



D3: DAE

Client **ADT (Auden)**

CALIBRATION CERTIFICATE

Object(s) **DAE3 - SN:510**

Calibration procedure(s) **QA CAL-06.v2
Calibration procedure for the data acquisition unit (DAE)**

Calibration date: **June 2, 2003**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

This calibration statement documents traceability of M&TE used in the calibration procedures and conformity of the procedures with the ISO/IEC 17025 international standard.

All calibrations have been conducted in the closed laboratory facility: environment temperature 22 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

| Model Type | ID # | Cal Date | Scheduled Calibration |
|-----------------------------------|-------------|----------|-----------------------|
| Fluke Process Calibrator Type 702 | SN: 6295803 | 3-Sep-01 | Sep-03 |

| | | | |
|----------------|-----------------------|------------|---|
| | Name | Function | Signature |
| Calibrated by: | Philipp Storchenegger | Technician |  |

| | | | |
|--------------|--------------|--------------|---|
| | Name | Function | Signature |
| Approved by: | Fin Bornholt | R&D Director |  |

Date issued: June 2, 2003

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

1. DC Voltage Measurement

DA - Converter Values from DAE

High Range: 1LSB = 6.1 μ V , full range = 400 mV
 Low Range: 1LSB = 61nV , full range = 4 mV

Software Set-up: Calibration time: 3 sec Measuring time: 3 sec

| Setup | X | Y | Z |
|--------------------|-------------|-------------|-------------|
| High Range | 403.2306258 | 403.4757894 | 403.8449771 |
| Low Range | 3.95687 | 3.92485 | 3.95853 |
| Connector Position | 44 ° | | |

| High Range | Input | Reading in μ V | % Error |
|-------------------|-------|--------------------|---------|
| Channel X + Input | 200mV | 200000.2 | 0.00 |
| | 20mV | 19993.79 | -0.03 |
| Channel X - Input | 20mV | -19980.99 | -0.10 |
| | 200mV | 200000.4 | 0.00 |
| Channel Y + Input | 20mV | 20001.85 | 0.01 |
| | 20mV | -19996.06 | -0.02 |
| Channel Y - Input | 20mV | -19996.06 | -0.02 |
| | 200mV | 200000 | 0.00 |
| Channel Z + Input | 20mV | 20005.1 | 0.03 |
| | 20mV | -19995.49 | -0.02 |
| Channel Z - Input | 20mV | -19995.49 | -0.02 |

| Low Range | Input | Reading in μ V | % Error |
|-------------------|-------|--------------------|---------|
| Channel X + Input | 2mV | 1999.96 | 0.00 |
| | 0.2mV | 200.262 | 0.13 |
| Channel X - Input | 0.2mV | -200.476 | 0.24 |
| | 2mV | 1999.94 | 0.00 |
| Channel Y + Input | 0.2mV | 199.654 | -0.17 |
| | 0.2mV | -200.567 | 0.28 |
| Channel Y - Input | 0.2mV | -200.567 | 0.28 |
| | 2mV | 1999.94 | 0.00 |
| Channel Z + Input | 0.2mV | 199.089 | -0.46 |
| | 0.2mV | -200.866 | 0.43 |
| Channel Z - Input | 0.2mV | -200.866 | 0.43 |

2. Common mode sensitivity

Software Set-up

Calibration time: 3 sec, Measuring time: 3 sec

High/Low Range

| in μV | Common mode Input Voltage | High Range Reading | Low Range Reading |
|------------------|---------------------------|--------------------|-------------------|
| Channel X | 200mV | 17.0932 | 16.4097 |
| | - 200mV | -16.4559 | -16.8147 |
| Channel Y | 200mV | 14.0608 | 14.2761 |
| | - 200mV | -17.3783 | -16.0218 |
| Channel Z | 200mV | -10.1267 | -10.289 |
| | - 200mV | 9.00246 | 9.53265 |

3. Channel separation

Software Set-up

Calibration time: 3 sec, Measuring time: 3 sec

High Range

| in μV | Input Voltage | Channel X | Channel Y | Channel Z |
|------------------|---------------|-----------|-----------|------------|
| Channel X | 200mV | - | 2.61579 | -0.0916442 |
| Channel Y | 200mV | 0.799878 | - | 4.96696 |
| Channel Z | 200mV | -0.930035 | 0.207589 | - |

4. AD-Converter Values with inputs shorted

| in LSB | Low Range | High Range |
|-----------|-----------|------------|
| Channel X | 16987 | 15970 |
| Channel Y | 17091 | 16204 |
| Channel Z | 16130 | 16170 |

5. Input Offset Measurement

Measured after 15 min warm-up time of the Data Acquisition Electronic.
Every Measurement is preceded by a calibration cycle.

Software set-up:

Calibration time: 3 sec
Measuring time: 3 sec
Number of measurements: 100, Low Range

Input 10M Ω

| in μV | Average | min. Offset | max. Offset | Std. Deviation |
|------------------|---------|-------------|-------------|----------------|
| Channel X | 0.28 | -0.35 | 1.12 | 0.25 |
| Channel Y | -2.13 | -3.88 | -1.32 | 0.34 |
| Channel Z | -0.46 | -1.98 | 0.32 | 0.30 |

Input shorted

| in μV | Average | min. Offset | max. Offset | Std. Deviation |
|------------------|---------|-------------|-------------|----------------|
| Channel X | 0.08 | -0.98 | 0.82 | 0.20 |
| Channel Y | -0.67 | -2.26 | 2.04 | 0.37 |
| Channel Z | -0.82 | -1.30 | -0.37 | 0.19 |

6. Input Offset Current

| in fA | Input Offset Current |
|-----------|----------------------|
| Channel X | < 25 |
| Channel Y | < 25 |
| Channel Z | < 25 |

7. Input Resistance

| | Calibrating | Measuring |
|-----------|-------------------|-------------------|
| Channel X | 200.1 k Ω | 200.28 M Ω |
| Channel Y | 200.07 k Ω | 197.89 M Ω |
| Channel Z | 200.06 k Ω | 198.39 M Ω |

8. Low Battery Alarm Voltage

| in V | Alarm Level |
|----------------|-------------|
| Supply (+ Vcc) | 7.86 V |
| Supply (- Vcc) | -7.69 V |

9. Power Consumption

| in mA | Switched off | Stand by | Transmitting |
|----------------|--------------|----------|--------------|
| Supply (+ Vcc) | 0.000 | 5.28 | 14.2 |
| Supply (- Vcc) | -0.012 | -7.47 | -8.76 |

10. Functional test

| | |
|-----------------------------|-------|
| Touch async pulse 1 | ok |
| Touch async pulse 2 | ok |
| Touch status bit 1 | ok |
| Touch status bit 2 | ok |
| Remote power off | ok |
| Remote analog Power control | ok |
| | |
| Modification Status | B – C |
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