HINDUSTAN AERONAUTICS LTD.
AIRCRAFT DIVISION BANGALORE

USER OPERATIONAL/MAINTENANCE MANUAL OF HYDRAULIC PRESSURE TEST RIG

Submitted by:
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HYDRAULIC PRESSURE TEST RIG PICTURES:

FIG.1.0HYDRAULIC TEST BENCH

FIG.1.1FRONT PANEL

ABOUT THIS MANUAL

CONTENTS:-

IMPORTANT NOTES

WARNING!

This is a High Pressure System and requires handling by trained personnel ONLY. Mishandling of the system may cause Injury. Please Follow the User Manual Instructions.

Please read this manual before doing anything with the system and follow the instructions carefully.

Signal words CAUTION and NOTE have special meanings.

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in damage.

NOTE indicates information to assist maintenance and better running of the system.

Dear User,

Neometrix is grateful for this opportunity provided to us to offer our product & services to you. We sincerely hope that you will be delighted to use our system and give us more opportunities to serve you in future.

Neometrix is very focused on systems & services which can be of immense use to you. We specialize in Hydraulic/ Servo Hydraulic Test Systems, Fuel System Test Rigs, Pneumatic System Test Rigs, Oxygen/ Special Gases system Test Rigs, Very High Pressure Systems, Electronic & Electrical Test Rigs. Our Services include:

- State of Art Test Rig Design, Development, Fabrication, Installation, Commissioning, Training & Support.
- Refurbishment / Up gradation of the Existing Test Rigs.
- Maintenance (AMC) contracts of Existing Test Rigs.
- Operations Contract for the Test Rigs.
- Setting up of complete Testing Infrastructure including civil work.

The following pages talk about some of our systems in brief. Please feel free to contact us for details of any particular system of your interest.

Neometrix is committed to offer its best solutions & services to you all the times and **wish to become your preferred supplier for these services**.

With Best Regards,
Shailendra Pratap Singh
CEO

2. INTRODUCTION TEST RIG:

2.1 Test Rig Description

The Test Rig is Electro Hydraulic. Safety & user Friendliness are the key features of the provided Test Rig. The Test Rig has been designed to address all the requirements of the Design Document.

- With this Test Rig, Operator can work independently.
- The entire Test as specified can be done on this Test Rig.

Specification of Test Rig:

- Arrangement to carry out static pressure testing of pipe assemblies of different sizes to a maximum pressure of 10000psi
- Digital gauges for pressure reading
- Timer for setting the test time duration.
- Pressure relief valve to hold a maximum pressure of 1000psi.
- Power and manual operated pumps are provided.
- Suitable cooling system is provided.
- A suitable safety HOOD is provided with focus light.
- QC/DC coupling is provided for pressure testing.
- All filters in the hydraulic circuit of Power Pack are provided with clogging indication.

MEASUREMENT AND CONTROL

3.1 Pressure Indicator:

The maximum working pressure of the Rig is 10000 PSI. Two pressure transmitters are mounted one for return line pressure (0-25 bar) and one for main line pressure (0-10000) PSI. Two digital process indicators are mounted on panel.

3.2 Fluid Level Indicators :

A vertical fluid level indicator is mounted on front of tank to permit visual monitoring of the level inside the Tank.

3.3 Filtration System

The filters are able to achieve the cleanliness in the working fluid. All filters that are used in the system are clogging indicators type. Once any of these filters get clogged the indication is shown on the front panel.

3.4 Front Panel

The front Panel shall provide means for activating, monitoring and indicating the various operating parameters of Test Rig.
The front panel has following function on it:-

- Emergency stop switch.
- Pressure regulator valve.
- Main motor ON/OFF switch.
- Cooling Motor ON/OFF switch.
- Timer START/RESET Switch.
- Main Line pressure Indicator (10000PSI)
- Cooling line pressure Indicator(0-25 bar)
- Timer to Set time duration of testing.

3.4 Control Panel

Control panel is provided on back of the front panel to control Hydraulic pumps , Pneumatic actuators and pressure indicators mounted on front panel.
Caution: Control panel has 3-phase power supply to control Motors. Details Circuit diagram of electric control panel is given on electrical circuit section.

4. INSTALLATION GUIDELINES

4.1 CAUTION:-

- Rotation of the motor should be in accordance to the pump i.e. in clockwise direction seeing at the back of electrical motor.
- Coupling of motors should be very well.
- Hydraulic oil to be filled should be **CLEAN.**
- Use the test schedule guidelines before testing.
- Increase pressure slowly.

4.2 IMPORTANT DO'S & DONT'S LIST

DO'S

1. Do check the level of the HYDRAULIC OIL filled in the Tank; it should be up to the high level mark of the level indicator in order to avoid increase in the temperature of oil. It also helps in better suction for the Pump.
2. Do check HYDRAULIC OIL is Free of any contamination.
3. Do Flush the tank in every 6 months.
4. Do read the manual properly before testing.
5. Check that the system is properly connected to the input and output system.
6. If any leakage is detected close the appropriate Valve.
7. Do check that Unit electrical connector is connected properly before operation.

DON'TS

1. Don't run the motor if the Oil Level is Low.
2. Don't run the motor if the Oil is contaminated.
3. Don't run the motor in anticlockwise direction.
4. Do not let Filler Breather Open.
5. Do not run machine if filter is clogged.

- Note: **Neometrix will do Installation & Commissioning. The facilities required is as follows:**
  - **Hydraulic Oil- VG-46 or Equivalent.**
  - **3-Phase power ~ 415±5 V**
  - **1-Phase power ~ 220±5 V**

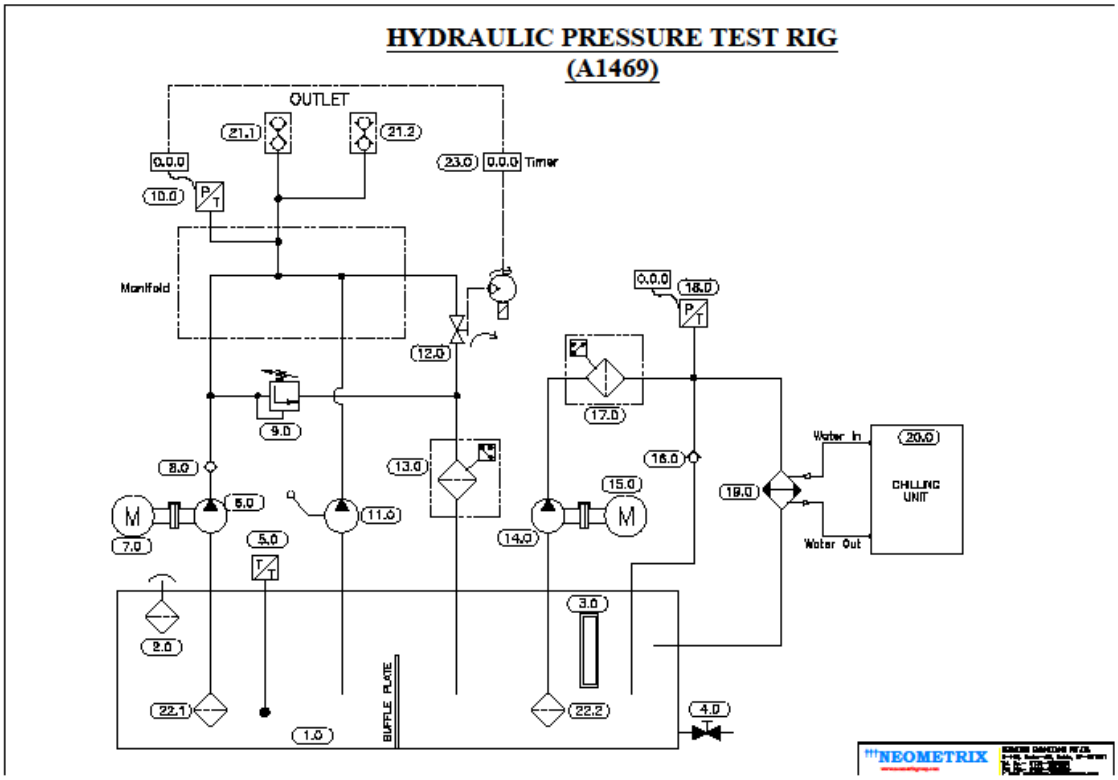
Electric power should have proper earth.

Bill of Materials :

S.No.	Item	Item Specification	Make	Model	Q
1	Oil Tank	SS 304, 50 Liter	Neometrix	Fabricated	
2	Filler Breather	SS	Standard	FSB25	
3	Oil Level Indicator		Hydroline	LG02-10	
4	Drain Valve	3/4" Gate Valve	Festo	QH-3/4 Part number: 9544	
5	Pt-100	Switch ON/OFF the Offline Cooling Unit	Standard		
6	Hydraulic Pump	5 LPM, 10000PSI	Rexroth	PR4-3X/4,00-700RA01M01	
7	Electric Motor	7.5 kW, 1440 RPM	ABB	M2BA132M4	
8	Check Valve	10000 PSI	Polyhydron	CI06T	
9	Pressure Relief Valve	10000 PSI, Manually Operated, threded, Hand knob	Polyhydron	DPR06*700-11	
10	Pressure Transducer with Digital Indicator	Pressure Range: 0 to 10000 PSIG	Sensor: Wika, Indicator: selec	Sensor Model:S10, Indicator Model: PIC152N	
11	Hand Pump	10000 PSI (700 bar), Tank capacity:13 liter	Polyhydron	HP5012	
12	Solenoid Valve	2/2-type (On/Off Valve), working Pressure : 700bar(10000PSI), media: Hydraulic Oil, flow capacity: 5LPM with pilot 5 to 7 bar air pressure, pilot port: ¼", 24 Volts operation from control panel, Normally open Qty. 01 nos	Rotex	3K1231-21-21- ADA180	
13	Return Line Filter	10 micron, with Electrical Clogging Indicator, 5LPM, 10 bar	Agro Hytos/Rexroth	110LEN0040H10XL-A	
14	Pump for offline filtration and cooling	5 LPM	Rexroth	AZPW21004R0RXXMBS0593	
15	Electric Motor	1 HP, 1420RPM	ABB	M2BA80B4	

16	Check Valve	3/4"	Polyhydron	C-15-T-1	
17	Filter	10 micron, with Electrical Clogging Indicator, 5LPM 10 bar	Agro Hytos		
18	Pressure Transducer with Digital Indicator	Pressure Range: 0 to 300 PSIG	Sensor: Wika, Indicator: selec	Sensor Model:S10, Indicator Model: PIC152N	
19	Pressure Relief Valve	150 PSI, Manually Operated, 5LPM	Polyhydron	DPR H 10 T 25	
20	Chilling UUT +Heat Exchanger	5HP (1 TR), 5LPM	Cresent	Custmized	
21	QCDC	1/4" Size	Stucchi	F. IV14HP NPT+M. IV14HP NPT	
22	Test Rig Enclosure	width X Height X Depth : 1000 mm X 1700 mm X 800 mm			
23	Hose Test chamber	width X Height X Depth : 3600 mm X 1800 mm X 800 mm			
25	Timer	for setting testing duration			
26	SS Pipes & SS Fittrings + Integration				

HYDRAULIC CIRCUIT DIAGRAM:-



Service & Maintenance Instructions:

FREQUENCY		(SERVICE & MAINTANENCE ACTION)
Before /After each use		Perform the visual check of the complete system.
		During Operation observe leakage, if any.
		Release Pressure from All Pressure Gauges/Pressure Transmitters on the Panel. Each gauge/Digital Indicator on the Panel should READ ZERO Pressure after completion of operation.
Every Month		Check for the Leakage of the tubing/Piping and fittings, if any. Clean the complete system to ensure Dust & Dirt Free system.
Every 3 months		Check the Pump for external leakage & overall performance.
		Clean the Filter and Filter Elements.
		Check for loosening of Nuts and bolts or pipe adaptors. Re-torque if needed.
Every 6-12 months		Inspect piping at full system pressure for leakage using pressure drop.
		Test & calibrate all pressure gauges/Sensors/Transmitters.
		Replace Hydraulic ELEMENTS.
		Get Valve, Pressure Relief Valve in the checked for performance .
Every 5 Years		Change the all major Items : Relief Valve, Pressure control valve, Motor, Pump etc.

Testing Procedure:

1. Set Relief valve to the minimum value.
2. Connect UUT using QRC.
3. On 3-phase from Electric Control panel MCB.
4. Press “Main Motor ON” from front panel.
5. Check the Digital pressure gauge is showing pressure.
6. Rotate relief valve in clock wise direction to set the desire testing pressure.
7. Check that pneumatic line is open for Rotex Valve.
8. Press “Timer Start” push button to start testing. After testing completion press “Timer Reset” push button.
9. When testing completed press “Main Motor Stop” push button. And off main power from electric control panel.

Troubleshooting Chart:

S.NO	PROBLEMS	POSSIBLE CAUSE
1	**Pump is running but pressure is not coming on Pressure Gauge**	• *Open return line near tank and see flow is coming or not.* • *Check the rotation of Motor is clock wise or not. If not interchange the two phase from three phase line.*
2	**Pressure gauge is not showing the pressure desired**	*Check that Gauge is connected with pressure transmitter and 24VDC is going for excitation of P/T.*
3	**Temperature is Increasing**	*Check that cooling motor is running or not. It is in auto mode with Temperature controller. If it is not running in auto start it manually from front panel before testing.*
4	**Pressure is not increasing even if Point-2 is OK**	*Check that pneumatic line is open for Rotex Ball Valve and 24 VDC is going for excitation on it.*

Calibration Certificates: