

Models 706 & 766 Current Signal Conditioners

Model 726 Mechanical and Fluid Power Instrument



Model 726 - Power Instrument for a torque, force, or pressure transmitter, and a frequency output sensor.



Model 766 2 channel dc current signal conditioner - for torque, speed, flow, pressure, and temperature transmitters.



- **Model 726 reads, displays, processes and outputs**
 - shaft torque, speed, power
 - pump/motor head, flow, fluid power
 - drawbar force, velocity, power
- **All Models have built-in ranges of 4-20mA, 12±8mA, 0±10mA and 0±20mA**
 - 2000 samples/sec. for dc current input channels
 - 1 millisecond response for speed, flow or velocity input
 - engineering unit display with legends and 0.01% resolution
 - serial communication, auto-scaled ±5V and/or ±10V analog outputs
 - assignable logic I/O's, fast max/min capture, real time calculations
 - protected excitation supplies, no pots, no batteries, no fans, no maintenance

These advanced instruments provide engineering unit display of one (Models 706 and 726) or two (Model 766) transmitters (2 or 4 wire) or current sources, and one frequency input (Model 726). What's more, 20 of the most useful processing functions plus real-time calculations are built in. Those capabilities, and the embedded State Machine, make these Instruments powerful testers easily configured to handle complex, Event Driven Testing.

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 0.01% resolution and ±5V and/or ±10V analog outputs at full scale. 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 current signal conditioner has 0.02% absolute accuracy. Manual adjustments aren't needed. Constant delay, Bessel filters are used to suppress noise without introducing overshoots or delay distortion. The frequency conditioner uses a proprietary algorithm to achieve fast response and 0.01% resolution at any full scale. With a quadrature input, it outputs signal direction as well as magnitude. Excitation is

furnished for both sensors; no need for external power. A Model 726 is easy to use, has superior noise immunity, offers great stability and requires no maintenance - it has no batteries, fans or potentiometers. Input channels accept a 130Vrms input without damage.

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.

The absolute accuracy of the current signal conditioner(s) eliminates any need for a mA transfer standard. Applications for these flexible Instruments run the gamut from an accurate, stable transducer readout to a sophisticated tester capable of executing complex, event driven testing. No other device offers such power and versatility.

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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Specifications for Models 706/766/726 Instruments

Current Input(s)	One (Models 706 and 726) or two (Model 766). May be used either differentially/floating or single ended.
Ranges	4-20mA, 12±8mA, 0±10mA or 0±20mA selectable from the keypad or remotely.
Overrange Capability	50% of full scale.
Input Protection	±130VDC or 130Vrms at each input to ground. Differential inputs protected by 62mA fuse.
Input Impedance	100Ω differential, 200k from negative input to ground.
Calibration	Absolute calibration is automatic when current range is selected.
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 Ratio¹	with 1/10/100/200Hz filters 86/80/72/66dB.
Resolution	0.01% of F.S.
Overall Accuracy (at 77°F/25°C)	0.02% of full scale typical, 0.03% of full scale, worst case.
Temperature Effects	Zero: ±0.001% of F.S./°F (max); Span: ±0.001% of F.S./°F (max).
Excitation Supply	+15V @ 30mA short circuit (current limit) and external high voltage (fuse) protected.
Maximum Transducer Cable Length	2000ft.
Frequency Input	Any one uni-directional or bi-directional (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 (dc to 60Hz), 55dB (at 10kHz).
Display Ranges and Resolution	Rangeless (use any F.S. Engineering Unit value) with 50% 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.
Excitation Supplies²	+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	2000Hz (hardware channels), 50Hz (CH3 calculation).
Limit Checking Rate	1000Hz (hardware channels), 50Hz (CH3 calculation).
Logic I/O Response Time	1ms (hardware channels), 20ms (CH3 calculation).
Update Rate for Each Analog Output	1000Hz.
System Control	All I/O functions can be OR'd in any combination. The <i>pattern</i> function adds ANDing 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, At Max, NOT At Max, At Min, NOT At Min.
Eight User-defined Patterns	Patterns of Logic 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 ±130VDC or 130Vrms.
Type	TTL compatible, Schmitt Trigger, low-true with 47kΩ pull-up. Input current is -100μA @ 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.
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	300 to 38400. 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 I/O's	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 Scale³	±5V or ±10V (user selectable). Resolution is 2mV @ ±5V F.S. or 4mV @ ±10V F.S.
Overrange	±8.2V @ ±5V F.S. or ±13.5V @ ±10V F.S.
Non-linearity	±2mV @ ±5V F.S. or ±4mV @ ±10V F.S.
Overall Error (worst case, including temperature effects)	±5mV @ ±5V F.S. or ±10mV @ ±10V F.S.
Filter	100Hz, 5 pole Bessel response low pass filter.
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: $4.8 \times (12V \text{ current}) + (5V \text{ current}) \leq 700mA$
AND 12V current ≤ 125mA AND 5V current ≤ 250mA.
 3. Option MA converts voltage output to 4-20mA or 12±8mA current output(s). See Bulletin 389-1 for complete details.
 4. Specification is subject to change without notice.