



INSTALLATION
MAINTENANCE

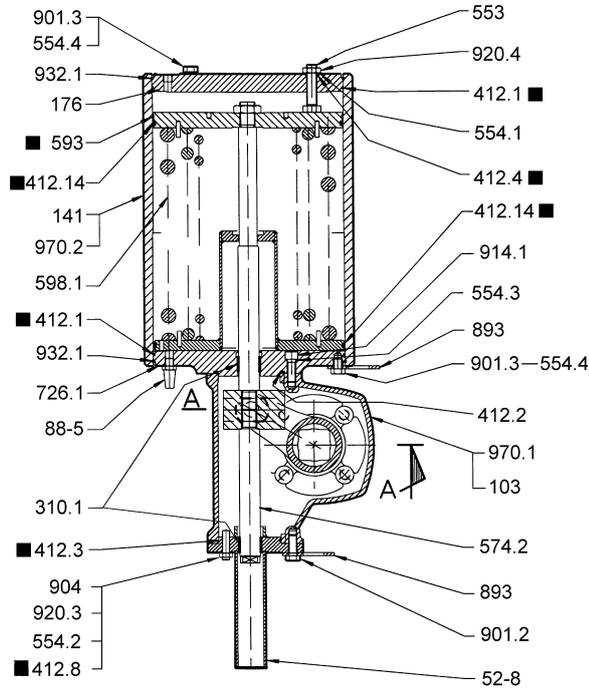
- 1 - General overview**
- 2 - Recommended tools**
- 3 - Installation / Safety / Exhaust ports of springs cartridges**
- 4 - Adjustment of adjustable end stops**
- 5 - Actuator disassembly**
- 6 - Actuator re-assembly**
- 7 - Actuator / Valve coupling and protection**
- 8 - Trouble shooting**

AMRI is ISO 9001 approved

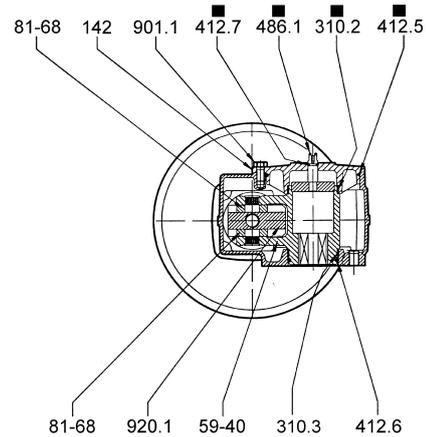
1 - GENERAL OVERVIEW

The purpose of this manual is to describe the installation / maintenance procedures and actions to be carried out in case of breakdowns or faulty operations of DYNACTAIR 200 to 800 type pneumatic actuators.

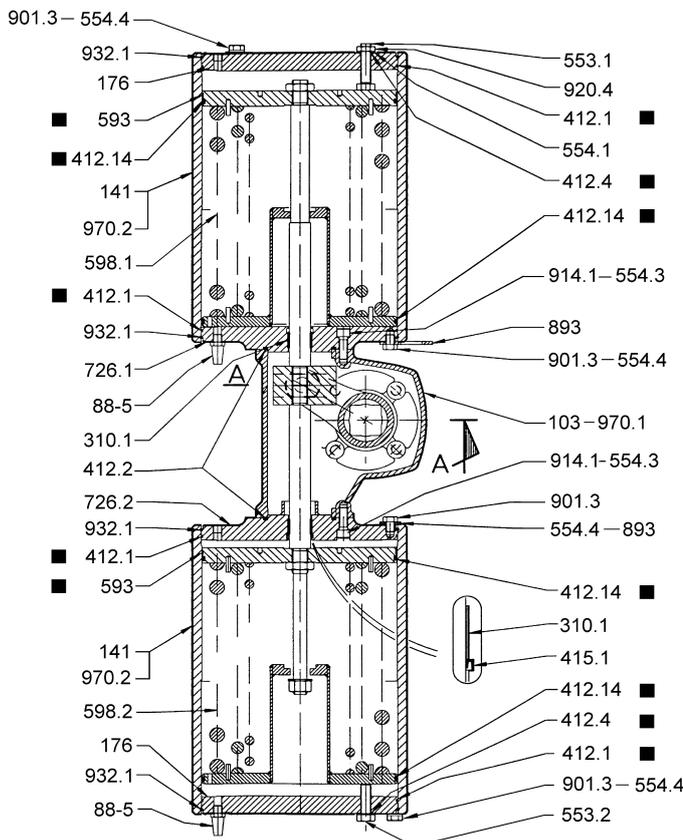
DYNACTAIR 200 – Closure function by lack of control fluid



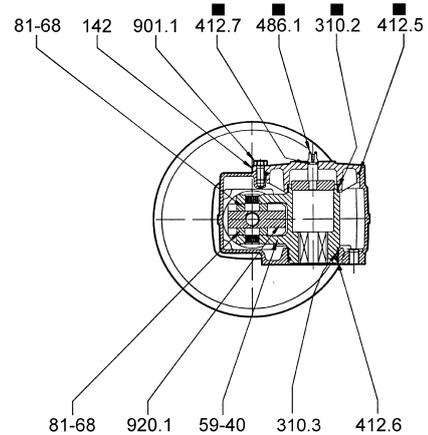
Section A-A



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



Section A-A



■ Parts included in the spare part kit

Item	Designation	Item	Designation
52-8	Protection sleeve	553.1	Thrust insert
59-40	Mandrel	553.2	Thrust insert
81-68	Pressure pad	554.1	Washer
88-5	Silencer 3/8" G	554.2	Washer
103	Housing	554.3	Washer
141	Cylinder	554.4	Washer
142	Cover	574.2	Rod
176	Cylinder head	593	Guiding strip
310.1	Self-lubricating bearing	598.1	Sub assembly springs cartridge
310.2	Self-lubricating strip	598.2	Sub assembly springs cartridge
310.3	Self-lubricating strip	726.1	Cylinder guiding flange
412.1	O-Ring	726.2	Cylinder guiding flange
412.2	O-Ring	893	Support plate
412.3	O-Ring	901.1	Hexagon head screw
412.4	O-Ring	901.2	Hexagon head screw
412.5	O-Ring	901.3	Hexagon head screw
412.6	O-Ring	904	Travel stop
412.7	O-Ring	914.1	Hexagon socket head screw
412.8	O-Ring	920.1	Operating nut
412.14	O-Ring	920.3	Hexagon nut
415.1	Lip seal ring	920.4	Hexagon nut
486.1	Ball	932.1	Spring retaining ring
		970.1	Identity plate *
991	Grease	970.2	Safety instructions plate

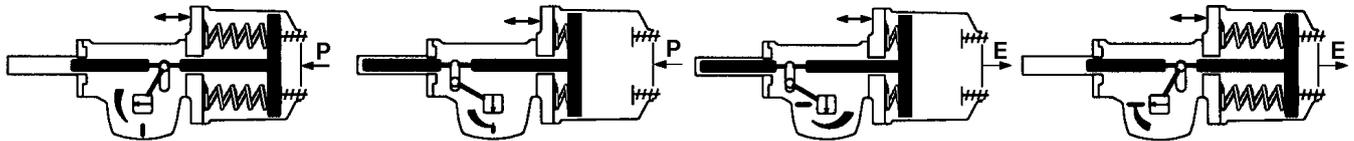
* NOTE : The identity plate 970.1 indicates the actuator references. These are needed any requested for information and spares.

Closure and opening functions by lack of control fluid of these actuators are defined following drawings thereafter:

DYNACTAIR 200 Closure function by lack of control fluid

Opening operation under fluid pressure
Actuator/Valve closed Actuator/Valve open

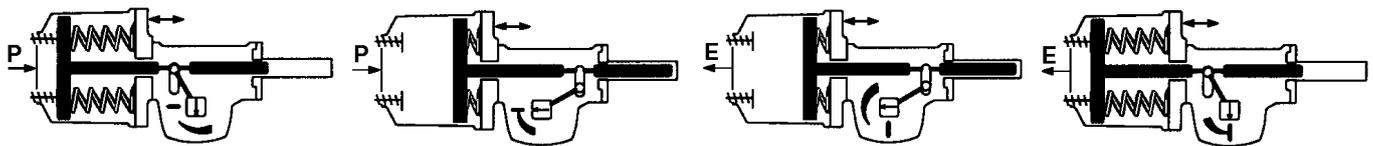
Closing function under springs action
Actuator/Valve open Actuator/Valve closed



DYNACTAIR 200 Opening function by lack of control fluid

Closing operation under fluid pressure
Actuator/Valve open Actuator/Valve closed

Opening function 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



DYNACTAIR 400 and 800 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



During the operation under pressure, the actuator is maintained in position by the air supply.

2 - RECOMMENDED TOOLS (not supplied)

- Pneumatic screwing machine
- Flat spanners 24 and 30
- Allen key 8, 10 and 14
- Screw driver
- Mallet
- 2 brushes for grease: the brushes must not loose its hair (one for cleaning out the old grease and one for greasing)

HANDLING MEANS (not supplied)

- Handling means (crane, hoist, travelling crane, etc...)
- Slings

CONSUMABLE

- Grease Multis MS2 (Total) or RETINAX AM (Shell) or RENOLIT MO2 (Fuchs).
- Specific grease may be used for special application.
Needed quantity of grease: 400 ml.
- Iamsub Spalmatura mastic (Veneziani) or Sikaflex 227 or equivalent.
- Glue Loctite 242 or equivalent.
- Flange sealant Loctite 58-14 or 58-31, Omnifit FD30 or equivalent
- KSB spare parts kits, according to the actuator size.

3 - INSTALLATION - SAFETY

3.1 - Safety instruction

The user is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorized, adequately qualified staff who are thoroughly familiar with this manual.

Any work on an actuator may only be performed after the disconnecting pneumatic energy supply.

ATTENTION: this actuator contains strong compressed springs. The dismantling of the actuator must be careful.

3.2 - Inadmissible modes of operation

Operational safety and reliability of the actuator supplied is only warranted for its designated use as defined in the type series booklet.

The limits stated in the technical documentations must not be exceeded under any circumstances.

3.3 - Before any action

- Index the mounting position of the actuator onto the valve (Position N or M)
- Index the position of the pointer 629 on mandrel 59-40



- **The disassembly of the actuator must be performed with be careful.**
- **The device retrieval system stores mechanical energy (Cartridge springs 598.1 / 598.2), the dismantling of this cartridge springs is strictly PROHIBITED.**
- **If the maintenance of the spring cartridge (598.1 / 598.2) is necessary, it must be carried out by KSB Service.**

3.4 - Adaptation onto the valve

In case of thick paint on the valve, put washers to avoid the nut to damage the paint
The adaptation onto the valves is achieved either directly or through adaptors parts:

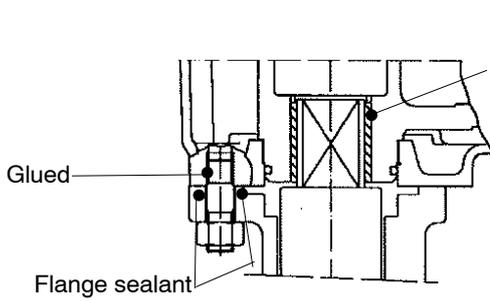


FIGURE 1
Direct fitting

Interchangeable inserts manufactured to the size and the shape of the different shafts output

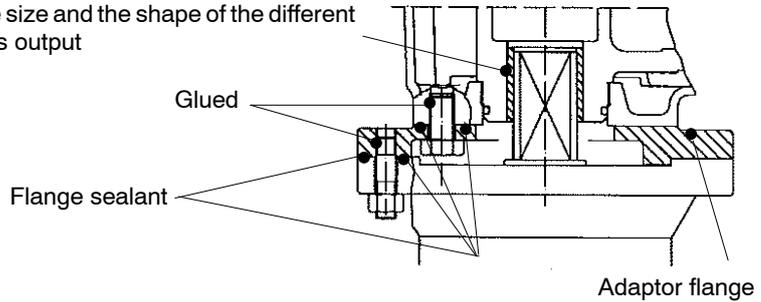


FIGURE 2
Adaptor flange fitting

3.5 - Actuator position onto the valve

If the open or closed position are not known, it is then necessary to apply air pressure in order to obtain clockwise operation : then, the actuator is in a closed position.

The actuator can be mounted in four positions, at 90° intervals.

Standard arrangement is the N position 1

DYNACTAIR 200 to 800

Arrangement N

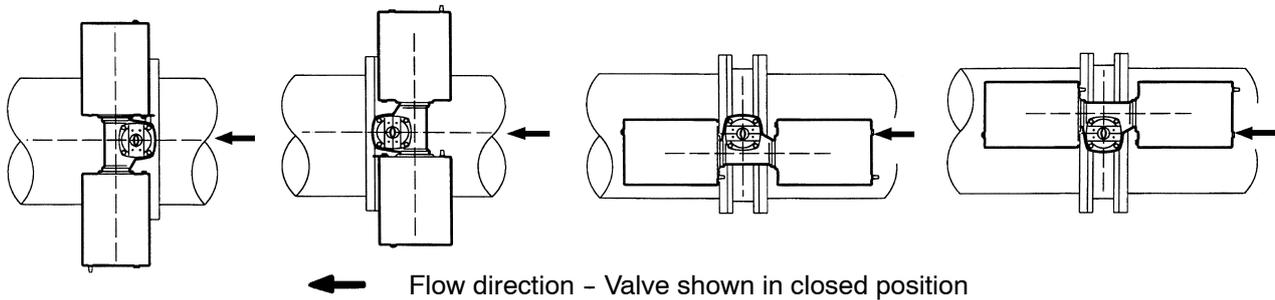
Position 1

Position 2

Arrangement M

Position 1

Position 2



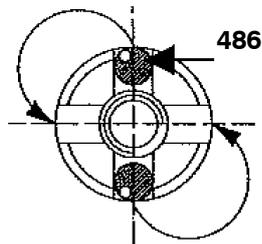
The arrangement position can be modified at site following the procedure described below and the specific assembly operations in accordance with maintenance procedure.

3.6 - transformation

Arrangement N \longleftrightarrow Arrangement M

- Drop the air pressure to put the valve in safety position. In case of offset disc valve, drop the pressure in the pipe,
- Disconnect the actuator from the valve,
- Remove the pointer 629,
- Remove the ball 486 out of the groove using a screwdriver, pin punch, . . .
- Insert the ball 486 in the perpendicular groove,
- Refit the position plate 970.2 (If any, in case of pointer or flag) at 90° from its initial position and retighten its screw,
- Mount the pointer at 90° in the initial position,
- Disengage mandrel insert, turn it 90° and reinsert into the mandrel (in the case of a flat ended shaft),
- Clean the surface and use sealant paste.
- Re-assemble the actuator onto the valve at 90° in the initial position.

Caution: If a limit switch box is fitted onto the actuator, the adjustments must be modified following the instructions given in its user guide documents.



3.7 - Exhaust ports of spring cartridges

These exhaust ports enable the “breathing” (outlet/inlet) of the spring cartridges.

They are protected by sintered silencers. If these silencers clog, this could be detrimental to the operation of the actuator. It is advisable to remove and clean them.

In a damp or external environment, water could be drawn in during operation. It is strongly recommended to collect the outlets (orifices 1/2” G) by piping towards a protected environment or downwards.

4 - ADJUSTMENT OF STANDARD ADJUSTABLE END STOPS ($\pm 2^\circ$)

REMINDER :

These actuators are equipped with adjustable end stops only in the close position.
Adjustable end stops in open position are fixed and not adjustable.

Adjustable end stops are factory set and need no further adjustment at site.
This is of utmost importance for the perfect tightness of the valve.
After any intervention on the actuator, the correct adjustment of the adjustable end stops must be verified.

If need be, this adjustment could be modified as per the following procedure :

Adjustment to be carried out on the complete unit : valve + actuator

WARNING : Do not damage O-rings 412.4 while adjustment operations

DYNACTAIR 200

Closure function by lack of control fluid : adjustment of closure end stops

- Put the unit in the open position by pressurising the actuator
- Unscrew the 3 nuts 920.4
- Progressively adjust in staggered way and with the same value the 3 adjustable end stops (measure the overheight compared to the cylinder head) until the required position is obtained by the release of the chamber pressure
- Repeat several times these operations if need be
- Tighten the 3 nuts 920.4



Opening function by lack of control fluid : adjustment end stops in closure

- Unscrew the nuts 920.3
- Unscrew of a few turns 1 of the 2 adjustable end stops
- Adjust the other adjustable end stop 904 until the required position is obtained by pressurising the chamber and lock in position nut 920.3
- Leave the unit under pressure
- Adjust the second adjustable end stop until contact with the nut 920.1 then lock nut 920.3

DYNACTAIR 400 and 800

Closing or Opening function by lack of control fluid : adjustment end stops in closure

- Put the unit in the open position by pressurising the actuator
- Unscrew the 3 nuts 920.4
- Progressively adjust in staggered way and with the same value the 3 adjustable end stops (measure the overheight compared to the cylinder head) until the required position is obtained by the release of the chamber pressure
- Repeat several times these operations if need be
- Tighten the 3 nuts 920.4

WARNING :

- Screw clockwise to decrease the valve closure
- Screw anti-clockwise to increase the valve closure

5 - ACTUATOR DISASSEMBLY

- Identify both the pointer and the mounting position of the actuator onto the valve.
- Drop the air pressure to put the valve in safety position. In case of offset disc valve, drop the pressure in the pipe.
- Disconnect the air supply
- Remove the actuator and the accessories from the valve and place them on a work bench- Disconnect all accessories from the actuator
- Ensure that the actuator is not pressurised, no presence of air in either chamber should be detected
- If the actuator has a pointer 629, remove the sub-unit plug 916 , screw 900 and pointer 629.

5.1 - Dismantling of cover 142



Remove the cover 142, the O-ring 412.5, the self-lubricating strip 310.2 and the O-ring 412.7

Unscrew 4 screws 901.1



5.2 - Dismantling of cylinder and piston o-rings

- Before any action, index the cylinder mounting position, the sides of the cylinder head 176 and the cylinder guiding flange 726.1

WARNING : The cylinder mounting direction is not reversible.

- Remove the 2 diametrically opposed screws 901.3 of the cylinder head and the washers 554.4

Replace those 2 screws by capstan screws

- Loosen by several turns the nuts 920.4

- Identify (measure or index) the height of the overlength of the adjustable end stops 553 compared to the cylinder head 176



- Unscrew alternatively and in a staggered way, the adjustable end stops 553 until contact with the screw heads is obtained
- = release the pressure of the spring cartridge

REMINDER : The spring cartridge is made safe and reaches in auto-stop after a few turns of adjustable end stops 553



The sub-unit cylinder head + spring cartridge (598.1 / 598.2) is a device factory mounted and made safe (coupling nut welding). It is strictly prohibited for safety reasons to dismantle this sub-unit (598.1 / 598.2). Handle carefully this sub-unit. Keep it in a dry environment.



VOIR PARAGRAPH 3.3 “BEFORE ANY ACTION” page 4

- Housing side : unscrew the screws 901.3 on the cylinder guiding flange 726.1 and remove the washers 554.4 and the support plates 893
- Push the unit cylinder 141 + cylinder head 176 inwards the cylinder and remove the spring retaining ring 932.1
- Sling the unit cylinder/cylinder head with capstan screws



- Remove carefully cylinder/cylinder head (heavy and cumbersome part) not to damage the inside and put it on the work bench
 - Unscrew the screws 901.3 and remove the washers 554.4 on the cylinder head
 - Push the cylinder head 176 using capstan screws and remove the spring retaining ring 932.1
 - Remove the cylinder head 176 and remove the O-ring 412.1
- Remove the O-ring 412.14 of the guiding flange of the spring cartridge
- Remove the O-ring 412.14 and the guiding strip 593 on the piston
- Remove the O-ring 412.1 on the cylinder guiding flange 726.1 on the cylinder

- Dismantling procedure - maintenance is limited to the operations previously described

CAUTION :

Thrust inserts 553.2 are fixed. No adjustment is necessary (complete screwing)

NOTE : Some actuators can be equipped with a 0.2mm thick wedge fitted under the guiding strip : this wedge is to be left in place

DYNACTAIR 400 and 800

Repeat these operations on the second cylinder

DYNACTAIR 200 : Protection sleeve side :

- Unscrew the screws 901.2 and remove the support plates 893 and remove the sub-unit protection sleeve 52.8 and remove the O-ring 412.3
- Unscrew the nuts 920.3, remove the washers 554.2 and the O-rings 412.8



6 - ACTUATOR REASSEMBLY

6.1 - Preparation of parts

All constitutive parts of the spare kits must be used.

O-rings and guiding strips must be lubricated with grease as defined in paragraph "consumables", before being put in place.

In the following pages, take off the old grease and clean the parts before greasing and re-assembly.

6.2 - Kinematics greasing

Grease the nut 920.1 (where the pressure pads 81-68 slide), on the upper and lower sides.

For specific applications with considerable and frequent temperature changes, it is strongly recommended to brush with the brush all the internal areas (gear casing, cap, cover, bottom, chuck, thrust washer, ...) with grease at least (200 ml). Specific grease may also be used.

6.3 - Cover re-assembly

- Ensure that cover is clean
- Grease the housing of the guiding strip 310.2 and set in place
- Insert the greased O-ring 412.5 in the cover 142



- Reinsert the greased O-ring 412.7 in the upper part of the mandrel



Carefully reassemble the cover.

Do not damage the O-rings and the guiding strip.

If needed, finish the insertion using a mallet and put back the 4 screws 901.1 in place

6.4 - Cylinder re-assembly

Special care :

Greasing O-rings before and after mounting is strongly recommended.

Do not use tools for the insertion of the O-rings in their groove.

- Clean the piston and fit the piston O-ring 412.14 and the guiding strip 593
- Clean the side plate of the spring cartridge and put in place the O-ring 412.14
- Clean the cylinder head 176 and insert the O-ring 412.1
- Clean the cylinder guiding flange 726.1 and fit in the O-ring 412.1

- Grease the O-rings, fill in the groove with grease and set in place



- Clean carefully the interior of the cylinder 141

- Caution :

Grease the interior of the cylinder 141

- For an easy assembly, it is advised to sling the actuator by the housing and place the cylinder in vertical position

- Move the unit cautiously downwards inside the cylinder respecting the initial assembly position (take into consideration the initial indexing)



- When sufficiently inserted put in place the spring retaining ring 932.1 located on the kinematics side

- Lift and remove the cylinder until contact retaining ring 932 and the cylinder guiding flange 726.1



- Put the support plates 893, washers 554-4 and screws 901.3 on the cylinder guiding flange 726.1 back in place in their initial position,

Do not completely tighten the screws 901.3

- Place the actuator in horizontal position
- Remove the nuts 920.4, washers 554.1 and O-rings 412.4, from the end adjustable stops 553

- Fit again the cylinder head 176, push it using the capstan screws and insert the retaining ring 932.1



- Place the cylinder head 176 back until contact with the retaining ring is achieved and remove the capstan screws.

- Unscrew alternatively and in a staggered way, the adjustable end stops 553 till their initial position is obtained.

For an easier operation, it is recommended to connect and supply the actuator to a 2 bar air pressure

- Insert the greased O-rings 412.4, washers 554.1 on the adjustable end stops 553 and tighten the nuts 920.4

Care should be taken not to damage the O-rings during this operation.

- Fully tighten screws 901.3 on the guiding flange then those of the cylinder head



DYNACTAIR 400 and 800 : Repeat these operations on the second cylinder

DYNACTAIR 200 : Protection sleeve side

- Put the O-ring 412.3 on the protection sleeve 52.8
- Mount the greased O-rings 412.8 on screws 904, then the washers 554.2 and tighten the nuts 920.3
- Mount the protection sleeve 52-8 on the housing with the support plates 893 and the screws 901.1.



- Disassemble the silencer(s) 88-5, carefully clean and put back in place
- Connect air supplies and pressurise
- Check tightness and the correct operation of the actuator

7 - ACTUATOR/VALVE COUPLING AND PROTECTION

It is Customer responsibility to take care of the paint and to prevent rust.

7.1 - Protection

- Outside space in front of the spring retaining rings 932-1:
It is compulsory to clean with a dry rag and to fill this gap with Sikaflex 227 for standard application, or with Iamsub Spalmatura mastic (Veneziani) for application in corrosive ambient.
- Clean, degrease and paint all the surfaces, all the contact junctions in order to prevent rust.
The paint must be chosen according to the environment.

7.2 - Coupling

Fit the pointer 629 and/or the accessories on the actuator in their initial position.

DIRECT FITTING following figure 1 § 3

Put some drops of glue on the threads of tie-bolts and screw

Cover all the area of the base plate Actuator / Valve with flange sealant

or

ADAPTOR FLANGE FITTING following figure 2 § 3

Actuator side, cover all the area of the base plate Actuator / Valve with flange sealant

Fit the flange onto the actuator

Put some drops of glue on the threads of screws and screw them

Put some drops of glue on the threads of tie-bolts and screw them

Valve side, cover all the area of the base plate Actuator / Valve with flange sealant

For a better protection of the actuator, it is recommended to clean, dry and paint all the interfaces after fitting (interfaces gear casing / bottom, gear casing / cover and gear casing / cap).

- Couple the actuator onto the valve in its initial position,
- Check the correct operation of the unit Valve / Actuator / Accessories.
- If necessary, re-adjust the adjustable end stops: see § 4 Adjustment of closing adjustable end stops.

8 - TROUBLE SHOOTING

At cylinder head 176	External leakage	
Axial at pistons (of sub-unit 598)		
At cylinder guiding flanges 726.1 / 726.2		
No operation		
Incomplete operation or stroke		
Irregular operation		
Reverse operation		
Drifting of the actuator		
Reverse or incorrect indication		
Coupling impossible valve side		
Coupling impossible accessories side		
Damaged O-rings 412.1 and 412.4		Change O-rings 412.1 and 412.4
Damaged O-rings 412.14		Change O-ring 412.14
Damaged O-rings 412.1		Change O-rings 412.1
Absence or insufficient pressure	Check solenoïd, restrictors, pressure and connections	
Valve blocked	Check the valve and/or the interface with pipe	
Internal leakage	Change O-rings 412.14	
External leakage	See external leakage	
Rupture of internal components	Consult the manufacturer for technical advice	
Wrong actuator selection	Consult technical leaflet Nr 8511 Consult valve technical leaflet	
Override in operation	Release air pressure Lock the override Consult technical leaflet Nr 8511	
If AMTRONIC: possible presence of screws 904	Uncouple the AMTRONIC Remove screws 904	
Wrong end stops adjustment	Refer to § adjustment of adjustable end stops	
AMTRONIC positioner maladjusted	Consult technical leaflet Nr 2316	
Valve overtorque	Contact the manufacturer	
Wrong interface	Check the driving and/or adapter flanges. Consult DYNACTAIR technical leaflet Nr 8511 or contact the manufacturer	
Air flow too low or silencers clogged	Check solenoïd, restrictors, pressure and connections and passage section of air pressure	
Closed actuator / Valve open or closed valve / Actuator open	Place the valve and the actuator in the same position	
Inverted pneumatic connections	Check the pneumatic connection	
Wrong definition of the solenoïd	Check the definition of the solenoïds	
Wrong assembly of the actuator onto the valve	Check arrangement positions on DYNACTAIR technical leaflet Nr 8511	
Pressure non constant	Pressurise the equipment and keep it under pressure	
Internal or external leakage with flow control equipment + AMTRONIC or varying input signal	See Internal or external leakage Check the O-ring of the mounting plate between DYNACTAIR and AMTRONIC	
Wrong adjustment of limit switch cams	Check the adjustment according to AMTRONIC technical leaflet Nr 2316	
Control and remote indication non compatible	Check accessories technical leaflet	

This leaflet is not contractual. and may be amended without notice

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concerned

