Brüel & Kjær Vibro

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Instructions

BKV Go Solution

CE

Retain for subsequent use

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Instructions - **BKV Go Solution**
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Table of Contents

1 About this Instruction

1.1 Scope

The scope of this document is to give instructions regarding:

- Mounting the CM360-CG/VCM-3 (including VCM-3, power supply and circuit breaker) and the sensors AS-667 (incl. connection cable AC-14xx)
- Connecting the circuit breaker of the CM360-CG/VCM-3 device
- Connecting the sensors to the VCM-3 device
- Creating a configuration file for your condition monitoring system
- Transferring the configuration to the VCM-3-device
- Monitoring the data provided by the sensors on a dashboard

INFO

You must observe the instructions in this document for safe installation, commissioning and disposal of its components. Also consider:

- The document *"VCM-3 Instructions (C108418)"*
- The document *"CM360-CG/VCM-3 Instructions (C107899)"*
- The data sheet of the Power Supply
- The data sheet of the Circuit Breaker
- The document *"AS-667 Instructions (C106195)"*

1.2 Document Conventions

Feature	Comments
Menu items, buttons, tabs, UI features, keyboard instruction	Indicated by **bold** type face. Examples: Click **Remove**. Press **Ctrl+Shift** or Press **F12**.
Path denotations	Example: File > Template > Load template
Reference to separate document	Example: *VCM-3 Product specifications and ordering information (C107757)*

1.3 Pictograms and their Meaning

DANGER!

"DANGER" refers to a directly hazardous situation which, if not prevented, will lead to death or serious injuries.

WARNING!

"WARNING" refers to a potentially hazardous situation which, if not prevented, may lead to death or serious injuries.

CAUTION!

"CAUTION" refers to a potentially hazardous situation which, if not prevented, may lead to slight to moderate injuries.

NOTICE!

"NOTICE" refers to a situation which, if not prevented, may lead to material damage.

INFO

"INFO" contains general information about the product.

2 Safe Use of BKV Go Solution

2.1 Disclaimer of Liability

The observance of this technical documentation is essential for the proper and safe operation of the product. We assume no liability for injury to persons, damage to property or financial losses resulting from failure to comply with this technical documentation. In this case the liability for material defects is also excluded.

2.2 General Warnings

2.2.1 Staff Requirements

Transport, storage, installation, assembly, connection, commissioning, maintenance and service must be undertaken exclusively by qualified technicians (for ATEX systems according to EN 60079-14). The following must strictly be observed:

- The instructions in this document
- The instructions for product and safety and the pictograms on the product
- Any product specific provisions and requirements
- All national and regional regulations for safety and accident prevention must be followed

WARNING!

In the event of impermissible opening of the product or removal of components, improper use, or incorrect installation or operation there is a risk of personal injury or damage to property.

2.2.2 Grounding Information

Figure 1: Grounding information

The casing of the VCM-3 can be grounded through the **P**rotective **E**arth screw at the left side of the cabinet.

2.2.3 Never Operate Damaged Products

Never operate damaged products. Upon delivery inspect the packaging for damage and compare the delivered item with the ordered items. If the BKV Go Solution is used in a way that is not described in the present instruction, this may result in impairment of functions and of protection.

NOTICE!

Observe the instructions in this document for safe installation, commissioning, and disposal of VCM-3 and AS-667.

2.3 Intended Use

2.3.1 Recommendations to User

If the use of the system in conjunction with machines or plant sections can produce risks outside of Brüel & Kjær Vibro's responsibility, the user is expected to prepare and distribute safety technical instructions or warnings and to ensure that the personnel concerned has received and understood it.

WARNING!

If system is integrated into a machine or designed to be assembled, commissioning must not take place until the machine the system is to be integrated in conforms to the EC directives.

2.3.2 Prohibition of Unauthorized Modifications

System and accessories must not be changed neither in construction nor safety technology without the express consent of Brüel & Kjær Vibro. Any unauthorized modification excludes Brüel & Kjær Vibro's liability for resulting damages.

2.3.3 VCM-3

The VCM-3 is intended for tapping and digitizing analog signals and to process these signals for utilization by Brüel & Kjær Vibro and 3rd party software.

The VCM-3 is only intended to be used indoor or mounted in a field cabinet. The input terminals of VCM-3 accept signals from a variety of sensors that can be supplied by a constant current source (CCS) or -24 V.

2.3.4 AS-667

If sensors and cables are used in a way not described in the relevant instructions, function and protection may be impaired and serious personal damage, death or serious, irreversible injuries may result.

- Exclusively use of the sensor as specified in data sheet. Any use other than specified is considered inappropriate. Brüel & Kjær Vibro does not assume any liability for damages resulting from inappropriate use. The user is solely responsible.
- Mounted sensors must not be used as steps.
- Ensure that the system is exposed only to admissible environmental influences specified in the technical system data sheet.
- Maintain electrical equipment at regular intervals. Remedy defects, e.g., loose wires, defective connectors, immediately.

Hot Surfaces

In line with the instructions, sensors and cables can be operated in extensive ambient temperature ranges, whereby they can become hot through self-heating on housing walls and can produce burning.

WARNING!

When mounted at external heat or cold sources (e.g., machine parts), systems, sensors and cables can adopt dangerous temperatures, whereby burning, among other things, can occur in the event of contact.

3 Product Description

3.1 Overview

The BKV Go Solution includes:

- One CM360-CG/VCM-3 (including VCM-3, power supply and circuit breaker). The steel cabinet enables installation in rough environments (IP66).
- A set of AS-667 acceleration sensors with associated mounting material (the number of sensors included depends on the size of your BKV Go Solution package)
- Standard cable packages to connect the sensors to the VCM-3 device
- BKV Go Quickstart Guide (printed version)
- Safety Instructions (printed version)

The goal is to quickly and easily set up a system that allows you to monitor your machine conditions and detect weak points in your system at an early stage.

The scope of delivery of your BKV Go Solution package is indicated in the corresponding document *”BKV Go Solution Product Specifications and Ordering Information (C108403)”*.

3.2 General Workflow

It is good practice to set up your BKV Go Solution system according to the following main steps:

- **Getting an overview of your operational environment area**
  - Look at the floor plans and local conditions
- **Getting an overview of which assets should be monitored.**
  An asset, for example, can consist of a motor and a pump
- **Specifying the number and placement of the sensors**
- **Assigning descriptive names to the assets and sensors.**
  This will help you during the configuration of your condition monitoring system via the BKV Go configuration website.
  Channel names can contain only UTF-8 characters except for " and space. Channel names cannot end with \ (backslash).
- **Ordering the BKV Go Solution package that meets your requirements**
- **Installing the VCM-3 monitoring device which is integrated in a steel cabinet**
  Refer to 5.1 Installing the Cabinet.
- **Mounting the AS-667 sensors**
  Refer to 5.2 Mounting the AS-667 Sensor.
- **Electrical installation of the VCM-3 monitoring device and the AS-667 sensors**
  Refer to 6 Electrical Installation.
- **Configuring your condition monitoring system via the BKV Go configuration website**
  Refer to 7 Configuration.
- **Downloading the configuration (file) onto an external storage media (USB stick/SD card)**
  Refer to 7.6 Review \ Step 6.
- **Transferring the configuration (file) to your VCM-3 monitoring device.**
  Refer to 8 Transferring the Configuration to the VCM-3.
- **Monitoring the data provided by the sensors on a dashboard (for example, on a PC)**
  Refer to 9 BKV Go Dashboard.

3.3 Overview of the VCM-3 Unit

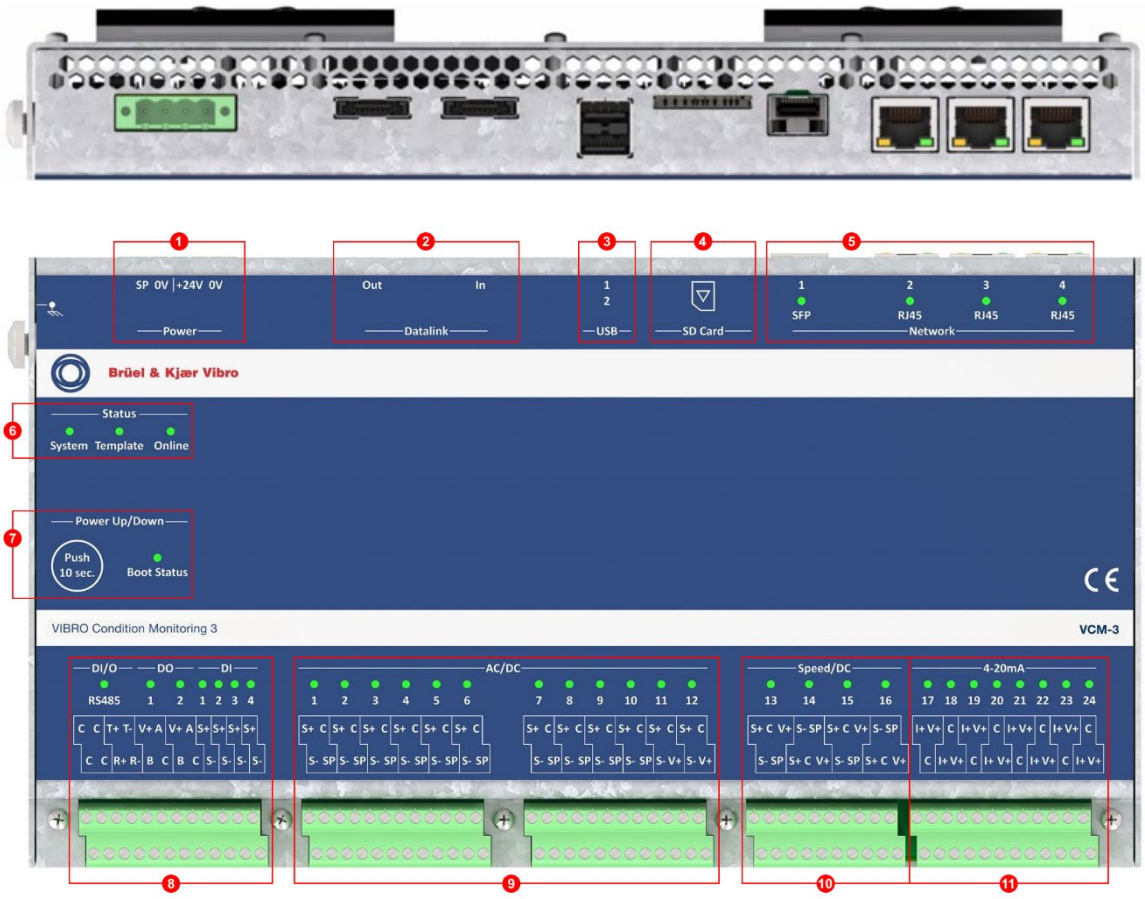


Figure 2: Overview of the VCM-3 unit

1	**Power:** 24 V Power Supply separate sensor power	
2	**Datalink:** Currently not active	
3	**USB:** 2x USB Type A mass storage	
4	**SD Card:** SD Card for mass storage	
5	**Network:** 1x Optical connector, 3x RJ45 connectors (Built-in Ethernet switch)	
6	**Status:** Watchdog Indicators	
7	**Power Up/Down:** Power Up/Down and Boot Status	
8	**DI/O:** RS485 Interface **DO:** 2x Digital Outputs **DI:** 4x Digital Inputs	Incl. LED indicators for sensor status and alarm status
9	**AC/DC:** 12x AC/DC Inputs for CCS accelerometers (ICP), Displacement Probes, Direct Input Voltage	
10	**Speed/DC:** 4x Speed Inputs	
11	**4-20mA:** 8x 4–20 mA Input for Process data	

Refer to document *"VCM-3 Product Specifications and Ordering Information (C107757)"* for further technical details.

3.4 AS-667 Acceleration Sensors

The AS-667 is mainly used for measurement of vibrations at rotating machines such as turbines, pumps, compressors, and so on.

Figure 3: AS-667 Acceleration sensor

3.4.1 Measuring Principle

The acceleration sensor operates according to the piezo-electric principle. A piezo-element and an internal sensor mass form a spring-mass system in the sensor.
If this system is subjected to vibrations the mass produces an alternating force on the piezo element. As a result of the piezo effect an electrical charge is produced that is proportional to vibration acceleration. An integrated amplifier converts this charge signal into a usable voltage signal.

3.4.2 EMV

EN 61326-1

Through electromagnetic stray fields, influences on the measured values may arise. In case of disturbing influences of this type, a grounded protective conduit is recommended for the signal cable.

3.4.3 Calibration

In the event of a calibration request, we offer the following services:

- Calibration Basic by Brüel & Kjær Vibro
- Calibration Pro by Brüel & Kjær Vibro

3.5 Technical Specification Summary

This section only lists the most important technical data. Please refer to the document *"BKV Go Solution Product Specifications and Ordering Information (C108403)"* for further details.

3.5.1 CM360-CG/VCM-3

Electrical	
AC Input	100–240 VAC, 1 A 50–60 Hz (fuse at 2–5 A)
DC Input	85–375 VDC
Environmental	
IP rating	IP66
Operating temperature	-10 ºC to +55 ºC (+14 ºF to +131 ºF)
CE Marking	In compliance with the EMC, Low Voltage Directive and RoHS 2011/65/EC Directives
Mechanical	
Dimensions	380 x 380 x 135 mm (14.96 x 14.96 x 5.32 in)
Weight	13 kg (28.66 lbs)
Material	Painted steel cabinet with a hinged lid with a window.
Power supply	
Voltage / power consumption	Nominal output voltage: +24 V 24–28 VDC adjustment range Worst case sensor current consumption 1.8–2.1 A, 50 W
Fuse	Internal input fuse T3.15 A

3.5.2 AS-667

The following performance data apply, to the extent that nothing else is indicated, under standard conditions (Ambient temperature = 25 °C / 77 °F, Constant current = 4 mA).

Dynamic	
Sensitivity, nom. (at 80 Hz):	100 mV/g ±10 %
Frequency response:	0.5 Hz to 13 kHz: ±3 dB 1.5 Hz to 10 kHz: ±10 %
Measurement range:	60 g Peak
Resonance frequency:	typically 30 kHz
Amplitude linearity:	< 1 %
Cross sensitivity:	typically 5 %
Electric	
Maximum output voltage:	27 V
Constant current supply (secure against reverse polarity):	2 mA to 10 mA (24 V nom.)
Output resistance:	100 Ω
Bias voltage, typically:	12.9 VDC
Across entire temperature range:	12.4 VDC to 13.4 VDC
Grounding:	Housing isolated against sensor electronic
Surroundings	
Operating temperature range:	-55 °C to +125 °C (-67 °F to 257 °F)
Operating temperature with connection cable AC-14xx:	-30 °C to +90 °C (-22 °F to 194 °F)
Storage temperature range in original packaging:	-20 °C to +70 °C (-4 °F to 158 °F)
Overload capacity:	Constant, sinusoidal: 500 g (17.64 oz) Shock: 5 000 g (176.37 oz) Housing design: Hermetically sealed stainless steel housing
Degree of protection acc. EN 60529:	IP68 (2 h at 5 bar) (incl. Nema 6) (only with connection cable AC-141x)
Physical values	
Measurement principle:	Piezoelectric principle, compression type
Weight:	120 g (4.23 oz)
Housing material:	stainless steel 1.4404
Mounting screw:	M8x1.25 tapped hole
Mounting torque:	3.5 Nm, width across flats: 22 mm / 0.866 in
Connection:	M12 plug, male, 4-pole

4 Delivery, Transport and Storage

Check the packaging for damage upon delivery and make sure that the contents are complete. Report any defects immediately as a complaint.

For environmental conditions, refer to 3.5 Technical Specification Summary.

5 Mechanical Installation

5.1 Installing the Cabinet

5.1.1 General Overview

The BKV Go Solution is delivered with a steel cabinet which enables installations in rough environments (IP66). The steel cabinet includes:

- A VCM-3 monitoring device
- A circuit breaker
- A power supply

The electrical installation in the cabinet is pre-wired. You only need to connect the power supply to the circuit breaker and the sensors to the corresponding terminals.

5.1.2 Before Installing

Before installing the cabinet:

- The cabinet must be clean and undamaged when it is installed.
- Unused cable entries in the cabinet must be closed with suitable plugs to ensure the IP rating.
- Appropriate tools must be used to install the cabinet.
- Only personnel with the appropriate training should perform the installation work.
- Cabinets that are installed on support frameworks must be mounted securely.
- The cabinet is fitted with 4 threaded bushings – 10 mm (0.394 in) depth – which need M8 x 1 screws.
- All the fastening bushings that are provided must be used.

5.1.3 Lightning Protection

Due to possible damage caused by lightning, we recommend an optional connection between the cabinet and an equipotential bonding bar.

5.1.4 Cabinet Dimensions

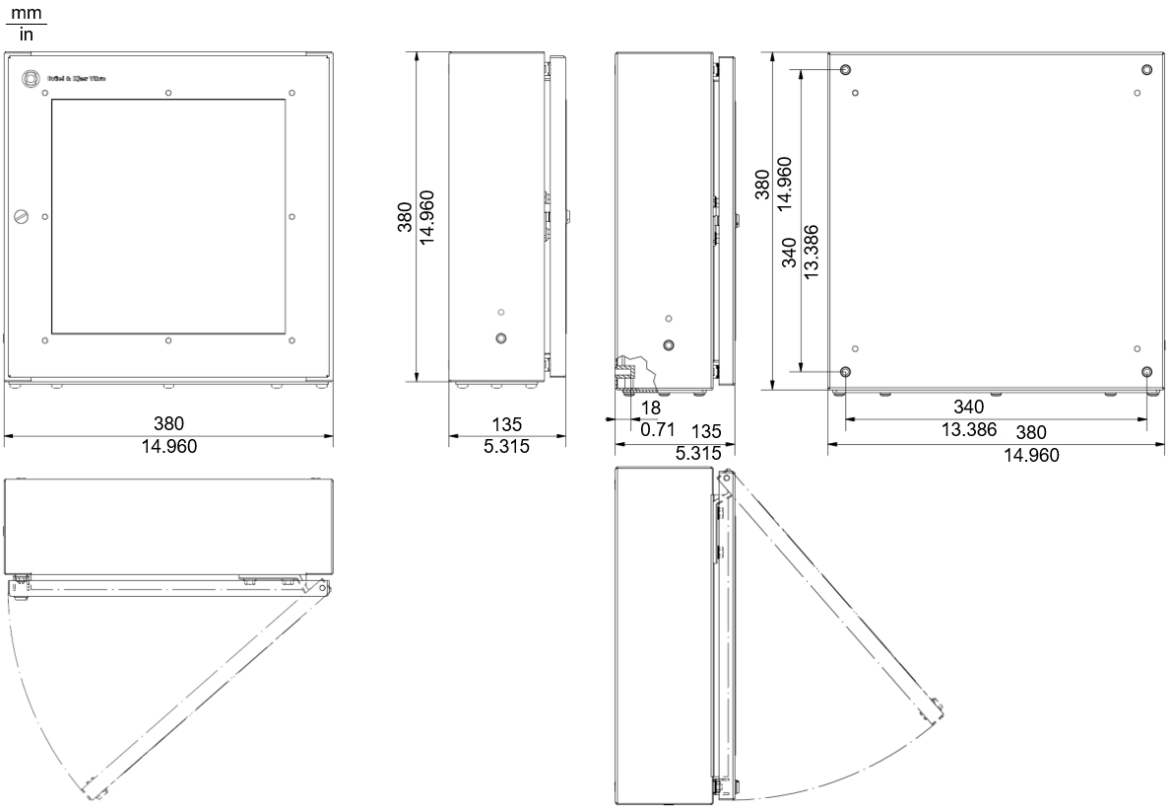


Figure 4: Cabinet dimensions

5.1.5 Screw Mounting in the Bushing

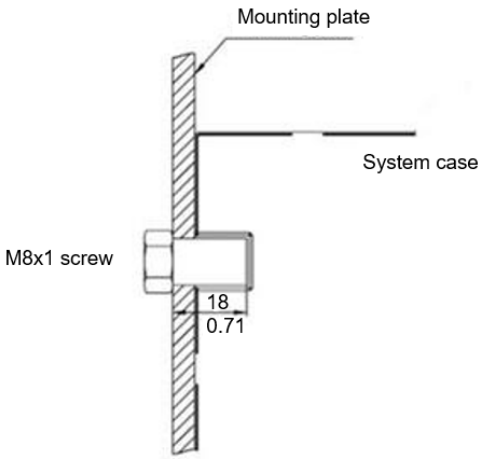


Figure 5: Screw mounting in the bushing

5.1.6 Gland Layouts

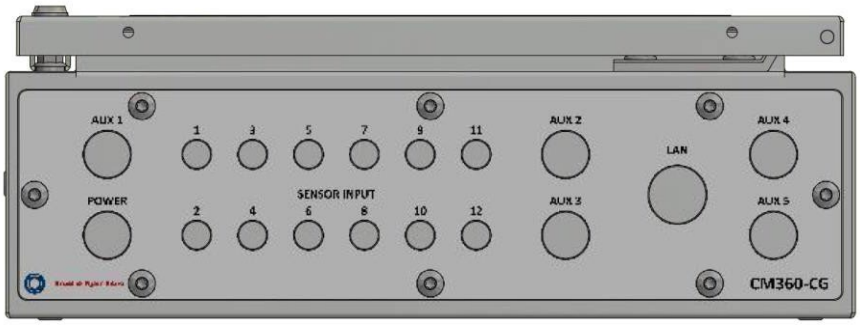


Figure 6: Gland layouts

5.1.7 Gland Use, Size and Cable Diameter

Purpose	Quantity	Size	Cable Diameter
Sensor 1–12	12 pcs	M16	3–6.5 mm (0.118–0.256 in)
External power	1 pcs	M20	6–12 mm (0.236–0.472 in)
Aux	1 pcs	M20	6–12 mm (0.236–0.472 in)
LAN [1]	1 pcs	M25	3–6 mm (0.118–0.236 in)

[1] *Allows feed through of RJ-45 LAN connector*

5.2 Mounting the AS-667 Sensor

5.2.1 General

When mounting the sensors to a monitored equipment, it is important to consider the location of the sensor and the contact between the sensor and the machine. The best location to attach the sensor depends on the machine and the monitored vibration source.

For best measurement quality, the contact surface on the machine should be:

- Completely flat (within 0.05 mm (1 mil = 1/1000th inch))
- Smooth (surface texture no greater than Ra 0.8 (32 microinches))
- Larger than the base of the sensor.

INFO

- From a measurement perspective, the best way of mounting is to screw the sensor directly onto the machine surface using threaded bolts
- It is a good practice to mount the sensor via a glue mount adapter to the machine
- If the surface of the machine is curved or uneven, a special mounting adapter must be used to mount (glue) the sensor.
  Refer to the table in chapter 5.2.3 Mounting Methods.

5.2.2 Selecting the Mounting Location for a Sensor

It is a good practice to observe the following rules when mounting a sensor:

- **Transmission path short and rigid**
  Measurement points should be selected so that the transmission path from the vibration source is as short and rigid as possible.

- **Bearing housings**
  On rotating machines, the bearing housings are the most suitable locations for mounting the sensors.

- **Clean measurement points**
  The measurement points must be even, clean, and free from grease or oil.

- **Sensor and cable securely seated and steady**
  The sensor must be securely seated, and the sensor and cable must be steady during the measurement.
  Ideally, the sensor cables should lead straight away from the sensor. The cables must not be kinked, and the minimum bending radius must not be exceeded. Please observe the product specification for the cable.

- **Gravitational load zone**
  The (ISO) standards and guidelines recommend measuring the RMS-value of vibration velocity (with BKV Go = **ISO Condition**) in the horizontal, vertical, and axial direction.
  However the best results will be achieved when taken in the gravitational load zone of the vibration force. In a typical oriented machine arrangement, the recommended measurement direction is the horizontal.

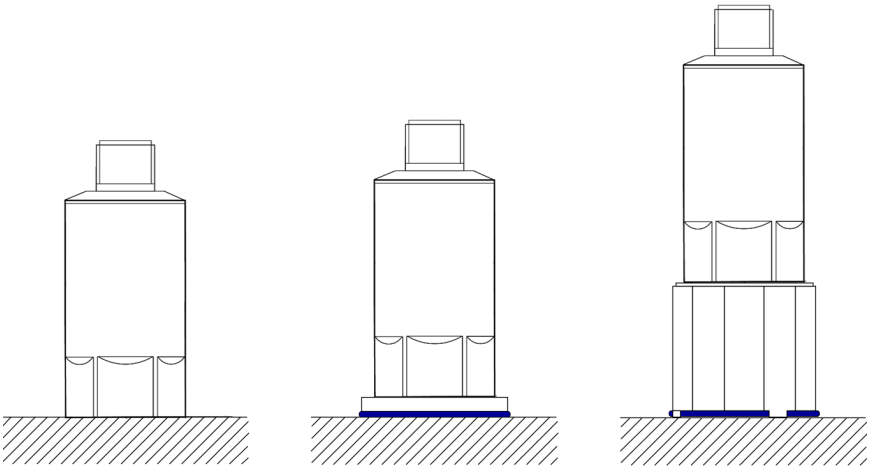
- **Perpendicular**
  The acceleration sensors are uni-directional, i.e., they have their main sensitivity perpendicular to the mounting surface.

5.2.3 Mounting Methods

You have three options to mount the sensors:

- 5.2.6 Mounting the Sensor with a Threaded Stud
- 5.2.7 Mounting the Sensor with a Glue Mount Adapter
- 5.2.8 Mounting the Sensor with a Magnetic Epoxy Mount Adapter

Mounting method	Bonding	Surface	Thread hole	Curved surface	BKV Go measurement support
With threaded stud (included)	Mechanical	28 mm (1.102 in)	M8 x 1.25	No	All
Glue mount adapter (included)	Acrylat or Epoxy	30 mm (1.181 in)	No	No	All (HF Condition + Bearing Condition with limitations*)
Magnetic epoxy mount adapter (must be ordered separately: C108348.001, AC-277 - Magnetic epoxy mount adapter)	Epoxy	32 mm (1.259 in)	No	Yes	ISO Condition + LF Condition (not necessarily recommended for HF Condition + Bearing Condition)
* Possible signal attenuation of higher frequency components					



With threaded stud | Glue mount adapter | Magnetic epoxy mount adapter

5.2.4 Coupling

The weight of the acceleration sensor should always be lower at least by a factor of ten than the weight of the object onto which it is mounted.
The acceleration sensor is an additional mass, which loads the object on which it is mounted, and this changes the vibration behavior if it is too large. The sensor requires a friction-locked, contact resonance-free, rigid mounting to the object, particularly for measurements at high frequencies. The cable must be attached on a non-tension basis and load-free in connection.

5.2.5 Gluing and Thread Locking

For gluing the sensors to the machine, you can use one of the following glues or any other suitable glue:

- LOCTITE® AA 330 (Acrylat; one-component with activator)
- LOCTITE® EA 3450 (Epoxy resin; two-component)
- WÜRTH ESK-50 (Epoxy resin; two-component)

For thread locking you can use one of the following adhesives or any other suitable adhesive:

- LOCTITE® 243 intermediate strength
- LOCTITE® 270 high strength

NOTICE!

For all glues and adhesives, always observe the manufacturer's data sheet, particularly with regard to resistance and ambient temperatures.

5.2.6 Mounting the Sensor with a Threaded Stud

The sensor is to be installed with the threaded stud included. It can be installed in any orientation on the machine.

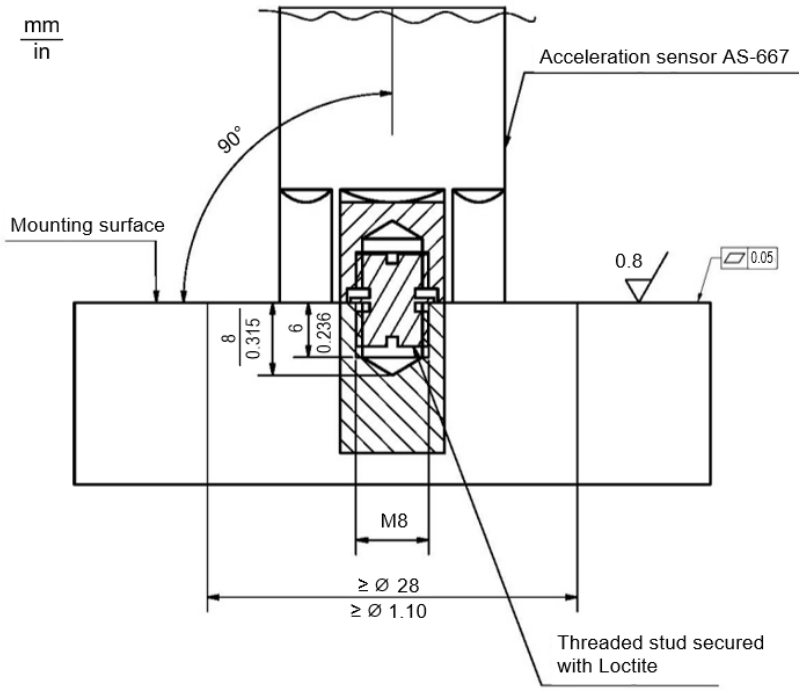


Figure 7: Mounting

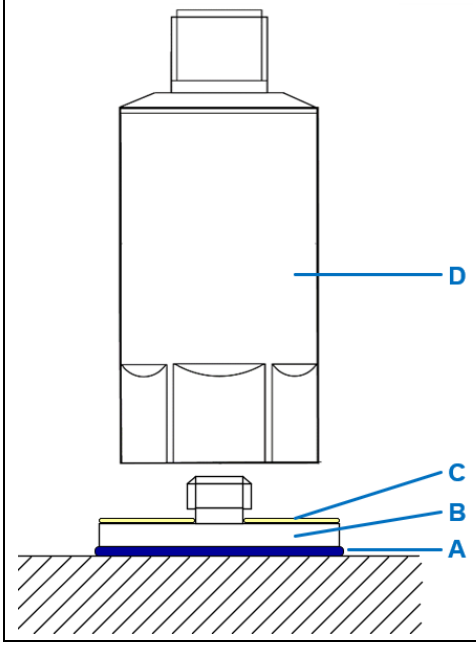
Step	Explanation
1	The mounting surface must be machined flat in the area of the sensor (roughness depth 0.8 µm, flatness 0.05 mm) and have a minimum diameter of 28 mm (1.102 in).
2	Supply installation surface with threaded bore M8x1.25 according to drawing (**Figure 7**).
3	The bore must be countersunk and cleaned.
4	Screw threaded stud into installation surface according to drawing (**Figure 7**) and secure (LOCTITE® 243 intermediate strength or LOCTITE® 270 high strength).
5	Apply thin layer of silicone grease to the installation surface to reduce contact resonance.
6	Screw sensor onto the threaded stud with a mounting torque of 3.5 Nm (key width 22 mm / 0.866 in) and secure (LOCTITE® 243 medium strength or LOCTITE® 270 high strength).

5.2.7 Mounting the Sensor with a Glue Mount Adapter

The sensor is to be installed with the glue mount adapter included. It can be installed in any orientation on the machine.
Using the glue mount adapter, a sensor can be mounted to a flat surface with glue without drilling a hole for a screw.
The glue mount adapter is glued to the machine surface. Afterwards, the sensor is attached to the pre-installed glue mount adapter.

NOTICE!

There is a risk that the adhesion of the glue between the adapter and the machine surface will be compromised when the sensor is fastened to the adapter.
Observe the specified torque. Excessive torque can damage the sensor and the machine. Insufficient torque can lead to insufficient contact between the sensor and the machine and thus to insufficient data acquisition.



Step	Explanation
1	The mounting surface must be machined flat in the area of the sensor (roughness depth 0.8 µm, flatness 0.05 mm) and have a minimum diameter of 30 mm (1.181 in).
2	Thoroughly clean the machine surface at the location where the sensor should be attached and in a larger area around it.
3	Thoroughly clean the bottom of the glue mount adapter.
4	Carefully apply the glue to the bottom of the glue mount adapter (**A**).
5	Apply the glue activator to the machine surface where it is planned to install the sensor.
6	Place the glue mount adapter (**B**) on the glue activator.
7	Let the glue harden.
8	Apply a thin layer of silicone grease (**C**) to the top of the glue mount adapter to reduce contact resonance.
9	Carefully screw the sensor (**D**) onto the glue mount adapter with a mounting torque of 3.5 Nm (key width 22 mm / 0.866 in) and secure with a suitable adhesive.

Table 1: Mounting the sensor with a glue mount adapter

5.2.8 Mounting the Sensor with a Magnetic Epoxy Mount Adapter

The sensor is to be installed with the magnetic epoxy mount adapter (must be ordered separately: C108348.001, AC-277 - Magnetic epoxy mount adapter).
It can be installed in any orientation on the machine.
Using the magnetic epoxy mount adapter, a sensor can be mounted on uneven surfaces without drilling a hole for a screw.
The adapter is pre-fixed with a magnet to the machine surface and must then be fixed with a suitable glue.

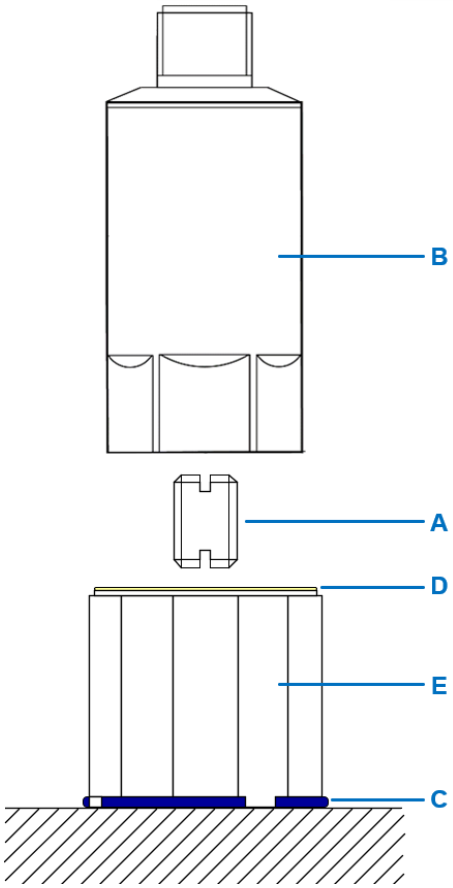
- **Option 1**:
  The magnetic epoxy mount adapter is glued to the machine surface. Afterwards, the sensor is attached to the pre-installed adapter.

- **Option 2**:
  The magnetic epoxy mount adapter is attached to the sensor. Afterwards the adapter/sensor combination is glued to the machine surface.

NOTICE!

There is a risk that the adhesion of the glue between the adapter and the machine surface will be compromised when the sensor is fastened to the adapter.
Observe the specified torque. Excessive torque can damage the sensor and the machine. Insufficient torque can lead to insufficient contact between the sensor and the machine and thus to insufficient data acquisition.

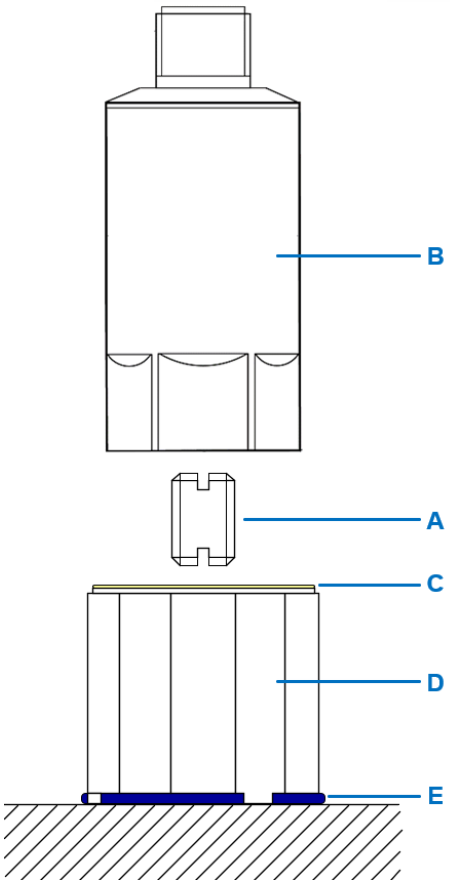
Option 1:
The magnetic epoxy mount adapter is glued to the machine surface. Afterwards, the sensor is attached to the pre-installed adapter.



Step	Explanation
1	The mounting surface must have a minimum diameter of 32 mm (1.259 in).
2	Screw the threaded stud (**A**) included into the sensor (**B**) and secure with a suitable adhesive.
3	Thoroughly clean the machine surface at the location where the sensor should be attached and in a larger area around it.
4	Thoroughly clean the magnetic top surface of the magnetic epoxy mount adapter. If you are not sure which surface is the correct one, test the magnetic surface of the adapter with a metal surface.
5	Prepare the glue and then apply it to the surface of your machine according to the instructions of the glue manufacturer. Make sure that the two components of the glue are completely mixed. **INFO** If you use an epoxy glue that is mixed in the nozzle, you can apply it directly to the machine surface.
6	Place the magnetic surface of the magnetic epoxy mount adapter on the glue (**C**).
7	Let the glue harden.
8	Thoroughly clean the non-magnetic top surface of the magnetic epoxy mount adapter.
9	Apply a thin layer of silicone grease (**D**) to the non-magnetic top surface of the magnetic epoxy mount adapter to reduce contact resonance.
10	Carefully screw the sensor (**B**) onto the magnetic epoxy mount adapter with a mounting torque of 3.5 Nm (key width 22 mm / 0.866 in) and secure with a suitable adhesive.

Table 2: Mounting the sensor with a magnetic epoxy mount adapter (option 1)

Option 2:
The magnetic epoxy mount adapter is attached to the sensor. Afterwards the adapter/sensor combination is glued to the machine surface.



Step	Explanation
1	The mounting surface must have a minimum diameter of 32 mm (1.259 in).
2	Screw the threaded stud (**A**) included into the sensor (**B**) and secure with a suitable adhesive.
3	Thoroughly clean the non-magnetic top surface of the magnetic epoxy mount adapter. If you are not sure which surface is the correct one, test the magnetic surface of the adapter with a metal surface.
4	Apply a thin layer of silicone grease (**C**) to the non-magnetic top surface of the magnetic epoxy mount adapter to reduce contact resonance.
5	Carefully screw the sensor (**B**) onto the magnetic epoxy mount adapter (**D**) with a mounting torque of 3.5 Nm (key width 22 mm / 0.866 in) and secure with a suitable adhesive.
6	Thoroughly clean the machine surface at the location where the sensor should be attached and in a larger area around it.
7	Thoroughly clean the magnetic top surface of the magnetic epoxy mount adapter.
8	Prepare the glue and then apply it to the surface of your machine according to the instructions of the glue manufacturer. Make sure that the two components of the glue are completely mixed. **INFO** If you use an epoxy glue that is mixed in the nozzle, you can apply it directly to the machine surface.
9	Place the magnetic surface of the magnetic epoxy mount adapter (**E**) on the glue.
10	Let the glue harden.

Table 3: Mounting the sensor with a magnetic epoxy mount adapter (option 2)

6 Electrical Installation

6.1 Electrical Parts

DANGER!

- Ensure that any electrical parts are disconnected before mounting the VCM-3 unit. Otherwise there can be a risk of death or severe personal damage
- Do not touch live electrical parts
- Disconnect electrical parts before any connections are made

6.2 Shielding

It is very important that the shields of the sensor cables and the housing of VCM-3 are connected to the same ground potential. That is, to the cabinet where they are mounted. On the side of VCM-3 housing a ground cable can be fastened to the cabinet. The sensor cables can be connected to the cabinet through the EMC rail or other means.

Figure 8: Shielding

6.3 Sensor Connection Terminals

CAUTION!

- Accepts wires up to 0.5 mm^2 (20 AWG) with ferrule and plastic sleeve
- Cables shall have a minimum temperature rating of 80 °C

6.4 Mains Power Connection

NOTICE!

Mains must be connected to the circuit breaker but must not be connected directly to the DC power supply. The power supply provides voltage in a range from 100–240 VAC.

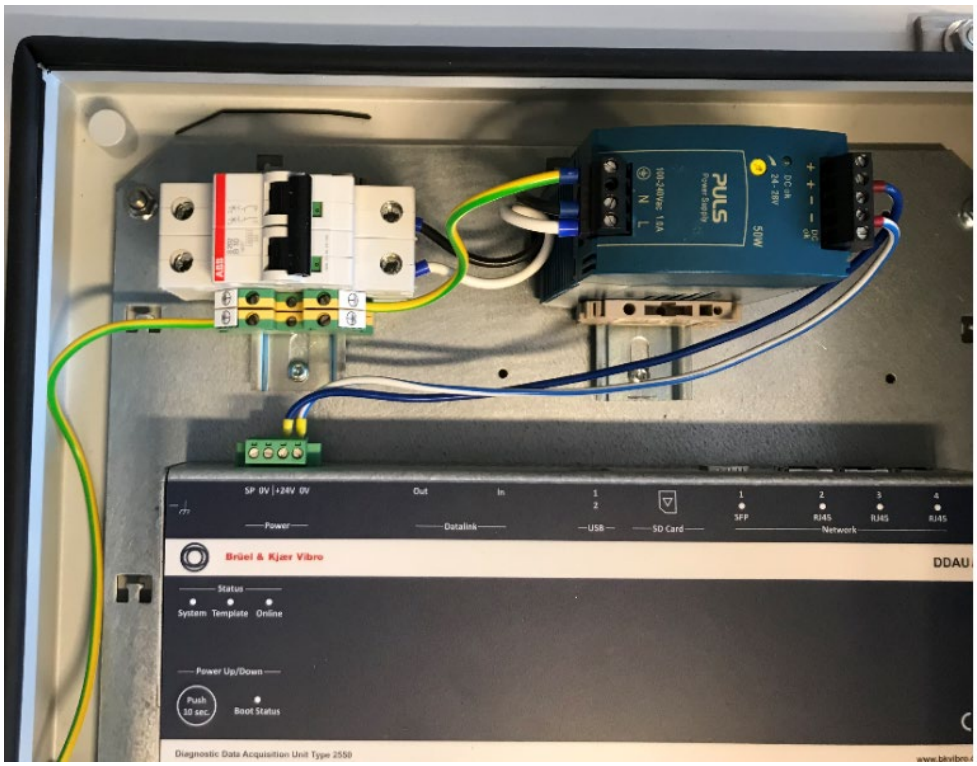


Figure 9: Mains power connection

Step	Explanation
1	Pull the cables through the cable glands found at the bottom of the cabinet.
2	Route the mains power cable inside the cabinet and ensure that it is securely fasten. When the cable is in the correct position, tighten the cable gland at the bottom of the cabinet.
3	Connect the mains power cable to L and N terminals on the circuit breaker and connect the PE to the PE terminal beside the circuit breaker.
4	The circuit breaker terminals accept wire gauges in the range from 0.5 mm² to 2.5 mm² (20 AWG to 13 AWG). The stripped cable ends should be provided with ferrules.
5	When the cable is correctly installed, tighten the mains power cable gland at the bottom of the cabinet.

6.5 Grounding

The cabinet shall be grounded through the PE connector on the PE terminal on the terminal block. On the left of the cabinet additional grounding option is provided with a treaded hole M8 x 15 mm (0.590 in).

6.6 Connecting Sensor Signals

The following section describes how to connect the sensors to the VCM-3.

Do not connect channel groups which are not supported.

WARNING!

The shield connections of the cables are not shown on the connection drawings. The shield must be connected to ground as described below.

6.6.1 Overview

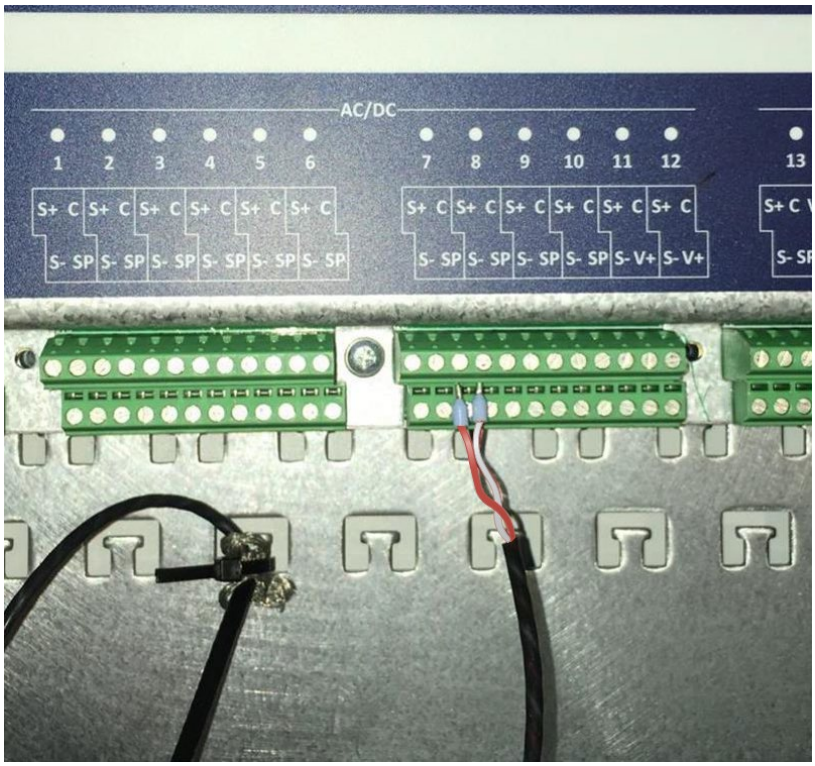
The BKV Go Solution package is delivered with standard cable packages to connect the sensors. The number of cables included depends on the size of your BKV Go Solution package.

The double-wired connection cables are equipped with a plug M12 on one side and are open on the other side of the cable.

The open side of the cables must be connected to the VCM-3 and the M12 plug must be attached to the sensor.

The cables must be attached on a non-tension basis and load-free in connection.

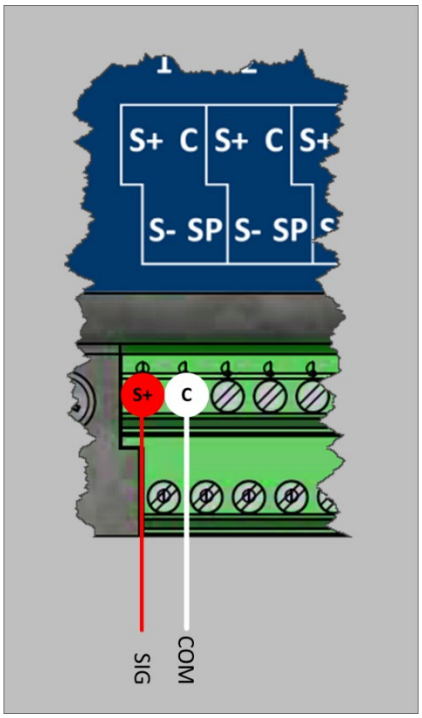
6.6.2 Connecting and Wiring Procedure

Step	Explanation
1	Pull the cables through the cable glands found at the bottom of the cabinet.
2	Route the cables inside the cabinet.
3	If single-screened sensor cable is used, then the screen must be folded back on the cable jacket and then strapped to the dedicated cut-out on the bottom plate. 
4	Connect the sensor cables according to the instructions given in 6.3 Sensor Connection Terminals.
5	Tighten the cable gland when the cable is correctly installed.

6.6.3 Connecting the Sensor Cables to the VCM-3

The open side of the cables must be connected to the VCM-3 using wire ferrules with plastic sleeves at the AC/DC inputs for CCS accelerometers (ICP). Refer to 3.3 Overview of the VCM-3 Unit.

The AS-667 acceleration sensors (multipurpose, 100 mV/g) are constant current line drive accelerometer (CCS) and are connected to channel 1–12 of the VCM-3.

	This type of sensor needs a constant current, which is supplied by the VCM-3 unit.

For details, refer to 6.6.2 Connecting and Wiring Procedure.

6.6.4 Connecting the Sensor Cables to the AS-667

The M12 plug of the connection cables must be plugged into top of the sensors and secured by a union nut.

7 Configuration

7.1 General Steps

To use the BKV Go Solution, it must be configured on the BKV configuration website. When the configuration is done, it can be reviewed and downloaded.

Save the downloaded configuration on a USB stick or SD card. Insert it into the VCM-3 to install and activate BKV Go.

INFO

Ideally, you should deactivate the channels that are not used. In other words, you only activate the channels on the BKV configuration website that will be used later.

However, it may be possible that enabled channels are either not connected with sensor or not attached to running machine.
In this case, the script for the initial alarm settings is not terminated but runs in the background and queries the history every 5 minutes.

In the above scenario, you may need to login to the BKV Go Dashboard and manually set some alarm limits for these channels. Then the script running in the background will recognize this and terminate.

This is the design because we also want to support the scenario in which the monitored machine, respectively the associated input channels, can be idle at the beginning but is later put into operation.

Further important information on automated initial alarm limit calculation and set up can be found in the section 9.1 General Alarm and Machine Conditions.

7.2 Overview

To configure the BKV Go Solution, go to the following website:

https://go.bkvibro.com

Figure 10: Four steps to configure the BKV Go Solution

To step through the configuration, you can either use the buttons **Back** and **Next** at the bottom of each page or click the numbered steps at the top (for example, **1 Device Settings**).

Fields marked with a (*) are required.

An information icon ("i" in a blue circle) indicates the possibility of viewing a help text.
Hover the mouse over the icon to view the help text.

Four steps are required to configure the BKV Go Solution:

- **1 Device Settings**
- **2 Connectivity**
- **3 Asset Channel Settings**
- **4 Review**

7.3 Device Settings

You can use this page to specify the base parameters of the device. You can use either DHCP or specify an IP Address to establish connection.

To configure the **Device Settings**, follow the steps described below:

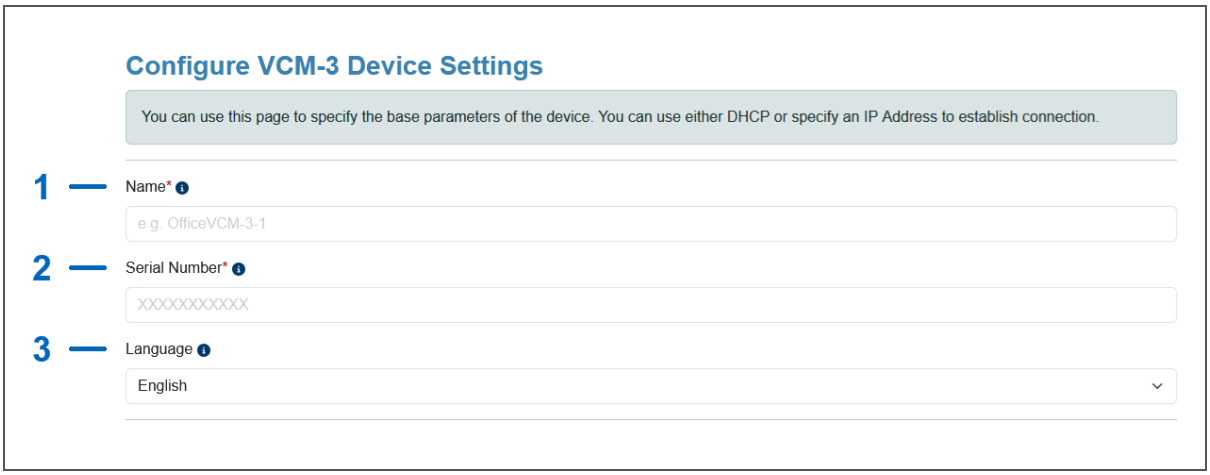


Figure 11: Configure VCM-3 Device Settings

Step	Explanation
1	**Name** Enter an individual name of your VCM-3 device for identification purposes. This name will also be used and displayed on the device homepage. The name must be between 1–63 characters long and cannot contain any special characters except for – (dash).
2	**Serial Number** Enter the unique VCM-3 serial number which you will find printed on the device type label. One type label is affixed to the side of the hardware device. In case of the BKV Go packages a second type label is in front of the device at the right above the CE marking. The format must follow YYYYMM#####.
3	**Language** Select the language of the VCM-3 built in homepage and its applications.

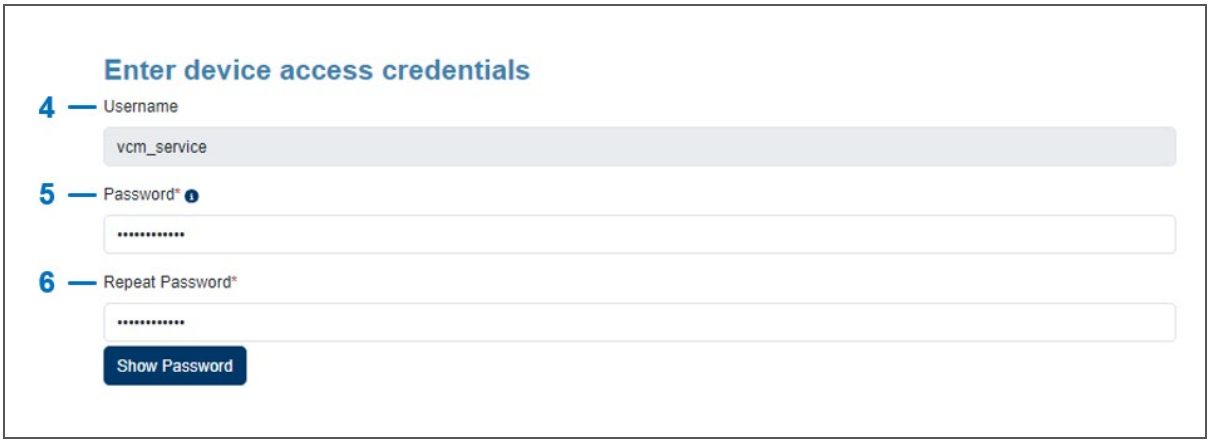


Figure 12: Enter device access credentials

Step	Explanation
4	**Username** Displays the VCM-3 service user named **vcm_service**. (read-only)
5	**Password** Enter the **Password** (*VCM3-Service*) for the existing VCM-3 service user named **vcm_service** (read-only). The initial factory password (*VCM3-Service*) and how to change it can be found in the document *"VCM-3 Instructions (C108418)"*. Please document any possible change of the password afterwards.
6	**Repeat Password** Please repeat your entered password. You can use the button **Show Password** to display the entered password.

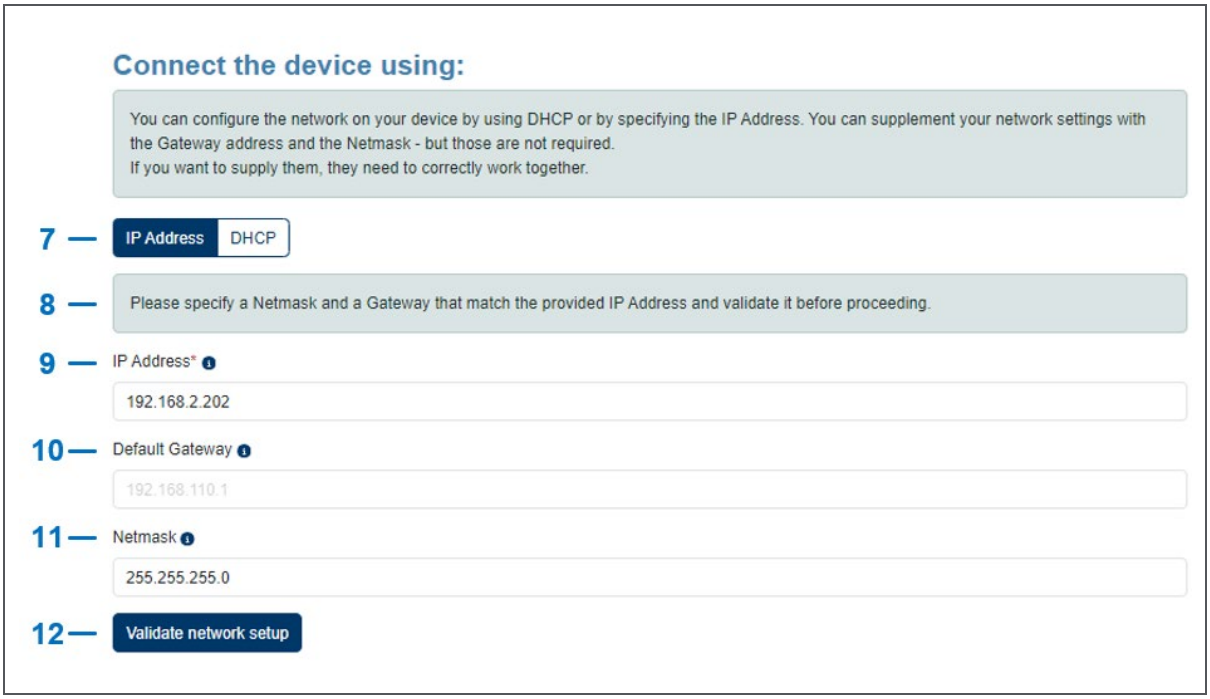


Figure 13: Connect the device using

Step	Explanation
7	You can configure the network on your device by specifying an IP Address or by using DHCP. • You can supplement your network settings with gateway address and netmask, but these are not required. If you want to supply them, they need to correctly work together. • DHCP does not require additional configuration here but requires that your system has access to a DHCP server in your network. Please carefully read the DHCP section in the user instruction document.
8	When you click the **Validate network configuration** button, a message is displayed indicating whether your network configuration is valid or not.
9	**IP Address** Enter a valid IPv4 address in the format xxx.xxx.xxx.xxx. Factory default IP address is: 192.168.2.202.
10	**Default Gateway** Enter the default gateway (router) address in the format xxx.xxx.xxx.xxx. It should be within the same network as the provided IP Address and follow the **Netmask** range.
11	**Netmask** Enter the netmask in the format xxx.xxx.xxx.xxx. It determines the range of **IP Adresses** within the network, including the provided **IP Address** and **Default Gateway**. Factory default is: 255.255.255.0.
12	**Validate network configuration** When you click the **Validate network configuration** button, a message is displayed indicating whether your network configuration is valid or not.

7.4 Connectivity

To configure the **Connectivity**, follow the steps described below (however, it is not mandatory to enable one of the options):

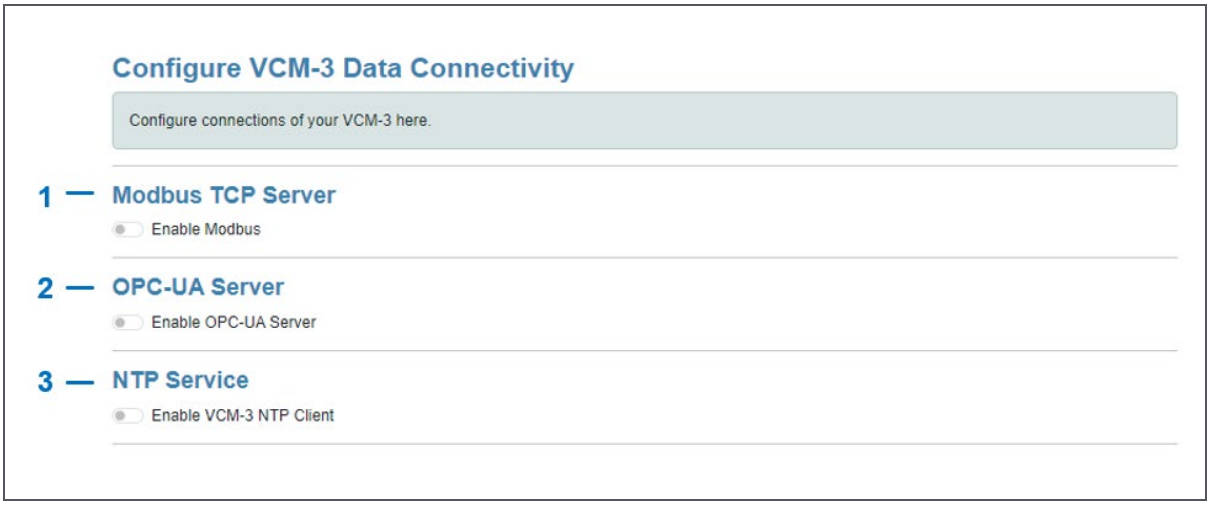


Figure 14: Configure VCM-3 Connectivity

Item	Explanation
1	**Modbus TCP Server** • **Address Range** IP Address prefix and subnet width of the Modbus client • **Byte Order** You can define the byte order here. Choose Big Endian (Most Significant Bit) or Little Endian (Least Significant Bit) configuration. • **Word Oder** You can define the word order here. Choose Big Endian (Most Significant Bit) or Little Endian (Least Significant Bit) configuration. • **Port Number** Communication port number defined by the monitoring template (read-only). Please note that the port number will be 502 and cannot be changed. • **Scalar Update (Refresh) Rate [s]** Modbus register refresh rate in seconds. Minimum is 1 s (second). • **Unit** Unit number. Numerical (integer) identifier of the VCM-3 device. Allows the Modbus client to distinguish data from different data sources. Need to match the Modbus client settings. For details, refer to 7.4.1 Modbus Register Overview.
2	**OPC-UA Server** The OPC-UA server will be enabled with default configuration.
3	**NTP Service** IP Address Enter a valid IPv4 address in the format xxx.xxx.xxx.xxx, where each xxx represents a number between 0 and 255. It is a good practice to use the NTP service.

7.4.1 Modbus Register Overview

The table provides the Modbus registers for the various descriptors of the individual channels and some general Modbus registers. The Modbus registers and data types cannot be changed.

Modbus register	Channel number	Channel name	Descriptor name	Unit	Data type
100	1	CH01	CH01.Sensor-Condition.vavg	V	Float
102	1	CH01	CH01.LF-Condition.rms.avg	mm/s (in/s)	Float
104	1	CH01	CH01.ISO-Condition.rms.avg	mm/s (in/s)	Float
106	1	CH01	CH01.HF-Condition.rms.avg	m/s^2 (g)	Float
108	1	CH01	CH01.Bearing-Condition.rms.avg	m/s^2 (g)	Float
110	1	CH01	CH01.Sensor-OK	—	Float
112	1	CH01	CH01.ISO-Condition.rms.Alarm	—	Float
114	1	CH01	CH01.HF-Condition.rms.Alarm	—	Float
116	1	CH01	CH01.Bearing-Condition.rms.Alarm	—	Float
118	1	CH01	CH01.LF-Condition.rms.Alarm	—	Float
200	2	CH02	CH02.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
218	2	CH02	CH02.LF-Condition.rms.Alarm	—	Float
300	3	CH03	CH03.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
318	3	CH03	CH03.LF-Condition.rms.Alarm	—	Float
400	4	CH04	CH04.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
418	4	CH04	CH04.LF-Condition.rms.Alarm	—	Float
500	5	CH05	CH05.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
518	5	CH05	CH05.LF-Condition.rms.Alarm	—	Float
600	6	CH06	CH06.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
618	6	CH06	CH06.LF-Condition.rms.Alarm	—	Float
700	7	CH07	CH07.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
718	7	CH07	CH07.LF-Condition.rms.Alarm	—	Float
800	8	CH08	CH08.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
818	8	CH08	CH08.LF-Condition.rms.Alarm	—	Float

Modbus register	Channel number	Channel name	Descriptor name	Unit	Data type
900	9	CH09	CH09.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
918	9	CH09	CH09.LF-Condition.rms.Alarm	—	Float
1000	10	CH10	CH10.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
1018	10	CH10	CH10.LF-Condition.rms.Alarm	—	Float
1100	11	CH11	CH11.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
1118	11	CH11	CH11.LF-Condition.rms.Alarm	—	Float
1200	12	CH12	CH12.Sensor-Condition.vavg	V	Float
…	..	…	…	…	…
1218	12	CH12	CH12.LF-Condition.rms.Alarm	—	Float
3000			performance.time-max	—	Float
3002	—	—	performance.time-avg	—	Float
3004	—	—	performance.mem-max	—	Float
3006	—	—	performance.mem-avg	—	Float
3008	—	—	performance.mem-cur	—	Float
3010	—	—	performance.load-max	—	Float
3012	—	—	performance.load-avg	—	Float
3014	—	—	performance.board-temperature	°C	Float
3016	—	—	performance.core-temperature	°C	Float
3018	—	—	status.time-synch-error	—	Float
3020	—	—	Spectra_Performance	sec	Float
3022	—	—	Spectra_Performance.max	sec	Float
3024	—	—	Spectra_Performance.avg	sec	Float
3026	—	—	Alarms_Performance	sec	Float
3028	—	—	Alarms_Performance.max	sec	Float
3030	—	—	Alarms_Performance.avg	sec	Float
3032	—	—	Status_Performance	sec	Float
3034	—	—	Status_Performance.max	sec	Float
3036	—	—	Status_Performance.avg	sec	Float

7.5 Asset Channel Settings

To configure the **Asset Channel Settings**, follow the steps described below:

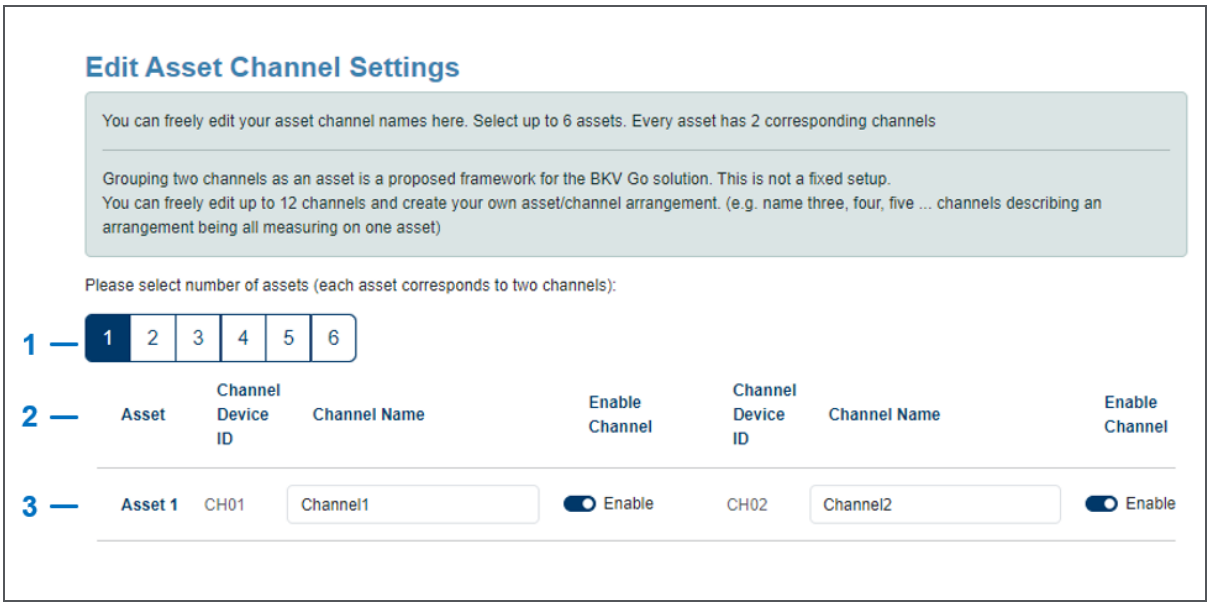


Figure 15: Edit Asset Channel Settings

Step	Explanation
1	**Please select number of assets:** Select up to 6 assets. **INFO** Do not enable any channels if they are not in use.
2	Every asset has 2 corresponding channels. **The Channel Device ID** (for example, **CH01**) is added by default and is read-only. Grouping two channels as an asset is a proposed framework for the BKV Go Solution. This is not a fixed setup. You can freely edit up to 12 channels and create your own asset/channel arrangement. (e.g., name three, four, five ... channels describing an arrangement being all measuring on one asset).
3	You can freely edit your asset channel names here. You can also enable and disable the channels. Channel names can contain only UTF-8 characters except for " and space. Channel names cannot end with \ (backslash).

7.6 Review

To review and download the configuration, follow the steps described below:

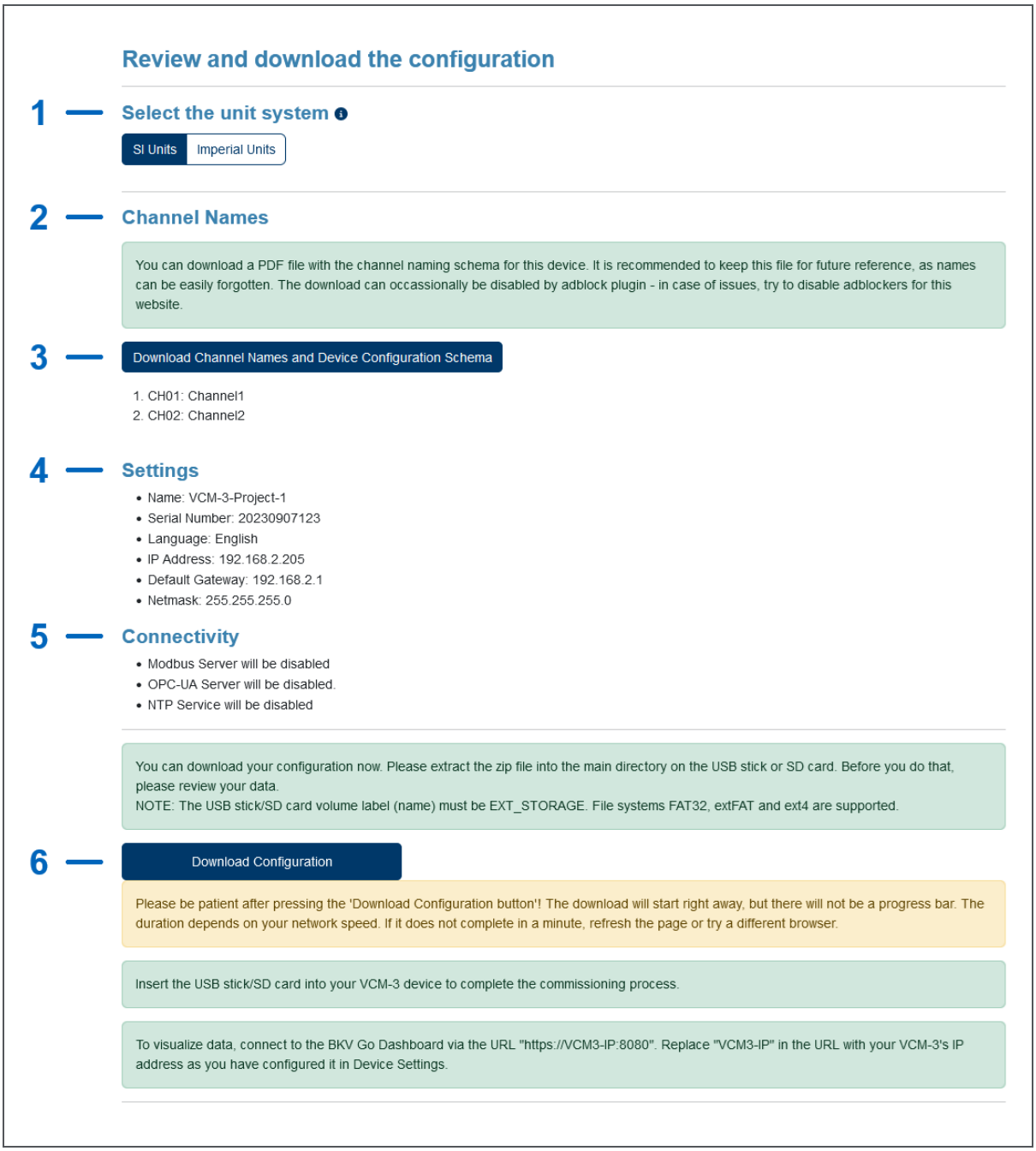


Figure 16: Review and download the configuration

Step	Explanation
1	**Select the unit system** Decide about the physical unit system the monitoring template measurements and alarms are scaled. • **SI Units** stands for “International System” (for example, metric meter) • **Imperial units** stand for British respectively US unit system (e.g., feet, inch).
2	**Channel Names** All configured assets with the selected channel names
3	**Download Channel Names and Device Configuration Schema** You can download a PDF file with the channel naming schema for this device. It is recommended to keep this file for future reference, as names can be easily forgotten. The download can occassionally be disabled by adblock plugin, in case of issues, try to disable adblockers for this website. The PDF file is named *VCM-3_AssetNaming_<Name>_<Serial Number>.pdf*. The *<Name>* and the *<Serial Number>* were entered in step **1 Device Settings.**
4	**Settings** All settings information about the configured VCM-3 (**Name**, **Serial Number**, **Language**, **IP Address**, **Default Gateway**, **Netmask)**
5	**Connectivity** All configured services for the VCM-3
6	**Download Configuration** You can download your configuration now. **INFO** The USB stick / SD card volume label (name) must be EXT_STORAGE. File systems FAT32, extFAT and ext4 are supported. Please extract the zip file to the main directory on the USB stick or SD card. Before you do that, please review your data. The zip file (*vcm3.zip*) contains 3 files: • *<Serial Number>.job* • *BKV-Go-dashboard_<Version number of dashboard>.tar* • *configuration_<Serial Number>.json* The *<Serial Number>* of the VCM-3 was entered in step **1 Device Settings**. **INFO** Be patient after pressing the Download Configuration button. The download will start immediately but note there is no progress graph. The download takes some time depending on your network performance.

8 Transferring the Configuration to the VCM-3

Step	Explanation
1	Download your configuration (refer to 7.6 Review \ Download Configuration).
2	Extract the zip file to the main directory on the USB stick/SD card. **INFO** The USB stick / SD card volume label (name) must be EXT_STORAGE. File systems FAT32, extFAT and ext4 are supported.
3	Insert the USB stick/SD card into your VCM-3 device (refer to 3.3 Overview of the VCM-3 Unit, item 3). The device may or may not be in operation.
4	The configuration file is automatically detected and verified (correct USB stick/SD card volume label, 3 files with the correct ID in the main directory on the USB stick/SD card, no log file on the USB stick/SD card). During the verification, the **Status System** LED lights up white.
5	If the verification is positive, the download is started. **NOTICE!** The download takes about 2–3 minutes. You must not remove the USB stick/SD card prior the download has been completed, i.e., the Status System LED lights up green again. If the download is completed, the **Status System** LED lights up green again. **NOTICE!** If the **Status System** LED flashes white only briefly, an error has occurred. Please contact Brüel & Kjær Vibro or your local sales representative and provide them with the *.log file stored on the USB stick/SD card. For information on the LED indicators on the VCM-3, refer to the document *"VCM-3 Instructions (C108418)"*.
6	After the download is completed, the BKV Go application retrieves measured values from the connected sensors. For each channel and for each of the four descriptor measurements, 1 value is retrieved per minute. During data retrieval, the machine must be switched on and running nominal (constant) speed and load. BKV Go has a built in *idle* respectively *stopped machine* state detection and does not include measurements from this state into the automatic alarm calculation for limit values (**Alert**, **Danger**). The limit values (**Alert**, **Danger**) are automatically calculated from the first 60 minutes of the retrieved data. During the first 60 minutes, BKV Go uses default limit values for monitoring. Also refer to 9.7 Alarm Limit Handling.

Step	Explanation
7	To connect to the BKV Go Dashboard, open an Internet browser and enter the appropriate URL. The URL consists of the IP address that you set in step **1 Device Settings**. (Refer to 7.3 Device Settings \ IP Address) and the port number. The URL must correspond to the following example: *https://xxx.xxx.xxx.xxx:8080*, where *xxx.xxx.xxx.xxx* is the IP address and the default port number is *8080*. **INFO** During configuration you can download a PDF file with the channel names and the device configuration schema. In this PDF you will find among other things the information about the IP address (refer to 7.6 Review\Step 3).
8	After connecting to the BKV Go Dashboard, you must enter your login credentials. Refer to 9.2 Logging in to the BKV Go Dashboard.

INFO

You can download more than one VCM-3 configuration on your USB stick/SD card.
This allows you to configure several VCM-3 devices with one USB stick/SD card.
The VCM-3 device recognizes its configuration based on the serial number.

9 BKV Go Dashboard

9.1 General Alarm and Machine Conditions

INFO

Getting Started: Before you begin using the BKV Go system, make sure to load the configuration from a USB stick/SD card and power on the VCM-3 when the machine's (asset) sensor signals are present, and the asset is running in “nominal operation” (nominal steady rotational speed and load) on configured (enabled) channels 1–12.

Scenario #1: All enabled channels (sensors) are connected to assets that are ‘idle’ in the first 24 hours and subsequently the assets are put into “nominal operation”.

Background: The BKV Go system automatically calculates Alert and Danger alarm limits for measurements on enabled channels. However, after 24 hours, if the system detects the machine is idle or there is no valid sensor signal on the enabled channels, it enters a hold mode. In hold mode, automatic threshold calculation pauses because there are no valid measured values for reference.

To exit Hold mode and resume alarm monitoring, follow these simple steps:

- **Check sensor signals**: Ensure that a stable sensor signal from the machine running in “nominal operation” is present on all configured channels.
  Once you have confirmed the presence of the sensor signals, proceed to the next step.
- **Choose your option**:
- **Option 1**: Log in to the BKV Go Dashboard after waiting for one hour.
- **Option 2**: Perform a soft reboot using the designated button on the VCM-3 hardware device (refer to 3.3 Overview of the VCM-3 Unit\item 7)
- **Option 3**: Execute the Reboot command directly from the VCM-3 homepage (refer to document *“VCM-3 Instructions (C108418)”*
- **Result**: Any of these options will effectively cancel the Hold mode, allowing the system to automatically calculate alarm limits. Your BKV Go system will then be back in full operation, ensuring accurate and timely condition monitoring of your machine.

Scenario #2: Part of the enabled channels (sensors) are connected to assets that are in nominal operation and part of them are connected to assets that are in ‘idle’ state. Subsequently the ‘idle’ assets are put into “nominal operation”.

The BKV Go system automatically calculates Alert and Danger alarm limits for measurements on enabled channels connected to assets in nominal operation within the first hour of commissioning. This is facilitated by the availability of valid values for these channels.
For the other enabled channels connected to idle assets, no alarm limit calculation takes place.
Given that these assets are put to nominal operation after 24 hours of commissioning, it is advisable to log in to the BKV Go Dashboard. This action initiates automatic alarm calculation since rebooting VCM-3 can impact the calculated alarm limits on other channels.

INFO

The BKV Go monitoring concept, incorporating the auto-alarm calculation process, is tailored for applications with stable operating regimes.
For optimal performance, it is crucial that speed and load fluctuations stay within a 5–10 % range.
Substantial variations may influence the vibration levels, making the auto-calculated alarm limits (alert and danger) unsuitable for the intended purpose.

INFO

BKV Go auto-calculates Alert and Danger limit values for all 12 input channels and measurement tasks, using the always-active auto-alarm calculation function.

This assumes the system or machine is in good dynamic condition. In cases when BKV Go is first installed on a machine not considered newly commissioned or suitable for long-term operation, the vibration values may already be significantly elevated.

In this scenario, the auto-alarm calculation function may yield excessively high alarm limit values. As a result, BKV Go may not recognize that the machine is in an unsatisfactory condition and will not alert the operator in a timely manner.

It is therefore essential to check the automatically calculated alarm limit values for Alert and Danger after the initial commissioning to ensure these are appropriate!

If necessary, users can adjust these limits, lowering the setpoint values, using the Descriptor Alarm Settings section in the General Dashboard Settings menu of the BKV Go Dashboard Web application.

For machines without a determined healthy/baseline condition, limit values can be found, in ISO 20816-X Mechanical vibration — Measurement and evaluation of machine vibration, or in OEM manual, for the ISO Condition measurement (velocity mm/s rms). Limit values of e.g., 4.5 mm/s rms are used for the Alert and 7.1 mm/s rms for the Danger for Medium-sized machines with a rated power above 15 kW up to and including 300 kW; electrical machines with shaft height 160 mm ≤ H < 315 mm (6.3 in ≤ H < 12.4 in). These machines usually have rolling element bearings (REBs) and rotational nominal speeds above 600 rpm.

The auto-alarm calculation process can be repeated as needed by activating the function from the BKV Go Dashboard.

(**Note**. The alarm calculation process will always take the last 60 = 60 minutes measurements in the calculation, and it is not possible to use different time lengths/ranges e.g., longer period).

9.2 Logging in to the BKV Go Dashboard

After connecting to the BKV Go Dashboard (refer to step 7 in chapter 8 Transferring the Configuration to the VCM-3), you must enter your login credentials.

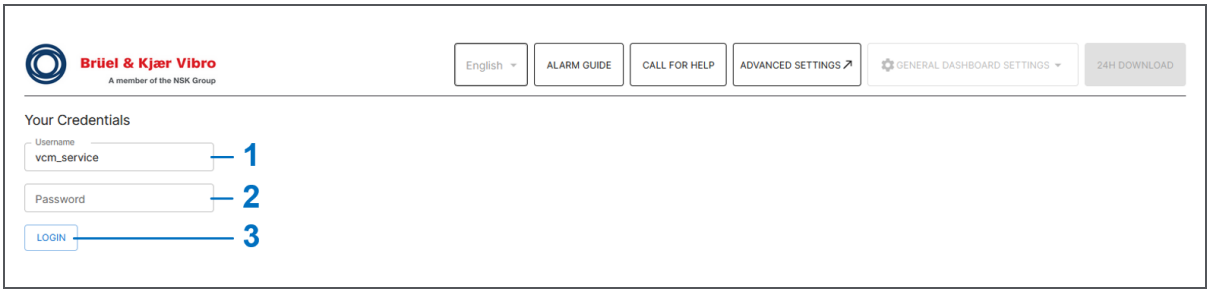


Figure 17: Login screen

Item	Explanation
1	**Username** Enter the username: **vcm_service** (default)
2	**Password** Enter the password for the **vcm_service** user (default is *VCM3-Service*). For details on the initial factory password and how to change it, refer to 7.3 Device Settings\Step 5**.**
3	**LOGIN** Click this button to log in. If you enter an invalid password, a message (**wrong password**) is displayed in the lower right corner of the **Main window**.

If you are not logged in, only the buttons **ALARM GUIDE**, **CALL FOR HELP** and **ADVANCED SETTINGS** in the **Header bar** are operable.

After logging in, the BKV Go Dashboard **Home screen** is displayed.

9.3 Home Screen

The BKV Go Dashboard **Home screen** consists of two main components:

- **Header bar**
- **Main window**

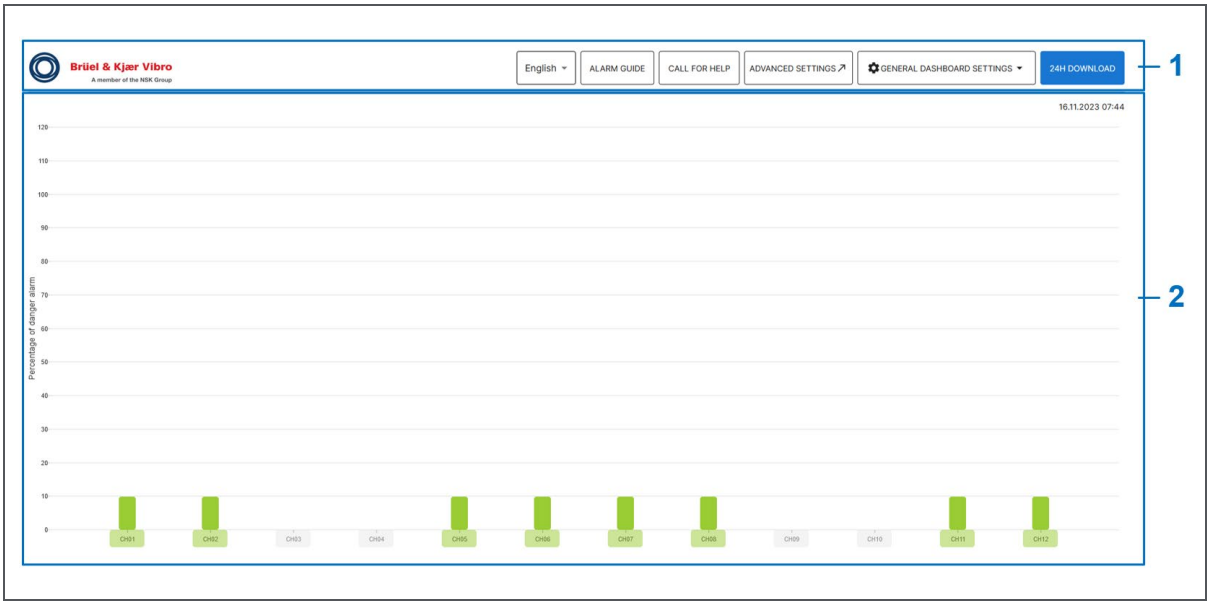


Figure 18: Home screen

Item	Explanation
1	**Header bar**
2	**Main window**

9.3.1 Header Bar

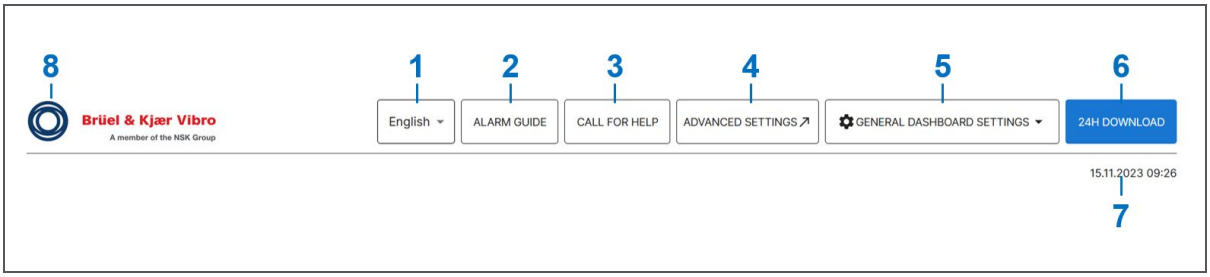


Figure 19: Header bar

Item	Explanation
1	**English / <language>** Select the language of the BKV Go Dashboard user interface (GUI). The default language is determined by the selection on the VCM-3 Homepage. For details, refer to document *"VCM-3 Instructions (C108418)"*.
2	**ALARM GUIDE** The ALARM CONDITION GUIDE with recommended actions is displayed.
3	**CALL FOR HELP** Displays a phone number and email address for help if the **ALARM GUIDE** is not helpful enough to assess and resolve your vibration problem.
4	**ADVANCED SETTINGS** Opens the login dialog for the VCM-3 Homepage. You must enter the corresponding login data (username and password). On the VCM-3 Homepage you can edit the advanced settings. For details, refer to document *"VCM-3 Instructions (C108418)"*.
5	**GENERAL DASHBOARD SETTINGS** For details, refer to 9.3.2 General Dashboard Settings**.**
6	**24H DOWNLOAD** Offers the possibility to download the history for the last 24 hours as a **.csv* file which can be opened and converted to Excel. You can download the history either for all channels (**All Channels History**) or for individual selected channels (for example, **<Channel> History**). A**lso r**efer to 9.9 24h Download (History).
7	**Date / Time** Displays the date and time of the VCM-3 device. The VCM-3 device has no real time clock. You can set the time manually or use t**he** NTP servi**ce**. For details, refer to 9.3.2 General Dashboard Settings \ Date & Time. **INFO** It is good practice to verify the time at the start of the condition monitoring measurements and set it correctly if necessary.
8	**Brüel & Kjær Vibro** logo Click the logo to go back to the **Home screen**.

9.3.2 General Dashboard Settings

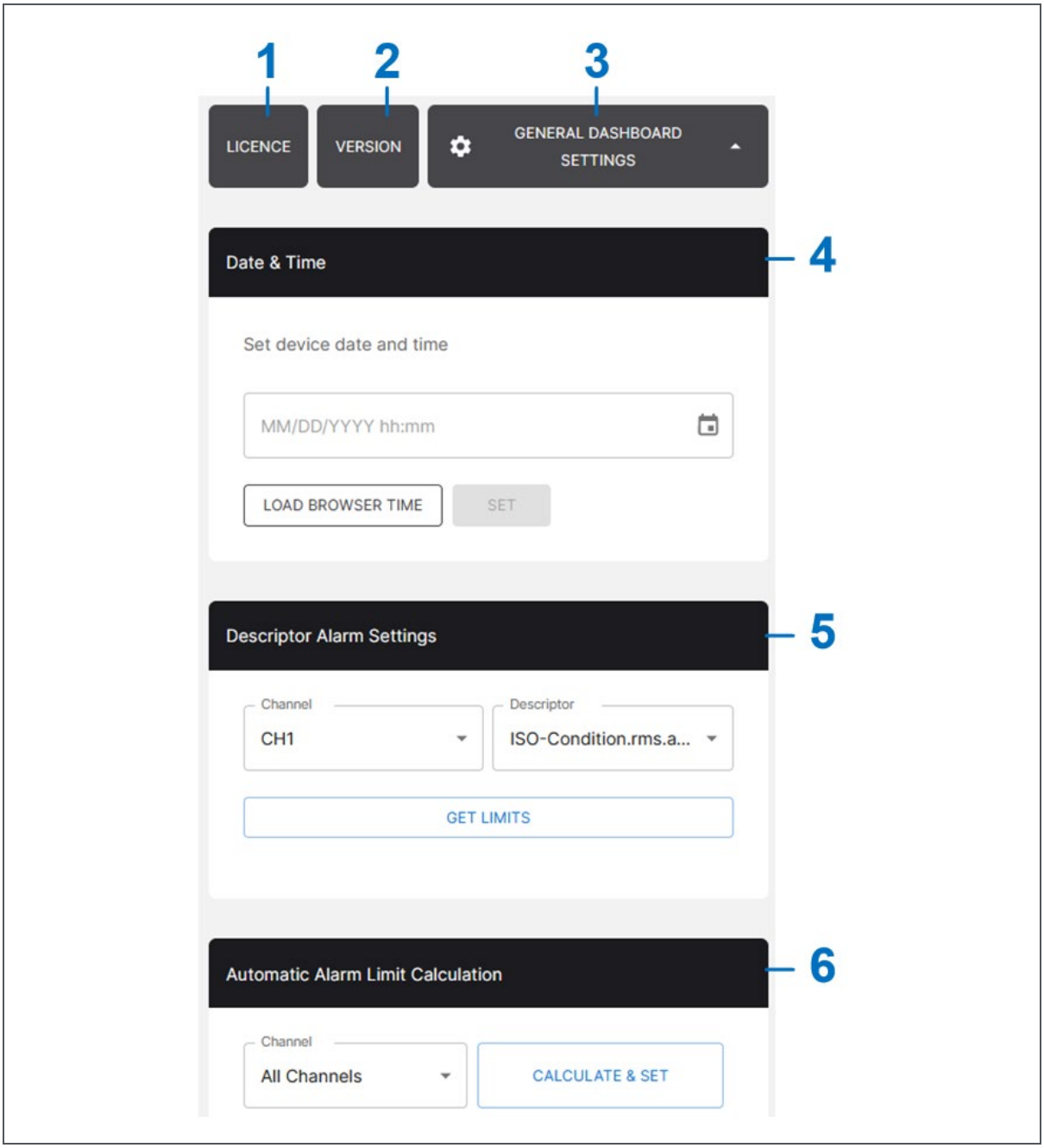
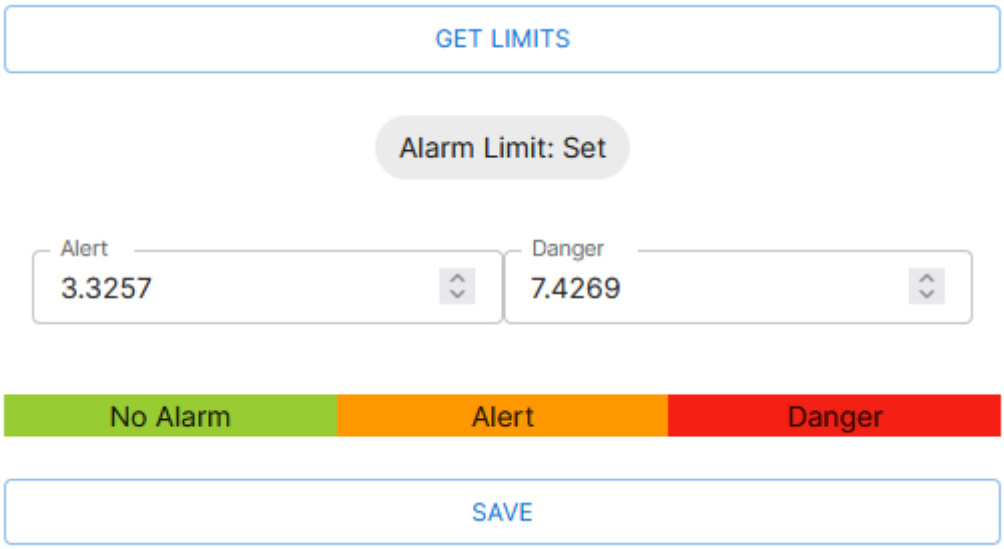


Figure 20: General dashboard settings

Item	Explanation
1	**LICENCE** Displays all BKV Go Dashboard licence information.
2	**VERSION** Displays all BKV Go Dashboard version information.
3	**GENERAL DASHBORD SETTINGS** Click this button to close the general dashboard settings dialog.
4	**Date & Time** **Set device date and time** You can set the date and time of the VCM-3 device manually. The VCM-3 device has no real time clock. It is a good practice to use t**he** NTP servi**c**e. (Refer to 7.4 Connectivity**Item 3**). **INFO** Do not use the **Set device date and time** option if the NTP service is enabled. • **LOAD BROWSER TIME** Click this button to load the browser time into the BVK Go Dashboard. • **SET** Click this button to set the date and time for the BKV Go Dashboard respectively the VCM-3 device. The device time is always converted to UTC (Coordinated Universal Time). **INFO** It is good practice to verify the time at the start of the condition monitoring measurements and set it correctly if necessary.

Item	Explanation
5	**Descriptor Alarm Settings** • **Channel** Click this button to select the channel for which you want to set the descriptor alarm settings. You can also select **All Channels.** • **Descriptor** Click this button to select the descriptor (for example, **ISO-Condition.rms.avg**) from the selected channel. • **GET LIMITS** Click this button to retrieve the present alarm limits.  You will see the presently set alarm limits. You can modify and save (**SAVE)** these. • **Alarm Limit** Shows a status of SET if alarm limits are calculated automatically based on the first 1 hour measurement data after commissioning or if they are SET manually by pressing SAVE button below. Shows a status of CALCULATING if alarm limits are being calculated, i.e., during the first 1 hour after commissioning or if alarm limits are taught again by clicking CALCULATE & SET button. • **SAVE** Click this button to set the new alarm limits to the selected channel and descriptor. The manually set alarm limits are valid (active for limit monitoring) until the button CALCULATE & SET is clicked or the limits are manually changed again**.** Also refer to 9.7 Alarm Limit Handling and to the INFO in 9.1 General Alarm and Machine Conditions.

Item	Explanation
6	**Automatic Alarm Limit Calculation** • **Channel** Click this button to select the channel for which you want to set the descriptor alarm settings. You can also select **All Channels.** • **CALCULATE & SET** If you click this button, you will be asked whether you want to re-initiate the **Auto Alarm Limit Calculation** process for the selected channel respectively all channels. Confirm with **YES** or discard the modifications with **NO**. Click **YES** to automatically (re)calculate the alarm limits based on the last 60 values in the history. The calculation takes about one to two minutes. During the recalculation a message is displayed in the lower left corner of the **Main window** (**Automatic alarm limit setting has been started**). The calculated alarm limits are valid (active for limit monitoring) until the button **CALCULATE & SET** is clicked again, or the limits are changed manually again. **NOTICE!** The modified plant must run for at least 60+ minutes at constant nominal speed and nominal load. After these 60 minutes, new suitable base values are stored in the history. **NOTICE!** Do not teach new limits while the machine is in transient operation. Wait 60+ minutes with constant nominal speed and nominal load.

9.3.3 Main Window

The **Main window** displays one of the following contents:

- **Channels overview**
  Displays an overview over all channels, containing for each channel information about the **ISO Condition** (color/value) and the most serious alarm limit reached (alert / danger), represented by color (green / orange / red).
  Refer to 9.4 Channels Overview.

- **Channel history overview**
  Provides information on four conditions (**ISO-Condition**, **LF-Condition**, **HF-Condition**, **Bearing-Condition**) for the selected channel.
  For each condition of the channel, an information icon indicates whether an alarm limit has been reached within the last 60 minutes.
  Refer to 9.5 Channel History Overview.

- **Channel measurement trend**
  Provides information about the selected condition of the channel.
  The alarm limits (**Alert** / **Danger**) are represented by lines in the trend diagram.
  The trend of the measured value is displayed for the last 60 minutes (one value per minute).
  In addition, you can display detailed information about each measured value (**Value**, **Alarm**, **Time**).
  Refer to 9.6 Channel Measurement Trend.

Only the values of the last 60 minutes are displayed in the different channel windows.
In addition, you can download the measured value history for the last 24 hours as a **.csv* file which can be opened and converted to Excel.

9.4 Channels Overview

INFO

There may be a delay up to 1 minute before all system indications, i.e., measurement values, alarm status changes, etc. in the BKV Go Dashboard are synchronized, i.e., displaying the same status information.

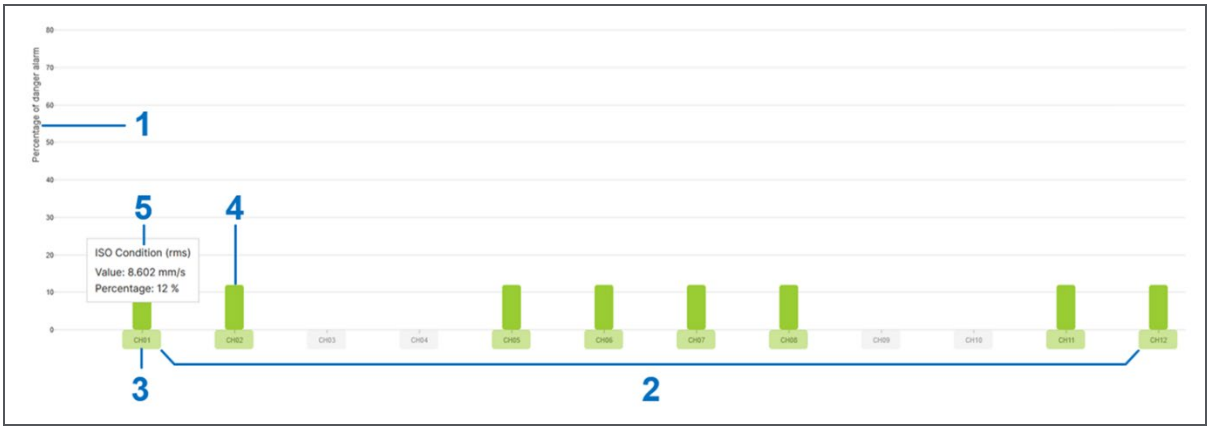


Figure 21: Channels overview

Item	Explanation
1	Percentage of **ISO Condition** danger alarm
2	The 12 channels are displayed. • Configured channels are displayed with a bubble (rectangle with rounded corners) and a value bar. • Non-configured channels are only displayed with a bubble.
3	The bubble (rectangle with rounded corners) shows: • The name of the channel • The color of the bubble represents the status of the most serious alarm limit reached (green = no alarm, orange = alert, red = danger) of any of the four conditions (**ISO-Condition**, **LF-Condition**, **HF-Condition**, **Bearing-Condition**) Hover the mouse over the bubble to view the full channel name.
4	The value bar shows: • The height of the bar represents value of the **ISO Condition** of the channel as a percentage of the danger alarm limit. • The color of the bubble represents the present status of the **ISO Condition** of the channel (green = no alarm, orange = alert, red = danger)
5	Hover the mouse over the bar to display the present value of the **ISO Condition**. The value is displayed in in/s (mm/s) and as a percentage of the danger alarm limit. The unit of the value depends on the selected unit system. (Refer to 7.6 Review\ Step 1).
If the bubble and the bar of a channel are displayed in grey, the alarm limits are just being calculated.	

Also refer to 9.8 Remote Alarm Notification.

If you click on the bubble or the bar of a channel, the respective **Channel history overview** is displayed. Refer to 9.5 Channel History Overview.

9.5 Channel History Overview

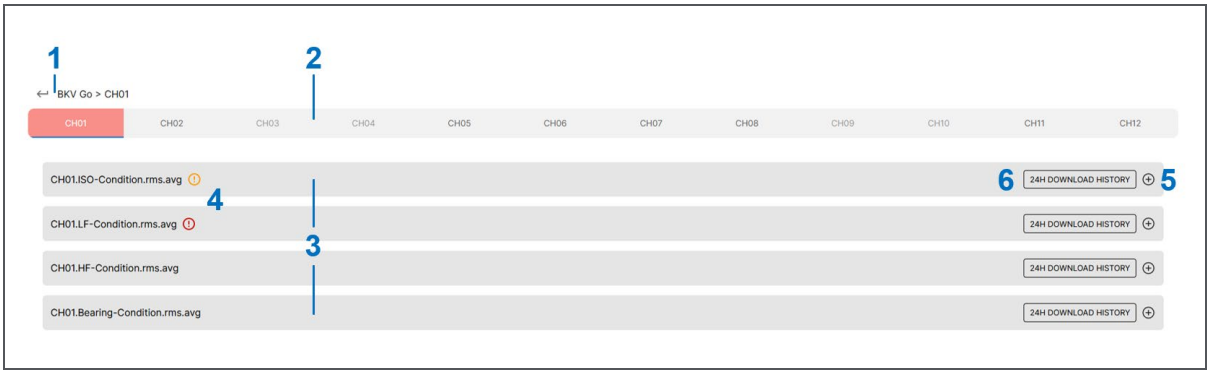


Figure 22: Channel history overview

Item	Explanation
1	Click the back arrow to return to the **Channels overview**.
2	Click on the tab of a channel to open the corresponding **Channel history overview**. The color of each channel tab represents the status of the most serious alarm limit reached (orange = alert, red = danger) of any of the four conditions (**ISO-Condition**, **LF-Condition**, **HF-Condition**, **Bearing-Condition**). The presently displayed channel is underlined in blue.
3	Displays the four conditions (**ISO-Condition**, **LF-Condition**, **HF-Condition**, **Bearing-Condition**) for the selected channel.
4	An exclamation mark (!) indicates that an alarm limit has been reached for this condition within the last 60 minutes. (Orange circle = alert, red circle = danger).
5	Click on the **+** sign to open the corresponding **Channel measurement trend** window for this condition. You can also click on the grey bar of the condition. Refer to 9.6 Channel Measurement Trend.
6	**24H DOWNLOAD HISTORY** Offers the possibility to download the history for the last 24 hours as a **.csv* file which can be opened and converted to Excel. You can download the history for this condition of the channel. Also refer to 9.9 24h Download (History).

Also refer to 9.8 Remote Alarm Notification.

9.6 Channel Measurement Trend

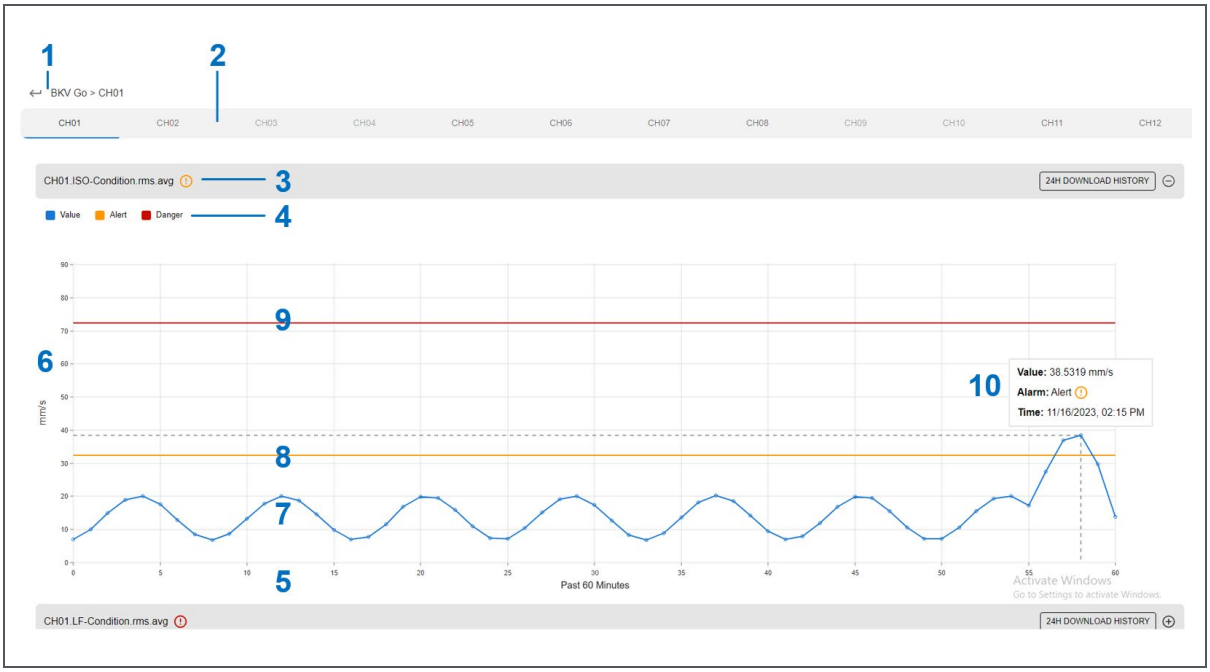


Figure 23: Channel measurement trend

Item	Explanation
1	Click the back arrow to return to the **Channels overview**.
2	Click on the tab of a channel to open the corresponding **Channel history overview**. The presently displayed channel is underlined in blue.
3	Name of the channel and the condition with an exclamation mark (!) that indicates that an alarm limit has been reached for this condition within the last 60 minutes. (Orange circle = alert, red circle = danger).
4	Legend for the trend graph: Blue = measured **Value**, orange = alarm limit **Alert**, red = alarm limit **Danger**
5	X-axis for the trend [Past 60 Minutes]
6	Y-axis for the trend [in/s or in/s^2] or [mm/s or mm/s^2] The unit of the value depends on the selected unit system. (Refer to 7.6 Review\ Step 1).
7	Trend of the measured **Value** (blue)
8	Alarm limit **Alert** (orange)
9	Alarm limit **Danger** (red)
10	Click on a measured value on the trend curve to display information about that measurement: • **Value** [in/s or in/s^2] or [mm/s or mm/s^2] • **Alarm**: Alarm limit (alert / danger) • **Time**: Time of measurement

9.7 Alarm Limit Handling

At any point of time, VCM-3 device is configured with alarm limits based on one of the following ways.

9.7.1 Default Alarm Limits

The default alarm limits come from the configuration (**.json* template file) located on the USB stick / SD card with which the VCM-3 device is initially configured.
The default alarm limits are valid until the automatic alarm calculation, i.e., during the first 60 minutes after downloading the configuration from the USB stick / SD card to the VCM-3 device or until the limits are set manually within 60 minutes.

9.7.2 Automatic Alarm Limits

The automatic alarm limits are calculated based on the first 60 minutes (1 specifically averaged value per minute) of data after downloading the configuration to the VCM-3 device.
These automatically calculated limits are valid until you decide to set the alarm limits manually or to teach the alarm limit. (A new automatic calculation is performed based on the last 60 values stored in the history buffer of the VCM-3 device).

Also refer to the INFO in 9.1 General Alarm and Machine Conditions.

9.7.3 Manual Alarm Limits

You may decide to overwrite the default alarm limits in the first hour, or you may decide to manually overwrite the automatically calculated alarm limits after one hour.
These manually set values are valid until an automatic alarm limit calculation is performed again or you manually modify the limits again.

Also refer to the INFO in 9.1 General Alarm and Machine Conditions.

9.7.4 Automatic Alarm Limit Calculation

During automatic alarm limit calculation, the limits are automatically (re) calculated based on the last 60 values in the history buffer. The calculation takes about one or two minutes.
The taught alarm values are valid until the alarm limits are taught again or you manually modify the limits again.

9.8 Remote Alarm Notification

If an alarm (**Alert** / **Danger**) is present for one of the 12 channels, this is displayed in the BKV Go dashboard.

In addition, a remote alarm notification is available via the digital outputs DO1 /DO2 (refer to 3.3 Overview of the VCM-3 Unit\item 8).

You can retrieve a sum alarm via these digital outputs and process it further. For example, you can control an optical-acoustic signaling device (light, buzzer).

The following applies to the two digital outputs:

- **DO1 is active** (high / LED lights up),
  if at least one present alarm value of a measurement
  (ISO-Condition, LF-Condition, HF-Condition, Bearing-Condition) of a channel (1–12)
  is in **Alert** status (yellow).
  DO1 is only active as long as the alarm is present.

- **DO1 and DO2 are active** (high / LEDs light up),
  if at least one present alarm value of a measurement
  (ISO-Condition, LF-Condition, HF-Condition, Bearing-Condition) of a channel (1–12)
  is in **Danger** status (red).
  DO1 and DO2 are only active as long as the alarm is present.

The voltage on DO1 and DO2 is inverted.

- If no **Alert** / **Danger** is present, the output signal is high (voltage present)
- If an **Alert** / **Danger** is present, the output signal is low (no voltage present)

9.9 24h Download (History)

There are two buttons to download the 24h history of channels/conditions:

- **24H DOWNLOAD** (refer to 9.3.1 Header Bar)
  Download history either for:
  - All channels (**All Channels History**) or
  - For individual selected channels (**<Channel> History**).

- **24H DOWNLOAD HISTORY** (refer to 9.5 Channel History Overview)
  Download history for one condition of a channel.

The buttons offer the possibility to download the history for the last 24 hours as a *.csv file which can be opened and converted to Excel.

Depending on the download button used (**24H DOWNLOAD** / **24H DOWNLOAD HISTORY**), the *.csv file provides the following information:

Information	Description
Descriptor Name	Name of the descriptor (for example CH01.ISO-Condition.rms.avg)
Timestamp	Date and time of the measurement
Value	Measured value
Unit	Unit for the value [in/s or in/s^2] or [mm/s or mm/s^2] The unit depends on the selected unit system (Imperial units / SI Units). Refer to 7.6 Review \ Step 1.
Alarm	• 0 = No alarm • 1 = Alert • 2 = Danger
Status	• 0 = OK The measurement is from running state of a machine • Non-zero = Not OK Either the monitored machine is in idle state (Status = -3) or the mounted sensor is not measuring correctly.

9.10 Alarm Condition Guide and Recommended Actions

The alarm condition guide shows recommended actions when conditions (alert or danger alarm status) are present.
If one or more of the measurements are in alert or danger alarm status, refer to the respective recommendations for more information on what actions to be taken.

NOTICE!

A danger limit setpoint violation requires a faster review than an alert violation.

9.10.1 Alarm Condition Guide (Condition / Action)

	List of recommended actions
ISO Condition (ISO velocity RMS)	• Check the Machine's Foundation and Mounting • Check the Structural Integrity • Check for Imbalance • Check for Misalignment • Look for Rotational Looseness • Check for Rolling Element Bearing Defects
LF Condition (Low frequency velocity RMS)	• Check the Machine's Foundation and Mounting • Check the Structural Integrity • Check for Imbalance • Check for Misalignment
HF Condition (High frequency acceleration RMS)	• Check for Lubrication Errors and early Bearing Defects • Check Bearing Temperatures • Check for Cavitation • Electrical Checks
Bearing Condition (Envelope acceleration RMS)	• Check for Lubrication Errors and early Bearing Defects • Check Bearing Temperatures • Check for Cavitation • Electrical Checks

Table 4: Alarm condition guide

9.10.2 Recommended Actions

Recommended actions	Verification/work proposal
Check the machine's foundation and mounting	Check foundation for signs of damage, cracks, and corrosion. Check the tightness of machine hold down bolts and verify that the mounting base is both levelled and securely anchored.
Check the structural integrity	Check the overall structural integrity of the machine housing and its support structure. Conduct visual inspections of the machine housing and its support structure for signs of damage, wear, or deterioration, including cracks, broken welds, loose fasteners, corrosion, and other structural anomalies.
Check for imbalance	• **E-Motors** Inspect motor cooling fan blades for dirt build up, cracked, distorted, or missing blades. • **Pumps** During plant turnaround, inspect the impeller for signs of wear, corrosion, erosion, debris accumulation or bent vanes. • **Fans** Inspect the fan rotor blades for cracked, distorted or missing blades, and dirt build up. Additionally (all types) check shaft keys are correctly sized, installed, and on opposite sides on coupled machines.
Check for misalignment	Coupled machines (E-Motor, Pump, Fan): With all safety procedures in place, check the alignment condition of the coupled machine, while it is still hot, meets manufacturer specified tolerances. Alignment condition should be measured turning the shafts in the direction of rotation. Other signs that could indicate misalignment are, loose or broken hold-down bolts, loose shim pack, excessive leakage on bearing seals, loose or broken coupling bolts, cracked or distorted coupling membranes, rubber/metal particles under the coupling, excessive amount of grease inside the coupling guards. For machines transmitted by belts, look for signs of unusual wear on belts and/or pulleys' grooves. Assure that pulley run-out, grooves condition and belt tension, follow manufacturer recommendations.
Look for rotational looseness	With the machine turned off and locked out, perform a physical inspection. Try to move the shafts of the motor and the attached machinery (Fan or Pump) by hand. There should be little to no play in the shafts. Rotating looseness can be caused by bearing loose on the shaft or excessive clearances, therefore, if possible, try to insert feeler gauge between bearing's inner ring and the shaft and/or check the grease for oil/soap separation in the tray. Rotating looseness can result from any other component that is not tightened and creates rattling and impacting, while the machine is running, i.e., protecting covers, loose hold-down bolts, etc. so, check and retighten loose bolts and nuts.

Recommended actions	Verification/work proposal
Check for rolling element bearing defects	Components with REB – Rolling Element Bearings: Listen for abnormal growling or squealing sounds from the bearings and (if possible) check the bearing races for evidence of damage, wear or discoloration and bearing seals for damage or incorrect fitting. Check for significant temperature increases (typically more than 10–15 °C), indicating potential severe wear or lubrication issues (insufficient or excessive lubricant). If wear is extensive, or with evidence of flaking, brinelling, spalling, cracks or corrosion consider replacing the bearings.
Check for lubrication errors and early bearing defects	Perform a comprehensive maintenance check by inspecting the lubrication system for proper functionality, ensuring that the grease inlet/outlet pipes are not clogged, and inspecting bearings for any unusual sounds. Unusual sounds from the bearings, such as grinding, knocking, or high-pitched squealing, can be an early indication of a fault. If possible, take ultrasound measurements, or use a stethoscope to magnify the sound while listening at the bearing area to detect abnormalities.
Check bearing temperatures	Check the SCADA/Process monitoring system for any deviation in the bearing temperatures. Consistently high temperature could be a sign of lubrication problems, excessive load or bearing fault.
Check for cavitation	If cavitation is suspected, look for signs such as audible noise high vibration, and reduced pump performance. Check the pump's suction pressure and flow rate, as these are commonly related to cavitation.
Electrical checks	Some high/low frequency issues could also stem from electrical related problems. A quick and easy check, if this will not disrupt production, is to turn off the power of the machine and assess the vibration and noise while machine is shutting down. If problem is electrical related the vibration/noise will disappear as soon as the power is cut, while the vibration/noise due to mechanical problems will be reducing as the machine is coasting down. If you have the necessary equipment and expertise, check for electrical anomalies like harmonics or voltage unbalance in the motor power supply. NOTE that electrical checks should only be performed by qualified personnel as they can involve safety risk due to high voltages.

Table 5: Recommended actions

9.10.3 Help by Phone or E-mail (preferred)

If the above alarm condition guide and the recommendations do not help you to assess and eliminate your vibration problem, please feel free to contact BKV by e-mail (preferred) or by phone.

Please include the keyword "BKV Go" when contacting us.

- E-mail: techsupport@bkvibro.com
- Phone (INT): +49 6151 428 1400 (Monday to Friday, 8 a.m. – 5 p.m. CET)
  Phone (US): +1-775-552-3110 (Monday to Friday, 8 a.m. – 5 p.m. PST)

10 Troubleshooting

10.1 USB Stick/SD Card Not Automatically Detected

If the USB stick/SD card is not automatically detected (**Status System** LED does not light up white), verify the following:

- The USB stick/SD card volume label (name) must be EXT_STORAGE.
- The 3 configuration files with the correct ID (**.job*, **.tar*, **.json*) must have been extracted from the downloaded zip file (*vcm3.zip*) to the main directory on the USB stick/SD card.
- Make sure that there is no log file (**.job.log*) on the USB stick/SD card.

NOTICE!

If the **Status System** LED flashes white only briefly, an error has occurred. Please contact Brüel & Kjær Vibro or your local sales representative and provide them with the *.log file.

10.2 Input Signal/Sensor NOK

When an event (alarm) occurs, users often wonder whether the instruments (monitor and sensors) are working properly.

- Poorly installed wiring or wires that are loose, sporadically shorted or opened, can have electrical induced noise
- The power supply can induce noise
- You can have grounding issues that cause false alarms
- The sensor itself can fail
- The VCM-3 can fail
- The communication can fail

Viewing the trend of Bias voltage provides a diagnostics tool to help rule out these potential failures.

10.3 Error Messages BKV Go Dashboard

The following table provides an overview of the error messages (with cause and solution) that may be displayed on the BKV Go Dashboard. If the problem persists reboot the VCM-3 device.

Error message	Cause	Solution
VCM-3 connection disconnected	Networking problems	Check network
VCM-3 connection closed		
Connection to VCM-3 failed		
Failed to receive a response from the VCM-3. Connection is not active.		
VCM-3 connection timeout		
VCM-3 connection has been failed		Connect to VCM-3 homepage (no need to login). Now log in to Dashboard.
Template error! Please verify that the VCM-3 is using a BKV Go compatible Monitoring Template	VCM-3 was loaded with a wrong Monitoring Template	Check currently active Master Monitoring Template (see document *"VCM-3 Instructions (C108418), Commissioning – Monitoring Template"*).
Unexpected response has been received from the VCM-3 The application will restart in 30 seconds	API connection problems and/or wrong monitoring template	Check currently active Master Monitoring Template (see document *"VCM-3 Instructions (C108418), Commissioning – Monitoring Template"*).
Current template file name could not be received		
Template file could not be received		
Frontpage values could not be received		
Front ISO alarms could not be received		
History values could not be received		
Vic registers could not be received		
Unknown response has been received		
Alarm limits could not be received		
Error occurred while processing history values		
Authentication error	Wrong user and/or password provided	Check user credentials

11 Maintenance

NOTICE!

Maintenance and service work must only be performed by trained qualified personnel!

VCM-3 does not require any regular service or maintenance. It contains no moving parts.

Input calibration has been done at the factory and no further calibration is needed. For recalibration, please contact Brüel & Kjær Vibro or your local sales representative.

In case of defects on the VCM-3, replace the VCM-3 and return the defect unit to factory for repair.

When cleaning the device on the outside, only use a damp cloth.

Be careful not to expose the inside of the device to humidity, i.e., water or other liquids.

12 Disposal of Product

The CM360-CG/VCM-3 device, the sensors (for example, AS-667) and the cables are subject to the EU Waste Management Legislation for electrical and electronic devices.

Do not discard the device in the household waste and observe the local regulations for disposal of waste or return the device to Brüel & Kjær Vibro.

WEEE-Reg.-No. DE 69572330

13 Appendix 1: EU Declaration of Conformity

Brüel & Kjær Vibro
A member of the NSK Group

EU-Konformitätserklärung / *EU- Declaration of conformity*

Hiermit bescheinigt das Unternehmen / *The company*

Brüel & Kjær Vibro GmbH
Wittichstraße 6
64295 Darmstadt

CE

die Konformität des Produkts / *herewith declares conformity of the product*

Condition monitoring system

Typ / *Type*

CM360-CG/VCM-3

mit folgenden einschlägigen Bestimmungen / *with applicable regulations below*
EU-Richtlinie / *EU-directive*

2014/30/EU EMV-Richtlinie / *EMC-Directive*
2014/35/EU Niederspannungsrichtlinie / *Low Voltage Directive*
2011/65/EU + (EU) 2015/863 Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten/ *EU Directive for the restriction of the use of certain hazardous substances in electrical and electronic equipment*

Angewendete harmonisierte Normen / *Harmonized standards applied*

EN IEC 61326-1:2021
EN IEC 63000:2018

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. / *This declaration of conformity is issued under the sole responsibility of the manufacturer*

Bereich / Division
Brüel & Kjær Vibro GmbH

Unterschrift / Signature
CE-Beauftragter / *CE-Coordinator*

Ort/*Place* **Darmstadt**
Datum / *Date* **04.11.2025**

(Niels Karg)

UNRESTRICTED DOCUMENT

Brüel & Kjær Vibro
A member of the NSK Group

EU-Konformitätserklärung / *EU- Declaration of conformity*

Hiermit bescheinigt das Unternehmen / *The company*

Brüel & Kjær Vibro GmbH
Wittichstraße 6
64295 Darmstadt

CE

die Konformität des Produkts / *herewith declares conformity of the product*

Beschleunigungs-Sensor / *Acceleration Sensor*

Typ / *Type*

AS-66x

mit folgenden einschlägigen Bestimmungen / *with applicable regulations below*
EU-Richtlinie / *EU-directive*

2014/30/EU EMV-Richtlinie / *EMC-Directive*

2011/65/EU + (EU) 2015/863 Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten/ *EU Directive for the restriction of the use of certain hazardous substances in electrical and electronic equipment*

Angewendete harmonisierte Normen / *Harmonized standards applied*

EN IEC 61326-1:2021

EN IEC 63000:2018

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller. / *This declaration of conformity is issued under the sole responsibility of the manufacturer.*

Bereich / Division
Brüel & Kjær Vibro GmbH

Ort/*Place* **Darmstadt**
Datum / *Date* **14.11.2024**

Unterschrift / Signature
CE-Beauftragter / *CE-Coordinator*

i.A. Karg
(Niels Karg)

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14 Appendix 2: Additional Documentation

Document type	Document title	Document no.
Product Specifications and Ordering Information	BKV Go Solution	C108403
	VIBRO Condition Monitoring 3 (VCM-3) – Reliability	C108080
Quickstart Guide	BKV Go Solution	C108407
Instructions	BKV Go Solution	C108402
	VIBRO Condition Monitoring 3 (VCM-3 / VCM-3 Ex) – Safety	C107761
	VIBRO Condition Monitoring 3 (VCM-3 / VCM-3 Ex)	C108418
	CM360-CG/VCM-3	C107899
	AS-667 Acceleration Sensor – Safety	C107912
	AS-667 Acceleration Sensor	C106195
Troubleshooting Guide	VCM-3 Condition Monitoring Unit	C108291
Release Notes	VIBRO Condition Monitoring 3 Firmware	C107825

Documents provided by third parties:

Document type	Document title	Document no.
Data Sheet	Power Supply	
	Circuit Breaker	

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