

burster

THE MEASUREMENT SOLUTION

YOUR INDIVIDUAL PRODUCT INFORMATION





THE MEASUREMENT SOLUTION

HIGH-TECH FROM A STRONG SOURCE

burster specializes in the development, production and sale of measuring and test devices, sensors and measurement systems as well as calibration services. Since 1961, burster has set standards for precision, quality and flexibility. This has made the German medium-sized enterprise one of the world's foremost suppliers of sensor signal processing and process monitoring systems.

Globally, burster is in contact with more than 140,000 people in industry and R&D. We are partners for mechanical and plant engineering and automation, the automotive industry and its suppliers, electrical and electronic engineering, the chemicals industry, e-mobility as well as many other sectors and future or niche markets such as medical engineering, biotechnology and robotics.



SENSOR ELECTRONICS

DIGITAL INDICATOR

TYP9110



Low-Cost hand lever presses monitoring

- Measurement channels: 2
- Max. amount of active measurement channels: 2

TYP9163



Digital Indicator

- Measurement accuracy: 0.1 % F.S.
- Sample rate: 500/s
- Type of sensor: Strain gauge; Potentiometer; Standard signals ...

TYP9163



SENSORMASTER

- Measurement accuracy: 0.1 % F.S.
- Sample rate: 500/s
- Type of sensor: Strain gauge; Potentiometer; Standard signals; DC/DC; Transmitter ...

TYP9180



Digital Display for Strain Gauge Units, Potentiometers, DC/DC Sensors and Standard Signals

- Measurement accuracy: 0.1 % F.S.
- Sample rate: 16/s

TYP9186



DIGILOW digital indicator for strain gauge sensors

- Measurement accuracy: 0.1 % F.S.
- Sample rate: 25/s

TYP9140



Digital displays for incremental position sensor

- Type of sensor: Incremental Position Sensor
- Interfaces: RS232

ForceMaster

Low-Cost Monitoring for Manual Presses

Model 9110

Code:	9110 EN
Delivery:	ex stock
Warranty:	24 months

NEW
Single-channel
force monitoring



- Excellent value "Plug & Work" complete system
- Easy auto-configuration with automatic setting of the evaluation tools
- Smart Card system for manipulation free configuration and storage of settings
- Acoustic and optic error indication
- Data logging on USB stick (optional)
- PLC sequence control function (optional)
- Analysis and configuration software included
- Automatic sensor identification
- Hub and other component counters

Applications

Pressure on price and quality continue to rise. The need to monitor even the simplest manufacturing and assembly process is increasingly common. With 100% monitoring of force/time curves or force displacement/time curves, the ForceMaster satisfies all requirements for ensuring the reliability of even simple press-fit processes. Thanks to its ultra-simple, single-button operation and intelligent auto-configuration, even semi-skilled staff can set up the equipment safely and quickly. "Card & Go" is the smart system that uses master, tool and PLC smart cards to make equipment settings, inhibit unauthorized changes and to trigger actions in sequence with the production process.

The ForceMaster 9110 has been developed specifically for monitoring manual lever presses. Simple manual workstations can be monitored extremely efficiently using the ForceMaster. Easy control functions that used to require an additional PLC can now be performed reliably with the ForceMaster. Tools can be changed quickly and easily using tool cards.

The ForceMaster is used for example for

- ▶ Pressing ball bearings
- ▶ Compressing powders
- ▶ Press-fitting pinion gears

Description

The ForceMaster has a multi-voltage power supply. Excitation of the load cell and displacement sensor is provided by internal voltage-conditioning circuits. Sensor identification is built into the sensor plug, allowing sensors to be connected easily with no further configuration needed.

The integral auto-configuration tool uses a GOOD component to train the ForceMaster with the measurement curve and automatically set the evaluation elements. The user can make any further fine-tuning and adjustments to these settings manually if required.

Visual indicators such as a red and green indicator lamp signal "Good" or "Bad" parts. An audible sound is also output for "Bad" parts.

The built-in PLC function allows sequence control of up to 60 steps. This can be used, for instance, to control pneumatic cylinders, compressors for blowing out workpieces, and reject gates for OK/NOK parts.

The PC software, which is included free of charge can be used for measurement-curve analysis and fine-tuning the evaluation elements. It also lets the user view and archive the measurement curves recorded on the USB stick.

Automatic sensor identification

The connected sensors are automatically detected by a special plug, so there is no need to configure each of the measurement channels. Faulty sensors or different measurement ranges can be changed in an instant, with no risk of mixing up sensors!

Auto-configuration

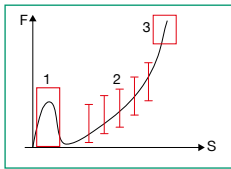
The auto-configuration function is an outstanding feature of the ForceMaster 9110.

This tool automatically predefines the start condition and position of the evaluation elements.

The basis for these settings is a GOOD production process in auto-configuration mode. The first stage in this process is to tare the force channel. This is necessary because the ForceMaster 9110 can only measure unipolar forces. Taring corrects any offset voltages and drift in the load cells. Then the ForceMaster 9110 waits for an upward movement of the press. Once the force exceeds a configurable force threshold, measurement recording begins.

If nothing else changes, the ForceMaster waits for a downward movement of the press. The teach-in training process is stopped once measurements pass below the start point. Then the measurements are analyzed and the configuration settings are made. Afterwards, in a second step, the user can choose whether to use force displacement limits (horizontal limits) or 2 gates (vertical limits) for the evaluation. There is also the option to monitor the 1 feed-in area for a maximum force. Another option is to enable monitoring of the 3 block force. As part of the block-force monitoring function, the user can also enable monitoring of the end deformation.

In addition, changes can be made to the internally calculated values and limits manually.



Main evaluation types

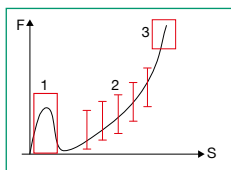
- ▶ Force displacement limits
- ▶ Gates (vertical force displacement)

The user can also enable:

- ▶ Feed-in force monitoring
- ▶ Block-force monitoring
- ▶ End-deformation monitoring
- ▶ Force alarm 1
- ▶ Force alarm 2

Description of evaluation types

Feed-in area 1

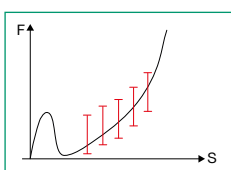


Within this area, the measurement process can be monitored for exceeding a maximum force (upper feed-in limit). Good parts are not allowed to exceed this limit.

The feed-in area is always disabled after the teach-in measurement process.

It must be enabled manually.

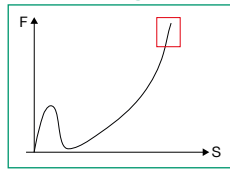
Gates (vertical limits) 2



With force-displacement limits, the force in this area must always exceed a minimum force (lower force limit). The force must then not drop below this limit again over the entire area. For good parts, the force must also not exceed a second force limit, the "upper force limit".

In the measuring range, the horizontal force-displacement limits are replaced by vertical force-displacement limits. 5 gates are active. Each are defined by a displacement position and an upper and lower force. The measurement curve must pass through the gate between these two forces. The gates do not have to be placed in a specific order. Evaluation is not performed until the last gate has been passed in the displacement direction.

Block area 3

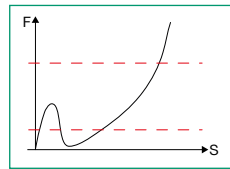


This area is usually where the end of the measurement lies, which a good part must always reach. The force limits "lower block limit" (which must be exceeded) and "upper block limit" (which the force must not drop below) are used to monitor the block force.

The measurement curve must end in this area. The curve must not go beyond the displacement point defining the block end (NOK). The measurement curve is allowed to have already exceeded the "lower block limit" when it enters this area. It is not allowed, however, to drop below the "lower block limit" again in this area.

The block area is always disabled after the teach-in measurement process. It must be enabled manually.

Force alarms



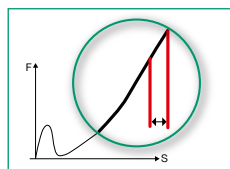
In addition to the evaluation areas 1 - 3 force alarms 1 and 2 are always available.

Force alarm 1 is used to monitor the load cell outside a started measurement. Since this is monitored over the displacement, this force monitoring is not enabled for the $Y=f(t)$ function (no displacement measurement).

Force alarm 2 is used for continuous monitoring of the load cell - both outside and during a measurement.

CAUTION: The force alarms do not generate an NOK evaluation. They are simply used to set the "Alarm occurred" PLC output for information purposes. But only if sequence control is not enabled!

End deformation



This option is used for monitoring deformation of the workpiece around the maximum force. This is done by measuring the displacement when the force exceeds the "lower block limit".

The end deformation is obtained from the difference between the maximum displacement during the measurement process and the deformation value saved when the force exceeded the "lower block limit". The calculation starts once the force has dropped below the "lower block limit" again during the return stroke.

End-deformation monitoring is always disabled after the teach-in measurement process. It must be enabled manually.

Components

Following counter options are accessible via the menu

- ▶ Parts OK
- ▶ Parts NOK
- ▶ Total parts
- ▶ Down-counter
- ▶ D-set (set value for down-counter)
- ▶ T.stroke (total-stroke counter)

PLC sequence control function (optional)

Control is based on the principle of a sequencer. A built-in electronic cam switch is provided for this purpose. The combination of these two forms of control provides a very powerful range of functions.

In principle, one can visualize a cam as a displacement range, which is also linked to the direction of movement. This makes it possible to program certain actions that are active for as long as the press stays in this range.

A sequence is composed of a series of commands that are processed step by step. Each step contains a condition and an action. The controller waits at each step until the condition is met and then carries out the action. Only then it does move on to the next step. There are 8 inputs and 8 outputs available. Depending on the safety requirements and risk levels of the application, additional measures must be taken to achieve the necessary "safety level".

Data logging on the USB stick

Curve data can be saved on an USB stick for subsequent analysis and assessment. This is possible for a press-insertion operation that has a cycle time of ≥ 1 second.

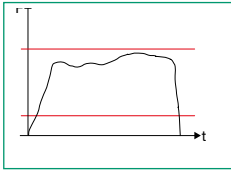
Display options

The display can show the following options: live sensor values, actual value for force/displacement or time, live evaluation, parts counter or maximum sensor values.

Special option force monitoring

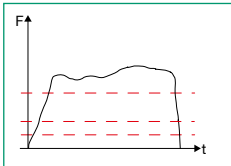
The force-time option is designed for straightforward force measurements requiring evaluation. For this application, just one load cell is connected to the ForceMaster 9110.

Force thresholds



Force thresholds can be used to monitor whether the force lies in a defined range. A green light indicates that the force lies in the specified range. A force that exceeds the upper force threshold triggers a visual and acoustic alarm. Evaluation takes place online during measurement.

Limits



In addition, 3 limits are available for defining various switching results. With hysteresis settings, a limit buffer and customizable switching behaviour, these switching results can be tailored to customers' requirements. There is also a facility to delete the limit via a digital input.

Smart cards

Master card

Only the master card allows access to the configuration menu. Without this card, the user is only permitted to view the general equipment data. It is also possible to specify in the configuration settings that faulty parts can only be confirmed with a master card.

Tool card

The tool card can be used to save and then reload a parts-specific program configuration (ForceMaster 9110 settings for measuring and evaluating a particular device under test).

This is useful, because different parts (depending on calibration quality) can then be measured on the same equipment or in future also on different ForceMaster 9110 units, without needing to perform an auto-configuration.

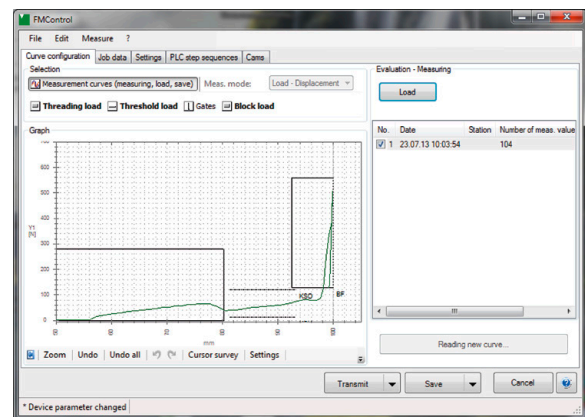
PLC card

A sequence-control program and the associated cam configuration can be stored on the PLC card and reloaded later.

PC software

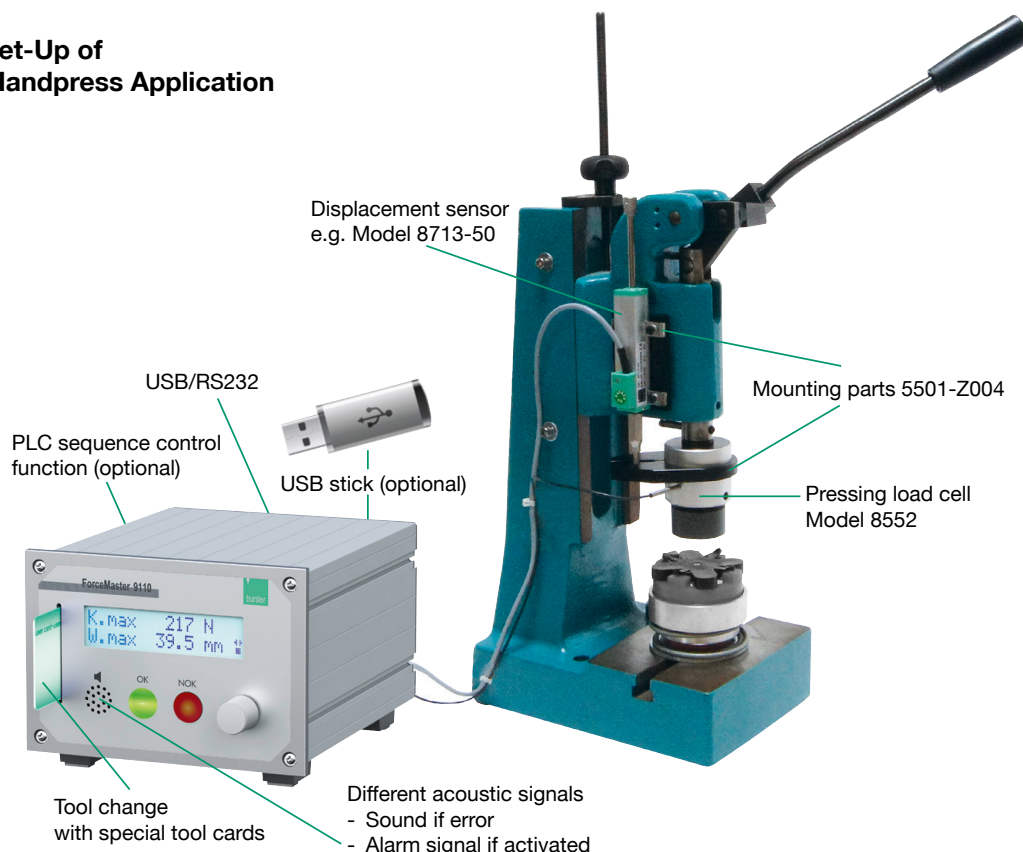
The free of charge configuration and analysis software FMControl offers following possibilities:

- ▶ Device parametrization
- ▶ Backup function
- ▶ Setting of evaluation elements according to auto configuration
- ▶ Programming the sequence
- ▶ Analysis of measurement curve
- ▶ Data storage and archiving
- ▶ Management and creation of tool smart cards



Application

Typical Set-Up of Manual Handpress Application



Load cell model 8552

The force is measured by a load cell, which is fitted on the press ram between sensor and tool. The load cell is equipped with mechanical overload protection.

Technical Data

Accuracy:	< ± 2 % F.S.
Measuring ranges:	from 0 ... 100 N to 0 ... 20 kN (50 kN ... 100 kN with model 8451)
Maximum force during use:	approx. 120% of rated force
Degree of protection:	IP54 to EN 60529
Diameter:	50 mm
Height without peg:	50 mm
Peg diameter:	10 mm
Sensor hole diameter x depth: (other pegs/holes optionally available)	standard 10 ^{H7} x 25 mm

When the sensor is used in the press, it is important to ensure that it is operated without transverse forces during the working stroke. Therefore the tool must be guided with the minimum possible play and the workpiece must be positioned securely.

Detailed technical data on the load cell is given in the 8552 data sheet.



Displacement sensor Model 8713 (optional)

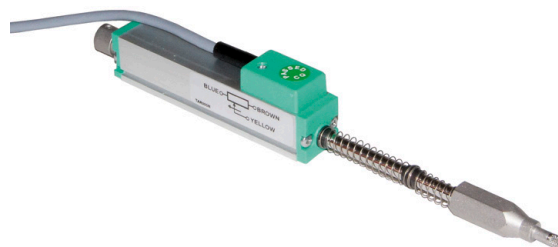
The full working stroke of the press ram can be monitored by a model 8713 displacement sensor firmly mounted on the press head.

Technical Data

Linearity deviation:	< 0.1 % full scale
Resolution:	0.01 mm
Degree of protection:	IP40 to EN 60529

When the displacement sensor is retrofitted to an existing press, a sketch is available which identifies the positions of the mounting holes that need to be made on the press head. We recommend using our 5501-Z004 mounting kit for this purpose.

Detailed technical data on the displacement sensor is given in the 8712/8713 data sheet.



Technical Data

Sensors for the force channel

Bridge resistor:	350 Ω ... 5 kΩ
Connection type:	4-wire
Sensor excitation:	5 V
Excitation current:	20 mA
Power consumption:	approx. 0.3 VA
Input voltage:	1 mV ... 10 mV
Total error:	< 1 % F.S.

Sensors for the displacement channel

Sensor type:	potentiometric displacement sensor
Track resistance:	1 kΩ ... 5 kΩ
Total error:	< 1 % F.S.

General equipment data

Display:	2 line illuminated LCD display
Warning and confirmation sounds:	configurable signal type
Alarm signal volume:	up to 75 dB
Measurement channels:	force/displacement or force/time
Communication interfaces:	USB - Slaveport type B, on the back RS232 - D-SUB 9, 19.2 kbaud data rate
Mains power supply:	90 ... 240 V AC / 50 ... 60 Hz
Cut-off frequency:	1 kHz
Operating temperature range:	5°C ... 40°C
Storage:	- 10°C ... 60°C
Air humidity:	10 ... 80 %, non-condensing
Enclosure type:	aluminum section
Degree of protection:	IP20
Connections:	coded special plugs
Sampling interval:	10 kHz
Protection class:	1
Number of I/O:	8 inputs / 8 outputs
Response time relay:	1 ms
Total current of all outputs:	0.3 A internal excitation 1.5 A external excitation
Dimensions (W x H x D):	174 x 119 x 213 [mm]
Weight:	approx. 3 kg

Order Code

ForceMaster Standard	9110 - V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		0	0	0	0
Options	PLC sequence control function		1		
	USB stick data logging				1
Single-channel force only		1			

Order Information

ForceMaster with PLC function and USB data logging
Analysis and configuration software **Model 9110-V0101**

Accessories

In order to fit the displacement sensor securely and firmly on the press head or on the load cell itself while still allowing fine adjustment, assembly kits are available that include all necessary parts such as carriers, plates, screws and mounting diagram for correct positioning

for 8451 load cell, measurement range up to 0 ... 20 kN **5501-Z002**
for 8451 load cell, measurement range starting from 0 ... 50 kN **5501-Z003**

for 8552 load cell **5501-Z004**
For further information see accessories' data sheet.

Cables

Connecting cable for potentiometric displacement sensors including plug (e.g. 8712) **Model 99221-591A-0090030**

RS232 cable to PC **Model 9900-K333**

USB cable to PC **Model 9900-K349**

Smart cards

Master card for full configuration access **Model 9110-Z001**

PLC card for storing PLC sequences on the card **Model 9110-Z002**

Tool card for saving tool data and measurement programs **Model 9110-Z003**

Connectors

Connector plug for load cells, containing stored sensor calibration data **Model 9900-V245**

Connector plug for potentiometric displacement sensors, containing stored sensor calibration data **Model 9900-V221**

Connector assembly **Model 99005**

Digital Indicator

Single-channel or multi-channel model for strain gauges, potentiometers, standard signals

Model 9163

Code:	9163 EN
Delivery:	ex stock / 4 weeks
Warranty:	24 months



New !
Evaluation optional
via Ethernet

- For force, pressure or torque measurements using strain gauge sensors
- For position or angle measurement using potentiometric or DC/DC sensors
- Optional multi-channel model
- Optional Profibus or serial interface
- 0.1 % measurement accuracy plus sensor-specific linearization
- Range of mathematical functions (e.g. differential measurement)
- OK/NOK feedback on multi color display and via 4 alarm limit outputs
- High sampling rate (500/sec.)

Application

The 9163 process value indicator covers a wide range of applications in which process values need to be measured, displayed, analyzed and transferred to higher-level control systems. Typical applications include measuring geometric values in production, for instance differential measurements, or testing material properties in the laboratory.

The measured values can be transferred via Profibus, RS232 interface or analog output.

The multi-channel version can be used with up to four sensors. These sensors can be combined using mathematical functions, so that even complex measurement tasks can be performed with just the one instrument.

Visual alarms on the display make it easier and more convenient to assess when values lie off-limits. Up to four configurable outputs are available as relay or logic outputs.

The excellent measurement accuracy of 0.1% also makes this instrument suitable for high-precision applications. Two digital inputs are provided for controlling various functions such as Reset or HOLD.

Strain gauges, potentiometric sensors, transmitters with process value output, Pt100 and thermocouples can be connected directly to the process value indicator. Thanks to its manual linearization facility, the instrument can handle sensors with a huge range of characteristic curves.

Description

The latest microprocessor technology has been used to pack a huge amount of engineering into the minimum space. Essential device settings can be made via the six-button keypad. Permanent settings such as the choice of excitation voltage are made using jumpers. The large 13 mm high, 7 segment display ensures that measurements and menu parameters can be read clearly.

The integral excitation voltage source supplies the sensors and provides the auxiliary power for any transmitters that are connected. The manual linearization facility with 32 data points means that even non-linear sensor curves can be input.

The indicator also supports memory functions for min, max and peak-to-peak values. The high measurement rate of 500 readings/s also ensures a rapid response by the four built-in alarm limit relays. TTL switched outputs can be provided as an alternative option. The device settings can be configured via the keypad or the optional RS232, RS485 or Profibus interface. A GSD file is supplied as standard with the Profibus option for Profibus integration.

A powerful software tool for data analysis and documentation is available on request for use with the RS232 and RS485 options.

Technical Data

Compatible sensors

Strain gauges (main channel)

Connection type:	4 wire technology
Bridge resistor:	350 Ω
Bridge voltage:	1.5 ... 4 mV/V
Sensor excitation:	5/10 V/ 60 mA

Potentiometer (main channel/auxiliary channel)

Track resistance:	> 100 Ω
Sensor excitation:	2.5 / 5 / 10 V

Standard signals, DC/DC sensors or transmitters (main channel/auxiliary channel)

Voltage input:	± 60 mV, ± 100 mV, ± 1V, ± 5 V, ± 10 V
Input impedance:	> 10 M Ω
Current input:	0/4 ... 20 mA
Load impedance:	50 Ω

Transmitters or DC/DC sensors (main channel/auxiliary channel)

Excitation:	15/24 V max. 150 mA
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Temperature sensor (main channel)

Type:	Pt100 to DIN 43750
Max. wire resistance:	20 Ω

Thermocouples (main channel)

Type:	TC (thermocouple) (ITS90) J, K, R, S, T
Linearization:	64 steps
Compensation error:	0.1 °/°C

Standard functions

Digital inputs

Quantity:	2, opto-isolated
Logic:	choice of PNP/NPN
Response time:	60 ms
Function:	tare, display peak values, HOLD, Display HOLD

General data

Display:	5 digit, dual-color red/green
Height:	13 mm
Display range:	-19999 ... 99999
Decimal point:	user-programmable
Measuring error:	0.1 % of full scale ± 1 digit
Measurement rate:	main channel 500/sec. auxiliary channel 100/sec.
Supply voltage:	100 - 240 VAC / 50 - 60 Hz, 20 - 27 VAC/VDC
Power consumption:	max. 20 VA
Dimensions (W x H x D):	96 x 48 x 150 mm
Front-panel cut-out (W x H):	92 x 45 mm
Gain drift:	150 ppm/K
Zero drift:	0.5 μV/K

Operating environment

Altitude:	up to 2000 m
Operating temperature:	0 ... 50 °C
Relative humidity:	20 ... 82 %, non-condensing
Protection class:	front panel IP54

Options

Limit switches

4 relay outputs:	250 VAC / 30 VDC 5 A
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TTL outputs:	TTL 24 VDC / 20 mA open e. p-switching as direct or inverted alarm signal
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Response time:	2 ms
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Technical changes reserved. All data sheets at www.burster.com

Analog output

Ranges:	0 ... 10 V, ± 10 V max. 25 mA, 0/4 ... 20 mA
Load impedance:	max. 500 Ω
Resolution:	≤ 0.03 %
Signal response time:	2 ms
Signal referred to:	Input signal Peak value Limit value

Serial interface

Type of interface:	RS232 or RS485
Protocol:	MODBUS RTU
Baud rate:	1200 ... 115200 bit/s
Max. transmission rate:	30 measurements/s

Profibus

Baud rate:	up to 12 MBaud
Standard:	Profibus DP V0 Slave
Addressing:	1 ... 99 via rotary switch
Connection:	via screw terminals

Order Code

Process value indicator model 9163-V	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standard:	0	0	0	0	0
Options:					
Case and auxiliary supply					
Panel-mount unit 100 - 240 VAC	_____	0			
Panel-mount unit 20 - 27 VAC/VDC	_____	1			
Analog output voltage					
None	_____	0			
0 - 10 V	_____	1			
0 - 20 mA	_____	2			
4 - 20 mA	_____	3			
± 10 V	_____	4			
Interface					
None	_____	0			
RS232	_____	1			
RS485	_____	2			
Profibus ¹⁾	_____	3			
Limit outputs					
4 x relay	_____	0			
4 x transistor (open e. p-switching)	_____	1			
Version					
1-main channel / 2 auxiliary channels	_____	0			
2-main channels / 2 auxiliary channels	_____	1			

¹⁾ no analog output possible

Accessories

Instrument calibration for one sensor ordered with the instrument or using sensor data provided by the customer (e.g. sensitivity, display range for correct readings, instrument settings, excitation voltage or sensor test certificate). **Model 91ABG**

DigiVision configuration and analysis software for single-channel and multi-channel operation with the single-user license code for the 9163 equipment range **Model 9163-P100**

Data cable

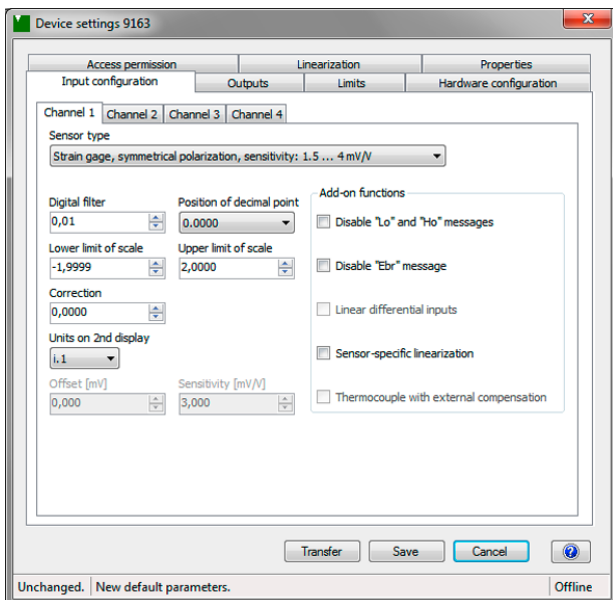
Networking via RS232/Ethernet converter	Model 9900-K453
Networking via RS485 requires converter	Model 9180-Z001

The CAD drawing (3D/2D) for this device can be imported online directly into your CAD system.

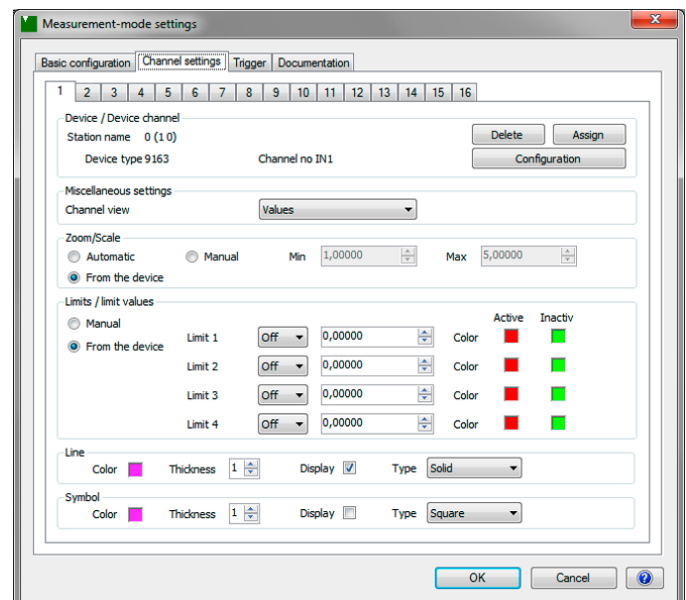
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

DigiVision 9163-P100 Configuration and Analysis Software

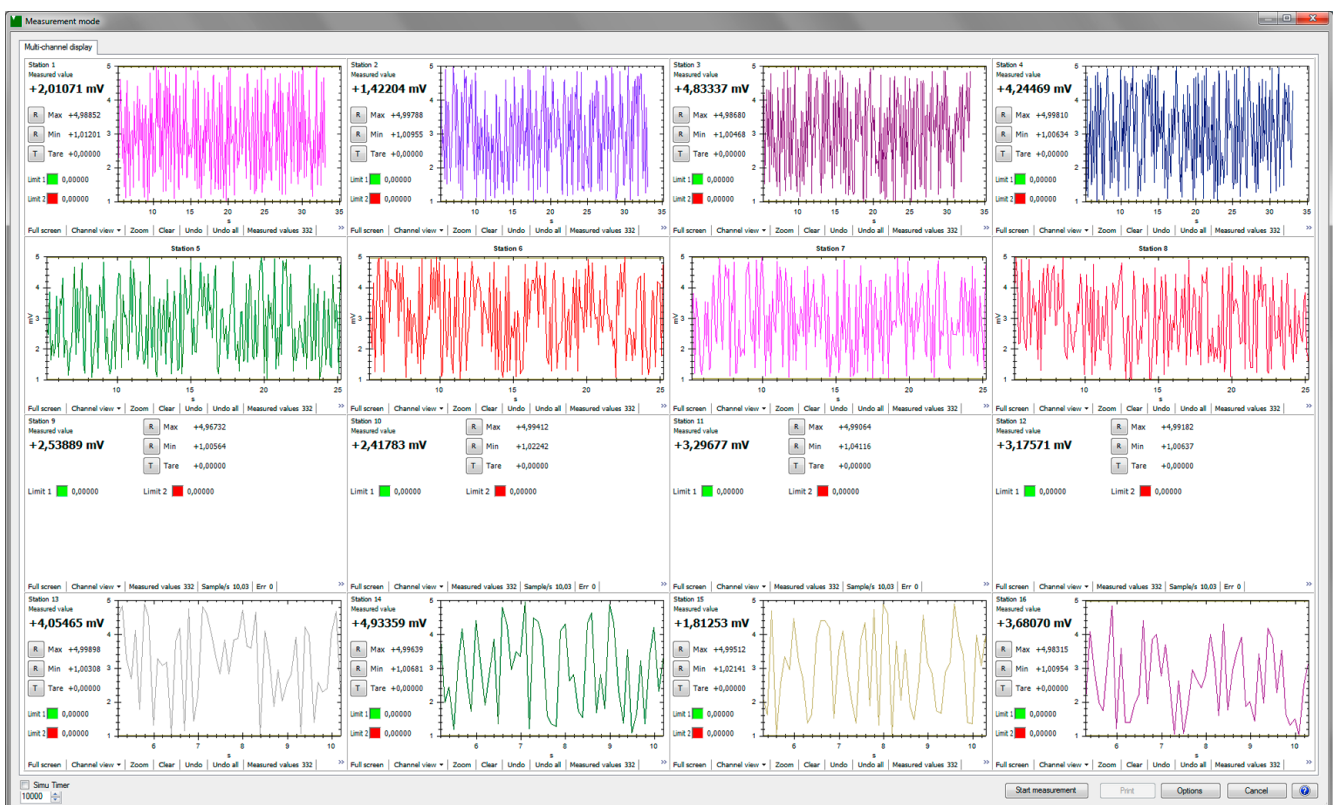
- Convenient device finder
- Instrument parameterization
- Instrument data adopted automatically, e.g. scaling, limit settings
- Back-up function for instrument data
- Simultaneous display of up to 16 measurement channels
- Different measurement rates can be combined
- Different triggers can be set: global or channel-specific
- Creation of instrument groups
- Report finder for locating group reports and individual reports
- Documenting individual measurement curves with various options e.g. serial number, batch counter, day counter
- Export function to Excel
- Communication with a controller unit (PLC etc.) via RS232 or Ethernet



Instrument parameterization



Managing several channels at once



Simultaneous display of up to 16 measurement channels different display options.

The measurement problem:

If the shaft of an electric motor is not circular, this will produce vibrations at high speeds and hence increased wear.

Irregular bearing surfaces may be one cause of a shaft running out of true. A bent shaft or a shaft without strict dimensional tolerances could also be the cause.

The solution:

As part of the quality assurance process, the shaft is tested for true running, bow and concentricity of the bearing surfaces. The test also includes measuring the diameter of the shaft bearings.

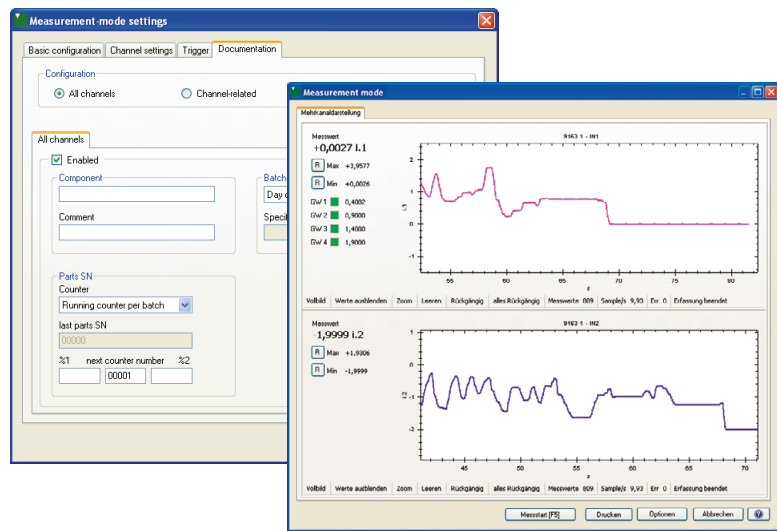
In the test, the shaft is clamped in a holder and turned by a motor while being measured by two position sensors. The instrument measures the difference between the signals from these two sensors; this difference is only allowed to vary within a specified tolerance band.

The 9163 performs the difference calculation and assesses the results.

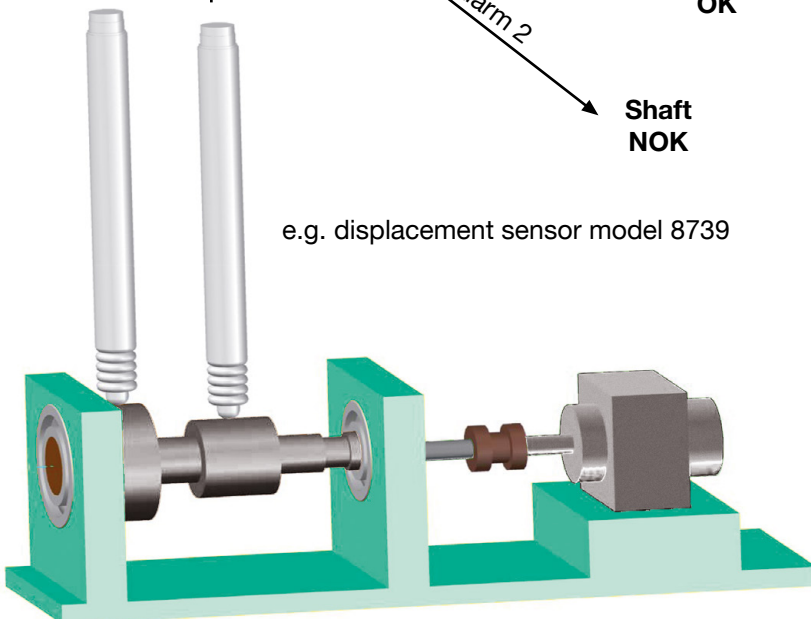
As this process takes just a few seconds, both random sampling and 100% testing are possible. If the shaft does not lie within the tolerance band, the 9163 outputs an alarm signal.

When used for testing random samples, the 9163 color display provides additional support by changing from green to red if the shaft lies out of tolerance. The operator thus knows immediately whether the shaft is OK.

**Differential measurement
IN1 minus IN2**



IN1 ↑
IN2 ↑



e.g. displacement sensor model 8739

9163-P100

**Analysis and configuration software
DigiVision 9163-P100**

Alarm 1

**Shaft
OK**

Alarm 2

**Shaft
NOK**

SENSORMASTER

Single-channel or multi-channel model for strain gauges, potentiometers, standard signals, Pt 100 and TC

Model 9163

Code:	9163-V3 EN
Delivery:	ex stock / 4 weeks
Warranty:	24 months



**New !
Evaluation optional
via Ethernet**



- For force, pressure or torque measurement using strain gauge sensors
- For position or angle measurement using potentiometric or DC/DC sensors
- Optional multi-channel model
- Optional USB or serial interface
- 0.1 % measurement accuracy plus sensor-specific linearization
- Range of mathematical functions (e.g. differential measurement)
- OK/NOK feedback on multi color display and via 4 alarm limit outputs
- High sampling rate (500/sec.)

Application

The SENSORMASTER 9163 covers a wide range of applications in which process values need to be measured, displayed, analyzed and transferred to higher-level control systems. Typical applications include measuring geometric values in production, for instance differential measurements, or testing material properties in the laboratory.

The measured values can be transferred via USB, RS232 or analog output.

The multi-channel version can be used with up to four sensors. These sensors can be combined using mathematical functions, so that even complex measurement tasks can be performed with just the one instrument.

Visual alarms on the display make it easier and more convenient to assess when values lie off-limits. Up to four configurable outputs are available as relay or logic outputs.

The excellent measurement accuracy of 0.1% also makes this instrument suitable for high-precision applications. Two digital inputs are provided for controlling various functions such as Reset or HOLD.

Strain gauges, potentiometric sensors, transmitters with process value output, Pt100 and thermocouples can be connected directly to the SENSORMASTER. Thanks to its manual linearization facility, the instrument can handle sensors with a huge range of characteristic curves.

Description

The latest microprocessor technology has been used to pack a huge amount of engineering into the minimum space. Essential device settings can be made via the six-button keypad. Permanent settings such as the choice of excitation voltage are made using jumpers. The large 13 mm high, 7 segment display ensures that measurements and menu parameters can be read clearly.

The integral excitation voltage source supplies the sensors and provides the auxiliary power for any transmitters that are connected. The manual linearization facility with 32 data points means that even non-linear sensor curves can be input.

The indicator also supports memory functions for min, max and peak-to-peak values. The high measurement rate of 500 readings/s also ensures a rapid response by the four built-in alarm limit relays. TTL switched outputs can be provided as an alternative option. The device settings can be configured via the keypad or the optional RS232, RS485 or USB interface.

A powerful software tool for data analysis and documentation is available on request.

Technical Data

Compatible sensors

Strain gauges

Connection type:	4 wire technology
Bridge resistor:	350 Ω
Bridge voltage:	1.5 ... 4 mV/V
Sensor excitation:	5/10 V/ 60 mA

Potentiometer

Track resistance:	> 100 Ω
Sensor excitation:	2,5 / 5 / 10 V

Standard signals, DC/DC sensors or transmitters

Voltage input:	± 60 mV, ± 100 mV, ± 1V, ± 5 V, ± 10 V
Input impedance:	> 10 M Ω
Current input:	0/4 ... 20 mA
Load impedance:	50 Ω

Transmitters or DC/DC sensors

Excitation:	15/24 V max. 150 mA
-------------	---------------------

Temperature sensor

Type:	Pt 100 to DIN 43750
Max. wire resistance:	20 Ω

Thermocouples

Type:	TC (thermocouple) (ITS90) J, K, R, S, T
Linearization:	64 steps
Compensation error:	0.1 °°C

Standard functions

Digital inputs

Quantity:	2, opto-isolated
Logic:	choice of PNP/NPN
Response time:	60 ms
Function:	tare, display peak values, HOLD, Display HOLD

General data

Display:	5 digit, dual-color red/green
Height:	13 mm
Display range:	-19999 ... 99999
Decimal point:	user-programmable
Measuring error:	0.1 % of full scale ± 1 digit
Measurement rate:	main channel 500/sec. Auxiliary channel 100/sec.
Supply voltage:	100 - 240 VAC / 50 - 60 Hz
Dimensions (W x H x D):	150 x 95 x 260 mm

Operating environment

Altitude:	up to 2000 m
Operating temperature:	0 ... 50 °C
Relative humidity:	20 ... 82 %, non-condensing
Protection class:	IP20

Options

Limit switches

4 relay outputs:	250 VAC / 30 VDC 5 A
TTL outputs:	TTL 24 VDC / 20 mA open e. p-switching as direct or inverted alarm signal
Response time:	2 ms

Analog output

Ranges:	0/2 ... 10 V, ± 10 V max. 25 mA, 0/4 ... 20 mA
Load impedance:	max. 500 Ω
Resolution:	≤ 0.03 %
Signal response time:	2 ms
Signal referred to:	Input signal Peak value Limit value

Serial interface

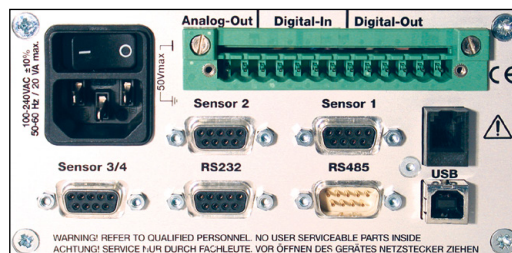
Type of interface:	RS232 or RS485
Protocol:	MODBUS RTU
Baud rate:	1200 ... 115200 bit/s
Max. transmission rate:	30 measurements/s

USB

Baud rate: 1200 ... 115200 bit/s

Max. transmission rate: 30 measurements/s

Rear side



Order Code

Process value indicator model 9163-V3

Standard:

Analog output voltage

None	0
0 - 10 V	1
0 - 20 mA	2
4 - 20 mA	3
± 10 V	4

Interface

None	0
RS232	1
RS485	2
USB	4

Limit outputs

4 x relay	0
4 x transistor (open e. p-switching)	1

Version

1-main channel / 2 auxiliary channels	0
2-main channels / 2 auxiliary channels	1

Accessories

Instrument calibration for one sensor ordered with the instrument or using sensor data provided by the customer (e.g. sensitivity, display range for correct readings, instrument settings, excitation voltage or sensor test certificate).

Model 91ABG

Configuration and analysis software for single-channel and multi-channel operation with the single-user license code for the 9163 equipment range

Model 9163-P100

Fitting of plug

Model 99002

Mating connector

Model 9900-V209

Data cable

for connection of desktop version and PC

Model 9900-K333

USB cable to PC

Model 9900-K349

Networking via RS232/Ethernet converter

Model 9900-K453

Networking via RS485 requires converter

Model 9180-Z001

Adapter cable for bench-top unit model **9163**, from sensor socket **1 or 2** to strain-gauge sensors with 5 VDC or 10 VDC excitation voltage with fitted plug 9900-V209 and to potentiometric position sensors with 5 VDC excitation voltage with fitted plug 9900-V209

99209-609A-0090002

Adapter cable for bench-top unit model **9163**, from sensor socket **1 or 2** to transmitters with 15 VDC or 24 VDC excitation voltage and sensors with fitted plug 9900-V209

99209-609B-0090002

Adapter cable for bench-top unit model **9163**, from sensor socket **3 or 4** to transmitters with 10 VDC excitation voltage or potentiometric position sensors with 5 VDC excitation voltage and fitted plug 9900-V209 plus sensor connecting cable with 99209-XXXX...

99208-609B-0090002

Adapter cable for bench-top unit model **9163**, from sensor socket **3 or 4** to transmitters with 15 VDC or 24 VDC excitation voltage and fitted plug 9900-V209

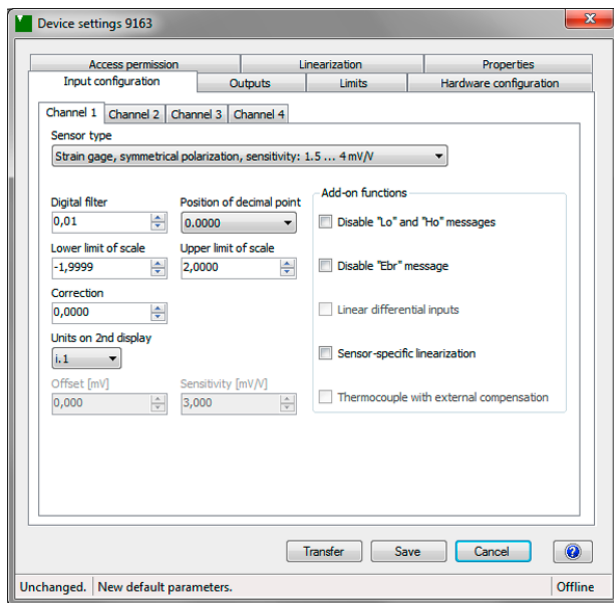
99208-609A-0090002

The CAD drawing (3D/2D) for this device can be imported online directly into your CAD system.

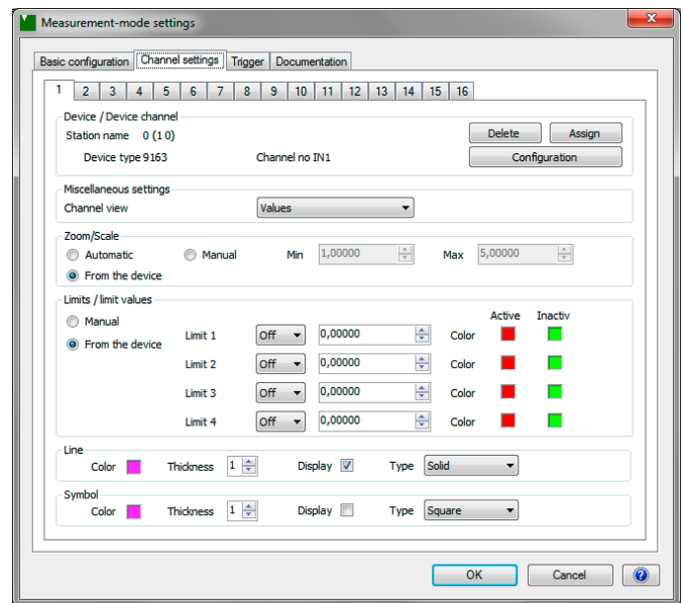
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

DigiVision 9163-P100 Configuration and Analysis Software

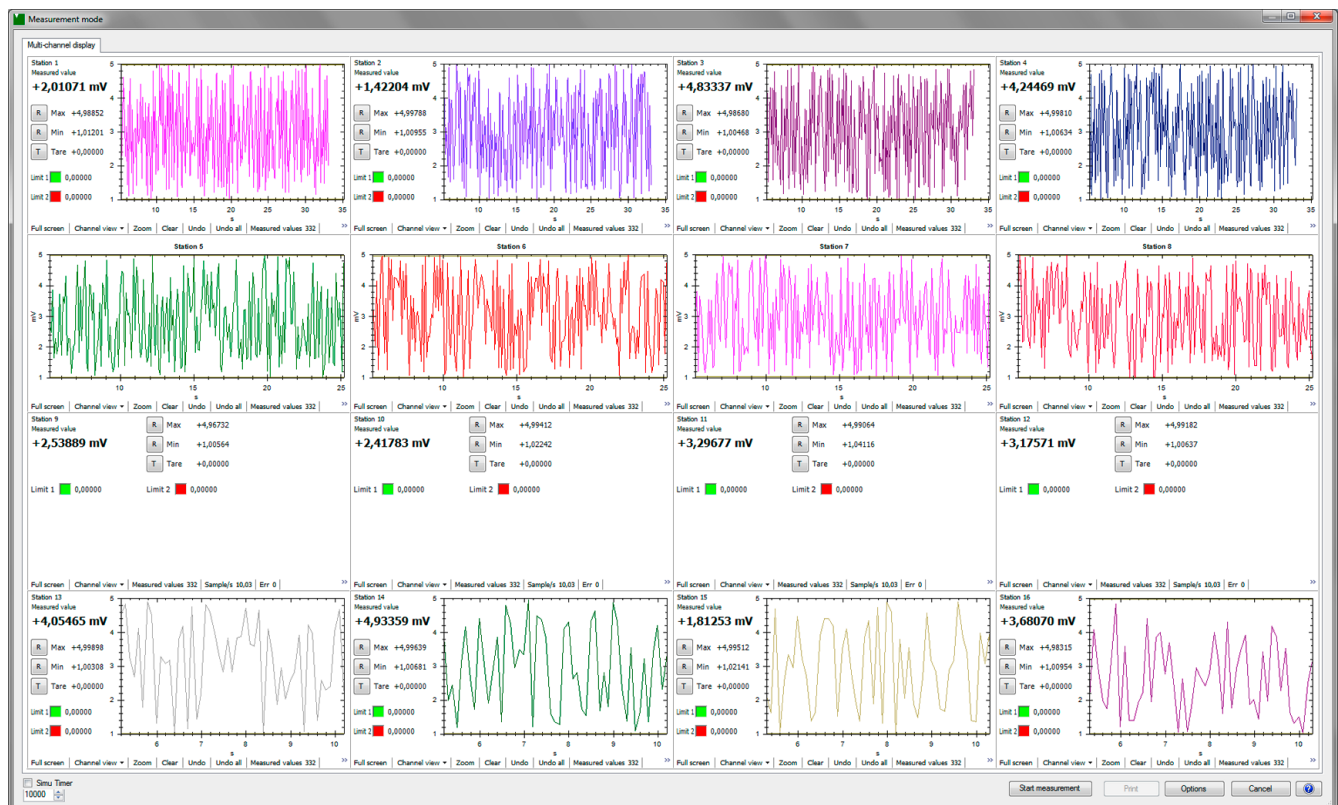
- Convenient device finder
- Instrument parameterization
- Instrument data adopted automatically, e.g. scaling, limit settings
- Back-up function for instrument data
- Simultaneous display of up to 16 measurement channels
- Different measurement rates can be combined
- Different triggers can be set: global or channel-specific
- Creation of instrument groups
- Report finder for locating group reports and individual reports
- Documenting individual measurement curves with various options e.g. serial number, batch counter, day counter
- Export function to Excel
- Communication with a controller unit (PLC etc.) via RS232 or Ethernet



Instrument parameterization



Managing several channels at once



Simultaneous display of up to 16 measurement channels different display options.

The measurement problem:

If the shaft of an electric motor is not circular, this will produce vibrations at high speeds and hence increased wear. Irregular bearing surfaces may be one cause of a shaft running out of true. A bent shaft or a shaft without strict dimensional tolerances could also be the cause.

The solution:

As part of the quality assurance process, the shaft is tested for true running, bow and concentricity of the bearing surfaces. The test also includes measuring the diameter of the shaft bearings.

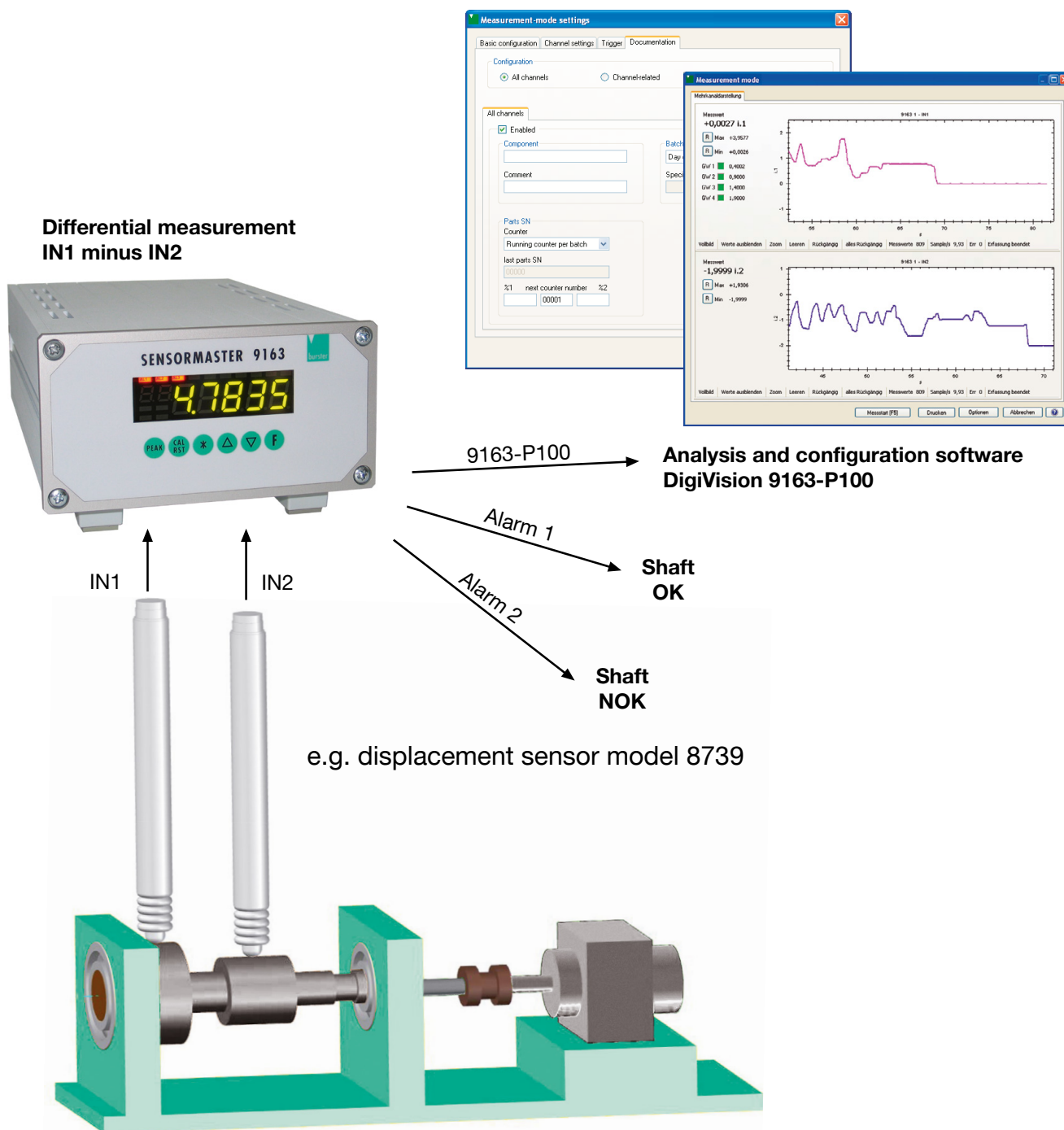
In the test, the shaft is clamped in a holder and turned by a motor while being measured by two position sensors. The instrument measures the difference between the signals from these two sensors; this difference is only allowed to vary within a specified tolerance band.

The 9163 performs the difference calculation and assesses the results.

As this process takes just a few seconds, both random sampling and 100% testing are possible.

If the shaft does not lie within the tolerance band, the 9163 outputs an alarm signal.

When used for testing random samples, the 9163 color display provides additional support by changing from green to red if the shaft lies out of tolerance. The operator thus knows immediately whether the shaft is OK.



Digital Display

For strain gauge units, potentiometers,
DC/DC sensors and standard signals

Model 9180

Code:	9180 EN
Delivery:	ex stock / 4 weeks
Warranty:	24 months



Desktop version

New !
Evaluation optional
via Ethernet

Application

Model 9180 supports force, pressure and torque sensors operating on the strain gauge principle, as well as the connection of position and angle sensors in potentiometer or DC/DC configuration. It also allows the measurement of process signals $\pm 1\text{ V} / 5\text{ V} / 10\text{ V}$ or $0 \dots 1\text{ mA}, 0(4) \dots 20\text{ mA}$. The current measured value is indicated on the 14 mm high LED main display, while a second display located directly below provides a reading of the peak value.

The display is particularly suitable for highly accurate measurements due to the high accuracy of 0.1%. It is also possible to monitor up to 4 limit values and provide the results via relay or transistor outputs. Thus the process value display can be used for classification, process and control tasks. The current measured value is frozen on the display by activating an external HOLD signal. The TARE function is useful for balancing out previous loads for example. The optional serial interface can be used to transfer measured values and perform device settings. Powerful PC software is available for this on request.



Panel-mounted version

- Up to 8 sensor parameters can be saved (optional)
- For force, pressure or torque measurements using strain gauge sensors
- For distance or angle measurements with potentiometer or DC/DC sensors
- Processing of standard signals $\pm 1\text{ V} / 10\text{ V} / 0 \dots 1\text{ mA}, 0(4) \dots 20\text{ mA}$
- Min. or max. peak values via an additional display
- TARE and HOLD function
- Generation of up to 4 limit signals (optional)
- RS232 or RS485 (optional)
- Analog output (optional)
- Measurement accuracy $< 0.1\%$
- Scaling possible using teach-in procedure or by entering sensor data directly
- Convenient configuration and evaluation software DigiVision

Description

State-of-the-art microprocessor technology has allowed the realization of numerous special functions for practical use. Menu guidance of device setup is standard. Self-explanatory abbreviations greatly facilitate this process so that even inexperienced users can manage without operating instructions. First, the user specifies the type of input signal or sensor. Strain gauge, potentiometer or process signals $0 \dots 1\text{ mA}, 4 \dots 20\text{ mA}$ or $\pm 1\text{ V}, \pm 10\text{ V}$ as well as DC/DC sensors can be selected. Then the calibration process is selected. Users can choose between teach-in or calibration depending on the sensor protocol. The decimal point can be moved as required. The sensor excitation stated in the technical specifications is set automatically upon selection of the sensor type except with process signals. A choice of three excitations is available for process signals. Complete electrical isolation of the measurement channel prevents measurement values from being falsified by ground loops.

Technical Data

Connectable sensors

Strain gauge

Connection system:	4 wire
Bridge resistance:	120 ... 1000 Ω
Bridge voltage:	15/ 30/ 60/ 300 mV, selection via menu
Sensor excitation:	10 V/ 120 mA, automatic 5 V/ 120 mA*

Potentiometer

Track resistance:	500 Ω ... 10 kΩ
Sensor excitation:	10 V/ 120 mA, automatic 5 V/ 120 mA*

Standard signals, DC/DC sensors and transmitters

Voltage input:	± 1 V/ ±10 V
Resolution:	0.1 mV respectively 1 mV
Input resistance:	1 MΩ

Current input:	0 ... 1 mA, 0 (4) ... 20 mA
Resolution:	1 μA
Load:	15 Ω

Transmitters and DC/DC sensors:	10 V/ 120 mA
Excitation:	24 V/ 30 mA 5 V/ 120 mA*

Transmitters can be connected in 2, 3 or 4 wire configuration.

*) if the jumper is set (default setting)

Standard functions

Peak-value memory

Minimum or maximum value on an auxiliary display, cancellation with RESET via keyboard or digital control input.

HOLD function

Freezing of the measured value on the main display.
Active: via ext. HOLD signal

TARE function

Balancing out an offset.
The balanced-out value can also be shown on the auxiliary display.
Active: via button or ext. TARE signal

Digital control inputs

RESET, HOLD, TARE, MIN/MAX (opto-electrically)
Active: 24 V
Resonse time ≤ 10 ms

General specifications

Accuracy

Resolution:	15 Bit
Measurement error:	0.1 % v. E. ± 3 digits
Temperature coefficient:	50 ppm/K
Warm-up period:	10 minutes

LED display

Main display:	- 99999 ... + 99999,	height 14 mm
Auxiliary display:	- 99999 ... + 99999,	height 8 mm
Decimal point:		programmable

Measurement rate

16/sec.

Environmental conditions

Operating temperature:	0 ... 50 °C
Relative humidity:	< 95 %
Protection class:	Front panel IP65

Dimensions/weight

Panel-mounted version:	
Dimensions (W x H x D):	96 x 48 x 120 mm
Installation depth incl. connector:	approx. 150 mm
Cut-out in front panel:	92 x 44 mm
Weight:	600 g
Housing material:	plastic

Desktop version:	Dimensions (W x H x D):	155 x 90 x 210 mm
	Weight:	1.2 kg
	Housing material:	metal/plastic

Electrical connection

Panel-mounted version:	snap-in plug connection
Desktop version:	12 pole jacks for plug 9941

Power supply

Desktop version:	115/230 ¹⁾ V AC, 50/60 Hz
Panel-mounted version:	115/230 ¹⁾ V AC, 50/60 Hz or 24/48 ¹⁾ V AC, 50/60 Hz
Power consumption:	5 VA without options 10 VA with all options

¹⁾Switch over by means of a jumper

Options

Digital set point alarm outputs

2 relay contacts	250 VAC/ 150 VDC/ 8 A, for 2 limiting values or
4 relay contacts	50 VAC/ DC/ 0.2 A, for 4 limiting values or
4 transistors	open C. switching n or open E. switching P, 50 V/ 50 mA for 4 limits each, opto-decoupled
Response time:	250 ... 750 ms, depending on the filter setting

Analog output

Ranges:	Voltage	0 ... 10 V
	Load	> 50 Ω
	Drift	0,2 mV/K
	or Current	4 ... 20 mA
	Load	< 800 Ω
	Drift	0,5 μA/K

(Selection between 0 ... 10 V and 4 ... 20 mA via the menu)

Resolution:	12 Bit
Potential separation to signal input	
Accuracy:	0.1 % F.S.
Signal response time:	60 ms

Serial interface

RS232 (V.24) or RS485 (half duplex)	
Baud rate:	1200 ... 19200
Data transmission rate:	10 values/sec. at 19200 baud
Networking via RS485 by means of a converter (model 9180-Z001)	

BCD interface

Level:	24 V/ TTL
	The BCD option excludes all other options.

The options analog output; RS232 or RS485 (only one) and 2 relays, 4 relays or 4 O.C. (only one); can be used simultaneously.

Calibration

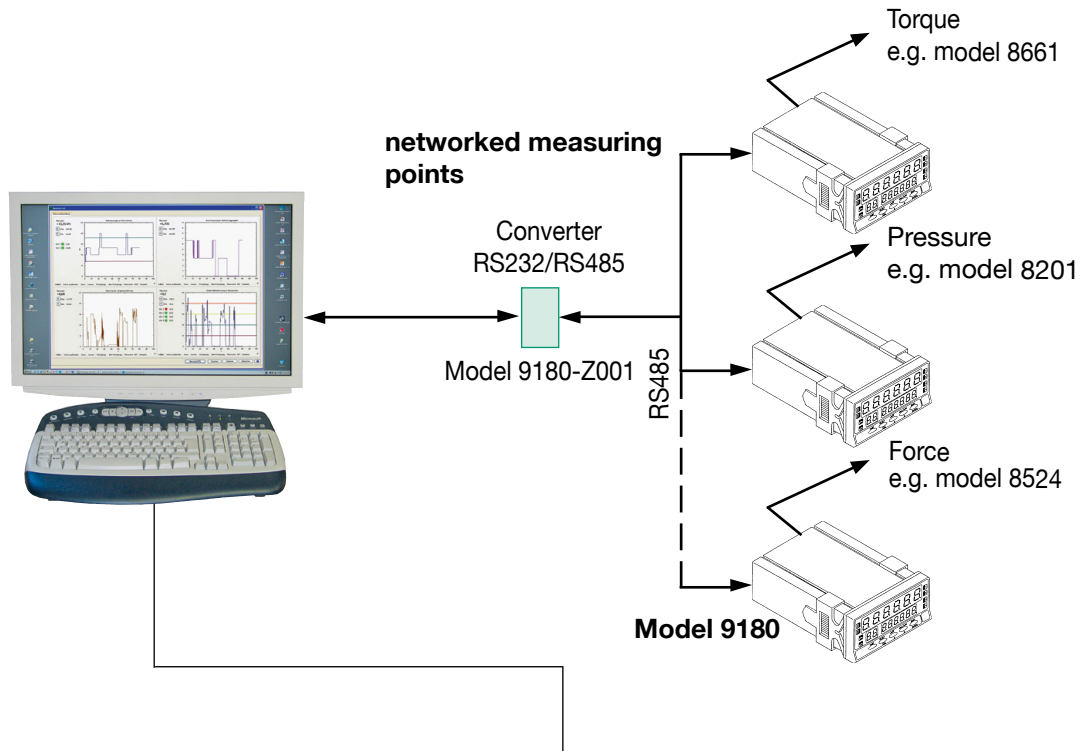
Two basic procedures are possible; in both cases, one display value is allocated to two input variables each (two-point calibration):

1. In the teach-in mode, the two input variables are applied physically as measurement signals to the input. These are assigned to the corresponding display values by pressing an enter key.
2. During calibration in accordance with the sensor protocol, the two signals are not applied physically, but read off from the sensor protocol and entered via the keyboard.

The CAD drawing (3D/2D) for this device can be imported online directly into your CAD system.

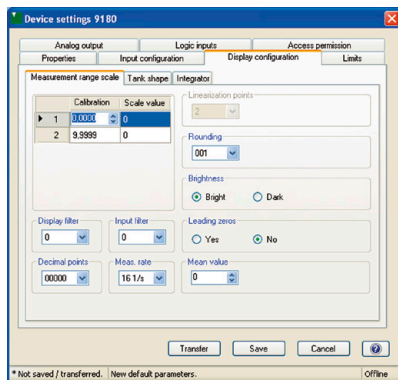
Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Measuring Data Acquisition and Evaluation



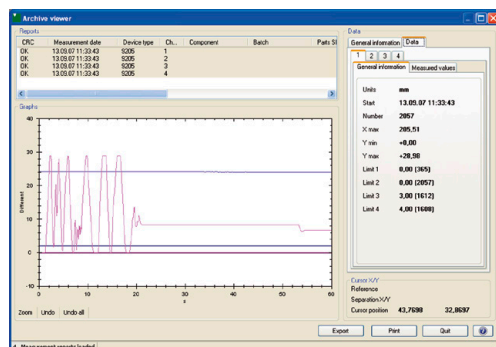
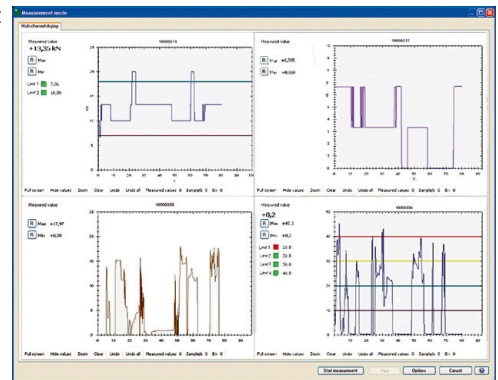
DigiVision 9180-P100 Configuration and Analysis Software

- Comfortable device finder
- Instrument parameterization
- Instrument data adopted automatically eg. scaling, limit settings
- Back-up function for instrument data
- Simultaneous display of up to 16 measurement channels
- Different measurement rates can be combined
- Different triggers can be set: global or channel-specific
- Creation of instrument groups
- Report finder for location group reports and individual reports
- Documenting individual measurement curves with various options e.g. serial number, batch counter, day counter
- Export function to Excel
- Communication with a controller unit (PLC, etc.) via RS232 or Ethernet



Parameterizing of devices

16 measurement channels



Archive viewer

Excel file

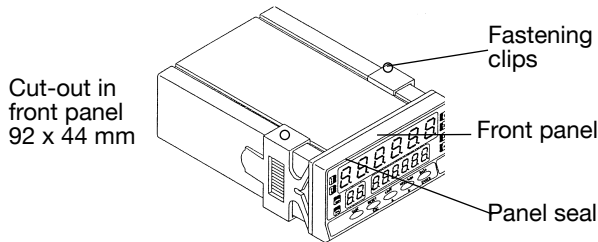
burster Excel-Measvalues		
Original measurement file	C:\Dokumente und Einstellungen\All Users\Dokumente\burster\Digivision	
Continuously file id	1	
Begin	13.09.2007 11:33:43	
Company	burster	
Tester	User	
Device caption	10000311	
Device-S/N	10000311	
Unit	mm	
Number of values	2057	
Counter	Time	Measurement value
1	0.002280	0.000
2	0.018680	0.000
3	0.118190	0.000
4	0.218000	0.000
5	0.318390	0.000
6	0.417880	0.000
7	0.518650	0.000
8	0.618250	0.000
9	0.717940	0.000
10	0.821640	0.000
11	0.917810	0.000
12	1.018540	0.000

9180 EN

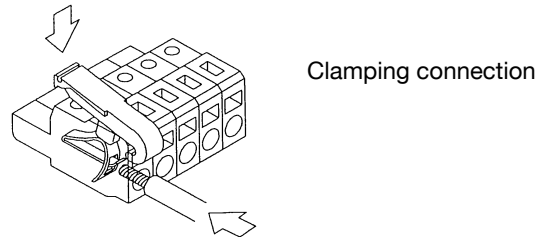
Displays and Operating Panel



Dimensions Mounting



Rear Connection

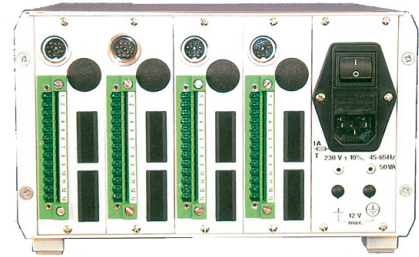


Multichannel Measurement Systems for any Numbers of Channels in Desktop Housing (please enquire)

Front view:
Up to 16 panel-meters in one common housing possible.



Back view:
All sockets for sensors, control signals and serial interfaces are completely installed.



Order Code

Digital indicator

Version model 9180 - V

8 sensor parameters

Options on extra charge:

Housing and power supply

Panel-mounted version 115/230V-50/60 Hz-0

Panel-mounted version 24/48V-50/60 Hz-1

Desktop version 115/230V-50/60 Hz-3

Desktop version 24/48V-50/60 Hz-6

Analog output

without _____ 0

0 ... 10 V / 4 ... 20 mA _____ 1

Interface

without _____ 0

RS232 _____ 1

RS485 _____ 2

BCD¹⁾ _____ 3

Set point alarm outputs

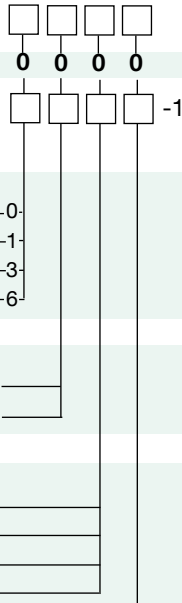
without _____ 0

2 relays _____ 1

4 relays _____ 2

4 transistor open C. n-switched _____ 3

4 transistor open E. p-switched _____ 4



Accessories

Instrument calibration for one sensor ordered with the instrument or using sensor data provided by the customer (e.g. sensitivity, display range of correct reading, excitation voltage or sensor test certificate) (Please specify the calibration data precisely!) **Model 91ABG**

If calibration data not communicated, it will be calibrated as standard sensor-specified.

Strain gauge simulator

See data sheet 76-9405 in section 7 of the Sensors and Process Instruments catalog.



Model 9405

DigiVision 9180-P100 configuration and analysis software for device series 9180

Enables an easy storage of device data, graphical visualization, storage and logging of measurement data **Model 9180-P100**

Converter RS232/RS485

Cartridge with RS485 applications for maximum 32 participants mains adapter included **Model 9180-Z001**

Indicator for angle, pulses or rotation

on request

Data cable

for connection of desktop version and PC **Model 9900-K333**
for connection of panel version and PC **Model 9180-K001**
Interface adapter USB-RS232 **Model 9900-K361**
Networking via RS232 requires Ethernet **Model 9900-K453**

¹⁾ - Important! The BCD option does not allow any additional options (limiting value or analog output) and is not available as desktop version either.

DIGILOW

Digital indicator for strain gauge sensors

Model 9186

Code:	9186 EN
Delivery:	ex stock
Warranty:	24 months



Desktop version



Panel-mounted version

- Less expensive digital display
- For force, pressure or torque measurements using gauge sensors
- Two limit alarms optionally available
- Extremely easy-to-read display with 20 mm digit height
- Display range -1999 to + 9999
- TARE function
- Scaling possible using teach-in procedure or by entering sensor data directly

Application

The DIGILOW digital display can be used with strain gauge sensors measuring force, pressure or torque.

The range of functions has been limited deliberately to ensure operation is simple and self-explanatory. With its unique, large and clear digit height of 20 mm, the digital display can be installed easily in process control panels and control cabinets. Thanks to the large choice of measurement signals that can be indicated, the display is ideal for use in a huge range of industry-based applications.

As a simple and compact digital display, it can also be used as a multi-channel solution in laboratory or test systems, where several different measurements may need to be taken and displayed simultaneously.

The front panel TARE function for the strain gauge sensor input makes it easy to zero the display for processes where an initial load may be applied (containers' own weight, pre-tensioning of sensor by tool adaptation and so on).

Production-oriented evaluation and control functions can be implemented using the limit generation option.

Description

The production of this excellent value digital display was possible by employing state-of-the-art microprocessor technology and keeping the complexity of the internal design to a minimum. The simple menu-driven instrument setup procedure with self-explanatory mnemonics ensures that even the novice can use the unit immediately without an operating manual. First, the user specifies the type of input signal or sensor. Then the user can select the relevant calibration procedure by either applying an input measurement or through teach-in (calibration taken from sensor documentation). The position of the decimal point can be set to suit, while the sensor supply voltage can be hardware-set to 5 VDC (default) or 10 VDC. There is also the option to use a digital low-pass filter to correct any display flicker caused by the particular application.

Technical Data

Connectable sensors

Strain gauge

Connection system:	4 wire
Bridge resistance:	120 Ω ... 1000 Ω
Bridge voltage:	30 mV / 300 mV / selection via menu
Sensor excitation:	5 VDC / 30 mA 10 VDC / 30 mA

Standard functions

TARE Balancing-out an offset

Digital control input (9186-x1xx) TARE

General specifications

Accuracy

Resolution:	16 bit
Measurement error:	0.1 % v. E. ± 4 digits
Temperature coefficient:	100 ppm/K
Warm-up period:	10 minutes

Display

Display:	- 1999 ... + 9999, height 20 mm
Display timing:	250 ms

Measurement range 25/sec.

Environmental conditions

Operating temperature:	- 10 ... + 60 °C
Relative humidity:	95 % at 40 °C
Protection class:	Front panel IP65

Dimensions and weight

Panel-mounted version	
Dimensions (W x H x D):	96 x 48 x 60 [mm]
Installation depth with connector:	approx. 90 mm
Cut-out front panel:	92 x 44 [mm]
Weight:	250 g
Housing material:	plastic
Desktop version	
Dimensions (W x H x D):	130 x 70 x 150 [mm]
Weight:	250 g
Housing material:	Plastic

The CAD drawing (3D/2D) for this device can be imported online directly into your CAD system.

Download via www.burster.com or directly at www.traceparts.com. For further information about the burster traceparts cooperation refer to data sheet 80-CAD-EN.

Electrical connection

Panel-mounted version:	Snap-in plug connection
Desktop version:	12 pole jacks for plug 9941

Power supply

Panel-mounted version:	20-265 VAC 50-60 Hz/VDC
Desktop version:	20-265 VAC 50-60 Hz/VDC
Power consumption:	3 VA

Options

Digital set point alarm outputs

2 relay contacts:	250 VAC / 150 VAC / 8 A, for 2 set points
Response time:	≤ 10 ms (typ.)

Accessories

Strain gauge simulator



Model 9405

See data sheet 76-9405 in section 7 of the Sensors and Process Instruments catalog.

Calibration

91ABG

Two models are available. Two input values are put in relation to one display value each for both methods (two point calibration).

With the teach-in method the two input values are put physically and in sequence on the measurement signal. The corresponding display values are assigned via buttons.

With the calibration acc. to sensor protocol the two signals are not measured but taken from the protocol and entered via buttons. A mix of both methods, i.e. the measurement of the zero point and entering of the end value is also supported.

If no customer data is given, a sensor specific standard adjustment is made.

Order Information

DIGILOW

Model 9186-V

Basic version

0 1 0 0

Housing and excitation

Panel-mounted version	0
Desktop version	3

Set points alarm output

without	0
2 relay	1

Digital Displays for Incremental Position Sensor

Series 9140

Code: 9140 EN
 Delivery: ex stock/4 weeks
 Warranty: 24 months



- Display resolution from -999999 ... 999999
- Resolution to 0.1 μm
- Peak value memory for min, max and peak-to-peak
- Classifier comparator
- Up to 2 measuring channels
- RS232 interface
- Mathematical functions

Application

The incremental digital displays are used in combination with our high-precision displacement sensors 8738. The digital technology of these measuring systems satisfies high demands for precision and long service life, as is required more and more nowadays

- ▶ in measuring laboratories
 - ▶ in production
 - ▶ in testing laboratories
 - ▶ in workshops
- and many other areas.

Typical uses:

- ▶ Automatic assembly machines
- ▶ Semiconductor industry
- ▶ Keyboard tests
- ▶ Robot controllers
- ▶ Testing of shafts and planes
- ▶ Measurement of differential displacement

Description

With its phenomenal resolution of 0.1 μm and the high response frequency of 20 MHz, the 9140 is a powerful display unit with a compact design. The comparator function integrated as standard allows for direct evaluation of measurements almost in real-time; these can be processed further by a higher-level controller. A rather more comprehensive acquisition method is also integrated into the system. Device settings can be made either through the keypad on the front, or through the optionally available serial interface.

The two-channel version also offers simple mathematical functions such as addition and subtraction. These are particularly handy for differential displacement measurements.

Technical Data

Display resolution:	± 999 999		
Resolution:	0.1 µm, 0.5 µm, 1 µm, 5 µm, 10 µm selectable		
Cut-off frequency:	20 MHz		
Power supply:	10.8 ... 26.4 VDC, max. 12 VA		
Working temperature range:	0 °C ... 40 °C		
Range of storage temperature:	10 °C ... 50 °C		
Dimensions:			
Panel meter (W x H x D)	Front plate	72 x 72 x 104.5 [mm]	
	cut-out	68 ^{+0,4} ₊₁ x 68 ^{+0,4} ₊₁ [mm]	
	Radius, corners of cut-out	4 R1 or less	

Functions

Reset (via reset button, control input or RS232C command):
The display is returned to zero or to a previously entered initial value.

Initial value:
Any desired display value can be assigned to any point in the range of measurement.

Comparator:
2 limit values for good/bad evaluation, results displayed by 3 LEDs, 3 NPN open collector outputs.

Extreme values:
Maximum value, minimum value, peak-to-peak value, start via reset button or RS232C command.

Hold function:
The START control input will store the current measured value in the "extreme value storage" mode.

Sum/difference:
The functions A + B, A - B and B - A can be executed by the 2 channel version.

Data transfer:
Started by a low level at the EXT.IN control input.

Serial interface RS232C, full duplex:

Baud rate:	600 ... 19200
Interface cables:	see accessories
Transmission rate	max. 10 measurements/s

Order Code

Displacement indicator	9140 - V	0	0	0	0
Standard					
Sensor model	8738-DK 8738-DG	0 1			
Interface	without with RS232 with BCD output		0 1 2		
Device type	1 channel 2 channel			0 1	

Accessories

Interface cable, length 2 m, with 9 pole Sub D socket
Model 9140-K001

Adjustment,
for a measurement chain
Model 91ABG



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burster praezisionsmesstechnik gmbh & co kg

Talstraße 1-5
76593 Gernsbach, GERMANY
Phone: +49-7224-645-0
Email: info@burster.com

www.burster.com