

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland

**Client** [REDACTED]

## CALIBRATION CERTIFICATE

Object(s) [REDACTED] DAE3 - SN:558

Calibration procedure(s) [REDACTED] QA CAL-06 v2  
Calibration procedure for the data acquisition unit (DAE)

Calibration date: [REDACTED] March 07, 2003

Condition of the calibrated item [REDACTED] 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: | Eric Hainfeld | Technician   | [Signature] |
| Approved by:   | Fin Bornhoff  | R&D Director | [Signature] |

Date issued: March 07, 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 =  $6.1\mu\text{V}$ , full range = 400 mV  
 Low Range: 1LSB =  $61\text{nV}$ , full range = 4 mV

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

| Setup              | X          | Y           | Z           |
|--------------------|------------|-------------|-------------|
| High Range         | 405.010098 | 404.9037428 | 405.0817835 |
| Low Range          | 3.972      | 3.95185     | 3.96828     |
| Connector Position | 86 °       |             |             |

| High Range        | Input | Reading in $\mu\text{V}$ | % Error |
|-------------------|-------|--------------------------|---------|
| Channel X + Input | 200mV | 200000                   | 0.00    |
|                   | 20mV  | 20003.4                  | 0.02    |
| Channel X - Input | 20mV  | -19993                   | -0.04   |
| Channel Y + Input | 200mV | 200001                   | 0.00    |
|                   | 20mV  | 20002.7                  | 0.01    |
| Channel Y - Input | 20mV  | -19993                   | -0.04   |
| Channel Z + Input | 200mV | 200000                   | 0.00    |
|                   | 20mV  | 20000.8                  | 0.00    |
| Channel Z - Input | 20mV  | -19997.7                 | -0.01   |

| Low Range         | Input | Reading in $\mu\text{V}$ | % Error |
|-------------------|-------|--------------------------|---------|
| Channel X + Input | 2mV   | 2000.2                   | 0.01    |
|                   | 0.2mV | 200.04                   | 0.02    |
| Channel X - Input | 0.2mV | -200.81                  | 0.41    |
| Channel Y + Input | 2mV   | 2000.1                   | 0.00    |
|                   | 0.2mV | 199.47                   | -0.27   |
| Channel Y - Input | 0.2mV | -201.01                  | 0.50    |
| Channel Z + Input | 2mV   | 1999.9                   | 0.00    |
|                   | 0.2mV | 198.68                   | -0.66   |
| Channel Z - Input | 0.2mV | -201.1                   | 0.55    |

## 2. Common mode sensitivity

Software Set-up

Calibration time: 3 sec, Measuring time: 3 sec

High/Low Range

| in $\mu\text{V}$ | Common mode Input Voltage | High Range Reading | Low Range Reading |
|------------------|---------------------------|--------------------|-------------------|
| Channel X        | 200mV                     | -1.0284            | -1.5716           |
|                  | - 200mV                   | 3.9204             | 1.3725            |
| Channel Y        | 200mV                     | 6.7686             | 5.874             |
|                  | - 200mV                   | -6.8145            | -8.0898           |
| Channel Z        | 200mV                     | 2.1943             | 2.766             |
|                  | - 200mV                   | -2.52              | -4.6218           |

## 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         | -         | 0.88082   | 0.19177   |
| Channel Y        | 200mV         | 0.049124  | -         | 0.25676   |
| Channel Z        | 200mV         | -2.1226   | -0.89508  | -         |

## 4. AD-Converter Values with inputs shorted

| in LSB    | Low Range | High Range |
|-----------|-----------|------------|
| Channel X | 16492     | 16236      |
| Channel Y | 16307     | 15690      |
| Channel Z | 16461     | 16033      |

## 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  | -0.52   | -1.64       | 0.60        | 0.43           |
| Channel Y  | -2.05   | -3.65       | 0.06        | 0.51           |
| Channel Z  | -0.34   | -2.05       | 0.43        | 0.37           |

Input shorted

| in $\mu$ V | Average | min. Offset | max. Offset | Std. Deviation |
|------------|---------|-------------|-------------|----------------|
| Channel X  | 0.04    | -0.84       | 1.09        | 0.41           |
| Channel Y  | -0.77   | -2.08       | 0.17        | 0.40           |
| Channel Z  | -1.01   | -1.68       | -0.38       | 0.24           |

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

## 8. Low Battery Alarm Voltage

| in V           | Alarm Level |
|----------------|-------------|
| Supply (+ Vcc) | 7.66 V      |
| Supply (- Vcc) | -7.53 V     |

## 9. Power Consumption

| in mA          | Switched off | Stand by | Transmitting |
|----------------|--------------|----------|--------------|
| Supply (+ Vcc) | 0.000        | 5.83     | 14.1         |
| Supply (- Vcc) | -0.011       | -7.86    | -9.13        |

## 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 |
|                             |       |
|                             |       |