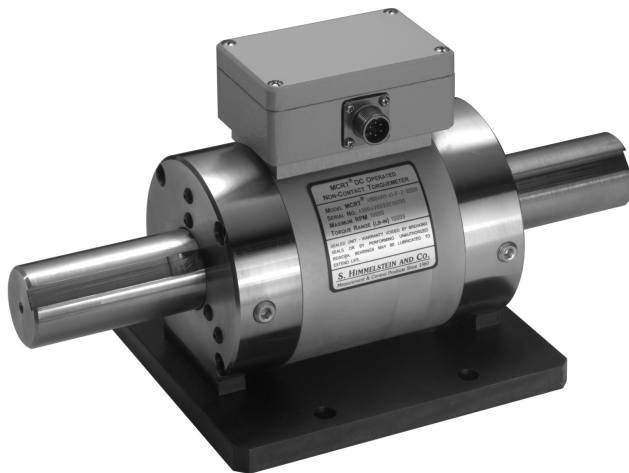


# MCRT<sup>®</sup> 48000V Non-Contact DC OPERATED TORQUEMETERS

- ✓ 2X Overload Rating
- ✓ Hardened to EMI From Adjustable Speed Drives
- ✓ Dual Outputs @  $\pm 5$  Volts or  $\pm 10$  Volts (Option L)
- ✓ Ferrite-free Rotary Transformer Coupling
- ✓ NIST Traceable\* Dead Weight Calibration
  - \*Calibration performed in our accredited metrology laboratory (NVLAP Lab Code 200487-0). For details see [www.himmelstein.com](http://www.himmelstein.com) or accreditation link at [www.nist.gov](http://www.nist.gov).
- ✓ Single Supply Operation (such as 12 & 24 Volt Batteries)
- ✓ Bidirectional Operation Includes Stall
- ✓ Remote Traceable\* Bidirectional Calibration
- ✓ Unexcelled Immunity To Machinery Magnetic Fields
- ✓ Zero Velocity (Code Z) and Standard (Code A) Speed Pickup Options



To excite and display Torque only, use a Model 703. To excite and display Torque, Speed and HP, use a Model 723. See Bulletins 374 & 372.



Torque Ranges: 0.625 to 4,000,000 lbf-in (0.071 to 452,400 N-m)

**Interface Directly To PC and PLC Controllers and Data Acquisition Systems**

## **S. HIMMELSTEIN AND COMPANY**

*Designing and Making the World's Best Torque Instruments Since 1960*

## Shaft End and Flanged Models

Shaft end Torquemeters are the choice for most applications. They cost less than flanged models and can be floated or foot mounted. Flanged Torquemeters are much shorter. Thus, flanged models are often used when space is too short for a shaft end model.

Flanged models handle large\* axial loads *without special mounting considerations*. They are often used in marine or vehicular drives, to support the weight and thrust of a mixers' impeller, and in other similar circumstances. A *flanged Torquemeter must be installed as a floating shaft*.

\* generally a thrust in pounds equal to the torquemeters' full scale rating in pound-inches.

**Other Characteristics:** Please refer to Bulletin 7400 for a description of operating principles, construction characteristics, bidirectional remote calibration, pinouts, other features, benefits and an application summary.

## General Specifications

	Code N Standard Performance	Code C <sup>1</sup> Enhanced Performance
<b>Combined Nonlinearity and Hysteresis</b> (end point method, % of F.S.):	±0.10	±0.05
<b>Nonrepeatability</b> (% of F.S.):	±0.05	±0.03
<b>Stability, 6 Months</b> (% of F.S.):	±0.20	±0.10
<b>Rotational Effect on Zero</b> (% of F.S.):	±0.05	±0.02
<b>Bidirectional Remote Calibration Accuracy</b> (% of F.S. @ 75 deg. F., traceable to NIST):	±0.05	±0.02
<b>Output Tracking</b> (difference between dual outputs, % of F.S.):	±0.10	±0.05
<b>Temperature Effects:</b>		
Zero (% of F.S./deg. F.):	±0.002	±0.001
Span (% of Rdg./deg. F.):	±0.002	±0.001
Compensated Range:		+75 to +175 deg. F.
Minimum Usable Range:		-25 to +185 deg. F.
Storage Range:		-65 to +225 deg. F.
<b>Outputs:</b> Fully bidirectional, dual outputs with common characteristics, as follows		
Clockwise (CW) Torque <sup>2</sup> :	Standard: +5 Volts <sup>3</sup> ; Option L: +10 Volts <sup>3</sup>	
Counterclockwise (CCW) Torque <sup>2</sup> :	Standard: -5 Volts <sup>3</sup> ; Option L: -10 Volts <sup>3</sup>	
Minimum Resistive Load:	10 kΩ	
Maximum Capacitive Load:	0.05 μF	
<b>Overrange</b> <sup>3</sup> (% of F.S.):	±33	
<b>Measurement Bandwidth</b> <sup>4</sup> :	High Frequency Output <sup>8</sup> dc to 500 Hz or 1.1 kHz (Option K) and, Low Frequency Output <sup>8</sup> dc to 1 Hz. Both outputs are present simultaneously.	
<b>Output Noise</b> (rms, % of F.S.):	0.10 at High Frequency output, 0.01 at 1 Hz output	
<b>Zero Control Range:</b>	±5% of F.S., nominal	
<b>Span Control Range:</b>	±5% of F.S., nominal	
<b>Supply Voltage</b> <sup>5</sup> :	Standard: 10.5 to 24 Volts dc; Option L: 18 to 24 Volts dc	
<b>Supply Current</b> <sup>5</sup> :	Standard: 85 mA, nominal; Option L: 100 mA, nominal	
<b>Power Supply Effect:</b>	<0.01% of F.S. per volt	

### Notes

- Available on all ranges ≥50 lbf-in (5.65 N-m).
- CW torque causes the torquemeter shaft to turn CW when viewed from its driven end. CCW torque causes the opposite rotation.
- Electrical outputs remain linear to the overrange level. A torquemeter won't yield below its rated overload torque. Reserve the region between rated and overload torques for unexpected loads; see Bulletin 705.
- Bandwidth upper limit is determined by integral Bessel response filter. The torquemeters' self resonant frequency is > 1 kHz.
- Fused and reverse polarity protected.
- "F.S." denotes "Full Scale". "Rdg." denotes "Reading".
- "deg. F." denotes "degree Fahrenheit".
- Speed ratings are for continuous, bidirectional operation.
- 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.
- Specifications are subject to change without notice.

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

### Enhanced Performance - Code C, or N if Standard

This option reduces measurement errors by a factor of two or more. See specifications for complete details.

### 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.

### Code L - ±10 Volt Output, N if ±5 Volts

Add Suffix L for optional 10V outputs; requires 18V minimum power.

### Speed Pickup - Code A, Z, or N if None

Outputs 60 pulses/rev except 512 pulses/rev for MCRT 48000V. Code A is a Standard pickup. Code Z calls a Zero Velocity Type which requires 5 to 15V dc power. Use code Z in electrically noisy environments.

### Option K - 1.1 kHz Bandwidth

Add Suffix K for optional 1.1 kHz high frequency output which replaces the 500 Hz high frequency output. Suffix is omitted when Option K is not specified.

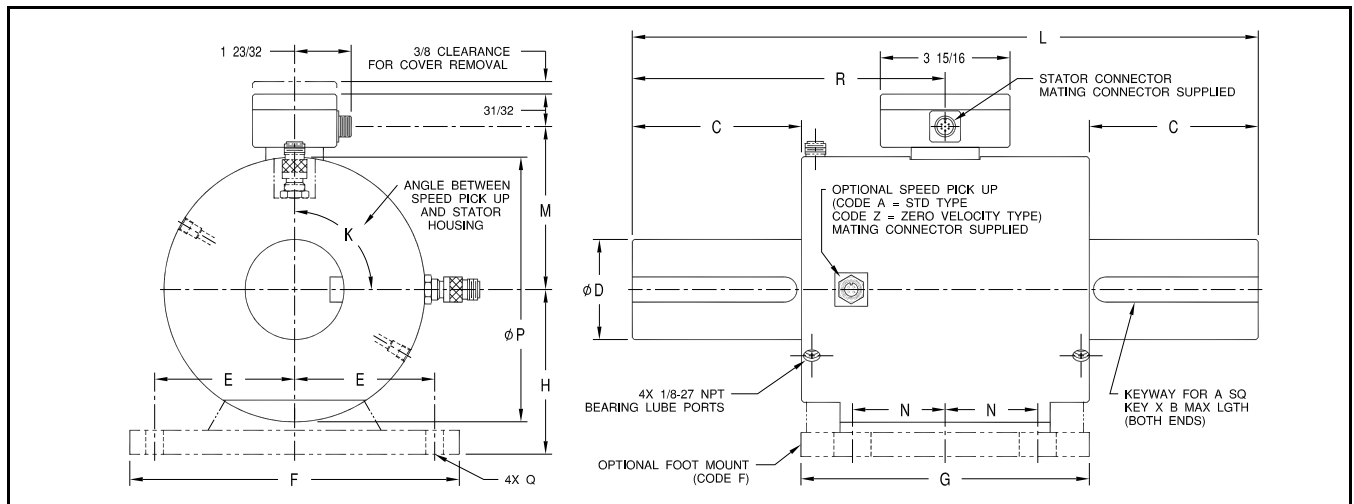
**Order Number:** MCRT<sup>®</sup> 48061V (6-3) - C - N - Z - L - K 1.1 kHz Bandwidth  
± 10 Volt Outputs  
Speed Pick-up  
Foot Mount

Model No. and Range \_\_\_\_\_  
Performance \_\_\_\_\_

# Standard Ratings, MCRT® 48000V Series Shaft End Models

MCRT® MODEL	TORQUE RANGE		TORQUE OVERLOAD		SPEED RATING	STIFFNESS*	INERTIA	WT.
	[lbf-in]	[N-m]	[lbf-in]	[N-m]	[rpm]	[lbf-in/radian]	[ozf-in sec <sup>2</sup> ]	[lbs]
48000VB(1-1)**	0.625 = 10 ozf-in	0.071	1.25 = 20 ozf-in	0.141	0 to ±15,000 for standard Model  0 to ±25,000 for Suffix H, High Speed Model	336 ozf-in/rad	1.82X10 <sup>-4</sup>	1.5
48000VB(2-1)**	1.25 = 20 ozf-in	0.141	2.50 = 40 ozf-in	0.283		528 ozf-in/rad	1.83X10 <sup>-4</sup>	1.5
48000VB(5-1)**	3.125 = 50 ozf-in	0.353	6.25 = 100 ozf-in	0.706		1,840 ozf-in/rad	1.87X10 <sup>-4</sup>	1.5
48000VB(1-2)**	6.25 = 100 ozf-in	0.706	12.50 = 200 ozf-in	1.412		4,224 ozf-in/rad	1.93X10 <sup>-4</sup>	1.5
48000VB(2-2)**	12.50 = 200 ozf-in	1.412	25.00 = 400 ozf-in	2.825		8,080 ozf-in/rad	2.01X10 <sup>-4</sup>	1.5
48000VB(4-2)**	25.00 = 400 ozf-in	2.825	50.00 = 800 ozf-in	5.650		12,048 ozf-in/rad	3.53X10 <sup>-4</sup>	1.5
48001V(25-0)	25	2.82	50	5.64	0 to ±15,000	2,150	0.034	6
48001V(5-1)	50	5.65	100	11.3	0 to ±15,000	6,030	0.034	6
48001V(1-2)	100	11.3	200	22.6	0 to ±15,000	14,700	0.034	6
48001V(2-2)	200	22.6	400	45.2	0 to ±15,000	18,900	0.034	6
48002V(5-2)	500	56.5	1,000	113	0 to ±15,000	57,900	0.035	7
48002V(1-3)	1,000	113	2,000	226	0 to ±15,000	70,100	0.035	7
48003V(2-3)	2,000	226	4,000	452	0 to ±8,500	260,000	0.15	11
48004V(5-3)	5,000	565	10,000	1,130	0 to ±8,500	580,000	0.19	14
48004V(1-4)	10,000	1,130	20,000	2,260	0 to ±8,500	605,000	0.19	14
48006V(2-4)	20,000	2,260	40,000	4,520	0 to ±8,000	1,800,000	2.3	105
48006V(4-4)	40,000	4,520	80,000	9,040	0 to ±8,000	2,700,000	2.4	105
48007V(5-4)	50,000	5,650	100,000	11,300	0 to ±6,000	5,700,000	2.8	115
48007V(1-5)	100,000	11,300	200,000	22,600	0 to ±6,000	7,100,000	3.0	115
48008V(2-5)	200,000	22,600	400,000	45,200	0 to ±3,600	29,000,000	11.0	150
48008V(375-3)	375,000	42,400	750,000	84,800	0 to ±3,600	38,000,000	11.7	150
48009V(75-4)	750,000	84,700	1,500,000	169,000	0 to ±1,800	115,000,000	205	775
48009V(15-5)	1,500,000	169,000	3,000,000	339,000	0 to ±1,800	136,000,000	212	790
48010V(3-6)	3,000,000	339,000	6,000,000	678,000	0 to ±1,200	221,000,000	567	1,455
48010V(4-6)	4,000,000	452,000	7,350,000	830,000	0 to ±1,200	227,000,000	582	1,475

\*Stiffness is conservatively rated and includes the torsion section and shaft ends. \*\* Has titanium shaft; all others have 15-5PH stainless steel shaft.



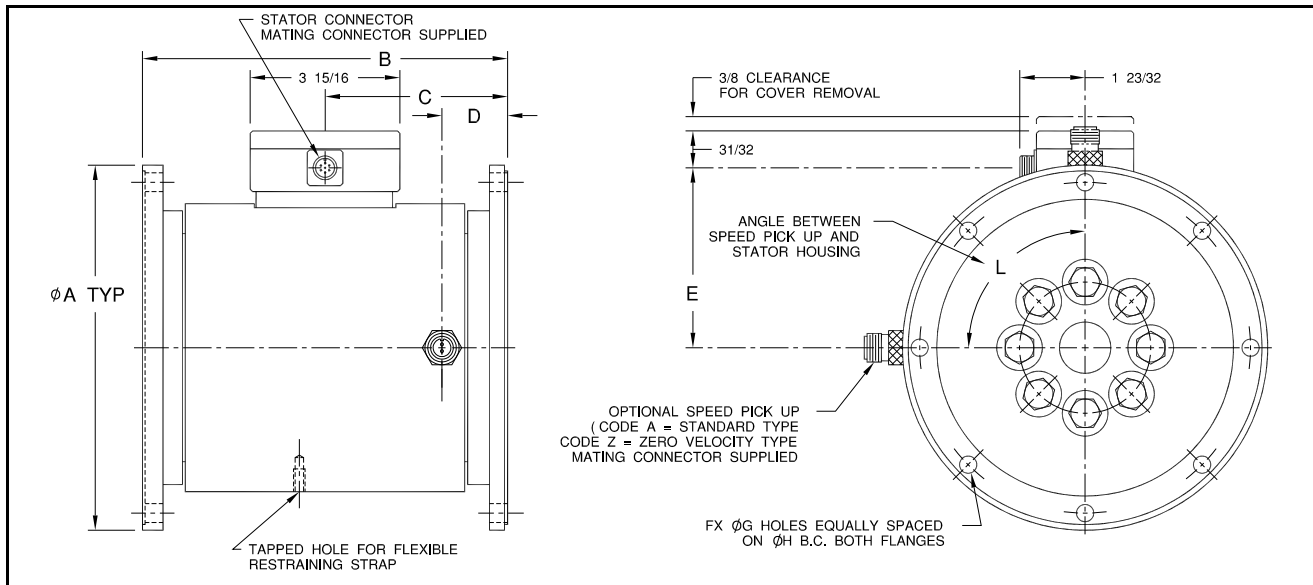
MCRT® MODEL	DIMENSIONS [inches]														
	A	B	C	D <sup>2</sup>	E	F	G	H	L	M	N	P	K	Q	R
48000VB	See Note 1		1.00	0.249/0.248	7/8	2.13	3.25	1.125	5.31	1 11/16	1 3/8	1 1/2	0°	0.156D	2 9/32
48001V	0.187	1.125	1.50	0.625	2.25	5.50	5.50	2.250	8.50	2 11/16	1 1/2	3 15/32	90°	0.406D	4 1/4
48002V	0.187	1.625	2.00	0.750	2.25	5.50	5.50	2.250	9.50	2 11/16	1 1/2	3 15/32	90°	0.406D	4 3/4
48003V	0.250	1.750	2.31	1.000	2.625	6.25	5.50	2.500	10.00	2 31/32	1 1/2	3 31/32	90°	0.406D	5
48004V	0.375	2.750	3.69	1.500	2.625	6.25	5.50	2.500	12.75	2 31/32	1 1/2	3 31/32	90°	0.406D	6 3/8
48006V	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 3	8 1/2
48007V	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 3	9 1/2
48008V	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 1/2	0°	Note 3	12 27/32
48009V	Note 4	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 3	18
48010V	Note 5	12	13.50	9.375	8.50	18.50	20.00	9.750	47.00	9 1/2	8 7/8	17	0°	Note 3	23 1/2

1. Has two 0.75" long flats spaced 90° @ both ends. 2. Tolerance on D diameter is +0.0000/-0.0005 for diameters = < 2.5" and +0.000/-0.001 for diameters = > 2.5".  
3. Slotted 0.531 wide by 1-1/8 long. 4. Dual rectangular keyways at each end are 2" wide by 1.50" high. 5. Dual rectangular keyways at each end are 2.50" wide by 1.75" high.

## Standard Ratings, Compact MCRT® 48000V Series Flanged Models

MCRT® MODEL	TORQUE RANGE		TORQUE OVERLOAD		SPEED RATING [rpm]	SHAFT STIFFNESS* [lbf-in/radian]	ROTATING INERTIA [ozf-in sec <sup>2</sup> ]	MAX WT. [lbs]
	[lbf-in]	[N-m]	[lbf-in]	[N-m]				
48060V(1-3)	1,000	113	2,000	226	0 to ±8,000	602,000	0.6	12½
48060V(2-3)	2,000	226	4,000	452	0 to ±8,000	1,375,000	0.6	12½
48060V(4-3)	4,000	452	8,000	904	0 to ±8,000	2,640,000	0.6	12½
48061V(6-3)	6,000	678	12,000	1,360	0 to ±8,000	2,430,000	0.9	15½
48061V(1-4)	10,000	1,130	20,000	2,260	0 to ±8,000	2,930,000	0.9	15½
48061V(18-3)	18,000	2,030	36,000	4,070	0 to ±8,000	3,530,000	0.9	15½
48070V(24-3)	24,000	2,710	48,000	5,420	0 to ±5,500	6,800,000	8.24	51
48070V(48-3)	48,000	5,420	96,000	10,800	0 to ±5,500	12,200,000	8.27	51½
48070V(96-3)	96,000	10,800	192,000	21,700	0 to ±5,500	17,900,000	8.33	52
48080V(2-5)	200,000	22,600	400,000	45,200	0 to ±3,600	39,200,000	54.5	153
48080V(375-3)	375,000	42,400	750,000	84,800	0 to ±3,600	53,100,000	54.9	155
48090V(75-4)	750,000	84,700	1,500,000	169,000	0 to ±1,800	137,000,000	480	976
48090V(15-5)	1,500,000	169,000	3,000,000	339,000	0 to ±1,800	164,000,000	487	991
48091V(3-6)	3,000,000	339,000	6,000,000	678,000	0 to ±1,200	282,000,000	1,838	1,504
48091V(4-6)	4,000,000	452,000	7,350,000	830,000	0 to ±1,200	292,000,000	1,852	1,518

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



MCRT® MODEL	DIMENSIONS [inches]								
	A	B	C	D	E	F	G	H	L
48060V	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°
48061V	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°
48070V**	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°
48080V	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°
48090V	23 (Flange faces have female pilots*)	31	15 1/2	7 1/8	7 7/8	32	0.755 +0.002/-0.000	20.625	0°
48091V	30 (Flange faces have female pilots*)	37	18 1/2	9 1/8	9 ½	32	1.005 +0.002/-0.000	27	0°

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

\*\*MCRT®48070V flanges mate with Spicer Series 1700/1800 drivelines.

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