

Excel Genesis Series Actuators

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1 Important Safety Procedures

Qualified maintenance personnel should read and follow these straightforward instructions.

ALWAYS disconnect the Air and Electrical supplies before carrying out any form of maintenance on an Actuator.

Caution: When removing any ball valve or plug valve assemblies from a pipe system, isolate the piping system on which the Actuator is installed and relieve any media pressure that may be trapped in the valve cavities before removing the Actuator for maintenance.

Caution: Always contain the Spring tension with HYTORK Retractor Bolts as explained in Section 6 (*Spring Return Actuators*). Follow instructions for using the Retractor Bolt carefully. Only HYTORK manufactured or approved retractor bolts are to be used for Spring removal. As with any threaded tool that is frequently used Retractor Bolts should be checked to ensure that the threads are not worn or damaged in any way and greased regularly. Any damaged or worn Bolts must not be used and must be destroyed.

Never attempt to 'BLOW OUT' the Pistons from the Actuator Body by using air pressure when the End Caps have been removed.

Numbers in brackets (#) refer to parts on the sectioned drawing (*Fig. 1*).

All HYTORK GENESIS Spares Kits are supplied with SAFEKEY (13/14) assemblies cut to an exact length which will fit the circumference of the End Cap (21) when fully assembled into the Actuator. Any shortened SAFEKEY must not be used. If in doubt contact HYTORK.

**Read the relevant sections
carefully before continuing.**

2 Spares Recommendations

When disassembling and carrying out maintenance work on the GENESIS Actuator, a HYTORK GENESIS Spares Kit must be used to replace all 'O' rings, DURASTRIP Bearings, Washers etc. This Kit is available from HYTORK or its Stocking Distributors.

3 Actuator to Valve Installation

The Pinion drive, coupling device and Valve Stem should be centred and concentric to prevent any side loading to the Pinion Radial Bearing and Valve Stem Seal area. Ensure that the square coupling shaft to be operated is a tight but free sliding fit into the female drive in the Actuator Pinion Shaft (19).

4 Operating Media, Pressures and Temperatures

Operating media:

Use clean, dry or lubricated air

Operating pressures:

not to exceed 10bar (150 psi)

Operating temperature range:

Using standard seals and grease the operating temperature range is:
-20°C to + 100°C (-4°F to +212°F)

For operating media's, pressures and temperatures outside these ranges please consult HYTORK.

Part No.	Component	Material	Quantity	Part No.	Component	Material	Quantity
1	Ball bearing	Stainless steel	2	16	Location Ring	Acetal	1
2	'O' Ring (End Cap)	Nitrile	2	17	'O' Ring (Pinion bottom)	Nitrile	1
3	Wear Ring (Piston)	DURASTRIP	2	18	Bearing (Pinion bottom)	DURASTRIP	1
4	'O' Ring (Piston)	Nitrile	2	19	Pinion	Steel	1
5	Thrust Washer (Circlip)	DURASTRIP	1	20	Piston	Aluminium alloy	2
6	Circlip	Stainless steel	1	21	End Cap	Aluminium alloy	2
7	Indicator	Nylon	1	22	Stop Screw	Stainless steel	2
8	'O' Ring (Pinion top)	Nitrile	1	23	Thread Seal	Steel/rubber	2
9	Bearing (Pinion top)	DURASTRIP	1	24	Locking Nut	Stainless steel	2
10	Bearing block (Piston)	DURASTRIP	2	25	Protective Cap	Plastic	2
11	Body	Aluminium alloy	1	26	Spring Outer	Spring steel	2
12	'O' Ring (SAFEKEY)	Nitrile	2	27	Spring Inner	Spring steel	2
13	SAFEKEY Head	Grilon	2	28	Label	Vinyl	1
14	SAFEKEY Wire	Stainless steel	2	29	Thrust Spacer	Stainless steel	1
15	Thread Insert	Steel	2				

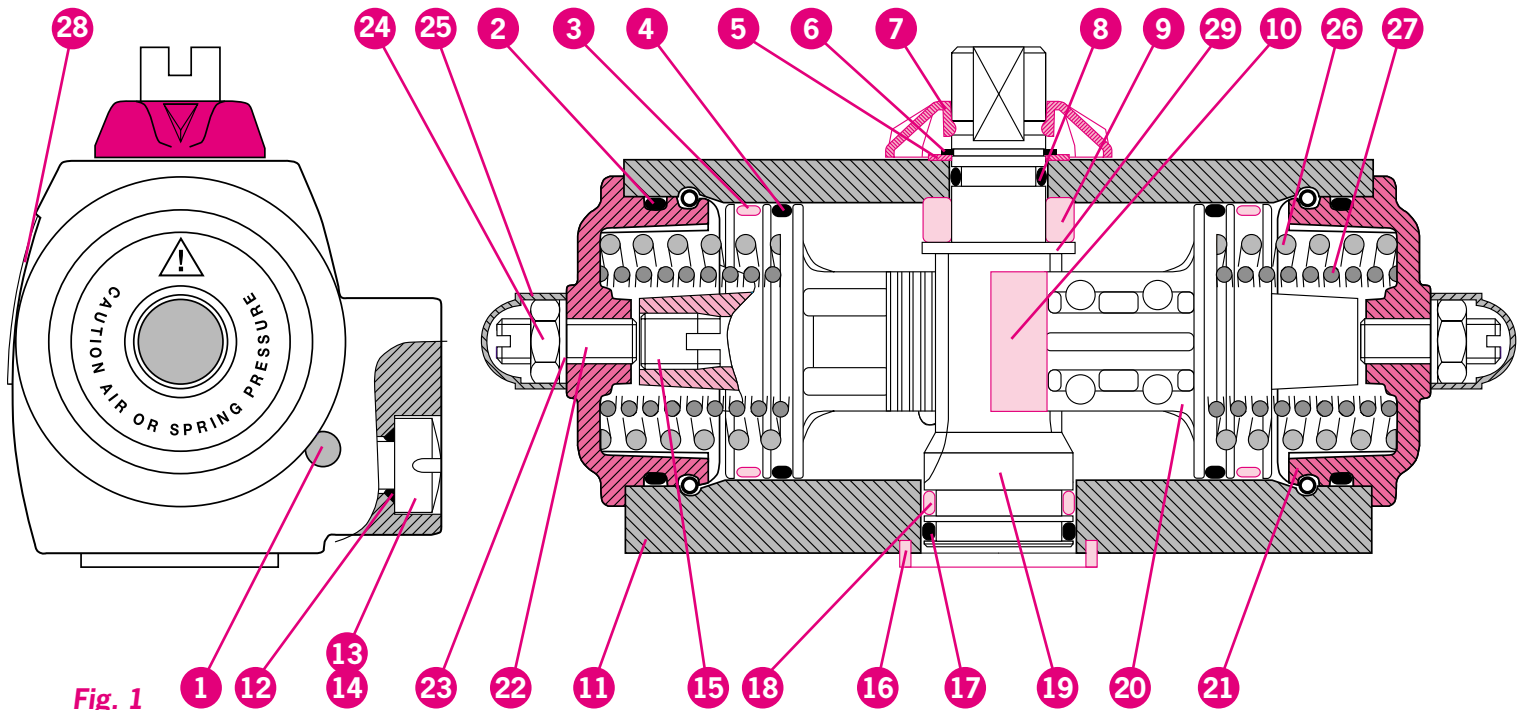


Fig. 1

5 Complete Disassembly & Safe Compression of Springs

Remove both travel stops (22) lock nuts (24) and seals (23) from the end caps (21). Place the HYTORK Retractor Bolt complete with washer (see Fig. 3a) through the hole in the End Caps and screw the bolt into the Piston (20) until it touches the End Cap.

Now screw in a further 1/2 to 1 turn to compress the springs (26/27) and unlock the SAFEKEY for removal. Do not overtighten. Repeat for the other End Cap.

Unscrew the two slotted SAFEKEY screws (13) located on the Body (11) next to each End Cap (21), and gently pull each SAFEKEY from the Body. If the SAFEKEY screw resists removal, gently tap the End Cap with a soft mallet (*hammer*) to assist release. When both SAFEKEYS have been removed, detach the position indicator (7) from the top of the Pinion and use a wrench (*spanner*) to rotate the Pinion (19), driving the Pistons (20) apart until they partially push the End Caps from the Body.

Spring Return Actuators:

To keep the spring pack assembly intact, (Fig. 3b) leave the retractor bolt in place. To disassemble the pack, unscrew the retractor bolt relieving the spring force.

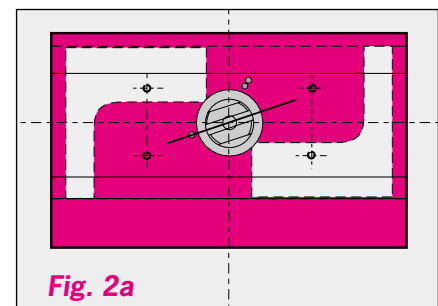


Fig. 2a

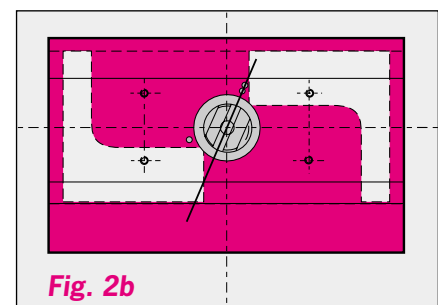


Fig. 2b

Double Acting Actuators:

Remove the SAFEKEY as described above. The retractor bolt is not required for Double Acting actuators. Remove the End Caps by pulling them free from the Body keeping them square to the end face of the Body.

Removal of Pistons:

Rotate the Pinion using a wrench (*spanner*) to drive the Pistons apart and remove from the body by pulling the piston.

Removal of Pinion:

Remove the snap ring (*circlip*) (6) and DURASTRIP thrust Bearing (5) from the top of the Pinion and CAREFULLY push the Pinion from the cylinder Body through the bottom. Take care that the Pinion does not damage the Pinion bores on removal. If necessary, remove any burrs, etc. from the top of the Pinion before removing it.

Inspection:

Clean and examine all parts for damage and wear. Check SAFEKEYS and replace if damaged in any way. HYTORK recommends that ALL 'O' rings, DURASTRIP Bearings, washers etc. are replaced using a HYTORK GS Spares Kit.

6 Assembly Instructions

Note: The grease used in ALL HYTORK standard model actuators is a Lithium Based Grease. Check with HYTORK for high and low temperature applications.

Double Acting Actuators

Installing the Pinion.

Lightly grease all 'O' rings, 'O' ring grooves, bearing grooves and pinion and assemble items (8), (9) (*top Pinion bearing with the moulded recesses pointing away from the gear form*), (29) (*this washer is used on the GS14 only*), (17 & 18) to the pinion (19).

Lightly grease the Pinion bores of the Body (11) and carefully insert the Pinion being careful not to damage the 'O' rings. With the Pinion in this position, install the top DURASTRIP thrust bearing (5) and the snap ring (*circlip*) (6) into the narrow groove at the top of the Pinion (*making sure the snap ring fits properly into the groove*). Only open the snap ring (*circlip*) enough to just clear the Pinion diameter. Opening too far will damage the snap ring. If damage occurs replace with a new part.

Note: The Circlip has one side with bevelled edges which must go DOWN onto the Durastrip thrust washer; the square edged side of the circlip must be UPWARDS.

Alignment of Pinion for correct Piston installation

(*when viewed from above the slot at the top of the Pinion*) (*Fig 2a & 2b*): Standard rotation is clockwise with the pistons moving towards each other.

Installing the Pistons.

Clockwise rotation with pistons moving towards each other (*Fig 2a*)
Align the Pinion by lining up the center of the NAMUR slot in the top of the Pinion

with the single dimple on the Body. Lightly grease all piston grooves, the gear form and piston 'O' rings (4) and fit the piston 'O' ring and bearing to the piston. Fit the wear block (10) to the back of the piston. Grease the Actuator Body bore. Insert the Pistons into the bore, ensuring the Piston racks line up with the Pinion gear (*the part number in the front face of the Piston must be lined up parallel to the Pinion*). Push both Pistons together until they are both in contact with the Pinion, so that when the Pinion is rotated clockwise the Pistons are drawn together. When the Pistons are together and the racks correctly engaged with the Pinion, the top Pinion drive flats should now be at right angles to the axis of the Body.

Anti-Clockwise rotation with pistons moving towards each other

 (*Fig 2b*)

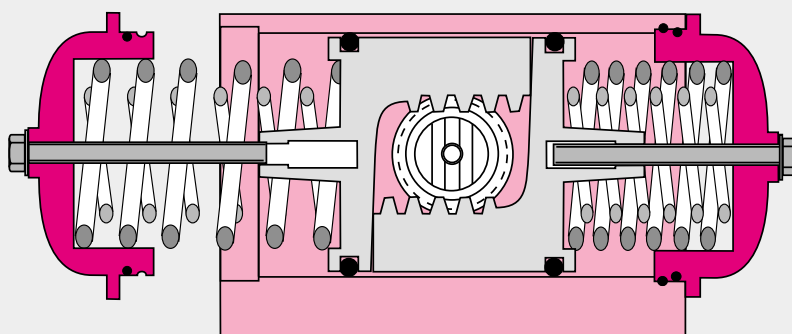
Align the NAMUR slot in the top of the Pinion with the multiple dimples on the Body and assemble pistons so that the pinion rotates anti-clockwise as the pistons are drawn together. (*Early models have a single dimple at both ends of the NAMUR slot*).

Installing the End Caps.

Install the SAFEKEY 'O' ring seals (12) to the slotted screws on the SAFEKEY assemblies (13). Lightly grease the End Cap 'O' rings (2) the ends of the Body bore and the End Caps grooves (21). Install the 'O' ring into the groove in the End Cap and insert the Cap into the Body. Holding the SAFEKEY close to the entry hole to prevent kinking, insert the SAFEKEY into the hole and gently push into place. With the slotted screw in contact with the Body, tighten with a screw driver to create a pressure seal by gently compressing the 'O' ring. Repeat the operation for the other End Cap. With the Pistons together, replace the position indicator (7) to the top of the Pinion.

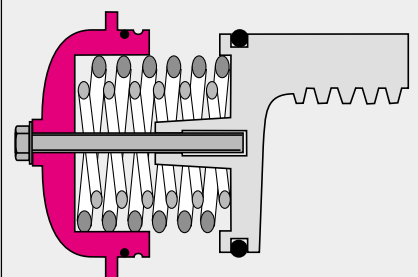
Spring retractor system using standard bolt

Fig. 3a



Spring retractor system using standard bolt

Fig. 3b



Installing the Travel Stops.

With the pistons apart, screw the travel stops (22) into each End Cap until they come into contact with the Piston. Fit the thread sealing washer (23) and the Lock nut (24) to the stop and lock them against the End Cap face. Refit the plastic protection cap (25). Final adjustment is easily made when the Actuator has been mounted to its Valve, Damper or other device. HYTORK GENESIS Actuators have an over travel of 5 degrees at the open end of the stroke.

Spring Return Actuators

Installing the Springs. (Other instructions are as Double Acting Actuators)

Insert the Springs (26/27) into the face of the piston and then the End Cap onto the Springs. Pass the Retractor Bolt through the End Cap (Fig. 3) and screw it into the thread in the Piston. Continue to screw the Retractor bolt in until the End cap is completely engaged in the Body. It will be necessary to push the End Cap into the body to overcome the 'O' ring compression. Line up each End Cap so that the safety symbols are correctly aligned for easy reading. When the End Caps are in place and the SAFEKEY fitted correctly remove the HYTORK Retractor Bolt completely and install the Travel Stops as described above.

7 Testing the HYTORK Actuator

Using compressed air at 80-100 psi (5.5 - 7 bar) check the seal areas with soapy water, ensuring there are no leaks and that the Pinion rotates smoothly over its full travel.

8 Testing and Cycling of Infrequently Used or Stored Actuators

Actuators not in current use (i.e. Actuators in storage or stock and/or not operated for at least a 3 month period), should be cycled a minimum of ten times and tested against the possible 'pre-set' of the seals. This is a safety precaution recommended by the Seal manufacturers.

9 Service

It is the policy of HYTORK to give the best possible service to our customers. We are happy to assist you in any way we can and if you have any questions about HYTORK Actuators or other HYTORK Products please do not hesitate to contact one of HYTORK'S VALVE AUTOMATION CENTERS or your local HYTORK Stocking Distributor.

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UK Patents:

GB 2 102 887 B;
GB 2 123 517 B;
GB 2 138 505 B;
GB 2 216 229 B;
GB 2 225 079 B;
GB 2 229 254 B;
GB 2 253 459 B;
GB 2 268 574 B.

US Patents:

4,496,071;
4,651,627;
4,716,815.

Warranties:

Unauthorised modification to any Hytork Product totally invalidates all warranties.

Important:

We have endeavoured in this publication to make the contents as accurate as possible, but being given as general information, it is not to be taken as binding unless specifically confirmed in writing. Due to Hytork's continuing commitment to engineered product advancement, the product specifications and data presented in this publication are subject to change without notice.

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