

SERIES 2300DV ULTRA-PRECISION Torque Transfer Standard

BEST ACCURACY* OF ANY SIMILAR TRANSFER STANDARD



- **Complete, Ultra-Precise Torque Transfer - No Errors From a mV/V Calibrator or Other External Device**
- **Ideally Suited for Accurate Field Calibration of Production Torque Transducers**
- **500/1,000/2,000/5,000/10,000/20,000/50,000 and 100,000 lbf-in Ranges**
- **0.01% Combined Nonlinearity & Hysteresis**
- **0.0003%/°F Temperature Compensation**
- **±10.000V Analog Output**
- **Digital Output of Real Time, Max/Min and Spread Data**
- **PC Interface Software Included**
- **Bi-directional Remote Calibration**
- **200% Overload**
- **150% Overrange**
- **Lowest Sensitivity to Clamping Loads**
- **11 Bessel Response Data Filters**
- **No Manual Adjustments**
- **Select from 10 Units of Measure Without Re-calibrating**

*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.

Series 2300DV Torque Transfer Standards' extreme accuracy and simple installation make them ideally suited for non-rotating calibration of production Torquemeters. Unlike mV/V output Transfer Standards, use of a mV/V Calibrator isn't required, thus, its errors are avoided. Multiple bridges and elegant design provide *high immunity to clamping and other extraneous loads*. High Overrange avoids errors from clipped torque peaks. Furthermore, High Overload reduces the likelihood of damage from operator mistakes.

There are no pots, switches or other parts subject to misadjustment by unauthorized personnel or from vibration. *Bi-directional remote cal* verifies operation of the entire data chain in *CW and CCW modes*. Calibration is invoked via I/O line or from

your computer. Hardening against electromagnetic interference generated by Variable Frequency Drives, ISM transmitters and other industrial noise sources further enhances performance. These devices have very high stiffness, low deflection and provide *exceptional static and dynamic system response*. They are installed without an additional coupling which *preserves driveline stiffness*, and yields a low overhung moment and a short overall length.

Included software interfaces with your Windows-based PC. That software displays Real-time, Maximum/Minimum and Spread Torque, can do Torque versus Time plots and store test results. You can select from 11 Bessel Response Filters and 10 Units of Measure without re-calibrating. Password protection may be invoked. Three performance grades are available.



Table 1

Common Specifications	Performance Grade		
	Code N	Code C	Code J
Torque Range¹	Factory Set @ Full Scale Torque; see Note 1.		
Torque Units of Measure	Select lbf-in, lbf-ft, ozf-in, ozf-ft, N-m, kN-m, N-cm, kgf-m, kgf-cm, gf-cm		
Combined Nonlinearity & Hysteresis² (0 to ±100% of full scale) (Best Fit Line Basis – see Tech Memo 230104)	≤±0.04%	≤±0.02%	≤±0.01%
Ovrange³ (% of Range)	150. Applies to all outputs.		
Repeatability	≤±0.015% of Range	≤±0.01% of Range	
Accuracy Class⁴	0.04	0.036	0.018
Calibration Signal⁵	100.00% of full scale for clockwise and counterclockwise directions		
Zero Drift (% of Range per °F/per °C)	≤±0.001/0.0018	≤±0.0003/0.00054	≤±0.0003/0.00054
Span Drift (% of Reading per °F/per deg °C)	≤±0.002/0.0036	≤±0.002/0.0036	≤±0.001/0.0018
48 Hour Drift (% of Range)	≤±0.03	≤±0.02	
Temperature Ranges (°F/ °C)	Compensated range: +75 to +115/+24 to +46.1 Usable Range: -25 to +185/-32 to +85 Storage Range: -65 to + 225/-54 to +107		
Analog Output Signal, Auto-Scaled	Allowable Load: 10k resistive, minimum; 0.05µF capacitive, maximum.		
Full Scale Torque¹	±10.000V with ±15V Ovrange. User may select ±5.000V with ±7.5V Ovrange.		
Signal Filter Cutoff Frequency	From 0.2 Hz to 500 Hz in 1-2-5 steps. Selected from a remote PC using furnished software.		
Com Port	RS232. Baud rate is 38.4 kB. For USB interface specify Option U.		
Maximum Cable Length	50 feet		
Interface Software Provided	Interfaces with Windows-based PC. Includes 20 foot interconnect cable.		
Pinout	1. +Cal 2. RXD 3. Analog Ground 4. TXD 5. Analog Out 6. Tare ⁶ 7. + Power In 8. Power Return/Digital Ground		
Supply Voltage	10 to 26 VDC		
Supply Power	0.5 watt nominal.		
Ovoltage Protection	Power In, Analog Out, Control Lines		
Available Mating Cables/Connector	Cable lengths (XX) are 20, 50 & 100 feet; RS232 cables are 50 feet max.		
Mating Connector, P/N 320-1306	If ordered without cables, a mating connector is furnished at no added cost.		
Cable, P/N 224-8636-XX 2300DV to Model 703	Powers 2300DV, displays torque, outputs its analog, accepts commands.		
Cable, P/N 224-8840-XX 2300DV to PC RS232 Port + C/F DAQ	Connects digital output to PC and accepts computer generated commands. Six unterminated lines for connection to customer power/control/acquisition.		
Cable, P/N 224-8841-XX 2300DV to PC RS232 Port & Model 703	Connects digital output to PC and accepts computer generated commands. Powers 2300DV, displays Torque, outputs its analog, accepts commands.		

Specification Notes

1. May be re-set via com port to any value between 1 and 10 volts with a resolution of 0.0001 V. Analog Output is short circuit protected.
2. Based on Best Fit Line; see Technical Memorandum 230104.
3. Combined Error in Ovrange <= 0.1% of Full Scale.
4. The greatest of Combined Error, Repeatability, Zero Drift and Span Drift over 18 °F (10 °C) expressed as a percent of Full Scale.
5. CW and CCW Calibrations are invoked via Com Port. Control line (Pin 1) invokes CW Cal.
6. Invoke Tare function is also available via Com Port.
7. Clear Tare via Com Port; also see Note 8 below.
8. Cycling Power Off/On Clears Tare and resets stored Max/Mins.
9. Maxima, Minima and Spread Data (Maxima - Minima) are available via the Com Port.
10. Specifications are subject to change without notice.

Table 2

Model	Torque Rating		Torsional Stiffness	Maximum Angular Deflection	Rotating Inertia	Maximum Extraneous Loads ¹			Max Weight
	Range	Overload				Thrust	Bending	Shear	
English Units	[lbf-in]		[lbf-in/rad]	[degree]	[ozf-in s ²]	[lbf]	[lbf-in]	[lbf]	[lbs]
2302DV(5-2)	500	1,000	527,000	0.054	0.634	500	250	125	5.0
2302DV(1-3)	1,000	2,000	1,480,000	0.039	0.635	1,000	500	250	5.0
2302DV(2-3)	2,000	4,000	4,020,000	0.028	0.638	2,000	1,000	500	5.0
2304DV(5-3)	5,000	10,000	4,560,000	0.063	3.96	3,000	1,500	800	13.3
2304DV(1-4)	10,000	20,000	12,600,000	0.045	3.97	4,000	2,000	1,000	13.4
2304DV(2-4)	20,000	40,000	33,900,000	0.034	3.99	6,000	3,000	2,000	13.5
2307DV(5-4)	50,000	100,000	55,900,000	0.051	29.3	15,000	7,500	4,000	43.3
2307DV(1-5)	100,000	200,000	145,000,000	0.039	29.7	25,000	12,500	5,000	44.1
SI Units	[N-m]		[N-m/rad]	[degree]	[kg-m ²]	[N]	[N-m]	[N]	[kg]
2302DV(5-2)	56.5	113	59,500	0.054	0.00448	2,220	28.2	556	2.3
2302DV(1-3)	113	226	167,000	0.039	0.00448	4,450	56.5	1,110	2.3
2302DV(2-3)	226	452	454,000	0.028	0.00451	8,900	113	2,220	2.3
2304DV(5-3)	565	1,130	515,000	0.063	0.028	13,300	169	3,560	6.0
2304DV(1-4)	1,130	2,360	1,420,000	0.045	0.028	17,800	226	4,450	6.1
2304DV(2-4)	2,260	4,520	3,830,000	0.034	0.028	26,700	339	8,900	6.1
2307DV(5-4)	5,650	11,300	6,310,000	0.051	0.207	66,700	847	17,800	19.6
2307DV(1-5)	11,300	22,600	16,300,000	0.039	0.210	111,000	1,410	22,200	20.0

Notes: 1. Maximum extraneous loads and rated torque may be applied simultaneously without damage.

Order Information

Order Number Format ▶ **A B C D**

- A** = Model Number from table: either 2302DV, 2304DV or 2307DV.
- B** = Range from tables above: (2-4) or (5-4), etc.
- C** = Performance code: N for Standard or, C for Enhanced Performance or J for Ultra Precision Performance.
- D** = USB interface: U, N when omitted.

Order Number Example ▶ **2307DV(1-5)CU** specifies a Torque Transfer Transducer with a 100,000 lbf-in (11.3 kNm) Torque Rating, a 200,000 lbf-in (22.6 kNm) Torque Overload Rating, Enhanced Performance, and a USB Adapter.

