

# INDELAC

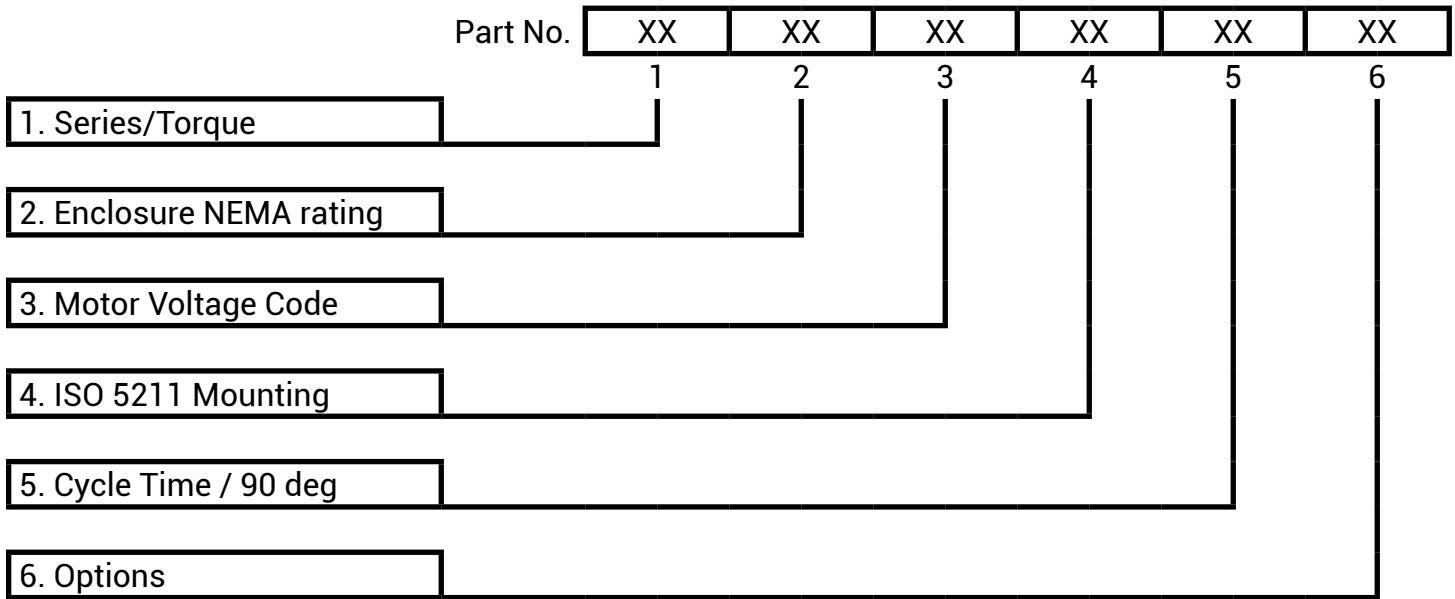
## CONTROLS, INC.

ELECTRIC ACTUATORS AND CONTROLS

ELECTRIC ACTUATOR  
CATALOG



# SIMPLIFIED MODEL NUMBER GUIDE



Notes: Multiple Selections Possible

Example: ML4BF07-30P1VP

ML	4	B	F07	-30	P1VP
1	2	3	4	5	6



1. M Series / 1000 In-Lb
2. NEMA 4
3. 115VAC
4. ISO 5211 F07 Mounting
5. 30 seconds / 90 degree
6. Power off Motor Brake & 4-20mA Positioner

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# R SERIES

## 100 IN-LBS, NEMA 4

The R series ultra-compact electric rotary actuator was specifically designed for small ball valve and damper applications.



### SPECIFICATIONS:

TORQUE	100 In-Lb (11.3 Nm)	
CYCLE TIME	2.5 Sec./90	115Vac & 230Vac
	2.9 Sec./90	12Vdc, 24Vdc, 24Vac motor (75%)
DUTY CYCLE	25% standard on 115Vac and 230Vac	
	75% standard on 12Vdc, 24Vdc and 24Vac	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	
CURRENT RATINGS	FL= Full Load, LR= Lock Rotor	

115VAC (Std.)		24VAC		24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
0.40	0.55	0.40	2.40	0.40	2.40	0.60	2.90	0.36	0.72	0.32	0.68

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATIONS	CSA	Master Contract 178618
CANADIAN	CSA C22.2 No. 139-10 Electrically Operated Valves 3rd Edition, Class 3221 02 - Valves – General Purpose Actuators	
UNITED STATES	UL 429 Electrically Operated Valves 7th Edition, Class 3221 82 - Valves – Actuators General Purpose Actuators certified to US Standards	
APPROVED VOLTAGES	12Vdc, 115Vac & 230Vac	
APPROVED TEMP.	-4F (-20C) to 104F (40C)	
APPROVED OPTIONS	Power off Brake, Spring Friction Brake, One or Two Auxiliary Switches (For complete list of options, see option grid in catalog page 33)	
COATING	Thermally bonded polyester powder	
INDICATOR	Visual	Dome style
	Electric	Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	7 (lb)
	Kilogram	3.2 (kg)
MOUNTING	Universal	
MOUNTING PAD	ISO 5211 F03 (9mm star drive), F04 (11mm star drive) AND F03/04 (11mm star drive with F03 bolt circle)	
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)	



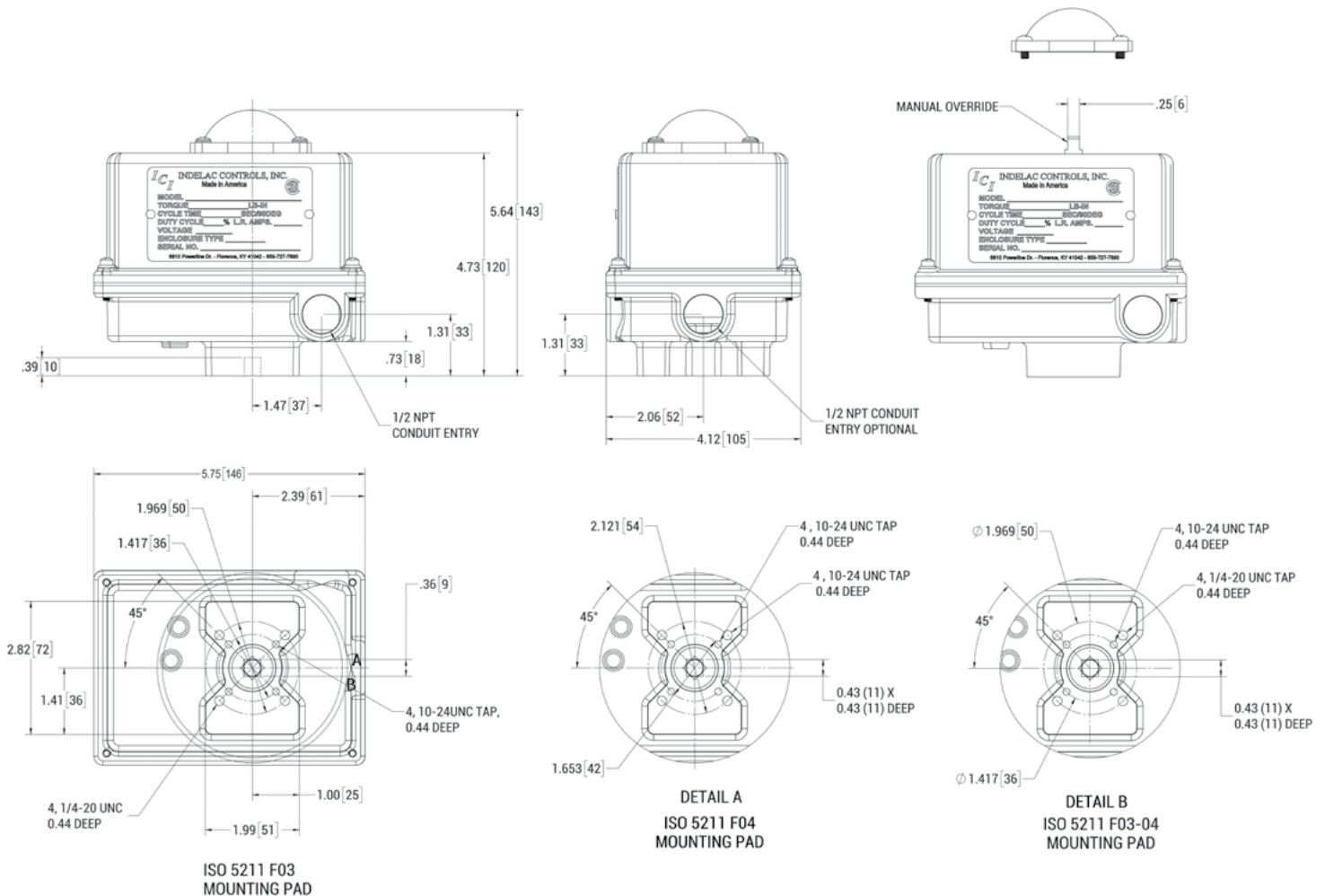
# R SERIES

## 100 IN-LBS, NEMA 4

OVERRIDE

Manual, non-declutching  
 Declutching manual override not available  
 DC voltage cannot be manually operated

### TECHNICAL DRAWING:



# RXP

## 100 IN-LBS, NEMA 7

The RXP model of the R series compact electric rotary actuator is designed for use in hazardous locations.



### SPECIFICATIONS:

TORQUE	100 In-Lb (11.3 Nm)	
CYCLE TIME	2.5 Sec./90	115Vac & 230Vac
	2.9 Sec./90	12Vdc, 24Vdc, 24Vac motor (75%)
DUTY CYCLE	25% standard on 115Vac and 230Vac	
	75% standard on 12Vdc, 24Vdc and 24Vac	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	
CURRENT RATINGS	FL= Full Load, LR= Lock Rotor	

115VAC (Std.)		24VAC		24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
0.40	0.55	0.40	2.40	0.40	2.40	0.60	2.90	0.36	0.72	0.32	0.68

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATIONS	CSA Master Contract 178618	
CLASSIFICATION	Class I Groups C and D, Divisions 1 & 2; Class II Groups E, F & G, Divisions 1 and 2	
CANADIAN	CSA Std. C22.2 No. 139-1982 – Electrically Operated Valves, CSA Std. C22.2 No. 25-1966 – Enclosures for use in Class II, Groups E, F & G Hazardous Locations CSA Std. C22.2 No. 30-M 1986 – Explosion Proof Enclosures for use in Class I Hazardous Locations	
UNITED STATES	UL Std. No. 29, 5th Edition 1999 – Electrically Operated Valves UL Std. No. 1203, 3rd Edition 2000 – Explosion Proof and Dust-Ignition-Proof Electric Equipment for use in Hazardous (Classified) Locations	
APPROVED VOLTAGES	12Vdc, 24Vdc, 115Vac & 230Vac	
APPROVED ENCLOSURES	NEMA Type 4X, Type 7 and IP66	
APPROVED TEMP.	-4F (-20C) to 104F (40C)	
APPROVED OPTIONS	Power off Brake, One or Two Auxiliary Switches, 1K, 5K & 10K Potentiometers, Heater, Heater with Thermostat and Three Position (For complete list of options, see option grid in catalog page 33)	
COATING	Thermally bonded polyester powder	
INDICATOR	Visual	Dome style
Electric	Feedback from limit switches, same as operating voltage	
SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	7 (lb)
	Kilogram	3.2 (kg)
MOUNTING	Universal	

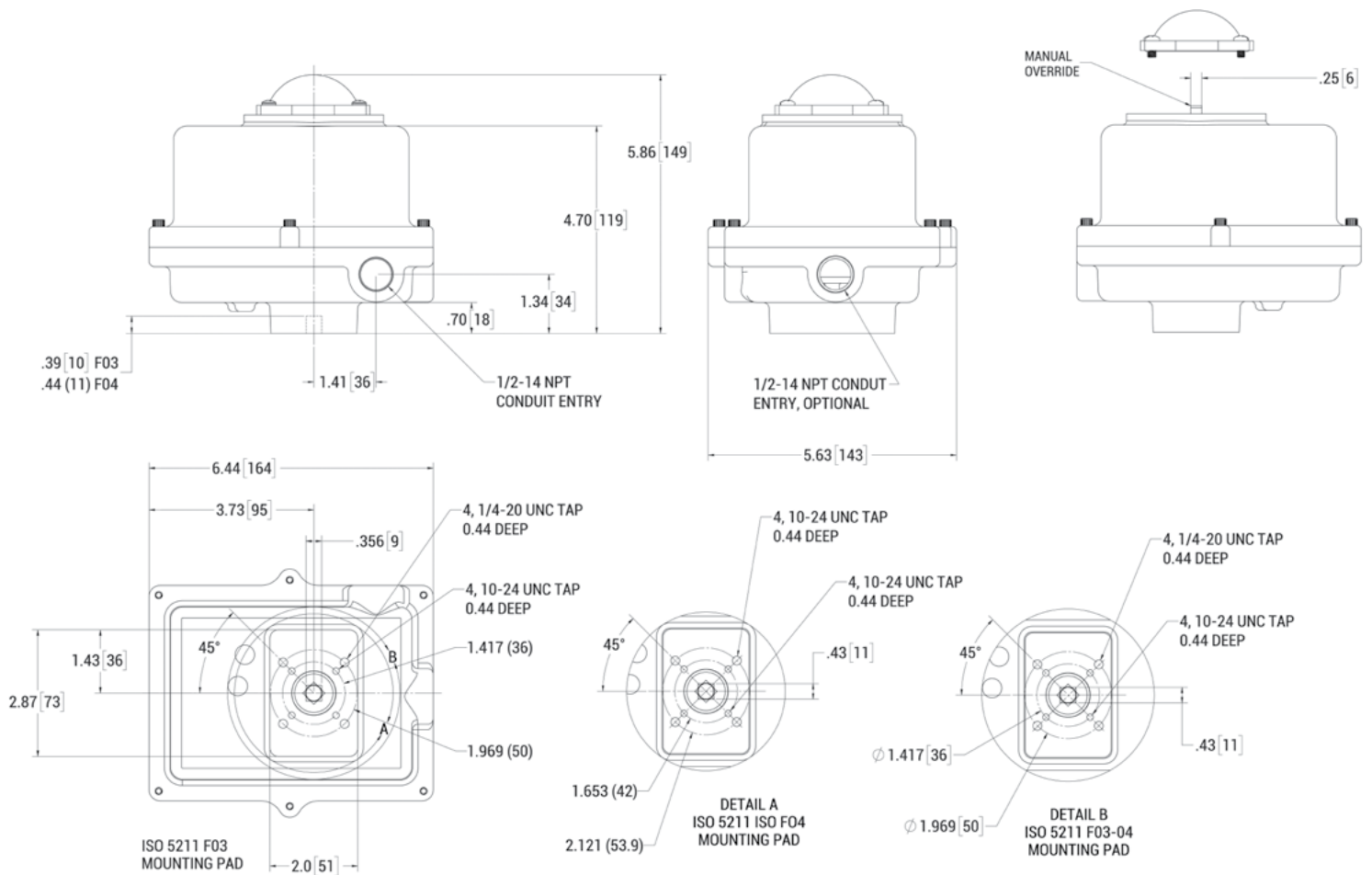


# RXP

## 100 IN-LBS, NEMA 7

MOUNTING PAD	ISO 5211 F03 (9mm star drive), F04 (11mm star drive) or F03/04 (11mm star drive with F03 bolt circle)
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)
OVERRIDE	Manual, non-declutching Declutching manual override not available DC voltage cannot be manually operated

### TECHNICAL DRAWING:



# SD & SDX SERIES

## 200 & 300 IN-LBS, NEMA 4



The SD & SDX are specifically designed for valve sizes from 3/4" to 2" and dampers that do not exceed the rated torque of the actuator.

### SPECIFICATIONS:

**TORQUE** SD 200 In-Lb (22.6 Nm)  
SDX 300 In-Lb (33.9 Nm)

**CYCLE TIME** 5 Sec./90 12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac  
11 Sec./90 115Vac extended duty motor (75%)

**DUTY CYCLE** 25% standard on 115Vac and 230Vac  
75% standard on 12Vdc, 24Vdc and 24Vac, optional on 115Vac extended duty motor

**MOTOR** Permanent split capacitor (for AC) with thermal overload protection

**CURRENT RATINGS** FL= Full Load, LR= Lock Rotor

115VAC (Std.)		24VAC		24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
0.38	0.75	0.70	3.20	0.70	3.20	1.30	4.20	0.28	0.35	0.25	0.35

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

**CERTIFICATIONS** CSA Master Contract 178618  
CANADIAN CSA C22.2 No. 139-10 Electrically Operated Valves 3rd Edition, Class 3221 02 - Valves – General Purpose Actuators

**UNITED STATES** UL 429 Electrically Operated Valves 7th Edition, Class 3221 82 - Valves – Actuators General Purpose Actuators certified to US Standards

**APPROVED VOLTAGES** 12Vdc, 24Vdc & 115Vac  
**APPROVED TEMP.** -4F (-20C) to 104F (40C)  
**APPROVED OPTIONS** Motor brake, spring friction brake, one auxiliary switch and two auxiliary switches (For complete list of options, see option grid in catalog page 33)

**COATING** Thermally bonded polyester powder

**INDICATOR** Visual Dome style  
Electric Feedback from limit switches, same as operating voltage

**SWITCHES** Snap action SPDT, 15A @ 250Vac

**LUBRICATION** Grease Permanent, little or no maintenance required

**WEIGHT** Pound 10 (lb)  
Kilogram 4.54 (kg)

**MOUNTING** Universal

**MOUNTING PAD** ISO 5211 F03, F05 & F07 with 14mm star drive



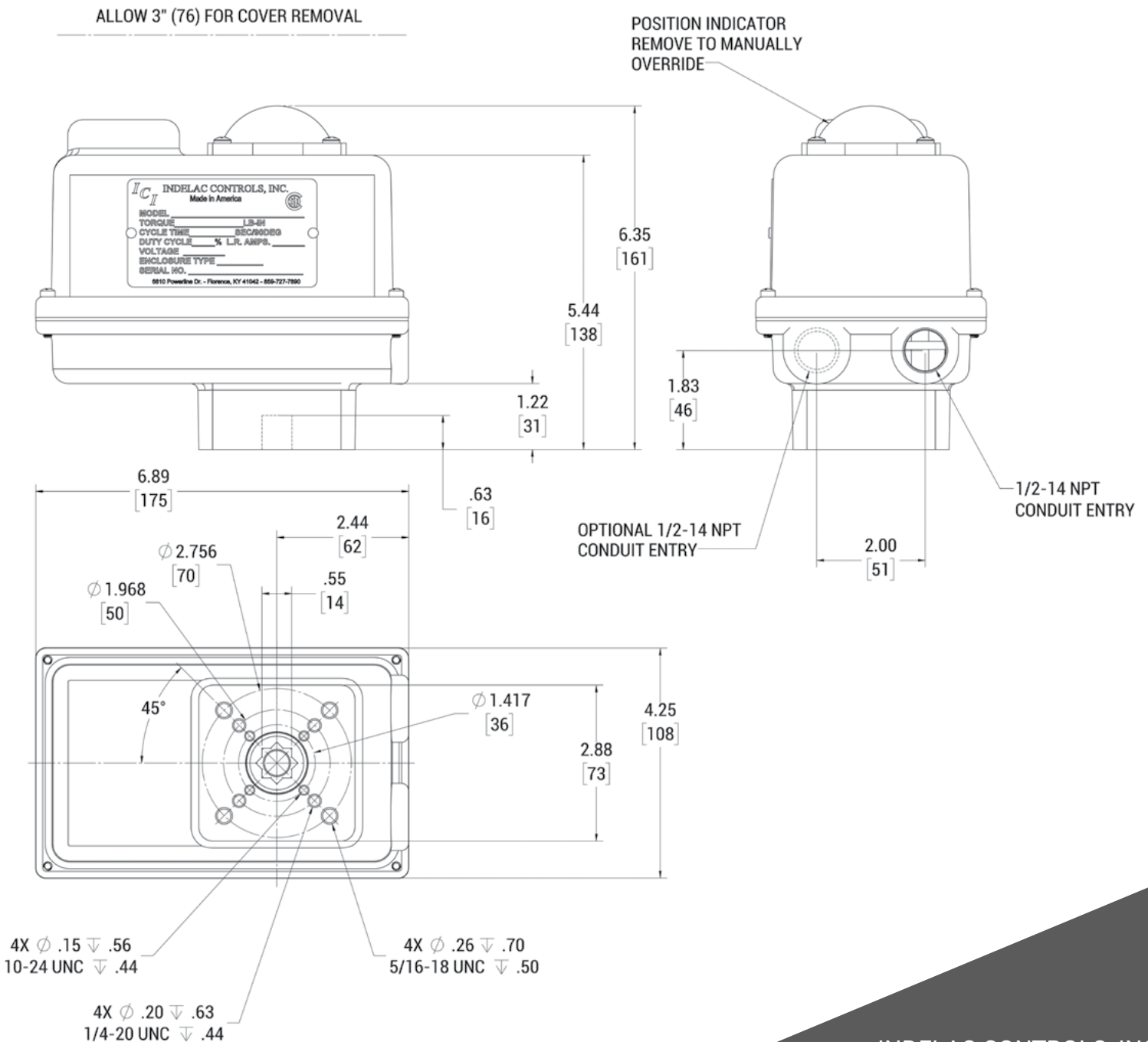


# SD & SDX SERIES

## 200 & 300 IN-LBS, NEMA 4

TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)
OVERRIDE	Manual, non-declutching Declutching manual override optional DC voltage and 75% duty cycle motor must be declutching

### TECHNICAL DRAWING:



# SR & SX SERIES DEEP BASE

## 200 & 300 IN-LBS, NEMA 4

The SR & SX rotary electric actuators were designed for applications within 200 & 300 in-lbs of torque used in general purpose locations when more space is needed inside the enclosure for optional equipment such as analog (4-20mA and 0-10Vdc) control, timers or speed control.



### SPECIFICATIONS:

TORQUE	SR	200 In-Lb (22.6 Nm)
	SX	300 In-Lb (33.9 Nm)
CYCLE TIME	5 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	11 Sec./90	115Vac extended duty motor (75%)
DUTY CYCLE	25% standard on 115Vac and 230Vac	
	75% standard on 12Vdc, 24Vdc and 24Vac, optional on 115Vac extended duty motor	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

115VAC (Std.)		24VAC		24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
0.38	0.75	0.70	3.20	0.70	3.20	1.30	4.20	0.28	0.35	0.25	0.35

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

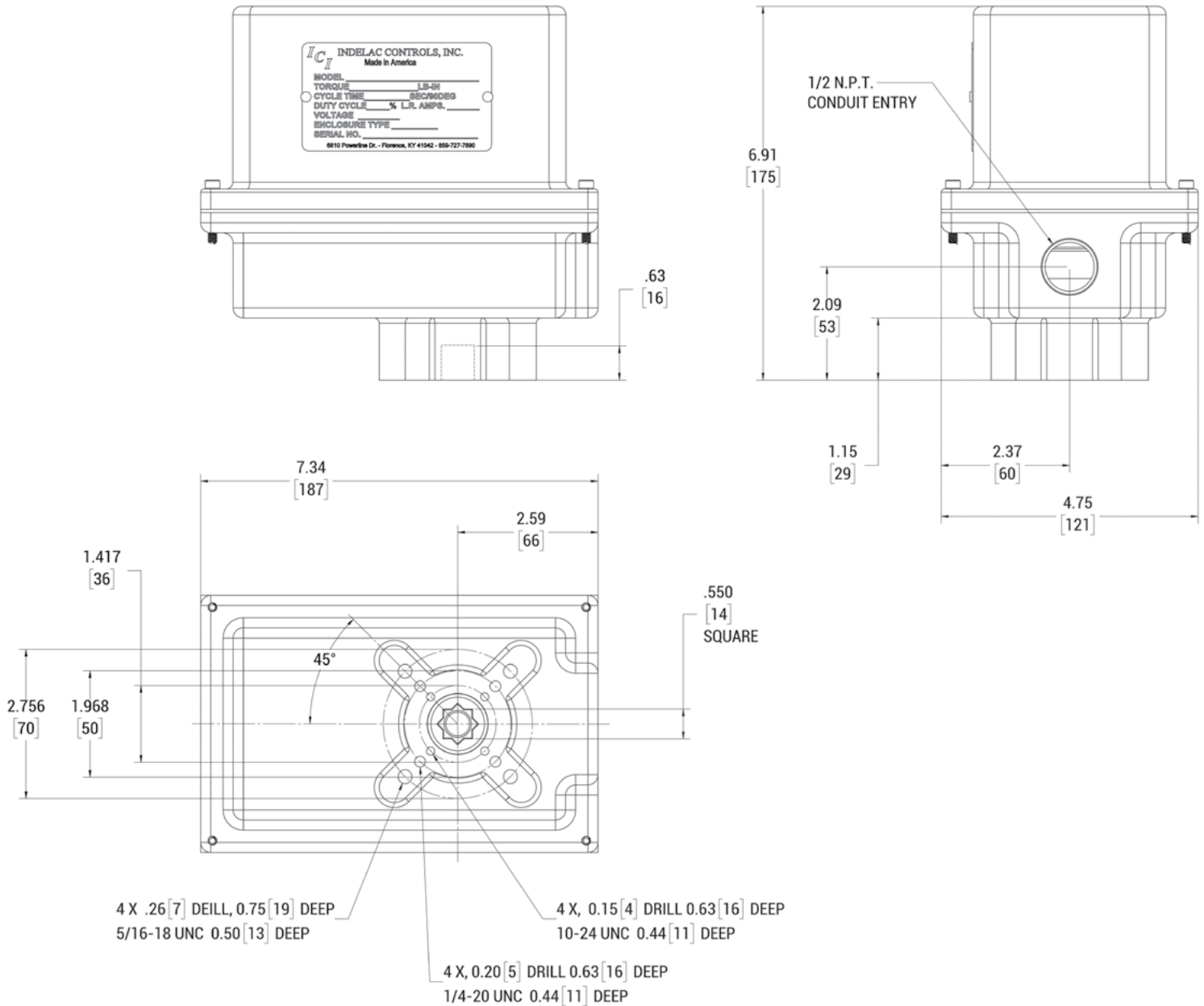
CERTIFICATIONS	None - General Purpose Actuators Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X	
COATING	Thermally bonded polyester powder	
INDICATOR	Visual	Optional
	Electric	Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	14 (lb)
	Kilogram	6.35 (kg)
MOUNTING	Universal	
MOUNTING PAD	ISO 5211 F03, F05 & F07 with 14mm star drive	
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)	
OVERRIDE	Manual, non-declutching optional Declutching manual override optional DC voltage and 75% duty cycle motor must be declutching	



# SR & SX SERIES DEEP BASE

## 200 & 300 IN-LBS, NEMA 4

### TECHNICAL DRAWING:



# SR & SX SERIES

## 200 & 300 IN-LBS, NEMA 7

The SR & SX rotary electric actuators were designed for applications within 200 & 300 in-lbs of torque used in hazardous locations. They can also be used in general purpose locations when more space is needed inside the enclosure for optional equipment such as analog (4-20mA and 0-10Vdc) control, timers or speed control.



### SPECIFICATIONS:

TORQUE	SR	200 In-Lb (22.6 Nm)
	SX	300 In-Lb (33.9 Nm)
CYCLE TIME	5 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	11 Sec./90	115Vac extended duty motor (75%)
DUTY CYCLE	25% standard on 115Vac and 230Vac 75% standard on 12Vdc, 24Vdc and 24Vac, optional on 115Vac extended duty motor	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

115VAC (Std.)		24VAC		24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
0.38	0.75	0.70	3.20	0.70	3.20	1.30	4.20	0.28	0.35	0.25	0.35

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATION	CSA	Master Contract 178618
LOCATION	Hazardous - Class I, Division 1 & 2, Groups C & D; Class II Division 1 & 2, Groups E, F & G	
CANADIAN	CSA C322802 - Valves - Actuators - For Hazardous Locations CAN/CSA - C22.2 No. 139-1982; CAN/CSA - C22.2 No. 25-1966; CAN/CSA- C22.2 No. 30-M1986	
UNITED STATES	Class C322882 - Valves - Actuators - For Hazardous Locations - Certified to US Standards. ANSI/UL 429, Seventh Ed. - 2013; ANSI/UL 1203 Third Ed. - 2000	
CERTIFIED VOLTAGES	12Vdc, 24Vdc & 115Vac	
APPROVED TEMP.	-4F (-20C) to 104F (40C)	
CERTIFIED OPTIONS	Enclosure Type 4, 7 & 9, One, Two or Three Auxiliary Switches, Push Knob Declutching Manual Override, Motor Brake for 12Vdc, 24Vdc & 115Vac, all Feedback Potentiometer options, Modulating Controls LRC, VP, VQ, VP0 & VQ0, Visual Position Indication D, DI, D3L, D3T, TX, TX0 & TQ, Additional Conduit Entry, Heater and Heater with Thermostat (For complete list of options, see option grid in catalog page 33)	
COATING	Thermally bonded polyester powder	
INDICATOR	Visual	Dome Indicator
	Electric	Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	15 (lb)
	Kilogram	6.80 (kg)

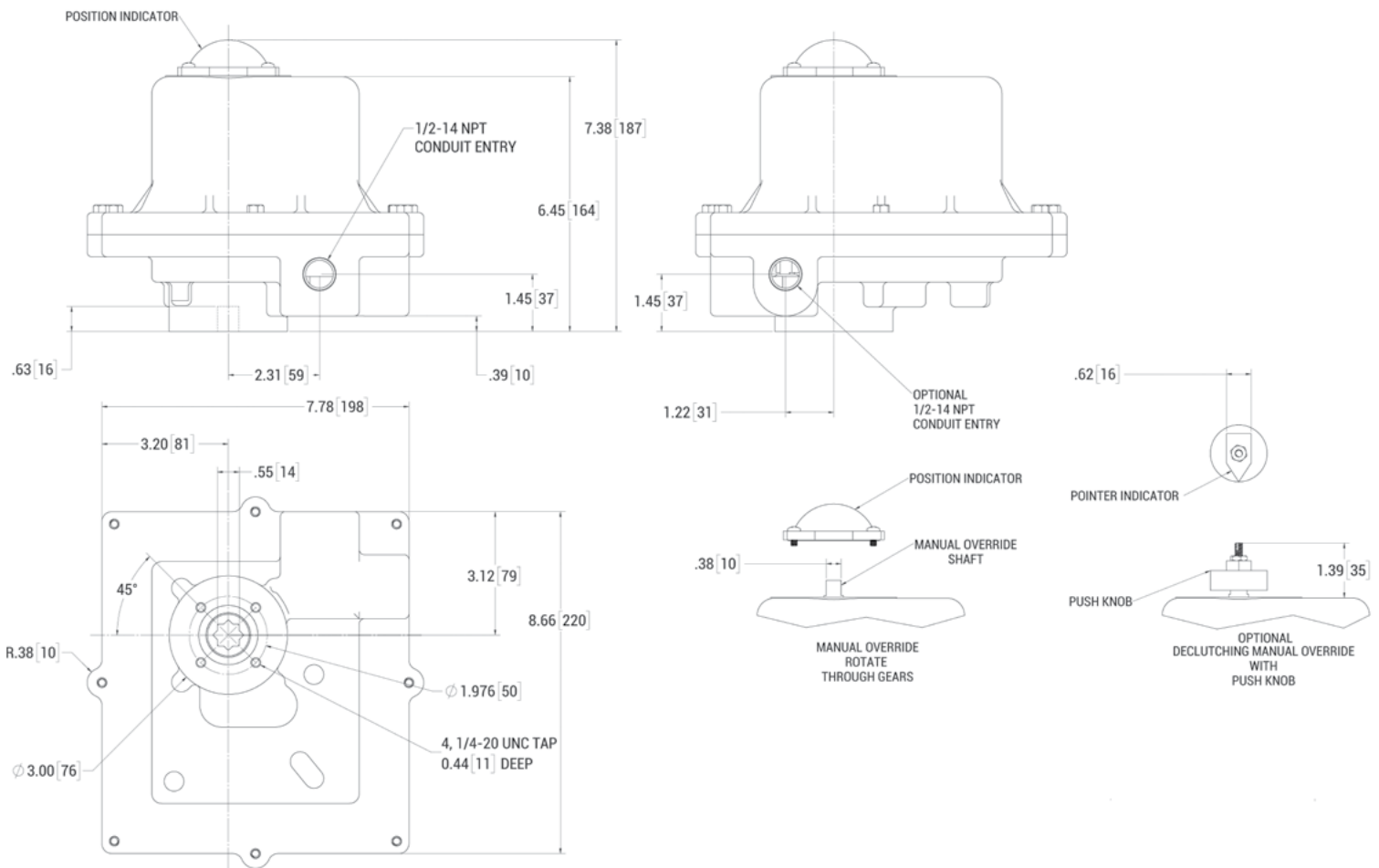


# SR & SX SERIES

## 200 & 300 IN-LBS, NEMA 7

MOUNTING	Universal
MOUNTING PAD	ISO 5211 F05 BC with 14mm star drive
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)
OVERRIDE	Manual, non-declutching Declutching manual override optional DC voltage and 75% duty cycle motor must be declutching

### TECHNICAL DRAWING:



# M SERIES

400, 675, 1000 & 1500 IN-LBS, NEMA 4

The M series rotary electric actuator was designed for small and medium size valve and damper applications. This industrial grade reversing actuator has been manufactured for over thirty years and has achieved an impeccable reputation for reliability in applications requiring repeated superior performance year after year.



## SPECIFICATIONS:

TORQUE	MS	400 In-Lb (45.2 Nm)
	MR	675 In-Lb (76.3 Nm)
	ML	1000 In-Lb (113Nm)
	MH	1500 In-Lb (169.5Nm)

CYCLE TIME	MS	10 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MS	23 Sec./90	115Vac extended duty motor (75%)
	MR & ML	15 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MR & ML	40 Sec./90	115Vac extended duty motor (75%)
	MH	30 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MH	75 Sec./90	115Vac extended duty motor (75%)

DUTY CYCLE 25% standard on 115Vac and 230Vac  
75% standard on 12Vdc, 24Vdc and 24Vac, optional on 115Vac extended duty motor

MOTOR Permanent split capacitor (for AC) with thermal overload protection

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

	115VAC (Std.)		24VAC & 24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
MS & MR	0.38	0.75	0.90	3.20	1.70	4.20	0.21	0.42	0.18	0.38
ML & MH	0.8	0.75	1.10	3.20	2.20	4.20	0.21	0.42	0.18	0.38

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATION	CSA	Master Contract 178618
CLASSIFICATION	3221 02 – Valves – Actuators; 3221 82 – Valves – Actuators Certified to US Standards	
CANADIAN	C22.2 No. 139-1982 (Reaffirmed 2000) – Electrically Operated Valves	
	C22.2 No. 94-M91 (Reaffirmed 2001) – Special Purpose Enclosures	
UNITED STATES	UL 429, 5th Edition (8 Oct 2004) – Electrically Operated Valves	
	UL 50, 11th Edition (12 Sep 2003) – Enclosures for Electrical Equipment	

APPROVED VOLTAGES	115Vac
APPROVED ENCLOSURE	Type 4
APPROVED TEMP.	-4F (-20C) to 104F (40C)
APPROVED OPTIONS	One or Two Auxiliary Switches, Decutching Manual Override with Hand Wheel, Friction Brake, Power On Brake and Power Off Brake for 115Vac (For complete list of options, see option grid in catalog page 33)

COATING Thermally bonded polyester powder

POSITION INDICATOR	Visual	Dome Indicator
	Electric	Feedback from limit switches, same as operating voltage

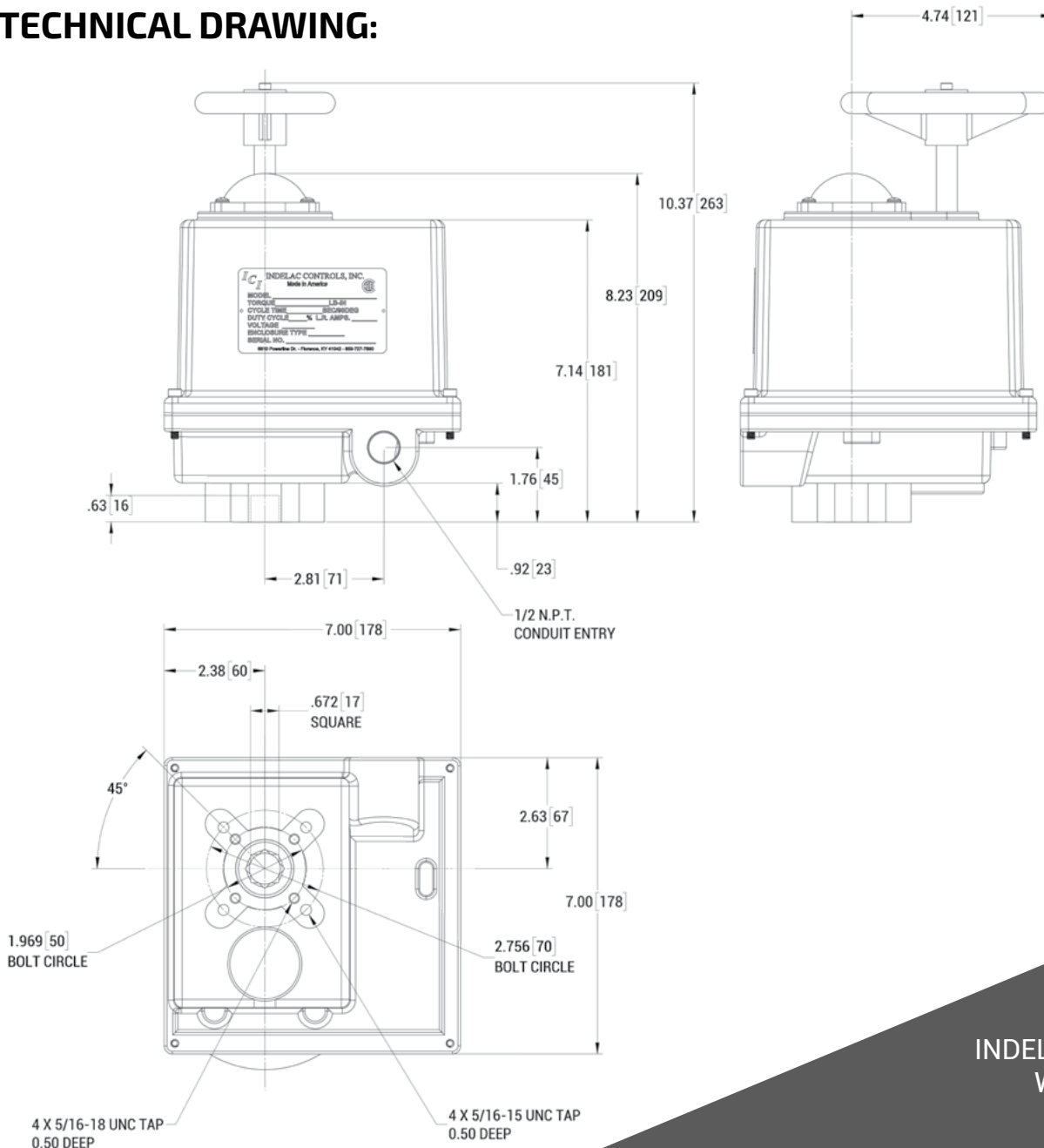


# M SERIES

400, 675, 1000 & 1500 IN-LBS, NEMA 4

SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	MS, MR & ML – 16 (lb)    MH – 22 (lb)
	Kilogram	MS, MR & ML – 7.26 (kg)    MH – 10 (kg)
MOUNTING	Universal	
MOUNTING PAD	ISO 5211 F05 & F07 with 17mm star drive	
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)	
OVERRIDE	Manual, Declutching Hand Wheel	

## TECHNICAL DRAWING:





# M SERIES

400, 675, 1000 & 1500 IN-LBS, NEMA 7

The M Series NEMA 7 electric actuator was designed for applications in hazardous locations.



## SPECIFICATIONS:

TORQUE	MS	400 In-Lb (45.2 Nm)
	MR	675 In-Lb (76.3 Nm)
	ML	1000 In-Lb (113Nm)
	MH	1500 In-Lb (169.5Nm)

CYCLE TIME	MS	10 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MS	23 Sec./90	115Vac extended duty motor (75%)
	MR & ML	15 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MR & ML	40 Sec./90	115Vac extended duty motor (75%)
	MH	30 Sec./90	12Vdc, 24Vdc, 24Vac, 115Vac & 230Vac
	MH	75 Sec./90	115Vac extended duty motor (75%)

DUTY CYCLE 25% standard on 115Vac and 230Vac  
75% standard on 12Vdc, 24Vdc and 24Vac, optional on 115Vac extended duty motor

MOTOR Permanent split capacitor (for AC) with thermal overload protection

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

	115VAC (Std.)		24VAC & 24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
MS & MR	0.38	0.75	0.90	3.20	1.70	4.20	0.21	0.42	0.18	0.38
ML & MH	0.8	0.75	1.10	3.20	2.20	4.20	0.21	0.42	0.18	0.38

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATION CSA Master Contract 178618  
CLASSIFICATION Class I, Division 1 & 2, Groups C & D; Class II Division 1 & 2, Groups E, F & G  
CANADIAN CSA C322802 – Valves – Actuators – For Hazardous Locations, CAN/CSA – C22.2 No. 139-1982; CAN/CSA – C22.2 No. 25-1966; CAN/CSA- C22.2 No. 30-M1986

APPROVED VOLTAGES 12Vdc, 24Vdc & 115Vac  
APPROVED ENCLOSURES Enclosure Type 4, 7 & 9  
APPROVED TEMP -4F (-20C) to 104F (40C)  
APPROVED OPTIONS One, Two or Three Auxiliary Switches, Declutching Manual Override with Hand Wheel, Motor Brake for 12Vdc, 24Vdc & 115Vac, all Feedback Potentiometer options, Modulating Controls LRC, VP, VQ, VP0 & VQ0, Visual Position Indication D, DI, D3L, D3T, TX, TX0 & TQ, Additional Conduit Entry, Heater and Heater with Thermostat (For complete list of options, see option grid in catalog page 33)

COATING Thermally bonded polyester powder

POSITION INDICATOR Visual Dome Indicator  
Electric Feedback from limit switches, same as operating voltage

SWITCHES Snap action SPDT, 15A @ 250Vac

LUBRICATION Grease Permanent, little or no maintenance required



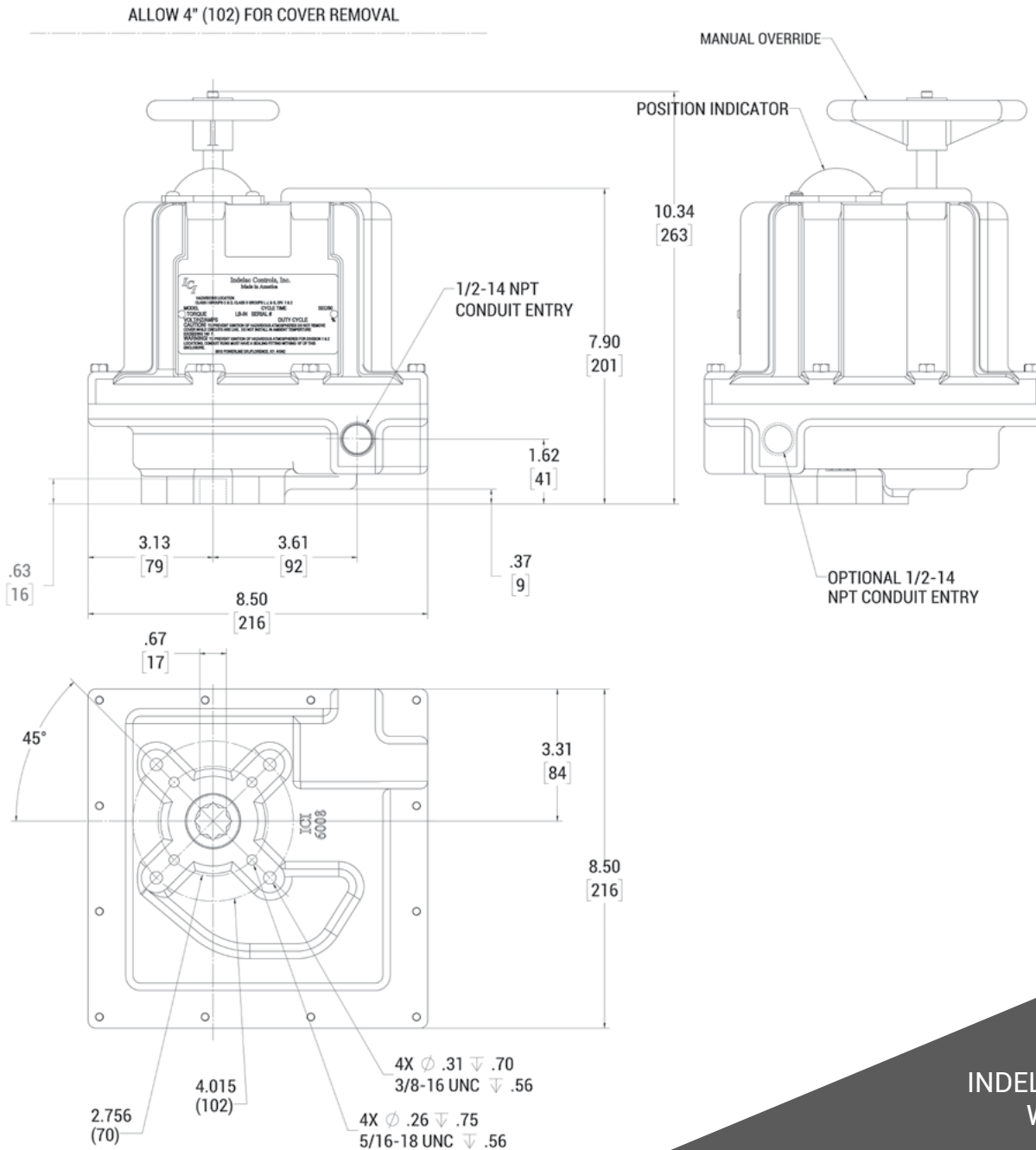


# M SERIES

400, 675, 1000 & 1500 IN-LBS, NEMA 7

WEIGHT	Pound	MS, MR & ML – 21 (lb)	MH – 22 (lb)
	Kilogram	MS, MR & ML – 9.52 (kg)	MH – 10 (kg)
MOUNTING	Universal		
MOUNTING PAD	ISO 5211 F07 & F10 with 17mm star drive		
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)		
OVERRIDE	Manual, Declutching Hand Wheel		

## TECHNICAL DRAWING:



# L SERIES

700, 1200, 2000 & 3840 IN-LBS  
NEMA 4 AND/OR 7



ICI's L series rotary electric actuator was designed for valve and damper applications requiring from 700 up to 3,840 in-lbs of torque. This industrial grade reversing actuator has been manufactured since 1991 and is well known for its dependability in harsh applications where reliability is of the utmost importance.

## SPECIFICATIONS:

TORQUE	LA-5	700 In-Lb (79 Nm)
	LA-12	2000 In-Lb (226 Nm)
	LX-5	1200 In-Lb (135.6 Nm)
	LX-14	3840 In-Lb (433.9 Nm)
CYCLE TIME	LA-5	5 Sec./90
	LA-12	12 Sec./90
	LX-5	5 Sec./90
	LX-14	14 Sec./90
DUTY CYCLE	12Vdc, 24Vdc, 24Vac & 115Vac 100%	
	230Vac-1Ph 30 minute continuous run	
	230Vac-3Ph & 460Vac-3Ph 30 minute continuous run (NEMA 4 only)	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

	115VAC (Std.)		24VAC & 24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
LA	1.20	2.90	3.70	25.00	6.90	48.00	1.54	2.50	1.40	2.00
LX	1.20	2.90	5.00	25.00	5.00	48.00	1.54	2.50	1.40	2.00

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CERTIFICATION	CSA	Master Contract 178618
CLASSIFICATION	Class I, Division 1 & 2, Groups C & D; Class II Division 1 & 2, Groups E, F & G	
CANADIAN	CSA C3228 02 – Valves – Actuators – For Hazardous Locations, CSA C3229 82 – Valves – Actuators – For Hazardous Locations – Certified to US Standards CSA – C22.2 No. 0-M1991; CSA – C22.2 No. 139-1982; CSA – C22.2 No. 0.4-04; CSA – C22.2 No. 25-1966; CSA – C22.2 No. 94-M91; CSA- C22.2 No. 30-M1986; UL 1002, 6th Ed.; UL 429, 5th Ed.; UL 50 11th Ed.	
APPROVED VOLTAGES	115Vac	
APPROVED ENCLOSURES	Enclosure Type 4, 4X, 7 & 4-7	
APPROVED TEMP.	-4F (-20C) to 104F (40C)	
APPROVED OPTIONS	One or Two, Declutching Manual Override with Hand Wheel, Motor Brake for 115Vac, Visual Position Indicator, Special Mounting Pad Configurations and Mechanical Stop (For complete list of options, see option grid in catalog page 33)	
COATING	Thermally bonded polyester powder	
POSITION INDICATOR	Visual	Dome Indicator
	Electric	Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac





# K SERIES

FROM 5,000 TO 27,300 IN-LBS  
NEMA 4 AND/OR 7

The K series of heavy-duty reversing actuators were developed in 1995 and meet AWWA standards. ICI's K series rotary electric actuator is a machine that was designed to automate quarter turn equipment requiring up to 27,300 In-Lbs of torque. The K series actuators are equipped with a combination of spur gear / worm gear drive train providing efficient and quiet operation, resistance to back driving and long maintenance free service.



5K up to 14K Shown

## SPECIFICATIONS:

TORQUE	5K	5000 In-Lb (565 Nm)
	7K	7020 In-Lb (793 Nm)
	12K	11500 In-Lb (1302 Nm)
	14K	14040 In-Lb (1586 Nm)
	19K	19020 In-Lb (2149 Nm)
	27K	27300 In-Lb (3084 Nm)
CYCLE TIME	5K & 7K	38 Sec. / 90; 12Vdc = 45 Sec. / 90; 24Vdc = 21 sec. / 90
	12K & 14K	58 Sec. / 90; 24Vdc = 43 sec. / 90
	19K	114 Sec. / 90; 12Vdc = 45 Sec. / 90; 24Vdc = 59 sec. / 90
	27K	136 Sec. / 90
DUTY CYCLE	12Vdc, 24Vdc, 24Vac 100%	
	115Vac - 1Ph 30 minute continuous run	
	230Vac - 1Ph 30 minute continuous run	
	230Vac - 3Ph & 460Vac-3Ph 30 minute continuous run	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	
CURRENT RATINGS	FL= Full Load, LR= Lock Rotor	

	115VAC (Std.)		24VAC & 24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
5K to 14K	2.50	4.00	14.00	32.60	16.50	38.50	1.50	2.20	1.40	2.00
14K to 27K	5.4	15.00	CF	CF	CF	CF	CF	CF	CF	CF

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended  
\* Reduce actuator torque 10% for sizing purposes

CERTIFICATIONS	None - General Purpose Actuators	
Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available	Designed to meet AWWA C540 standards	
COATING	Thermally bonded polyester powder	
POSITION INDICATOR	Visual	Dome Indicator
	Electric	Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac
TORQUE SENSOR	Mechanical, set for torque at full load amp draw	



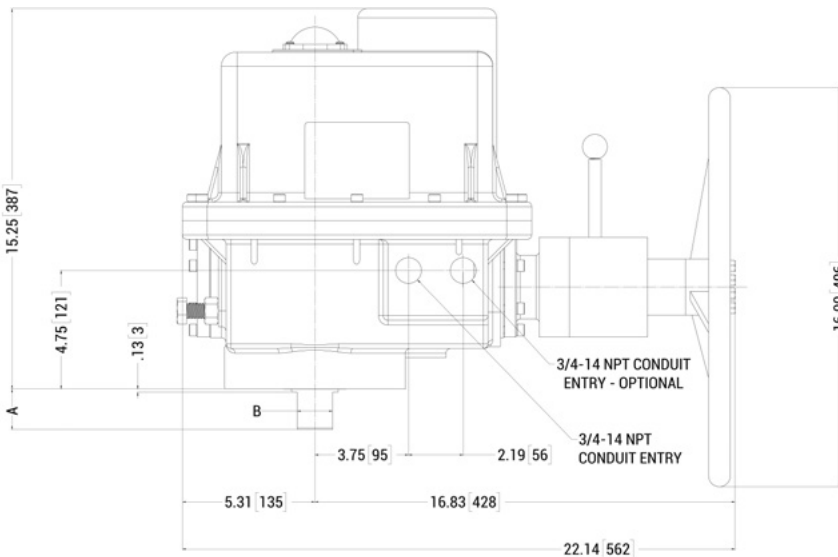
# K SERIES

## FROM 5,000 TO 27,300 IN-LBS

### NEMA 4 AND/OR 7

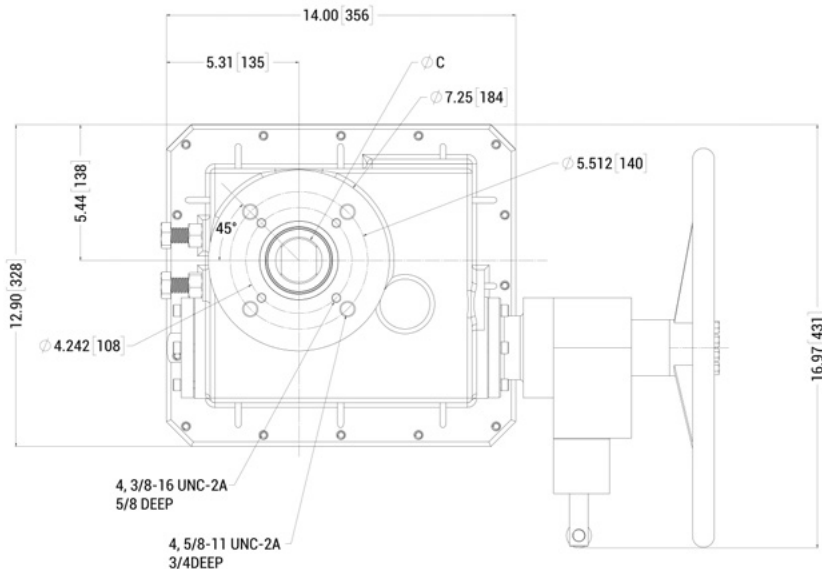
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	5K up to 14K 19K & 27K	110 Pounds (50 kg) 195 Pounds (88.5 kg)
MOUNTING	Universal	
MOUNTING PAD	5K 7K to 14K 19K 27K	ISO 5211 F14 & 4.242" Bolt Circle with 22.2mm Double "D" Male Drive ISO 5211 F14 & 4.242" Bolt Circle with 36.1mm Double "D" Male Drive ISO 5211 F14 Bolt Circle with 36mm Double "D" Male Drive 7.50" Bolt Circle with 2.375" Bore & 0.625" Keyway
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)	
OVERRIDE	Manual, Declutching Hand Wheel	

### 5K TO 14K TECHNICAL DRAWING: *(19K and 27K technical drawing on next page)*



Model	5K	7K to 14K
A	1.19 (30)	1.63 (41.4)
B *	0.872 (22.1)	1.415 (63.1)
C	1.13 (28)	1.87 (47.5)

\* +/- 0.002

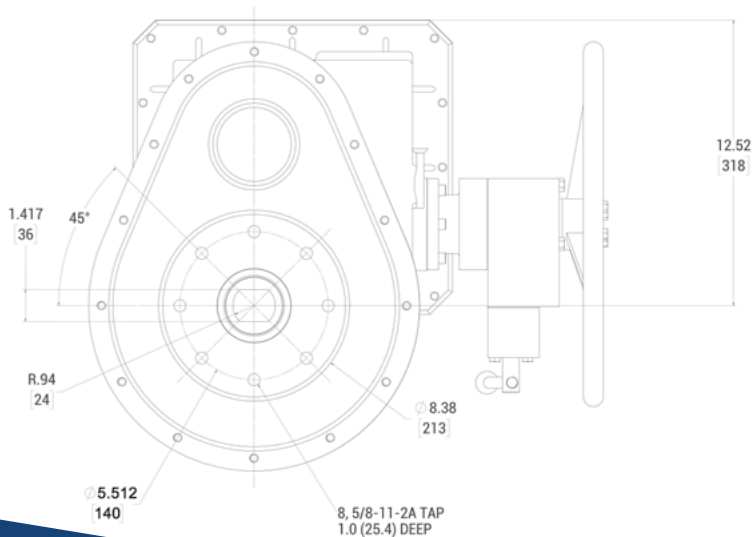
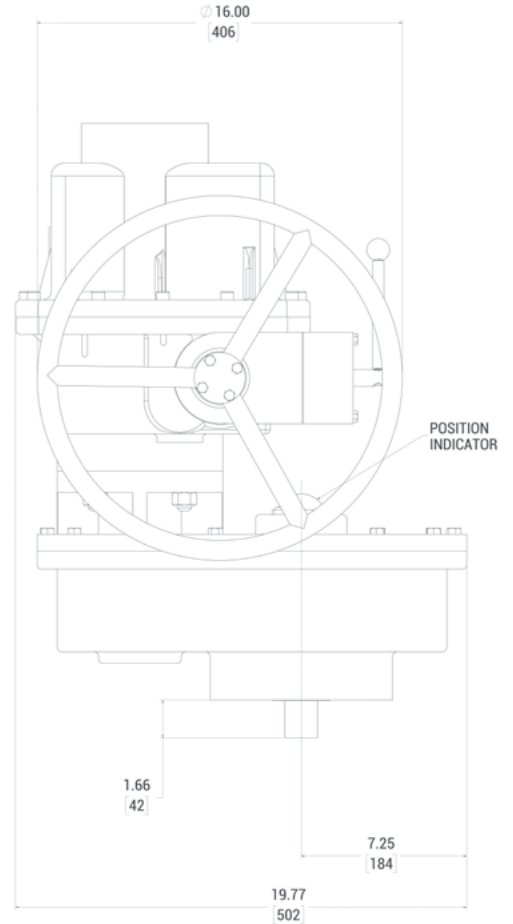
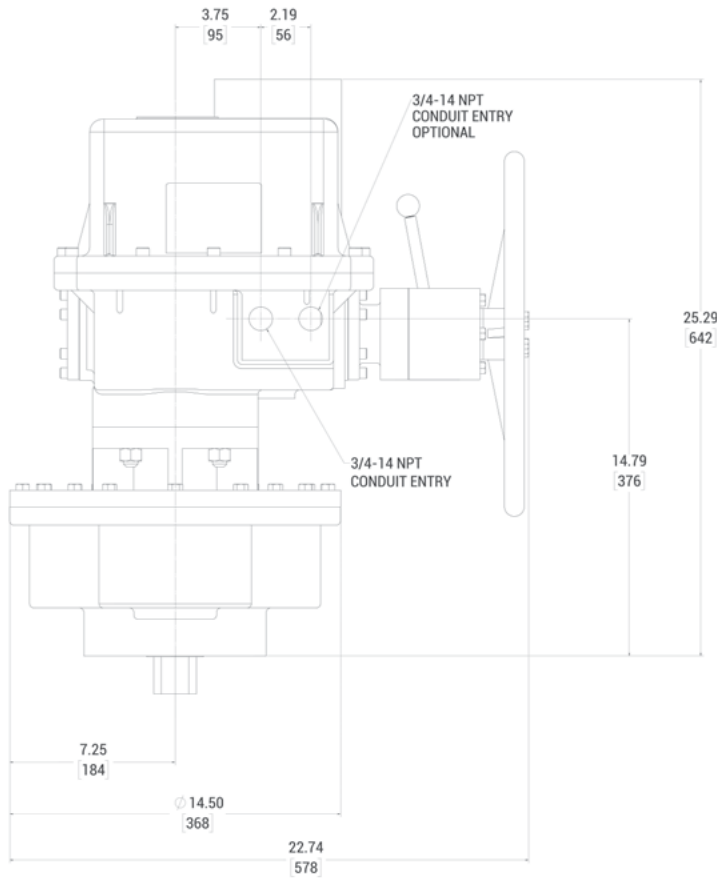


# K SERIES

FROM 5,000 TO 27,300 IN-LBS  
NEMA 4 AND/OR 7

## 19K TECHNICAL DRAWING:

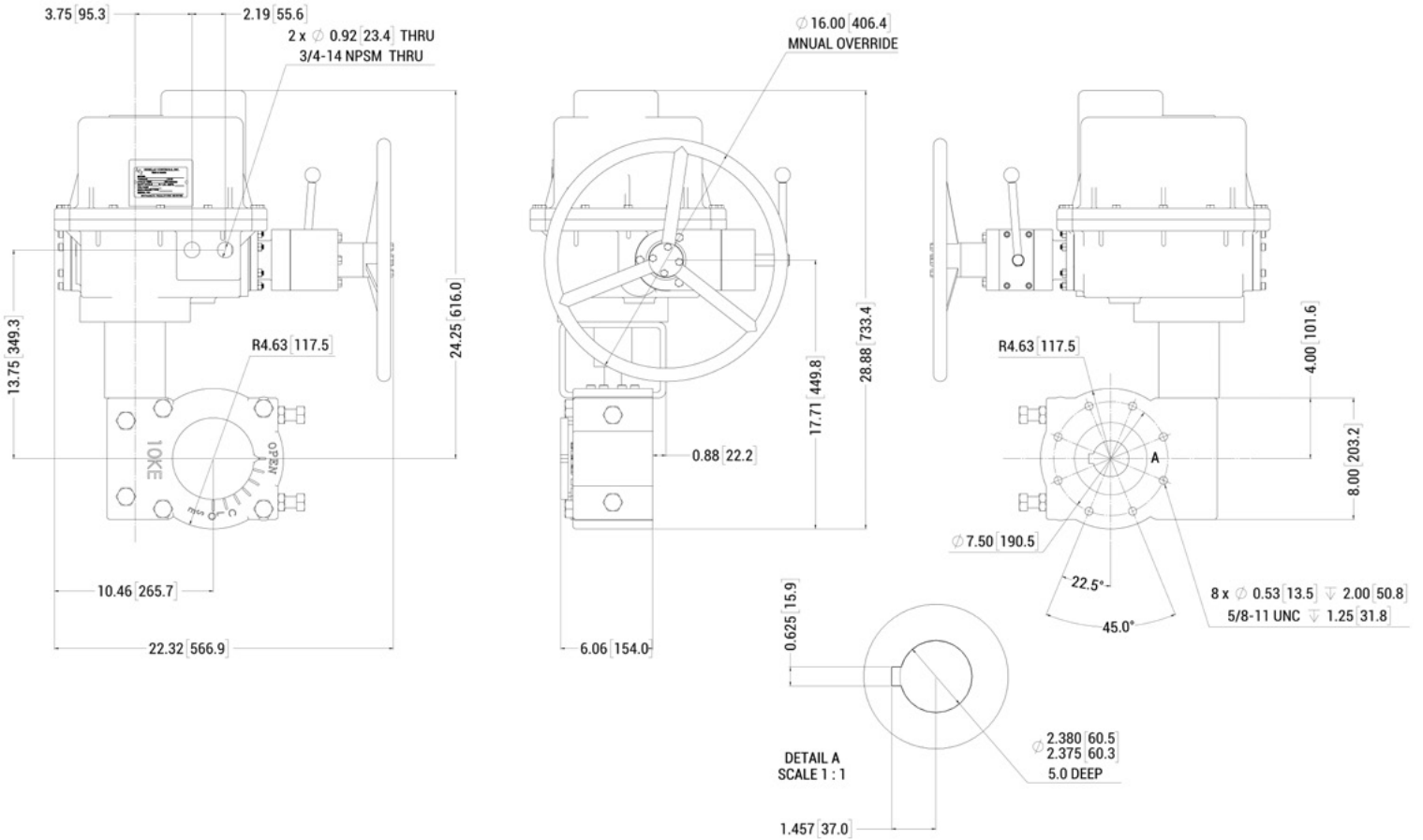
ALLOW 7" FOR COVER REMOVAL



# K SERIES

FROM 5,000 TO 27,300 IN-LBS  
NEMA 4 AND/OR 7

## 27K TECHNICAL DRAWING:



# ES2

## 200 IN-LBS, NEMA 4 AND/OR 7

Indelac's ES2 spring return electric actuators are light duty, quarter turn rotary actuators. These high quality, American made actuators have been designed for use as a fail-safe solution in the industrial valve and damper automation industry. They are recommended for applications requiring system protection from unforeseen power failures.



### SPECIFICATIONS:

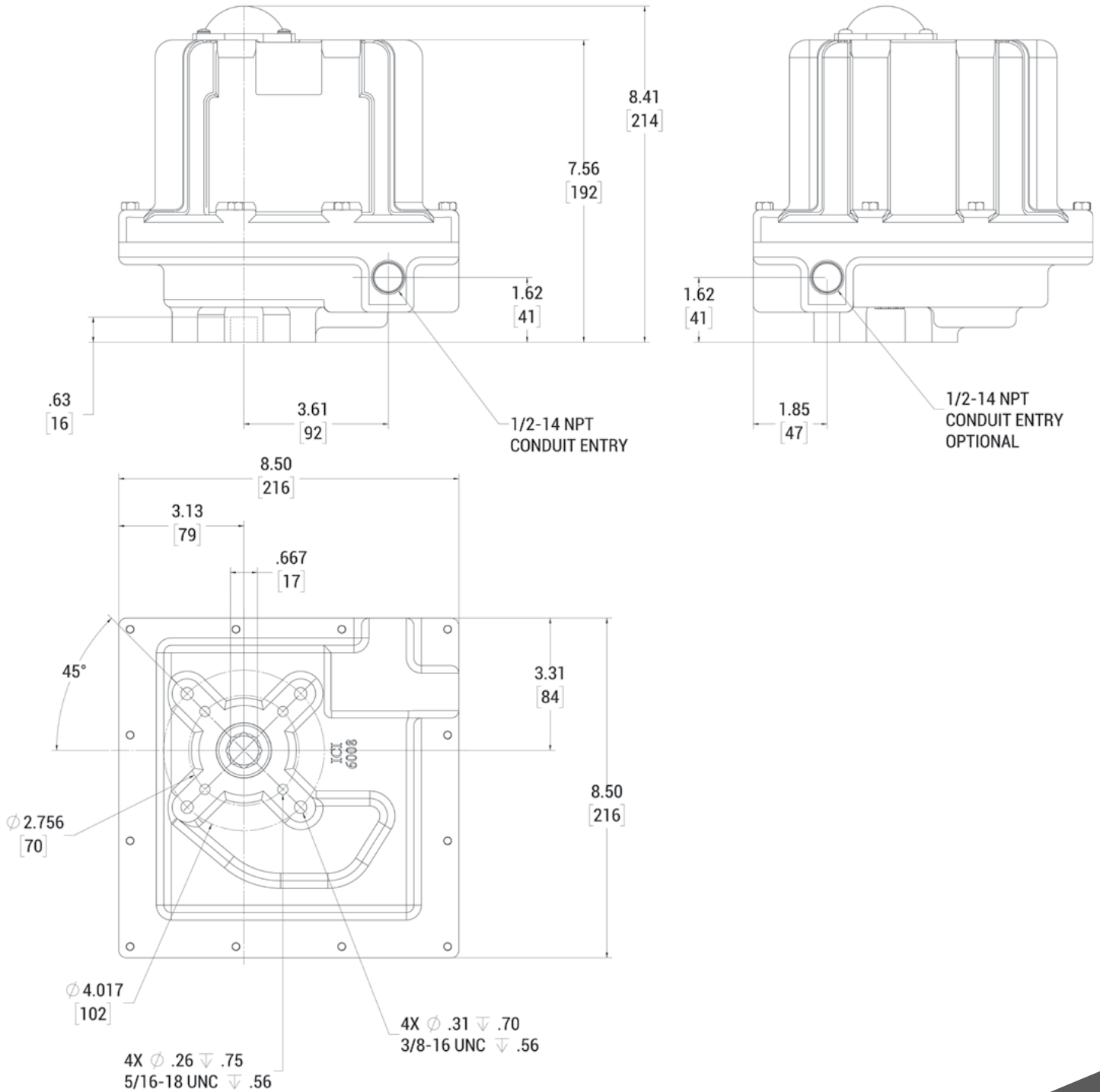
TORQUE	200 In-Lb (22.6 Nm) spring end	
CYCLE TIME	10 sec. / 90° electric, 2 sec. / 90° spring	
DUTY CYCLE	25%	
MOTOR	115Vac ONLY permanent split capacitor with thermal overload protection	
CURRENT RATINGS	.38 FL (Full Load) Amps, .75 LR (Lock Rotor) Amps The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended	
MOTOR BRAKE	Power ON	
CERTIFICATIONS	None - General Purpose Actuators Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available	
COATING	Thermally bonded polyester powder	
INDICATOR Electric	Visual	Dome Indicator Feedback from limit switches, same as operating voltage
SWITCHES	Snap action	SPDT, 15A @ 250Vac
LUBRICATION	Grease	Permanent, little or no maintenance required
WEIGHT	Pound	22 (lb)
	Kilogram	10 (kg)
MOUNTING	Universal	
MOUNTING PAD	ISO 5211 F07 & F10 with 17mm star drive	
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)	
MAX. CYCLES	1,900 power OPEN and power CLOSE, spring fail is to be reserved for emergency use only *	
* Allowing this actuator to spring fail as a part of normal operation will severely limit the life expectancy of the product and waives the product warranty		





**ES2**  
 200 IN-LBS, NEMA 4 AND/OR 7

**TECHNICAL DRAWING:**

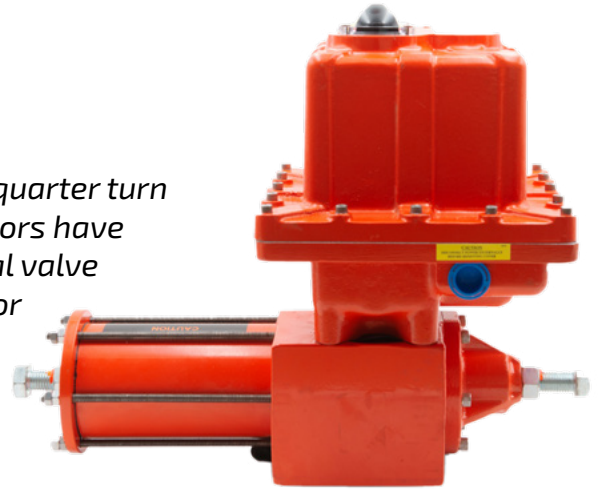


# AS SERIES

## 400, 600 & 1000 IN-LBS

### NEMA 4 AND/OR 7

Indelac's AS Series spring return actuators are heavy duty, quarter turn rotary actuators. These high quality, American made actuators have been designed for use as a fail-safe solution in the industrial valve and damper automation industry. They are recommended for applications requiring system protection from unforeseen power failures.



### SPECIFICATIONS:

TORQUE	Start	End
	AS4 600 In-Lb (67.8 Nm)	400 In-Lb (45.2 Nm)
	AS6 800 In-Lb (90.4 Nm)	600 In-Lb (67.8 Nm)
	AS10 1,200 In-Lb (135.6 Nm)	1,000 In-Lb (113 Nm)
CYCLE TIME	12 sec. / 90° electric, 2 sec. / 90° spring	
DUTY CYCLE	25%	
MOTOR	Permanent split capacitor (for AC) with thermal overload protection	

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

115VAC (Std.)		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
FL	LR	FL	LR	FL	LR
2.50	4.00	1.50	2.20	1.40	2.00

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

MOTOR BRAKE	Power ON		
CERTIFICATIONS	None - General Purpose Actuators Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available		
COATING	Thermally bonded polyester powder		
INDICATOR	Visual	Dome Indicator	
	Electric	Feedback from limit switches, same as operating voltage	
SWITCHES	Snap action	SPDT, 15A @ 250Vac	
LUBRICATION	Grease	Permanent, little or no maintenance required	
WEIGHT	Pound	AS4 & AS6 – 68 (lb)	AS10 – 78 (lb)
	Kilogram	AS4 & AS6 – 30.8 (kg)	AS10 – 35.4 (kg)
MOUNTING	Universal		
MOUNTING PAD	AS4 & AS6	ISO 5211 F07 with .66" Square Male Drive	
	AS10	ISO 5211 F10 with 1.00" Square Male Drive	
TEMPERATURE	-40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below Optional double heater for application down to -76F (-60C)		



# AS SERIES

## 400, 600 & 1000 IN-LBS

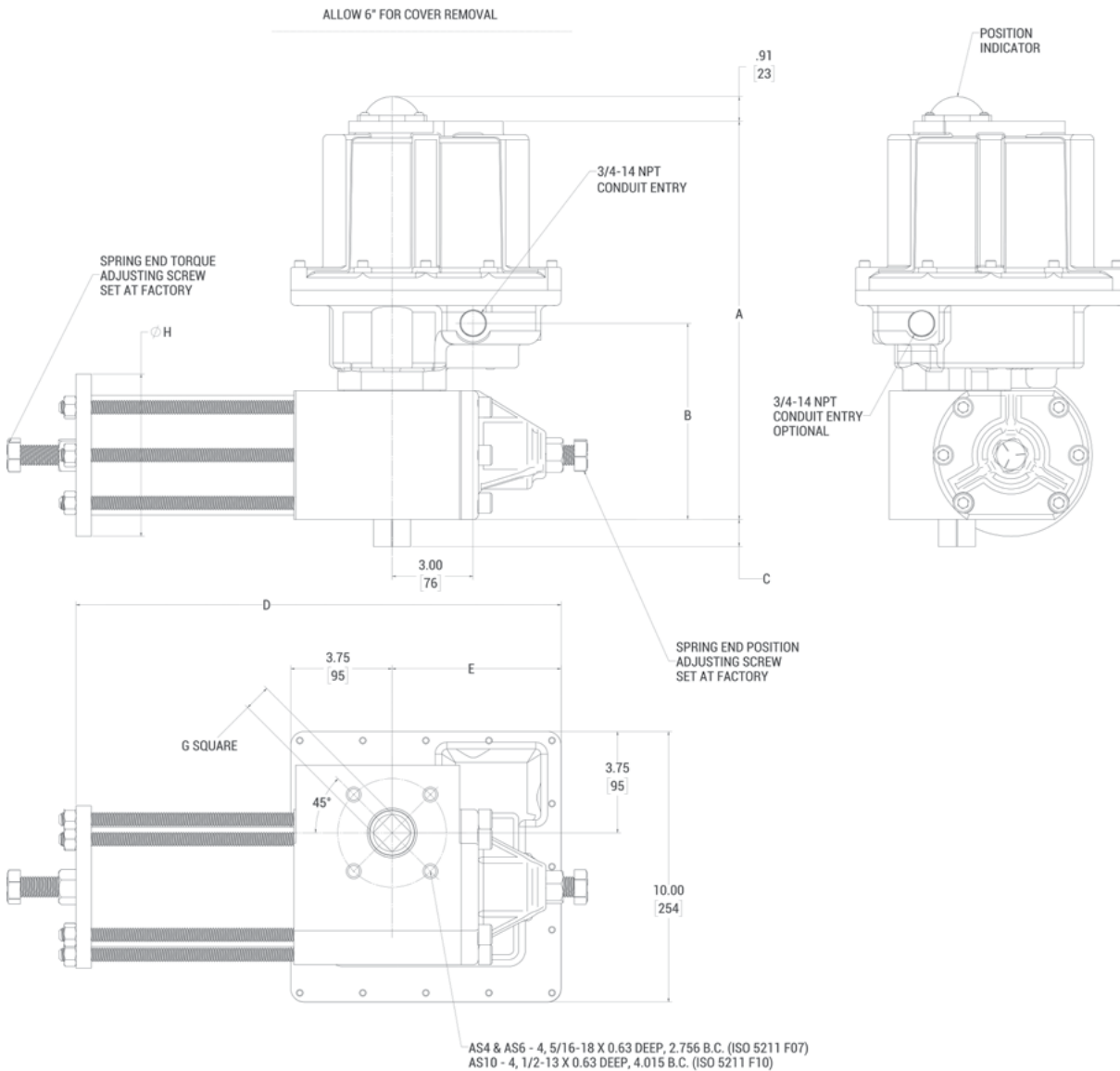
### NEMA 4 AND/OR 7

MAX. CYCLES

25 power OPEN and power CLOSE cycles per day, spring fail is to be reserved for emergency use only \*

\* Allowing this actuator to spring fail as a part of normal operation will severely limit the life expectancy of the product and waives the product warranty

### TECHNICAL DRAWING:

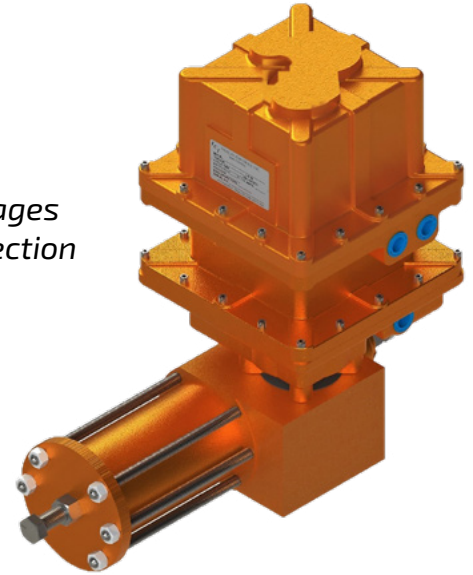


Model	A	B	C	D	E	G	H
AS4 & AS6	14.69	4.69	0.75	15.66	5.06	0.660	5.0
	(373)	(119)	(19)	(397.8)	(128.5)	(16.76)	(127)
AS10	15.06	4.88	1.0	17.0	5.88	1.0	6.0
	(382.5)	(124)	(25.4)	(431.8)	(149.4)	(25.4)	(152.4)

# ACS SERIES

400, 600, 1000 & 1200 IN-LBS  
NEMA 4 AND/OR 7

The ASC Series spring return actuators are compatible with DC voltages and can be used for modulating applications requiring system protection from unforeseen power failures.



## SPECIFICATIONS:

TORQUE	Start		End
	ASC4	600 In-Lb (67.8 Nm)	400 In-Lb (45.2 Nm)
	ASC6	800 In-Lb (90.4 Nm)	600 In-Lb (67.8 Nm)
	ASC10	1,200 In-Lb (135.6 Nm)	1,000 In-Lb (113 Nm)
	ASC12	1,400 In-Lb (158.2 Nm)	1,200 In-Lb (135.6 Nm)

CYCLE TIME 12 sec. / 90° electric, 2 sec. / 90° spring

DUTY CYCLE ASC 4 up to ASC 10 75%  
ASC12 30 minute continuous run

MOTOR Permanent split capacitor (for AC) with thermal overload protection

CURRENT RATINGS FL= Full Load, LR= Lock Rotor

	115VAC (Std.)		24VAC & 24VDC		12VDC		208VAC/1PH/60HZ		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR	FL	LR
ASC4-10	1.60	2.90	3.70	25.00	6.90	48.00	1.20	2.20	1.03	2.00
ASC12	2.80	4.10	5.00	25.00	10.00	48.00	1.20	2.20	1.03	2.00

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

CLUTCH Electro-magnetic

CERTIFICATIONS None - General Purpose Actuators  
Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available

COATING Thermally bonded polyester powder

INDICATOR Electric Feedback from limit switches, same as operating voltage

SWITCHES Snap action SPDT, 15A @ 250Vac

LUBRICATION Grease Permanent, little or no maintenance required

WEIGHT Pound 110 (lb)  
Kilogram 49.9 (kg)

MOUNTING Universal

MOUNTING PAD ACS4 & ASC6 ISO 5211 F07 with .66" Square Male Drive  
ASC10 & ASC12 ISO 5211 F10 with 1.00" Square Male Drive

TEMPERATURE -40F (-40C) to 150F (65.6C), heater & thermostat required 0F and below  
Optional double heater for application down to -76F (-60C)



# ACS SERIES

## 400, 600, 1000 & 1200 IN-LBS

### NEMA 4 AND/OR 7

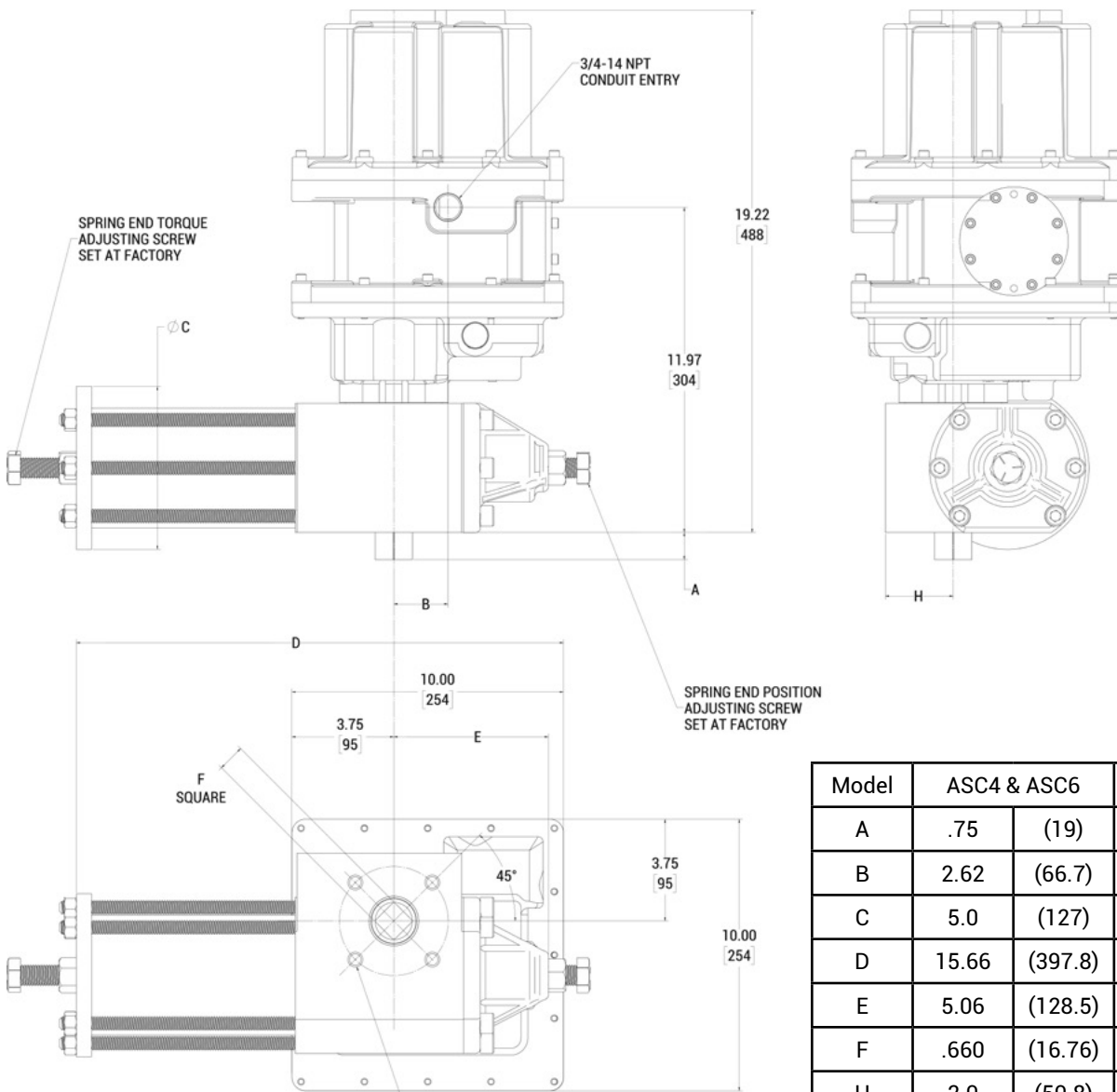
MAX. CYCLES

MODULATING = 300 per hour, ON/OFF = 17 per day, spring fail is to be reserved for emergency use only \*

\* Allowing this actuator to spring fail as a part of normal operation will severely limit the life expectancy of the product and waives the product warranty

## TECHNICAL DRAWING:

ALLOW 7.5" (191) FOR COVER REMOVAL



Model	ASC4 & ASC6		ASC10 & ASC12	
A	.75	(19)	1.0	(25.4)
B	2.62	(66.7)	2.62	(66.7)
C	5.0	(127)	6.0	(152.4)
D	15.66	(397.8)	17.38	(441.5)
E	5.06	(128.5)	5.69	(144.6)
F	.660	(16.76)	1.0	(25.4)
H	2.0	(50.8)	2.5	(63.5)

ASC4 & 6 - 4, 5/16-18 X 0.63 DEEP, 2.756 (70) B.C. (ISO 5211 F07)  
ASC10 & 12 - 4, 1/2-13 X 0.63 DEEP, 4.015 (102) B.C. (ISO 5211 F10)

# SNS-400 TO 1500

## SAFE & SECURE SERIES ACTUATOR WITH BATTERY BACKUP, NEMA 4 AND/OR 7

The Safe & Secure Series is a compact powerful solution for critical applications. Equipped with an internal battery this unit is field adjustable to fail closed, fail open, or continue standard operations, always leaving you in control during sudden loss of utility power and/or control signal.



### SPECIFICATIONS:

**TORQUE**

SNS4	400 In-Lb (45.2 Nm)
SNS6	675 In-Lb (76.3 Nm)
SNS10	1,000 In-Lb (113 Nm)
SNS15	1,500 In-Lb (169.5 Nm)

**CYCLE TIME**

SNS4	10 sec. / 90°
SNS6/10	15 sec. / 90°
SNS15	30 sec. / 90°

**DUTY CYCLE** 100%

**MOTOR** Brush type 12Vdc (for all input voltages)

**CURRENT RATINGS** FL= Full Load, LR= Lock Rotor

	115VAC		24VAC & 24VDC		12VDC		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR
SNS4	0.20	0.44	0.83	2.10	1.65	4.20	0.09	0.22
SNS6	0.16	0.44	0.75	2.10	1.50	4.20	0.08	0.22
SNS10	0.23	0.44	1.10	2.10	2.20	4.20	0.12	0.22
SNS15	0.24	0.44	1.15	2.10	2.30	4.20	0.12	0.22

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

**BATTERY** 12 Volt 0.8 AHr, Rechargeable Sealed Lead Acid Battery, Minimum 4 Years Life in Stand-By Use at 68°F

RUN TIMES/CYCLES	Time to complete 90 deg. rotation (in sec.)	Number of cycles	Total run time (in min.)
SNS4	9	30	150
SNS6	15	30	150
SNS10	18	6	30
SNS15	30	5	25

Testing was done at the maximum torque for each valve. If the torque is less than the maximum, the run time/cycles will increase. All cycles are based on - 90° motion, 5 minute delay, then repeat

**CHARGER** Trickle charger drawing 1 to 1.3A during battery recharge and 50mA to maintain to full charge

**CERTIFICATIONS** None - General Purpose Actuators  
Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available

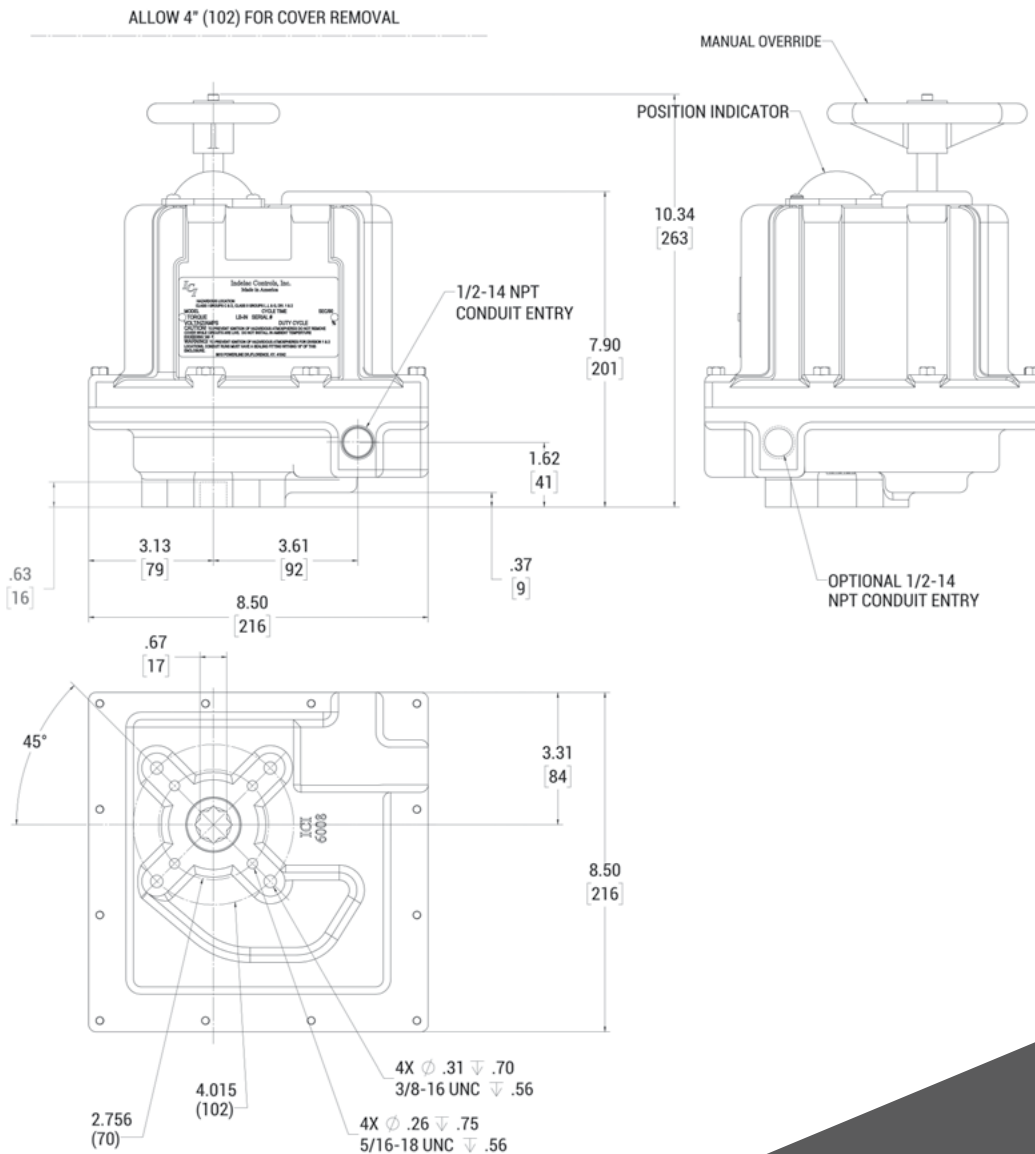


# SNS-400 TO 1500

## SAFE & SECURE SERIES ACTUATOR WITH BATTERY BACKUP, NEMA 4 AND/OR 7

COATING	Thermally bonded polyester powder			
POSITION INDICATOR	Visual	Dome Indicator		
SWITCHES	Snap action	SPDT, 15A @ 250Vac		
LUBRICATION	Grease	Permanent, little or no maintenance required		
WEIGHT	Pound	22 (lb)	Kilogram	10 (kg)
MOUNTING	Universal			
MOUNTING PAD	ISO 5211 F07 & F10 with 17mm star drive			
TEMPERATURE	-40F (-40C) to 150F (65.6C), self-regulating heater			
OVERRIDE	Manual, Declutching Hand Wheel			

### TECHNICAL DRAWING:





# SNS-2000 TO 2800

## SAFE & SECURE SERIES ACTUATOR WITH BATTERY BACKUP, NEMA 4 AND/OR 7

The Safe & Secure Series is a compact powerful solution for critical applications. Equipped with an internal battery this unit is field adjustable to fail closed, fail open, or continue standard operations, always leaving you in control during sudden loss of utility power and/or control signal.



### SPECIFICATIONS:

TORQUE	SNS20	2000 In-Lb (226 Nm)
	SNS28	2800 In-Lb (317 Nm)
CYCLE TIME	SNS20	12sec. / 90°
	SNS28	14 sec. / 90°
DUTY CYCLE	100%	
MOTOR	Brush type 12Vdc (for all input voltages)	
CURRENT RATINGS	FL= Full Load, LR= Lock Rotor	

	115VAC		24VAC & 24VDC		12VDC		230VAC/1PH/60HZ	
	FL	LR	FL	LR	FL	LR	FL	LR
SNS20	0.60	5.00	2.75	24.00	5.50	48.00	0.30	2.50
SNS28	1.00	5.00	4.50	24.00	9.00	48.00	0.50	2.50

The motor's LR amps must be taken into account when sizing the input power supply and fuses. Slow blow fuses are recommended

BATTERY 12 Volt 1.4 AHr, Rechargeable Sealed Lead Acid Battery, Minimum 4 Years Life in Stand-By Use at 68°F

RUN TIMES/CYCLES	Time to complete 90 deg. rotation (in sec.)	Number of cycles
SNS20	12	1
SNS28	14	1

Testing was done at the maximum torque for each valve. If the torque is less than the maximum, the run time/cycles will increase  
All cycles are based on - 90° motion

CHARGER Trickle charger drawing 1 to 1.3A during battery recharge and 50mA to maintain to full charge

CERTIFICATIONS None - General Purpose Actuators  
Designed to meet NEMA 4 Standards with optional NEMA enclosure types 4X, 9 and 7 available.

COATING Thermally bonded polyester powder

POSITION INDICATOR Visual Dome Indicator

SWITCHES Snap action SPDT, 15A @ 250Vac

LUBRICATION Grease Permanent, little or no maintenance required

WEIGHT Pound 41 (lb) Kilogram 18.6 (kg)



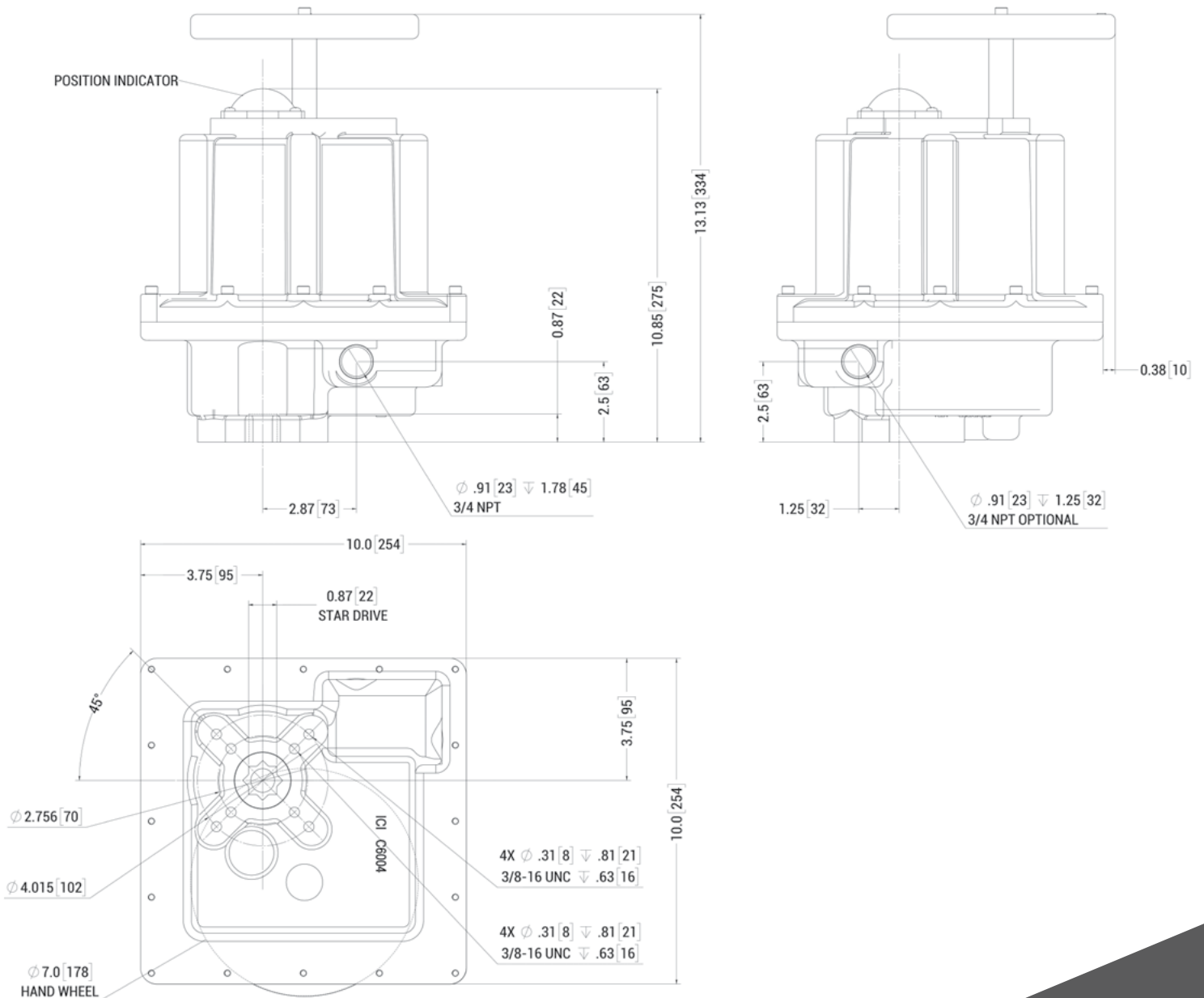


# SNS-2000 TO 2800

## SAFE & SECURE SERIES ACTUATOR WITH BATTERY BACKUP, NEMA 4 AND/OR 7

MOUNTING	Universal
MOUNTING PAD	ISO 5211 F07 & F10 with F10 22mm Star Female Drive
TEMPERATURE	-40F (-40C) to 150F (65.6C), self-regulating heater
OVERRIDE	Manual, Declutching Hand Wheel

### TECHNICAL DRAWING:



# HAZARDOUS LOCATION

## CSA GUIDE - NORTH AMERICA



### EXAMPLES OF NORTH AMERICAN MARKING

Division System	
Class I, Division 1, Groups A, B, C, D T4	
Class I	Hazard class
Division 1	Area classification
Groups A, B, C, D	Gas group
T4	Temperature classification
Class II, Division 1, Groups E, F, G	
Class II	Hazard class
Division 1	Area classification
Groups E, F, G	Dust group

Zone System	
Class I, Zone 0, AEx ia IIC T4	
Class I	Hazard class
Zone 0	Area classification
AEx	Approved to US standards (Ex - Canadian standards)
ia	Protection concept (example is intrinsic safety)
IIC	Gas group
T4	Temperature classification

### STANDARDS ELECTRICAL

#### Division System, Class I (Gas, Vapour & Mists)

Type of Protection	Code	Country	Permitted Division	Standard FM, UL CSA C22.2	Definition
General Requirements		USA	1, 2	FM 3600	Applies to all protection concepts, general safety
		CAN	1, 2	CSA No 0	
Non-Incendive	NI	USA	2	UL 121201 FM 3611	No arcs, sparks or hot surfaces
		CAN	2	CSA No 213	
Explosion-proof	XP	USA	1	UL 1203 FM 3615	Contain the explosion and quench the flame
		CAN	1	CSA No 30	
Intrinsic Safety	IS	USA	1	UL 913 FM 3610	Energy limitation in sparks and hot surfaces
		CAN	1	CSA 60079-11	
Pressurized	Type X	USA	1	FM 3620 NFPA 496	Exclude the flammable gas
	Type Y	USA	2		
	Type Z	CAN	1		
		CAN	2		

Note: The standards listed above deal with Hazardous Locations (HazLoc) approvals only. North American approvals require both HazLoc and Ordinary Locations (OrdLoc) approvals before certification is complete.

#### Division System, Class II (Dusts)

Type of Protection	Code	Country	Permitted Division	Standard FM, UL CSA C22.2	Definition
General Requirements		USA	1, 2	FM 3600	Applies to all protection concepts
		CAN	1, 2	CSA No 0	
Dust Ignition Proof	—	USA	1	UL 1203 FM 3616	
		CAN	1	CSA No 25	
Dust Protected	—	USA	2	UL 121201 FM 3611	Keep the combustible dust out
		CAN	2	CSA No 213	
Pressurized	PX	USA	1	FM 3620 NFPA 496	
	PY	USA	2		
	PZ	USA	2		
		CAN	2		
Intrinsic Safety	IS	USA	1	UL 913 FM 3610	Energy limitation in sparks and hot surfaces
		CAN	1		
		CAN	1		
		CAN	2		

Note: The standards listed above deal with Hazardous Locations (HazLoc) approvals only. North American approvals require both HazLoc and Ordinary Locations (OrdLoc) approvals before certification is complete.

#### Division System, Class III (Fibres & Flyings)

Type of Protection	Code	Country	Permitted Division	Standard FM, UL CSA C22.2	Definition
General Requirements	—	USA	1, 2	FM 3600	Applies to all protection concepts
		CAN	1, 2	CSA No 0	
Fibre & Flying Protection	—	USA	1, 2	UL 121201	Keep the ignitable fibres & flyings out
		CAN	1, 2	CSA No 213	
Intrinsic Safety	IS	USA	1	UL 60079-11	Energy limitation in sparks and hot surfaces
		CAN	1	CSA 60079-11	

Note: The standards listed above deal with Hazardous Locations (HazLoc) approvals only. North American approvals require both HazLoc and Ordinary Locations (OrdLoc) approvals before certification is complete.

#### Zones System Class I (Gas, Vapour & Mists)

Type of Protection	Code	Country	Permitted Zone	Standard UL CSA C22.2	Definition
General Requirements	AEx Ex	USA	0, 1, 2	UL 60079-0	Applies to all protection concepts, general safety
		CAN	0, 1, 2	CSA 60079-0	
Increased Safety	AEx eb AEx ec Ex eb Ex ec	USA	1	UL 60079-7	No arcs, sparks or hot surfaces. Enclosure IP 54 or better
		CAN	2	CSA 60079-7	
Non-sparking	AEx nA Ex nA	USA	2	UL 60079-15	CSA 60079-15
		CAN	2	CSA 60079-15	
Flameproof	AEx da AEx db AEx dc Ex da Ex db Ex dc	USA	0*	UL 60079-1	Contain the explosion and quench the flame.
		USA	1		
		USA	2		
		CAN	0*		
Enclosed Break	AEx nC Ex nC	USA	2	UL 60079-15	*applies to catalytic sensors only
		CAN	2	CSA 60079-15	
Powder Filled	AEx q Ex q	USA	1	UL 60079-5	CSA 60079-5
		CAN	1	CSA 60079-5	
Intrinsic Safety	AEx ia AEx ib AEx ic Ex ia Ex ib Ex ic	USA	0	UL 60079-11	Energy limitation in sparks and hot surfaces
		USA	1		
		USA	2		
		CAN	0		
Pressurized	AEx pxb AEx pyb AEx pzc Ex pxb Ex pyb Ex pzc	USA	1	UL 60079-2	
		USA	1		
		USA	2		
		CAN	1		
Encapsulation	AEx ma AEx mb AEx mc Ex ma Ex mb Ex mc	USA	0	UL 60079-18	Keep the flammable gas out
		USA	1		
		USA	2		
		CAN	0		
Oil Immersion	AEx ob AEx oc Ex ob Ex oc	USA	1	ISA 60079-6	
		USA	2		
		CAN	1	CSA 60079-6	
		CAN	2	CSA 60079-6	
Restricted Breathing	AEx nR Ex nR	USA	2	UL 60079-15	CSA 60079-15
		CAN	2	CSA 60079-15	
Optical Radiation	AEx op is AEx op pr AEx op sh Ex op is Ex op pr Ex op sh	USA	0, 1, 2	UL 60079-28	To prevent ignition by thermal, photochemical or plasma means
		USA	1, 2		
		USA	0, 1, 2		
		CAN	0, 1, 2		

Equipment suitable for use in a Zone 0 is permitted in a Zone 1 or 2

Equipment suitable for use in a Zone 1 is permitted in a Zone 2, but **not** in a Zone 0

Equipment suitable for use in a Zone 2 is **not** permitted in either a Zone 0 or Zone 1

Note: The standards listed above deal with Hazardous Locations (HazLoc) approvals only. North American approvals require both HazLoc and Ordinary Locations (OrdLoc) approvals before certification is complete.

#### Zones System Class II (Dusts)

Type of Protection	Code	Country	Permitted Zone	Standard UL CSA C22.2	Definition
General Requirements	AEx Ex	USA	20, 21, 22	UL 60079-0	Applies to all protection concepts
		CAN	20, 21, 22	CSA 60079-0	
Protection by Enclosure	AEx ta AEx tb AEx tc Ex ta Ex tb Ex tc	USA	20	UL 60079-31	
		USA	21		
		USA	22		
		CAN	20		
Encapsulation	AEx ma AEx mb AEx mc Ex ma Ex mb Ex mc	USA	20	UL 60079-18	Keep combustible dust out
		USA	21		
		USA	22		
		CAN	20		
Pressurization	AEx pxb AEx pyb AEx pzc Ex pxb Ex pyb Ex pzc	USA	21	UL 60079-2	
		USA	21		
		USA	22		
		CAN	21		
Intrinsic Safety	AEx ia AEx ib AEx ic Ex ia Ex ib Ex ic	USA	20	UL 60079-11	Energy limitation in sparks and hot surfaces
		USA	21		
		USA	22		
		CAN	20		
Optical Radiation	AEx op is AEx op pr AEx op sh Ex op is Ex op pr Ex op sh	USA	20, 21, 22	UL 60079-28	To prevent ignition by thermal, photochemical or plasma means
		USA	21, 22		
		USA	20, 21, 22		
		CAN	20, 21, 22		

Equipment suitable for use in a Zone 20 is permitted in a Zone 21 or 22

Equipment suitable for use in a Zone 21 is permitted in a Zone 22, but **not** in a Zone 20

Equipment suitable for use in a Zone 22 is **not** permitted in either a Zone 20 or Zone 21

Note: The standards listed above deal with Hazardous Locations (HazLoc) approvals only. North American approvals require both HazLoc and Ordinary Locations (OrdLoc) approvals before certification is complete.



# HAZARDOUS LOCATION

## CSA GUIDE - GENERAL

### AREA CLASSIFICATION

Class & Divisions System (Canada & US Only)	
<b>Class I</b>	Flammable gases, vapours or liquids *
<b>Class II</b>	Combustible dusts *
<b>Class III</b>	Ignitable fibres and flyings *

<b>Division 1</b>	Where ignitable concentrations of * can exist all of the time or some of the time under normal operating conditions.
<b>Division 2</b>	Where ignitable concentrations of * are not likely to exist under normal operating conditions.

Groups		
CLASS I	CLASS II	CLASS III
<b>A - Acetylene</b>	E - Metal Dust	None Specified
<b>B - Hydrogen</b>	F - Coal Dust	
<b>C - Ethylene</b>	G - Grain Dust	
<b>D - Propane</b>		

Zones System (IECEx/ATEX/Canada & US)		
ZONE		Hazardous areas are classified into Zones based upon the frequency of the occurrence and duration of an explosive gas/dust atmosphere, as follows:
Gas	Dust	
0	20	A potentially flammable atmosphere is present continuously or for long periods or frequently.
1	21	A potentially flammable atmosphere is likely to occur in normal operation occasionally.
2	22	A potentially flammable atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Reference: EN 60079-10

Correlation Between Divisions & Zones			
Type of Area	Divisions	Zones	Definition
<b>Continuous Hazard</b>	1	0, 20	A place in which a PFA is continuously present
<b>Intermittent Hazard</b>	1	1, 21	A place in which a PFA is likely to occur in normal operation.
<b>Abnormal Hazard</b>	2	2, 22	A place in which a PFA is not likely to occur in normal operation, but may occur for short periods.

Both Canada and the US are making greater use of the Zone system

PFA = Potentially Flammable Atmosphere

### MATERIAL GROUPINGS

Division System		Zone System	
Material	Class/Group	Material	Group
Acetylene	Class I, Group A	Acetylene	IIC
Hydrogen	Class I, Group B	Hydrogen	
Ethylene	Class I, Group C	Ethylene	IIB
Propane	Class I, Group D	Propane	IIA
Methane (Mines)	N/A (see note 1)	Methane (Mines)	I
Metal Dusts	Class II, Group E	Conductive Dusts	IIIC
Coal Dusts	Class II, Group F	Non Conductive Dusts	IIIB
Grain Dusts	Class II, Group G		
Fibers/Flyings	Class III	Combustible Flyings	IIIA

Note 1: Mines are not within the scope of the Division system (Canada & US)

### GAS & DUST GROUPS

Gas Groups		Dust Groups	
Gas Group	Typical Gas	Dust Group	Type
I	Methane	IIIA	Combustible flyings
IIA	Propane	IIIB	Non-conductive dust
IIB	Ethylene	IIIC	Conductive dust
IIC	Hydrogen		

**Group I** - Covers mining applications  
**Gas Group II** - Covers surface and other locations  
**Dust Group III** - Covers surface and other locations

### TEMPERATURE CLASSIFICATION

Maximum Surface Temperature (°C)	Divisions	Zones
450	T1	T1
300	T2	T2
280	T2A	—
260	T2B	—
230	T2C	—
215	T2D	—
200	T3	T3
180	T3A	—
165	T3B	—
160	T3C	—
135	T4	T4
120	T4A	—
100	T5	T5
85	T6	T6

### Material Ex Classifications

Gas	Ignition Temp (°C)	Apparatus Group	Temperature Class
Ammonia	630	IIA	T1
Hydrogen	560	IIC	T1
Methane	537	IIA	T1
Propane	450	IIA	T2
Ethylene	425	IIB	T2
Butane	372	IIA	T2
Acetylene	305	IIC	T2
Cyclohexane	259	IIA	T3
Kerosene	210	IIA	T3
Di-ethyl Ether	160	IIB	T4
Carbon Disulphide	90	IIC	T6

### Material Ex Classifications

Dust Typical Ignition Temperatures		
Dust	Cloud (°C)	Layer (°C)
Aluminium	590	>450
Coal dust (ignites)	380	225
Flour	490	340
Grain dust	510	300
Methyl cellulose	420	320
Phenolic resin	530	>450
Polythene	420	(melts)
PVC	700	>450
Soot	810	570
Starch	460	435
Sugar	490	460

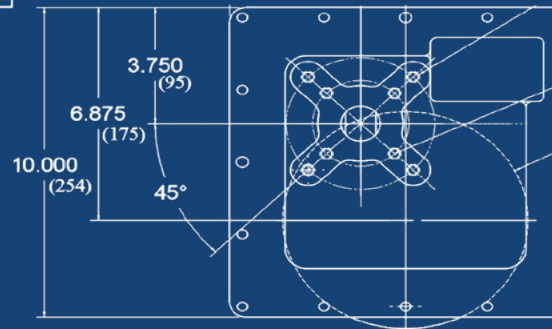
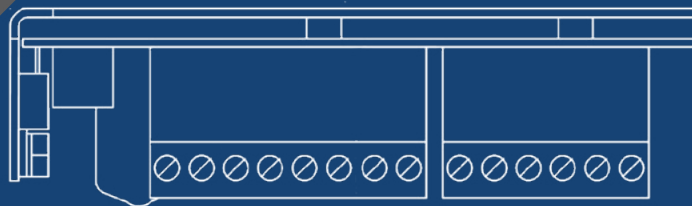
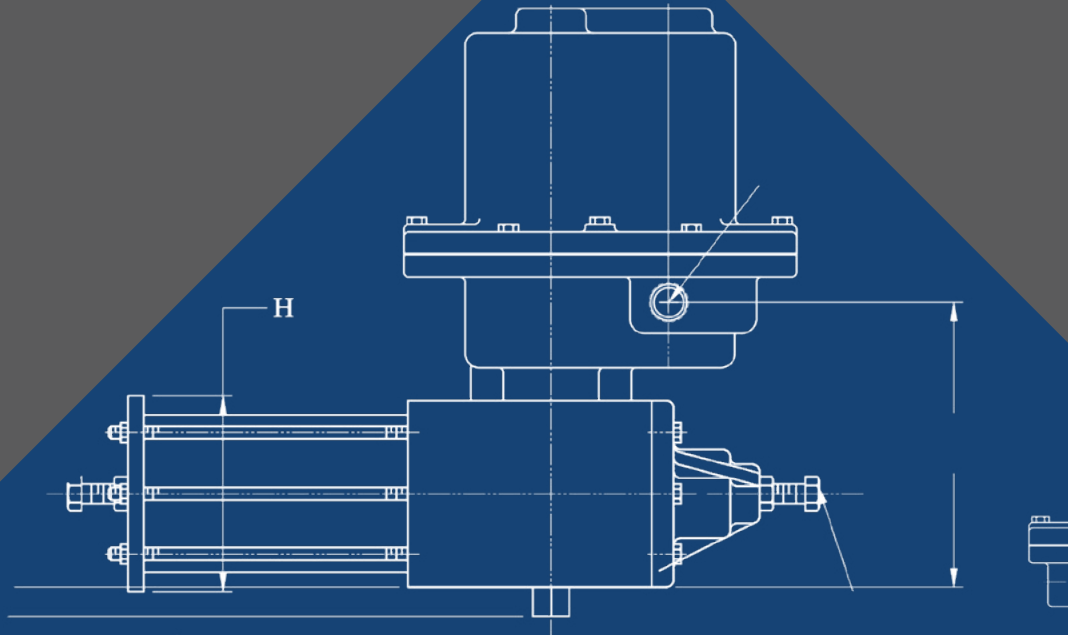
### CORRELATION BETWEEN ZONES/EQUIPMENT PROTECTION LEVEL (EPL)/ATEX CATEGORIES

Zone	EPL	Category
0	Ga	1G
1	Gb	2G
2	Gc	3G
20	Da	1D
21	Db	2D
22	Dc	3D
<b>Mining Application</b> (Equipment can remain energised in the presence of flammable atmosphere - firedamp)	Ma	M1
<b>Mining Application</b> (Equipment to be de-energised when flammable atmosphere is detected - firedamp)	Mb	M2

G = Gas, D = Dust, M = Mining

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