INSTRUCTION MANUAL WINTEX MCL3

- **0-120 or 0-200 cm**
- **For all soils**
- **Robust construction**
- **Fast and user-friendly**
- **Efficient and reliable**

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201806

Manufactured by:	WINTEX AGRO Vilhelmsborgvej 8C DK-7700 Thisted
Type designation:	WINTEX MCL3
Voltage:	12 volt DC
Year of production:	2018

CE

PRECAUTION

- Use personal hearing protection.
- Do not move the soil sampler with the tower in vertical position, especially not on ploughed fields and uneven fields or slopes.
- Consider stability when moving on slopes. Where possible, drive straight up or down the slope, not across it.
- Keep an open eye on sharp bumps, holes, ruts and obstacles.
- Adjust the speed to the prevailing conditions.
- Do not prolong penetration with no visible sink – you are most likely driving against a large stone causing damage to the sampler. Take a new sample nearby.

Hard soils – important

When sampling in hard soil, the sampler **must be stopped and rotated every 30 cm.** Under normal conditions, rotation must happen in rotation mode only (without using the hammer). If the rotation in extremely hard soils is not carried out, it may be almost impossible to retrieve the sampler from full depth, even if the hammer drives down successfully. Careful penetration at the beginning will give the operator a feeling of whether or not the above procedure is necessary.

1. INTRODUCTION

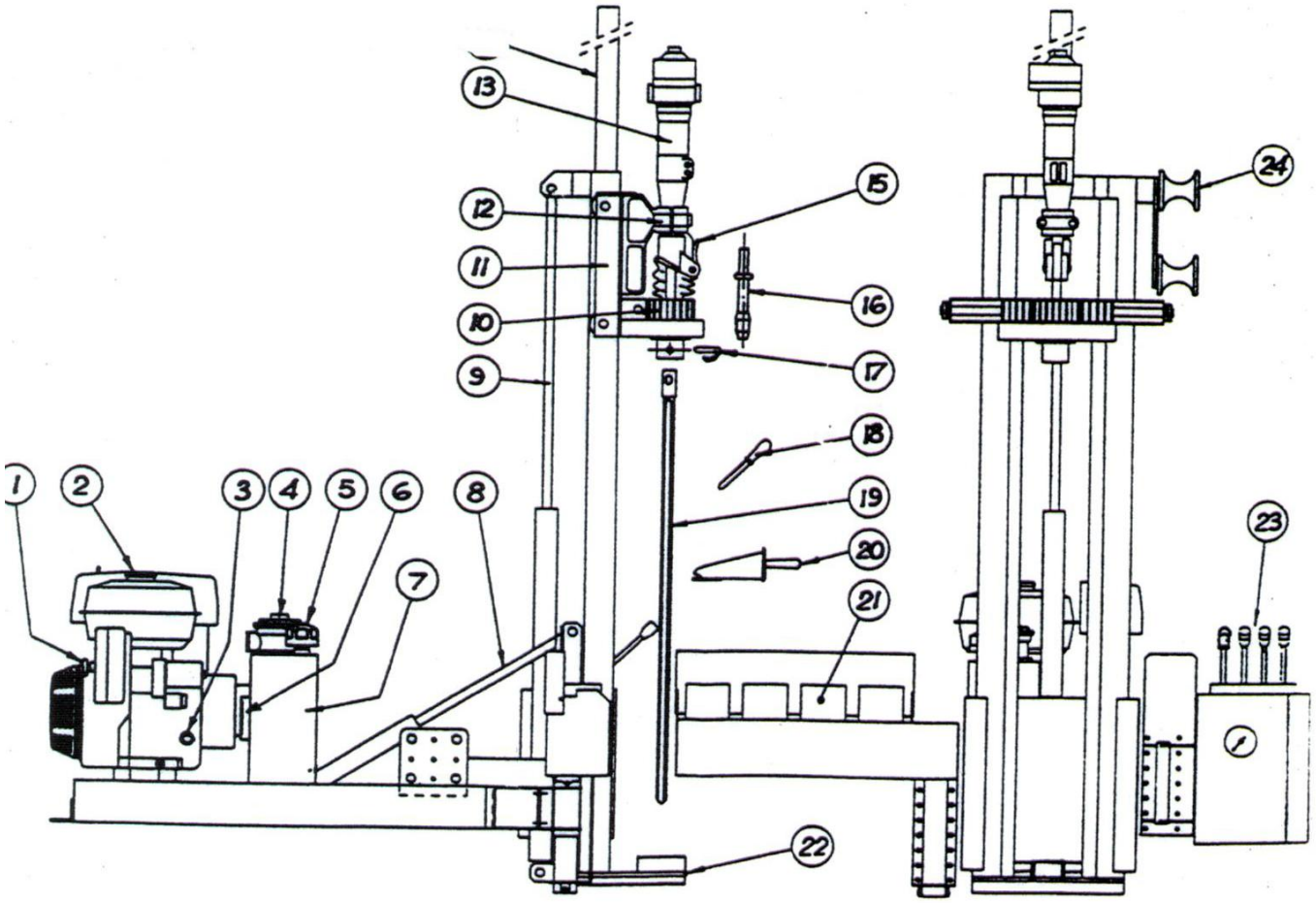
The Wintex MCL3 soil is designed for accurate and effective soil sampling in all kinds of cultivated soils down to maximum root depth. Its main use is to collect soil samples for analyzing the content of nitrate in the soil and thus providing a basis for more accurate nitrogen fertilization in agriculture.

The Wintex MCL3 is designed and produced in Denmark in accordance with Scandinavian standards of safety and ergonomics. It can be mounted on a variety of carriers without any major modification, for example a John Deere 6x4 Gator, a Polaris 6X6 Big Boss 350, a four-wheel motorcycle trailer, a Honda HP500 crawler, a Kawasaki Mule 2510 4x4 or a pick-up truck. Please contact Wintex Agro for any information on other carriers than mentioned here.

2. SPECIFICATION

Sample depth:	1,20 m and 2 m
Probe:	Open slot with tapered body
Total weight soil sampler:	300 kg
Hydraulic unit:	Honda GX13 HP 4-stroke petrol engine Electric starter, 12 V battery Hydraulic pump 120 bar, 20 l/min.
Hydraulic oil tank:	30 litres
Hydraulic hammer:	LH12, 2500 blows/min.
Hydraulioc rotation:	180º-550 Mn
Hydraulic pull-up:	14,8 kN

3. IDENTIFICATION



1. Start switch
2. Petrol tank filler cap
3. Engine oil filler/level
4. Hydraulic oil filter
5. Hydraulic oil filler cap
6. Hydraulic oil level gauge
7. Hydraulic oil tank
8. Hydraulic cylinder, raise/park
9. Hydraulic cylinder, lift mast
10. Rotation gear assembly
11. Main slide
12. Hydraulic hammer clamp
13. Hydraulic hammer
14. –
15. Release clasp for striker
16. Striker (inside hammer)
17. Drive pin for sampler
18. Sample scraper
19. Slot sampler
20. Sample scoop
21. Sample holder
22. Mast foot
23. Control console
24. Hydraulic hose guide

4. DESCRIPTION

The mast of the Wintex MCL3 is reclineable for transport purposes. It is mounted in elastometer bushes to absorb vibration during transportation and operation.

All sampling operations are hydraulically operated from the control console. There are four separate functions; lifting the mast, positioning the mast on the ground, penetration (feed combined with percussion) and rotation. A special valve sequence control ensures that maximum penetration is automatically obtained under all conditions which eliminates operator adjustments. The high-moment rotation unit shears the sample at full depth prior to retrieval.

All machine parts are precision made, which ensures complete interchangeability when the replacement of parts is necessary. In addition special attention has been given to easy maintenance and reliability.

The open-slot sampler is secured to the machine spindle by means of a standard locking pin with a spring clip. This enables the sampler to be rotated and retrieved.

5. OPERATION

5.1. Check the level of the lubrication oil in the Honda motor, top up if necessary.
Oil type: SAE 10W-40 SE/SF detergent oil

5.2. Check the level of the hydraulic oil by visual inspection of the sight glass on the tank. Avoid ingress of dirt. Top up if necessary.
Oil type: ISO 32 hydraulic oil (temperate climate), ISO 40 hydraulic oil (warm climate)

5.3. Check the fuel tank; top up/fill if necessary. Tank capacity: 6.5 litres.
Fuel type: 95 octane unleaded automobile quality

5.4. Start procedure – cold engine
Fuel on.
Set the choke, **close**.
Throttle lever 30%.
Turn the start switch clockwise.
Release the start switch after start.
Run the engine and gradually reduce the choke until smooth running is ensured.

5.5. Start procedure – warm engine
The same as the start procedure with cold engine (5.4.) but with the choke **open**.

5.6. Raise the mast vertically using the left valve lever **(raise mast)** which points forward as opposed to the other three levers.

5.7. Lift the slide to the upmost position and use the valve lever in **retrieve** mode.

5.8. Place the sampler head in the drive socket under the rotation gear. Shove it up once as high as possible with two hands in order to activate the hammer.

5.9. Align the drive slot with the hole in the socket.

5.10. Drive the driving pin with a hammer blow until the retaining clip springs over the socket body.
Note:
Occasionally it may be difficult to enter the locking pin into the hole because of the hydraulic hammer pressure build-up. To overcome this, proceed with the next step (5.11.).

5.11. Using the valve lever second from left **(mast down)**, lower the mast to the ground, until the weight of the soil sampler rests on the foot.

5.12. Using the valve lever second from left in **penetrate** mode, carefully press the soil sampler into the ground until the resistance is sufficient to start the hammer.
Note:
Avoid hammering without resistance for long periods.
Occasionally the hammer may fail to start. This will normally not happen if paragraph 5.8 has been followed properly. If not, go to paragraph 5.22 and then proceed with paragraph 5.8 again. The cause of this is that the shuttle value in the prevents pressure rise. Pressing the sampler into the hammer is sufficient to start it again.

5.13. If the pin could not be entered as mentioned in paragraph 5.10, enter the drive pin and hammer the clip into position before commencing penetration.

5.14. Give full opening to the valve in penetrate mode (push the handle down). The soil sampler will penetrate the soil. When experiencing resistance, the hydraulic hammer will automatically start and a synchronized sequence between hammer and feed ensures optimum soil penetration without the operator's need for participation.

5.15. When the sampler has penetrated the soil to the required depth, release the valve lever, third from left, from the penetrate mode (mid position). Penetration will then cease.

5.16. Using outside valve lever rotation in a relevant mode, shear the sample through 180^{o} (full stroke on the rotation cylinder).

5.17. Retrieve the sample by placing the valve lever into retrieve position.

5.18. Inspect the sample in the sloth if required.

5.19. Scrape out the sample from the slot by using the special tool so that it falls into the collecting scoop. It is usual to take soil samples for every 30 cm, e.g. 0-30 cm, 30-60 cm, 60-90 cm.

5.20. Empty the scoop into the relevant storage bin.

5.21. The soil samples can then be mixed and analysed according to the pertaining practise employed by the agronomist and the laboratory.

5.22. Removing the sampler:
Rotate the driving pin into a suitable position for driving out. Using a drift, Ø12-Ø16 round pin, apply a sharp hammer blow to open the spring clip, and hammer out the driving pin. With the main slide in the uppermost position, remove the sampler from the socket.

5.23. Transport:
Remove the sampler as described in paragraph 5.22 above.
Lift the foot from ground, using the valve in mast up mode.
Lower the main slide by using the valve in penetrate mode. Take care not to open the valve fully; otherwise the hammer will start to function. The main slide is lowered until it reaches the point of balance – approximate level with the hinge bracket.
Park the mast with the lever in mast park mode.
Switch off the petrol engine with the ignition key.
Close the petrol supply valve when transporting the soil sampler from site to site, or when the sampler is not in use.

6. MAINTENANCE

Weekly

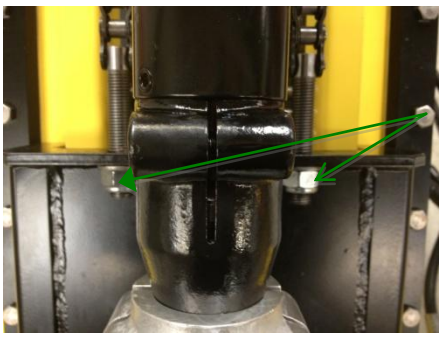
General:	Check the machine for oil leakage. Loose nuts and bolts and check for defective parts and wear. Rectify by tightening and fitting new parts if necessary.
Hammer system:	Open the hammer clasp on the hammer and withdraw the striker. The striker should be examined for wear, and the shank greased with moly grease (MoS2). Replace the striker in the hammer and close the clasp.
Connection slide to cylinder:	Check the six nuts and bolts holding the main slide to the feed cylinder for tightness. Tighten if necessary.
Hammer clamp:	Check for tightness.
Honda engine:	Maintenance as recommended in the Honda owner's manual for GX390 engine.

Annually

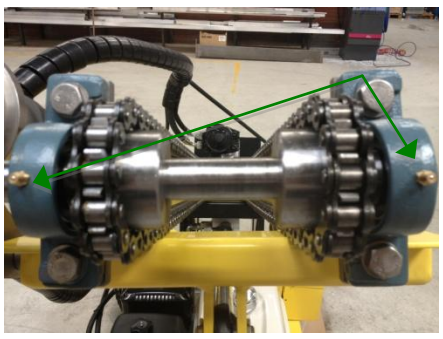
Service:	Drain off hydraulic oil 301 from the main tank (the drain plug is situated under the tank), and replace with new clean hydraulic oil. Avoid ingress of dirt. Remember that the machine's working life depends on the cleanliness of the hydraulic oil.
Hydraulic main filter:	Unscrew and remove the filter element. Replace with a new element.

7. TIGHTENING AND LUBRICATION OF CHAINS

Tighten the chain by tightening the nuts.



Lubricate the grease nipples.



It is important to lubricate the chain with oil.

8. FUNCTION OF THE HYDRAULIC SYSTEM

Hydraulic oil is sucked through a strainer from the hydraulic oil tank to the pump inlet. Pressure oil, 120 bar, is fed from the pump to the inlet port on the four-slide, four-way valve block. The inlet port is in connection with the pressure relief valve which opens if the system pressure of 120 bar is exceeded, and dumps the oil directly into the tank via the return filter. The hydraulic system is of the open centre type.

The petrol engine is overpowered by purpose in order to have reserves for future modifications and power requirements. It has also a reduction gear fitted so that the gear pump runs slowly and generates less hydraulic noise. The oil flows through the valve block directly to the tank at low pressure, when none of the valve functions are actuated.

The penetration slide valve is connected to the aluminium block containing two cartridge valves, one for pressure reduction and one for a pilot operated check valve function.

These valves work in combination with the hammer and the feed cylinder in order to automatically provide optimum penetration. The cartridge valves can be easily removed and exchanged should the need arise. The complete system is designed to avoid unwanted heat due to excessive pressure regulation.

Hydraulic adjustments

The system pressure is adjusted to 120 bar by the relief valve which is situated on the pressure inlet side of the four-way direction valve block. This value must not be exceeded, as it is the maximum pressure for the hydraulic hammer system. The pressure regulating cartridge valve can be adjusted, but this is normally not necessary. For adjustment, slacken off the screw completely, and then gradually screw it in until the pressure build-up is sufficient to just lift the weight of the soil sampler with the valve in sample penetrate mode and the mast foot lowered to the ground for support.

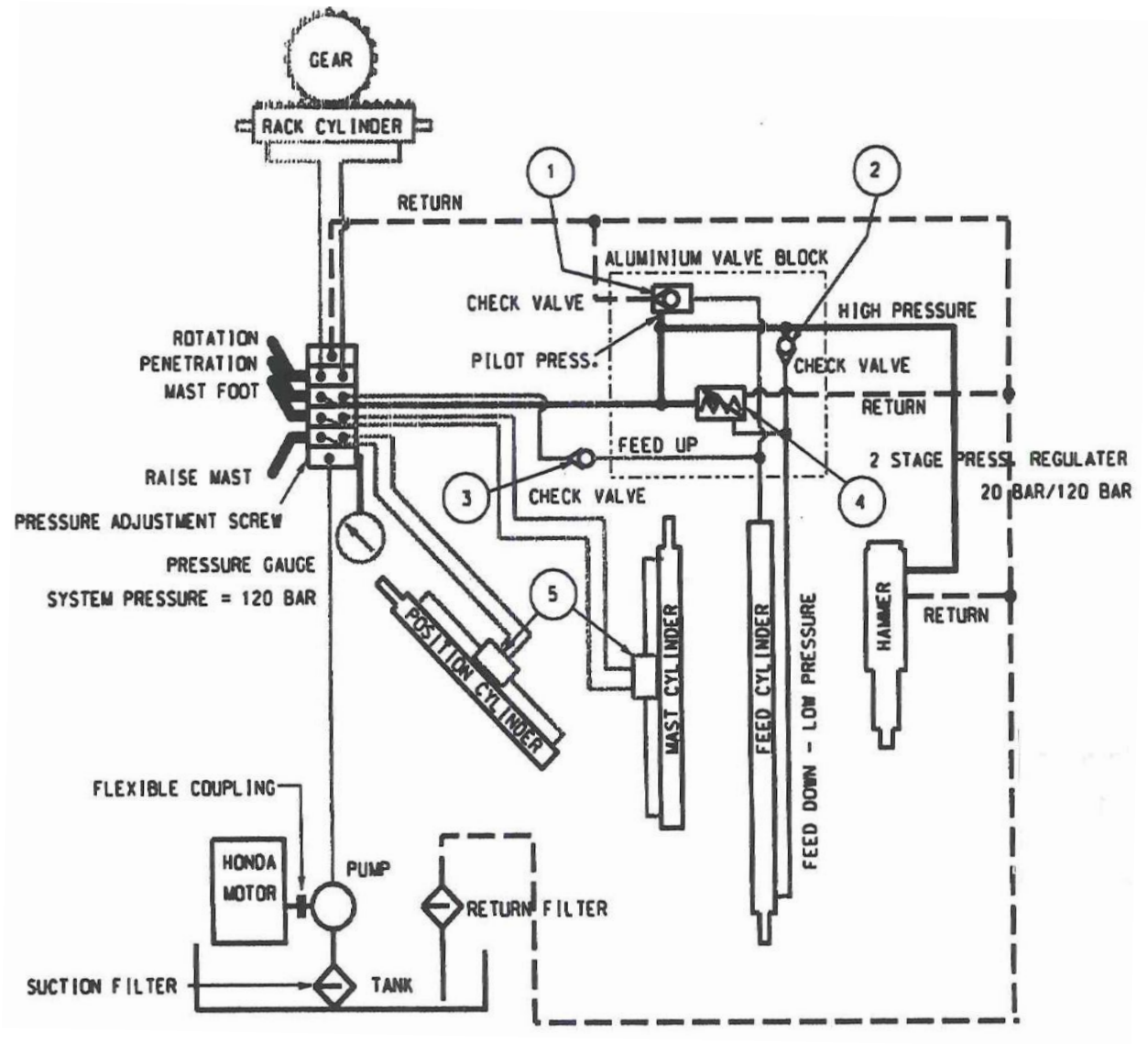
9. ROTATION SYSTEM

This is a simple, robust, high torque device consisting of a hydraulic cylinder equipped with a toothed track driving gear wheel to which the sampler is directly mounted. The piston remains stationary whilst the cylinder reciprocates, causing the gear wheel to turn 180^{o}. The driving pin is similar to standard US auger machines common in earth drilling.

Hydraulic hammer nitrogen gas accumulator

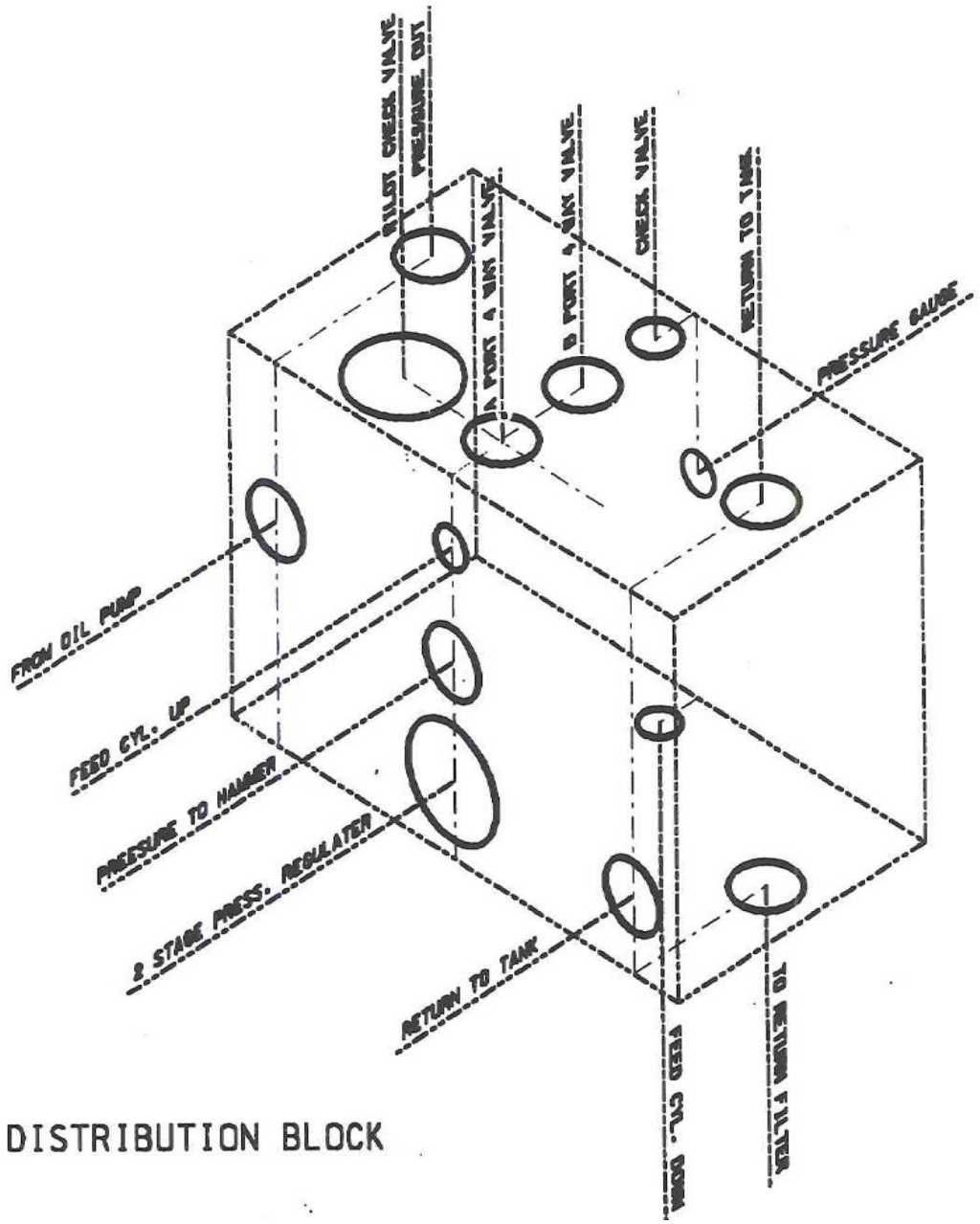
The hydraulic hammer contains a gas/oil accumulator which is hermetically charged with nitrogen gas and necessary for the correct function of the hammer.
After long service life (several years), the pressure membrane could become defect causing gas leakage. This failure can be observed by the operator. The hammer would lose penetration power, and the hydraulic tubes feeding oil to and from the hammer would shake violently. The hammer must not be used in this condition. It would require maintenance, a new membrane and recharging with gas. This service can be carried out by a skilled Technician, but a special tool is required for the job. Consult your dealer.

10. COMPONENTS OF THE HYDRAULIC SYSTEM



Cartridge valves:

No. 1) Check valve
No. 2) Check valve cartridge
No. 3) Check valve – tube mounted
No .4) Two-stage press, reducing valve
No. 5) Cylinder check valve



DISTRIBUTION BLOCK

11. DESCRIPTION OF HYDRAULIC SYSTEM

The hydraulic pump draws hydraulic oil through a suction filter placed in the tank, and delivers it under pressure to the actuating valve block with the four control levers. The first section of this block is an adjustable relief valve, which function it is to maintain system pressure and to protect the system from excessive pressure. When no valves are actuated, the oil from the pump returns into the hydraulic oil tank through the return filter – an open circuit system. A pressure gauge is fitted to the relief valve to show the system pressure at any instant. The maximum system pressure should be set to 110-120 bar.

The first two sections of the valve block are for the operation of the positioning cylinders, for raise/park and lift mast foot. These are simple directional valve operations. The cylinders can be moved in either direction by means of the actual lever. Once they are in the

desired position, the check valves prevent oil leakage causing undesired movement or creep. The cylinder check valves cartridges and can easily be removed for cleaning or replaced by new ones.

The penetration section is somewhat different. Its operation is based on a combination of special valves mounted in the aluminium distribution block. When actuating the lever “penetration”, hydraulic oil is supplied to the two-stage pressure settings, low pressure and high pressure setting. The low pressure stage actuates the feed cylinder downwards without hammer operation. When

resistance with soil is encountered in the probe, the pressure raises in the feed-down line, and the regulating valve changes to high pressure stage. The hammer needs at least 40 bar to start. The pressure line to the regulating valve is also connected to a pilot which allows the oil from the feed cylinder exhaust to return to the tank via the check valve instead of returning to tank via the four-way valve port as usual. A further check valve, PRVV 15 LR, closes this line to the four-way valve. Fluctuation between the two pressure stages allows the probe to obtain its maximum rate of penetration, independent of the operator. The lowest pressure must be set by the means of the adjustment screw on the regulating valve cap so that the rig weight is balanced in low pressure penetration mode, i.e. the rig will not be lifted up.

An extra valve, Sterling DIA-25, is placed between the hammer pressure line and the feed down line. It’s function is to prevent a hydraulic lock from forming, causing the hammer not to start, i.e. no pressure difference.

The rotation unit is designed to obtain a high torque with little weight and oil consumption. It consists of a special hydraulic cylinder with a piston rod in each end and a toothed rack which drives a gear wheel through 180°. The fourth lever on the valve block actuates this function which is a conventional direction control operation. The cylinder turns the gear wheel 180° clockwise and anticlockwise.

NOTE:
It is **important** that the speed of the petrol engine does not exceed 2700 rpm, otherwise the hydraulic pump delivers more oil than the hammer can use effectively. This causes leakage in the hammer, overheating of oil and excessive vibration at the engine mountings.

12. ADJUSTMENT OF HYDRAULIC VALVES

System pressure
Remove the console cover (see instructions).
On the direction control four-way valve block under the console top, on the inlet section, farthest out from the center of the MCL3 is an adjustment screw for pressure regulation.
Remove the protection cap nut.
The adjusting screw is now exposed.
To increase pressure, screw clockwise.
To decrease pressure, screw anti-clockwise.

Set system pressure
Place the console cover containing the pressure gauge in a convenient position so that it may be observed when making adjustments.
Start the engine and actuate one of the hydraulic cylinders so that it goes to an end position (rotation).
Observe the maximum pressure shown on the pressure gauge with the cylinder in the end position.
Adjust the regulating screw until a pressure of 120 bar is shown.
Tighten the lock nut and replace the protective cap nut.

Adjustment of two-stage pressure valve in aluminum block
This valve is located on the front of the aluminum block just under the hydraulic tubes going to the mast.
It should be screwed out as far as possible (anti-clockwise). Be careful not to screw it too far out so that it falls out of its housing.
With the actuating lever set in the penetration mode screw in the adjustment screw until the MCL3 rig is just about to lift from the ground.
Lock the adjustment screw in this position.

13. DISMANTELING THE MCL3

Rotation gear assembly
Unscrew and remove the six screws securing the cover.
Undo the clamp holding the hammer (two nuts and bolts) and take out the hammer. It can hang in the hydraulic tubes.
Remove the rubber gaiter.

Remove the cover from the assembly.
Remove the circlip and the retaining washer securing the gearwheel underneath the gear case.
Pull out the gearwheel. Inspect it for excess wear.

Replace the bearing by removing the nuts and bolts securing the bearing housing to the bracket and remove it. Press out the worn bearing and discard it. Refit a new bearing.

Removal of hydraulic rack cylinder
Dismantle the gearwheel as described above.
Disconnect the two oil tubes from each end of the cylinder.
Undo the two lock nuts securing the piston rods to the bracket.
Pull out the cylinder from the slots in the bracket.
In a suitable hydraulic workshop the cylinder may be dismantled.
Scew out the two cylinder ends and withdraw them from the piston rods. Inspect for damage to the sliding surfaces.
If damaged, replace the damaged parts; otherwise fit new seals.
Re-assemble in opposite sequence.

14. PROBLEM SOLVING

Problem	Possible causes to be controlled by user	skilled Technician	Code list for possible causes	
Honda motor fails to start	1,2,3	3	1	Empty tank
No hydraulic system pressure	4	4,5,6	2	Flat battery
No vertical mast movement	-	4,5,6,7,8	3	See user manual for Honda motor
No penetration	4	4,6,9,10,11,25	4	Defect coupling to hydraulic pump
No retrieval	4	4,8,10,11	5	Defect relieve valve in four-way valve block
Hammer fails to start	4	4,8,9,15,17,24	6	Defect hydraulic pump
Hammer is weak	-	12,13	7	Leaking check valve, Sterling D2D60 in aluminum block
Hammer oil leakage	14,16	14,16,23	8	Defect four-way valve actuator
No rotation	4,18,19	4,18,19	9	Defect pressure regulator in block, Sterling C1C 125
Creep in mast, park cylinders	20	20	10	Defect check valve in block
Feed cylinder falls unactuated	-	21	11	Defect check valve PRVV 15 LR
Uneven stroke, slow feed up	-	21	12	Defect membrane (see Lifton catalogue)
Feed cylinder moves without actuation	-	22	13	Worn hammer
Excessive vibration in hammer tubes	-	12	14	Worn seals
Excessive vibration in engine mountings	23	23	15	Defect start valve in hammer
Excessive heat in oil tank, oil mist from filler cap	23	23	16	Loose screw threads
			17	Hammer shuttle valve incorrectly fitted
			18	Broken gear wheel
			19	Leaking seals
			20	Check valve leaking (mounted on cylinder)
			21	Check valve spring too weak, Sterling D2D60
			22	Loose retaining latch on four-way valve spool
			23	Too much engine speed, excessive oil flow
			24	Hammer shuttle valve siezed
			25	Pilot piston seized (under check valve nr. 1)