HCA & HCA-RA SERIES

Hermetically Sealed AC LVDT

SPECIFICATIONS

- **Hermetically sealed, all welded**
- **Stainless steel housing**
- **MS type connector, glass sealed**
- **Axial or radial electrical connection**
- **IEC IP68 rating to 1,000 PSI [70 bars]**
- **Stroke ranges from ± 0.05 to ±10 inches**
- **AC operation from 400Hz to 10kHz**
- **Double magnetic shielding**
- **Through bore design (HCA-RA version)**

The **HCA and HCA-RA Series** hermetically sealed LVDTs provide premium performance in harsh industrial environments. Impervious to dirt, water, steam, and corrosive liquids/vapors compatible with its materials, the HCA/HCA-RA all-welded stainless steel construction withstands external pressures up to 1,000 PSI [70 bars]. Double magnetic shielding offers excellent protection from external electromagnetic fields.

The HCA/HCA-RA Series can be configured with a number of standard options. A high temperature operation (200ºC) model, HCA-T is also available. The HCA/HCA-RA is compatible with the full line of Measurement Specialties LVDT signal conditioners.

The HCA-RA version adds the convenience of a radial connector termination. This feature decreases the required installation space, while also allowing debris to harmlessly pass through the 'open-ended' bore.

Like in most of our LVDTs, the HCA/HCA-RA windings are vacuum impregnated with a specially formulated, high temperature, flexible resin, and the coil assembly is potted inside its housing with a two-component epoxy. This provides excellent protection against hostile environments such as high vibration and shock.

Captive core option: The HCA/HCA-RA features an optional captive core design that greatly simplifies installation. The core rod and bearing assembly includes a Bronze bearing on the front end for self-alignment, while a PTFE sleeve allows low-friction travel through the stainless steel boreliner (spool tube). The core rod and the bearing assembly are both field serviceable.

Also see our other hermetically sealed LVDT models with built-in signal conditioning: **HCD** (DC voltage), **HCT** (4-20mA, 2-wire loop) and **HC-485** (RS-485 Digital Series).

FEATURES

- All-welded stainless steel construction
- Glass sealed, MS type connector (MIL-C-5015)
- Shock and vibration tolerant
- Captive core eases installation (optional)
- High temperature version available (200ºC)
- Calibration certificate supplied with each unit
- Right angle (HCA-RA) version available

APPLICATIONS

- Harsh industrial environments
- Submersible (with appropriate connector)
- Pressure vessels
- Corrosive liquid and vapor areas (check materials)
- Mild radiation areas
- Turbine valve

PERFORMANCE SPECIFICATIONS

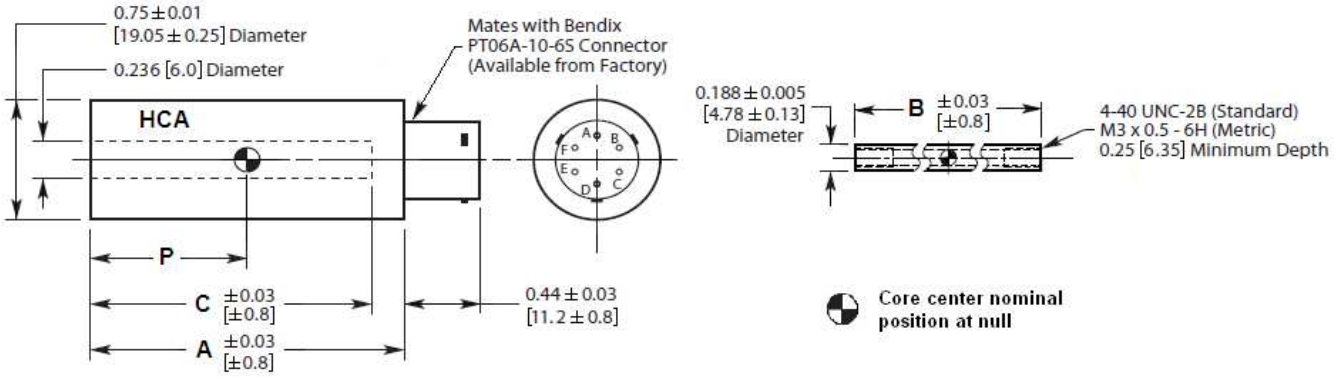
ELECTRICAL SPECIFICATIONS										
Parameter	**HCA HCA-RA 050**	**HCA HCA-RA 125**	**HCA HCA-RA 250**	**HCA HCA-RA 500**	**HCA HCA-RA 1000**	**HCA HCA-RA 2000**	**HCA HCA-RA 3000**	**HCA HCA-RA 4000**	**HCA HCA -RA 5000**	**HCA HCA-RA 10000**
Stroke range	±0.050 [±1.27]	±0.125 [±3.17]	±0.25 [±6.35]	±0.5 [±12.7]	±1 [±25.4]	±2 [±50.8]	±3 [±76.2]	±4 [±101.6]	±5 [±127]	±10 [±254]
Sensitivity V/V/inch mV/V/mm	4.2 [165]	2.4 [94.5]	1.6 [63.0]	1.1 [43.3]	0.84 [33.1]	0.32 [12.6]	0.20 [7.9]	0.18 [4.6]	0.16 [6.3]	0.13 [5.1]
Output at stroke ends, mV/V *(*)*	210	300	400	550	840	640	600	720	800	1,300
Phase shift	+6°	+5°	+5°	+2°	+1°	-1°	+1°	+3°	-5°	-6°
Input impedance (PRIMARY)	430Ω	1710Ω	800Ω	900Ω	900Ω	525Ω	930Ω	1000Ω	1200Ω	930Ω
Output impedance (SECONDARY)	950Ω	1820Ω	940Ω	1150Ω	2100Ω	535Ω	1040Ω	580Ω	1640Ω	3000Ω
Non-linearity	±% of FR									
@100% stroke (maximum)	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
@125% stroke	0.25	0.25	0.30	0.30	0.35	0 .40 *(**)*	0 .50	/	0 .80	0.90 *(**)*
@150% stroke	0.50	0.50	0.50	0.55 *(**)*	0 .55 *(**)*	0 .70 *(**)*	1.00 *(**)*	/	/	/
Input voltage	3 VRMS sine wave									
Input frequency	400Hz to 10kHz									
Test frequency	2.5kHz									
Null voltage	0.5% of FRO, maximum									

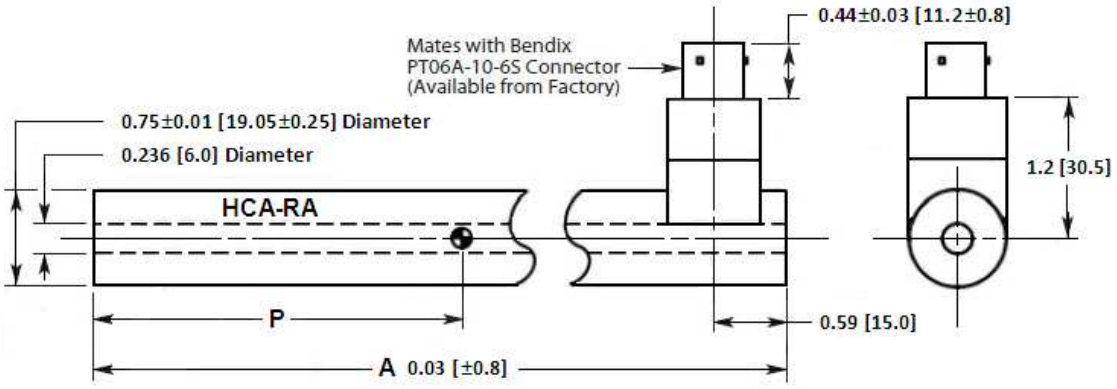
ENVIRONMENTAL SPECIFICATIONS & MATERIALS	
Operating temperature	-65°F to +300°F [-55°C to 150°C]
Shock survival	1,000 g (11ms half-sine)
Vibration tolerance	20 g up to 2kHz
Housing material	AISI 400 Series stainless steel
Electrical connector	6-pin MS type connector (MIL-C-5015)
IEC 60529 rating	IP68 to 1,000 PSI [70 bars] with use of proper mating connector plug

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
FRO (Full Range Output): Algebraic difference in 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

MECHANICAL SPECIFICATIONS – NON CAPTIVE CORE (STANDARD)

Parameter	HCA HCA-RA 050	HCA HCA-RA 125	HCA HCA-RA 250	HCA HCA-RA 500	HCA HCA-RA 1000	HCA HCA-RA 2000	HCA HCA-RA 3000	HCA HCA-RA 4000	HCA HCA-RA 5000	HCA HCA-RA 10000
Body length "A"	1.66 [42.2]	2.50 [63.5]	3.36 [85.3]	5.05 [128.3]	7.29 [185.2]	10.68 [271.3]	15.76 [400.3]	16.17 [410.7]	19.70 [500.4]	33.82 [859.0]
Core length "B"	0.59 [15.0]	1.10 [27.9]	1.80 [45.7]	3.00 [76.2]	3.80 [96.5]	5.30 [134.6]	6.20 [157.5]	6.20 [157.5]	6.20 [157.5]	12.00 [304.8]
Bore depth "C" **HCA** only	1.07 [27.2]	1.91 [48.5]	2.77 [70.4]	4.46 [113.3]	6.72 [170.7]	10.20 [259.1]	15.17 [385.3]		19.12 [485.6]	33.23 [844.0]
Core center at null "P"	0.55 [14.0]	0.96 [24.4]	1.39 [35.3]	2.23 [56.6]	3.32 [84.3]	4.91 [124.7]	7.59 [192.8]	7.87 [199.9]	9.56 [242.8]	16.61 [421.9]
HCA body weight oz [g]	1.20 [34]	1.73 [49]	2.22 [63]	2.93 [83]	5.22 [148]	5.65 [160]	8.33 [236]	8.50 [241]	10.31 [292]	18.57 [526]
HCA-RA body weight, oz [g]	2.26 [64]	2.79 [79]	3.28 [93]	3.98 [113]	6.28 [178]	6.70 [190]	9.38 [266]	9.60 [272]	11.35 [322]	19.61 [556]
Core weight oz [g]	0.07 [2]	0.11 [3]	0.14 [4]	0.28 [8]	0.39 [11]	0.46 [13]	0.60 [17]	0.60 [17]	0.60 [17]	0.85 [24]

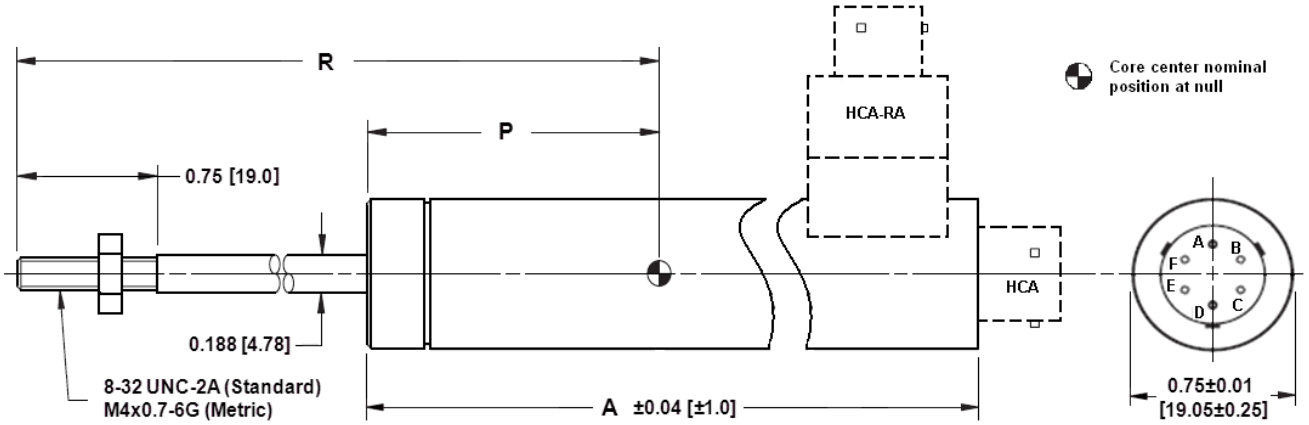




Dimensions are in inch [mm]

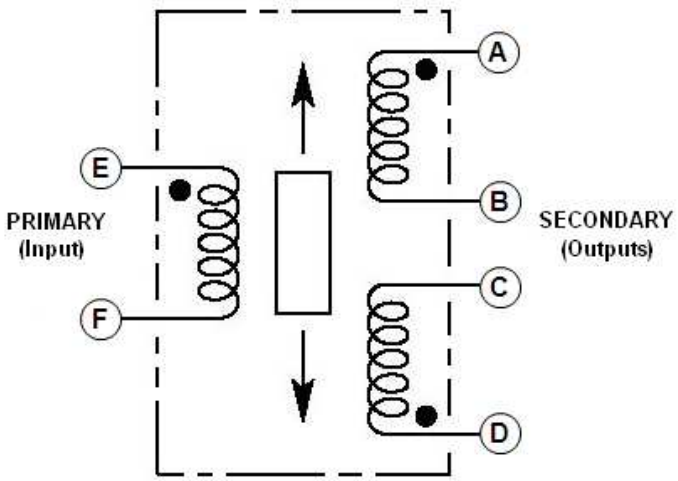
MECHANICAL SPECIFICATIONS – CAPTIVE CORE OPTION

Parameter	HCA/HCA-RA 050	HCA/HCA-RA 125	HCA/HCA-RA 250	HCA/HCA-RA 500	HCA/HCA-RA 1000	HCA/HCA-RA 2000	HCA/HCA-RA 3000
Body length "A"	2.00 [50.8]	2.84 [72.1]	3.70 [94.0]	5.39 [136.9]	7.63 [193.8]	11.02 [279.9]	16.10 [408.9]
Core center at null "P"	0.89 [22.6]	1.30 [33.0]	1.73 [43.9]	2.57 [65.3]	3.66 [93.0]	5.39 [136.9]	7.93 [201.4]
Core rod position at null "R"	3.70 [94.0]	4.28 [108.7]	4.75 [120.6]	6.04 [153.4]	7.90 [200.7]	10.52 [267.2]	15.27 [387.9]
Weight, oz [grams]	1.98 [56]	2.61[74]	3.14 [89]	4.06 [115]	6.63 [188]	7.37 [209]	10.62 [301]



Dimensions are in inch [mm]

WIRING INFORMATION



A through F: Connector pin assignments
Connect B to C for differential output

ORDERING INFORMATION

Description	HCA Model	Part Number
±0.050 inch LVDT	HCA 050	02560413-000
±0.125 inch LVDT	HCA 125	02560414-000
±0.25 inch LVDT	HCA 250	02560415-000
±0.5 inch LVDT	HCA 500	02560416-000
±1 inch LVDT	HCA 1000	02560417-000
±2 inch LVDT	HCA 2000	02560418-000
±3 inch LVDT	HCA 3000	02560419-000
±4 inch LVDT	HCA 4000	72560000-000
±5 inch LVDT	HCA 5000	02560420-000
±10 inch LVDT	HCA 10000	02560421-000

Description	HCA-RA Model	Part Number
±0.050 inch LVDT	HCA-RA 050	02560413-500
±0.125 inch LVDT	HCA-RA 125	02560414-500
±0.25 inch LVDT	HCA-RA 250	02560415-500
±0.5 inch LVDT	HCA-RA 500	02560416-500
±1 inch LVDT	HCA-RA 1000	02560417-500
±2 inch LVDT	HCA-RA 2000	02560418-500
±3 inch LVDT	HCA-RA 3000	02560419-500
±4 inch LVDT	HCA-RA 4000	72560000-500
±5 inch LVDT	HCA-RA 5000	02560420-500
±10 inch LVDT	HCA-RA 10000	02560421-500

OPTIONS		
Description	**Comments**	**Part Number**
5.0 kHz calibration	HCA/HCA-RA 050 through HCA/HCA-RA 500 only	XXXXXXXX-002
10 kHz calibration		XXXXXXXX-003
Metric threaded core (Non-captive) or connecting rod (Captive core)	All	XXXXXXXX-006
Guided core	Available on non-captive core models only	XXXXXXXX-010
Small-diameter/low-mass core *(consult factory for mass and dimensions)*		XXXXXXXX-020
Captive core	HCA/HCA-RA 050 through HCA-RA 3000 only	XXXXXXXX-200

Note: Add multiple option dash numbers together to determine proper ordering suffix
Example: HCA-RA 1000, ±1 inch, right angle connector model, with captive core and 5 kHz calibration, P/N 0256417-702

ACCESSORIES FOR HCA AND HCA-RA		
Description	**Comments**	**Part Number**
Core connecting rod, 6 inches long, 4-40 threads		05282946-006
Core connecting rod, 12 inches long, 4-40 threads		05282946-012
Core connecting rod, 24 inches long, 4-40 threads		05282946-024
Core connecting rod, 36 inches long, 4-40 threads		05282946-036
Core connecting rod, 6 inches long, M3x0.5 metric threads		05282977-006
Core connecting rod, 12 inches long, M3x0.5 metric threads		05282977-012
Mounting block		04560950-000
Mating connector kit	PT06A-10-6S(SR)	62101011-000
Interconnect cable for LVM-110 and LiM 4-20 Signal Conditioners *(1)*	HCA/HCA-RA to Stripped/Tinned	04290417-000
Interconnect cable for IEM-422 Signal Conditioner *(1)*	HCA/HCA-RA to PTO6A-10-6P	04290133-000
Interconnect cable for ATA-2001 Signal Conditioner *(1)*	HCA/HCA-RA to DB-9P	04290457-000
Interconnect cable for MP-2000 Series Set-Point Controller *(1)*	HCA/HCA-RA to 05BL5M	04290560-000
Interconnect cable for LDM/PML-1000 Signal Conditioners, **200°C** *(1)*	HCA/HCA-RA to Stripped/Tinned	04290595-000

(1) All cables are shielded, 10 foot long, and rated 80°C [176°F] operating unless otherwise noted. Consult factory for other lengths.

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