

## GENERAL DESCRIPTION

The SM-1100, SM-1500 and SM-1600 Series are multi-turn, rotary actuators, designed to meet the exacting requirements for closed-loop modulating positioning control. They can be applied to valves, metering pumps, hydraulic and pneumatic pressure regulators, dampers, and many more industrial/process control applications where reliable remote positioning control is required.

All SM-1100, SM-1500 and SM-1600 Series actuators are also available with an internal amplifier (AC voltage only). These amplifiers are all full-featured ac switching devices designed to work seamlessly with the actuator for closed loop control.



## FEATURES

- Permanently lubricated for any position mounting
- A wide variety of speed/torque combinations
- AC or DC input power versions
- Wide ambient temperature range
- Full one year warranty

## BASE MODEL INCLUDES:

- Motor
- Enclosure: NEMA Type 4 (IP65) indoor/outdoor, and/or hazardous locations for Class I, Division 1, Groups C and D, or Class II, Division 1, Groups E, F and G.
- Internal spur gear train
- 4-20 mA transmitter for customer use (amplifier models only)
- End of travel limit switches, not for customer use

## AMPLIFIER FEATURES

- Isolated, two-wire, 4-20mA feedback
- Customer-adjustable deadband
- Customer-adjustable zero and span
- Accepts either voltage or current command inputs
- Selectable options for Loss-of-Signal action:
  - Lock in place
  - Run to preset
- Field selectable dynamic brake
- Solid state switching of motor for increased life
- Easy pushbutton setup

## POPULAR OPTIONS *(See Pages 197-206)*

- Potentiometer or 4 to 20 mA position feedback
- Custom mounting and interface hardware
- Anti-condensation heater and thermostat
- Motor brake (SM-1500/SM-1600 only)
- Manual Handcrank (SM-1500/SM-1600 only)
- Battery back-up, RP-4000

## SPECIFICATIONS

ACTUATOR	SM-1100	SM-1500	SM-1600
<b>Torque Range</b> in. lbs. (Nm)	3.5 to 100 (0.4 to 11.3)	40 to 400 (4.5 to 45.2)	500 to 1000 (56.5 to 113)
<b>Rotation</b>	40° to 60 turns	72° to 324 turns	
<b>Speed</b>	0.065 to 70 rpm	0.60 to 73 rpm	2.5 to 5 rpm
<b>Approx. Weight</b> lbs. (kg)	12-14 (5.4) to (6.4)	15 to 22 (6.8 to 10)	

**Temperature Limits:** -40°F to 150°F (-40°C to 65°C)  
*For greater temperature ranges, consult factory.*

**Field Wiring:** Barrier terminal blocks

**Approvals:** See page 207

**Position Switch Rating:** 120/240 Vac, 10 Amp

***The SM-1100, SM-1500 and SM-1600 Series do not have overtorque protection. Overtorquing the actuator will cause permanent damage.***

# SM-1100/SM-1500/SM-1600 SPECIFICATION CHART

Actuator Model	Input Power Volts/Phase/Hz	Current (Amps)		Command Input	Input Impedance in ohms	Feedback	Modulation Rate*
		Run	Stall				
SM-1110-N	120/1/50/60	0.25	0.26	N/A	N/A	N/A	2000 starts/hr
SM-1110-D	120/1/50/60	0.25	0.26	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1120-N	120/1/50/60	0.6	0.7	N/A	N/A	N/A	600 starts/hr
SM-1120-D	120/1/50/60	0.6	0.7	4-20 mA	200	1000 ohm pot or 4-20 mA	600 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1140-N	24 Vdc	1.2	4.8	N/A	N/A	N/A	4000 starts/hr
SM-1150-N	120/1/60	0.1	0.1	N/A	N/A	N/A	2000 starts/hr
SM-1150-D	120/1/60	0.1	0.1	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1170-N	240/1/50/60	0.14	0.15	N/A	N/A	N/A	2000 starts/hr
SM-1170-D	240/1/50/60	0.14	0.15	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1180-N	24 Vdc	1.9	5.2	N/A	N/A	N/A	4000 starts/hr
SM-1520-N	120/1/50/60	2.5	2.9	N/A	N/A	N/A	600 starts/hr
SM-1520-D	120/1/50/60	2.5	2.9	4-20 mA	200	1000 ohm pot or 4-20 mA	600 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1530-N	120/1/50/60	0.9	1.2	N/A	N/A	N/A	2000 starts/hr
SM-1530-D	120/1/50/60	0.9	1.2	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1540-N	24 Vdc	1.7	1.9	N/A	N/A	N/A	4000 starts/hr
SM-1550-N	240/1/50/60	0.45	0.5	N/A	N/A	N/A	2000 starts/hr
SM-1550-D	240/1/50/60	0.45	0.5	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1580-N	24 Vdc	5.2	6.25	N/A	N/A	N/A	4000 starts/hr
SM-1590-N	240/1/50/60	1.1	1.6	N/A	N/A	N/A	600 starts/hr
SM-1590-D	240/1/50/60	1.1	1.6	4-20 mA	200	1000 ohm pot or 4-20 mA	600 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1630-N	120/1/50/60	0.9	1.2	N/A	N/A	N/A	2000 starts/hr
SM-1630-D	120/1/50/60	0.9	1.2	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1650-N	240/1/50/60	0.45	0.5	N/A	N/A	N/A	2000 starts/hr
SM-1650-D	240/1/50/60	0.45	0.5	4-20 mA	200	1000 ohm pot or 4-20 mA	2000 starts/hr
				0-5 Vdc or 0-10 Vdc	100,000		
SM-1680-N	24 Vdc	5.2	6.25	N/A	N/A	N/A	4000 starts/hr

\* Minimum Position Change of 1%.

N/A = Not Applicable

## REMOTE AMPLIFIER CHART

Actuator	Remote Mounted Amplifier	Catalog Page
SM-1110-N	AD-8240	173
SM-1120-N	AD-8240	173
SM-1140-N	AD-7530	170
SM-1150-N	AD-8240	173
SM-1170-N	AD-8240	173
SM-1180-N	AD-7530	170
SM-1520-N	AD-8240	173
SM-1530-N	AD-8240	173
SM-1540-N	AD-7530	170
SM-1550-N	AD-8240	173
SM-1580-N	AD-7540	170
SM-1590-N	AD-8240	173
SM-1630-N	AD-8240	173
SM-1650-N	AD-8240	173
SM-1680-N	AD-7540	170

## ACTUATOR/AMPLIFIER SPECIFICATIONS

	SM-1110-D, SM-1120-D, SM-1150-D, SM-1170-D, SM-1520-D, SM-1530-D, SM-1550-D, SM-1590-D, SM-1630-D, SM-1650-D
<b>Position Accuracy</b>	1.0 % of full travel
<b>Repeatability</b>	0.5 % of full travel
<b>Hysteresis</b>	0.5 % of full travel
<b>Linearity</b>	+/-1 % of full travel
<b>Deadband</b>	0.75 % of full travel
<b>Resolution</b>	0.75 % of full travel

To convert RPM to sec./90°:

$$X = \text{RPM} \quad Y = \text{Sec. for } 90^\circ \quad \frac{1}{X} \times 15 = Y$$

# SM-1100 SERIES SELECTION CHART

Selection

1	Basic Model	<b>SM-1110-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier			
		<b>SM-1110-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier			
		<b>SM-1120-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier			
		<b>SM-1120-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier			
		<b>SM-1140-N</b>	24 Vdc (If amplifier desired, see remote model AD-7530)			
		<b>SM-1150-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier			
		<b>SM-1150-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier			
		<b>SM-1170-N</b>	1 phase, 240 Vac, 50/60 Hz, without built-in digital amplifier			
		<b>SM-1170-D</b>	1 phase, 240 Vac, 50/60 Hz, with built-in digital amplifier			
		<b>SM-1180-N</b>	24 Vdc (If amplifier desired, see remote model AD-7540)			
2	Input Voltage	<b>1:</b> 120 Vac, 1 Phase, 50/60 Hz (SM-1110-N, SM-1110-D, SM-1120-N, SM-1120-D, SM-1150-N, SM-1150-D)				
		<b>2:</b> 240 Vac, 1 Phase, 50/60 Hz (SM-1170-N, SM-1170-D)				
		<b>6:</b> 24 Vdc (SM-1140-N, SM-1180-N)				
3	Speed, rpm	SM-1110 SM-1170	SM-1120	SM-1140	SM-1150	SM-1180
		<b>0.6/100</b> (11.3)	<b>0.6/100</b> (11.3)	<b>0.75/100</b> (11.3)	—	<b>1/100</b> (11.3)
		<b>1.2/100</b> (11.3)	<b>1.2/100</b> (11.3)	<b>1.5/100</b> (11.3)	—	<b>2/100</b> (11.3)
		<b>2.5/56</b> (6.3)	<b>2.5/100</b> (11.3)	<b>3/100</b> (11.3)	<b>0.065/100</b> (11.3)	<b>4/100</b> (11.3)
		<b>5/28</b> (3.2)	<b>5/56</b> (6.3)	<b>6/100</b> (11.3)	<b>0.127/100</b> (11.3)	<b>8/100</b> (11.3)
		<b>10/14</b> (1.6)	<b>10/28</b> (3.2)	<b>12/70</b> (7.9)	<b>0.255/100</b> (11.3)	<b>17/90</b> (10.2)
		<b>20/7</b> (0.8)	<b>20/14</b> (1.6)	<b>25/35</b> (4.0)	<b>0.504/100</b> (11.3)	<b>35/45</b> (5.1)
4	Torque in. lbs. (Nm)	<b>40/3.5</b> (0.4)	<b>40/7</b> (0.8)	<b>50/19</b> (2.1)	<b>1.012/50</b> (5.6)	<b>70/25</b> (2.8)
		<b>Select</b> rotation between 40° and 60 turns				

## SM-1100 STANDARD OPTIONS

Code	Description	Selection
<b>Toggles, Lights</b>		
<b>A008</b>	Local Auto/Manual and INC/OFF/DEC (Close Coupled Enclosure)	
<b>A015</b>	ON/OFF Toggle Power Switch (Close Coupled Enclosure)	
<b>Feedback</b>		
<b>F001</b>	Potentiometer, 1000 ohms	
<b>F002</b>	Tandem Potentiometer, 1000 ohms each (Not available with amplifier)	
<b>F003</b>	Potentiometer, 5000 ohms (Not for use with models with internal amplifiers)	
<b>F004</b>	Potentiometer, 10,000 ohms (Not for use with models with internal amplifiers)	
<b>F005</b>	Transmitter, 4-20 mA	
<b>F006</b>	One Potentiometer, 1000 ohms plus Transmitter, 4-20 mA (Not available with amplifier)	
<b>F010</b>	Anti Backlash Feedback Spring (Up to 5.85 turns)	
<b>F011</b>	Anti Backlash Feedback Gearing (5.85 turns or greater)	
<b>F999</b>	Special Potentiometer (consult factory)	
<b>Heater</b>		
<b>H001</b>	Anti-Condensation Heater (24 VDC)	
<b>H002</b>	Anti-Condensation Heater (120 VAC)	
<b>H003</b>	Anti-Condensation Heater (240 VAC)	
<b>Identification/Certifications</b>		
<b>J001</b>	CE Marking, AC input only (only available for units with amplifiers)	
<b>J002</b>	Stainless Steel Tags	
<b>J004</b>	One year extended warranty	
<b>J005</b>	Two year extended warranty	

Code	Description	Selection
<b>Shaft</b>		
<b>R001</b>	Hollow Shaft, 1/2" inner diameter with keyway	
<b>R002</b>	Round Shaft, .38" diameter, .38" long (MC Shaft)	
<b>Auxiliary Switches</b>		
<b>S005</b>	Aluminum Cam (Up to 5.85 turns)	
<b>S006</b>	Aluminum Feedback Frame (Up to 5.85 turns)	
<b>S007</b>	Aluminum Feedback Frame (5.85 turns or greater)	
<b>S008</b>	Two nonadjustable end of travel position switches, SPST, 10 Amp, 120/240 Vac	
<b>S009</b>	Two Adjustable Position Switches, SPDT, 10 Amp, 120/240 Vac, up to 5.85 turns	
<b>S010</b>	Two Adjustable Position Switches, DPDT, 10 Amp, 120/240 Vac, up to 5.85 turns	
<b>S013</b>	Two nonadjustable end of travel position switches, SPDT, 10 Amp, 120/240 Vac	
<b>Painting/Coating</b>		
<b>W001</b>	JCI Standard Polyurethane Blue	
<b>W002</b>	Two Part Epoxy	
<b>W003</b>	Food Grade Epoxy	
<b>W004</b>	Baked On Epoxy	
<b>W005</b>	Teflon	
<b>Special Mechanical Options</b>		
<b>Y006</b>	Metric mounting holes, 6mm	

*For a full description of options, go to the Complete Listing of Options starting on page 197.*

# SM-1500/SM-1600 SERIES SELECTION CHART

Selection

1	Basic Model	<b>SM-1520-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1520-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier				
		<b>SM-1530-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1530-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier				
		<b>SM-1540-N</b>	24 Vdc (If amplifier desired, see remote model AD-7530)				
		<b>SM-1550-N</b>	1 phase, 240 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1550-D</b>	1 phase, 240 Vac, 50/60 Hz, with built-in digital amplifier				
		<b>SM-1580-N</b>	24 Vdc (If amplifier desired, see remote model AD-7540)				
		<b>SM-1590-N</b>	1 phase, 240 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1590-D</b>	1 phase, 240 Vac, 50/60 Hz, with built-in digital amplifier				
		<b>SM-1630-N</b>	1 phase, 120 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1630-D</b>	1 phase, 120 Vac, 50/60 Hz, with built-in digital amplifier				
		<b>SM-1650-N</b>	1 phase, 240 Vac, 50/60 Hz, without built-in digital amplifier				
		<b>SM-1650-D</b>	1 phase, 240 Vac, 50/60 Hz, with built-in digital amplifier				
<b>SM-1680-N</b>	24 Vdc (If amplifier desired, see remote model AD-7540)						
2	Input Voltage	<b>1:</b> 120 Vac, 1 Phase, 50/60 Hz (SM-1520-N, SM-1520-D, SM-1530-N, SM-1530-D, SM-1630-N, SM-1630-D)					
		<b>2:</b> 240 Vac, 1 Phase, 50/60 Hz (SM-1550-N, SM-1550-D, SM-1590-N, SM-1590-D, SM-1650-N, SM-1650-D)					
		<b>6:</b> 24 Vdc (SM-1540-N, SM-1580-N, SM-1680-N)					
3	Speed, rpm	SM-1520 SM-1590	SM-1530 SM-1550	SM-1540	SM-1580	SM-1630 SM-1650 SM-1680	
		<b>0.6/400</b> (45)	<b>0.6/400</b> (45)	<b>0.8/400</b> (45)	<b>0.6/400</b> (45)	—	
		<b>2/400</b> (45)	<b>2/400</b> (45)	<b>3/400</b> (45)	<b>2/400</b> (45)	<b>2.5/1000</b> (131)	
		<b>4/400</b> (45)	<b>4/400</b> (45)	<b>6/400</b> (45)	<b>4/400</b> (45)	<b>5/500</b> (56)	
		<b>7/400</b> (45)	<b>7/400</b> (45)	<b>10/300</b> (34)	<b>7/400</b> (45)	—	
		<b>15/400</b> (45)	<b>15/200</b> (23)	<b>20/140</b> (16)	<b>15/270</b> (31)	—	
		<b>26/300</b> (34)	<b>26/100</b> (11)	<b>36/80</b> (9)	<b>26/160</b> (18)	—	
		<b>41/190</b> (21)	<b>41/67</b> (8)	<b>56/52</b> (6)	<b>41/100</b> (11)	—	
4	Torque in. lbs. (Nm)	<b>53/150</b> (17)	<b>53/50</b> (6)	<b>73/40</b> (4)	<b>53/75</b> (8)	—	
		<b>Select</b> rotation between 72° and 324 turns					

**To convert RPM to sec./90°:**

$$X = \text{RPM} \qquad \frac{1}{X} \times 15 = Y$$

$$Y = \text{Sec. for } 90^\circ$$

# SM-1500/SM-1600 STANDARD OPTIONS

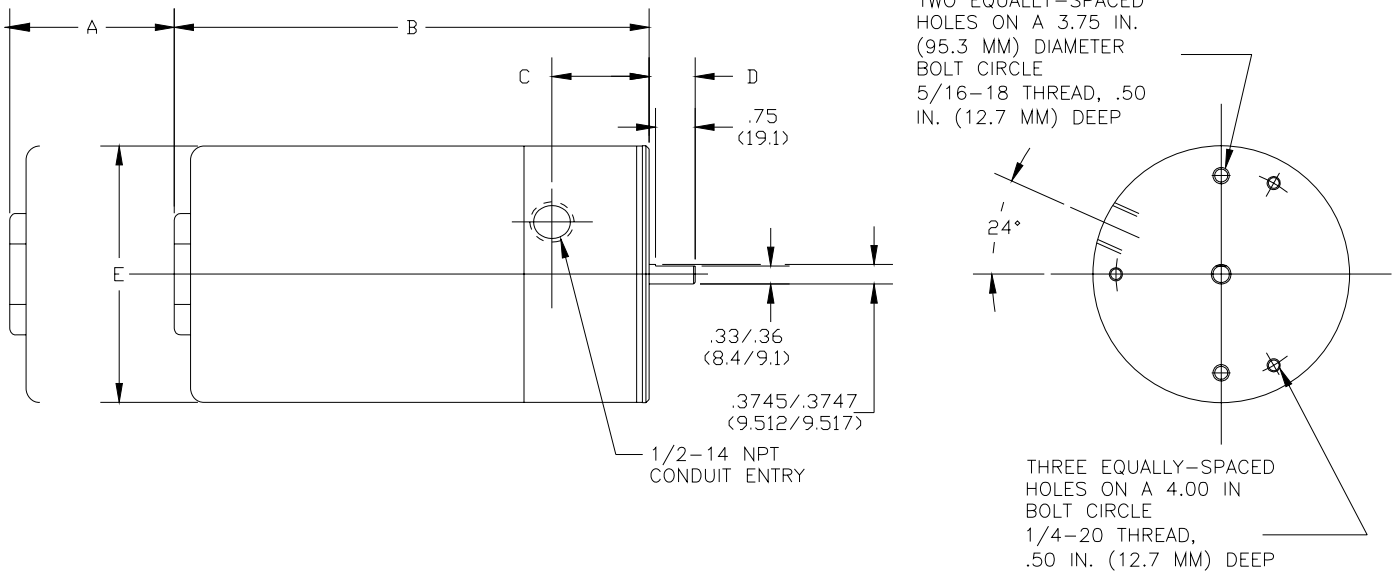
Code	Description	Selection
<b>Toggles, Lights</b>		
A008	Local Auto/Manual and INC/OFF/DEC (Close Coupled Enclosure)	
A015	ON/OFF Toggle Switch (Power) (Close Coupled Enclosure)	
<b>Brake</b>		
B001	Electrically Operated Brake 120 Vac	
B002	Electrically Operated Brake 240 Vac	
<b>Drive Arm/Adapter Clevis/Driven Arm</b>		
D041	Adjustable drive arm for standard shaft (SM-1500 only)	
<b>Feedback</b>		
F001	Potentiometer, 1000 ohms	
F002	Tandem Potentiometer, 1000 ohms each (Not available with amplifier)	
F003	Potentiometer, 5000 ohms (Not for use with models with internal amplifiers)	
F004	Potentiometer, 10,000 ohms (Not for use with models with internal amplifiers)	
F005	Transmitter, 4-20 mA	
F006	One Potentiometer, 1000 ohms plus 4-20 mA Transmitter (Not available with amplifier)	
F010	Anti Backlash Feedback Spring (Up to 27.26 turns)	
F011	Anti Backlash Feedback Gearing (27.26 turns or greater)	
F999	Special Potentiometer (consult factory)	
<b>Heater</b>		
H001	Anti-Condensation Heater (24 VDC)	
H002	Anti-Condensation Heater (120 VAC)	
H003	Anti-Condensation Heater (240 VAC)	

Code	Description	Selection
<b>Identification/Certifications</b>		
J001	CE Marking, AC input only (only available for units with amplifiers)	
J002	Stainless Steel Tags	
J004	One year extended warranty	
J005	Two year extended warranty	
J006	ATEX Approval (SM-1590-D only)	
<b>Handcrank</b>		
K001	Manual Handcrank (X-Proof)	
<b>Shaft</b>		
R003	Hollow Shaft, 1/2" diameter (SM-1500 only)	
<b>Auxiliary Switches</b>		
S005	Aluminum Cam (Up to 27.26 turns)	
S006	Aluminum Feedback Frame (Up to 27.26 turns)	
S007	Aluminum Feedback Frame (27.26 turns or greater)	
S008	Two nonadjustable end of travel position switches, SPST, 10 Amp, 120/240 Vac	
S009	Two Adjustable Position Switches, SPDT, 10 Amp, 120/240 Vac (Up to 27.26 turns)	
S010	Two Adjustable Position Switches, DPDT, 10 Amp, 120/240 Vac (Up to 27.26 turns)	
S013	Two nonadjustable end of travel position switches, SPDT, 10 Amp, 120/240 Vac	
<b>Painting/Coating</b>		
W001	JCI Standard Polyurethane Blue	
W002	Two Part Epoxy	
W003	Food Grade Epoxy	
W004	Baked On Epoxy	
W005	Teflon	
<b>Special Mechanical Options</b>		
Y013	Metric mounting holes, 8mm	

*For a full description of options, go to the Complete Listing of Options starting on page 197.*

# SM-1100 MAJOR DIMENSIONS

INCHES / (MILLIMETERS)
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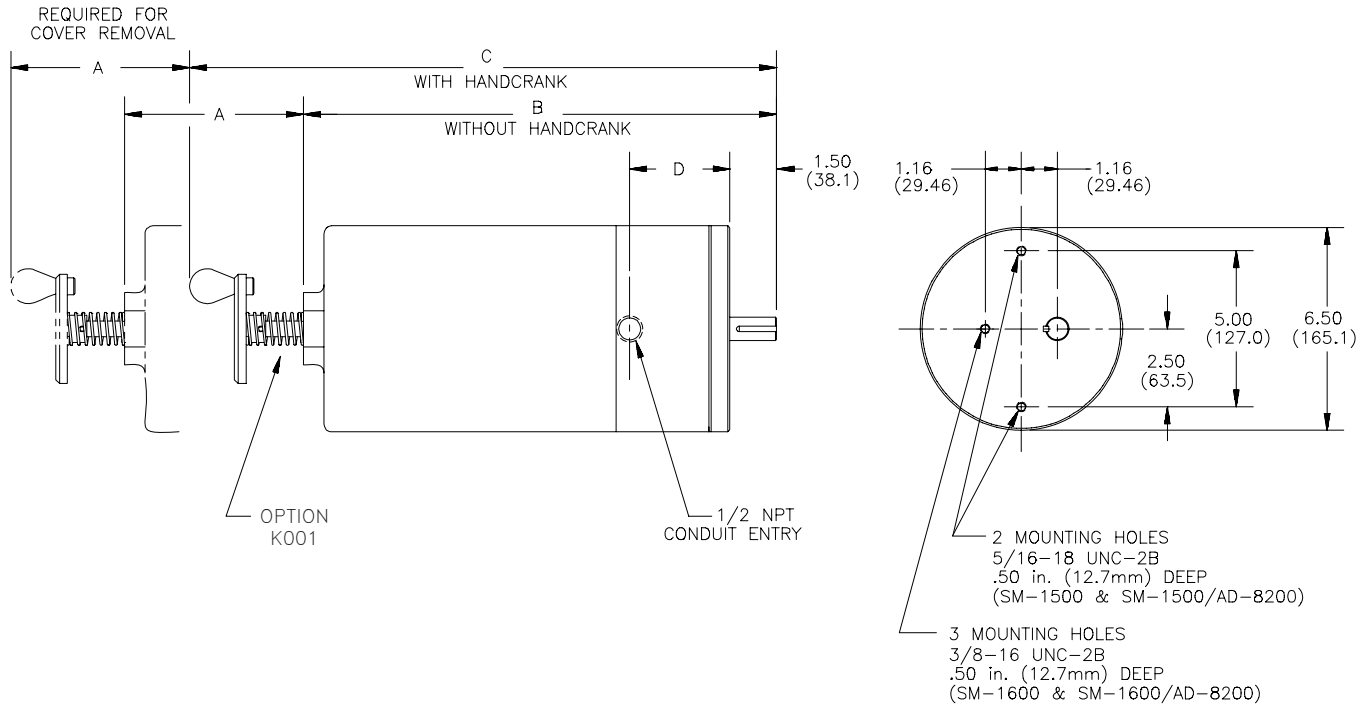
<b>SM-1100-N</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E (Dia.)</b>
Nema Type 4 Watertight and X-proof	6.28 (159.5)	8.65 (219.7)	1.84 (46.7)	0.88 (22.4)	4.88 (124)

<b>SM-1100-D</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E (Dia.)</b>
Nema Type 4 Watertight and X-proof	7.81 (198.4)	10.21 (259.3)	1.84 (46.7)	0.88 (22.4)	4.88 (124)

These dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. For current installation manuals and other product information, see [www.jordancontrols.com](http://www.jordancontrols.com).

# SM-1500/SM-1600 MAJOR DIMENSIONS

INCHES  
/-----  
(MILLIMETERS)



SM-1500/SM-1600	A		B		C		D
	Without an internal amplifier	With an internal amplifier	Without an internal amplifier	With an internal amplifier	Handcrank without an internal amplifier	Handcrank with an internal amplifier	
Nema Type 4 Watertight and X-proof	7.00 (177.8)	10.13 (257.3)	12.20 (309.9)	15.33 (389.4)	15.76 (400.3)	18.89 (479.8)	3.20 (81.3)

Output Shaft Dimensions	SM-1500 Series	SM-1600 Series
Output Shaft Diameter	0.7490/0.7496 (19.025/19.040)	0.9990-0.9996 (25.375/25.390)
Keyway Dimensions	0.187 W x 0.105 D x 1.25 L	0.250 W x 0.145 D x 1.25 L
Key (supplied)	3/16 Sq. x 1.19 L	1/4 Sq. x 1.19 L

These dimensions are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. For current installation manuals and other product information, see [www.jordancontrols.com](http://www.jordancontrols.com).