

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

FREQUENCY I/O

Product name	Model
Pulse Isolator	M5PP
Pulse Isolator	M5YPD <small>Under development</small>
Frequency Transmitter	M5PA
Frequency Transmitter (PC programmable)	M5XPA
Encoder Speed Transmitter (PC programmable)	M5XRP
DC/Frequency Transmitter	M5AP <small>Scheduled release date: Sept. 2025</small>
Pulse Scaler	M5PRU <small>Under development</small>

DC ALARMS

Product name	Model
DC Alarm	M5AVS <small>Under development</small>
DC Alarm	M5SED <small>Under development</small>

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

POWER TRANSDUCERS

Product name	Model
Multi Power Transducer (PC programmable, self-powered, support harmonic distortion)	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.

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 CO₂ 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
- CO₂ 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 5 for detailed information

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See Page 5 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)



Your local representative:

MG CO., LTD.
www.mgco.jp

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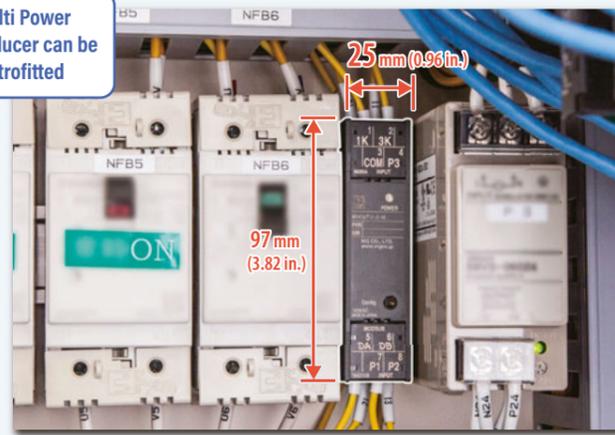
Make Greener automation

Installation

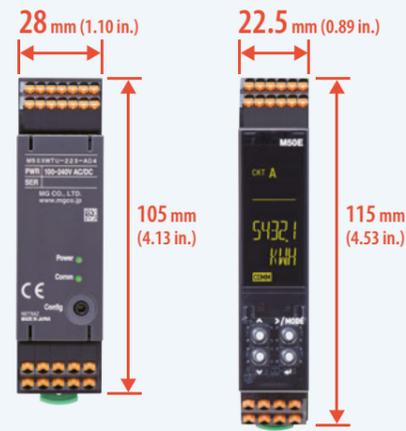
Compact size

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

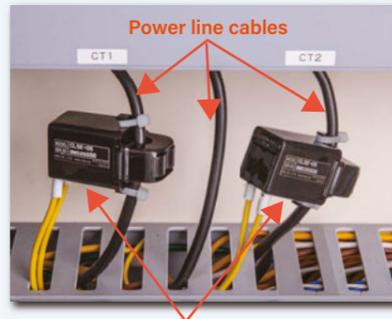
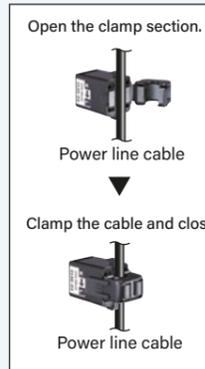
Installation

Easy installation with clamp-on current sensors

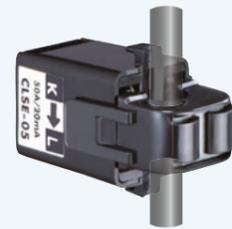
The current inputs are connected in one touch by using **Clamp-on Current Sensors** (Model: CLSE), needing no live cable modification.

Furthermore, the M5XWTU and M5XWT use the voltage input to drive their internal circuits, needing no auxiliary power supply connection.

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



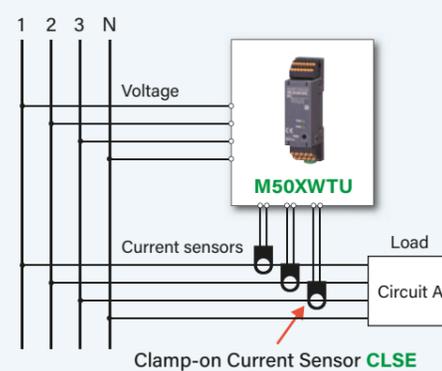
The current sensors can be installed without modifying existing power lines.



Easy Retrofitting
Clamp-on
Current Sensor
CLSE Series

Power line cable

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.



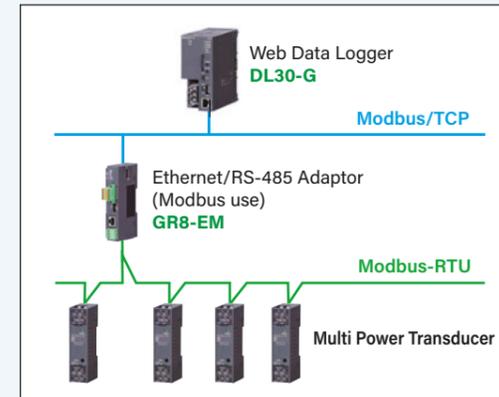
Model	CLSE-R5	CLSE-05	CLSE-10	CLSE-20	CLSE-40	CLSE-60
Applicable wire diameter	10 dia. max.	10 dia. max.	16 dia. max.	24 dia. max.	36 dia. max.	36 dia. max.
Operational range	5 A max.	50 A max.	100 A max.	200 A max.	400 A max.	600 A max.

Settings and Connection

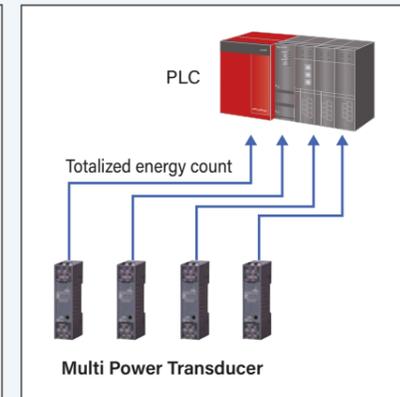
Modbus communication

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^(*) are also available for direct input to PLC/DCS.



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



The CPU calculates all AC power variables.

The built-in CPU calculates the AC power variables instantaneously

The built-in CPU calculates instantaneously up to 290^(*) 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).

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 commissioning.



Monitoring window example (PC Configurator Model: PMCFG)

Monitoring window for M50XWTU

• PMCFG is downloadable for free from our website.

Labels for the screenshot:

- Communication loop test output
- Display of various measurement values
- Settings for input specifications and measurement items
- Maximum and minimum values
- Energy and counter values
- CO₂ emissions (energy conversion value)
- All measurement data on PC screen!
- Harmonic distortion contents
- Vector Chart
- Voltage/current vector chart

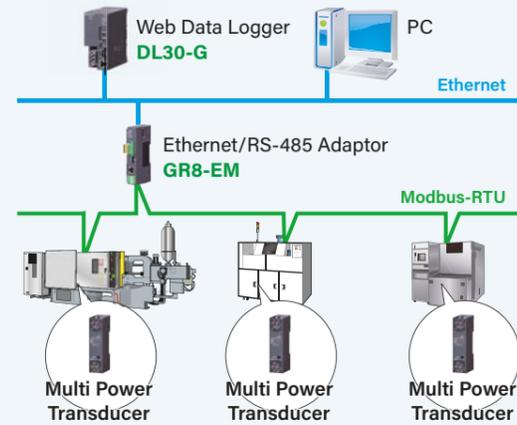
Applications

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.

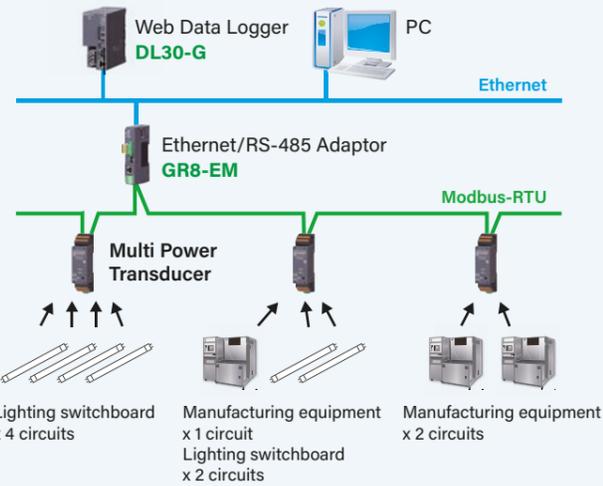
You can start with a small budget and gradually increase the number of measurement points, extending to overall management. For example, using **Web Data Logger** (Model: DL30-G) may be ideal as it enables Modbus communication at a reasonable cost.

System configuration example



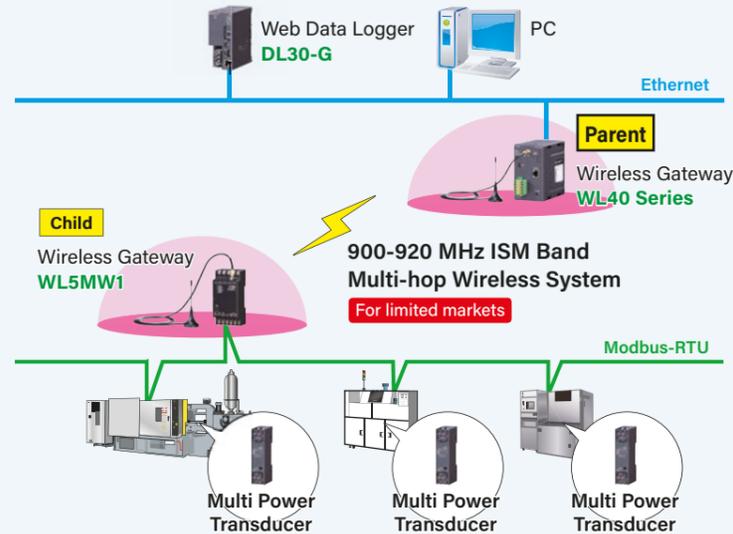
System configuration example for M50XWTU / M50EXWTU

CO₂ 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.

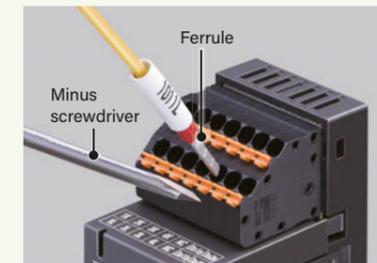


Equipped with OEL display

FEATURES

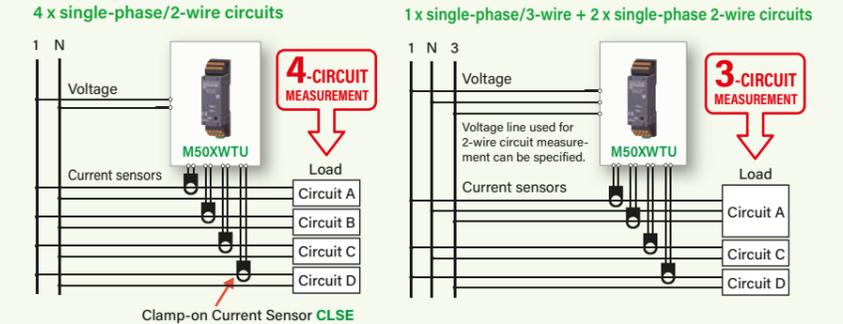
- CO₂ emissions (energy conversion value) can be calculated.
- Max. 480 V AC direct input
- Three-phase/4-wire system input connection
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system by single module
- Two energy count pulse outputs
- 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 mm² can be used.

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



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

M50EXWTU: OEL display clearly displays information

The OEL display allows you to check the measured values of voltage, current, power, energy, CO₂ 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 ∇ \blacktriangle button switches the measured value display in order.

Control buttons

Display examples

Measuring value display mode

Flashes when an error or other problem is occurring → ALARM

Currently displayed circuit and measured point → CKT A POINT 1-N

Measured value and unit → 110.24 V

Lit during Modbus communication → COMM Do1 Do2

Flashes according to the ON/OFF state of totalized pulse

Setting value display mode

Lit while a setting value is displayed or changed → SET

Setting value menu number → MENU A-1

Setting value → ON

Setting item → ACTV

Holding down the button switches the display mode

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")



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")

Product name	Multi Power Transducer (PC programmable)		Multi Power Transducer (PC programmable, self-powered, supporting harmonic distortion)		Multi Power Transducer (PC programmable, self-powered)	
Model	M50EXWTU	M50XWTU	M5XWTU	M5XWT		
Configuration	Single phase / 2-wire and 3-wire, 3-phase / 3-wire and 4-wire		Single phase / 2-wire and 3-wire, 3-phase / 3-wire			
Construction	Terminal block		Terminal block			
Connection	Tension clamp terminal		M3.5 screw terminals (torque 0.8 N-m)			
Screw terminal	---		Nickel-plated steel (standard) or stainless steel			
Applicable wire size	Lower connector (voltage input, power, Modbus) 0.2 - 1.5 mm ² , stripped length 8 - 9 mm Upper connector (current sensor input, pulse output) 0.2 - 1.5 mm ² , stripped length 10 - 11 mm		---			
Housing material	Flame-resistant resin (black)		Flame-resistant resin (black)			
Isolation	Voltage input or current input to Modbus to pulse output 1 to pulse output 2 to power		Current input or voltage input to analog output or pulse output or Modbus		Current input or voltage input to Modbus	
General Specifications	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		Voltage: R-S, S-T, T-R Current: R, S, T 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 CO₂ emissions (energy conversion value)		Voltage: R-S, S-T, T-R Current: R, S, T Active power Reactive power Apparent power Power factor Frequency Active energy: Incoming / outgoing	
Measured variables	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 CO₂ emissions (energy conversion value)		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		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	
Simplified measurement mode	Calculates power from current values with fixed voltage values and power factor.		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.		Green LED; Blinking patterns indicate different operating status of the transducer.	
Communication	Half-duplex, asynchronous, no procedure		Half-duplex, asynchronous, no procedure			
Standard	Conforms to TIA/EIA-485-A		Conforms to TIA/EIA-485-A			
Transmission distance	500 meters max.		500 meters max.			
Baud rate	1200, 2400, 4800, 9600, 19200, 38400 bps (default: 38400 bps)		1200, 2400, 4800, 9600, 19200, 38400 bps (default: 38400 bps)			
Protocol	Modbus-RTU		Modbus-RTU			
Node address	1 to 247 (default: 1)		1 to 247 (default: 1)			
Parity	None, even or odd (default: odd)		None, even or odd (default: odd)			
Stop bit	1 or 2 (default: 1)		1 or 2 (default: 1)			
Max. number of nodes	31 (excluding master)		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.)		Shielded twisted-pair cable (CPEV-S 0.9 dia.)	
Internal terminating resistor	110 Ω		110 Ω		110 Ω	
Communication indicator LED	---		Green LED turns ON while Modbus communication		---	
Frequency	50 / 60 Hz (45 - 66 Hz)		50 / 60 Hz (45 - 66 Hz)		50 / 60 Hz (45 - 66 Hz)	
Input/Output Specifications	<ul style="list-style-type: none"> 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) 		<ul style="list-style-type: none"> 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) 		<ul style="list-style-type: none"> 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) 	
	<ul style="list-style-type: none"> 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. 		<ul style="list-style-type: none"> 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) 		<ul style="list-style-type: none"> 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. 	
Operating temperature	-20 to +65°C (-4 to +149°F)		-20 to +65°C (-4 to +149°F)		-20 to +65°C (-4 to +149°F)	
Operating humidity	30 to 90 %RH (non-condensing)		30 to 90 %RH (non-condensing)		30 to 90 %RH (non-condensing)	
Atmosphere	No corrosive gas or heavy dust		No corrosive gas or heavy dust		No corrosive gas or heavy dust	
Mounting	DIN rail		DIN rail		DIN rail	
Weight	90 g (2.8 oz)		70 g (2.5 oz)		80 g (2.8 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)		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)		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)	

(*3) Sensor error margin not included. Add sensor error margin when using 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.

(*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%
 [Ext] 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.