

Power Transducer Series *LT-UNIT*

WATT TRANSDUCER
(self-powered)

MODEL **LTWTN**

MODEL & SUFFIX CODE SELECTION

MODEL _____ **LTWTN-□□□□□**

CONFIGURATION _____

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

VT INPUT (unbalanced load) _____

- 1 : 110V AC*
- 2 : 220V AC*
- 4 : $\frac{380V}{\sqrt{3}}$ / 380V AC (3-phase/4-wire only)

A : 100V / 200V AC (single-phase/3-wire only)

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

*Not selectable for single-phase/3-wire.

CT INPUT (unbalanced load) _____

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

DC OUTPUT _____

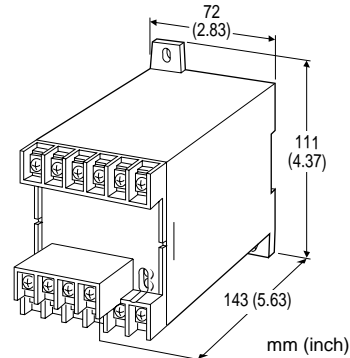
Current	Voltage
A : 4 – 20mA DC	1 : 0 – 10mV DC
D : 0 – 20mA DC	2 : 0 – 100mV DC
F : 0 – 10mA DC	3 : 0 – 1V DC
G : 0 – 1mA DC	4 : 0 – 10V DC
J : 0 – 5mA DC	5 : 0 – 5V DC
FW : -10 – +10mA DC	6 : 1 – 5V DC
GW : -1 – +1mA DC	1W : -10 – +10mV DC
JW : -5 – +5mA DC	2W : -100 – +100mV DC
Z : Specify current	3W : -1 – +1V DC
	4W : -10 – +10V DC
	5W : -5 – +5V DC
	0 : Specify voltage

PULSE OUTPUT (open collector) _____

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

OPTIONS _____

/T : Terminal cover



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 2000V 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

How To Determine Wattage Range

$$\text{Calibration Range [W]} = \frac{\text{Measuring Wattage}}{(\text{VT Ratio}) \times (\text{CT Ratio})}$$

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 750kW, VT 3300/110V, CT 250/5A

$$\frac{750 \times 10^3 \text{ [W]}}{(3300/110) \times (250/5)} = 0 - 500 \text{ [W]}$$

How To Determine Pulse Unit

[example]

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

$$\frac{10 \text{ [kWh/pulse]}}{(3300/110) \times (250/5)} = 6.666 \times 10^{-3} \text{ [kWh/pulse]} = 6.666 \text{ [Wh/pulse]}$$

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

$$\frac{\text{Input Range [W]}}{\text{Calculated Pulse} \times 3600 \text{ [s]}} = \frac{750}{6.666 \times 3600} = 0.03125 \text{ [Hz]}$$

ORDERING INFORMATION

Specify code number and variables. Use Ordering Information Sheet (No. ESU-3355).

• **Code number** (e.g. LTWTN-115A2)

GENERAL SPECIFICATIONS

Construction: stand-alone; terminal access at the front

Connection: M4 screw terminals
(chrome-plated steel; torque 1.2 N·m)

Housing material: flame-resistant resin (black)

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

Computation: time division multiplication

Ovrange output: approx. -10 – +120% at 1 – 5V

Front adjustments (DC output): zero and span; ±5%

INPUT & OUTPUT

■ **INPUT**

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

■ **INPUT RANGE**

• **Single-phase / 2-wire**

VT / CT CODE	INPUT		USABLE		BURDEN (VA)	
	STD.RANGE	RANGE	VT	CT	VT	CT
1 / 1	±100W	±50 – ±120W	2.5	0.1	2.5	0.1
1 / 2	±200W	±100 – ±240W		0.2		0.2
1 / 5	±500W	±250 – ±600W		0.5		0.5
2 / 1	±200W	±100 – ±240W		0.1		0.1
2 / 2	±400W	±200 – ±480W		0.2		0.2
2 / 5	±1000W	±500 – ±1200W		0.5		0.5
4 / 1	±400W	±200 – ±480W		0.1		0.1
4 / 2	±800W	±400 – ±960W		0.2		0.2
4 / 5	±2000W	±1000 – ±2400W		0.5		0.5

• **Single-phase / 3-wire**

VT / CT CODE	INPUT		USABLE		BURDEN (VA)	
	STD.RANGE	RANGE	VT	CT	VT	CT
A / 1	±200W	±100 – ±240W	P1: 2.5 P2: 0.2	0.1/ph	P1: 2.5 P2: 0.2	0.1/ph
A / 2	±400W	±200 – ±480W		0.2/ph		0.2/ph
A / 5	±1000W	±500 – ±1200W		0.5/ph		0.5/ph

• **3-phase / 3-wire**

VT / CT CODE	INPUT		USABLE		BURDEN (VA)	
	STD.RANGE	RANGE	VT	CT	VT	CT
1 / 1	±200W	±100 – ±240W	P1: 2.5 P3: 0.2	0.1/ph	P1: 2.5 P3: 0.2	0.1/ph
1 / 2	±400W	±200 – ±480W		0.2/ph		0.2/ph
1 / 5	±1000W	±500 – ±1200W		0.5/ph		0.5/ph
2 / 1	±400W	±200 – ±480W	P1: 2.5 P3: 0.4	0.1/ph	P1: 2.5 P3: 0.4	0.1/ph
2 / 2	±800W	±400 – ±960W		0.2/ph		0.2/ph
2 / 5	±2000W	±1000 – ±2400W		0.5/ph		0.5/ph

• **3-phase / 4-wire**

VT / CT CODE	INPUT		USABLE		BURDEN (VA)	
	STD.RANGE	RANGE	VT	CT	VT	CT
1 / 1	±200W	±100 – ±240W	P1 – P2 : 2.5 P3: 0.1	0.1/ph	P1 – P2 : 2.5 P3: 0.3	0.1/ph
1 / 2	±400W	±200 – ±480W		0.2/ph		0.2/ph
1 / 5	±1000W	±500 – ±1200W		0.5/ph		0.5/ph
2 / 1	±400W	±200 – ±480W	P1 – P2 : 2.5 P3: 0.3	0.1/ph	P1 – P2 : 2.5 P3: 0.3	0.1/ph
2 / 2	±800W	±400 – ±960W		0.2/ph		0.2/ph
2 / 5	±2000W	±1000 – ±2400W		0.5/ph		0.5/ph
4 / 1	±800W	±400 – ±960W	P1: 2.5 P1, P3 : 0.4	0.1/ph	P1: 2.5 P1, P3 : 0.4	0.1/ph
4 / 2	±1600W	±800 – ±1920W		0.2/ph		0.2/ph
4 / 5	±4000W	±2000 – ±4800W		0.5/ph		0.5/ph

■ **OUTPUT**

• **DC Current:** -10 – +20mA DC

Span: min. 1mA, max. 20mA

Zero suppression/elevation: max. 1.5 times span

Load resistance: output drive 10V maximum

Output	Load Resistance
4 – 20mA	: 500 (Ω maximum)
0 – 20mA	: 500
0 – 10mA	: 1000
0 – 1mA	: 10k
0 – 5mA	: 2000
-10 – +10mA	: 1000
-1 – +1mA	: 10k
-5 – +5mA	: 2000

• **DC Voltage:** -10 – +12V DC

Minimum span: 5mV

Zero suppression/elevation: max. 1.5 times span

Load resistance: output drive 1mA maximum at ≥0.5V

Output	Load Resistance
0 – 10mV	: 10k (Ω minimum)
0 – 100mV	: 100k
0 – 1V	: 1000
0 – 10V	: 10k
0 – 5V	: 5000
1 – 5V	: 5000
-10 – +10mV	: 10k
-100 – +100mV	: 100k
-1 – +1V	: 1000
-10 – +10V	: 10k
-5 – +5V	: 5000

■ **PULSE OUTPUT:** open collector; 0 Hz at 0W

(cutout at approx. 0.5 – 1.0%)

Rating: 35V DC @100mA

ON voltage: ≤1V at 100mA

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.

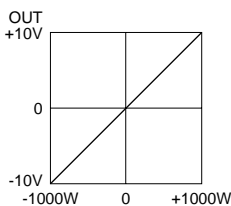
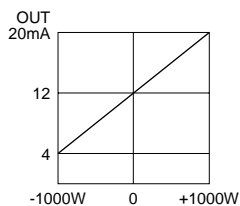
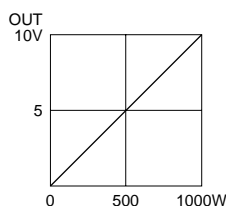
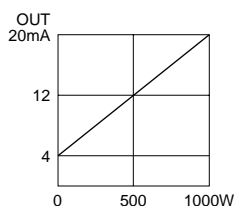
• **2.777 Hz at 100% Input**

[example] 1000W calibration range

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

• **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.

■ **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

Dimensions: W72×H111×D143* mm (2.83"×4.37"×5.63")

*D147 mm (5.79") with terminal cover

See General Spec. Sheet Figure C-1.

Weight: 450 g (0.99 lbs)

Terminal assignment: See General Spec. Sheet Figure D-1.

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% (400A/m)

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

Ripple: 0.5% p-p max.

Insulation resistance: ≥100MΩ with 500V DC

Dielectric strength: 2000V AC @1 minute (voltage input to current input to DC output to pulse output to ground)

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

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Low Voltage Directive (73/23/EEC)

EN61010-1

Installation category II

Pollution degree 2

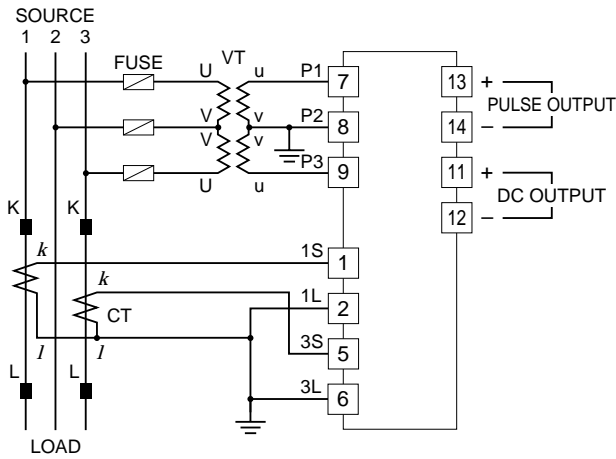
Input to output – Reinforced insulation

Max. operating voltage 300V

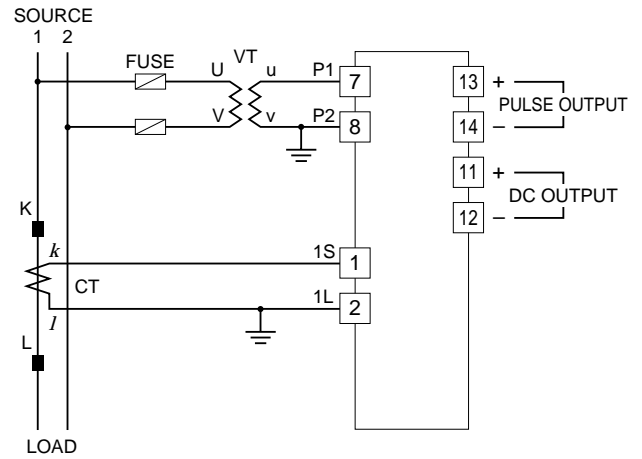
IEC Standard: IEC 60688

CONNECTION DIAGRAM

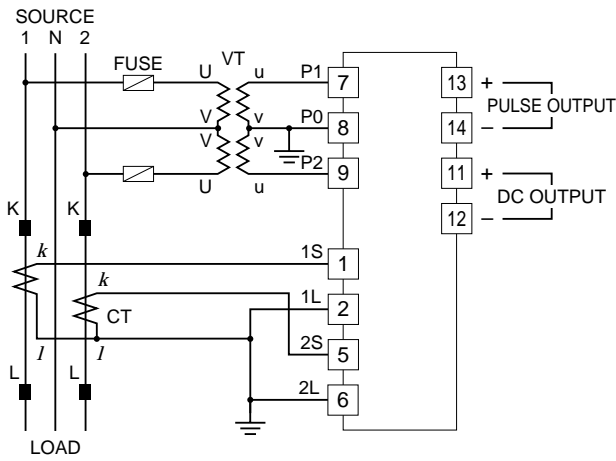
■ **3-PHASE/3-WIRE**



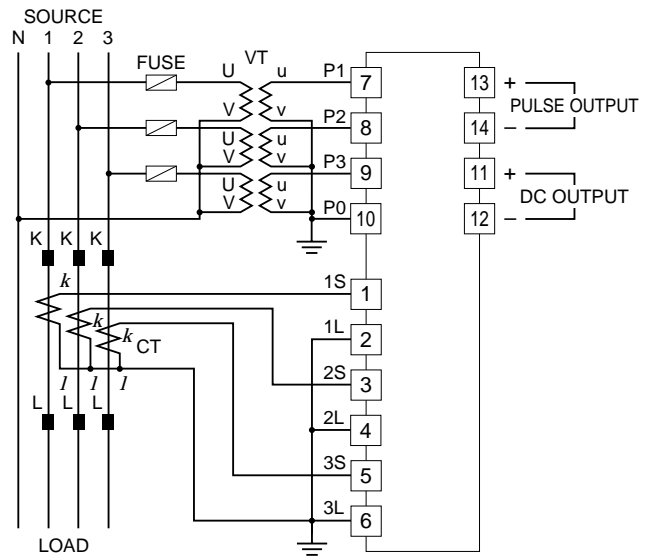
■ **SINGLE-PHASE/2-WIRE**



■ **SINGLE-PHASE/3-WIRE**



■ **3-PHASE/4-WIRE**



Pulse Output Connection Example

■ Open Collector

