



**INSTALLATION, OPERATION AND
MAINTENANCE
MANUAL**

**AUTOMATIC PROGRESSIVE
LUBRICATION SYSTEM**

MANUAL NO. F550

**Revision 1
September, 2013**

Major Sales and Service
(a division of Major Furnace Australia Pty Ltd)
92 Fairbank Road, Clayton, Vic, 3169
Telephone: (61 3) 8558 1800 Facsimile: (61 3) 8558 1805

INSTRUCTION MANUAL

The equipment supplied is designed to operate as set out in this instruction manual. Operation or use of the equipment except in accordance with this instruction manual may place the obligation for its performance on the user, and/or void the conditions of our warranty.

Please contact us for advice if you believe some alteration may be desirable, our Engineering Staff shall be only too willing to assist. We also offer a full after sales service, maintenance and advisory service that is at your disposal.

INDEX

- Page.04 – Manufacturer's declaration
- Page.05 – Where they are installed
- Page.06 – Application - Description
- Page.07 – Assembly, Installation Instructions
- Page.10 – TP1 Pump with Electronic Equipment
- Page.11 – Electronic Equipment
- Page.12 – Electronic Equipment set up
- Page.13 – TLS Progressive Distributor Description
- Page.14 – TLS Progressive Distributor Dimensions
- Page.15 – Grease Description
- Page.16 – Recommended Grease Chart
- Page.17 – Troubleshooting
- Page.18 – Troubleshooting
- Page.19 – Plunger
- Page.20 – Plunger Installation
- Page.21 – Dimensioning System Formulas
- Page.22 – Periodic Maintenance
- Page.23 – Grease Reservoir Refilling
- Page.24 – Warranty
- Page.25 – Disclaimer



MANUFACTURER'S DECLARATION (TLS)

The manufacturer hereby declares that the grease pumps with reservoirs and components thereof of the model numbers starting TP-LP, are prepared in accordance with the EC directives for machinery 97/37/EC annex B, for installation on a machine or mounting with other machines in a machine.

Commissioning is prohibited unless it is determined that the machine where this component should be mounted, corresponds to the regulations of the European Directive 98/37/EC. Harmonized standards applied here are DIN EN 809 and EN 292 part 1 and part 2.

In reference to EC Directives 97/23/EC regarding pressurized equipment. The items can be used in accordance with the provisions and only in accordance with the terms of the documentation.

In this regard particular attention should be paid to the following: TLS products are not designed or approved for use in combination with fluid group I (dangerous fluids), defined in accordance with article 2, paragraph 2 of directives 67,548, EEC of 27 June 1967.

TLS products are not designed and shall not be authorized for use in combination with gases, liquefied gases, gases dissolved under pressure, vapors and liquids, whose steam pressure at the maximum allowable temperature is more than 0.5 bar above atmospheric pressure.

The products supplied by T.L.S. are manufactured in accordance to the dispositions and the values recorded in article 3, Paragraph 1, number 1.1 up to 1.3 and paragraph 2 of Directive 97/23 EC.

Therefore they are not subject to the requirements of Annex I of the directive, and therefore do not require the CE mark with reference to Directive 97/23 EC.

TLS classify the items according to article 3, paragraph 3 of the Directive.

Declaration of conformity to CE

For the TLS product named piston pump series TP-LP 1-2-3 declares that these pumps correspond to the principal applications of protection that have been fixed in the following directives of the Council for equality of legal rules of the Member countries.

Electromagnetic Compatibility 95/54/EEC
Electromagnetic Interference 70/156/EEC
Electromagnetic Immunity 70/156/EEC
Number of approval is 24 10R-020223
Test report EMC.TR.05.1000A

Automatic Progressive Lubrication System

The system of centralized automatic lubrication has been widely adopted in the industrial sector on:



- Trucks, Tractors, Road sweepers, Compactors, Towing.
- Excavators, Earthmovers
- Reach stackers, straddle carriers.
- Agricultural machinery.



The system of centralized lubrication provides constant lubrication of components of the machinery, due to the system of progressive distribution. With this principle the desired quantity of lubricant can be distributed to each grease point, ensuring an excellent resistance to wear due to correct, measured and directed continuous lubrication of the machine.

Applications.

The T.L.S. automatic lubrication systems are ideal for all types of machinery, whether industrial, agricultural or employed on the road.

A system with progressive distributors can lubricate up to 300 points with a single pump. (to lubricate more points consult the distributor)

General Description for Operation of System.

T.L.S. automatic lubrication systems are different from their competitors due to their quality. Designed and constructed from material of high quality, simplicity of assembly and the adoption of functional devices for control and diagnosis of process.

Automatic lubrication is essential for machinery that has to furnish elevated levels of continuous performance under arduous conditions.

The grease, once injected, forms a barrier against damp, dirt and corrosion reducing the wear and tear of the moving parts. By adopting a centralized automatic system a constant regular and precise injection of lubricant is supplied while the machine is in full function. It achieves optimal distribution of grease on all surfaces to be lubricated and consumption of grease is up to 50% lower in comparison to manual lubrication due to the precision dosing of lubricant.

The adoption of the automatic lubrication system frees the operator and mechanical servicemen from the time consuming task of manual lubrication.

The grease is loaded in the pump through a special connector DIN 71412 (the same used for manual lubrication), after that it will pass through a special 100 micron filter, in order that the grease in the reservoir is absolutely free of impurity and any solids contamination, allowing a clean system without any problems of malfunction caused by dirt contamination.

The T.L.S. pump is composed of a system of desmodromic piston feeders (from 1 to 4), connected via a cam system moved by an electric motor. Through these, the grease is pushed from the reservoir to the principal distributor and subsequently to the secondary distributors through TEKAFLEX hoses, that have an operating pressure of 200 Bar and a burst pressure of 800 Bar.

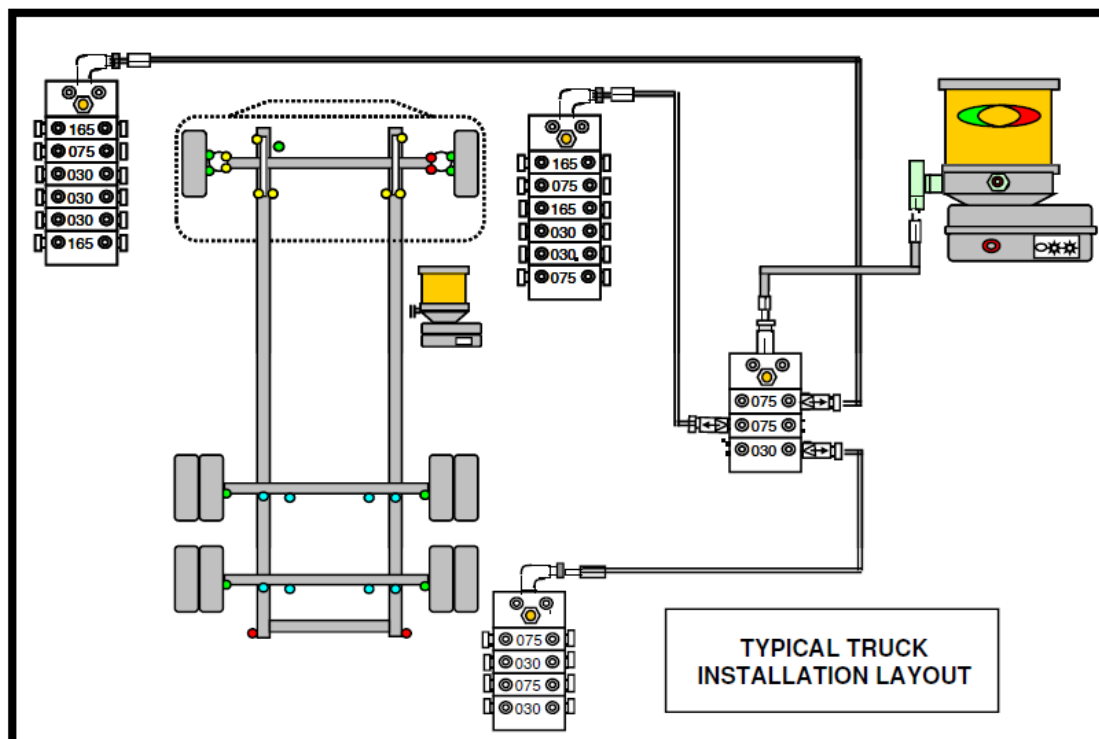
From the secondary distributors to the single greasing points high thickness RILSAN hoses are used, with an operating pressure of 100 Bar and a burst pressure of 300 Bar.

General Instructions on Installation.

- Respect all general safety rules before beginning the job, electrically and mechanically isolate all moving parts of the machine.
- Cover sensitive parts (truck windows box, hydraulic pipes, cylinders, etc.) before beginning any work with grinding tools.
- Avoid damaging the paintwork. Otherwise after brushing and welding the parts treat the affected parts with a rustproof base and subsequently paint with the original color.

Before unscrewing the grease nipples, check by means of a grease pump that the passage of the grease is free and fill possible voids of grease in the bearings.

Attention: work with clean tools being careful in order not to introduce dirt into the components of the centralized lubrication system or the bearings.



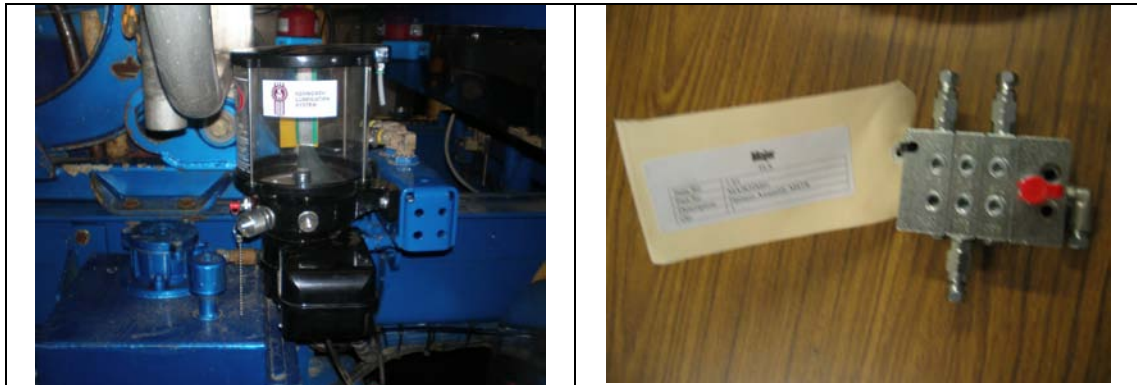
The kit should be laid out in a clear area or table for quick access to the parts.



Front Harnesses should be installed first followed by the Rear Harness



Then Pump and Master Divider Block with 8mm connections.







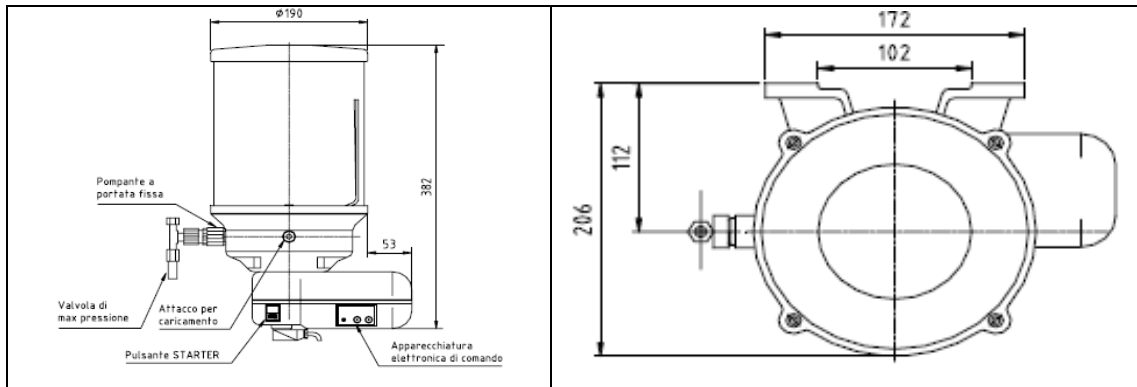
Installation Checklist.

1. Mount & Wire Pump
2. Check hose fittings to blocks
 - when each block is installed pump grease using cordless grease gun
 - check fittings on inlet side of block
 - check each section
3. Manually check master block using grease gun, when 3 circuits are connected to master block.
4. Connect master block to pump
 - fill pump with grease, through quick fill fitting from new cartridges if you have a syringe or through filtered nipple if using drum pump or grease gun.
 - check overall plumbing
 - check overall wiring
 - set control panel - pumping interval
 - pumping duration
 - test system manually using manual button on pump
 - check all points for leaks

Technical Data Sheet for Motor Driven Grease Pump, Electronic Timer Model.

Specification

<p>Code TP 1001.... Motor type Electric Power supply 12 VDC or 24 VDC Rotation speed 20 rpm Current 0.8 A (at 300 bar and 20° C) Case protection degree IP 65 Reservoir Gloss Polycarbonate Reservoir capacity 3.5 Kg ; 5 Kg ; 7Kg. Max. working pressure 300 bar N° of pumping elements 1 to 4 Pumping delivery 0.15 cm³/stroke Grease delivery per Hour 110 cm³/h (each element) Working temperature -30 +80° C Refilling nipple greaser nipple (DIN 71412) Supply grease connector Ø6 Tube Electric supply cable. Length = 10 m. Lubricant Grease NLGI 2 max</p>	
<p>Electronic timer</p> <p>Voltage supply 10 – 30 VDC Maximum load Current 6 A (max) Working temperature -30 +70° C Timer function Pause – Working Working time Adjustable from 2 to 32 min. Pause time Adjustable from 30 min. to 8 h</p>	
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p style="text-align: center;">Timer panel</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  Led </div> <div style="text-align: center;">  Work 2-32' </div> <div style="text-align: center;">  pause 0,30-8h </div> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> <p>PUMP HEIGHT: kg 3.5:mm350 kg 5.0:mm390 kg 7.0:mm440</p> </div>

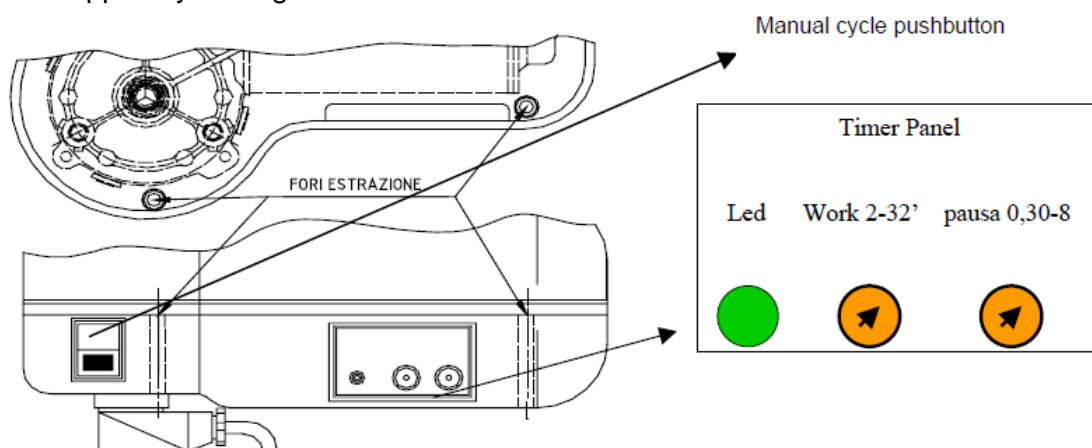


Electronic Timer With Memory.

The electronic timer with memory, called timer, is used in systems where manually setting the work and rest times of the pump is required. The timer is easy to use thanks to the controller positioned inside the lower crankcase. When the pump is switched on the LED flashes red for around 3 seconds during the system self check, if no anomalies are detected, the LED becomes green and the pump begins normal operation.

The operation of the pump is controlled by the work and pause times set by the operator by turning the special selectors. When the power is switched off (the truck engine is not running or machinery is switched off) the time of break is memorized. When the vehicle is switched on, the controller will continue from the stop position of the cycle. Each time the vehicle or machinery is switched on and the pump starts and will run for two turns while performing a self test.

Depressing the button will initiate one run cycle. Holding the button depressed for 10 seconds engages the continuous cycle mode for the pump. The continuous cycle can be stopped by turning off the machine or truck.

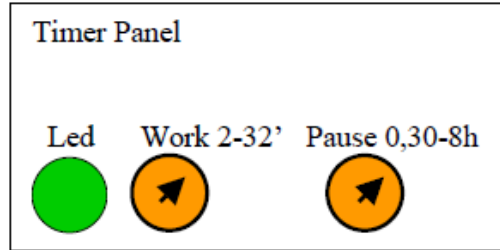


Instructions For Dismantling the Casing (Timer Lodging).

To open the casing of the pump where the timer is fitted it is necessary to unscrew the 3 screws M5, and extract the window being careful to not damage the inner cables. Before reassemble ensure that all parts are dry and clean.

TWO COLOR LED'S RED & GREEN

FUNCTION : GREEN LED FLASHING – WORKING TIME (PUMP MOTOR IS RUNNING.)
GREEN LED FIXED - PAUSE TIME (MOTOR IS STOPPED)
RED LED FLASHING - SWITCH ON PUMP TEST



SETTING-UP ELECTRONIC TIMER

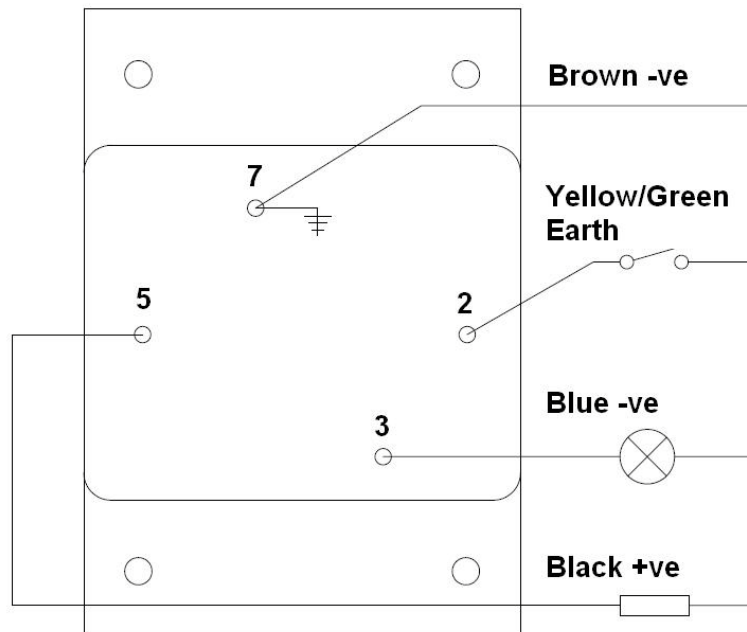
WORKING TIME

2 = 2 min.
4 = 4 min.
6 = 6 min. increase from 2 min. up to 30 min.
8 = 8 min.
10 = 10 min.
Ecc..

PAUSE TIME

0,5 = 30 min.
1 = 1 hour
1,5 = 1 hour 30min increase from 30 min.up to 8 hours
2 = 2 hours
2,5 = 2 hours 30 min.
Ecc..

Power Supply: 10 – 30 Vdc
Working time increase to 2 min. each step
Pause time increase to 30 min. each step



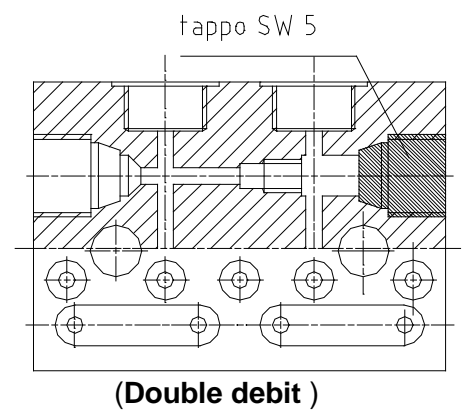
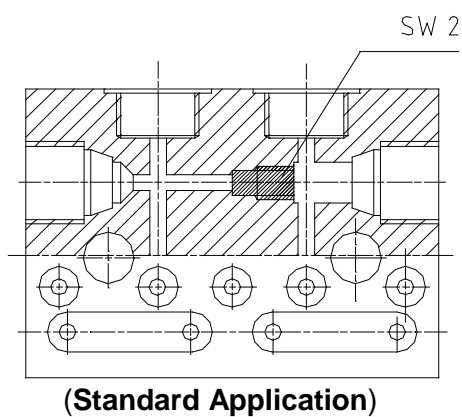
PROGRESSIVE FEEDERS

Operating Principle.

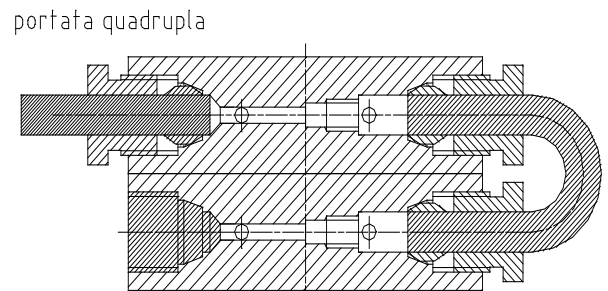
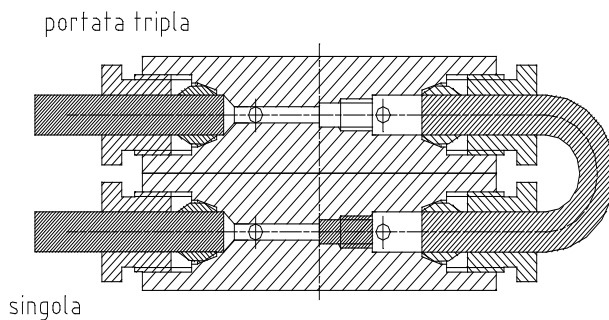
A progressive feeder is constituted by an initial element, from two or more intermediary feeder elements, and from a final feeder element. The feeder blocks are fixed together by means of a threaded rod. The pressure among the various elements is ensured by a high resistance O-Ring.

Single elements and mixing.

2 Output for each element



3 Output connected together



The global capacity of the output is equal to the sum of the single capacity of the feeder elements combined, when short circuit bridge is connected.

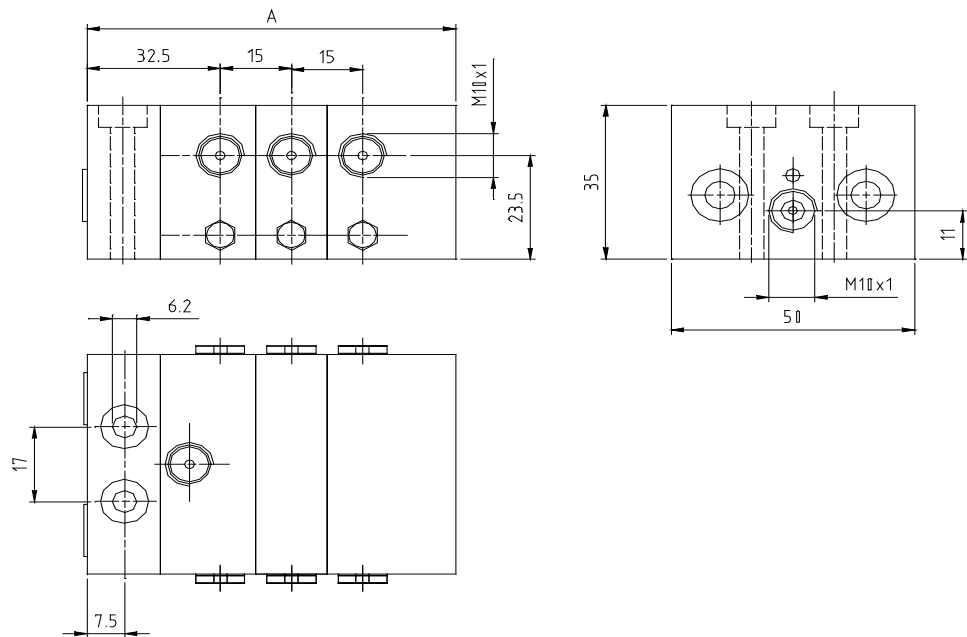
ATTENTION: BEFORE PLUGGING AN OUTLET REMOVE THE GRUB SCREW SW2 IN ORDER TO ENABLE CORRECT OPERATION OF FEEDER.

Technical Data and Dimensions.

The modular feeders for the progressive system are made of steel and the inside piston in tempered steel. The feeder elements are available with single stroke grease capacity from 0,045 - 0,075 - 0,110 - and 0,165 cm³ for single outlet. The seal among the various elements is ensured by high resistance O-Rings. They can be used both in oil lubrication systems and grease lubrication systems. The principle of operation in "series" allows, with only one control, to verify the correct operation of the plant in all the points of lubrication.

Specification

Working pressure: from 15 to 300 bar
Working temperature: from -20°C to +80° C
N° stroke per minute: 300 max.
Input connection: M10x1
Output connection: M10x1
Max. elements per feeder: 12



N° ELEMENTS	DIMENSIONS (mm.)		N° ELEMENTS	DIMENSIONS (mm.)	
3	80		8	155	
4	95		9	170	
5	110		10	185	
6	125		11	200	
7	140		12	215	

LUBRICANT GREASE

The general classifications have been drafted by NLGI (National Lubricating Grease Institute).

The lubricating greases have been grouped according to their penetration ability measured in tenths of a millimetre that the grease achieves at 25°C, after a standard working test (60 shots) by a well-defined cone normalized by weight (ASTM D 217-67 T).

NLGI GRADE	000	00	0	1	2	3
ASTM Penetration index Tenth of millimetres at 25°C	445-475	400-430	355-385	310-340	265-295	220-250

RECCOMENDED GREASES

Manufacturer	Lubricant code	Dropping point °C	Penetration Index	Composition
AGIP	Agip GRMU / EP0	180	350 / 370	Lithium+EP additives
	Agip GRMU / EP1	180	310 / 340	Lithium+EP additives
API	Apigrease PGX0	180	355 / 385	Lithium+EP additives
	Apigrease PGX1	190	300 / 340	Lithium+EP additives
BP	Bpgrease LTX/EP0	180	350 / 370	Lithium+EP additives
	Bpgrease LTX/EP1	180	310 / 340	Lithium+EP additives
CASTROL	Spheerol APT1	183	310 / 340	Lithium
	Spheerol EPL0	175	350 / 360	Lithium+EP additives
	Spheerol EPL1	183	310 / 340	Lithium+EP additives
ELF	Traslube LI grease EP0	180	350 / 360	Lithium+EP additives
	Traslube LI grease EP1	180	310 / 340	Lithium+EP additives
ESSO	Beacon EP0	180	355 / 385	Lithium+EP additives
	Beacon EP1	180	310 / 340	Lithium+EP additives
FINA	Finamarson EPL0	180	355 / 385	Lithium+EP additives
	Finamarson EPL1	180	320 / 330	Lithium+EP additives
IP	Athesia EP0	175	355 / 385	Lithium+EP additives
	Athesia EP1	180	310 / 340	Lithium+EP additives
	Silisgrease HTL	infusib.	310 / 340	
KLUBER	KR 380 AA MF	Infusib.	320	Synthetic bisulphide
	Straburags B15/A	280	400	Mo Sodium
MOBIL	Mobilux EP0	190	350 / 390	Lithium+EP additives
	Mobilux EP1	190	305 / 345	Lithium+EP additives
	Mobilplex 46	260	310 / 340	Complex
	Mobiltempe 78	260	295 / 340	Infusible ispes. soap.
ROLOIL	Litex grease EP0	185	355 / 375	Lithium+EP additives
	Litex grease EP1	185	310 / 340	Lithium+EP additives
SHELL	Supergrease EP0	170	400 / 430	Ca+lithium+ EP add.
	Supergrease EP1	180	310 / 340	Ca+lithium+ EP add.
TOTAL	Multis EP00	180	400 / 430	Lithium+EP additives
	Multis EP1	180	310 / 340	Lithium+EP additives
VANGUARD	Liko EP0	180	365 / 385	Lithium+EP additives
	Liko EP1	180	310 / 340	Lithium+EP additives
	LMP 180/0	191	355 / 385	Lithium + Mo S ₂
	LMP 180/1	191	310 / 340	Lithium + Mo S ₂
VISCOL	Signal gren EP0	180	355 / 385	Lithium+EP additives
	Signal gren EP1	185	310 / 340	Lithium+EP additives

TROUBLESHOOTING.

EFFECT	CAUSE	HOW TO OPERATE
Excess grease on one or more points of greasing.	- feeder with excessive capacity	Change capacity of element
Excess grease on all points of greasing.	- Excessive working time. - Pause time too short.	-Decrease working time or increase pause time by means of knob on electronic timer
Pump not working (Wiper not turning) but LED is flashing	- Failure of electric motor. - Plunger incorrectly mounted	-Replace pump. -Verify correct positioning of plunger (see instruction manual for how to)
Pump not working (wiper not turning) LED is off.	- Power supply pump switched off. - Failure of electronic timer.	-Verify that power and polarity are correctly connected. -Replace electronic timer.
Pump working but grease is not feeding.	- Empty reservoir. - Air bubble near aspiration zone. - Plunger failure.	-Refill of grease reservoir by means of refilling connector. -Loosen max. pressure valve until grease outlet and circuit is purged of air. -Replace failed plunger.
Maximum pressure relief valve activated by circuit point failure.	- One or more points of circuit are obstructed - Feeder obstructed. - Crushed pipeline or obstruction in pipeline.	-Verify the integrity of the pipelines/hose and the feeders and in case it is damaged handle the replacement. -free the greasing points with a high pressure lever lubricator.
Absence of collar of grease in a point of lubrication.	-Related lubrication pipe/hose damaged or not hermetically sealed. -Loosen thread connection.	-Replace pipeline/hose. -Shut the threaded connections and in the case it is damaged handle the replacement.
Absence of collar of grease in all points of lubrication.	- Working time too short. - Pause time too long. - Circuit jammed. - Main pipeline crushed.	-Increase working time and decrease pause time by means of knob of electronic timer. Verify status of main pipeline -Verify that maximum pressure valve is not alarmed.

EFFECTS	CAUSE	HOW TO OPERATE
Spillage of the indicator of block of the valve of maximum pressure.	- Excessive pressure in circuit. - Maximum pressure valve spring jammed. - Feeder jammed.	-Check the regular working of all feeders -If the circuit is all ok replace maximum pressure valve

FLASHING LED CODE

- When the pump is switched on, the electronic circuit will self test. If operational the LED on the pump will become a Fixed Green colour: this means that the pump is ready to operate according to the times of work and pause planned. To start the pump, press the red start button.
- During the phases of work the LED of the pump flashes Green.
- When the pump detects a generic failure the LED of the pump flashes Red:
 - if the failure is not quickly reset the LED becomes fixed Red, and the pump stops.

PLUNGER REPLACEMENT

(Figure. A)

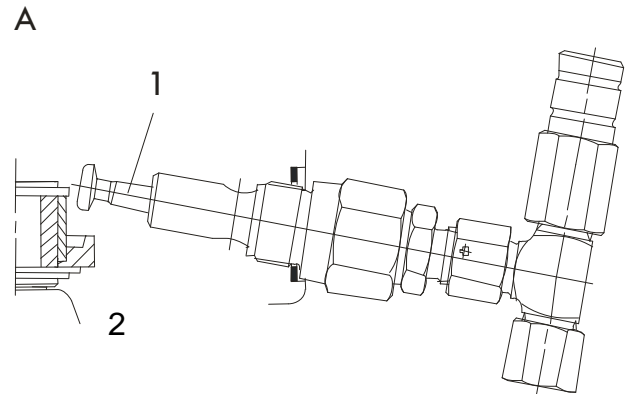
To replace the pump:

Withdraw the plunger slightly (Fig. 1)

Insert the plunger slightly tilted
with the tip of the piston facing up.

Try to hook the plunger in the eccentric

Lip channel pushing the plunger down after
having touched the eccentric channel with the
head of the piston (Fig. 2)

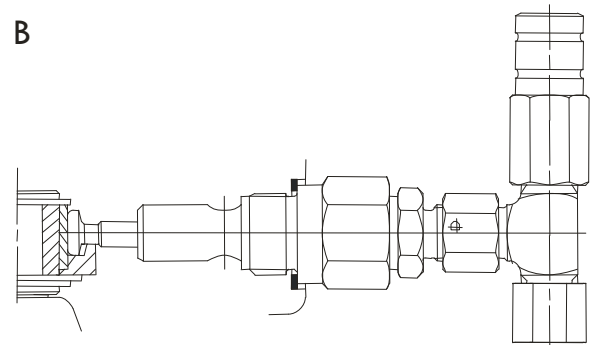


PLUNGER INSERTION

(Pict. B)

After having connected the plunger,
screw the connecting adaptor in a clockwise
direction with a 24mm spanner taking care that
it is in the correct direction.

To check if the desmodromic pump is correctly
hooked to the channel lip in the eccentric cam
simply press the button to manually start a greasing
cycle and check if the grease reservoir wiper
turns correctly. If not repeat the steps in Figure A
and Figure B because it means that the pump element
piston is not correctly hooked into the channel lip on the eccentric cam.



Plunger TLS (A)

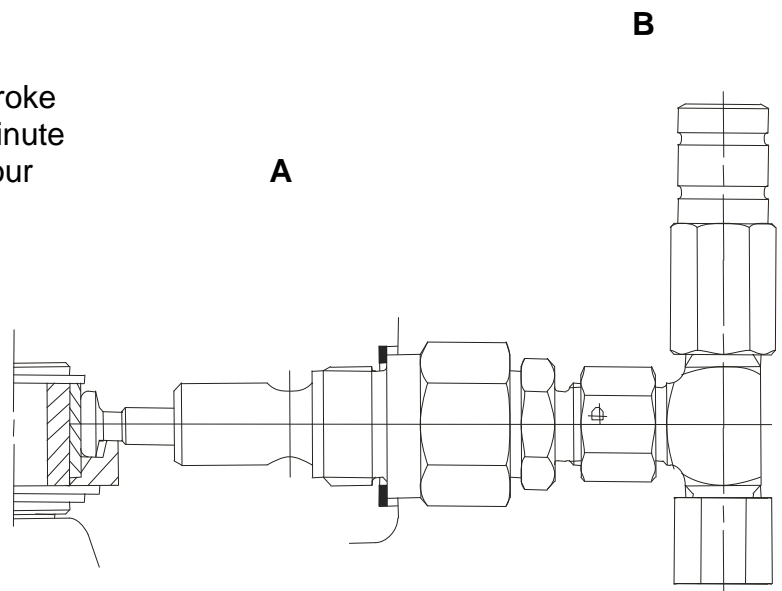
Fixed capacity plunger

Plunger Body : Tempered steel
Plunger : Tempered steel
Plunger diameter : 6,50 mm

Grease debit : 0,23 cm³ per stroke
Grease debit : 4,60 cm³ per minute
Grease debit : 276,00 cm³ per hour

Grease density : 0,98 gr/cm³

Grease debit : 0,217 gr. per stroke
Grease debit : 4,34 gr. per minute
Grease debit : 260,40 gr. per hour



Maximum pressure valve (B)

Pressure set up valve : 250 Bar

System Design Formulas

First find all the lubrication points of the machine, then you must calculate the amount of lubricant needed for each point.

Generally the parts to be lubricated are bearing bushes, ball bearings, gears, chains and sliding guides. To calculate the amount of lubricant needed for each point the engineer should take into account the following three factors:

DC = Dimensional calculation.

It is calculated in function of the dimension of the support or the plain part of machine to be lubricated.

SC = Service Coefficient.

It is calculated according to the conditions of work of the media.

LB = Type of lubrication request.

Bearing bushing	$DC = \frac{D + L}{200}$	D= Shaft diameter in mm. L = Shaft length in mm.
Roller Bearing	$DC = \frac{D \times N}{200}$	D= Shaft diameter in mm. N = No of sphere rows
Gears	$DC = \frac{S}{200}$	S= Projected area in $cm^2 = 3,14 \times \text{ext. Diameter in cm.} \times \text{width in cm.}$
Chains	$DC = \frac{S}{200}$	S =Projected area in $cm^2 = 3,14 \times \text{ext. Diameter in cm.} \times \text{width in cm.}$
Sliding guides	$DC = \frac{S}{500}$	S = Contact area in cm^2

SC = Service Coefficient.

Rotation or stroke

Alternate

Intermittent SC = 0,5

Continuous SC = 1

Parts subjected to heavy work in any movement,
exposed to high temperatures and / or dusty,
vertical guides or guides without seals.

SC = 2

PERIODIC MAINTENANCE OF THE GREASING SYSTEM

Weekly

- Check if the green LED remains turned on when the pump is waiting for the periodic cycle.
- Check the pump if it correctly turns.

Monthly

- Check the level of the grease in the reservoir of the pump.
- Check the pipeline to ensure there are no cracks or breakages.
- Check pins, Bushings, slides and anything else are correctly lubricated.

As Required

- Refill the reservoir of grease before the reserve is reached and do not fill it over the maximum level allowed.
- In case of failure of the pump use the grease nipple on the main distribution blocks to manually grease the machine with a manual pump or electric grease gun or pneumatic drum pump (ensure grease in drum pump is kept free of contamination by dirt.)

REFILLING OF THE PUMP RESERVOIR



To refill the pump reservoir with grease you need to use a pump for the grease. You can use a TLS quickfill syringe to refill through the quick fill fitting making sure to use only new grease cartridges which are opened directly before use to prevent contamination of the system. If using an electric or pneumatic drum pump you need only to hook the output pipe to the head of the lubricator mounted on the body of the pump this contains a 100 micron filter to prevent ingress of dirt or other contaminants.

Don't refill over the maximum allowed as indicated on the reservoir.



Warranty Condition

All products are supplied under the manufacturer's warranty of 2 years (24 months) from the date of delivery to the delivery address noted on the delivery documentation from the supplier.

This warranty covers defective goods at the point of delivery only. The supplier is not responsible for damage caused by defective installation, damage caused during installation, damage caused by accident in service, inappropriate use in service, tampering of the system or damage caused by transportation from the original point of delivery to another point of delivery.

Goods that are found to be defective can be returned to the supplier. The supplier will inspect the goods to confirm the warranty claim. All goods returned to the supplier and accepted for warranty by the supplier will be replaced or credited so long as claims are made with a written confirmation signed by the delivery agent indicating the date and point of delivery. The supplier will be responsible for freight costs associated with such a return.

The manufacturers' warranty is limited to the lubrication system and its components only. The manufacturer and/or the supplier will not be responsible for consequential loss or damage to equipment upon which the lubrication system has been installed.

TLS TECNOLUBRISYSTEM SNC

WARNING NOTICE / DISCLAIMER

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS IN THIS MANUAL OR RELATED ITEMS MAY CAUSE DEATH, PERSONAL INJURY AND/OR PROPERTY DAMAGE.

The product information, features, specifications and descriptions contained in this manual have been compiled for the use and convenience of our customers from information furnished by the manufacturer of the products. Major Furnace Australia Pty Ltd ("Major") does not accept any responsibility for the accuracy or correctness of any description, feature, specification or information contained herein and makes no warranties or representations in relation thereto or to the products.

All products described in this manual are being sold on an as is basis and Major disclaims any implied warranty, including any warranty of merchantability or warranty of fitness for any particular purposes whatsoever, with respect to any of the products herein. Major will make all reasonable efforts to pass on to customers the benefit of all manufacturer warranties held in respect of the products, but Major shall not be responsible for special, indirect, incidental or consequential damages resulting from the purchase or use of any of the products or information contained or described in this manual.

This manual as well as all other catalogues, manuals, brochures, price lists and information provided by Major are intended to provide general product information only for further consideration and investigation by prospective purchasers having technical expertise.

Purchasers are solely responsible for making their own evaluation, analysis and selection of the products and/or systems prior to purchase and of ensuring after purchase that all performance, safety and warning requirements relating to use of the products are met.

The products and/or systems described herein including, without limitation, product features, specifications, availability and pricing are subject to change by Major at any time without notice.

In purchasing any products in this manual, you acknowledge that you have read this warning notice and disclaimer, that you understand and agree to be bound by the terms and conditions in this document and you agree that the products are sold to you by Major subject to the terms and conditions herein.