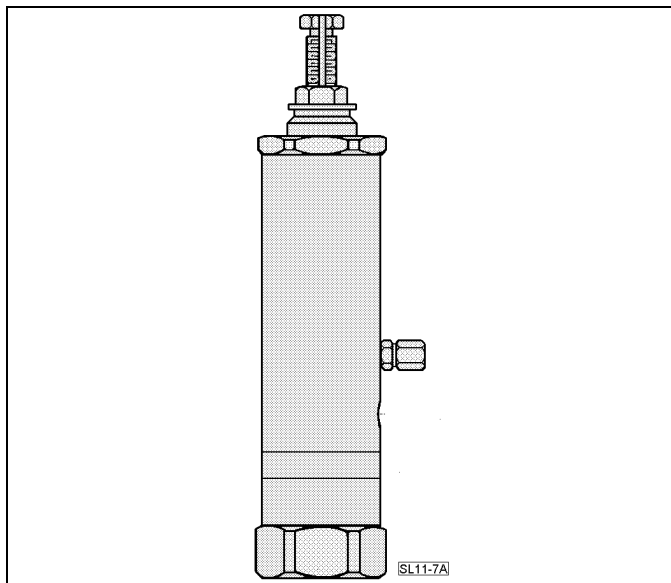


**Operating Instructions & Service Parts List**



Injector type SL-11

**1. Foreword**

Installation work, setting-up, operation and maintenance of Injectors and the Central Lubrication System shall be executed by qualified, trained personnel.

This User Manual is primarily intended to familiarize the user of *Centro-Matic* central lubricating equipment with the supplied product 'Injector' and its specifications. It shall also aid to identify parts by part number and parts for service part inventory.

**2. Safety Instructions**



Safety Symbol according to DIN 4844-W9

Warnings for exposure to hazards that may result in serious personal injury if ignored, are marked in the manual by the general safety symbol

**CAUTION**

Safety instructions that might result in equipment damage and machine malfunction if ignored, are marked by the word 'CAUTION'.

Also heed safety instructions of the manufacturer of the machine!

**3. Specifications of the Product**

<u>Manufacturer</u>	<u>Sales &amp; Service</u>
LINCOLN	Lincoln GmbH
St. Louis, Mo 63120-1578	Heinrich-Hertz-Str. 2-8
USA	D-69190 Walldorf / Germany

Contact customer service if requiring additional information or service:

See bottom line for telephone- and telefax number

**Designated Use**

- Single-line metering device for grease up to class NLGI # 2, for use in *Centro-Matic* single-line lubrication systems. The lubricant must be suitable for the application with the *Centro-Matic* single line system.
- Metering device for petroleum based lubricants; if using synthetic lubricants, the subject lubricant must be compatible with the construction parts (steel, Viton seals) of the injector.
- Designed for pressure range of 70-240 bar for operating during lubrication cycle and residual pressure < 55 bar between lubricating intervals in the pause time.

**General Description**

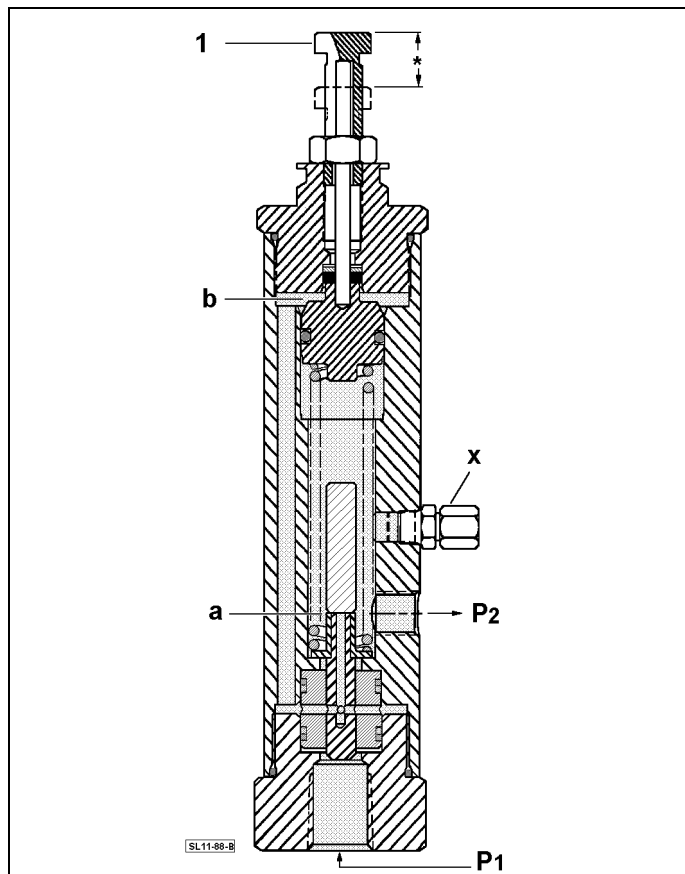
Injector SL-11 is a so-called 'direct' single-line metering device. The injector lubricates under pressure applied by the pump to the injector piston. The spring of the injector is only for re-charging purposes.

The lubricant output is adjustable in a range between 0,82 cm<sup>3</sup> to 8,19 cm<sup>3</sup> by the adjusting screw.

The working pressure (fluid pressure) of the pump must be at least 70 bar for lubricating and shall not exceed 240 bar. The recommended pressure for standard application of *Centro-Matic* single-line grease systems is 173 bar.

After pressure build-up and completion of the lubricating phase, the supply line (lubricant line between pump and injector) must be relieved from pressure. To permit the injector to re-charge, the pressure at the injector inlet must drop below 55 bar during the pause time.

Injector SL-11 can be used in a single-line circuit of injectors type SL-1, SL-32 or SL-33 in *Centro-Matic* central lubrication systems for grease. *Attention:* When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar (instead of 55 bar).



<b>P1</b>	Inlet	<b>P2</b>	Outlet
<b>a</b>	Discharge chamber	<b>b</b>	Measuring chamber
<b>1</b>	Adjusting screw	<b>x</b>	Fitting with cap
<b>*</b>	~ 16 mm (min.-max. ~ 12¾ turns)		

*Note:* Check output of lubricant directly at the outlet of the injector if the adjusting screw is adjusted to less than ½ turn from minimum. The closed control outlet (x) is designed for filling the feed line and permits check for verification of the lubricant output from the injector.

Injector output adjustment:

See Section 5 'Operation'.

**Injector No. 85497 Ser. B**

Technical Data

Injector type	Series SL-11		
Part number	85497	Single unit injector	
Output range	0,82-8,19 cm <sup>3</sup>		
Output adjustment	Setting by adjusting screw, min. to max. ~ 12¾ turns ) <sup>1</sup>		
Operating pressure ) <sup>2</sup>	minimal	normal	maximal
	70 bar	173 bar	240 bar
	Vent pressure < 55 bar		
Constr. materials	Steel Seals: Viton Back-up rings: Teflon		
Amb. temperature (constr. materials)	TMIN		TMAX
	- 40° C		+ 93° C
Connections:	Inlet	1/2" NPTF female	
	Outlet	1/4" NPTF female	
Weight	2,7 kg		

Note:

)<sup>1</sup> **Attention:** Check output if Adjusting Screw is adjusted to less than ½ turn from minimum.

)<sup>2</sup> 'normal' = recommended operating pressure.

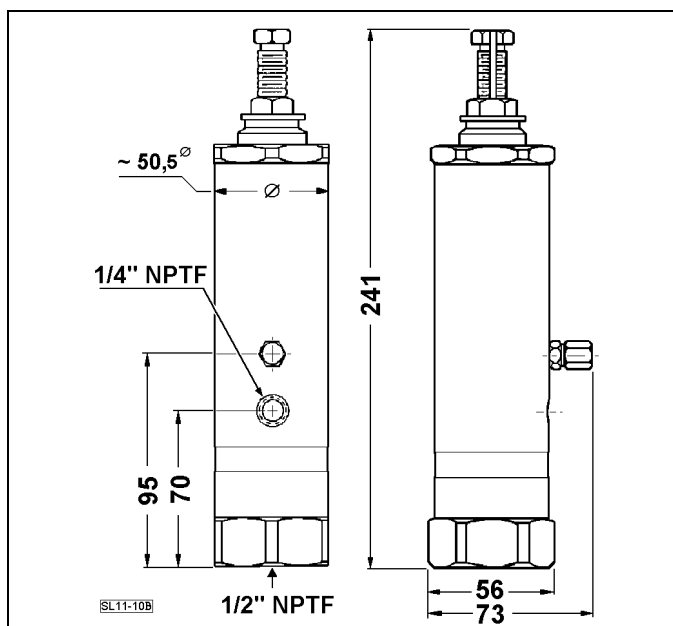
The operating pressures listed under 'minimal' and 'Vent pressure' are changed and deviate from specifications of the previous injector SL-11 series.

During pause time, after completion of the lubrication cycle, a pressure relief below 55 bar must follow.

Also note: When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar (instead of 55 bar).

On lay-out of a Centro-Matic system, take the operating / ambient temperatures in mind because of the affect on the ventability of a lubricant in the piping system. Always use lubricant supply lines of appropriate inside diameter.

Dimensions



Injector SL-11

4. Erection & Installation

**Warning**



Never exceed the maximum working pressure of the Centro-Matic system.

Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

**CAUTION**

Before using synthetic lubricants, check compatibility with the construction materials of injectors and other system components.

Required tools

Ring & Open end wrenches of inch-size series are required for the installation of injectors.

Mounting of injectors

The injector outlet has a female thread of 1/4" NPTF for connecting the lubricant feed line.

The inlet adapter at the bottom of the injector has a female thread of 1/2" NPTF for connecting the main or branch line of the supply line.

Order connectors separately if required.

- Injectors can be mounted in any position. Mount injector in a position which permits access for output adjustment and visual function control of the injector.

- Location of injectors  
See drawing & instructions of the machine manufacturer.
- Allocation of injector/lubricating point  
See drawing & instructions of the machine manufacturer.

Note: When using feed line tubing of 3/8" O. D. (~ 9,6 mm<sup>Ø</sup>), the feed line must not exceed a length of approx. 13,5 m (based on grease NLGI #1 at 18° C).

Observe on mounting that injector and routing of lines (supply line / feed line) do not interfere with the machine operation. Keep lines clear from damage. Consider max. ambient temperature in case of heat radiation of the machine.

- Replacement Injector; pls. note for assembly/disassembly: When the injector has been replaced:
  - Vent injector and relevant line.
  - Adjust lubricant output of the injector.  
See Section 5. 'Operation'.

General information concerning the lines for lubricant.

Piping and fastening material :

See drawing & parts list of the machine manufacturer.

As for material quality, resistance to pressure, nominal width and length, the lines used must correspond to the individual operating conditions and must be suitable for the central lubrication system.

- Install lines in accordance with good plumbing practice.
  - Securely tighten connectors to avoid leakage; when installing, follow procedure recommended by the fitting manufacturer.
  - Tubing and hoses must be clean inside before installing; remove all foreign particles. Steel tubing must be free from rust.
  - Use tube cutter for cutting steel tubing. Make rectangular cuts and avoid burrs.
  - Observe manufacturer standards concerning the bending radius of steel tubing & pipes and flexible tubes.
  - Lines should be securely anchored; use tube clamps to avoid vibration and tearing off of lines.

**Injector No. 85497 Ser. B**

**5. Operation**



Never exceed the maximum working pressure of the *Centro-Matic* system.  
Do not carry out any assembly or disassembly works when the system is pressurized or pump/machine are in operation.

**Setting-up for operation**

For setting-up of *Centro-Matic* Central Lubrication Pump and Controller:

- See User Manual of supplied components.
- See specific instructions and safety instructions of the manufacturer/supplier of the machine.

**Initial operation**



**Safety instruction**  
Wear safety glasses when venting lubricant supply lines. Avoid splashing.

*Prior to the initial operation:*

Read specific instructions as well as safety instructions of the manufacturer/supplier of the machine.

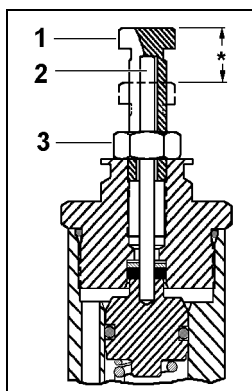
**Filling and venting of the lubricant supply line**

Before the injectors may be operated the following steps are necessary:

- Fill main line with lubricant
- Vent branch lines and supply line riser.
- Flush supply line while carrying-out the venting procedure.
- Operate pump with low pressure when filling and venting lines.
- Provide assistant with a can to collect the expelled lubricant when venting the lines.
- Check lubricant supply line for any leakage

*Please note:* The max. working pressure of Injector SL-11 is 240 bar.

**Output adjustment of injector type SL-11**



- Legend:**
- 1 Adjusting screw (hex. 5/8")
  - 2 Indicator stem (visual function indicator)
  - 3 Lock nut (hex. 3/4")
  - \* ~ 16 mm (min.-max. ~ 12¾ turns)

**CAUTION**

Adjustment is only permitted when supply line / injectors are depressurized.

Observe lubricant requirement of each lubricating point and the lubricant output setting of the individual injectors:

See lubrication chart and instructions of the machine manufacturer.

Loosen lock nut (3).

Turn adjusting screw (1) clockwise into injector body to its stop, hand tight. Use open-end wrench.

Then turn adjusting screw (1) counter-clockwise. After ~ 12¾ turns of the adjusting screw the injector is set to the max. output of 8,19 cm<sup>3</sup>. If a lower output setting is desired, turn the adjusting screw proportionally.

When the injector has been adjusted for the proper lubricant output, lock adjusting screw (1) with lock nut (3).

*Note:* Retracting the adjusting screw beyond 12¾ turns will not increase the lubricant output beyond the max. output!

**Attention:** Check output of lubricant directly at the outlet of the injector if the adjusting screw is adjusted to less than ½ turn from minimum.

*Note:* Before operating the machine, for example after installation works or repairs:

- Main supply line / branch lines and injectors must be filled with lubricant and vented.
  - Feed lines must be filled with lubricant and connected with lube points.
  - The function of all injectors must have been checked.
  - All injectors and the system control for the lubricating intervals must have been adjusted in compliance with the specifications.
- ⇒ See specific instructions of the machine manufacturer.

**Functional check of injectors**

The recommended system operating pressure is 173 bar; adjust pump and control system accordingly.

⇒ See User Manual of the relevant central lubrication pump / control system and injectors.

- Initiate manual starting of the lubricating cycle.
- After the rising of the pressure to ~ 70 bar the indicator stem of the injector must be retracted; after pressure relief < 55 bar the indicator stem must return, back to rest position. Insufficient venting of the supply line system may impair the function of injectors.

*Note:* When used together with injectors type SL-32 & SL-33 in a system, the pressure relief must be < 13 bar (instead of 55 bar).

When all injectors of the system have been checked and function properly:

**Fill feed lines with lubricant**

Before connecting the feed lines to the lubricating points:

- Fill feed lines with lubricant.
- Use only lubricant specified by the machine manufacturer for pre-filling.
- Fill lines with lubricant by means of a grease gun.
- The feed line can be filled via the fitting in the control outlet port in the injector body.
- Check feed line outlet for evidence of lubricant flow.
  - Collect emerging lubricant at the end of the line.

When all lines have been filled:

- Connect feed lines.

**Injector No. 85497 Ser. B**

**Operation**

During operation of the central lubrication system

- all injectors must have been set to the lubricant output specified by the machine manufacturer.
- the lubrication system controller must have been set to pause time as specified by the machine manufacturer.
- the required operating pressure (fluid pressure) for operating the injectors (lubricant discharge) as well as the subsequent pressure relief of the lubricant supply line for re-charge of the injectors have to be observed.

When the machine is put out of operation

- the central lubrication system must be switched off.

**CAUTION**

Excess lubrication or insufficient lubrication may result in machine damages.

Do not use contaminated lubricants.



**Warning**

Never exceed the admissible working pressure of the central lubrication system. Switch off pump immediately in case of defects or abnormal operating performance.

When putting machine and central lubrication system in operation after a longer shut-off period:

- Check function of the central lubrication system.

**Inspection and maintenance**

**Warning**



Never attempt to disassemble the equipment while pump is in operation or system is pressurized. Do not perform adjustment of injectors while the system is pressurized.

- Check all lubricant lines and injectors regularly to ensure leak proof and proper condition.
- Check function of the central lubrication equipment (pump/controller/injectors) regularly.
- Eliminate defects immediately.

**Maintenance**



**Warning**

Never attempt to disassemble the equipment while pump is in operation or system is pressurized.

Before performing any works the machine must be out of operation.

Heed safety instructions of the machine manufacturer.

If machine components being also part of the central lubrication system were removed for service, they shall be properly reassembled before the machine is operated again. Then check the function of the centralized lubrication system as specified. The same applies to maintenance work performed on parts of the *Centro-Matic* central lubrication system.

Avoid contamination of the indicator stem in order to prevent premature wear of the injector seal. If necessary, provide protective injector cover cap;

No. 83730 Cover Cap, Vinyl plastic material.

**Trouble shooting**

- ⇒ See checklist below
- ⇒ See User Manual of the relevant central lubrication pump.
- ⇒ See User Manual of the relevant system control & monitoring equipment and instructions of the manufacturer of the machine.

**CAUTION**

Operation of the machine with inactive or defective central lubrication system will cause damages to the machine.

⇒ See instructions of the machine manufacturer.

Malfunction of individual lubricant metering devices or damaged lubricant feed lines will cause damage of parts connected to because of lack of lubrication.

*Note on Checklist:*

The numbers in bold brackets ( ) refer to the item numbers in the service parts drawing & parts list of the injector.

**Checklist**

Problem	Possible cause	Solution
Leakage at the ends of the cylindrical injector body	Damaged or worn O-rings.	Replace O-ring <b>(4)</b> (upper and / or lower)
Leakage at fitting assembly <b>(10)</b>	Loose cap Damaged fitting	Tighten cap Replace fitting assy. <b>(10)</b>
Leakage at indicator rod	Worn or damaged packing Worn or damaged indicator rod	Replace <b>(6)</b> . Replace piston assy. (w. rod) <b>(8)</b> and replace relevant packings.
Lubricant volume to bearing LOW.	Output adjustment screw setting incorrect. Worn or damaged <i>lower</i> slide valve body O-ring. Plunger spring broken or worn.	Adjust to proper setting and lock with lock nut. Replace O-ring <b>(13)</b> and back-up ring <b>(12)</b> . Replace spring <b>(9)</b> .
Lubricant volume to bearing HIGH.	Output adjustment screw setting incorrect. Worn or damaged <i>upper</i> slide valve body O-ring. Plunger spring broken or worn. Worn or damaged slide valve assy. / valve body.	Adjust to proper setting and lock with lock nut. Replace O-ring <b>(13)</b> and back-up ring <b>(13)</b> . Replace spring <b>(9)</b> . Replace slide valve <b>(11)</b> and valve body <b>(14)</b> .

**Injector No. 85497 Ser. B****6. Repair**

Repairs must be carried out by qualified, trained personnel only.

**Warning**

Do not disassemble injectors when pump/central lubrication system are pressurized.

Before performing any works the machine must be out of operation.

Before servicing shut off pump/central lubrication system and perform pressure relief procedure. Depressurize pump and supply line system.

Always collect lubricant in a can.

Only use original replacement parts.

Use all parts included in a kit when replacing parts.

See service parts list for repair kits.

After repair of injectors:

– Check function of injectors.

After repair, before restart of normal operation of the machine/central lubrication system:

– Adjust output of the relevant injectors as described.

Vent lubrication line system and check function of the central lubrication system.

**Required tools**

Open-end wrenches 7/16", 5/8", 3/4" and 2".

Cylindrical brass or wooden dowel rod 11-12,5 mm & 5 mm and a steel driver of approx. 3 mm <sup>Ø</sup>.

**Note**

The numbers in bold brackets ( ) refer to the item numbers in the service parts drawing & parts list of the injector.

**Disassembly of the Injector**

1. Remove the adjustment adapter (3) from the top of the injector.
2. Remove the piston assembly (8) from inside the injector.
3. Remove plunger spring (9) and spacer (17) from inside the injector.
4. Remove the inlet adapter (16) from the bottom of the injector.
5. To remove the slide valve assembly (11), turn injector over, with the top pointing down. If the slide valve does not fall out, it may be pushed out of the slide valve body with a blunt object, being careful not to damage the slide valve body.
6. To remove valve body (14) including O-rings and back-up rings:
  - a) If it sticks in the inlet adapter (16), gently pry the valve body out of the inlet adapter using a small round rod. Place the rod into a hole in the side of the valve body (14) and pry against the face of the inlet adapter. Work one hole at a time, working around the valve body until it is freed.
  - b) If the valve body sticks in the injector body (15), turn injector right side up and use a 11-12,5 mm <sup>Ø</sup> brass or wooden dowel to gently tap the valve body out of the injector body.
7. Remove back-up rings and O-rings (12 & 13) from the valve body (14).
8. Remove adjusting screw (1) from adjustment adapter (3).
9. To remove the indicator stem packing (6) from the adjustment adapter (3), use a blunt object, such as a wooden dowel, placed into the adjustment screw hole to gently push the washer (5) and stem packing (6) out of the adjustment adapter, from the bottom side.

**Reassembly instructions**

*Note:* Clean all injector components, and carefully inspect all parts for wear, replacing parts as necessary.

Generally replace all gasket and seals after a complete disassembly of the injector.

Apply a liberal coating of lubricant to seals, piston, valve piston and threaded parts on reassembly of the injector.

Adhere to torque specifications for tightening adjustment adapter (3) and inlet adapter (16).

⇒ See service parts drawing.

1. Start reassembly by pre-assembling the valve body (14), by installing the O-rings (13) and back-up rings (12). See valve body detail, for correct assembly sequence. Apply a liberal amount of grease to O-rings on outside of valve body, and gently push the pre-assembled valve body into the inlet of adapter (16).
2. Install O-ring (4) onto the inlet adapter (16). Install inlet adapter into the injector body (15), and tighten by hand assuring that the valve body (14) slides into its respective bore in the injector body. Tighten the inlet adapter to the injector body, observing the specified torque.
3. Apply a liberal coating of grease to the slide valve assembly (11). Insert the slide valve assembly through the top of the injector into the valve body (14), which should already be installed into the bottom of the injector body.
4. Apply a liberal coating of grease to the piston bore in the injector body (15). Drop in the plunger spring (9) and place the spacer (17) inside the spring.
5. Install the O-ring (7) on the piston assembly (8). Apply a liberal coating of grease to the piston, O-ring and indicator rod. Place the piston assembly into the piston bore of the injector body (15).
6. Install the O-ring (4) on adjustment adapter (3).
7. Install washer (5) and packing (6) into adjustment adapter (3). Apply grease to the O-ring on the adjustment adapter and the mating bore on the top of the injector body. Carefully slide the pre-assembled adjustment adapter over indicator pin down and screw both parts (3 & 15) together hand tight.
8. Then tighten adjustment adapter (3) with wrench, observing the specified torque.
9. Reinstall lock nut (2) and screw adjusting screw (1) into the adjustment adapter (3).

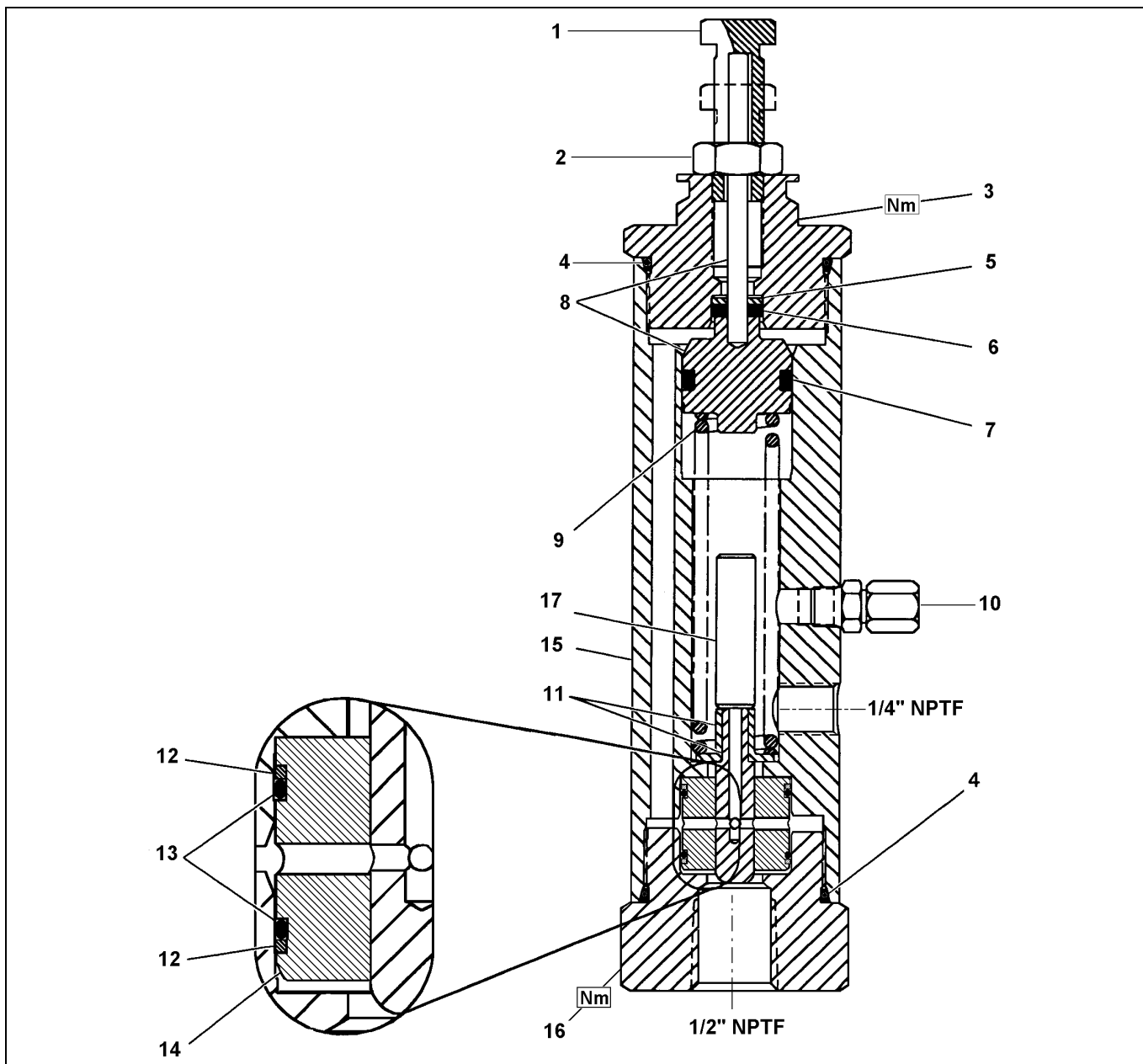
For installation of injector in central lubrication system and output adjustment of the injector:

⇒ See sections 4. and 5. of the operating instructions.

Please always note specific instructions and safety instructions of the machine manufacturer on installation and start-up.

Injector No. 85497 Ser. B

Injector SL-11 No. 85497 Ser. B Service parts drawing & parts list



Item	Description	@	Qty.	Part no.
1	ADJUSTING SCREW		1	244628
2	LOCK NUT		1	51039
3	ADJUSTMENT ADAPTER		1	244613
4	O-RING, Viton	●	2	-
5	WASHER	●	1	-
6	PACKING, Viton	●	1	-
7	O-RING, Viton	●	1	-
8	PISTON ASSY. w. stem		1	244622
9	PLUNGER SPRING	●	1	-
10	FITTING ASSY.		1	90471
11	SLIDE VALVE ASSY.	●	1	-
12	BACK-UP RING, Teflon	●	2	-
13	O-RING, Viton	●	2	-
14	VALVE BODY	●◎	1	-
15	INJECTOR BODY	◎	1	247768
16	INLET ADAPTER		1	244611
17	SPACER		1	244626

**Attention:** Adhere to torque specifications on re-assembly.

Item 3 Adjustment adapter torque 223,7 Nm  
Item 16 Inlet adapter torque 223,7 Nm

Wrench sizes

Item 10 7/16" Item 1 5/8"  
Item 2 3/4" Item 3 & 16 2"

Legend:

◎ Indicates change  
Column @: ● Item included in # 247842 Repair Kit  
Column @: ◎ Not available as repair part; replace if damaged by new SL-11 # 85497.

Repair Kit 247842 contains all normal wear parts for this injector.

Subject to change