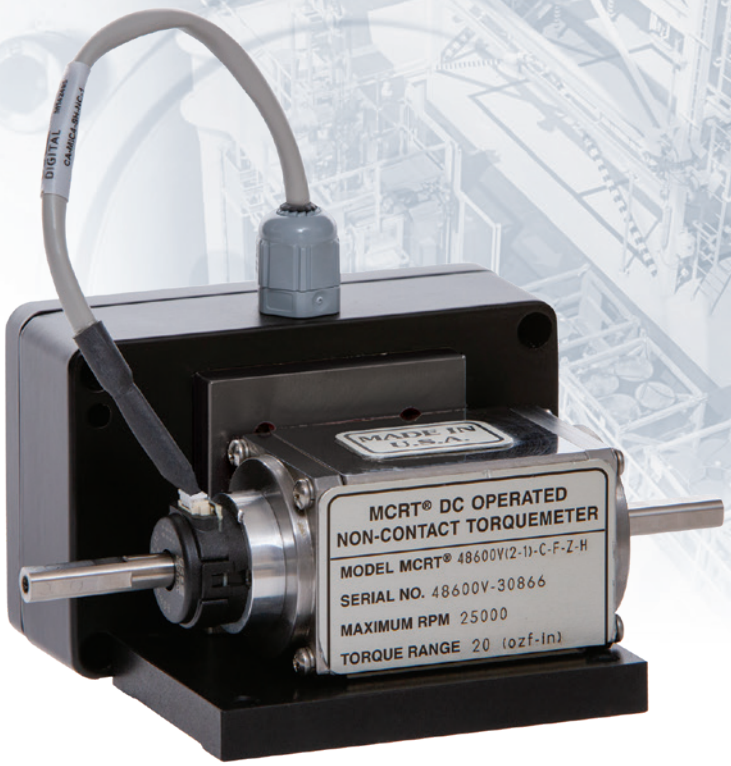
MCRT® 48600V

LOW CAPACITY, NON-CONTACT TORQUE METER

Has Analog and Digital Outputs and The Highest Accuracy, Overload and Overrange Ratings of Any Similar Torque Sensor

Capacities from 10 to 200 ozf-in (0.07 to 1.4 N–m); 25,000 RPM Speed Rating
≤±0.05% Combined Nonlinearity and Hysteresis
1000% Overload on 10 ozf-in (0.07 N-m) Range
150% Overrange
Outputs Torque, Speed & Power in Analog & Digital Form
0.002% Temperature Performance
0.04% 48 Hour Drift
Accredited* ISO/IEC 17025:2017 CW and CCW Cal
Bipolar Rotor Shunt Cal - NIST Traceable*
Hardened to EMI From Adjustable Speed Drives

- **±5.000/±10.000V Analog Outputs of Torque, Speed & Power**
- **Engineering Unit Digital Outputs of Torque, Speed & Power**
- **1 kHz Bandwidth; 13 Constant Delay Signal Filters**
- **Select from 33 Units of Measure Without Re-calibration**
- **Shaft Power Calculated 7800 Times/Second**
- **128 µs Max/Min Data Acquisition**
- **Titanium Shaft, Stainless Steel Housing**



To power and display Torque only, use a Model 703+.
For Torque, Speed and HP, use a Model 733+.

***NIST traceable calibration performed in our accredited laboratory (NVLAP Lab Code 200487-0). For details visit www.himmelstein.com or follow the accreditation link at www.nist.gov.**

These strain gage Torque Meters measure and output ***shaft torque in analog and digital form. Option Z adds shaft speed and shaft power.*** Their outstanding performance is due, in part, to *industries highest Overrange which avoids clipping real-world torque peaks and torsionals. Without high Overrange, clipped peaks cause large errors;* see AN20805B.

High Overload ratings reduce the risk of handling damage to low range models. Also enhancing performance is elimination of pots subject to misadjustment under vibration and by unauthorized users. The Torquemeters are hardened against VFD and other noise sources. ***Bipolar rotor shunt cal verifies operation of the entire data chain in CW and CCW modes.***

Included software displays, plots and stores real-time data on your PC. It also Displays and Stores Max/Min and Spread Data. Choose RS232, RS422, RS485 or USB (option) communication. Input power is a single, unregulated voltage. Reverse polarity protection is provided. Password protection is supported.

Two Performance Grades are offered; Standard (Code N), and Enhanced (Code C). Option Z adds ***conditioned speed and power outputs***. All outputs are simultaneously available in both analog and digital form.

Should the torque, speed or rotor temperature exceed the Torquemeter's ratings, a warning flag(s) is generated. Option Z is required to generate a speed flag.

Common Specifications	Code N, Standard Performance	Code C, Enhanced Performance
Torque and Speed (Option) Scaling	Factory Set @ Torque Capacity and Maximum Speed. Field Resettable to any lower value.	
Power (Option) Range – See Note 1	Factory Set @ the Product of Rated Torque, Speed and a Constant. **It is user re-settable.**	
Units of Measure	Default units are ozf-in and, if Option Z is specified, rpm and watt. Any of 33 supported units may be specified or, selected with a PC and furnished software. See listing on page 3.	
Torque - Combined Nonlinearity[2] and Hysteresis[2] (% of F.S.)	≤±0.1	≤±0.05 Not Available on 10 ozf-in range.
Speed & Power (Option Z) - Combined Nonlinearity[2] and Hysteresis[2] (% of F.S.) (Speed sensor is a 200 PPR encoder.)		
Nonrepeatability[2] (% of F.S.)	Torque and Power: Code N ≤±0.03, Code C ≤±0.02; Speed ≤±0.01	
Zero Drift (% of F.S./deg. F.)	Torque and Power: ≤±0.002 except ≤±0.005 on 10 ozf-in model, Speed : none	
Span Drift (% of Rdg./deg. F.)	Torque and Power: ≤±0.002 except ≤±0.005 on 10 ozf-in model, Speed : none	
48 Hour Drift (% of F.S.)	≤±0.04 except ≤±0.09 on 10 ozf-in model	
Temperature Ranges (deg. F.)	Compensated: +75 to +175; Usable: -25 to +185; Storage: -65 to +225	
Overrange (% of F.S.)	150 except the Analog Output is ±15V max. Combined error ≤0.1% in Overrange.	
Signal Filter Cutoff Frequency[4], Analog and Digital Data	Field selectable from 0.1 to 1,000 Hz in thirteen 1-2-5 steps using furnished software. Torque, and Speed Filters are identical and their cutoff frequencies track. Units are set to 10Hz (default) unless Purchase Order specifies another frequency.	
Analog Output Signals, Auto Scaled	Torque plus Speed and Power with Option Z. All are simultaneously available.	
Full Scale Torque[3] and Power[3]	CW = +10V, CCW = - 10V or, CW = +5V, CCW = - 5V; field changeable (Default = ±10V)	
Full Scale Speed[3]	+10V or +5V for CW and CCW directions; field changeable (Default = +10V)	
Resistive Load	10,000 ohms, Minimum	
Capacitive Load	0.05 uF, Maximum	
Minimum Resolution (% of F.S.)	0.003 for both Analog and Digital Data.	
Data Acquisition Time	Torque & Power: 128 µs, Speed: >240 rpm ≤1.25 ms, <240 rpm: 300/rpm ms.	
Duplex Serial Communications Port Selectable as RS232, RS422 or RS485	Outputs Torque, Speed and Power (option Z) with units of measure. Inputs range selections, scaling and null values, cal info, units of measure, etc. and test parameters.	
BAUD Rate	115,200. Drivers are Short circuit (current limit) and ±15kV ESD protected	
120 Ω Termination (RS422/485)	Software selectable.	
Maximum Cable Length	4,000 feet for RS422 and RS485, 50 feet for RS232	
Supply Voltage[5] and Power	10 to 26 VDC at 2.7 watt, nominal. (Series 700 Instrument compatible.)	
Connector Pinouts	See Page 3 tabulation.	

1. Torque and Speed (option Z) scaling may be re-set at any value less than or equal to the Transducer Full Scale Rating. For example: If the set Torque range is 100 ozf-in, and the set Speed range is 15krpm then Power Range = 100*15000/1,352.25 = 1,109.26 watts = 10V analog output.
2. Assumes torque scale is set to the device torque rating.
3. CW torque causes the shaft to turn CW when viewed from its driven end. CCW torque causes the opposite rotation. Power polarity tracks torque.
4. Torque signal bandwidth upper limit is 1,000 Hz determined by integral Bessel response filters.
5. Reverse polarity protected.
6. "deg. F." denotes "degree Fahrenheit".
7. Specifications are subject to change without notice.

Order No.	MCRT® 48600V	(2-1 ozin)	N	F	Z	H
	Model Number	Range	Performance Code: N or C	Foot Mount: is standard	Speed/Power Option: Z if supplied N when omitted	Max rpm: N for 15,000 H for 25,000
	An MCRT® 48600V(2-1 ozin)NFZH is a 20 ozf-in Torque Meter with Standard Performance, 500% (100 ozf-in) Overload, Foot Mount, Speed/Power option and 25,000 rpm maximum speed rating.					

MCRT® Model	Torque Ratings			Speed Rating	Shaft Stiffness[1]		Rotating Inertia		Total Weight	
	Capacity		Overload							
	[ozf-in]	[N-m]	[% of Full Scale]	[rpm]	[ozf-in/rad]	[N-m/rad]	[ozf-in s²]	[kg-m²]	[lb]	[kg]
48600V(1-1 ozin)[2]	10	0.071	1,000	Code N: 0 to ±15,000	3,000	21.2	161 E-06	1.14E-06	2.4	1.1
48600V(2-1 ozin)	20	0.141	500		3,000	21.2	161 E-06	1.14E-06	2.4	1.1
48600V(5-1 ozin)	50	0.353	400		6,130	43.3	165 E-06	1.14E-06	2.4	1.1
48600V(1-2 ozin)	100	0.706	400	Code H: 0 to ±25,000	9,470	66.9	170 E-06	1.20E-06	2.4	1.1
48600V(2-2 ozin)	200	1.412	200		9,470	66.9	170 E-06	1.20E-06	2.4	1.1

1. Stiffness is conservatively rated and includes the torsion section and shaft-ends.
2. Enhanced Performance is not available on this model.

Supported Units of Measure	
Torque	ozf-in *(default)*, lbf-in , lbf-ft, ozf-ft, N-m, kN-m, N-cm, kgf-m, kgf-cm, gf-cm
Speed	rpm *(default)*, rps, rph, rad/s, rad/min, rad/h, degree/min, degree/s, degree/h, grad/s
Power	hp, hp (metric), kW, W *(default)*, ft-lbf/min, ft-lbf/s, Btu/h, Btu/min, Btu/s, ton, cal/h cal/min, cal/s

Available Cables	
Cable lengths (XX) are 20, 50 and 100 feet. RS232 cables are limited to 50 feet. When purchased without cables, mating connectors are supplied at no added cost.	
Torquemeter to Model 703+ P/N 224-8722-XX	Powers Torquemeter, displays Torque, Implements Model 703+ functions including Remote Cal, Tare, Analog Output, Zero, etc.
Torquemeter to Model 733+ P/N 224-8800-XX	Powers Torquemeter, displays Torque ***and*** Speed, Implements Model 733+ functions including Remote Cal, Tare, Power Calculation, Analog Output, Zero, etc.
Torquemeter to RS422/485 Host P/N 224-8360-XX	Connects Torquemeter to host computer and implements all Torquemeter functions. Requires external power input (10-26 VDC). It is unterminated at host end.
RS485 Torquemeter to Torquemeter P/N 224-8361-XX	Provides Torquemeter interconnect when using RS485 protocol to read and control multiple Torquemeters with a single host computer.
Torquemeter to RS232 PC Port P/N 224-8359-XX	Connects Torquemeter to RS232 host Port. Implements all Torquemeter functions. 50 feet maximum. Use RS422/485 connection in noisy environments or for long runs.

10 Pin Connector Pinout	
Pin A	Invoke CW Cal
Pin B	Tare Data
Pin C	Clear Tare
Pin D	Ground Return
Pin E	+ Power Input
Pin F	Reset Max/Mins
Pin G	Temperature In Rating (will drive users optical relay)
Pin H	Torque In Rating (will drive users optical relay)
Pin J	Speed In Rating (will drive users optical relay)
Pin K	Invoke CCW Cal

Twin 6 Pin Connector Pinout	
Pin A	+ TXD
Pin B	Ground for RS422/485, Open for RS232
Pin C	Ground
Pin D	- RXD or TXD
Pin E	+ RXD or RXD
Pin F	- TXD

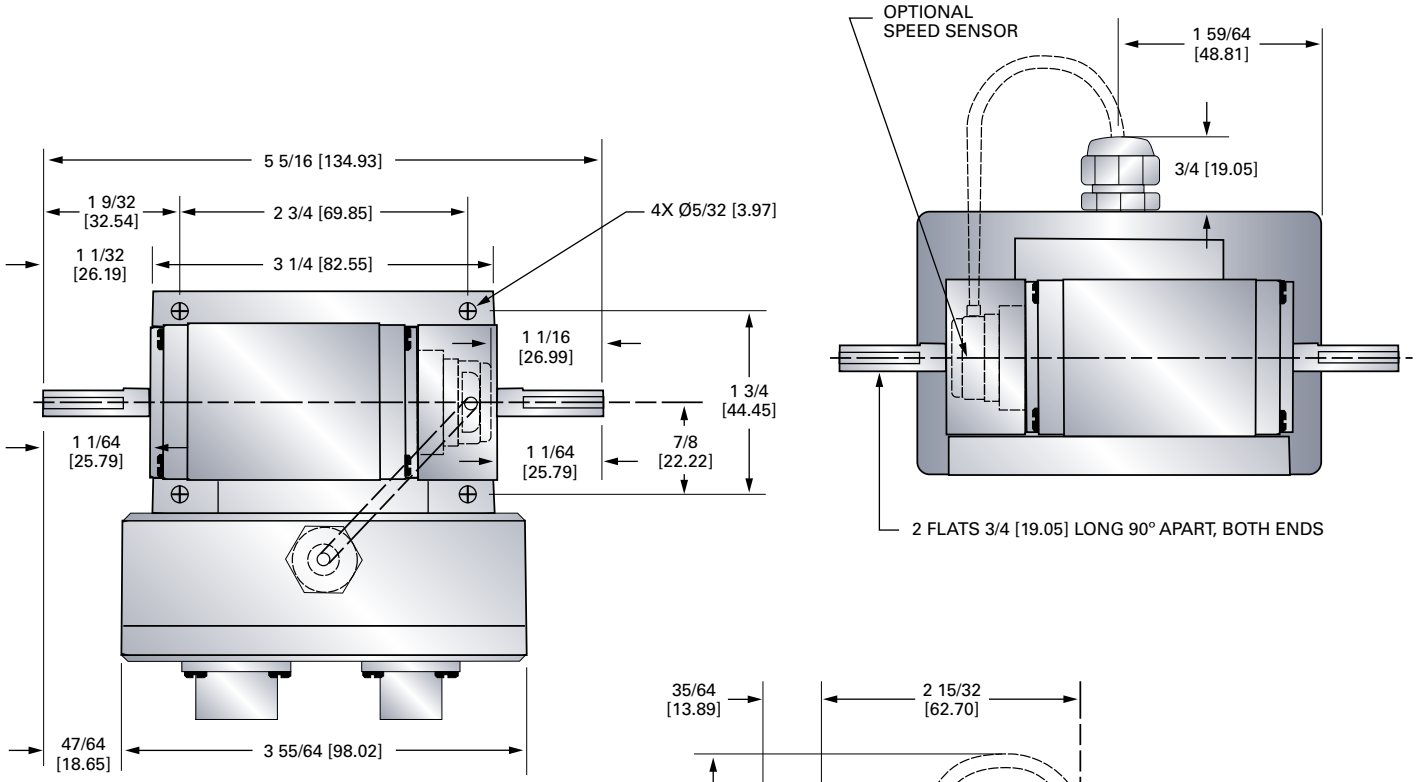
To facilitate RS485 connection of multiple sensors two identical connectors are wired in parallel. Either may be used for RS232 or RS422 service. The terms TXD and RXD apply to RS232 applications. The terms ±TXD and ±RXD apply to RS422 and RS485 applications.

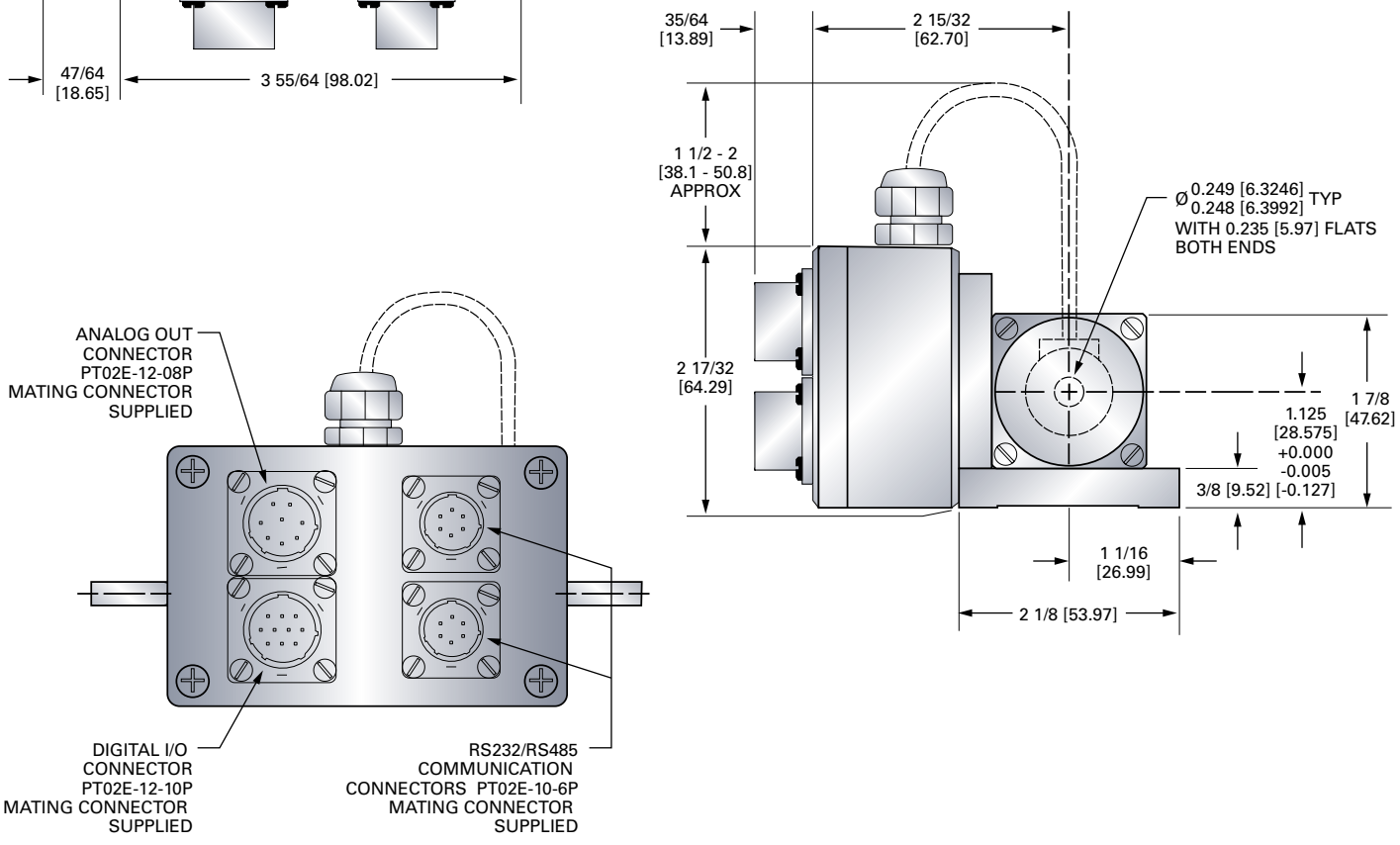
8 Pin Connector Pinout	
Pin A	Speed Analog Out (10.000V)
Pin B	Power Analog Out (10.000V)
Pin C	Analog Ground
Pin D	+ Power Input
Pin E	Invoke CW Cal
Pin F	Invoke CCW Cal
Pin G	Torque Analog Out (10.000 V)
Pin H	Digital Ground/Power Return

Default pinout shown assume Option Z is present. When it is not, default is: Pins A and B are +5V and -5V analog Torque signals, i.e., they provide a differential 10V torque output. Pin G remains a 10V Torque signal. Outputs can be re-assigned to any combination of signals; 2 Torques, one Speed, etc.

Outline Dimensions in inch/[mm]

Dimensions subject to change without notice – contact factory for certified drawings.





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