

MCRT[®] 48000V Non-Contact DC OPERATED TORQUEMETERS

- ✓ **2X Overload Rating**
- ✓ **Hardened to EMI From Adjustable Speed Drives** (Option G)
- ✓ **Dual Outputs @ ±5 Volts or ±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 or accreditation link at www.nist.gov.
- ✓ **Single Supply Operation** (such as 12 Volt Battery)
- ✓ **NIST Traceable Calibration**
- ✓ **Bidirectional Operation Includes Stall**
- ✓ **Remote Calibration & Balance Free of Cable Effects**
- ✓ **Unexcelled Immunity To Machinery Magnetic Fields**
- ✓ **15-5 PH Stainless Shaft, Splashproof & Corrosion Resistant**



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

Measurement and Control Products Since 1960

Shaft End and Flanged Models

Shaft end torque meters are the choice for most applications. They cost less than flanged models and can be floated or foot mounted. Flanged torque meters 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 torque meter must be installed as a floating shaft*.
* generally a thrust in pounds equal to the torque meters' 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 ¹ Enhanced Performance
Nonlinearity (end point method, % of F.S.):	±0.10	±0.07
Hysteresis (% of F.S.):	±0.10	±0.07
Nonrepeatability (% of F.S.):	±0.06	±0.03
Accuracy (combined nonlinearity, hysteresis and nonrepeatability, % of F.S.):	±0.15	±0.08
Stability, 6 Months (% of F.S.):	±0.20	±0.10
Rotational Effect on Zero (% of F.S.):	±0.05	±0.02
Bidirectional Remote Calibration Accuracy (% of F.S. @ 75 deg. F., traceable to NIST):	±0.05	±0.02
Output Tracking (difference between dual outputs, % of F.S.):	±0.10	±0.05
Temperature Effects:		
Zero (% of F.S./deg. F.):	±0.003	±0.0015
Span (% of Rdg./deg. F.):	±0.003	±0.0015
Compensated Range:		+75 to +175 deg. F.
Minimum Usable Range:		-25 to +185 deg. F.
Storage Range:		-65 to +225 deg. F.
Outputs: Fully bidirectional, dual outputs with common characteristics, as follows		
Clockwise (CW) Torque ² :	Standard: +5 Volts ³ ; Option L: +10 Volts ³	
Counterclockwise (CCW) Torque ² :	Standard: -5 Volts ³ ; Option L: -10 Volts ³	
Minimum Resistive Load:		10 kΩ
Maximum Capacitive Load:		0.05 μF
Overrange ³ (% of F.S.):		±33
Measurement Bandwidth ⁴ :	High Frequency Output ⁵ dc to 500 Hz and, Low Frequency Output ⁵ dc to 1 Hz. Both outputs are present simultaneously.	
Output Noise (rms, % of F.S.):	0.10 at 500 Hz output, 0.01 at 1 Hz output	
Zero Control Range:	±5% of F.S., nominal	
Span Control Range:	±5% of F.S., nominal	
Supply Voltage ⁵ :	Standard: 10.5 to 24 Volts dc; Option L: 18 to 24 Volts dc	
Supply Current ² :	Standard: 85 mA, nominal; Option L: 100 mA, nominal	
Power Supply Effect:	<0.01% of F.S. per volt	

Notes

1. Available on all ranges ≥50 lb-in (5.65 n-m).
2. CW torque causes the torque meter 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 torque meter won't yield below its rated overload torque. Reserve the region between rated and overload torques for unexpected loads; see Bulletin 705.
4. Bandwidth upper limit is determined by integral Bessel response filter. The torque meters' self resonant frequency is > 1 kHz.
5. Fused and reverse polarity protected.
6. "F.S." denotes "Full Scale". "Rdg." denotes "Reading".
7. "deg. F." denotes "degree Fahrenheit".
8. Speed ratings are for continuous, bidirectional operation.
9. These torque meters 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.

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 torque meters. Refer to outline drawing for dimensions.

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

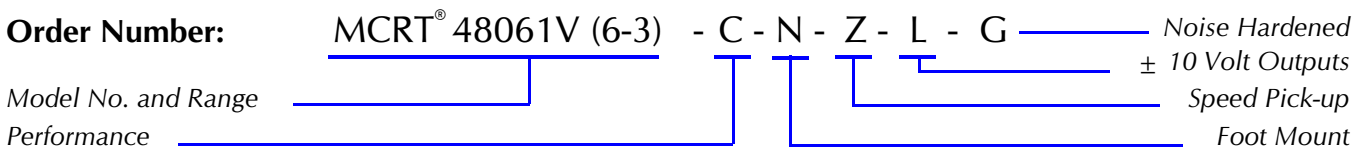
Add Suffix L for optional 10V outputs; requires 18V minimum power.

Speed Pick-up - Code A, Z, or N if None

Outputs 60 pulses/rev except 512 pulses/rev for MCRT 48000V; its maximum pulse rate is 100 kHz. Needs 5 to 15V dc power. Pulse amplitude is approximately the input supply voltage less 0.5 volts.

Option G - Hardened to Severe EMI

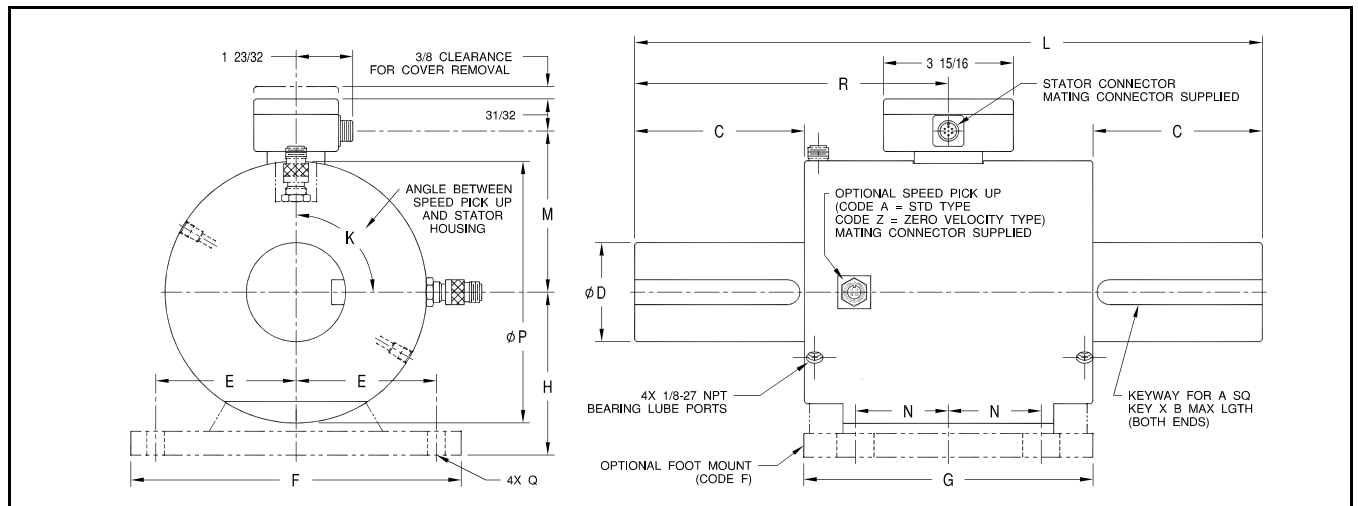
Add Suffix G for optional hardening against severe EMI produced by IGBT-based adjustable speed drives; see Bulletin 708.



Standard Ratings, MCRT® 4800V Series Shaft End Models

MCRT® MODEL	TORQUE RANGE		TORQUE OVERLOAD		SPEED RATING	SHAFT STIFFNESS*	ROTATING INERTIA	MAX WT.
	[lbf-in]	[N-m]	[lbf-in]	[N-m]	[rpm]	[lbf-in/radian]	[ozf-in sec ²]	[lbs]
48000V(1-1)**	0.625 = 10 oz-in	0.071	1.25 = 20 oz-in	0.141	0 to ±25,000	336	1.82X10 ⁻⁴	1.5
48000V(2-1)**	1.25 = 20 oz-in	0.141	2.50 = 40 oz-in	0.283	0 to ±25,000	528	1.83X10 ⁻⁴	1.5
48000V(5-1)**	3.125 = 50 oz-in	0.353	6.25 = 100 oz-in	0.706	0 to ±25,000	1,840	1.87X10 ⁻⁴	1.5
48000V(1-2)**	6.25 = 100 oz-in	0.706	12.50 = 200 oz-in	1.412	0 to ±25,000	4,224	1.93X10 ⁻⁴	1.5
48000V(2-2)**	12.50 = 200 oz-in	1.412	25.00 = 400 oz-in	2.825	0 to ±25,000	8,080	2.01X10 ⁻⁴	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(1-3)	1,000	113	2,000	226	0 to ±8,500	197,000	0.15	11
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.



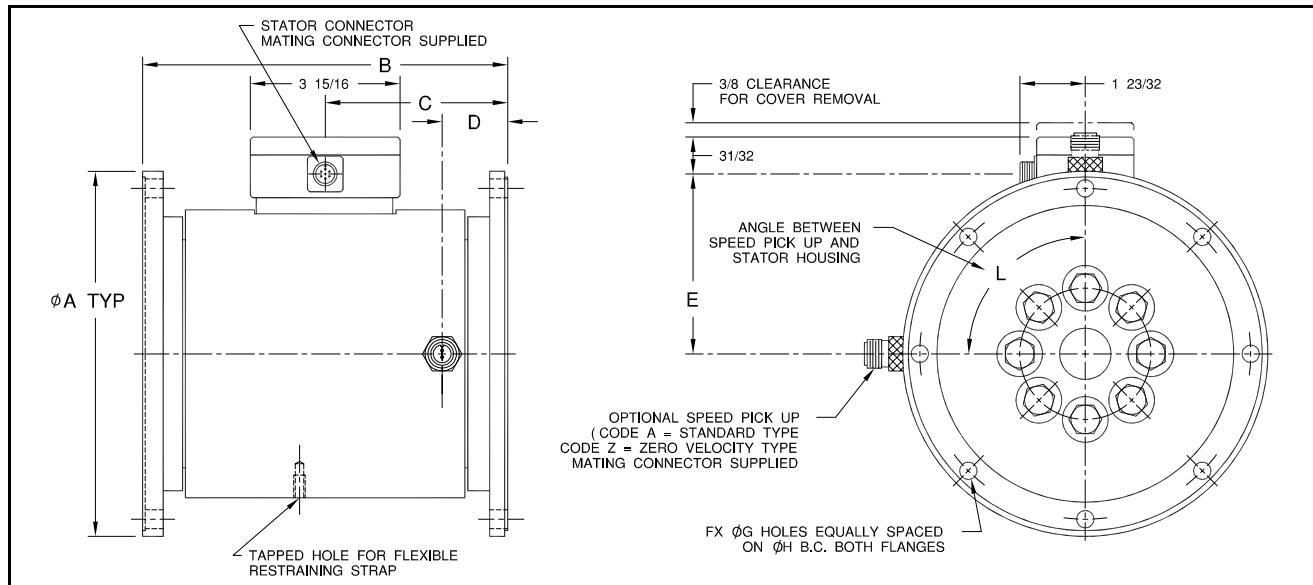
MCRT® MODEL	DIMENSIONS [inches]														
	A	B	C	D ²	E	F	G	H	L	M	N	P	K	Q	R
48000V	See Note 1		1.00	0.249/0.248	7/8	2.13	3.25	1.125	5.31	1 11/16	1 3/8	1 1/2	0°	0.156D	2 9/32
48001V	0.187	1.125	1.50	0.625	2.25	5.50	5.50	2.250	8.50	2 11/16	1 1/2	3 15/32	90°	0.406D	4 1/4
48002V	0.187	1.625	2.00	0.750	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 ²]	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.

Patent Notice Himmelstein torque measurement products are manufactured under one or more of the following U.S. Patents:

RE26,501 3,441,886 3,531,748 3,531,749 3,717,029 3,800,591 3,961,526 4,412,198 4,555,956 4,563,905 4,616,512 4,651,573 4,790,175

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