# Industrial IoT IFM moneo & Smart Sensors

*Components for deploying your Industrial IoT projects*

## Description of the teaching aid

Moneo, IFM's IIoT platform industry and production, bridges the gap between the operational (OT - Workshop) and informational (IT - ERP, MES...) levels. Data generated by sensors in production facilities can be easily read and processed.

The benefits of Monéo :

- An open technology platform
- More efficient installations
- Early detection of damage
- Adaptable solutions and systems
- Possibility of declaring maintenance work orders
- Tracking maintenance operations
- Maintenance history

**Bac Pro MELEC, Bac Pro MSPC,**
**BTS Electrotechnique, BTS MS, BTS CRSA**
**IUT, Universities**

## THEMES ADDRESSED

Industrial Maintenance, Production Control, Electrical Engineering and Automation, Automation & Control, Design and Development.

## IFM Monéo kit for multi-machine IOT deployment (Ref: IO11)

✓ This **kit contains :**

- ▸ 4-port IO-Link master
- ▸ Vibration sensor
- ▸ Temperature sensor and transmitter
- ▸ Speed control sensor
- ▸ Wi-Fi access
- ▸ Set of cords
- ▸ **Industrial PC with the following software configuration:**
  - IIoT platform as a basis for moneo applications (Moneo OS license)
  - Parameter-setting software for configuration and diagnostics IO-Link devices (Moneo configure license)
  - Real-time maintenance software for maintenance conditional preventive and analysis (Moneo RTM license)
  - Data interface to IO-Link master (Moneo EdgeConnect AL) LIC)
  - 25 information points to transmit process values (Moneo Infopoint license)

**The IFM Moneo environment is second to none when it comes to connecting several systems**

## Highlights

✓ Learn about the latest technologies in **intelligent industrial sensors and monitoring solutions**
✓ **Scalable solution ideal for project activities**
✓ Programming dashboards in Monéo

## Educational activities

✓ Sensor parameterization
✓ Setting up communication with an Io-Link Master
✓ Programming dashboards in Monéo
✓ Alarm creation

*The kits are delivered with a detailed procedure to facilitate implementation on systems by teaching teams and learners. Any integration of these kits on a machine by ERM Automatismes will be subject to a quotation.*


## IO-Link Master & USB Configurator" pack (REF IO10)

✓ This **Sensor Pack contains** :

- ▸ Profinet IO-Link master for 8 IO-Links
- ▸ Wi-fi access
- ▸ IO-Link data distributor
- ▸ 24VDC power supply
- ▸ Bluetooth IO-Link adapter
- ▸ Y-distributor adapter
- ▸ IO-Link USB master kit
- ▸ Cord set

It increases the number of sensors connected to Moneo.

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## Examples of sensors that can be used with the Moneo platform

### Energy measurement" package (Ref IO00)

✓ This **Sensor Pack contains** :

- Modular three-phase energy meter
- IO-Link compressed air meter
- Set of cords, clamps and fittings

### IO-Link Vibration and Temperature Pack (Ref IO01)

✓ This **Sensor Pack contains** :

- Capacitive vibration sensor
- Electronic box for temperature sensor
- Set of cords
- 2 Temperature sensors

### Detection, Counting, Distance IO-Link" package (Ref IO02)

✓ This **Sensor Pack contains** :

- Inductive proximity switch
- 0 to 200 Hz IO-Link speed controller
- IO-Link counter module
- IO-Link inductive proximity switch
- IO-Link optoelectric sensor
- Set of cords

### Hydraulics, Pressure, Level and Temperature" package (Ref IO03)

✓ This **Sensor Pack contains** :

- Pressure sensor
- Level sensor
- Temperature sensor
- Set of cords

### Light beacon and IO-Link circuit-breaker" pack (REF IO04)

✓ This **Sensor Pack contains** :

- IO-Link multi-channel electronic circuit breaker
- RGB LED beacon with IO-Link buzzer
- IO-Link humidity and temperature
- Set of cords

This pack is specifically designed for cabinet connectivity.
electric.

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## Moneo OS: The IIoT platform

The moneo OS application offers all the functions of modern IIoT software.

The software allows you :

- Create users and administer them in different groups (users can be defined as admin, user and visitor)
- Generate a clear numerical representation
- Adapt process values

## Moneo Configurator: the parameter-setting software package

With just a few clicks, many IFM IO-Link components and IO-Link masters can be parameterized. To facilitate the integration of devices from other manufacturers, a connection to the IODD is integrated.

The software allows you :

- Quickly detect and display IO-Link networks
- Visualize up to two process data with the same unit on the same graph, for configuration and diagnostics of IO-Link devices
- Parameterize and monitor sensors without requiring PLCs

## Moneo RTM: analysis software

Thanks to the innovative condition-based preventive maintenance system, users can quickly find out the status their plant and collect important process information.

The software allows you :

- Create user-specific dashboards
- To be informed quickly in the event of deterioration and avoid any failure
- Large-scale data analysis

## Moneo edgeConnect: the communications interface

Moneo edgeConnect connects devices and data sources to moneo OS.

The software allows you :

- Read IFM IO-Link master with connected IO-Link sensors
- Read an electronic vibratory diagnosis of the entire IFM sensors connected


## Moneo infopoints: data volume

With monéo infopoints, the volume of data from connected devices can be adapted and extended as required.

Depending on the number info points, the size and scope of applications can be individually.

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**Example of deployment on an Ermaflex production line**


moneo | application journey

This **system** requires: use of a Moneo IO11 kit for multiple machines

All alerts are sent by e-mail

**Legend**

- Vibration measurement
- Temperature measurement
- Electrical measurements (consumption, current, voltage, etc.)
- Pneumatic measurements (consumption, pressure, flow, etc.)
- Product detection (counting etc...)
- Humidity

More information at www.erm-automatismes.com

# Industrial IoT IFM moneo & Smart Sensors

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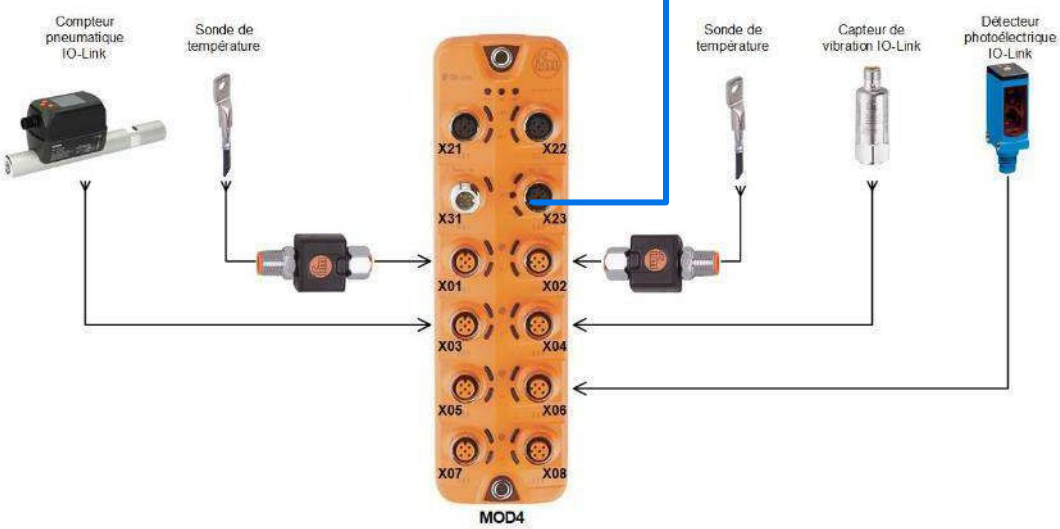
## Example of hardware architecture for deployment on 2 systems

moneo | application journey

IO11

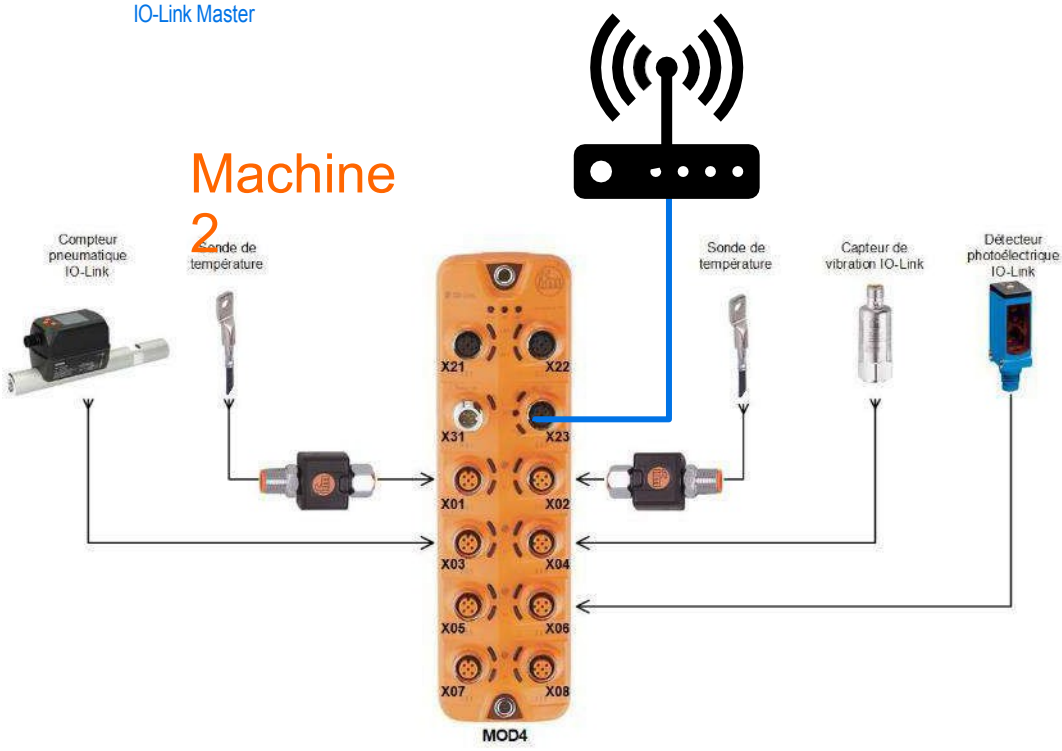
Industrial PC for IoT

## Machine 1




IO-Link Master

## Machine 2




IO-Link Master

# Industrial IoT IFM moneo & Smart Sensors

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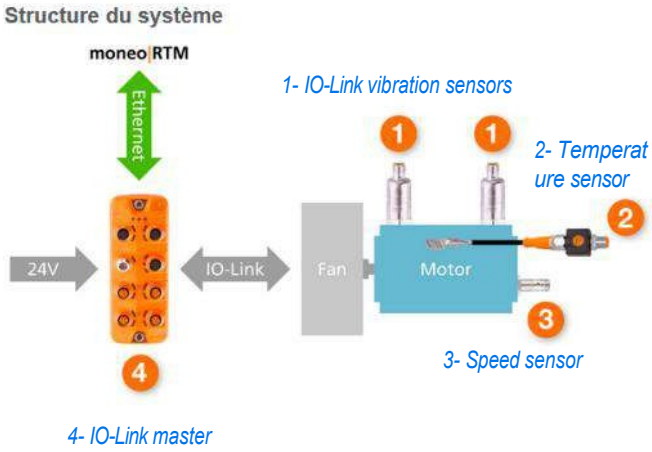
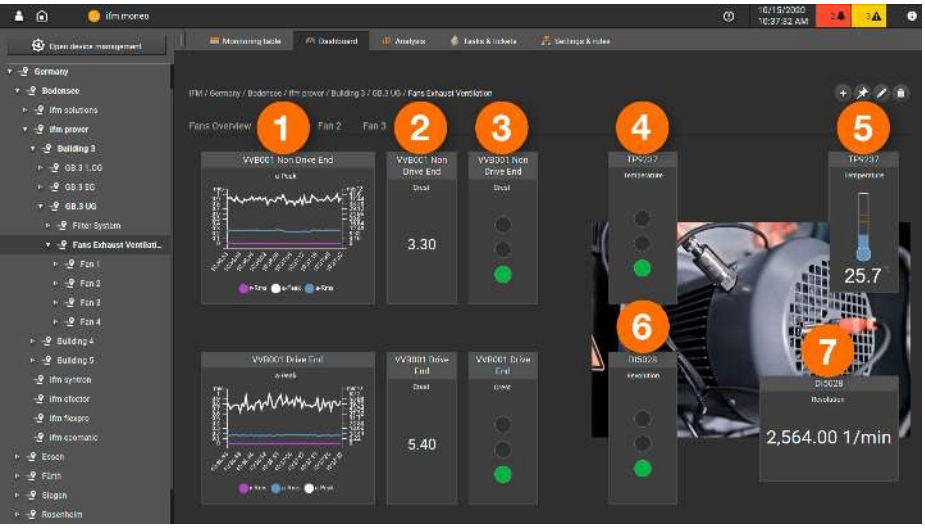
## Use : Vibration monitoring of fans in a suction system with moneo RTM

### Starting situation

There was no consistent, continuous status of the fans, and a fault detected too late could bring the entire production line to a halt.

- **Objective**: To ensure continuous monitoring of the fans, flexible, preventive maintenance in line with needs .
- **Realization**: moneo RTM makes condition-based maintenance possible
- **Success criteria**: Early detection of impending fan damage, Planning of repair operations to reduce plant downtime.




### Dashboard

**1** Overview of characteristic vibration values:
v-Rms, a-Peak and a- Rms
**2** : Crest Factor bearing condition assessment
**3** Crest Factor **4:** Traffic of temperature value
**5** Current motor surface temperature
**6** **:** Tricolour display rotation speed
**7** Current motor speed

### Analysis

**1** Motor speed curve
**2** Motor speed trend
**3** VVB peak value


# Industrial IoT IFM moneo & Smart Sensors

*Components for deploying your Industrial IoT projects*

# IO-Link IFM smart sensor case

*Applied study and deployment of IO-Link intelligent sensors*

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## THEMES ADDRESSED

Industrial Maintenance, Production Control, Electrical Engineering and Automation, Automation & Control
Management, Design and Development.

## Description of the teaching aid

The **IFM IO-Link Smart Sensors** Kit contains several types of IO-Link smart sensors associated with an IO-Link master. Each sensor can be parameterized and tested using the Kit's accessories. The Monéo configure software communicates with the IO-Link Master, enabling data to be viewed locally.
The MQTT communication available in the IO-Link Master, will enable it to communicate data with third-party systems or software.

The variety of components in this case allows you to discover completely different components, sensors, actuators...
Some sensors enable intelligent tasks
and predictive maintenance

## Common features of sensors and applications

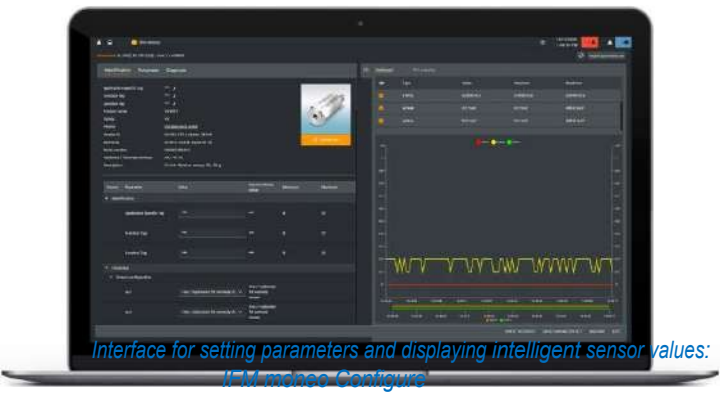
Sensors and actuators can be configured the "moneo Configure" configuration environment.

They are associated with the IFM IO-Link Master, which includes 2 network cards (1/ PLC communication - 2/ IoT network with MQTT).

## Contents

The case consists mainly of :

- ✓ An 8-port IO-Link master with TCP/IP and Profinet communications
- ✓ Bluetooth IO-Link adapter for retrieving sensor values via tablet/smartphone interface
- ✓ An opto-electronic sensor (distance measurement) IO-Link
- ✓ A position sensor for ¼-turn IO-Link actuators
- ✓ 1-10 bar IO-Link pressure sensor (air pressure)
- ✓ IO-Link humidity and temperature
- ✓ An RGB light beacon+ Buzzer IO-Link
- ✓ An inductive proximity switch with speed control function
- ✓ Accessories for sensor testing.



*Interface for setting parameters and displaying intelligent sensor values: IFM moneo Configure*


*IO-Link IFM smart sensor case*

## Highlights

- ✓ Tackle the full range of IO-Link intelligent industrial actuators and sensors
- ✓ Delivered with practical turnkey activities
- ✓ Simple interface with dashboard-style indicators

## Educational activities

- ✓ Sensor parameterization
- ✓ Connecting IO-Link components
- ✓ Discovering and understanding the particularities of IO-Link (what are its benefits for the maintenance profession?)
- ✓ Setting up communication between an IO-Link master and a PC in MQTT mode
- ✓ Production of dashboards on moneo

## Reference

- ✓ IO15: IO-Link IFM smart sensor case

# IO-Link IFM smart sensor case

*Applied study and deployment of IO-Link intelligent sensors*

## IO-Link Cabling practical activity

- ✓ **Study of master and sensor wiring:**

Wire the equipment according to the instructions given
Answer the question "How can I guarantee watertightness?

- ✓ **Master and sensor wiring :**

Procedure for tightening and dismantling Ecolink plugs and socket-outlets

## Learning activity "Remote sensor in SIO / IO-Link mode

- ✓ **Master and sensor wiring :**

Wire the equipment as indicated

- ✓ **Master IP address configuration**
- ✓ **Case studies**

Setting the scene, modifying specifications, calculating parameters sensor,...


## Learning activity "DI5029 sensor replacement and restoration configuration "

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **The various parameter restoration modes**

up, configure port and set sensor to factory setting

- ✓ **Configuration of backup and restore mode:**

Mode "type compatible V1.0 device", Mode "type compatible V1.1 device",...

- ✓ **Conclusion**

## Learning activity "Changing the OGD582 sensor and restoring the configuration".

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **The various parameter restoration modes**

up, configure port and set sensor to factory setting

- ✓ **Configuration of backup and restore mode:**

Mode "type compatible V1.0 device", Mode "type compatible V1.1 device",...

- ✓ **Conclusion**

## Learning activity "Discovering the MVQ101 sensor".

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **Discovering the sensor**

Setting up the situation, sensor configuration (detection state wear, contamination and blockage )

## Moneo Blue" learning activity

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **Using the Moneo Blue application**

master IP address, MVQ101 sensor dashboard, sensor parameterization, sensor data logging,...

## DI5029 sensor parameterization" learning activity

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **Discovering the sensor**

Setting the scene, window mode, sensor configuration and process data structure

- ✓ **Data processing and visualization (Moneo Os):**

Monitoring, dashboard and analysis

## PV8004 sensor parameterization" learning activity

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **Discovering the sensor**

Setting the scene

## Training activity "Pressure monitoring with MVQ101 & PV8004".

- ✓ **Master and sensor wiring :**

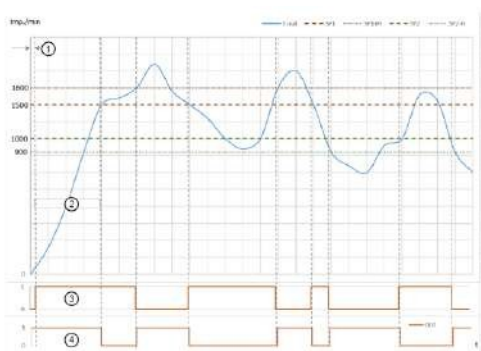
Connecting devices

- ✓ **Setting the scene**

Sensor parameterization and pneumatic connection

- ✓ **Creation monitoring tools on Moneo OS:**

Monitoring panel, creation, alarm and warning creation, ...



## Learning activity "Controlling a DV2130 signal lamp with Moneo".

- ✓ **Master and sensor wiring :**

Connecting devices

- ✓ **Setting the scene**

Set sensor parameters and program signal lamp