



## Instructions for Use

# **pictor N432M-ETH, pictor N432C-ETH** Intelligent Camera

## **Impress**

Publisher / Manufacturer	Vision & Control GmbH Mittelbergstraße 16 98527 Suhl, Germany Telephone: +49 (0) 3681 7974-0 Telefax: +49 (0) 3681 7974-33 <i>www.vision-control.com</i>
Name of the document	999.994.422.10.-en-1.2
Date of first issue	06.06.2018
Date modified	20.06.2018
Copyright	© Vision & Control GmbH 2018

## **Copyright**

It is forbidden to pass this document on to third parties, reproduce and communicate its contents in as far as this has not been expressly authorized. Offenders will be liable for damages.

All rights are reserved with respect to patent, utility sample and design patent registrations, as well as for rights of use within the scope of copyright.

vicotar®, vicolux®, pictor®, vicosys® and vcwin® are registered trademarks of Vision & Control GmbH.

The products and brand names of other manufacturers or suppliers are mentioned for information only.

## Validity

These instructions for use are valid for following devices:

Device	Order no.
pictor N432M-ETH	3-12-506
pictor N432C-ETH	3-12-507

## Product Identification

Designation	Description
pictor	Intelligent Camera
N	Operating Software vcwin pro
4	Generation
32	Number of Pixels: 3.2 megapixel
M C	Monochrom Colour (with Bayer filter)
ETH	Interface: Ethernet

TABLE OF CONTENTS

---

**1 Information about the Instructions of Use.....7**

1.1 Intended Use..... 7

1.2 Improper Use.....8

1.3 Qualified Personnel..... 8

1.4 Warranty and Liability..... 9

**2 Safety..... 10**

2.1 Presentation of Safety Instructions.....10

2.2 Safe Handling of the Device..... 11

**3 Scope of Delivery and Accessories..... 12**

3.1 Scope of Delivery..... 12

3.2 Accessories.....13

**4 Device Description..... 14**

4.1 Device Views..... 14

4.2 Interfaces and Connectors..... 15

4.3 Display Elements.....16

4.4 Notices on the device.....17

**5 Technical Data..... 18**

5.1 General Parameters..... 18

5.2 Processor.....18

5.3 Image sensor.....19

5.4 Electrical Parameters..... 19

5.5 Interfaces..... 20

5.5.1 Ethernet interface..... 20

5.5.2 Digital Inputs.....20

5.5.3 Digital Outputs.....21

5.6 Conditions for Operation, Storage and Transport..... 22

5.7 Technical Drawings.....23

**6 Commissioning..... 24**

6.1 Unpacking.....24

6.2 Mounting.....24

6.3 Connecting.....26

6.3.1 Connecting Ethernet cable.....26

6.3.2 Connect PLC/Power cable..... 27

6.3.3 Connect Power supply.....	29
6.4 Operating Software vcwin pro.....	29
6.4.1 System Requirements.....	29
6.4.2 Installing, Starting and Updating Operating Software vcwin pro.....	30
<b>7 Operation.....</b>	<b>31</b>
7.1 Making Operational Readiness.....	31
7.2 Operating via the Operating Software vcwin pro.....	31
7.2.1 First Steps.....	31
7.2.2 Interface Settings.....	32
7.2.3 Connect to the Operating Software.....	33
<b>8 Maintenance and Service.....</b>	<b>34</b>
8.1 Maintenance.....	34
8.2 Service.....	35
<b>9 Disposal.....</b>	<b>36</b>
<b>10 EU Declaration of Conformity.....</b>	<b>37</b>



# 1 INFORMATION ABOUT THE INSTRUCTIONS OF USE

---

This document contains technical information, important instructions for correct installation, commissioning and use, as well as product information which were up-to-date at the time of going to press.

Using this document makes it easier for you to familiarise yourself with the device and avoid malfunctions caused by improper operation.

The instructions of use and the local regulations and rules must be followed.

To ensure a save and proper application, please read the instructions of use carefully and keep them for future reference.

## 1.1 Intended Use

The device is intended exclusively for use as a machine vision system for industrial image processing in automation technology.

The device is not suitable for use in potentially explosive areas.

It is intended for use in a confined environment.

The device may only be used if it is in technically faultless condition and only for its intended purpose, and only in accordance with the specifications in this instructions of use by authorised operative personnel, who are aware of the safety rules and hazards.

If the device is planned to be used for any other purpose or in a different environment, the express authorisation of the manufacturer must be obtained in advance. Any modifications or adaptations required may only be made by the manufacturer.

## **1.2 Improper Use**

All unintended use and all device-related activities not described in these instructions of use is to be deemed as unauthorised misuse outside the legal limits of indemnity of the manufacturer.

### **Reasonably foreseeable misuse is:**

- Non-compliance with the instructions for use,
- Faulty operation,
- Operating by personnel not qualified or instructed,
- Operating the device if it is not in a proper technical condition,
- Operating the device in ambient conditions differing from the corresponding specifications in the instructions of use
- Operating the device with voltages differing from the corresponding specifications in the instructions of use,
- Using spare parts which are not original parts from the manufacturer,
- Using incompatible accessory components,
- Improper maintenance and repair works,
- Unauthorised modifications to the device.

## **1.3 Qualified Personnel**

The device may only be assembled, commissioned, operated, maintained, installed, set up, cleaned, repaired and transported by qualified skilled personnel.

A qualified person is deemed to be someone who has been trained and instructed for his/her activities with the device, and who has proven his/her capability to the purchaser. The operating personnel must be authorised by the purchaser for those activities at the device.

For the installation and operation of the device, the skilled personnel must know and comply with the applicable guidelines and standards for handling control equipment, electrical installations and working materials.



## **1.4 Warranty and Liability**

The contents of this document have been checked carefully and correspond to current legislation and best practise at the time of going to press.

However, the manufacturer shall not be liable for any damage arising from the use of this edition of the manual, and rejects any warranty derived therefrom.

Within the bounds of the legal requirements, the manufacturer shall only be responsible for the technical safety characteristics of the device if the maintenance, repairs and modifications to the device are performed by himself or by authorised skilled personnel in accordance with his instructions.

### **Loss of warranty**

The manufacturer shall accept no liability or warranty in the event of improper use, opening of the device or incorrect maintenance.

## 2 SAFETY

---

### 2.1 Presentation of Safety Instructions

Each safety instruction is introduced by a key word and colour highlighted.

The key word indicates the degree of danger. The danger and its cause are described, and then the measures to prevent conceivable consequences of the danger. These measures must be taken.



#### **DANGER**

Indicates an imminent danger with high risk, resulting in severe injuries or death if not avoided.

---



#### **WARNING**

Indicates a hazardous situation with medium risk, possibly resulting in severe injuries or death if not avoided.

---



#### **CAUTION**

Indicates a hazardous situation with low risk, resulting in minor or medium injuries if not avoided.

---

#### **NOTICE**

Indicates a situation that may result in property damage.

---

## 2.2 Safe Handling of the Device

Read the following applicable safety instructions carefully and completely. Follow the instructions for your own safety, the safety of other people, and to avoid damage to the device and the connected technical equipment. Hazards going beyond the general safety instructions are referred to separately at the relevant points in this manual.



### CAUTION



#### **Risk of injury due to electric shock.**

- Before starting work on the device, disconnect it from the operating voltage supply.
- Follow all applicable safety regulations for the preparation and operation of electrical devices.

## **3 SCOPE OF DELIVERY AND ACCESSORIES**

---

Power supply and communication cables are required to operate the device. Because of the many possible configurations, the cables are listed in the accessories rather than included in the scope of delivery.

### **3.1 Scope of Delivery**

<b>Designation</b>	<b>Quantity</b>
Device pictor N432M-ETH, pictor N432C-ETH	1 x
Product DVD with: <ul style="list-style-type: none"><li>• Operating Software vcwin pro</li><li>• Instructions for Use pictor N432M-ETH, pictor N432C-ETH (PDF)</li><li>• Instructions for Use vcwin pro (PDF)</li></ul>	1 x
CS/C-Mount adapter (mounted)	1 x
Protective cap (mounted)	1 x
Instructions for Use pictor N432M-ETH, pictor N432C-ETH	1 x

### 3.2 Accessories

Description	Lenght	Order no.
Ethernet cable, 6-pin HIROSE plug / RJ45 plug	5 m	4-40-203
Ethernet cable, 6-pin HIROSE plug / RJ45 plug	10 m	4-40-204
Ethernet cable, 6-pin HIROSE plug / RJ45 plug	20 m	4-40-206

Table 1: Accessories Ethernet cable

Description	Lenght	Order no.
PLC/power cable, 12-pin HIROSE socket / open cable end	5 m	4-40-223
PLC/power cable, 12-pin HIROSE socket / open cable end	10 m	4-40-224
PLC/power cable, 12-pin HIROSE socket / open cable end	25 m	4-40-225

Table 2: Accessories PLC/power cable

Description	Quantity	Order no.
Power supply, 24V DC/0.63 A, 12-pin HIROSE-socket / 230V AC power plug	1	4-40-209

Table 3: Accessories Power supply

## 4 DEVICE DESCRIPTION

---

### 4.1 Device Views

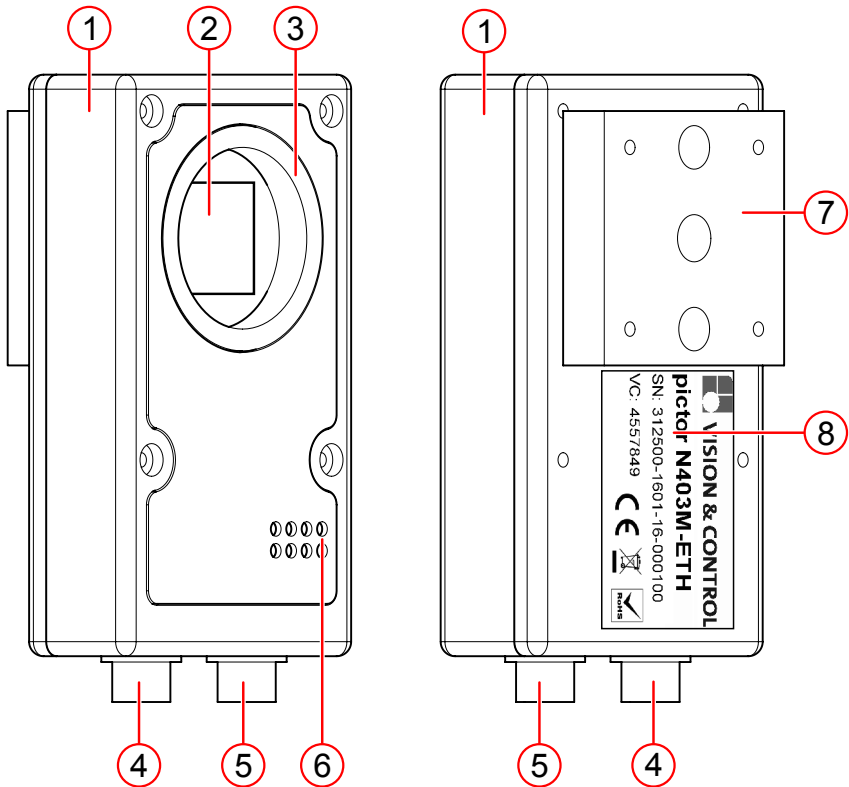
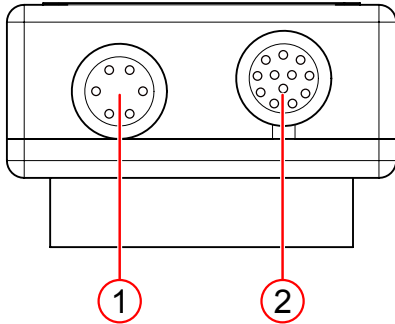


Image 1: Device view

- |   |                     |   |                     |
|---|---------------------|---|---------------------|
| 1 | Casing              | 5 | PLC/Power interface |
| 2 | Image sensor window | 6 | Display Elements    |
| 3 | CS-mount lens mount | 7 | Mounting block      |
| 4 | Ethernet interface  | 8 | Type plate          |

## 4.2 Interfaces and Connectors



*Image 2: Interfaces and Connectors*

1 LAN/Ethernet interface

2 PLC/Power interface

4.3 Display Elements

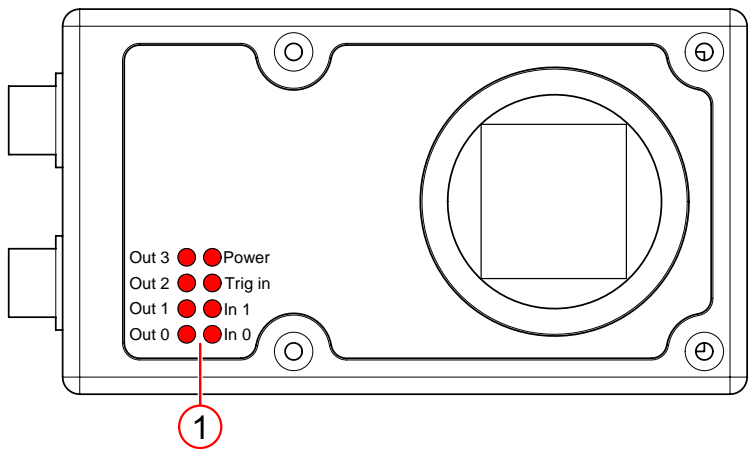


Image 3: Display Elements

1 LED display

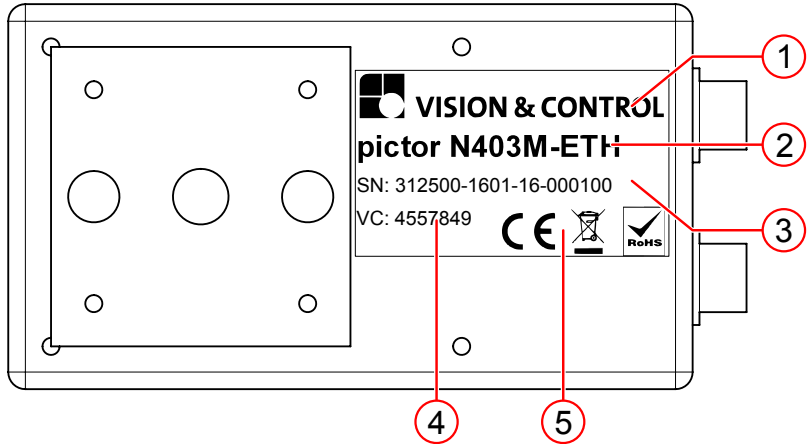
Display Elements

Designation	Colour	Status
Out 3	Red	On: Signal applied
Out 2	Red	On: Signal applied
Out 1	Red	On: Signal applied
Out 0	Red	On: Signal applied
Power	Red	On: Operating voltage applied
		Off: Operating voltage not applied
Trig in	Red	On: Signal applied
In 1	Red	On: Signal applied
In 0	Red	On: Signal applied



## 4.4 Notices on the device

Following notices are on the back of the device:



*Image 4: Type plate*

- 1 Manufacturer name
- 2 Device designation
- 3 Serial number
- 4 Hardware ID
- 5 CE marking

## 5 TECHNICAL DATA

---

### 5.1 General Parameters

Parameter	Characteristic
Housing material	Aluminium, anodised
Housing dimensions	80 mm x 45 mm x 20 mm (without connector)
Mounting	At bottom: mounting block with 2 x M6 thread and 1 x 1/4" UNC thread
Lens mount	CS-Mount, C-Mount (with adapter)
Weight	175 g
Degree of protection (IP)	IP 20
Safety class	Class III, operation on safety extra low voltage (SELV)

### 5.2 Processor

Parameter	Characteristic
Processor	Dual-Core ARM® Cortex®-A9 with 866MHz and integrated FPGA
RAM	512 MB DDR-SDRAM
Flash EPROM	16 GB flash memory (non volatile), approx. 12 GB of it available for test programmes and images
Communication interfaces	1 x Ethernet 100Mbit
Process interface	2 x Input, 4 x Output 1 x Trigger input (image acquisition) 1 x Trigger output (flash)

## 5.3 Image sensor

Parameter	Characteristic
Image sensor	Sony IMX252 Pregius
Type	Monochrome at pictor N432M-ETH Colour at pictor N432C-ETH
Number of pixels	2048 x 1536
Optical format	1/1.8"
Image diagonal	8.8 mm
Sensor size	7.1 mm x 5.3 mm
Pixel size	3.45 $\mu\text{m}$ x 3.45 $\mu\text{m}$
Frame rate	88 fps
Shutter	min. 5 $\mu\text{s}$
Integration	Global Shutter
Image acquisition	Program-controlled or with external high-speed trigger, jitter free acquisition

## 5.4 Electrical Parameters

### Operating voltage supply

Parameter	Min	Nom <sup>(1)</sup>	Max
Operating voltage $U_o$	12 V	24 V	30 V
Current consumption at $U_o$	160 mA	90 mA	
Power consumption $P_{\text{tot}}$		4.5 W	

## 5.5 Interfaces

### 5.5.1 Ethernet interface

The device has an Ethernet interface.

#### ADVICE

In the delivery state the vision system tries to obtain an IP address from a DHCP server. If this fails, the vision system assigns itself an IP address from the "link local" address space.

This behaviour can be changed via the operating software.

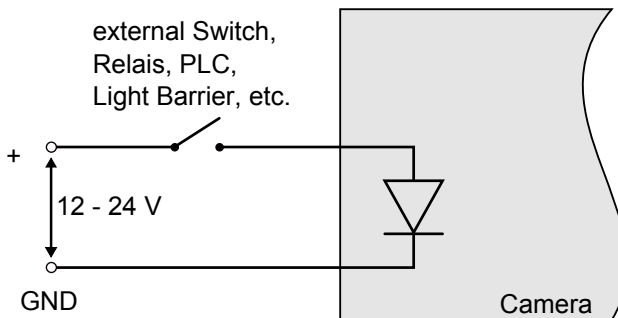
---

### Characteristics

- Integration of the device in a LAN, suitable for process communication as well as parametrisation with the operating software vcwin pro
- LAN: 10/100 Mbps

### 5.5.2 Digital Inputs

#### Connection of PLC / trigger inputs



## Characteristics

- 2 digital inputs
- 1 trigger input
- Operating voltage 12 - 24 V
- Threshold voltage 8 V (input high for signals greater 8 V)
- Maximum voltage: 30 V
- Reverse voltage protection
- Input voltage 2 mA at 24 V
- Signal debouncing hardware: none

## 5.5.3 Digital Outputs

### Connection of PLC / trigger outputs

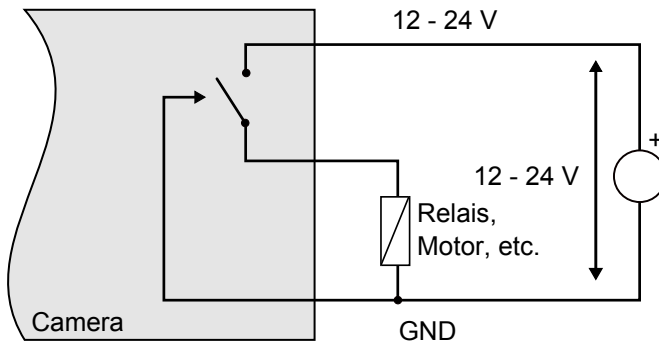


Image 5: Connection of digital outputs (PLCOUT/TriggerOUT)

## Characteristics

- 4 digital outputs
- 1 trigger output
- Operating voltage 12 - 24 V
- Current per output: 400 mA (total current for all outputs < 1000 mA)
- Output high will switch positive voltage
- Short-circuit and overtemperature protection (2 A)
- Free-wheeling diode integrated

5.6 Conditions for Operation, Storage and Transport

Store and transport the device in shock-proof box, if possible in the original packaging.

For accessories, connected devices and components observe the specific information in the associated instructions for use.

Ambient Conditions

	Operation	Storage / Transport
Temperature	0 °C to 50 °C	- 20 °C to 60 °C
Air humidity	20 % to 80 %	20 % to 90 %
Condensation water	not permissible	not permissible

## 5.7 Technical Drawings

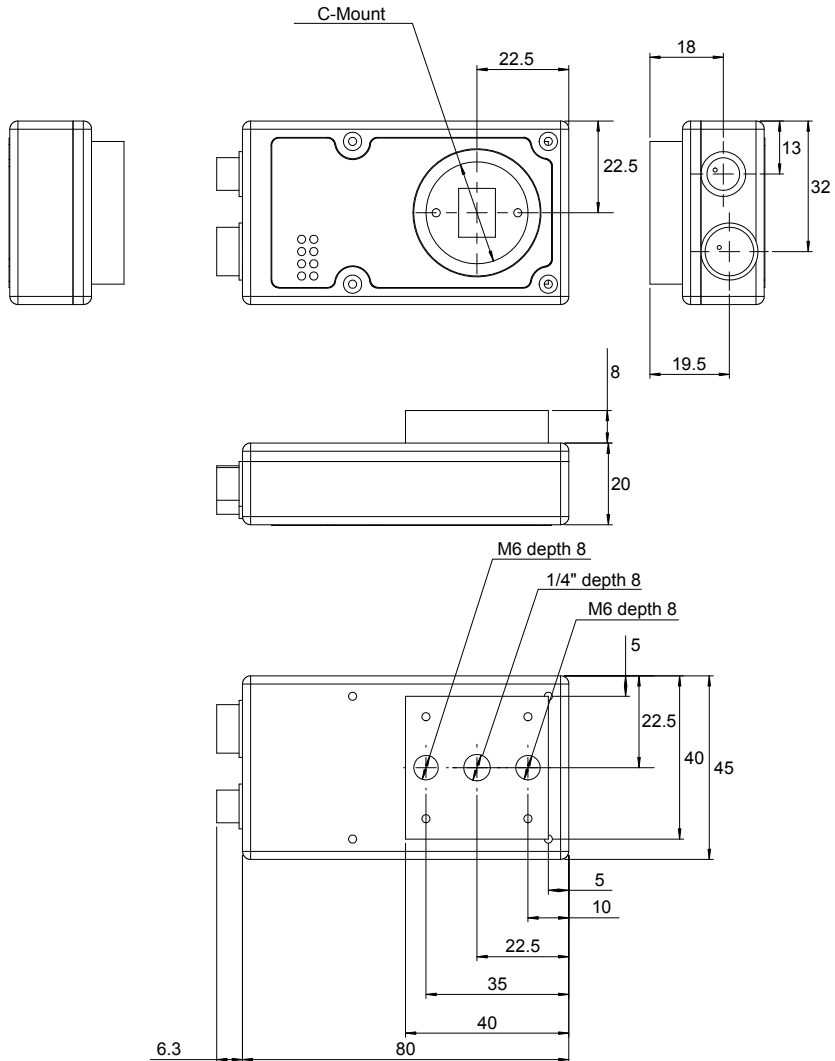


Image 6: Technical Drawings - Dimensions in mm

## 6 COMMISSIONING

---

### 6.1 Unpacking

#### NOTICE

**Damage or destruction of the device caused by condensation and large temperature differences!**

- Do not subject the device to large temperature fluctuations.
  - After storage and transport, allow the device to adjust slowly to the ambient temperature at the place of use.
  - Do not open the lens cover during the acclimatisation (to prevent the formation of condensation water).
- 

#### ADVICE

Unpack the device in a dry, dust-free environment.

---

1. Lift the cardboard, together with the device, out of the carton.
2. Fold out the tucked in sides on the bottom of the cardboard.  
➡ Loosening the film and forming an insertion pocket.
3. Remove the device out of the insertion pocket.
4. Dispose the packing material.

### 6.2 Mounting

#### NOTICE

Installation and connection operations may only be performed in the off and de-energised state.

---



## Mounting the Device

To mount the device, tapped holes are located at the rear side.

The maximum screwed-in depth is 8 mm.

The maximum tightening torque for M6 screws is 10 Nm.

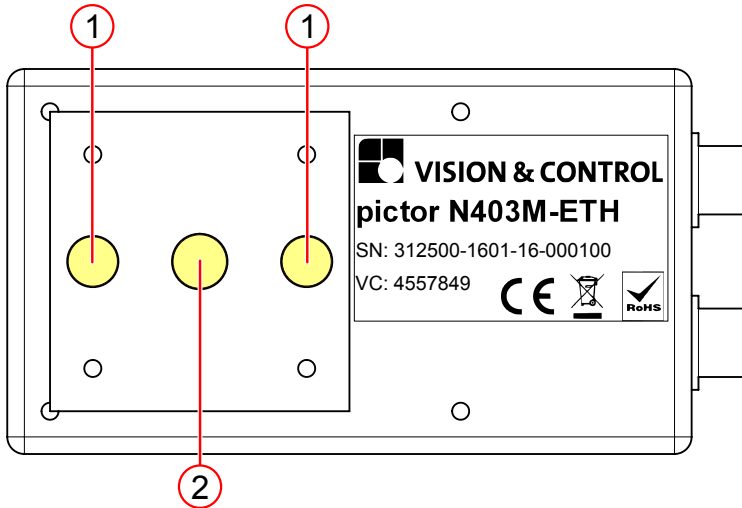


Image 7: Mounting holes

- 1 2 x Tapped hole M6
- 2 1 x Tapped hole 1/4"

## Mounting the lens

1. Hold the device securely.
2. Remove the protective cap from the lens mount.

For C-mount lenses, screw on the CS/C-mount adapter (included in the scope of delivery) hand tight.

For M12 mount lenses, screw on the M12 adapter (accessories) hand tight.

3. Screw the lens onto the device or adapter hand tight.

## 6.3 Connecting

### NOTICE

Installation and connection operations may only be performed in the off and de-energised state.

---

### NOTICE

#### Cable damage

- Comply with the specified minimum bending radius.
  - Cables must generally be mounted with a strain relief clamp.
  - Use cables corresponding to the specification (see data sheet).
- 

### 6.3.1 Connecting Ethernet cable

Carry out the following steps in the de-energized state:

1. Insert the 6-pin Hirose socket of the Ethernet cable into the LAN plug on the device.
2. Connect the RJ45 plug to a free Ethernet interface on the host computer or the network.

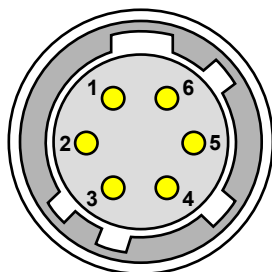


Image 8: View: Plug on camera

## Pin assignment Ethernet cable

Pin	Designation	Description	RJ45 plug Pin
1	TX-	Send data -	2
2	TX+	Send data +	1
3	NC	Not connected	-
4	NC	Not connected	-
5	RX-	Receive data -	6
6	RX+	Receive data +	3

Table 4: Pin assignment Ethernet cable

## 6.3.2 Connect PLC/Power cable

Carry out the following steps in the de-energized state:

1. Insert the 12-pin Hirose plug of the PLC/Power cable into the I/O socket on the device.
2. Connect the open end of the PLC/Power cable to the control unit / power supply.

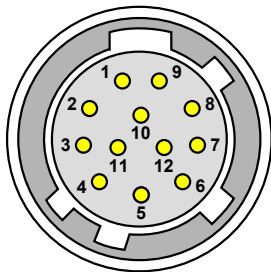


Image 9: View: Plug on camera

### **Pin assignment PLC/Power cable**

<b>Pin</b>	<b>Colour</b>	<b>Signal</b>	<b>Open cable end</b>
1	Red	(12)* 24 V PLC**	(+12)* + 24 V dig. In- and Outputs
2	Red / Blue	+UB	Operating voltage (+12)* + 24 VDC
3	Black	GND	Operating voltage GND
4	Pink	IN 1	Digital Input 1
5	Yellow	OUT 3	Digital Output 3
6	Green	OUT 2	Digital Output 2
7	Brown	OUT 1	Digital Output 1
8	White	OUT 0	Digital Output 0
9	Grey / Pink	(12)* 24 V PLC**	(+12)* + 24 VDC dig. In- and Outputs
10	Purple	TrigOUT	Trigger Output
11	Blue	TrigIN	Trigger Input
12	Grey	IN 0	Digital Input 0
* The device can be operated with 12 or 24 V DC.			
** The PLC output voltage is identical to the supply voltage.			

*Table 5: Pin assignment PLC/Power cable*

### 6.3.3 Connect Power supply

#### ADVICE

When using the power supply (AC adapter), the digital I/O interfaces of the device can not be used.

---

Carry out the following steps in the de-energized state:

1. Plug the 12-pin HIROSE connector of the power supply into the I/O socket on the device.
2. Connect the plug to the 230 V AC socket.

### 6.4 Operating Software vcwin pro

If the device is connected via Ethernet interface, it can be immediately controlled, parameterised and configured with the Operating Software.

The device is parameterised with the Operating Software vcwin pro via the Ethernet interface.

#### 6.4.1 System Requirements

##### Minimum requirements of the computer

- Operating systems: Windows 7, Windows 8, Windows 8.1, Windows 10  
- Both 32 and 64 bit versions (Windows RT is not supported)
- DVD drive (for installation from DVD) or Internet connection (for installation after download)
- Minimum 1 GB free RAM
- Ethernet interface

## 6.4.2 Installing, Starting and Updating Operating Software vcwin pro

### Installing Operating Software vcwin pro

#### ADVICE

Administrator rights are required to install the Operating Software.

---

1. Insert the supplied DVD into the drive of the host computer
2. Select the folder "Software".
3. Select the Operating Software vcwin pro and install on the computer by double-click. Follow the instructions given by the installation program, and change the target directory if desired.

The software also installs an optional icon on the Windows Desktop, and creates entries in the start menu.

### Starting Operating Software vcwin pro

The Operating Software can be started by double-clicking the icon on the Desktop or by selecting it from the start menu. Registration is not required.

### Updating Operating Software vcwin pro

The software version which is current at the time of delivery is always supplied with the device. There is no automatic update.

New versions of the Operating Software vcwin pro can be downloaded from:  
*[www.vision-control.com](http://www.vision-control.com)*.

## 7 OPERATION

---

### 7.1 Making Operational Readiness

The device is switched on with the operating voltage supply via the PLC/Power cable or the power supply.

Disconnecting the device from the operating voltage supply switches the device off.

### 7.2 Operating via the Operating Software vcwin pro

#### ADVICE

To operate the device from the software Operating Software , please read the software manual of the Operating Software vcwin pro. This also describes the scope of functions and test functions of the software.

---

#### 7.2.1 First Steps

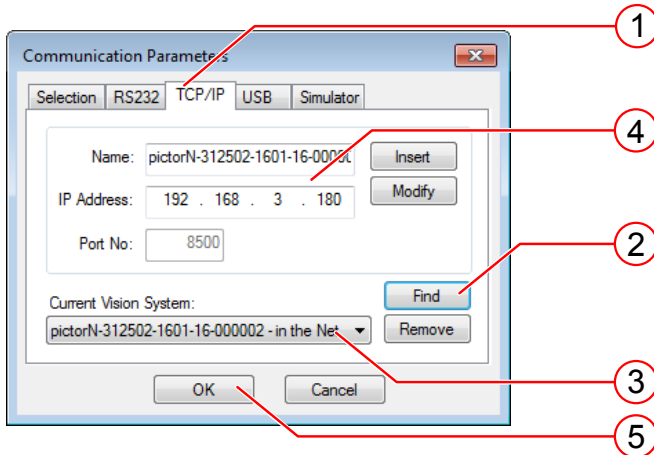
- 1 Connect the device to a host computer via Ethernet cable. See: *"Connecting Ethernet cable", Page 26*
- 2 Connect the device with a 24 V DC power supply. See: *"Connect PLC/ Power cable", Page 27*
- 3 On the computer, start the Operating Software vcwin pro.

## 7.2.2 Interface Settings

Use Menu **Communication > Interface** to configure the interface for communication between the host computer and the device.

Settings made here are used in every connection with vcwin pro.

### TCP/IP connection with the device



1. Switch to the **TCP/IP** tab.
2. With the [Search] button, all available devices, on the same subnet, are displayed (UDP broadcast to all participants).
3. Select the appropriate device.
4. Optionally, you can also enter the name and IP address of your device.
5. Click the [OK] button to accept the values.


The device can now be connected to vcwin pro.



## 7.2.3 Connect to the Operating Software

Connect the device with the operation software vcwin pro via:

- Menu: Communication > Connect  
or

- Toolbar 

The initialisation of the host computer interface sets up a connection with the device via vcwin pro. The Run Mode is interrupted and the system resources are queried. vcwin pro uses the initialisation to recognise all the geometry variables, results, contour buffer, counters, image memory pages and I/O hardware available from the device connected. After initialising, the system is in Command Mode and vcwin commands may be used.

## **8 MAINTENANCE AND SERVICE**

---

### **8.1 Maintenance**

The device is maintenance-free. Depending on the operating environment, it may have to be cleaned.

The housing can be cleaned according to the conditions applicable to the given protection class.

Cleansers must not be applied directly to the housing, and the housing must not be bathed.

#### **Cleaning the outside**

- Clean the outside with a damp cloth.
- Remove excessive dirt with an approved anodised aluminium cleaner. Refer to the instructions of the cleaner.
- The connectors must be clean and dry before the device is connected and put into operation.

#### **Cleaning the protective glass / filter**

- Do not scratch and keep dust and grease off the protective glass! Do not touch the glass!
- If it is heavily soiled, clean the protective glass with a cotton bud soaked in ethyl, methyl or isopropyl alcohol. The alcohol must not be applied directly to the protective glass.
- Clean and care for the lenses as described in the guide for the relevant lens.

#### **Cleaning by the manufacturer**

The device can be sent to the manufacturer for cleaning (for a fee). Please contact our Technical Support.

## 8.2 Service

### Technical Support

Please contact our technical support if you have any technical questions concerning our products.

We will be glad to be of service:

Monday to Thursday 8:00 to 17:00, and Friday 8:00 to 15:00.

Vision & Control GmbH

Mittelbergstraße 16

98527 Suhl, Germany

**Phone: +49 (0) 3681 7974-0**

*[www.vision-control.com](http://www.vision-control.com)*

### Defective device

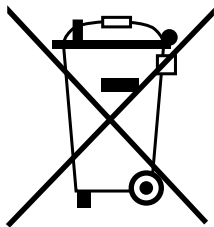
If the device has a defect, the manufacturer can repair or exchange it. Please contact your local sales partner or technical support.

## **9 DISPOSAL**

---

The device and its accessories and packaging must be sent to environmentally compatible recycling.

Do not throw electrical devices or tools into the household waste!



According to European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation in national law, unusable electric tools must be collected separately, and sent to environmentally compatible recycling.

Disposal, including that of individual components, must also always be in a way that does not harm the environment, which means it must be done in accordance with the currently valid legal regulations.

Please contact the manufacturer, your local specialist dealer or the relevant national authority for the proper disposal of old devices.

The electrical and electronic components must be sent to a specialist recycling company or to the manufacturer for proper disposal.

## 10 EU DECLARATION OF CONFORMITY

---



**Vision & Control GmbH**

Mittelbergstraße 16

D-98527 Suhl, Germany

Representative: Dr. Jürgen Geffe, Managing director

We, Vision & Control GmbH Suhl, declare that the product described below

- Designation: pictor N432M-ETH, pictor N432C-ETH
- Order no.: 3-12-506 / 3-12-507

has been manufactured in accordance with the following standards and normative documents:

- 2014/30/EU - Electromagnetic compatibility (EMC directive)
- DIN EN 61000-6-2:2005 - Electromagnetic compatibility (EMC) - Immunity for industrial environments
- DIN EN 61326-1:2006 - Electrical equipment for measurement, control and laboratory use - EMC compatibility

The product described above is in conformity with Directive 2011/65/EU (RoHS) of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Suhl, 05.06.2018

Dr. Jürgen Geffe

Managing director





---

Vision & Control GmbH  
Mittelbergstraße 16  
98527 Suhl, Germany  
Telephone +49 (0) 3681 7974-0  
Telefax: +49 (0) 3681 7974-33  
[www.vision-control.com](http://www.vision-control.com)



Management  
System  
ISO 9001:2008

[www.tuv.com](http://www.tuv.com)  
ID 1100003008