

Test Rig Control Rack

The control rack is designed to control and monitor durability and performance tests performed on a hydraulic test rig. The control rack is purpose built to control a specific test rig.

The control tower has a distribution system providing mains power and 24VDC to the rack equipment. Separate power supplies are used for the hard-wired controls, instrumentation and the servo system.

The PC based data acquisition and control system utilises a National Instruments PCI card with BNC breakout boxes for flexibility of signal connection.

Signal conditioning for load cells, strain gauge pressure transducers and an LVDT is provided by an instrumentation rack of Fylde manufacture containing a number of circuit board modules. Signal processing for thermocouples and flowmeters is provided by a DIN rail mounted module for each signal channel.

Interfaces for relay inputs and outputs are provided by a National Instruments rack mount unit providing relay and opto-isolator connections to the system of twenty four volt control relays, solenoid valves and sensors.

The unit on test is controlled by a rack mounted module provided by the end user. Analogue signals link this UUT controller to the test rig PC.

The unit on test is subjected to a load that is applied by a hydraulically actuated ram. This hydraulic system is controlled a microprocessor based servo unit of Tiab manufacture. The servo unit provides ready access to the control parameters (loop gain, integral control and differential term) by the test rig PC.

The test rig PC described here has software that was written and commissioned by the end user. Mecelec Design can offer bespoke software for test and production applications written by a knowledgeable and experienced team working with National Instruments LabVIEW platform.



Technical Data

Technical Data	
Power distribution	240V single phase and 24VDC
Safety systems	Hardwired 24VDC
Computer system	Rackmount PC and monitor. Keyboard and mouse in a drawer.
PC interfaces	PCI card by National Instruments
Interfaces for Unit Under Test	Customer supplied rack unit
Hydraulic load control	Programmable servo system by Tiab
Signal processing for Load Cell and LVDT	PCB Modules in a Fylde rack
Signal handling for thermocouples	DIN rail mounted modules
Flowmeter signal conditioning	DIN rail mounted modules

Warning beacon.
A red beacon is controlled
by the PC.

Main disconnect switch and
power on indicator.

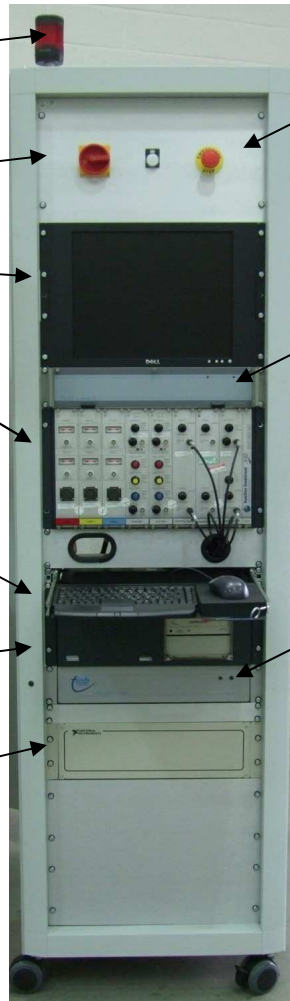
19in rackmount LCD
monitor.

Control equipment for the
unit under test

Drawer for keyboard and
mouse.

Drawer for keyboard and
mouse.

National Instruments
24VDC control gear
interfaces.



Control Rack
Front View

Emergency Stop Pushbutton.
The emergency stop control
is linked to the master relay
in the test rig hydraulic
power supply.

Load cell and LVDT signal
conditioning by Fylde
Instruments.

Microprocessor based
servo control system by
Tiab.

Circuit breakers for mains power
distribution.

24VDC power supplies for control
gear, transducers and servo
system.

Fylde signal conditioning rack.

Fylde BNC breakout box.

National Instruments BNC signal
input unit.

Mains power outlet sockets.

Rackmount PC including NI PCI
card.

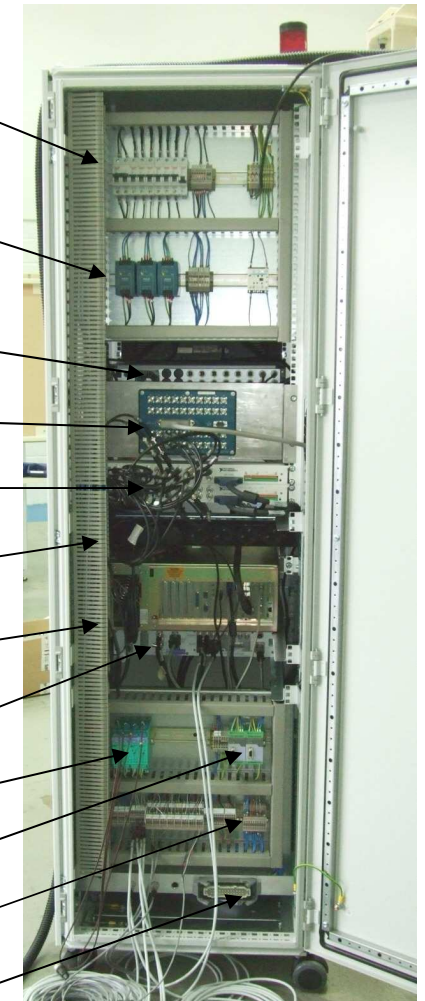
Tiab servo controller.

Thermocouple amplifier modules.

Flowmeter interfaces.

Signal connections.

Control gear interconnecting
socket.



Control Rack
Rear View