DEWETRON GmbH

Parkring 4
8074 Grambach
Austria

AAT2540006
Akkreditierung Austria 0632
17.01.2025

Kalibrierstelle für elektrische Messgrößen
Calibration body for electrical measurands

akkreditiert durch / *accredited by*
AKKREDITIERUNG AUSTRIA

Kalibrierzeichen
Calibration Mark

Kalibrierschein nach ISO/IEC 17025
Calibration certificate according to ISO/IEC 17025

Gegenstand *Object*	isolated voltage amplifier
Hersteller *Manufacturer*	DEWETRON
Typ *Type*	DAQP-HV
Herstellernummer *Serial number*	492224
Auftraggeber *Customer*	
Kalibriernummer *Order number*	AAT2540006
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	6
Datum der Kalibrierung *Date of calibration*	17.01.2025

Dieser Kalibrierschein dokumentiert die Rückführbarkeit auf nationale Normale zur Darstellung der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI).

Akkreditierung Austria ist Unterzeichner der multilateralen Übereinkommen der European Co-operation for Accreditation (EA) und der International Laboratory Accreditation Cooperation (ILAC) zur gegenseitigen Anerkennung der Kalibrierscheine.

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements according to the International system of Units (SI).

Akkreditierung Austria is a signatory to the multilateral agreements of the European Co-operation for Accreditation (EA) and of the International Laboratory Accreditation Cooperation (ILAC) for the mutual recognition of calibration certificates.

Stempel *Seal*	Datum *Date*	Zeichnungsberechtigter *Authorised person*	Bearbeiter *Person responsible*
	17.01.2025	Stefan Strohmaier	Nandor Nagy

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1. Kalibriergegenstand / *Calibration object*

isolated voltage amplifier DEWETRON DAQP-HV, S/N: 492224

2. Kalibrierverfahren / *Calibration procedure*

Die Kalibrierung erfolgt durch Vergleich der durch die Kalibrierstelle / Normale dargestellten Werte mit den Ausgangsgrößen am Kalibriergegenstand beziehungsweise den am Kalibriergegenstand angezeigten Werten.
The calibration is made by comparing the readings from the laboratory / standards to the output of the calibration object respectively the values displayed on the calibration object.

Prüfroutine / *Calibration procedure*: DAQP-HV_Akkred, Rev. 2.00

3. Messergebnisse / *Measurement results*

Die Kalibrierung im Rahmen der Akkreditierung umfasst die Messgrößen Gleichspannung, Wechselspannung, Gleichstrom, Wechselstrom und Gleichstromwiderstand.
Die Messergebnisse beziehen sich ausschließlich auf diesen Kalibriergegenstand zum Zeitpunkt der Kalibrierung.
The calibration scope of the accreditation contains the quantities direct voltage, alternating voltage, direct current, alternating current and direct current resistance.
The measurement results are exclusively linked to this calibration object at the time of calibration.

4. Messunsicherheit / *Measurement uncertainty*

Angegeben ist die erweiterte Messunsicherheit, die sich aus der Standardmessunsicherheit durch Multiplikation mit dem Erweiterungsfaktor k=2 ergibt. Sie wurde gemäß EA-4/02 ermittelt. Der Wert der Messgröße liegt im Regelfall mit einer Wahrscheinlichkeit von annähernd 95% im zugeordneten Werteintervall.
Ein Anteil für die Langzeitstabilität des Kalibriergegenstandes ist nicht enthalten.
The stated extended measurement uncertainty is derived from the standard uncertainty of measurement multiplied by the coverage factor k=2. It has been determined according to EA-4/02. The measured quantity is inside the corresponding value interval with a probability of approximately 95%.
A factor for the long time stability of the calibration object is not taken into account.

5. Umgebungsbedingungen / *environmental conditions*

Temperatur / *Temperature:*	22,4 °C
Rel. Luftfeuchte / *Rel. humidity:*	37,6 % r.H.
Kalibrierort / *Place of calibration:*	DEWETRON GmbH, Parkring 4, 8074 Grambach, Austria

6. Auftragnummer / *Reference Number*

7. Status / *Status*

PASS ()

AS-FOUND:	Eingangskalibration / *Incoming calibration*
AS-LEFT:	Ausgangskalibration / *Outgoing calibration*
FOUND/LEFT:	Eingangskalibration erfüllt Herstellerspezifikation / *Incoming calibration according to manufacturer specifications*
PASS:	Messergebnis liegt innerhalb der Herstellerspezifikationen (ohne Berücksichtigung der Messunsicherheiten) / *Measurement result is within manufacturer's specifications (without taking into account the measurement uncertainties)*
FAIL:	Das Messergebnis liegt nicht innerhalb der Herstellerspezifikationen (ohne Berücksichtigung der Messunsicherheiten) / *Measurement result is out of manufacturer's specifications (without taking into account the measurement uncertainties)*

8. Verwendete Fußnoten / *Used foot notes:*

(1) Zusätzliche Messwerte außerhalb des akkreditierten Bereiches, es kann keine Konformitätsaussage getroffen werden.
(1) Additional measured values outside the accreditited scope, a conformity statement cannot be made.

9. Kommentare / *Comments*

test

Für die Festlegung und Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.
The user is responsible for the definition and the compliance to a resonable period for repeating the calibration.

10. Verwendete Normale / Standards used

Asset	Description	Serial Number	Certificate No.	Cal Date	Due Date
5522A	5522A CALIBRATOR	2940903	N9102024	31-Okt-2024	31-Okt-2025
Keysight 3458A 05	3458A Multimeter	MY45056148	42082024	8-Aug-2024	8-Aug-2025

11. Testergebnisse / Test results

Test Description	True Value	Test Result	Lower limit	Upper limit	Exp Uncert	Error	% of Tol	Status
Kalibrierverfahren / calibration method: CAL-KV-01_Gleichspannung_v1.0_2024-07-04.xlsx-01 CAL-KV-02_Wechselspannung_v1.0_2024-07-04.xlsx-01								
Current Temperature of DMM and Calibrator DMM: 38.5°C Calibrator: 25.64°C								
Firmware Revision: 1.10 SERIAL Number .: 492224 Module Revision .: 201								
DC Calibration								
All DC-tests done with appropriate Range and Filter set to 100 Hz								
±20V Range (0.05% ±40mV)								
Real Val. ±5V ±10mV / Scaled Val. ±20V ±40mV								
Input 0V	0.0000 V	-0.0009 V	-0.0100 V	0.0100 V	4.80 e-06 V	-0,0009 V	8.82%	Pass
Input 2V	0.5000 V	0.4993 V	0.4898 V	0.5102 V	11.00 e-06 V	-0,0007 V	6.8%	Pass
Input 10V	2.5000 V	2.5004 V	2.4888 V	2.5113 V	53.00 e-06 V	0,0004 V	3.33%	Pass
Input 18V	4.5000 V	4.5022 V	4.4878 V	4.5122 V	89.00 e-06 V	0,0022 V	17.6%	Pass
Input -18V	-4.5000 V	-4.5020 V	-4.5122 V	-4.4878 V	89.00 e-06 V	-0,0020 V	16.4%	Pass
±50V Range (0.05% ±40mV)								
Real Val. ±5V ±4mV / Scaled Val. ±50V ±40mV								
Input 5V	0.5000 V	0.4996 V	0.4958 V	0.5042 V	11.00 e-06 V	-0,0004 V	9.63%	Pass
Input 25V	2.5000 V	2.5004 V	2.4947 V	2.5053 V	50.00 e-06 V	0,0004 V	7.73%	Pass
Input 45V	4.5000 V	4.5019 V	4.4938 V	4.5062 V	140.00 e-06 V	0,0019 V	30.5%	Pass
Input -45V	-4.5000 V	-4.5012 V	-4.5062 V	-4.4938 V	140.00 e-06 V	-0,0012 V	19.8%	Pass
±100V Range (0.05% ±50mV)								
Real Val. ±5V ±2.5mV / Scaled Val. ±100V ±50mV								
Input 10V	0.5000 V	0.4998 V	0.4973 V	0.5028 V	12.00 e-06 V	-0,0002 V	7.62%	Pass
Input 50V	2.5000 V	2.5005 V	2.4962 V	2.5038 V	77.00 e-06 V	0,0005 V	13.1%	Pass
Input 90V	4.5000 V	4.5019 V	4.4953 V	4.5047 V	130.00 e-06 V	0,0019 V	39.4%	Pass
Input -90V	-4.5000 V	-4.5007 V	-4.5047 V	-4.4953 V	130.00 e-06 V	-0,0007 V	15.4%	Pass
±200V Range (0.05% ±100mV)								
Real Val. ±5V ±2.5mV / Scaled Val. ±200V ±100mV								
Input 20V	0.5000 V	0.4995 V	0.4973 V	0.5028 V	12.00 e-06 V	-0,0005 V	19.4%	Pass
Input 100V	2.5000 V	2.5001 V	2.4962 V	2.5038 V	72.00 e-06 V	0,0001 V	2.69%	Pass
Input 180V	4.5000 V	4.5014 V	4.4953 V	4.5047 V	120.00 e-06 V	0,0014 V	30.5%	Pass
Input -180V	-4.5000 V	-4.5010 V	-4.5047 V	-4.4953 V	120.00 e-06 V	-0,0010 V	20.8%	Pass
±400V Range (0.05% ±200mV)								
Real Val. ±5V ±2.5mV / Scaled Val. ±400V ±200mV								
Input 40V	0.5000 V	0.4996 V	0.4973 V	0.5028 V	17.00 e-06 V	-0,0004 V	16.1%	Pass
Input -40V	-0.5000 V	-0.5006 V	-0.5028 V	-0.4973 V	17.00 e-06 V	-0,0006 V	23.6%	Pass
Input 120V	1.5000 V	1.4997 V	1.4968 V	1.5033 V	43.00 e-06 V	-0,0003 V	8.41%	Pass
Input 200V	2.5000 V	2.5000 V	2.4962 V	2.5038 V	70.00 e-06 V	0,0000 V	1.04%	Pass
Input -200V	-2.5000 V	-2.5009 V	-2.5038 V	-2.4962 V	70.00 e-06 V	-0,0009 V	24.5%	Pass
Input 280V	3.5000 V	3.5005 V	3.4958 V	3.5042 V	96.00 e-06 V	0,0005 V	12.5%	Pass
Input 360V	4.5000 V	4.5014 V	4.4953 V	4.5047 V	130.00 e-06 V	0,0014 V	28.8%	Pass
Input -360V	-4.5000 V	-4.5007 V	-4.5047 V	-4.4953 V	130.00 e-06 V	-0,0007 V	14.5%	Pass
±800V Range (0.05% ±400mV)								
Real Val. ±5V ±2.5mV / Scaled Val. ±800V ±400mV								
Input 80V	0.5000 V	0.4995 V	0.4973 V	0.5028 V	16.00 e-06 V	-0,0005 V	17.4%	Pass
Input 400V	2.5000 V	2.4999 V	2.4962 V	2.5038 V	72.00 e-06 V	-0,0001 V	2.69%	Pass
Input 720V	4.5000 V	4.5014 V	4.4953 V	4.5047 V	120.00 e-06 V	0,0014 V	29.1%	Pass
Input -720V	-4.5000 V	-4.5008 V	-4.5047 V	-4.4953 V	120.00 e-06 V	-0,0008 V	15.9%	Pass
±1400V Range (0.05% ±700mV)								
Real Val. ±5V ±2.5mV / Scaled Val. ±1400V ±700mV								
Input 140V	0.5000 V	0.5001 V	0.4973 V	0.5028 V	15.00 e-06 V	0,0001 V	1.99%	Pass
Input 700V	2.5000 V	2.5008 V	2.4962 V	2.5038 V	67.00 e-06 V	0,0008 V	21.4%	Pass
Input 980V	3.5000 V	3.5017 V	3.4958 V	3.5042 V	91.00 e-06 V	0,0017 V	41.1%	Pass
Input -980V	-3.5000 V	-3.5012 V	-3.5042 V	-3.4958 V	91.00 e-06 V	-0,0012 V	28.1%	Pass
All AC-tests done with appropriate Range and Filter set to max Bandwidth 300kHz								
AC Accuracy: 20 V and 50 V Range 1 Hz to 1 kHz : ±0.15 % of reading ±0.1 % of range ±40 mV 1 kHz to 10 kHz : ±0.35 % of reading ±0.1 % of range ±40 mV								

11. Testergebnisse / Test results

Test Description	True Value	Test Result	Lower limit	Upper limit	Exp Uncert	Error	% of Tol	Status
100 V to 1400 V Range	1 Hz to 1 kHz : ±0.15 % of reading ±0.15 % of range							
	1 kHz to 50 kHz : ±0.35 % of reading ±0.15 % of range							
±20V Range								
Input 2V @ 20Hz	0.5000 V	0.4998 V	0.4843 V	0.5158 V	230.00 e-06 V	-0,0002 V	1.34%	Pass
Input 12V @ 20Hz	3.0000 V	2.9990 V	2.9805 V	3.0195 V	1.80 e-03 V	-0,0010 V	5.14%	Pass
Input 12V @ 50Hz	3.0000 V	3.0004 V	2.9805 V	3.0195 V	930.00 e-06 V	0,0004 V	2.15%	Pass
Input 12V @ 1kHz	3.0000 V	3.0005 V	2.9805 V	3.0195 V	930.00 e-06 V	0,0005 V	2.62%	Pass
±50V Range								
Input 30V @ 20Hz	3.0000 V	2.9986 V	2.9865 V	3.0135 V	1.60 e-03 V	-0,0014 V	10.2%	Pass
Input 30V @ 50Hz	3.0000 V	3.0000 V	2.9865 V	3.0135 V	840.00 e-06 V	0,0000 V	0.333%	Pass
Input 30V @ 1kHz	3.0000 V	3.0001 V	2.9865 V	3.0135 V	840.00 e-06 V	0,0001 V	0.498%	Pass
±100V Range								
Input 60V @ 50Hz	3.0000 V	2.9999 V	2.9880 V	3.0120 V	1.00 e-03 V	-0,0001 V	1.09%	Pass
Input 60V @ 1kHz	3.0000 V	2.9997 V	2.9880 V	3.0120 V	1.00 e-03 V	-0,0003 V	2.18%	Pass
Input 60V @ 10kHz	3.0000 V	2.9993 V	2.9820 V	3.0180 V	1.40 e-03 V	-0,0007 V	3.62%	Pass
±200V Range								
Input 120V @ 50Hz	3.0000 V	2.9998 V	2.9880 V	3.0120 V	950.00 e-06 V	-0,0002 V	1.59%	Pass
Input 120V @ 1kHz	3.0000 V	2.9996 V	2.9880 V	3.0120 V	950.00 e-06 V	-0,0004 V	3.51%	Pass
±400V Range								
Input 40V @ 50Hz	0.5000 V	0.5000 V	0.4918 V	0.5082 V	170.00 e-06 V	0,0000 V	0.575%	Pass
Input 40V @ 1kHz	0.5000 V	0.4999 V	0.4918 V	0.5082 V	170.00 e-06 V	-0,0001 V	0.878%	Pass
Input 120V @ 50Hz	1.5000 V	1.4997 V	1.4903 V	1.5097 V	560.00 e-06 V	-0,0003 V	2.76%	Pass
Input 120V @ 1kHz	1.5000 V	1.4996 V	1.4903 V	1.5097 V	560.00 e-06 V	-0,0004 V	4.17%	Pass
Input 240V @ 50Hz	3.0000 V	2.9996 V	2.9880 V	3.0120 V	920.00 e-06 V	-0,0004 V	3.4%	Pass
Input 240V @ 1kHz	3.0000 V	2.9993 V	2.9880 V	3.0120 V	920.00 e-06 V	-0,0007 V	5.77%	Pass
±800V Range								
Input 480V @ 50Hz	3.0000 V	2.9996 V	2.9880 V	3.0120 V	1.30 e-03 V	-0,0004 V	3.33%	Pass
Input 480V @ 1kHz	3.0000 V	2.9996 V	2.9880 V	3.0120 V	1.30 e-03 V	-0,0004 V	3.15%	Pass
±1400V Range								
Input 840V @ 50Hz	3.0000 V	3.0003 V	2.9880 V	3.0120 V	1.30 e-03 V	0,0003 V	2.79%	Pass
Input 840V @ 1kHz	3.0000 V	3.0009 V	2.9880 V	3.0120 V	1.30 e-03 V	0,0009 V	7.8%	Pass
FILTER TEST								
All tests done in ±20V Range								
Filter test: 10Hz @ 10Hz							Pass	(1)
Filter test: 10Hz @ 100Hz							Pass	(1)
Filter test: 30Hz @ 15Hz							Pass	(1)
Filter test: 30Hz @ 30Hz							Pass	(1)
Filter test: 30Hz @ 300Hz							Pass	(1)
Filter test: 100Hz @ 50Hz							Pass	(1)
Filter test: 100Hz @ 100Hz							Pass	(1)
Filter test: 100Hz @ 1kHz							Pass	(1)
Filter test: 100Hz Butter. @ 1kHz							Pass	(1)
Filter test: 300Hz @ 150Hz							Pass	(1)
Filter test: 300Hz @ 300Hz							Pass	(1)
Filter test: 300Hz @ 3kHz							Pass	(1)
Filter test: 1kHz @ 500Hz							Pass	(1)
Filter test: 1kHz @ 1kHz							Pass	(1)
Filter test: 1kHz @ 10kHz							Pass	(1)
Filter test: 1kHz Butter. @ 10kHz							Pass	(1)
Filter test: 3kHz @ 1500Hz							Pass	(1)
Filter test: 3kHz @ 3kHz							Pass	(1)
Filter test: 3kHz @ 30kHz							Pass	(1)
Filter test: 10kHz @ 5 kHz							Pass	(1)
Filter test: 10kHz @ 10kHz							Pass	(1)
Filter test: 10kHz @ 100kHz							Pass	(1)
Filter test: 30kHz @ 15kHz							Pass	(1)
Filter test: 30kHz @ 30kHz							Pass	(1)
Filter test: 100kHz @ 50kHz							Pass	(1)
Filter test: 100kHz @ 100kHz							Pass	(1)
Bandwith test @ 100kHz							Pass	(1)
Bandwith test @ 200kHz							Pass	(1)
Bandwith test @ 300kHz							Pass	(1)
CMR test								
CMRR test: 20V Range @ 50Hz							Pass	(1)
CMRR test: 20V Range @ 400Hz							Pass	(1)
CMRR test: 20V Range @ 1kHz							Pass	(1)
CMRR test: 20V Range @ 10kHz							Pass	(1)
CMRR test: 20V Range @ 100kHz							Pass	(1)

Ende des Kalibrierscheines / *End of Calibration Certificate*