Power Transducer Series L-UNIT

PHASE ANGLE TRANSDUCER

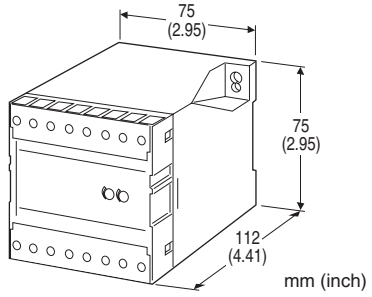
(between two voltages)

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 [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: Lag 60°– 0 – lead 60° or
Lead 60° – 0 – lag 60°

[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 M-System's 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

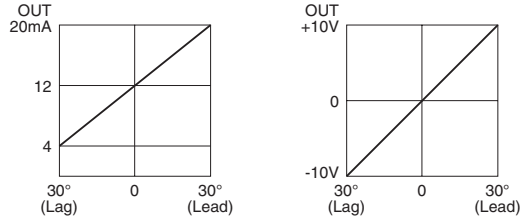
Frequency: 50 or 60 Hz
Input burden: 0.5 VA
Operational range: 85 – 110 % of rating
Overload capacity: 150 % of rating for 10 sec., 110 % continuous

OUTPUT SPECIFICATIONS

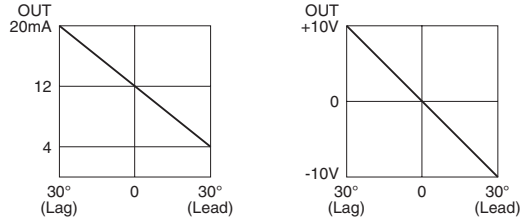
■ **DC Current**: -10 – +20 mA DC
Span: Min. 1 mA, max. 20 mA
Offset: Max. 1.5 times span
Load resistance: Output drive max. 11 V
■ **DC Voltage**: -10 – +12 V DC
Minimum span: 5 mV
Offset: Max. 1.5 times span
Load resistance: Output drive 1 mA max. at ≥ 0.5 V

■ **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.

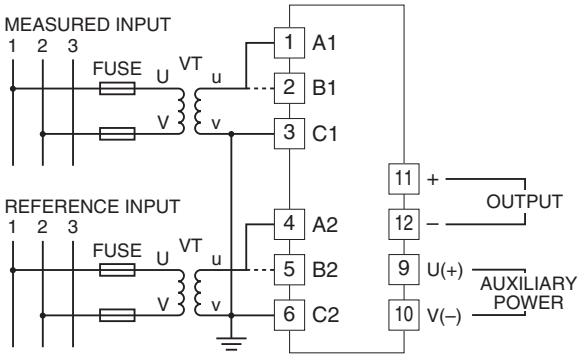
INSTALLATION

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

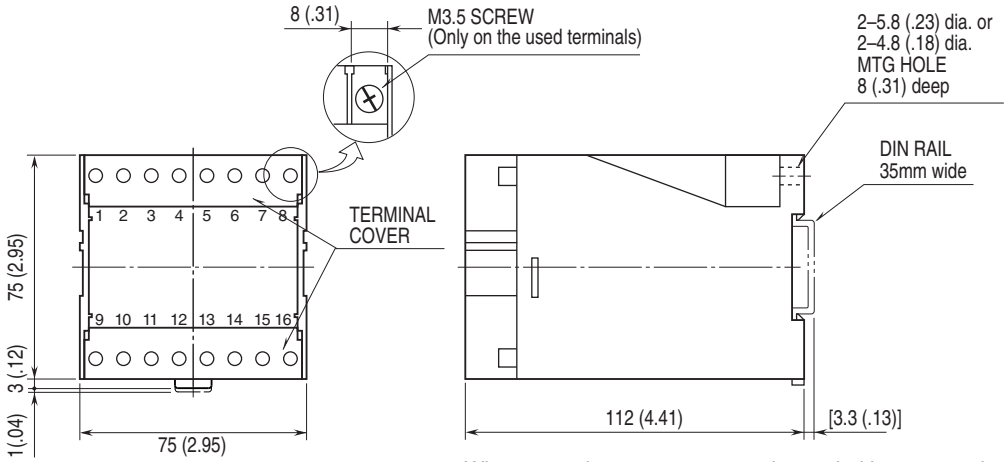
Accuracy: ±2 %
(at 23°C ±10°C or 73.4°F ±18°F, 45 – 65 Hz)
Response time: ≤ 2 sec. (0 – 100 % ±1 %)
Ripple: 0.5 %p-p max.
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 2000 V AC @ 1 minute
(measured input to reference input to output to auxiliary power to ground)
Impulse withstand voltage: 1.2 / 50 μsec., ±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.

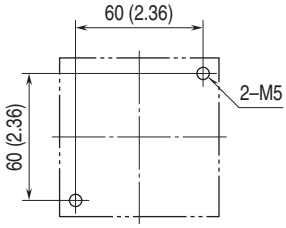
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



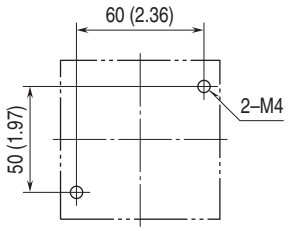
•When mounting, no extra space is needed between units.

MOUNTING REQUIREMENTS unit: mm (inch)

■ **M5 SCREWS**



■ **M4 SCREWS**



⚠ Specifications are subject to change without notice.