

HB-Therm[®]

Instruction Manual IR-Temperature sensor



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Translation of original instruction

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General

1 General

1.1 Information about this manual

This manual makes it possible to handle the IR temperature sensor unit with magnetic base safely and efficiently.

The manual is a component part of the IR temperature sensor unit with magnetic base and must always be kept close to the IR temperature sensor readily accessible for personnel. Before starting any work, the personnel must have carefully read and understood this manual. A basic requirement to work safely is to comply with all the safety instructions and behaviour guidelines in this manual.

Illustrations in this manual are for basic understanding and may deviate from the actual design.

1.2 Explanation of symbols

Warnings

Warnings are identified by symbols. These warnings are introduced by signal words, which express the severity of a danger. Adhere to these warnings and act cautiously in order to avoid accidents, personal injuries and damage to property.



ATTENTION!

... indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Hints and recommendations



NOTE!

... emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.

1.3 Limitation of liability

All information and notes in this Manual were compiled under due consideration of valid standards and regulations, the present status of technology and our years of knowledge and experience.

The manufacturer can not be made liable for damage resulting from:

- disregarding this Manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- technical modifications
- use of unapproved spare parts

In case of customised versions the actual scope of delivery can vary from the explanations and representations in this Manual, because of the utilization of additional options or due to latest technical changes.

Apart from this, the obligations agreed upon in the delivery contract, the general terms and conditions and the delivery conditions of the manufacturer and the legal regulations valid at the time of contract do apply.

1.4 Copyright

This Manual is protected by copyright law and exclusively to be used for internal purposes.

Passing this Manual on to third parties, duplication of any kind – even in form of excerpts – as well as the use and/or disclosure of the contents without the written consent of the manufacturer is not permitted, except for internal purposes.

Violations oblige to compensation. The right for further claims remains reserved.

1.5 Warranty terms

The warranty terms are provided in the manufacturer's terms and conditions.

1.6 Customer Service

For technical information, please contact the HB-Therm representatives or our customer service department
→ www.hb-therm.ch.

Furthermore, our employees are always interested in new information and experiences resulting from the application that could be valuable for the improvement of our products.

Technical data

2 Technical data

General information

For the technical specifications of the IR temperature sensor, please refer to the data sheet issued by the manufacturer, Optris GmbH (→ <http://hb.click/IR-EN>).

Factory settings

	Value	Unit
Analogue output	0–10	V DC
Temperature range	0–200	°C
Emission factor	1	
LED function status	Temperature Code Display	

Environment

	Value	Unit
Temperature range	-20–80	°C
Relative humidity *	10–95	% RH
Type of protection	IP 63	

* non-condensing

3 Structure and function

3.1 Overview

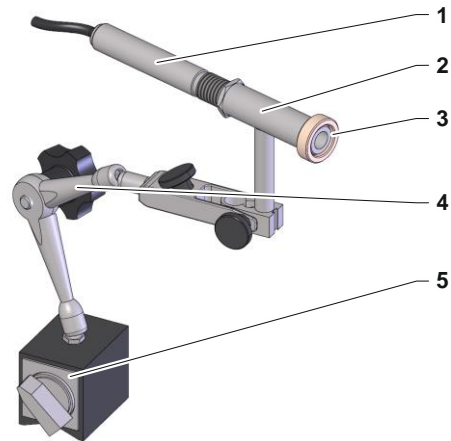


Fig. 1: Overview

- 1 IR temperature sensor with power cable
- 2 IR temperature sensor screen pipe with holder
- 3 PEEK boot
- 4 Ball joint swivel arms with precision adjustment mechanism
- 5 Magnetic base with rotary switch

3.2 Functional principle

In variothermal tempering, assistants are available that support the user in determining the parameters. For this purpose, the mould cavity surface temperature of injection moulding tools must in some cases be measured.

If there are no tool sensors, an alternative is required, and this is offered as an accessory. Contactless measurement (measurement of the open tool) using the IR temperature sensor (infra-red) is suitable for this purpose.

The IR temperature sensor measures the temperature of the measurement area and expresses the temperature in the form of an electrical signal.

Operation

4 Operation

4.1 Connection

Connecting the IR temperature sensor

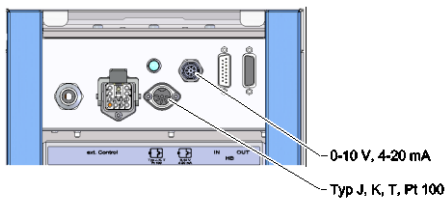


Fig. 2: Interfaces Vario-5

You must connect the IR temperature sensor to the Vario-5 to display the consumer temperature.

1. Feed the cable of the IR temperature sensor between the front and the service flap.
2. Connect the power cable to the 0–10 V, 4–20 mA socket.
3. Close the service flap.
4. Setting the IR temperature sensor (→ (chapter 4.3 on page 9)
5. For schematic terminal assignment (→ chapter 6 on page 13



WARNING:

Damage due to improper cable routing!

Material damage can occur due to improper cable routing.

Therefore:

- Connecting cables to and from the unit must not touch any objects that have surface temperatures greater than 50 °C.
- Avoid mechanical stress on the IR temperature sensor.

4.2 Attaching the measuring unit

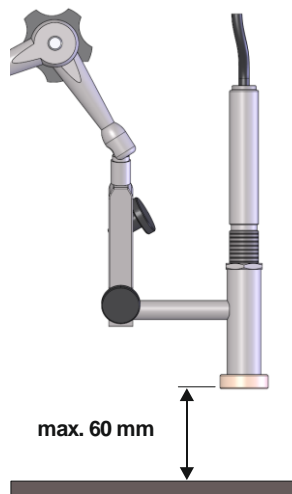


Fig. 3: Positioning the measuring device

When attaching the measuring device, the following points must be observed:

- Only mount the measuring device on an open tool.
- Attach the magnetic base on a magnetic surface using a switch (ON/OFF).
- Align the IR temperature sensor vertical to the surface.
- Keep the distance to the measurement area as short as possible. The distance is measured from the front edge of the boot (max. distance 60 mm → Fig. 3).
- Avoid exposure to extreme external lighting.

4.3 Setting the external sensor

Pre-selection of external sensor type

Setting ▶ Miscellaneous			
No.	VC1	1...99 TH1 TC1	
Sensor type external sensor		U/0-10 V	
Emissivity		1.00	
Temperature compensation IR		30 °C	
VC	Main TH	25.0 °C	OFF
1	Main TC	25.0 °C	Vario Neutral

Fig. 4: Sensor type external sensor

The external sensor type is set as follows:

1. With button **⏏** or select **D** module no. "VCn".
 2. Open the **Setting \ Miscellaneous** menu page.
 3. Parameter Set parameter **Sensor type external sensor** to the connected sensor type "U/0–10 V".
- The **External** temperature is displayed on the basic display Graph or under **Display \ Actual value**.

Operation

4.4 Surface measuring area

Measuring the temperatures on shiny metal surfaces is very difficult, even when the emission factor has been adjusted, especially because of the reflection. To avoid adjusting the emission factor, one of the following characteristics of the surface of the measurement area can be used:

- Emissions level label with defined emissions level
→ chapter 4.4.1 on page 10
- Blackening the surface with a matt paint or special emission paint
- Applying a powder coating of soot or graphite
- Oiling the surface with a commercially available oil (not too thin)



NOTICE!

If no adjustments can be made to the surface, the emissions level must be adjusted by taking a reference measurement (→ chapter 4.4.2 on page 11) to reduce the reflection of the background radiation using shielding.

4.4.1 Emissions level label

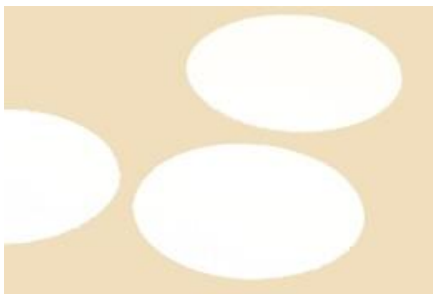


Fig. 5: Emissions level label for measuring temperatures on shiny surfaces

If possible, an emissions level label (Fig. 5) should be attached to the surface.

- Diameter emissions level label 25 mm
- Emissions level 1.00
- Temperature resistance up to 250 °C



NOTICE!

On shiny metallic surfaces, the 25 mm emissions level label should preferably be used.



WARNING: Residues from emissions level label!

When removing the emissions level label, adhesive residues can potentially be left behind.

Therefore:

- Only use the emissions level label on surfaces that can also be cleaned accordingly.

4.4.2 Emissions level and determination

Emissions level

The emissions level describes the surface-related share of emitted radiation and the associated share of radiation that is reflected back.

If no emissions level label is used for measurement, the emissions level of the IR temperature sensor must be set using a reference measurement.

Setting the emissions level





Setting ▸ Miscellaneous			
No.	VC1	1...99 TH1 TC1	 
Sensor type	external sensor	U/0-10 V	
Emissivity		1.00	
Temperature compensation	IR	30 °C	
VC	Main TH	25.0 °C	OFF
1	Main TC	25.0 °C	Vario Neutral

Fig. 6: Setting the emissions level

The emissions level should be set as follows:

1. With button  or  select module no. "VCn".
2. Open the [Setting \ Miscellaneous](#) menu page.
3. Parameter Set parameter [Emissivity](#) to the desired value.

Determining an unknown emissions level

A reference temperature is required to determine an unknown emissions level. The temperature of the IR temperature sensor is aligned to match this by adjusting the emissions level.



NOTICE!

Die temperature of the measurement object must deviate from the ambient temperature.

Procedure

A thermocouple, contact sensor or similar can be used to determine the current temperature of the measurement object. Subsequently, the temperature can be measured using the IR temperature sensor and the emissions level adjusted until the measurement value displayed corresponds to the actual temperature that was previously detected for the measurement object.

Operation

4.5 LED function

Temperature Code Display

The object temperature measured is also displayed as a percentage by long and short flashes of the LED on the IR temperature sensor.

Condition	Meaning	Value
Long flash	Ten * 2	xx
Short flash	Units * 2	xx
10 long flashes	Ten = 0	0x
10 short flashes	Unit = 0	x0

Examples

86 °C	4 long flashes followed by 3 short flashes	80 6
32 °C	1 long flash followed by 6 short flashes	20 12
8 °C	10 long flashes followed by 4 short flashes	0 8
20 °C	1 long flash followed by 10 short flashes	20 0
50 °C	2 long flashes followed by 5 short flashes	40 10

5 Maintenance

5.1 Cleaning

Cleaning the lens

To have unrestricted access, the IR temperature sensor must first be unscrewed from the screen pipe and holder.

Clean the measuring device under the following conditions:

- Clean the surface of the lens with a soft, clean and damp cloth.
- Do not use any aggressive cleaning agents.

6 IR temperature sensor connection assignment

