HYDRAULIC SUSPENSION UNIT TEST BENCH

INTRODUCTIONS/TECHNICAL SPECIFICATIONS

Objective: -The objective of "**HYDRAULIC TEST EQUIPMENT FOR HSU"** is to check the Strength and leaks of HYDRAULIC SUSPENSION UNIT.

The test equipment is customized and designed according to the specification and test parameter for the hydro-pneumatic suspension unit. Multiple test can be performed on the machine simultaneously.

In all there are three test benches which test the unit for different parameters. Both dynamic as well as static test can be done. These test benches are-

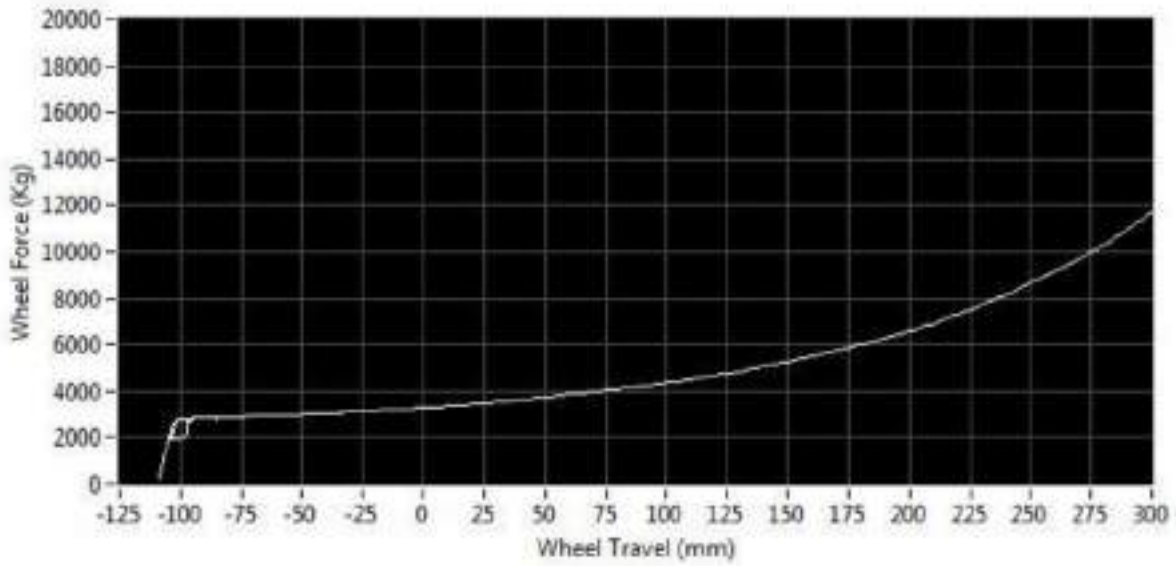
1. HSU TEST BENCH
2. DAMPER UNIT TEST BENCH
3. STATIC PROOF PRESSURE TEST BENCH

Hydraulic suspension unit is based on hydro-pneumatic system. Each unit has an internal gas spring and hydraulic damper. It provides stability, smooth mobility and isolate vehicle body from terrain induced vibration when travelling through rough terrain, and when firing the main armament.

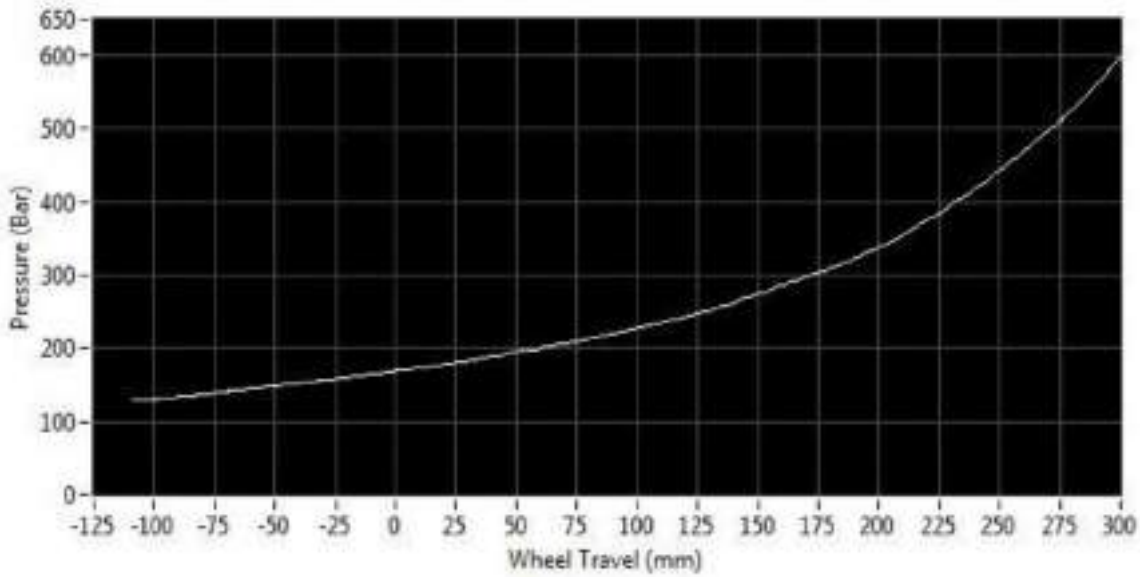
GRAPH TO BE GENERATED BY DAQ SYSTEM

During the test procedure of hydro pneumatic suspension unit on main HSU test bench, DAQ Panel will generated following graphs:

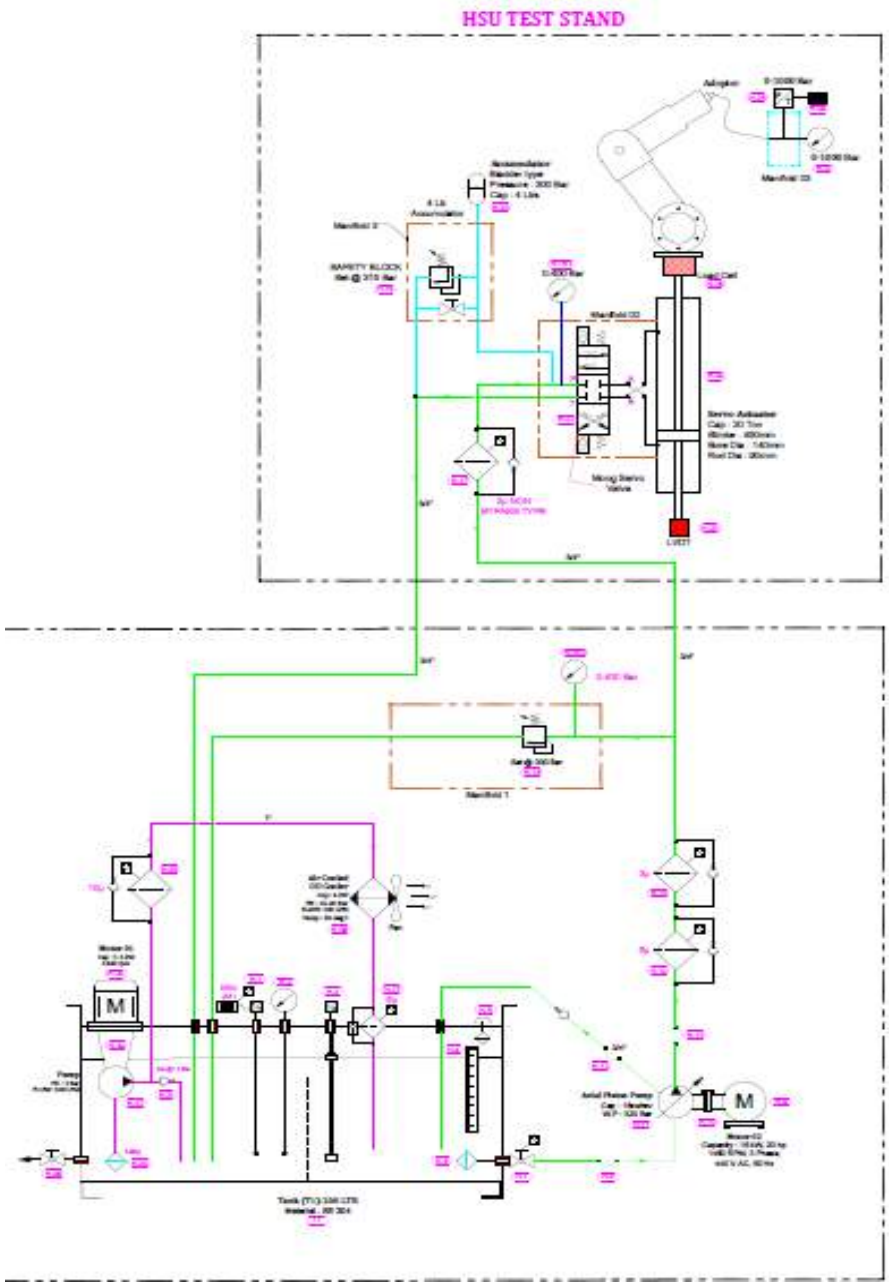
Load (kg) vs wheel travel (mm)



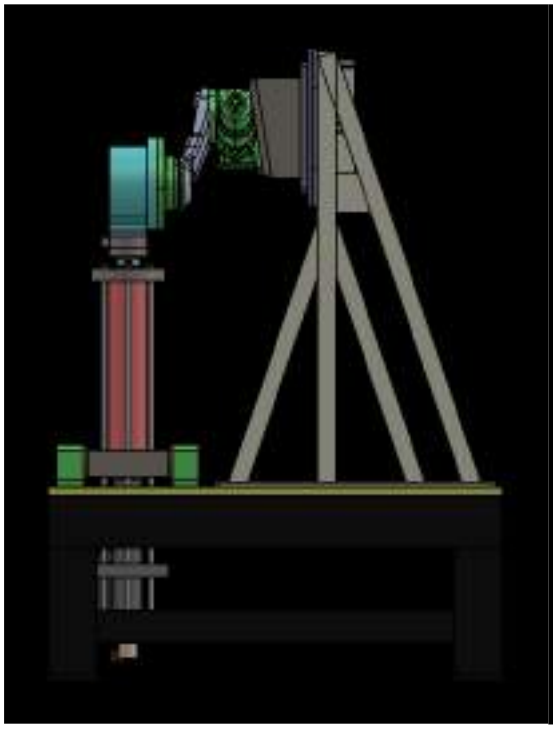
Pressure (bar) vs wheel travel(mm)

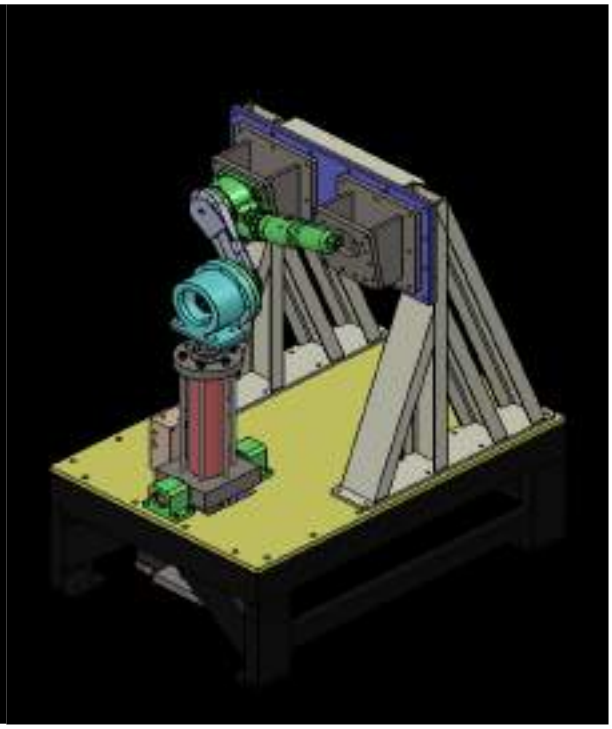


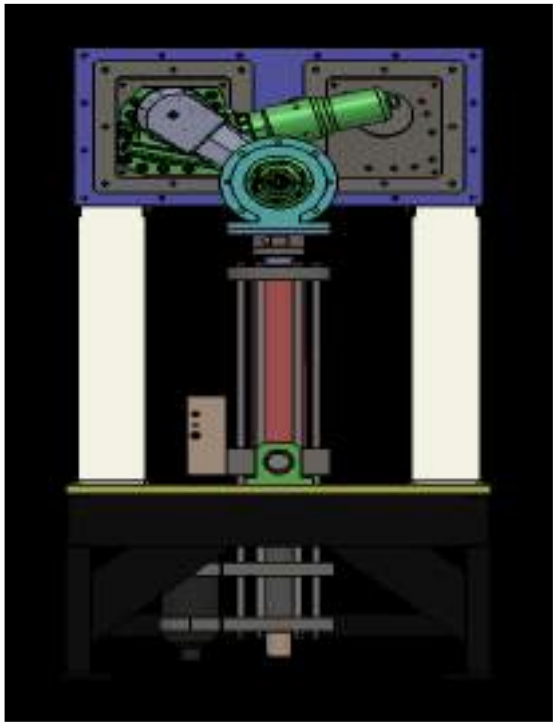
PIPING AND INSTRUMENTATION DIAGRAM OF HSU TEST BENCH



Diagrammatic Representation







Working of the System:-

This system consist two Parts.

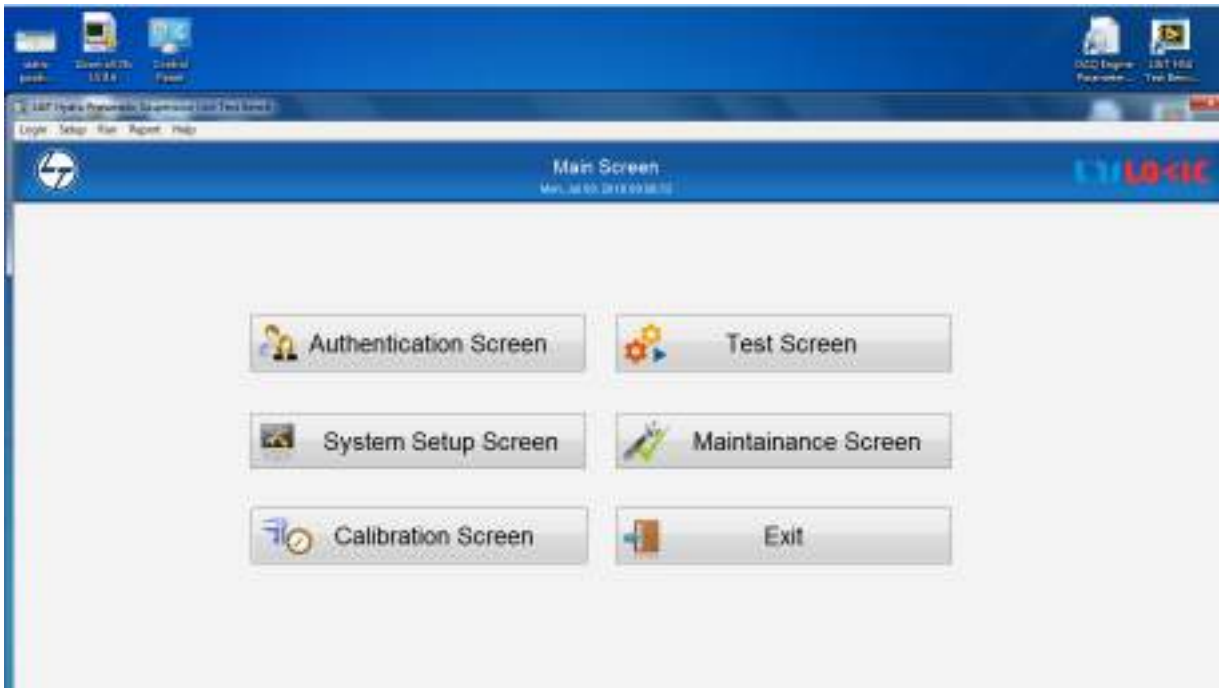
- **HSU POWER PACK**: Tank of 1000 liter is used as the storage for the servo oil. Equipped with limit switch, temperature transmitter, and temperature gauge on the tank top. Inlet of the system have manual ball valve with limit switch feedback to it. PARKER PV plus axial piston pump is used to generate 250 bar of max pressure. To overcome shock, BELLOW is used in combination with anti-vibration pad in combination. At outlet oil is filtered by in-line filter of 6 micron and 3 micron respectively. At junction manifold, pressure regulator is placed to set the limit of pressure.

A separate circuit for the filtration and cooling of oil is provided including air cooled oil cooler with separate motor pump arrangement. A tank top filter is also provided of 6 micron to filter oil regularly.

- **HSU TEST BENCH:** Further filtration is provided with in line 3 micron filter before going to Servo valve. Accumulator with safety shut off block is provided to give constant pressure to actuator. Main Actuator assembly mounted with loadcell (50,000 lbs) apply load on the test unit.

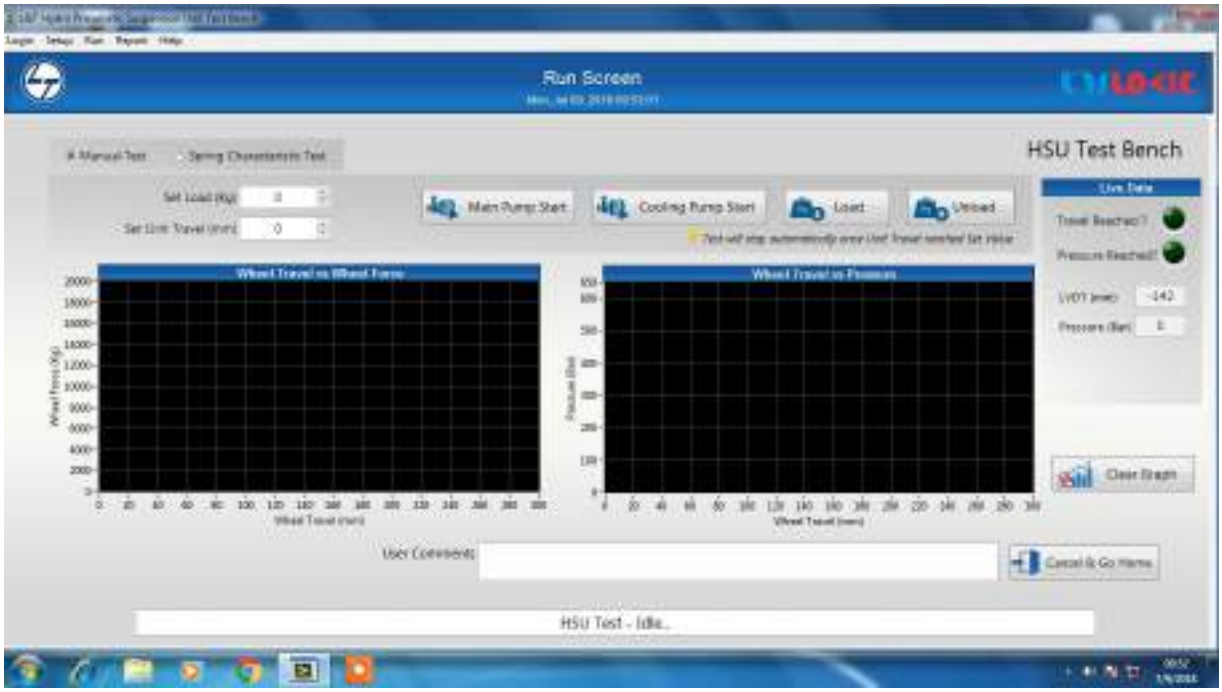
  Actuator motion is controlled by automatic servo valve at a constant speed of 15-20 mm/sec. for 3 cycles. Test bed have Tank of 1000 liter With Pressure transmitter to give output to DAQ Panel.

1. **Enter your username and password>click OK.Below screen will appear.**

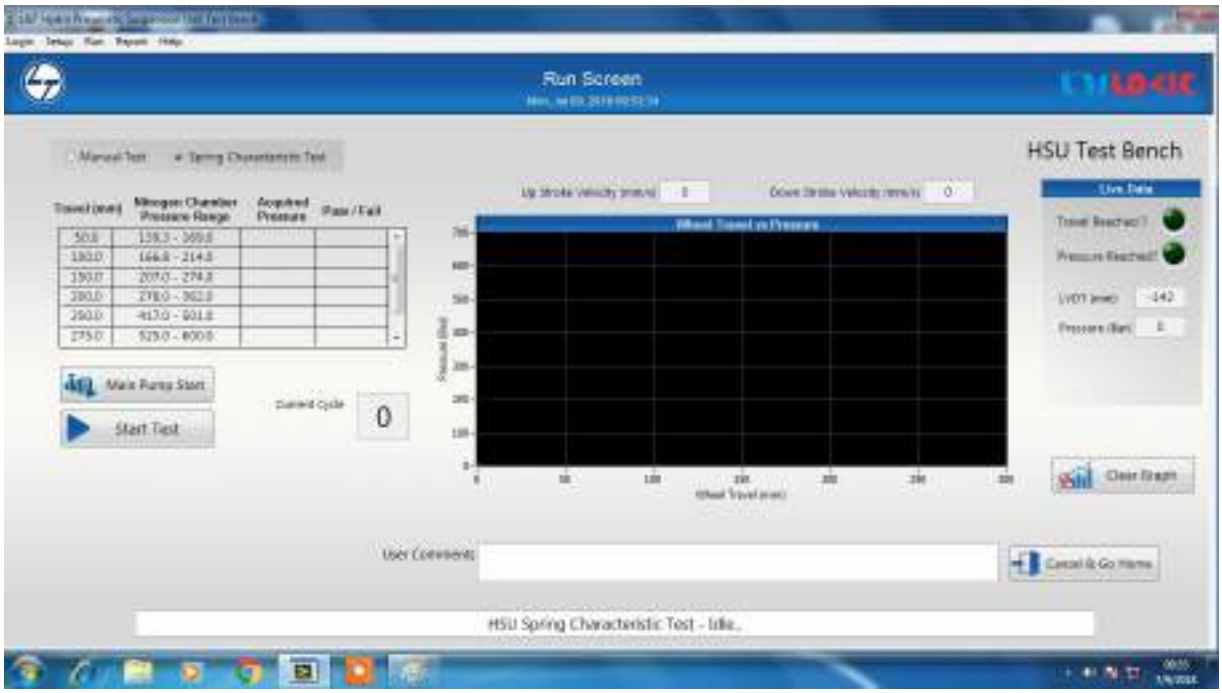


2. **Click on test screen option for testing>click OK. Below screen will**

3. **Choose the option of HSU TEST>enter Unit part number>choose LH or RH.>Unit serial number>test pressure (bar).Click OK. Below screen will appear.**



4. For spring characterstic test click the option>below screen appear.



5. Click Main pump Start> Click Start Test.

(System will automatically do the testing and generate the graph in the end result.)

6. Save and exit the test main screen.

Don't touch the system component during operation.

Safety instructions

User must ensure the following safety points before operation the test bench.

1. **Ensure the main ball valve at pump inlet is always on, otherwise pump will get destroyed if run dry.**
2. **Pressure regulator setting must not be altered without proper supervision. It should not be more than 110 bar in any case.**
3. **Safety shutoff block should be open during testing.**
4. **Ensure that the testing should not be done without cooling system is on. If any case cooling system shut down Do not operate the test bench.**
5. **In any case temperature of oil should not go beyond 50 degree Celsius.**
6. **No manual testing to be performed on the HSU test bench.**
7. **As automatic test start, do not come nearby to the test bench.**
8. **Maximum value of the actuator stroke should not be altered without proper supervision.**
9. **If any shot circuit happens, directly cut the main supply to the HSU test bench from power pack panel.**
10. **Ensure proper Earthing to the machine.**