OPERATING INSTRUCTIONS

1000/500 kN Compression/Tension Machine

36-1410

(with serial number 1891-X-XXXX)

ELE International Chartmoor Road, Chartwell Business Park Leighton Buzzard, Bedfordshire, LU7 4WG England phone: +44 (0) 1525 249200 fax: +44 (0) 1525 249249 email: ele@eleint.co.uk http://www.ele.com ELE International, a division of Hach Lange Ltd.	***Distributor:***	**ELE International** Soiltest Product Division PO Box 389, Loveland, CO 80539 USA phone: +1 (800) 323 1242 fax: +1 (970) 663 9781 email: soiltest@eleusa.com http://www.eleusa.com

Contents

1 Introduction

These instructions cover machines with serial numbers beginning with 1891, i.e. 1891-X-XXXX.

The Compression/Tension machine (Fig 1) has been designed to test concrete cubes and cylinders for compressive strength, determination of the aggregate crushing value and ultimate tensile strength of plain and deformed steel reinforcing bars.

The machine and gauge are calibrated in compression as a unit to ensure that the indicated load is accurate to ± 1% through the range from 10% to 100% of maximum load.

The load frame is of four column construction, with a fixed upper head carrying either a ball seated platen or the upper grip body, grips and the load gauge.

The ram carrying either the compression testing adaptor and lower platen or tension testing adaptor and lower grip body and grips is located on the base and is protected by a rubber gaiter.

Hydraulic pressure is generated by a motorised hydraulic pump.

Tension or compression modes are selected using a valve which is mounted on the right hand side of the load frame.

Accessories and distance pieces are available to enable the machine to test alternative size cubes, cylinders and reinforcing bars, and to determine the aggregate crushing value.

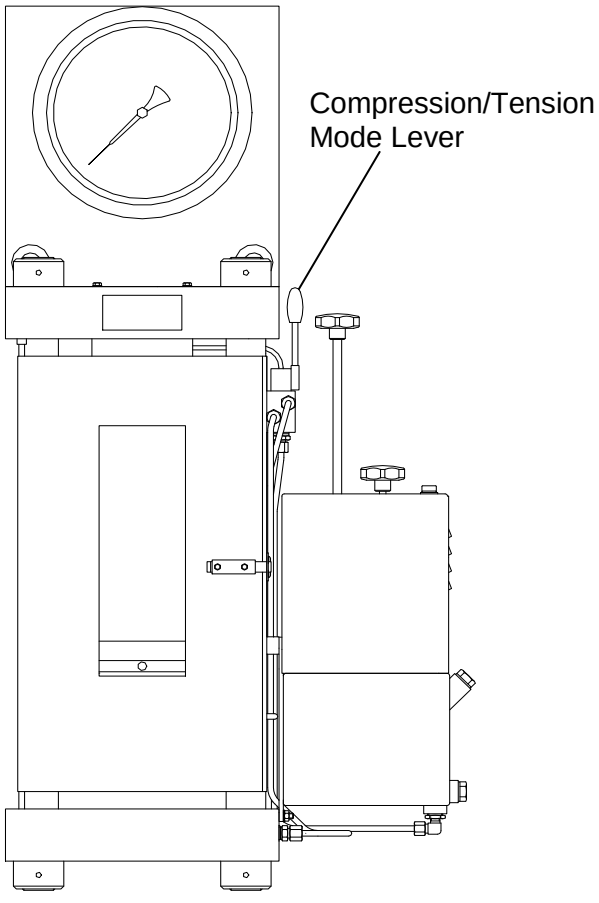


Fig 1 Compression/Tension Machine

2 Specification

Dimensions and data

Dimensions (approx.)	*length x width x height*
Motorised	430 x 715 x 1275 mm
Maximum vertical clearance between platens	340 mm
Upper and lower platen diameter	220 mm
Maximum horizontal clearance	230 mm
Electrical consumption	1350 watts
Approximate weight (dry)	385 kg
Approximate oil capacity	11 litres

Type: Shell Tellus T46 or equivalent oil to viscosity grade ISO HV 46.

IMPORTANT: The ram travel is 100 mm and cannot be exceeded. Maximum travel limits are indicated by the red lines on the debris guard and door.

It must be noted that although the machine has a maximum movement of 100 mm, not all of this is 'useful' as during initial loading and whilst the tapered grips are 'bedded in', there will be some movement which is 'lost' and cannot be used to extend the sample.

3 Installation

3.1 Moving and lifting

WARNING: exercise caution when lifting the machine. Use only approved and tested equipment. ELE International will accept no responsibility for damage caused by mishandling.

The machine will be delivered mounted on a pallet and should remain on the pallet until it has been moved as near as possible to its final position.

To remove the machine from the pallet, remove the four securing bolts then lift the machine and remove the pallet.

The machine can be lifted by a fork lift or hoist and lifting straps utilising the two eyebolts in the top of the upper cross-head.

Note: The eyebolts fitted are "Dynamo" eyebolts to BS4278 which are intended for direct lifting only. A spreader beam or spreader frame must always be used.

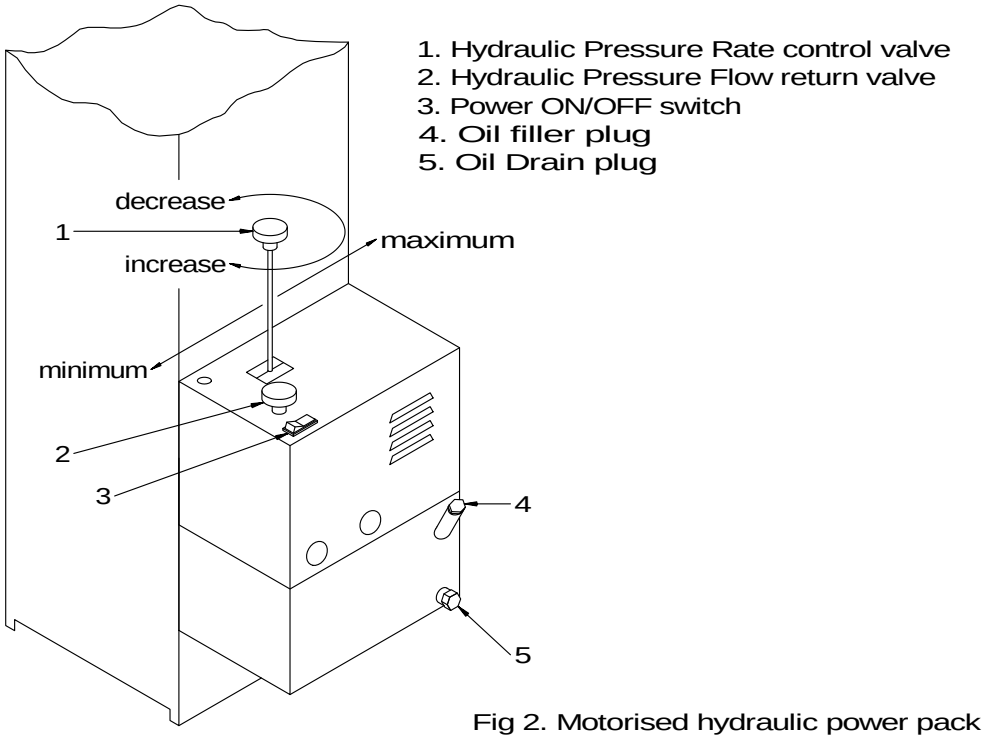


Fig 2. Motorised hydraulic power pack

4 Motorised Hydraulic Power Pack (Fig 2)

This provides the hydraulic supply to the load frame in order to raise or lower the hydraulic piston.

4.1 Installation

4.1.1 Electrical supply

Safety

Whilst the test is in operation do not remove any covers or attempt to adjust any part of the machine.

Ensure all moving parts are thoroughly secured before attempting any maintenance.

Ensure all appropriate measures are taken to protect the operator from excessive noise.

See noise certificate (when supplied).

Electrical safety

Warning: Before removing any covers or performing maintenance repair and service, isolate from electrical supply by removing mains plug. Where mains supply is required during these activities, only competent persons should perform the work.

Check that the power supply is compatible with the requirements stated on the label and connect in accordance with IEE regulations or to local requirements.

This machine may be operated through a standard 13 amp socket outlet when fitted with an appropriate 3 pin plug fused in accordance with the label.

Electrical:
The motorised hydraulic power pack is supplied with a power cable, coded as follows:

Brown wire	L	Live or Power
Blue wire	N	Neutral
Green/Yellow wire	E	Earth or Ground

Important: This equipment must be correctly earthed.

Portable Appliance Tests (PAT)

All ELE designed products are tested for electrical safety prior to sale.

An electrical safety test label is fitted, (usually adjacent to the mains input socket).

Should no label be found, please contact ELE Service Department quoting the serial number of the equipment.

Organisations have an obligation to ensure equipment is maintained and is safe for use. Regular PAT testing is one means of ensuring equipment continues to be electrically safe.

Important: do not connect PAT leads to sensitive components such as PCBs, control switches and the like.

DO NOT FLASH TEST ELECTRONIC EQUIPMENT.

If in doubt as to the most suitable connection point (which will usually be an earth stud or an external earth connection) contact ELE Service Department for assistance.

4.1.2 Filling with oil (Refer to Fig 2)

Unscrew the filler cap (4) and fill the tank to the filler port with oil as specified in section 2.

Note: the ram will not return to starting position under its own weight. When a test in either tension or compression is finished, it is necessary to switch the machine to the other mode and pump the ram back to starting position. When the ram reaches its starting position stop pumping, or a build up of pressure may occur. If so switch off the pump and release the pressure.

Caution: Do not operate the mode valve when the machine is pressurized or a sample is under load. To remove the load from a sample or to depressurize the machine, switch off the pump, set the rate control valve to minimum and open the pressure relief valve.

4.1.3 Priming the pump

Rotate valve (2) anti-clockwise to open the hydraulic return. Push the rate control valve (1) to maximum. Select ‘COMPRESSION’ on the mode valve (Refer to Fig 1). Switch on the unit and allow it to run for 2 to 3 minutes and then rotate valve (2) clockwise to close the hydraulic return. The ram should rise. After 15 seconds, open valve (2).

4.2 Bleeding the hydraulic system

Remove the lower platen (Fig 3) and the compression test adaptor (Fig 4). The platen lifts off, the adaptor screws off (anti-clockwise), it may be tight, if so use a tommy bar in the side hole to assist removal.Select ‘COMPRESSION’. Rotate valve (2) clockwise to close, set the rate control valve (1) to maximum and switch on the pump.

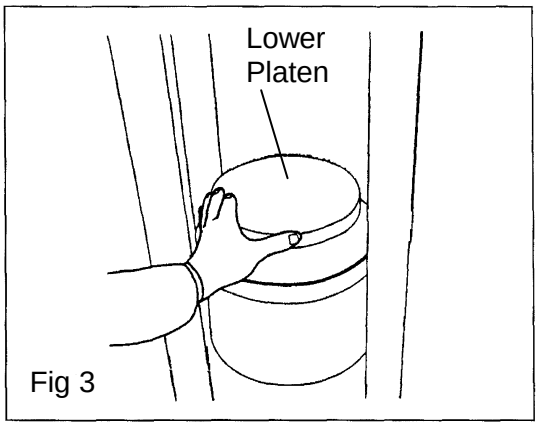


Fig 3

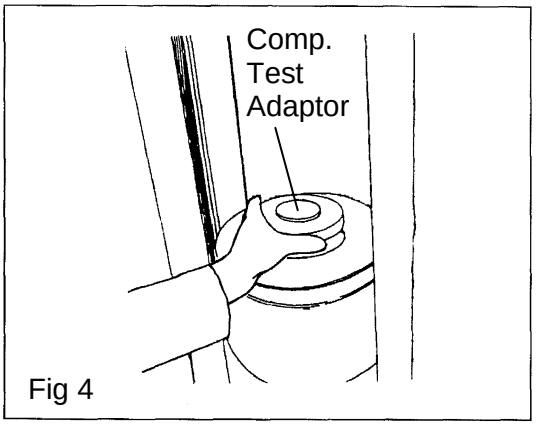


Fig 4

Using the hexagon wrench supplied, unscrew the bleed screw in the top of the ram 4 turns. (Refer to Fig 5).

Caution: do not remove the bleed screw as this may cause the loss of the 8 mm

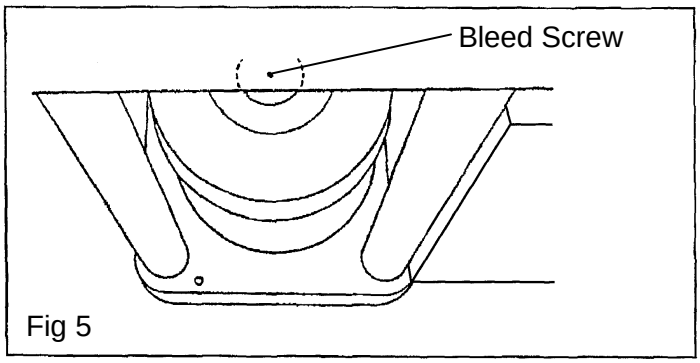


Fig 5

diameter steel ball.

Air and oil will escape from the bleed screw. When oil, free from air bubbles flows out, close the bleed screw and tighten firmly. The ram should rise, continue pumping to raise the ram to its upper limit ***See Note.***

Select 'TENSION' on the mode valve and operate the pump until the ram reaches the bottom of its stroke. As the ram goes down, the oil level will rise. When the ram reaches the bottom of its stroke, check the oil level and top up if necessary. The level should be just into the filler cap tube.

Reselect 'COMPRESSION' and operate the pump to raise the ram to its upper limit. This will expel any air left in the system.

After completion of bleeding, open valve (2) and switch off the pump. Clean away all oil from the top of the ram.

Note: *Failure of oil to bleed from the piston indicates that air is trapped in the pump preventing normal oil flow. The following procedure should prevent this problem.*

Push the rate control valve (1) to maximum. Switch the motor on. Close the hydraulic return valve (2), wait 15 seconds then open this valve again sharply. Repeat the closing and opening of this valve (2) in this manner for a maximum of 3 minutes.

If the pump still fails to prime – push rate control valve (1) to maximum, switch the motor on and off repeatedly.

If, after several minutes, the fault will not clear, contact ELE Service Department or your authorised distributor.

The machine is fitted with an analogue gauge, the capillary tube may also need bleeding. Please refer to the analogue gauge section 5 for details of symptoms which indicate bleeding is required and the method of bleeding.

5 Analogue Gauge

The analogue gauge used on the Motorised Compression/Tension Machine is of the Bourdon tube type.

A maximum load indicator is arranged on the front of the gauge. This is operated by the load indicator needle and can be zeroed before each test. Each gauge is provided with a device to slow the return of oil from the gauge after a rapid specimen failure thus avoiding possible damage.

5.1 Procedure for adjusting torque on carry forward pointers

Zero pressure gauge and rotate black knob anticlockwise to zero carry forward pointer.

Continue to rotate black knob until locking screw in collar is visible through aperture in chrome locknut.

Loosen locking screw by turning anticlockwise with a screwdriver.

Prevent collar from rotating by holding the locking screw with a screwdriver.

Rotate black knob either:

Clockwise to increase torque, or anticlockwise to reduce torque.

Note: optimum torque is achieved when the carry forward pointer will not rotate of its own accord when placed horizontally on gauge face and will not inhibit the travel of the pressure pointer.

When optimum torque is achieved, tighten locking screw in collar.

5.2 Bleeding the Analogue gauge

During initial setting up of the machine, the hydraulic system may require bleeding. In addition to the work referred to in the Power Pack section, it may be found necessary to bleed the gauges.

Air in the capillary to the gauge will cause jumping of the needle and sluggish response.

The point to bleed the gauge capillary is situated at the rear of the gauge.

To bleed the gauge system, first set the hydraulic system operating. With the control valves set for maximum platen movement, carefully slacken the hexagon union to allow air to bleed from the capillary.

Note: take care not to disturb the capillary or the gauge casing.

When oil free from air bubbles flows, tighten the union.

6 Operation

6.1 Power pack operation (Refer to Fig 2)

Switch on the pump unit (3), rotate the pressure release valve (2) fully clockwise to close and push the rate control valve (1) to maximum with the knob rotated anti-clockwise.

The ram will rise in COMPRESSION mode or fall in TENSION mode.

As the test commences, return the rate control valve to near 'minimum' position and rotate the knob clockwise to maintain the required loading rate.

6.2 Compression testing

Ensure that the compression test adaptor is screwed fully into the ram, and the ball seated platen securing screws are tight. Set the lower platen on the compression adaptor.

When testing specimens less than 300 mm long, it is essential to fit distance pieces below the lower platen.

6.3 Tension testing

The following procedure assumes the machine is presently set up for compression testing. Read the following subsections before testing.

A wedge removal tool and 1 box of 12 black wax sticks are supplied with each machine.

Various different bars can be tested using the appropriate grips. Contact ELE International or authorised distributor for details of available grips.

Tension grips are manufactured from high quality steel which is then heat treated for optimum performance. Even so it should be noted that due to the extreme stresses involved in tension testing, the grips do not have an unlimited life. The actual life is dependent upon the strength and surface deformation of the bars being tested.

The specimen length must be 475 mm ±75 mm (18¾ inch ±3 inch).

Periodically rub the black wax sticks on the outside face of the grips and on the tapered face of the grip body (Fig 6). The wax lubricates the surfaces, reducing wear and aiding wedge removal.

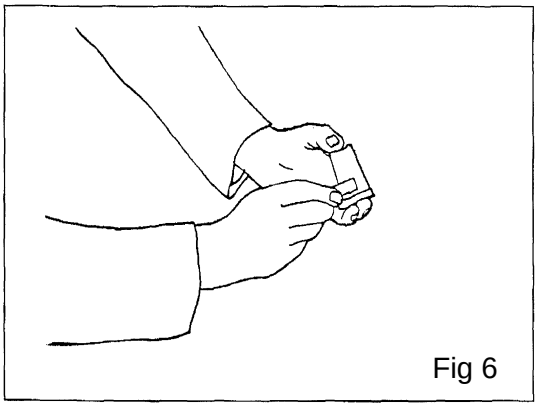


Fig 6

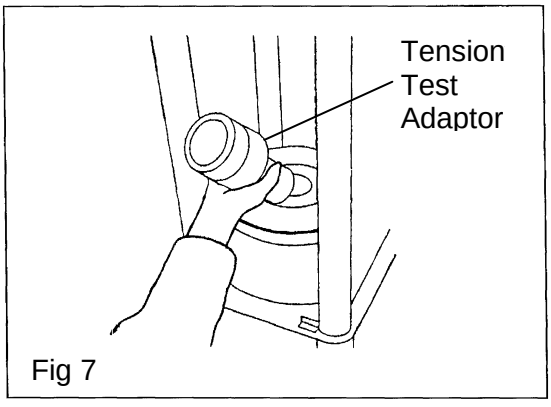


Fig 7

6.3.1 Tension grip installation

Remove the lower platen (Fig 3) and compression testing adaptor (Fig 4) from their positions on the ram. The platen lifts off, the adaptor screws off (anti-clockwise), it may be tight, if so use a tommy bar in the side hole to assist removal.

Remove the rear guard.

Support the upper ball seated platen from the front and rear, then undo the two securing screws on the upper head and remove the platen and screws from the machine. Replace the rear guard.

Ensure the tension test adaptor's internal and external threads are clean and undamaged, then screw it fully onto the ram (Fig 7). Place the grips of the correct size for the specimen being tested into the tension test adaptor. Arrange them evenly in the centre with a gap between wedges (Fig 8).

Ensure the lower grip body threads are clean then screw it a small way into the tension test adaptor Fig 9).

Ensure the upper grip body and upper head threads are clean and screw the upper

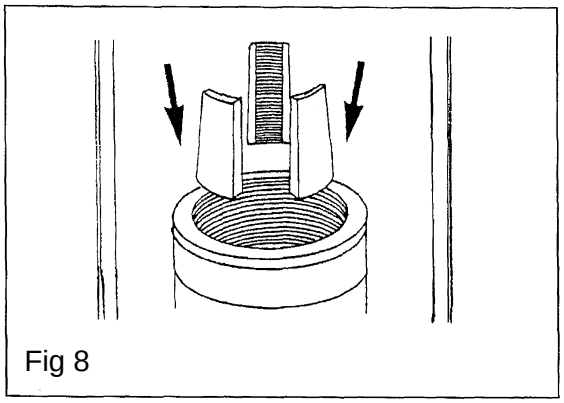


Fig 8

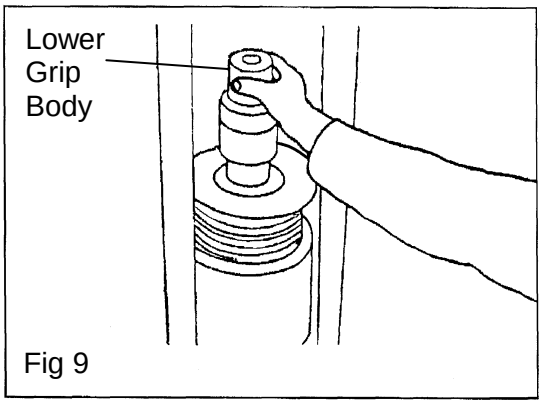


Fig 9

grip body fully into the upper head (Fig 10).

6.3.2 Specimen preparation

Remove loose rust and scale from the specimen then pass the specimen through the upper grip body, into the lower grip body so that it 'bottoms' in the tension test adaptor.

Screw down the lower grip body fully into the tension test adaptor so that the lower grip 'bites' into the specimen.

Place the upper grips evenly around the specimen. This is made easier if the grip removal tool is used.

Place the safety cap (9) over the specimen and screw it into the upper grip body until it contacts the grips (Fig 11).

This operation must be carried out as it prevents the specimen being ejected on failure.

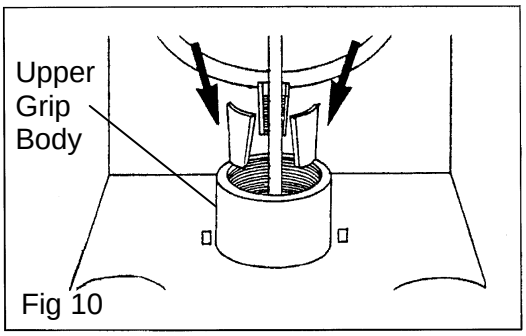


Fig 10

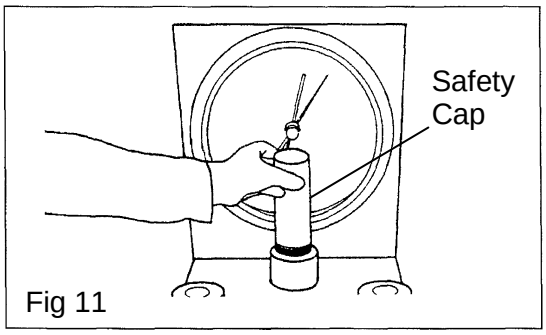


Fig 11

6.3.3 Specimen removal

On completion of testing the grips will normally require freeing from their bodies to release the specimen. A grip removal tool is supplied for this purpose.

Before attempting to free the grips slacken the lower grip body (Fig 12) and the safety cap (Fig 13) by two or three turns.

Position the grip removal tool round the specimen so that it contacts the ends of the grips. Strike the removal tool with a hammer to free the grips.

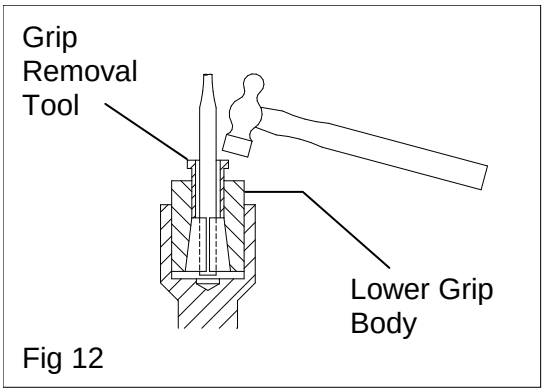


Fig 12

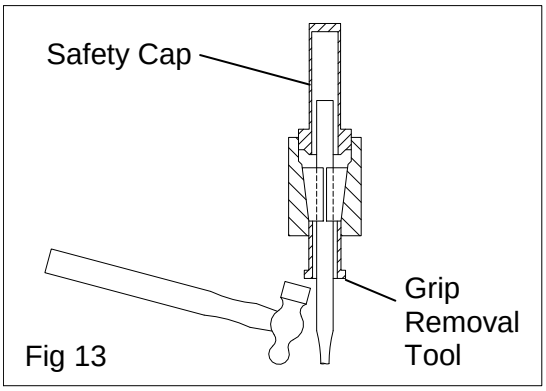


Fig 13

7 Maintenance

7.3 Daily

Always check that the platens are clean before commencing the test.

Keep all parts, especially the screw threads and grips clean.

Brush away all concrete debris from the area around the hydraulic ram, raising the ram will assist in the removal of this debris from between the folds of the gaiter.

Check for signs of leaks in the hydraulic system.

7.4 Monthly

Check the column nuts for tightness (Fig 14) using the tommy bar (supplied with the machine).

7.5 Occasionally

Check upper platen assembly and regrease spherical segment with a medium grease as required.

Inspect ram gaiter for damage.

Check the oil level in the oil reservoir.

Inspect the platens for wear.

Check the oil in the reservoir for signs of contamination and replace if necessary as follows:

(a) Ensure that the hydraulic pressure flow return valve is fully open. Remove the filler cap followed by the drain plug.

(b) When the oil has drained, replace the drain plug and refill with oil as specified in section 2.

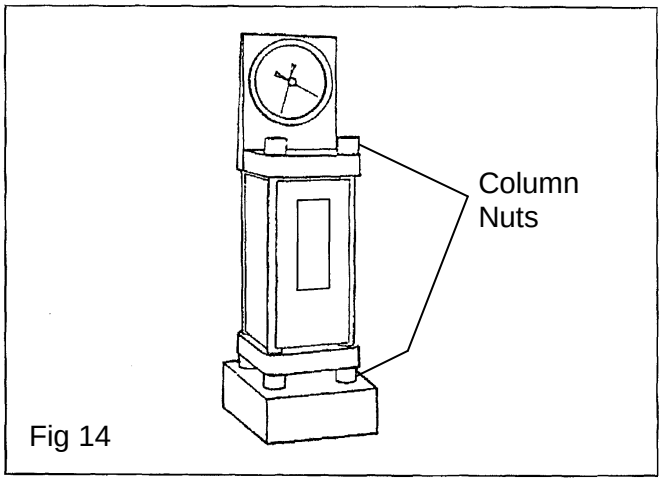


Fig 14

8 Verification

It is normal National Standard requirement to request the verification of load measuring systems at least once each year or more frequently according to the work undertaken.

A verification should be undertaken after each occasion when any adjustment to the compression machine may have affected the load measuring system.

The verification of the load measurement system should be undertaken by qualified engineers using approved equipment.

9 Service and Spares

It is recommended that either the ELE Service Department or an authorised distributor be contacted for details of available spare parts or servicing requirements.

Declaration of Conformity

Issued By: **ELE International**

Date of Issue: 1st January 1998 ELE doc ref: 9901X0003

ELE International

Approved Signatory

We, ELE International, Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Beds LU7 4WG, England, declare under sole responsibility that the following product(s) to which this declaration relates is (are) in conformity with the provisions of:

73/23/EEC Electrical Equipment Directive implemented in the UK by S1728/1989 amended by 93/68/EEC 1/1/1997.

Electrical Safety tested to BS EN 60204-1.

89/392/EEC, 91/368/EEC, 93/44/EEC and 93/68/EEC Machinery Directive implemented in the UK by S13073/1992 and S12063/1994.

89/336/EEC, 91/263/EEC, 92/31/EEC (the EMC Directive) amended by 93/68/EEC and implemented in the UK by SI/2372/1992 and SI/3080/1994.

Emissions tested to BS EN 50081-1 Domestic/Light Industrial.
Immunity tested to prEN 50082-2 Industrial.

Product Description	Serial No.
ELE Non Automatic range of Compression and Compression/ Flexural Machines including: Compression Frames a) 1500 kN 2000 kN 3000 kN Flexural Frames b) 100 kN Compression/Tension Machine c) 1000/500kN	(See details on product identification plate)

BS EN ISP9001: 1994 approved
Certificate number 860461

Responsible person's/approved signatory
M Green, Managing Director

This Declaration of Conformity complies with BS 7514 (EN 45014), General Criteria for suppliers' Declaration of Conformity

ELE International
Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Beds, LU7 4WG England
phone: + (0)1525 249200
fax: + (0)1525 249249
email: ele@eleint.co.uk
http: www.ele.com
ELE International, a division of Danaher UK Industries Ltd

Noise Test Certificate

Issued By: **ELE International**

Date of Issue: 1st January 1998 ELE doc ref: 9901X0003

Date of Test: 1st January 1998

ELE International

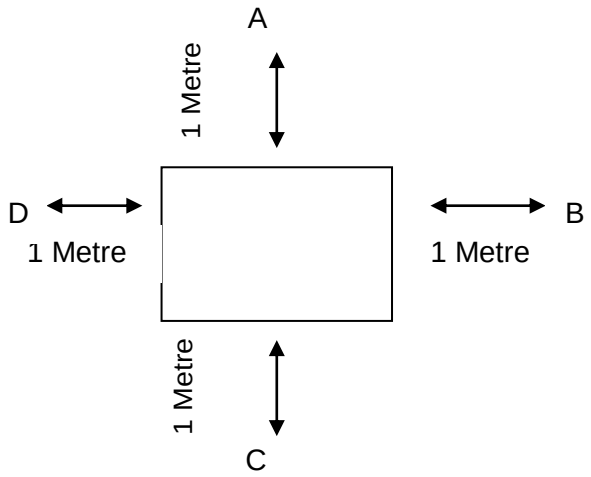
Approved Signatory

We, ELE International, Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Beds LU7 4WG, England, declare under sole responsibility that the following product(s) to which this declaration relates is (are) in conformity with the provisions of:

73/23/EEC Electrical Equipment Directive implemented in the UK by S1728/1989.

89/392/EEC, 91/368/EEC, 93/44/EEC and 93/68/EEC Machinery Directive implemented in the UK by S13073/1992 and S12063/1994.

Product Description	Serial No.
Non Automatic Compression Machines	(See details on product identification plate)



Measurements/recorded noise level

Position A	68	dB
Position B	64	dB
Position C	69	dB
Position D	72	dB
Position E	70	dB

(Normal operator position)

Background Noise level	50	dB

Notes: Tests carried out with machine under load.

BS EN ISP9001: 1994 approved
Certificate number 860461

Noise tests were carried out using Test Meter, serial No.

N30863

which has been calibrated using calibrated standards traceable to national standards of measurement.

ELE International
Chartmoor Road, Chartwell Business Park, Leighton Buzzard, Beds, LU7 4WG England
phone: + (0)1525 249200
fax: + (0)1525 249249
email: ele@eleint.co.uk
http: www.ele.com
ELE International, a division of Danaher UK Industries Ltd

PRODUCT SAFETY DATA SHEET

COPY

SHELL TELLUS OIL T

Shell U.K. Oil, Shell-Mex House, Strand, London WC2R 0DX.
Telephone 01-257-3000

Data Sheet No. LTEL02 Version : 16 11 89

BRANDNAMES :	SHELL TELLUS OIL T15	60406
	SHELL TELLUS OIL T37	60407
	SHELL TELLUS OIL T46	60408
	SHELL TELLUS OIL T100	60409

PRODUCT INFORMATION

APPROVED USES

Shell Tellus Oil T are approved for use as :

hydraulic fluids and fluid power transmission oils.

If Shell Tellus Oil T are used for a purpose not covered in this section, Shell UK Oil would be grateful to receive information on the application.

KNOWN MISUSES/ABUSES

None known.

COMPOSITION

Shell Tellus Oil T are manufactured from highly refined mineral base oil derived from crude petroleum, and may contain additives, none of which give rise to any additional hazard in the finished product to that posed by the mineral oil components.

PHYSICAL AND CHEMICAL PROPERTIES

Physical State :	Liquid at Ambient Temperatures
Appearance :	Pale/Dark Amber
Odour :	Characteristic Mineral Oil
IBP. :	> 280 Deg. C.
Vapour Density (Air = 1) :	> 5
Vapour Pressure @ 20 Deg. C. :	< 0.1 kPas
Sol. in Water :	Very Low
Acidity/Alkalinity :	Neutral

TYPICAL PROPERTIES	DENSITY @ 20 Deg C.	POUR POINT Deg C.	VISCOSITY in cSt. @ 40 Deg C.	@ 20 Deg C.
SHELL TELLUS OIL T15	0.87	-50	15	31
SHELL TELLUS OIL T37	0.87	-42	37	101
SHELL TELLUS OIL T46	0.88	-40	46	130
SHELL TELLUS OIL T100	0.89	-30	100	328

FIRE AND EXPLOSION HAZARDS

Flammability Limits	- Upper :	10 % vol.
	- Lower :	1 % vol.
Autoignition Temperature in Deg. C. :		> 320
Extinguishants	- Large Fire :	Foam/Water Fog - NEVER USE WATER JET
	- Small Fire :	Foam/Dry Powder/CO2/Halon/Sand/Earth

FLASH POINT in Deg. C. by Pensky Marten Closed Cup unless stated otherwise.

SHELL TELLUS OIL T15	150
SHELL TELLUS OIL T37	177
SHELL TELLUS OIL T46	177
SHELL TELLUS OIL T100	153

See also section 4.2.2 'Fire and Explosion' in Part 1 (Page 9)

SUPPLY CLASSIFICATION

Not Dangerous for Supply

See also section 4.2.6 'Product Handling' in Part 1 (Page 12)

TRANSPORT CLASSIFICATION

Not Dangerous for Conveyance

See also section 4.2.4 'Product Receipt' in Part 1 (Page 10)

STORAGE PRECAUTIONS

See also section 4.2.5 'Product Storage' in Part 1 (Page 11)

ACUTE HEALTH HAZARDS AND ADVICE

Toxicity following single exposure to high levels (orally, dermally or by inhalation) is of a low order. The main hazards are: in the unlikely event of ingestion, aspiration into the lungs with possible resultant chemically induced pneumonia ; and, if the products are handled under high pressures, of high pressure injection injuries.

See also section 3.2 'Health Aspects of Petroleum Products' in Part 1 (Pages 4 - 7)

INHALATION

Under normal conditions of use inhalation of vapours is not feasible or likely to present an acute hazard.

SKIN

Skin contact presents no acute health hazard except in the case of high pressure injection injuries. These can lead to the loss of the affected limbs if not treated immediately and properly.

PRECAUTIONS :

Avoid contact with the skin by the use of suitable protective clothing. Where skin contact is unavoidable, a high standard of personal hygiene must be practised. Extreme care must be exercised where the product is likely to be encountered at high pressures. Where high pressures are likely to be encountered, it is recommended that safe systems of work be employed.

FIRST AID :

Skin contact does not normally require first aid, but oil soaked clothing should be removed, and contaminated skin washed with soap and water. If persistant irritation occurs, medical advice should be sought without delay.

Where a high pressure injection injury has occurred, medical attention should be obtained immediately. Show this Data Sheet and section 3.4 'Notes for Doctors' from Part I to the physician.

EYES

Eye contact may cause some discomfort.

PRECAUTIONS :

If there is a risk of splashing while handling the liquid, suitable eye protection should be used.

FIRST AID :

Flush the eye with copious quantities of water. If irritation persists refer for medical attention.

INGESTION

The main hazard following ingestion is of aspiration into the lungs during subsequent vomiting.

PRECAUTIONS :

Accidental ingestion is unlikely. Normal handling and hygiene precautions should be taken to avoid ingestion.

FIRST AID :

DO NOT INDUCE VOMITING If ingestion is suspected, wash out the mouth with water, and send to hospital immediately. Show a copy of this data sheet and section 3.4 'Notes for Doctors' from Part I to the physician.

CHRONIC HEALTH HAZARD AND ADVICE

Prolonged and repeated contact with oil products can be detrimental to health. The main hazards arise from skin contact and in the inhalation of mists. Skin contact under conditions of poor hygiene and over prolonged periods can lead to defatting of the skin, dermatitis, erythema, oil acne and oil folliculitis. Excessive and prolonged inhalation of oil mists may cause a chronic inflammatory reaction of the lungs and a form of pulmonary fibrosis.

Adherence to the precautions contained in section 3.3 'Health Precautions' in Part 1 (Pages 4 to 7) will minimise risks to health.

EXPOSURE LIMIT VALUES

UK Maximum Exposure Limits :
UK Occupational Exposure Standards :

Oil Mist, Mineral :	5 mg/cubic metre 8-hour TWA value
	10 mg/cubic metre 10-min TWA value

RECOMMENDED PROTECTIVE CLOTHING

Impervious gloves and overalls where regular contact is likely, and goggles if there is a risk of splashing.

COMBUSTION PRODUCTS

The substances arising from the thermal decomposition of these products will largely depend upon the conditions bringing about decomposition. The following substances may be expected :

Carbon Dioxide
Carbon Monoxide
Water
Particulate Matter
Polycyclic Aromatic Hydrocarbons
Unburnt Hydrocarbons
Unidentified Organic and Inorganic Compounds

DISPOSAL

See section 5.2.2 'Product Disposal' in Part 1 (Page 13)

FURTHER INFORMATION

The references set out below refer to the publications given in section 6 'Further Information' in Part 1 (Pages 14 & 15)

References : B1, B2.
References : C4.
References : E1
References : L3, L6, L11, L15
References : S12
References : X2, X4, X10.
References : Y1, Y3.
References : Z3, Z8.

EMERGENCY ACTION

See section 7 'Emergency Action' in Part 1 (Page 16)