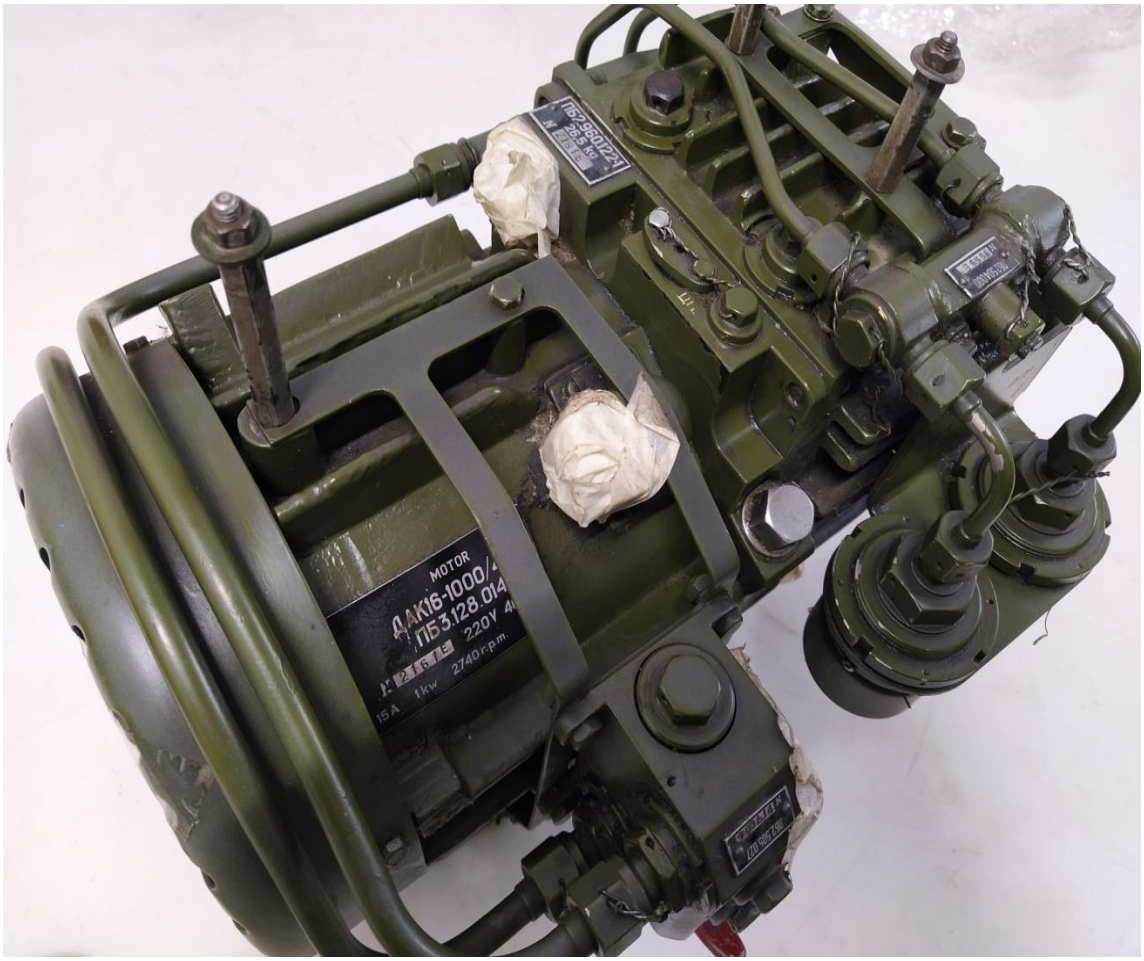
NEOMETRIX DEFENCE

ROH MANUAL OF HYDAULIC DRIVE OF OSA



Neometrix Defence Limited
E-148, Sector-63, Noida-201301 www.neometrixgroup.com, contact@neometrixgroup.com,
Phone: 0120-4500800 (100 Lines), Fax: 0120-4500888

About-

The hydraulic drive is a power actuator of the stabilization system. It converts the electrical control signal of the commands given to physical movement of actuating cylinder rod and rotating the TAR Antenna.

Hydraulic drive is associated with OSA-AK WPN system used to set the radar antenna in X and Y axis.

Two Hydraulic drives is used in single OSA WPN system. μ Drive is responsible for X axis drive and ŋ drive is responsible for Y axis drive.

The μ and ŋ drives comprises of below major items

1. Motor
2. Hydraulic Pump
3. Throttle valve
4. Valve Box
5. Inductive transducers (Pressure Transducers)

Neometrix is having proper Lab setup for repair, Overhaul and testing of hydraulic drive. This manual will brief you the process we are following during overhaul of the Hydraulic drive.

NEOMETRIX DEFENCE

INDEX

NEOMETRIX DEFENCE

CHAPTER 1: INSPECTION & FUNCTIONAL TEST at 7BRD

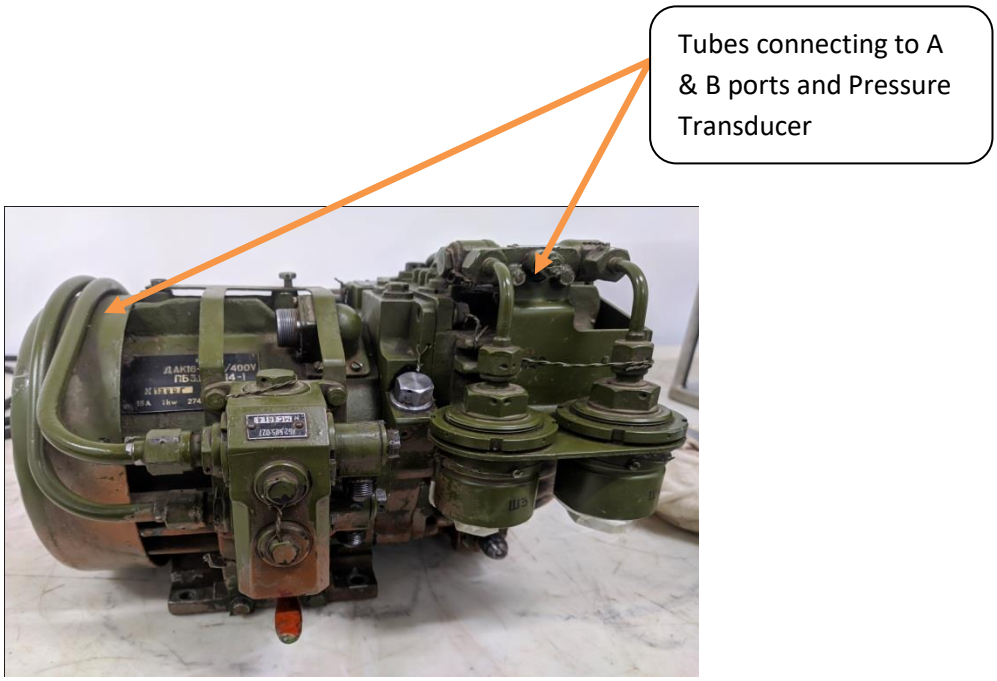
Neometrix Team visited to IAF for Sample inspection and to Check functional testing of the mu drive sample taken from IAF.

Following points observed:-

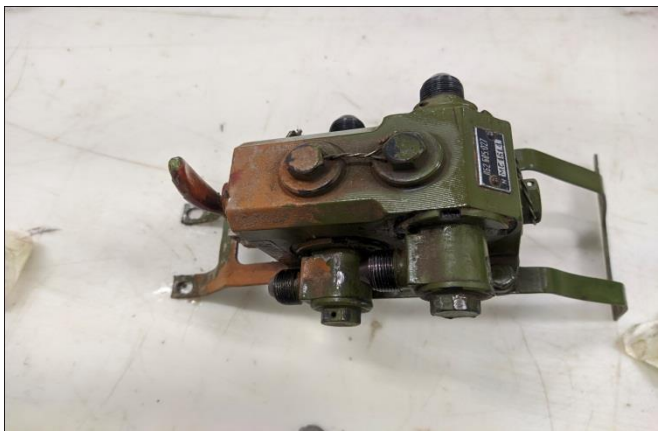
1. In Visual Inspection, Drive's surface finish found not good and many dents, Scratches, and dirty.
2. Founded Missing Screws/Bolts and washers in motor cover.
3. Motor running with 400Hz observed unwanted sound from motor.
4. Running of hydraulic drive in close loop and observe leakages and other unwanted sound.
5. Connect the A and B pressure port of hydraulic drive to actuator and run for 20 cycles.
6. Hold the pressure alternatively on both side (A or B) and measure the pressure using transducers.
7. Observe any leak in the system at higher pressure and check the stability of actuator.
8. Disconnected the Hydraulic drive for further activity at Neometrix.

CHAPTER 2: DESASSEMBLY OF MU DRIVE AT NEOMETRIX

Step 1:- Taken out all tubes of Drive connecting to A & B ports of Actuator/Pressure Transducer

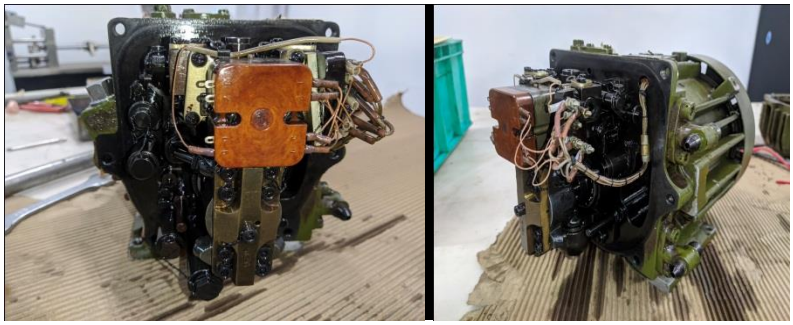


Step 2:- Opening the valve Box of Drive



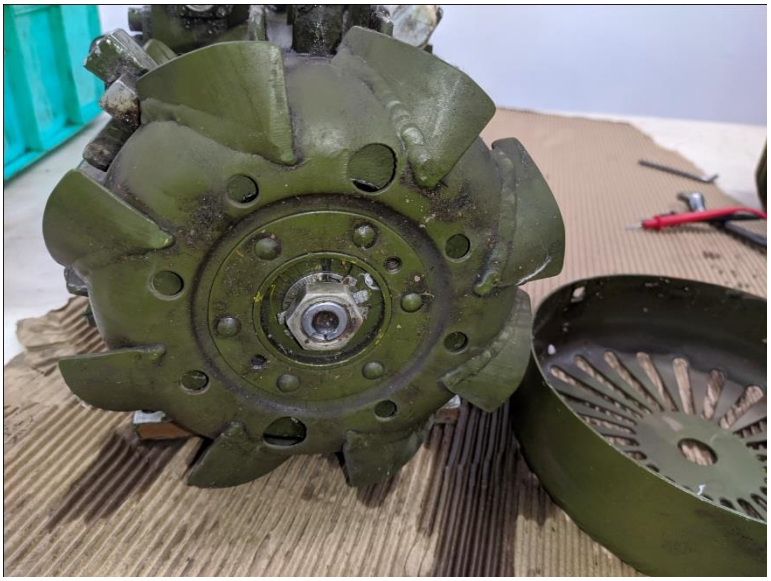
Neometrix Defence Limited
E-148, Sector-63, Noida-201301 www.neometrixgroup.com, contact@neometrixgroup.com,
Phone: 0120-4500800 (100 Lines), Fax: 0120-4500888

Step3:- Opening of pump casing from motor assembly

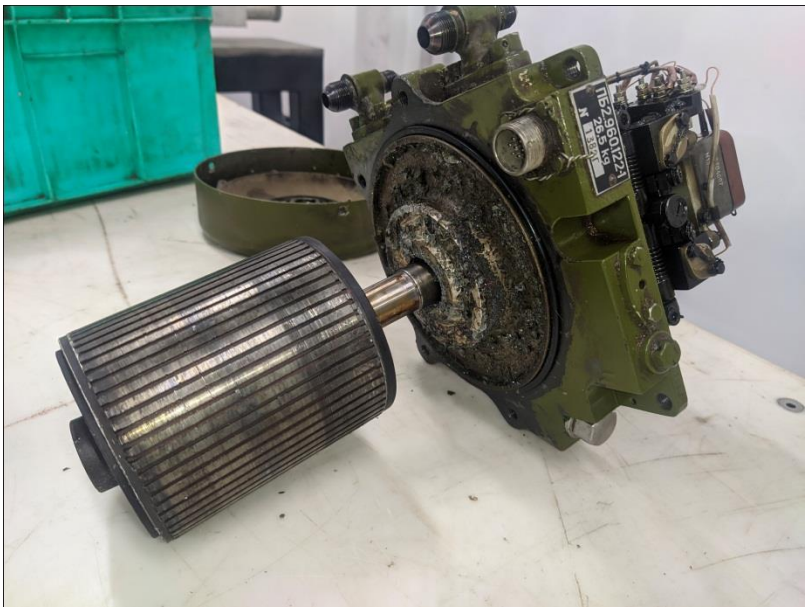


While opening the pump casing cover all Allen bolts Size : M8 x 15mm, found rusted and damaged. Also washer were also found damage/missing.

Setp4: - motor Fan & bearing



Step5:- Taking out motor armature, Motor rotor



Neometrix Defence Limited
E-148, Sector-63, Noida-201301 www.neometrixgroup.com, contact@neometrixgroup.com,
Phone: 0120-4500800 (100 Lines), Fax: 0120-4500888

CHAPTER 3: FAULT LOOK

After Visual Inspection, Functional testing and complete disassembly of mu Drive system following faults has been observed at Neometrix.

SI.No.	ACTIVITY	OBSERVATION/FAULTY
1	Visual Inspection	System appearance /finishing found scratches at many places , paints dents , Missing screws/Bolts/ Washers
2	Functional Testing	Unwanted Noise from running motor, Leakage from tubes/fittings ,instability in pressure while actuating cylinder
3	Disassembly	
	I. 6mm Tubes /Fittings	Tubes were rusted, scratched, dented,
	II. 8mmTubes/Fittings	Tubes were rusted, scratched, dented,
	III. Valve Box	Rusted, scratched, dented, Screw/bolts head damaged,
	IV. Pump Casing	Seal damaged, bolts rusted, bolts head damaged
	V. Motor Fan Cover	Rusted, dents , missing screws/washers,
	VI. Pump inlet Nozzle	Seal damaged, dented,
	VII. A & B Ports fittings	Seal damaged, dented,
	VIII. Motor cover from pump	Seal damaged, dried sealant
	IX. Motor Armature	Paint dents scraps were founded inside the motor rotor, unwanted impurities,
	X. Motor windings /Rotor shaft	Dried varnish, impurities, bearings damaged, winding scratches,

CHAPTER 4: REPAIR AND OVERHAUL

SI.No.	Activity	Process	Precautions
1	**Parts Cleaning**		
1.1	Tubes/Fittings	1.Thorough Air Cleaning 2. Acetone Cleaning with Clean Cloth 3.Hot water cleaning for oily parts 4.Flushing with hydraulic oil	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface 3. Ensure oil used is very clean
1.2	Pump Casing	1.Thorough Air Cleaning 2.Hot water cleaning for oily parts 3. Thinner cleaning with clean cloth 4. Acetone Cleaning with Clean Cloth 5. Emery paper p1000 cleaning	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface 3.Ensure there is no scratches during emery paper cleaning
1.3	Motor Fan Cover	1.Acetone Cleaning with Clean Cloth 2.Hot water cleaning for oily parts 3. Thinner	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface

		cleaning with clean cloth 4. Acetone Cleaning with Clean Cloth	
1.4	Valve Box cover	1.Thorough Air Cleaning 2. Acetone Cleaning with Clean Cloth	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface
1.5	Pressure Transducer set Box	1.Thorough Air Cleaning 2. Acetone Cleaning with Clean Cloth	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface
1.6	Motor Armature /Rotor	1.Thorough Air Cleaning 2.carbon Surface Cleaning with clean cloths 3. Emery paper grade P1000 cleaning	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface
1.7	Motor Stator	1.Thorough Air Cleaning 2.carbon Surface Cleaning with clean cloths 3. Emery paper grade P1000 cleaning	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface

1.8	Motor bearing/bush	1.Thorough Air Cleaning 2.carbon Surface Cleaning with clean cloths 3. Emery paper grade P1000 cleaning	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface
1.9	Metal Ceramic Filter	1.Thorough Air Cleaning 2. Surface Cleaning with clean cloths	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface
2.	**Lubrication/Greasing**		
2.1	Pump inlet nozzle	1.lubrication of pump nozzle and its parts using hydraulic oil	1. Ensure oil used is very clean
2.2	Motor Bearing/Bush	1. Greasing the motor bearing	1. Ensure grease used is very clean
2.3	Pump Casing cover	1.hydraulic oil lubrication of pump parts	1. Ensure oil used is very clean
2.4	Motor bindings	1.Motor windings varnish coating	1. Ensure there is no dirt on the surface
3.	**Replacements of parts**		
3.1	Replacement of 04 hydraulic tubes lines including the joints, nuts and ferrule.		
3.2	Replacement of nozzle of fluid inlet		

3.3	Replacement of Bolts/washer securing the pump with hydraulic motor.		
3.4	Replacement of 07 different type of seals and gasket		
3.5	Replacement of metal ceramic filter which is used to remove mechanical impurities from hydraulic fluids.		
3.3	Replacement of locking pin of motor rotor		
4.	**Repairs of sub components**		
4.1	Motor Bindings	1. clean Varnish coating done on the surface of bindings	
4.2	Safety Valve	2. Proper cleaning and serviceability of the safety valve ensure which is used to provide the required pressure in control cavity.	
4.3	Motor bearing	1.Motor bearing proper greasing	
4.4	Throttle	1. throttle serviceability check which is used to regulate the flow of working fluid between the hydraulic drive lines.	1. Ensure there is no dirt on the surface 2. Ensure there are no burrs on any surface

NEOMETRIX DEFENCE

CHAPTER 5: ASSEMBLY

STEPS	Process
STEP1	Hydraulic Schematic piping assembly with hydraulic pump.
STEP2:-	Hydraulic Pump Casing cover screwing with 6 nos. of Allen bolts with hydraulic pump
STEP3:-	Electric Motor Armature assembly with motor rotary shaft.
STEP4:-	Electric Motor Stator cover assembly with hydraulic pump by screwing 6 nos. of bolts.
STEP5:-	Motor Cooling Fan assembly with motor shaft and locking pin.
STEP6:-	Motor Fan cover assembly.
STEP7:-	Mounting of cut off Lever box on motor body.
STEP8:-	Mounting of Pressure transducers/Sensors set off box on pump casing.
STEP9:-	Tubes and fittings assembly with pressure transducers and Lever box.
STEP10:-	Final tightening of all bolts/screws/Nuts of Complete assembly and locking wiring.

CHAPTER 6: PAINTING/METALLIC SURFACE FINISH

STEPS	PROCESS
Step1:-	Old paints/rust/dent removal
Step2:-	Proper thinner/Acetone cleaning with clean cloths
Step3:-	Applying Masking tapes to connectors/ports
Step4:-	Primer coating to clean painting surfaces
Step5:-	Painting the all primer coated surfaces
Step6:-	Surface finishing coating

CHAPTER 7: FACTORY ACEPTANCE TEST

Functional Test Activity sheet (T-PED-A2445-FT-REV00):

S.NO	ACTIVITY PERFORMED	OBSERVATION	REMARK
1	Motor running with 400Hz and measure RPM using Noncontact tachometer.		
2	Running of hydraulic drive in close loop for 1hrs.	No leakages, No unwanted sound of motor running	
3	Connect the A and B pressure port of hydraulic drive to actuator and run for 20 cycles.	Cylinder actuating smoothly.	
4	Hold the pressure alternatively on both side (A or B) and measure the pressure using transducers.	Steady pressure and stability of pressure build-up noted	
5	Observed no any leak in the system at higher pressure and check the stability of actuator.	Working smoothly	

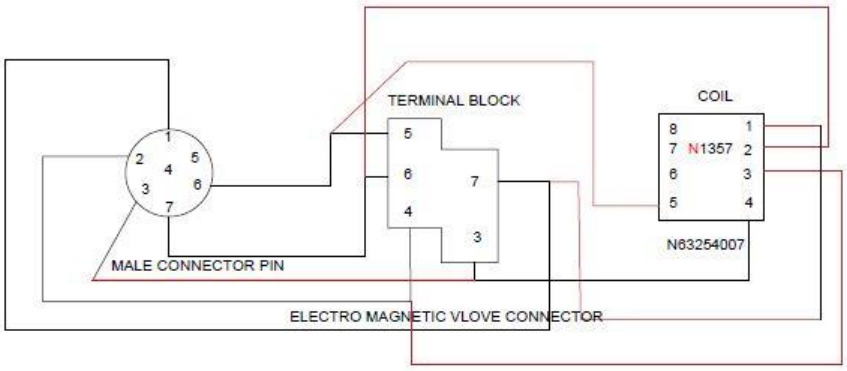
CHAPTER 8: DISPATCH

STEPS	PROCESS	REMARKS
Step1:-	Quality check of all components/overall dimension check/Photography.	
Step1:-	Proper bubble rapping/sheets/packing	
Step2:-	Packing in proper size wooden box	
Step3:-	Ready to Dispatch	

CHAPTER 9: SITE ACEPTANCE TEST

SI.NO.	Parameters	Standards	Observation	Remarks
1	Visual Inspection	• Surface finish check • Painting /appearance check • Damage/Deterioration check		
2	Material Check	• All tubes/fittings replaced in alloy iron/SS 304		
3	Overall Dimension check	• Length: 340 mm • Width: 290 mm • Height: 220 mm		
4	Protective Coating/Sealing Check	• Anti-corrosive Treatment • Paint & Varnish • Application of Grease/Oil Sealing		
5	Fitment Check	• Dimensional Accuracy Check		
6	Functional Check	• Input Voltage :- 220 V 400 Hz • Endurance on Peak Output:- 150 Kgf/cm Square		
7	Environmental Checks	• Temperature range:- -40°C to + 50°C		

Electromagnetic Valve wire diagram



PIN OF ELECTROMAGNETIC OIL

CONECTOR PIN(M)	COIL PIN	TERMINAL BLOCK PIN
1 2 3 6 7	1 3 4 5 2	7 4 3 5 6

Neometrix Defence Limited
E-148, Sector-63, Noida-201301 www.neometrixgroup.com, contact@neometrixgroup.com,
Phone: 0120-4500800 (100 Lines), Fax: 0120-4500888