



Instructions for set-up  
moneo|starterkit  
**QZ9100**

**GB**



## Contents

1	Preliminary note . . . . .	3
1.1	Symbols used . . . . .	3
1.2	Further documents . . . . .	3
2	Safety instructions . . . . .	4
3	Intended use . . . . .	5
4	Items supplied . . . . .	6
5	Function . . . . .	7
5.1	IO-Link master . . . . .	7
5.2	moneo software . . . . .	7
6	Installation . . . . .	8
6.1	VVB001 - Vibration sensor . . . . .	8
6.2	DI5028 - Speed monitor . . . . .	9
6.3	TS2229 - Temperature cable sensor / TP3231 - Evaluation electronics . . . . .	9
6.4	AL1350 - IO-Link master . . . . .	10
6.5	QHA210 - moneo appliance . . . . .	10
6.6	ZB0878 - WLAN bolt . . . . .	10
6.7	DN4011 - Power supply . . . . .	11
7	Electrical connection . . . . .	12
8	Set-up . . . . .	13
8.1	Requirements . . . . .	13
8.2	IP addresses of the network components . . . . .	13
8.3	Establishing connection with WLAN network . . . . .	13
8.4	Starting and licensing moneo . . . . .	13
8.4.1	Initial login . . . . .	13
8.5	Offline activation . . . . .	14
8.6	First steps in moneo . . . . .	14
8.7	Recommended settings . . . . .	15
8.7.1	Process values of the vibration sensors . . . . .	15

# 1 Preliminary note


You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at [www.ifm.com](http://www.ifm.com).

## 1.1 Symbols used

- ✓ Requirement
- Instructions
- ▷ Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note  
Non-compliance may result in malfunction or interference.
-  Information  
Supplementary note

## 1.2 Further documents

- Installation instructions
- Operating instructions
- Instructions for set-up moneo|appliance

 The documents can be downloaded at: [www.ifm.com](http://www.ifm.com).  
The manual embedded in the software provides additional help.

## 2 Safety instructions

- The unit described is a subcomponent for integration into a system.
  - The system architect is responsible for the safety of the system.
  - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.

### **3 Intended use**

Permanent condition monitoring of industrial machines. Basis for condition-based maintenance of the installation.

## 4 Items supplied

- 1x QHA210 moneo|appliance
- 1x ZB0878 WLAN bolt
- 1x AL1350 IO-Link master with IoT interface
- 2x VVB001 vibration sensor with IO-Link interface
- 1x DI5028 speed monitor
- 1x TS2229 temperature cable sensor with contact sensor
- 1x TP3231 evaluation electronics for PT100/PT1000 temperature sensors
- 1x DN4011 switching power supply 24 V DC
- 1x E12090 network cable M12/RJ45
- 1x EC2080 Ethernet connection cable
- 3x EVC013 connection cable M12, 2 m
- 1x EVC010 connection cable M12, 0.3 m
- 1x 80291308 (EVC001) connection cable M12/4 x 0.34 mm<sup>2</sup>, 2 m
- 1x 80291307 Y-cable for power supply of the moneo|appliance and the WLAN bolt



To use the system, the corresponding moneo licences are required. These are not included in the scope of delivery and must be ordered separately via article number QM9101.

## 5 Function

The system records the following process data:

- Winding temperature at the motor
- Speed
- Effective value of the vibration speed (v-RMS)
- Effective value of the acceleration (a-RMS)
- Maximum value of the acceleration (a-Peak)
- Ratio of the maximum value to the effective value of the acceleration (crest factor)

This process data is visualised in moneo|RTM (Real Time Maintenance). Warning and alarm values can be defined and managed in the integrated ticket system.

The parameters of the IO-Link sensors and masters can be set using the moneo|configure module.

### 5.1 IO-Link master

The IO-Link master serves as a gateway for the process data of the connected sensors to the moneo|appliance. The IO-Link master enables parameter setting of the connected sensors using moneo|configure.

### 5.2 moneo software

The moneo software on the moneo|appliance offers the following functions:

- Parameter setting of the IO-Link master and the connected sensors with moneo|configure
- Monitoring of the system's process data with moneo|RTM
- Storage of the process data of the application.

## 6 Installation

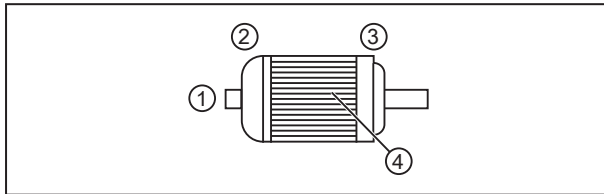


- Disconnect the power of the machine before installation.

Adhere to the instructions enclosed to the individual devices.



- Tighten all sensors with the indicated tightening torque.



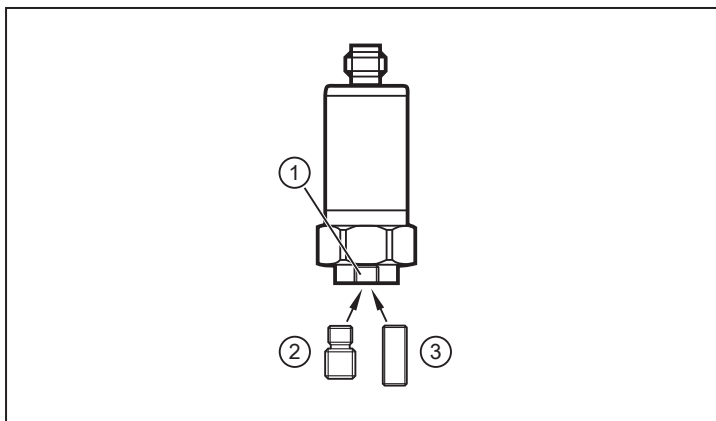
- 1: Speed monitor
- 2: Vibration sensor (motor, non drive end)
- 3: Vibration sensor (motor, drive end)
- 4: Temperature sensor

Fig. 1: Installation example and positioning of the sensors



The positioning of the sensors depends on the machine type and the structure of the installation to be monitored.

### 6.1 VVB001 - Vibration sensor



- Install the vibration sensors as close as possible to the bearing.
- Screw the threaded adapter ¼ "-28 UNF / M8 (2) or the threaded adapter ¼ "-28 UNF (3) into the device (1). Threaded adapters are supplied.
- Tighten using a 3 mm Allen key. Tightening torque 8 Nm.
- Drill and tap a hole at the mounting location:
  - M8 hole / depth min. 10 mm for threaded adapter ¼ "-28 UNF / M8.
  - Or ¼ "-UNF hole / depth min. 13 mm for threaded adapter ¼ "-28 UNF.

Various mounting options can be found in the operating instructions.



[www.ifm.com/](http://www.ifm.com/)  
QR/VVB001



## 6.2 DI5028 - Speed monitor

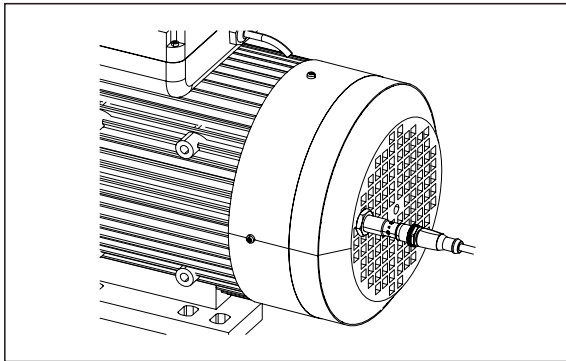


Fig. 2: Mounting principle

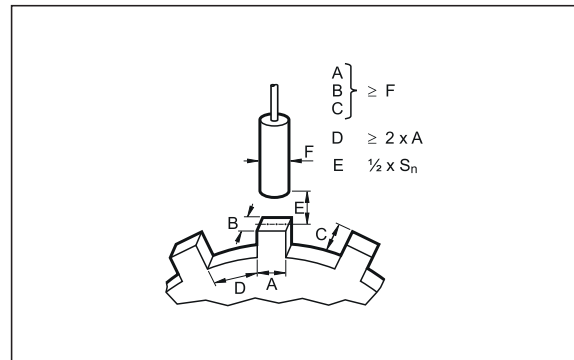


Fig. 3: Mounting specifications

- Fasten the device using the nuts supplied.
- Adhere to the above mounting specifications to ensure a correct function.



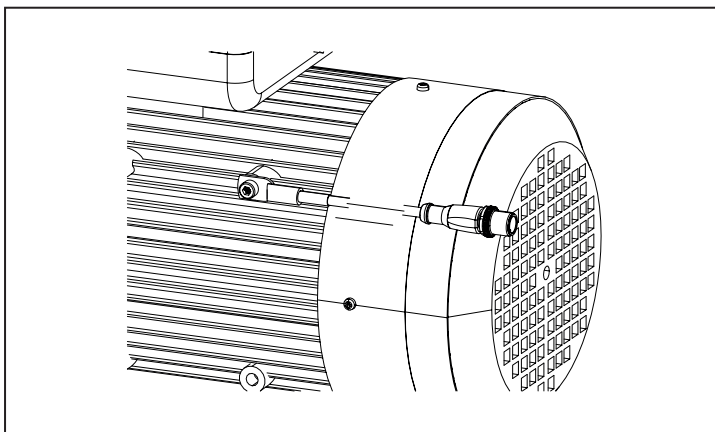
The sensor must be mounted in a way that allows for it to be damped e.g. by a screw or an attached metal target.

If attaching an additional target, it is recommended to remove the attached weight.



[www.ifm.com/  
QR/DI5028](http://www.ifm.com/QR/DI5028)

## 6.3 TS2229 - Temperature cable sensor / TP3231 - Evaluation electronics



- Install the temperature sensor flat on the motor in order to enable precise temperature measurement.



www.ifm.com/  
QR/TS2229



www.ifm.com/  
QR/TP3231

## 6.4 AL1350 - IO-Link master

- Fix the IO-Link master to a flat installation surface.
- Use 2 M5 mounting screws and washers for fastening. Tightening torque: 1.8 Nm.



www.ifm.com/  
QR/AL1350

## 6.5 QHA210 - moneo|appliance

- Integrate the device into the control cabinet. The following has to be observed:
  - Attach the device to a DIN rail using the bracket on the back.
  - To remove, pull down the retaining latch with a screwdriver.



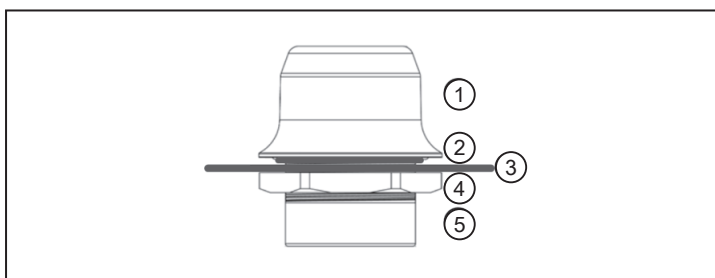
The device is rated for convection cooling.

- Do not impede the air circulation.



www.ifm.com/  
QR/QHA210

## 6.6 ZB0878 - WLAN bolt



- 1: Upper part of the housing
- 2: Sealing ring
- 3: Machine/control cabinet
- 4: M50 nut
- 5: Bottom part of the housing

- Mounting via a cut-out with a diameter of 50.5 mm (M50) in the control cabinet.

## 6.7 DN4011 - Power supply

► Integrate the power supply into the control cabinet. The following has to be observed:

- Suited for DIN rails according to EN 60715 with a height of 7.5 or 15 mm.
- The input terminals are located on the lower front part of the device.
- Adhere to the following installation distances under permanent full load operation: Left / right: 5 mm (15 mm for adjacent heat sources). Top: 40 mm, bottom 20 mm from the device.



The device is rated for convection cooling.

► Do not impede the air circulation. Adhere to installation distances.



[www.ifm.com/  
QR/DN4011](http://www.ifm.com/QR/DN4011)



## 8 Set-up

When the operating voltage has been applied, the components of the moneo|starterkit function according to the factory settings. The LEDs show the status of the devices and interfaces (→ Instructions of the individual components).

### 8.1 Requirements

- WLAN-enabled PC for connecting your own computer to the WLAN bolt and thus to the appliance. To access the moneo software installed on the appliance, one of the two web browsers must be installed on your own computer:
  - Chrome
  - Firefox
- License Activation Code (LAC) that you have received by e-mail from ifm after placing your order



To activate the moneo software licences (QM9101), your own PC must have temporary access to the internet (→ Offline activation [14](#)).

### 8.2 IP addresses of the network components

The network components of the moneo|starter kit have the following default IP addresses:

Device/interface	Default IP address	Own setting	Subnet mask
WLAN bolt	192.168.0.99		255.255.255.0
IO-Link master	192.168.1.101		
moneo appliance, Ethernet interface ETH1 (A)	192.168.1.100		
moneo appliance, Ethernet interface ETH2 (B)			

### 8.3 Establishing connection with WLAN network

- Switch on the moneo|appliance.
- Connect to the WLAN network of the WLAN bolt using your own WLAN-enabled PC.  
 Network name (SSID): moneo\_ <serial number of moneo|appliance>  
 Password: <serial number of moneo|appliance>



The serial number is provided on the product label on the bottom of the moneo|appliance.



We recommend that you change the password of the WLAN network after establishing the connection (see enclosed documentation Anybus® from HMS Industrial Networks).

### 8.4 Starting and licensing moneo

- Start the web browser on your own PC and enter the following URL:  
**http://192.168.0.100**

#### 8.4.1 Initial login

When logging in for the first time, a user with administrator rights must be created.

- ✓ The window to configure the administrator appears.
- Enter the first name, last name and email address.  
 (The email address is used as the username)

- ▶ Enter and confirm the password.
- ▶ Accept the General terms.
- ▶ Click on [Login].
- ▷ moneo is set up accordingly. This may take a moment.
- ▷ The configured user is logged in to moneo.



There must always be a user account with administrator rights in the system so that the system and the user management remain configurable.

## 8.5 Offline activation

Due to the system structure, the licences must be activated offline.

- ▶ Select [Offline activation].
- ▶ Click on [Next].
- ▶ Note down the indicated fingerprint.  
OR  
Click on [Save Fingerprint as .txt file] and save fingerprint.txt locally on your PC or on a USB stick.
- ▶ Click on [Next].
- ▷ Required steps and web address for license activation are displayed.
- ▶ Carry out the indicated steps on a computer with an internet connection.
- ▶ After receiving the licence key, download it and save it on your own PC or on a USB stick.
- ▶ Continue licensing in moneo to go to step 3 [License activation]: Click on [Next].
- ▶ Copy the license key from the .txt file, and then paste it in the [License key] box.
- ▶ Click on [Next].
- ▶ Click on [Finish].

## 8.6 First steps in moneo



An introduction video and a manual embedded in the software are available in moneo. The introduction video can be accessed via the QR code below.



The following steps for set-up are required in moneo:

1. Create devices.
  - ▶ Open [Device management].
  - ▶ Add IO-Link master (→ IP addresses of the network components 13).
  - ▶ Create topology.
2. Set up the operating hours counter.
  - ▶ Select [Revolution] data source of the DI5028.
3. Enter limit values for the vibration sensor.
  - ▶ Open [Monitoring table].

- ▶ Click the [Settings & rules] tab.
- ▶ Click the [Thresholds] tab and select the sensor in the created topology.
- ▷ The surface for limit values of the vibration sensor opens.
- ▶ Enter suitable limit values.

#### 4. Create dashboards.



For more information on creating users and managing them, dashboards and analyses as well as creating ticket processing rules etc., please refer to the moneo manual.



For more information on the moneo|appliance, please refer to the instructions for set-up (QHA210) and the software manual.

## 8.7 Recommended settings

### 8.7.1 Process values of the vibration sensors

#### v-RMS

The v-RMS (effective value of the vibration velocity) measures the total load of a rotating machine. The most frequent types of overload (unbalance, alignment errors, etc.) are reflected in the v-RMS. An increased load can damage the machine in the long term (fatigue, fatigue strength) or, in extreme cases, destroy it within a short time.

#### a-RMS

The a-RMS (effective value of the acceleration) detects mechanical contact of machine components. This contact typically occurs due to wear (defective bearings, worn toothed wheels, etc.) or lubrication problems (impurities in grease, water in oil, etc.).

#### a-Peak

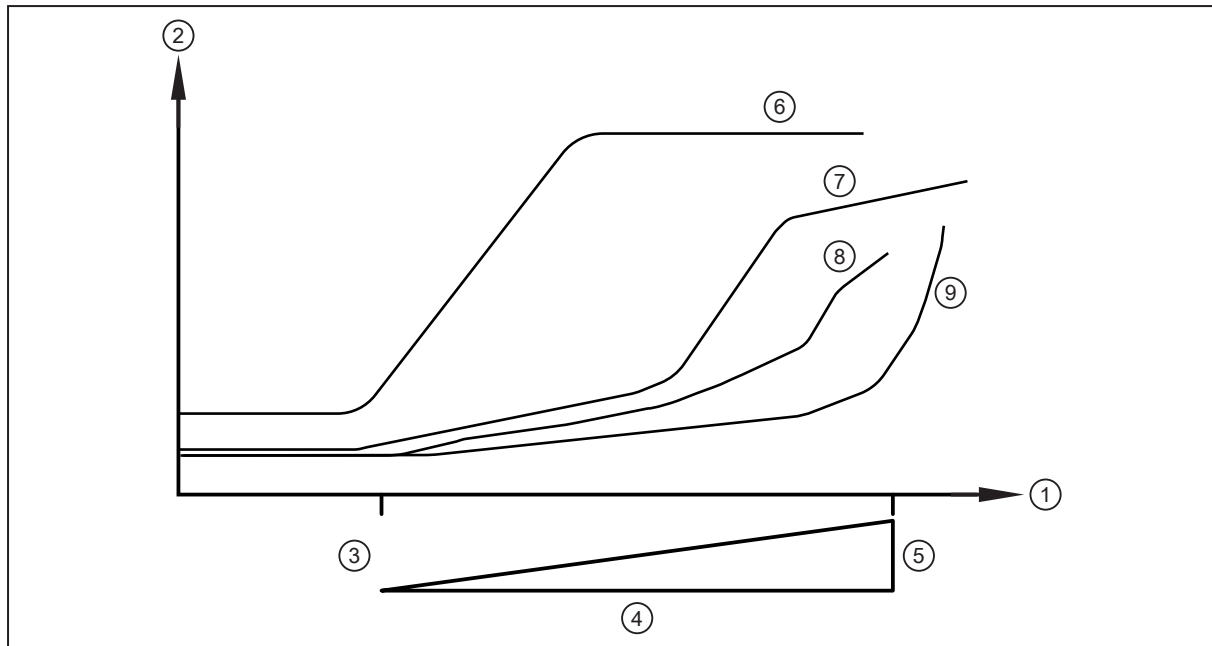
The a-Peak monitors the maximum value of the acceleration. Shocks in acceleration, as in a crash, may occur once or periodically, for example, in case of a bearing damage. a-Peak is a measure of the forces acting on the machine.

#### Crest factor

The crest factor is a described characteristic value of the signal analysis. It is defined as the ratio of the maximum value to the effective value (peak/RMS).

In condition monitoring, the characteristic value is used to evaluate the bearing condition. The high-frequency signals with a short pulse duration of a bearing damage generate higher peak values in relation to the effective value. This relation can be read from the crest factor.

## Characteristic value development



1: Time  
3: Start of damage  
5: Failure  
7: a-RMS  
9: Temperature

2: Characteristic value  
4: Increase of damage  
6: a-Peak  
8: v-RMS



Occurring damage can be correctly detected by means of prior inspection of the installation.

► Before installing the system, check if the system is free of damage.

Various procedures can be applied to determine the warning and alarm limits in order to receive early messages in moneo in case of deterioration.

The limits must be defined accordingly:

- Warning limit: Repair required
- Alarm limit: Installation is approaching failure

Recommended procedures for determining the limit values:

1. Definition of the limit values according to the recommendation of the machine manufacturer. This approach should be preferred if information is available or retrievable from the manufacturer.



Here, the measuring points of the vibration sensors should be observed according to the manufacturer's specifications. The age of the installation and the type of machine placement may be factors causing deviating values.

2. Setting of the v-RMS according to the recommendation in DIN standard ISO 10816.

3. Determination of the limits by means of reference values (a-RMS, a-Peak, ...).

The determination of the reference value should be done with run-in and undamaged bearings. The comparison of the current value with the reference value in the trend curve should be done under the same operating conditions (speed, load, ...).



Temperature differences can also have a great impact on the vibration values, for example, due to the lubricating behaviour of the lubricant at very high or low temperatures. For installations exposed to high temperature fluctuations, this fact should be taken into consideration when determining the reference value and the limits. The reference value will not be changed for the entire lifetime of the roller bearings.

A measuring period of > 2 weeks is recommended for determining the reference values. A warning value of up to +25% can be chosen, depending on the application, by taking the maximum value and the average value of the process value as a reference. Accordingly, the alarm value should be higher in percentage terms.



In applications where higher vibrations may lead to a reduced process quality, the warning / alarm value should be set low.

For applications with relatively low vibrations, e.g. at the beginning of the machine life cycle, the warning and alarm value can also be set > 25%.

#### 4. Adjustment by specialists

In case of critical applications and deviations from the standard or manufacturer's recommendations for structural and application related purposes, it is recommended to consult a specialist to determine the warning and alarm values.