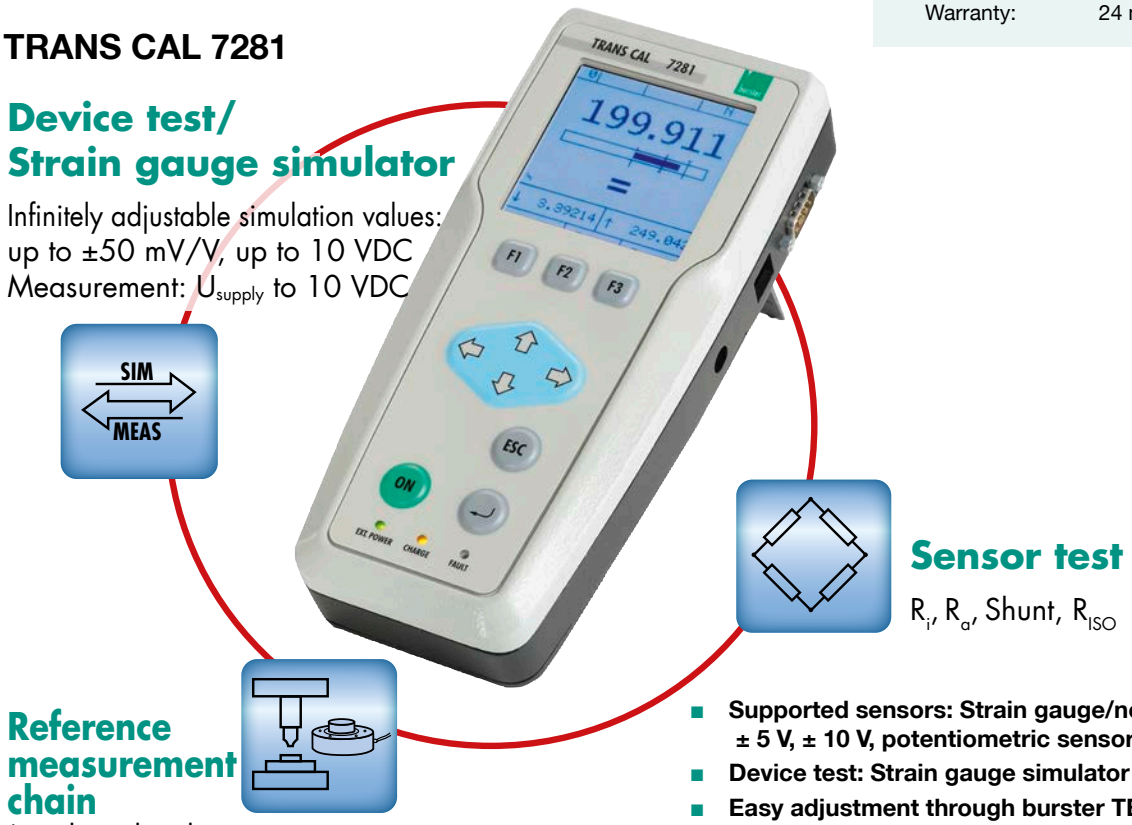
Mobile High-Precision Calibrator and Testing Device

For mechanical and electrical measurements

Code:	7281 EN
Delivery:	ex stock
Warranty:	24 months

TRANS CAL 7281



Device test/ Strain gauge simulator

Infinitely adjustable simulation values:
up to ±50 mV/V, up to 10 VDC
Measurement: U_{supply} to 10 VDC

Sensor test

R_i, R_a, Shunt, R_{ISO}

Reference measurement chain
(combined with a reference sensor)

7281 EN

- **Supported sensors: Strain gauge/normalized signal ± 5 V, ± 10 V, potentiometric sensors**
- **Device test: Strain gauge simulator up to ± 50 mV/V**
- **Easy adjustment through burster TEDS**
- **Excellent linearity with non-linearity < ± 0.001 %**
- **Storage of up to 16 measurement programs**
- **Data logger for up to 30,000 measurements**
- **Factory calibration certificate and/or German accredited DAkkS calibration certificate optionally available for the instrument / entire measurement chain**

NEW burster TEDS

Application

The multipurpose digital indicator TRANS CAL 7281 can be used wherever there is a need to perform high-precision, on-site calibrations of sensing components used in equipment such as presses, torque tools or pressure-regulating systems. An optional factory calibration certificate or German-accredited DAkkS calibration certificate can be provided when the measurement device needs to be used as a reference. This provides a quick and cost-effective way of assessing a system with traceable documentation of measurement results.
If a reference measurement cannot be made because the sensor location is difficult to access, it is still possible to test the zero point, the input, output and isolation resistance as well as the calibrating offset of the fitted sensor. It is also possible to check the indicating device by measuring the excitation voltage and simulating the characteristic values (mV/V or V) of the sensor used.
The instrument is used in metrology institutes, calibration laboratories and in industry in the fields of quality assurance, facility commissioning and system monitoring.

Areas of use:

- ► Checking hydraulic presses
- ► Reference measurements in assembly lines
- ► Test of robotic pressing forces
- ► Calibrating test equipment
- ► Calibrating of high-precision measuring devices

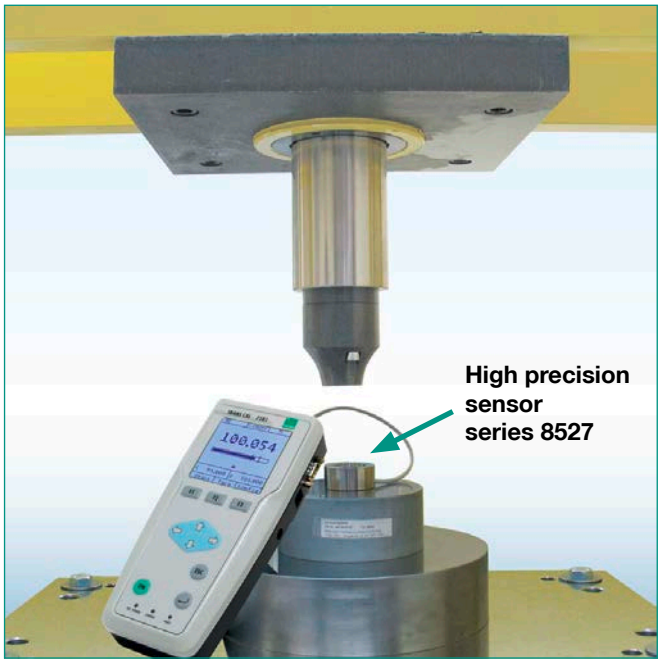
Description

The TRANS CAL 7281 can be fitted with standard or rechargeable batteries for portable use or can run from an external power supply. Combined with a reference sensor the testing device provides a high-precision reference measurement chain e.g. for force measurements, but is also ideal for service engineers as a tool for locating faults in devices or sensors.
The choice of sensors includes strain gauge, normalized-signal ± 5 V / ± 10 V and potentiometric sensors. The LCD graphics display shows the live measurement value and the corresponding bar indicator. It also supports display functions such as data-logger, tared value in % and upper/lower limit for the comparator with simultaneous indicator (< = >) of the evaluation result.
For routine testing and also fault-locating tasks, the tester makes it really simple to measure isolation resistances and input/output resistances. The equipment test function is a quick and easy way to verify that the display device complies with the characteristic value, offering strain-gauge simulation of up to ± 50 mV/V or output of a normalized signal of up to 10 V. German-accredited DAkkS calibration certificates or factory calibration certificates are optionally available. The DigiCal configuration and data-acquisition software provides useful display and reporting functions

MTS **Messtechnik Schaffhausen GmbH**
Mühlenstrasse 4, CH-8260 Stein am Rhein, Telefon +41 52-672 50 00, Telefax +41 52-672 50 01, www.mts.ch, e-mail: info@mts.ch
Messen Prüfen Automatisieren www.mts.ch

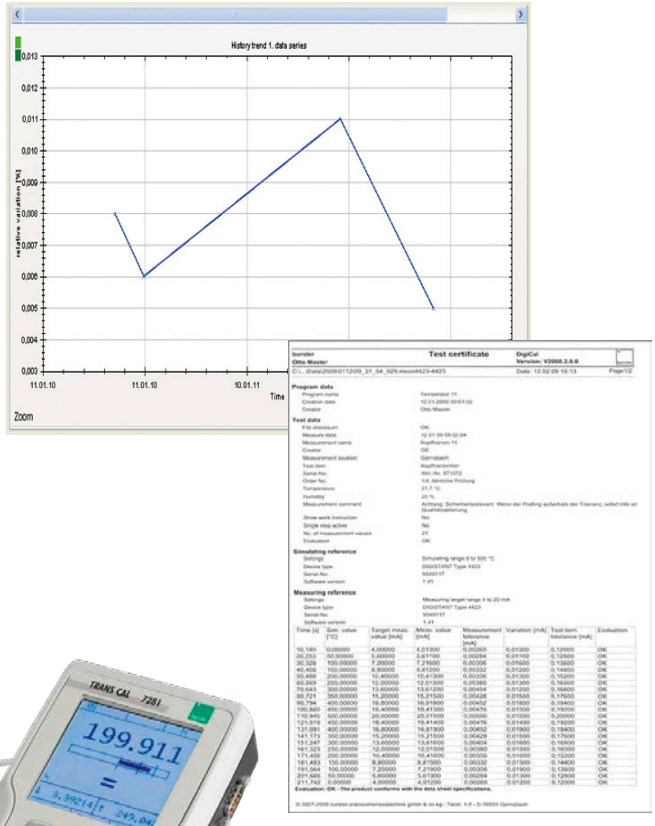
Precision force check of electrical, mechanical or hydraulic presses

- Maximum precise and traceability even under on-site conditions
- Designed for industrial use also in harsh environments (excellent display backlighting, rugged case, battery-supplied amongst other features).
- OK/NOK evaluation of measurement values, data readout of actual values and evaluation results from the data logger using DigiCal software.
- Reference load cell in line with the flux of force ensures optimum comparative measurements in difficult-to-access locations. Sensor and device hardware can be checked separately.



DigiCal testing and calibration software: creating a own test certificate

Export to Excel for further processing		
Measurement actual value in N	Measurement tolerance in N	Evaluation
0.00	0.0011	OK
1667.10	0.1677	OK
3333.60	0.3345	OK
5000.20	0.5011	OK



Quality test of torque wrenches

- Regular testing involves measuring the release torque (click wrench). TRANS CAL 7281 also detects the release peak values at a measurement rate of ≤ 1200/s. Multiple measurements/evaluations easily possible for each set release torque.
- Stores logged measurement values or quality-relevant data, which can be read using the optional DigiCal calibration software (statistical analysis MIN/MAX – MEAN VALUE – STANDARD DEVIATION).
- Measurement values from up to four sets of manually recorded data can be displayed in parallel as a table and graph. This can be useful, for instance, as an easy way to compare and document release torques of torque wrenches.

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Mühlenstrasse 4, CH-8260 Stein am Rhein, Telefon +41 52-672 50 00, Telefax +41 52-672 50 01, www.mts.ch, e-mail: info@mts.ch
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Device test with strain gauge simulator

The high-precision calibrator and tester model 7281 is ideal for locating faults in measurement systems. For display devices based on strain gauge sensors, the stored characteristics values can be simulated in an infinitely adjustable range of ± 3 mV/V and ± 50 mV/V. In this case it is also important to measure the excitation voltage for strain gauge sensor in order to rule out any problems here.

Voltage source

It is also possible to verify the stored sensor data for display devices with an “active” input. Using the voltage source function, up to 10 V (infinitely adjustable) can be supplied to the device being tested.

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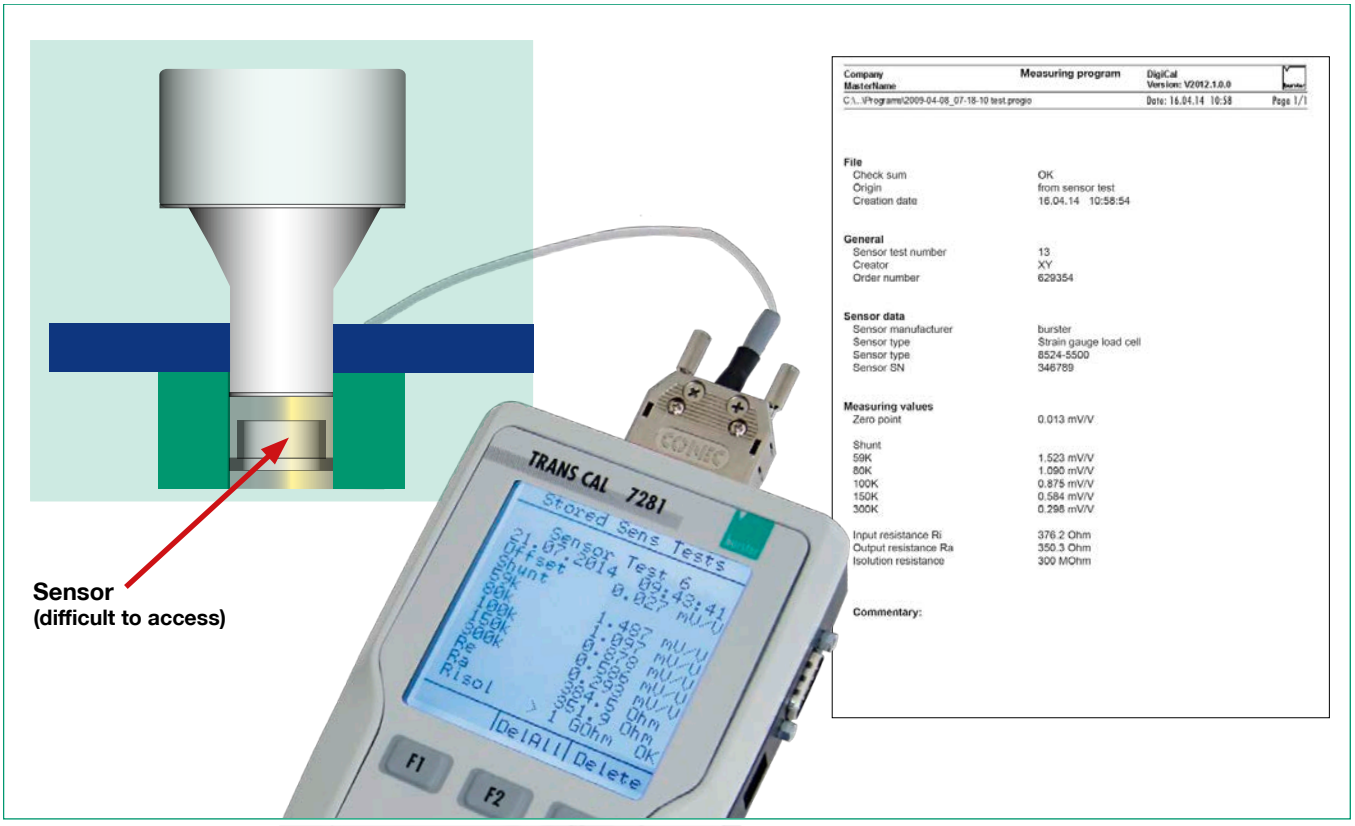
Sensor test

When sensors are difficult to access and cannot be removed, the sensor test function can be used to measure the input and output resistances of the strain gauge full-bridge, their zero point, the isolation resistance and the shunt calibration factor in mV/V (generated by a built-in shunt resistor). This provides a fast and reliable way of electronically assessing the connected sensor. The optional DigiCal calibration software can be used to create a test certificate after completing the sensor test.



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Mühlenstrasse 4, CH-8260 Stein am Rhein, Telefon +41 52-672 50 00, Telefax +41 52-672 50 01, www.mts.ch, e-mail: info@mts.ch
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Technical Data

Operation mode: Reference measurement device

Non-linearity:	< ± 0.001 %
Measuring rates:	0.1 ... 1200/s (DC); 0.1 ... 2/s (AC) (reduced accuracy at 50/s)
TC gain:	± 0.001 %/K
TC zero point:	< 0.2 µV/K
Cut-off frequency:	10 kHz (-3db)

Supported sensors

Strain gauge

Error limit:	± 0.02 % F.S.
Bridge resistance (full bridge):	120 Ω ... 10 kΩ
Connection type:	4 / 6 wire technology
Input voltage ranges (DC):	± 15 mV; ± 30 mV; ± 250 mV
Input voltage ranges (AC):	± 15 mV; ± 30 mV
Sensor excitation voltage (DC):	2.5 V; 5 V (at 120 Ω only 2.5 V)
Sensor excitation voltage (AC):	2.5 Veff / 5 Veff (from 350 Ω)
Sensor excitation current:	max. 30 mA
Electronic data sheet (TEDS):	read from sensor EEPROMs

Potentiometric sensors

Error limit:	± 0.05 % F.S.
Track resistance:	500 Ω ... 10 kΩ
Connection type:	3 / 5 wire technology
Excitation voltage:	5 V DC
Excitation current:	< 30 mA
Measurement range:	± 5 V

Transmitter

Error limit:	± 0.02 % F.S.
Excitation voltage:	12 V DC ± 5 %
Excitation current:	< 100 mA
Input voltage range:	± 10 V
Units:	freely selectable

Sensors and devices with voltage output

Input voltage range:	± 10 V
Error limit:	± 0.02 % F.S.

Operation mode: Device test with strain gauge simulator (model 7281-V0001 only)

Strain gauge simulator

Error limit:	± 0.01 % F.S.
Excitation voltage:	≤ ± 10 V (DC)
Characteristics (infinitely adjustable simulation values):	0 ... ± 3 mV/V to 0 ... ± 50 mV/V
Resolution:	± 16 Bit
Bridge resistance:	350 Ω
TC:	± 0.002 %/K
Measurement of excitation voltage:	0 ... 10 V DC

Note: Not suitable for amplifiers with carrier frequency method.

Voltage source

Error limit:	± 0.02 % F.S.
Infinitely adjustable simulation values:	0 ... +10 V
Resolution:	1 mV
TC:	± 0.005 %/K

Operation mode: Sensor test (model 7281-V0001 only)

TC:	± 0.005 %/K

Shunt calibration step

Error limit:	± 0.25 %
Calibration shunt resistors:	59 kΩ; 80 kΩ; 100 kΩ; 150 kΩ; 300 kΩ

Input and output resistance of sensor

Error limit:	± 0.25 % F.S.
Measurement range:	120 Ω ... 10 kΩ

Insulation resistance

Error limit:	± 5 % Rdg.
Measurement range:	20 MΩ ... 1 GΩ
Resolution:	1 MΩ
TC:	± 0.1 %/K

General device data

A/D converter:	24 Bit
Real-time clock/date	
Interface:	USB 2.0, downwards compatible, opto-isolated
Nominal temperature range:	0 ... 40 °C
Storage temperature range:	- 20 ... 60 °C
Display:	LCD with white LED backlighting
Baud rate:	115200
Supply voltage:	4 x Mignon or 10 ... 28 VDC, integrated battery charging circuit
Measuring, device test, sensor test:	SUB-D female connector, 9 pin
Strain gauge simulator:	SUB-D male connector, 9 pin
USB interface:	type B male connector

Housing

Material:	Aluminium (light gray, black)
Dimension (L x W x H):	220 x 100 x 52 [mm] with tilting foot and rubber feet
Weight:	approx. 850 g
Protection class:	IP40

Order Information

High-precision calibrator
for mechanical measurements TRANS CAL
- reference measurement device **Model 7281-V0000**

High-precision calibrator and testing device
for mechanical and electrical measurements TRANS CAL
- reference measurement device-sensor test-device test/DMS simulator **Model 7281-V0001**

Order Example

High-precision force measuring chain 100 kN with DAkkS calibration certificate:

High-precision load cell, 100 kN **Model 8527-6100**

Testing device for force, torque, displacement and pressure **Model 7281-V0000**

Connector **Model 9900-V209**

Connector fitting **Model 99004**

Adjustment of a measurement chain comprising sensor and display device **Model 72ABG**

DAkkS Calibration Certificate
for force measurement chains in the range 0 ... 200 kN **Model 85DKD-85DX-6200**

Accessories

TRANS CAL 7281 PC software, Plus version:
- functions include editing device parameters, setting parameters via the configuration interface, recording and documenting data-logger values and sensor test data, data export, handling meta-data **Model 7281-P100**

TRANS CAL 7281 PC software, Basis version:
- functions include editing device parameters, setting parameters via the configuration interface, recording and documenting data-logger values, data export, handling metadata **Model 7281-P101**

Power pack, 100 - 240 VAC / 50/60 Hz / 12 VDC, 1.5 A **Model 7281-Z001**

Battery set 4 x Mignon AA **Model 7281-Z002**

Sub-D male connector, 9 pin **Model 9900-V209**

USB connector cable **Model 9900-K349**

Adapter cable, length 1 m for TRANS CAL 7281 and sensors with 12 pin male connector, model 9941 **Model 99209-540A-0110010**

Adapter cable (e.g. for device test 7281), length 1 m, 6 wire, one site 9 pin female connector model 9900-V609, other side open end **Model 99609-000E-0150010**

Six-core connection cable, for 7281 device test and strain gauge simulation, length 2 m, for indicator with 9 pin Min-D male connector, e.g. for DIGIFORCE® 9310/9307 **Model 99209-609E-0150020**

Adapter cabel, length 0.2 m for TRANS CAL 7281 and Sensors with 15 pin SUB-D male connector model 9900-V280 **Model 99209-580A-0110002**

Aluminium case for TRANS CAL 7281 and accessories **Model 7200-Case**

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9-pin male sub-D connector and memory chip for the electronic sensor datasheet, for connecting strain-gauge load cells to the TRANS CAL 7281 **Model 9900-V229**

Fitting connector 9900-V229 (7281) to a strain-gauge sensor and programming the electronic sensor datasheet **Model 99011**

DAkkS Calibration Certificate

The DAkkS calibration certificate per guideline DKD-R 6-1 contains a minimum of three measuring cycles, each with 21 measuring points in 10 % steps for rising and falling loads across the entire measuring range.

Manufacturer Calibration Certificate

The standard factory calibration certificate for a reference measurement chain consisting of the TRANS CAL 7281 instrument in conjunction with, for example, a force or pressure sensor, contains 11 points, starting at zero in 20 % steps across the entire measuring range for rising and falling loads.

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