

# Kalibrier-Zertifikat Calibration Certificate

# MUSTER

Gegenstand Object	SCOPEMETER
Hersteller Manufacturer	Fluke
Typ Type description	Fluke 190-104 Scopemeter
Serien Nr. Serial no.	12345
Inventar Nr. Inventory no.	---
Prüfmittel Nr. Test equipment no.	---
Equipment Nr. Equipment no.	12345678
Standort Location	---
Auftraggeber Customer	Mustermann GmbH
Kunden Nr. Customer ID no.	DE-12345 Musterhausen
Auftrags Nr. Order no.	654321
Datum der Kalibrierung Date of calibration	19.04.2021
Datum der empfohlenen Rekalibrierung Date of the recommended re-calibration	19.04.2025

Hiermit bestätigen wir, dass das durchführende Kalibrierlabor ein Managementsystem nach ISO 9001:2015, sowie ISO/IEC 17025:2018 eingeführt hat. Die Urkunden finden Sie auf [www.testotis.de](http://www.testotis.de). Die für die Kalibrierung verwendeten Messeinrichtungen werden regelmäßig kalibriert und sind rückführbar auf die nationalen Normale der Physikalisch Technischen Bundesanstalt (PTB) Deutschlands oder auf andere nationale Normale. Wo keine nationalen Normale existieren, entspricht das Messverfahren den derzeit gültigen technischen Regeln und Normen. Die für diesen Vorgang angefertigte Dokumentation kann eingesehen werden. Alle erforderlichen Messdaten sind in diesem Kalibrier-Zertifikat aufgelistet.

Hereby we confirm that the performing calibration laboratory is working with a management system according to ISO 9001:2015 and ISO/IEC 17025:2018. Accreditation certificates can be found under [www.testotis.de](http://www.testotis.de). The measuring installations used for calibration are regularly calibrated and traceable to the national standards of the German Federal Physical Technical Institute (PTB) or other national standards. Should no national standards exist, the measuring procedure corresponds with the technical regulations and norms valid at the time of the measurement. The documents established for this procedure are available for viewing. All the necessary measured data can be found on the following page(s) of this calibration certificate.

## Konformitätsaussage Conformance

- Messwert(e) innerhalb der zulässigen Abweichung<sup>1)</sup>. Measured value(s) within the allowed deviation<sup>1)</sup>.  
 Messwert(e) außerhalb der zulässigen Abweichung<sup>1)</sup>. Measured value(s) beyond the allowed deviation<sup>1)</sup>.

<sup>1)</sup> Die erweiterte Messunsicherheit wurde nach EA-4-02 M:2013 mit einer Überdeckungswahrscheinlichkeit von 95% berechnet und enthält die Unsicherheit der Referenz, des Verfahrens sowie die Unsicherheit des Prüflings. Die Konformitätsaussage erfolgt nach der Entscheidungsregel 'Vertrauensniveau 50'.

<sup>1)</sup> The expanded measurement uncertainty was calculated according to EA-4-02 M:2013 with a coverage probability of 95% and contains the uncertainty of the reference, the method and the uncertainty of the unit under test. The statement of conformity is based on the decision rule 'Vertrauensniveau 50' (confidence level 50).

Dieser Kalibrierschein darf nur vollständig weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung des ausstellenden Kalibrierlaboratoriums. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.

This calibration certificate may not be reproduced other than in full except with permission of the issuing laboratory. Calibration certificates without signature and seal are not valid.

V 4.84 / DE

Stempel Seal



Fachverantwortlicher Supervisor

*Max Mustermann*  
Max Mustermann

Bearbeiter Technician

*Martina Musterfrau*  
Martina Musterfrau



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## Messeinrichtung Measuring equipment

Referenz Reference	Rückführung Traceability	Rekal. Next cal.	Zertifikat-Nr. Certificate-no.	EQ-Nr. EQ-no.
Multifunction Calibrator Fluke 5520A-SC1100	15070-01-01 2020-12	2021-12	E143875	11093954
Frequenznormal Fluke 910R	GPS locked ---	---	Support device	11846061
Waveform Generator Agilent 33220A	15070-01-01 2020-05	2021-05	E123011	13272683

Referenzzertifikate sind auf [www.primasonline.com](http://www.primasonline.com) abrufbar Reference certificates are available at [www.primasonline.com](http://www.primasonline.com)

## Umgebungsbedingungen Ambient conditions

Temperatur Temperature (23 ± 3) °C  
Relative Luftfeuchte Relative Humidity (20...70) %

## Messverfahren Measuring procedure

Die Kalibrierung erfolgt nach Kalibrieranweisung 4\_AA\_00190\_DE - in Abstimmung nach VDI/VDE/DGQ/DKD 2622  
The calibration is performed according to the 4\_AA\_00190\_DE procedure- in accordance with VDI/VDE/DGQ/DKD 2622

Prüfprozedur Procedure E:Fluke:190-xx4:5520,33220:USB / Rev.:1.4

## Messergebnisse Measuring results

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## Besondere Bemerkungen Special remarks

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Bereich Range	Referenzwert (Normal) Reference value	Messbedingung Measuring condition	Angezeigter Wert UUT Indicated value UUT	zulässige Abweichung allowed deviation	Ausnutzung der zul. Abw. in % Utilization of allowed dev. in %	Messunsicherheit (k=2) Measuring uncertainty (k=2)
<b>Firmwarestand</b> firmware version:						
V09.00						
<b>Eingangswiderstand</b> Input resistance						
Input A						
	0.9941 MOhm		1.000 MOhm	±0.01 MOhm	59% pass	0.97 · 10 <sup>-3</sup>
Input B						
	0.9952 MOhm		1.000 MOhm	±0.01 MOhm	48% pass	0.97 · 10 <sup>-3</sup>
Input C						
	0.9939 MOhm		1.000 MOhm	±0.01 MOhm	61% pass	0.97 · 10 <sup>-3</sup>
Input D						
	0.9945 MOhm		1.000 MOhm	±0.01 MOhm	55% pass	0.97 · 10 <sup>-3</sup>
<b>Messbedingung</b> measured condition						
100mV/Div						
<b>Vertikalablenkung</b> Vertical deflection						
Input A						
16mV	6.00 mV	2mV/Div	5.9 mV	±0.33 mV	30% pass	9.6 · 10 <sup>-3</sup>
16mV	-6.00 mV	2mV/Div	-6.1 mV	±0.33 mV	30% pass	9.6 · 10 <sup>-3</sup>
40mV	15.00 mV	5mV/Div	14.8 mV	±0.51 mV	39% pass	3.9 · 10 <sup>-3</sup>
40mV	-15.00 mV	5mV/Div	-15.0 mV	±0.51 mV	0% pass	3.9 · 10 <sup>-3</sup>
80mV	30.00 mV	10mV/Div	29.7 mV	±1.03 mV	29% pass	1.9 · 10 <sup>-3</sup>
80mV	-30.00 mV	10mV/Div	-30.0 mV	±1.03 mV	0% pass	1.9 · 10 <sup>-3</sup>
160mV	60.0 mV	20mV/Div	59 mV	±2 mV	29% pass	9.6 · 10 <sup>-3</sup>
160mV	-60.0 mV	20mV/Div	-59 mV	±2 mV	34% pass	9.6 · 10 <sup>-3</sup>
400mV	150.0 mV	50mV/div	149 mV	±5.1 mV	25% pass	3.9 · 10 <sup>-3</sup>
400mV	-150.0 mV	50mV/div	-148 mV	±5.1 mV	33% pass	3.9 · 10 <sup>-3</sup>
800mV	300.0 mV	100mV/div	297 mV	±10.3 mV	29% pass	1.9 · 10 <sup>-3</sup>
800mV	-300.0 mV	100mV/div	-297 mV	±10.3 mV	29% pass	1.9 · 10 <sup>-3</sup>
1.6mV	600.0 mV	200mV/div	595 mV	±12.6 mV	40% pass	0.96 · 10 <sup>-3</sup>
1.6mV	-600.0 mV	200mV/div	-594 mV	±12.6 mV	48% pass	0.96 · 10 <sup>-3</sup>
4 V	1.500 V	500mV/div	1.49 V	±0.072 V	17% pass	3.9 · 10 <sup>-3</sup>
4 V	-1.500 V	500mV/div	-1.48 V	±0.072 V	23% pass	3.9 · 10 <sup>-3</sup>
8 V	3.000 V	1V/div	2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
8 V	-3.000 V	1V/div	-2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
16 V	6.000 V	2V/div	5.94 V	±0.14 V	43% pass	0.96 · 10 <sup>-3</sup>
16 V	-6.000 V	2V/div	-5.94 V	±0.14 V	43% pass	0.96 · 10 <sup>-3</sup>



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40 V	15.00 V	5V/div	14.9 V	±0.72 V	17% pass	3.9 · 10 <sup>-3</sup>
40 V	-15.00 V	5V/div	-14.8 V	±0.72 V	23% pass	3.9 · 10 <sup>-3</sup>
80 V	30.00 V	10V/div	29.9 V	±0.95 V	11% pass	1.9 · 10 <sup>-3</sup>
80 V	-30.00 V	10V/div	-29.6 V	±0.95 V	42% pass	1.9 · 10 <sup>-3</sup>
160 V	60.00 V	20V/div	59.5 V	±1.4 V	36% pass	0.96 · 10 <sup>-3</sup>
160 V	-60.00 V	20V/div	-59.2 V	±1.4 V	57% pass	0.96 · 10 <sup>-3</sup>
400 V	150.0 V	50V/div	149 V	±5.1V	21% pass	3.9 · 10 <sup>-3</sup>
400 V	-150.0 V	50V/div	-148 V	±5.1V	33% pass	3.9 · 10 <sup>-3</sup>
800 V	300.0 V	100V/div	298 V	±10.3 V	19% pass	1.9 · 10 <sup>-3</sup>
800 V	-300.0 V	100V/div	-295 V	±10.3 V	49% pass	1.9 · 10 <sup>-3</sup>
<b>Input B</b>						
16mV	6.00 mV	2mV/Div	5.9 mV	±0.33 mV	30% pass	9.6 · 10 <sup>-3</sup>
16mV	-6.00 mV	2mV/Div	-6.0 mV	±0.33 mV	0% pass	9.6 · 10 <sup>-3</sup>
40mV	15.00 mV	5mV/Div	14.8 mV	±0.51 mV	39% pass	3.9 · 10 <sup>-3</sup>
40mV	-15.00 mV	5mV/Div	-14.9 mV	±0.51 mV	19% pass	3.9 · 10 <sup>-3</sup>
80mV	30.00 mV	10mV/Div	29.7 mV	±1.03 mV	29% pass	1.9 · 10 <sup>-3</sup>
80mV	-30.00 mV	10mV/Div	-29.8 mV	±1.03 mV	19% pass	1.9 · 10 <sup>-3</sup>
160mV	60.0 mV	20mV/Div	59 mV	±2 mV	29% pass	9.6 · 10 <sup>-3</sup>
160mV	-60.0 mV	20mV/Div	-59 mV	±2 mV	24% pass	9.6 · 10 <sup>-3</sup>
400mV	150.0 mV	50mV/div	148 mV	±5.1 mV	37% pass	3.9 · 10 <sup>-3</sup>
400mV	-150.0 mV	50mV/div	-149 mV	±5.1 mV	21% pass	3.9 · 10 <sup>-3</sup>
800mV	300.0 mV	100mV/div	297 mV	±10.3 mV	29% pass	1.9 · 10 <sup>-3</sup>
800mV	-300.0 mV	100mV/div	-298 mV	±10.3 mV	19% pass	1.9 · 10 <sup>-3</sup>
1.6mV	600.0 mV	200mV/div	594 mV	±12.6 mV	48% pass	0.96 · 10 <sup>-3</sup>
1.6mV	-600.0 mV	200mV/div	-596 mV	±12.6 mV	32% pass	0.96 · 10 <sup>-3</sup>
4 V	1.500 V	500mV/div	1.48 V	±0.072 V	22% pass	3.9 · 10 <sup>-3</sup>
4 V	-1.500 V	500mV/div	-1.48 V	±0.072 V	26% pass	3.9 · 10 <sup>-3</sup>
8 V	3.000 V	1V/div	2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
8 V	-3.000 V	1V/div	-2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
16 V	6.000 V	2V/div	5.93 V	±0.14 V	50% pass	0.96 · 10 <sup>-3</sup>
16 V	-6.000 V	2V/div	-5.94 V	±0.14 V	43% pass	0.96 · 10 <sup>-3</sup>
40 V	15.00 V	5V/div	14.8 V	±0.72 V	26% pass	3.9 · 10 <sup>-3</sup>
40 V	-15.00 V	5V/div	-14.9 V	±0.72 V	18% pass	3.9 · 10 <sup>-3</sup>
80 V	30.00 V	10V/div	29.7 V	±0.95 V	32% pass	1.9 · 10 <sup>-3</sup>
80 V	-30.00 V	10V/div	-29.7 V	±0.95 V	32% pass	1.9 · 10 <sup>-3</sup>
160 V	60.00 V	20V/div	59.3 V	±1.4 V	50% pass	0.96 · 10 <sup>-3</sup>
160 V	-60.00 V	20V/div	-59.3 V	±1.4 V	50% pass	0.96 · 10 <sup>-3</sup>
400 V	150.0 V	50V/div	148 V	±5.1V	37% pass	3.9 · 10 <sup>-3</sup>
400 V	-150.0 V	50V/div	-148 V	±5.1V	35% pass	3.9 · 10 <sup>-3</sup>
800 V	300.0 V	100V/div	297 V	±10.3 V	29% pass	1.9 · 10 <sup>-3</sup>
800 V	-300.0 V	100V/div	-297 V	±10.3 V	29% pass	1.9 · 10 <sup>-3</sup>
<b>Input C</b>						
16mV	6.00 mV	2mV/Div	5.9 mV	±0.33 mV	30% pass	9.6 · 10 <sup>-3</sup>
16mV	-6.00 mV	2mV/Div	-6.0 mV	±0.33 mV	0% pass	9.6 · 10 <sup>-3</sup>



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40mV	15.00 mV	5mV/Div	14.8 mV	±0.51 mV	39% pass	3.9 · 10 <sup>-3</sup>
40mV	-15.00 mV	5mV/Div	-14.9 mV	±0.51 mV	19% pass	3.9 · 10 <sup>-3</sup>
80mV	30.00 mV	10mV/Div	29.8 mV	±1.03 mV	19% pass	1.9 · 10 <sup>-3</sup>
80mV	-30.00 mV	10mV/Div	-29.9 mV	±1.03 mV	10% pass	1.9 · 10 <sup>-3</sup>
160mV	60.0 mV	20mV/Div	59 mV	±2 mV	29% pass	9.6 · 10 <sup>-3</sup>
160mV	-60.0 mV	20mV/Div	-59 mV	±2 mV	29% pass	9.6 · 10 <sup>-3</sup>
400mV	150.0 mV	50mV/div	149 mV	±5.1 mV	29% pass	3.9 · 10 <sup>-3</sup>
400mV	-150.0 mV	50mV/div	-149 mV	±5.1 mV	25% pass	3.9 · 10 <sup>-3</sup>
800mV	300.0 mV	100mV/div	298 mV	±10.3 mV	19% pass	1.9 · 10 <sup>-3</sup>
800mV	-300.0 mV	100mV/div	-297 mV	±10.3 mV	29% pass	1.9 · 10 <sup>-3</sup>
1.6mV	600.0 mV	200mV/div	594 mV	±12.6 mV	48% pass	0.96 · 10 <sup>-3</sup>
1.6mV	-600.0 mV	200mV/div	-594 mV	±12.6 mV	48% pass	0.96 · 10 <sup>-3</sup>
4 V	1.500 V	500mV/div	1.49 V	±0.072 V	18% pass	3.9 · 10 <sup>-3</sup>
4 V	-1.500 V	500mV/div	-1.49 V	±0.072 V	21% pass	3.9 · 10 <sup>-3</sup>
8 V	3.000 V	1V/div	2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
8 V	-3.000 V	1V/div	-2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>
16 V	6.000 V	2V/div	5.96 V	±0.14 V	29% pass	0.96 · 10 <sup>-3</sup>
16 V	-6.000 V	2V/div	-5.93 V	±0.14 V	50% pass	0.96 · 10 <sup>-3</sup>
40 V	15.00 V	5V/div	14.9 V	±0.72 V	11% pass	3.9 · 10 <sup>-3</sup>
40 V	-15.00 V	5V/div	-14.9 V	±0.72 V	21% pass	3.9 · 10 <sup>-3</sup>
80 V	30.00 V	10V/div	29.8 V	±0.95 V	21% pass	1.9 · 10 <sup>-3</sup>
80 V	-30.00 V	10V/div	-29.7 V	±0.95 V	32% pass	1.9 · 10 <sup>-3</sup>
160 V	60.00 V	20V/div	59.4 V	±1.4 V	43% pass	0.96 · 10 <sup>-3</sup>
160 V	-60.00 V	20V/div	-59.3 V	±1.4 V	50% pass	0.96 · 10 <sup>-3</sup>
400 V	150.0 V	50V/div	149 V	±5.1 V	25% pass	3.9 · 10 <sup>-3</sup>
400 V	-150.0 V	50V/div	-149 V	±5.1 V	27% pass	3.9 · 10 <sup>-3</sup>
800 V	300.0 V	100V/div	297 V	±10.3 V	29% pass	1.9 · 10 <sup>-3</sup>
800 V	-300.0 V	100V/div	-296 V	±10.3 V	39% pass	1.9 · 10 <sup>-3</sup>
<b>Input D</b>						
16mV	6.00 mV	2mV/Div	6.0 mV	±0.33 mV	0% pass	9.6 · 10 <sup>-3</sup>
16mV	-6.00 mV	2mV/Div	-6.0 mV	±0.33 mV	0% pass	9.6 · 10 <sup>-3</sup>
40mV	15.00 mV	5mV/Div	14.8 mV	±0.51 mV	39% pass	3.9 · 10 <sup>-3</sup>
40mV	-15.00 mV	5mV/Div	-15.0 mV	±0.51 mV	0% pass	3.9 · 10 <sup>-3</sup>
80mV	30.00 mV	10mV/Div	29.8 mV	±1.03 mV	19% pass	1.9 · 10 <sup>-3</sup>
80mV	-30.00 mV	10mV/Div	-29.9 mV	±1.03 mV	10% pass	1.9 · 10 <sup>-3</sup>
160mV	60.0 mV	20mV/Div	59 mV	±2 mV	24% pass	9.6 · 10 <sup>-3</sup>
160mV	-60.0 mV	20mV/Div	-59 mV	±2 mV	29% pass	9.6 · 10 <sup>-3</sup>
400mV	150.0 mV	50mV/div	149 mV	±5.1 mV	21% pass	3.9 · 10 <sup>-3</sup>
400mV	-150.0 mV	50mV/div	-148 mV	±5.1 mV	33% pass	3.9 · 10 <sup>-3</sup>
800mV	300.0 mV	100mV/div	298 mV	±10.3 mV	19% pass	1.9 · 10 <sup>-3</sup>
800mV	-300.0 mV	100mV/div	-297 mV	±10.3 mV	29% pass	1.9 · 10 <sup>-3</sup>
1.6mV	600.0 mV	200mV/div	594 mV	±12.6 mV	48% pass	0.96 · 10 <sup>-3</sup>
1.6mV	-600.0 mV	200mV/div	-592 mV	±12.6 mV	64% pass	0.96 · 10 <sup>-3</sup>
4 V	1.500 V	500mV/div	1.49 V	±0.072 V	14% pass	3.9 · 10 <sup>-3</sup>
4 V	-1.500 V	500mV/div	-1.48 V	±0.072 V	23% pass	3.9 · 10 <sup>-3</sup>
8 V	3.000 V	1V/div	2.97 V	±0.095 V	32% pass	1.9 · 10 <sup>-3</sup>



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8 V	-3.000 V	1V/div	-2.96 V	±0.095 V	42% pass	1.9 · 10 <sup>-3</sup>
16 V	6.000 V	2V/div	5.96 V	±0.14 V	29% pass	0.96 · 10 <sup>-3</sup>
16 V	-6.000 V	2V/div	-5.93 V	±0.14 V	50% pass	0.96 · 10 <sup>-3</sup>
40 V	15.00 V	5V/div	14.9 V	±0.72 V	15% pass	3.9 · 10 <sup>-3</sup>
40 V	-15.00 V	5V/div	-14.8 V	±0.72 V	23% pass	3.9 · 10 <sup>-3</sup>
80 V	30.00 V	10V/div	29.7 V	±0.95 V	32% pass	1.9 · 10 <sup>-3</sup>
80 V	-30.00 V	10V/div	-29.6 V	±0.95 V	42% pass	1.9 · 10 <sup>-3</sup>
160 V	60.00 V	20V/div	59.3 V	±1.4 V	50% pass	0.96 · 10 <sup>-3</sup>
160 V	-60.00 V	20V/div	-59.0 V	±1.4 V	71% pass	0.96 · 10 <sup>-3</sup>
400 V	150.0 V	50V/div	149 V	±5.1V	18% pass	3.9 · 10 <sup>-3</sup>
400 V	-150.0 V	50V/div	-148 V	±5.1V	39% pass	3.9 · 10 <sup>-3</sup>
800 V	300.0 V	100V/div	298 V	±10.3 V	19% pass	1.9 · 10 <sup>-3</sup>
800 V	-300.0 V	100V/div	-296 V	±10.3 V	39% pass	1.9 · 10 <sup>-3</sup>
<b>Messfunktion</b> measurement function						
DC Volts Mean						
<b>Messbedingung</b> measured condition						
Coupling DC						
t = 1ms						
2 mV/Div -> 10 mV/Div: (BW Limit f = 20 kHz)						
20 mV/Div -> 100 V/Div: (BW Full f = 100 MHz)						
<b>Horizontalablenkung</b> Horizontal deflection						
<b>Funktionstest</b> Function test						
12ms	1.0000 ms		1.000 ms	±0.002 ms	0% pass	0.58 · 10 <sup>-3</sup>
<b>Messfunktion</b> measurement function						
Cursor delta time						
<b>Messbedingung</b> measured condition						
Coupling DC						
Averaging = 64						
<b>Zeitbasis</b> Timebase						
	10.0000000 MHz		9.999770 MHz	±0.001 MHz	23% pass	1.0 · 10 <sup>-6</sup>
<b>Messverfahren</b> measuring procedure						
Unterabtastung Undersampling						
<b>Messbedingung</b> measured condition						
t= 20ms						
<b>Anstiegszeit</b> Risetime						
Input A						
2.59ns <= 3.5ns	MU = 40*E-3 + 7ps				pass	



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<b>Input B</b>						
2.79ns <= 3.5ns	MU = 40*E-3 + 7ps					pass
<b>Input C</b>						
2.59ns <= 3.5ns	MU = 40*E-3 + 7ps					pass
<b>Input D</b>						
2.79ns <= 3.5ns	MU = 40*E-3 + 7ps					pass
<b>Messfunktion measurement function</b>						
<b>Type Rise</b>						
<b>Messbedingung measured condition</b>						
250mV @ 1MHz ; Trig Source Int						
<b>Funktionstest Function test</b>						
<b>Triggerflanke @ Input A 20 MHz</b>						
"Signal auf +/- Flanke triggerbar"						pass

zulässige Abweichung gemäß Herstellerangabe.  
allowed deviation in accordance with manufacturer.

Die dimensionslosen Anteile der Messunsicherheit U sind als relative Messunsicherheiten e bezogen auf den Messwert zu verstehen (U = e \* MW).

The non-dimensional fractions of the measuring uncertainty U are relative values e in relation to the indicated value (U = e \* i.v.).

Ausnutzung der zul. Abw. in % = |Abweichung| / zul. Abw.

Utilization of allowed dev. in % = |deviation| / allowed dev.