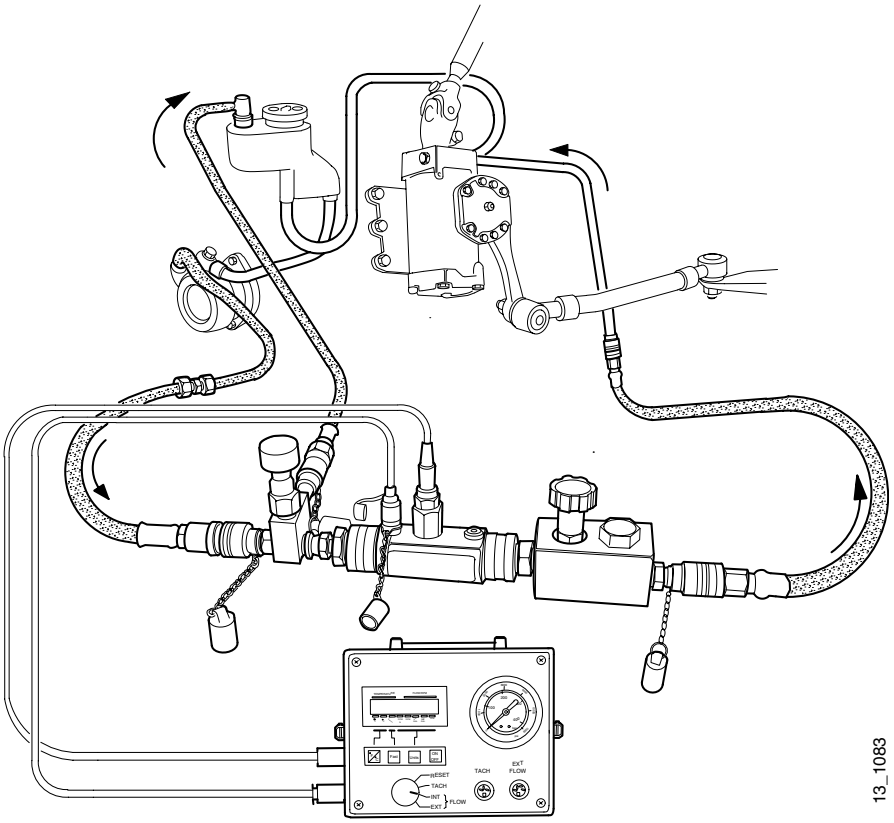
SCANIA

13:00-01

Issue 2 **en**

Measuring equipment 587 696

Function and work description



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1 586 654

Contents

Functional description

General

The measuring equipment is to be connected to the hydraulic system and is used to measure the pressure, flow and temperature in the system.

The measuring equipment comprises a storage box, measuring instrument, flow unit and a set of hoses and unions for connecting to the hydraulic system.

The flow unit is an integrated component comprising an adjustable pressure limiting valve, a flow meter and an adjustable restriction valve.

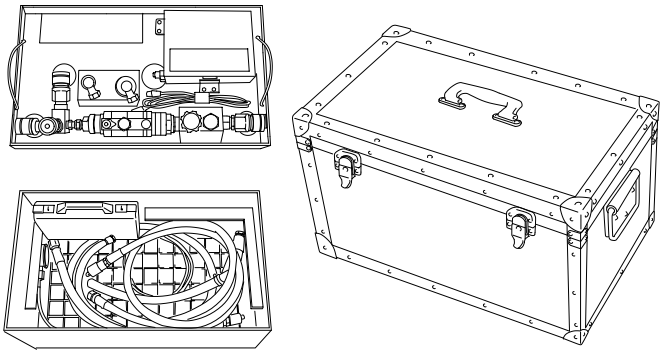
The measuring instrument is factory calibrated for the specific calibration value of the flow meter. This value is stamped on the flow meter housing. The calibration is programmed into the measuring instrument and cannot be changed without modifying the instrument.

When renewing the flow meter, the measuring instrument must be sent to Scania for recalibration to the calibration value of the new flow meter.

The measuring equipment can be supplemented with an external flow meter (EXT. FLOW) and a tachometer (TACH) as accessories.

The measuring instrument can be calibrated for an external flow meter without affecting the factory calibration for the internal flow meter.

The above accessories are not included in the Scania tool assortment.



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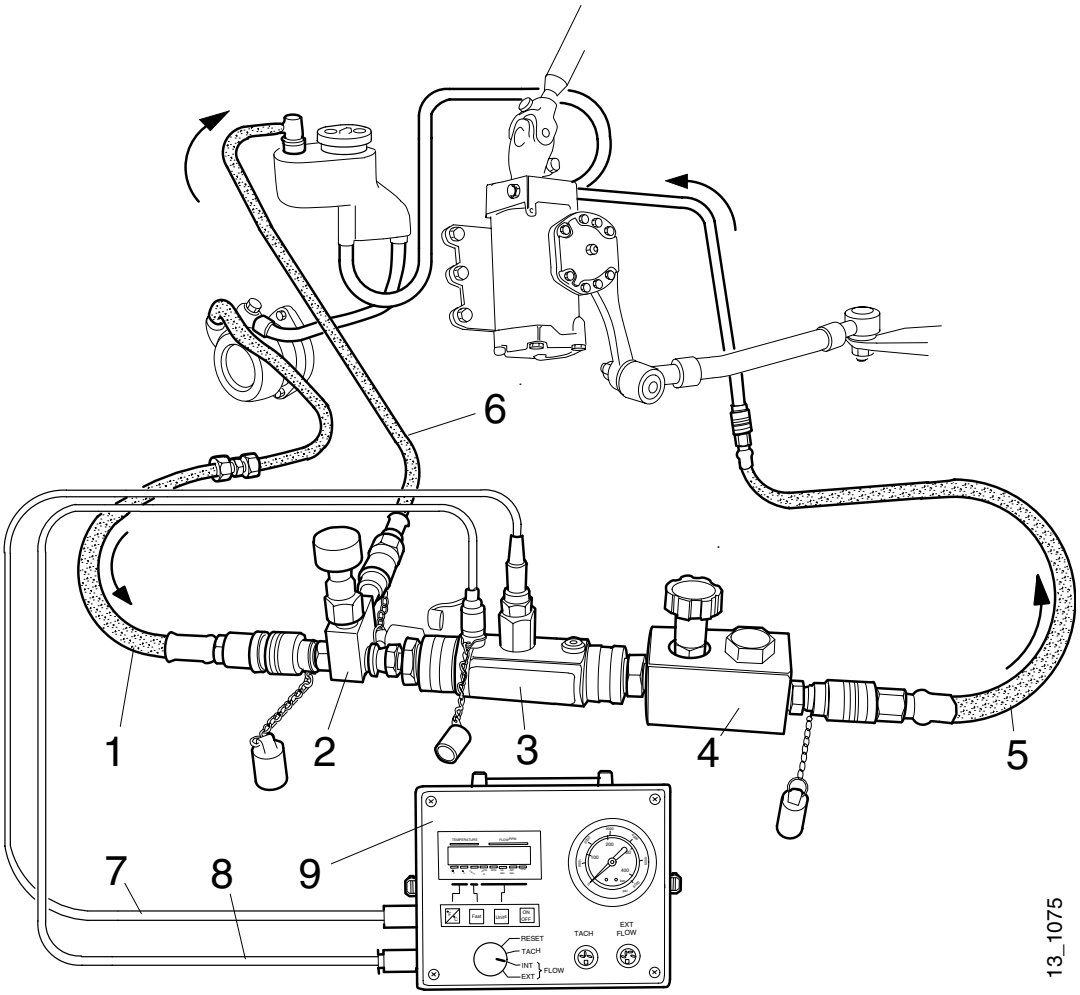
Measuring equipment 587 696



1 Hydraulic hose – connects to the delivery side of the hydraulic pump

Flow unit:

2 Adjustable pressure limiting valve

3 Flow meter

4 Adjustable restriction valve

5 Hydraulic hose – connects to the delivery side of the steering gear

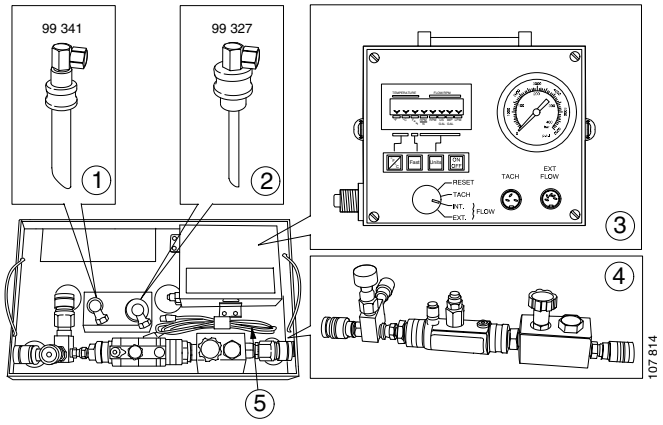
6 Hydraulic hose – connects to the oil reservoir

7 Signal lead for temperature and flow

8 Pipe assembly for oil pressure

9 Measuring instrument

The following components are stored on the shelf insert:



1 *Adapter for return connection to 3-series, Scania 99 341.*

2 *Adapter for return connection to 4-series, Scania 99 327.*

3 *Measuring instrument*

4 *Flow unit: pressure limiting valve, flow meter and restriction valve.*

5 *Signal lead for measuring instrument.*

The following components are stored in the box insert:

1 *Union set 587_952. This set is adapted to 3-series vehicles and can be ordered separately.*

2 *Short hose for return line.*

3 *Hydraulic hose*

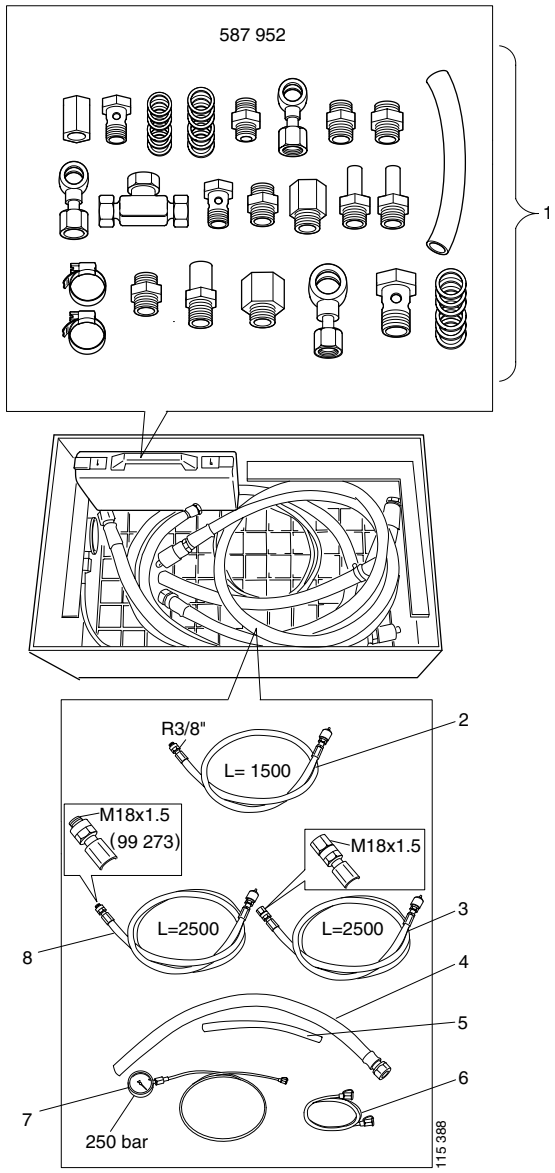
4 *Hose for return line on 3-series vehicles with dual-circuit steering. Can be ordered separately, 1 333 129.*

5 *Hose for return line on 3-series vehicles. Adapter 99 341 replaces the hose in several tests. The hose is included in union set 587 952.*

6 *Pipe assembly for measuring oil pressure.*

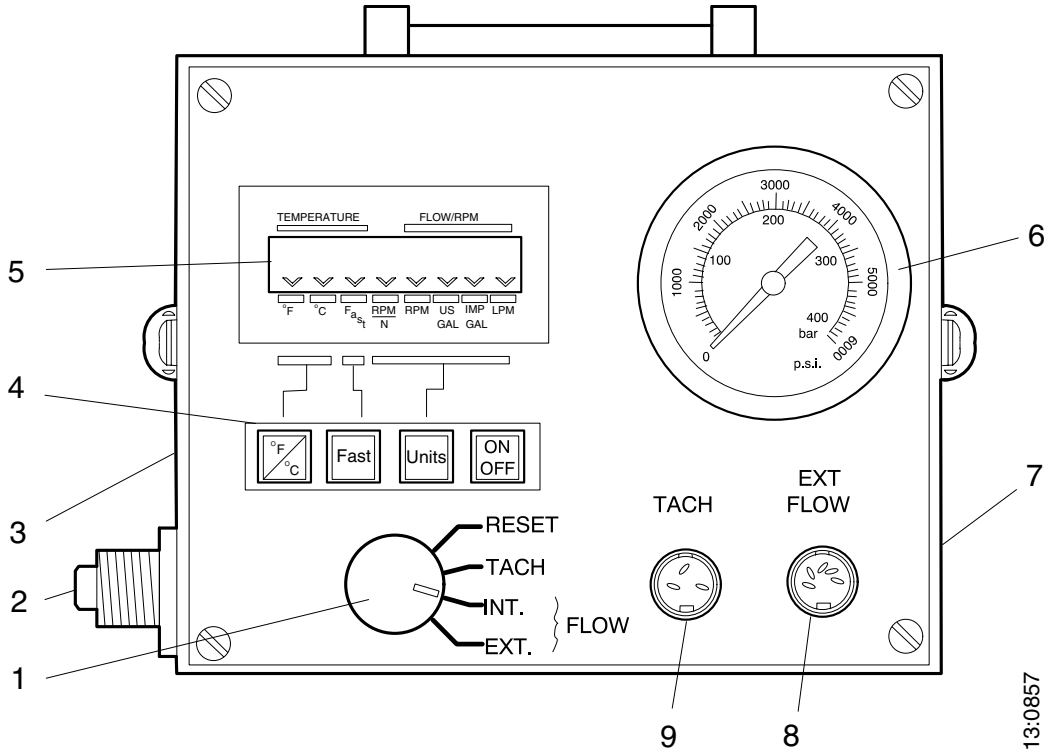
7 *Pressure gauge 99 240, 250 bar, with measuring hose and quick-fit coupling, Tema 100.*

8 *Hydraulic hose.*



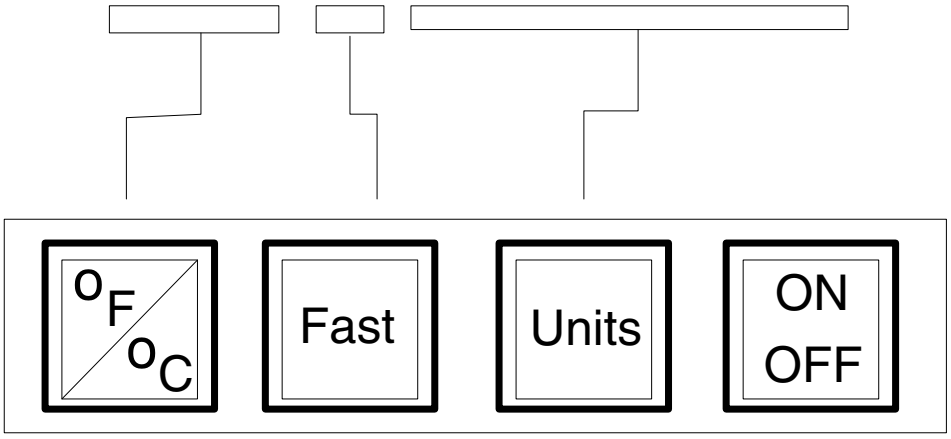
Component description

Measuring instrument



1 *Control knob*
2 *Connection to pipe assembly for oil pressure*
3 *Connection to signal lead for temperature and flow*
4 *Push button panel*
5 *Display*
6 *Manometer*
7 *Battery compartment*
8 *Connection to external flow meter*
9 *Connection to tachometer*

Push button panel



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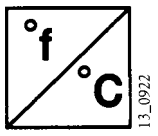
Temperature unit setting °F / °C.



13_0922

Setting for alternative measuring rates, 1 per second or 3 per second.

A cursor (/) will be shown on the display when 3 per second is active. The dot on the right of the cursor always flashes in time with the measuring rate.

13_0923

Measuring unit flow setting (litres/gallons).

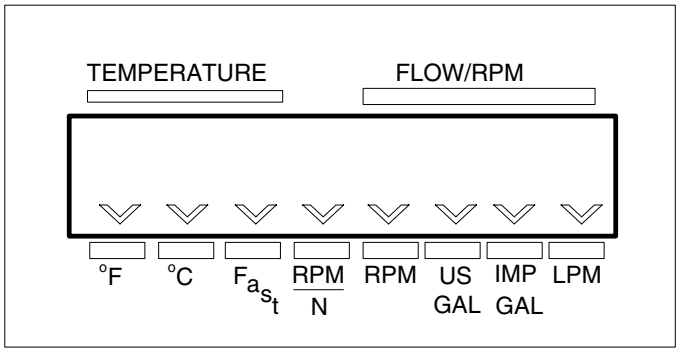
13_0924

Measuring instrument switch. The display is active when the switch is in the "ON" position.

The power will be switched off after approximately 1 hour if the switch is left on.

13_0925

Display

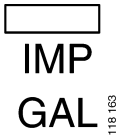


The display shows the following values:

Oil temperature - °**F** or °**C**.

Oil flow per minute. Oil flow can be shown in the following units:

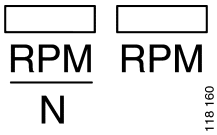
US gallons



Imperial gallons

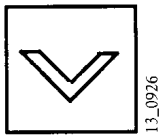
Litres

If the flow is below approx. 1 litre/min, the display will show **L**.



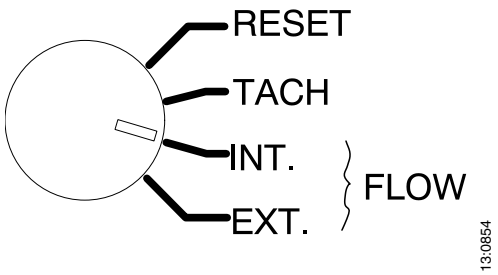
RPM measurement (accessory)

Cursors indicate the set units.



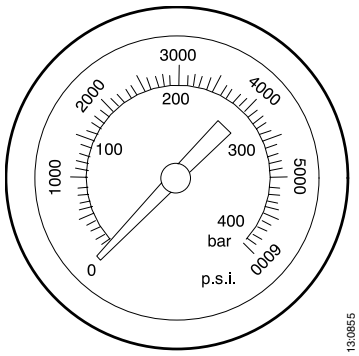
Control knob

Position	Function
RESET	Main switch
TACH	RPM measurement (accessory)
INT. FLOW	Measurement of pressure, flow and temperature
EXT: FLOW	Measurement using an external flow meter (accessory)



Manometer

The manometer measures oil pressure in the flow meter.



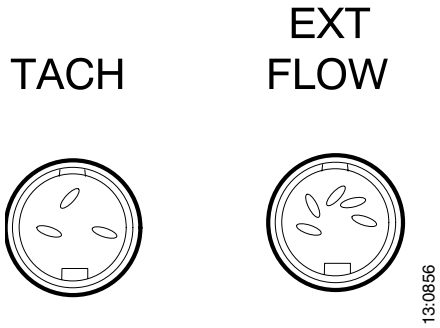
Connections for accessories

"TACH"

Connection for tachometer.

"EXT FLOW"

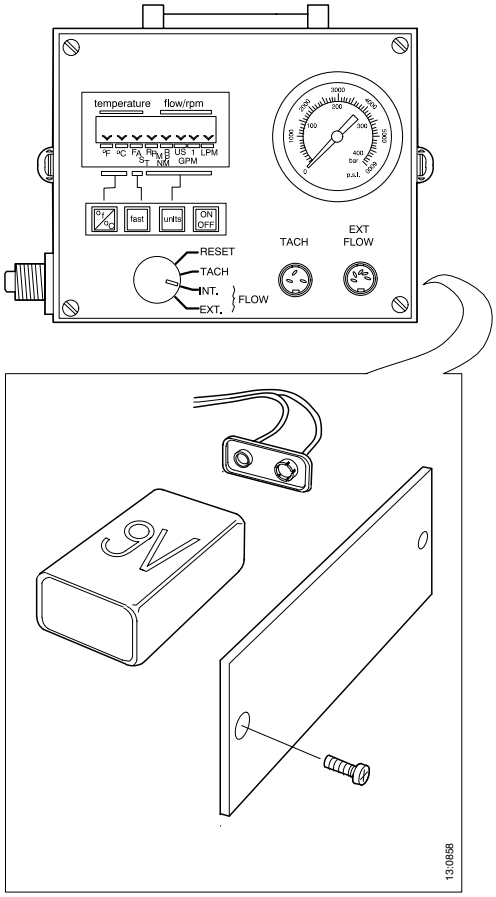
Connection for external flow meter.



Battery compartment

The measuring instrument receives power from a 9 volt battery, which is located in a compartment behind a cover on the right end of the instrument.

"LO" will be shown on the display when the battery is discharged.



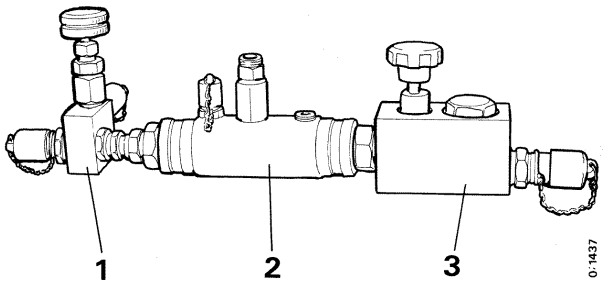
Flow unit

The flow unit comprises three integrated components:

1 Adjustable pressure limiting valve

2 Flow meter

3 Adjustable restriction valve



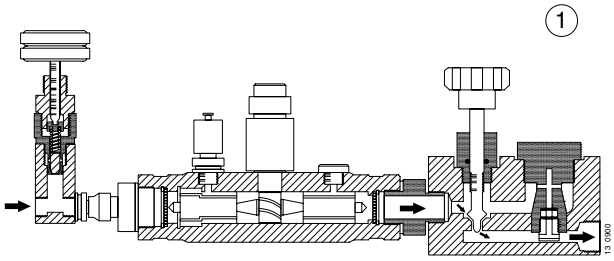
1 Adjustable pressure limiting valve
2 Flow meter
3 Adjustable restriction valve

Pressure limiting valve

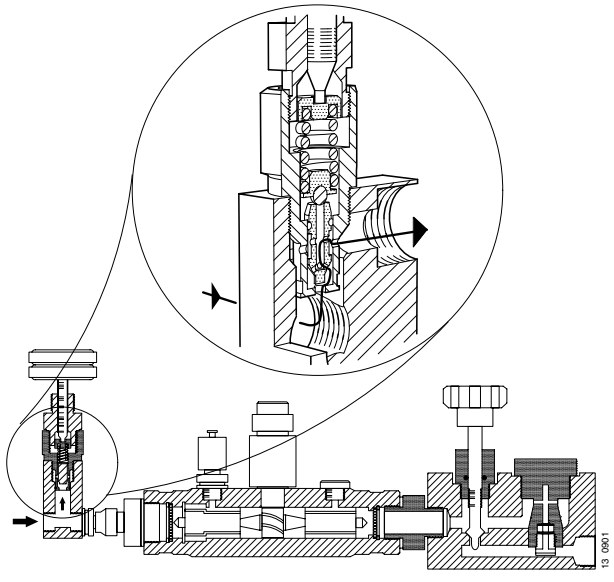
The pressure limiting valve is of by-pass type with a control knob for setting various opening pressures.

The valve cone in the control knob is spring-loaded and the opening pressure is adjustable between 0-180 bar.

As the valve opens, oil passes from the delivery side of the hydraulic system to the return line and back to the tank.



If the oil pressure exceeds 180 bar, it will overcome the spring loading to the integrated safety valve and the valve cone will lift from its seat. Oil from the delivery line then passes to the return line and back to the tank so that the pressure in the system cannot exceed 180 ± 5 bar.



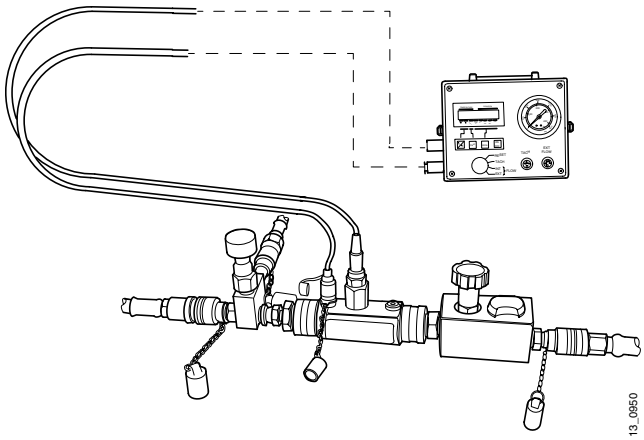
Flow meter

The flow meter comprises an aluminium housing with a turbine axially mounted in the direction of the oil flow.

The oil flow drives the turbine and an integrated impulse sensor measures the flow of oil by registering the rotational speed of the turbine. The signal is led to the measuring instrument via a signal lead. Oil flow and oil temperature are shown digitally on the display.

The oil pressure in the flow meter is transferred via pipes to the manometer of the measuring instrument.

There are oil strainers mounted in both ends of the flow meter housing that can be removed for cleaning. See page 18 for instructions.

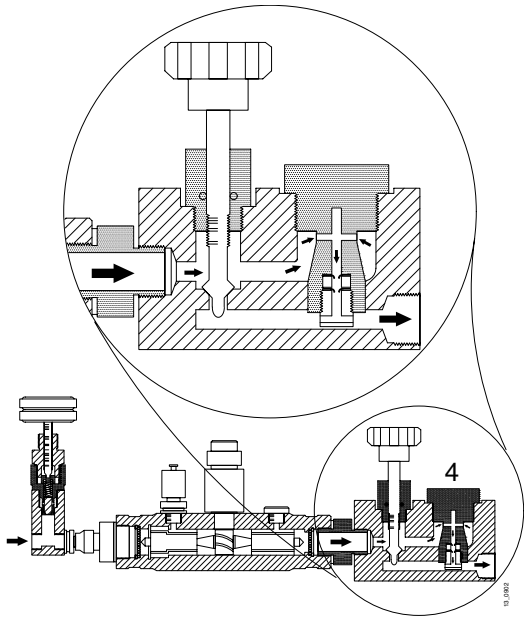


Adjustable restriction valve

The restriction valve is used to restrict the flow of oil and thereby increase the pressure load on the hydraulic pump. This is achieved with a control knob. If the control knob is closed completely, its valve cone will seal against the seat in the outlet passage and stops the flow of oil through the valve. The valve housing includes a safety retainer (4) that contains two burst plates.

If the oil pressure in the system exceeds 210 bar, alternatively 280 bar, the burst plates will bend and open the valve to allow the oil to flow freely.

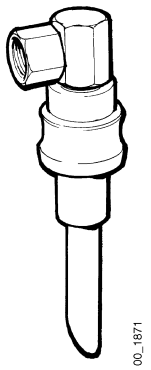
The bent burst plates must be replaced with new ones before the valve will work again. See page 18 for instructions.



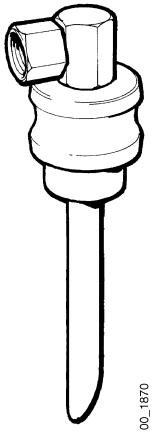
Adapters for oil reservoir

The return hose connects to an adapter, which in turn is mounted on the oil reservoir instead of the cover.

Two adapters are available, 99 341 for the 3-series and 99 327 for the 4-series.



Adapter 99 341 for the 3-series



Adapter 99 327 for the 4-series

Union set 587 952, 3-series vehicles

The union set contains fittings for connecting the measuring equipment to the vehicle steering system.

WARNING!

The fittings must never be subjected to a working pressure of more than 300 bar. This is also subject to the condition that only the rubber-steel gaskets included in the set are used.

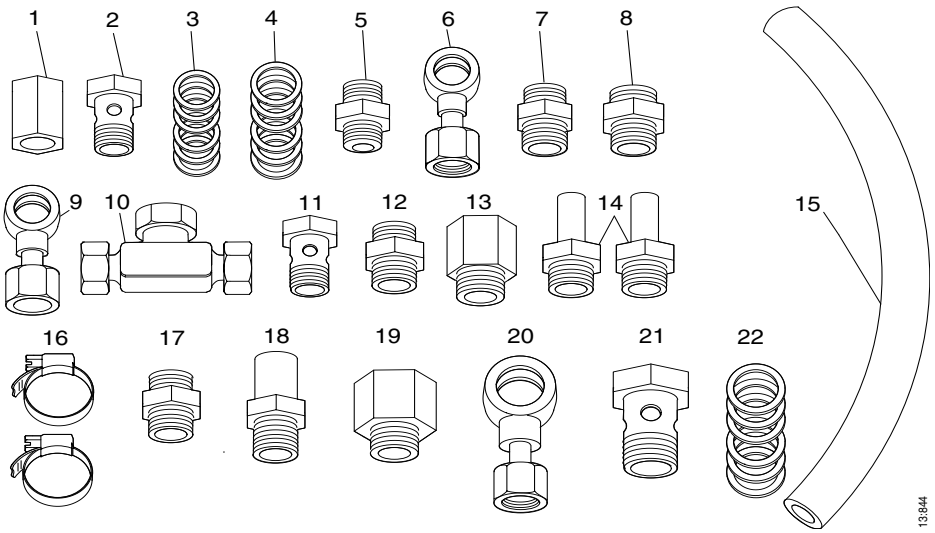
The union set also includes a hose, pos. 15. This is stored in the bottom compartment of the case and in certain cases is connected between the T-union and the return line.

WARNING!

The hose may only be connected to the return line – maximum 10 bar.

The individual parts of the union set cannot be bought separately.

Parts numbered 99 xxx cannot be ordered separately.



Pos.	Part no.	Description	Qty
1	99 266	Intermediate piece	1
2	812 391	Banjo screw	1
3	1 354 084	Sealing ring	10
4	1 354 085	Sealing ring	10
5	130 764	Straight union	1
6	99 267	Banjo union	1
7	99 273	Straight union	1
8	126 580	Straight union	1
9	99 268	Banjo union	1
10	99 275	T-union	1
11	812 392	Banjo screw	1
12	99 274	Straight union	1
13	99 269	Union	1
14	99 270	Pipe union	2
15	99 271	Hose	1
16	796 351	Hose clamp	2
17	99 265	Straight union	1
18	99 272	Pipe union	1
19	99 292	Union	1
20	99 293	Banjo union	1
21	812 394	Banjo screw	1
22	1 354 086	Sealing ring	10

Maintenance of measuring equipment

General

- Take care when handling the measuring equipment, especially the measuring instrument.
- When in use, the measuring instrument must not be exerted to oil spills, vibrations or bumps.
- When in use, the instrument must not be exerted to temperatures below –10°C.

Calibration

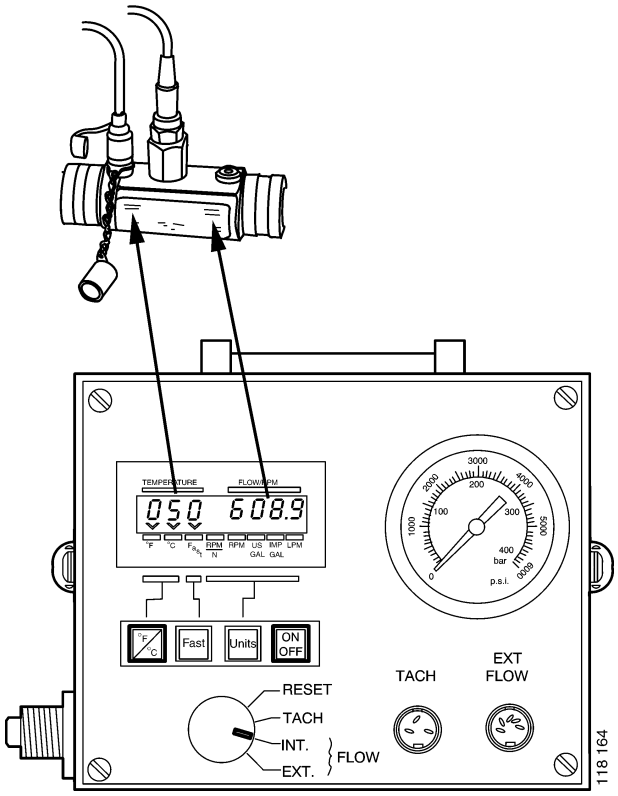
The measuring instrument is factory calibrated to the calibration value of the internal flow meter. Calibration to the flow meter in the set is therefore not possible.

The calibration can be checked in the following way:

- Set the control knob to "INT".
- Press "ON-OFF" and "°F/°C" simultaneously.

The type of flow meter and the set calibration value will now be displayed.

The calibration value must agree with the value stamped on the flow meter housing.



Work description

Troubleshooting

Fault: No values displayed.

Action:

1 Set the control knob to "INT".

2 Press the "ON-OFF" button.

3 If no values are displayed, turn the knob to "RESET" and then back to "INT".

4 Renew the battery. See "Renewing the battery", page 20.

Fault: Display shows "LO".

Action:

1 Battery nearly discharged, renew battery.

2 See "Renewing the battery", page 20.

Fault: Display shows temperature but not flow.

Action:

1 Contaminated oil strainers in flow meter. See "Cleaning the strainers", page 22.

Fault: The adjustable restriction valve is out of order (pressure change not possible).

Action:

1 Burst plates bent.

2 See "Renewing burst plates in adjustable restriction valve", page 23.

Renewing the battery

1 Turn off the instrument with the "ON-OFF" button.

2 Turn the control knob to "RESET".

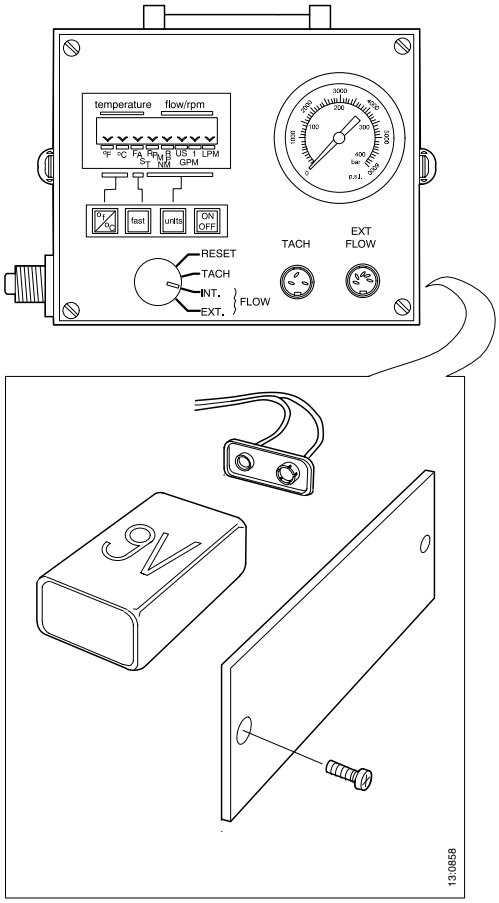
3 Remove the cover from the right-hand side of the instrument. Remove the battery and fit a new one.

4 To save space, slide the leads through the opening on the inner side of the instrument before putting the battery in place.

5 Fit the cover.

6 Turn the control knob to "INT" and press the "ON-OFF" button.

The values should now be displayed.



Oil strainers in flow meter

Test

1 Make sure the adjustable restriction valve is open and the adjustable pressure limiting valve is closed.

2 Blow compressed air through the pressure limiting valve with the flow meter connected to the measuring instrument.

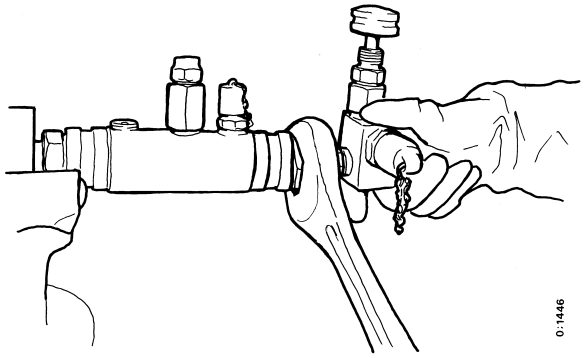
3 Press the "ON-OFF" button. Turn the control knob to "INT".

Note: Do not over rev the turbine

4 Clean the oil strainers if the flow value is not displayed.

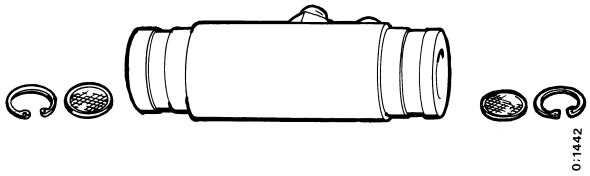
Cleaning the strainers

1 Remove the valves from the flow meter.



2 Remove the retaining rings and strainers.

3 Clean the strainers and refit them with the retaining rings.

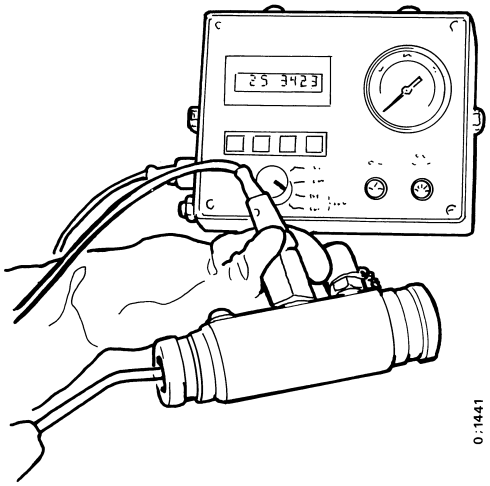


4 Connect the flow meter to the measuring instrument and press the "ON-OFF" button. Turn the control knob to "INT".

5 Blow compressed air through the flow meter to see whether any flow value is displayed.

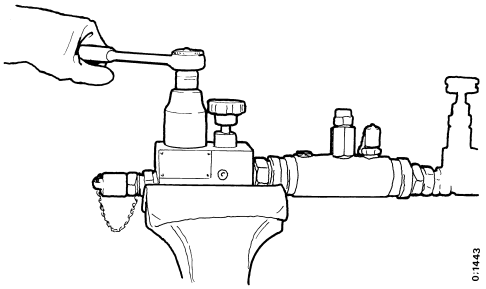
Note: Do not over rev the turbine.

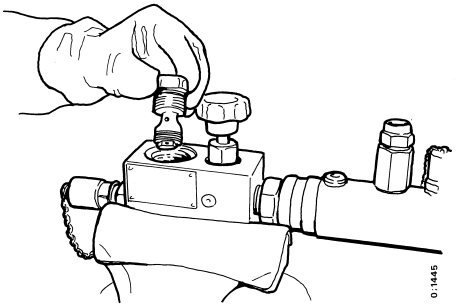
6 If the turbine is at fault, the flow meter and measuring instrument must be sent to Scania for repair.



Renewing burst plates in adjustable restriction valve

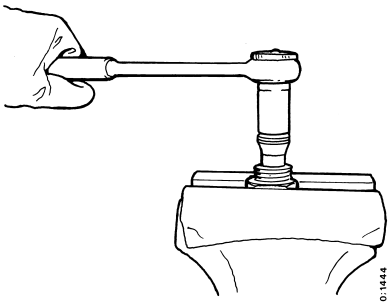
1 Place the adjustable restriction valve in a vice and remove the safety retainer.



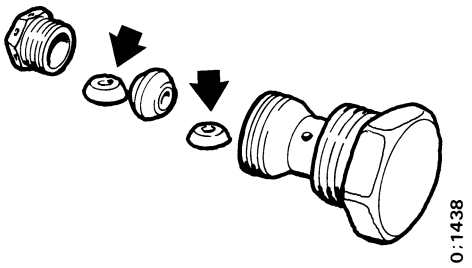


2 Remove the bottom plug from the safety retainer and take out the burst plates and support plate.

Note: Do not damage the teflon seals of the safety retainer.



3 Fit new burst plates to the support plate, assemble the safety retainer and tighten it to the valve housing.



Note: The burst plates are available in two different colours:

Yellow – for maximum 210 bar pressure

Green – for maximum 280 bar pressure

Both burst plates must have the same colour code.

Use the yellow ones for maximum 210 bar pressure when testing the power steering system.

4 Renew the gasket between the retainer and the valve housing if the safety retainer is leaking.

Data

	Measuring range	Accuracy
Operating pressure	0 - 180 bar [1)]	+ 7 bar
Flow/min	1,5 [2)] - 60 l	+/- 0.1 l at 2.0 - 10 l l % at 10 - 60 l
Temperature range	10 - 120 °C	+/- 1 °C
Exterior temperature while testing	- 10 °C to + 45 °C	

[1)] The adjustable pressure limiting valve opens at 180 bar. If the return hose of the valve is not connected to tank, the adjustable restriction valve burst plates will act as a safety valve and burst at 210 or 280 bar.

[2)] The instrument will indicate flow down to 1.0 l/min but the starting value is 1.5 l/min.