

Power Transducer Series LT-UNIT

WATT TRANSDUCER

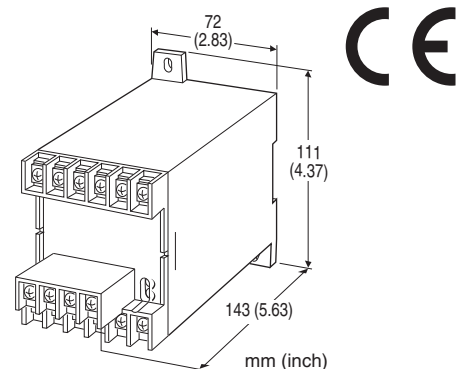
(self-powered)

Functions & Features

- Provides a DC output signal and a pulse totalizer signal in proportion to AC active power
- Convenient pulse unit output (Wh×10ⁿ)
- Measuring bidirectional power flow
- DC output containing little ripple is ideal for computer input
- "Time division multiplication" method accepts distorted waveforms
- Isolation up to 2000 V AC
- High-density mounting
- Conforms to IEC 60688
- No auxiliary power supply required

Typical Applications

- Centralized monitoring and control of power management system in a manufacturing facility or building
- SCR - Silicon Controlled Rectifier



MODEL: LTWTN-[1][2][3][4][5][6]

ORDERING INFORMATION

- Code number: LTWTN-[1][2][3][4][5][6]
Specify a code from below for each of [1] through [6].
(e.g. LTWTN-115A2/T/Q)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01)
- Use Ordering Information Sheet (No. ESU-3355).

How to determine Pulse Unit

[Example]

3-phase / 3-wire, VT 3300/110 V, CT 250/5 A, calibration range 750 W

$$10 [\text{kWh/pulse}] \div ((3300 \div 110) \times (250 \div 5))$$

$$= 6.666 \times 10^{-3} [\text{kWh/pulse}]$$

$$= 6.666 [\text{Wh/pulse}]$$

Check that the required pulse unit is within the available frequency range, 0.006 - 3.12 Hz.

$$\text{Input Range [W]} \div (\text{Calculated Pulse} \times 3600[\text{s}])$$

$$= 750 \div (6.666 \times 3600)$$

$$= 0.03125 [\text{Hz}]$$

[1] CONFIGURATION

- 1: 3-phase / 3-wire
- 2: Single-phase / 2-wire
- 3: Single-phase / 3-wire
- 4: 3-phase / 4-wire

[2] VT INPUT (unbalanced load)

For 3-phase / 4-wire, phase voltages (e.g. 110 V / $\sqrt{3}$) are used.

- 1: 110 V AC
(Not selectable for single-phase/3-wire system.)
- 2: 220 V AC
(Not selectable for single-phase/3-wire system.)
- 4: 220 V / 380 V AC (3-phase/4-wire only)
- A: 100 V / 200 V AC
(single-phase / 3-wire only)

[3] CT INPUT (unbalanced load)

Current

- 1: 1 A AC
- 2: 2 A AC
- 5: 5 A AC

[4] DC OUTPUT

Current

- A: 4 - 20 mA DC (Load resistance 500 Ω max.)
- D: 0 - 20 mA DC (Load resistance 500 Ω max.)
- F: 0 - 10 mA DC (Load resistance 1000 Ω max.)
- G: 0 - 1 mA DC (Load resistance 10 k Ω max.)
- J: 0 - 5 mA DC (Load resistance 2000 Ω max.)
- FW: -10 - +10 mA DC (Load resistance 1000 Ω max.)
- GW: -1 - +1 mA DC (Load resistance 10 k Ω max.)
- JW: -5 - +5 mA DC (Load resistance 2000 Ω max.)
- Z: Specify current (See OUTPUT SPECIFICATIONS)

Voltage

- 1: 0 - 10 mV DC (Load resistance 10 k Ω min.)
- 2: 0 - 100 mV DC (Load resistance 100 k Ω min.)
- 3: 0 - 1 V DC (Load resistance 1000 Ω min.)
- 4: 0 - 10 V DC (Load resistance 10 k Ω min.)
- 5: 0 - 5 V DC (Load resistance 5000 Ω min.)
- 6: 1 - 5 V DC (Load resistance 5000 Ω min.)
- 1W: -10 - +10 mV DC (Load resistance 10 k Ω min.)
- 2W: -100 - +100 mV DC (Load resistance 100 k Ω min.)

3W: -1 ~ +1 V DC (Load resistance 1000 Ω min.)
4W: -10 ~ +10 V DC (Load resistance 10 kΩ min.)
5W: -5 ~ +5 V DC (Load resistance 5000 Ω min.)
0: Specify voltage (See OUTPUT SPECIFICATIONS)

[5] PULSE OUTPUT (open collector)

0: None
1: 2.777 Hz at 100 % input
2: Specify pulse unit (within 0.006 ~ 3.12 Hz)

[6] OPTIONS (multiple selections)

Terminal Cover

blank: Without

/T: With

Other Options

blank: none

/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

GENERAL SPECIFICATIONS

Connection: M4 screw terminals (torque 1.2 N·m)

Screw terminal: Chrome-plated steel

Housing material: Flame-resistant resin (black)

Isolation: Voltage input to current input to DC output to pulse output

Computation: Time division multiplication

Overrange output: Approx. -10 to +120 % at 1 ~ 5 V

Zero adjustment(DC output): -5 to +5 % (front)

Span adjustment(DC output): 95 to +105 % (front)

INPUT SPECIFICATIONS

Frequency: 50 or 60 Hz

■ VOLTAGE INPUT

Operational range: 85 ~ 110 % of rating

Overload capacity: 150 % of rating for 10 sec., 110 % continuous

■ CURRENT INPUT

Operational range: 0 ~ 120 % of rating

Overload capacity: 4000 % of rating for 1 sec., 2000 % for 4 sec., 120 % continuous

■ How to determine Wattage Range

Calibration Range [W] = Measuring Wattage ÷ ((VT Ratio) × (CT Ratio))

Check that the required calibration range is within the available range in the table. Specify this range when

ordering.

[Example]

3-phase / 3-wire, measuring wattage 750 kW,

VT 3300/110 V, CT 250/5 A

$750 \times 10^3 [\text{W}] \div ((3300 \div 110) \times (250 \div 5)) = 500 [\text{W}]$

• Single-phase / 2-wire

INPUT		USABLE RANGE	BURDEN (VA)	
VT / CT CODE	STD.RANGE		VT	CT
1 / 1	±100W	±50 ~ ±120W	2.5	0.1
1 / 2	±200W	±100 ~ ±240W		0.2
1 / 5	±500W	±250 ~ ±600W		0.5
2 / 1	±200W	±100 ~ ±240W	2.5	0.1
2 / 2	±400W	±200 ~ ±480W		0.2
2 / 5	±1000W	±500 ~ ±1200W		0.5

• Single-phase / 3-wire

INPUT		USABLE RANGE	BURDEN (VA)	
VT / CT CODE	STD.RANGE		VT	CT
A / 1	±200W	±100 ~ ±240W	P ₁ : 2.5 P ₂ : 0.2	0.1/ph
A / 2	±400W	±200 ~ ±480W		0.2/ph
A / 5	±1000W	±500 ~ ±1200W		0.5/ph

• 3-phase / 3-wire

INPUT		USABLE RANGE	BURDEN (VA)	
VT / CT CODE	STD.RANGE		VT	CT
1 / 1	±200W	±100 ~ ±240W	P ₁ : 2.5 P ₂ : 0.2 P ₃ : 0.2	0.1/ph
1 / 2	±400W	±200 ~ ±480W		0.2/ph
1 / 5	±1000W	±500 ~ ±1200W		0.5/ph
2 / 1	±400W	±200 ~ ±480W	P ₁ : 2.5 P ₂ : 0.4 P ₃ : 0.4	0.1/ph
2 / 2	±800W	±400 ~ ±960W		0.2/ph
2 / 5	±2000W	±1000 ~ ±2400W		0.5/ph

• 3-phase / 4-wire

INPUT		USABLE RANGE	BURDEN (VA)	
VT / CT CODE	STD.RANGE		VT	CT
1 / 1	±200W	±100 ~ ±240W	P ₁ - P ₂ : 2.5 P ₃ : 0.1	0.1/ph
1 / 2	±400W	±200 ~ ±480W		0.2/ph
1 / 5	±1000W	±500 ~ ±1200W		0.5/ph
2 / 1	±400W	±200 ~ ±480W	P ₁ - P ₂ : 2.5 P ₃ : 0.3	0.1/ph
2 / 2	±800W	±400 ~ ±960W		0.2/ph
2 / 5	±2000W	±1000 ~ ±2400W		0.5/ph
4 / 1	±800W	±400 ~ ±880W	P ₁ : 2.5 P ₂ : 0.4 P ₃ : 0.4	0.1/ph
4 / 2	±1600W	±800 ~ ±1760W		0.2/ph
4 / 5	±4000W	±2000 ~ ±4400W		0.5/ph

OUTPUT SPECIFICATIONS

■ DC Output

• **DC Current:** -10 ~ +20 mA DC

Span: Min. 1 mA, max. 20 mA

Offset: Max. 1.5 times span

Load resistance: Output drive 10 V max.

• **DC Voltage:** -10 ~ +12 V DC

Minimum span: 5 mV

Offset: Max. 1.5 times span

Load resistance: Output drive 1 mA max. at ≥ 0.5 V

■ **Pulse output:** Open collector

0 Hz at 0 W (cutout at approx. 0.5 – 1.0 %)

Rating: 35 V DC @ 100 mA

ON voltage: ≤ 1 V at 100 mA

ON duration: Max. 0.5 sec., min. 50 msec. (approx.)

Frequency range: 0 – 2.777 Hz (0 – 100 %) standard; 0 – 0.006 Hz through 3.12 Hz is possible.

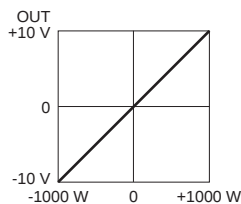
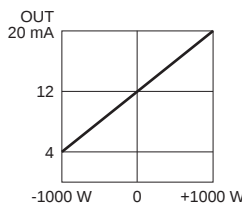
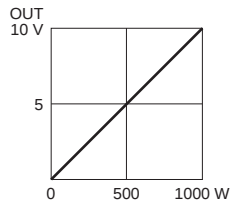
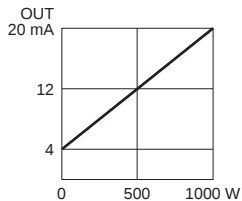
• **2.777 Hz at 100 % Input**

[Example] 1000 W calibration range

$2.777 \text{ [Hz]} \times 3600 \text{ [s]} \div 1 \text{ [kW]} = 10000 \text{ [pulses/kWh]}$

• **Specified Pulse Unit:** Refers to how much electrical energy (kWh) consumption at the primary of the VT and CT corresponds to the single output pulse per hour from the transducer.

■ **OPERATION DIAGRAM (example)**



INSTALLATION

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 85 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: 450 g (0.99 lb)

PERFORMANCE in percentage of span

Accuracy: ± 0.5 % (at 23°C $\pm 10^\circ\text{C}$ or 73.4°F $\pm 18^\circ\text{F}$, 45 – 65 Hz)

Magnetic field (ext. origin) effect: ± 0.5 % (400 A/m)

Response time: ≤ 2 sec. (0 – 100 % ± 1 %)

Ripple: 0.5 %p-p max.

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute

(voltage input to current input to DC output to pulse output to ground)

Impulse withstand voltage: 1.2 / 50 $\mu\text{sec.}$, ± 5 kV

(input to output or ground)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1

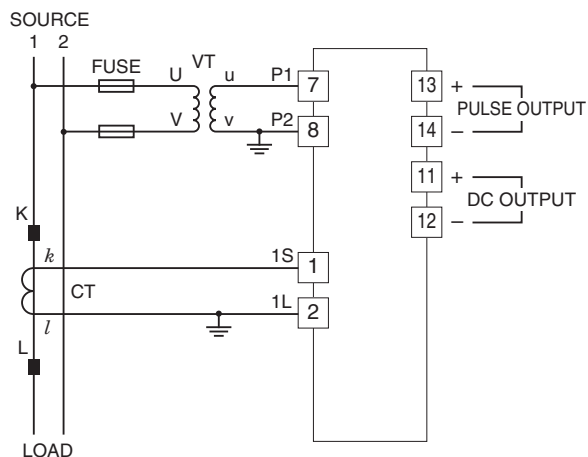
Measurement Category II (input)

Pollution Degree 2

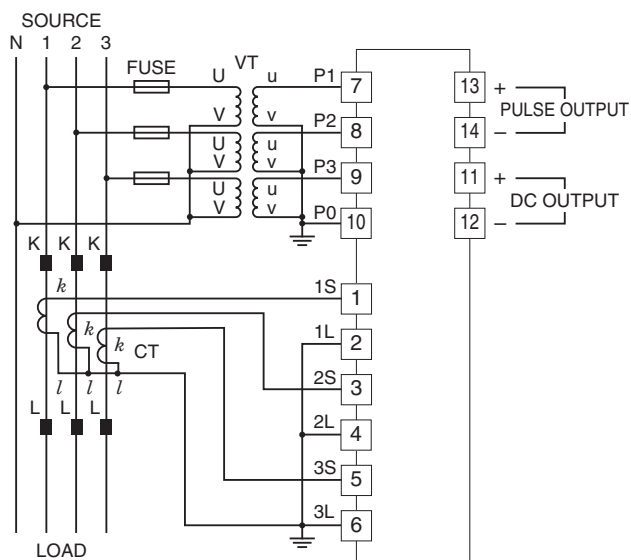
Input to output: Reinforced insulation (300 V)

RoHS Directive

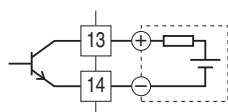
■ SINGLE-PHASE/2-WIRE



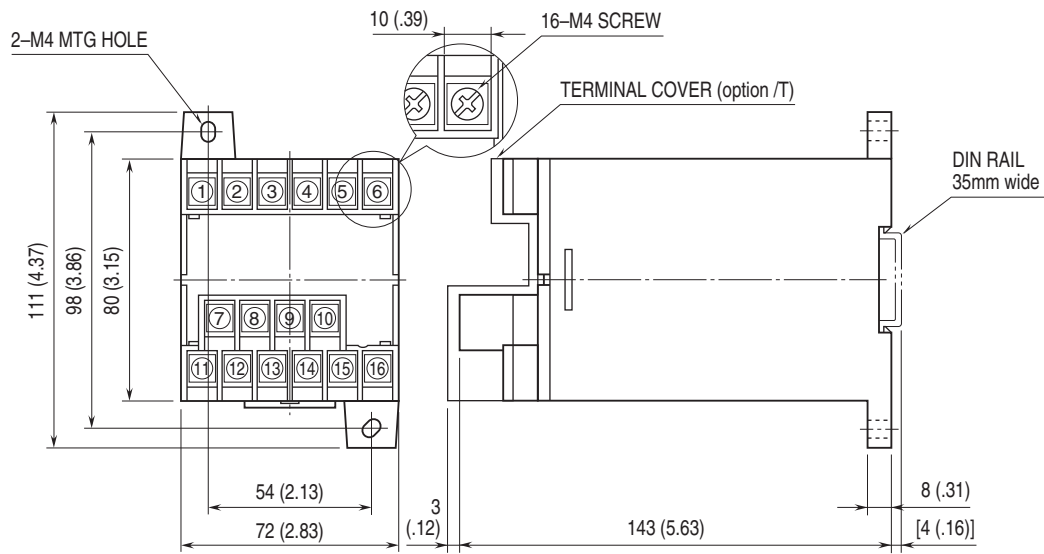
■ 3-PHASE/4-WIRE



■ Open Collector



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



• When mounting, no extra space is needed between units.



Specifications are subject to change without notice.