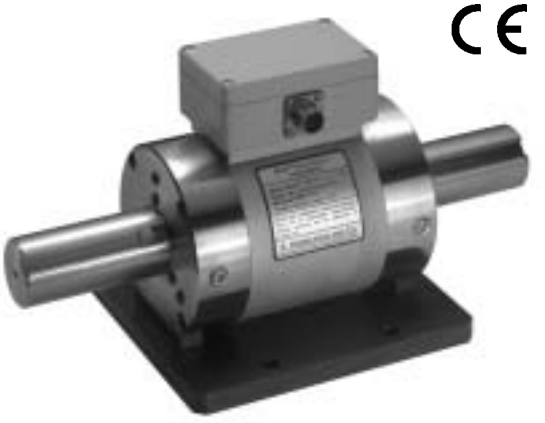
MCRT® 79000V

DUAL RANGE, DC OPERATED NON-CONTACT TORQUEMETERS

- ✓ ***Replaces Multiple Torquemeters***
- ✓ ***10X Low Range Overload***
- ✓ ***Hardened to EMI From IGBT-based Drives***
- ✓ ***Ferrite-free Transformer Coupling***
- ✓ ***NIST Traceable Remote Calibration***

CE



5 & 10 Volt Outputs Interface PC and PLC Controllers & Data Acquisition Systems

The MCRT® 79000V series was developed *to accurately measure torque when the ratio of peak torque to average torque is high.* In that situation, *a conventional torquemeter must be oversized to avoid damage — a process which greatly reduces accuracy.* Conditions that create high peak to average ratios include starting, stopping or reversing inertia loads, torsional oscillations, and diesel and single cylinder engine/compressor drives. Additionally, when peak torques are unknown, an MCRT® 79000V reduces the risk of damage from unexpected or accidental torque spikes.

An MCRT® 79000V can accurately measure low running torque and high transient spikes *without the expense of using several conventional sensors*. Furthermore, these products *are hardened to the intense electromagnetic interference (EMI)* often generated by modern, IGBT-based adjustable speed drives/controls.

These torquemeters use patented Himmelstein technology newly refined to achieve MCRT® 79000V performance. *Rotary transformers* connect torque sensing strain gages to stationary circuitry without contact. Transformers don't generate noise or wear. They are immune to noise, dirt and lubricants and provide long, maintenance-free life. *Unlike ferrite transformers, Himmelsteins' robust, non-ferrite design isn't susceptible to cracking and impact damage.* MCRT® 79000V sensors are suitable for diesel service and other hostile environments.

RFI shielded circuitry, improved EMI tolerance, and the high level output with low source impedance further enhance noise immunity. Simple cabling yields *calibration and balance truly free of cable effects*. There are no slip rings, brushes, radio transmitters or other limited-life, noise-generating elements.

S. HIMMELSTEIN AND COMPANY

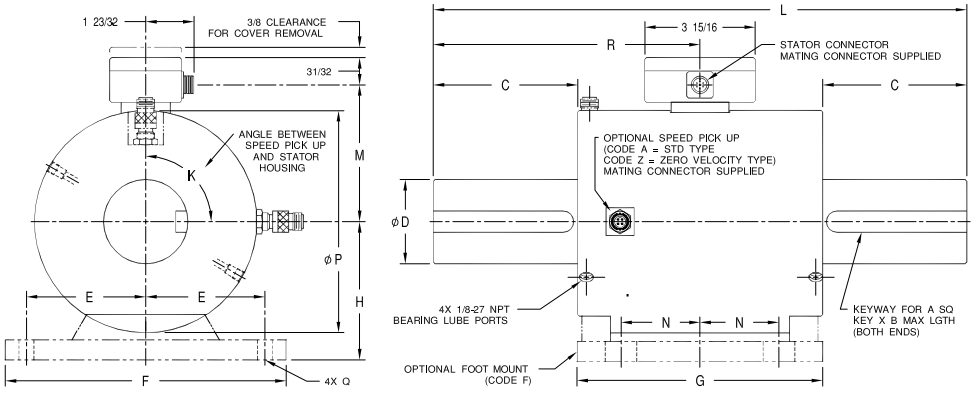
2490 Pembroke Avenue, Hoffman Estates, IL 60195 • Tel: 847/843-3300 • Fax: 847/843-8488

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Standard Ratings, Shaft End Models

MCRT® MODEL	LOW TORQUE RANGE		HIGH TORQUE RANGE		TORQUE OVERLOAD	SPEED RATING	SHAFT STIFFNESS*	ROTATING INERTIA	MAX WT.
	[lb-in]	[n-m]	[lb-in]	[n-m]	[lb-in]	[rpm]	[lb-in/rad]	[oz-in sec^2]	[lbs]
79001V(2-2)	40	4.52	200	22.6	400	0 to ±15,000	21,400	0.035	9
79002V(5-2)	100	11.3	500	56.5	1,000	0 to ±15,000	57,900	0.035	10
79002V(1-3)	200	22.6	1,000	113	2,000	0 to ±15,000	117,000	0.035	10
79003V(2-3)	400	45.2	2,000	226	4,000	0 to ±10,000	214,000	0.11	22
79004V(4-3)	800	90.4	4,000	452	8,000	0 to ±10,000	421,000	0.16	25
79004V(1-4)	2,000	226	10,000	1,130	20,000	0 to ±10,000	593,000	0.16	25
79006V(2-4)	4,000	452	20,000	2,260	40,000	0 to ±8,000	1,800,000	2.3	105
79006V(4-4)	8,000	904	40,000	4,520	80,000	0 to ±8,000	2,700,000	2.4	105
79007V(1-5)	20,000	2,260	100,000	11,300	200,000	0 to ±6,000	7,100,000	3	115
79008V(2-5)	40,000	4,520	200,000	22,600	400,000	0 to ±3,600	29,000,000	11	150
79008V(375-3)	75,000	8,470	375,000	42,400	750,000	0 to ±3,600	39,500,000	11.7	150
79009V(75-4)	150,000	16,900	750,000	84,700	1,500,000	0 to ±1,800	115,000,000	205	775
79009V(1-6)	200,000	22,600	1,000,000	113,000	2,000,000	0 to ±1,800	125,000,000	207	780
79009V(15-5)	300,000	33,900	1,500,000	169,000	3,000,000	0 to ±1,800	136,000,000	212	590
79009V(2-6)	400,000	45,200	2,000,000	226,000	4,000,000	0 to ±1,800	142,000,000	218	800
79010V(25-5)	500,000	56,500	2,500,000	282,000	5,000,000	0 to ±1,200	216,000,000	556	1445
79010V(3-6)	600,000	67,800	3,000,000	339,000	6,000,000	0 to ±1,200	221,000,000	567	1455
79010V(35-5)	700,000	59,100	3,500,000	395,000	7,000,000	0 to ±1,200	224,000,000	574	1465
79010V(4-6)	800,000	90,4000	4,000,000	452,000	7,350,000	0 to ±1,200	227,000,000	582	1475

* *Stiffness is conservatively rated and includes both the torsion section and shaft-ends.*



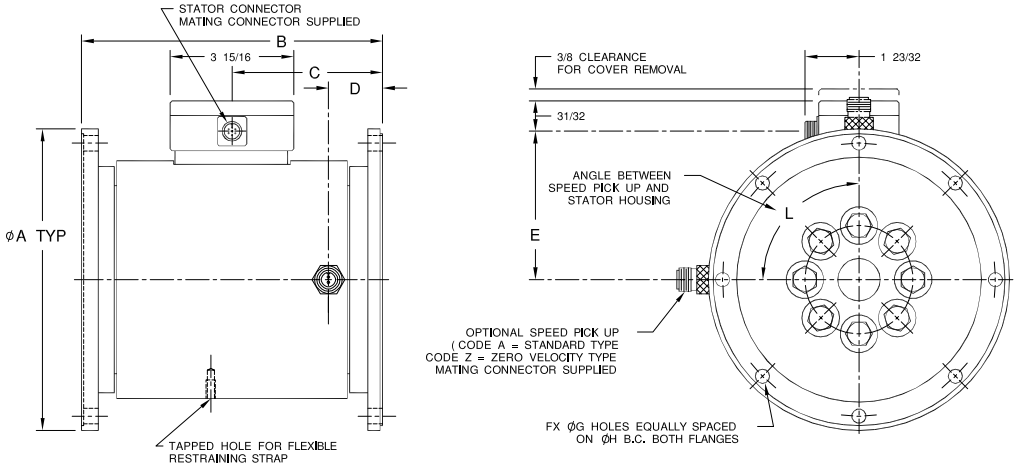
MCRT® MODEL	DIMENSIONS [inches]														
	A	B	C	D1	E	F	G	H	L	M	N	P	K	Q	R
79001V	0.187	1.125	1.50	0.625	2.25	5.50	5.50	2.250	8.50	2 9/16	1 ½	3 15/32	90°	0.406D	4 1/4
79002V	0.187	1.625	2.00	0.750	2.25	5.50	5.50	2.250	9.50	2 9/16	1 ½	3 15/32	90°	0.406D	4 3/4
79003V	0.250	1.750	2.00	1.000	2.625	6.25	7.00	2.500	10.00	2 31/32	1 ½	4 7/32	90°	0.406D	5
79004V	0.375	2.750	3.38	1.500	2.625	6.25	7.00	2.500	12.75	2 31/32	1 ½	4 7/32	90°	0.406D	6 3/8
79006V	0.625	3.500	4.13	2.500	4.25	10.00	8.75	5.000	17.00	4 7/8	2 13/16	7 15/16	0°	Note 2	9 ½
79007V	0.750	4.500	5.13	3.000	4.25	10.00	8.75	5.000	19.00	4 7/8	2 13/16	7 15/16	0°	Note 2	9 ½
79008V	1.000	6.500	7.56	4.500	4.25	10.00	7.75	5.000	23.00	5 1/8	2 13/16	8 ½	0°	Note 2	12 27/32
79009V	Note 3	8.000	9.00	7.750	7.00	15.50	18.00	8.000	36.00	7 7/8	7 7/8	13 7/8	0°	Note 2	18
79010V	Note 4	12	13.50	9.375	8.50	18.50	20.00	9.750	47.00	9 ½	8 7/8	17	0°	Note 2	23 ½

1. Tolerance on D diameter is +0.0000/-0.0005 for diameters =< 2.5" and +0.000/-0.001 for diameters > 2.5". 2. Slotted 0.531 wide by 1-1/8 long.
3. Dual rectangular keyways at each end are 2" wide by 1.50" high. 4. Dual rectangular keyways at each end are 2.50" wide by 1.75" high.

Standard Ratings, Compact Flanged Models

MCRT® MODEL	LOW TORQUE RANGE		HIGH TORQUE RANGE		TORQUE OVERLOAD	SPEED RATING	SHAFT STIFFNESS*	ROTATING INERTIA	MAX WT.
	[lb-in]	[n-m]	[lb-in]	[n-m]	[lb-in]	[rpm]	[lb-in/rad]	[oz-in sec^2]	[lbs]
79060V(1-3)	200	22.6	1,000	113	2,000	0 to ±8,000	602,000	0.6	12½
79060V(2-3)	400	45.2	2,000	226	4,000	0 to ±8,000	1,375,000	0.6	12½
79060V(4-3)	800	90.4	4,000	452	8,000	0 to ±8,000	2,640,000	0.6	12½
79061V(1-4)	2,000	226	10,000	904	20,000	0 to ±8,000	2,930,000	0.9	15½
79061V(18-3)	3,600	407	18,000	2,260	36,000	0 to ±8,000	3,530,000	0.9	15½
79070V(24-3)	4,800	542	24,000	4,070	48,000	0 to ±5,500	6,800,000	8.24	50
79070V(48-3)	9,600	1,080	48,000	5,420	96,000	0 to ±5,500	12,200,000	8.27	50
79070V(96-3)	19,200	2,170	96,000	10,800	192,000	0 to ±5,500	17,900,000	8.33	52
79080V(2-5)	40,000	4,520	200,000	21,700	400,000	0 to ±3,600	39,200,000	54.5	150
79080V(375-3)	75,000	8,470	375,000	45,200	750,000	0 to ±3,600	53,100,000	54.9	155
79090V(75-4)	150,000	16,900	750,000	80,470	1,500,000	0 to ±1,800	137,000,000	480	974
79090V(15-5)	300,000	33,900	1,500,000	169,000	3,000,000	0 to ±1,800	164,000,000	487	989
79090V(2-6)	400,000	45,200	2,000,000	339,000	4,000,000	0 to ±1,800	177,000,000	493	998
79100V(3-6)	600,000	67,800	3,000,000	452,000	6,000,000	0 to ±1,200	282,000,000	1,838	1,502
79100V(4-6)	800,000	90,400	4,000,000	678,000	7,350,000	0 to ±1,200	292,000,000	1,852	1,516

**Stiffness is conservatively rated from flange face-to-face.*



MCRT® MODEL	DIMENSIONS [inches]								
	A	B	C	D	E	F	G	H	L
79060V	4.250 ±0.001 *(Flange faces are pilotless)*	5 3/16	2 19/32	1 3/32	2 27/32	8	3/8-24UNF-2B	3.625	90°
79061V	4.250 ±0.001*(Flange faces are pilotless)*	5 15/16	2 31/32	1 15/32	2 27/32	8	3/8-24UNF-2B	3.625	90°
79070V	8 *(Flange faces have male and female pilots*)*	8	4 1/32	1 7/16	4 1/16	8	0.377 +0.002/-0.000	7.250	0°
79080V	12 *(Flange faces have female pilots*)*	15 1/4	8 13/16	5 5/8	5 5/32	16	0.630 +0.002/-0.000	10.375	0°
79090V	23 *(Flange faces have female pilots*)*	31	15 ½	7 1/8	7 7/8	32	0.755 +0.002/-0.000	20.625	0°
79100V	30 *(Flange faces have female pilots*)*	37	18 ½	9 1/8	9 ½	32	1.005 +0.002/-0.000	27	0°

**Contact the factory for a print of flange details.*

General Specifications

	Low Range Performance	High Range Performance
Non-linearity (end point method, % of Range):	≤ ±0.10	≤ ±0.07
Hysteresis (% of Range):	≤ ±0.10	≤ ±0.07
Non-repeatability (% of Range):	≤ ±0.05	≤ ±0.03
Combined Error (guaranteed combined non-linearity, hysteresis and non-repeatability, % of Range):	≤ ±0.15	≤ ±0.12
Rotational Effect on Zero (% of Range):	≤ ±0.05	≤ ±0.03
Remote[1] Calibration Error (% of Range @ 75 deg. F., traceable to NIST):	≤ ±0.04	≤ ±0.04
Temperature Effects:		
Zero (% of Range/deg. F.):	≤ ±0.0025	≤ ±0.001
Span (% of Rdg./deg. F.):	≤ ±0.0025	≤ ±0.001
Compensated Range: +75 to +175 deg. F.		
Minimum Usable Range:	- 25 to +185 deg. F.	
Storage Range:	- 65 to +225 deg. F.	
Outputs: Fully bi-directional, dual outputs for each range with common characteristics, as follows		
Clockwise (CW) Torque[2,3] (Volts):	+5 standard, or +10 Option L.	
Counterclockwise (CCW) Torque[2,3] (Volts):	- 5 standard, or - 10 Option L.	
Minimum Resistive Load:	10 kΩ.	
Maximum Capacitive Load:	0.05 uF.	
Source Impedance:	< 1Ω.	
Overrange[3] (% of Range):	±33.	
Zero Control Range:	±5% of Range, nominal.	
Span Control Range:	±5% of Range, nominal.	
Supply Voltage[5] (Volts dc):	10.5 to 24 standard, 18 to 24 Option L.	
Supply Current[5]:	100 mA, nominal.	
Power Supply Effect:	<0.01% of Range/volt.	
Measurement Bandwidth[4]:	High Freq. Output ☞ dc to 500 Hz, Low Frequency Output ☞ dc to 1 Hz; both outputs are simultaneously available on each range.	
Output Noise (rms, % of Range):	0.10 @ 500 Hz. output, 0.02 @ 1 Hz output.	

Notes

1. Calibration enabled by shorting CAL terminal to COMMON.
2. CW torque causes the torquemeter shaft to turn CW when viewed from its driven end. CCW torque causes the opposite rotation.
3. Electrical outputs remain *linear* to *the overrange* level. A torquemeter will not *yield* below its *rated overload torque. The region between 5X rated and overload torques should be reserved for unexpected loads.*
4. Bandwidth upper limit is determined by integral Bessel response filter. The torquemeters' resonant frequency is independent of amplifier bandwidth; see Tech Memo No. 8150.
5. Fused and reverse polarity protected.
6. "Range" denotes "Range Full Scale". "Rdg." denotes "Reading".
7. "deg. F." denotes "degree Fahrenheit".
8. Speed ratings are for continuous, bi-directional operation.
9. These torquemeters will operate in a condensing atmosphere, and if wetted with non-corrosive fluids and mud. When operated continuously, clean regularly or cover to deflect contaminants. They are not submersible.
10. Specifications are subject to change without notice.

Available Options: Available options are listed. Consult the factory should you have special requirements.

Configuration - Code N if Standard, Code S if Special
This code identifies the torquemeter as being a standard configuration or flags the presence of a special modification(s).

Foot Mount - Code F, or N if None
Foot mounts provide a rigid stator mounting. They are only available on shaft end torquemeters. Refer to outline drawing for dimensions.

Output - Code L for ±10V (Option L)**, or N if ±5V** (standard).

Zero Velocity Speed Pick-up - Code Z, or N if None
Outputs 60 voltage pulses/rev., *not ±5 volts.* Pulse amplitude is constant - approximately the supply voltage less ½ volt . *It requires a 5 to 15V dc supply.* ***Use below 100 rpm and in electrically noisy environments.***

Standard Speed Pick-up - Code A, or N if None
Outputs 60 voltage pulses/rev., *not ±5 volts.* Its amplitude is proportional to speed. ***Use Code Z pick-up below 100 rpm and in noisy environments.***

Order No. ☞	MCRT® 79061V	(1-4)	N	N	Z	L
	Model Number	*Range*	*Configuration*	*Foot Mount*	*Speed Pick-up*	*Output*

An MCRT® 79061V(1-4)NNZL is a 10,000/2,000 lb-in dual range torquemeter with standard configuration (Code N), no foot mount (Code N), zero velocity speed pick-up (Code Z) and ±10 Volt output (Code L).

	CONNECTOR PINOUTS		
Pins	**Torque Connector**	**Code A Speed Pick-up Connector**	**Code Z Speed Pick-up Connector**
A	+ Power In	Signal	+ Power In
B	- Power In	Signal	Signal
C	Low Range Cal Enable	N/C	Common
D	High Range Cal Enable		N/C
E	Signal Common		
F	Low Range 500 Hz Output		
G	High Range 500 Hz Output		
H	Low Range 1 Hz Output		
J	High Range 1 Hz Output		
K	N/C		