

Power Transducer Series LT-UNIT

WATT TRANSDUCER

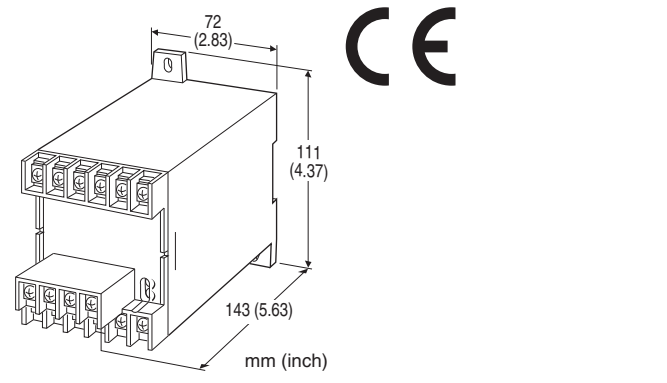
(self-powered)

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

• 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	0.1/ph
1 / 2	±400W	±200 - ±480W		0.2/ph
1 / 5	±1000W	±500 - ±1200W		P ₃ : 0.1
2 / 1	±400W	±200 - ±480W	P ₁ - P ₂ : 2.5	0.1/ph
2 / 2	±800W	±400 - ±960W		0.2/ph
2 / 5	±2000W	±1000 - ±2400W		P ₃ : 0.3
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.

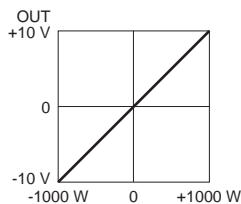
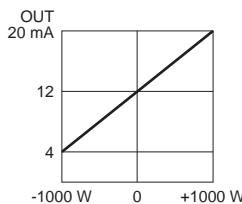
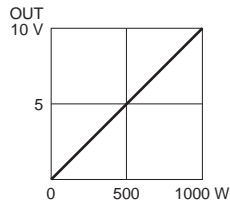
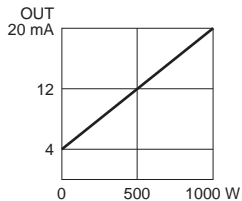
• **2.777 Hz at 100 % Input**

[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)**



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

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 ± 10 °C or 73.4°F ± 18 °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

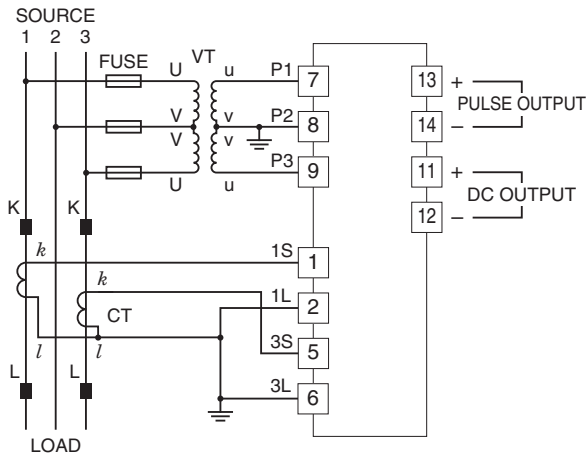
(voltage input to current input to DC output to pulse output to ground)

Impulse withstand voltage: 1.2 / 50 μ sec., ± 5 kV

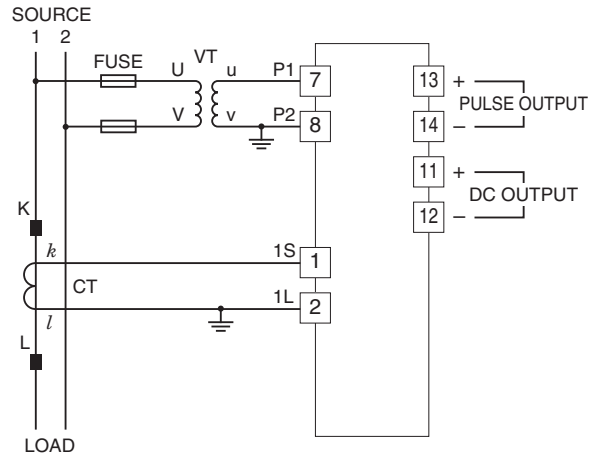
(input to output or ground)

CONNECTION DIAGRAM

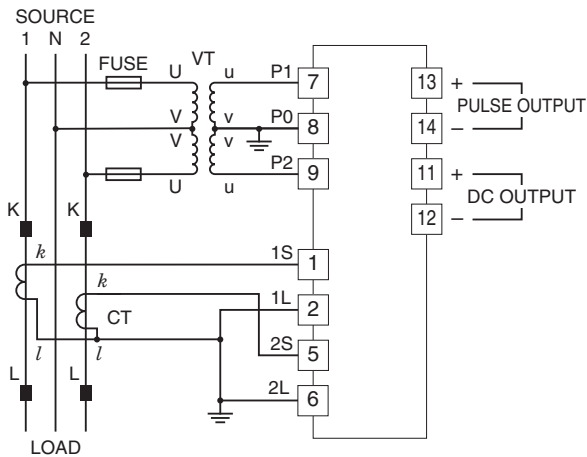
3-PHASE/3-WIRE



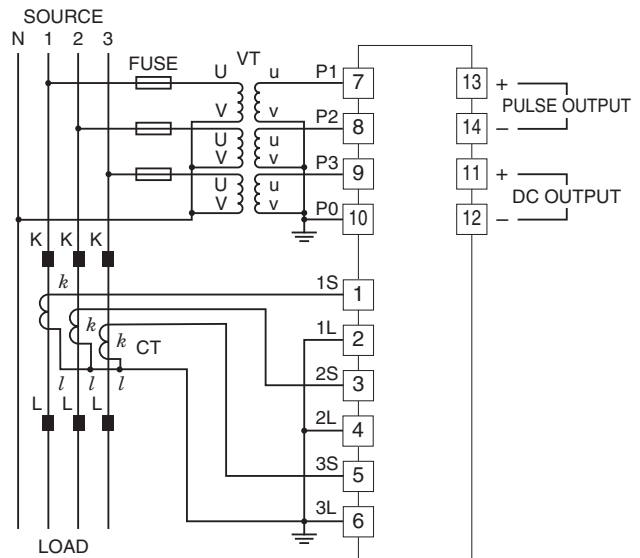
SINGLE-PHASE/2-WIRE



SINGLE-PHASE/3-WIRE

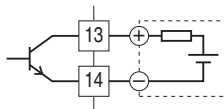


3-PHASE/4-WIRE

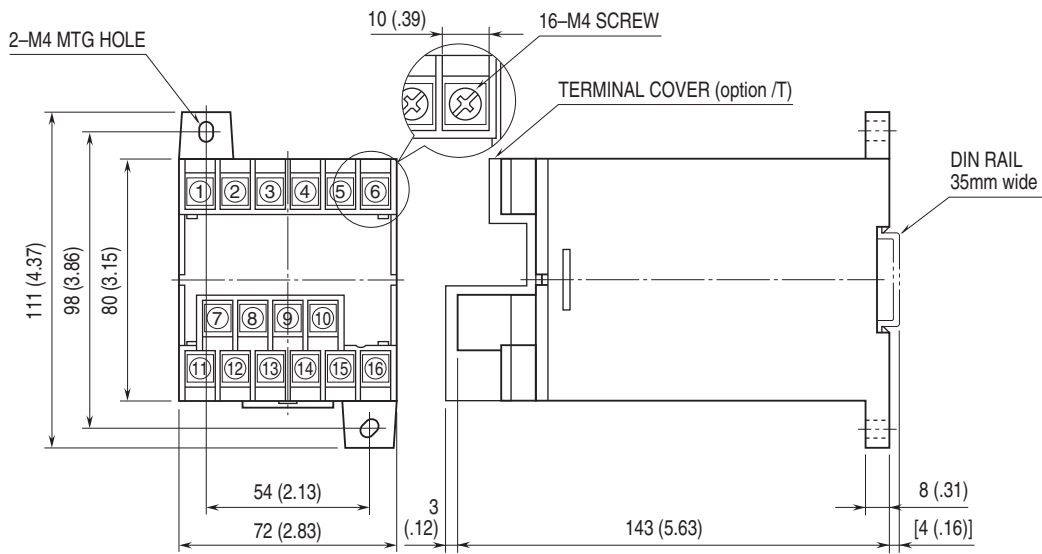


Pulse Output Connection Example

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.