M4770 Storage micrometer for strain gauge and inductive tracers

Contents:

The storage column micrometer M4770 disposes of a maximum as well as a minimum storage function for the measurement of dynamic measuring processes. The measuring device displays the measuring value as analogue light bar and as numeric value. The measuring device contains four tracer inputs: +A for a torque/force sensor as well as -A, +B, -B for inductive tracers. In comparison to the predecessor model of the AYE 4000 series, the power consumption was approximately halved.
The light bar display is adjusted to the tolerance limits (UL = +100%, LL = -100%). The centre point of the display corresponds to the centre of the tolerance range (0%). The display scale goes up to a tolerance excess of 50%. A tolerance excess is marked by a change in colour from green to yellow or red. In addition, the classification of the measuring value is made available via 5 optocoupler outputs (+12...24VDC).

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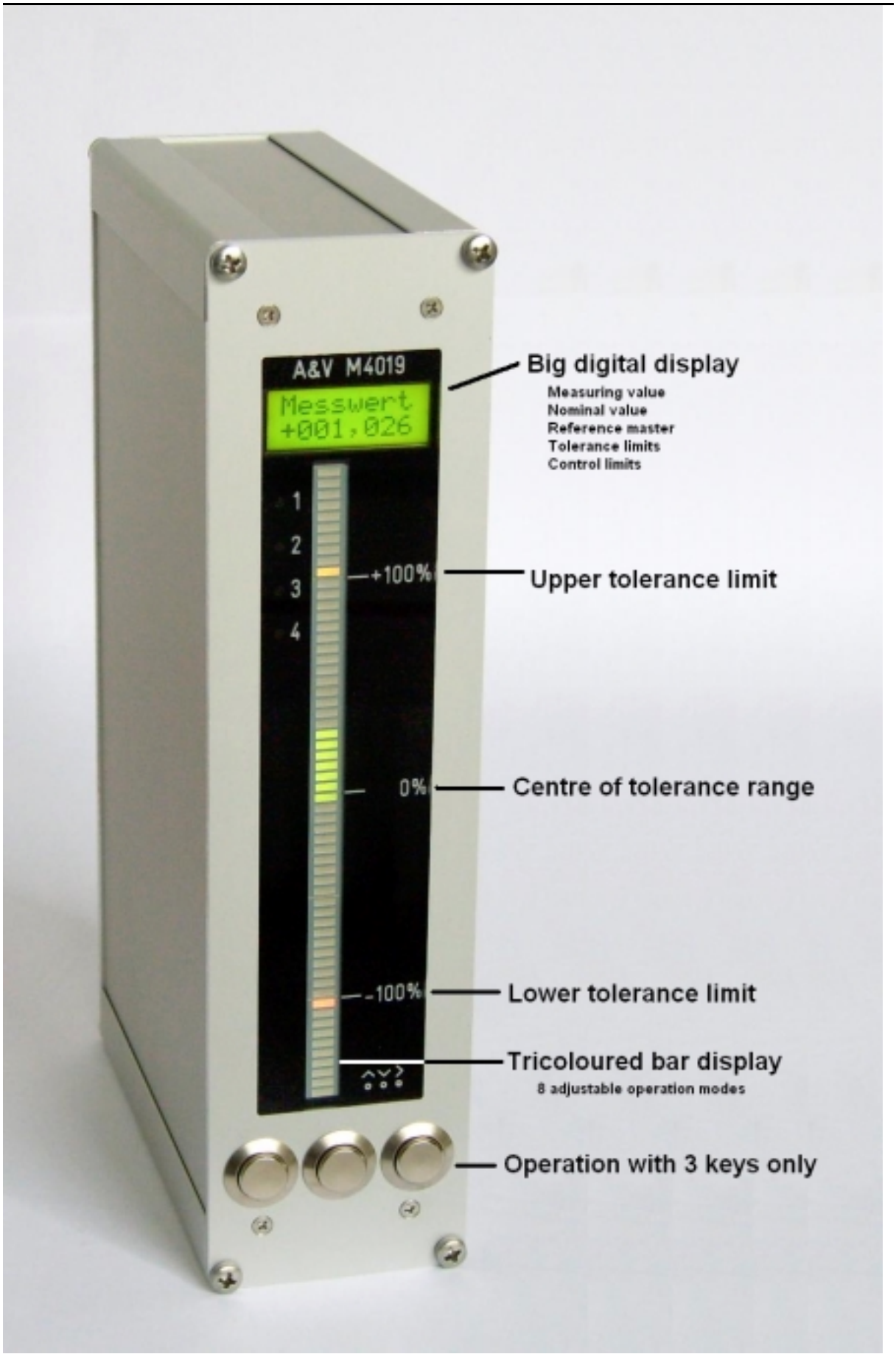

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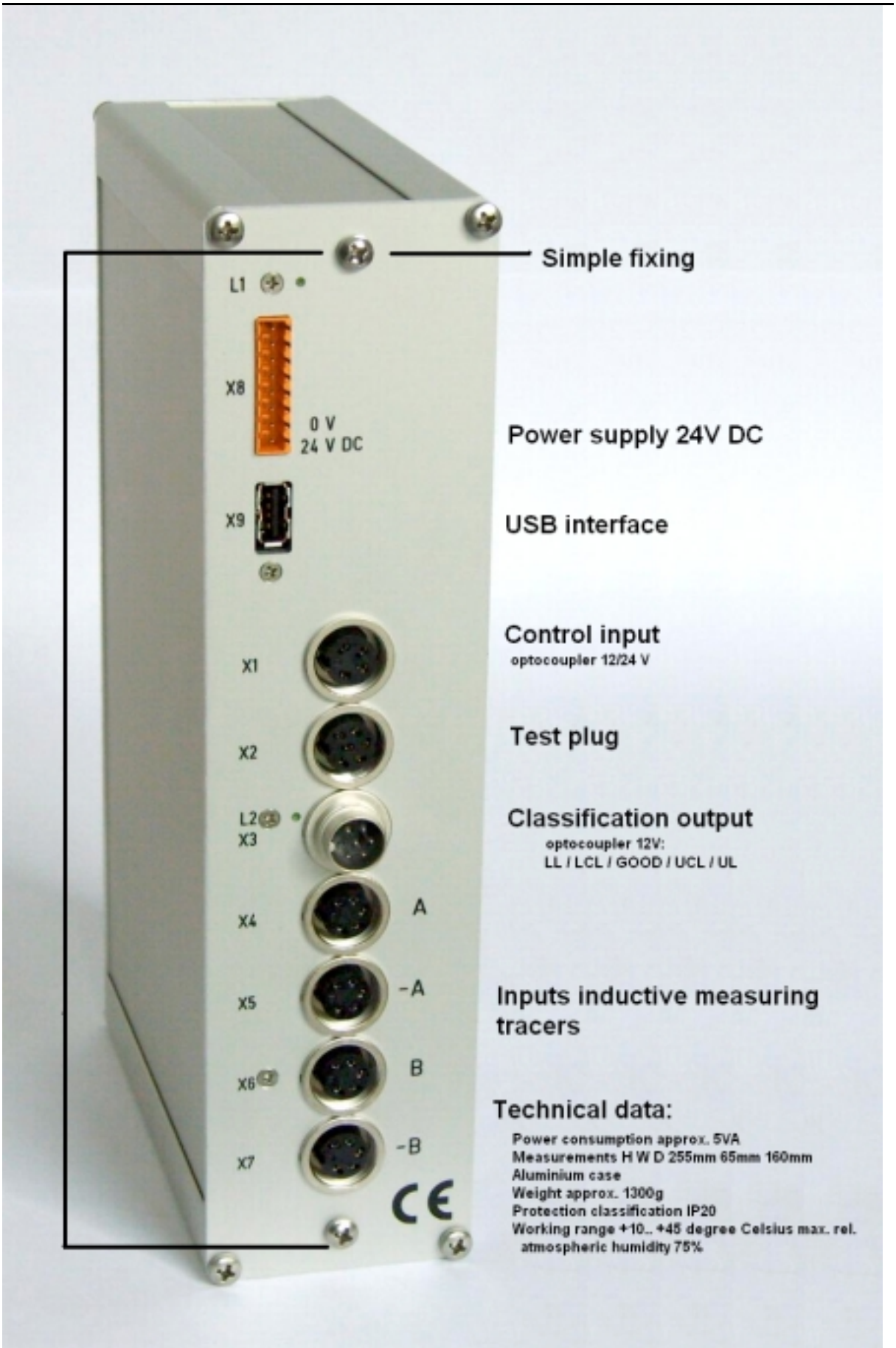

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1. Power supply

Connect the output cable of the included external 24V mains plug via the 8-pole connector to X8 of the unit and the power supply to 230V, 50Hz. Subsequently, a self-test of the unit is carried out. This takes a few seconds. To avoid influence of temperature, the unit should be switched on ten minutes before the first measuring and calibration.

2. Digital display (selection of possible display options by pressing the key ">")

Measuring value - Absolute measuring value according to the formula ((tracer (+A-A+B-B) * factor)

This is the display after starting the unit. After approximately 30 sec. without pressing any key, the programme automatically switches back to this measuring value display from the other display modes. It is not possible to change this display value by pressing the UP (^) or DOWN (v) keys.

The values of the following indications may be changed by pressing the keys UP (^) or DOWN (v). By pressing the key ">", the settings are saved power failure-proof.

Zero - zero point

Tracer - direct display of tracer inputs for inductive tracers, UP (^) and DOWN (v) keys are ineffective

UL - upper limit (absolute value)

UCL - upper control limit (absolute value)

LCL - lower control limit (absolute value)

LL - lower limit (absolute value)

2.1 Contrast adjustment of digital display

Digital display on „Measuring value“.
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display „Contrast“ by pressing the key ">" and adjust the desired contrast by pressing the keys UP (^) or DOWN (v).
By pressing the key ">", the inputs are saved power failure-proof.

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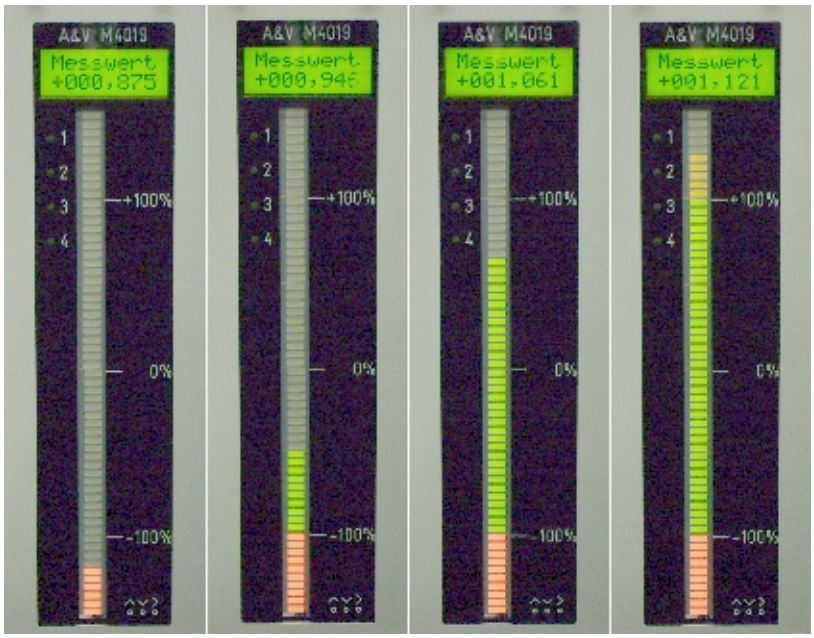
3. Adjustment of bar display

Digital display on „Measuring value“.
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display „Bar“ by pressing the key ">" and adjust the desired mode by pressing the keys UP (^) or DOWN (v):



Mode 000,001 – continuous bar from bottom range end

Mode 000,002 – Green bar from centre of tolerance range (0%) to plus or minus.
When the tolerance limit is exceeded, the display is switched to yellow bar from UL (+100%) to plus or red bar from LL (-100%) to minus.

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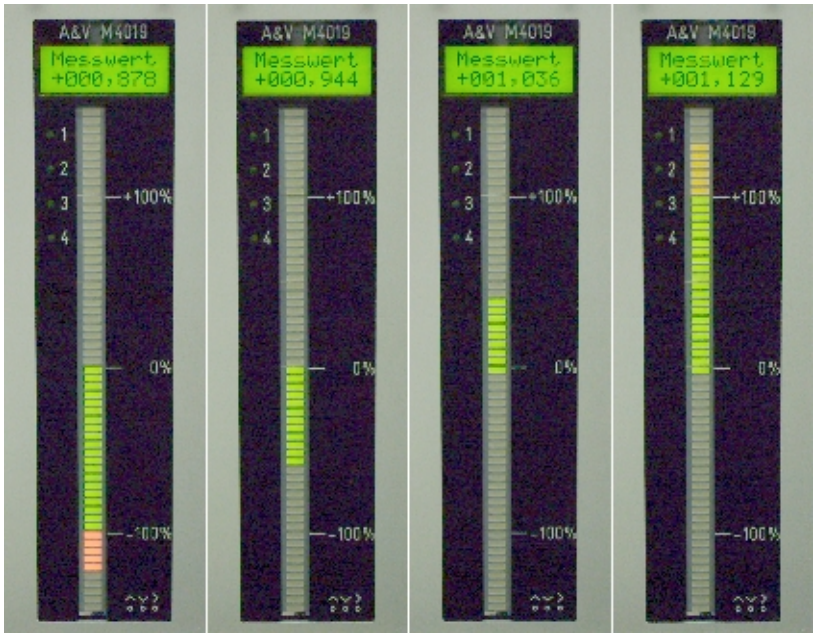
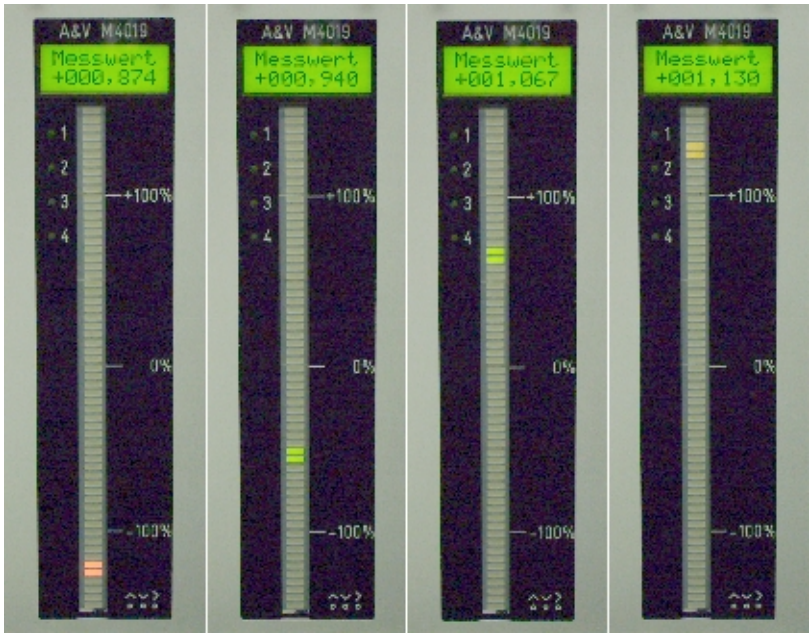


Mode 000,003 – As (000,002), but always from centre of tolerance range (0%).



Mode 000,004 – continuous point LL/GOOD/UL

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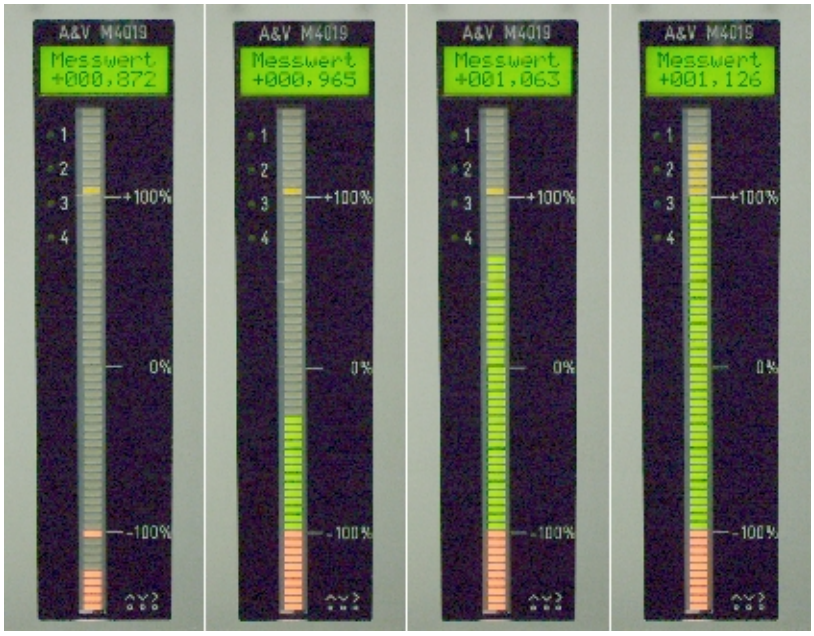
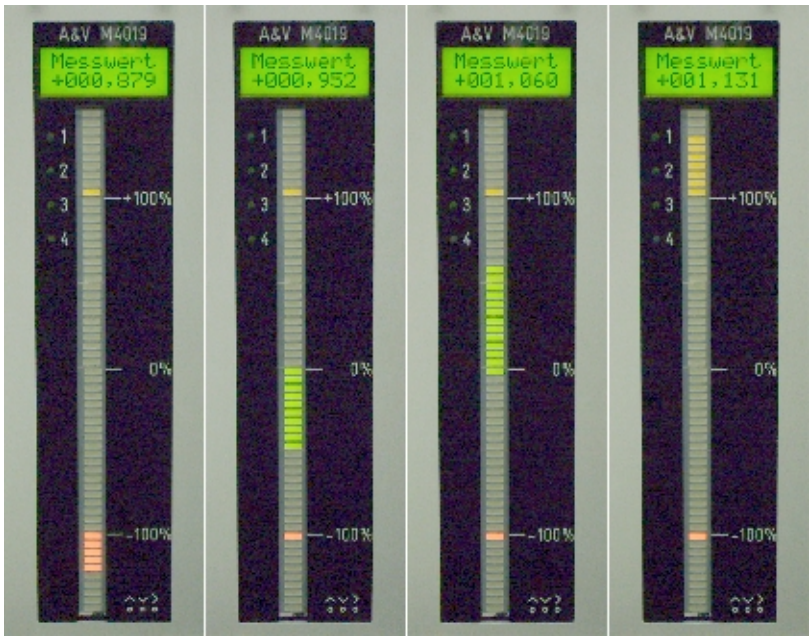


Mode 000,011 – As (000,001) but with marks red – LL (-100%) and yellow - UL (+100%).



Mode 000,012 – As (000,002) but with marks red – LL (-100%) and yellow - UL (+100%).

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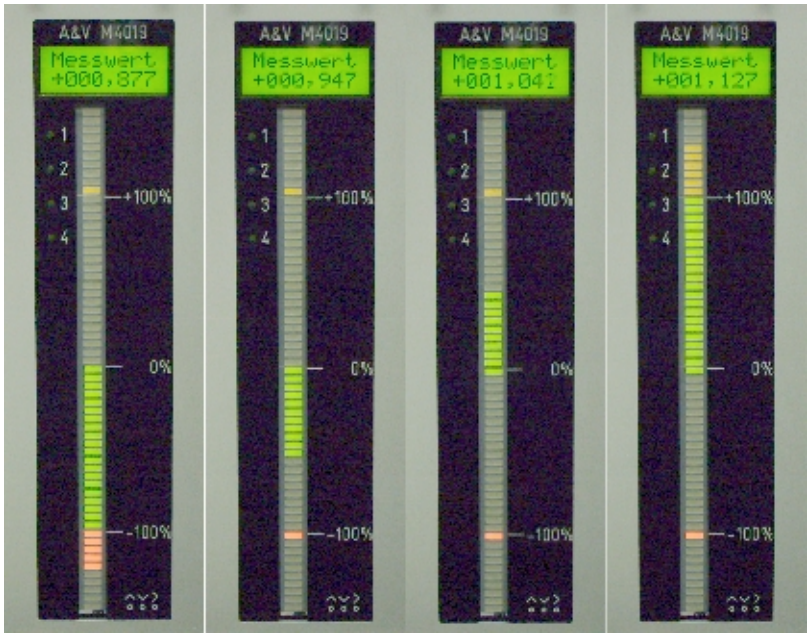

Mode 000,013 – As (000,003) but with marks red - LL (-100%) and yellow - UL (+100%).

Mode 000,014 – As (000,004) but with marks red - LL (-100%) and yellow - UL (+100%).

By pressing the key ">", the inputs are saved power failure-proof.

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4. Status displays

1 – Control input 1: Delete
2 – Control input 2: Measuring
3 – Control limits exceeded
4 – Reserve for special functions

5. Set-up of measuring task

5.1 Connection of inductive measuring tracers or torque/force sensor

The tracers are connected to the jacks -A, A, B, -B in accordance with the measuring task. Jack A is provided for a torque or force sensor.
The tracers connected to jacks A and B work in positive direction. The tracer connected to jacks -A, -B works in negative direction.

5.2 Positioning of inductive measuring tracers

Remove the inductive measuring tracers.
Select the digital display „Zero“ by pressing the key ">" and adjust the zero point with the keys UP (^) or DOWN (v). Connect the inductive tracer. Insert the reference master value into the measuring device.

When using one inductive tracer:
Position the inductive tracer so that approximately the zero point is displayed.

When using two inductive tracers:
Position the first inductive tracer approximately on the zero point (digital display „Zero“). Position the second inductive tracer so that the display shows approximately the reference master value (digital display „Master“).

For fine-tuning, adjust the exact reference master value with the keys UP (^) or DOWN (v) (digital display „Zero“).

5.3 Setting of tolerance limits

Select the digital display „UL“ by pressing the key ">" and set the desired absolute value of the upper limit by pressing the keys UP (^) or DOWN (v). Subsequently, make settings for the digital displays (UCL: upper control limit, LCL: lower control limit and LL: lower limit).

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5.4 Adjustment of tracer scale factor of inductive tracers (normal value 1,000)

The gain was already adjusted in the factory and only needs to be changed in rare cases (e.g. when using a special measuring tracer). A check of the adjustment, especially in combination with the measuring device, should be carried out in regular intervals, e.g. monthly. For the adjustment of the gain a second reference master is needed. In case of a deviation, the factor may be corrected:
Digital display on „Measuring value“.
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display „Factor“ by pressing the key ">" and set the desired value by pressing the keys UP (^) or DOWN (v). Max. setting range +/- 5,000.

By pressing the key ">", the inputs are saved power failure-proof.

5.5 Adjustment of low-pass filter

Adjusting the low-pass filter has an influence on the attenuation of the measuring value display. The higher the low-pass filter value, the higher the attenuation.
Digital display on „Measuring value“.
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display „Filter“ by pressing the key ">" and set the desired value by pressing the keys UP (^) or DOWN (v). Setting range 0 - +10,000. By pressing the key ">", the inputs are saved power failure-proof.

5.6 Adjustment of storage linkage / classification

Digital display on „Measuring value“
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display "LOCAL/MAX/MIN/MAX+MIN/MAX-MIN" by pressing the key „>“ and set the desired mode by pressing the keys UP (^) or DOWN (v).

The value of the tracer inputs for inductive tracers corresponds to the formula ((tracer (+A-A+B-B) * factor) + nominal value.

LOCAL	The measuring value display directly follows the tracer inputs for inductive tracers without storage function.
MAX	The measuring value display shows the maximum value of the tracer inputs for inductive tracers obtained during measuring.
MIN	The measuring value display shows the minimum value of the tracer inputs for inductive tracers obtained during measuring.
MAX+MIN	The measuring value display shows the sum of the maximum and minimum value of the tracer inputs for inductive tracers obtained during measuring.
MAX-MIN	The measuring value display shows the difference of the maximum and minimum value of the tracer inputs for inductive tracers obtained during measuring.

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5.7 Selection of torque/force sensor

Digital display on "Measuring value".
Switch to the next level by simultaneously pressing the keys UP (^) and DOWN (v). Select the display "Scale" by pressing the key ">" and set the desired mode with the keys UP (^) or DOWN (v).

Scale 1 = 1 Nm / 1 kN
Scale 2 = 2 Nm / 2 kN
Scale 5 = 5 Nm / 5 kN
Scale 10 = 10 Nm / 10 kN
Scale 20 = 20 Nm / 20 kN
Scale 50 = 50 Nm / 50 kN
Off: when using an inductive tracer

By pressing the key ">", the inputs are saved power failure-proof.

The classification is done corresponding to the measuring value display and is saved until the next measuring.

6. Measuring with storage function

Function 1:
The acquisition of measuring values is done for the duration of the input signal 2 (MEASURE). The result is saved until a further measuring.

Function 2:
Digital display on „Measuring value“.
The acquisition of measuring values is done for as long as the key DOWN (v) is pressed.
The result is saved until further measuring. Both functions work simultaneously.

7. Interfaces

X1 control input (OPTION)
- 1 - output +12V (max. 0.2A)
- 2 - Gnd
- 3 - control input 1: reserve
- 4 - control input 2: measure (if connection 1-4)

X2 analogue output (OPTION)
- 5 - output 5mV/um
- 6 - Gnd

X3 control output (optocoupler plus-switching)
- 1 - input supply voltage +12...24VDC
- 2 - output classification LL
- 3 - output classification LCL
- 4 - output classification GOOD
- 5 - output classification UCL
- 6 - output classification UL

X4 input +A for torque/force sensor
X5 input -A for inductive tracer
X6 input +B for inductive tracer

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X7 input -B for inductive tracer
X4-X7 1 - generator signal for inductive tracer
2 - Gnd
3 - input signal for inductive tracer
4 - not assigned
5 - generator signal for inductive tracer
X8 input power supply 24VDC
1 - +24V DC
2 - Gnd 24V
3 - Gnd
4 - test output MV1
5 - test output MV2
6 - test output MV3
7 - test output MV4
8 - DAC
X9 USB plug for the connection with a PC

8. Technical data

Power consumption: approx. 5W
Measurements HxWxD: 255mm x 65mm x 160mm
Weight: approx. 1,3 kg
Protection classification: IP20
Working range: +10 - + 45 degrees Celsius, max. rel. atmospheric humidity 75%.
2 x fixing holes at the back with M4 thread

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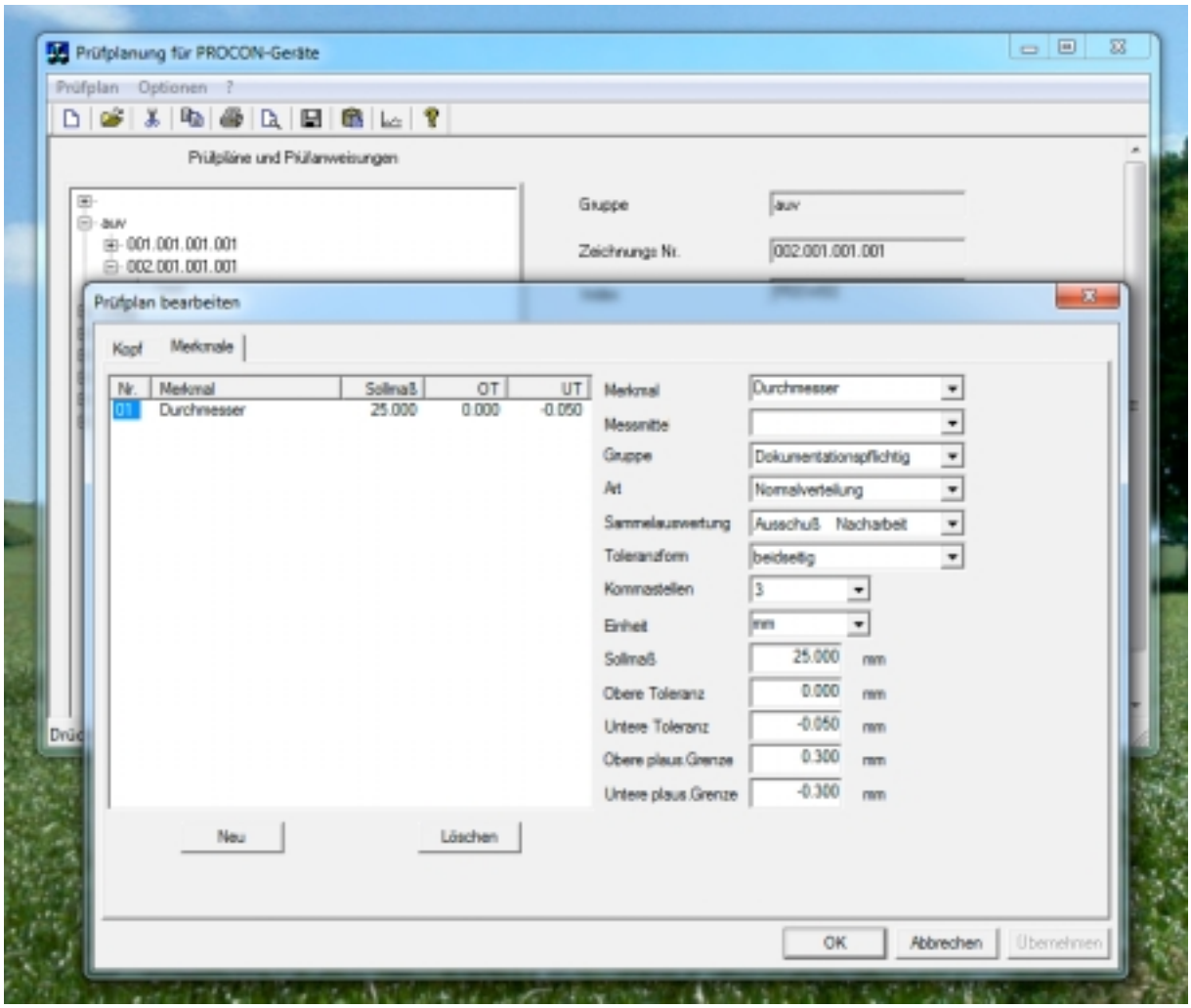
9. OPTION: Programming interface

The external programming of the measuring task is done using a computer. The control plan administration software PROCPROG is used for creating and administrating the control plans and control tasks. The transfer of the prepared control plan into the column micrometer is done via the USB interface on the device.

Control plan administration software PROCPROG: revising control plans



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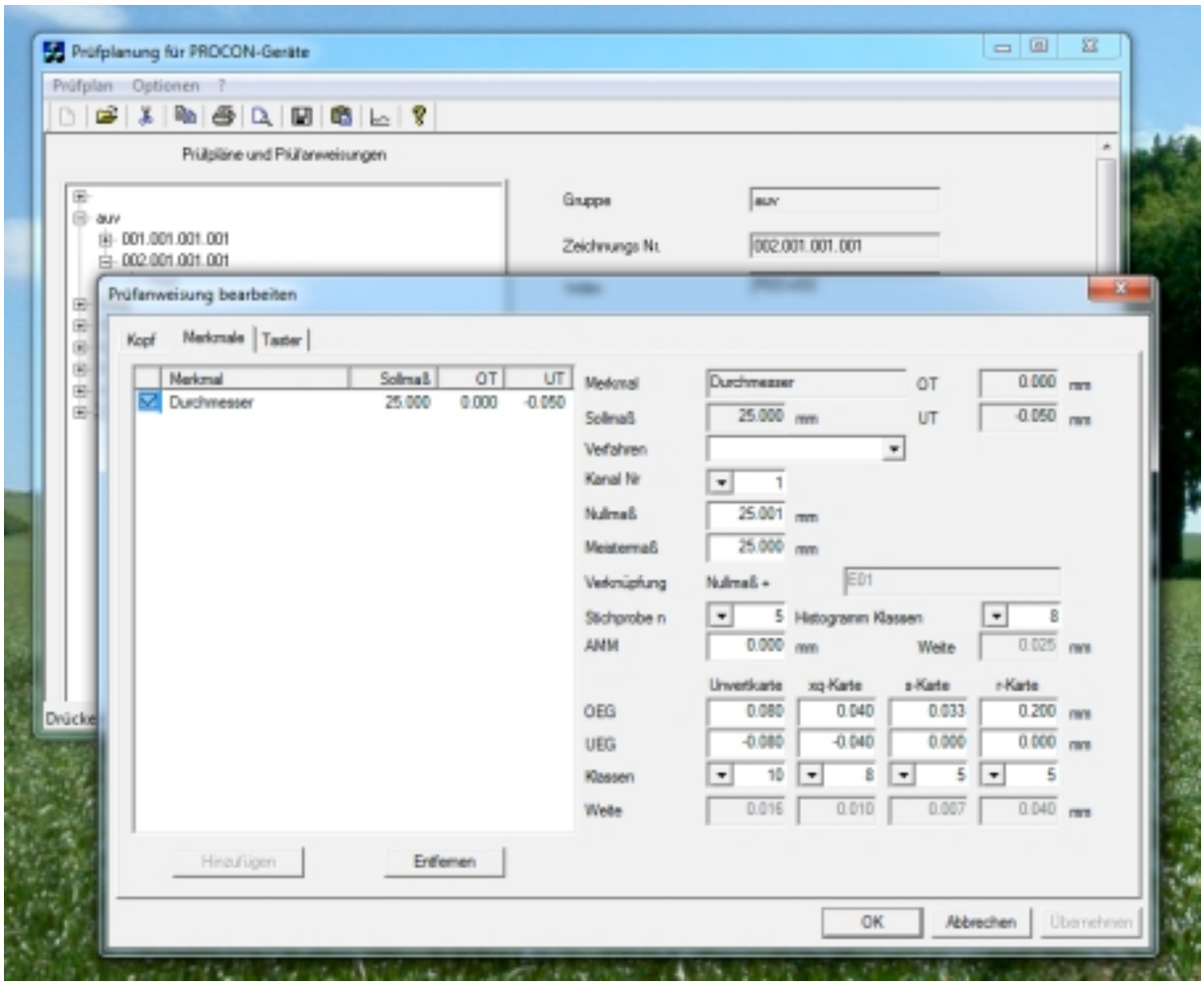
Control plan administration software PROCPROG: revision of control tasks

zero value, reference master value



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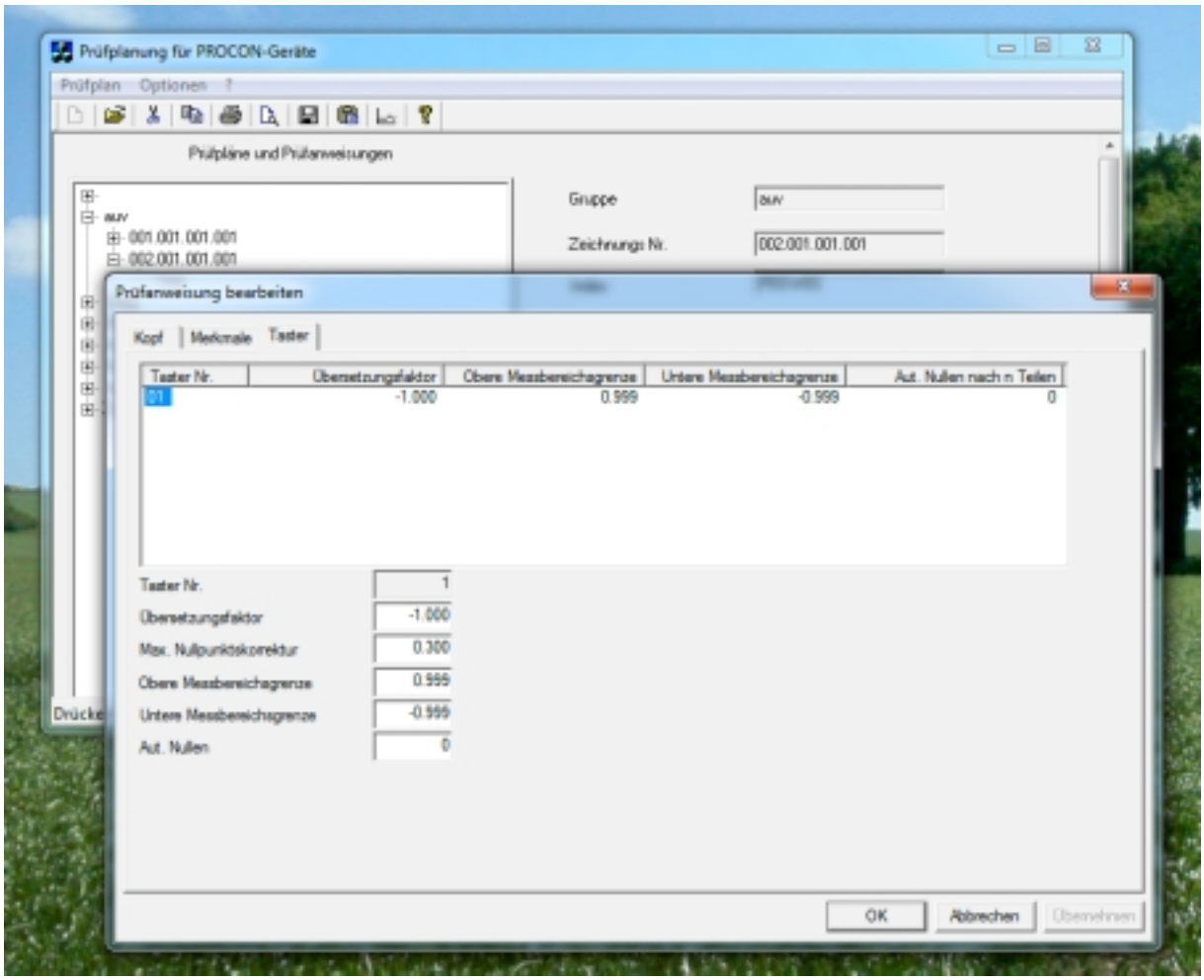
Control plan administration software PROCPROG: revising control tasks

inputs for inductive tracers



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Security instructions according to VDE 0411

Technical data

time for warming up	10 minutes
temperature	0...+40 degrees C
atmospheric humidity	up to 75% rel.
frequency	50/60 Hz
power supply voltage	230V +10%, -15%
security	according to VDE 0411, protection class 1

This unit is built and checked under DIN 57411 part 1/VDE 0411 part 1 and left the factory in a safe and perfect condition. To preserve this condition and to guarantee a safe working, the user has to follow the comments and warnings which are given in these instructions. Before turning on the power, you have to make sure that the voltage of operation and the mains voltage correspond. The mains plug may only be inserted into a socket with ground contact. The safety effect may not be abolished by an extension lead without ground connection. The opening of covers or removing of components, except if it is possible to do by hand, might uncover parts or connections under dangerous voltage. Racks may only be used inside a cover. If an adjustment, maintenance or repair at the opened unit under voltage is unavoidable, it may be done only by a qualified employee, who is well acqainted with the dangers involved.

ATTENTION:
After the end of those works, the unit has to be checked according to VDE 0411, part 1. You have to make sure, that only fuses of the given type and values are taken for replacement. The use of mended fuses or short-circuiting them is inadmissible. If it is presumed, that a safe work is not possible, you have to take this unit out of work.
A safe work may not be possible, if
– there are visible damages at the unit.
– the unit does not work.
– after longer storage under unfavourable circumstances.
– after heavy stress of transport.

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