

TECHNICAL
DOCUMENTATION
No.
TL 97/087

**GS, SY AND VA ACTUATORS SERIES
OPERATING MANUAL**

REV,	0	1	2	3
DATE	29/10/1997	18/01/2002	01/09/2002	08/06/2005
PREPARED BY	E.C.	M.F.	FURLANETTO M.	M.F.
VERIFIED BY	E.B.	E.C.	M.F.	E.C.

DOUBLE ACTING ACTUATORS GS SERIES

(see drawings CDT005-E/017 and CDT005-E/013)

The following instructions are relevant for old and new stock. The main difference between old and to new stock is on the frame block thread of new stock (see dwg. STC 879 part. A). Old and new pneumatic cylinders can be assembled on the old frame, seal between frame and cylinder is as before where frame is new model, seal can be by means of o-ring or gasket. New and old cylinders need adaptor (STC 879 part. A) in order to enable their assembling on new frame.

GUIDELINES FOR DISASSEMBLING

- Pressurize the actuator from the port of the end flange (19), put it in open position and release the pressure.
- Remove the position indicator from the top of the frame by unscrewing the two socket head screws.
- Unscrew the bolts (14) on the top of the frame and remove the cover.
- Unscrew the 4 bolts (30) which hold the cylinder to the frame.
- Pull the cylinder which will rotate the yoke until the rod wrench seat beside the guide block is accessible. Unscrew the piston rod from the guide block (6) using a wrench.
- To open the cylinder unscrew the nuts (28) and remove the end flange (19).
- Pull the head flange and remove it.
- To unscrew the piston rod remove the fixing nut (12).
- To remove the yoke from the housing, pull the guide bar (7) out of the frame and disengage the guide block (6) together with the bronze sliding block from the yoke slot.

DOUBLE ACTING ACTUATORS SY SERIES

(see drawings CDT005-E/024)

GUIDELINES FOR DISASSEMBLING

- Pressurize the actuator from the port of the end flange (19), put it in open position and release the pressure.
- Remove the position indicator from the top of the frame by unscrewing the two socket head screws.
- Unscrew the bolts (14) on the top of the frame and remove the cover.
- Unscrew the 4 bolts (30) which hold the cylinder to the frame.
- Pull the cylinder which will rotate the yoke until the rod wrench seat beside the guide block is accessible. Unscrew the piston rod from the guide block (6) using a wrench.
- To open the cylinder unscrew the nuts (28) and remove the end flange (19).
- Pull the head flange and remove it.
- To remove the yoke from the housing, pull the guide bar (7) out of the frame and disengage the guide block (6) together with the bronze sliding block from the yoke slot.

DOUBLE ACTING ACTUATORS VA SERIES

(see drawing CDT051-E/047)

GUIDELINES FOR DISASSEMBLING

- Put the actuator in fail safe position and disconnect the pneumatic and electric power supply.
- Remove the position indicator from the actuator frame, by unscrewing the fixing screw.
- Remove the cover (23) from the actuator frame, by unscrewing the fixing screws (20).
- Remove the manual override (if any), by unscrewing the fixing screws (6).
- Slowly unscrew the screws (45) of the tie rods, then remove the same screws with their washers (46).
- Remove the end flange (32).
- Extract the tie rods (40) from the flange of the frame.
- Extract the cylinder liner (43).
- Unscrew the screw (30), then remove the piston (42) from the frame bar (5).
- Push the frame bar (5) until the pin (13) is accessible.
- Rotate the same pin in order to extract the two circlips (14) and the sliding blocks (12).
- Extract the pin from the frame bar (5).
- Extract the bar (5) from the frame.
- Unscrew the cap.
- Extract the pin (18) from the scotch yoke (17).
- Remove the circlips (15).
- Extract the shaft (9) from the frame.
- Extract the scotch yoke (17) from the frame.

SPRING RETURN ACTUATORS

The following instructions are relevant for old and new stock. The main difference between the old and new stock is on the frame block thread of new stock (see dwg. STC 880 part. A and B). New and old pneumatic cylinder can be assembled on the old frame, seal between frame and cylinder or spring cartridge is as before where frame is new model, seal can be by means of o-ring or gasket. New and old cylinders need adaptor (STC 879 part. A) in order to enable their assembling on new frame. New, old cylinders and spring cartridge need adaptor (STC 880 part. A for spring cartridge and part. B for cylinder) in order to enable their assembly on new frame.

GS SERIES (see drawing CDT005-E/016 and CDT005-E/20)

- Check that the actuator is in fail position and the spring is completely released by unscrewing the relevant end stroke dowel (11). Unscrew the bolts (14) on the top of the frame and remove the cover.
- Remove the 4 bolts (37) which hold the spring container to the frame and pull and remove it. Pull and remove the pusher (36).
- Continue as for double acting actuators.

SY SERIES (see drawing CDT005-E/025)

- Check that the actuator is in fail position and the spring is completely released by unscrewing the relevant end stroke dowel (11). Unscrew the bolts (14) on the top of the frame and remove the cover.
- Remove the 4 bolts (44) which hold the spring container to the frame and pull and remove it. Pull and remove the pusher (36).
- Continue as for double acting actuators.

VA SERIES (see drawing CDT051-E/050)

- Put the actuator in fail safe position and disconnect the pneumatic and electric power supply.
- Remove the position indicator from the actuator frame, by unscrewing the fixing screw.
- Remove the cover (23) from the actuator frame, by unscrewing the fixing screws (20).
- Remove the manual override (if any), by unscrewing the fixing screws (6).
- Slowly unscrew the screws (45) of the tie rods, then remove the same screws with their washers (46).
- Remove the end flange (32).
- Remove the spring (if any) (47).
- Continue as for double acting actuators.

MAINTENANCE OF PISTON SEALS

(see drawings STC043 and STC042)

GS AND SY SERIES

- Remove the cylinder end flange (19) by unscrewing the 4 nuts (28). Pull and remove the cylinder liner (15).
- Remove the piston seals without scratching or damaging the seal groove. Should the leakage be localized on the piston rod glider (22) the cylinder must be completely disassembled following the relevant procedure for replacing the seals.
- Replace the seals following the Instructions For Replacing the Teflon Seals.

VA SERIES

- Remove the cylinder end flange (32) by unscrewing the 4 nuts (45). Pull and remove the cylinder liner (43).
- Remove the piston O-ring (28) without scratching or damaging its groove.
 - Replace the O-ring, if necessary, after having cleaned its seat.
 - Should the leakage be localized on the piston rod O-ring, the cylinder must be completely disassembled.
 - Replace the O-ring, if necessary, after having cleaned its seat.

INSTRUCTIONS FOR DISASSEMBLING THE JACKSCREW OVERRIDE FROM THE SPRING RETURN ACTUATORS

GS SERIES (see drawing CDT005-E/018 and CDT-E/014)

-Remove the manual override together with the cylinder flange (19) by unscrewing the 4 nuts (28). Unscrew the fixing nut (12) to remove the end flange and the socket head screw (41) to have access to the ball bearings.

SY SERIES (see drawing STC481)

-Remove the manual override together with the cylinder flange (19) by unscrewing the 4 nuts (28). Unscrew the screw (41) to have access to the ball bearings.

VA SERIES (see drawings CDT051-E/047 and CDT051-E/050)

-Put the actuator in fail safe position and disconnect the pneumatic and electric power supply.

-Remove the position indicator from the actuator frame, by unscrewing the fixing screw.

-Remove the cover (23) from the actuator frame, by unscrewing the fixing screws (20).

-Remove the manual override (if any), by unscrewing the fixing screws (6).

GS SERIES

(see drawing CDT 005-E/017 and CDT 005-E/016)

GUIDELINES FOR ASSEMBLING

- Remove the plastic plugs from the cylinder connections. Pressurize the cylinder from the port of the end flange (19), to project the piston rod completely out of the cylinder and release the pressure. Plug the cylinder air connection using a sealing carbon steel or aluminium plug.
- Put the cylinder in a vertical position with the piston rod projected out from the top side and mount the teflon bar into its seat as shown below.
- Remove the position indicator from the top of the frame by unscrewing the two socket head nuts.
- Unscrew the bolts (14) on the top of the frame and remove the cover.
- Remove the flange (34) and the four bolts (37) and install two lifting eye bolts through the holes of the same.
- Hang the frame by the two eye bolts (making sure that the guide bar does not fall out) vertically onto the cylinder rod and put some Loctite 242 on the rod threads.
- Lower the frame and screw the piston rod into the guide block by turning the complete housing.
- Tighten the piston rod by using a wrench.
- Install and tighten the four bolts (30) to fix the cylinder to the frame.
- Lay down the actuator in a horizontal position, unscrew the end stroke (11) completely and put the actuator in close position by pressurizing the cylinder through the port of the rod flange (18). Then release the pressure.

(only for Spring Return Actuators)

- Install the spring pusher (36).
- Fix the spring container by the four bolts (37) and mount the cover onto the frame.

SY SERIES

(see drawing CDT 005-E/024 and CDT 005-E/025)

GUIDELINES FOR ASSEMBLING

- Remove the plastic plugs from the cylinder connections. Pressurize the cylinder from the port of the end flange (19), to project the piston rod completely out of the cylinder and release the pressure. Plug the cylinder air connection using a sealing carbon steel or aluminium plug.
- Put the cylinder in a vertical position with the piston rod projected out from the top side.
- Remove the position indicator from the top of the frame by unscrewing the two socket head nuts.
- Unscrew the bolts (14) on the top of the frame and remove the cover.
- Remove the flange (42) and the four bolts (45) and install two lifting eye bolts through the holes of the same.
- Hang the frame by the two eye bolts (making sure that the guide bar does not fall out) vertically onto the cylinder rod and put some Loctite 242 on the rod threads.
- Lower the frame and screw the piston rod into the guide block by turning the complete housing.
- Tighten the piston rod by using a wrench.
- Install and tighten the four bolts (30) to fix the cylinder to the frame.
- Lay down the actuator in a horizontal position, unscrew the end stroke (11) completely and put the actuator in close position by pressurizing the cylinder through the port of the rod flange (18). Then release the pressure.

(only for Spring Return Actuators)

- Install the spring pusher.
- Fix the spring container by the four bolts (44) and mount the cover onto the frame.

VA SERIES

(see drawings CDT 051-E/047 and CDT 051-E/050)

GUIDELINES FOR ASSEMBLING

- Insert the scotch yoke (17) into the frame.
- Insert the shaft (9) into the frame.
- Insert the circlips (15).
- Insert the pin (18) into the scotch yoke (17).
- Screw the cap into the frame.
- Insert the bar (5) into the frame.
- Insert the pin (13) into the frame bar (5) with the sliding blocks (12).
- Rotate the same pin in order to insert the two circlips (14).
- Pull the frame bar (5) until the pin is inserted in the scotch yoke.
- Insert the piston (42) into the frame bar (5), then screw the screw (30).
- Insert the tie rods (40) into the flange of the frame.
- Insert the cylinder liner (43).
- Insert the spring (if any) (47).
- Assemble the end flange (32).
- Insert the washers (46), then screw the screws (45) of the tie rods.
- Assemble the manual override (if any), by screwing the fixing screws (6).
- Assemble the cover (23) on the actuator frame, by screwing the fixing screws (20).
- Assemble the position indicator on the actuator frame, by screwing the fixing screw.

INSTRUCTIONS FOR REPLACING THE TEFLON SEALS

When the seals need to be replaced, before assembling, check that the groove is clean and lubricated with grease.

To replace the seals, proceed as follows:

a) Piston seals

- Place the O-ring into its groove
- Stretch the teflon glider with the fingers and place it on the O-ring (see DWG. STC043)

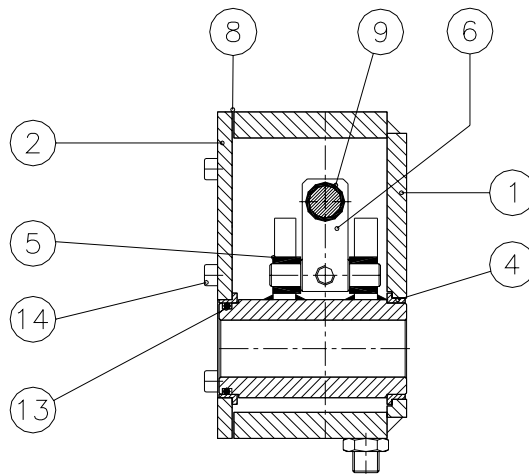
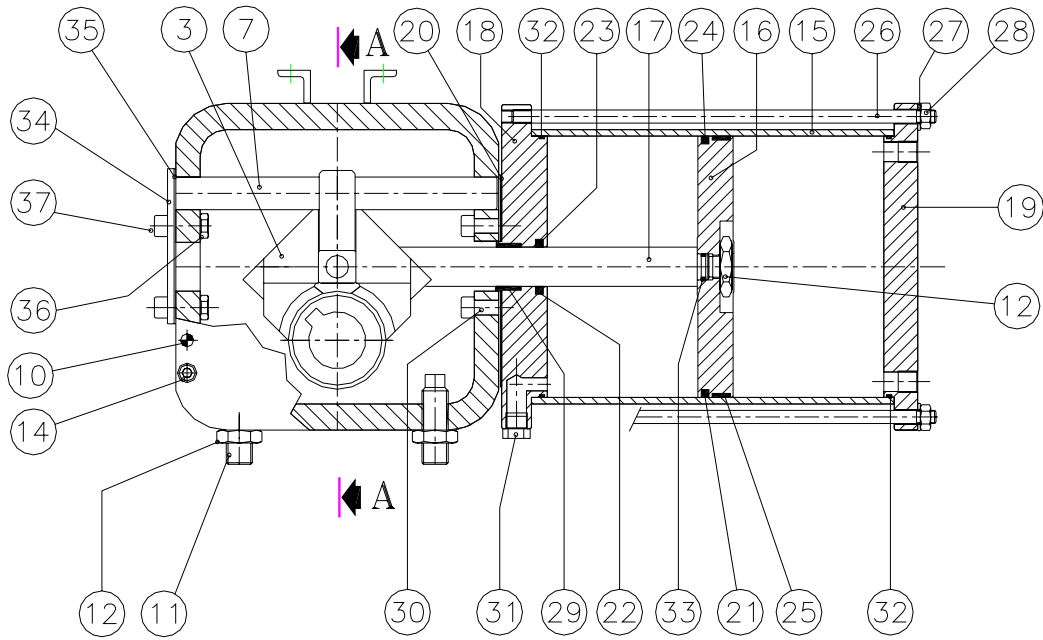
The glider's elastic memory, will make it return to its original dimensions after a while.

b) Rod seals

Place the rubber O-ring into its seat. Bend the teflon glider and insert it inside the O-ring groove as shown on DWG. STC042.



GUIDELINES FOR MOUNTING AN ACTUATOR ONTO A VALVE

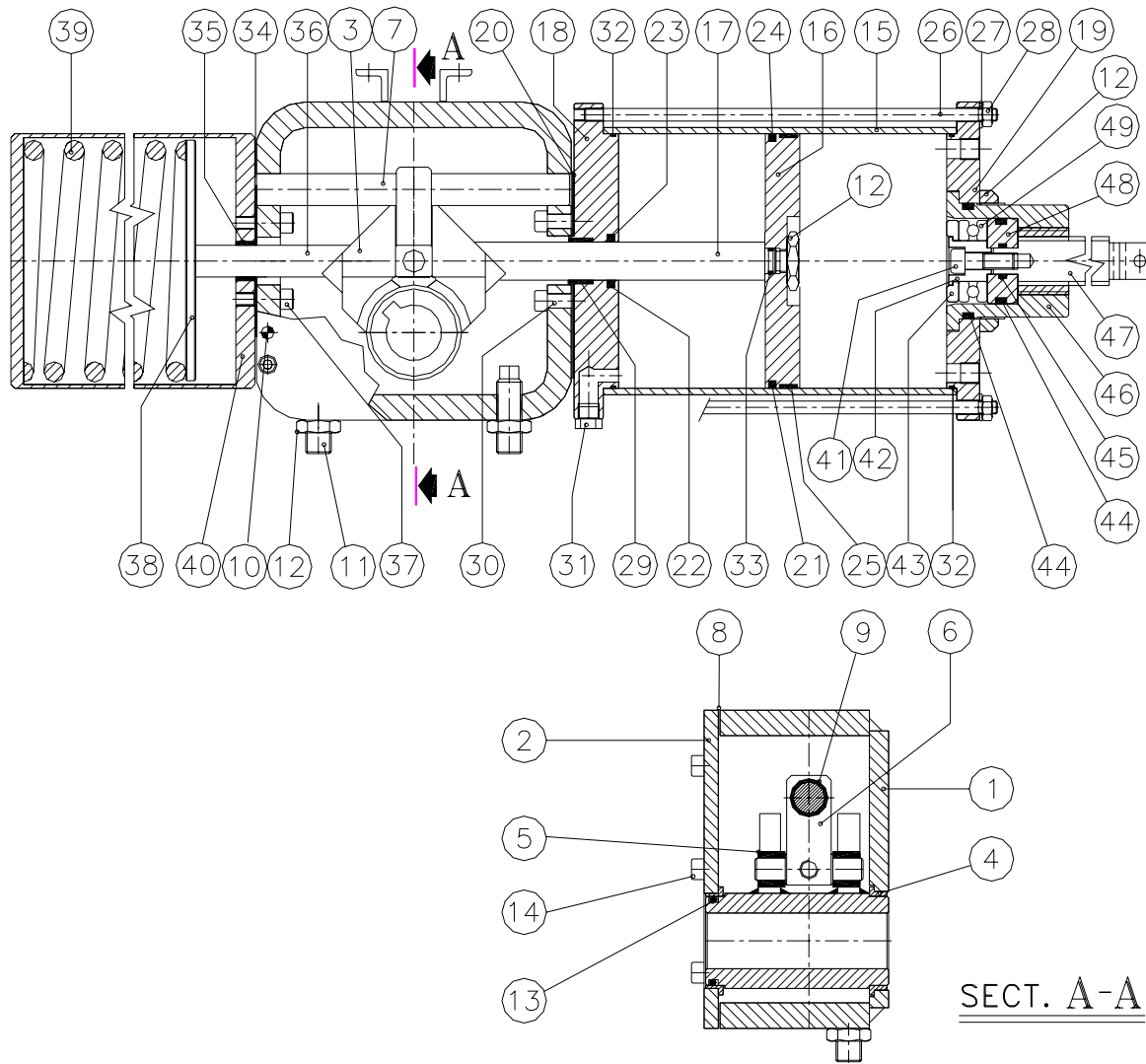
1. Check alignment of stem key slot with the valve. With valve in open position, the key slot should face the bore of the valve. With valve in closed position, the key slot should be 90 degrees to the bore of the valve. On valves with square stem nuts an indicator bar shows the valve position.
2. On actuators equipped with mechanical stops, adjust stops so that actuator can attain maximum travel.
3. Check to see that the valve and actuator are in the same position, ie., both open or both closed.
4. Install actuator on valve and check alignment of mounting holes. If mounting holes are not aligned, operate actuator manual control to rotate actuator mounting flange, until holes line up. Secure actuator to valve mounting flange.
5. Adjust actuator with travel stops/switches.
On actuator with mechanical stops, manually operate the valve to the closed position against the valve stops and adjust operator stop so that it is fractionally in advance of the valve stops. Repeat for “open position”.
On actuators with limit valves or switches (gas or electric) manually operate the valve to the closed position against the valve stops. Adjust actuator limit valve or switch setting to coincide with the valve stops. Repeat for open position.



SECT. A-A

N°	PART NAME	MATERIAL	N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL	21	GLIDER	TEFLON
2	COVER	CARBON STEEL	22	GLIDER	TEFLON
3	SCOTCH YOKE	ALLOY STEEL	23	O-RING	NBR
4	BUSHING	BRONZE	24	O-RING	NBR
5	SLIDING BLOCK	BRONZE	25	GUIDE SLIDER	TEFLON
6	GUIDE BLOCK	CARBON STEEL	26	STUD BOLT	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL	27	WASHER	COMMERCIAL
8	GASKET	KLINGERIT	28	NUT	ALLOY STEEL
9	DU-BEARING	Fe-Bz-TEFLON	29	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL	30	BOLT	COMMERCIAL
11	DOWEL	ALLOY STEEL	31	PLUG	CARBON STEEL
12	NUT	ALLOY STEEL	32	O-RING	NBR
13	O-RING	NBR	33	O-RING	NBR
14	BOLT	ALLOY STEEL	34	FLANGE	CARBON STEEL
15	LINER	CARBON STEEL	35	GASKET	KLINGERIT
16	PISTON	CARBON STEEL	36	NUT	COMMERCIAL
17	PISTON ROD	CARBON STEEL	37	SCREW	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL			
19	END FLANGE	CARBON STEEL			
20	GASKET	KLINGERIT			



REV.	1	2			 
BY.	COMPASS	Starkt			
CK.	E.C.	E.C.			DOUBLE ACTING GS ACTUATOR SECTIONAL DRAWING
DATE	29/10/97	16/02/00			
Ex.			SCALE.		DWG. CDT005-E\013

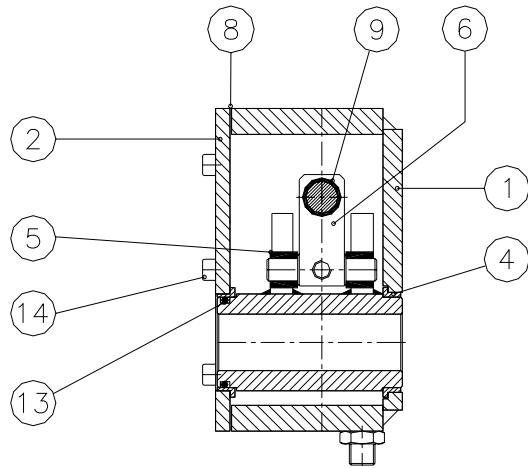
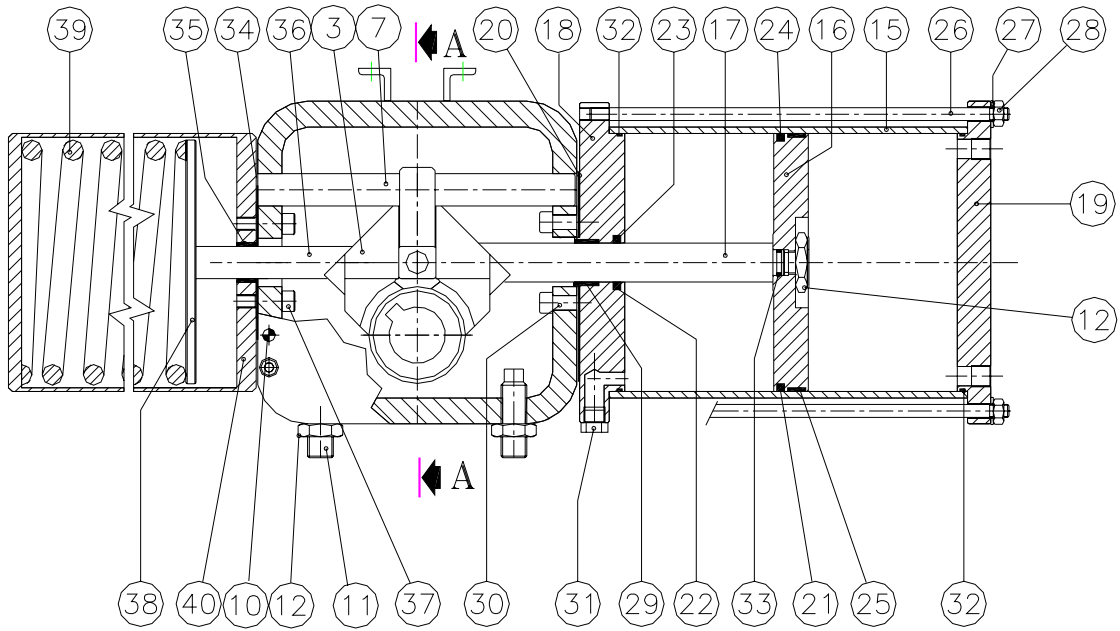


SECT. A-A

N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	BRONZE
6	GUIDE BLOCK	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL
8	GASKET	KLINGERIT
9	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	ALLOY STEEL
15	LINER	CARBON STEEL
16	PISTON	CARBON STEEL
17	PISTON ROD	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL
19	END FLANGE	CARBON STEEL
20	GASKET	KLINGERIT
21	GLIDER	TEFLON
22	GLIDER	TEFLON
23	O-RING	NBR
24	O-RING	NBR
25	GUIDE SLIDER	TEFLON

N°	PART NAME	MATERIAL
26	STUD BOLT	CARBON STEEL
27	WASHER	COMMERCIAL
28	NUT	ALLOY STEEL
29	DU-BEARING	Fe-Bz-TEFLON
30	BOLT	COMMERCIAL
31	PLUG	CARBON STEEL
32	O-RING	NBR
33	O-RING	NBR
34	GASKET	KLINGERIT
35	DU-BEARING	Fe-Bz-TEFLON
36	PIN	CARBON STEEL
37	BOLT	ALLOY STEEL
38	FLANGE	CARBON STEEL
39	SPRING	SPRING STEEL
40	SPRING HOUSING	CARBON STEEL
41	SCREW	COMMERCIAL
42	BEARING CENTERING	CARBON STEEL
43	BEARING SUPPORT	CARBON STEEL
44	O-RING	NBR
45	O-RING	NBR
46	THREADED BUSHING	CARBON STEEL
47	SCREW	CARBON STEEL
48	BUSH	CARBON STEEL
49	BALL BEARING	COMMERCIAL



REV.	1	2			 
BY.	COMPASS	Starkt			
CK.	E.C.	E.C.			
DATE	29/10/97	16/02/00			
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					SPRING RETURN GS ACTUATOR SECTIONAL DRAWING DWG. CDT005-E\014

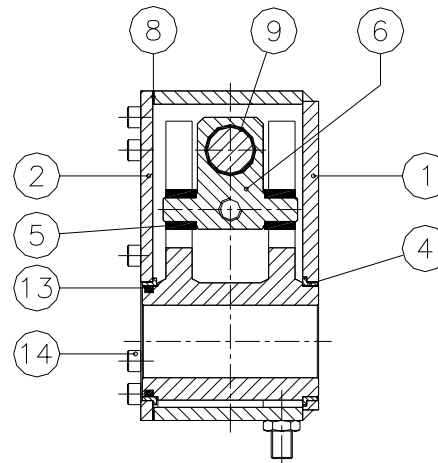
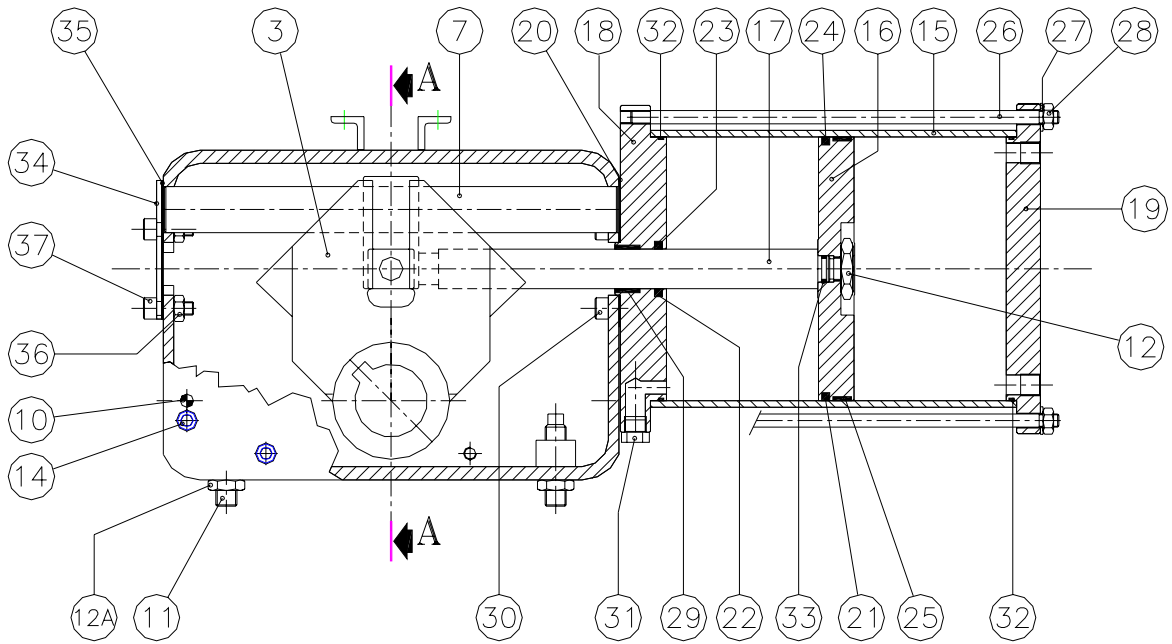


SECT. A-A

N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	BRONZE
6	GUIDE BLOCK	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL
8	GASKET	KLINGERIT
9	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	ALLOY STEEL
15	LINER	CARBON STEEL
16	PISTON	CARBON STEEL
17	PISTON ROD	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL
19	END FLANGE	CARBON STEEL
20	GASKET	KLINGERIT

N°	PART NAME	MATERIAL
21	GLIDER	TEFLON
22	GLIDER	TEFLON
23	O-RING	NBR
24	O-RING	NBR
25	GUIDE SLIDER	TEFLON
26	STUD BOLT	CARBON STEEL
27	WASHER	COMMERCIAL
28	NUT	ALLOY STEEL
29	DU-BEARING	Fe-Bz-TEFLON
30	SCREW	COMMERCIAL
31	PLUG	CARBON STEEL
32	O-RING	NBR
33	O-RING	NBR
34	GASKET	KLINGERIT
35	DU-BEARING	Fe-Bz-TEFLON
36	PUSHER	CARBON STEEL
37	SCREW	COMMERCIAL
38	FLANGE	CARBON STEEL
39	SPRING	SPRING STEEL
40	SPRING HOUSING	CARBON STEEL

REV.	1	2				 
BY.	COMPASS	Starkt				
CK.	E.C.	E.C.				SPRING RETURN GS ACTUATOR SECTIONAL DRAWING
DATE	29/10/97	16/02/00				
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SECT. A-A

N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	BRONZE
6	GUIDE BLOCK	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL
8	GASKET	KLINGERIT
9	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	ALLOY STEEL
15	LINER	CARBON STEEL
16	PISTON	CARBON STEEL
17	PISTON ROD	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL
19	END FLANGE	CARBON STEEL
20	GASKET	KLINGERIT

N°	PART NAME	MATERIAL
21	GLIDER	TEFLON
22	GLIDER	TEFLON
23	O-RING	NBR
24	O-RING	NBR
25	GUIDE SLIDER	TEFLON
26	STUD BOLT	CARBON STEEL
27	WASHER	COMMERCIAL
28	NUT	ALLOY STEEL
29	DU-BEARING	Fe-Bz-TEFLON
30	BOLT	ALLOY STEEL
31	PLUG	CARBON STEEL
32	O-RING	NBR
33	O-RING	NBR
34	FLANGE	CARBON STEEL
35	GASKET	KLINGERIT
36	NUT	ALLOY STEEL
37	BOLT	ALLOY STEEL

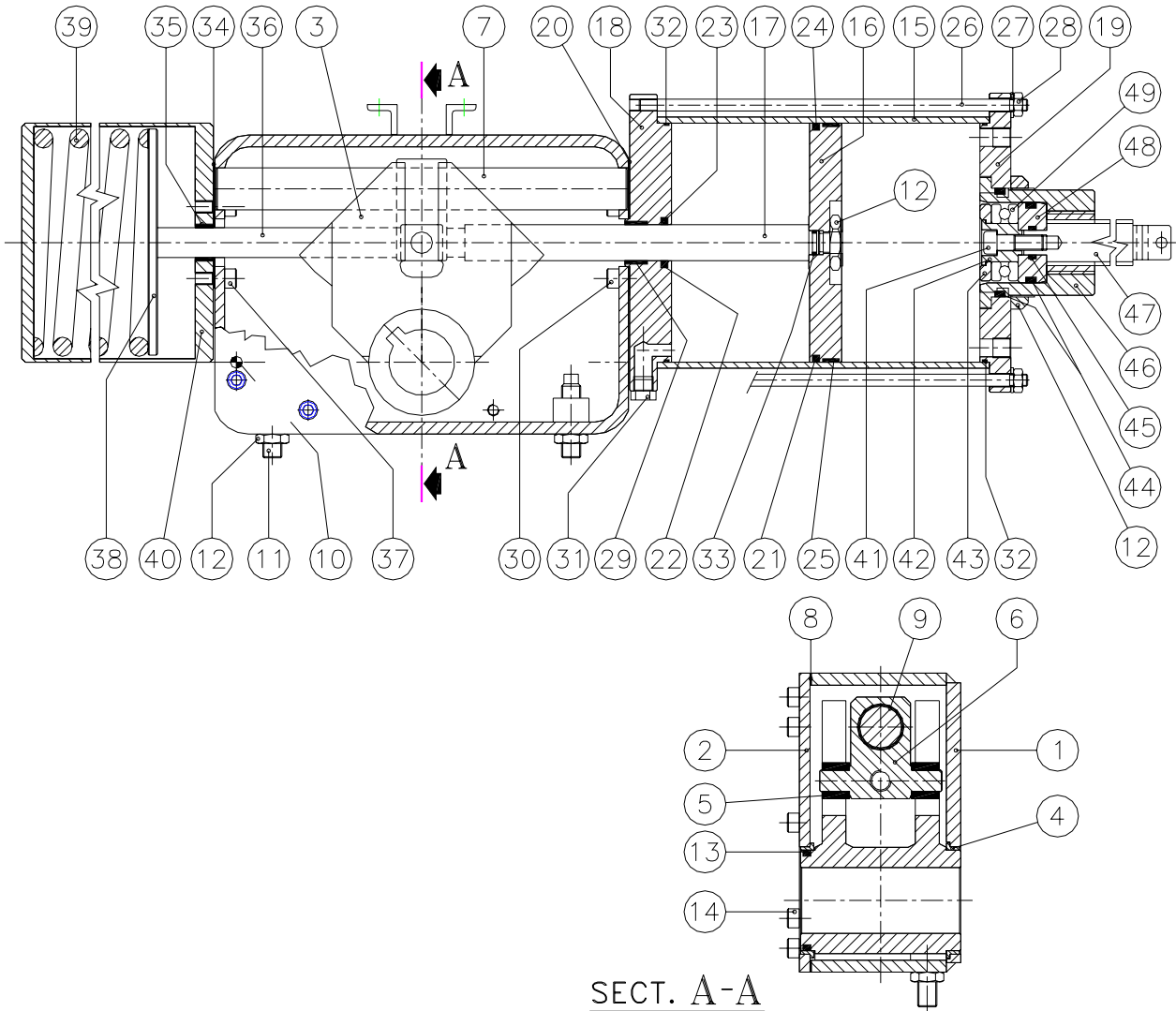
REV.	1	2			
BY.	COMPASS	Starkt			
CK.	E.C.	E.C.			
DATE	29/10/97	16/02/00			
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DOUBLE ACTING GS ACTUATOR
SECTIONAL DRAWING



DWG. CDT005-E\017

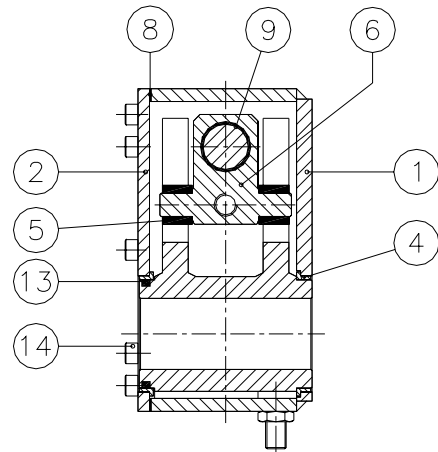
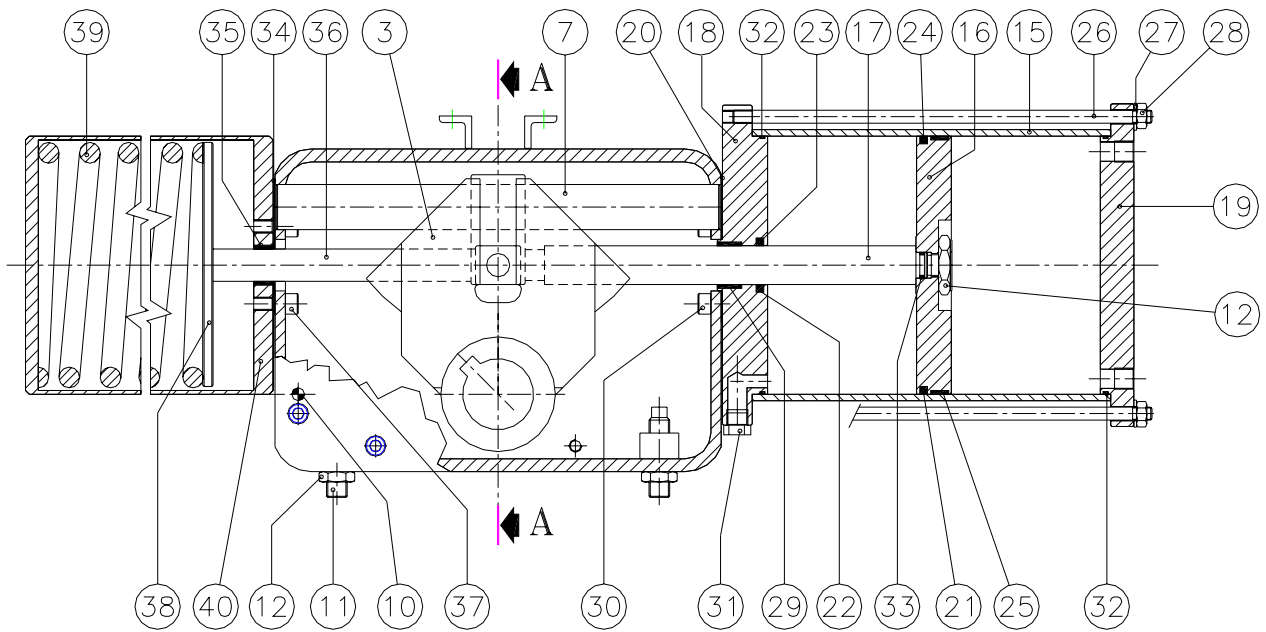


SECT. A-A

N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	BRONZE
6	GUIDE BLOCK	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL
8	GASKET	KLINGERIT
9	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	COMMERCIAL
15	LINER	CARBON STEEL
16	PISTON	CARBON STEEL
17	PISTON ROD	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL
19	END FLANGE	CARBON STEEL
20	GASKET	KLINGERIT
21	GLIDER	TEFLON
22	GLIDER	TEFLON
23	O-RING	NBR
24	O-RING	NBR
25	GUIDE SLIDER	TEFLON

N°	PART NAME	MATERIAL
26	STUD BOLT	CARBON STEEL
27	WASHER	COMMERCIAL
28	NUT	ALLOY STEEL
29	DU-BEARING	Fe-Bz-TEFLON
30	BOLT	COMMERCIAL
31	PLUG	CARBON STEEL
32	O-RING	NBR
33	O-RING	NBR
34	GASKET	KLINGERIT
35	DU-BEARING	Fe-Bz-TEFLON
36	PUSHER	CARBON STEEL
37	BOLT	COMMERCIAL
38	FLANGE	CARBON STEEL
39	SPRING	SPRING STEEL
40	SPRING HOUSING	CARBON STEEL
41	SCREW	COMMERCIAL
42	BEARING CENTERING	CARBON STEEL
43	BEARING SUPPORT	CARBON STEEL
44	O-RING	NBR
45	O-RING	NBR
46	THREADED BUSHING	CARBON STEEL
47	SCREW	CARBON STEEL
48	BUSH	CARBON STEEL
49	BALL BEARING	COMMERCIAL



REV.	1	2			 
BY.	COMPASS	Starkt			
CK.	E.C.	E.C.			
DATE	29/10/97	16/02/00			
Ex.			SCALE.		
					SPRING RETURN GS ACTUATOR SECTIONAL DRAWING DWG. CDT005-E\018

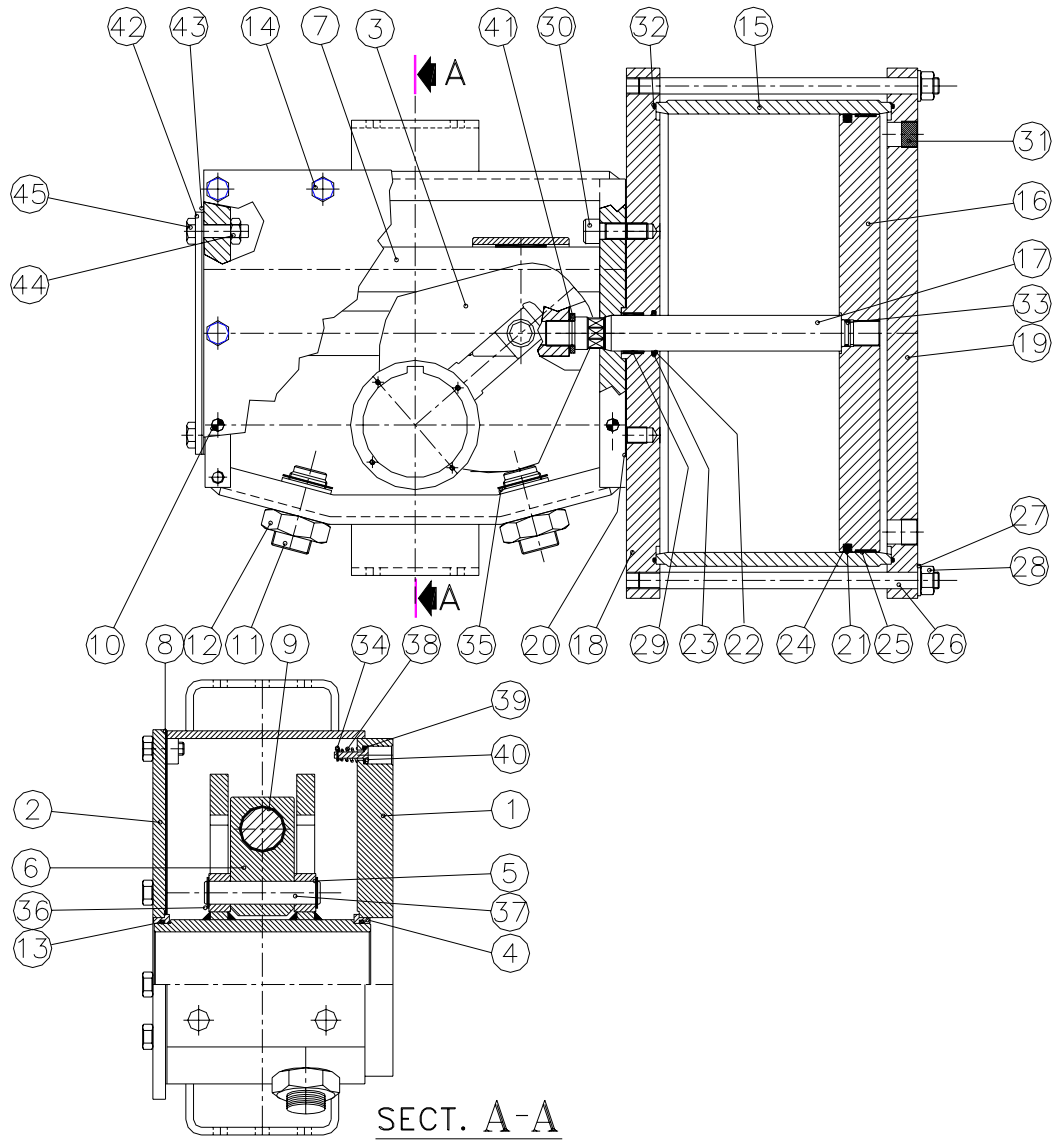


SECT. A-A

N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	BRONZE
6	GUIDE BLOCK	CARBON STEEL
7	SIDE LOAD BAR	ALLOY STEEL
8	GASKET	KLINGERIT
9	DU-BEARING	Fe-Bz-TEFLON
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	COMMERCIAL
15	LINER	CARBON STEEL
16	PISTON	CARBON STEEL
17	PISTON ROD	ALLOY STEEL
18	ROD HEAD FLANGE	CARBON STEEL
19	END FLANGE	CARBON STEEL
20	GASKET	KLINGERIT



N°	PART NAME	MATERIAL
21	GLIDER	TEFLON
22	GLIDER	TEFLON
23	O-RING	NBR
24	O-RING	NBR
25	GUIDE SLIDER	TEFLON
26	STUD BOLT	CARBON STEEL
27	WASHER	COMMERCIAL
28	NUT	ALLOY STEEL
29	DU-BEARING	Fe-Bz-TEFLON
30	SCREW	COMMERCIAL
31	PLUG	CARBON STEEL
32	O-RING	NBR
33	O-RING	NBR
34	GASKET	KLINGERIT
35	DU-BEARING	Fe-Bz-TEFLON
36	PUSHER	CARBON STEEL
37	SCREW	COMMERCIAL
38	FLANGE	CARBON STEEL
39	SPRING	SPRING STEEL
40	SPRING HOUSING	CARBON STEEL

REV.	1	2				 
BY.	COMPASS	Starkt				
CK.	E.C.	E.C.				
DATE	29/10/97	16/02/00				
Ex.			SCALE.			
						SPRING RETURN GS ACTUATOR SECTIONAL DRAWING DWG. CDT005-E\020



SECT. A-A

N°	PART NAME	MATERIAL	N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL	24	O-RING	NBR
2	COVER	CARBON STEEL	25	GUIDE SLIDER	TEFLON
3	SCOTCH YOKE	ALLOY STEEL	26	STUD BOLT	CARBON STEEL
4	BUSHING	BRONZE	27	WASHER	COMMERCIAL
5	SLIDING BLOCK	BRONZE	28	NUT	ALLOY STEEL
6	GUIDE BLOCK	CARBON STEEL	29	DU-BEARING	Fe-Bz-TEFLON
7	SIDE LOAD BAR	ALLOY STEEL	30	BOLT	COMMERCIAL
8	GASKET	KLINGERIT	31	PLUG	CARBON STEEL
9	DU-BEARING	Fe-Bz-TEFLON	32	O-RING	NBR
10	PIN	COMMERCIAL	33	O-RING	NBR
11	DOWEL	COMMERCIAL	34	CIRCLIP	COMMERCIAL
12	NUT	COMMERCIAL	35	CIRCLIP	COMMERCIAL
13	O-RING	NBR	36	CIRCLIP	COMMERCIAL
14	BOLT	ALLOY STEEL	37	THRUST PIN	ALLOY STEEL
15	CYLINDER TUBE	CARBON STEEL	38	SPRING	SPRING STEEL
16	PISTON	CARBON STEEL	39	GASKET	TEFLON
17	PISTON ROD	ALLOY STEEL	40	PRESSURE RELIEF VALVE	ALLOY STEEL
18	INNER END CAP	CARBON STEEL	41	WASHER	CARBON STEEL
19	OUTER END CAP	CARBON STEEL	42	FLANGE	ALLOY STEEL
20	GASKET	KLINGERIT	43	GASKET	KLINGERIT
21	GLIDER	TEFLON	44	NUT	COMMERCIAL
22	GLIDER	TEFLON	45	SCREW	ALLOY STEEL
23	O-RING	NBR			

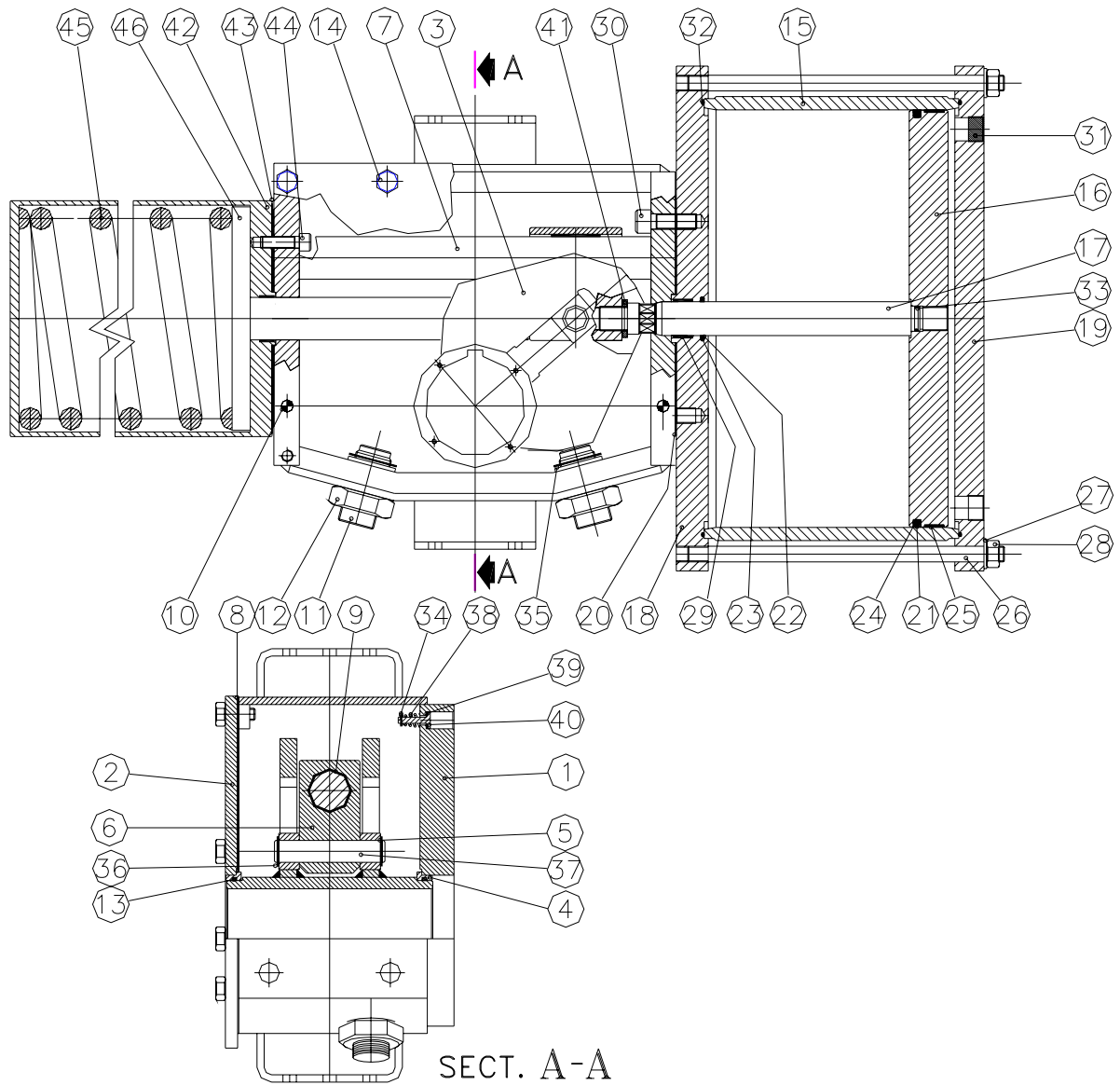
REV.	1	2			 
BY.	COMPASS	Starkt			
CK.	E.C.	E.C.			
DATE	29/10/97	16/02/00			
Ex.	SCALE.			DWG. CDT005-E\024	

Ledeen
FACILITY

 CAMERON



DOUBLE ACTING SY ACTUATOR
SECTIONAL DRAWING

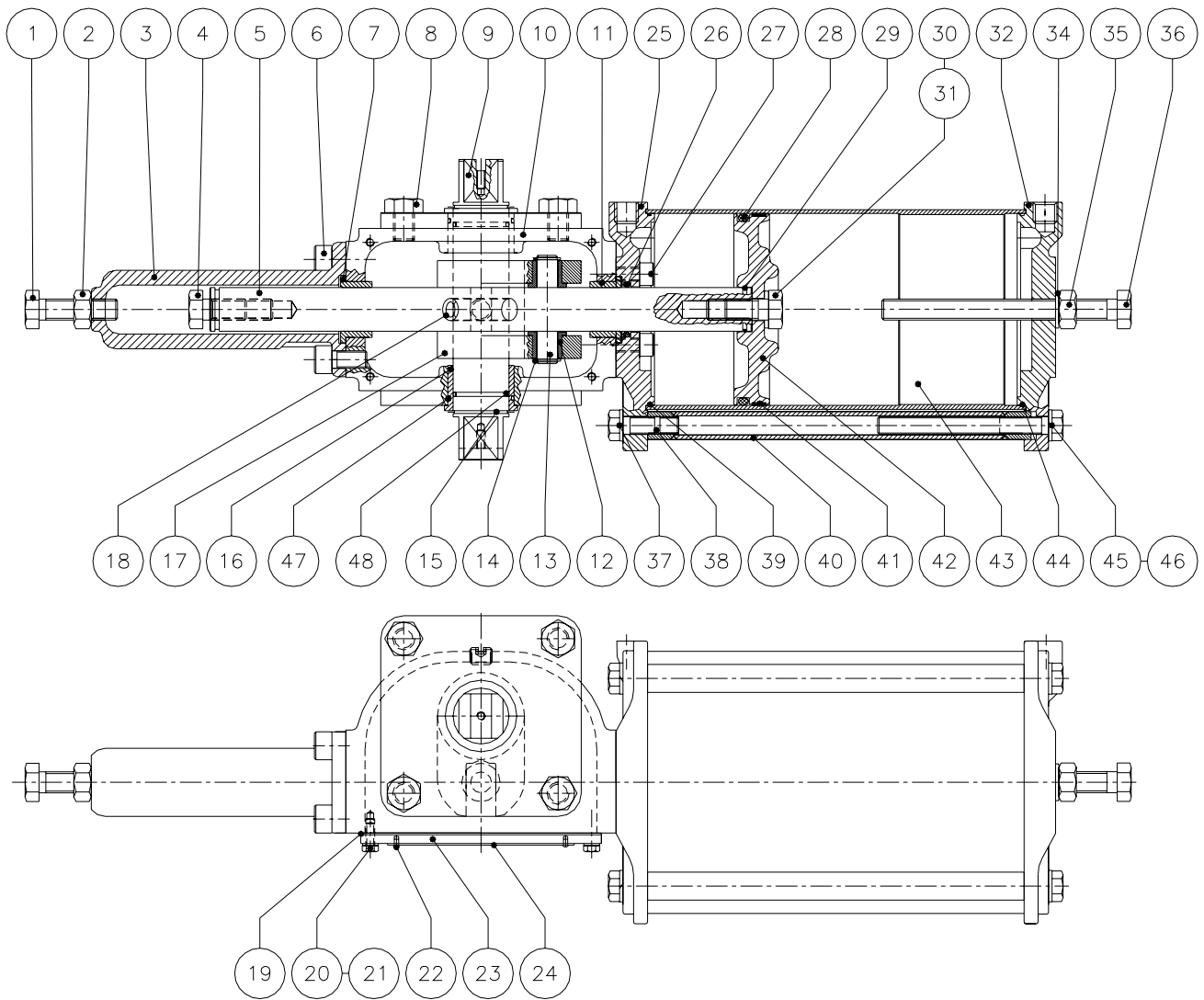
DWG. CDT005-E\024



SECT. A-A

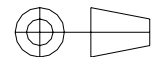
N°	PART NAME	MATERIAL	N°	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL	24	O-RING	NBR
2	COVER	CARBON STEEL	25	GUIDE SLIDER	TEFLON
3	SCOTCH YOKE	ALLOY STEEL	26	STUD BOLT	CARBON STEEL
4	BUSHING	BRONZE	27	WASHER	COMMERCIAL
5	SLIDING BLOCK	BRONZE	28	NUT	ALLOY STEEL
6	GUIDE BLOCK	CARBON STEEL	29	DU-BEARING	Fe-Bz-TEFLON
7	SIDE LOAD BAR	ALLOY STEEL	30	BOLT	COMMERCIAL
8	GASKET	KLINGERIT	31	PLUG	CARBON STEEL
9	DU-BEARING	Fe-Bz-TEFLON	32	O-RING	NBR
10	PIN	ALLOY STEEL	33	O-RING	NBR
11	DOWEL	ALLOY STEEL	34	CIRCLIP	COMMERCIAL
12	NUT	ALLOY STEEL	35	CIRCLIP	COMMERCIAL
13	O-RING	NBR	36	CIRCLIP	COMMERCIAL
14	BOLT	ALLOY STEEL	37	THRUST PIN	ALLOY STEEL
15	CYLINDER TUBE	CARBON STEEL	38	SPRING	SPRING STEEL
16	PISTON	CARBON STEEL	39	GASKET	TEFLON
17	PISTON ROD	ALLOY STEEL	40	RELIEF VALVE	CARBON STEEL
18	INNER END CAP	CARBON STEEL	41	WASHER	ALLOY STEEL
19	OUTER END CAP	CARBON STEEL	42	SPRING HOUSING	CARBON STEEL
20	GASKET	KLINGERIT	43	GASKET	KLINGERIT
21	GLIDER	TEFLON	44	BOLT	ALLOY STEEL
22	GLIDER	TEFLON	45	SPRING	SPRING STEEL
23	O-RING	NBR	46	SPRING PLATE	CARBON STEEL

REV.	1	2				 
BY.	COMPASS	Starkt				
CK.	E.C.	E.C.				
DATE	29/10/97	16/02/00				
Ex.			SCALE.			
						SPRING RETURN SY ACTUATOR SECTIONAL DRAWING DWG. CDT005-E\025





N°	PART NAME	MATERIAL
1	SCREW	COMMERCIAL
2	NUT	COMMERCIAL
3	COVER	CAST IRON
4	SCREW	COMMERCIAL
5	PISTON ROD	ALLOY STEEL Δ
6	SOCKET HEAD SCREW	COMMERCIAL
7	BUSHING	BRONZE
8	SCREW	COMMERCIAL
9	SHAFT	CARBON STEEL
10	HOUSING	CAST IRON Δ
11	BUSHING	BRONZE
12	SLIDING BLOCK	BRONZE
13	PIN	ALLOY STEEL Δ
14	SEEGER	COMMERCIAL
15	SEEGER	COMMERCIAL
16	BUSHING	BRONZE
17	SCOTCH YOKE	ALLOY STEEL Δ
18	PIN	SPRING STEEL
19	GASKET	NA-1030
20	SCREW	COMMERCIAL
21	WASHER	COMMERCIAL
22	RIVET	COMMERCIAL
23	COVER	CARBON STEEL
24	NAME PLATE	AISI 303

N°	PART NAME	MATERIAL
25	ROD HEAD FLANGE	CAST IRON
26	O-RING	NBR
27	SOCKET HEAD SCREW	COMMERCIAL
28	O-RING	NBR
29	O-RING	NBR
30	SCREW	COMMERCIAL
31	WASHER	COMMERCIAL
32	BLANK HEAD FLANGE	CAST IRON
34	O-RING	NBR
35	HEX. NUT	COMMERCIAL
36	SCREW	COMMERCIAL
37	SCREW	COMMERCIAL
38	PIN	CARBON STEEL
39	O-RING	NBR
40	TIE ROD	CARBON STEEL
41	GUIDE SLIDER	TEFLON+15% GRAPHITE
42	PISTON	CAST IRON
43	CYLINDER LINER	STAINLESS STEEL
44	O-RING	NBR
45	SCREW	COMMERCIAL
46	WASHER	COMMERCIAL
47	O-RING	NBR
48	O-RING	NBR

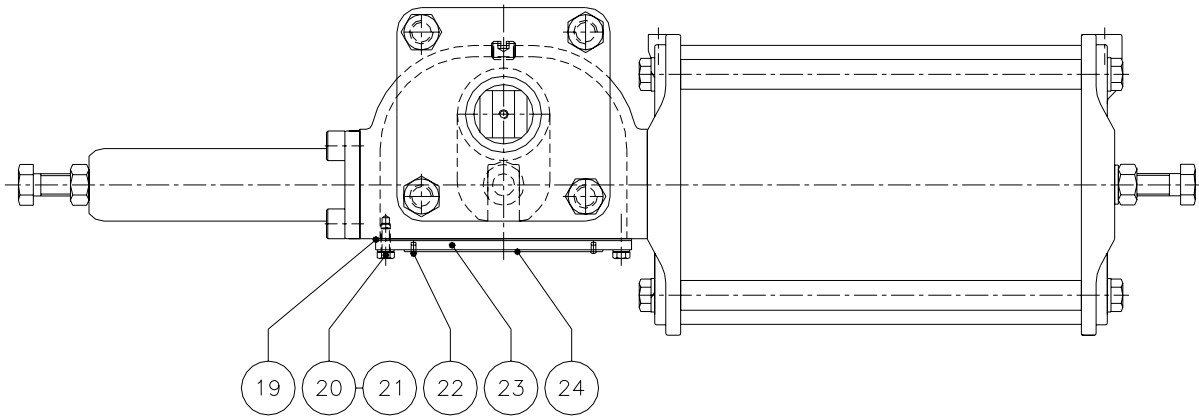
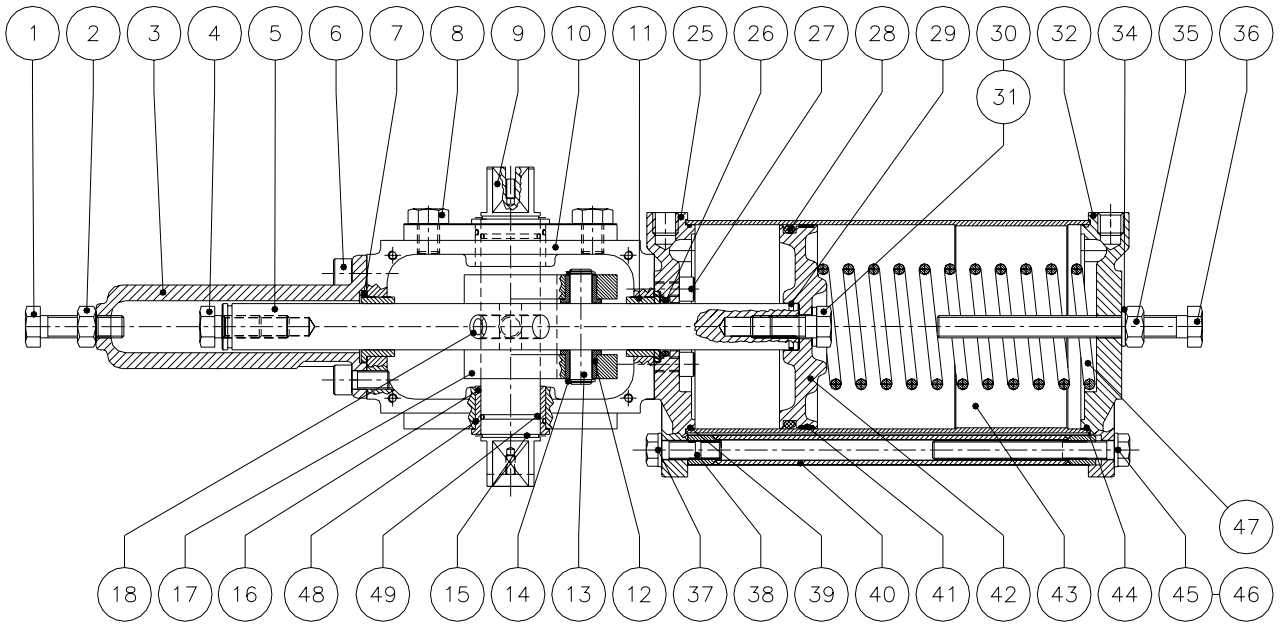


REV.	0	1	2	Δ 3
BY.	COMPASS	COMPASS	COMPASS	M.F.
CK.	M.F.	E.C.	M.F.	E.C.
DATE	21/7/2000	31/8/2000	09/11/2000	09/10/01
Ex.	SCALE.			

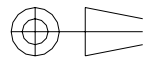
DOUBLE ACTING VA ACTUATOR
SECTIONAL DRAWING

DWG. CDT051-E\047



N°	PART NAME	MATERIAL
1	SCREW	COMMERCIAL
2	NUT	COMMERCIAL
3	COVER	CAST IRON
4	SCREW	COMMERCIAL
5	PISTON ROD	ALLOY STEEL
6	SOCKET HEAD SCREW	COMMERCIAL
7	BUSHING	BRONZE
8	SCREW	COMMERCIAL
9	SHAFT	CARBON STEEL
10	HOUSING	CAST IRON
11	BUSHING	BRONZE
12	SLIDING BLOCK	BRONZE
13	PIN	ALLOY STEEL
14	SEEGER	COMMERCIAL
15	SEEGER	COMMERCIAL
16	BUSHING	BRONZE
17	SCOTCH YOKE	ALLOY STEEL
18	PIN	SPRING STEEL
19	GASKET	NA-1030
20	SCREW	COMMERCIAL
21	WASHER	COMMERCIAL
22	RIVET	COMMERCIAL
23	COVER	CARBON STEEL
24	NAME PLATE	AISI 303

N°	PART NAME	MATERIAL
25	ROD HEAD FLANGE	CAST IRON
26	O-RING	NBR
27	SOCKET HEAD SCREW	COMMERCIAL
28	O-RING	NBR
29	O-RING	NBR
30	SCREW	COMMERCIAL
31	WASHER	COMMERCIAL
32	BLANK HEAD FLANGE	CAST IRON
34	O-RING	NBR
35	HEX. NUT	COMMERCIAL
36	SCREW	COMMERCIAL
37	SCREW	COMMERCIAL
38	PIN	CARBON STEEL
39	O-RING	NBR
40	TIE ROD	CARBON STEEL
41	GUIDE SLIDER	TEFLON+15% GRAPHITE
42	PISTON	CAST IRON
43	CYLINDER LINER	STAINLESS STEEL
44	O-RING	NBR
45	SCREW	COMMERCIAL
46	WASHER	COMMERCIAL
47	SPRING	SPRING STEEL
48	O-RING	NBR
49	O-RING	NBR

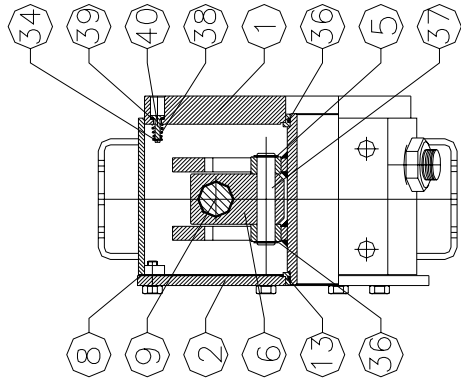
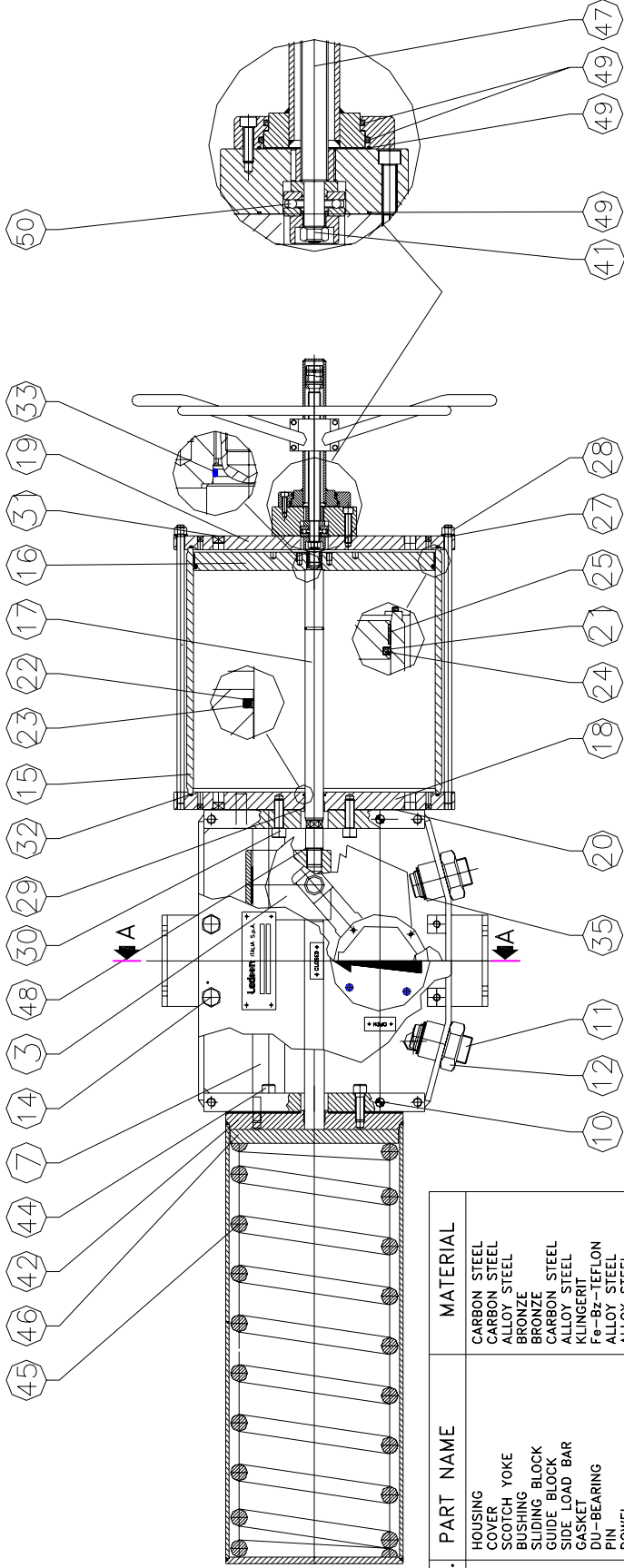


REV.	0	1	2	3
BY.	COMPASS	COMPASS	COMPASS	COMPASS
CK.	M.F.	E.C.	M.F.	M.F.
DATE	21/7/2000	31/8/2000	09/11/2000	09/10/2001
Ex.	SCALE.			



SPRING RETURN VA ACTUATOR
SECTIONAL DRAWING

DWG. CDT051-E\050



SECT. A-A

No.	PART NAME	MATERIAL
1	HOUSING	CARBON STEEL
2	COVER	CARBON STEEL
3	SCOTCH YOKE	ALLOY STEEL
4	BUSHING	BRONZE
5	SLIDING BLOCK	CARBON STEEL
6	GUIDE BLOCK	ALLOY STEEL
7	SIDE LOAD BAR	KLINGERIT
8	GASKET	F8-BZ-TEFLON
9	DU-BEARING	ALLOY STEEL
10	PIN	ALLOY STEEL
11	DOWEL	ALLOY STEEL
12	NUT	ALLOY STEEL
13	O-RING	NBR
14	BOLT	ALLOY STEEL
15	CYLINDER TUBE	CARBON STEEL
16	PISTON ROD	CARBON STEEL
17	INNER END CAP	ALLOY STEEL
18	OUTER END CAP	CARBON STEEL
19	GASKET	KLINGERIT
20	GUIDER	TEFLON
21	GUIDER	TEFLON
22	O-RING	NBR
23	O-RING	NBR
24	GUIDE SLIDER	TEFLON
25	STUD BOLT	CARBON STEEL
26	WASHER	COMMERCIAL
27	NUT	ALLOY STEEL
28	DU-BEARING	F8-BZ-TEFLON
29	BOLT	COMMERCIAL
30	PLUG	CARBON STEEL
31	O-RING	NBR
32	O-RING	NBR
33	CIRCLIP	COMMERCIAL
34	CIRCLIP	COMMERCIAL
35	CIRCLIP	COMMERCIAL
36	THRUST PIN	ALLOY STEEL
37	THRUST PIN	ALLOY STEEL
38	THRUST PIN	ALLOY STEEL
39	THRUST PIN	ALLOY STEEL
40	THRUST PIN	ALLOY STEEL
41	THRUST PIN	ALLOY STEEL
42	THRUST PIN	ALLOY STEEL
43	THRUST PIN	ALLOY STEEL
44	THRUST PIN	ALLOY STEEL
45	THRUST PIN	ALLOY STEEL
46	THRUST PIN	ALLOY STEEL
47	THRUST PIN	ALLOY STEEL
48	THRUST PIN	ALLOY STEEL
49	THRUST PIN	ALLOY STEEL
50	THRUST PIN	ALLOY STEEL



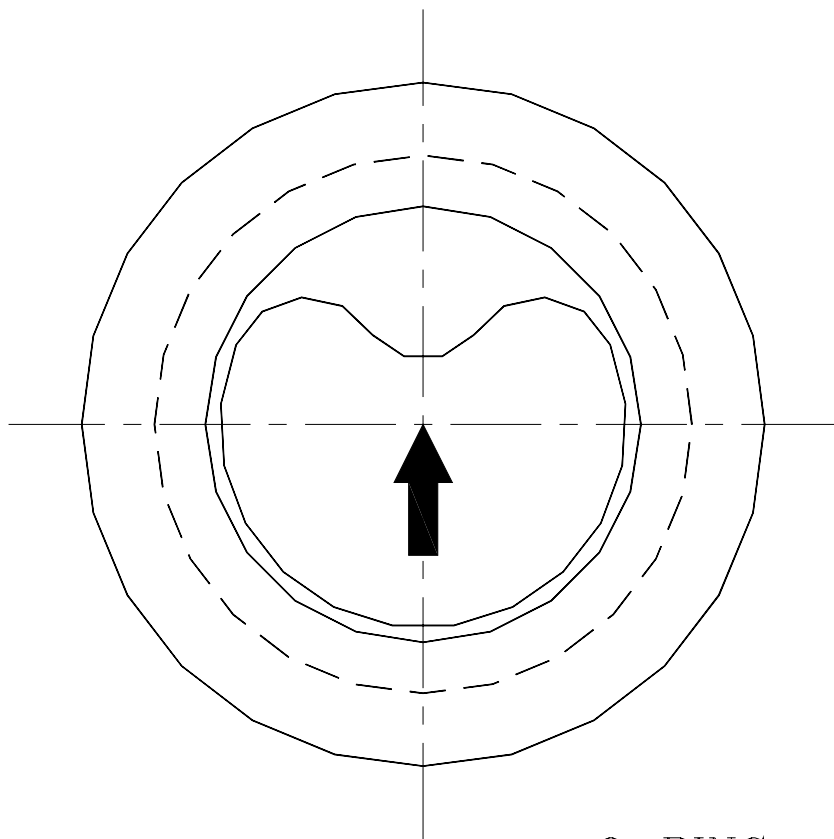

SPRING RETURN ACTUATORS
 SERIES SY7/10** - SR** - EJS

REV.	0				
BY.	COMPASS				
CK.	S.C.				
DATE	18/01/2002				

DWG. STC481

SCALE.

Ex.

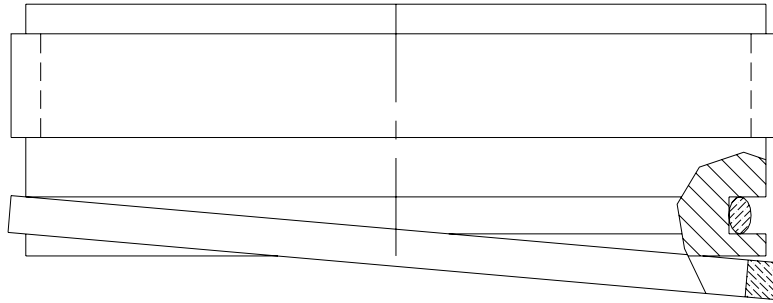


O-RING

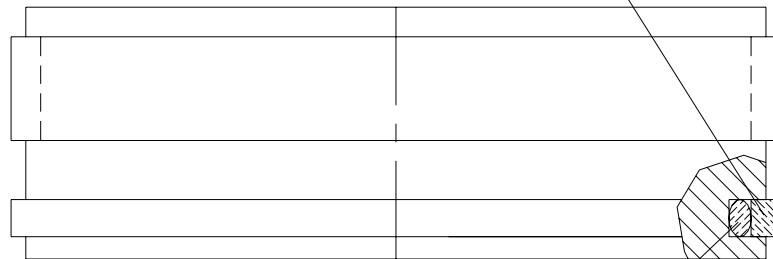


GLIDER FOR ROD



REV.	0					 
BY.	F.M.					
CK.	B.E.					ROD SEALS ASSEMBLY
DATE	29/03/93					
Ex.		SCALE.		DWG.	STC042	



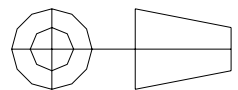
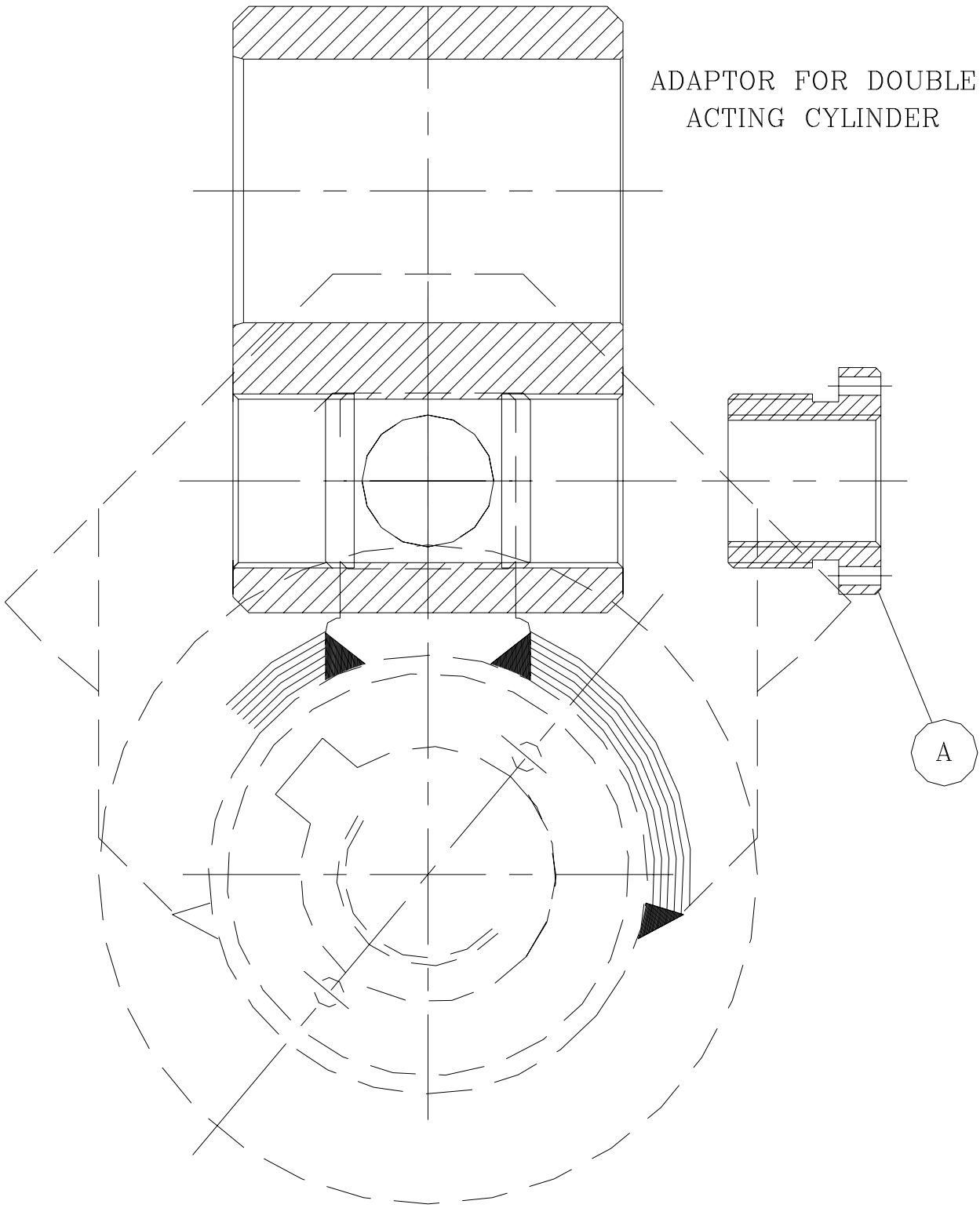
PISTON GLIDER





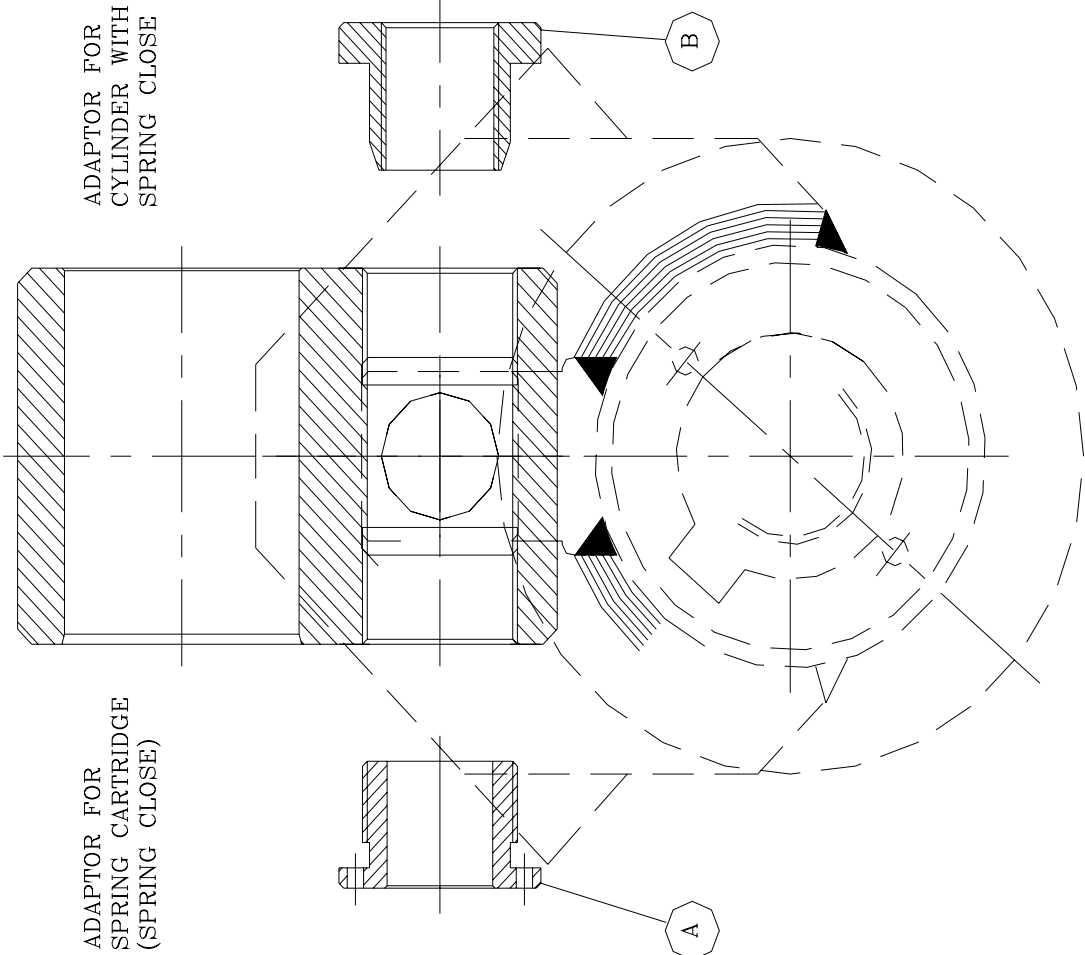
PISTON O-RING

REV.	0					 
BY.	F.M.					
CK.	B.E.					PISTON SEALS ASSEMBLY
DATE	29/03/93					
Ex.		SCALE.		DWG.	STC043	

ADAPTOR FOR DOUBLE
ACTING CYLINDER

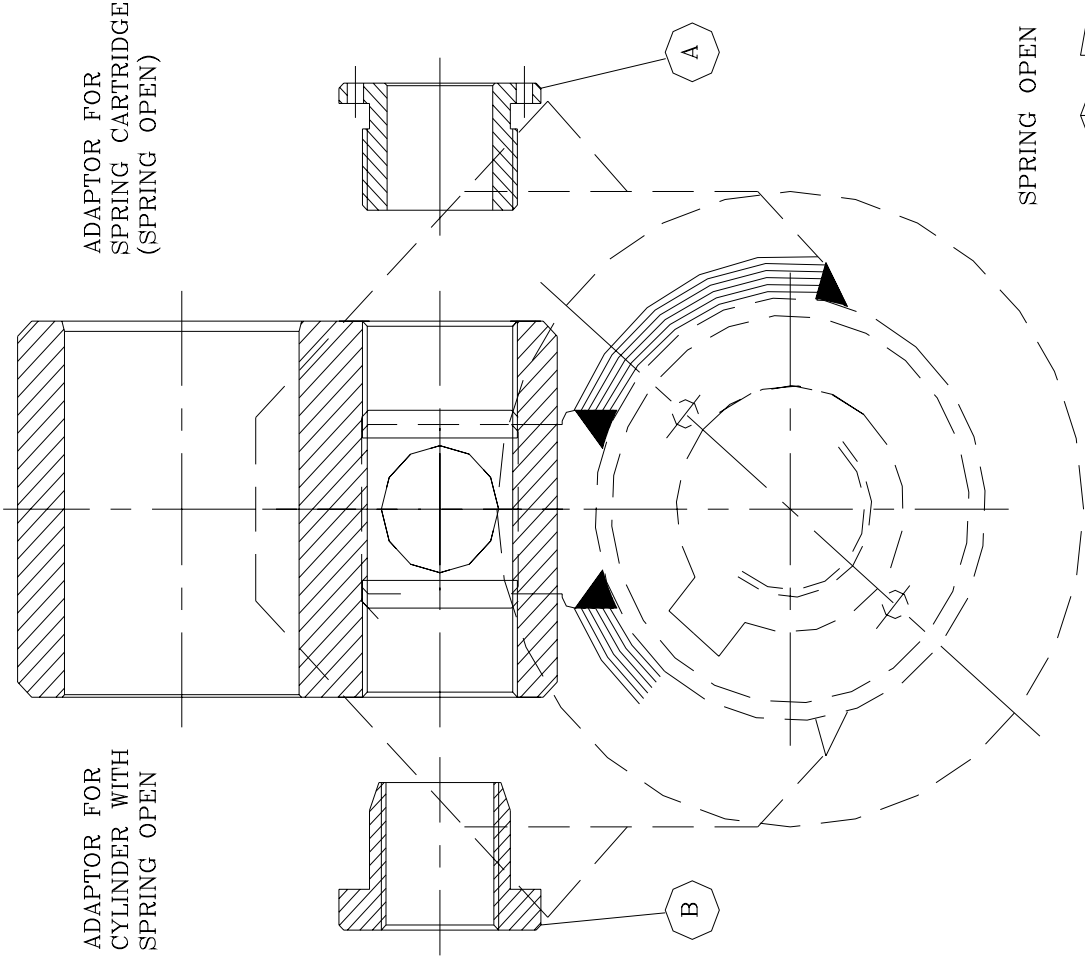


REV.	0					 
BY.	Daloiso Matteo					
CK.	E.C.					DOUBLE ACTING GS ACTUATOR
DATE	12/04/2005					
Ex.		SCALE.			DWG.	STC879



ADAPTOR FOR
SPRING CARTRIDGE
(SPRING CLOSE)

ADAPTOR FOR
CYLINDER WITH
SPRING CLOSE



ADAPTOR FOR
CYLINDER WITH
SPRING OPEN

ADAPTOR FOR
SPRING CARTRIDGE
(SPRING OPEN)

SPRING OPEN



SPRING CLOSE

REV.	0								
BY.	Daliso Matteo								
CK.	E.C.								
DATE	12/04/2005								
Ex.								UTP No.	
								DWG.	STC880



SPRING RETURN GS ACTUATOR