

7 Maintenance

Target groups O, E, M, C



Definition of the target groups:

- Operating Instructions *General*
Chapter *Introduction/target groups*.



Observe the following information:

- Operating Instructions *General*
Chapter *Safety*,
Chapter *Maintenance*,
- Subsuppliers'* Operating Instructions,
- Electrical Equipment* Operating Instructions.

7.1 Maintenance schedule

Area	Inspection	Action	OS	TI
Fluid	<ul style="list-style-type: none"> Chemical analysis Analysis of contamination (type and degree) 1. during commissioning 2. during operation 	Change/check filter	N N N	M 3D M/W
Tank (Level switch/overflow protection, thermostat, heating elements, air filter)	<ul style="list-style-type: none"> Leaks Corrosion Level (visual) Temperature (visual) Cabling and plugs Functioning of level switch / overflow protection Function of thermostat Function of heating elements Clogging of air filters 	Repair/change Correct setting values	N N/P N N N P P P N	D M D D W W M M W

Maintenance

Area	Inspection	Action	OS	TI
HP pump package (pump, motor, coupling)	<ul style="list-style-type: none"> ▪ Power input of electric motor ▪ Cabling ▪ Pump running noises ▪ Housing temperature ▪ Pressure setting ▪ Leak oil quantity 	Repair/change Correct setting values	N N N N N P	D W D D D 3M
Recirculating pump package	<ul style="list-style-type: none"> ▪ Power input of electric motor ▪ Cabling ▪ Pump running noises ▪ Housing temperature ▪ Pressure setting 	Repair/change Correct setting values	N N N N N	D W D D D
Pressure filter, recirculation filter, return line filter	<ul style="list-style-type: none"> ▪ Clogging indicator (visual) ▪ Cabling ▪ Filter change upon signal from clogging indicator 	Repair/change	N N N	W/D W
Cooling system (heat exchanger, water valve, water filter)	<ul style="list-style-type: none"> ▪ Leaks on heat exchanger ▪ Contamination of heat exchanger ▪ Switching operation of water valve ▪ Clogging of water filter 	Repair/change	N P N N	W Y W W
Accumulator (bladder-type accumulator, piston- type accumulator)	<ul style="list-style-type: none"> ▪ Switching operation of accumulator shut-off valves and/or pressure relief valves ▪ Nitrogen charging pressure (consider ambient temperature) 1. Initial fill 	Repair/change Correct setting values	N P P	W 3D 2W

HP hydraulic system

Maintenance

Area	Inspection	Action	OS	TI
	2. Commissioning 3. In operation (always on condition that nothing has changed since the previous check) ▪ Corrosion		P	M
			N/P	3M
Directional control valves	▪ Switching operation (mech. valves) ▪ Electric functioning (solenoid valves) ▪ Cabling and plugs ▪ Measurement of input voltage	Repair/change	N	W
			N	W
			N	W
			N	M
Proportional valves	▪ Setting values according to circuit diagram (speeds, ramp times) ▪ Electric functioning ▪ Cabling and plugs ▪ Measurement of input voltage and/or current	Repair/change Correct setting values	N	W
			N	W
			N	W
			N	M
Servo valves	▪ Control deviations ▪ Electric functioning ▪ Cabling and plugs ▪ Measurement of input voltage and/or current ▪ Housing/protective case temperature ▪ Leak oil quantity	Repair/change Correct setting values	N	W
			N	W
			N	W
			N	M
			N	W
			P	3M
Pressure valves	▪ Setting values according to circuit diagram	Correct setting values	N	W

Maintenance

Area	Inspection	Action	OS	TI
Throttle valves, flow control valves	<ul style="list-style-type: none"> Setting values according to circuit diagram (speeds) 	Correct setting values	N	W
Pressure switches	<ul style="list-style-type: none"> Signaling Setting values according to circuit diagram 	Exchange/correct setting values	N P	M M
Safety pressure switch (downstream of system pressure shut-off)	<ul style="list-style-type: none"> Functional check: Does the indication correspond to the system pressure when the plant is in operation and/or when the pressure is switched on? 	Correct setting values	N	W
Pipework system	<ul style="list-style-type: none"> Leaks Corrosion Fastenings 	Repair/change	N N N	D M W
Hoses, rubber expansion joints, electric cables	<ul style="list-style-type: none"> Damage Chafe marks Proper attachments / fastenings 	Repair/change	N N N	D D D
Cylinders, tilting cylinders, motors	<ul style="list-style-type: none"> Collars, wipers Shaft seal rings Piston rods Setting of cushioning 	Repair/change	N N N N	D D D W
Leak oil trays, retention systems, leak oil warning systems	<ul style="list-style-type: none"> Corrosion Tightness Function 	Repair/change	N N N	W W W

HP hydraulic system

Maintenance

Operating state (OS)		Time interval (TI)	
N	Normal operation (production)	**D	every day (24 hours)
Z	Enabling mode	**W	every week
S	Special operating mode	**M	every month
P	Stop (maintenance, troubleshooting)	**Y	every year
R	Repair	**) Intervals together with numbers mean, for example: 2D= every two days, or 3M= every three months	
X	All operating conditions		

Supplementary notes

General

When performing maintenance/assembly of components/equipment units, the instructions given by the suppliers/manufacturers must be observed (see *Subsuppliers' Operating Instructions*).

Spare parts

To avoid long standstill periods, sufficient quantities of spare parts must always be kept available. The quantity of required spare parts depends on the type and load conditions of the respective system and must therefore be individually specified in each case. As a rule, there should not only be sufficient quantities of filter cartridges, seals and gaskets, but also at least one spare item for each unit that is subject to mechanical stress. After consumption/installation of a spare part, a replacement has to be procured immediately or the damaged part must be repaired.

Safety-relevant components

According to EN ISO 13849-1:2006 the maximum service life in compliance with the oil purity is TM=20 years. As part of preventive maintenance, it is recommended that the components are replaced before expiry of the maximum useful life.

Industrial valves are usually designed for a number of 10 million switching cycles. When the maximum number of switching cycles is