ABB Ability™ Verification for measurement devices
SRV500 Premium
Measurement made easy
The best possible check of measurement performance, without removal from the process

Maintenance made easy
- universal test platform
- automated test procedure
- simple connection
- intuitive and easy-to-use software
- enhance your verification with an externally traceable input/output test

Predictive maintenance
- detailed analysis of device health status
- trend data to determine maintenance interval

Flexible license options to suit your needs
- try before you buy
- pay per use or annual licenses
Help meet regulatory requirements and reduce maintenance costs with verification testing

What is verification?
Verification is the inspection and testing of a measurement device to establish that it is functioning within a specified permissible measurement error. Verification is typically used to meet regulatory/quality management system requirements. Industrial instrumentation is robust, very reliable and designed to operate for many years with minimal maintenance. In today's competitive environment customers are looking for ways to maximize their profitability – regular product verifications is one way to ensure processes operate continuously at their peak. Verification can also increase calibration intervals, saving money and reducing downtime.

The ABB verification story
Customers in water and other industries have been able to save large sums of money thanks to ABB's innovations in product verification over the last two decades.

1995 CalMaster released
- Worlds first flow verification system
- Step change in regulatory compliance and flow maintenance
- Tests to within 1% of original calibration certificate

2006 CalMaster2 released
- Worlds first battery-powered device verification system

2008 VeriMaster and ScanMaster released
- Flow verification testing without interrupting the measurement
- Testing using revolutionary in-built diagnostics coming from the device itself

2018 ABB Ability™ Verification for measurement devices
- Multi-device verification platform
- Traceable input/output testing

Introducing ABB Ability Verification for measurement devices
ABB Ability Verification for measurement devices is the next generation verification tool suite for use with a range of ABB devices. Download the software and load the relevant Verification Definition File (VDF) to provide the best possible check of measurement accuracy, without stopping your process.

The software (SRV500S) verifies the condition and performance of the device under test. With the licensed software version, test reports can be generated and stored locally for further analysis. Results can also be compared with historical measurements using the trending function.

For customers that require a traceable input/output test for regulatory/safety purposes the software can also be connected to a hardware testing unit SRV500H. SRV500H provides a plug-and-play, simple-to-use alternative to carrying a multimeter, precision resistor and timer counter into the field, with results included automatically in the verification report.

Building on ABB's fingerprint philosophy, each device is verification tested before shipping from the factory. The software enables the operator to choose whether to use either the factory fingerprint or to create a new fingerprint based on real site conditions after product commissioning. All verifications performed in the field can then be compared with the fingerprint data and previous tests to ensure device performance has not degraded.

Taking the pain out of instrumentation maintenance
- The clean, easy to use, software interface designed for keyboard and touch screen operation.
- Built-in help commands to walk the user through the verification process.
- Plug-and-play I/O tester
Product features and verification levels

Premium
- All features from standard and enhanced verification included
- Simulation of physical signals
- Measurement and verification of physical signals (internal currents, voltages and resistances)
- Designed for service

Enhanced
- Licensed software testing included
- Automated verification of outputs (pulse and current)
- USB input/output tester hardware box
- Accuracy statement for tested inputs and outputs

Standard
- Instrument diagnostics verification
- Guided (manual) output testing
- Report generation
- Historical verification data (trending)
- Installable software for control systems (DTM/FDI)

Basic
- Installable app (Windows 10)
- Device health indication pass/fail

Expanding functionality

- Most features locked

Unlocked features

Locked features
Basic verification (try before you buy)
- A simple method of checking product health
- Simple connection to your device
- One-button testing
- Fast feedback of device condition

Standard verification (licensed software)
- Easy-to-operate testing of product performance and maintenance needs
- Detailed certificate printing for regulatory and quality system management
- Move from reactive- to predictive-maintenance planning with historical data analysis

Enhanced verification
- Enhance your verification with an externally traceable input/output test
- Plug-and-play hardware tester

Premium verification
- Use the Premium hardware test box to offer best-in-class service
- Plug-and-play hardware tester
- Tests inputs/outputs, internal electrical signals and simulates physical measurements to test the transmitter
Ease of operation

The ease of operation of the software is of real benefit to the user, providing a list of verifications and the status of each device. Regardless of which type of device you are testing the results are stored in the same format for ease of use.

Certificates can be printed via the software in Adobe®.pdf format.

Condition monitoring

A major benefit is that the software can also be used as a diagnostic- and condition-monitoring tool. It stores all measured values automatically and includes visualization in a graph to enable long-term trend analysis.

Moving from preventive to predictive maintenance methodology

Detailed observation can give early warning of a possible system failure, enabling maintenance engineers to anticipate problems and take planned remedial action in advance.

Prooftest coverage for ProcessMaster 300/500

Performing SRV500 verification results in >50 % diagnostic coverage identifying undetected failures. If the test is not passed, the device may no longer be used as part of a protective system.

The influence of systematic faults on the safety function are not covered by the test and must be examined separately. Systematic faults can be caused by, for example, medium properties, operating conditions, build-up or corrosion.

Prooftest coverage for ProcessMaster FEP630

An on-site test, performed using SRV500 results in a >80 % diagnostic coverage identifying undetected failures. An on-site inspection includes:

- visual inspection
- simulation and electrical inspection of the current output
- switching off and on
- performing a Fingerprint Verification – see Safety Instruction SM/FEX630/SIL-EN

Prooftest coverage with activated VeriMass on FCB100/400

Factory calibration is the most complex and costly, but provides the greatest testing depth. In this case the user removes the flowmeter and sends it to the manufacturer for review and recalibration. Less costly on-site calibration with a reference device allows for limited testing depth. Using the VeriMass diagnostic procedure, together with onsite inspections, greatly simplifies and speeds calibration. It also makes possible testing depths of >90 % at very little expense without the need for a ‘proof test’ recalibration either on site or at a test lab.

Note.
A White Paper is available: WP/CORIOLIS/VERIMASS/101-EN
CoriolisMaster mass flowmeter | Diagnostics, verification and proof test.
Software interfaces
ABB Ability Verification for measurement devices is a versatile software platform that allows the customer to choose how they want to use it:
• local data storage
• pay-per-use licenses or annual
• multi-product testing or single product
• factory fingerprint or as commissioned

Specification – software
Microsoft™ Windows OS
• 10 enterprise

Supported communication protocols
• HART™
• Logic HART
• NFC
• IR
• Serial

Software language
English

Supported Hardware
• Any laptop/Desktop Machine
• Microsoft surface tablet

Hardware tester compatibility
The hardware tester is compatible only with the following transmitters:
• Premium version:
  – FEP 300/500 – ProcessMaster/HygienicMaster
  – FEX 100 – WaterMaster
  – FET6XX – ProcessMaster/HygienicMaster
  – AquaMaster2, AquaMaster3, AquaMaster4, MagMaster
  – AquaMaster4 MobileComms (4G & NBIOT)
  – Hybrid: AquaMaster4 (Transmitter) + AquaMaster3 (Sensor)
  – Hybrid: ProcessMaster (Transmitter) + MagMaster (Sensor)
  – EMF Z Series (FEW010)
• Standard/Basic/Enhanced versions:
  – FEP 300/500 ProcessMaster/HygienicMaster
  – FEX 100 WaterMaster
  – FET6XX ProcessMaster/HygienicMaster
  – AquaMaster2, AquaMaster3, AquaMaster4, MagMaster
  – AquaMaster4 MobileComms (4G & NBIOT)
  – Hybrid: AquaMaster4 (Transmitter) + AquaMaster3 (Sensor)
  – Hybrid: ProcessMaster (Transmitter) + MagMaster (Sensor)
  – EMF Z Series (FEW010)
  – AquaProbe
  – LMT100
  – LLT100
  – TTX300
  – 266 PdP
  – CoriolisMaster
  – FSV430/FSS430
  – FSV450/FSS450
  – SensyFlow HART FMT500
  – FMT2XX/4XX
  – LWT300
  – EDP300
  – Hybrid: AquaMaster4 (Transmitter) + AquaMaster3 (Sensor)
  – Hybrid: FEP630/610/PM300/PM500 (Transmitter) + XE/XM (Sensor)
  – Hybrid: FEP630/610 (Transmitter) + PM300/PM500 (Sensor)
  – FSM4000
  – Hybrid: FEP630/610/PM300/PM500 (Transmitter) + XE/XM (Sensor)
  – Hybrid: FEP630/610 (Transmitter) + PM300/PM500 (Sensor)
Connect to device

Load Verification Device File (VDF) into SW

Enable software to required functionality level

USB hub – used to connect to communication modem

SRV500 software

Verification history

Verify history

Stored locally or on network drive

License key
- Software only
- Product line
- Annual/Pay-per-use

Product verification test script
See Hardware tester compatibility above.
Specification – SRV500H hardware unit

SRV500H input/output test tool
Test capability
- mA outputs (active and passive) and mA inputs
- pulse or frequency outputs (active and passive)
- current input
- digital input
- supply voltage (10 or 24 V) communication protocols

Connection to PC/software
Connection via USB 2.0 or micro USB

Connection to instrument under test
Connection can be direct from the software-hosted PC or via the SRV500H unit

Power options
- battery powered
- battery powered and trickle charged via USB 2.0 connection to PC replacement battery option available to ensure testing can continue if power is depleted from the battery
- battery capacity allows for ten hours continuous use
- field-replaceable battery as an option

SRV500H is controlled by the software and enables the user to visualize SRV500H device connection status, battery charging/discharging, battery percentage. Additionally capability to control charging can be enabled and disabled in the software depending on users preference and battery status.

Status indicators
SRV500H device itself also includes LED indicators to advise operation status:
- device connected
- under test (Verification in Progress)
- SRV500H power ON indicator
- battery condition, good, charging, depleted

Calibration of SRV500H
To ensure the testing of the inputs and outputs remain traceable the tool requires annual calibration by an ABB Measurement & Analytics service workshop

USB adaptor housing requirements
- housing material: ASA+PC
- all exposed metal made from 316L stainless steel to avoid corrosion
- housing dimensions: 280 × 170 × 60 mm (11.02 × 6.69 × 2.36 in)
- weight: 1200 g (2.74 lb)
- adaptor fits into a toughened plastic case for transportation

Accuracy of input/output requests

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Measurement range</th>
<th>Measurement accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current output (active/passive)</td>
<td>4 mA</td>
<td>±0.05 % of range (20 ppm)</td>
</tr>
<tr>
<td>Current output (active/passive)</td>
<td>20 mA</td>
<td>±0.05 % of range (20 ppm)</td>
</tr>
<tr>
<td>Current output (active/passive)</td>
<td>12 mA</td>
<td>±0.05 % of range (20 ppm)</td>
</tr>
<tr>
<td>Pulse output (active/passive)</td>
<td>0.1 to 11 kHz</td>
<td>±2 % reading</td>
</tr>
<tr>
<td>Internal temperature (68 to 140 °F)</td>
<td>20 to 60 °C</td>
<td>±1 °C (1.8 °F)</td>
</tr>
<tr>
<td>Current input (active/passive)</td>
<td>4 to 20 mA</td>
<td>±0.05 % of range (20 ppm)</td>
</tr>
<tr>
<td>Digital output (active/passive)</td>
<td>&gt; 5 V and &lt;24 V</td>
<td>Low or High</td>
</tr>
<tr>
<td>Digital input</td>
<td>24 V</td>
<td>±2 %</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>10 to 24V</td>
<td>±2 %</td>
</tr>
</tbody>
</table>

The SRV500H is hot-pluggable to the PC and to the software without the need for special connection/disconnection means

Environmental specification
- IP65 as standard
- ambient temperature range Std. : -20 to 60 °C (~4 to 140 °F)
- storage temperature: -40 to 70 °C (~40 to 158 °F)
- relative humidity: 5 to 95 % non-condensing
- Sinusoidal vibrations: according to DIN EN 60068-2-6/IEC 60068-2-6.
- vibration transport condition shock: according to DIN EN 60068-2-27/IEC 60068-2-27
- impact tests (IK5) and drop tests in accordance with IATA dropped from 1.2 m (3.93 ft) height

CE mark
EMC
- EMC Directive 2014/30/EU
- EMC Standard DIN EN 61326-1/IEC 61326
- RoHS Directive 2011/65/EU
## Ordering information

<table>
<thead>
<tr>
<th>Main Order Number</th>
<th>1 to 6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>SRV500 ABB Ability verification for measurement devices</td>
<td>SRV500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Verification type
- Verification Tool Standard - SW license only: S
- Verification Tool Enhanced - I/O Tester: H
- Verification Tool Premium - EMF Tester: F

### Product Line License
- Reserved: Y

### Machine License Type
- Single PC license: 1

### Verification License Term
- 0 Verifications (software only): A
- 10 Verifications (software only): B
- 50 Verifications (software only): C
- 100 Verifications (software only): D

### Data storage and report viewing
- Local: 1

### Verification Tool Premium Box (Variants)
- None: N
- EMF ALL: E
- EMF Process: P
- EMF Water: W
- Reserved: Y

### Documentation Language
- English: M5
### Spares and accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FZA100</td>
<td>Infrared service port adapter</td>
</tr>
<tr>
<td>3KXS210059L0001</td>
<td>FEIG™ NFC reader</td>
</tr>
<tr>
<td>3KXS210058L0001</td>
<td>Mactek HART modem</td>
</tr>
<tr>
<td>3KXS210057L0001</td>
<td>IFAK HART modem</td>
</tr>
<tr>
<td>3KXS210013L0001</td>
<td>1000 Ω resistor (pulse)</td>
</tr>
<tr>
<td>3KXS210012L0001</td>
<td>250 Ω ±0.05 % resistor (current out)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3KXS360040L0003</td>
<td>Local operating interface for 4-WCT</td>
</tr>
<tr>
<td>3KXS210010U0100</td>
<td>Verification tester (enhanced)</td>
</tr>
<tr>
<td>3KXS210080U0100</td>
<td>Verification tester (premium)</td>
</tr>
<tr>
<td>3KXS210025L0001</td>
<td>Battery (Li-ion, 3.7 V, 5.8 Ah)</td>
</tr>
</tbody>
</table>
### Spares and accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3KXS210053L0001</td>
<td>USB cable: USB 2.0, type A to Micro B</td>
</tr>
<tr>
<td>3KXS210137U0100</td>
<td>USB RS232 cable 10CM DB9</td>
</tr>
<tr>
<td>3KXS210052L0001</td>
<td>MagMaster/ProcessMaster/HygienicMaster/WaterMaster common I/O testing cable</td>
</tr>
<tr>
<td>WADX0089</td>
<td>MagMaster VKE adaptor PCB (ABB UK part)</td>
</tr>
<tr>
<td>3KXS210099U0100</td>
<td>MagMaster sensor premium testing cable</td>
</tr>
<tr>
<td>3KXS210100U0100</td>
<td>MagMaster transmitter premium testing cable</td>
</tr>
<tr>
<td>3KXS2100051L0001</td>
<td>AquaMaster2, 3 and 4 common I/O testing cable Note. AquaMaster2 with Bulgin connectors also require adaptor cable WEBC0233</td>
</tr>
<tr>
<td>3KXS210094U0100</td>
<td>AquaMaster 2 transmitter premium testing cable (Bulgin connector)</td>
</tr>
<tr>
<td>3KXS210082U0100</td>
<td>ProcessMaster 300, ProcessMaster 600, HygienicMaster, WaterMaster integral sensor Premium testing cable</td>
</tr>
<tr>
<td>3KXS210089U0100</td>
<td>ProcessMaster 300, ProcessMaster 600, HygienicMaster, WaterMaster remote transmitter Premium testing cable</td>
</tr>
<tr>
<td>3KXS210083U0100</td>
<td>ProcessMaster 300, ProcessMaster 600, HygienicMaster, WaterMaster integral transmitter Premium testing cable</td>
</tr>
<tr>
<td>3KXS210088U0100</td>
<td>ProcessMaster 300, ProcessMaster 600, HygienicMaster, WaterMaster remote sensor Premium testing cable</td>
</tr>
<tr>
<td>3KXS210101U0100</td>
<td>AquaMaster 2 sensor premium testing cable (Bulgin connector)</td>
</tr>
<tr>
<td>WEBC0233</td>
<td>AquaMaster2 I/O testing adaptor cable (Bulgin connectors)</td>
</tr>
<tr>
<td>3KXS210097U0100</td>
<td>AquaMaster 2 and 3 transmitter premium testing cable (Souriau/MIL connector)</td>
</tr>
<tr>
<td>3KXS210098U0100</td>
<td>AquaMaster 2 and 3 sensor premium testing cable (Souriau/MIL connector)</td>
</tr>
<tr>
<td>3KXS210090U0100</td>
<td>AquaMaster 3 integral transmitter premium testing cable</td>
</tr>
<tr>
<td>3KXS210070U0100</td>
<td>AquaMaster4 remote transmitter premium testing cable</td>
</tr>
<tr>
<td>3KXS210071U0100</td>
<td>AquaMaster4 remote sensor premium testing cable</td>
</tr>
<tr>
<td>3KXS210072U0100</td>
<td>AquaMaster4 integral sensor premium testing cable</td>
</tr>
<tr>
<td>3KXS210073U0100</td>
<td>AquaMaster4 integral transmitter premium testing cable</td>
</tr>
</tbody>
</table>
Supported products

### ProcessMaster

- **FEP300**
  - For efficient plant operation and constant product quality

- **FEP500**
  - For efficient plant operation and constant product quality with extended diagnosis functionality

- **FEP610**
  - The first choice for all industrial standard applications

- **FEP630**
  - Innovative next generation of electromagnetic flowmeters with SmartSensor technology and built-in verification

### HygienicMaster

- **FEH300**
  - For demanding hygienic applications

- **FEH500**
  - For demanding hygienic applications with extended diagnosis functionality

- **FEH610**
  - The first choice for all industrial standard applications

- **FEH630**
  - Designed to meet highest levels of demands for enhanced metering with SmartSensor technology and built-in verification

### SwirlMaster

- **FSS430**
  - The basic version of swirl flowmeters for measurement of gases, liquid and steam

- **FSS450**
  - The universal version of swirl flowmeters with enhanced flow computer functionality for gases, liquid and steam

### VortexMaster

- **FSV430**
  - The basic version of vortex flowmeters for measurement of gases, liquid and steam

- **FSV450**
  - The universal version of vortex flowmeters with enhanced flow computer functionality for gases, liquid and steam

### WaterMaster

- **AquaMaster4**
  - The ideal flowmeter for potable water distribution networks, revenue metering and irrigation applications

- **AquaMaster3**
  - The high value, precision solution for remote water metering and irrigation applications

- **AquaMaster2**
  - Designed to improve the precision and quality of logged information

- **WaterMaster**
  - Measurement/management in water, waste water and effluent applications
### Supported products

<table>
<thead>
<tr>
<th>Sensyflow</th>
<th>CoriolisMaster</th>
<th>MagMaster</th>
<th>AquaProbe</th>
</tr>
</thead>
<tbody>
<tr>
<td>A digital mass flowmeter for air, gases and gas mixtures in process applications</td>
<td>Low pressure drop, high capacity for accurate flow and density measurement of liquids and gases</td>
<td>Over ⅓ of a million of ABB’s hugely successful MagMaster flowmeter have been sold worldwide. MagMaster was replaced in 2012 by the feature-rich WaterMaster and AquaMaster ranges</td>
<td>An economic alternative to full bore flowmeters, AquaProbe FEA finds application in existing water distribution systems where a full bore flow meter would be uneconomic</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FMT2XX/4XX</th>
<th>LMT100</th>
<th>LLT100</th>
<th>TTX300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal mass flowmeters that are suitable for all industrial and test rig applications demanding quick and precise gas measurement</td>
<td>A modular range of field mounted, advanced microprocessor-based electronic transmitters, utilizing multiple sensor technologies</td>
<td>The LLT100 is a high performance laser transmitter that accurately measures level, distance and position over short and long ranges</td>
<td>A range of compact and robust field mounted temperature transmitters accommodated in field housings with optional indicators</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>266PdP</th>
<th>LWT300</th>
<th>EDP300</th>
<th>FSM4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure transmitters offering a broad variety of communication possibilities</td>
<td>Guided-wave radar level transmitters with built-in intelligence to differentiate between the actual level and other false signals</td>
<td>An electronically configurable positioner with communication capabilities designed for mounting to linear or rotary actuators.</td>
<td>A robust flowmeter for heavy duty applications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMF Z Series (FEW010)</th>
<th>AquaMaster4</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMF Z Series (FEW010)</td>
<td>AquaMaster 4 Mobile comms</td>
</tr>
<tr>
<td>WaterMaster is the ultimate solution for flow measurement and management in sectors as diverse as water, waste water, sewage and effluent.</td>
<td>AquaMaster is the ultimate solution for flow measurement for District Metered Area. Measuring every drop accurately.</td>
</tr>
</tbody>
</table>
Notes

Acknowledgments

• ABB Ability is a registered trademark of ABB Limited.
• Microsoft is a registered trademark of Microsoft Corporation in the United States and/or other countries.
• Windows and Windows 10 are registered trademarks of Microsoft Corporation in the United States and/or other countries.
• Adobe is a registered trademark of Adobe Systems Incorporated in the United States and/or other countries
• HART is a registered trademark of the FieldComm Group.
• MacTek is a registered trademark of WIKA Instruments Ltd.
• FEIG is a registered trademark of FEIG ELECTRONIC GmbH.
We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. ABB does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

We reserve all rights in this document and in the subject matter and illustrations contained therein. Any reproduction, disclosure to third parties or utilization of its contents – in whole or in parts – is forbidden without prior written consent of ABB.

© 2022 ABB
All rights reserved