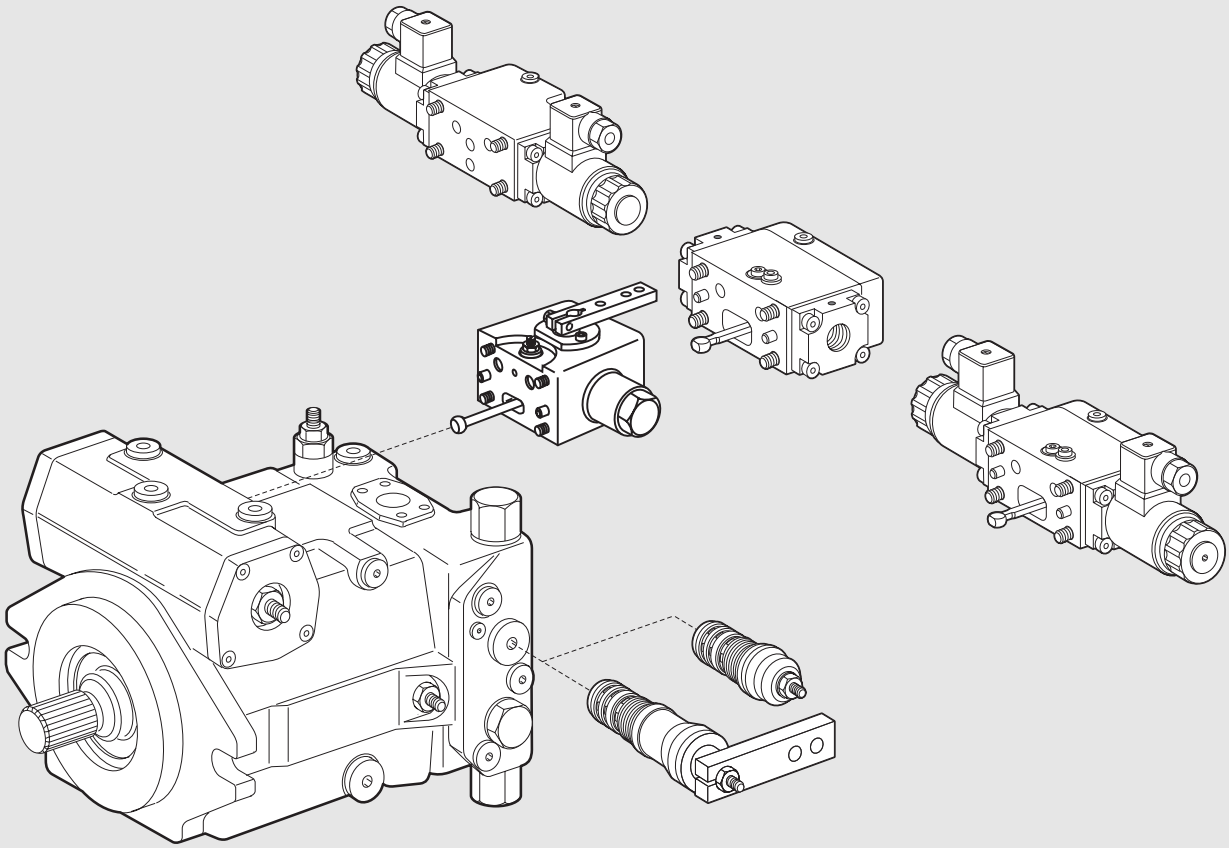
Rexroth
Bosch Group

Verstellpumpe A4VG 40-56
Variable Pump A4VG 40-56
Baureihe/Series 32

RDE 92 003-01-R/03.03
ersetzt/replaces 10.02

R

Reparaturanleitung / Repair Instructions



Hinweis / Inhalt
Notice / Contents

HINWEIS

Bezeichnungen, Beschreibungen und Darstellungen entsprechen dem Informationsstand zum Zeitpunkt der Drucklegung dieser Unterlage.

Änderungen können den Service am Produkt beeinflussen, Verpflichtungen entstehen uns daraus nicht.

Methoden und Vorrichtungen sind Empfehlungen, für deren Resultat wir keine Haftung übernehmen können.

BRUENINGHAUS HYDROMATIK- Baugruppen, mit Angabe der Fabrik-Nr. bestellt, sind die Basis guter Reparaturen.

Einstell- und Prüfarbeiten sind bei Betriebstemperatur auf dem Teststand vorzunehmen.

Schutz von Personen und Eigentum ist durch Vorkehrungen sicherzustellen.

Sachkenntnis, die Voraussetzung für jede Service-arbeit, vermitteln wir in unseren Schulungskursen.

NOTICE

Specifications, descriptions and illustrative material shown here in were as accurate as known at the time this publication was approved for printing.

BRUENINGHAUS HYDROMATIK reserves the right to discontinue models or options at any time or to change specifications, materials, or design without notice and without incurring obligation.

Optional equipment and accessories may add cost to the basic unit, and some options are available only in combination with certain models or other options.

For the available combinations refer to the relevant data sheet for the basic unit and the desired option.

Adjustment and tests have to be carried out on the test bench under operating temperatures.

Protection of personnel and property has to be guar-anteed by appropriate measures.

Expert knowledge, the precondition of any service work, can be obtained in our training courses.

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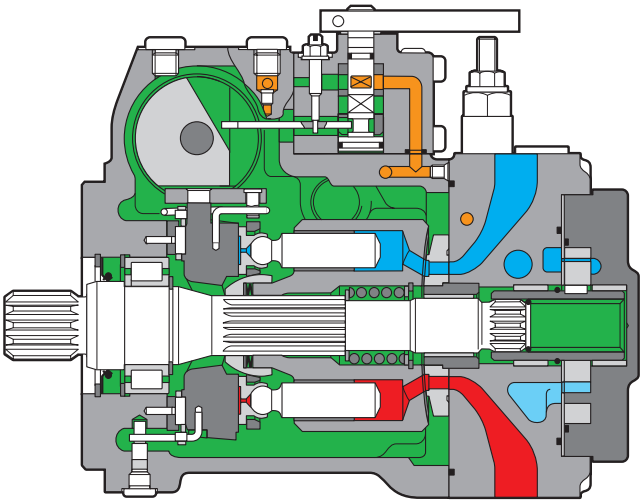
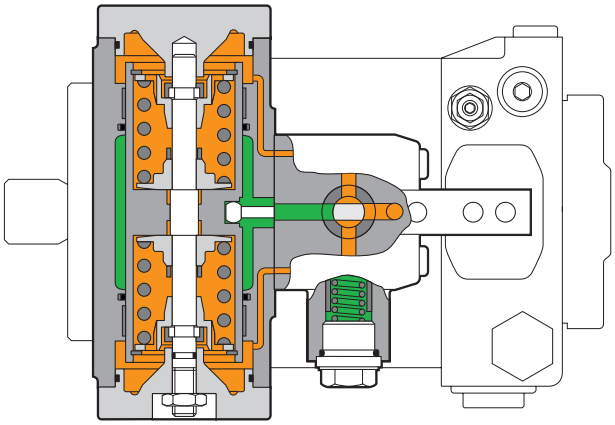
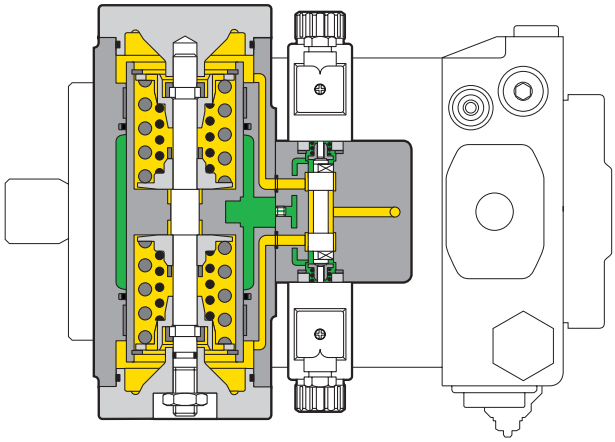
Schnittbild
Sectional view



HWD



DAD



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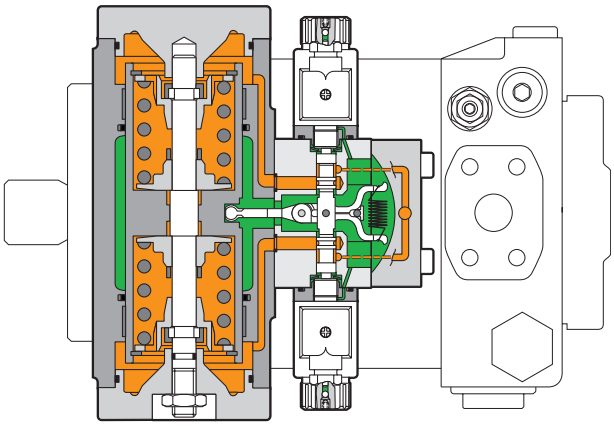
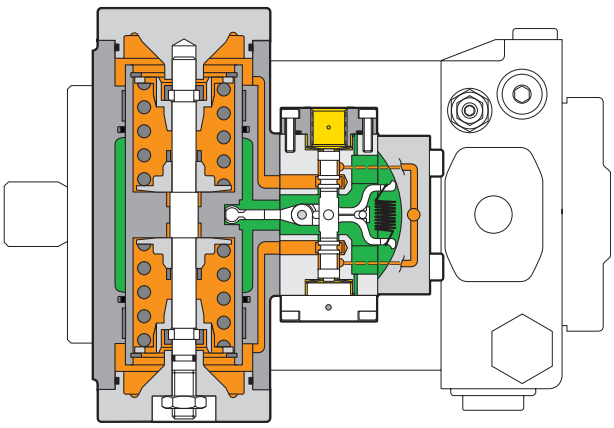
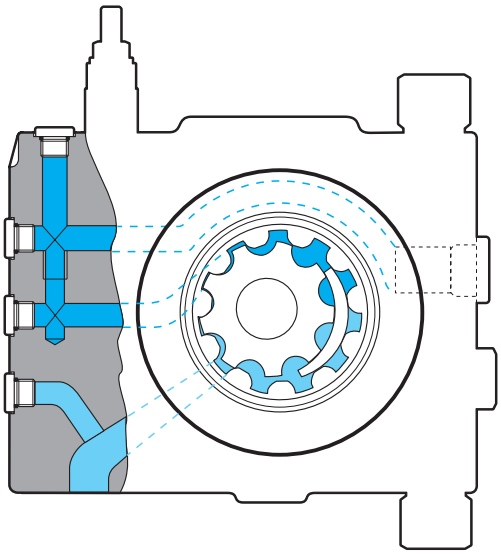


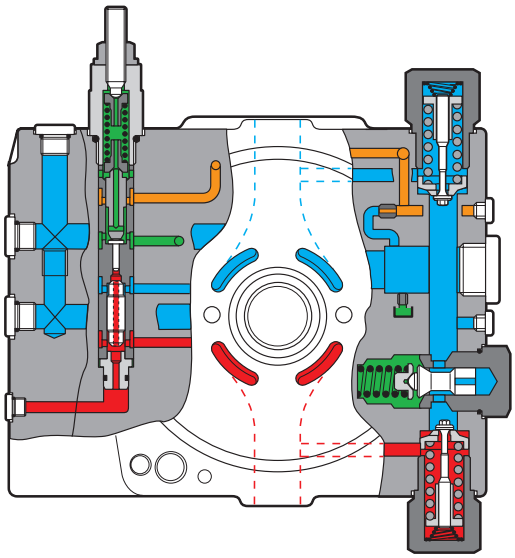
HDD



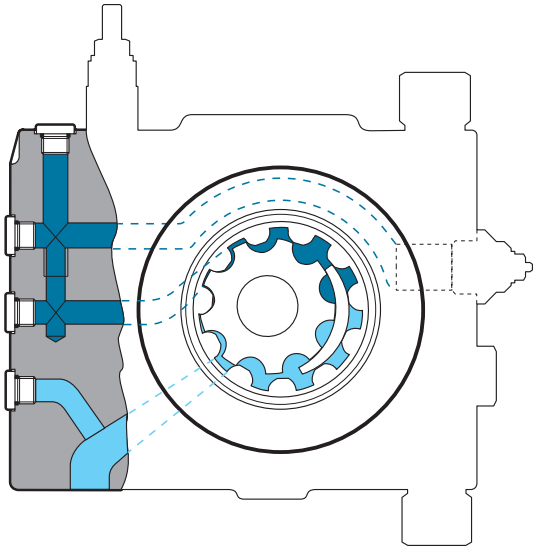
Schnittbild
Sectional view

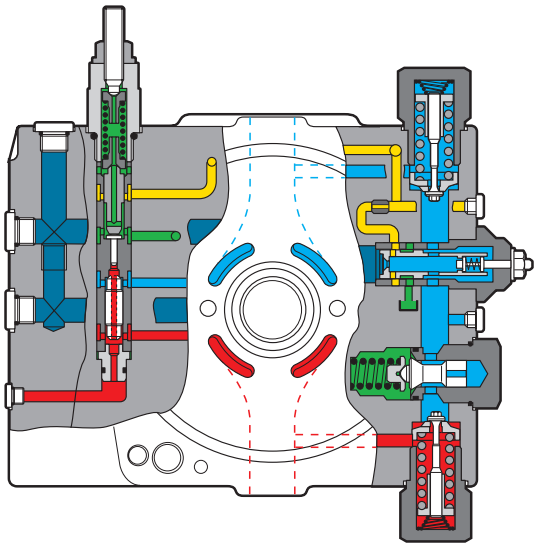
HWD / EPD / HDD





DAD

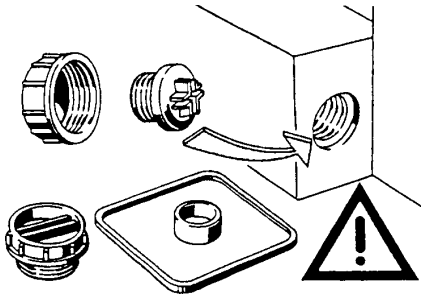




Allgemeine Reparaturhinweise
General repair instructions

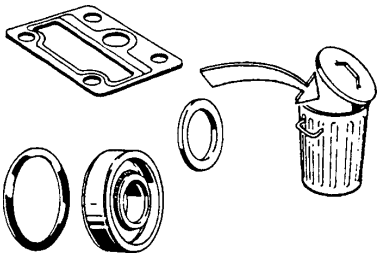
Achtung!
Nachfolgende Hinweise bei allen Reparaturarbeiten an Hydraulikaggregaten beachten!

Attention!
Observe the following notices when carrying out repair work at hydraulic aggregates!



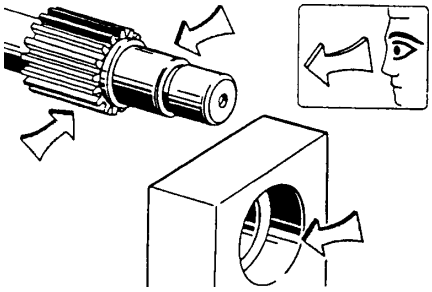
Alle Öffnungen der Hydraulikaggregate verschließen.

Close all ports of the hydraulic aggregates.



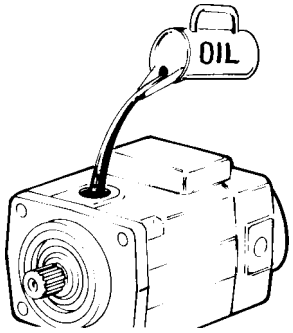
Alle Dichtungen erneuern.
Nur ORIGINAL BRUENINGHAUS HYDROMATIK -Ersatzteile verwenden.

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.

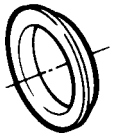
Check all seal and sliding surfaces for wear.
Attention: Rework of sealing area f. ex. with abrasive paper can damage surface.



Hydraulikaggregate vor Inbetriebnahme mit Betriebsmedium befüllen.

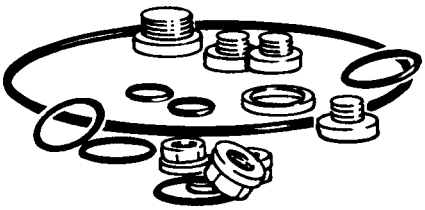
Fill the hydraulic units with the operating medium before commissioning.

Dichtsätze und Baugruppen
Seal kits and sub assembly groups



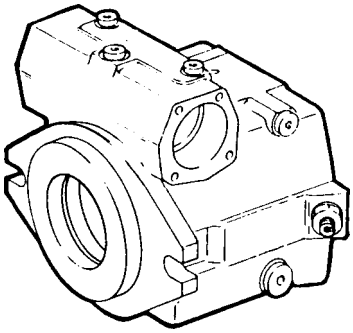
Dichtsatz für Triebwelle.

Seal kit for drive shaft.



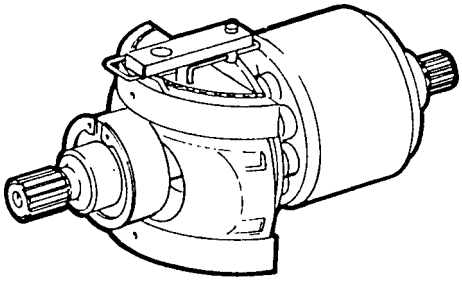
Äußerer Dichtsatz.

Peripheral seal kit.



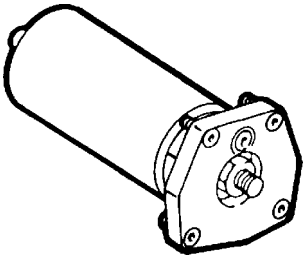
Gehäuse

Housing



Triebwerk komplett.

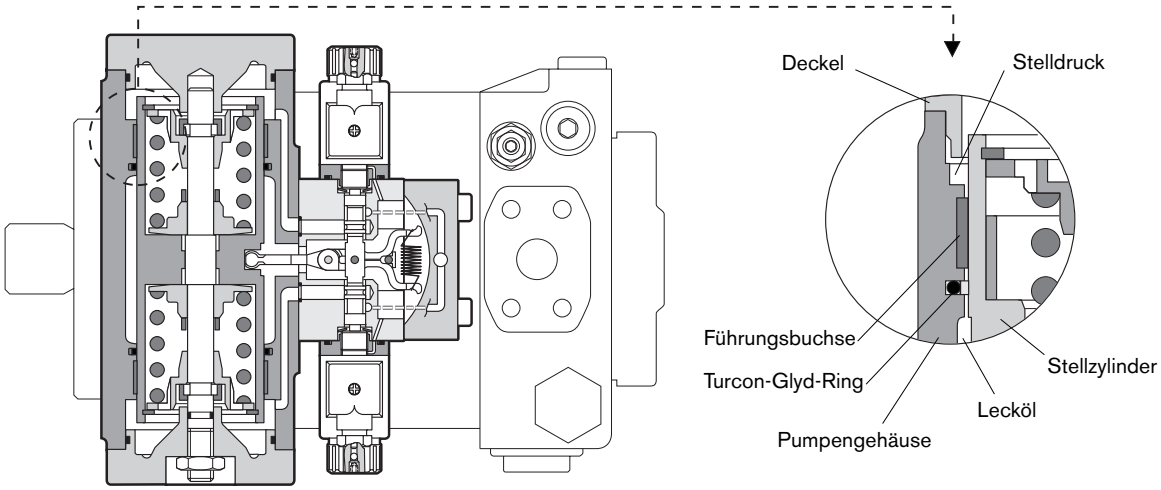
Complete rotary group.



Stellkolben

Positioning piston

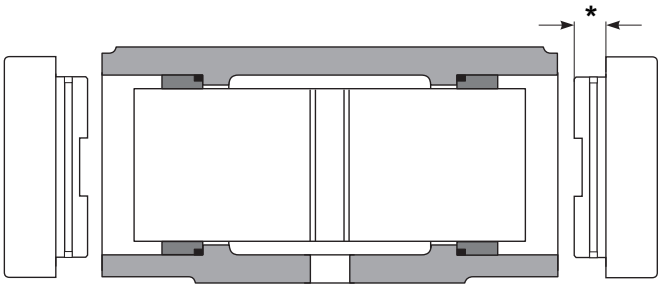
Stellkolben - Turcon-Glyd-Ring Dichtung
Positioning piston - Turcon-Glyd-ring seal



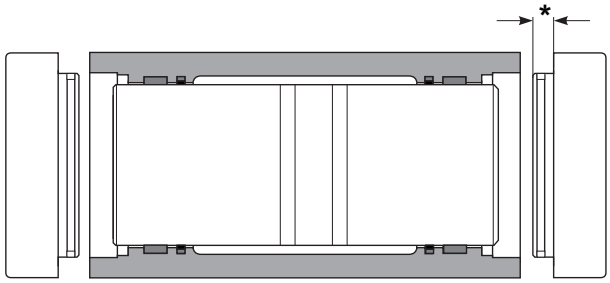
Bei den Verstellpumpen A4VG erfolgt zur Zeit die Umstellung der Verstellung auf Turcon-Dichtungen.
Die Stückliste der kompletten Einheit erhält dabei eine neue Ident.- Nummer.
Typenschlüssel, Typnummer und Außenabmeßungen bleiben dabei unverändert. (Pumpengehäuse ändert sich nur im Bereich vom Stellkolben. Stellkolben ändert sich in eine angefaste Ausführung).

At present the change of the control into Turcon seal is made for A4VG.
The parts list of the complete unit will receive a new identification number.
Type reference and outside dimensions remain unchanged (pump housing will change at the area of the positioning piston. Positioning piston will change into chamfering design).

Pumpengehäuse / Pump housing
mit Lagerbuchse / with bush **ALT / OLD**



Pumpengehäuse / Pump housing
mit Turcon-Dichtung / with Turcon seal **NEU / NEW**



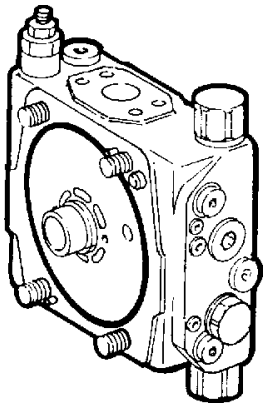
⚠ Die Umstellung der Verstellung auf Turcon-Dichtung ist im allgemeinen mit einer Funktionsverbesserung verbunden (DA-Verhalten, geringerer Temperatureinfluß auf Stellzeiten).

⚠ Bei gleicher Düsenbestückung können sich die Stellzeiten geringfügig verändern.

⚠ The change of the control into Turcon seal design improves in general the function (DA-behaviour, lower temperature-influence on control times).

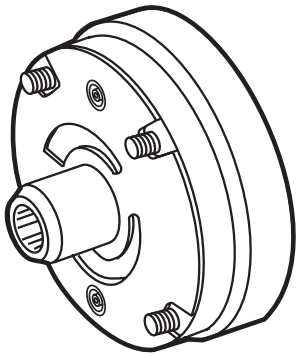
⚠ The control times will slightly change with the same throttle sections. Therefore our customers have to be informed about this change.

Baugruppen
Sub assemblies



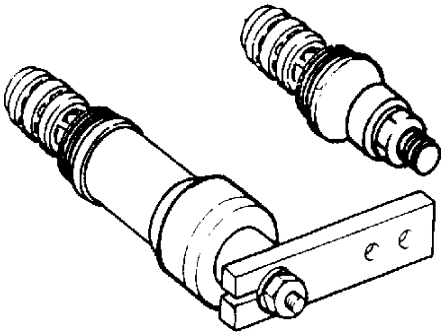
Anschlußplatte

Port block



Hilfspumpe

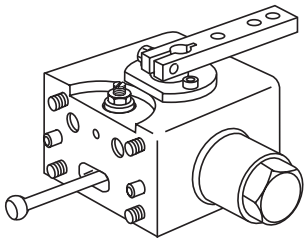
Boost pump



Regelventil

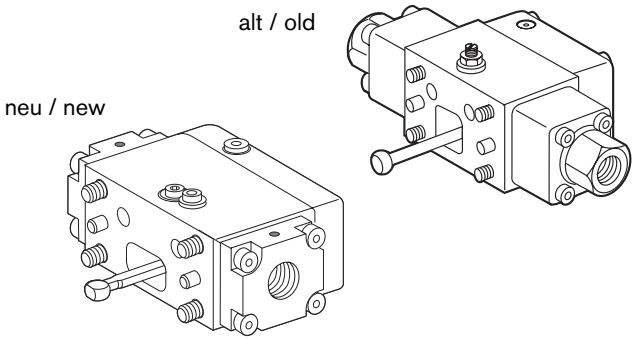
Control valve

Baugruppen
Sub assemblies



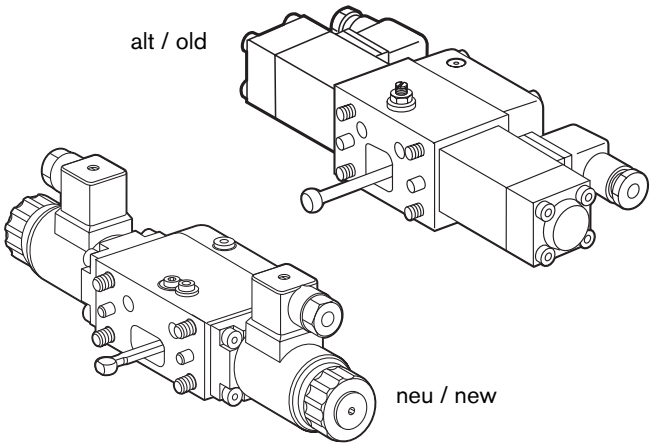
Ansteuergerät **HW**

Control unit **HW**



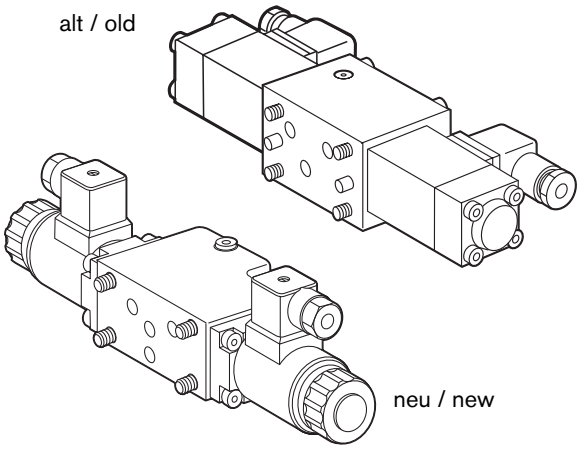
Ansteuergerät **HD**

Control unit **HD**



Ansteuergerät **EP**

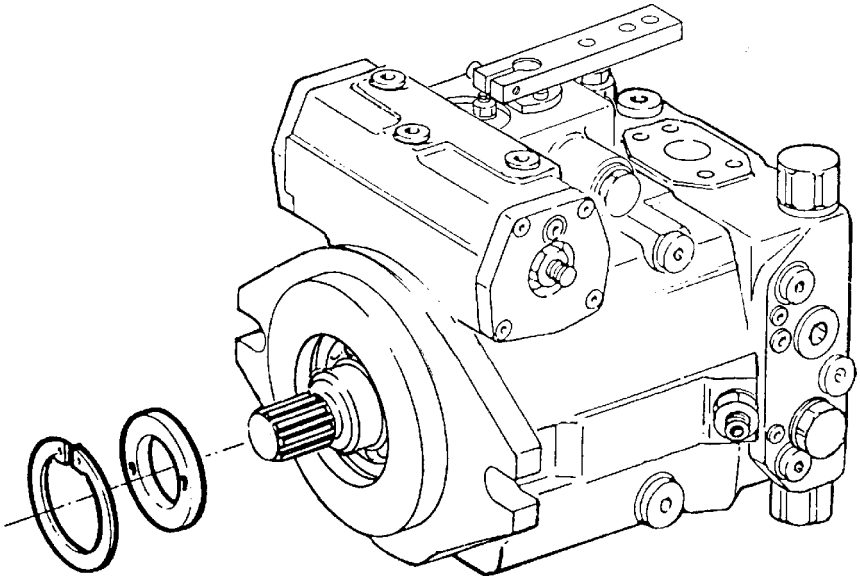
Control unit **EP**

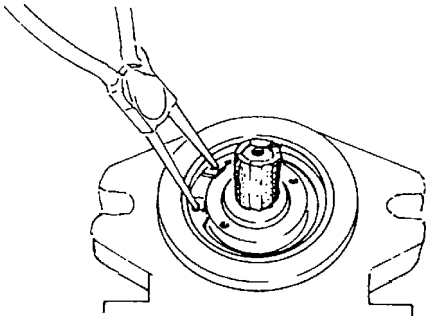


4/3 Wegeventil **DA**

Control unit **DA**

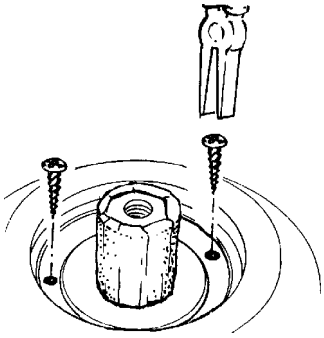
Triebwelle abdichten
Sealing of the drive shaft





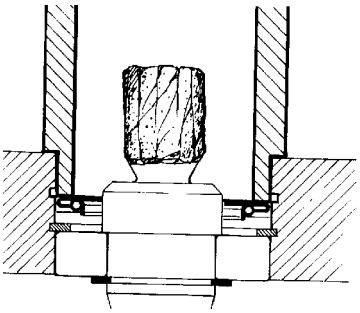
Triebwelle abkleben.
Sicherungsring ausbauen.

Protecting the drive shaft.
Remove retaining ring.



Blechschraube in die mit Gummi gefüllten Löcher eindrehen.
Mit Zange WDR herausziehen.

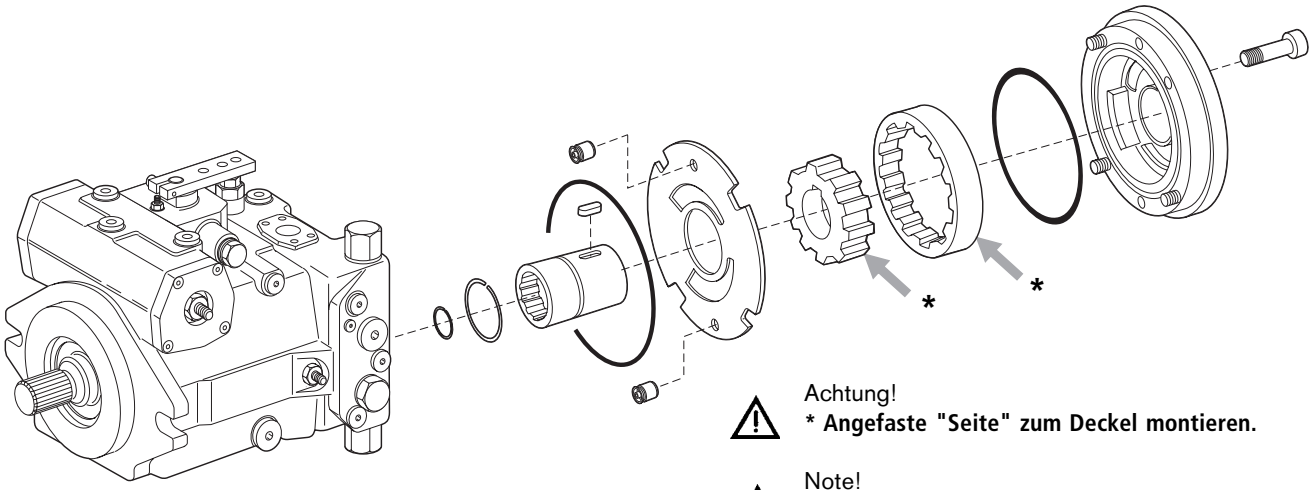
Screw in sheet metal screw into the holes fitted with rubber.
Pull out shaft seal with pliers.



Wellendichtring mit Buchse auf Anschlag einpressen.
⚠ Zwischen Dicht- und Staublippe, Wellendichtring leicht einfetten.

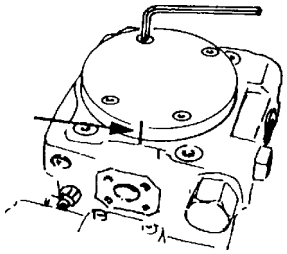
Press-in shaft seal with bush to stop.
⚠ Lightly grease the seal, dust lips and shaft seal ring.

Hilfspumpe abdichten
Sealing of the boost pump



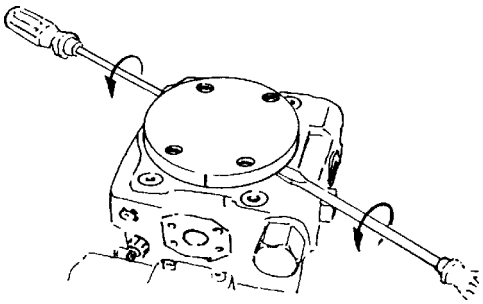
Achtung!
*** Angefaste "Seite" zum Deckel montieren.**

Note!
*** Mount chamfered side facing cover.**



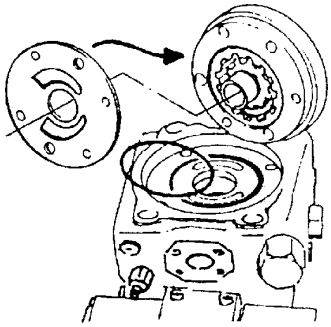
Lage kennzeichnen,
Befestigungsschrauben ausbauen.

Mark position,
remove fixing screws.



Deckel abdrücken.

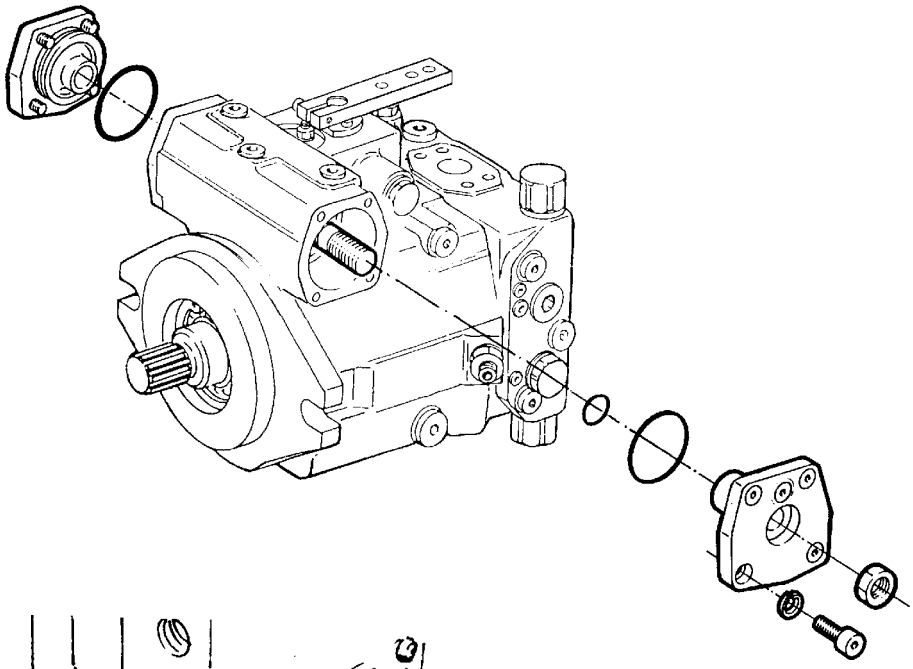
Pry-off cover.

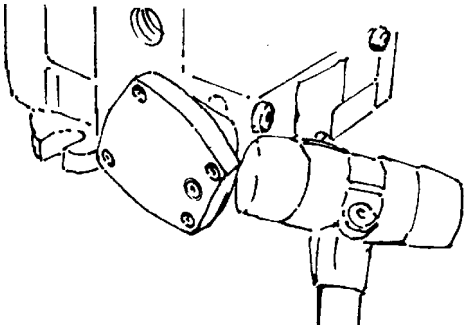


Teile der Hilfspumpe auf Verschleiß untersuchen.
Pumpe kann nur komplett ausgetauscht werden.

Inspect the parts of the boost pump and wear parts.
Boost pump can only be interchanged completely.

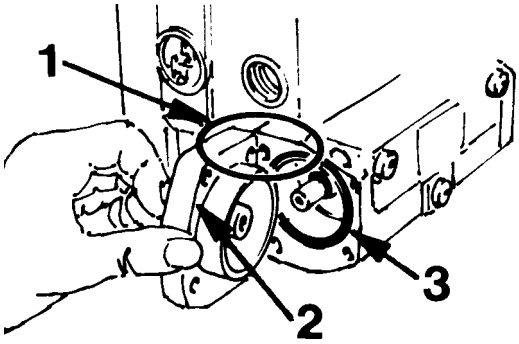
Stellkolbendeckel abdichten
Sealing of the control piston cover





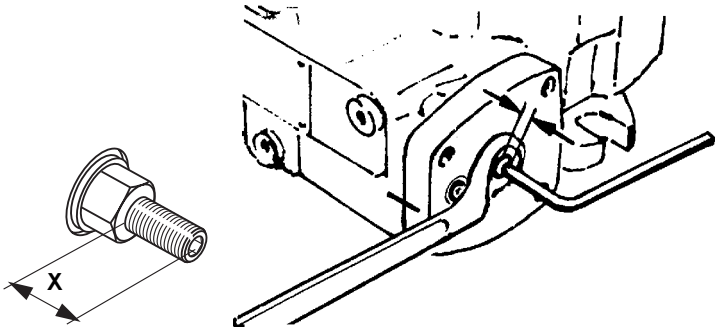
Befestigungsschrauben lösen.
Deckel verdrehen und mit leichten Hammerschlägen lösen.

Loosen mounting screws.
Rotate cover and release by tapping gently with hammer.



Kontrolle!
O-Ring (1), Nut (2), Gehäuse (3).

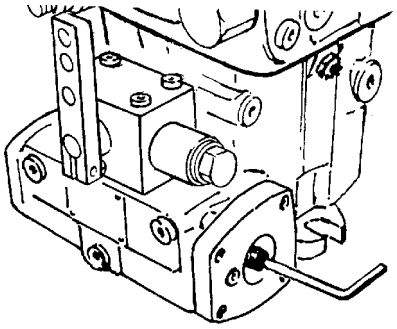
Check!
O-ring (1), groove (2), housing (3).



Kontermutter ausbauen, Stellschraube gegenhalten.
Deckel kennzeichnen. Maß festhalten, Kontermutter lösen.

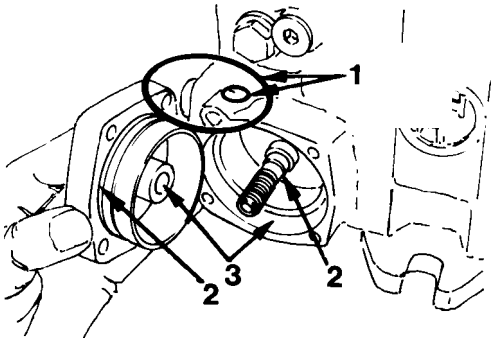
Remove locknut whilst holding setting screw.
Mark cover. Must be fixed, loosen counter nut.

Stellkolbendeckel abdichten
Sealing of the control piston cover



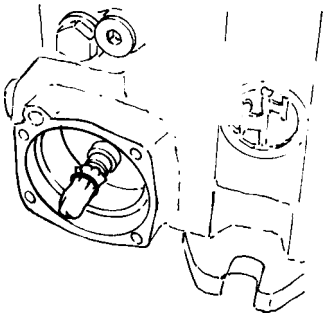
Über 0-Lagen-Einstellschraube Deckel abdrücken und drehen.

Pull cover off using zero position adjustment screw.



Kontrolle!
O-Ring (1), Nut (2), Gehäuse (3).

Check!
O-ring (19, groove (2), housing (3).

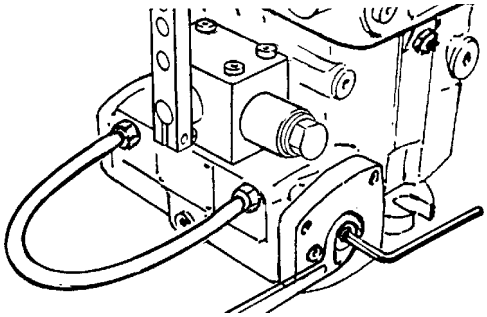


Gewinde abdecken, kleinen O-Ring aufschieben. Montage in umgekehrter Reihenfolge.

Cover threads, push on small O-ring. Assemble in reversed order.

Achtung!
Korrekte mechanische Nullageneinstellung muß nach Einbau im Gerät bzw. Prüfstand erfolgen.

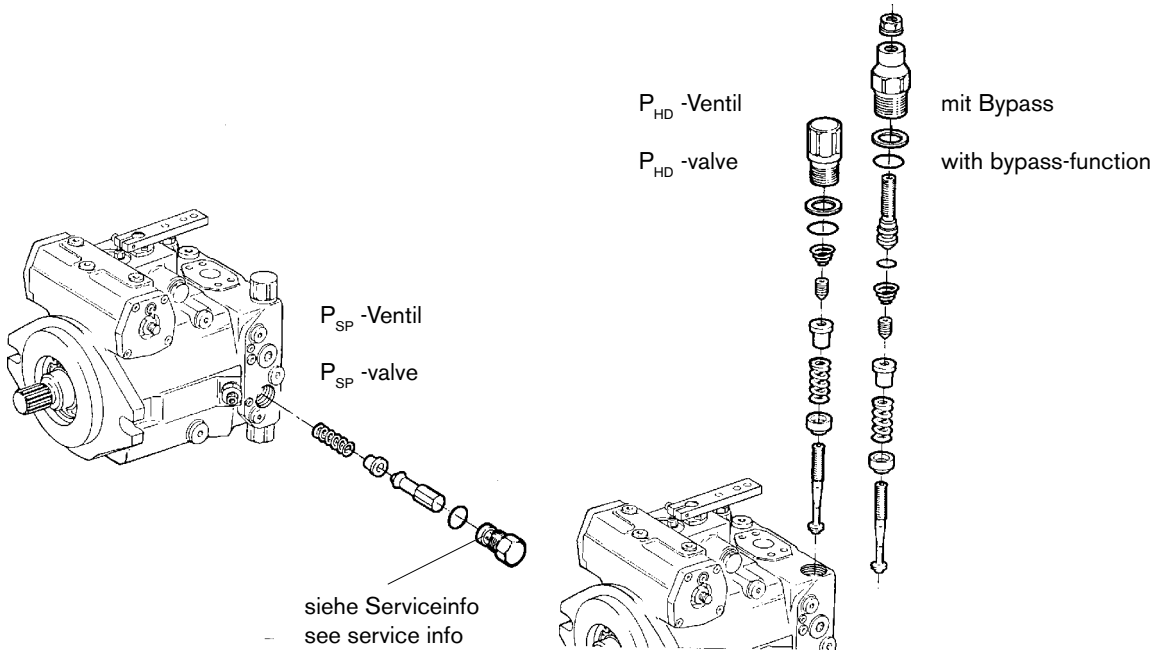
Attention!
Adjustment of the correct zero position to be carried out after installation into the machine or on the test bench.

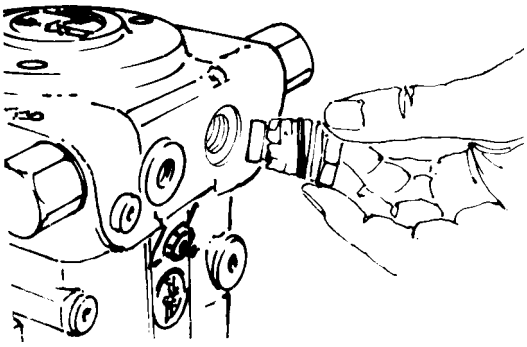


Mechanische Nullage neu einstellen, dazu X_1 mit X_2 verbinden (>NW6).

Reset mechanical zero position. To do this, connect X_1 to X_2 (size > 6).

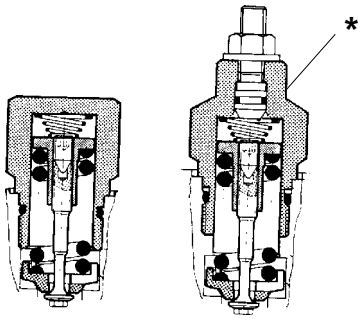
Ventile abdichten
Sealing of the valves





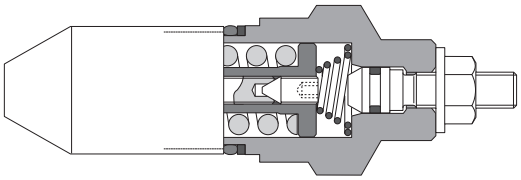
Gewinde vor Montage des neuen O-Ringes abkleben.
(Beschädigungsschutz).

Cover threads before fitting new O-rings.
(Damage protection).



Ventilkegel mit Druckfeder ausbauen.
*** mit Bypassfunktion**

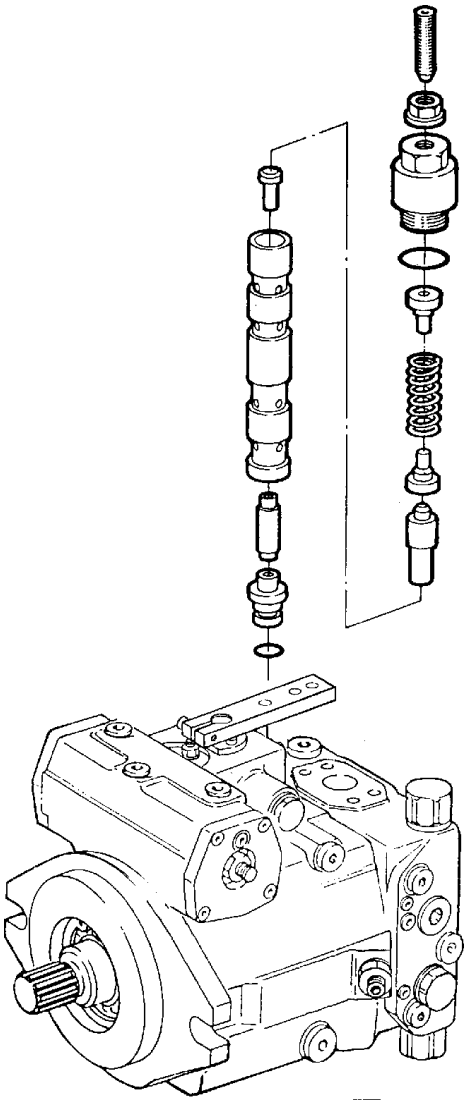
Remove valve poppet with spring.
*** with bypass-function**

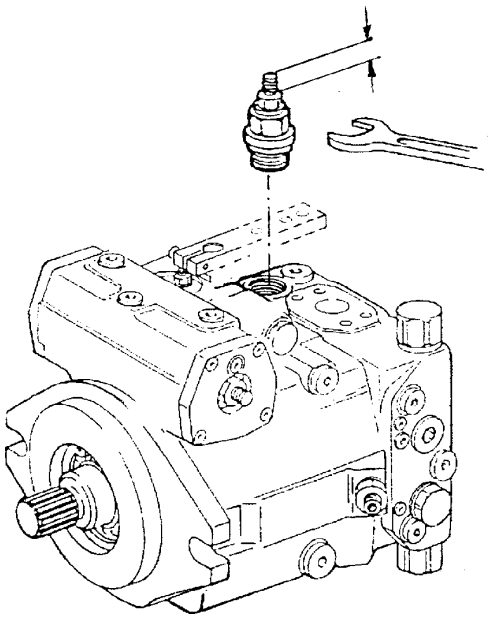


O-Ring und Stützring mit Hilfswerkzeug (Hülse) aufziehen. (siehe Serviceinfo)

Place on O-ring and back-up ring with auxiliary tool (sleeve). (see servicei nfo)

Druckabschneidung abdichten
Sealing of the pressure cut-off valve





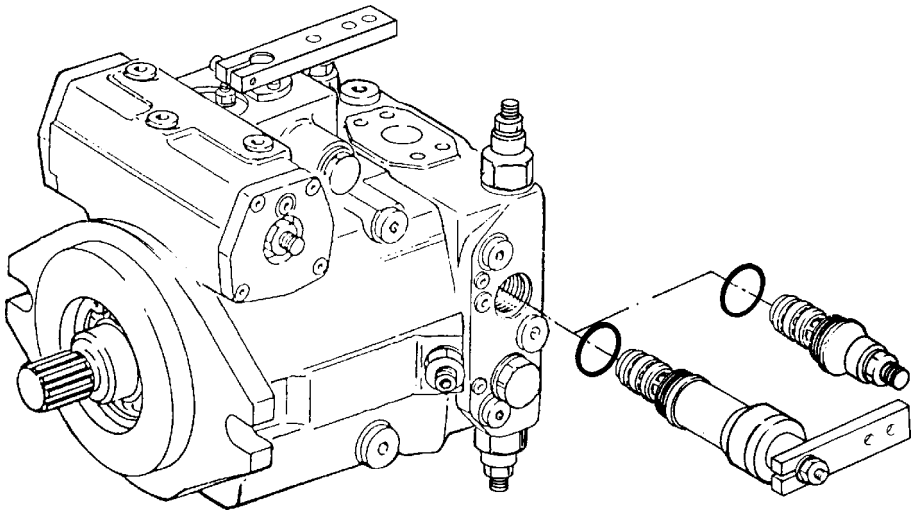
Wechsel der Dichtmutter.
Einstellmaß festhalten (*).

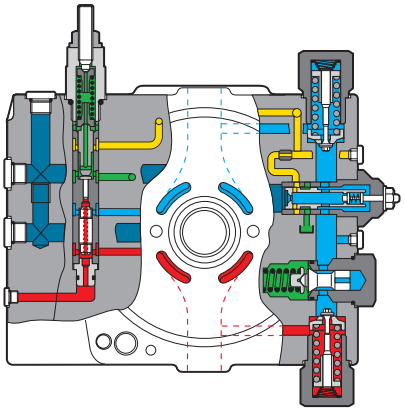
Change of the sealing nut.
Note setting measure (*).

Achtung!
Nach Einbau "Ventileinstellung" überprüfen.

Attention!
After assembly check "valve setting".

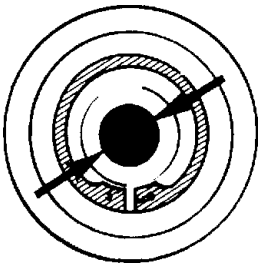
Regelventil abdichten
Sealing of the control valve





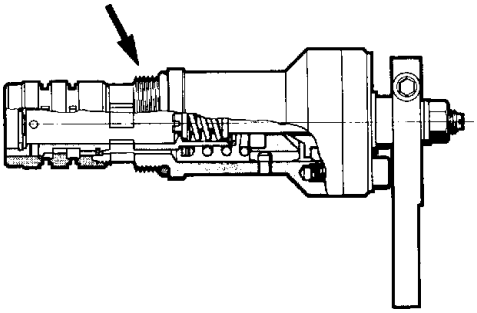
Regelventil ausbauen.

Remove control valve.



Blendendurchmesser nicht beschädigen.

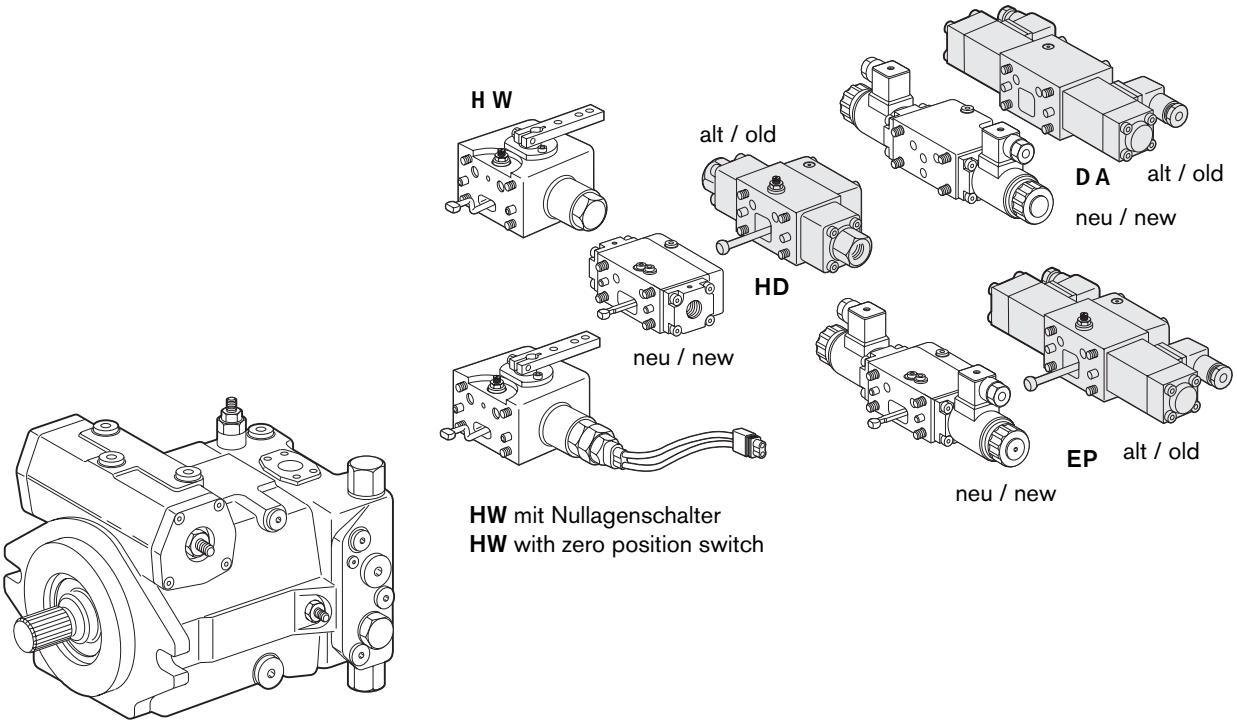
Do not damage throttle diameter.

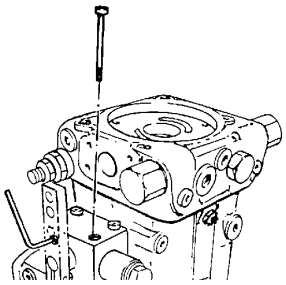


Gewinde vor Montage des neuen O-Ringes abkleben.

Before installing the new O-ring, tape the threads.

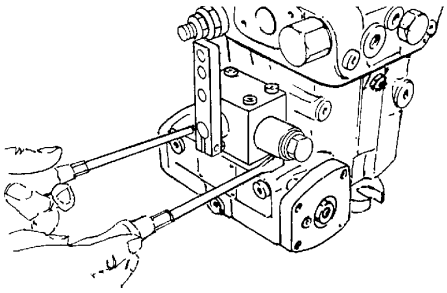
Steuergerät demontieren
Removing of the control module





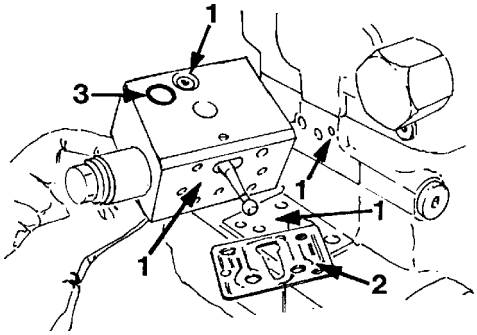
Befestigungsschrauben demontieren.

Remove fixing screws.



Ansteuergerät abdrücken.

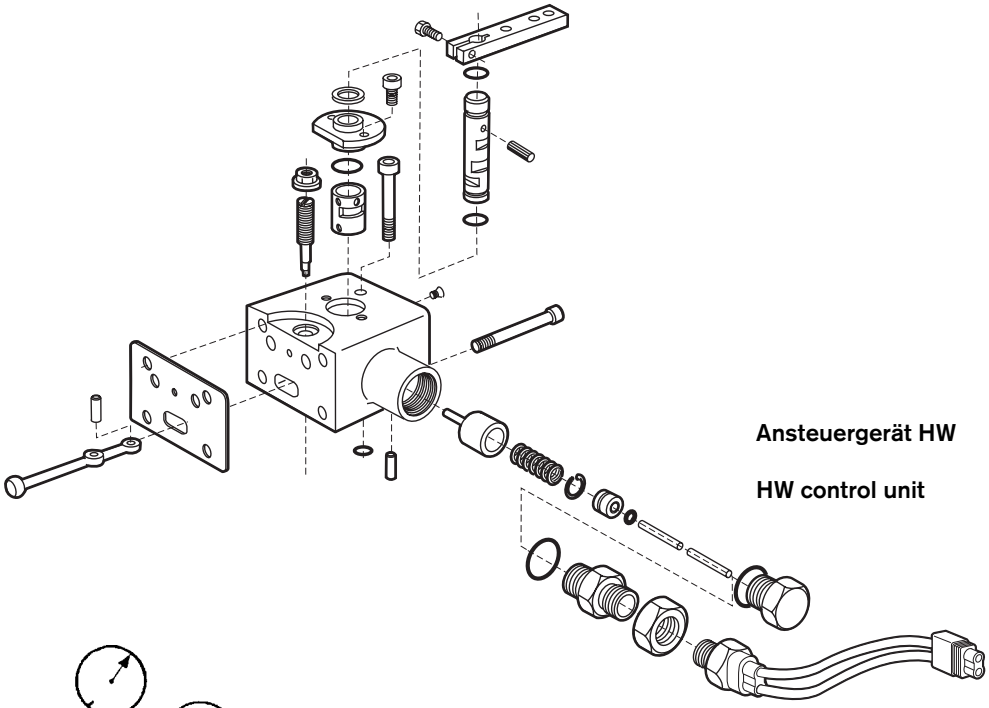
Pry-off the control module.



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

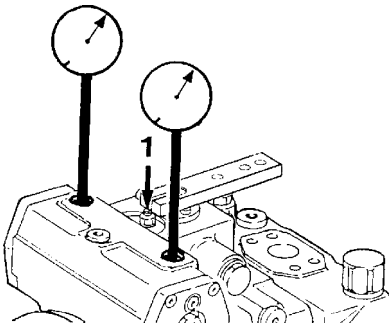
Check
Sealing surface (1), gasket (2), o-rings (3).

Ansteuergeräte
Control modules



Ansteuergerät HW

HW control unit

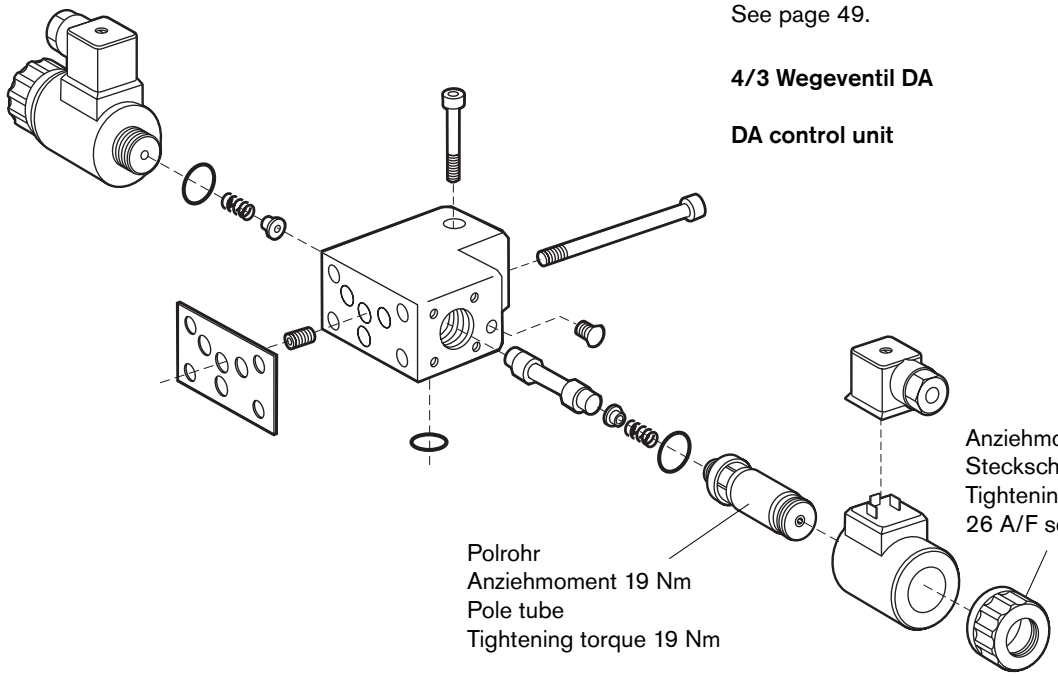


Hydraulische Nullage (1) neu einstellen. Beide Manometer müssen gleichen Druckwert anzeigen. Siehe Einstellhinweise Seite 49

Reset hydraulic zero position (1).
Both gauges must indicate the same pressure.
See page 49.

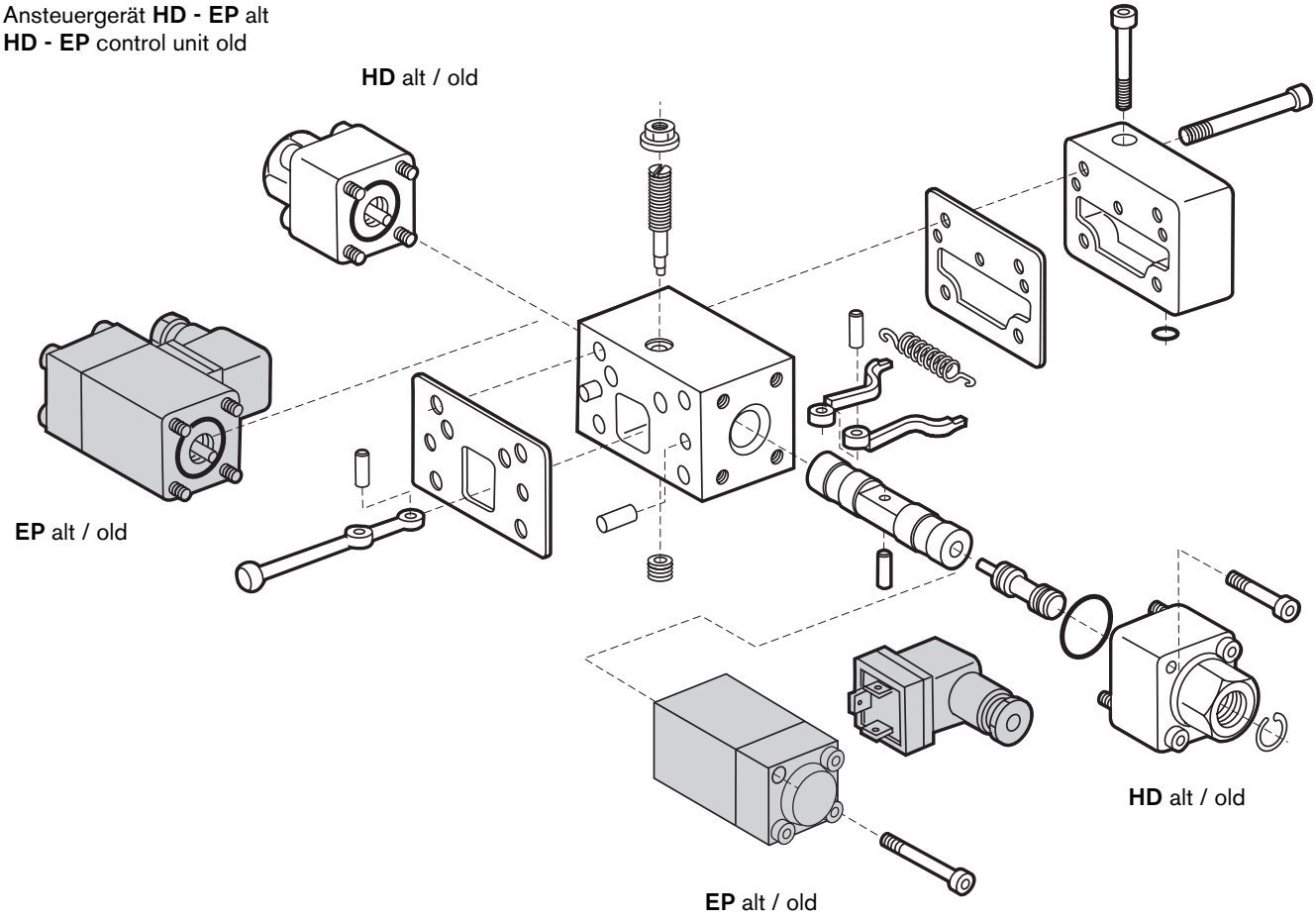
4/3 Wegeventil DA

DA control unit

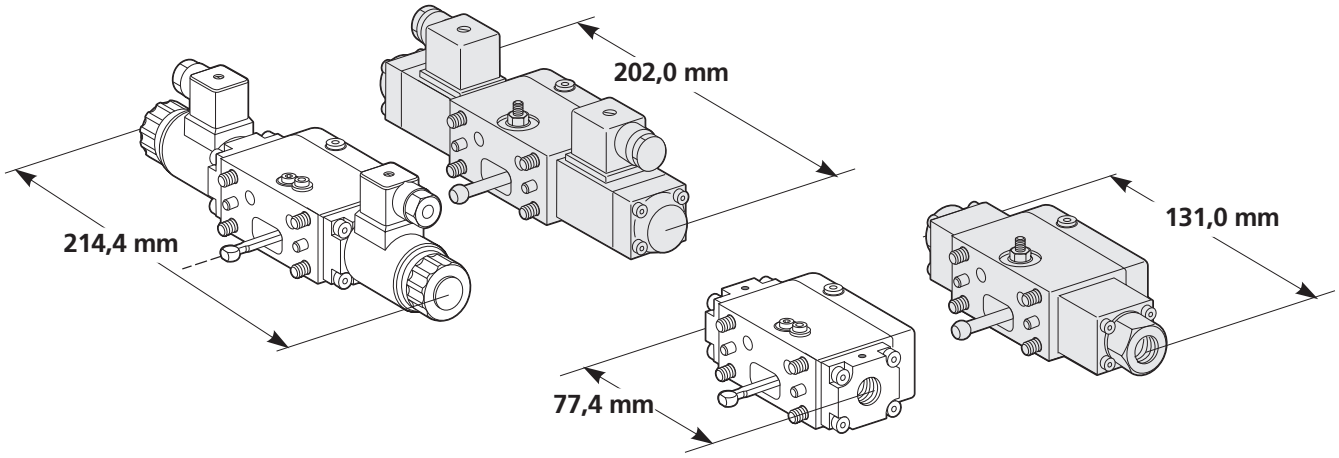


Ansteuergeräte
Control modules

Ansteuergerät **HD - EP** alt
HD - EP control unit old

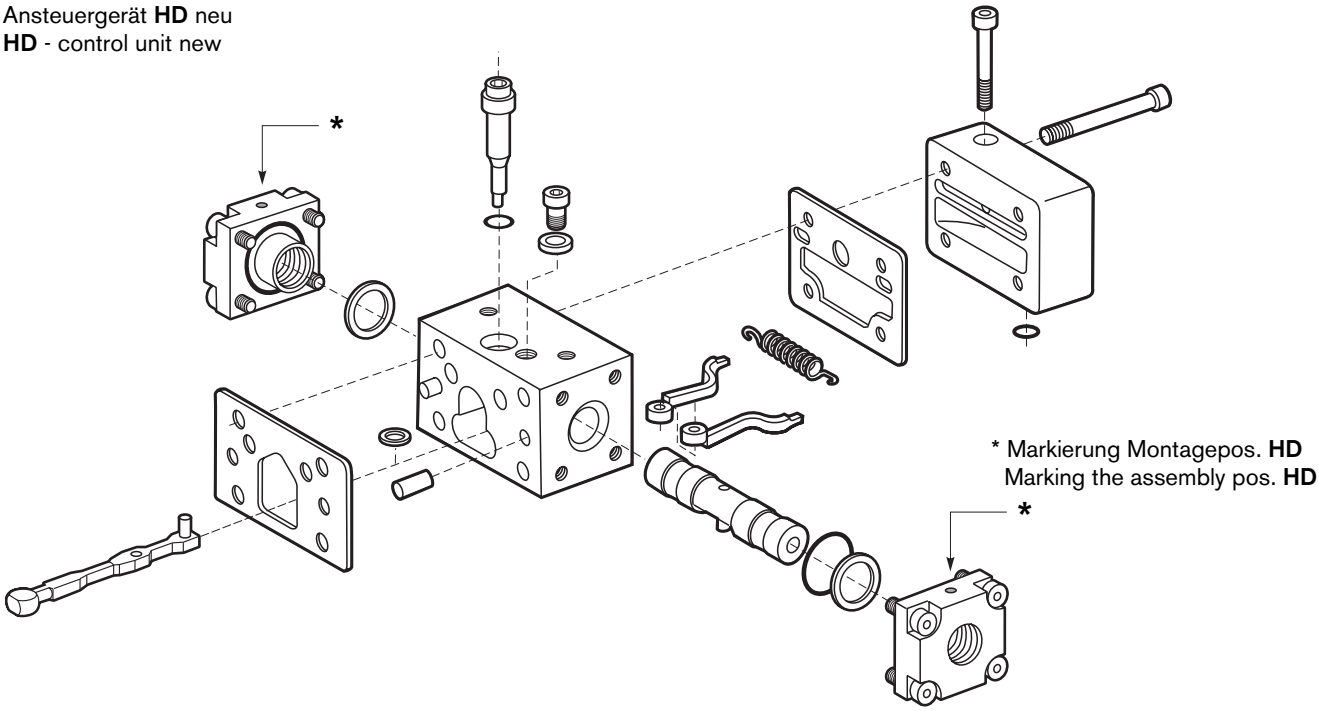


Neues Ansteuergerät **HD - EP**
New **HD - EP** control unit old



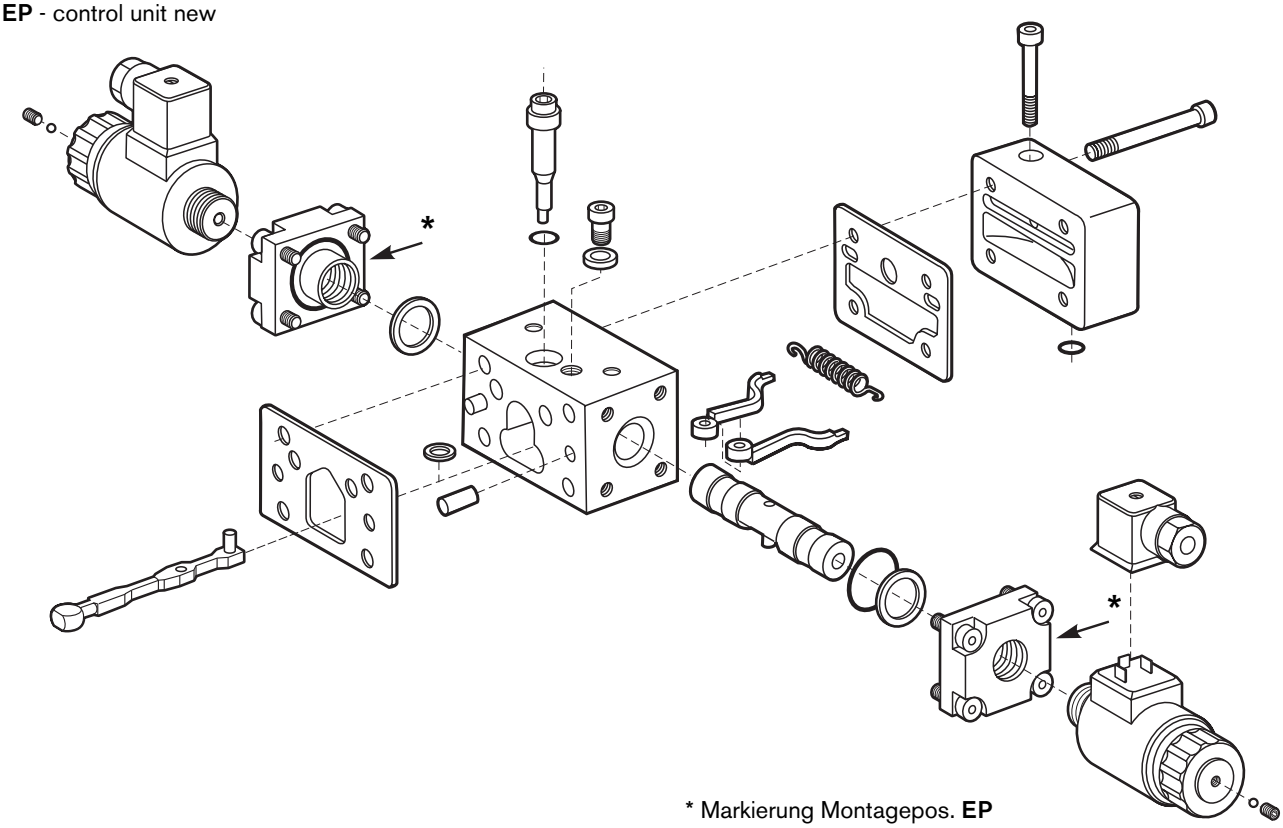
Ansteuergeräte
Control modules

Ansteuergerät **HD** neu
HD - control unit new



* Markierung Montagepos. **HD**
Marking the assembly pos. **HD**

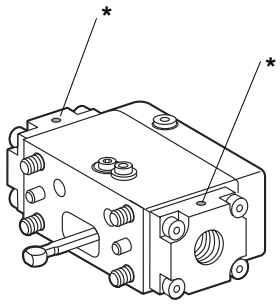
Ansteuergerät **EP** neu
EP - control unit new

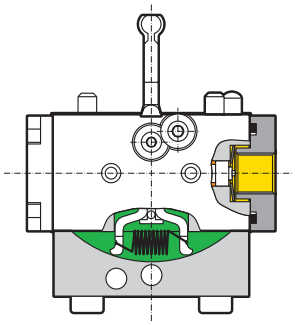


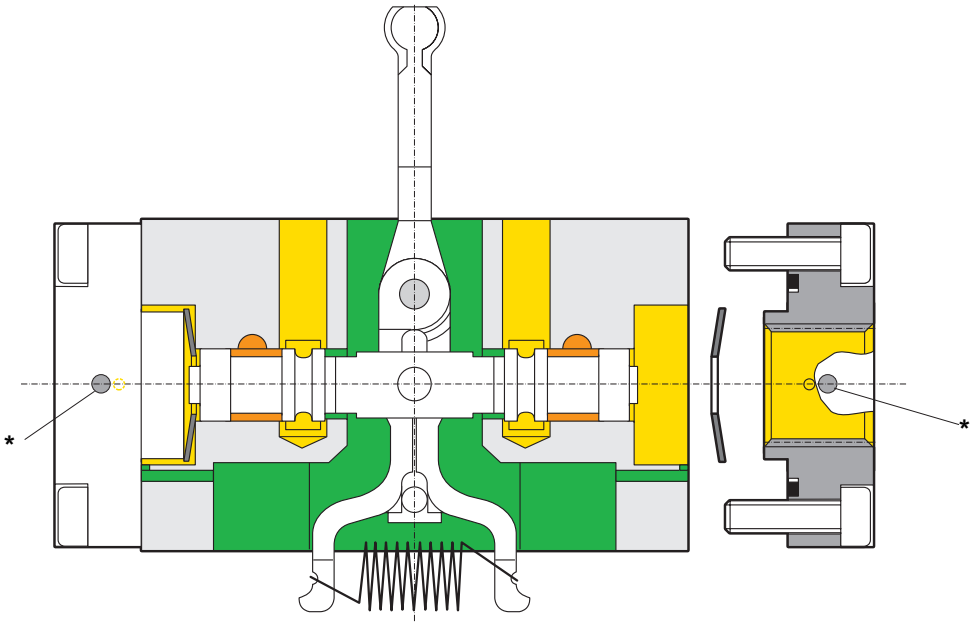
* Markierung Montagepos. **EP**
Marking the assembly pos. **EP**

Ansteuergeräte
Control modules

* Markierung Montageposition **HD**
* Marking the assembly position **HD**







* Markierung Montageposition **HD**

* Assembly position marker **HD**

Wird von EP- auf HD-Ausführung umgebaut - Deckelposition beachten siehe Markierung

○ Leckölkanal offen wird geschlossen.

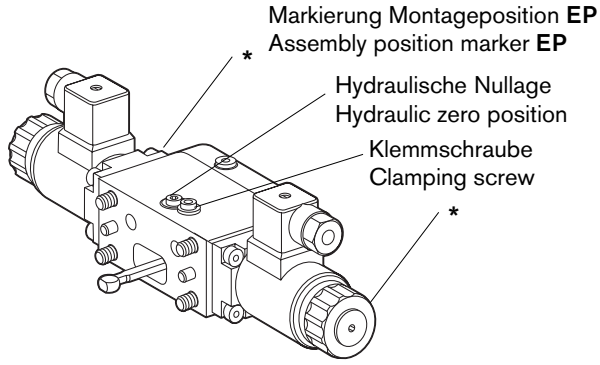
⚠ Zugfeder tauschen!

Is converted from EP into the HD version - take note of the cover position, see marker

○ The open leakage port is plugged

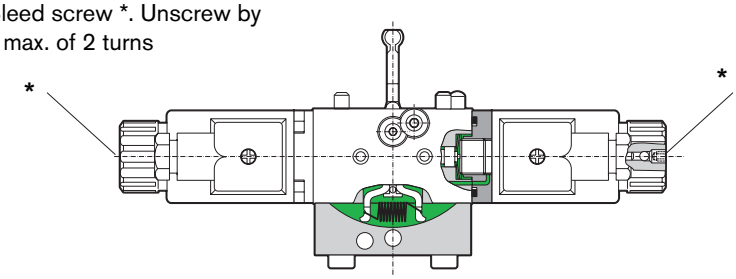
⚠ Exchange the tension spring!

Ansteuergeräte
Control modules

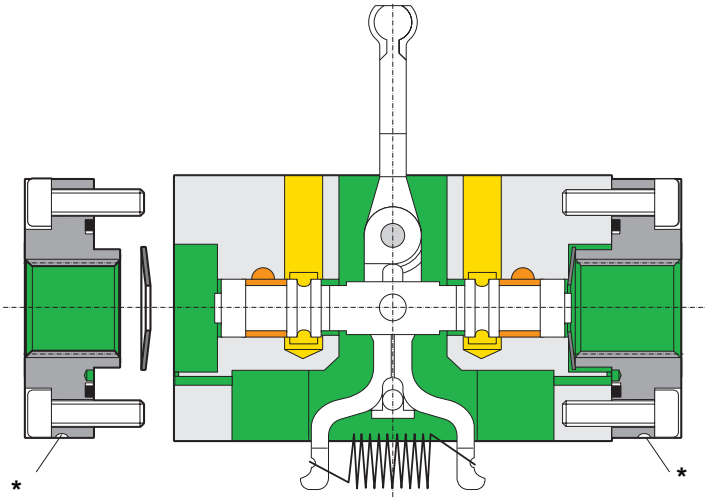


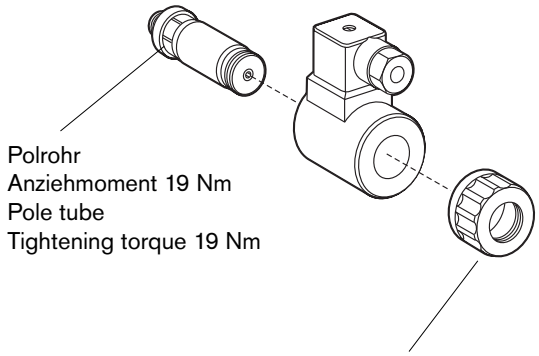
Die neuen Proportionalmagnete müssen bei der Inbetriebnahme entlüftet werden. Wird die Luft nicht aus dem Ankerraum entfernt, kann es zum Schwingen der Ansteuerung kommen.
Zum Entlüften ist am Ende des Magneten, im Messingteil, ein kleiner Gewindestift M4, SW 2 vorhanden. Dieser Gewindestift ist max. 2 Umdrehungen herauszudrehen und nach dem Entlüften mit 1 Nm wieder festzuziehen.
Bei der Ausführung mit Nothand mit Federrückzug muß zum Entlüften die Kunststoffmutter mit Gummibalg entfernt und nach dem Entlüften mit 5+1 Nm wieder angeschraubt werden.

Entlüftungsschraube * max. 2 Umdrehungen herausdrehen.
Bleed screw *. Unscrew by a max. of 2 turns



The new proportional solenoids must be bled during commissioning. If the air is not removed from the armature chamber oscillations at the control can occur. For bleeding purposes there is, on the end of the solenoid, in the brass component a small set screw M4, 2A/F. This can be unscrewed by a maximum of 2 turns and then after completion of the bleeding tightened to a maximum of 2 Nm.
For the version with hand override and spring return the plastic nut with rubber coating has to be removed for bleeding. After bleeding it has to be replaced and tightened with 5+1 Nm.

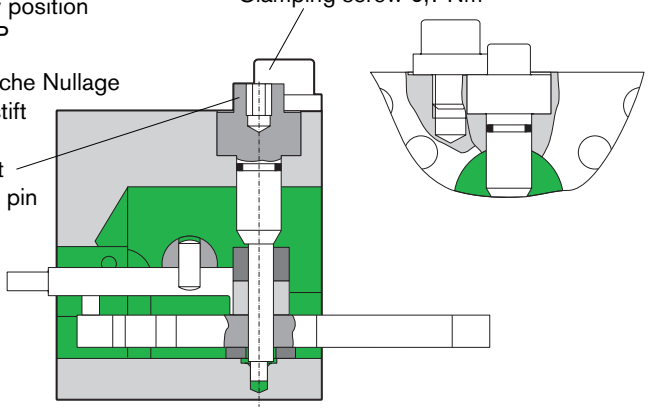




Markierung Montageposition **EP**
Assembly position marker EP

Klemmschraube 6,1 Nm
Clamping screw 6,1 Nm

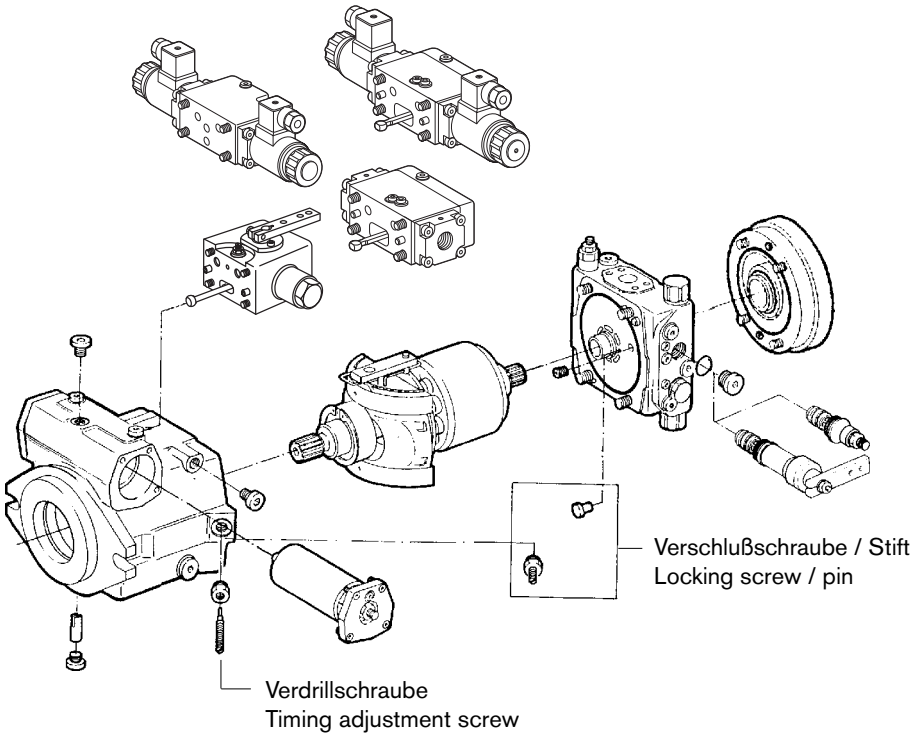
Hydraulische Nullage
Exzenterstift
Hydraulic zero point
Eccentric pin

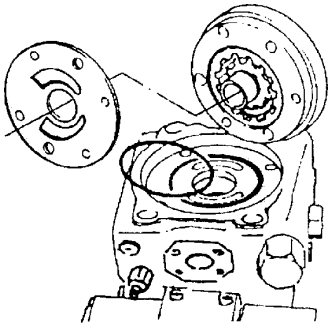


⚠ Beim Lösen der Klemmschraube
Exzenterstift - Hydraulische Nullage festhalten.

⚠ When loosening the clamping screw
Hold the eccentric pin - hydraulic zero point

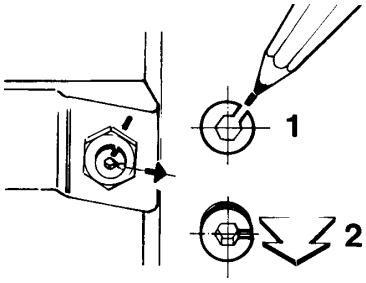
Pumpe demontieren
Pump disassembly





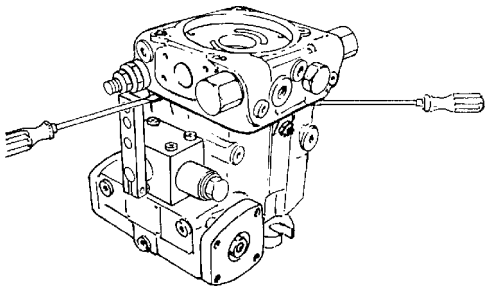
Lage der Hilfspumpe und Anschlußplatte markieren.
Hilfspumpe abbauen.

Mark position of the boost pump and the port plate.
Remove the boost pump.



Lage der Verdrillschraube markieren (1).
Verdrillschraube auf Demontageposition stellen (2).

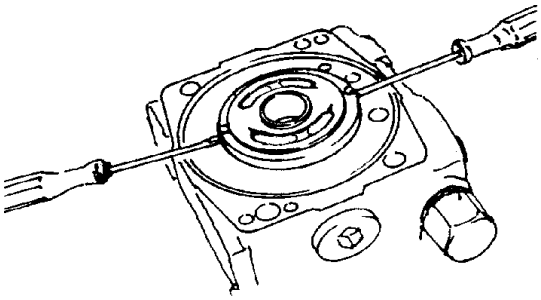
Mark the position of the indexing screw (1).
Set the indexing screw to disassembly position (2).



Anschlußplattenbefestigung lösen.
Anschlußplatte abheben.
Achtung! Dichtfläche.

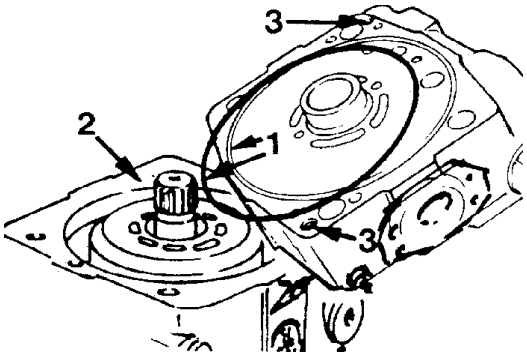
Release port plate fitting.
Take off port plate. If necessary, use screwdriver.
Attention! Sealing surface.

Pumpe demontieren
Pump disassembly



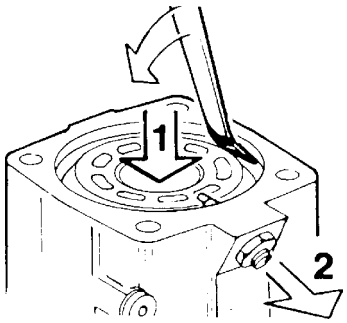
Steuerplatte abdrücken.
Lage notieren.

Lift off control plate.
Note position.



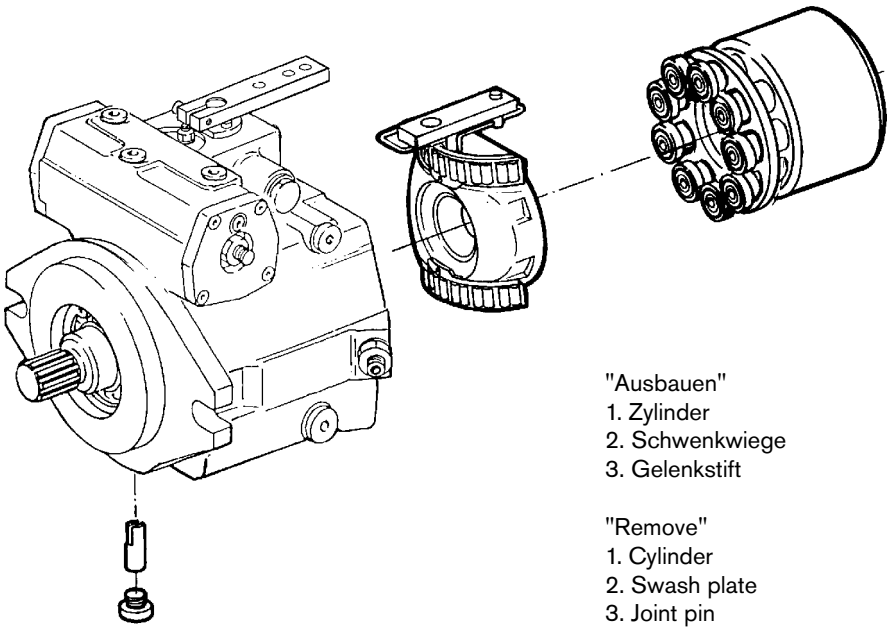
Kontrolle!
O-Ring mit Nut (1), Gehäuse (2), Quad-Ring und Quad-Ring Nut (3).

Check!
O-ring and groove (1), housing (2), Quad-ring and groove (3).



Zylinder nach unten drücken (1).
Verdrillschraube herausdrehen (2).
Triebwerk ausheben (3).

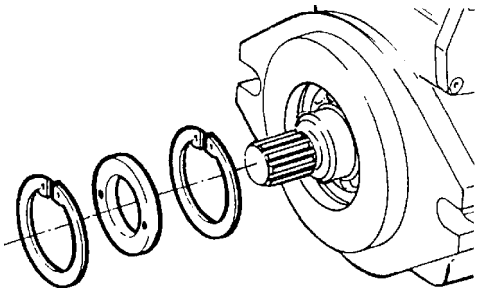
Press the cylinder to the bottom (1).
Remove fiming indexing screw (2).
Lift out rotary group (3).



"Ausbauen"
1. Zylinder
2. Schwenkwiege
3. Gelenkstift

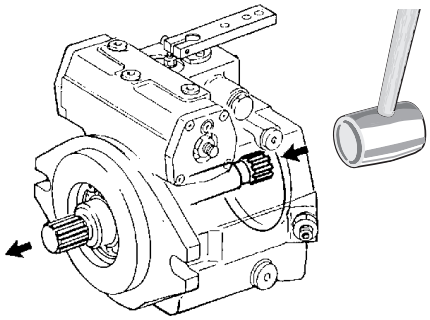
"Remove"
1. Cylinder
2. Swash plate
3. Joint pin

Triebwerk ausbauen
Removal of the rotary group



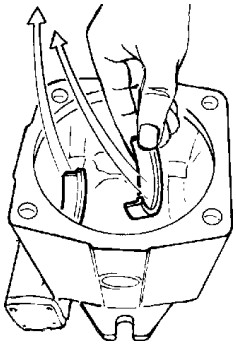
Sicherungsring, WDR ausbauen.

Remove retaining ring, radial seal ring.



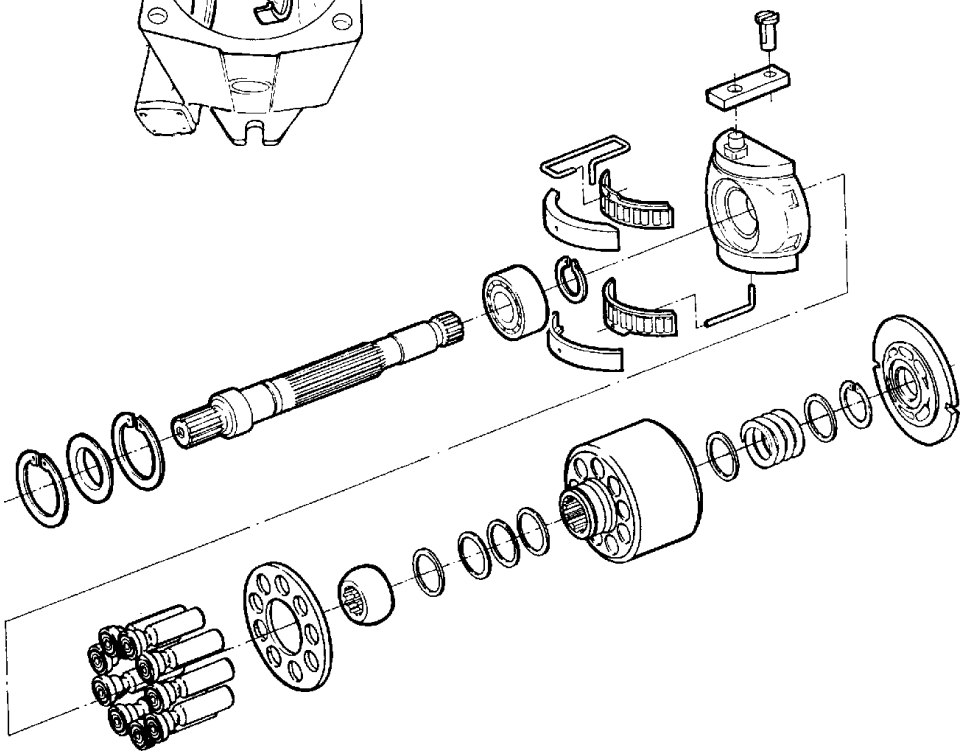
Triebwelle mit leichten Hammerschlägen austreiben.

Remove drive shaft with slight hammer strokes.

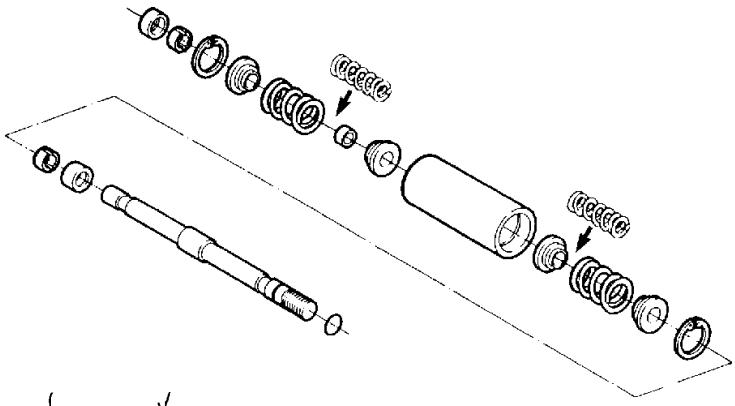


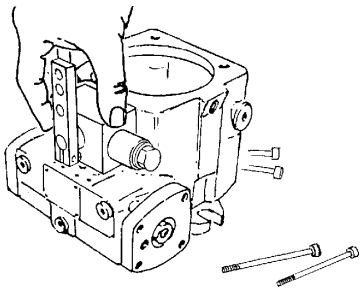
Lagerschalen ausbauen.

Remove bearing cups.



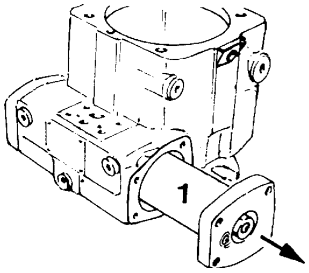
Stellkolben demontieren
Disassembly of the positioning piston





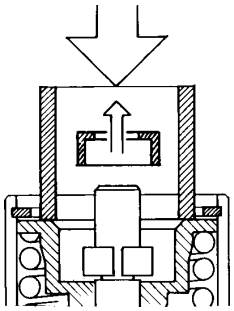
Steuergerät abbauen.

Remove control module.



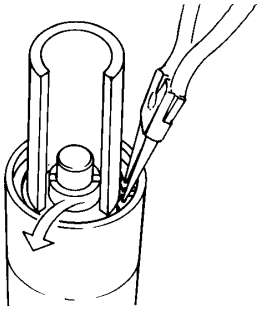
Stellkolben (1) ziehen.

Pull out control piston (1).



Vorrichtung aufsetzen und Feder vorspannen.
Aufnahmering ausbauen.

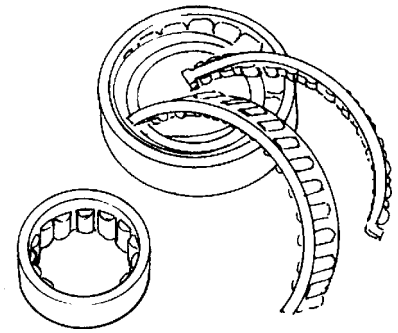
Mount fixture and tension spring.
Remove receiving ring.



Ringe ausbauen.
Sicherungsring ausbauen.
Achtung! Teile stehen unter Federvorspannung.

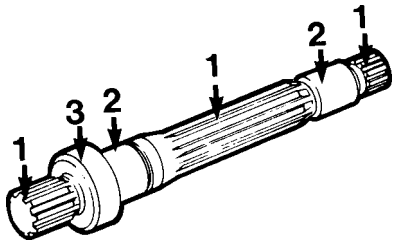
Take out rings.
Remove retaining ring.
Note! Parts are spring loaded.

Überprüfungshinweise
Inspection notes



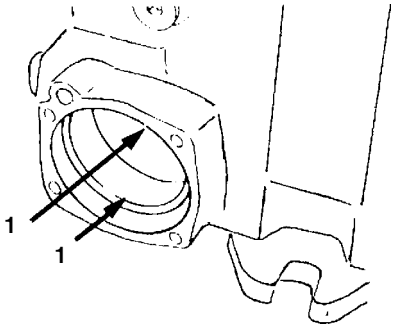
Alle Lager erneuern.

Replace all bearings.



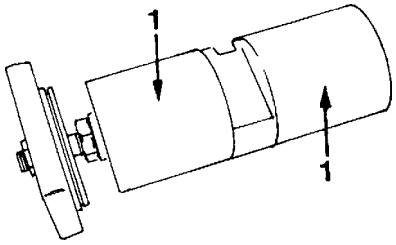
Kontrolle!
1. Verzahnung, ausgeschlagen, Passungsrost.
2. Lauffläche.
3. Einlaufrillen vom Wellendichtring.

Check!
1. Splines, wear steps, corrosion.
2. Running surfaces.
3. Grooves made by the shaft seal.



Stellkolbenlaufbüchse (1) riefenfrei, nicht ausgelaufen.

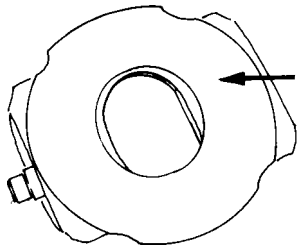
Check that the control piston guide bush (1) is free of grooves and is free of wear.



Kontrolle!
Stellkolben (1) riefenfrei.

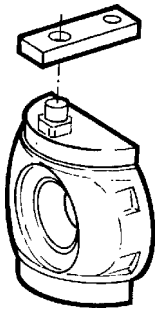
Check!
Control piston (1) is not scored.

Kontrolle der Triebwerksteile
Inspection of rotary group parts



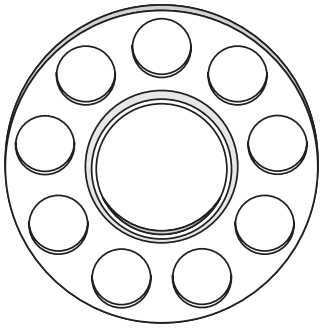
Kontrolle!
Gleitfläche riefenfrei.

Check!
Sliding surface free of grooves.



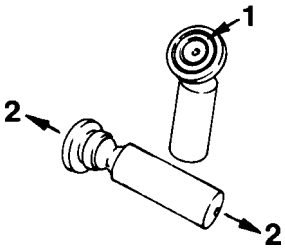
Kontrolle!
Verbindung Gleitstein/Schwenkzapfen spielfrei.

Check!
That the connection of slide ring/swivel pin is free of play.



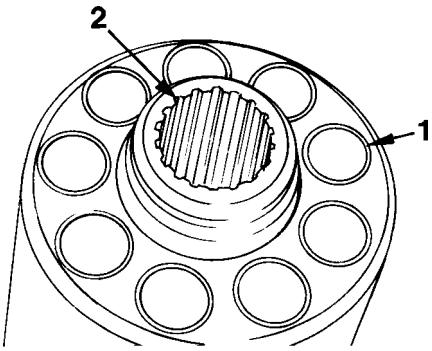
Kontrolle!
Rückzugeinrichtung riefenfrei, keine Einlaufspuren im Gleitschuhbereich.

Check!
That the retaining plate is free of grooves and that there is no wear in the slipper pad area.



Kontrolle!
Lauffläche (1) keine Kratzer, keine Metall-einlagerungen, kein Axialspiel (2),
(Kolben nur satzweise tauschen).

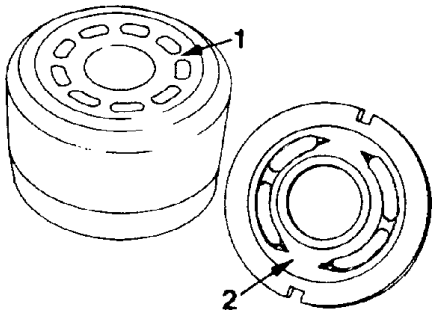
Check!
Check to see that there are no scratches or metal deposits on the sliding surface (1), and that there is no axial play (2),
(pistons must only be replaced as a set).



Kontrolle!
Zylinderbohrungen (1), Verzahnungen (2).

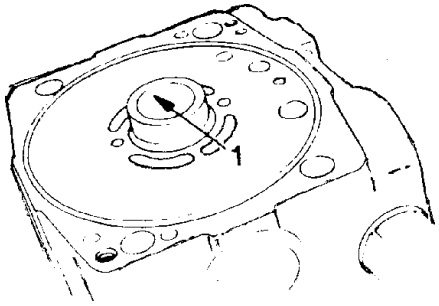
Check!
Cylinder bores (1), splines (2).

Kontrolle der Triebwerksteile
Inspection of rotary group parts



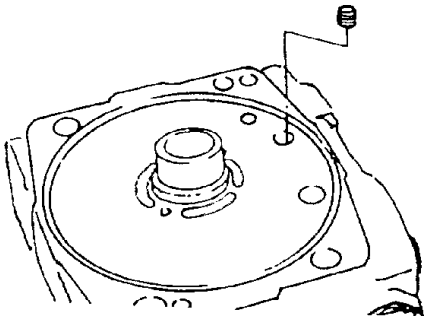
Kontrolle!
Zylindergleitfläche (1) riefenfrei, nicht eingelaufen, keine Einlagerungen, Steuerplatte (2) nicht riefig (nur satzweise austauschen).

Check!
Cylinder gilding surface (1) free of scratches, no traces of wear and no embedded foreign particles. No scratches on the valve plate (2).
(Replace ONLY in sets).



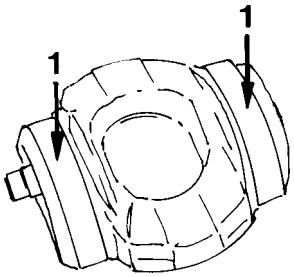
Kontrolle!
DU-Lagerbuchse (1) nicht ausgelaufen.

Check!
DU-bearing bush (1) is not worn out.



Hinweis:
Bohrung bei DA-Regelung offen.
Ohne DA-Regelventil geschlossen.

Information:
Boring for DA-control open.
Without DA-control closed.



Kontrolle!
Lagerbahnen (1)

Check!
Bearing surfaces (1)

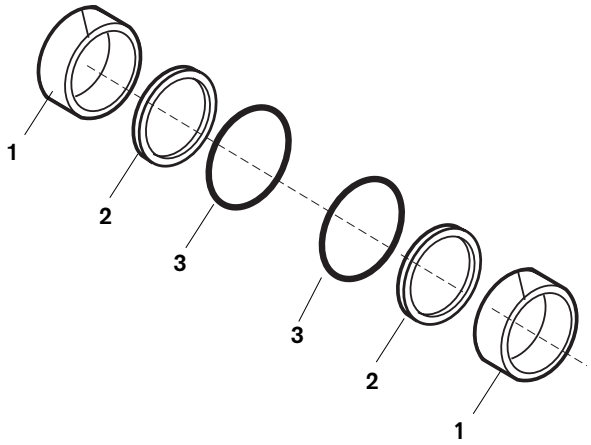
Stellkolben, Triebwerk einbauen
Positioning piston, rotary group assembly

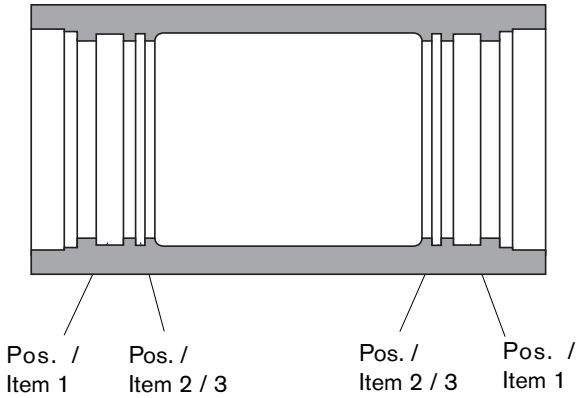
Gehäuse - Turcon-Glyd-Ring montieren / Assemble housing - Turcon-Glyd-ring

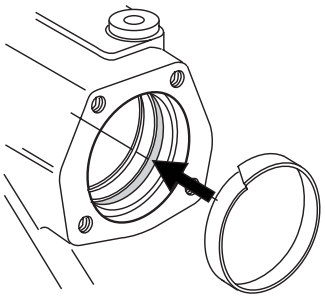
Hilfswerkzeuge / Auxiliary tools:

Montagezange / Assembly pliers: B+S x M22

Montage / Assembly A4VG

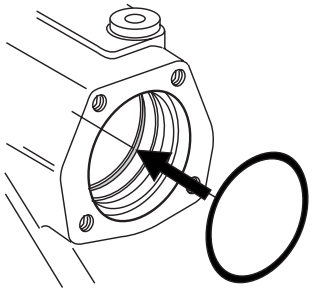






Pos. / Item 1: Stangenführungsring montieren.

Install barguide ring.

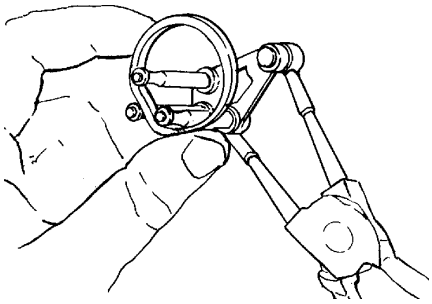


Pos. / Item 3: O-Ring montieren.

Install O-ring.

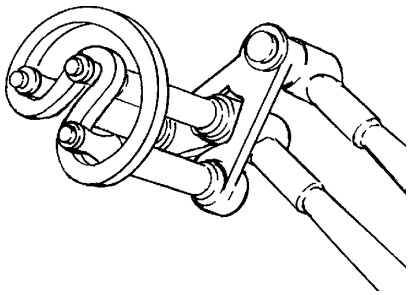
Stellkolben, Triebwerk einbauen
Positioning piston, rotary group assembly

Gehäuse - Turcon-Glyd-Ring montieren / Assemble housing - Turcon-Glyd-ring



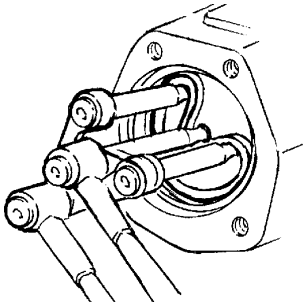
Dichtring (Pos. 2) in die Montagezange einlegen.

Fit the seal ring (Item 2) into the assembly tool.



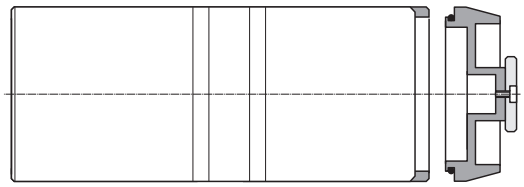
Dichtring mit Zangenschenkel nierenförmig zusammendrücken. Die Verformung von Turcon-Dichtungen ist sorgfältig vorzunehmen, damit die Dichtkanten nicht beschädigt werden.

Press the seal ring into the kidney shape using the assembly tool. The deformation of the Turcon seal has to be done with care so as not to damage the sealing edges.



Dichtring ins Gehäuse einführen und in der Aufnahmenut plazieren. Dann Spannung lösen und Montagezange herausziehen. Lage des Dichtringes prüfen - eventuell mit dem Finger egalisieren.

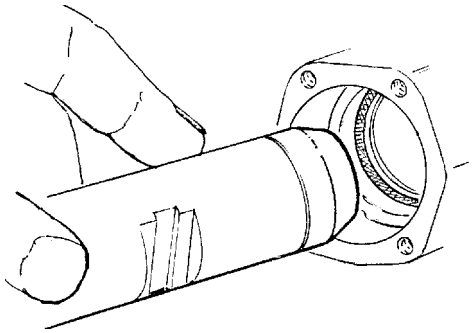
Position the seal ring into the housing and place it into the groove. Release the tension and withdraw the assembly tool.
Check the position of the seal ring if necessary straighten using a finger.



Führungsdorn in Stellkolben einbauen.

Insert guide thorn into the positioning piston.

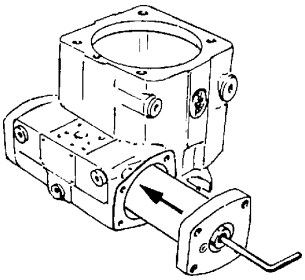
Führungsdorn / Guide thorn:	A4VG28	I: 277 5 017
	A4VG40	I: 277 5 017
	A4VG56	I: 277 5 018
	A4VG71	I: 277 5 019
	A4VG90	I: 277 5 020
	A4VG125	I: 277 5 021
	A4VG180	I: 277 5 022
	A4VG250	I: 277 5 023



Führungsdorn leicht einfetten.
Stellkolben mit Führungsdorn einbauen.

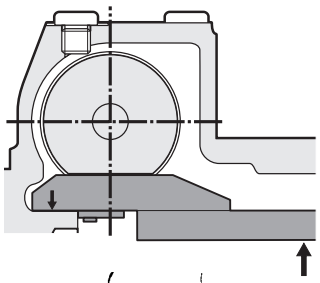
Grease slightly guide thorn.
Install positioning piston with guide thorn.

Triebwerk einbauen
Installation of the rotary group



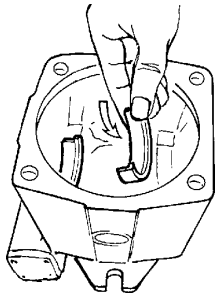
Stellkolben ins Gehäuse einsetzen.
Hinweis:
Stellkolben vor Einbau einölen.

Insert positioning piston into the housing.
Instruction:
Oil positioning piston before assembly.



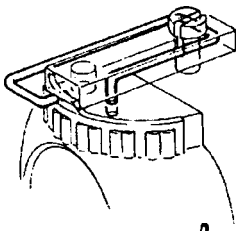
Stellkolben mit Hebel (Id.Nr. 2774491) ausrichten.
* Führung für Gleitstein - Schwenkwiege

Position stroke piston with lever (Id.No. 2774491).
* Sliding stone guidance in the piston.



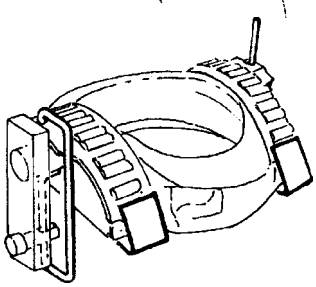
Lagerschalenpaar einsetzen.

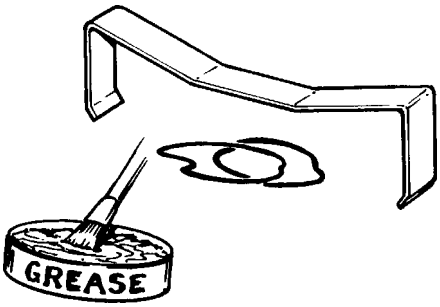
Insert bearing shells.

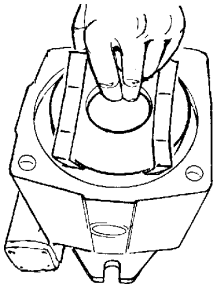


Lager, Draht, Gleitstein und Gelenkstift montieren.
Montagehilfe: z.B. - Klammer / Gummiringe / Fett

Assemble the bearing, wire, slide ring and joint pin
Assemble aids:
e.g. - clips / rubber rings / grease



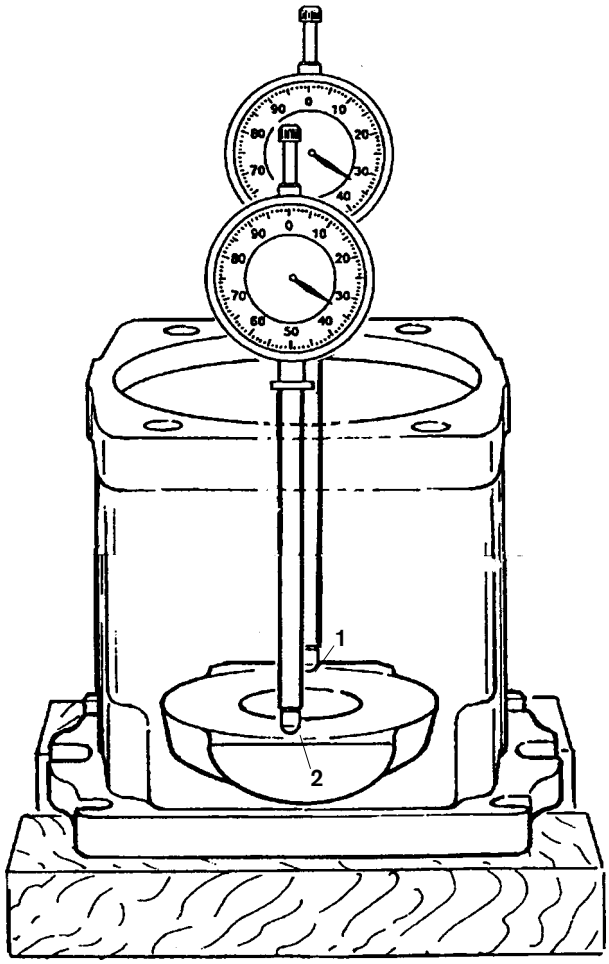




Schwenkwiege komplett ins Gehäuse einsetzen.
Auf korrekten Sitz der Schwenklager im Gehäuse "achten".
⚠ Montagehilfe ausbauen.

Insert the swash plate into the housing.
Ensure that the swivel-bearing is correctly located in the housing.
⚠ Remove assembly aid.

Triebwerk einbauen
Installation of the rotary group

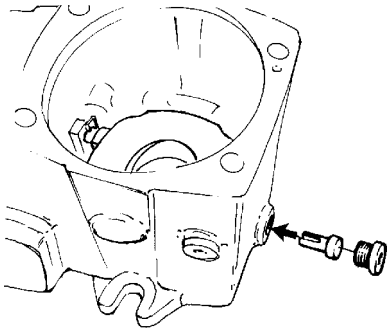


⚠ Kontrolle: Sitz der Schwenklager in der Lagerbahn.

Mittig stellen mit Meßvorrichtung (Uhr oder Tiefenmaß)
Punkt 1 und 2 kontrollieren - gleiches Maß.

⚠ Check: Location of the swivel-bearing in the bearing.

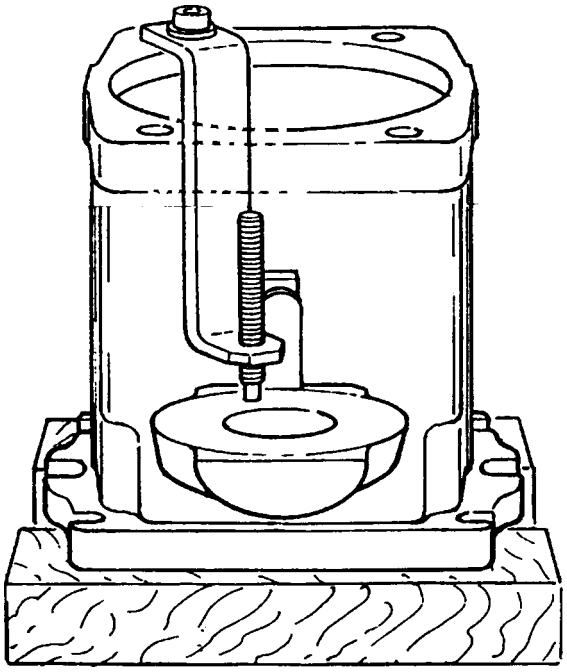
Centralise by using a measuring device (dial gauge or depth measurement).
Check points 1 and 2 - they should have the same dimension.



Gelenkstift montieren.

Fit joint pin.

Triebwerk einbauen
Installation of the rotary group



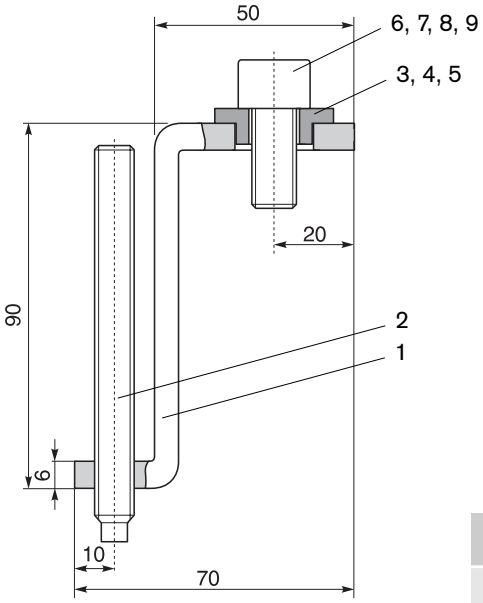
Haltevorrichtung montieren.
Mit Gewindestift Schwenkwiege festhalten.

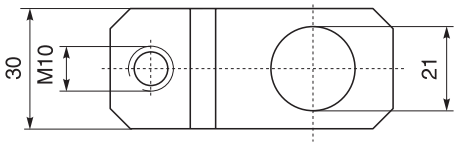
⚠ Keine Gewaltanwendung.

Fit holding device.
Hold swash plate in position utilising the set screw.

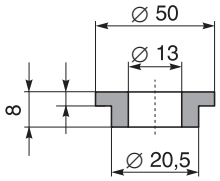
⚠ Do not use force.

Haltevorrichtung "Schwenkwiege" A4V
Holding device "swivel cradle" A4V

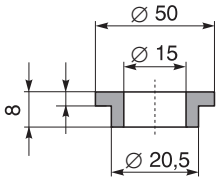




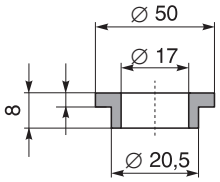
Teil/Part 3



Teil/Part 4

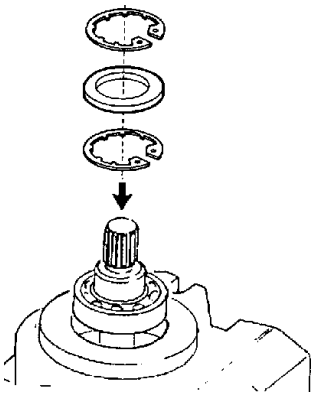


Teil/Part 5



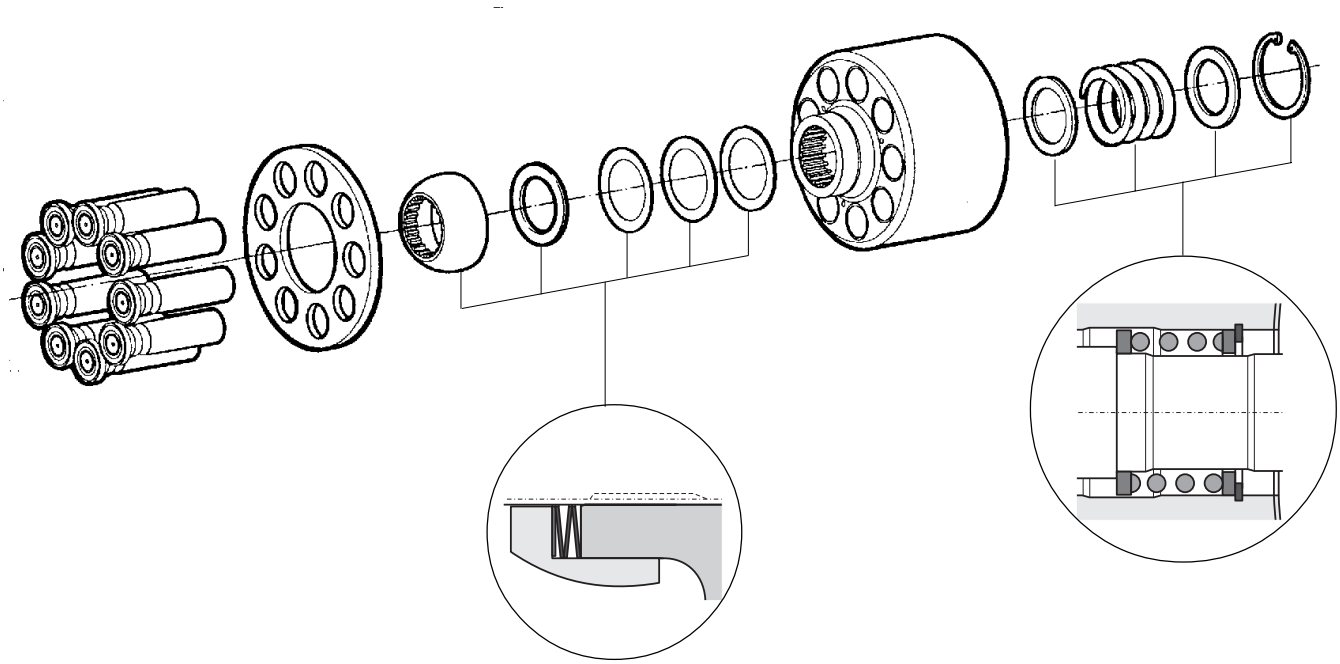
Pos./Item	Benennung/Designation	Stck./Qty.
1	Winkel/Angle	2
2	Gewindestift/Threaded pin	2
3	Scheibe/Shim	2
4	Scheibe/Shim	2
5	Scheibe/Shim	2
6	Zyl. Schraube/Cyl. screw M12 x 25 DIN 912	2
7	Zyl. Schraube/Cyl. screw M14 x 25 DIN 912	2
8	Zyl. Schraube/Cyl. screw M16 x 30 DIN 912	2
9	Zyl. Schraube/Cyl. screw M20 x 35 DIN 912	2

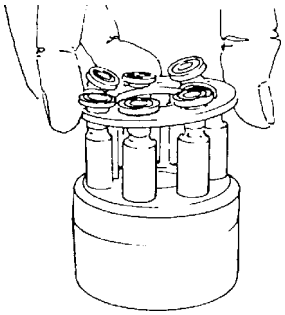
Triebwerk einbauen
Installation of the rotary group



Neue Montageposition!
Triebwelle mit Lager und Wellendichtring einbauen.

Assemble drive shaft with bearings and radial seal rings.

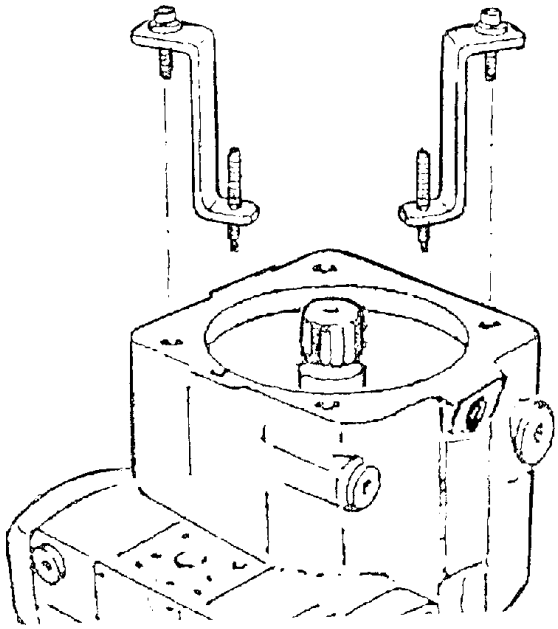




Kolben mit Rückzugeinrichtung montieren.
Hinweis:
Kolben, Gleitschuhe einölen.

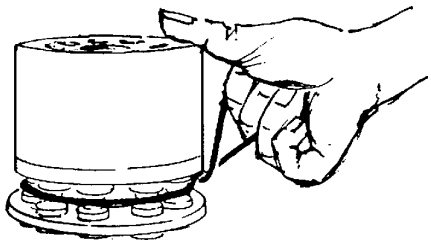
Assemble piston with retaining plate.
Note:
Oil piston and piston pad.

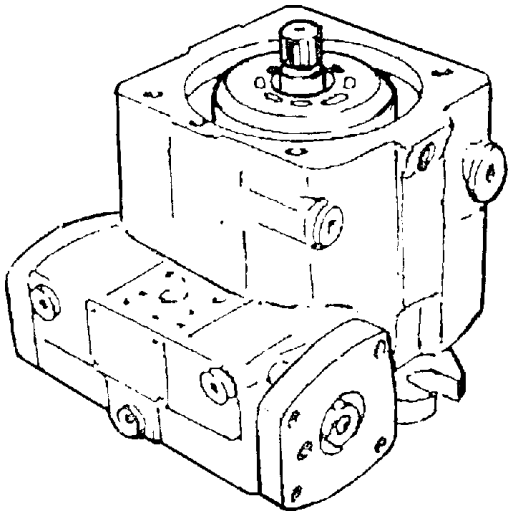
Triebwerk einbauen
Installation of the rotary group



Vorrichtung ausbauen.
Zylinder mit Kolben und Rückzugeinrichtung einbauen.

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

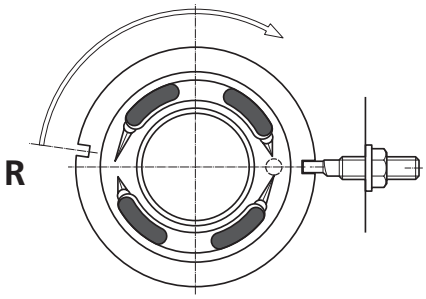




Montagehilfe:
Mit O-Ring Kolben festhalten.

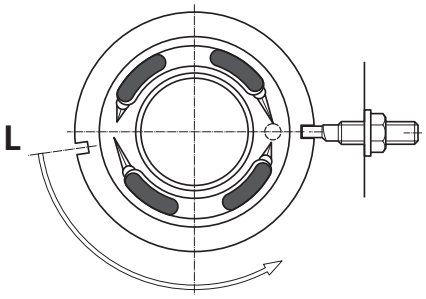
Assembly aid:
Hold the pistons by using an O-ring.

Triebwerk einbauen DA
Installation of the rotary group DA



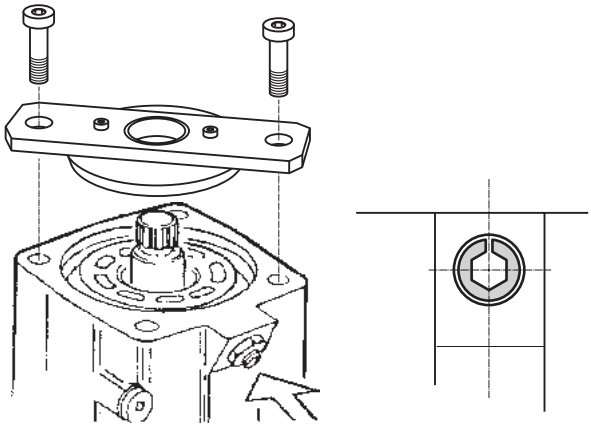
Steuerplatte Rechtslauf - in Drehrichtung verdreht.
Achtung! Geräuschkerben sind drehrichtungs-bezogen eingeschliffen.

Control plate clockwise rotation - indexed in the direction of rotation.
Note! Noise grooves are machined - in based on directionof rotation.



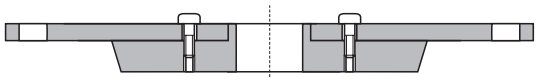
Steuerplatte Linkslauf - in Drehrichtung verdreht.
Achtung! Geräuschkerben sind drehrichtungs-bezogen eingeschliffen.

Control plate counter clockwise rotation - indexed in the direction of rotation.
Note! Noise grooves are machined - in based on direction of rotation.

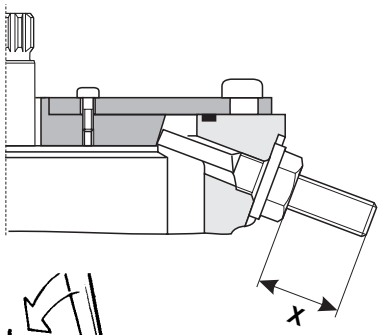


Bei Ausführung mit Verdrillschraube:
Zylinder nach unten drücken - Verdrillschraube auf Maß x einschrauben.
* Kerbe in Montageposition.

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.

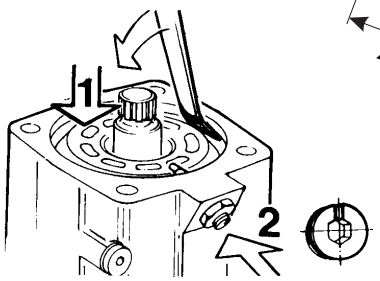


⚠ Maß X mit Vorrichtung neu ermitteln.
Zylinder mit Vorrichtung nach unten drücken.
Verdrillschraube bis Anschlag einschrauben - Maß X - Kerbe in Montageposition drehen.



⚠ Re-identify dimension X with device.
Push cylinder down with device.
Screw in eccentric screw till stop - Dimension X - Turn groove in assembly position.

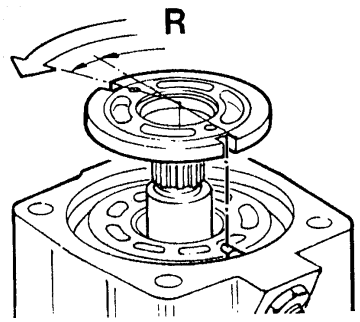
Hilfsvorrichtung: / A4VG40 I: 277 5 086
Auxiliary device: A4VG56 I: 277 5 087



Zylinder nach unten drücken (1).
Verdrillschraube einbauen (2).
Kerbe in Montageposition.

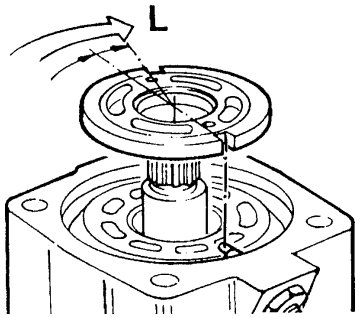
Press the cylinder to the bottom (1).
Screw in the indexing screw (2).
Groove in mounting position.

Pumpe montieren DA
Assembly of the pump DA



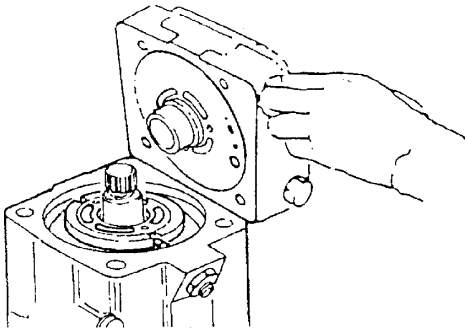
Steuerplatte einsetzen - Rechtslauf.

Insert the control plate - clockwise rotation.



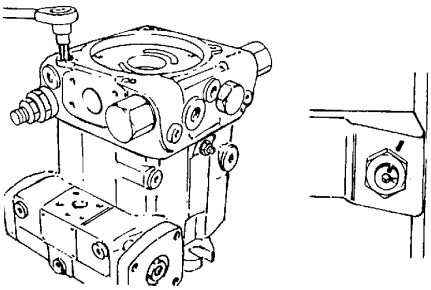
Steuerplatte einsetzen - Linkslauf.

Insert the control plate -
Counter- clockwise rotation.



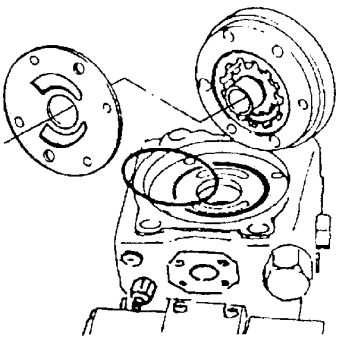
Anschlußplatte lagerichtig aufsetzen.

Place control plate in correct position.



Schrauben über Kreuz anziehen.
Verdrillschraube auf Markierung drehen.

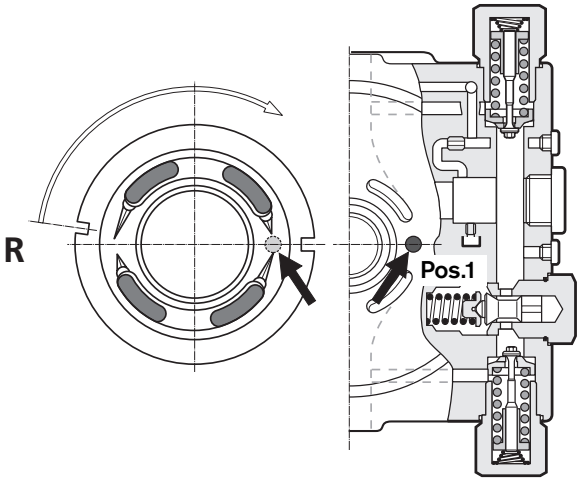
Tighten screws (Cross-corner).
Turn the indexing screw to marking.



Hilfspumpe montieren.

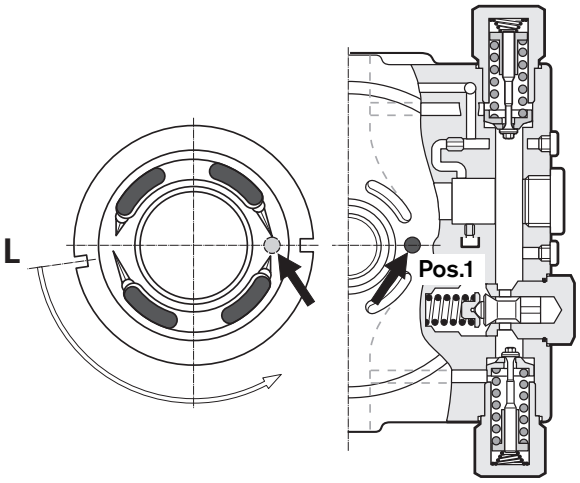
Assemble boost pump.

Triebwerk einbauen EP, HD, HW
Installation of the rotary group EP, HD, HW



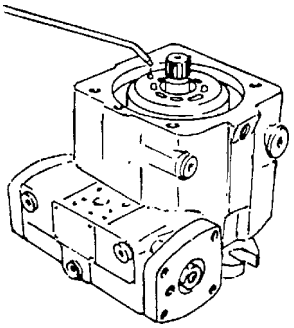
Steuerplatte Rechtslauf - in Drehrichtung verdreht.
Achtung! Pos.1 Fixierstift
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate clockwise rotation - indexed in the direction of rotation.
Note! Pos.1 Fixing pin
Noise grooves are machined - in based on direction of rotation.



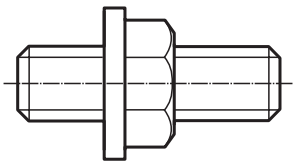
Steuerplatte Linkslauf - in Drehrichtung verdreht.
Achtung! Pos.1 Fixierstift
Geräuschkerben sind drehrichtungsbezogen eingeschliffen.

Control plate counter clockwise rotation - indexed in the direction of rotation.
Note! Pos.1 Fixing pin
Noise grooves are machined - in based on direction of rotation.



Zylinderflächen und DU-Lager einölen, neue O-Ringe mit Fett einreiben und einsetzen.

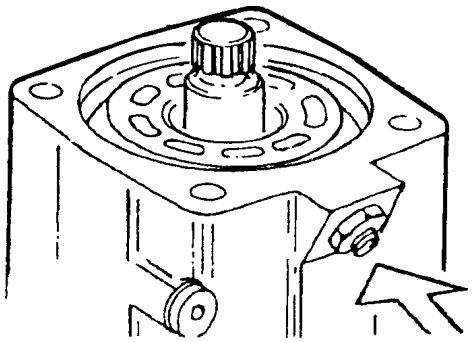
Oil the running surfaces of the cylinder barrel and the DU- bearing. Grease the O-rings and insert in grooves.



Verschlußschraube

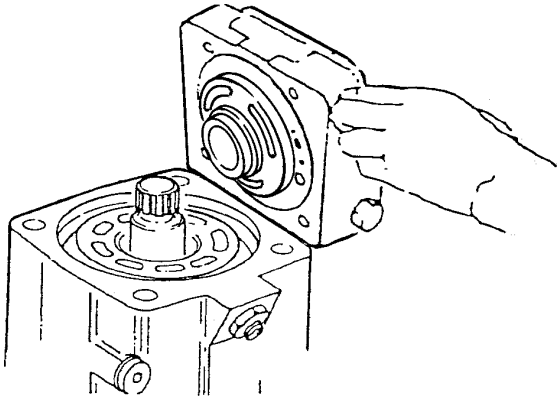
Plug

Pumpe montieren EP, HD, HW
Assembly of the pump EP, HD, HW



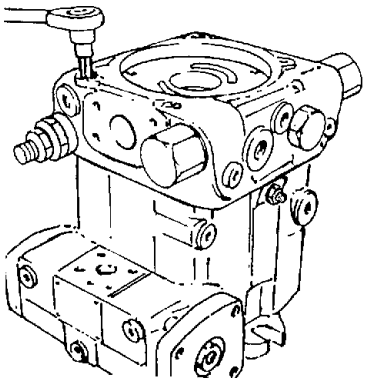
Verschlußschraube einbauen.

Screw in the plug.



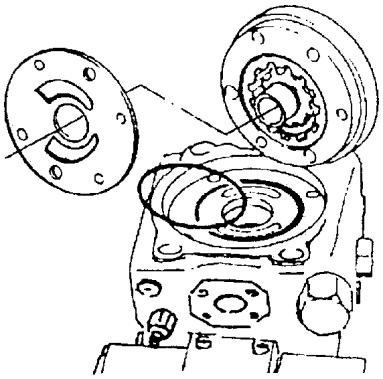
Anschlußplatte mit Steuerplatte lagerichtig aufsetzen.
Hinweis:
EP, HD, HW -Steuerplatte mit Fett einsetzen.

Place port block with control plate in correct position.
Note:
EP, HD, HW - Put control plate with grease.



Schrauben über Kreuz anziehen.
Verdrillschraube auf Markierung drehen.

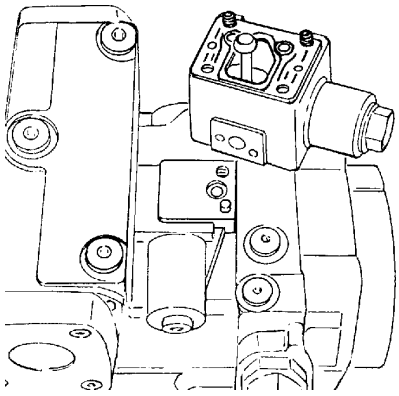
Tighten screws (Cross-corner).
Turn the indexing screw to marking.



Hilfspumpe montieren.

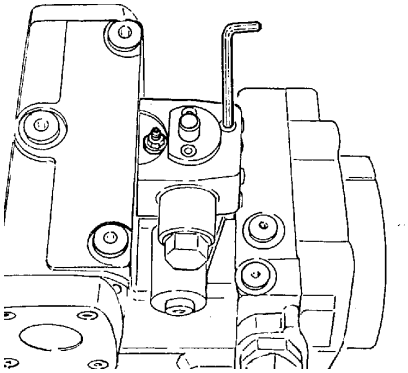
Assemble boost pump.

Pumpe montieren
Assembly of the pump



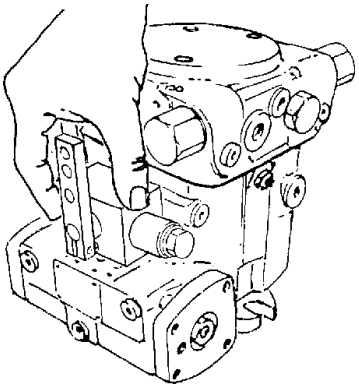
Dichtung mit zwei Befestigungschrauben zentrieren und Ansteuergerät einbauen.
Alle vier Schrauben mit halbem Drehmoment anziehen.

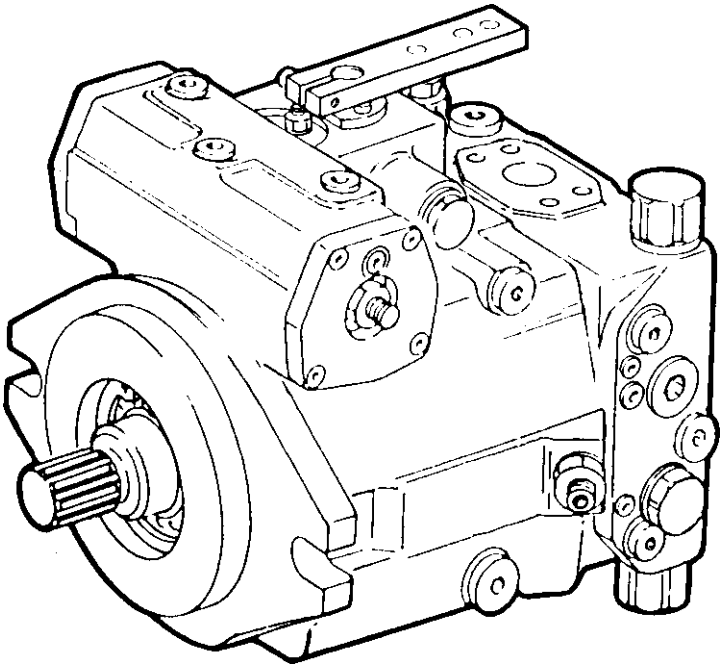
Centre the seal using two fixing screws and fit the control unit.
Tighten all four screws to half of specified torque.



Fünfte Schraube einsetzen und mit Drehmoment = 10,4 Nm festziehen.
Restliche vier Schrauben nach Drehmoment festziehen.

Fit the fifth screw and tighten to a torque of 10,4 Nm.
Then tighten the other four screws to there correct torque.





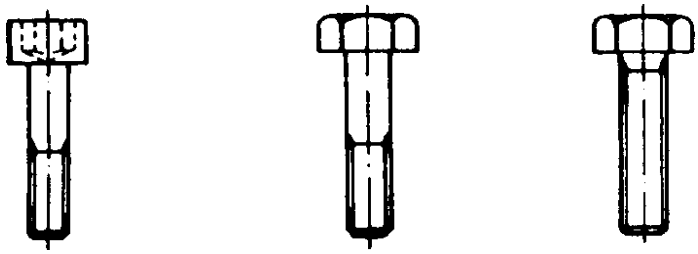
Montageanweisung für Anziehdrehmomente
Assembly guidelines for tightening torques

1. **Schaftschrauben** (nach N 08.001)

   Die Werte gelten für Schaftschrauben mit metrischem ISO-Gewinde nach DIN 13 Teil 13, sowie Kopfauflagemaßen nach DIN 912 Zylinderschrauben,
   DIN 931 Sechskantschrauben mit Schaft bzw.
   DIN 933 Sechskantschrauben mit Gewinde bis Kopf.

1. **Bolts** (to N 08.001)

   The values stated are valid for bolts with metric ISO threads to DIN 13 part 13, as well as head areas to DIN 912 socked head cap screws,
   DIN 931 hexagon bolt or
   DIN 933 hexagon bolts with threads up to the head.

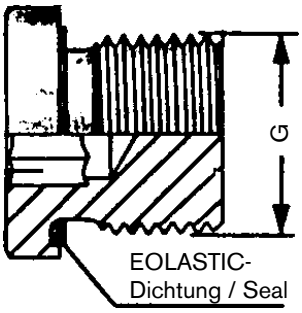


Gewinde / Thread	Festigkeitsklassen / Tensile strength class		
	8.8	10.9	12.9
	Anziehdrehmoment / Tightening torque M_A in Nm		
M3	1,1	1,6	1,9
M4	3,1	4,5	5,3
M5	6,1	8,9	10,4
M6	10,4	15,5	18
M8	25	37	43
M10	51	75	87
M12	87	130	150
M14	140	205	240
M16	215	310	370
M18	300	430	510
M20	430	620	720
M22	580	830	970
M24	740	1060	1240

Montageanweisung für Anziehdrehmomente
Assembly guidelines for tightening torques

2. **Verschlußschrauben** mit Innensechskant und Profildichtring (nach N 02.009).

2. **Plugs** with internal hexagon and profile seal ring (to N 02.009).

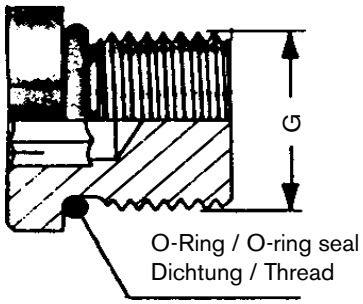


Gewinde / Thread	Anziehdrehmoment / Tightening torque M_A in Nm	Gewinde / Thread	Anziehdrehmoment Tightening torque M_A in Nm
M8 x 1	5	G 1/8 A	10
M10 x 1	10	G 1/4 A	30
M12 x 1,5	20	G 3/8 A	35
M14 x 1,5	30	G 1/2 A	60
M16 x 1,5	35	G 3/4 A	90
M18 x 1,5	40	G 1 A	140
M20 x 1,5	50	G 1 1/4 A	240
M22 x 1,5	60	G 1 1/2 A	300
M26 x 1,5	70		
M27 x 2	90		
M30 x 1,5	100		
M33 x 2	140		
M42 x 2	240		
M48 x 2	300		

Montageanweisung für Anziehdrehmomente
Assembly guidelines for tightening torques

5. Verschlußschrauben mit Innensechskant, O-Ring und UNF-, UN-Gewinde nach SAE J 514 (nach N 02.106)

5. Plugs with internal hexagon, O-ring and UNF-, UN- threads to SAE J 514 (nach N 02.106)

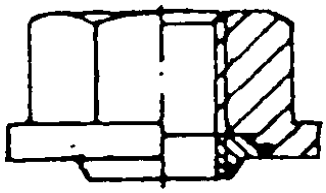


Gewinde / Thread	Anziehdrehmoment / Tightening torque M_A in Nm	Gewinde / Thread	Anziehdrehmoment Tightening torque M_A in Nm
7/16 - 20 UNF	15	M12 x 1,5	10
1/2 - 20 UNF	20	M14 x 1,5	30
9/16 - 18 UNF	25	M27 x 1,5	35
3/4 - 16 UNF	72		
7/8 - 14 UN	127		
1 1/16 -12 UN	147		
1 3/16 -12 UN	173		
1 5/16 -12 UN	198		
1 5/8 -12 UN	320		
1 7/8 -12 UN	390		

6. SEAL-LOCK-Dichtmuttern (nach N 02.100)

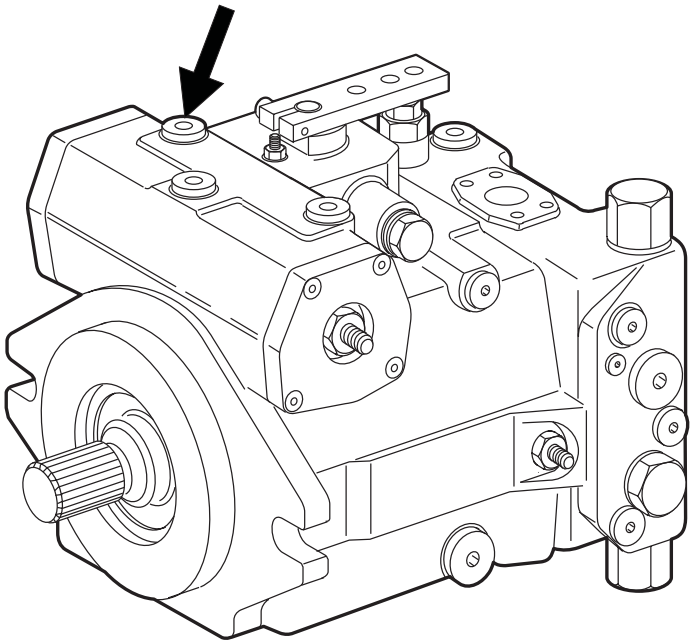
6. SEAL-LOCK - sealing nuts (to N 02.100)

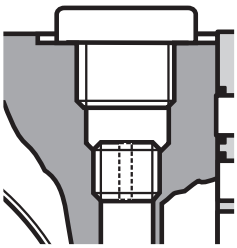
Gewinde / Thread	Anziehdrehmoment M_A in Nm Tightening torque M_A in Nm
M6	10
M6 x 0,5	11
M8	22
M8 x 1	24
M10	40
M10 x 1	44
M12	69
M12 x 1,5	72
M14	110
M14 x 1,5	120
M16	170
M16 x 1,5	180

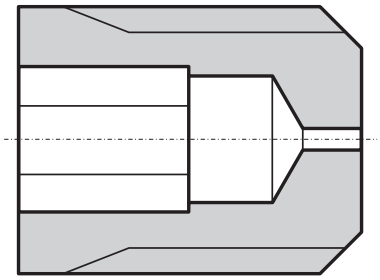


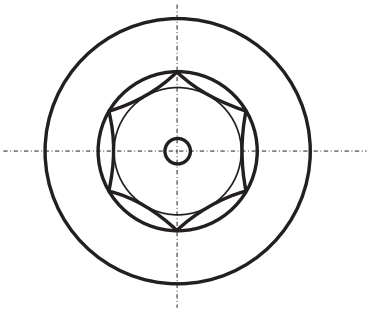
Montageanweisung für Anziehdrehmomente
Assembly guidelines for tightening torques

A4V - Düsen / orifices









Gewinde / Thread	Anziehdremomente Nm / Tightening torques Nm	
	bisher / up to	**neu / new**
M6	6,5	**3**
M10	28	**12**

Sicherheitsbestimmungen
Safety regulations

Allgemein

- Machen Sie sich mit der Ausstattung der Maschine vertraut.
- Fahren Sie die Maschine nur, wenn Sie sich völlig mit den Bedien- und Steuerelementen sowie der Arbeitsweise der Maschine vertraut gemacht haben.
- Benutzen Sie Ihre Schutzausrüstung wie Schutzhelm, Sicherheitsschuhe und Gehörschutz.
- Machen Sie sich mit Ihrem Arbeitsgebiet vertraut.
- Benutzen Sie die Maschine nur für den ihr zugedachten Zweck.

General advice

- Make yourself familiar with the equipment of the machine.
- Only operate the machine if your are completely familiar with the operating and control elements as well as the functioning of the machine.
- Use your safety equipment like helmet, safety shoes and hearing protection.
- Make yourself familiar with your working field.
- Only operate the machine for its intended purpose.

Beachten Sie bitte die Richtlinien der Berufsgenossenschaft und des Maschinenherstellers

Please observe the guidelines of the Professional Association and the machine manufacturer.

Vor dem Start

- Beachten Sie die Bedienungshinweise vor dem Starten.
- Prüfen Sie die Maschine auf auffällige Fehler.
- Fahren Sie die Maschine nicht mit defekten Instrumenten, Kontrolleuchten oder Steuerorganen.
- Alle Schutzvorrichtungen müssen fest auf ihrem Platz sein.
- Nehmen Sie keine losen Gegenstände mit bzw. befestigen Sie diese an der Maschine.
- Halten Sie die Maschine von öligem und zündfähigem Material frei.
- Prüfen Sie vor dem Besteigen der Maschine, ob sich Personen oder Hindernisse neben oder unter der Maschine befinden.
- Vorsicht beim Besteigen der Maschine, benützen Sie Treppen und Griffe.
- Stellen Sie vor dem Start Ihren Sitz ein.

Before starting

- Observe the operating instructions before starting.
- Check the machine for remarkable faults.
- Do not operate the machine with defective instruments, warning lights or control elements.
- All safety devices must be in a secure position.
- Do not carry with you movable objects or secure them to the machine.
- Keep oily and inflammable material away from the machine.
- Before entering thc driver's cabin, check if personsor obstacles are beside or beneath the machine.
- Be careful when entering the driver's cabin, use stairs and handles.
- Adjust your seat before starting.

Sicherheitsbestimmungen
Safety regulations

Starten

- Beim Starten müssen alle Bedienhebel in “Neutralstellung” stehen.
- Die Maschine nur vom Fahrersitz aus Starten.
- Prüfen Sie die Anzeigeinstrumente nach dem Start, um sicher zu gehen, daß alles ordnungsgemäß funktioniert.
- Lassen Sie die Maschine nicht unbewacht, während der Motor läuft.
- Beim Start mit Batterieverbindungskabeln verbinden Sie Plus mit Plus und Minus mit Minus. Massekabel (Minus) immer zuletzt anschliesen und zuerst abtrennen.

Vorsicht

- Auspuffgase sind lebensgefährlich. Bei Start in geschlossenen Räumen für ausreichende Luftzufuhr sorgen!

Hydraulikanlage

1. Hydraulikanlage steht unter hohem Druck!

   ⚠ Unter hohem Druck austretende Hochdruck- Flüssigkeiten (Kraftstoff, Hydrauliköl) können die Haut durchdringen und schwere Verletzungen verursachen. Daher sofort einen Arzt aufsuchen, da anderenfalls schwere Infektionen entstehen können!
2. Bei der Suche nach Leckstellen wegen Verletzungsgefahr geeignete Hilfsmittel verwenden!
3. Vor Arbeiten an der Hydraulikanlage diese unbedingt drucklos machen und angebaute Geräte absenken!
4. Bei Arbeiten an der Hydraulikanlage unbedingt Motor abstellen und Traktor gegen Wegrollen sichern (Feststellbremse, Unterlegkeil)!
5. Beim Anschließen von Hydraulikzylindern und -motoren ist auf vorgeschriebenen Anschluß der Hydraulikschläuche zu achten!
6. Bei Vertauschen der Anschlüsse umgekehrte Funktionen (z.B. Heben/Senken) - Unfallgefahr!
7. Hydraulikschlauchleitungen regelmäßig kontrollieren und bei Beschädigung und Alterung austauschen! Die Austauschschlauchleitungen müssen den technischen Anforderungen des Geräteherstellers entsprechen!

⚠ Öle, Kraftstoffe und Filter ordnungsgemäß entsorgen!

Start

- When starting all operating levers must be in “neutral position”.
- Only start the machine from the driver’s seat.
- Check the indicating instruments after start to assure that all functions are in order.
- Do not leave the machine unobserved when the motor is running.
- When starting with battery connection cables connect plus with plus and minus with minus. Always connect mass cable (minus) at last and cut off at first.

Attention

- Exhaust gas is dangerous. Assure sufficient fresh air when starting in closed rooms!

Hydraulic equipment

1. Hydraulic equipment is standing under high pressure.

   ⚠ High pressure fluids (fuel, hydraulic oil) which escape under high pressure can penetrate the skin and cause heavy injuries. Therefore immediately consult a doctor as otherwise heavy infections can be caused.
2. When searching leakages use appropriate auxiliary devices because of the danger of accidents.
3. Before working at the hydraulic equipment, lower pressure to zero and lower working arms of the rnachine.
4. When working at the hydraulic equipment, absolutely stop motor and secure tractor against rolling away (parking brake, shim)!
5. When connecting hydraulic cylinders and motor pay attention to correct connection of hydraulic flexible hoses.
6. In case of exchanging the ports, the tunctions are vice versa (f. ex. lift-up/lower) - danger of accidents!
7. Check hydraulic flexible hoses regularly and replace them in case of dammage or wear! The new hose pipes must comply with the technical requirements of the machine manufacturer!

⚠ Orderly disposal or recycling of oil, fuel and filters!

Einstellhinweise - ND-Ventil (Speisedruck)

Adjustment instructions - Low pressure valve (Boost pressure)

Achtung!
Sicherheitsbestimmungen beachten!

Hinweis:
Nachjustierung nur bei Betriebstemperatur.

Manometer an "G" anschließen.

Achtung!
* Speisedruckeinstellung!
Nenndruck p_H - 20 bar
Höchstdruck p_H - 40 bar
Bei Max.-Drehzahl.

Hinweis:
Einstelldaten nach Werksauftrag.

[1] bei DA-Ausführung

Attention!
Observe safety regulations!

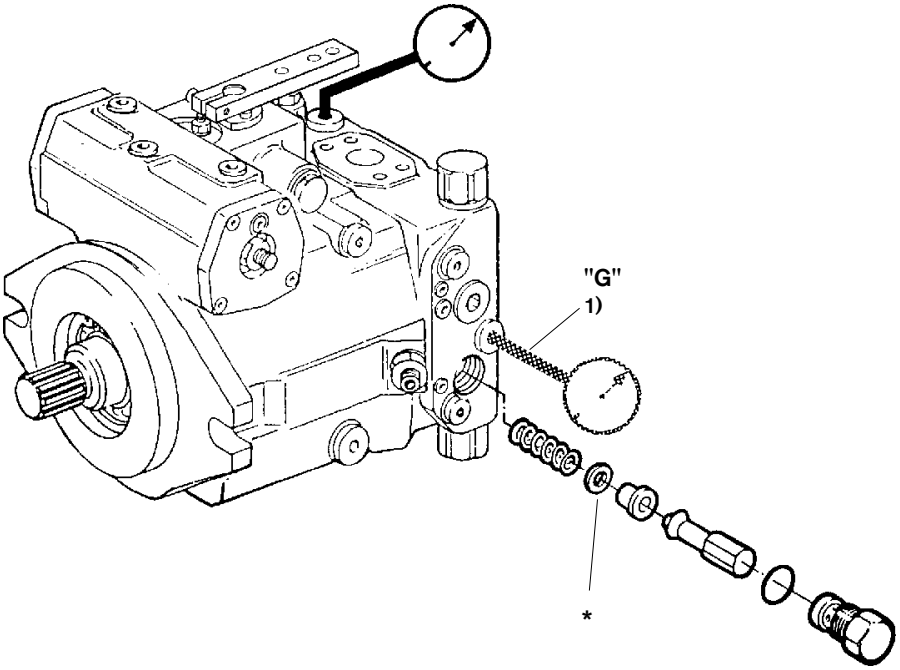
Note:
Readjusting only at operating temperature.

Connect pressure gauge to "G".

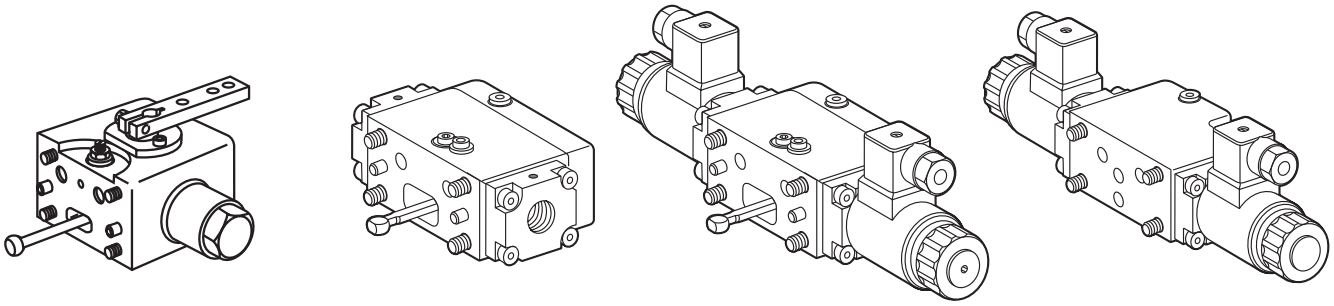
Attention!
* Boost pressure setting!
Nominal pressure p_H - 20 bar
Peak pressure p_H - 40 bar
at max. speed.

Note:
Setting data is in accordance to the works order.

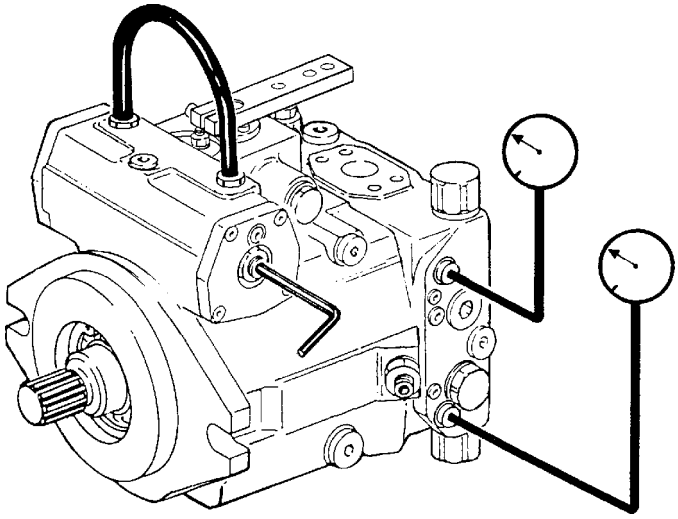
[1] with the DA version



Einstellhinweise - Mechanische "Nullage"
Adjustment instructions - Mechanical "zero position"



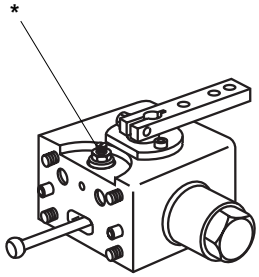
HW HD EP DA



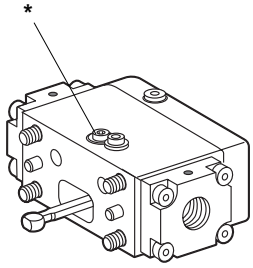
Achtung!
Sicherheitsbestimmungen beachten!
Mit Schlauch NW6 beide Stellkammern verbinden. Vermeidung von Restsignal aus hydraulischer Nullage.
Manometer an M_A und M_B anschließen.
Nullage so einstellen, daß bei blockiertem Antrieb beide Manometer auf gleichem Druckwert stehen.
Hinweis:
Totband der Nullage - vermitteln.

Attention!
Observe safety regulations!
Connect both control chambers with a nominal size 6 hose. Avoidance of residual signals from hydraulic zero position.
Connect pressure gauges to M_A and M_B. Adjust the zero position so that with at blocked drive both pressure gauges indicate the same pressure valve.
Note:
Ascertain the zero position dead band.

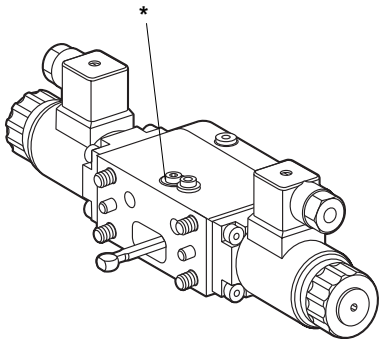
Einstellhinweise - Hydraulische "Nullage"
Adjustment instructions - Hydraulic "zero position"



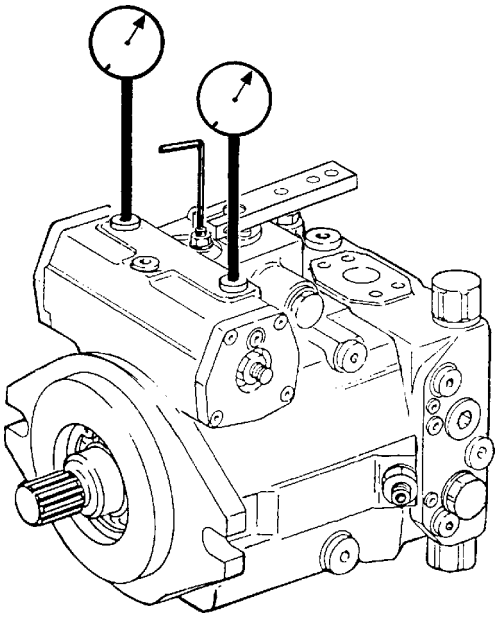
HW



HD



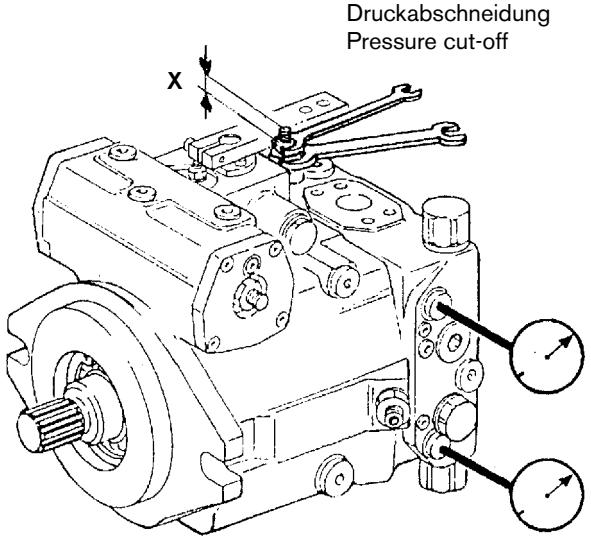
EP



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°.**

Einstellhinweise - HD- Ventile (Hochdruck) und Druckabschneidung
Adjustment instructions - HP- valves (High pressure) and pressure cut-off



Achtung!
Sicherheitsbestimmungen beachten!

HD-Ventil ohne Bypass

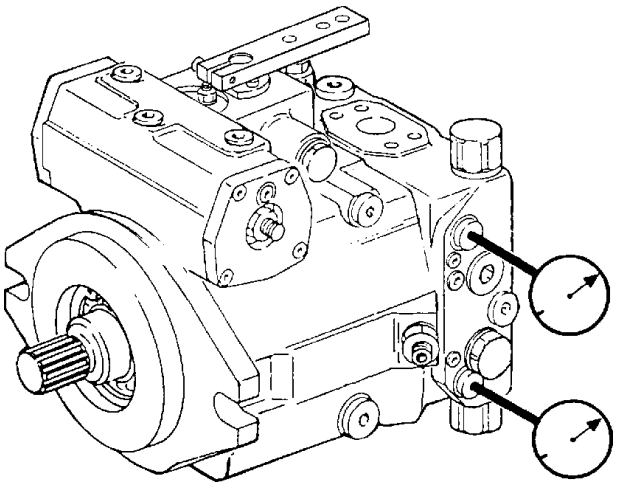
1. HD-Ventile sind immer 10% höher eingestellt als die Druckabschneidung.
2. Nachjustierung nur bei Betriebstemperatur

   Manometer (600 bar) an M_A und M_B anschließen.

Druckabschneidung:
Zum Blockieren der Druckabschneidung beim Überprüfen der Hochdruckventile die Einstellschraube Pos. 1 mit gelöster Kontermutter Pos. 2 bis zum Anschlag mit **max. 2 Nm im drucklosen Zustand eindrehen!**

HD-Ventile: Mit geringer Pumpenmenge über Ventile fahren.
Einstellwert kontrollieren.
(Nur kurzzeitig "Temperatur".)
Einstellwert verändern - siehe Serviceinfo

Druckabschneidung:
Einstellschraube auf Maß (*) zurückdrehen.
Druckwert kontrollieren bzw. nachjustieren.
Achtung! Differenz von 10% HD-Ventile und Druckabschneidung beachten!
Hinweis: Einstelldaten nach Werksauftrag.



HD- Ventile
HP- valves

Attention!
Observe safety regulations.

HP valve without bypass-function

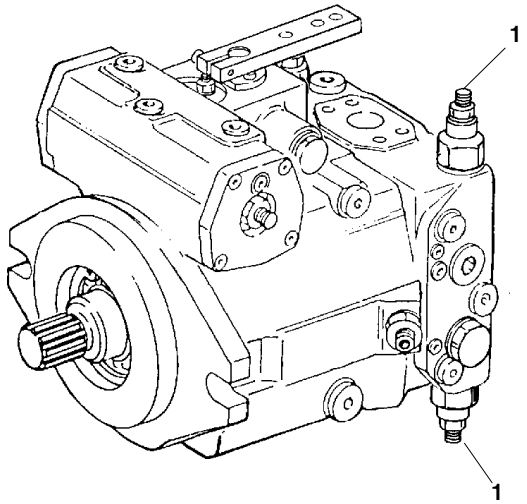
1. HP valves are always adjusted 10% higher than the pressure cut-off.
2. Readjusting only at operating temperature.

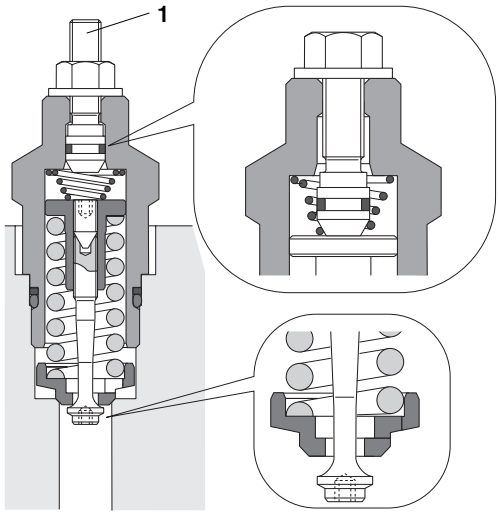
Connect pressure gauge (600 bar) to M_A and M_B.
Pressure cut-off:
To block the pressure cut-off when testing the high pressure valves, the adjustment screw (item 1), with the lock-nut (item 2) loosened, has to be screwed in **with a max. torque of 2 Nm in the depressurised condition** until the end stop is reached.

HP valves: Operate the valves with small pump flow over the valves.
Check setting value. (only for a short time "temperature").
Change setting value - see service information.

Pressure cut-off:
Turn back setting screw to measurement (*).
Check pressure value and readjust if necessary.
Attention! Observe the 10% pressure difference between the HP valves and the pressure cut-off!
Note: Setting data is in accordance with the works order.

Einstellhinweise - Bypassventil
Adjustment instructions - Bypass valve





Fahrzeuge mit rein-hydrostatischem Fahrantrieb bzw. mit hydrostatischem Fahrantrieb und Schaltgetriebe ohne Leerlaufstellung (Freilauf).

Hydrostatischer Antrieb / Bypaß-Schaltung

In diesem Fall wird der Fahrantrieb auf freien Umlauf geschaltet. Zu diesem Zweck haben die in der Verstellpumpe integrierten Hochdruckbegrenzungsventile eine sogenannte Bypaß-Funktion. D.h. durch Drehen der entsprechenden Schraube (Pos.1) wird der Ventil-Einsatz so entspannt, daß ein freier Öl-Umlauf möglich ist.

⚠ Bypass: Pos.1 einschrauben bis eben mit Mutter. Mutter wieder anziehen.

Schleppgeschwindigkeit
Die maximale Schleppgeschwindigkeit sollte 2 km/h nicht überschreiten.

- Höhere zulässige Schleppgeschwindigkeiten sind abhängig von der Hydromotordrehzahl bzw. dem eingelegten Gang.

Abschleppdistanz
Die Schleppentfernung sollte 1 km nicht überschreiten.

- Bei fehlender Einspeisung entleert sich der Hydraulik-Kreislauf.
  Zu beachten ist die Wärmeentwicklung im Hydromotor-Triebwerk.

Abschleppvorgang beendet
Nach beendetem Abschleppvorgang Pos.1 zurückdrehen.
Der ursprüngliche Einstellwert der Hochdruckventile liegt somit wieder vor.

⚠ Ventilfunktion: Pos.1 zurückschrauben bis Anschlag. Mutter anziehen.

Vehicle with a pure hydrostatic transmission or with a hydrostatic drive with gear box without free wheel position.

Hydrostatic transmission / Bypass condition

In this case the travel drive is switched on to the free wheel position. For this purpose the high pressure valves of the variable displacement pump have a so-called bypass function.
By turning the relevant screw (item 1) the valve is so released that free oil circulation is made possible.

⚠ Bypass: Screw in item1 until it is level with the nut.

Towing speed
The max. towing speed of 2 km/h should not be exceeded.

- Higher permissible speeds are depended on the hydraulic motor speed or the selected gear.

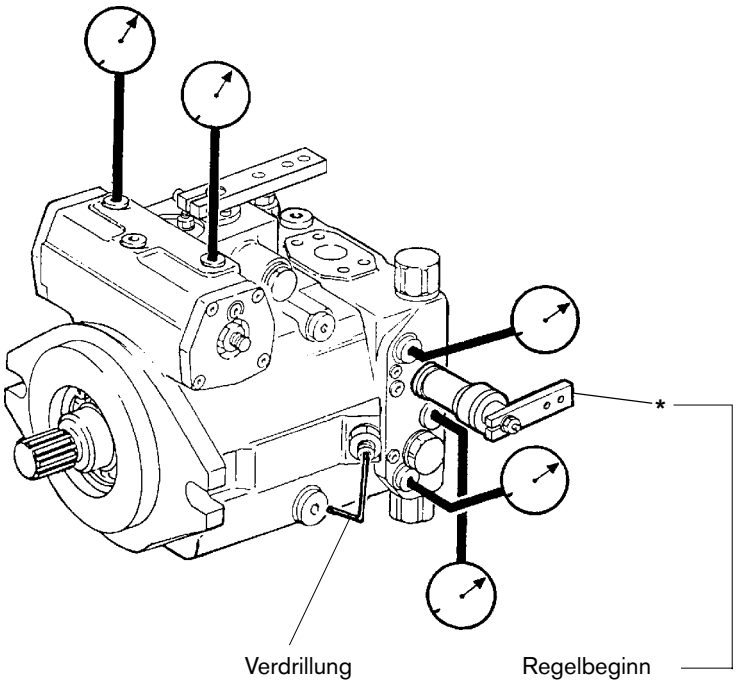
Towing distance
The towing distance should not exceed 1 km.

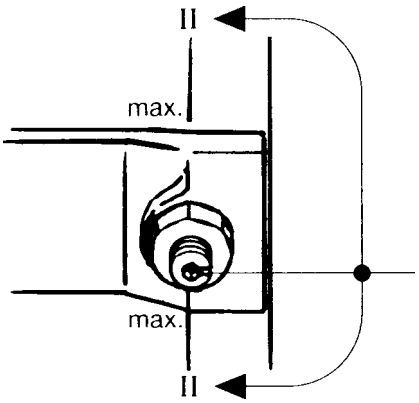
- With no boost avaiable the hydraulic circuit drains.
  The heat generation in the hydraulic motor rotary group has to be taken into account.

Termination of the towing operation
After termination of the towing operation turn back item 1.
The original set pressure value is thereby avaiable.

⚠ Valve function: Screw back item 1 up to stop. Screw up the nut.

Einstellhinweise - DA- Regelung
Adjustment instructions - DA control





Achtung!
Sicherheitsbestimmungen beachten!

Überprüfung der Einstelldaten
Betriebstemperatur soll während des Überprüfungsvorgangs weitgehend konstant gehalten werden.
Antriebsmotor starten, Leerlaufdrehzahl

Blockzustand
Fahrtrichtungsschalter **"0"**
Motordrehzahl langsam steigern bis zur max. Motordrehzahl, dabei Meßgeräte beobachten.
Speisedruck:
Leerlaufdrehzahl
Psp = ca. 15-20 bar
max. Motordrehzahl
Psp = ... bar*

Blockzustand
Fahrtrichtungsschalter - vorwärts
(Straßengang und Festgebremst)

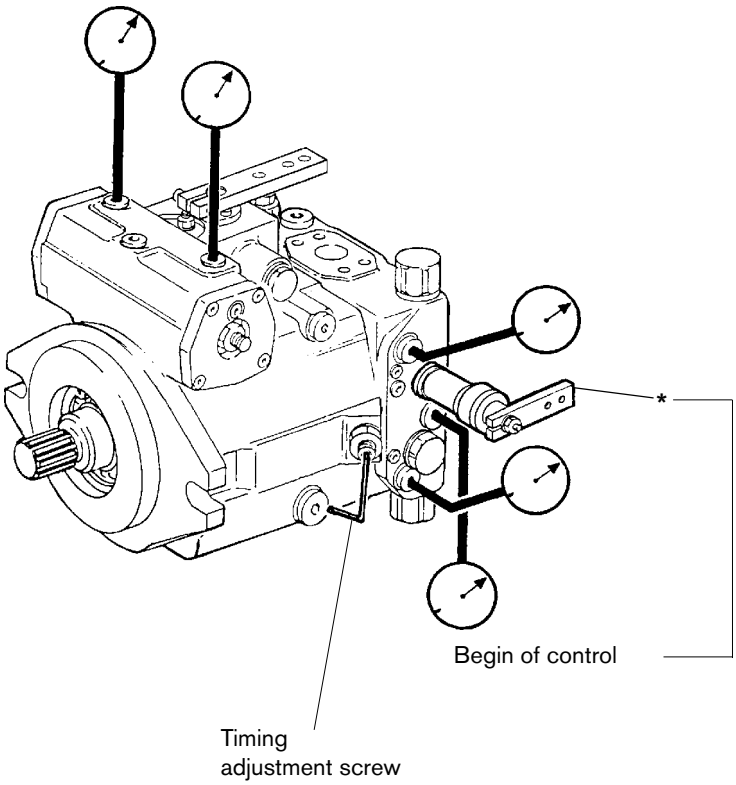
Einstelldaten Pumpe A10V/DA überprüfen
*** Regelbeginn**
HD 40 - 50 bar
Motordrehzahl . min.[1] * Psp . . . . . bar*
HD . . . . . bar
Nachjustierung - Regelbeginnschraube

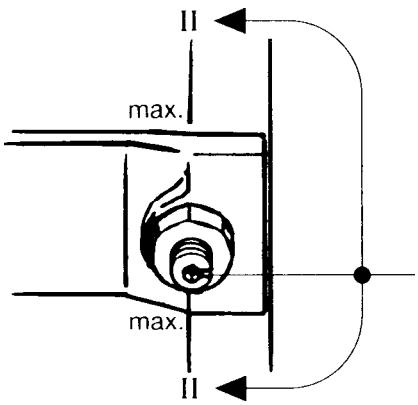
Regelende
HD . . . . . bar*
Motordrehzahl . . . . . min.[1] * Psp . . . . . bar*
Nachjustierung - Verdrillschraube

Hinweis:
Excenterjustierung - Drehrichtung beachten

Hinweis: * Einstelldaten nach Werksauftrag!

Einstellhinweise - DA- Regelung
Adjustment instructions - DA control





Attention!
Observe safety regulations!

Check setting data.
Operating temperature should be generally kept constant during the checking procedure.
Start prime mover, idle speed.

Block position
Drive direction switch - **"0"**.
Slowly increase motor speed up to the max. motor speed and observe measuring instruments.

Boost pressure:
Idle speed of prime mover
Psp = approx. 15 - 20 bar
max. motor speed
Psp = ... bar*

Block position
Drive direction switch - **forwards**
(Road gear and fully applied brake)

Check setting data pump A4VIDA
*** Start of control:**
HD 40 - 50 bar
Motor speed . . . . . rpm* Psp . . . . . bar*
HD . . . . . bar*
Readjustment of start of control screw

End of control
HD . . . . . bar
Motor speed . . . . . rpm* Psp . . . . . bar*
Readjustment of the indexing screw

Note:
Eccentric adjusting - observe direction of rotation.

Note: * Setting data is in accordance to the order work!

Rexroth
Bosch Group

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