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YOUR CONCESSIONARY

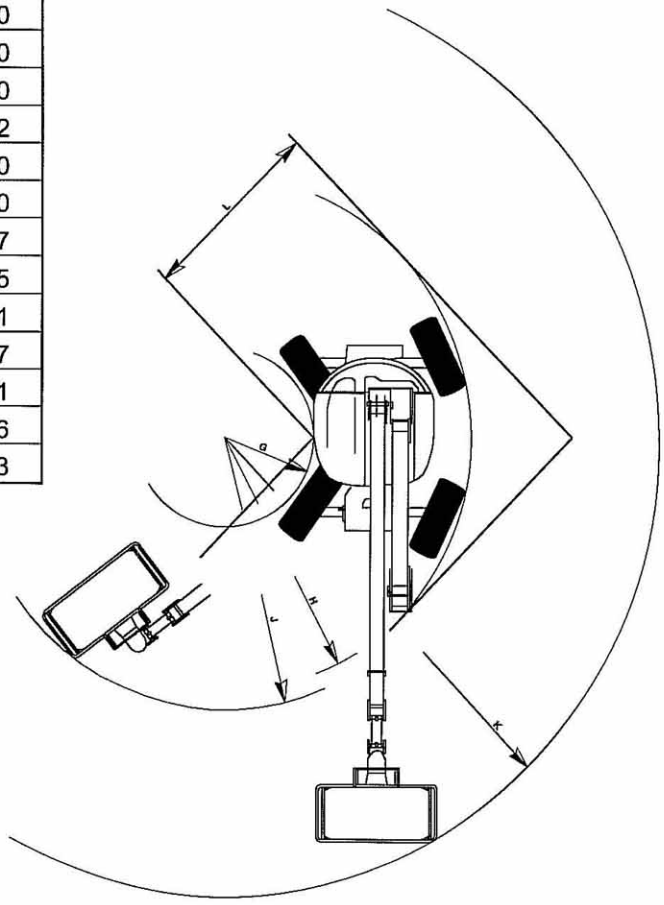
REF : 547 343 EN (01 / 02)

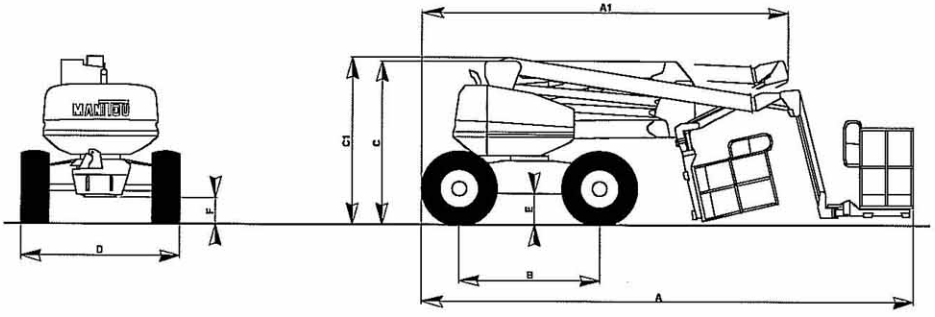
ACCESS PLATFORM 165 ATJ

REPAIRS MANUAL

DIMENSIONS 165 ATJ

	165 ATJ
A	7310
A1	5450
B	2100
C	2342
C1	2380
D	2360
E	447
F	375
G	1321
H	3667
J	3841
K	6476
L	2733





Contents

Basic engine data 11A

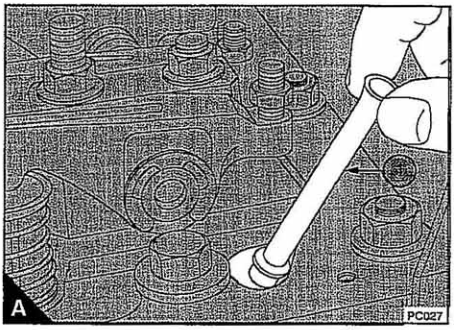
7 Release the lock nut for the adjustment screw on each rocker lever. Set the adjustment screws to the fully out position.

8 Rotate the crankshaft in the normal direction of rotation until the camshaft is in a position where the inlet valve of any cylinder has just opened and the exhaust valve of the same cylinder has not closed completely. All of the tappets will now be close to their lowest position. This will enable the push rods to be fitted more easily.

9 Fit the push rods (A1) correctly in the sockets of the tappets. Set the adjustment screw in the rocker lever to just contact the socket in the push rod.

10 Set the valve tip clearances, see operation 12A-05.

11 Lubricate thoroughly the rocker shaft assembly, the valves and the push rods with clean engine lubricating oil.



Engines which use cylinder head gasket, part number 3681E028

Caution: *The gasket must be clean and free from scratches or other damage.*

The gasket must not be used if:

- there is a scratch or other damage on the gasket
- debris is on the outer surfaces or has entered between the layers of the gasket.

Warning: *Methyl Ethyl Ketone (MEK), also known as Butanone, is very flammable. Its storage and use must be in accordance with the manufacturers instructions. The vapour from MEK is toxic, therefore ensure that the work area has good ventilation. Protect your hands with gloves suitable for solvents. Wear eye protection.*

Caution: *The new laminated gasket, the bottom face of the cylinder head and the top face of the cylinder block must be completely clean and free of scratches or other damage. If the faces are dirty or damaged, the gasket will not seal correctly.*

1 Clean thoroughly the bottom face of the cylinder head and the top face of the cylinder block. Methyl Ethyl Ketone (MEK) can be used to clean these faces, but it will not remove hard carbon. Hard carbon can be removed with a hard plastic or hard wood scraper. Ensure that the top face of the cylinder block and the bottom face of the cylinder head are free from scratches or other damage.

2 Check that the threaded holes in the cylinder block for the cylinder head setscrews and the studs, if they were removed, are clean and in good condition. Ensure that there is no debris, coolant or oil in the cylinder bores or in the threaded holes for the cylinder head setscrews and studs.

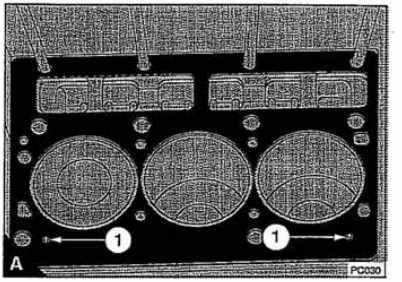
Note: Two location pins (A1) are pressed into the cylinder block to ensure the correct location of the cylinder head gasket and the cylinder head.

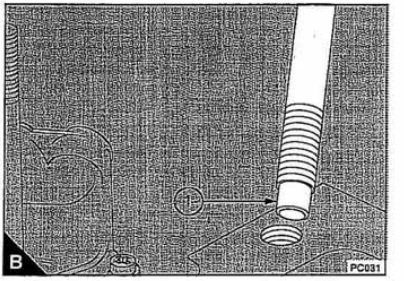
Cautions:

- *Ensure that the location pins are pressed into the cylinder block.*
- *The cylinder head gasket must be fitted without jointing compound.*

3 Ensure that the threads of the studs are clean and in good condition. If the studs were removed earlier, fit the four studs in the cylinder block. The studs are fitted with the non-threaded area (B1) at the end of the stud in the cylinder block. Tighten the studs to 25 Nm (18 lbf ft) 2,5 kgf m.

Continued





Cylinder head

To inspect and to correct **12A-12**

1 Remove the cylinder head assembly, operation 12A-07.

2 Inspect the cylinder head for signs of gas or coolant leakage.

3 Remove the valve springs and the valves, operation 12A-08.

4 Clean the face of the cylinder head and the passages for coolant and for lubricating oil. The water jacket can be cleaned with a special solvent which must be used in accordance with the manufacturer's instructions.

5 Test the cylinder head for leaks at the pressure given in data and dimensions at the end of the section.

6 When the cylinder head is thoroughly clean, check it for cracks. Check carefully the areas around the valve seats and around the holes for the atomiser nozzles.

7 The bottom face of the cylinder head can be machined if: there is distortion; there are deep scratches; the valve depths are below the service limit.

8 Use a straight edge and feeler gauges to check the cylinder head for distortion across and along its bottom face, see data and dimensions at the end of this section. If the distortion is more than the limit given in data and dimensions, the bottom face can be machined.

Cautions:

- *Remove only the minimum material and then not more than 0,40 mm (0.016 in).*
- *The nozzle protrusion must be 1,61/2,13 mm (0.063/0.084 in) when measured with the nozzle seat washer fitted, after the cylinder head has been machined.*
- *After the cylinder head has been machined the valve seats must be corrected to give the correct valve head depth. It is better to work to the minimum limit to allow for later wear.*
- *If a new valve seat insert is to be fitted, the back face must be surface ground to ensure that there is no protrusion above the bottom face of the cylinder head, see operation 12A-14.*

9 Check the valve seats for wear and for damage.

10 Before any work is done on the valve seats, new valve guides must be fitted, operation 12A-11.

11 Where there is little damage, the valve and valve seat can be lapped. When the valve seats are lapped keep the seat as narrow as possible and ensure that all the compound used to lap the valve and the seat is removed.

12 More badly damaged valve seats can be corrected by use of the cutter tool, operation 12A-13, or new inserts can be fitted to the inlet valves, operation 12A-14.

Piston and connecting rod assembly

To remove and to fit **13A-03**

To remove

Caution:

- *Ensure that the bolts for the connecting rod do not damage the crank pin when the connecting rod is removed or fitted. If necessary, fit a temporary plastic sleeve to the big end bolts.*

1 Drain the lubricating oil and the cooling system.

2 Remove the cylinder head assembly, operation 12A-07.

3 Remove all carbon from the top of the bores of the cylinder liners.

4 Remove the lubricating oil sump, operation 19A-03.

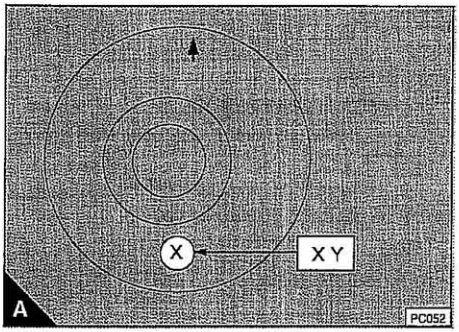
5 Remove the lubricating oil strainer and suction pipe, operation 19A-04.

6 Check the height of the piston above the top face of the cylinder block, see operation 13A-03A. Make a note of the piston grade letter (A).

6 Remove the big end caps and the big end bearings from the connecting rods, operation 13A-01.

7 Push the piston and the connecting rod out through the top of the cylinder. Keep the bearings and caps together to ensure that they can be fitted in their original positions.

8 Inspect the crank pins for damage.



Gudgeon pins

Type	Fully floating
Outside diameter	31,745/31,750 mm (1.2498/1.2500 in)
Clearance fit in piston boss	0,003/0,014 mm (0.0001/0.0006 in)

Small end bushes

Type	Steel back, lead bronze face
Outside diameter	35,014/35,052 mm (1.3785/1.3800 in)
Inside diameter (reamed)	31,763/31,788 mm (1.2505/1.2515 in)
Clearance fit on gudgeon pin	0,013/0,043 mm (0.0005/0.0017 in)

Connecting rod bearings

Type	Steel back, aluminium tin face
Inside diameter	57,188/57,214 mm (2.2515/2.2525 in)
Clearance on big end	0,058/0,104 mm (0.0023/0.0041 in)
Thickness at centre of bearings	1,816/1,823 mm (0.0715/0.0718 in)
Available undersizes bearings	- 0,25 mm (0.010 in)
	- 0,51 mm (0.020 in)
	- 0,76 mm (0.030 in)

To fit

Caution: *Some shell bearings do not have a hole in the bearing. These shell bearings must only be fitted in the main bearing cap. If this type of shell bearing is fitted to the cylinder block, the bearing will not receive lubricating oil and the bearing and the crankshaft journal will be damaged.*

1 Clean the upper half of the shell bearing and lubricate the bearing surface with clean engine lubricating oil.

2 Fit the plain end of the upper half of the bearing between the crankshaft journal and the side of the cylinder block which has the recess for the location tag. Slide the bearing into position until the tag on the bearing is fitted correctly in its recess in the cylinder block.

3 Clean the lower half of the bearing and the bearing cap, lubricate the bearing surface with clean engine lubricating oil.

4 Fit the bearing into the cap with the tag of the bearing fitted correctly in the recess in the cap.

5 Ensure that the location thimbles are fitted correctly to the cap or to the cylinder block. Fit the bearing cap with the location tags of both bearings on the same side.

6 Inspect the setscrews for damage and for distortion and renew them if necessary. Lightly lubricate the setscrew threads with clean engine lubricating oil. Fit the setscrews and tighten them gradually and evenly to 152 Nm (112 lbf ft) 15,5 kgf m.

7 Ensure that the crankshaft turns freely. If the thrust washers have been removed and fitted, check the crankshaft end-float, operation 14A-03.

8 If the front main bearing was removed:

- fit the lubricating oil pump, see section 19
- fit the delivery and suction pipes, see section 19
- fit the front bridge piece, see section 15

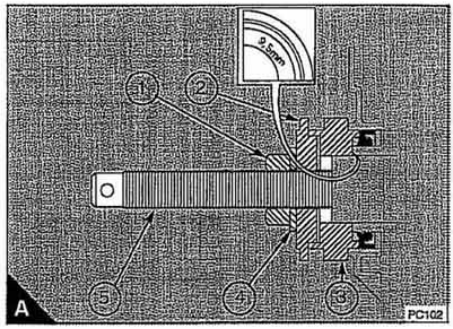
9 Fit the rear oil seal assembly, see operation 14A-02. Fit the lubricating oil sump, operation 19A-03 and fill it to the correct level with an approved lubricating oil. Fit the flywheel housing and the flywheel, see section 22.

To inspect **14A-07**

Inspect the bearings for wear and for other damage. If a bearing is worn or damaged, renew both half of the shell bearings and check the condition of the other bearings.

Front oil seal

To remove and to fit **15A-02**



To remove

1 Remove the drive belts, operation 23A-03.

2 Remove the crankshaft pulley, operation 14A-01.

3 Remove the oil seal with a suitable lever behind the main lip of the oil seal. Do not damage the edge of the oil seal housing.

To fit

Special tools:

Replacer tool for front oil seal (main tool), PD.170

Pressure plate, PD.170-1

Adaptor for standard seal, PD.170-4

1 Clean the oil seal housing. Inspect the new seal for damage. If a scratch can be seen across the lip of the seal, do not fit the seal.

2 Lubricate the outer circumference of the oil seal with clean engine lubricating oil and enter the seal into the housing. Ensure that the spring loaded lip of the oil seal is towards the inside of the timing case cover and that the oil seal is square to the bore of the seal housing.

3 Fit the threaded main tool (A5) to the front of the crankshaft

4 Fit the adaptor (A3) onto the nose of the crankshaft and against the seal. The dimension 9,5 mm, marked on the face of the adaptor, must be toward the seal.

5 Fit the pressure plate (A2) to the main tool.

6 Fit the washer (A4) and the nut (A1) to the main tool.

7 Tighten the nut in order to apply pressure to the plate, this will press the seal into the timing case cover. Ensure that the seal is still square to the timing case cover. Continue to tighten the nut until the shoulder of the adaptor contacts the front of the seal housing. Remove the tool.

8 Fit the crankshaft pulley, see operation 14A-01.

12 Ensure that the timing marks on the gears are correctly aligned.

13 Fit the timing case cover, operation 15A-01.

14 Fit the water pump, see operation 21A-02.

15 Fit the crankshaft pulley, see operation 14A-01.

16 Fit the alternator bracket and the alternator, see section 23. Ensure that the belt tension is correct.

17 Fill the sump to the correct level with lubricating oil of the correct specification.

18 Fill the coolant system with coolant of the correct specification.

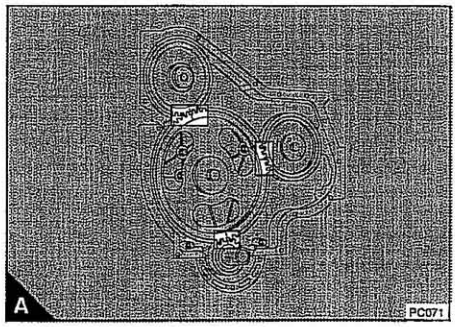
General description

The timing gears are stamped with timing marks (A) to ensure that they are assembled correctly. The stamped teeth of the crankshaft, camshaft and fuel pump gears will be in mesh with the idler gear when number 1 piston is at top dead centre (TDC) on the compression stroke. The marked teeth of the idler gear may not necessarily be in mesh in this position, because of to the different speeds at which the gears rotate.

TDC on number 1 cylinder can be found by the alignment of holes in the backplate and the flywheel.

The fuel injection pump is timed at TDC on the compression stroke of number 1 cylinder. There is no timing mark on the rear face of the timing case, but there is a mark on the flange of the fuel injection pump.

The fuel injection pump has a lock screw which locks the shaft. When the lock is applied before the pump is removed, it is not necessary to time the pump to the engine if the crankshaft has not been rotated.



Filter canister

To renew **19A-01**

Warning! *Discard the used canister and lubricating oil in a safe place and in accordance with local regulations.*

1 Put a tray under the filter to retain spilt lubricating oil. Clean thoroughly the outside surfaces of the filter assembly.

2 Use a strap wrench or similar tool to loosen the filter canister. Remove and discard the canister. Ensure that the adaptor (A1) is secure in the filter head.

3 Clean inside the filter head.

4 Add clean engine lubricating oil to the new canister. Allow the oil enough time to pass through the filter element.

5 Lubricate the seal (A2) on top of the canister with clean engine lubricating oil.

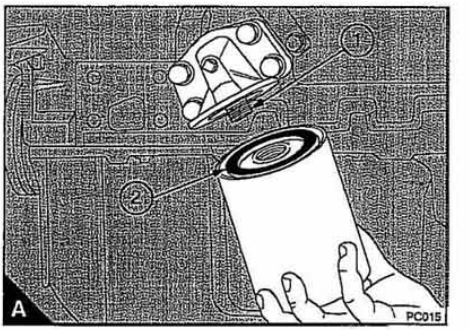
6 Fit the new canister and tighten it by hand until the seal contacts the filter head. Tighten the canister a further 1/2 to 3/4 of a turn by hand only. Do not use a strap wrench.

7 Ensure that there is lubricating oil in the sump. Ensure that the engine will not start and operate the starter motor until oil pressure is obtained. To ensure that the engine will not start, either put the manual stop control in the "stop" position or disconnect the electrical stop control of the fuel injection pump. Oil pressure is indicated when the warning light is extinguished or by a reading on the gauge.

8 Start the engine and check for leakage from the filter. Stop the engine. After 15 minutes check the oil level on the dipstick and, if necessary, put more lubricating oil into the sump.

Cautions:

- *Do not fill the sump past the "Max" mark on the dipstick.*
- *The canister contains a valve and special tube to ensure that lubricating oil does not drain from the filter. Therefore, ensure that the correct Perkins POWERPART canister is used.*



Fuel system 20

To fit

1 Inspect the "O" ring (A1) and, if necessary, fit a new "O" ring.

2 Lightly lubricate the "O" ring with clean engine lubricating oil and put the pump into position on the timing case. Ensure that the key (A2) is engaged correctly in the keyway of the drive gear.

3 Fit the spring washer and the nut to retain the drive gear. Tighten the nut to approximately 15 Nm (11 lbf ft) 1,5 kgf m.

4 Hold the top of the pump toward the engine to remove the backlash and fit the nuts to the pump flange. Tighten them to 22 Nm (16 lbf ft) 2,2 kgf m.

5 Release the locking screw (B2) on the fuel pump and adjust the spacer to enable the locking screw to be tightened on the slot of the spacer (B1). Tighten the locking screw on the fuel pump to 12 Nm (9 lbf ft) 1,2 kgf m. Check that the spacer cannot move. **The drive shaft of the fuel pump is now free to move.**

6 Fully tighten the nut for the drive gear to 80 Nm (59 lbf ft) 8,2 kgf m. Fit the gear cover.

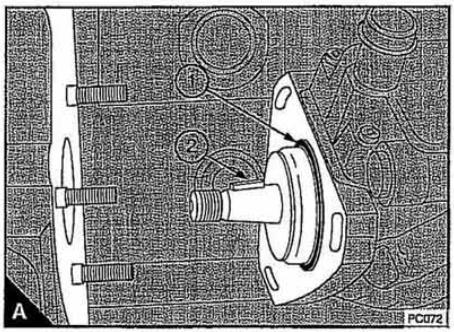
7 Fit the fuel pipes, the cables and the electrical connections to the pump.

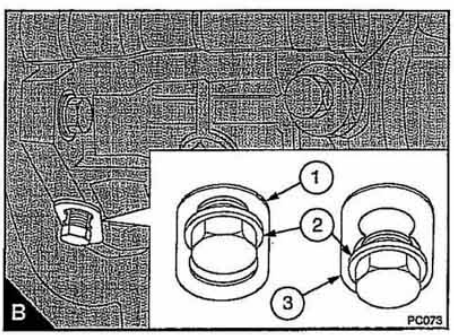
8 Eliminate air from the fuel system, see operation 20A-08.

9 Fit the rocker cover, operation 12A-01.

10 Remove the locking pin from the flywheel.

11 Operate the engine and check for leakage. With the engine at the normal temperature of operation, check that the idle speed and the maximum no-load speed are correct, see operation 20A-07.





Coolant pump

To dismantle and to assemble **21A-03**

Special tool:

Puller, PD.155C

Adaptors, PD.155B-5, for use with the puller

Consumable products:

POWERPART Retainer (oil tolerant)

To dismantle

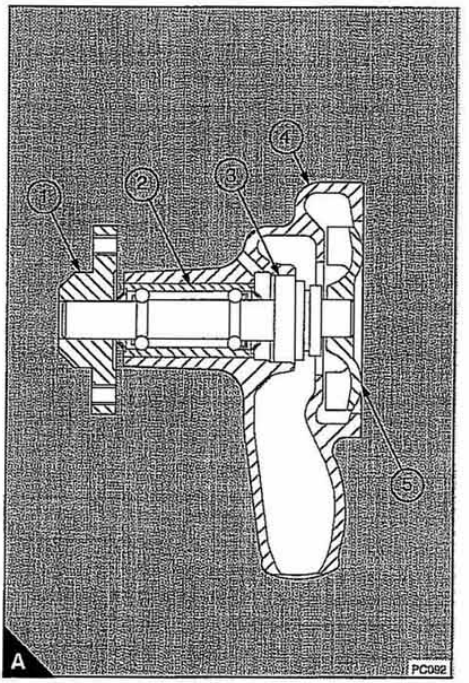
1 Remove the coolant pump (A4) from the engine, operation 21A-02.

2 Withdraw the hub (A1) with the puller and the adaptors.

3 Support the pulley end of the pump body. Use a suitable adaptor to press the shaft and bearing assembly (A2) through the impeller (A5) and coolant seal (A3). Continue to press until the shaft and bearing assembly are out of the pump body.

4 Discard the impeller and the shaft and bearing assembly. Remove and discard the coolant seal.

5 Clean the body of the pump with a suitable safe cleaning fluid. Inspect the pump body for cracks.



Alternators 23A

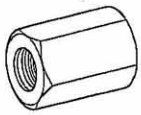
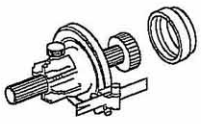
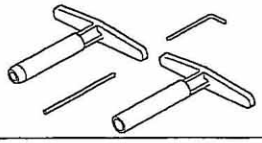
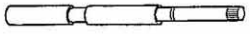
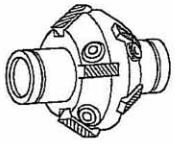
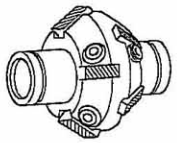
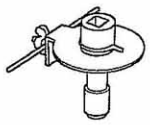
To test on the engine **23B-03**

Ensure that the battery is fully charged.

Turn on the lights and operate the starter switch. If no lights are fitted to the machine, connect a voltmeter across the battery terminals and operate the starter switch.

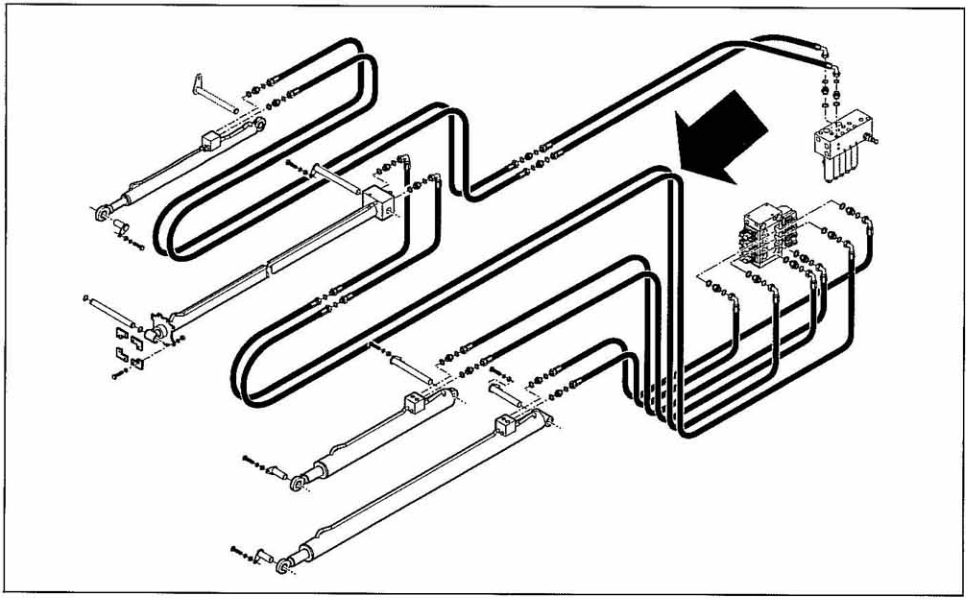
If the starter does not operate but the lights keep their power or there is no voltage drop across the battery, check the switch and all the connections and wires. Slow action of the starter can be caused by faulty connections.

Failure to engage smoothly between the starter and the flywheel can be caused, on some types of starter motor, by dirt on the helical grooves of the starter motor drive, which can prevent free pinion movement. Clean the shaft thoroughly with gasolene, or a fluid made especially for the purpose, and apply a small quantity of Aero Shell 6B or its equal.

Number	Description	Illustration
PD.6118B-10	Stud adaptor for use with PD.6118B. Part number 21825934	
MS.67B	Universal timing gauge. Part number 21825610	
MS.76B	Handle set for valve seat cutters (also included in MS.73). Part number 21825619	
MS.76-150-7	Adjustable pilot for valve seat cutters (also included in MS.73). Part number 21825550	
MS.76-285	Cutter for exhaust valve seats (also included in MS.73) Part number 21825633	
MS.76-692	Cutter for inlet valve seats Part number 21825977	
(MS.1531)	Angle gauge to tighten cylinder head setscrews Part number 21825607	

B - REMOVING THE HOSES FROM THE LOWER PART

B1



NOTE : For this operation , you will need guide wires.
- They must be resistant and flexible.
- Once attached onto the hoses, they will be covered with tape to form a type of conethat will facilitate the passage into the ducts.
- Position the arms in order to facilitate the work..

E.g : Removing the telescopic cylinder hoses.

- Cut off the power supply by means of a battery cutout.

- Dismantle the lower tie rod hose cover as well as the upper arm hose cover.

- Dismantle the right turret cowl.

- Dismantle the damaged hose at the articulation level.

- Fix a guide wire onto its end.

- Disconnect the damaged hose at the distributor level and remove it by pulling it.

REASSEMBLY

- Proceed in the same way as for the reassembly of hoses from the upper part.

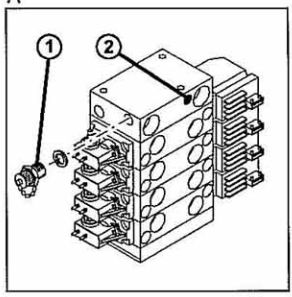
REMOVING THE LIFTING CYLINDERS
165ATJ
70-2-60-M.53 EN

REMOVING THE COMPENSATION CYLINDER
165ATJ
70-2-64-M.53 EN

01 / 2002

All the pressures are adjusted between 25 et 30°c

A



- Remove the turret right cowling.

MAIN CIRCUIT (240 BARS)

- Required tooling

- 1 pressure gauge (0-400 bar) 549885
- 1 test hose.....549887

- Connect the pressure gauge onto the pressure tapping point 1 (Fig. A).

- Lower the lower arm as much as possible.

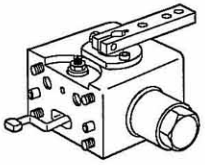
- Read the pressure on the pressure gauge.

- Main circuit pressure = 240 bar.

- If necessary, act upon the pressure limiter 2 (Fig. A) with a 1/4 mm hex. wrench (adjusting screw) after having removed the plug.

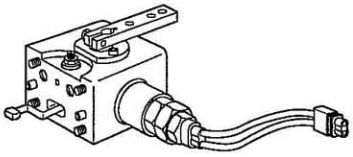
GROUPS 75

HYDROSTATIC



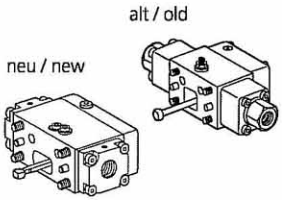
Ansteuergerät **HW**

Control unit **HW**



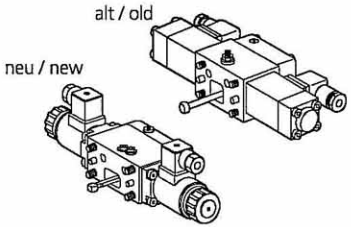
Ansteuergerät **HW** mit Nullagenanzeige

Control unit **HW** with zero indicator



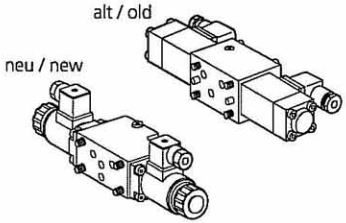
Ansteuergerät **HD**

Control unit **HD**



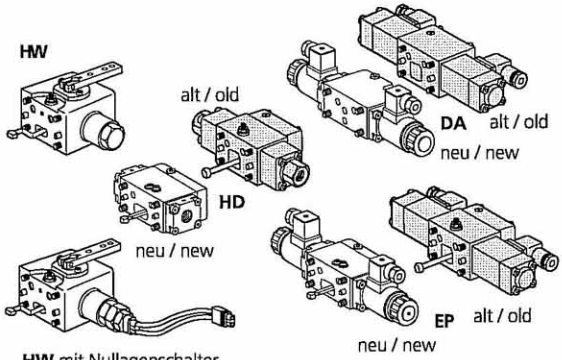
Ansteuergerät **EP**

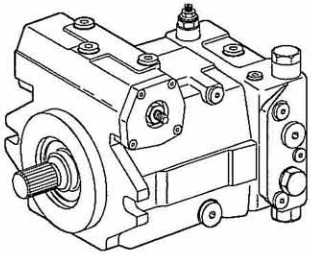
Control unit **EP**



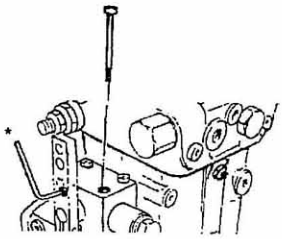
Ansteuergerät **DA**

Control unit **DA**



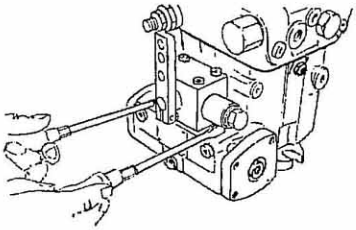


HW mit Nullagenschalter
HW with zero position switch



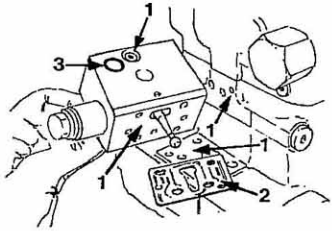
* Befestigungsschrauben demontieren.

* Remove fixing screws.



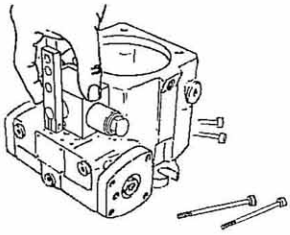
Ansteuergerät abdrücken.

Pry-off the control unit.



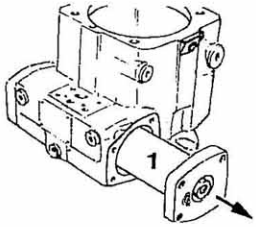
Kontrolle
Dichtfläche (1), Flachdichtung (2), O-Ringe (3).

Check
Sealing surface (1), gasket (2), O-rings (3).



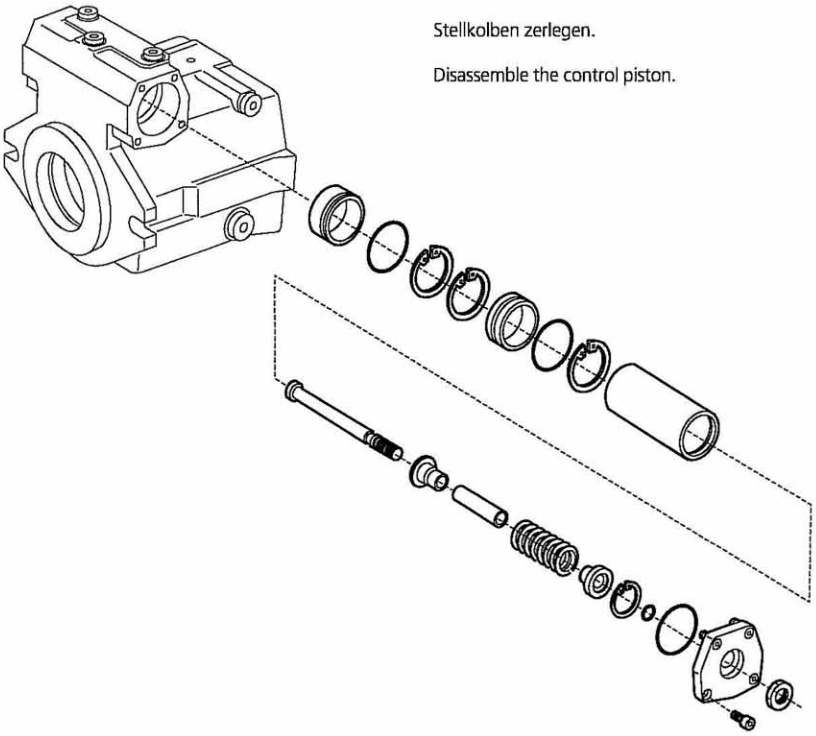
Steuergerät abbauen.

Remove control unit.



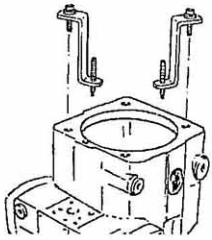
Stellkolben (1) ziehen.

Pull out control piston (1).



Stellkolben zerlegen.

Disassemble the control piston.

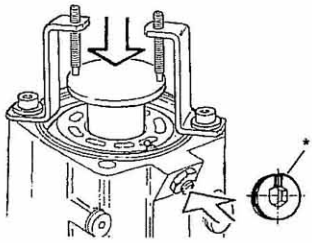


Vorrichtung ausbauen.
Zylinder mit Kolben und Rückzugeinrichtung einbauen.

Remove holding device.
Fit cylinder complete with pistons and retaining device.

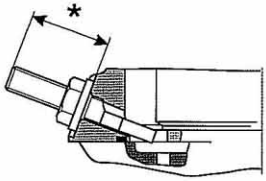
Montagehilfe:
Mit O-Ring Kolben festhalten.

Assembly aid:
Hold the pistons by using an O-ring.

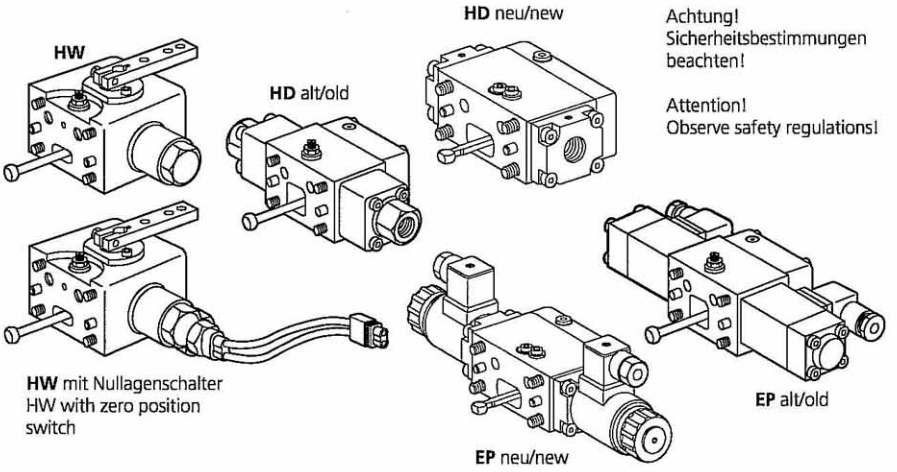


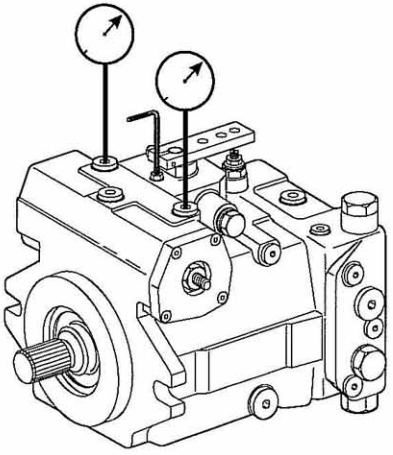
Bei Ausführung mit Verdrillschraube:
Zylinder nach unten drücken - Verdrillschraube auf Maß x einschrauben.
* Kerbe in Montageposition.

For the version with eccentric screw:
Push the cylinder down - screw in the eccentric screw in the eccentric screw until dimension x is reached.
* groove in assembled position.



NG / Size 28 = 31 ± 0,75 mm
NG / Size 45 = 32 ± 0,75 mm



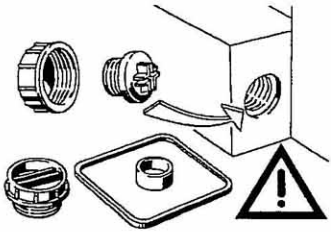


Manometer an X_1 und X_2 anschließen.
Nullage so einstellen, daß bei blockiertem Antrieb beide Manometer auf gleichem Druckwert stehen.
Hinweis:
Excenterjustierung
- nicht über ±90° verdrehen.

Connect pressure gauges to X_1 and X_2.
Adjust the zero position so that with a block drive both pressure gauges indicate the same pressure value.
Note:
Eccentric adjusting
- Do not turn more than ±90°.

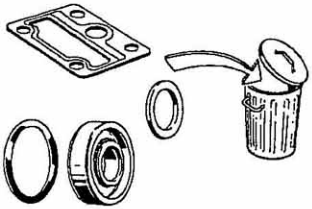
Achtung!
Nachfolgende Hinweise bei allen Reparaturarbeiten an Hydraulikaggregaten beachten!

Attention!
Please take into account the following guidelines when carrying out repair work on hydraulic units!



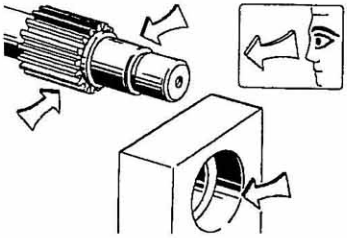
Alle Öffnungen der Hydraulikaggregate verschließen.

Close off all of the ports of the hydraulic unit.



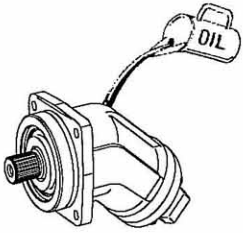
Alle Dichtungen erneuern.
Nur original BRUENINGHAUS HYDROMATIK Ersatzteile verwenden!

Replace all seals.
Use only original BRUENINGHAUS HYDROMATIK spare parts!



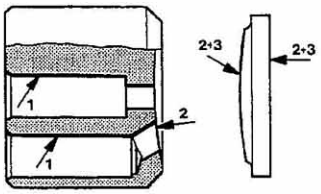
Alle Dicht- und Gleitflächen auf Verschleiß prüfen.
Achtung: Nacharbeiten an Dichtflächen z.B. durch Schleifpapier kann die Oberfläche beschädigen.

Check all seal and sliding surfaces for wear.
Attention: Rework of the sealing surfaces, using for example abrasive paper, can damage surface.



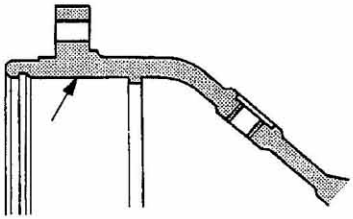
Hydraulikaggregate vor Inbetriebnahme mit Hydrauliköl befüllen.

Fill the hydraulic unit with hydraulic oil before commissioning.



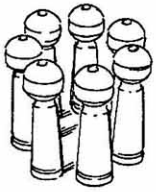
Zylinder/Steuerplatte
1. Bohrungen riefenfrei, nicht ausgelaufen.
2. Gleichmäßiges Tragbild, riß- und riefenfrei.
3. Mindesthärte 700 HV 10.

Cylinder / control plate
1. Bores unscratched, and no traces of wear.
2. Even load distribution, free of cracks and grooves.
3. Min. hardness 700 HV 10.



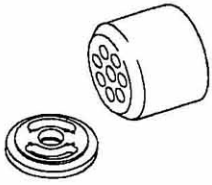
Gehäuse
Im Lagerbereich riefenfrei und keine Einlaufspuren.

Housing
No traces of wear in the bearing area.



Nur kompletten Kolbensatz austauschen.

Only exchange the pistons as a complete set.



Zylinder und Steuerplatte nur gemeinsam austauschen.

Only replace the cylinder and control plate as a pair.

REPLACING THE ELECTRONIC BASEBOARD AND MICROPROCESSOR 165ATJ

80-2-10-M.53 EN

01 / 2002

LEFT ROTATION ELECTROVALVE

Input CI / Movement	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Basket Control	1	X	X	X	X	X	X	X	X	X	0	0	X	0	0	0	1	X	0	0	1	1	0	0	X

Output CI / Movement	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
Left Rotation EV	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

0 = Plate led switched off in order to have the movement
1 = Plate led switched on in order to have the movement
X = No taking into account of the state0-1 in order to have the movement

LEDS STATE TABLE PER POSSIBLE MOVEMENT Ref. MICRO W.517700-007

OSCILLATION X2 EV

Input CI / Movement	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Basket Control	X	1	1	X	X	X	X	1	X	X	X	X	X	X	X	X	X	X	X	X	X	1	X	X	X

Output CI / Movement	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21
Oscillation X2 EV	X	X	X	X	X	X	X	X	X	X	X	1	X	X	X	X	X	X	X	X	X

0 = Plate led switched off in order to have the movement
1 = Plate led switched on in order to have the movement
X = No taking into account of the state0-1 in order to have the movement

ABREVIATION AND CORRESPONDENCE
OF THE INPUTS LED

- A = SLOPE SENSOR
- B = ARM 3 FC / ANGULAR
- C = LOWER FC ARM
- D = FREE
- E = TELESCOPE SPEED REGULATION PLATE OK (S6)
- F = 1/2 ARM SPEED REGULATION PLATE OK (S3)
- G = PROPORTION 4 SPEED REGULATION PLATE OK (S4)
- H = TRANSLATION SPEED REGULATION PLATE OK (S1)
- I = ARM 3 SPEED REGULATION PLATE OK (S2)
- J = FREE
- K = PENDULAR LOWERING
- L = PENDULAR LIFTING
- M = BP DIFFERENTIAL LOCKING
- N = SLOPE TILTING
- O = CAVAGE TILTING
- P = BASKET RIGHT ROTATION
- Q = BASKET LEFT ROTATION
- R = HARE SELECTOR
- S = RIGHT STEERING
- T = LEFT STEERING
- U = OVERLOAD SAFETY
- V = BASKET CONTROL
- W = TURRET RIGHT ROTATION (S7)
- X = TURRET LEFT ROTATION (S5)
- Y = FREE