

# CURTIS ASSEMBLE & TEST LIMITED

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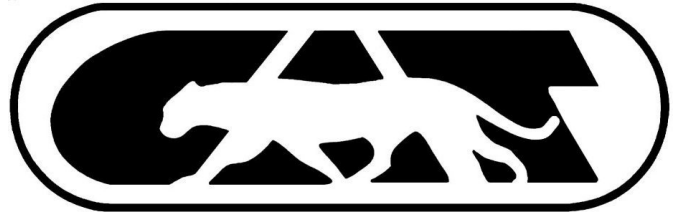
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## CURTIS PUMP TEST MACHINE

### Description:

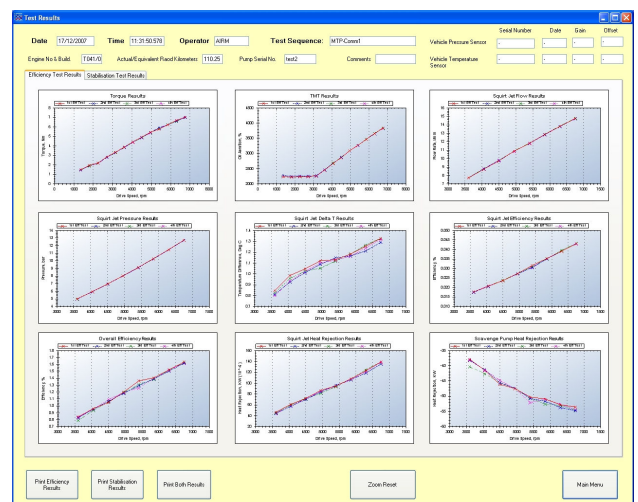
The pump test machine is designed to test the performance of a high performance pump assembly. It is capable of supplying each of the 5 individual pump chambers with different flow rates simultaneously. The supply to each of the chambers is made up of two individual feeds, one for oil and the other for air. Both of these supplies are servo controlled and are then combined to give a homogenous mix before entering the pump. The outlet pressure from the pump exits are also servo controlled allowing various operating conditions to be simulated. The pump under test can be run at up to 10,000 rpm by an electric motor coupled to the input shaft.

The system comprises a main test unit and a conditioning unit. The test unit performs the tests, drives the pump, controls the flows to the pump and the exit conditions. The conditioning unit conditions the test oil by continually circulating it through filters and maintains a settable temperature. When required, oil is pumped from the conditioning unit to the test unit where the flow rates into the pump are controlled.

The configuration and data acquisition are carried out by a dedicated DAQ PC running bespoke software. The Machine control is carried out by a Siemens PLC which communicates with the DAQ PC via industrial Ethernet.



*Curtis Pump Test Machine*

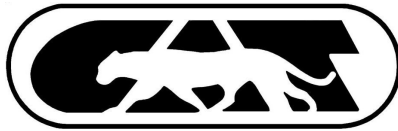


*Pump Test Results*

The operator may interface with the machine via a keyboard and mouse from outside the test cell or by touch screen interface on the test unit inside the test cell.

Test routines may be built up using an intuitive creation process where all controllable aspects of the machine may be specified. A routine consists of multiple individual steps, each one specifying the target and control tolerances for each controllable aspect of the machine. A routine may have up to 90 steps which may be repeated up to 9 times.

Previously obtained test results can be compared with each other using the inbuilt comparison facility. Any particular result from any number of previous tests can be compared against each other providing a



facility to gauge historical trends, compare the performance of pumps with each other and look up test results for a specific pump.

The system continually monitors all analogue and digital signals and shuts down should any exceed specified limits or indicate a machine fault.

Complete System diagnostics is provided via a password protected area. Each output on the system can be forced and all inputs monitored. Circuit schematics are overlaid with the digital and analogue signals to make the diagnostics facilities as useful as possible.

Whenever an error occurs, the operator is informed via a comprehensive, meaningful message which hyperlinks to the relevant electrical or mechanical circuit highlighting the precise location of the error.

## **CURTIS PUMP TEST MACHINE**

### **Operation:**

The pump to be tested is secured to the fixture following the correct tightening sequence. If the fixture is below a specified temperature the system performs a warming sequence to begin raising the pump temperature to a point where testing can be initiated. Once up to temperature, the test sequence automatically begins. The machine maintains all the controllable aspects to the specified parameters and logs all transducer readings when all controllable parameters are within limits. At the end of each step, the acquired data is analysed. If the analysed information falls outside settable limits the machine can be stopped immediately, at the end of that test section or allowed to continue depending on specified preferences.

When a test sequence has completed, the operator is presented with a clear indication of pass or fail. From here a graphical view of each of the results may be called up. This will show all the results for the number of times the sequence was repeated. The system will begin an automatic cooling sequence to reduce the component temperature until it is safe to handle. A print out of the test results will be automatically generated if this option is selected.

### **Specification:**

	<b>Oil Circuit</b>	<b>Air Circuit</b>
Inlet Pressure:	Up to 8 bar	Up to 7 bar
Exit Pressure:	Up to 1.5 bar	Up to 1.0 bar
Flow rate:	Up to 100 L/min	Up to 500 L/min
Inlet Temperature:	Ambient to 160°C	Ambient to 160°C
Filtration:	25 and 3 microns	0.5 microns

### **General**

Pump speed:	Up to 10,000 rpm
Torque:	Up to 10Nm at 10,000 rpm
Conditioning Circuits:	2
Test Fluid:	Engine oil