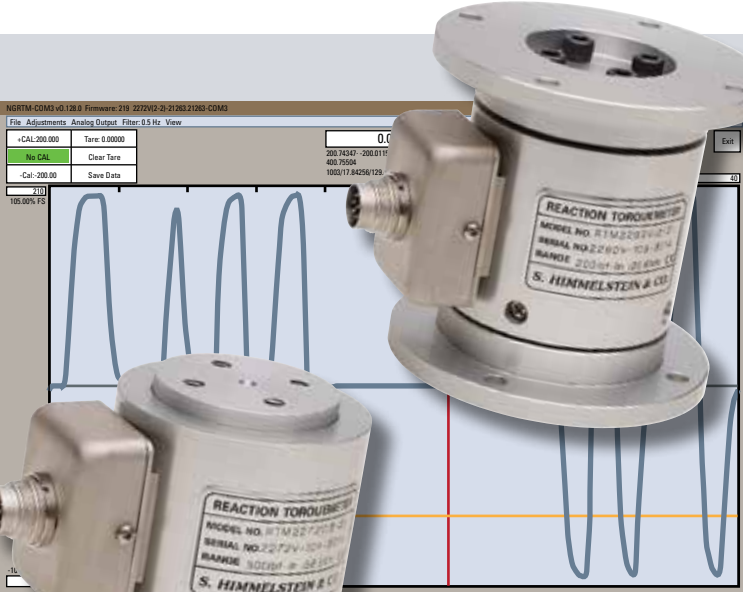


## SERIES 2270V/2280V

# HIGH PRECISION REACTION TORQUEMETERS HAVE ANALOG AND DIGITAL OUTPUTS

The Best Performance of Any Similar Flanged Reaction Torquemeter, Torque Sensor, or Torque Transducer



- 10 lbf-in to 100,000 lbf-in Ranges (2270V) (1.13 to 11,300 N-m)
- 10 lbf-in to 750,000 lbf-in Ranges (2280V) (1.13 to 84,700 N-m)
- 200% (2X) Overload Rating
- 150% Overrange Rating
- 0.05% Combined Nonlinearity & Hysteresis
- No Bearings, No Speed Limit
- Remote Bi-directional Shunt Calibration
- RS232 Communication
- PC Interface Software Included
- 0 to ±10.000 Volt Analog
- 11 Bessel Response Data Filters
- No Manual Adjustments
- NIST Traceable\* Bi-directional Calibration

Series 2270V/2280V Torquemeters have high accuracy, high torsional stiffness, and low deflection. Overload capacity is twice rated torque. All are calibrated CW and CCW to rated load in our NVLAP\* accredited laboratory. There are no pots or other parts subject to misadjustment during vibration or by unauthorized users. You can select any of 10 units of Measure without recalibrating.

Analog and digital outputs are simultaneously available. Use the RS232 port with furnished software or write your own. The Torquemeter has low drift, exceptional temperature performance, and 150% Overrange. Without High Overrange, clipped peaks cause large errors\*\*.

Calibration, Tare and Zero may be invoked via control lines or your computer. Use any of 11 Bessel filters for signal processing. Use your PC to *Display Current, Max, Min and Spread Data, to Save and Plot Data and to Store Test Settings.*

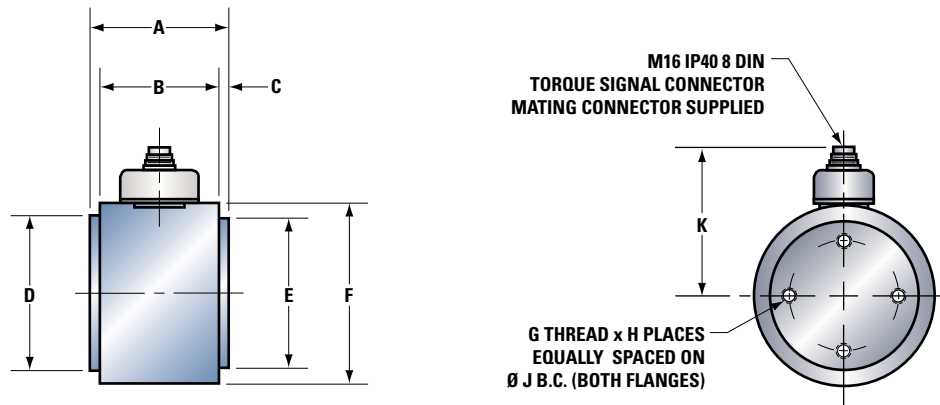


**The Model 703 or 733 displays one or two channels of torque respectively. See Bulletin 374.**

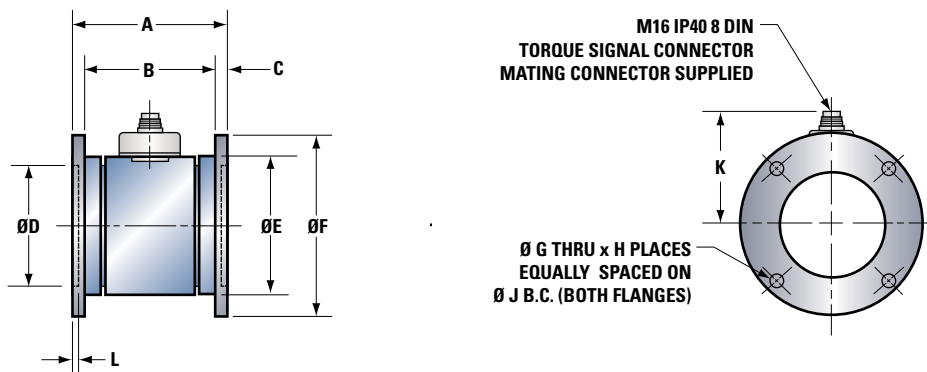
\* To review our NVLAP Certificate of Accreditation and its Scope, see our website or follow the "Laboratory Accreditation" link at [www.nist.gov](http://www.nist.gov).

\*\* See Application Note 20805B

Outline Dimensions – Inches



MODEL	A	B	C	D ± .001	E ± .001	F	G THREAD	H	J ± .005	K
2271	2 1/8	1 7/8	1/8	1.375	1.250	2	#10-32 UNF-2B	2	.750	2 1/2
2272	2 3/4	2 3/8	3/16	2.000	1.875	2 3/4	1/4-20 UNC-2B	4	1.250	2 7/8
2273	3 1/2	3	1/4	3.875	3.750	4 1/2	3/8-24 UNF-2B	4	2.750	3 3/4
2274	4 1/2	3 3/4	3/8	5.375	5.250	6	7/16-20 UNF-2B	8	4.000	4 1/2
2275	5 1/2	4 3/4	3/8	7.375	7.250	8	5/8-18 UNF-2B	12	5.750	5 1/2



MODEL	A	B	C	D	E	F	G	H	J ± .005	K	L
2281	3	2.582	.209	—	2	2.9988/2.9981	13/64	2	2.500	2 1/2	—
2282	3 7/8	3.325	.275	—	2 3/4	3.8736/3.8727	17/64	4	3.313	2 7/8	—
2283	5 1/8	4.299	.413	—	4 1/2	5.9984/5.9974	25/64	4	5.250	3 3/4	—
2284	6 1/2	5.538	.481	—	6	7.6855/7.6843	29/64	8	6.844	4 1/2	—
2285	8 1/4	6.875	.688	—	8	10.2475/10.2463	41/64	12	9.125	5 1/2	—
2286	10 1/2	6.500	2.000	6.002/6.000	8	14	1.020	8	11.000	5 1/2	.313
2287	10 1/2	6.500	2.000	6.002/6.000	8	15	1.520	8	12.000	5 1/2	.313

### Standard Ratings, Series 2270V High Precision, Reaction Torquemeters

Model No.	Torque Range		Torque Overload		Torsional Stiffness (Flange-Face-Face)		Weight		Maximum Extraneous Loads*					
	(lbf-in)	(N-m)	(lbf-in)	(N-m)	(lbf-in/rad)	(N-m/rad)	(lb)	(kg)	Thrust		Bending		Shear	
									(lbf)	(N)	(lbf-in)	(N-m)	(lbf)	(N)
2271V(1-1)	10	1.13	20	2.26	650	73.5	0.65	0.294	40	180	10	1.13	10	4.45
2271V(2-1)	20	2.26	40	4.52	1,800	203			80	356	20	2.26	20	90
2271V(5-1)	50	5.65	100	11.3	7,400	836			200	900	50	5.65	50	222
2272V(1-2)	100	11.3	200	22.6	13,400	1,510	1.4	0.61	100	445	50	5.65	50	222
2272V(2-2)	200	22.6	400	45.2	37,500	4,240			200	900	100	11.3	100	445
2272V(5-2)	500	56.5	1,000	113	145,000	16,400			500	2,220	250	28.2	250	1,110
2273V(1-3)	1,000	113	2,000	226	270,000	30,500	8.1	3.69	1,000	4,450	500	56.5	500	2,220
2273V(2-3)	2,000	226	4,000	452	775,000	87,600			2,000	9,000	1,000	113	1,000	4,450
2273V(5-3)	5,000	565	10,000	1,130	3,000,000	339,000			5,000	22,200	2,500	282	2,500	11,100
2274V(1-4)	10,000	1,130	20,000	2,260	2,000,000	226,000	20.0	9.1	10,000	44,500	5,000	565	5,000	22,200
2274V(2-4)	20,000	2,260	40,000	4,520	5,000,000	565,000			20,000	90,000	10,000	1,130	10,000	44,500
2275V(5-4)	50,000	5,650	100,000	11,300	13,000,000	1,470,000	41.0	18.6	50,000	222,200	25,000	2,820	25,000	111,000
2275V(1-5)	100,000	11,300	200,000	22,600	33,000,000	3,730,000			100,000	445,000	50,000	5,650	50,000	222,000

\* See Bulletin 770 for definition of extraneous loads.

### Standard Ratings, Series 2280V Precision, Reaction Torquemeters

Model Number	Torque Range		Torque Overload		Torsional Stiffness (Flange Face-To-Face)		Weight		Maximum Extraneous Loads*					
	(lbf-in)	(N-m)	(lbf-in)	(N-m)	(lbf-in/rad)	(N-m/rad)	(lb)	(kg)	Thrust		Bending		Shear	
									(lbf)	(N)	(lbf-in)	(N-m)	(lbf)	(N)
2281V(1-1)	10	1.13	20	2.26	650	73.5	1.06	0.481	40	178	10	1.13	10	44.5
2281V(2-1)	20	2.26	40	4.52	1,800	203			80	356	20	2.26	20	90
2281V(5-1)	50	5.65	100	11.3	7,400	836			200	890	50	5.65	50	222
2282V(1-2)	100	11.3	200	22.6	13,400	1,510	2.3	1.04	100	445	50	5.65	50	222
2282V(2-2)	200	22.6	400	45.2	37,500	4,240			200	890	100	11.3	100	445
2282V(5-2)	500	56.5	1,000	113	145,000	16,400			500	2,220	250	28.2	250	1,110
2283V(1-3)	1,000	113	2,000	226	270,000	30,500	17	7.71	1,000	4,450	500	56.5	500	2,220
2283V(2-3)	2,000	226	4,000	452	775,000	87,600			2,000	8,900	1,000	113	1,000	4,450
2283V(5-3)	5,000	565	10,000	1,130	3,000,000	339,000			5,000	22,200	2,500	282	2,500	11,100
2284V(1-4)	10,000	1,130	20,000	2,260	2,000,000	226,000	35.9	16.3	10,000	44,500	5,000	565	5,000	22,200
2284V(2-4)	20,000	2,260	40,000	4,520	5,000,000	565,000			20,000	89,000	10,000	1,130	10,000	44,500
2285V(5-4)	50,000	5,650	100,000	11,300	13,000,000	1,470,000	82.2	37.3	50,000	222,000	25,000	2,820	25,000	111,000
2285V(1-5)	100,000	11,300	200,000	22,600	33,000,000	3,730,000			100,000	445,000	50,000	5,650	50,000	222,000
2286V(3-5)	300,000	33,900	600,000	67,800	103,000,000	11,600,000	220	99.8	55,000	245,000	120,000	13,600	44,000	195,000
2286V(5-5)	500,000	56,500	1,000,000	113,000	139,000,000	15,700,000			80,000	356,000	200,000	22,600	56,000	245,000
2287V(6-5)	600,000	67,800	1,200,000	136,000	189,000,000	21,400,000	252	114	90,000	400,000	240,000	27,100	95,000	423,000
2287V(75-4)	750,000	84,700	1,500,000	170,000	209,000,000	23,600,000			105,000	467,000	300,000	339,000	115,000	512,000

\*See Bulletin 770 for definition of extraneous loads.

<b>Order Number</b>	<b>2283VC(5 - 3)</b>	<b>A 2283VC(5-3) is a 5,000 lbf-in Torquemeter with Enhanced Performance</b>	<b>Model # from table with Performance Suffix; N or C.</b>
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## Specification

Full Scale Analog Output: (volts).....	<b>± 10.000<sup>1,8</sup></b>	48 Hour Drift (% of Range).....	≤ ± <b>0.03</b>
Allowable Loads:.....	<b>10 kΩ, 0.05 μF</b>	Compensated Temperature Range:.....	+ <b>75 to + 175 °F</b>
Selectable Bessel Data Filters:.....	<b>0.2 to 500 Hz. In 1-2-5 steps</b>	Usable Temperature Range:.....	- <b>40 to + 185 °F</b>
Com Port:.....	<b>RS232, at 38.4 kB</b>	Overrange: (% of Range).....	<b>150</b>
Sampling Rate: (kHz).....	<b>8</b>	Nonlinearity in Overrange: (% of Range).....	≤ <b>0.1</b>
Measurement Bandwidth: (Hz).....	<b>500</b>	Supply Voltage:.....	<b>10 to 26VDC, reverse polarity protected.</b>
System Resolution: (% of Range).....	≤ <b>0.005</b>	Supply Power: (W).....	≤ <b>0.5</b>
Combined Nonlinearity & Hysteresis: (% of Range)		Overvoltage Protection:.....	<b>Power In, Analog Out, Control Lines</b>
Standard (Code N).....	≤ <b>0.1<sup>2</sup></b>	Pinout:.....	1. <b>+ Cal<sup>3</sup></b> .....
Enhanced (Code C).....	≤ <b>0.05<sup>2</sup></b>		2. <b>RXD</b> .....
<i>Code C is not available above 100,000 lbf-in</i>			3. <b>Analog Ground</b> .....
Nonrepeatability: (% of Range).....	≤ <b>+ 0.02</b>		4. <b>TXD</b> .....
Zero Drift: (% of Range/ ° F).....	≤ ± <b>0.001</b>	Selectable Units of Measure:.....	5. <b>Analog Out</b>
Span Drift: (% of Reading/°F).....	≤ ± <b>0.002</b>		6. <b>Tare<sup>4</sup></b>
			7. <b>+ Power</b>
			8. <b>Ground</b>
			..... <b>lbf-in, lbf-ft, ozf-in, ozf-ft, N-m,</b>
			..... <b>kN-m, N-cm, kgf-m, kgf-cm, g-cm</b>

## Specification Notes

1. May be re-set, via com port, to any value between 1 and 10 volts.
2. Based on best fit line; see Technical Memorandum 230104.
3. Invoke bi-directional Cal via the com port.
4. Clear Tare via com port; see Note 7.
5. Invoke Tare function is also available via com port.
6. Invoke Zero via com port or ground both pins 1 & 6.
7. Cycling Power Off/On Clears Tare and Resets Max/Min's.
8. Analog outputs are short circuit protected.
9. Specifications are subject to change without notice.

## Series 2270/2280

<b>Available Cables</b>	Cable lengths (XX) are 20, 50 and 100 feet. If sold without cables, a mating connector is supplied.
<b>P/N 224-8636-XX 2270V/2280V to Model 703</b>	Powers Torquemeter, Displays torque, Implements Model 703 functions including Remote Cal. Zero, etc.
<b>P/N 224-8840-XX 2270V/2280V to RS232 + C/F DAQ</b>	Connects Torquemeter to Host. 6 unterminated lines for C/F Power & DAQ. 50 feet max. length.
<b>P/N 224-8841-XX 2270V/2280V to PC RS232 &amp; 703</b>	Connects Torquemeter to Host Port. Powers 2280V, displays Torque and implements all 703 functions. 50 feet maximum length.

## S. Himmelstein and Company

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