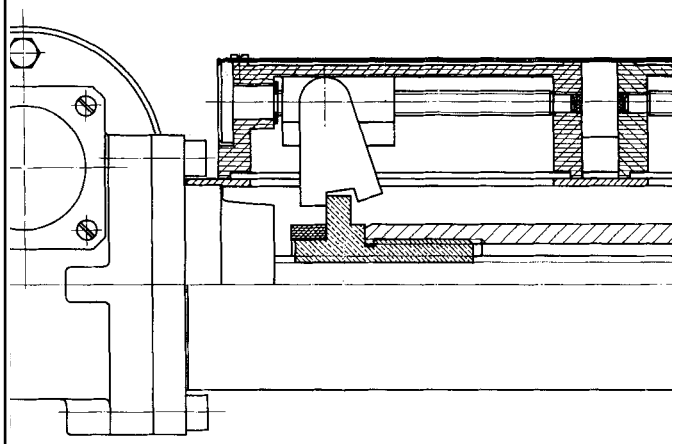
LEROY SOMER®

Réf. 1482 - 4.33 / b - 12.96

This manual must be sent to the end user



ELECTRIC JACKS

Verelec series 2 : V 152 - V 302 - V 602 - V 902

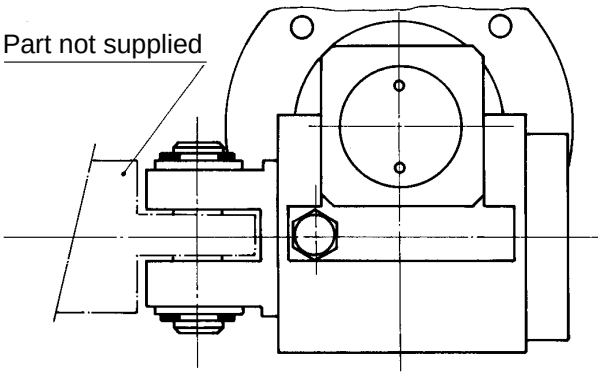
Linear jacks : VD 50

Installation and maintenance

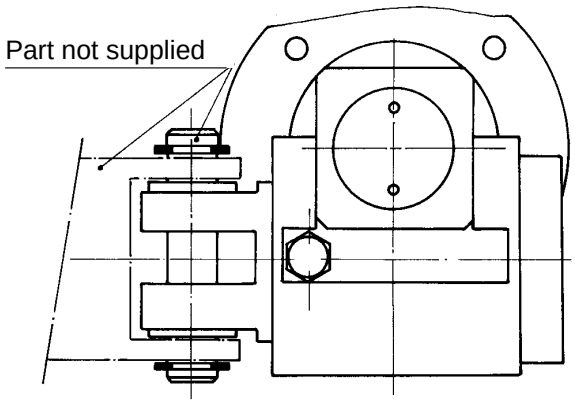
GN 002001 a

V 152 - V 302 with adjustable rear coupling

The rear coupling is adjustable to 90° and enables it to be used (like the front coupling) either as a fork joint or as a tenon joint, thereby superseding the former assembly with front and rear tenon joints (see drawing below).



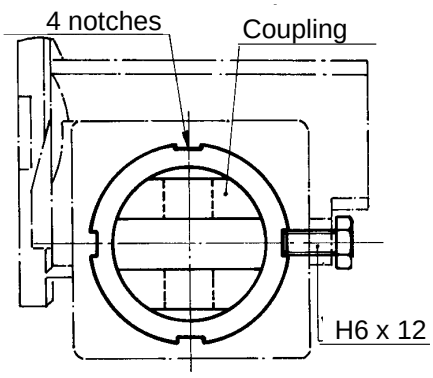
Use with fork joint



Use with tenon joint

ADJUSTMENT OF REAR COUPLING

– Loosen the H6 x 12 bolt by about 6 mm to release it from the casing.
– Pivot the coupling through 90°.
– Tighten the H6 x 12 bolt. Make sure that the bolt fits into the notch.



In addition, it is possible to obtain an adjustment other than 90°. To do this, remove the H6 x 12 bolt, move the rear coupling into the required position, make a 5 mm diameter hole, about 5 mm deep, and fit a round-headed screw (not supplied).

NOTE : Unless otherwise stipulated when ordering, the rear coupling is supplied with the hole parallel to the motor axis.

INSTALLATION

The installation of LEROY-SOMER electric jacks presents no major difficulties.
However, it is advisable to confirm a number of points before the installed equipment carries out the required operation. In particular :

- The conformity between the power supply voltage and the motor winding

- The operating factor.

Our devices are designed for a 20% operating factor, ie during a cycle of 5 minutes it will be operating for one minute and at rest for 4 minutes. It is worthwhile making sure that these operations are correctly spaced.
Confirm that the compression force, or the tension force, is exerted along the longitudinal axis of the jack. It should not be subjected to any lateral force.
In fact, lateral stress will create abnormal pressure either on the guide bush ring (Verelec series 2) or on the operating nut (linear jacks) and will cause premature wearing of these parts.
Under no circumstances will this fault be covered by the guarantee.
- For the same reason as above, make sure that the fixed or movable attachments are perfectly aligned and that the angular displacement of the jack during operation is performed freely around its axes. It is advisable to lubricate the axes.
The operations that are performed should not exert tension or compression forces on the jack greater than the rated force corresponding to the type of jack used.
When operating in compression mode, watch out for any reduction in force due to the length of the stroke (see LEROY-SOMER ELECTRIC JACKS catalogue).
- Follow precisely the connection diagram supplied with the equipment.
- For jacks that are fitted with force limiters and limit switches, follow
carefully the directions for their adjustment.

IMPORTANT :

NO ALTERATION CAN BE MADE TO A JACK (ADAPTATION OR REMOVAL OF AN OPTION, ETC) WITHOUT THE WRITTEN AGREEMENT OF OUR FACTORY IN SAINT-SYMPHORIEN-D'OZON (69).

SERVICING : Verelec series 2 : V 152 - V 302 - V 602 - V902.

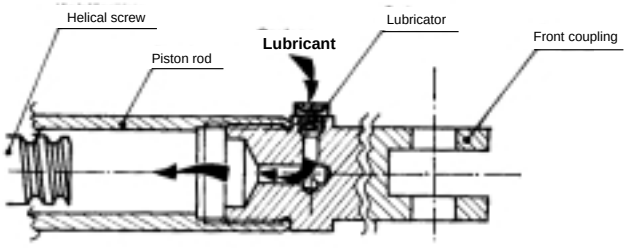
The equipment is designed to operate without special maintenance for a total travel distance of about 10 to 12 kilometres with an operating factor of 20%.
However, according to the conditions of use (heavy duty) or installation conditions (temperature) it is advisable to regularly examine the condition of :
- the mounting shafts (lubrication, make sure that they are not worn).
- the wiper seal at the head of the jack.
- the general state of the jack in order to detect possible faults (lubrication leak).
The front coupling on the V 602 and V 902 jacks is equipped with a lubricator (TECALEMIT - LUB). The lubricator accesses the operating screw. We advise lubricating every 6 to 7 kilometres of travel and at least once a year.
Equipment should not be dismantled without our agreement but should be returned, according to the circumstances, either to your supplier or to our after-sales department.

Lubrication :

a) Bevel gear housing : greased for life (in theory) - Type LX DDEB from LUBRILOG
As replacement : subject to a complete and thorough cleaning, do not mix these lubricants. (Weight approx. 100g)
Tivella Compound - A - from SHELL
Energrease GSF - from BP/Structouis P00 from KLÜBER

b) Operating screw :
Type : GALLIA 2 DL from KLÜBER.
Amount of lubricant in grams to be added every 6 to 7 kilometres of travel :

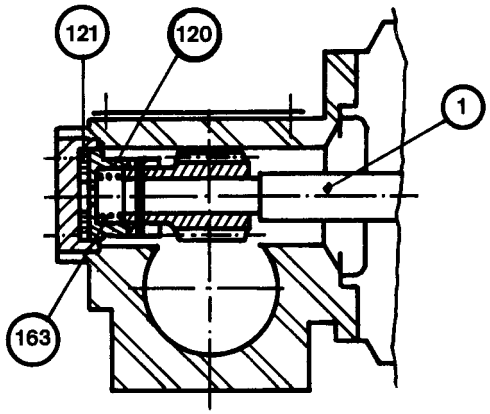
Travel	150	225	300	400	500
V 152 V 302	Greased for life				
V 602	15	20	25	35	45
V 902	20	25	30	40	50



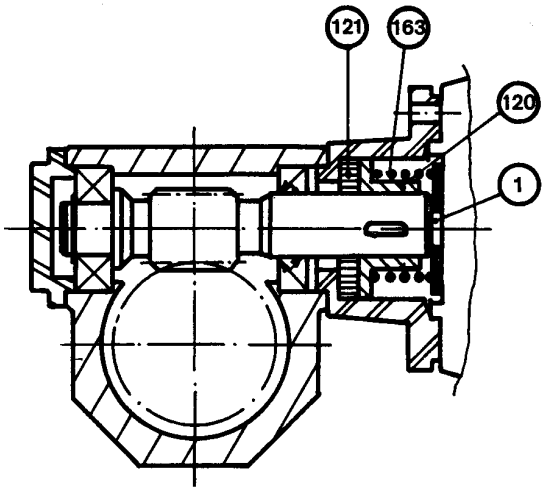
Lubrication is carried out when the piston rod is extended to its maximum so that the operating screw is coated with clean lubricant before the piston rod is retracted.

CONTINUOUS BRAKE :
Verelec series 2 : V 152 - V 302 - V 602 - V 902

The continuous brake is a mechanical device which enables jacks with a speed greater than or equal to 470 mm/mn to limit the slide of the piston rod when the motor stops and to increase the non-reversibility of the jack. It can be adapted for all sizes and needs no adjustment when the selected jack is installed.



Continuous brake on V 152 - V 302



Continuous brake on V 602 - V 902

OPERATION OF CONTINUOUS BRAKE

When the motor shaft (1) rotates, this drives a brake ring (120) which continuously rubs against a lining (121). The lining is itself in contact either with the stop plate (V 152 - V 302) or with the motor coupling flange (V 602 - V 902). The continuous pressure between surfaces is obtained by the action of the spring (163) , which automatically takes up the wear of the lining resulting from the operation.

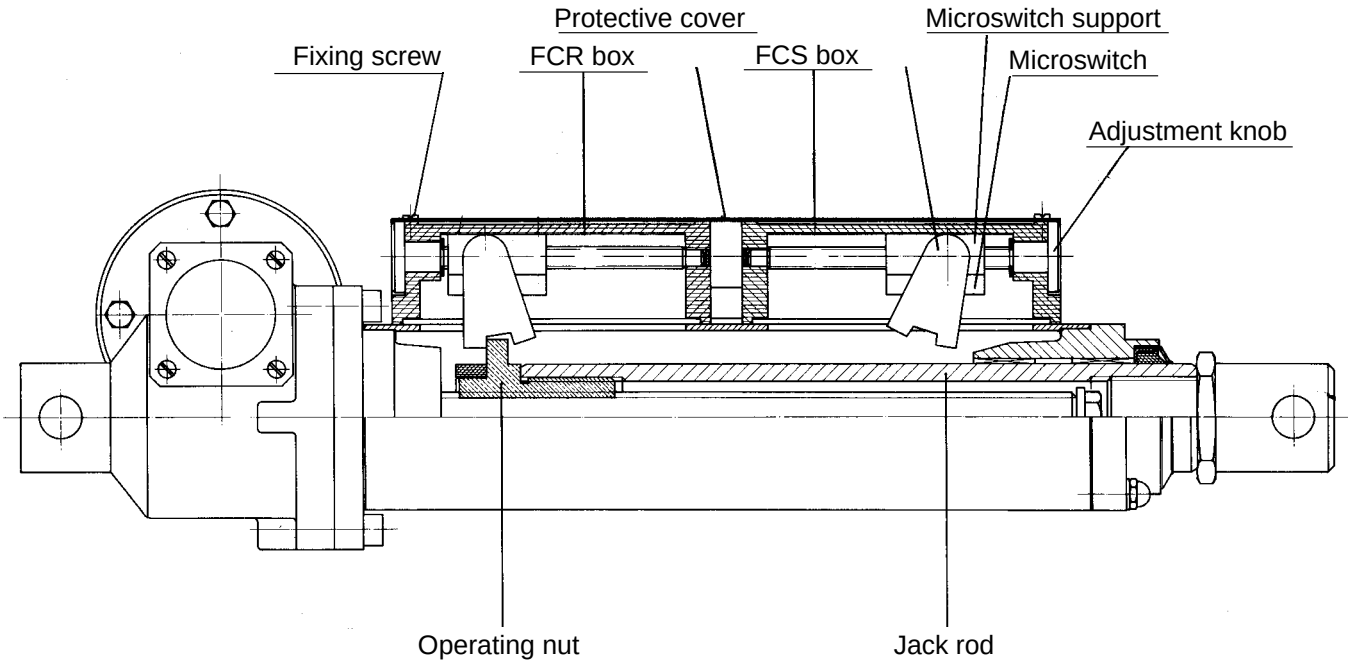
MAINTENANCE

In normal usage, it is necessary to change the lining every 4 to 5 kilometres of travel.
If, however, the parts in contact with the lining should heat up abnormally or if the jack makes unusual noises (squealing) when operating, check the state of wear of the lining.

NOTE : For specific applications : vibrations, very precise positioning, etc, use an FMC or FAST type brake motor.

LIMIT SWITCH ADJUSTMENTS : Verelec series 2

FCR : Limit switch retracted
FCS : Limit switch extended



LONGITUDINAL SECTION

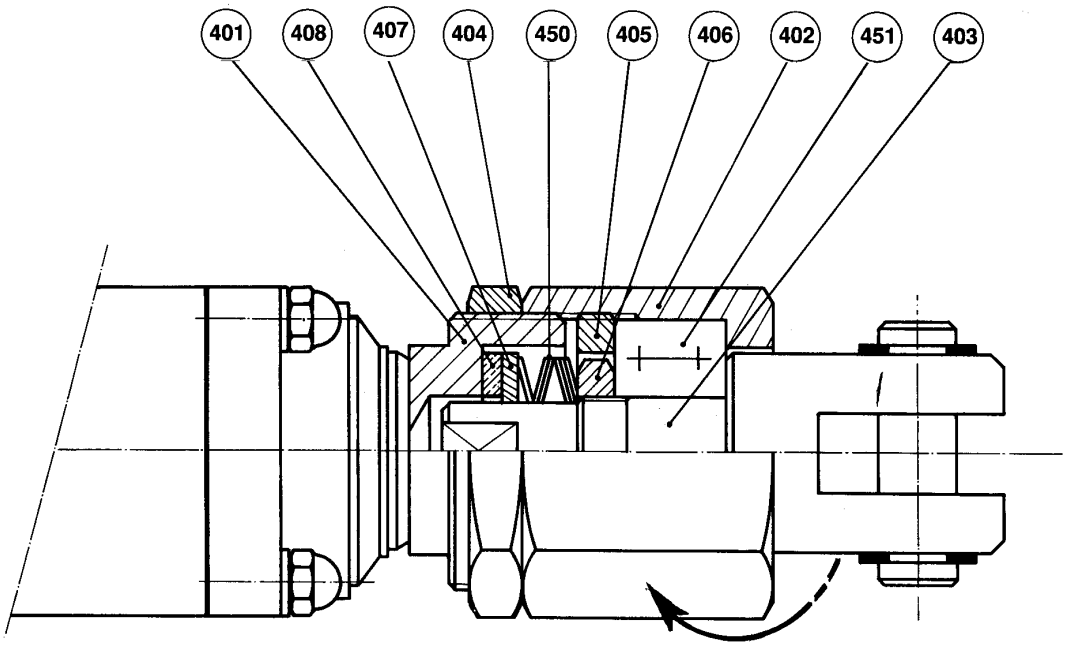
Operation :
The "limit switch" assembly comprises 2 boxes fixed to the jack and protected by a steel cover.
When the piston rod, during its linear movement, approaches the limit switch, the operating nut engages a cam which activates a microswitch and disconnects the power.
When the piston rod moves in the opposite direction, the operating nut accompanies the cam to its initial rest position and continues its travel up to the other limit switch.
The microswitch support, housed in a transparent box, can be adjusted in a linear direction by a screw-nut system.

Adjustment :
Remove the protective cover which is fixed by 2 screws at each end.

Turn the adjustment knob, making sure that the microswitch support moves in the required direction ; one turn of the adjustment knob = 1 mm travel of the jack rod.
Replace the protective cover, lining up the side with each adjustment knob. Replace the fixing screws and proceed to tests.

Remarks :
In the case of incorrect connection : due to reversal of the relays or phases (for three-phase supply), the limit switch that is activated does not disconnect the power ; the operating nut then passes under the cam which is in the reverse position. Do not remove the box. After having corrected the connection, the operating nut will bring the cam into its normal operating position.

ADJUSTMENT OF MECHANICAL FORCE LIMITER (LEM) : Verelec series 2 : V 152 - V 302 - V 602



This friction force limiter slips if the value of the load exceeds the preset maximum force value. In this case, the jack piston turns on itself and is not extended or retracted.
For jacks fitted with limit switches, it is understood that these will have been adjusted beforehand.

METHOD OF ADJUSTMENT

1) Take hold of nut 402 with a key.
2) Loosen nut 404 with another key.
3) Make the adjustment as follows :
- To increase the value of maximum force, the nut 402 should be tightened in the direction indicated by the arrow.
- To decrease the value of maximum force, the nut 402 should be loosened in the opposite direction of the arrow.
4) Take hold of nut 402 and relock nut 404.

Note : this limiter functions in both directions (in tension and in compression).
A correct adjustment results from moving the jack on the machine several times and adjusting the limiter again until the required value is achieved.
On each adjustment, even during operations, the nut 404 should be locked against nut 402.

IMPORTANT

• The jack is supplied with its limiter adjusted approximately to half-rated load.

ADJUSTMENT SHOULD BE CARRIED OUT DURING INSTALLATION

• The limiter is not designed to slip continuously. If this happens, there is a risk of deterioration of the limiter (jamming of the parts through friction) or the motor (overheating).

ADVICE ON INSTALLATION

It is strongly advised that the installation to which a jack with force limiter is fitted should be equipped with a system such as a test lamp for detecting undesirable conditions or with a system to temporarily stop the motor, thus enabling power supply to be disconnected if, for example, an obstacle prevents it from completing its normal travel. This delay time can be adjusted to +10 seconds of the normal operating time. A slip for 10 seconds will not harm the device as long as the following operation is sufficiently spaced to allow it to cool down again.

OPERATING PROBLEMS AND REMEDIES

FAULT	PROBABLE CAUSES	REMEDY
The limiter slips and the piston (operating nut for VTP 150) does not extend or retract.	Limiter out of adjustment or adjusted too low.	Adjust.
Not possible to adjust limiter correctly. Dispersion in adjustment.	Friction linings worn or spring washers deteriorated or the push force is not exerted along the rod axis. The lateral component has a tendency to block the limiter.	Dismantle the limiter and change parts 407 and 408.
The limiter does not slip for its initial adjustment.	Linings stuck as a result (for example) of prolonged stop time in a wet environment.	Unscrew the limiter ; restart the motor ; let the limiter slip for several seconds. Adjust the limiter again.

DISMANTLING THE LIMITER

This operation should only be carried out when replacing worn parts.

Note : part 402 should not be removed from the piston.

After having loosened part 404 while holding part 402, unscrew part 402 completely.

On part 403 are fitted :

- 6 spring washers 450
- 1 bronze washer 408
- 1 steel washer 407

Remove these parts and replace them with new parts, paying particular attention to the order and mounting position of each part in relation to the others.

Reassemble the equipment and proceed to adjustment as previously indicated.

SPARE PARTS

A packet containing the following parts can be supplied for initial maintenance :

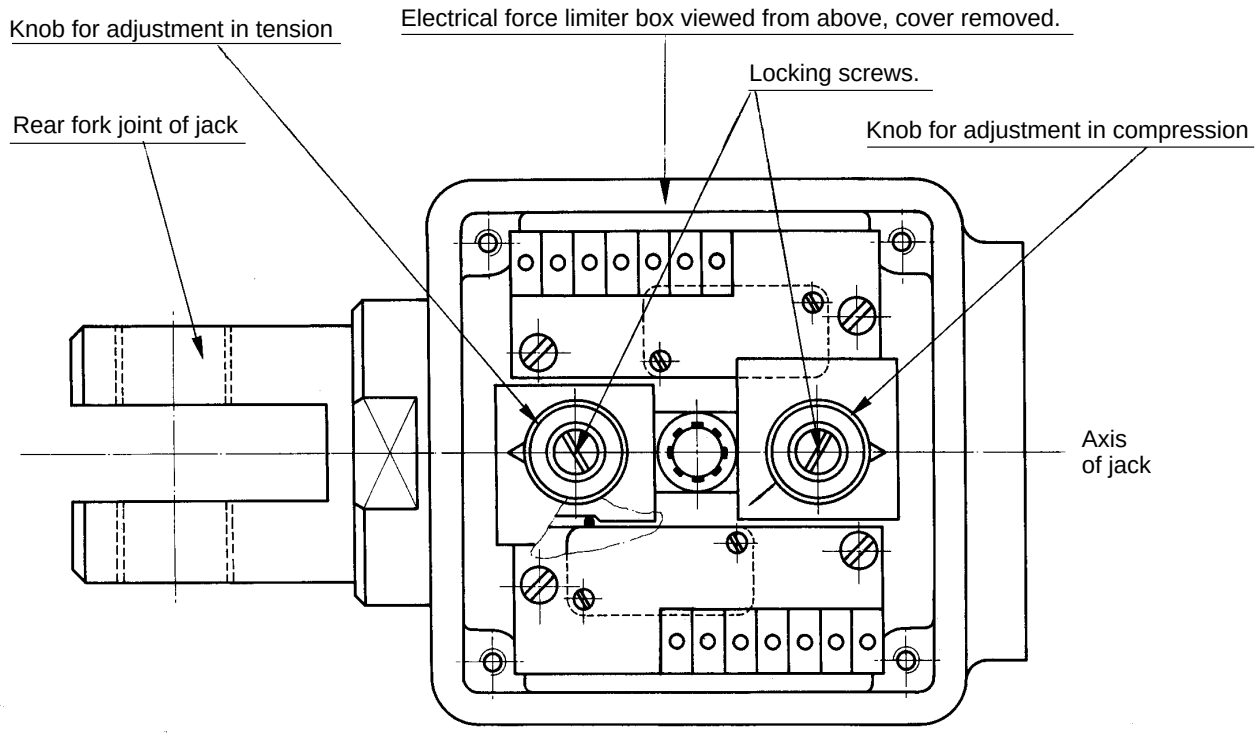
- 6 spring washers 450
- 1 bronze washer 408
- 1 steel washer 407.

References :

R.E.C - LEM V 152 for the V 152
R.E.C - LEM V 302 for the V 302
R.E.C - LEM V 602 for the V 602

NOTE : When ordering spare parts, it is essential to specify the type of jack involved.

ADJUSTMENT OF ELECTRICAL FORCE LIMITER (LEE) : V 602 - V 902



OPERATION OF ELECTRICAL FORCE LIMITER :

The rear fork joint of the jack is held in position axially by two stacks of dynamic spring washers. When a force is exerted in tension or compression, the washers contract, the deflection taken up by the washers depends on the force ; this linear motion activates a microswitch which disconnects the power.

An adjustment system enables the microswitch to be set at different values of deflection ; disconnection of power occurs earlier or later and brings about an adjustment in force.

The electrical force limiter system can be adjusted with different values in tension and in compression.

ADJUSTMENT OF ELECTRICAL FORCE LIMITER :

Adjustment of electrical force limiter :

In order to carry out the adjustment, all that is necessary is to loosen the locking screw and turn the adjustment knob in the required direction.

The minimum = 3000 N and the maximum = 12000 N are located when the notch is on the axis of the jack.

The 2 adjustment knobs are shown in the minimum position.

Recommendations :

Tighten the locking screw after each adjustment. To find the adjustment value, proceed as follows : before turning the power on, confirm that the 2 adjustment knobs are at the minimum position ; then turn the adjustment knob for compression slowly (beware, minimum to maximum is reached in half a turn!) if extension of the piston rod is required*, or the adjustment knob for tension if retraction is required*, until the appropriate relay is engaged.

If the adjustment is too close to the rated force of the jack, it can produce a jerky operation ; in this case, increase the adjustment very gradually in order to improve this. Once the force limiter has been adjusted, it brings about a disconnection as soon as the force exceeds normal operating force by about 10%.

** If movement occurs in the opposite direction, check the connection : reversal of relays or phases (in three-phase).*

IMPORTANT : IT IS NOT POSSIBLE TO CARRY OUT ANY WORK ON THE ELECTRICAL FORCE LIMITER, APART FROM ADJUSTMENT, OUTSIDE THE FACTORY.

POTENTIOMETRIC SYSTEM FOR POSITION MEASUREMENT (POT) : V 602 - V 902

The potentiometric system for position measurement is a device which makes it possible to know at any time the position of the piston rod, and thus the position of the load. This is achieved through measurement of resistance variations at the terminals of a potentiometer.

Functioning principle :

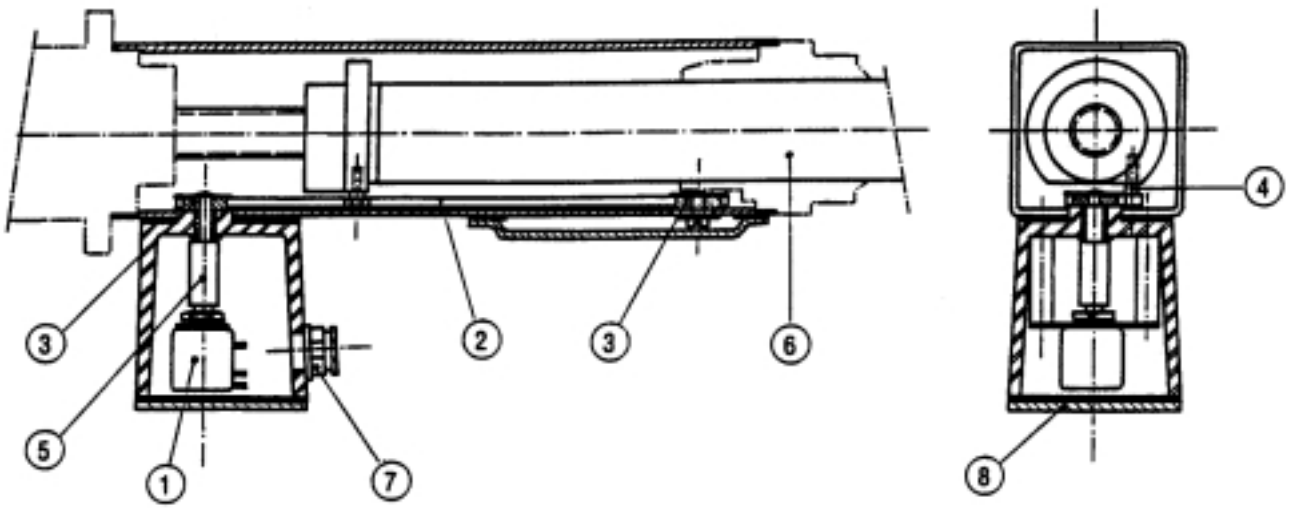
When the jack is operated, the translation movement of the piston rod (6) is transmitted to the toothed belt (2) through the pin (4) ; this induces a rotating movement of pulleys 3 and 3' which is transmitted to the potentiometer (1) through the sleeve (5). The rotation of the potentiometer creates a resistance variation which can be measured at its terminals and it is thus possible to know at any time the position of the load. This system is entirely enclosed, tightening is achieved with flat gaskets (see drawing), access to the potentiometer is through cover (8) and connecting cables are passed through cable gland (9).

Notice :

- Resistance variation from 0 to 10 kΩ, i.e. 10 turns of the potentiometer, corresponds to a distance variation from 0 to 500 mm maximum stroke.
- The potentiometric system for position measurement (POT) can be fitted to all standard stroke (150-225-300-400 and 500 mm) series 2 jacks model V602 and V902.
- Options "End of Stroke" (FC), electrical stress limiter (L.E.E.) and potentiometric system for position measurement (POT) can be combined, however a Verelec series 2 jack model 602 with POT system cannot be fitted with the mechanical stress limiter option (L.E.M.).

Construction : see drawing hereunder.

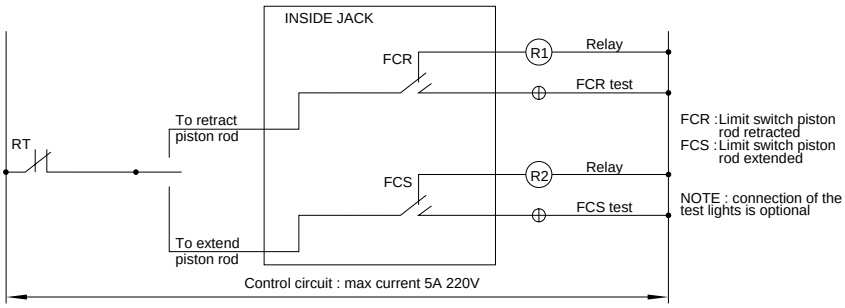
- Item 1 : rotating potentiometer, 10 turns, maximum resistance 10 kΩ
- Item 2 : toothed belt
- Item 3 : toothed pulley for transmission of rotation to potentiometer
- Item 3' : idler pulley for belt tensioning
- Item 4 : pin for linkage between belt and piston rod
- Item 5 : elastic sleeve for linkage between items 1 and 3
- Item 6 : piston rod + control nut
- Item 7 : cable gland n° 9
- Item 8 : closing cover



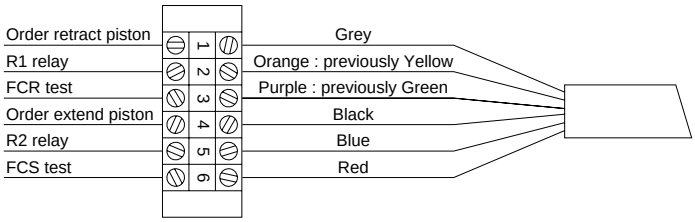
SIMPLIFIED SCHEMATIC DIAGRAMS FOR LEE AND FC OPTIONS

"LIMIT SWITCH"
FC
OPTION

CONTROL CIRCUIT DIAGRAM

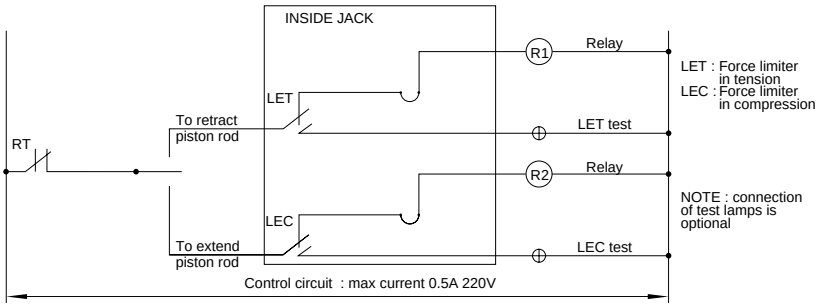


CONNECTION DIAGRAM

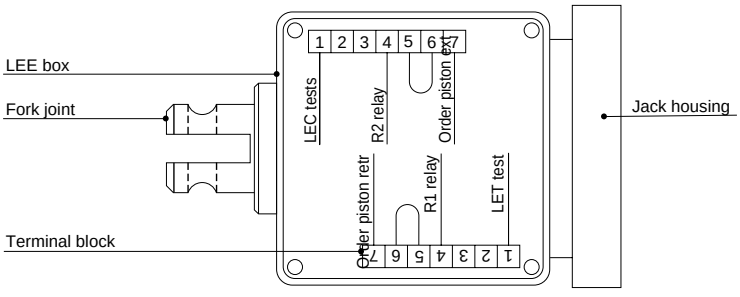


"ELECTRICAL FORCE LIMITER"
LEE
OPTION

CONTROL CIRCUIT DIAGRAM



CONNECTION DIAGRAM



IMPORTANT : Valid for both diagrams.

– The microswitches on these systems can only be supplied with an AC supply.
– The jack is delivered with the rod slightly extended in order to be able to carry out tests.
– When connecting, activate a pulse to confirm that :
  • the piston rod retracts when relay R1 is activated
  • the piston rod extends when relay R2 is activated
    – If this is not the case, check the connection.

SERVICING
Linear jacks : VD 50

The electric jacks VD 50 are delivered ready to use.
Maintenance is restricted to keeping the operating screw clean and lubricated.
However, according to the conditions of use (heavy duty) or installation conditions (temperature) it is advisable to regularly examine the condition of the mounting shafts (lubrication - make sure that these are not worn).

LUBRICATION OF OPERATING SCREW :
- Ex factory : V 152 - V 302 - VD 50 - V 602 - V 902
Mineral oil GALLIA 2 DL from Klüber
Lubrication
- When replacing or topping up during service, use a lubrication that comprises :
  - A mineral-based oil
  - A lithium-based soap
  - Melting point 165 °C
  - Worked penetration : 265 to 300 (NLGI grade : 2)
  - Appropriate temperature range

Despite all the care taken during the production and inspection of this equipment, LEROY-SOMER cannot give a 100% guarantee that there will be no leakage of lubricant. In a situation where these leaks could have serious consequences, risking the safety of goods and persons, it is the responsibility of the fitter to take all necessary precautions to avoid these consequences.

SOME EXAMPLES :
(See table below)

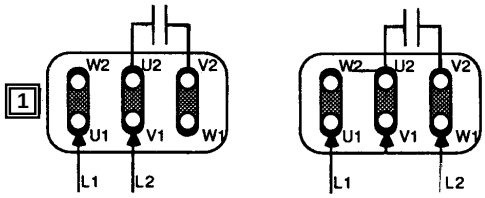
Reference	Supplier
SHELL ALVANIA R2	SHELL
SHELL ALVANIA EP2	SHELL
MOBILPLEX 47	MOBIL
MULTIS 2	TOTAL
BEACON 2	ESSO
BEACON EP 2	ESSO
SUPRACO G 43 SL	MOTUL
SUPRACO G53 XP	MOTUL
EPEXA 2	ANTAR
COFRANIA EP2 (multiservices)	COFRAN

MOTOR CONNECTION DIAGRAMS

Single-phase motors
D 18 P motors

1 Clockwise direction

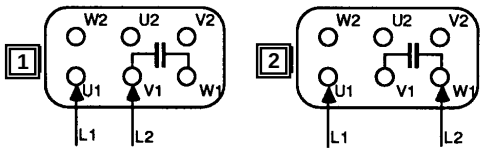
2 Anti-clockwise direction



Single-phase motors
LS 56 P and 63 EP motors

1 Clockwise direction

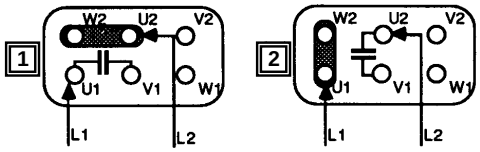
2 Anti-clockwise direction



Single-phase motors
LS 71 P motors

1 Clockwise direction

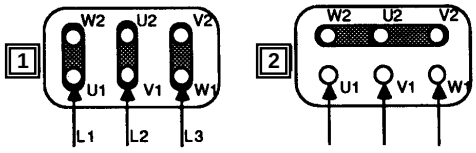
2 Anti-clockwise direction



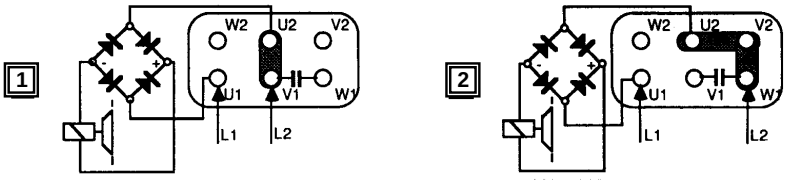
Three-phase motors
Plated 220-380 V

1 Connections for 220 V

2 Connections for 380 V



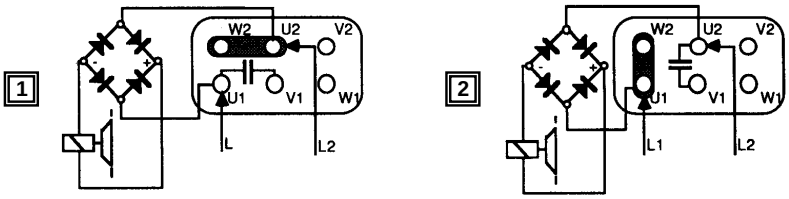
FMC single-phase brake motors :
Motors from 0.06 to 0.12 kW



1 Clockwise direction

2 Anti-clockwise direction

Motors from 0.18 to 0.37 kW



FMC three-phase brake motors :

The brake is connected in the factory.
The motor is connected in the same way as a standard motor (without brake).

The circuit diagrams for three-phase motors are for clockwise rotation. To reverse the direction of rotation, reverse two phases.