Series 2200 PRECISION, SOLID FLANGED REACTION TORQUEMETERS



- 10 ozf-in to 100,000 lbf-in capacities (0. 07 to 11,300 N-m)
- 200% (2X) overload rating
- no bearings or speed limit
- short length with high stiffness
- 15-5PH stainless and aluminum alloy sensing elements
- mV/V or 0 to ±10 Volt output
- NIST traceable* bidirectional calibration
- low cost

* To review our NVLAP Certificate of Accreditation and its Scope, see our website or follow the "Laboratory Accreditation" link at www.nist.gov.

Series 2200 torquemeters are characterized by high accuracy, high torsional stiffness, and low torsional deflection. Their overload capacity is twice rated torque. They handle large extraneous loads with low crosstalk (1% typical). All models are calibrated CW and CCW to rated load in our NVLAP* accredited laboratory, NVLAP Lab Code 200487-0. A NVLAP approved Calibration Certificate documenting NIST traceability is furnished.

Low capacity units have aluminum alloy torsion elements. Larger units employ 15-5PH elements; a high strength stainless steel with outstanding transducer properties. See Bulletins 770 and 7070 for a discussion of reaction torque measurement theory and extraneous load definitions.

Choose a mV/V or ±10V output. An M Suffix denotes a mV/V output. A V Suffix denotes a ±10V output. V Suffix sensors have remote calibration. Specify the type by substituting an M or V for the underscore in the Model Number. Thus, a Model 2205V(1-5) is a 100,000 lbf-in ±10V output unit; the mV/V version is a Model 2205M(1-5), etc. See the overleaf for details.

Performance Specification Notes.

1. *Except 10 ozf-in range; Model 2200M(1-1) is rated 1.3 mV/V (nominal).*
2. *Load Resistance > = 10 kOhm; Source Resistance < 1 Ohm.*
3. *For Suffix M, Bandwidth is determined by external signal conditioner.*
4. *When powered by more than 20 Volts, maximum operating temperature is 160 °F. V Suffix Models have both reverse polarity and thermal protection.*
5. *For M Suffix, excitation is supplied by external signal conditioner. It should be regulated.*
6. *Specifications and dimensions are subject to change without notice.*

Performance Specification

Bridge Impedance: (Ohms, nominal) 350
Output: For M Suffix (mV/V, nominal) . . . . . ±2[1]
For V Suffix (Volts) . . . . . ±10.00[2]
Zero Unbalance: (% of Range) . . . . . ≤±1 (M Suffix), ≤±0.1(V Suffix)
Nonlinearity: (% of Range, End Point Method) . . . . . ≤ ±0.1
Hysteresis: (% of Range) . . . . . ≤ ±0.1
Nonrepeatability: (% of Range) . . . . . ≤±0.05
Calibration Error: (% of Range, @ 75 Degrees°F.) . . . . . ≤±0.05
Measurement Bandwidth[3]:
For M Suffix . . . . . External Conditioner Dependent
For V Suffix . . . . . dc to 500Hz
Zero Drift: For M Suffix . . . . . ≤±0.002 (% of Range/°F)
For V Suffix . . . . . ≤±0.003 (% of Range/°F)
Span Drift: For M Suffix . . . . . ≤±0.002 (% of Reading/°F)
For V Suffix . . . . . ≤±0.003 (% of Reading/°F)
Compensated Temperature Range: . . . . . +75 to +175 °F
Usable Temperature Range: For M Suffix . . . . . - 65 to +225 °F
For V Suffix . . . . . -65 to +185 °F[4]
Control Range: For M Suffix . . . . . External Conditioner Dependent
For V Suffix . . . . . ±10% of Range for Zero & ±5% for Span
Output Signal Polarity With CCW torque through torquemeter
For M Suffix . . . . . positive
For V Suffix . . . . . positive
Note: . . . . . output polarity changes with torque direction
Overrange: For M Suffix . . . . . External Conditioner Dependent
V Suffix Only . . . . . 30% of Range, nominal
Excitation: For M Suffix (ac or dc) . . . . . 15V, max[5]
For V Suffix . . . . 13.5 to 24V dc, unregulated @ 50mA, max[4]
Power Supply Effect: For M Suffix . . External Conditioner Dependent
For V Suffix . . . . . <0.01% of Range per Volt

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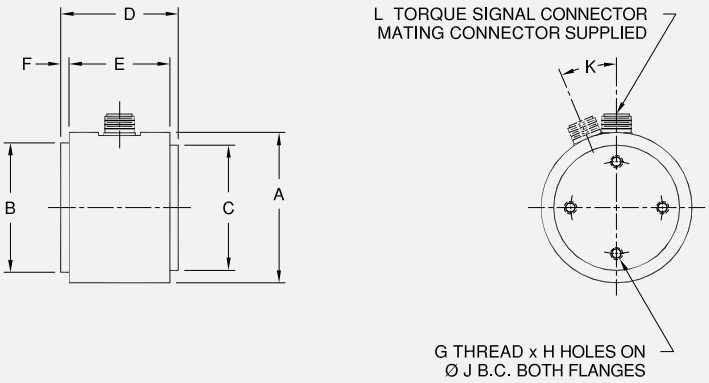
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Standard Ratings, Series 2200 Precision, Solid Flanged Reaction Torquemeters

Model No.[1]	Torque Range		Torque Overload		Torsional Stiffness (from flange face-to-face)		Weight	Maximum Extraneous Loads[2]		
								Thrust (F)	Bending	Shear
	(lbf-in)	*(N-m)*	*(lbf-in)*	*(N-m)*	*(lbf-in/rad)*	*(N-m/rad)*	*(lb)*	*(lbf)*	*(lbf-in)*	*(lbf)*
2200M(1-1)*	0.625 = 10 ozf-in	0.071	1.25 = 20 ozf-in	0.141	560 ozf-in	0.25	0.2	200 ozf	50 ozf-in	25 ozf
2200M(2-1)*	1.25 = 20 ozf-in	0.141	2.5 = 40 ozf-in	0.283	880 ozf-in	0.39		320 ozf	80 ozf-in	40 ozf
2200M(5-1)*	3.125 = 50 ozf-in	0.353	6.25 = 100 ozf-in	0.706	3,200 ozf-in	1.41		600 ozf	150 ozf-in	75 ozf
2200M(1-2)*	6.25 = 100 ozf-in	0.706	12.5 = 200 ozf-in	1.41	9,600 ozf-in	4.24		800 ozf	200 ozf-in	100 ozf
2200M(2-2)*	12.5 = 200 ozf-in	1.412	25 = 400 ozf-in	2.83	27,200 ozf-in	12.0		800 ozf	200 ozf-in	200 ozf
2201M(1-1)*	10	1.13	20	2.26	650	73.5	0.5	40	10	10
2201M(2-1)*	20	2.26	40	4.52	1,800	203		80	20	20
2201M(5-1)*	50	5.65	100	11.3	7,400	836		200	50	50
2202_(1-2)	100	11.3	200	22.6	13,400	1,510	1.2	100	50	50
2202_(2-2)	200	22.6	400	45.2	37,500	4,240		200	100	100
2202_(5-2)	500	56.5	1,000	113	145,000	16,400		500	250	250
2203_(1-3)	1,000	113	2,000	226	270,000	30,500	8	1,000	500	500
2203_(2-3)	2,000	226	4,000	452	775,000	87,600		2,000	1,000	1,000
2203_(5-3)	5,000	565	10,000	1,130	3,000,000	339,000		5,000	2,500	2,500
2204_(1-4)	10,000	1,130	20,000	2,260	2,000,000	226,000	20	10,000	5,000	5,000
2204_(2-4)	20,000	2,260	40,000	4,520	5,000,000	565,000	20	20,000	10,000	10,000
2205_(5-4)	50,000	5,650	100,000	11,300	13,000,000	1,470,000	41	50,000	25,000	25,000
2205_(1-5)	100,000	11,300	200,000	22,600	33,000,000	3,730,000	42	100,000	50,000	50,000

1. In the Model No., substitute for the underscore, an M for a mV/V output, or a V for a 0 to ±10V output. 2. See Bulletin 770 for definition of extraneous loads.
** Asterisked models only available in mV/V (M suffix) version*

Outline Dimensions



MODEL	A	B ±.001	C ±.001	D	E	F	G THREAD	H	J ±.005	K	L CONNECTOR
2200	1 1/2	1.000	0.875	1 1/2	1 3/8	1/16	#4-40 UNC-2B	2	0.563	0°	CONXALL 7282-6PG-300
2201	2	1.375	1.250	2 1/8	1 7/8	1/8	#10-32 UNF-2B	2	0.750	0°	CF 3102E 14S-6P
2202	2 3/4	2.000	1.875	2 3/4	2 3/8	3/16	1/4-20 UNC-2B	4	1.250	0°	CF 3102E 14S-6P
2203	4 1/2	3.875	3.750	3 1/2	3	1/4	3/8-24 UNF-2B	4	2.750	0°	CF 3102E 14S-6P
2204	6	5.375	5.250	4 1/2	3 3/4	3/8	7/16-20 UNF-2B	8	4.000	22.5°	CF 3102E 14S-6P
2205	8	7.375	7.250	5 1/2	4 3/4	3/8	5/8-18 UNF-2B	12	5.750	15°	CF 3102E 14S-6P

Order Number: 2204 V (1-4)

Model No.
Output Code (M = mV/V, V = ±10V)
Range (in lbf-in units)

The above Order Number example specifies a 10,000 lbf-in Solid Flanged Reaction Torquemeter with ±10 Volt output. A mV/V version of the same torquemeter is Model 2204M(1-4).