



OPTICHECK Technical Datasheet

In-situ verification for field devices (electromagnetic, mass and vortex flowmeters and level devices)

- Preventive maintenance and service features
- Easy to use
- Printed verification certificate

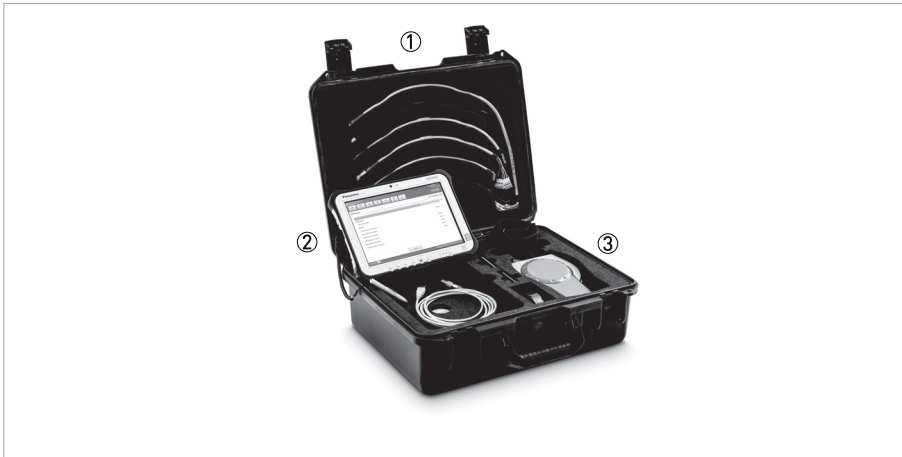
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1.1 Inline health check

The OPTICHECK is the essential tool for making sure that your installed field devices are performing to specification.

When you connect the tool to the device under test in-situ on site, it gathers measuring data to ensure that for example an electromagnetic or vortex flowmeter is performing within $\pm 1\%$ of its specification.

Contact KROHNE and learn more about the handling and benefits of the new OPTICHECK.



- ① Suitcase
- ② Tablet
- ③ OPTICHECK

OPTICHECK and service highlights

- Lightweight portable device comes with all cables and accessories for easy connection and handling
- Verification of the range of OPTIFLUX, TIDALFLUX and WATERFLUX flow sensors equipped with IFC 050, 070, 100 and 300 signal converters, the OPTISWIRL series with VFC 200 signal converter, the OPTIWAVE series with RLC 400 signal converter as well as OPTIMASS flow sensors equipped with MFC 300 and MFC 400 signal converters.
- Hard copy verification report for every field device
- Digital storage of verification data in the internal database
- Option to download original factory calibration settings from the KROHNE manufacturing database

Industries

- Water & Wastewater
- Chemical & Petrochemical
- Minerals & Mining
- Iron, Steel & Metals
- Food & Beverage
- Power generation
- Pulp & Paper
- Marine

Applications

- In-situ verification of signal converters, electronics and sensors
- Accuracy check
- Process diagnostics
- Report generation
- Preventive maintenance
- Check of factory calibration settings

1.2 Product features and options

Trustworthy field device readings

The OPTICHECK fulfils third party requirements for the independent verification of electromagnetic, vortex and mass flowmeters as well as radar level devices. For rapid trouble shooting, a quick scan based on the powerful diagnostic features of signal converters may suffice.

In addition to that, a full verification performs a complete check of all I/Os and electrical tests of the sensors. For electromagnetic flowmeters, electrical verification of electrode and coil circuits are performed.

Schedule preventive maintenance

By using OPTICHECK regularly, you will extend the time between costly re-calibration. This will ensure less downtime and increase safety for operators and plant.

Improve quality

Certified verifications in accordance with international standards, improve the overall quality standard of the plant. An annual recalibration service keeps the OPTICHECK compliant with national and international standards.

1.3 Theory of operation

Design and connection of the device

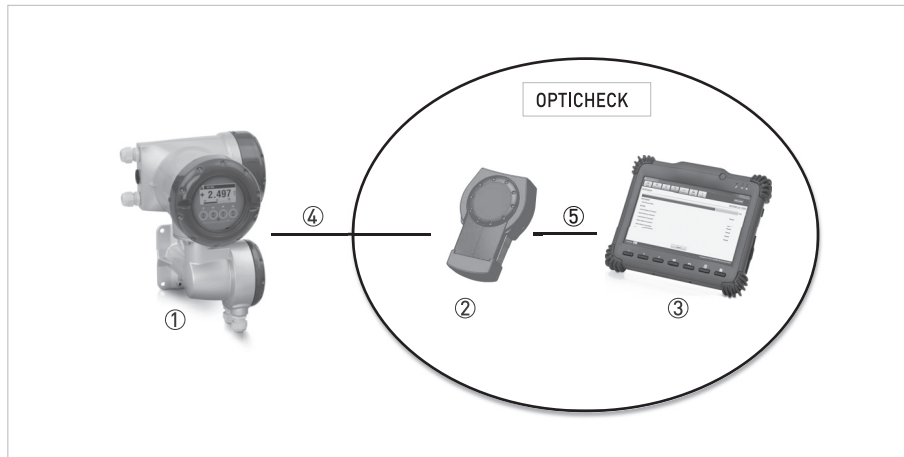


Figure 1-1: Connection diagram

- ① Device Under Test (DUT)
- ② Verification box
- ③ Tablet
- ④ Adapter
- ⑤ USB

The OPTICHECK consists of:

- Verification box including all the electronic hardware and software for the measurements
- Rugged tablet or PC with a USB connection to the verification box including the control and evaluation software (for the sequential tests performed by the verification box)
- USB connection cable to connect the verification box with the tablet / laptop
- Different adapters to connect various KROHNE field devices (DUT) to the verification box

Verification box

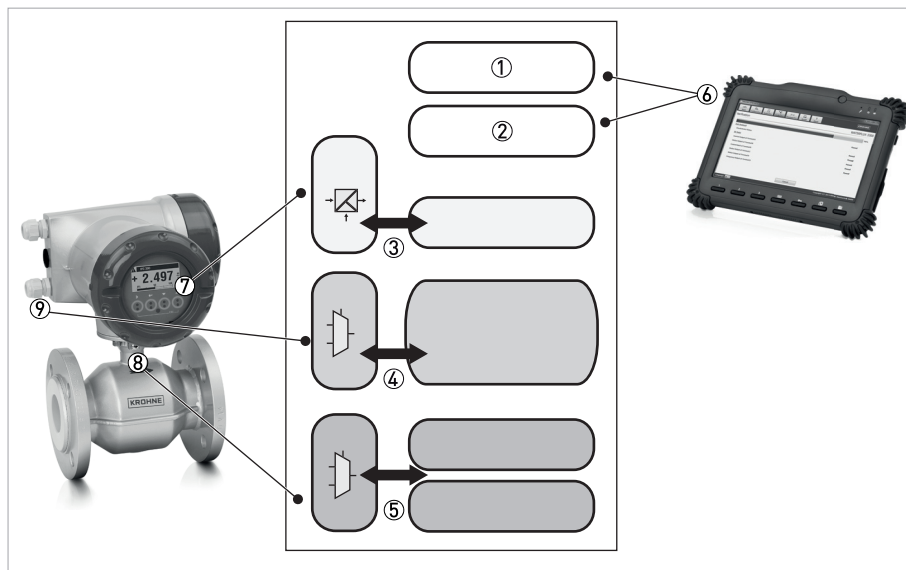


Figure 1-2: Block diagram of verification box

- ① Serial <-> USB
- ② Galvanically isolated power supply (via the USB interface from the tablet)
- ③ GDC connection (galvanically isolated)
 - interface connects the OPTICHECK to the internal communication interface of the field device
- ④ I/O connections
 - connects (and if required supplies) to the I/O circuitry of the field device via a multiplexer
 - I/O measurement and supply, up to 4 different I/O channels
 - voltage, current, and frequency measurement possible
 - voltage or current supply possible
- ⑤ Sensor connection
 - sensor simulation; supplies calibrated test signals to the sensor input of the signal converter
 - sensor measurement; connects to the sensor and is able to perform different measurements
- ⑥ Tablet
- ⑦ GDC terminal on field device position (depends on field device)
- ⑧ Sensor connection on field device (depends on field device)
- ⑨ I/O connection on field device (depends on field device)

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Design

Product contents	The OPTICHECK verification system consists of a verification box and connection cables included in a suitcase. It is available with or without a rugged tablet.
Compatibility for electromagnetic flowmeters	
Compact version	IFC 050, IFC 070, IFC 100 & IFC 300 signal converters
Field version	IFC 070 & IFC 300 signal converters
Wall version	IFC 050, IFC 100 & IFC 300 signal converters
19" rack version (28 TE)	IFC 300 signal converter
Flow sensors	OPTIFLUX, TIDALFLUX & WATERFLUX series
Compatibility for mass flowmeters	
Compact version	MFC 300 & MFC 400 signal converters
Field version	MFC 300 & MFC 400 signal converters
Wall version	MFC 300 signal converters
19" rack version (28 TE)	MFC 300 signal converters
Flow sensors	OPTIMASS series
Compatibility for vortex flowmeters	
Compact version	VFC 200 signal converter
Flow sensors	OPTISWIRL series
Compatibility for radar level meters	
Compact version	RLC 400 signal converter
Level sensors	OPTIWAVE series
Calibration	
Standard	Factory calibrated
Period	Annual calibration

Specifications of operating system

Windows 7	32 / 64 bit
Windows 8 / 8.1	32 / 64 bit (except RT)
Windows 10	32 / 64 bit
Proper functionality of OPTICHECK is guaranteed if the included tablet is used. Other combinations of tablet / laptop and Windows operating systems should work very likely, but proper functionality cannot be guaranteed.	
Report output	
PDF	To display a generated certificate / report, a PDF reader is required (e.g. Adobe Acrobat Reader).
Printing	A printer is required to print the generated certificate / report.

Rugged tablet Panasonic FZ-G1 (optional)	
AC/DC adapter	Input: 100...240 VAC
	Output: 16 VDC, 4.06 A
Battery pack	Lithium ion (11.1 V, 4200 mAh)
Water and dust resistance	IP65
Vibration and shock resistance	MIL-STD-810G

Operating conditions

Temperature	
Ambient and operating temperature	-20...+50°C / -4...+122°F
Storage temperature	-20...+60°C / -4...+140°F
Relative humidity	0...90%, non-condensing
Other conditions	
Duration of a verification	< 10 minutes (level 0, 1 & 2)

Installation conditions

Installation	Always secured with strapped band.
Dimensions	
Nominal size	204 mm x 137 mm x 68 mm / 8.3" x 5.4" x 2.7"
Nominal weight	0.905 kg / 2 lb
Dimensions suitcase	490 mm x 185 mm x 390 mm / 19.3" x 17.3" x 15.4"

Electrical connections

GDC	Connection cable with green marking
I/O	Connection cable with red marking
	I/O adapter for IFC 100 and MFC 300/400
	Standard: wire-end sleeve
	Variant 1: Phoenix connectors
	Variant 2: IFC 050 specific connectors
Flow sensor	Connection cable with black marking
	Adapters:
	Variant 1: Sensor adapter for IFC 050
	Variant 2: Sensor adapter for IFC 070 / IFC 100 / IFC 300
	Variant 3: Sensor adapter for VFC 200
USB	Cable with blue marking
	USB 2.0, 500 mA
	Connection to a passive USB hub is not recommended.

Approvals and certificates

CE	This device fulfils the statutory requirements of the relevant EU directives. The manufacturer certifies successful testing of the product by applying the CE mark.
	For full information of the EU directives & standards and the approved certifications, please refer to the EU declaration of conformity or the manufacturer website.

3.1 Intended use

This device is a Group 1, Class A device as specified within CISPR11:2009. It is intended for use in industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

OPTICHECK is a portable testing and verification tool for field devices. It allows the operator to check the functionality and accuracy of the field device, without the need to remove the device from the process. The OPTICHECK operates on the power supply from tablet/laptop and needs no other power supply. It is intended to be operated for a short duration of measuring time only. If RF transmitters are used in close proximity, the equipment may be disturbed.

A tablet is a sensitive equipment. For charging use surge protection equipment MNT-1 D (Phoenix Contact). In case of OPTICHECK operating with a laptop, ensure that laptop and charger are suited for the industrial electromagnetic environment.

OPTICHECK is not meant or able to perform tests on communication interfaces such as HART[®], Profibus[®], Foundation Fieldbus[®], ModBus or other buses. It is built to perform tests on current output, pulse and frequency outputs and status outputs as well as control and current inputs.

Faulty installation

To measure accurately both the field device and the signal converter must be installed correctly. Measurement errors caused by faulty installation (mechanical and/or electrical) or minor defects on the sensor, may not be detected by the OPTICHECK.

An electromagnetic or vortex field device that has been verified by the OPTICHECK will measure within $\pm 1\%$ of the original factory calibration. Please note that on site verification with the OPTICHECK is not intended to replace a full wet calibration on a calibration rig.

OPTICHECK is not Ex certified and must not be used in areas with an explosive atmosphere. Do not connect the OPTICHECK to a sensor or a signal converter if an explosive atmosphere may exist. Signal converters intended for Ex configurations can only be verified in a safe area.

OPTICHECK is not designed to verify devices used in custody transfer applications. To perform a verification, the seals of the device have to be broken. There is no approval of OPTICHECK for these types of applications.

Only use OPTICHECK on signal converters that are listed as compatible. Using OPTICHECK on field devices that are not compatible may cause damage to the signal converter or OPTICHECK. If the device is not used according to the operating conditions (refer to chapter "Technical data") the intended protection could be affected.

3.2 General notes on installation

The installation of the OPTICHECK verification tool always has to be done on the signal converter side.

Avoid extensive humidity and/or direct entry of rain, when measuring / working with the OPTICHECK, during the verification process or when the housing of the signal converter is open.

Installation of the OPTICHECK verification tool and the tablet, mechanically and electrically, together with the use of software and installation of special drivers, is only permitted to specially trained personal.

The service engineer and/or operator has to know the correct handling of the OPTICHECK tool, as well as servicing and operating sensor/signal converter combinations.

Please contact the manufacturer or your local sales office, for the availability of training and information tools.

For a reliable and high accuracy measurement, it is essential to follow the installation requirements as specified in the manual of the related field device. Neither wet calibration in a calibration rig nor OPTICHECK are able to include verification of installation/application conditions.

Take special care of:

- Grounding conditions of the field device

3.2.1 Magnetic field

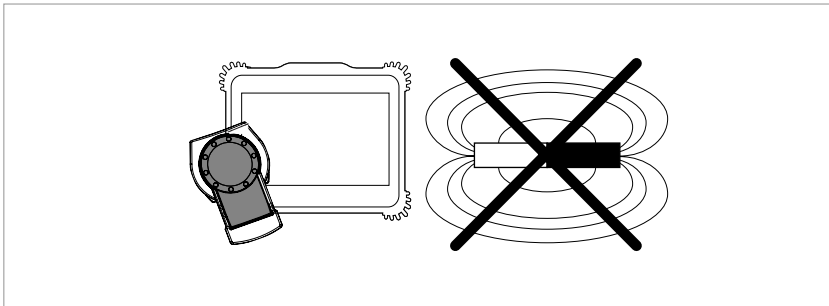


Figure 3-1: Avoid magnetic fields

In order to use OPTICHECK with compatible field devices, their housing has to be opened for required cable connections. In this case, OPTICHECK and the connected field device are to some extent sensitive to high electromagnetic radiation. If this temporary disturbance influences the operation or verification process, a device reset or power cycle can become necessary to restore normal operation.

3.2.2 Impacts and vibration

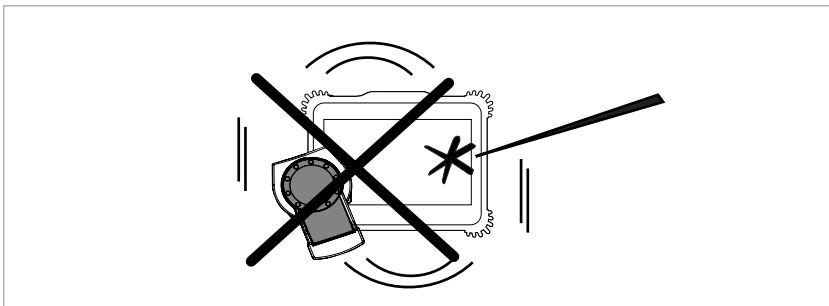


Figure 3-2: Avoid high impacts or vibration

*The OPTICHECK setup has been designed to be as robust as possible. To ensure reliability, accuracy and long life time the following has to be respected:
Be careful, not to drop the device and take special attention on the way the device is attached and/or placed on a particular surface.*

3.2.3 Electrostatic discharge

*The OPTICHECK is connected to the signal converter of the field device. The housing of the field device has to be opened for these connections.
Extensive humidity and direct rain has to be avoided during verification.*



The signal converter is to some extent sensitive to ESD (electrostatic discharge). To prevent a failing verification or even damage:

- Do not touch any electrical contact directly!
- Make sure to discharge yourself by wearing a wrist strap.
- If no wrist strap is available, ground yourself by touching a metal surface that is grounded.

3.2.4 Software installation

The tablet delivered with OPTICHECK comes with a pre-installed Windows and the OPTICHECK application and drivers.

If OPTICHECK should be used with a different tablet or notebook, 32 bit or 64 bit versions for Microsoft Windows[®] can be selected depending on the target system. The recent version is available via the KROHNE Downloadcenter.

Start the Windows install wizard with a double-click on the setup file (administrator rights required). The user will be guided through the installation process. Follow the instructions given.

The following components are installed:

- OPTICHECK application software
- USB driver for OPTICHECK

3.2.5 Signal converter specific information

For more detailed information regarding basic instructions on how to operate signal converters, please consult applicable manual or addendum of the IFC 050, IFC 070, IFC 100, IFC 300, MFC 300, MFC 400, VFC 200 and RLC 400 signal converters, respectively. The same applies for the following signal converter related topics:

- connection diagram (electrical and I/O and detailed information regarding electrical connection)
- cable requirements, cable preparation and lengths
- explanation of data and markings on nameplates or CG numbering
- mechanical mounting of signal converters
- software and electronics versions and revisions
- menu and operating actions

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Device variants and connections

The OPTICHECK is suited to be used with the electromagnetic flowmeter families OPTIFLUX, TIDALFLUX and WATERFLUX, the vortex flowmeter family OPTISWIRL, the mass flowmeter family OPTIMASS as well as the radar level family OPTIWAVE.

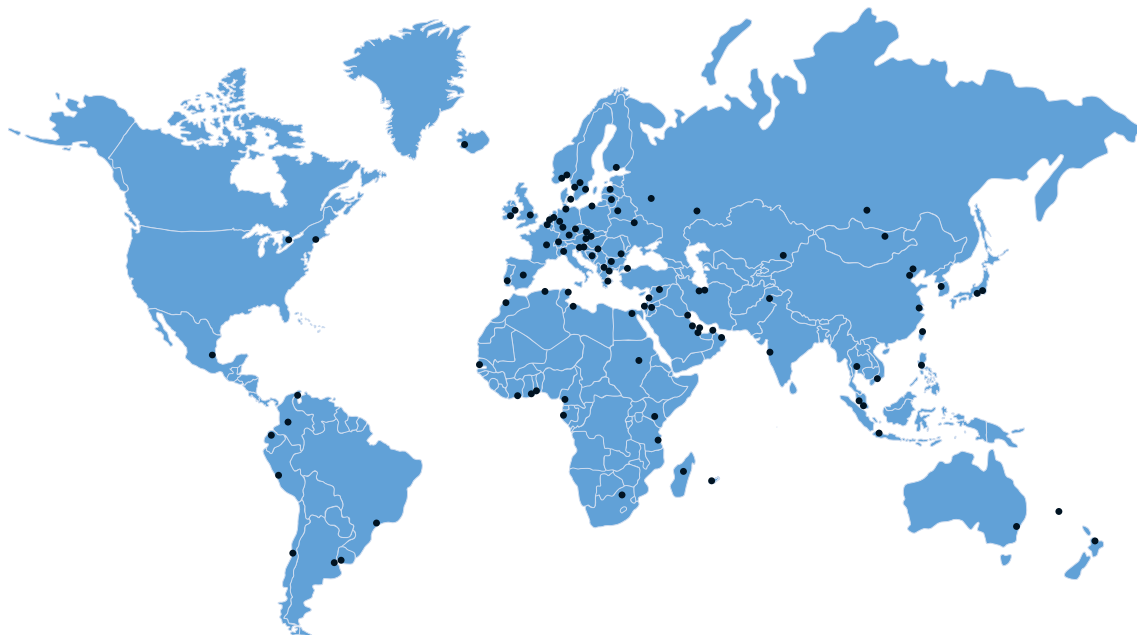
There is no need for an external power connection since the OPTICHECK verification box itself is fully powered over USB. However, the device under test (DUT) must be externally powered during verifications (except the battery powered device IFC 070 and the loop-powered devices).

The OPTICHECK can perform a fully automated verification of all compatible field devices in order to verify the accuracy of the signal converter. Depending on the field device type, the sensor is verified – either by physical check of its electric characteristics or by firmware-internal diagnostic functions. Therefore, it is not necessary to remove the field device from the process environment (except cabling) for the verification.

Different types of verifications are available which provide different depths of verification depending on the type of the DUT – ranging from device-internal diagnostics to full electrical verification of, for instance, input and output circuits. For all levels, a detailed test report and certificate can be generated after verification.

OPTICHECK is supplied with all the connection cables and adapters for the signal converters of the afore-mentioned field device series and a USB cable for connection to the tablet.





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