

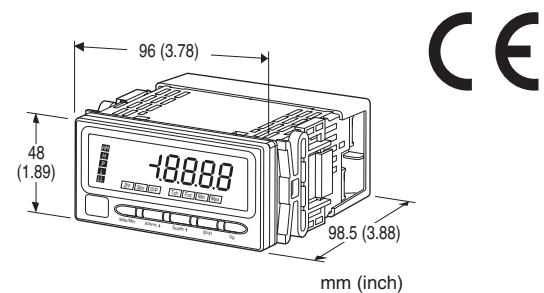
Digital Panel Meters 47 Series

FREQUENCY INPUT DIGITAL PANEL METER

(4½ digit, LED display type)

Functions & Features

- 4½ digit digital panel meter
- Measures line frequency deviation of a heavycurrent power system
- 1/8 DIN size
- Max. and Min. value display
- IP66 front panel
- Separable terminal block
- Rear terminal cover for safety strapped to the meter



MODEL: 47LHZ-1[1][2][3]-[4][5]

ORDERING INFORMATION

- Code number: 47LHZ-1[1][2][3]-[4][5]
- Specify a code from below for each of [1] through [5].
(e.g. 47LHZ-101G-M2/Q)
- Specify the specification for option code /Q
(e.g. /C01/S01/SET)

INPUT

1: Frequency input

[1] DC OUTPUT

0: Without

Current

A: 4 - 20 mA DC (Load resistance 550 Ω max.)

D: 0 - 20 mA DC (Load resistance 550 Ω max.)

Voltage

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.)

4W: -10 - +10 V DC (Load resistance 10 kΩ min.)

[2] ALARM OUTPUT

0: None

1: N.O. relay contact, 4 points

2: SPDT relay contact, 2 points

[3] DISPLAY COLOR

R: Red

YR: Orange

G: Green

BG: Bluegreen

B: Blue

W: White

[4] POWER INPUT

AC Power

M2: 100 - 240 V AC (Operational voltage range 85 - 264 V, 50/60 Hz)

DC Power

R: 24 V DC

(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

P: 110 V DC

(Operational voltage range 85 - 150 V, ripple 10 %p-p max.)

[5] 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.)

Moving parts and indicators are not coated.

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

TERMINAL SCREW MATERIAL

/S01: Stainless steel

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet

(No. ESU-9517)

GENERAL SPECIFICATIONS

Construction: Panel flush mounting

Degree of protection: IP66; applicable to the front of the panel meter mounted according to the specified panel cutout

Connection: M3 separable screw terminal (torque 0.6 N·m)

Screw terminal: Nickel-plated steel (standard) or stainless steel

Housing material: Flame-resistant resin (gray)

Isolation: Input to DC output to HH output or H output to L output or LL output to power

Input waveform: Up to 15 % of 3rd harmonic content

Setting: (Front button)

- Scaled range

- Input type

- Alarm setpoint
- Hysteresis (deadband)
- Others

(Refer to the instruction manual for details)

Lockout setting: Prohibiting certain operations; protecting settings

DISPLAY

Display: 16 mm (.63) high, 4 ½ digits, 7-segment LED

Display range: -19999 to 19999

Decimal point position: 10^{-1} , 10^{-2} , 10^{-3} , 10^{-4} or none

Zero indication: Higher-digit zeros are suppressed.

Over-range indication: '19999' or '19999' blinking for display values out of the display range.

'S.ERR' and 'Min' or 'Max' blinking when the input signal is out of the usable range.

Alarm status indication

LL indicator: Green turns on when the LL alarm is tripped.

L indicator: Green turns on when the L alarm is tripped.

H indicator: Red turns on when the H alarm is tripped.

HH indicator: Red turns on when the HH alarm is tripped.

P indicator: Amber turns on when none of the other alarms is tripped.

Note: Only 'P' turns on with no-alarm-output type. 'LL' or 'HH' does not turn on with dual-alarm-output type.

All setpoints can be independently set either for Hi or Lo alarm trip.

Function indicators:

Zro, Spn, D/P, Tch, Fnc, Min, Max

Display mode status and operation status, amber ON or blink

Engineering unit indication:

Sticker label attached
 DC, AC, mV, V, kV, μ A, mA, A, kA, mW, W,
 kW, var, kvar, Mvar, VA, Hz, Ω , k Ω , M Ω ,
 cm, mm, m, m/sec, mm/min, cm/min, m/min,
 m/h, m/s², inch, l, l/s, l/min, l/h, m³, m³/sec,
 m³/min, m³/h, Nm³/h, N·m, N/m², g, kg, kg/h,
 N, kN, Pa, kPa, MPa, t, t/h, °C, °F, %RH, J,
 kJ, MJ, rpm, sec, min, min⁻¹, pH, %, ppm, etc.

INPUT SPECIFICATIONS

Input voltage: Max. 300 V (conformance range 50 - 300 V)

Overload capacity: 450 V for 10 seconds, 360 V continuous

Default measuring range: 45 - 65 Hz

| TYPE IND | MEASURING RANGE | OPERATIONAL RANGE | INPUT BURDEN |
|----------|-----------------|-------------------|--------------|
| H50 | 45 - 55 Hz | 40 - 60 Hz | ≤0.5VA |
| H60 | 55 - 65 Hz | 50 - 70 Hz | ≤0.5VA |
| H55 | 45 - 65 Hz | 40 - 70 Hz | ≤0.5VA |
| H400 | 350 - 450 Hz | 300 - 500 Hz | ≤0.5VA |
| HF | 10 - 500 Hz | 5 - 600 Hz | ≤0.5VA |

OUTPUT SPECIFICATIONS

DC Output

DC Current

Operational range: -5 - +105 %

DC Voltage

Operational range: -5 - +105 %

Alarm Output: Relay contact

Rated load: 250 V AC @ 3 A (cos ϕ = 1)

30 V DC @ 3 A (resistive load)

Maximum switching voltage: 250 V AC, 30 V DC

Maximum switching power: 750 VA, 90 W (resistive load)

Minimum load: 5 V DC @ 10 mA

Mechanical life: $\geq 5 \times 10^6$ cycles (rate 180 cycles/min.)

INSTALLATION

Power consumption

•AC: Approx. 6.5VA

•DC: Approx. 3 W

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Mounting: Panel flush mounting

Weight: 300 g (0.66 lb)

PERFORMANCE in percentage of max. span

Accuracy

Display: ± 0.1 Hz; ± 1 Hz at 70 Hz or more (input 50 - 300 V)

Output: ± 0.1 % (DC output = display + output)

Temp. coefficient: ± 0.015 %/°C (± 0.008 %/°F)

Input resolution: Max. 0.01 Hz

Output resolution: Max. 14 bits

Response time: ≤ 0.5 second except for 45 Hz or less (alarm output: 0 - 100 % at 90 % setpoint)

≤ 0.5 second except for 45 Hz or less

(DC output: 0 - 90 %)

Line voltage effect: ± 0.1 % over voltage range

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute (input to DC output to HH output or H output to L output or LL output to power to ground)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1

Measurement Category III (input)

Measurement Category II (alarm output)

Installation Category II (power)

Pollution Degree 2

Input or DC output to alarm output to power: Reinforced insulation (300 V)

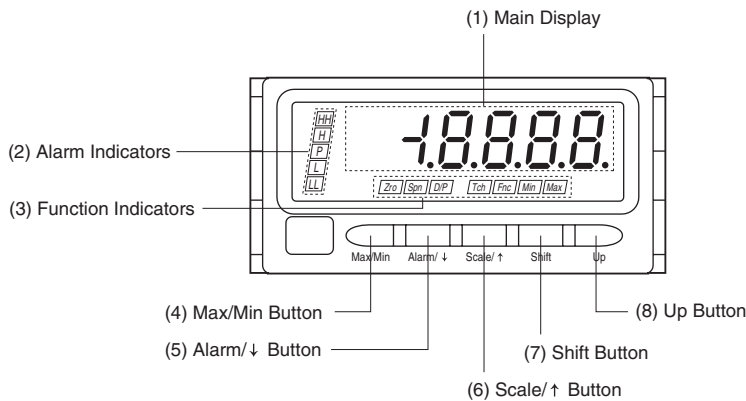
Input to DC output: Basic insulation (300 V)

RoHS Directive

Protection against access to the terminal blocks:

Finger protection (VDE 0660-514)

EXTERNAL VIEW



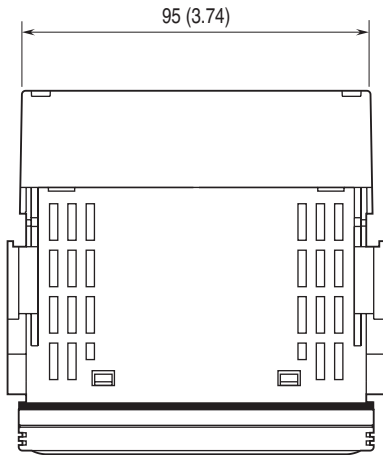
• COMPONENT IDENTIFICATION

| No. | COMPONENT | FUNCTION |
|-----|---------------------|--|
| (1) | Main display | Indicates present values, setting values and status of the unit. |
| (2) | Alarm indicators | Indicate alarm status of the input signal. |
| (3) | Function indicators | Indicate the status in each setting mode. |
| (4) | Max/Min button | Used to switch the main display to show the present values, maximum values or minimum values etc. |
| (5) | Alarm/↓ button | Used to confirm alarm setting value and to move on to the alarm and other setting modes; or to shift through setting items in each setting mode. |
| (6) | Scale/↑ button | Used to move on to the scaling and other setting modes; or to shift through setting items in each setting mode. |
| (7) | Shift button | Used to move on to the setting standby status of each setting mode and shift through display digits in each setting mode. |
| (8) | Up button | Used to select setting values in each setting mode. |

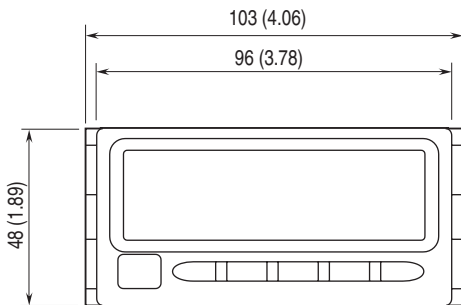
Note: Refer to the operating manual for details on each function.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

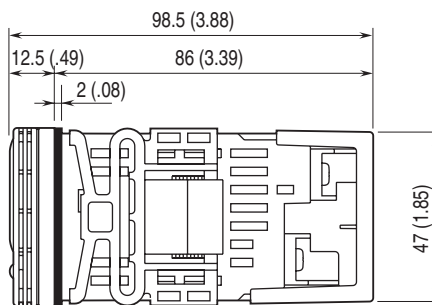
■ TOP VIEW



■ FRONT VIEW

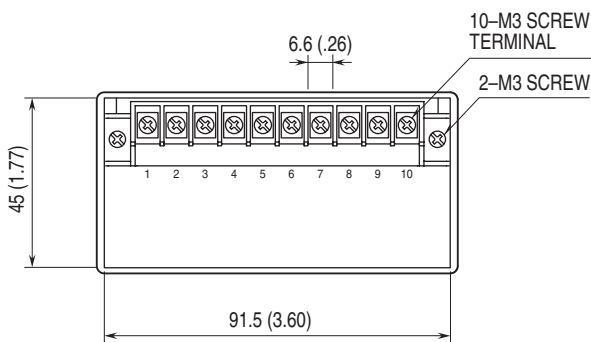


■ SIDE VIEW

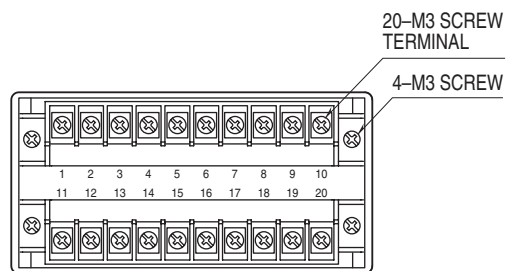


■ REAR VIEW

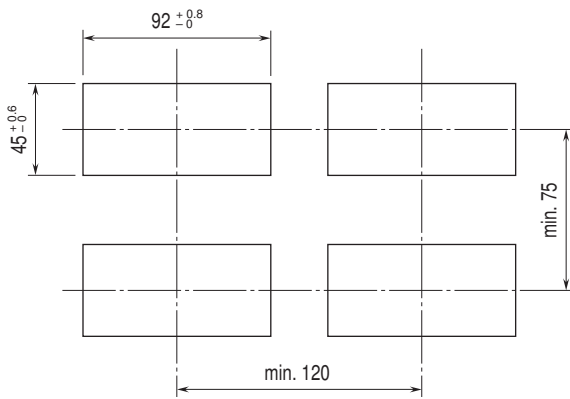
- No Alarm Output



- Alarm Output



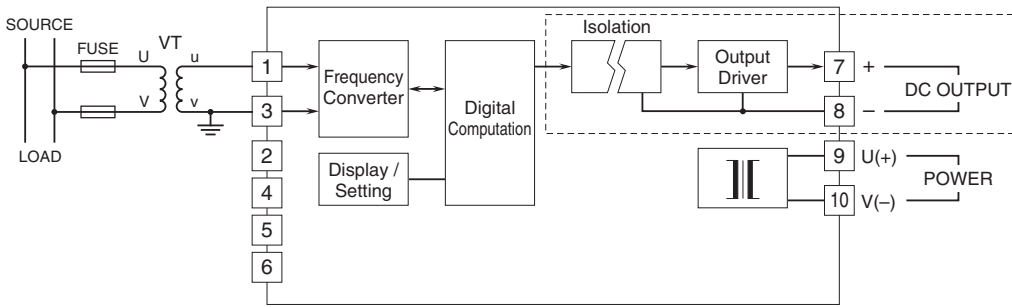
MOUNTING REQUIREMENTS unit: mm



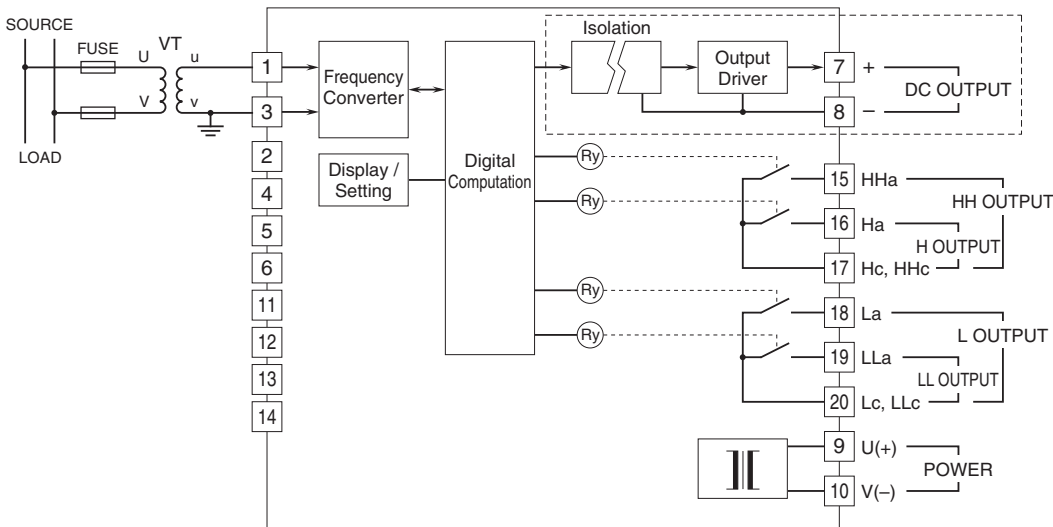
Panel thickness: 1.6 to 8.0 mm

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

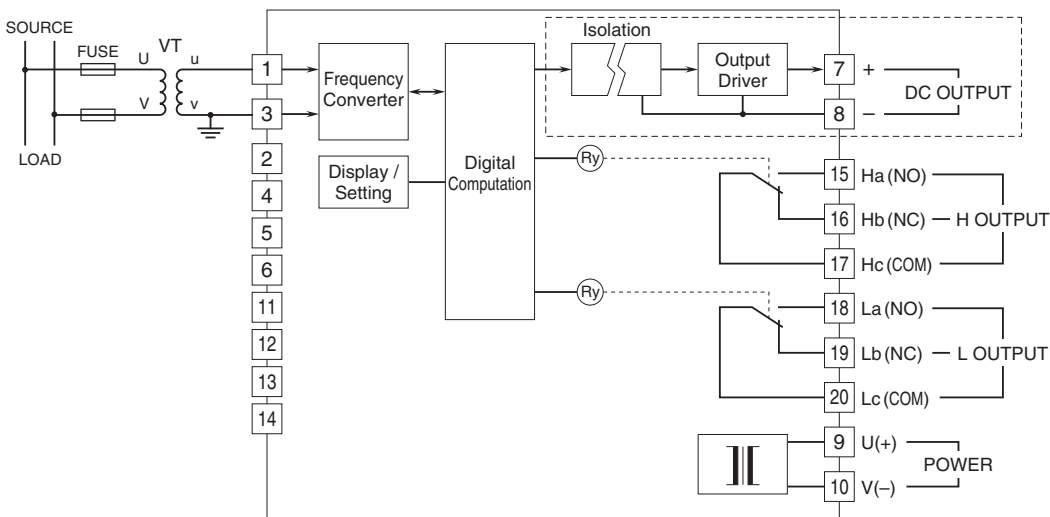
■ ALARM OUTPUT CODE 0: No alarm output



■ ALARM OUTPUT CODE 1: N.O. contact, 4 points



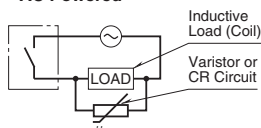
■ ALARM OUTPUT CODE 2: SPDT contact, 2 points



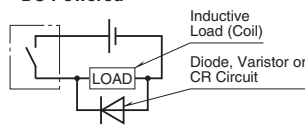
Note: The section enclosed by broken line is only with DC output option.

■ Relay Protection

• AC Powered



• DC Powered





Specifications are subject to change without notice.