Service Bulletin no.: SB 04007 GB

Title: Trouble shooting on combi hydraulics BK 05 – BK 07. 60076605

Document references (Q-documents, drawing list, item no. list, tool list, etc.):

Recommended spare parts

Valve pos. 02-08-14, 60095079

Valve pos. 07-16, 60095081

Check valve pos. 09, 60096748

Accumulator pos. 06, 60097868

Accumulator pos. 60, 60097871

Pressure transmitter pos. 12-61, 60066971

Needle valve pos. 15, 60065410

Shuttle valve pos. 62, 60097651 + Loctite

Coil for valve pos. 02-07-08-14-16, 60095082. Must be brought along.

Service Bulletin shall be executed:

When there is a need for troubleshooting on combi hydraulics. BK 05 and BK 07

Background:

To facilitate troubleshooting on combi hydraulics.

Concerns turbines (turbine types):

NM72C/1500- NM72C/1500 evo2- NM72C/(1650)- NM82/1500- NM82/1500 evo2- NM82/1650

Service Bulletin execution (scope of task, instruction):

Brake and yaw calibre must be ventilated before start of the troubleshooting procedure. Oil level must be checked. Diagram and Manometer 0-300 bar is brought along. It must be checked that the correct valves are present (pos. 02,08,14, NC- pos. 07,16, NO. Can be seen on the valve) in the right position no. 80% of all errors on hydraulics are caused by dirt, so CLEANLINESS is important.

There are three test functions in TAC 2. These are used to test the yaw function and the brake function.

Begin by putting pressure on brake and yaw. Check hydraulics system visually for leakages.

Test 1: When yawing
Below 10 m/s valves are switched pos. 02-07-14 and pressure disappears from yaw circuit.
Above 10 m/s valves are switched pos. 07-14 and yawing is carried out with drag pressure of approx. 15 bar.
If alarm no. 331 Too freq. shaft brake recharge, occurs when yawing, take a measurement on test nipple pos. 86. If pressure disappears, then valve pos. 16 or check valve pos 09 or pos.62-60 are defective and must be replaced one by one.

Test 2: Brake
Initial pressure is placed on hydro spring of brake calibre, valve pos. 63 is switched, approx. 60 bar to be measured on test nipple pos. 66 and checked in TAC. If ok, shuttle valve pos. 62changes and pressure transmitter pos. 61 and two-way valve are ok.

Test 3: Brake
Turn on pressure and release brake, check pressure on test nipple pos. 86 and in TAC. If pressure level is the same, approx. 120 bar, then shuttle valve pos. 62 and pressure transmitter pos. 61 function correctly. If the brake looses pressure, and alarm no. 331 Too freq. shaft brake recharge, or alarm no. 376 shaft brake pressure too low occurs, mount the manometer on test nipple pos. 17 and remove plug from valve pos. 08. Compare pressure levels with manometer and TAC, and if pressure drops pos.86, the valves pos. 16, acc. Pos. 60 or shuttle valve pos. 62 are defective (pos. 62 is most frequent). If pressure drops on pos. 17 in relation to TAC, then pos. 05, 06 or 63 is defective.
Typical errors and faulty components.

Alarm no. 321 Pump time shaft brake too long. Begin by checking the following: if the calibre leaks, oil pressure is too low, hydraulics systems leaks, valve pos. 16 is defective, pump is defective: too small on BK 05, old model with small pump (can be seen on label on hydraulics station). If there is a small leakage, then needle valve pos. 15 is open.

Alarm no. 350 Shaft brake too slow. Valve pos. 16 defective, nozzle pos. 11 defective or clogged up, accumulator pos. 60 defective, or calibre adjusted.

Alarm no. 371 Shaft brake pressure too high. If pressure transmitter pos. 61 is defective or wrong (200 bar), check pressure on test nipple pos. 86, accumulator pos. 60 is defective. Hydraulics system is hot.

Alarm no. 372 Yaw brake pressure too high. Pressure transmitter pos. 12 defective or wrong (200 bar) check pressure on test nipple pos. 18, hydraulics system may have been hot.

Alarm no. 376 Shaft brake pressure too low. Hydraulics system leaks. Pressure transmitter pos. 61 is defective or wrong (200 bar), valve pos. 8 or 16 defective, accumulator pos. 60 is defective.

Alarm no. 377 Yaw brake pressure too low. Needle valve pos. 15 not closed. Valve pos. 02 or 14 defective or internal leakage in calibre.

Alarm no. 382 Yaw brake by-pass valve is defective. Valve pos. 02 is defective.
Control of accumulator pos. 06. The system is pressurized till approx. 100 bar, press emergency stop, needle valve pos.15 is opened a little, follow pressure drop in TAC, make a note of when there is a rapid drop of pressure. The visually observed pressure is = with approx. accumulator pre-charge. (Must be approx. 45 bar)

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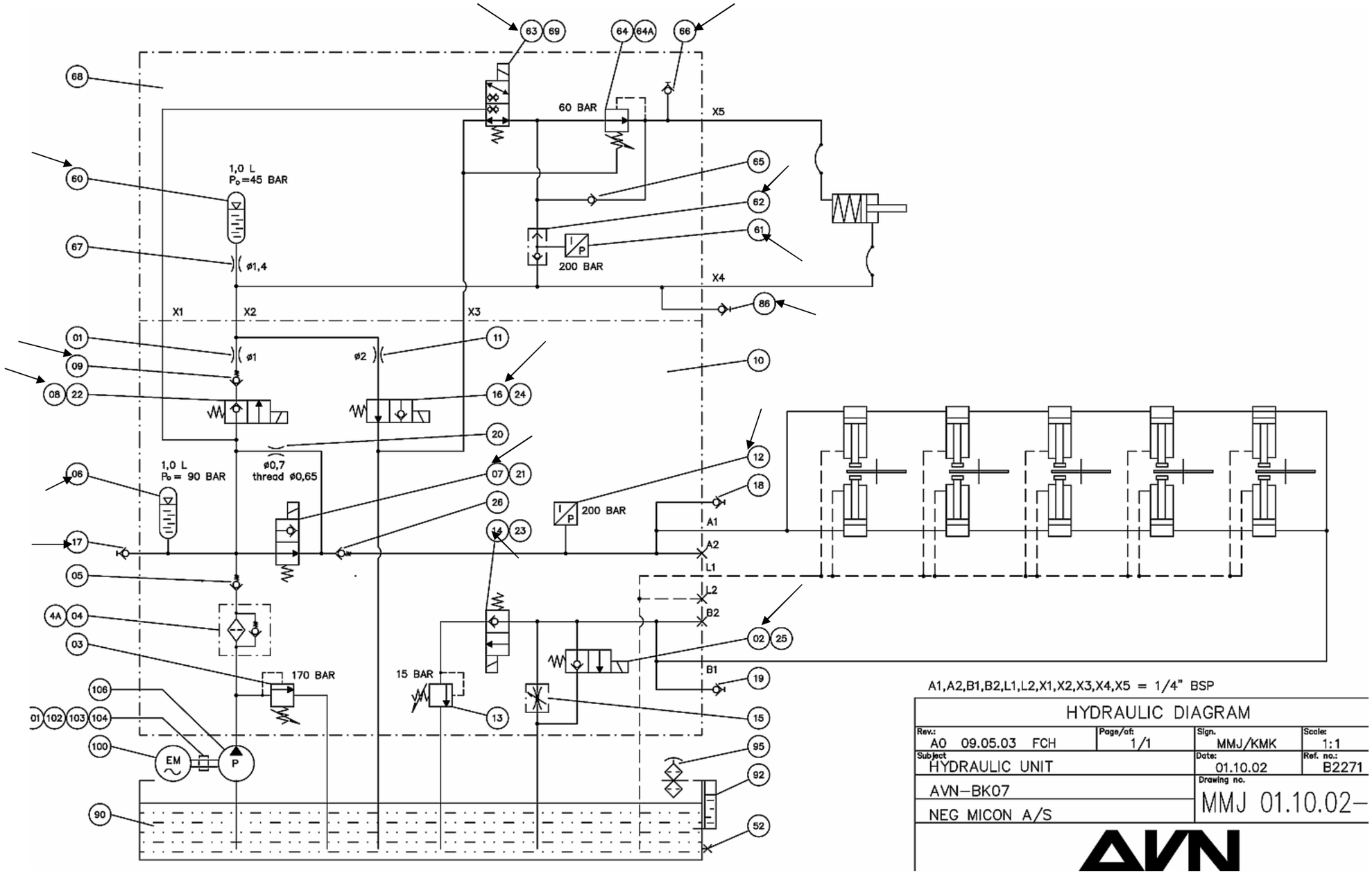

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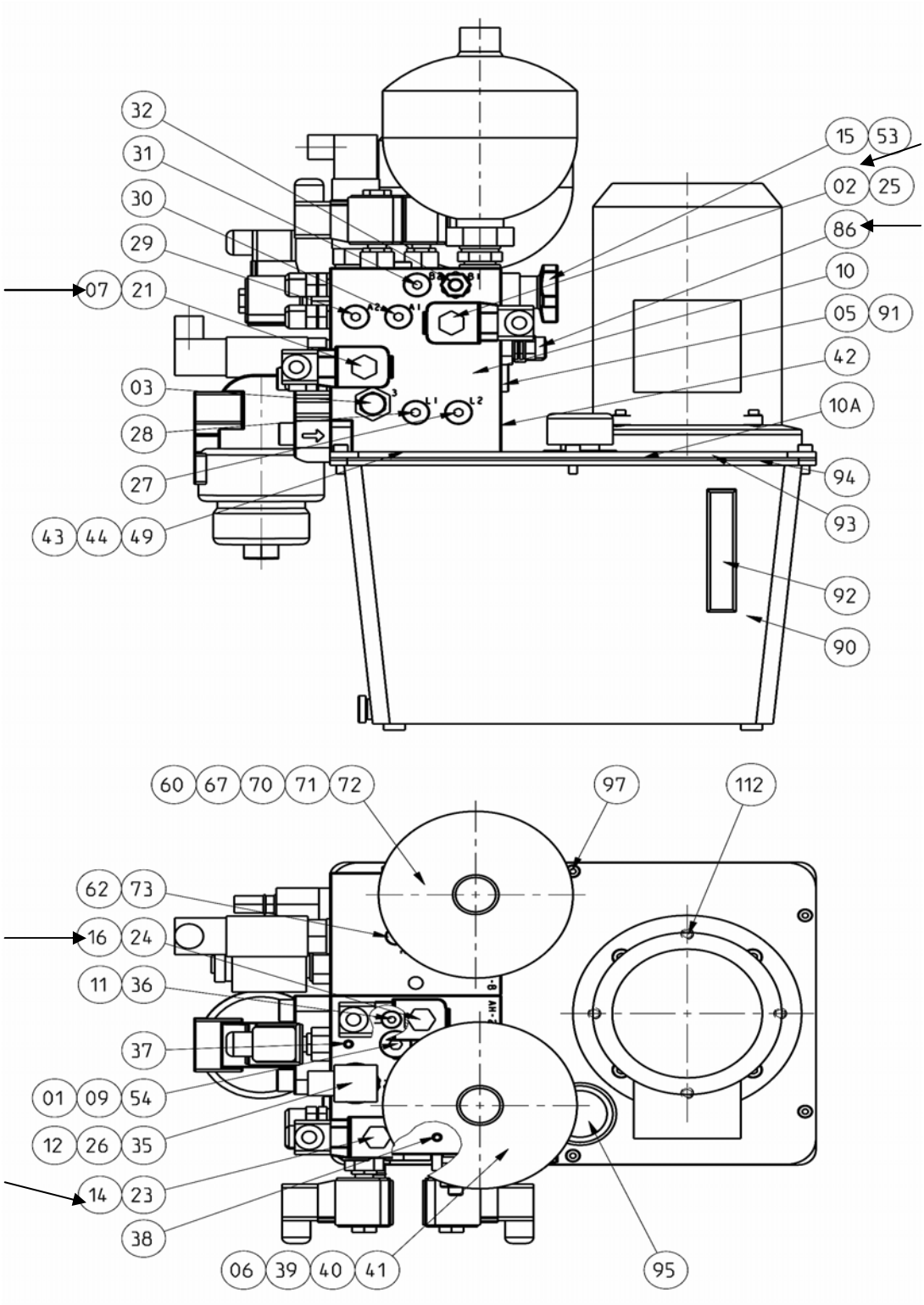

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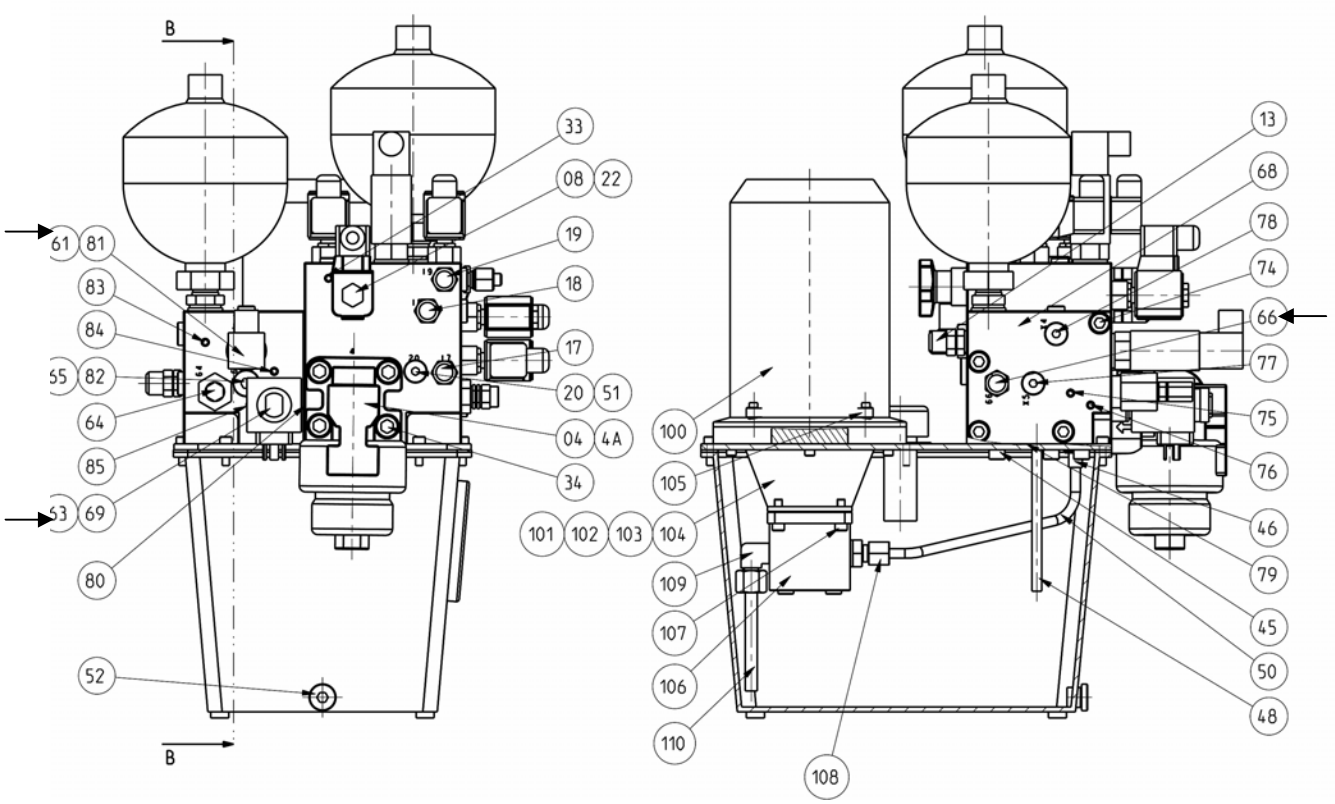

Responsibility for execution:

Turbine technician – Troubleshooting instruction

Cost coverage:

If the hydraulics station is covered by a guarantee, the defective parts are sent to AVN.

Service Bulletin

Customer information:

None.

Reporting to Product Claim (possibly retrofit project manager) concerning status and progress:

Documents to be updated as a consequence of this Service Bulletin:

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Approved by: Ole Olesen (CS Technical Support) Date: **24 January 2003**

Flemming Kjær Christensen (Technical expert / R&D) Date: **24. januar 2003**