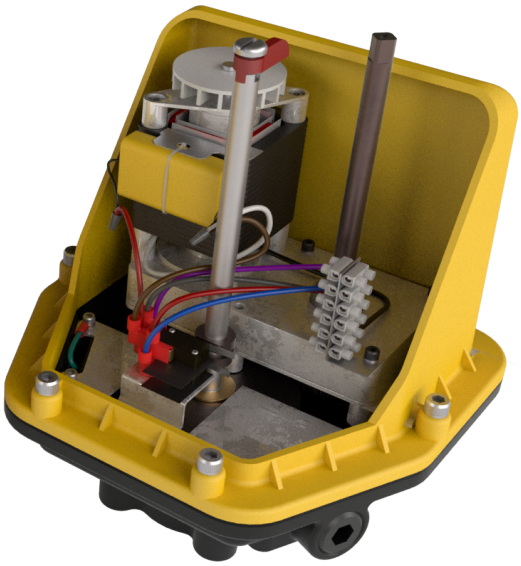
AE SERIES ACTUATORS
HOW TO ORDER



AE -	400 -	3	BF
PREFIX	TORQUE (LB - IN)	VOLTAGE	OPTIONS
AE	200	1 - 115 vac	0 - Standard
	400	2 - 24 vac	A - One extra switch & cam*
	600	3 - 220 vac	B - Two extra switches & cams*
	800		C - Three extra switches and cams*
	1000	4 - 12 vdc	D - Heater and Thermostat (15 watt)
	Enter all digits of Torque Value	5 - 24 vdc	F - Motor Brake (115 VAC & 24 VAC Only)
			H - Tropical Heater (15 watts)
			P - Positioner 4-20 mA
			T - Transmitter 4-20 mA

Note: AE will always be the first two characters of the part number, all digits from torque value must be entered into part number (i.e. 400, 1000, etc.) Only use one digit for voltage depiction (i.e. 1-5). For the options listing you may use more than one character, up to three, (i.e. O, AD or BD etc.)

- *1 Year warranty on positioner & positioner with transmitter*
- *Transmitter available with (P) positioner option only*
- *Positioner & transmitter are not CSA listed*
- ** Not available with "P" option*

Example:
AE-400-2BF :
400 lb. in.; 24 VAC; 2 extra switches and cams, motor brake
AE-1000-1D :
1000 lb. in.; 115 VAC; Heater and thermostat

CS and CL electric actuators are split phase reversing AC motors for standard duty or brushless DC Motors for continuous duty. Eight sizes are available which produce breakaway torques between 150 and 3000 lb-in. They are excellent industrial quality units capable of on/off, fail safe, and modulating applications. The efficient spur gear drive train is supported by permanently-lubricated bearings making it very secure while eliminating the potential for side loading of the output shaft.

Apollo offers as standard a 75% duty cycle AC motor. Continuous-duty brushless DC motors are also available for a range of input voltages. All units are rated for use in ambient environments from -40°F (with optional heater & thermostat) to 150°F (note that units equipped with an internal battery are rated to 130°F).

HAZARDOUS LOCATION ENCLOSURES

The standard enclosures (CS and CL) are rated for NEMA 4/4X (weather tight and corrosion resistant). The Hazardous Location enclosures are rated for NEMA 4/4X/7 & 9, Class I, Div 1, Groups C&D; Class II, Div. 2, Groups E, F, & G; Class III.

(CSA) CERTIFICATIONS

Certification by the Canadian Standards Association of either hazardous or weatherproof locations is standard on all CS & CL models.

FEATURES

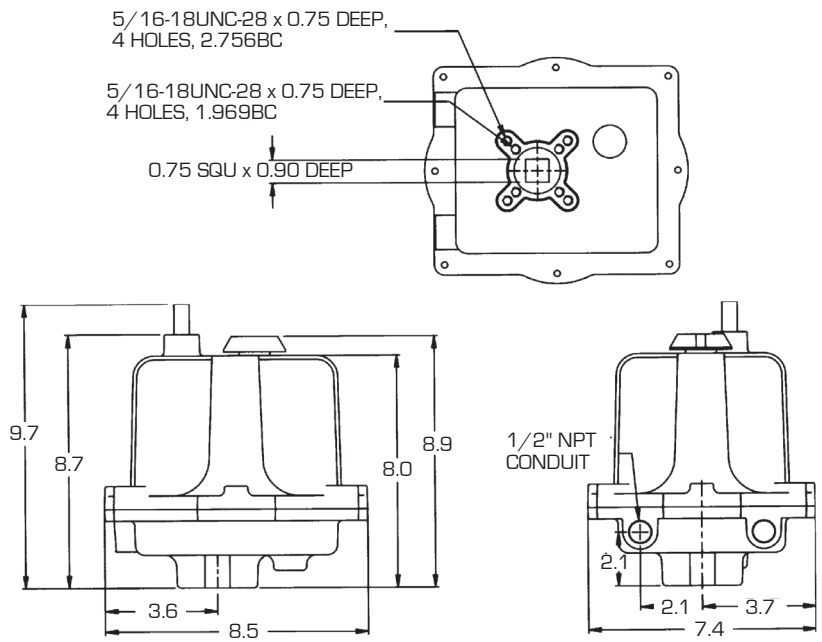
- Plug-in connectors for the motor, the brake option and the heater/thermostat option
- All connectors are coded to prevent mis-wiring.
- Limit switch wires are soldered to the board - no more loose connections.
- A six position terminal strip clearly labeled so it can be wired up in the
- ield without an instruction manual.
- Thermal overload protection (AC motors)
- Dual conduit openings; 3/4" (1/2" with supplied bushings)
- Visual position indication
- All aluminum enclosure
- Captive cover bolts on CS Series
- Manual override shaft (optional handwheel override with declutchable shaft)

INTRODUCING SIMPLICITY FOR CALIBRATING MODULATING ACTUATORS

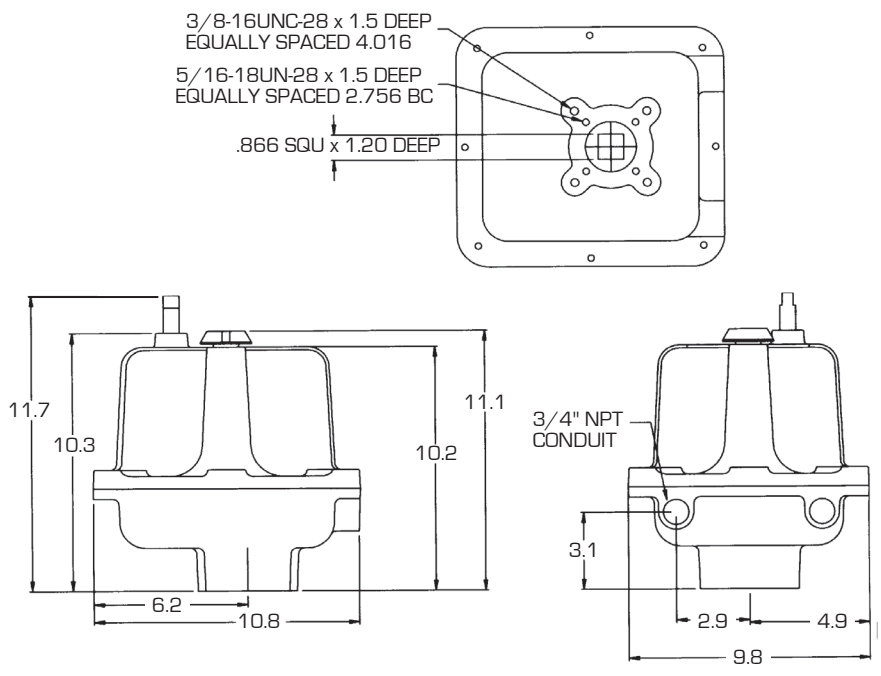
The control board brings a whole new level of simplicity to the field. It will work with either of the motor boards (115VAC or 230VAC).
Features include:

- Switch selector for 4-20mA or 0-10VDC input
- Switch selector for 4-20mA or 0-10VDC position readback
- Switch selector for either "fail in-place" or "fail to zero" upon loss of control signal (provided input power remains)
- On-board push buttons to manually position the actuator
- A "Mode Selector" switch with LEDs, which are used for:
  - "No tools" pot calibration
  - Setting Zero and span
  - Manually positioning the actuator
- An adjustable pot for speed control (motor pulsing)
- An adjustable pot for deadband adjustment
- Locked rotor protection if the actuator cannot achieve the position commanded by the control signal, it will cut power to the motor. Repeated stalls will not damage the actuator.
- Reverse acting operation with no rewiring.
- Split range operation with no rewiring.

CS DIMENSIONS



CL DIMENSIONS



CS & CL EXTENDED DUTY DATA
TECHNICAL DATA—115VAC AND 230VAC MODELS*

SERIES	TORQUE OUTPUT (BREAKAWAY)	SPEED (SECONDS PER 90° ROTATION)	DUTY CYCLE	VA RATING		MAX RUNNING CURRENT AT FULL LOAD (TRUE RMS)		MAX EFFECTIVE PEAK INRUSH CURRENT (=.66 X PEAK INRUSH)	
				115 VAC	230 VAC	115 VAC	230 VAC	115 VAC	230 VAC
CS	150 in lb	8	75%	70vA	115vA	0.6 amps	0.5 amps	1.25 amps	0.924 amps
	300 in lb	15	75%	70vA	115vA	0.6 amps	0.5 amps	1.25 amps	0.924 amps
	600 in lb	30	75%	70vA	115vA	0.6 amps	0.5 amps	1.25 amps	0.924 amps
CL	1000 in lb	25	75%	92vA	161vA	0.8 amps	0.7 amps	1.66 amps	1.29 amps
	1500 in lb	40	75%	92vA	161vA	0.8 amps	0.7 amps	1.66 amps	1.29 amps
	2000 in lb	55	75%	92vA	161vA	0.8 amps	0.7 amps	1.66 amps	1.29 amps
	2500 in lb	70	75%	92vA	161vA	0.8 amps	0.7 amps	1.66 amps	1.29 amps
	3000 in lb	75	55%	92vA	161vA	0.8 amps	0.7 amps	1.66 amps	1.29 amps

CS & CL CONTINUOUS DUTY DATA

SERIES	TORQUE (IN-LB)	DUTY CYCLE	12 VDC		24 VDC		24 VAC		115 VAC		230 VAC	
			CYCLE TIME (SEC/90°)	CURRENT DRAW AMPS	CYCLE TIME (SEC/90°)	CURRENT DRAW AMPS	CYCLE TIME (SEC/90°)	CURRENT DRAW AMPS	CYCLE TIME (SEC/90°)	CURRENT DRAW AMPS	CYCLE TIME (SEC/90°)	CURRENT DRAW AMPS
CS	150	100%	11	2.2	13	1.2	8	1.8	9	0.4	9	0.4
	300	100%	17	2.5	13	1.4	12	2.1	13	0.5	13	0.4
	600	100%	17	2.8	13	1.7	13	2.5	14	0.6	14	0.5
CL	1000	100%	21	4	14	2.4	15	3.5	15	0.9	15	0.6
	1500	100%	40	4	24	2.4	27	3.5	29	0.9	29	0.6
	2000	100%	40	4.3	33	2.4	28	3.5	29	0.9	29	0.6
	2500	100%	55	3.3	40	2	38	3.1	39	0.8	39	0.6
	3000	100%	60	3.7	42	2.2	40	3.5	42	0.8	43	0.6

**Notes:*

1. *The Current Draws stated above include all options. If the brake and/or heater & thermostat are not installed, the actual current draws will be less.*
2. *For Extended Duty Cycle Models, Current Draws are provided at full running torque. If the actuator encounters an overtorque condition, such as a stall condition, the Current Draw will be vastly increased.*
3. *Continuous Duty actuators contain brushless DC motors and are therefore not limited by duty cycle restraints in environments at or below 104°F; in ambient environments above this temperature the duty cycle is de-rated to 80%.*

ACTUATOR MODEL#s/DESCRIPTION

- 115 — 115 VAC Motor (Standard or Continuous)
- 230 VAC — 230 VAC Motor (Standard or Continuous)
- J — Speed Control/Timer Board
- X — NEMA 4,4X,7, & 9
- W — NEMA 4 & 4X
- H — Tropical Heater
- S2 — Two Auxiliary Switches SPDT
- T — Heater and Thermostat
- K — Motor Brake[2]
- Z — Declutchable Handwheel Override
- P — Feedback Potentiometer (0-1000 Ohm)

• CSA certification with (C US) marking is standard on all standard (extended) duty models.
• CSA certification with (C US) marking is standard on continuous duty models ordered with enclosure option "E".
[2] Standard on continuous duty cycle units

HOW TO ORDER CS & CL EXTENDED DUTY CYCLE ACTUATOR

PART NUMBER MATRIX

SERIES	TORQUE	ENCLOSURE	GENERAL OPTIONS	DUTY CYCLE	VOLTAGE
CS	600	W	S2	E - STANDARD	115 VAC
CL	1500	X	S2	E - STANDARD	230 VAC

HOW TO ORDER CS CONTINUOUS DUTY CYCLE ACTUATOR

PART NUMBER MATRIX

3RA	**CS**	**600**	**W**	**UL2**	**Z**
PREFIX	SERIES	TORQUE	ENCLOSURE	OPTIONS[2]	ADDITIONAL OPTIONS
3RA	CS	150 IN-LB, 12 FT-LB, 17 NM	W - NEMA 4/4X	U2 - ON/OFF/POSITION BOARD	-- NO ENTRY IF STANDARD
		300 IN-LB, 25 FT-LB, 34 NM	X - NEMA 4/4X/7&9	UL2 - ON/OFF/POSITION BOARD	Z - HANDWHEEL
		600 IN-LB, 50 FT-LB, 68 NM		W/ BATTERY BACKUP	

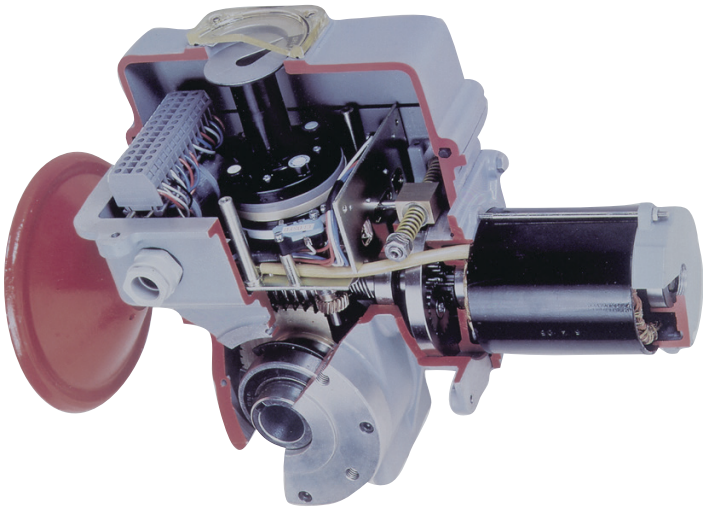
HOW TO ORDER CL CONTINUOUS DUTY CYCLE ACTUATOR

PART NUMBER MATRIX

3RA	**CL**	**2500**	**X**	**UL3**	**-**
PREFIX	SERIES	TORQUE	ENCLOSURE	OPTIONS[2]	ADDITIONAL OPTIONS
3RA	CL	1000 IN-LB, 83 FT-LB, 113 NM	W - NEMA 4/4X	U2 - ON/OFF/POSITION BOARD	-- NO ENTRY IF STANDARD
		1500 IN-LB, 125 FT-LB, 169 NM	X - NEMA 4/4X/7&9	UL3 - ON/OFF/POSITION BOARD	Z - HANDWHEEL
		2000 IN-LB, 167 FT-LB, 226 NM		W/ BATTERY BACKUP	
		2500 IN-LB, 208 FT-LB, 282 NM			
		3000 IN-LB, 250 FT-LB, 339 NM			

1. All Continuous Duty Cycle CS/CL actuators accept any of the following input voltage (12VDC, 24VDC, 24VAC, 115VAC, & 230VAC), are rated for continuous duty cycle, include a holding brake, two auxiliary limit switches, 4-20mA or 0-10VDC position feedback, wrench-operated manual override, CSA "C US" certification, CE compliance, and a heater/thermostat that can be user-enabled on the option board.

2. Only one board option can (and must) be selected. All board options can be configured for On/Off or modulating operation.



The LB-Series is available in several basic designs with a wide variety of configurations from which to select torque and speeds to meet specific application requirements. These rugged and uncomplicated actuators provide a practical and reliable method for turning any mechanism 90°. Torques range from 540 inch-pounds to 54,000 inch-pounds (6.25 to 625 kilogram-meters). Electrical models are available in 115 VAC-50/60 Hz single phase, 200 VAC-50/60 single phase; and 220/440 VAC-50/60 Hz three phase. Models are available for on/off modulating control.

Listed below are performance specifications for a limited sampling of LB-Series electric actuators. This product family is available with a such a variety of options and features that they can not be represented in this catalog. Options such as positioners, transmitters, special enclosure ratings, extra switches, or motor voltages are optionally available. Contact Apollo's Actuator Engineering Department for the proper actuator to fit non standard or unique requirements.

3R - AD - M - 05 - B - X - F

TYPE
AC = OA6
AD = OA8
AE = OA15
AF = AT18
AG = AT25
AH = AT50
AJ = BT50
AK = BT100

MODULATION
M = MODULATING
BLANK = NON MODULATING

TIME (S)
05 = 5 SECONDS
25 = 25 SECONDS
50 = 50 SECONDS

VOLTAGE
A = 1/60/115 VAC
B = 1/60/220 VAC
C = 3/60/460 VAC
D = 3/60/600 VAC
E = 3/60/230 VAC
G = 1/50/220 VAC
H = 3/50/380 VAC
I = 3/50/400 VAC
J = 1/50/115 VAC
K = 24 VDC

DRIVE
F = FEMALE
M= MALE

OPTIONS
CONTOL SWITCHES*
H - HEATER
P - POTENTIOMETER
MS - POSIGAM+

NOTE:
* CONSULT FACTORY FOR ANY ADDITIONAL OPTIONS OR VARIATIONS NOT SHOWN HERE.

LB SERIES ELECTRIC ACTUATOR PERFORMANCE DATA

L-B SERIES MODEL NUMBER	TORQUE OUTPUT LB-IN	ROTATING SPEED (SEC/90 DEGREE)		POWER REQUIREMENTS 30% DUTY CYCLE			
				115VAC 1 PH 60HZ		460 VAC 3 PH 60 HZ	
		STD	OPT	RATED	START	RATED	START
OA8	885	5		1.95	3.3	0.63	1.15
OA8	885	25		1.25	2	0.39	0.78
OA15	1350	15	25	1.95	3.3	0.39	0.78
AT25	2250	15		1.95	3.3	0.63	1.15
AT25	2250	25	50	1.95	3.3	0.39	0.78
AT50	4500	25		4.6	12	0.63	1.15
AT100	8850	24	12	4	17	0.6	1.2

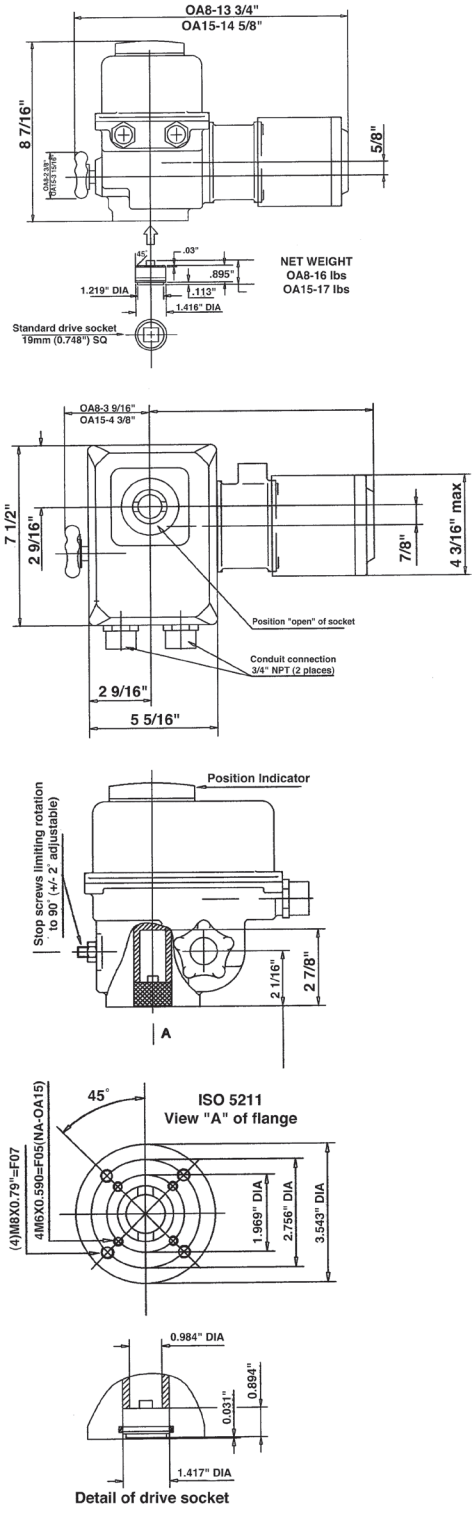
Contact factory for part numbers of actuators with options & other voltages

Notes:

- *Operating speed is based on an actuator operating at rated output torque. Actual operating speed will vary depending on actual output torque.*
- *All torque and speed ratings are based on a plus or minus 10% motor voltage variation.*
- *All torque ratings represent the maximum torque available during both breakaway (start) and run (dynamic) conditions.*
- *Each actuator is supplied, as standard, with a 30% duty cycle, F insulation, TENV design motor rated for 360 starts per hour at 104˚F.*
- *All actuators are NEMA 4 rated as standard. Many are optionally available with additional ratings, such as, explosion proof or submersible, etc., to meet special service requirements.*
- *All actuators utilize a self-locking gear train design and have provision for manual override.*
- *All actuators have both electrical and mechanical travel stop provisions.*
- *FQ Series are Spring Return Failsafe models. Contact factory for model number and price (not listed above).*

TYPES AO8 AND OA15

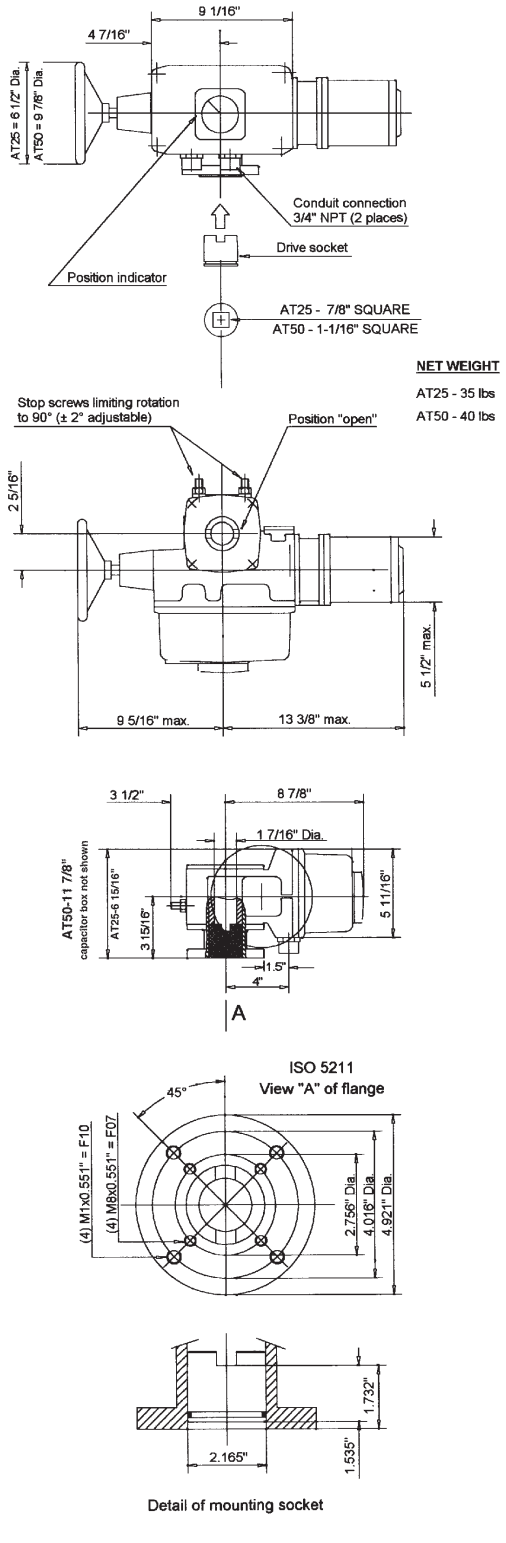
Standard specification: Weatherproof NEMA 4, with two adjustable SPDT limit switches; with built-in motor thermal cutouts, with handwheel for manual operation. Duty rating 30%.



TYPES AT25 AND AT50

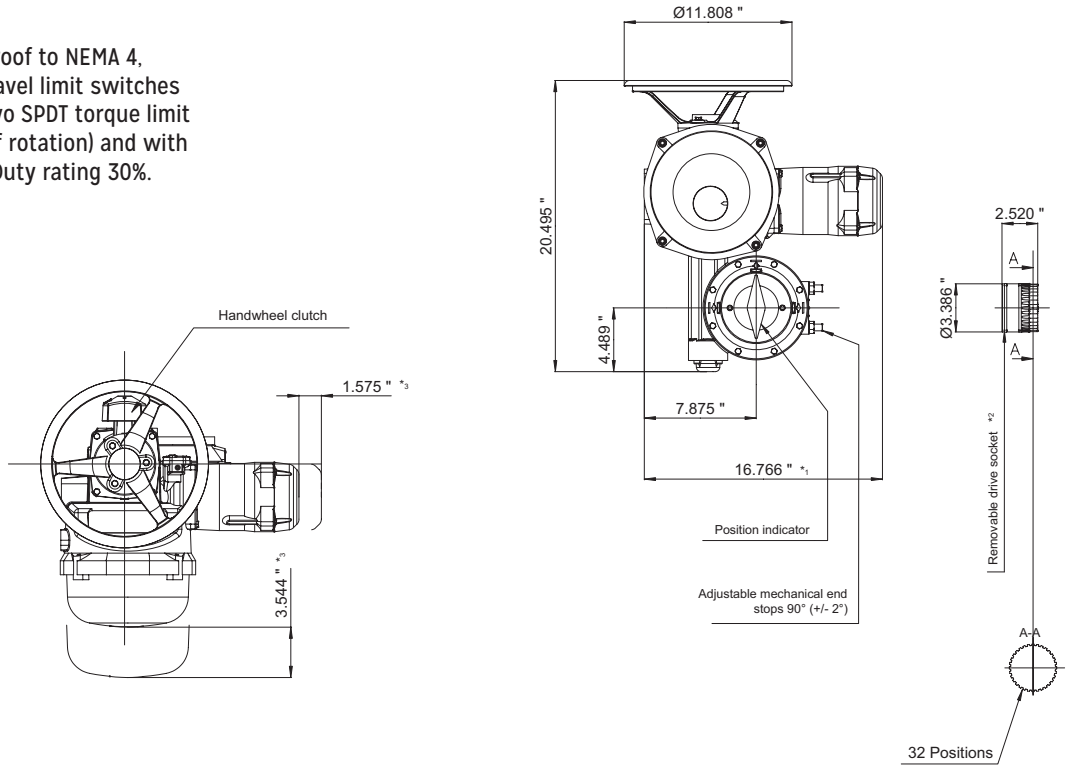
Standard specification: Weatherproof to NEMA 4, fitted with two adjustable SPDT travel limit switches (one for each extreme position); two SPDT torque limit switches (one for each direction of rotation) and with handwheel for manual operation.

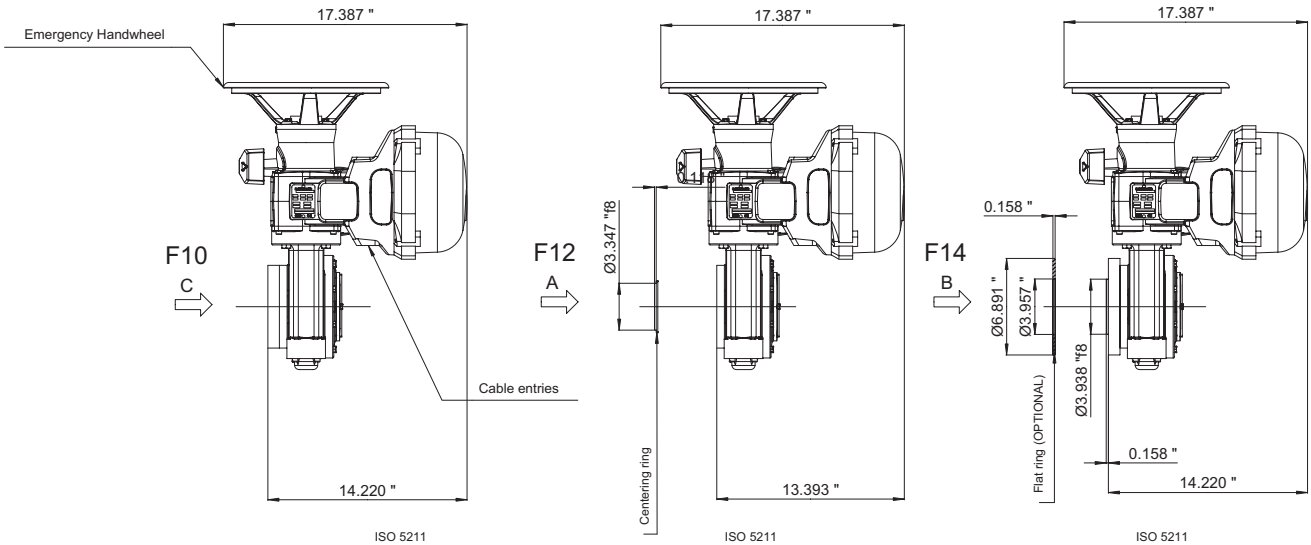
Duty rating 30%. Net weight: 40 lbs.
AT25 female socket dimension = .866 square
AT50 female socket dimension = 1.063 square

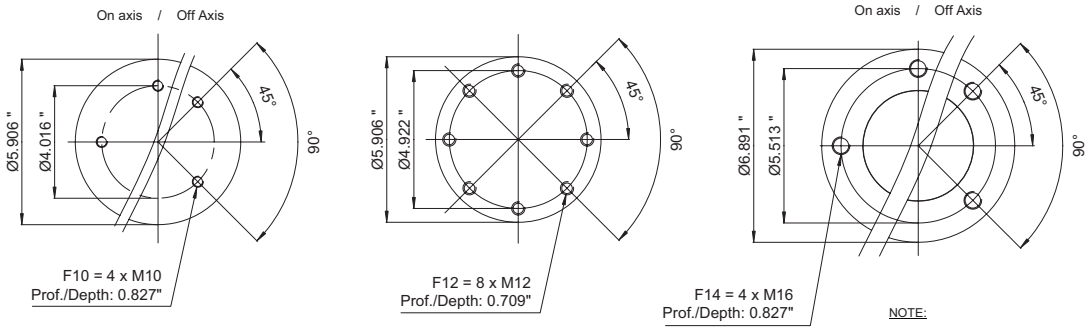


TYPE AT100

Standard specification: Weatherproof to NEMA 4, fitted with two adjustable SPDT travel limit switches (one for each extreme position); two SPDT torque limit switches (one for each direction of rotation) and with handwheel for manual operation. Duty rating 30%.







NOTE:

*1 The actuator is represented in its maximum size.

*2 Representation of the socket in closed position.

*3 Dimension to allow for dissassembly

DIRECT MOUNTED NAMUR SOLENOID VALVES

TEMPERATURE LIMITS:
- Media: 0°F to +180°F.
- Ambient:
  NEMA 4, 4X, 0°F to +180°F.
  NEMA 4-4X-7-9, 0°F to +125°F.

COIL RATINGS:
- NEMA 4, 4X: Continuous duty molded Class H insulation.
- NEMA 4-4X-7-9: Continuous duty molded Class F

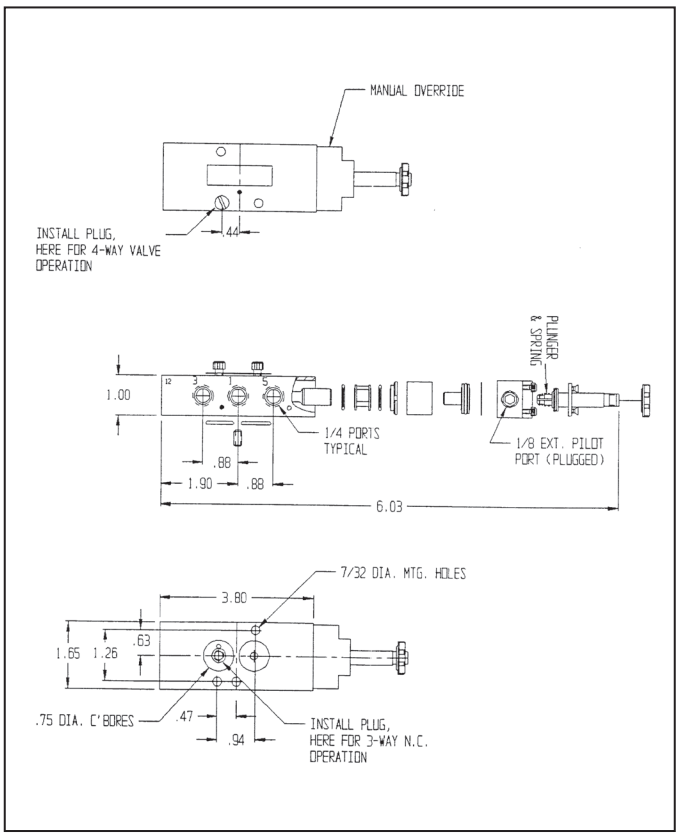
COIL VOLTAGES AVAILABLE:
- Coil Voltage Variation: +/-10% of Nominal
  120 VAC-60 Hz/110 VAC-50 Hz.
  240 VAC-60 Hz/220 VAC-50 Hz/120 VDC.
  48 VAC-60 Hz/44 VAC-50 Hz/24 VDC.
  24 VAC-60 Hz/22 VAC-50 Hz/12 VDC.

POWER CONSUMPTION:
- 6 Watts

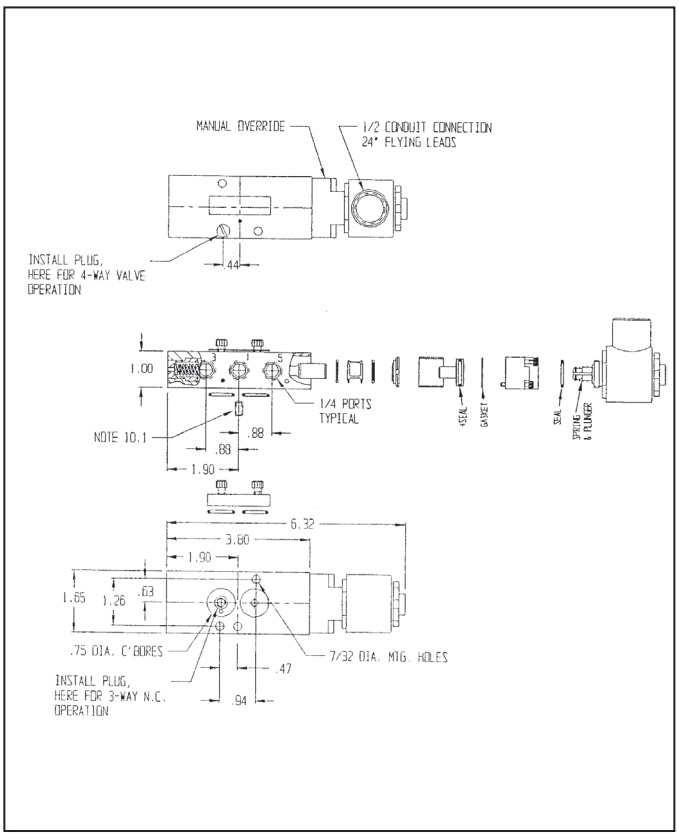
MATERIALS:
- Valve Body=Aluminum, anodized.
- Fasteners=Stainless Steel
- Seals & O-Rings=Nitrile.

CV FLOW RATE:
- 1.8

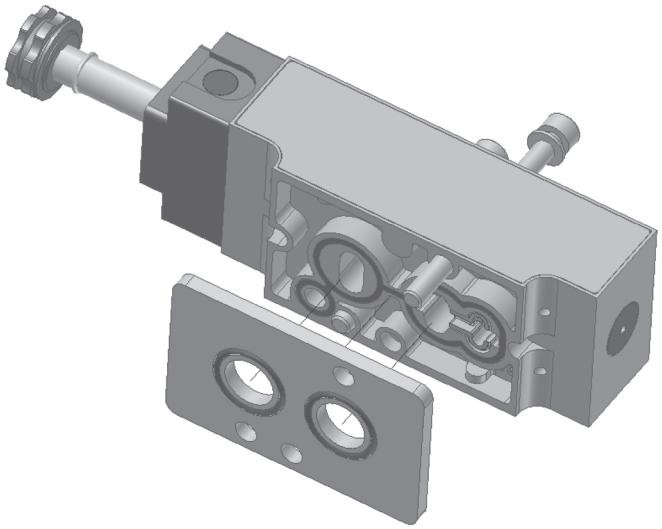
NEMA 4-4X UL, CSA, PTB&CE



NEMA 4, 4X, 7 & 9 UL, CSA, PTB&CE



NAMUR SOLENOID VALVE WITH TRANSITION PLATE



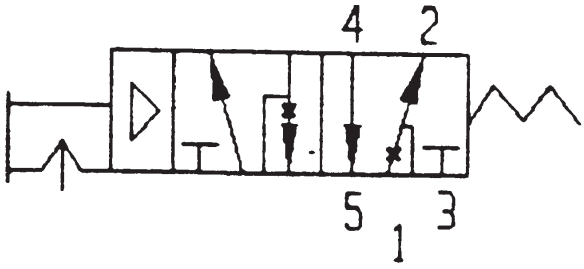
SOLENOID VALVES

AVC NAMUR *Three & Four-way, end mounted coil
Solenoids: Cv=1.8
For NAMUR Direct Mount

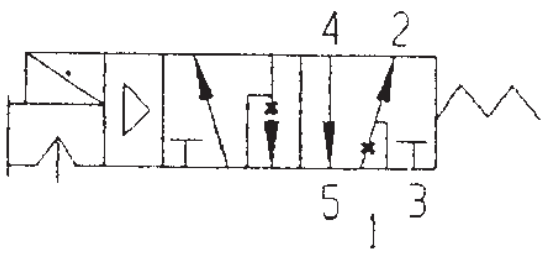
PART NO.		
3T8-411-40A	115 VAC NEMA 4	0025 thru 4000
3T8-421-40A	12 VDC/24 VAC NEMA4	0025 thru 4000
3T8-431-40A	24 VDC/48 VAC NEMA4	0025 thru 4000
3T8-441-40A	220 VAC NEMA4	0025 thru 4000
3T8-711-40A	115 VAC NEMA7	0025 thru 4000
3T8-721-40A	12 VDC/24 VAC NEMA7	0025 thru 4000
3T8-731-40A	24 VDC/48 VAC NEMA7	0025 thru 4000
3T8-741-40A	220 VAC NEMA7	0025 thru 4000

All above include adapters to turn “NAMUR 90º”

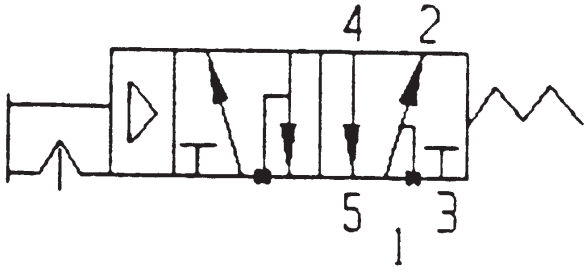
PART NO.		
3T8-000-32A	Adapter	0025-4000



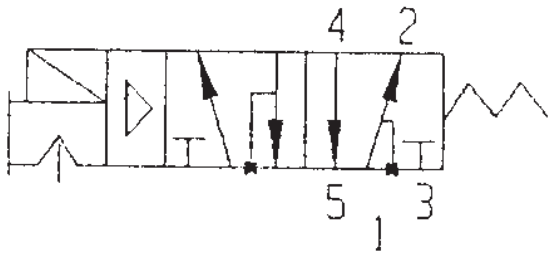
3-WAY N.C.



3-WAY N.C.



4-WAY OPERATION



4-WAY OPERATION

The Quartz is available in explosion proof (QX), nonincendive and intrinsically safe (QN) and general purpose (QG) versions. The robust epoxy coated anodized aluminum construction makes this platform extremely durable and well suited for use in corrosive, heavy wash down environments. A broad range of switching, position transmitter and communication options may be selected to accommodate most applications.

This versatile platform adapts to a wide variety of valve systems. Attach the Quartz to quarter-turn actuators, manual operators, linear operators and positioners using readily available stainless steel mounting systems.

ENCLOSURES OPTIMIZED FOR ENVIRONMENT

- QX: Explosion proof, water tight and corrosion-proof enclosure is approved for use in div. 1/zone 1 hazardours areas.
- QN: Nonincendive is approved for all div.2/zone 2 hazardous environments with proximity sensors using a clear cover. Intrinsically safe Namur sensors or passive switches are available for div. 1/zone 0 applications.
- QG: General purpose features a clear Lexan cover with mechanical switches. All enclosures are rated NEMA 4, 4x, and 6.

RAPID ENCLOSURE ACCESS

- Screw-on cover allows quick enclosure access, saving you valuable
- maintenance and set-up time. The cover provides a vapor tight seal and allows entry to internal components in less than five seconds.

FASTER WIRING

- Pre-wired and labeled terminal strip enables quick, convient attachment of field wires.

WIDE VARIETY OF SWITCHING & COMMUNICATION

- Switching options include dual module sensors and communication, Maxx-Guard proximity switches and mechanical switches. Continuous signal output is available in a 4 to 20 mA position transmitter.

QUICK SET CAMS ARE EASY TO ADJUST

- Touch and Tune switch settings allow you to make adjustments in seconds without the use of tools.

DUAL SHAFT O-RING SEALS ELIMINATE CORROSION

- Top inner and bottom outer shaft o-rings seal the drive bushing from both external corrosives and internal contaminants that enter the enclosure.

SPECIAL DRIVE BUSHING ASSURES LONG CYCLE LIFE

- The oil impregnated bronze bushing maintains smooth operation and eliminates the potential for shaft seizure due to actuator shaft eccentricity.

SPACE SAVING VISUAL INDICATION

- Visual indicator offers excellent view ability without sacrificing accessibility or adding to space requirements. Indicators are also available with continuous percentage or three-way indication.

See Page 42 for Part Numbering Matrix

Moniteur Limit Switches have been designed to provide the most visible and reliable valve position indication in general purpose, difficult process, and explosion-proof environments. With a wide variety of switches and sensors available to match your application.

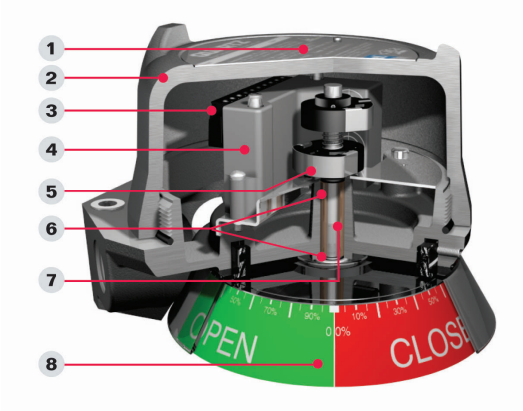
FEATURES

- The industry's only "true" visual valve position indicator available for multi-port valves, adjustable to match the actual physical flow pattern of the valve.
- Patented engineered Loc-Ring Cam and Shaft Retention System provides unsurpassed sensing accuracy over the multi-million cycle life of the physical platform.
- Clear Ektar cover offers optimum chemical resistance and strength and is environmentally sealed to prevent fogging and entry of contaminants.
- Indicator is fully adjustable to any valve or actuator.
- Internal switches and terminal block are labeled for easier installation.
- Careful material selection provides a rated life of minimum 1,000,000 cycles.
- Materials of construction selected to excel in high vibration, corrosive, and dirty environments, either indoors or outdoors.
- "Flat cover" version is available without an indicator for areas with tight space requirements.

PART NUMBER	MODEL NO.	DESCRIPTION
3T-LS3-02	FMYB-5120	NEMA 4/Indicator/2 SPDT Mech.
3T-LS3-06	FFNB-5120	NEMA 4/Flat Cover/2 SPDT Mech.
3T-LS3-01	AMYB-5120	NEMA 7/Indicator/2 SPDT Mech.
3T-LS3-05	AFNB-5120	NEMA 7/Flat Cover/2 SPDT Mech.
3T-LS3-03	AMYB-5220	NEMA 7/Indicator/2 SPDT Prox.
3T-LS3-07	AFNB-5220	NEMA 7/Flat Cover/2 SPDT Prox.
3T-LS3-04	FMYB-5220	NEMA 4/Indicator/2 SPDT Prox.

PART NUMBER	ACTUATOR SIZE
63-002-12	0012
63-002-13	0025-0350
63-002-14	0600-4000

**Short shaft NAMUR must use kits above.*



Explosion proof Quartz Models (Aluminum Cover)

Series: QX

Sensors/Switches

Sensor Modules

33	SST N.O. Switching Sensor Dual Module

Valve Communication Terminals (VCTs)

92	DeviceNet VCT
93	Foundation Fieldbus
96	AS-Interface
97	AS-Interface (w/ extended addressing)

Mechanical Switches

2V	(2) SPDT Mechanical Switches
2W	(2) SPDT Gold Contact Mechanical Switches
4V	(4) SPDT Mechanical Switches
4W	(4) SPDT Gold Contact Mechanical Switches
14	(2) DPDT Mechanical Switches
5V	Position Transmitter w/ (2) SPDT Mechanical Switches
5W	Position Transmitter w/ (2) SPDT Mechanical Switches

Expeditors (Proximity Type)

82	DeviceNet
86	AS-Interface

Sensors/Switches

Function		Switch/Sensor Type	
2	(2) Switches	P	SPST Maxx-Guard
4	(4) Switches	L	SPST Maxx-Guard (LED)
5	Position Transmitter w/ (2) or No Switches	G	SPDT Maxx-Guard
7	High Performance Position Transmitter w/ (2) or No Switches	H	SPDT Maxx-Guard
8	Expeditor, Y or H switches only	S	SPDT Maxx-Guard (LED)
		Y	Expeditor Only (3)
		F	PNP Solid State 3-Wire P&F
		X	SST Sensor (LED)
		O	No Switches

Enclosure

E	North American (NEC/CEC)
R	International (IEC/ATEX)
F	INMETRO
S*	Stainless Steel North American (NEC/CEC)
T*	Stainless Steel International (IEC/ATEX)
M*	Stainless Steel INMETRO

* Available w/ 03 or 06 conduit entry only

Conduit Entries

02	(1) 3/4" NPT & (1) 1/2" NPT
03	(1) 3/4" NPT & (2) 1/2" NPT
05	(2) M20
06	(3) M20

Indicator

SRA	Red-Closed / Green-Open
SGA	Green-Closed / Red-Open
S1A	T1 3-way
S2A	T2 3-way
S3A	T3 3-way
S4A	T4 3-way
S5A	T5 3-Way
S0A	No Indication
SXA	Special
SCA	Continuous

Nonincendive & Intrinsically Safe Quartz Models (Clear Cover)

Series: QN

Sensors/Switches

Sensor Modules

33	SST N.O. Switching Sensor Dual Module
44	Namur Sensors Dual Module I.S.; DIN 19234

Valve Communication Terminals (VCTs)

92	DeviceNet VCT
93	Foundation Fieldbus
96	AS-Interface
97	AS-Interface (w/ extended addressing)

Expeditors (Proximity Type)

82	DeviceNet
86	AS-Interface

Sensors/Switches

Function		Switch/Sensor Type	
2	(2) Switches	P	SPST Maxx-Guard
4	(4) Switches	L	SPST Maxx-Guard (LED)
5	Position Transmitter w/ (2) or No Switches	G	SPDT Maxx-Guard
7	High Performance Position Transmitter w/ (2) or No Switches	H	SPDT Maxx-Guard
8	Expeditor, Y or H switches only	S	SPDT Maxx-Guard (LED)
		Y	Expeditor Only (3)
		F	PNP Solid State 3-Wire P&F
		X	SST Sensor (LED)
		O	No Switches

Intrinsically Safe Type	
J	SPST (Passive)
M	SPDT (Passive)
N	P + F Namur Sensors

Enclosure

C	North American (NEC/CEC)
D	International (IEC/ATEX)

Conduit Entries

02	(1) 3/4" NPT & (1) 1/2" NPT
03	(1) 3/4" NPT & (2) 1/2" NPT
05	(2) M20
06	(3) M20

Indicator

SRA	Red-Closed / Green-Open
SGA	Green-Closed / Red-Open
S1A	T1 3-way
S2A	T2 3-way
S3A	T3 3-way
S4A	T4 3-way
S5A	T5 3-Way
S0A	No Indication
SXA	Special
SCA	Continuous

General Purpose Quartz Models (Clear Cover)

Series: QG

Function

Mechanical Switches

2V	(2) SPDT Mechanical Switches
2W	(2) SPDT Gold Contact Mechanical Switches
4V	(4) SPDT Mechanical Switches
4W	(4) SPDT Gold Contact Mechanical Switches
14	(2) DPDT Mechanical Switches

Enclosure

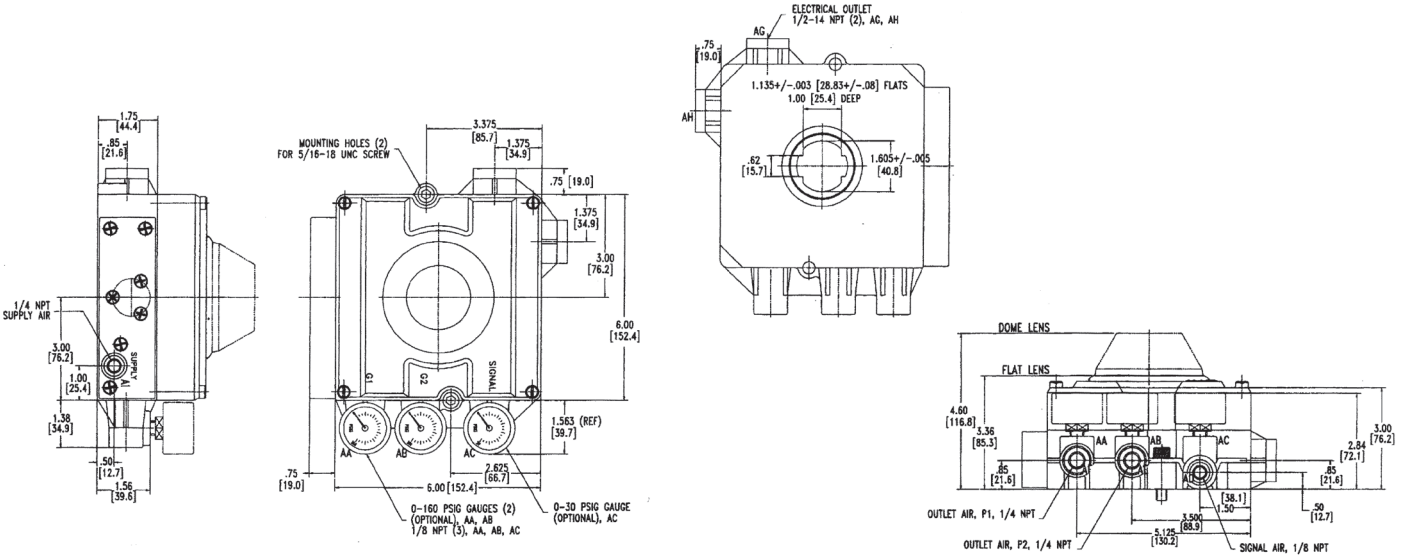
C	General Purpose

Conduit Entries

02	(1) 3/4" NPT & (1) 1/2" NPT
03	(1) 3/4" NPT & (2) 1/2" NPT
05	(2) M20
06	(3) M20

Indicator

SRA	Red-Closed / Green-Open
SGA	Green-Closed / Red-Open
S1A	T1 3-way
S2A	T2 3-way
S3A	T3 3-way
S4A	T4 3-way
S5A	T5 3-Way
S0A	No Indication
SXA	Special
SCA	Continuous



STANDARD MATERIALS LIST

PART	MATERIALS
Enclosure	PPA Composite, 300 Stainless Steel Port Rings, Cover and Mounting Bolts
Indicator Lens	LEXAN™
Internals	PPA, PPS and PEEK Composites 300 Series Stainless Steel
Nickel Plated Brass Spool Valve	Carpenter 70 Grade Stainless Steel
I/P Converter (VK02) VE Model	PPA Composite, TEFLON™ Coated Carbon Steel, Nickel Plated Carbon Steel, High Density Polyethylene DELRIN™
Signal Diaphragm/ O-Rings	BUNA N

PERFORMANCE

PARAMETER	SPECIFICATION
Resolution	1.25% Maximum 0.10% Typical
Repeatability	99.75% Minimum 99.90% Typical
Hysteresis	0.50% Maximum 0.25% Typical
Linearity	1.0% Maximum
Gain @80 psig	250 Single Acting 500 Double Acting
Air Consumption @80 psig	0.25 SCFM – Standard Flow Spool Valve 0.45 SCFM – Maximum Flow Spool Valve
Temp. Range	-40 to 150˚F/-40 to 65˚C

HOW TO ORDER VRC POSITIONERS

PART NUMBER MATRIX

3PV -	0	7	3	0	0
PREFIX	POSITION INDICATOR & TYPE	SPOOL VALVE	PORT GAUGES	POSITION TRANSMITTER	LIMIT SWITCH
3PV	0 - Flat Pneumatic	7 - Standard Flow	3 - No Gauges	0 - No Transmitter	0 - No Switch
	1 - Flat Electro-Pneumatic	8 - Max Flow	4 - Brass Gauges	F - 4-20MA Current	K - Mechanical Switch
	5 - Dome Pneumatic		5 - SS Gauges	Output 2-Wire	M - Proximity Switch
	6 - Dome Electro-Pneumatic				

Simple design makes this product easy to understand, calibrate and repair. Rugged construction provides operation in a variety of tough applications. Compact size minimizes space requirements. A complete package means the user can select the right positioner for his application.

A bright indicator makes it easy for operators to visually check valve position. Spool valve design requires very little maintenance. Electro-pneumatic unit eliminates the need for an extra product and additional connections. Recognized product name means a proven product with many years of service.

PRODUCT SPECIFICATIONS

	P2000/20	P5/EP5*
Connections:	1/4"	1/4"
Supply Pressure:	120 psig	145 psig
Hysteresis:	0.5%	0.5%
Linearity:	2.0%	0.5%
Repeatability:	0.5%	0.5%
Sensitivity:	0.5%	0.25%
Input Signal:	4-20 mA	3-15, 4-20mA
Temperature - Standard:	+5 - 175˚F	+5 - 185˚F
Temperature - Optional:	+5 - 230˚F	+5 - 230˚F
Weight:	5.9 lbs.	2.9/4.1 lbs.
Air Consumption @ 85 psig:	35/.71 scfm----------.75 scfm	
Air Delivery @ 57 psig:	12/15.7 scfm	12.6 scfm
Gain Factor:	50/400	10,000

**PMV New Modular Unit P5-Pneumatic; EP5 Electropneumatic*

PMV MOUNTING KITS FOR APOLLO ACTUATORS

ACTUATOR SIZE	MOUNTING KIT	MATERIAL
AD/AS 0012	63-002-01	Stainless Steel
AD/AS 0025-0350	63-001-89	Stainless Steel
AD/AS 0600-4000	63-001-91	Stainless Steel

Valve positioners are an excellent tool for increasing the gain of your valve package, often reducing your actuator size due to your increased ability to accurately control higher air deliveries, and the flexibility to add options and accessories to complete your control package's performance.

Our standard positioners include both pneumatic and electropneumatic positioners. Electropneumatic Positioners may be used on either double acting or spring return actuators. The anodized aluminum housing provides excellent product integrity and good corrosion resistance. Options including special coatings, stainless steel housings, and a variety of accessory items which provide the flexibility to meet your most demanding control applications.

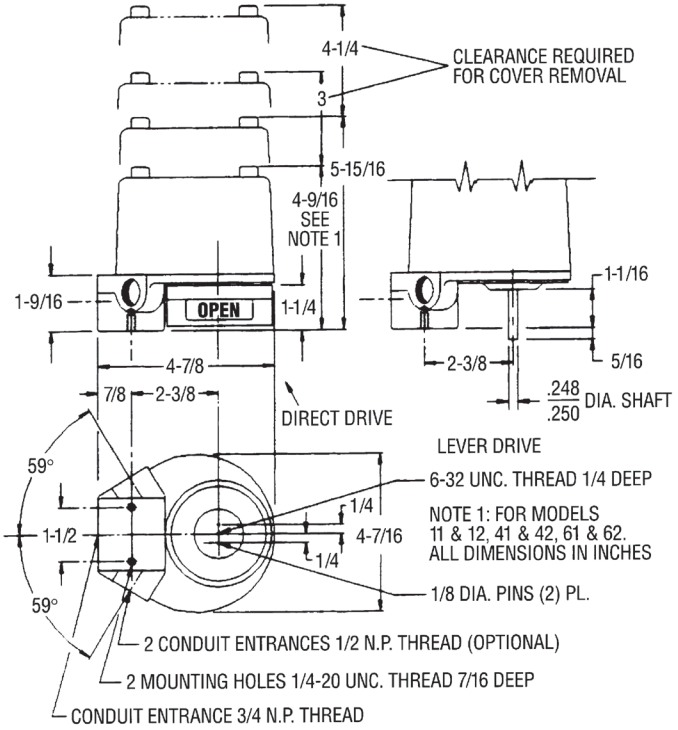
PART NUMBERS

APOLLO PART #'S	PMV MODEL #'S	DESCRIPTION
3T-200-01	P-2000	Double Acting, Electro-Pneumatic, 1
3T-202-01	P-2020	Double Acting, Electro-Pneumatic, 2
3T-500-01	P5	Double Acting, Hi Capacity & Gain
3T-250-01	EP5	Electro Pneumatic, Hi Capacity & Gain
3T-250-02	EP5-EX	Double Acting, Hi Capacity & Gain, Explosion Proof

1. *Normal Capacity*
2. *High Capacity*
3. *ccessories such as pressure gauges, limit switches, transmitters, and potentiometers are available. Please consult the factory for pricing.*

VALVE POSITION MONITORING SYSTEMS

Proximity Controls' flexible Valve Position Monitoring Systems give users the ability to reliably monitor both manual and actuated valves. The durable position monitoring system features mounting hardware available in zinc plated steel, stainless steel, and Namur standards for all Proximity indicator models.



PROXIMITY MODEL #	NEMA	MODEL DESCRIPTION	SWITCH/TRANSMITTER SPECIFICATIONS
42ADM	4,4X	2 SPDT MECH, Clear Plastic Cover	15 amps ac, 5 amps dc
42AD0	4,4X,7,9	2 SPDT MECH, Anodized Aluminum Housing	15 amps ac, 5 amps dc
42DD0	4,4X,7,9	2 DPDT MECH, Anodized Aluminum Housing	10 amps ac, 10 amps dc
42RD0	4,4X,7,9	2 SPDT PROX, Herm Sealed Reed, Anodized Al.	3 amps ac, 2 amps dc
42VD0J1	4,4X,7,9	2 SPDT MECH, 3/4" & 1/2" NPT Entry, Anodized Al.	10 amps ac, 10 amps dc
42RD0J1	4,4X,7,9	2 SPDT PROX, 3/4" & 1/2" NPT Entry, Anodized Al.	3 amps ac, 2 amps dc
44AD0	4,4X,7,9	4 SPDT MECH, Anodized Aluminum Housing	15 amps ac, 5 amps dc
45VD0	4,4X,7,9	2 SPDT MECH, & Transmitter, Anodized Aluminum	10 amps / 4-20 mA out
45RD0	4,4X,7,9	2 SPDT PROX, & Transmitter, Anodized Aluminum	3 amps / 4-20 mA out
62PD0	4,4X,7,9	2 SPST PROX, Anodized Aluminum Housing	Herm Sealed Reed (mA)
62QD0	4,4X,7,9	2 SPDT PROX, Anodized Aluminum Housing	Herm Sealed Reed (mA)
35OD0*	Mag Coupling	MULTI-TURN Transmitter, Anodized Aluminum	No Switch / 4-20 mA
12AD0**	Mag Coupling	2 SPDT MECH, Anodized Aluminum Housing	15 amps ac, 5 amps dc
15VD0	Mag Coupling	2 SPDT MECH, & Transmitter, Anodized Aluminum	10 amps / 4-20 mA out
12VD0J1	Mag Coupling	2 SPDT MECH, 3/4" & 1/2" NPT Entry, Anodized Al.	10 amps ac, 10 amps dc
12AD6	Mag Coupling - ST STL	2 SPDT MECH, 304 Stainless Steel Housing	15 amps ac, 5 amps dc
15VD6	Mag Coupling - ST STL	2 SPDT MECH, & Transmitter, 304 Stainless Steel	10 amps / 4-20 mA out

**No Visual Indicator Mag (Magnetic) Coupling - Maximum hazard protection and submersible. Prox (Proximity) sensors are all Herm (Hermetically) Sealed Reeds. Anodized aluminum housing is standard. 316 Stainless Steel is optional.*
*** Conbraco maintains the 12ADO in stock, Conbraco part number with indicator M116100 and without indicator M105900.*

When ordering, please specify requirements for explosion proof certifications (US, CSA OR CENELEC), or Intrinsic Safety. Standard temperature (180°F) switches are available. White epoxy is optional. When you need a junction package, specify your solenoid valve requirement(s). For factory sealed lead orders, please specify number of leads and desired length (36" standard). Let us know if you need special cables or connectors, and specify your mounting hardware requirements.

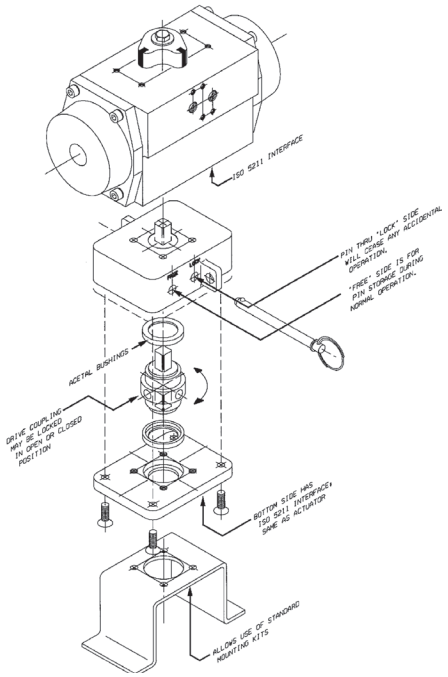
The Apollo® Lockout Tagout accessory for actuators complies with OSHA 1910.147 guidelines. It insures complete lockout capability in both the fully open or the fully closed position. Its design prevents accidental or malicious tampering of an automated valve's orientation.

The housing is constructed in investment cast 316SS, the fasteners, the lock pin, and the coupling are made of 300 Series stainless steel. This rugged construction, plus two acetal bushings located above and below the coupling, assures the strength and support necessary to withstand the torque and torsion generated by the actuator mounted above.

The top and bottom of the housing feature ISO 5211 mounting patterns. This design allows the accessory to be fitted between existing actuators and stainless steel bracketry that also comply with the ISO 5211 standard.

Available in six sizes, it is the perfect compliment to the Apollo® Rack and Pinion Actuator and Apollo® Ball Valve. The design results in a safe automated package that will satisfy the concerns of the most discriminating safety engineer.

The lockout device may be used with electric actuators. However, caution should be exercised due to the possibility of motor burnout in an energized and locked position.



DIMENSIONS

DIMENSION	3TL3000	3TL4000	3TL5060	3TL6570	3TL8000	3TL9000
A	4.00	4.00	6.00	6.00	8.00	8.00
B	3.00	3.00	4.25	4.25	6.00	6.00
C	2.25	2.25	3.12	3.12	4.25	4.25
D	1.75	1.75	2.37	2.37	3.50	3.50
E	0.06	0.06	0.10	0.10	0.18	0.18
F	2.00	2.00	3.00	3.00	4.00	4.00
G	0.50	0.70	0.87	0.87	1.38	1.38
H	1.02	1.02	1.75	1.75	2.50	2.50
I	0.62	0.70	1.17	1.17	2.00	2.00
J(RAD.)	0.37	0.37	0.50	0.50	0.75	0.75
K	0.96	0.96	1.50	1.50	2.50	2.50
L1	0.265	0.265	0.328	0.328	0.515	0.640
L2	NA	NA	0.390	0.390	NA	NA
UNC1	1/4-20UNC	1/4-20UNC	5/16-18UNC	5/16-18UNC	1/2-20UNC	5/8-11UNC
UNC2	NA	NA	0.390	0.390	NA	NA
M1 B.C.	1.970 (F05)	1.970 (F05)	2.756 (F07)*	2.756 (F07)	4.920 (F12)	5.510 (F14)
M2 B.C.	NA	NA	4.016 (F10)	4.016 (F10)*	NA	NA
XT (MAX.)	0.540	0.690	0.955	1.080	1.325	1.780
XB (MIN.)	0.551	0.710	0.985	1.105	1.420	1.890
CT	.430/.432	.547/.550	.744/.747	.862/.865	1.056/1.059	1.413/1.416
CB	.433/.435	.551/.553	.748/.750	.866/.868	1.060/1.063	1.419/1.422
WEIGHT	3.65	3.75	9.90	10.40	28.90	29.50

**F Patterns Designated are Conbraco's Standard Mounting Arrangement*