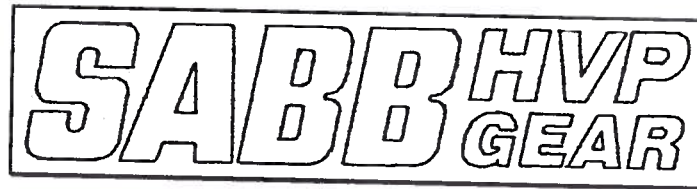


Form.: 977.565

Revidert/

Revised:

FEB.1996



HYDRAULIC CONTROLLABLE PROPELLER

SABB HVP-25

**DESCRIPTION-
MAINTENANCE-REPAIR-
PARTS LIST.**

**INPUT DRIVE FLANGE
WITH FULL-SPLINE
FROM JANUARY 1996**

SABB MOTOR A.S

P.O.Box 40 - 5031 BERGEN - NORWAY

Telefon 47-55-348800 Fax 47-55-348801 Telex 42559 SABB N

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WARNING

Follow these health- and safety precautions:

Loose or wide clothing may be extremely dangerous when working on or near the engine or other moving mechanical parts.

Clothes polluted with oil or other products may cause health trouble if in contact with your skin over long time.

Any work or maintenance to the engine or other mechanical parts should be done when engine is stopped. If that is not possible, make sure that tools, test equipment as well as your body are being kept well away from all moving mechanical parts.

Avoid direct contact with exhaust pipes and uncooled mufflers or silencers. Such components are very hot when in operation and may cause burns.

Some liquids used in engines may cause serious damage if swallowed or splashed into your eyes. Always get medical assistance if fuel, lub.oil or rinsing liquid has been accidentally swallowed.

NOTE:

During towing or sailing make sure that the pitch control lever is in foremost position. The propeller blades are then set with stern pitch.

SPECIFICATION, HVP 25: Feil! Bokmerke er ikke definert.

Gearbox type:.....HVP 25
 Reduction (effective).....1,7:1 / 2,14:1 / 3,05:1
 Reduction (nominal)1,7:1 / 2:1 / 3:1
 Max. input torque.....245 Nm (25 kpm)
 Rotation, output.....Right hand
 Oil pressure.....24 bar +/- 2 bar
 Oil type.....Lubricating oil SAE 15/40
 Oil quantity.....2,25 litre excl. oil cooler
 Movement of pull rod.....34 mm +/- 0,5 mm
 Gearbox drop.....105 mm
 Torque setting for bolts.....M8: 2,5 kpm, M10: 5,0 kpm.
 Gearbox weight.....43 kg

DESCRIPTION:

The gearbox is available with alternative reduction ratios (nominal): 1,7:1, 2:1 and 3:1. The direction of rotation for the input shaft is LH (viewed from rear) and RH for the output shaft (right hand turning propeller).

The gearbox contains following main components:

1. Hydraulic operated multiple disc clutch.
2. Slide valve housing and hydraulic pump housing.
3. Pitch control crank and oil inlet.
4. Reduction gear with incorporated pitch control system.
5. External system consisting of oil filter, oil cooler with hoses and pipes

REMOVING GEARBOX FROM ENGINE

1. Note and mark position of the pull rod clamp nut on the rod. Unscrew the clamp nut.
2. Remove the shaft coupling bolts and push the propeller shaft backwards.
3. Unscrew oil hoses between oil cooler and gearbox.
4. Remove cover 120 on port hand side, and drain gearbox oil using a suitable sump draining pump.
5. Unscrew the six bolts securing gearbox to engine. The 6th bolt is reached through the cover opening. Pull entire gearbox backwards and lift it off. Further dismantling depends on which parts are to be checked. Note that the gearbox includes a number of parts machined to close tolerances and with very smooth surfaces. Be careful not to damage such parts during the repair job. All removed parts should be placed on clean and dry rags. Before assembly all parts should be scrupulously cleaned and inspected for damage of the surfaces.

DISMANTLING OF THE CLUTCH.

The clutch unit 17 is a hydraulic operated multiple disc clutch, i.e. the clutch is engaged by means of hydraulic oil that forces the discs (plates) together and thus permitting the engine torque to be transferred to the gearbox. The oil pump 45 supplies oil under pressure via the slide 151 through the hollow drive shaft 13 (141) to the clutch. The oil is acting on the piston 18 which is pressed against the disc pack. During de-clutching the oil pressure is released back to the oil sump, and the disc springs 26 force the piston backwards. Clutch repair is limited to change of the oil seals or replacement of worn or burnt discs:

1. Unscrew the four cap screws 92 securing front cover 5. Pull off cover by means of a suitable screw driver or smtg similar under the flange.
2. Extract Input drive flange 33 screwing two bolts M6 (threaded 40 mm) into the two holes in flange. Tighten the bolts evenly until flange comes off.
3. The two ball bearings should normally come off with the flange. If not, use a ball bearing extractor to pull them off, after the flange has been removed.
4. Open the lock washer 38 and unscrew ring nut 37.
5. The clutch is now loose and can be removed for inspection.

6. Check the discs, oil seals and sealing surfaces for wear or damages (scratches) Replace where necessary. When installing new Teflon rings 19 and 20, use tapered sleeves to fit the rings over the rubber O-rings. A certain sluggishness of the piston is normal with new oil seals. This will hamper piston movement and cause propeller to "follow" with clutch disengaged. After short use however, the clutch will free completely.
 7. When assembling the clutch follow opposite sequence to the dismantling. Observe that the centre disc, springs and periphery discs are correctly fitted: Start with No. 1 centre disc against piston, then fit spring (cup spring) 26 and finally the periphery disc. The complete disc pack consists of 6 centre discs, 5 springs and 5 periphery discs. When fitting the last centre disc make sure this is correctly positioned on the clutch disc hub 27 before backplate 28 is pressed on, and nut 37 tightened up. Use a screw driver or similar tool to check that the discs are free to move. A special tool kit (MVS-F-16) is available for tightening the disc pack.
 8. Bend lock washer lip 38 to lock the nut 37, and finally fit the ball bearings 32.
-
9. Before fitting the input flange 33 extract the drive shaft 43 to check end grooves for wear. Observe that the shaft end groove must mesh with the pin 43 of the input flange. When fitting input flange 33 note that the tongues of periphery disc mesh with the slots on the flange, and finally that the pin 34 slides into its groove of the drive shaft 43. Check by carefully rotating the input flange. The drive flange is correctly positioned when it can be pressed fully home against bearings 32.
 10. Fit new oil seal 30 and gasket 39 and press on the front cover 5. Note that lub.oil slots are in vertical position.
 11. Fill up with clean engine oil of correct quality. Fit gearbox to the engine.
 12. Follow procedure STARTING THE ENGINE, page 12.

DISMANTLING HYDRAULIC PUMP HSG AND CLUTCH VALVE HSG.

1. Loosen suction hose 104 and pressure pipe 155. Remove banjo plug 153, and use a spanner on nipple 152 to avoid twisting. Remove the oil filter 156.
2. Remove the two Allen screws fixing pump housing 4. Pull of pump housing. Oil pressure valve 87 and spring 86 are now free to be removed.
3. Remove oil pump element 45 (external and internal parts). Check for wear. The axial end play of element in its housing is checked with feeler gauge. Normal value for new parts should be 0,025-0,060 mm. (.001-.002 in) Excessive clearance i.e. above 0,10 mm (.004 in) may cause pressure drop and sluggish operation.
4. Unscrew two bolts 103 and pull of the clutch slide valve housing 3. Take good care of the shims 171. Extract pump bolt 49. Check pins 133 and their slot in shaft 43 for wear. Replace worn parts. If the pins 133 are worn or broken, but pump bolt still undamaged, the pins may be replaced by $\varnothing 3,5 \times 24$ mm and $\varnothing 2 \times 24$ mm elastic pins (DIN 1481). First fit the $\varnothing 3,5$ mm pin, with split in direction of rotation. Then fit the $\varnothing 2$ mm pin inside, with split in opposite direction of the first. File pin ends to flush with pump bolt. Be careful not to harm the bolt surface when filing. Inspect needle bearings 48 and 51 for wear. If necessary replace the entire pump bolt.

NOTE: The hydraulic pump is a very important part of the gearbox, and the gearbox will not function properly with damaged or defective pump. Utmost care is required during checking and work on this part.

5. If wear is suspected of the oil inlet sleeve 10 and/or the clutch slide 151, the parts are removed as follows:
Unscrew the Allen screw 46 and extension 102. Pull off pin 142. Remove circlips and washers 41-42 both ends and remove the clutch slide. Unscrew socket screw 6 above the clutch slide and use a $\varnothing 8$ mm drift to drive out the elastic pin 9. The sleeve is now free to be extracted by means of a socket wrench or similar tool.
6. Check the sleeve 10 by sliding it on its shaft. No noticeable slack is permitted. Correct measures are $\varnothing 30$ mm f5 for the shaft, and $\varnothing 30$ mm H6 for the sleeve. Replace sleeve if worn or damaged. Worn shaft may be ground to undersize -0,25 mm and same tolerance. Undersize sleeves (-0,25 and -0,50 mm) are available.
7. Inspect the clutch slide 151 for rust or wear and replace as required. A new slide which is too tight may be lapped to the bore by using fine lapping compound. Recommended

clearance is 2-3 my (0,002-0,003 mm).

8. Assembling of the components should be done opposite to the dismantling procedures. Take care that the grooved pin 142 is fitted correct way, otherwise the clutch slide will be wrong by 180 degrees. Use "liquid gasket" on the threads of socket screw 6 before fitting. Use new O-rings and circlips for the slide and fit the O-rings from each side to prevent damage by the bore in the housing.

9. IMPORTANT:

If the oil releaf valve has been off, the oil pressure must be adjusted again before engine is started. Unscrew nipple 80 and fit a pressure gauge for 40 bar. Unscrew dome nut 78. Screw out the adjusting screw completely before starting the engine. When gearbox oil has reached normal working temperature, adjust oil pressure by screwing in the adjusting screw until 24 bar (plus/minus 2 bar) on gauge at full speed. Fit the dome nut and washer. Finally remove gauge and refit the nipple.

Note: It is important that the engine is not started first time after gearbox overhaul unless the oil pressure valve is completely released by means of the adjusting screw. Excessive oil pressure may ruin the gauge and cause damages to internal parts of the gearbox.

DISMANTLING PITCH CONTROL CRANK AND OIL INLET PARTS

1. The pull rod 62 should rest in rearmost position, i.e. the pitch control lever 115 in foremost position. It will be possible, without starting the engine, to push piston 72 backwards by carefully pressing the control lever. Alternatively, piston may be pulled backwards by using a suitable tool at the pull rod end. Be careful not to bend the pull rod during this operation. The safest method however, will be to start engine and stop it when rod is in its rear position.
2. Remove cover 120.
3. Unscrew socket screw 170 and remove pitch control lever 115.
4. Unscrew the gland 135.
5. Use 14 mm spanner to hold nipple 117 in position while loosening hose 118.
6. Lift crank 100 enough to come off the block 145, turn it, pull down and out. Remove block

7. Remove circlip 77 and spacer 42. Push forward the oil inlet block 148 until it comes off (provided the piston is in rearmost position, see 1. above)
8. Check all parts for wear. Belonging parts should move freely, but without any slack. Internal dia. of bush 149, when fitted in the oil inlet block 148, should be $\varnothing 20\text{mm}$ H6. Pitch control slide 77 measures $\varnothing 20\text{mm}$ f5. Replace bush if worn. The slide, if worn, may be ground to undersize 0,25mm, and new bush fitted. Note that slide 77 and piston 72 are lapped (lap fit) and can not be replaced individually.
9. Assembling is done in reverse direction of dismantling. Note that both spacers 42 are fitted against the oil inlet block 148. Use new circlip 41. Do not overstretch the circlip when fitting, and make sure it rests perfectly in its groove. Nipple 117 is not tightened, but permitted to turn together with the hose 118. Hold nipple in position with 14 mm spanner when tightening the hose nut. Do not twist the hose. Pitch control crank 100 must not bend or stick when gland 135 is tightened. A small axial movement should be felt when gland has been tightened. When the control lever has been fitted a certain slack should be felt when the slide moves the permitted distance limited by the dowel (elastic pin) 76 The movement must be easy.

DISMANTLING GEARBOX

1. Remove oil pump housing, clutch slide housing, clutch and oil inlet bloc following previous instruction.
2. Undo lock washer 59 and unscrew the ring nut 58. Clamp off the coupling flange 60.
3. Unscrew seven bolts 12 and 129 for gear housing cover 2. To extract the cover first fit three M10 socket set screws (without head) into the upper and the two lower threaded holes. These screws should only enter 4-5 turns into the housing, thus forming the base for three M12 bolts by which the cover now can be extracted. Tighten evenly the three bolts until the cover comes off.
4. The drive shaft 141 (13) and the complete intermediate shaft assembly 61 with gears and servo mechanism can be lifted out of the gearbox.

DISMANTLING SERVO CYLINDER

5. Unscrew six countersunk head screws 14.
6. Permit the unit to rest on gear 75 (143). Hammer carefully with rubber mallet against the end of pull rod 62. Take care not to scratch the pull rod. (Oil leakage!)
7. Removing the slide is normally not necessary. The pitch control piston 72 and the slide 77 fit together and must be replaced as a set. Check all parts for wear, including gears and roller bearings. Inspect the chrome layer on coupling flange 60. Damage or wear of the chrome surface might cause leakage. The pull rod 62 should also have a smooth surface without scratches. Replace worn parts.
8. Rinse the strainer 126 and gearbox internally before assembling the parts.

NOTE: THOROUGH CLEANLINESS IS REQUIRED DURING THE ASSEMBLY.
ANY DIRT OR FOREIGN PARTICLES MAY CAUSE LEAKAGE OR
BREAKDOWN.

9. When assembling fit new O-rings and gaskets. Piston ring 73 is cut and removed. Fit new piston ring using a tapered tool to expand the ring over the piston. All O-rings should be covered with thick oil or grease before fitting.
10. The assembling is carried out in reverse sequence to the dismantling. The countersunk head screws 14 should be tightened to 2,5 kpm and locked by punch marks.

11. Insert the complete shaft assemblies from rear and check that the shims 171 (and 172 if the bearing's outer race has been removed) are in place.
12. Replace the oil seals 63 and 137 applying grease into the cavity between the rings.
13. Fit gear housing cover 2 using new gasket 70. Be certain that the dowels come into position before carefully knocking the cover home using a mallet. Tighten all bolts evenly.

NOTE: Gear housing and its cover are machined as a unit. Thus one of the parts can not be replaced individually.

14. After assembly check the axial clearance (end play) by means of dial gauge. Use a rubber mallet to knock the two shaft ends, making sure they are fully home and free to move. No noticeable movement should be felt, but the shafts should rotate freely without undue resistance.
15. The coupling flange 60 is pressed on. Apply some silicone into the keyway before fitting. This will prevent oil leaking at the key. (Heating of the coupling flange to appr. 150 degr. C will facilitate fitting). Tighten the ring nut 58 and lock with the lock washer.
16. Follow previous instruction for fitting clutch slide housing 3, oil pump housing 4, clutch 17 and pitch control crank 100.
17. Before mounting the gearbox to the engine make sure that the damper plate is in order. Replace the damper plate in case of wear and slack of springs and spline.
18. Mount the gearbox, connect all hoses and pipes. Replace oil filter element (see special instruction) and fill up to max. level with correct oil.

STARTING THE ENGINE

If the oil control valve has been touched, unscrew completely the adjusting screw before starting engine again. Start the engine. Adjust oil pressure as described in "Dismantling hydraulic pump housing and clutch slide housing". Rotate the screw forward until the manometer gauge reaches 24 bar. Permit engine to run until gearbox oil has warmed up. Then adjust oil pressure to 24 ± 2 bar.

When the engine has reached normal working temperature the oil pressure may decrease to appr. 15-20 bar at idling speed. That is normal and will not cause any trouble for the operation. Check that clutch and pitch control operate satisfactorily. During full speed trial check the gearbox for undue heat and noise. Tighten again all hose- and pipe connections.

IRREGULAR GEARBOX OPERATION - FAULT LOCATION

1.

Low oil pressure is noticed by the operation becoming slow and sluggish. At very low pressure the clutch may slip and the clutch discs will wear out within short.

The cause of low oil pressure:

A: Insufficient quantity of oil in the gearbox. Check this first.

B: Leaky suction hose. Check hose clamps tension and inspect hoses for damage. Fine-foamed oil indicates suction leakage. Such fine foam or air bubbles will cause fluctuation of the manometer pointer, if fitted.

C: Oil pressure valve loose. Adjust pressure and tighten dome nut securely.

D: Defective oil pressure valve. Remove the clutch slide housing and check if the valve has stuck or if the spring is broken.

E: Wear of oil pump. Check this in following way: Remove the pressure pipe 155 at union 98. Unscrew the union and plug the threaded hole by means of 1/4" BSP plug. Run the engine at no load (clutch disengaged). If pressure remains low the fault is likely in the oil pump. Remove the pump and check it according to previous instruction "Dismantling hydraulic pump housing and clutch slide valve housing".

F: Wear of the parts at the pitch control unit or defective internal seals. If the pressure drop is caused by internal leakage at the pitch control unit, the pressure will remain almost constant with clutch engaged or disengaged. On checking points C, D and E an oil pressure gauge is required. This should read 40 bar. The manometer is fitted after nipple 80 has been removed. The pressure should read 24 bar plus/minus 2 bar with new or reconditioned gearbox at full speed and normal working temperature. The oil pressure will gradually sink as the gearbox gets older. The clutch will work properly even if pressure sinks far below 20 bar. The pitch control however, will not operate safely if pressure drops below 20 bar. Low oil pressure will give slow and sluggish pitch operation. Pressure under 17 bar should not be permitted, and the gearbox should be replaced or reconditioned.

2.

If the pitch control becomes sluggish, and oil pressure still remains normal, the defect is likely in the propeller boss. Particularly so if pitch can only be adjusted with clutch disengaged.

The boat should be beached for control of the propeller. Inspect blades for damage, or check internal parts for possible wear or bend. If the propeller blades hit a floating matter or strikes the bottom, the shock may sometimes cause internal damage.

Slow pitch control is sometimes caused by lack of lubricant in the propeller boss, or use of incorrect grade of grease. Use recommended grease for lubrication of the propeller.

3. Gearbox noise:

If the engine is operated at low rpm a certain noise is often noticeable. This noise comes from the interference between the gears and the damper plate. The noise is annoying to the operator, but is harmless to the gearbox. Increase the engine speed some to avoid or reduce the noise. If the interference noise tends to increase in time, the damper plate should be checked for wear or damage. When fitting damper plate again use new lock washers for the bolts and tighten securely to 2,5 kpm.

GEARBOX MAINTENANCE

Routine maintenance of the HVP25 gearbox is limited to check of lub.oil exchanging oil and filter as well as greasing of oil seals at gearbox output flange.

Gearbox oil (Hydraulic system and lubrication)

To drain the oil, remove the nipple (close to dipstick) at the oil return from cooler. Insert the hand pump suction pipe, and make sure the pipe reaches bottom in order to pump out any sediment. It is recommended that the pull rod is in foremost position, i.e. propeller blades set for astern pitch. To fill up with clean oil first remove the breather filter 112 and fill through the opening.

First oil change with new (or reconditioned) gearbox after the first 50 operating hours. Later changes every 300 operating hours, or at least once per year.

REPLACING THE OIL FILTER

The oil filter is installed in the pressure line between the pump and the pitch control unit. A by-pass valve is included, permitting oil to flow through even if the element is clogged. The filter element should be replaced after the first 50 operating hours for new (or reconditioned) gearbox. Later changes every 300 operating hours or at least once per year, in connection with oil change.

The element is replaced as follows:

Previous type gearbox HVP25 has a hexagon shape of the filter housing, lower part. Unscrew the filter bowl by means of a spanner. Use another spanner to hold the filter top in position to avoid damaging the pipe connection. Later type filter is opened by unscrewing two bolts 161.

Remove the filter element 165 (paper type) and insert a new one. Make sure the two O-rings 158 and 163 are securely positioned before tightening the bowl again.

GREASING GEARBOX OIL SEALS.

The oil seals 63 and 137 at output shaft should get 5 shots of grease (or until grease is pressed out at the oil seal lip) per week of operation.

Observe that salt water and condensate at the output flange may cause rust damage and subsequent oil leakage. Also apply a thin layer of grease or rust protection to the clutch slide ends 151 and to the remote control cable ends.

INSTALLATION OF PROPELLER SHAFT AND STERN GEAR

The propeller shaft should be straight and undamaged. If possible check the shaft before starting the installation. If the shaft protrudes more than 1.6 meter (40 times the dia.) ahead of the stuffing box, a support bearing should be inserted about halfway between stuffing box and shaft coupling.

During installation observe necessary clearance 10 mm between stern bearing and propeller clamp ring (see drawing page 17). Too small clearance may cause interference between propeller clamp ring and stern bearing.

First fit the shaft coupling such that the two holes in coupling correspond with the shaft grooves. Clamp the coupling to the shaft by means of two M16 bolts. Tighten evenly in three steps to 22 kpm. Connect the coupling flanges and check again the clearance between stern bearing and clamp ring before the final positioning of the engine mounts.

Align engine as follows:

Disconnect the shaft coupling flanges and press together the flanges firmly by hand. Use feeler gauge in four positions around the flange, up/down and left/right. The flanges must be true within 0,1 mm (.004in.) i.e. the feeler blade should not enter any of the four positions. Rotate the shaft coupling, with gearbox flange at ease, and repeat the check every 1/4 turn all way round.

After final alignment tighten the connecting bolts to 5 kpm for the stainless steel bolts. The alignment should be checked again later: After the boat has been launched, and then again after 150 hours of operation. At the same time tighten engine foundation bolts.

The propeller blades are usually set for full pitch astern; i.e. the pull rod is in foremost position. The gearbox rod should be in foremost position as well. In this position the two pull rod ends are connected and secured by means of the clamp nut.

FITTING THE REMOTE CONTROLS

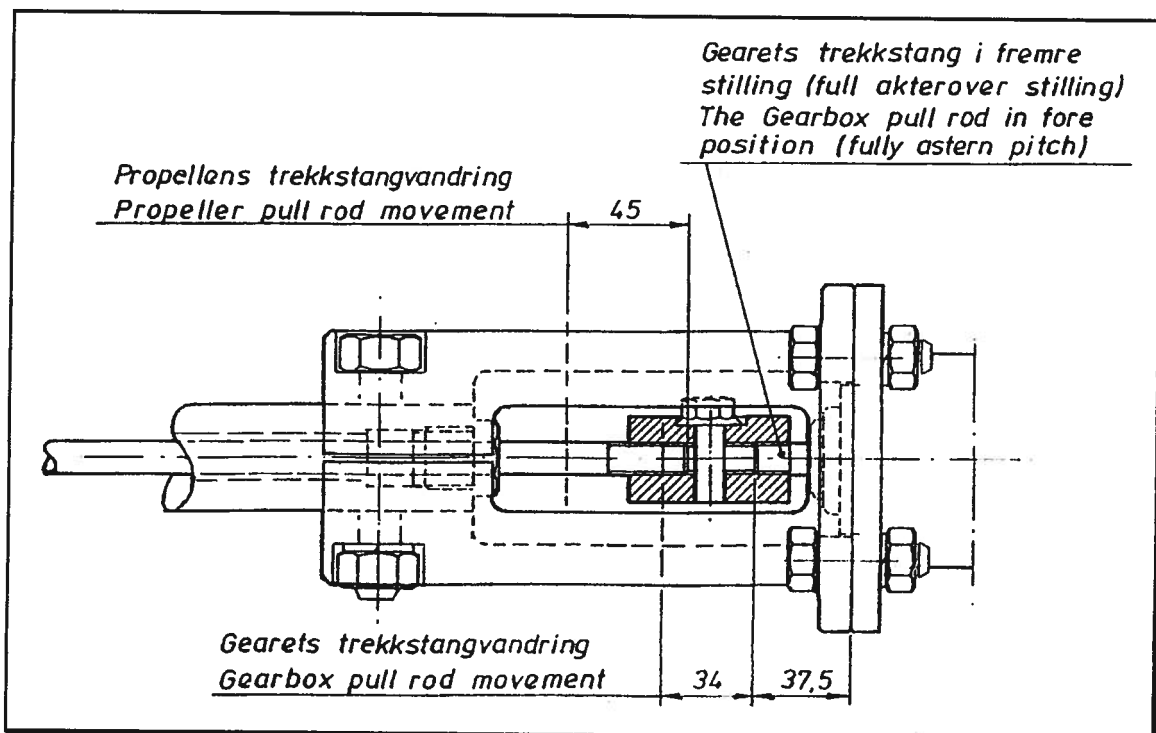
The operator unit (Pilot house, "TWIN S" or "S") has different sets of holes in the control arm to which the cable end is fixed. Thus the cable travel can be chosen for different installations.

The HVP25 has total travel of the gearbox fitted pitch control lever 115 of 52 mm (measured at the inner hole), for pitch adjustment from full ahead to full astern. However, this total travel is seldom required, but may vary from one boat to another. The gearbox lever as well has the choice of three holes. From the point of view of accurate pitch control, as large sector as possible should be used for the operator unit. The selection of holes will permit the most favorable cable travel in each type of boat.

The clutch control lever 101 requires 65 mm cable travel to operate correctly.

After the boat has been tested at sea, the maximum ahead and astern pitch should be set by means of the set screws in the operator unit. Sometimes it will be advisable to alter the position of the two pull rods, propeller shaft pull rod and gearbox rod, to optimize the pitch control function dependant on type of boat or duty. Then the clamp nut is made loose and rods adjusted accordingly. The longer astern the rod is permitted, the more ahead pitch will be available and vice versa.

Ahead pitch should usually be set corresponding to the max. engine rpm. For certain duties however, such as trolling, a slightly heavier pitch will be favorable in order to benefit from the higher torque available, and then reduce the pitch some when going full speed.



1. *Manøvrehandel, kobling (1), vist i aktive stilling - og urkoblet, (handel monter opp).*

Remote control handel, (no.1) is shown in rear position and disengaged (the handel is now pointing up)

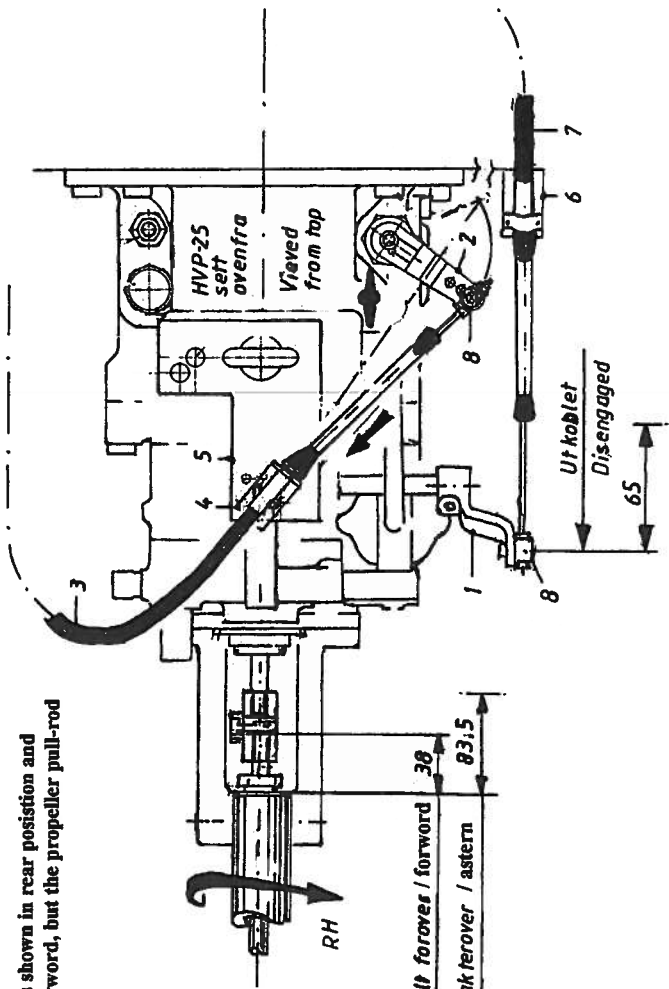
2 *Manøvrehandel, vripropell (2), vist i aktive stilling - gir full vingeveidning forover, med propelltrekksstang helt inne (38 mm).*

Remote control handel, (no.2) is shown in rear position and gives the propeller full pitch forward, but the propeller pull-rod is fully pulled bak (38mm)

Trekksstang bevegelsen er nådd med propellen sammen sett, men før tilkobling til gearet.

The pull-rod movement is measured with the propeller connected, but before the gearbox is mounted on.

Trekksstang helt inne = fullt forover / forward
Trekksstang helt ute = akterover / astern



Not to scale

Tegn: Ness		Dato: 04.04.97		Målestokk: 	
Kontroll:		Godkjent:			
JANSTILLING AV KOBLINGSHEDEL OG MANØVERHEDEL FOR VINGEVLIDNING MED TREKKSTANG BEVEGELSE HVP-25					
Material:		8031M06 / 8041M08 HVP-25			
Ers. nr:		Ers. nr:		Uts. nr:	
				9714	
				Modell/Ers. nr:	

SABB MOTOR A/S
BERGEN - NORWAY

FITTING PROPELLER BOSS TO THE SHAFT.

(Corresp. Drawing F91.107.1.3)

1. The propeller must be dismantled before fitting it to the shaft. Remove the clamp ring 11 from the fore part. Heat the fore part carefully (to 50-100 degr.C). Push the fore part on to the shaft until it hits the shaft shoulder.
2. Insert the three socket head screws 9 into the boss, each with its rubber ring 8 over the threads, such that the rubber rings will be trapped between the boss and the clamp ring 11. These rings prevent water entering.
3. Apply a thin coating of lubricant MOLYKOTE G-N PLUS to the taper.
4. Push the clamp ring on to the taper, without using any force, until it stops in "natural" way, and in line with the screws. Measure the distance "A", using a slide gauge, and note the measure.

Tighten evenly the three socket head screws until measure "A" is reduced by 1,2 mm.: $F = A - 1,2 \text{ mm}$. The reduction 1,2 mm is minimum value, but reduction should not be more than 1,5 mm.

A = Measure before tightening. F = Measure after tightening (final measure).

NOTE: It is important that measure F is constant all way round.

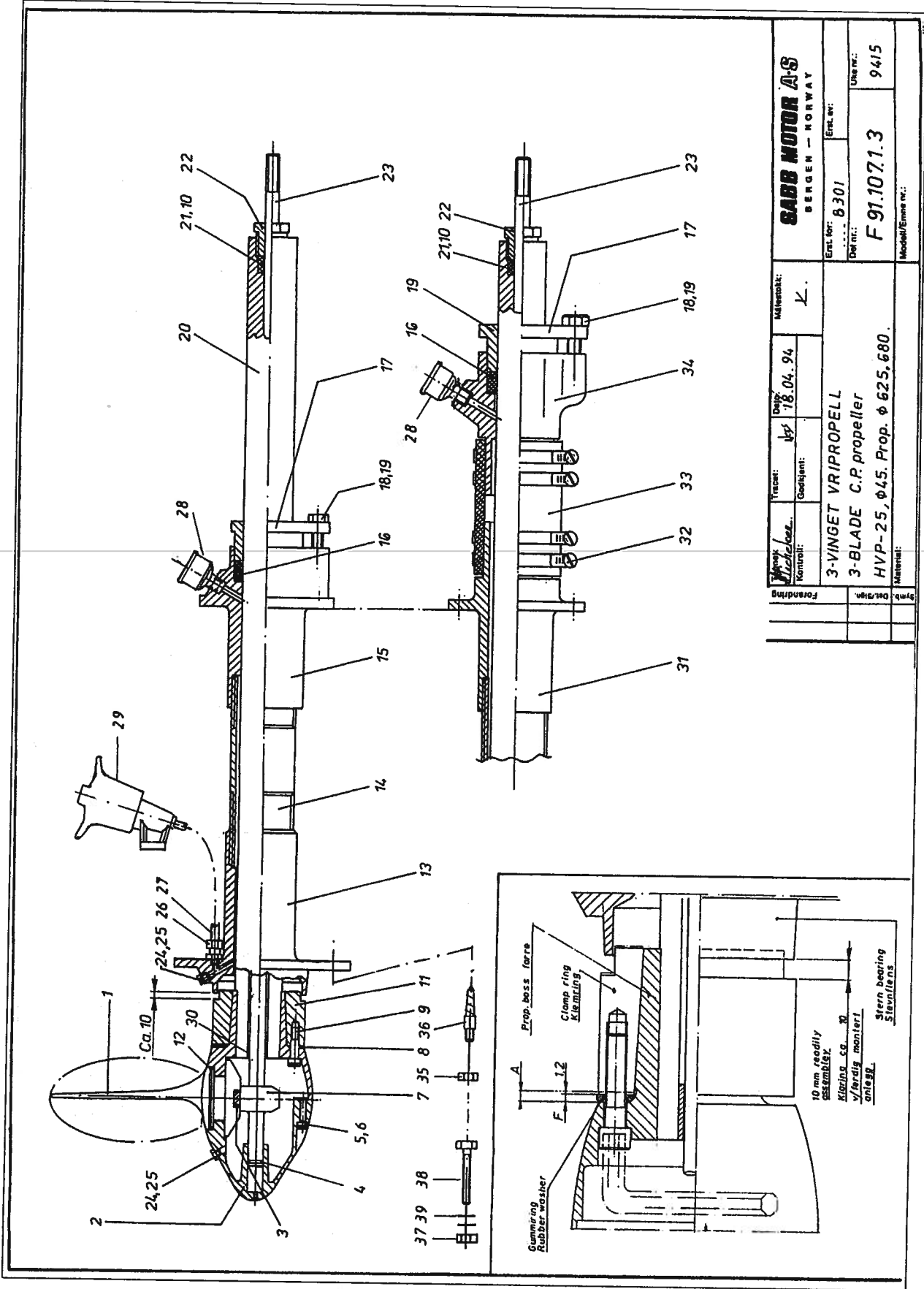
5. Fit the driving block 7 to the pull rod. Apply some LOCTITE 307 to the threads before fitting. Fit O-ring 4 to the pull rod. Insert the pull rod into the shaft and fit the three wedges 3 on the block taps.
6. Fit the O-rings 12 in their grooves in each blade boss, and fit the blades according to punch marks. Note that the blades, pull rod block and the two propeller boss parts are marked for correct assembling.
7. Finally six socket head screws 5 with washers 6 are tightened evenly to 2,57 kpm.

DISMANTLING PROPELLER BOSS FROM THE SHAFT.

This procedure is opposite to the fitting procedure, except for the clamp ring.

To remove the clamp ring first try by unscrewing the three screws 9 approx. 10 mm and knocking carefully on the screw heads. If not successful, proceed as follows:

1. Remove the three screws.
2. Heat the clamp ring some and insert suitable wedges between the clamp ring and boss fore part. This will normally make the clamp ring free from the boss.
3. If the boss is still fixed to the shaft, heat the boss carefully until it comes off by careful knocking.



Forsyning		Prosjekt:	Dato:	Materiell:	
Kontroll:		Godkjent:	18.04.94	✓	
Dato:		18.04.94		✓	
3-VINGET VRIPROPELL		3-BLADE C.P. propeller		F 91.107.1.3	
HVP-25, ø45, Prop. ø 625, 680.		8301		9415	
Material:		Model/Emne nr.:			

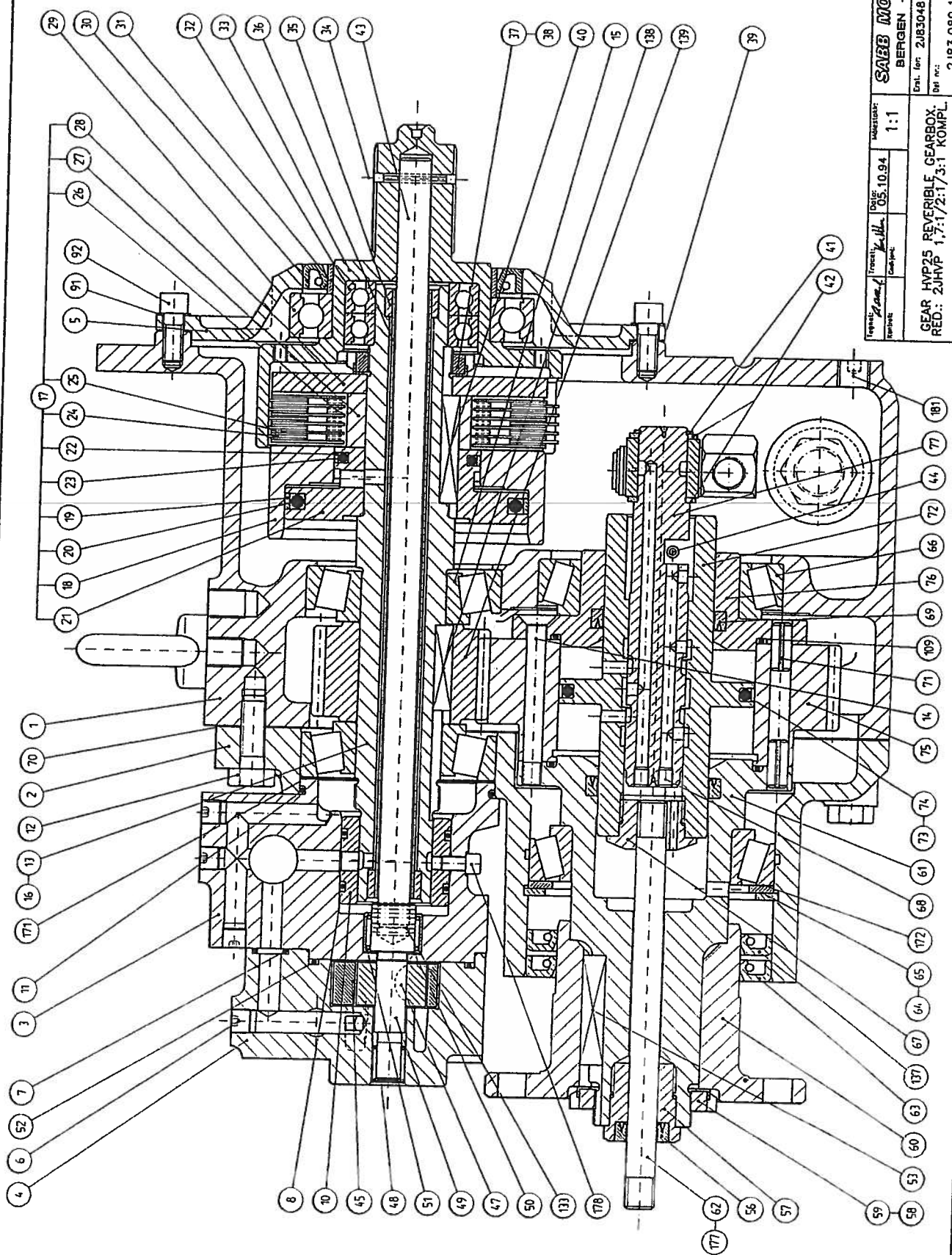
SABB MOTOR A-S	
BERGEN - NORWAY	
Est. for:	Est. nr.:
8301	
Del nr.:	Utg nr.:
F 91.107.1.3	9415
Model/Emne nr.:	

ORDERING SPARE PARTS.

For ordering spare parts please see the SPARE PARTS CATALOGUE for correct part name and part number.

When ordering always state full details:

1. Gearbox Type and Serial Number.
 2. Part name and part number.
 3. Quantity required.
 4. Full address, name of ship, port of call, marking and forwarding instruction (air freight, air mail, by ship, by mail).
-



SABB MOTOR A.S			
BERGEN - NORWAY			
Enst. lrt:	2J83048	Enst. nr:	
Enst. nr:	2J83.089.1.2	Enst. nr:	9440
GEAR HVP25 REVERSIBLE GEARBOX.			
RED: 2JHVP 1,7:1/2:1/3:1 KOMPL			
1:1			
05.10.94			
Enne nr:			
Art. nr			

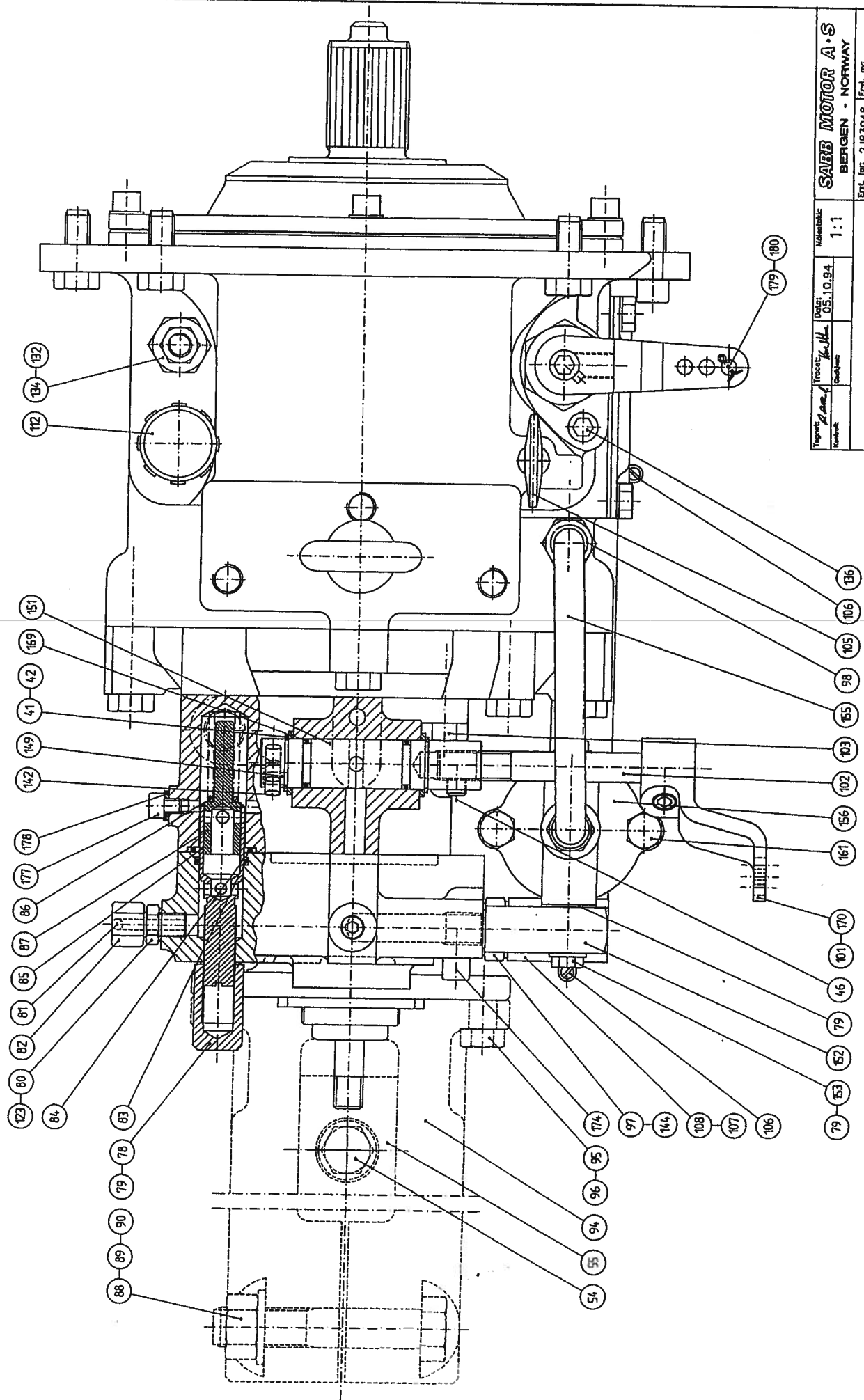
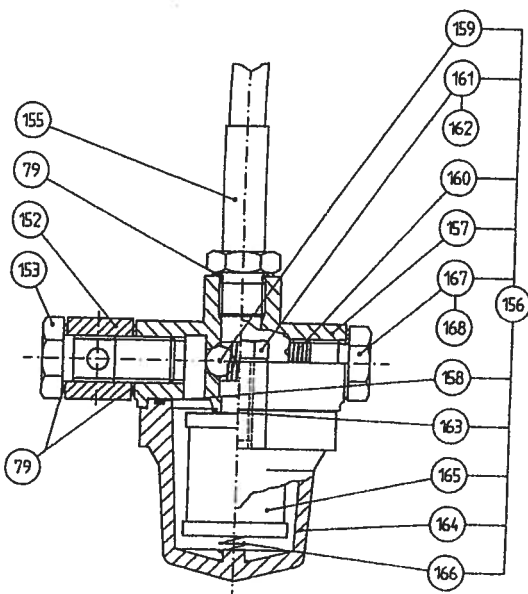
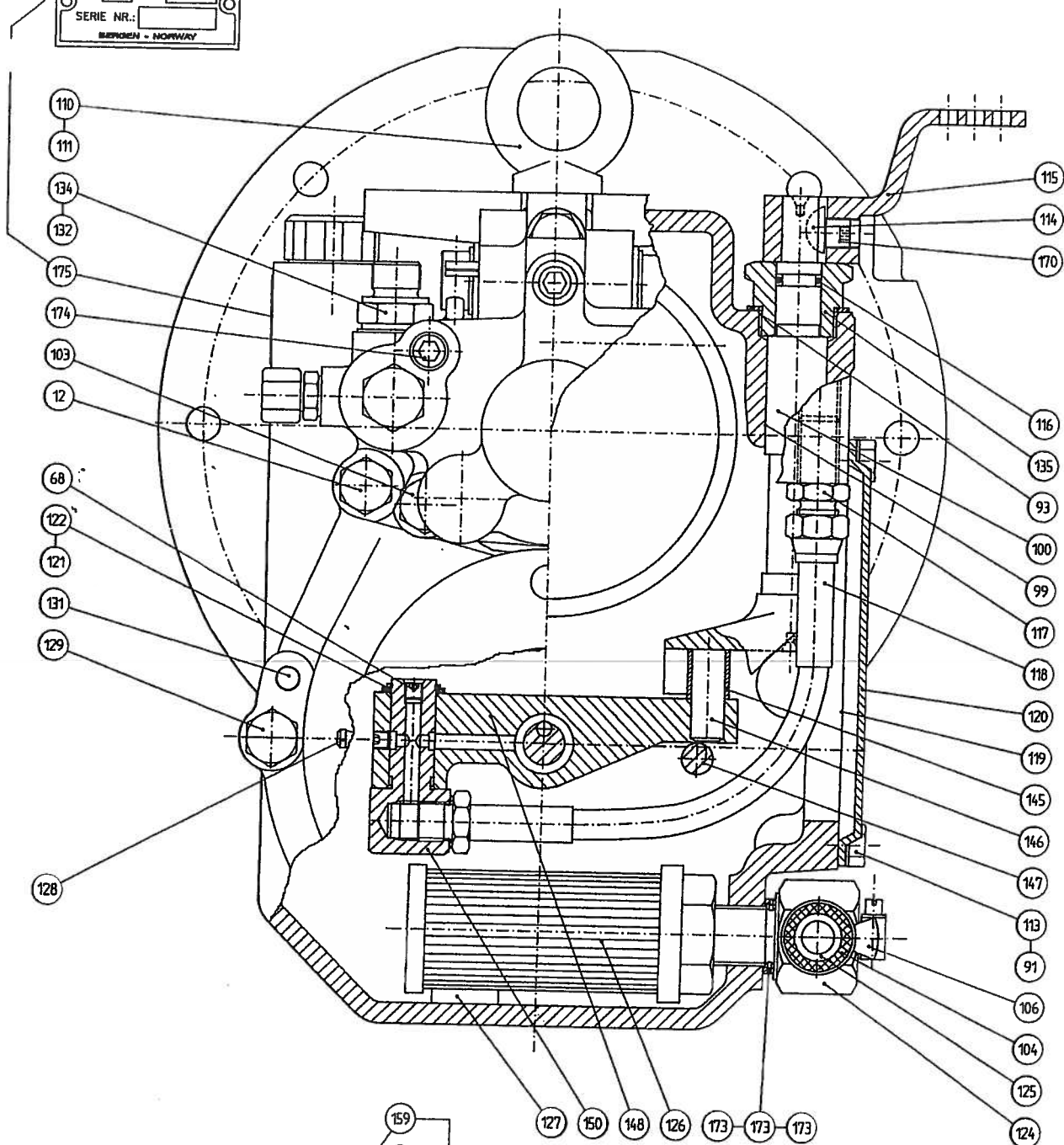


Figura: 2 and 3		Tecnica: 1/1		Data: 05.10.84		Materiale: 1:1		SABB MOTOR A-S BERGEN - NORWAY			
GEAR HVP25 REVERSIBLE GEARBOX. RED.: 2JHVP 1,7:1/2:1/3:1 KOMPL.		Erit. per: 2J83048		Erit. or:		Erit. nr.:		Ula nr.:			
						2J83.090.1.2		9440			
						Erit. nr.:		ATL nr.:			
Materiale:											

SABB MOTOR A-S
HVP: 25 RED.:
SERIE NR.:
BERGEN - NORWAY



Tegnet:	Tracel:	Dato:	Målestokk:	SABB MOTOR A-S	
Kontrollert:	Godkjent:	05.10.94	1:1	BERGEN - NORWAY	
GEAR HVP25 REVERIBLE GEARBOX. RED.: 2JHVP 1,7:1/2:1/3:1 KOMPL.			Ers. for: 2JB3047		Ers. av:
Material:			Del nr.: 2JB3.091.1.2		Uts. nr.: 9440
			Emne nr.:		Art. nr.:

Dato for utskrift : 29.03.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
0	GEAR HVP-25 KOMPLETT GEARBOX HVP-25 ASSY	HVP25-3.0	2J83.049.1.0	1				RED. 3,0:1
0	GEAR HVP-25 KOMPLETT GEARBOX HVP-25 ASSY	HVP25-2.1	2J83.050.1.0	1				RED. 2,0:1
0	GEAR HVP-25 KOMPLETT GEARBOX HVP-25 ASSY.	HVP25-1.7	2J83.096.1.0		1			RED. 1,7:1
0								
0	BESTÅR AV: CONSISTS OF:							
1	GEARHUS GEARBOX HOUSING	002644	2J83.001.1.1	1	1			
2	GEARHUSDEKSEL HOUSING COVER	002646	2J83.002.1.2	1	1			
3	KOBLINGSSLEIDHUS CLUTCH SLIDE VALVE HOUSING	003148	2J82.003.3.3	1	1			
4	HYDRAULIKKUMPEHUS HYDRAULIC PUMP HOUSING	002619	2J82.004.3.3	1	1			
5	FRONTDEKSEL FRONT COVER	004398	2J83.027.1.3	1	1			
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROL. PITCH CONTROL						1: HVP25-RED. 3:1
Signatur 00								2: HVP25-RED. 2:1
Dato 10.11.92								3: HVP25-RED. 1,7:1
Erst for 2J83.047/048								4:
Erst av								Fra motor/gear nr :
Ukenr 9246								
Side/Page 1 av/of 20		2J83.088						

Dato for utskrift : 29.03.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

SABBA MOTOR A.S. Bergen, Norway

SITAKKLISIE / PART LIST

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
6	RØRPLUGG PLUG	516047		4	4	4		1/8" BSP
7	O-RING O-RING	821053		1	1	1		Ø 10,78 X 2,62
8	O-RING O-RING	821043		2	2	2		Ø 39,5 X 3
8	SYL.HODESKRUE M/6K HULL CAP SCREW	433063		2	2	2		M 8 X 60
9	STOPPTAPP STOP PIN	452037		1	1	1		
10	OLJEINNFØRINGSHYLSE OIL INLET SLEEVE	002622	2J82.007.1.4	1	1	1		
11	O-RING O-RING	821034		1	1	1		74,5 X 3
12	HODESKRUE BOLT	432013		2	2	2		M10 X 30
13	DRIVAKSEL PINION SHAFT	004720	2J82.026.1.3	1				REDUKSJON 3 : 1
13	DRIVAKSEL PINION SHAFT	003760	2J82.009.3.3	1	1	1		REDUKSJON 2 : 1 OG 1,7 : 1
Stykkliste 2J83.088			1				Variant / Type	
Tilh.tegn 83.089-090-091								
Signatur 00								
Dato 10.11.92								
Erst for 2J83.047/048								
Erst av Ukenr 9246								
Side/Page 2 av/of 20			2J83.088				1: HVP25-RED. 3:1 2: HVP25-RED. 2:1 3: HVP25-RED. 1,7:1 4:	
							Fra motor/gear nr :	

Dato for utskrift : 29.03.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
14	SENKSKRUE M/6K HULL COUNTERSUNK SCREW	433023		6	6	6		M8 X 70
15	KONISK RULLELAGER TAPER ROLLER BEARING	912008		2				32208, R3:1
15	KONISK RULLELAGER TAPER ROLLER BEARING	912010			2	2		30307, R2:1, R1,7:1
16	DISTANSERING DISTANCE SLEEVE	727025		1				MELLOM LAGER OG KOBLING, R3:1
17	HYDRAULISK LAMELLKOBLING HYDROPERATED CLUTCH COMPLETE	002686	2J82.018.1.0	1	1	1		ROCKFORD
17	BESTÅR AV POS 18-28 COMPRISING " 18-28							
18	KOBLINGSSTEMPEL CLUTCH PISTON	007675	2J82.029.1.4	1	1	1		
19	TETNINGSRING PISTON SEAL	823012		1	1	1		
20	O-RING O-RING	821083		1	1	1		81,99 X 5,34 VITON
21	KOBLINGSNAV CLUTCH BODY	007673	2J82.028.1.4	1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur ØØ				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst. for 2J83.047/048				4:				
Erst. av				Fra motor/gear nr :				
Ukenr 9246								
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Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
				1	2	3	4	
22	TETNINGSRING PISTON SEAL	823011		1	1	1		
23	O-RING O-RING	821084		1	1	1		47,22 X 3,53 VITON
24	PERIFERILAMELL OUTER DISC	982006		5	5	5		
25	SENTERLAMELL INNER DISC	982007		6	6	6		
26	BØLGEFJÆRSKIVE SPRING	725030		5	5	5		
27	KOBLINGSLAMELLNAV HUB, CLUTCH DISC	007676	2J82.021.1.0	1	1	1	1	
28	KOBLINGSBAKPLATE BACK PLATE	007677	2J82.022.1.0	1	1	1	1	
29	KULELAGER BALL BEARING	911001		1	1	1	1	6013
30	TETNINGSRING SEAL	824036		1	1	1	1	
31	SLITERING SLEEVE	626046		1	1	1	1	STÅL, HARDFORKROMMET
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur 00				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av Ukenr 9246				Fra motor/gear nr :				
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Dato for utskrift : 29.03.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
32	KULELAGER BALL BEARING	911046		2	2	2		6006
33	KOBLINGSDRIVFLENS INPUT DRIVE FLANGE	004649	2J82.025.1.3	1	1	1		
33	KOBLINGSDRIVFLENS INPUT DRIVE FLANGE	011796	2J82.032.1.3	1	1	1		FULL SPLINE FRA/FROM JAN.96
34	PINN PIN	452035		1	1	1		
34	PINN PIN	452038		1	1	1		FOR FULL SPLINE JAN.96
35	KLEMYLSE SLEEVE	626037		2	2	2		
36	DRIVAKSELRØR DRIVE SHAFT PIPE	614029		1	1	1		
37	RINGMUTTER RING NUT	442008		1	1	1		KM7
38	LÅSEKIVE LOCK WASHER	725021		1	1	1		MB7
39	PAKNING GASKET	813016		1	1	1		0,5 MM
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur ØO				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av Ukenr 9246				Fra motor/gear nr :				
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STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
40	KILE KEY	451028		1	1	1		
41	SEEGERRING CIRCLIP	734042		3	3	3		
42	STØTTESKIVE SUPPORT WASHER	727018		4	4	4		
43	OLJEPUMPEAKSEL OIL PUMP DRIVE SHAFT	003999	2J82.023.1.4	1	1	1		
44	SPENNSTIFT ELASTIC PIN	456008		1	1	1		Ø5X40 DIN1481
45	OLJEPUMPEELEMENT OIL PUMP ELEMENT	941015		1	1	1		
46	GJENGESTIFT SET SCREW	434020		1	1	1		
47	SKIVEKILE KEY	451027		1	1	1		
48	NÅLELAGER NEEDLE BEARING	913013		1	1	1		
49	PUMPEBOLT PUMP BOLT	006387	2J82.024.1.4	1	1	1		
Stykkliste 2J83.088		HYDR. VRI PROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091	Signatur 00	HYDR. CONTROL. PITCH CONTROL		1: HVP25-RED. 3:1				
Dato 10.11.92	Erst for 2J83.047/048			2: HVP25-RED. 2:1				
Erst av	Ukenr 9246			3: HVP25-RED. 1,7:1				
Side/Page 6 av/of 20		2J83.088		4:				
				Fra motor/gear nr :				

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
50	ANLEGGSSKIVE WASHER	721037		1	1	1		
51	NÅLELAGER NEEDLE BEARING	913012		1	1	1		
52	O-RING O-RING	821006		1	1	1		59, 5X3
53	KILE KEY	451029		1	1	1		
54	HODESKRUE BOLT	432072		1	1	1		M12X30
55	SKJØTESTYKKE, TREKKSTANG CLAMP NUT	004719	2J83.032.1.4	1	1	1		
56	TETNINGSRING SEAL	824037		1	1	1		
57	MELLOMAKSELPAKKBOKS GLAND, INTERMEDIATE SHAFT	004716	2J83.033.1.4	1	1	1		
58	RINGMUTTER RING NUT	442002		1	1	1		KM8
59	LÅSEKIVE LOCK WASHER	725001		1	1	1		MB8
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL						
Signatur 00								
Dato 10.11.92								
Erst for 2J83.047/048								
Erst av Ukenr 9246								
Side/Page 7 av/of 20		2J83.088		1: HVP25-RED. 3:1 2: HVP25-RED. 2:1 3: HVP25-RED. 1,7:1 4: Fra motor/gear nr :				

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
60	FORRESTE FLENSKOBLING FRONT COUPLING FLANGE	004711	2J83.030.1.4	1	1	1		
61	MELLOMAKSEL INTERMEDIATE SHAFT	004709	2J83.029.1.3	1	1	1		
62	TREKKSTANG PULL ROD	004714	2J83.034.1.4	1	1	1		
63	TETNINGSRING SEAL	824033		1	1	1		
64	SEEGERRING CIRCLIP	734030		1	1	1		
65	STØTTERING SUPPORT WASHER	727014		1	1	1		
66	KONISK RULLELAGER TAPER ROLLER BEARING	912009		2	2	2		32013X
67	TREKKSTANGHODE ROD HEAD	004713	2J83.035.1.4	1	1	1		
67	TREKKSTANG M/HODE KOMPL. PULL ROD WITH HEAD COMPL.	011807	2J83.100.1.4	1	1	1		
68	GJENGESTIFT SET SCREW	434018		5	5	5		M6X6
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROL. FITCH CONTROL		1: HVP25-RED. 3:1				
Signatur 00				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av				Fra motor/gear nr :				
Ukenr 9246								
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STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
69	STANGTETNINGSRING OIL SEAL	823009		2	2	2		
70	PAKNING, GEARHUSDEKSEL GASKET, GEARBOX COVER	813015		1	1	1		0,5 MM
71	SPENNSTIFT ELASTIC PIN	456020		4	4	4		Ø 8X24, DIN 1481
72	OMSTYRINGSSTEMPEL PITCH CONTROL PISTON	004707	2J83.031.1.4	1	1	1		
73	STEMPELTETNINGSRING PISTON RING	823010		1	1	1		
74	O-RING O-RING	821061		1	1	1		
75	TANNHJUL GEAR	004704	2J83.026.1.4	1	1	1		66.04 X 5,34
75	TANNHJUL GEAR	004706	2J83.028.1.4	1	1			R3:1
75	TANNHJUL GEAR	011254	2J83.074.1.4			1		R 2:1
76	FORRE OMSTYRINGSSYLINDERBUNN CYLINDER END UNIT, FRONT	005078	2J83.041.1.4	1	1	1		R 1,7:1
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL						
Signatur 00								
Dato 10.11.92								
Erst for 2J83.047/048								
Erst av								
Ukenr 9246								
Side/Page 9 av/of 20		2J83.088		1: HVP25-RED. 3:1 2: HVP25-RED. 2:1 3: HVP25-RED. 1,7:1 4:				Fra motor/gear nr :

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STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
77	OMSTYRINGSSLEID PITCH CONTROL SLIDE	002653	2J83.017.1.4	1	1	1		
77	OMSTYRINGSSLEID KOMPL. PITCH CONTROL SLIDE COMPL.	014279		1	1	1		BESTÅR AV/CONSISTS OF: POS.: 72,77,68,44
78	BUNNMUTTER NUT	441085	441085	1	1	1		
79	KOBERRING COPPER WASHER	831019		2	2	2		Ø 13 X 18 X 1,5
80	OVERGANGSNIPPEL REDUCING NIPPLE	511041		1	1	1		
81	KULE BALL	915004		1	1	1		1/42
82	RØRMUTTER NUT	512010		1	1	1		
83	O-RING O-RING	821001		1	1	1		17,6 X 2,4
84	O-RING O-RING	821056		1	1	1		19,5 X 3
85	OLJETRYKKJUSTERINGSHYLSE OIL PRESSURE ADJUSTING SLEEVE	002620	2J82.005.1.4	1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur 00				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av Ukenr 9246				Fra motor/gear nr :				
Side/Page 10 av/of 20		2J83.088						

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STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
86	TRYKKVENTILFJØR VALVE SPRING	711064		1	1	1		
87	OLJETRYKKSVENTIL OIL PRESSURE VALVE	002615	2J82.002.1.4	1	1	1		
88	HODESKRUE BOLT	432036		2	2	2		M 16 X 30
89	FJÆRSKIVE SPRING WASHER	722004		2	2	2		Ø16
90	MUTTER NUT	441053		2	2	2		M16
91	FJÆRSKIVE SPRING WASHER	722002		9	9	9		Ø8
92	SYL.SKRUE M/6K HULL CAP SCREW	433067		4	4	4		M 8 X 16
93	KOBERRING COPPER WASHER	831033		1	1	1		Ø 25 X Ø32
94	KLEMKOBLING SPLIT COUPLING	002823	F 81 A	1	1	1		
95	HODESKRUE BOLT	432116		4	4	4		7/16"UNC X 1 1/2"
Stykkliste 2J83.088		HYDR. VRIPROPPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur ØØ				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av Ukenr 9246				Fra motor/gear nr :				
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STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
96	LÅSEMUTTER LOCK NUT	441057		4	4	4		7/16"UNC
97	NIPPEL UNION	511050		1	1	1		
98	VINKELNIPPEL UNION, 90 DEGR.	511106		1	1	1		
99	SPLITTFORING SPLIT BUSH	622022		2	2	2		
100	OMSTYRINGSVEIV PITCH CONTROL CRANK	007181	2J83.042.1.4	1	1	1		
101	KOBLINGSARM CLUTCH LEVER	002613	2J83.022.2.4	1	1	1		
102	KOBLINGSSLEIDFORLENGELSE CLUTCH SLIDE EXTENSION	002614	2J82.015.1.4	1	1	1		
103	HODESKRUE BOLT	432009		2	2	2		M 10 X 25
104	SUGESLANGE SUCTION HOSE	841087		1	1	1		5/8" X 280 MM OLJEBESTANDIG
105	PEILEPINN DIPSTICK	003103	2J83.025.1.4	1	1	1		
Stykkliste 2J83.088			HYDR. VRIPROPPELLANLEGG HVP25				Variant / Type	
Tilh.tegn 83.089-090-091			HYDR. CONTROLL. PITCH CONTROL				1: HVP25-RED. 3:1	
Signatur 00							2: HVP25-RED. 2:1	
Dato 10.11.92							3: HVP25-RED. 1,7:1	
Erst for 2J83.047/048							4:	
Erst av Ukenr 9246							Fra motor/gear nr :	
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STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
106	SLANGEKLEMMER HOSE CLIP	921003		2	2	2		17-25
107	SLANGENIPPEL HOSE NIPPLE	518008		1	1	1		
108	ALBU ELBOW	641016		1	1	1		
109	O-RING O-RING	821007		2	2	2		79,5 X 3
110	PINNESKRUE STUD	437087		1	1	1		M12 X 32
111	ØYEMUTTER LIFTING EYE	443015		1	1	1		
112	OLJEPÅFYLLINGSPROPP BREATHER FILTER	517011		1	1	1		
113	HODESKRUE BOLT	432024		4	4	4		M 8 X 12
114	SKIVEKILE KEY	451006		1	1	1		
115	OMSTYRINGSARM PITCH CONTROL LEVER	004721	2J83.036.1.4	1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur 00				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av				Fra motor/gear nr :				
Ukenr 9246								
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STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
116	O-RING	821054		1	1	1		10,6 X 2,4
117	OLJEINNFORINGSNIPPEL OIL INLET NIPPLE	511003		1	1	1		
118	INN. TRYKKOLJESLANGE INT. OIL PRESSURE HOSE	843224		1	1	1		
119	KOBLINGSLOKKEPAKNING GASKET, CLUTCH COVER	815024		1	1	1		
120	KOBLINGSHUSLOKK COVER	001402	G 82 QL	1	1	1		
121	STØTTESKIVE SUPPORT WASHER	727019		1	1	1		SS15 X 22 X 1,5
122	SEEGERRING CIRCLIP	734039		1	1	1		15A
123	KOBERRING COPPER WASHER	831036		1	1	1		Ø10
124	OLJESILNIPPEL OIL STRAINER NIPPLE	511104		1	1	1		
125	SLANGENIPPEL HOSE NIPPLE	518042		1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091	Signatur 00	HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Dato 10.11.92	Erst for 2J83.047/048			2: HVP25-RED. 2:1				
Erst av	Ukenr 9246			3: HVP25-RED. 1,7:1				
Side/Page 14 av/of 20		2J83.088		4:				
				Fra motor/gear nr :				

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
126	OLJESIL OIL STRAINER	942016		1	1	1		
127	MAGNET MAGNET	942001		1	1	1		
128	FETTNIPEL GREASE NIPPLE	517004		1	1	1		
129	HODESKRUE BOLT	432015		5	5	5		M10 X 40
131	RIFLEPINN DOWEL	452030		2	2	2		Ø8 X 40
132	NIPPEL UNION	511046		1	1	1		
133	SPENNSTIFT ELASTIC PIN	456014		2	2	2		Ø 2 X 24, DIN 1481
134	KOBBERING COPPER WASHER	831048		1	1	1		Ø 17 X 20 X 1
135	OMSTYRINGSVEIVGLAND GLAND, PITCH CONTROL CRANK	007715	2J83.045.1.4	1	1	1		
136	RØRPLUGG PLUG	516054		1	1	1		M12 X 1,5
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091	Signatur 00	HYDR. CONTROL. PITCH CONTROL						
Dato 10.11.92	Erst for 2J83.047/048							1: HVP25-RED. 3:1
Erst av	Ukenr 9246							2: HVP25-RED. 2:1
Side/Page 15 av/of 20		2J83.088						3: HVP25-RED. 1,7:1
								4:
								Fra motor/gear nr :

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
137	TETNINGSRING SEAL	824009		1	1	1		
138	KILE KEY	451003		1	1	1		
139	TANNHJUL GEAR	004705	2J82.027.1.4		1			R 2:1
139	TANNHJUL GEAR	011255	2J82.030.1.4			1		R 1,7 : 1
142	RIFLEPINN DOWEL	454008		1	1	1		
144	KOBERRING COPPER WASHER	831020		2	2	2		
145	KLOSS PITCH SLIDE BLOCK	001524	2H 91 M	1	1	1		
146	BOLT FOR OLJEINNFØRINGSSTYKKE BOLT FOR OIL INLET BLOCK	455013		1	1	1		
147	STOPPBOLT BOLT	455014		1	1	1		
148	OLJEINNFØRINGSSTYKKE OIL INLET BLOCK	007714	2J83.043.1.4					
Stykkliste 2J83.088			HYDR. VRIPROPPELLANLEGG HVP25		Variant / Type			
Tilh.tegn 83.089-090-091			HYDR. CONTROL. PITCH CONTROL		1	2	3	4
Signatur ØO					1: HVP25-RED. 3:1			
Dato 10.11.92					2: HVP25-RED. 2:1			
Erst for 2J83.047/048					3: HVP25-RED. 1,7:1			
Ukenr 9246					4:			
Side/Page 16 av/of 20			2J83.088		Fra motor/gear nr :			

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
149	SLETTG	621012		1	1	1		
149	SPENNSTIFT ELASTIC PIN	456017		2	2	2		Ø5 X 22
150	OLJEINNFORINGSTAPP OIL INLET BOLT	007413	2J83.044.1.4	1	1	1		
151	KOBLINGSSLEID CLUTCH SLIDE	002635	F82.054.2.4	1	1	1		
152	NIPPEL FOR OLJEFILTER OIL STRAINER NIPPLE	511089		1	1	1		
153	HULSKRUE BANJO BOLT	521026		1	1	1		
155	KOBLINGSTRYKKSLENGE CLUTCH OIL PRESSURE HOSE	843225		1	1	1		
156	TRYKKOLJEFILTER KOMPLETT OIL FILTER ASSY	942038		1	1	1		
156	BESTÅR AV POS 157-168 COMPRISING " 157-168							
157	ØVRE FILTERHUS UPPER FILTER HSG.	942036		1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091	Ø0	HYDR. CONTROL. PITCH CONTROL		1: HVP25-RED. 3:1				
Dato 10.11.92	2J83.047/048			2: HVP25-RED. 2:1				
Erst for	Erst av			3: HVP25-RED. 1,7:1				
Ukenr 9246				4:				
Side/Page 17 av/of 20		2J83.088		Fra motor/gear nr :				

Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty			Merknader / Remarks
158	O-RING O-RING	821048		1	1	1	Ø41,6 X 2,4
159	KULE BALL	915001		1	1	1	
160	FJÆR SPRING	711036		1	1	1	
161	HODESKRUE BOLT	432023		2	2	2	
162	FJÆRSKIVE SPRING WASHER	722002		2	2	2	Ø8
163	O-RING O-RING	821067		1	1	1	12,2 X 1,6
164	NEDRE FILTERHUS LOWER FILTER HSG.	942037		1	1	1	
165	TRYKKFILTERELEMENT FILTER ELEMENT	942031		1	1	1	
166	FJÆR SPRING	711056		1	1	1	
167	RØRPLUGG PLUG	516034		1	1	1	
Stykkliste 2J83.088		HYDR. VRITPROPELLANLEGG HVP25		1	2	3	4
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1			
Signatur ØO				2: HVP25-RED. 2:1			
Dato 10.11.92				3: HVP25-RED. 1,7:1			
Erst for 2J83.047/048				4:			
Erst av				Fra motor/gear nr :			
Ukenr 9246							
Side/Page 18 av/of 20		2J83.088					

Dato for utskrift : 29.03.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

21.05.00

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
168	KOBBERRING COPPER WASHER	831019		1	1	1		
169	O-RING O-RING	821042		2	2	2		15,6 X 2,4
170	GJENGESTIFT SET SCREW	434017		2	2	2		M10 X 10
171	SHIM SHIM	741010		X	X	X		PS80 X 63 X 0,3
171	SHIM SHIM	741009		X	X	X		PS80 X 63 X 0,1
172	SHIM SHIM	741063		X	X	X		PS100 X 80 X 0,1
172	SHIM SHIM	741064		X	X	X		PS100 X 80 X 0,3
172	SHIM SHIM	741065		X	X	X		PS100 X 80 X 0,5
173	KOBBERRING COPPER WASHER	831020		1	1	1		Ø25 X 21 X 0,9
173	KOBBERRING COPPER WASHER	831021		X	X	X		Ø25 X 21 X 1,2
Stykkliste 2J83.088				1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091								
Signatur 00								
Dato 10.11.92								
Erst for 2J83.047/048								
Erst av								
Ukenr 9246								
Side/Page 19 av/of 20				1: HVP25-RED. 3:1 2: HVP25-RED. 2:1 3: HVP25-RED. 1,7:1 4:				
2J83.088				Fra motor/gear nr :				
HYDR. VRIPROPPELLANLEGG HVP25								
HYDR. CONTROLL. PITCH CONTROL								

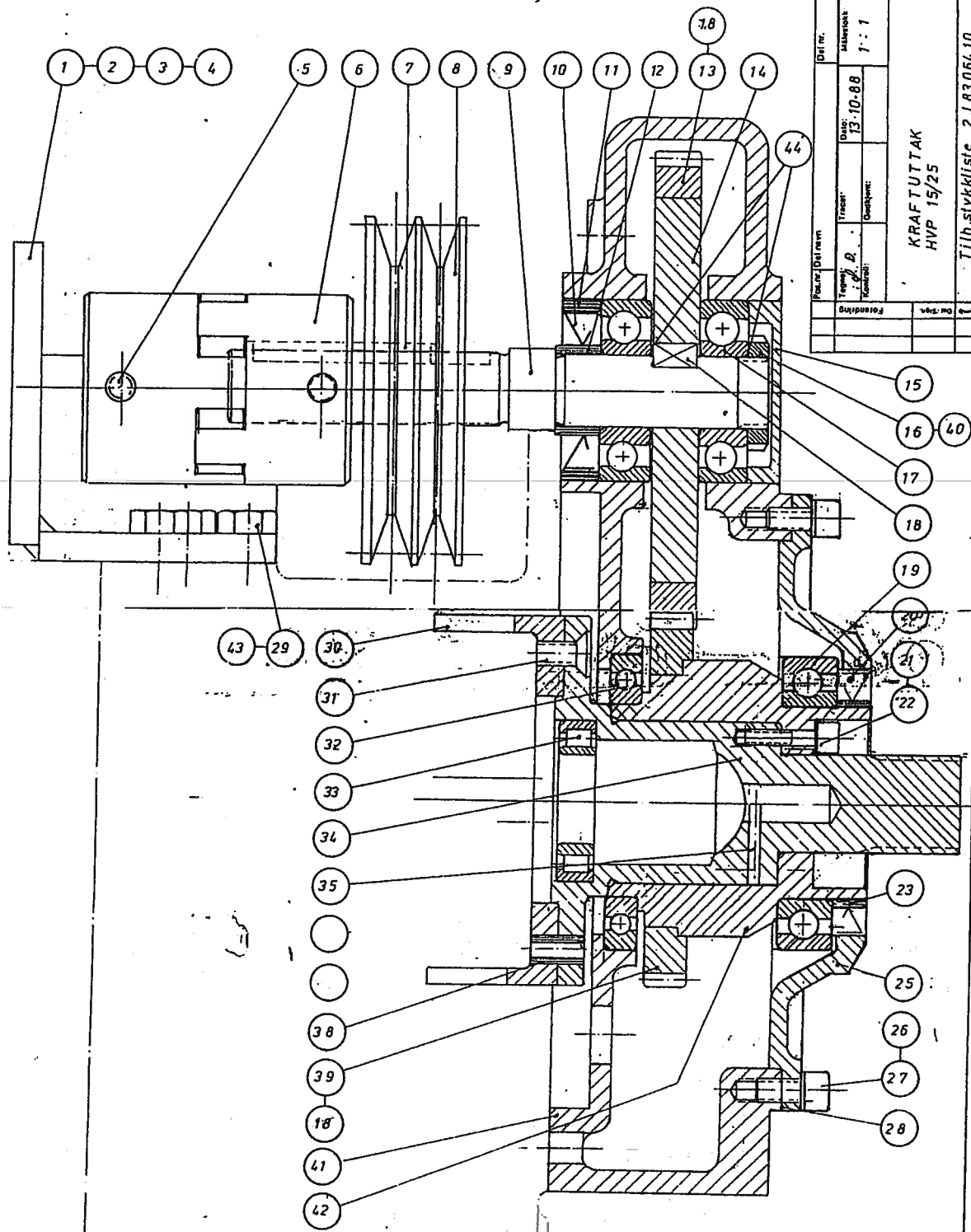
Dato for utskrift : 29.03.00

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
173	KOBBERING COPPER WASHER	831022		X	X	X		Ø25 X 21 X 1,5
174	SYL.HODESKRUE ALLEN BOLT	433063		2	2	2		M8 X 60
175	SERIENUMMERSKILT NUMBER PLATE	974009		1	1	1		
176	FORING BUSH	631012		1	1	1		
177	TRANSPORTHETTE TRANSPORTATION CAP	011943	2J83.101.1.4	1	1	1		
Stykkliste 2J83.088		HYDR. VRIPROPELLANLEGG HVP25		1	2	3	4	Variant / Type
Tilh.tegn 83.089-090-091		HYDR. CONTROLL. PITCH CONTROL		1: HVP25-RED. 3:1				
Signatur ØØ				2: HVP25-RED. 2:1				
Dato 10.11.92				3: HVP25-RED. 1,7:1				
Erst for 2J83.047/048				4:				
Erst av				Fra motor/gear nr :				
Ukenr 9246								
Side/Page 20 av/of 20		2J83.088						

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Ant. / Mat. Dim. - Måttabell	Dr. nr.	Skala	Ant. / Mat. Dim. - Måttabell
SABB MOTOR A-8	13-10-88	1:1	SABB MOTOR A-8
BENGE - NORWAY			BENGE - NORWAY
Em. nr.	Em. nr.	Em. nr.	Em. nr.
2 J 830 63.12	2 J 830 63.12	2 J 830 63.12	2 J 830 63.12
88.42	88.42	88.42	88.42
KRAFTUTTAK HVP 15/25			
Tilh.stykkliste 2 J 830 64.10			

Dato for utskrift :

12.02.96

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty	Merknader / Remarks
0	KRAFTUTTAK KOMPLETT PTO EQUIPMENT COMPL	011299	2J83.064.1.0	1	
0	BESTÅR AV: CONSISTS OF:				
1	PUMPEBRACKET PUMP BRACKET	011132	2J83.062.1.2	1	
2	STRAMMEVINKEL ADJUSTING BRACKET	007884	MS83.038.1.4	1	
3	HODESKRUE BOLT	432159		2	M8 X 80
4	HODESKRUE BOLT	432150		2	M8 X 16
5	GJENGESTIFT SET SCREW	434017		2	
6	FLEKSIBEL KOBLING FLEXIBLE COUPLING	0063248	981.028	1	
7	KILE KEY	451003		2	
8	REMSKIVE PULLY	987042		1	Ø 112 2SPA
Stykkliste Tilh.tegn Signatur Dato Erst. for Erst. av Ukenr		2J83.064.1.0 2J83.063.1.2 KN 12.02.96		1 2 3 4 Variant / Type	
Side/Page		1 av/of 5		1: KRAFTUTTAK FOR HVP15/25 - PTO FOR HVP15/25 2: 3: 4: Fra motor/gear nr :	
		KRAFTUTTAK FOR HVP15/25 PTO EQUIPMENT FOR HVP15/25			
		2J83.064.1.0			

Dato for utskrift :

12.02.96

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty	Merknader / Remarks
9	KRAFTUTTAKAKSEL PTO SHAFT	011037	2J83.058.1.4	1	
10	TETNINGSRING OIL SEAL	824045		1	305510
11	DISTANSERING DISTANCE SLEEVE	626069		1	
12	SLITERING SLEEVE	626055		1	
13	TANNHJUL GEAR	011068	F83.102.1.4	1	
14	TANNHJULSBOSS GEAR BOSH	011038	2J83.059.1.4	1	
15	PROPP PLUGG	516071		1	
16	RINGMUTTER NUT	442012		1	KM 5
17	KULELAGER BALL BEARING	911050		2	6305
18	KILE KEY	451041		3	B8x7x12
Stykkliste 2J83.064.1.0		KRAFTUTTAK FOR HVP15/25		1	Variant / Type
Tilh.tegn 2J83.063.1.2		PTO EQUIPMENT FOR HVP15/25		2	
Signatur KN				3	
Dato 12.02.96				4	
Erst. for				1: KRAFTUTTAK FOR HVP15/25 - PTO FOR HVP15/25	
Erst. av				2:	
Ukenr 9607				3:	
Side/Page 2 av/of 5		2J83.064.1.0		4: Fra motor/gear nr :	

Dato for utskrift :

12.02.96

STYKKELISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks
19	KULELAGER BALL BEARING	911001		1				6013
20	TETNINGSRING OIL SEAL	824006		1				
21	FJÆRSKIVE SPRING WASHER	722029		4				8mm
22	SYL.HODESKRUE M/INNV. 6K BOLT	433002		4				M6x22
23	SLITERING SLEEVE	626046		1				
24	BØSSNING BUSH	987047		1				1610-Ø25
25	FRONTDEKSEL FRONT COVER	0043984	2J83.027.1.3	1				
26	FJÆRSKIVE SPRING WASHER	722002		4				Ø8
27	SYL.HODESKRUE BOLT	433067		4				M8x16
28	PAKNING GASKET	813016		1				
Stykkliste 2J83.064.1.0		KRAFTUTTAK FOR HVP15/25		1	2	3	4	Variant / Type
Tilh.tegn 2J83.063.1.2		PTO EQUIPMENT FOR HVP15/25						
Signatur KN								
Dato 12.02.96								
Erst. for								1: KRAFTUTTAK FOR HVP15/25 - PTO FOR HVP15/25
Erst. av								2:
Ukenr 9607								3:
								4:
Side/Page 3 av/of 5		2J83.064.1.0		Fra motor/gear nr.:				

STYKKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

SABB MOTOR A.S. Bergen, Norway

Fig	Delnavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty				Merknader / Remarks		
29	HODESKRUE BOLT	432009		4				M10x25		
30	KOBLINGSDRIVFLENS COUPLING FLANGE	011133	2J82.017.1.4	1						
31	SENKSKRUE M/INN. 6K BOLT	433086		4				M8x16		
32	KULELAGER BALL BEARING	911051		1				16013		
33	RULLELAGER ROLLER BEARING	912021		1				NU1006		
34	KOBLINGSDRIVAKSEL COUPLING SHAFT	011036	2J83.057.1.3	1						
35	PINN PINN			1						
38	SPENNSTIFT ELASTIC PINN	456007		2						
39	TANNHJUL GEAR	011069	F83.103.1.4	1						
40	SIKRINGSSKIVE WASHER	725031		1				MB5		
Stykkliste 2J83.064.1.0 Tilh.tegn 2J83.063.1.2 Signatur KN Dato 12.02.96 Erst. for Erst. av Ukenr 9607			KRAFTUTTAK FOR HVP15/25 PTO EQUIPMENT FOR HVP15/25				Variant / Type			
							1	2	3	4
Side/Page			4 av/of		5		2J83.064.1.0			
			1: KRAFTUTTAK FOR HVP15/25 - PTO FOR HVP15/25							
			2:							
			3:							
			4:							
			Fra motor/gear nr.:							

12.02.96

STYCKLISTE / PART LIST

SABB MOTOR A.S. Bergen, Norway

Fig	DeInavn / Part name	Art. no.	Tegn/Drawing	Antall / Qty	Merknader / Remarks
41	KRAFTUTTAKHUS PTO HOUSE	011034	2J83.056.1.2	1	
42	TANNHJULBOSS GEAR BOSH	011039	2J83.060.1.4	1	
43	FJÆRSKIVE SPRING WASHER	722031		4	
44	PASSKIVE WASHER	741068		2	PS25x35x0.5
Stykkliste 2J83.064.1.0 Tilh.tegn 2J83.063.1.2 Signatur KN Dato 12.02.96 Erst. for Erst. av Ukenr 9607		KRAFTUTTAK FOR HVP15/25 PTO EQUIPMENT FOR HVP15/25		1 2 3 4	Variant / Type
Side/Page 5 av/of 5		2J83.064.1.0		1: KRAFTUTTAK FOR HVP15/25 - PTO FOR HVP15/25 2: 3: 4: Fra motor/gear nr:	