MORIN B AND C SERIES ACTUATORS

B series - Ductile iron w/ stainless steel cylinders, C series - Ductile iron w/ carbon steel cylinders
Spring return and double acting actuators
Quarter-turn output torques to 158200 Nm

B SERIES

C SERIES

GENERAL APPLICATIONS

For remote control of any quarter-turn application: ball, butterfly, rotary plug or damper style valves, etc. for use in chemical process, food and beverage, iron and steel, pharmaceutical, power, oil and gas, pulp and paper and textile industries.

TECHNICAL DATA

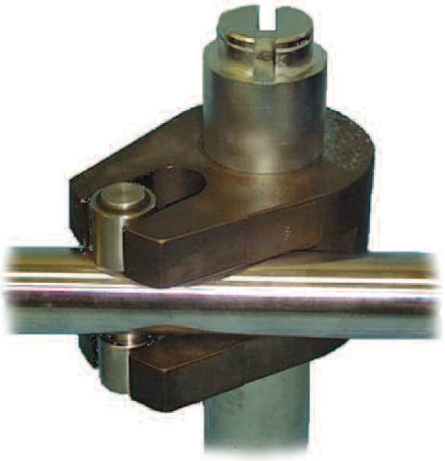
Supply pressure:	3 to 11 barg (see torque chart)
Supply medium:	Air or any gas compatible with materials of construction
Temperature rating	
Standard range:	-29°C to 99°C
Optional range:	-54°C to 149°C
Angular rotation:	90 degrees (adjustable between 82 and 98 degrees)
Mounting pattern:	ISO 5211
Protection:	IP66
Certification:	SIL3 capable

FEATURES AND BENEFITS

- Ductile iron housing, piston and end caps provide long life and durable, cost-effective operation.
- High strength alloy steel or 17-4PH stainless output shaft transmits torque without fatigue.
- Sintered bronze or PTFE composite output shaft bushings eliminate side loading of valve stem to maximize stem packing performance.
- Strong, corrosion-resistant chrome-plated steel piston rod for enduring high cycle applications.
- Sintered bronze piston rod bushings provide low-friction support and precise alignment to increase efficiency, reduce maintenance and extend actuator life.
- Heat-treated stainless steel thrust pin and rollers transfer piston force to yoke to reduce friction for longer life and more efficient torque transmission.
- PTFE guide bands ensure low-friction piston guidance, protecting cylinder walls from scoring and extending seal performance with a continuous cylinder wiping action.
- Bi-directional travel stops provide accurate valve rotation adjustment.
- NAMUR drive slot maintains a compact assembly for accessory-driven components with no couplings necessary.
- Tectyl-coated springs need no special tools to be disarmed safely and easily, reducing down time.

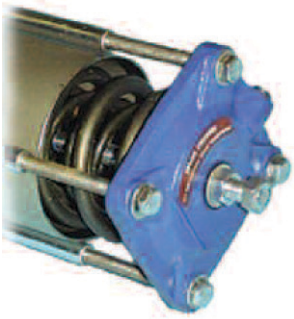
ALGA/ALGAS models available over the 1150 size

DESIGNED WITH A RUGGED HEART



Scotch yoke design
The heart of any scotch yoke actuator is the yoke. B and C series actuators use either 17-4PH or ductile iron for this critical area as standard.
The yoke is the mechanism used to convert linear force to torque. The yoke is critical to actuator performance, it must be rugged yet precisely machined to give long life at high efficiency - all our yoke designs meet this test.

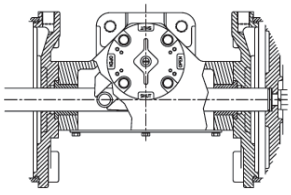
Principles of construction
Using high quality materials of construction and modern rugged design concepts, provides the standard for high quality, low cost valve actuation.
The actuator housings are all machined from ductile iron castings. This produces a rugged, low cost product through reduced machining time and by eliminating wasteful excess material.
Any components that rotate or slide during operation, such as the high strength output shaft, chrome-plated piston rod, stainless steel thrust pin or the ductile iron piston, are all supported by replaceable friction reducing bearings.



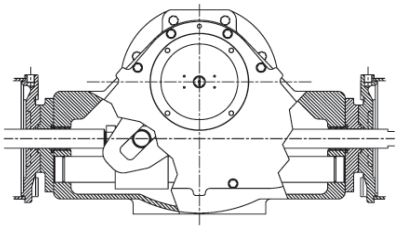
Bi-directional travel stops
Adjustable stops on each end cap provide the flexibility of accurate valve rotation positioning at the end of the 'open' and 'close' stroke. Both stops are located on the cylinder centerline, the optimal position to maximize travel adjustment and eliminate any detrimental side loading on the travel stops. Adjustable from 82° to 98°.

Spring designed for safety
All spring return models incorporate a 'man safe' spring design that allows the actuator to be safely assembled and disassembled in the field without the need for special tools. The integral tie rods are bored and tapped to provide a means of loading and unloading the spring in a safe and convenient manner.

Experts in actuator design
We understand that the most efficient design for one torque range is not the most efficient for another. Our actuators use the standard scotch yoke design for lower torque ranges and a guide bar design for the higher torque ranges. This gives a rugged design with economic cost.



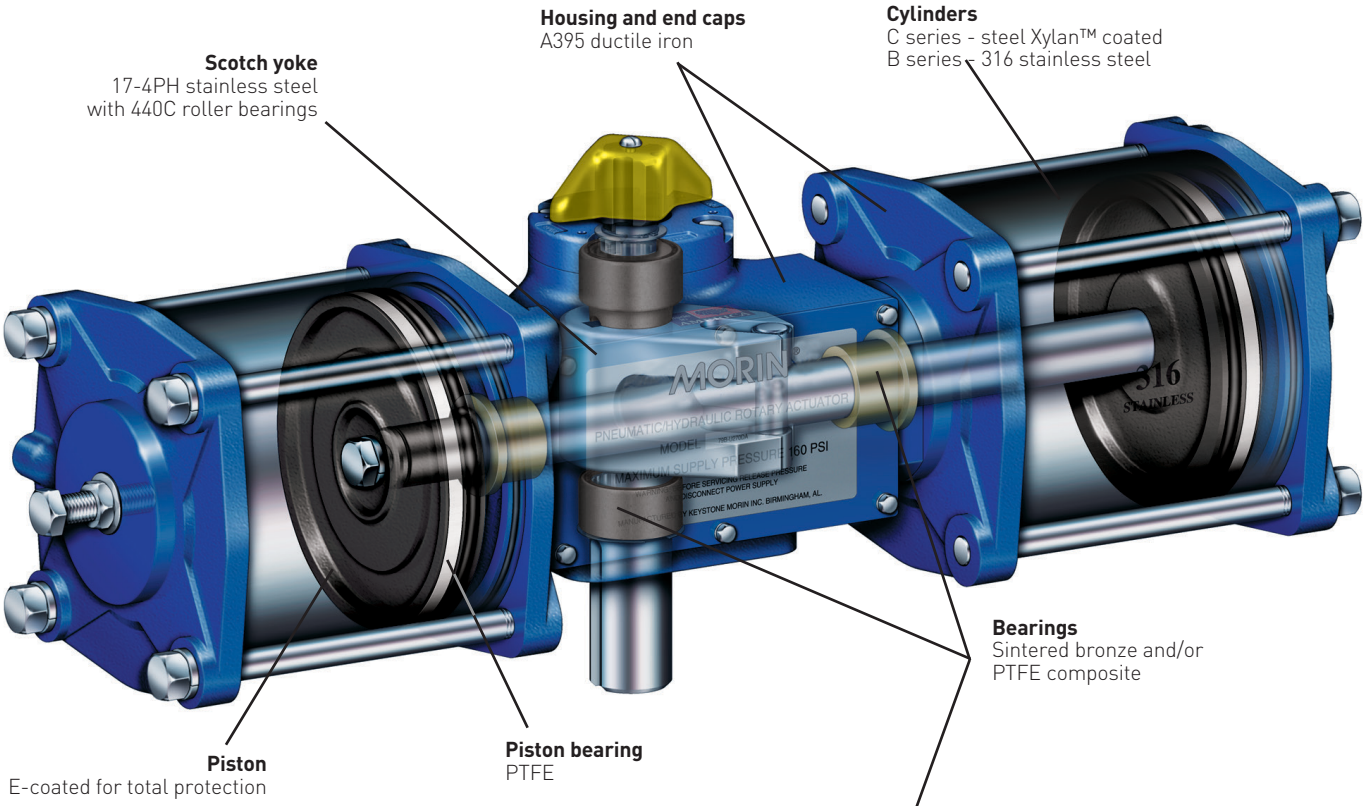
STANDARD DESIGN, SCOTCH YOKE



GUIDE BAR DESIGN, SCOTCH YOKE

Superior materials of construction offer long life, and mean less downtime

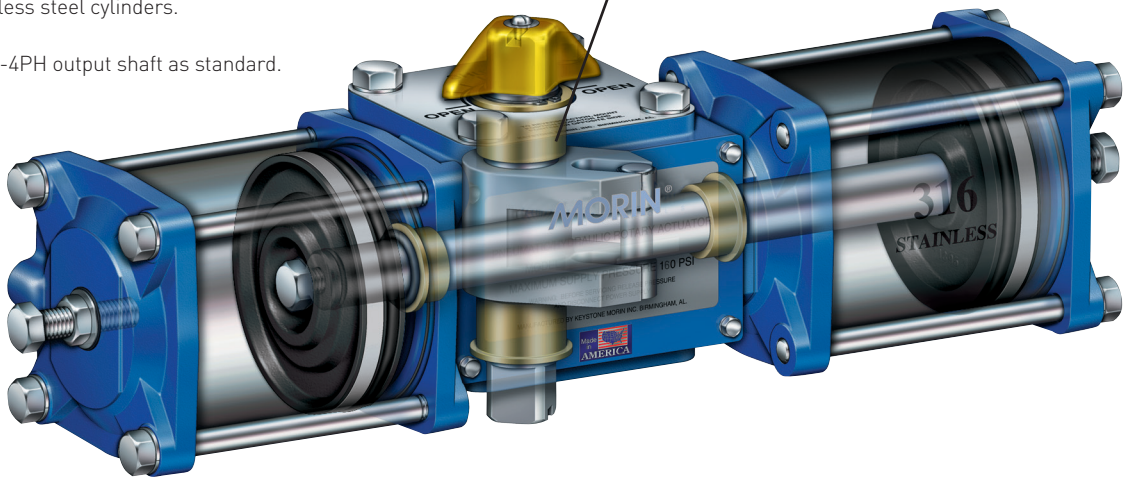
B OR C SERIES, MODELS 135 TO 1150



B SERIES MODELS 006 TO 100

B series actuators use construction identical to the C series, but with 316 stainless steel cylinders.

Models 006 to 100 use 17-4PH output shaft as standard.



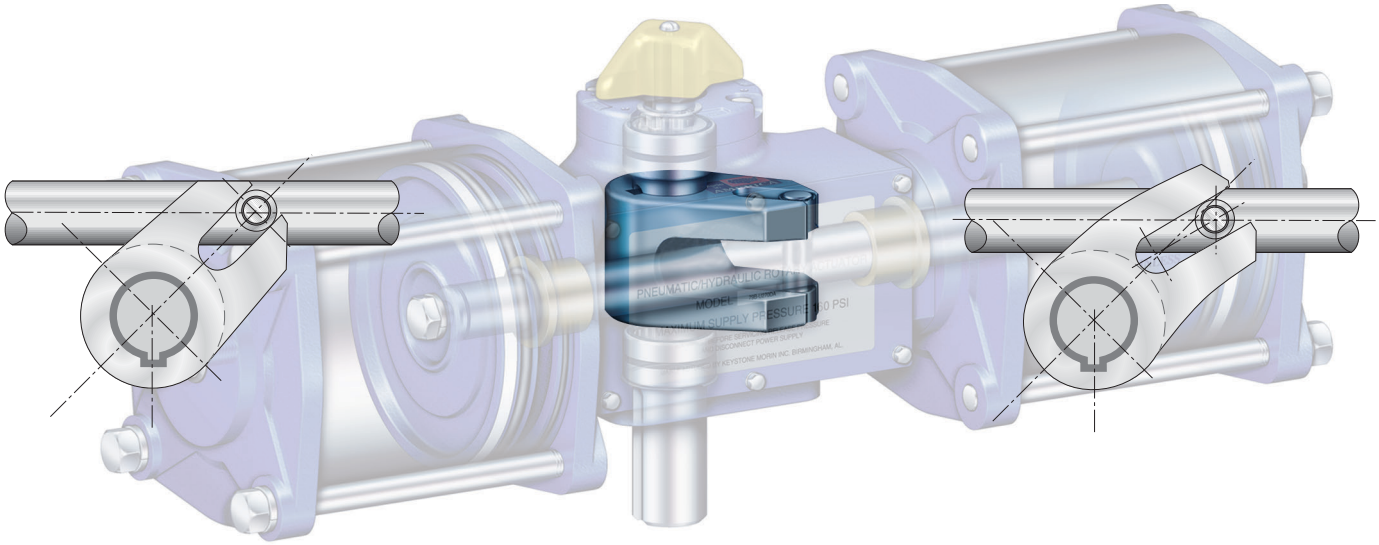
NOTE
See B/C/S series IOM for a complete bill of materials.

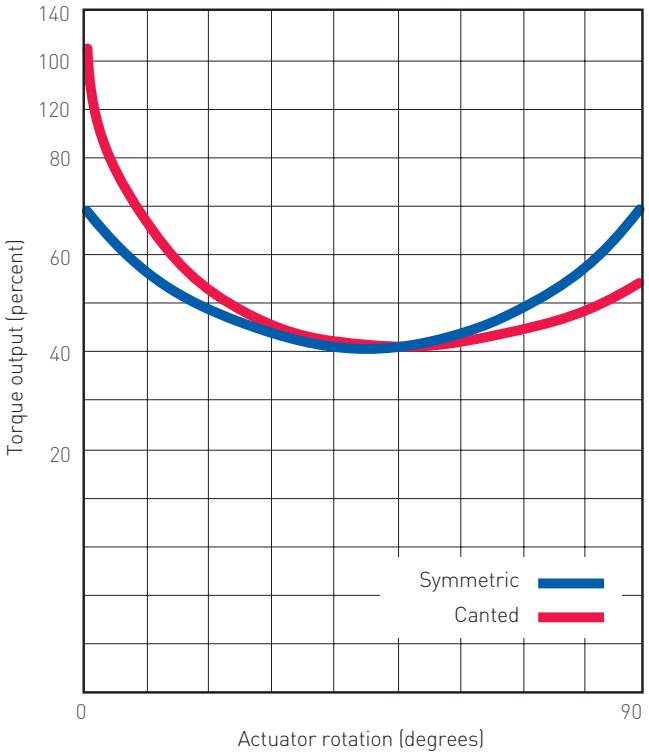
SYMMETRICAL AND CANTED YOKES

It's about fitting the torque curve of the actuator to the valve . . .
It's about lower cost, lighter weight, smaller actuators . . .
It's about CHOICE . . .

Symmetric
Symmetrical yoke design offers the standard torque curve seen most often in relation to scotch yoke actuators. It offers the increased torque advantage at both ends of the 90° stroke as shown on the blue curve below. This torque curve covers most quarter-turn applications.

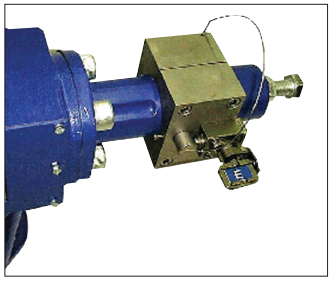
Canted
Canted yoke design moves the torque curve to where it's needed most, gaining as much as 35% more break and reseat torque for the same size actuator. The canted yoke curve is shown in red below. Canted yoke actuators allow selection of smaller, lighter, and less expensive actuator packages.





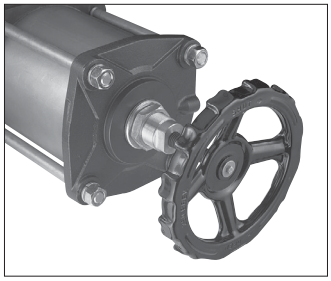
OPTIONS

To provide the actuation package best suited for your application, we offer a full range of manual accessories.

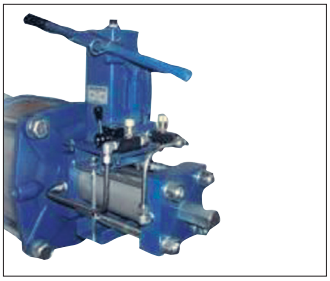


Partial stroke test device (PSTD)
Provides a method of testing ESD packages without shutdown.

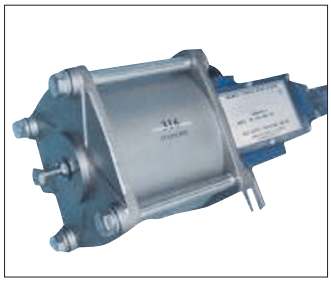
Lockout
Integral lockout allows safe shutdowns for maintenance and isolation of systems.



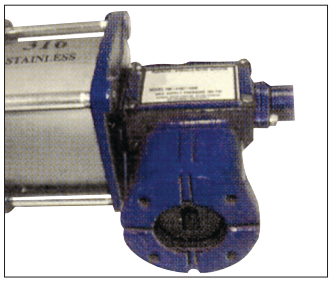
Jackscrew override (JSO)
Manual operation when power is lost. Simple and effective.



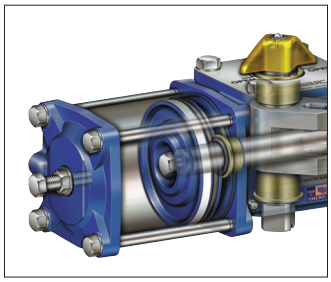
Hydraulic override (MHP)
Manual operation when power is lost. Includes speed controls.



AWWA
Tested per American Waterworks Association C540. Available for pneumatic or water service operation.

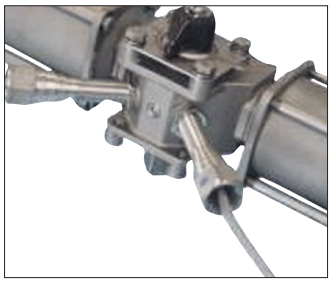


Direct mounting cast adapters
Many valve top works covered, including some ISO mounting. Assures economic but correct mounting alignment.

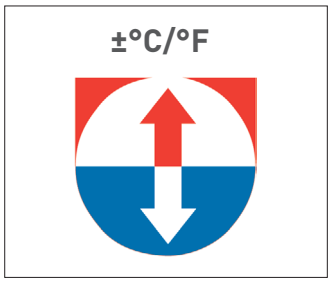


Full stroke adjuster
Provides mechanical control of maximum and/or minimum valve stroke.

Epoxy painting (EX)
Offshore rated, three-part coating system for high level of environmental protection.



Proximity switch preparation
Allows installation of cartridge style proximity switches. Leaves top works open for mounting of other devices.



High or low temperature ratings
Standard rating of -29°C to 99°C [-20°F to 210°F] covers most applications. Optional ratings down to -54°C [-65°F] and up to 149°C [300°F].

Optional certification for CE
Manufactured in accordance with the Pressure Equipment Directive 97/23/EC and ATEX 94/9/EC.

MECHANICAL DATA

Actuator model	Closing torque at 5.5 barg Symmetrical	Canted	Number of pistons	Cylinder bore (mm)	Stroke (mm)	Volume[1] (liters) 90° stroke	Cycle time[2] (seconds) 90° stroke	Weight (kg)
Double acting								
006	68	-	1	69.9	50.8	0.20	1	5.0
015	170	-	1	111.1	50.8	0.49	1	6.5
023	260	338	1	111.1	76.2	0.74	1	13.5
036	447	582	1	138.1	76.2	1.15	2	15.0
050	565	735	1	158.8	76.2	1.51	2	17.5
059	667	867	2	111.1/138.1	76.2	1.84	2	16.5
072	895	*1018	2	138.1	76.2	2.25	3	18.5
100	1130	**1102	2	158.8	76.2	2.98	3	22.0
135	1602	2082	1	209.6	127.0	4.38	5	75.0
210	2610	3393	1	260.4	127.0	6.77	5	84.0
270	3204	4165	2	209.6	127.0	8.62	6	95.5
345	4093	*4656	2	209.6/260.4	127.0	11.00	7	106.0
370	4181	5816	1	311.2	152.4	11.59	8	177.0
420	4746	**4627	2	260.4	127.0	13.37	9	116.5
575	7212	9376	1	393.7	152.4	18.55	10	235.5
740	8780	11414	2	311.2	152.4	22.86	10	240.5
945	11426	**11140	2	311.2/393.7	152.4	29.82	11	296.0
1150	13645	***11086	2	393.7	152.4	36.79	12	351.5
1485	●	●	●	●	●	●	●	●
1935	●	●	●	●	●	●	●	●
2385	●	●	●	●	●	●	●	●
3071	●	●	●	●	●	●	●	●
3731	●	●	●	●	●	●	●	●
4534	●	●	●	●	●	●	●	●
5336	●	●	●	●	●	●	●	●
7114	●	●	●	●	●	●	●	●

● Use ALGA model

Spring return								
006	25	-	1	69.9	50.8	0.20	0.5	6.0
015	59	-	1	111.1	50.8	0.49	1	9.0
023	90	127	1	111.1	76.2	0.74	1	17.0
036	142	199	1	138.1	76.2	1.15	1.5	21.0
046	181	235	2	111.1	76.2	1.44	2	21.5
058	*181	*253	2	138.1/111.1	76.2	1.84	2.3	24.5
059	214	299	2	111.1/138.1	76.2	1.84	2.4	24.5
072	283	396	2	138.1	76.2	2.25	2.5	27.0
100	396	554	2	158.8	76.2	2.98	3	39.0
135	641	897	1	209.6	127.0	4.38	4.5	95.5
210	914	1279	1	260.4	127.0	6.77	5	106.5
270	1175	1644	2	209.6	127.0	8.62	6	113.5
344	1428	1999	2	260.4/209.6	127.0	11.00	7	143.0
345	****1555	****2177	2	209.6/260.4	127.0	11.00	7	143.0
370	1683	2356	1	311.2	152.4	11.59	8	245.0
420	1744	2442	2	260.4	127.0	13.37	8.5	172.0
575	2388	3108	1	393.7	152.4	18.55	9.5	353.5
740	3366	4712	2	311.2	152.4	25.56	10	299.5
944	*3132	*4384	2	393.7/311.2	152.4	29.82	11	395.0
945	3650	5110	2	311.2/393.7	152.4	29.82	11	395.0
1150	4776	6686	2	393.7	152.4	36.79	12	491.0
1485	❖	❖	❖	❖	❖	❖	❖	❖
1934	❖	❖	❖	❖	❖	❖	❖	❖
1935	❖	❖	❖	❖	❖	❖	❖	❖
2385	❖	❖	❖	❖	❖	❖	❖	❖
3071	❖	❖	❖	❖	❖	❖	❖	❖
3072	❖	❖	❖	❖	❖	❖	❖	❖
3731	❖	❖	❖	❖	❖	❖	❖	❖
4534	❖	❖	❖	❖	❖	❖	❖	❖
5336	❖	❖	❖	❖	❖	❖	❖	❖
6044	❖	❖	❖	❖	❖	❖	❖	❖
7114	❖	❖	❖	❖	❖	❖	❖	❖

❖ Use ALGAS model

NOTES

1. Air consumption:
   Liter shown in chart represent actual free air volume in cylinder between piston and end cap when furthest apart. Air consumption will vary depending on supply pressure. To determine standard cubic meter per second use the following formula:

$$SCMS = \left(\frac{\text{Vol. ltr.}}{1000}\right)\left(\frac{\text{Supply air barg} + 1}{1\ \text{barg}}\right)\left(\frac{\text{Strokes/min}}{60}\right)$$

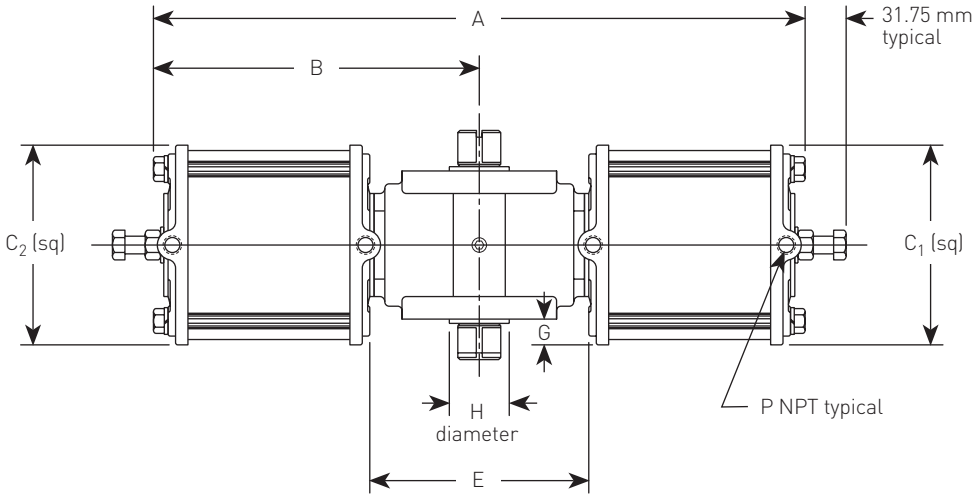
Example: calculate SCMS for model 023 double acting using 5.5 barg air supply and 5 strokes/minute.

$$SCMS = \left(\frac{0.737}{1000}\right)\left(\frac{5.5 + 1}{1}\right)\left(\frac{5}{60}\right) = 0.000401$$

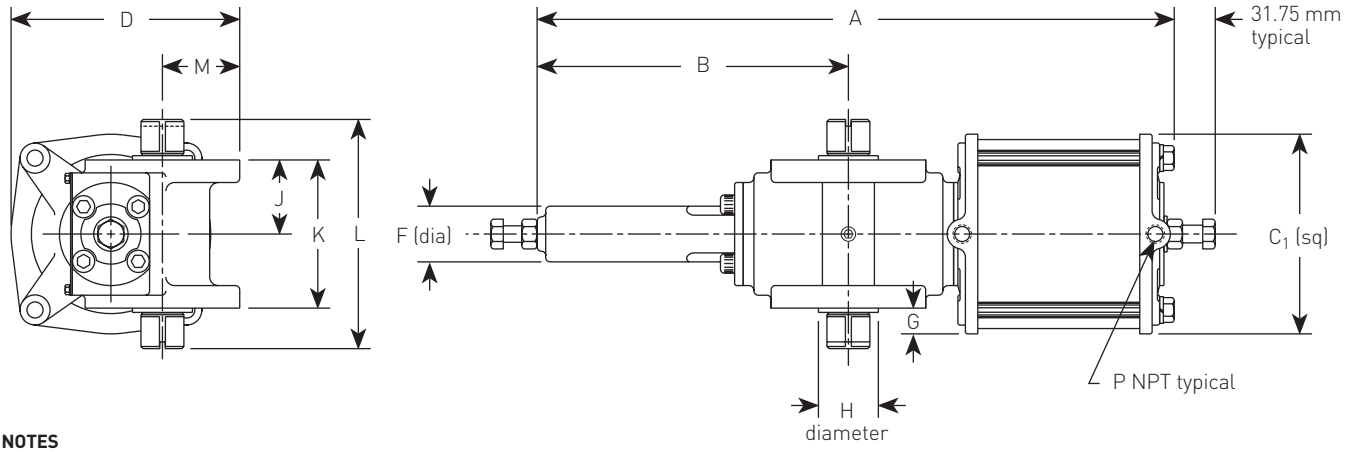
2. Cycle times shown represent average time to stroke 90 degrees using standard pilot valves and should be used as a guide only. Cycle times can be increased or decreased dramatically by using speed controls, oversized pilot valves or quick exhaust valves.

* at 4.8 barg;
** at 4.1 barg;
*** at 3.4 barg;
**** at 6.2 barg

MODELS 046, 058, 059, 072 AND 100



MODELS 006, 015, 023, 036 AND 050



NOTES

1. Shown without pointer for clarity.
2. For mounting dimensions, refer to page 10.

DIMENSIONS (mm) DOUBLE ACTING

Model	A	B	C_1	C_2	D	E	F	G	H	J	K	L	M	P
006DA	326.9	134.1	80.8	-	98.3	-	27.7	4.6	38.1	38.1	76.2	120.7	33.3	⅛
015DA	312.7	134.1	122.2	-	122.2	-	27.7	25.4	38.1	38.1	76.2	120.7	33.3	¼
023DA	470.9	225.6	122.2	-	156.5	-	44.5	6.4	44.5	54.9	109.5	169.9	57.2	¼
036DA	472.4	225.6	147.6	-	169.2	-	44.5	19.1	44.5	54.9	109.5	169.9	57.2	¼
050DA	471.2	225.6	180.8	-	185.7	-	44.5	35.1	44.5	54.9	109.5	169.9	57.2	¼
059DA	492.8	245.4	122.2	147.6	169.2	161.0	-	19.1	44.5	54.9	109.5	169.9	57.2	¼
072DA	491.5	245.9	147.6	147.6	169.2	162.1	-	19.1	44.5	54.9	109.5	169.9	57.2	¼
100DA	482.1	245.9	180.8	180.8	185.7	162.1	-	35.1	44.5	54.9	109.5	169.9	57.2	¼

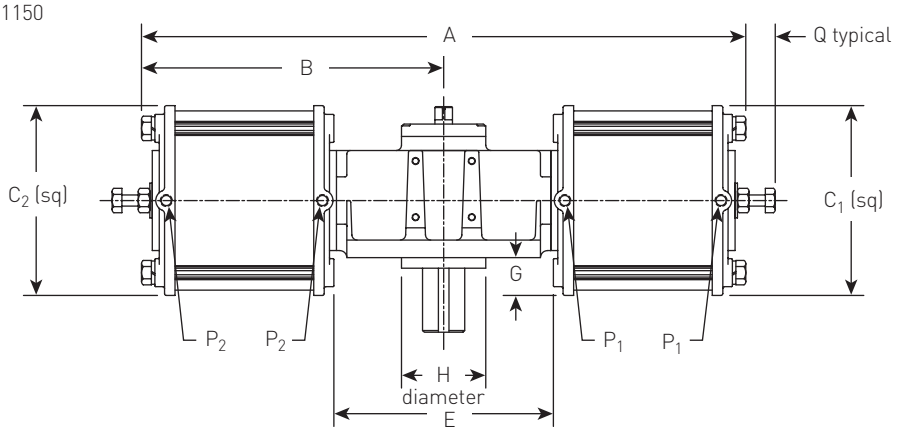
DIMENSIONS (mm) SPRING RETURN

Model	A	B	C_1	C_2	D	E	F	G	H	J	K	L	M	P
006SR	326.9	134.1	80.8	-	98.3	-	27.7	4.6	38.1	38.1	76.2	120.7	33.3	⅛
015SR	368.3	134.1	122.2	-	122.2	-	27.7	25.4	38.1	38.1	76.2	120.7	33.3	¼
023SR	557.5	225.6	122.2	-	156.6	-	44.5	6.4	44.5	54.9	109.5	169.9	57.2	¼
036SR	600.7	225.6	147.6	-	169.2	-	44.5	19.1	44.5	54.9	109.5	169.9	57.2	¼
046SR	577.3	245.4	122.2	122.2	156.5	141.7	-	6.4	44.5	54.9	109.5	169.9	57.2	¼
058SR	578.9	247.1	147.6	122.2	169.2	141.7	-	19.1	44.5	54.9	109.5	169.9	57.2	¼
059SR	620.8	245.4	122.2	147.6	169.2	138.2	-	19.1	44.5	54.9	109.5	169.9	57.2	¼
072SR	621.0	245.9	147.6	147.6	169.2	138.2	-	19.1	44.5	54.9	109.5	169.9	57.2	¼
100SR	622.6	247.1	180.8	180.8	185.7	138.2	-	35.1	44.5	54.9	109.5	169.9	57.2	¼

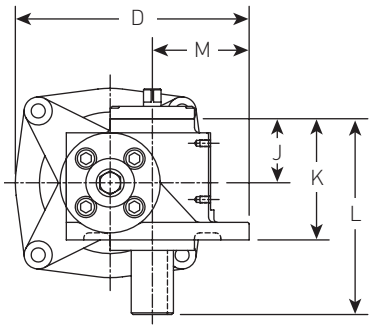
MORIN B AND C SERIES ACTUATORS

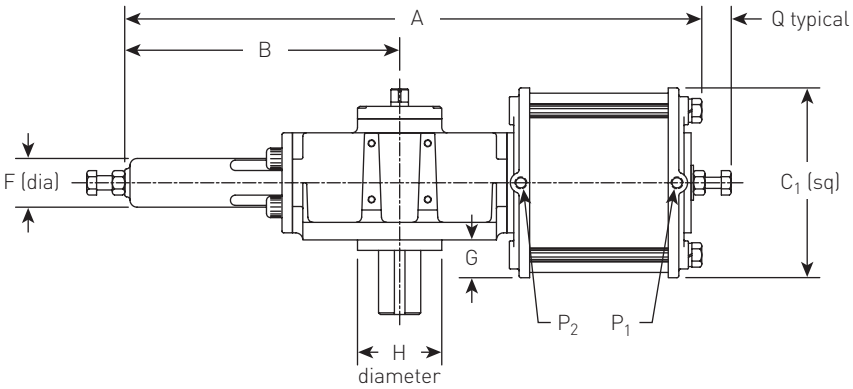
DIMENSIONS

MODELS 270, 344, 345, 420, 740, 944, 945 AND 1150



MODELS 135, 210, 370 AND 575





NOTES

1. Shown without pointer for clarity.
2. For mounting dimensions, refer to pages 10-11.

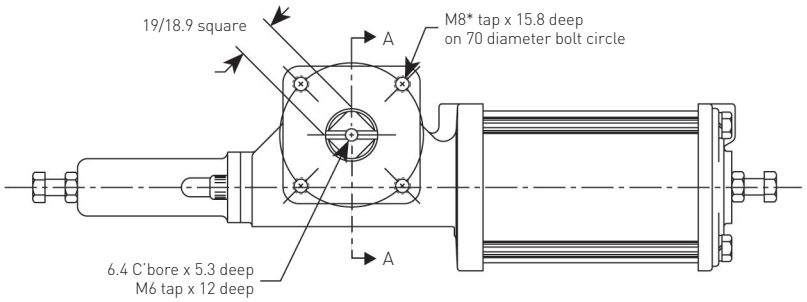
DIMENSIONS (mm) DOUBLE ACTING

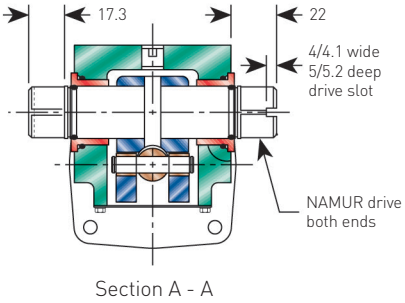
Model	A	B	C_1	C_2	D	E	F	G	H	J	K	L	M	P_1	P_2	Q
135DA	831.6	403.4	241.3	-	265.2	-	69.9	25.4	-	111.3	206.5	300.2	81.0	⅜	⅜	44.5
210DA	844.8	403.4	292.1	-	290.6	-	69.9	50.8	-	111.3	206.5	300.2	81.0	½	½	53.8
270DA	857.8	429.0	241.3	241.3	265.2	297.7	-	25.4	-	111.3	206.5	300.2	81.0	⅜	⅜	44.5
345DA	870.2	429.0	241.3	292.1	290.6	291.3	-	50.8	-	111.3	206.5	300.2	81.0	⅜	½	53.8
370DA	1057.7	496.8	342.9	-	425.5	-	88.9	68.3	149.9	138.2	241.3	376.2	174.8	½	½	44.5
420DA	882.7	441.5	292.1	292.1	290.6	285.0	-	50.8	-	111.3	206.5	300.2	81.0	½	½	53.8
575DA	1073.4	496.8	431.8	-	469.9	-	88.9	112.8	149.9	138.2	241.3	376.2	174.8	¾	¾	63.5
740DA	1121.4	560.6	342.9	342.9	425.5	396.7	-	68.3	149.9	138.2	241.3	376.2	174.8	½	½	44.5
945DA	1137.2	560.6	342.9	431.8	469.9	387.4	-	112.8	149.9	138.2	241.3	376.2	174.8	½	¾	63.5
1150DA	1152.9	576.3	431.8	431.8	469.9	378.0	-	112.8	149.9	138.2	241.3	376.2	174.8	¾	¾	63.5

DIMENSIONS (mm) SPRING RETURN

Model	A	B	C_1	C_2	D	E	F	G	H	J	K	L	M	P_1	P_2	Q
135SR	1002.3	403.4	241.3	-	265.2	-	69.9	25.4	-	111.3	206.5	300.2	81.0	⅜	⅜	44.5
210SR	1083.8	403.4	292.1	-	290.6	-	69.9	50.8	-	111.3	206.5	300.2	81.0	½	½	53.8
270SR	1030.5	431.5	241.3	241.3	265.2	278.1	-	25.4	-	111.3	206.5	300.2	81.0	⅜	⅜	44.5
344SR	1040.1	441.5	292.1	241.3	290.6	271.8	-	50.8	-	111.3	206.5	300.2	81.0	½	⅜	53.8
345SR	1112.3	431.5	241.3	292.1	290.6	269.5	-	50.8	-	111.3	206.5	300.2	81.0	⅜	½	53.8
370SR	1307.6	496.8	342.9	-	425.5	-	88.9	68.3	149.9	138.2	241.3	376.2	174.8	½	½	44.5
420SR	1121.9	441.5	292.1	292.1	290.6	263.1	-	50.8	-	111.3	206.5	300.2	81.0	½	½	53.8
575SR	1374.6	496.8	431.8	-	469.9	-	88.9	112.8	149.9	138.2	241.3	376.2	174.8	¾	¾	63.5
740SR	1371.3	560.6	342.9	342.9	425.5	374.7	-	68.3	149.9	138.2	241.3	376.2	174.8	½	½	44.5
944SR	1386.6	575.8	431.8	342.9	469.9	365.0	-	112.8	149.9	138.2	241.3	376.2	174.8	¾	½	63.5
945SR	1438.4	560.6	342.9	431.8	469.9	359.7	-	112.8	149.9	138.2	241.3	376.2	174.8	½	¾	63.5
1150SR	1453.4	576.3	431.8	431.8	469.9	350.3	-	112.8	149.9	138.2	241.3	376.2	174.8	¾	¾	63.5

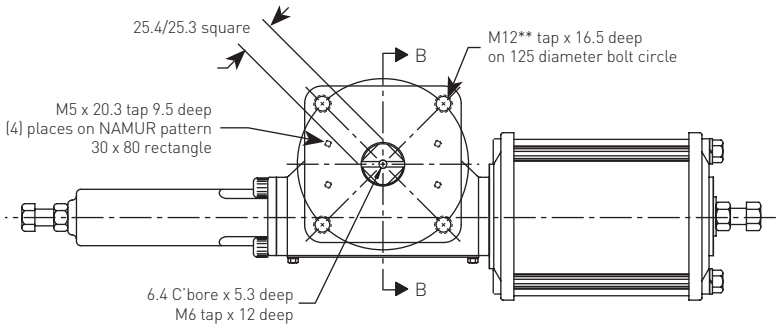
MODELS 006 AND 015 - TOP AND BOTTOM OF HOUSING (SYMMETRICAL) ISO 5211-F07

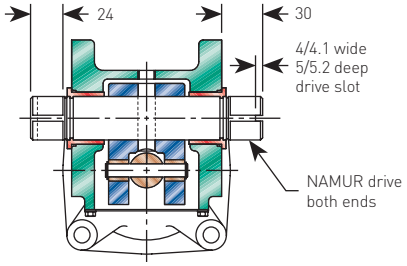




Section A - A

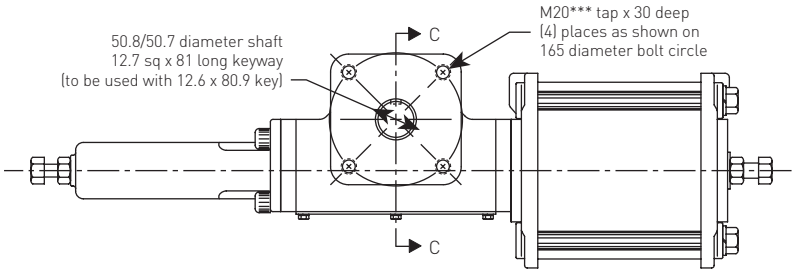
MODELS 023 THROUGH 100 - TOP AND BOTTOM OF HOUSING (SYMMETRICAL) ISO 5211-F12

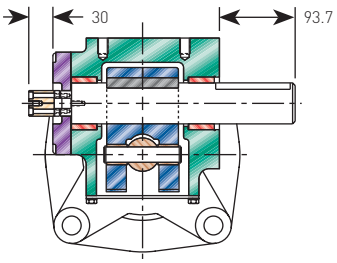




Section B - B

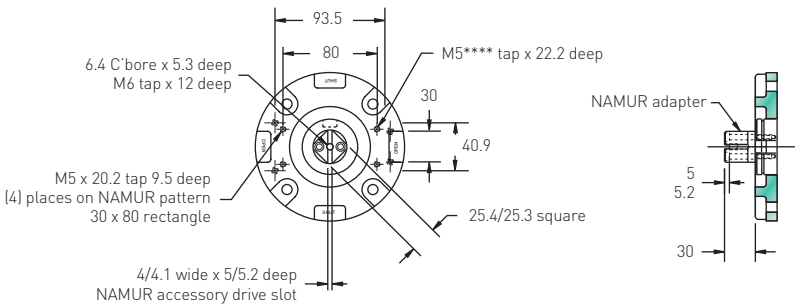
MODELS 135, 210, 270, 344, 345 AND 420 - BOTTOM OF HOUSING ISO 5211-F16





Section C - C

MODELS 135, 210, 270, 344, 345 AND 420 - TOP OF HOUSING - MOUNTING DETAILS

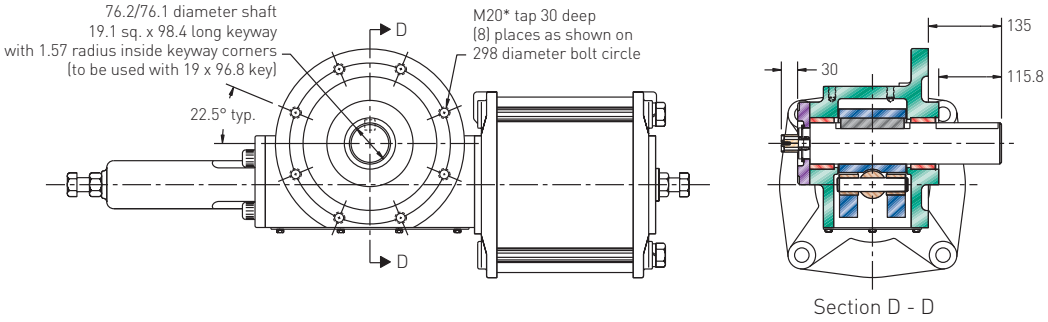


IMPERIAL THREAD OPTION

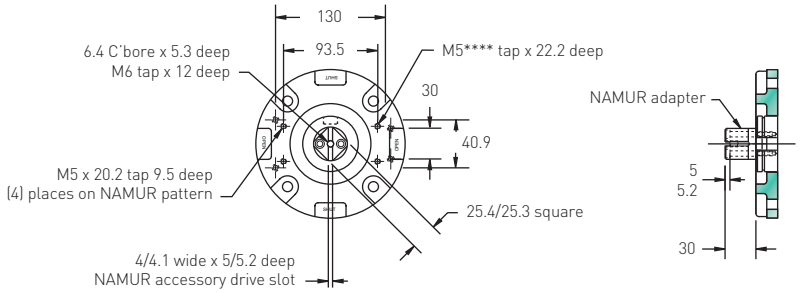
Standard tap		Model number
*	5/16 - 18 UNC	006 and 015
**	1/2 - 13 UNC	023 to 100
***	3/4 - 10 UNC	135 to 1150
****	10 - 32 UNC	135 to 1150

Replace 'M' with 'U' in order number designation (refer to page 12).

MODELS 370, 575, 740, 944, 945 AND 1150 - BOTTOM OF HOUSING ISO 5211-F30



MODELS 370, 575, 740, 944, 945 AND 1150 - TOP OF HOUSING - MOUNTING DETAILS



IMPERIAL THREAD OPTION

Standard tap		Model number
*	¾ - 10 UNC	370 and 575 to 1150
****	10 - 32 UNC	135 to 1150

Replace 'M' with 'U' in order number designation (refer to page 12).

SELECTION GUIDE

Actuator model

B-
C-

Actuator size Model code based on approximate torque of symmetrical double acting at 5.5 barg

270 **006** **012** **015** **023** **036** **046** **050** **058** **059** **072** **100** **135** **210** **270** **344** **345** **370** **420** **575** **740** **944** **945** **1150**

Interface bolting

U – UNC mounting threads
M – Metric mounting threads

Yoke design

(blank) – Symmetrical yoke
C – Canted yoke

Function

D – Double acting
S – Spring return

Spring code

00 **00** – No spring - Double acting
04 – 40 pound spring
05 – 50 pound spring
06 – 60 pound spring
Etc. see Morin Torque Book for available springs

Spring return failure rotation

0 – No spring (double acting OR actuator rotates clockwise on loss of air)
1 – Actuator rotates counterclockwise on loss of air

Option

(blank) – No options (standard configuration)
See complete modules code listing
Note: Some codes can be used in combination. Indicate by "stacking" separated by "-".
Consult factory for possible combinations combinations.

B- 270 U C - D 00 0 - JSO = Model number **S-270UC-D000-JSO**

HOW TO ORDER

1. Double acting (symmetrical yoke) example

Air supply: 5.5 barg
Break/end torque: 2610 Nm

B-210U-D000

B Series
210 Model number
U UNC mounting threads
D Double acting
000 No spring

2. Spring return (symmetrical yoke) example

Air supply: 5.5 barg
End torque: 914Nm

B-210U-S080

B Series
210 Model number
U UNC mounting threads
S Spring return
080 Spring set

3. Double acting (canted yoke) example

Air supply: 5.5 barg
Break (CCW) torque: 3524 Nm
End (CW) torque: 3393 Nm

B-210UC-D000

B Series
210 Model number
U UNC mounting threads
C Canted yoke
D Double acting
000 No spring

4. For all spring return models

Use required torque to determine spring set code (see torque chart)
All spring sets ending with '0' fail clockwise (40, 50, 60, etc.)
All spring sets ending with '1' fail counterclockwise (41, 51, 61, etc.)
All symmetrical yoke models between 006 and 100 may be mounted to fail clockwise or counterclockwise by 'flipping' along the longitudinal axis