ACTUADORES PNEUMÁTICOS DE SIMPLES E DUPLO EFEITO
SINGLE RETURN AND DOUBLE ACTING PNEUMATIC ACTUATORS

DESCRIÇÃO DO PRODUTO

Actuador pneumático rotativo com sistema "cremalheira-pinhão" que transforma a energia do ar comprimido em energia mecânica de rotação limitada a um quarto de volta (90º) adequada para a automatização de qualquer tipo de válvula com rotação de 90º (esfera, borboleta, etc.) garantindo um elevado número de ciclos.

A instalação do actuador pneumático permite operar uma válvula sem a intervenção manual de um operador através de dispositivos de controlo colocados remotamente.

PRODUCT DESCRIPTION

Rotary pneumatic actuator with "rack-pinion" system that transforms the energy of the compressed air into mechanical energy of rotation limited to a quarter turn (90º), suitable for the automation of any type of valve with a 90º turn (ball, butterfly, etc) guaranteeing a high number of cycles.

The installation of the pneumatic actuator allows to operate a valve without manual intervention of an operator through control devices placed remotely.

DESIGNAÇÃO

- Simples efeito: ida por ar e retorno por molas (SE).
- Duplo efeito: ida e retorno por ar (DE).
- Número de série gravado em todos os corpos.

CARACTERÍSTICAS GERAIS

- Dupla furação inferior para a ancoragem e centragem da válvula de acordo com ISO 5211/DIN 3337.
- Ajuste externo do curso angular dos pistões (± 5˚) quer em abertura quer em fecho.
- Indicador de posição incorporado.
- Equipados de série com 12 molas (apenas simples efeito).
- Eixo não ejectável.
- Temperatura para a construção normalizada: -20 ˚C a 80 ˚C.
- Protecção contra intrusão IP67.
- Certificação ATEX segundo a Directiva 2014/34/UE.

Nota 1: Retirando ou acrescentando as molas necessárias, a sua concepção permite intercambiar a configuração de SE a DE ou vice-versa.

Nota 2: O actuador é fornecido para a rotação em sentido anti-horário.

CARACTERÍSTICAS OPCIONAIS

- Mudança do sentido de rotação.
- Controlo pneumático (montagem directa de electroválvulas tipo 5/2, 3/2 e biestáveis 5/2 e acessórios NAMUR VDI/VDE3845).
- Fins de curso electromecânicos SPDT e ATEX.
- Posicionadores pneumáticos, electro-pneumáticos e electro-pneumáticos digitais.
- Redutor manual destacável.
- Vários acessórios (silenciador, regulação de escape, placa adaptadora de controlo da velocidade).

APLICAÇÕES GERAIS

- Fornecimento de águas e sistemas de rega.
- Obras hidraúlicas e civis compatíveis.
- Processos diversos (alimentação, farmácia, indústrias diversas).
- Climatização.

Observações:
Dada a complexidade, variedade e grande quantidade de especificações particulares de cada instalação, em conjunção com a existência de diversos factores que podem afectar as condições de trabalho e natureza do produto, é da responsabilidade do utilizador final realizar os ensaios necessários para garantir o correcto funcionamento do produto em cada aplicação concreta.
A instalação do produto deverá ser realizada e mantida seguindo os códigos de boa práctica e/ou normas existentes.

DESIGNATION

- *Single Return: go by air and return by springs (SR).*
- *Double Acting: go and return by air (DA).*
- *Serial number engraved on all bodies.*

GENERAL CHARACTERISTICS

- *Double drilled hole for anchoring and centering the valve according to ISO 5211 / DIN 3337.*
- *External adjustment of the angular running of the pistons (± 5˚) both in opening and closing.*
- *Built-in position indicator.*
- *Standard equipped with 12 springs (single acting only).*
- *Non-ejectable shaft.*
- *Temperature for standard construction: -20 ˚C to 80 ˚C.*
- *Ingress protection IP67.*
- *ATEX approval according to Directive 2014/34/EU.*

Note 1: By eliminating or adding the necessary springs, its design allows to exchange the configuration from SR to DA and back.

Note 2: The actuator is supplied for counter-clockwise rotation (CCW).

OPTIONAL CHARACTERISTICS

- *Change of direction of rotation.*
- *Pneumatic control (direct mounting of NAMUR VDI/VDE3845 accessories and solenoid valves type 5/2, 3/2 and 5/2 bi stable).*
- *Electromechanical limit switches SPDT and ATEX.*
- *Pneumatic, electropneumatic and digital electropneumatic positioners.*
- *Detachable manual gearbox.*
- *Various accessories (muffler, exhaust regulation, speed control adapter plate).*

GENERAL APPLICATIONS

- *Water supply and irrigation.*
- *Compatible hydraulic and civil works.*
- *Various processes (food, pharmacy, various industry).*
- *Air conditioning.*

Remarks:
Due to the complexity, variety and large number of particular specifications for each installation, along with the existence of diverse factors which can affect the working conditions and nature of the product, it is the responsibility of the end-user to carry out the necessary tests to ensure the proper functioning of the product in any specific application.
Product installation must be carried out and maintained following the good practice codes and/or updated technical standards.

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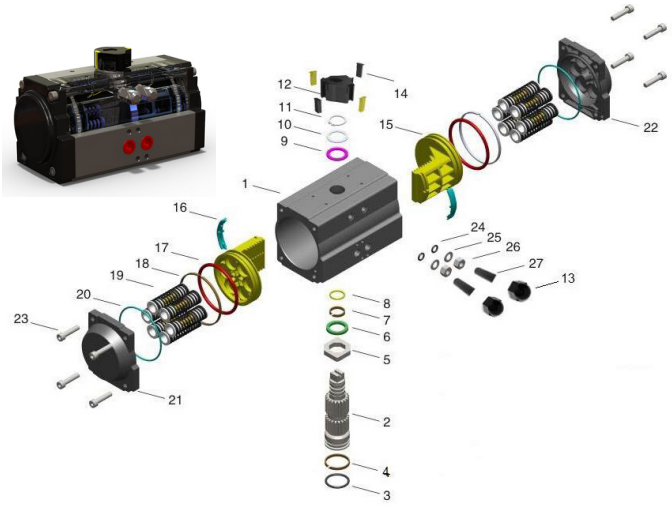
INSTALAÇÃO

- Para a utilização dos actuadores, adicionalmente às características de série dos mesmos, deverão ser tidos em consideração a natureza do fluido, as condições meio ambientais e as características das válvulas a serem operadas.
- Os fluidos a serem conduzidos deverão estar no estado líquido e isentos de materiais que lhes confiram comportamentos incrustantes e/ou agressivos, devendo também estar livres de contaminantes que possam modificar o atrito do sistema de abertura-fecho das válvulas por secagem ou qualquer outra causa.
- Adicionalmente, a velocidade do fluido deverá ser estável e deverá dispor-se de um protocolo que garanta um ciclo de operação (abertura-fecho mínimo) definido.
- Para qualquer outro tipo de fluido, seja líquido, gasoso ou pulveroso, deve ser realizada uma consulta prévia antes da encomenda.
- A geometria e características que definem os binários das válvulas deverão ser compatíveis com as propriedades normalizadas dos actuadores com que são operadas, devendo estas válvulas ser devidamente montadas com os elementos previstos e ligadas ao fluido de alimentação pneumático e/ou eléctrico unicamente por pessoal competente.
- A ATUSA não se responsabiliza pela actuação de válvulas não fornecidas pela empresa.

INSTALLATION

- *In order to use the actuators, in addition to their standard characteristics, the nature of the fluid, the environmental conditions and the characteristics of the valves to be operated must be taken into account.*
- *The fluids to be conducted must be liquids and free of materials that make them encrusting and / or aggressive, being also free of contaminants that can modify the friction of the valve opening-closing system due to drying out or any other cause.*
- *Additionally, the speed of the fluid must be stable and a protocol must be available that guarantees a defined operating cycle (minimum opening-closing).*
- *For any other type of fluid, whether liquid, gaseous or powdery, prior consultation must be made before ordering.*
- *The geometry and characteristics that define the torques of the valves must be compatible with the standard properties of the actuators which they are operated, and valves must be properly assembled with the elements planned and connected to the pneumatic and / or electrical supply fluid by competent personnel.*
- *ATUSA is not responsible for the actuation of valves not supplied by itself.*

CONSTRUÇÃO
CONSTRUCTION



Esquema do Actuador Simples Efeito e Duplo Efeito (sem molas)
Scheme Actuator Single Return and Double Acting (without springs)

DESCRIÇÃO DOS COMPONENTES - *COMPONENTS DESCRIPTION*

Ítem	Peças - *Parts*	Descrição - *Description*	Material - *Material*
1	1	Corpo - *Body*	Liga Alumínio extrudido - *Aluminium alloy*
2	1	Eixo/pinhão - *Shaft/pinion*	Aço Carbono+Ni - *Carbon steel+Ni*
3	1	Junta inferior pinhão - *O-ring pinion bottom*	NBR
4	1	Anilha anti-fricção - *Bearing*	Nylon 46
5	1	Came - *Cam*	Aço inox - *Stainless steel*
6	1	Anilha superior anti-fricção - *Bearing (Pinion Top)*	Nylon 46
7	1	Anilha anti-fricção saída eixo - *O-ring (Pinion Top)*	Nylon 46
8	1	Junta superior eixo - *O-ring (Pinion top)*	NBR
9	1	Anilha anti-fricção - *Bearing*	Nylon 46
10	1	Anilha superior - *Washer (Pinion top)*	Aço Inox - *Stainless steel*
11	1	Fixador Mola - *Spring clip*	Aço Inox - *Stainless steel*
12	1	Indicador de posição - *Position Indicator*	PP+30%GF
13	2	Porca cega do parafuso ajuste - *Acorn nut adj. bolt*	Nylon
14	4	Barra indicadora da posição - *Position indicator bar*	PP+30%GF
15	2	Pistão - *Piston*	Liga Alumínio - *Aluminium alloy*
16	2	Guia anti-fricção - *Guide*	Nylon 46
17	2	Junta do pistão - *O-ring piston*	NBR
18	2	Anilha anti-fricção pistão - *Bearing (piston)*	Composto de flúor-carbono - *Fluorine-carbon composite*
19	5-12	Molas pré-comprimidas - *Spring cartridge*	Aço - *Carbon Steel*
20	2	Junta de tampa - *End cap O-ring*	NBR
21	1	Tampa esquerda - *Left end cap*	Liga Alumínio - *Aluminium alloy*
22	1	Tampa direita - *Right end cap*	Liga Alumínio - *Aluminium alloy*
23	8	Parafuso da tampa - *End cap screw*	Aço inox - *Stainless steel*
24	2	Junta do parafuso ajuste - *Adjust screw O-ring*	NBR
25	2	Anilha do parafuso ajuste - *Adjust screw washer*	Aço inox - *Stainless steel*
26	2	Porca de fixação parafuso - *Adjust screw nut*	Aço inox - *Stainless steel*
27	2	Parafuso de ajuste - *Adjust screw*	Aço inox - *Stainless steel*

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COMPONENTES BÁSICOS

- Corpo: liga de alumínio extrudido com protecção anti-corrosiva em anodizado duro.
- Pistões: liga de alumínio injectado, anodizados e maquinados para prolongar a vida do actuador.
- Tampas de protecção externa: alumínio injectado com revestimento epóxi-poliéster.
- Guias: nylon (deslizantes com baixo coeficiente de atrito para evitar contacto metal-metal).
- Pinhão: aço ao carbono níquelado.
- Molas: aço revestido a resina epoxy.
- Juntas de estanquidade: NBR (VITON ou EPDM a pedido).
- Parafusos: aço inoxidável AISI 304.

CURVAS TÍPICAS DE ACTUAÇÃO

- Duplo efeito: para uma dada pressão de alimentação o actuador oferece um binário constante em todo o curso. Este binário deve ser superior ao binário da válvula[1] a ser operada.
- Simples efeito: para uma dada pressão de alimentação o actuador oferece quatro binários extremos diferentes. Desde a posição de alimentação por defeito (NC - Normalmente Fechado), quando pressurizado realiza a rotação anti-horaria (0° a 90°) oferecendo o ar dois binários limite, um por cada fim de curso. Quando se elimina/descarrega a pressão de ar a mola gera a rotação horária (90° a 0°) devolvendo a sua energia acumulada e oferecendo respectivamente dois binários. Estes binários[2] devem ser superiores nos dois cursos às curvas de binário da válvula[1] que se deseja operar.

[1] É requerido conhecer o binário máximo da válvula, o qual deve ser adicionalmente multiplicado por um factor de segurança (25-30%). Este factor de segurança pode ser maior dependendo das condições do fluido e da instalación.

[2] Em simples efeito, deve ser prestada especial atenção ao binário de fecho da mola (o binário a 0°).

BASIC COMPONENTS

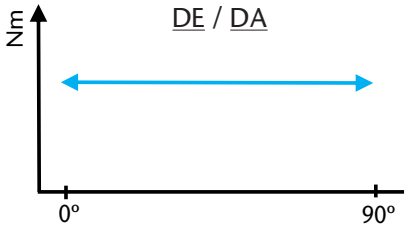
- *Body: extruded aluminum alloy with hard anodizing corrosion protection.*
- *Pistons: Injected aluminum alloy, anodized and machined to prolong the life of the actuator.*
- *External protection caps: injected aluminum with epoxy-polyester coating.*
- *Guides: nylon (sliding with low friction coefficient to avoid metal-metal contact).*
- *Pinion: nickel plated carbon steel.*
- *Springs: epoxy resin coated steel.*
- *Seals: NBR (VITON or EPDM on request).*
- *Screws: AISI 304 stainless steel.*

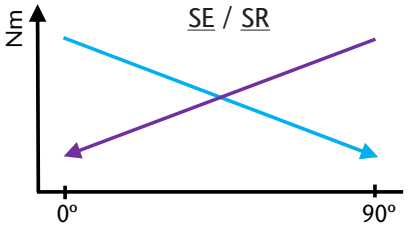
TYPICAL ACTUATION CURVES

- *Double acting: for a given supply pressure the actuator offers a constant torque over the entire stroke. This torque must be higher than the torque of the valve[1] to be operated.*
- *Single acting: for a given supply pressure the actuator offers four different extreme torques. From the default supply position (NC-Normally Closed), when pressurized, the actuator makes counter-clockwise (0° to 90°), offering the air two limit torques, one at each limit stroke. When the air pressure is eliminated/ discharged, the spring makes a clockwise turn (90° to 0°), returning its accumulated energy, and therefore offering two pairs. These torques[2] must be greater in both strokes than the torque curves of the valve[1] to be operated.*

[1] *It is required to know the maximum torque of the valve which must be additionally increased by a safety factor of 25-30%. This safety factor may be higher depending on the fluid and installation conditions.*

[2] *In simple effect, special attention must be taken to the closing torque of the spring (the torque at 0 °).*





BINÁRIOS CARACTERÍSTICOS PARA APLICAÇÕES NORMALIZADAS

- Alimentação com ar comprimido filtrado, seco ou lubrificado. Pressão mínima de 2 bar (DE) / 3 bar (SE) e máxima de 8 bar (SE e DE). Os binários indicados são para aplicações normalizadas.

CHARACTERISTIC TORQUES FOR STANDARD APPLICATIONS

- *Supply with filtered, dry or lubricated compressed air. Minimum pressure of 2 bar for DA / 3 bar for SE and maximum of 8 bar for SR and DA. Torques offered are for standard applications*

BINÁRIOS DE ACTUADORES DUPLO EFEITO / *DOUBLE ACTING TORQUE RATINGS*

BINÁRIOS FORNECIDOS (Nm) - *SUPPLIED TORQUES (Nm)*

Modelo - *Model*	Pressão do ar de alimentação - *Air pressure supply*						
	2 bar	3 bar	4 bar	5 bar	6 bar	7 bar	8 bar
ACDE0052	8,5	12,7	17,0	21,2	25,5	29,7	34,0
ACDE0063	15,0	22,5	30,0	37,5	44,9	52,4	59,9
ACDE0075	24,7	37,1	49,5	61,9	74,2	86,6	99,0
ACDE0083	32,5	48,7	65,0	81,2	97,4	113,7	130,0
ACDE0092	46,5	69,8	93,0	116,3	140,0	162,9	186,0
ACDE0105	69,3	104,0	138,5	173,2	207,8	242,5	277,0
ACDE0125	122,7	184,0	245,5	306,8	368,0	429,5	490,8
ACDE0140	184,7	277,0	369,5	461,8	554,0	646,5	739,0
ACDE0160	281,5	422,0	563,0	704,0	844,0	985,0	1 126,0
ACDE0190	453,0	680,0	907,0	1 134,0	1 361,0	1 587,0	1 814,0
ACDE0210	623,0	935,0	1 246,0	1 558,0	1 870,0	2 182,0	2 493,0
ACDE0240	977,0	1 465,0	1 954,0	2 443,0	2 931,0	3 420,0	3 908,0
ACDE0270	1 374,0	2 061,0	2 748,0	3 435,0	4 122,0	4 809,0	5 496,0
ACDE0300	1 696,0	2 544,0	3 392,0	4 241,0	5 089,0	5 937,0	6 785,0

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BINÁRIOS DE ACTUADORES SIMPLES EFEITO / *SINGLE RETURN TORQUE RATINGS*

BINÁRIOS FORNECIDOS (Nm) - *SUPPLIED TORQUES (Nm)*

Modelo *Model*	Molas *Springs*	Binário das molas *Spring torques*		Pressão do ar de alimentação - *Air Pressure supply*											
				3 bar		4 bar		5 bar		6 bar		7 bar		8 bar	
		Início *Begin*	Fim *End*	Início *Begin*	Fim *End*	Início *Begin*	Fim *End*	Início *Begin*	Fim *End*	Início *Begin*	Fim *End*	Início *Begin*	Fim *End*	Início *Begin*	Fim *End*
		90°	0°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°	0°	90°
ACSE0052	5	5,4	4,0	8,8	7,3	13,0	11,6								
	6	6,5	4,7	8,0	6,3	12,3	10,5	16,5	14,8						
	7	7,6	5,5	7,2	5,2	11,5	9,4	15,7	13,7	20,0	17,9				
	8	8,6	6,3	6,4	4,1	10,7	8,4	14,9	12,6	19,2	16,8	23,4	21,1		
	9	9,7	7,1			9,9	7,3	14,1	11,5	18,4	15,8	22,6	20,0	26,9	24,3
	10	10,8	7,9			9,1	6,2	13,3	10,4	17,6	14,7	21,8	18,9	26,1	23,2
	11	11,9	8,7					12,6	9,4	16,8	13,6	21,0	17,9	25,3	22,1
	12	13,0	9,5					11,8	8,3	16,0	12,5	20,3	16,8	24,5	21,0
ACSE0063	5	9,9	6,8	15,7	12,5	23,2	20,0								
	6	11,9	8,1	14,3	10,5	21,8	18,0	29,3	25,5						
	7	13,9	9,5	13,0	8,5	20,4	16,0	27,9	23,5	35,4	31,0				
	8	15,9	10,9	11,6	6,5	19,1	14,0	26,6	21,5	34,0	29,0	41,5	36,5		
	9	17,9	12,2			17,7	12,0	25,2	19,5	32,7	27,0	40,2	34,5	47,7	42,0
	10	19,9	13,6			16,4	10,0	23,9	17,5	31,3	25,0	38,8	32,5	46,3	40,0
	11	21,9	14,9					22,5	15,5	30,0	23,0	37,5	30,5	44,9	38,0
	12	23,9	16,3					21,1	13,6	28,6	21,0	36,1	28,5	43,6	36,0
ACSE0075	5	15,5	10,2	27,0	21,6	39,3	34,0								
	6	18,6	12,2	24,9	18,6	37,3	30,9	49,7	43,3						
	7	21,7	14,2	22,9	15,5	35,3	27,8	47,6	40,2	60,0	52,6				
	8	24,8	16,2	20,9	12,4	33,2	24,7	45,6	37,1	58,0	49,5	70,4	61,8		
	9	27,9	18,3			31,2	21,6	43,6	34,0	56,0	46,4	68,3	58,7	80,7	71,1
	10	30,9	20,3			29,2	18,5	41,6	30,9	53,9	43,3	66,3	55,7	78,7	68,0
	11	34,0	22,3					39,5	27,8	51,9	40,2	64,3	52,6	76,6	64,9
	12	37,1	24,4					37,5	24,7	49,9	37,1	62,2	49,5	74,6	61,8
ACSE0083	5	21,5	14,9	33,9	27,2	50,1	43,4								
	6	25,8	17,8	30,9	22,9	47,1	39,1	63,3	55,3						
	7	30,1	20,8	27,9	18,6	44,1	34,8	60,4	51,0	76,6	67,3				
	8	34,4	23,8	24,9	14,3	41,2	30,5	57,4	46,7	73,6	63,0	89,9	79,2		
	9	38,8	26,7			38,2	26,2	54,4	42,4	70,7	58,7	86,9	74,9	103,1	91,1
	10	43,1	29,7			35,2	21,9	51,5	38,1	67,7	54,3	83,9	70,6	100,2	86,8
	11	47,4	32,7					48,5	33,8	64,7	50,0	81,0	66,3	97,2	82,5
	12	51,7	35,6					45,5	29,5	61,8	45,7	78,0	62,0	94,2	78,2
ACSE0092	5	30,3	21,8	48,0	39,5	71,3	62,8								
	6	36,3	26,2	43,7	33,5	66,9	56,7	90,2	80,0						
	7	42,4	30,5	39,3	27,4	62,6	50,7	85,8	74,0	109,1	97,2				
	8	48,4	34,9	34,9	21,4	58,2	44,6	81,5	67,9	104,7	91,2	128,0	114,4		
	9	54,5	39,2			53,9	38,6	77,1	61,8	100,4	85,1	123,7	108,4	146,9	131,6
	10	60,6	43,6			49,5	32,5	72,8	55,8	96,0	79,1	119,3	102,3	142,6	125,6
	11	66,6	47,9					68,4	49,7	91,7	73,0	114,9	96,3	138,2	119,5
	12	72,7	52,3					64,0	43,7	87,3	66,9	110,6	90,2	133,8	113,5
ACSE0105	5	46,1	39,3	64,6	57,8	99,2	92,4								
	6	55,3	47,2	56,8	48,6	91,4	83,2	126,0	117,9						
	7	64,5	55,0	48,9	39,4	83,5	74,0	118,2	108,6	152,8	143,3				
	8	73,8	62,9	41,0	30,2	75,7	64,8	110,3	99,4	144,9	134,1	179,6	168,7		
	9	83,0	70,7			67,8	55,6	102,4	90,2	137,1	124,8	171,7	159,5	206,4	194,1
	10	92,2	78,6			59,9	46,3	94,6	81,0	129,2	115,6	163,9	150,3	198,5	184,9
	11	101,4	86,5					86,7	71,8	121,4	106,4	156,0	141,0	190,6	175,7
	12	110,6	94,3					78,9	62,5	113,5	97,2	148,1	131,8	182,8	166,5
ACSE0125	5	80,0	53,0	131,0	104,0	192,0	166,0								
	6	96,0	64,0	120,0	88,0	182,0	150,0	243,0	211,0						
	7	112,0	74,0	110,0	72,0	171,0	134,0	233,0	195,0	294,0	257,0				
	8	128,0	85,0	99,0	56,0	161,0	118,0	222,0	179,0	283,0	241,0	345,0	302,0		
	9	144,0	95,0			150,0	102,0	211,0	163,0	273,0	225,0	334,0	286,0	395,0	347,0
	10	160,0	106,0			139,0	86,0	201,0	147,0	262,0	209,0	324,0	270,0	385,0	331,0
	11	175,0	117,0					190,0	131,0	252,0	193,0	313,0	254,0	374,0	315,0
	12	191,0	127,0					180,0	115,0	241,0	177,0	302,0	238,0	364,0	299,0
ACSE0140	5	139,0	93,0	184,0	138,0	277,0	230,0								
	6	167,0	111,0	166,0	110,0	258,0	203,0	351,0	295,0						
	7	195,0	130,0	147,0	82,0	240,0	175,0	332,0	267,0	424,0	360,0				
	8	222,0	148,0	129,0	55,0	221,0	147,0	313,0	239,0	406,0	332,0	498,0	424,0		
	9	250,0	167,0			203,0	119,0	295,0	212,0	387,0	304,0	480,0	396,0	572,0	489,0
	10	278,0	185,0			184,0	91,0	276,0	184,0	369,0	276,0	461,0	368,0	554,0	461,0
	11	306,0	204,0					258,0	156,0	350,0	248,0	443,0	341,0	535,0	433,0
	12	334,0	222,0					239,0	128,0	332,0	220,0	424,0	313,0	516,0	405,0
ACSE0160	5	211,0	143,0	279,0	211,0	420,0	352,0								
	6	253,0	172,0	251,0	169,0	391,0	310,0	532,0	450,0						
	7	295,0	200,0	222,0	127,0	363,0	268,0	504,0	408,0	644,0	549,0				
	8	338,0	229,0	193,0	85,0	334,0	225,0	475,0	366,0	616,0	507,0	756,0	648,0		
	9	380,0	257,0			306,0	183,0	446,0	324,0	587,0	465,0	728,0	605,0	869,0	746,0
	10	422,0	286,0			277,0	141,0	418,0	282,0	559,0	422,0	699,0	563,0	840,0	704,0
	11	464,0	315,0					389,0	239,0	530,0	380,0	671,0	521,0	811,0	662,0
	12	507,0	343,0					361,0	197,0	501,0	338,0	642,0	479,0	783,0	619,0
ACSE0190	5	349,0	232,0	448,0	332,0	675,0	559,0								
	6	418,0	278,0	402,0	262,0	629,0	489,0	856,0	716,0						
	7	488,0	325,0	356,0	192,0	582,0	419,0	809,0	646,0	1 036,0	873,0				
	8	558,0	371,0	309,0	123,0	536,0	350,0	763,0	576,0	990,0	803,0	1 217,0	1 030,0		
	9	627,0	418,0			490,0	280,0	717,0	507,0	943,0	733,0	1 170,0	960,0	1 397,0	1 187,0
	10	697,0	464,0			443,0	210,0	670,0	437,0	897,0	664,0	1 124,0	891,0	1 351,0	1 117,0
	11	767,0	510,0					624,0	367,0	851,0	594,0	1 077,0	821,0	1 304,0	1 048,0
	12	837,0	557,0					577,0	297,0	804,0	524,0	1 031,0	751,0	1 258,0	978,0
ACSE0210	5	467,0	297,0	638,0	468,0	950,0	780,0								
	6	560,0	356,0	579,0	375,0	891,0	687,0	1 202,0	998,0						
	7	654,0	416,0	519,0	282,0	831,0	593,0	1 143,0	905,0	1 455,0	1 217,0				
	8	747,0	475,0	460,0	188,0	772,0	500,0	1 083,0	812,0	1 395,0	1 123,0	1 707,0	1 435,0		
	9	840,0	535,0			712,0	407,0	1 024,0	718,0	1 336,0	1 030,0	1 647,0	1 342,0	1 959,0	1 653,0
	10	934,0	594,0			653,0	313,0	965,0	625,0	1 276,0	937,0	1 588,0	1 248,0	1 900,0	1 560,0
	11	1 027,0	653,0					905,0	532,0	1 217,0	843,0	1 529,0	1 155,0	1 840,0	1 467,0
	12	1 121,0	713,0					846,0	438,0	1 158,0	750,0	1 469,0	1 062,0	1 781,0	1 373,0
ACSE0240	5	797,0	448,0	1 018,0	668,0	1 506,0	1 157,0								
	6	957,0	538,0	928,0	509,0	1 417,0	998,0	1 905,0	1 486,0						
	7	1 116,0	627,0	839,0	350,0	1 327,0	838,0	1 816,0	1 327,0	2 304,0	1 815,0				
	8	1 276,0	717,0	749,0	190,0	1 238,0	679,0	1 726,0	1 167,0	2 215,0	1 656,0	2 703,0	2 144,0		
	9	1 435,0	806,0			1 148,0	519,0	1 637,0	1 008,0	2 125,0	1 496,0	2 614,0	1 985,0	3 102,0	2 473,0
	10	1 595,0	896,0			1 058,0	360,0	1 547,0	848,0	2 036,0	1 337,0	2 524,0	1 825,0	3 013,0	2 314,0
	11	1 754,0	985,0					1 457,0	689,0	1 946,0	1 177,0	2 435,0	1 666,0	2 923,0	2 155,0
	12	1 914,0	1 075,0					1 368,0	529,0	1 856,0	1 018,0	2 345,0	1 507,0	2 834,0	1 995,0
ACSE0270	5	1 037,0	540,0	1 522,0	1 024,0	2 209,0	1 711,0								
	6	1 245,0	648,0	1 414,0	816,0	2 101,0	1 503,0	2 788,0	2 190,0						
	7	1 452,0	756,0	1 306,0	609,0	1 993,0	1 296,0	2 680,0	1 983,0	3 367,0	2 670,0				
	8	1 660,0	864,0	1 198,0	401,0	1 885,0	1 088,0	2 572,0	1 775,0	3 259,0	2 463,0	3 946,0	3 150,0		
	9	1 867,0	971,0			1 777,0	881,0	2 464,0	1 568,0	3 151,0	2 255,0	3 838,0	2 942,0	4 525,0	3 629,0
	10	2 075,0	1 079,0			1 669,0	673,0	2 356,0	1 361,0	3 043,0	2 048,0	3 730,0	2 735,0	4 417,0	3 422,0
	11	2 282,0	1 187,0					2 248,0	1 153,0	2 935,0	1 840,0	3 622,0	2 527,0	4 309,0	3 214,0
	12	2 490,0	1 295,0					2 140,0	946,0	2 827,0	1 633,0	3 514,0	2 320,0	4 201,0	3 007,0
ACSE0300	5	1 329,0	821,0	1 724,0	1 216,0	2 572,0	2 064,0								
	6	1 594,0	985,0	1 560,0	950,0	2 408,0	1 798,0	3 256,0	2 647,0						
	7	1 860,0	1 149,0	1 396,0	685,0	2 244,0	1 533,0	3 092,0	2 381,0	3 940,0	3 229,0				
	8	2 126,0	1 313,0	1 231,0	419,0	2 080,0	1 267,0	2 928,0	2 115,0	3 776,0	2 963,0	4 624,0	3 812,0		
	9	2 392,0	1 477,0			1 915,0	1 001,0	2 764,0	1 849,0	3 612,0	2 698,0	4 460,0	3 546,0	5 308,0	4 394,0
	10	2 657,0	1 642,0			1 751,0	736,0	2 600,0	1 584,0	3 448,0	2 432,0	4 296,0	3 280,0	5 144,0	4 128,0
	11	2 923,0	1 806,0					2 435,0	1 318,0	3 284,0	2 166,0	4 132,0	3 014,0	4 980,0	3 863,0
	12	3 189,0	1 970,0					2 271,0	1 052,0	3 119,0	1 901,0	3 968,0	2 749,0	4 816,0	3 597,0

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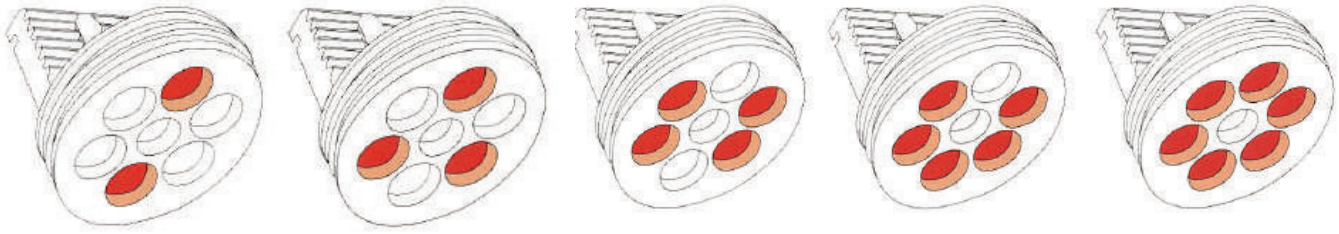
CONFIGURAÇÃO DAS MOLAS / *SPRING CONFIGURATION*

A correcta colocação das molas (incluindo número impar), deve ser como a seguir indicado:
The correct placement of the springs (even odd number), is as follows:



ESQUEMA DE FUNCIONAMENTO

Posição de alimentação normalizada: NC (Normalmente Fechado).

Rotação normalizada para abrir (passar de 0° a 90°):
- quer em SE como em DE: rotação no sentido anti-horário, o binário é exercido pelo ar comprimido.

Rotação normalizada para fechar (passar de 90° a 0°):
- em DE: rotação no sentido horário, o binário é exercido pelo ar.
- em SE: rotação no sentido horário, o binário é exercido pelas molas.

OPERATING SCHEME

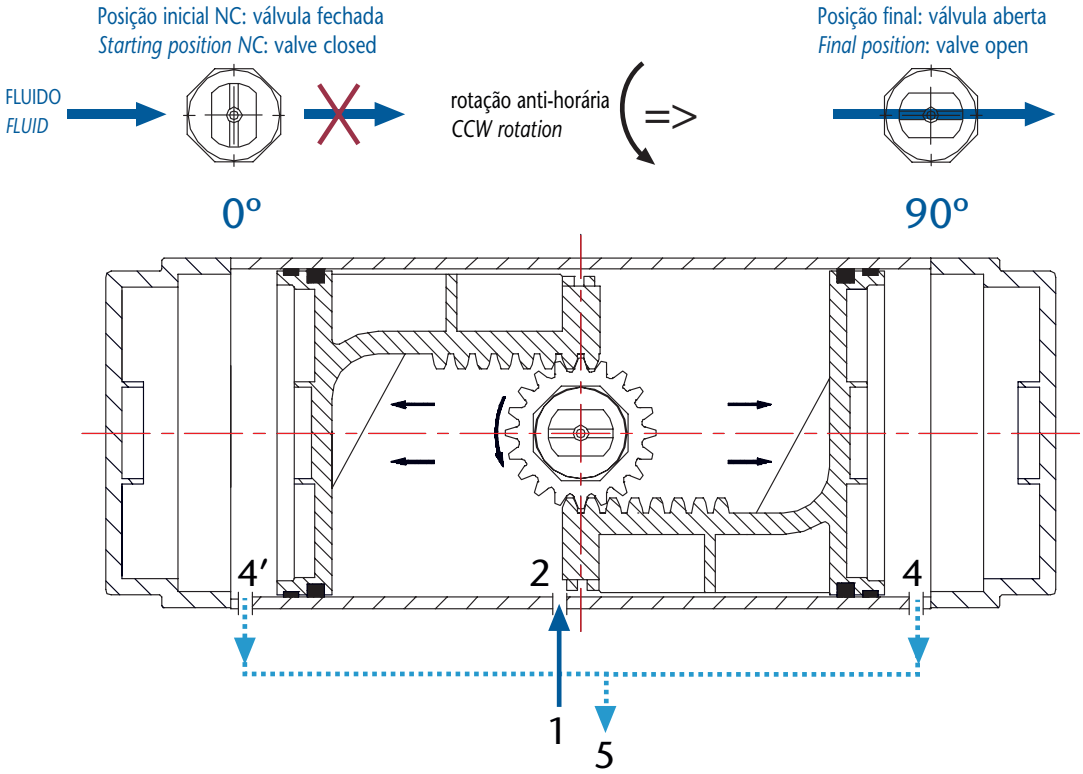
Standard supply position: NC (Normally Closed).

Standard rotation to open (from 0 ° to 90 °):
- *both, SR and DA: counter clockwise rotation (CCW), the torque is exerted by the air.*

Standard rotation to close (from 90 ° to 0 °):
- *DA: clockwise rotation (CW), the torque is exerted by the air.*
- *SE: clockwise rotation (CW), the torque is exerted by the springs.*

Duplo efeito, operação de abertura
Double acting, opening operation

DUPLO EFEITO (DE): ABRIR
DOUBLE ACTING (DA): OPEN



O ar pressurizado entra pela porta 2 na câmara central (via 1 da electroválvula 5/2) deslocando os pistões no sentido anti-horário (CCW) até às câmaras laterais, as quais são comprimidas fazendo o ar sair para o exterior através das portas laterais 4' e 4 ligadas entre si (via 5 da electroválvula 5/2). A câmara central fica pressurizada e o pinhão do actuador gira 90º (de 0º a 90º). O eixo da válvula montado com o actuador gira simultaneamente e esta é aberta.

The pressurized air enters through port 2 in the central chamber (via 1 of solenoid valve 5/2) moving the pistons in counter clockwise (CCW) direction towards the lateral chambers which are compressed and their air goes out through the side ports 4 'and 4 connected to each other (via 5 of solenoid valve 5/2). The central chamber is pressurized and the actuator pinion rotates 90º (from 0º to 90º). The valve shaft assembled to the actuator rotates simultaneously and the valve is opened.

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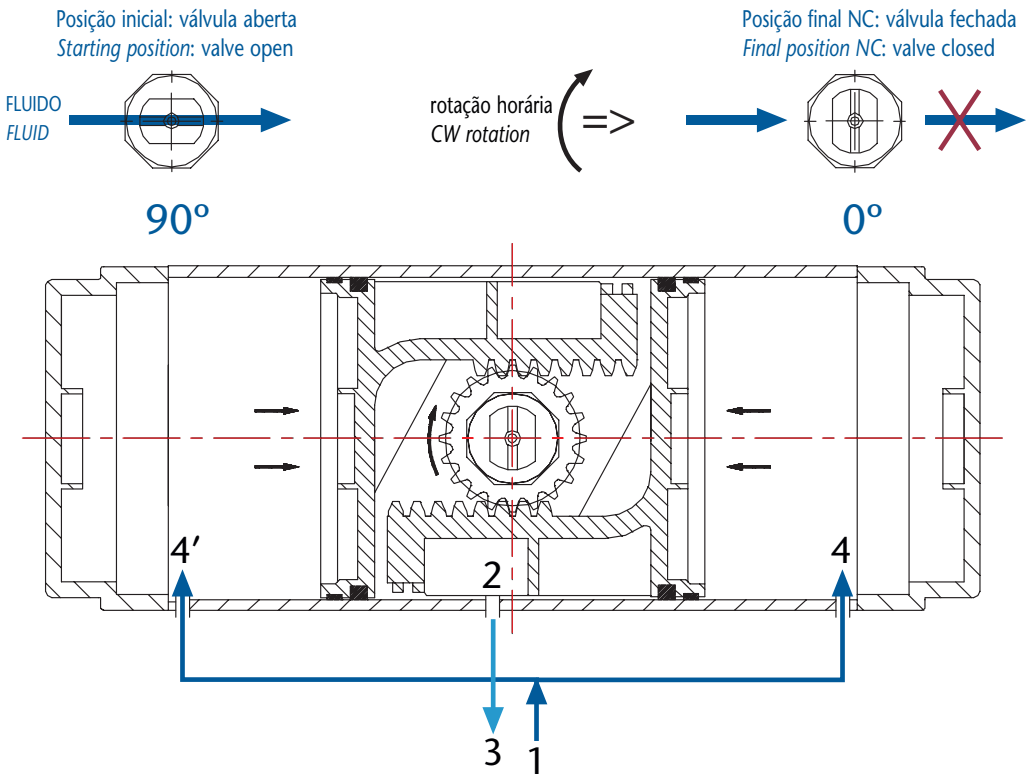
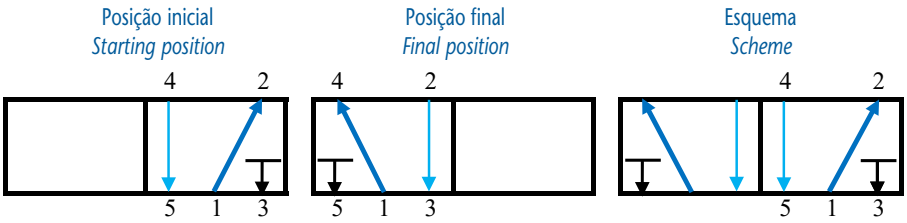
Duplo efeito, operação de fecho
Double acting, closing operation

DUPLO EFEITO (DE): FECHAR
DOUBLE ACTING (DA): CLOSE



O ar pressurizado entra pelas portas 4' e 4 (via 1 da electroválvula 5/2) ligadas entre si até às câmaras laterais deslocando os pistões no sentido horário (CW) até à câmara central, a qual se despressuriza expulsando o seu ar pela porta 2 (via 3 da electroválvula 5/2) e fazendo girar o pinhão do actuador 90º (de 90º a 0º). O eixo da válvula montada com o actuador gira simultaneamente e esta volta à sua posição inicial fechando-se.

The pressurized air enters through ports 4 'and 4 (via 1 of solenoid valve 5/2) connected to each other towards the side chambers moving the pistons in clockwise (CW) direction towards the central chamber which is depressurized by expelling its air through port 2 (via 3 of the 5/2 solenoid valve) and turning the actuator pinion 90º (from 90º to 0º). The valve shaft assembled to the actuator rotates simultaneously and it returns to its initial position by closing.



Nota : Em caso de falha ou corte voluntário do ar, o atuador-válvula fica permanentemente na posição em que se encontra naquele momento.
Note : In case of failure or voluntary air cut, the actuator-valve remains permanently in the position in which it is at that moment.

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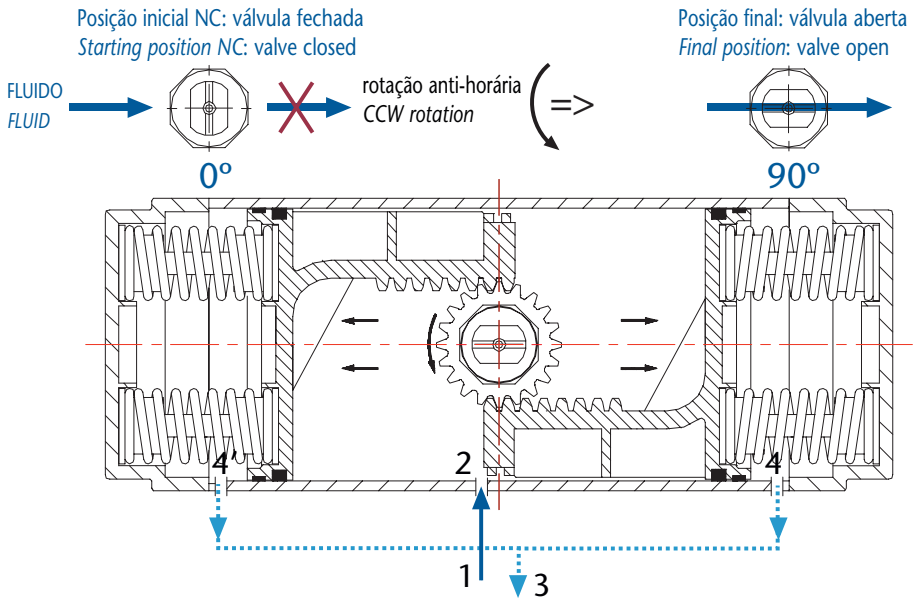
Simples efeito, operação de abertura
Single acting, opening operation

SIMPLE EFECTO (SE): ABRIR
SINGLE RETURN (SR): OPEN

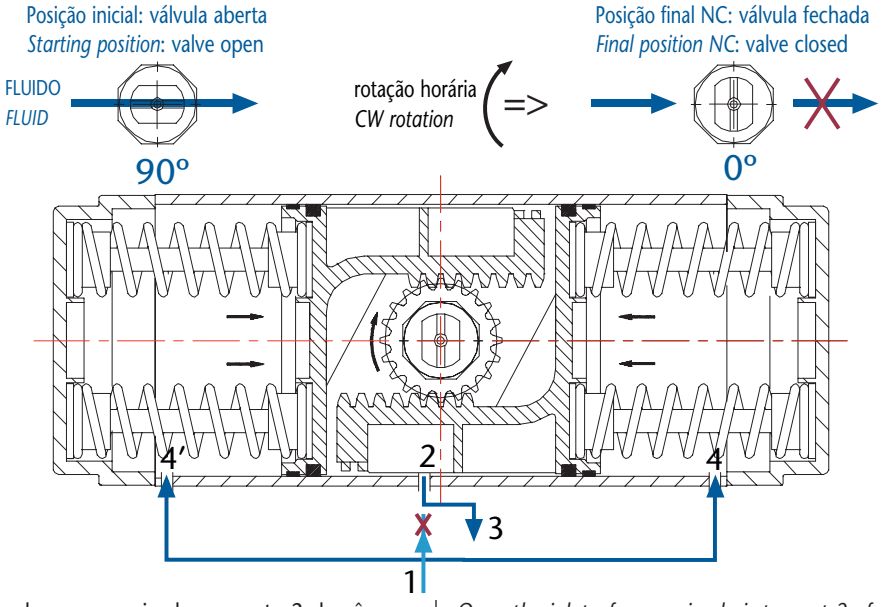


O ar pressurizado entra pela porta 2 na câmara central (via 1 da electroválvula 3/2) deslocando os pistões em sentido anti-horário (CCW) até às câmaras laterais e comprimindo assim as molas. A câmara central fica pressurizada e o ar das câmaras laterais sai para o exterior através das portas laterais 4' e 4 ligadas entre si (via 3 da electroválvula 3/2) girando o pinhão do actuador 90º (de 0º a 90º). O eixo da válvula montada com o actuador gira simultaneamente e esta é aberta. Se o actuador é alimentado permanentemente de ar comprimido este permanece em repouso nessa posição e a válvula fica permanentemente aberta.

The pressurized air enters through port 2 in the central chamber (via 1 of solenoid valve 3/2) moving the pistons in counter clockwise direction (CCW) towards the side chambers and thus compressing the springs. The central chamber is pressurized and the air from the side chambers goes out through the lateral ports 4 'and 4 connected to each other (via 3 of solenoid valve 3/2) turning the pinion of the actuator 90º (from 0º to 90º). The valve shaft assembled to the actuator rotates simultaneously and the valve open. If the actuator is permanently supplied with pressurized air, it remains at rest in that position and the valve is permanently open.

Simples efeito, operação de fecho
Single acting, closing operation

SIMPLES EFEITO (SE): FECHAR
SINGLE RETURN (SR): CLOSE



Assim que se anula a entrada de ar pressurizado na porta 2 da câmara central (via 1 da electroválvula 3/2) esta descomprime expulsando o ar e provocando um efeito de sucção nas câmaras laterais e descomprimindo as molas cujo alongamento origina que os pistões se movam no sentido horário (CW) obrigando a que o pinhão do actuador gire 90º (de 90º a 0º). O eixo da válvula montada com o actuador gira simultaneamente e esta volta à sua posição inicial (definida como de segurança) fechando-se.

Once the inlet of pressurized air to port 2 of the central chamber (via 1 of solenoid valve 3/2) is cancelled, it is decompressed, expelling the air and causing a suction effect in the side chambers and decompressing the springs whose elongation causes the pistons to move in the clockwise (CW) direction making the actuator pinion rotate 90º (from 90º to 0º). The valve shaft assembled to the actuator rotates simultaneously and it returns to its initial closed position (defined as safety).

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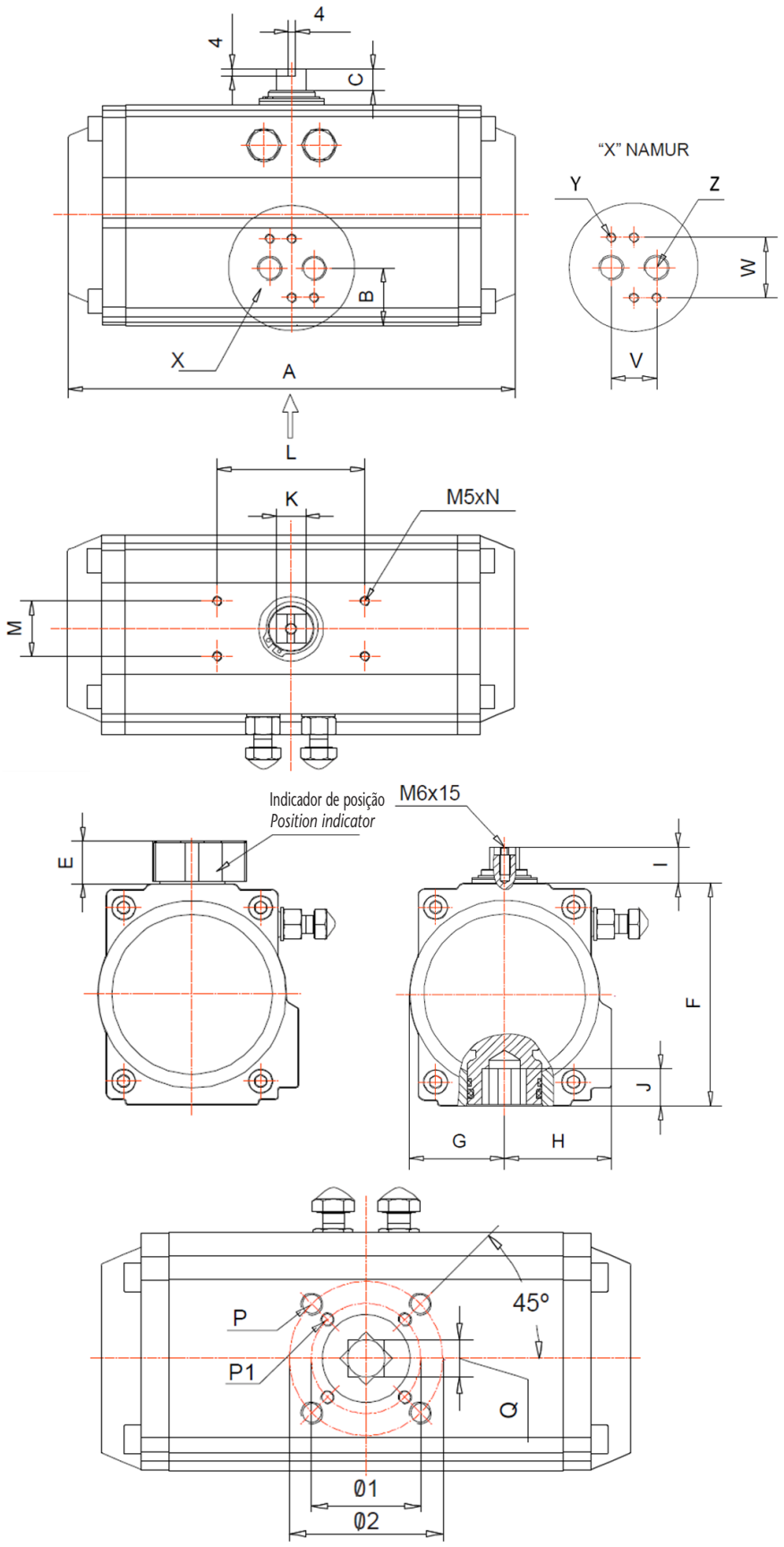
DIMENSÕES DOS ACTUADORES / *ACTUATOR DIMENSIONS*



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DIMENSÕES DOS ACTUADORES - SIMPLES e DUPLO EFEITO (mm)
ACTUATORS DIMENSIONS - SINGLE RETURN and DOUBLE ACTING (mm)

Modelo	ACSE0052	ACSE0063	ACSE0075	ACSE0083	ACSE0092	ACSE0105	ACSE125	ACSE0140	ACSE0160	ACSE0190	ACSE0210	ACSE0240	ACSE0270	ACSE0300
Model	ACDE0052	ACDE0063	ACDE0075	ACDE0083	ACDE0092	ACDE0105	ACDE125	ACDE0140	ACDE0160	ACDE0190	ACDE0210	ACDE0240	ACDE0270	ACDE0300
ISO 5211	F03-F05	F05-F07	F05-F07	F05-F07	F05-F07	F07-F10	F07-F10	F10-F12	F10-F12	F14	F14	F16	F16	F16
A	145,0	169,0	201,0	209,0	242,0	275,0	332,0	385,0	450,0	507,0	562,0	646,0	722,0	825,0
B	24,0	25,5	27,0	30,5	31,0	32,5	33,0	39,5	43,5	58,5	64,0	72,0	74,0	85,0
C	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	12,0	20,0	20,0	20,0	20,0	20,0
D	40,0	40,0	40,0	40,0	40,0	40,0	55,0	55,0	55,0	80,0	80,0	80,0	80,0	80,0
E	22,0	22,0	22,0	22,0	22,0	22,0	22,0	22,0	22,0	33,0	33,0	33,0	33,0	33,0
F	72,0	88,0	100,0	108,0	120,0	133,0	155,0	171,5	197,0	230,0	255,0	290,0	320,0	354,0
G	30,0	36,0	42,0	46,0	51,0	58,0	67,5	76,0	86,5	103,0	113,0	129,0	146,0	162,0
H	41,0	46,0	52,0	55,0	57,5	64,0	70,0	77,0	87,5	103,0	113,0	129,0	146,0	173,0
I	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	20,0	30,0	30,0	30,0	30,0	30,0
Jmin	13,0	16,0	20,0	20,0	20,0	25,0	25,0	30,0	30,0	40,0	40,0	50,0	50,0	50,0
K	12,0	12,0	12,0	16,0	16,0	16,0	22,0	22,0	22,0	32,0	32,0	32,0	32,0	32,0
L	80,0	80,0	80,0	80,0	80,0	80,0	80,0	80,0	80,0	130,0	130,0	130,0	130,0	130,0
M	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0	30,0
N	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0
ø1	36,0	50,0	50,0	50,0	50,0	70,0	70,0	102,0	102,0	----	----	----	----	----
ø2	50,0	70,0	70,0	70,0	70,0	102,0	102,0	125,0	125,0	140,0	140,0	165,0	165,0	165,0
P1	4-M5	4-M6	4-M6	4-M6	4-M6	4-M8	4-M8	4-M10	4-M10	----	----	----	----	----
P	4-M6	4-M8	4-M8	4-M8	4-M8	4-M10	4-M10	4-M12	4-M12	4-M16	4-M16	4-M20	4-M20	4-M20
Q	11,0	14,0	17,0	17,0	17,0	22,0	22,0	27,0	27,0	36,0	36,0	46,0	46,0	46,0
V	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	24,0	40,0	40,0	40,0
W	32,0	32,0	32,0	32,0	32,0	32,0	32,0	32,0	32,0	32,0	32,0	45,0	45,0	45,0
Y	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M5x8	M6x10	M6x10	M6x10
Z	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	3/8"	3/8"	1/2"

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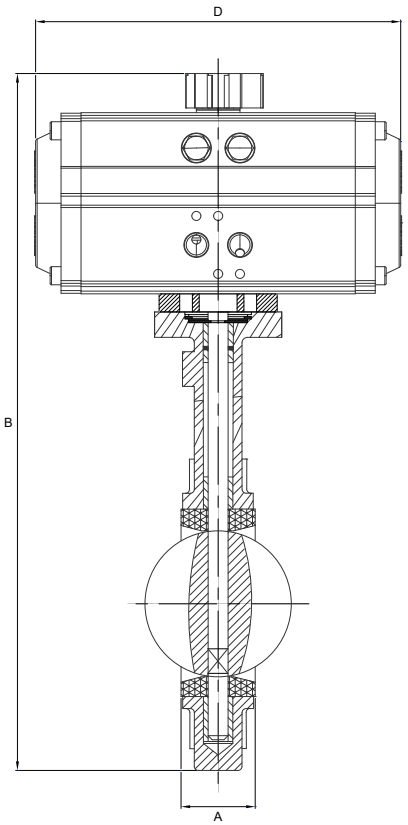
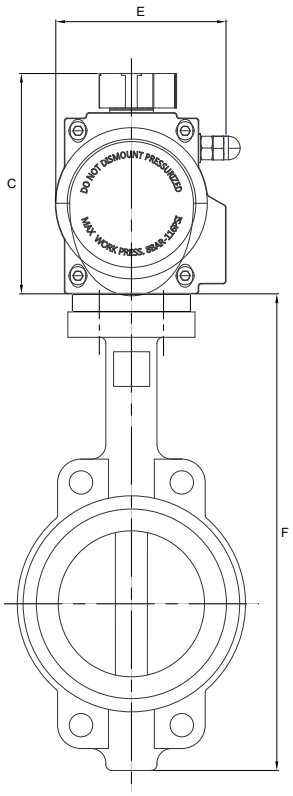
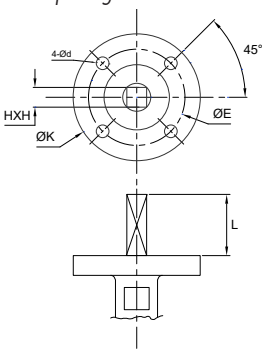
DIMENSÕES DAS VÁLVULAS TIPO WAFER ACTUADAS / *ACTUATED WAFER VALVES DIMENSIONS*





Flange superior ISO 5211
Top flange ISO 5211



L - altura livre do eixo
L - shaft clear height

DIMENSÕES DAS VÁLVULAS TIPO WAFER ACTUADAS - *DIMENSIONS OF ACTUATED WAFER VALVES*

DN	DIMENSÕES - *DIMENSIONS* (mm)													FLANGE / *FLANGE* - ISO 5211			
	A	$B_{SE/SR}$	$B_{DE/DA}$	$C_{SE/SR}$	$C_{DE/DA}$	$D_{SE/SR}$	$D_{DE/DA}$	$E_{DE/DA}$	$E_{SE/SR}$	$F_{SE/SR}$	$F_{DE/DA}$	L	H x H	Tipo de flange *Flange Type*	4 - Ød	ØK	ØE
32	33	302	302	92	92	145	145	71	71	210	210	24	9 x 9	F05	4 - 7	70	50
40	33	327	327	92	92	145	145	71	71	235	235	24	9 x 9	F05	4 - 7	70	50
50	43	354	338	108	92	169	145	82	71	246	246	29	9 x 9	F05	4 - 7	70	50
65	46	394	366	120	92	201	145	94	71	274	274	29	9 x 9	F05	4 - 7	70	50
80	46	414	394	128	108	209	169	101	82	286	286	26	11 x 11	F05	4 - 7	70	50
100	52	464	444	140	120	242	201	109	94	324	324	26	11 x 11	F05	4 - 7	70	50
125	56	503	483	153	128	275	209	122	101	350	355	28	14 x 14	F07	4 - 9	90	70
150	56	550	520	175	140	332	242	138	109	375	380	32	14 x 14	F07	4 - 9	90	70
200	60	637	603	192	153	385	275	153	122	445	450	29	17 x 17	F07	4 - 9	90	70
250	68	723	681	217	175	450	332	175	138	506	506	38	22 x 22	F10	4 - 12	125	102
300	78	854	782	260	192	507	385	206	153	594	590	34	22 x 22	F10	4 - 12	125	102

Nota : As medidas são orientativas e podem ser alteradas sem aviso prévio.
Note : The measurements are indicative and may change without prior notice.

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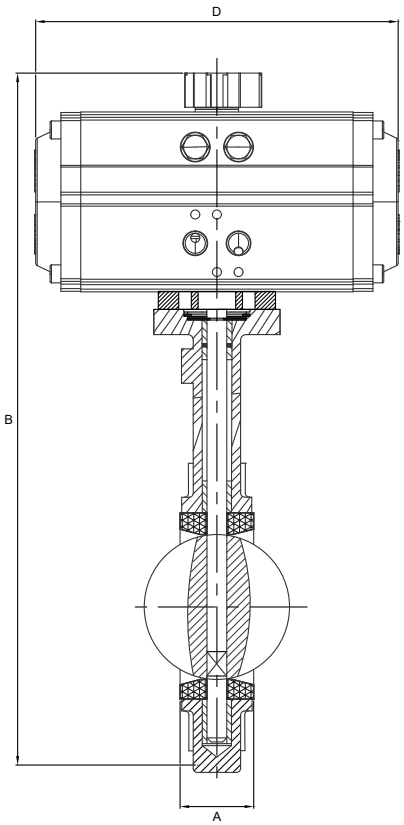
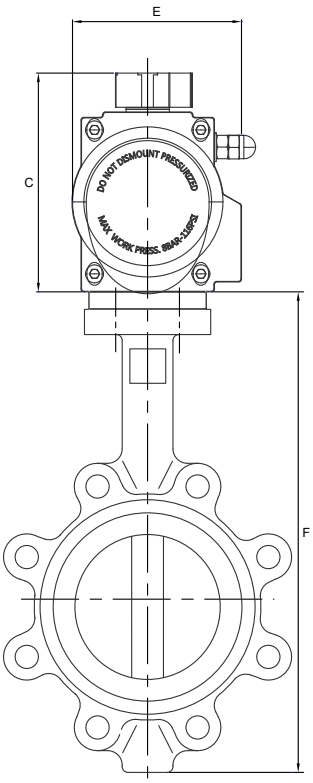
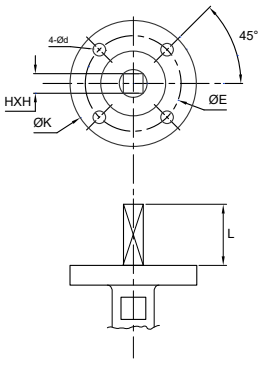
DIMENSÕES DAS VÁLVULAS TIPO LUG ACTUADAS / *ACTUATED LUG VALVES DIMENSIONS*





Flange superior ISO 5211
Top flange ISO 5211



L - altura livre do eixo
L - shaft clear height

DIMENSÕES DAS VÁLVULAS TIPO LUG ACTUADAS - *DIMENSIONS OF ACTUATED LUG VALVES*

DN	DIMENSÕES - *DIMENSIONS* (mm)													FLANGE / *FLANGE* - ISO 5211			
	A	$B_{SE/SR}$	$B_{DE/DA}$	$C_{SE/SR}$	$C_{DE/DA}$	$D_{SE/SR}$	$D_{DE/DA}$	$E_{DE/DA}$	$E_{SE/SR}$	$F_{SE/SR}$	$F_{DE/DA}$	L	H x H	Tipo de flange *Flange Type*	4 - Ød	ØK	ØE
32	33	316	316	92	92	145	145	71	71	224	224	23	9x9	F05	4 - 7	70	50
40	33	316	316	92	92	145	145	71	71	224	224	23	9x9	F05	4 - 7	70	50
50	43	315	299	108	92	169	145	82	71	207	207	23	9x9	F05	4 - 7	70	50
65	46	345	317	120	92	201	145	94	71	225	225	23	9x9	F05	4 - 7	70	50
80	46	377	357	128	108	209	169	101	82	249	249	24	11x11	F05	4 - 7	70	50
100	52	413	393	140	120	242	201	109	94	273	273	24	11x11	F05	4 - 7	70	50
125	56	493	473	153	128	275	209	122	101	340	345	27	14x14	F07	4 - 9	90	70
150	56	550	520	175	140	332	242	138	109	375	380	27	14x14	F07	4 - 9	90	70
200	60	634	600	192	153	385	275	153	122	442	447	30	17x17	F07	4 - 9	90	70
250	68	728	686	217	175	450	332	175	138	511	511	31	22x22	F10	4 - 12	125	102
300	78	854	782	260	192	507	385	206	153	594	590	31	22x22	F10	4 - 12	125	102

Nota : As medidas são orientativas e podem ser alteradas sem aviso prévio.
Note : The measurements are indicative and may change without prior notice.

Nota : Devido ao constante desenvolvimento dos nossos produtos, o desenho e os dados fornecidos podem ser alterados sem aviso prévio.
Note : Due to the continuous development of our products, specifications may be changed without notification at any time.

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