

SCM3000 Controller for Static Testing

Digital Closed-Loop Servo Control and Data Acquisition System



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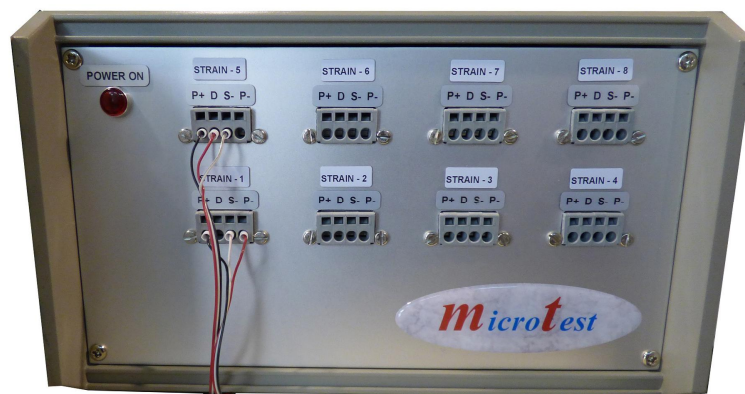


OVERVIEW

Microtest SCM3000 electronics provides full digital servo control, machine safety, transducer conditioning and data acquisition for the proposed testing system, **Microtest EM2/100/FR**, to conduct static (tensile, compression, flexural/bend, shear, friction, tear, peel, adhesion etc.) and low frequency cyclic (quasi-static loading rates) tests on a wide variety of materials and components. Furthermore, SCM3000 controller acts as the interface between the testing software/touchscreen operator panel and the testing machine.

SCM3000 digital controller includes an integrated signal conditioner for the load channel. Some applications may also require direct strain measurement from the specimen or load/strain control. Sensor conditioner cards can be added to the SCM3000 electronics and these are directly compatible with extensometers and LVDTs, as well as load cells or other devices even with +/- 10V DC output signal.

SCM3000 digital controllers can take up to two additional signal conditioner cards for the strain channel(s) as standard but this can considerably be increased using a **Channel Expansion Module** (optional). This provides signal conditioning and calibration for up to eight (or even more) transducers which may be used for control and/or data acquisition. An analog output and digital I/O card is also available (optional), allowing connection of analog chart recorders and plotters.



Channel Expansion Module for 8 Strain Channels

SCM3000 controller provides enough input (measurement) channels for most cases in materials testing. However, the number of input channels can be increased if required. External units can also be connected to the system by serial port, USB or Ethernet to provide strain signals.

As mentioned above, digital servo control, transducer conditioning and data acquisition for the proposed testing system is carried out by the SCM3000 control system which includes a high performance 32-bit Digital Signal Processor (DSP). The SCM3000 control electronics, designed and developed by Microtest specifically for demanding materials testing applications, feature high speed servo control (up to 1000 Hz control loop update rate) and high resolution analogue-to-digital conversion for at least 8 analog input channels.



The control mode is user selectable among load, crosshead displacement (stroke) and strain (deformation). When coupled with the SCM3000 testing software, the SCM3000 digital controller enables the operator to develop and conduct complicated tests in **automatic control mode**. Besides, the testing frame connected to the SCM3000 control system can be operated in **manual control mode** through the SCM3000 testing software or the touchscreen operator panel.

SCM3000 control system has digital input/output lines connected with the testing machine and motor driver, covering the rest of the control and security functions of the control system. The testing machine and the SCM3000 digital controller communicate with the computer system via **high speed serial port** or **USB interface** (or Ethernet upon request). SCM3000 testing software allows recording of different test data during mechanical testing.

SCM3000 digital servo control system also provides advanced safety features, such as automatic limit checking of crosshead position, overload, over voltage, etc.



SCM3000 digital control electronics, front view



SCM3000 digital control electronics, back view



MAIN FEATURES

- Self-identification capability for automatic detection, scaling and calibration of load cells or other compatible transducers to prevent configuration errors and simplify setup
- Overload protection to avoid or minimize damage of load cell, specimen and fixtures during test setup and end of test
- Control mode: load, crosshead displacement (stroke) and strain (deformation)
- Control loop update rate: 1000 Hz
- Data sampling rate (internal): 400 kHz providing high speed and real time synchronization of test data for all of the input (measurement) channels, including load, crosshead position (stroke), strain1, strain2, etc.
- Resolution of data acquisition: up to 24 bits
- High rate data acquisition at the PC: user selectable data acquisition rate of **500 Hz** (standard) or **2000 Hz** (optional, which can also be increased up to **50 kHz** or even higher upon request) per channel simultaneous on load, crosshead position (displacement), strain1 and strain 2 channels
- Standard input channels: load and crosshead displacement (stroke)
- 2 strain input channels, expandable up to 8 (or even more) using a channel Expansion Module (optional)
- Sensor conditioner cards for additional transducers through LVDT or other types of transducers (optional)
- Analog outputs for LVDT signal, strain and load channels (optional)
- Digital I/O (optional)

INPUTs / OUTPUTs

- Compatible transducer types: resistive bridges (e.g. strain gauged load cells and extensometers), AC devices (e.g. LVDT) and DC Devices (e.g. pre-conditioned devices)
- Up to 8 analog input channels as standard for load, strain1, strain 2, LVDT, etc.
- 1 digital (pulse) input channel as standard for crosshead displacement (stroke)
- Calculated channels: user defined in SCM3000 testing software
- External input channels via USB, Ethernet interface or serial ports
- Expandable architecture: additional analog and digital input/output channels

From the above-mentioned channels, 4 general-purpose input channels, i.e. load, crosshead displacement (stroke), strain1 and strain2, are contemporaneously active and can be used for test control. The pulse channel provides high accuracy position measurement and control.

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