



ESA Messtechnik GmbH

Schlossstr. 119 - D-82140 Olching / München
Telefon: +49 (0)8142 444 130 - Fax: +49 (0)8142 444 131
Internet: www.esa-messtechnik.de
E-Mail: info@esa-messtechnik.de

Signal Conditioner/Amplifier System Traveller Static



ESAM *TRAVELLER Static* is a high-performance signal conditioner/amplifier system mainly for static and quasi-static measurements in experimental stress analysis when medium or high numbers of input channels are required. The system accepts inputs from strain gauges in all common bridge configurations, from strain gauge based transducers, from potentiometers, and from general voltage sources. It also accepts inputs from 4-bits digital signal sources.

System configuration is achieved with the special "ESAM STATIC" Software which is also used for the setup of channel parameters as well as the A/D-conversion mode, the trigger circuits, the sampling rate and the data transfer from the Host-PC via USB communication interface. These software/hardware capabilities offer significant reductions in setup time, and also drastically reduce the risks of faulty system configurations and system connections. The Software smoothly runs under Windows®98, Windows®ME, Windows®2000, Windows®XP, Windows®Vista (32 bit) and Windows® 7 (32-bit).

System Features:

- Signal bandwidth <50 Hz.
- Software selectable sampling rate between 0.002 and 100 Samples/s per analogue channel.
- Modern USB 2.0 interface double RAM buffer for the transfer of measurement data system commands.
- Additional RS232C port (option).
- Internal high-speed 32-bit microcontroller.
- Internal EEPROM- and FLASH-Memory Card (1GB Card optional) for storage of system setup parameters and converted data stream.
- 3 different internal trigger circuits for automatic data stream recording.
- Integrated LCD Display and keyboard for offline operation.
- Digital I/O-Port, 4 buffered lines.
- System setup and measurements parameters fully software-controlled.
- Internal insulated 12 VDC power supply (for 16 channels version).
- System drivers for Windows®98, Windows®ME, Windows®2000, Windows®XP, Windows®Vista (32 bit) and Windows® 7 (32 bit).
- Integrated "ESAM STATIC" High-performance Software.

Technical Specifications (Basic System Unit):

Cabinet	For 16-, 32-, 64-, and 128 channel systems with LCD-Display and frontplate keyboard.
Number of Channels:	8 Analogue channels per board (up to 2, 4, 8 and 16 boards per system).
Data Acquisition:	Simultaneous data acquisition of all channels in the system.
A/D-Converter:	16-bits A/D-converter for each analogue channel; measuring range ± 2.500 VDC; programmable sampling rate 0.002 up to 100 samples per second per channel.
Averaging Digital Filter:	Averaging 1, 2, 4, or 8 samples/channel.
Interface:	USB2.0 (compatible with USB1.1) interface for data transfer and setup commands to/from PC.
Additional Interface:	RS232C interface for connecting event markers such as AT-MARK-2.
Data Storage and Data Display:	Measurement data are transferred to PC-HDD via USB interface. Measurement data are stored in SD-/MMC-Memory Card in accessible slot (option). Measurement data to be transferred from SD-/MMC Card to PC via USB-interface with ESAM Traveller Static Software. Measurement data to be read from front late LCD-display.
Trigger:	Analogue signal – rising edge (level and duration software-programmable); analogue signal – falling edge (level and duration software-programmable); analogue signal - level (level and duration software-programmable); time (year, month, hour ,min., sec. for Start/Stop - software-programmable)
Power Supply:	10 to 18 VDC; 18 to 36 VDC optional, standard with systems of 64 channels and more.
Dimensions and Weight	70 mm x 302 mm x 206 mm; approx. 2,2 kg - for 16-channels cabinet 121 mm x 302 mm x 206 mm; ca. 3,5 kg - for 32- channels cabinet 202 mm x 302 mm x 206 mm; ca. 6 kg - for 64- channels cabinet Data for 128- channels cabinet on request

Strain Gauge Bridge Amplifier Mod. ETSSGA-0

Short Description:

Strain gauge bridge amplifier Mod. ETSSGA0 is a high-precision programmable analogue channel for strain gauges, strain gauge based transducers, potentiometers, and other compatible voltage sources.

Features of Amplifier Board Mod. ETSSGA-0:

- 8 analogue channels per board.
- Constant voltage bridge excitation in 4 levels, individually programmable for each analogue board.
- Built-in bridge completion module for 350/120 Ω strain gauge half- and quarter bridge circuits and transducer circuits.
- Built-in shunt-calibration circuits with internal low-impedance switches for software-programmable configuration of adequate calibration configurations.
- Built-in 3-pole Butterworth low-pass filter, fixed for 20 Hz (-3dB) cut-off frequencies.
- Digital averaging filter, up to 8 samples used for averaging for one single measuring data for each channel on the board.
- Software-programmable electronically coarse bridge balance with possibility of automatic simultaneous balancing of all channels on the board.
- Bridge excitation, calibration and bridge balance fully software-programmable.
- Individual high-speed 16-bits A/D-converter for each analogue board.
- All functions and adjustments of the analog channels of each board are served and controlled by a high-speed CMOS-32-bits-microcontroller (external jumpers, potentiometer, switches, or the like not required).

Technical Specifications Strain Gauge Bridge Amplifier Mod. ETSSGA-0:

Inputs to Analogue Channels:	Number of Input Channels:	8 complete bridge amplifiers per board
	Inputs:	2 to 4 leadwires and guard/shield for strain gauge quarter-, half-, and full bridges, transducers or voltage sources. Internal half bridge, 350Ω/120 Ω bridge completion resistors, internal shunt-calibration resistors.
	Input Impedance:	20 MΩ @ 1500 pF
	Common Mode Voltage:	± 2.5 V
	Common Mode Rejection:	100 dB typical.
	Input Overload Protection:	Protected against ± 40 VDC
	Measuring Ranges:	± 16380 µm/m at 1.25V bridge excitation (resolution 0.5 µm/m). ± 8190 µm/m at 2.5V bridge excitation (resolution 0.25 µm/m). ± 4096 µm/m at 5.0V bridge excitation (resolution 0.125 µm/m). or ±2.5 V with unity gain amplifier (G = 1) (optional amplifier only for measurements with high-level voltage sources or potentiometers).
Constant Voltage Bridge Excitation:	Ranges:	1.25 V; 2.50 V; 5.0 V and 0.0 V – software-selectable, common to all channels on one single board.
	Output Current:	40 mA per analogue channel, over current protection 320mA separate for each analogue board (8 x 40 mA)
	Accuracy:	± 0.2 %
	Temperature Stability:	± 0.01 %/K
Bridge Balance:	Type:	Internal microprocessor-controlled electronically balance circuitry
	Range:	±100 % of ranges: ± 16380 µm/m at bridge excitation 1.25 V resolution 8 µm/m ± 8190 µm/m at bridge excitation 2.5 V resolution 4 µm/m ± 4096 µm/m at bridge excitation 5.0 V resolution 2 µm/m
Calibration:	Type:	Software controlled Shunt-calibration
	Calibration Resistors:	RC1 = 174.65kΩ 0.1 %, 1000 µm/m (0.50 mV/V) for 350 Ω and gauge factor K=2,00 RC2 = 59.88kΩ 0.1 %, 1000 µm/m (0.50 mV/V) for 120 Ω and gauge factor K=2.00
Amplifier:	Accuracy:	±0.05 % + 50 ppm/K
	Linearity:	0.002 % of FS
	Temperature Coefficient of Zero:	± 1 µV/K (max.) RTI after 30 Min. warm-up
	Common Mode Rejection:	100 dB
	Hardware-Filter:	3-pole Butterworth low-pass filter for each channel; cut-off frequency -3dB in in bandwidth range DC to 20 Hz

Potentiometer Amplifier Mod. ETSPOT-0

Short Description:

Mod. ETSPOT0 Potentiometer Amplifier is a high-precision analogue amplifier board for stationmaster transducers and other voltage signal sources which are compatible with the input specifications of Mod. ETSPOT0.

Features of the Amplifier Board Mod. ETSPOT-0:

- 8 analogue channels per Amplifier
- 5 VDC excitation common for all 8 channels on the board.
- Built-in 3-pole Butterworth low-pass filter with fixed cut-off frequency of 16 Hz (-3dB).
- Digital averaging filter, averaging of up to 8 samples for one reading of each channel on the board.

- Individual high-speed 16-bits-A/D-Converter for each analogue board.
- All functions and setup adjustments of the board's potentiometer channels are served and controlled by a CMOS-32-bits-microcontroller.

Technical Specifications Potentiometer Amplifier Board Mod. ETSPOT-0:

Inputs to Analogue Channels:	Number of Input Channels:	8 complete amplifiers per board
	Inputs:	2 to 3 leadwires and guard/shield for potentiometer inputs or voltage sources, internal half bridge.
	Input Impedance:	20 MΩ @ 1500 pF
	Common Mode Voltage:	± 2.5 V
	Common Mode Rejection:	100 dB typical
	Input Overload Protection:	Protected against ± 40 VDC
	Measuring Ranges:	± 2.5 V
Transducer excitation:	Ranges:	5.0 VDC
	Output Current:	40 mA per analogue channel, over current protection 320mA separate for each analogue board (8 x 40 mA)
	Accuracy:	± 0.05 %
	Temperature Stability:	± 0.01 %/K
Amplifier:	Accuracy:	±0.05 % + 50 ppm/K
	Linearity:	0.002 % of FS
	Temperature Coefficient of Zero:	± 2 μV/K (typical) RTI after 30 Min. warm-up
	Hardware-Filter:	3-pole Butterworth low-pass filter for each channel; cut-off frequency -3dB in a bandwidth range of DC to 20 Hz

High-level Amplifier Mod. ETSHV-0

Short Description:

Mod. ETSHV0 is a high-precision analogue amplifier board for signals from isolated and grounded voltage sources and from transducers with high-level voltage output.

Features of the Amplifier Board Mod. ETSHV-0:

- 8 analogue channels per board.
- Built-in 3-pole Butterworth low-pass filter with fixed cut-off frequency of 20 Hz (-3dB).
- Digital averaging filter, averaging of up to 8 samples for one reading of each channel on the board.
- Individual high-speed 16-bits-A/D-Converter for each analogue board.
- All functions and setup adjustments of the board's potentiometer channels are served and controlled by a CMOS-32-bits-microcontroller.

Technical Specifications High-level Amplifier Board Mod. ETSHV-0D:

Inputs to Analogue Channels:	Number of Input Channels:	8 complete amplifiers per board
	Inputs:	2 leadwires and guard/shield for voltage sources or transducers with high-level output
	Differ. Input Impedance:	20 MΩ @ 1500 pF
	Input Common Mode Imp.:	0.5 MΩ
	Common Mode Voltage:	± 50 V
	Common Mode Rejection:	80 dB min.
	Input Overvoltage Protection:	Protected against ± 500 VDC
	Measuring Ranges:	± 5 V

Amplifier:	Accuracy:	±0.05 % + 50 ppm/K
	Linearity:	0.002 % of FS
	Temperature Coefficient of Zero:	± 20 µV/K (typical) RTI after 30 minutes warm-up
	Hardware-Filter:	3-pole Butterworth low-pass filter for each channel; cut-off frequency -3dB in a bandwidth range of DC to 20 Hz

Amplifier Mod. ETSPT-0 for Temperature Measurements

Short Description:

Mod. ETSPT0-board is an 8-channels precision amplifier for temperature measurements with Platin sensors of the PT100 type. These sensors exhibit a resistance 100 Ω at 0°C. The measuring principle of PT100 sensors is based on their change of electrical conductivity with temperature changes. These sensors are generally known as RTD's (Resistance Temperature Detector).

Mod. ETSPT0 contains an ultra-stable 100.00 Ω reference resistor and 2 identical precision current sources, one of which is the supply for the sensor, the other one for the reference resistor. The differential voltage between the two resistors then represents the measuring signal which is available at the differential output of the amplifier.

Due to the matched current sources and the 3-leadwire circuitry all voltage drops in the leadwires will compensate. The active 3-pole output filter (cut-off frequency 10 Hz) reduces 50 Hz noise.

Technical Specifications Amplifier Input Board Mod. ETSPT-0:

Number of Input Channels:	8 complete signal conditioner channels per board
Platin-Sensor Type:	PT100 (100 Ω @ 0°C) PT1000 (1000 Ω at 0°C) optional
Constant Current Excitation:	0.2 mA
Measuring Range:	-100°C to +400°C max.
Max. Input Voltage:	-6V to +40V
Resolution:	0.013 K min.
Temperature Coefficient of Zero:	±1 mV/K RTI
Overall Accuracy:	± 0.4 K
Low-pass Filter:	Active 3-pole-10 Hz Filter
Fine Adjustment:	Internal microcontroller adjusts 0 °C to 0.0 V.
Input Connector:	Miniature-Sub-D 9-Pin female

Subject to changes and modifications without prior notice!