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 changes reserved. All data sheets at www.burster.com

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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

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
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 ... 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 □ □ □ □ □

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.

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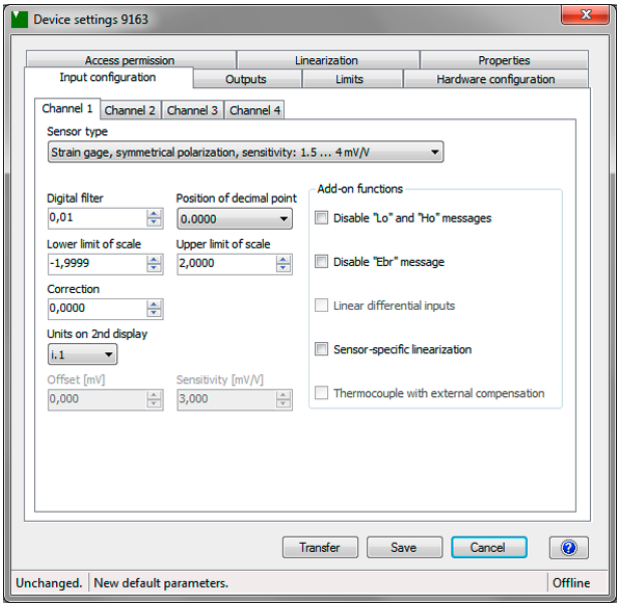
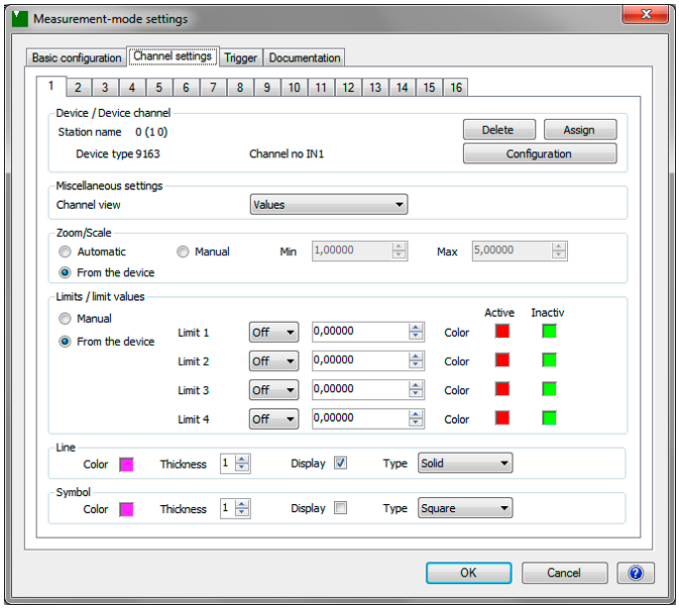
DigiVision 9163-P100 Configuration and Analysis Software

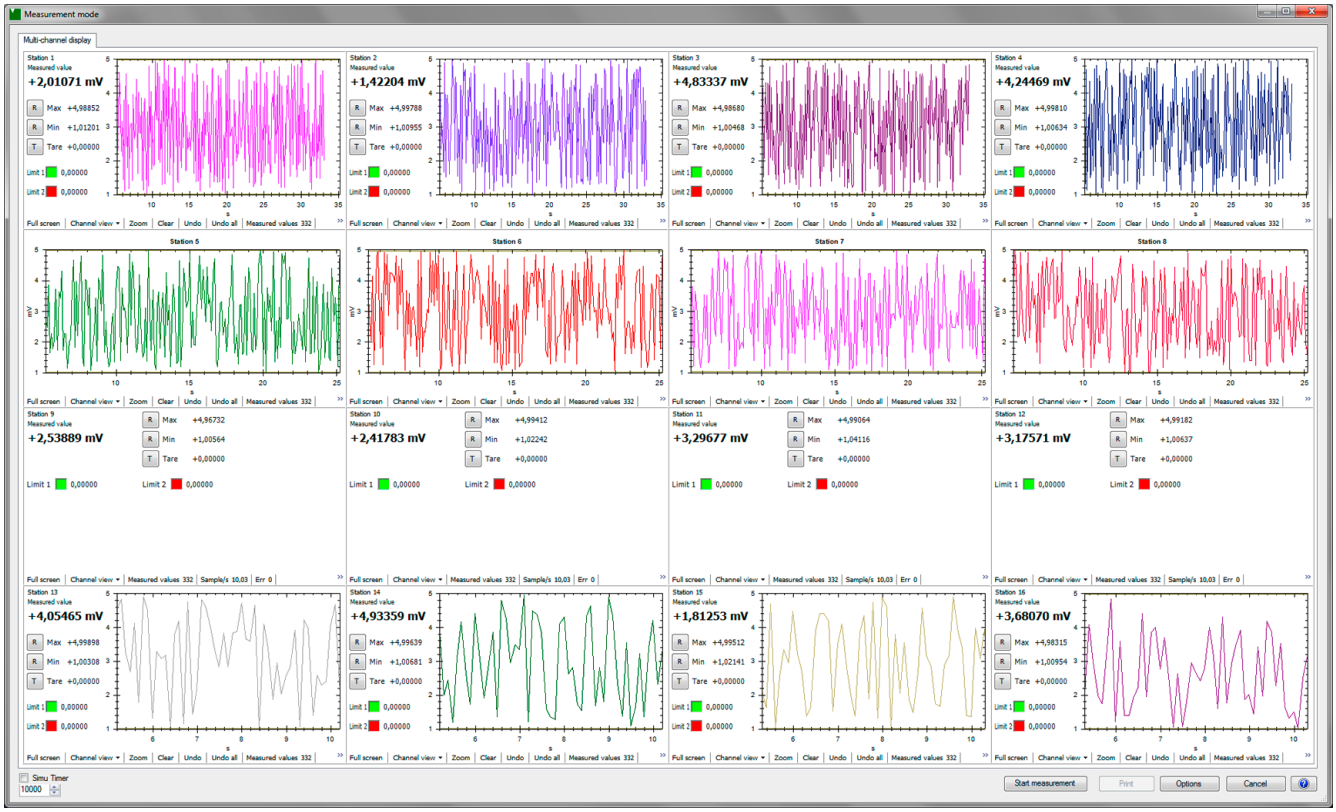
- Convenient device finder
- Instrument parameterization
- Instrument data adopted automatically, e.g. scaling, limit settings
- Back-up function for instrument data
- Simultaneous display of up to 16 measurement channels
- Different measurement rates can be combined
- Different triggers can be set: 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.

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The measurement problem:

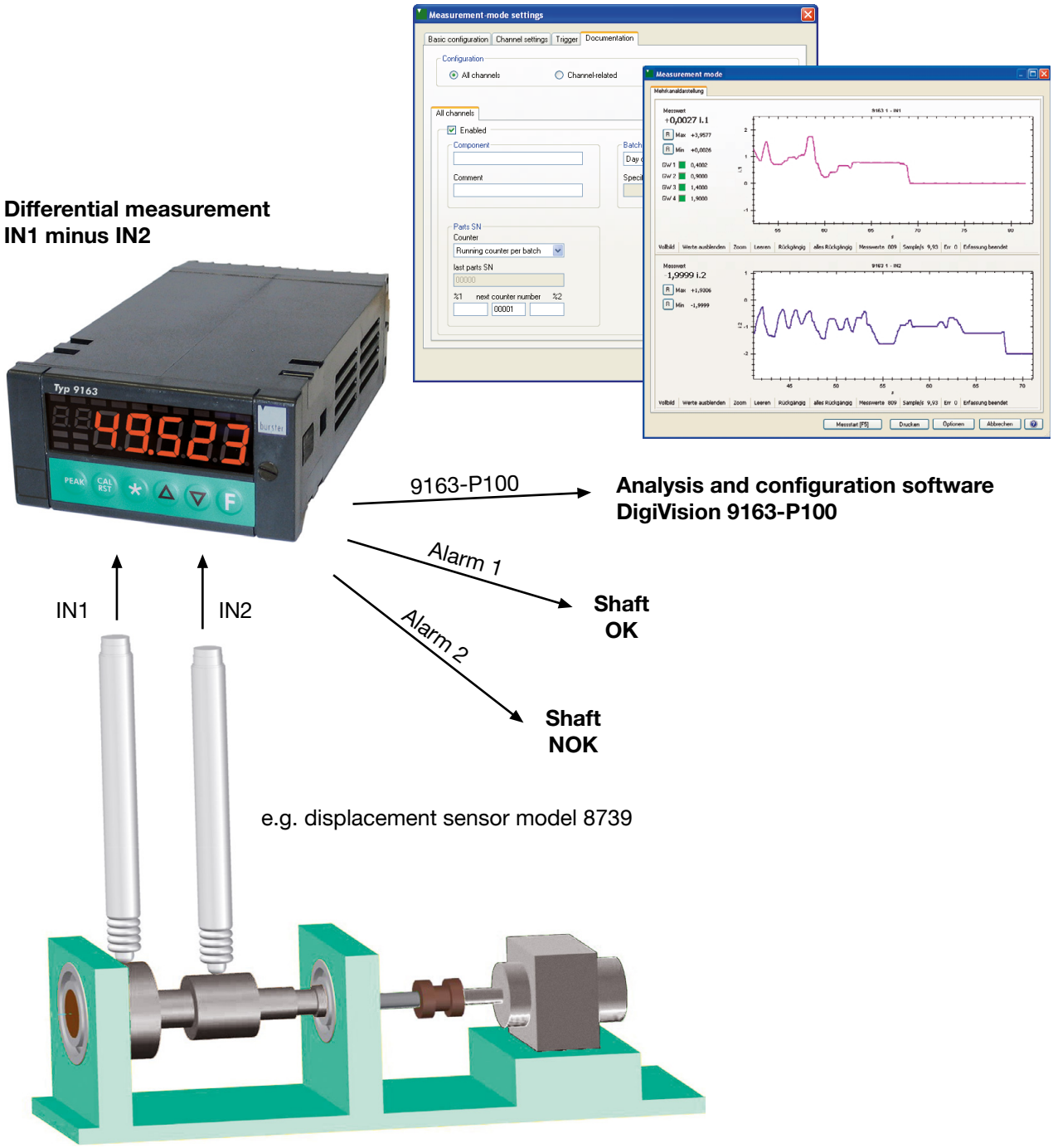
If the shaft of an electric motor is not circular, this will produce vibrations at high speeds and hence increased wear.

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.