

ATLAS 



User Manual: **Atlas +**

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**SPHERAG**

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## 1. DESCRIPTION OF THE DEVICE

### INTRODUCTION

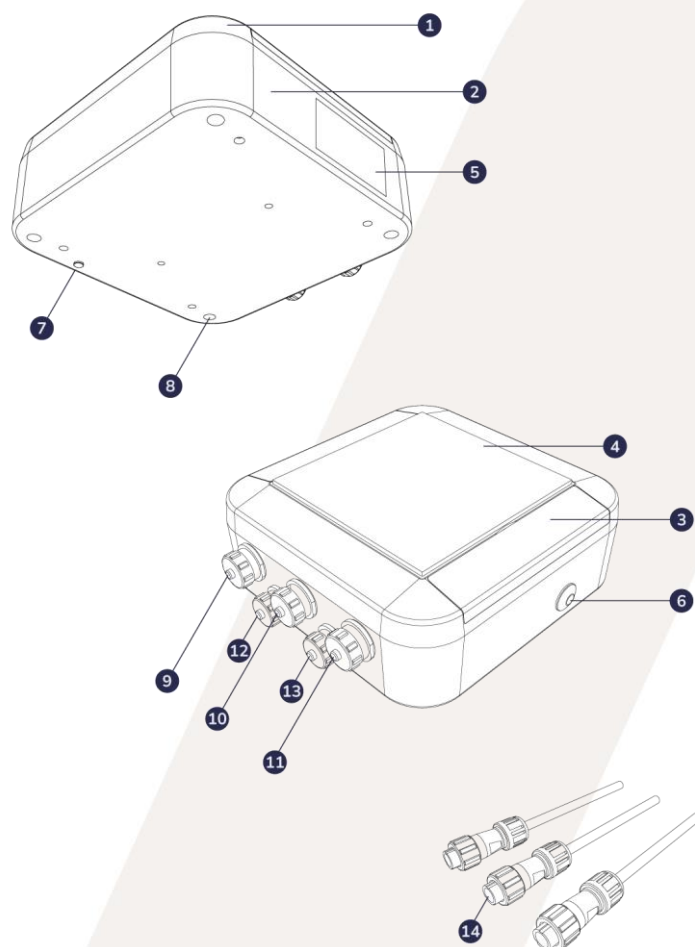
The ATLAS PLUS IoT device is an irrigation controller capable of collecting and sending real-time data, equipped and designed to control and automate irrigation installations. It is completely autonomous, connects in real time and does not need any additional connectivity installation, such as gateways or repeaters, to perform its function.

It includes two ports with four outputs each to act on solenoids or latching relays, four inputs for reading pulse counters, one port for reading up to four I<sup>2</sup>C sensors and one port for reading up to four SDI-12 sensors.

Each device is equipped with a micro-SIM card that allows it to connect to the mobile network via LTE-M, NB-IoT and EGPRS networks, allowing the flexibility to choose the configuration that offers the best signal quality for each specific location, combined with the ability to select the operator.

The control and management of all the functionalities available for the ATLAS PLUS device can be done from the SPHERAG platform. <https://portal.spherag.com/>

## PARTS OF THE DEVICE



1. Cover.
2. Body.
3. Acces tabs to the support holes.
4. Solar panel.
5. Equipment identification label..
6. On/off button.
7. LED indicator.
8. Warranty stickers.
9. Output connector 1 to 4.
10. Output connector 5 to 8.
11. Input connector 1 to 4.
12. Sensor connector I<sup>2</sup>C.
13. SDI-12 sensor connector.
14. Connection cables for outputs and inputs.

## TECHNICAL SPECIFICATION

General specifications	
<b>Inputs</b>	4 (Flowmeter or digital input)
<b>Outputs</b>	8 (Latch relay or latch solenoid)
<b>Output voltage</b>	14 Vdc
<b>Sensor input</b>	1 (I <sup>2</sup> C), 1 (SDI-12)
<b>Remote configuration</b>	Spherag Platform
<b>Led indicator</b>	<ul style="list-style-type: none"> <li>- Searching: 1 flash/sec</li> <li>- Connecting: 1 flash/sec</li> <li>- Connected: no flash</li> <li>- Communicating: 1 flash/sec</li> </ul>
Available sensors	
<b>Pressure sensor</b>	I <sup>2</sup> C (1 a 30 bar)
<b>Soil Temperature &amp; Moisture Sensor</b>	SDI-12 I <sup>2</sup> C (Soil temperature, VWC)
<b>EC sensor</b>	SDI-12 (EC ES2)
<b>Level sensor</b>	I <sup>2</sup> C (10m)

Mechanical specifications	
Dimensions	165 x 150 x 55 mm
Weight	490g
Material	ASA, EFTE
Accessories	3 cables IO (1 m) <sup>(1)</sup>
Connectivity	
Network	GPRS, NB-IoT, LTE-M
Antenna	Internal
SIM Card	Inside the device
Electrical specifications	
Power supply	Embedded 1.5 W sola panel
Maximum voltage	4.2 Vdc
Minimum voltage	3.4 Vdc
Nominal voltage	3.7 Vdc
Nominal current	8 mA
Voltage solar cell	5 Vdc
Current solar cell	340 mA

<sup>(1)</sup> Two in case the device has only four outputs enabled

Sending data	
Uplink communications (sensors)	1 h <sup>(2)</sup>
Uplink communications (others)	Asynchronous
Downlink communications	Asynchronous
Other specifications	
Working temperature	-20 ~ +50 °C
Working humidity	45% ~ 75% RH
Working height	0 ~ 2000 m
Storage temperature	-20 ~ +50 °C
Storage humidity	45% ~ 75% RH
Storage height	0 ~ 2000 m

<sup>(2)</sup> Please contact us for other synchronization options

## 2. OPERATION

### ACTION

The ATLAS PLUS device has up to eight outputs. Each of the outputs can be connected via a relay or interlocking solenoid to the element of the installation to be controlled, for example:

- Valve
- Pump
- Fertilizer
- Mixer

Each of the device's two connectors for the outputs (9. Connector outputs 1-4 and 10. Connector outputs 5-8) has five wires, four of red, green, white and yellow colors for each of the outputs and one of common black color to make the connections with the elements of the installation.

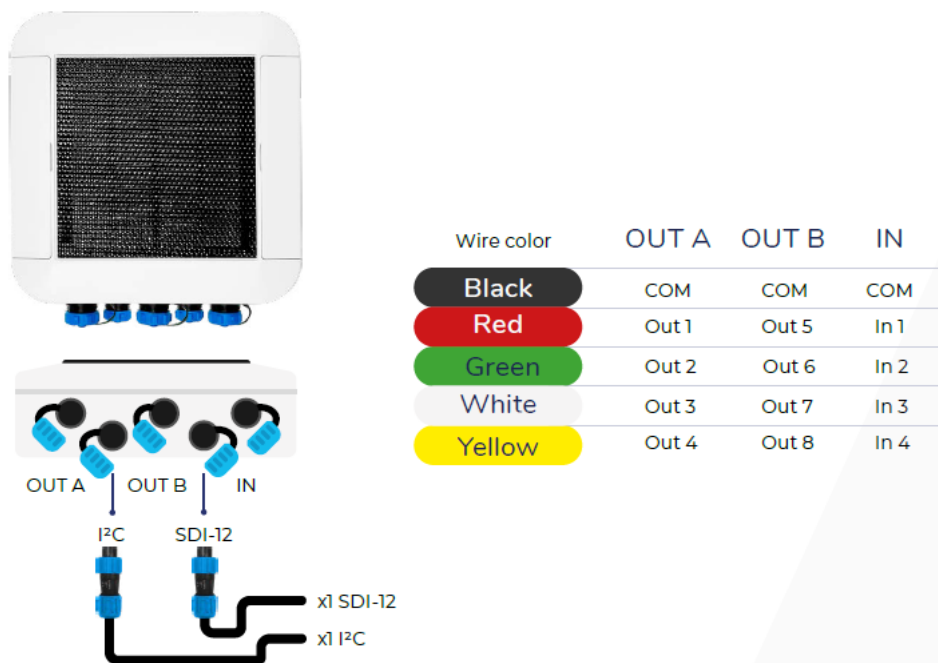


Figura 1. Outputs and inputs of the ATLAS PLUS device.

In order to facilitate the user experience, we recommend connecting the cables in one of the ways shown in Figure 2.1. Figure 2.



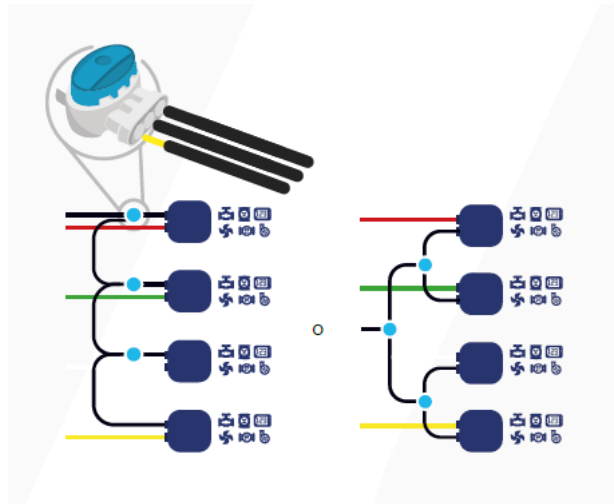


Figure 2. Connection of inputs and outputs.

After registering the device on the SPHERAG platform, the functionality to be associated with each output can be selected, as well as its mode: manual or automatic.

As mentioned above, each output can be used in manual or automatic mode. That is, it is possible to execute the opening or closing of the installation element by manually changing the output status, or automatically, by means of a command sent by a program stored in the unit's memory.

## MONITORING

### LOCAL SENSOR MONITORING

The ATLAS PLUS includes two ports<sup>(3)</sup> for connection of I<sup>2</sup>C and SDI-12 technology sensors. For example:

- Pressure sensor;
- Temperature and soil humidity sensor;
- Ambient temperature and humidity sensor;
- Level sensor;
- others <sup>(4)</sup>.

Through the platform, the user can configure the unit of measurement of the sensors, as well as set alerts that act and send notifications based on the measured values, to control and keep track of the installation over time.

<sup>3</sup> The connection of multiple sensors is done through a specific "hub" for each of the technologies.

<sup>4</sup> Only sensors marketed by Spherag are supported. The sensors are purchased separately.

On the other hand, it is possible to create customized graphs with the selected sensors for to obtain a complete monitoring of everything that happens in your crops, such as, for example, keeping track of the field capacity.

## VOLUMETRIC METER MONITORING

The ATLAS PLUS includes four inputs for reading pulse counters. As for the outputs, the device has an input to connect the four elements to be measured by means of five wires of different colors that must be connected in the same way as in the case of the outputs (Figure 1)

Through the SPHERAG platform the user can register the connected elements and configure the unit of measurement (m<sup>3</sup> , L or Gal) and the value of each pulse (1, 10, 100) for them, as well as the current price of water to know what is the cost that is being produced in that meter.

**Note:** If the installed flowmeter contains previous readings, the current value of the flowmeter must be entered into the platform in order to synchronize the platform with the current flowmeter reading.

**Note: To ensure that the flowmeter reads the transmitter pulses correctly, we recommend following these tips:**

- Reduce the cable distance used.
- Keep the cable away from other electrical cables, motors, coils, fluorescent tu-bes, etc., along its entire length.
- Shield the cable if possible and connect the shield to ground.
- Increase the cable section (depending on the distance used).

## DIGITAL INPUT

The device has the possibility to connect up to four devices that indicate an all-nothing event in the installation, for example:

- Mechanical pressure reading equipment
- Flowmeters
- Adjustable pressure reading equipment
- Rain sensors
- Level sensors

In order to receive the information from these elements, they must be registered in the SPHERAG platform, as is the case with the rest of the elements connected to the outputs, inputs or sensors of the device. That is to say, through these devices, the device

will inform the platform of possible changes in the installation. For example, through a flow meter, the device will indicate on the platform if water is flowing in the point of the installation where it is placed in real time.

These devices are connected like the pulse emitters to each of the four inputs of the ATLAS PLUS.

## 3. ALERTS AND NOTIFICATIONS

The digitalization and monitoring of irrigation installations allows executing and sending pop-up and e-mail notifications to the user registered in the platform in the event of any anomalous reading, such as an excess or deficit of pressure.

### FLOW ALERTS

The ATLAS PLUS device has pulse meter reading, which allows to know if the irrigation is being executed with a flow rate out of the established.

**WARNING:** It is necessary to perform a calibration beforehand to know the nominal flow rate and to be able to establish a flow rate alert. This calibration can be performed either manually or automatically.

The platform must be used to indicate the limits within which the flow rate of the system must be set for the selected flowmeter and the limits that trigger the shutdown of the equipment for safety reasons if this option is selected.

Notifications are sent via e-mail so that the user is aware of when the alert has been issued and can review the installation.

### PRESSURE ALERT

Thanks to the functionality of the device that allows monitoring pressure (5), pressure alerts can be set up to prevent possible failures in its installation.

Through the platform, the user can program two different types of alerts, one that simply notifies an anomaly in the pressure of the installation (Notification) or an alert that in addition to notifying a problem with the pressure stops its installation (Notification and stop).

To set a pressure alert, the user sets the time he wants to allow the system pressure to be out of range (Out of range time). If the pressure goes out of the marked pressure range for longer than the set time, the user will receive a notification indicating a problem in the installation.

It is also necessary to select on which outputs of the device the pressure alert is to be linked so that, if the Notification and stop alert is selected, the elements connected to these outputs will stop their operation.

On the other hand, the supervision time must be indicated. This is the time it will take for the alert to come into operation. That is to say, for example, the installation may take a few minutes to reach the nominal pressure. To avoid false pressure alerts appearing during these minutes of filling the pipe, this time can be added to the Monitoring time.

**NOTE:** If this time interval is not required, it can be set to 0.

## 4. INSTALLATION AND FIRST STEPS

Please read the following instructions carefully and carry them out in the order described. Failure to follow the guidelines in this manual does not guarantee the effect of the warranty.

**WARNING:** None of the cables of the device must be electrically connected to each other. If any of the cables are not used, they must be left electrically isolated.

Make sure that you have good coverage in the installation area before connecting the device. Press the button located on the side of the device (6. On/Off button) to turn it on.

The LED (7. LED light) of the device will blink continuously with a blue light while establishing connection. Subsequently, once the device is connected it will not blink.



*Figure 3. ATLAS PLUS CONNECTION SEQUENCE.*

Unscrew the watertight cap covering the connector for the device cables. Connect the cable to the device and close the safety thread.

**WARNING:** Make sure that the notches and the number of pins match and the connector is in the correct position when connecting. There is only one correct position. Screw the connector nut all the way down to prevent possible water leakage leading to failure of the device.

Connect the selected output or input cable (red, green, white or yellow) and the common (black) cable (Figure 1) to the wires of the solenoid or pulse emitter of the fixture (Figure 4).

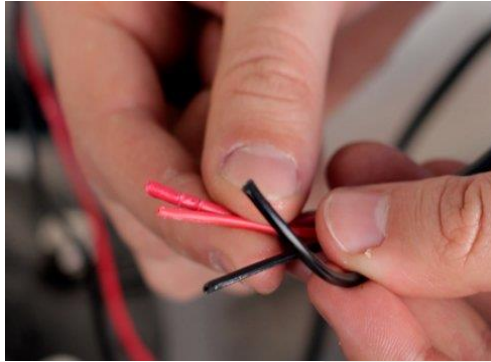


Figure 4. Connectors from an interlocking solenoid to an ATLAS PLUS.

**Note:** We recommend the use of watertight connectors (Figure 5) <sup>(5)</sup>.

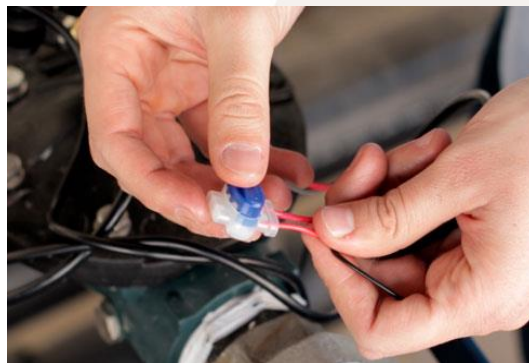


Figure 5. Connection of the positive polarity by means of a watertight connector.

(Optional) If a 3-way valve is coupled to the system valve, it must be placed in the "AUTO" position (Figure 6).

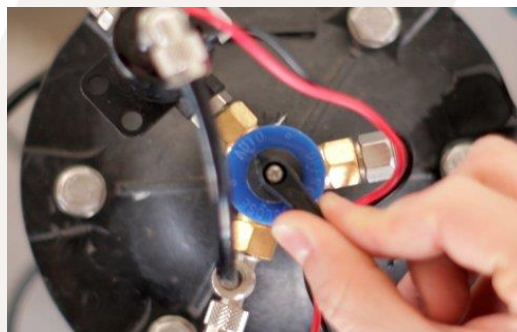


Figure 6. 3 way valve, "AUTO" position.

Unscrew the waterproof cap covering the adapter for the device's sensor connector.

Connect the sensor to the device and close the safety thread.

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<sup>5</sup> Se adquieren por separado.

**WARNING:** Make sure that the notches and the number of pins match and the connector is in the correct position when connecting. It has only one correct position.

Screw the connector nut all the way down to prevent possible water leakage leading to failure of the device.

Verify that the device is turned on and has a correct connection (Point 1). Position the ATLAS PLUS device facing the equator to ensure proper solar charging.

**NOTE:** By lifting up the tabs located on the device housing (3. Access tabs to support holes) you have holes to place it through screws to the surface on which you are going to place the equipment (wood, wall, metal ...).

### Important considerations for placement:

Do not cover the solar panel (4. Solar panel) with flanges, glass or any other element and periodically make sure that the solar panel is not covered with dust or dirt. The solar cell must receive the sun's rays directly and over its entire surface.

There should be no elements (houses, trees, etc.) that provide shade to the device during the day. The solar panel must receive at least 7 hours of direct sunlight per day.

It is not recommended to place the device on concave surfaces or ground where water can accumulate. It is recommended to place the device in a position where it receives direct and perpendicular sunlight for at least 7 hours per day.

Do not cut or manipulate the cable of any sensor in order to reduce or extend its distance.

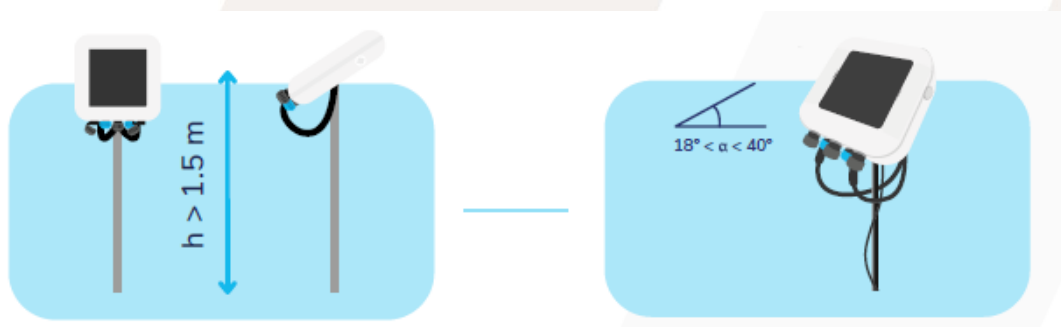


Figure 7. ATLAS PLUS placement.

## 5. TROUBLESHOOTING

Problem	Motive	Solution
Does not charge the battery	Poor installation.	Follow the installation recommendations. 4. INSTALLATION AND FIRST STEPS.
	Lack of sunny days (especially in winter.	Turn off the device and keep it for 4-5 days in direct sunlight for at least 6 hours. Then turn the device on again.
The solenoid status (ON/OFF) does not correspond to that shown on the platform.	Synchronization has not been performed on the platform.	Open and close the system element from the platform.
	The polarity of the solenoid is not connected correctly to the output of the device.	Change the polarity of the connection.
Fictitious flow rate readings	The cables connected to the emitter are not electrically insulated.	Insulate with non-conductive elements.
LED does not light up when the device is turned on.	Battery depleted.	Turn off the device and keep it for 4-5 days in direct sunlight for at least 6 hours. Then turn the device on again.
Irrigation is not performed at the indicated time.	Equipment in the wrong mode.	Set the device output to automatic mode.
	Battery depleted.	Turn off the device and keep it for 4-5 days in direct sunlight for at least 6 hours. Then turn the device on again.



	Program not received on the device due to poor signal quality.	Place it in a high place, so that the quality of the coverage is better.
	Device failure due to a possible short circuit.	Contact Spherag technical support: <ul style="list-style-type: none"> <li>- Phone: +34 684 464 107</li> <li>- Email: support@spherag.com</li> </ul>
Water flow is not interrupted	Valve installed incorrectly.	Install the valve so that the arrow on the valve points in the direction of water flow.
	Faulty solenoid.	Replace the solenoid.
No hay flujo de agua	Valve blocked by dirt or incrustations.	Replace the valve.

## 6. GLOSSARY OF TERMS

1. **IoT (Internet of Things):** A concept that refers to the digital interconnection of everyday objects with the internet, allowing these objects to send and receive data.
2. **LTE-M:** A low-power, narrow-bandwidth communications technology designed for IoT devices that require reliable, long-lasting connectivity over LTE cellular networks.
3. **NB-IoT (Narrowband IoT):** A low-power, narrow-bandwidth communications technology designed to connect IoT devices over narrowband cellular networks.
4. **EGPRS (Enhanced General Packet Radio Service):** An evolution of the GSM (Global System for Mobile Communications) mobile data transmission system that provides higher data rates and spectrum efficiency.
5. **I2 C (Inter-Integrated Circuit):** It is a two-wire communication standard that allows communication between various digital electronic devices.
6. **SDI-12 (Serial Data Interface at 1200 Bauds):** A communication standard used primarily in sensors to efficiently transmit data to data acquisition devices.
7. **EC (Electroconductivity):** A measure of the ability of a material to conduct electric current. In the context of agriculture and hydroponics, it is used to measure the salinity of irrigation water.
8. **ASA (Acrylonitrile Styrene Acrylate):** A type of plastic used in the manufacture of weather and UV resistant components and housings.
9. **EFTE (Ethylene Tetrafluoroethylene):** A polymer used in applications requiring high resistance to weathering and chemicals.
10. **Relay or solenoid, latching:** A type of relay or solenoid that remains in its on or off state even after the control signal is removed. Also known as relays or solenoids, latch type.
11. **Field capacity:** Refers to the maximum moisture capacity of the crop field.
12. **All-nothing event:** Refers to an event that occurs in a binary manner, i.e., it can be classified as "all" (yes/activated) or "nothing" (no/deactivated).
13. **Calibration:** The process of adjusting or correcting a measuring instrument to provide accurate and reliable results.
14. **Nominal flow rate:** The flow rate that can pass through a device/pipeline under normal operating conditions.
15. **Pressure rating:** The normal pressure for which a device or equipment is designed to operate safely and efficiently.
16. **Pins:** These are the connection terminals on an electronic device that are used to connect it to other devices or components within an electrical circuit, in this case to the connector.

## 7. PRODUCT RECYCLING

Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) according to Annex I indicates that "COMPUTER AND TELECOMMUNICATIONS EQUIPMENT" should not be recycled with other municipal waste. These appliances should be disposed of separately, in order to optimize the recovery and recycling of materials and thus reduce the impact they may have on human health and the environment. The crossed-out wheeled garbage can symbol






reminds you of your obligation to dispose of this product correctly. If the product in question is equipped with a battery or battery pack for its electrical autonomy, it must be removed before disposal and treated separately as a waste of a different category. For detailed information about the most appropriate way to dispose of your appliances and/or the corresponding batteries, the consumer should contact the local authorities.

## **8. WARRANTY**

Consult the General Warranty and Repair Conditions of our devices through the following link:

<https://spherag.com/general-warranty-and-repair-conditions/>

## 9. EXPLANATION OF THE SYMBOLOGY

	<p>Complies with Directive 89/336/EEC for Electromagnetic Compatibility and Low Voltage Directive 73/23/EEC for Product Safety Compliance. Compliance with the following specifications was demonstrated as stated in the Official Journal of the European Communities. Responsible within the European Union:</p> <p>SPHERAG TECK IOT S.L.</p> <p>Av. Alcalde Gómez Laguna, 25, Planta 10, Oficina B1, 50009 Zaragoza</p>
	<p>To identify the location where the operating instructions are stored or to identify information related to the operating instructions. To indicate that the operating instructions should be taken into account when using the device or control in the vicinity of where the symbol is placed. ISO 7000-1641</p>
	<p>Indicates that electrical and electronic equipment (EEE) should not be disposed of with household waste at the end of its useful life. The product should be taken to the appropriate collection point for recycling and proper treatment of electrical and electronic equipment in accordance with national legislation.</p>