

Calibration for imc measurement devices

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With imc's calibration service¹, for each channel and in every input range, a calibrator's setpoint value is compared with the system's actual measured value. A correction value is formed on the basis

¹ FAQ:

What does calibration entail?

In calibration, the relationship between the measured value of an output quantity and the corresponding value of the measured input quantity is determined under specified conditions. Simply put: comparison with a reference having the same units, which in measurement engineering means determining the measurement deviation returned by measurement equipment. Calibration does not entail technical intervention – such as adjustment – in the measurement equipment. With indicator measurement equipment, calibration determines the deviation between the measured value indicated and the correct value – or the reference value considered correct.

Calibrations are performed in order to ensure that the measurement equipment used indicates values having a known and documented proportionality to an internationally accepted standard for the quantity measured.

The goal is that when measurements of the same quantities are performed by different parties, e.g. customer and supplier, comparable results are obtained. The prerequisite for this is that the measurement uncertainty—which is inherent in any measurement—must be known.

Performing calibration leads to results and findings which provide a guide in better understanding and assessing the tolerances of measurement equipment.

When and why is adjustment needed?

Adjustment refers to the process of adjusting measurement instruments to compensate for known systematic measurement discrepancies. In contrast, then, to calibration, this means manipulating the instrument in a way which produces lasting effects. Note that this renders any previous calibration and its traceability pedigree obsolete! It is then also no longer possible to reconstruct any changes in the instrument's measurement properties.

By default, imc's adjustment procedure includes incoming calibration.

What is a legally secure calibration chain?

The process of calibrating a piece of measurement equipment using equipment conformant to a higher standards, which in turn is calibrated using equipment conformant to yet higher standards, is known as the calibration chain.

The purpose of this calibration chain is to trace a piece of equipment's calibration to the national standard.

How often is calibration necessary?

To get correct measurements in the long term, the test equipment used has to be monitored regularly and calibrated, if appropriate. The time between such calibration treatments is called the calibration interval. We frequently receive questions about the necessary calibration interval for measurement and test equipment.

However, there is no unambiguous answer to this question (in most cases there is no legally binding regulation), since a device's state of calibration is dynamic and depends upon the following factors, to name a few: the input quantity and its permissible tolerances, wear and tear on the equipment, stability of previous calibration procedures, measurement precision required and last but not least a company's quality assurance system policies.

As a matter of principle, a calibration is valid only at the moment it is performed.

Setting deadlines for re-calibration is the responsibility of the equipment user. As a rule, the calibration interval should be designed to optimize the balance between risks and costs.

This means that the calibration interval is ultimately the user's own responsibility to determine and monitor. Our recommendation is 1-2 years. In order to provide support in determining this interval for our customers, we offer consultation with our personnel.

As a default we recommend a calibration interval of 1 year in our technical spec sheets.

of this approach and saved in the device memory upon the subsequent adjustment process. Following the adjustment, a second calibration is performed. The reports are archived (electronically) at imc for 10 years. The test equipment used is subject to imc's test equipment monitoring program and is traceable to national standards, thus complying with the requirements of ISO 9001. The physical variables to be calibrated for any device depend on how the device is equipped; in general, a DC voltage calibration (offset and gain over three points), a calibration of internal reference sources (e.g. PT100 current source) and for temperature calibration (type K thermocouple, 1 measurement point with an isothermal box) are performed.

What do I need to order?

Ordering options with imc CRONOS-PL as an example

Recommended:

- **Adjustment for one measurement amplifier
CRPL/ADJ**
Flat charge for 1 CRONOS-PL measurement amplifier
Measurement of actual values
(customer is notified of deviations outside of tolerances)
Adjustment for each measurement amplifier as well as subsequent output calibration
Manufacturer's calibration conformant to DIN EN ISO 9001
Recommended in conjunction with CRPL/INSP-CRPL-x or CRPL/MOD-CRPL-x
Calibration including adjustment according to manufacturer's specifications is also possible on site for standard devices. Calibration according to the user's inspection plan available on-site by request.

Alternatively:

- **Calibration for one measurement amplifier
CRPL/CAL-A**
Flat charge for 1 CRONOS-PL measurement amplifier
Measurement of actual values
(customer is notified of deviations outside of tolerances)
Manufacturer's calibration conformant to DIN EN ISO 9001
Recommended in conjunction with CRPL/INSP-CRPL-x or CRPL/MOD-CRPL-x
Calibration including adjustment according to manufacturer's specifications is also possible on site for standard devices. Calibration according to the user's inspection plan available on-site by request.

Optional:

- **Calibration report set for one measurement amplifier
CRPL/CAL-P, SUP/CAL-P**
Report set with manufacturer's calibration certificate and single measurement values, along with a list of test equipment used. Only in conjunction with CRPL/CAL-A or CRPL/ADJ-A
Meets the requirements of DIN EN ISO 17025.
Provided upon request also in electronic format.

Optionally recommended:

- **System Inspection**

- CRPL/INSP-CRPL-x**

- Flat charge for one device

- Comprises system check, function check, service report

- Extra charge according to time and materials for necessary maintenance work

- Extra charge for adjustment, time and materials for necessary maintenance work, repairs

- System Inspection is also available on site for standard devices.

Why should every calibration include a System Inspection?

Following *imc System Inspection* the device is returned to the user having undergone complete functional testing (and repair if appropriate)! The imc System Inspection is the best and most reliable *100% Function test* according to the manufacturer's inspection plan, in which *even latent errors are detected*.

The work is performed by experienced specialist personnel of the manufacturer, in accordance with the device's history as recorded in the Service database.

Along with all digital components, the functioning of the power adapter and UPS are inspected.

Within the framework of the imc System Inspection, it is also possible to take account of customer-specific or device-specific prerequisites or conditions (for instance, the characteristics of an ICP channel or the custom interconnections can be checked). All work performed is documented internally by imc with reference to the device's serial number; the customer receives a service report and a test certificate.

Result: Full function test according to manufacturer's inspection plan

Along with the calibration certificate, the customer receives a test certificate and a Service report = status report with recommendation for maintenance interval and recalibration interval.