



EQUIPMENT MANUAL



SR3000PT PUMP

Serial Number Recording

Type:	
CCL Serial Number:	
Date:	CCL Stamp:
CCL Order Number:	

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This manual is designed to provide skilled and trained operatives with the necessary safety precautions associated with the installation, use, problem solving and maintenance of the CCL Stressing Systems products. If applied correctly, these instructions can result in a more efficient and safe working environment and an increased product service life.

All efforts have been made to accurately record all information and data in this manual; however, CCL Stressing Systems Ltd can neither control the workmanship or conditions under which the products are used, nor make any guarantee, which expressed or implied, regarding the recommendations contained herein.

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CCL Stressing Systems Ltd

CCL products have been providing market leading quality and service around the world since 1935 with CCL prestressing systems being developed in the 1960's. The current CCL Stressing Systems Ltd was formed in 2000 and operates from Leeds England supplying innovative and reliable solutions for the Building and Civil Engineering industry.

The current CCL product range reflects over 40 years of continuous and ongoing development and service. CCL Stressing Systems Ltd has a reputation for quality, innovation and service and our range of products are in use daily around the world.



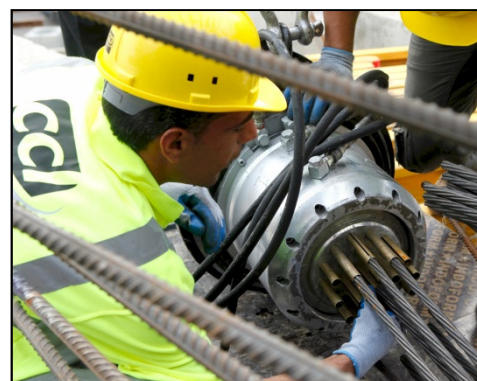
Original CCL Equipment

Original CCL equipment is only manufactured by CCL in Leeds in England. All equipment is produced to CCL's ISO 9001 quality management systems and in line with the European CE marking directive.

CCL stressing equipment is widely accepted as the world leader in design and quality, delivering fast and reliable service.

The CCL range of stressing equipment is designed especially for the task and built to exacting standards. It is valuable equipment and trouble free operation can only be achieved by operators carefully adhering to these maintenance instructions.

When operated and maintained in line with CCL guidelines the equipment will provide years of trouble free service.



These instructions should be read entirely before commencing operation and maintenance work. Only a competent fitter should be employed to dismantle and re-assemble this equipment.

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1. General Description

This Operating Manual describes the CCL Stressomatic System that is transportable, electrically driven, hydraulic power pack. It provides on-site power for CCL Stressomatic jacking systems and in this context it can be used with the CCL Automatic Multi-trip Load Meter.

CCL Load Meter's are electronic units, which have evolved along with microprocessor technology. At the same time, the pump units themselves together with the stressing jacks have been developed to match this electronic capability. No attempt should be made to use SR3000PT equipment with equipment from earlier systems or from other similar systems without first contacting CCL Stressing regarding the compatibility. The latest Stressomatic System incorporating the SR3000PT Pump Unit and the Automatic Multi-trip Load Meter is illustrated in the diagram below (Fig. 1.1).

These instructions should be read in conjunction with the appropriate stressing jack and load meter manuals.

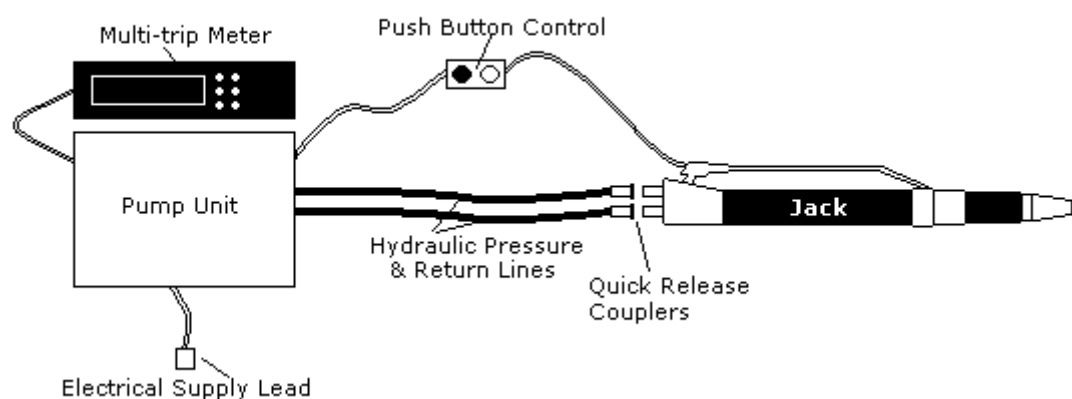


Fig. 1.1 Diagram of Stressomatic System

Note: Loose Electrical lead & 12 Pin Socket to Jack apply to Load Cell Jacks only

1.1 Ancillary Equipment Requirements

The SR3000PT pump is compatible with the following equipment;

CCL Stressomatic jack	Part No.
• S60S	105121
• S160S	106171
• S160L	106173
• S300S	107821
• S300L	107823

CCL Hydraulic hoses* (or equivalent specification see section **3.1**)

***Note Hydraulic hoses are not included unless a pump AND jack are ordered together.**

2. Standard Nomenclature

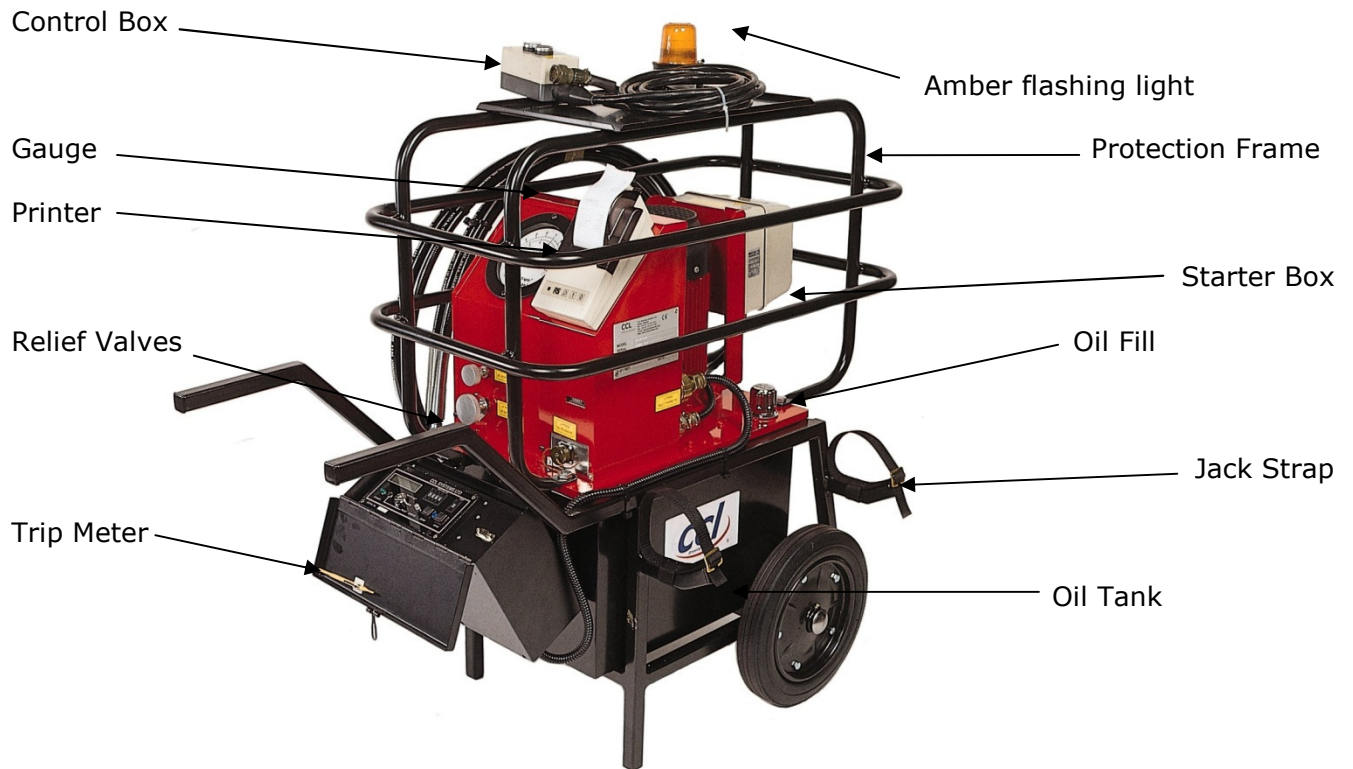


Fig. 2.1 SR3000PT General Layout

3. Specification

The following chapter includes technical information for the SR3000PT pump.

3.1 SR3000PT Specification

Electrical

Fuses: 2.5 Amp Anti-surge (Fitted to Electrical Control Box)

Hydraulic

Oil type for ambient temperatures

0°C (32°F) to 34°C (94°F):	TEXACO RANDO HDA (ISO 32)
Above 34°C (94°F):	TEXACO RANDO HDA (ISO 46)

(Another reputable brand of oil may be used providing exact equivalents are obtained)

Maximum oil temperature	70°C (158°F)
Capacity of tank:	32 litres (7 Imp. Gals)
Pump rating:	4KW (5.5hp)
Maximum flow rate:	5.75 l/min (1.2 gal/min up to 350 bar)

(Flow dependent on setting of Stage 1 pump unloading valve)	2.15 l/min (0.47 gal/min up to 550 bar)
Maximum working pressure:	550 bar (800 psi)
Filtration:	Suction strainers (cleanable)

Weights

Pump unit only:	95.5 kg
Trolley and wheels:	20 kg
Safety Frame:	10 kg
Oil (32 litres):	28 kg
Automatic Multi Trip Load Meter:	6.5 kg
Fully Equipped Unit:	160 kg

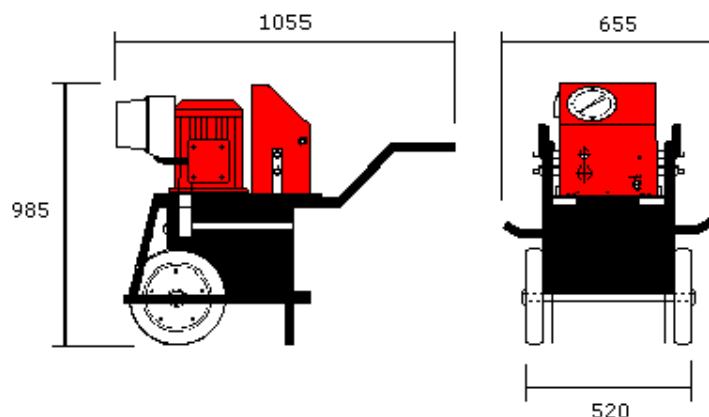


Fig. 3.1 Overall Dimensions SR3000PT

3.2 Hose Specification

The hoses supplied by CCL (part no. 149506) for use with the stressomatic range of jacks conform to; "The supply of machinery (safety) regulations 1992" (EC machinery directive-for portable equipment). All hoses are tested prior to shipping & are fully traceable.

NOTE. Only CCL supplied hoses or equivalent quality hydraulic hoses should be used with CCL equipment. If in doubt contact CCL.



Nominal Bore (A)	3/8in
Fittings (B)	3/8in BSPF
Working pressure	690bar/10000psi
Bursting pressure	2760bar/40000psi
Length	3m

4. Setting up Procedures

4.1 Filling the Pump With Oil

Depending on transport regulations it is probable that the pump is delivered without hydraulic oil. If this is the case the unit must be filled with oil before operation can commence.

- Place the pump on level ground.
- Unscrew the oil filler cap located towards the front of the pump.
- Slowly fill the oil tank to the correct level (indicated on the oil-level sight glass) using a suitable hydraulic oil (see section 3). **TAKE CARE NOT TO OVERFILL THE PUMP!**

4.1.1 Draining Oil From the Pump

CCL recommend that the hydraulic oil is completely drained and replenished each month.

- To drain the oil, ensure the pump is placed on level ground.
- Position a suitable container beneath the oil tank drain plug.
- Unscrew the plug to release the oil.
- **USED OIL MUST BE LEGALLY DISPOSED OF!**

4.2 Lifting and Moving the Pump

The pumps can be lifted using an appropriate lifting device and lifting straps securely attached to the pump frame.

4.2.1 Positioning the Pump

The pump must be positioned on level ground and should always be operated at ground level. Position the pump unit so that the pressure gauge is in the direct line of sight of the operator. This is to ensure an accurate reading of the gauge value. Ensure that the electrical lead to the (Extend/Retract) pushbutton controller is not snagged. For operator safety, the full length of the lead should be used for remote control during stressing.

4.3 Connecting the Pump to the Power Source

CCL recommend the fitting of an earth leakage protection device to the incoming power supply of all electrically operated pump units, See Appendix.

The main power cable (not supplied with pump) should be connected to the circuit breaker in the starter box. A high-flex armoured cable is recommended, the voltage of the pump dictates the connection arrangement, check that the electrical supply is suitable for the unit by checking the

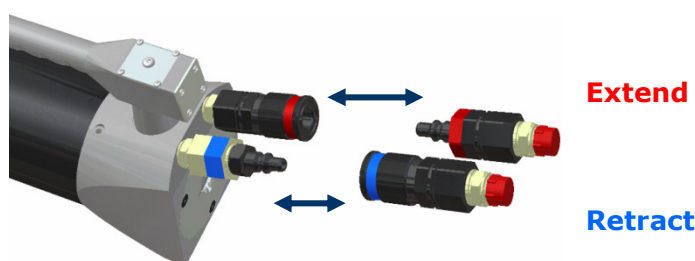
motor specification label for voltage. The cable should be attached to the starter box using a suitable cable gland. All electrical work should be carried out by fully qualified personnel

4.4 Connecting the Jack to the Pump Unit

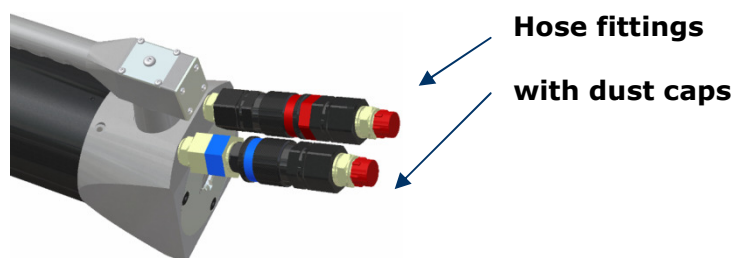
Safety Note: It is important that only CCL Quick Release couplings are fitted at the jack head. They should be fitted as shown below in Fig. 4.1. They should not be fitted at the pump end of the hoses. Failure to observe this could damage the jack beyond repair and may cause an accident.

Assuming that the hoses are already correctly connected to the pump unit. Connect the hoses using the Quick release couples fitted to the rear of the jack Fig 4.1. Ensure that the male coupling half is fitted to the retract side of the jack (stamped R) and the female coupling half is fitted to the extend side of the jack (stamped E or S).

Failure to connect the hoses correctly could lead to premature failure of the jack tubes, or other injuries, with potentially dangerous consequences. Use the protective caps if disconnecting as dirt entering these connectors could lead to a blockage, and subsequent overload.



**Quick Release
Couplers (disconnected)**



**Quick Release
Couplers (connected)**

Fig 4.1 Hose Connections

4.4.1 Disconnecting the Jack from the Pump Unit

Ensure that there is no residual pressure in the hydraulic system before removing a connector.

4.5 Lifting & Moving the Jack

The Type 160 & 300 jacks weigh over 28 kg and should not be lifted by one person. A lifting attachment is on the body of these jacks, which should be used in conjunction with a lifting device.

4.6 Wedge Condition

Worn wedge teeth in either the jack or the permanent wedges may allow the strand to slip out, creating a serious hazard. See relevant jack manual for servicing details.

Re-useable wedges must have a special lubricant to ensure that they grip the wire/strand.

5. Calibration

Calibration of the SRX must be carried out along with a CCL stressomatic jack so that the relationship between the hydraulic pressure supplied by the pump and the consequent force exerted by the jack can be defined.

If the pump supplied by CCL was bought in conjunction with a CCL jack then the equipment will already have been calibrated before shipping, and a corresponding calibration certificate supplied similar to the one shown below.

Calibration Certificate
Page 1 of 2

Certificate No: SRX 6522-1 06 160 6495-1 06
Date: 09/08/06
Carried Out By: P Charlesworth
CCL Reference: 2006/SRX 6522-1 160 6495-1

CCL Stressing Systems Ltd
Unit 4 Park 2000 Millennium Way
Leeds England
LS11 9AL
Tel: +44 (0)113 270 1221
Fax: +44 (0)113 277 8977
Email: sales@cclstressing.com
www.cclstressing.com

CCL Q.A. Approval to British Standards Institute (BSI) BSI EN ISO 9001: 2000 Certificate No FM54413

Calibration Chart

Master Load Cell	Pressure Gauge
0	0
20	10
40	135
60	260
80	260
100	322
120	387
140	450
160	512

Load Meter Calibration Figure: N/A

Test Equipment

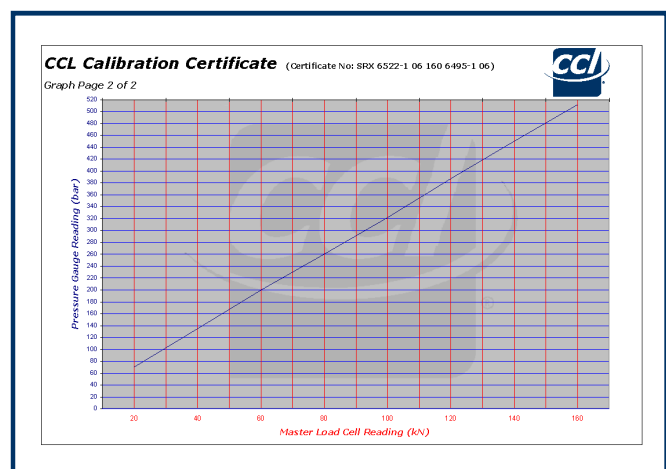
Type	Serial Number
Load Meter	N/A
Proving Ring	N/A
Calibration Device	Mastermatic 840
Jack	160 6495-1
Pump	SRX 6522-1
Pressure Gauge	100mm 0-4000 Bar
Pressure Transducer	N/A

Signed Operator: For and on Behalf of CCL
Date: 09/08/06

Signed QA: For and on Behalf of CCL
Date: 09/08/06

Q.A. Stamp

Quality Management System Form: QMSF/060 Date: 14/02/03 Issue: A



Calibration of the jack to the corresponding pump pressure gauge should be carried out as regularly as possible so that the application of accurate prestressing loads is maintained. CCL advise that equipment be calibrated once every twelve months at the absolute minimum, no matter how little the equipment has been used.

CCL can supply the necessary equipment to carry out a calibration (see diagram: **Part No. 116039**) and also operate a calibration service from the UK factory.



6. General Precautions & Safety

Wire or strand anchorages or gripping devices used in conjunction with the CCL jack must only be used as instructed by their supplier, and must not be used for any other purpose. Where anchorages or gripping devices not manufactured or supplied by CCL are used it is the responsibility of the end user to ensure that they are suitable for use with the CCL jack.

Stressing of wire/strand is extremely dangerous and should only be carried out by persons suitably qualified in the use of the equipment, and with the necessary safety procedures to protect both the operators and non-involved personnel. These procedures have been formulated in accordance with the "Management of Health and Safety" and "Provision and Use of Work Equipment Regulations 1992"

6.1 Overloading or Improper Use

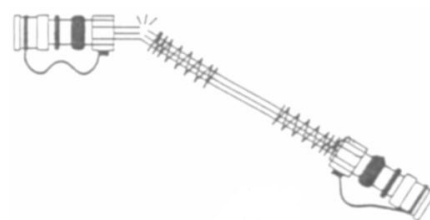
- Overloading or improper use could lead to **FATAL** injury.
- The load applied to the wire or strand should never exceed 80% of the manufacturer's certified minimum breaking load.
- The load should never exceed the specified design load of the jack (see stressomatic jack equipment manual).
- The hydraulic pressure should never exceed the specified maximum pressure of the pump (see section 3) or jack (see Stressomatic jack equipment manual).
- The equipment should only be used within the ambient working temperature range shown in section 3.

6.2 Hose Inspection and Maintenance

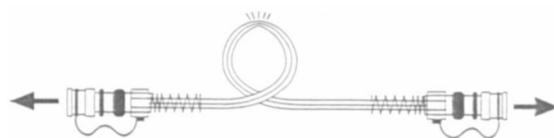
It is necessary to carry out the following regular inspection procedures (particularly as the hose assembly is likely to be used under arduous conditions) to ensure the hoses remain in a safe operational state. These inspections shall be carried out by a competent person properly trained and familiar with the operational use of the equipment.

- **Before use**

- Ensure that only hoses, couplings and fittings provided by CCL Stressing Systems are used or components of equivalent quality and specification.
- Ensure that the couplings are securely attached to the hose.
- Ensure that anti-kink springs are fitted on all hoses and hose assemblies and that they are in their correct location and are firmly attached to the ferrule.

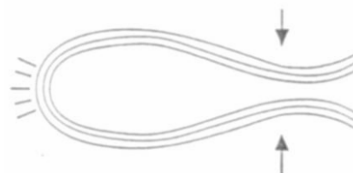


- Ensure that the hose is free from cuts, abrasions, kinks and other irregularities which could impair its performance.



- **During use**

- Ensure that the hose is not bent beyond the minimum bend radius of 70mm.



- Avoid twisting, knotting or trapping the hose.



- Avoid handling the hose unnecessarily whilst under pressure.



- **DO NOT** use the hose as a means of moving either the pump or the jack.

- Hose assemblies should **NOT** be used as a means to hold tools in position especially whilst under pressure.

- **After use**

- Before disconnecting the quick release connectors ensure that there is no residual pressure in the hydraulic system (see section **10.1**).
- Remove the anti-kink springs and visually inspect the joint at the connection of the hose to the ferrule.
- Visually inspect the whole length of the hose for signs of cuts, abrasions and any other mechanical or chemical damage.
- Reconnect anti-kink spring.

- For hose that has satisfied the visual inspections identified above, the following pressure test shall be conducted as regularly as possible.

- With the hoses disconnected from the jack, pressurise the complete assembly to the maximum working pressure of the pump.
- Maintain this pressure for 5 minutes. De-pressurise the hose.
- Repeat this pressure test for a further 5 minutes and visually inspect for signs of leakage. If any leakage occurs, the hose should be withdrawn from service immediately and returned to the supplier for inspection.
- Thermoplastic hose should be withdrawn from service after 8 years, regardless of the condition.

6.3 Daily maintenance checks

- Visually check the oil level using the sight glass located at the front of the pump. Top-up level if necessary.
- Visually inspect the aluminium motor casing for damage/obstruction of internal cooling fins.
- Visually inspect the motor internal cooling fins for damage/dirt contamination – cooling efficiency can be seriously affected by these problems.
- Visually inspect the push-button control box for damage.
- Visually inspect the main power and push-button control box cables for damage/kinks.
- Visually inspect the pump and associated hydraulic system for oil leaks.

7. Basic operation

The following instructions are for information only and should be read in conjunction with the CCL operation and maintenance instructions for the Stressomatic range of jacks. Wire or strand anchorage systems must only be used as instructed by their supplier and must not be used for any other purpose. Where anchorages or gripping devices not manufactured by CCL are used, it is the responsibility of the end user to ensure that they are suitable for use with the CCL jack.

7.1 Controls

7.1.1 Main relief valve

Required tensioning pressure (and therefore load) is adjusted by rotating this control.

7.1.2 Stage 1 Pump Unloading Valve

This is factory pre-set to a maximum of 350 bar (5000 psi) and will permit full flow from the pump to this pressure. For normal use it is recommended that it is set to operate at approx. 35 bar (500 psi) below the final stressing pressure, which can be determined using the jack/pump calibration certificate (see section 5) as follows:

- Fit a short length (approx. 900mm - 3 ft) of suitable diameter wire/strand into the jack leaving sufficient exposed to carry an open grip. Thread the grip with the small diameter of the taper to the jack nose.
- Slacken the locking ring on the main relief valve knob and screw out (anti-clockwise) fully.
- Unscrew the Stage 1 pump unloading valve knob (anti-clockwise) fully.
- Press the white 'EXTEND' pushbutton and keep pressed whilst screwing in the main relief valve knob until the pressure gauge indicates a load which is approx. 35 bar (500 psi) below the required final stressing pressure (see calibration certificate).
- Whilst keeping the white 'EXTEND' pushbutton pressed, screw in the Stage 1 pump relief valve until the Stage 1 pump operating light (Fig. 3, item 22) is just extinguished.
- Screw in the main relief valve until the pressure gauge reads the final stressing pressure required.
- Press the black 'RETRACT' button to return the jack.
- Press the white 'EXTEND' button and check that as the pressure rises, the stage 1 pump operating light extinguishes before reaching the final stressing pressure.

7.1.3 Lock-Off Relief Valve

The lock off relief valve is factory set and locked at 206 bar (3000 psi), this pressure should never be exceeded if adjusted. This is a pressure suitable for the majority of stressing applications. For effective operation during applications which require lower than the normal stressing loads, the lock off pressure must always be set 14 bar (200 psi) lower than the stressing pressure. The valve may be reset as follows: (reference numbers relate to the pump general assembly drawing shown in appendix)

- Detach the hydraulic hoses from the Stressomatic jack and join the free ends together to form a loop by means of Quick Release Connector.
- Remove the manifold cover (Ref. 22) and then remove the electrical control box cover (Ref. 2) to gain access to the valve timer.

WARNING: The electrical box operates at mains voltage and care should be taken to avoid contact with any electrical terminals.

- Adjust the valve timer to provide maximum working time. The timer is factory set to provide a two seconds time delay during which the lock off piston operates – for value adjustment only, turn the timer clockwise to five seconds (the maximum setting).
- Slacken the locking ring on the lock off relief valve knob, press the black 'RETURN' pushbutton and hold the button down whilst rotating the knob until the required pressure is indicated on the pressure gauge. The knob is turned anti-clockwise to reduce pressure and clockwise to increase pressure.

NOTE: Lock off pressure must never exceed 206 bar (3,000 psi). If the timer operates (after 5 seconds) before adjustment is completed, repeat instruction 4 until an accurate setting can be achieved.

- Tighten the relief valve knob-locking ring.
- Reset the timer to two seconds.
- Replace the covers that were removed in Operation 1 above.

NOTE: The lock off pressure should be returned to normal 206 bar (3000 psi) setting after a low pressure application has been completed.

7.1.4 'EXTEND' White Push button

The Stressomatic jack extends as long as the button is pressed, or until either; the jack reaches full stroke, the Multi Trip Load Meter provides an over-riding signal at set load, the main relief valve operates or the jack reaches the stroke limiting switch (when fitted).

7.1.5 'RETRACT' Black Push button

When pressed, after a delay during which the lock-off piston operates, the stressing jack retracts.

Note: If there is no load on the jack the jack may extend for two seconds before retracting.

7.2 Hydraulic System SR3000

(See appendix for hydraulic circuit diagrams)

When the white 'Extend' button is pressed, the solenoids of V1 & V2 are energised. This allows fluid to flow to the stressing head. When the required pressure is indicated, the white 'Extend' button is released, solenoids V1 & V2 are de-energised: pressure in the extend line is held by the non-return valve and the pump output is vented through V1.

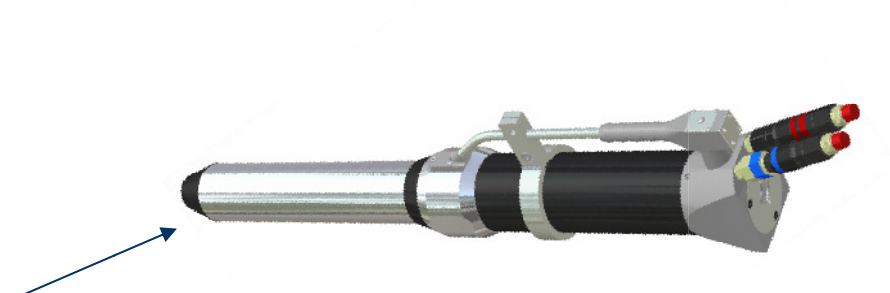
Note: For jacks fitted with stroke limiting device this procedure is automatic and the 'Extend' cycle is automatically terminated.

Pressing the black 'Retract' button energises solenoid V1, and activates the delay timer. During the delay, pressure builds up to operate the lock-off piston, then solenoid V3 is energised and the stressing head retracts. When retraction is complete the push button is released, all solenoids are de-energised, and fluid is vented through V1 and the motor stops.

Adjustable relief valves are fitted to control lock-off pressure and to protect the circuit.

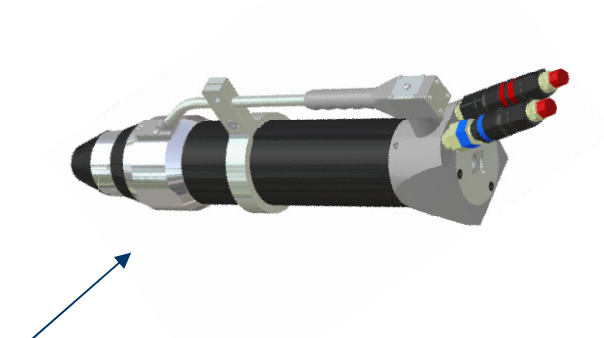
7.3 Purging Air from the Pump and Jack Hydraulic System

- Connect the hoses as described in section **4.4** and ensure the hose inspection guidelines and maintenance checklist shown in sections **6.2** and **6.3** have been followed.
- Fully unscrew (anti-clockwise) the main relief valve on the pump.
- Press the white extend button on the pump control box to start operation.
- Screw the main relief valve clockwise until the jack outer tube begins to move, the outer tube will extend and may jump due to air in the ram. This is normal for a jack the first time it is used.
- Once the jack reaches the end of its stroke and the outer tube stops moving screw the main relief valve clockwise one full turn. The pressure gauge needle will rise, indicating an increase in pressure.

A 3D perspective rendering of a hydraulic jack. The outer tube is extended forward, showing its full length. The jack has a black body with silver-colored mounting brackets and hydraulic ports at the rear. A blue arrow points from the text label to the extended outer tube.

**Outer tube
fully extended**

- Release the extend button and press the retract button, the lock-off piston in the front of the jack will extend and after a 2 second delay the jack outer tube will begin to retract.
- Once the outer tube of the jack is fully retracted (i.e. it has stopped moving) release the retract button-there is now no pressure in the hydraulic system.

A 3D perspective rendering of the same hydraulic jack, but with the outer tube fully retracted into the main body. A blue arrow points from the text label to the retracted tube.

**Outer tube
fully retracted**

- The jack can be cycled in and out several times as described above to purge all the air in the hydraulic system.
- Once the jack extends and retracts smoothly the system is free from air.

NOTE: When pressing the retract button with no wire or strand in the jack the outer tube will extend for the 2 seconds before retracting, this is normal and does not occur when stressing strand.

7.4 Stressing the Wire/Strand

Now the hydraulic system between the pump and jack is free from air, stressing of the wire/strand can commence.

- Thread the fully retracted jack onto the wire/strand nose-first and support using the jack handle and appropriate lifting device. Care must be taken not to bend or kink the strand.
- The desired load which is to be applied to the wire/strand should be translated to a corresponding pressure value using the calibration certificate & the stage one pump unloading valve/main relief valves set accordingly as described in section 7.1.2
- To begin stressing the white (extend) button is pressed, the pump unit runs and the jack extends-pulling the wire/strand through the anchor grip.
- If there is a large amount of slack it may not be possible to reach the required stressing pressure, hence apply the required load to the wire/strand within the first full extension of the jack. If this is the case, after completing a full stroke the jack should be retracted by pressing the black (retract) button, then pushed up to the back of the anchor grip, and further pulls taken until the required load is achieved.
- Once the required load has been achieved it should be checked that the jack is not at the end of its stroke (i.e. fully extended) as this may give a false pressure reading. If in doubt the jack should be retracted and another bite of the strand taken.

8. Appendix

Connection of Mains Electricity to Pump Unit

IMPORTANT

All electrical equipment contains devices that are capable of causing serious or fatal injuries. Any person who is involved in installation or maintenance of this equipment must be fully competent to carry out work. Such persons should be familiar with the requirements of the 'Health and Safety at Work act, and Electricity at Work Regulations 1989' or the equivalent National Regulations in the country where the equipment is used.

Persons responsible for UK installation should have a working knowledge of the IEE Wiring Regulations (BS 7671 : 1992 – as amended AMD8536).

Using the Table and Diagram below, the equipment should be fitted with suitable cable and connected as shown.

Note: The connection into the mains supply must not be permanent, unless the pump is fitted with an insulator.

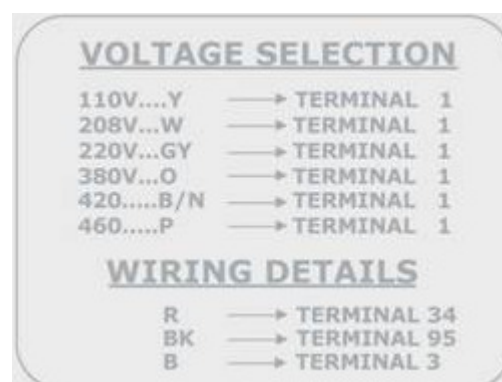
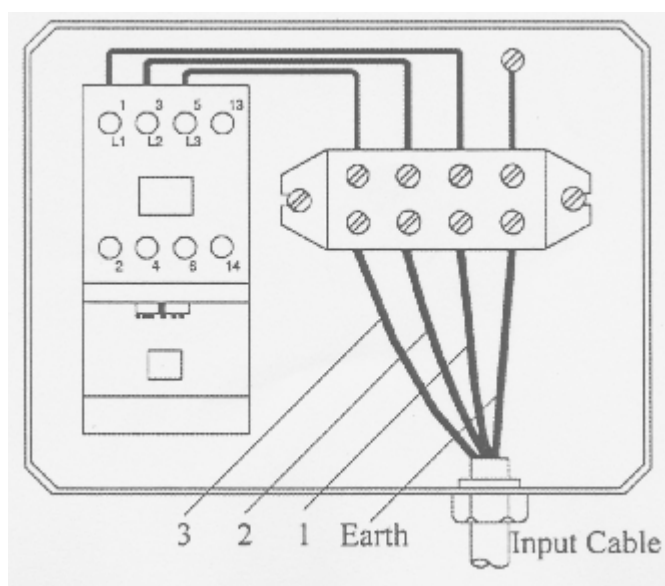
Connection should be by suitable plug and socket, the outlet socket must be protected by fuses or circuit breaker of a rating compatible with the full load current of the motor, given in the table below. It is also recommended that an Earth Leakage Protection Device be fitted.

SR3000PT Pump

MOTOR VOLTAGE V	Hp kW	CYCLE Hz	PHASE pH	SPEED NOM rpm	MOTOR FLC Amp
110	4	50	3	1500	31.8
220	4	50	3	1500	15.9
240	4	50	3	1500	14.6
380	4	50	3	1500	9.2
415	4	50	3	1500	8.4
110	4	60	3	1800	31.8
220	4	60	3	1800	15.9
240	4	60	3	1800	14.6
380	4	60	3	1800	9.2
415	4	60	3	1800	8.4

Cable sizes based on 4-core pvc/pvc unarmoured to BS 6500, having a maximum length of 20 metres.

MOTOR FLC	MIN.CABLE SIZE mm ²	MOTOR FLC	MIN.CABLE SIZE mm ²	MOTOR FLC	MIN.CABLE SIZE mm ²
6.5	1	11.24	1.5	24.5	4
7.1	1	12.26	1.5		
8.4	1	14.6	1.5	31.8	6
9.2	1	15.9	1.5		



Pump Sub Assembly Drawing

