Introduction to tail lift repair & maintenance

DHOLLANDIA tail lifts, a complete range of tail lifts

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Signs & symbols:
How to read hydraulic & electric diagrams

Main objectives

• Learn to speak a “common” technical language
• Understand how DHOLLANDIA diagrams are set up
• Be able to recognize the used symbols, and making the link with the “real world”
• Understand how the principle valves, etc… work in theory
1. Main electric spare parts

- Battery switch
- Battery 12V-24V
- Fuse + AMP
- Rotational 3 POS. Selection switch

- 2x NO contact
- Combined 1x NO contact 1x Nc contact
- Battery switch

300A
15A
Rotational 3 position selection switch
2x NO - 0 - 2x NO
Mid contact is activated when turning switch in either direction.

Starter solenoid

Electric wire
7x1 mm²
9x1 mm²
...
Valve
Solenoid

Electric Motor
+ Thermal switch

Valve
Solenoid
2. Main hydraulic spare parts

- **Oil reservoir**
- **Oil filter**
- **Oil pump**
- **Gear pump**
- **Single acting (SA) safety valve**
- **Double acting (DA) safety valve**
- **Check valve**
- **Non-return valve**
- **Pressure compensating breaking valve**
- **K0109 on cylinders**
- **V003 on power pack**
- **K1279 as coupling**
- **K153 in logical valve**
Single Acting (SA) electrovalve

Manometer coupling

Pressure relief valve

Logical 3-way valve

Switch valve

Logical valve block in hydraulic power pack

Logical valve block V096.E or V012.E

Pressure Compensating Breaking valve
Single acting (SA) lift cylinder, or other SA cylinder without spring

SA Tilt (close) cylinder with internal spring

SA Tilt cylinder (for opening) with external spring

Double acting (DA) tilt cylinder NO spring
Tilt cylinder SC10 – type EDS

Tilt cylinder SC09 – type SKSV

Standard SA cylinder – no springs
Hydraulic Memory cylinder

Double acting (DA) hydraulic stabilising leg

Double acting (DA) Retraction cylinder

Hydromotor with gearwheel
Hydromotor +
¾ way valve
3. Visualizing hydraulic components in action

MECHANICAL VALVES

1- CHECK VALVE
   NON-RETURN VALVE
   Oil can flow freely from 1 to 2.
   Oil CANNOT flow from 2 to 1.

2- PRESSURE RELIEF VALVE
   Is used to set the maximum working pressure of the hydraulic system, and therefore the capacity of the lift.
   In example: Pmax = 180bar
   As long as P<Pmax, oil flows from 1 to 2.
   When Pmax is reached, oil flows from 1 to 3.

3a- BREAKING VALVE
    FLOW REGULATOR
    Oil can flow freely from 1 to 2.
    When oil flows from 2 to 1, the (opening or lowering) speed is adjusted / reduced.
    See checklist in yearly maintenance reports for allowed operating speeds.
4- SWITCH VALVE
LOGICAL 3-WAY VALVE

In neutral position oil can flow freely from 2 to 3.
When pump turns oil can flow from 1 to 2, and flow from 2 to 3 is interrupted.

Practical: when valve is in neutral position, oil can flow back from the cylinder (2) to the oil reservoir (3). The Return to the pump (1) is blocked off.

When the pump turns, the oil can flow from the pump (1) to the cylinder (2), and the return to the oil reservoir is blocked off.

3b- BREAKING VALVE
FLOW REGULATOR
(new symbol)

Oil can flow freely from 1 to 2.
When oil flows from 2 to 1, the (opening or lowering) speed is adjusted/reduced.

See checklist in yearly maintenance reports for allowed operating speeds.
4. Visualizing hydraulic components in action

SINGLE ACTING ELECTRIC VALVE

NOT ACTIVATED / DE-ENERGIZED

In neutral de-energized position, the oil can flow from 1 to 2.

The oil CANNOT flow from 2 to 1. The valve blocks oil from going from 2 to 1.

Recognition:

- 2 O-rings
- Turn-button
SINGLE ACTING ELECTRIC VALVE

ACTIVATED / ENERGIZED

When energized / activated, the valve allows flow in both directions.

When activated, oil can flow from 1 to 2, and oil can flow from 2 to 1.

Reminder from previous page

In neutral de-energized position, the oil can flow from 1 to 2.

The oil CANNOT flow from 2 to 1. The valve block oil from going from 2 to 1.

Recognition:

2 O-rings

Turn-button
5. Visualizing hydraulic components in action

DOUBLE ACTING ELECTRIC VALVE

NOT ACTIVATED / DE-ENERGIZED

In neutral de-energized position, the valve blocks the flow in both directions.

Oil CANNOT flow from 1 to 2.

Oil CANNOT flow from 2 to 1.
DOUBLE ACTING CONTROL VALVE

ACTIVATED / ENERGIZED

When energized / activated, the valve allows flow in both directions. When activated, oil can flow from 1 to 2, and oil can flow from 2 to 1.

In neutral de-energized position, the valve blocks the flow in both directions. Oil CANNOT flow from 1 to 2. Oil CANNOT flow from 2 to 1.

Reminder from previous page:

- Recognition:
  - 3 O-rings
  - Push-button
6. Visualizing hydraulic components in action

¾ WAY VALVE WITH CLOSED MID POSITION

**NOT ACTIVATED / DE-ENERGIZED**

In **neutral de-energized** position, the valve blocks the flow of oil in all directions.

Oil can NOT flow from 1 to 2 & 4
Oil can NOT flow from 3 to 2 & 4. And inverse.
¾ WAY VALVE WITH CLOSED MID POSITION

**ACTIVATED / ENERGIZED**

When $U$ is energized / activated,
- The oil can flow from 3 to 4.
- And
- The oil can flow from 2 to 1.

When $I$ is energized / activated,
- The oil can flow from 3 to 2.
- And
- The oil can flow from 4 to 1.

Reminder from previous page

In neutral de-energized position, the valve blocks the flow of oil in all directions.