

Power Transducer Series L-UNIT

WATT TRANSDUCER

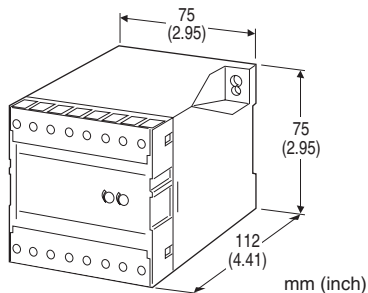
(with pulse output)

Functions & Features

- Providing a DC output signal and 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

Typical Applications

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



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

ORDERING INFORMATION

- Code number: LWT-[1][2][3][4]-[5][6]
- Specify a code from below for each of [1] through [6]. (e.g. LWT-11A2-C/B/Q)
- Specify the specification for option code /Q (e.g. /C01/S01)
- Calibration range (e.g. -750 - +750 W)
- VT ratio, CT ratio (e.g. VT 3300/110 V, CT 250/5 A)
- Special DC output range (For codes Z & 0)
- Pulse output (e.g. 6.666 Wh/pulse)

How To Determine Pulse Unit

[example]

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

- **From Pulse Unit** 10 [kWh/pulse]
10 [kWh/pulse] / (3300/110) × (250/5)

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

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

- **From Pulse Rate** 150 [pulses/kWh]

$$1 / 150 \text{ [pulses/kWh]}$$

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

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

- **From Frequency** 0.03125 Hz (at 100 %)

$$750 \text{ [W]} / 0.03125 \text{ [H]} \times 3600 \text{ [s]}$$

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

[1] CONFIGURATION

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

[2] INPUT (unbalanced load)

- 1: 110 V / 5 A AC
- 2: 110 V / 1 A AC
- 3: 220 V / 1 A AC
- 4: 220 V / 5 A AC
- 5: 220 V / 380 V / 1 A AC (3-phase / 4-wire)
- 6: 220 V / 380 V / 5 A AC (3-phase / 4-wire)
- 7: 110 V / 190 V / 1 A AC (3-phase / 4-wire)
- 8: 110 V / 190 V / 5 A AC (3-phase / 4-wire)
- A: 100 V / 200 V / 1 A AC (single-phase / 3-wire)
- B: 100 V / 200 V / 5 A AC (single-phase / 3-wire)

[3] DC OUTPUT

Current

- A: 4 - 20 mA DC (Load resistance 600 Ω max.)
- B: 2 - 10 mA DC (Load resistance 1200 Ω max.)
- C: 1 - 5 mA DC (Load resistance 2400 Ω max.)
- D: 0 - 20 mA DC (Load resistance 600 Ω max.)
- E: 0 - 16 mA DC (Load resistance 750 Ω max.)
- F: 0 - 10 mA DC (Load resistance 1200 Ω max.)
- G: 0 - 1 mA DC (Load resistance 12 kΩ max.)
- J: 0 - 5 mA DC (Load resistance 2400 Ω max.)
- FW: -10 - +10 mA DC (Load resistance 1000 Ω max.)
- GW: -1 - +1 mA DC (Load resistance 10 kΩ 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 kΩ min.)
- 2: 0 - 100 mV DC (Load resistance 100 kΩ min.)
- 3: 0 - 1 V DC (Load resistance 1000 Ω min.)
- 4: 0 - 10 V DC (Load resistance 10 kΩ 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 kΩ min.)
- 2W: -100 - +100 mV DC (Load resistance 100 kΩ 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)

[4] PULSE OUTPUT (open collector)

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

[5] AUXILIARY POWER SUPPLY

AC Power
B: 100 V AC
C: 110 V AC
D: 115 V AC
F: 120 V AC
G: 200 V AC
H: 220 V AC
J: 240 V AC
DC Power
R: 24 V DC
V: 48 V DC
P: 110 V DC

[6] OPTIONS (multiple selections)

Optional Process
blank: None
/B: Bonding
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating
TERMINAL SCREW MATERIAL
/S01: Stainless steel

GENERAL SPECIFICATIONS

Construction: Stand-alone; terminal access at the front
Connection: M3.5 screw terminals (torque 0.8 N·m)
Screw terminal: Nickel-plated steel (standard) or stainless steel
Housing material: Flame-resistant resin (black)
Isolation: Voltage input to current input to DC output to pulse output to auxiliary power
Computation: Time division multiplication
Overrange output: Approx. -10 - +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: 0 - 120 % of rating

Overload capacity: 150 % of rating for 10 sec., 120 % continuous

• Current Input

Operational range: 0 - 120 % of rating

Overload capacity: 1000 % of rating for 3 sec., 200 % for 10 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

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

■ INPUT RANGE

• 3-phase / 3-wire

INPUT	STD.RANGE	AVAILABLE RANGE	BURDEN (VA)	
			VOLT.	CURR.
110V/1A	±200 W	±100 - ±240 W	0.2	0.1/ph
110V/5A	±1000 W	±500 - ±1200 W	/phase	0.5/ph
220V/1A	±400 W	±200 - ±480 W	0.4	0.1/ph
220V/5A	±2000 W	±1000 - ±2400 W	/phase	0.5/ph

• Single-phase / 2-wire

INPUT	STD.RANGE	AVAILABLE RANGE	BURDEN (VA)	
			VOLT.	CURR.
110V/1A	±100 W	±50 - ±120 W	0.2	0.1
110V/5A	±500 W	±250 - ±600 W		0.5
220V/1A	±200 W	±100 - ±240 W	0.4	0.1
220V/5A	±1000 W	±500 - ±1200 W		0.5

• Single-phase / 3-wire

INPUT	STD.RANGE	AVAILABLE RANGE	BURDEN (VA)	
			VOLT.	CURR.
200V/1A	±200 W	±100 - ±240 W	0.2	0.1/ph
200V/5A	±1000 W	±500 - ±1200 W	/phase	0.5/ph

INPUT RANGE

• 3-phase / 4-wire

INPUT	STD.RANGE	AVAILABLE RANGE	BURDEN (VA)	
			VOLT.	CURR.
$\frac{110V}{\sqrt{3}}/1A$	±200 W	±100 – ±240 W	0.1 /phase	0.1 /phase
$\frac{110V}{\sqrt{3}}/5A$	±1000 W	±500 – ±1200 W		0.5 /phase
$\frac{190V}{\sqrt{3}}/1A$	±350 W	±175 – ±420 W	0.2 /phase	0.1 /phase
$\frac{190V}{\sqrt{3}}/5A$	±1750 W	±875 – ±2100 W		0.5 /phase
$\frac{220V}{\sqrt{3}}/1A$	±400 W	±200 – ±480 W	0.3 /phase	0.1 /phase
$\frac{220V}{\sqrt{3}}/5A$	±2000 W	±1000 – ±2400 W		0.5 /phase
$\frac{380V}{\sqrt{3}}/1A$	±700 W	±350 – ±840 W	0.4 /phase	0.1 /phase
$\frac{380V}{\sqrt{3}}/5A$	±3500 W	±1750 – ±4200 W		0.5 /phase

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 12 V maximum; 10 V for [±] output

• 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. approx. 50 msec.

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

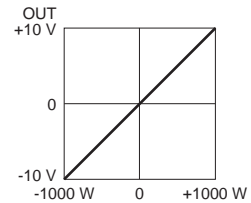
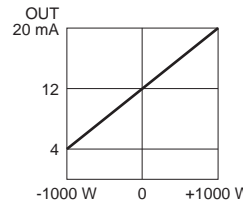
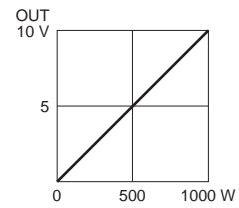
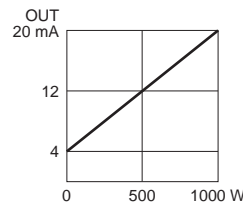
[example] 1000 W calibration range

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

• 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.

Output Frequency [Hz] = Calibration Range [kW] × VT Ratio × CT Ratio / Pulse Unit [kWh/pulse] × 3600 [s]

OPERATION DIAGRAM (example)



INSTALLATION

Auxiliary power supply

• AC: Operational voltage range: rating -15/+10 %, 50/60 Hz, approx. 2 VA

• DC: Operational voltage range: rating ±10 %, or 85 - 150 V for 110 V rating, ripple 10 %p-p max., approx. 2 W (18 mA at 110 V)

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)

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

Ripple: 0.5 %p-p max. (The output ripple may increase when there is great difference between the frequencies of input signal and power supply)

Line voltage effect: ±0.1 % over voltage range

Insulation resistance: ≥ 100 MΩ with 500 V DC

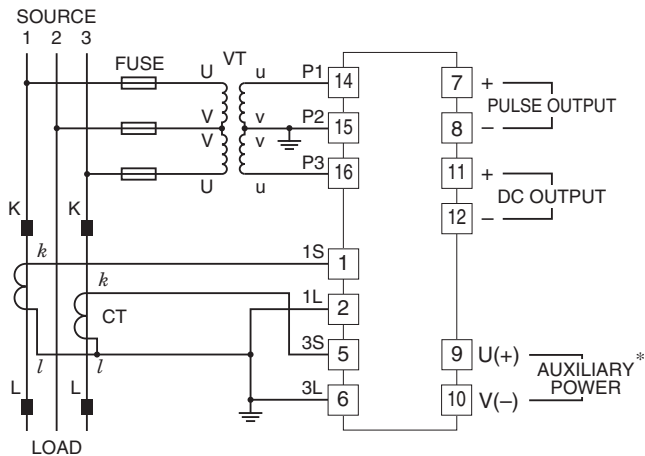
Dielectric strength: 2000 V AC @ 1 minute

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

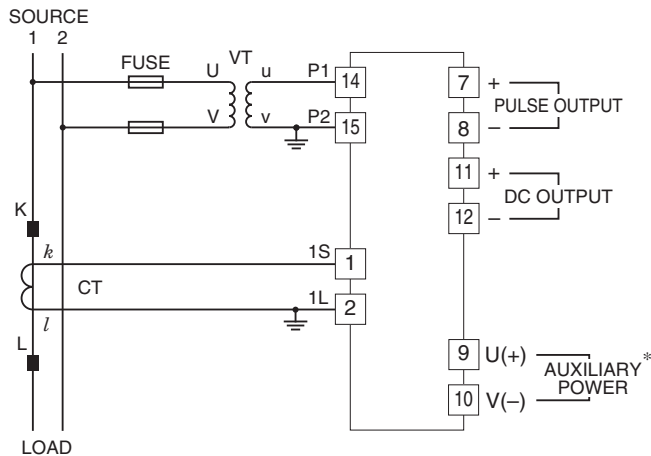
Impulse withstand voltage: 1.2 / 50 μsec., ±5 kV (input to output or ground)

CONNECTION DIAGRAM

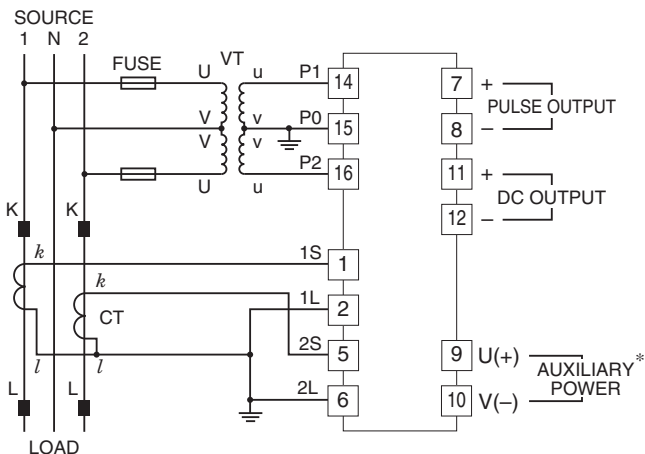
3-PHASE/3-WIRE



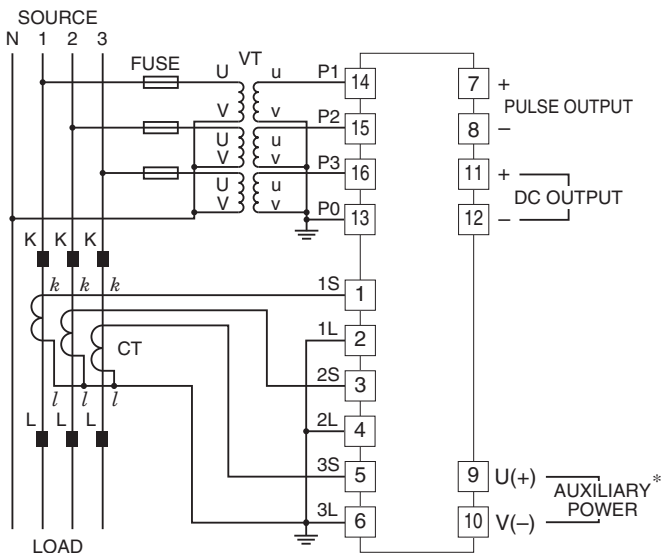
SINGLE-PHASE/2-WIRE



SINGLE-PHASE/3-WIRE

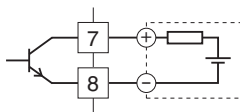


3-PHASE/4-WIRE



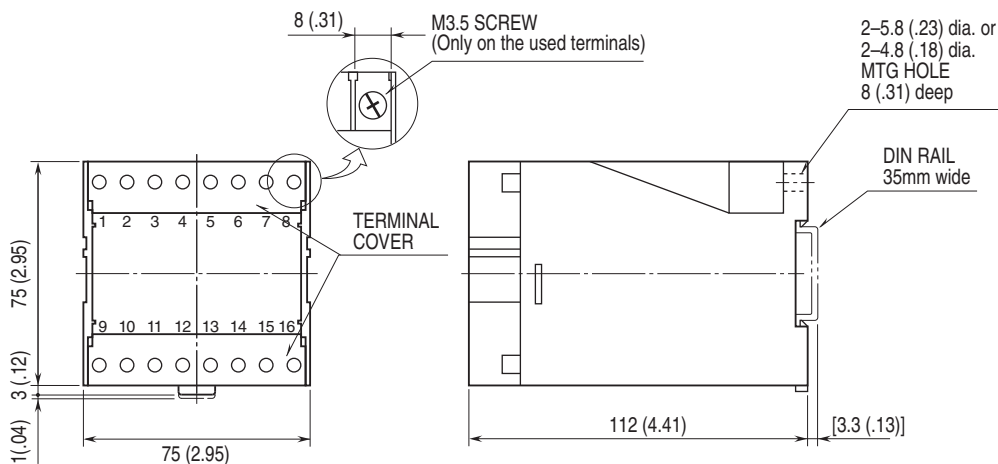
Pulse Output Connection Example

■ Open Collector



*The transducer can be powered from the input voltage when the voltage is sufficiently stable and meets within the range of auxiliary power supply of the unit specified in the data sheet/instruction manual.

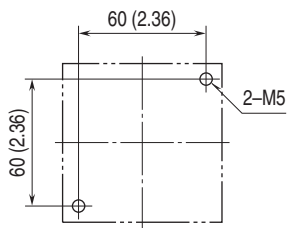
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



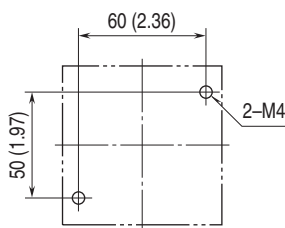
•When mounting, no extra space is needed between units.

MOUNTING REQUIREMENTS unit: mm [inch]

■ M5 SCREWS



■ M4 SCREWS



EXPLANATIONS OF TERMS

• Bonding

An silicone adhesive reinforces the part, which is sensitive to vibration, on PWB. The improvement of vibration performance is not assured.



Specifications are subject to change without notice.