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1 Introduction

1.1 Intended Use

The HIGH RESOLUTION CAMERA is suitable for inspecting the readability of:
1D and 2D code reading and verification, multiple code reading for aggregation within the track & trace process. It also reads the identification number, lot number, proof of origin, expiry date and variable print on labels, cartons, films and other printed items.

The optical character reading monitors the most important errors of:
Stamp, hot stamp block, photo plate, thermal transfer, laser or inkjet printers, that render the print unreadable or result in incorrect recognition, for example:
Reversed characters; blurred characters; worn characters; merged characters or missing character(s).

Typical applications for optical character verification are on:
Brochures, labels, vignettes, cartons, tubes and tins.

Any other use or use that exceeds the aforementioned scope is not in compliance with the intended use. The manufacturer/supplier is not liable for any damage arising from misuse. Risk is borne solely by the user.

CAUTION

If the high resolution camera is not used correctly, reliable operation of the system cannot be guaranteed. The operator of the image processing system is liable for any personal injury and damage to property caused by incorrect use, not the manufacturer.

1.2 Original Language

The original manual is written in English. If you are reading a translated version of this manual, and you also need the English original manual, you can ask METTLER TOLEDO to supply it. If you have a question about the intended meaning of any translated text, consult the original English-language manual.

1.3 Contacting METTLER TOLEDO Service

Contact your authorized METTLER TOLEDO Service representative about the following products and services:
• Installation
• Integration
• Start-up support
• Certified, genuine parts
• Emergency repairs and support
• Customer training

For more information, contact your local and authorized METTLER TOLEDO Service representative using the link below (and, if necessary, select the applicable country):
http://www.mt.com/contact

When you contact the Service Department, have the following information available, if applicable:
• METTLER TOLEDO order number and date
• Equipment name, model, or type
• Serial number
• Precise wording of the displayed error message or detailed fault description
• Pictures or videos of the part or problem
1.4 Warranty

1.5 Naming Conventions
The following chapter describes the naming convention of the components and the system.
Example: HRC 2.0 1200-H17R-NL-016M

<table>
<thead>
<tr>
<th>Camera name and version</th>
<th>Megapixels of camera (here: 12 megapixels)</th>
<th>Housing</th>
<th>Adjustable polarization filter (optional)</th>
<th>Illumination (not included)</th>
<th>Focal length and optional suffix 'M' for macro lens</th>
</tr>
</thead>
</table>
2 Important Safety Information

All information related to safety in this manual is important. The information in this chapter is general. There is other important safety information that you must read throughout the manual.

**Important Safety Message**

Read and understand all the safety information in the following sections as well as the safety messages in the rest of this manual.

If you do not follow the safety information and messages, this may lead to property damage and personal injury up to and including death.

2.1 Safety Labels and Notice Labels

The ISO 3864 safety labels are installed at potentially hazardous areas on the equipment. They give special safety-related notifications. The locations of these labels are given in the drawings supplied with your equipment. There are three types of safety labels:
- Hazard notifications
- Mandatory procedures
- Prohibitive procedures

Additionally, NOTICE labels may appear on your equipment.

The meanings of the different kinds of labels are explained in the following sections.

Before you transport, install, operate or work on the equipment, find out about the location and meanings of the labels. Maintain the labels so that they are clear of obstructions and are readable. Do not remove any labels. Replace any label that is no longer readable.

2.1.1 Hazard Notifications

A hazard notification consists of the following:
- Hazard alert symbol (yellow triangle with black symbol)
- Signal word (DANGER, WARNING, or CAUTION)
- Special notifications related to the hazard (as required)

The signal word labels are attached next to the hazard alert symbol labels on the equipment.

2.1.1.1 Definitions of Signal Words

Signal words describe the level of risk of a particular hazard. The color of the safety label background indicates the risk, as shown in the following table. The definitions of the signal words are based upon the ISO 3864 definitions.

<table>
<thead>
<tr>
<th>Signal Word</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER (red)</td>
<td>This signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</td>
</tr>
<tr>
<td>WARNING (orange)</td>
<td>This signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</td>
</tr>
<tr>
<td>CAUTION (yellow)</td>
<td>This signal word indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.</td>
</tr>
</tbody>
</table>

2.1.2 Meaning of Hazard Alert Symbols

The following hazard alert symbols may be installed on your equipment.

- Cutting
- Impact
2.1.2 Notice

The word **NOTICE** does not give safety information. It is still an important word to inform you of activities that may harm the equipment or other property. The following definition is based upon the ANSI Z535 definition.

**NOTICE** (blue): This indicates important information that is not related to personal injury which, if ignored, could result in damage to the equipment, damage to property, malfunctions, erroneous results, or loss of data.

2.1.3 Note

The word **NOTE**: does not give safety information. It indicates useful supplementary information, hints, and tips.

2.2 General Protective Procedures

**Important Safety Message**

Make sure that all personnel who work on or near the equipment are capable of performing all operations in a safe way.

- Keep the manual in a convenient location near the equipment. Replace the manual if it becomes lost or damaged.
- Wear Personal Protective Equipment (PPE) in accordance with your plant's safety procedures.
- Understand the hazards of the equipment and the risks related to those hazards before working on or near the equipment.
- Obey all safety procedures of the local plant.
- Do not wear loose clothing, jewelry, long hair, or anything that can become entangled with the equipment.
- Be careful around the equipment to avoid hitting your head, arms, or other body parts against the equipment. Be careful if the equipment is over your head.
- Be careful not to trip over cables or other parts of the equipment.
- Do not move quickly in the area around the equipment.
- Do not climb, hang onto, or use any of the part of the equipment as a support.
- Obey the lockout tagout (LOTO) procedures of the plant.
- If there is a safety-related malfunction when you are operating the equipment, press the emergency stop device. Tell the responsible supervisor, and follow the applicable steps approved by your company to fix the malfunction.

2.3 Safety Information for Various Activities

**Important Safety Message**

Read and understand all parts of the manual before using or working on any equipment.

The following sections list safety information for particular activities or groups of activities. Refer to the correct sections in the manual for more detailed instructions.

2.3.1 Transporting and Moving the Equipment

- Only transport or move the equipment if you have the applicable training as defined by your company.
• Your company has sole responsibility for the safe moving and transporting of the equipment.
• Use safe moving procedures during transporting to maintain stability and to prevent the equipment from tipping or falling.
• Disconnect the electrical supply, the pneumatic supply, and the communication cables before you move the equipment.
• Use the correct lifting devices. If you use a forklift, lift the equipment at the correct lift points as shown by the blue lift point labels.
• Blue lift point labels are placed on the equipment to show recommended locations for lifting. These lift point locations were tested with the manufacturer’s forklift trucks. A qualified rigger must make sure that the lift points are correct for your lifting equipment.
• When you lift the equipment by hand, obey the safe lifting procedures of your company.

2.3.2 Installing

Only install the equipment if you have the applicable training as defined by your company.

2.3.3 Operating the Equipment and Monitoring the Inspection Process

• Before beginning operation, make sure that the area is safe.
• Know the location and effect of each emergency stop button that controls the equipment.
• Do not operate the equipment without protective guards and doors in place.
• Do not reach into path of the products when any conveyors are in motion.
• Do not reach into the area around any sorting device, when the equipment is turned on.
• Make sure the safety circuit is working correctly.
• Do regular inspections of the equipment.
• If there is a fault or change in the equipment behavior, stop the equipment and inform responsible personnel.

2.3.4 Testing and Verifying the Equipment

Only do testing and verifying of the equipment if you have applicable training as defined by your company.

2.3.5 Maintaining, Cleaning and Sanitizing the Equipment

• Remove all power from the equipment before doing any work.
• Keep the equipment in good working order.
• Follow a preventative maintenance program.
• Replace parts when needed.
• Obey the lockout tagout (LOTO) procedures of the plant.
• Test (validate) the safety circuit after parts are replaced.
• Only use METTLER TOLEDO approved spare parts and accessories.
• Do not make any unauthorized modifications to the equipment.
• Replace safety labels if damaged, missing, or unreadable.
• Do a visual check of the equipment at least once during a shift to identify any visual damage or faults. Report any equipment changes to the responsible supervisor immediately.
• When required for a hygienic production environment, do regular sanitizing of the equipment according to your company’s procedures.
• After cleaning or sanitizing, check all cables, connectors, and pneumatic hoses for leakage, loose connections, rub marks and damage. Tighten, repair, or replace any faulty cables and air tubing, as necessary.

2.4 Special Hazards

The following sections describe special instructions for equipment that may have special hazards.
2.4.1 Electricity

- Only work on the electrical systems if you have the applicable electrical training as defined by your company.
- Keep all electrical enclosure doors closed. If the doors have locks on them, keep them locked.
- Remove all power from the equipment before doing any work.

2.4.2 Strobe Lights

- Strobe lights can cause seizures in individuals with photosensitive epilepsy.
- Individuals with photosensitive epilepsy must not operate the equipment.
- Do not operate the equipment when excessively fatigued or after consuming alcohol.
- Do not look directly at the lights, especially at close distances.
- Avoid placing the equipment in areas with reduced lighting.
- If lights are inside of an enclosure, do not open the enclosure doors when lights are flashing.

2.4.3 Lights and Laser Sensors

- Do not stare directly at any lights or lasers.
- Avoid prolonged exposure to ultraviolet (UV) light, infrared (IR) light, and lasers.
3 Description of Camera Hardware

3.1 Camera Components
The HRC system consists of the following components:
- High-resolution camera
- Lens
- Filter
- Housing
- External illumination
- Connection board
- PC

3.2 High-Resolution Cameras

<table>
<thead>
<tr>
<th>Name</th>
<th>Resolution</th>
<th>Color</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Resolution Camera</td>
<td>12.3 MP, 4069 x 3000 pixels</td>
<td>Monochrome (b/w)</td>
<td>Gigabit Ethernet</td>
</tr>
<tr>
<td>(GigE, 12 MP, 1.1&quot;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-Resolution Camera</td>
<td>47.6 MP, 7920 x 6004 pixels</td>
<td>Monochrome (b/w)</td>
<td>Dual Gigabit Ethernet</td>
</tr>
<tr>
<td>(GigE, 50 MP)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 Lenses

3.3.1 HRC 2.0 12 MP
The following lenses are available for the HRC 2.0 with 12 MP.

<table>
<thead>
<tr>
<th>Name</th>
<th>Focal length (mm)</th>
<th>Maximal aperture (mm)</th>
<th>Minimal working distance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-resolution lens</td>
<td>12.5</td>
<td>2.4</td>
<td>41</td>
</tr>
<tr>
<td>(12.5 mm, C-mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-resolution lens</td>
<td>16</td>
<td>1.8</td>
<td>300</td>
</tr>
<tr>
<td>(16 mm, C-mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-resolution lens</td>
<td>16</td>
<td>1.8</td>
<td>33</td>
</tr>
<tr>
<td>(16 mm, macro lens for very small</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fields of view, C-mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-resolution lens</td>
<td>20</td>
<td>2.0</td>
<td>62</td>
</tr>
<tr>
<td>(20 mm, C-mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-resolution lens</td>
<td>25</td>
<td>1.8</td>
<td>300</td>
</tr>
<tr>
<td>(25 mm, C-mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3.2 HRC 2.0 50 MP
The following lenses are available for the HRC 2.0 with 50 MP.

<table>
<thead>
<tr>
<th>Name</th>
<th>Focal length (mm)</th>
<th>Maximal aperture (mm)</th>
<th>Minimal working distance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-resolution lens</td>
<td>35</td>
<td>2.8</td>
<td>230</td>
</tr>
<tr>
<td>(35 mm, M58 mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-resolution lens</td>
<td>50</td>
<td>2.8</td>
<td>190</td>
</tr>
<tr>
<td>(50 mm, M58 mount)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4 Filters

The following filters are available for the HRC.

<table>
<thead>
<tr>
<th>Name</th>
<th>Housing</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed polarization filter</td>
<td>H17, H19</td>
<td>Polarization direction fixed</td>
</tr>
<tr>
<td>Adjustable polarization filter</td>
<td>H17, H19</td>
<td>Polarization direction adjustable</td>
</tr>
<tr>
<td>Fixed polarization filter</td>
<td>H18, H20</td>
<td>Polarization direction fixed</td>
</tr>
</tbody>
</table>

3.5 Housings

The following housings are available for the HRC.

<table>
<thead>
<tr>
<th>Name</th>
<th>Width</th>
<th>Height</th>
<th>Length</th>
<th>Mirror</th>
</tr>
</thead>
<tbody>
<tr>
<td>H17</td>
<td>80</td>
<td>80</td>
<td>225</td>
<td>No</td>
</tr>
<tr>
<td>H18</td>
<td>120</td>
<td>120</td>
<td>312</td>
<td>Yes</td>
</tr>
<tr>
<td>H19</td>
<td>100</td>
<td>100</td>
<td>252</td>
<td>No</td>
</tr>
<tr>
<td>H20</td>
<td>120</td>
<td>120</td>
<td>338</td>
<td>Yes</td>
</tr>
</tbody>
</table>

3.6 Illumination and Illumination Brackets

Depending on the housing, the following illumination and illumination brackets are available.

<table>
<thead>
<tr>
<th>Housing</th>
<th>External Illumination</th>
<th>Illumination bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>H17 (straight)</td>
<td>2x Illu 340 FL-WL-7 (6 LED modules)</td>
<td>2x Bracket Area Light (6 LED modules) for HRC 2.0 12 MP (straight)</td>
</tr>
<tr>
<td></td>
<td>2x Illu 370 FL-WL-11 (4 LED modules)</td>
<td>2x Bracket Area Light (4 LED modules) for HRC 2.0 12 MP (straight)</td>
</tr>
<tr>
<td>H18 (mirror)</td>
<td>2x Illu 340 FL-WL-7 (6 LED modules)</td>
<td>2x Bracket Area Light (6 LED modules) for HRC 2.0 12 MP (angled)</td>
</tr>
<tr>
<td>H19 (straight)</td>
<td>2x Illu 340 FL-WL-7 (6 LED modules)</td>
<td>2x Bracket Area Light (6 LED modules) for HRC 2.0 50 MP (straight)</td>
</tr>
<tr>
<td>H20 (mirror)</td>
<td>2x Illu 340 FL-WL-7 (6 LED modules)</td>
<td>2x Bracket Area Light (6 LED modules) for HRC 2.0 50 MP (angled)</td>
</tr>
</tbody>
</table>
4 Installation

The camera has multiple electrical and mechanical connectors. The "System and I/O" connector and the "Ethernet" connector are used to connect the camera to the electrical cabinet. These connectors enable the power supply, the I/O signal transfer and the image data transfer. At the electrical cabinet, the "System and I/O" cable and the "Ethernet" cable are applied to the "Patch Panel". From the Patch Panel there is a direct Ethernet connection to a specific Ethernet port of the IPC.

In addition, the camera has two connectors for the flash illumination. The illumination units are connected directly to the camera. These connections provide the power supply and the trigger signal for the flash illumination units. The illumination units can be directly mounted mechanically to the camera housing using a corresponding illumination bracket.

The camera is connected to the connecting unit megapixel camera with screw clamps at the open cable end. The USB connection is attached directly to a USB port of the IPC.

To install the camera refer to MTPCE wiring diagram.
4.1 Connection Overview

**HRC 2.0 - 12 MP**

1. LED for input (trigger) signal indication
2. LED(s) for output signals indication
3. LED for supply voltage indication
4. Ethernet connector (8pin, M12, IP 67)
5. LED for flash light signal indication
6. Illumination connector (4pin, M9, IP 67)
7. System and I/O connector (12pin, M12, IP 68)
8. Illumination connector (4pin, M9, IP 67)

**HRC 2.0 - 50 MP**

1. LED for input (trigger) signal indication
2. LED(s) for output signals indication
3. LED for supply voltage indication
4. Ethernet connector (8pin, M12, IP 67)
5. LED for flash light signal indication
6. Illumination connector (4pin, M9, IP 67)
7. System and I/O connector (12pin, M12, IP 68)
8. Illumination connector (4pin, M9, IP 67)
4.2 Overview of Patch Panel Clamps

The following image shows the assignment of clamps to the machine signals. You can use the machine clamps to connect the inputs and outputs of the PLC or a trigger sensor or optocouplers and the power supply.

Graphical top view on patch panel
### 4.3 Clamp Assignment for HRC

The following tables show the Patch Panel 3.0 clamp-assignment for HRC.

<table>
<thead>
<tr>
<th>Power supply</th>
<th>Input</th>
<th>RS232 Interface</th>
<th>Shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp number</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Clamp function</td>
<td>+24V</td>
<td>Minus</td>
<td>In0</td>
</tr>
<tr>
<td>Assignmen  t cable and wire</td>
<td>System cable brown</td>
<td>System cable blue</td>
<td>System cable white</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>Shield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp number</td>
<td></td>
</tr>
<tr>
<td>Clamp function</td>
<td>Out0</td>
</tr>
<tr>
<td>Assignmen  t cable and wire</td>
<td>System cable yellow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet Interface</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp number</td>
<td>35</td>
<td>36</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>Clamp function</td>
<td>TxD+ D1+</td>
<td>TxD- D1-</td>
<td>RxD+ D2+</td>
<td>RxD- D2-</td>
</tr>
<tr>
<td>Assignment cable and wire</td>
<td>Ethernet cable white-orange</td>
<td>Ethernet cable orange</td>
<td>Ethernet cable white-green</td>
<td>Ethernet cable green</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet Interface</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp number</td>
<td>39</td>
<td>40</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>Clamp function</td>
<td>D3-</td>
<td>D3+</td>
<td>D4+</td>
<td>D4-</td>
</tr>
<tr>
<td>Assignment cable and wire</td>
<td>Ethernet cable white-blue</td>
<td>Ethernet cable blue</td>
<td>Ethernet cable white-brown</td>
<td>Ethernet cable brown</td>
</tr>
</tbody>
</table>
5 Maintenance

This device has been specially designed for industrial requirements. As a result, reliable operation is guaranteed under the normal conditions existing in production plants, provided that trained personnel have installed the device.

For perfect operation, it is necessary to clean the glass plate of the camera housing at regular intervals. For cleaning, only use the cleaning cloths and agents intended specially for this purpose.

### NOTICE

The device itself has no mechanical wearing parts and therefore requires no maintenance.
6 Operation

The camera is connected directly to a PC. On this PC, a software is running that operates the camera.
The following software is able to operate one or multiple HRC:
• HRC – AI Core (Aggregation Inspection)
• HRC – LI Core (Label Inspection)
By using a touch monitor, the operator can setup an inspection format with one or multiple inspection tools.
The following inspection formats are available:
• Multiple code reading (aggregation inspection)
• Presence check
• Code reading, code verification, and quality inspection
• Plain text reading (OCR)
• Print inspection (image comparison)

For instructions on how to operate the camera, refer to the manual of the software package.

6.1 Adjusting the Iris and the Focus of the Lens

The optical settings of the lens (iris and focus) have to be adjusted in the following cases:
• After installation of the camera
• If the distance between the camera and the product that has to be inspected has been changed

Accessing the Lens

You can access the lens through the cover plates at the camera housing. There are two cover plates at the housing.

1. Remove the four screws (2) at one of the cover plates (1).
2. Remove the cover plate (1).

Adjusting the Iris

At the lens, there are two rings. One ring is for the focus adjustment and one ring is for the iris adjustment. Both rings are fixed with a small finger-driven screw.
The iris is set to a default value of 5.6, since this provides the best image quality regarding lens and camera sensor. We recommend to use the default value for your application.

**NOTE:** The specific value of 5.6 may not be explicitly printed onto the lens, but is meant by the dot between the values 4 and 8.

---

**Iris and focus adjustment**

<table>
<thead>
<tr>
<th></th>
<th>Iris ring</th>
<th></th>
<th>Fixing screw for iris ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Iris ring</td>
<td>2</td>
<td>Fixing screw for iris ring</td>
</tr>
<tr>
<td>3</td>
<td>Fixing screw for focus ring</td>
<td>4</td>
<td>Focus ring</td>
</tr>
</tbody>
</table>

1. Unscrew the fixing screw (2) until the iris ring (1) can be rotated.
2. Set the desired iris value.
3. To fix the value, tighten the fixing screw (2).

**Adjusting the Focus**

The focus needs to be adjusted in respect to the distance between the camera and the product that has to be inspected.

1. Unscrew the fixing screw (3) until the focus ring (4) can be rotated.
2. Set the desired focus value.
3. To fix the value, tighten the fixing screw (3).

For instructions on how to find the best focus value for your application, refer to the User Manual of the HRC software.

**Mounting the Cover Plate**

After adjusting the lens and the focus, attach the cover plate using the four screws. Properly tighten the screws to reestablish the ingress protection class (dust and water protection).

---

**6.2 Adjusting the Polarization Filter**

The polarization filter is used to suppress bright reflexes from the flash illumination in the image area.

The polarization filter has to be adjusted in the following cases:

- After installation of the camera
- If the orientation between the camera and the flash illumination has been changed
### 6.2.1 Adjustable Polarization Filter

**NOTICE**

**Bad image quality due to damage or pollution**

Damage to the front glass or filter as well as pollution of the front glass or filter may cause bad image quality.

- Do not scratch or smudge the front glass or the filter. Do not touch the front glass or filter with your finger.

1. To adjust the polarization filter, unscrew the four screws (1) at the front glass (3).
2. Unscrew the two fixing screws (4) until the filter (2) can be rotated.
3. Run the camera in live image mode.
4. Slowly turn the polarization filter (2) until there are no more reflexes (for example, at shiny surfaces or metal parts).
   - When the reflexes are as dark as possible, you have aligned the filter correctly.
5. To fix the polarization filter in its orientation, tighten the fixing screws (4).
6. Attach the front glass (3). Properly tighten the four screws (1) to reestablish the ingress protection class (dust and water protection).

![Diagram of adjustable polarization filter components](image)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Screw</td>
</tr>
<tr>
<td>2</td>
<td>Polarization filter</td>
</tr>
<tr>
<td>3</td>
<td>Front glass</td>
</tr>
<tr>
<td>4</td>
<td>Fixing screw</td>
</tr>
</tbody>
</table>

### 6.2.2 Fixed Polarization Filter

In cameras with a fixed polarization filter, the filter is correctly aligned to the flash illumination at factory assembly.

If there are still reflexes, adjust the filter:

1. Open the camera housing.
2. Unmount the filter plate.
3. Set the filter plate back with a rotation of 90° to the previous mounting position.
4. Close the camera housing.
5. Check if the reflexes are gone.
   - If there are still reflexes at the image, contact the technical support.
## 7 Technical Data

### Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
</table>
| Image sensor resolution| • HRC 2.0 12 MP: 12.3 megapixels, 1.1”, 4096 x 3000 pixels  
                          • HRC 2.0 50 MP: 47.6 megapixels, 36 x 24 mm, 7920 x 6004 pixels                                   |
| Frame rate             | • HRC 2.0 12 MP: Max. 9 frames per second (full image – without image inspection)                  
                          • HRC 2.0 50 MP: Max. 5 frames per second (full image – without image inspection)                |
| Housing                | Made of anodized aluminium     
                          • H17: straight, 80 x 80 x 225 mm    
                          • H18: 90°, 120 x 120 x 312 mm     
                          • H19: straight, 100 x 100 x 252 mm    
                          • H20: 90°, 120 x 120 x 338 mm       |
| Ingress protection     | IP 65                                                                                                 |
| Lens mount             | • HRC 2.0 12 MP: C-mount lens, various focal lengths (depending on application)                       
                          • HRC 2.0 50 MP: M58 mount                                                          |
| Power supply           | 24 V DC, min. 20 V, max. 28 V  
                          Current during operation: about 130 mA                                           
                          Current pulse during start-up: max. about 1 A                                         |
| Inputs                 | 1 input, 24 V DC, max. 28 V  
                          Response threshold:     
                          High: about >13 V      
                          Low: about <10 V        |
| Outputs                | 1 output, 24 V DC, type PNP                                                                                   
                          Max. 100 mA permanent                                         
                          Max. 200 mA peak                                                                                   
                          Short-circuit proof, protected against overload and external voltage peaks                     |
| Interface              | Ethernet 1000 MBit                                                                                       |
| Illumination           | External LED illumination (depending on application)                                                   |
| Standard visible area  | Length x height: 600 x 400 mm (depending on application)                                                 |
| Camera inclination angle| 0° in relation to vertical and product horizontal                                                          |
| Movement               | • Max. speed*: 0.15 m/s                                                                                     
                          • Max. acceleration*: 1.5 m/s²                                                                       
                          • Max. jerk*: 7.5 m/s³                                                                                   
                          * The use of a drag-chain compatible cable is mandatory:                                              
                          • Article numbers for system cable: 2.05.1300.00.0034 or 2.05.1300.00.0035                           
                          • Article numbers for network cable: 2.05.1300.00.0036 or 2.05.1300.00.0037                           |
| Environmental conditions at transport and storage | Temperature: -20 °C (-4 °F) to +80 °C (+176 °F)  
                                                      Max. humidity: 90 %, non-condensing                                                          |
| Environmental conditions at operation | Temperature: 0 °C (32 °F) to 50 °C (122 °F)                                                                 
                                                       Max. humidity: 80 %, non-condensing                                                             |
Dimensions

HRC 2.0 - 12 MP - Housing H17

HRC 2.0 - 12 MP - Housing H18
8 Connectors and Pin Assignment

Inside the camera housing different camera models and vendors can be installed. The build-in interface electronic converts the different signal logics and signal voltage levels of the different cameras to standard connections available at the outside of the camera housing.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>First supplier</th>
<th>Second supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>![Dimensions Diagram]</td>
<td></td>
</tr>
<tr>
<td>Ethernet connector</td>
<td>8-pin RJ45</td>
<td>8P8C RJ45</td>
</tr>
<tr>
<td>I/O connector</td>
<td>Hirose HR10A-7P-6S</td>
<td>M8 8Pins SACC-DSI-M8MS-8CON-M8-L180</td>
</tr>
<tr>
<td>I/O pin 1</td>
<td>+24 V, power</td>
<td>GPIO 2 (line 2)</td>
</tr>
<tr>
<td>I/O pin 2</td>
<td>Opto-coupled input, line 1</td>
<td>+24 V, power $V_{CC}$</td>
</tr>
<tr>
<td>I/O pin 3</td>
<td>GPIO, line 3</td>
<td>IN 1 (line 0)</td>
</tr>
<tr>
<td>I/O pin 4</td>
<td>Opto-coupled input, line 2</td>
<td>GND IN 1</td>
</tr>
<tr>
<td>I/O pin 5</td>
<td>GND for opto-coupled I/O lines</td>
<td>Power $V_{CC}$ OUT1</td>
</tr>
<tr>
<td>I/O pin 6</td>
<td>GND for camera power and GPIO lines</td>
<td>OUT 1 (line 3)</td>
</tr>
<tr>
<td>I/O pin 7</td>
<td>–</td>
<td>GND (power, GPIO)</td>
</tr>
<tr>
<td>I/O pin 8</td>
<td>–</td>
<td>GPIO 1 (line 1)</td>
</tr>
</tbody>
</table>
9 Disposal

In conformance with the European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties, the content of this regulation must also be related.
To protect your product’s future:
METTLER TOLEDO Service assures the quality, measuring accuracy and preservation of value of this product for years to come.

Please request full details about our attractive terms of service.