Dyne Systems

DynPro$_2$ System Accuracy / Instrumentation

DynPro$_2$ System Accuracy

Channel	Accuracy Description	% Accuracy After Calibration
Analog Input	The ADC's reference voltage will affect the uncalibrated accuracy of these channels. It has a ± 1.20% initial accuracy and a ± 20 ppm/°C (0.002%) temperature drift. Uncalibrated accuracy: ± 1.42% (0 – 65°C) Calibrated accuracy: ± 0.016% (0 – 65°C) Measurement precision: ± 0.0046% of Full Scale	± 0.5% Full Scale
Frequency Input	In terms of the absolute frequency measurement, the un-calibrated and calibrated accuracy of the frequency channels are the same. Any gain or offset errors from the sensor driving the frequency input can be calibrated out thus adjusting for any sensor errors. Uncalibrated and calibrated accuracy: ± 0.052%	± 0.1% Full Scale
Torque (Load Cell) Channels	The instrumentation amplifier has a ± 1.08% gain error (1% from the gain resistor), and a ± 0.13% potential offset error. The ADC has a potential ± 0.0046% uncertainty from the Integral NonLinearity (INL). Uncalibrated accuracy: ± 1.290% (0 – 65°C) Calibrated accuracy: 0.0685% (0 – 65°C) Measurement precision: ± 0.0046% of Full Scale Typical load cell % accuracy after calibration: Non-linearity - 0.030% Full Scale Output and Hysteresis - 0.020% Full Scale Output	± 0.1% Full Scale
Thermocouple Channels	K-Type thermocouple standard error limit: the greater of ± 2.2°C or ± 0.75% Measurement precision: 12-bits (± 10 LSB) = ± 0.244%	The greater of ± 2.2°C or ± 0.75% Full Scale (In the DynPro$_2$ system, thermocouple channels are not calibrated, but instead are tested to ensure that they meet the NIST thermocouple standard error limit.)
Fuel Measurement System	**Fuel Weight Measurement** Uncalibrated accuracy: ± 1.765% (0 – 65°C) Calibrated accuracy: ± 0.210% (0 – 65°C) Measurement precision: 24-bits (± 0.00000596%) **Fuel Temperature Measurement** Uncalibrated accuracy: ± 1.42% (0 – 65°C) Calibrated accuracy: ± 0.016% (0 – 65°C) Measurement precision: ± 0.0046% of Full Scale	**Fuel Weight Measurement** ± 0.5% Full Scale **Fuel Temperature Measurement** ± 0.5% Full Scale
Baro Sensor Input	26.00 - 31.00 inHg	± 0.04 inHg or ± 2.1 mBar
DAC Output (Programmable Closed Loop Control)	16-Bit, 0-10 Vdc or 4-20mA	± 0.5% Full Scale
PWM Outputs (Programmable Closed Loop Control)	10V, 10Hz – 10kHz PWM	± 0.5% Full Scale
Analog Expansion Channels (via the TDC2002 panels)	The ADC's reference voltage will affect the un-calibrated accuracy of these channels. It has a ± 1.20% initial accuracy and a ± 20 ppm/°C (0.002%) temperature drift. Uncalibrated accuracy: ± 1.27% (0 – 65°C) Calibrated accuracy: ± 0.0165% (0 – 65°C) Measurement precision: ± 0.0046% of Full Scale	± 0.5% Full Scale
Pressure Transducers	Supply Voltage: 5 Vdc ±0.5 Vdc / Signal: 0.5 Vdc to 4.5 Vdc	0°C to 80°C, < 1.00% Full Scale -20°C to 125°C, < 1.50% Full Scale

DynPro$_2$ Accessory Accuracy

Accessory	Model Description	% Accuracy After Calibration		
Blowby Meter	3/4 in. (19 mm) 1 in. (25.4 mm) 2 in. (50.8 mm)	± 2% Full Scale		
Weather Station	Humidity	± 3.5% Relative Humidity		
Intake Airflow Meter	0 - 1,250 SCFM 0 - 2,130 SCFM	± 0.1% of natural span, including non-linerity, Hysteresis, deadband, and non-repeatability		
Opacity Meter	Closed exhaust Open exhaust	The unit's accuracy is ± 1.0% nominal ± one digit. The control unit is initially calibrated under clear stack conditions with checks at 0% and 100% opacity.		
Emissions Analyzer	Testo 350	**Measurement Parameter**	**Accuracy**	**Response Time**
		O_2	± 0.2 Volume %	< 20s (t95)
		CO, H_2 - compensated	± 10 ppm (0...199 ppm) ± 5% of reading (200...2,000 ppm) ± 10% of reading (rest of range)	< 40s (t90)
		CO_{low} H_2 - compensated	± 2 ppm (0...39.9 ppm CO) ± 5% of reading (rest of range)	< 40s (t90)
		NO	± 5 ppm (0...99 ppm) ± 5% of reading (100...1,999 ppm) ±10% of reading (rest of range)	< 30s (t90)
		NO_{low}	± 2 ppm (0...39.9 ppm) ± 5% of reading (rest of range)	< 30s (t90)
		NO_2	± 5 ppm (0...99.9 ppm) ± 5% of reading (rest of range)	< 40s (t90)
		SO_2	± 5 ppm (0...99 ppm) ± 5% of reading (100...1,999 ppm) ± 10% of reading (rest of range)	< 30s (t90)
		H_2S	± 2 ppm (0...39.9 ppm) ± 5% of reading (rest of range)	< 35s (t90)
		CO_2 - (IR)	± 0.3 Vol. % ± 1% of reading (0...25 Vol. %) ± 0.5 Vol. % ± 1.5% of reading (rest of range)	< 10s (t90) heat-up time: < 15 min.
		HC	± 400 ppm (100...4,000 ppm) ± 10% of reading (rest of range)	< 40s (t90)
		Differential Pressure 1	± 1.5% of fmv (-16 to -1 "H_2O) ± 1.5% of reading (rest of range)	-
		Differential Pressure 2	± 1.5% of fmv (-80 to +20 "H_2O) ± 1.5% of reading (rest of range)	-
		Absolute Pressure	± 4 "H_2O	-
		Stack Gas Temp. Thermocouple Type K (NiCr-Ni)	± 39.2°F (-148°F to 392°F) ± 33.8°F (rest of range)	-
		Thermocouple Type S (Pt10Rh-Pt)	± 33.8°F (0°F to 3,200°F)	-
		Combustion air via permanently installed Negative Temperature Coefficient	± 32.36°F (14°F to 122°F) ± 37.4°F Offset	-

Everything you need to succeed

Dyne Systems is a division of Taylor Dynamometer
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