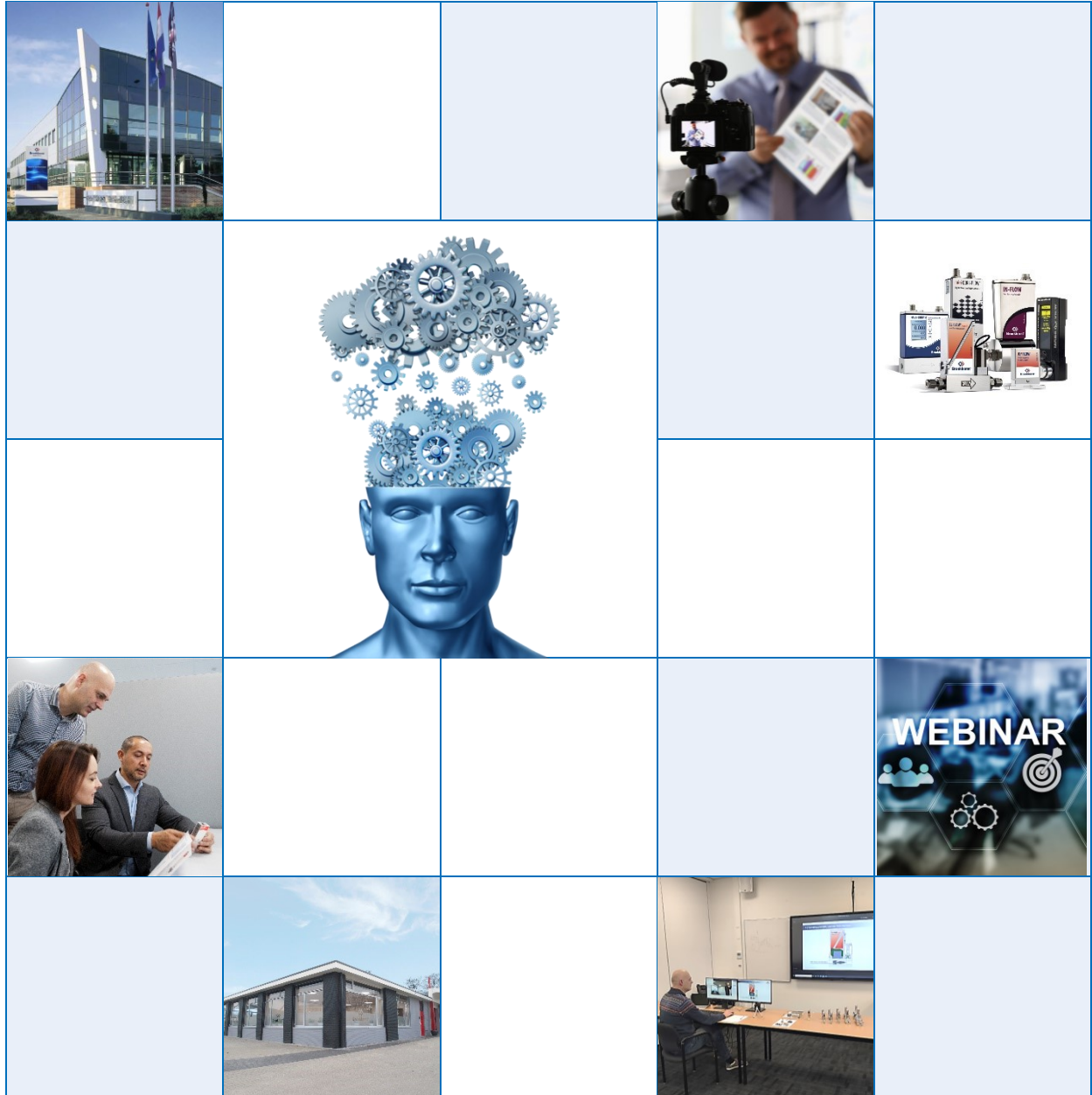


CUSTOMER CALIBRATION TRAINING

CATALOGUE 2024



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Instrument knowledge

Training objectives

In this course you will gain knowledge about the principles of mass flow measurement and control for gases and/or liquids based on thermal and/or Coriolis measurement technology. You will get insight in the construction, operation principles and typical applications of the Bronkhorst product series.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

No specific prerequisites required.

Product series

- ◆ EL-FLOW (7.26.040)
- ◆ LOW-DP-FLOW (7.26.043)
- ◆ EX-FLOW (7.26.043)
- ◆ MASS-STREAM (7.26.042)
- ◆ MASS-VIEW (7.26.075)
- ◆ LIQUI-FLOW (7.26.045)
- ◆ (mini) CORI-FLOW (7.26.044)

Content

In this course the following topics will be presented:

- ◆ Introduction
- ◆ Product differentiation
- ◆ Construction principles
- ◆ Model numbering
- ◆ Models and ranges
- ◆ Operating principles
- ◆ Features and benefits
- ◆ Installation and start-up



Duration

2 hours (per product series).

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: various, see product series.



Introduction to calibration

Training objectives

In this course you will gain knowledge about the principles of a mass flow meter calibration. You will get insight in the construction and the operation principles of the Bronkhorst Calibration equipment. The calibration methods and conversion models used at Bronkhorst will be explained.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Content

In this course the following topics will be presented:

- ◆ Definitions
- ◆ Calibration methods
- ◆ Calibration references
- ◆ Traceable and accredited calibration
- ◆ Accuracy
- ◆ Conversion factors
- ◆ Linearisation methods



Duration

2 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.029



As Found calibration using Portable Calibrator

Training objectives

In this course you will gain knowledge about the handling of the Portable Calibrator and how to perform As Found calibration of an instrument.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

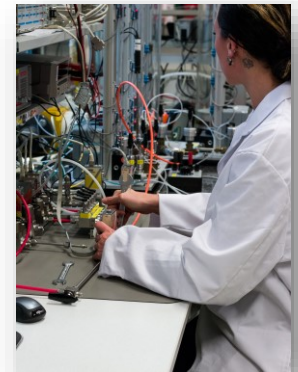
Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Module 7.26.029: introduction to calibration.



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented:

- ◆ Introduction
- ◆ System hardware set-up
- ◆ Mechanical and electrical Hook-up
- ◆ Environmental conditions
- ◆ Position DUT <> Portable Calibrator
- ◆ Operating E-8000 (or legacy E-7000) Readout and Control module

- ◆ Explanation of the software tools: FlowDDE, FlowView and FlowPlot
- ◆ Evaluate/optimize DUT state and performance
- ◆ Explanation FLUICAL calibration software
- ◆ Flow stability criteria
- ◆ Measuring calibration points
- ◆ Calibration certificate
- ◆ Accuracy
- ◆ Evaluate; Pass / Fail

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.030



As Found calibration using Piston Prover

Training objectives

In this course you will gain knowledge about the handling of the FLOW-BUS Piston Prover and how to perform As Found calibration of an instrument.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Module 7.26.029: introduction to calibration.



Duration

6 hours.

Training location

This training can only be offered offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented:

- ◆ Introduction
- ◆ System hardware set-up
- ◆ Mechanical and electrical hook-up
- ◆ Installation: environmental conditions, positioning, pressure supply, mercury (re-)placement, cleaning
- ◆ Manual operation of the calibration system using E-7000 Readout and Control module (legacy)

- ◆ Explanation of the software tools: FlowDDE, FlowView and FlowPlot
- ◆ Evaluate/optimize DUT state and performance
- ◆ Explanation FLUICAL calibration software
- ◆ Flow stability criteria
- ◆ Measuring calibration points
- ◆ Calibration certificate
- ◆ Accuracy
- ◆ Evaluate; Pass / Fail

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.031



As Found calibration using Rotary Meter

Training objectives

In this course you will gain knowledge about the handling of the FLOW-BUS Rotary Meter and how to perform As Found calibration of an instrument.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Module 7.26.029: introduction to calibration.



Duration

4 hours.

Training location

This training can only be offered offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented:

- ◆ Introduction
- ◆ System hardware set-up
- ◆ Mechanical and electrical hook-up
- ◆ Environmental conditions
- ◆ Manual operation of the calibration system using legacy E-7000 Readout and Control module (legacy)

- ◆ Explanation of the software tools: FlowDDE, FlowView and FlowPlot
- ◆ Evaluate/optimize DUT state and performance
- ◆ Explanation FLUICAL calibration software
- ◆ Flow stability criteria
- ◆ Measuring calibration points
- ◆ Calibration certificate
- ◆ Accuracy
- ◆ Evaluate; Pass / Fail

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.032



Adjustment: Look Up Table

Training objectives

In this course you will gain knowledge about the adjustment of digital instruments by storing calibration points in a Look Up Table using FLUICAL calibration software.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.
Module 7.26.029: introduction to calibration.
Module As Found calibration.

Instrument types

The "Look Up Table" adjustment method is applicable for the following instrument types:

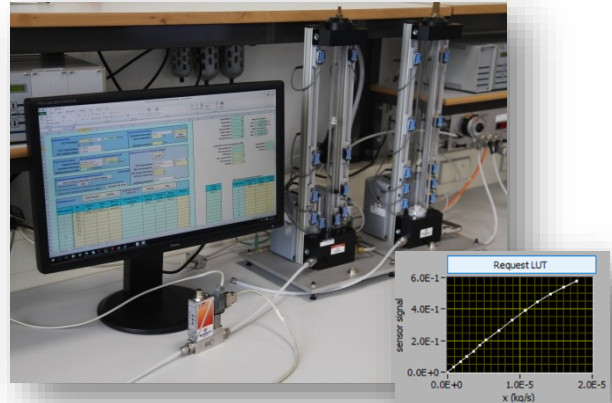
- ◆ EL-FLOW Select
- ◆ IN-FLOW Select (EL-FLOW IP65 execution)
- ◆ FLOW-SMS Select
- ◆ EL-FLOW Base *
- ◆ EL-FLOW Classic *

Content

In this course the following topics will be presented and practised:

- ◆ Introduction
- ◆ Adjust zero using auto-zero (0%)
- ◆ Adjust span using calculate full scale (100%)
- ◆ Measure sensor curve
- ◆ Store real flow (x) and sensor signal (y) in Look Up Table
- ◆ As Left calibration
- ◆ Additional curves *

* Note: Additional curves not available on some product series.



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.034



Adjustment: Polynomial function

Training objectives

In this course you will gain knowledge about the adjustment of digital instruments by measuring calibration points to obtain a polynomial function using FLUICAL calibration software.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.
Module 7.26.029: introduction to calibration.
Module As Found calibration.

Instrument types

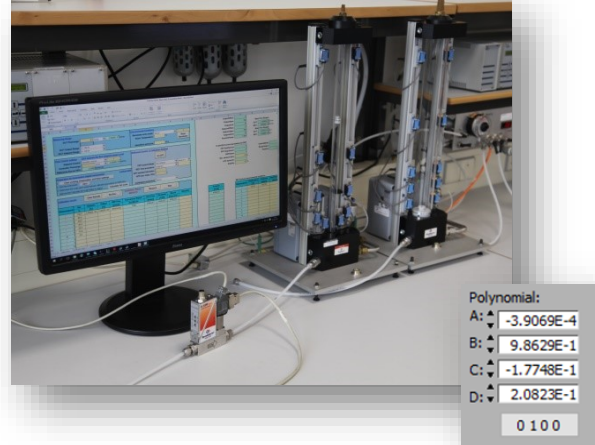
The "Polynomial function" adjustment method is applicable for the following instrument types:

- ◆ LOW- Δ P-FLOW digital
- ◆ IN-FLOW High Flow (F-106/F-107/F-116/F-206)
- ◆ EL-FLOW / IN-FLOW High Pressure (PN200 / PN400)
- ◆ EL-FLOW digital (legacy product)
- ◆ IN-FLOW digital (legacy product)
- ◆ FLOW-SMS digital (legacy product)

Content

In this course the following topics will be presented and practised:

- ◆ Introduction
- ◆ Adjust zero with auto-zero (0%)
- ◆ Adjust span with Full Scale factor (100%)
- ◆ Measure sensor curve
- ◆ Calculate and store polynomial constants A-D
- ◆ As Left calibration
- ◆ Additional curves



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.035



Adjustment: Tuning potentiometers

Training objectives

In this course you will gain knowledge about the adjustment of analog instruments by tuning potentiometers using FLUICAL calibration software.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Module 7.26.029: introduction to calibration.

Module As Found calibration.

Instrument types

The “potentiometers” adjustment method is applicable for the following instrument types:

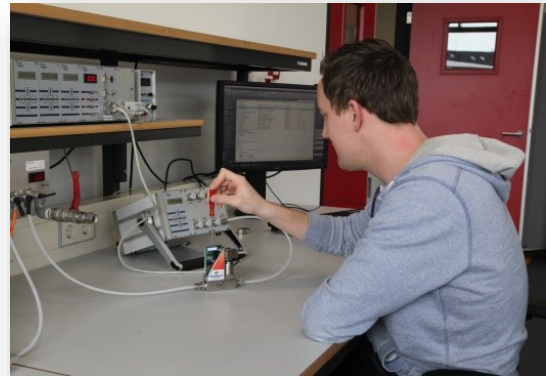
- ◆ EX-FLOW
- ◆ MANI-FLOW analog *
- ◆ EL-FLOW analog (legacy product)
- ◆ LOW- Δ P-FLOW analog (legacy product)
- ◆ IN-FLOW analog (legacy product)
- ◆ MASS-STREAM D-6200 analog (legacy product)
- ◆ MASS-STREAM D-5100 (legacy product) *

Content

In this course the following topics will be presented and practised:

- ◆ Introduction
- ◆ Adjust zero with “L” (Low) potentiometer (0%)
- ◆ Adjust span with “H” (High) potentiometer (100%)
- ◆ Adjust linearisation with “M” (Middle) potentiometer (50%) *
- ◆ Verify at 0%, 50%* and 100%, if necessary re-adjust potentiometers
- ◆ As Left calibration

* Note: “M” (Middle) potentiometer not available on all product series.



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.036



Adjustment: zero & span tuning (CTA gas)

Training objectives

In this course you will gain knowledge about the adjustment of digital instruments by tuning the span of the instrument using FLUICAL calibration software.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

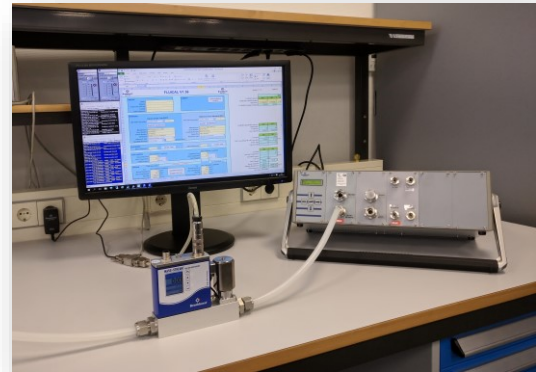
Prerequisites

Module instrument knowledge.
Module 7.26.029: introduction to calibration.
Module As Found calibration.

Instrument types

The "Span adjust" adjustment method is applicable for the following instrument types:

- ◆ MASS-STREAM D-6300
- ◆ MASS-VIEW
- ◆ MASS-STREAM D-6200 digital (legacy product)



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented and practised:

- ◆ Introduction
- ◆ Adjust zero (0%)
- ◆ Adjust span (100%)
- ◆ As Left calibration

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.037

As Found calibration using liquid reference

Training objectives

In this course you will gain knowledge about the handling of the liquid reference meter and how to perform As Found calibration of an instrument.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.

Module 7.26.029: introduction to calibration.



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented:

- ◆ Introduction
- ◆ System hardware set-up
- ◆ Mechanical and electrical hook-up
- ◆ Environmental conditions
- ◆ Fill system with calibration fluid
- ◆ Purging to remove gas from liquid
- ◆ Zeroing of liquid reference meters

- ◆ Explanation of the software tools: FlowDDE, FlowView and FlowPlot
- ◆ Evaluate/optimize DUT state and performance
- ◆ Explanation FLUICAL calibration software
- ◆ Flow stability criteria
- ◆ Measuring calibration points
- ◆ Calibration certificate
- ◆ Accuracy
- ◆ Evaluate; Pass / Fail

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.033

Adjustment: zero & span tuning (liquid flow)

Training objectives

In this course you will gain knowledge about the adjustment of digital instruments by tuning the span of the instrument using FLUICAL calibration software.

Audience

This training course is intended for anyone using or calibrating measurement instruments, for calibration coordinators, or for those responsible for maintaining quality.

Level

Attendees are supposed to be experienced or educated on vocational or bachelor level in the field of engineering.

Prerequisites

Module instrument knowledge.
Module 7.26.029: introduction to calibration.
Module As Found calibration.

Instrument types

The “zero & span adjustment” method is applicable for the following instrument types:

- ◆ mini CORI-FLOW M12, M13, M14, M15
- ◆ CORI-FLOW M52, M53, M54, M55
- ◆ LIQUI-FLOW L13, L23



Duration

4 hours.

Training location

This training can be offered online (via MS Teams) or offline (at Bronkhorst HQ, or onsite at the customer).

Date

Ask your local Sales Representative for available dates.

Content

In this course the following topics will be presented and practised:

- ◆ Introduction
- ◆ Adjust zero (0%)
- ◆ Adjust span (100%)
- ◆ As Left calibration

Attendees

Max 3 persons.

Executive trainer(s)

Bronkhorst specialists.

Certificate

A certificate of participation will be supplied.

Module number: 7.26.038



Contact

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Subscription

Please contact your local sales representatives for available dates and subscription.

