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Пневматические приводы KSB. Техническое описание

DYNACTAIR 1.5 to 800

Spring return pneumatic actuators

DYNACTAIR 1.5, 3, 6, 12 and 25 : rack and pinion kinematics

DYNACTAIR 50 and 100 : scotch-yoke kinematics

DYNACTAIR 200, 400 and 800 : yoke AMRI patented kinematics

Output torques up to 8800 Nm

amri

KSB

General features

Designed for the automation of ¼ turn valves (butterfly valves, ball valves), the DYNACTAIR series of spring return pneumatic actuators and their AMTROBOX/AMTRONIC/SMARTRONIC box are involved in all the functions of control and supervision encountered in all modern processes, and more particularly in communication by fieldbus.

3 kinematics are used for the actuators operation:
- rack and pinion kinematics for DYNACTAIR 1.5, DYNACTAIR 3, DYNACTAIR 6, DYNACTAIR 12 and DYNACTAIR 25,
- scotch-yoke kinematics for DYNACTAIR 50 and DYNACTAIR 100,
- yoke AMRI patented kinematics for DYNACTAIR 200, DYNACTAIR 400 and DYNACTAIR 800.

The mounting interface is in accordance with ISO 5211 standard.
Equipped with an interchangeable insert, they can be easily fitted on different valve shaft (square end, flat end, key).
In standard version, the DYNACTAIR actuators are equipped with a visual pointer and adjustable mechanical travel stops:
- on closed **or** on open position for DYNACTAIR 1.5 to 100 (see pages 6 and 7),
- on closed **and** on open position for DYNACTAIR 200 to 800.

The actuator is mounted directly or by means of an adaptator on ¼ turn valve plate.

Protection:

They are hose and fine dust proof (protection degree equivalent to IP 65).

External coating:

DYNACTAIR 1.5 to 100: housing with 50 µm thickness hard anodization and cylinder head with black cataphoresis coating 30 µm.
DYNACTAIR 200 to 800: polyurethane paint, thickness 80 µm, colour dark grey RAL 7016.

Working temperature :

From –20° C up to +80° C: standard version,

Alternative construction for DYNACTAIR 1.5 to 100:
–40° to +80°C: dynamic O-rings in special Nitrile,
–20° to +120°C: dynamic O-rings in Viton (available with corrosive motive medium).

Other working temperature range for DYNACTAIR 200 to 800: Please consult us.

Standard variant:

ATEX version in accordance with 94/9/EC directive.

This spring return actuator range is completed by the ACTAIR series of double acting pneumatic actuators. Please consult type series booklet ACTAIR 1.5 to 1600 pneumatic actuators, ref. 8515.1.

Production range

DYNACTAIR Type	ISO 5211 mounting plate *	Maximum allowable dimensions for the shaft			
		Height	Diameter		
			Driving by square	Driving by flat	Driving by key
1.5	F04 or F05+F04 (45°)*	24	11	11	Please, consult us
3	F05 – F07	30	16	14	
6	F05 – F07	32	19	17	
12	F07 – F10	40	22	22	
25	F10 – F12	45	27	27	
50	F10 – F12	55	36	36	
100	F14	65	50	46	
200	F16	80	60	55	
400	F16	80	60	55	
800	F16 – F25	95	70	75	

*** Direct adaptation onto identical mounting plate.**
Adaptation by intermediate flange onto different plate (different size or shape).

Control fluid supply

Air or any neutral gas,filtered, dry or lubricated:
- filtration: 50 μm,
- drying: dew point at max. working pressure ≤ 4° C and min. temperature -5° C

If a lubrification is required - the lubrification increases the actuator life - the use of a non detergent oil without aggressive additive is recommended:
- viscosity 2 to 3° ENGLER at 50° C
- anhiline point 90° C to 105° C
- flow 1 to 3 drop for 500 NL/mn.

Operating times

The table below defines the minimum operating times under 5 bar control air pressure and the operation rates per minute for DYNACTAIR actuators on/off function.

DYNACTAIR type	Minimum operating time On/off function			Operation rates per minute
	DYNACTAIR + AMTRONIC	DYNACTAIR with distibutor ISO-1 or NAMUR fitted onto the housing	DYNACTAIR direct connection	
1.5	2 seconds	2 seconds		30 maxi
3	2 seconds	2 seconds		30 maxi
6	2 seconds	2 seconds		30 maxi
12	4 seconds	2 seconds		15 maxi
25	6 seconds	3,5 seconds		10 maxi
50	10 seconds	5 seconds		6 maxi
100	15 seconds	8 seconds		4 maxi
200	45 seconds	30 seconds	15 seconds	2 maxi
400	90 seconds	45 seconds	30 seconds	1 maxi
800	180 seconds	90 seconds	40 seconds	0,5 maxi

On request, adjust construction for :
- other operation times,
- hight operation rates.

Please consult us.

Capacity

DYNACTAIR type	Capacity in cm^3
1.5	240
3	570
6	1180
12	2400
25	4700
50	5280
100	9800
200	25000
400	50000
800	92000

Safety function

In standard version, the DYNACTAIR actuators are designed to ensure valve closure in case of lack of control fluid pressure.
On request, valve opening by lack of control fluid is available.
The opening function by lack of control fluid differentiates itself from the closing function by a different mounting of the kinematics (refer to pages 6 to 9) and by a more or less powerful construction of the energy accumulator (refer to pages 4 and 5).
Due to these differences of construction, the use of a closing function actuator instead of an opening function actuator (and vice versa) can cause some hazards during operation such as the impossibility to operate the valve or operation in the wrong direction. For these reasons, it is strongly inadvisable to try to change from one type of actuator to the other.

Output torque (Nm) relating to the control fluid pressure and the safety function

To ensure the safety function (closing or opening) in case of lack of control fluid, the DYNACTAIR spring return pneumatic actuators are equipped with an energy accumulator.
This energy accumulator consists in:
- for DYNACTAIR 1.5 to 25 actuators: 2, 3 or 4 precompressed spring cartridges fitted between the pistons, each cartridge including four helicoidal springs,
- for DYNACTAIR 50 to 800 actuators: a precompressed spring cartrige fitted at each housing end, ech cartrige including one, two or three helicoidal springs depending on the requested output torque.

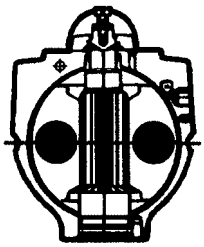
The table below shows the different output torques relating to the control fluid pressure and the quantity of spring cartriges (case of DYNACTAIR 1.5 to 25) or of the quantity of springs and their position (case of DYNACTAIR 50 to 800).

DYNACTAIR	Energy accumulator configuration (cartridge/spring)	Output torque restored by the energy accumulator (cartridge/spring		Output torque during the setting of the energy accumulator relating to the control fluid pressure											
				3 bar		4 bar		5 bar		6 bar		7 bar		8 bar	
		Springs start	Springs end	Air start	Air end	Air start	Air end	Air start	Air end	Air start	Air end	Air start	Air end	Air start	Air end
Rack and pinion kinematics (refer to page 6 for curves and operation)															
1.5	3 (2 cart./ 2 springs)	16	9	16	5	24	13	32	20						
	4 (2 cart./ 4 spring)	30	15					25	5	32	13				
3	2 (2 cartridges)	28	16	27	14	41	28	55	43						
	3 (3 cartridges)	42	24			33	14	47	29	61	43				
	4 (4 cartridges)	57	32					39	14	53	29	68	43	82	57
6	2 (2 cartridges)	51	32	55	28	82	55	108	81						
	3 (3 cartridges)	77	48			58	29	85	56	111	82				
	4 (4 cartridges)	103	64					69	30	96	57	122	83	148	109
12	2 (2 cartridges	108	64	94	50	147	103	200	156						
	3 (3 cartridges)	161	96			115	50	168	103	220	155				
	4 (4 cartridges)	215	128					136	48	188	101	241	154	294	207
25	2 (2 cartridges)	220	131	186	97	292	203	398	308						
	3 (3 cartridges)	330	196			226	94	332	199	437	305				
	4 (4 cartridges)	440	262					267	89	372	194	478	299	583	405
Scotch- yoke kinematics (refer to page 7 for curves and operation)															
50	1 (1 spring A ● ●)	360	229	401	270	611	481								
	2 (2 springs A ● C)	550	336	295	81	505	291	716	502						
	3 (2 springs A B ●)	622	404			437	218	647	429	857	639				
	4 (3 springs A B C)	810	520			317	60	528	278	738	488	949	698	1116	909
100	1 (1 spring A ● ●)	728	447	789	508	1202	921								
	2 (2 ressorts A ● C)	970	585	652	267	1065	680	1478	1093						
	3 (2 ressorts A B ●)	1350	800			843	293	1256	706	1669	1119				
	4 (3 ressorts A B C)	1600	1010			657	120	1070	533	1482	946	1895	1358	2300	1771
Yoke AMRI patented kinematics (refer to pages 8 and 8 for curves and operation)															
Closing by lack of control fluid	200	2 (1 spring A ● ●)	800	1000	1880	700									
		3 (2 springs A B ●)	1000	1700			2100	600							
		4 (3 springs A B C)	1000	2150			1700	300	2600	1000	2600	1000			
	400	2 (1 spring A ● ●)	1000	2000	3700	1000									
		3 (2 springs A B ●)	1000	3400			4200	1000							
		4 (3 springs A B C)	1000	4300			3400	600	4400	1000	4400	1000			
	800	2 (1 spring A ● ●)	2000	3000	7000	2000									
		3 (2 springs A B ●)	2000	5400	4400	700	7800	2000							
		4 (3 springs A B C)	2000	8000					8800	2000	8800	2000			
Opening by lack of control flui	200	2 (1 spring A ● ●)	1500	500	1000	1300	1000	2100							
		3 (2 springs A B ●)	2500	1000			1000	1050	1000	2000	1000	2900			
	400	2 (1 spring A ● ●)	3000	1000	1000	2600	1000	4200							
		3 (2 springs A B ●)	4400	1000			1000	2100	1000	4000	1000	4400			
	800	2 (1 spring A ● ●)	4600	1800	2000	5420	2000	8800							
		3 (2 springs A B ●)	8800	2000	2000	1200	2000	4500	2000	7900	2000	8800			

Configuration of the energy accumulator

DYNACTAIR 1.5

2 cartridges

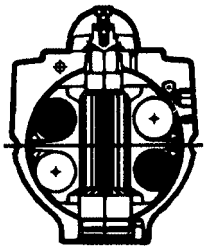


Configuration 4:
2 cartridges with 4 springs

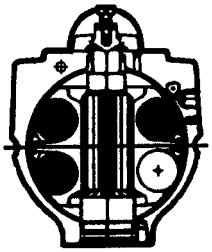
Configuration 3:
2 cartridges with 2 springs

DYNACTAIR 3, 6, 12 and 25

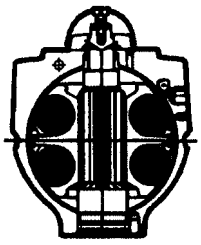
Configuration 2
2 cartridges



Configuration 3
3 cartridges



Configuration 4
4 cartridges



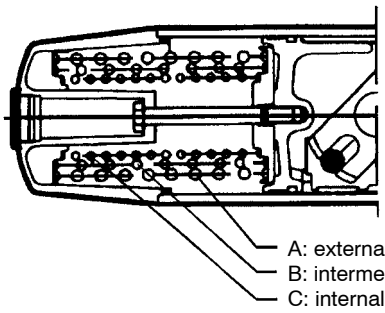
DYNACTAIR 50 and 100

A ● C defines an energy accumulator including:

one internal spring

no intermediate spring

one external spring

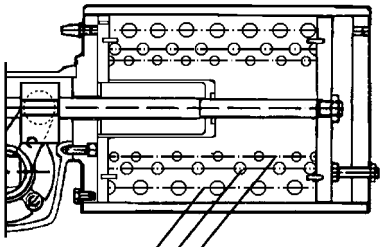


Configuration 4 = ABC
Configuration 3 = AB●
Configuration 2 = A●C
Configuration 1 = A●●

A: external spring
B: intermediate spring
C: internal spring

DYNACTAIR 200, 400 and 800

Configuration 4 = ABC
Configuration 3 = AB●
Configuration 2 = A●●



A: external spring
B: intermediate spring
C: internal spring

Actuator selection

Relating to the ¼ turn valve to be operated and it operating torque, the available control fluid pressure and the requested safety function, it is necessary to take into consideration the following criteria for the actuator selection (type and configuration):

Butterfly valves
Closing function = springs end and air start,
Opening function = springs start and air end.

Ball valves
Whatever the safety function may be, the four criteria must be taken into consideration:
Springs end and air start,
Springs star and air end.

Choose the values for springs and air the nearest possible one another and immediately higher than the operating torque of the valve to be actuated (consult the manufacturer instructions).
This selection is already defined in the technical leaflets for KSB–AMRI valves: definition of the DYNACTAIR configuration relating to its safety function and control fluid pressure.

DYNACTAIR		Closing by lack of control fluid				Opening by lack of control fluid			
		3 bar	4 bar	5 bar	6 bar	3 bar	4 bar	5 bar	6 bar
1.5	Configuration	3	3	4	4		3	3	3
3 – 6 –12 – 25		2	3	4	4	2	2	3	3
50 – 100		2	3	4	4	1	1	2	3
200 – 400 – 800		2	3	4	4	2	2	3	3

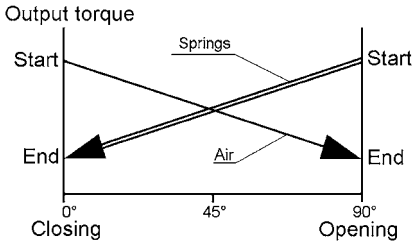
Operation

DYNACTAIR 1.5 to 25: rack and pinion kinematics

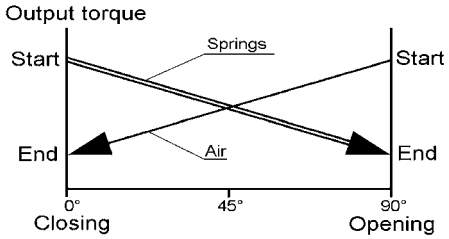
The rack and pinion kinematics develop a linear output torque.
The movement of the rack/pistons secured by the control fluid pressure causes a ¼ turn rotation of the pinion integral with the valve shaft: the pressure ensures at once the valve operation and the compression of the spring cartridges.
The spring cartridges reset the valve in safety position when the pressure is cut-off.

Curve of the rack and pinion kinematlcs

Closing by lack of control fluid



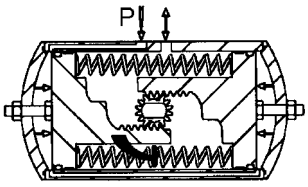
Opening by lack of control fluid



Closure function by lack of control fluid - Adjustable mechanical travel stop on closing position
Adjustment range (±2,5°) for the end-stop
The DYNACTAIR with closure function by lack of control fluid can be equipped with only an adjustable end-stop on closing position

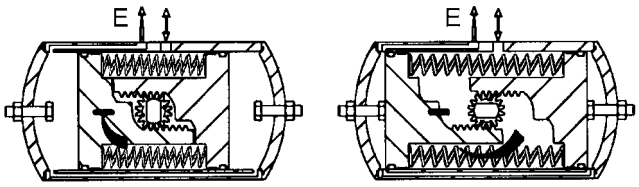
Opening operation under fluid pressure

Actuator/Valve closed | Actuator/Valve open



Closing operation under springs action

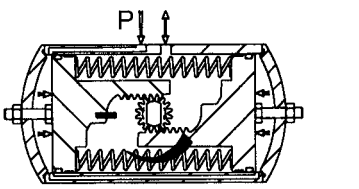
Actuator/Valve open | Actuator/Valve closed



Opening function by lack of control fluid - Adjustable mechanical travel stop on opening position
Adjustment range (±2,5°) for the end-stop
The DYNACTAIR with opening function by lack of control fluid can be equipped with only an adjustable end-stop on opening position

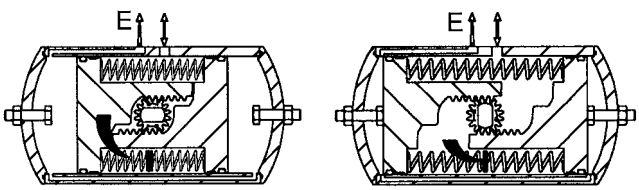
Closing operation under fluid pressure

Actuator/Valve closed | Actionneur/Robinet fermé



Opening operation under springs action

Actuator/Valve closed | Actuator/Valve open



During the operation under control fluid pressure, the holding in position is only achieved by the pressure in the chambers.

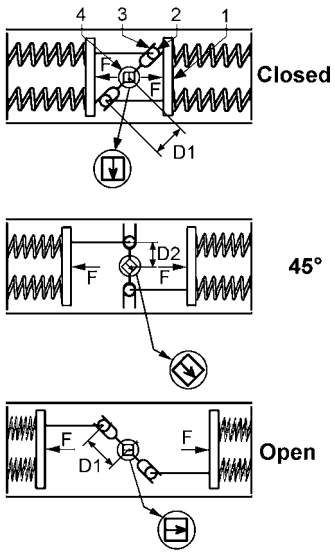
DYNACTAIR 50 and 100: scotch-yoke kinematics

The scotch-yoke kinematics develop a variable output torque well suited tothe operation of ¼ turn valves.

The movement transmission is achieved by means of the piston system ①, rollers ②, scotch-yoke ③ and shaft ④.
The movement of the pistons ① secured by the pressure causes the sliding of the rollers ② in the grooves of the yoke ③.
The yoke ③ allows the rotation of the shaft ④ integral with the valve shaft.

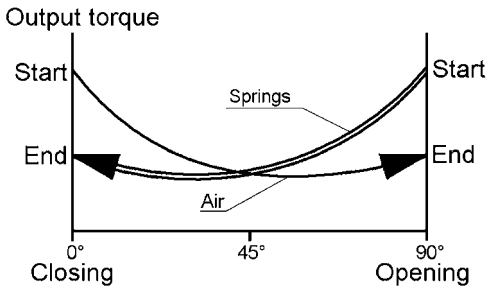
The control fluid pressure ensures at once the valve operation and the compression of the springs.

The springs reset the valve in safety position when the pressure is cut-off.

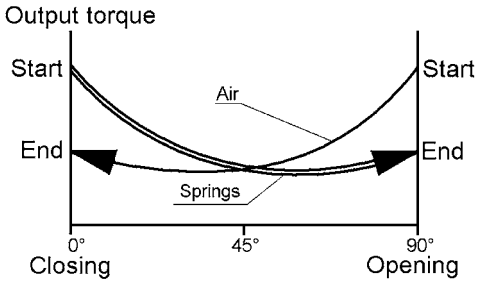


Curve of the scotch-yoke kinematics

Closing by lack of control fluid



Opening by lack of control fluid



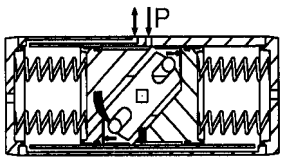
Closure function by lack of control fluid - Adjustable mechanical travel stop on closing position

Adjustment range (±2,5°) for the end-stop

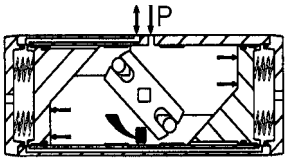
The DYNACTAIR with closure function by lack of control fluid can be equipped with only an adjustable end-stop on closing position

Opening operation under fluid pressure

Actuator/Valve closed

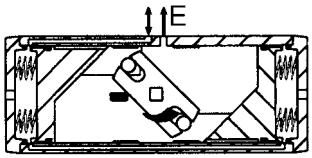


Actuator/Valve open

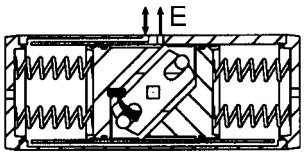


Closing operation under springs action

Actuator/Valve open



Actuator/Valve closed



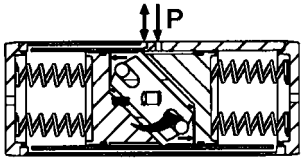
Opening function by lack of control fluid - Adjustable mechanical travel stop on opening position

Adjustment range (±2,5°) for the end-stop

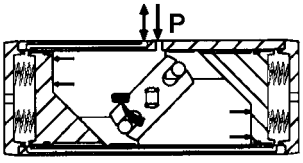
The DYNACTAIR with opening function by lack of control fluid can be equipped with only an adjustable end-stop on opening position

Closing operation under fluid pressure

Actuator/Valve open

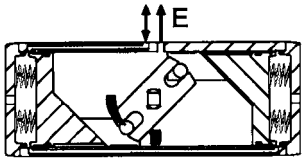


Actuator/Valve closed

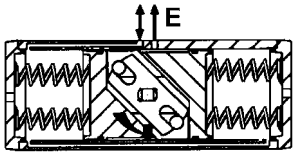


Opening operation under springs action

Actuator/Valve closed



Actuator/Valve open



During the operation under control fluid pressure, the holding in position is only achieved by the pressure in the chambers.

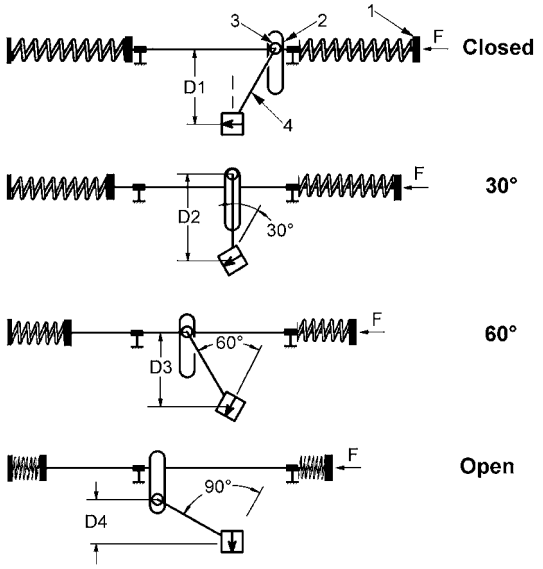
DYNACTAIR 200 to 800: yoke AMRI patented kinematics

The yoke AMRI patented kinematics develop a variable output torque very well suited to the operation of ¼ turn valves with hydrodynamic torque.

The movement transmission is achieved by means of the piston system ①, the slide operating nut ②, the rolling pad ③ and the yoke ④.
The movement of the piston ① secured by pressure in the actuator cylinder causes the linear travel of the operating nut ②.
This movement drives the sliding of the pads ③ in the 2 slides of the operating nut , and allows the rotation of the yoke ④ integral with the valve shaft.

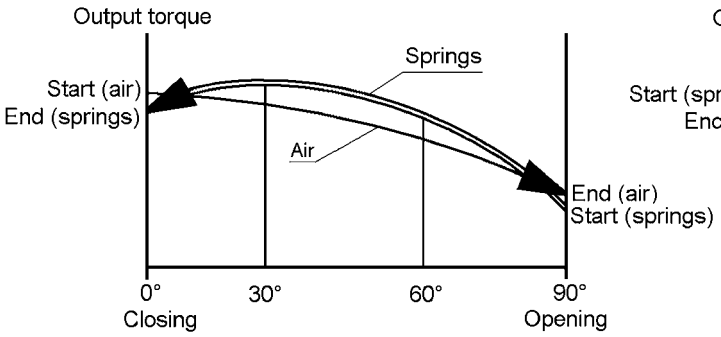
The control fluid pressure ensures at once the valve operation and the compression of the springs.

The springs reset the valve in safety position when the pressure is cut-off

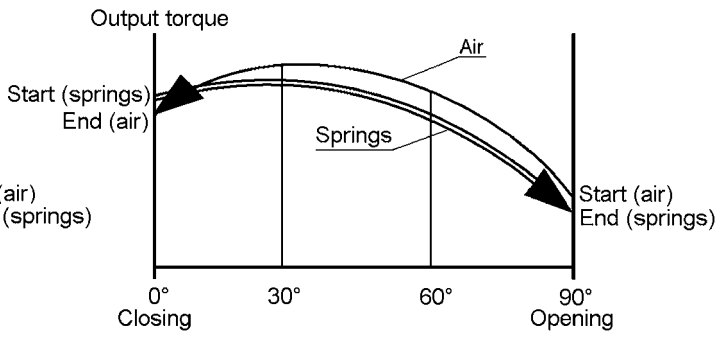


Curve of the yoke AMRI patented kinematics

Closing by lack of control fluid



Opening by lack of control fluid



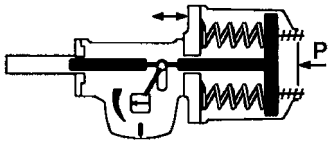
During the operation under control fluid pressure, the holding in position is only achieved by the pressure in the chambers.

DYNACTAIR 200

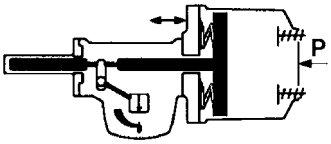
Closure function by lack of control fluid

Opening operation under fluid pressure

Actuator/Valve closed

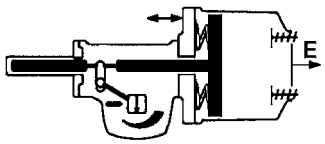


Actuator/Valve open

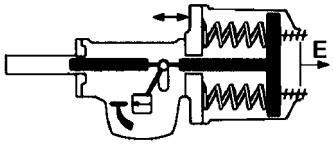


Closing operation under springs action

Actuator/Valve open



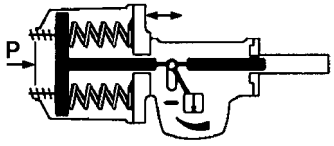
Actuator/Valve closed



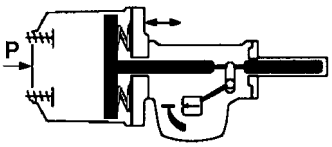
Opening function by lack of control fluid

Closing operation under fluid pressure

Actuator/Valve open

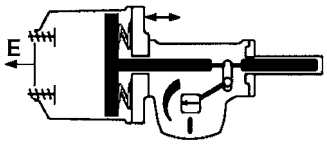


Actuator/Valve closed

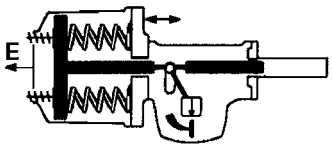


Opening operation under springs action

Actuator/Valve closed



Actuator/Valve open

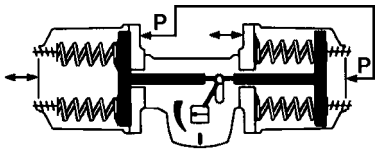


DYNACTAIR 400 and 800

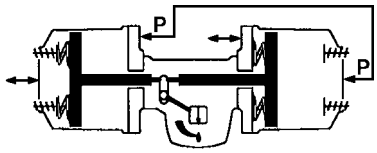
Closure function by lack of control fluid

Opening operation under fluid pressure

Actuator/Valve closed

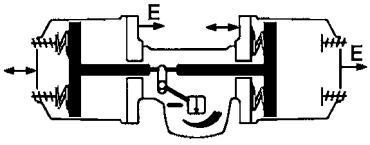


Actuator/Valve open

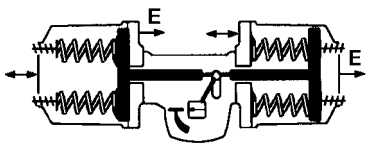


Closing operation under springs action

Actuator/Valve open



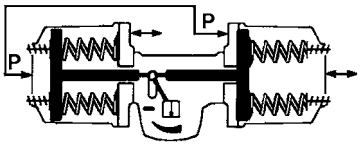
Actuator/Valve closed



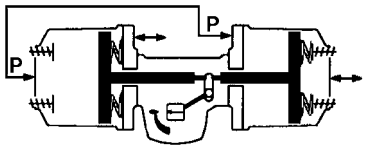
Opening function by lack of control fluid

Closing operation under fluid pressure

Actuator/Valve open

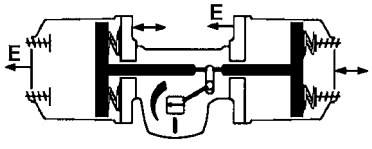


Actuator/Valve closed

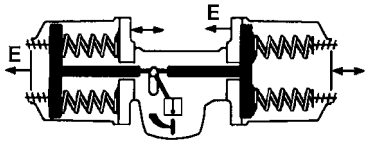


Opening operation under springs action

Actuator/Valve closed



Actuator/Valve open

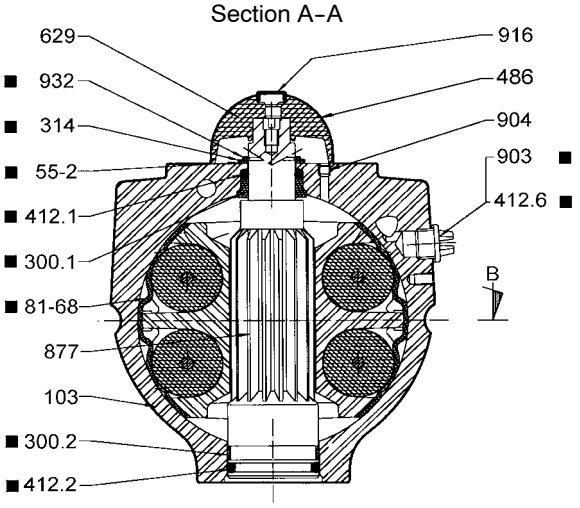


DYNACTAIR 1,5 to 25

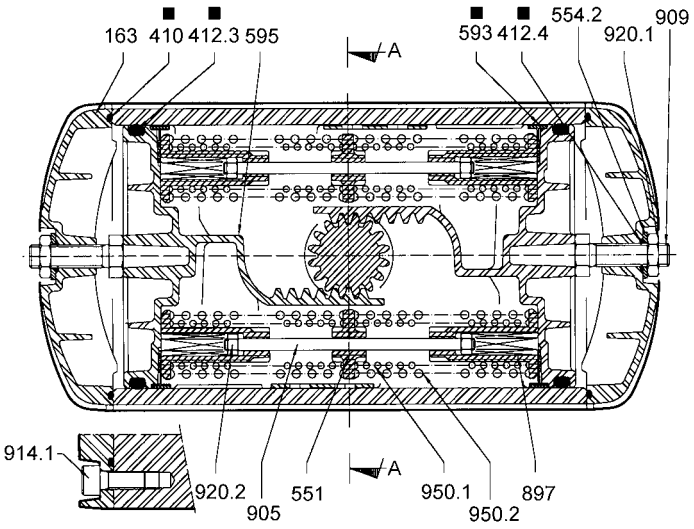
Construction

Direct pneumatic connection 1/4" Gas.

Section A–A



Section B–B



Item		Designation	Materials
103		Housing	Light alloy with 50 µm hard anodization
163		Cylinder head	Light alloy with 30 µm cataphoresis coating
300.1	■	Upper bearing	Acetal
300.2	■	Lower bearing	Acetal
314	■	Thrust washer	Stainless steel type 316
410	■	Cylinder head gasket	Nitrile
412.1	■	O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.2	■	O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.3	■	Piston O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.4	■	O-Ring	Nitrile
412.6	■	O-Ring	Nitrile
486	■	Ball	Stainless steel
554.2		Washer	Stainless steel A4-70
55-2	■	Friction washer	Acetal
593	■	Piston bearing	Acetal
595		Piston	Light alloy
629		Pointer	Polyamide 6-6 + treatment against U.V. rays
81-68	■	Piston guide	Acetal
877		Pinion	Zinc coated steel
903	■	Plug	Polyamide 6-6
904		Socket screw	Stainless steel with cladding
909		Adjusting screw	Stainless steel A4-70
914.1		Hexagon socket head screw	Stainless steel A4-70
916		Plug	Polyethylene
920.1		Hexagonal nut	Stainless steel A4-70
932	■	Spring retaining ring	Stainless steel
		Precompressed spring cartridge including:	
551		Space washer	Acetal + fibreglass
897		Spring guide	Acetal + fibreglass
905		Tie-rod	Zinc coated steel
920.2		Hexagonal nut	Zinc coated steel
950.1		Internal spring	Steel with cataphoresis coating
950.2		External spring	Steel with cataphoresis coating

■ Parts included in the spare parts kit

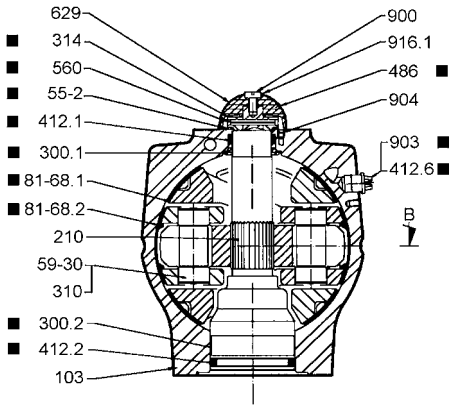
* Alternative: Special Nitrile (–40° to +80° C) or Viton (–20° to +120° C)

DYNACTAIR 50 and 100

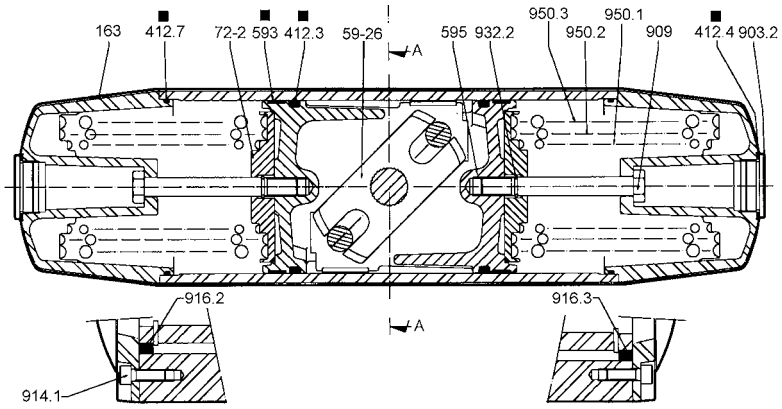
Construction

Direct pneumatic connection 1/4" Gas

Section A-A



Section B-B



Item		Designation	Materials
103		Housing	Light alloy with 50 µm hard anodization
210		Shaft	Zinc coated treated steel
300.1	■	Upper bearing	Acetal
300.2	■	Lower bearing	Stainless steel + PTFE
310		Self lubricating bearing	PTFE filled
314	■	Thrust washer	Zinc coated treated steel
412.1	■	O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.2	■	O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.3	■	Piston O-Ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.6	■	O-Ring	Nitrile
486	■	Ball	Stainless steel
55-2	■	Friction washer	Acetal
560	■	Pin	Stainless steel
593	■	Piston bearing	Acetal
595		Piston	Ductile iron JS 1030
59-26		Scotch-yoke	Treated steel
59-30		Roller	Treated steel
629		Pointer	Polyamide 6-6 + treatment against U.V. rays
81-68.1	■	Piston guide	Acetal
81-68.2	■	Piston guide	Acetal
900		Cheese head screw	Stainless steel A4-70
903	■	Plug	Polyamide 6-6
904		Socket screw	Stainless steel
914.1		Hexagon socket screw	Stainless steel A4-70
916.1		Plug	Polyethylene
916.2		Cylindrical plug	Nitrile
916.3		Triangular plug	Nitrile
		Pre-mounted spring pack including:	
163		Cylinder head	Light alloy with 30 µm cataphoresis coating
412.4	■	O-Ring	Nitrile
412.7	■	O-Ring	Nitrile
72-2		Centring plate	Light alloy
903.2		Threaded plug	Stainless steel
909		Adjusting screw	Zinc coated steel
932.2		Spring retaining ring	Stainless steel type 316
950.1		Internal spring	Steel with cataphoresis coating
950.2		Intermediate spring	Steel with cataphoresis coating
950.3		External spring	Steel with cataphoresis coating

■ Parts included in the spare parts list.

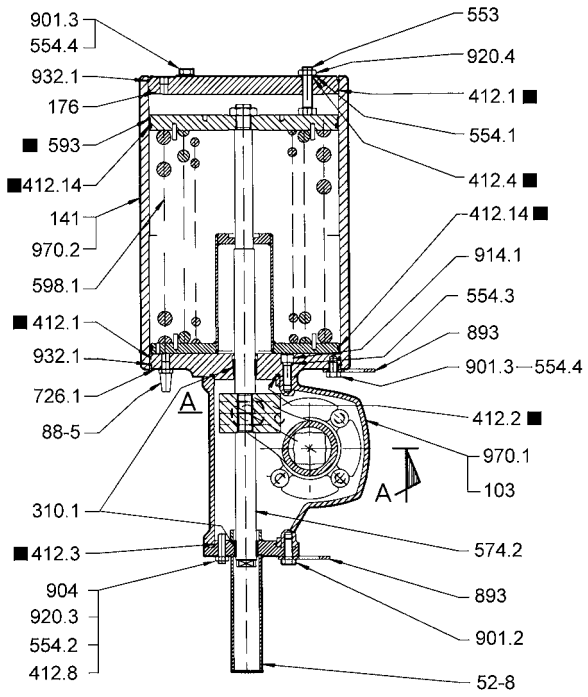
* Alternative: Special Nitrile (–40° to +80° C) or Viton (–20° to +120° C)

DYNACTAIR 200 to 800

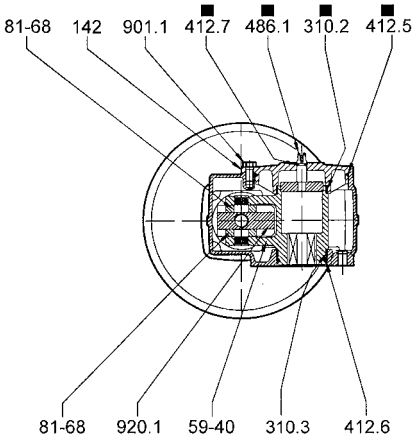
Construction

Direct pneumatic connection: 1/2” Gas for DYNACTAIR 200 and 400
3/4” Gas for DYNACTAIR 800

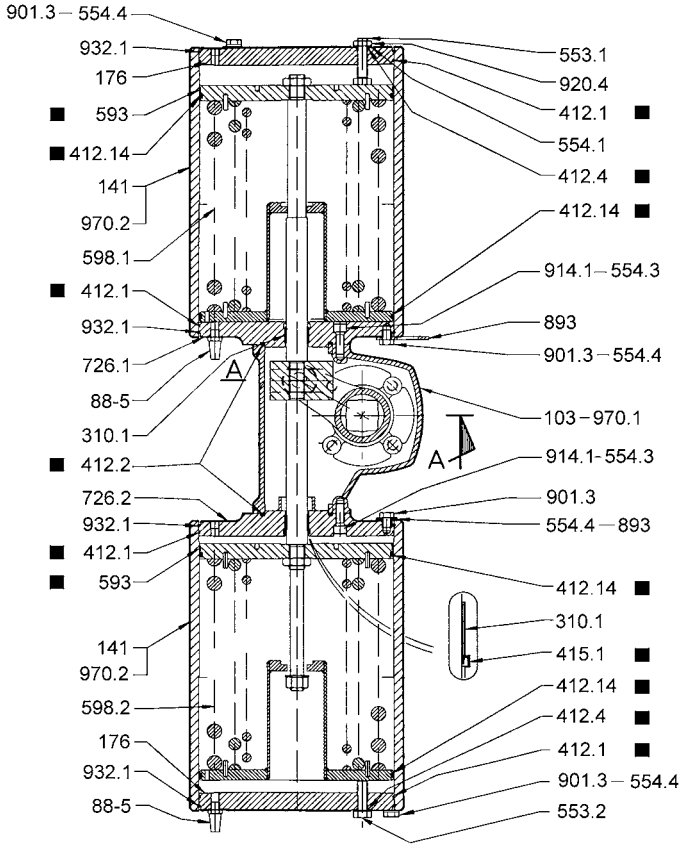
DYNACTAIR 200 – Closure function by lack of control fluid



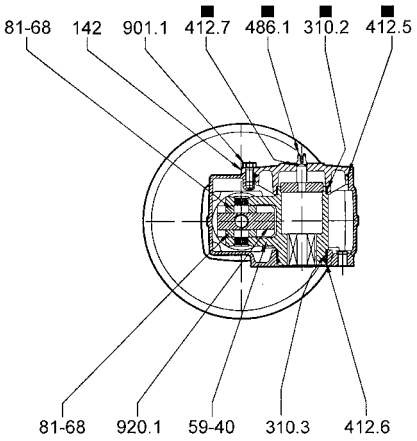
Section A–A



DYNACTAIR 400 and 800 – Closure function by lack of control fluid



Section A–A



■ Parts included in the spare parts kit

DYNACTAIR 200 to 800

Standard construction

Direct pneumatic connection: 1/2" Gas for DYNACTAIR 200 and 400
3/4" Gas for DYNACTAIR 800

Item		Designation	Materials
103		Housing	Ductile iron JS 1030
141		Cylinder	Steel
142		Cover	Ductile iron JS 1030
176		Cylinder head	Steel with cataphoresis coating
310.1		Self-lubricating bearing	PTFE filled on steel casing
310.2	■	Self-lubricating bearing	PTFE filled on steel casing
310.3		Self-lubricating bearing	PTFE filled on steel casing
412.1	■	O-Ring	Nitrile
412.2	■	O-Ring	Nitrile
412.3	■	O-Ring	Nitrile
412.4	■	O-Ring	Nitrile
412.5	■	O-Ring	Nitrile
412.6		O-Ring	Nitrile
412.7	■	O-Ring	Nitrile
412.8		O-Ring	Nitrile
412.14	■	O-Ring	Nitrile
415.1	■	Lip seal ring	Nitrile
486.1	■	Ball	Stainless steel
52-8		Protection sleeve	Treated steel
553.1		Thrust insert	Stainless steel A4-70
553.2		Thrust insert	Stainless steel A4-70
554.1		Washer	Stainless steel A4-70
554.2		Washer	Stainless steel A4-70
554.3		Washer	Nylon
554.4		Washer	Stainless steel
574.2		Rod	Steel
593	■	Guiding strip	PTFE + bronze
598.1		Sub assembly springs cartridge	Treated steel + springs in steel
598.2		Sub assembly springs cartridge	Treated steel + springs in steel
59-40		Chuck	Ductile iron JS 1030*+ signalisation shaft in stainless steel
726.1		Guiding flange	Steel with cataphoresis coating
726.2		Centring washer	Steel with cataphoresis coating
81-68		Pressure pad	Nitrured steel
88-5		Silencer	----------
893		Support plate	Steel with cataphoresis coating
901.1		Hexagon head screw	Stainless steel A4-70
901.2		Hexagon head screw	Stainless steel A4-70
901.3		Hexagon head screw	Stainless steel A4-70
904		Travel stop	Stainless steel A4-70
914.1		Hexagon socket head screw	Stainless steel A4-70
920.1		Operating nut	Ductile iron JS 1060
920.2		Hexagon nut	Stainless steel A4-70
920.4		Hexagon nut	Stainless steel A4-70
932.1		Spring retaining ring	Treated steel
970.1		Identity plate	Stainless steel
970.2		Safety instructions plate	Stainless steel

■ Parts included in the spare parts kit

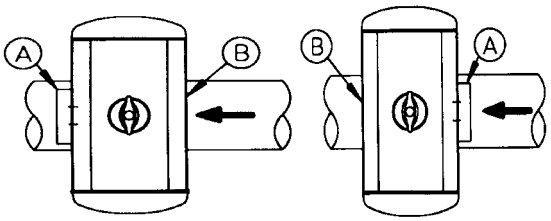
Mounting on valve

The actuator can be positioned in four position, at intervals of 90°.
Unless otherwise stated, the actuator is mounted according to the arrangement N position 1.

DYNACTAIR 1.5 to 100

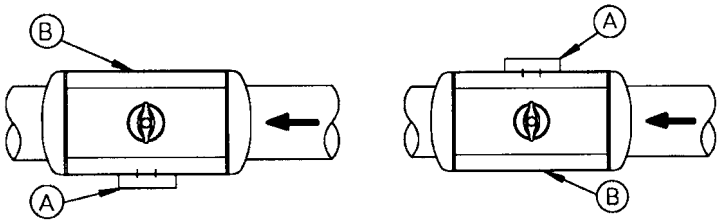
Arrangement N

Position 1 Position 2



Arrangement M

Position 1 Position 2



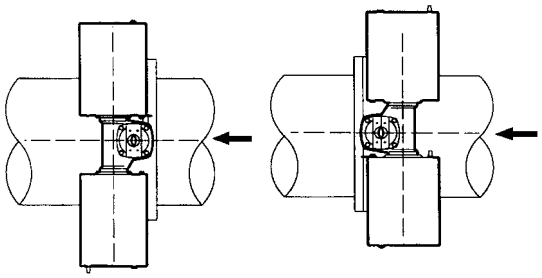
Flow direction
Valve shown in closed position

Interface A: direct connection to control fluid or via a NAMUR or ISO distributor
Interface B: electric and pneumatic connections of AMTRONIC box

DYNACTAIR 200 to 800

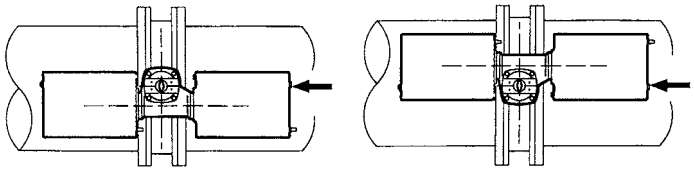
Arrangement N

Position 1 Position 2



Arrangement M

Position 1 Position 2



Flow direction – Valve shown in closed position

These actuators are equipped with interchangeable inserts machined to the size and the shape of various vale shafts to be operated.

DYNACTAIR 1.5 to 25

Pinion with star draiving allowing mounting at intervals of 45°

Flat end

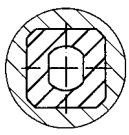
Key end

Square end

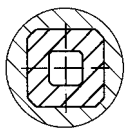
DYNACTAIR 50 to 800

Shaft or yoke with driving square and insert

Flat end



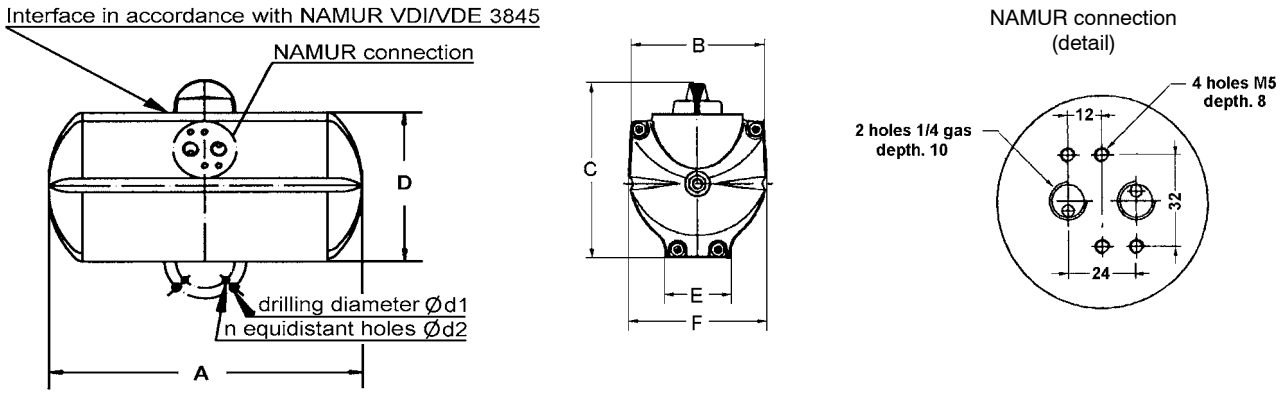
Square end



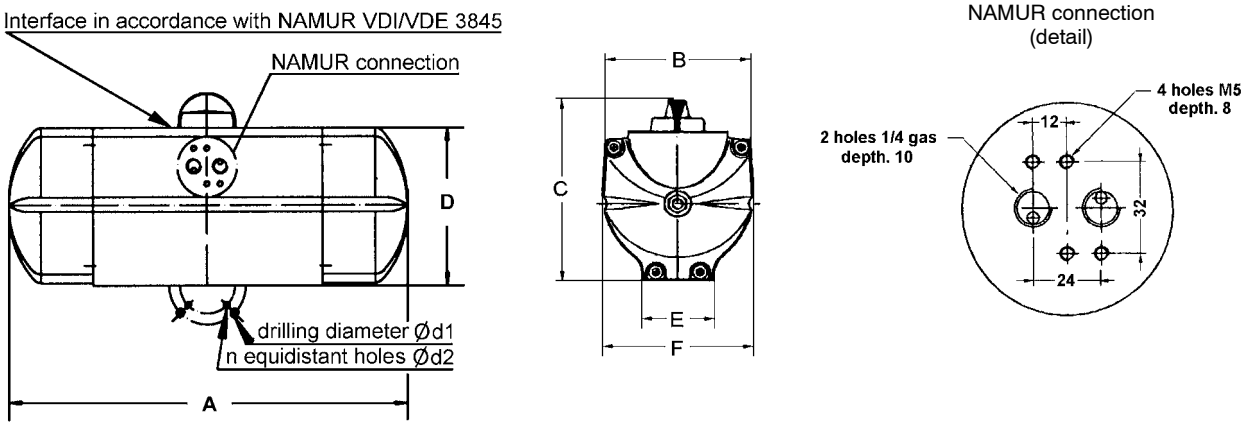
The actuators can be delivered with or without the coupling parts.

Overall dimensions (mm) and weights (kg)

DYNACTAIR 1.5 to 25



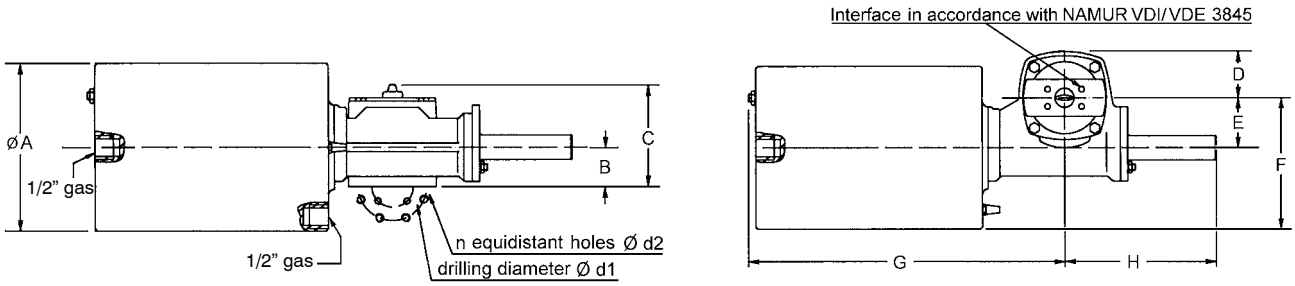
DYNACTAIR 50 and 100



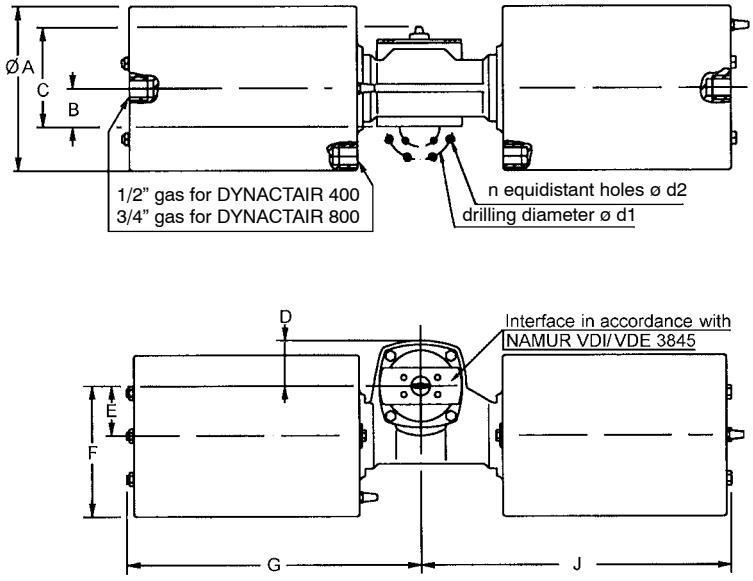
DYNACTAIR							ISO 5211 mounting plate				Weight
Type	A	B	C	D	E	F	ref	ød1	ød2	n	kg
1.5	194	100	119	98	55	100	F04 (45°) F05	42 50	M5 M6	4 4	3,2
3	218	114	137	116	65	118	F05 F07	50 70	M6 M8	4 4	4,5
6	272	132	163	142	65	138	F05 F07	50 70	M6 M8	4 4	7,3
12	344	156	197	176	90	166	F07 F10	70 102	M8 M10	4 4	13,6
25	424	174	238	217	125	200	F10 F12	102 125	M10 M12	4 4	24
50	705	157	216	195	122	170	F10 F12	102 125	M10 M12	4 4	46
100	812	174	258	237	144	210	F14	140	M16	4	75

Overall dimensions (mm) and weights (kg)

DYNACTAIR 200 (Standard version - Direct connection)



DYNACTAIR 400 and 800 (Standard version - Direct connection)



DYNACTAIR										ISO 5211 mounting plate				Weight
Type	A	B	C	D	E	F	G	H	J	ref	ød1	ød2	n	kg
200	406	95	246	115	125	328	740	474		F16	165	M20	4	270
400	406	95	246	115	125	328	740		790	F16	165	M20	4	410
800	508	109	280	155	140	394	905		950	F16 F25	165 254	M20 M16	4 8	880

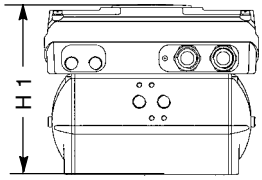
Indication function

Limit switch indication by AMTROBOX (IP67)

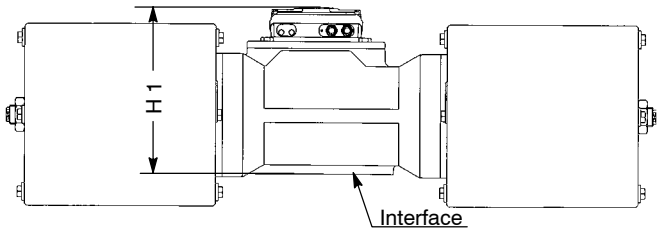
The function provided by AMTROBOX is as follow:

- Position detection:
  - On/off position detection by means of microswitches or inductive proximity detectors (1/O, 1/C, 1 on intermediate position on request).

DYNACTAIR 1.5 100



DYNACTAIR 200 to 800



Consult type series booklet AMTROBOX ref. 8525.1

Control and supervision functions

Piloting-servo control by AMTRONIC / SMARTRONIC box

The functions provided are as follows :

AMTRONIC :

- On/off pneumatic distribution: 4/2 or 4/3 configuration, spring return or double acting, A.C. or D.C. supply.
- Operating time adjustment.

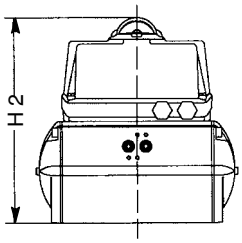
SMARTRONIC :

- Proportional distribution for autocalibration seting, 4-20 mA pilot.
- Operating time adjustment

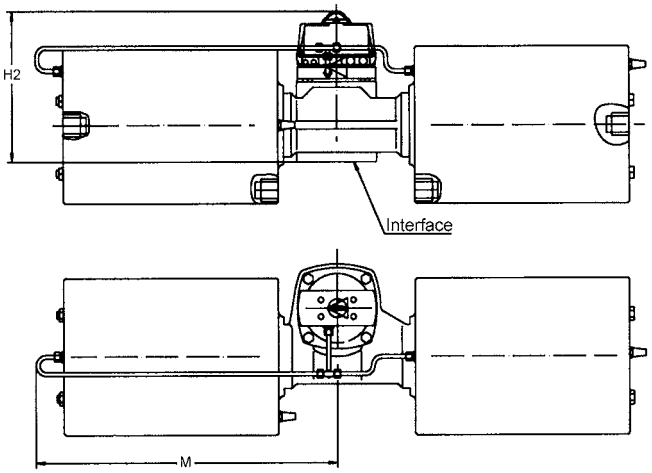
Options :

- On/off position detection (2 microswitches or inductive proximity detectors),
- Proportional position detection (4-20 mA).
- Field bus: AS-i, Profibus DP, Device Net.

DYNACTAIR 1.5 to 100



DYNACTAIR 200 to 800



Consult type series booklet AMTRONIC ref. 8512.1
and SMARTRONIC MA 8527.1

DYNACTAIR Type	H1	H2	M	Weight kg
1.5	168	235		4,5
3	185	252		5,5
6	211	278		8
12	245	312		13
25	286	353		20
50	264	331		32
100	306	373		50
200	293	390	790	280
400	293	390	790	425
800	328	425	955	900

Options

Visual position indicator type "BEACON"
DYNACTAIR 1.5 to 800

Instead of the standard pointer.

Direct NPT air connection
DYNACTAIR 1.5 to 200

1/4" NPT connection plate made of anodised Aluminium, fitted onto the Namur interface of the standard actuator.

DYNACTAIR 200 to 800

NPT air connection directly threaded on the cylinder:
- 1/2" NPT on DYNACTAIR 200 and 400,
- 3/4" NPT on DYNACTAIR 800

DYNACTAIR actuators can be equipped with different accessories instead of AMTROBOX, AMTRONIC and SMARTRONIC instrumentation box.

Limit switch box
DYNACTAIR 1.5 to 800

The switch box is fitted onto the top of the actuator housing by means of a yoke with interface in accordance with VDI/VDE 3845 NAMUR specification.
Please consult us.

Positioner
DYNACTAIR 1.5 to 800

A positioner with a 3-15 PSI pneumatic piloting signal or a 4-20 mA electric signal (standard or with intrinsically safety) can be mounted onto the top of actuator housing by means of a yoke with VDI/VDE 3845 interface.
Please consult us.

NAMUR distributor
DYNACTAIR 1.5 to 100

A distributor with electric or pneumatic piloting with NAMUR interface can be fitted directly onto the side of the actuator housing.
Please consult us.

ISO size 1 distributor
DYNACTAIR 1.5 to 800
ISO size 2 distributor
DYNACTAIR 200 to 800

A distributor with an ISO 5599 size 1 or size 2 interface can also be fitted to the actuator by means of a distributor plate.

Options

Manual emergency control

Protection:
Hose and fine dust proof (protection degree equivalent to IP 65).

External coating:
Polyurethane paint thickness 80 µm, colour dark grey ref. RAL 7016.

Working temperature:
From –20° C up to +80° C.

DYNACTAIR 1.5 to 100: declutchable manual override

A manual override using a declutchable gear box may be fitted between the valve mounting plate and the actuator.
This manual control will override with the pneumatic actuator and can be set in clutched or declutched positions.

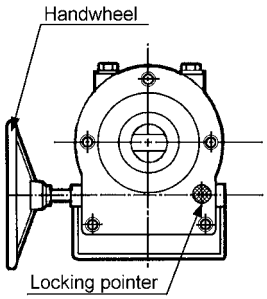
Construction:
- housing, cover and extension in JL 1040 cast iron,
- handwheel in welded steel,
- screw in treated steel,
- worm in JS 1030 ductile iron,
- drive shaft, clutch lever, locking pointer, adjustable mechanical travel stops (±5°) and external bolting in 13% chromium stainless steel.

For more information, please refer to Manual Override technical leaflet ref 5350.1.

Instructions for override operation

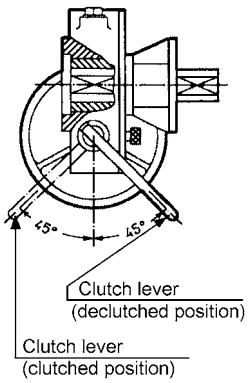
The manual override should only be used under the following recommendations:
- ***absence of air pressure in the actuator,***
- ***the actuator chambers must be to the open air.***

Check the actuator is not under air pressure before use the manual override.



Override clutch
1 – Unlock the unit by pulling the locking pointer ,
2 – Keep the pointer in pulled position and turn the clutch lever to the clutched position,
3 – Release the pointer, it must bolt itself in low position.

Manual emergency control use
4 – Operate the valve by turning the handwheel.
Turns number for a complete operation
DYNACTAIR 1.5 , 3 , 6 and 12: 10 turns
DYNACTAIR 25 and 50 : 12 turns
DYNACTAIR 100 : 13 turns
5 – Bring the emergency control back to its initial position by turning the handwheel in the opposite direction.



Override declutch
6 – Repeat the clutch operations in the opposite way.

Caution : the clutch lever operation is not allowed when the springs are compressed, that causes damages to the override. The declutch operation can be done only with the actuator in safety position, i.e. springs decompressed.
The operation no. 5 must be imperatively done before system declutch.

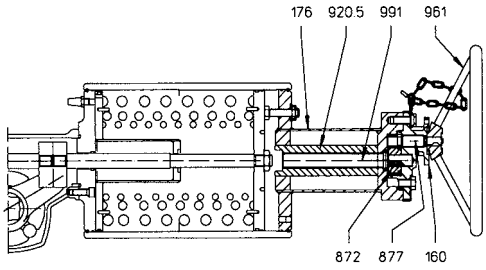
The actuator can be now pressurized.

Options

Manual emergency control

DYNACTAIR 200 to 800: emergency control to be pushed

A manual emergency control to be pushed can be fitted on the cylinder head.
Operation by handwheel dia.500 mm with reduction gear unit.
This control can be locked in any position by means of a chain.



Construction

- sub-assembly sleeve 176 in treated steel with cataphoresis coating,
- nut 920.5 in bronze,
- operating screw 991, toothed wheel 872 and pinion 877 in treated steel,
- cover 160 in JS 1030 ductile iron,
- handwheel 961 in welded steel.

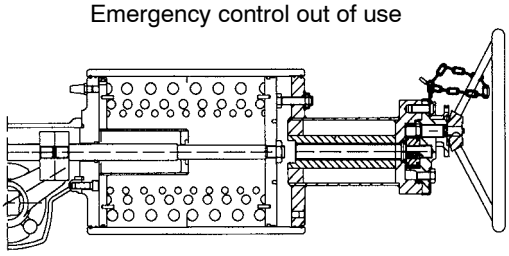
Instructions for emergency control operation

The manual emergency control should only be used under the following recommendations:

- ***absence of air pressure in the actuator,***
- ***the actuator chambers must be to the open air.***

Check the actuator is not under air pressure before emergency control use.

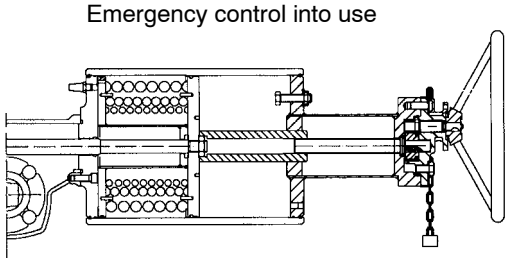
Emergency control out of use



Bringing into service

- Unlock the handwheel,
- Turn the handwheel:
  - clockwise for valve closure,
  - anticlockwise for valve opening.
- Handwheel turns number for a complete operation:
  - DYNACTAIR 200 and 400: 123 turns,
  - DYNACTAIR 800: 231 turns.

Emergency control into use



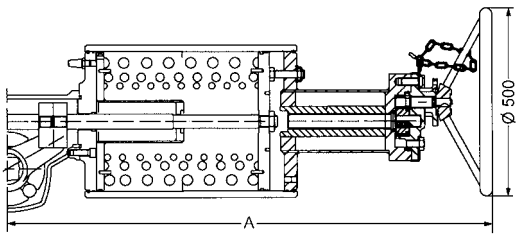
Before normal use of the actuator, imperatively bring out of use the emergency control.

- Bring back the control to its initial position,
- Lock the handwheel.

Now, the pressurization of the actuator is possible.

Overall Dimensions

DYNACTAIR	A (mm)
200	1245
400	
800	1456



Stroke limiter

DYNACTAIR 1.5 to 100

Stroke limiter adjustable between 0 and 90° in only one direction.
The device is fitted instead of the standard adjustment end-stop.
Available on open **or** close direction.
Consult us.

DYNACTAIR 1.5 to 6

Stroke limiter adjustable in both directions (open and close).
The device is fitted between the valve top flange and the actuator.
Consult us.

11.07.05
8511.1/6-10

Pneumatic Actuator

SISTO-LAP

Piston Actuator
Maintenance-free
LAP-SF type
LAP-ÖF type
LAP-AZ type

Type Series Booklet

SISTO

Pneumatic Actuators

Piston Actuators

SISTO-LAP

SISTO-LAP product description

Pneumatic piston actuator designed for valves with a linear stem movement (globe, diaphragm and gate valves).

Suitable for building services, industrial plants, power stations, the food and beverages industries and the chemical industry.

The pneumatic actuators can also be used in potentially explosive atmospheres.

Product benefits

- Actuator variants with optimised stroke ensure full valve travel with minimum air consumption
- Smooth, low-friction movement of the piston assembly with double cup seal or low-friction piston seal

Operating data

- Max. permissible control medium temperature: 80 °C
- Permissible ambient temperature: -10 °C to +80 °C

Permissible control pressure

Piston diameter mm	Top flange DIN ISO 5210/ DIN 3358	Permissible control pressure $p_{ctr.\ perm.}$ bar
80 - 250	F10	5,5 - 10
250	F14	5,5 - 10
300	F10	5,5 - 7
300	F14	5,5 - 10
D250[1)]	F14	5,5 - 7
D300[1)]	F14	5,5 - 7
500	F25	4-10
D500[1)]	F25	4-7

Pneumatic actuators from SISTO are suitable for the control medium air and all non-aggressive gases. The control medium must be free from any solid particles and condensed water (Important in the event of frost!).

Design details

Design

- Double-acting piston, with piston rod extending from one end only, with or without spring
- Piston rod sealed by U-ring and scraper ring
- Piston with double cup seal and vulcanised metal disc
- Mechanical travel stop in the actuator for closed and open positions
- Flanges to DIN ISO 5210/DIN 3358
- Pistons Ø 80 to Ø 300 = F10
- Pistons Ø 250 to Ø 300 = F14
- Piston Ø 500 = F25
- Installation kit and mating dimensions see technical data sheet of the valve type series

Actuator function

- LAP-AZ actuator type: air-to-open/air-to-close
- LAP-ÖF actuator type: spring-to-open/air-to-close
- LAP-SF actuator type: air-to-open/spring-to-close

Accessory variants

- Exhaust regulator
- Double piston
- Throttling valve
- Piston rods protruding from both cylinder end caps (stroke limited in closing direction)
- Filter/pressure reducer
- Emergency handwheel
- Solenoid valves, 3/2-way; 5/2-way
- Position switch(es)
- Silencer
- Positioner

On all enquiries/orders please specify

Actuator

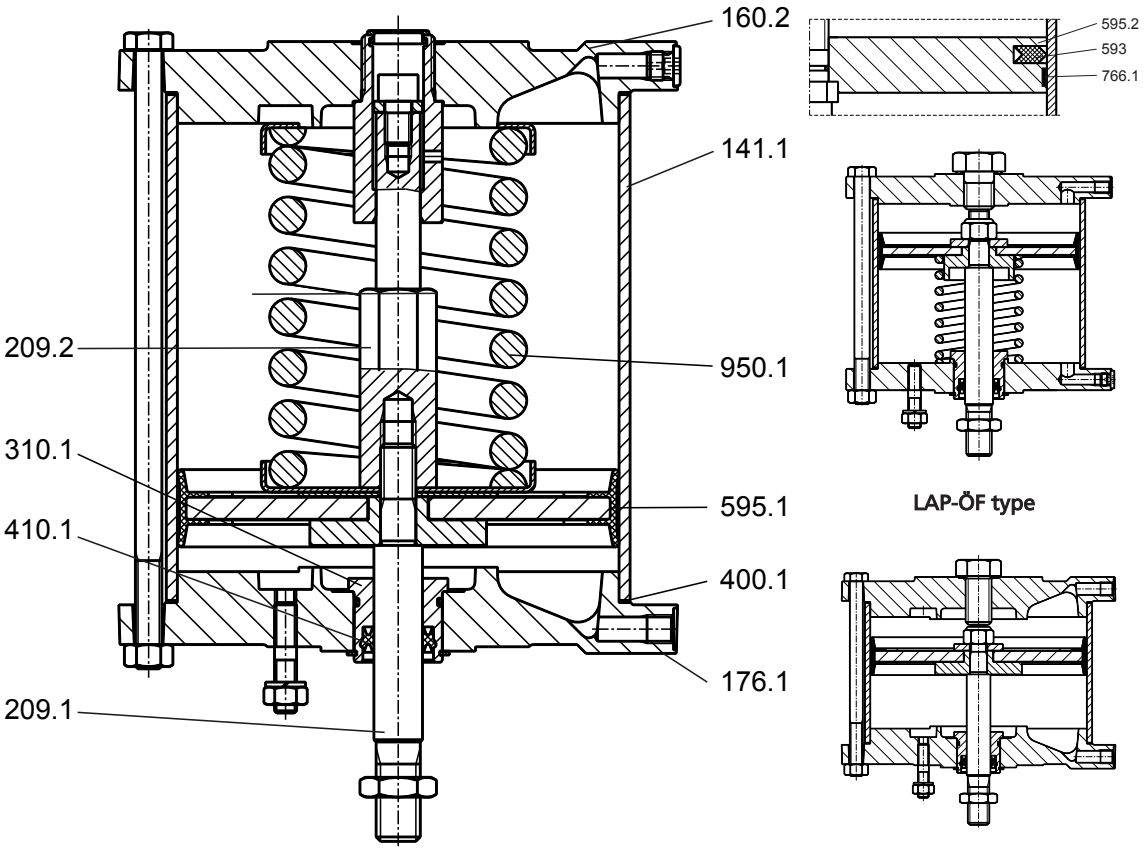
1. Type
2. Control pressure P_{ctr}
3. Accessories
4. Number of type series booklet
5. Valve travel

1) Double piston

6. Break-to-open force
7. Break-to-close force
8. End-to-open force
9. End-to-close force

Materials

SISTO-LAP piston actuator



LAP-SF type

LAP-ÖF type

LAP-AZ type

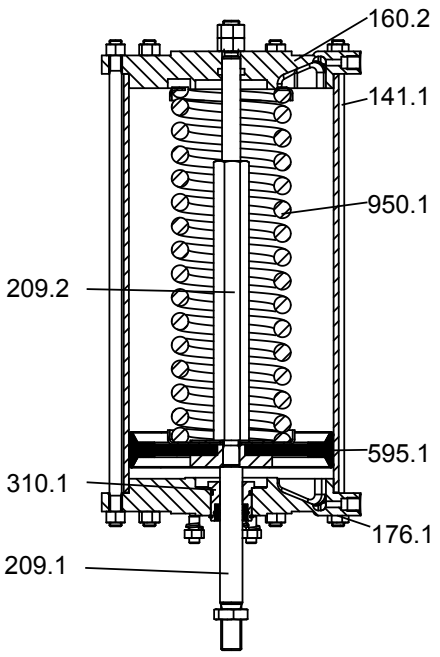
Parts list

Part No.	Description	Material	Material number	Piston Ø dK
141.1	Cylinder	CuZn37 AlMgSi	2.0321 3.3206	Ø 80 Ø 125 - Ø 300
160.2	Top end cap	AlCu4PbMgMn AlSi7Mg0,3	3.1645 3.2371	Ø 80 - Ø 160 Ø 200 - Ø 300
176.1	Bottom end cap	AlCu4PbMgMn AlSi7Mg0,3	3.1645 3.2371	Ø 80 - Ø 160 Ø 200 - Ø 300
209.1	Lower piston rod	Stainless steel - X14CrMoS17	1.4104	Ø 80 - Ø 300
209.2	Upper piston rod	Stainless steel - X14CrMoS17	1.4104	Ø 80 - Ø 300
310.1[2)]	Plain bearing	Plastic – POM		Ø 80 - Ø 300
400.1[2)]	Gasket	Plastic – AFM 30		Ø 80 - Ø 300
410.1[2)]	Seal/wiper set	Plastic – L96-SFR/NBR		Ø 80 - Ø 300
593[2)]	Piston seal	Acrylonitrile butadiene rubber – NBR		Ø 300
595.1[2)]	Piston assembly	Steel/acrylonitrile butadiene rubber – St/NBR		Ø 80 - Ø 250
595.2	Piston	Cast aluminium alloy - G-AlSi7Mg0.3	3.2371	Ø 300
766.1	Guide band	PTFE		Ø 300
950.1	Spring	Spring steel		Ø 80 - Ø 300

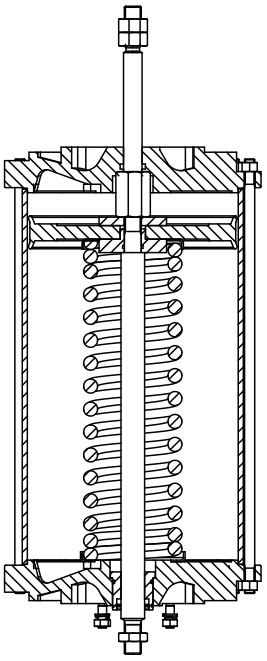
2) Recommended spare parts (= complete set of sealing elements)

Materials

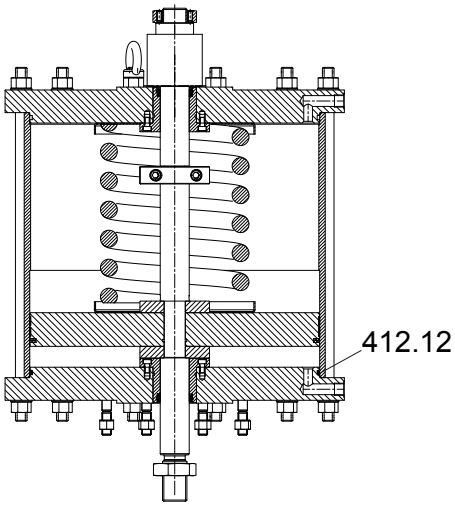
SISTO-LAP piston actuator
(with piston rods protruding from both cylinder end caps)



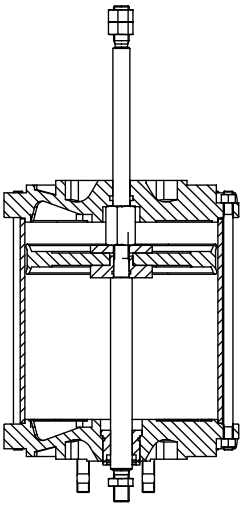
LAP-SF....DK



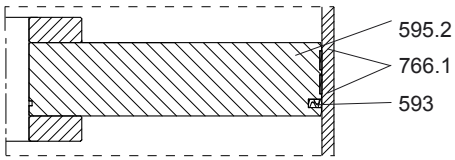
LAP-ÖF....DK



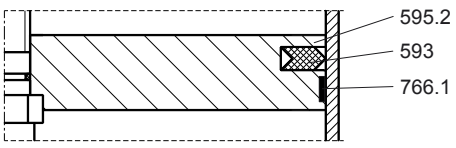
LAP-SF 500....DK



LAP-AZ....DK



Piston 500



Piston 300

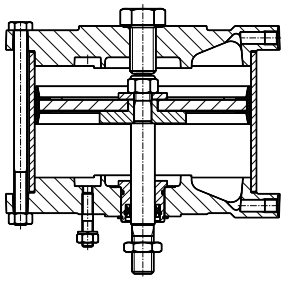
Parts list

Part No.	Description	Material	Material number	Piston Ø dK
141.1	Cylinder	CuZn37 AlMgSi0,5F22 St E355	2.0121 3.3206 1.0580	Ø 80 Ø 125 - Ø 300 Ø 500
160.2	Top end cap	AlCuMgPb AlSiMg AW2017A	3.1645 3.2371	Ø 80 - Ø 160 Ø 200 - Ø 300 Ø 500
176.1	Bottom end cap	AlCuMgPb AlSiMg AW2017A	3.1645 3.2371	Ø 80 - Ø 160 Ø 200 - Ø 300 Ø 500
209.1	Lower piston rod	Stainless steel – X12CrMoS17	1.4104	Ø 80 - Ø 500
209.2	Upper piston rod	Stainless steel – X12CrMoS17	1.4104	Ø 80 - Ø 500
310.1[3)]	Plain bearing	Plastic - POM CWR710R	 2.0540	Ø 80 - Ø 300 Ø 500
412.12	O-Ring	NBR		Ø 500
593[2)]	Piston seal	Acrylonitrile butadiene rubber – NBR		Ø 300
595.1[2)]	Piston assembly	Steel/acrylonitrile butadiene rubber – St/NBR		Ø 80 - Ø 250
595.2	Piston	Cast aluminium alloy - G-AlSi7Mg AW2017A	3.2371	Ø 300 Ø 500
766.1	Guide band	PTFE		Ø 500
950.1	Spring	Spring steel		Ø 80 - Ø 300

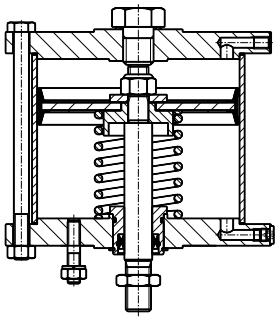
3) Recommended spare parts (= complete set of sealing elements)

Variants

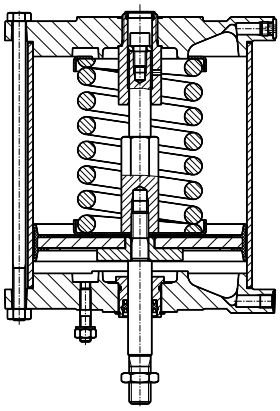
SISTO-LAP piston actuator and accessories



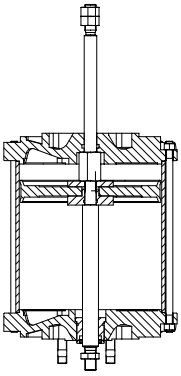
LAP-AZ type



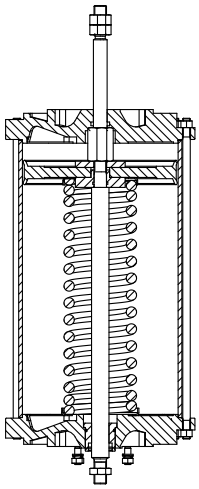
LAP-ÖF type



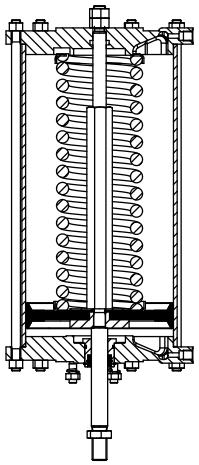
LAP-SF type



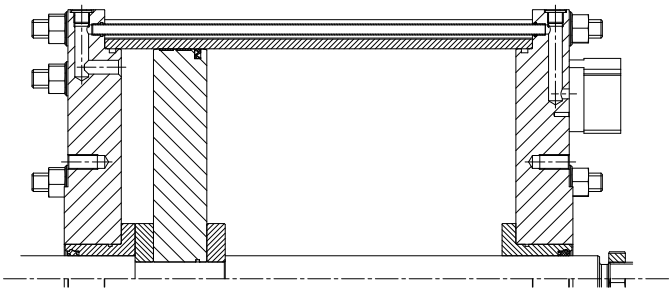
LAP-AZ....DK type



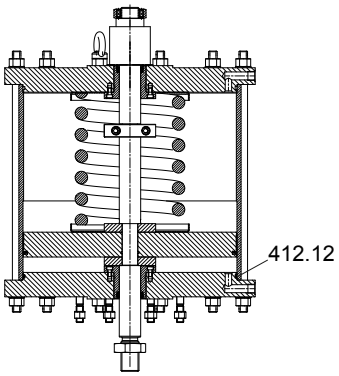
LAP-AZ....DK type



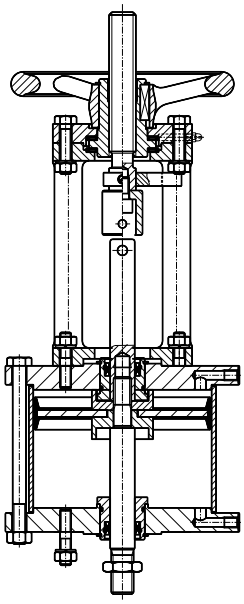
LAP-SF....DK type



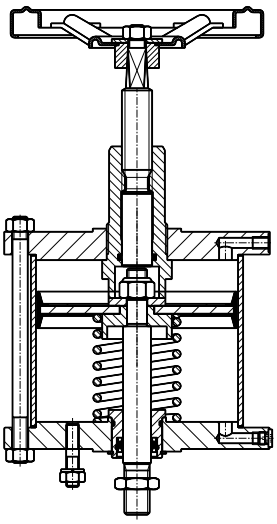
Internal air routing, example: LAP-AZ-500
(only available for LAP-500 design)



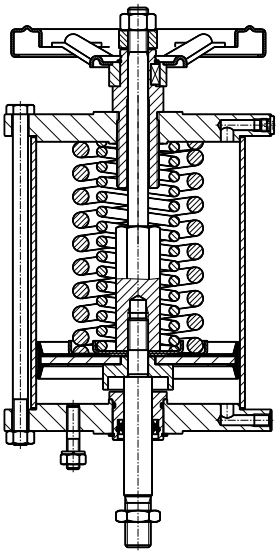
LAP-SF-500....DK type
(design with piston rods protruding from both cylinder end caps only)



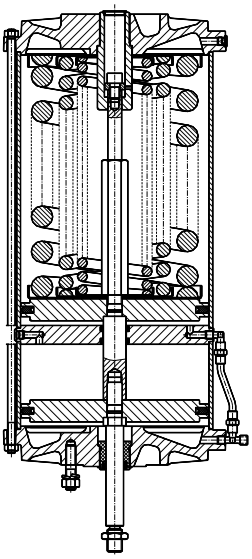
LAP-AZ type with emergency handwheel



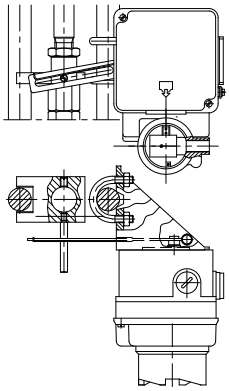
LAP-ÖF type with emergency handwheel



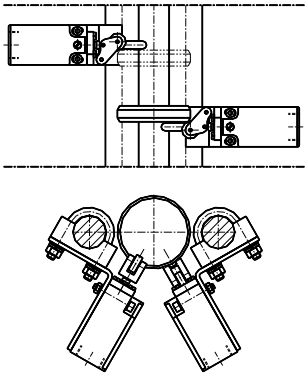
LAP-SF type with emergency handwheel



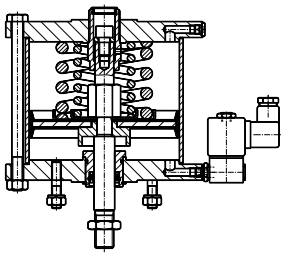
LAP-SF type with double piston



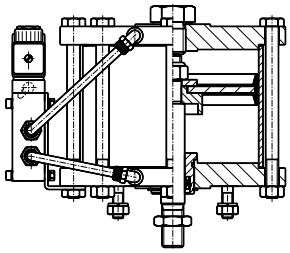
Configuration with positioner



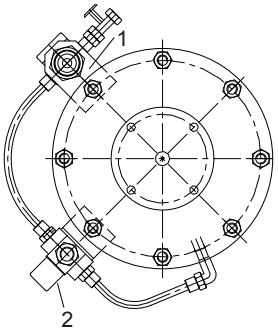
Configuration with position switches



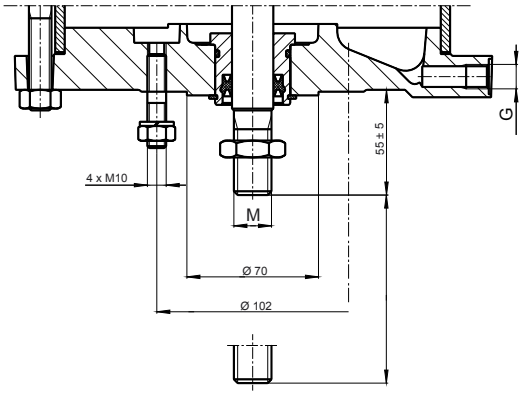
LAP-SF type with 3/2 directional control valve



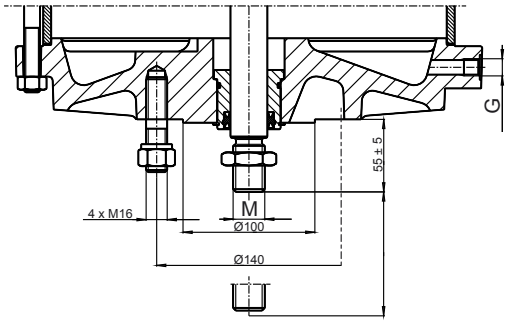
LAP-AZ type with 5/2 directional control valve



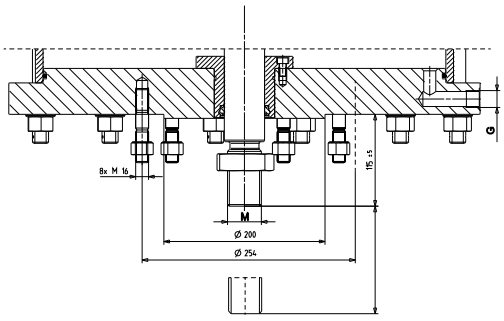
1) Filter/pressure reducer
2) Solenoid valve



Flange connection F10[4)]



Flange connection F14[4)]



Flange connection F25[4)]

Symbols key

Symbol	Description
G	G1/8" for piston Ø 80/125/160 G1/4" for piston Ø 200/250/300 G 1/2" for piston Ø 500
M	M12 for piston Ø 80/125 M20 for piston Ø 160 to 300 M24 for piston Ø 300/F14 (optional) M42x3 for piston Ø 500

Mating dimensions - Standards

Flange connection:	DIN ISO 5210 / DIN 3358
Pipe connection:	DIN ISO 228

4) See "Symbols key" table

ACTAIR 1,5 to 1600

ACTAIR 400

ACTAIR 1,5 to 200

Double acting pneumatic actuators

ACTAIR 1,5-3-6-12-25-50: rack and pinion kinematics

ACTAIR 100-200: scotch-yoke kinematics

ACTAIR 400-800-1600: yoke patented kinematics

Output torques up to 17600 Nm

Applications

- All sectors of Water, Industry and Energy.

General features

- Designed for the automation of ¼ turn valves (butterfly valves, ball valves), the ACTAIR series of double acting pneumatic actuators and their AMTROBOX/ AMTRONIC/SMARTRONIC boxes are involved in all functions of control and supervision encountered in all modern processes, and more particularly in communication by fieldbus.
- The mounting plate is in accordance with ISO 5211 standard.
- The actuator is mounted directly or by means of an adaptator on ¼ turn valve plate.
- Equipped with an interchangeable insert, they can be easily fitted on different valve shaft (square end, flat end, key…).
- The ACTAIR series actuators are equipped, in standard version, with a visual pointer and adjustable mechanical travel stops.
- Air or any neutral gas, filtered, dry or lubricated and compressed to a pressure 3 to 8 bar:
  - filtration: 50 µm
  - drying: dew point at max. working pressure ≤ 4 °C and min. temperature -5 °C

Protection

- They are hose and fine dust proof and are protected against accidental immersion effects (protection degree: IP 67).

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External coating

- ACTAIR 1,5 to 200: Housing with hard anodization 50 µm thickness and cylinder head with black cataphoresis coating 30 µm.
- ACTAIR 400 to 1600: Polyurethane paint (colour dark grey RAL 7016, 80 µm thickness).

Working temperature range

- En standard:
  de –20 °C to +80 °C
- En variante for ACTAIR 1.5 to 200:
  de –40 °C to +80 °C: dynamic O-rings in special Nitrile,
  de –20 °C to +120 °C: dynamic O-rings in Viton (available with corrosive motive medium).

Standard variante

- ATEX version in accordance with 94/9/EC directive.
- DYNACTAIR series spring return actuator range which is based on the double acting actuators.
  Please consult the type series booklet DYNACTAIR 1,5 to 800 no. 8511.1.

Options

- Declutchable manual override RMD
- Adjustable stroke

Kinematic

3 kinematics are used for the actuators operation:
- rack and pinion kinematics for ACTAIR 1,5-3, ACTAIR 6, ACTAIR 12, ACTAIR 25 and ACTAIR 50,
- scotch-yoke kinematics for ACTAIR 100 and ACTAIR 200,
- yoke patented kinematics for ACTAIR 400, ACTAIR 800 and 1600.

Mounting plate according to ISO 5211 standard.

Production range

ACTAIR Type	ISO 5211 Mounting plate*	Maximum allowable dimensions for the shaft			
		Height	Driving by square	Driving by flat	Driving by key
1,5	F04	24	11	11	Please, consult us
3	F04 or F05+F04 (45°)*	24	11	11	
6	F05 – F07	30	16	14	
12	F05 – F07	32	19	17	
25	F07 – F10	40	22	22	
50	F10 – F12	45	27	27	
100	F10 – F12	55	36	36	
200	F14	65	50	46	
400	F16	80	60	55	
800	F16 – F25	95	70	75	
1600	F25 – F30	110	90	85	

*** Direct adaptation onto identical mounting plate.**
Adaptation by intermediate flange onto different plate (different size or shape).

Output torques (Nm) relating to control fluid pressure

The output torque of the actuator depends on the pressure of the control fluid.
The table below shows different output torques as a function of control fluid pressure.

Type	Maximum allowable output torque (Nm)	Control fluid pressure in bar																			
		3			4			5			6			8							
Rack and pinion kinematics																					
1.5	20	9			12			15			18			20							
3	55	25			33			40			50			55							
6	105	48			64			80			96			105							
12	170	89			115			140			155			170							
25	385	178			237			290			350			385							
50	640	357			475			520			580			640							
Scotch-yoke kinematics																					
		0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°	0°	45°	90°					
100	1320	600	360	600	800	480	800	1000	600	1000	1200	720	1200	1320	792	1320					
200	2640	1200	720	1200	1600	960	1600	2000	1200	2000	2400	1440	2400	2640	1584	2640					
Yoke patented kinematics																					
		0°	30°	60°	90°	0°	30°	60°	90°	0°	30°	60°	90°	0°	30°	60°	90°	0°	30°	60°	90°
400	4400	2700	2970	2700	700	3200	3520	3200	800	4000	4400	4000	1000	4400	4840	4400	1100	4400	4840	4400	1100
800	8800	5160	5676	5160	1300	6800	7480	6800	1700	8600	9460	8600	2150	8800	9680	8800	2200	8800	9680	8800	2200
1600	17600	9500	10450	9500	2500	12500	13750	12500	3150	15500	17050	15500	3900	17600	19360	17600	4400	17600	19360	17600	4400

Control fluid pressure

Air or any neutral gas, filtered, dry or lubricated and compressed to a pressure 3 to 8 bar:
- filtration: 50 μm,
- drying: dew point at max. working pressure ≤ 4° C and min. temperature -5° C

If a lubrification is required - the lubrification increases the actuator life and particularly recommended in throttling applications - the use of a non detergent oil without aggressive additive is recommended:
- viscosity 2 to 3° ENGLER at 50° C
- anhiline point 90° C to 105° C
- flow 1 to 3 drop for 500 NL/mn.

For throttling applications with dry air, please consult us.

Operating time

The table below defines the minimum operation times under control air pressure 5 bar and the operation rates per minute of the ACTAIR on/off function.

ACTAIR Type	Mini operation time **On/off function**			Operation rates per minute
	ACTAIR + AMTRONIC	ACTAIR with distributor ISO-1 or NAMUR onto the housing	ACTAIR direct connexion	
1.5		0,5 second		60 max.
3	1 second	0,5 second		60 max.
6	1 second	0,5 second		60 max.
12	2 seconds	1 second		30 max.
25	4 seconds	1,5 seconds		20 max.
50	5 seconds	2 seconds		15 max.
100	6 seconds	3 seconds		10 max.
200	9 seconds	4 seconds		7 max.
400	25 seconds	12 seconds	8 seconds	4 max.
800	50 seconds	25 seconds	15 seconds	2 max.
1600	90 seconds	45 seconds	20 seconds	1 max.

Adjust construction on request for:
- other operation times,
- high operation rates.

Consult us.

Capacity

ACTAIR Type	Capacity in cm^3	
	For opening	For closing
1,5	72	100
3	240	305
6	570	660
12	1 180	1 265
25	2 400	2 508
50	4 700	4 680

ACTAIR Type	Capacity in cm^3	
	For opening	For closing
100	5 280	4 380
200	9 800	8 500
400	15 960	15 720
800	35 300	35 300
1600	62 500	62 500

Construction

In the standard version, ACTAIR actuators are designed to ensure clockwise valve closure.
On request, anticlockwise arrangement is available.

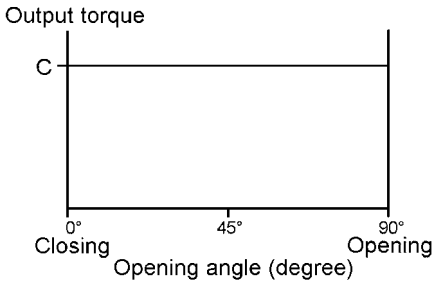
In standard version, these actuators are equipped with adjustable end-stops:
- ACTAIR 1,5:
  on close position **and** on open position
  adjustable on 2 positions: adjustment range ±2°.
  these adjustable end-stop are fixed on the side of the housing
- ACTAIR 3 to 200 :
  on close position **o** on open position (see pages 6 and 7)
  adjustable on only one position: adjustment range ±2,5°.
  In standard, adjustable end-stop on close position.
  In option, adjustable end-stop on open position.
- ACTAIR 400-800-1600:
  on close position **and** on open position
  adjustable on 2 positions: adjustment range ±2°.

ACTAIR 1,5 to 50: Rack and pinion kinematics

The rack and pinion kinematics develop a constant output torque.
The movement of the rack/pistons secured by the pressure causes a ¼ turn clockwise rotation of the pinion integral with the valve shaft.

Curve of the rack and pinion kinematics

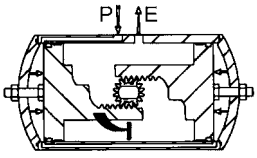
Constant output torque



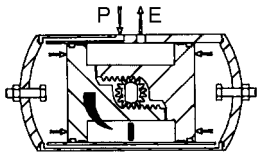
ACTAIR 3 to 50: Clockwise closure version – Adjustable mechanical travel stop at the closed position

Opening operation

Actuator/Valve closed

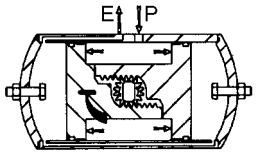


Actuator/Valve open

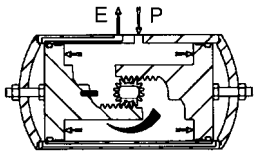


Closure operation

Actuator/Valve open



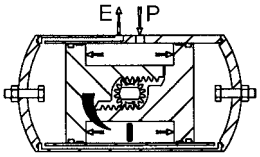
Actuator/Valve closed



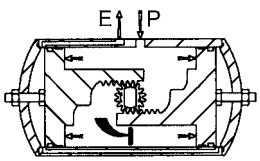
Clockwise closure version – Adjustable mechanical travel stop at the open position

Opening operation

Actuator/Valve closed

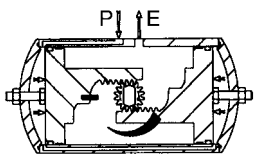


Actuator/Valve open

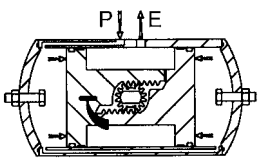


Closure operation

Actuator/Valve open



Actuator/Valve closed



ACTAIR 100 and 200: Scotch-yoke kinematics

The scotch-yoke kinematics develop a variable output torque very well suited to the operation of ¼ turn valves.

The movement transmission is achieved by means of the piston system ①, rollers ②, scotch-yoke ③ and shaft ④.
The movement of the pistons ① secured by the pressure causes the sliding of the rollers ② in the grooves of the yoke ③. The yoke ③ allows the rotation of the shaft ④ integral with the valve shaft.

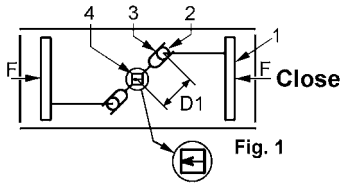
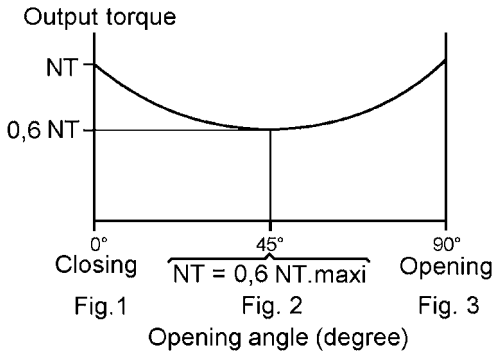


Fig. 1

Curve of the Scotch yoke kinematics

Output torque for F constant C = F x D



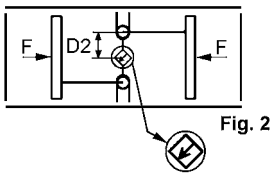


Fig. 2

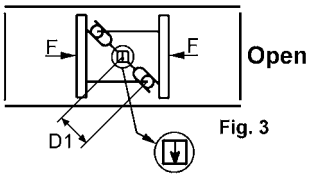
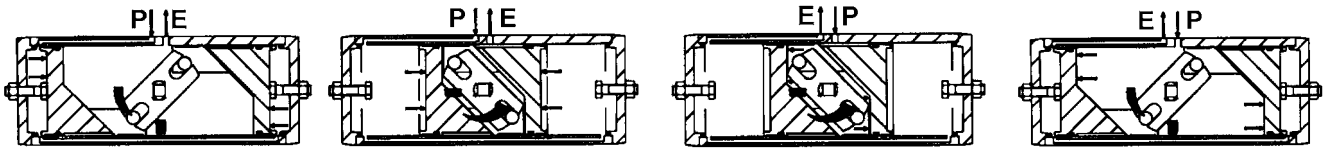


Fig. 3

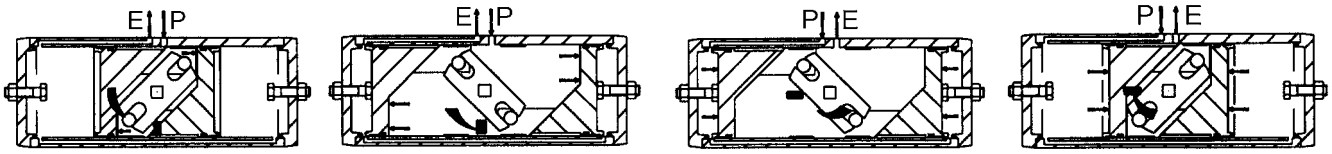
Clockwise closure version – Adjustable mechanical travel stop at the closed position

Opening operation		Closure operation	
Actuator/Valve closed	Actuator/Valve open	Actuator/Valve open	Actuator/Valve closed



Clockwise closure version – Adjustable mechanical travel stop at the open position

Opening operation		Closure operation	
Actuator/Valve closed	Actuator/Valve open	Actuator/Valve open	Actuator/Valve closed



ACTAIR 400 to 1600: Yoke AMRI patented kinematics

The yoke AMRI patented kinematics develop a variable output torque very well suited to the operation of ¼ turn valves with hydrodynamic torque.

The movement transmission is achieved by means of the piston system ①,the slide operating nut ②, the rolling pad ③ and the yoke ④.
The movement of the piston ① secured by the pressure in the actuator cylinder causes the linear travel of the operating nut ②. This movement drives the sliding of the pads ③ in the 2 slides of the operating nut ② and allows the rotation of the yoke ④ integral with the valve shaft.

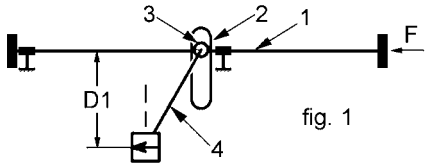


fig. 1

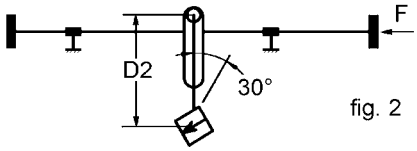


fig. 2

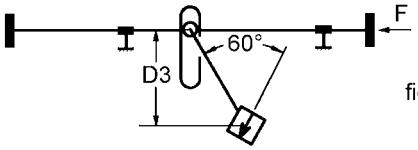


fig. 3

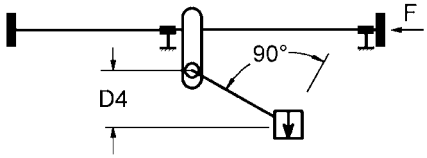
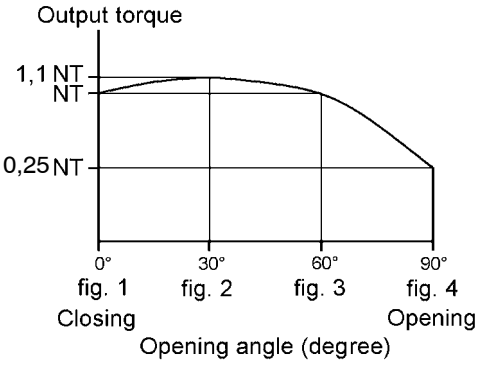


fig. 4

Curve of the yoke AMRI patented kinematics

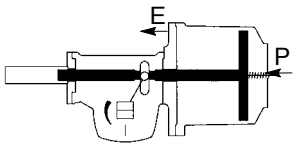
Output torque for F constant C = F x D



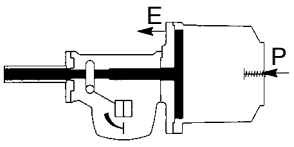
ACTAIR 400

Opening operation

Actuator/Valve closed

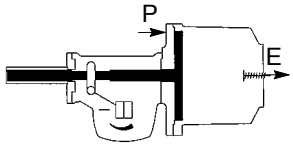


Actuator/Valve open

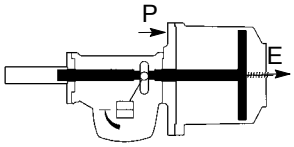


Closure operation

Actuator/Valve open



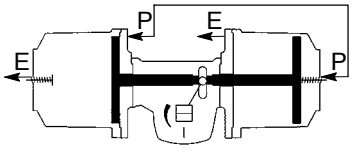
Actuator/Valve closed



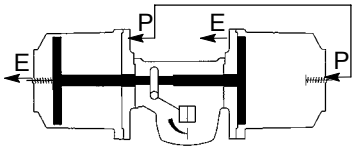
ACTAIR 800 and 1600

Opening operation

Actuator/Valve closed

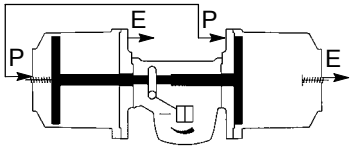


Actuator/Valve open

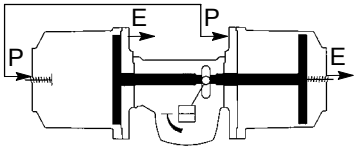


Closing operation

Actuator/Valve open



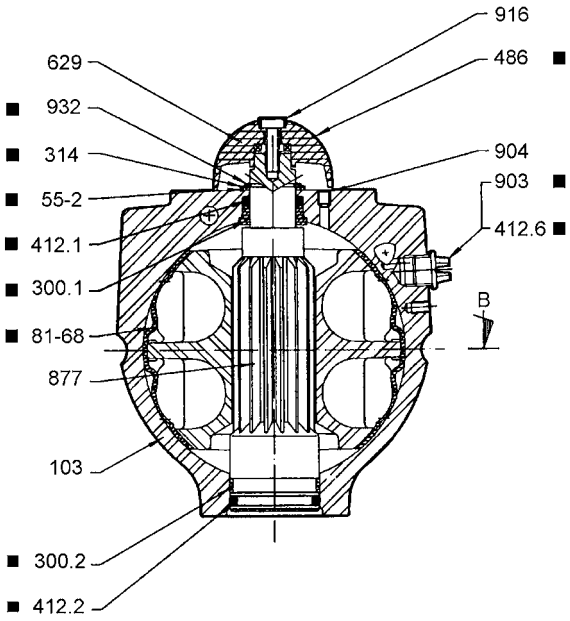
Actuator/Valve closed



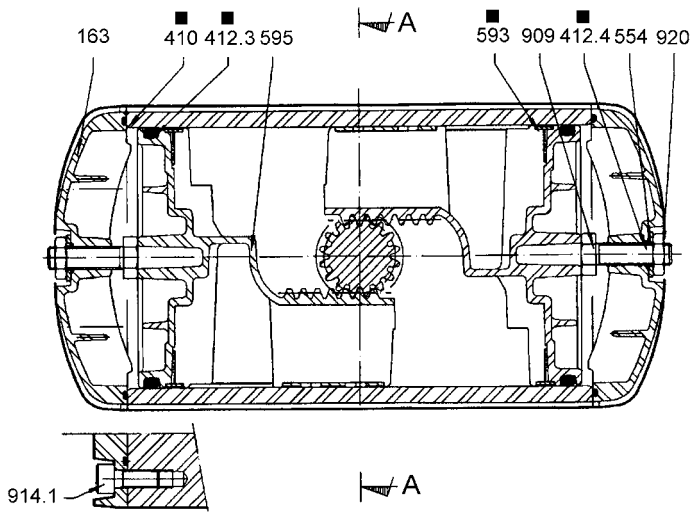
ACTAIR 1,5 to 50

Construction
Direct pneumatic connection ¼" G.

Section A-A



Section B-B



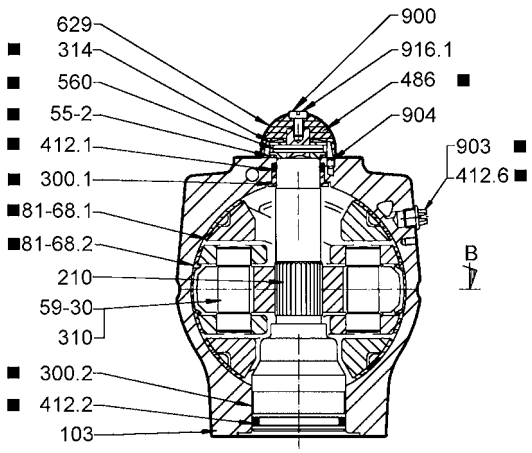
Item		Designation	Materials
103		Housing	Light alloy with 50 µm hard anodization
163		Cylinder head	Light alloy with 30 µm cataphoresis coating
300.1	■	Upper bearing	Acetal
300.2	■	Lower bearing	Acetal
314	■	Thrust washer	Stainless steel type 316
410	■	Cylinder head gasket	Nitrile
412.1	■	O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.2	■	O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.3	■	Piston O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.4	■	O-ring	Nitrile
412.6	■	O-ring	Nitrile
486	■	Ball	Stainless steel
554		Washer	Stainless steel A4-70
55-2	■	Friction washer	Acetal
593	■	Piston bearing	Acetal
595		Piston	Light alloy
629		Pointer	Polyamide 6-6 + treatment against U.V. rays
81-68	■	Piston guide	Acetal
877		Pinion	Zinc coated steel
903	■	Plug	Polyamide 6-6
904		Socket screw	Stainless steel with cladding
909		Adjusting screw	Stainless steel A4-70
914.1		Hexagon socket head screw	Stainless steel A4-70
916		Plug	Polyethylene
920		Hexagonal nut	Stainless steel A4-70
932	■	Spring retaining ring	Stainless steel

■ Parts included in the spare parts kit
* Alternative: Special Nitrile (–40 °C to +80 °C) or Viton (–20 °C to +120 °C)

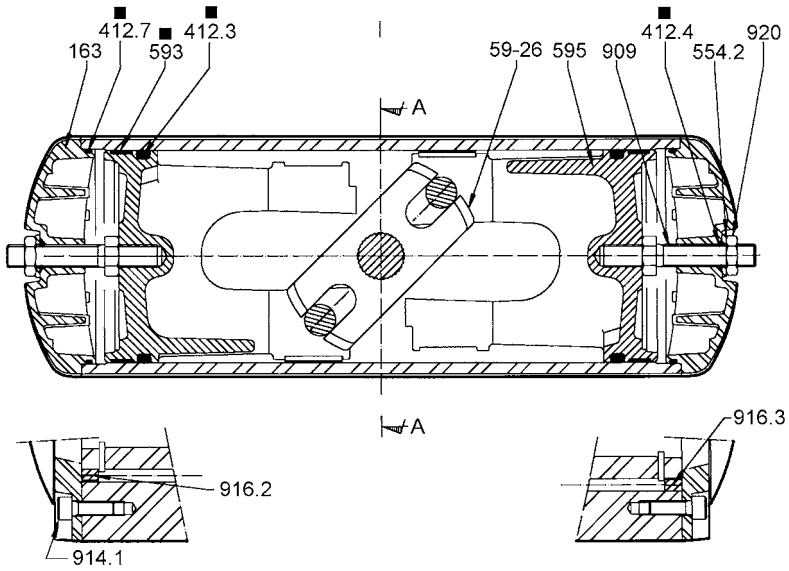
ACTAIR 100 and 200

Construction
Direct pneumatic connection ¼" G

Section A-A



Section B-B

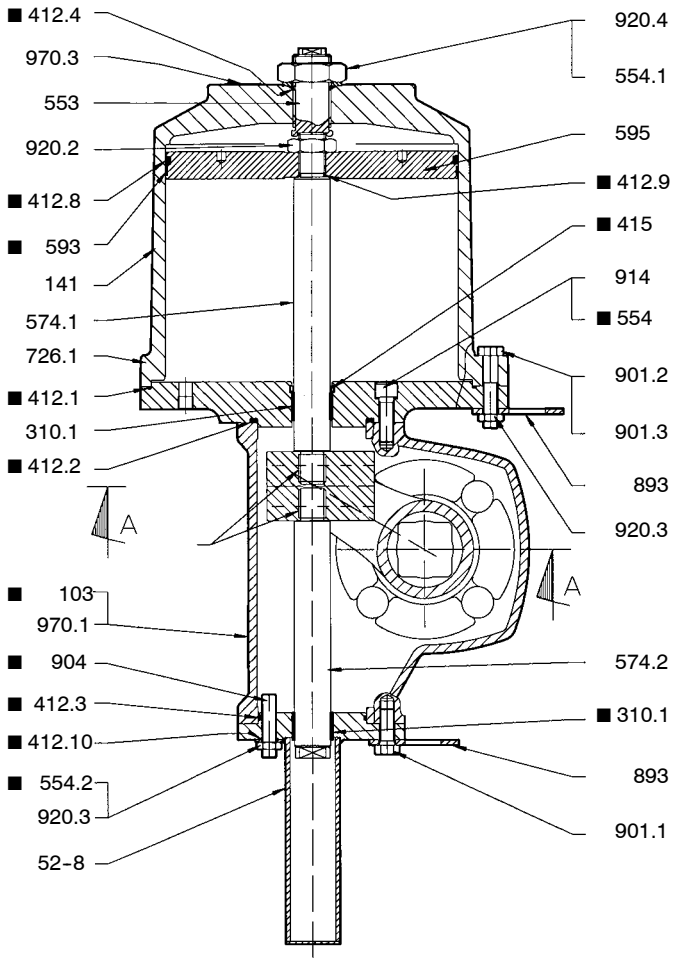


Item		Designation	Materials
103		Housing	Light alloy with 50 µm hard anodization
163		Cylinder shaft	Light alloy with 30 µm cataphoresis coating
210		Shaft	Zinc coated treated steel
300.1	■	Upper bearing	Acetal
300.2	■	Lower bearing	Stainless steel + PTFE
310		Self lubricating bearing	PTFE filled
314	■	Thrust washer	Zinc coated treated steel
412.1	■	O-ring	Nitrile
412.2	■	O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.3	■	Piston O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.4	■	O-ring	Nitrile (Working temperature range: from –20° up to +80° C)*
412.6	■	O-ring	Nitrile
412.7	■	O-ring	Nitrile
486	■	Ball	Stainless steel
554.2		Washer	Stainless steel A4-70
55-2	■	Friction washer	Acetal
560	■	Pin	Stainless steel
593	■	Piston bearing	Acetal
595		Piston	JS 1030 spheroidal graphite cast iron
59-26		Scotch-yoke	Treated steel
59-30		Roller	Treated steel
629		Pointer	Polyamide 6-6 + treatment against U.V. rays
81-68.1	■	Piston guide	Acetal
81-68.2	■	Piston guide	Acetal
900		Cheese head screw	Stainless steel A4-70
903	■	Plug	Polyamide 6-6
904		Socket screw	Stainless steel
909		Adjusting screw	Stainless steel A4-70
914.1		Hexagon socket head screw	Stainless steel A4-70
916.1		Plug	Polyethylene
916.2		Cylindric plug	Nitrile
916.3		Triangular plug	Nitrile
920		Hexagonal nut	Stainless steel A4-70
932	■	Circlips	Stainless steel

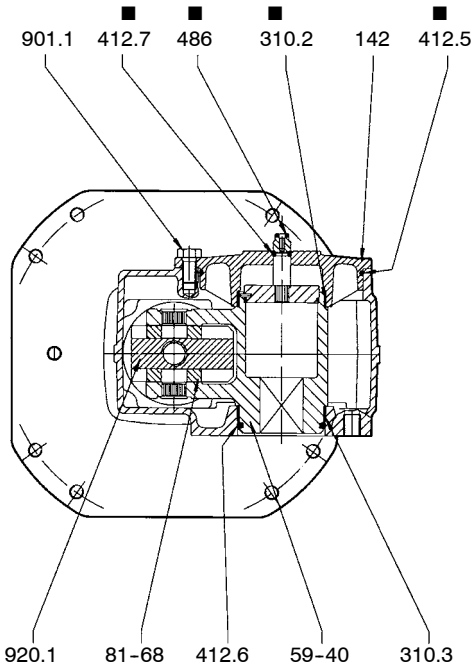
■ Parts included in the spare parts kit
* Alternative: Special Nitrile (–40° C to +80° C) or Viton (–20 ° C to +120 ° C)

ACTAIR 400

Construction



Section A-A



■ Parts included in the spare parts kit

ACTAIR 400

Standard construction
Direct pneumatic connection1/2" G

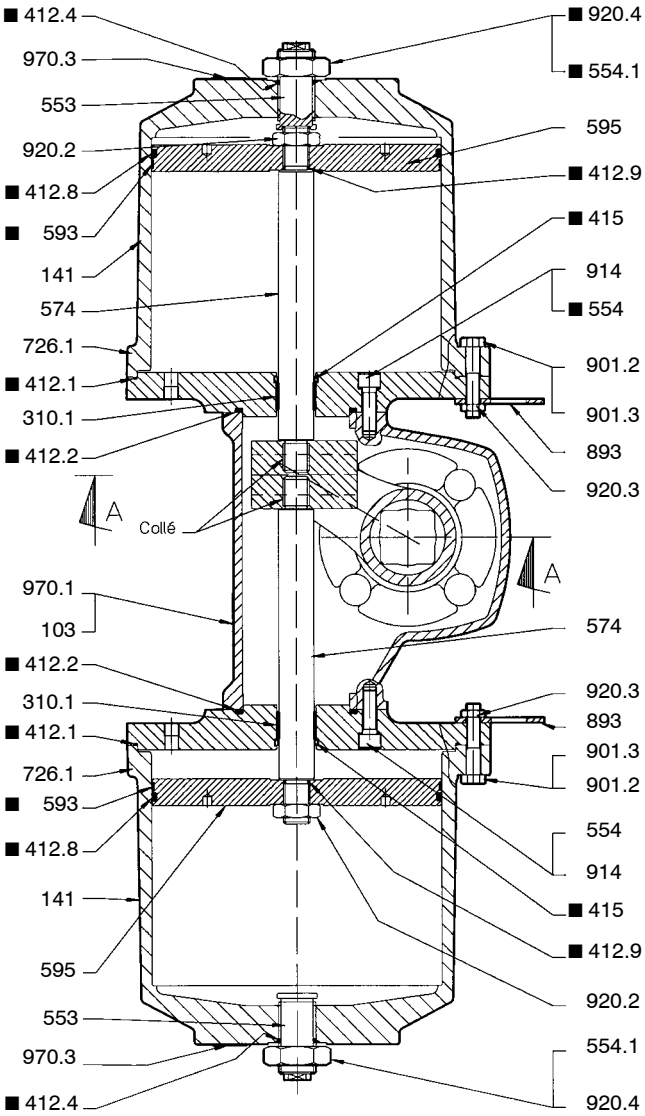
Item		Designation	Materials
103		Housing	JL 1040 grey cast iron or JS 1030 spheroidal graphite cast iron
141		Cylinder	JS 1030 spheroidal graphite cast iron
142		Cover	JL 1040 grey cast iron or JS 1030 spheroidal graphite cast iron
310.1		Self-lubricating bearing	PTFE filled on steel casing
310.2	■	Self-lubricating bearing	PTFE filled on steel casing
310.3		Self-lubricating bearing	PTFE filled on steel casing
412.1	■	O-ring	Nitrile
412.2	■	O-ring	Nitrile
412.3	■	O-ring	Nitrile
412.4	■	O-ring	Nitrile
412.5	■	O-ring	Nitrile
412.6		O-ring	Nitrile
412.7	■	O-ring	Nitrile
412.8	■	O-ring	Nitrile
412.9	■	O-ring	Nitrile
412.10	■	O-ring	Nitrile
415	■	Leap seal ring	Nitrile
486	■	Ball	Stainless steel
52.8		Protection sleeve	Treated steel
553		Thrust insert	Stainless steel 316
554	■	Washer	Nylon
554		Washer	Stainless steel A4-70
554.2		Washer	Stainless steel A4-70
574.1		Piston rod	Chromed steel
574.2		Rod	Chromed steel
593	■	Guiding strip	PTFE + Bronze
595		Piston	Steel
59-40		Chuck	JS 1030 spheroidal graphite cast iron + stainless steel
726.1		Flange	Steel + cataphoresis coating
81-68		Pressure pad	Nitrured steel
893		Soleplate	Steel + cataphoresis coating
901.1		Hexagon head screw	Stainless steel A4-70
901.2		Hexagon head screw	Stainless steel A4-70
901.3		Hexagon head screw	Stainless steel A4-70
904		Grub screw	Stainless steel A4-70
914		Screw	Stainless steel A4-70
920.1		Operating nut	JS 1060 spheroidal graphite cast iron
920.2		Hexagon nut	Stainless steel A4-70
920.3		Hexagon nut	Stainless steel A4-70
920.4		Hexagon nut	Stainless steel A4-70
970.1		Identity plate	Stainless steel
970.3		Stiker for mechanical stop use	Adhesive

■ Parts included in the spare parts kit

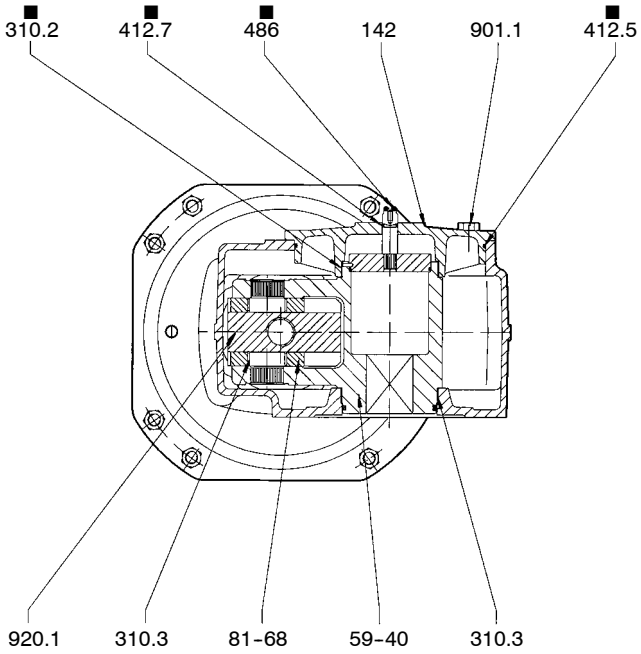
Other working temperature range: Please consult us.

ACTAIR 800

Construction



Section A-A



■ Parts included in the spare parts kit

ACTAIR 800

Standard construction
Direct pneumatic connection1/2" G

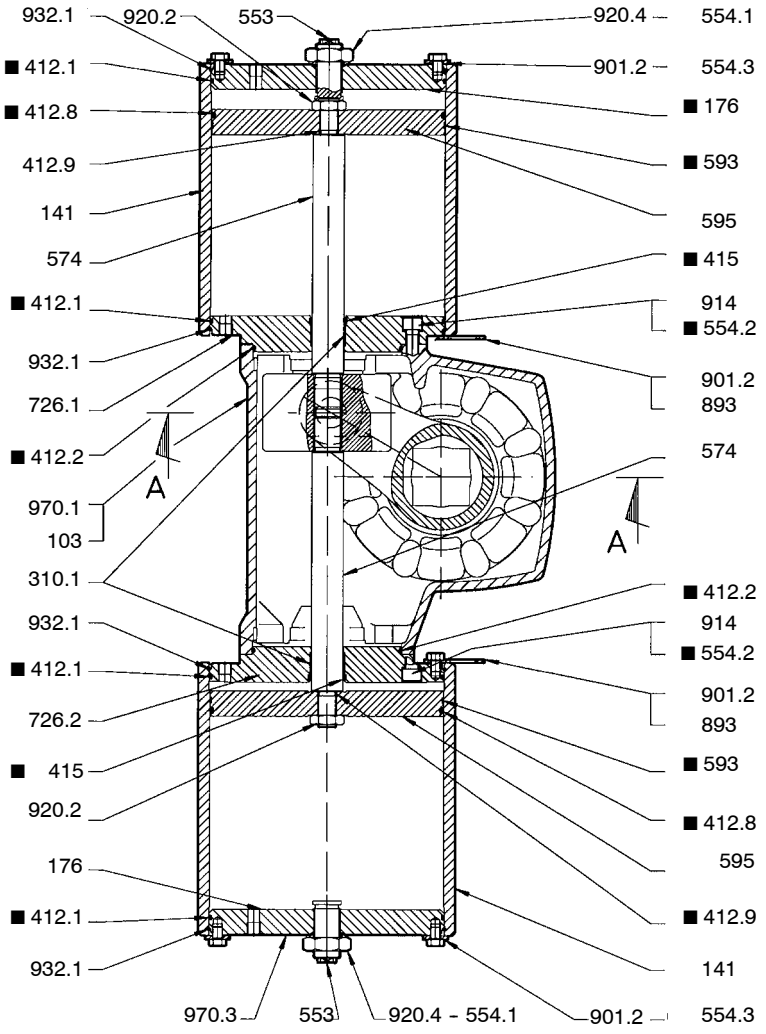
Item		Designation	Materials
103		Housing	JL 1040 grey cast iron or JS 1030 spheroidal graphite cast iron
141		Cylinder	JS 1030 spheroidal graphite cast iron
142		Cover	JL 1040 grey cast iron or JS 1030 spheroidal graphite cast iron
310.1		Self-lubricating bearing	PTFE filled on steel casing
310.2	■	Self-lubricating bearing	PTFE filled on steel casing
310.3		Self-lubricating bearing	PTFE filled on steel casing
412.1	■	O-ring	Nitrile
412.2	■	O-ring	Nitrile
412.4	■	O-ring	Nitrile
412.5	■	O-ring	Nitrile
412.7	■	O-ring	Nitrile
412.8	■	O-ring	Nitrile
412.9	■	O-ring	Nitrile
412.10	■	O-ring	Nitrile
415	■	Leap seal ring	Nitrile
486	■	Ball	Stainless steel
52.8		Protection sleeve	Treated steel
553		Thrust insert	Stainless steel 316
554	■	Washer	Nylon
554.1		Washer	Stainless steel A4-70
574		Rod	Chromed steel
593	■	Guiding strip	PTFE + Bronze
595		Piston	Steel
59-40		Chuck	JS 1030 spheroidal graphite cast iron + stainless steel
726.1		Flange	Steel + cataphoresis coating
81-68		Pressure pad	Nitrured steel
893		Soleplate	Steel + cataphoresis coating
901.1		Hexagon head screw	Stainless steel A4-70
901.2		Hexagon head screw	Stainless steel A4-70
901.3		Hexagon head screw	Stainless steel A4-70
914		Screw	Stainless steel A4-70
920.1		Operating nut	JS 1060 spheroidal graphite cast iron
920.2		Hexagon nut	Stainless steel A4-70
920.3		Hexagon nut	Stainless steel A4-70
920.4		Hexagon nut	Stainless steel A4-70
970.1		Identity plate	Stainless steel
970.3		Stiker for mechanical stop use	Adhesive

■ Parts included in the spare parts kit

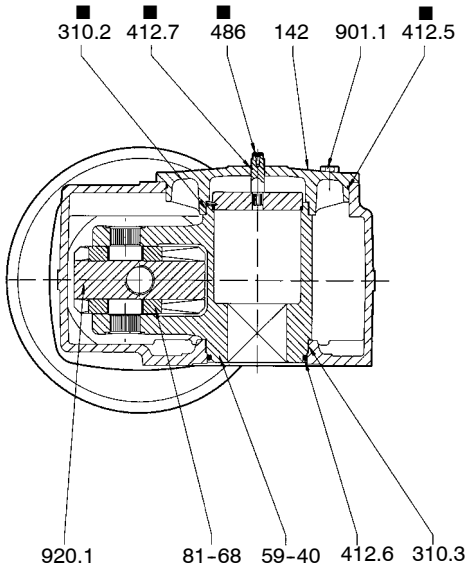
Other working temperature range: Please consult us.

ACTAIR 1600

Construction



Section A-A



■ Parts included in the spare parts kit

ACTAIR 1600

Standard construction
Direct pneumatic connection 3/4" G

Item		Designation	Materials
103		Housing	JS 1030 spheroidal graphite cast iron
141		Cylinder	Steel
142		Cover	JS 1030 spheroidal graphite cast iron
176	■	Cylinder head	Steel + cataphoresis coating
310.1		Self-lubricating bearing	PTFE filled on steel casing
310.2	■	Self-lubricating bearing	PTFE filled on steel casing
310.3		Self-lubricating bearing	PTFE filled on steel casing
412.1	■	O-ring	Nitrile
412.2	■	O-ring	Nitrile
412.5	■	O-ring	Nitrile
412.6		O-ring	Nitrile
412.7	■	O-ring	Nitrile
412.8	■	O-ring	Nitrile
412.9	■	O-ring	Nitrile
415	■	Leap seal ring	Nitrile
486	■	Ball	Stainless steel
553		Thrust insert	Stainless steel 316
554.1		Washer	Stainless steel A4-70
554.2	■	Washer	Stainless steel A4-70
554.3		Washer	Nylon
574		Piston rod	Chromed steel
593	■	Guiding strip	PTFE + Bronze
595		Piston	Steel
59-40		Chuck	JS 1030 spheroidal graphite cast iron + stainless steel
726.1		Flange	Steel + cataphoresis coating
726.2		Flange	Steel + cataphoresis coating
81-68		Pressure pad	Nitrured steel
893		Soleplate	Steel + cataphoresis coating
901.1		Hexagon head screw	Stainless steel A4-70
901.2		Hexagon head screw	Stainless steel A4-70
914		Screw	Stainless steel A4-70
920.1		Operating nut	JS 1060 spheroidal graphite cast iron
920.2		Hexagon nut	Stainless steel A4-70
920.4		Hexagon nut	Stainless steel A4-70
932		Retaining ring	Treated steel
970.1		Identity plate	Stainless steel
970.3		Stiker for mechanical stop use	Adhesive

■ Parts included in the spare parts kit

Other working temperature range: Please consult us.

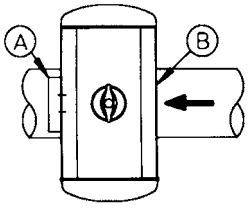
Mounting on valve

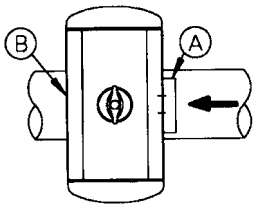
The actuator can be positioned in four positions, at intervals of 90°.
Unless otherwise stated, the actuator is mounted according to the arrangement N position1.

ACTAIR 1,5 to 200

Arrangement N

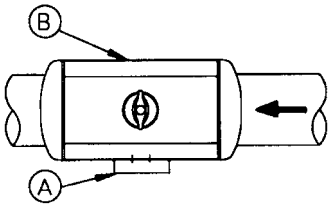
Position 1 Position 2

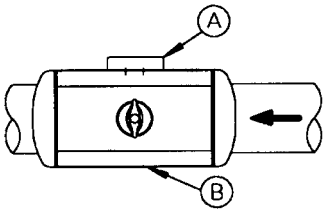




Arrangement M

Position 1 Position 2





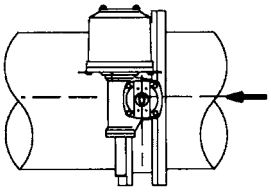
Flow direction
Valve shown in closed position

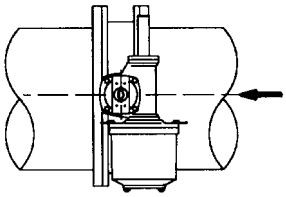
Interface A: direct connection to control fluid or via a NAMUR distributor
Interface B: electric and pneumatic connections of AMTRONIC box

ACTAIR 400 to 800

Arrangement N

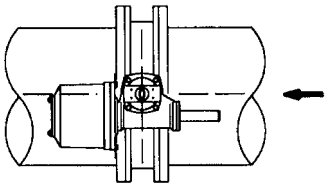
Position 1 Position 2

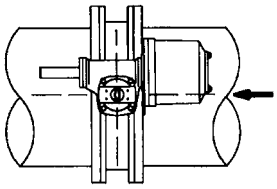




Arrangement M

Position 1 Position 2





Flow direction
Valve shown in closed position

These actuators are equipped with interchangeable inserts manufactured to the size and the form of different valve shafts for motorized operation (square end, flat end, key…).

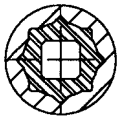
ACTAIR 1,5 to 50

Pinion with star driving allowing mounting of the insert at intervals of 45°

Flat end

Key end

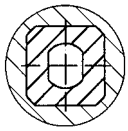
Square end



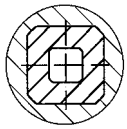
ACTAIR 100 to 1600

Shft or yoke with driving square and insert

Flat end



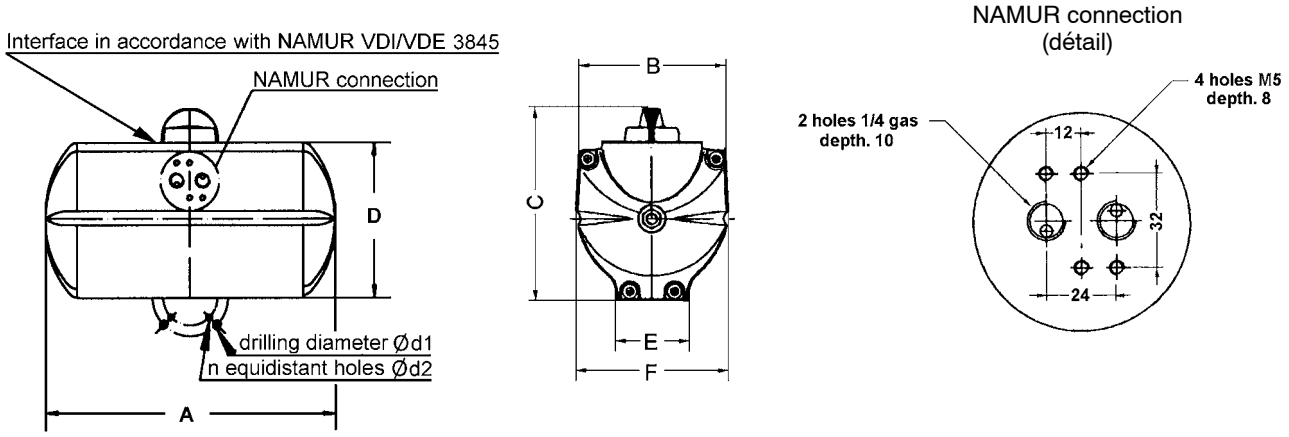
Square end



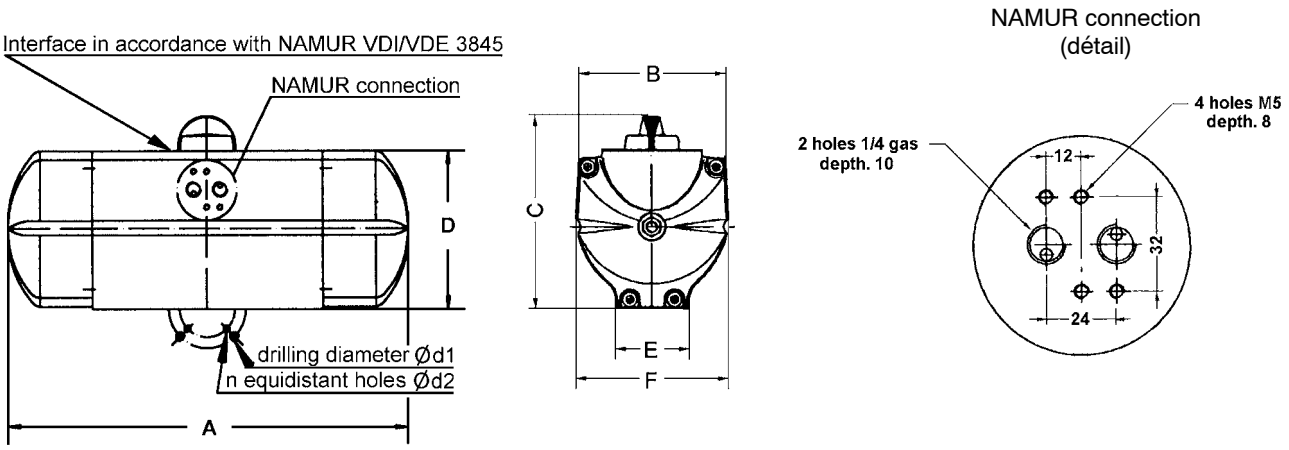
The actuators can be delivered with or without the coupling parts.

Overall dimensions (mm) and weights (kg)

ACTAIR 1,5 to 50



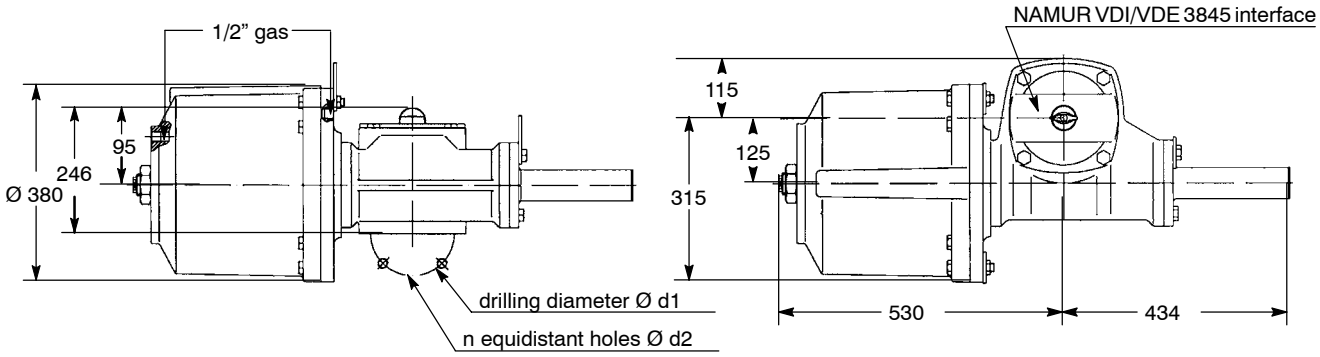
ACTAIR 100 and 200



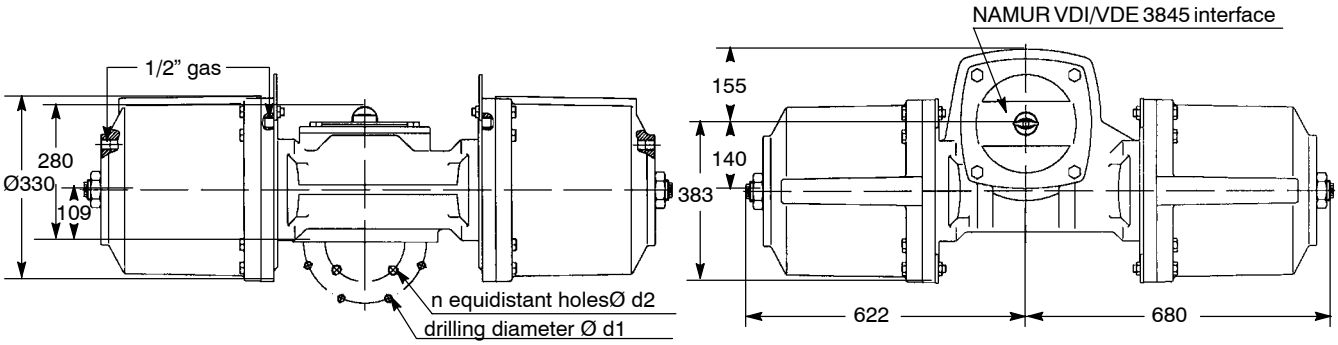
ACTAIR Type	A	B	C	D	E	F	ISO 5211 mounting plate ref	Ød1	Ød2	n	Weight kg
1.5	143	76	96	66	44	76	F04	42	M5	4	1.2
3	194	100	119	98	55	100	F04 (45°) F05	42 50	M5 M6	4 4	2.8
6	218	114	137	116	65	118	F05 F07	50 70	M6 M8	4 4	3.9
12	272	132	163	142	65	138	F05 F07	50 70	M6 M8	4 4	6.0
25	344	156	197	176	90	166	F07 F10	70 102	M8 M10	4 4	11.0
50	424	174	238	217	125	200	F10 F12	102 125	M10 M12	4 4	18.3
100	505	157	216	195	122	170	F10 F12	102 125	M10 M12	4 4	30.0
200	592	174	258	237	144	210	F14	140	M16	4	48.0

Overall dimensions (mm) and weights (kg)

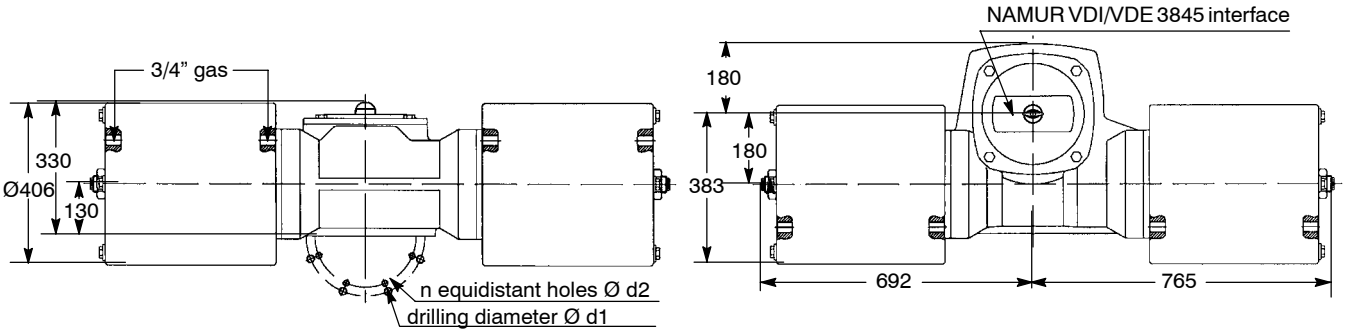
ACTAIR 400 (Standard version - Direct connection)



ACTAIR 800 (Standard version - Direct connection)



ACTAIR 1600 (Standard version – Direct connection)



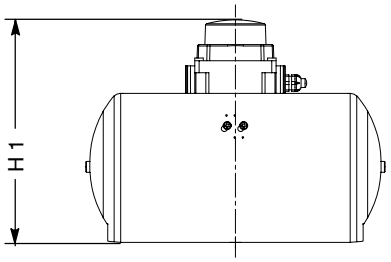
ACTAIR Type	ISO 5211 Mounting plate ref	Ød1	Ød2	n	Weight kg
400	F16	165	M20	4	160.0
800	F16 F25	165 254	M20 M16	4 8	290.0
1600	F25 F30	254 298	M16 M20	8 8	504.0

Indication function

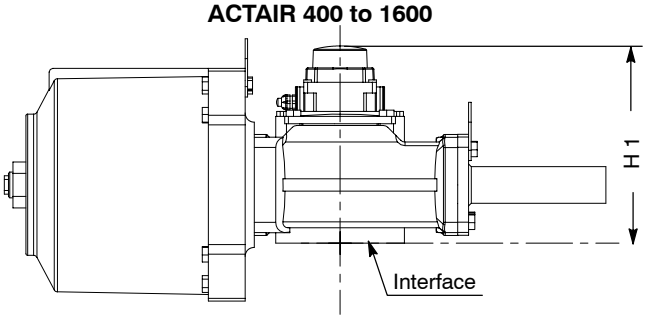
Limit switch box IP 67 AMTROBOX C (Type Series Booklet AMTROBOX C ref. 8525.178-10)
The function provided by AMTROBOX C is as follow:

- Position detection:
  - On/off position detection by means of microswitches or inductive proximity detectors (1/O, 1/C, 1 on intermediate position on request).

ACTAIR 1,5 to 200



ACTAIR 400 to 1600



Control and supervision functions

Piloting-servo control by AMTRONIC/SMARTRONIC
The functions provided are as follows :

AMTRONIC :

- On/off pneumatic distribution: 4/2 or 4/3 configuration, spring return or double acting, A.C. or D.C. supply.
- Operating time adjustment.

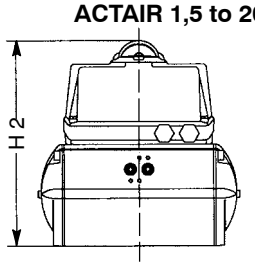
SMARTRONIC :

- Proportional distribution for autocalibration seting, 4-20 mA pilot.
- Operating time adjustment

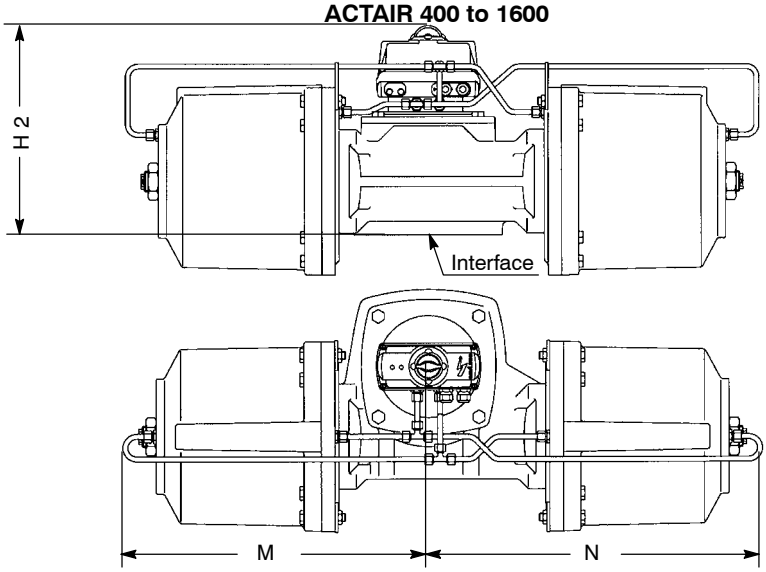
Options :

- On/off position detection (2 microswitches or inductive proximity detectors),
- Proportional position detection (4-20 mA).
- Field bus : AS-i, Profibus DP.

ACTAIR 1,5 to 200



ACTAIR 400 to 1600



Consult type series booklets AMTRONIC ref. 8512.1 and SMARTRONIC MA 8527.1

ACTAIR type	H1	H2	M	N	Weight (kg)
1.5	144				2,9
3	168	235			4.5
6	185	252			5.5
12	211	278			8.0
25	245	312			13.0
50	286	353			20.0
100	264	331			32.0
200	306	373			50.0
400	293	390	580	434	170.0
800	328	425	672	730	300.0
1600	378	475	742	815	514.0

Options :

Visual position indicator type "BEACON"

Instead of the standard pointer.

ACTAIR 3 to 1600

Direct NPT air connection

1/4" NPT connection plate made of anodised Aluminium, fitted onto the Namur interface of the standard actuator.

ACTAIR 1.5 to 200

ACTAIR 400 to 1600

NPT air connection directly threaded on the cylinder:
- 1/2" NPT on ACTAIR 400 and 800,
- 3/4" NPT on ACTAIR 1600

Declutchable manual override: ACTAIR 3 to 1600

The manual override using a declutchable gear box may be fitted between the valve mounting plate and the actuator. This manual override will override with the pneumatic actuator and can be set in clutched or declutched positions. This device is based on worm wheel and screw kinematics.
Please consult us.

Note: The manual override should only be used under the following recommendations:
- ***absence of air pressure in the actuator,***
- ***Leakage to air free of all the cylinders of the actuator.***

The manual override should not be declutched when pressure is in the actuator.

Construction :

- Housing, cover and extension in JL 1040 grey cast iron,
- Handwheel in welded iron,
- Screw in steel,
- Worm in JS 1030 spheroidal graphite cast iron,
- Drive shaft, clutch lever, locking pointer, adjustable mechanical travel stops (+/-5°) and external bolting in 13 % chromium steel.

Protection :

They are hose and fine dust proof (protection degree: IP 65).
Construction for protection degree IP 67 on request: please, consult us.

External coating:

Polyurethane paint (colour dark grey RAL 7016, 80 µm thickness).

Working temperature range:

From –20° C to +80° C.

Please refer to the type series booklet manual override ref. no.5350.1.

Options

Stroke limiter

ACTAIR 3 to 200

Stroke limiter adjustable between 0 and 90° in only one direction.
The device is fitted instead of the standard adjustment end-stop.
Available on open **or** close direction.
Consult us.

ACTAIR 3 to 12

Stroke limiter adjustable in both directions (open and close).
The device is fitted between the valve top flange and the actuator.
Consult us.

ACTAIR actuators can be equipped with different accessories instead of AMTRONIC instrumentation box.

Limit switch box
ACTAIR 1,5 to 1600

This switchbox is fitted onto the top of the actuator housing by means of a yoke with interface in accordance with VDI/VDE 3845 NAMUR specification.
Please consult us.

Positioner
ACTAIR 1,5 to 1600

A positioner with a 3-15 PSI pneumatic piloting signal or a 4-20 mA electric signal (standard or with intrinsically safety) can be mounted onto the top of actuator housing by means of a yoke with VDI/VDE 3845.
Please consult us.

NAMUR distributor
ACTAIR 1,5 to 200

A distributor with electric or pneumatic piloting with NAMUR interface can be fitted directly onto the side of the actuator housing.
Please consult us.

ISO size 1 distributor
ACTAIR 3 to 1600
ISO size 2 distributor
ACTAIR 400 to 1600

A distributor with an ISO 5599 size 1 or size 2 interface can also be fitted to the actuator by means of a distributor plate.

13.02.07

8515.1/9-10

По вопросам продаж и поддержки обращайтесь:

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