

MCRT® 88700V Bearingless

Dual-Range Digital Torquemeters

High Ranges: 500 to 100,000 lbf-in (56.5 Nm to 11.3 kNm), Low Ranges: 100 to 20,000 lbf-in (11.3 Nm to 2.26 kNm)

Best Performance under Real - World Conditions

Industries Highest Overage and Overload
World Class Temperature Performance
Greatest Immunity to External Noise
Accredited*, CW and CCW Dead Weight Cal
Bipolar Rotor Shunt Cal
Simple, Non-critical Installation

- **0.05% Accuracy***; **21,000 Samples/Sec.**
- **≥300% and ≥150% Overage**
- **1,000% and 200% Overload**
- **0.0006%/°F Temperature Compensation**
- **FM Output**
- **±5.000/±10.000V Analog Output**
- **RS232, RS422, RS485 Com Ports - Software Included**
- **Works With VFD's, ISM Transmitters and Other Industrial Noise Sources**
- **48µS Max/Min Acquisition, 10 Bessel Data Filters, Tare Function, Rotor Temperature Measurement, Speed Pickup Option**



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

MCRT® 88700V's *measure high and low torques without the cost and inconvenience of swapping two conventional sensors. They also correctly measure average torque when the peak to average torque ratio is high. Thus, avoiding the accuracy loss that occurs when an oversized sensor is used to prevent physical damage.*

They have *high accuracy in real-world applications, not just in the cal lab.* That's due, in part, to *industries highest Overage.* High overrange avoids clipping real-world torque peaks and driveline torsionals. *Without high Overage, clipped peaks produce large errors¹.*

World class temperature performance greatly reduces drive heating and gradient errors and avoids Low Range accuracy degradation. Further enhancing real-world performance is very high stiffness and low deflection, exceptional

1. See Application Note 20805B for details.

hardening to EMI from Variable Frequency Drives, other industrial noise sources and ISM devices - see Bulletin 8700.

Each range is calibrated CW and CCW and documented by a NVLAP approved Calibration Certificate certifying NIST traceability and that our laboratory operation and quality management system meet ISO/IEC 17025:2005. A *bi-directional rotor shunt cal* verifies the entire CW and CCW data chains. It may be invoked from switches, I/O lines or your computer. You can select from ten units of measure without re-calibration.

Included software interfaces Windows-based PC's. It displays and plots real time data, selects 5V or 10V output, torque range, filter cutoff frequency, FM center frequency, units of measure, calls calibration, tare, reset max/mins, saves data and test setups, etc.

S. HIMMELSTEIN AND COMPANY

Designing and making the worlds best torque instruments since 1960

STANDARD RANGES MCRT® 88700V DUAL-RANGE BEARINGLESS DIGITAL TORQUEMETERS

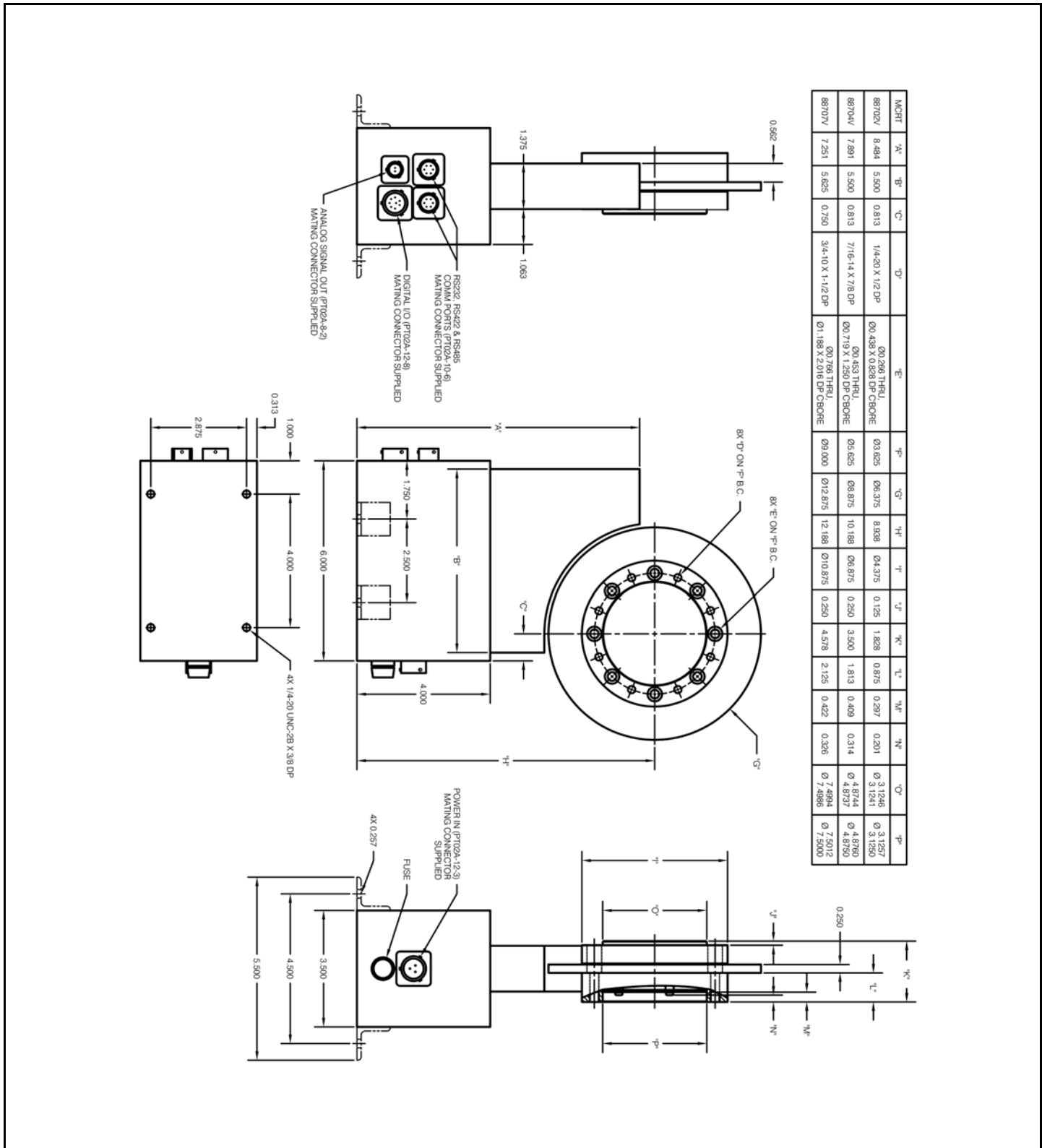
MCRT® MODEL	HIGH RANGE			LOW RANGE			ALL RANGES						ROTOR WEIGHT
	TORQUE RANGE		MAXIMUM DEFLECTION	TORQUE RANGE		MAXIMUM DEFLECTION	MAXIMUM SPEED	TORSIONAL STIFFNESS	ROTATING INERTIA	MAX THRUST	MAX BENDING	MAX SHEAR	
	(lbf-in)	(Nm)	(degree)	(lbf-in)	(Nm)	(degree)	(rpm)	(lbf-in/rad)	(ozf-in s ²)	(lbf)	(lbf-in)	(lbf)	
88702V(1-3)	1,000	113	0.021	200	22.6	0.004	15,000	2.77X10 ⁶	0.67	1,000	500	250	6
88704V(2-3)	2,000	226	0.007	400	45.2	0.0014	13,500	1.61X10 ⁷	7.2	2,000	1,000	400	28
88704V(5-3)	5,000	565	0.014	1,000	113	0.0028	13,500	2.04X10 ⁷	7.2	4,000	2,000	800	28
88704V(1-4)	10,000	1,130	0.021	2,000	226	0.0042	13,500	2.73X10 ⁷	7.2	7,000	3,500	1,000	28
88707V(2-4)	20,000	2,260	0.004	4,000	452	0.0008	10,000	2.87X10 ⁸	59	10,000	5,000	2,000	94
88707V(5-4)	50,000	5,650	0.009	10,000	1,130	0.0019	10,000	3.09X10 ⁹	59	20,000	10,000	4,000	94
88707V(1-5)	100,000	11,130	0.018	20,000	2,260	0.0036	10,000	3.20X10 ⁹	59	30,000	15,000	5,000	94
ALL MODELS: TORQUE OVERLOAD RATING IS 200% OF THE HIGH RANGE													
To convert lbf-in to Nm multiply by 0.112985													
To convert Nm to lbf-in multiply by 8.85073													

SUPPORTED UNITS OF MEASURE (lbf-in and °F are the default units)	
Torque	lbf-in, lbf-ft, ozf-in, ozf-ft, N-m, kN-m, N-cm, kgf-m, kgf-cm, gf-cm
Temperature	°F, °C

Order Number	MCRT® 88702V	(1 - 3)	C	O
	Model No. From Table	High Range	<u>Performance Code</u> N if Standard, C if Enhanced	<u>Speed Pickup Option</u> Z if magnetic, O if optical, N if none
An MCRT® 88702V(1-3)CO is a 1,000 lbf-in High Range Torquemeter with a 200 lbf-in Low Range, Enhanced Performance and with an installed Optical Speed Pickup.				

General Specifications	Standard, Code N Performance		Enhanced, Code C Performance	
	High Range	Low Range	High Range	Low Range
Torque ¹ Combined Linearity & Hysteresis (% of Range)	≤±0.1		≤±0.05	
Torque Nonrepeatability (% of Range)	≤±0.05	≤±0.07	≤±0.020	≤±0.05
Zero Drift Torque (% of Range/°F)	≤±0.001	≤±0.005	≤±0.0006	≤±0.003
Span Drift Torque (% of Reading/°F)	≤±0.002		≤±0.001	
Temperature Ranges (°F)	Compensated: +75 to +175, Useable: - 25 to +185, Storage: - 65 to +225			
Rotor-to-Stator Maximum Misalignment (inch)	Axial: ±0.4, Radial:0.3 with or without Code O Optical Pickup. If Code Z Magnetic Pickup is used, radial alignment must be held within ±0.020 and axial alignment within ±0.040.			
Analog Torque Output (Auto-Scaled): Maximum Load	CW ² : +10.000 volts or, + 5.000 volts - user selectable (default = +10.000 V). CCW ² : - 10.000 volts or, - 5.000 volts - user selectable (default = - 10.000 V). ≥10 kΩ Resistive, ≤0.05 uF Capacitive			
Frequency Modulated Output (Auto-Scaled)	10±5 kHz, 20±10 kHz or 40±20 kHz; software changeable. TTL square wave format.			
Constant Delay Torque Signal Filters	Field selectable from 1 to 1,000 Hz in ten 1-2-5 steps plus 3 kHz using furnished software.			
Minimum Overrange ³ - Applies to All Outputs	≥150% of High Range and ≥300% of Low Range except Analog Output is limited to ±15V.			
Output Noise, All Outputs (% of Range)	<0.01 at 1 Hz, <0.01 at 10 Hz, <0.015 at 100 Hz and < 0.05 at 1 kHz.			
System Response	Torque is sampled at 21 kHz. Analog output bandwidth is 3 kHz, reducible by filtering.			
System Resolution	High Range: ≥0.01% on all outputs. Internal data resolution is 24 bits. Low Range: ≥0.025% of range (≥0.005% of High Range) on all outputs.			
RS232, RS422, RS485 Com Port Interface Software Baud Rate Maximum Cable Length	Duplex port outputs Torque and Temperature with units of measure. Inputs Range, filter selection, ±5 or ±10V analog output, calls cal, tare, clear tare, reset max/min, save data, etc. Provided. Interfaces with Windows based PC. Includes interconnect cable to PC. 115,200 Baud. Drivers are short circuit (current limit) and ±15 kV ESD protected. RS232 = 50 feet, RS422/485 = 4,000 feet; 120 ohm termination may be accessed via software.			
Rotor-to-Stator Data Transfer Rate	1.25 MBaud.			
I/O Lines (user definable)	5 input and 2 output all user assignable. Input defaults are +CAL, - CAL, TARE, CLEAR TARE, TOGGLE RANGE. Output lines are FM Torque Out and Data OK.			
Bi-polar Rotor Shunt Cal Enable	From Stator Switches (one CW and one CCW), via I/O, or PC Com Port using furnished software.			
Range Select	Accomplished via Com Port (software supplied) and Toggle Range I/O Line.			
Range Indicator	The selected Range is output via the Com Port and displayed on the computer screen by the supplied software. Additionally, whenever the LOW Range is selected, the Data LED is periodically dimmed.			
Stator Keypad Control Switches	+ Cal invokes CW Rotor Shunt Cal, - Cal invokes CCW Rotor Shunt Cal, holding both for 5 seconds invokes TARE.			
Status LEDs (on Stator Keypad)	Power (Yellow = Power-up, Green = OK, Red = Fault); Data (Green = OK, Red = Data Error); Rotor Temperature (Green = In Operating Range, Red = Out of Operating Range).			
Rotor Temperature Measurement	Output via Com Port. Measurement range is 0 to 185 °F. Accuracy is ±2 °F, nominal.			
Speed Pick Up Options	30 to 60 pulse/revolution (model dependent) Zero Velocity Speed Pickups. Code O specifies Optical Pickup. Code Z specifies Magnetic Pickup, which, if used, limits rotor-stator misalignment; see above.			
Supply Voltage/Power Input ⁴	10 to 26 VDC @ 6 W with rotor aligned to 10 W with maximum misalignment.			
Start-up Input Current	<1 A			

- Each torque range is factory calibrated and documented in the Calibration Certificates accompanying the Torquemeter. The Certificate also documents NIST traceability. Although the system allows setting any range less than the HIGH range, if it is a non-calibrated range you won't have either certified results or be assured of their accuracy.
- CW torque causes the shaft to turn CW when viewed from its driven end. CCW torque causes the opposite rotation.
- Data is linear to the Overrange specified. Caution: the Torquemeters have infinite fatigue life for full reversals equal to one half their Overload Rating or, their High Range torque rating. Knowingly operating above that value risks a fatigue failure. Fatigue is not an issue on the Low Range which can sustain a 1,000% Overload (of its range) without a failure.
- Fused and reverse polarity protected.
- All outputs are fused. Digital inputs are reverse polarity and overvoltage protected.
- Specifications are subject to change without notice.



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