



VISION SENSOR

CS-60

LICENSING MODEL
QUICK START GUIDE

 **di-soric**

OUR FLEXIBLE ONE. THE CS-60 VISION SENSOR.

ALSO FOR MORE DEMANDING APPLICATIONS.

The CS-60 Vision Sensor impresses with its powerful, upgradeable software, clever and robust illumination concept, its M12 interchangeable lens system, and extensive optics accessories. Thanks to high-performance image processing tools and the quickly configurable nVision-i software, optimal performance and smooth startup is guaranteed.

Comprehensive focal lengths through M12 interchangeable lenses

for satisfying all common application requirements in the industrial vision sensor area



EtherNet/IP™

Supported industrial protocols

Digital I/O, TCP/IP, Profinet, Ethernet/IP, HTTP, FTP/SFTP and ReST-API

Integrated high power LED illumination in red and white

Illumination can be switched in the software for optimal startup at high speed and at a large working distance.

High-performance image-processing tools and a user-friendly, intuitive software interface

ensure simple and seamless integration

Image correction and calibration

for improving image quality and conversion of pixel values to real values (mm)

Upgrade function

The „Measure“, „ID“ and „ID Pro“ modules can be acquired separately or together as a software expansion to the standard module (localization, detection, counting) via a simple licensing model.

Reliable and fast: The ID Read tools

for all common 1D and 2D code types and easily recognizable, directly marked DPM codes (Optional ID Pro upgrade available)

Robust, compact casing with protection class IP67

For use in working environments with active washing without the application of additional protective equipment



First steps	4	The image processing tools	8	Appendices	12
Unboxing	4	Counting	8	Renaming verification tools	12
Installing the nVision-i software:	4	Measurement	8	Renaming a job name	12
Licensing	5	Localization	8	Setting a boot job	13
Upgrade	5	Detection	8	Importing and exporting the job	13
FAQs	5	Localize and read	8	Technical data	14
Adjusting the settings of the CS-60	6	User interface	10		
Focusing the lens	7	Structure of the user interface	10		
		Communication with higher-level control systems	11		
		Saving the job	11		
		Executing the job	11		

LICENSE MODELS FOR CS-60

I License for nVision-i Parameterization software

- Article 213438 nVision-i
- Creation of offline jobs
- Parameterization of sensor
- Reference to Online Shop, Customer Service
- Free

* With each sensor supplied, the licence key for the nVision-i parameterisation software is included on the delivery note.

II Upgrade License Function Extension

- Article 213364 CS60-UP-ID-LIZENZ
- Article 213770 CS60-UP-ID-PRO-LIZENZ
- Article 213365 CS60-UP-MEAS-LIZENZ
- The licenses are used to release functions on the sensor.
- Fee-based

III CD-60 Variants Licensed off the shelf

- Article 212910 CS60-BM28-EP15/300
- Article 213359 CS60-BM28-EP15/300ID
- Article 213358 CS60-BM28-EP15/400
- Article 213360 CS60-BM28-EP15/400ID
- Article 212911 CS60-BM38-EP15/300
- Article 213361 CS60-BM38-EP15/400
- Article 213362 CS60-BM38-EP15/300ID
- Article 213363 CS60-BM38-EP15/400ID

PROCESSES FOR LICENSE MODELS

I License for nVision-i Parameterization software

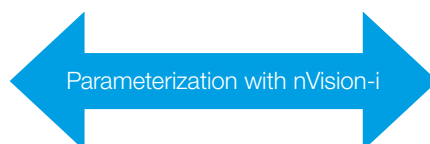
1. The nVision-i software can be downloaded via the Online Shop.
2. The license is activated automatically when the software is started for the first time.
3. If there is no Internet connection, di-soric Customer Service can activate the license manually.

II Upgrade License Function Extension

1. A CS-60 is already present.
2. To complete a new task, an expanded functional scope is required.
3. The upgrade can be acquired via the Online Shop or via di-soric Customer Service. The sensor serial number is required for this.

III CD-60 Variants Licensed off the shelf

1. The CS-60 is acquired via the Online Shop or Customer Service.
2. Off the shelf, the sensor has the license setup uploaded to it and has the ordered status upon delivery.



FIRST STEPS

Unboxing



With each sensor supplied, the licence key for the nVision-i parameterisation software is included on the delivery note.

1. Unpack the CS-60, mechanically assemble it and complete electrical wiring according to instructions.
2. Connect the M12 plug end (8-pin) of the Ethernet connection cable to the M12-X socket on the sensor.
3. Connect the RJ45 end of the Ethernet connection cable to the RJ45 interface of the Client PC (PC is only required for setup) or the PLC.
4. Connect the sensor to the power supply. To do this, PWR, GND, Trigger and I/O must be properly connected. The power supply must be between 18 and 30 V DC. Caution: It must be ensured that both ends of the cable are firmly and correctly attached to establish a physical connection.
5. Connect the M12 plug (12-pin) of the IO-PWR cable to the free M12 socket (12-pin) of the sensor.

Note:

- Each CS-60 is delivered with a standard, fixed IP address IP: 192.168.3.15 / subnet mask: 255.255.255.0 and the device name "CS-60." To avoid network interference, it must be ensured in advance that each IP address is unique within the network!
- The sensor and PC must be in the same IP address range for them to be able to be connected.
- Preferably, use static IP addresses in the network in order to ensure a stable connection.
- If several CS-60 Vision Sensors are to be used simultaneously, the IP addresses must be adjusted in order to prevent network conflicts.

Installing the nVision-i software:

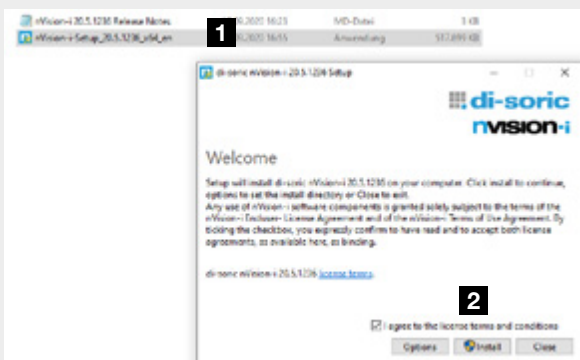
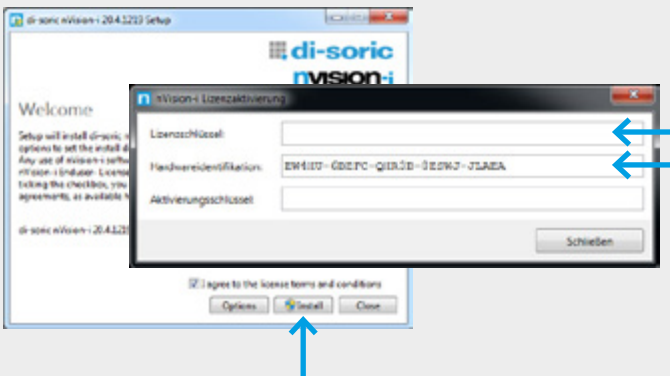


Fig. 01

- The most current software version is available for download on the di-soric homepage at <https://www.di-soric.com/213438>. To ensure that the nVision-i software is installed properly, full administrative rights are required!
- Start installation by clicking on "Install." Perform the installation steps on the screen according to the instructions on the screen. At the end of a successful installation, a confirmation notice is displayed. The computer may have to be restarted.

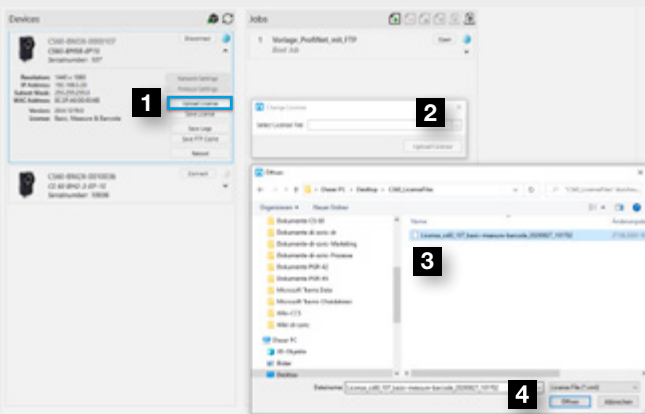
Licensing



The license is activated the first time nVision-i is started. If licensing is successful, nVision-i can be started.

If the computer being used does not have an Internet connection, the software can also be activated by phone. Using hardware identification, Customer Service can generate the activation key.

Upgrade



1 Start nVision-i and open up the Parameter menu of the sensor.

2 Open file explorer by way of the “Upload license” entry.

3 Select the license file in the file explorer.

4 Upload the file with “Open.”

FAQs

Even with a functioning Internet connection, retrieval of the license file is not possible.

Cause: All app access to the Internet is blocked by Customer IT as a rule.

Solution: Simply perform the installation as described above without Internet access.

After the installation, the connected sensors are not recognized.

Cause: The app is blocked in the firewall structure of the Customer IT.

Solution: Customer IT must release the app.

Adjusting the settings of the CS-60

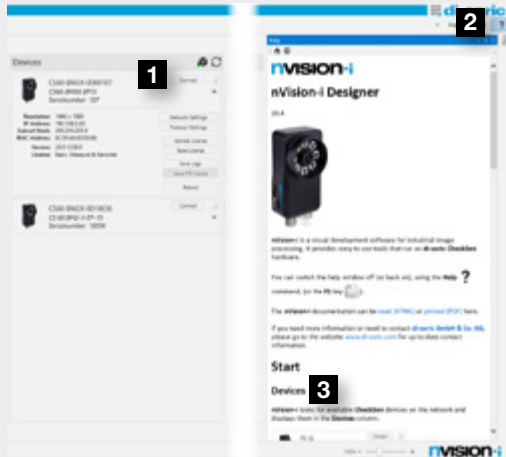


Fig. 02

After starting the nVision-i software, the following image appears: (Fig. 02)

- 1** Connect to Sensor
- 2** Help for selected action
- 3** Help with connection to sensor

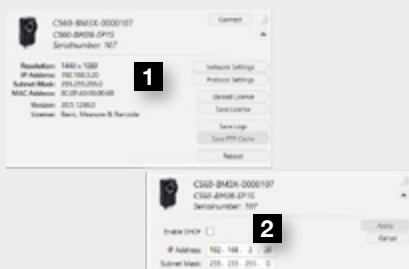


Fig. 03

Note:

In this window, adjustments to network settings, such as the assignment of the IP address or the activation of the industry protocols, can be performed. Click on “Apply” to save all changes. (Fig. 03)

- 1** Select Change IP
- 2** Set IP address to network

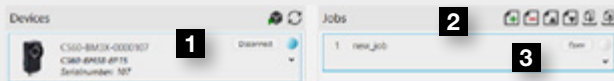


Fig. 04

In the Devices area, a sensor or the emulator can be selected to establish a connection. A new job can then be created using “+” in the Jobs area. By clicking on “Open,” verifications can be set up in the main menu. (Fig. 04)

- 1** Establish connection to sensor
- 2** Create new job
- 3** Open job

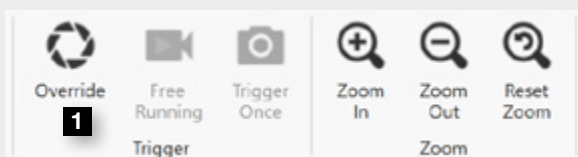


Fig. 05

First select “Override” to put the sensor in editing mode. Click “Trigger Once” to record the first image. Next, you can begin with the image setup and focusing of the lens. (Fig. 05)

- 1** Adopt sensor control

Focusing the lens

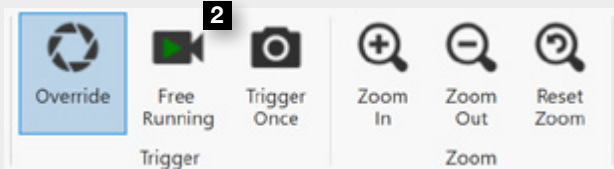


Fig. 06

To do this, continuous recording must be started via “Free Running.” (Fig. 06)

2 Select Image Trigger

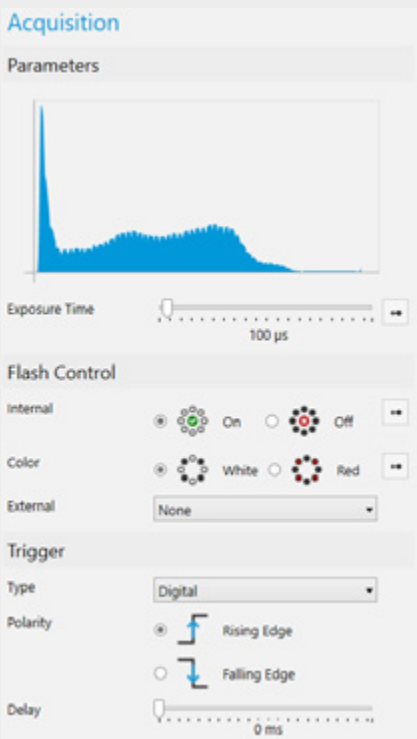


Fig. 07

By turning the lens, the image can then be focused. If needed, the exposure time, the flash mode (flash, color) and the trigger settings can also be chosen in the Acquisition area. (Fig. 07)



Fig. 08

After a new job has been created, the appropriate verification tool for the task can be selected in the Menu area. To do this, click on the corresponding tool to add it in the Tool list area. It is also possible to add several tools to a job. (Fig. 08)

All configured jobs are saved locally on the CS-60. The Vision Sensor thus works with or changes between jobs which are stored in its memory. But it is also possible to export these jobs to the computer or vice versa.

THE IMAGE PROCESSING TOOLS

SIMPLE AND FAST

LOCALIZATION of areas, edges and shapes

<p>AREA</p>	<p>The tool “Localize area” is used in order to localize a part in a scene using Blob analysis</p>		
<p>EDGE</p>	<p>Finds an edge within the defined search field and serves as a guide for subsequent tools</p>		
<p>SHAPE</p>	<p>Compares learned patterns within the defined working area and also serves as position correction for subsequent tools</p>		

DETECTION of the presence/absence of a feature based on pixel values and contrast

<p>BRIGHTNESS</p>	<p>Detects the average brightness as a function of the threshold range within a defined area in the image</p>		
<p>CONTRAST</p>	<p>Detects the contrast as a function of the threshold range within a defined area in the image</p>		
<p>AREA PIXELS</p>	<p>Detects the number of pixels as a function of the threshold range within a defined area in the image</p>		
<p>EDGE PIXELS</p>	<p>Detects the number of edge pixels as a function of the threshold range within a defined area in the image</p>		

ZÄHLEN von Flächen, Kanten und Formen

<p>AREAS</p>	<p>Determines the number of contiguous dark or bright regions</p>		
<p>EDGES</p>	<p>Determines the number of edges along a line/search beam</p>		
<p>SHAPES</p>	<p>Identifies and counts objects whose contour matches the learned contour</p>		

UPDATE MEASUREMENT of angles, diameters, distances and spacings in mm and pixels +

ANGLE	Determines the angle of an edge			
CIRCLE	Determines the diameter and circularity			
DISTANCE	The slider determines the distance between 2 edges			
POINT-TO-POINT	Measures the distance between 2 contour patterns, 2 circles or mixed points			
POINT-TO-LINE	Measures the distance between a point (from blob, contour pattern, circle or edge) and a line/edge			

UPDATE ID: Localize, read and count 1D, 2D and DPM codes +

LOCALIZATION	Finds a code within the defined search field and serves as a guide for subsequent tools. Efficient for label fit check			
READING	Decodes all codes and can evaluate the content using different criteria (regular expressions)			
COUNTING	Enables multiple recognition of different codes			

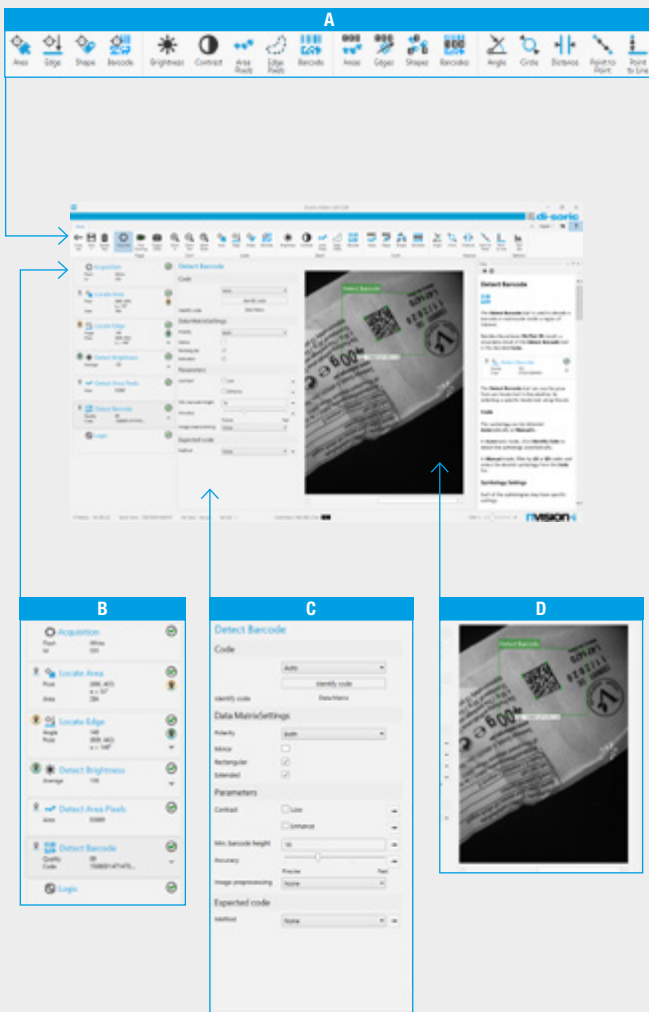
UPDATE ID PRO: Read hard-to-read DPM codes on difficult surfaces +

READ DPM CODES	The upgrade enables high-performance reading of hard-to-read directly marked codes on difficult surfaces and code grading			
-----------------------	---	--	--	--

USER INTERFACE

Structure of the user interface

The CS-60 user interface is made up of 4 areas. The navigation bar in the upper area is for instructions and setup. The verification tools contained here are divided into 4 groups. Double-click on one of these tools to insert it in the area on the left, the so-called Pipeline. Configuration and parameterization of the selected tools can be performed in the area in the middle. Finally, on the right side there is an even larger field in which the image and the drawing tools are displayed.



A Navigation bar & verification tools:

- Intuitive and user-friendly navigation menu.
- Contextual help can be displayed as needed.
- Menu guidance available in 4 languages.

B Pipeline & status checks:

- Verification tools can be inserted here via drag & drop. Measured values and test results/status are shown here.

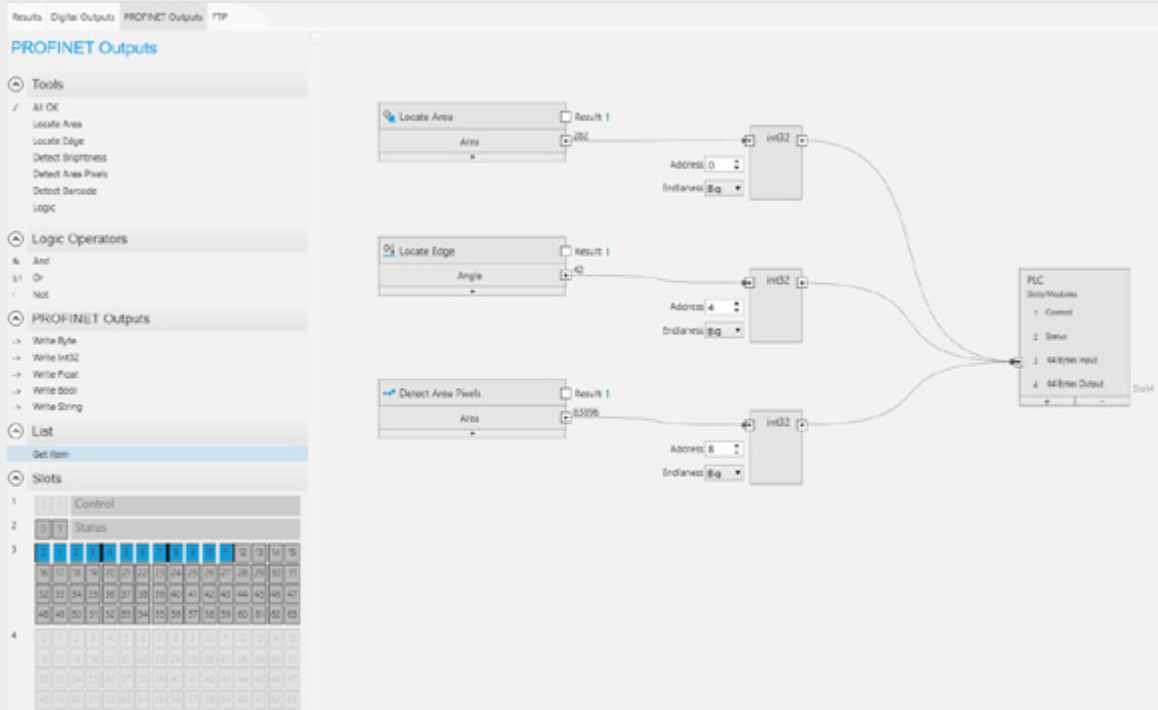
C Configuration:

- Parameters for search criteria can be adjusted simply and directly.
- Limit values for the evaluation criteria can be entered easily.

D Display & Drawing tools:

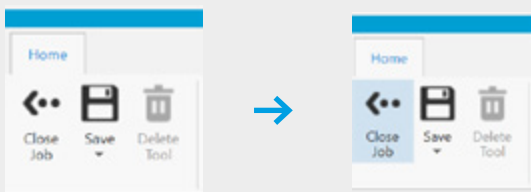
- Image viewing for checking and analysis during operation.

Communication with higher-level control systems



At the end of editing, the results can be summarized and transmitted to the higher-level control system using the options in the Logic area.

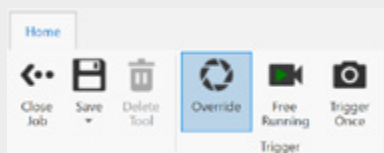
Saving the job



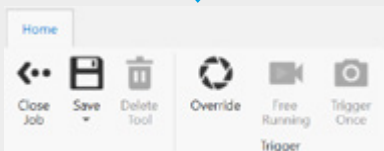
Save the job in the flash memory of the sensor by clicking “Save job.” Return to the starting view with “Close job.”

Executing the job

Editing state



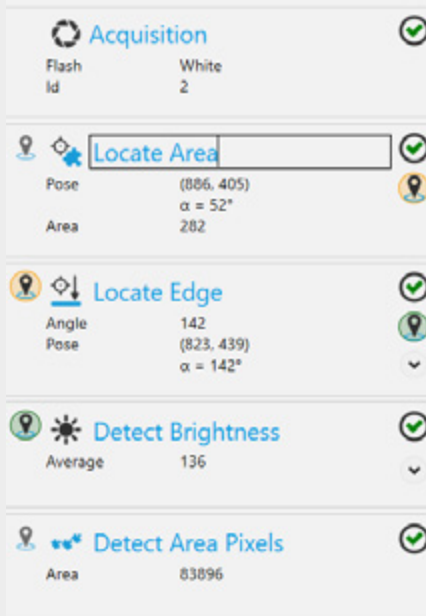
Online state



Select “Override” to execute a job. Now the sensor is active and ready to communicate with the higher-level control.

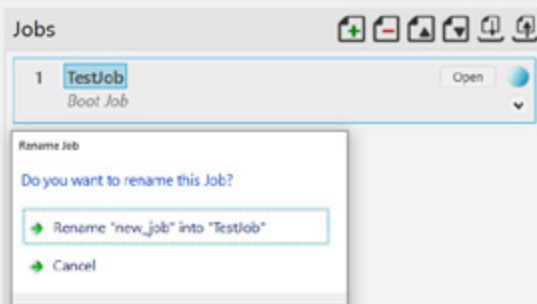
APPENDICES

Renaming verification tools



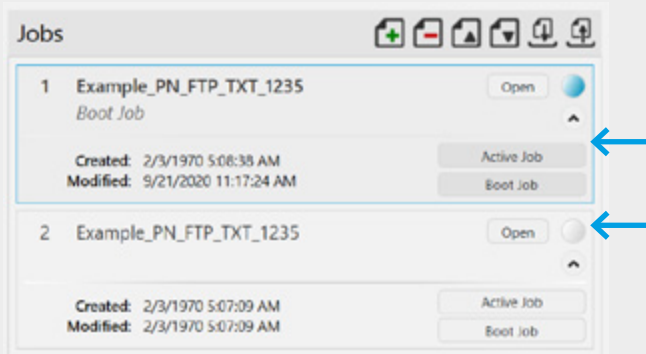
Click on the name field to select and rename it.

Renaming a job name



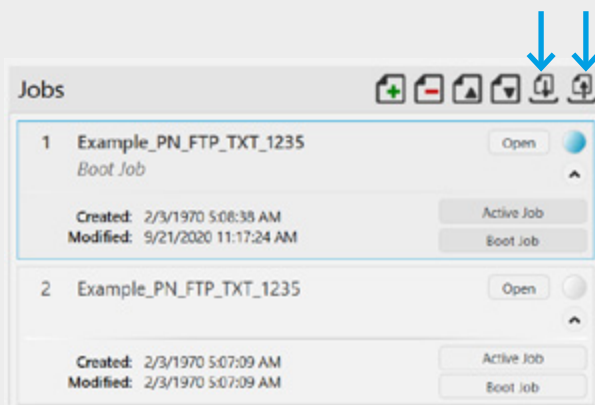
To do this, click on the corresponding name field and rename it.

Setting a boot job



First click on the arrow and then on “Boot job.”

Importing and exporting the job



Click on the corresponding arrow.

CS-60 VISION SENSOR

TECHNICAL DATA



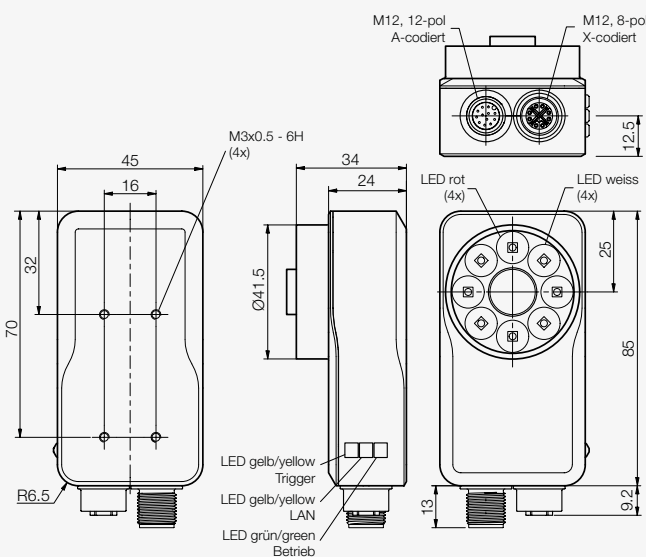
- Compact and high-performance
- High power LED illumination in red and white
- Flexible and high-performance software
- Parameter changes during production
- Easy & intuitive
- Flexible working distances of 50 - 1,500 mm by changing lenses.
- Upgrade option: Measure & read 1D and 2D codes.
- Customization option



Enclosure Type 1 Supply Class 2

NFPA79 Applications only.
For Adapters providing field wiring means refer to product information or customer support.

Design / connection information



12-pol A-codiert		
1	SPS_IN0	7 +UB
2	SPS_IN1	8 GND
3	SPS_OUT_2	9 NC
4	SPS_OUT_3	10 Trigger IN
5	RESET / READY	11 SPS_OUT_0
6	COMMON INTERFACE	12 SPS_OUT_1

8-pol X-codiert		
1	LAN A+	5 LAN D+
2	LAN A-	6 LAN D-
3	LAN B+	7 LAN C-
4	LAN B-	8 LAN C+



WARNING! Not a safety component pursuant to 2006/42/EG and EN 61496-1/-2! May not be used for personal protection! Non-compliance can lead to death or serious injuries! Only use as directed!

Software requirements

The nVision-i software can be run on the following operating systems:

- -Microsoft Windows 7 (64-bit), SP1
- -Microsoft Windows 10 (64-bit)

Minimum computer requirements:

- Intel® Core™ i3 Processor @1.6GHz
- 2GB RAM (Windows 7 SP1 / Windows 7 Embedded Standard SP1)
- 3GB hard drive space
- 32-bit color display, 1366x768 or 1280x960
- 4.0 Windows Experience Index (particularly for graphics)
- 1 USB 2.0 port and 1 network port

Recommended computer requirements:

- Intel® Core™ i7 Processor @ 2.0GHz
- Internet Explorer 11 / Google Chrome
- 8GB RAM (Windows 7 SP1)
- 10GB of hard drive space
- 32-bit color display, 1920 x 1080
- 5.0 or greater Windows Experience Index
- 1 USB 2.0 port and 1 Gigabit Network port (Intel Chipset recommended)



CS60- BM28-EP15/300	CS60- BM28-EP15/300ID	CS60- BM28-EP15/400	CS60- BM28-EP15/400ID	CS60- BM38-EP15/300	CS60- BM38-EP15/300ID	CS60- BM38-EP15/400	CS60- BM38-EP15/400ID
------------------------	--------------------------	------------------------	--------------------------	------------------------	--------------------------	------------------------	--------------------------

Image processing tools

■ Localization	■	■	■	■	■	■	■
■ Part recognition	■	■	■	■	■	■	■
■ Counting	■	■	■	■	■	■	■
■ Measuring			■	■		■	■
■ ID (Reading 1D/2D/DPM codes)		■		■		■	■

Upgrade modules:

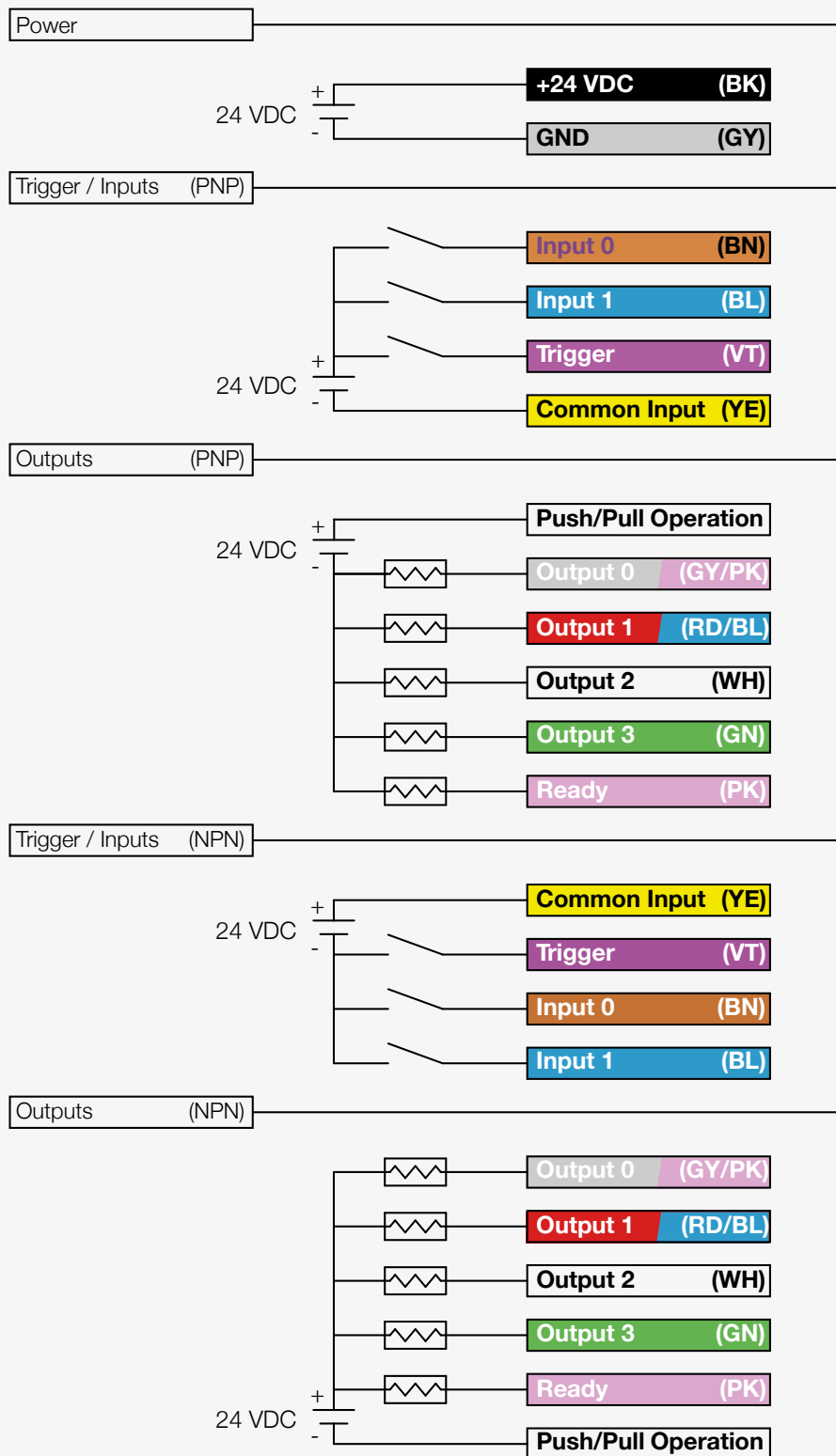
■ Measurement	■	■			■	■	
■ ID (Reading 1D/2D/DPM codes)	■		■		■		■
■ ID Pro (ID-Upgrade*) * Read hard-to-recognize DPM codes * Code grading based on ISO 15415	■	■	■	■	■	■	■
■ Customization * Customization of the software to requirements / corporate design	■	■	■	■	■	■	■

Resolution	736 (H) x 480 (V)	1440 (H) x 1080 (V)
Pixel size (µm)	4.5 x 4.5	3.45 x 3.45
Shutter	global	global
Max. image frequency (fps)	30	30

Scope of delivery	CS-60 Vision Sensor, lens O-S1-S-080-40, lens cover CS60-Window
Housing dimensions H/W/D	85 / 45 / 34 mm
Service voltage	18...30 VDC
Working distance	1 Vision Sensor with S-mount - 4 lenses: 50 – 1500 mm
Focal length	Variable - S-mount: 3.6, 8, 16, 25 mm
Internal lighting	Switchable integrated illumination: High Power red, High Power white
Storage / number of jobs	16 GB / to 255
Focusing	Variable focus with aperture 4 and 8
Interfaces & protocols	Digital I/O, TCP/IP, Profinet, Ethernet/IP (from nVision-i Release 24.1)
Digital inputs / outputs	2 + 1 external trigger / 4 + 1 ready signal
Image storage	Via FTP / manually in the software
Protection class	IP67

* The ID upgrade ID Pro is only possible on the basis of an existing ID license.

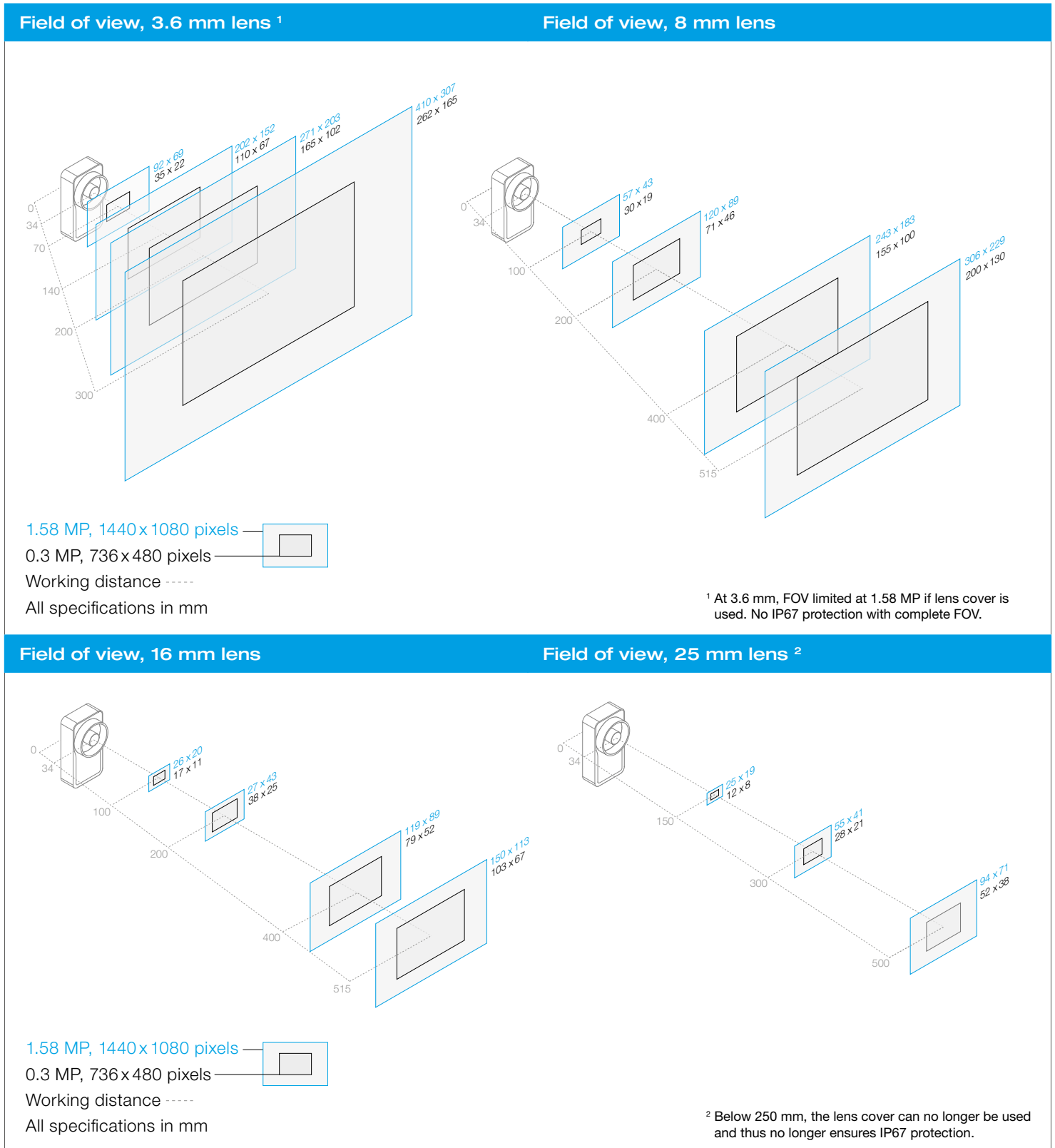
DIO connection



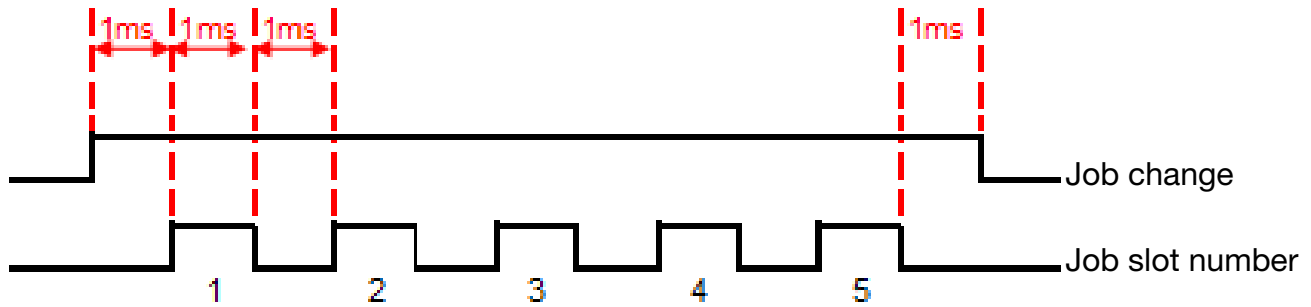
FIELDS OF VIEW

CS-60

The following table shows the representation of fields of view with the available lenses at various working distances for the CS-60 with 736 x 480 pixels (0.3 MP) and 440 x 1080 pixels (1.58 MP). Working distance: Back edge sensor to worktop. Depth of sensor: 34 mm.



Change job when using the inputs



To do this, use the inputs 0 and 1. The PLC sets a high signal to the line 0 “Change job” and then sends a series of impulses (1 ms hold time) to line 1 “Job selection.” The number of impulses then corresponds to the job number, e.g. 5 impulses = job number 5. After the 5th impulse and a wait time (Low side) of 2 ms, the signal to line 0 is then canceled (Low side).

HMI recommendation

The nVision-i software comes pre-installed on the following Windows-based panels upon delivery. This enables a complete set-up of the CS-60 family as well as visualization via commonly used browsers such as Google Chrome, Firefox or Edge.

ARCHMI-912ARH74600-DIC	(12 inch, resistive display)
ARCHMI-912APH74600-DIC	(12 inch, capacitive display)
ARCHMI-915ARH74600-DIC	(15 inch, resistive display)
ARCHMI-915APH74600-DIC	(12 inch, capacitive display)

The following panels can only be used for visualization purposes via an automation browser. Android 10 is used as the operating system. The following types are available for selection:

JWS101-A210-3288432KY-A	(10 inch, capacitive display, automation browser, Android 10.0)
JWS121-A210-3288432KY-A	(12 inch, capacitive display, automation browser, Android 10.0)
JWS121-A210-3288432KY-A	(15 inch, capacitive display, automation browser, Android 10.0)

For information about prices and delivery times, please contact the company Wachendorff directly via the following contact info:

Andreas Weible, Head of D-South-West sales region

Mobile: +49 (0) 1 51 / 180 118 45

Tel.: +49 (0) 71 25 / 9698 847

E-mail: awe@wachendorff.de

SOLUTIONS. CLEVER. PRACTICAL.

di-soric Headquarters

Germany: di-soric GmbH & Co. KG | Steinbeisstrasse 6 | 73660 Urbach
Phone +49 71 81 98 79-0 | Fax +49 71 81 98 79-179 | info@di-soric.com

di-soric Subsidiaries

Austria: di-soric GmbH & Co. KG | Phone +43 7228 72 366 | info.at@di-soric.com

China: di-soric Industrial Automation (Suzhou) Co. Ltd. | Phone +86 199 5127 5458 | info@di-soric.cn

France: di-soric SAS | Phone +33 476 61 65 90 | info.fr@di-soric.com

Singapore: di-soric Pte. Ltd. | Phone +65 6694 7866 | info.sg@di-soric.com

The Netherlands: di-soric B.V. | Phone +31 413 33 13 91 | info.nl@di-soric.com

For further information visit www.di-soric.com/international

www.di-soric.com