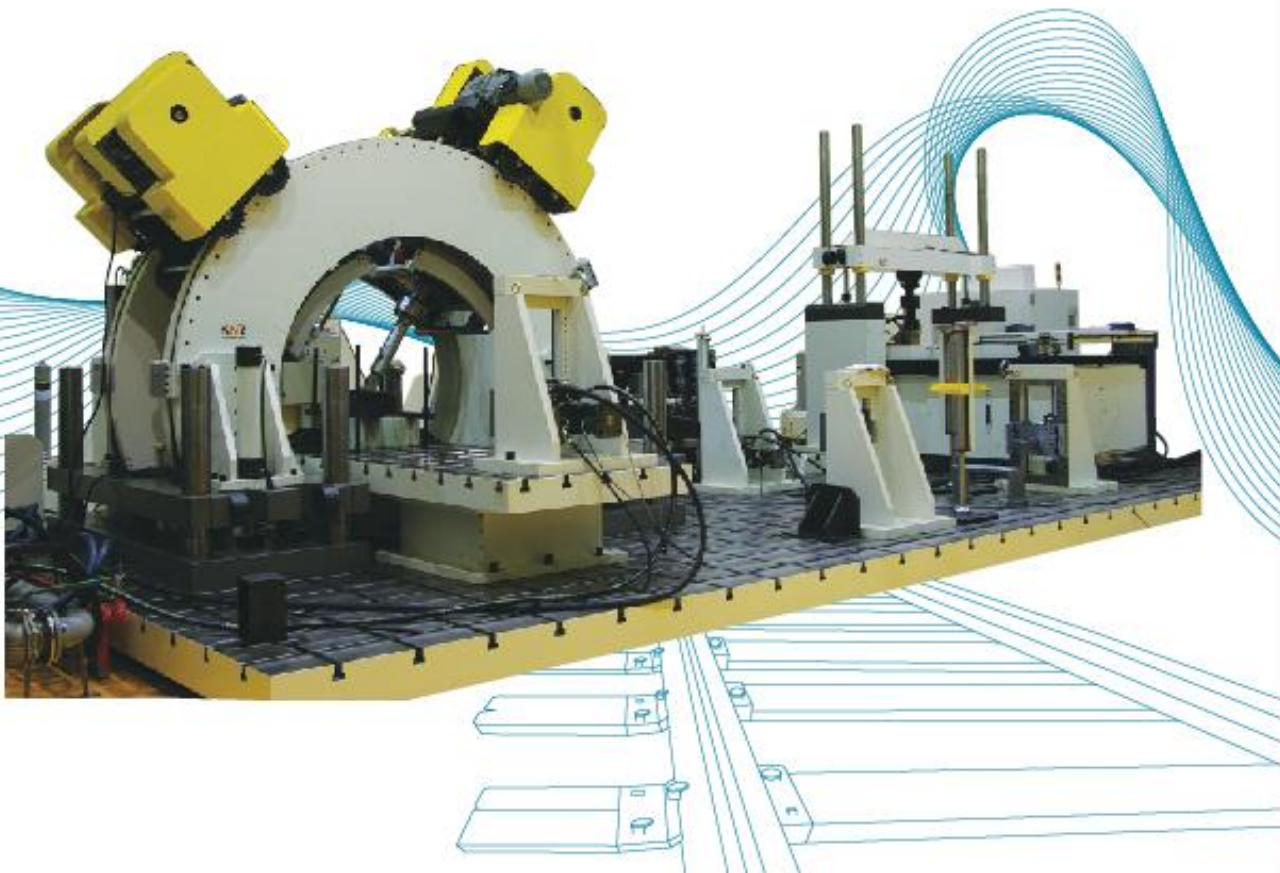# Multi –axial Fatigue Testing For Rail Fastening System & Components

Multi-axial fatigue testing system for rail fastening system & components-a hydraulic actuating system to test the static and dynamic performance of a rail fastening system & components in laboratory.

The testing system should be composed of hydraulic actuators [250kN(2sets), 100kN(2sets), 50kN(1set), 25kN(1set)], test bed, U-frame, portal frame, side frame. U-frame should contain two 250kN and one 100kN hydraulic actuators. The other hydraulic actuators should be installed in portal frame and side frame.

| Component	Specifications		Component	Specifications	
Hydraulic Actuator	Static Force Rating	±250kN , ±100kN, ±50kN , ±25kN	**Environmental Chamber**	Temperature Range	-20℃ ~ 100℃
	Dynamic Force Rating	±200kN, ±80kN ±40kN, ±20kN		Humidity Range	30%RH to 98%RH
	Dynamic Displacement	±75mm		Inner Space	1400x1000x1000
Swivel Joint	Static Force Capacity	±350kN , ±150kN, ±50kN , ±25kN		Weight of specimen	±3.0% RH Max
	Dynamic Force Capacity	±250kN , ±100kN, ±70kN , ±35kN		Rate of cooling	5.0℃/min in empty chamber
	Swivel Angle Tilt angle	±90 ±7	**Servic Manifold Distributor & Hose**	operation	21MPa(3000psi)
Hydraulic Power Supply	Flow Rate	350lpm at 210bar 116lpm 3station ass'y		Filtration	3Micron
	Electrical voltage	380V, 60Hz, 3Phase			
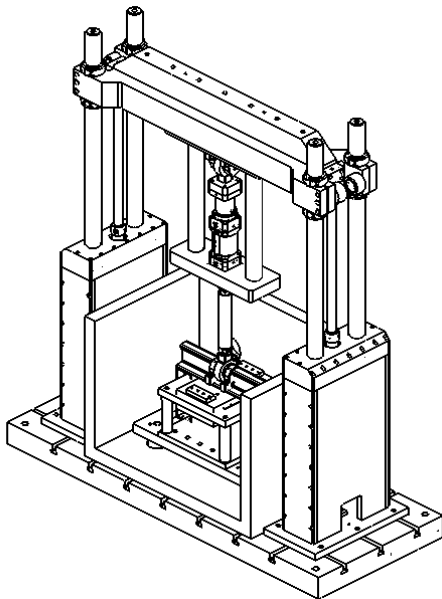
Portal Frame

Force rating : More than 150kN

Working height : 2,200mm

Up & Down Stroke : 1000mm

Reaction Frame Stiffness : Max. Displacement is 0.5mm

Frame Natural Frequency : 20Hz

Basic Space : 1800mm(inner)
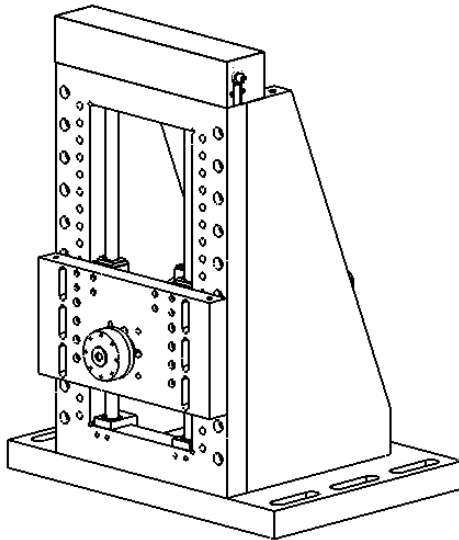
T-slot mount

Environment Chamber

- Inner space : 1400x1000x1000

- Temperature range : -20 ~ +100℃

- Humidity range : 30~98%

- Weight of specimen : 200kg

- Temperature profile control
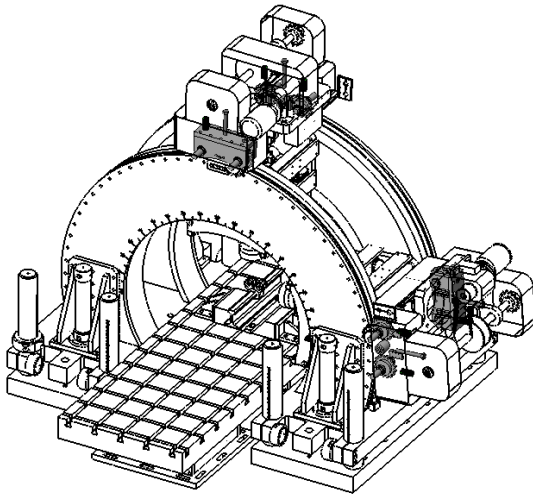
U-Frame

- 3 axial test system
- Capacity : 250kN
- Max. Displacement : ≤0.5mm
- Up & Down Stroke : 500mm
- Test bed size : length 3400mm, width 1200mm
- Moving angle : 0~90°, Resolution 0.5 °
- T-slot mount
- Anti-rust post treatment

Side Fixture

- Capacity : 100kN
- Max. Displacement : ≤0.5mm
- Vertical Stroke : 200mm to 600mm
- Actuator Mounting Method : Front & Rear
- Moving Type : Handle Screw Type ,
  Gear Box Cover included
- T-slot mount
- Actuator Balancer

Digital Servo-Controller

- 4 control channels
- Ethernet communication
- PIDF control parameters tuning.
- 1kHz for DDC loop closure of Servo control.
- Sine, ramp, square and random signal
- Data transfer is possible in ASCII, MS Excel, MS word and lotus formats.
- Transducer conditioner for AC or DC transducers.
- All hardware adjustments and settings are to be controlled through software.
- Full scale engineering unit values, and control optimization settings.
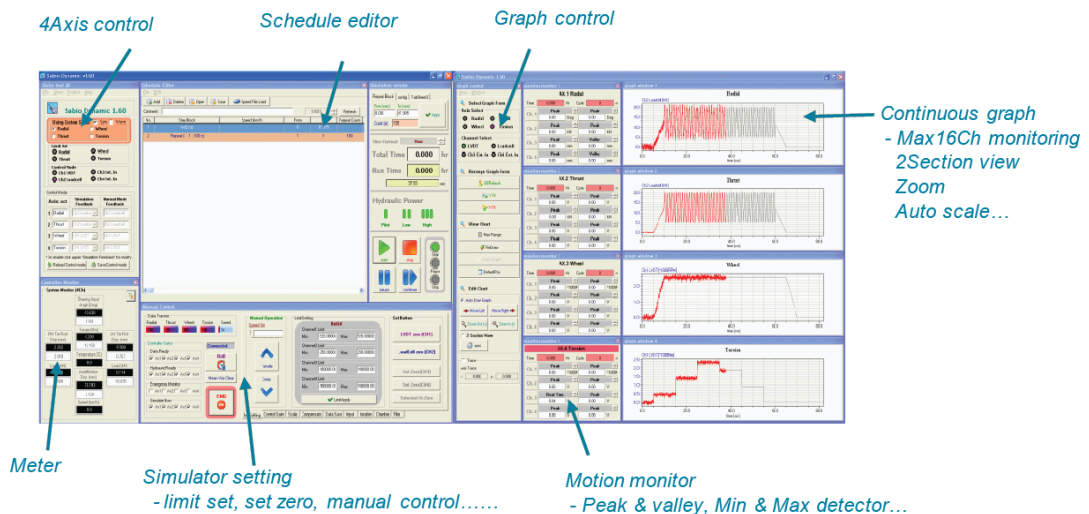- CAN network device for control of ignition and speed.
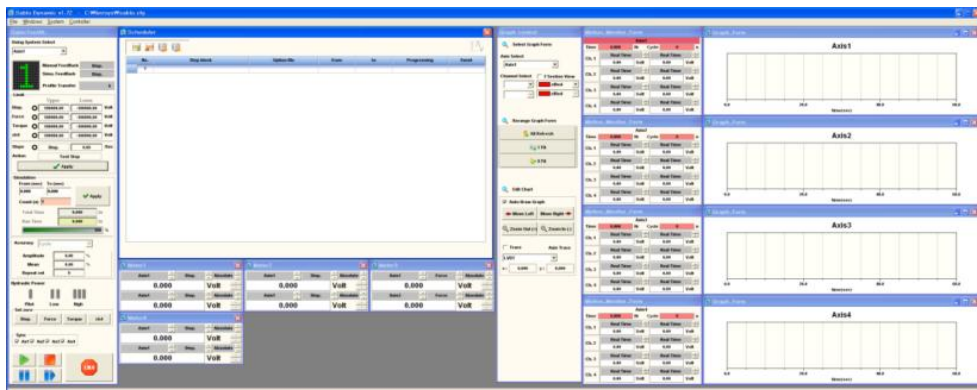
Control Software

- Display for test specific information
- Saving and loading of gains, limits, and some conditions
- Time based runtime plot with auto scaling and zooming
- Creatable test sequence manager
- Mathematical transformations are calculated by software
- Dual monitor display
- Automatic Data Acquisition, Storing and Display
- Monitor Test Program in Progress
- User Defined Display of all Data and Graphs sets
- CAN interface
- EPS error signal detection
- Monitoring of environmental chamber
- Road load profile regeneration of EPS

Additional function

- User passwords for security
- Report generation with customized template
- Example test methods in wizard
- Interactive user learning CD

4Axis control   Schedule editor   Graph control

Continuous graph
- Max16Ch monitoring
  2Section view
  Zoom
  Auto scale...

Meter

Simulator setting
- limit set, set zero, manual control......

Motion monitor
- Peak & valley, Min & Max detector...

Data process

- Other supported data formats: CSV, ASCII, Rigsys
- Interactive graphical analytical process builder
- Intrinsically multi-file, multi-channel, multi-format
- Processes can be saved as templates and re-used
- Temporary data within a process available for review