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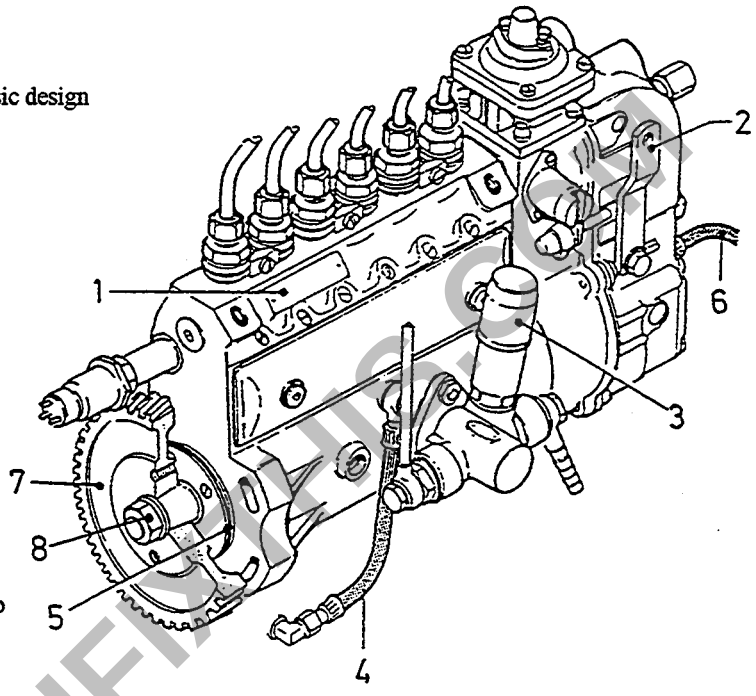
Bosch-A injection pump

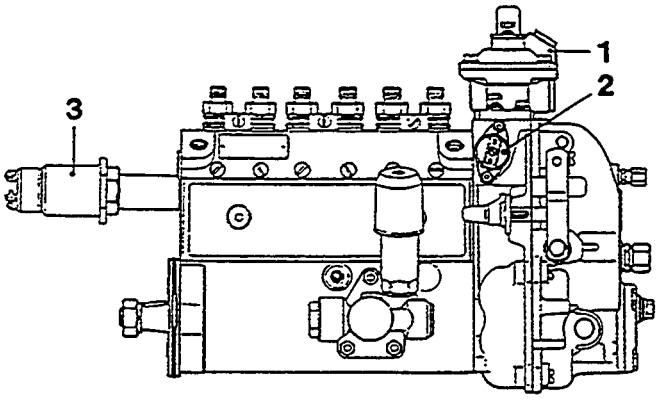
This injection pump is an inline pump; the basic design is the same for all engines.



1. Nameplate
2. Adjustment lever
3. Hand pump
4. Lubricating oil pipe to the injection pump
5. Sealing ring
6. Lubricating oil backflow to the engine
7. Gear

The injection pump is fixed to the timing gear housing by means of a flange and sealed by a sealing ring. The drive of the pump is by the crankshaft via intermediate gear and injection pump gear. The injection pump is connected to the lubrication pressure system of the engine by external pipes.

The fuel delivery pressure is produced in the piston pump fixed to one side of the injection pump. An eccentric drive on the camshaft of the injection pump drives this piston pump. The amount of fuel delivered by this pump excessively exceeds the amount used by the injection pump. The additionally delivered fuel is lead back to the fuel tank together with the leakage oil via the overflow valve. This additional fuel cools the injection pump and ventilates the fuel system.



Injection pump with charging pressure control

1. Charging pressure control
2. Solenoid coil for cold start
3. Switch-off solenoid

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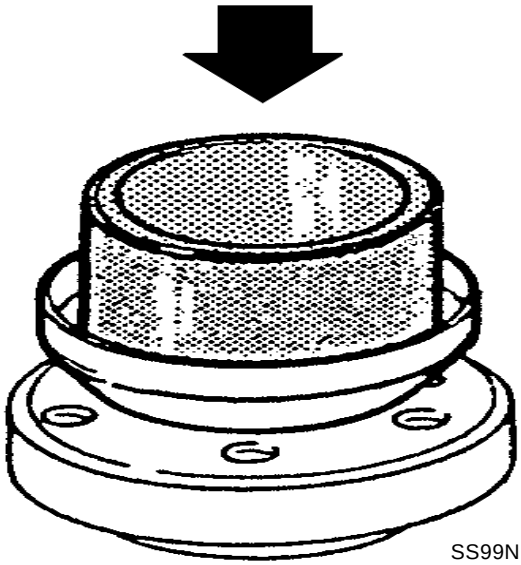
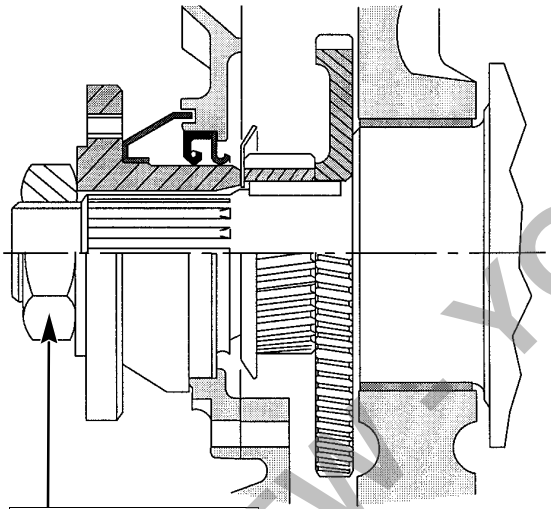


SS99N115

8. If it has been removed, re-fit the dust cap on the V-belt pulley hub on the crankshaft. To do so, use the 1TSW 519 pressing tool.



SS99N116

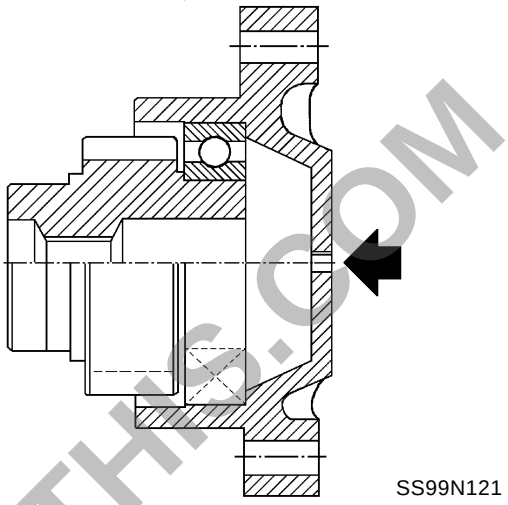
9. Oil both the seal and the sealing surfaces and fit the V-belt pulley together with the hub.

10. Apply a little oil to the thread on crankshaft nut. Tighten the nuts for engine types 320 and 420 to a torque of **600 Nm** and those for engine type 620 to a torque of **1000 Nm**.

11. Re-fit the other parts which have been removed.

D. Front power take-off / auxiliary drive

Engine types 320 and 420 (with the exception of 420.85) are equipped with a timing gearcase with auxiliary drive. The auxiliary drive is driven by the camshaft wheel and drives the hydraulic pump.



SS99N121

Use ball bearing grease (NLGI 2) for the hydraulic pump shaft grooves and coupling sleeve.

The auxiliary drive is fitted with an external lubrication tube.

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ABKÜRZUNGEN

ABST.	-	Abstellung
ARBSCH.B.BB	-	Arbeitsscheinwerfer bei Blinkbegrenzungsleuchte
ASR	-	Antischlupfregelung
ASW.	-	Arbeitsscheinwerfer
AT	-	Außentaster
AUSST.-SCH.	-	ausstellbare Scheibe
AUSS.	-	außen
BC	-	Bordcomputer
BEL.	-	Beleuchtung
DA	-	Dach
DIFF.	-	Differentialsperre
EL.	-	elektrisch
EL.WKZ.	-	elektrische Werkzeugbetätigung
ERS.SCHEINW.	-	Ersatzscheinwerfer
ESW.SCHEINW.	-	Ersatzscheinwerfer
FHW	-	Fronthubwerk
FL.	-	flach
GE	-	gelb
GEBL.ST.	-	Gebläsestufe
GER.TR. (GT)	-	Geräteträger
GETR.	-	Getriebe
GN	-	grün
HEBEL.(HEB.)	-	Hebelschalter
HI.	-	hinten
HIGH	-	schnell
HY	-	hydraulisch
HZG	-	Heizung
HZSP.	-	Heizspiegel
HZSCH.	-	Heizscheibe
IND	-	induktiv
INN.	-	innen
INNENL.	-	Innenleuchte
INSTR.	-	Instrument
KO. (KONTR.)	-	Kontrolle
KONTAKTBR.	-	Kontaktbrücke
LI.	-	links
LOW	-	langsam
LTG.	-	Leitung
LSTGS.DO.	-	Leistungssteckdose
MANAG.	-	Management
MGV.	-	Magnetventil
MOT.	-	Motor
N/E	-	Normal/Economy
OB	-	obere
POT.(z.B.15)	-	Potential
POTI (POT.)	-	Potentiometer
PTO	-	Zapfwelle (englisch)
RE.	-	rechts
REL.	-	Relais
RES.	-	Reserve
RD.	-	rund
RU.	-	Rumpf
SCH.	-	Schalter
SCH.KO.	-	Schaltkontakt
SCHR.	-	Schraubanschluß / Verteiler
SICH.	-	Sicherung
SP.	-	Sperre
SPGS.-TREIBER	-	Spannungstreiber
ST.	-	Stufe
STV.	-	Steckverbindung
SW	-	Schwimmstellung od. Scheinwerfer
UMSCH. F/H	-	Umschalter Front/Heck
VERS.	-	Versorgung
VERT.	-	Verteiler
VO	-	vorne
WA.	-	Waschen
WI.	-	Wischer
ZSG.EW	-	Zusatzsteuergerät einfachwirkend
ZSG.DW	-	Zusatzsteuergerät doppeltwirkend

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Electrical equipment:

A13	PCB roof electrics
A88	Gearbox electrics box
P6	Display gearbox power-shift, f/b
S11/	Multi Controller
/9	Switch power-shift high
/10	Switch power-shift low
X2/13	Plug connection round, instrument additional roof
X2/16	Plug connection round, supply roof frame
X3/15	Plug connection round, body, right diagnostics
X6/2	Plug connection round, roof frame
X6/5	Plug connection round, instrument additional body, right
X6/32	Plug connection round, body, right Multi Controller
X31/2	Plug connection round, body, right gearbox
X55/2	Distributor gearbox potentials
Y21	Solenoid valve power-shift
Y22	Solenoid valve power-shift
Y23	Solenoid valve power-shift
Y24	Solenoid valve power-shift
Y25	Solenoid valve power-shift
Y26	Solenoid valve driving direction forwards
Y27	Solenoid valve driving direction backwards

Ground points:

17	Mudguard, back

Sections:

A	Gearbox power-shift
B	Gearbox f/b solenoids
C	Gearbox display
D	Gearbox diagnostics

Line colour code according to N05449

A	red	H	orange
B	beige	K	light blue
C	white	L	brown
D	yellow	M	Ground strap
E	grey	N	pink
F	green	P	colourless
G	violet	S	black

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Page 7/37:

Equipement électrique:

A12	Carte imprimée équipement électrique central
A14	Carte imprimée équipement électrique moteur
D1/1	Groupe de diodes chauffage du filtre
E32	Chauffage filtre de carburant
F10	Fusible 15 toit, chargeur frontal
F15	Fusible chargeur frontal
F20	Fusible réserve potentiel 30
F27	Fusible potentiel 15, réserve moteur
F43	Fusible chauffage du filtre
K4/1/1	Relais temporisé réserve
K5/22	Relais central carte imprimée de réserve
K5/24	Relais chargeur frontal
K5/37	Relais central carte imprimée de réserve
K5/39	Relais chauffage du filtre de carburant
S26	Contact de commutation chauffage du filtre de carburant
X1/3	Connecteur à fiches plat, chargeur frontal
X6/9	Connecteur à fiches rond, câble du corps droit
X9/7	Connecteur à fiches rond, corps de moteur gauche
X9/14	Connecteur à fiches rond, câble moteur
X9/15	Connecteur à fiches rond, câble moteur
X9/25	Connecteur à fiches rond, câble corps, gauche
X12/1	Connecteur à fiches rond, câble instruments
X12/2	Connecteur à fiches rond, câble instruments
X12/7	Connecteur à fiches rond, câble corps, côté droit
X15/6	Connecteur à fiches rond, câble corps, côté droit
X15/8	Connecteur à fiches rond, câble alimentation toit
X31/1	Connecteur à fiches rond, instruments moteur

Points de masse:

5	Compartiment moteur

Denomination des sections:

A	Chauffage du filtre de carburant
B	Carte imprimée centrale de réserve
C	Préparation chargeur frontal

Identification des lignes suivantes

A	rouge	H	orange
B	beige	K	bleu clair
C	blanc	L	marron
D	jaune	M	Band de mise à la masse
E	gris	N	rose
F	vert	P	sans coleur
G	violet	S	noir

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Electrical equipment

A12	Print, central electrics
F17	Fuse, reserve potential 30 for on-board computer
F20	Fuse, potential 15, socket
F22	Fuse, power socket
F28	Fuse, reserve potential 15 for on-board computer
X1/6	Plug-in connection, flat, engine cable
X2/4	Plug-in connection, potential 15 socket
X2/9	Plug-in connection, potential 15 socket
X10	Plug-in connection, 7-pole, trailer
X10/3	Plug-in connection, on-board computer provision
X14	Flat power socket
X14/1	Plug-in connection, cable chassis, left
X14/2	Plug-in connection, instrument cable
X24/2	Plug-in connection, cable, chassis, right

Grounding point

15	Instrument panel sockets
17	Rear mudguard

Designation of Sections

A	Trailer socket
B	Provision for on-board computer
C	Power socket 40A

Cable colour or coding in accordance with standard 05449

Ident. letter	Colour	Type of use
A	Red	+30 (potential 30) = Cont. current
B	Beige	-- Control line (ground)
C	White	+ Control line (positive)
D	Yellow	+ 15 Si (Potential 15 safety)
E	Grey	Potential 58 Lighting cable
F	Green	Signal cable
G	Violet	+ 15 (potential 15.1 or 15.2) Switched current after the pre-glow switch
H	Orange	VDC, stabilised by the 'E' Box
K	Light blue	D+
L	Brown	Ground via a box
N	Pink	Spare
P	Colourless	Spare
S	Black	Ground, directly to a grounding point

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Index for Circuit Diagram

9105 – 9145
CS100 – CS150

Title	**Page** (e.g. 1) **Section** (e.g. A)	Title	**Page** (e.g. 1) **Section** (e.g. A)
40A power socket	23C	Front sidelights	8C
4-WD	6B	Front twinpower roof worklight	12C
4-WD management, Optistop	5B	Front washer pump	21D
Air conditioning system for high-top	19A	Fuel pump control	3A
Air-sprung seat	28D	Gearbox diagnosis	36D
Automatic pre-glowing	2B	Gearbox display Gearbox electronics box supply	36C/37C
Auxiliary headlight	10A	Gearbox forward / reverse solenoid valve	36B
Auxiliary headlight for low-top	11A	Gearbox power-shift	36A
Brake light	5A	Gearbox sensors	38B
Cigarette lighter	28B	Headlights	10B
Clock	17B	Heated rear window	17D
Combination instrument	25 - 27A	Heated windscreen	17C
Differential lock	6C	Horn	21A
Differential lock management	5C	Interior light	14F
Dipped/Main beam changeover	10C	Interior light for low-top	18C
Door contact switch	14D	Italy brake valve	24B
Double-action auxiliary valve with floating position and interlock block	29B/30B	Mirror heating	16A
ECCU supply	40B	Mobile socket	28B
EHR box supply, 30 and 15/1	31A	Number plate lighting on roof	13B/14C
EHR diagnostics display	35A	On-board computer preparation	23B
EHR external pushbutton	32D	Opti-Stop	5B
EHR lift/pressure changeover switch	34F	Parallel wiper	21C
EHR lighting, front panel	35J	Parallel wiper for low-top	22C
EHR lowering speed	35D	Power supply	1A
EHR mixed control	35E	Power supply with battery main switch	2A
EHR position sensors	31C	Pre-glowing with pushbutton	1B
EHR power sensors	31B	Radio preparation	17A
EHR preparation, external sensors	31E	Radio preparation for low-top	18A
EHR quick-drop	33C	Rear outer roof worklight	12A
EHR Raise/Lower indicator	35C	Rear PTO shaft	39A
EHR Raise/Lower solenoid valve	31D	Rear sidelights	8D
EHR Raise/Lower switch	32C	Rear washer pump	21E
EHR setpoint	33D	Reserves – central print	7B
EHR slip indicator	35B	Reserves – engine print	14B
EHR stop	33E	Reserves – roof print	16D/24C
EHR traction control	35H / 32A	Roof blower motor	20A
EHR Transport/Control	33A/B	Rotating beacon	16B
EHR upper limit	35F	Safety switch	28C
Engine cut-off	4B	Spot	16C
Entrance light	14E	Sprung front axle	40A
External pushbutton, front hitch	30D	Standard front wiper	21F
Floor-level heating	15C	Standard rear wiper	21G
Front PTO shaft	39B	Standard signal socket	32B

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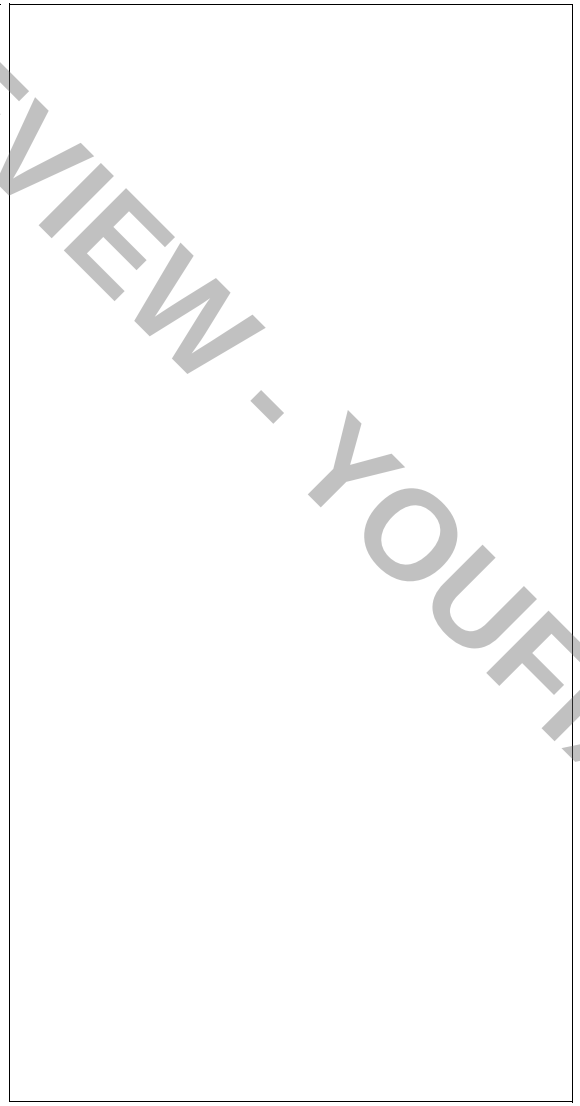
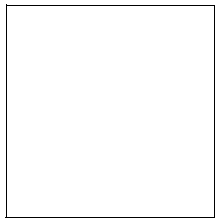
Electrical equipment

A16	Print, EHR operating console
A55	Control unit, EHR D
E44	Lighting, upper limit potentiometer
E45	Lighting, mixing potentiometer
E46	Lighting, potentiometer, lowering speed
E50	Lighting, diagnosis front panel
H2/1	Diagnosis display
H2/2	Traction control display
H2/3	Raise display
H2/4	Lower display
R5/1	Resistor, 261 ohms
R6/2	Upper limit potentiometer
R6/3	Mixed control potentiometer
R6/4	Lowering speed potentiometer
S2/73	Switch, traction control
X2/6	Plug-in connection, round, switch lighting
X3/16	Plug-in connection, round, potentiometer, lowering speed
X3/17	Plug-in connection, round, potentiometer, limit
X3/18	Plug-in connection, round, potentiometer, mixed control
X4/2	Plug-in connection, round, diagnosis/ traction control
X4/3	Plug-in connection, round, Raise/Lower
X5/2	Plug-in connection, round, auxiliary switch
X5/3	Plug-in connection, round, switch, traction control
X24/31	Plug-in connection, flat, EHR print
X55	Plug-in connection, flat, EHR box cable





Grounding point

Designation of Sections

A	EHR diagnostics display
B	EHR – slip indicator
C	EHR raise/lower display
D	EHR lowering speed
E	EHR mixed control
F	EHR, upper limit
H	EHR traction control
J	EHR lighting, front panel

Cable colour or coding in accordance with standard 05449

Ident. letter	Colour	Type of use
A	Red	+30 (potential 30) = Cont. current
B	Beige	-- Control line (ground)
C	White	+ Control line (positive)
D	Yellow	+ 15 Si (Potential 15 safety)
E	Grey	Potential 58 Lighting cable
F	Green	Signal cable
G	Violet	+ 15 (potential 15.1 or 15.2) switched current after the starter switch
H	Orange	VDC, stabilised, from the 'E' Box
K	Light blue	D+
L	Brown	Ground via a box
M		Grounding strip
N	Pink	Spare
P	Colourless	Spare
S	Black	Ground, directly to a grounding point

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Inhalt der Bereiche / *Index of sections*

Bereich *Section*	**Beschreibung**	***Description***	***Seite*** *Page*
A	Achsbeschreibung Spezifikation	Description - axle *Specifications and features*	4
B	Bereichsansichten	*Section view*	6
C	Anzugsdrehmomente	*Torque settings*	10
D	Schmierung	*Lubrication*	12
E	Spezialwerkzeuge	*Special tools*	13
F	Demontage, Montage und Einstellungen	*Disassembling, reassembling and setting operations*	19

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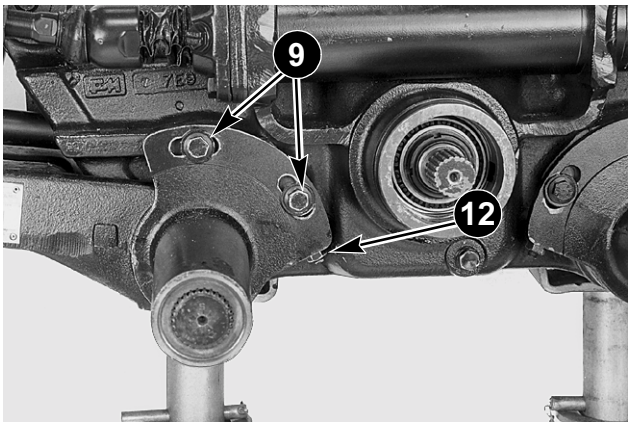
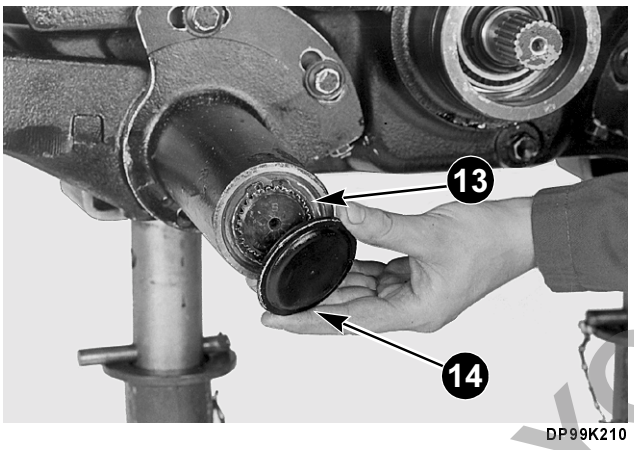
STEP 9



Tighten the locking nut (12) to a torque of 45 Nm. Tighten the securing screws (9) to a torque of 169 Nm.

STEP 10



Fit the circlip (13) and the cover (14) (both ends).

STEP 11

Repeat STEP 1 to STEP 10 to fit the other torsion bar.

STEP 12

Fit the 4-wheel axle in the reverse sequence to that used to remove it (see page 22).

STEP 13

Adjust the potentiometer and calibrate the axle. See "Adjusting the Potentiometer" and "Axle Calibration" in chapter 5 – FUNCTIONAL DESCRIPTION; ADJUSTMENTS AND TROUBLESHOOTING INDEPENDENTLY SUSPENDED FRONT AXLE.

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Fault analysis:

Mixing-up of electric connectors on the transmission

Certain sensors/solenoid valves/switches are arranged very close to each other on the transmission and have the same type of connector.

The mating connectors on the wiring loom cannot be arranged in such a way at these points that a mix-up can be completely ruled out.

The following consideration shows the effects of mixing up electric connectors.

1. Four-wheel solenoid valve and temperature sensor

- Four-wheel solenoid valve
- Temperature sensor
  Both elements with Jet-Tronic connectors
- Spacing: Approx. 55 mm

1.1 Four-wheel connector on temperature sensor in switch postion four-wheel "OFF"

- Four-wheel "OFF" --> 12 V voltage at temperature sensor
- Error code on display
- Electronic system switches transmission to "permanent neutral"
  The vehicle can no longer be driven!

1.2 Four-wheel connector on temperature sensor in switch postion four-wheel "ON"

- Four-wheel "ON" --> 0 V voltage at temperature sensor
- Error code on display: Temperature sensor defective
- Hard shifts

(5 V supply in electronics overloaded but short circuit proof.)

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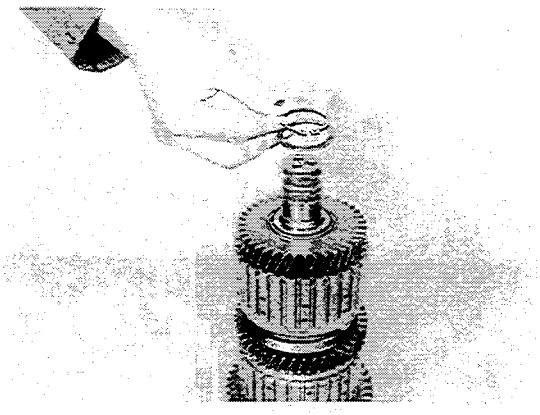
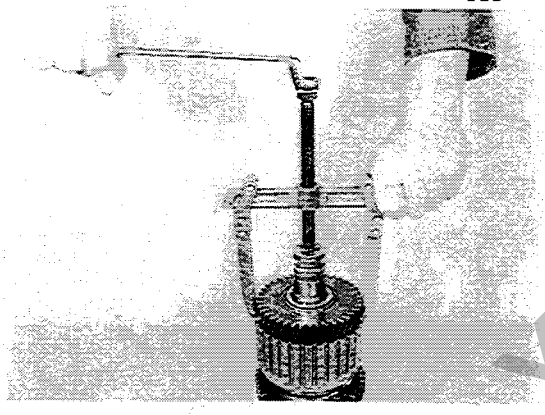
Squeeze circlip out again and remove shim.



113

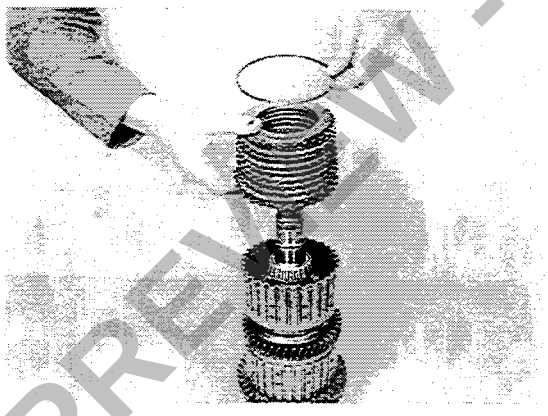
Pull spur gear from the output shaft.

(S) Two-leg puller



114

Introduce plate pack of Clutch D, starting with one outer plate.
Mount backing plate and introduce snap ring (optional).



115

NOTE :

In principle, the stacking of the outer and inner plates has to be carried out alternately.
The number of the plates has to be taken from the Spare-Parts List in question.

Now, determine plate clearance 3,8 ... 4,3 mm - Procedure see Figure 72 to Example "A" (Page 1.17) !

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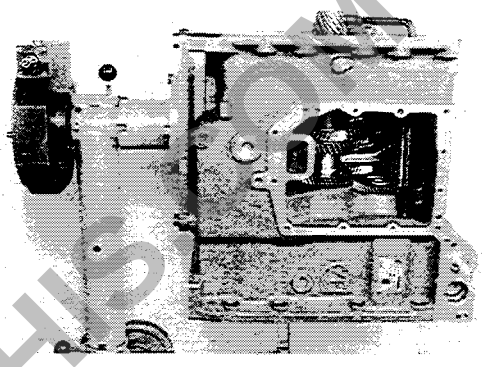
7. MAIN TRANSMISSION (6-Speed Synchronized transmission)

NOTE :

The separating of Main transmission and Powershift transmission is treated on Page 1.01 !
The removal of the remote control and the pump drive is treated on Page 5.01, resp. Page 6.01.



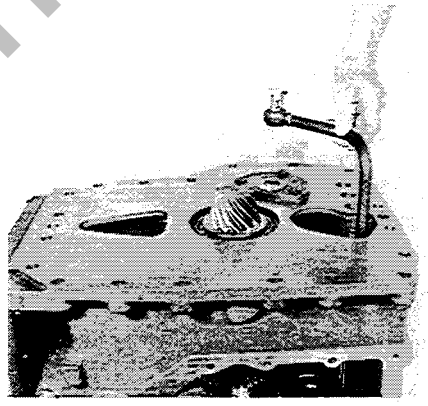
400

7.1 Disassembly

Fasten gearbox housing on the assembly car.

(S) Clamping support TSW 220

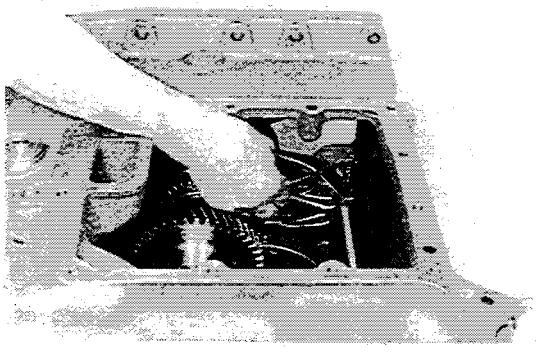
Loosen hollow screw and remove oil pipe.



401

7.1.1 Remove Shift control (mechanical part)

Loosen both straight pins on the shift fork (1st/2nd speed).



402

Remove detent block, composed of ball, spring and screw plug, see Arrow !

403

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Crown-wheel-adjustment

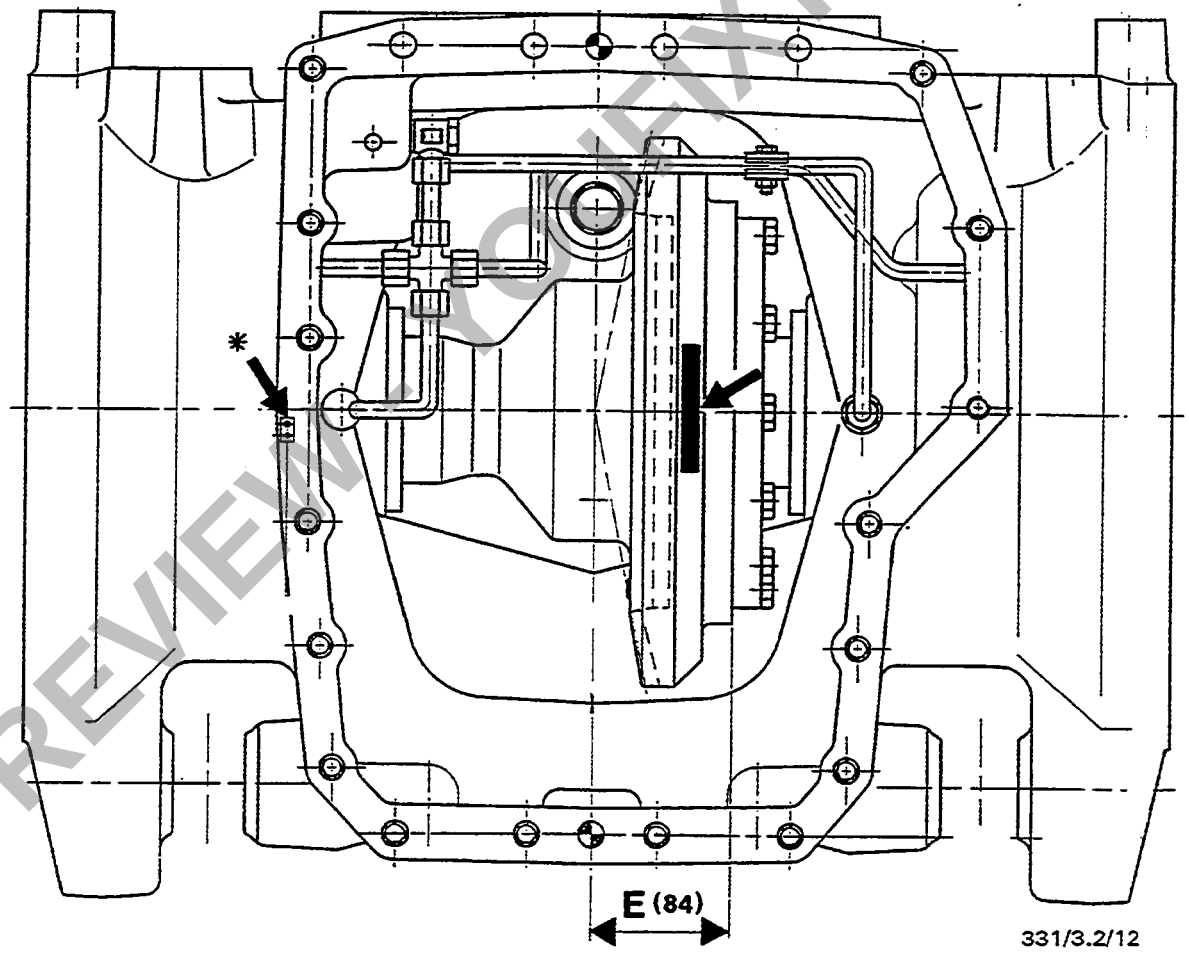
E=Nominal measure (theoretical installation measure) 84,00mm is punched into crown wheel.

K=Correction measure (difference from nominal measure) is written on to crown wheel. In case there is no correction measure, the nominal measure is valid.

T=The real installation measure (T) is the calculation result of nominal measure (E) and the actual correction measure (K). The calculated measure (T) must be adjusted within a tolerance of +/- 0,025mm.

Example: 84,00 (E) + 0,25 (K) = 84,25 +/- 0,025 (T)

Tooth backlash of crown wheel and pinion is marked on crown wheel.



* **Marking for choosing gasket**

If the measure from mid crown wheel to front mating surface is between 170,000 and 170,040 the mark on indicated place is a symbol with one circle.If the measure is between 169,960 and 170,000 the mark is a symbol with two circles.

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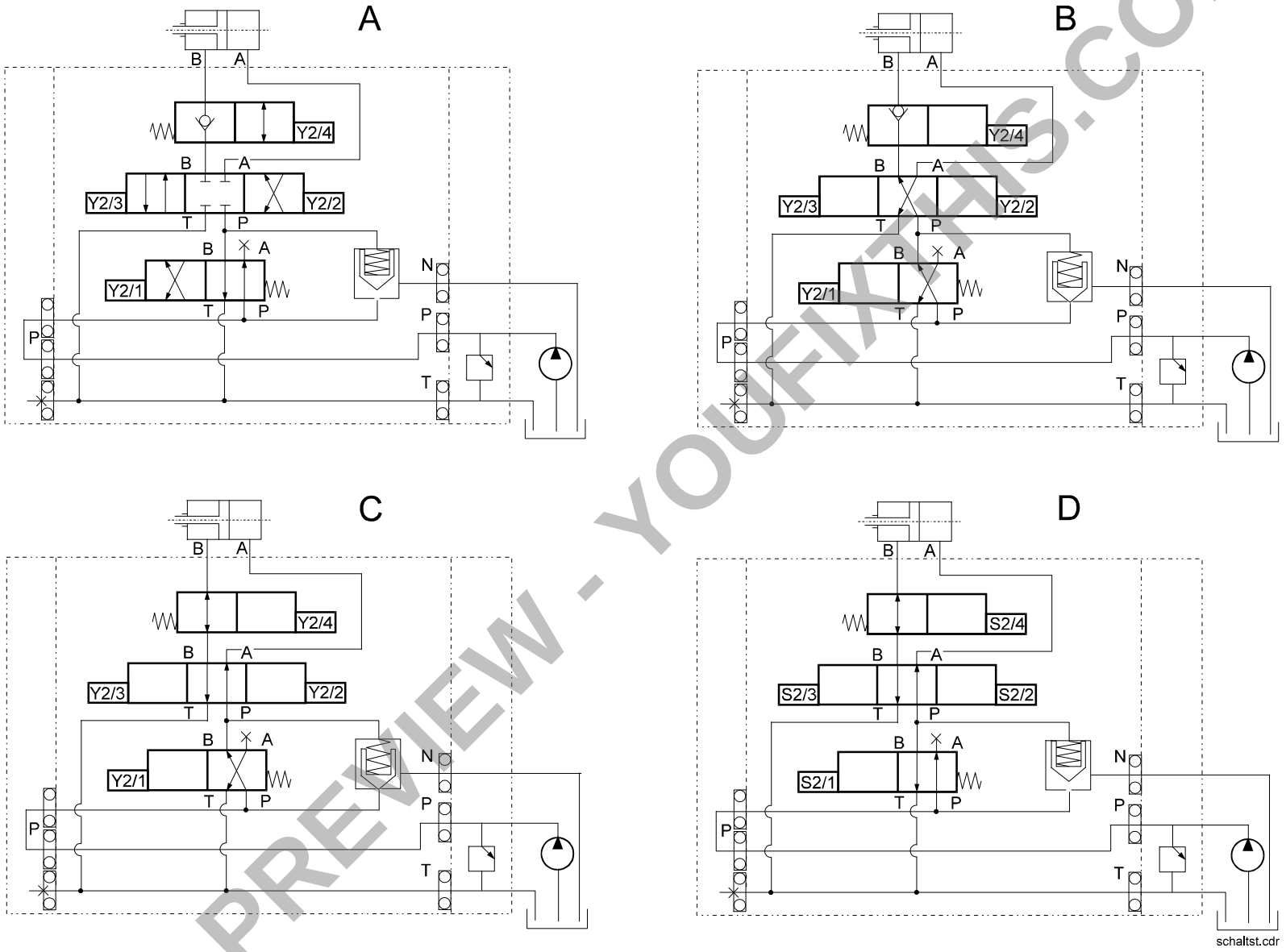

Hydraulics circuit diagram - control units

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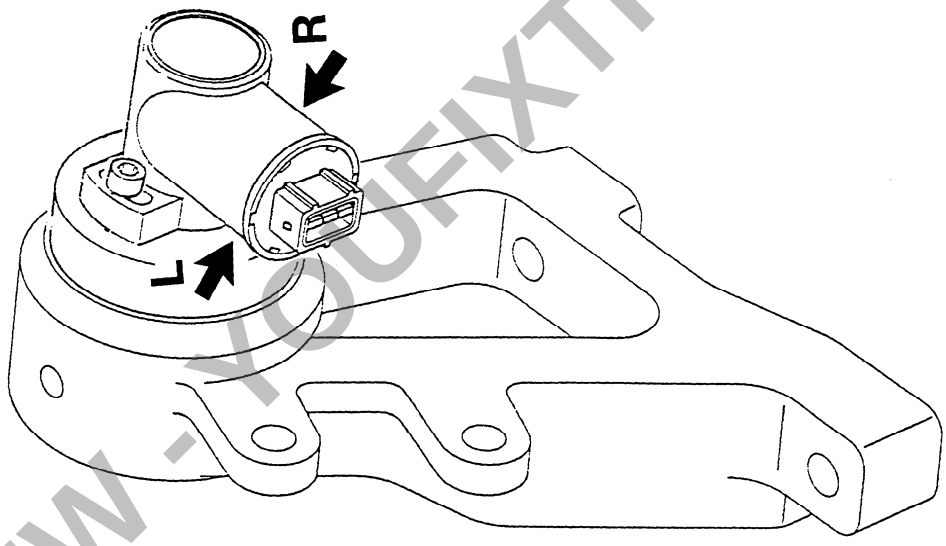

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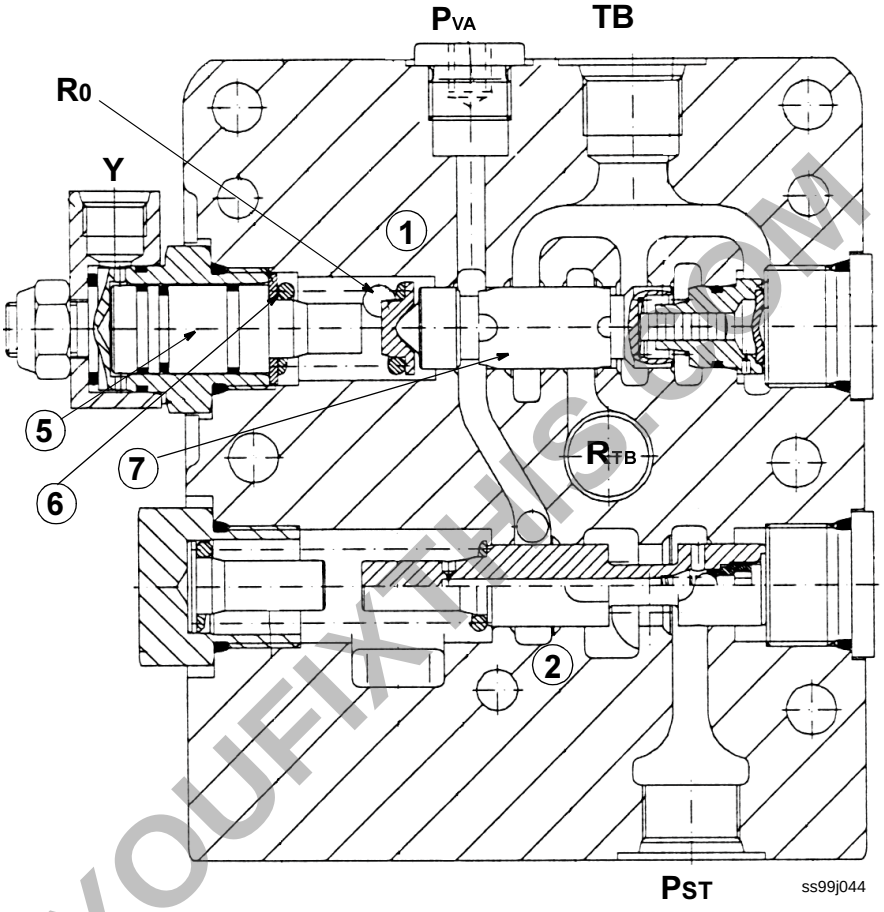
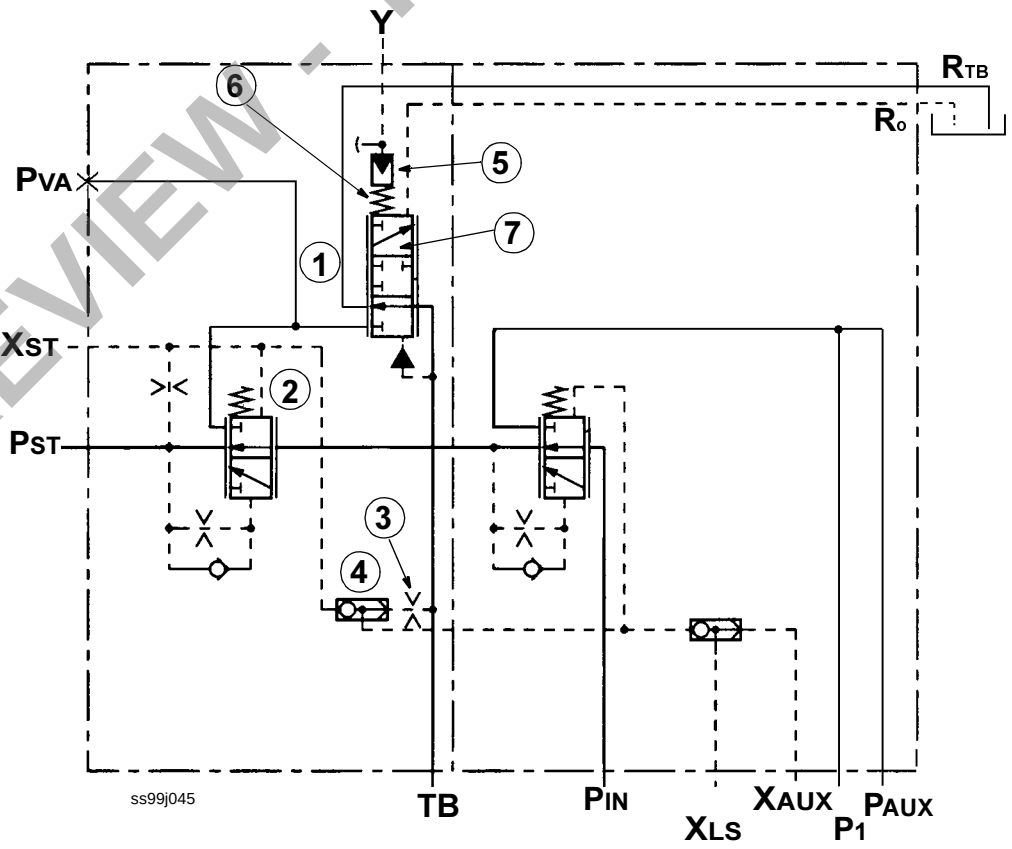
Priority Block LT43 / LT 44 / Circuit Diagram

P_{IN}	Input from the PFC pump
P_1	P connection, sprung front axle (LT44/ LT43)
P_{ST}	P connection, steering
P_{AUX}	P connection ACR / EHR
X_{AUX}	LS connection ACR / EHR
X_{LS}	LS connection, PFC pump controller
X_{ST}	LS connection, steering
TB	Hydraulic trailer brake connection (LT43)
TB	4-wheel brake connection (LT44)
P_{VA}	P connection LT03 (LT43)
Y	Connection, driving brake
R_{TB}	Return feed connection (tank)
R_0	Return feed connection (tank)





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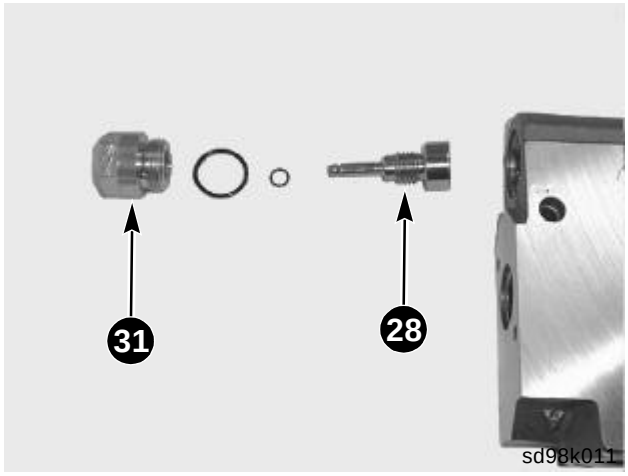
Assembly

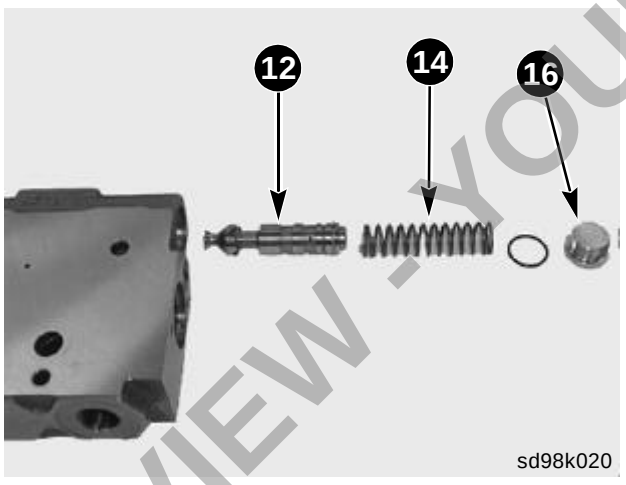
NOTE: *Clean all parts and the sealing ring and replace all worn or damaged parts. Oil all individual parts before assembly.*

STEP 8



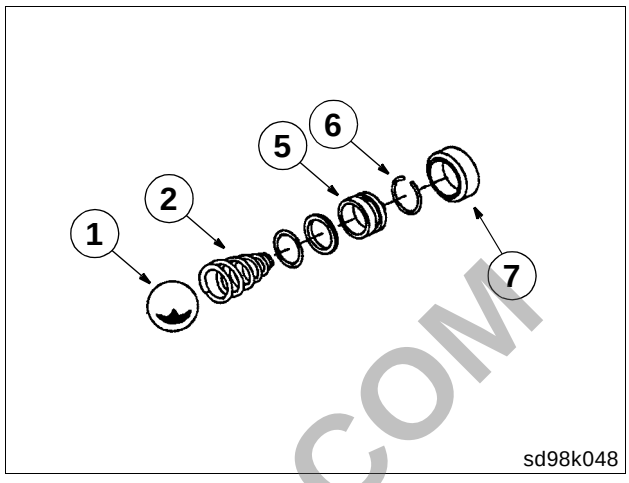
Fit the throttle screw (28) with the new o-ring into the locking screw (31). Fit the locking screw with the new o-ring into the control unit.

STEP 9



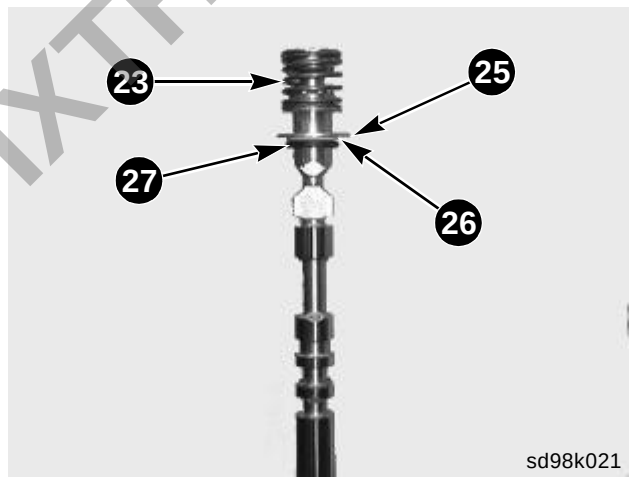
Insert the slide valve (12) and spring (14) into the control unit. Fit the locking screw (16) with the new o-ring and tighten to a torque of 67^{+22} Nm.

STEP 10



Fit the ball (1), spring (2) and stopper plug (5) with the new o-ring into the control unit. Attach the circlip (6) and the cap (7).

STEP 11



Slide the o-ring (27), thrust ring (26) and supporting plate (25) onto the control slider. Use the lokking screw (21) to fit the compression spring (23) and spring collars (22,24) onto the control slider. Tighten the locking screw (21) to a torque of $19^{+6.3}$ Nm.

NOTE:
Secure the locking screw with Loctite 243.

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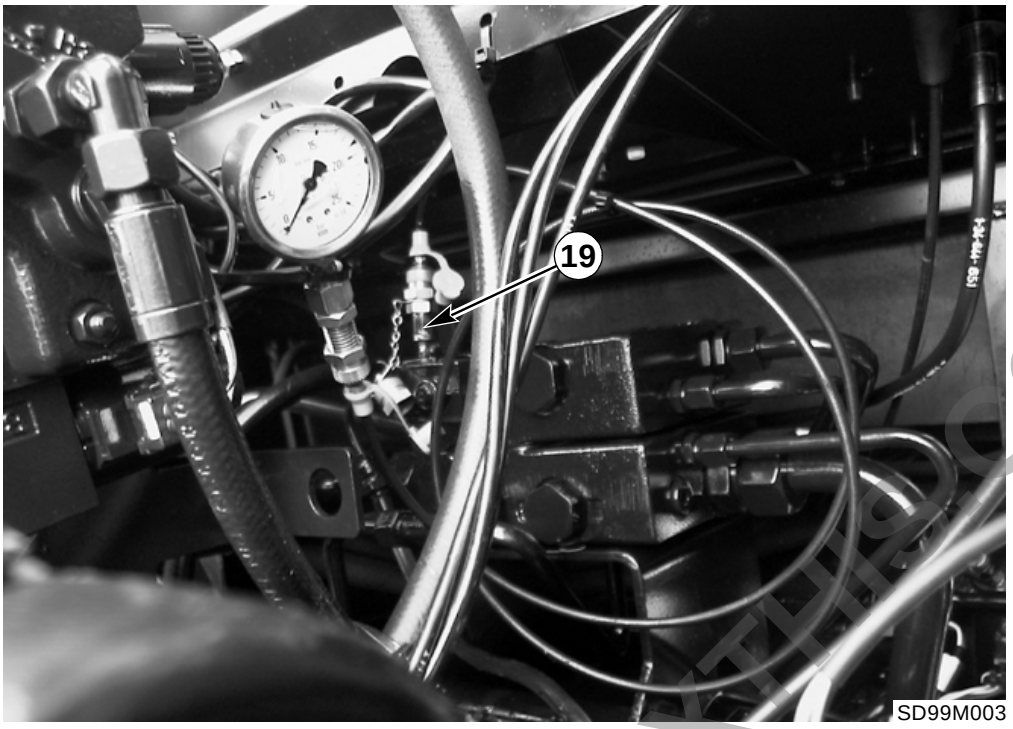
TEST – HADRAULIC TRAILER BRAKE



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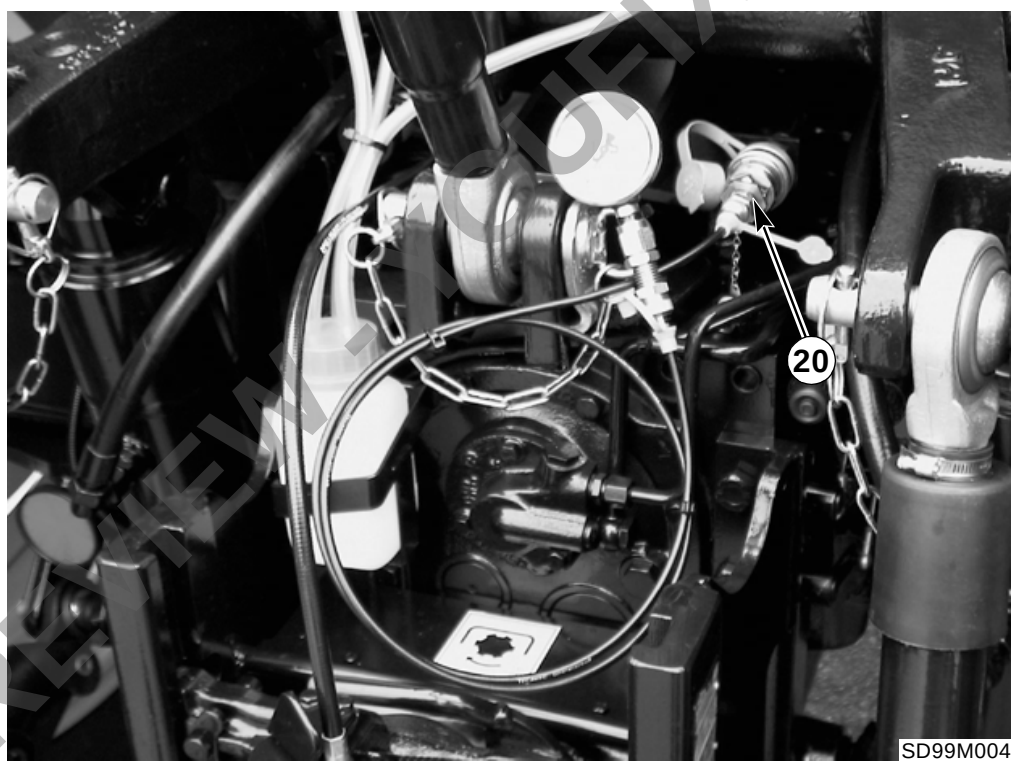

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Test connections

Connect the 25 bar pressure gauge 1TSW 5025 to measuring point 19.
To do this, remove the air-bleed nipple from priority block LT43 and fit the connector 1TSW 661, the mini-measuring connector 1TSW 639 and the mini-measuring line 1TSW 635 in its place.

Connect the 250 bar pressure gauge 1TSW 5250 to measuring point 20.
To do this, use the connection piece 180438030020, a reduction piece 1TSW 644, a mini-measuring connection 1TSW 639 and a mini-measuring line 1TSW 635.

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Gear box section – Power flow Forwards – Power-shift stage 1 - 6th gear, crawler gear shift in N position

– The engine torque is transferred to input shaft 4 via the vibration absorber with zero-loss. This is connected to drive shaft 1 via a profile, which can not turn in respect to it.
– Drive shaft 1 drives the left-hand gear wheel via the profile, which at the same time serves as disk carrier for the internal disks of clutch C.
– Clutch C is closed (engaged). Its external disks grip into the piston carrier which transfers the torque on to the external disk of clutch A.
– Clutch A is also engaged. Its internal disks reach into the disk carrier, which represents a mutual component with the I gear wheel to the right.
– The gear wheel meshes into the mating gear which is securely seated on drive shaft 2 to prevent it turning with respect to this.
– The sliding sleeve on the crawler gear shift is moved to the left, to the N position. A direct drive transfer occurs and drive shaft 2 drives the main clutch (driving clutch) via the gear shift parts of the clutch housing.
– The main clutch is engaged through the force of the belleville springs.
– Clutch shaft 5 is driven by the disk carrier, it is fitted in intermediate shaft 6 over a profile to prevent it turning with respect to this.
– The 6th gear is engaged. The synchro-member fitted against turning with intermediate shaft 6, drives the 6th gear via the loose wheel sliding sleeve. This meshes with the double gear wheel, which is fitted onto main shaft 7 so that it cannot turn with respect to it.
– The driving torque is transferred from the pinion to the rear axle.

4-wheel drive

– A drive gear is mounted at the front end of main shaft 7 to prevent turning. It drives the mating gear on the 4-wheel drive clutch. This is engaged through the force of the belleville springs and drives the front axle via 4-wheel shaft 8 and the universal drive shaft.

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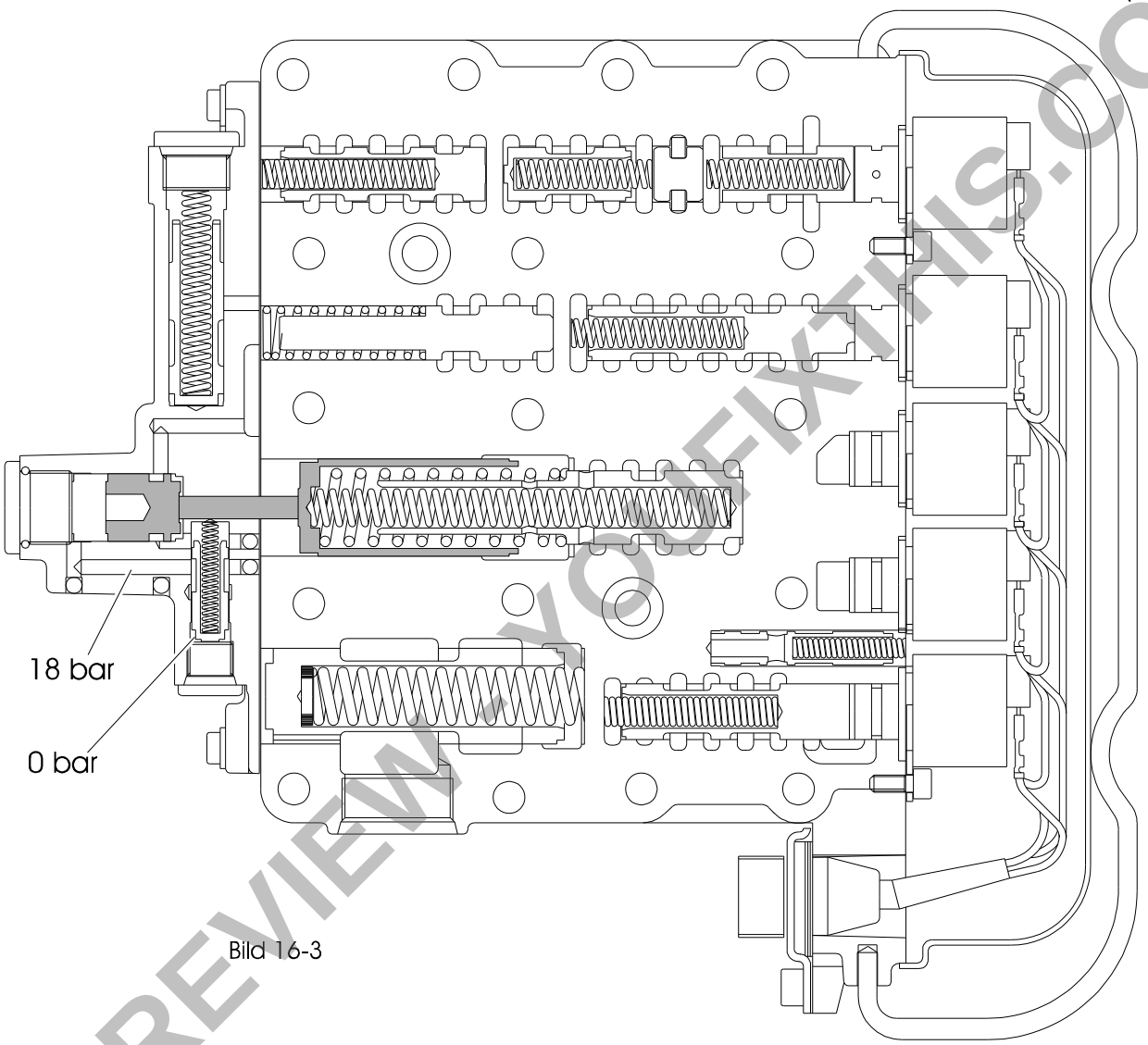

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INSTALLATION POSITION OF THE MAIN CLUTCH

1	Vibration damper	13	6th and 5th gear synchronizer
2	Intermediate housing	14	Countershaft
3	Input shaft	15	PTO shaft drive
4	Power-shift group	16	2nd and 1st gear synchronizer
5	Clutch "C“	17	Main shaft
6	Clutch "A“	18	Front axle drive
7	Crawling gear group	19	Crawling gear drive
8	Crawling gear group synchronizer	20	Clutch "F“
9	Drive clutch	21	Clutch "G“
10	6-speed main transmission (counter and main shafts)	22	Clutch "D“
11	Spur wheel for hydraulic pump drive	23	Clutch "B“
12	4th and 3rd gear synchronizer		

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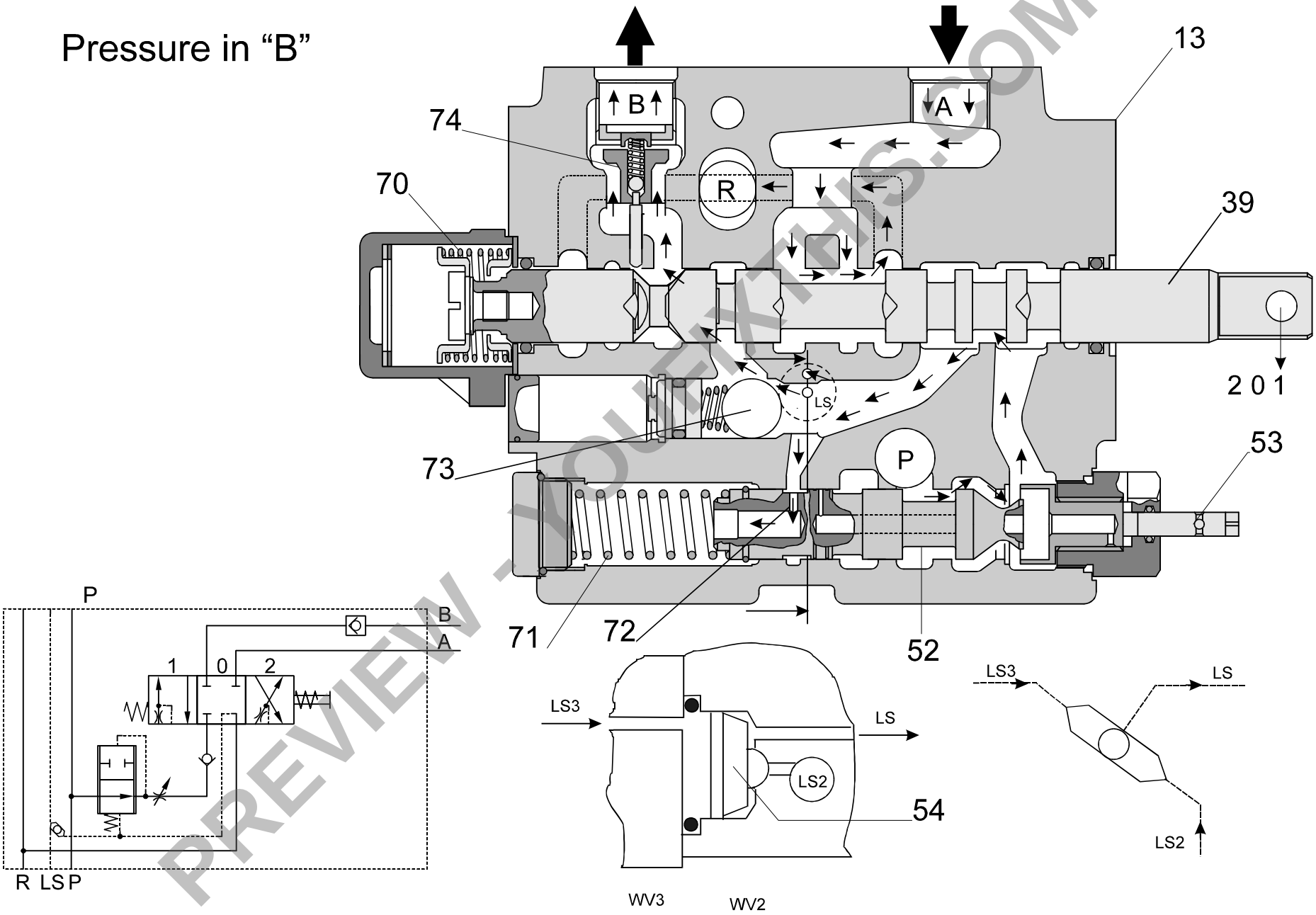
Pressure in “B”



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