

Switch Testing Device DIGISWITCH

For production and laboratory

Model 5410

Code: 5410 EN
 Delivery: ex stock
 Warranty: 24 months



- Capture and evaluation of switch point, reverse switch point, actuator movement and difference movement acc. DIN 41635
- Haptic testing on switch elements
- Testing of up to 5 switches per second
- 32 different switch types in 32 measurement programs
- Connection of strain gauge or piezo-electric load cells and all kinds of displacement sensors
- Control signals for e.g. Start/Stop and limit force switch-off
- RS232 and PLC interface
- Profibus DP (option)

Application

The switch testing device DIGISWITCH model 5410 was developed especially for the testing of switches and buttons acc. to DIN 41635 resp. DIN 41636. With the simultaneous capture of force, displacement and switch point, the complete switch characteristic can be displayed and evaluated on the 120 x 88 [mm] LCD.

With a sample rate of up to 5 work pieces per second the device is well suitable for online testing in production. Nevertheless, also in the laboratory or at simpler manual work places the device can be of great assistance for spot-checks.

Next to the PLC output switches OK/NOK the various measurement values as well as the complete measuring curve can be transferred to a PC via the RS232 interface. Fast work piece changes with varying switch characteristics are not a problem for DIGISWITCH. The 32 work piece related parameter sets can be selected via PLC or the device's menu.

Together with the PC software one can save even more data sets. Furthermore, it serves to protocol the measurement results, to up- and download the complete device settings, etc.

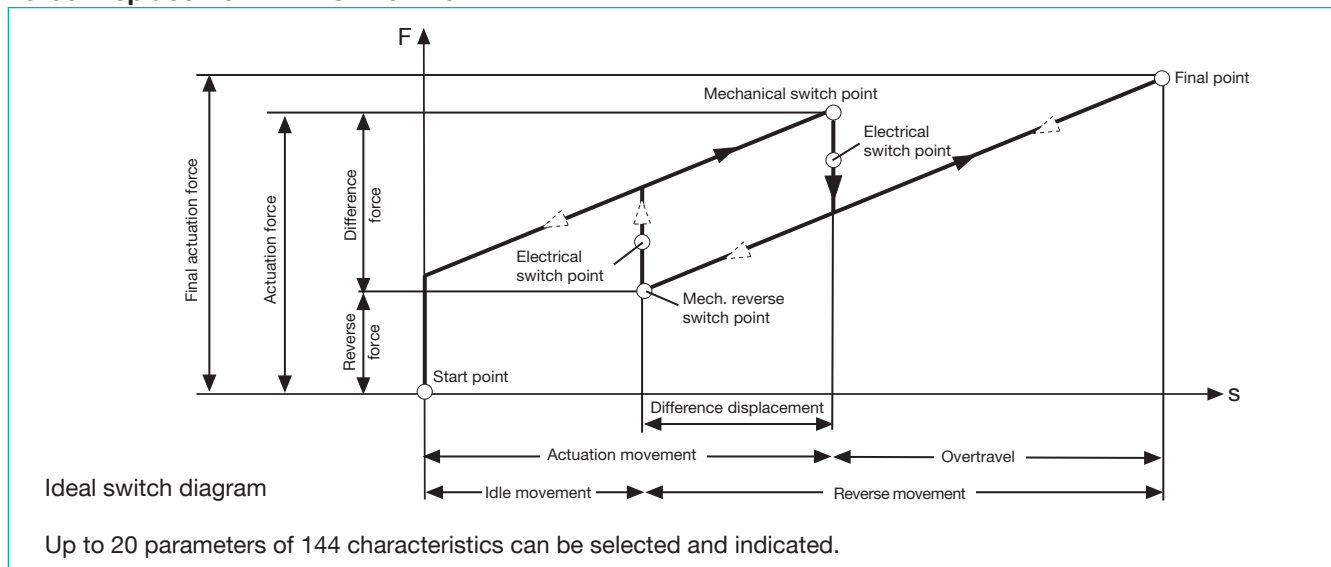
Description

The complete switch characteristic is recorded and evaluated with the help of specific attributes such as actuation force, reverse force, difference force, difference movement. Next to the mechanical values the electrical switch point is also captured. In order to do so, a window is set at the striking position. If the measuring values lie beyond the preset limit value within this window, the window is evaluated as NOK. In an additional field on the LCD the evaluation of every window is displayed next to the graphic. Only if all preset limit values are in accordance, the switch is evaluated as an OK part which is also transmitted to the PLC with an OK signal. The capture of the switch characteristics with evaluation is effected optimally within 200 ms.

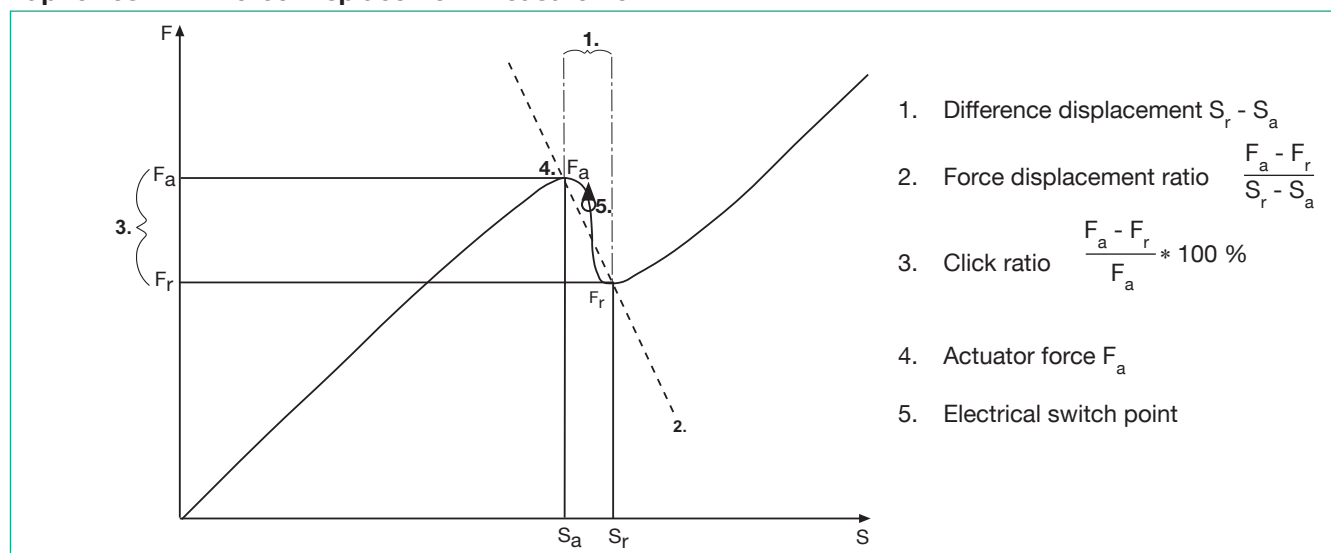
In case of a defect on the sensor the limit force switch-off is effected with a reaction time of approx. 2 ms.

A complete switch test installation can be configured, consisting of DIGISWITCH model 5410 together with linear positioning actuator model 5490-Z001 and a load cell.

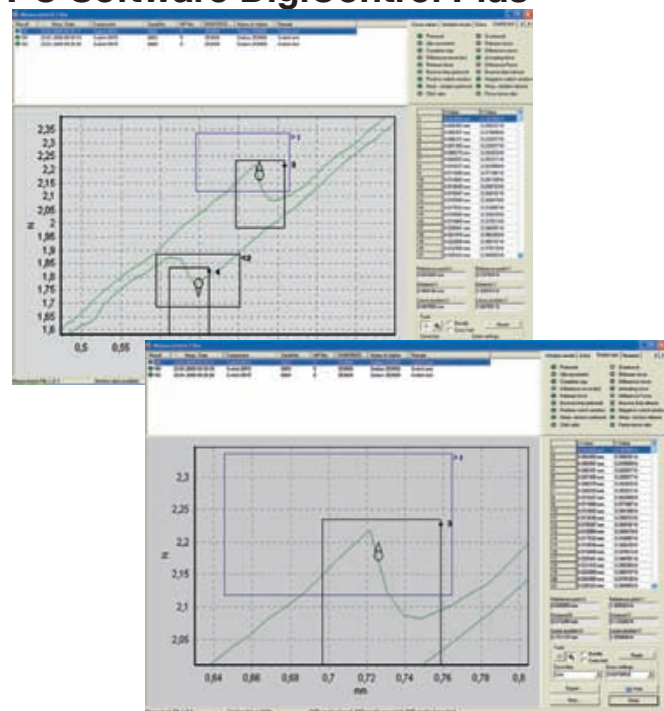
Force Displacement with Switch Point



Haptic Test with Force Displacement Measurement



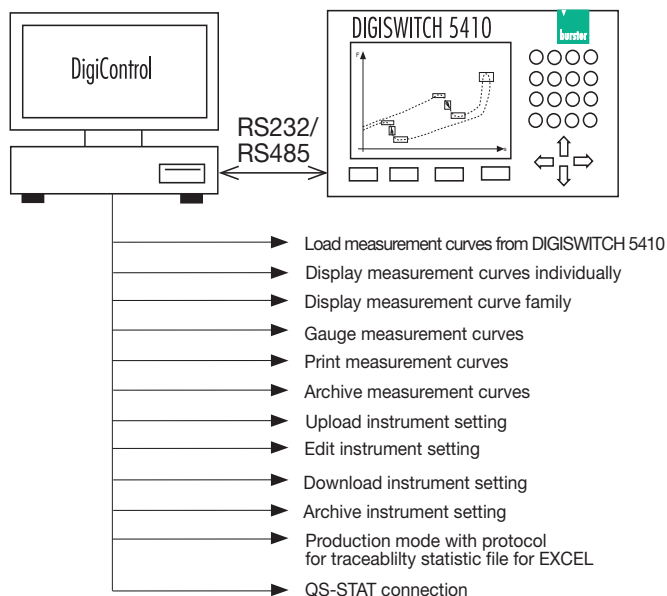
PC Software DigiControl Plus



Display of the force displacement diagram and switch point with magnifier function.

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DIGISWITCH 5410 is a self-contained device and can be operated without any external tools. However, the PC program DigiControl (model no. 9306-P100), obtainable as an accessory, offers a number of practical tools:



Sensors for Force Measurement

Strain gauges

Parameters:	$\pm 0.2 \dots 25 \text{ mV/V}$
Bridge resistance:	$100 \Omega \dots 5 \text{ k}\Omega$
Excitation voltage:	2.5 V or 5 V
Current:	25 mA
Type:	2 excitation lines, 2 sense lines
Cut-off frequency in steps:	$5 \text{ Hz} \dots 5 \text{ kHz}$ selectable
Cumulative error:	$< 0.1 \%$

Piezo sensors

Measured range:	$\pm 1 \text{ nC} \dots \pm 500 \text{ nC}$
Cut-off frequency in steps:	$5 \text{ Hz} \dots 5 \text{ kHz}$ selectable
Cumulative error:	$< 1 \%$

Process signals

Signal range:	$\pm 5 \text{ V}, \pm 10 \text{ V}$
Cut-off frequency in steps:	$5 \text{ Hz} \dots 5 \text{ kHz}$ selectable
Cumulative:	$< 0.1 \%$

Sensors for Displacement Measurement

Potentiometers, DC/DC sensors, process signals

Signal range:	$\pm 5 \text{ V}, \pm 10 \text{ V}$
Supply voltage:	$5 / 10 \text{ V}$
Current:	approx. 100 mA max.
Cut-off frequency:	approx. 5 kHz (-3 dB)
Cumulative:	$< 0.1 \%$

Incremental sensors

You can connect sensors with or without reference markers, whose coding consists of pulse strings phase-displaced by 90 degrees.

Sinusoidal current output

Signal:	$7 \dots 16 \mu\text{A}_{\text{ss}}$
Excitation voltage:	$+ 5 \text{ V}, 150 \text{ mA}, -5 \text{ V}, 150 \text{ mA}$
Cut-off frequency:	max. 50 kHz
Counting resolution:	16 bit
Interpolation:	four times

Using a TTL-channel

Signal:	5 V
Supply voltage:	$+ 5 \text{ V}, 150 \text{ mA}, -5 \text{ V}, 150 \text{ mA}$
Moving load:	open
Cut-off frequency:	max. 100 kHz
Counting resolution:	16 bit
Interpolation:	four times

General Technical Data

Voltage on the switch:	$10 \dots 15 \text{ V}$ or ext.
Current over the switch:	$10 \dots 100 \text{ mA}$ or ext.
Scanning rate max. at $y = f(x)$:	$8\,000$ value pairs/s
Scanning rate at $y = f(t)$, selectable:	$500 \mu\text{s} \dots 6.5 \text{ s}$
Digitalization:	12 bit ($11 \text{ bit} + \text{sign bit}$)
Memory:	$8\,000$ pairs for measurement curve
Computing time:	$40 - 110 \text{ ms}$
Delay of the limit outputs S1 ... S4:	$2 - 10 \text{ ms}$
PLC interface:	all in- and outputs are opto-decoupled ext. DC supply $20 \text{ V} \dots 24 \text{ V} \dots 30 \text{ V}$ necessary positive logic with consuming current PLC input (negative logic option)
RS232/485 interface:	9 pin SubMin D socket Baud rate $300 \dots 57400$ Protocol ANSI X.3.28 1976 Subcategory 2-1, A3 SCPI commands, version 1995.0

Profibus

Data transfer rate:	$9.6 \text{ kBaud} \dots 12 \text{ MBaud}$
Address range:	$0 \dots 126$
Bus connection:	9 pin SubMin D socket
Range of operating temperature:	$+ 5 \dots + 23 \dots + 50 \text{ }^\circ\text{C}$
Range of storage temperature:	$0 \dots + 60 \text{ }^\circ\text{C}$
Power supply:	$230 \text{ V AC} / 25 \text{ VA}$ or $115 \text{ V AC} / 25 \text{ VA}$

Housing

Desktop housing	Protection class:	IP 40
	Dimensions [W x H x D]:	$235 \times 133 \times 255 \text{ [mm]}$

Display

Dimensions:	$120 \times 88 \text{ [mm]}$
Pixel:	320×240

Measuring Functions

F = f(s)

A variable F is computed and evaluated as a function of the variable s. A selectable s-interval determines the input of F/s coordinates. The advantage: Input only occurs when the s-variables change.

F = f(s, t)

A variable F is computed and evaluated as a function of the variable s. A selectable time interval determines the input of F/s coordinates.

Switch point

The F/s coordinates of the electric switch point are computed and evaluated.

Order Code

DIGISWITCH with RS232/485

Model 5410-V0000

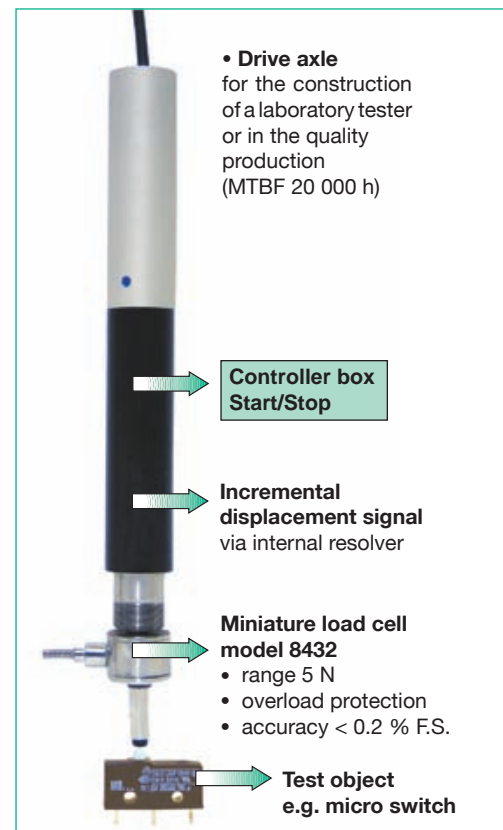
DIGISWITCH with Profibus DP
(RS232 is included)

Model 5410-V0002

Accessories

Linear positioning actuator

Travel range:	max. 50 mm
Force:	max. 50 N
Velocity programmable:	$< 30 \text{ mm/s}$ an operational profile may be stored
Resolution of displacement sensor:	$0.5 \mu\text{m}$
MTBF:	$20\,000$ hours
Dimensions:	length 196 mm , diameter 27 mm
Weight:	approx. 650 g



• **Drive axle**
for the construction
of a laboratory tester
or in the quality
production
(MTBF 20 000 h)

Controller box
Start/Stop

Incremental
displacement signal
via internal resolver

Miniature load cell
model 8432
• range 5 N
• overload protection
• accuracy $< 0.2 \%$ F.S.

Test object
e.g. micro switch

Actuator with controller electronic

Model 5490-Z001

USB interface cable

Model 9900-K350

19" rack mount kit

Model 9305-Z003

Test box for PLC simulation

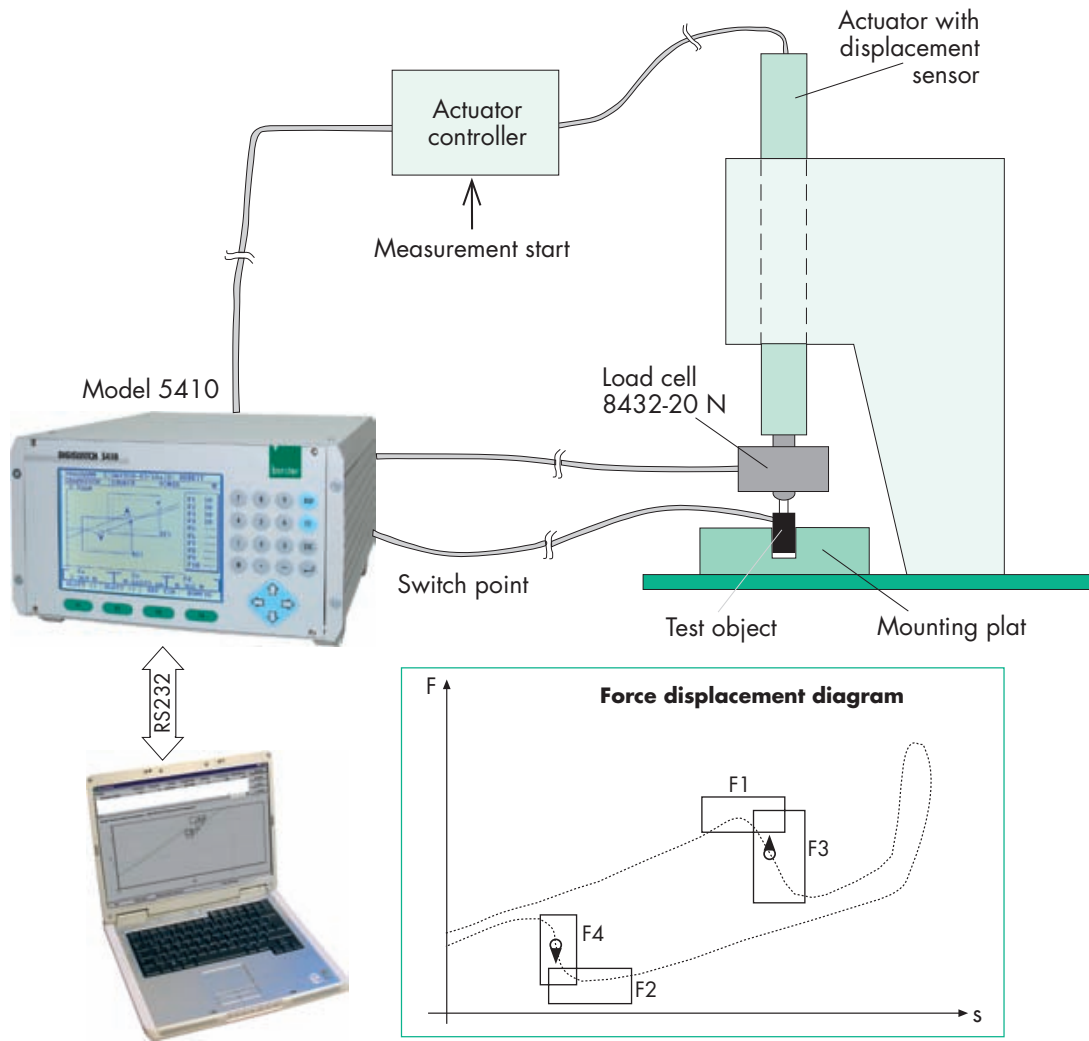
Model 9306-Box

PC software DigiControl Plus

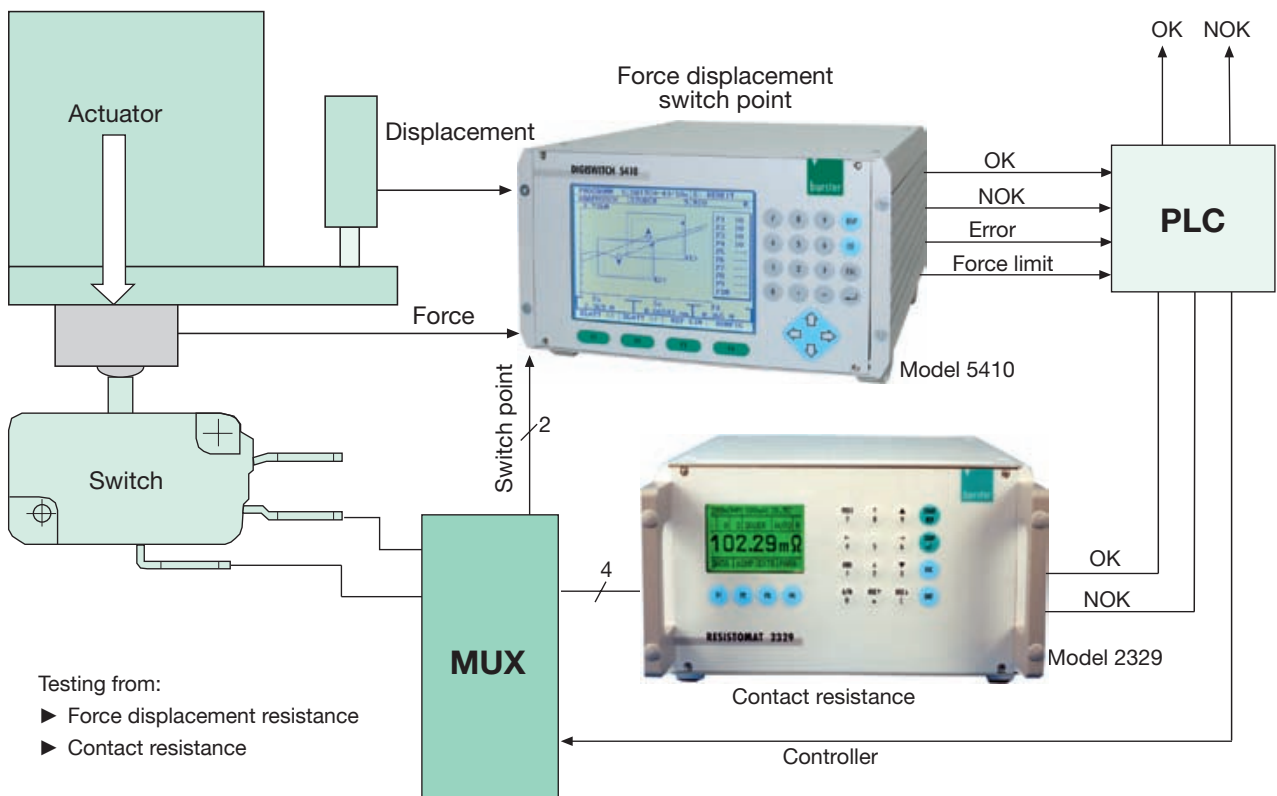
Model 9306-P100

Application

Classic micro switch test with DIGISWITCH 5410



Automated switch test in production



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