

## MJP General Recommended Maintenance

### MAIN COMPONENTS

ITEM	PERIODIC CHECK	ESTIMATED LIFETIME	REASON	NECESSARY TOOLS	EST. DEL TIME
<b>Impeller</b>	Inspection at annual docking	Depending on water quality, and presence of foreign objects. Normally >10 years	Excessive impeller clearance (>1,5mm) and coarse surface on impeller blades.	Normally impeller can be refurbished by welding, grinding, balancing and final machining.	On order 60 days
<b>Hub unit:</b> (Exchange system of complete hub unit possible if desired)				Hub unit overhaul recommended by MJP service	5 days
<b>Mechanical seal</b>	Daily check for oil contamination in hub unit lubrication circuit	According to manufacturer every 12 000 hours, or every 4 year	Worn sealing surfaces	Ordinary workshop tools and "long reach" Allen key.	5 days
<b>Roller bearings</b>	Bearing inspection at mechanical seal change Daily check - increased hub lube oil temperature	Bearings dimensioned according to manufacturer L10 > 20 000 hours	Excessive clearance in bearing. Operation with contaminated oil.		5 days
<b>Disc coupling (set)</b>	Insp. every 24 month Observe damaged disks and bolt tightness	Life is unlimited if operated within alignment and in clean condition	Lifetime is shorter when misaligned. Dirt.	Ordinary workshop tools	5 days
<b>Steering unit:</b>					
<b>Bushings and bolts</b> (kit for 1 jet unit)	Inspection at annual docking	Approx. 4 yrs or 4000 hrs. (water quality affects life)	Excessive clearance (>1,5mm)	Ordinary workshop tools Sledge, drift, grinding and welding machine	On order 60 days
<b>Shaft seal:</b>					
<b>Radial seal</b>	Daily check water leakage	Approximately 1 year (water quality affects life)	Aging of rubber and wear on sealing lip.	Ordinary workshop tools Screwdriver, pliers and spanner	2 days
<b>Complete unit</b>		16 000 hours if lube water is of good quality. (Dirt or sand in water increase bearing wear)	Worn support bearing	Ordinary workshop tools	14 days
<b>O-rings</b> <b>Lock washers</b>		Note: O-rings and lock washers to be changed when reassembled			

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### HYDRAULIC COMPONENTS

ITEM	PERIODIC CHECK	ESTIMATED LIFETIME	REASON	NECESSARY TOOLS	EST. DEL TIME
<b>Lubrication oil</b> (hub circuit)	Daily check level and temp. in tank units (recommended 45C but < 60C)	Change every 24 month or take oil sample	Leakage, contamination change in operation temperature	Ordinary workshop tools	-
<b>Hydraulic oil</b> (manoeuvring circuit)	Daily check level and temperature in tank units (recommended < 60C)	Change every 24 month or take oil sample	Leakage, contamination, moisture, dirt and acid	Ordinary workshop tools	-
<b>PTO pump</b>	Test of condition every 10 000 hours	Normally >20 000 hrs	Internal wear. Leakage test < 4 l / min	Ordinary workshop tools	Quoted
<b>PTO pump pressure regulator</b>		Very long, but if exposed to dirt, damage can occur.	Contamination by sludge and wear	Ordinary workshop tools	1 week
<b>Lube oil pump</b>		Normally >20 000 hrs		Ordinary workshop tools	3 weeks
<b>Proportional valves</b>		If good oil condition is maintained: Very long time	Internal wear or damaged coils.	Ordinary workshop tools	1 week
<b>HP oil filter</b>	Daily, filter indicator	Change every 12 month or when indicator show change	Wear products and dirt	Ordinary workshop tools	1-2 days
<b>Return filter</b>	See above	See above	See above	Ordinary workshop tools	1-2 days
<b>Lube oil filter</b> (hub unit)	See above	See above	See above	Ordinary workshop tools	1-2 days
<b>Hydraulic hoses *</b> (set for one (1) jet unit)	Monthly check condition	Change every 24 month	Wear, embrittlement by ageing. (UV-light)	Ordinary workshop tools	On order 1 week
<b>Steering cylinder seals</b> (kit for 1 cyl.)	See above	Change every 24 month or 2000 hours	Wear	Ordinary workshop tools	2 days
<b>Reversing cylinder seals</b> (kit for 1 cyl.)	See above	Change every 36 month or 3000 hours	Wear	Ordinary workshop tools	2 days

\* When ordering, give type. See reference page - hydraulic hose arrangement.

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### ELECTRONIC COMPONENTS

ITEM	PERIODIC CHECK	ESTIMATED LIFETIME	REASON	NECESSARY TOOLS	EST. DEL TIME
Azimuth steering potentiometers		12 000 hrs	Internal wear, output signal bad.	Ordinary workshop tools and multipurpose instr.	On order 20 days
Azimuth rev./ahead potentiometers		16 000 hrs		See above	On order 20 days
Feed-back sensor for steering cylinder.	Visual inspection during seal change	Contact less design Life depend on oil and operation condition	Cable or contact damaged during operation. Cable is integrated in sensor	Ordinary workshop tools and multipurpose instrument	2 days
Feed-back sensor. reversing cylinder.	See above.	See above.	See above.	See above	2 days
Normal and back up controls, indicators and follow up	Daily function check of jets and response prior to departure				
Computer battery		4 years			On order 30 days

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### SHAFTING

ITEM	PERIODIC CHECK	ESTIMATED LIFETIME	REASON	NECESSARY TOOLS	EST. DEL TIME
Tooth gear coupling (Alt. coupling options)	Daily check grease below coupling	3 000 hours re-lubrication 8 000 hours dismantling and check	Life shorter if excessive misalignment. Lost seal - grease.	Ordinary workshop tools	On order 15 weeks
Spacer		Life is unlimited	Cracks or breakage due to excessive torque in drive train.	Ordinary workshop tools (Check fractural groove for cracks with penetrant)	On order 4 weeks
Drive shaft		Life is unlimited	Excessive force on shaft. Vibration - check straightness (< 0.2 mm)	Ordinary workshop tools	On order 15 weeks
Splines on shaft		Grease spline when reassembled	Wear on splines (lack of lubrication)		

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### Miscellaneous

ITEM	PERIODIC CHECK	ESTIMATED LIFETIME	REASON	NECESSARY TOOLS	EST. DEL TIME
Painting, waterjet	Inspection at annual docking	12 months, follow paint manufacturers instructions	Wear	Epoxy primer and antifouling paint	
Painting, hull and duct	Inspection at annual docking	12 months, follow yards and paint manufacturers instructions	Wear		
Steering unit, pin shaft weld lock	Inspection at annual docking	Life of pin shaft / bearing, see above	Check condition of lock and weld from impact and wear		
Anodes, waterjet (option)	Inspection at annual docking	12 months, change when 50% is consumed	Cathode protection	Ordinary workshop tools	5 days
Anodes, hull (option)	Inspection at annual docking	12 months, follow yards instructions	Cathode protection	Ordinary workshop tools	

