

# Models 703 & 733 Voltage Conditioners

## Accurate, Versatile, User Friendly



Unexcelled for DC operated torquemeters, DC LVDT's, Watts, vars, current, voltage and potentiometric transducers.

- **2000 samples/second/channel**
- **$\pm 1V$  to  $\pm 10V$  inputs protected to 130Vrms**
- **accepts differential or single ended signals**
- **6 digit engineering unit display with legends and 0.01% resolution**
- **real-time cross channel calculations and math operations**
- **20 built-in data acquisition and control functions**
- **includes protected 15V and 5V sensor excitation**
- **RS232/RS422/RS485 serial communication**
- **user assignable logic inputs and outputs**
- **auto-scaled  $\pm 5V$  and/or  $\pm 10V$  analog outputs**
- **no manual adjustments, no batteries, no fans, no maintenance**

These instruments are full featured voltage conditioner/readouts; the Model 703 handles one and the Model 733 handles two inputs. Both provide fast, accurate data for each input. Twenty (20) useful processing functions and 26 real-time digital calculations make the Model 703/733 powerful production and performance test analyzers with easily configured characteristics. No need to 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. It guides you with user friendly English language prompts. There are no manual adjustments. Calibration is simple; enter the full scale in engineering units and the instrument provides 0.01% accuracy and  $\pm 5V$  and/or  $\pm 10V$  analog outputs at full scale. Keystrokes access measured data, derived data, stored data, limit status, and/or I/O status without test disruption. User set values may be password protected, when needed.

Select either RS232, RS422, or RS485 communications to remotely acquire data, and setup and control the instrument modes. Input actions and output events can be controlled by user configurable logic I/O's. When used in its State Mode, Event Driven Tests can be done - without special hardware or software. That is, the Instrument setup automatically changes as the test moves between states; up to 8 states are possible - see AN7000 for details.

Calculations allow implementation of many common tasks. Thus, a Model 733 and 2 DC LVDT's displays, classifies and outputs two displacements and runout. A Model 733, Watt sensor and DC operated torquemeter displays and classifies electric motor input, output and efficiency.

Included software remotely controls all instrument functions from a Windows based PC. It displays, plots and saves real-time data, does X-Y plots, and will also save and download the instruments setup parameters.

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# Model 703/733 Specification

<b>Voltage Input</b>	May be used either differentially or single ended.
<b>Sensitivity</b>	$\pm 1V$ to $\pm 10V$ . Maximum allowable (no damage) input is $\pm 130VDC$ or $130Vrms$ .
<b>Overrange Capability</b>	50% of full scale.
<b>Zero Control Range</b>	$\pm 10\%$ of full scale (F.S.) with 50% overrange and $\pm 60\%$ of full scale with 0% overrange.
<b>Input Impedance</b>	$2M\Omega$ differential, $1M\Omega$ single ended.
<b>Calibration</b>	Dual polarity calibration with engineering unit scaling.
<b>Antialias Filter</b>	5 pole Bessel response filter.
<b>Low Pass Filtering</b>	4 pole Bessel response digital filter with 11 cutoff frequencies from 0.1 to 200Hz in 1-2-5 steps.
<b>Signal-to-Noise Ratio<sup>1</sup></b>	with 1/10/100/200Hz filters 86/80/72/66dB.
<b>Common Mode Rejection Ratio</b>	$> 80dB$ DC to 10MHz.
<b>Resolution</b>	0.01% of F.S.
<b>Overall Accuracy (at 77°F/25°C)</b>	0.01% of full scale typical, 0.02% of full scale, worst case.
<b>Temperature Effects</b>	Zero: $\pm 0.001\%$ of F.S./°F (max); Span: $\pm 0.001\%$ of F.S./°F (max).
<b>Excitation Supplies<sup>2</sup></b>	+15V@100mA and +5V@250mA short circuit (current limit) and overvoltage (fuses) protected.
<b>Maximum Transducer Cable Length</b>	2,000ft.
<b>System Display</b>	2 line by 16 alphanumeric characters, each 0.2" wide by 0.3" high. Backlit LCD with adjustable contrast.
<b>Views</b>	Select either 2 Channels, 1 Channel with Limit Status, or 1 Channel with I/O Status.
<b>Data Displayed</b>	Select from Current, Max, Min, Spread, Held data and Tare value.
<b>Data Format</b>	Engineering units with 6 digits (1-2-5 format) and 5 character, upper/lower case, user-entered legend/descriptor.
<b>System Response (per channel)</b>	
<b>Data Sampling &amp; Max/Min Update Rates</b>	2000Hz (hardware channels), 50Hz (CH3 calculation).
<b>Limit Checking Rate</b>	1000Hz (hardware channels), 50Hz (CH3 calculation).
<b>Logic I/O Response Time</b>	1ms (hardware channels), 20ms (CH3 calculation).
<b>Update Rate for Each Analog Output</b>	1000Hz.
<b>System Control</b>	All I/O functions can be OR'd in any combination. The <i>pattern</i> function adds ANDing capabilities.
<b>Input Actions/Channel</b>	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.
<b>Output Events/Channel</b>	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.
<b>Eight User-defined Patterns</b>	Patterns of Logic outputs and Matrix signals.
<b>State Machine Capability</b>	User enabled/disabled. Permits up to eight states and allows event driven testing. See AN7000 for details.
<b>Limit Checking</b>	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.
<b>Four Logic Inputs</b>	Each with programmable destination, protected to $\pm 130VDC$ or $130Vrms$ .
<b>Type</b>	TTL compatible, Schmitt Trigger, low-true with $47k\Omega$ pull-up. Input current is $-100\mu A$ @ 0V.
<b>Six Logic Outputs</b>	Each with programmable source, short circuit (current and thermal limits) and overvoltage (fuse) protected.
<b>Type</b>	Open collector, low-true. Operating @ 24V (max) and 0.3A max sink current.
<b>External +5VDC Power (on I/O connector)</b>	250mA, short circuit (current limit) and overvoltage (fuse) protected.
<b>Serial Communication Port (selectable as RS232, RS422, or RS485. Supports 32 devices on RS485 port and 1 device on RS232/422)</b>	
<b>BAUD Rate</b>	300 to 38400. Maximum Cable Length: 4000ft (RS422/RS485), 50ft (RS232).
<b>120<math>\Omega</math> Termination Resistors (RS485)</b>	user selectable for RXD and TXD.
<b>RS422/485 Transceivers</b>	Slew-rate limited, short circuit protected (current & thermal limits).
<b>RS232 Drivers</b>	Short circuit protected (current limit).
<b>Serial I/O's</b>	Use a 9 pin D connector. They are $\pm 15kV$ ESD protected and float ( $100k\Omega$ ) with respect to Earth Ground.
<b>Commands</b>	Control of all modes, settings, and measurements.
<b>Non-Volatile Memory Storage for System Settings</b>	EEPROM, batteries are not used.
<b>Dual Analog Outputs</b>	Each assignable to any of the 3 channels are short circuit (current limit) and overvoltage (fuse) protected.
<b>Output Impedance/Minimum Load Resistance</b>	$< 1\Omega/10k\Omega$ .
<b>Full Scale</b>	$\pm 5V$ or $\pm 10V$ (user selectable). Resolution is 2mV @ $\pm 5V$ F.S. or 4mV @ $\pm 10V$ F.S.
<b>Overrange</b>	$\pm 8.2V$ @ $\pm 5V$ F.S. or $\pm 13.5V$ @ $\pm 10V$ F.S.
<b>Non-linearity</b>	$\pm 2mV$ @ $\pm 5V$ F.S. or $\pm 4mV$ @ $\pm 10V$ F.S.
<b>Overall Error (worst case, including temperature effects)</b>	$\pm 5mV$ @ $\pm 5V$ F.S. or $\pm 10mV$ @ $\pm 10V$ F.S.
<b>Filter</b>	100Hz, 5 pole Bessel response low pass filter.
<b>Size and Weight</b>	6.5" wide, 2.9" high, 8.7" deep. Weight is 3 pounds.
<b>Operating Temperature</b>	$+41^\circ F$ to $+122^\circ F$ ( $+5^\circ C$ to $+50^\circ C$ ).
<b>Input Power</b>	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  $100\Omega$  source impedance.
  2. Both excitation voltages can be used simultaneously with the following restrictions:  $6 \times (15V \text{ current}) + (5V \text{ current}) \leq 700mA$   
AND  $15V \text{ current} \leq 100mA$  AND  $5V \text{ current} \leq 250mA$ . The Model 733 has two pairs of these supplies.
  3. Specification is subject to change without notice.