

# Series 600

## High Accuracy ADTs

The Series 600 Angular Displacement Transducers (ADT's) are precision differential capacitors. These transducers do not have the edge effects and dimensional instability characteristic of traditional capacitive devices. The sensing element is coupled to a solid state oscillator, demodulator, and amplifier to yield DC input — DC output performance.



These transducers deliver a high level analog DC voltage directly proportional to shaft angular displacement with a high degree of conformity. Rotation is continuous and there is no reactive torque. Reliable performance is assured by the absence of any high speed rubbing contacts.

### KEY FEATURES

- Ranges from  $\pm 30^\circ$  to  $\pm 60^\circ$
- Absolute Measurement
- Non-linearity < 0.05%
- DC Voltage Operation

### SPECIFICATIONS

MODEL NO.	DISPL. RANGE +CW, -CCW	LINEARITY*	MAX. USABLE RANGE	LINEARITY USABLE RANGE	OUTPUT VDC	INPUT/OUTPUT CURVE	TYPICAL TEMP. COEF. SPAN/°F
0600-0000	$\pm 30^\circ$	$\pm 0.05\%$	$\pm 40^\circ$	$\pm 0.10\%$	100 mV/°	1	-0.01%
0601-0000	10° -70° CW	$\pm 0.05\%$	0° -80° CW	$\pm 0.10\%$	100 mV/°	2	-0.015%
0602-0000	10° -70° CCW	$\pm 0.05\%$	0° -80° CCW	$\pm 0.10\%$	100 mV/°	3	-0.01%
0603-0000	$\pm 60^\circ$	$\pm 0.10\%$	$\pm 80^\circ$	$\pm 0.15\%$	100 mV/°	4	-0.01%
0603-0001	$\pm 60^\circ$	$\pm 0.05\%$	$\pm 80^\circ$	$\pm 0.10\%$	100 mV/°	4	-0.01%
0603-0002	20° -140° CW	$\pm 0.10\%$	0° -160° CW	$\pm 0.15\%$	50 mV/°	5	-0.015%
0603-0003	20° -140° CW	$\pm 0.05\%$	0° -160° CW	$\pm 0.10\%$	50 mV/°	5	-0.015%
0603-0004	20° -140° CCW	$\pm 0.10\%$	0° -160° CCW	$\pm 0.15\%$	50 mV/°	6	-0.01%
0603-0005	20° -140° CCW	$\pm 0.05\%$	0° -160° CCW	$\pm 0.10\%$	50 mV/°	6	-0.01%

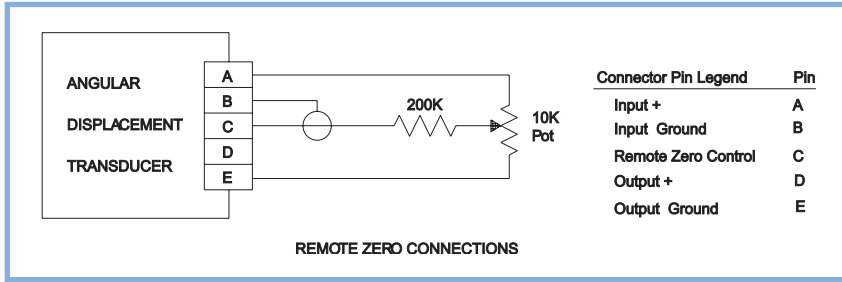
\*Definition: Zero Base Terminal Average, expressed as a max % deviation of total range.

CW defined as clockwise direction of shaft rotation, when viewed from shaft end.

### COMMON ELECTRICAL SPECIFICATIONS

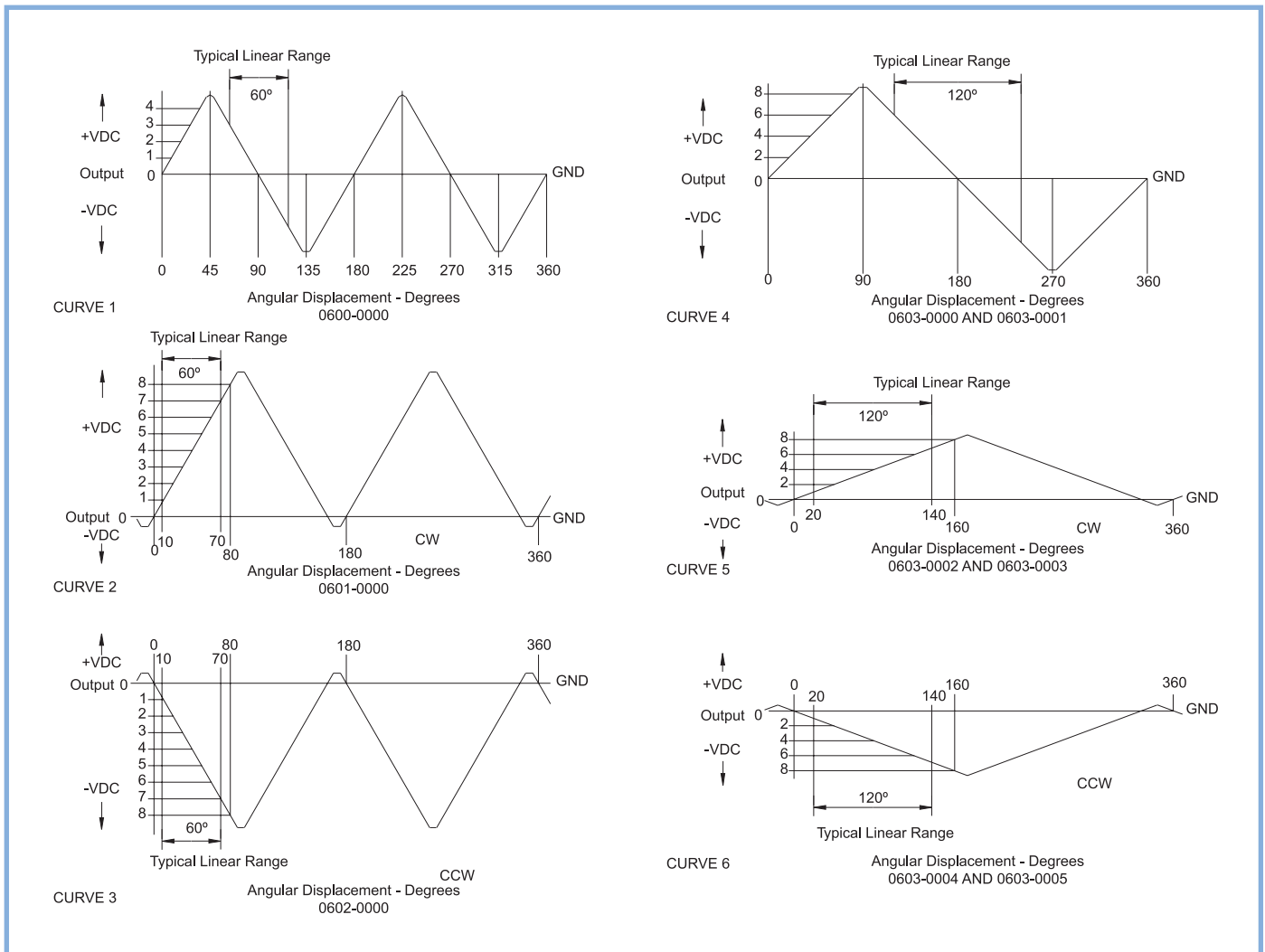
REPEATABILITY	< .01%	INTERNAL CARRIER FREQUENCY	400 KHz
RESOLUTION	Infinite	RIPPLE, MAX.	20 mV P/P 400 KHz
CURRENT, INPUT	30 mA Max.	ZERO ADJUSTMENT	$\pm 3^\circ$
IMPEDANCE, OUTPUT	< 2 Ohms	ZERO POSITIONS	See Output Curves
MAX. ANGULAR VELOCITY	1,440°/sec	FREQUENCY RESPONSE	> 1500 Hz
MAX. ANGULAR VELOCITY with output down < 2%	18,000°/sec available (see "Ordering Information", pg. 53)	EXCITATION VOLTAGE Input > 18 VDC may damage unit	15.00 VDC (see options, pg. 53)
INPUT POLARITY PROTECTED		OUTPUT SHORT CIRCUIT PROTECTED	

### REMOTE ZERO OPERATION



Unless operating in a noise free environment, the lead to pin C must be shielded, as shown. The existing zero adjust potentiometer in the Angular Displacement Transducer must be rotated fully clockwise before the remote zero control can function correctly. This remote function is useful in applications where it is inconvenient to access the adjustment screw on the transducer housing.

### INPUT - OUTPUT CURVES



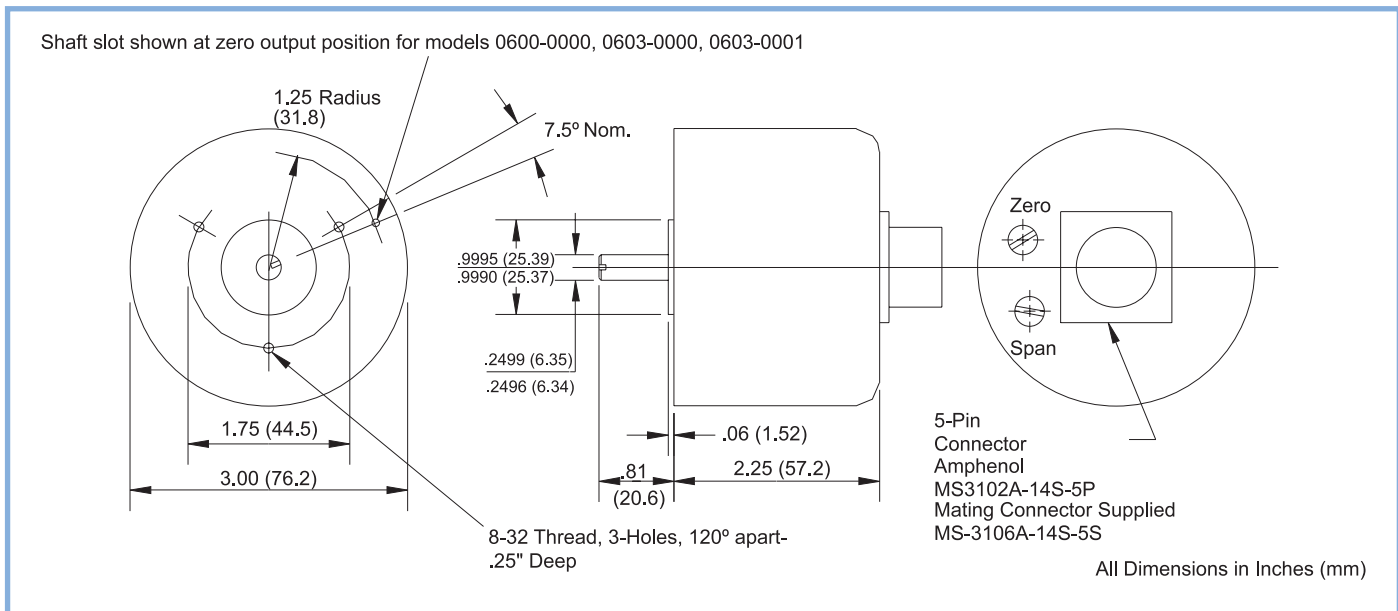
# Series 600

## Mechanical Specifications

### MECHANICAL SPECIFICATIONS

<b>DISPLACEMENT RANGE</b>	Continuous	<b>NOMINAL WEIGHT</b>	12.5 oz., 352 gm.
<b>TORQUE, MAX. STARTING</b> (0.5 GM. CM. AVAILABLE)	5.0 gm. cm.	<b>LIFE: LIMITED BY BEARINGS, EG.</b>	10 lbs. radial load at 10 RPM; bearing life - 17,000 hours
<b>TORQUE, MAX. RUNNING</b>	3.5 gm. cm.	<b>OPERATING TEMP. RANGE</b>	+32°F to +167°F (0°C to +75°C)
<b>MOMENT OF INERTIA, ROTOR</b>	6 gm. cm. <sup>2</sup>	<b>OPERATING TEMP. RANGE (EXPANDED)</b>	-67°F to +257°F (-55°C to +125°C) available (see "Ordering Information", next pg.)
<b>MAX. RADIAL LOAD, AT SHAFT END</b>	10 lbs.	<b>STORAGE TEMP. RANGE</b>	-67°F to +257°F (-55°C to +125°C)
<b>MAX. AXIAL LOAD</b>	7 lbs.	<b>MOUNTING</b>	Any position, gravity insensitive

### DIMENSIONAL DIAGRAM



### SLOT - ANGLE POSITION

MODEL	SLOT-ANGLE POSITION	MODEL	SLOT-ANGLE POSITION
0600-0000	0° ±3°	0603-0000, 0603-0001	0° ±3°
0601-0000	40° CW ±3°	0603-0002, 0603-0003	80° CW ±3°
0602-0000	40° CCW ±3°	0603-0004, 0603-0005	80° CCW ±3°

As seen in the output curves graph on the previous page, there is more than one linear range throughout one complete shaft revolution. Only one of these ranges is calibrated. To find the calibrated range, line up the slot in the shaft to the drill hole in

the face of the unit. The output voltage at this position corresponds to the angular position within the linear range. For Models 0600-0000, 0603-0000, and 0603-0001, this is the zero position.

### INSTALLATION

There are no installation restrictions; the transducer can be mounted in any position. Three tapped holes are provided in the mounting surface. The close toleranced stainless steel pilot when fitted into a properly machined bore will predetermine the shaft

position. Aligning the shaft slot with the drill spot on the transducer face will approximate the center of the working range. Refer to the physical diagram for mounting dimensions.

**ORDERING INFORMATION**

Model #	S-Number	Description												
060_ - 000_	S - 0 0 0													
		<table border="0"> <tr> <td style="text-align: center;"><u>TEMPERATURE</u></td> <td style="text-align: center;"><u>ANGULAR VELOCITY/ STARTING TORQUE</u></td> <td style="text-align: center;"><u>SEALING</u></td> </tr> <tr> <td>1 +32°F to +167°F</td> <td>1 Standard</td> <td>1 General Purpose</td> </tr> <tr> <td>2 -67°F to +257°F<sup>1</sup></td> <td>2 Max Angular Velocity: 18,000°/sec</td> <td>2 Splashproof</td> </tr> <tr> <td></td> <td>3 Max Angular Velocity: 18,000°/sec; Starting torque: 0.5 gm. cm<sup>2</sup></td> <td></td> </tr> </table>	<u>TEMPERATURE</u>	<u>ANGULAR VELOCITY/ STARTING TORQUE</u>	<u>SEALING</u>	1 +32°F to +167°F	1 Standard	1 General Purpose	2 -67°F to +257°F <sup>1</sup>	2 Max Angular Velocity: 18,000°/sec	2 Splashproof		3 Max Angular Velocity: 18,000°/sec; Starting torque: 0.5 gm. cm <sup>2</sup>	
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<p>Notes: 1. When expanded temperature range is selected, option 2 or 3 must be selected under Angular Velocity. 2. The shaft OD is reduced to 0.125 Inches (3.18 mm).</p>														

For an additional charge, the following options are available at the time of purchase:

- Units can be factory calibrated to your specified excitation voltage, ranging from 12 to 16 VDC to provide an output as stated in the electrical specifications per listed model number. The standard is 15 VDC.
- Units can be factory calibrated to your specified sensitivity; available sensitivity values will vary with the particular model selected, the input voltage and other factors. Please contact factory for details.
- Zero offset other than the standard models listed ranging from 0° to ±30° (0600-0000) to 0 to ±60° (0603-0000) can be ordered providing that the maximum output voltage is 4 VDC less than the supply voltage (12 to 16 VDC).

**SALES OPTIONS**

Option #	Description
X0016:	Vibration Protection - Internal electronics are encapsulated in RTV to prevent free movement during high vibration and/or shock
X0033:	Material modification for operation in a vacuum environment; Span and Zero pots are replaced by fixed resistors
X0035:	Increase axial load tolerance to 14 pounds; not available with high speed option
X0042:	Optional side connector configuration; replaces axial connector; see diagram below

**DIMENSIONAL DRAWING**

