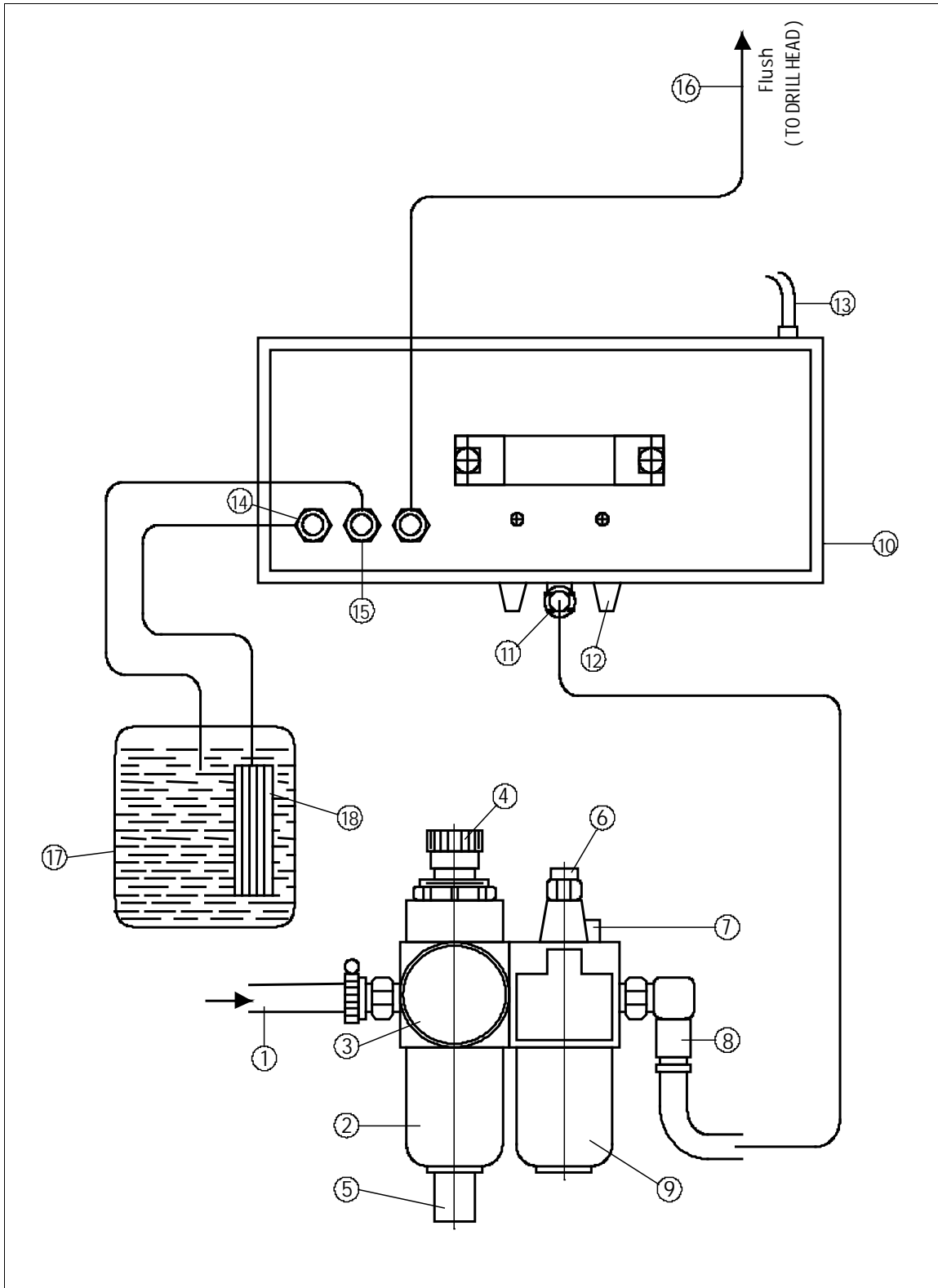


6-3 FLUSHING PUMP OPERATION INSTRUCTION

6-3.1 H-100 Flushing Pump



A. DIELECTRIC WATER

This system is composed of two barrels of water. each with volume of 20 liters. One barrel is filled with clean water , the other barrel is used for collecting after-machining water.

B. THE AIR PUMP

EXPLANATION:

- 1) Air inlet: Range 5 kg/cm² to 7 kg/cm² . Do not exceed 7 kg/cm².
- 2) 3 Point Air-filter set: Dehydrate , lubricant oil.
- 3) Air pressure gauge
- 4) Air pressure regulator: Pull up the knob to adjust to the pressure needed.
Higher air pressure will result in higher water pressure.
- 5) Water drain: Automatic drainage.
- 6) Lubricant oil adjusting knob.
- 7) Lubricant oil refilling hole: Please use lubricant oil #30 to #40.
- 8) Air outlet: To air pump.
- 9) Lubricant oil container: The oil level should keep in between index H and L.
refill the oil (use #30 to #40) when the level is below L index.
- 10) Air pump: Air driven and electrically controlled.
- 11) Air inlet: From No.8 range 5 kg/cm² to 7 kg/cm². do not exceed 7 kg/cm².
- 12) Air outlet .
- 13) Controlling electrical wire : AC 110V, 50/60HZ, 1 phase.
- 14) Water inlet: From water tank.
- 15) Pressured-water outlet : To water pressure gauge.
- 16) High-pressure water outlet : To drill chuck spindle.
- 17) Water tank.
- 18) Water filter.
- 19) Check the flushing pump oiler level per two weeks. Make sure the oiler has function properly. By adjust the tuner 6 to obtain a proper oil consumption.

6-3.2 Flushing checking Before Operations:

CHECK THE FOLLOWING ITEM FIRST BEFORE EDMing.

- 1) If the water filter & water inlet pipe , water outlet pipe and recycler-water pipe (No.14,15,17) are all put into the water tank (No.17)
- 2) If the water tank is filled up completely.
- 3) If the air pressures is in the range from 5 kg/cm² to 8 kg/cm². Note that do not exceed 8 kg/cm².
- 4) When changing the electrode pipe & guide , Shut off the pump first; to release the pressures inside the spindle.

6-3.3 Referential flushing water pressure for different size of electrode.

The referential flushing water pressure (No.4) are:

- a. for electrode pipe dia. 0.2-0.5 mm : 50 to 80 kg/cm².
- b. for electrode pipe dia. 0.6-1.0 mm : 60 to 100 kg/cm².
- c. for electrode pipe dia. 1.6-3.0 mm : 30 to 50 kg/cm².

6-4 EDM OPERATION DESCRIPTION

6-4.1 Preparation before start a EDMing :

Installation of electrode and guide :

- (1) Raise the electrode chuck to the higher place by pressed the button of " Electrode upward " .
- (2) Follow the sequence to load the electrode tubes and guide .
- (3) Insert the ER collet properly into ER spindle.(ER collet are optional)
- (4) Rotate the chuck before EDM to make sure the electrode tubing has no wobble.
- (5) Always press the PUMP button to check the Water sealing and flushing before EDMing.

6-4.2 Caution:

- (1) To use correct sizes of ER collet chuck , and electrode guide to suit the diameter of electrode steel tube.
- (2) Pay extra carefully to the diameter of tube and **DO NOT** drop or crash the electrode.
- (3) Make sure the electrode tubes is perfectly without burr or flat outlet.
- (4) Check whether or not the tube has bending situation. Cut off the bent section if any.

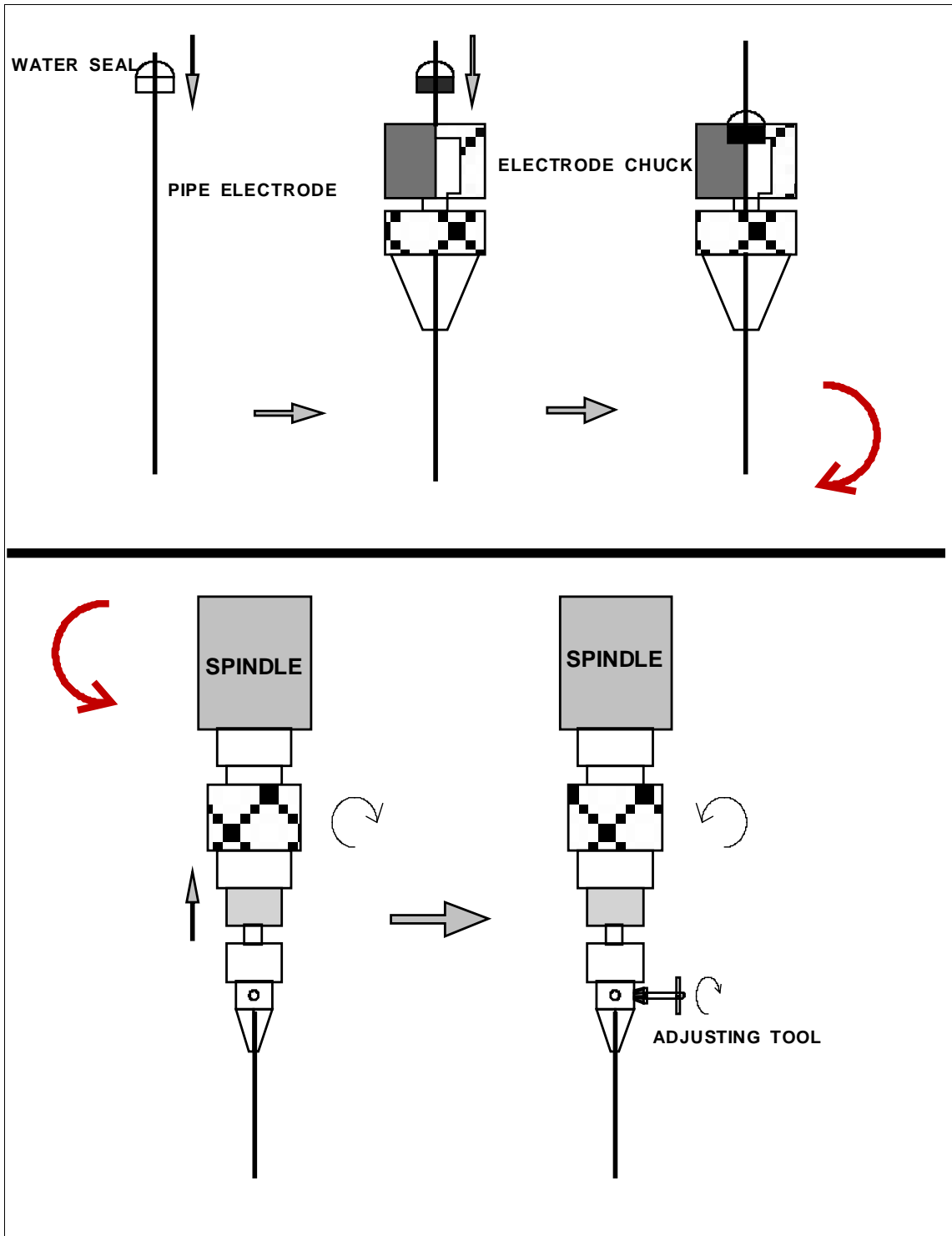
Installation of work piece :

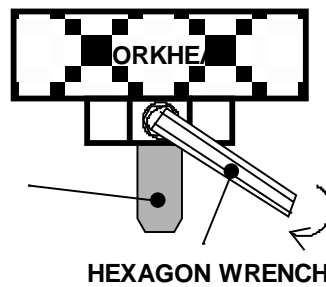
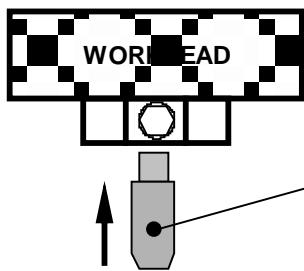
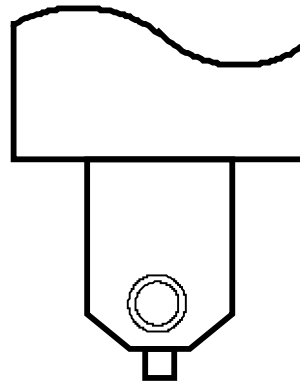
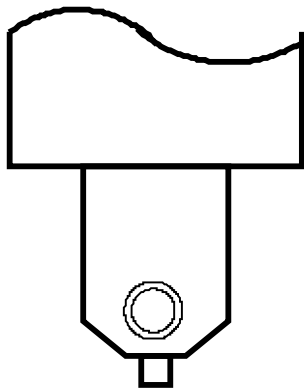
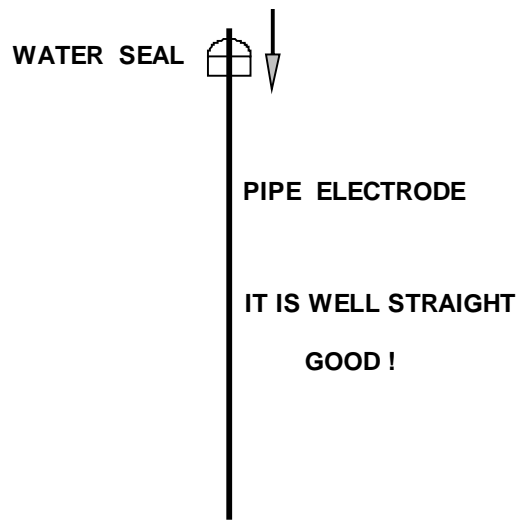
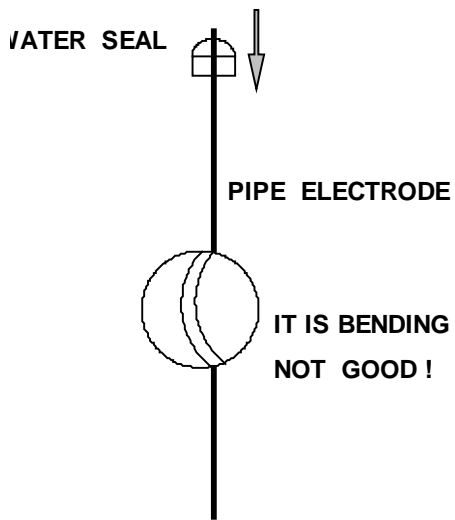
- (1) Lift the electrode guide up before fixed the work piece.
- (2) Clean the bottom of work piece and work table to avoid of molds insulating from work table .
- (3) Fix work piece on the work table tightly.
- (4) Put on the flushing guard to keep distance from EDM sparking zone.
- (5) Alignment the electrode and work piece .
- (6). **place an insulate board (such as plastic .Acrylic .or china plates) underneath the work piece to prevent from over EDMed to ruin the work table.**

6-4.3

Electrode installation

Load electrode according to the following figures.





6-5.1 Trouble shooting of Flushing Pump

HP-100 FLUSHING PUMP

Flushing Pump's Type of trouble and how to correct trouble

Symptom	Cause	Corrective Actions	
<p>1. Switch on the flushing pump: But No water flushing out at all. Pump piston reciprocating action stopped.</p> <p>The water pressure gauge point at low level.</p> <p>2. Every seals has been renew. But the pump cycle fast without any water.</p>	<p>The new installed machine or used machine has a long time idle ; Rubber O rings or water check valve has adhered tightly ; Dues to rusty or lack of lubricating.</p>	<p>A. Run the pump before electrode tubing has put in to the rotate chuck unit.</p> <p>B. Use an air-gun to jet in some air from water inlet pipe (that one of 2 pipe dipped in water tank) to loosen the adhered steel ball with nut.</p> <p>C. Check the lubricate oiler system per 2 weeks.</p>	
<p>2. Switch on the flushing pump: But No water flushing out at all. Pump piston reciprocating action stopped.</p> <p>The water pressure gauge point at low level.</p>	<p>1. Small control P.C.B. of flushing pump defected. (Function of pump's Piston direction .)</p> <p>2. Magnetic reed sensor defected .</p> <p>3. Magnetic reed sensor out of position.</p> <p>4. O rings inside Air-Solenoid Type-EC13801/4L which control pump piston direction has adhered dues to lack of lubricating. (This O rings will short life if flushing fluid is not pure water; Such as kerosene or corrosive chemical additives.)</p> <p>5. Coil inside Air-Solenoid Type EC13801/4L has defects dues to dirt or water get in.</p> <p>6. Leaking occurred on the pipe way.</p> <p>7. A.C110V power off at the 6 pin terminal stand. Pin 3 & 4.</p>	<p>1. Renew the small P.C.B.</p> <p>2. Renew magnetic reed sensor.</p> <p>3. Attach magnetic reed sensor close to the cylinder.</p> <p>4. Check the lubricate system weekly. Or renew Air-Solenoid. Avoid of using corrosive chemical additives.</p> <p>5. Renew coil of Air-Solenoid. Normally the coil terminals 1 & 2 has 950-1000Ω. electric resistance.</p> <p>6. Seal the leakage point.</p> <p>7. Check A.C. 110 V at Pin 3 & 4.</p>	<p>The small Control PCB has 3 editions. Their circuits are the same one , But different at terminal input type .(Cartridge or bolt- in type). Wiring input Identify are the same. Therefore they are switchable.</p>
<p>3. Switch on the flushing pump: But No water flushing out at all. Pump piston still reciprocating action smoothly.</p> <p>The water pressure gauge point at low level.</p>	<p>1. Water check valve defected.</p> <p>2. Flushing pipe line jammed by dirt</p> <p>3. Leaking on the water filter-cane.</p> <p>4. Leaking on the water pipe way or fittings.</p>	<p>1. Renew inlet or out let water check valve.</p> <p>2. Clean the pipe line by air-gun.</p> <p>3. Seal the leakages.</p> <p>4. Renew the leakage parts.</p>	

<p>General Common sense</p> <p>4. Switch on the flushing pump: But No water flushing out at all. Pump piston reciprocating action quicker than normal. The water pressure gauge point at low level. Water continue flow out from auto pressure release pipe into water tank.</p>	<p>Do not pumping without flushing</p> <p>1.O rings of Air cylinders worn out. 2.O rings of water cylinder worn out. 3.O rings adhered inside the Auto pressure release solenoid. 4. Auto pressure release solenoid coil blew up . 5.O rings of water pressure Auto release solenoid defected. Dues to O ring defected by long run or corrosive by Chemical liquid. 6.Block of water pressure Auto release solenoid defected.</p>	<p>Cause nylon poly hose broken</p> <p>1. Renew Air cylinder's O rings. And Check oil-lubricate system weekly. 2. Renew water cylinder's O rings. 3. Put some grease on the O rings part. 4. Renew the coil of Auto pressure release solenoid.. 5.Renew O rings of water pressure Auto release solenoid. or whole unit. Avoid of using corrosive Chemical liquid. 6.Renew the block of Auto release solenoid or whole unit.</p>	
<p>5. There are lot of air bubbles mixed with water jet back into the water supply tank while you stop the pump from working cycle.(Jet out from Water Auto- pressure release pipe the 1 of 2 pipes dipped into the water tank.</p>	<p>1.O rings of water cylinder worn out.</p>	<p>Renew the P-30 O ring.(New) (Older style pump UHS -30)</p>	
<p>6. Water leaking from Air-cylinder direction solenoid Type-EC13801/4L; Pump piston still reciprocating action smoothly. The water pressure gauge point at high level.</p>	<p>1.O rings of water cylinder worn out. 2.Piston shift worn out. 3.Cylinder worn out.</p>	<p>1.Renew O rings of water cylinder. 2. Renew piston shift. 3. Renew cylinder.</p>	
<p>7. Flushing OK at EDMing begging :Then No more water flashing. And Pump stop recycle go and back. The chuck has hot temperature when touch it. The water -pressure gauge point at high level.</p>	<p>Nozzle or fittings jammed in the water flushing way by dirt.. Long used filter element jammed . Dirt jammed on the inlet of electrode tubing.</p>	<p>1. Use an air-gun to jet air into electrode chuck fitting ;to remove the jammed stuff. 2.. Renew or chose a smaller tissue filter element. 3.Clean the jammed section tubular electrode.(cut off the jammed end.)</p>	
<p>8. Switch on the flushing pump: But tiny water flushing out only. Pump piston go without</p>	<p>Two air-outlet mufflers jammed by oil and dirt.</p>	<p>1.Renew the mufflers. 2.Drill a small hole on the muffler. 3.Remove away the</p>	

backward. Restart pump again; the pump go without backward again.(only one stroke movement). The water pressure gauge point at low level.		muffler for testing.	
9.No function of auto water pressure releasing ;while change electrode tubing a strong water splash out from electrode chuck joint. Defective of Auto pressure release solenoid.	1.O rings adhered inside the Auto pressure release solenoid. 2. Auto pressure release solenoid coil blew up . 3.O rings of water pressure Auto release solenoid defected. Dues to O ring defected by long run or corrosive by Chemical liquid. 4.Block of water pressure Auto release solenoid defected.	1.Grease on the O rings. 2.Renew Auto pressure release solenoid coil. 3. Renew the O rings. or whole unit. Avoid of using corrosive Chemical liquid. 4.Renew the block of water pressure Auto release solenoid	
Symptom	Cause	Corrective Actions	Diagnosis
10.Switch on the flushing pump: Pump will come up to pressure okay but will not hold the pressure very long with small electrode. The pump has been renew seals and air solenoid.	There are leaking at water Inlet section. Pipe way of suction; Pipe fittings. Filter cane ;or cracks on the black cap of the filter cane. Broken or lost of filter cane seal.	Make sure well sealing at Water suction-in section.	Reroute an inlet pipe From pump fitting to the Water tank directly . Try suction without filtration unit.
11.No air bubbles comes out from the water pressure release pipe after pumping stopped.	Normal condition of water sealing. Old style:UHS-30. New style: P-30		
12.Pumping quickly during one way or both go and back.	Water cylinder poor sealing. UHS-30 Water O ring worn out. Either end of big cylinder cap's inside bore has dent or scratched.	Renew water O rings. Renew the big cap. Part No:22# You may renew it with New style big caps to be update.	Air bubbles comes out from the water pressure release pipe after pumping stopped.
13. Switch on the flushing pump: Pump will come up to pressure okay but will not hold the pressure	Air cylinder has dents or scratched inside. Part:32# 2. Air O ring o 120mm has worn out. Part:30#	1.Renew Air cylinder. 2.Renew Air O ring.	Some noise occurred during the cylinder stroking stage

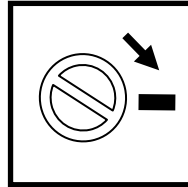
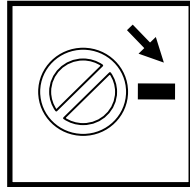
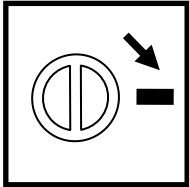
<p>very long with small electrode. The pump has been renew seals and air solenoid. Water suction line directly to water</p>			<p>from the 2 mufflers.</p>
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Test on the Direction Solenoid of Flushing Pump Type EC13801/4L Boncsi Parts NO:H-005

PCB Control mode

Manual A

Manual B



Plug in air pressure to the flushing pump ; But not yet to put the AC 110 V in, By using an I type screw driver to turn Direction control knob of Type EC 13801/4L from preset position (PCB control mode)to be Manual A(forward) or Manual B (backward) which could drive the pump's Air-cylinder to go forward and backward.

Both movement will pumping high pressure water out from Water Auto- pressure release pipe the 1 of 2 pipes dipped into the water tank. By this way to perform the normal functions of the Flush pump.Wile Power on with AC 110V The LED light UP =The piston forward. LED light OFF=The piston backward

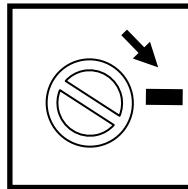
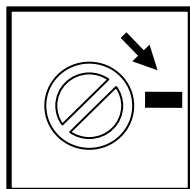
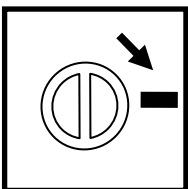
Normally the coil terminals1 & 2 has 950-1000Ω.electric resistance.

Test on the Water Pressure Auto-release Solenoid of Flushing Pump

PCB Control mode

Manual A

Manual B

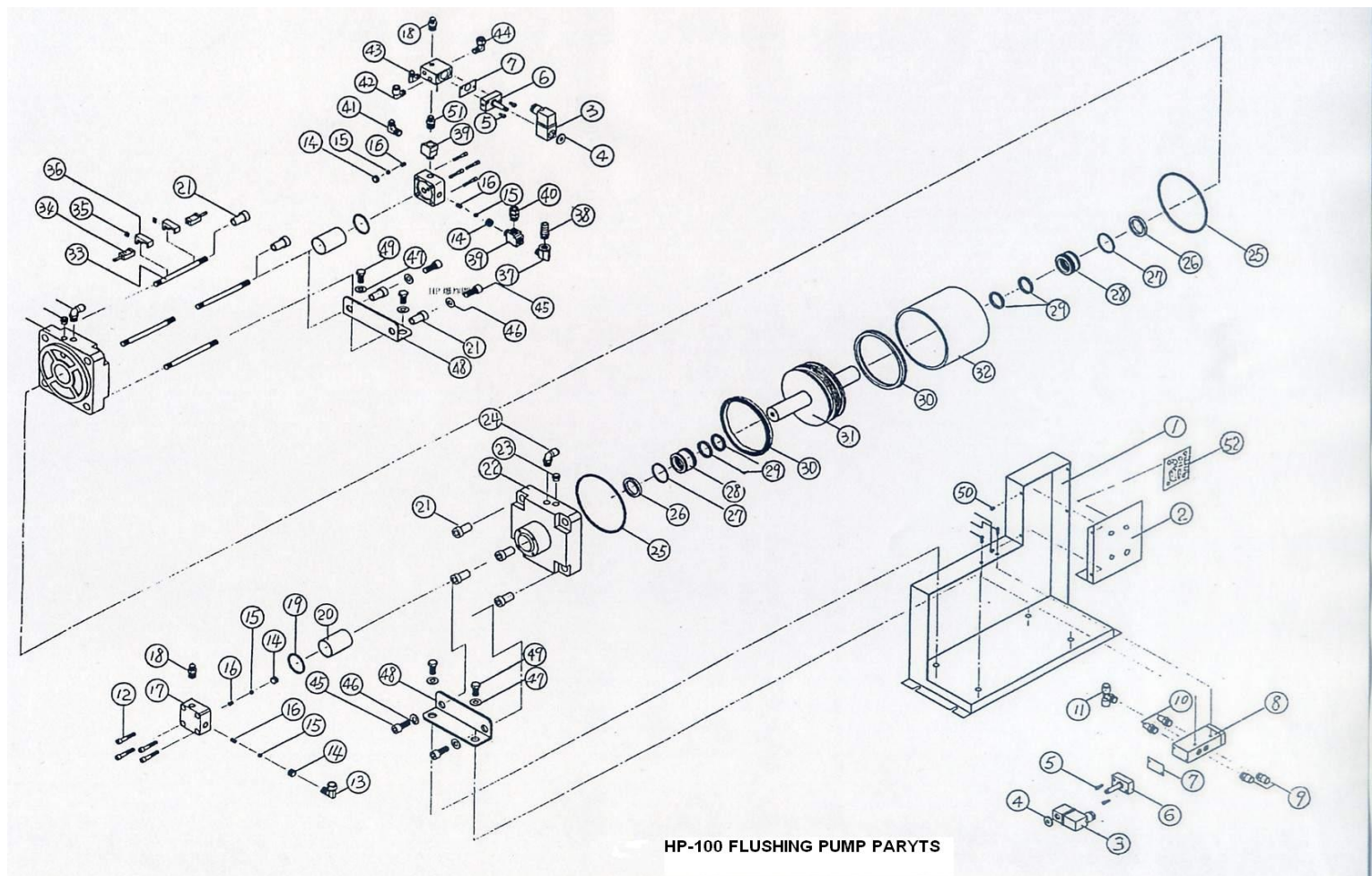


At PCB control mode; Press the pump key (power on the pump) then shut off the pump ; Will made a high pressure water flush out from pipe of Water Pressure Auto-release. Flushing from electrode tubing will stop immediately. The pressure in the gauge will drop to 0 at once.

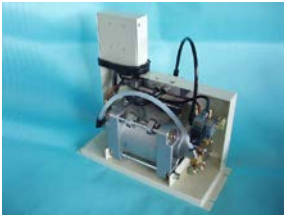




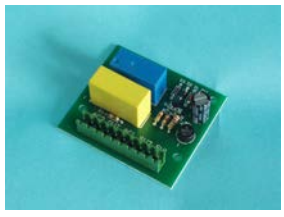









If turn to Manual A or Manual B At manual control mode; Press the pump key (power on the pump) then shut off the pump ; Will made NO water flush out from pipe of Water Pressure Auto-release. The water flushing from electrode tubing will continue a while. The pressure in the gauge will drop down slowly.

In case of Symptom 9 ;(No Auto-Release functions) For the time being; You can turn control knob from preset position (PCB control mode)to be Manual A(forward) or Manual B (backward)to maintain a normal water flushing for normal EDMing. But beware while stop pumping ;you better wait a while to change the electrode tubing until the water pressure has gone low, to prevent from water splash.

6-5.2 HP-100 FLUSHING PUMP PARTS:



HP-100 PUMP PARTS

				
H-001	H-002	H003	H-004	H-005
Pump Unit	Pressure release solenoid	Filter cane	O ring seal kit	Direction solenoid
				
H-006	H-007	H-008	H-009	H-010
Pcb	Cylinder	Side Cap- Left	Side Cap-Right	Piston
				
H-011	H-012	H-013	H-014	H-015

6-5.3 Operation sequence :

- (1) Check the AC power and make sure cables are connected properly before turn on the power switch .
- (2) Press power switch in the control panel.
- (3) Fix the work piece on the working table tightly .
- (4) load suitable size of electrode tubing with guide .
- (5) Alignment of work piece and electrode:
 - (a) Fix work piece and electrode correctly.
 - (b) Push the bottom #9 Retract , and the Led is lit , when the electrode touch the work piece the buzzer will beeping and the electrode will raise up automatically to prevent the electrode tubing from

bending.

- (c) Lift electrode guide device to the properly position and lock it , then move electrode head to enable the tube tip to touch work piece surface.**
- (d) Move X axis and Y axis to EDM location.**
- (e) After positioning, fix X axis and Y axis and lower the electrode guide to approach the surface of work piece.**
- (f) Lower electrode head and made electrode into electrode guide device. Please pay extra attention when lower electrode tip not to collide the work piece and keep electrode tube not bent or damage.**
- (g) Push "PUMP button", Please refer to the discharging condition on how to adjust the flushing pressure.**
- (h) Push "Chuck retract" button.**
- (i) Select "E.D.M. current" , "E.D.M. timing".**
- (j) Adjust "Servo feed rate" tuner to make E.D.M. stable.**

6-5.4 Caution before Starting A EDMing:

(1) Before E.D.Ming:

- (A) Electrode is tube , electrode diameter between 0.3-3.0 mm.
- (B) DO NOT damage electrode tube.
- (C) Any damage in the guide of Electrode tube will create flushing leaking .
Check it carefully.
- (D) Check the electrode tubes on a flat table by turning it to check if it is vibration or bending.
- (E) Fix works tightly
- (F) Check the flushing outlet situation.
- (G) Always had the electrode tubing flushing before E.D.Ming.

(2) During EDMing:

- (A) Please adjust "Servo feed rate" to lower feed rate situation in the begin to make sure the electrode tube will not be bending or not stable occurred.
- (B) General setting. (low consumption)
The lower EDM amperage will cause lower electrodes consumption .
****By added an auxiliary pump to water into the guide tip during the EDMing stages; to greatly help smoothen E.D.Ming with high efficiency and easy hole break through. Also save working time and consumes less of electrode tubes.**
****By place an insulate board (such as plastic .Acrylic .or china plates) underneath the work piece to prevent from over EDMed to the work table.**

6-5.5 PRECAUTIONARY ITEMS :

(1) Precautionary items before machining.

- (A) Electrode material can be copper , brass the diameter from ϕ 0.3 ~ 3.0 mm.
- (B) Electrode copper bends easily when hitting other objects especially using the tiny diameter such as ϕ 0.3-0.2mm.
- (C) Electrode tube will be jammed if it is not flat or dirty.
- (D) Rotate the electrode on flat surface to check if bent or not.
- (E) Work piece should be tightly fixed.
- (F) Rotate the electrode to check if it is deflecting or bending . If so, it will be result in not stable ,electrode wearages are not equally from hole to hole. Even unable to perform drilling with auto-depth controller mode.
- (G) Please refer to " Flushing Pump "to check the flushing.
- (H) Consult the machining data to check the preset machining condition.

(2) Precautionary items while machining .

At the beginning of machining , please turn "Servo Sensitivity" and slow down electrode feed in speed. If the electrode feed in speed is too high , the electrode bends and defects easily and results in unstable to EDMing. After stable machining , adjust "Servo Sensitivity " to a better efficiency of electrode feed in speed.

****By place an insulate board (such as plastic .Acrylic .or china plates) underneath the work piece to prevent from over EDMed to the work table.**

6-5.6 OPERATION STEPS

- 1) Be sure power connects to power switch well.
Turn on Door Switch of main power.
- 2) Depress the power switch on the panel, the indication lamp lights then start to operate.
- 3) Fix the workpiece on the worktable.
- 4) Choose the chuck and " water repellent plastic block " fix for electrode diameter , and install the electrode properly .
Meanwhile , apply the suitable guide head.
- 5) Adjustment between electrode and workpiece.
 - (A) Fix the electrode and workpiece exactly.
 - (B) Push the "Z RETRACT \uparrow " on the control panel , the buzzer will sounds. Meantime ; this switch can protect the pipe without bending.

- (C) Lift the electrode guide device to a proper height , and fix it then move the electrode head to make the electrode close to workpiece.**
- (D) Move X axis and Y axis to the machining area.**
- (E) Fix X axis and Y axis and lower the electrode guide device near the workpiece surface.**
- (F) Lower electrode holder and install the electrode into electrode guide device , while the electrode is lowering ascertain to avoid the hit of electrode to workpiece resulting in the bending or damaging of electrode copper.**
- (G) Turn on the dielectric switch to inject the dielectric water from the inner tube of electrode copper. Please consult the dielectric pressure of machining condition.**
- (H) Preset "machining current", "pulse on duration" "pulse-off duration" machining capacitor then depress discharge switch.**
- (I) Electrode starts to lower and machine.
Coordinate "servo adjustment button" adjustment to stabilize machining.**

6-5.7

Drilling with Z-axis auto depth control 

1. Edit a HOME program on the DRO panel >escape from HOME key >
2. Initiate EDM DEPTHER key on the DRO panel >
3. Press AUTO EDM key on the EDM Function panel


6-5-8 Edit a HOME program

1. Try an hole test drilling to know how's the electrode wears depth.

Example: If a free drilling results was used a Φ 0.8 mm Brass electrode to drilled through a 20 MM tall steel works. While the electrode tubing has spark out from the bottom of the works ; The Z axis read out are : 30(mm)30-20=10 The electrode wastages are 10 mm.


2. Press the Home key 

(LED lit ON) on the DRO panel ;The message screen displays "EDM DEEP" >Key in the Z- Axis depth digitals you desired. Such as 20 (mm)> Press ENTER key.

The message screen displays "EDM HOME" >Key in the depth above the works of the electrode tip retract up to the Z position ;(Z chuck spindle return to HOME level before EDMing) Such as 3 (mm)(3 mm above the works surface) > Press the ENTER key ;The message screen displays "EDM COMP" Key in the wears of your test-Drilling Experiences; Such as 10 (mm)(electro wears) >Press the ENTER key >Press the Home key 

(LED lit OFF) = Editing finished.

6-5-9 Modify a HOME Editing program

Press the Home key 

(LED lit ON) on the DRO panel ;The message screen displays "EDM DEEP" >Key in the newly Z- Axis depth digitals you prefer. Such as 22 (mm)> Press ENTER key.=Modify O.K.

If the message screen displays "EDM DEEP" >Key in the original Z- Axis depth . Such as 20 (mm)> Press ENTER key.=To keep original set up remains.

You may press the scroll up & down  

To select EDM HOME or EDM COMP to be modified .

6-5-10 EDM with Z axis depth control

Step-1:After edited a HOME program >Step-2:Initiated the EDM

DEPTH key  on the DRO panel >Step-3: Pressed (5)AUTO key to

starting a Z –depth controlled drilling.The Z spindle will auto-stop with beeping after the HOME program depth has reached .

6-5-11 Raise up the Z axis after the Home program given Z depth had reached.

After a Z –depth controlled drilling has finished ∴The Z

spindle will auto-stop with beeping (after the HOME program depth has

reached .) >Press the Z-Retract UP ↑ key ...The spindle chuck will auto retract

up to the home position

6-5.12.How to prevent from over EDMed to ruin the work table ?

A. EDM with Z axis depth control

B. Place an insulate board (such as plastic .Acrylic .or china plates) underneath the work piece to prevent from over EDMed to ruin the work table.

6-5.13 TROUBLE SHOOTING OF EDM DRILLING

If you got any troubles on EDM drilling functional or technical ;Even machinery issues; **We strongly suggested you to put a standard trial drilling before your service call.**

It is a simple 1.0 mm hole- drilling on a 20 mm or 10 mm tall steel with a brass electrode tubing.

If you can't get a good result of standard trial drilling as the machine 's first came or original performances ;

Please contact us for helps.

If you can get a good result of standard trial drilling as the machine 's first came or original performances ; And you remain need our helps;

Please write down the details of your troubles to us for a quick and accurate advice.

Do not just said: My 0.3 mm drilling is very difficult .

We need your details at least as the machining date sheet described .

Therefore ; We can do the same thing as you did on our end machine to simulate your situation and find out the good result or better settings for you. Or a quick troubles shooting.

Q: Why my driller has unstable drilling at 0.3 mm or 0.2 mm electrode but quite stable on 1.0 mm electrode ? Are this driller no good ?

A:This EDM driller has well-designed digital controller ;It can provide a very stable EDM drilling settings performances for most of application.

But dues to the small electrode tips are much easier to get bent than big electrode. Once the tip's inside the drilling holes has bent ;the shorted arcing occurd ; the Z axis ram will retract up and down , This up & down will take as long as the bent tips has worn-out. To raised the electrode and cut the bent tip off as well as to use a even qualities electrode tubes and obtained a gentle setting are the way out .

Q: Why the Z SERVO motor has an sharp echo noise with drifting D.R.O at my day operating beginning especially cold days ? **A:** Sometimes especially cold morning the Z D.R.O has up or down drifting are due to the up & down balance controller has not been warm upd. Pls hit the up & down key several times and wait a minutes .The drifting and noise will vanish by itself.

6-5.9 EDM CONTROL & DRO PANEL

