

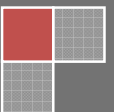
MICROTEST

Digital Modular Controller DMC 4000 system

MICROTEST



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Digital Modular Controller MICROTTEST DMC 4000 system and MICROTTEST SCM4000 software:

Fully Digital real time control loop with synchronized data acquisition and with function generation to drive the actuator.

This Digital Modular Controller Unit has a controller and signal conditioning modules for the control, measurement and acquisition of position, load, strain, etc.

Digital modular controller with computer control Features:

Actuators will perform in load controlled, strain controlled and displacement controlled mode. The system control is from the integrated PC via the built-in computer interface. The controller disposes of frontal **operator panel** to provide additional and supplementary manual user interface to the controller. This panel provides on-line scope to observe signals, digital display of measurements.

Real time control function like loop closure of data acquisition, command signal generation, and signal conditioning. Emergency stop button, upper lower limit switches included.

The Digital Modular Controller and signal conditioning modules are used for the control of position, load or strain. The configuration includes spare slots for additional channels of signal conditioning, data acquisition and control through the use of optional strain channels.



The system includes Transducer conditioning modules for stroke control, load control and strain control and they are a full range design.

Controller & Interface software have the typical functions associated with setting up limits, sensor selection, valve tuning and set up, error detects, status display and digital displays of sensor output.

Safety features with over travel protection.

Function generation of monotonic ramps and cyclic waveforms using sine, square and triangular shapes, Auto-zero, bump-less start, hydraulics on mode switching, ability to save and restore PIDF tuning settings.

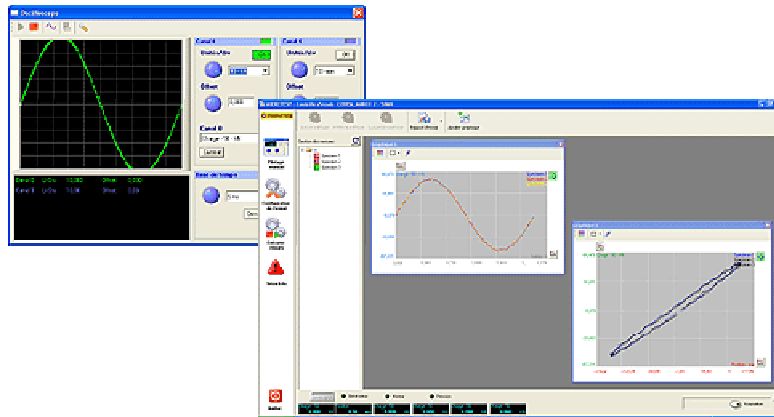


The Control System includes an the axis controller board configured with load and position sensors conditioning units.

Each controller is provided with at least eight free channels for feeding input from a variety of externally mounted sensors like load cells, strain gauges, LVDT's etc.

The DMC4000 unit includes at least 3 digital universal conditioners for different type of sensors: strain gages, force, displacement, strain, etc.

SCM4000 Software provides full system control from the PC. The control software includes waveform generation, calibration, and limit set up; status monitoring. The SCM4000 software and system is also suitable to add an optional Operator Panel (Touch screen Operator Panel) to provide a supplementary manual user interface to the controller.



Adaptive control system with adaptive controls compensation: Peak-valley and null placing and overall accuracy of the test systems better than 1% which is a combination of actuator, controller and servo valve and HPU. The adaptive controller automatically updates the control loop terms to compensate for changes in stiffness during testing. This facility run at 100Hz adaptive control. Controller provides adaptive PIDF gain control, limit and event detectors and system trips. It is possible to generate ramp, triangular, trapezoidal and other complicated waveforms.

The Test Controller is 19" rack mountable unit. The controller is a 1-4 channel stand-alone digital servo-controller that has been carefully designed based on input from users to meet the demanding needs of automotive testing. It can be used for manual control, constant amplitude tests and high performance handling of complex testing formulas.

The controller can be operated by the integrated touch screen PC included in hardware panel or externally through other computer. Integrated PC interface to controller is through USB or Ethernet. Appropriate configuration PC will be supplied. It operates on Windows based OS.

The system has necessary **safety features** & interlocks (see later). The control electronics is able of performing **diagnostic tests** during power up and report and define any faults found. The



controller has a communications watchdog to detect loss of communication with the personal computer and operator panel. In the event of communications loss, the controller reverts to a safe state.

Advantages:

- High performance operation due to force loop technology for faster and more efficient testing and reduced set-up times.
- **Bumpless transfer from one control mode to another** is possible. Test interruption facilities are included, allowing the tests to be intermittently stopped and re-started. This facility allows the test to be paused on completion of the current cycle.
- Matrix Control provides measurement and control flexibility for more efficient testing.
- Flexible features such as ability to run with integrated or external PC in user-friendly operation in a range of testing applications.

Features:

- Advanced control expandable.
- A portable and standalone test controller.
- Unique control loops for faster and efficient testing and reduced set-up time.
- Built-in data-acquisition, integrated display and data storage capability on a local hard disk, make testing easier and save both lab space and running costs.
- Flexibility with any hydraulic, electric or pneumatic actuators.
- Pseudo channels capability allowing the user to create online **calculated channels** using formulas and other inputs, offering greater flexibility and cost savings for the lab. The controller is able to control any close loop from any concerned, calibrated available transducer. i.e. position, load or strain control.
- Bumpless switching (e.g. Force, Position) to take advantage of the full range of application
- Scripting for digital and analog I/O as well as limits and peak detectors makes set up and running of tests easier.

Housing:

- **Expandable:** it can contain **up to 8 channels in the same housing.**
- Input voltage: 90-132/180-264 VAC; 47-63 Hz; 10A@115V, 5 A@230V,400VA.

Servo-Controller:

- Up to **2.5kHz single channel control loop** (software selectable).
- Controller supports Proportional, Integral, Derivative, and Feed-forward (PIDF) control.
- Four feedback control possibilities (Force, Position, other (strain)).
- CLC Control: Channel Limited Channel control is included and software selectable, with the second feedback signal providing means for limiting the actuator.
- DM Control: Dual Mode control with two feedback signals to provide better control stability.
- Bumpless instant mode switching between force (or strain) and position mode.



Function Generation:

- **Frequency range 0.01 to 100 Hz (wave form).**
- Internal function generation.
- Waveforms: sine, saw-tooth or triangle, block/square, ramp, etc.
- A **cycle counter** is available and able to display elapsed and total cycles.
- Advanced control algorithms can be used to provide bi-modal and tri-modal control.

Standard Inputs (per channel):

- 2x high resolution (0.03 %) with selectable gain and bridge excitation.
- Pot meter input (0.03 %) ($\pm V$ 5 mA) or LVDT input (0.03 %) with LVDT excitation.

The controller provides also control of the hydraulic power supply from the load frame. The safety of the Hydraulic Power Supply is monitored by the controller: alarms indication, actions, states, etc.

Standard Output:

- 16 bits \pm 100 mA valve driver output, with a limit in software from 0 to 100 % or (hardware selectable) \pm 10 V output.
- 2x 16 bit D/ A converters. \pm 10 V.
- Manifold Control Unit with 4 On/Off Low/High pressure valves (24 VDC/2 A each).
- Digital I/O board containing 8 inputs and 8 outputs.
- Add on board for 2 or 3-stage servovalves.
- A servo valve dither facility is provided with a variable frequency and amplitude up to 10% of full scale drive signal. Servo valve automatically adjusted.

Hardware Operator Panel:

MT-TSP Touchscreen operator panel is provided and integrated in the SDCM4000 controller unit to adjust actuator, start/stop test, turn hydraulics on/off, etc. at the load frame. Touch screen type. This element provides manual control of (one axis) crosshead or actuator positioning including a digital display of static and dynamic load as well as the static and dynamic stroke.

The operator panel allows also to run automatic or manual fatigue test in load, position or strain control without another main computer. The status and information of the system is also displayed in the screen when connected to other optional main control computer. The operator can set the limits, alarms, waveforms, number of cycles etc. to run tests directly, This operator panel is fully compatible with basic control software.

The controller has the capability of **sample data** playback via computer interface with a rate of at least 10 kHz. Standard digital filters are available for sampled data playback adjustable by the user.

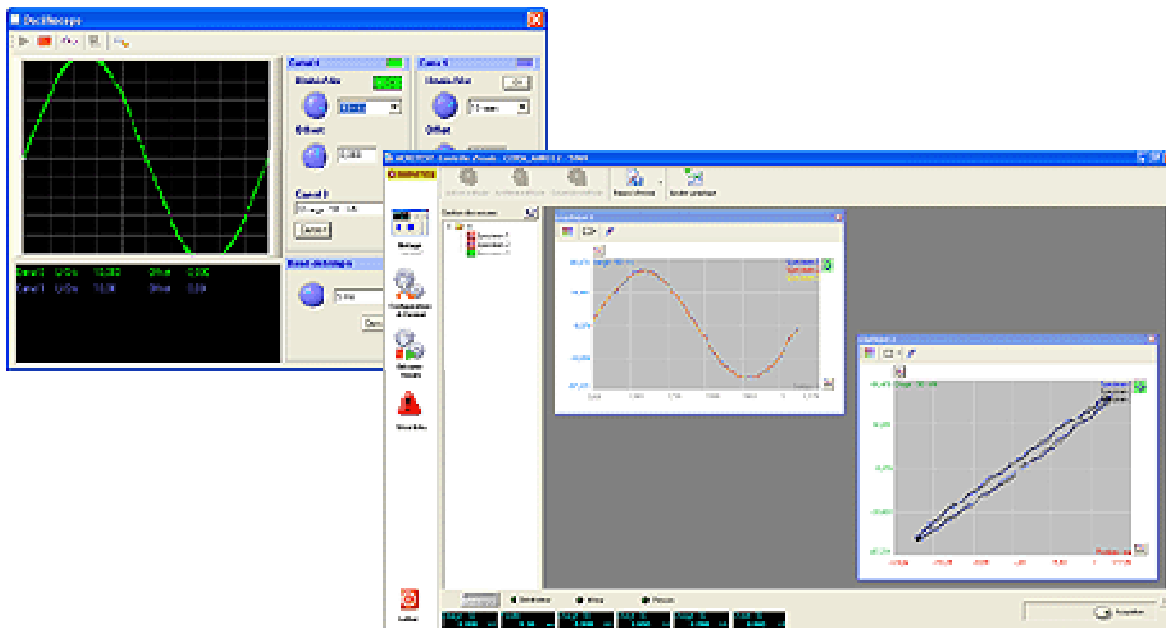




All the necessary cables for connecting the machine, controller, load frame, PC, transducers etc. with one another are included in the supply.

Panel mounting Computer (touch screen) included with at least these specifications:

- Intel Core 2 DUO or better
- With Intel motherboard
- Hard disk 500GB
- RAM 4 GB
- DVD-ROM
- Monitor at least 15" TFT
- Keyboard and optical mouse



- To be supplied with Microsoft Windows 7 Professional operating system.
- Software included: Microsoft Office.
- MICROTEST SCM4000 (latest version) software installed.

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