

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	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
Frequency Transmitter	M5PA
Frequency Transmitter (PC programmable)	M5XPA
Encoder Speed Transmitter (PC programmable)	M5XRP
DC/Frequency Transmitter	M5AP
Pulse Scaler	M5PRU

DC ALARMS

Product name	Model
DC Alarm	M5AVS
DC Alarm	M5SED

FUNCTION MODULES

Product name	Model
Adder (PC programmable)	M5XADS
Subtractor (PC programmable)	M5XSBS
Multiplier (PC programmable)	M5XMLS
Divider (PC programmable)	M5XDIS
Ratio/Bias Transmitter (PC programmable)	M5XREB
Ratio/Bias Transmitter (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)	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



Request Info

MG CO., LTD.  
(formerly M-System Co., Ltd.)  
www.mgco.jp

Your local representative:

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<sub>2</sub> 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.



NEW

Model: M50EXWTU

Modbus communication

CO<sub>2</sub> 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



Model: M50XWTU

Modbus communication

CO<sub>2</sub> 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 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)

MG CO., LTD.  
(formerly M-System Co., Ltd.)  
www.mgco.jp

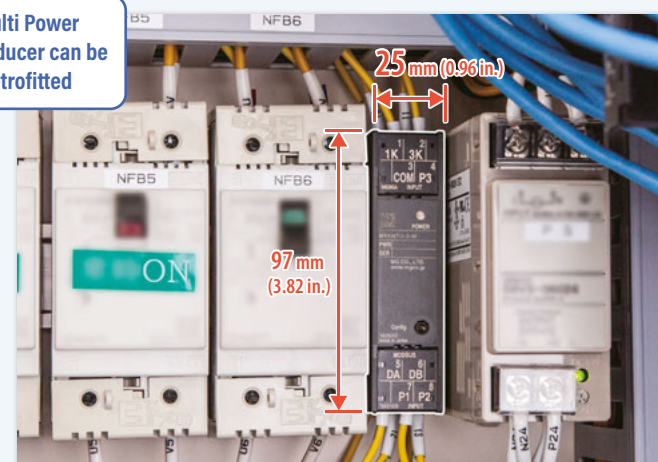
Make Greener automation

## Installation

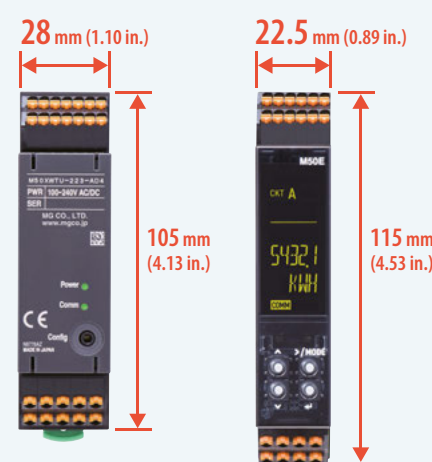
### Compact size

**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

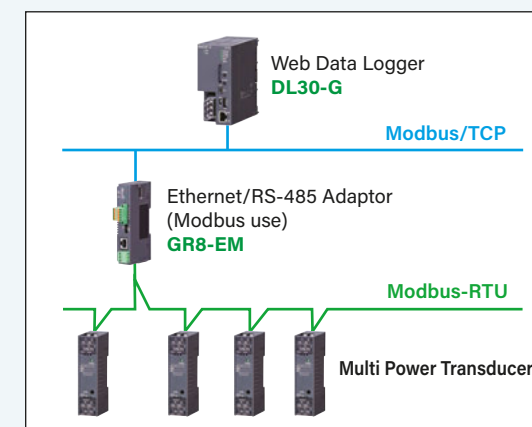
M50EXWTU

## Settings and Connection

### Modbus communication

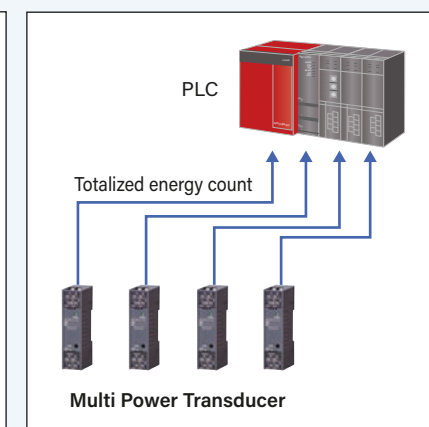
Modbus communication, convenient for remote energy monitoring by PLC or data loggers, is selectable as standard. Monitoring points can be easily added by daisy-chain wiring of twisted-pair cables.

Other output options such as analog signal, energy count pulse and alarm contact<sup>(\*)</sup> 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 built-in CPU calculates the AC power variables instantaneously

The built-in CPU calculates instantaneously up to 290<sup>(\*)</sup> 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).

## 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.

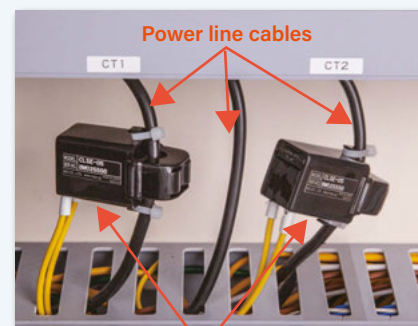
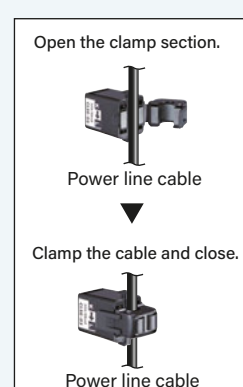
Furthermore, the **M5XWTU** and **M5XWT** use the voltage input to drive their internal circuits, needing no auxiliary power supply connection.



Power line cable

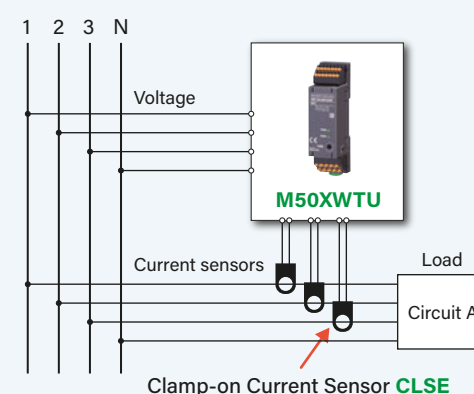
Easy Retrofitting  
Clamp-on  
Current Sensor  
CLSE Series

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.



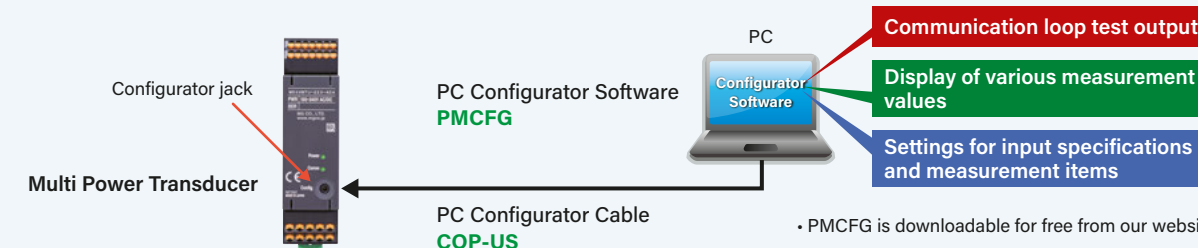
Model	CLSE-R5	CLSE-05	CLSE-10	CLSE-20	CLSE-40	CLSE-60
Applicable wire diameter	10 dia. max.	10 dia. max.	16 dia. max.	24 dia. max.	36 dia. max.	36 dia. max.
Operational range	5 A max.	50 A max.	100 A max.	200 A max.	400 A max.	600 A max.

## Settings and Connection

### Free setup software tool with convenient functions

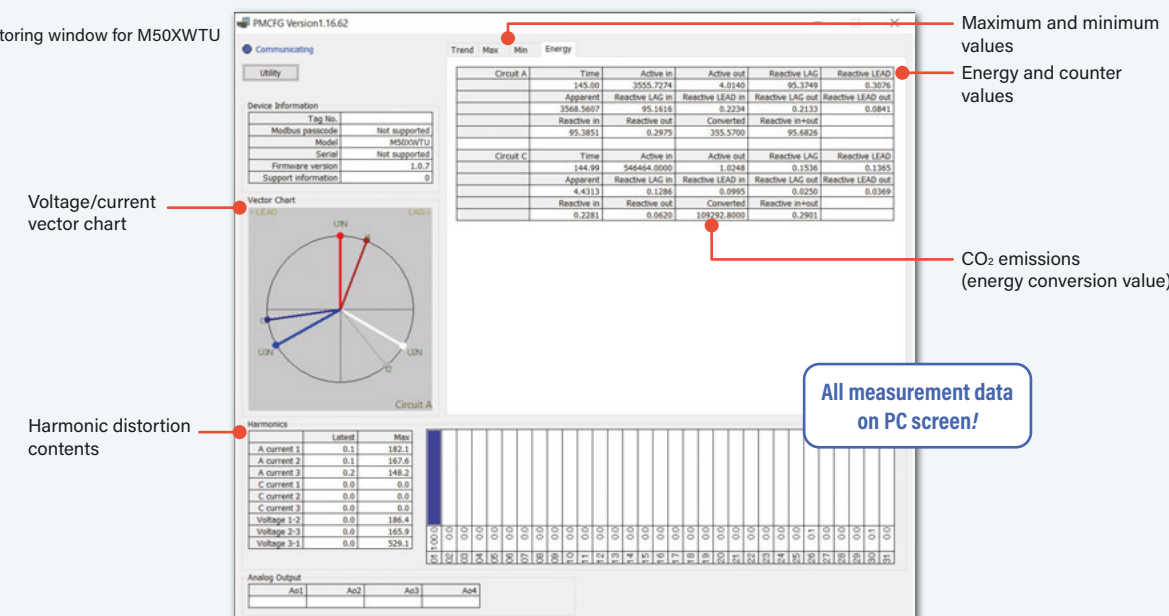
The PC Configurator Software is used to set up various parameters of the **Multi Power Transducer**. It has a convenient monitoring window showing all measurement values in real time.

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



All measurement data on PC screen!

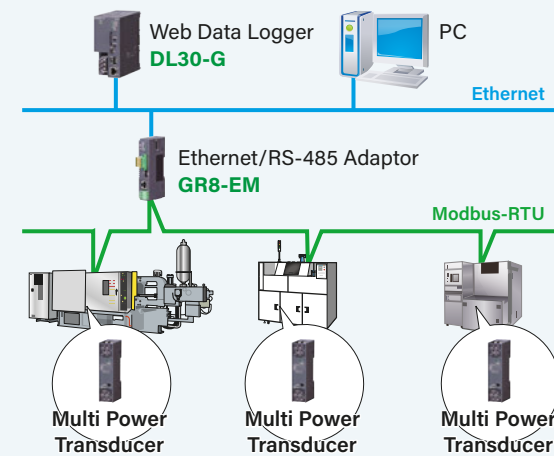


## You can start a single- or multi-point power monitoring system with the Modbus.

Precise power management is essential to achieving carbon neutrality. You can install the **Multi Power Transducers** in a small space, even on existing equipment.

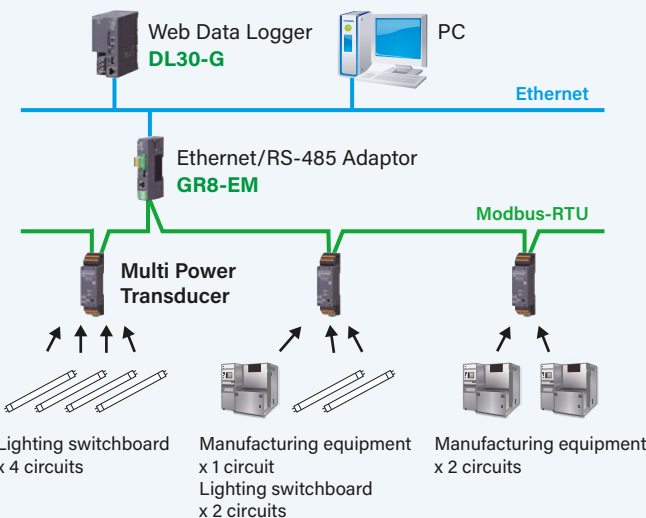
You can start with a small budget and gradually increase the number of measurement points, extending to overall management. For example, using **Web Data Logger** (Model: DL30-G) may be ideal as it enables Modbus communication at a reasonable cost.

### System configuration example



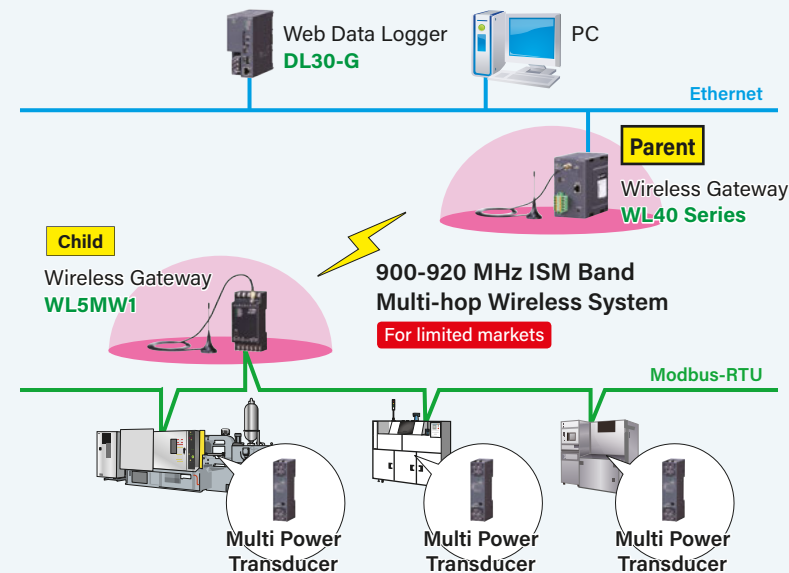
### System configuration example for M50XWTU / M50EXWTU

CO<sub>2</sub> 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.

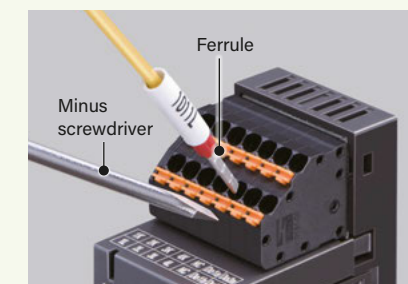
Multi-circuit measurement by single unit thanks to the tension-clamp terminal block with a large number of terminals.



### FEATURES

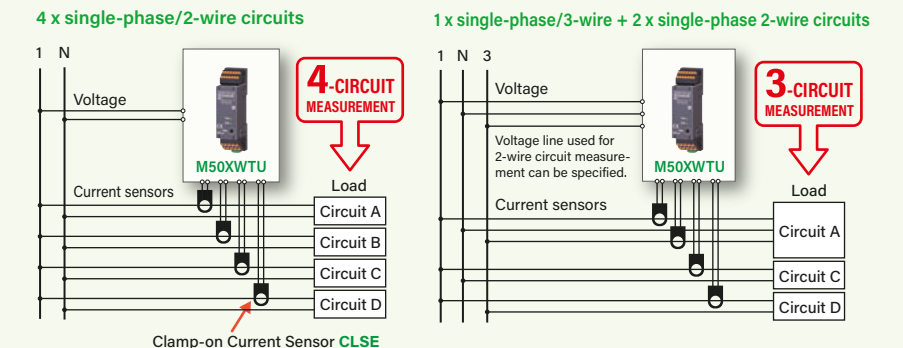
- CO<sub>2</sub> emissions (energy conversion value) can be calculated.
- Max. 480 V AC direct input
- Three-phase/4-wire system input connection
- Max. 4-circuit inputs for single-phase/2-wire system, max. 2-circuit inputs for single- or three-phase/3-wire system by single module
- Two energy count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

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



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

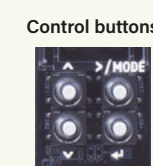
### M50EXWTU: OEL display clearly displays information

The OEL display allows you to check the measured values of voltage, current, power, energy, CO<sub>2</sub> emissions (energy conversion value), and relative harmonic content of each element, as well as various setting values.

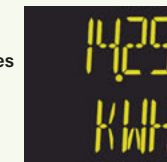
The display turns off if a set time elapses without any button operation. Just press any button while the display is off to return to the state before the display was turned off. You can also set the display to always be on.

### Switching measured value display

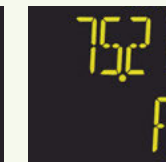
Pressing  $\nabla$   $\Delta$  button switches the measured value display in order.



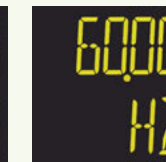
Display examples



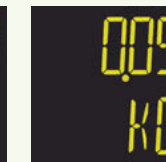
Active energy



Current

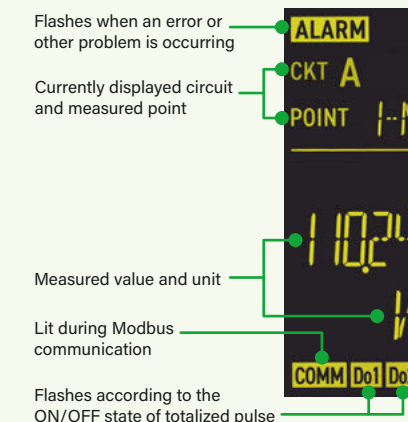


Frequency



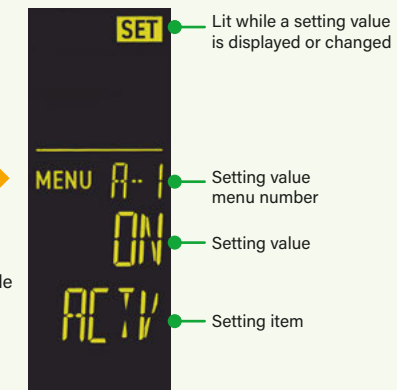
Energy conversion value (CO<sub>2</sub> emissions)

### Measuring value display mode

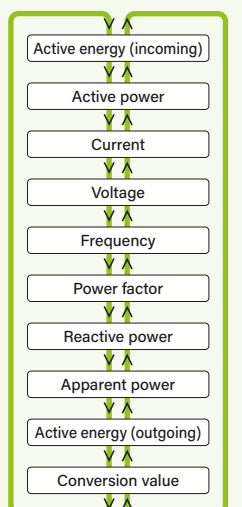


Display example for 1-N line voltage of circuit A





### Setting value display mode



Example of enabling display of circuit A



## Specifications

Specifications		 <div>W22.5 x H115 x D55 mm (0.89" x 4.53" x 2.17")</div>	 <div>W28 x H105 x D41 mm (1.10" x 4.13" x 1.61")</div>	 <div>W25 x H97 x D41 mm (0.96" x 3.82" x 1.61")</div>	 <div>W25 x H97 x D41 mm (0.96" x 3.82" x 1.61")</div>			
Product name		Multi Power Transducer (PC programmable)		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 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)		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	Measured variables	Voltage: 1-N, 2-N, 3-N, 1-2, 2-3, 3-1	Active energy: Incoming / outgoing	Voltage: R-S, S-T, T-R	Active energy: Incoming / outgoing	Harmonic distortion	Voltage: R-S, S-T, T-R	Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive)
		Current: 1, 2, 3, N	Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive)	Current: R, S, T	Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive)	Overall distortion ratio, content rate (2nd to 31st)	Current: R, S, T	Reactive energy: Incoming / outgoing / lag (inductive) / lead (capacitive)
		Active power	Harmonic distortion: Overall distortion ratio, content rate (2nd to 31st)	Active power	Apparent energy	Max. and min. values	Max. and min. values	Apparent power
		Max. and min. values	CO <sub>2</sub> emissions (energy conversion value)	Apparent power	Average active power (demand)		Average active power (demand)	Apparent power
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 0.9 dia.)	Shielded twisted-pair cable (CPEV-S 0.9 dia.)				
Internal terminating resistor		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)				
Input/Output Specifications		• Voltage Input	■ Pulse output	• Voltage Input	• Voltage Input			
		Rated voltage for each wiring	Outputs assignable to pulse: various energy	Rated voltage: 240 V AC	Rated voltage: 240 V AC			
		Single-phase/2-wire: rated voltage 240 V AC	Output type: Photo MOSFET relay	Input range: 80 - 260 V AC (Phase voltage range is 80 - 130 V for single-phase/3-wire)	Input range: 80 - 260 V AC			
		Single-phase/3-wire: phase voltage 240 V AC / line voltage 480 V AC	Rated load: 30 V 200 mA AC/DC at peak	Consumption VA: P1 - P2: ≤ 3 VA (power consumption of internal circuit)	(Phase voltage range is 80 - 130 V for single-phase/3-wire)			
Three-phase/3-wire: line voltage 240 V AC		ON resistance: 1 Ω max.	P2 - P3: voltage²/≤ 1.5MΩ VA	Consumption VA: P1 - P2: ≤ 3 VA (power consumption of internal circuit)				
(480 V AC when voltage to ground for each line is ≤ 277 V)		Leakage current during opening: 2 μA max.	Selectable primary voltage range: 50 - 400 000 V	P2 - P3: voltage²/≤ 1.5MΩ VA				
Three-phase/4-wire: phase voltage 277 V / line voltage 480 V AC			• Current Input	Selectable primary voltage range: 50 - 400 000 V				
Input range: 1-N, 2-N, 3-N: 50 to 277 V AC			CLSE-R5: 0 - 5 A AC	• Current Input				
1-2, 2-3, 3-1: 50 to 480 V AC			CLSE-10: 0 - 100 A AC	CLSE-R5: 0 - 5 A AC				
Consumption VA: Voltage circuit ≤ ULN² / 250 kΩ / ph			CLSE-40: 0 - 400 A AC	CLSE-10: 0 - 100 A AC				
Selectable primary voltage range: 50 - 400 000 V			CLSE-60: 0 - 600 A AC	CLSE-20: 0 - 200 A AC				
• Current Input			Input range: 0 - 120% of the rating	CLSE-40: 0 - 400 A AC				
CLSE-R5: 0 - 5 A AC			Low-end cutout (current): 0 - 99.9% (default setting: 1%)	CLSE-60: 0 - 600 A AC				
CLSE-10: 0 - 100 A AC			Selectable primary current range: 1 - 20 000 A (only with CLSE-R5, refer to the configurator settings)	Input range: 0 - 120% of the rating				
CLSE-40: 0 - 400 A AC			■ Analog output	Low-end cutout (current): 0 - 99.9% (default setting: 1%)				
Input range: 0 - 120% of the rating			Default setting is DC current output 4 - 20 mA	Selectable primary current range: 1 - 20 000 A				
Low-end cutout (current): 0 - 99.9% (default setting: 1%)			Types	(only with CLSE-R5, refer to the configurator settings)				
Selectable primary current range: 1 - 20 000 A (only with CLSE-R5, refer to the configurator settings)			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.					
Operating temperature		-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)				
Atmosphere		No corrosive gas or heavy dust		No corrosive gas or heavy dust				
Mounting		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)	Temp. coefficient: ±0.0075 %/°C (0.004 %/°F)	Accuracy (*3)	Analog output accuracy (*6)	Accuracy (*3)			
	Voltage: ±0.5 % (*4)	Sampling time: ≤ 500 msec.	Voltage: ±0.5 % (*5)	Temp. coefficient: ±0.0075 %/°C (0.004 %/°F)	Voltage: ±0.5 % (*5)			
	Current: ±0.5 % (*4)	Insulation resistance: ≥ 100 MΩ with 500 V DC	Current: ±0.5 % (*5)	Sampling time: ≤ 500 msec.	Current: ±0.5 % (*5)			
	Power: ±0.5 % (*4)	Dielectric strength: 2000 V AC @ 1 minute	Power: ±0.5 % (*5)	Analog output response time: ≤ 1.5 sec. (0 to 99%)	Power: ±0.5 % (*5)			
	Power factor: ±1.5 %	(current input or voltage input to Modbus to pulse output 1 to pulse output 2 to power) (M50XWTU)	Power factor: ±1.5 %	Insulation resistance: ≥ 100 MΩ with 500 V DC	Power factor: ±1.5 %			
	Frequency: ±0.1 Hz	2000 V AC @ 1 minute	Frequency: ±0.5 Hz	Dielectric strength: 2000 V AC @ 1 minute (current input or voltage input to analog output or pulse output or Modbus to ground)	Frequency: ±0.5 Hz			
	Energy: ±2 %	(current input or voltage input to Modbus to pulse output 1 or pulse output 2 to power)	Energy: ±2 %		Energy: ±2 %			
	(power factor ≥ 0.5, input ≥ 10%)	500 V AC @1 minute (pulse output 1 to pulse output 2) (M50EXWTU)	(power factor ≥ 0.5, input ≥ 10%)		(power factor ≥ 0.5, input ≥ 10%)			

(\*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.

(\*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.