

Instruction Manual - AP-UP units

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INSTALLATION

- All AP/UP units are provided with Vanguard ATF Dexron II hydraulic oil.



Warning

In order to avoid any oil emulsion problem, AP/UP are provided with a quantity of oil bigger than the max. level allowed. To drain exceeding oil follow procedure on page 5 prior to arrange for the pneumatic connection. The unfulfilment of this operation may cause serious damages to the hydraulic circuits of the unit.

- Compressed air for unit feeding shall be filtered and lubricated and shall absolutely not exceed the max. pressure of 6 bar.
- Check that during connection pipes are clean in order to avoid any foreign matter to enter the circuits and affect the proper operation of the unit.
- Check that fittings and pipes used for unit connection have a section commensurate to the type of unit to be built. A wrong choice may affect the work execution speed.

To this purpose the following pipe diameters are suggested for the circuits of our units.

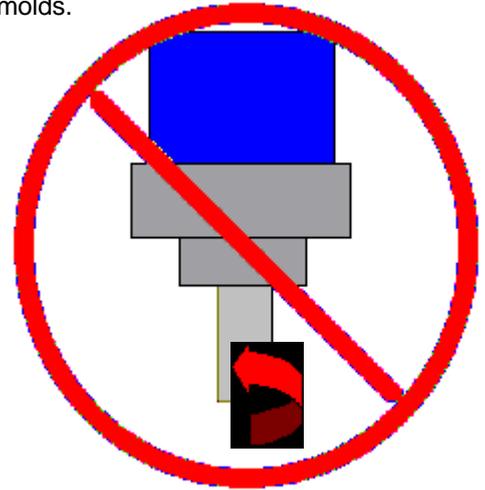
UNIT		INSIDE DIAMETER mm.
AP 0840		6
AP 0950		6
AP 1063	UP 0163	8
AP 1180	UP 0280	8
AP 12100	UP 03100	10
AP 13125	UP 04125	10
AP 14160	UP 05160	12
AP 15200*	UP 06200	12

(*) AP 15200 = AP 16200 (12mm)

- Pneumatic valves to be used shall have a capacity commensurate to the inside diameters of the pipes.

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Prevent unit stem from rotating during connection of equipment or molds.



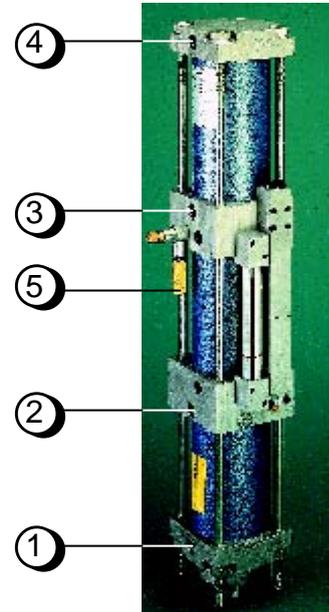
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CHECKS TO BE CARRIED OUT AFTER INSTALLATION

- 1 Further to the pneumatic connection check that with unit at rest pressure is as follows:

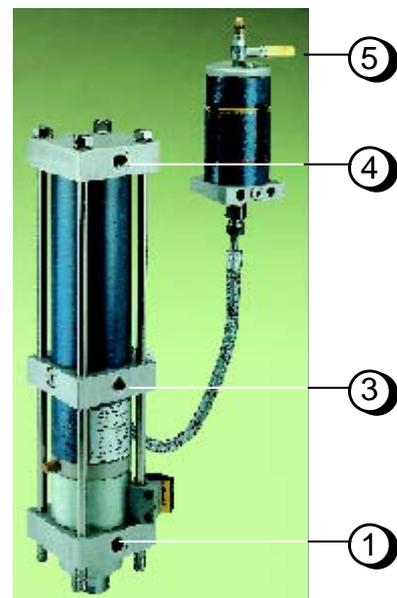
AP units

- Connections 1 and 3 = Pressure at 6 bar
- Connections 2 and 4 = Unload
- Connection 5 = Pressure at 2.5 bar

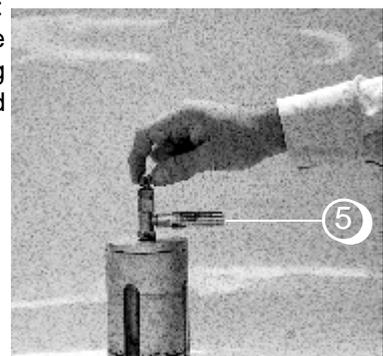


UP units

- Connections 1 and 3 = Pressure at 6 bar
- Connection 4 = Unload
- Connection 5 = Pressure at 2.5 bar



- 2 To properly connect connection no.5 follow this procedure: position pressure regulator at 2.5 bar and slowly unscrew the knurled knob situated on the connection so that any exceeding pressure can flow out. Screw knob again until sealing is reached again (see bottom picture)

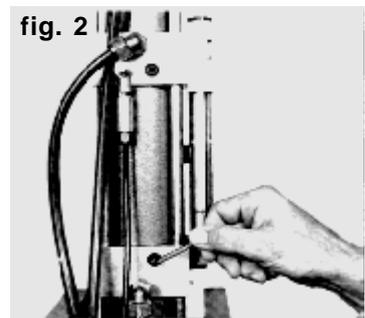
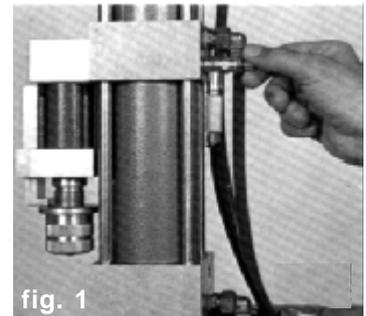


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- 3 Check oil level by measuring with unit stem back and tank with a max. pressure of 2.5 bar. The oil in the unit must not exceed the max level- any exceeding oil shall be removed. Oil drainage procedure is the following:

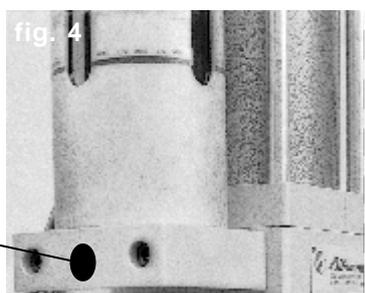
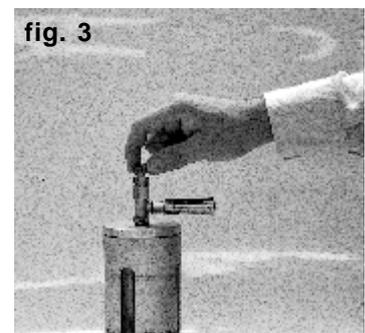
AP Units (without external tank)

- Depressurize unit.
- Discharge remaining pressure by unscrewing the knurled knob on the escape valve.
- Unscrew the drain plug and let the exceeding oil flow out.



UP /AP units with external tank

- Depressurize unit.
- Unscrew the knurled knob of the escape valve on top of the tank.
- Unscrew the drain plug at the bottom of the tank and let the exceeding oil flow out (in the units equipped with external tank, it is situated at its bottom -pos.1)



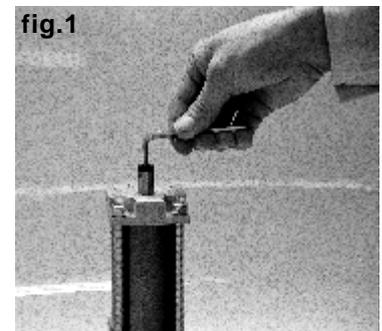
1

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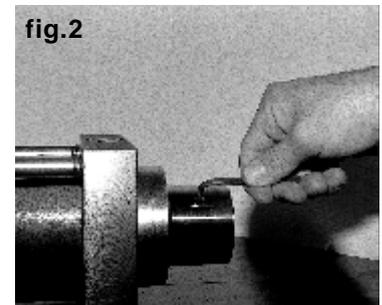
4 Check oil emulsion if any as during handling and transport some air bubbles may occur inside the unit causing the subsequent emulsion of the fluid during work phase. The following operations shall therefore be followed:

- [AP Unit] When the unit is vertically installed (stem downward) emulsion can be eliminated by having the unit carry out 10-15 cycles with approaching stroke only at adjusted speed without starting any work stroke.

- [AP Unit] When the unit is vertically installed equipped with standing compensator, proceed to drainage through the screw installed on the head of the mobile stem of the compensator tank. The operation must be carried out with unit under pressure considering that the drainage plug must be only loosened and slowly rotated max 360° checking that the air and a small quantity of oil flow out. At the end of this operation screw again until sealing



- [AP Unit] When the unit is installed equipped with external tank, drainage is carried out by pressurizing the plant and having the unit carry out the approaching stroke (stem fully forward) Then the drainage dowel is slowly unscrewed letting the air and a small quantity of oil flow out. Then screw dowel again until sealing.



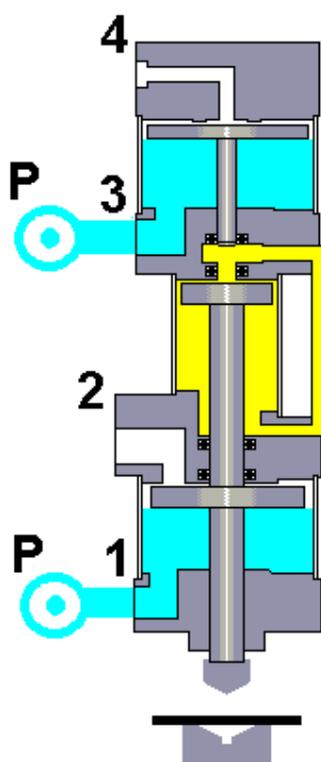
- [UP Unit] Depressurize unit and discharge any remaining pressure according to procedure set out on page 4. Unscrew oil loading plug situated on the edge of the relevant tank and leave unit at rest so that the air in emulsion in the oil can slowly come to the surface and leave the liquid. Visually check this process through tank plexyglass which will be considered as completed when there are no more small air bubbles in the oil.

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WARNINGS FOR A PROPER OPERATION

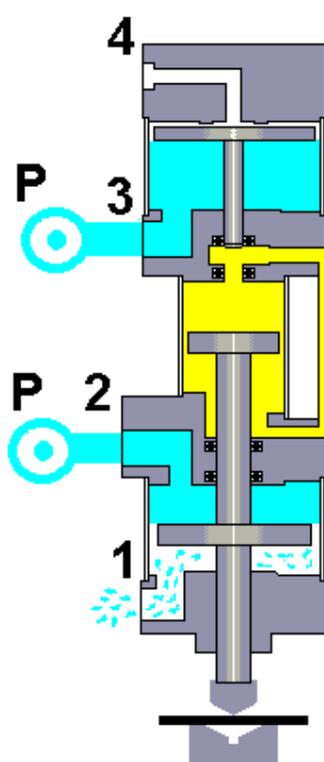
- Compressed air for unit feeding must be filtered and dehumidified.
- Feeding pressure must absolutely not exceed 6 bar.
- At the completion of the installation check the unit operating cycle considering that this consists of three separate and independent phases:

Operating cycle for AP units



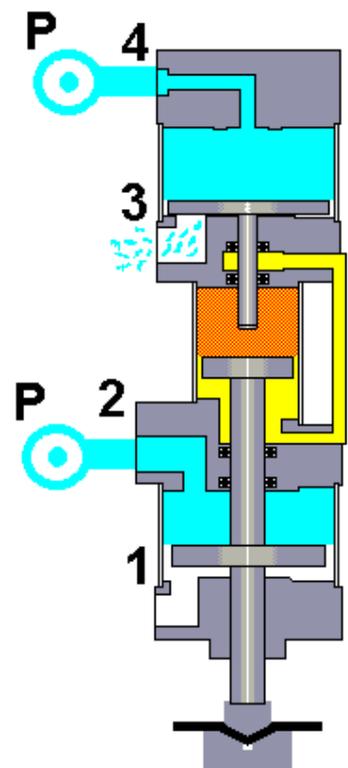
UNIT AT REST

Stem fully in back position. This situation must take place at the end of each work cycle.



1° PHASE

Switching of approaching valve. Unit stem must reach and lay onto the part to be processed.

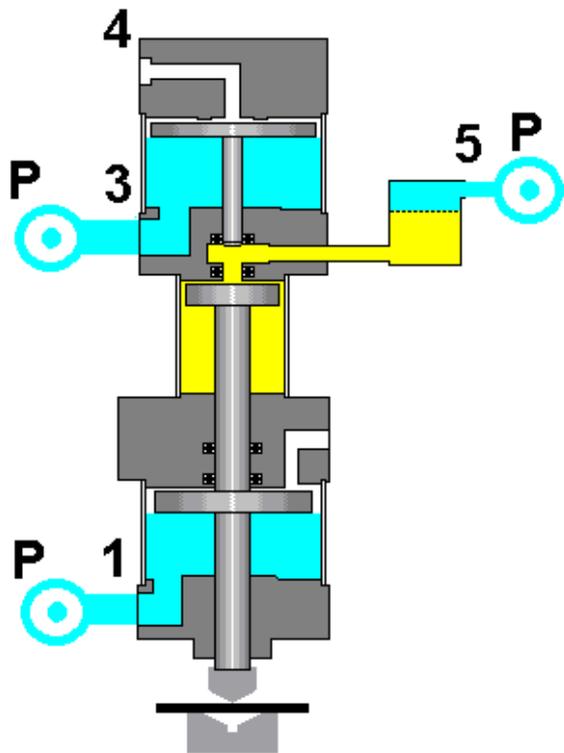


2° PHASE

Switching of the work stroke valve. The unit carries out the work stroke performing the processing it has been set for.

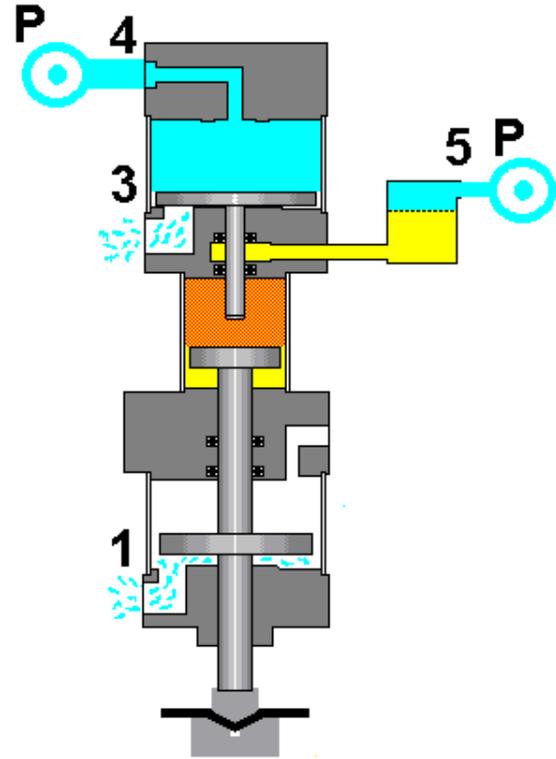
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Operating cycle for UP units



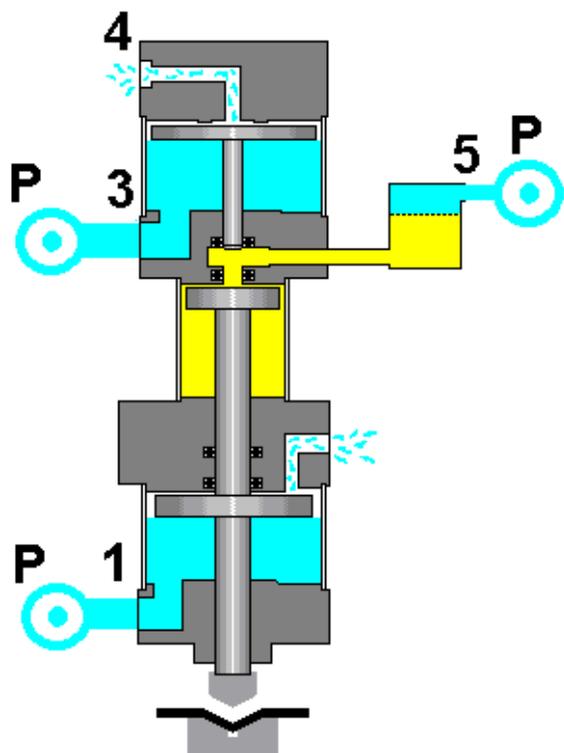
UNIT AT REST

Stem fully in back position. This situation must take place at the end of each work cycle.



1° PHASE

Switching of stem return valve. Switching of work stroke valve and relevant performance.



2° PHASE

Switching of work stroke valve. Switching of stem return valve and completion of operating cycle.

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STROKE ADJUSTMENT SYSTEMS

Volumetric adjustment of work stroke by means of modulating valve (AP units)

Work stroke modulating valve allows to pre-set the work stroke value by manual adjustment thus optimizing the unit work and replacing external mechanical locks. The system has been designed so that pre-set work strokes can be used in any point of the approaching stroke. Adjustment is carried out by rotating the knurled knob and checking the set work stroke on the nonius. To a clockwise rotation corresponds a work stroke increase whereas to an anticlockwise rotation corresponds a work stroke decrease.

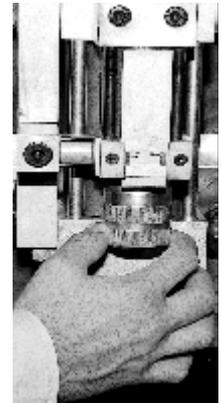


fig.1

Stroke volumetric adjustment by means of standing compensator (AP units)

The standing compensator is a pneumatically operated volumetric device allowing the unit stem to go forward at adjusted speed and stop at every point of the approaching stroke. Adjustment procedures strictly depend on the type of pneumatic system selected by the customer.



fig.2

Magnetic model (AP- UP units)

By means of electronic sensors, it allows to identify the final or intermediate position of the pistons, ensuring an electronic management of the different phases of the operating cycle (sensor features and electric connection - see page 32)



fig.3

Return stroke decelerator (AP units)

By rotating decelerator screw clockwise the unit decelerating intensity increases while an anticlockwise rotation decreases it. The capacity of absorbing energy means avoiding stress to the machine structure and limiting noise.

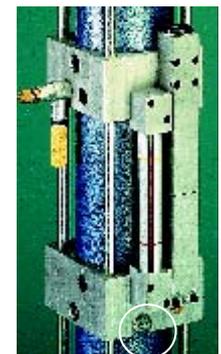


fig.4

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OPERATION FAILURES GENERATED BY WRONG INSTALLATION OR WRONG WORK CYCLE

AP units

FAILURE FOUND OUT	FAILURE CAUSE
<p>Stem slows down during approaching stroke and then work stroke does not develop.</p> <p>Work stroke does not develop or develops partially.</p> <p>Oil contained in the unit tends to emulsify.</p> <p>During return stroke stem tends to slow down and stop before reaching top dead center.</p>	<p>The cause is to be identified in the work stroke start in advance over the operating cycle.</p> <p>This can be caused by:</p> <ol style="list-style-type: none"> 1) Work stroke start in advance over operating cycle 2) Emulsified oil 3) Stem already at stroke end <p>The cause is to be identified in the work stroke start in advance over the operating cycle.</p> <p>This can be caused by:</p> <ol style="list-style-type: none"> 1) Excessive quantity of oil in the tank 2) Decelerator adjusting screw closed 3) Excessive pressure in the tank

UP units

FAILURE FOUND OUT	FAILURE CAUSE
<p>Work stroke does not fully develop</p> <p>Difficulties for the stem during return phase which is not fully carried out.</p>	<p>Probable oil emulsion..</p> <p>Check actual pressure in the tank and eliminate any exceeding pressure through suitable valve.</p>

- During initial phase of stem return the stroke may have a non -correct regularity due to the different speed between approaching and work strokes.This can be solved by means of a dump valve on connection no.4

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ORDINARY MAINTENANCE

AP/UP units keep their operating features over time without requiring any special maintenance intervention. It is sufficient to periodically carry out two important operations:

- Periodically lubricate all parts in motion.
- Constantly check oil circulating in the power group. Arrange for topping up if required if level falls below the minimum level on the indicator.

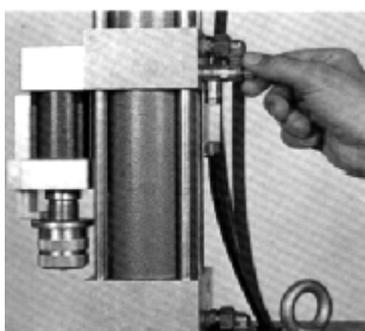


Warning

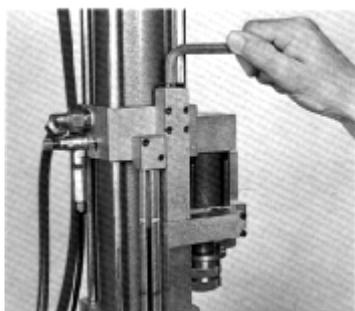
- The oil contained in the unit during working hours may change colour and even become dark brown. This is essentially due to the oil contact with nitrile rubber gaskets and does not at all affect the proper operation and subsequent reliability of the unit.

The oil circulating in the unit maintains its features even after long work periods according to the life of gaskets. No oil replacement is required. On the contrary it is essential for the proper operation of the unit to arrange for topping up if required if level in the unit falls below the minimum level on the indicator.

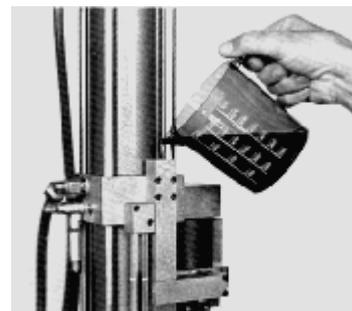
Topping up procedure for units without external tank



- Depressurize unit
- Discharge any remaining pressure of the power group by rotating the knurled knob on connection no.5 anticlockwise and then unscrew and remove it



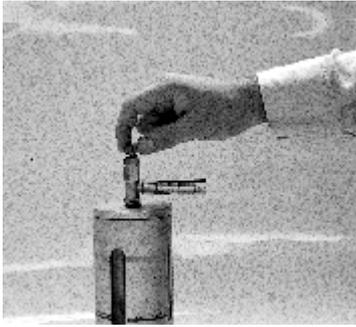
- Remove filling plug situated on the top of the tank by unscrewing it anticlockwise.



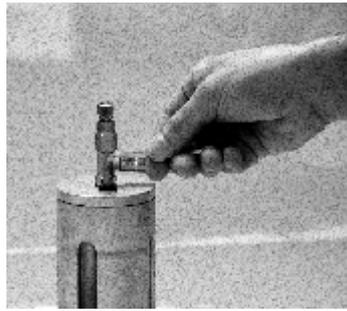
- Pour oil into the duct of the type indicated on the table attached to the unit

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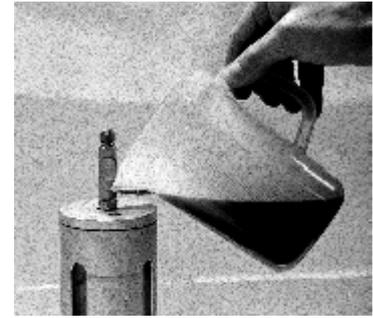
Topping up procedure for units with external tank



- Depressurize unit
- Discharge any remaining pressure of the power group by rotating the knurled knob on connection no.5 anticlockwise and then unscrew and remove it.

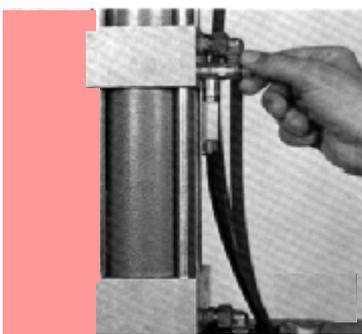


- Remove filling plug situated on the top of the tank by unscrewing it anticlockwise.

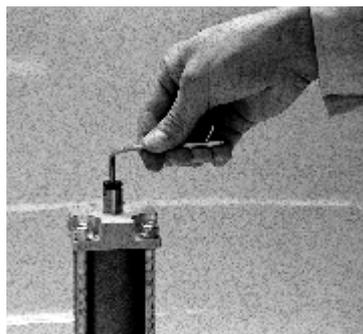


- Pour oil into the duct of the type indicated on the table attached to the unit.

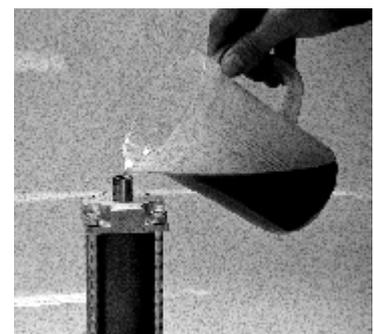
Topping up procedure for units with standing compensator



- Depressurize unit
- Discharge any remaining pressure of the power group by rotating the knurled knob on connection no.5 anticlockwise and then unscrew and remove it.



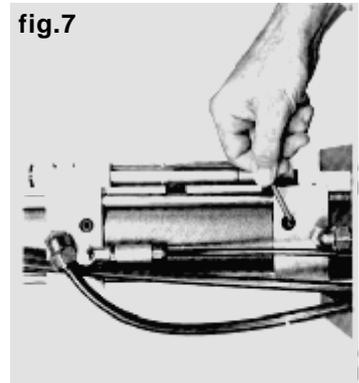
- Remove filling plug situated on the top of the tank by unscrewing it anticlockwise.



- Pour oil into the duct of the type indicated on the table attached to the unit.

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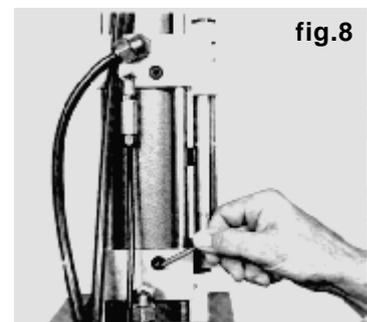
Topping up of units equipped with standing compensator carried out vertically is rather slow due to the tank collecting the oil poured in. This is due to a bigger complexity of the hydraulic circuit. This can be solved, when allowed by the application, by placing unit horizontally and carrying out operations mentioned above and removing oil drainage plug as well.



Quantity of oil to pour in

- If unit stem is remained at rest (back position) ,pour oil until max.level on indicator is reached.
- If unit stem is remained in stroke end position, pour oil until a medium level between max and min. on indicator is reached.
- An exceeding quantity of oil poured into the unit may cause a slowing down when stem comes back. To remove exceeding oil , proceed as follows:

- 1 Depressurize unit
- 2 Discharge remaining pressure
- 3 Unloose drainage plug and let exceeding oil flow out. Screw again until sealing.



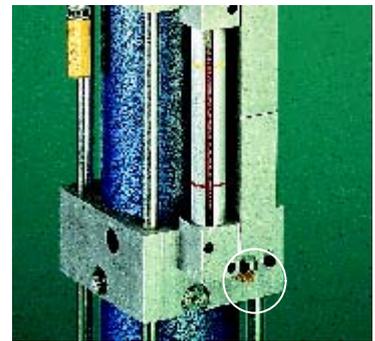
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EXTRAORDINARY MAINTENANCE

An extraordinary maintenance intervention is required when the following operation failures take place:

- Excessive oil consumption requiring a more frequent topping up than usual (approx. every 500 work hours)
- When oil external leakages occur.
- When work stroke does not start up

A pilot light situated just below the loading duct allows, in case of gasket wear, to evaluate any air or oil leakage and subsequently plan maintenance (for AP units only)



Before arranging for the total replacement of gaskets carry out the following checks:

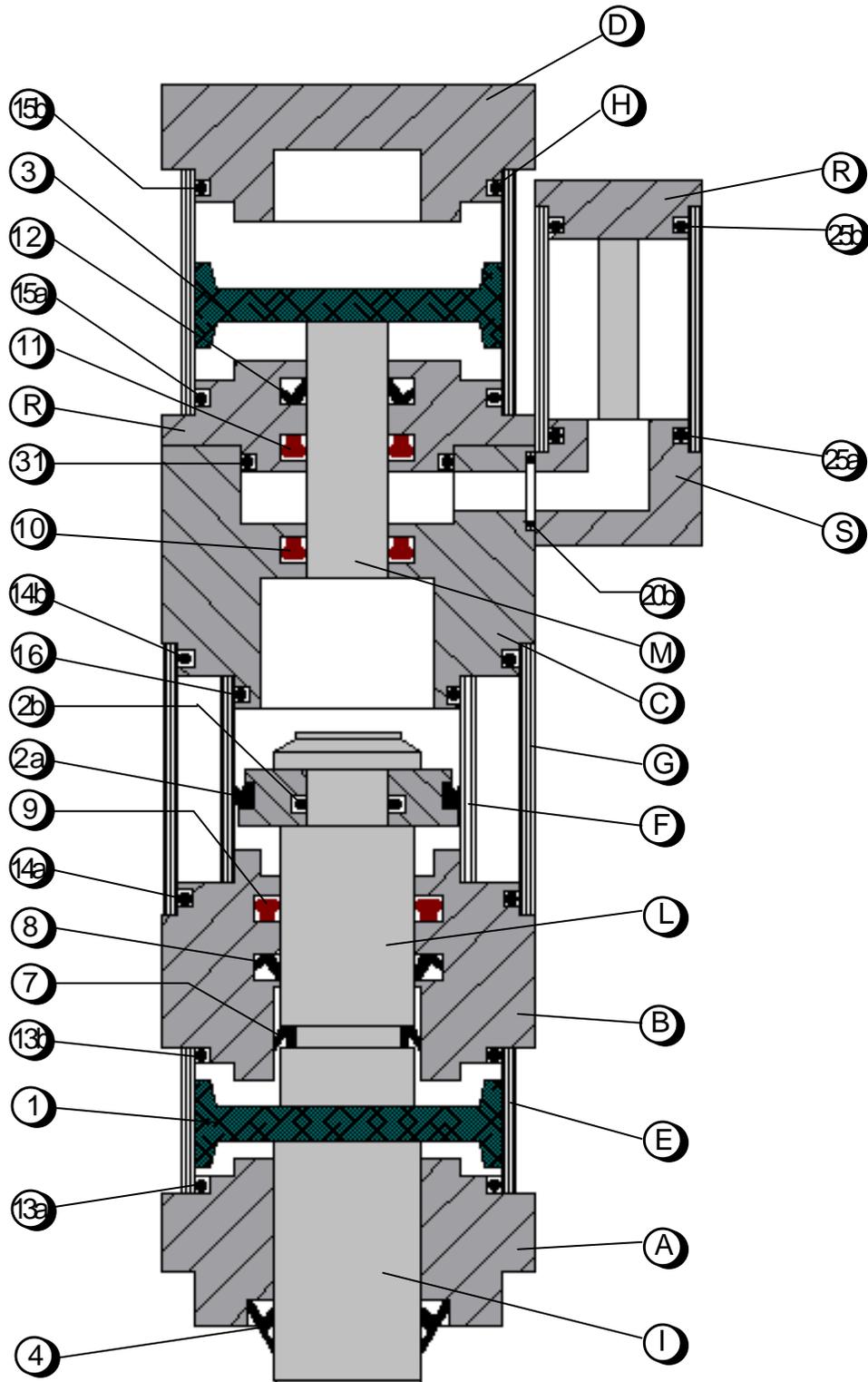
- In the event of external leakages, clean unit and after identifying the point of leakage replace gasket involved.
- When the work stroke does not start up check correct operation of the system

Gasket replacement procedure

- 1) All gaskets of AP/UP units must be removed from their seats by means of a tool allowing to carry out the operation without damaging such seats. Any trace left by inappropriate tools may affect gasket sealing.
- 2) New gaskets can be installed without any tool. It is sufficient to generate a slight manual deformation to facilitate fitting into the relevant hole. Unappropriate tools may damage gasket countour and affect its sealing features.
- 3) Before installing any gasket (except for O-rings) it is essential to know the correct orientation of the gasket. Check orientation of each gasket on the scheme herebelow. A gasket installed in the contrary direction is fully ineffective.

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Gasket assembly scheme on AP 0840 - AP 0950 units



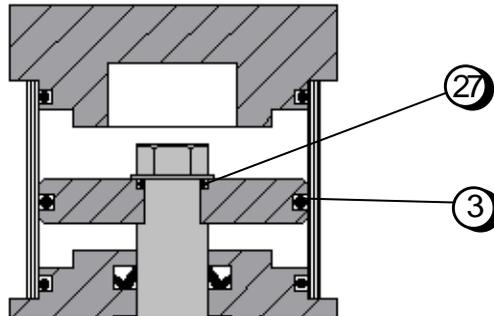
Instruction Manual - AP-UP units

Gasket replacement procedure for AP 0840 - AP0950

- 1) Depressurize unit.
- 2) Discharge any remaining pressure from the unit according to the procedure set out on page 4.
- 3) Let all oil in the unit flow out according to the procedure set out on page 5.
- 4) Unscrew the four nuts tightened on the tie rods corresponding to the back head.
- 5) Extract tie rods from unit.
- 6) Remove front head (pos.A) by extracting it from the stem.
- 7) By means of a suitable gripper release the snap ring fixing NIPSL to the front head-then replace both NIPSL (pos.4) and sealing O-ring (pos.13a) with front liner.
- 8) Extract front liner (pos.E).
- 9) Remove oil tank by unscrewing the screws fixing its supporting flange (pos.S) to unit.
- 10) Remove lower body (pos.B) by separating it from intermediate liners (pos F-G).
- 11) After removing locking dowel, release front piston (pos.1) by unscrewing front stem (pos.l) from intermediate stem (Pos.L) and replace it.
- 12) Release intermediate piston by unscrewing ring nut fixing it to the intermediate stem and replace piston-stem sealing O-ring (ps.2b) and MAD (pos.2a)
- 13) Extract intermediate stem (pos.L) from lower body (pos.B) by taking it from the front part and replace DE (pos.7)
- 14) Extract intermediate liners (pos.F-G).
- 15) Replace from lower body (pos.B) the two sealing O-rings with liners (pos.13b-14a). Also replace CSC (pos.9),NI (pos.8).
- 16) Extract intermediate body (pos.C) from stem (pos.M) and from upper body (Pos.R) and replace the two sealing O-rings with liners (pos.14b-16) as well as the sealing O-ring with tank (pos.20b) and also the sealing CSC (pos.10) with multiplier stem.Then replace sealing O-ring with upper body (pos.31)
- 17) Extract upper body (pos.R) from multiplier stem (pos.M) and replace CSC (pos.11) and NI (pos.12) as well as sealing O-ring with liner (pos.15a).
- 18a) [For AP0950 model only] Release pressure multiplier piston from stem and replace it (pos.3)

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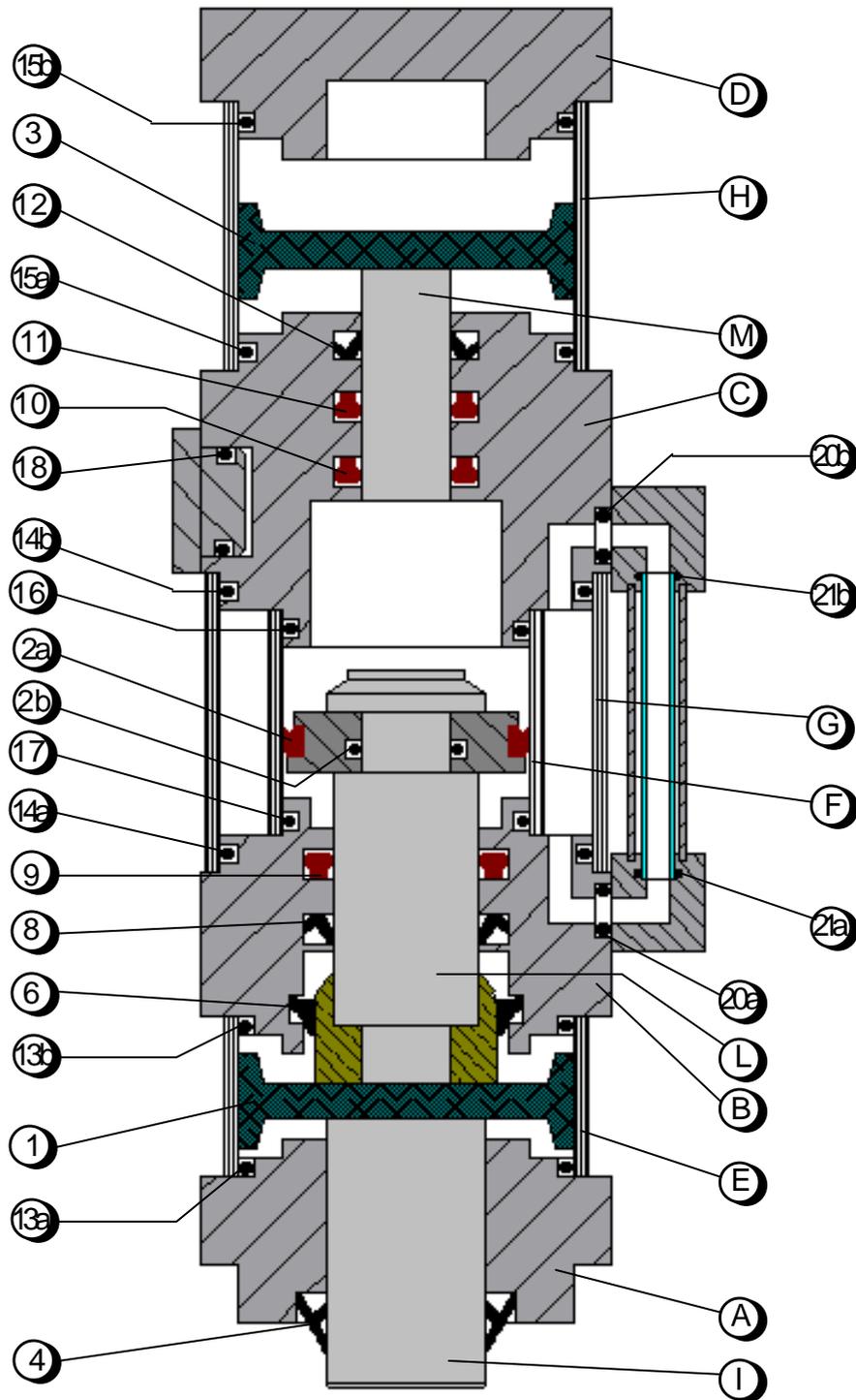
- 18b) [For AP0840 model only] Unscrew the nut fixing the pressure multiplier piston to relevant stem and replace sealing O-ring (pos.27). Then replace piston O-ring (pos.3)



- 19) Replace from back head (pos.D) the sealing O-ring with liners (pos.15b).
- 20) Unscrew joint installed on top of oil tank. Release lid (pos.R) and plexyglass pipe. Then replace from lid and supporting flange (pos.S) the two O-rings (pos.25a-b)
- 21) Remake disassembly phases in the opposite sequence to re-assemble unit and cross tighten tie rod nuts

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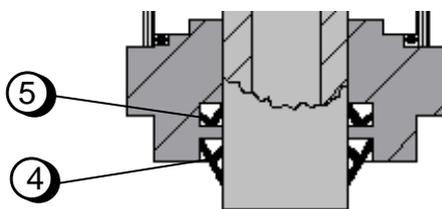
Gasket assembly scheme on AP1063 - AP1180 - AP12100 - AP13125 units



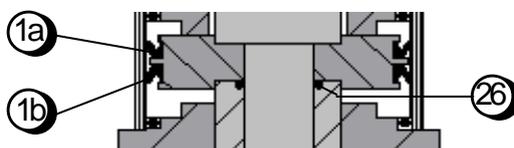
Instruction Manual - AP-UP units

Gasket replacement procedure for AP1063 - AP1180 - AP12100 - AP13125

- 1) Depressurize unit.
- 2) Discharge any remaining pressure from the unit according to the procedure set out on page 4.
- 3) Let all the oil in the unit flow out according to the procedure set out on page 5.
- 4) Unscrew the four nuts tightened on the tie rods corresponding to the back head.
- 5) Extract tie rods from unit.
- 6) Remove front head (pos.A) by extracting it from the stem.
- 7a) [For AP 1063 and AP 1180 models only] By means of a suitable gripper release the snap ring fixing NIPSL to the front head-then replace both NIPSL (pos.4) and sealing O-ring (pos.13a) with liner.
- 7b) [For AP 12100 and AP 13125 models only] By means of a screwdriver or suitable device remove stem scraping AS (pos.4) When assembling a new gasket remember that this is provided with an external perimeter ring which shall be slightly forced into its seat.(AP 12100) The AP 13125 model is equipped with an RGS stem scraper (pos.4) with assembly procedure similar to the other gaskets. Then replace NI (pos.5) and sealing O-ring (ps.13a) with front liner.

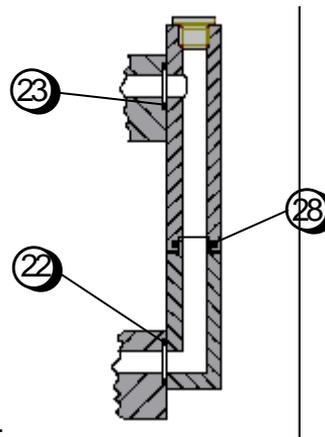


- 8) Extract front liner (pos.E).
- 9) Remove oil loading and level circuits by unscrewing the screws fixing them to the unit bodies.
- 10) Remove lower body (pos.B) by separating it from lower liners (pos F-G).
- 11a) [For AP1063 AP1180 and AP12100 models only] After removing locking dowel,release front piston (pos.1) by unscrewing front stem (pos.I) from intermediate stem (pos.L) and replace it.
- 11b) [For AP13125 model only].Release front piston by unscrewing front stem (pos.I) from intermediate stem (pos.L) then replace the two DEM (pos 1a-1b) installed on the steel piston and the stem-piston sealing O-ring (pos. 26)
- 12) Release intermediate piston by unscrewing ring nut fixing it to intermediate stem and replace piston.stem sealing O-ring (pos.2b) and MAD (pos.2a)



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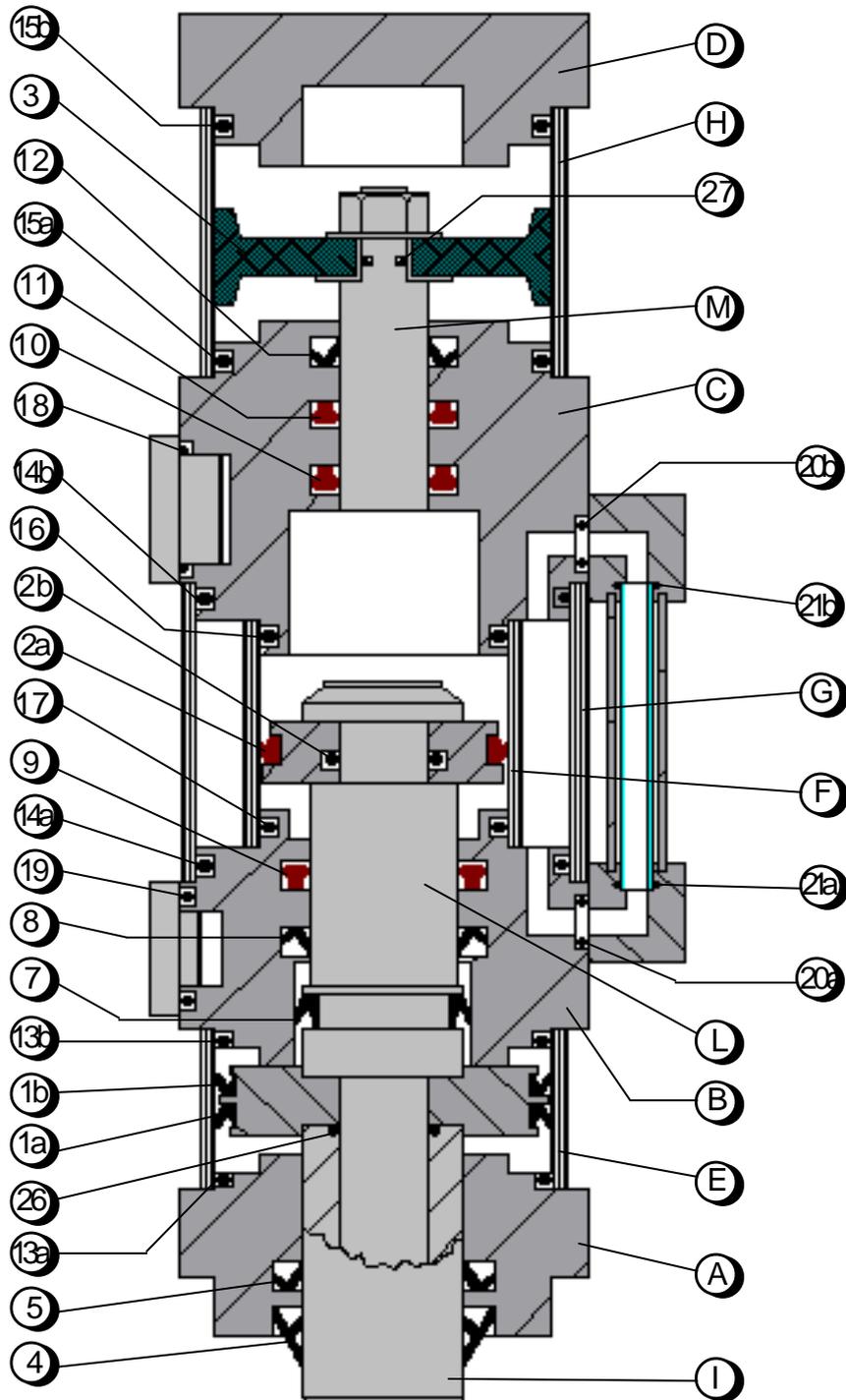
- 13) Replace from lower body (pos.B) the three sealing O-rings with liners (pos.13b-14a-17) [only 13b-14a for AP1063 model] and the two sealing O-ring with circuits (pos 20a-22) .Also replace CSC (pos.9), NI (pos.8) and PPP (pos.6)



- 14) Extract intermediate liners (pos.
- 15) Extract upper body (pos.C) from stem (pos.M) and from the multiplier liner (pos.H) and replace the three sealing O-rings with liners (pos.14b-15a-16) as well as the sealing O-rings with circuits (pos.20b-23) and the two sealing CSC (pos-10-11) with multiplier stem and NI (pos.12). If there is no stroke modulating valve replace sealing O-ring with appropriate plug (pos.18).
- 16) Release pressure multiplier piston from stem and replace it (pos.3).
- 17) Replace from back head (pos. D)the sealing O-ring with liners (pos.15b).
- 18) Separate oil level pipe with relevant protection from flanges fixing it to unit and replace the two sealing O-rings (pos.21a-b).
- 19) Separate the two oil loading pipes and replace sealing O-ring (pos.28).
- 20) Remake disassembly phases in the opposite sequence to re-assemble unit and cross tighten tie rod nuts.

Instruction Manual - AP-UP units

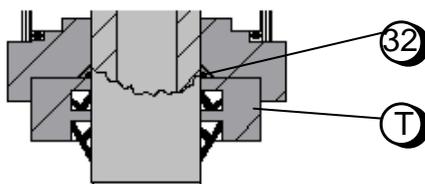
Gasket assembly scheme on AP14160 - AP15200 - AP16200 units



Instruction Manual - AP-UP units

Gasket replacement procedure for AP14160 - AP15200 - AP16200

- 1) Depressurize unit.
- 2) Discharge any remaining pressure from the unit according to the procedure set out on page 4.
- 3) Let all the oil in the unit flow out according to the procedure set out on page 5.
- 4) Unscrew the four nuts tightened on the tie rods corresponding to the back head.
- 5) Extract tie rods from unit.
- 6) Remove front head (pos.A) by extracting it from the stem.
- 7) Remove and replace stem scraping RGS (pos.4). Then replace NI (pos 5) and sealing O-ring (pos.13a) with front liner On AP 16200 models release front front head the relevant flange (pos.T) by unscrewing fixing socket head screws , then replace sealing O-ring (pos.32)



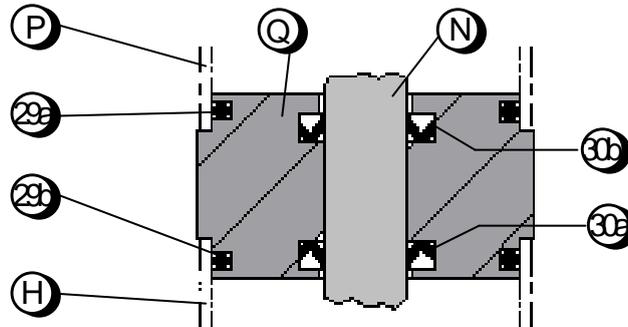
- 8) Extract front liner (pos.E).
- 9) Remove oil loading and level circuits by unscrewing the screws fixing them to the unit bodies .
- 10) Remove lower body (pos.B) by separating it from the intermediate liners (pos.F-G)
- 11) After removing locking dowel, release front piston by unscrewing front stem (pos.I) from the intermediate stem (pos.L) , then replace the two DEM (pos.1a-1b) installed on the steel piston and the stem-piston sealing O-ring (pos.26)
- 12) Release intermediate piston by unscrewing the ring nut fixing it to the intermediate stem and replace piston-stem sealing O-ring (pos.2b) and MAD (pos.2a)
- 13) Extract intermediate stem (pos.L) from lower body (pos.B) by extracting it from the front part and replace NA (pos.7)
- 14) Replace from lower body (pos.B) the three sealing O-rings with liners (pos. 13b-14a-17) and the two sealing O-rings with circuits (pos 20a-22) .Also replace CSC (pos.9),NI (pos.8) and if there is no modulating valve, outlet O-ring (pos.19) [For AP 14160 AP15200 models only].
- 15) Extract intermediate liners (pos.F-G).
- 16) Extract upper body (pos C) from stem (pos. M) and from multiplier liner (pos. H) and replace the three sealing O-rings with liners (pos.14b-15a-16) as well as sealing O-rings with circuits (pos.20b-23)and the two sealing CSC (pos.10-11) with multiplier stem and NI (pos.12). If there is no stroke modulating

Instruction Manual - AP-UP units

valve replace sealing O-ring with appropriate plug (pos.18) [For AP 14160 and AP 15200 models only].

17a) [For AP 14160 AP 15200 models only] Release pressure multiplier piston (pos.3) from relevant stem and replace it. Also replace stem-piston sealing O-ring (pos.27)

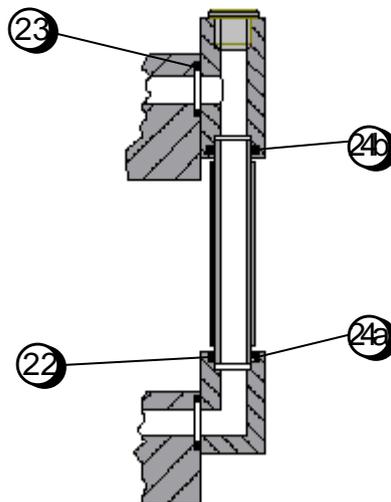
17b) [For AP 16200 model only] Extract lower pressure multiplier liner (pos.H) and remove back head (pos.D) with relevant liner (pos.P), then release lower multiplier piston (pos.3) by unscrewing lower stem (pos.M) from the upper stem (pos.N). Then separate upper multiplier piston from relevant stem by unscrewing the nut fixing it . Remove from the intermediate body of the pressure multipliers (pos.Q) the two sealing O-rings with liners (pos.29a-b) and the two NI (pos.30a-b)



17) Replace from back head (pos.D) sealing O-ring with liners (pos.15b)

18) Separate oil level pipe with relevant protection from flanges fixing it to unit and replace the two sealing O-rings (pos.21 a-b)

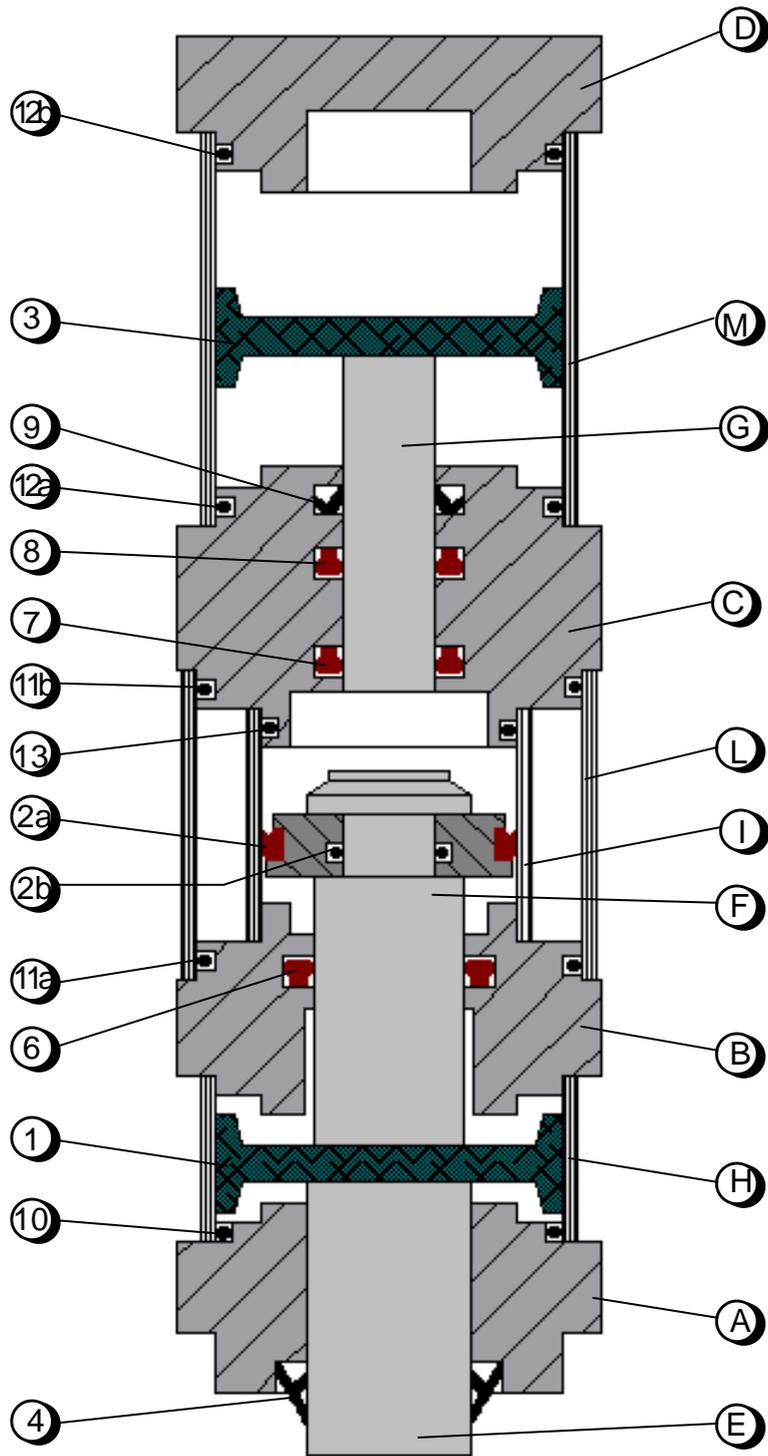
19) Separate oil loading pipe from relevant flanges and replace the two sealing O-rings (pos.24 a-b)



20) Remake disassembly phases in the opposite sequence to re-assemble unit and cross tighten tie rod nuts.

Instruction Manual - AP-UP units

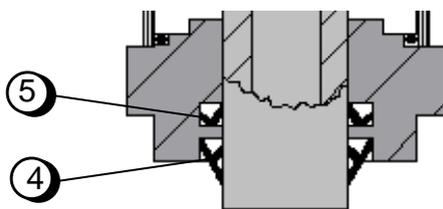
Gasket assembly scheme on UP units



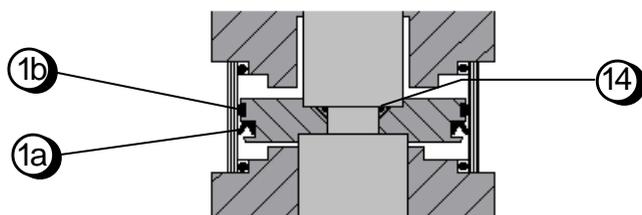
Instruction Manual - AP-UP units

Gasket replacement procedure for UP units

- 1) Depressurize unit.
- 2) Discharge any remaining pressure from the unit according to the procedure set out on page 4.
- 3) Let all the oil in the unit flow out according to the procedure set out on page 5.
- 4) Unscrew the four nuts tightened on the tie rods corresponding to the back head.
- 5) Extract tie rods from unit.
- 6) Remove front head (pos.A) by extracting it from the stem.
- 7a) [For UP0163 and UP0280 models only] By means of a suitable gripper release the snap ring fixing NIPSL to the front head-then replace both NIPSL (pos.4) and sealing O-ring (pos.10a) with front liner.
- 7b) [For UP03100 and larger models only] By means of a screwdriver or suitable device remove stem scraping AS (pos.4) [UP 03100]. When assembling a new gasket remember that this is provided with an external perimeter ring which shall be slightly forced into its seat. UP04125 and larger models are equipped with an RGS stem scraper (pos.4) with assembly procedure similar to the other gaskets. Then replace NI (pos.5) and sealing O-ring (pos.10) with front liner.



- 8) Extract front liner (pos H).
- 9) Remove lower body (pos.B) by separating it from intermediate liners (pos I-L).
- 10a) [For UP0163 UP0280 UP03100 models only]. Release front piston (pos.1) by unscrewing front stem (pos.E) from intermediate stem (pos.F) and replace it.
- 10b) [For UP04125 and larger models only] Release front piston by unscrewing front stem (pos.E) from intermediate stem (pos.F)-then replace DEM (pos.1a) and driving ring (pos.1b) installed on aluminium piston and stem-piston sealing O-ring (pos.14)

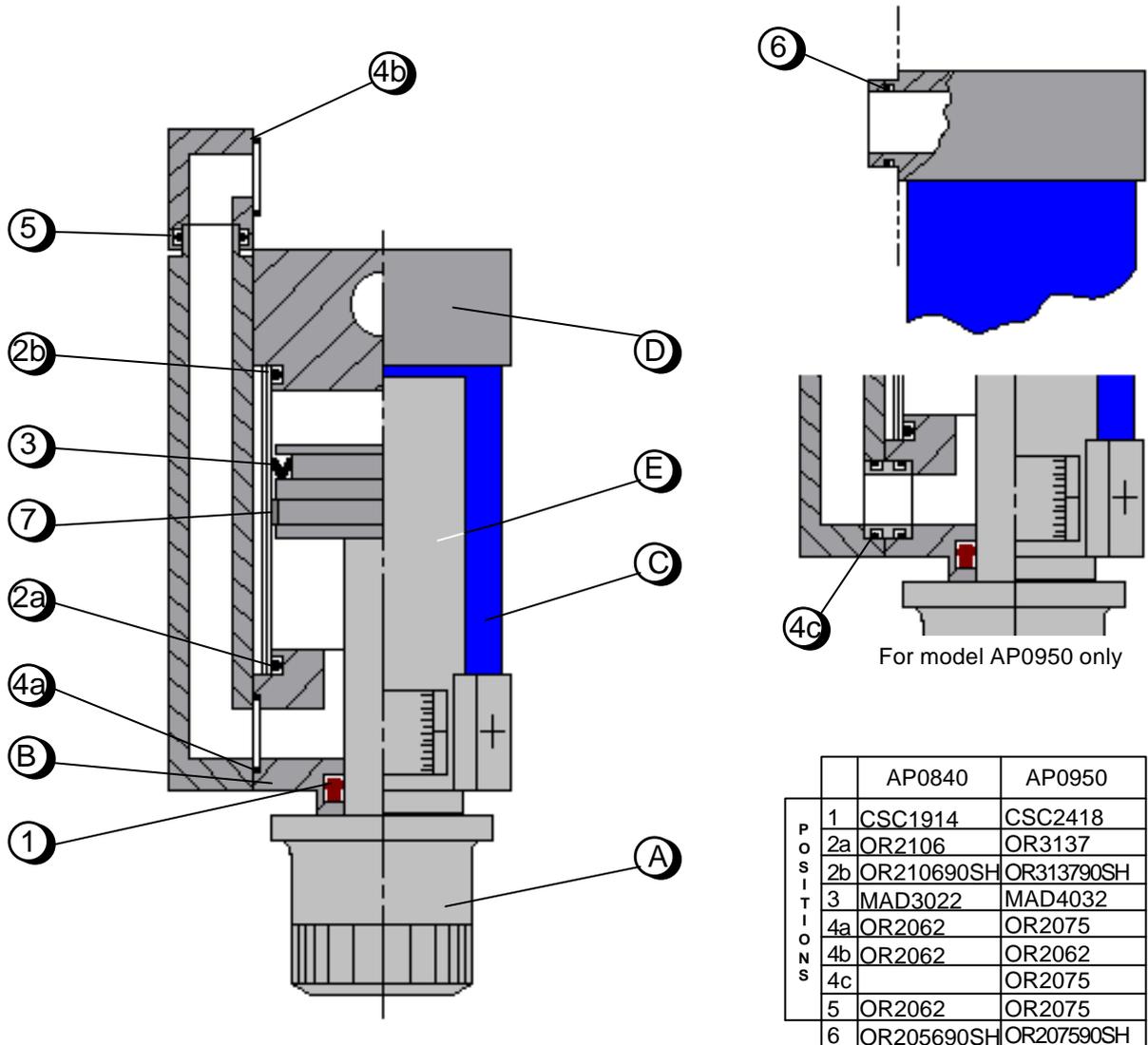


Instruction Manual - AP-UP units

- 11) Release intermediate piston by unscrewing ring nut fixing it to intermediate stem and replace piston-stem sealing O-ring(pos.2b) and MAD (pos.2a).
- 12) Replace from lower body (pos.B) sealing O-ring with liners (pos.11a). Also replace CSC (pos.9)
- 13) Extract intermediate liners (pos.I-L).
- 14) Extract upper body (pos.C) from stem (pos.G) and from multiplier liner (pos.M) and replace the three sealing O-rings with liners (pos. 11b-12a-13) as well as the two sealing CSC (pos.7-8) with multiplier stem and NI (pos.9)
- 15) Release pressure multiplier piston from stem and replace it (pos.3)
- 16) Replace from back head (pos.D) sealing O-ring with liners (pos.12b)
- 17) Re-make the disassembly phases in the opposite sequence to re-assemble the unit and cross- tighten tie rod nuts .

Instruction Manual - AP-UP units

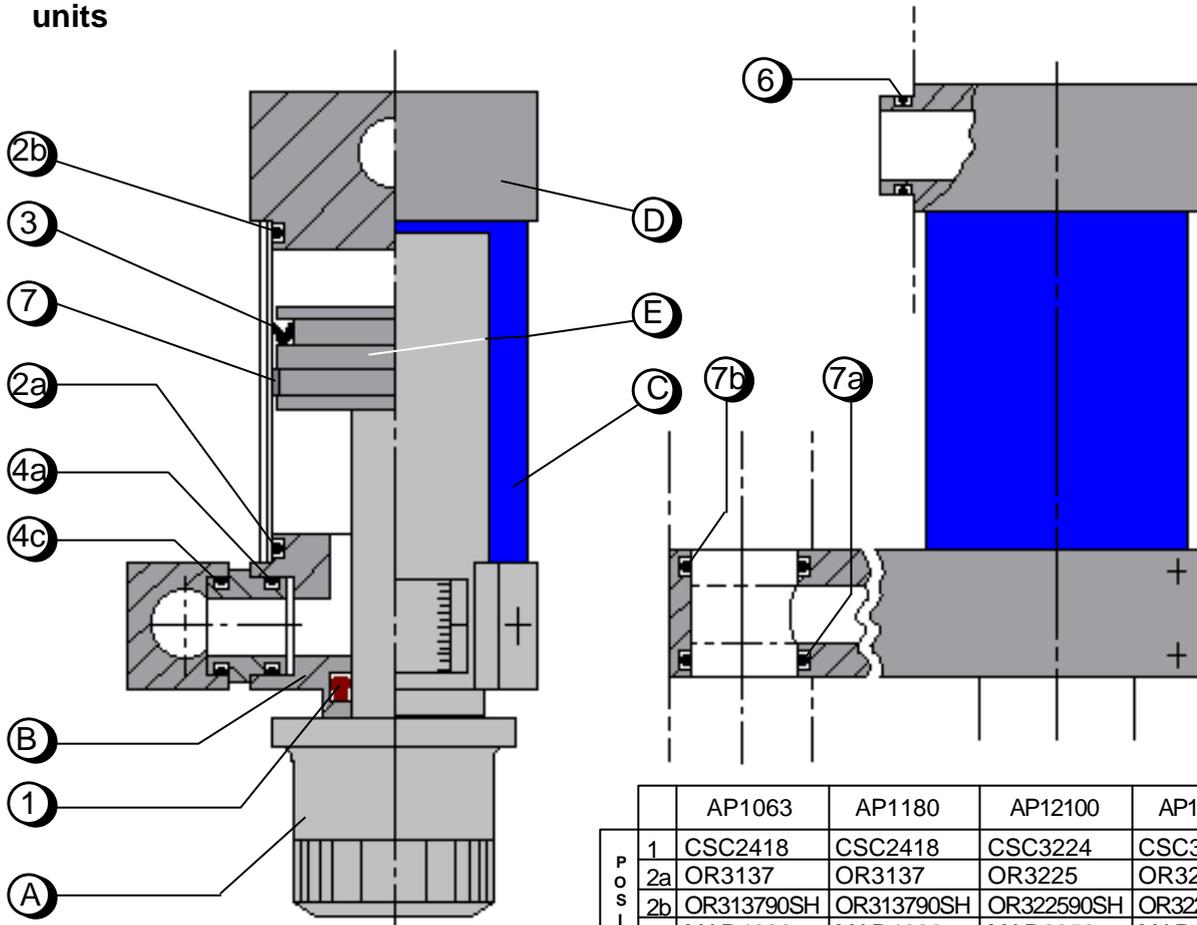
Replacement of gaskets on modulating valve for AP0840 - AP0950 units



- 1) Separate the modulating valve from the oil circuit and from the unit body by unscrewing the relevant fixing screws.
- 2) Remove the snap ring (seeger) of the adjusting knob (pos.A) and unscrew the latter until separating it from its stem
- 3) Unscrew the four tie rods ensuring the valve assembly
- 4) Extract the valve front body (pos.B) and replace the CSC (pos.1), the sealing O-ring (pos. 2a) with the lining (pos.C) and the sealing ring with the oil circuit (pos.4a). [For AP0950 model replace also the second sealing O-ring with the circuit (pos. 4b)]
- 5) Replace MAD (pos.3) and the driving belt (pos.7) from the valve piston (pos.E)
- 6) Extract the lining from the back body (pos.D) and replace sealing O-rings with the lining (pos.2b) and with the unit body (pos.6) respectively..
- 7) Separate the oil circuit and replace the sealing O-ring (pos.5).

Instruction Manual - AP-UP units

Replacement of gaskets on modulating valve for AP1063 - AP1180 - AP12100 - AP 13125 units

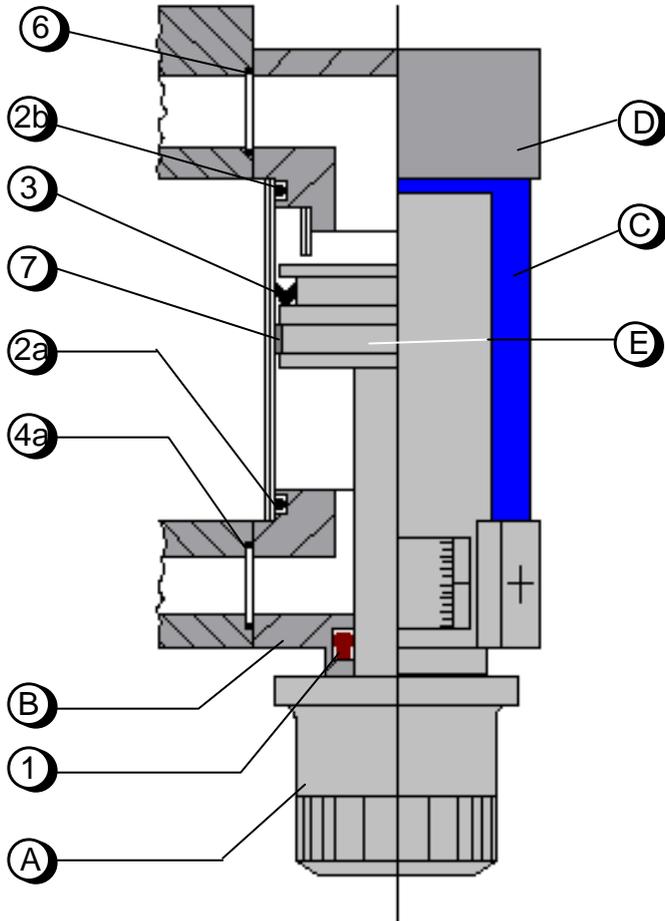


	AP1063	AP1180	AP12100	AP13125	
P O S I T I O N S	1	CSC2418	CSC2418	CSC3224	CSC3224
	2a	OR3137	OR3137	OR3225	OR3225
	2b	OR313790SH	OR313790SH	OR322590SH	OR322590SH
	3	MAD4032	MAD4032	MAD6353	MAD6353
	4a	OR2075	OR2075	OR2093	OR2106
	4c	OR2075	OR2075	OR2093	OR2106
	6	OR207590SH	OR207590SH	OR313790SH	OR313790SH
	7a	OR2075	OR2075	OR3118	OR3118
	7b	OR2075	OR2075	OR3118	OR3118

- 1) Separate the modulating valve from the oil circuit and from the unit body by unscrewing the relevant fixing screws.
- 2) Remove the snap ring (seeger) of the adjusting knob (pos.A) and unscrew the latter until separating it from its stem.
- 3) Unscrew the four tie rods ensuring the valve assembly
- 4) Extract the valve front body (pos.B) and replace the CSC (pos.1), the sealing O-ring (pos.2a) with the lining (pos.C) and the sealing ring with the oil circuit (pos.4a).
- 5) Replace MAD (pos.3) and the driving belt (pos.7) from the piston (pos.E)
- 6) Extract the lining from the back body (pos.D) and replace sealing O-rings with the lining (pos.2b) and with the unit body (pos.6) respectively..
- 7) Separate the oil circuit and replace the sealing ring (pos.4c-7a-7b).

Instruction Manual - AP-UP units

Replacement of gaskets on modulating valve for AP14160 - AP15200 units

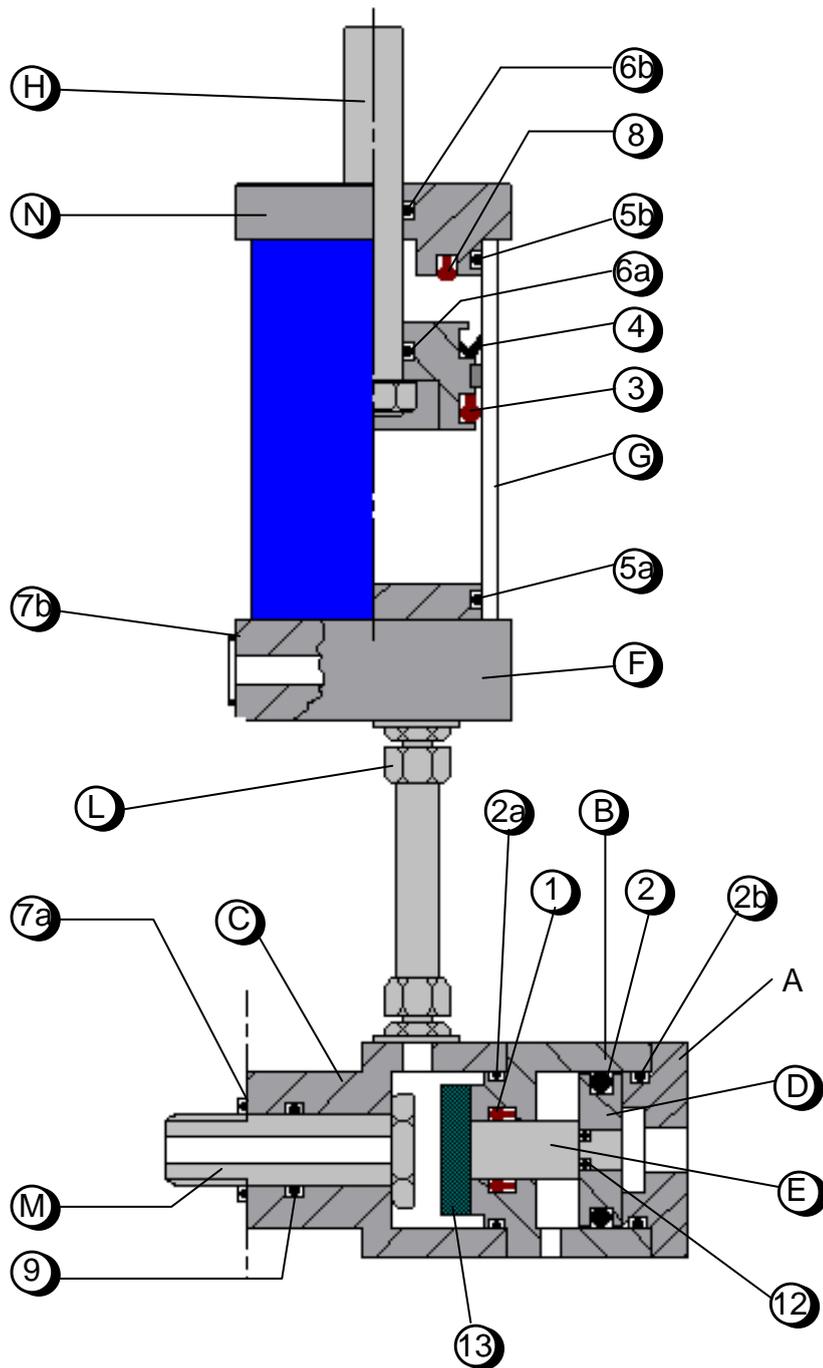


	AP14160	AP15200	
P O S I T I O N S	1	CSC3830	CSC3830
	2a	OR3225	OR3225
	2b	OR322590SH	OR322590SH
	3	MAD6353	MAD6353
	4a	OR3125	OR3125
	6	OR312590SH	OR312590SH

- 1) Separate the modulating valve from the oil circuit and from the unit body by unscrewing the relevant fixing screws.
- 2) Remove the snap ring (seeger) of the adjusting knob (pos.A) and unscrew the latter until separating it from its stem.
- 3) Unscrew the four tie rods ensuring the valve assembly.
- 4) Extract the valve front body (pos.B) and replace the CSC (pos.1), the sealing O-ring (pos.2a) with the lining (pos.C) and the sealing ring with the oil circuit (pos.4a)
- 5) Replace MAD (pos.3) and the driving belt (pos.7) from the piston (pos.E)
- 6) Extract the lining from the back body (pos.D) and replace sealing O-rings with the lining (pos.2b) and with the unit body (pos.6) respectively.

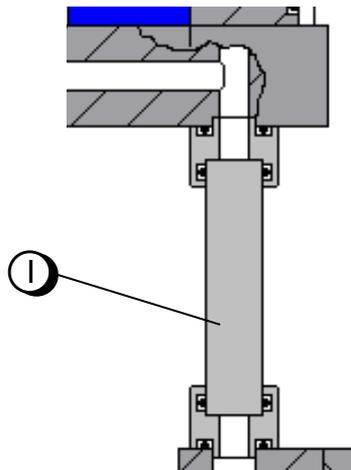
Instruction Manual - AP-UP units

Replacement of gaskets on standing compensator for AP units

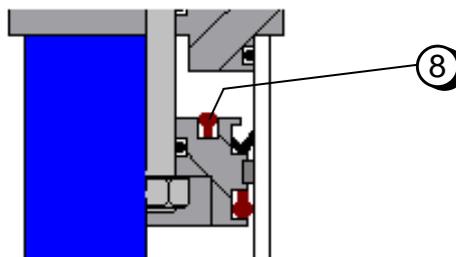


Instruction Manual - AP-UP units

- 1) Remove lid (pos.A) by unscrewing the four screws fixing it to relevant body (pos.B) and replace sealing O-ring (pos.2b)
- 2) Separate bodies (pos B and C) and replace sealing O-ring (pos.2a)
- 3) Unscrew nut fixing piston (pos.D) to stem (pos.E) and replace piston O-ring (pos.2) as well as CSC (pos.1)
- 4a) [For AP13125 and smaller models] Unscrew the four screws fixing compensator (pos.F) to unit and lock connecting screw (pos.M). Replace its O-ring (pos.9) . Remove the whole standing compensator from unit and replace sealing O-ring with it (pos.7a-7b). On AP12100 and AP13125 models proceed to extract oil duct (pos.l) and replace sealing O-rings (pos.10a-10b-11a-11b)
- 4b) [For AP14200 and larger models] Unscrew screws fixing bodies (pos.F-C) to unit and remove the whole compensator from unit. Then replace sealing O-rings with unit bodies (pos 7a-7b) , proceed to extract oil duct (pos.l) and replace sealing O-rings(pos. 10a-10b-11a-11b)



- 5) Separate body (pos.F) from liner (pos.G) and replace body-liner sealing O-ring(pos.5a).
- 6) Extract body (pos.N) from relevant liner (pos.G) and replace body-liner sealing O-ring (pos. 5b) , sealing O-ring (pos.6b) with stem (pos.H) and [For AP1063 AP1180 models only] bumper CSC (pos.8).
- 7) Replace piston gaskets: CSC (pos.3) , DEM (pos.4) and sealing O-ring with stem (pos.6a)
- 8) [For AP12100 models and upper] Replace piston bumper (pos.8).



Instruction Manual - AP-UP units

P O S I T I O N S		AP1063	AP1180	AP12100	AP13125	AP14200	AP15200	AP16200
	1	CSC1812	CSC1812	CSC2416	CSC2416	CSC3224	CSC3224	CSC2416
	2	OR3106	OR3106	OR3175	OR3175	OR3225	OR3225	OR3175
	2a	OR3106	OR3106	OR3118	OR3118	OR322590SH	OR322590SH	OR3137
	2b	OR2112	OR2112	OR3175	OR3175	MAD6353	MAD6353	OR3175
	3	CSC5042	CSC5042	CSC8068	CSC8068	CSC8068	CSC8068	CSC125110
	4	DEM50	DEM50	DEM80	DEM80	DEM80	DEM80	DEM125
	5a	OR3175	OR3175	OR176	OR176	OR313790SH	OR313790SH	PE4462
	5b	OR3175	OR3175	OR176	OR176	OR3118	OR3118	OR4462
	6a	OR3056	OR3056	OR123	OR123	OR3118	OR3118	OR123
	6b	OR3056	OR3056	OR123	OR123	OR123	OR123	OR123
	7a	OR2068	OR2068	OR2106	OR2106	OR2106	OR2106	OR2106
	7b	OR2068	OR2068	OR2062	OR2062	OR2106	OR2106	OR2106
8	CSC4032	CSC4032	CSC5042	CSC5042	CSC5042	CSC5042	CSC5042	
9	OR2068	OR2068						
10a					OR2081	OR2081	OR2081	
10b					OR2081	OR2081	OR2081	
11a					OR3106	OR3106	OR3106	
11b					OR3106	OR3106	OR3106	
12	OR2031	OR2031	OR2031	OR2031	OR2031	OR2031	OR2031	
13	P 01-274	P 01-274	P 01-474	P 01-474	P 01-474	P 01-474	P 01-474	

Features of the sensors for magnetic units

ELECTRIC DATA	
Rated voltage	U_{\min} 15 V =
	U_{\max} 30 V =
Charing current	I_{\max} 800 mA
Rated current	off 14 mA
	on 25 mA
Electric connection	PG9 3-pole connection
Protection	IP65, polarity reversal safety, service voltage,protecting insulation

Instruction Manual - AP-UP units

		AP SERIES MODELS								
		AP 0840	AP 0950	AP 1063	AP 1180	AP 12100	AP 13125	AP 14160	AP 15200	AP 16200
P O S I T I O N S	1	DKM054009	DKM055010	DKM056316	DKM058016	TDUOP10069				
	1a / 1b						DEM125	DEM160	DEM200	DEM200
	2a	M43224	MAD4032	MAD504075	MAD504075	MAD8065	MAD8065	MAD10085	MAD10085	MAD125-110
	2b	OR2075	OR2075	OR3106	OR3106	OR3125	OR3125	OR3162	OR3162	OR3206
	3	OR4131	DKM055010	DKM056312	TDUOP8073	TDUOP10069	TDUOP12551	TDUOP16025	TDUOP20025	TDUOP20025
	4	NIPSL22327	NIPSL22327	NIPSL30407	NIPSL40507	AS60707	RGS8088	RGS100108	RGS100108	RGS100108
	5					NI150607285	NI150809285	NI1501001151	NI1501001151	NI1501001151
	6			PPP894050	PPP894050	PPP895060	PPP895060			
	7	DE093	DE100					DEM63	DEM63	NA325
	8	DI087	DI093	NI15030407	NI5030407	NI15040507	NI15040507	NI150607285	NI150607285	NI150809285
	9	CSC3022	CSC3224	CSC3830	CSC3830	CSC5040	CSC5040	CSC7060	CSC7060	CSC9080
	10	CSC1812	CSC2416	CSC2618	CSC2416	CSC3224	CSC3224	CSC3830	CSC3830	CSC4636
	11	CSC1812	CSC2416	CSC2618	CSC2416	CSC3224	CSC3224	CSC3830	CSC3830	CSC4636
	12	NI150122055	NI150162455	DI068	NI150162455	DI093	DI093	NI15030407	NI15030407	NI15036467
	13a / 13b	OR3137	OR3175	OR3225	OR176	OR4362	OR4462	OR4600	OR235	OR4750
	14a / 14b	OR3156	OR3193	OR3256	OR176	OR4412	OR4462	OR4600	OR235	OR4750
	15a / 15b	OR3137	OR3175	OR3225	OR176	OR4362	OR4462	OR4600	OR235	OR4750
	16	OR2112	OR3137	OR317590SH	OR317590SH	OR17690SH	OR17690SH	OR436290SH	OR436290SH	OR446290SH
	17				OR3175	OR176	OR17690SH	OR4362	OR4362	OR4462
	18			OR207590SH	OR207590SH	OR313790SH	OR313790SH	OR312590SH	OR312590SH	
	19							OR3125	OR3125	
	20a			OR108	OR108	OR108	OR108	OR108	OR108	OR108
	20b	OR2062	OR2062	OR108	OR108	OR108	OR108	OR108	OR108	OR108
	21a / 21b			OR114	OR114	OR114	OR114	OR114	OR114	OR114
	22			OR2068	OR2068	OR2106	OR2106	OR2106	OR2106	OR2106
	23			OR2068	OR2062	OR2068	OR2062	OR2106	OR2106	OR2106
	24a / 24b							OR3106	OR3106	OR3106
	25a / 25b	OR3156	OR3156							
	26						OR2093	OR2106	OR2106	OR3193
	27	OR2031						OR2062	OR2062	
	28			OR2075	OR2075	OR3118	OR3118			
	29a / 29b									OR4750
30a / 30b									NI15036467	
31	OR2125	OR 3175								
32									OR4462	

Coupled with PARBAK8247

		MODELS					
		UP 0163	UP 0280	UP 03100	UP 04125	UP 05160	UP 06200
P O S I T I O N S	1	DKM056316	TDUOP8073	TDUOP10069			
	1a				DEM125	DEM160	DEM200
	1b				P-22-614	P-22-714	P-22-814
	2a	MAD5040	MAD5040	MAD8065	MAD8065	MAD10085	MAD10085
	2b	OR3106	OR3106	OR3125	OR3125	OR436290SH	OR3162
	3	DKM056312	TDUOP8073	TDUOP10069	TDUOP12551	TDUOP16025	TDUOP20025
	4	NIPSL30407	NIPSL40507	AS60707	RGS8088	RGS100108	RGS100108
	5			NI150607285	NI150809285	NI1501001151	NI1501001151
	6	CSC3830	CSC5040	CSC7060	CSC7060	MAD10085	CSC9080
	7	CSC2618	CSC2416	CSC3224	CSC3224	CSC3830	CSC3830
	8	CSC2618	CSC2416	CSC3224	CSC3224	CSC3830	CSC3830
	9	DI068	NI150162455	DI093	DI093	NI15030407	NI15030407
	10	OR3225	OR176	OR4362	OR4462	OR4600	OR235
	11a / 11b	OR3256	OR176	OR4412	OR4462	OR4600	OR235
12a / 12b	OR3225	OR176	OR4362	OR4462	OR4600	OR235	
13	OR317590SH	OR317590SH	OR17690SH	OR17690SH	OR436290SH	OR436290SH	
14				OR3162	OR3193	OR3193	