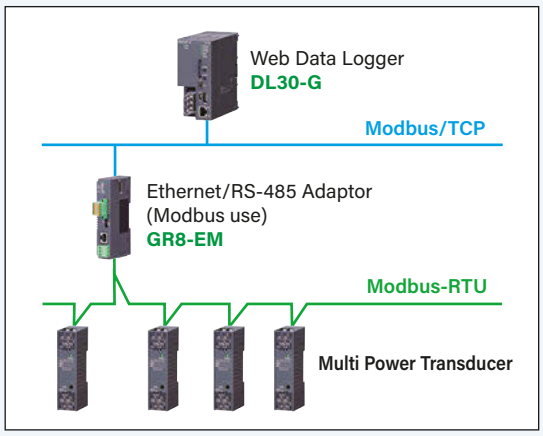
The one-touch clamp-type sensor, incorporating a nylon spring, can be easily installed on existing equipment, such as distribution boards.
5 A, 50 A, 100 A, 200 A, 400 A, and 600 A types are available.

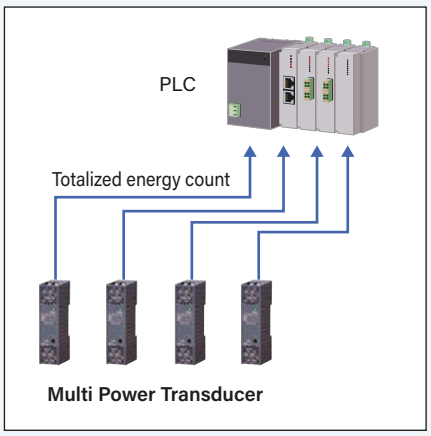
Model	CLSE-R5	CLSE-05	CLSE-10	CLSE-20	CLSE-40	CLSE-60
Applicable wire diameter	10 dia. max.	10 dia. max.	16 dia. max.	24 dia. max.	36 dia. max.	36 dia. max.
Operational range	5 A max.	50 A max.	100 A max.	200 A max.	400 A max.	600 A max.

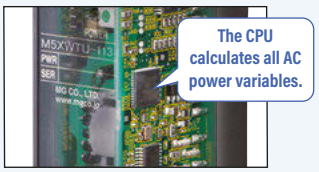
Settings and Connection

Modbus communication

Modbus communication, convenient for remote energy monitoring by PLC or data loggers, is selectable as standard.
Monitoring points can be easily added by daisy-chain wiring of twisted-pair cables.
Other output options such as analog signal, energy count pulse and alarm contact(*1) are also available for direct input to PLC/DCS.







The built-in CPU calculates the AC power variables instantaneously

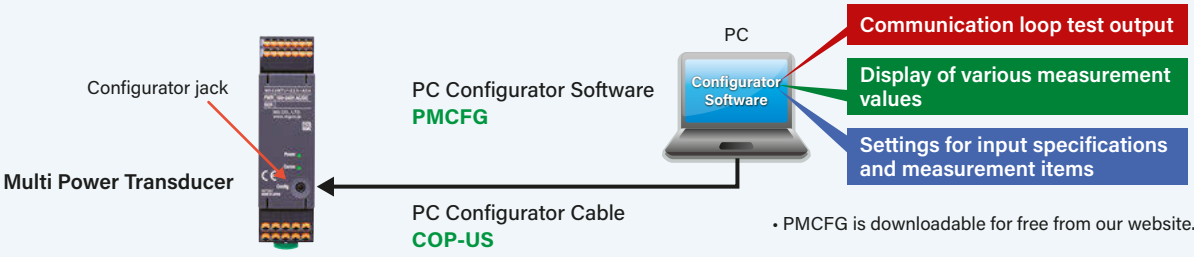
The built-in CPU calculates instantaneously up to 290(*2) variables for three-phase/3-wire system, including momentary values such as current, voltage, power, average values, maximum and minimum values, total harmonic distortion, and the 2nd to 31st harmonic contents, before updating the measured data in the memory every 500 milliseconds (approximate cycle).

(*1) Options for M5XWTU. Modbus only for M5XWT. Modbus plus energy count pulse signals are available for M50XWTU and M50EXWTU.
(*2) 104 variables for M5XWT (three-phase/3-wire), excluding harmonic contents.

Settings and Connection

Free setup software tool with convenient functions

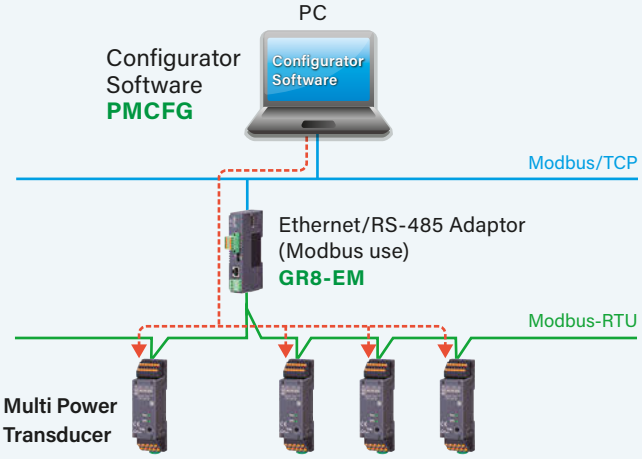
The PC Configurator Software is used to set up various parameters of the **Multi Power Transducer**. It has a convenient monitoring window showing all measurement values in real time.
The loop test output mode, in which any output value can be simulated without actually connecting to active input circuits, is useful for system comissioning.



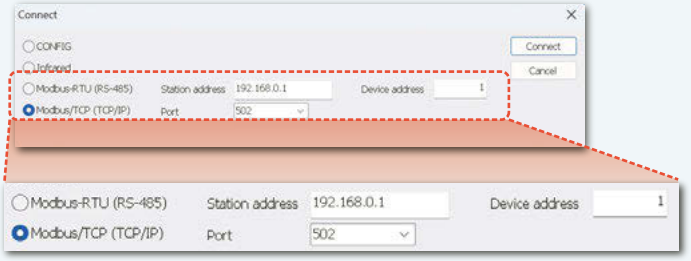
• PMCFG is downloadable for free from our website.

Useful Function

Setup via Modbus communication

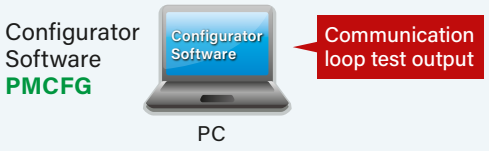


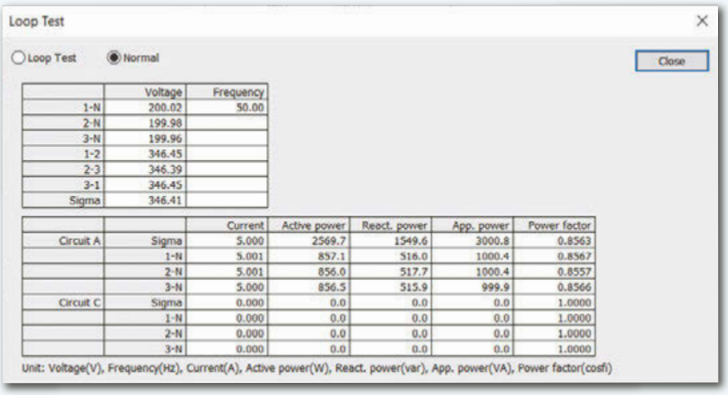
Using the PC Configurator Software to set the device address to the **Multi Power Transducer** in advance makes it possible to configure settings remotely via Modbus communication from a LAN-connected PC.



Built-in loop test output function

Loop test output mode in the PC Configurator Software can be used to simulate any output value without actually connecting to the active input circuits, which is useful for system commissioning.





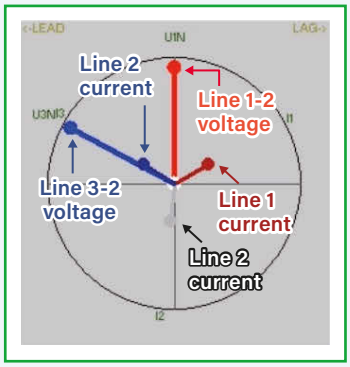
		Voltage	Frequency
	1-N	200.02	50.00
	2-N	199.98	
	3-N	199.96	
	1-2	346.45	
	2-3	346.39	
	3-1	346.45	
	Sigma	346.41	

		Current	Active power	React. power	App. power	Power factor
Circuit A	Sigma	5.000	2569.7	1549.6	3000.8	0.8563
	1-N	5.001	857.1	516.0	1000.4	0.8567
	2-N	5.001	856.0	517.7	1000.4	0.8557
	3-N	5.000	856.5	515.9	999.9	0.8566
Circuit C	Sigma	0.000	0.0	0.0	0.0	1.0000
	1-N	0.000	0.0	0.0	0.0	1.0000
	2-N	0.000	0.0	0.0	0.0	1.0000
	3-N	0.000	0.0	0.0	0.0	1.0000

Incorrect wiring and disconnection checking

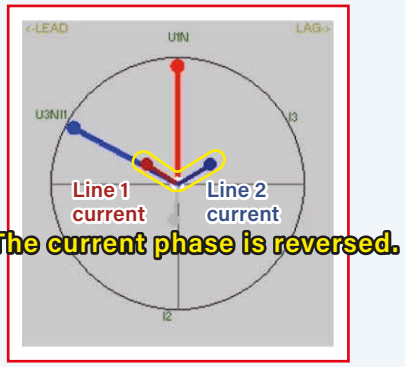
The vector chart in the PC Configurator Software can be used to visually check for incorrect wiring and disconnections.

Correct wiring



• Monitoring window for M5XWTU

Incorrect wiring (example)

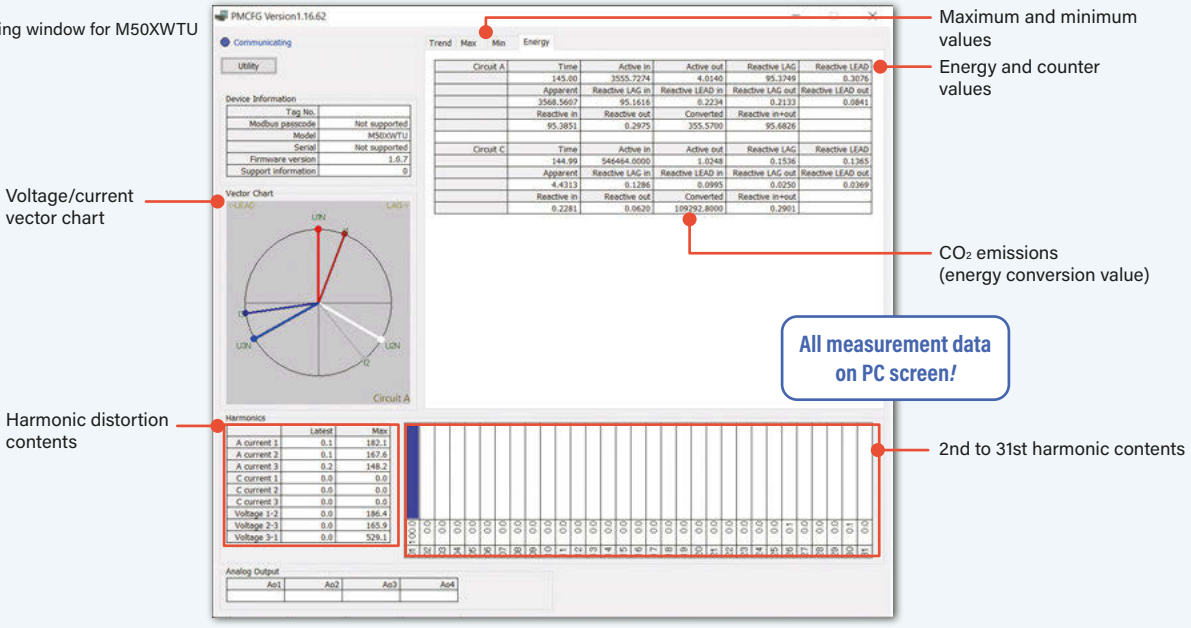


Convenient for periodic inspections

The PC Configurator Software makes it possible to record items that are not constantly monitored—such as harmonics and power factor—during periodic inspections, and the recorded data can then be used for predictive and preventive maintenance.

■ **Monitoring window example (PC Configurator Model: PMCFG)**

• Monitoring window for M50XWTU

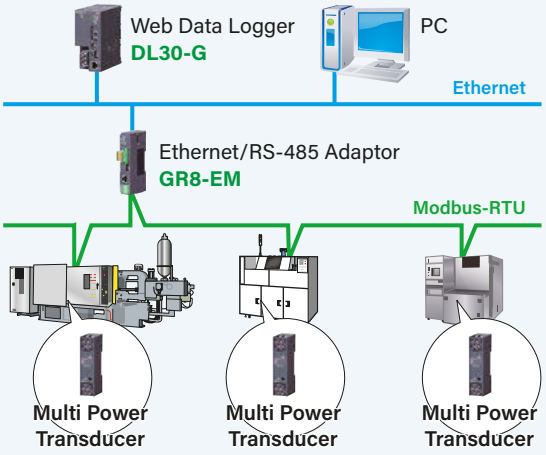


Applications

You can start a single- or multi-point power monitoring system with the Modbus.

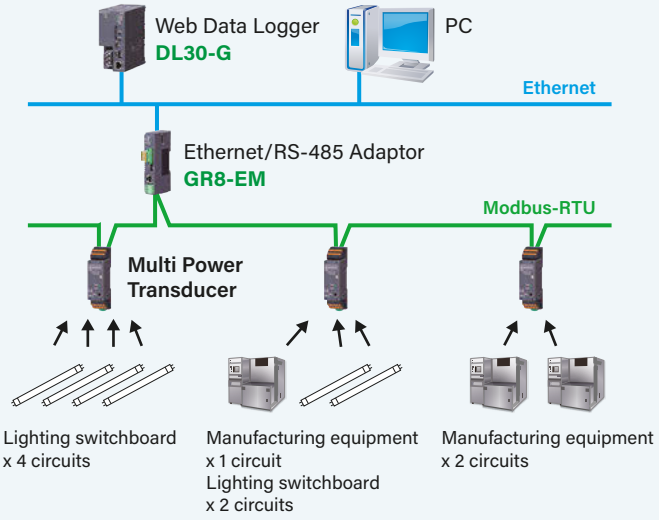
Precise power management is essential to achieving carbon neutrality. You can install the **Multi Power Transducers** in a small space, even on existing equipment.
You can start with a small budget and gradually increase the number of measurement points, extending to overall management. For example, using **Web Data Logger** (Model: **DL30-G**) may be ideal as it enables Modbus communication at a reasonable cost.

■ **System configuration example**



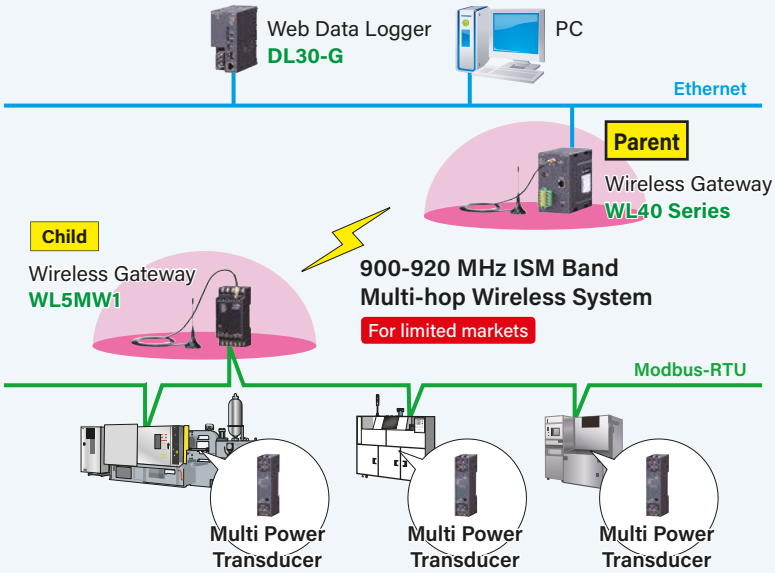
■ **System configuration example for M50XWTU / M50EXWTU**

CO_2 emissions can be calculated (energy conversion value)



The **Wireless Gateway** allows the wireless transmission of the Modbus communication of the **Multi Power Transducers**.

■ **System configuration example, wireless system**



Features of 900-920 MHz band

- Frequencies on the 900-920 MHz bands are highly diffractive and obstacle resistant.
- A network is constructed with an exceptionally reliable multi-hop system.
- Communication is available for a line-of-sight distance of up to 1 km.
- No license application is required.
- No communication wiring work is required.

920 MHz Band Multi-hop Wireless System

Child

Wireless Gateway
Model: WL5MW1

Limited to Japanese market

- Modbus-RTU transparent, 920 MHz band wireless gateway
- The gateway connects to Modbus remote I/Os and transfers Modbus-RTU protocol onto a wireless communication network.
- The compact terminal block style module can be installed in shallow panels such as breaker boxes and control panels on machines.

W45 x H97 x D41 mm (1.77″ x 3.82″ x 1.61″)

M50XWTU / M50EXWTU with Universally Adaptable Features

Universally adaptable features including CE marking, 480 V AC input, and three-phase/4-wire configuration.

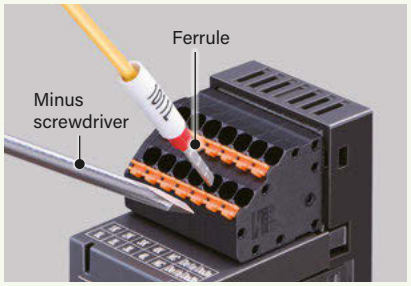
Multi-circuit measurement by single unit thanks to the tension-clamp terminal block with a large number of terminals.

M50XWTU M50EXWTU

FEATURES

- CO_2 emissions (energy conversion value) can be calculated.
- Max. 480 V AC direct input
- Three-phase/4-wire system input connection
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system by single module
- Two energy count pulse outputs
- High-contrast OEL display equipped on the M50EXWTU

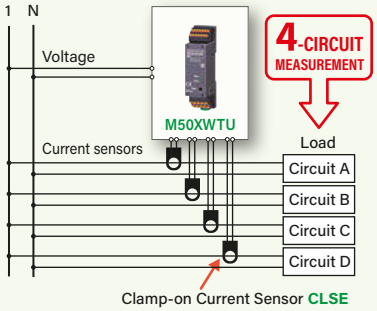
■ Tension-clamp terminal block



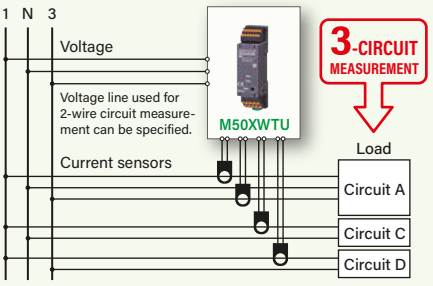
Wiring to the tension-clamp terminal block is quick and easy. Ferrules, solid or stranded wires of up to 1.5 mm^2 can be used.

■ Single module can measure up to 4 circuits! Space-saving and economical.

4 x single-phase/2-wire circuits



1 x single-phase/3-wire + 2 x single-phase 2-wire circuits



• Please see data sheet for more connection/application examples.

Introducing the UL-approved M50XWTU-U

UL-approved products are those that have been proved as meeting the safety standard requirements set by Underwriters Laboratories (UL) in the United States.

Model : M50XWTU-U

CLAMP-ON CURRENT SENSOR CLSE-U

The CLSE-U is an easily installable one-touch clamp-type sensor with a nylon spring, available in 5 A, 50 A, 100 A, 200 A, 400 A, and 600 A configurations.

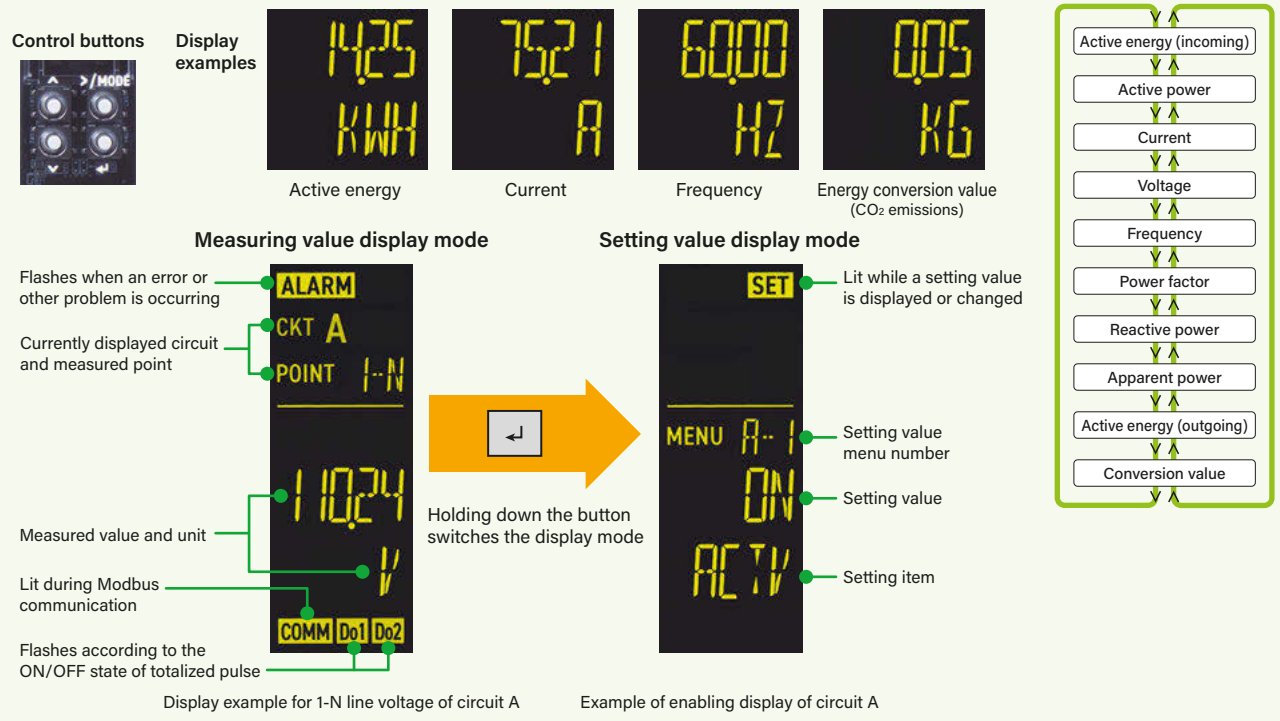
Model	CLSE-U-R5	CLSE-U-05	CLSE-U-10	CLSE-U-20	CLSE-U-40	CLSE-U-60
Applicable wire diameter	0.8-10 dia.	2.5-10 dia.	5-16 dia.	8-24 dia.	12.5-36 dia.	17-36 dia.
Operational range	5 A max.	50 A max.	100 A max.	200 A max.	400 A max.	600 A max.

M50EXWTU: OEL display clearly displays information

The OEL display allows you to check the measured values of voltage, current, power, energy, CO_2 emissions (energy conversion value), and relative harmonic content of each element, as well as various setting values.

The display turns off if a set time elapses without any button operation. Just press any button while the display is off to return to the state before the display was turned off. You can also set the display to always be on.

Switching measured value display Pressing ∨ ∧ button switches the measured value display in order.



Main specifications of the UL-approved M50XWTU-U

▪ See the latest specification sheet for more information.

INSTALLATION

This equipment can be mounted in customers' equipment and machine. The equipment cannot be mounted or retrofitted to switchboards, distribution boards, or control panels that are installed and in operating in a facility.
The equipment must be installed such that appropriate clearance.(*)

(*) Space 3 mm or more when placing this equipment side by side.

INSTALLATION SPECIFICATIONS

POWER INPUT
AC Power: 100～240 V AC
POWER CONSUMPTION
AC Power: ≤ 3 VA
Operating temperature:
-20 to +55°C (-4 to +131°F)

GENERAL SPECIFICATIONS

Applicable wire size (wire material: Copper):
Lower connector (voltage input, power, Modbus) 0.2 - 1.5 mm²(AWG 16-24), stripped length 8 - 9 mm
Upper connector (current sensor input, pulse output) 0.2 - 1.5 mm²(AWG 16-24), stripped length 10 - 11 mm

MODBUS COMMUNICATION

Standard: Conforms to TIA/EIA-485-A
Protocol: Modbus RTU

INPUT SPECIFICATIONS

240 V AC / CLSE-U
Clamp-on current sensor is selectable from below.
CLSE-U (5 A, 50 A, 100 A, 200 A, 400 A, 600 A)
5A is available as CT's secondary.
▪ **Voltage Input**
Rated voltage for each wiring:
▪Phase voltage (1-N, 2-N, 3-N) 240 V AC
▪Line voltage (1-2, 2-3, 3-1) 240 V AC
Type for each wiring:
▪Single-phase/2-wire
▪Single-phase/3-wire
▪Three-phase/3-wire
▪Three-phase/4-wire
Input range:
1-N, 2-N, 3-N 50 to 277 V AC
1-2, 2-3, 3-1 50 to 277 V AC

▪ **Current Input**
Current sensor (default: CLSE-U-R5)
CLSE-U-R5: 0 – 5 A AC
CLSE-U-05: 0 – 50 A AC
CLSE-U-10: 0 – 100 A AC
CLSE-U-20: 0 – 200 A AC
CLSE-U-40: 0 – 400 A AC
CLSE-U-60 : 0 – 600 A AC
Selectable primary current range: 1 – 20 000 A (only with CLSE-U-R5, refer to the configurator settings)

OUTPUT SPECIFICATIONS

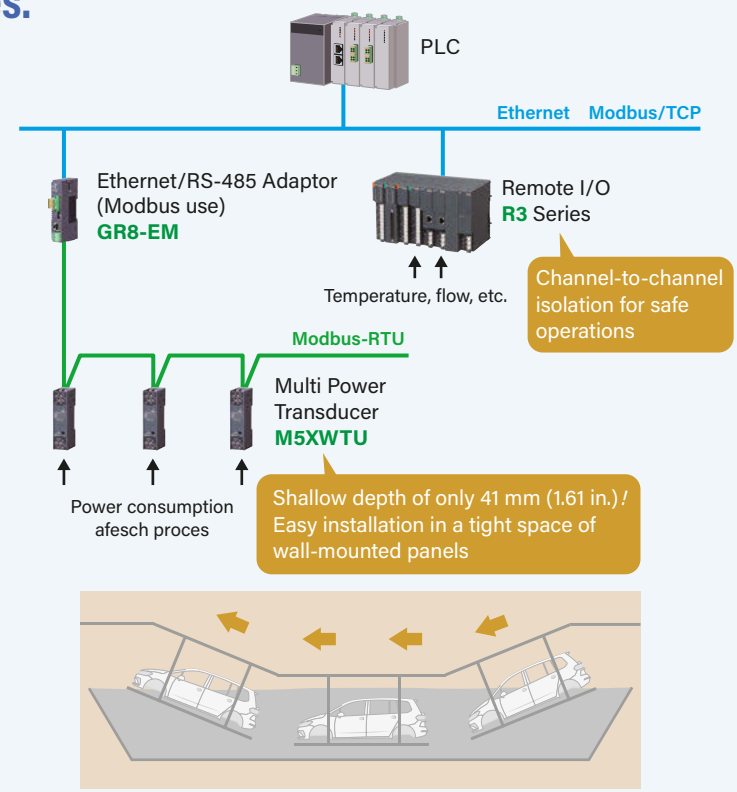
Pulse output
Outputs assignable to pulse:
various energy
Output type: Photo MOSFET relay
Rated load: 30 V 200 mA AC/DC at peak

STANDARDS & APPROVALS

Approval:
UL/C-UL general safety requirements (UL 61010-1, CAN/CSA-C22.2 No.61010-1)

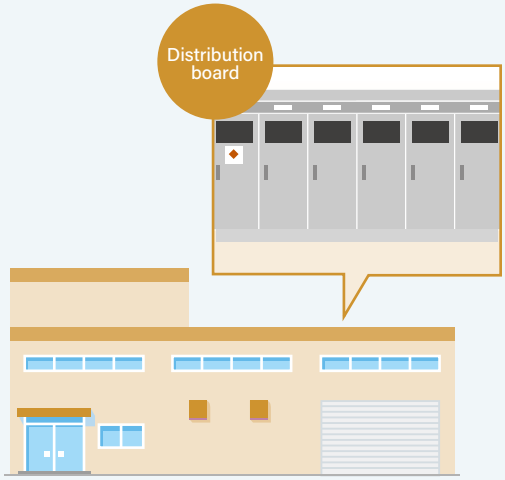
Details of power data collected to reduce power consumption in automotive body painting processes.

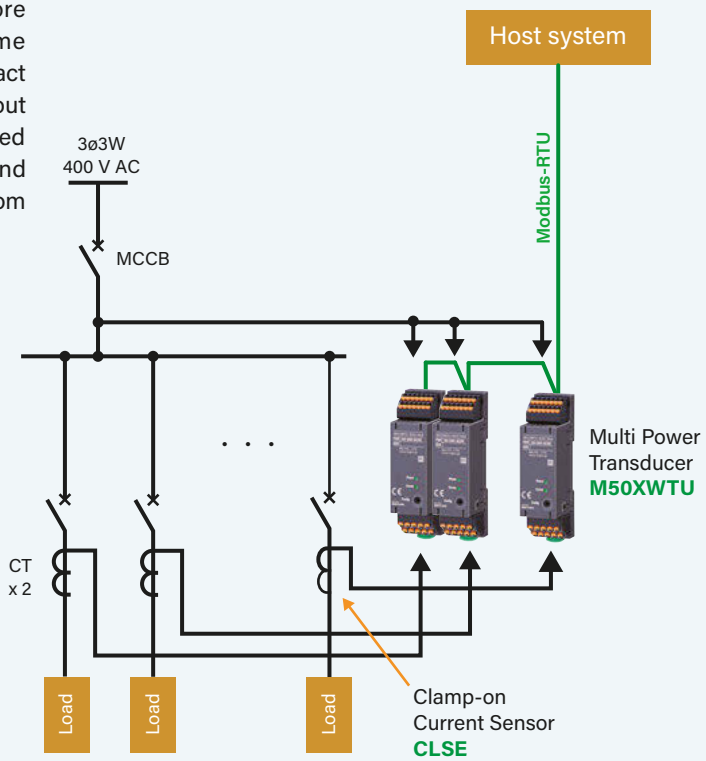
The automotive body painting process involves several other processes, including operating the cranes, powering the electrolysis tanks, and drying. The customer needed to determine the actual power consumption in each process in order to review the overall power consumption. They decided to use the **Multi Power Transducer** (Model: **M5XWTU**), an ultra-compact device that can be installed in a tight space of equipment panels on site, in order to measure the power consumption in each process and collect this data through a higher-level PLC via an open network.
In addition, because monitoring temperatures and flow rates is important in the painting process, they also use the **R3 Series** Remote I/O, a multi-channel device with channel-to-channel isolation, to implement a comprehensive monitoring system.
The company plans to analyze the details of the collected power data and begin to reduce power consumption in the processes that are expected to have the greatest impact.



Power monitoring at the distribution board level was achieved with a Terminal Block Multi Power Transducer that allows direct input of 400 V lines.

Although power monitoring has conventionally tended to only be done at the factory's main switchboard, it was decided to consider more detailed monitoring at the distribution board level. Since some distribution boards had 400 V AC lines, we proposed an ultra-compact **Multi Power Transducer** that supports direct voltage input without using a voltage transformer, and can also be installed in the limited space of distribution boards. This proposal was well-received and adopted. Centralized monitoring is performed by collecting data from multiple monitoring points using Modbus communication.

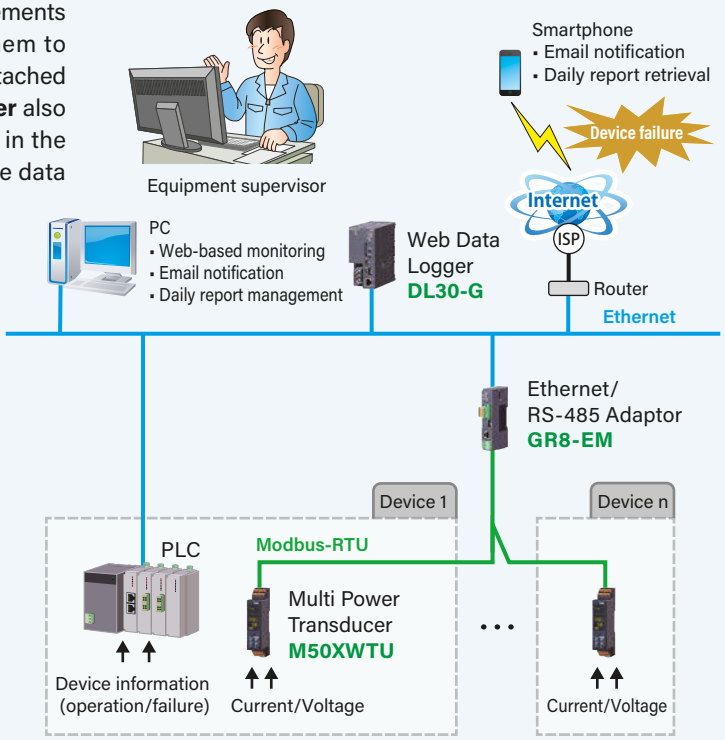




AC power monitoring at a metal materials factory

Web Data Logger collects various electric power measurements provided by the **Multi Power Transducer** and uses them to generate reports automatically.Report data can then be attached to an email and sent at specific intervals. **Web Data Logger** also acquires equipment information data from the PLC and, in the event of an equipment failure or other problem, sends the data as an email notification.

Maintenance staff



Web Data Logger

DL30 Series

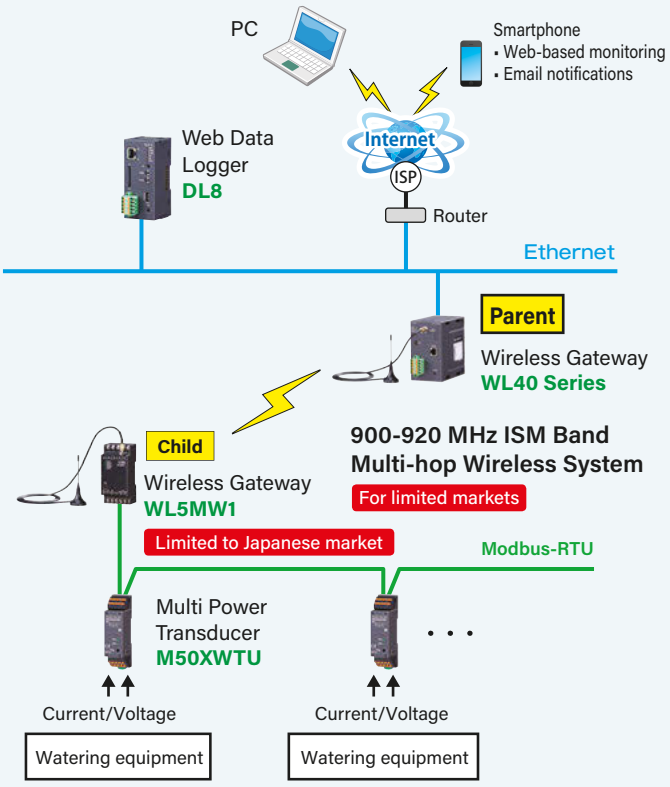
Web Data Logger is an on-site installable data logger with remote monitoring, data logging, and event reporting functions that can be accessed via a Web browser. It also includes a report function for generating reports.

Model: DL30

CE

AC power monitoring of golf course watering equipment

By combining the **DL8 series**, **Multi Power Transducer**, and **ISM Band Multi-hop Wireless System**, it is possible to remotely monitor the AC power of equipment used to supply water to sprinklers and other devices.
The monitoring window included with the **DL8 series** can be remotely monitored from anywhere using only a Web browser, and the system can automatically generate and email reports in the event of a malfunction.



Web Data Logger

DL8 Series

The DL8 series is an IoT device with Web-based remote monitoring, data logging, and event reporting functions.

Model: DL8

CE

DL8 simple Web server window

Trend graph

Data display

Specifications

W22.5 x H115 x D55 mm
(0.89″ x 4.53″ x 2.17″)

W28 x H105 x D41 mm
(1.10″ x 4.13″ x 1.61″)

Product name		Multi Power Transducer (PC programmable)	
Model		M50EXWTU	M50XWTU
Configuration		Single phase / 2-wire and 3-wire, 3-phase / 3-wire and 4-wire	
General Specifications	Construction	Terminal block	
	Connection	Tension clamp terminal	
	Screw terminal	---	
	Applicable wire size	Lower connector (voltage input, power, Modbus) 0.2 - 1.5 mm², stripped length 8 - 9 mm Upper connector (current sensor input, pulse output) 0.2 - 1.5 mm², stripped length 10 - 11 mm	
	Housing material	Flame-resistant resin (black)	
	Isolation	Voltage input or current input to Modbus to pulse output 1 to pulse output 2 to power	
	Measured variables	**Voltage**: 1-N, 2-N, 3-N, 1-2, 2-3, 3-1 **Current**: 1, 2, 3, N **Active power** **Reactive power** **Apparent power** **Power factor** **Frequency** **Active energy**: Incoming / outgoing **Reactive energy**: Incoming / outgoing / lag (inductive) / lead (capacitive) **Harmonic distortion**: Overall distortion ratio, content rate (2nd to 31st) **Max. and min. values** **CO_2 emissions (energy conversion value)**	
	Simplified measurement mode	Calculates power from current values with fixed voltage values and power factor.	
	Power indicator LED	---	Green LED; Blinking patterns indicate different operating status of the transducer.
Modbus Communication	Communication	Half-duplex, asynchronous, no procedure	
	Standard	Conforms to TIA/EIA-485-A	
	Transmission distance	500 meters max.	
	Baud rate	1200, 2400, 4800, 9600, 19200, 38400 bps (default: 38400 bps)	
	Protocol	Modbus-RTU	
	Node address	1 to 247 (default: 1)	
	Parity	None, even or odd (default: odd)	
	Stop bit	1 or 2 (default: 1)	
	Max. number of nodes	31 (excluding master)	
	Transmission media	Shielded twisted-pair cable (CPEV-S 0.65-0.9 dia.)	Shielded twisted-pair cable (CPEV-S 0.9 dia.)
	Internal terminating resistor	110 Ω	
	Communication indicator LED	---	Green LED turns ON while Modbus communication
Input/Output Specifications	Frequency	50 / 60 Hz (45 – 66 Hz)	
		• **Voltage Input** **Rated voltage for each wiring** Single-phase/2-wire: rated voltage 240 V AC Single-phase/3-wire: phase voltage 240 V AC / line voltage 480 V AC Three-phase/3-wire: line voltage 240 V AC (480 V AC when voltage to ground for each line is ≤ 277 V) Three-phase/4-wire: phase voltage 277 V / line voltage 480 V AC **Input range**: 1-N, 2-N, 3-N: 50 to 277 V AC 1-2, 2-3, 3-1: 50 to 480 V AC **Consumption VA**: Voltage circuit ≤ ULN² / 250 kΩ / ph **Selectable primary voltage range**: 50 – 400 000 V • **Current Input** **CLSE-R5**: 0 – 5 A AC **CLSE-05**: 0 – 50 A AC **CLSE-10**: 0 – 100 A AC **CLSE-20**: 0 – 200 A AC **CLSE-40**: 0 – 400 A AC **CLSE-60**: 0 – 600 A AC **Input range**: 0 - 120% of the rating **Low-end cutout (current)**: 0 - 99.9% (default setting: 1%) **Selectable primary current range**: 1 – 20 000 A (only with CLSE-R5, refer to the configurator settings)	■ **Pulse output** **Outputs assignable to pulse**: various energy **Output type**: Photo MOSFET relay **Rated load**: 30 V 200 mA AC/DC at peak **ON resistance**: 1 Ω max. **Leakage current during opening**: 2 μA max.
		■ **M50EXWTU display specifications** **Display function**: Displays measured values and status of the unit **Display size**: Approx. 14 x 40 mm (0.55" x 1.57") **Character color**: Yellow **Brightness**: Standard or low brightness (default: standard) **Display life**: Approx. 120,000 hours (Expected time for the display brightness to be reduced to 50 % when the display is used continuously with low brightness in 25°C) **Operating mode**: Automatically turn off after no operation, or always on (default: automatically turn off after no operation for 10 minutes) **Display type**: OEL display	
Installation	Operating temperature	-20 to +65°C (-4 to +149°F)	
	Operating humidity	30 to 90 %RH (non-condensing)	
	Atmosphere	No corrosive gas or heavy dust	
	Mounting	DIN rail	
	Weight	90 g (2.8 oz)	70 g (2.5 oz)
	Power consumption	AC: Max. 3 VA (100 - 240 V AC) / DC: ≤ 1.5 W (100 - 240 V DC) [universal]	
Performance		**Accuracy** (*3) **Voltage**: ±0.5 % (*4) **Current**: ±0.5 % (*4) **Power**: ±0.5 % (*4) **Power factor**: ±1.5 % **Frequency**: ±0.1 Hz **Energy**: ±2 % (power factor ≥ 0.5, input ≥ 10%) **Temp. coefficient**: ±0.0075 %/°C (0.004 %/°F) **Sampling time**: ≤ 500 msec. **Insulation resistance**: ≥ 100 MΩ with 500 V DC **Dielectric strength**: 2000 V AC @ 1 minute (current input or voltage input to Modbus to pulse output 1 to pulse output 2 to power) (M50XWTU) 2000 V AC @ 1 minute (current input or voltage input to Modbus to pulse output 1 or pulse output 2 to power) 500 V AC @1 minute (pulse output 1 to pulse output 2) (M50EXWTU)	

(*3) Sensor error margin not included. Add sensor error margin when using with the combination of the sensor.
(*4) An accuracy for rated input. The described accuracy levels are ensured at the input 1% or more for neutral current in a single-phase/3-wire circuit, phase-2 current in a 3-phase/3-wire circuit and phase-N current in a 3-phase/4-wire circuit.

 W25 x H97 x D41 mm (0.98″ x 3.82″ x 1.61″)	 W25 x H97 x D41 mm (0.98″ x 3.82″ x 1.61″)
Multi Power Transducer (PC programmable, self-powered, supporting harmonic distortion)	**Multi Power Transducer (PC programmable, self-powered)**
M5XWTU	**M5XWT**
Single phase / 2-wire and 3-wire, 3-phase / 3-wire	
Terminal block	
M3.5 screw terminals (torque 0.8 N·m)	
Nickel-plated steel (standard) or stainless steel	

Flame-resistant resin (black)	
Current input or voltage input to analog output or pulse output or Modbus	Current input or voltage input to Modbus
Voltage: R-S, S-T, T-R **Current**: R, S, T **Active power** **Reactive power** **Apparent power** **Power factor** **Frequency** **Active energy**: Incoming / outgoing **Reactive energy**: Incoming / outgoing / lag (inductive) / lead (capacitive) **Apparent energy** **Average active power (demand)** **Average reactive power (demand)** **Average apparent power (demand)** **Average (demand) current**: R, S, T **Harmonic distortion** Overall distortion ratio, content rate (2nd to 31st) Voltage: R-S, S-T, T-R Current: R, S, T **Max. and min. values**	**Voltage**: R-S, S-T, T-R **Current**: R, S, T **Active power** **Reactive power** **Apparent power** **Power factor** **Frequency** **Active energy**: Incoming / outgoing **Reactive energy**: Incoming / outgoing / lag (inductive) / lead (capacitive) **Apparent energy** **Average active power (demand)** **Average reactive power (demand)** **Average apparent power (demand)** **Average (demand) current**: R, S, T **Max. and min. values**
Calculates power from current values with fixed voltage values and power factor.	
Green LED; Blinking patterns indicate different operating status of the transducer.	
Half-duplex, asynchronous, no procedure	
Conforms to TIA/EIA-485-A	
500 meters max.	
1200, 2400, 4800, 9600, 19200, 38400 bps (default: 38400 bps)	
Modbus-RTU	
1 to 247 (default: 1)	
None, even or odd (default: odd)	
1 or 2 (default: 1)	
31 (excluding master)	
Shielded twisted-pair cable (CPEV-S 0.9 dia.)	
110 Ω	
---	
50 / 60 Hz (45 – 66 Hz)	
• **Voltage Input** **Rated voltage**: 240 V AC **Input range**: 80 - 260 V AC (Phase voltage range is 80 - 130 V for single-phase/3-wire) **Consumption VA: P1 - P2**: ≤ 3 VA (power consumption of internal circuit) **P2 - P3**: voltage²/≤ 1.5MΩ VA **Selectable primary voltage range**: 50 – 400 000 V • **Current Input** **CLSE-R5**: 0 – 5 A AC **CLSE-05**: 0 – 50 A AC **CLSE-10**: 0 – 100 A AC **CLSE-20**: 0 – 200 A AC **CLSE-40**: 0 – 400 A AC **CLSE-60**: 0 – 600 A AC **Input range**: 0 - 120% of the rating **Low-end cutout (current)**: 0 - 99.9% (default setting: 1%) **Selectable primary current range**: 1 – 20 000 A (only with CLSE-R5, refer to the configurator settings)	• **Voltage Input** **Rated voltage**: 240 V AC **Input range**: 80 - 260 V AC (Phase voltage range is 80 - 130 V for single-phase/3-wire) **Consumption VA: P1 - P2**: ≤ 3 VA (power consumption of internal circuit) **P2 - P3**: voltage²/≤ 1.5MΩ VA **Selectable primary voltage range**: 50 – 400 000 V • **Current Input** **CLSE-R5**: 0 – 5 A AC **CLSE-05**: 0 – 50 A AC **CLSE-10**: 0 – 100 A AC **CLSE-20**: 0 – 200 A AC **CLSE-40**: 0 – 400 A AC **CLSE-60**: 0 – 600 A AC **Input range**: 0 - 120% of the rating **Low-end cutout (current)**: 0 - 99.9% (default setting: 1%) **Selectable primary current range**: 1 – 20 000 A (only with CLSE-R5, refer to the configurator settings)
■ **Analog output** Default setting is DC current output 4 - 20 mA **Types** **DC current output**: 0 - 20 mA DC **DC voltage output**: -10 - +10 V DC **DC voltage output**: -5 - +5 V DC (3 types can be switched by DIP switch and PC) **Outputs**: Voltage, current, various powers, power factor, frequency, harmonic current and harmonic voltage • **DC current output range 0 - 20 mA DC** **Output available range**: 0 - 23 mA DC **Minimum span**: 1 mA **Load resistance**: 550 Ω • **DC voltage output range -10 - +10 V DC** **Output available range**: -11.5 - +11.5 V DC **Minimum span: 1 V** **Load resistance**: Output drive 1 mA max. (e.g. When 0 - 10 V DC, 10 V÷1 mA = 10kΩ) • **DC voltage output range -5 - +5 V DC** **Output available range**: -5.75 - +5.75 V DC **Minimum span**: 500 mV **Load resistance**: Output drive 1 mA max. (e.g. When 1 - 5 V DC, 5 V÷1 mA = 5000Ω) ■ **Pulse / alarm output** **Outputs assignable to pulse**: various energy **Outputs assignable to alarm**: Voltage, current, various powers, power factor, frequency, various energy average, current average, harmonic current and harmonic voltage **Output type**: Photo MOSFET relay **Rated load**: 160 V 150 mA AC/DC at peak **ON resistance**: 8 Ω max. **Leakage current during opening**: 2 µA max.	
-20 to +65°C (-4 to +149°F)	
30 to 90 %RH (non-condensing)	
No corrosive gas or heavy dust	
DIN rail	
80 g (2.8 oz)	

Accuracy (*3) **Voltage**: ±0.5 % (*5) **Current**: ±0.5 % (*5) **Power**: ±0.5 % (*5) **Power factor**: ±1.5 % **Frequency**: ±0.5 Hz **Energy**: ±2 % (power factor ≥ 0.5, input ≥ 10%) **Analog output accuracy** (*6) **Temp. coefficient**: ±0.0075 %/°C (0.004 %/°F) **Sampling time**: ≤ 500 msec. **Analog output response time**: ≤ 1.5 sec. (0 to 99%) **Insulation resistance**: ≥ 100 MΩ with 500 V DC **Dielectric strength**: 2000 V AC @ 1 minute (current input or voltage input to analog output or pulse output or Modbus to ground)	**Accuracy** (*3) **Voltage**: ±0.5 % (*5) **Current**: ±0.5 % (*5) **Power**: ±0.5 % (*5) **Power factor**: ±1.5 % **Frequency**: ±0.5 Hz **Energy**: ±2 % (power factor ≥ 0.5, input ≥ 10%) **Temp. coefficient**: ±0.0075 %/°C (0.004 %/°F) **Sampling time**: ≤ 500 msec. **Insulation resistance**: ≥ 100 MΩ with 500 V DC **Dielectric strength**: 2000 V AC @ 1 minute (current input or voltage input to Modbus to ground)

(*5) An accuracy for rated input. The described accuracy levels are ensured at the input 1% or more for neutral current in a single-phase/3-wire circuit and phase-S current in a 3-phase/3-wire circuit.
(*6) Output accuracy for the setting value span is shown as following formula. Output accuracy = (output range ÷ output setting value span) × 0.02%
For current output: Output accuracy = (output range ÷ output setting value span) × 0.04% [Ex1] DC current output 4 - 20 mA: Output accuracy = (20 mA ÷ 16A) × 0.04% = 0.05%
Input accuracy and sensor error are added to total accuracy.

M5-UNIT Series Terminal Block Signal Conditioners

ISOLATORS & SENSOR INPUTS

Product name	Model
Isolator	**M5YV**
Input Loop Powered Isolator	**M5SN**
Universal Transmitter (PC programmable)	**M5XU**
Signal Transmitter (PC programmable)	**M5XV**
Signal Transmitter	**M5VS**
Signal Transmitter (narrow span input)	**M5MV**
Signal Transmitter (high speed response)	**M5VF**
Signal Transmitter (high speed response 30 µsec.)	**M5VF2**
Signal Transmitter (high dielectric strength)	**M5VSH**
Voltage Divider	**M5VV**
Thermocouple Transmitter	**M5TS**
TC/RTD Transmitter (PC programmable)	**M5XTR**
RTD Transmitter	**M5RS**
Potentiometer Transmitter	**M5MS**
Current Loop Supply (non-isolated)	**M5D**
Current Loop Supply	**M5DY**
Current Loop Supply (applicable to HART signal, opencircuit detection selectable)	**M5DYH2**
Tachogenerator Transmitter	**M5TG**
AC Transmitter	**M5AC**

FUNCTION MODULES

Product name	Model
Adder (PC programmable)	**M5XADS**
Subtractor (PC programmable)	**M5XSBS**
Multiplier (PC programmable)	**M5XMLS**
Divider (PC programmable)	**M5XDIS**
Ratio/Bias Transmitter (output bias, PC programmable)	**M5XREB**
Ratio/Bias Transmitter (input bias, PC programmable)	**M5XRTS**
Linearizer (PC programmable)	**M5XF**
Square Root Extractor (PC programmable)	**M5XFLS**
Inverted Output Transmitter (PC programmable)	**M5XUDS**
Ramp Buffer (PC programmable)	**M5XCRS**
Track/Hold (PC programmable)	**M5XAMS**
Peak Hold (PC programmable)	**M5XPHS**
High/Low Selector (PC programmable)	**M5XSES**
Parameter Generator (PC programmable)	**M5XMST**

FREQUENCY I/O

Product name	Model
Pulse Isolator	**M5PP**
Frequency Transmitter	**M5PA**
Frequency Transmitter (PC programmable)	**M5XPA**
Encoder Speed Transmitter (PC programmable)	**M5XRP**

POWER TRANSDUCERS

Product name	Model
Multi Power Transducer (PC programmable, self-powered, support harmonic distorion)	**M5XWTU**
Multi Power Transducer (PC programmable, self-powered)	**M5XWT**
PT Transmitter (RMS sensing)	**M5PT**
CT Transmitter (RMS sensing)	**M5CT**
CT Transmitter (clamp-on current sensor)	**M5CTC**

- **Universal power supply**
  Supporting 100 to 240 V AC and 24 V DC
- **Reliable 3-port isolation**
  3-port isolation between input, output, and power supply
- **Loop test output**
  Simulated signals are output for operation testing without input signals. (PC programmable type only)

• Specifications may vary depending on the model. For details, check the specification sheet.

Website

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