



## MHR-V SERIES

### Miniature Vented Case, High Temperature AC LVDT

#### SPECIFICATIONS

- ◆ Vented case for submersed applications
- ◆ Operating pressure up to 10,000 PSI
- ◆ Operating temperature 392°F [200°C]
- ◆ Small size and low mass core
- ◆ High output signal
- ◆ Stroke ranges from  $\pm 0.025$  to  $\pm 1$  inch
- ◆ AC operation from 2kHz to 20kHz
- ◆ Stainless steel housing
- ◆ Imperial or metric threaded core

The **MHR-V** Series LVDTs are a variant of the legendary MHR Series. The MHR-V is specifically designed for submersion in inert gas, mineral oil, and other non-aggressive oils (consult factory for medium compatibility) under pressures up to 10,000 PSI [700 bars].

With a diameter of just 3/8 inch [9.5mm], the MHR-V Series allow precision measurements in space restrictive installations at temperatures up to 392°F [200°C]. The extremely lightweight core makes the MHR-V an excellent choice for applications where excessive core weight could influence the motion; with less inertia, accurate measurements at higher displacement speeds are easier to achieve. The lightweight core also reduces mechanical stresses and helps preserve the structural integrity of the core actuation assembly.

The high output sensitivity resulting from the close electrical coupling between the coil and core provides ample signal for interfacing with practically all signal conditioners and conditioning circuits. The magnetic stainless steel housing provides electromagnetic and electrostatic shielding.

Available in a variety of stroke ranges from  $\pm 0.025$  to  $\pm 1$  inch, the MHR-V is compatible with the full line of Measurement Specialties LVDT signal conditioners.

#### FEATURES

- ◆ Compact size
- ◆ 10,000 PSI equipressure operation
- ◆ 392°F [200°C] continuous operation
- ◆ Lightweight core
- ◆ Stainless steel case
- ◆ Calibration certificate supplied with each unit

#### APPLICATIONS

- ◆ Immersion applications (oils, inert gasses)
- ◆ Subsea Oil & Gas equipment
- ◆ Down-hole tools and oil drilling equipment
- ◆ Hydrostatic test chambers
- ◆ Hydraulic spool valve feedback
- ◆ Automotive transmission servo testing

**PERFORMANCE SPECIFICATIONS**

| <b>ELECTRICAL SPECIFICATIONS (common)</b>                        |                   |               |               |               |              |             |
|--|-------------------|---------------|---------------|---------------|--------------|-------------|
| Input voltage  | 3 VRMS sine wave  |               |               |               |              |             |
| Input frequency  | 2kHz to 20kHz     |               |               |               |              |             |
| Test frequency   | 2.5kHz (standard) |               |               |               |              |             |
| <b>ELECTRICAL SPECIFICATIONS @ 10kHz (recommended operation)</b> |                   |               |               |               |              |             |
| Parameter  | MHR-V 025         | MHR-V 050     | MHR-V 100     | MHR-V 250     | MHR-V 500    | MHR-V 1000  |
| Stroke range   | ±0.025 [±0.64]    | ±0.05 [±1.27] | ±0.10 [±2.54] | ±0.25 [±6.35] | ±0.5 [±12.7] | ±1 [±25.4]  |
| Sensitivity, V/V/inch [mV/V/mm]                                  | 8.10 [319]        | 3.15 [124]    | 2.80 [110]    | 2.07 [81.5]   | 1.96 [77.2]  | 0.77 [30.3] |
| Output at stroke ends, mV/V (*)                                  | 202.5             | 157.5         | 280           | 517.5         | 980          | 770         |
| Phase shift  | +21°              | +8°           | +5°           | +7°           | +7°          | -1°         |
| Input impedance (PRIMARY)  | 238Ω              | 419Ω          | 400Ω          | 345Ω          | 264Ω         | 155Ω        |
| Output impedance (SECONDARY)                                     | 485Ω              | 154Ω          | 200Ω          | 420Ω          | 810Ω         | 450Ω        |
| Non-linearity  | ±% of FR          |               |               |               |              |             |
| @ 50% stroke   | 0.15              | 0.15          | 0.15          | 0.15          | 0.15         | 0.20        |
| <b>@100% stroke (maximum)</b>                                    | <b>0.25</b>       | <b>0.25</b>   | <b>0.25</b>   | <b>0.25</b>   | <b>0.25</b>  | <b>0.25</b> |
| @125% stroke   | 0.25              | 0.35          | 0.25          | 0.35          | 0.30 (**)    | 0.50        |
| @150% stroke   | 0.30              | 0.50          | 0.30          | 0.50 (**)     | 0.75 (**)    | /           |
| Null voltage (max.)  | 0.5% of FSO       |               |               |               |              |             |

| <b>ELECTRICAL SPECIFICATIONS @ 2.5kHz (standard calibration)</b> |                |               |               |               |              |             |
|--|----------------|---------------|---------------|---------------|--------------|-------------|
| Parameter  | MHR-V 025      | MHR-V 050     | MHR-V 100     | MHR-V 250     | MHR-V 500    | MHR-V 1000  |
| Stroke range   | ±0.025 [±0.64] | ±0.05 [±1.27] | ±0.10 [±2.54] | ±0.25 [±6.35] | ±0.5 [±12.7] | ±1 [±25.4]  |
| Sensitivity, V/V/in [mV/V/mm]                                    | 4.36 [172]     | 2.55 [100]    | 2.40 [94]     | 1.73 [68]     | 1.60 [63]    | 0.70 [27]   |
| Output at 100% stroke, mV/V (*)                                  | 109            | 127.5         | 240           | 432.5         | 800          | 700         |
| Phase shift  | +58°           | +36°          | +30°          | +33°          | +23°         | +6°         |
| Input impedance (PRIMARY)  | 116Ω           | 141Ω          | 135Ω          | 147Ω          | 145Ω         | 100Ω        |
| Output impedance (SECONDARY)                                     | 286Ω           | 90Ω           | 125Ω          | 268Ω          | 445Ω         | 370Ω        |
| Non-linearity  | ±% of FR       |               |               |               |              |             |
| @ 50% stroke   | 0.15           | 0.15          | 0.15          | 0.15          | 0.15         | 0.20        |
| <b>@100% stroke (maximum)</b>                                    | <b>0.25</b>    | <b>0.25</b>   | <b>0.25</b>   | <b>0.25</b>   | <b>0.25</b>  | <b>0.25</b> |
| @125% stroke   | 0.25           | 0.35          | 0.25          | 0.35          | 0.30 (**)    | 0.50        |
| @150% stroke   | 0.30           | 0.50          | 0.30          | 0.50 (**)     | 0.75 (**)    | /           |
| Null voltage (max)   | 0.5% of FSO    |               |               |               |              |             |

| <b>ENVIRONMENTAL SPECIFICATIONS &amp; MATERIALS</b> |  |
|---|--|
| Operating temperature                               | -4°F to +392°F [-20°C to +200°C]   |
| Operating pressure                                  | Up to 10,000 PSI [700 bars]; <b>maximum slew rate 1,000 PSI [70 bars] per minute (***)</b> |
| Housing material                                    | AISI 400 Series stainless steel  |
| Electrical connection                               | Six lead-wires, 32 AWG stranded plated Copper, PTFE insulated, 3 foot [1 meter] long       |

**Notes:**

All values are nominal unless otherwise noted

Electrical specifications are for the test frequency indicated in the table

Dimensions are in inch [mm] unless otherwise noted

FR: Full Range is the stroke range, end to end; FR=2xS for ±S stroke range

FSO (Full Scale Output): Largest absolute value of the outputs measured at the ends of the range

(\*) Unit for output at stroke ends is millivolt per volt of excitation (input voltage)

(\*\*) Requires special reduced core length

(\*\*\*) Do not increase or decrease pressure faster than 1,000 PSI [70 bars] per minute to avoid permanent damage

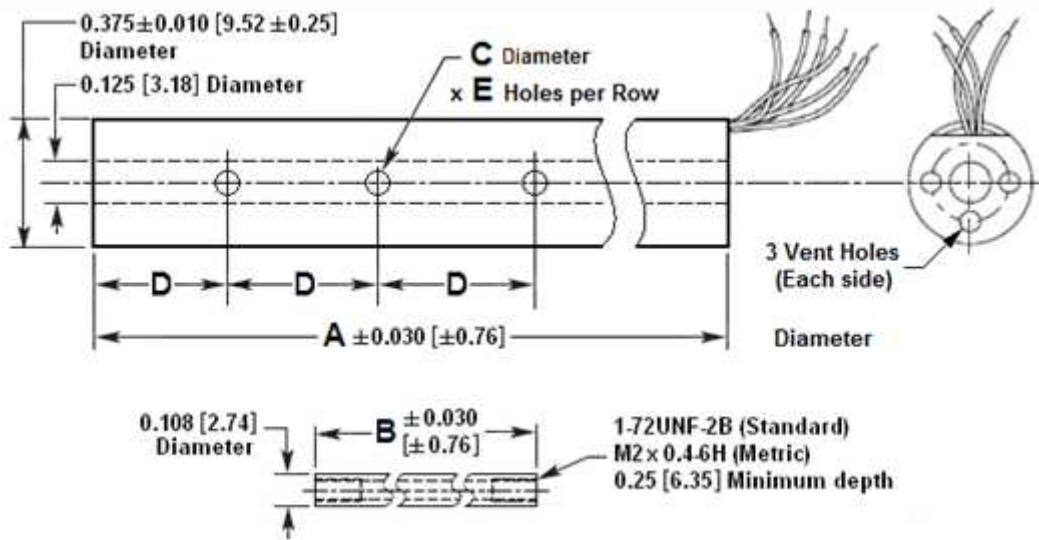


# MHR-T SERIES

Miniature High-Temperature AC LVDT

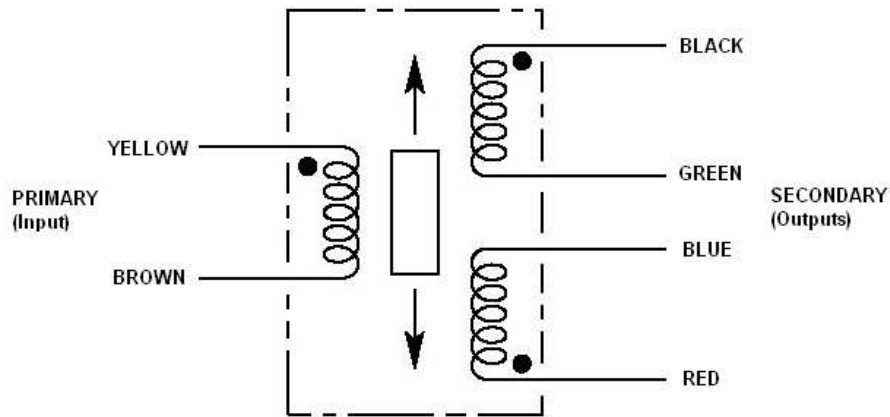
## MECHANICAL SPECIFICATIONS

| Parameter                              | MHR-V 025                | MHR-V 050    | MHR-V 100    | MHR-V 250    | MHR-V 500     | MHR-V 1000    |
|--|--------------------------|--------------|--------------|--------------|---------------|---------------|
| Body length "A"                        | 0.660 [16.8]             | 0.815 [20.7] | 0.990 [25.1] | 1.850 [47.0] | 3.300 [83.82] | 5.600 [142.2] |
| Core length "B"                        | 0.400 [10.2]             | 0.500 [12.7] | 0.625 [15.9] | 1.125 [28.6] | 2.000 [50.8]  | 3.000 [76.2]  |
| Housing vent hole diameter "C"         | 0.063 [1.60]             | 0.063 [1.60] | 0.063 [1.60] | 0.063 [1.60] | 0.063 [1.60]  | 0.063 [1.60]  |
| Vent hole spacing "D"                  | 0.20 [5.1] to 0.28 [7.1] | 0.27 [6.9]   | 0.33 [8.4]   | 0.46 [11.7]  | 0.825 [21.0]  | 0.80 [20.3]   |
| Number of vent holes per row "E"       | 2                        | 2            | 2            | 3            | 3             | 6             |
| Number of hole rows around housing "F" | 4                        | 4            | 4            | 3            | 3             | 3             |
| Body weight, oz [g]                    | 0.18 [5]                 | 0.21 [6]     | 0.21 [6]     | 0.32 [9]     | 0.60 [17]     | 0.92 [26]     |
| Core weight, oz [g]                    | 0.016 [0.5]              | 0.016 [0.5]  | 0.025 [0.7]  | 0.032 [0.9]  | 0.056 [1.6]   | 0.088 [2.5]   |



Dimensions are in inch [mm]

## WIRING INFORMATION



Connect Blue to Green for differential output