Mobile Plant Automatic Grease Lubrication System Manual

Type: **Single Line Injector**

Model: **TPSH.SL20**

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Hydraulic Pump Station for Mobile Plant

The Tecalemit TPSH.SL20 is a heavy duty single line hydraulic pump station for centralised lubrication systems on mobile mining and earthmoving equipment fitted with single line grease injectors.

This pump station is designed for new installations and retro fitting to existing centralized systems requiring a replacement pump station where hydraulic is the preferred power source. The grease pod is a compact square line unit suitable for rear or deck mounting, making it particularly suited to underground equipment. The unit is fitted with a highly reliable and efficient Tecalemit TPH series 10:1 hydraulic pump, dry coil electric vent valve, pressure switch, grease pressure gauge, inlet grease filter, overflow valve, breather and high pressure connection hoses including an optional manual grease gun and hose.

Key Features:

- High pressure 10:1 hydraulic grease pump for efficient operation and smooth continuous grease flow.
- Dry coil electric vent valve prevents failures due to grease gumming.
- Includes TC100D2 controller with adjustable time on and off, pump on light, cycle counter, audible alarm, and manual test button. Can be mounted on pod or remotely
- Compact square, heavy duty grease pod construction is robust and space efficient. Swing down lid is suited to installation on low profile underground equipment. Bottom fill entry connection prevents air entrainment in grease.
- Pod overflow valve prevents overfilling and tank pressurisation.
- 20kg, 45kg and custom pod designs and dual line versions available.

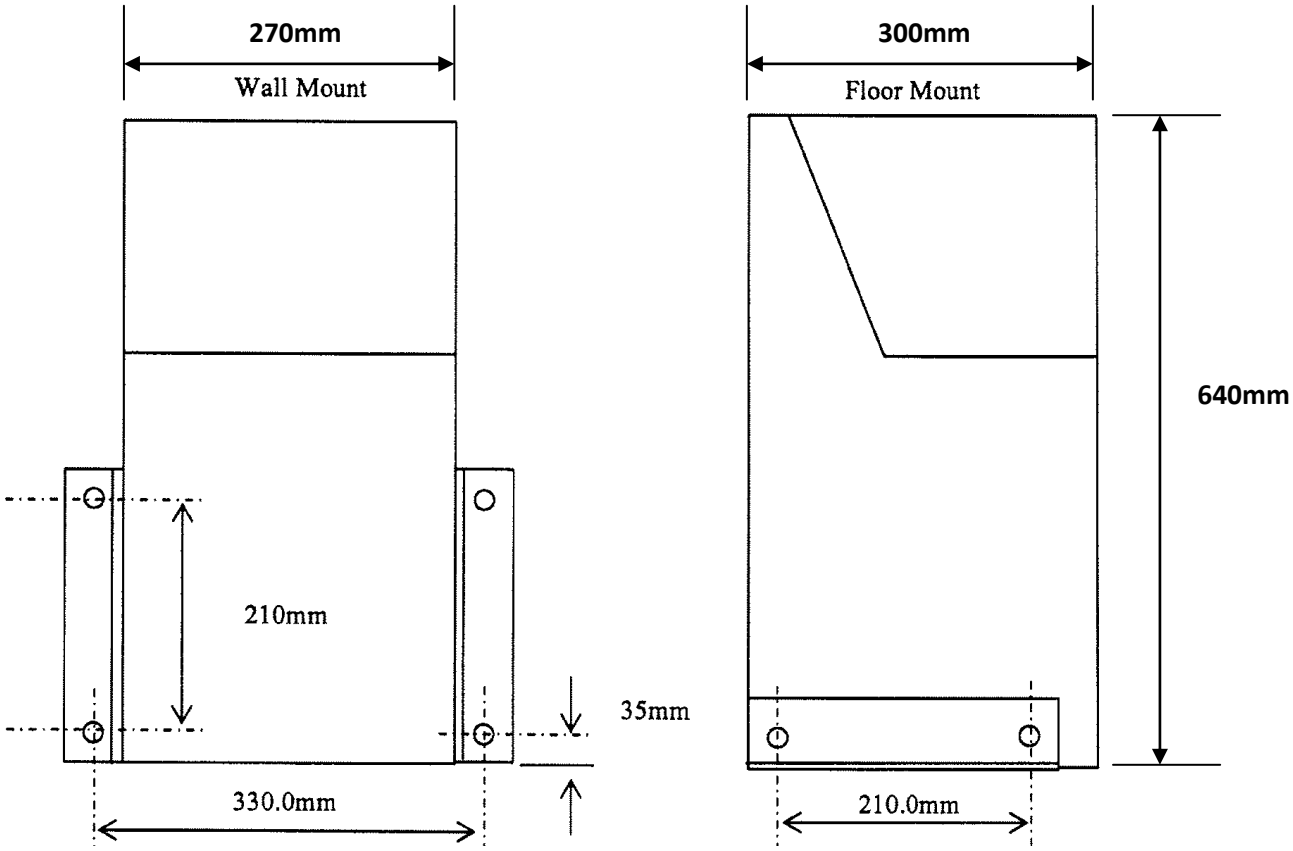
Technical specifications:

Pump Compression Ratio: 10:1
Recommended Hydraulic Oil Operating Pressure: 300-450 psi
Recommended Pump Oil Flow: 6 LPM
Grease Output: 150cc/min
Pressure Switch Actuation: 2,500 psi (adjustable)
Required Supply Voltage: 24VDC 2A

Dimensions: Standard 20kg unit
Height overall: 635mm
Width & depth: 265 x 285mm
Capacity: 20 litres
Weight Tare: 45 Kg
Gross: 60 Kg

Connections:
Oil inlet: 7/ 6” JIC Male
Oil outlet: 9/ 16” JIC Male
Grease outlet: 3/4” JIC Male
Overflow: 3/4” BSPT Female
Grease bottom fill inlet: 1/4” BSP Female or Grease Nipple

Installation and Commissioning of the Hydraulic Single Line Lubrication System

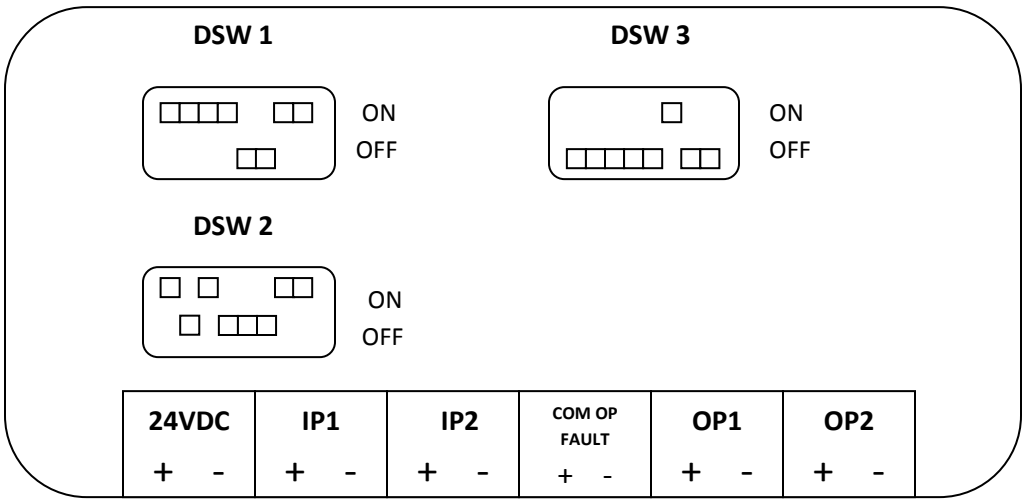


Pump Station Mounting

1. Select a location that is easy to reach for re-fill, servicing and opening of hatch for easy access to major components. Also consider the installation of the hydraulic pressure and return lines and the grease outlet line.
2. Bolt the pump station in place using the predrilled foot mountings (wall or floor mounting as pictured above)
3. Connect the hydraulic supply and return lines to the host equipment pilot system.
   Pressure port inlet (P) 7/16” JIC and return port (T) 9/16”JIC.
4. The TC100D2 controller can be installed either in the pump station or in the cabin and should be powered from the ignition circuit. Most machinery will have a power supply at the fuse box for auto lube controllers.
5. Connect 24VDC supply, pressure switch, pump solenoid and vent valve to controller as per TC100D2 electrical diagram.

TC100D2 Controller

Wiring and factory set settings



Connections

24VDC Supply Positive to + Negative to –

IP1 Pressure Switch: T1 to +ve
T3 to –ve (N.O.)

OP1 Pump Solenoid: T1 to +ve
T2 to –ve

OP2 Vent Valve: T1 to +ve
T2 to –ve

Six liquid tight cable glands supplied with controller to suit cables 2.9 – 6.4mm OD

Factory Settings

DSW1 Pump Delay Time: 15 minutes & initial start after 10 seconds from power up.

(1,2,3,4,7,8 ON 5,6 OFF) Switch 8 initiates first cycle to commence 10 seconds after start up.

DSW2 Pump On Time: 5 minutes set 150 pulses (1 pulse = 1 sec ON, 1 sec OFF).

(1,3,7,8 ON 2,4,5,6 OFF)

DSW3 Options: - 6 ON: Pressure Switch terminates Pump On time.

(6 ON 1,2,3,4,5,7,8 OFF)

Alternative Pump Delay Time Settings (all with initial start up after 10 seconds)

10 minutes	**ON:** 2, 4, 7, 8	**OFF:** 1,3,5,6
15 minutes	**ON:** 1, 2, 3, 4, 7, 8	**OFF:** 5, 6
20 minutes	**ON:** 3, 5, 7, 8	**OFF:** 1, 2, 4, 6
30 minutes	**ON:** 2, 3, 4, 5, 7, 8	**OFF:** 1, 6

PLEASE NOTE: DSW1 & DSW2 MUST BE SET PRIOR TO POWER-ON.
CHANGES TO THE SWITCH SETTINGS WHIST THE CONTROLLER IS POWERED WILL NOT BE RECOGNISED.

If an invalid setting has been made eg. Out of range of multiplier, the error will be signalled by a flashing "O" on the cycles display.

Wiring information TC100D2

24VDC:	Power supply input (internal fuse: 20 x 5mm 2 Amp anti-surge)
IP1:	Pressure switch input (N.O. volts free)
IP2:	Low level switch input (N.O. volts free)
FAULT:	Fault alarm relay output (jumper selectable: N.O. volts free contact, switched 24VDC or 0VDC. Resettable fuse rating: 0.5 Amp
OP1:	Pump SSR output (switched 24VDC, 30 Watts)
OP2:	Valve Solenoid SSR output (switched 24VDC, 20 Watts)

Software Operation

There are three 8 way DIP switches labelled DSW1 (Delay Time), DSW2 (Pump On Time) and DSW3 (Options) that are preset by the user. The DIP switches are read only during the power on initialization sequence.
At power on the FAULT & LOW LEVEL indicators (and fault relay output) are flashed on for 1 second as a lamp test to verify they are operational.
Controllers fitted with an audible FAULT alarm device (piezo beeper) will emit a pulsing beep (1 sec on, 1 sec off) when fault is indicated. To silence the beeper, press and hold the TEST switch for more than 5 seconds. (Note this will not cancel the FAULT lamp or relay output)
To cancel all FAULT indications, press and release the TEST switch in less than 5 seconds ie. Normal press, the indication will be cancelled upon release.

System Program

Delay time set by DSW1 commences. Upon expiration of the delay period, output OP1 is energized for the pump on time period set by DSW2. During the pump on time period, the switch input IP1 must close otherwise FAULT will be indicated. If IP1 is closed at the beginning of the pump on cycle, it must open and then close again to avoid FAULT indication.
OP2 is energized at the same time as OP1, but remains active for a further 5 sec after OP1 deactivates. The cycles display is incremented by one when OP2 deactivates. Delay time period recommences. A repeat cycle is now in progress.
When a FAULT is indicated, all outputs are deactivated until the controller is reset by either interrupting power or by pressing TEST switch on the front panel. Pressing TEST resets the delay time period to zero and energizes output OP1 immediately.

Mounting the injector banks

1. Select an appropriate location for the injector banks considering ease of visual inspection and proximity to lubrication points.
2. Run main grease line (Min ½" NB DWB hose) from pump station to injector banks and ensure last injector bank has a blanking plug.
3. Run feed lines (Min ¼" NB SWB hose) from injector outlets to the various greasing points.
4. Ensure all lines are clamped securely and allow full articulation of the machine.

Commissioning the System

1. Ensure all hose assemblies are connected and clamped in position.
2. Ensure the controller is connected to the power supply, hydraulic oil solenoid, grease vent valve and pressure switch.
3. Ensure the hydraulic circuit is connected and primed.
4. Fill the tank with grease via filter block at front of tank until grease appears at overflow outlet.
5. Remove the blanking plug from the last injector bank.
6. Turn on the machine and check for leaks in the hydraulic system.
7. Press the manual test button on the controller to operate the pump. When grease appears from the last injector bank, replace the blanking plug.
8. Remove the feed line at the injector and connect to a hand pump. Fill the line with grease until grease appears at the bearing point. Re-connect the line and repeat for all points.
9. Press the test button on the controller and watch the injectors to see the indicator pin cycle down into the injector body. This shows each injector is operating correctly.
10. When the system reaches pressure (controlled by pressure switch setting), the pump should stop and the vent valve allow the pressurized grease in the line to vent back to tank, thus allowing each injector to recharge with grease.
11. Check each injector to ensure the pin is in the out position.

System Adjustment

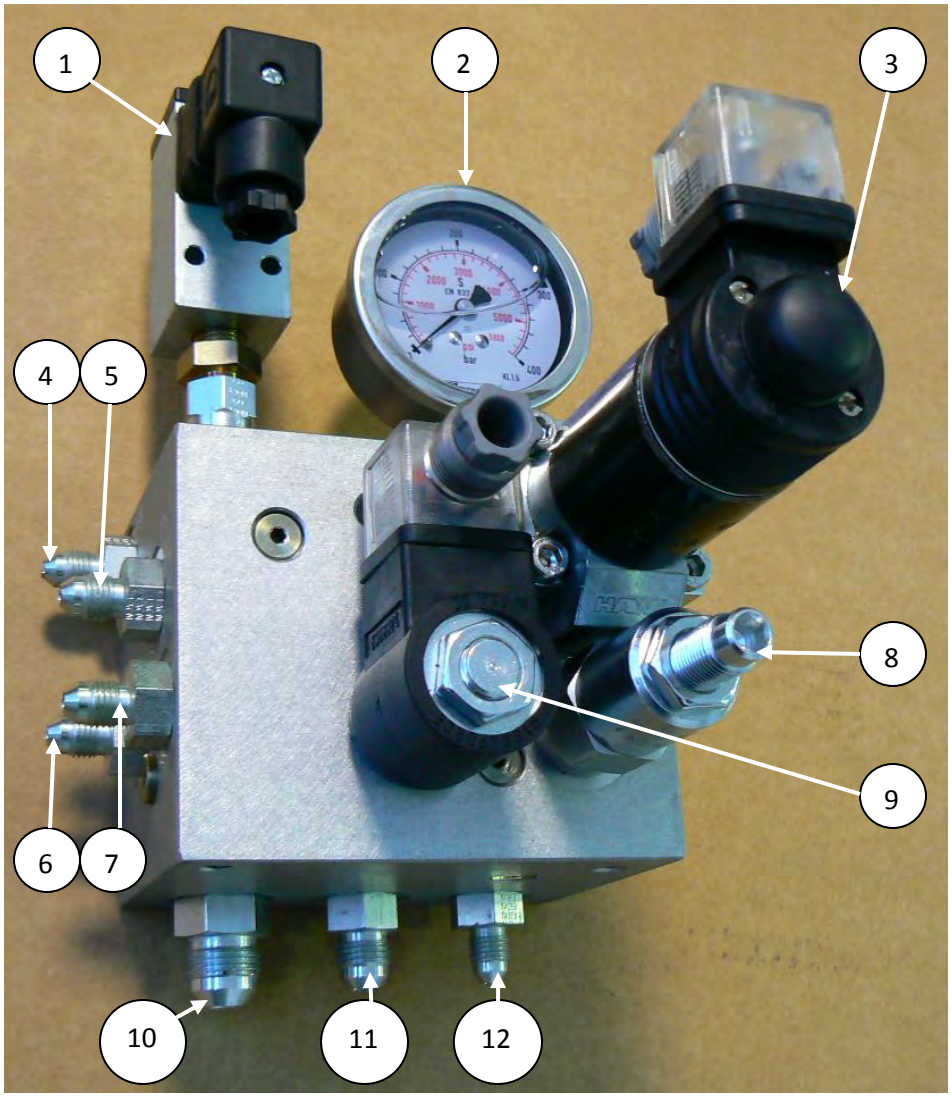
Hydraulic oil relief valve.

Remove din plug from pressure switch, press test button on controller, allow pressure to build and become constant on the pressure gauge. Pressure setting should be 3,100-3,200 psi. If adjustment is required loosen oil relief valve lock-nut and wind the adjusting screw to achieve correct setting. Anti-clockwise to reduce pressure, clockwise to increase pressure.

Pressure switch.

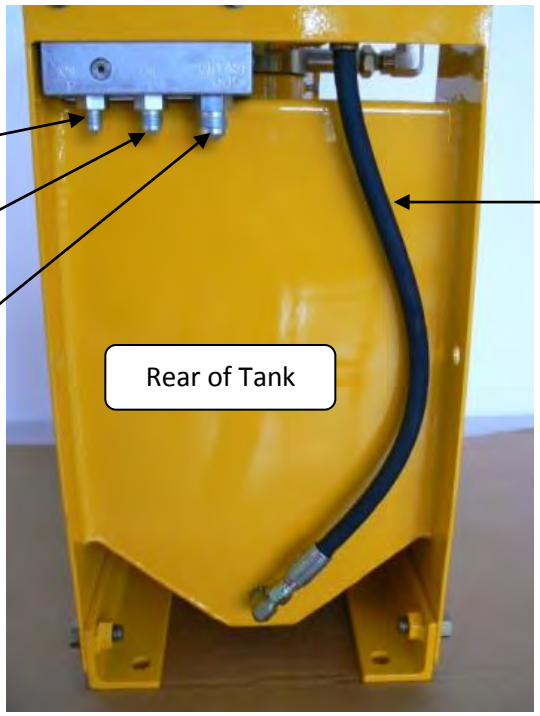
Press the test button on the controller and monitor the pressure gauge, pump should stop after reaching 2,500 psi gauge pressure. If adjustment is required, loosen locknut on top of the switch and wind the adjusting screw to achieve correct setting. Anti-clockwise to reduce pressure, clockwise to increase pressure.

Main Manifold Connection & Parts



1	**IP1** Pressure Switch Part N° TEC.GPS
2	Pressure Gauge Part N° V15964N
3	**OP2** Grease Vent Valve Part N° TVV24VDC
4	**GR Port** Grease return to tank vent line 7/16”JIC (male)
5	**PG Port** Grease inlet from pump 7/16”JIC (male)
6	**B Port** Hydraulic oil to top of pump 7/16”JIC (male)
7	**A Port** Hydraulic oil to side of pump 7/16”JIC (male)
8	Hydraulic oil system relief valve Part N° V22695
9	Hydraulic Oil Solenoid Valve Part N° V22693, Coil V22694
10	**Grease Outlet** to injectors ¾”JIC (male)
11	**T Port** Hydraulic oil return to tank 9/16”JIC (male)
12	**P Port** Hydraulic oil inlet pressure port 7/16”JIC (male)

TPSH.SL Tank Ports



Fault Finding Chart

Fault	Symptom	Remedy
System not working	No lights on controller	Check power supply to controller Check fuse. **Note: Install correct fuse (2A Slow Blow)**
Controller fault light on	Pump not stroking	Press test button on controller, check that the green pump on light flashes, if not check DSW 2 inside the controller is set to pulse. If green light flashes check output voltage from OP1 to hydraulic changeover valve. If OK check oil supply pressure. If OK change hydraulic solenoid valve.
	Termination of pump on time. Pressure build up but exceeds time on period	If system is pumping and output grease pressure reaches 3,000 psi but system remains on, check terminal 1 and 3 of the pressure switch using multi-meter. The switch should be closed. If closed, check continuity back to controller and ensure DSW 3 has switch 6 set to ON. If switch still open, adjust pressure switch to close at 2,500 psi, if pressure switch will not close & open, replace pressure switch.
	Termination of pump on time. No pressure build up and exceeds time on period.	At grease pump outlet check for grease flow. If no flow is evident, check tank grease level by introducing new grease while pumping until grease emerges from overflow valve. This will clear any air pockets. If tank level OK and problem persists change seals in pump. If grease flow is evident at pump outlet depress manual override on electric vent valve cap. If grease is dispensed and pressure builds up, check supply voltage to vent valve. If voltage to vent valve is OK, change vent valve. If vent valve manual override is stuck, replace vent valve.

Spare Parts List

Part No	Description
V20456	Hydraulic Grease Pump
TPH1.S	Seal kit for V20456 Hydraulic Grease Pump
TEC.GPS	Pressure Switch
V15964N	Pressure Gauge
TVV24VDC	24VDC Electric Vent Valve
V22695	Hydraulic System Relief Valve
V22693	Hydraulic Solenoid Valve
V22694	Coil for V22693 Solenoid Valve
TF150	Inlet Grease Filter Assembly
TF150C	150 Micron Element for TF150

TC100D2 Auto-lube System Controller for Mobile Plant

The Tecalemit TC100D2 is a purpose designed 12/24V DC microprocessor based controller designed by Tecalemit. Engineered to control and monitor automatic lubrication systems fitted to a wide range of mobile plant operating in the toughest environmental conditions.

Commonly fitted to single line progressive, single line injector or dual line systems, the TC100D2 provides variable on/off settings for dose and cycle control, with a display that that includes a digital cycle count, pump on light, low level light and a manual test button.
Monitoring features include visual red alarm light, 24V DC alarm and power loss alarm outputs and a built in audible alarm to ensure the operator is made aware if the system is not operating for any reason.

The controller is fitted in a compact 160x80x60mm weather proof oil & solvent resistant IP65 die cast and baked enamel enclosure with stainless steel screws for complete protection and reliability.

The TC100D2 is most often cabin mounted on mobile plant where the operator can see and hear the visual and audible alarms, but can be remote mounted, with alarm outputs hard wired to the operator's dashboard or control display.

This controller can also be used with a transformer to provide simple control and monitoring of centralized lubrication systems in a variety of fixed plant applications.

Key Features:
Variable On/Off dose and cycle control.
Digital cycle count display and pump on light for easy operation checks.
Built in visual and audible failure alarms.
Manual test button.
Compact weatherproof enclosure for in cabin or external mounting

Technical Specifications:
24V DC Powered
Weatherproof oil and solvent resistant IP65 enclosure
24VDC alarm outputs
Built in fuse.
6.5mm cable gland nuts supplied.

Dimensions:
Size: 160 x 80 x 60 mm
Mass: 800g

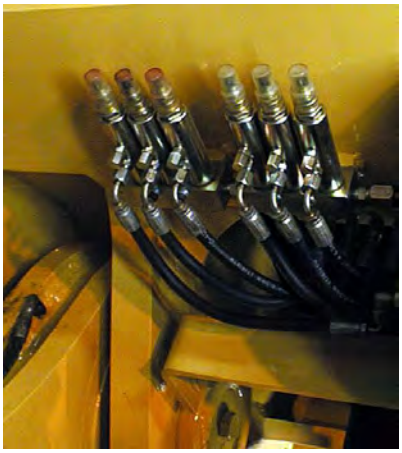
A detailed system operating manual that outlines control settings, fault alarm interpretation and system trouble shooting procedures is available on request.

TSLI Series Single Line Grease Injectors

TSLI Series Grease Injectors are designed for adjustable control and metering of grease from centralised lubrication systems on fixed and mobile plant.

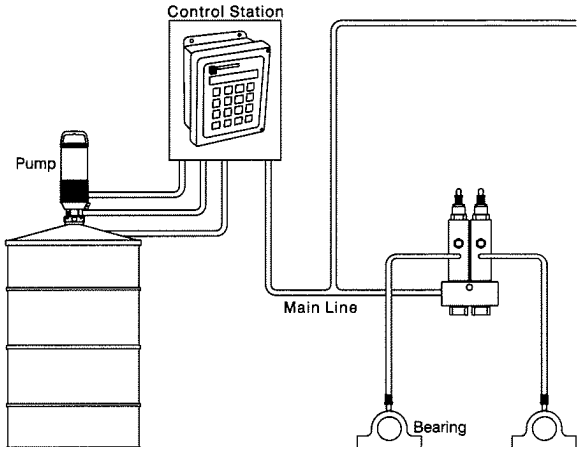
Single line grease injectors are fed by a single pressurized grease line and discharge at pressures up to 3,500psi. Their adjustable output, simple operation and the ability to monitor output via a cycle switch or visual indicator pin make them a popular choice for medium sized lubrication systems on fixed and mobile plant.

Adjustable output volume ranges from 0.13 to 1.31cc.
Operating pressure ranges between 1,800 and 3,500psi, with 600 psi vent pressure. Available in a variety of configurations ranging from bare injector replacement cartridges to 5 injector manifold assemblies, these units are supplied as standard with plastic dust caps.



TSLI Series Injectors are plated for protection from harsh operating environments.

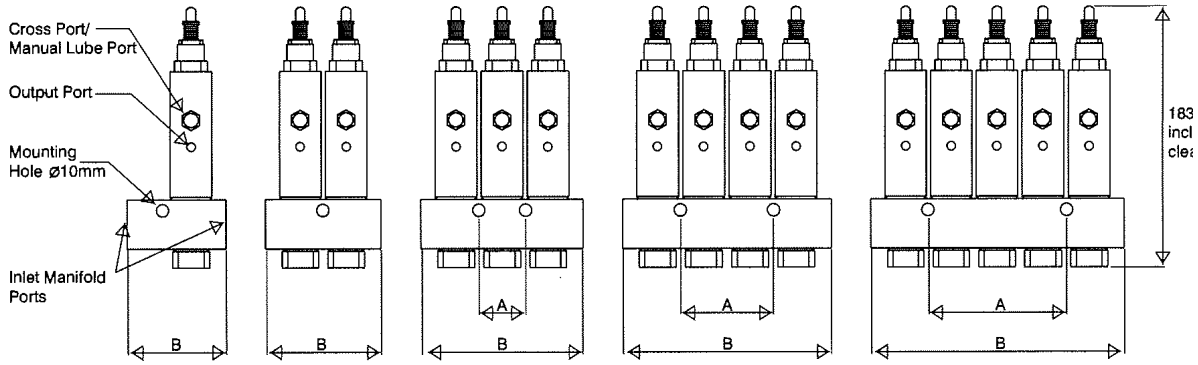
Key Features:
Adjustable output.
Simple visual or automated monitoring.
Available as singles or in multiple manifolds.
Interchangeable with other brands.



Specifications:

Suitable for use with up to NLGI Grade 2 grease

Output per cycle :	Min. 0.008ci / 0.13cc
	Max. 0.080ci / 1.31cc
Operating Pressure:	Min. 1,850psi / 128 Bar
	Max. 3,500psi / 241 Bar
Vent Pressure:	600psi / 41 Bar
Port Sizes:	Manifold – 3/8” NPT(F)
	Output – 1/8” NPT(F)
	Cross Port – 1/8” NPT(F)



Part Numbers	Description	No. of Injectors	Mass	Dimensions	
				A	B
				Inches mm	Inches mm
TSLI.3	3 Bank Injector & Manifold Assembly	3	2.6kg	1 ¼" 32mm	4 ½" 108mm
TSLI.4	4 Bank Injector & Manifold Assembly	4	3.5kg	2 ½" 63mm	5 ½" 140mm
TSLI.5	5 Bank Injector & Manifold Assembly	5	4.2kg	3 ¾" 95mm	6 ¾" 171mm
TSLI.S	Bare Injector Only	1	0.6kg	-	-

For further information on applications suited to single line injectors or the design of centralized lubrication systems for fixed and mobile plant, contact Tecalemit.

Freecall (within Australia) **1800 68 55 77**, or email expertadvice@tecalemit.com.au.