DAWSON
CONSTRUCTION PLANT LTD

HPH 6500 HYDRAULIC HAMMER & POWER PACK

INNOVATIVE PILING EQUIPMENT

- HYDRAULIC PILING HAMMERS
- EXCAVATOR MOUNTED VIBRATORS
- EXCAVATOR MOUNTED DRILLS
- QUIET, VIBRATIONLESS PUSH-PULL PILING
- PILE EXTRACTION
- SHEET PILE GUIDE FRAMES
- SHEET PILE CAPPING SYSTEMS
- CFA CLEANERS
- PILE POINTS & SPLICERS
- HANDLING / LIFTING

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DAWSON
CONSTRUCTION PLANT LTD

HPH6500 HYDRAULIC

HAMMER AND POWER PACK DHP170-04 - ONWARDS

- USER'S MANUAL

HAMMER SERIAL NO:_____
HAMMER COMMISSION DATE:
POWER PACK SERIAL NO:_____
POWER PACK COMMISSION DATE:_____
ENGINE TYPE:_____
ENGINE SERIAL NO:_____
POWER PACK TYPE:

V4 26/02/13

C O N T E N T S

The responsible person:-

DAWSON CONSTRUCTION PLANT LIMITED
CHESNEY WOLD, BLEAK HALL
MILTON KEYNES MK6 1NE
ENGLAND

EC DECLARATION OF CONFORMITY

Description: *Hydraulic Hammer & Power Pack*

Type: *HPH6500*

Serial Numbers: _____

The above mentioned equipment conforms to the Machinery Directive89/392/EEC(a) as amended by Council Directive 91/368/EEC(b), Council Directive 93/44/EEC(c) and Article 6 of Council Directive 93/68/EEC(d).

Signed for and on behalf of
Dawson Construction Plant Limited: .....

Name: David Brown

Position: Director

Date: ...../...../.....

1.0 INTRODUCTION

The D.C.P. Hydraulic Hammer has been designed and manufactured to meet the demands of today's contractor. The hammer has many advantages over traditional piling hammers, including other hydraulic hammers:

- Rapid blow rate. The hammer is double acting, not only giving high-energy output, but also increasing the speed of operation. This inevitably increases production and keeps the pile on the move. All Dawson hammers hit at 80 blows per minute at maximum energy rating and up to 130 blows per minute at minimum energy.

- Energy output is derived from a heavy ram impacting at a speed that will minimise pile head damage. This means that apparently lighter weight pile sections can be driven with the HPH6500 at lower energy settings without over stressing the pile. Other double acting hydraulic hammers produce their energy from high impact velocity – this is a prime cause of pile damage and definitely not the case with the HPH6500.

- Hydraulic hammers are inherently efficient, typically 80-90% of the potential driving energy being transferred into the pile.

- The hammer fits a huge range of bearing piles from H-pile, pipe and even concrete piles. Sheet piles can be accommodated with ease and the hammer can readily drive this vast range of pile types either leader mounted or free hanging. This adaptability is a feature common to all Dawson hydraulic hammers – hammers designed with the demands of a modern contractor in mind.

- The hammer does not have a single electrical component on it that controls its operation. This means no downtime due to electrics. All competent fitters can understand this hammer.

- Infinitely variable stroke controlled, between limits, at the touch of a button. This enables precise energy control which is very important when commencing piling or when coping with delicate operations. Single blow control comes as standard – no more soft starting problems!

- Robust construction. The hammer has been designed with full knowledge of what is required of piling equipment. A quick look at the hammer sitting on a pile will confirm this.

- The hammer offers excellent power to weight ratio's lending itself to being used on long reach jobs where there are few economic alternatives.

- Pile with the hammer underwater thus eliminating the use of follower piles and the problems they create including huge loss of energy transfer

- Noise levels are considerably lower than that of diesel or air hammers.

- Transmitted ground vibrations have been measured lower than that of a vibrator.

1.1 Basic Safety Points

- Ear protection should be worn when in close proximity of the hammer.
- Keep clear of the hammer and/or power pack when they are being lifted.
- Avoid standing directly below the hammer when it is piling.
- Adhere to maintenance requirements set out in this manual.
- Lift equipment using lifting points specified only (see figures over).

1.2 Transportation and laying down hammer

- BEFORE operating the hammer for the first time AND after each lay-down use inspection holes to ensure dolly is seated correctly in anvil before striking.
- WHEN LAYING DOWN HAMMER, support top of hammer at higher level than bottom of hammer.
- TRANSPORTATION, support top of hammer at higher level than bottom of hammer.
- TRANSPORTATION – install the Travel Bolt into the hammer casing prior to transportation. Failure to do so will create an unsafe transportation condition with the drop weight permitted to slide inside the hammer casing. This could allow the hammer to move during shipment.
- OFF-LOADING – prior to putting the hammer into service ensure the travel bolt is first removed.

START / STOP OPERATING PROCEDURE

DAWSON CONSTRUCTION PLANT LTD

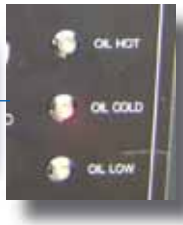
START PACK

ISOLATOR ON

HYDRAULIC OIL ON

KEY SWITCH ON

ALL OIL LAMPS ON FOR 2 SECONDS / BUZZER SOUNDS CONTINUOUS



NO RESPONSE

ENGINE MANAGEMENT BOOTS UP

CHECK ALL E/STOPS

PRESS STOP TO RESET PLC

CHECK SELECTOR SWITCHES ARE IN FOLLOWING POSITIONS

MANUAL IDLE PANEL WARM

PRESS START

ENGINE STARTS

BUZZER GOES OFF

BUZZER STAYS ON

OIL COLD LAMP STAYS ON

OIL TEMPERATURE REACHES 25°C

HYDRAULIC FILTER BLOCKED

OIL COLD LAMP TURNS OFF

LOOK AT SOLENOID CAPS TO DETERMINE WHICH FILTER REQUIRES REPLACING

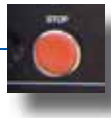
SELECTOR WARM - RUN SWITCH TO RUN

REPLACE FILTER AS SOON AS POSSIBLE

PACK NOW READY FOR OPERATION

STOP PACK

PRESS STOP



BUZZER SOUNDS INTERMITTENT

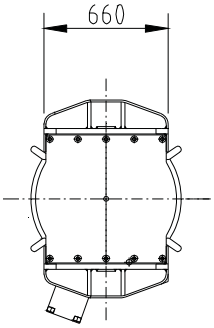
ENGINE STOPS AFTER 60 SECONDS

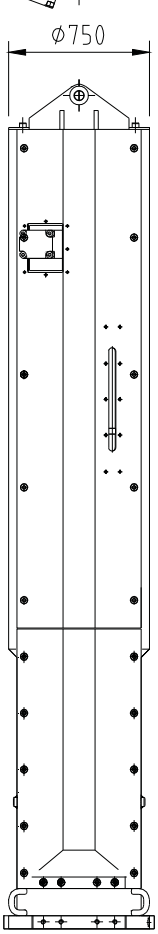
BUZZER SOUNDS CONTINUOUS

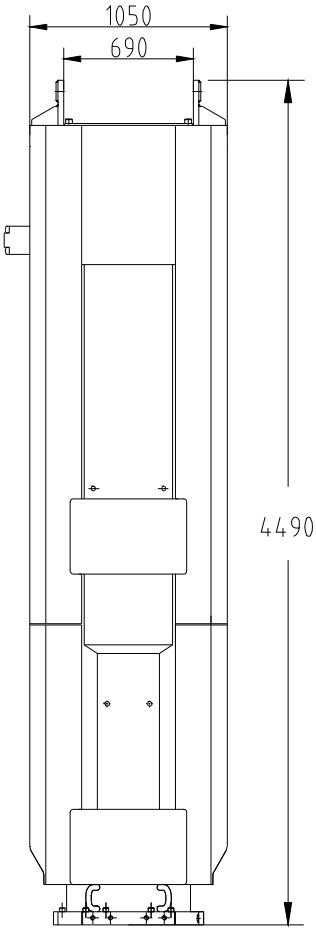
DELAY IS FOR CORRECT ENGINE SHUT DOWN.

ONLY USE E-STOP TO STOP ENGINE IN AN EMERGENCY!

Rf.no	Qnt.	Revision	Date	Intro.	Appr.by







BASIC CONFIGURATION

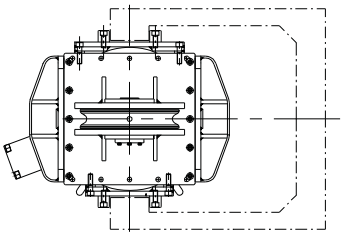
IN 'BASIC' CONFIGURATION THE HAMMER CANNOT BE USED TO DRIVE ANY PILE TYPES. APPROPRIATE ANVILS, SUSPENSION SYSTEM & PILE GUIDANCE SYSTEM MUST BE ADDED. SEE PROCEEDING DRAWINGS.

PERFORMANCE SUMMARY

MAX. ENERGY INTO PILE 6500 Kg.m
BLOW RATE AT MAX. STROKE 80 b.p.m.
BLOW RATE AT MIN. STROKE 120 b.p.m.
TOTAL WEIGHT 13,500 Kg (EXCLUDING HOSES)
WEIGHT OF RAM 4650 Kg
OPERATING HYDRAULIC PRESSURE 270 bar
HYDRAULIC FLOW RATE REQUIREMENT 270 l/min

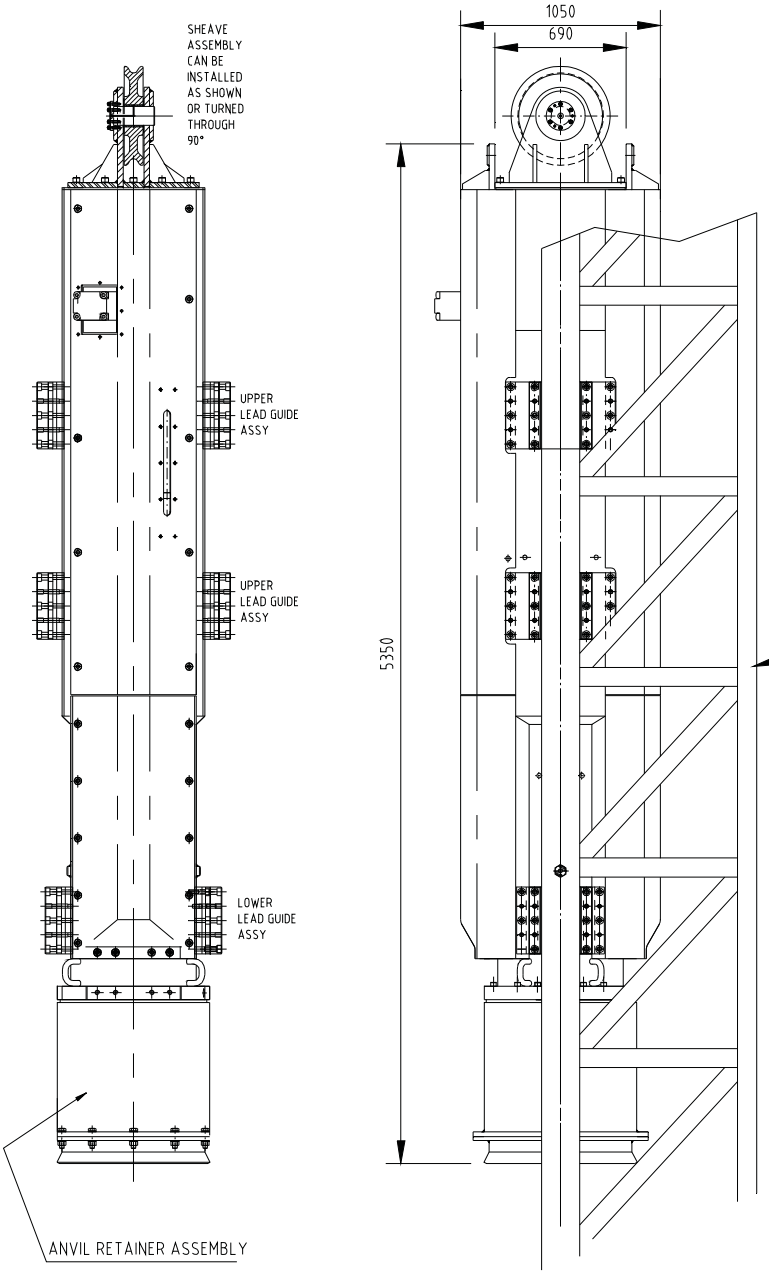
Ref.no.	Qnt.	Part name	Material	Dimension	Remark
Design by	Drawn at	Copied	Checked	Standard A4 / Affirmed	Scale 1 : 20
					Replace / Replaced by
DAWSON CONSTRUCTION PLANT LTD.		SPECIFICATION OF HPH6500 BASIC HAMMER CONFIGURATION			File name / Date 8/12/99
					Drawing no. 6500 SPEC.1

Rf.nr	Qnt.	Revision	Date	Intro.	Appr by



LEAD MOUNTED CONFIGURATION

WHILST THE HAMMER IS SHOWN IN 32" U-LEADS, IT CAN BE READILY FITTED TO MANY OTHER LEADER STYLES - DETAILS AVAILABLE ON REQUEST.



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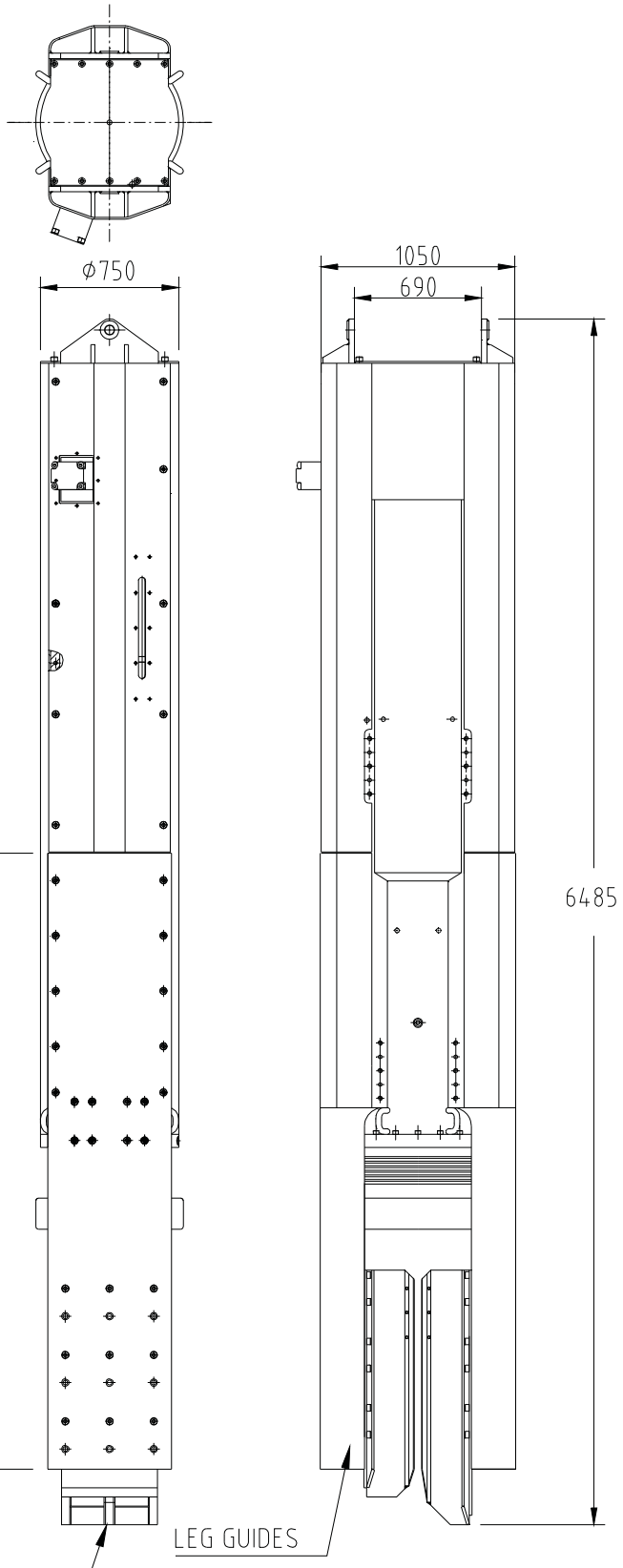
HYDRAULIC FLOW RATE REQUIREMENT 270 l/min

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
Design by	Drawn at	Copied	Checked	Standard A4 / Affirmed	Scale 1 : 20

DAWSON CONSTRUCTION PLANT LTD	SPECIFICATION OF HPH6500 LEAD MOUNTED CONFIGURATION	Replace / Replaced by File name / Date 8/12/99 Drawing no. 6500 SPEC.2

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by



FREE-HANGING WITH LEG GUIDES.

THE BASIC HAMMER CAN BE FITTED WITH LEG GUIDES THAT HAVE FLEXIBLE LEG INSERTS AS SHOWN. DIFFERENT LEG INSERTS CAN BE USED TO ADAPT TO DIFFERENT SHEET PILE TYPES.
THE HAMMER READILY FITS PAIRS OF MOST 'U' OR 'Z' SHEET PILES WITH DIFFERENT INSERTS.
INSERTS CAN ALSO BE SUPPLIED TO PERMIT THE HAMMER TO DRIVE H-PILES.

PERFORMANCE SUMMARY

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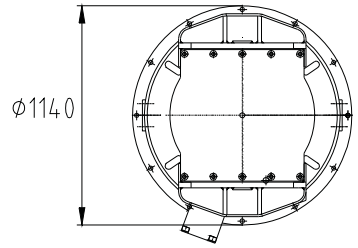
OPERATING HYDRAULIC PRESSURE 270 bar
HYDRAULIC FLOW RATE REQUIREMENT 270 l/min

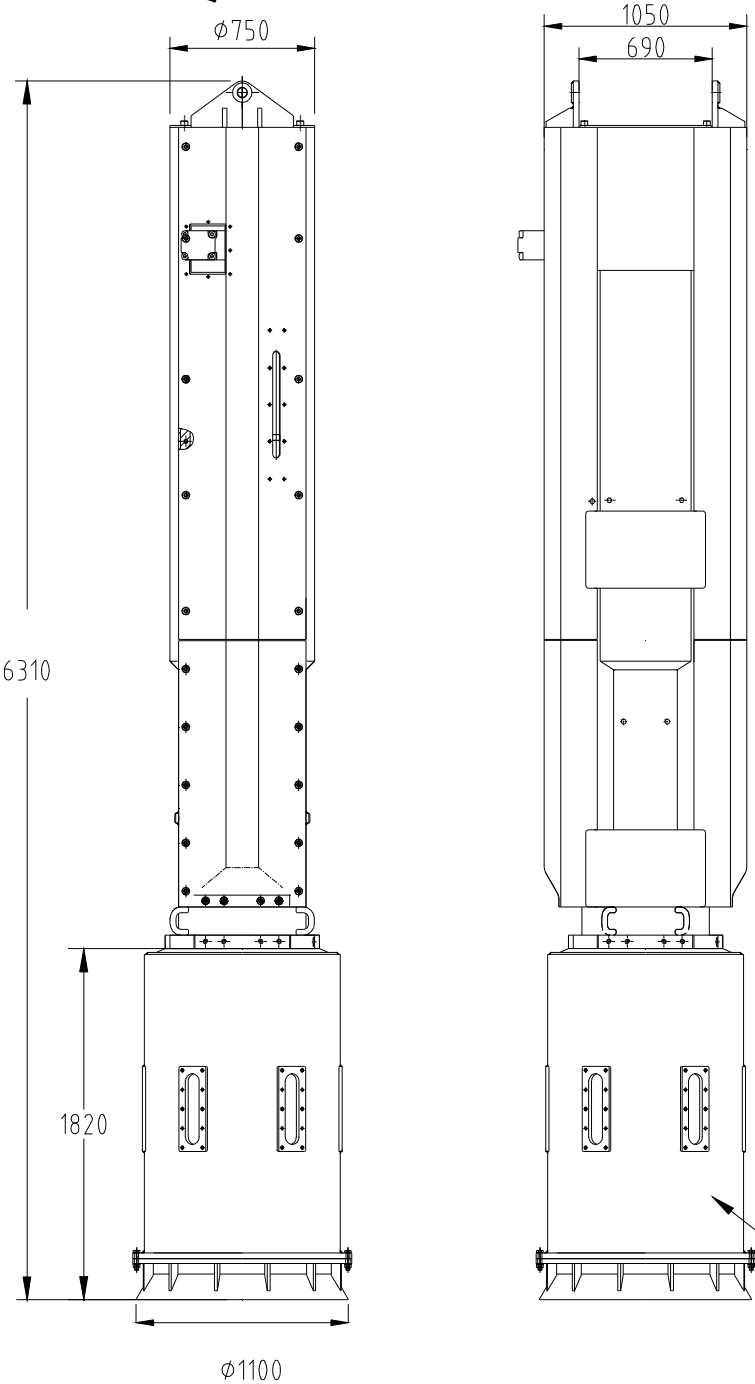
Ref.no.	Qnt.	Part name	Material	Dimension	Remark
Design by	Drawn at	Copied	Checked	Standard A4 / Affirmed	Scale 1 : 20
					Replace / Replaced by
DAWSON CONSTRUCTION PLANT LTD		SPECIFICATION OF HPH6500 FREE HANGING CONFIGURATION WITH LEG GUIDES.			File name / Date 8/12/99
					Drawing no. 6500 SPEC. 3

Rf.no	Qnt.	Revision	Date	Intro.	Appr.by



FREE HANGING WITH UNIVERSAL GUIDE SLEEVE.

THIS CONFIGURATION PERMITS THE HAMMER TO BE USED FREE-HANGING TO DRIVE NUMEROUS DIAMETERS OF PIPE PILE WITH APPROPRIATE ADAPTORS. THE SAME ARRANGEMENT, BUT WITH SPECIAL ADAPTORS CAN BE USED TO DRIVE 'H' PILES.



PERFORMANCE SUMMARY

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WEIGHT OF RAM 4650 Kg
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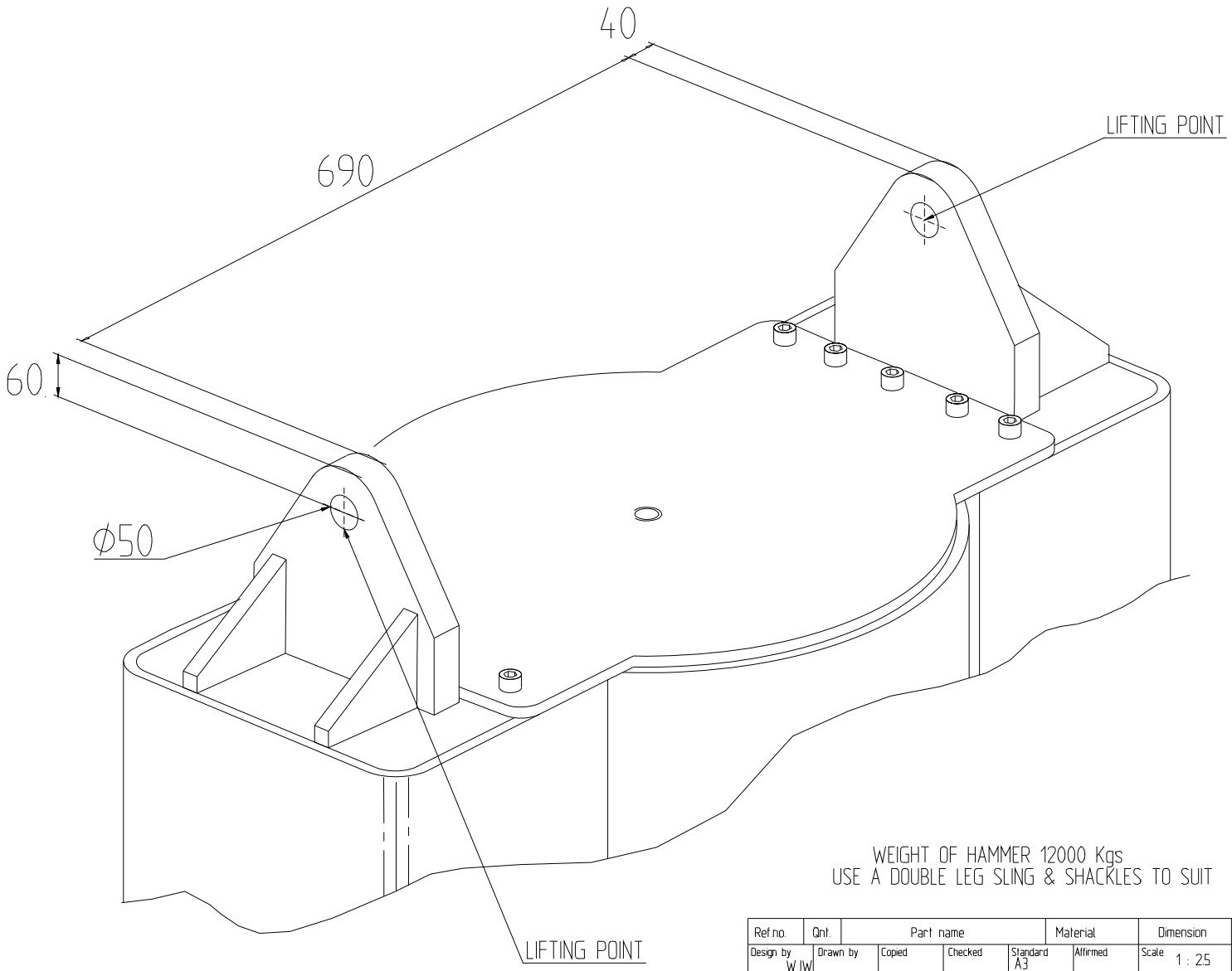
HYDRAULIC FLOW RATE REQUIREMENT 270 l/min

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
Design by	Drawn at	Copied	Checked	Standard A4 / Affirmed	Scale 1 : 20
DAWSON CONSTRUCTION PLANT LTD.		SPECIFICATION OF HPH6500 FREEHANGING CONFIGURATION WITH UNIVERSAL GUIDE SLEEVE			Replace / Replaced by / File name / Date 8/12/99 / Drawing no. 6500 SPEC. 4



WEIGHT OF HAMMER 12000 Kgs
USE A DOUBLE LEG SLING & SHACKLES TO SUIT

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by

Ref.no.	Qnt.	Part name	Material	Dimension	Remark

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A3		1 : 2.5		

DAWSON CONSTRUCTION PLANT LTD.

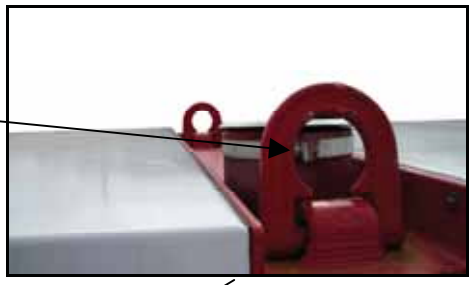
HPH6500 HAMMER
LIFTING POINTS

File

Date 20-03-95

Drawing no. lifthammer

2 off lifting points
Ø65 - 27mm Thk. plate



SPECIFICATION	UNITS	DHP170
DIESEL ENGINE POWER	kW	168
	rpm	2200
HYDRAULIC SYSTEM PRESSURE	bar	270
	psi	3915
OIL FLOW RATE	L/min	270
SIZE - LENGTHxWIDTHxHEIGHT	m	3.8 x 1.5 x 2
	ins	149 x 59 x 78
WEIGHT	kg	4800
	lbs	10,560

2.0 HOW DOES THE HAMMER WORK? (See fig. 1)

The D.C.P. Hydraulic Hammer consists of a 'drop weight' driven up and down by 'hydraulic cylinders' inside a 'casing.' The hydraulic cylinders are double acting; meaning the drop weight is accelerated both on the upstroke and on the down stroke. This gives the hammer its very efficient energy output and high blow rate.

The oil supplied to the hydraulic cylinders comes from the power pack via a 'control valve' mounted inside the top of the hammer. This control valve switches the oil supply on or off at the upstroke side of the hydraulic ram i.e. oil supply 'on' lifts the drop weight and oil supply 'off' drops it.

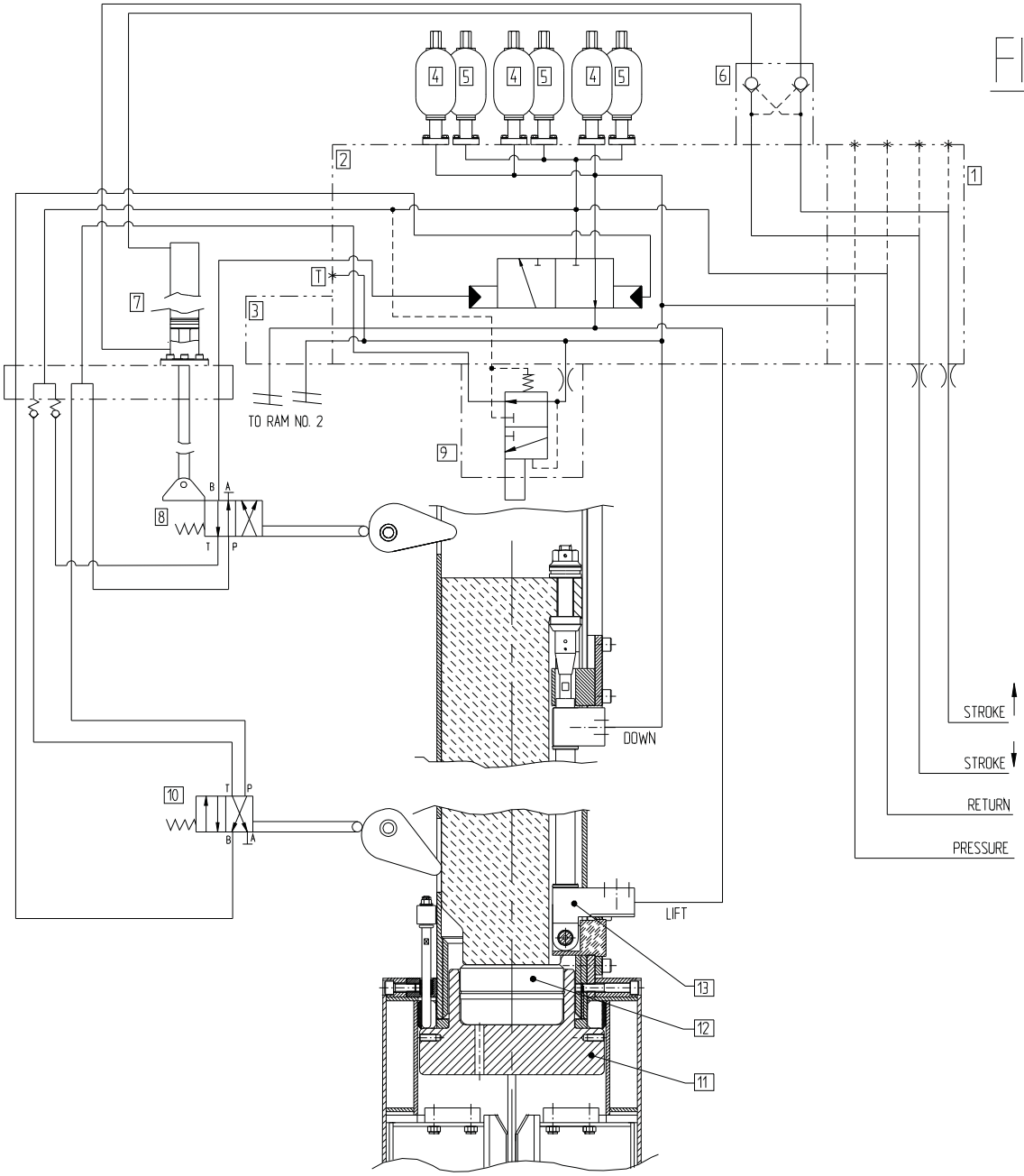
The control valve itself has to be switched from one position to another at precisely the right times for optimum performance. The control valve is switched by hydraulic pilot signals from two mechanically actuated sensors mounted on the hammer casing. The 'bottom sensor,' when actuated by the drop weight, switches the control valve to the on (lift) position and the 'top sensor' switches the control valve to the off (drop) position. The stroke of the drop weight is adjusted by moving the position of the top sensor e.g. moving the sensor down reduces the stroke or vice versa.

The position of the top sensor is altered by a small 'height adjusting ram' mounted inside the top of the hammer. This is adjusted as required by the operator who can view an indicator on the side of the hammer.

The hammer is fully controlled using a hand-held control pendant. This unit enables the hammer to be started/stopped, run on single/automatic blows and have its stroke varied. The controller may be used from a remote position.

Ref nr	Qnt.	Revision	Date	Intro.	Appr by

FIGURE 1



T OVERTRAVEL VALVE BYPASS TEST LINE

Ref no.	Qnt.	Part name	Material	Dimension	Part number
13	2	HYDRAULIC MAIN RAM			
12	1	DROP WEIGHT			
11	1	PRIMARY DRIVE ANVIL			
10	1	BOTTOM SENSOR			
9	1	OVERTRAVEL VALVE			
8	1	TOP SENSOR			
7	1	HEIGHT ADJUSTING RAM			
6	1	DUAL PILOT CHECK VALVE			
5	3	LOW PRESS' ACCUMULATOR			
4	3	HIGH PRESS' ACCUMULATOR			
3	1	OUTLET MANIFOLD			
2	1	CONTROL VALVE			
1	1	INLET MANIFOLD			

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A3				

DAWSON CONSTRUCTION PLANT LTD.

HYDRAULIC SCHEMATIC DIAGRAM OF HPH 6500 HYDRAULIC HAMMER

File name | Date 05/01/2000

Drawing no. 6500 hydcirlift

3.0 CONFIGURING THE HAMMER FOR PILE DRIVING

The hammer can be readily adapted to perform many different types of pile driving tasks. It may, for example, be necessary to use the hammer in leads to drive 1:1 raking piles or be necessary to drive pipe piles free hanging. Switching configurations is quite straight forward but will require additional items from Dawson to cover all eventualities.

3.1 The Basic Hammer Configuration

In its Basic Configuration the HPH6500 can not be used to drive any piles. The hammer is complete except for Primary Drive Anvil, Dolly, Suspension System and pile guidance system e.g. Sheet Pile Leg Guides and Inserts or Pipe Pile Guide etc.

The basic hammer configuration is shown on drawing number 6-000-00-01 in section 8.1 at the back of this manual.

To use the basic hammer the user must first decide what piles have to be driven and identify what the most appropriate method of pile driving will be. The following sections discuss the various configurations available.

3.2 Free Hanging Configuration – Universal Guide Sleeve

Dawson offers a Universal Guide system for use with the HPH6500 that is bolted to the bottom of the Basic Hammer Configuration. This system uses one large guide sleeve that can be altered for different diameter pipe piles up to a maximum ∅36" (914mm) - see drawing 6-300-00-02 under section 8.1 at the end of this manual. It can also be readily adapted to drive H-pile and other pile types.

The system incorporates one secondary anvil that covers all pipe sizes up to ∅36"(914mm). Different diameters are accommodated by using either six guide blocks and a dedicated bottom guide ring or by installing an adaptor insert that fixes in place of the bottom guide sleeve. The latter is held at its upper end by the ∅36"(914) guide block set.

Simply determine which pipe size is going to be driven and install either the relevant guide block sets or the adaptor sleeve as shown on drawing 6-300-00-02.

Alternatively, larger sleeves can be made to order to suit specific applications.

3.3 Free Hanging Configuration – with Leg Guides for Steel Sheet or H-Piling.

The HPH6500 will fit a whole range of heavier steel sheet piles typically in pairs. From the very heavy walled British Steel Larssen 6 to the very wide, highly efficient Arbed AZ48, the 6500 is an excellent match. Typically the hammer will not be run on maximum energy simply because it would be too powerful. This is however one of its strengths, running the hammer at lower energy levels derives even more benefit from the rapid blow rate – typically 100 to 120 blows per minute on sheet piling; real production!

The HPH6500 also offers excellent ram to pile weight ratios, ensuring the sheet pile receives much of the impact energy from ram mass and not from more damaging high impact velocity, as is the case with many other hydraulic impact hammers.

The Basic Hammer configuration requires its Lower Side Covers to be removed and in place much longer (and stronger) Sheet Pile Leg Guides must be fitted. Leg Inserts are then fitted inside the Leg Guides, mounted within elastomers or rubber sandwich mounts, so that the hammer takes a bite or grip on the steel sheet piles. This is all-important because it keeps the hammer in-line with the sheets, preventing pile damage, and it keeps the hammer and pile moving down together during driving. The Sheet Pile Configuration is shown on drawing 6-600-00-02 under section 8.1 at the back of this manual.

A Primary Drive Anvil has to be fitted, together with Dolly and Suspension System, and Spreader Plates are used to cover the pile tops as much as possible. The Spreader Plate required to cover a pair of Larssen 6's will of course be quite different from one used to cover a pair of Arbed AZ48's. There is a huge advantage in using the Spreader Plate concept, one proven by Dawson over many years.

Finally, which Leg Inserts used will depend on the pile types being driven. Essentially, there are different inserts for Z-piles and for U-piles. It is also possible to use other inserts to drive H-piles and certain sizes of pipe pile using the Sheet Pile Leg Guides if necessary.

3.4 Lead Mounted Configurations

The HPH6500 lends itself to running on many styles of lead. Minimum American U-lead size is 32" as pictured here. Leads requiring the hammer to be mounted on the front of the lead can be easily accommodated also.

The benefit of this method is that the hammer can be used to drive raking piles, even to a rake of 1:1, with minimal loss of energy output due to its double acting nature; loss of gravitational effect is minimised. Diesel hammers, or free fall hammers generally suffer from tremendous energy loss when driving raking piles.

Further benefit can be gained from running the hammer from the hydraulic circuit of the base carrier if suitable, eliminating the need for an additional power pack.

In this configuration all that is added to the Basic Hammer is the Primary Drive Anvil, Dolly and some form of Mast Guides. In the case of the leads pictured here, four guide brackets were bolted to the hammer casing using the standard mast guide fixing holes in the hammer.

For general layout information see drawing 6-400-00-02 in section 8.1 at the back of this manual.

It should be noted that Dawson has considered the design of this configuration very carefully and felt it unnecessary to design a whole new range of special drive caps when many contractors have a range of existing drive caps available to them already; why spend more money? Typically, the drive cap will be SWR suspended off the bottom of the HPH6500 as shown here. Of course Dawson would be happy to manufacture drive caps for any specific requirements a contractor may have.

3.5 Using the hammer underwater

It is possible to drive piles with this hammer underwater whatever the hammer configuration. However, the hammer must be prepared correctly in order to do so - it can not be used underwater in standard format.

The work involved is briefly as follows: -

a) The stroke adjuster 'slot' in the leg guide must be sealed with a cover.
b) The insides of the hammer should be suitably greased to minimise the effects of corrosion.
c) The gaps between hammer casing; side covers/leg guides and top cover must be sealed with a special rubber seal.
d) The inspection holes near the bottom of the hammer casing must be plugged.
e) A threaded compressed airline fitting must be fitted to the port near the bottom of the hammer.
f) The hammer must be run in conjunction with a 35/70 c.f.m. (100 psi) air compressor.
g) The hammer grease nipples must be greased after every pile drive to ensure ample lubrication.

NOTE: FOR DETAILED ASSISTANCE WITH THIS TYPE OF WORK PLEASE CONTACT THE MANUFACTURER.

PLEASE CONTACT THE MANUFACTURER IF YOU HAVE A SPECIFIC PILE DRIVING PROBLEM – WE ARE MOST LIKELY TO HAVE DONE IT BEFORE!

4.0 POWER PACK AND HAMMER OPERATION

4.1 Connecting the hydraulic hoses and control pendant

(The power pack must be turned off at this time to enable correct installation of the hoses)

There are four hydraulic hoses running between the power pack and the hammer, viz:

1. Pressure line (1¼" BSP) carries the main high-pressure oil supply to the hammer.

2. Return line (1½" BSP) returns low-pressure oil from the hammer to the power pack.

3.} Height adjusting lines (3/8" BSP) used to deliver
4.} Oil to the height adjusting ram, as required.

The pressure/return hoses have the same specification. However, the return hose ends have larger fittings than the pressure hose to avoid possible confusion. The hoses should be left connected to the hammer at all times - this reduces the likelihood of oil contamination and reduces leakage problems. The hoses should be connected/ disconnected at the outlets of the power pack. All these connectors are of the 'quick-release' type. The hoses should be disconnected from the power pack when moving the power pack around to avoid straining the connectors.

Make sure that the connectors are thoroughly cleaned when making a connection

Having connected the hoses next fit the hand control pendant connector block to the multi-pin outlet from the power pack. This is positioned adjacent to the instrumentation panel of the unit. Check that a clean connection is made and that no water is present in either half of the connection. The 'power' switch on the controller should be turned off.

4.2 Checking the power pack before starting

Having connected the hydraulic hoses and hand control pendant, as described in section 3.1, next check fluid levels on the power pack. Check:

a. engine oil level
b. diesel fuel level
c. hydraulic oil level, and fill if required

Notes:-

1. The diesel fuel is stored in the base of the pack frame and has an indicator gauge just inside the main door adjacent to the instrument panel. The hydraulic oil tank has a sight gauges on its side.

2. The power pack will not run if the hydraulic oil level is too low.

3. The hammer will not run if the hydraulic oil temperature is too low. The auto warm-up routine must be used to pre-warm the oil. See section 4.3.1.

4.3 Starting the power pack (see fig. 2)

Prior to starting the power pack, check that the hand control pendant is turned 'off.' Set the throttle control lever to half of full throttle (22). Turn 'on' the battery isolator (1). Push the engine start push button (4) until the engine starts.

Allow the engine to reach working temperature by running it at 1500 rpm under zero load for 10-15 minutes. Check all gauges and diagnostic lights for correct function of unit (diagnostic lights should be off.)

Notes: -

1. If any of the following L.E.D.'s (8, 9, 10 & 11) are 'on' when the isolator switch (1) is turned 'on,' the power pack will not start. Rectify problem immediately.

2. If L.E.D. (7) is on, the power pack will start but the pendant will be 'dead' until the hydraulic oil warm-up procedure is carried out.

4.3.1 Hydraulic Oil Warm-up Procedure

If the hydraulic oil temperature is less than +25ºC, L.E.D. (7) will be on and the oil will require warming prior to using the hammer.

The hand control pendant will be 'dead' for as long as L.E.D. (7) is on.

To warm the oil: -

a) Run the engine at 1800 rpm

b) Turn the 'warm-up/run' selector switch (6) to 'warm-up'. (The engine should go under load and the high pressure gauge (20) should read approx. 200 bar).

c) Leave the pack in this condition until the L.E.D. (7) goes off. (The engine should come off load at the same time the L.E.D. goes out and gauge (20) return to zero bar).

d) Turn the 'warm-up/run' selector switch (6) to 'run'. The power pack is now ready for use.

4.4 Using the hammer

Before using the hammer for the first time ensure the Travel Bolts are removed from the casing.

4.4.1 Installing hammer on the pile

The hammer must be sat correctly on the pile to avoid hammer or pile damage. The pile tops should be as level and square cut as possible. The hammer anvil must be in good condition.

Lift the hammer onto the pile(s) to be driven. Lower the hammer down until the handling slings lose their tension. At this point, the anvil should be seated correctly i.e. the rubber rings around the anvil should be compressed between the casing and the anvil. If it is not and there is a gap here, re-site the hammer.

Note: Before using the hammer (and particularly after transportation) check that the dolly is fitted correctly in the anvil. There are inspection holes at the bottom of the hammer casing to check this.

4.4.2. Bleeding air from the hammer hydraulic system - only required when running hammer after initial connection or following a repair

When running the hammer for the first time after initial connection to the power pack, there will be air in the hydraulic system. The hammer will 'bleed' this air automatically but the following procedure must be applied: -

a. Run the power pack at 2100 rpm

b. Turn on the control pendant 'power' button.

c. Adjust the stroke height indicator to minimum using the '↓' push button.

d. Set the 'Auto/Man' turn button to 'Man.'

e. Hold the 'start' push button down for 2-3 seconds.

f. Repeat (e) three or four times until the hammer consistently gives one or two small blows each time. Providing the hammer does not 'jump' on the pile, hold the 'start' push button down, so that the hammer gives several consistent blows, on the next operation. (Approximately 120 blows per minute.) If the hammer 'jumps' on the pile, because the drop weight is hitting the top of the hammer casing, the hammer will stop automatically. To reset see section 4.4.4.

g. Commence the piling operation using the hammer as required.

4.4.3 Pile driving with the hammer

Having the hammer sited on the pile and removed air from the hydraulic system (if necessary) as described above, the hammer is ready for pile driving: -

a. Increase the power pack engine speed to 2200 rpm (having followed - "Starting the power pack" section 4.3)

b. Turn the hand control pendant 'power' button on.

c. Adjust the 'stroke height indicator' on the side of the hammer to minimum stroke by pressing the '↓' push button.

d. Set the 'Auto/Man' selector button to the required position:

   'Auto' - hammer will continue running automatically when the 'start' push button is pressed once.

   'Man' - hammer will only run whilst the 'start' push button is held down.

e. Depress the 'start' push button as required by 'Auto/Man.'

f. During operation the hammer stroke may be altered using the '↑' or '↓' push buttons to adjust the stroke height indicator.

g. To stop the hammer whilst it is running on 'Auto,' turn the 'Auto/Man' selector to 'Man' or turn the 'power' selector off.

It is good practice to start piling with the hammer set on minimum stroke; this limits unnecessary damage to both the hammer and the pile when the pile can be driven easily. The stroke may then be adjusted to suit the changing driving resistance.

4.4.4 Cold running/over-travel

The hammer 'jumps' on the pile top when trying to achieve full stroke if the hydraulic system is 'cold.' If this happens, the hammer will **stop automatically.** (Thus preventing internal damage to the unit.) The power pack will continue to run and the 'pressure' gauge will read approximately 240 bar.

In order to reset the hammer, turn off the 'power' selector on the hand control pendant and stop the power pack. Allow the engine to stop for approximately 10 seconds then restart the unit. Reduce the stroke of the hammer to minimum. Run the hammer at this lower setting until the oil is warm enough to allow correct full stroke setting. If reducing the stroke does not cure the problem, warm the hydraulic oil as described in section 4.3.1.

If the hammer should over-travel again, refer to the Troubleshooting section 7.0.

THE HAMMER WILL NOT RUN IF IT IS NOT ALLOWED TO RESET CORRECTLY

4.4.5 Refusal

PILING MUST STOP WITH THIS HAMMER WHEN THE RATE OF DRIVING REACHES 10 BLOWS PER 25MM.

Continued use will result in hammer and/or pile damage.

4.4.6 Alternative to Pendant Control

It is possible to control the hammer directly from the Power Pack instrumentation panel instead of using the control pendant. To do this, simply switch the button on the instrumentation panel marked “Panel/Pendant” (switch 14 on figure 2) to Panel. All the pendant controls are replicated on the instrumentation panel and the hammer can be controlled in exactly the same way as described in the above sections – SEE FIGURE 2 BUTTONS 12, 13, 15 & 16.

This may be useful in cases where the pendent or cable has become damaged for some reason.

Power Pack Instrumentation Panel for HPH6500

5.0 HAMMER MAINTENANCE (SEE APPENDIX 8.1)

5.1 Daily maintenance checks (or every 10 hours)

a. Apply Lithium based general-purpose grease to hammer through each one of fourteen points (part 1-057-00-01). Ten operations of a grease gun on each grease point every shift will be adequate.

b. Check all external fasteners for tightness and re-tighten where necessary.

c. Check that the dolly (part 6-006-20-01) has not been damaged or worn beyond its serviceable limit, i.e. the top face of the dolly should not fall below the top of the anvil rim by more than 30mm. If the dolly is replaced, ensure that the O' ring is replaced with it (part 6-089-00-01).

   To replace the dolly insert a steel bar through one of the holes in the bottom of the primary drive anvil and drive the old dolly out using a hammer. Insert a new dolly (complete with O' ring) ensuring that it is pushed fully home.

d. Check the six rubber/steel suspension ring 4 and the inner suspension ring 3 for wear/damage and replace if necessary. These must be in good condition at all times. These items act as the hammers 'suspension system' reducing the shock transmitted from the blow to the hammer and its components - **very important** for keeping the hammer functioning correctly.

e. Check the condition of lifting tackle and lifting points prior to being taken into service. Pay particular attention to the condition of the lifting lugs and holes for wear or cracking.

5.2 Planned 125 hour maintenance checks (run the hammer for 15 minutes before and after this maintenance work)

Every 125 hours the following work should be carried out in addition to that described in 5.1 above: -

a. Remove each hammer side cover in turn and check the condition and tightness of: all hydraulic hoses and fittings; bolts; locking rings, and visually check all components for condition.

b. Check the condition of each sensor assembly paying particular attention to cam wear, roller operated valve travel and tightness of fixing bolts. Each roller valve should have a travel of 4mm through full actuation of its associated cam. This measurement is critical and if it is not achieved the hammer will not run correctly (as with the ignition timing on a motor car). Travel can be lost through excessive cam wear or with wear on the roller or roller pin at the end of the valve.

c. Check the condition of the relevant pile guidance system e.g. sheet pile leg guides or pipe pile guide, in order to ensure correct fitting on pile sections and tightness of all fasteners.

FIGURE 4 Hammer Dolly photographs

5.3 Planned 250 hour maintenance checks (run the hammer for 15 minutes before and after this maintenance work)

Every 250 hours the following work should be carried out in addition to the work described in 5.1 and 5.2 above:

a. Check the accumulator (part 1-048-00-05) pre-charge pressures using the gas pressure checking kit and a bottle of nitrogen gas.

The pre-charge pressures are: -

High pressure -100 bar (three accumulators)
Low pressure - 3 bar (three accumulators)

To gain access to the accumulators it is necessary to remove the top cover (part 6-017-00-01). The three high-pressure accumulators are on the left hand side viewed from the inlet manifold. To check the pre-charge pressures see appendix 8.2 in this manual.

b. Check the function and condition of the bottom trip device.

c. Check the function of the hammer's over-travel valve by intentionally over-stroking the hammer when cold.

5.4 Planned 375 hour maintenance (run the hammer for 15 minutes before and after this maintenance work).

Every 375 hours the following work should be carried out in addition to the work described in 5.1 and 5.2 above:

Before the flexible coupling is changed, the ram guide buffer (16) and damping pin bush (18) should be checked and replaced if showing signs of degradation.

The flexible couplings between the main hydraulic cylinders and the drop weight **must** be changed. The procedure is quite straightforward (see Figure 3). Failure to do this will result in an expensive repair. There are two hydraulic cylinders inside the hammer and it will be necessary to turn the hammer over during the course of this work.

Please look at Figure 3 and the hammer parts lists in section 8.1 whilst reading the instructions below.

a. Lay the hammer on its side on stable level ground with the hose inlet manifold uppermost, packed on timbers. Remove the Top & Bottom Side Covers; it is NOT necessary to remove the hose inlet manifold. This will expose one flexible coupling assembly through the hammer casing.

b. Remove items (3) & (4) from the top of the end cap, undoing the cap screws in a sequence so as to keep the cap square to the ram connector during removal.

c. Remove the top stack of Disc Springs (15).

d. Retract the piston rod of the Hydraulic Cylinder from the Drop Weight by hand and remove the other Disc Spring stack (15).

e. Dispose of the old Disc Springs (15) 48No. – they are now at the end of their useful service life and their re-use will be false economy.

f. Inspect items (10), (11) and (12) for signs of excessive wear or cracking. Check the distance across the two hardened bushes as shown in Figure 3 and ensure they are within acceptable wear limits. If this distance is below acceptable limit, even with new washers (11) and (12) fitted, it will be necessary to order and fit oversized washer from the manufacturer – contact Dawson or your nearest distributor for further details. *Note: standard washers (11) and (12) are 6 and 7mm thick respectively, oversize items start at 9mm thick.*

g. Re-assemble the connection as in Figure 3 ensuring the new Disc Springs (6) are installed in pairs using adequate EP Moly grease. Coat the Ram Connector (13) and underside of the End Cap (9) with EP Moly grease on all contact faces. Check that the threads in the end of the Ram Connector are free of grease before installing the End Cap (9), and that no grease gets into these threads before fitting the Cap Screws (3) with Loctite 270 Studlock; *Remember the Nordloc Washers (4).*

h. Tighten Cap Screws (3) until they are hand-tight, approximately 45 Nm (33ft.lbs) – just taking up the slack. Check the distance 'A' as shown on Figure 3 before, during and after tightening fully; *dimension 'A' should change by 6mm +/- 1mm during assembly!* Tighten the Cap Screws (3) to a torque of 320Nm.

   Tip: Tighten all three screws fully with dry threads first. Then remove one at a time in order to apply the Loctite fluid. This produces less Loctite waste and ensures a more reliable installation process without Loctite getting between the Ram Connector end and the underside of the End Cap.

i. Once completed, re-assemble the Upper & Lower Side Covers on the hammer - the unit is now ready for turning over.

j. Turn the hammer over on to its opposite side, taking care not to rest the hammer on the Inlet Manifold. Remove the other set of Upper & Lower Side Covers. Repeat steps b) to i) as detailed above.

5.5 Planned 500 hour maintenance checks (run the hammer for 30 minutes before and after this maintenance work)

Besides the work mentioned in 5.1, 5.2 and 5.3 above the following work should be carried out: -

a. Condition and function of the Height Adjusting Ram.

b. Tightness of the Accumulator assemblies.

c. Condition of the main feed hoses between the hammer and power pack. Hoses with excessive amount of "braiding" exposed or damaged should be replaced.

d. Energy Monitoring System (EMS) service (if fitted). See EMS section in appendices for details.

5.6 Planned 1000 hour maintenance checks (run the hammer for 30 minutes before and after this maintenance work

Check the following: -

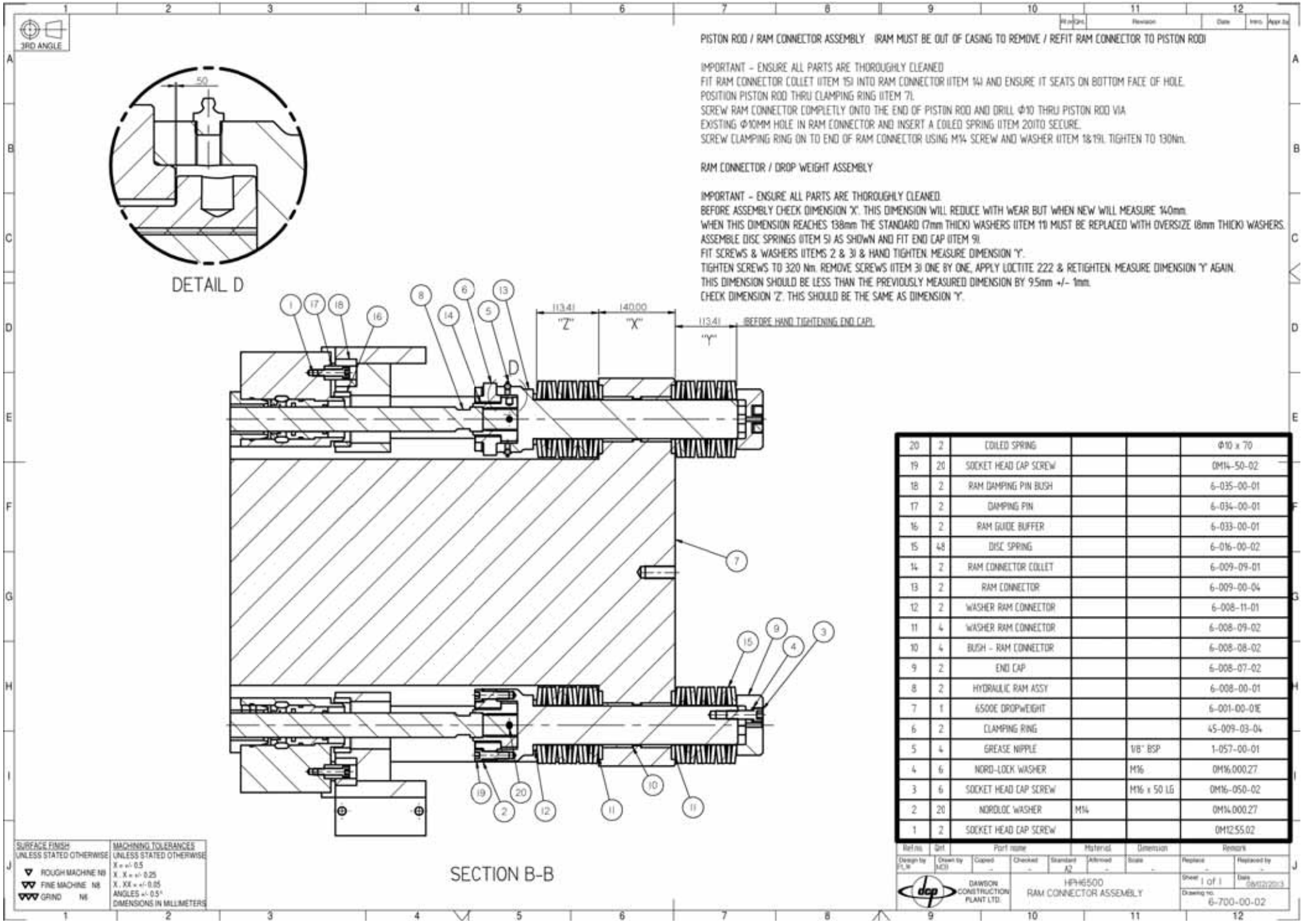
a. Play in the main ram anchorage assemblies.

b. Condition of the Primary and Secondary Anvils.

c. Play between the Drop Weight and Casing bore.

Note: It is strongly recommended that in order to achieve thorough and correct maintenance of this equipment that customer's service personnel should be fully trained by the manufacturer.

FIGURE 3



Ref.no	Qnt	Part name	Material	Dimension	Remark
20	2	COILED SPRING			Φ10 x 70
19	20	SOCKET HEAD CAP SCREW			0M14-50-02
18	2	RAM DAMPING PIN BUSH			6-035-00-01
17	2	DAMPING PIN			6-034-00-01
16	2	RAM GUIDE BUFFER			6-033-00-01
15	48	DISC SPRING			6-016-00-02
14	2	RAM CONNECTOR COLLET			6-009-09-01
13	2	RAM CONNECTOR			6-009-00-04
12	2	WASHER RAM CONNECTOR			6-008-11-01
11	4	WASHER RAM CONNECTOR			6-008-09-02
10	4	BUSH - RAM CONNECTOR			6-008-08-02
9	2	END CAP			6-008-07-02
8	2	HYDRAULIC RAM ASSY			6-008-00-01
7	1	6500E DROPWEIGHT			6-001-00-01E
6	2	CLAMPING RING			45-009-03-04
5	4	GREASE NIPPLE		1/8" BSP	1-057-00-01
4	6	NORD-LOCK WASHER		M16	0M16.000.27
3	6	SOCKET HEAD CAP SCREW		M16 x 50 LG	0M16-050-02
2	20	NORDLOC WASHER	M14		0M14.000.27
1	2	SOCKET HEAD CAP SCREW			0M12.55.02

5.7 PREVENTATIVE MAINTENANCE GUIDELINES FOR HPH6500 HYDRAULIC HAMMER AND DIESEL ENGINED POWER PACKS

	DAILY OR REFUELLING	EVERY 125 HOURS	EVERY 250 HOURS	EVERY 375 HOURS	EVERY 500 HOURS	EVERY 1000 HOURS	EVERY 2000 HOURS
ENGINE	CHECK: • OIL LEVEL • COOLANT LEVEL • FAN - INSPECTION • DRIVE BELT - INSPECT • FUEL WATER TRAP - DRAIN		CHANGE: • LUBE OIL • LUBE FILTER CHECK: • AIR CLEANER • INTAKE SYSTEM • CHARGE AIR COOLER		CHANGE: • FUEL FILTER CHECK: • ANTI FREEZE	ADJUST: • VALVE LASH CLEARANCE CHECK: • FAN HUB • BELT TENSIONER BEARING • BELT TENSION	CHANGE: • ANTI FREEZE CHECK: • DAMPER
POWER PACK	CHECK: • HYDRAULIC OIL LEVEL • AIR INLET/OUTLETS FREE FROM OBSTRUCTION • CONDITION OF LIFTING POINTS & SLINGS/SHACKLES • TEST DIAGNOSTIC LEDS • INSPECT GAUGES • CONDITION OF QUICK RELEASE COUPLINGS	CHECK: • FOR HYDRAULIC OIL LEAKS & RECTIFY • CONDITION OF HOSES • TIGHTNESS OF FASTENERS • CONDITION OF PAINTWORK • BATTERY WATER LEVEL • FUNCTION OF PENDANT & CONDITION OF CABLE	CHECK: • BATTERY CHARGING CHANGE: • HYDRAULIC OIL/FUEL FILLER FILTERS		CHECK: • PRESSURE OUTPUT OF PUMP • FLOW OUTPUT OF PUMP CHANGE: • PRESSURE/RETURN HYDRAULIC FILTERS	CHECK: • CONDITION OF WIRING • DRIVE COUPLING FOR WEAR • CONDITION OF EXHAUST CHANGE: • HYDRAULIC OIL AND CLEAN OUT SYSTEM	
HAMMER	CHECK • ALL EXTERNAL FASTENERS FOR TIGHTNESS • DOLLY CONDITION • SUSPENSION RINGS • LIFTING POINT CONDITION • SERVICEABILITY OF SLINGS/SHACKLES **MUST:** • GREASE HAMMER FREQUENTLY	CHECK: • TIGHTNESS OF ALL HOSES, FITTINGS AND FASTENERS INSIDE HAMMER • CONDITION OF BOTH SENSORS • WEAR ON PILING GUIDANCE SYSTEM	CHECK: • ACCUMULATOR NITROGEN PRECHARGE PRESSURES • FUNCTION OF OVERTRAVEL VALVE • FUNCTION/CONDITION OF PROBE ASSEMBLY AND BOTTOM TRIP DEVICE	CHECK: • CONDITION OF RAM GUIDE BUFFER AND DAMPING PIN BUSH CHANGE: • DISC SPRINGS BETWEEN DROP WEIGHT AND HYDRAULIC CYLINDERS	CHECK: • CONDITION OF HEIGHT ADJUSTING RAM • TIGHTNESS OF ACCUMULATORS • CONDITION OF MAIN FEED HOSES TO HAMMER • EMS SENSORS AND CABLES. CHANGE: • EMS BATTERIES (IF FITTED)	CHECK: • PLAY IN MAIN RAM ANCHORAGE ASSEMBLY • CONDITION OF ANVILS • PLAY BETWEEN DROP WEIGHT AND CASING BORE	
	-	TEST RUN ON PILE 15 MINUTES BEFORE AND AFTER CHECKING	TEST RUN ON PILE 15 MINUTES BEFORE AND AFTER CHECKING	TEST RUN ON PILE 15 MINUTES BEFORE AND AFTER CHECKING	TEST RUN ON PILE 30 INUTES BEFORE AND AFTER CHECKING	TEST RUN ON PILE 30 MINUTES BEFORE AND AFTER CHECKING	TEST RUN ON PILE 30 MINUTES BEFORE AND AFTER CHECKING

(FOR FULL DETAILS SEE SECTIONS 5 AND 6 IN THE HAMMER MANUAL AND THE CUMMINS SERVICE MANUAL)

6.0 POWER PACK MAINTENANCE

6.1 Power pack specification

6.1.1 Basic specification

Engine power output	-	168kW @ 2200 rpm
Engine maximum rpm	-	2200
Hydraulic flow output	-	270 l/min
Max hydraulic pressure output	-	270 Bar
Dimensions (l x w x h)	-	3800 x 1500 x 2000mm
Weight	-	4800 kg / 10,560lbs

6.1.2 Lubrication specification

Hydraulic oil type	-	Fina Hydran LZ 32 or equivalent
Hydraulic oil capacity	-	700 litres
Diesel engine oil type	-	15 W 40
Diesel engine oil capacity	-	14.2 litres (incl. filter)
Diesel fuel type	-	DIN 51601-DK
Diesel fuel capacity	-	350 litres

6.2 Daily maintenance checks (for full details of diesel engine maintenance see Cummins service manual)

a. Check hydraulic oil level - must be visible in sight glass, but not over half way in sight.

b. Check diesel lubrication oil level.

c. Ensure pump isolator valve is fully open.

d. Ensure air inlet/outlet panels are free from obstruction.

e. Drain water from diesel water trap.

f. Inspect lifting tackle and lifting points before being put into service.

g. Check function of diagnostic L.E.D.'s by pressing test button.

h. Check function of gauges.

i. Check condition of quick release couplings.

j. Check engine coolant level.

k. Check condition of fan and drive belt.

6.3 Planned maintenance checks

For full details of diesel engine maintenance see Cummins service manual and for power pack maintenance procedures see section 6.4.

6.3.1 Every 125 hours

Check the following: -

a. Hoses, pipe work and fittings for any hydraulic oil leaks and rectify as required.

b. Tightness of all fasteners.

c. Condition of body panels and paint work. Touch-up where necessary.

d. Battery water level.

e. Condition and function of hand control pendant.

6.3.2 Every 250 hours

Check the following: -

a. Engine air cleaner.

b. Engine intake system

c. Engine charge air cooler.

d. Battery charging rate.

Change the following: -

e. Engine oil.

f. Engine oil filter.

g. Hydraulic oil filling filter.

h. Diesel fuel filling filter.

6.3.3 Every 500 hours

Check the following: -

a. Anti freeze in engine coolant.

b. Pump output flow rate and working pressure.

Change the following: -

c. Fuel filter.

d. Hydraulic oil pressure and return filters.

6.3.4 Every 1000 hours

Check the following: -

a. Engine fan hub.

b. Engine belt tensioner bearing.

c. Engine belt tension.

d. Adjust valve lash clearance on engine.

e. Condition of all wiring and tightness of electrical connectors.

f. Wear on hydraulic pump flexible coupling.

g. Condition of exhaust.

Change the following: -

i. System hydraulic fluid.

6.4 Maintenance procedures

NOTE: Before any of the following procedures are undertaken, the battery isolator switch must be switched off.

a. Changing fuel/hydraulic oil inlet filler elements.

(i) Replacement element
(ii) Remove filter bowl
(iii) Remove and discard filter element (do not clean)
(iv) Wash bowl thoroughly
(v) Fit replacement element into bowl
(vi) Re-assemble filter
(vii) Prime hand pump

b. Changing hydraulic pressure filter element.

(i) Replacement element
(ii) Remove filter bowl
(iii) Remove and discard filter element (do not clean)
(iv) Wash bowl thoroughly
(v) Fit replacement element onto spigot
(vi) Fill filter bowl with clean hydraulic oil
(vii) Replace bowl O' ring if necessary
(viii) Re-assemble filter

c. Change hydraulic return filter element.

(i) Replacement element
(ii) Remove filter bowl
(iii) Remove and discard filter element (do not clean)
(iv) Wash bowl thoroughly
(v) Fit replacement element onto spigot
(vi) Fill filter bowl with clean hydraulic oil
(vii) Replace bowl O' ring if necessary
(viii) Re-assemble filter

d. Pump removal/re-fitting.

(i) **IMPORTANT NOTE** - the hydraulic pump should be returned to the manufacturer for repair/overhaul. This item **must not** be stripped or tampered with.

(ii) Isolate pump from hydraulic oil reservoir using pump isolator valve
(iii) Remove hoses from pump body
(iv) Remove mounting screws from front flange of pump
(v) Withdraw pump from coupling towards oil reservoir
(vi) Remove bell-housing from engine mounting flange
(vii) Reverse procedure for re-assembly
(viii) Fill case drain of pump with clean hydraulic oil prior to start up following removal from the system (port located on the top of the pump with adaptor fitted)

e. Cooler removal/re-fitting.

(i) Close pump isolator valve to prevent system syphoning
(ii) Remove flexible hoses from cooler
(iii) Remove mounting bolts from cooler
(iv) To remove matrix, remove top and bottom retaining strips from front of cooler and withdraw matrix from front of cooler assembly

f. Control valve assembly.

(i) Close pump isolator valve to prevent system syphoning
(ii) To replace solenoid coils remove plastic retainer from end of coil and withdraw coil from retaining tube
(iii) To replace valve assemblies remove 4 off retaining screws from top of valve and replace component as necessary

g. Pipework.

(i) For details of hose assemblies see hydraulic schematic drawing Appendix 8.5.1
(ii) Welded pipe ends are currently utilised and should it become necessary to disturb these fittings a replacement O' ring should be used

h. Changing system hydraulic fluid

(i) Change hydraulic fluid
(ii) Remove clean-out cover and clean reservoir
(iii) Replace fuel inlet and hydraulic fluid inlet filter elements
(iv) Replace hydraulic pressure line filter element
(v) Replace hydraulic return line filter element
(vi) Blow through cooler matrix to clear
(vii) Replace solid pipe fitting O' rings as necessary
(viii) Replace tank cover gasket
(ix) Check all electrical connections for tightness
(ix) Check drive coupling for wear and replace or adjust if necessary

6.5 Setting procedures

a. Re-setting pressure

The pressure regulating adjuster is situated on the main control valve assembly.
To adjust:

(i) Loosen the lock nut and wind the centre spigot counter clockwise to reduce pressure
(ii) Press the test button on the control panel to load the system
(iii) Turn the centre spigot clockwise to raise the system pressure
(iv) When the required pressure has been achieved (max 240 bar) tighten the lock nut

NOTE: Should the required pressure be exceeded, wind the adjuster back and increase again. **Never** wind the pressure downwards to set

b. Engine gauges replacement.

(i) There is a resistor fitted to all gauge power lines. This must be replaced after maintenance to prevent damage to the gauges.

7.0 TROUBLESHOOTING

7.1 Power pack engine will not start

a. Check battery condition.

b. Check diagnostics panel for fault LED showing (see fig. 2.)

7.2 Engine cuts out during running

a. Check diagnostics panel for fault LED showing and rectify (see fig. 2.)

7.3 Power pack does not generate any pressure

a. Check L.E.D. (11) to see if hydraulic oil is up to temperature (see figure 2). If not perform warm-up operation described in section 4.3.1.

b. Check operation of main valve in power pack by turning selector switch (5) to 'warm-up' on the instrumentation panel (fig. 2.) This gives 200 bar reading on pressure gauge.

c. Check fuses or electrical connections to valve block if no reading from (b).

d. Check operation of relief valve if no reading from (b).

e. Check operation of hand control pendant and fuses in electrical box if reading is O.K. in (b).

7.4 Power pack generates pressure but hammer does not run

a. Anvil not pushed fully up into hammer casing (see section 4.4.1.) or the dolly is not sitting correctly in the anvil (especially after transportation or laying on its side)

b. Air in hammer hydraulic system - see section 4.4.2.

c. Hammer has been allowed to over-travel - see section 4.4.4. to reset.

d. Faulty bottom sensor assembly - lay the hammer on timber blocks on level stable ground with the hose inlet manifold upper most then remove the Upper & Lower Side Covers and check the bottom sensor as follows: -

   (i) Cam/spring operation - does the cam rotate/return freely and is the spring in good order.
   (ii) Check for correct lift on valve roller (4mm)
   (iii) Check 'trip' arrangement for correct function

(iv) It is possible to work the hammer for diagnostic purposes whilst it is lying on the ground. However, extreme caution must be exercised when doing so, as incorrect operation will cause hammer damage. Always ensure the pendant is in MANUAL mode and NOT automatic mode. The anvil must be in the 'up' position so as to ensure the trip device is 'off'. The hammer can be pressurised by 'tapping' the 'start' push button on the pendant (power pack running) very gradually building up enough pressure to move the drop weight. If the button is held for too long the drop weight will possibly impact the inside top of the hammer - not a good idea!

However, by careful application of this method it is possible to check pressure is reaching the relevant sensor. If it is not, then the problem may be with the over-travel valve (part 1-084-00-02) not allowing oil flow to the control side of the hammer. This can be confirmed by removing the main pressure feed to either sensor - no oil flow when pressurising the system indicates over-travel valve problems and this item should be removed for inspection. (The over-travel valve can be removed through the wide slot in the side of the hammer encased by the rear leg guide and the hammer will require turning over to do this). Turn the power pack off before removal.

When checking the over-travel valve first check the small restrictor/dowel on its top face for any blockage. The valve is unlikely to be faulty inside and if this is suspected the unit should be returned to the manufacturer for checking.

If pressure is reaching the sensor check that the pilot signal from the sensor is reaching the main control valve block at the top of the hammer when the roller valve is operated. If not, remove and inspect the roller valve.

e. If this all appears to be in order check the top sensor mechanism in a similar manner to that described in e. (i) and (ii) above as it may be that the top sensor is jammed on.

Note: The spool inside the roller valve and the roller shaft are not connected so even though the roller returns when operated it does not follow that the spool has returned. Check the tension on the roller shaft, if there is none the spool may be stuck open.

f. If all appears well the problem may be with the main control valve spool. Contact the manufacturer for further details.

7.5 Hammer will lift but not drop

a. Has the hammer been allowed to over-travel? Check reset - see section 4.4.4.

b. Air in hammer hydraulic system - see section 4.4.2.

c. Damaged 'looped' hose from sensor assembly - check by removing the Upper & Lower Side Covers from the Rear Side of the hammer i.e. the side with the Hose Inlet Manifold.

d. Faulty top sensor assembly - see 7.4.d as diagnosis is similar to faulty bottom sensor assembly.

e. Faulty bottom sensor assembly i.e. valve is staying on (see section 7.4.d. for similar diagnosis)

7.6 Hammer runs erratically

a. Air in hydraulic system - see section 4.4.2.

b. 'Cold' hydraulic oil - see section 4.4.4.

c. Accumulator pressures incorrect or bladders damaged.
See Appendix 8.2.High pressure accumulator - 100 bar (3 off)
Low pressure accumulator - 3 bar (3 off)

d. Not enough hydraulic flow/pressure from power pack - check flow rate.

e. One or both sensors damaged/contaminated - see sections 7.4 and 7.5

7.7 Excessive hose 'jumping'

Check accumulator pressures/condition - see Appendix 8.2.

7.8 Hammer 'jumping' excessively on pile top - reduce stroke immediately and/or stop piling

a. Too much hydraulic oil input - set to 270 l/min.

b. 'Cold' hydraulic oil - see section 4.4.4 and reduce stroke. To warm the oil see section 4.3.1.

c. Stroke adjuster set too high - reduce **immediately** to continue working.

d. Suspension Rings damaged. Inspect and replace immediately, if necessary.

e. Incorrect operation of top sensor assembly i.e. cam wear and/or incorrect roller travel.

7.9 Stroke height indicator will not move

a. With the power pack running and control pendant connected, check pressure gauges when '↑' and '↓' are pressed. If no readings, check relevant valve and wiring/fuses in power pack.

b. If readings are O.K., check hoses to hammer. If these are O.K., check restrictor orifices for blockages - these are the male/male adaptors located on the inlet manifold

c. If these are clear remove the Rear Upper Side Cover and check the height adjusting ram and top sensor assembly.

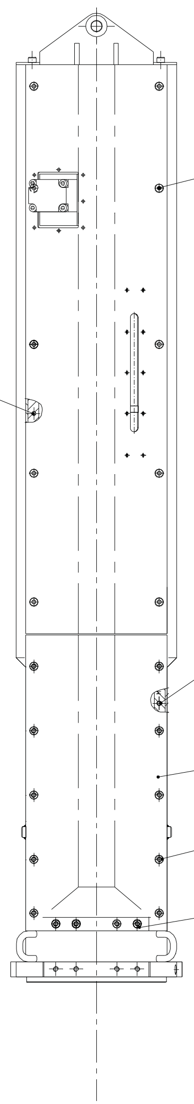
APPENDIX 8.1 -

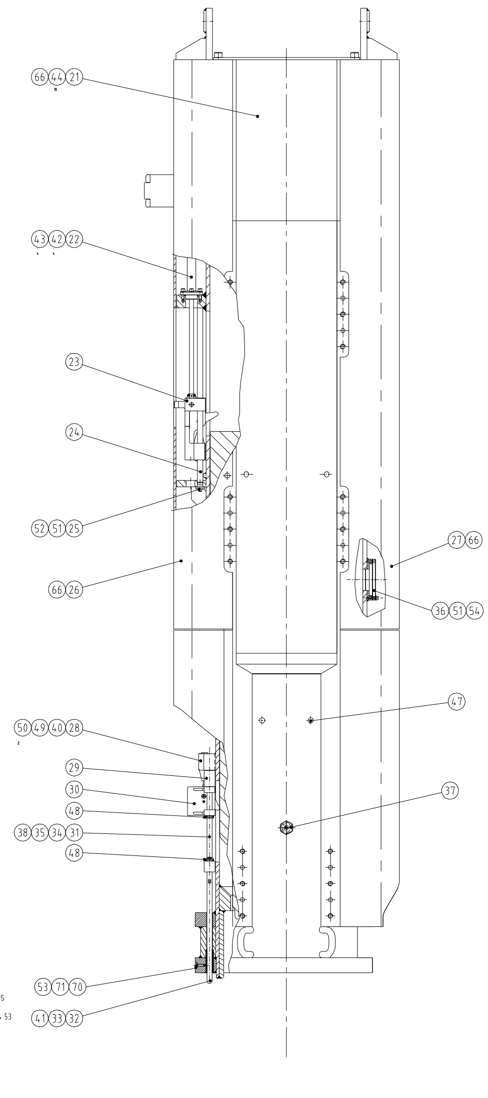
HPH6500 HYDRAULIC HAMMER

PARTS LISTS FOR ALL CONFIGURATIONS

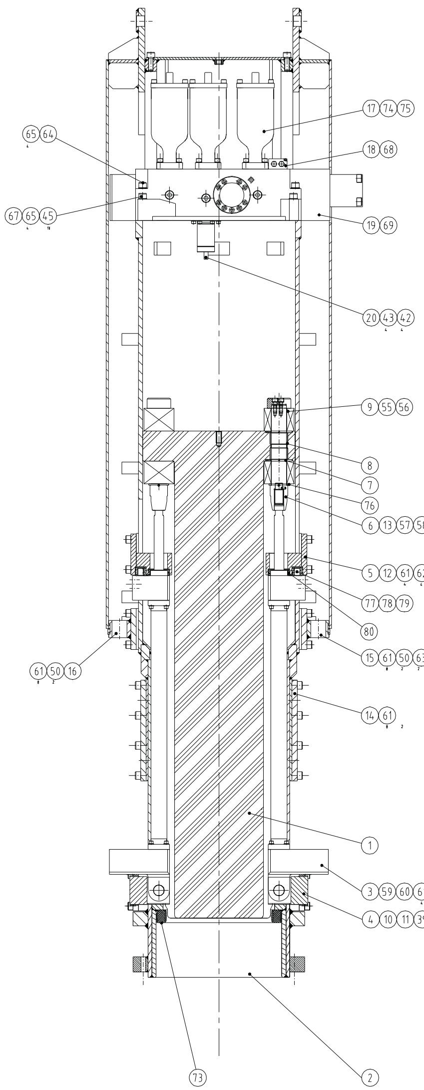
This includes the following drawings:

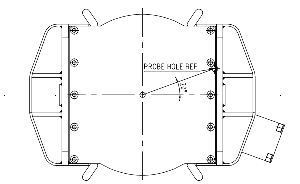
6-000-00-01	Basic Hammer Configuration
6-300-00-02	Hammer Configured to Drive Tubes/Pipe with the Universal Guide System – free hanging.
6-400-00-02	Hammer Configured to Operate in Leads
6-600-00-02	Hammer Configured to Drive Sheet Pile – Free Hanging





USE PEG IT 70 AS
ASSY AID
LEAVE ITS 71 & 53
TO PLUG HOLE





Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by
A		QUANTITIES OF SCREWS,ETC CORRECTED.	3/08/99	WJW	
B		ITEM 66 'O' RING CORD WAS 6.0 DIA.	29/02/00	WJW	
C		ITEM 7 WAS 6 OFF, ITEM 48 2 OFF ADDED	13/04/00	WJW	
D		ITEM 3 RAM UPGRADED TO ISS 2 WITH M16 BOLTS AND THICKER FLANGES ITEM 12 WAS 1-015-00-01	26/06/00	WJW	
E		ITEM 3 RAM UPGRADED TO ISS 3 WITH LONGER BARREL SPIGOTS RAM CONNS UPGRADED TO ISS 2	16/10/00	WJW	
F		ITEM 48 2X6-008-10-01 REMOVED & ITEM No7 QNTY INCREASED FROM 4	08/01/01	ML	
G		SUSPENSION RING 3 ADDED TO BASIC HAMMER BUILD - ITEM 73	12-12-01	ML	
H		ACCUMULATOR REVISED -05 FIXING BOLTS REVISED	26-04-02	ML	
I		RAM CONNECTOR COMPONENTS UPGRADED TO MANFIG3B	30-05-02	DAB	
J		URETHANE DAMPER AND BUFFER FITTED BETWEEN RAM/GUIDE BLOCK RAM TO REV 04 AND GUIDE BLOCK TO REV 02	12-12-02	DAB	

Ref.no.	Qnt.	Part name	Material	Dimension	Part number
80	2	RAM GUIDE BUFFER	URETHANE		6-033-00-01
79	2	SOCKET HEAD CAP SCREW	12.9		0M12-055-02
78	2	DAMPING PIN BUSH	URETHANE		6-035-00-01
77	2	DAMPING PIN			6-033-00-01
76	2	WASHER 1 RAM CONNECTOR			6-008-11-01
75	24	NORDLOCK WASHERS		M16	0M16-000-27
74	24	SOCKET HEAD CAP SCREW	12.9	M16 x 55	0M16-055-02
73	1	SUSPENSION RING 3			6-024-20-01
72	2	LOWER SIDE COVER			6-062-00-01
71	1	DOG PT. SKT SCREW	12.9	M10 X 40	0M10-040-16
70	1	PEG	NYLON	Ø8 X10	6-041-10-01
69	1	HOSE & FITTINGS KIT			6-113-00-01
68	4	SOCKET HEAD CAP SCREW	12.9	M6 X 45	0M06-045-02
67	4	SOLID DOWEL		Ø21 X 70	1-086-00-01
66	1	O RING CORD Ø6.99	NITRILE	14mtrs	6-022-11-01
65	8	ANTIVIBRATION WASHER		M24	0M24-000-21
64	4	SOCKET HEAD CAP SCREW	12.9	M24 X 200	0M24-200-02
63	2	SEAL-SEAL PLATE			6-028-01-01
62	8	CSK HEAD SKT SCREW	12.9	M10 X 16	0M10-016-03
61	56	SOCKET HEAD CAP SCREW	12.9	M24 X 60	0M24-060-02
60	2	NYLOC NUT		M16	0M16-000-11
59	2	HEX HEAD BOLT	8.8	M16 X 115	0M16-115-01
58	2	SPRING PIN		Ø10 X 70	0M10-070-22
57	4	CONE PT.GRUB SCW	12.9	M10 X 12	0M06-012-17
56	6	NORDLOC WASHER		M16	0M16-000-27
55	6	SOCKET HEAD CAP SCREW	12.9	M16 X 50	0M16-050-02
54	6	SPRING WASHER		M10	0M10-000-21
53	1	HEX NUT	8.8	M10	0M10-000-15
52	4	NORDLOC WASHER		Ø10	0M10-000-27
51	16	SOCKET HEAD CAP SCREW	12.9	M10 X 35	0M10-035-02
50	14	SPRING PIN		Ø12 X 40	0M12-000-22
49	4	SOCKET HEAD CAP SCREW	12.9	M10 X 50	0M10-050-02
48	4	COMPRESSION SPRING SEAT			1-081-01-01
47	14	GREASE NIPPLE		G1/8"	1-057-00-01
46	16	COILED PIN HWK		Ø20 X 50	1-348-00-01
45	44	SOCKET HEAD CAP SCREW	12.9	M24 X 150	0M24-150-02
44	10	SOCKET HEAD CAP SCREW	12.9	M24 X 40	0M24-040-02
43	12	SPRING WASHER		M12	0M12-000-21
42	12	SOCKET HEAD CAP SCREW	12.9	M12 X 40	0M12-040-02
41	2	SEATING WASHER			1-036-12-01
40	1	ROLLER VALVE MTG BLOCK			6-003-02-01
39	4	HARDENED INNER BUSH			2-098-00-01
38	2	COMPRESSION SPRING			6-081-00-01
37	2	TRAVEL BOLT			6-084-00-01
36	1	HOUSING PROXIMITY SENSOR			6-003-05-01
35	2	LOCATION BOSS			6-003-06-01
34	4	COMPRESSION SPRING			1-081-00-01
33	1	PROBE GUIDE BUSH			6-041-00-01
32	1	PROBE ASSEMBLY			6-083-00-01
31	2	GUIDE BAR 2			6-038-00-01
30	1	BOTTOM SENSOR ASSEMBLY			1-036-00-05
29	2	SPACER			1-037-00-02
28	1	ROLLER OPERATED VALVE			1-050-00-03
27	1	UPPER SIDE COVER FRONT			6-061-00-01
26	1	UPPER SIDE COVER REAR			6-060-00-01
25	2	RETAINER SPIGOT			1-078-00-01
24	2	GUIDE BAR 1			6-027-00-01
23	1	TOP SENSOR ASSEMBLY			1-030-00-05
22	1	HAR RAM			6-026-00-01
21	1	TOP COVER			6-017-00-01
20	1	OVERTRAVEL VALVE			1-084-00-03
19	1	CONTROL VALVE ASSEMBLY			6-018-00-02
18	1	HAR VALVE BLOCK			6-026-01-01
17	6	ACCUMULATOR ASSEMBLY			1-048-00-05
16	1	SEALING PLATE REAR			6-028-00-01
15	1	SEALING PLATE FRONT			6-029-00-01
14	2	TIE PLATE			6-031-00-01
13	48	DISC SPRING			6-016-00-02
12	4	WEAR PAD			6-015-00-01
11	2	PIN RETAINER			2-014-00-01
10	2	LOWER RAM PIN			2-013-00-02
9	2	END CAP			6-008-07-02
8	4	BUSH RAM CONN.			6-008-08-02
7	4	WASHER RAM CONN.			6-008-09-02
6	2	RAM CONNECTOR			6-009-00-03
5	2	RAM GUIDE BLOCK			6-032-00-02
4	2	RAM ANCHOR			2-021-00-02
3	2	HYDRAULIC RAM			6-008-00-04
2	1	CASING			6-003-00-01
1	1	DROP WEIGHT			6-001-00-01

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
MLEE				A0		1:8		

DAWSON CONSTRUCTION PLANT LTD.

GENERAL ASSEMBLY OF HPH6500 BASIC HAMMER

File name: 6-000-00-01.dwg
Date: 26-04-02
Drawing no.: 6-000-00-01

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by

3RD ANGLE

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
38	2	COMPRESSION SPRING			6-081-00-01
37	2	TRAVEL BOLT			6-084-00-01
36	1	HOUSING PROXIMITY SENSOR			6-003-05-01
35	2	LOCATION BOSS			6-003-06-01
34	4	COMPRESSION SPRING			1-081-00-01
33	1	PROBE GUIDE BUSH			6-041-00-01
32	1	PROBE ASSEMBLY			6-083-00-01
31	2	GUIDE BAR 2			6-038-00-01
30	1	BOTTOM SENSOR ASSEMBLY			1-036-00-05
29	2	SPACER			1-037-00-02
28	1	ROLLER OPERATED VALVE			1-050-00-03
27	1	UPPER SIDE COVER FRONT			6-061-00-01
26	1	UPPER SIDE COVER REAR			6-060-00-01
25	2	RETAINER SPIGOT			1-078-00-01
24	2	GUIDE BAR 1			6-027-00-01
23	1	TOP SENSOR ASSEMBLY			1-030-00-05
22	1	HAR RAM			6-026-00-01
21	1	TOP COVER			6-017-00-01
20	1	OVERTRAVEL VALVE			1-084-00-03
19	1	CONTROL VALVE ASSEMBLY			6-018-00-02
18	1	HAR VALVE BLOCK			6-026-01-01
17	6	ACCUMULATOR ASSEMBLY			1-048-00-06
16	1	SEALING PLATE REAR			6-028-00-01
15	1	SEALING PLATE FRONT			6-029-00-01
14	2	TIE PLATE			6-031-00-01
13	48	DISC SPRING			6-016-00-02
12	4	WEAR PAD			6-015-00-01
11	2	PIN RETAINER			2-014-00-01
10	2	LOWER RAM PIN			2-013-00-02
9	2	END CAP			6-008-07-02
8	4	BUSH RAM CONN.			6-008-08-02
7	4	WASHER RAM CONN.			6-008-09-02
6	2	RAM CONNECTOR			6-009-00-03
5	2	RAM GUIDE BLOCK			6-032-00-02
4	2	RAM ANCHOR			2-021-00-02
3	2	HYDRAULIC RAM			6-008-00-04
2	1	CASING			6-003-00-01
1	1	DROP WEIGHT			6-001-00-01

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
MLEE				A0				

DAWSON CONSTRUCTION PLANT LTD.

GENERAL ASSEMBLY OF HPH6500 BASIC HAMMER

File: 6-000-00-01.dwg

Date: 26-04-02

Drawing no.: 6-000-00-01

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
80	2	RAM GUIDE BUFFER	URETHANE		6-033-00-01
79	2	SOCKET HEAD CAP SCREW	12.9		0M12-055-02
78	2	DAMPING PIN BUSH	URETHANE		6-035-00-01
77	2	DAMPING PIN			6-033-00-01
76	2	WASHER 1 RAM CONNECTOR			6-008-11-01
75	24	NORDLOCK WASHERS		M16	0M16-000-27
74	24	SOCKET HEAD CAP SCREW	12.9	M16 x 55	0M16-055-02
73	1	SUSPENSION RING 3			6-024-20-01
72	2	LOWER SIDE COVER			6-062-00-01
71	1	DOG PT. SKT SCREW	12.9	M10 X 40	0M10-040-16
70	1	PEG	NYLON	ø8 X10	6-041-10-01
69	1	HOSE & FITTINGS KIT			6-113-00-01
68	4	SOCKET HEAD CAP SCREW	12.9	M6 X 45	0M06-045-02
67	4	SOLID DOWEL		ø21 X 70	1-086-00-01
66	1	O RING CORD ø6.99	NITRILE	14mtrs	6-022-11-01
65	8	ANTIVIBRATION WASHER		M24	0M24-000-21
64	4	SOCKET HEAD CAP SCREW	12.9	M24 X 200	0M24-200-02
63	2	SEAL-SEAL PLATE			6-028-01-01
62	8	CSK HEAD SKT SCREW	12.9	M10 X 16	0M10-016-03
61	56	SOCKET HEAD CAP SCREW	12.9	M24 X 60	0M24-060-02
60	2	NYLOC NUT		M16	0M16-000-11
59	2	HEX HEAD BOLT	8.8	M16 X 115	0M16-115-01
58	2	SPRING PIN		ø10 X 70	0M10-070-22
57	4	CONE PT.GRUB SCW	12.9	M10 X 12	0M06-012-17
56	6	NORDLOC WASHER		M16	0M16-000-27
55	6	SOCKET HEAD CAP SCREW	12.9	M16 X 50	0M16-050-02
54	6	SPRING WASHER		M10	0M10-000-21
53	1	HEX NUT	8.8	M10	0M10-000-15
52	4	NORDLOC WASHER		ø10	0M10-000-27
51	16	SOCKET HEAD CAP SCREW	12.9	M10 X 35	0M10-035-02
50	14	SPRING PIN		ø12 X 40	0M12-000-22
49	4	SOCKET HEAD CAP SCREW	12.9	M10 X 50	0M10-050-02
48	4	COMPRESSION SPRING SEAT			1-081-01-01
47	14	GREASE NIPPLE		G1/8"	1-057-00-01
46	16	COILED PIN HWK		ø20 X 50	1-348-00-01
45	44	SOCKET HEAD CAP SCREW	12.9	M24 X 150	0M24-150-02
44	10	SOCKET HEAD CAP SCREW	12.9	M24 X 40	0M24-040-02
43	12	SPRING WASHER		M12	0M12-000-21
42	12	SOCKET HEAD CAP SCREW	12.9	M12 X 40	0M12-040-02
41	2	SEATING WASHER			1-036-12-01
40	1	ROLLER VALVE MTG BLOCK			6-003-02-01
39	4	HARDENED INNER BUSH			2-098-00-01

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
MLEE				A0				

DAWSON CONSTRUCTION PLANT LTD.

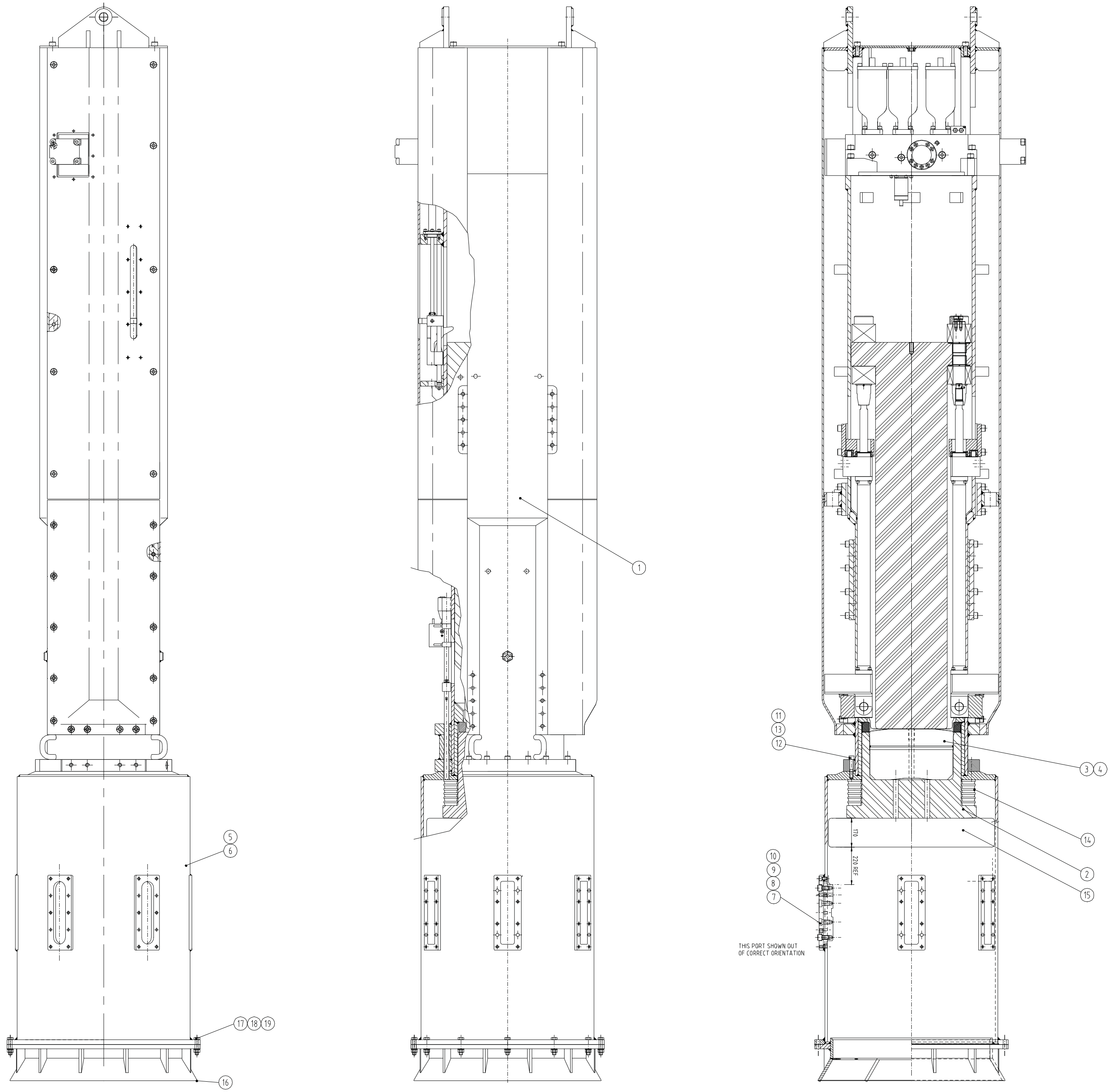
GENERAL ASSEMBLY OF HPH6500 BASIC HAMMER

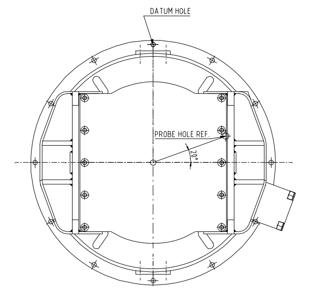
File: 6-000-00-01.dwg

Date: 26-04-02

Drawing no.: 6-000-00-01

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by
A		GUIDE SLEEVE WAS 6-300-10-01 (IN ERROR)	11/01/00	WJW	
B		SUSPENSION RING 3 REMOVED FROM THIS ASSY	12-12-01	ML	
C		GEN. DWG UPDATE. NO PARTS LIST CHANGE.	07/10/03	DB	





NOTE:
LOWER GUIDE & SUPPORT BLOCKS SUPPLIED TO SUIT PILE DIAMETER FOR PIPE PILES.

LOWER GUIDE MAY BE SUBSTITUTED WITH ADAPTOR SLEEVE TO SUIT ALTERNATIVE PILE TYPES

Ref.no.	Qnt.	Part name	Material	Dimension	Part number
19	12	FLAT WASHER		M20	0M20-000-20
18	12	NYLOC NUT		M20	0M20-000-11
17	12	HEX HEAD BOLT	8.8	M20 X 90	0M20-090-01
16	1	LOWER GUIDE			6-300-3X-01
15	1	SPREADER PLATE		170 THK	6-005-30-02
14	6	SUSPENSION RING (4)			6-024-30-01
13	18	ANTIVIBRATION WASHER		M20	0M20-000-21
12	18	SOCKET HEAD CAP SCREW	12.9	M20 X 100	0M20-100-02
11	1	SOLID DOWEL		Ø16 X 50	4073
10	36	COILEDPIN HWK		Ø20 X 50	1-348-00-01
9	24	SOCKET HEAD CAP SCREW	12.9	M24 X 40	0M24-040-02
8	48	SOCKET HEAD CAP SCREW	12.9	M16 X 30	0M16-030-02
7	6	SUPPORT BLOCK			6-300-2X-01
6 (A)	1	GUIDE SLEEVE			6-300-11-01
5	1	'O' RING CORD 2020 LG		Ø1.6 SECT	6-022-10-01
4	1	'O' RING Ø469 I/D			6-089-00-01
3	1	DOLLY 2			6-006-20-01
2	1	PRIMARY ANVIL			6-005-20-01
1	1	BASIC HAMMER ASSY			6-000-00-01

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A0		1:8		

DAWSON CONSTRUCTION PLANT LTD.

HPH6500 C/W UNIVERSAL GUIDE SLEEVE FOR Ø914mm MAX

File name: 6-300-00-02.dwg | Date: 7/7/99

Drawing no.: 6-300-00-02

Ref.no.	Qnt.	Part name	Material	Dimension	Part number
19	12	FLAT WASHER		M20	0M20-000-20
18	12	NYLOC NUT		M20	0M20-000-11
17	12	HEX HEAD BOLT	8.8	M20 X 90	0M20-090-01
16	1	LOWER GUIDE			6-300-3X-01
15	1	SPREADER PLATE		170 THK	6-005-30-02
14	6	SUSPENSION RING (4)			6-024-30-01
13	18	ANTIVIBRATION WASHER		M20	0M20-000-21
12	18	SOCKET HEAD CAP SCREW	12.9	M20 X 100	0M20-100-02
11	1	SOLID DOWEL		ϕ16 X 50	4073
10	36	COILEDPIN HWK		ϕ20 X 50	1-348-00-01
9	24	SOCKET HEAD CAP SCREW	12.9	M24 X 40	0M24-040-02
8	48	SOCKET HEAD CAP SCREW	12.9	M16 X 30	0M16-030-02
7	6	SUPPORT BLOCK			6-300-2X-01
6	1	GUIDE SLEEVE			6-300-11-01
5	1	'O' RING CORD 2020 LG		ϕ1.6 SECT	6-022-10-01
4	1	'O' RING ϕ469 I/D			6-089-00-01
3	1	DOLLY 2			6-006-20-01
2	1	PRIMARY ANVIL			6-005-20-01
1	1	BASIC HAMMER ASSY			6-000-00-01

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A0		1:8		

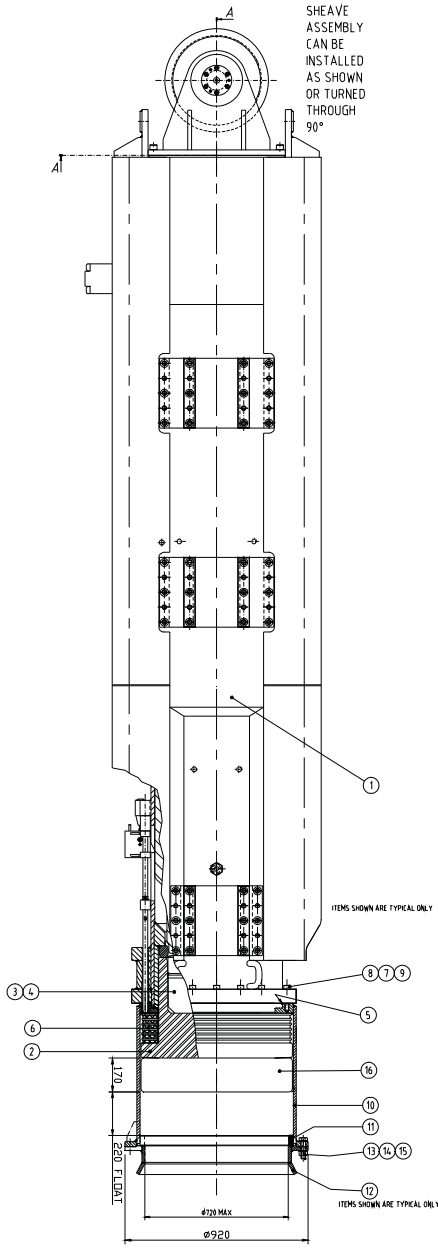
DAWSON CONSTRUCTION PLANT LTD.

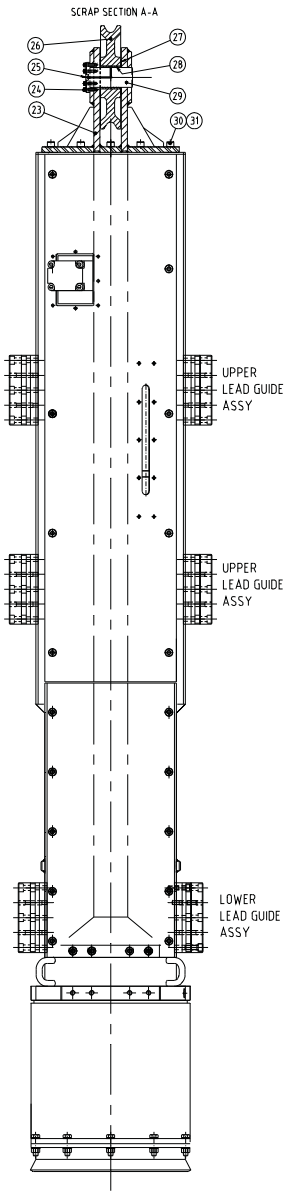
HPH6500 C/W UNIVERSAL GUIDE SLEEVE FOR ϕ914mm MAX

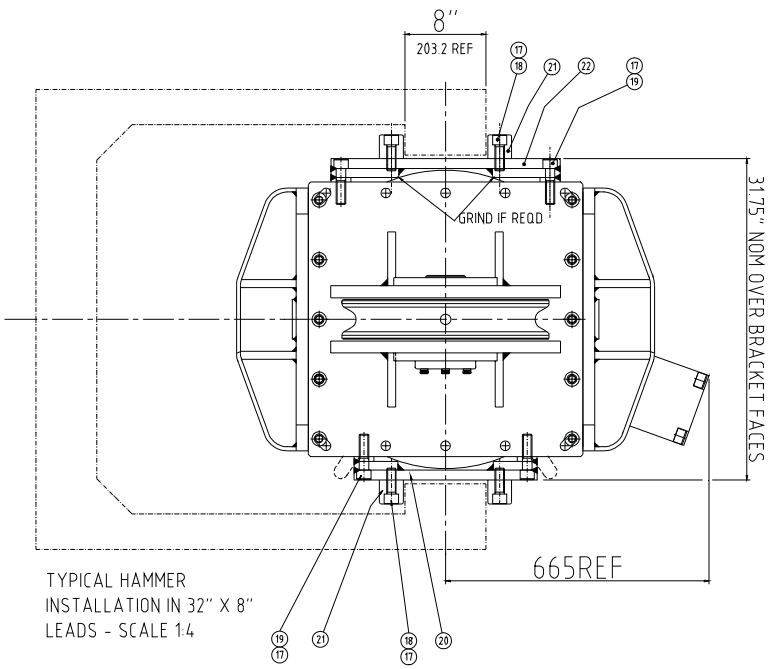
File name: 6-300-00-02.dwg

Date: 7/7/99

Drawing no.: 6-300-00-02







TYPICAL HAMMER INSTALLATION IN 32" X 8" LEADS - SCALE 1:4

RETURN SHEAVE ASSEMBLY P/NO 6-420-00-02 ILLUSTRATES SET UP FOR 32" AMERICAN U-LEADS.

LEAD GUIDE SET P/NO 6-410-00-01. ILLUSTRATES SET UP FOR 32" AMERICAN U-LEADS.

ANVIL RETAINER ASSEMBLY P/NO 6-416-00-01. ILLUSTARTES SET UP FOR 12" H-PILE

Ref no.	Qnt	Part name	Material	Dimension	Remarks
31	10	PLAIN WASHER		M24	6M24-000-20
30	10	SOCKET HEAD CAP SCREW	12.9	M24 X 80	6M24-080-02
29	1	PIN			6-420-03-02
28	1	BUSH			6-420-06-02
27	2	THRUST WASHER			6-420-04-02
26	1	SHEAVE			6-420-02-02
25	1	GREASE NIPPLE		G1/8"	1-957-06-01
24	6	SOCKET HEAD CAP SCREW	12.9	M12 X 40	6M12-040-02
23	1	MAIN BODY			6-420-01-02
22	4	LEAD GUIDE BRACKET - UPPER			6-410-01-01
21	12	RUNNER		350 LNG	6-410-03-01
20	2	LEAD GUIDE BRACKET - LOWER			6-410-02-01
19	36	SKT HD SCW	12.9	M20 X 90	1364.90.01
18	36	SKT HD SCW	12.9	M24 X 65	1-869-80-01
17	48	COILED PIN HWK		ø20 X 50	1-368-00-01
16	1	SPREADER PLATE	EXAMPLE	TYP THK	6-005-30-05
15	20	PLAIN WASHER		M24	2-087-00-01
14	10	NYLOC NUT		M24	6M24-000-01
13	10	HEX HEAD BOLT	8.8	M24 X 90	6M24-090-01
12	1	LOWER GUIDE - TO SUIT PILE	EXAMPLE	12" H-PILE	6-415-05-01
11	1	SUSPENSION RING	NYRIM 2000		6-415-03-01
10	1	RETAINER BODY			6-415-01-01
9	1	DOWEL		ø16 X 50	L473
8	18	ANTIVIBRATION WASHER		M20	1-345-00-01
7	18	SKT HD CAP SCW	12.9	M20 X 100	6M20-100-02
6	6	SUSPENSION RING 4			6-024-30-01
5	1	'O' RING CORD 2820 GL	NITRILE	1.6 SECT	6-022-10-01
4	1	'O' RING 469 DIA	NITRILE		6-089-00-01
3	1	DOLLY 2			6-006-20-01
2	1	PRIMARY ANVIL			6-005-20-01
1	1	BASIC HAMMER ASSEMBLY			6-000-00-01

Designed by	Drawn by	Traced	Checked	Standard	Approved	Scale	Replaces	Replaced by
MG					AM	1:8		

DAWSON CONSTRUCTION PLANT LTD

HPH 6500 HAMMER LEAD MOUNTED - SHOWN CONFIGURED FOR 32" U-LEADS

File 17-12-05

Drawing No. 6-400-00-49

SURFACE FINISH UNLESS STATED OTHERWISE
▽ ROUGH MACHINE 50
▽▽ FINE MACHINE 10
▽▽▽ GRIND 1.6

MACHINING TOLERANCES UNLESS STATED OTHERWISE
X +-/- 0.5
X, X +-/- 0.25
X, XX +-/- 0.05
ANGLES +-/- 0.5°
DIMENSIONS IN MILLIMETERS

RETURN SHEAVE ASSEMBLY P/NO 6-420-00-02.
ILLUSTRATES SET UP FOR 32" AMERICAN
U-LEADS.

LEAD GUIDE SET P/NO 6-410-00-01.
ILLUSTRATES SET UP FOR 32" AMERICAN
U-LEADS.

ANVIL RETAINER ASSEMBLY P/NO 6-416-00-01.
ILLUSTARTES SET UP FOR 12" H-PILE

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
31	10	PLAIN WASHER		M24	0M24-000-20
30	10	SOCKET HEAD CAP SCREW	12.9	M24 X 80	0M24-080-02
29	1	PIN			6-420-03-02
28	1	BUSH			6-420-06-02
27	2	THRUST WASHER			6-420-04-02
26	1	SHEAVE			6-420-02-02
25	1	GREASE NIPPLE		G1/8"	1-057-00-01
24	6	SOCKET HEAD CAP SCREW	12.9	M12 X 40	0M12-040-02
23	1	MAIN BODY			6-420-01-02
22	4	LEAD GUIDE BRACKET - UPPER			6-410-01-01
21	12	RUNNER		350 LNG	6-410-03-01
20	2	LEAD GUIDE BRACKET - LOWER			6-410-02-01
19	36	SKT HD SCW	12.9	M20 X 90	1.044.00.01
18	36	SKT HD SCW	12.9	M24 X 65	1-069-00-01
17	48	COILED PIN HWK		⌀20 X 50	1-348-00-01
16	1	SPREADER PLATE	EXAMPLE	170 THK	6-005-30-05
15	20	PLAIN WASHER		M24	2-087-00-01
14	10	NYLOC NUT		M24	0M24-000-01
13	10	HEX HEAD BOLT	8.8	M24 X 90	0M24-090-01
12	1	LOWER GUIDE - TO SUIT PILE	EXAMPLE	12" H-PILE	6-415-05-01
11	1	SUSPENSION RING	NYRIM 2000		6-415-03-01
10	1	RETAINER BODY			6-415-01-01
9	1	DOWEL		⌀16 X 50	4073
8	18	ANTIVIBRATION WASHER		M20	1-045-00-01
7	18	SKT HD CAP SCW	12.9	M20 X 100	0M20-100-02
6	6	SUSPENSION RING 4			6-024-30-01
5	1	'O' RING CORD 2020 GL.	NITRILE	1.6 SECT	6-022-10-01
4	1	'O' RING 469 DIA	NITRILE		6-089-00-01
3	1	DOLLY 2			6-006-20-01
2	1	PRIMARY ANVIL			6-005-20-01
1	1	BASIC HAMMER ASSEMBLY			6-000-00-01

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
ML				A0		1:8		

DAWSON CONSTRUCTION PLANT LTD.

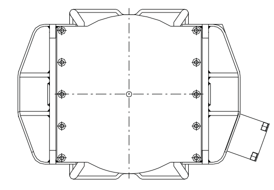
HPH 6500 HAMMER LEAD MOUNTED - SHOWN CONFIGURED FOR 32" U-LEADS

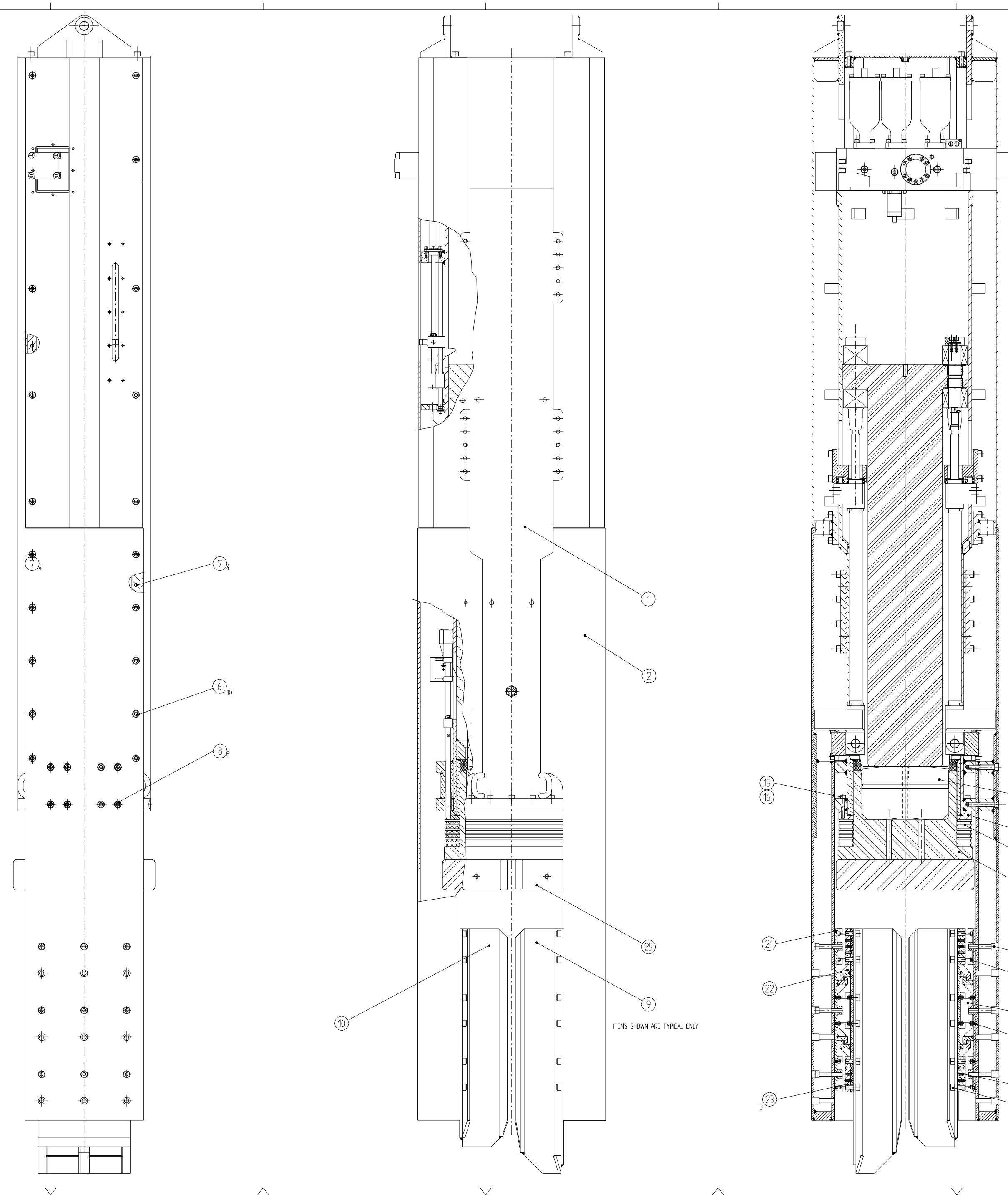
File

Date 17-12-01

Drawing no. 6-400-00-03

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by
A		P/LIST REVISED	18-12-01		ML
B		GEN, UPDATES TO VIEWS.	07-10-03		DAB





STANDARD SHEET PILE LEG INSERT OPTIONS	PART NUMBER
FRONT LEG INSERT FOR U-SHEET PILES	6-019-00-01
FRONT LEG INSERT FOR Z-SHEET PILES	6-019-04-01
REAR LEG INSERT FOR U-SHEET PILES	6-020-00-01
REAR LEG INSERT FOR Z-SHEET PILES	6-020-04-01

SPREADER PLATE OPTIONS	PART NUMBER
PAIRS NARROW U-PILES E.G. LARSSEN 6	6-005-31-02
PAIRS MEDIUM WIDTH PILES E.G. L6/42, W's & AZ48	6-005-33-02
PAIRS WIDE PILES E.G. PU & AZ's	6-005-32-02

Ref.no.	Qnt.	Part name	Material	Dimension	Part number
28	1	DOWEL		Φ16 X 50	4073
27	8	SOCKET HEAD CAP SCREW	12.9	M10 X 55	0M10-055-02
26	8	SPRING PIN		Φ12 X 40	0M12-040-22
25	1	SPREADER PLATE			SEE TABLE
24	1	'O' RING CORD X 2020 LG	NITRILE	Φ1.6 SECT	6-022-10-01
23	6	STOP BLOCK			6-020-03-01
22	2	INSERT FRONT PLATE			6-020-02-01
21	2	INSERT BACKPLATE			6-020-01-01
20	24	SOCKET HEAD CAP SCREW	12.9	M24 X 60	0M24-060-02
19	96	NYLOC NUT		M12	0M12-000-11
18	18	SOCKET HEAD CAP SCREW	12.9	M24 X 130	0M24-130-02
17	108	CSK SKT SCREW	12.9	M12 X 35	0M12-035-03
16	18	SOCKET HEAD CAP SCREW	12.9	M20 X 100	0M20-100-02
15	18	ANTIVIBRATION WASHER		M20	0M20-000-21
14	12	SPRING PIN		Φ10 X 27	0M10-027-22
13	12	SANDWICH MOUNTING			1-033-00-02
12	6	SUSPENSION RING 4			6-024-30-01
11	1	FLANGE COVER			6-022-00-01
10	1	REAR LEG INSERT			SEE TABLE
9	1	FRONT LEG INSERT			SEE TABLE
8	16	SOCKET HEAD CAP SCREW	12.9	M24 X 150	0M24-150-02
7	8	COILED PIN		Φ20 X 50	0M20-050-36
6	24	SOCKET HEAD CAP SCREW	12.9	M24 X 200	0M24-200-02
5	1	'O'RING Φ469 I/D	NITRILE	6.99 SECT	6-089-00-01
4	1	DOLLY 2			6-006-20-01
3	1	PRIMARY ANVIL			6-005-20-01
2	2	LEG GUIDE			6-002-00-01
1	1	BASIC HAMMER ASSY			6-000-00-01

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A0		1 : 8		

DAWSON CONSTRUCTION PLANT LTD.

HPH 6500 WITH LEG GUIDES FOR SHEET PILING

File name — Date 6/7/99

Drawing no. 6-600-00-02

STANDARD SHEET PILE LEG INSERT OPTIONS	PART NUMBER
FRONT LEG INSERT FOR U-SHEET PILES	6-019-00-01
FRONT LEG INSERT FOR Z-SHEET PILES	6-019-04-01
REAR LEG INSERT FOR U-SHEET PILES	6-020-00-01
REAR LEG INSERT FOR Z-SHEET PILES	6-020-04-01

SPREADER PLATE OPTIONS	PART NUMBER
PAIRS NARROW U-PILES E.G. LARSSEN 6	6-005-31-02
PAIRS MEDIUM WIDTH PILES E.G. L6/42, W's & AZ48	6-005-33-02
PAIRS WIDE PILES E.G. PU & AZ's	6-005-32-02

Ref.no.	Qnt.	Part name	Material	Dimension	Part number
28	1	DOWEL		Φ16 X 50	4073
27	8	SOCKET HEAD CAP SCREW	12.9	M10 X 55	0M10-055-02
26	8	SPRING PIN		Φ12 X 40	0M12-040-22
25	1	SPREADER PLATE			SEE TABLE
24	1	'O' RING CORD X 2020 LG	NITRILE	Φ1.6 SECT	6-022-10-01
23	6	STOP BLOCK			6-020-03-01
22	2	INSERT FRONT PLATE			6-020-02-01
21	2	INSERT BACKPLATE			6-020-01-01
20	24	SOCKET HEAD CAP SCREW	12.9	M24 X 60	0M24-060-02
19	96	NYLOC NUT		M12	0M12-000-11
18	18	SOCKET HEAD CAP SCREW	12.9	M24 X 130	0M24-130-02
17	108	CSK SKT SCREW	12.9	M12 X 35	0M12-035-03
16	18	SOCKET HEAD CAP SCREW	12.9	M20 X 100	0M20-100-02
15	18	ANTIVIBRATION WASHER		M20	0M20-000-21
14	12	SPRING PIN		Φ10 X 27	0M10-027-22
13	12	SANDWICH MOUNTING			1-033-00-02
12	6	SUSPENSION RING 4			6-024-30-01
11	1	FLANGE COVER			6-022-00-01
10	1	REAR LEG INSERT			SEE TABLE
9	1	FRONT LEG INSERT			SEE TABLE
8	16	SOCKET HEAD CAP SCREW	12.9	M24 X 150	0M24-150-02
7	8	COILED PIN		Φ20 X 50	0M20-050-36
6	24	SOCKET HEAD CAP SCREW	12.9	M24 X 200	0M24-200-02
5	1	'O'RING Φ469 I/D	NITRILE	6.99 SECT	6-089-00-01
4	1	DOLLY 2			6-006-20-01
3	1	PRIMARY ANVIL			6-005-20-01
2	2	LEG GUIDE			6-002-00-01
1	1	BASIC HAMMER ASSY			6-000-00-01

Design by	Drawn at	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
WJW				A0		1 : 8		

DAWSON CONSTRUCTION PLANT LTD.

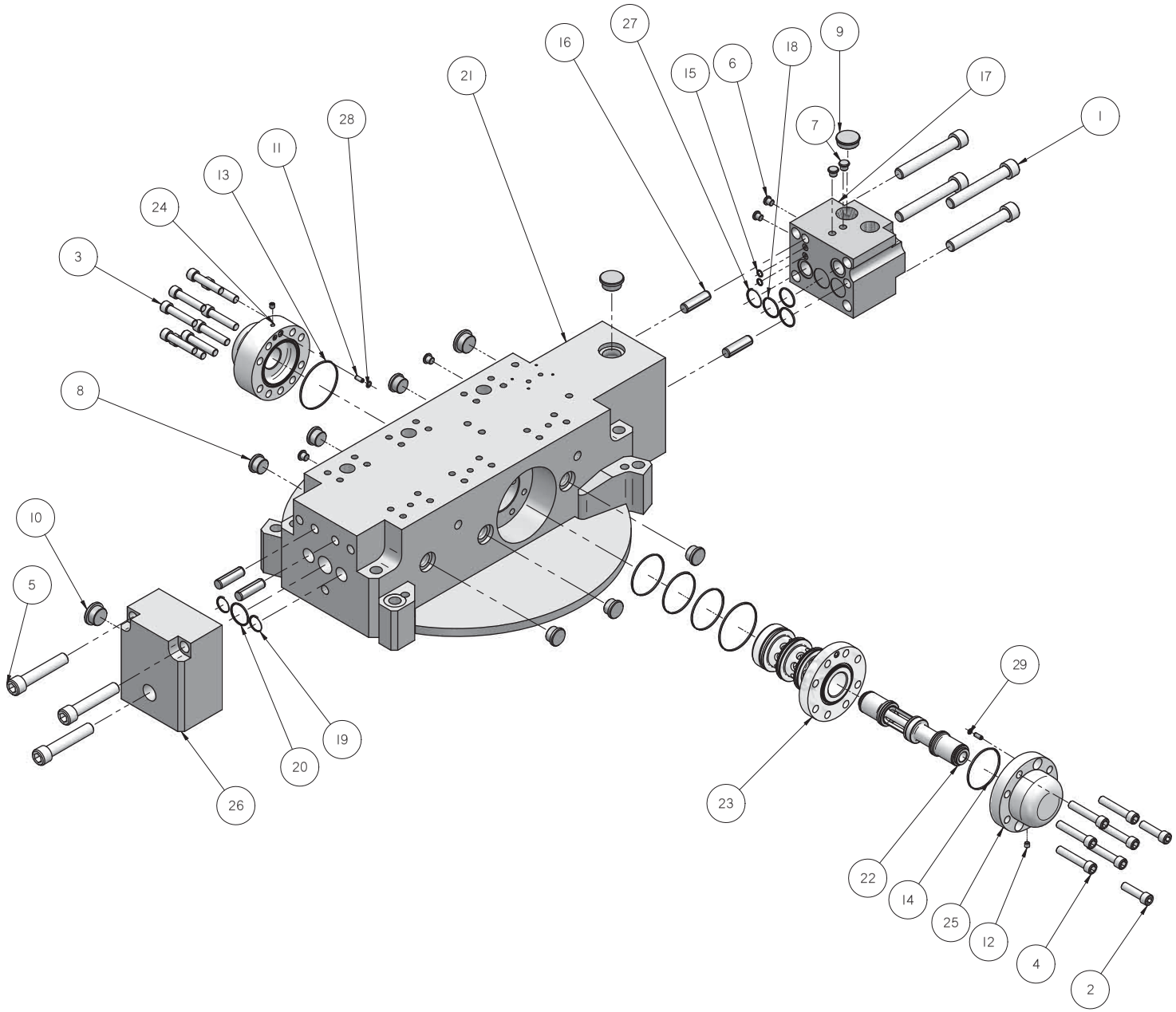
HPH 6500 WITH LEG GUIDES FOR SHEET PILING

File name | Date 6/7/99

Drawing no. 6-600-00-02

3RD ANGLE

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by



Ref.no.	Qnt.	Part name	Material	Dimension	Remark
29	1	O-RING			O-RING
28	1	O-RING			O-RING
27	3	O-RING	206-338-4470	ID 38 x 3	6-018-31-01
26	1	OUTLET MANIFOLD			6-018-30-01
25	1	CONTROL VALVE END CAP 1			6-018-05-01
24	1	CONTROL VALVE END CAP 2			6-018-04-01
23	1	PISTON SLEEVE			6-018-03-01
22	1	CONTROL VALVE PISTON			6-018-02-01
21	1	VALVE BLOCK			6-018-01-01
20	1	O-RING	206-346-4470	ID 46 x 3	2-018-31-01
19	2	O-RING	206-332-4470	ID 23 x 3	2-018-27-01
18	1	O-RING	206-340-4470	ID 40 x 3	2-018-26-01
17	1	Inlet Manifold			2-018-23-02
16	4	SPECIAL DOWEL		DIA 21	1-086-00-01
15	2	O-RING	204-012-4470	ID12 x 2	1-018-25-01
14	4	O-RING	204-012-4470	ID12 x 2	1-018-25-01
13	2	O-RING	204-012-4470	ID12 x 2	1-018-25-01
12	2	BLANKING PLUG		1/8" BSPT	1-018-22-01
11	2	HOLLOW DOWEL			1-018-21-01
10	3	BLANKING PLUG			1-018-07-01
9	1	BLANKING PLUG			1-018-07-01
8	6	BLANKING PLUG			1-018-07-01
7	4	BLANKING PLUG			1-018-07-01
6	2	BLANKING PLUG			1-018-07-01
5	3	SOCKET HEAD CAP SCREW	12.9	M24 x 130 LG	0M24-130-02
4	6	SOCKET HEAD CAP SCREWS	12.9	M16 x 85 LG	0M16-085-02
3	9	SOCKET HEAD CAP SCREW		M16 x 75 LG	0M16-075-02
2	2	SOCKET HEAD CAP SCREW	12.9	M16 x 60 LG	0M16-060-02
1	4	SOCKET HEAD CAP SCREW	12.9	M24 x 165 LG	0M10-165-02

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
markbramley	markbramley	–	–	A2	–	–	–	–

DAWSON CONSTRUCTION PLANT LTD.

HAMMER CONTROL
VALVE ASSEMBLY

Sheet 1 of 1 | Date 24/07/2009

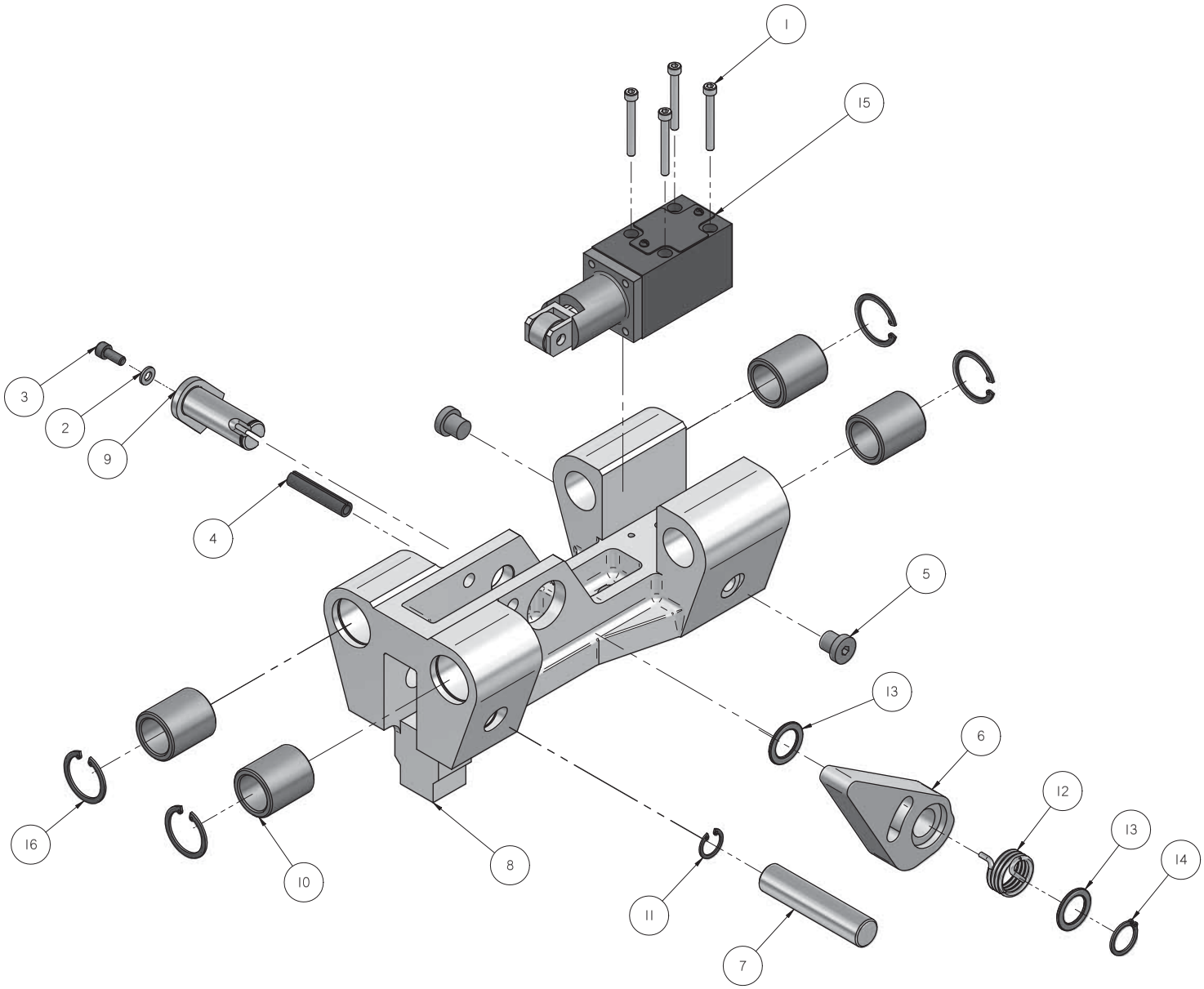
Drawing no. 6-018-00-02

SURFACE FINISH
UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9
▽▽ FINE MACHINE N8
▽▽▽ GRIND N6

MACHINING TOLERANCES
UNLESS STATED OTHERWISE
X = +/- 0.5
X . X = +/- 0.25
X . XX = +/- 0.05
ANGLES +/- 0.5°
DIMENSIONS IN MILLIMETERS

3RD ANGLE

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by



NOTES.

BEFORE ASS'Y OF MECHANISM COMPONENTS CLEAN THE M6 HOLE IN ITEM 3 & ITEM 14 WITH LOCTITE 7063 APPLY ACTIVATOR 7471 TO THE AFOREMENTIONED ONLY IF THE ASS'Y IS TO BE USED WITHIN 24 HRS OF ASS'Y.

USE A SOFT FACED HAMMER TO FIT ITEM 6
APPLY A COPPER BASED ANTI-SEIZE COMPOUND SUCH AS ROCOL J 166
TO SPACER WASHERS ITEM 8 AND TORSION SPRING ITEM 13.

APPLY LOCTITE STUDLOCK 270 TO SOCKET HEAD CAP SCREW ITEM 14 AND TIGHTEN TO A TORQUE OF 16 Nm.
CIRCLIP ITEM 4 TO BE INSTALLED AS SHOWN SO THAT THE GAP IS NOT COINCIDENT WITH THE SLOT IN THE CAM CENTRE SHAFT ITEM 6.

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
16	4	CIRCLIP			1-065-00-01
15	1	ROLLER OPERATED VALVE	HFA 282		1-050-00-03
14	1	CIRCLIP		Ø1400-0200	1-036-04-01
13	2	SPACER WASHER		2MM THK	1-030-21-01
12	1	TORSION SPRING			1-030-18-01
11	1	CIRCLIP		Ø1300-0200	1-030-11-01
10	4	GUIDE BUSH			1-030-10-01
9	1	CAM CENTRE SHAFT			1-030-06-04
8	1	VALVE MOUNTING BLOCK			1-030-03-03
7	1	LINK PIN			1-030-02-01
6	1	CAM 2			1-030-01-03
5	2	BLANKING PLUG	VS-R 1/4WD	1/4" BSP	1-018-18-01
4	1	SPRING PIN		ø 10 x 50 LG	0M10-050-22
3	1	SOCKET HEAD CAP SCREW		M6 x 15 LG	0M06-015-02
2	1	WASHER		M6	0M06-000-20
1	4	SOCKET HEAD CAP SCREW		M5 x 45 LG	0M05-045-02

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
M.D.B	M.D.B	–	–	A2	–	1 – 1	–	–

DAWSON CONSTRUCTION PLANT LTD.

TOP SENSOR ASSEMBLY

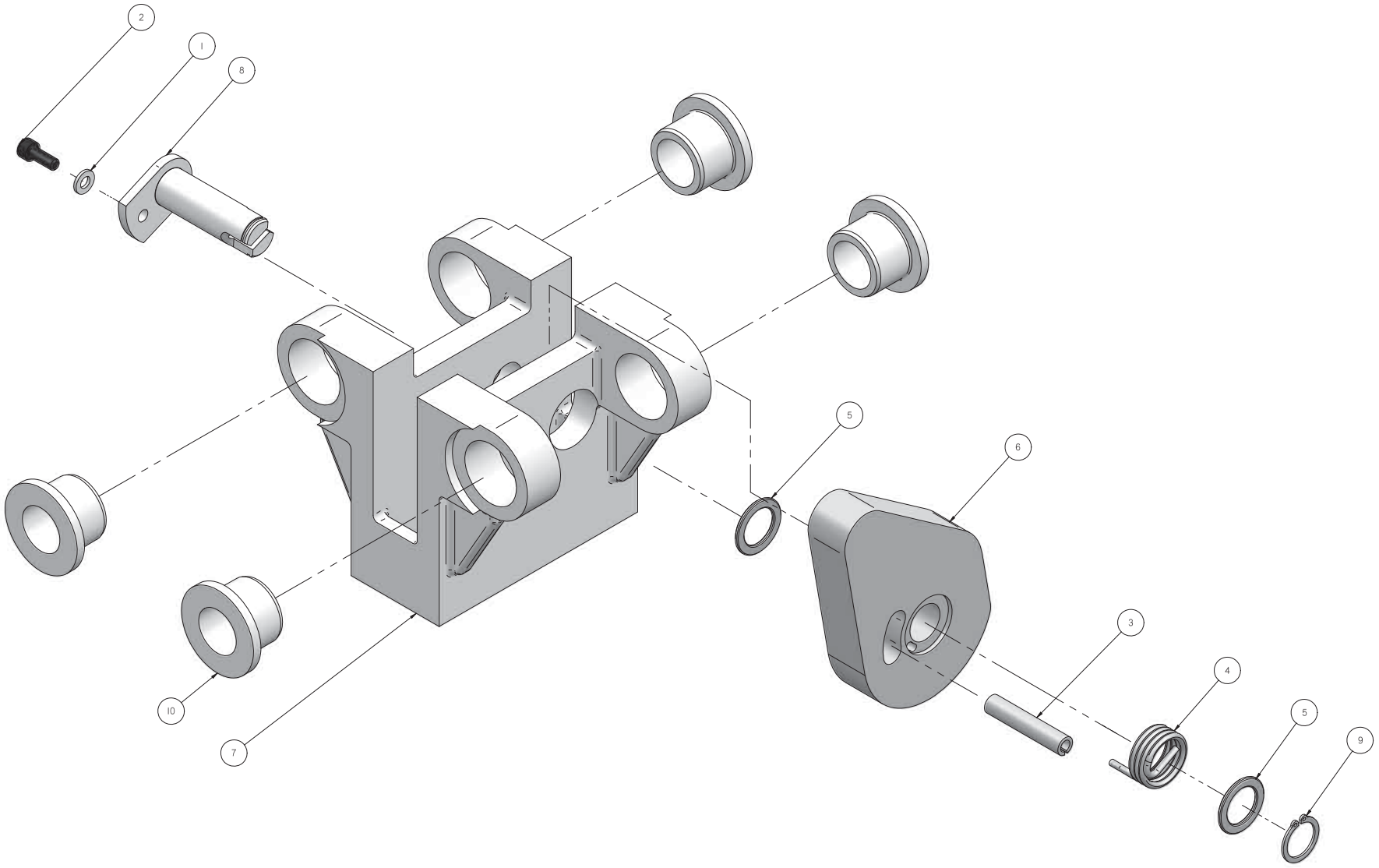
Sheet 1 of 1 | Date 15/02/2008

Drawing no. 1-030-00-05

SURFACE FINISH	MACHINING TOLERANCES
UNLESS STATED OTHERWISE	UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9	X = +/- 0.5
▽▽ FINE MACHINE N8	X . X = +/- 0.25
▽▽▽ GRIND N6	X . XX = +/- 0.05
	ANGLES +/- 0.5°
	DIMENSIONS IN MILLIMETERS

3RD ANGLE

Ref.no	Qnt.	Revision	Date	Intro.	Appr.by



BEFORE ASS'Y OF MECHANISM COMPONENTS CLEAN THE M6 HOLE IN ITEM 2 & ITEM 8 WITH LOCITITE 7063. APPLY ACTIVATOR 7471 TO THE AFOREMENTIONED ONLY IF THE ASS'Y IS TO BE USED WITHIN 24 HRS OF ASS'Y.

USE A SOFT FACED HAMMER TO FIT ITEM 3. APPLY A COPPER BASED ANTI-SEIZE COMPOUND SUCH AS ROCOL J 166 TO SPACER WASHERS ITEM 5 AND TORSION SPRING ITEM 7.

APPLY LOCTITE STUDLOCK 270 TO SOCKET HEAD CAP SCREW ITEM 8 AND TIGHTEN TO A TORQUE OF 16Nm.
CIRCLIP ITEM 4 TO BE INSTALLED AS SHOWN SO THE GAP IS NOT COINCIDENT WITH THE SLOT IN THE CAM CENTRE SHAFT ITEM 3.

FLANGED BUSH ASSEMBLY – ITEM 6
APPLY LOCTITE CLEANER 7070 TO SURFACES TO BE BONDED.
WIPE OFF CLEANER WITH A CLEAN RAG AND ALLOW TO DRY 2-3 MINUTES.

DO NOT USE CLEANER 7063 AS THIS IS SOLVENT BASED AND WILL ATTACK THE NYLON FLANGED BUSHES.

APPLY LOCTITE ACTIVATOR 7471 TO SURFACES TO BE BONDED. ALLOW ACTIVATOR TO EVAPORATE FOR 2-3MINUTES UNTIL SURFACES ARE DRY.

APPLY LOCTITE 601 TO BOTH SURFACES TO BE BONDED INSTALL FLANGED BUSH INTO CAM CARRIAGE UNTIL SURFACES ARE FLUSH.

REMOVE ANY EXCESS LOCTITE FROM THE JOINT WHILST IT IS STILL WET.

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
10	4	FLANGED BUSH			1-036-13-01
9	1	CIRCLIP		D1400-0200	1-036-04-01
8	1	CAM CENTRE SHAFT			1-036-03-03
7	1	CAM CARRIAGE			1-036-02-04
6	1	CAM 3			1-036-01-03
5	2	SPACER WASHER		2MM THK	1-030-21-01
4	1	TORSION SPRING			1-030-18-01
3	1	SPRING PIN		ø 10 x 50 LG	OM10-050-22
2	1	SOCKET HEAD CAP SCREW		M6 x 16	OM06,016,02
1	1	WASHER		M6	OM06-000-20

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
MDB	MDB	–	–	A1	–	1 – 1	–	–

DAWSON CONSTRUCTION PLANT LTD.

BOTTOM SENSOR ASSEMBLY

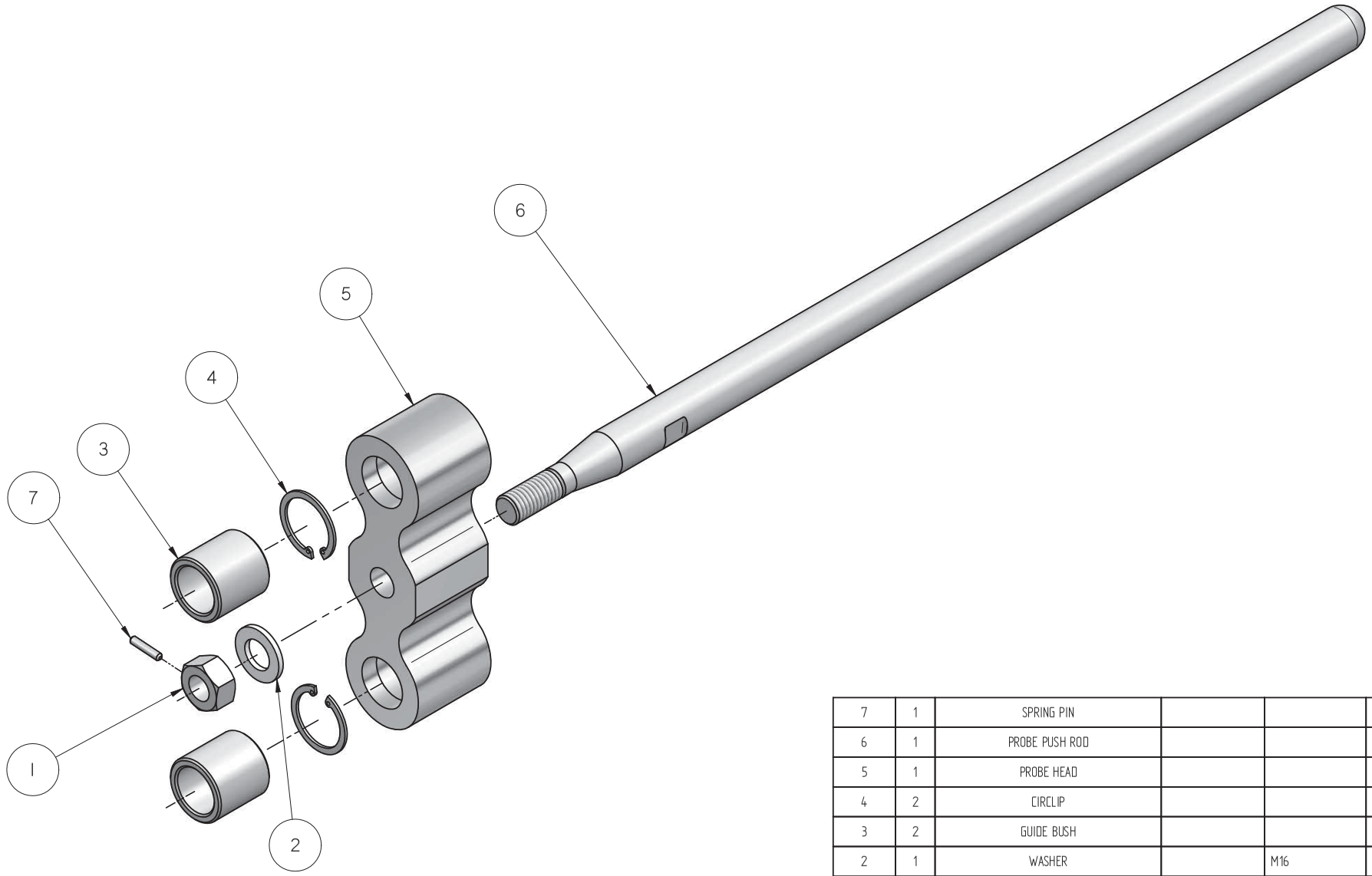
Sheet 1 of 1 | Date 18/02/2008

Drawing no. 1-036-00-05

SURFACE FINISH UNLESS STATED OTHERWISE	MACHINING TOLERANCES UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9	X = +/- 0.5
▽▽ FINE MACHINE N8	X . X = +/- 0.25
▽▽▽ GRIND N6	X . XX = +/- 0.05
	ANGLES +/- 0.5°
	DIMENSIONS IN MILLIMETERS

3RD ANGLE

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by



Ref.no.	Qnt.	Part name	Material	Dimension	Remark
7	1	SPRING PIN			617
6	1	PROBE PUSH ROD			6-083-02-01
5	1	PROBE HEAD			1-083-01-02
4	2	CIRCLIP			1-065-00-01
3	2	GUIDE BUSH			1-041-00-01
2	1	WASHER		M16	0M16-000-20
1	1	HEXAGON NUT		M16x1.5-6g	0M16-000-10

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
markbramley	markbramley	–	–	A3	–	–	–	–

DAWSON CONSTRUCTION PLANT LTD.

PROBE ASSEMBLY

Sheet 1 of 1 | Date 28/07/2009

Drawing no. 6-083-00-01

SURFACE FINISH
UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9
▽▽ FINE MACHINE N8
▽▽▽ GRIND N6

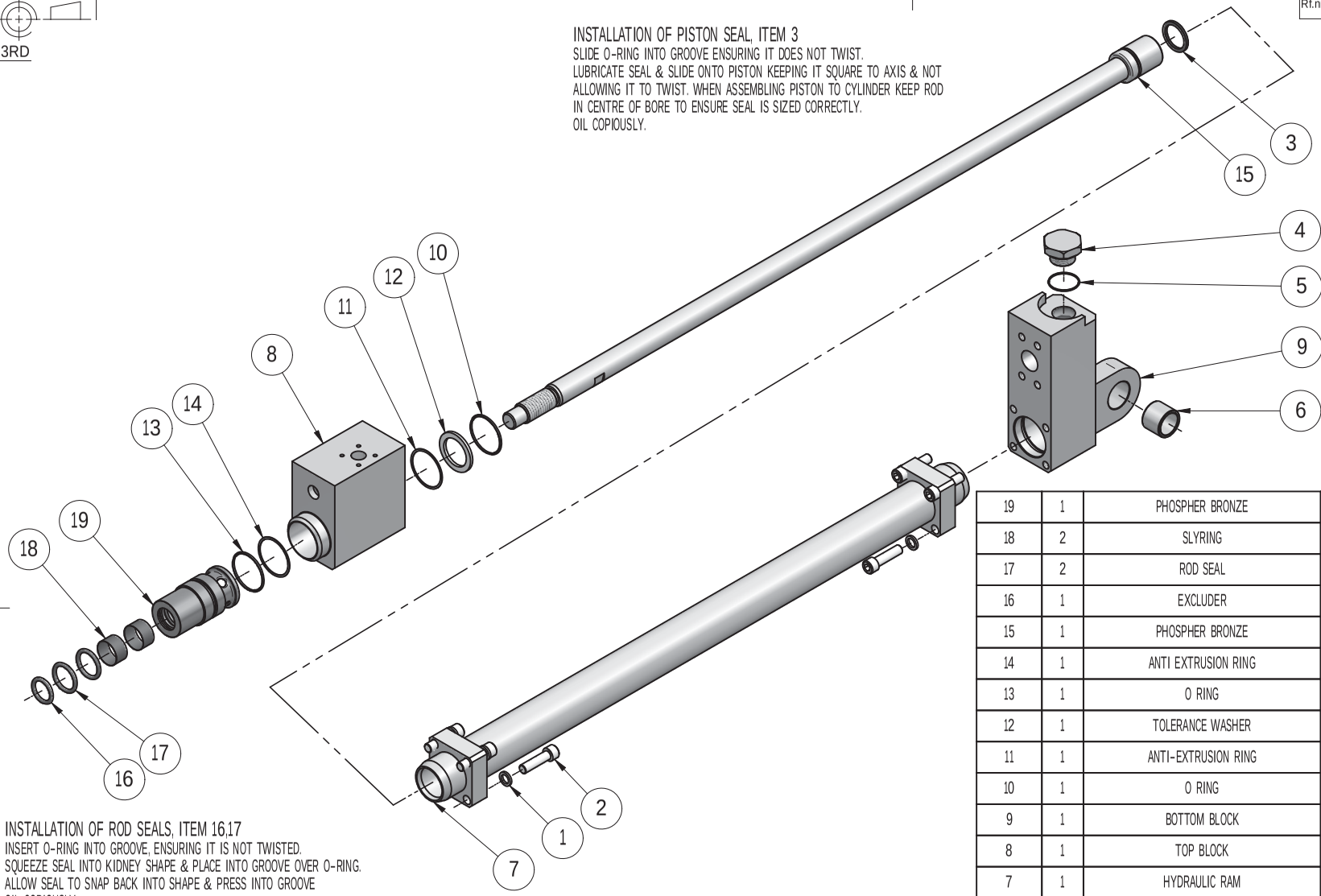
MACHINING TOLERANCES
UNLESS STATED OTHERWISE
X = +/- 0.5
X . X = +/- 0.25
X . XX = +/- 0.05
ANGLES +/- 0.5°
DIMENSIONS IN MILLIMETERS

3RD

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by

INSTALLATION OF PISTON SEAL, ITEM 3

SLIDE O-RING INTO GROOVE ENSURING IT DOES NOT TWIST.
LUBRICATE SEAL & SLIDE ONTO PISTON KEEPING IT SQUARE TO AXIS & NOT ALLOWING IT TO TWIST. WHEN ASSEMBLING PISTON TO CYLINDER KEEP ROD IN CENTRE OF BORE TO ENSURE SEAL IS SIZED CORRECTLY.
OIL COPIOUSLY.



GENERAL NOTES:-

- DIMENSIONS TO BE PRIMED WITH ZINC PHOSPHATE
- DO NOT PAINT OVER HYDRAULIC INTERFACE, BORE OF INNER BUSH OR PISTON ROD.
- FLUID PORTS TO BE PROTECTED WITH PLASTIC CAPS
- RAM TO BE CLEARLY IDENTIFIED WITH DCP PART NUMBER AND RAM SERIAL NUMBER

PRESSURE TESTING

- BOTH ENDS OF RAM INDEPENDENTLY TO 350 BAR
- CHECK INTEGRITY OF ALL SEALS

LOCTITING PROCEDURE

- CLEAN PARTS TO BE LOCTITED USING LOCTITE 7063 ALLOW CLEANER TO DRY (2-3 MINUTES)
- APPLY LOCTITE ACTIVATOR 7471 TO BOTH SURFACES ALLOW ACTIVATOR TO DRY (2-3 MINUTES)
- APPLY LOCTITE ADHESIVE 270 TO COMPONENTS AND ASSEMBLE
- ADHERE TO ANY LOCTITE SAFETY RECOMMENDATIONS.

Ref.no.	Qnt.	Part name	Material	Dimension	Remark
19	1	PHOSPHER BRONZE			6-708-27-01
18	2	SLYRING			6-708-22-01
17	2	ROD SEAL			6-708-21-01
16	1	EXCLUDER			6-708-20-01
15	1	PHOSPHER BRONZE			6-708-03-01
14	1	ANTI EXTRUSION RING			6-008-30-01
13	1	O RING			6-008-29-01
12	1	TOLERANCE WASHER			6-008-28-01
11	1	ANTI-EXTRUSION RING			6-008-25-01
10	1	O RING			6-008-24-01
9	1	BOTTOM BLOCK			6-008-06-02
8	1	TOP BLOCK			6-008-05-03
7	1	HYDRAULIC RAM			6-008-04-03
6	1	HARDENED INNER BUSH			2-097-00-01
5	1	O RING			2-008-27-01
4	1	HYDRAULIC RAM			2-008-26-01
3	1	PISTON SEAL (ROUGH)			2-008-23-01
2	8	SOCKET HEAD CAP SCREW	12.9	M16 x 60 LG	0M16-060-02
1	8	NORD-LOCK WASHER		M16	0M16-000-27

INSTALLATION OF ROD SEALS, ITEM 16,17

INSERT O-RING INTO GROOVE, ENSURING IT IS NOT TWISTED.
SQUEEZE SEAL INTO KIDNEY SHAPE & PLACE INTO GROOVE OVER O-RING.
ALLOW SEAL TO SNAP BACK INTO SHAPE & PRESS INTO GROOVE
OIL COPIOUSLY.

INSTALLATION OF ROD SEALS, ITEM 19

FORM STRIP INTO DIAMETER SMALLER THAN BORE.
SLIDE INTO PLACE, KEEPING IT SQUARE & ALLOW IT TO RECOVER TO GROOVE DIAMETER, PRESS BACK INTO GROOVE OIL COPIOUSLY.

SURFACE FINISH	MACHINING TOLERANCES
UNLESS STATED OTHERWISE	UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9	X = +/- 0.5
▽▽ FINE MACHINE N8	X . X = +/- 0.25
▽▽▽ GRIND N6	X . XX = +/- 0.05
	ANGLES +/- 0.5°
	DIMENSIONS IN MILLIMETERS

RAM SPECIFICATIONS:-

CYLINDER BORE - 55mm
ROD DIAMETER - 45mm
WORKING PRESSURE - 240bar (350 bar max).
MAXIMUM ROD SPEED 5.03 m/s
ROD MATERIAL: EN24T GROUND PRIOR TO CHROMING
ROD HARD CHROMED TO A THICKNESS OF 0.1MM
CYLINDER ENDS MANUFACTURED FROM BS4360: GRADE 50B PROFILES

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
markbramley	markbramley	-	-	A3	-	-	-	-

DAWSON CONSTRUCTION PLANT LTD.

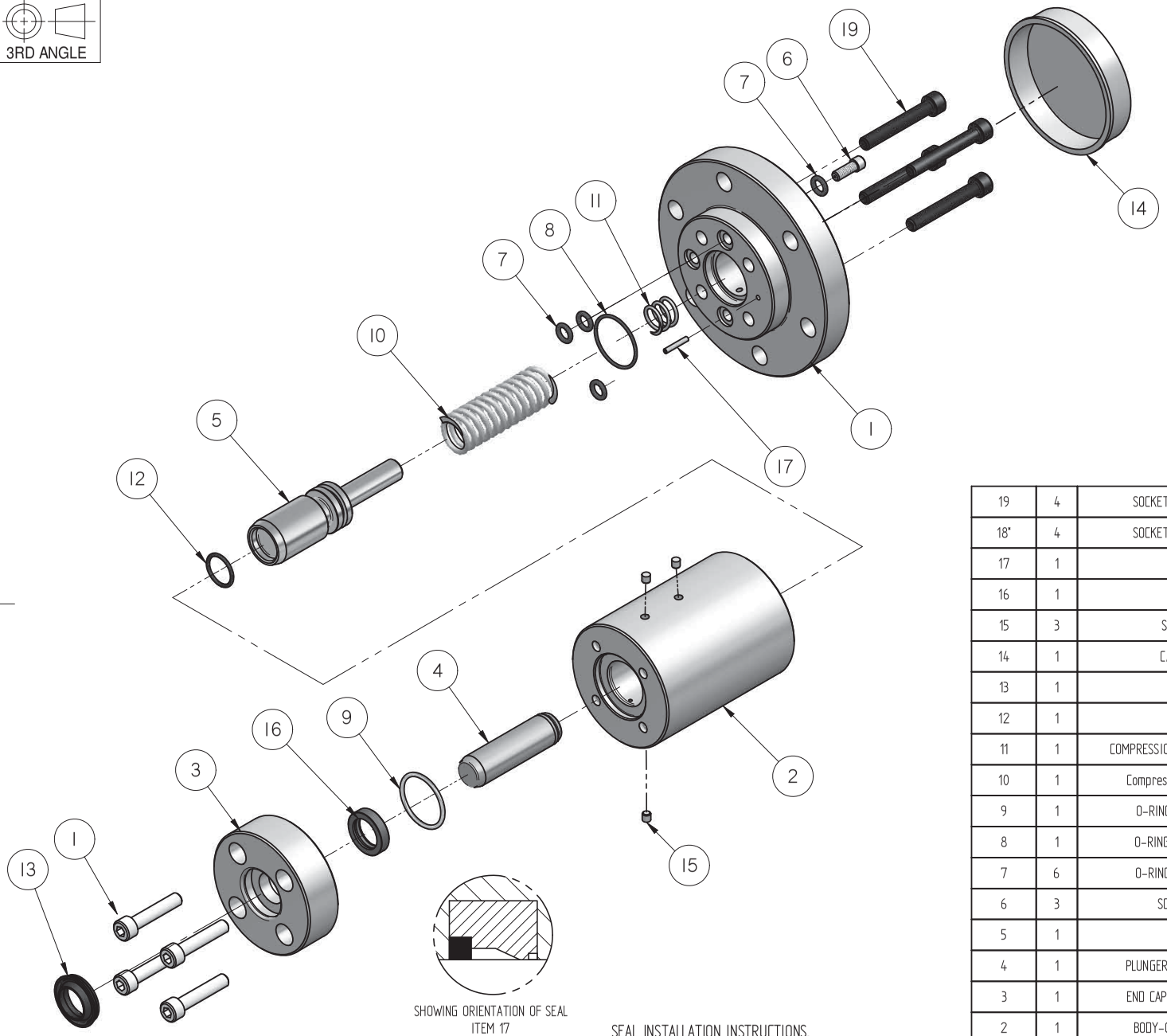
HYDRAULIC RAM

Sheet 1 of 1 | Date 27/07/2009

Drawing no. 6-708-00-01

3RD ANGLE

Rf.nr	Qnt.	Revision	Date	Intro.	Appr.by



SHOWING ORIENTATION OF SEAL ITEM 17

ASSEMBLY NOTES

1. PLUNGER (ITEM 5) AND SEAL (ITEM 17) TO BE OILED BEFORE ASSY. PLUNGER TO BE KEPT AS PERPENDICULAR TO THE END CAP AS POSSIBLE DURING ASS'Y AS THE PLUNGER RESIZES THE SEAL..

2. ASSEMBLE ITEM 8 & 18 TO ITEM 2, & ITEM 9 TO ITEM 3 USING CLEAN OIL. BOLT TOGETHER USING ITEM 19 & LOCTITE 242 TORQUE TIGHTEN TO 50N/mm FIT ITEM 7 , TORQUE TO 20N/mm.

3. LOAD ITEM 11 ONTO PISTON ITEM 6, THEN USING CLEAN OIL ENTER ASSEMBLY INTO BORE ITEM 3. SECURE ENDCAP ASSY ITEM 4 TO PREVIOUS ASSEMBLY WITH ITEM 10, USING ITEM 1 & LOCTITE 242, TORQUE TIGHTEN TO 50N/mm.

19	4	SOCKET HEAD CAP SCREW		M8 x 60	0M10-100-02
18*	4	SOCKET HEAD CAP SCREW			0M10-100-02
17	1	SPRING PIN		Φ3 x 18	2-026-06-05
16	1	STEP SEAL			1-084-23-01
15	3	SEALING PLUG	MB700050		1-084-20-01
14	1	CAP (H86/053)	ALLIANCE		1-084-16-01
13	1	ROD WIPER			1-084-15-01
12	1	SNAP RING			1-084-12-01
11	1	COMPRESSION SPRING (LC-080J-11)	LEE SPRINGS		1-084-11-01
10	1	Compression Spring Special	LIONS SPRINGS		1-084-10-02
9	1	O-RING (206-134-4470)	DOWTY	Φ34x2.5	1-084-09-02
8	1	O-RING (200-026-4470)	DOWTY	Φ31.47x1.78	1-084-08-01
7	6	O-RING (200-109-4470)	DOWTY	Φ7.6x2.62	1-084-07-01
6	3	SCREW SPECIAL			1-084-06-01
5	1	PISTON			1-084-05-01
4	1	PLUNGER OVERTRAVEL VALVE			1-084-04-01
3	1	END CAP OVERTRAVEL VALVE			1-084-03-01
2	1	BODY-OVERTRAVEL VALVE			1-084-02-01
1	1	FLANGE			1-084-01-01

Ref.no.	Qnt.	Part name	Material	Dimension	Remark

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
M.D.B	M.D.B	–	–	A3	–	–	–	–

DAWSON CONSTRUCTION PLANT LTD.

OVERTRAVEL VALVE

Sheet 1 of 1 | Date 20/02/08

Drawing no. 1-084-00-05

SEAL INSTALLATION INSTRUCTIONS.

ROD SEAL - ITEM 17
SQUEEZE THE SEAL RING TOGETHER TO FORM A KIDNEY SHAPE. PLACE THE SEAL RING IN THE GROOVE.

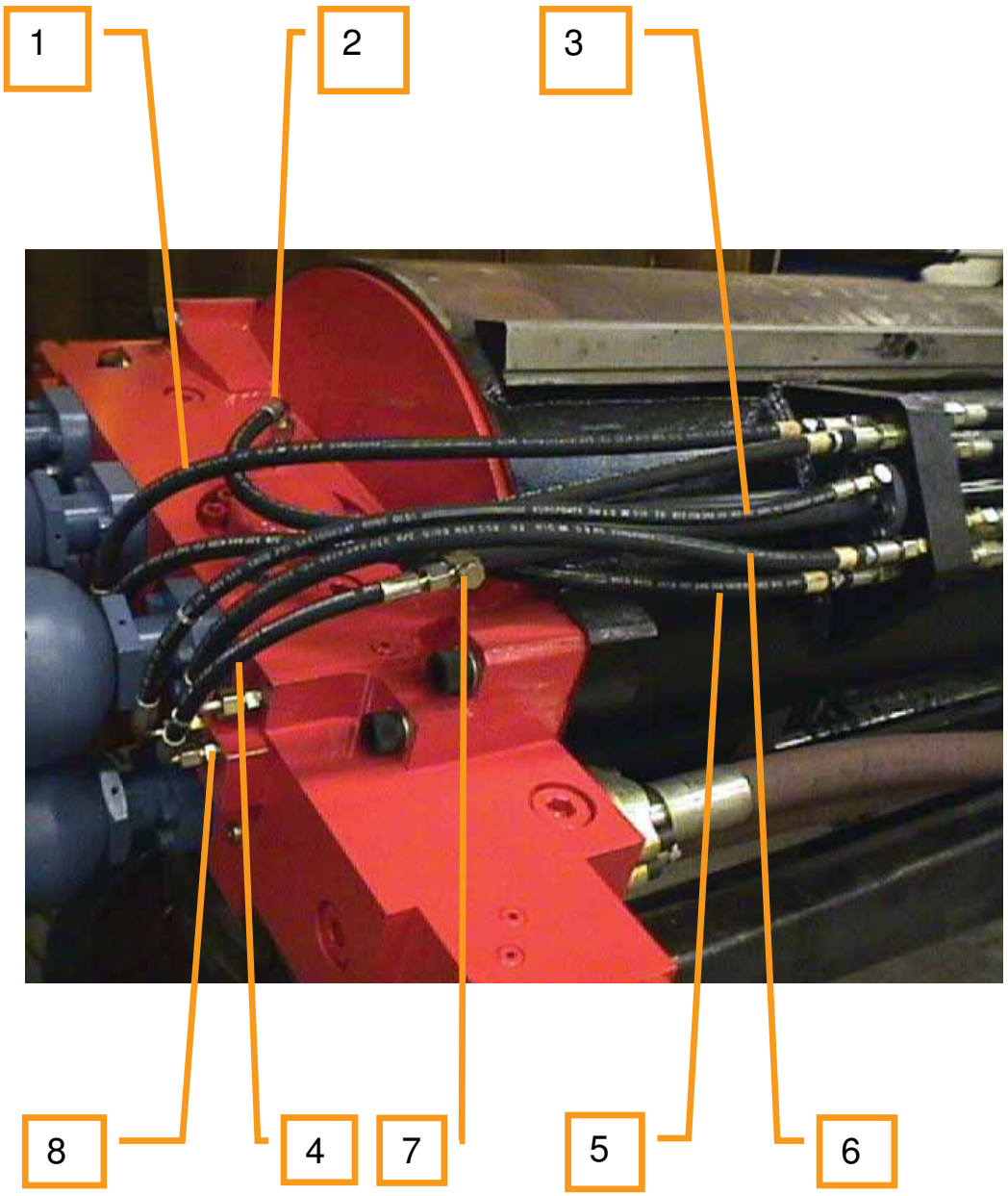
ROD WIPER - ITEM 14
SNAP THE SEAL INTO POSITION

SURFACE FINISH
UNLESS STATED OTHERWISE
▽ ROUGH MACHINE N9
▽▽ FINE MACHINE N8
▽▽▽ GRIND N6

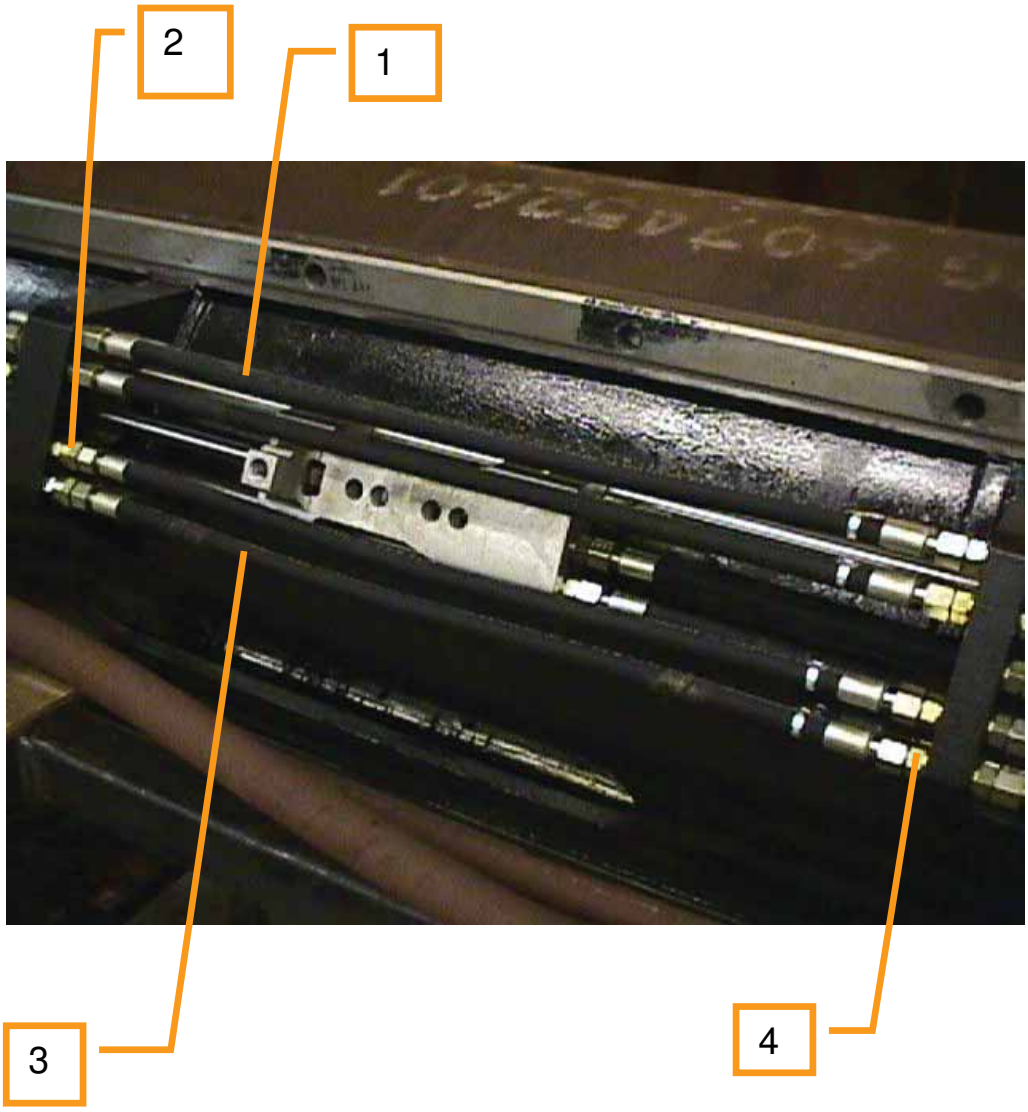
MACHINING TOLERANCES
UNLESS STATED OTHERWISE
X = +/- 0.5
X . X = +/- 0.25
X . XX = +/- 0.05
ANGLES +/- 0.5°
DIMENSIONS IN MILLIMETERS

APPENDIX 8.1.1 -

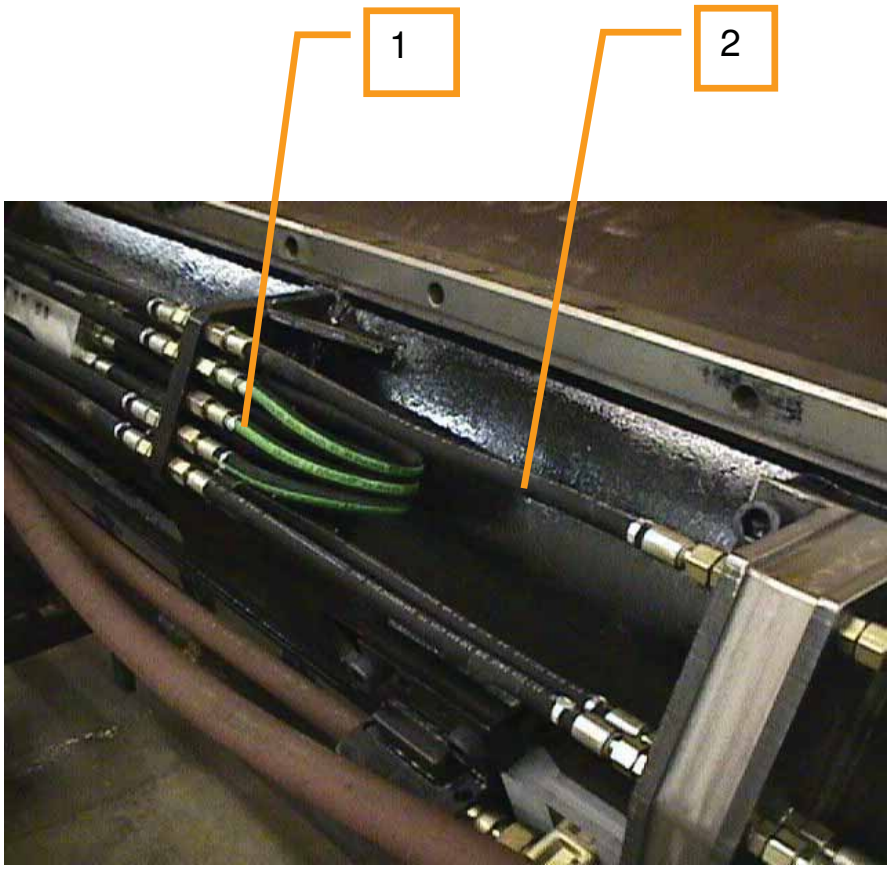
HYDRAULIC HOSE DETAILS FOR HPH6500 HAMMER



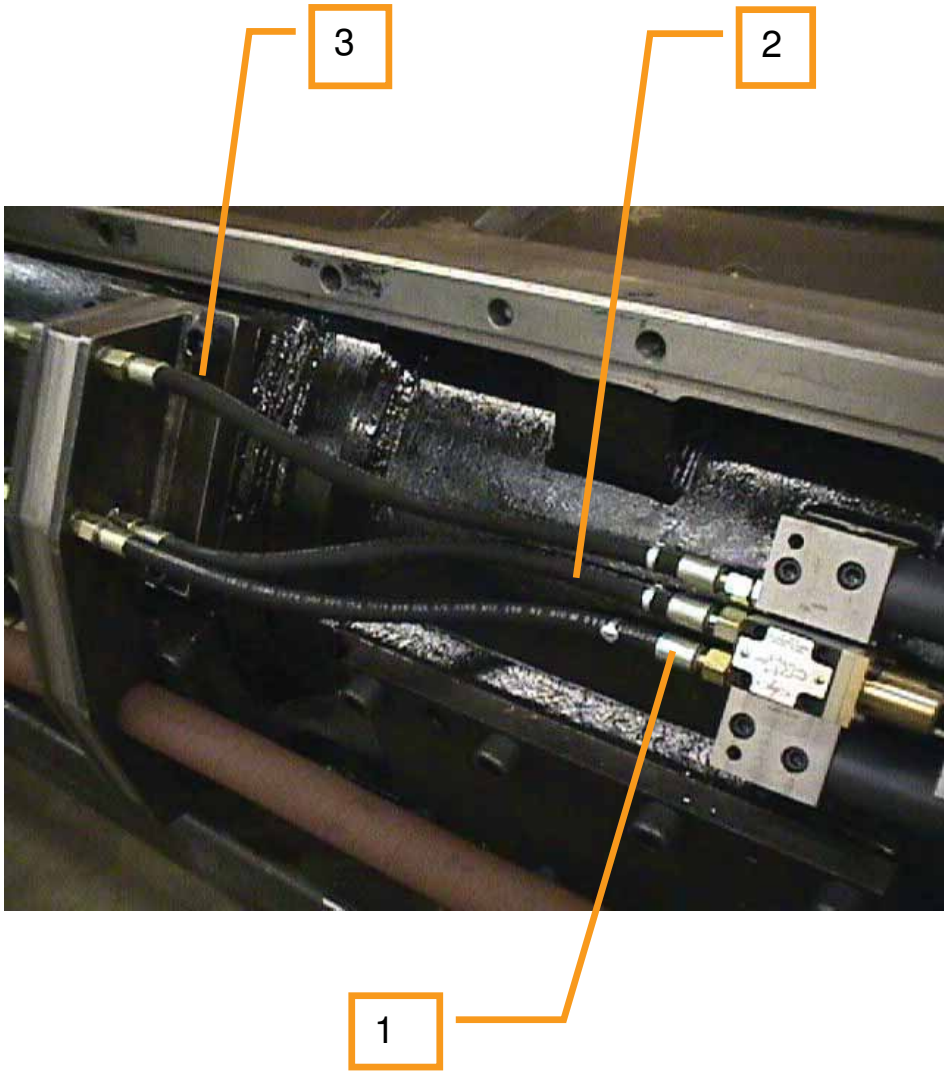
ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.110.09.01	1	Hose Assembly
2	6.110.11.01	1	Hose Assembly
3	6.026.30.01	1	Hose Assembly
4	6.026.31.01	1	Hose Assembly
5	6.110.12.01	1	Hose Assembly
6	6.110.10.01	1	Hose Assembly
7	6.026.32.01	2	Banjo Coupling
8	1.111.12.01	2	Male Stud Coupling



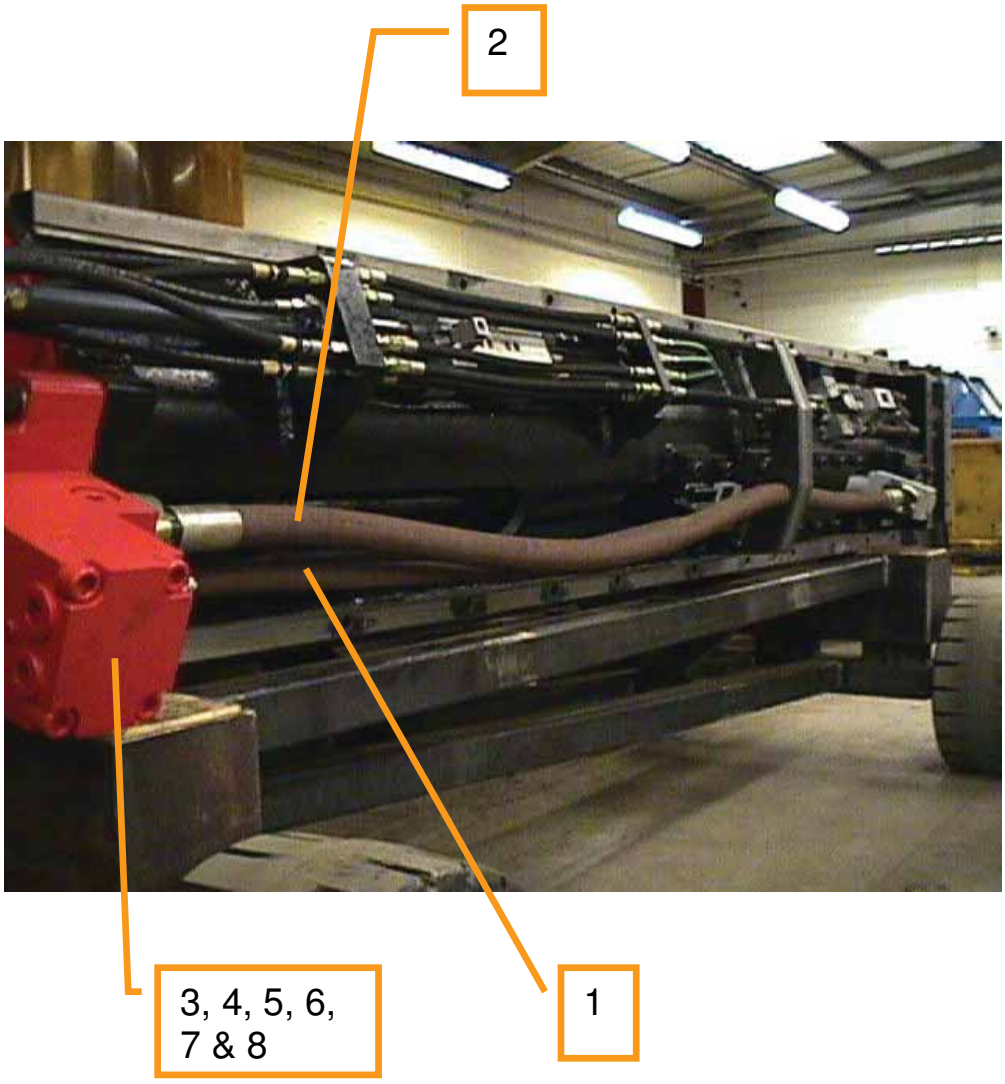
ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.110.01.01	4	Hose Assembly
2	1.100.03.02	2	Check Valve
3	6.110.03.01	2	Hose Assembly
4	1.111.14.02	36	Male Stud Coupling



ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.110.04.01	3	Hose Assembly
2	6.110.05.01	3	Hose Assembly

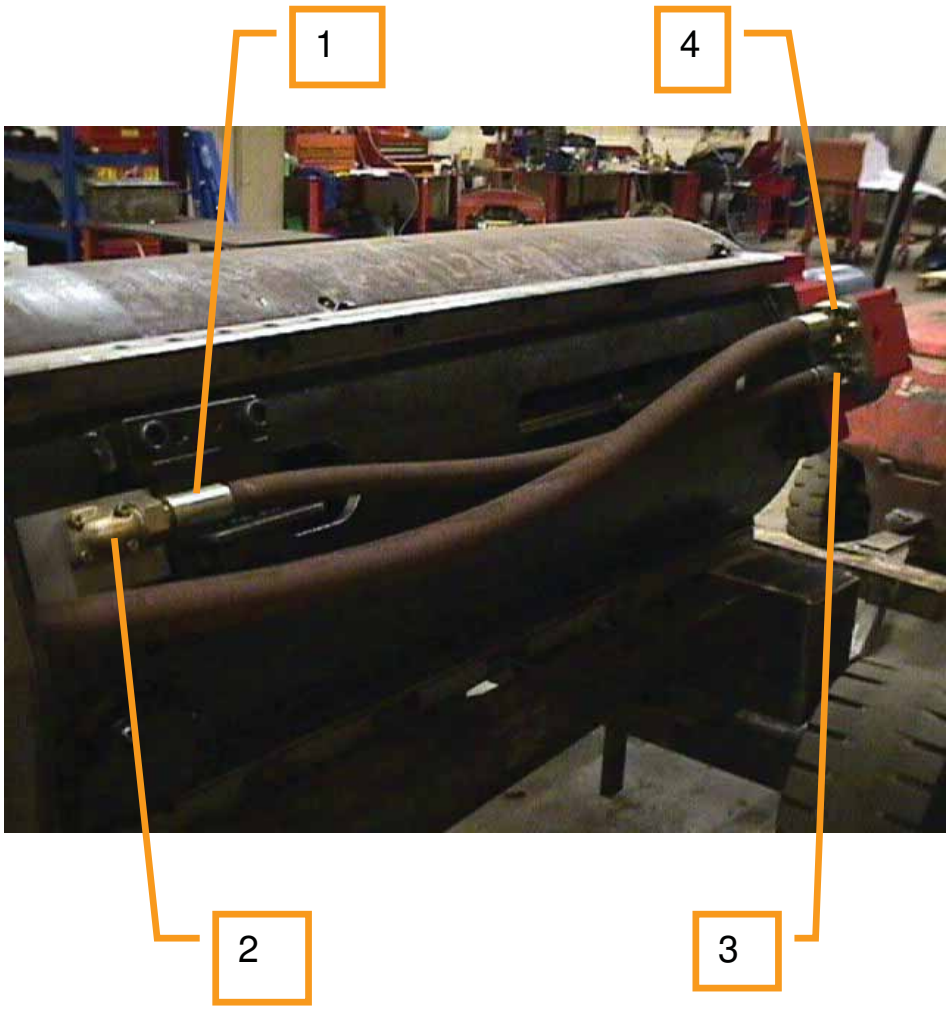


ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.110.06.01	1	Hose Assembly
2	6.110.07.01	1	Hose Assembly
3	6.110.08.01	1	Hose assembly



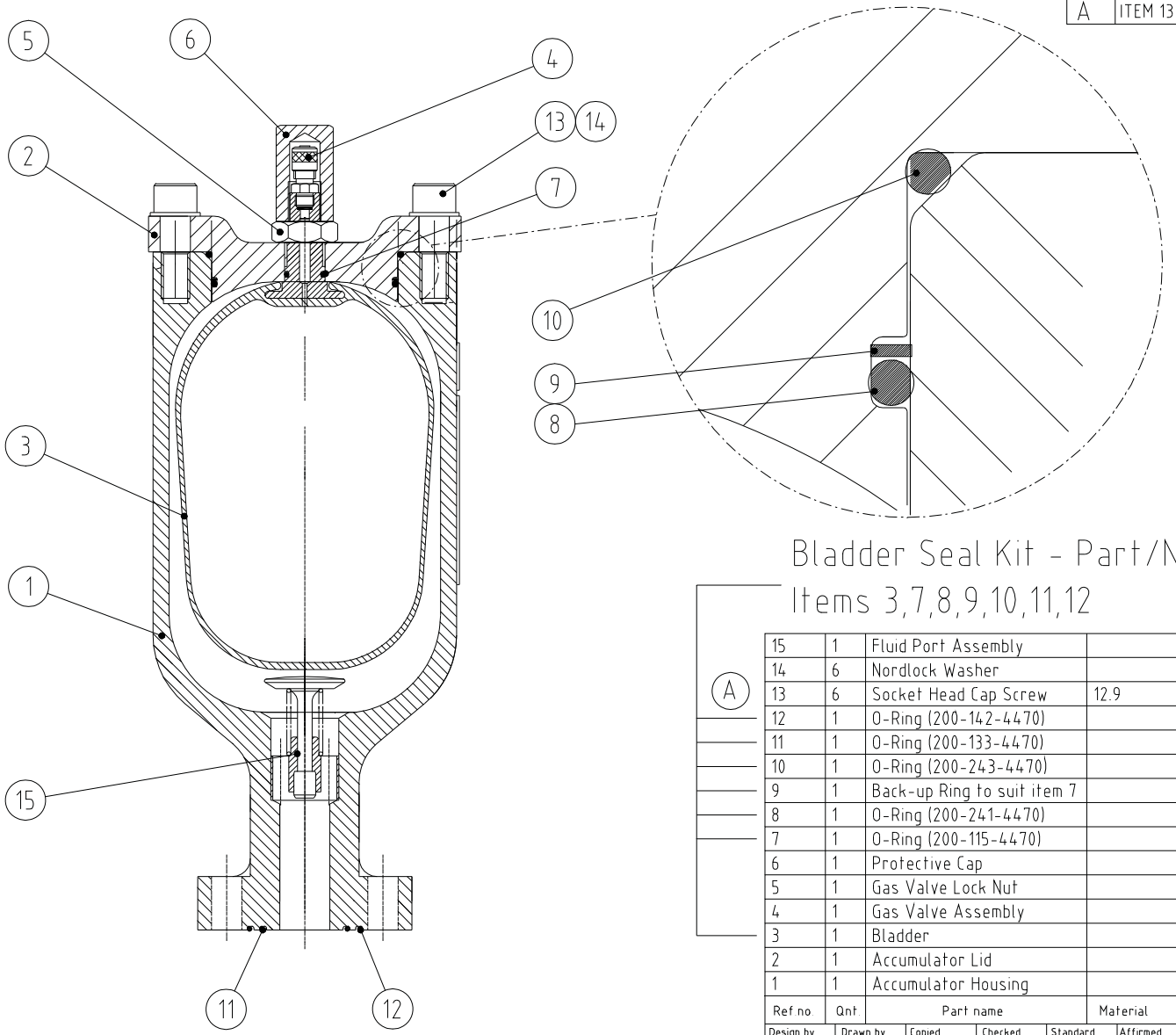
ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.111.01.01	2	Hose Assembly
2	6.111.02.01	2	Hose Assembly
3	1.501.07.01	1	1¼" BSP M/M Adaptor
4	2.501.06.01	1	1½" BSP M/M Adaptor
5	1.501.08.01	2	3/8" Restricted M/M Adaptor
6	1.102.03.01	1	1¼" BSP Dowty Seal
7	1.102.06.01	1	1½" BSP Dowty Seal
8	1.100.01.01	2	3/8" Dowty Seal

Inlet Manifold



ITEM	PART NUMBER	QUANTITY	DESCRIPTION
1	6.111.01.01	2	Hose Assembly
2	1.111.17.01	2	Flanged Elbow
3	1.111.20.01	2	1” SAE 6000 Split Flange Clamps
4	1.088.00.01	4	1½” SAE 6000 Split Flange Clamps

Rf nr	Qnt	Revision	Date	Intro	Appr by
A		ITEM 13 WAS 45 LONG	02/12/05	PLW	



Bladder Seal Kit - Part/No 1-048-30-06

Items 3,7,8,9,10,11,12

A

Ref no	Qnt	Part name	Material	Dimension	Remark
15	1	Fluid Port Assembly			1-048-06-02
14	6	Nordlock Washer		M16	0M16-000-27
13	6	Socket Head Cap Screw	12.9	M16 x 55	0M16-055-02
12	1	O-Ring (200-142-4470)			1-048-19-01
11	1	O-Ring (200-133-4470)			1-048-18-01
10	1	O-Ring (200-243-4470)			1-048-17-01
9	1	Back-up Ring to suit item 7			1-048-16-01
8	1	O-Ring (200-241-4470)			1-048-15-01
7	1	O-Ring (200-115-4470)			1-048-14-01
6	1	Protective Cap			1-048-11-01
5	1	Gas Valve Lock Nut			1-048-10-01
4	1	Gas Valve Assembly			1-048-09-05
3	1	Bladder			1-048-01-06
2	1	Accumulator Lid			1-048-13-05
1	1	Accumulator Housing			1-048-12-05

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
M Lee								

DAWSON CONSTRUCTION PLANT LTD.

Accumulator - one piece with Poppet

File

Date 30-07-03

Drawing no. 1-048-00-06

Important Safety Notes for Bladder Accumulators

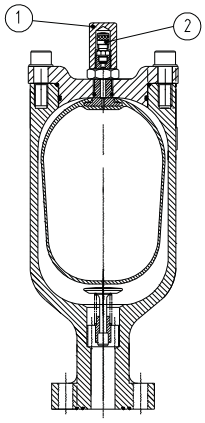
1. Use nitrogen gas only
2. All accumulators are supplied precharged to 100bar (1450 psi) unless sent via air-freight – in which case they will be shipped unprecharged
3. Always use the gas filling apparatus supplied by Dawson. This equipment includes a regulator valve specifically designed for use with hammer accumulators where the precharge pressure is less than the supply cylinder pressure.
4. Read the instructions below fully before attempting to adjust the precharge in any accumulator
5. Routine maintenance on the accumulator in-situ or removal of the accumulator must only be carried out when the hydraulic system pressure has been completely removed.

Accumulator Pre-charge Pressure

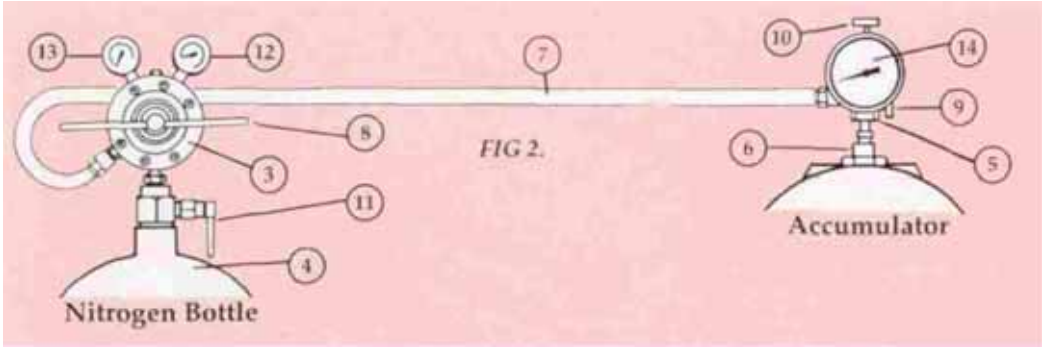
High pressure accumulator – 100 bar Low Pressure Accumulator – 3 bar

Pre-charge Procedure

Figure 1



1. Remove Protective Cap (1) and Sealing cap (2) – see figure 1.
2. Attach the Regulator Valve to the nitrogen cylinder – see figure 2.
3. Attach the charging set (5) to the accumulator gas valve assembly (6) and connect charging hose (7) between the regulator and the charging set connection.
4. Back off handle (8) anticlockwise until loose. Check gas bleed valve (9) on charging set is closed and screw hand wheel (10) clockwise to open gas valve.
5. Open nitrogen cylinder valve by turning key (11), cylinder pressure will register on right hand gauge (12). This pressure should be checked against the required precharge pressure.
6. Turn handle (8) clockwise until outlet pressure on left hand gauge (13) registers 10% higher than required precharge pressure (110 bar or 3.5 bar). When pressure on the charging set and outlet gauges are equal, close nitrogen cylinder valve.
7. Turn hand wheel (10) anticlockwise to seal gas valve.
8. Crack bleed valve (9) to exhaust gas from charging hose and remove hose from charging set and replace hose connection sealing cap.
9. Close bleed valve, turn hand wheel (10) clockwise to open gas valve and crack bleed valve (9) to vent down to required precharge pressure. Close bleed valve.
10. Turn hand wheel (10) anticlockwise to reseal gas valve, crack bleed valve and remove charging set from the accumulator.
11. Test accumulator gas valve for leaks using soapy water or similar.
12. Replace sealing cap (2) and tighten with pliers. Replace protective cap using a wrench.



Inspection and repair of Accumulators

Due to the nature of the design and specific assembly procedures it is recommended that the accumulators should only be inspected and repaired by a competent person. Dawson Construction Plant Limited or their approved dealers will be happy to undertake this work as required. Please note the Important Safety Notes at the beginning of this section.

Removal of Accumulator Pre-charge

- Remove Protective Cap (Item 6) from the Bladder Stem by unscrewing anti-clockwise
- Remove the Sealing Cap from the Gas Valve Assembly (Item 4)
- Connect Charging Set to the Gas Valve Assembly
- Release all the gas pressure by opening the Bleed Valve (Item 9 on the gas Charging Set)
- Disconnect the Charging Set from the Accumulator

Removal of Accumulator Lid & Bladder

- Remove M16 Socket Head Cap Screw (Item 13) and washers (Item 14)
- Remove Lid & Bladder (Item 2) from Accumulator Housing (Item 1)

Cleaning and Inspection

- Clean all metallic components with an organic solvent – do not use on rubber components
- Inspect the Bladder (Item 3) for any visible signs of damage. (Cracking or Surface Abrasion etc.)
- Inspect the Housing (Item 1) and Lid (Item 2) both inside and outside for signs of corrosion / mechanical damage.
- Replace any parts found or considered to be defective.
- Replace the following parts irrespective of condition:
    1) O-Rings – items 7, 8,10, 11 and 12
    2) Back -up Ring – item 9
- If the unit was removed from the system the connecting O-Rings (items 11 and 12) should be replaced irrespective of condition

Replacement of Bladder – having removed the Accumulator Lid

- Unscrew the Gas Valve Assembly (Item 4) from the Bladder Stem by turning anti-clockwise.

- Remove the Locknut (Item 5) from the Bladder Stem by turning the Locknut anti-clockwise, remove the bladder from the Accumulator Lid.

Fitting of Bladder to Lid

- Ensure 'O'-Ring (Item 8) is fitted to new the Bladder's stem. Push the stem through the central hole in the Lid (Item 2) then fit Locknut (Item 5)

Fitting of Bladder & Lid to Accumulator Body

- Checking that all O-Rings & Back-up Rings are in Place. Expel all nitrogen from the Bladder (Item 2) to enable it to pass through the top opening in the Housing (Item 1).

- Insert the assembled Bladder & Lid into the Accumulator Housing aligning the holes in the Lid with the M16 tapped holes in the Housing

- Ensure the M16 Socket Head Cap Screws (Items 13) are in good clean condition then install them together with the M16 Nordlock washers (Items 14) into the top of the Housing

- Tighten Items 13 to a torque of 231Nm (173 lbs.ft)

- Re-fit the Gas Valve Assembly (Item 4) and tighten

- Re-fit the Protective Cap (Item 6) and tighten

Re-Assembly is now complete and the accumulator is ready to be Pre-charged – see details at the top of this section.

PRIOR TO APPLYING HYDRAULIC PRESSURE TO THE SYSTEM THE ACCUMULATOR MUST BE PRECHARGED WITH NITROGEN IN ACCORDANCE WITH THE ABOVE INSTRUCTIONS. FAILURE TO DO SO WILL RESULT IN BLADDER FAILURE.

Appendix 8.3 - Energy Monitoring System (EMS) instructions and parts list

(optional fit)

An overview of the system

The system works by measuring the velocity of the drop weight just before impact. This value is used, along with the known ram weight, to calculate the kinetic energy of the ram weight before each impact.

To measure the velocity of the drop weight, two magnetic sensors are used to sense a corrugated profile that has been machined into the drop weight. As the corrugations pass the sensors a chain of pulses is generated. The on hammer electronics then condition the pulses, perform some calculations, and format the information. The information is then sent to the display unit in the power pack either via a radio link or a wire link.

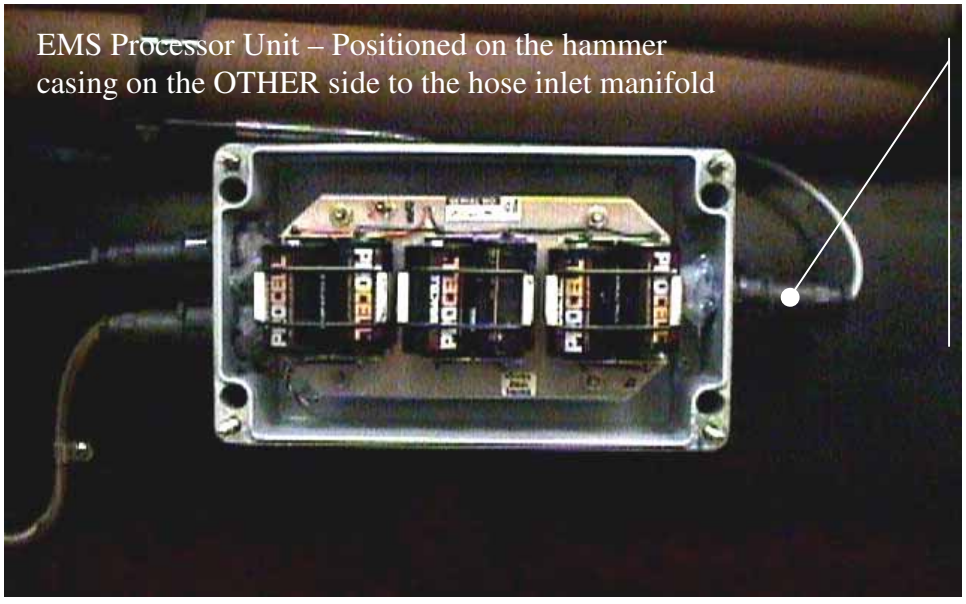
Power for the system is provided by 6 batteries (Duracell D type) these are mounted inside the hammer electronics enclosure, battery life is 1000 hours +. A pressure switch mounted on the main hydraulic valve block turns on the system. The system turns off automatically 3-4 minutes after hydraulic pressure is removed.

System Operation

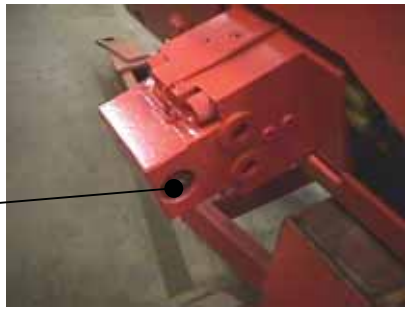
The system can communicate between the hammer and display via either radio or wire link. Decide which is most appropriate for the particular job.

Radio + No physical connection between power pack and hammer
- Needs clear line of sight between hammer antenna and power pack antenna
- Will not work underwater

Wire + Will work underwater
+ Will not be affected by obstructions between hammer and pack
- Requires physical connection

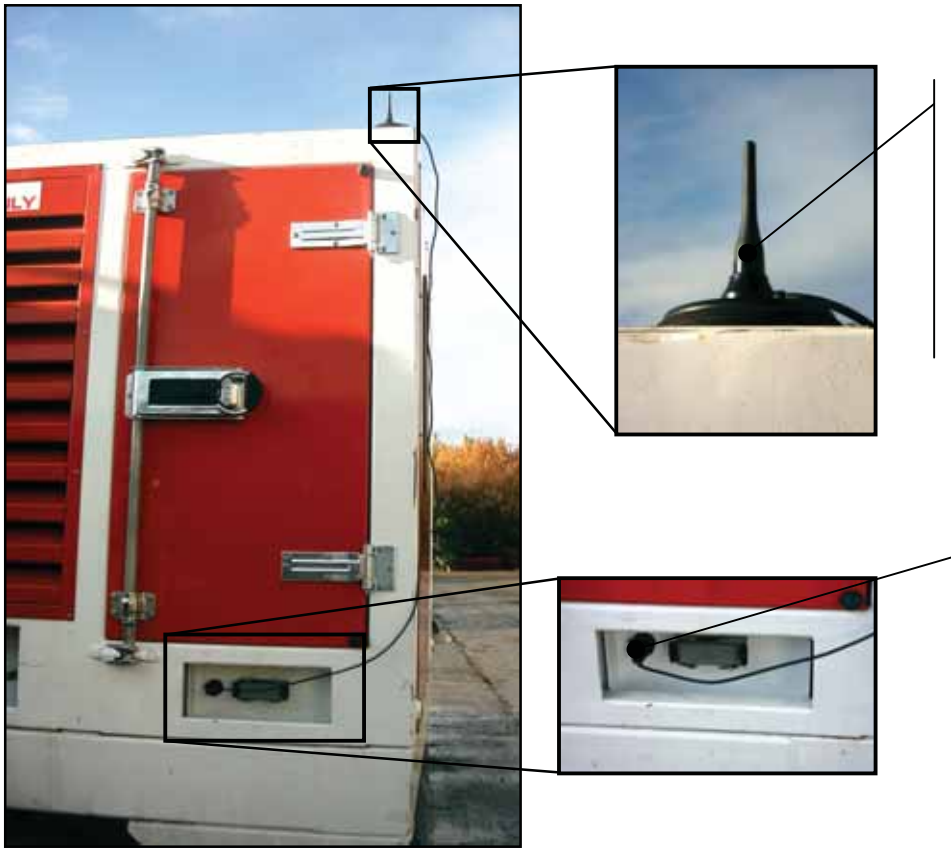


Plug going to the antenna for radio link **OR** plug going to socket on hydraulic inlet manifold for wire link.



If using wire link, the wire to the power pack plugs in here (hydraulic inlet manifold)

Setting the power pack end for radio or wire link:



If using radio link, position the antenna on pack top. (magnetic mounted)

Plug in antenna for radio link OR wire from hose inlet manifold for wire link.

Using the system

The display has three modes - Running, Lap, and Reset.

- Running: **Top display** - last blow energy.
  Middle display - blows per minute (averaged over the last 5 blows).
  Bottom display - live blow counter.

- Lap: **Top display** - average blow energy over the last lap.
  Middle display - frozen blows per minute.
  Bottom display - frozen lap count preceded by a letter "L" as an indication of lap state.

- Reset: **Top display** - radio signal strength 0-100%
  Middle display - monitor battery strength (0-9.0V)
  Bottom display - total blows since last reset.

Switching modes

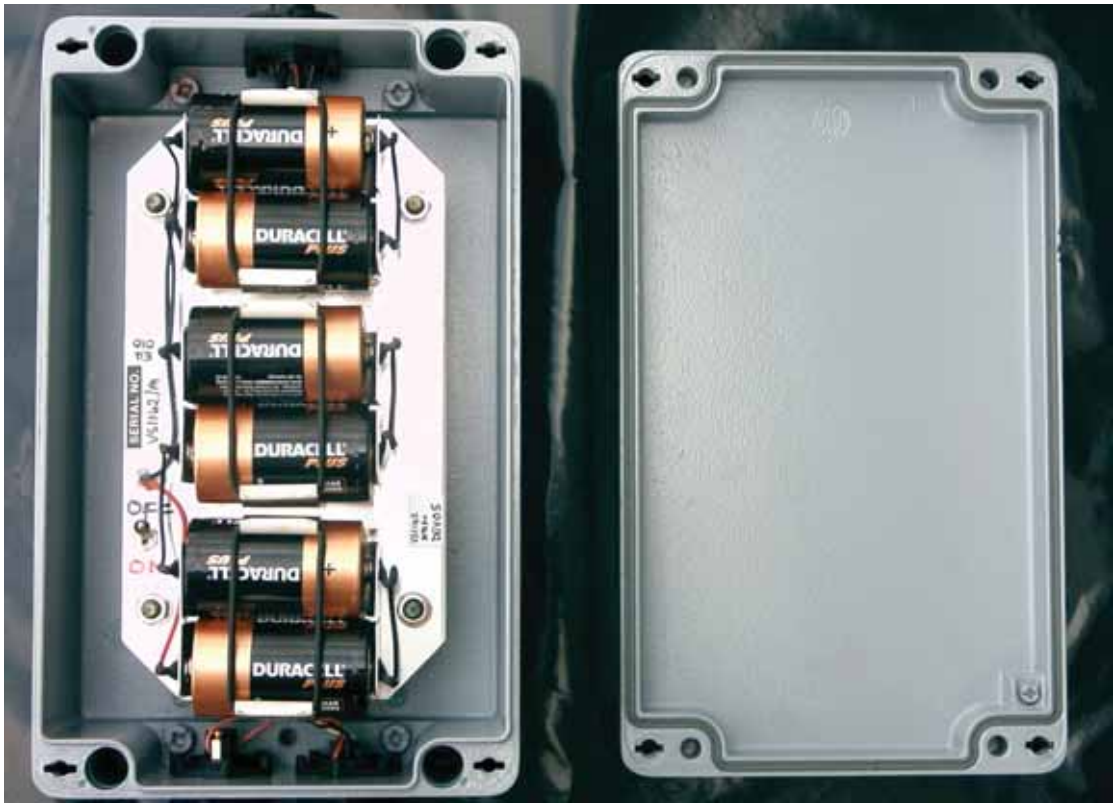
- Press the lap button for less than 1 second to toggle the display between running and lap mode. (the lap counters are reset on entry into the lap mode).

- Holding the lap button for more than 1 second will cause the unit to enter the reset mode (remains in the reset state until the button is released)

System maintenance Every 500 hours

a. Replace the 6 duracell type D batteries.

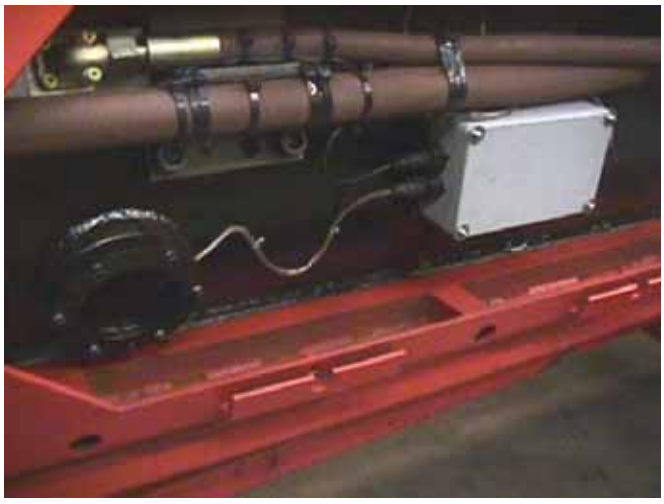
Remove the lid of the processor unit (4 M6 nyloc nuts), this is mounted on the hammer casing on the OTHER side to the hydraulic hose inlets. Note the orientation before removing the old batteries. Ensure the protective tape to prevent the batteries from chafing on the steel supports is in place.

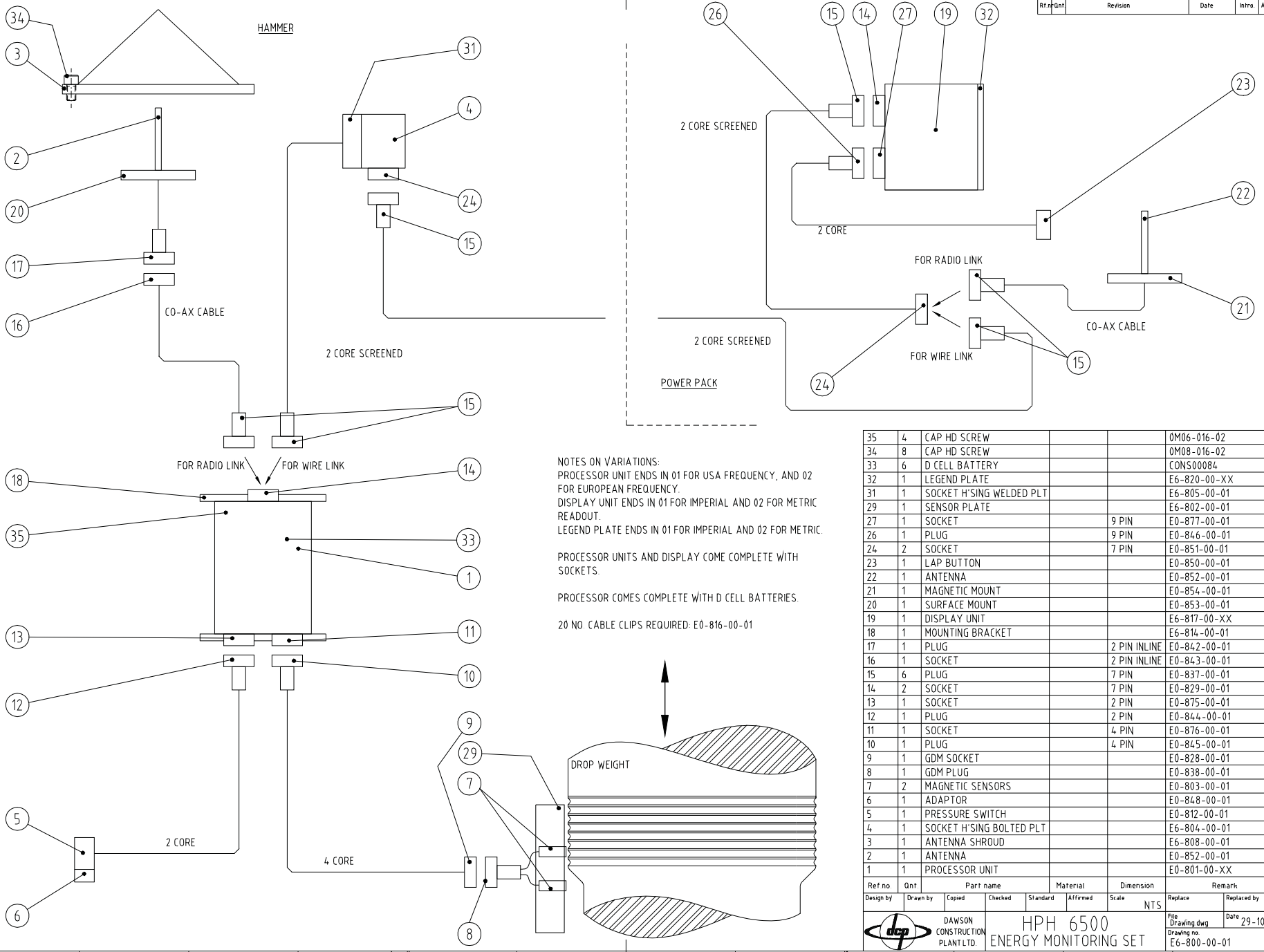


c. Check all plugs and sockets are screwed up tightly and cabling is in good condition.

d. Check the two magnetic sensors for physical damage, also measure their resistance. This should be between 300-350 ohms. (across pins 1-2 and 3-4 on the 4 pin plug)
Replace the complete sensor assembly if there are any signs of damage.

Magnetic sensor plate





NOTES ON VARIATIONS:
PROCESSOR UNIT ENDS IN 01 FOR USA FREQUENCY, AND 02 FOR EUROPEAN FREQUENCY.
DISPLAY UNIT ENDS IN 01 FOR IMPERIAL AND 02 FOR METRIC READOUT.
LEGEND PLATE ENDS IN 01 FOR IMPERIAL AND 02 FOR METRIC.

PROCESSOR UNITS AND DISPLAY COME COMPLETE WITH SOCKETS.

PROCESSOR COMES COMPLETE WITH D CELL BATTERIES.

20 NO. CABLE CLIPS REQUIRED: E0-816-00-01

Rf.no	Qnt	Revision	Date	Intro.	Appr.by

Ref.no	Qnt	Part name	Material	Dimension	Remark
35	4	CAP HD SCREW			0M06-016-02
34	8	CAP HD SCREW			0M08-016-02
33	6	D CELL BATTERY			CONS00084
32	1	LEGEND PLATE			E6-820-00-XX
31	1	SOCKET H'SING WELDED PLT			E6-805-00-01
29	1	SENSOR PLATE			E6-802-00-01
27	1	SOCKET		9 PIN	E0-877-00-01
26	1	PLUG		9 PIN	E0-846-00-01
24	2	SOCKET		7 PIN	E0-851-00-01
23	1	LAP BUTTON			E0-850-00-01
22	1	ANTENNA			E0-852-00-01
21	1	MAGNETIC MOUNT			E0-854-00-01
20	1	SURFACE MOUNT			E0-853-00-01
19	1	DISPLAY UNIT			E6-817-00-XX
18	1	MOUNTING BRACKET			E6-814-00-01
17	1	PLUG		2 PIN INLINE	E0-842-00-01
16	1	SOCKET		2 PIN INLINE	E0-843-00-01
15	6	PLUG		7 PIN	E0-837-00-01
14	2	SOCKET		7 PIN	E0-829-00-01
13	1	SOCKET		2 PIN	E0-875-00-01
12	1	PLUG		2 PIN	E0-844-00-01
11	1	SOCKET		4 PIN	E0-876-00-01
10	1	PLUG		4 PIN	E0-845-00-01
9	1	GDM SOCKET			E0-828-00-01
8	1	GDM PLUG			E0-838-00-01
7	2	MAGNETIC SENSORS			E0-803-00-01
6	1	ADAPTOR			E0-848-00-01
5	1	PRESSURE SWITCH			E0-812-00-01
4	1	SOCKET H'SING BOLTED PLT			E6-804-00-01
3	1	ANTENNA SHROUD			E6-808-00-01
2	1	ANTENNA			E0-852-00-01
1	1	PROCESSOR UNIT			E0-801-00-XX

Design by	Drawn by	Copied	Checked	Standard	Affirmed	Scale	Replace	Replaced by
						NTS		

DAWSON CONSTRUCTION PLANT LTD.

HPH 6500
ENERGY MONITORING SET

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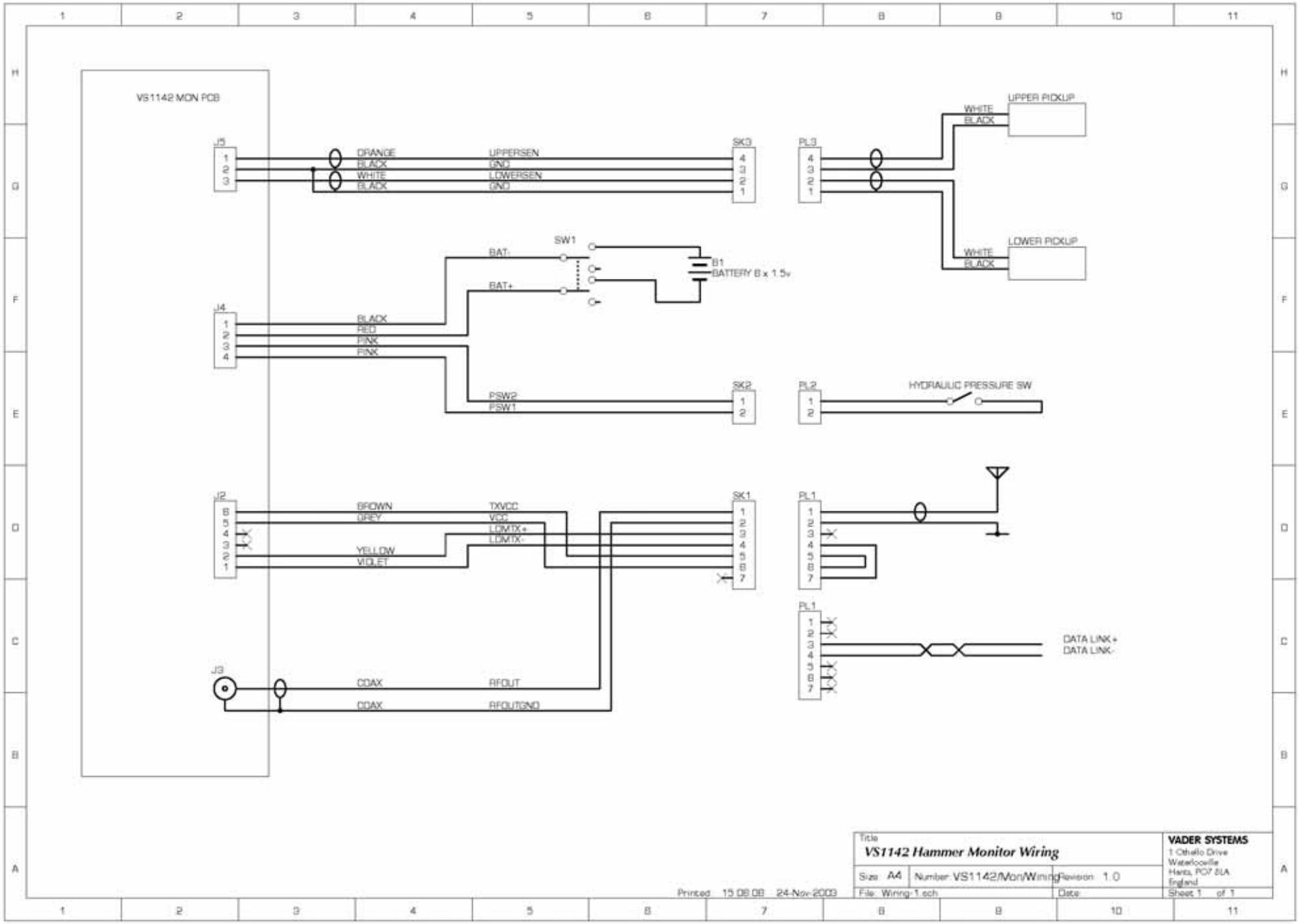
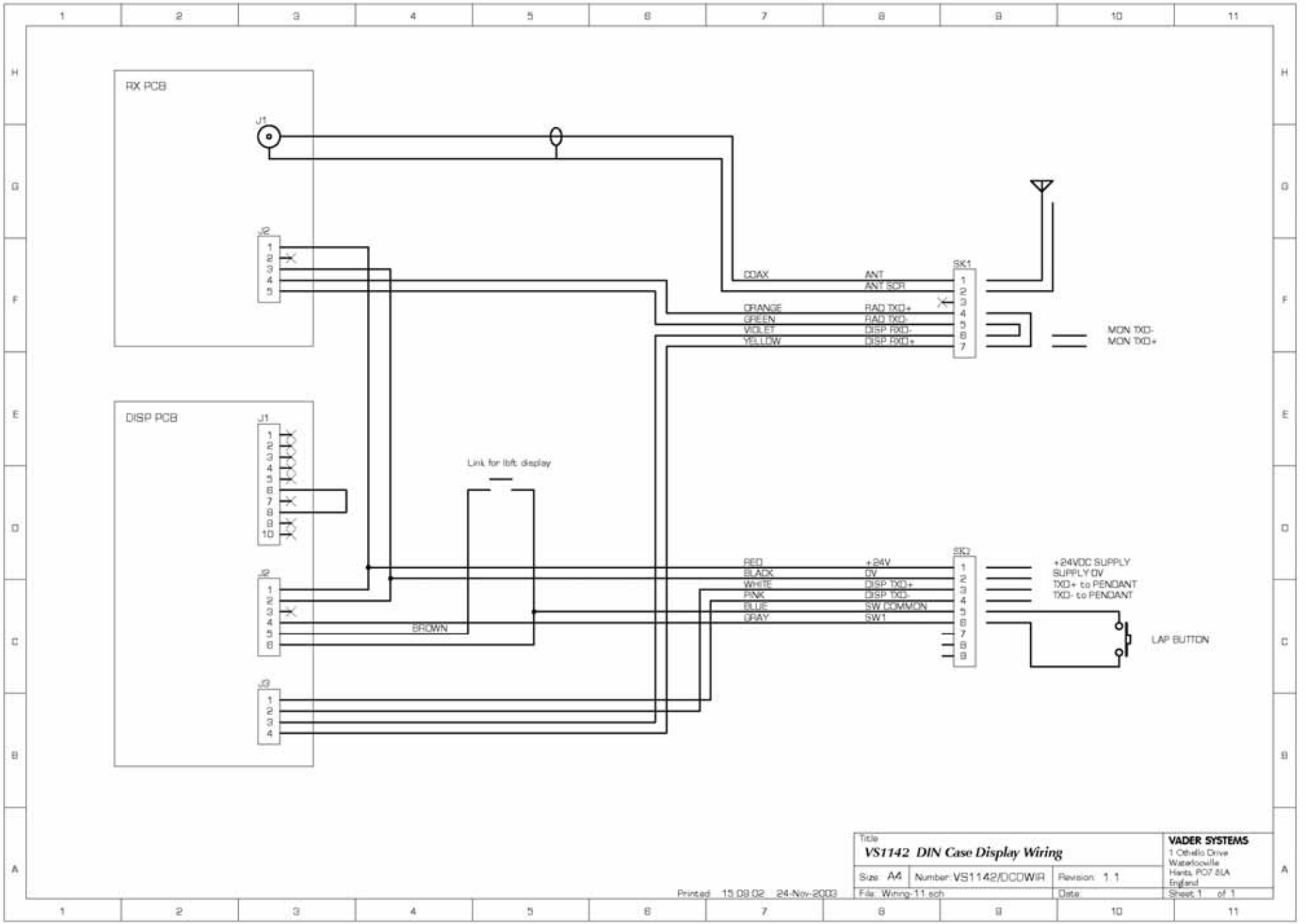
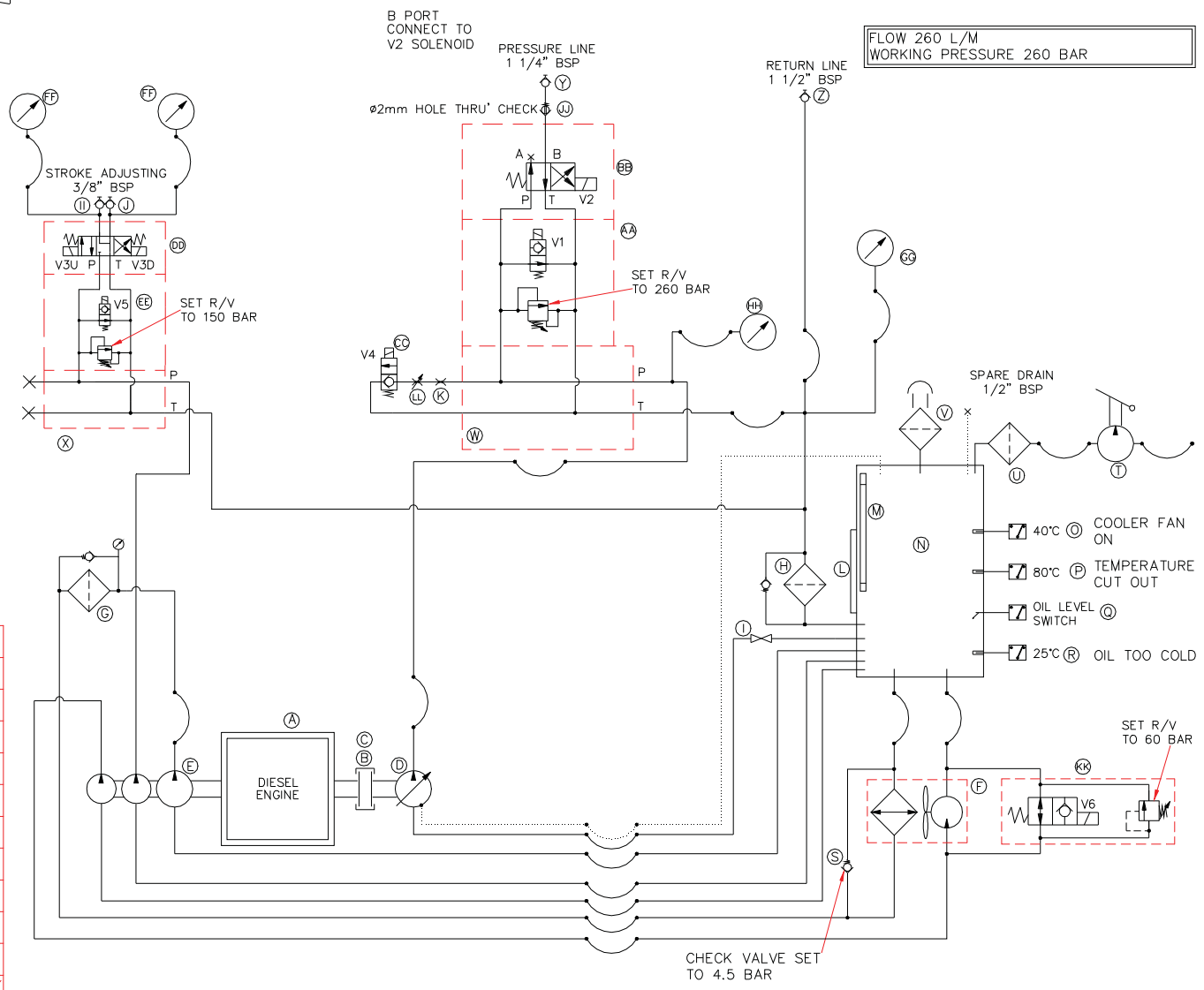
Date: 29-10-03
Drawing no.: E6-800-00-01


VS1142 MON PCB
J5
1
2
3
ORANGE
BLACK
WHITE
BLACK
UPPERSEN
GND
LOWERSEN
GND
SK3
4
3
2
1
PL3
4
3
2
1
WHITE
BLACK
UPPER PICKUP
WHITE
BLACK
LOWER PICKUP
SW1
BAT-
BAT+
B1
BATTERY 8 x 1.5v
J4
1
2
3
4
BLACK
RED
PINK
PINK
PSW2
PSW1
SK2
1
2
PL2
1
2
HYDRAULIC PRESSURE SW
J2
8
3
4
3
2
1
BROWN
GREY
YELLOW
VIOLET
TXVCC
VCC
LDMTX+
LDMTX-
SK1
1
2
3
4
5
6
7
PL1
1
2
3
4
5
6
7
PL1
1
2
3
4
5
6
7
DATA LINK+
DATA LINK-
J3
COAX
COAX
RFOUT
RFOUTGND
Title
VS1142 Hammer Monitor Wiring
Size A4
Number VS1142/MonWiring
Revision 1.0
File: Wiring-1.sch
Date
Printed 15:08:08 24-Nov-2003
VADER SYSTEMS
1 Othello Drive
Waterlooville
Hants, PO7 8UA
England
Sheet 1 of 1


RX PCB
J1
J2
1
2
3
4
5
COAX
ANT
ANT SCR
ORANGE
GREEN
VIOLET
YELLOW
RAD TXD+
RAD TXD-
DISP RXD-
DISP RXD+
SK1
1
2
3
4
5
6
7
MON TXD-
MON TXD+
DISP PCB
J1
1
2
3
4
5
6
7
8
9
10
Link for lbft display
J2
1
2
3
4
5
6
BROWN
J3
1
2
3
4
RED
BLACK
WHITE
PINK
BLUE
GRAY
+24V
0V
DISP TXD+
DISP TXD-
SW COMMON
SW1
SK2
1
2
3
4
5
6
7
8
9
+24VDC SUPPLY
SUPPLY 0V
TXD+ to PENDANT
TXD- to PENDANT
LAP BUTTON
Title
VS1142 DIN Case Display Wiring
Size A4
Number VS1142/DCDWIR
Revision 1.1
File Wiring-11.sch
Date
Sheet 1 of 1
VADER SYSTEMS
1 Othello Drive
Waterlooville
Hants. PO7 8LA
England
Printed 15:09:02 24-Nov-2003

DRG. NO. HPH 6500 | SHEET NO. OF | 3rd ANGLE PROJECTION | IF IN DOUBT ASK. | APP 96500

No.	PART.	DESCRIPTION	QTY
A	DIESEL ENGINE	6BTA 5.9C DCP 6002	1
B	COUPLING	CPLG-ASSLY-3C7048	1
C	BELL HOUSING	DCP 6232	1
D	VARIABLE DISPLACEMENT PUMP	HPR.135.02.RN.LPP.C/W SPU DCP 6230	1
E	FIXED DISPLACEMENT TRIPLE PUMP	3AND80AS/2D40/16MS + O-RING DCP 6203	1
F	OIL COOLER	LHC.078.F.00.000.0.Z DCP 6202	1
G	COOLER LINE FILTER	MSH 100 BA G2 A10 V6 DCP 6231	1
H	RETURN LINE FILTER	MPH 650.4COSAF1A25T DCP 6201	1
I	BALL VALVE	BV 40B DCP 6043	1
J	QR COUPLING	3/8" FIRG FEMALE DCP 0027	1
K	FIXED RESTRICTOR	TOMLIN (2.5mm)	1
L	ACCESS COVER	TOMLINS + O-RING DCP 0039, COR 00452	1
M	SIGHT LEVEL	LVU 500 PA 10 DCP 0201	1
N	OIL TANK	TOMLINS DCP 6028	1
O	THERMOSTAT	RS-561-460 SMM1 DCP 1050	1
P	THERMOSTAT	RS-561-460 SMM1 DCP 1050	1
Q	FLOAT SWITCH	MFS 21E2 DCP 1128	1
R	THERMOSTAT	TS.IRNO.025.3/8 BSP DCP 1127	1
S	CHECK VALVE	CV8A-05 DCP 3509	1
T	HAND PUMP	SD60FM - A2054 DCP 0022	1
U	HAND PUMP FILTER	TI.16B-1-AHP0 DCP 6017	1
V	BREATHER	GBS 10B DCP 0017	1
W	MANIFOLD BLOCK	MR-7-1-G-1" DCP 6005	1
X	MANIFOLD BLOCK	MR3-1-G-3/8" DCP 6036	1
Y	QR COUPLING	1 1/4" FIRG MALE DCP 0025	1
Z	QR COUPLING	1 1/2" FIRG MALE DCP 2008	1
AA	RELIEF VALVE	A 208-248-J03 DCP 6233	1
BB	CONTROL VALVE	DPHI.2631.2.D.N.24DC DCPEUR 2004	1
CC	LOADING VALVE	COMPLETE VALVE DCP 6009/10/11	1
DD	CONTROL VALVE	DHI.0713..N.DC DCP 6065	1
EE	RELIEF VALVE & UNLOADING VALVE	XRCOLWNHA-S-224 DCP 6061	1
FF	STROKE ADJ GAUGES	(ø63mm)0-250 BAR DCP 6064	2
GG	RETURN LINE GAUGE	(ø63mm)0-10 BAR DCP 6013	1
HH	PRESSURE LINE GAUGE	1001 - 400 DCP 1043	1
II	QR COUPLING	3/8" FIRG MALE DCP 0023	1
JJ	CHECK VALVE	CV10A-05 DCP 6033	1
KK	MOTOR BYPASS	SUN HYDRAULICS DFDB-8DN	1
LL	NEEDLE VALVE	NV06B CPU 0025	1
		DAAA MHN 760 224 (24v)	1 1
		RDFA-LBN 4150051009	1 1
		DCP 6204	



ISSUE	MOD. No.	DATE	CHK'D
4	FILTER CHANGE POS & MANU	23/08/2002	–
3	COOLING CIRCUIT IMPROVEMENTS	21/08/2001	–
2	ITEM JJ MOVED	31/10/2000	–
1	–	28/02/2000	–

DRAWN DG | CHECKED

TOLERANCES EXCEPT WHERE OTHERWISE STATED

LINEAR	
UP TO 50	±0.25
OVER 50 TO 100	±0.50
OVER 100	±1.00
ANGULAR	+0.50°

REMOVE ALL BURRS, SHARP EDGES & CORNERS

0 ORIGINAL SCALE 50

DO NOT USE TO SCALE DRAWING.

MATERIAL N/A

FINISH N/A

SCALE: - 1: 1

TOLERANCES UNLESS OTHERWISE STATED

DIMENSIONS IN mm

EST. MASS

Tomlin HYDRAULICS Ltd
STATION ROAD, UPPINGHAM, RUTLAND, LE15 9TX
TEL: (01572) 821052. FAX: (01572) 821361.

TITLE
HYDRAULIC SCHEMATIC
N.S.N. SERIAL No 1584

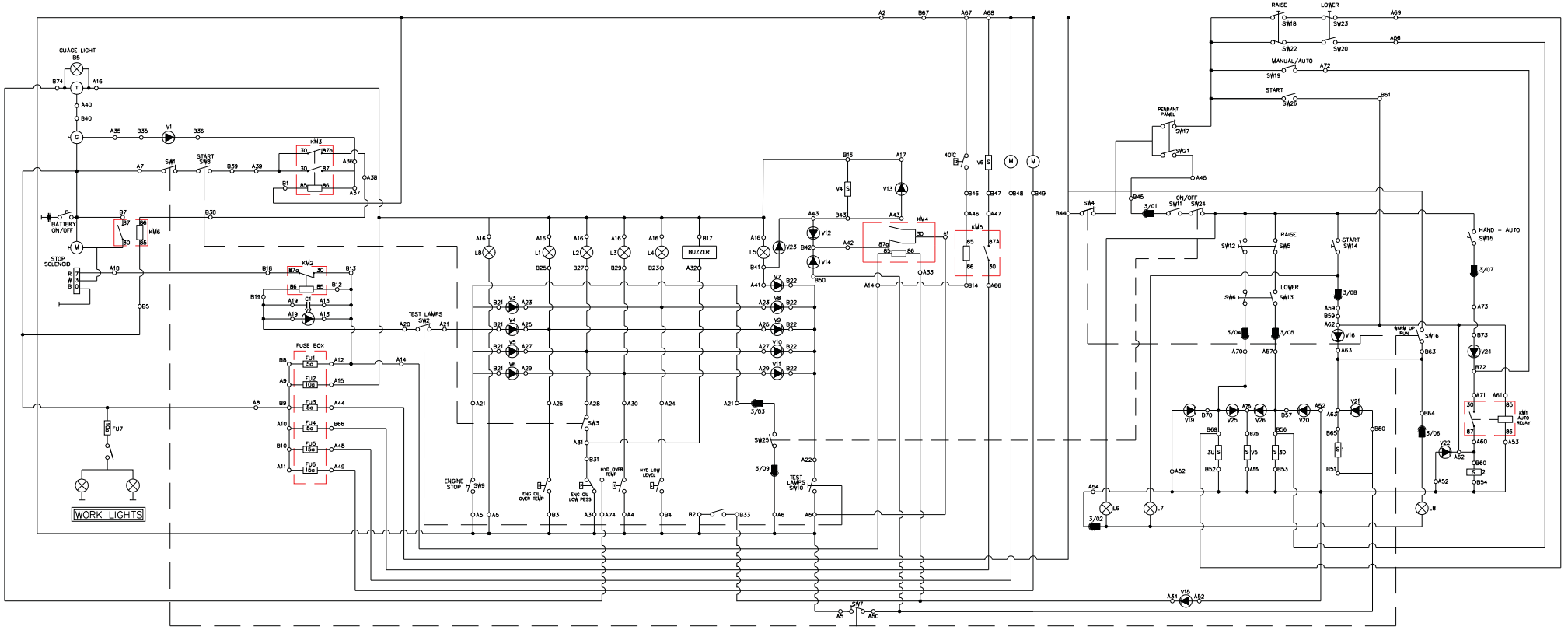
DRG. NO. HPH 6500 | SHEET NO. OF

DRG. NO.	SHEET NO. OF	SERIAL No
HPH 6500		1584

3rd ANGLE PROJECTION — IF IN DOUBT ASK.

APP 96500

NOTE FU 7 LOCATED NEXT TO ALTERNATOR



ENCLOSURE	53021		DIODE	261 – 823	V14 – V16 V24 – V26	CONTACT BLOCK	ZB2 – BE101	SW8–10,16–20, 25	SOCKET	480 – 349		BUTTON	XAC–A9412	L1 – 5
STOP BUTTON	ZA2–BS 44		DIODE	261 – 299	V1 – V13 V19 – V23	BATTERY ISOLATOR	SSB – 106		PENDANT			CONTACT BLOCK	ZB2–BE102	SW5 – 6
FUSE BOX	FBB 64 – 1	F1 – F6	CAPACITOR	288 6953	C1	L.E.D	590266	L1 – 5	PENDANT BODY	XAC – A06		CONTACT BLOCK	ZB2–BE101	SW11 – 15
RELAY	0332 209 206	KM1 – 5	TERMINAL	952032		TACHO	100238	T	L.E.D	577 – 140	L6	CABLE CLAMP	12.9610	
BASE	0 729 00	KM1 – 5	BUTTON	ZB2 – BP2		THERMOSTAT	561 – 460	T1 – T2	L.E.D	577 – 156	L7			
RELAY	3916302	KM6	CONTACT BLOCK	ZB2 – BZ103		THERMOSTAT	TS–IRNO–025	T3	L.E.D	577 – 162	L8			
12 CORE CABLE	369 – 163		SWITCH	XB2 – BD21		BATTERY	647		SWITCH	ZA2 – BD2				
PLUG	486 – 741		CONTACT BLOCK	ZB2 – BE102	SW1 – 4, 7 21–24,	LEVEL SWITCH	MFS 21E2		BUTTON	XAC–A9413				
DESCRIPTION	PART No	DESIGNATION	DESCRIPTION	PART No	DESIGNATION	DESCRIPTION	PART No	DESIGNATION	DESCRIPTION	PART No	DESIGNATION	DESCRIPTION	PART No	DESIGNATION

SPARE WIRES

3/10	A76	B76
3/11	A77	B77
3/12	A78	B78
3/13	A79	B79
3/14	A80	B80
3/15	A81	B81
3/16	A82	B82

DRAWN	CHECKED
DG	

ISSUE	MOD. No.	DATE	CHK'D
1	–	08/10/2001	–

TOLERANCES EXCEPT WHERE OTHERWISE STATED	
LINEAR	
UP TO 50	±0.25
OVER 50 TO 100	±0.50
OVER 100	±1.00
ANGULAR	+0.50°

REMOVE ALL BURRS, SHARP EDGES & CORNERS

0 ORIGINAL SCALE 50

DO NOT USE TO SCALE DRAWING.

MATERIAL: N/A

FINISH: N/A

SCALE: – 1: 1

TOLERANCES UNLESS OTHERWISE STATED

DIMENSIONS IN mm

EST. MASS

N.S.N.

Tomlin HYDRAULICS Ltd
STATION ROAD, UPPINGHAM, RUTLAND, LE15 9TX
TEL: (01572) 821052.
FAX:(01572) 821361.

TITLE: ELECTRIC SCHEMATIC

DRG. NO.	SHEET NO. OF
HPH 6500	

DRG. NO. 96500-0001 | SHEET NO. OF | 3rd ANGLE PROJECTION

APP 96500

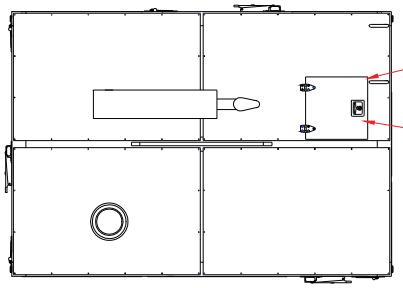
BREAK ALL SHARP EDGES. CHAMFER 0.5 UNLESS OTHERWISE STATED
IF IN DOUBT ASK.

PACK WEIGHT – 3500KG
FULL OIL TANK
1/2 FULL DIESEL TANK

COLOUR SCHEME

FINISH PAINTED IN GLOSS WHITE ~
BASE FRAME, CANOPY FRAME, ROOF PANELS
INTERNAL BAFFLE, ENGINE & PUMPS

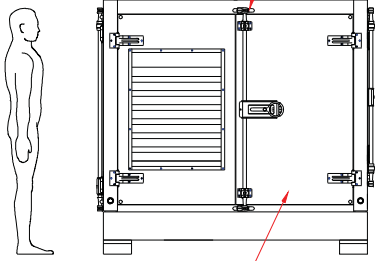
FINISH PAINTED IN GLOSS RED ~
OIL RESERVOIR, LOUVRES, DOORS
BLANK SIDE PANELS,
HIGH LIGHTED WARNING SIGN

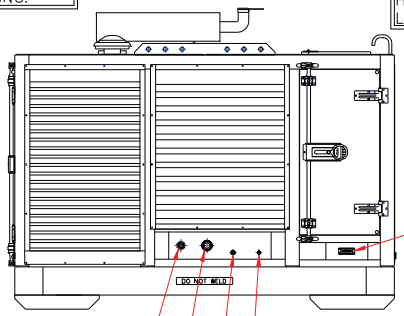


OIL RESERVOIR FILLER
SPOUT AND RETURN
FILTER ACCESS

FRONT AND REAR OF HATCH
SURROUND TO BE FITTED WITH
SIDE TUBE SEAL
DCP 6209, 2 x 430mm

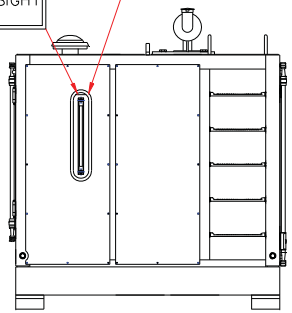
STAINLESS DOOR CLASPS ARE TO BE
MASKED OFF DURING SPRAYING.

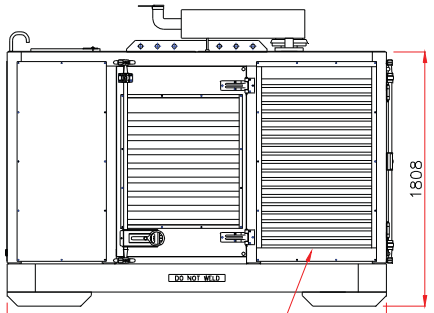




HYDRAULIC OIL SIGHT
LEVEL GAUGE

RUBBER EDGING FOR PLASTIC WINDOW
CLAYTONRITE RUBBER (DCP 6212) x 1500mm
FILLER STRIP (DCP 6213) x 1500mm



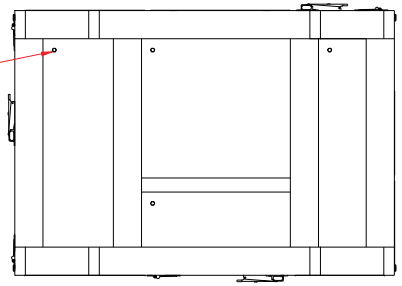


PENDENT
SOCKET

1 1/4" QR – PRESSURE LINE
1 1/2" QR – RETURN LINE
3/8" MALE QR – H.A.R LINE
3/8" FEMALE QR – H.A.R LINE

ALL PANELS AND DOORS TO BE
ACOUSTICALLY CLAD
ALL DOOR FRAMES TO BE LINED
WITH SIDE TUBE SEAL
DCP 6209

ENGINE INTAKE LOUVRE TO HAVE
TOP TUBE SEAL FITTED TO 32mm x 3mm
FLAT ON REAR
DCP 6219, 2 x 675mm, 2 x 668mm



1/2" BSP DRAIN PLUGS
IN 4 PLACES

SILICON SEAL DETAIL

SILICON SEAL AROUND ~
– DOOR CLASPS
– HATCH LID SURROUND
– HYDRAULIC BULKHEAD INTERNAL JOINTS.
– BENEATH TOP HATCH LATCH

DRAWN				
DG				
CHECKED				
	1	–	19/12/2001	–
	ISSUE	MOD. No.	DATE	CHK'D

TOLERANCES EXCEPT WHERE OTHERWISE STATED	
LINEAR	
UP TO 50	±0.25
OVER 50 TO 100	±0.50
OVER 100	±1.00
ANGULAR	+ 0.50°

REMOVE ALL BURRS, SHARP EDGES & CORNERS

0 ORIGINAL SCALE 50

DO NOT USE TO SCALE DRAWING.

MATERIAL: VARIOUS

FINISH: SEE COLOUR SCHEME

SCALE:- 1:0.04

TOLERANCES UNLESS OTHERWISE STATED

DIMENSIONS IN mm

EST. MASS 3500 Kg

Tomlin HYDRAULICS Ltd
STATION ROAD, UPPINGHAM, RUTLAND, LE15 9TX
TEL: (01572) 821052. FAX:(01572) 821361.

TITLE: EXTERNAL DETAIL

DRG. NO. 96500-0001 | SHEET NO. OF

DRG. NO. 96500–0002 SHEET NO. OF

3rd ANGLE PROJECTION

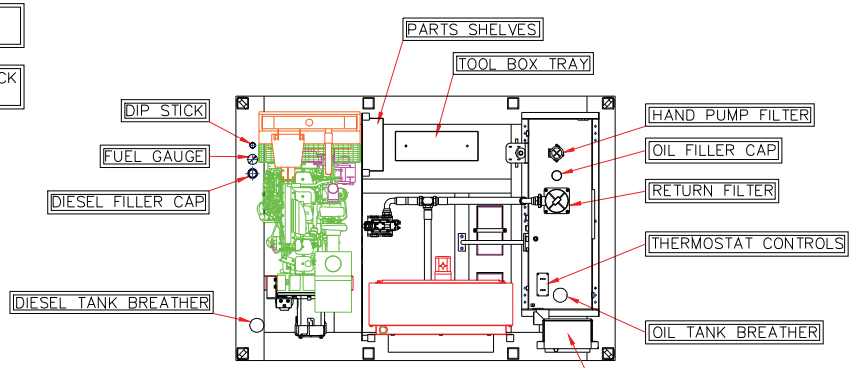
APP 96500

BREAK ALL SHARP EDGES. CHAMFER 0.5 UNLESS OTHERWISE STATED
IF IN DOUBT ASK.

NOTE: HOSE WORK REMOVED FOR CLARITY

NOTE: VIEW SHOWS POWER PACK WITH CANOPY REMOVED

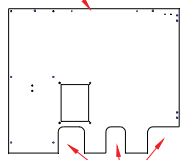
BUILD DETAIL
SEE HYDRAULIC BUILD LIST AND HOSE LIST – ISSUE 2
SEE NUTS & BOLTS BUILD LIST – ISSUE 2



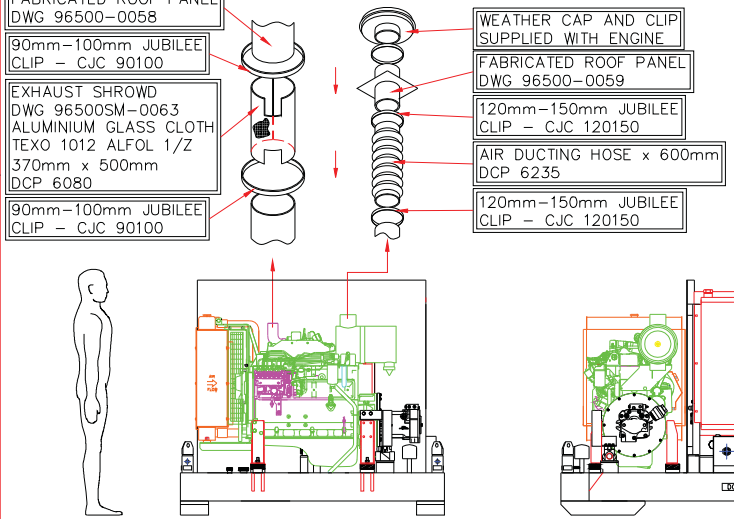
USE TOP TUBE SEAL ON CONTROL PANEL REAR COVER – DCP 6219
340mm REQUIRED ON OVERHANGING LIP.

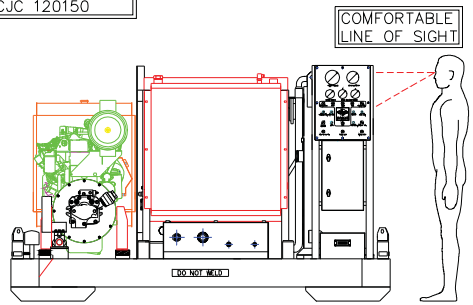
MAIN BAFFLE PLATE
RUBBER EDGING DETAIL

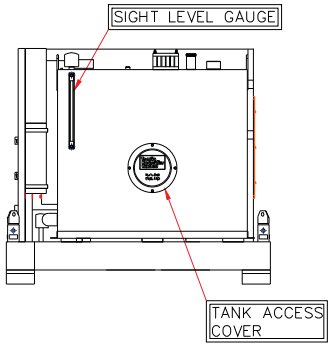
TOP TUBE SEAL – DCP 6219 x 1620
ALONG TOP EDGE OF PANEL

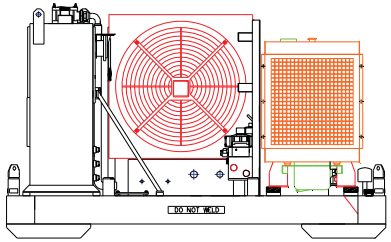


SIDE TUBE SEAL – DCP 6209
REQUIRED AROUND EACH CUT OUT
LENGTH 1 – 520mm
LENGTH 2 – 625mm
LENGTH 3 – 620mm









ISSUE	MOD. No.	DATE	CHK'D
2	PUMP CHANGED HPR 135 S2	21/08/2002	–
1	–	19/12/2001	–

DRAWN DG

CHECKED

TOLERANCES EXCEPT WHERE OTHERWISE STATED	
LINEAR	
UP TO 50	±0.25
OVER 50 TO 100	±0.50
OVER 100	±1.00
ANGULAR	+ 0.50°

REMOVE ALL BURRS, SHARP EDGES & CORNERS

0 ORIGINAL SCALE 50

DO NOT USE TO SCALE DRAWING.

MATERIAL: VARIOUS

FINISH: SEE COLOUR SCHEME

SCALE:- 1:0.04

TOLERANCES UNLESS OTHERWISE STATED

DIMENSIONS IN mm

EST. MASS

Tomlin HYDRAULICS Ltd
STATION ROAD, UPPINGHAM, RUTLAND, LE15 9TX
TEL: (01572) 821052. FAX: (01572) 821361.

TITLE
INTERNAL DETAIL
SERIAL No 1584, 1585, 1586

DRG. NO. 96500–0002 SHEET NO. OF

APPENDIX 8.6 -

HYDRAULIC HAMMER TOOL KIT
(PART NO. 6.150.00.01)

PART NO.	QTY.	DESCRIPTION
065	1 off	3mm Allen Key
066	1 off	4mm Allen Key
067	1 off	5mm Allen Key
068	1 off	6mm Allen Key
2.150.01.01	1 off	8mm Allen Key
2.150.02.01	1 off	12mm Allen Key
2.150.03.01	1 off	14mm Allen Key
070	1 off	17mm Allen Key
1.150.02.01	1 off	19mm Allen Key - long series
1.150.03.01	1 off	22mm Allen Key
2.150.04.01	1 off	10mm Combination Spanner
1.150.12.01	1 off	19mm Combination Spanner
1.150.27.01	1 off	22mm Combination Spanner
1.150.28.01	1 off	24mm Combination Spanner
1.150.29.01	1 off	27mm Combination Spanner
1.150.09.01	1 off	18” Adjustable Spanner
1.150.21.01	1 off	External/Internal Circlip Pliers
1.150.20.01	1 off	5/16" Parallel Pin Punch
1.150.24.01	1 off	Soft Hammer
1.150.18.01	2 off	M24 Lifting Eye
1.150.16.01	1 off	¾” Sliding T Bar
1.150.23.01	1 off	¾” 200m Extension
2.150.06.01	1 off	65mm Socket 1” Square Drive
2.150.07.01	1 off	¾” Fem to 1” Male Convertor
2.150.05.01	1 off	2¼” A/F Open End Spanner
1.150.25.01	1 off	Grease Gun
1.070.00.01	1 off	Gas Filling Apparatus
6.150.18.01	1 off	M33 Lifting Point
0M16.130.01	4 off	M16 x 130 Socket Hd Cap Screw

DAWSON
CONSTRUCTION PLANT LTD

HPH 6500
HYDRAULIC HAMMER
& POWER PACK

Dawson Construction Plant Ltd
Chesney Wold.
Bleak Hall,
Milton Keynes,
MK6 1NE, England
Tel: +44 (0) 1908 240300
Fax: +44 (0) 1908 240222

CE