

Power Transducer Series L-UNIT

3: Lag 60°- 0 - lead 60° or
Lead 60° - 0 - lag 60°

PHASE ANGLE TRANSDUCER

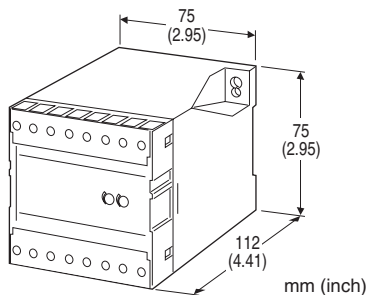
(between two voltages)

Functions & Features

- Providing a DC output signal in proportion to phase angle between two voltages
- Can accept both line voltages and phase voltages
- DC output containing little ripple is ideal for computer input
- Isolation up to 2000 V AC
- High-density mounting

Typical Applications

- Matching the phase of two power lines in order to turn on the circuit breaker



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

ORDERING INFORMATION

- Code number: LPD-[1][2][3][4]-[5][6]
- Specify a code from below for each of [1] through [6].
(e.g. LPD-11MA-C/Q)
- Special output range (For codes Z & 0)
- Specify the specification for option code /Q
(e.g. /C01/S01)

[1] INPUT VOLTAGE

Phase voltage / line voltage

- 1: 63.5 V / 110 V AC
- 2: 127 V / 220 V AC
- 3: 110 V / 190 V AC
- 4: 220 V / 380 V AC

[2] INPUT RANGE

- 1: Lag 30°- 0 - lead 30° or
Lead 30° - 0 - lag 30°
- 2: Lag 45°- 0 - lead 45° or
Lead 45° - 0 - lag 45°

[3] OUTPUT SIGNAL POLARITY

- P: Negative in lag, positive in lead
- M: Negative in lead, positive in lag

[4] OUTPUT

Current

- A: 4 - 20 mA DC (Load resistance 550 Ω max.)
- B: 2 - 10 mA DC (Load resistance 1100 Ω max.)
- C: 1 - 5 mA DC (Load resistance 2200 Ω max.)
- D: 0 - 20 mA DC (Load resistance 550 Ω max.)
- E: 0 - 16 mA DC (Load resistance 650 Ω max.)
- F: 0 - 10 mA DC (Load resistance 1100 Ω max.)
- G: 0 - 1 mA DC (Load resistance 11 kΩ max.)
- J: 0 - 5 mA DC (Load resistance 2200 Ω max.)
- DW: -20 - +20 mA DC (Load resistance 550 Ω max.)
- FW: -10 - +10 mA DC (Load resistance 1100 Ω max.)
- GW: -1 - +1 mA DC (Load resistance 11 kΩ max.)
- JW: -5 - +5 mA DC (Load resistance 2200 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)

[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

blank: none

/Q: With options (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: Measured input to reference input to output to auxiliary power

Computation: Phase angle detection

Input waveform: Up to 5 % of 3rd harmonic content

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

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

Span adjustment: 95 to 105 % (front)

INPUT SPECIFICATIONS

Frequency: 50 or 60 Hz

Input burden: 0.5 VA

Operational range: 85 - 110 % of rating

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

OUTPUT SPECIFICATIONS

■ **DC Current:** -10 - +20 mA DC

Span: Min. 1 mA, max. 20 mA

Offset: Max. 1.5 times span

Load resistance: Output drive max. 11 V

■ **DC Voltage:** -10 - +12 V DC

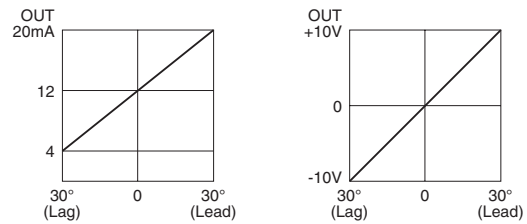
Minimum span: 5 mV

Offset: Max. 1.5 times span

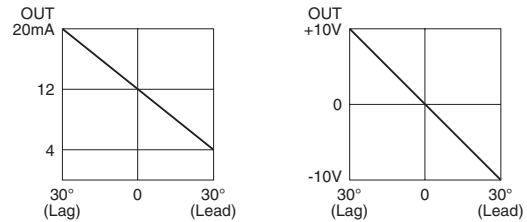
Load resistance: Output drive 1 mA max. at ≥ 0.5 V

■ OPERATION DIAGRAM (example)

• **Negative in lag, positive in lead**



• **Negative in lead, positive in lag**



Remark: When there is no input voltage, the transducer outputs as negative (-) overrange.

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: ± 2 %

(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.

Line voltage effect: ± 0.1 % over voltage range

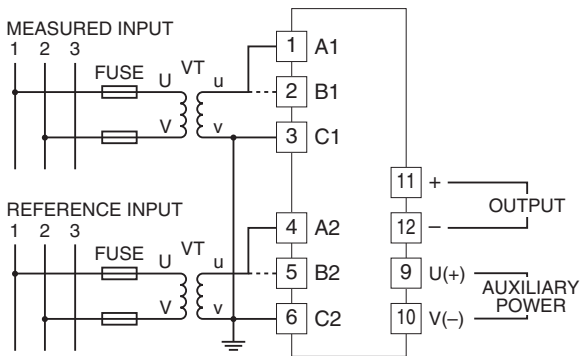
Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute

(measured input to reference input to output to auxiliary power to ground)

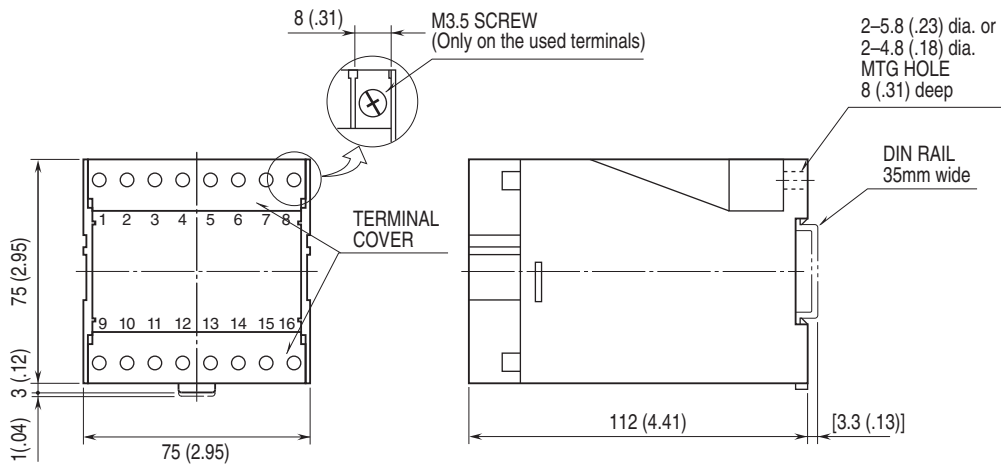
Impulse withstand voltage: 1.2 / 50 μ sec., ± 5 kV (input to output or ground)

CONNECTION DIAGRAM



For measuring line voltages, use the terminals 1 and 4.
 For measuring phase voltages, use the terminals 2 and 5.

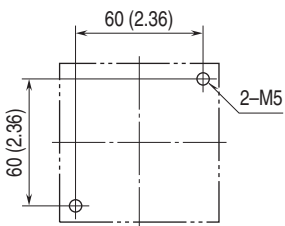
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



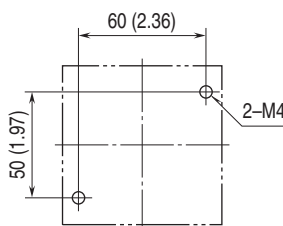
•When mounting, no extra space is needed between units.

MOUNTING REQUIREMENTS unit: mm [inch]

■ M5 SCREWS



■ M4 SCREWS



Specifications are subject to change without notice.