

ACTUATION



PRODUCT CATALOG





PERFORMING IN DEMANDING APPLICATIONS

Ball Valves & Actuators for the most demanding, challenging and hazardous applications is our passion and profession for the last 70 years. We believe in designing, manufacturing and supplying control and shutoff components and solutions that improves the overall safety, integrity and sustainability of the systems they are installed in.

Designed, manufactured and tested according to the highest standards, our products allow us to partner within systems that flows and control varied gases and liquids in divers markets especially where extreme temperatures and pressures are involved, hazardous materials are used and system performances are critical.

We are leading in cryogenic ball valve-based control solutions, emergency shutoff ,High Pressure and Severe Service and specially designed solutions. Believing that supplying and developing the most effective, safe and reliable products for the global leaders in the Gas distribution Severe Service and BioTech markets continually challenges us to improve our capabilities and products. Best coping with our prestigious customers’ most challenging requirements technically, operationally and commercially is the outcome and our contribution to the development of these high end markets.

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 SANITARY	 INDUSTRIAL	 HIGH TEMP.	 HIGH PRESSURE
 CONTROL	 ACTUATORS	 CRYOGENIC	 SPECIAL USE



HOW TO USE THIS CATALOGUE

This catalogue provides information in a hierarchical structure starting from Habonim company general information, product families, product lines, product series and to a single product data.

When using information of any level, the aggregate information of the levels above would apply and should be taken into consideration where applicable.

Online Version

A live and up-to-date electronic version of this catalog is available for online use and download on Habonim: www.habonim.com



In the case of discrepancies between the print and electronic versions, we recommend to use the latest version (the version date is printed on the back cover).

Proprietary Note

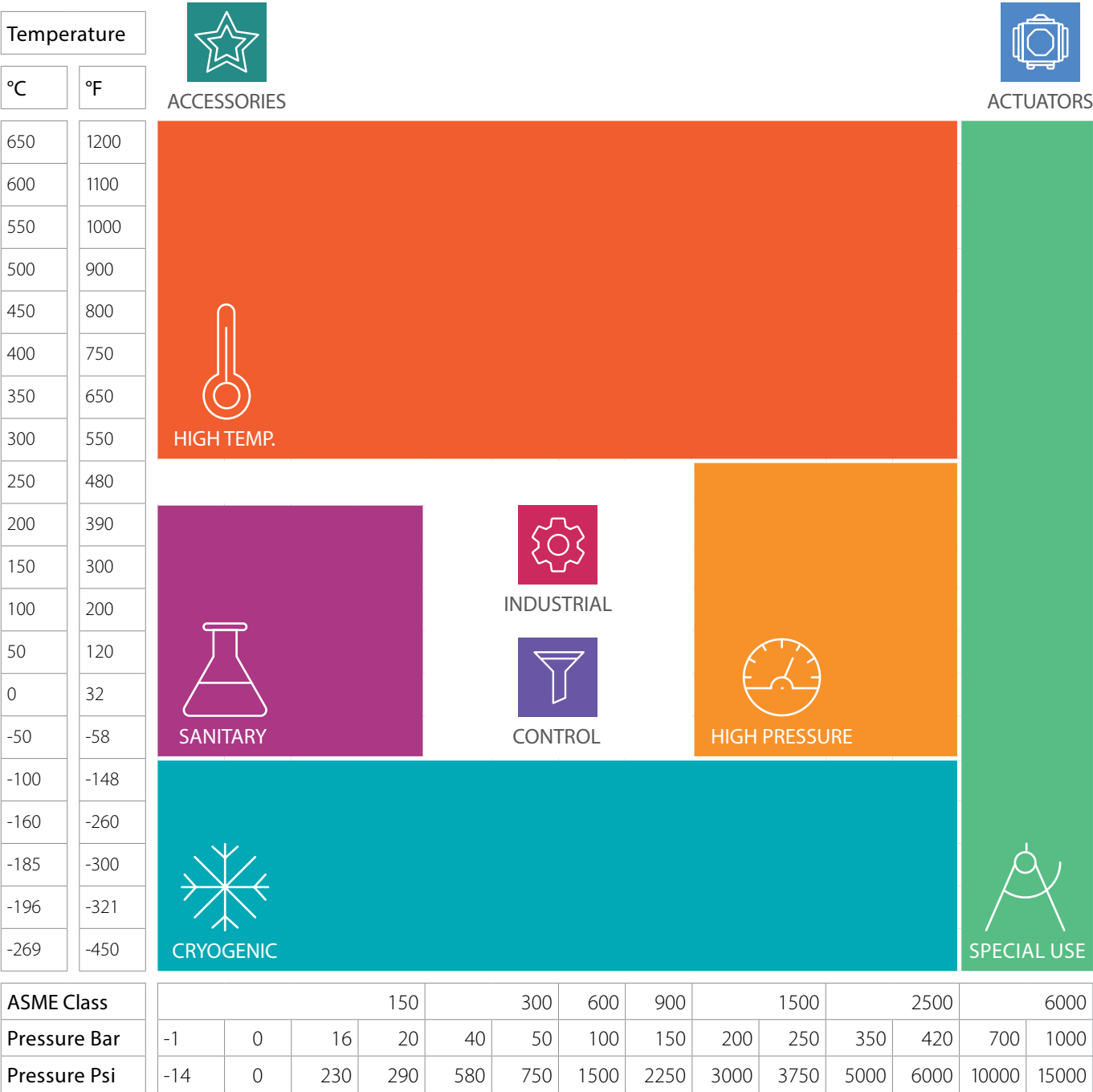
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Disclaimer

The products and datasheets in this catalog reflect current Habonim standard production specifications. Habonim Industrial Valves and Actuators Ltd. Reserves the right to modify products and materials, including modifications undertaken to comply with specific customer requests and technical specifications without further notice.

It is always the system designer and the end-user responsibility to verify all equipment use in their system is properly selected to ensure safety and integrity of their systems. Habonim offers only general information based on common market knowledge and standard market adaptations for its valves. For each system and use, the system designer and end-user must consider the particular operations conditions, media parameters and any other implication of their system for the proper selection of valves to be used on their solely responsibility.

PRODUCT FAMILIES



ABOUT HABONIM

Sustainability, Safety and Health

Habonim management and employees around the world are dedicated to promoting, in every aspect of their work, the following principles and guidelines:

Sustainability

Habonim management pledges to comply with the relevant laws, standards, and regulations to preserve the environment and promote sustainability at company premises and in our products.

Safety & Health

Habonim aspires to a safe and healthy work environment, aiming for zero work accidents and promoting our employee's wellbeing. Management and the entire workforce comply with the relevant laws and regulations necessary to achieve this goal.

Operations

Habonim operates a global infrastructure to best support customers and projects by supplying our catalog standard products, specially adjusted catalog products and custom-made products and sub-systems. Ball valves, actuators and control packages are our core deliveries.

Standard Delivery

With the goal of offering our high-end products as well as our general-use products with best availability, best quality, cost-effectiveness and with simple communication, handling and operation, we mark selected items designated as **Standard Offer** in most of our product lines with the Green "Standard Delivery" mark in order to provide best availability and supply readiness.





Materials

Habonim uses and stocks metallic, polymeric and other materials used in our products, all sourced from well-recognized manufacturers with the required testing, certifications and documentation.

Heat numbers and materials certificates are managed throughout the manufacturing and assembling process to enable full backtracking for our product components.

Available Certifications, some supply as standard and some per request:

- Materials certificates per EN10204 type 2.2/3.1/3.2
- FDA / USP Class VI compliant for polymers, elastomers, and lubricants where applicable
- CE1935:2004 compliant for polymers, elastomers, and lubricants where applicable

Tagging, Traceability

Each product is tagged for traceability. For product identification, a stainless steel nameplate is placed on the product body.

Traceability of assembly and testing procedures, heat codes, and foundry identification as per B16.34 stipulations where applicable.



ABOUT HABONIM

Cleaning, Assembling and Packing

Habonim manages different levels of cleaning, assembling and packing lines to meet different levels of end product and use requirements:

Commercial Service

Excessive hydrocarbon films, water, rust or mill scale, shop dirt, filings, chips or loose weld spatter is removed from the valve parts.

- Accessible surfaces are inspected for cleanliness by the naked eye under bright white light.
- Inaccessible surfaces are inspected and cleaned indirectly by wiping.
- A sticker on the package indicates the cleaning grade of the product.

Oxygen

A meticulous cleaning and assembly procedure eliminate the ignition hazards that can be caused by the presence of hydrocarbon oil, grease, and metal chips.

Our process of cleaning, assembling and packing refers to international standards in partial or in full:

- ASTM A380 • CGA G 4.1 • EN 12300

Habonim uses an environment friendly, alkaline-based degreasing process with controlled parameters. Valves are assembled in an oil-free restricted area by personnel who are specially equipped and trained to perform this task. The assembling area, work surfaces, equipment and tools are specially maintained to ensure cleanliness requirements are met.

- Valves are capped ends and plastic bagged
- A sticker on the plastic bag indicating "oxygen use"

High Purity Service

Habonim offers as an option high purity ball valves for gas and water distribution, as well as chemical handling processes. Such valves are cleaned in accordance with CGA G4.1:

- Cleaning, drying and packaging under Class 100,000 conditions
- Assembly under Class 10,000 conditions
- No lubricants used
- 100% helium leak tested
- Capped ends and plastic bagged





Quality

Habonim strives to deliver quality products that meet and exceed customer expectations, providing complete and total satisfaction and to operate, instruct and train employees globally in light of standards such as:

- ISO 9001:2015
- CE PED 2014/68/EU (Module H)
- ATEX 2014/34/EU
- API SPEC Q1: 2013
- TPED 2010/35/EU – for specific product lines
- IEC 61508-2:2010 (SIL 2 / 3) – for specific product lines
- SIL IEC 61508-1,2, 2010/35/ EU – for specific product lines

Habonim's management diligently monitors goals and objectives and continually enhances processes and products as well as the safety and environmental practices in light of the above.

Testing and Laboratories

Habonim operates a wide range of testing laboratories and equipment for ongoing and R&D needs and certifies products for cryogenic, high pressure, aggressive or clean, industrial use and more.

Habonim carries out external and internal testing and certification of products per customers' requests and market trends on a regular basis and offer a wide range of certified products for diverse certification bodies as but not limited to:







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HABONIM ACTUATORS

General

Habonim's unique quarter-turn COMPACT actuators have been proven for more than 30 years to have superior performance of double the torque per size, much longer cycling before any maintenance, high opening and closing speed and extraordinary durability in the most demanding industrial environments.

Our COMPACT actuators are successfully used to supply control packages in diverse industries and applications that are superior in overall smaller size, with less weight, less compressed-air consumption, much more reliable especially in high cyclic applications and with a very short acting times.

Habonim quarter-turn actuation offering includes:

- Double acting actuators (Air-air operated)
- Single acting actuators (air-Spring operated) as normally open/close options
- Shutoff valve and actuation packages
- Control valve and actuation packages
- Emergency Shut Down (ESD) and Fire Block Valve (FBV) packages



Habonim actuators product line is subject to the company's regulation, methodologies and certification – for more information, see Habonim Introduction chapter.

Design and Engineering

Habonim designs its actuators with accordance to international standards and guidelines in full, partial or with reference to. For some an external certification is available:

- ISO 5211:2017 - Industrial valves - part-turn actuator attachments
- VDI/VDE 3845:2010 (NAMUR) - Industrial process control - pneumatic control valves - Interfaces of valves and auxiliary equipment
- IEC 61508-2:2010 SIL2/3 - Safety integrity level - functional safety of electrical/ electronic/ programmable electronic safety-related systems (optional)

Testing

External shell and internal leak test

- 100% of actuators are tested
- Functional testing

Packing

Habonim actuators are delivered as a standard:

- Air inlet and outlets are capped
- Each actuator is packed in a firm, clean package.





Quick Selection Table

Double Acting - Torque

Stroke Time	5.5 bar (80psi)  8.0 bar (120psi)																	
3.0 Sec.																	C90M	C90M
2.5 Sec.															C75	C75		
1.5 Sec.													C60	C60				
0.75 Sec.											C45	C45						
0.4 Sec.									C35	C35								
0.24 Sec.							C30	C30										
0.2 Sec.					C25	C25												
0.13 Sec.			C20	C20														
0.1 Sec.	C15	C15																
0 Sec.																		
Torque NM	19	27	35	51	72	105	119	176	208	304	408	593	967	1406	1768	2596	3268	4754
Torque in/lb	172	244	311	468	639	961	1052	1611	1848	2780	3622	5429	8585	12872	15856	23767	28922	42073

Spring Return - Start Torque

Stroke Time	5.5 bar (80psi) X X 8.0 bar (120psi)																		
0.8 Sec.															C45M		C45M		
0.77 Sec.													C45		C45				
0.5 Sec.									C35M		C35M								
0.48 Sec.									C35		C35								
0.28 Sec.					C30M		C30M												
0.28 Sec.				C30		C30													
0.23 Sec.				C25		C25													
0.15 Sec.	C15		C15	C20		C20													
Torque NM	12	18	22	30	45	59	73	102	103	120	133	176	211	215	260	357	414		
Torque in/lb	106	165	195	275	398	522	668	912	934	1099	1177	1611	1903	1932	2301	3268	3790		

Stroke Time	5.5 bar (80psi) X X 8.0 bar (120psi)											
3.1 Sec.									C90M	C90M		
2.9 Sec.							C75M	C75M				
2.9 Sec.					C75	C75						
1.6 Sec.	C60M	C60M										
1.6 Sec.		C60	C60									
Torque NM	495	635	835	953	1003	1184	1575	1867	1869	3006		
Torque in/lb	4381	5620	7645	8434	9183	10478	14419	17093	16541	22709		

HABONIM ACTUATORS

COMPACT Actuator Features



NAMUR output drive for limit switches and positioners



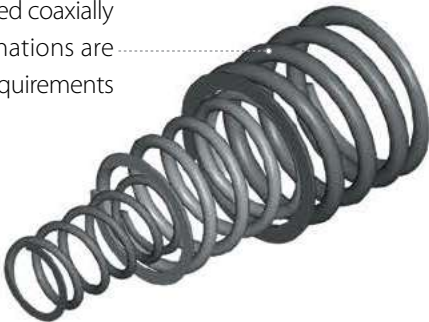
NAMUR VDI/VDE 3845 connection to limit switches



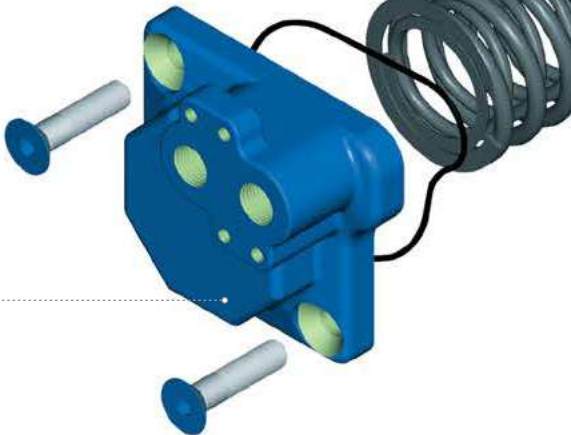
Smaller in the overall size compared to double piston actuators



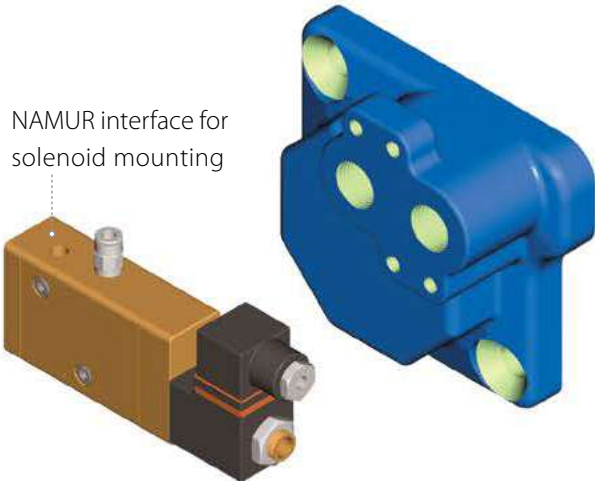
Spring cartridge: The modified spring set design improves the torque characteristics of the COMPACT actuator



Spring return covers with extended screws for safe relief of springs



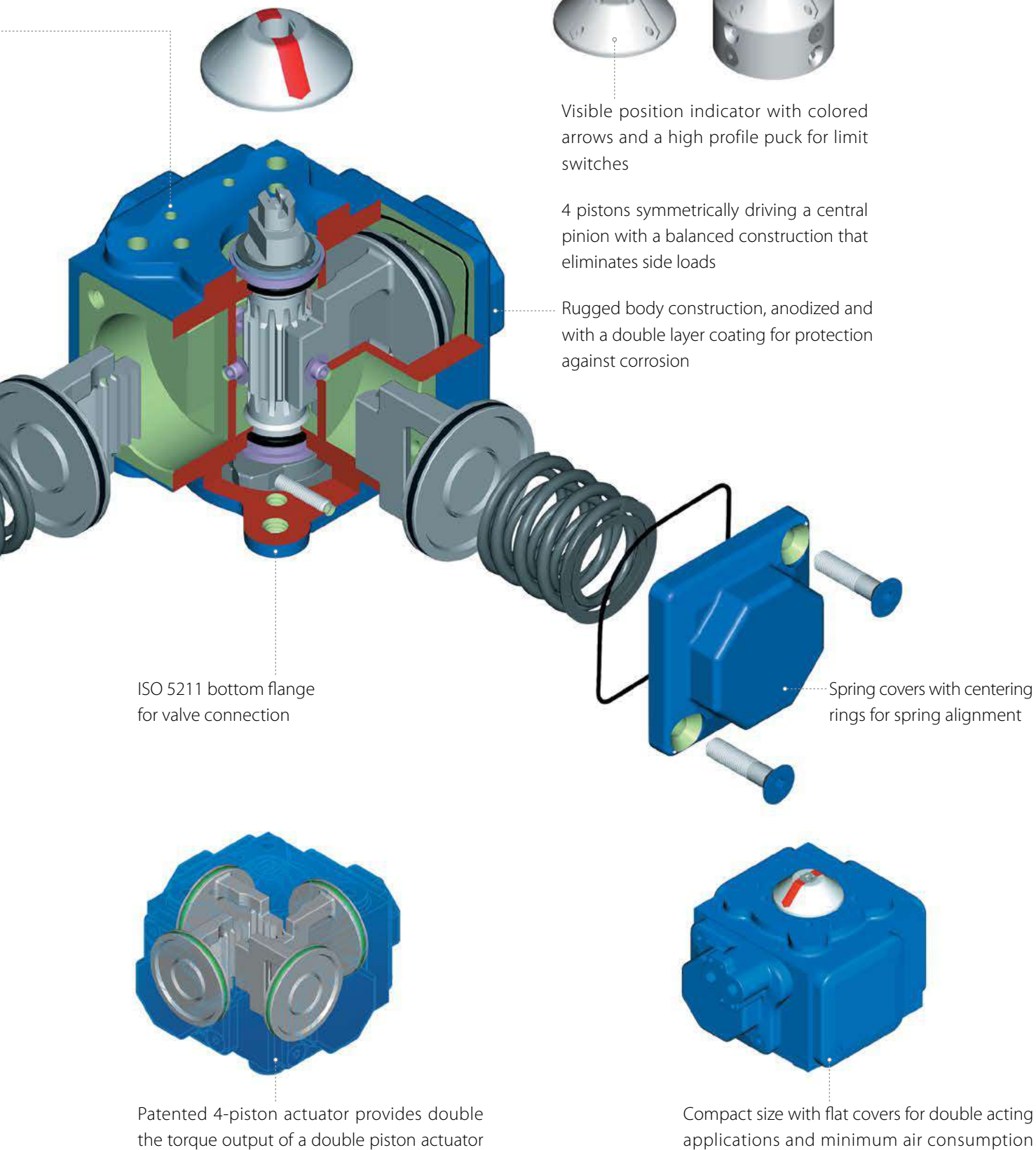
NAMUR interface for solenoid mounting

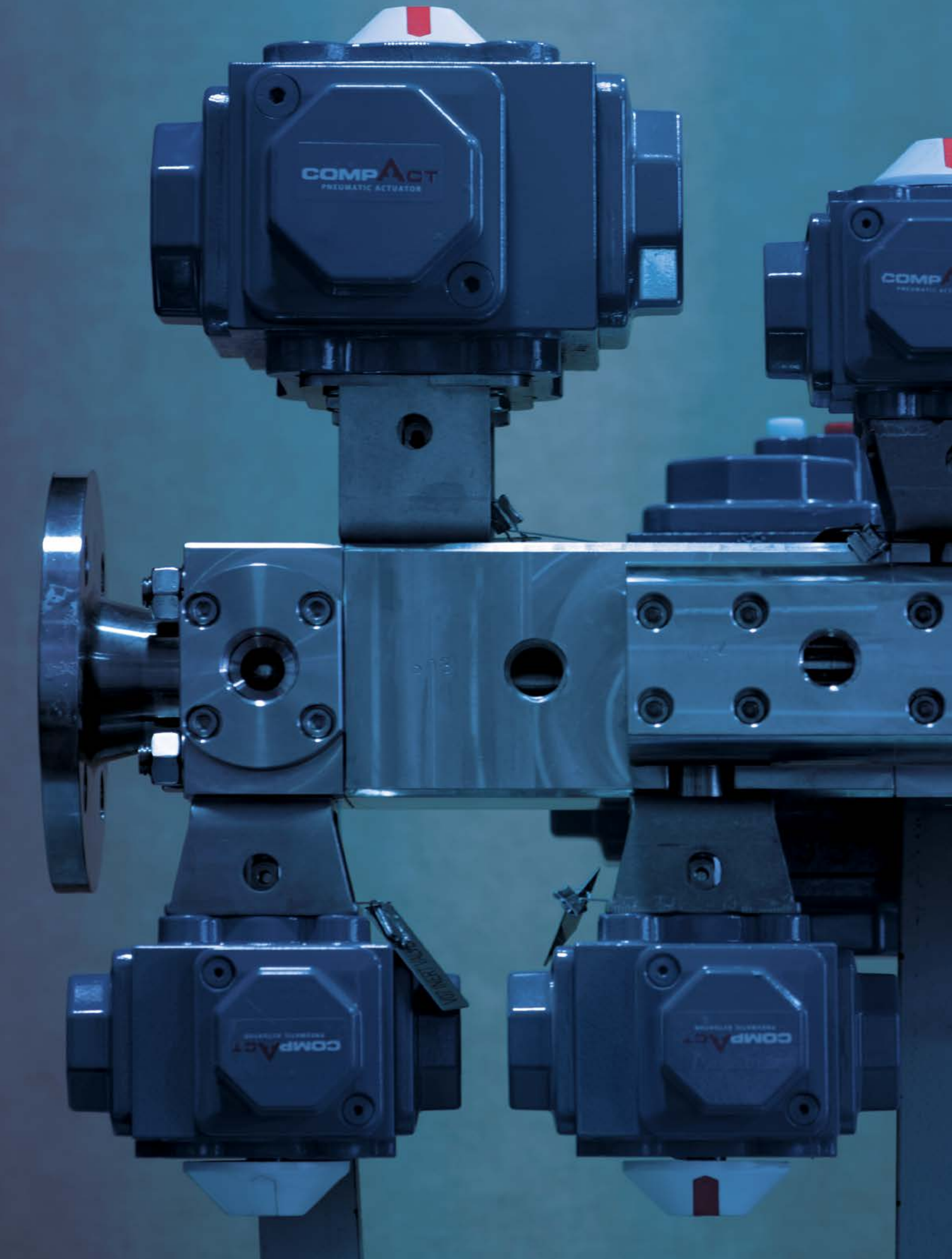


Limit stop for open-close and intermediate positions



COMPACT Actuator Features





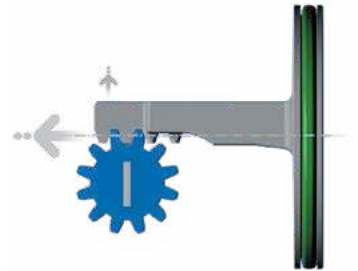
HABONIM ACTUATORS



COMPACT Actuator Features

Balanced forces

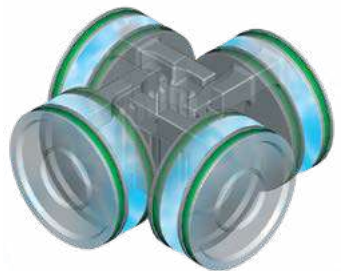
The cube-shaped configuration positions the pistons in a way that allows each piston to develop thrust along its own axis with zero side load. This efficient design eliminates the use of guide rods and thrust bearings. The result is less stress on the seals than off-axis piston thrust, which is caused by the piston side loading that is inherent in the geometry of traditional actuator configurations.



Less wear

The COMPACT's unique 4-piston design achieves a more uniform load distribution than standard single- or double-piston actuators, therefore greatly reducing the wear on gears at the points of contact between rack and pinion.

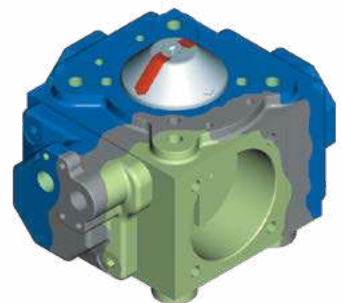
The force-balanced, shorter-stroke piston prevents uneven wear of O-rings, gears and pistons. This design eliminates the need for bearings and guiding rods and reduces the number of soft parts, thereby resulting in longer maintenance schedules and lower cost of repair kits.



The surface of the four cylinders is hardened by an anodizing treatment, which protects their high surface finish.

Superior corrosion resistance

The body and covers are anodized internally and externally to protect against corrosive atmospheres tested to more than 336 hours of life in a salt spray bath. An external epoxy base layer and a second layer of polyurethane paint provide additional protection against aggressive environments.



Less air consumption

Fast action is one of the most attractive features of the COMPACT 4-piston actuator. The distinctive four-piston design allows for a smaller diameter actuator pinion that significantly shortens piston travel and response time.

Fast action

Fast action is one of the most attractive features offered by the COMPACT 4-piston actuator. The unique four-piston design allows for a smaller diameter actuator pinion that significantly shortens piston travel, resulting in a shorter response time.

HABONIM ACTUATORS

COMPACT Actuator Features

Pinion

The pinion has a double-square female drive on its bottom plane that complies with ISO 5211 standard. The top plane has the NAMUR slot for attachment to switches or positioners. There is a machined flat below the NAMUR interface to enable manual operation of the actuator with a wrench.

Indicator & puck

A highly visible indicator with flow direction arrows is snapped on to the pinion, to provide easy identification of the valve position. These indicator arrows allow true positioning of any type of valve porting. The modular design makes it easy to change the indicator to match various flow pattern.

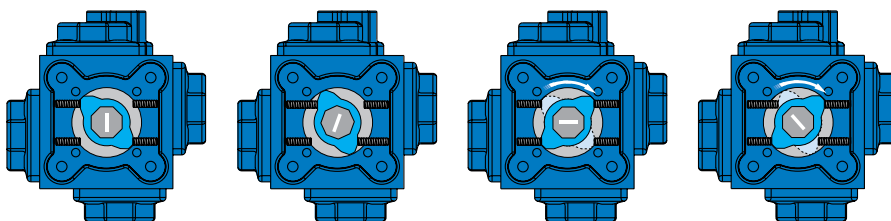
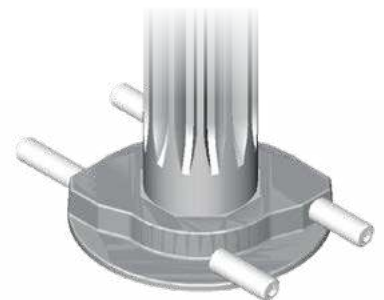
Safety features

The COMPACT's built-in safety features ensure secure and safe operation. Assembly and dismantling of the actuator are simple tasks. Long cover-bolts for spring return actuators relieve the spring load before they disengage from their threads. Before the pistons can be removed, the stop screw must be released and the pinion removed thus ensuring that any trapped and potentially hazardous pressure in the body will escape.

Limit stop

The pinion and stop rotation can be adjusted by four large-diameter, diametrically-opposed adjustable set-screws that are threaded into the actuator body. Each opposing pair of screws exerts simultaneous and equal force on opposite sides of the stop when the rotation limit is reached, thus preventing the generation of off-center forces.

The stop screws allow for $\pm 5^\circ$ rotation adjustment in both directions of travel. Larger span can be achieved with a longer set of stop screws. This feature is built into the actuator stop mechanism and eliminates the need for additional plates and screws. The stop material is stainless steel for better wear and corrosion resistance.



Close

Partially closed

Open

Partially open





COMPACT Actuator Features

Nested springs

The COMPACT can be used with up to three different spring sizes for the spring that, in each of the four cylinders, is nested between the cover and the piston and aligned by a centering ring. Each spring is wound in the opposite direction to its neighbor to avoid entanglement. All the springs act at the piston center axis so that no side load will occur if one spring fails to operate. By virtue of the four-cylinder design, there are many more spring combination possibilities than with double piston actuators, providing superior solutions for any air supply pressure required. Special painting of the springs provides higher corrosion resistance to the environment, resulting in more than 250 hours of life in a salt spray bath.



Spring cartridge - Only available in CxxM COMPACT items

Using a modified spring set in a cartridge improves the torque characteristics of the COMPACT actuator. Modifications include deeper covers to allow sufficient volume for the spring cartridge, thereby increasing the overall dimensions of the actuator. The spring cartridge is comprised of a shaped tube in which the extended springs have been preloaded and are held safely in place by two rigid discs. Changing a spring set configuration in this design requires changing the complete cartridge.



Flow indication

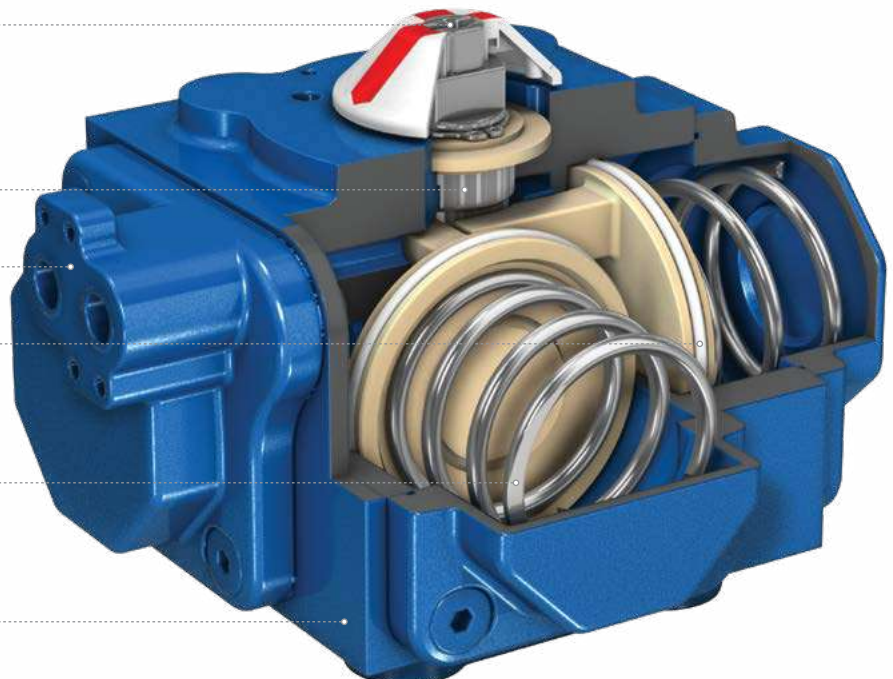
Pinion

NAMUR interface

Piston

Springs

Superior corrosion resistance



HABONIM ACTUATORS

COMPACT Actuator Features

NAMUR & ISO interface

An extensive range of accessories such as solenoids, positioners and limit switches are available for direct mounting to the COMPACT actuator. Any accessory whose connections comply with ISO 5211 and VDI/VDE 3845 (NAMUR) mounting can be connected to the actuator.

NAMUR VDI/VDE 3845

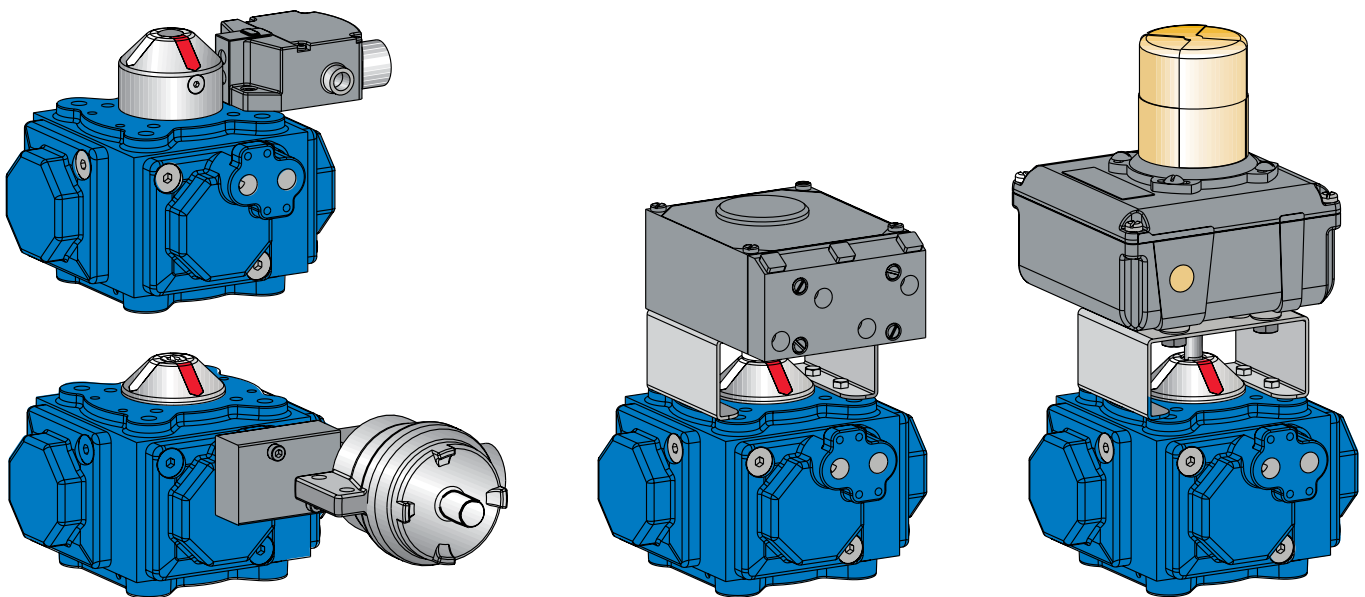
This standard provides for a range of accessories such as limit switches, pucks, indicators and positioners with a VDI/VDE interface so that they can be easily mounted onto the actuator top face.

NAMUR solenoid mounting

One of the four available actuator covers incorporates a pad for solenoid mounting according to the NAMUR international standard. Any solenoid that conforms to the NAMUR interface can be directly mounted to the actuators, thus simplifying the installation of solenoids and eliminating additional piping. It also allows quick actuation response as pressurized air supply is available at the port entrance.

ISO 5211

The actuator bottom flange is in accordance with the ISO 5211 international standard and incorporates a star-shaped female drive to flexibly fit a variety of valve output shafts. The valve can be attached by a bracket or mounted directly onto the actuator, using one of the various ISO hole patterns.



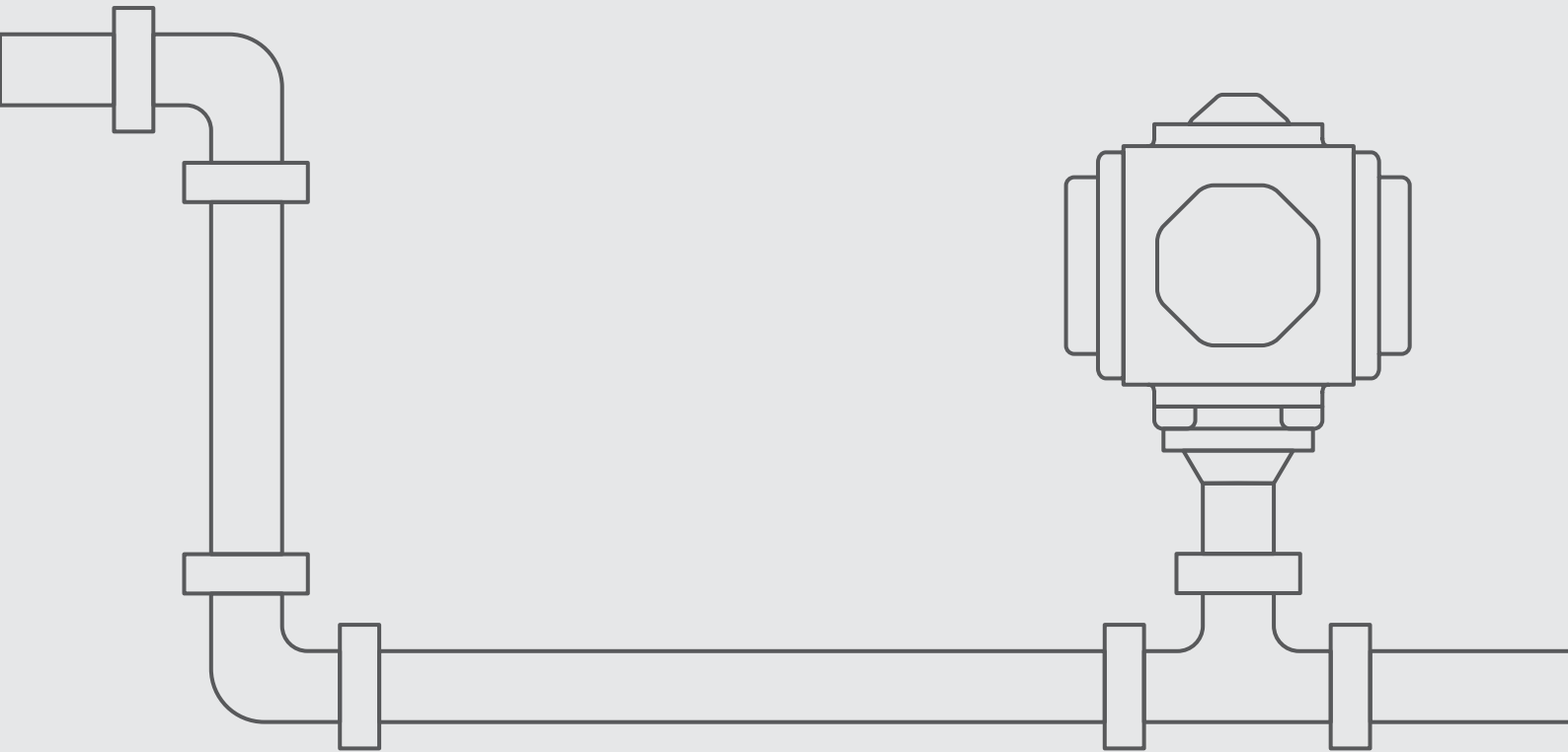
C15-C90M



Actuation

PNEUMATIC ACTUATOR

COMPACT
4 PISTONS



C15-C90M

COMPACT 4 Pistons Pneumatic Actuator

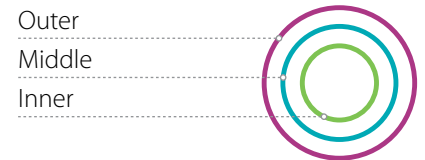
Type	Working temperature C° (F°)	Working Pressure Air, Nitrogen, CO2, Natural gas [sweet] Bar (psi)	Application	Ordering code
Standard	-20 to 80 (-4 to 176)	3.0 (44) to 8.0 (116)	General	Blank
Low Temperatures	-40 to 100 (-40 to 213)		General	LT
High Temperatures	-20 to 120 (-4 to 250)		General	HT
High Cycle	-20 to 80 (-4 to 176)		Above 1 cycle/minute	HC
Nuclear	-40 to 80 (-40 to 176)		Nuclear use	NU

Spring combinations

C15 only

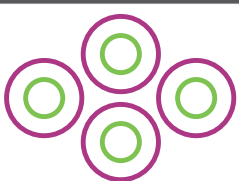
Code	Spring combinations
1A	
1B	

Code	Spring combinations
1B2	
2	



C20 -C90M0

Code	Spring combinations
2AB	
2A	
2A2B	

Code	Spring combinations
2B	
2A3	
2C	

Code	Spring combinations
2C3	
3	

Sizing a spring return actuator requires that the torque output at the start and end of both the spring and air drive strokes is greater than the valve torque at that position.

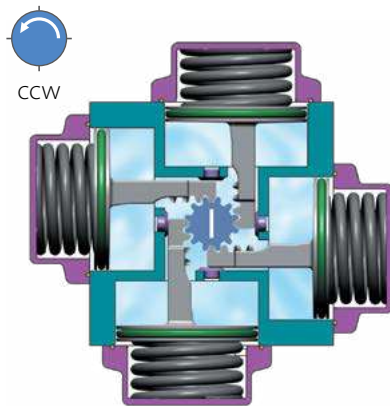
COMPACT Actuators Configurations

The actuator can be configured for either spring return or double-action operation. In both cases the air supply to drive the pistons flows into Port A of the NAMUR cover. Port A is connected to the center chamber, and Port B is connected to the four outside chambers.

Spring return (fail-safe)

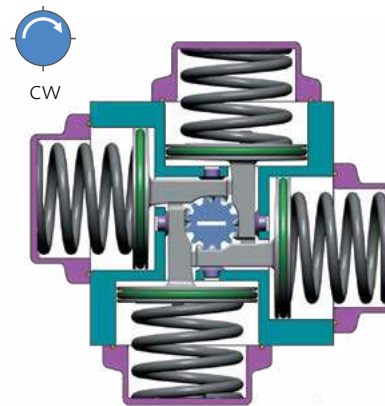
Pressure entering Port A to open:

- Center chamber is pressurized and pistons move outward
- Springs are compressed
- Pinion rotates counterclockwise



Pressure exiting Port A to close:

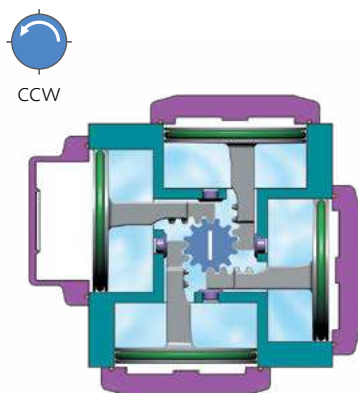
- Air released from center chamber
- Springs drive pistons inward
- Pinion rotates clockwise



Double action (increased torque)

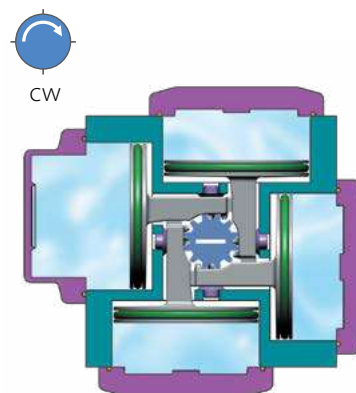
Pressure entering Port A to open:

- Center chamber is pressurized
- Pistons move outward
- Pinion rotates counterclockwise



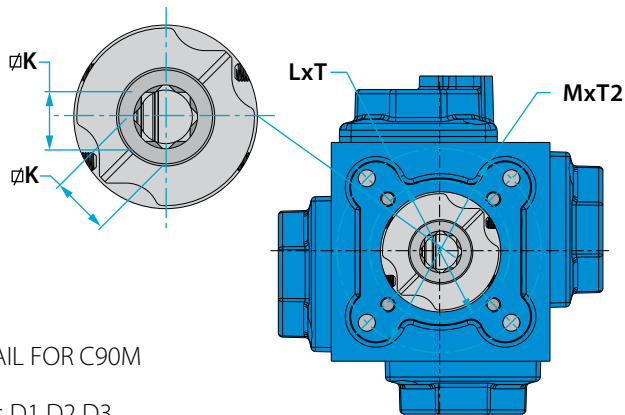
Pressure entering Port B to close:

- Outside chambers are pressurized
- Pistons move inward
- Pinion rotates clockwise



C15-C90M

COMPACT 4 Pistons Pneumatic Actuator

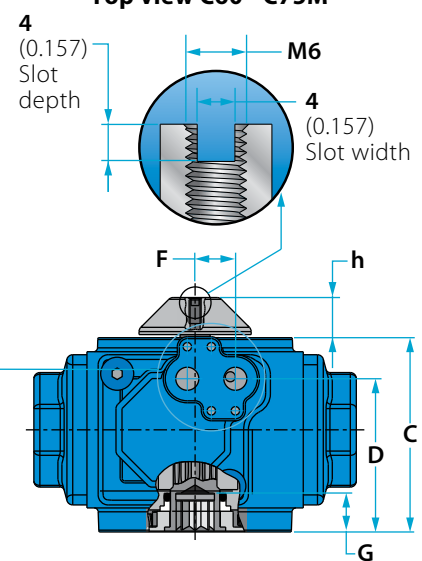
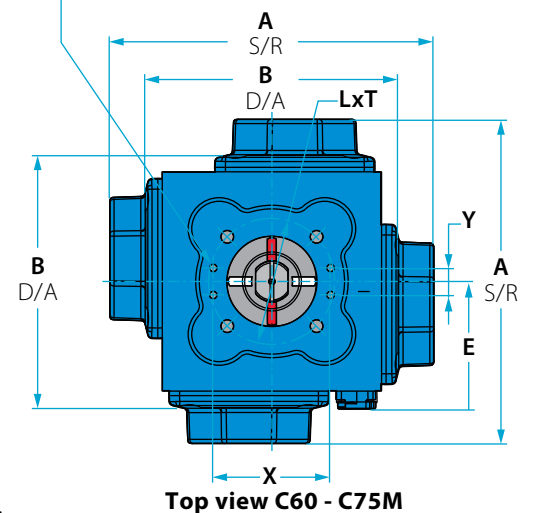
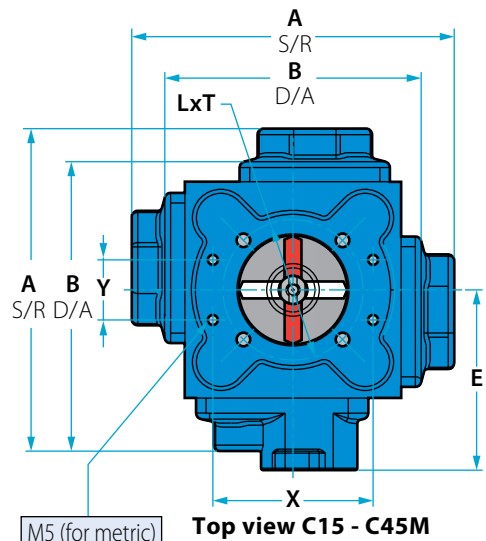
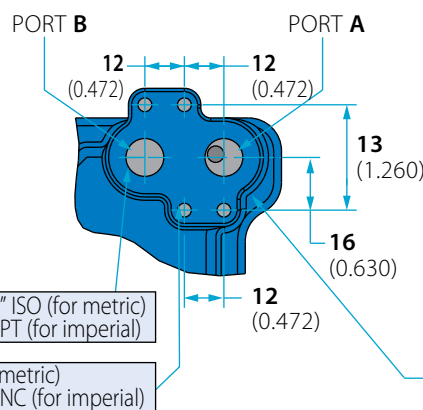
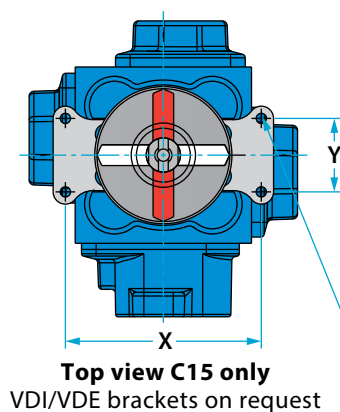
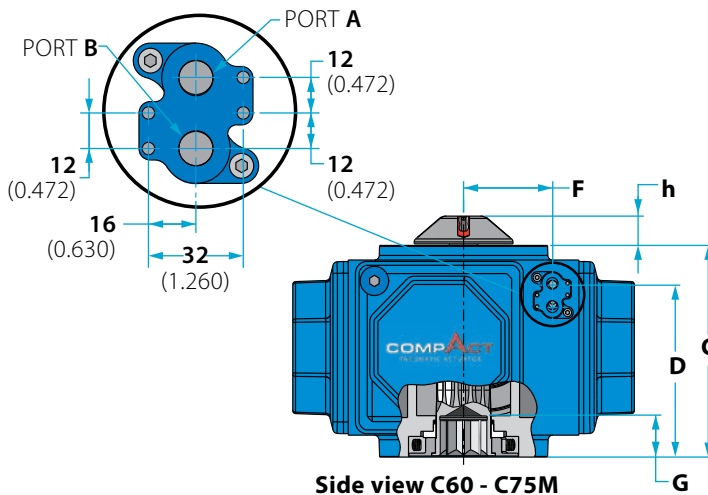


DETAIL FOR C90M

Ports D1 D2 D3

G-½" ISO 45 20 22.5

½" NPT 0.79 1.57 0.886



VDI / VDE 3845	
Sizes	X x Y x h
C15 - C45M	80 x 30 x 20
C60 - C90M	130 x 30 x 30

Port A is connected to the center chamber
Port B is connected to the outside chambers



Actuator Dimensions

Size	A S/R		B D/A		B1 D/A		C		D		E		F		G		Øk		L PCD		T Thread		M PCD (2)		T2	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
C15	110	4.31	86	3.39	97.8	3.85	68.8	2.71	50.8	2.00	66.0	2.60	16.0	0.63	13.5	0.53	9	0.35	50 (F05)	1.97 (F05)	M6x8	1/4"X0.314	-	-	-	-
C20	131	5.17	102	4.03	117.0	4.6	80.5	3.17	61.5	2.42	77.2	3.04	16.5	0.65	15.0	0.59	11	0.43	50 (F05)	1.97 (F05)	M6x8	1/4"X0.314	70 (F07)	2.76 (F07)	M8x11	5/16"X0.43
C25	161	6.34	132	5.24	147.0	5.79	97.0	3.82	76.5	3.01	90.0	3.54	20.0	0.79	19.5	0.77	14	0.55	70 (F07)	2.76 (F07)	M8x9	5/16"X0.354	102 (F10)	4.02 (F10)	M10X11	3/8"X0.43
C30	186	7.33	151	5.94	169.0	6.64	116.0	4.58	93.4	3.68	105.0	4.15	22.3	0.88	22.0	0.87	17	0.67	70 (F07)	2.76 (F07)	M8x11	5/16"X0.43	102 (F10)	4.02 (F10)	M10X12	3/8"X0.47
C30M	216	8.50	-	-	-	-	116.0	4.58	93.4	3.68	120.0	4.72	22.3	0.88	22.0	0.87	17	0.67	70 (F07)	2.76 (F07)	M8x11	5/16"X0.43	102 (F10)	4.02 (F10)	M10X12	3/8"X0.47
C35	222	8.74	182	7.15	202.0	7.94	135.0	5.31	102.0	4.02	114.0	4.48	22.5	0.89	26.0	1.02	22	0.87	102 (F10)	4.02 (F10)	M10x13	3/8"X0.51	-	-	-	-
C35M	256	10.07	-	-	-	-	135.0	5.31	102.0	4.02	131.0	5.15	22.5	0.89	26.0	1.02	22	0.87	102 (F10)	4.02 (F10)	M10x13	3/8"X0.51	-	-	-	-
C45	269	10.59	221	8.70	245.0	9.65	164.0	6.46	127.0	5.00	147.0	5.79	31.0	1.22	33.0	1.30	27	1.06	125 (F12)	4.92 (F12)	M12x15	1/2"X0.59	102* (F10)	4.02* (F10)	M10X15	3/8"X0.59
C45M	303	11.93	-	-	-	-	164.0	6.46	127.0	5.00	164.0	6.45	31.0	1.22	33.0	1.30	27	1.06	125 (F12)	4.92 (F12)	M12x15	1/2"X0.59	102* (F10)	4.02* (F10)	M10X15	3/8"X0.59
C60	360	14.17	285	11.22	-	-	218.0	8.58	180.0	7.09	141.0	5.57	94.0	3.70	43.0	1.69	36	1.42	140 (F14)	5.51 (F14)	M16x18	5/8"X0.71	-	-	-	-
C60M	390	15.35	-	-	-	-	218.0	8.58	180.0	7.09	141.0	5.57	94.0	3.70	43.0	1.69	36	1.42	140 (F14)	5.51 (F14)	M16x18	5/8"X0.71	-	-	-	-
C75	437	17.20	342	13.46	-	-	270.0	10.63	223.0	8.76	166.0	6.54	110.0	4.33	43.0	1.69	36	1.42	140 (F14)	5.51 (F14)	M16x18	5/8"X0.71	-	-	-	-
C75M	467	18.38	-	-	-	-	270.0	10.63	223.0	8.76	166.0	6.54	110.0	4.33	43.0	1.69	36	1.42	140 (F14)	5.51 (F14)	M16x18	5/8"X0.71	-	-	-	-
C90M	570	22.42	369	14.52	-	-	317.0	12.48	264.0	10.37	196.0	7.71	128.0	5.04	52.0	2.05	46	1.81	165 (F16)	6.5 (F16)	M20x30	3/4"X1.18	-	-	-	-

* The C45 bottom PCD can be either F12 or F10, but not both. The standard is F12. When ordering C45 with F10, you must add it to the code.

Technical Data

Actuator size		Unit	C15	C20	C25	C30	C30M	C35	C35M	C45	C45M	C60	C60M	C75	C75M	C90M
Weight		kg	1.10	1.90	3.50	5.00	6.10	9.00	10.40	15.00	16.70	35.00	39.40	64.00	72.00	160.00
Spring return		lb	2.40	4.20	7.70	11.00	13.40	19.80	22.00	33.10	37.40	77.20	86.00	141.10	158.00	353.00
Weight		kg	0.90	1.50	2.60	4.40	-	7.10	-	11.00	-	26.00	-	51.00	-	92.00
Double acting		lb	1.98	3.30	62.00	9.70	-	15.70	-	24.30	-	57.30	-	112.40	-	203.00
Air consumption per stroke actual volume	CCW	liter	0.07	0.12	0.25	0.44	0.44	0.74	0.74	1.33	1.33	3.20	3.2	5.76	5.76	12.00
	CW		0.09	0.15	0.33	0.54	-	0.80	-	1.33	-	3.20	-	5.76	-	-
	Total		0.16	0.27	0.58	0.98	-	1.54	-	2.66	-	6.40	-	11.52	-	-
Air consumption per stroke actual volume	CCW	in ³	4.30	7.30	15.00	27.00	27.00	45.00	45.00	81.00	81.00	195.00	195	351.00	351.00	726.00
	CW		5.50	9.20	20.00	33.00	-	49.00	-	81.00	-	195.00	-	351.00	-	-
	Total		9.80	16.50	35.00	60.00	-	94.00	-	162.00	-	391.00	-	703.00	-	-
Stroke time with S.V. with 0.9 Cv at 80 psi	D/A	sec.	0.10	0.13	0.20	0.24	-	0.40	-	0.75	-	1.50	-	2.50	-	3.00
	S/R Open		0.10	0.15	0.23	0.29	0.30	0.54	0.60	1.00	1.10	2.20	2.4	3.70	4.00	4.80
	S/R Close		0.15	0.15	0.23	0.28	0.28	0.48	0.50	0.77	0.80	1.60	1.6	2.90	2.90	3.10

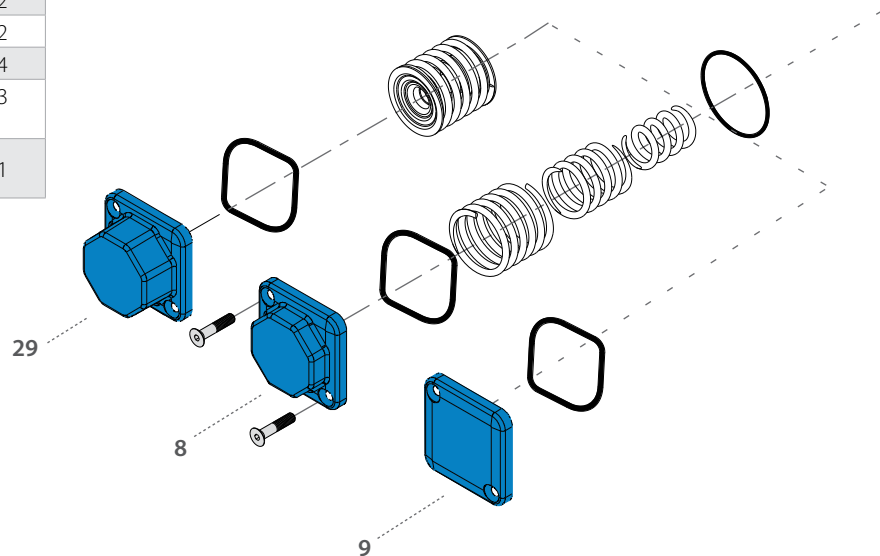
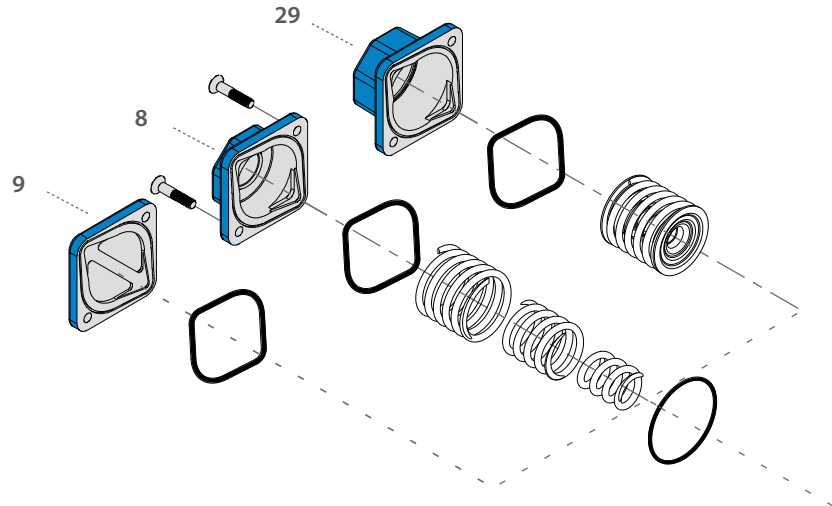
C15-C90M

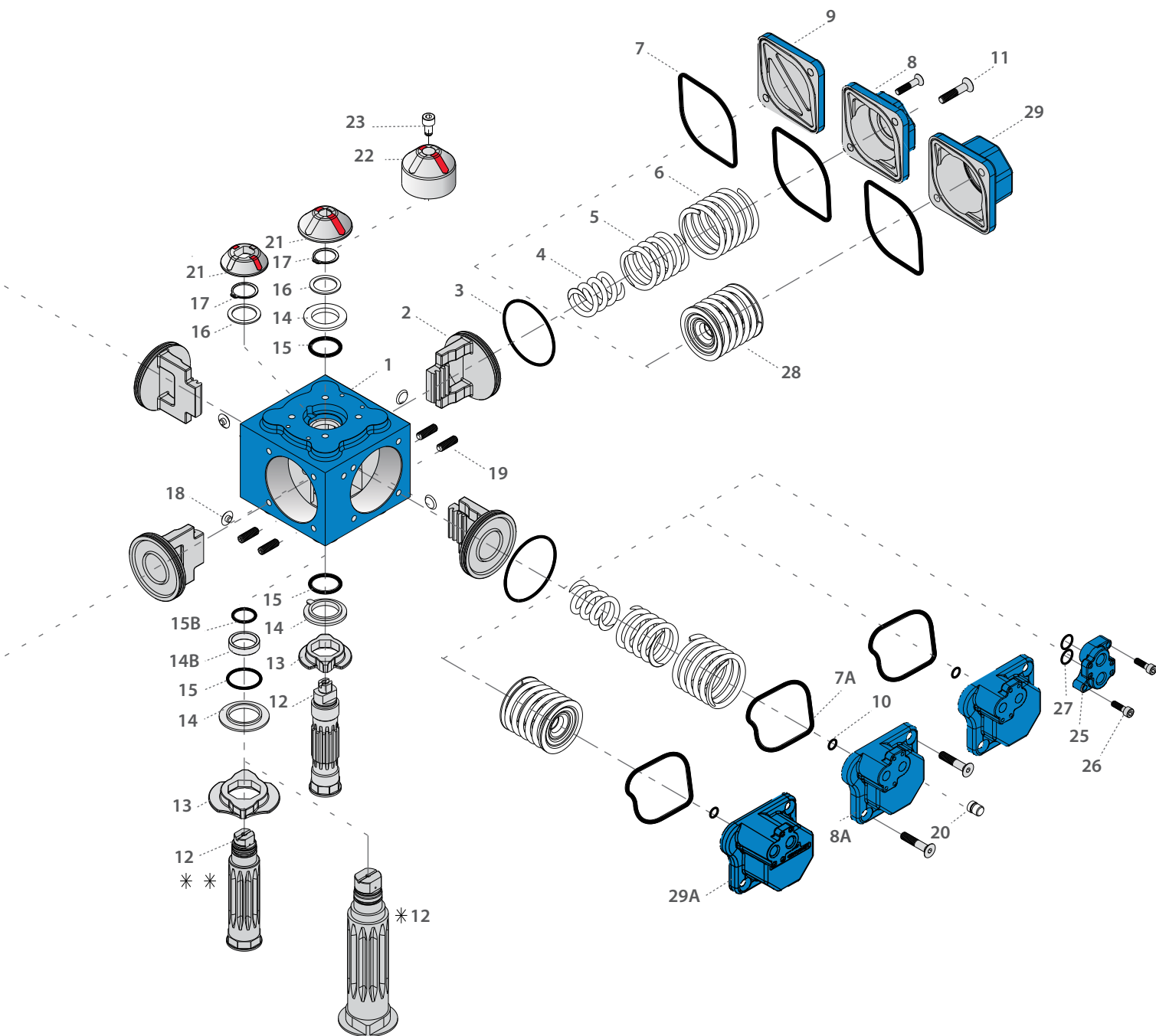
COMPACT 4 Pistons Pneumatic Actuator

Item	Description	Material specifications	Qty.
1	Body	Acc. Ordering Code	1
2	Piston	Acc. Ordering Code	4
3	Piston O-ring	Acc. Ordering Code	4
4	Inner spring	Spring steel, painted	4
5	Middle spring	Spring steel, painted	4
6	Outer spring	Spring steel, painted	4
7	Cover O-ring	Acc. Ordering Code	3
7a	NAMUR cover O-ring	Acc. Ordering Code	1
8	Spring return cover	Acc. Ordering Code	3
8a	NAMUR cover	Acc. Ordering Code	1
9	Double acting cover	Acc. Ordering Code	3
10	Air supply O-ring	Acc. Ordering Code	1
11	Cover screw	Stainless steel	16
12	Pinion	Acc. Ordering Code	1
13	Stop plate	S. steel	1
14	Thrust washer	Acc. Ordering Code	2
14B	Bearing	Acc. Ordering Code	1
15	Pinion O-ring	Acc. Ordering Code	2
15B	Top pinion O-ring	Acc. Ordering Code	1
16	Disc bearing	Stainless steel / Delrin	1
17	Circlip	Stainless steel, spring steel zinc plated	1
18	Pad	Acc. Ordering Code	4
19	Stroke adjustment screw	Stainless steel	4
20	Exhaust plug (silencer)	Delrin, brass	1
21	Indicator	Plastic ABS, red & white	1
22	Puck	Plastic ABS, red & white	1
23	Indicator screw	Stainless steel	1
24	Tag (not shown)	Stainless steel	4
25	NAMUR insert	AL 380	1
26	Insert screw	Stainless steel	2
27	NAMUR insert O-ring	Acc. Ordering Code	2
28	Spring cassette	Spring steel, painted	4
29	Spring return cover for M series	Acc. Ordering Code	3
29A	NAMUR cover for M series	AL 380	1

* C75 & C90M Pinion (12) and stop (13) are one piece

** pinion assembly for actuators C35 and above





C15-C90M

COMPACT 4 Pistons Pneumatic Actuator

Torque Chart (Nm)

Spring return single acting

Size	Spring set	Air pressure - bar (psi)														Spring torque	
		3.0 (44)		4 (58)		5 (73)		5.5 (80)		6 (87)		7 (102)		8 (116)			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
C15	1A	7	4	10	7	13	11	15	12	17	14	20	17	24	21	6	3
	1B			8	4	12	8	13	10	15	11	18	14	22	18	9	5
	1B2					10	5	12	7	13	9	16	11	20	15	12	7
	2									11	6	14	8.5	18	12	15	9
C20	2A			16	10	22	16	26	19	29	22	35	29	41	35	15	9
	2A2B			14	7	20	13	24	16	27	19	33	26	39	32	18	11
	2B					18	10	22	13	25	17	31	23	38	29	21	13
	2C							19	10	22	13	28	19	35	25	25	16
	3									19	9	24	15	30	21	29	19
C25	2A	23	11	36	23	49	36	55	42	62	49	75	62	88	74	28	16
	2A2B			33	19	46	32	53	39	60	45	73	58	86	70	32	18
	2B					43	27	50	34	57	41	70	53	83	66	36	21
	2C					38	18	45	24	52	31	64	44	77	56	47	27
	3									47	21	60	34	73	46	57	31
C30	2A	36	19	57	40	80	62	91	73	102	84	125	107	148	129	42	26
	2A2B			52	30	75	52	86	63	98	74	120	96	143	118	53	31
	2B			48	18	70	43	81	54	93	65	115	87	138	109	62	36
	2C					64	25	73	39	85	50	107	72	130	94	78	44
	3									75	33	98	55	120	77	96	54
C30M	2A	27	19	48	40	70	62	81	73	92	84	113	106	135	128	42	34
	2A2B	21	12	42	33	64	55	75	67	85	77	107	99	129	121	49	40
	2B			36	26	57	48	69	60	79	70	101	92	123	114	56	46
	2C					48	36	59	47	69	58	91	80	113	102	69	57
	3									58	44	80	66	102	88	83	68
C35	2A	75	39	111	74	150	112	168	129	186	147	224	184	262	221	74	38
	2A2B	64	26	100	62	139	99	157	117	175	134	213	171	251	208	87	49
	2B			92	44	130	82	148	99	166	117	204	154	242	191	105	58
	2C							133	68	151	86	189	123	227	160	137	73
	3									135	63	173	100	211	137	161	89
C35M	2A	54	42	89	77	126	114	143	131	160	148	197	185	234	223	70	57
	2A2B	43	28	78	63	115	110	132	117	149	134	186	171	223	209	85	69
	2B			67	49	104	86	121	103	139	120	176	157	213	195	99	80
	2C					86	65	103	82	120	99	157	136	194	173	122	100
	3									102	76	139	114	176	151	146	119
C45	2A	134	60	208	132	280	203	317	239	353	275	426	346	499	417	159	86
	2A2B			197	113	269	184	306	219	342	255	415	326	488	397	179	97
	2B			179	82	252	153	288	188	325	224	398	295	471	366	212	115
	2C					223	102	260	137	296	173	369	244	442	315	265	144
	3									268	122	341	193	414	264	318	173
C45M	2A	90	60	162	131	232	201	267	236	302	271	373	342	443	412	134	107
	2A2B	110	83	181	154	251	225	286	260	321	295	392	365	462	436	160	127
	2B			142	107	213	177	248	213	283	248	353	318	424	388	184	147
	2C					180	136	215	171	250	206	321	277	391	347	228	182
	3									216	163	286	234	357	304	273	218



COMPACT 4 Pistons Pneumatic Actuator

Torque Chart (Nm)

Spring return single acting

Size	Spring set	Air pressure - bar (psi)														Spring torque	
		3.0 (44)		4 (58)		5 (73)		5.5 (80)		6 (87)		7 (102)		8 (116)			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
C60	2A	328	160	501	329	675	498	762	583	848	667	1021	835	1194	1004	360	194
	2A2B			478	285	651	454	738	538	824	623	997	791	1170	960	406	218
	2B			442	221	615	390	702	475	789	559	961	727	1134	896	473	254
	2C					548	268	635	352	721	437	894	605	1067	774	600	323
	3									657	322	830	490	1003	659	720	388
C60M	2A	212	148	379	315	546	483	630	566	714	650	880	816	1047	983	371	304
	2A2B	259	203	426	370	593	537	677	621	760	704	927	871	1094	1038	314	255
	2B			333	261	500	428	583	512	667	595	833	762	1000	929	429	353
	2C					411	321	495	404	578	488	744	654	912	821	542	447
	3									502	393	668	559	835	726	642	527
C75	2A	614	345	935	657	1255	969	1414	1124	1574	1280	1894	1592	2212	1902	615	350
	2A2B			891	582	1211	894	1370	1049	1530	1205	1850	1517	2168	1827	693	395
	2B			820	461	1140	773	1299	928	1459	1084	1779	1396	2097	1706	819	467
	2C					1025	576	1184	632	1344	887	1664	1199	1982	1509	1024	584
	3									1229	691	1549	1003	1867	1313	1229	700
C75M	2A	480	360	789	668	1098	977	1252	1131	1406	1285	1714	1594	2021	1900	596	468
	2A2B	406	269	715	578	1024	887	1177	1041	1331	1195	1640	1503	1947	1810	691	547
	2B			641	488	949	797	1103	951	1257	1104	1566	1413	1873	1720	786	624
	2C					799	606	953	760	1107	913	1415	1222	1722	1529	986	783
	3									959	726	1268	1035	1575	1342	1184	938
C90M	2A2B	734	467	1328	1061	1922	1655	2219	1952	2516	2249	3111	2844	3705	3438	1315	1048
	2B			1155	846	1749	1440	2046	1737	2343	2034	2938	2629	3532	3223	1530	1221
	2C					1571	1224	1868	1521	2165	1818	2760	2413	3354	3007	1746	1399
	3										1376	2411	1971	3005	2565	2188	1748

Double acting

Size	Operating pressure (bar)						
	3.0	4.0	5.0	5.5	6.0	7.0	8.0
C15	10	14	17	19	21	24	27
C20	18	25	32	35	38	45	51
C25	39	52	65	72	79	92	105
C30	62	84	107	119	130	153	176
C35	114	151	190	208	226	265	304
C45	222	297	371	408	445	519	593
C60	527	703	879	967	1,055	1,230	1,406
C75	974	1,299	1,624	1,786	1,948	2,273	2,596
C90	1,783	2,377	2,971	3,268	3,565	4,160	4,754

C15-C90M

COMPACT 4 Pistons Pneumatic Actuator

Torque Chart (in-lb)

Spring return single acting

Size	Spring set	Air pressure - psi (bar)														Spring torque	
		40 (2.8)		60 (4.1)		70 (4.8)		80 (5.5)		90 (6.2)		100 (6.9)		120 (8.3)			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
C15	1A	56	32	92	64	110	93	133	106	156	128	174	148	220	192	53	27
	1B			73	37	102	68	115	89	137	101	156	121	201	165	80	44
	1B2					85	42	106	62	119	82	139	95	183	137	106	62
	2									101	55	121	74	165	110	133	80
C20	2A			146	92	187	136	230	168	266	201	304	252	375	320	133	80
	2A2B			128	64	170	110	212	142	247	174	286	226	357	293	159	97
	2B					153	85	195	115	229	156	269	200	348	266	186	115
	2C							168	89	201	119	243	165	320	229	221	142
	3									174	82	208	130	275	192	257	168
C25	2A	185	89	330	211	416	306	487	372	568	449	651	538	806	677	248	142
	2A2B			302	174	390	272	469	345	549	412	633	503	787	641	283	159
	2B					365	229	443	301	522	375	607	460	760	604	319	186
	2C					322	153	398	212	476	284	555	382	705	513	416	239
	3									430	192	521	295	668	421	504	274
C30	2A	290	153	522	366	679	526	805	646	934	769	1085	928	1355	1181	372	230
	2A2B			476	275	636	441	761	558	897	677	1041	833	1309	1080	469	274
	2B			439	165	594	365	717	478	851	595	998	755	1263	998	549	319
	2C					543	212	646	345	778	458	928	625	1190	861	690	389
	3									687	302	850	477	1099	705	850	478
C30M	2A	217	153	439	366	594	526	717	646	842	769	980	920	1236	1172	372	301
	2A2B	169	97	385	302	543	467	664	593	778	705	928	859	1181	1108	434	354
	2B			330	238	484	407	611	531	723	641	876	798	1126	1044	496	407
	2C					407	306	522	416	632	531	790	694	1035	934	611	504
	3									531	403	694	573	934	806	735	602
C35	2A	603	314	1016	677	1273	950	1487	1142	1703	1346	1944	1596	2399	2023	655	336
	2A2B	515	209	916	568	1180	840	1389	1035	1602	1227	1848	1484	2298	1904	770	434
	2B			842	403	1103	696	1310	876	1520	1071	1770	1336	2216	1749	929	513
	2C							1177	602	1382	787	1640	1067	2078	1465	1212	646
	3									1236	577	1501	868	1932	1254	1425	788
C35M	2A	434	338	815	705	1069	967	1266	1159	1465	1355	1709	1605	2142	2042	620	504
	2A2B	346	225	714	577	976	933	1168	1035	1364	1227	1614	1484	2042	1913	752	611
	2B			613	449	883	730	1071	912	1273	1099	1527	1362	1950	1785	876	708
	2C					730	552	912	726	1099	906	1362	1180	1776	1584	1080	885
	3									934	696	1206	989	1611	1382	1292	1053
C45	2A	1078	483	1904	1208	2376	1723	2805	2115	3232	2518	3696	3002	4568	3818	1407	761
	2A2B			1804	1035	2283	1561	2708	1938	3131	2335	3601	2829	4468	3635	1584	858
	2B			1639	751	2139	1298	2549	1664	2975	2051	3453	2560	4312	3351	1876	1018
	2C					1892	866	2301	1212	2710	1584	3202	2117	4047	2884	2345	1274
	3									2454	1117	2959	1675	3790	2417	2814	1531
C45M	2A	724	483	1483	1199	1969	1706	2363	2089	2765	2481	3236	2967	4056	3772	1186	947
	2A2B	885	668	1657	1410	2130	1909	2531	2301	2939	2701	3401	3167	4230	3992	1416	1124
	2B			1300	980	1808	1502	2195	1885	2591	2270	3063	2759	3882	3552	1628	1301
	2C					1528	1154	1903	1513	2289	1886	2785	2403	3580	3177	2018	1611
	3									1978	1492	2481	2030	3268	2783	2416	1929



COMPACT 4 Pistons Pneumatic Actuator

Torque Chart (in-lb)

Spring return single acting

Size	Spring set	Air pressure - psi (bar)														Spring torque	
		40 (2.8)		60 (4.1)		70 (4.8)		80 (5.5)		90 (6.2)		100 (6.9)		120 (8.3)			
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
C60	2A	2639	1287	4587	3012	5728	4226	6744	5160	7764	6107	8859	7245	10931	9192	3186	1717
	2A2B			4376	2609	5525	3853	6531	4761	7544	5704	8650	6863	10712	8789	3593	1929
	2B			4047	2023	5219	3310	6213	4204	7223	5118	8338	6308	10382	8203	4186	2248
	2C					4650	2274	5620	3115	6601	4001	7757	5249	9769	7086	5310	2859
	3									6015	2948	7201	4251	9183	6033	6372	3434
C60M	2A	1706	1191	3470	2884	4634	4099	5576	5009	6537	5951	7635	7080	9585	9000	3283	2690
	2A2B	2084	1633	3900	3387	5032	4557	5991	5496	6958	6445	8043	7557	10016	9503	2779	2257
	2B			3049	2390	4243	3632	5160	4531	6107	5447	7228	6611	9155	8505	3797	3124
	2C					3488	2724	4381	3575	5292	4468	6455	5674	8350	7516	4797	3956
	3									4596	3598	5796	4850	7645	6647	5682	4664
C75	2A	4940	2776	8560	6015	10650	8223	12514	9947	14410	11719	16433	13813	20251	17413	5443	3098
	2A2B			8157	5328	10277	7587	12125	9284	14007	11032	16051	13162	19848	16727	6133	3496
	2B			7507	4221	9674	6560	11496	8213	13357	9924	15435	12112	19198	15619	7248	4133
	2C					8698	4888	10478	5593	12305	8121	14438	10403	18146	13815	9062	5168
	3									11252	6326	13440	8703	17093	12021	10877	6195
C75M	2A	3862	2896	7223	6116	9318	8291	11080	10009	12872	11764	14871	13830	18503	17395	5275	4142
	2A2B	3266	2164	6546	5292	8690	7527	10416	9213	12186	10940	14229	13041	17825	16571	6115	4841
	2B			5868	4468	8054	6764	9762	8416	11508	10107	13587	12260	17148	15747	6956	5522
	2C					6781	5143	8434	6726	10135	8359	12277	10603	15765	13998	8726	6930
	3									8780	6647	11002	8980	14419	12286	10478	8301
C90M	2A2B	5945	3789	11856	9473	16846	14506	20088	17671	22524	20134	26832	24530	33482	31069	11639	9276
	2B			10312	7553	15329	12621	18522	15724	20975	18209	25340	22675	31919	29126	13542	10807
	2C					13769	10728	16910	13769	19382	16275	23805	20812	30310	27174	15453	12382
	3									16257	12318	20795	17000	27156	23180	19365	15471

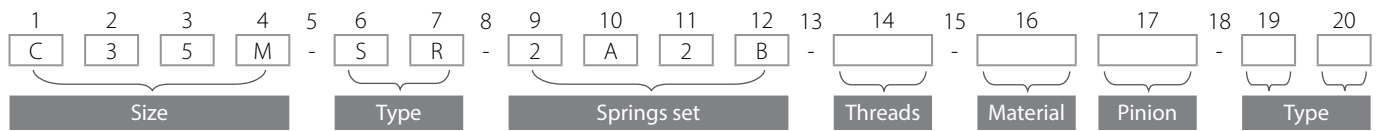
Double acting

Size	Operating pressure (psi)						
	40	60	70	80	90	100	120
C15	81	125	149	172	188	207	244
C20	146	229	271	311	351	390	468
C25	317	476	555	639	723	802	961
C30	505	769	914	1,052	1,190	1,334	1,611
C35	928	1,382	1,624	1,848	2,073	2,311	2,780
C45	1,807	2,719	3,170	3,622	4,074	4,525	5,429
C60	4,289	6,436	7,511	8,585	9,659	10,725	12,872
C75	7,926	11,893	13,877	15,856	17,834	19,819	23,767
C90	14,442	21,222	26,040	29,584	31,915	35,880	42,962



COMPACT 4 Pistons Pneumatic Actuator - Ordering Code System

"Standard offer" options are marked with light green background



Size (1-4)		Type (6-7)		Threads (14)		Material / Coating (16)		Pinion (17)	
C15	Actuator sizes	SR	Spring return	Blank	Matric	Blank	Aluminum	Blank	C.st
C20		DA	Double acting	I	Imperial	N	Electroless nickel plating	6	S.ST
C25		Springs set (9-12)				6	S.ST *	Type (19-20)	
C30		1A	See spring set combinations in page 24					Blank	Standard
C30M		1B						LT	Low temp
C35		1B2						HT	High Temp
C35M		2						HC	High cycle
C45		2AB						NU	Nuclear
C45M		2A							
C60		2A2B							
C60M		2B							
C75		2A3							
C75M		2C							
C90M		2C3							
		3							

* For selected sizes only - consult factory

EMERGENCY SHUT-DOWN SYSTEM (ESD)



Short response time

A short response time is essential for valves operating in Emergency Shut Down (ESD) systems such as in refineries, power stations, mining and other applications where safety regulations call for such.

The values in the table below indicate the closing time (seconds) of an unloaded actuator and a loaded actuator with torque values simulating real-life situations. The stroke time measures the actual movement of the actuator without a solenoid or any other accessory delay.

COMPACT actuator stroking time (sec.)

1/4" NAMUR solenoid valve

Compact actuator closing time (sec.)					
Compact Actuator for Emergency Shut-Down (ESD) Systems		Normal		Improved	Fast
		1/4" Namur solenoid valve Cv = 0.9		1/4" Namur solenoid valve Cv = 0.9, & Breather Block	1/4" Non-Namur Solenoid valve Cv = 1, & 1/4" quick exhaust
Size	Load	3/2	5/2	3/2	3/2
C20-2C	0	0.09	0.08	0.05	0.05
	10 Nm / 89 lbf-in	0.14	0.09	0.07	0.07
C25-2C	0	0.17	0.12	0.07	0.06
	22 Nm / 195 lbf-in	0.35	0.15	0.17	0.15
C30-2C	0	0.26	0.20	0.12	0.10
	36 Nm / 319 lbf-in	0.49	0.23	0.25	0.20
C35-2C	0	0.39	0.29	0.26	0.17
	60 Nm / 531 lbf-in	0.58	0.35	0.41	0.27
C45-2C	0	0.71	0.52	0.43	0.30
	116 Nm / 1027 lbf-in	1.23	0.64	0.76	0.57
C60-2C	0	1.79	1.30	1.21	0.73
	260 Nm / 2300 lbf-in	2.36	1.38	1.73	1.13
C75-2C	0	2.78	2.00	1.86	1.08
	460 Nm / 4071 lbf-in	3.90	2.42	2.91	1.75

Compact actuator closing time (sec.)				
Compact Actuator for Emergency Shut-Down (ESD) Systems		Normal		Fast
		1/2" Namur solenoid valve Cv = 3.5		1/2" Non-Namur Solenoid valve Cv = 3.5, & 1/2" quick exhaust
Size	Load	3/2	5/2	3/2
C60-2C	0	0.71	0.49	0.53
	260 Nm / 2300 lbf-in	1.22	0.60	0.80
C75-2C	0	1.12	-	1.04
	460 Nm / 4071 lbf-in	1.79	-	1.52
C90-2C	0	1.4	-	1.2
	770 Nm / 6815 lbf-in	2.7	-	2.4

MOUNTING KITS

Mounting kits play a major role in the proper functioning of an automated unit. A rigid bracket must connect the actuator to the valve so they become a single unit with zero movement between the three components. The coupler is an element that transfers the torque from the actuator to the valve shaft. It must fit tightly and accurately so as to minimize hysteresis and to turn the valve shaft on its center axis without side loading. The mounting kit is designed for safe installation and operation of the complete unit, having rigid construction and no sharp corners. This well-engineered product provides a wide range of movement for the spanner, allowing for easy installation and maintenance, as well as maximum worker safety. Whether pairing Habonim valves with the Habonim Compact™ actuators, customizing a mounting kit to pair the Habonim Compact™ actuator with other valve brands or mounting Habonim valves on a wide variety of other actuator brands; Habonim is a one stop shop, offering valve automation linkage hardware for a wide range of applications.

Cast brackets

Habonim's rigid cast bracket, has a unique shape and precise construction with dual ISO 5211 standard hole patterns on both the top and bottom. The cast bracket is designed for installation on all Habonim valves, and the Compact™ pneumatic actuator which conform to ISO 5211 standard. An aesthetic shape and rounded corners, allow clear visibility of the valve stem and coupler from all directions. This well-engineered product provides a wide range of movement for the spanner, allowing for easy installation and maintenance, as well as maximum worker safety. The cast bracket is made from cast grade CF8 (AISI304) stainless steel for better corrosion resistance. Each pad is marked with the relevant ISO "F" number for clear identification. The coupler is made from stainless steel 303 as standard, and the fasteners are from stainless steel 304. Other materials are available upon special request.

Sample MK code description 'MK47C-25-C35'



'Closed box' mounting kit

The 'closed box' mounting kit design is used mainly for Non-ISO 5211 compliant top pads, platforms larger than ISO 5211 F14 PCD, or for unique applications which are not covered by the cast bracket. A 'closed box' bracket is comprised of a top and bottom element connected by a precisely welded tongue and groove construction. This configuration delivers the load from the actuator to the valve mainly through this latch mechanism and less is applied through the welding seam. The Closed box bracket is made from stainless steel sheet AISI 304, however, for off-shore applications, desalination plants and applications exposed to corrosive environments stainless steel 316/316L is used. An epoxy painted carbon steel bracket is used to connect large scotch-yoke actuators to large high pressure valves or trunnion mounted valves. As standard the coupler is made from stainless steel 303, and the fasteners are made from stainless steel 304. Other materials are also available upon special request.

Sample MK code description 'MK47-25-C35'



'Lock Pin' mounting kit

To enhance site safety by preventing unintentional remote operation of an automated valve, Habonim provides a special lockable mounting kit. The '-LP' mounting kit consists of a special bracket and coupler. A concentric hole drilled through the coupler and bracket allows a rigid stainless steel pin to be slid through both elements, blocking the valve stem and actuator pinion. The '-LP' mounting kit does not include the lock pin itself, only the preparation to fit the lock pin as lock pins are normally part of maintenance toolbox.

Sample MK code description 'MK47-25-C35-LP'

Sample Lock pin kit codes:

- LOCK PIN KIT C15/C30
- LOCK PIN KIT C35/C45
- LOCK PIN KIT C60/C75



'IFM' mounting kit

When a small footprint automated valve is required, Habonim provides a special mounting kit to allow easy installation of a barrel type proximity switch between the valve and actuator. The '-IFM' mounting kit consist of a special bracket drilled to match the proximity switch OD, and a unique coupler with two ferromagnetic pin targets connected to it. The targets are aligned with the proximity switch unit so that when the actuator turns the valve to the open or closed position, the proximity switch signals the valve's position. This solution is an ideal non-contact detection of metal targets in position sensing applications, combined with smaller footprint allows for reduced space on the plant floor, but also minimizes the mounting space for sensors used for position control.

Sample MK code description 'MK47-10/12-C25-IFM12'

IFM shows the proximity switch type, followed by a number (8, 12, 18 or 30 mm) which indicates the outside diameter of the proximity switch cylinder.

'MOL' mounting kit

Manual operation of an automated valve is necessary during commissioning of a plant when an energy source is not stable, in case of an emergency, when there is a power outage and the valve must remain in the open or closed position, or due to an actuator malfunction. Normally a declutchable gear would be used to integrate human intervention in an automated loop, however for small size valves up to 1½" (DN40), Habonim recommends a cost effective mounting kit that allows the operator to turn the valve manually. The 'MOL' mounting kit consists of a unique coupler with milled flats, and a drilled hole in its center. The 'MOL' closed box bracket is designed with an additional groove that allows a full quarter turn of a spanner. The kit also includes a lock pin and 19 mm spanner chained to the bracket. To rotate the pneumatically automated valve, disconnect the air pressure from the actuator. Hold the coupler flats with the spanner, and turn the drive train to its counter position, slide the lock pin all the way through the bracket and coupler to hold the valve and actuator in the new position.

Sample MK code description 'MK47-10/12-C25-MOL'

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1¼", 2½", 4" FB ARE EXCLUDED

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	½" DN15	¾" DN20	1" DN25	1½" DN32	1½" DN40	2" DN50
C15		MK47C-05/07-C15		MK47C-10/12-C15		-	
C20		MK47C-05/07-C20		MK47C-10/12-C20		MK47C-15/20-C20	
C25		MK47-05/07-C25		MK47C-10/12-C25		MK47C-15/20-C25	
C30 / C30M		MK47-05/07-C30		MK47C-10/12-C30		MK47C-15/20-C30	
C35 / C35M		-		MK47-10/12-C35		MK47-15/20-C35	
C45 / C45M		-		-		MK47-15/20-C45	
C60 / C60M / C75 / C75M		-		-		-	
C90M		-		-		-	

Valve Size Standard port / Actuator size	inch mm	2½" DN65	3" DN80	4" DN100	4" FB DN100	6" DN150	8" DN200
C15		-		-		-	
C20		-		-		-	
C25		MK47C-25-C25		-		-	
C30 / C30M		MK47C-25-C30		MK47C-30/40-C30		-	
C35 / C35M		MK47C-25-C35		MK47C-30/40-C35		-	
C45 / C45M		MK47C-25-C45		MK47C-30/40-C45		MK47-60/80-C45	
C60 / C60M / C75 / C75M		-		MK47C-30/40-C60/C75		MK47-60/80-C60/C75	
C90M		-		-		MK47-60/80-C90	

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APPLICABLE FOR SIZES ½" - 2"

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	½" DN15	¾" DN20	1" DN25	1½" DN40	2" DN50
C15		MK47C-05/07-C15	MK47C-10/12-C15		-	-
C20		MK47C-05/07-C20	MK47C-10/12-C20		MK47C-15/20-C20	-
C25		MK47-05/07-C25	MK47C-10/12-C25		MK47C-15/20-C25	MK47C-25-C25
C30 / C30M		MK47-05/07-C30	MK47C-10/12-C30		MK47C-15/20-C30	MK47C-25-C30
C35 / C35M		-	MK47-10/12-C35		MK47-15/20-C35	MK47C-25-C35
C45 / C45M		-	-		MK47-15/20-C45	MK47C-25-C45
C60 / C60M / C75 / C75M		-	-		-	-
C90M		-	-		-	-

Valve Size Standard port / Actuator size	inch mm	3" DN80	4" DN100	6" DN150	8" DN200
C15		-		-	-
C20		-		-	-
C25		-		-	-
C30 / C30M		MK47C-30/40-C30		-	-
C35 / C35M		MK47C-30/40-C35		-	-
C45 / C45M		MK47C-30/40-C45		MK47-60/80-C45	-
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75		MK47-60/80-C60/C75	MK47-A0-C60/C75
C90M		-		MK47-60/80-C90	MK47-A0-C90



Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	½" DN15	¾" DN20	1" DN25	1¼" DN32	1½" DN40	2" DN50
C15		MK47C-05/07-C15		MK47C-10/12-C15		-	-
C20		MK47C-05/07-C20		MK47C-10/12-C20		MK47C-15/20-C20	-
C25		MK47-05/07-C25		MK47C-10/12-C25		MK47C-15/20-C25	MK48C-20-C25
C30 / C30M		MK47-05/07-C30		MK47C-10/12-C30		MK47C-15/20-C30	MK48C-20-C30
C35 / C35M		-		MK47-10/12-C35		MK47-15/20-C35	MK48C-20-C35
C45 / C45M		-		-		MK47-15/20-C45	MK48C-20-C45
C60 / C60M / C75 / C75M		-		-		-	-
C90M		-		-		-	-

Valve Size Standard port / Actuator size	inch mm	2½" DN65	3" DN80	4" DN100	6" DN150
C15		-	-	-	-
C20		-	-	-	-
C25		-	-	-	-
C30 / C30M		MK47C-30/40-C30		-	-
C35 / C35M		MK47C-30/40-C35		-	-
C45 / C45M		MK47C-30/40-C45		MK47-60/80-C45	
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75		MK47-60/80-C60/C75	
C90M		-	-	-	-

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	½" Full port DN15	¾" DN20	1" DN25	1¼" DN32	1½" DN40	2" DN50
C15		MK47C-10/12-C15		-		-	-
C20		MK47C-10/12-C20		MK47C-10/12-C20		MK47C-15/20-C20	-
C25		MK47C-10/12-C25		MK47C-10/12-C25		MK47C-15/20-C25	MK48C-20-C25
C30 / C30M		MK47C-10/12-C30		MK47C-10/12-C30		MK47C-15/20-C30	MK48C-20-C30
C35 / C35M		-		MK47-10/12-C35		MK47-15/20-C35	MK48C-20-C35
C45 / C45M		-		-		MK47-15/20-C45	MK48C-20-C45
C60 / C60M / C75 / C75M		-		-		-	-
C90M		-		-		-	-

Valve Size Standard port / Actuator size	inch mm	2½" DN65	3" DN80	4" DN100
C15		-	-	-
C20		-	-	-
C25		-	-	-
C30 / C30M		MK48C-20-C30	MK47C-30/40-C30	-
C35 / C35M		MK48C-20-C35	MK47C-30/40-C35	-
C45 / C45M		MK48C-20-C45	MK47C-30/40-C45	MK47-60/80-C45
C60 / C60M / C75 / C75M		MK48-20-C60/C75	MK47C-30/40-C60/C75	MK47-60/80-C60/C75
C90M		-	-	-

Mounting Kits Selection Guide

Standard

Valve Size Standard port / Actuator size	inch mm	½" DN15	¾" DN20	1" DN25	1¼" DN32	1½" DN40
C15		MK24-05-C15	MK24-07-C15	-	-	-
C20		MK24-05-C20	MK24-07-C20	MK24-10-C20	MK24-12-C20	MK24-15-C20
C25		MK24-05-C25	MK24-07-C25	MK24-10-C25	MK24-12-C25	MK24-15-C25
C30 / C30M		-	-	MK24-10-C30	MK24-12-C30	MK24-15-C30
C35 / C35M		-	-	-	-	MK24-15-C35

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	½" DN15	¾" DN20	1" DN25	1¼" DN32	1½" DN40	2" DN50
C15		MK27-05-C15	MK27-07-C15	-	-	-	-
C20		MK27-05-C20	MK27-07-C20	MK27-10/12-C20	-	MK27-15-C20	-
C25		MK27-05-C25	MK27-07-C25	MK27-10/12-C25	-	MK27-15-C25	MK27-20-C25
C30 / C30M		MK27-05-C30	MK27-07-C30	MK27-10/12-C30	-	MK27-15-C30	MK27-20-C30
C35 / C35M		-	-	MK27-10/12-C35	-	MK27-15-C35	MK27-20-C35
C45 / C45M		-	-	-	-	MK27-15-C45	MK27-20-C45
C60 / C60M / C75 / C75M		-	-	-	-	-	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2½" DN65	3" DN80	4" DN100	6" DN150	8" DN200
C15		-	-	-	-	-
C20		-	-	-	-	-
C25		-	-	-	-	-
C30 / C30M		MK27-25-C30	MK27-30-C30	MK27-40-C30	-	-
C35 / C35M		MK27-25-C35	MK27-30-C35	MK27-40-C35	-	-
C45 / C45M		MK27-25-C45	MK27-30-C45	MK27-40-C45	MK27-60-C45	-
C60 / C60M / C75 / C75M		-	MK27-30-C60/C75	MK27-40-C60/C75	MK27-60-C60/C75	MK27-A0-C60/C75
C90M		-	-	-	MK27-60-C90	MK27-A0-C90



Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		-	-	-	-	-	-
C20		MK47C-05-C20	MK47C-10/12-C20	-	-	-	-
C25		MK47C-05-C25	MK47C-10/12-C25	MK28C-10-C25	MK28C-12-C25	-	-
C30 / C30M		MK47-05-C30	MK47C-10/12-C30	MK28C-10-C30	MK28C-12-C30	MK48-20-C30	MK28C-15/20-C30
C35 / C35M		-	MK47-10/12-C35	MK28-10-C35	MK28-12-C35	MK48-20-C35	MK28C-15/20-C35
C45 / C45M		-	-	MK28-10-C45	MK28-12-C45	MK48-20-C45	MK28-15/20-C45
C60 / C60M / C75 / C75M		-	-	-	-	-	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	6" DN150	8" DN200
C15		-	-	-	-	-
C20		-	-	-	-	-
C25		-	-	-	-	-
C30 / C30M		-	-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK28-30-C35	-	-	-
C45 / C45M		MK47C-30/40-C45	MK28-30-C45	MK28-40-C45	-	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK28-30-C60/C75	MK28-40-C60/C75	MK28-60-C60/C75	MK28-80-C60/C75
C90M		-	-	-	MK28-60-C90	MK28-80-C90

Mounting Kits Selection Guide

Series in range: 26, 26X, 26W

Valve Size Standard port / Actuator size	inch mm	2" DN50	3" DN80	4" DN100	6" DN150	8" DN200
C15		-	-	-	-	-
C20		-	-	-	-	-
C25		-	-	-	-	-
C30 / C30M		MK47C-30/40-C30	-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK47-60/80-C35	-	-	-
C45 / C45M		MK47C-30/40-C45	MK47-60/80-C45	MK47-A0-C45	-	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK47-60/80-C60/C75	MK47-A0-C60/C75	MK26-80-C60/C75	
C90M		-	-	-	MK47-A0-C90	MK26-80-F16

C47

C31

C32

1 1/4", 2 1/2", 4" FB ARE EXCLUDED

Mounting Kits Selection Guide

Cryogenic

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		MK47C-05/07-C15		MK47C-10/12-C15		-	
C20		MK47C-05/07-C20		MK47C-10/12-C20		MK47C-15/20-C20	
C25		MK47-05/07-C25		MK47C-10/12-C25		MK47C-15/20-C25	
C30 / C30M		MK47-05/07-C30		MK47C-10/12-C30		MK47C-15/20-C30	
C35 / C35M		-		MK47-10/12-C35		MK47-15/20-C35	
C45 / C45M		-		-		MK47-15/20-C45	
C60 / C60M / C75 / C75M		-		-		-	
C90M		-		-		-	

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	4" FB DN100	6" DN150	8" DN200
C15		-		-		-	
C20		-		-		-	
C25		MK48C-20-C25		-		-	
C30 / C30M		MK48C-20C30		MK47C-30/40-C30		-	
C35 / C35M		MK48C-20-C35		MK47C-30/40-C35		-	
C45 / C45M		MK48C-20-C45		MK47C-30/40-C45		MK47-60/80-C45	
C60 / C60M / C75 / C75M		-		MK47C-30/40-C60/C75		MK47-60/80-C60/C75	
C90M		-		-		MK47-60/80-C90	

C73

C74

C77

C78

APPLICABLE FOR SIZES 3" - 6", 1/2" - 2"

Mounting Kits Selection Guide

Series in range: C73C, C73W, C74C, C74W, C77C, C77W (Applicable for sizes 3" - 6"), C78C, C78W (Applicable for sizes 1/2" - 2")

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/2" DN40	2" DN50
C15		MK47C-05/07-C15	MK47C-10/12-C15		-	-
C20		MK47C-05/07-C20	MK47C-10/12-C20		MK47C-15/20-C20	-
C25		MK47-05/07-C25	MK47C-10/12-C25		MK47C-15/20-C25	MK48C-20-C25
C30 / C30M		MK47-05/07-C30	MK47C-10/12-C30		MK47C-15/20-C30	MK48C-20-C30
C35 / C35M		-	MK47-10/12-C35		MK47-15/20-C35	MK48C-20-C35
C45 / C45M		-	-		MK47-15/20-C45	MK48C-20-C45
C60 / C60M / C75 / C75M		-	-		-	-
C90M		-	-		-	-

Valve Size Standard port / Actuator size	inch mm	3" DN80	4" DN100	6" DN150	8" DN200
C15		-		-	-
C20		-		-	-
C25		-		-	-
C30 / C30M		MK47C-30/40-C30		-	-
C35 / C35M		MK47C-30/40-C35		-	-
C45 / C45M		MK47C-30/40-C45		MK47-60/80-C45	-
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75		MK47-60/80-C60/C75	MK47-A0-C60/C75
C90M		-		MK47-60/80-C90	MK47-A0-C90

C26C

C26W



Valve Size Standard port / Actuator size	inch mm	2" DN50	3" DN80	4" DN100	6" DN150	8" DN200
C15		-	-	-	-	-
C20		-	-	-	-	-
C25		-	-	-	-	-
C30 / C30M		MK47C-30/40-C30	-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK47-60/80-C35	-	-	-
C45 / C45M		MK47C-30/40-C45	MK47-60/80-C45	MK47-A0-C45	-	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK47-60/80-C60/C75	MK47-A0-C60/C75	MK26-80-C60/C75	-
C90M		-	-	MK47-A0-C90	MK26-80-F16	-

C61

C62

Valve Size Standard port / Actuator size	inch mm	1/2" Full port DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		MK47C-10/12-C15	-	-	-	-	-
C20		MK47C-10/12-C20	-	MK47C-10/12-C20	-	MK47C-15/20-C20	-
C25		MK47C-10/12-C25	-	MK47C-10/12-C25	-	MK47C-15/20-C25	MK48C-20-C25
C30 / C30M		MK47C-10/12-C30	-	MK47C-10/12-C30	-	MK47C-15/20-C30	MK48C-20-C30
C35 / C35M		-	-	MK47-10/12-C35	-	MK47-15/20-C35	MK48C-20-C35
C45 / C45M		-	-	-	-	MK47-15/20-C45	MK48C-20-C45
C60 / C60M / C75 / C75M		-	-	-	-	-	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100
C15		-	-	-
C20		-	-	-
C25		-	-	-
C30 / C30M		MK47C-30/40-C30	-	-
C35 / C35M		MK47C-30/40-C35	-	-
C45 / C45M		MK47C-30/40-C45	MK47-60/80-C45	MK47-60/80-C45
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75	MK47-60/80-C60/C75	MK47-60/80-C60/C75
C90M		-	-	-

C28

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		-	-	-	-	-	-
C20		MK47C-05-C20	MK47C-10/12-C20	-	-	-	-
C25		MK47C-05-C25	MK47C-10/12-C25	MK47C-15/20-C25	-	-	-
C30 / C30M		MK47-05-C30	MK47C-10/12-C30	MK47C-15/20-C30	-	MK48-20-C30	-
C35 / C35M		-	MK47-10/12-C35	MK47-15/20-C35	-	MK48-20-C35	-
C45 / C45M		-	-	MK47-15/20-C45	-	MK48-20-C45	-
C60 / C60M / C75 / C75M		-	-	-	-	MK48-20-C60/C75	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	6" DN150	8" DN200
C15		-	-	-	-	-
C20		-	-	-	-	-
C25		-	-	-	-	-
C30 / C30M		-	-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK47-60/80-C35	-	-	-
C45 / C45M		MK47C-30/40-C45	MK47-60/80-C45	MK47-60/80-C45	-	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK47-60/80-C60/C75	MK47-60/80-C60/C75	MK28-60-C60/C75	MK28-A0-C60/C75
C90M		-	-	-	MK28-60-C90	MK28-A0-C90

Z47

Z47T

Mounting Kits Selection Guide

High Temperature

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		MK47C-05/07-C15 *		-		-	
C20		MK47C-05/07-C20		MK47C-10/12-C20 (DA ONLY)		-	
C25		MK47-05/07-C25		MK47C-10/12-C25		MK47C-15/20-C25 (DA ONLY)	
C30 / C30M		MK47-05/07-C30		MK47C-10/12-C30		MK47C-15/20-C30	
C35 / C35M		-		MK47-10/12-C35		MK47-15/20-C35	
C45 / C45M		-		-		MK47-15/20-C45	
C60 / C60M / C75 / C75M		-		-		-	
C90M		-		-		-	
Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	6" DN150	8" DN200	8" FB DN200
C15		-		-		-	
C20		-		-		-	
C25		-		-		-	
C30 / C30M		MK47C-30/40-C30 (DA ONLY)		-		-	
C35 / C35M		MK47C-30/40-C35		-		-	
C45 / C45M		MK47C-30/40-C45		MK47-60/80-C45		-	
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75		MK47-60/80-C60/C75		MK47-A0-C60/C75	MK26-80-C60/C75
C90M		-		-		MK47-A0-C90	MK26-80-F16

*(DA ONLY)

Z73

Z73T

Z74

Z74T

Z78

Z78Z

Z77

Z77T

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/2" DN40	2" DN50
C15		MK47C-05/07-C15 *	-		-	-
C20		MK47C-05/07-C20	MK47C-10/12-C20 *		-	-
C25		MK47-05/07-C25	MK47C-10/12-C25		MK47C-15/20-C25 *	-
C30 / C30M		MK47-05/07-C30	MK47C-10/12-C30		MK47C-15/20-C30	MK48C-20-C30 *
C35 / C35M		-	MK47-10/12-C35		MK47-15/20-C35	MK48C-20-C35
C45 / C45M		-	-		MK47-15/20-C45	MK48C-20-C30
C60 / C60M / C75 / C75M		-	-		-	-
C90M		-	-		-	-
Valve Size Standard port / Actuator size	inch mm	3" DN80	4" DN100	6" DN150	8" DN200	
C15		-	-	-	-	
C20		-	-	-	-	
C25		-	-	-	-	
C30 / C30M		-	-	-	-	
C35 / C35M		MK47C-30/40-C35	MK47C-30/40-C30 *	-	-	
C45 / C45M		MK47C-30/40-C45	MK47Z-40-C45	MK47-60/80-C45	-	
C60 / C60M / C75 / C75M		MK47C-30/40-C60/C75	MK47Z-40-C60/C75	MK47-60/80-C60/C75	MK47-A0-C60/C75	
C90M		-	-	-	MK47-A0-C90	

*(DA ONLY)



Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		-	-	-	-	-	-
C20		MK47C-05-C20	MK47C-10/12-C20	-	-	-	-
C25		MK47C-05-C25	MK47C-10/12-C25	MK28C-10-C25	MK28C-12-C25	-	-
C30 / C30M		MK47-05-C30	MK47C-10/12-C30	MK28C-10-C30	MK28C-12-C30	MK48-20-C30	MK28C-15/20-C30
C35 / C35M		-	MK47-10/12-C35	MK28-10-C35	MK28-12-C35	MK48-20-C35	MK28C-15/20-C35
C45 / C45M		-	-	MK28-10-C45	MK28-12-C45	MK48-20-C45	MK28-15/20-C45
C60 / C60M / C75 / C75M		-	-	-	-	-	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	6" DN150
C15		-	-	-	-
C20		-	-	-	-
C25		-	-	-	-
C30 / C30M		-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK28-30-C35	-	-
C45 / C45M		MK47C-30/40-C45	MK28-30-C45	MK28-40-C45	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK28-30-C60/C75	MK28-40-C60/C75	MK28-60-C60/C75
C90M		-	-	-	MK28-60-C90

Mounting Kits Selection Guide

Valve Size Standard port / Actuator size	inch mm	1/2" DN15	3/4" DN20	1" DN25	1 1/4" DN32	1 1/2" DN40	2" DN50
C15		-	-	-	-	-	-
C20		MK47C-05-C20	MK47C-10/12-C20	-	-	-	-
C25		MK47C-05-C25	MK47C-10/12-C25	MK47C-15/20-C25	-	-	-
C30 / C30M		MK47-05-C30	MK47C-10/12-C30	MK47C-15/20-C30	-	MK48-20-C30	-
C35 / C35M		-	MK47-10/12-C35	MK47-15/20-C35	-	MK48-20-C35	-
C45 / C45M		-	-	MK47-15/20-C45	-	MK48-20-C45	-
C60 / C60M / C75 / C75M		-	-	-	-	MK48-20-C60/C75	-
C90M		-	-	-	-	-	-

Valve Size Standard port / Actuator size	inch mm	2 1/2" DN65	3" DN80	4" DN100	6" DN150
C15		-	-	-	-
C20		-	-	-	-
C25		-	-	-	-
C30 / C30M		-	-	-	-
C35 / C35M		MK47C-30/40-C35	MK47-60/80-C35	-	-
C45 / C45M		MK47C-30/40-C45	MK47-60/80-C45	MK47-60/80-C45	-
C60 / C60M / C75 / C75M		MK47C-30/40-60/C75	MK47-60/80-C60/C75	MK47-60/80-C60/C75	MK28-60-C60/C75
C90M		-	-	-	MK28-60-C90

ACCESSORIES

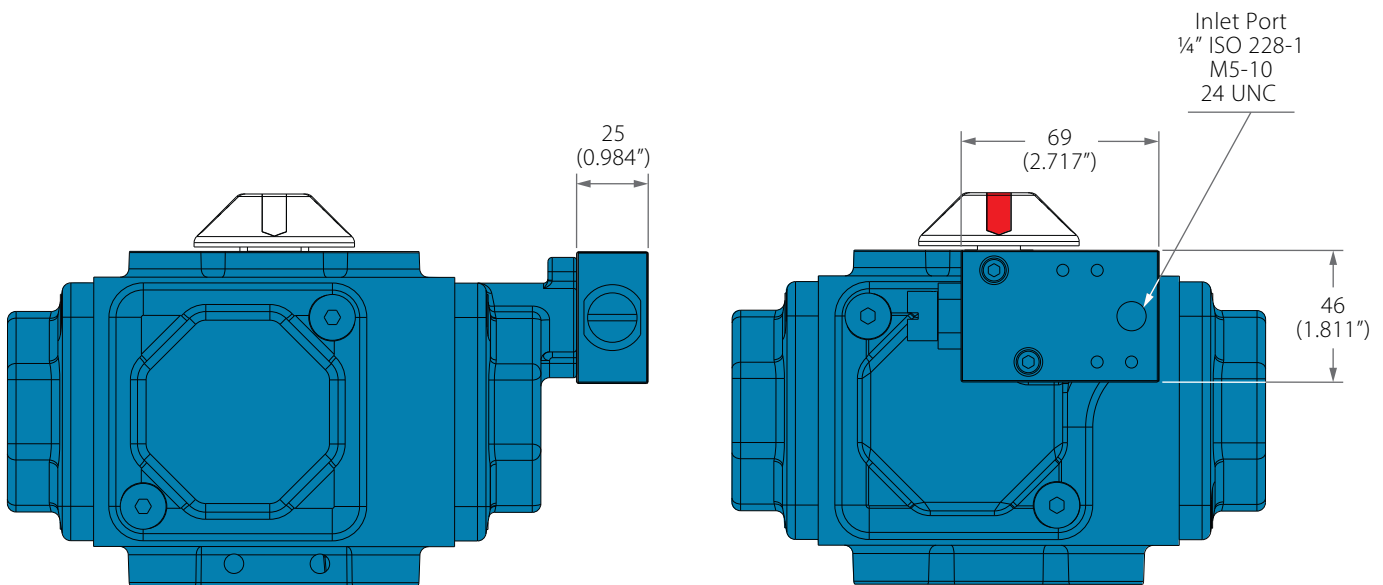
Breather Block

In applications that use a fail-safe actuator, the spring chambers are exposed to the surrounding environment. Every stroke generated by the force of the springs introduces air from the surroundings into the actuator's inner parts. In the case of corrosive and/or abrasive working environments, the springs and the interior of the spring chamber become prone to damage that could cause the product to malfunction.

The Breather Block isolates the actuator's internal parts from the corrosive/abrasive surroundings by allowing only dry and filtered instrument air to flow into the spring chamber during the actuator's spring stroke. The Breather Block's exhaust port only allows air to flow out of the spring chamber and prevents outside air from flowing in.

Features

- Fits directly onto any actuator with a Namur interface
- Interface for direct mounting of Namur solenoids
- When using remote solenoids, air supply tubes can be connected to the inlet port with a ¼" NPT (Imperial) or M5-10/24 UNC (Metric) connector
- Aluminum anodized coating and external paint layer for extreme protection
- Optional metallic construction materials are available. The O-ring and membrane are made from Buna-N
- Operating limits: pressures up to 10 bar (150 psi) and temperature range of -20° C to +85° C (-4° F to +185° F)
- One unit fits all actuator sizes





IMPACT™ - Spring Assist

In a failsafe actuator compressed air inside the actuator preloads the springs. During normal operation, each time the solenoid valve is tripped the compressed air is released into the atmosphere through the solenoid valve's exhaust port.

The patented IMPACT™ unit diverts part of this energy to the spring chamber in order to boost the torque of the actuator by at least 50%.

The IMPACT™ also functions as a Breather Block that isolates the spring chamber from the atmosphere, and as a check valve that ensures that the temporary reduction of the compressed air pressure does not trigger movement of the valve and actuator to the mid-position.

The IMPACT™ is used for on/off systems only, and cannot be used for control applications.



Features

- Boosts the torque of any spring return actuator
- One size down actuator for the same functionality
- Increases system reliability
- Internal Breather Block
- No external energy required
- NAMUR interface
- Single mechanical unit



ACCESSORIES

IMPACT™ Cycle Of Operation

1. Starting Point

The IMPACT™ full cycle of operation is illustrated below on a single-piston spring return actuator. In the initial startup the spring chamber and the centre chamber are not pressurized.

2. "ON" command to the actuator

At the ON command air pressure from the supply line is applied through the IMPACT™ and into the centre chamber of the actuator causing the piston to retract and compress the spring. The centre chamber stays pressurized until the OFF command is given.

3. "OFF" command to the actuator

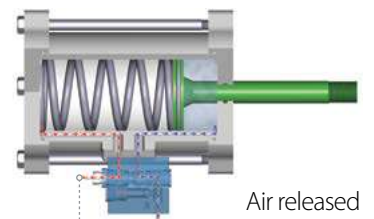
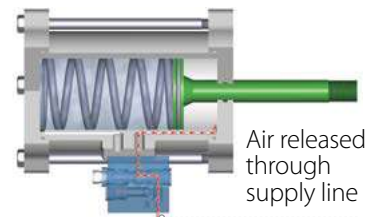
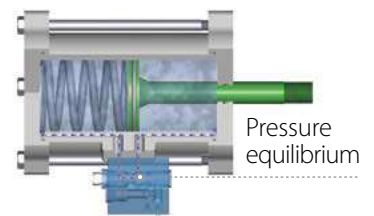
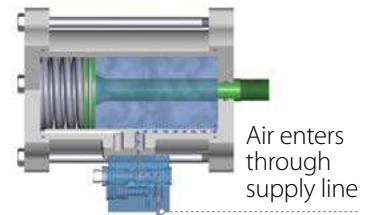
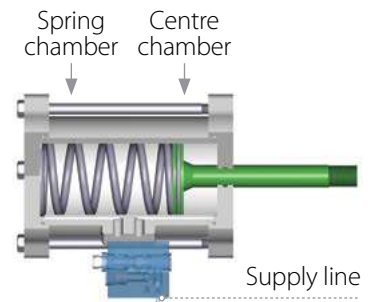
At the OFF command air pressure is directed from the centre chamber to the spring chamber as the spring pushes the piston back. The air pressure in the spring chamber and the centre chamber reach equilibrium.

4. Spring End Position

As equilibrium is reached, the air in the centre chamber is released through the supply line it contributes additional force to the spring closing motion. Pressurized air is trapped until the next ON command.

5. Next "ON" command

At the next ON command air pressure from the supply line is applied through the IMPACT™ and into the centre chamber and at the same time exhausting the trapped air from the spring chamber.





IMPACT™

Applications

The IMPACT™ can be utilized directly on site where operating conditions may occur that cause functional disorders or become a safety issue. Some typical examples are given here:

1. Actuators that are not achieving their published torque output can have the IMPACT™ field mounted to improve their reliability without having to replace them or stop the process.
2. In situations where unexpected pressure drops occur, such as at beginning of a days work or when additional accessories are added to a system, the IMPACT™ will keep the pressure level at its maximum and prevent the actuators from shifting from their position.
3. In many cases it is possible to substitute a smaller actuator with the IMPACT™ and achieve the torque output of a larger actuator.
4. The IMPACT™ will increase the reliability and safety margin of existing actuators. The additional torque provided to existing actuators extend their life and reduce maintenance.
5. The IMPACT™ is ideal for critical applications where quick-closing actuators are required.
6. The IMPACT™ will help "self opening" valves keep their shut-off position.

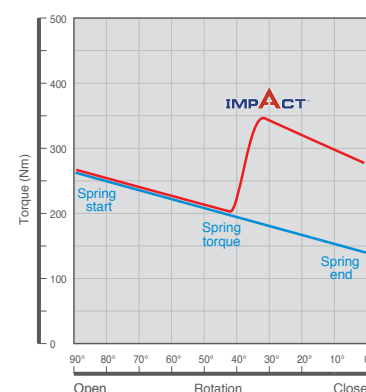
Features

Adds 50% more torque

Redirecting the air pressure into the spring chamber increases the spring end torque by 50% and more.

The torque generated depends on the type of valves in service and the operating conditions. The additional torque can be above 200%.

The IMPACT™ typical behavioral reaction to a spring return stroke is shown in the graph below. It is evident that the actual spring end torque is significantly higher with the IMPACT™.

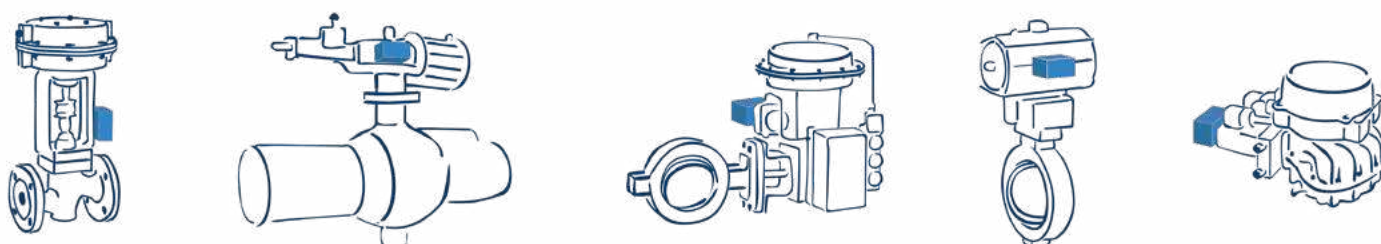
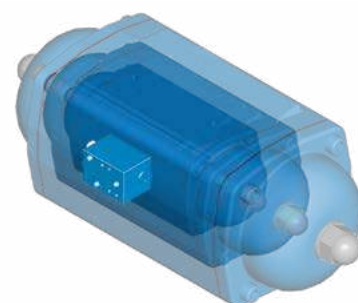


One size

The IMPACT™ comes in one size only which fits all size actuators making it a simple and easy solution for all the actuators on site or in inventory.

Used with any actuator

The IMPACT™ can be used with any type of spring return actuator, be it linear or rotary such as: rack and pinion (single piston, double piston, four piston), Scotch-Yoke, Spring-Diaphragm, Vane type and Worm gear.



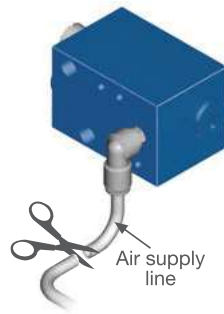
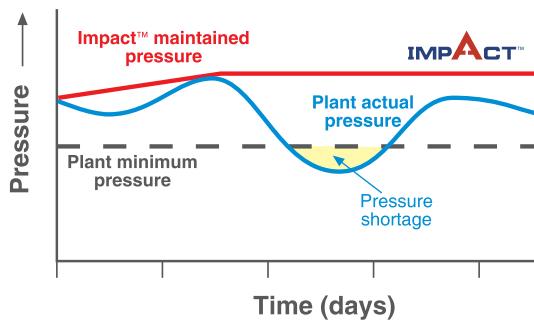
ACCESSORIES

IMPACT™

Safety and reliability

1. Pressure fluctuations

The IMPACT™ has a built-in non-return valve that will hold the maximum air pressure in the centre chamber so that any pressure fluctuations in the system will not cause spring return actuators to start closing and trigger alarms.



2. Emergency cutoff

Under emergency situations the IMPACT™ will operate and react to any air supply cutoff. Unlike many other devices, the IMPACT™ is not dependant on an alternative air source.

3. No electrical hazard

The IMPACT™ does not operate on electric or electronic commands and therefore is not considered an electrical hazard.

Energy saving

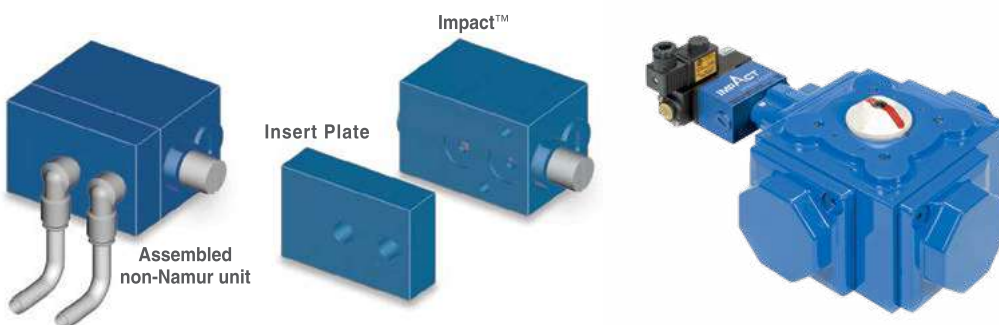
The IMPACT™ does not operate on any form of external energy and is therefore a significant energy saver for its user.

Namur interface

The IMPACT™ direct mounts to any actuator with Namur interface and has direct mounting for Namur solenoids. Only solenoids type 3/2 are required.

Non-Namur interface

By using a special insert plate the IMPACT™ can be used with any actuator that has standard threaded air connections.





IMPACT™

No additional air

The IMPACT™ does not need an additional source of air supply and does not require a safety backup system. The air used comes from the air already supplied to the centre chamber.

Built-in Breather Block

The IMPACT™ has a built-in Breather Block that prevents suction of external air into the spring chamber (refer to Habonim Namur Breather Block catalog).

Compact size

The physical footprint of the IMPACT™ is slightly larger than a matchbox. The actual dimensions are 69 x 46 x 46 mm (2.716" x 1.811" x 1.811").

Quick shutoff

In cases where there is a requirement for increased closing speed for fail safe operations, the IMPACT™ provides faster closing due to the additional air pressure assisting the springs.

Patented

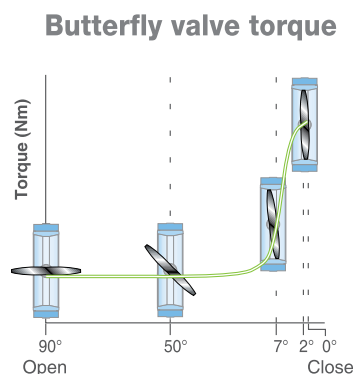
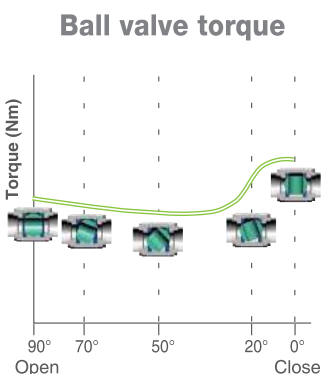
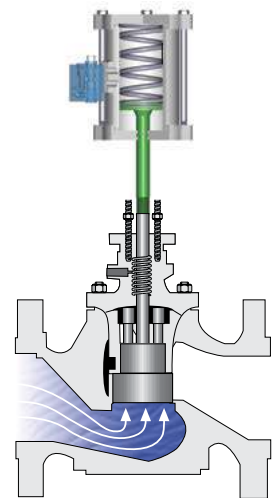
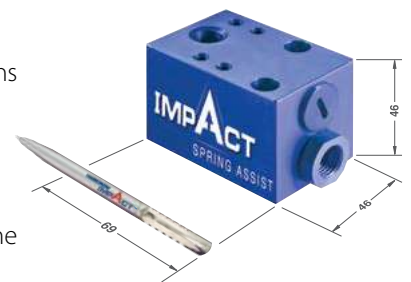
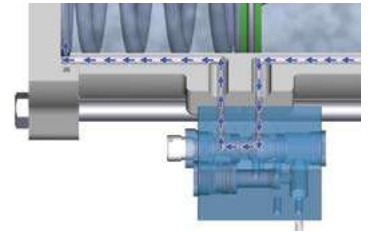
The IMPACT™ is patent pending.

Dynamic response

The IMPACT™ unique design dynamically responds to valve torque increases and provides the extra air pressure to the actuator when it is required. Every valve type has its typical torque profile and spring action of the actuator is required to provide enough torque through the full stroke. The IMPACT™ responds to the actual conditions to give the additional torque. The IMPACT™ will also respond to situations where unexpected conditions can cause the valves to seize.

Reduce maintenance & inventory

Being only one size makes the IMPACT™ a great staff tool for the maintenance personnel on site and an economical solution for procurement.

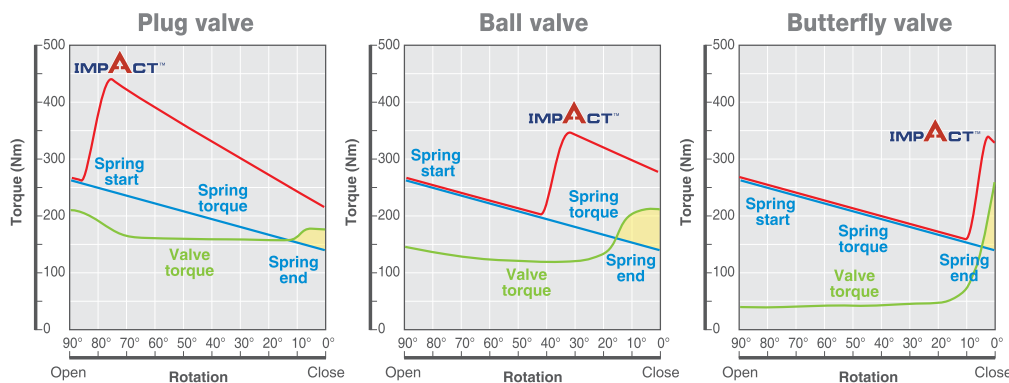


ACCESSORIES

IMPACT™

Self opening

When the actuator has closed the valve the IMPACT™ maintains the air pressure on the springs until the next operation. This gives the actuator a higher spring end torque which is ideal for “self-opening” valves. Because high pressure fluid loads the entire valve port it creates a force that acts against the actuator springs.



How to calculate additional spring closing torque

The following steps will help you understand how to calculate the additional torque the IMPACT™ Air Assist will give your Spring Return actuator. The IMPACT™ will work with any type actuator, and you should use the torque tables provided by your actuator of preference:

Step 1: Calculate Torque difference

In the Double acting Torque table find the actuator model and size that you are working with. Calculate the torque difference of 1 bar at any pressure.

Example shown The Spring Return actuator model size is C30 and the ΔP of 1 bar calculated is between 5.0 bar (73 psi) and 6.0 bar (87 psi). The additional torque will be: $130-107=23$ [Nm] ($1,150-947=203$ in-lb).

Step 2: Calculate Spring Torque

In the Spring Return torque tables find the actuator model and size with the spring combination that you are working with. Locate the Spring End torque and add the additional torque as above.

Example shown The Spring Return actuator model size is C30 with 2C spring combination. The Spring End torque is 44[Nm] (389in-lb). The new Spring End torque will be: $44+23=67$ [Nm] ($389+203=592$ in-lb).

Double acting table $\Delta P = 1 \text{ bar}$

Model	Operating pressure (bar)					
	3.0	4.0	5.0	6.0	7.0	8.0
C15	10	14	17	21	24	27
C20	18	25	32	38	45	51
C25	39	52	65	79	92	105
C30	62	84	107	130	153	176

Spring return table

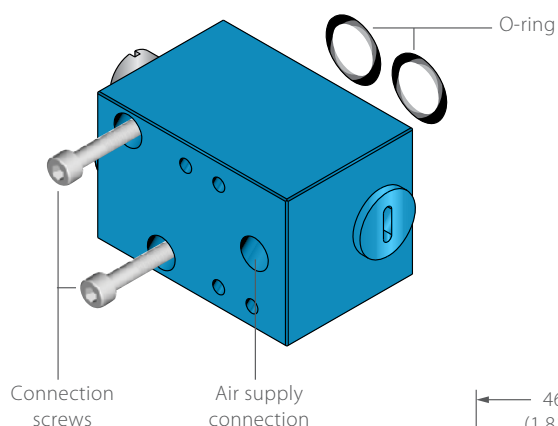
Size	Spring set	Air pressure - bar (psi)						Spring torque	
		3.0 (44)		7 (102)		8 (116)		Start	End
		Start	End	Start	End	Start	End		
C30	2A	36	19	125	107	148	129	42	26
	2A2B			120	96	143	118	53	31
	2B			115	87	138	109	62	36
	2C			107	72	130	94	78	44



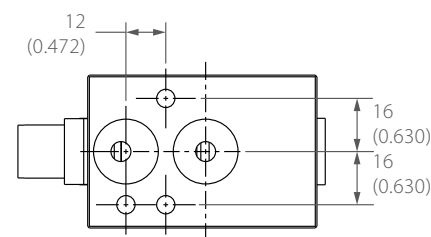
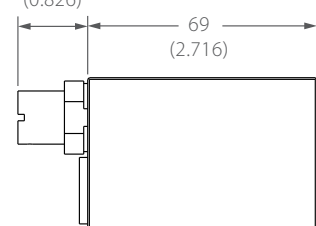
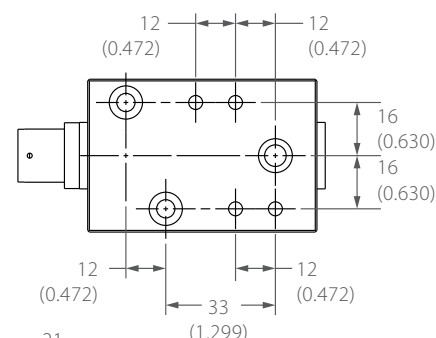
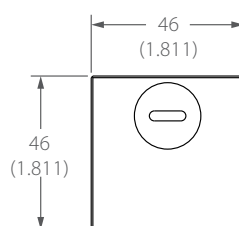
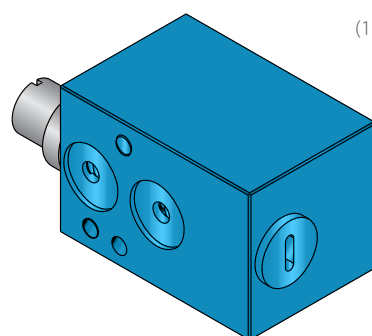
IMPACT™

Dimensions

Solenoid interface side



Actuator interface side



Specifications

- The IMPACT™ is environmentally protected by a hard anodized coating that is applied to all the parts both internally and externally.
- The temperature limits are -20°C to +80°C (-4°F to +176°F).
- The air supply pressure range is 3 to 8 bar (45 to 120 psi).
- The IMPACT™ will not operate at pressures below 3 bar (45 psi).
- The IMPACT™ is not affected by humidity, moisture, wetness or magnetic surroundings.
- Use only filtered air to 30 microns.

Ordering Information

Please provide all the information specified below:

Namur interface actuators:

- IMPACT™ - I: Imperial connecting screws thread type 10/24 UNC and air supply connection type 1/4" NPT.
- IMPACT™ - M: Metric connecting screws thread type M5 and air supply connection type G-1/4" ISO.

Non-Namur actuators: As above but add the letter "X"

- IMPACT™ - I-X: for Imperial / IMPACT™ - M-X: for Metric
- All the IMPACT™ units are provided with the two
- connecting screws and two O-rings.



About Habonim

Ball Valves & Actuators for the most demanding, challenging and hazardous applications are our passion and profession for the last 70 years.

We believe in designing, manufacturing and supplying control and shutoff components and solutions that improves the overall safety, integrity and sustainability of the systems they are installed in.

Designed, manufactured and tested according to the highest standards, our products allow us to partner within systems that flow and control varied gases and liquids in diverse markets especially where extreme temperatures and pressures are involved, hazardous materials are used and system performances are critical.

We are leading in cryogenic ball valve-based control solutions, emergency shutoff and specially designed solutions.

Believing that supplying and developing the most effective, safe and reliable products for the global leaders in the LNG and Gas distribution market continually challenges us to improve our capabilities and products.

Best coping with our prestigious customers' most challenging requirements technically, operationally and commercially is our promise fulfilled for decades.

Performing in Demanding Applications



Habonim USA 1 866 261 8400 | Habonim EU +34 640 384 759 | Habonim Singapore +65 8127 0221 | Habonim China +86 21 58056370
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