Model 723+ Mechanical Power Instrument
Use With a DC Output Sensor and a Frequency Output Sensor

S. HIMMELSTEIN AND COMPANY   700 Series

259.900 HP   3
9370.50 LB-IN   1

MENU   VIEW   TEST   TARE   HOLD   ESC/RESET   ENTER

CE

Superb instrument for dc output torque, force, and pressure sensors, and frequency producing speed, flow and velocity transducers

- *reads, displays, processes and outputs*
  - *shaft torque, speed, power*
  - *pump/motor head, flow, fluid power*
  - *drawbar force, velocity, power*
- *fast, rock solid readings with high noise immunity*
  - *7,800 samples/sec. for torque, head or drawbar force input*
  - *1 millisecond response for speed, flow or velocity input*
- *6 full digit engineering unit display with user definable legends*
- *RS232/RS422/RS485 serial communication*
- *auto-scaled selectable Voltage or Current analog outputs*
- *no pots, batteries, fans, maintenance, or external power supplies*

These advanced instruments provide engineering unit display of a high level (±1V to ±10V) dc input and a frequency input. They also compute power and perform 21 functions including limits, tare, hold, and max/min capture. You needn't write code or add hardware to be up-and-running a productive test.

The alphanumeric readout can display measured and computed data, units of measure and test status. During setup, it guides you with English language prompts. There are no manual adjustments. To calibrate, enter the full scale value in engineering units and the instrument provides 0.001% display resolution and Voltage or Current (user selectable) analog outputs. The keyboard accesses measured data, held data, max/min data, data spread, limit status, and/or I/O status without test disruption. Password protection may be used, if needed.

The DC signal conditioner has high accuracy and wide signal offset capability; manual adjustments aren't needed. Constant delay, Bessel filters may be used to suppress noise without introducing overshoots or distortion. Frequency is processed with a proprietary algorithm that achieves both

fast response and 0.01% resolution at any full scale the user selects. With a quadrature input, a Model 723+ outputs signal direction as well as magnitude. Excitation is furnished for both sensors; no need for external power.

A Model 723+ is functionally equivalent to a Model 721+ (see Bulletin 371), except it uses a high level DC conditioner not the Model 721+'s ac mV/V torque/force/head conditioner. A Model 723+ is easy to use, has superior noise immunity, offers great stability and requires no maintenance – it has no batteries, fans or potentiometers. Both channels accept a 130Vrms input without damage.

Select either RS232, RS422, or RS485 communications to remotely acquire data, and setup and control instrument modes. User configurable logic I/O's can be linked to input actions and output events. When used in its State Mode, Event Driven Tests can be done - without special hardware or software - see AN7000 for details. Included software remotely controls all Instrument functions from a Windows-based PC. The same software displays, plots and saves real time data, does X-Y plots, and will save and download the Instruments' setup parameters.

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Model 723+ Specification

Voltage Input . . . . May be used either differentially or single ended.
    Sensitivity . . . . ±1V to ±10V. Maximum allowable (no damage) input is ±130VDC or 130Vrms.
    Overrange Capability . . . . 150% of full scale.
    Zero Control Range . . . . ±10% of full scale (F.S.) with 150% overrange and ±60% of full scale with no overrange.
    Input Impedance . . . . 2MΩ differential, 1MΩ single ended.
    Calibration . . . . Dual polarity calibration with engineering unit scaling.
    Antialias Filter . . . . 5 pole Bessel response filter.
    Low Pass Filtering . . . . 4 pole Bessel response digital filter with 11 cutoff frequencies from 0.1 to 200Hz in 1-2-5 steps.
    Common Mode Rejection Ratio . . . . >80dB DC to 10MHz.
    Signal-to-Noise Ratio[1] . . . . with 1/10/100/200Hz filters 86/80/72/66dB.
    Resolution . . . . 0.001% of F.S.
    Overall Accuracy (at 77°F/25°C) . . . . 0.01% of full scale typical, 0.02% of full scale, worst case.
    Temperature Effects . . . . Zero: ±0.001% of F.S./°F (max); Span: ±0.001% of F.S./°F (max).
    Excitation Supplies[2] . . . . +15V@100mA and +5V@250mA short circuit (current limit) and overvoltage (fuses) protected.
Frequency Input . . . . Any uni-directional or quadrature source including self generating and zero velocity speed pickups,
    optical encoders, flowmeters, etc. When used with bi-directional sensors, the conditioner outputs both <u>direction</u> and <u>magnitude</u>.
    Input Impedance and Configuration . . . . Differential or single ended inputs. 100kΩ differential, 50kΩ single ended.
    Input Threshold (keypad selectable) . . . . 10, 20, 50, 100 or 200mVp-p (between inputs) or TTL.
    Maximum Input Voltage . . . . ±130VDC or 130Vrms.
    Input Signal Bandwidth . . . . 0.001 to 200kHz (10 to 200mVpk-pk threshold), 0.001 to 400kHz (TTL threshold).
    Low Pass Filter (keypad selectable) . . . . 20kHz (-3dB) or none. This filter is not available for TTL inputs.
    Common Mode Rejection . . . . 80dB (60Hz), 55dB (0 to 10kHz).
    Display Ranges and Resolution . . . Rangeless (use any Engineering Unit value) with 150% overrange. Resolution is 0.01% of F.S.
    Response Time . . . . Greater of: 1 ms, typical (2ms, worst case) or the input pulse length.
    Low Pass Filtering of Sampled Data . . . . . Unfiltered or 4 pole Bessel filter. Cutoff frequencies from 0.1 to 100 Hz in 1-2-5 steps.
    Overall Accuracy . . . . 0.01% of F.S. @ +77°F (+25°C), 0.015% of F.S. @ +41°F to +122°F (+5°C to +50°C).
    Excitation Supplies[3] . . . . +12V@125mA or +5V@250mA short circuit (current limit) and overvoltage (fuses) protected.
Maximum Transducer Cable Length . . . . 1000ft.
System Display . . . . 2 line by 16 alphanumeric characters, each 0.2" wide by 0.3" high. Backlit LCD with adjustable contrast.
    Views . . . . Select either 2 Channels, 1 Channel with Limit Status, or 1 Channel with I/O Status.
    Data Displayed . . . . Select from Current, Max, Min, Spread, Held data and Tare value.
    Data Format . . . Engineering units with 6 digits (1-2-5 format) and 5 character, upper/lower case, user-entered legend/descriptor.
System Response (per channel)
    Data Sampling & Max/Min Update Rates . . . . 7,800Hz (hardware channels and CH3 calculation).
    Limit Checking Rate . . . . 2,600Hz (hardware channels and CH3 calculation).
    Logic I/O Response Time . . . . 384μs (hardware channels and CH3 calculation).
    Update Rate for Each Analog Output . . . . 2,600Hz.
System Control . . . . All I/O functions can be OR'd in any combination. The *pattern* function adds AND'ing capabilities.
    Input Actions/Channel . . . . Logic inputs, outputs, and internal Matrix signals control following actions. Tare, Clear Tare,
    Hold, Clear Hold, Reset Max/Min, Clear Latched Limits, Check Limits, Do Max/Mins, Apply +CAL, Apply −CAL.
    Output Events/Channel . . . . The following events drive Logic outputs and internal Matrix signals.
    HI Limit, NOT HI Limit, IN Limit, NOT IN Limit, LO Limit, NOT LO Limit, At Max, NOT At Max, At Min, NOT At Min.
    Eight User-defined Patterns . . . . Patterns of Logic inputs, outputs and internal Matrix signals.
State Machine Capability . User enabled/disabled. Permits up to eight states and allows Event Driven Testing. See AN7000 for details.
Limit Checking . . . . . Each channel has a HI and LO limit which may be latched or unlatched, absolute or signed, and with or without
    hysteresis. Select either Current, Max, Min, Spread or Held data for limit checking.
    Limit violations on any or all channels can be set to trigger backlight flashing in any of the display view modes.
Four Logic Inputs . . . . Each with programmable destination, protected to ±48V.
    Type . . . . TTL compatible, low-true with 2kΩ pull-up. Input current is -1.5mA @ 0V.
Six Logic Outputs . . . . . . Each with programmable source, short circuit (current and thermal limits) and overvoltage (fuse) protected.
    Type . . . . Open collector, low-true. Operating @ 24V (max) and 0.3A max sink current.
    Protection . . . . Short circuit (current and thermal limits) and overvoltage.
External +5VDC Power (on I/O connector) . . . . 250mA, short circuit (current limit) and overvoltage (fuse) protected.
Serial Communication Port (selectable as RS232, RS422, or RS485. Supports 32 devices on RS485 port and 1 device on RS232/422)
    BAUD Rate . . . . 1.2 to 230.4kBaud. Maximum Cable Length: 4000ft (RS422/RS485), 50ft (RS232).
    120Ω Termination Resistors (RS485) . . . . User selectable for RXD and TXD.
    RS422/485 Transceivers . . . . Slew-rate limited, short circuit protected (current & thermal limits).
    RS232 Drivers . . . . Short circuit protected (current limit).
    Serial Signals . . . . Use a 9 pin D connector. They are ±15kV ESD protected and float (100kΩ) with respect to Earth Ground.
    Commands . . . . Control of all modes, settings, and measurements.
Non-Volatile Memory Storage for System Settings . . . . EEPROM, batteries are not used.
Dual Analog Outputs . . . . . . Each assignable to any of the 3 channels are short circuit (current limit) and overvoltage (fuse) protected.
    Output Impedance/Minimum Load Resistance . . . . <1Ω/10kΩ.
    Full Scale . . . . Selectable from 0 to ±10V or 0 to 20mA. Resolution is 0.5mV or 0.5μA.
    Overrange . . . . Voltage overrange is 150% of Full Scale (F.S.). Current overrange is 150% of F.S. or 23.2mA.
    Non-linearity . . . . ±1mV or ±1μA.
Size and Weight . . . . 6.5" wide, 2.9" high, 8.7" deep. Weight is 3 pounds.
Operating Temperature . . . . +41°F to +122°F (+5°C to +50°C).
Input Power . . . . . 90VAC to 250VAC, 50/60Hz @ 25VA, max. Two 2A/250V fuses, line filter, and rear power switch. Option 12D1,
    converts from AC line power to 10 to 15VDC operation @ 15 Watts, max. It includes a rear power switch, fuse & filter.

Notes:
  1. The ratio expressed in decibels (dB), of full scale (F.S.) signal to noise spread. Measurements are made for a 1 minute interval using a 100Ω source impedance.
  2. Both excitation voltages can be used simultaneously with the following restrictions: 6 × (15V current) + (5V current) ≤ 700mA AND 15V current ≤ 100mA AND 5V current ≤ 250mA.
  3. Both excitation voltages can be used simultaneously with the following restrictions: 4.8 × (12V current) + (5V current) ≤ 700mA AND 12V current ≤ 125mA AND 5V current ≤ 250mA.
  4. Specification is subject to change without notice.