

EQUALIZER International Limited

10T(I) Integral Hydraulic Spreading Wedge Repair Instruction Manual



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THE EQUALIZER 10T(I) Integral Hydraulic Wedge

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The EQUALIZER 10T(I) Integral hydraulic wedge repair manual will allow a technician to locate problems and to carry out the necessary repairs with ease. Each example is illustrated with 3D images to assist in identifying the parts along with step by step instructions ensuring that the technician can repair the tool with confidence.

The use of these instructions will promote safe use and maximize the service life of the tool.

It is recommended that all sections of this instruction manual be read prior to carrying out any repairs to the tool.

2. TROUBLE SHOOTING

Fault	Cause:	Remedial Action
Wedge advances 50% and then stops functioning	<ul style="list-style-type: none"> - A sticker has been placed over the air vent. - The operator is covering the air vent with his finger while operating the pump. - The air vent has become blocked with dirt. 	<p>Remove sticker</p> <p>One hand should be on the handle of the tool while the other hand operates the pump handle</p> <p>Carefully unblock air vent using a small blunt object.</p>
No wedge movement.	<ul style="list-style-type: none"> - Air lock within system - Insufficient oil. - Release valve open. - Air accumulates around pump inlet when used upside down. - Inlet Check or intermediate valve ball stuck 	<p>Open release valve and prime pump to circulate oil around the system.</p> <p>Refill with clean oil and bleed system.</p> <p>Close release valve.</p> <p>Bleed out air from reservoir. See Section 14. Pages 18 thru 23 (Bleeding The System). Look for any oil leaks on reservoir which may indicate air intake.</p> <p>Dismantle check valve, free and clean balls.</p>
Wedge moves but when under load feels as if not reaching full pressure.	<ul style="list-style-type: none"> - Intermediate valve not seating, or relief valve leaking. 	<p>Check balls for dirt then re-seat using a hammer and punch.</p>
Pressure leaks away, handle rises of its own accord.	<ul style="list-style-type: none"> - Outlet check valve leaking. 	<p>Check ball for dirt then re-seat using a hammer and punch.</p>
Pressure leaks away, handle remains static.	<ul style="list-style-type: none"> - Release valve leaking. - Piston seal leaking. - Leak on cylinder or pump body. 	<p>Release lever may not be tight enough.</p> <p>Look for oil leaking from cylinder bearing.</p> <p>Check blanking plugs for leaks, tighten.</p>
Spongy action.	<ul style="list-style-type: none"> - Air in system. 	<p>Bleed system.</p>

PLEASE NOTE: pump units with serial Nos from 1340000 to 1340031 are single speed units and the exploded parts lists for these units are on pages 3 and 4 of this instruction manual.

Pump units with serial Nos from 1340032 to 1340292 are dual speed units and the exploded parts lists for these units are on pages 5 and 6 of this instruction manual.

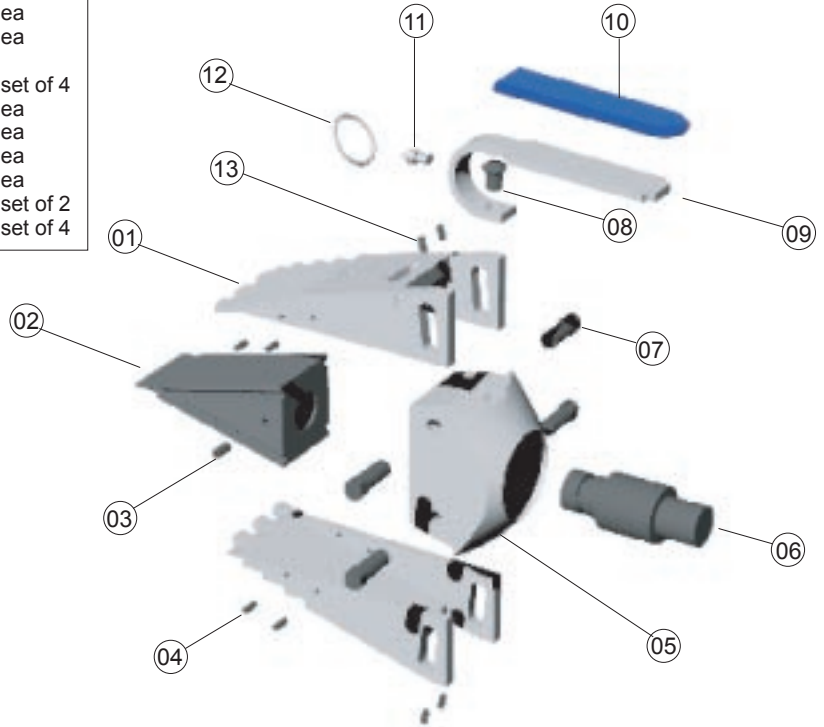
Pump units with serial number 1340293 onward are fitted with an upgraded piston rod and seal (see page 7 of this instruction manual). These parts are interchangeable with both the single and dual speed models above. These modified parts give more corrosive protection to the internal walls of the pump as they will stop water seeping in past the standard seal when used in sub-sea applications.

In order to determine the pump model you require spare parts for, you should first establish the serial no. of the pump unit you have. (See Fig 1.) The pump serial number is etched into your pump unit as illustrated opposite.



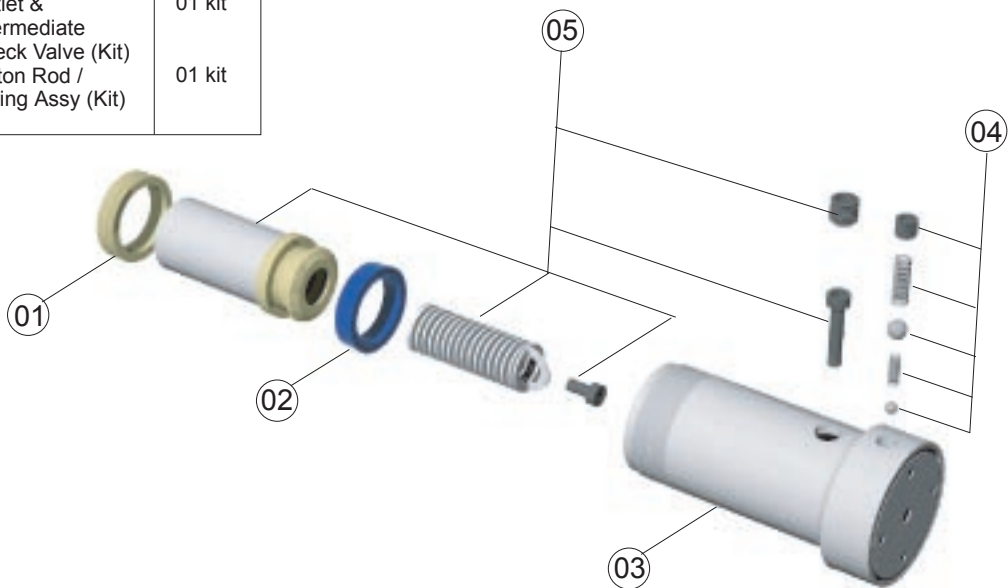
Wedge-head

Item	Part No	Description	Qty
01	300203-01	Jaw (pair)	01 ea
02	300101-01	Wedge	01 ea
03	301301-01	Grub Screw	01 ea
04	301201-08	Roll Pins	01 set of 8
05	301102-01	Body	01 ea
06	300301-01	Connector/Push Rod	01 ea
07	300501-04	Slide Pins	01 set of 4
08	401801-01	Retaining Screw	01 ea
09	308201-01	Handle	01 ea
10	312301-01	Handle Sleeve	01 ea
11	310601-01	Grease Nipple	01 ea
12	311601-02	Ring	01 set of 2
13	300401-04	Grub Screws	01 set of 4



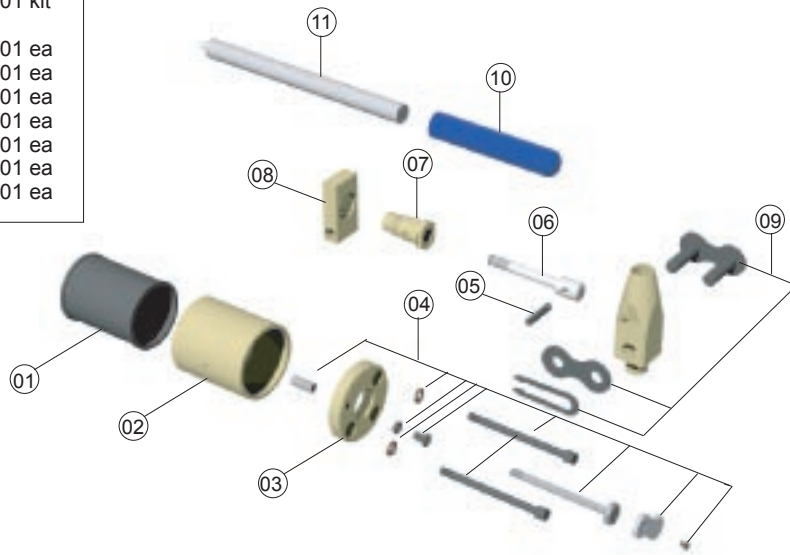
Single speed pump serial No: 1340000 To 1340031 Section 1

Item	Part No	Description	Qty
01	303401-01	Bearing	01 ea
02	303801-01	Seal	01 ea
03	303901-01	Pump Body	01 ea
04	310901-01	Outlet & Intermediate Check Valve (Kit)	01 kit
05	303502-01	Piston Rod / Spring Assy (Kit)	01 kit



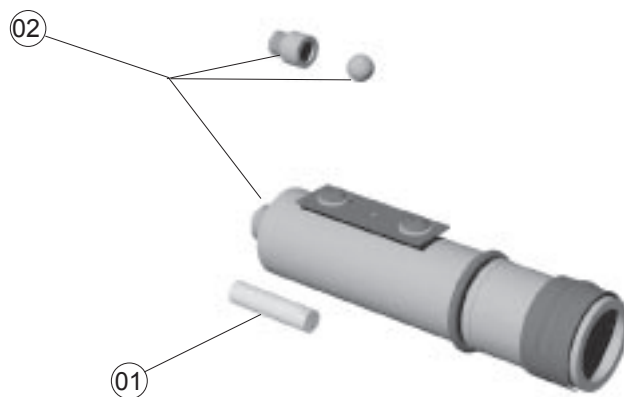
Single speed pump serial No: 1340000 To 1340031 Section 2

Item	Part No	Description	Qty
01	304501-01	Bellows	01 ea
02	304601-01	Reservoir	01 ea
03	304801-01	End Cap	01 ea
04	311001-01	Service Kit (End Cap)	01 kit
05	306001-01	Springl Pin	01 ea
06	306101-01	Piston Rod	01 ea
07	306201-01	Bearing	01 ea
08	306301-01	Pivot Plate	01 ea
09	305701-01	Link	01 ea
10	306501-01	Handle Sleeve	01 ea
11	306401-01	Handle	01 ea



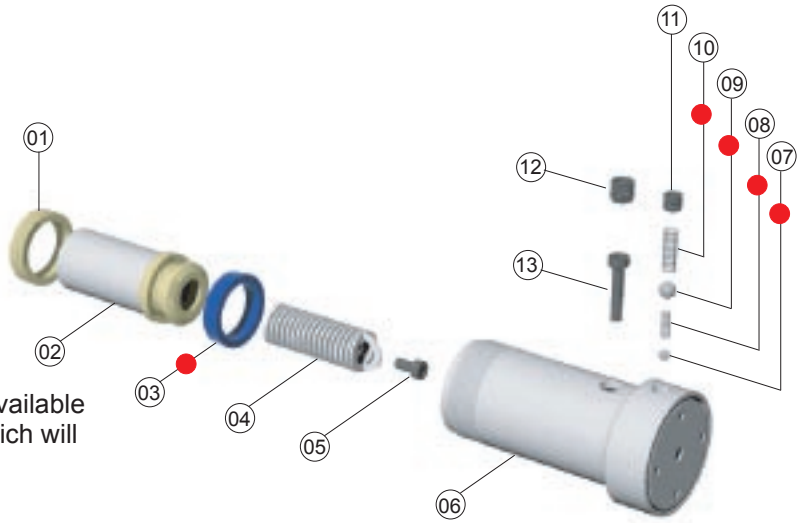
Single speed pump serial No: 1340000 To 1340031 Section 3

Item	Part No	Description	Qty
01	304001-01	Filter	01 ea
01	310701-01	Barrel Relief Valve Assy (set)	01 kit



Dual speed pump serial No: 1340032 To 1340292 Section 1

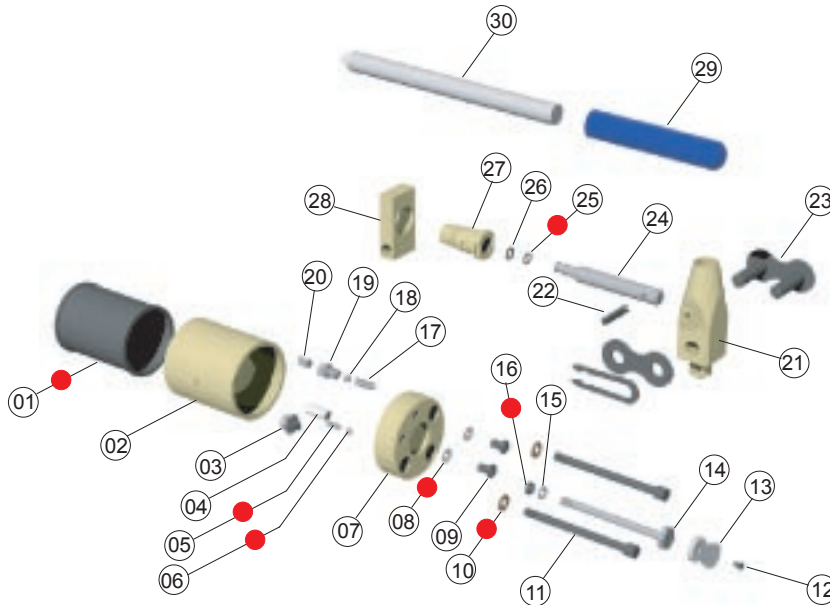
Item	Part No	Description	Qty
01	303401-01	Bearing	01 ea
02	303501-01	Piston Rod	01 ea
03	303801-01	Seal	01 ea
04	303601-01	Spring	01 ea
05	303701-01	Skt Cap Screw	01 ea
06	303901-01	Pump Body	01 ea
07	307301-01	Ball	01 ea
08	314901-01	Spring	01 ea
09	307501-01	Ball	01 ea
10	307001-01	Spring	01 ea
11	307701-01	Socket Plug	01 ea
12	307801-01	Socket Plug	01 ea
13	307901-01	Skt Cap Screw	01 ea



NOTE: All items marked with ● are also available as part of a service kit part No: 308001 which will service all pump models.

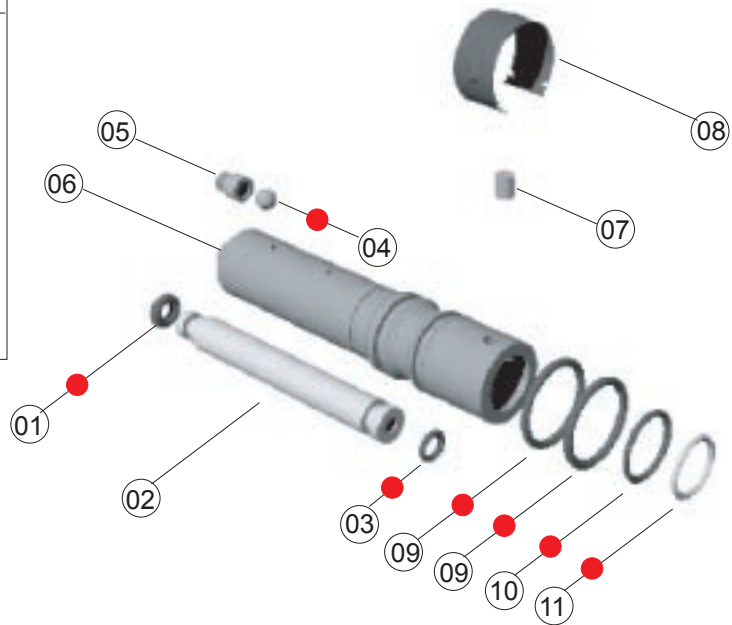
Dual speed pump serial No: 1340032 To 1340292 Section 2

Item	Part No	Description	Qty	Item	Part No	Description	Qty
01	304501-01	Bellows	01 ea	16	309501-01	"O"Ring	01 ea
02	304601-01	Reservoir	01 ea	17	309601-01	Spring	01 ea
03	309101-01	Adjusting Screw	01 ea	18	307301-01	Ball	01 ea
04	304701-01	Release Sleeve	01 ea	19	309701-01	Inlet Fitting	01 ea
05	309001-01	Spring	01 ea	20	309801-01	Filter Element	01 ea
06	306601-01	Ball	01 ea	21	305801-01	Clevis	01 ea
07	309201-01	End Cap	01 ea	22	306001-01	Spring Pin	01 ea
08	305001-02	Bonded Washer	01 set of 2	23	305701-01	Link	01 ea
09	305101-02	Skt Btn Screw	01 set of 2	24	309901-01	Piston rod	01 ea
10	305201-02	Copper Washer	01 set of 2	25	310101-01	Back-Up Ring	01 ea
11	309301-02	Skt Cap Screw	01 set of 2	26	308601-01	"O" Ring	01 ea
12	305601-01	Retaining Screw	01 ea	27	310201-01	Bearing	01 ea
13	305501-01	Release Lever	01 ea	28	306301-01	Pivot Plate	01 ea
14	309401-01	Release Screw	01 ea	29	306501-01	Handle Sleeve	01 ea
15	304901-01	Washer	01 ea	30	306401-01	Handle	01 ea



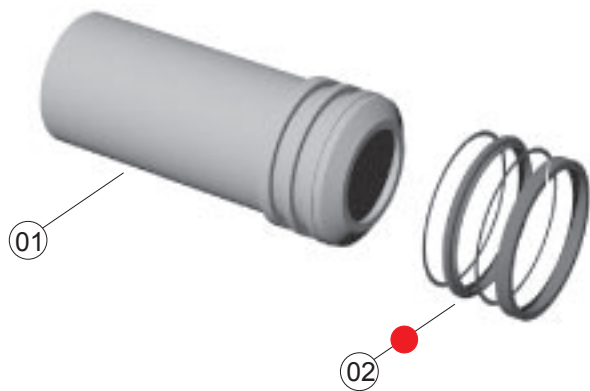
Dual speed pump serial No: 1340032 To 1340292 Section 3

Item	Part No	Description	Qty
01	308401-01	"O" Ring	01 ea
02	308501-01	Connector Tube	01 ea
03	308601-01	"O" Ring	01 ea
04	306601-01	Ball	01 ea
05	306901-01	Release Body	01 ea
06	310801-01	Barrel Relief Valve Assy	01 kit
07	306701-01	Dowal	01 ea
08	306801-01	Clip	01 ea
09	308701-02	"O" Ring	01 set of 2
10	308801-01	"O" Ring	01 ea
11	308901-01	Back Up Ring	01 ea



Dual speed pump serial No: 1340293 Onward with new style piston & seal Section 4

Item	Part No	Description	Qty
01	303503-01	Piston Rod	01 ea
02	303802-01	Seal	01 ea



Ensure that the air vent on the side of the reservoir is free from any obstruction such as dirt, or in some cases a sticker which the user may have placed over it. The air vent allows the bellows to collapse as the wedge is advanced and to expand as the wedge retracts. If the air vent is obstructed in any way a vacuum will occur and the wedge will not advance properly.



8. RELEASE VALVE

If the wedge does not advance at all, it may be because the release valve has not been closed properly. Turn the release valve in a clockwise direction to close.

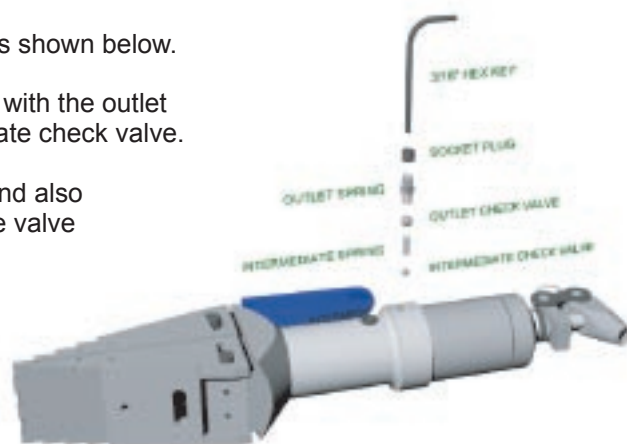


9. SERVICING INTERMEDIATE & OUTLET CHECK VALVES

Step 1.
Using a 3/16" hex key remove the socket plug as shown below.

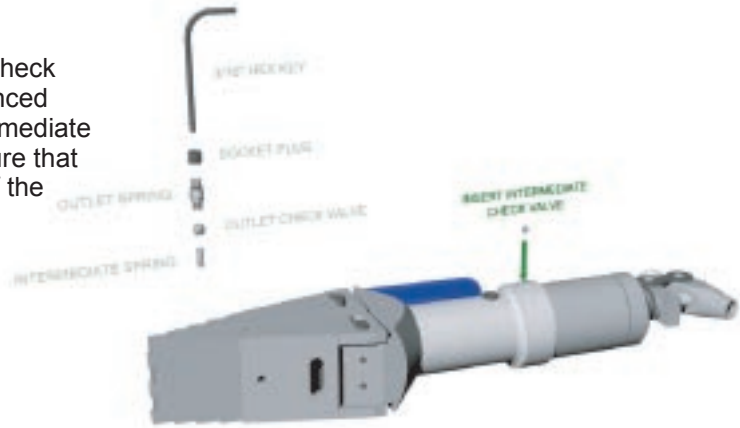
The outlet spring should now be removed along with the outlet check valve, Intermediate spring, and Intermediate check valve.

Examine both check valves for damage or dirt and also examine inside the hole for dirt or damage to the valve seats.



Step 2.

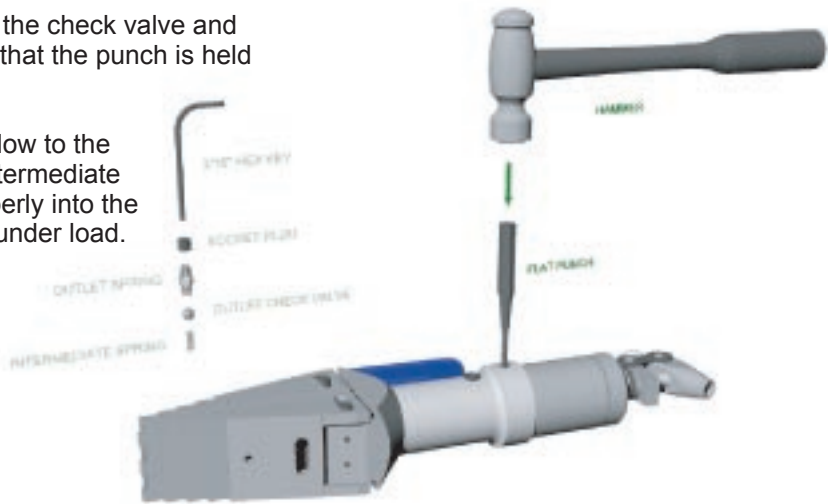
Once you have examined the tool and check valves for dirt or damage and are convinced that they can be used again, place Intermediate check valve back into the hole and ensure that it is positioned correctly at the bottom of the hole.



Step 3.

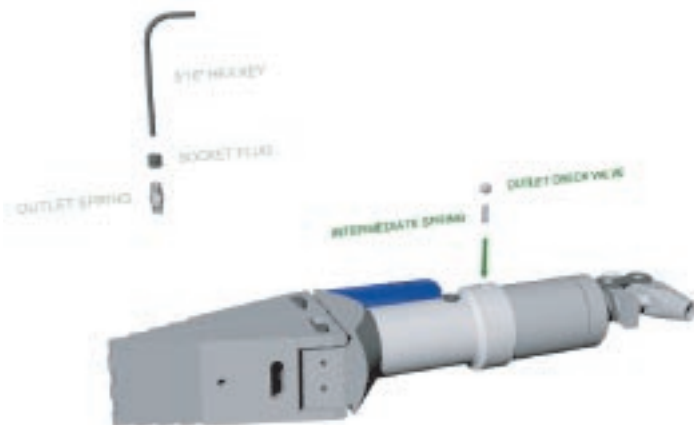
Place a 5mm flat punch on top of the check valve and hold firmly with one hand. Ensure that the punch is held vertically.

Using a hammer, apply one firm blow to the punch. This will ensure that the Intermediate check valve has been sealed properly into the seat and that it will hold pressure under load.



Step 4.

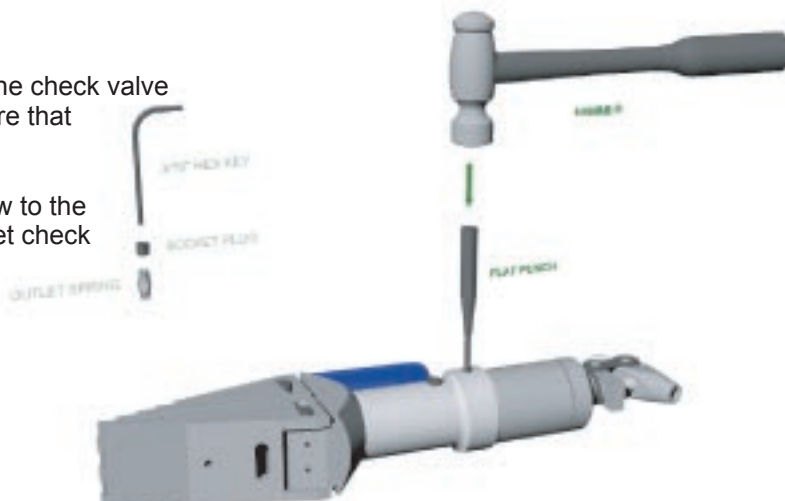
Next insert the Intermediate spring and Intermediate check valve



Step 5.

Place an 8mm flat punch on top of the check valve and hold firmly with one hand. Ensure that the punch is held vertically.

Using a hammer, apply one firm blow to the punch. This will ensure that the outlet check valve has been sealed properly into the seat and that it will hold pressure under load.

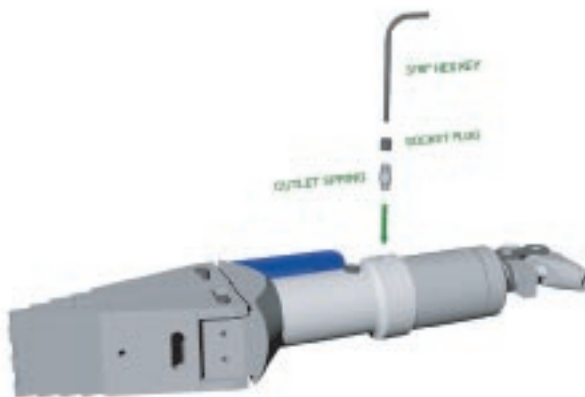


Step 6.

At this stage it is advised to fill the hole up with some hydraulic oil. This will, in most cases, avoid having to bleed any air out of the system once the socket plug is re-inserted.

Insert the outlet spring.

Apply ptfе tape or a thread sealer around the socket plug thread and re-insert. Tighten using the 3/16\"



The tool should now be tested for proper function and to ensure that no air is present within the unit.

Advance the wedge fully out until pressure is reached at the end of the stroke. If pressure cannot be reached more oil will have to be added to the system, (see bleeding the system, section 14 Page 42 - 56))

10. OIL LEAKING FROM RESERVOIR AIR VENT

Step 1.

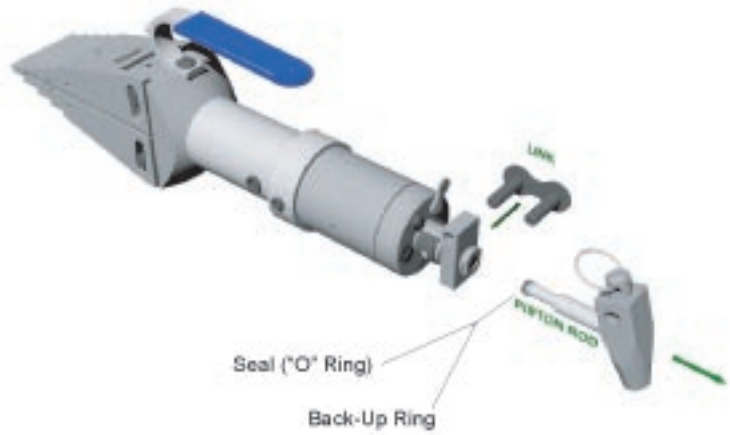
If oil is leaking from the air vent, this means that the bellows within have been punctured and must be replaced. (See dismantling the pump section 11 page 10 - 12)



Step 2.
Remove clip and link



Step 3.
Once the link has been removed, the piston rod can be pulled out. At this stage the seal ("O" Ring) and back-up ring can be examined and replaced if necessary



Step 4.
Remove the spring clip and dowel



Step 5.
Unscrew the bearing and slide the pivot plate off. Examine and remove the back-up ring and "O" ring from within the barrel relief valve assembly

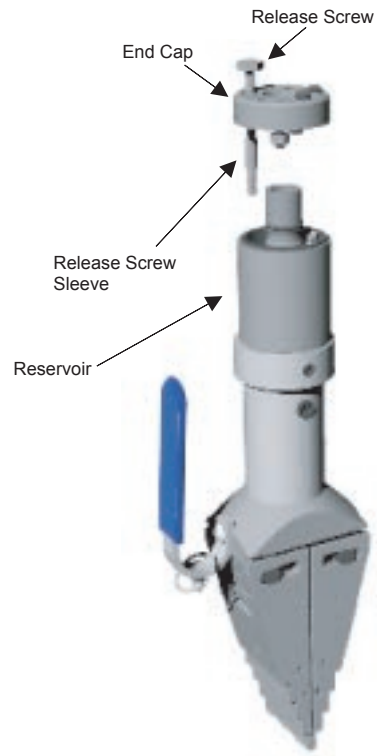


Step 6.
Remove release lever and unscrew release screw but do not remove. Unscrew and remove both socket cap screws and copper washers.



Step 7.
Hold the reservoir firmly when removing the end cap. This will prevent hydraulic oil from escaping.

Once the end cap is removed, tilt the pump over and empty the oil into a container.



Step 8.
With the hydraulic oil removed, stand the pump upright again and remove the reservoir and bellows.



Step 9.
Remove all 3 "O" Rings.

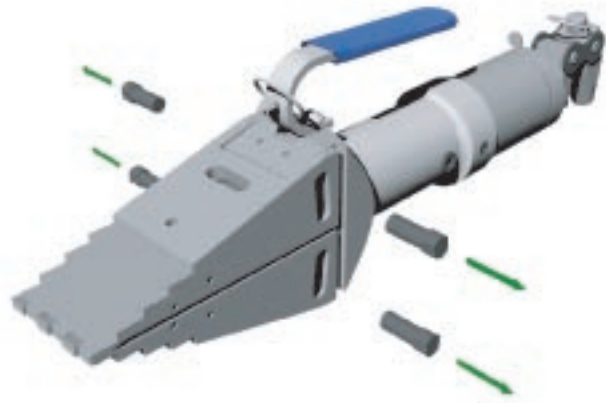
NOTE: When re-assembling the pump ensure that the release valve is placed into the release body and the pump remains upright during assembly.

12. REMOVING THE WEDGE HEAD

Step 1.
Unscrew and remove all 4 grub screws.



Step 2.
Remove all 4 slide pins..



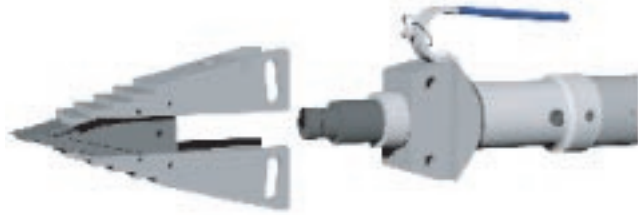
Step 3.
Advance the wedge forward 1" (25mm)



Step 4.
Remove M6 x 12 mm grub screw from wedge..



Step 5.
The wedge and jaws can now be removed from the body / push pin



Step 6.
The body is secured to the pump using loctite thread sealer and will need to be heated in order to release the hold. To remove the body from the pump, a blow lamp will be required to apply an evenly spread heat around the body area. The body should be heated to approx 120 degrees C.

It is important to make sure that the piston rod is fully retracted within the pump so that minimum heat will reach through and damage the seal.



Step 7.
The pump should be held in a vice and the body can then be unscrewed using a monkey wrench or stillson.



Step 1.

With the piston rod fully retracted place the pump in a vice to hold it firmly. Unscrew and remove the socket plug using a 1/4" hex key as shown.



Step 2.

Using an M5 hex key unscrew and remove the socket cap screw as shown. This will release the piston rod return spring within the pump..



Step 3.

Now unscrew the bearing anti - clockwise using a small flat punch and hammer.



Step 4.
The piston rod, seal and spring can now be removed.



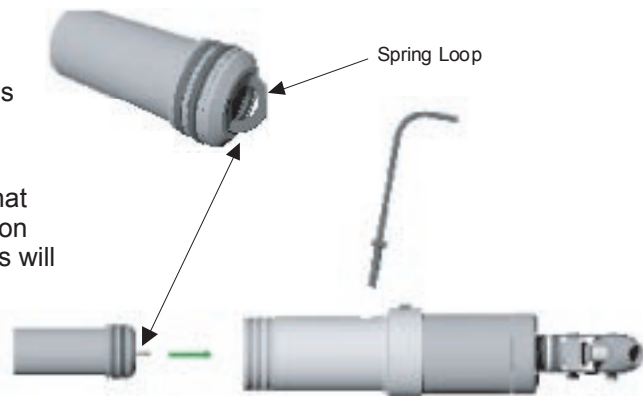
Step 5.
Remove the first back-up ring then the seal followed by the second back-up seal and finally the wiper seal .

This sequence should be followed in reverse when re-assembling.



Step 6.
Ensure that the spring is inserted at 90 degrees to the socket cap screw as it is placed into the pump

NOTE: Great care MUST be taken to ensure that the back up rings remain in position as the piston rod assembly is re- inserted into the pump. This will prevent leakage when assembled.



Step 7.
The piston rod, spring and seal must be inserted fully into the pump.

Using the M5 hex key tilt the socket cap screw at 10 degrees and place into the hole and through the loop of the spring.



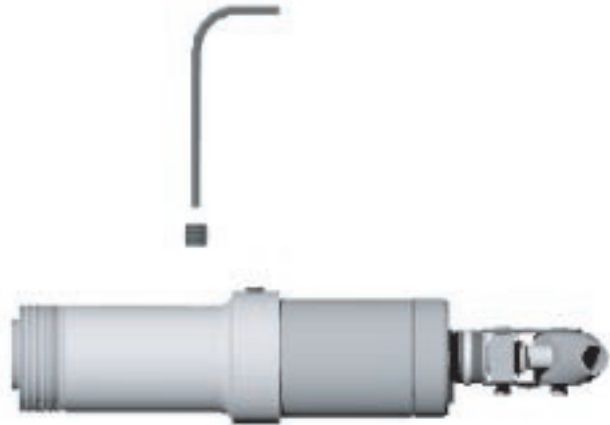
Step 8.
Screw the socket cap screw at this angle through the spring until it will screw no further.



Step 9.
Tilt the socket cap screw upright which in turn will pre-load the spring. Now locate the socket cap screw into the threaded hole and carry on screwing until it is fully tight. This procedure requires some control as the load of the spring must be retained at the same time as the screw is turned, ensuring that the screw locates into the thread correctly.



Step 10.
Apply some thread sealing tape to the thread of the socket plug and then using the 1/4" hex key insert and tighten the socket plug.



14. BLEEDING THE SYSTEM

Step 1.
Place the 10T(I) Integral hydraulic wedge in an upright position



Step 2.
Loosen and remove the button-head screw which holds the copper washer. This screw is the one situated on the right hand side of the two as shown below. This is the oil reservoir filler point and bleed screw.



Step 3.

Using an oil can which has been cleaned and filled with hydraulic oil (Grade 32 centi).

Place the nozzle of the oil can into the filler hole and pump hydraulic oil into the reservoir. This should be done in stages by removing the nozzle frequently allowing trapped air to escape out of the bleed hole.



Step 4.

Continue filling in this manner until the hydraulic oil is over-flowing.



Step 5.

Close the release lever in a clockwise direction.



Step 6.
Prime the pump and advance the wedge forward..



Step 7.
Continue priming until the wedge is fully advanced.



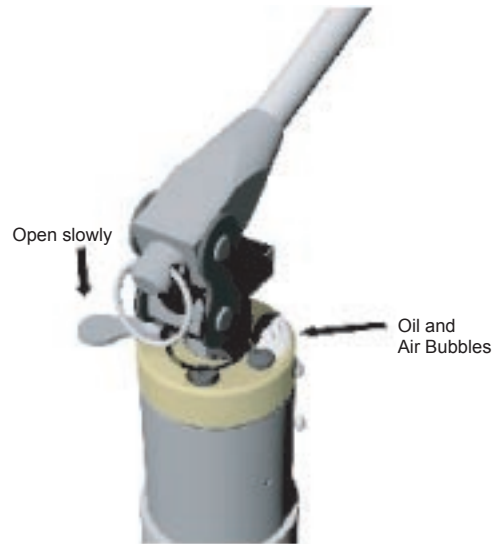
Step 8.
Add some more hydraulic oil until it overflows again.



Step 9.

Open the release lever slowly allowing the wedge to retract. As the wedge retracts hydraulic oil and air bubbles will over-flow out of the filler hole.

When all the bubbles have ceased and the oil is clear flowing, this means that the system is free of air.



Step 10.

Allow the wedge to retract until it is within 10% of being fully retracted, at this point **close the release lever** to stop the wedge from fully retracting.



Step 11.

With the release lever in the closed position and the hydraulic oil clear of any air bubbles re-insert the copper washer and button head screw and tighten.



Step 12.
Open the release lever and allow the wedge to fully retract.



Step 13.
Check that the wedge has fully retracted and the Jaws have closed together.
If the wedge does not fully retract, this indicates that there is too much oil within the system and some should be bled out.

This can be done by loosening the button head bleed screw and allowing a small amount of hydraulic oil to escape until the wedge is closed.



Step 14.
Close release lever and prime the wedge open.



Step 15.
As the wedge opens to its maximum, pressure should start to build up on the handle. If pressure becomes present this means that the system has enough hydraulic oil and the procedure is complete.

If the wedge does not fully advance and pressure is not present, this means that there is insufficient oil within the system and steps 8 thru 14 should be repeated.





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