

**DASY - DOSIMETRIC ASSESSMENT SYSTEM**

**CALIBRATION REPORT**

**DATA ACQUISITION ELECTRONICS**

**MODEL:** DAE3 V1

**SERIAL NUMBER:** 322

This Data Acquisition Unit was calibrated and tested using a FLUKE 702 Process Calibrator. Calibration and verification were performed at an ambient temperature of  $23 \pm 5$  °C and a relative humidity of < 70%.

Measurements were performed using the standard DASY software for converting binary values, offset compensation and noise filtering. Software settings are indicated in the reports.

Results from this calibration relate only to the unit calibrated.

**Calibrated by:** M.Bruggmann

**Calibration Date:** 31.12.97

**DASY Software Version:** DASY3 V1.0a

## 1. DC Voltage Measurement

DA - Converter Values from DAE

High Range: 1LSB =  $7.6\mu\text{V}$ , full range = 500 mV  
 Low Range: 1LSB =  $76\text{nV}$ , full range = 5 mV

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

| Setup              | X        | Y        | Z        |
|--------------------|----------|----------|----------|
| High Range         | 505.7575 | 505.41   | 505.9225 |
| Low Range          | 4.95165  | 4.939525 | 4.979075 |
| Connector Position | 110°     |          |          |

| High Range        | Input | Reading in $\mu\text{V}$ | % Error |
|-------------------|-------|--------------------------|---------|
| Channel X + Input | 200mV | 200001                   | 0.00    |
|                   | 20mV  | 20002.8                  | 0.01    |
| Channel X - Input | 20mV  | -19999.6                 | 0.00    |
| Channel Y + Input | 200mV | 200000                   | 0.00    |
|                   | 20mV  | 20000.9                  | 0.00    |
| Channel Y - Input | 20mV  | -20002.3                 | 0.01    |
| Channel Z + Input | 200mV | 200000                   | 0.00    |
|                   | 20mV  | 20003.1                  | 0.02    |
| Channel Z - Input | 20mV  | -20000                   | 0.00    |

| Low Range         | Input | Reading in $\mu\text{V}$ | % Error |
|-------------------|-------|--------------------------|---------|
| Channel X + Input | 2mV   | 2000.04                  | 0.00    |
|                   | 0.2mV | 199.784                  | -0.11   |
| Channel X - Input | 0.2mV | -200.753                 | 0.38    |
| Channel Y + Input | 2mV   | 2000.17                  | 0.01    |
|                   | 0.2mV | 198.891                  | -0.55   |
| Channel Y - Input | 0.2mV | -201.35                  | 0.67    |
| Channel Z + Input | 2mV   | 1999.9                   | 0.00    |
|                   | 0.2mV | 199.459                  | -0.27   |
| Channel Z - Input | 0.2mV | -201.24                  | 0.62    |

## 2. Common mode sensitivity

Software Set-up

Calibration time: 3 sec, Measuring time: 3 sec

Low/High Range

| in $\mu\text{V}$ | Common mode Input Voltage | High Range Reading | Low Range Reading |
|------------------|---------------------------|--------------------|-------------------|
| Channel X        | 200mV                     | 10.6458            | 8.11049           |
|                  | - 200mV                   | -7.52593           | -8.80445          |
| Channel Y        | 200mV                     | 2.77096            | 1.74226           |
|                  | - 200mV                   | -4.62126           | -3.96747          |
| Channel Z        | 200mV                     | 2.33392            | 1.04693           |
|                  | - 200mV                   | -2.38279           | -3.44739          |

## 3. Channel separation

Software Set-up

Calibration time: 3 sec, Measuring time: 3 sec

High Range

| in $\mu\text{V}$ | Input Voltage | Channel X | Channel Y | Channel Z |
|------------------|---------------|-----------|-----------|-----------|
| Channel X        | 200mV         | -         | 1.76361   | -0.118691 |
| Channel Y        | 200mV         | 2.30225   | -         | 2.60122   |
| Channel Z        | 200mV         | -3.40601  | -1.47267  | -         |

## 4. AD-Converter Values with inputs shorted

| in LSB    | Low Range | High Range |
|-----------|-----------|------------|
| Channel X | 13074     | 12448      |
| Channel Y | 12829.9   | 12444.6    |
| Channel Z | 11583.8   | 12596.6    |

## 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 $\Omega$

| in $\mu$ V | Average  | min. Offset | max. Offset | Std. Deviation |
|------------|----------|-------------|-------------|----------------|
| Channel X  | -0.40045 | -1.27585    | 0.195834    | 0.254749       |
| Channel Y  | -0.64842 | -1.28513    | 0.124686    | 0.29496        |
| Channel Z  | -1.12127 | -2.23713    | -0.40703    | 0.269582       |

Input shorted

| in $\mu$ V | Average  | min. Offset | max. Offset | Std. Deviation |
|------------|----------|-------------|-------------|----------------|
| Channel X  | -0.83035 | -1.55355    | -0.12397    | 0.283752       |
| Channel Y  | 0.640006 | -0.14782    | 1.588       | 0.243942       |
| Channel Z  | -0.75032 | -1.46387    | -0.08725    | 0.304108       |

## 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 k $\Omega$ | 200M $\Omega$ |
| Channel Y | 200 k $\Omega$ | 200M $\Omega$ |
| Channel Z | 200 k $\Omega$ | 200M $\Omega$ |

## 8. Low Battery Alarm Voltage

| in V           | Alarm Level |
|----------------|-------------|
| Supply (+ Vcc) | 7.9 V       |
| Supply (- Vcc) | -7.6V       |

## 9. Power Consumption

| in mA          | Switched off | Stand by | Transmitting |
|----------------|--------------|----------|--------------|
| Supply (+ Vcc) | 0.006        | 5.6      | 13.6         |
| Supply (- Vcc) | -0.009       | -8.1     | -9.2         |

## 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 |
|                             |    |
|                             |    |
|                             |    |
|                             |    |

Date: 31-12-97

Signature: *[Handwritten Signature]*