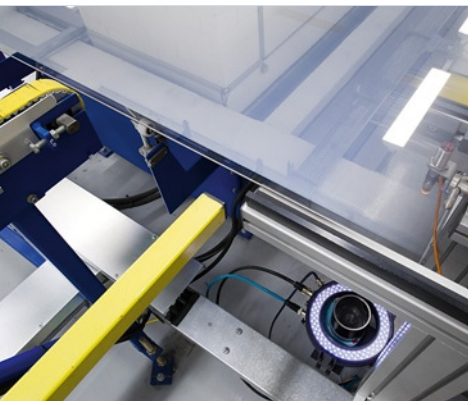
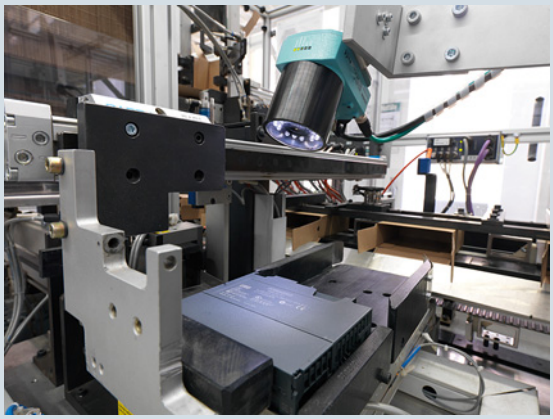


Overview



Optical readers – Reading and verification of 1D/2D codes

For state-of-the-art production systems, tracing products and parts with machine-readable identification is a central requirement. A unique coding system permits the planning and implementation of each and every step of production for every part manufactured as well as changes within the production process or in the materials used. Direct marking of products also allows the implementation of specified legal requirements for tracing production batches throughout the production system.

What is direct part marking (DPM)?

Direct part marking (DPM) is the application of a mark directly on the surface of a product without the use of a separate carrier material, such as an adhesive label. This makes it possible to identify products in production and trace them after delivery as well.

With so-called 2D codes a coding method is available that meets these user requirements. 2D codes consist of easy to implement, point-shaped basic elements. Laser and needle marking technologies are outstanding with regard to durability, marking speed and material independence. Despite mechanical deformations, e.g. with metallic work pieces, the 2D codes can still be read using 2D readers even after multiple processing steps. 2D codes also provide the advantage of being able to encode data in more limited spaces than comparable barcodes or plain text.

Benefits

get Designed for Industry

- Clear identification of products and product parts
- Marking in accordance with international standards (e.g. ISO 29158).
- Direct part marking is the key technology for tracing products - low-cost, undetachable, and almost indestructible.
- Flexible and economic solutions thanks to the complete and scalable portfolio of powerful stationary optical readers.
- Simplified engineering, commissioning, diagnostics and maintenance through seamless integration into Totally Integrated Automation (TIA):
  - Integrated bus connection to an automation system, such as SIMATIC, SIMOTION or SINUMERIK via communication modules with PROFIBUS and PROFINET.
  - Easy S7 software integration based on ready-to-use function blocks.
  - Extensive status and diagnostic functions.
- Greater security of investment due to support of all standard matrix and barcodes.
- Openness due to connection possibilities to different bus systems from different manufacturers and PC environments via communication modules.

Integration

The product range of optical reading devices from Siemens

Stationary optical readers

Stationary optical SIMATIC MV440 and MV420 readers

The high-performance stationary optical readers are small, user-friendly devices for reading applications. The devices read various two-dimensional (2D) codes as well as one-dimensional (1D) barcodes. Optionally, function packages can be added to all SIMATIC MV440 devices using SIMATIC License Manager licenses. The following licenses are available for function expansion:

- Veri-Genius for measuring the marking quality
- Text-Genius for text recognition and
- Pat-Genius for object recognition

These optional function extensions can be selected and combined as required.

Optical handheld reading devices

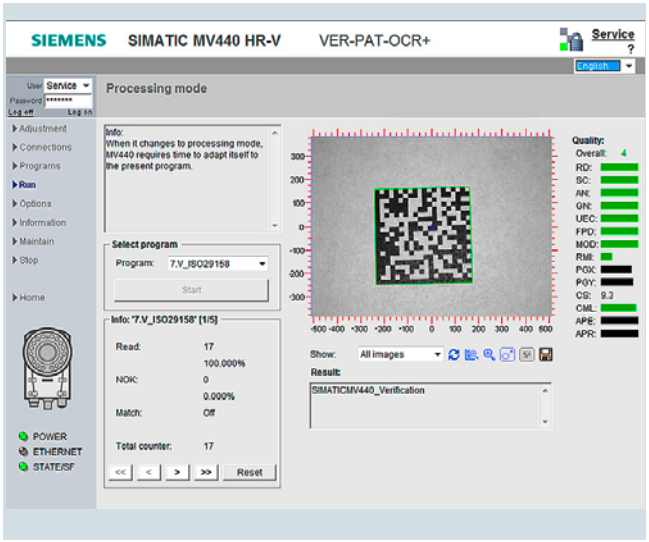
SIMATIC MV320 optical handheld reading device

SIMATIC MV325 optical handheld reading device

SIMATIC MV340 optical handheld reader

The high-performance, high-resolution handheld readers are suitable for either two-dimensional (2D) data matrix codes and/or one-dimensional (1D) bar codes. The devices can communicate with a host computer via RS232, USB or Bluetooth, depending on the selected model.

Verification systems

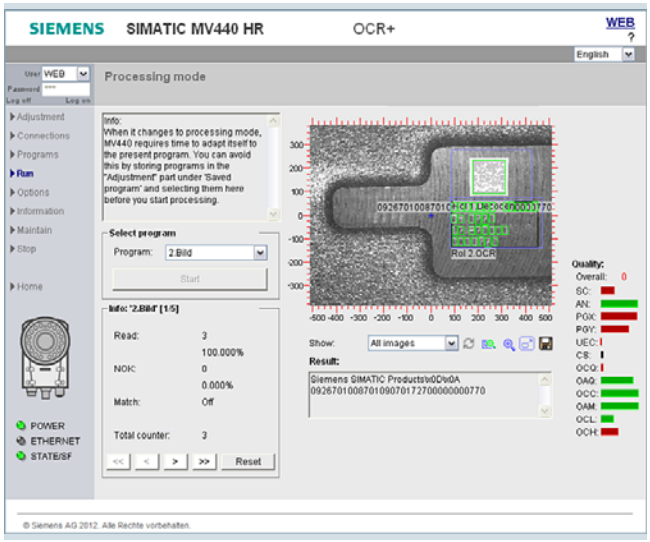


Graphical representation of the marking quality (verification) in the user interface

By using verification systems, the readability of marks is guaranteed throughout the entire production process, regardless of any possible contamination or when using different readers. Moreover, the marking can continue to be read after the production process throughout the lifespan of the product.

In addition to reading 1D barcodes and 2D matrix codes, SIMATIC MV440 can be expanded at any time with verification functionality using the "Veri-Genius" verification license. The license is supplied as a "Single License" on a USB stick and can be copied to the SIMATIC MV440 with the SIMATIC Automation License Manager (ALM) using a plug-in. The license is executable on any SIMATIC MV440 as of firmware version 4.0.

Optical character recognition



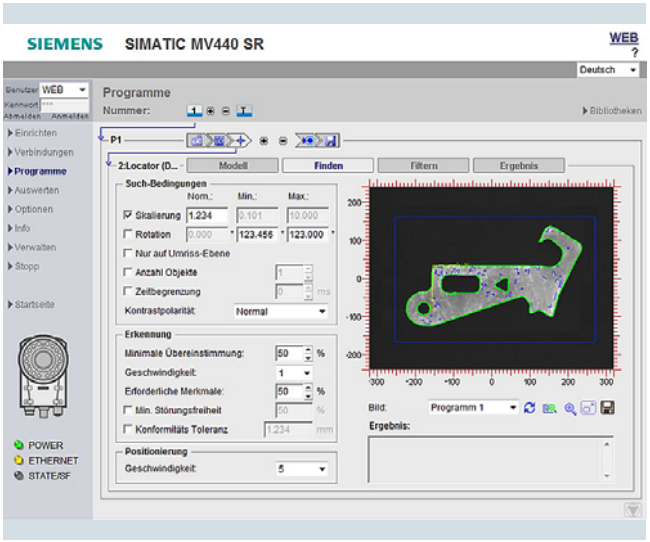
SIMATIC MV440 HR OCR

With the "Text-Genius" OCR license, SIMATIC MV440 can also be used for optical character recognition (OCR) in addition to reading 1D barcodes and 2D matrix codes. It is also possible to read and compare plain text and machine-readable code in the same image field.

Text recognition is available in two versions. "Text-Genius" is the text recognition version that is supplied ready-to-use for a specified character set (e.g. Polyfont). The "Text-Genius Plus" version is available for any character sets and project-specific character sets. In this version, the recognition can be adapted to numerous character sets and print images by means of project-specific training. Both text recognition licenses include the functionality of "PAT-Genius" for preparing (e.g. searching for the label position) text recognition.

The licenses are supplied as a "Single License" on a USB stick and can be copied to the device with the SIMATIC Automation License Manager (ALM) using a plug-in. The "Text-Genius" license is executable on any SIMATIC MV440 from firmware version 3.0 - the "Text-Genius Plus" license on any SIMATIC MV440 from firmware version 5.0

Object detection



Object recognition with Pat-Genius

With the "Pat Genius" object recognition license, SIMATIC MV440 can also be used for object recognition (object classification, position detection, counting, etc.) in addition to reading 1D barcodes and 2D matrix codes. In addition, the functionality is possible in combination with text recognition, for example, thus enabling position control of a label and control of the labeling (reading and comparison) of plain text in an image field.

The license is supplied as a "Single License" on a USB stick and can be copied to the device with the SIMATIC Automation License Manager (ALM) using a plug-in. The license is executable on any SIMATIC MV440 firmware version 6.0 or higher.

Overview

The stationary optical code readers read various two-dimensional (2D) codes as well as one-dimensional (1D) barcodes. SIMATIC MV440 also features additional functions for measuring the marking quality (verification) for process control purposes, and for text recognition (optical character recognition, OCR) and object detection. All devices can be easily and flexibly integrated into the automation system thanks to standardized, industry-compatible interfaces and function blocks.

SIMATIC MV420

The SIMATIC MV420 series is particularly suitable for close-up to mid-range reading distances (approx. 10 mm to 400 mm).

The SIMATIC MV420 is an optical reader that has been specially designed for detecting and evaluating a variety of machine readable codes in the packaging industry (e.g. F&B, pharmaceuticals and tobacco) and industrial production (e.g. automotive, electronics and solar). The list of readable codes includes all standard matrix codes and barcodes which can be reliably detected - mostly independent of the printing technology applied and carrier medium used. One key feature of the unit is its ability to read data matrix codes (DMC). The SIMATIC MV420 device family is flexible, reliable and easy to use.

Besides this, two different lenses are available for the SIMATIC MV420 which can be adjusted to the required reading distances. In addition, various powerful integrated illumination systems are available. The models can be ordered as preconfigured or freely combinable. The particularly compact enclosures have the high degree of protection IP67.

SIMATIC MV440

The SIMATIC MV440 is an optical reader designed specifically for the recognition and evaluation of numerous machine-readable codes in industrial production. The SIMATIC MV440 device family is characterized by very high reading reliability, high-speed reading and flexible process interfacing. The product is also robust, has a high degree of protection, and is easy to use. The professional decoding software is suitable for almost all types of marking, especially sophisticated "direct part marking", on a wide range of different carrier materials.

With the "Veri-Genius" verification license, the optical MV440 readers are able to verify the marking quality of codes in accordance with the applicable standards. The device determines the quality of the applied code and helps you ensure the readability using the following process steps. Verification can be performed simultaneously with the other functions, e.g. reading of 1D and 2D codes.

With the "Text-Genius / Text-Genius Plus" text recognition licenses, the optical MV440 readers can be used for text recognition (OCR optical character recognition). Text recognition can be performed simultaneously with the other functions, e.g. reading of 1D and 2D codes.

With the "Pat-Genius" object recognition license, object recognition, position detection, presence checks, completeness checks and text recognition (contour-based) are all possible. Object recognition can also be combined with the other functions.

Major differences

Optical readers	SIMATIC MV420	SIMATIC MV440
		
Housing	Extremely compact design, IP67	Compact design, IP67
Sensor / resolution	CMOS 640 x 480 pixels 752 x 480 pixels	CCD 640 x 480 pixels 1 024 x 768 pixels 1 600 x 1 200 pixels
Lens system	Freely selectable lenses (M12) Lens selection: http://www.siemens.com/tia-selection-tool	Freely selectable lenses due to C-Mount lens connection Lens selection http://www.siemens.com/tia-selection-tool
Lighting	Integrated lighting	Integrated or external lighting
Commissioning and operation	• Integrated web server • Auto-optimizing of parameters • Languages: English / German / French / Italian / Spanish / Chinese	• Integrated web server • Auto-optimizing of parameters • Languages: English / German / French / Italian / Spanish / Chinese
Communication	• PROFIBUS (via communication module; M16) • PROFINET (on-board M12 or via communication module, various interfaces) • Ethernet (onboard, M12) • RS232 (onboard, M16)	• PROFIBUS (via communication module, M12) • PROFINET (on-board M12 or via communication module, various interfaces) • Ethernet (onboard, M12) • RS232 (onboard, M16)
Digital inputs/outputs	• 1 trigger • 1 strobe • 2 programmable inputs/outputs	• 1 trigger • 1 strobe • 4 programmable inputs/outputs
Optical character recognition	–	• Polyfont (can be used without training) • Freely trainable fonts
Object detection	–	• Objects/shapes are freely trainable
Verification	–	• ISO/IEC 29159:2011 (previously: AIM DPM-1-2006) • ISO/IEC 16022:2000 • ISO/IEC 15415:2004 • AS9132 Rev A, 2005 • ISO/IEC 15416:2000 • ANSI X3.182-1990

Application

- Automotive industry
  - Needle punched markings on various automotive power train components (cylinder heads, cylinder blocks, manifolds, etc.)
  - Laser markings on various automotive power train components (camshafts, crankshafts, pistons, connecting rods, transmission components, etc.)
  - Laser markings on electronic components, printed circuit boards, or enclosures
- Packaging (e.g. pharmaceutical, F&B and tobacco industries)
  - Printed or laser markings on folded boxes, plastic containers, etc.
  - Reading through transparent foil packaging
- Aerospace industry
  - Needle punched markings on gas turbine blades
  - Needle punched markings on various aluminum components of propulsion units
- Medical equipment
  - Laser markings on pacemakers and other implantable devices
  - Laser markings on various medical devices and drugs
- Electronics
  - Laser markings on ESD sensitive hard drive components or even on printed labels
- Semiconductor
  - Laser markings on rigid and flexible circuit boards
  - Laser markings on packaged semiconductor devices, heat sinks or heat dissipators

Integration

The SIMATIC MV420/440 readers have industry-standard PROFINET and communication module interfaces on the device. In addition, communications interfaces such as Ethernet and RS232 are directly available on the device.

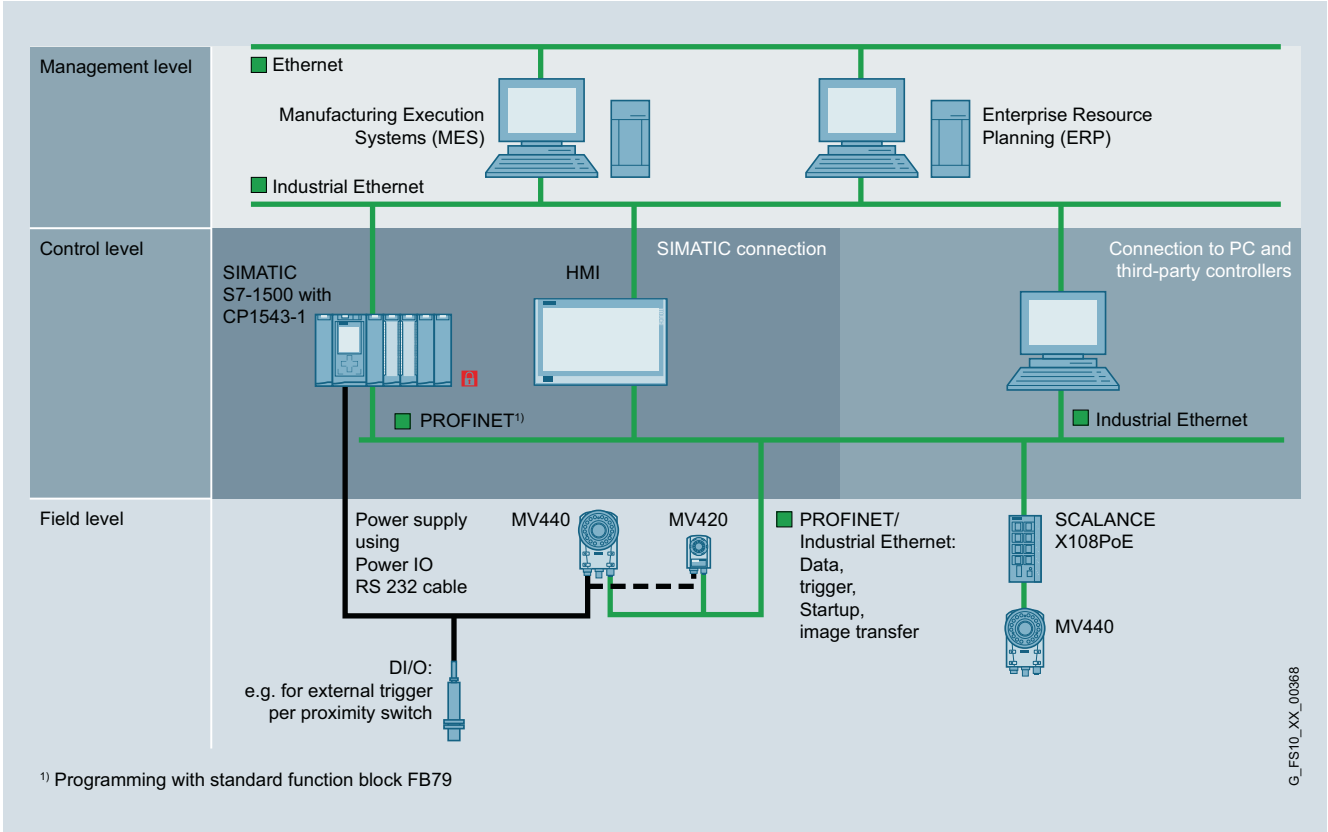
Via the specified interfaces, the following communication services can be used:

Usable communication services	Interface
PROFINET IO (FB 79)	Onboard MV400 PROFINET interface.
PROFINET IO (FB 101, Ident profile)	Onboard MV400 PROFINET interface.
PROFINET IO (FB 45, FB 101, Ident profile)	Via communication module interface, with communication module RF180C.
Ethernet/IP	Via communication module interface, with communication module RFID 181EIP.
PROFIBUS DP V0/1 (FB 45, Ident profile)	Via communication module interface, with communication module ASM 456.
TCP/IP (HTTP, ASCII)	Onboard MV400 PROFINET interface.
RS232 (ASCII)	Onboard MV400 RS232 interface.
SIMATIC S7-1200, S7-300, ET 200pro	Via communication module interface, with communication module RF120C, RF170C, ASM 475.

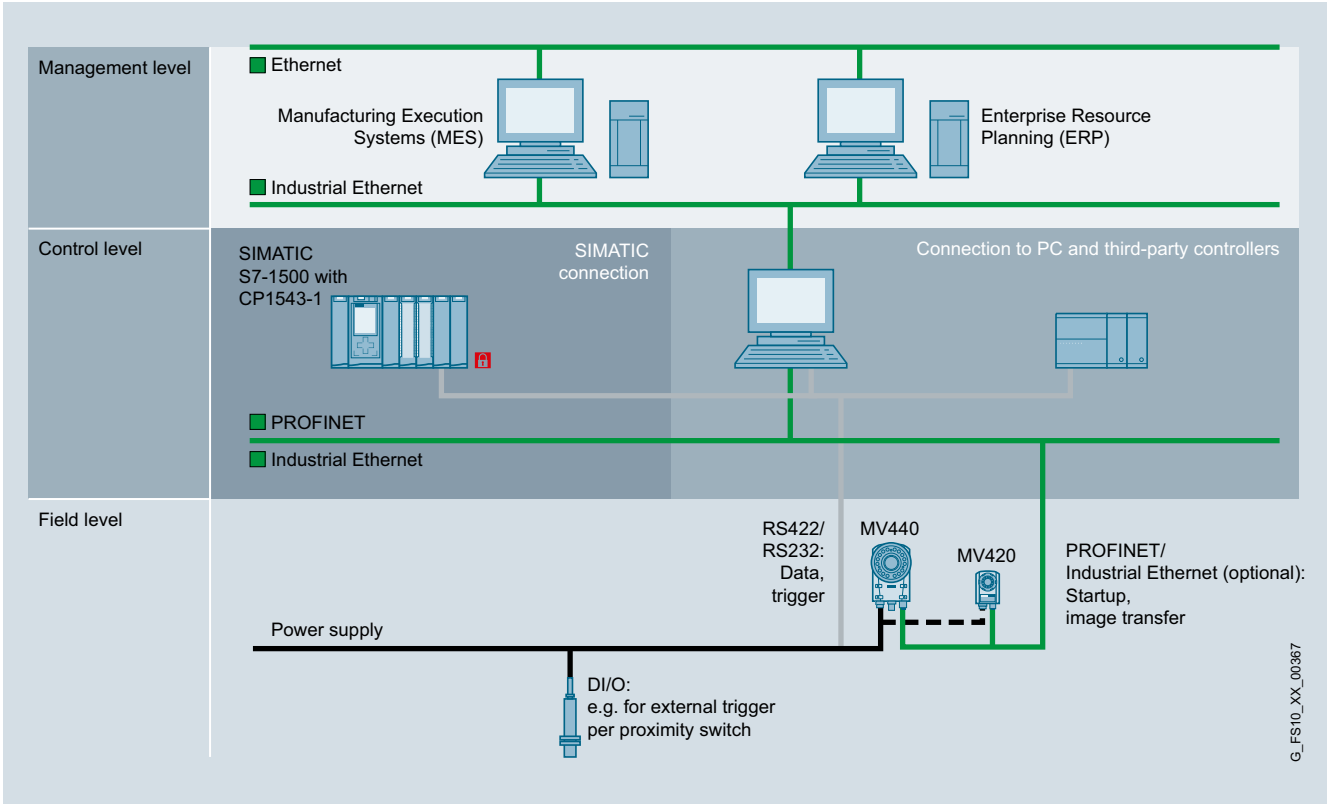
The preferred connection of the SIMATIC MV420/440 readers in the SIMATIC environment is the onboard PROFINET interface. The standard function block "Ident Profile" (FB 101) is available for this interface. This type of connection is a component of the device library of SIMATIC TIA Portal, Version 13 SP1 or higher, and is compatible for the connection of communication modules.

Furthermore, the SIMATIC MV420/440 readers are compatible with the predecessor products SIMATIC VS130-2. For this purpose, the onboard PROFINET interface is released for use with function block FB 79.

A separate function block called "LDrivers MV4X0" is available for the connection to SIMOTION systems. You will find additional information on the topic of LDrivers MV4x0 under: http://support.automation.siemens.com/WW/view/en/67385474



Integration of SIMATIC MV420/MV440 with a direct connection to PROFINET or Ethernet, with/without PoE (PLC and HMI via Profinet/Ethernet; trigger via DI)



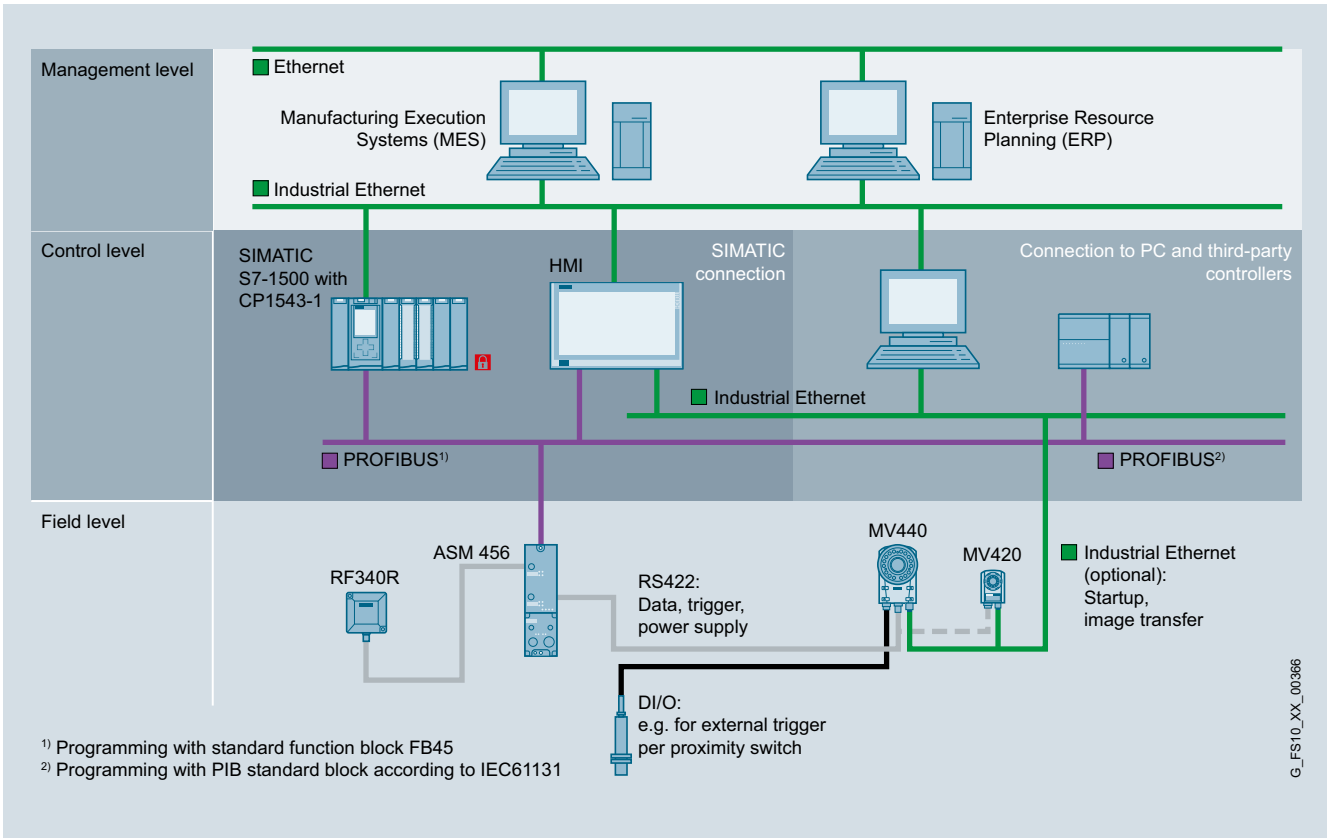
Integration of SIMATIC MV420/MV440 with connection via RS232 (PLC via RS232; trigger via DI; HMI via Ethernet)

Via the onboard communication module interface, all communication modules can be used, e.g. for the PROFIBUS connection. The communication module interface is compatible with all available communication modules both electrically and with regard to protocol. The connection via a communication module therefore makes it possible to switch between optical code readers and RFID readers, simply by reconnection. The PLC programming is performed with the aid of function blocks that are available for SIMATIC and SIMOTION.

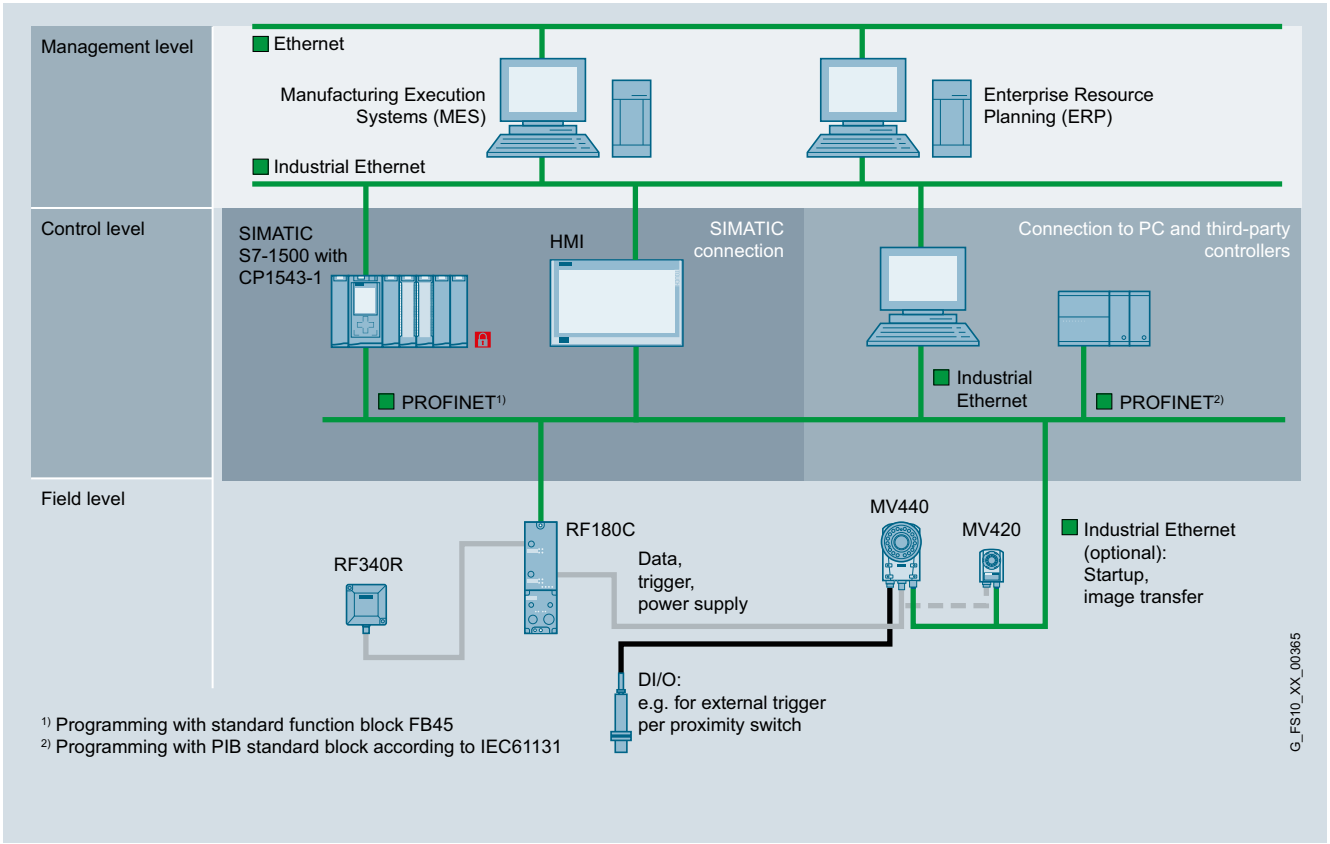
A frequently applied integration method is the connection of the SIMATIC MV420/440 readers to the controller (e.g. transmission of the read results) via communication modules. The onboard PROFINET interface is thus available for a separate connection to HMI or a control center.

The advantage of connecting SIMATIC MV420/440 to a communication module is that a wide variety of PLC types and fieldbus systems can be connected. Furthermore, with the communication modules, the complete range of cables of these modules is available. For details on this, see chapter 5 "Communication modules".

Introduction

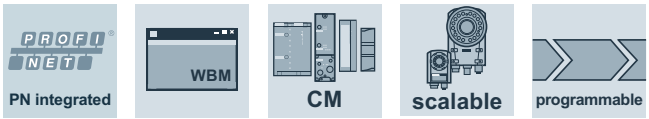


Integration of SIMATIC MV420/MV440 by means of the ASM 456 communication module (PLC via Profibus; HMI via Ethernet)



Integration of SIMATIC MV420/MV440 by means of the SIMATIC RF180C communication module (PLC via Profinet; HMI via Ethernet; trigger via DI or RS422)

Overview



The SIMATIC MV420 is a particularly compact optical reader and is suitable for close-up to mid-range reading distances (approx. 10 mm to 400 mm).

The optical SIMATIC MV420 reader has been specifically designed for detecting and evaluating a variety of machine readable codes in the packaging industry (e.g. F&B, pharmaceuticals, and tobacco) and industrial production (e.g. automotive, electronics, and solar). The list of readable codes includes all standard matrix codes and barcodes which can be reliably detected - mostly independent of the printing technology applied and carrier medium used. One key feature of the unit is its ability to read data matrix codes (DMC). The SIMATIC MV420 device family is flexible, reliable and easy to use.

Highlights at a glance:

- Compact design with IP67 degree of protection.
- Variety of lenses with variable reading distances.
- Integrated high-performance lighting.
- Web server technology: a normal Web browser is sufficient for parameter assignment.
- Interfaces: Ethernet, PROFINET, RS232, DI/DO, and direct connection to RFID communication modules (ASM).
- Exceptionally high reading speeds, depending on the model.

Further important product characteristics are:

- Excellent read algorithms based on many years of experience in the development and production of optical readers for industrial applications.
- No special knowledge required for reliable parameterization of reading features. Parameterization usually unnecessary, and is only required for difficult to read codes. "Setup" is performed automatically by presenting a readable code pattern.
- Code quality evaluation: Displays the key quality parameters of the code to be read.
- Customized user interface can be easily generated with SIMATIC WinCC flexible/WinCC.
- Web-based user interface; can run on a variety of platforms meeting the following requirements: Internet browser (IE 6.0 or higher), JAVA-VM (MS, SUN).
- Password protected user interface with integrated access rights administration.
- Web-based user interface available for easy integration with an HMI device. The browser and JAVA VM requirements previously mentioned also apply in this case.
- 6 language versions (operator interface, manual and online help are each available in German, English, French, Spanish, Italian, and Chinese).

In addition, SIMATIC MV420 SR-P offers the following highlights:

- Autotrigger mode: Automatic detection of a code without an external trigger signal.
  - Savings in sensor technology and cabling.
  - Reduced potential for error as there are fewer components.
  - Solution for applications where proximity switches and light barriers cannot be used
- Open Web API interface for comfortable creation of customized applications and PC-based camera remote control
- Multicode: reads multiple codes in one step within the same field of view.
  - ID-Genius: A high-performance code reading algorithm for poorly legible directly marked data matrix codes (DPM: direct part marking).

Application

Key features of the SIMATIC MV420:

- Reading of 1D and 2D codes
- Comparing the read result with a preset value
- Formatting of read results for further use.

The range of application for the SIMATIC MV420 product family extends to practically all areas of industrial production. The possibilities for use range from identification of stationary parts to fast moving parts on conveyor systems. The powerful integrated lighting allows a very compact design. Due to its high degree of protection (IP67), the device is protected against environmental influences. The optical SIMATIC MV420 reader is therefore suitable for all industrial applications, including direct part marking (DPM). In addition to industrial production, the compact design and flexibility of the optical SIMATIC MV420 reader also make it optimally suitable for the packaging industry (such as for the food and beverage, pharmaceutical and tobacco industries).

The optical readers of the MV420 series include all common communications interfaces, such as Ethernet or PROFINET, and can therefore be connected to a wide variety of systems. An integrated RS422 interface makes it possible to use all of the RFID communication modules, such those required for the PROFIBUS connection. The combination of optical reader and RFID reader is also possible on one communication module.

The reading devices are particularly easy to use and commission despite the wide variety of options for use. Parameters are automatically configured for most applications. If recalibration is required, however, parameter assignment can be carried out conveniently using an Internet browser on the integrated Web server without the need for pre-installed software.

SIMATIC MV420

Due to the properties and functions described, the emphasis for MV420 is on the following sectors and applications:

- Automotive industry:
  - Needle markings on various drive components (DPM), e.g. cylinder heads, cylinder blocks, manifolds.
  - Laser markings on various power train components (DPM), e.g. camshafts, crankshafts, cylinder piston, connecting rods, gearbox components.
  - Laser markings on electronic components, printed circuit boards, or enclosures.
- Pharmaceutical industry, food industry (F&B), tobacco industry:
  - Printed or laser markings on drugs (DPM, OCR/OCV).
  - Recording the contents of cartons (up to 150 codes).
  - Read portal by linking several cameras.
- Aerospace industry:
  - Needle or laser markings on gas turbine blades (DPM).
  - Needle or laser markings on jet engine components (DPM).
- Medical equipment:
  - Laser markings on heart pacemakers and other implants (DPM).
  - Laser markings on medical devices (DPM).
- Electronics:
  - Needle or laser markings on hard disk components.
  - Laser or etched markings on hard disk components (DPM)
- Semiconductors:
  - Laser markings on rigid and flexible circuit boards (DPM).
  - Laser markings on enclosed semiconductor components, heat sinks or heat exchangers (DPM).

More information is available in the accompanying manual.

Design

SIMATIC MV420 is a particularly compact code reader. The device can be assembled from individual components or ordered as a prefabricated unit. The MV420 is available in two versions:

- Basic model: SIMATIC MV420 SR-B
- Performance model: SIMATIC MV420 SR-P

For the individually configurable models the following individual components are available in addition to the basic units (body):

- Lenses
- Ring lights

The basic units include the protective barrel for the lens.

The preconfigured models include an integrated lens (6 mm, aperture 5.6) and a red ring light including protective barrel.

The following accessories are available for the connection and installation:

- Flexible mounting angle
- Power DIO RS232 cable (M16 connector on open end)
- M12 Ethernet cable (varying lengths)
- Ethernet cable (M12 to RJ45) for commissioning/lab operation (various lengths)
- Special communication module cable for M16 connector (M16 to M12) for connecting to RFID communication modules (ASM). Can be expanded using standard communication module cables, if required.
- Plug-in power supply for demonstration and lab operation (for office environment only)
- CD with installation/operating instructions (supplied with unit)

Further information can be found in the supplied manual.

Function

Key functions of the SIMATIC MV420:

- Reading of 1D and 2D codes
  (see "Overview" and "Area of application")
- Formatting of read results for further use and/or comparison
- Comparing the read result with a preset value
  - Default setting of the comparison string via one of the serial interfaces (PROFINET (ASM and onboard), PROFIBUS (communication module), RS232).
  - Comparison of the formatted read results with the comparison string
- Individual specification possible with FB 45 per read operation

The functions can be used individually or they can be combined.

The SIMATIC MV420 reads the following codes:

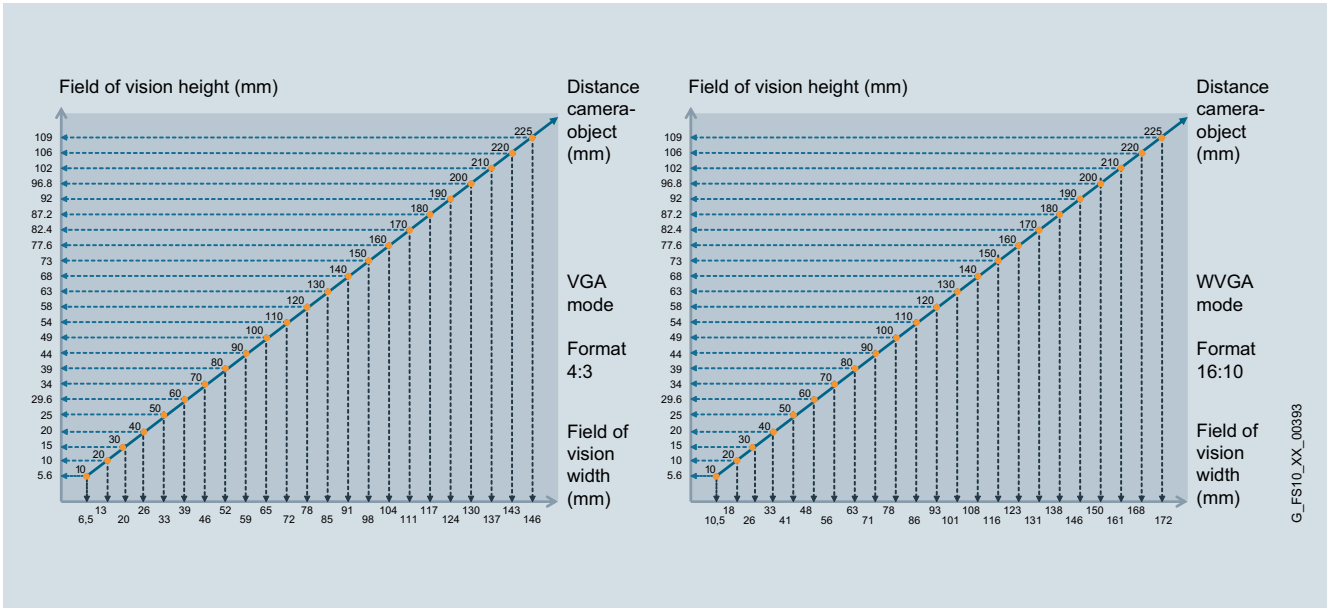
- 1D codes (barcodes):
  - Int. 2/5 (no checksum)
  - Int. 2/5+CS (checksum included)
  - Code 128
  - Code 39 (no checksum)
  - Code 39+CS (checksum included)
  - EAN 13
  - EAN 8
  - UPC-A
  - UPC-E
  - GS1 Databar 14
  - GS1 Databar Stacked
  - GS1 Databar Limited
  - GS1 Databar Expanded
- 2D codes:
  - DMC
  - PDF417
  - QR
  - DotCode
  - Vericode

The SIMATIC MV420 reads codes on many different components and surfaces, e.g.:

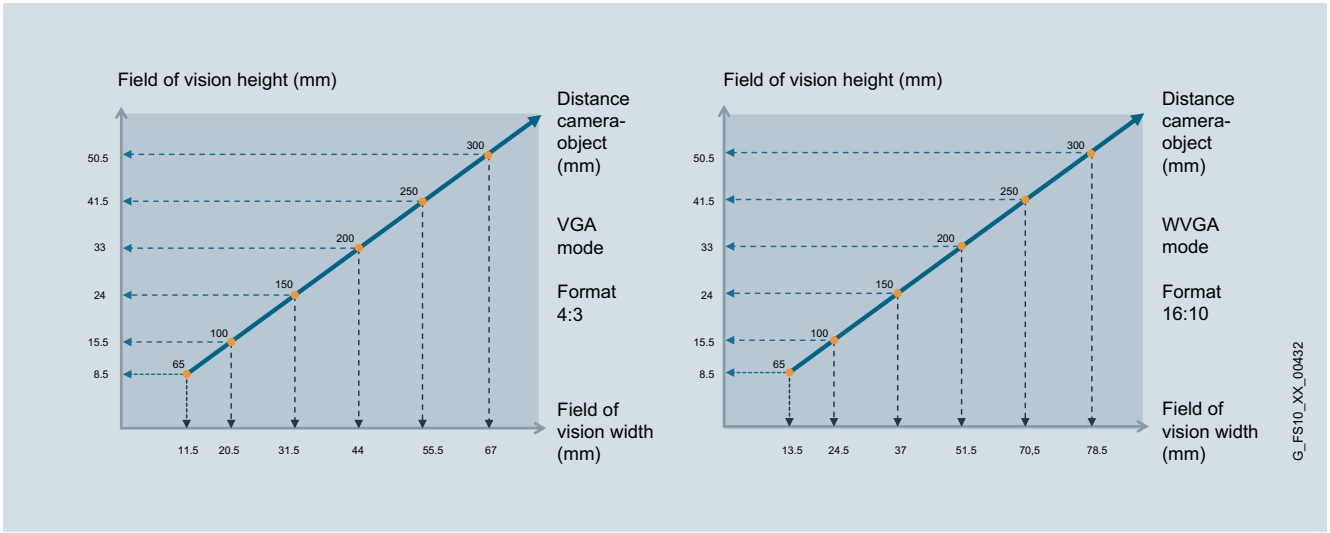
- Paper or plastic labels
- Plastic parts
- Circuit boards
- Metallic objects

The optical SIMATIC MV420 reader reads codes applied in many different ways, e.g.:

- Printed
- Dot peened
- Laser
- Stamped
- Bored



SIMATIC MV420 field of view dimensions for the 6 mm lens



SIMATIC MV420 field of view dimensions for the 16 mm lens

Further information can be found in the supplied manual.

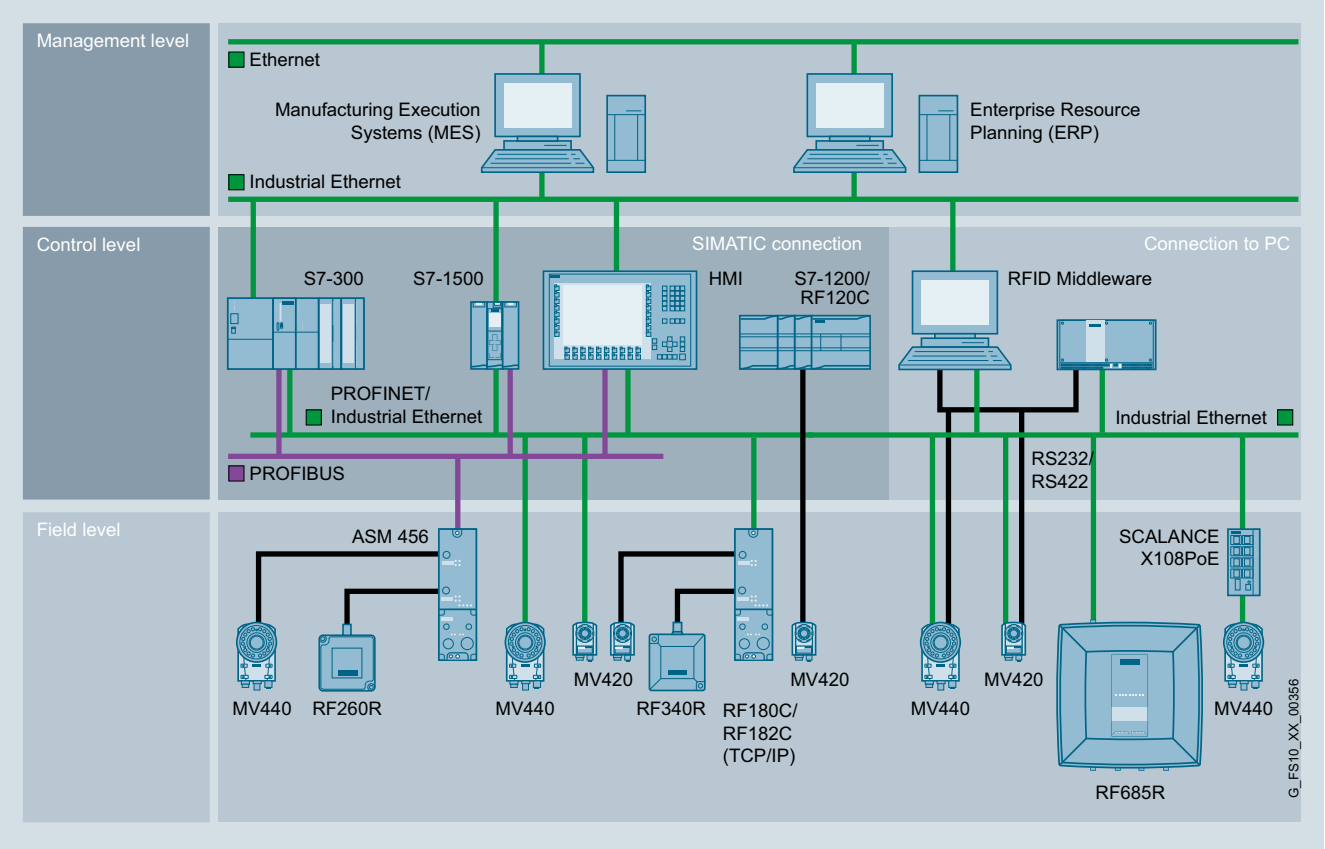
Integration

Various onboard connection options and convenient function blocks are available for the integration into the automation level.

In the case of SIMATIC MV420, direct connection via PROFINET, Ethernet or RS232 is possible.

In addition, communication modules are available for connection to other bus systems or the shared interface with RFID readers.

For further details on the communication modules, see chapter 5 "Communication modules".



Integration of the SIMATIC MV420 in the automation environment

Technical specifications

Article number	**6GF3420-0AA20**	**6GF3420-0AA40**	**6GF3420-0AX20**	**6GF3420-0AX40**
Product type designation	MV420 SR-B code reader	MV420 SR-P code reader	MV420 SR-B code reader (body)	MV420 SR-P code reader (body)
Suitability for operation	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1 2D codes: DMC, Dot code, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1 2D codes: DMC, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	1D codes: Int. 2/5, Code 128, Code 39, EAN 13, EAN 8, UPC-A, UPC-E, GS1 2D codes: DMC, Dot code, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode
Schnittstellen				
Type of electrical connection				
• of Industrial Ethernet interface	M12, d-coded	M12, d-coded	M12, d-coded	M12, d-coded
• of the RS422 interface	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
• of the RS232 interface	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
• for supply voltage	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
• at the digital inputs/outputs	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
Number of digital inputs	3	3	3	3
Number of digital outputs	3	3	3	3
Design of digital inputs	One high-speed trigger input, 2 opto isolated inputs (NPN, PNP capability) optionally as output	One high-speed trigger input, 2 opto isolated inputs (NPN, PNP capability) optionally as output	One high-speed trigger input, 2 opto isolated inputs (NPN, PNP capability) optionally as output	One high-speed trigger input, 2 opto isolated inputs (NPN, PNP capability) optionally as output
Design of digital outputs	1 fast strobe output for external lighting, 2 isolated outputs optionally as input, short-circuit-proof, max. 100 mA	1 fast strobe output for external lighting, 2 isolated outputs optionally as input, short-circuit-proof, max. 100 mA	1 fast strobe output for external lighting, 2 isolated outputs optionally as input, short-circuit-proof, max. 100 mA	1 fast strobe output for external lighting, 2 isolated outputs optionally as input, short-circuit-proof, max. 100 mA

SIMATIC MV420

Article number	6GF3420-0AA20	6GF3420-0AA40	6GF3420-0AX20	6GF3420-0AX40
Product type designation	MV420 SR-B code reader	MV420 SR-P code reader	MV420 SR-B code reader (body)	MV420 SR-P code reader (body)
Optical data				
Design of image sensor of the camera	CMOS chip, VGA (640 x 480), WVGA (752 x 480)	CMOS chip, VGA (640 x 480), WVGA (752 x 480)	CMOS chip, VGA (640 x 480), WVGA (752 x 480)	CMOS chip, VGA (640 x 480), WVGA (752 x 480)
Type of image capture	Global shutter	Global shutter	Global shutter	Global shutter
Range	10 ... 400 mm	10 ... 400 mm	10 ... 400 mm	10 ... 400 mm
Range Note	Adjustable within the range	Adjustable within the range	Adjustable within the range	Adjustable within the range
Mounting type of lens	Fixed (M12)	Fixed (M12)	M12 screw-in lens from list of accessories	M12 screw-in lens from list of accessories
Type of light source	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list	Integrated ring lamp according to accessories list	Integrated ring lamp according to accessories list
Image acquisition frequency maximum	50 Hz	80 Hz	50 Hz	80 Hz
Code reading rate maximum	29 1/s	50 1/s	29 1/s	50 1/s
Type of focusing	Manual adjustment on the lens cover	Manual adjustment on the lens cover	Manual adjustment on the lens cover	Manual adjustment on the lens cover
Supply voltage, current consumption, power loss				
Supply voltage				
• at DC Rated value	24 V	24 V	24 V	24 V
• at DC	19.2 ... 28.8 V	19.2 ... 28.8 V	19.2 ... 28.8 V	19.2 ... 28.8 V
Consumed current at DC at 24 V				
• typical	0.17 A	0.17 A	0.17 A	0.17 A
• maximum	2 A	2 A	2 A	2 A
Buffering time in the event of power failure minimum	0.01 s	0.01 s	0.01 s	0.01 s
Mechanical data				
Material	Die-cast aluminum	Die-cast aluminum	Die-cast aluminum	Die-cast aluminum
Color	petrol blue	petrol blue	petrol blue	petrol blue
Permitted ambient conditions				
Ambient temperature				
• during operation	0 ... 50 °C	0 ... 50 °C	0 ... 50 °C	0 ... 50 °C
• during storage	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C
• during transport	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %	95 %	95 %	95 %
Protection class IP	IP67	IP67	IP67	IP67
Shock resistance	According to IEC 60068-2	According to IEC 60068-2	According to IEC 60068-2	According to IEC 60068-2
Shock acceleration	150 m/s^2	150 m/s^2	150 m/s^2	150 m/s^2
Vibrational acceleration	10 m/s^2	10 m/s^2	10 m/s^2	10 m/s^2
Design, dimensions and weight				
Width	52.5 mm	52.5 mm	52.5 mm	52.5 mm
Height	70.7 mm	70.7 mm	70.7 mm	70.7 mm
Depth	39.5 mm	39.5 mm	39.5 mm	39.5 mm
Net weight	0.25 kg	0.25 kg	0.25 kg	0.25 kg
Mounting type	2 x M4 screws	2 x M4 screws	2 x M4 screws	2 x M4 screws
Product properties, functions, components general				
Product feature silicon-free	Yes	Yes	Yes	Yes
Display version	4 LEDs	4 LEDs	4 LEDs	4 LEDs
Standards, specifications, approvals				
Certificate of suitability	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL
MTBF at 40 °C	95 y	95 y	95 y	95 y
MTBF	95 y	95 y	95 y	95 y
Accessories				
Accessories	Mounting brackets, built-in ring lamps, M12 lenses	Mounting brackets, built-in ring lamps, M12 lenses	Mounting brackets, built-in ring lamps, M12 lenses	Mounting brackets, built-in ring lamps, M12 lenses

Selection and ordering data

	Article No.
SIMATIC MV420 SR-B Pre-configured basic model: Including lens (6 mm, aperture 5.6) and a red ring light, without multi-code and ID-Genius algorithm	**6GF3420-0AA20**
SIMATIC MV420 SR-P Preconfigured performance model Including lens (6 mm, aperture 5.6) and a red ring light, for very fast read rates, with multicode and ID-Genius algorithm	**6GF3420-0AA40**
SIMATIC MV420 SR-B body Basic model body: Does not include multicode or the ID-Genius algorithm	**6GF3420-0AX20**
SIMATIC MV420 SR-P body Performance model body: For very high read rates; includes multicode reading and the ID-Genius algorithm	**6GF3420-0AX40**
Lens accessories	
Lens kit 6 mm Lens 6 mm, aperture 5.6, including protective barrel 	**6GF3420-0AC00-0LK0**
Lens kit 16 mm Lens 16 mm, aperture 4, including protective barrel 	**6GF3420-0AC00-1LK0**
Protective barrels for lenses	
Protective barrel replacement set Contains: 2x protective barrel, 3x O-rings, 8x mounting screws, offset screwdriver	**6GF3420-0AC00-2AA0**
Built-in ring lights 	
Built-in ring lamp, red	**6GF3420-0AC00-1LT0**
Built-in ring lamp, white	**6GF3420-0AC00-2LT0**
Built-in ring lamp, infrared	**6GF3420-0AC00-3LT0**

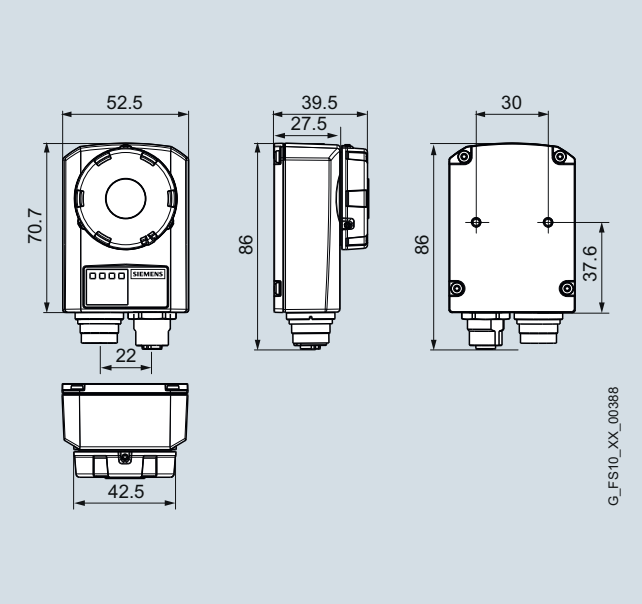
	Article No.
Cable	
IE connecting cable M12-180/IE FC RJ45 plug-145 for commissioning, service and installation Prefabricated IE FC TP Trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection. 	
2 m	**6XV1871-5TH20**
3 m	**6XV1871-5TH30**
5 m	**6XV1871-5TH50**
10 m	**6XV1871-5TN10**
15 m	**6XV1871-5TN15**
IE Connecting Cable M12-180/M12-180 Pre-assembled IE FC TP Trailing Cable GP 2 x 2 (PROFINET Type C) with two 4-pin M12 plugs (D-coded) up to 85 m, IP65/IP67 degree of protection. 	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2 m	**6XV1870-8AH20**
3 m	**6XV1870-8AH30**
5 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**
Industrial Ethernet FastConnect plug connector, 2x2, 180° cable outlet RJ45 plug connector (10/100 Mbit/s) with rugged metal enclosure and FastConnect technology, for Industrial Ethernet FastConnect cable 2x2.  For further cables, see Catalog IK PI under "Passive network components".	**6GK1901-1BB10-2AA0**

SIMATIC MV420

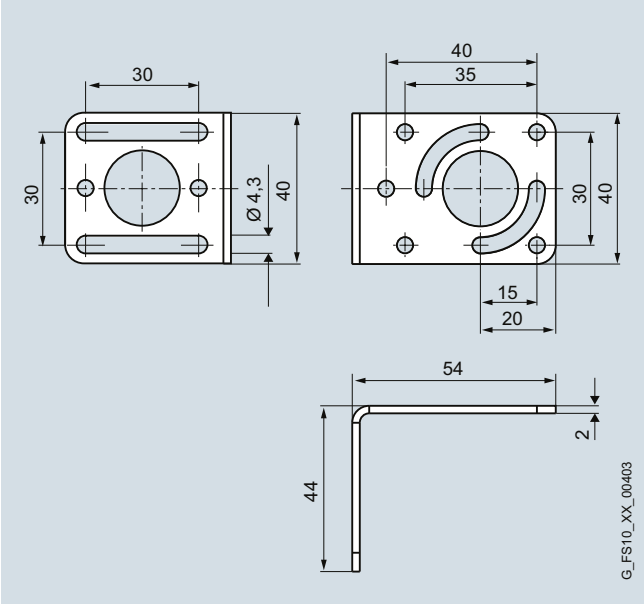
	Article No.
Cable 24 V power supply	
Power cable, M16 pre-assembled, push-pull.	
	
1.5 m	**6GF3400-0BH15**
2 m	**6GF3400-1BH20**
Power supply cable DIO-RS232	
Power IO RS232 cable, M16 assembled on one end, open on other end	
	
10 m	**6GF3440-8BA2**
30 m	**6GF3440-8BA4**
Adapter cable for RFID communication modules (ASM)	**6GF3420-0AC00-2CB0**
M16 connector (MV420) to M12 connector (communication module); length: 2 m; expandable to any length with standard communication module cables.	
	
Cable for communication module interface	
Standard communication module cable for installation, pre-assembled connecting cable for ASM 456, RF160C, RF170C, RF180C, and RF182C.	
	
2 m	**6GT2891-4FH20**
5 m	**6GT2891-4FH50**
10 m	**6GT2891-4FN10**
20 m	**6GT2891-4FN20**
50 m	**6GT2891-4FN50**
All cables with M12 connectors mentioned in the chapter 5 can be used on the reader to extend the adapter cable.	
Brackets	
Mounting bracket for SIMATIC MV420	**6GF3420-0AC00-1AA0**
	

	Article No.
Additional accessories	
Industrial Ethernet Switch SCALANCE XB205-3	**6GK5205-3BD00-2AB2**
With five 10/100 Mbps RJ45 ports and three fiber-optic cable ports (MM FO SC).	
Description see page 5/28.	
	
Plug-in power supply (EU, US)	**6GF3420-0AC00-1PS0**
For demo and laboratory mode (office environments only)	
	

Dimensional drawings



SIMATIC MV420 stationary optical reader



Mounting bracket for SIMATIC MV420 stationary optical reader

Overview

SIMATIC MV440 with built-in ring light and D65 protective barrel in plastic (included in the scope of supply)

SIMATIC MV440 with built-in ring light and D65 protective barrel (protective barrel available as accessory)

SIMATIC MV400 with external ring light and D65 protective barrel

The SIMATIC MV440 readers have been specially developed for use in industrial production. The devices offer professional decoding algorithms for machine-readable codes and text recognition in one device for production and logistics. The SIMATIC MV440 device family is characterized by flexibility, reliability and ease of use.

The list of readable codes includes all common matrix and barcodes which, regardless of the printing technology and the carrier medium used, are recognized reliably. A special feature of this device is its ability to read data matrix code (DMC) which is frequently used, especially in production, for direct part marking (DPM) and places the highest demands on the readers.

The operating range of the devices extends from 70 mm close range to 3 000 mm long range. Due to the freely selectable lenses and lighting, the working range as well as implementation in applications with special requirements is almost unrestricted. Integration in industrial automation environments is via standardized fieldbus technology. Open interfaces are also supported.

Benefits

get Designed for Industry

Highlights at a glance:

- Compact design with IP67 degree of protection.
- Very high reading reliability and read rates thanks to Siemens decoding algorithms
- Different screen resolutions can be selected specific to the application.
- Flexible adaptation to the application by means of freely selectable lenses and lighting.
- Option of integrated or external high-performance lighting
- Variety of interfaces: Ethernet (PoE), PROFINET (PoE), RS232, DI/DO, communication module interface.
- Many connector technologies, can be used via the communication module.
- Function block for PROFINET/PROFIBUS can be used with SIMATIC and SIMOTION.
- Web-based user interface can be used for parameter assignment and monitoring, without the need for installation.

Further important product characteristics are:

- No special knowledge required for reliable parameterization of reading features. Automatic "setup" by presenting a readable code pattern.
- Autotrigger mode: Automatic detection of a code without an external trigger signal.
  - Savings in sensor technology and cabling.
  - Reduced potential for error as there are fewer components.
  - Solution for applications in which proximity switches and light barriers cannot be used.
- Multicode function: Reads multiple codes in one step within the same field of view.
- ID-Genius: A high-performance reading algorithm for poorly legible directly marked data matrix codes (DPM: direct part marking).
- Code quality evaluation: Displays the key quality parameters of the code to be read.
- Customized user interface can be easily generated with SIMATIC WinCC flexible/WinCC.
- Open Web API interface for comfortable creation of customized applications and PC-based camera remote control
- Web-based user interface; can run on a variety of platforms meeting the following requirements: Internet browser (IE 6.0 or higher), JAVA-VM (MS, SUN).
- Extensive diagnostics functions ensure operation at the maximum read rate.
- User/password-protected operator interface with integrated management of access rights.
- 6 language versions (operator interface, compact manual and online help are each available in English, German, French, Spanish, Italian and Chinese); manual available in 2 language versions (English and German).

Application

The main functions of SIMATIC MV440 are:

- Reading 1D and 2D codes
- Optical character recognition (OCR).
- Object detection.
- Verification (measuring the code quality).
- Comparing the read result with a preset value.
- Formatting of read results for further use.

The application range of the SIMATIC MV440 product family covers all sectors and areas of industrial production and logistics. The possible applications include the identification of stationary parts through to extremely fast moving parts on a conveyor belt. The powerful integrated lighting allows a very compact design. The device has IP67 degree of protection and is therefore suitable for harsh industrial environments.

Due to its particularly powerful lighting, lenses and sensor technology, the MV440 specializes in applications for direct part marking (DPM). Due to the high picture quality, MV440 recommends itself for measuring the marking quality (verification) in the area of DPM.

Due to the properties and functions described, the emphasis for SIMATIC MV440 is on the following sectors and applications:

- Automotive industry:
  - Needle punched markings on various automotive power train components (DPM), e.g. cylinder heads, cylinder blocks, manifolds.
  - Laser markings on various automotive power train components (DPM), e.g. camshafts, crankshafts, pistons, connecting rods, transmission components.
  - Laser markings on electronic components, printed circuit boards, or enclosures.
- Pharmaceutical industry, food industry (F&B), tobacco industry:
  - Print or laser markings on medicines (DPM, OCR).
  - Recording the contents of cartons (up to 150 codes).
  - Read portal by linking several cameras.
- Aerospace industry:
  - Needle or laser markings on gas turbine blades (DPM).
  - Needle or laser markings on jet engine components (DPM).
- Medical equipment:
  - Laser markings on heart pacemakers and other implants (DPM).
  - Laser markings on medical devices (DPM).
- Electronics:
  - Needle or laser markings on hard disk components.
  - Laser or etched markings on hard disk components (DPM)
- Semiconductors:
  - Laser markings on rigid and flexible circuit boards (DPM).
  - Laser markings on enclosed semiconductor components, heat sinks or heat exchangers (DPM).

Further information can be found in the supplied manual.

Design

The SIMATIC MV440 is a compact, stationary optical reader. It consists of one basic unit, which can be configured with other individual components (lens, ring light, filter and protective barrel). This allows the MV440 to be optimally adapted to the application conditions.

The SIMATIC MV440 basic unit is available in three versions. They differ only with regard to the resolution of the CCD sensor and the associated recording speed mode and read rate. All three versions of the basic unit have identical functionality:

- SIMATIC MV440 SR
  640 pixels x 480 pixels, 50 full screens/s
- SIMATIC MV440 HR
  1 024 pixels x 768 pixels, 20 full screens/s
- SIMATIC MV440 UR
  1 600 pixels x 1 200 pixels, 15 full screens/s

Using the following accessories, the SIMATIC MV440 basic units can be tailored to the requirements of the application and configured. For a detailed listing of the individual accessories, please refer to the section entitled "Accessories":

- Lenses
- Filter
- Protective barrel for lens
- Ring lights

The following accessories are available for the connection and installation:

- Flexible mounting plate
- Power DIO RS232 cable (M16 connector on open end)
- M12 Ethernet cable (varying lengths)
- Ethernet cable (M12 to RJ45) for commissioning/lab operation (various lengths)
- Standard cable with M12 plug for connection to communication modules (see Communication modules)
- Plug-in power supply for demonstration and lab operation (for office environment only)
- CD with installation/operating instructions (supplied with unit)

The following configurations are recommended for the close or distant ranges:

Configuration for close range	Lenses	Ring lights	Protective barrel for lens
	Mini lens 8.5 mm	The built-in ring light cannot be used (alternative: external mounting of a ring light).	D65 protective barrels for lenses can be used.
	Mini lens 6 mm	Built-in ring lights can be used.	
	Mini lens 12 mm		
	Mini lens 16 mm		
	Mini lens 25 mm		
	Mini lens 35 mm		
	Mini lens 50 mm		
	Mini lens 75 mm		Use of the D65 protective barrel extension for lenses required.

Configuration for distant range	Lenses	Ring lights	Protective barrel for lens
	Mini lens 6 mm	External ring lights can be used.	D65 protective barrels for lenses can be used.
	Mini lens 8.5 mm		
	Mini lens 12 mm		
	Mini lens 16 mm		
	Mini lens 25 mm		
	Mini lens 35 mm		
	Mini lens 50 mm		
	Mini lens 75 mm		Use of the D65 protective barrel extension for lenses required.

Function

The main functions of SIMATIC MV440 are:

- **Reading** 1D and 2D codes
- **Verification** (requires license "Veri-Genius")
- **Text recognition** (requires license "Text-Genius")
- **Object recognition** (requires license "Pat-Genius")
- **Comparison** of the read result with a default value
- **Formatting** the read result for forwarding

The functions can be used individually or they can be combined.

All functions, including all licenses, are available to the user in demo mode on each version of the MV440. It is therefore possible to test a licensed function at any time. However, the output result is unusable, because one or more characters of the result will be randomly replaced by the '?' character.

Binary results are completely suppressed.

Read

The SIMATIC MV440 reads the following 1D and 2D codes (detailed information can be found in the manual):

- 1D codes (barcodes):
  - Int. 2/5 (with/without checksum)
  - Code 128
  - Code 93
  - Code 39 (with/without checksum)
  - Code 32
  - EAN 13
  - EAN 8
  - UPC-A
  - UPC-E
  - CodaBar
  - GS1 DataBar (Omnidirectional, Stacked, Limited, Expanded)
  - Pharmacode (0° and 180°)
  - Postnet
- 2D codes:
  - Data Matrix Code (ECC 0 - 200)
  - PDF417 (without: Truncated, Micro and Macro)
  - QR (without: Micro and Macro)
  - DotCode
  - Vericode (demo mode/VeriCode license)

Verification

Verification is the term used for measuring the marking quality of 1D and 2D codes. This additional functionality is subject to license and is available for every SIMATIC MV440 by installing the "Veri-Genius license". The following verification methods are supported:

- ISO/IEC TR29158 (previously AIM DPM-1-2006)
- Siemens DPM
- ISO/IEC 15415
- AS9132 Rev. A (previously IAQG)
- ISO/IEC 15416 (previously ANSI X3.182-1990)

SIMATIC MV440

Optical character recognition

Text recognition is used to detect plain text (Optical Character Recognition: OCR). This additional functionality is subject to license and is available for every SIMATIC MV440 by installing the "Text-Genius license" or the "Text-Genius-Plus License".

Text recognition with the "Text-Genius license" is able to recognize many fonts without training immediately after installation. Particularly suitable fonts are:

- OCR-A
- Semifont M13
- and similar fonts

With the "Text-Genius Plus license", text recognition can be expanded to include numerous fonts, print image versions (e.g. distortions), and special characters. By contrast, this version requires training, but offers almost unlimited potential in expanding the range of characters to be recognized.

Object detection

Object recognition is used for finding and recognizing trained patterns in the picture. This functionality can be used alone or in combination with all other functions mentioned. Accordingly, it has different areas of application: Shape recognition offers the following functionality:

- Object recognition (classification)
- Position detection (position, rotational position, scaling)
- Presence check (object recognition and position check with setpoint specification)
- Completeness check (multiple presence check with setpoint specification)
- Text recognition (based on the contour of any character or symbol). However, shape recognition can also be used in combination with text recognition, for example. In this case, the text recognition read area can track the current position of an object or label.

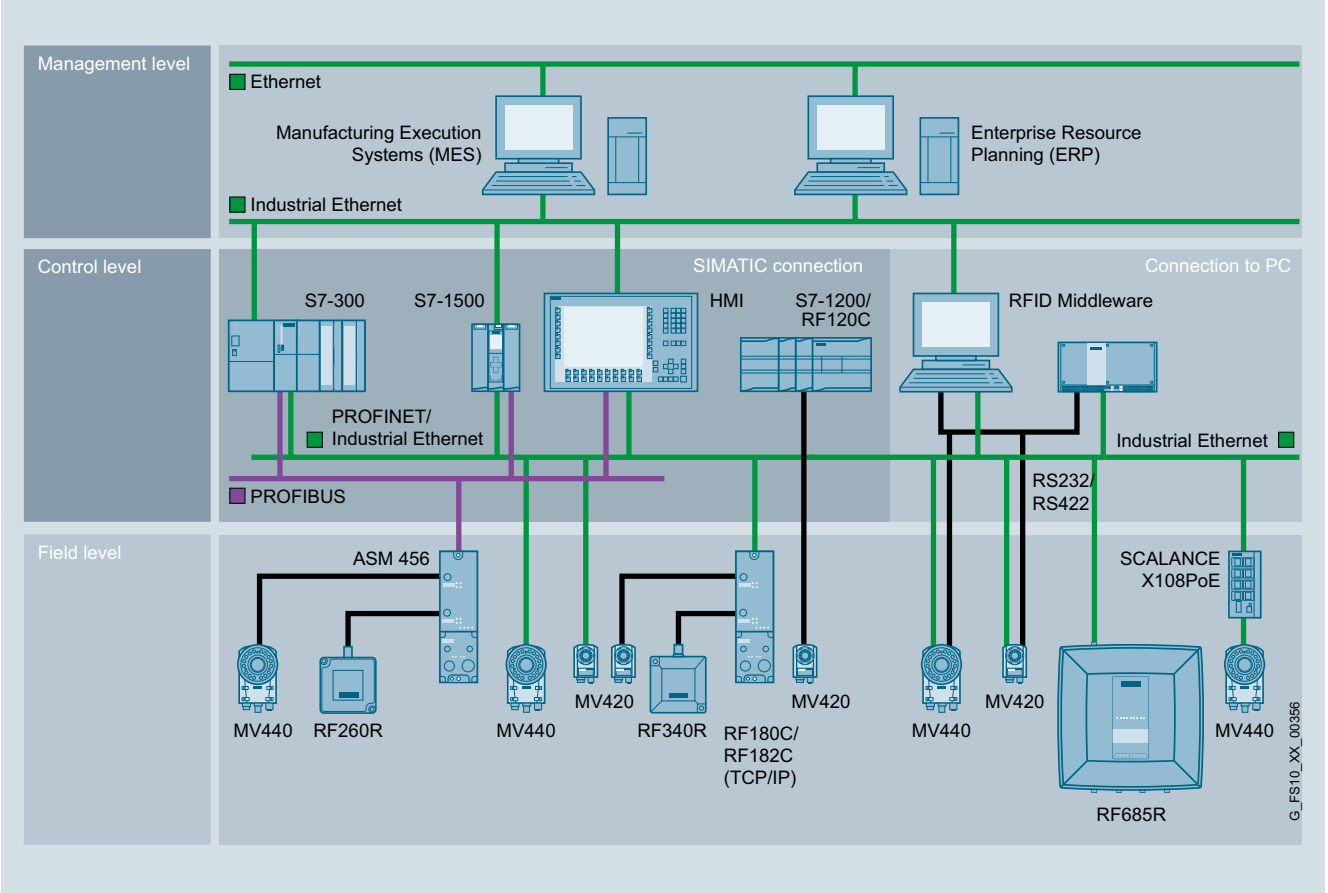
Note: In demo mode, the full functionality of the devices is available. Testing of a licensed function is therefore possible at any time. However, the output result is unusable, because one or more characters of the result will be randomly replaced by the character '?'. Binary results are completely suppressed.

Integration

Various onboard connection options and convenient function blocks are available for the integration into the automation level.

In the case of SIMATIC MV440, for example, direct connection via PROFINET, Ethernet or RS232 is possible.

In addition, communication modules are available for connection to other bus systems or the shared interface with RFID readers.



Technical specifications

Article number	**6GF3440-1CD10**	**6GF3440-1GE10**	**6GF3440-1LE10**
Product type designation	MV440 SR code reader	MV440 HR code reader	MV440 UR code reader
Suitability for operation	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet	1D codes: Int. 2/5, Code 128, Code 93, Code 39, Code 32, EAN 13, EAN 8, UPC-A, UPC-E, GS1, Pharmacode, Postnet
	2D codes: DMC, Dot code, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	2D codes: DMC, Dot code, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode	2D codes: DMC, Dot code, PDF417 (without: Truncated, Micro and Macro), QR (without: Micro and Macro), Vericode
	Text recognition: OCR-A, Semifont M13, similar fonts	Text recognition: OCR-A, Semifont M13, similar fonts	Text recognition: OCR-A, Semifont M13, similar fonts
	Code verification: ISO/IEC 29158, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416	Code verification: ISO/IEC 29158, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416	Code verification: ISO/IEC 29158, Siemens DPM, ISO/IEC 15415, AS9132 Rev. A, ISO/IEC 16416
Schnittstellen			
Type of electrical connection			
• of Industrial Ethernet interface	M12, d-coded, PoE	M12, d-coded, PoE	M12, d-coded, PoE
• of the RS422 interface	M12, 8-pin, male	M12, 8-pin, male	M12, 8-pin, male
• of the RS232 interface	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
• for supply voltage	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
• at the digital inputs/outputs	M16, 12-pin, male	M16, 12-pin, male	M16, 12-pin, male
Number of digital inputs	5	5	5
Number of digital outputs	5	5	5
Design of digital inputs	1 high-speed trigger input	1 high-speed trigger input	1 high-speed trigger input
	4 opto isolated inputs (NPN, PNP capability) optionally as output	4 opto isolated inputs (NPN, PNP capability) optionally as output	4 opto isolated inputs (NPN, PNP capability) optionally as output
Design of digital outputs	1 fast strobe output for external lighting	1 fast strobe output for external lighting	1 fast strobe output for external lighting
	4 isolated outputs optionally as input, short-circuit-proof, max.100 mA	4 isolated outputs optionally as input, short-circuit-proof, max.100 mA	4 isolated outputs optionally as input, short-circuit-proof, max.100 mA
Optical data			
Design of image sensor of the camera	CCD chip 1/3", 640 x 480	CCD Chip 1/3'', 1 024 x 768	CCD chip 1/1.8", 1 600 x 1 200
Type of image capture	Global shutter with manual or automatic exposure time	Global shutter with manual or automatic exposure time	Global shutter with manual or automatic exposure time
Range	70 ... 3 000 mm	70 ... 3 000 mm	70 ... 3 000 mm
Range Note	Using C-mount lenses and lens accessories, the range can be exactly matched to the application	Using C-mount lenses and lens accessories, the range can be exactly matched to the application	Using C-mount lenses and lens accessories, the range can be exactly matched to the application
Mounting type of lens	C mount lens connection with Plexiglas lens protection, 65 mm diameter	C mount lens connection with Plexiglas lens protection, 65 mm diameter	C mount lens connection with Plexiglas lens protection, 65 mm diameter
Type of light source	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list	Integrated lighting or external lighting according to accessories list
Image acquisition frequency maximum	80 Hz	30 Hz	25 Hz
Code reading rate maximum	80 1/s	30 1/s	25 1/s
Type of focusing	Manual adjustment on the lens	Manual adjustment on the lens	Manual adjustment on the lens
Supply voltage, current consumption, power loss			
Supply voltage			
• at DC Rated value	24 V	24 V	24 V
• at DC	19.2 ... 28.8 V	19.2 ... 28.8 V	19.2 ... 28.8 V
Consumed current at DC at 24 V			
• typical	0.27 A	0.27 A	0.27 A
• maximum	2 A	2 A	2 A
Buffering time in the event of power failure minimum	0.01 s	0.01 s	0.01 s
Mechanical data			
Material	Die-cast aluminum	Die-cast aluminum	Die-cast aluminum
Color	petrol blue	petrol blue	petrol blue

SIMATIC MV440

Article number	**6GF3440-1CD10**	**6GF3440-1GE10**	**6GF3440-1LE10**
Product type designation	MV440 SR code reader	MV440 HR code reader	MV440 UR code reader
Permitted ambient conditions			
Ambient temperature			
• during operation	0 ... 50 °C	0 ... 50 °C	0 ... 50 °C
• during storage	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C
• during transport	-30 ... +70 °C	-30 ... +70 °C	-30 ... +70 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %	95 %	95 %
Protection class IP	IP67	IP67	IP67
Shock resistance	According to IEC 60068-2	According to IEC 60068-2	According to IEC 60068-2
Shock acceleration	100 m/s^2	100 m/s^2	100 m/s^2
Vibrational acceleration	10 m/s^2	10 m/s^2	10 m/s^2
Design, dimensions and weight			
Width	68 mm	68 mm	68 mm
Height	122 mm	122 mm	122 mm
Depth	45 mm	45 mm	45 mm
Net weight	0.55 kg	0.55 kg	0.55 kg
Mounting type	4 x M4 screws	4 x M4 screws	4 x M4 screws
Product properties, functions, components general			
Product feature silicon-free	Yes	Yes	Yes
Display version	5 LEDs	5 LEDs	5 LEDs
Standards, specifications, approvals			
Certificate of suitability	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL	CE, KCC, F&B suitable, UL
MTBF at 40 °C	88 y	88 y	88 y
MTBF	88 y	88 y	88 y
Accessories			
Accessories	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses	Licenses (verification and text recognition), mounting brackets, built-in ring lights, external ring lights, C-mount lenses, protective barrels for lenses

Selection and ordering data

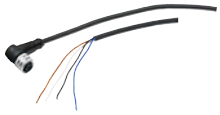
	Article No.
SIMATIC MV440 SR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 640 x 480 pixels. PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1CD10**
SIMATIC MV440 HR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 1 024 x 768 pixels. PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1GE10**
SIMATIC MV440 UR For one- and two-dimensional codes. Optional: Text recognition (OCR), object detection and verification of barcodes and data matrix codes. Variable image field and distance. Resolution: 1 600 x 1 200 pixels PoE; IP67 using protective barrel for lens and sealing caps, otherwise IP40; package comprises reader, CD and plastic protective barrel for lens.	**6GF3440-1LE10**
Optional software modules	
Text recognition module "Text-Genius" License for the module "Text-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V3.0 and higher (MV440 not included in the scope of supply). For a description, see page 4/50.	**6GF3400-0SL01**
Text recognition module "Text-Genius Plus" License for the module "Text-Genius Plus", supplied on USB flash drive; executable on SIMATIC MV440 firmware V5.0 and higher (MV440 not included in the scope of supply). For a description, see page 4/50.	**6GF3400-1SL01**
Verification module "Veri-Genius" License for the module "Veri-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V4.0 and higher (MV440 not included in the scope of supply). For a description, see page 4/45.	**6GF3400-0SL02**
Shape recognition module "Pat-Genius" License for the module "Pat-Genius", supplied on USB flash drive; executable on SIMATIC MV440 firmware V6.0 and higher (MV440 not included in the scope of supply). For a description, see page 4/54.	**6GF3400-0SL03**

	Article No.
Accessories	
C-mount lenses Mini lenses with fixed focal length, adjustable aperture and focus (see "Lenses" section on page 4/32).	
	
Intermediate ring sets for utilizing mini lenses for close-range macro photography (see "Lenses" section on page 4/32).	
Filters for utilizing mini lenses (see "Lenses" section on page 4/32).	
Protective barrels for lenses	
D65 protective barrel for lens made of metal, for built-in ring lights, internal diameter 57 mm, max. Lens length 57 mm, IP67 degree of protection.	
	
• Glass front pane	**6GF3440-8AC11**
• Plastic front pane	**6GF3440-8AC21**
D65 protective barrel for lens made of plastic; to achieve IP67 degree of protection; suitable for all variants of MV440 and for use with built-in ring lights; max. internal diameter 55 mm, max. lens length 48 mm.	**6GF3440-8AC12**
	
D65 protective barrel extension for lens made of metal, for built-in ring lights, internal diameter 55 mm, extension by 35 mm (cascadable), IP67 degree of protection.	**6GF3440-8AC13**
	

4

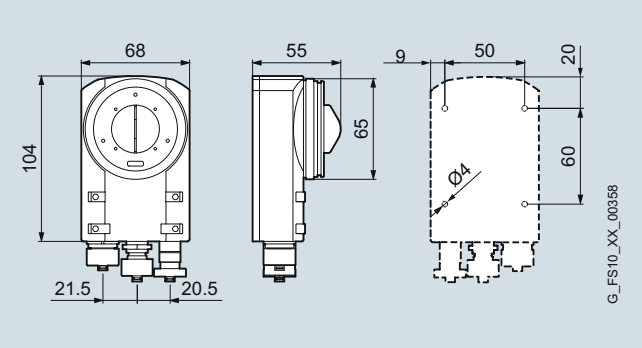
	Article No.
Built-in ring lights	
	
• **Built-in ring light, red** Light source: LED red (630 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA11**
• **Built-in ring light, white** Light source: White LED (440 nm to 650 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA21**
• **Built-in ring light, green** Light source: Green LED (500 nm to 570 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens..	**6GF3440-8DA31**
• **Built-in ring lamp, infrared** Light source: Infrared LED (850 nm to 880 nm) Flash duration 20 µs to 10 ms, range of illumination 800 mm, mounting materials included, IP67 degree of protection when using protective barrel for lens.	**6GF3440-8DA41**
External ring lights	
	
• **Ring light, metal, infrared, clear** light source LED infrared, light source 850 nm, light source 500 mm to 23 000 mm, suitable for D65 lens protective barrel, supply voltage: 24 V (18 V ... 30 V), dimensions B x H x T (mm): 142 x 142 x 42.4, degree of protection IP67.	**6GF3400-0LT01-7BA1**
• **Ring light, metal, red, clear** light source LED infrared, light source 500 mm to 3 000 mm, suitable for D65 lens protective barrel, supply voltage: 24 V (18 V ... 30 V) dimensions W x H x D (mm): 142 x 142 x 42.4, degree of protection IP67.	**6GF3400-0LT01-8DA1**

	Article No.
Cables	
IE connecting cable M12-180/IE FC RJ45 plug-145 for commissioning, service and installation Prefabricated IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with M12 plug (D-coded) and IE FC RJ45 plug, IP65/IP67 degree of protection.	
	
2 m	**6XV1871-5TH20**
3 m	**6XV1871-5TH30**
5 m	**6XV1871-5TH50**
10 m	**6XV1871-5TN10**
15 m	**6XV1871-5TN15**
IE connecting cable M12-180/M12-180 Pre-assembled IE FC TP trailing cable GP 2 x 2 (PROFINET type C) with two 4-pin M12 connectors (D-coded) up to max. 85 m, IP65/IP67 degree of protection, RJ45 assembly possible with plug-in connector 6GK1 901-1BB10-2AA0 (see below).	
	
0.3 m	**6XV1870-8AE30**
0.5 m	**6XV1870-8AE50**
1 m	**6XV1870-8AH10**
1.5 m	**6XV1870-8AH15**
2 m	**6XV1870-8AH20**
3 m	**6XV1870-8AH30**
5 m	**6XV1870-8AH50**
10 m	**6XV1870-8AN10**
15 m	**6XV1870-8AN15**
Industrial Ethernet FastConnect plug connector, 2x2, 180° cable outlet RJ45 plug connector (10/100 Mbit/s) with rugged metal enclosure and FastConnect connection method. For Industrial Ethernet FastConnect cable 2x2.	**6GK1901-1BB10-2AA0**
	
For further cables, see Catalog IK PI under "Passive network components".	

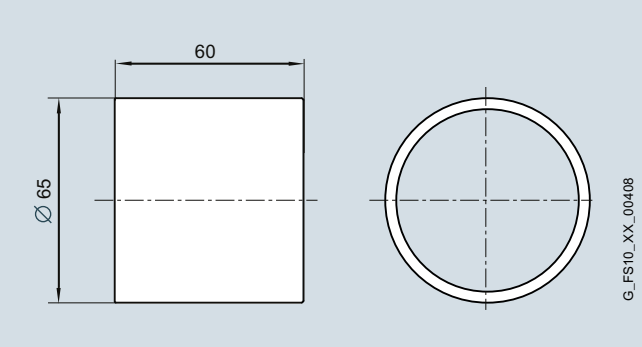
	Article No.
Cable for communication module interface Communication module cable for connection to communication modules, e.g. ASM 456, RF160C, RF170C, RF180C, and RF182C. Plug-in cable pre-assembled for SIMATIC MV440.	
	
2 m	**6GT2891-4FH20**
5 m	**6GT2891-4FH50**
10 m	**6GT2891-4FN10**
20 m	**6GT2891-4FN20**
50 m	**6GT2891-4FN50**
All cables with M12 connectors mentioned in the chapter 5 can be used on the reader to extend the adapter cable.	
Cable 24 V power supply Power cable, M16 pre-assembled, push-pull.	
	
1.5 m	**6GF3400-0BH15**
2 m	**6GF3400-1BH20**
Cable power supply DIO RS232 Power IO RS232 cable, M16 prefabricated at one end, other end open.	
	
10 m	**6GF3440-8BA2**
30 m	**6GF3440-8BA4**
Cable for external ring lights Suitable for 6GF3400-0LT01-7BA1, 6GF3400-0LT01-8DA1; M12, open end, 4-pole, not suitable for drag cables, cable connects external ring lights with the control cabinet (24 V, GND, strobe), length 10 m.	**6GF3440-8BC4**
	
Adapter cable for external ring lights Suitable for 6GF3400-0LT01-7BA1, 6GF3400-0LT01-8DA1; enables direct connection of external ring lights to the MV440 when using power supply cable DIO-RS232 (see above). M16, 12-pin socket; M16, 12-pin connector; M12, 4-pin socket, length 25 cm.	**6GF3440-8BD1**
	

	Article No.
Mounting accessories	
Reader mounting plate Dimensions W x H x D (mm) 80 x 80 x 60, plate thickness: 4 mm	**6GF3440-8CA**
	
Mounting plate for external ring lights Dimensions W x H x D (mm) 96 x 76 x 46, plate thickness: 4 mm	**6GF3440-8CD01**
	
Support system, tri-plate Dimensions W x H x D (mm) 80 x 80 x 60, plate thickness: 4 mm	**6GF9002-7AD**
	
Additional accessories	
SCALANCE X108PoE **Industrial Ethernet Switch** With 6 x 10/100 Mbps RJ45 ports, electrical 2 x 10/100 Mbps RJ45 PoE ports, electrical. For connecting the MV440 via Power-over-Ethernet (PoE). See also page 5/29.	**6GK5108-0PA00-2AA3**
	

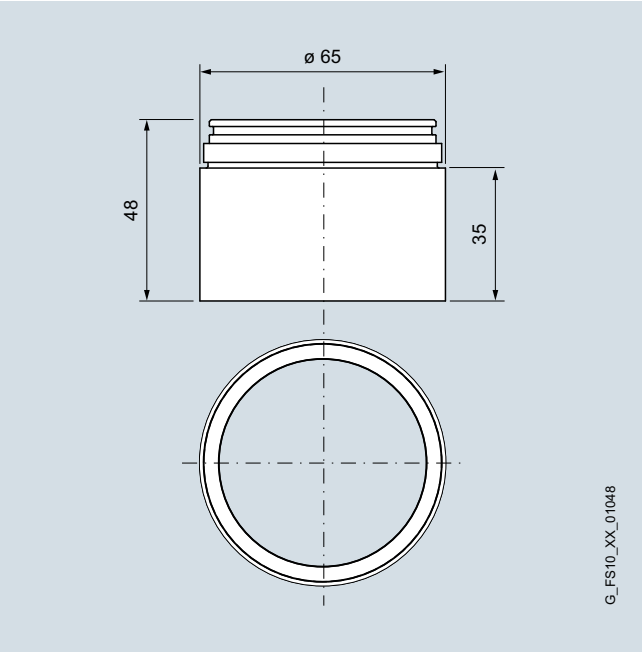
Dimensional drawings



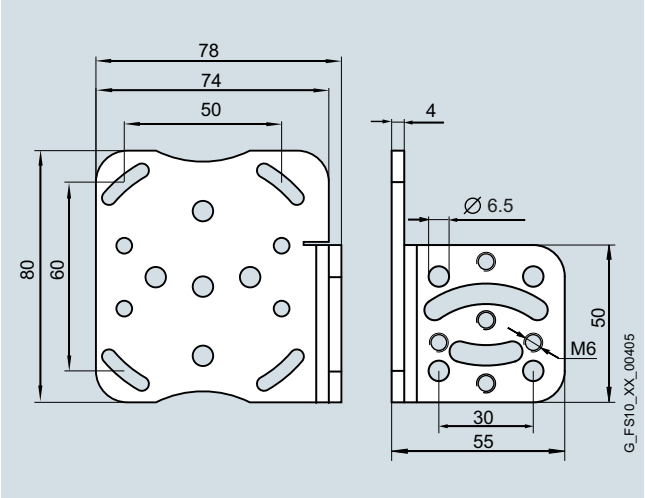
SIMATIC MV440 stationary optical reader



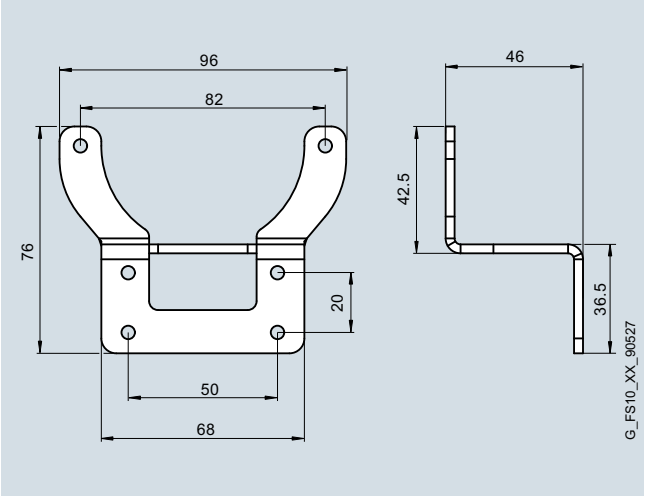
Protective barrel for lens D65



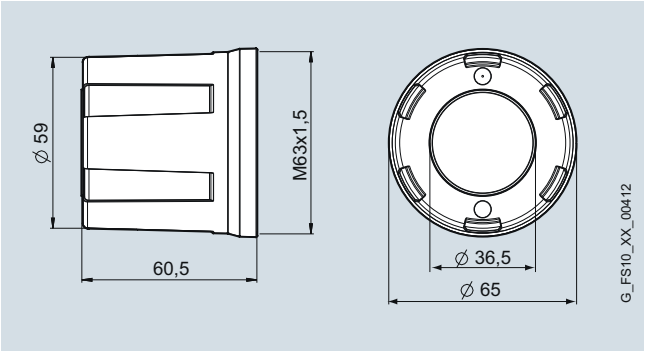
Protective barrel extension for lens D65



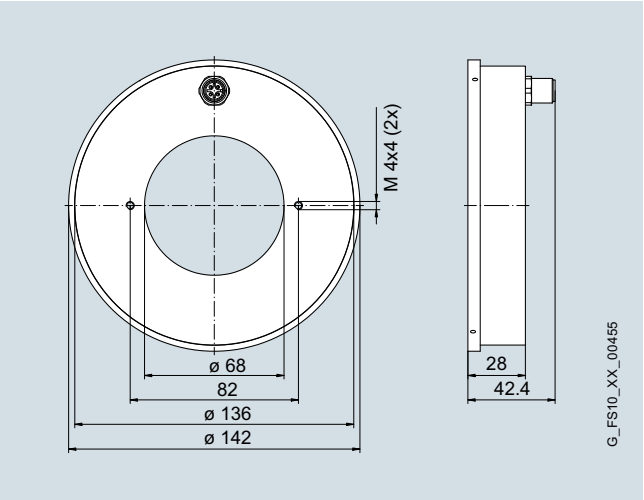
Mounting bracket for the SIMATIC MV440 optical reader



Mounting plate for external ring light



Plexiglas protective barrel



MV400 ring light

Overview

With a lens suitable for the respective image evaluation task, the size of the image field is determined for the camera image for the required operating distance.

High light intensity and the geometry of the image are extremely important for image evaluation (code reading, form recognition and position detection) High light intensity permits short shutter speeds and consequently a reduction of the blurring due to motion as well as maximizing the range.

Lenses with fixed focal length and a settable aperture and focus are ideal for this purpose and are therefore preferred.

Application

Code reading and text recognition

The algorithms of code reading and text recognition tolerate variations in form and size of the marking. In many applications, optical readers must tolerate the influence of perspective distortion. Geometric errors resulting from the imaging often reduce the reading performance of the overall system.

Important selection criteria for the lenses of readers are fast shutter speeds which guard against blurring due to motion, as well as maximization of the reading distance.

All lenses in this accessories list meet the requirements for code reading and text recognition. In addition, lens accessories (e.g. filters) are available which in conjunction with the accessories of the readers support project-specific configurations.

Form recognition and position location

For form recognition with high reproducibility, is a format-filling high-resolution image is required. Geometric errors resulting from the imaging often reduce the reading performance of the overall system.

Important selection criteria for the lenses of readers are a short exposure time, which guards against blurring due to motion, as well as maximization of the range. It is particularly important to maximize the range, since the stability of image analysis rises as the angle of the image field reduces. This is why a large distance from the test object is advantageous.

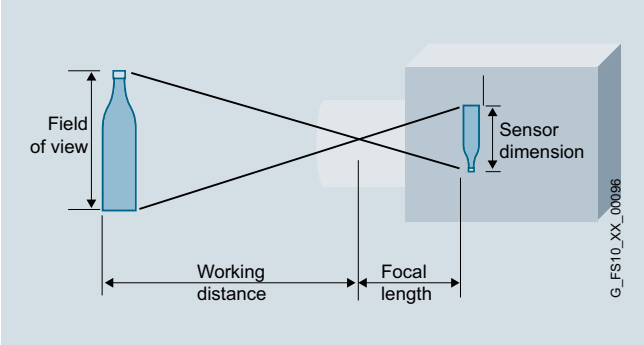
All lenses in this accessories list meet the requirements for shape recognition. In addition, lens accessories (e.g. filters) are available which in conjunction with the accessories of the readers support project-specific configurations.

Function

Image types

The optical path of the lens is defined by its construction.

For **spherical lenses** the solid angle depends on the focal length, focus adjustment, and aperture. All rays run through the focal point of the lens (central projection). Objects that are further away from the lens are depicted smaller. Objects that are closer to the lens are depicted larger:



The required image field size (height and width of the image), the size of the sensor chip and the focal length of the lens determine the operating distance:

A = (f x BF) / b

d = Operating distance (distance from lens to test object) in mm

f = Focal length of the lens in mm

IS = Size of image in the plane of the test object in mm

b = effective dimensions of the sensor in mm

In the case of lenses used in image processing systems, the focal length is fixed, whereas apertures and focus settings can be fixed. The focal length, the maximum focal aperture and the focusing range are normally specified on the lenses.

Focal distance

The focal length makes a statement about the angle of the image field or the ratio of the size of the real object to the size of the image.

The focal length of the lens is determined by the size of the required image field and the size of the camera chip when a specific distance has to be maintained. The most common chip sizes in cameras today are ½", ⅓" and ¼". If the distance to the object lies below the adjustable focusing range of the lens, i.e. at close range, the focus can be adjusted using intermediate rings.

Aperture

Reduction of the light intensity by interrupting the optical path.

Focus

Setting the focus of the lens to a specific distance.

Depth of field

Depth of field is the area within which (in front of and behind the object) that is displayed with sufficient sharpness of focus. The larger the aperture (the smaller the aperture number), the smaller the depth of field.

Lenses with a larger focal length have a smaller depth of field, the effect is considerable for images at close range.

Lens types

Lenses with smaller focal length are called wide-angle lenses, they can also be used at short operating distances, but produce intense distortion of the image. At a suitable given distance, they have a large image field.

Lenses with a long focal length are called telephoto lenses. They have a large magnification but cannot be focused at close range. So macro lenses are used that can be focused by means of large telescopic extensions or intermediate rings. At a given distance, they have a small image field.

In the case of telecentric lenses, at least the optical path at the object end is almost parallel (parallel projection). This means that objects at different distances are depicted in the same size. Objects can, however, only be displayed that are smaller than the diameter of the lens. It is not possible to adjust the range of focus with these lenses.

The optical characteristics can be restricted by means of optical filter glasses to counteract distortion in the image. Colored filters limit the spectral range, gray filters limit the light intensity and polarization filters restrict the transmission plane. Filters of this type can be attached either by using the internal thread or the flange on the front of the lens. The holder for the filter glass is designed to fit the lens.

Selection and ordering data

	Article No.
C-mount lenses	
With fixed focal length, adjustable aperture and focus, with locking screw.	
• **Mini lens 6 mm, 1:1.4** D = 32 mm, L = 37.5 mm, MOD = 0.1 m[1)]	**6GF9001-1BB01**
• **Mini lens 8.5 mm, 1:1.5** D = 42 mm, L = 47 mm; successor type for 6GF9001-1BE; MOD = 0.2 m[1)] Not for use with internal ring lamps.	**6GF9001-1BE01**
• **Mini lens 12 mm, 1:1.4** D = 29.5 mm, L = 35.7 mm; MOD = 0.25 m[1)]	**6GF9001-1BL01**
• **Mini lens 16 mm, 1:1.4** D = 29.5 mm, L = 37.2 mm; successor type for 6GF9001-1BF; MOD = 0.25 m[1)]	**6GF9001-1BF01**
• **Mini lens 25 mm, 1:1.4** D = 29.5 mm, L = 38.9 mm; successor type for 6GF9001-1BG; MOD = 0.25 m[1)]	**6GF9001-1BG01**
• **Mini lens 35 mm, 1:1.6** D = 29.5 mm, L = 41.4 mm; MOD = 0.4 m[1)]	**6GF9001-1BH01**
• **Mini lens 50 mm, 1:2.8** D = 29.5 mm, L = 38.0 mm; successor type for 6GF9001-1AH; MOD = 0.9 m[1)]	**6GF9001-1BJ01**
• **Mini lens 75 mm, 1:2.8** D = 34.0 mm, L = 63.6 mm; MOD = 0.7 m[1)] Not for use with internal ring lamps. If protective tube D60 is used, this lens also requires the protective tube extender (6GF3440-8AC13) which is to be ordered separately.	**6GF9001-1BK01**
CS-Mount for C-Mount adapter ring 5 mm	**6GF9001-1AP02**

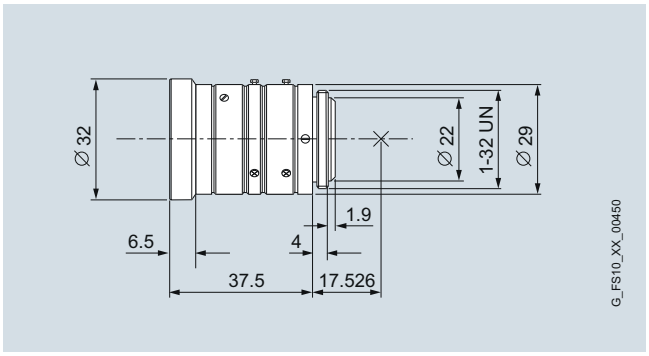
[1)] MOD = Minimum object distance of the lens – please take the influence of any protective tube into account.

Lenses

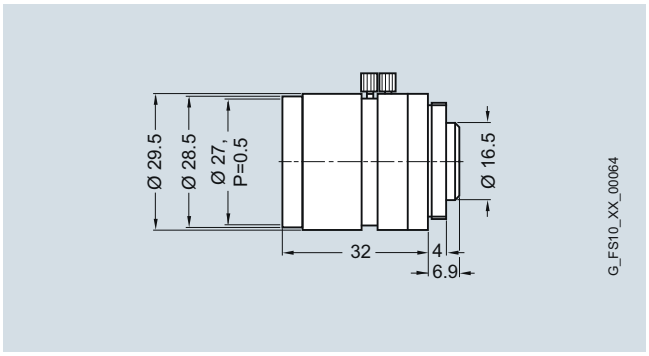
	Article No.
Accessories for utilizing mini lenses at close range	
Set of intermediate rings with 0.5 mm, 1.0 mm, 5.0 mm, 10.0 mm, 20.0 mm and 40 mm rings with 31 mm diameter C thread, to be screwed in between the lens and the camera body for image capture in the macro range.  Illustrations are approximate	**6GF9001-1BU**
Set of intermediate rings with 0.5 mm and 2 x 1.0 mm rings with 31 mm diameter C thread, to be screwed in between the lens and the camera body for image capture in the close range. 	**6GF9001-1BU01**
Accessories for utilizing mini lenses in the telephoto range	
Focal length doubler D = 30.5 mm, L = 17.9 mm, with C-thread to be screwed in between the lens and camera to extend the focal length by a factor of 2. Suitable lenses: 6GF9001-1BE01, …-1BL01, …-1BF01, …-1BG01, …-1BH01, …-1BJ01, …-1BK0 	**6GF9001-1BV**
Filter for utilizing the mini lenses in the limited field of view	
	
Infrared filter Function: Visible light is largely or completely filtered out, infrared light can pass through. Application: When used with infrared lamps, it is possible to achieve independence from daylight. Suitable lenses: 6GF9001-1BL01, …-1BF01, …-1BG01, …-1BH01, …-1BJ01	**6GF9001-2AD**
Blue filter Function: Blue light can pass through. Application: e.g. to improve the visualization of structures. Suitable lenses: 6GF9001-1BL01, …-1BF01, …-1BG01, …-1BH01, …-1BJ01	**6GF9001-2AE**
Polarization filter Function: Filters out light which is directed at right angles to the polarization direction of the filter. Application: e.g. to reduce reflections from metal. Suitable lenses: 6GF9001-1BL01, …-1BF01, …-1BG01, …-1BH01, …-1BJ01	**6GF9001-2AF**
Daylight filter Function: Visible light can pass largely undiminished, and frequencies above and below (infrared light and ultraviolet light) are filtered out. Application: The filter is used to protect the image sensor in the camera from laser light to the extent that this is outside the visible spectrum. Suitable lenses: 6GF9001-1BL01, …-1BF01, …-1BG01, …-1BH01, …-1BJ01	**6GF3440-8EA1**

Dimensional drawings

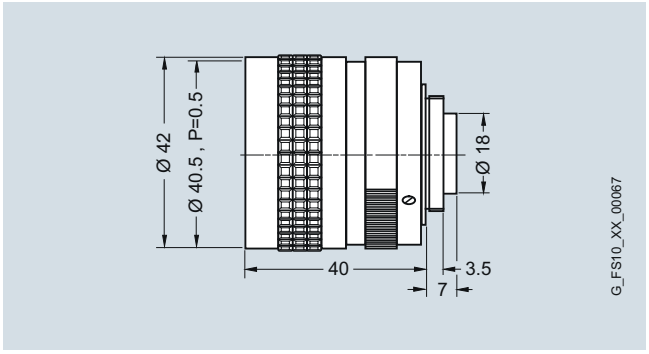
Lenses for code reading, text recognition, and object detection



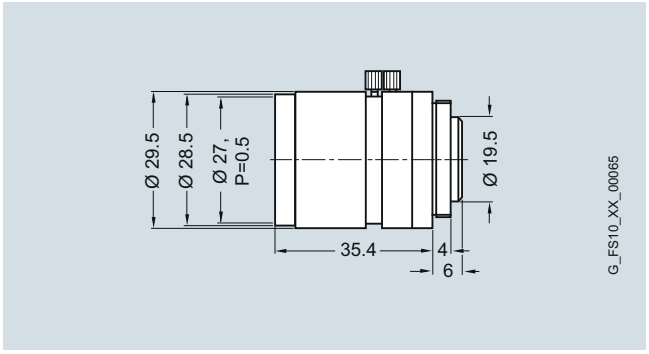
Lens 6GF9001-1BB01



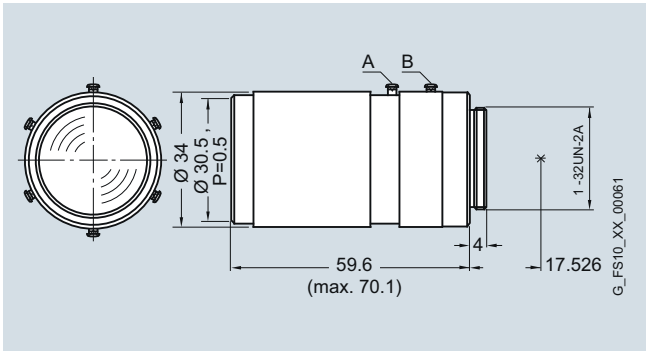
Lens 6GF9001-1BG01



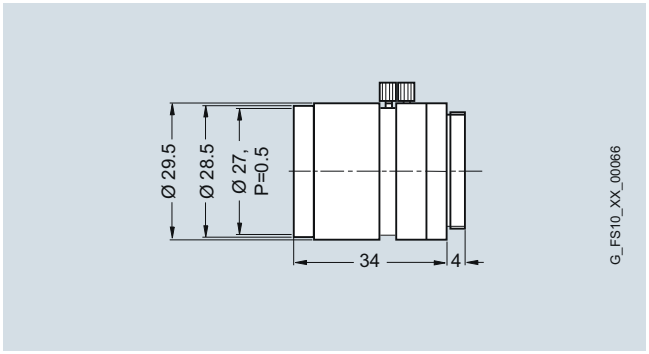
Lens 6GF9001-1BE01



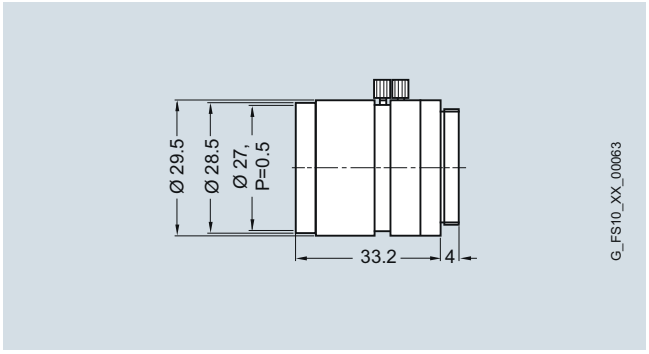
Lens 6GF9001-1BH01



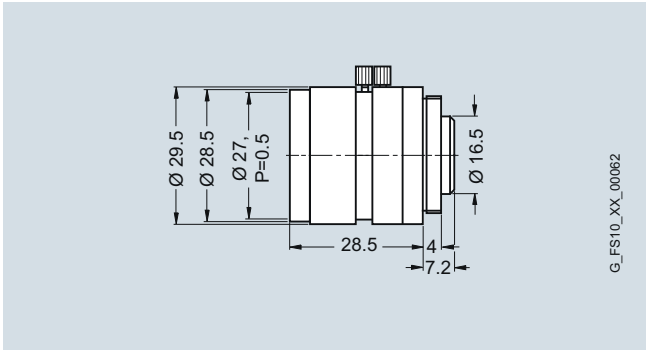
Lens 6GF9001-1BK01



Lens 6GF9001-1BJ01



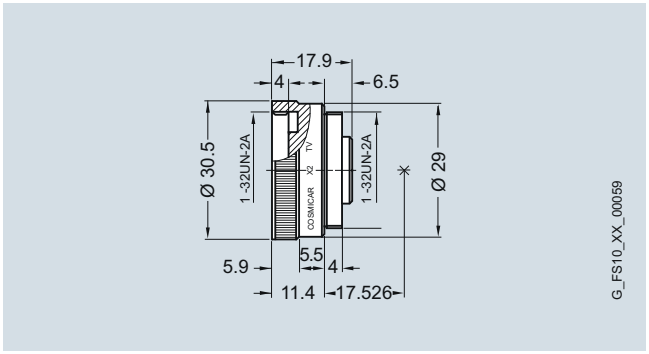
Lens 6GF9001-1BF01



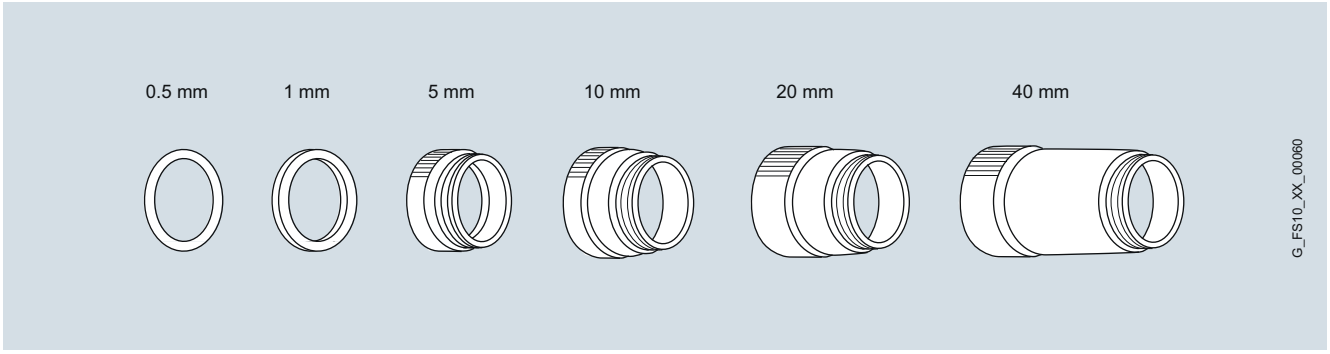
Lens 6GF9001-1BL01

Lenses

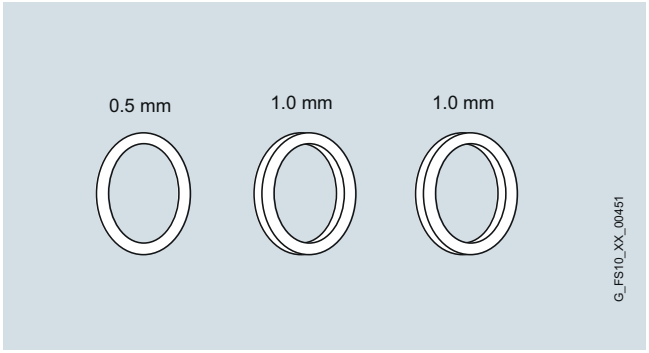
Accessories for lenses



Focal range doubler 6GF9001-1BV



Intermediate ring set 6GF9001-1BU



Intermediate ring set 6GF9001-1BU01

Overview

Optical handheld readers are suitable for portable reading of two-dimensional (2D) data matrix codes and one-dimensional (1D) barcodes. The integrated complex image processing functions and illumination technologies enable codes to be read on a variety of surfaces. Optical handheld readers of various performance classes are available for this purpose.

The range extends from devices for simple reading tasks such as printed barcodes up to models for demanding, weak-contrast markings such as dot-peened or lasered codes.

SIMATIC MV320 optical handheld reader

SIMATIC MV320

The SIMATIC MV320 handheld reader is the entry level device. It is suitable for labels with higher contrasts, but it can also be used application-specifically for labels with lower contrasts.

The SIMATIC MV320 is also available as a wired version (RS232, USB). The reader is designed for a distance of up to 375 mm.

SIMATIC MV325 optical handheld reader

SIMATIC MV325

The optical SIMATIC MV325 handheld reader is a high-performance reader with Bluetooth wireless communication. It is suitable for labels with higher contrasts, but it can also be used application-specifically for codes with lower contrasts.

The SIMATIC MV325 is supplied with a charging station containing the respective access point of the wireless interface and a cabled connection to the host (USB). The reader is designed for a distance of up to 375 mm.

SIMATIC MV340 optical handheld reader

SIMATIC MV340

The SIMATIC MV340 is the most powerful device and is particularly suitable for demanding applications such as low-contrast and damaged codes. It has a high reading rate when decoding data matrix symbols.

The special integrated lighting works equally well on smooth, reflective or wavy surfaces. The SIMATIC MV340 can be connected via RS232 or USB. This optical handheld reader is designed for close ranges and records codes at a distance of up to 50 mm.

Introduction

Major differences

Type	SIMATIC MV320	SIMATIC MV325	SIMATIC MV340
Graphic display	–	–	–
Read quality of low-contrast codes	+	+	+++
Operating distance			
• Minimum (code-dependent)	50 mm (1.9")	50 mm (1.9")	0 mm (0.0")
• Maximum (code-dependent)	375 mm (14.8")	375 mm (14.8")	50 mm (2.0")
Field of view			
• Near	25 mm x 15 mm (0.98" x 0.6") at 50 mm (1.9") distance	25 mm x 15 mm (0.98" x 0.6") at 50 mm (1.9") distance	36 mm x 29 mm (1.4" x 1.1") at distance of 0 mm (0.0")
• Distant	150 mm x 90 mm (5.9" x 3.5") at 50 mm (1.9") distance	150 mm x 90 mm (5.9" x 3.5") at 375 mm (14.8") distance	71 mm x 57 mm (2.8" x 2.2") at distance of 51 mm (2.0")
Decoding capability	1D: Codabar, Code 11, Code 32, Code 39, Code 93, Code 128, Interleaved 2 of 5, GS1 DataBar (RSS), Maxtrix 2 of 5, MSI Plessey, Plessey, Straight 2 of 5, Trioptic, UPC/EAN/JAN Stacked 1D: GS1 Composite (CC-A/CC-B/CC-C), MicroPDF, PDF417 2D: Aztec Code, Data Matrix, Micro QR Code, QR Code, Han Xin	1D: Codabar, Code 11, Code 32, Code 39, Code 93, Code 128, Interleaved 2 of 5, GS1 DataBar (RSS), Maxtrix 2 of 5, MSI Plessey, Plessey, Straight 2 of 5, Trioptic, UPC/EAN/JAN Stacked 1D: GS1 Composite (CC-A/CC-B/CC-C), MicroPDF, PDF417 2D: Aztec Code, Data Matrix, Micro QR Code, QR Code, Han Xin	1D: Code 39, Code 93, Code 128, I2of5, Codabar, UPC/EAN, Pharmacode, BC 412 2D: Data Matrix, QR Code, MicroQR Code, PDF417, GS1 Databar, Aztec
Department of Defense Unique Identifier String Validator	–	–	•
Code creation	Print, laser	Print, laser	Laser, print, dot peen
Radio interfaces	–	Bluetooth	–
Ports	USB, RS232	USB	USB, RS232

4

Benefits

get Designed for Industry

- Industry leading reading performance for Data Matrix codes, also for hard-to-read DPMs.
- Rugged design, for production environment.
- Supports multiple communication protocols: RS232 / USB or Bluetooth.
- Can read barcodes, data matrix codes, and other symbols.
- Can be used as a replacement device for existing barcode readers.

Application

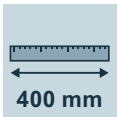
The optical handheld readers are suitable for optical identification of objects using 1D or 2D codes in the production, logistics, quality assurance, and maintenance and servicing fields. Application examples:

- Automotive industry
  - Markings on various drive components (cylinder heads, cylinder blocks, elbow joints, etc.)
  - Laser markings on various drive components (cam shafts, crankshafts, pistons, piston rods, gearbox components, etc.)
  - Laser markings on electronic components, printed circuit boards, or enclosures
- Mechanical engineering
  - Markings on different types of component
- Tobacco industry
  - Printed or laser markings on boxes
- Food industry
  - Printed or laser markings on cartons
  - Laser markings on production machines

Design

All handheld readers are equipped with a handle. The handles are equally suitable for right-handed or left-handed persons. The read process is triggered by a switch on the handle. The handle can be removed. On cabled connections via RS232 or USB, data and power are transmitted direct via the shared cable.

Overview



SIMATIC MV320 is a rugged, powerful industrial barcode and data matrix code reader suitable for high resolutions. This handheld reader reads two-dimensional (2D) data matrix codes and one-dimensional (1D) barcodes.

It can read medium to high contrast data matrix codes. The cell size should be larger than 0.13 mm. Barcodes can be read if the width of a bar is larger than 0.12 mm.

The reader possesses complex image processing functions and illumination technology in order to read codes on many different surfaces.

The SIMATIC MV320 handheld reader is suitable for wired communication. Due to the varied interface technology (USB, RS232), simple integration into your application is possible with the device.

The optical SIMATIC MV320 handheld reader is supplied as a package including USB cable. A separate package comprising cable and power supply is available for use as an RS232 version.

Design

The SIMATIC MV320 handheld reader features a robust, ergonomic handle with integrated strain relief.

The SIMATIC MV320 is a monolithic product and thus extremely robust. The only replaceable component is the cable that is connected to the reader with protected strain relief but can nevertheless be easily replaced for the purpose of changing the interface technology.

Integration

The SIMATIC MV320 handheld readers can communicate with the host computer by means of RS232 and USB. No special software is required for this purpose. The SIMATIC MV320 is configured by reading supplied data matrix codes.

The optical handheld reader can only be operated via RS232 and USB for direct transfer of the codes to the host computer. "Batch mode" is not possible.

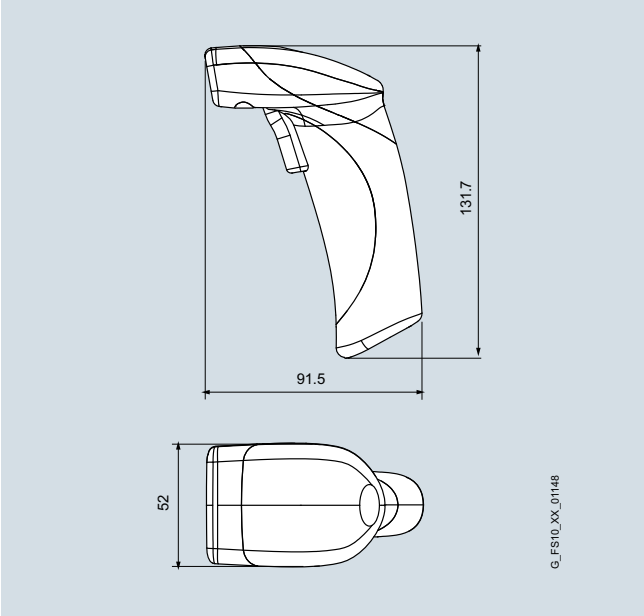
Technical specifications

Article number	**6GF3320-0HT01**
Product type designation	MV320 optical handheld reader
Suitability for operation	1D/2D: Aztec, Codabar, Codablock F, Code 11, Code 39, Code 39 Short Margin, Code 39 Extended Full ASCII, Code 39 Checksum, Code 93, Code 128, Code 128 Short Margin, Composite, Data Matrix, Data Matrix Rectangle, Data Matrix Inverse, GS1 DataBar (all), Interleaved 2of5, Interleaved 2of5 - 2 Digits, Macro PDF417, Maxicode, Matrix 2of5, Micro PDF417, MSI Plessy, NEC 2of5, OCR, PDF417, Postal Codes (All), QR Code, Telepen, UPC, UPC Short Margin, UPC Extension
Range	20 ... 375 mm
Range Note	Range depends on the type and size of code. See manual for details
Optical data	
Design of image sensor of the camera	CMOS 1 280 x 960, image resolution 960 x 640
Mounting type of lens	Integrated
Type of light source	Lighting system comprising incident light (red)
Image acquisition frequency maximum	10 Hz
Type of focusing	Fixed focus, optimum focal point at 6.3 mm
Supply voltage, current consumption, power loss	
Type of current supply	Via USB or external plug-type power supply unit (RS232), 5 V, 410 mA
Type of battery	--
Permitted ambient conditions	
Ambient temperature	
• during operation	-20 ... +55 °C
• during storage	-30 ... +65 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Height of fall maximum	1.8 m
Design, dimensions and weight	
Width	132 mm
Height	52 mm
Depth	92 mm
Net weight	0.13 kg
Product properties, functions, components general	
Design of the display	2 LEDs
Operator element version	Trigger in handle
Design of acoustic signaling element	Vibration alarm, audible signal
Design of the interface	USB, RS232
Product functions management, configuration	
Product function of the software	Read, display, save, transfer codes
Type of programming	Optical parameterization or via configuration software
Accessories	
Accessories	RS232 cable with power supply, USB cable, metal stands

Selection and ordering data

	Article No.
SIMATIC MV320 Rugged industrial handheld reader for barcodes and data matrix codes, with 1.8 m USB cable. 	**6GF3320-0HT01**
Accessories	
USB cable 1.8 m long, not spiraled	**6GF3320-0AC02**
RS232 cable 2.4 m long, spiraled 	**6GF3320-0AC03**
Plug-in power supply For use with RS232 cable	
• For the USA	**6GF3020-0AC40-0AP1**
• For Europe	**6GF3020-0AC40-0AP2**
Metal stands 	**6GF3320-0AC07**

Dimensional drawings



SIMATIC MV320 optical handheld reading device

4

Overview

The SIMATIC MV325 handheld reader is a robust, high-performance industrial barcode and data matrix code reader suitable for high resolutions. It reads two-dimensional (2D) data matrix codes and one-dimensional (1D) barcodes.

Medium to high contrast data matrix codes can be read. The cell size should be larger than 0.13 mm. Barcodes can be read if the width of a bar is larger than 0.12 mm.

The reader possesses complex image processing functions and illumination technology in order to read codes on many different surfaces.

The SIMATIC MV325 handheld reader is suitable for wireless communication. Thanks to Bluetooth interface technology, simple integration into your application is possible with the device.

The handheld reader is supplied as a package including a charging station and USB cable.

Design

The optical SIMATIC MV325 handheld reader has a replaceable battery pack and is extremely rugged. The only replaceable component is the battery that can be charged together with the reader or individually in the charging station.

Integration

The charging station of the SIMATIC MV325 can communicate with the host computer by means of USB. No special software is required for this purpose. The SIMATIC MV325 is configured by reading supplied data matrix codes.

The SIMATIC MV325 handheld reader itself communicates via Bluetooth with the base station. No special software is required for connecting a handheld reader with a specific charging station since the SIMATIC MV325 is connected with the charging station by reading a unique identifier on the charging station.

The code contents read are automatically transferred to the charging station as soon as a wireless connection is established. If the connection to the charging station is not established, the read results are buffered in the mobile section (if this function is activated). This operating mode is referred to as batch mode. As soon as the connection to the charging station is restored, the read results are automatically transferred.

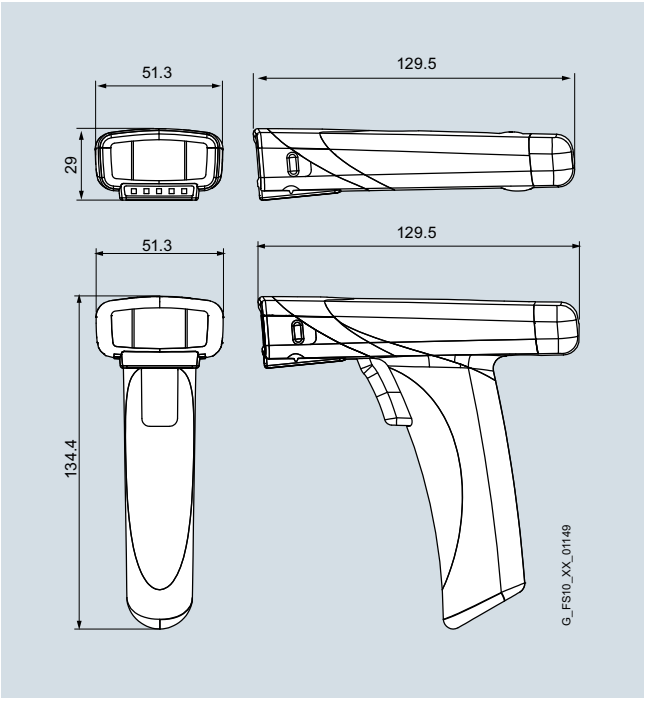
Technical specifications

Article number	**6GF3325-0HT01**
Product type designation	MV325 optical handheld reader
Suitability for operation	1D: Codabar, Code 11, Code 32, Code 39, Code 93, Code, 128, Interleaved 2 of 5, GS1 DataBar (RSS), Maxtrix 2of5, MSI Plessey, Plessey, Straight 2of5, Trioptic, UPC/EAN/JAN Stacked 1D: GS1 Composite (CC-A/CC-B/CC-C), MicroPDF, PDF417 2D: Aztec Code, Data Matrix, Micro QR Code, QR Code, Han Xin
Range	20 ... 375 mm
Range Note	Range depends on the type and size of code. See manual for details
Optical data	
Design of image sensor of the camera	CMOS 1 280 x 960, image resolution 960 x 640
Mounting type of lens	Integrated
Type of light source	Lighting system comprising incident light (red)
Image acquisition frequency maximum	10 Hz
Type of focusing	Fixed focus, optimum focal point at 6.3 mm
Supply voltage, current consumption, power loss	
Type of current supply	Battery operation
Type of battery	Lithium ion accumulator, fast charging capability
Battery capacity	1.3 Ah
Operating period with standard battery typical	12 h
Permitted ambient conditions	
Ambient temperature	
• during operation	-20 ... +55 °C
• during storage	-30 ... +65 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Height of fall maximum	1.8 m
Design, dimensions and weight	
Width	135 mm
Height	51 mm
Depth	130 mm
Net weight	0.18 kg
Product properties, functions, components general	
Design of the display	6 LEDs
Operator element version	Trigger in handle
Design of acoustic signaling element	Vibration alarm, audible signal
Design of the interface	Bluetooth Class 2, USB
Product functions management, configuration	
Product function of the software	Read, display, save, transfer codes
Type of programming	Optical parameterization or via configuration software
Accessories	
Accessories	Changeable accumulator for 50000 readings (Lion 3.7 V / 1.3 Ah), external charging station (power supply via USB) incl. Bluetooth Accesspoint

Selection and ordering data

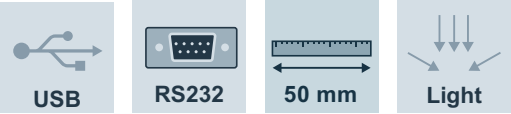
	Article No.
SIMATIC MV325 Robust industrial optical handheld reader for 1D and 2D codes (e.g. barcodes and data matrix codes), with charging station and USB cable. With Bluetooth wireless interface and charging station with USB host interface.	**6GF3325-0HT01**
Accessories	
Charging station Charging station with USB host interface and with Bluetooth wireless interface. With USB cable (0.9 m). 	**6GF3325-0AC03**
Battery Lithium ions (1300 mAh; 50 000 charging cycles) 	**6GF3325-0AC07**

Dimensional drawings



SIMATIC MV325 optical handheld reading device

Overview



The SIMATIC MV340 is one of the most powerful handheld readers in the world and is thus particularly suitable for demanding applications. The reader reads a wide range of direct part markings (DPM), from linear barcodes all the way to 2D symbols. Different codes can be read without having to reconfigure the device.

The optical MV340 handheld reader is designed for close ranges and records codes at a distance of up to 50 mm. The optimum reading distance is 6 mm. The special integrated lighting is ideal for a wide variety of surfaces and increases the contrast with stamped codes. Low-contrast reading despite fluctuating lighting conditions and twisted or damaged codes are the strengths of the SIMATIC MV340.

The SIMATIC MV340 handheld reader is connected via a USB or RS232 interface to the IT system or HMI device.

Design

The SIMATIC MV340 is a fully integrated device that combines a powerful reader unit and lighting in a rugged housing with an ergonomically shaped handle. The read process is triggered by a switch on the handle. Feedback from the read process can be optical via a multi-color LED, acoustic, or by means of a vibrating alarm.

The special integrated lighting unit can switch automatically between different lighting types to always provide optimal lighting conditions for a wide range of code and surface types. Even low-contrast codes or dot peen markings are therefore no longer a problem.

The device is supplied with a USB cable as standard. An RS232 cable can be ordered separately as an accessory.

Integration

The SIMATIC MV340 is connected via USB or RS232. The free ESP software is available for user-friendly set-up of the device. As an alternative, the device can be installed and operated without special software since it can also be configured by reading supplied data matrix codes.

The power supply is solely via cable. If the device is connected via USB to the host computer, the supply voltage is applied directly via the USB port. Connection to the RF170C communication module is also via the USB port. If the connection is via RS232, an additional power supply unit is required which is coupled to the RS232 connector via Y-cable. The power supply unit is available in three variants: EU, UK, and USA.

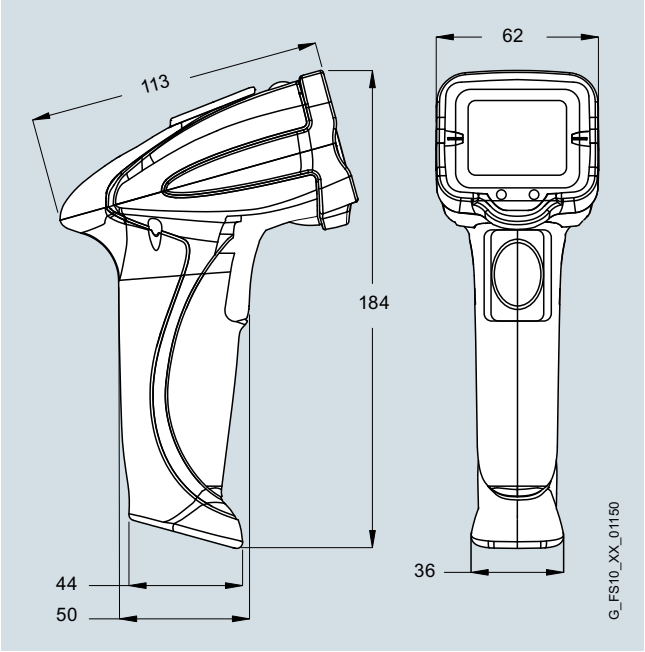
Technical specifications

Article number	**6GF3340-0HT01**
Product type designation	MV340 optical handheld reader
Suitability for operation	1D Codes: Int. 2/5, Code 128, Code 93, Code 39, EAN/UPC, Codabar, BC 412 2D-Codes: DMC, PDF417, QR, GS1 Databar
Range	0 ... 50 mm
Range Note	Code-dependent
Optical data	
Design of image sensor of the camera	CMOS 1 280 x 1 024
Mounting type of lens	Integrated
Type of light source	Lighting system comprising diffuse incident light (light field: red/blue) and dark field (red)
Image acquisition frequency maximum	10 Hz
Type of focusing	Fixed focus, optimum focal point at 6.3 mm
Supply voltage, current consumption, power loss	
Type of current supply	Via USB or external plug-type power supply unit (RS232), 5 V, 410 mA
Type of battery	--
Permitted ambient conditions	
Ambient temperature	
• during operation	0 ... 50 °C
• during storage	-20 ... +65 °C
Relative humidity at 25 °C without condensation during operation maximum	95 %
Height of fall maximum	1.8 m
Design, dimensions and weight	
Width	180 mm
Height	63 mm
Depth	114 mm
Net weight	0.2 kg
Product properties, functions, components general	
Design of the display	Multi-color LED
Operator element version	Trigger in handle
Design of acoustic signaling element	Vibration alarm, audible signal
Design of the interface	USB, RS232
Product functions management, configuration	
Product function of the software	Read, display, save, transfer codes
Type of programming	Optical parameterization or via configuration software
Accessories	
Accessories	RS232 cable with power supply

Selection and ordering data

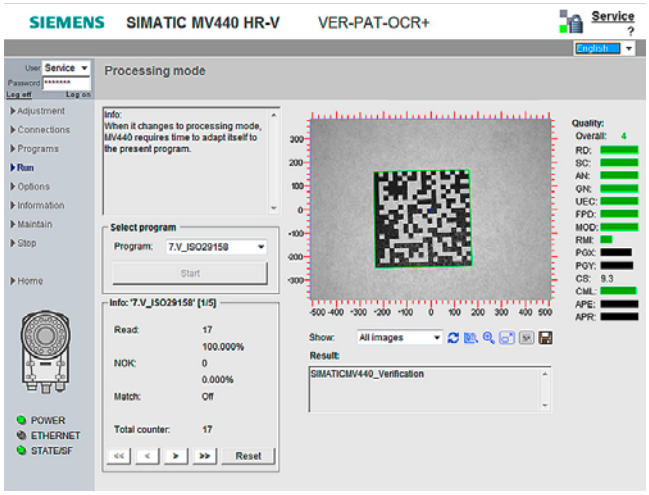
	Article No.
SIMATIC MV340 Robust industrial optical reader for barcodes and data matrix codes, with special integrated lighting. Suitable for demanding, i.e. low-contrast, marking systems. With USB cable.	**6GF3340-0HT01**
Accessories	
RS232 cable	
• 2.4 m long, spiraled.	**6GF3020-0AC40-0AC1**
• 2.4 m long, spiraled, with power supply for USA.	**6GF3020-0AC40-0AC3**
• 2.4 m long, spiraled, with power supply for Europe.	**6GF3020-0AC40-0AC4**
• 2.4 m long, spiraled, with power supply for UK.	**6GF3020-0AC40-0AC5**
• 5 m long, spiraled.	**6GF3020-0AC40-0AC7**
• 5 m long, spiraled, with power supply for Europe.	**6GF3020-0AC40-0AC8**
USB cable 1.8 m long, not spiraled.	**6GF3020-0AC40-0AC0**
Power supplies For use with RS232 cable	
• For USA.	**6GF3020-0AC40-0AP1**
• For Europe.	**6GF3020-0AC40-0AP2**

Dimensional drawings



SIMATIC MV340 optical handheld reading device

Overview



Marking a product is normally done very early on in the production process so that all following steps can be controlled using the product identity.

By using verification systems, the readability of marks is guaranteed throughout the entire production process regardless of any possible contamination or when using different read devices. Moreover, the marking can continue to be read after the production process throughout the lifespan of the product.

With the verification license "Veri-Genius", devices of the SIMATIC MV440 family can be used for checking the marking quality of codes (verification) in addition to reading 1D barcodes and 2D matrix codes.

The license is supplied as a "Single License" on a USB flash drive and can be installed via the SIMATIC Automation License Manager (ALM) on any reader of the SIMATIC MV440 series. The license is executable on a SIMATIC MV440 as of firmware version 4.0.

Benefits

get Designed for Industry

Support for all important sectors and code types through the following verification standards:

- ISO TR 29158 (previously AIM DPM-1-2006)
  - Code type: Data Matrix Code
  - Type of marking: All - focus on DPM, e.g. dot-peened and lasered markings
  - Industries: All - focus on DPM, e.g. dot-peened and lasered markings
- Siemens DPM
  - Code type: Data Matrix Code
  - Type of marking: All - focus on DPM, e.g. dot-peened and lasered markings
  - Industries: All
- ISO/IEC 15415
  - Code type: Data Matrix Code
  - Type of marking: Printed
  - Sectors: All – focus: Pharmaceutical industry
- AS9132 Rev. A (previously IAQG)
  - Code type: Data Matrix Code
  - Type of marking: Printed
  - Sectors: All – focus: Aerospace
- ISO/IEC 15416 (previously ANSI X3.182-1990)
  - Code type: Barcode
  - Type of marking: Printed
  - Sectors: All - printed labels

Further highlights

- Various resolutions available (640 x 480 pixels, 1 024 x 768 pixels and 1 600 x 1 200 pixels)
- License includes calibration card
- Simultaneous reading and verifying in one field of view
- Flexible retrofitting of the license to each device of the SIMATIC MV440 series via the Automation License Manager of SIMATIC – advantage: Savings with stocking spare parts
- Easy integration of verification into the automation environment via SIMATIC MV440 using a function block (FB 79, FB 45 and Ident profile).

Application

Applications for verification span across almost all sectors. To maximize read rates in production and logistics and to make them predictable, it is essential to measure the marking quality.

The following sectors and applications are a particular focus for MV440 verification systems:

Automotive industry

- Needle marking (DPM):
  e.g. cylinder heads, cylinder blocks, etc.
- Laser marking (DPM):
  Cylinder pistons, gearbox components, etc.
- Laser markings on electronic components,
  printed circuit boards, or enclosures

Pharmaceutical industry

- Print or laser markings on medicines (DPM, OCR)
- Aerospace industry
- Needle or laser markings on gas turbine blades (DPM)
- Needle or laser markings on jet engine components (DPM)

Medical equipment

- Laser markings on implants (DPM)
- Laser markings on medical devices (DPM).

Electronics

- Needle or laser markings on hard disk components.
- Laser or etched markings on hard disk components (DPM)

Semiconductors

- Laser markings on rigid and flexible circuit boards (DPM)
- Laser markings on enclosed semiconductor components, heat sinks or heat exchangers (DPM)

"Veri-Genius" can be used anywhere where ambient conditions permit the use of the MV440 optical reader - for details, see SIMATIC MV440. Standard ring lights and lenses are designed to achieve IP67 degree of protection by means of the protective barrel, and for glass-free use in the food and beverages industry. If light sources or lenses are used outside the protective barrel, they must be used in compliance with their specification.

Any host and HMI systems required must be selected for a sector and a specific project. The range of application of the selected test method is defined in the specification of the test method and compliance is essential if universally valid results are to be obtained.

Design

All stationary optical SIMATIC MV440 readers are basic units under the terms of the "Veri-Genius" license. The verification functionality is enabled by transferring the license key from the supplied USB flash drive to the optical MV440 reader by means of SIMATIC License Manager.

The functionality is available without a license in demo mode. The functions subject to licensing are fully available without performance restrictions in Demo mode. Only output of the results on the communication channels is disrupted. Users can therefore determine in Demo mode if the functions and performance fulfill their requirements.

Verification with MV440 verification systems is suitable for both inline and offline measurements. In both cases, the specification of the verification standard used must be observed to ensure a robust measurement result. This means that, for example, the lighting and alignment of the light source, camera and test object must be selected in accordance with the specifications of the respective standard.

If only one light source is used, the MV440 can control an external light source using the existing image-synchronized digital output, or the external light source can be operated continuously.

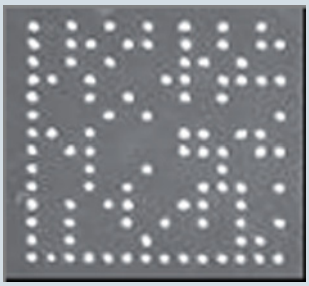
If more lighting directions are required, an external controller can be used to activated the desired lighting and to start each individual measurement by means of triggering. The result from the quality measurement or the relevant partial measurement is output directly by the MV440 after completion of the measurement. In the case of more than one measurement, it is the task of the external controller to combine the partial results into an overall result and to visualization this.

For a measurement with only one type of lighting, the measurement result can be visualized directly as a verification report in the form of an HTML page which can then be printed out.

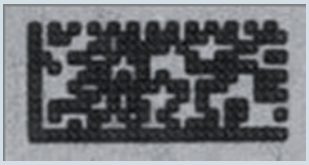
If the test method requires calibration, the calibration card included in the scope of delivery can be used in most cases. In cases with extreme imaging requirements (e.g. with very small or very large codes), the task of calibration must be resolved application-specifically.

Function

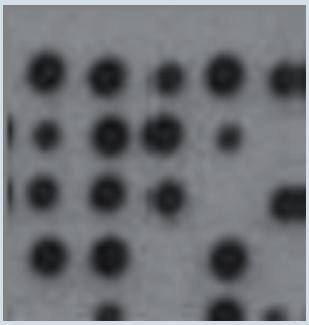
The following typical types of fault can be detected by measuring the marking quality - the following pictures show examples of correct code and faults in the marking quality:



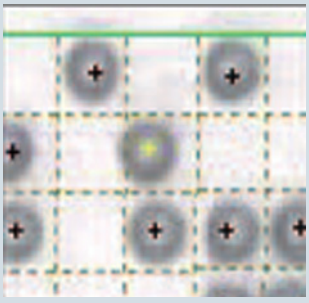
Correct code



Incorrect or non-uniform cell size in the marking



Incorrect or non-uniform cell size in the marking



Incorrect or non-uniform cell position in the marking

Incorrect overall geometry of the marking

Damaged surface of the marking or part

Very little or non-uniform contrast in the marking

Very little or non-uniform contrast in the marking

The following measuring procedures/standards are available for the purposes of inspection:

- ISO TR 29158 (previously AIM DPM-1-2006)
- Siemens DPM
- ISO/IEC 15415
- AS9132 Rev. A (previously IAQG)
- ISO/IEC 15416 (previously ANSI X3.182-1990)

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Veri-Genius for MV440

The measurement result is output as an overall result in 5 stages, which are named using letters or numbers:

Overall result as a digit	Overall result as letters	Overall result as text
4	A	Top quality
3	B	Good quality
2	C	Satisfactory quality
1	D	Adequate quality
	E	(not used)
0	Fault	Marking quality inadequate

The components of a measurement result and calculation of the overall result are dependent on the test method used.

The overall result and the components of a measurement result can be output after a test, and are then available for further processing on an external system, e.g. for archiving or creating a test report.

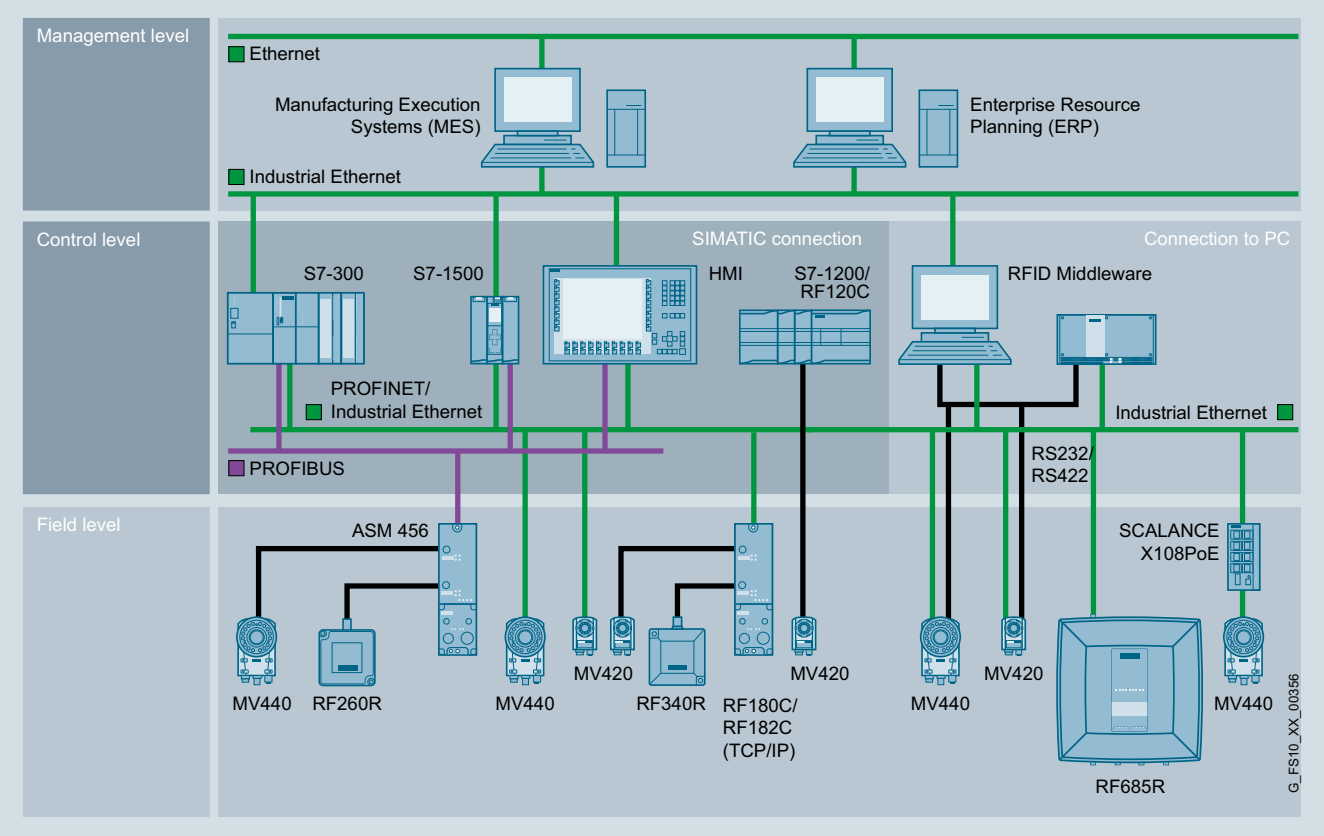
Integration

The MV440 verification systems can use all communication services that the SIMATIC MV440 basic unit offers:

Usable communication services	
PROFINET IO (FB 79)	Onboard MV440 PROFINET interface.
PROFINET IO (FB 101, Ident profile)	Onboard MV440 PROFINET interface.
PROFINET IO (FB 45, FB 101, Ident profile)	Via MV440 communication module interface, using the RF180C communication module.
Ethernet/IP	Via communication module interface, with communication module RFID 181EIP.
PROFIBUS DP V0/1 (FB 45, Ident profile)	Via MV440 communication module interface, using the ASM 456 communication module.
TCP/IP native	Onboard MV440 PROFINET interface.
RS232 (ASCII)	Onboard MV440 RS232 interface.
SIMATIC S7-1200, S7-300, ET 200pro	Via communication module interface.

The most important types of interface in the automation environment are shown in the overview below.

Refer to the section on the SIMATIC MV440 for additional details.

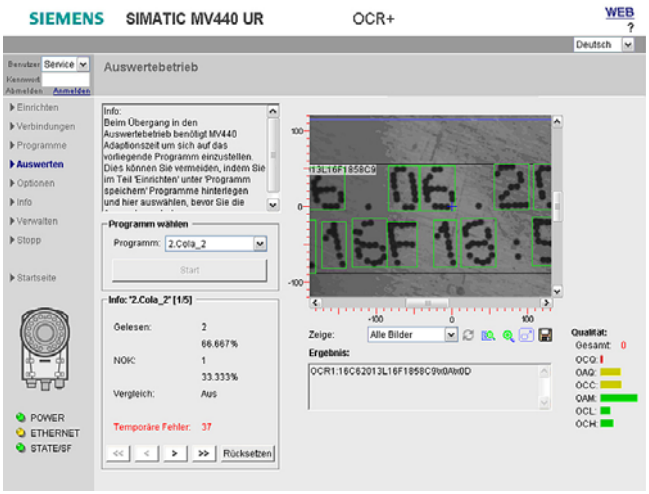


Selection and ordering data

	Article No.
Verification module Veri-Genius Software license for verification of machine-readable 1D barcodes and Data Matrix Codes. The license is supplied on a USB flash drive; executable on all optical SIMATIC MV440 readers as of firmware V4.0 (SIMATIC MV440 not included in the scope of delivery). The scope of supply includes the calibration card.	**6GF3400-0SL02**
Calibration card Spare part	**6GF3440-8CE**

Text-Genius for MV440

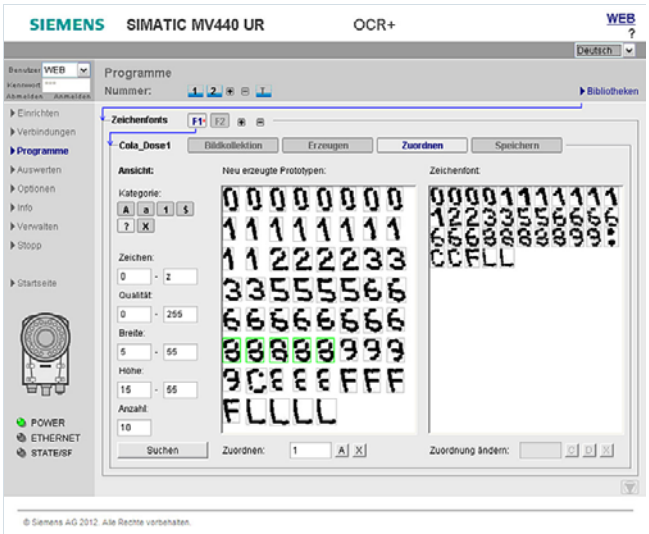
Overview



With the "Text-Genius" and "Text-Genius Plus" licenses, SIMATIC MV440 can be used for text recognition (in addition to reading 1D barcodes and 2D matrix codes).

Text recognition is also referred to as OCR (Optical Character Recognition). Simultaneous reading and comparing of plain text and reading of machine-readable codes in the same field of view is thus possible.

"Text-Genius" allows text recognition without training for a number of character sets by using generic algorithms, and thus reading without a preparatory phase.



Text-Genius Plus

The "Text-Genius Plus" license comprises all functions of the "Text-Genius" license and additionally enables training of further fonts and characters, including special characters and graphic symbols.

Licenses

The licenses are supplied as a "Single License" on a USB flash drive and can be copied to the device with the SIMATIC Automation License Manager (ALM) using a plug-in. The "Text-Genius" license is executable on a SIMATIC MV440 with firmware version 3.0 and higher, the "Text-Genius Plus" license with Firmware version 5.0 and higher.

Benefits

get Designed for Industry

Highlights of Text-Genius and Text-Genius Plus at a glance

- Quick and reliable reading (up to than 2000 readings per minute depending on the application) for high-speed applications.
- Fast and reliable checking of the readability of plain text (up to 1 000 reads per minute) for high-speed applications.
- Flexible reading and swapping between different fonts (e.g. OCR A, OCR B) without complex learning using Polyfont character set.
- High reading rate and reliability through saving of fonts on the camera.
- Reading and comparison of plain text and machine-readable code in the same image field.
- Automatic position tracking of the reading range with the resources of "Pat-Genius".
- Automatic text localization without the use of predefined areas means that text can be read even when its position varies.
- Automatic line detection for max. 12 freely definable image regions with max. 15 lines.
- Automatic character height recognition between 15 and 220 pixels.
- Individual parameterization per image region.
- Reading of mirrored, 90° rotated, and inverted text.
- Numerous filter and comparison functions.
- Comparison of text recognition result with an individually specified text per read operation.
- Flexible retrofitting of the text recognition function via the SIMATIC Automation License Manager
- Simple integration in the automation environment, e.g. via function block of the SIMATIC MV440 devices.

Additional highlights of Text-Genius Plus:

- Simple training of additional characters and fonts (user fonts).
- Adaptation of text recognition by user fonts to the specific requirements of the application to enable:
  - Expansion of defined fonts by missing characters, e.g. special characters.
  - Optimization of recognition for specific printing procedures (e.g. laser, ink, scribed, needled).
  - Optimization of recognition by using different versions of individual characters, e.g. to compensate distortions.
- Up to five user fonts can be used in the reader.
- Very high read reliability can be achieved (> 99.5%).

Application

Applications for text recognition span across almost all sectors. The application areas can be generally divided in three task areas:

- Text recognition for recording the content of a plain text identification.
- Comparison of the content of a plain text identification with the content of the adjacent machine-readable identification, e.g. Data Matrix Code (DMC).
- Comparison of the content of a plain text identification with individually specified values which are transferred to the reader similar to a printer.

Applications for different sectors are listed below. The list is incomplete and only serves to illustrate the wide range of possible applications.

Automotive industry, aerospace industry

- Detection and checking of plain text identifiers for type identification of components
- Comparison of DMC and plain text
- Acquisition of a unique identification of a product (serialization)
- Acquisition and checking the expiry date

Medical equipment

- Laser markings on implants (DPM)
- Laser markings on medical devices (DPM).

Electronics

- Detection of a unique plain text identifier for identifying devices, e.g. electricity meters
- Detection and checking of plain text identifiers for type identification of PCBs
- Solar industry (serial numbers on thin-layer modules)
- Detection of a unique plain text identifier on thin-layer modules (serialization)

Food and beverage industry

- Inspection of expiry date on packaging
- Control of packaging and storage processes

"Text-Genius" and "Text-Genius Plus" can be used anywhere where ambient conditions permit the use of the optical reader SIMATIC MV440. For details, see "SIMATIC MV440". Standard ring lights and lenses are designed to achieve IP67 degree of protection by means of the protective barrel, and for glass-free use in the food and beverages industry. If light sources or lenses are used outside the protective barrel, they must be used in compliance with their specification.

The "text recognition" function can be implemented in applications without the need to consider the type of font used for marking (Polyfont) or the marking method. The fonts which enable a maximum read rate to be achieved are listed in the "Function" chapter. Further fonts and additional characters can be added to Text-Genius Plus at any time by training. No marking methods are excluded either. The read rate improves if the font has a stable appearance and when there is a good contrast between the background and marking.

Design

All stationary optical SIMATIC MV440 readers are basic units under the terms of the "Text-Genius" and "Text-Genius Plus" licenses. The text recognition functionality is enabled by transferring the license key from the supplied USB flash drive to the MV440 reader by means of SIMATIC License Manager.

The functionality is available without a license in demo mode. The functions subject to licensing are fully available without performance restrictions in Demo mode. Only output of the results on the communication channels is disrupted. Users can therefore determine in Demo mode if the functions and performance fulfill their requirements.

Function

The outstanding feature of "Text-Genius" and "Text-Genius Plus" is that they are easy to set up. To achieve stable read results for text recognition, it is only necessary to set a few, simple parameters. "Text-Genius" uses a generic approach for text recognition, so no individual training is required for most fonts and the characters (letters and digits) of the ASCII character set. Recognition of several fonts is thus possible with this software without specific training. In particular, no complex settings are required for optimizing recognition performance.

The following fonts are ideal for recognition of the text:

- OCR-A
- Semifont M13
- and similar fonts

Furthermore, Arial, OCR-B and similar fonts also produce good reading results.

"Text-Genius Plus" additionally allows the training of additional characters for any character set. Expansion of the character set is required to allow recognition of characters which are not included or of those which are deformed as a result of the printing process.

The character sets of the "Text-Genius" license are available as the basis for text recognition with "Text-Genius Plus", meaning that text recognition can be started immediately without further training. "Text-Genius Plus" is particularly suitable for applications with a varying print image and unknown fonts.

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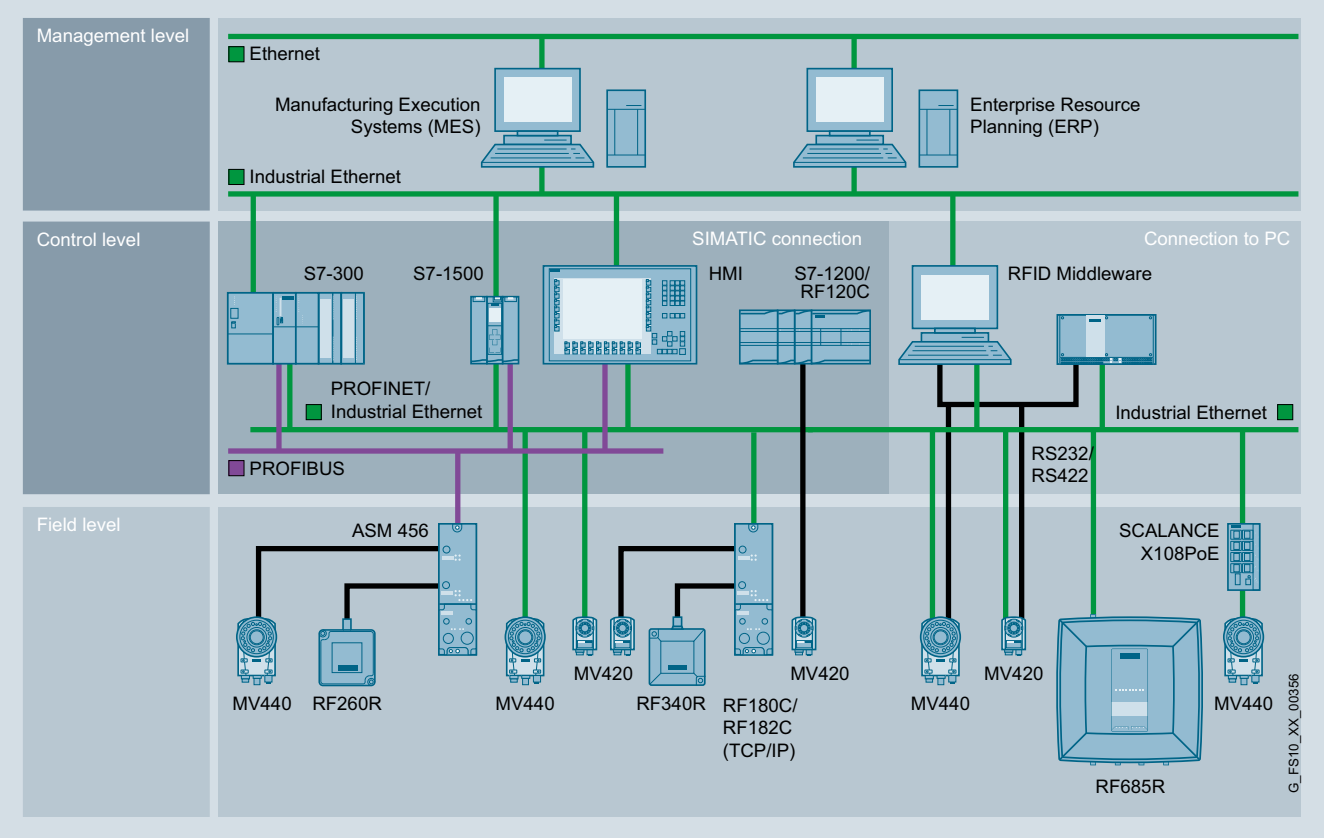
Integration

The MV440 text recognition systems can use all communication services that the SIMATIC MV440 basic unit offers:

Usable communication services	
PROFINET IO (FB 79)	Onboard MV440 PROFINET interface.
PROFINET IO (FB 101, Ident profile)	Onboard MV440 PROFINET interface.
PROFINET IO (FB 45, FB 101, Ident profile)	Via MV440 communication module interface, using the RF180C communication module.
Ethernet/IP	Via communication module interface, with communication module RFID 181EIP.
PROFIBUS DP V0/1 (FB 45, Ident profile)	Via MV440 communication module interface, using the ASM 456 communication module.
TCP/IP native	Onboard MV440 PROFINET interface.
RS232 (ASCII)	Onboard MV440 RS232 interface.
SIMATIC S7-1200, S7-300, ET 200pro	Via communication module interface.

The most important types of interface in the automation environment are shown in the overview below.

For further details, refer to the chapter on SIMATIC MV440.

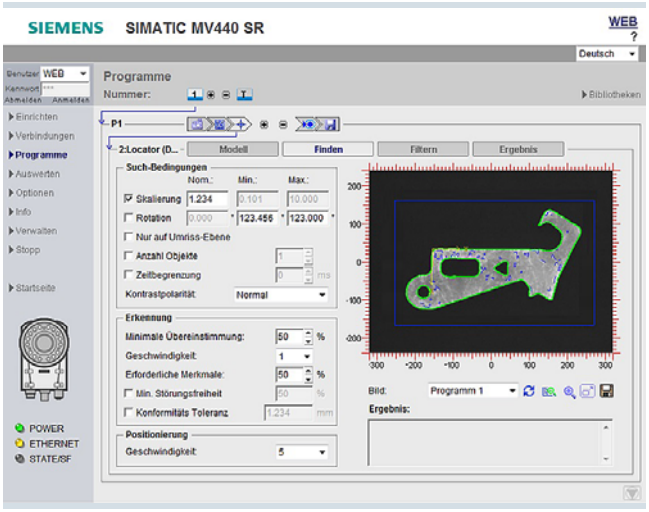


Selection and ordering data

	Article No.
OCR module Text-Genius Software license for reading machine-readable 1D barcodes and 2 D matrix codes, as well as for optical character recognition. The license is supplied on a USB flash drive; executable on optical SIMATIC MV440 readers as of firmware V3.0 (SIMATIC MV440 not included in the scope of delivery).	**6GF3400-0SL01**
OCR module Text-Genius Plus Software license for machine-readable text recognition (OCR) and for reading 1D barcodes and 2 D matrix codes. Trainable text recognition allows the training of individual characters or even complete character sets. The character sets of Text-Genius are provided as trained, expandable libraries. The license is supplied on a USB flash drive; executable on optical SIMATIC MV440 readers as of firmware V5.0 (SIMATIC MV440 not included in the scope of delivery).	**6GF3400-1SL01**

Pat-Genius for MV440

Overview



Objekterkennung mit Pat-Genius

With the object recognition license "Pat-Genius", devices of the SIMATIC MV440 family can also be used for checking the specifiable structures in the image (verification) in addition to reading 1D barcodes and 2D matrix codes.

The license is supplied as a "Single License" on a USB flash drive and can be installed via the SIMATIC Automation License Manager (ALM) on any reader of the SIMATIC MV440 series. The license can be installed on a SIMATIC MV440 as of firmware version 6.0.

Benefits

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- Pat-Genius shape recognition contains the following different partial tasks:
  - Object recognition (classification)
  - Position detection (position, rotational position, scaling)
  - Presence check (object recognition and position check with setpoint specification)
  - Completeness check (multiple presence check with setpoint specification)
  - Text recognition (based on the contour of any character or symbol)
- Pat-Genius is easy to operate thanks to its integration in the uniform operating concept for all function packages in the user interface of the MV440 devices
- Pat-Genius can be used together with all other function packages (Text-Genius and Veri-Genius) of the SIMATIC MV440 devices.
- Pat-Genius is available for all resolution versions of the SIMATIC MV440 (640 x 480 pixels, 1 024 x 768 pixels and 1 600 x 1 200 pixels).
- Pat-Genius can be flexibly retrofitted for every device of the SIMATIC MV440 family (via the SIMATIC Automation License Manager). Customer benefit: Cost benefits with stocking spare parts.
- Pat-Genius licenses are transferrable between all SIMATIC MV440 devices without regard for the resolution capacity.
- Pat-Genius supports the proved simple integration of the SIMATIC MV440 devices into the automation environment using a function block (FB 79, FB 45 and FB 101) for the SIMATIC S7-1200, S7-1500, S7-300 and S7-400 controllers.

Application

The functionality of object recognition is basically suitable for applications such as

- Pick-and-place machines
- Quality control in production
- Position detection in infeed systems
- Quantity monitoring in infeed systems and production

Pat-Genius can be used anywhere where ambient conditions permit the use of the optical MV440 reader - for details, see SIMATIC MV440. Standard ring lights and lenses are available for IP67 degree of protection by means of the protective barrel, and for glass-free use in the food and beverages industry. If light sources or lenses are used outside the protective barrel, they must be used in compliance with their specification.

Any host and HMI systems required must be selected for a sector and a specific project. The range of application of the selected test method is defined in the specification of the test method and compliance is essential if universally valid results are to be obtained.

The following sectors and applications are a particular focus for MV440 verification systems:

Automotive industry

For example:

- Testing the manufacturing process: e.g. assembling the body in white, etc.
- Access control for semi-finished products for machining stations in the process: Cylinder heads, etc.
- Monitoring the uniformity of the assembly quality in the manufacturing process

Pharmaceutical industry

For example:

- Checking of warning information on medicines (e.g. Caution poisonous)
- Checking of the correct arrangement of the content and the closing mechanism in the packaging process
- Checking the filling level of packages

Medical equipment

For example:

- Inline quality check and documentation by means of checking completeness and shape consistency

Electronics

For example:

- Inline quality check and documentation by means of checking completeness and shape consistency

Semiconductors

For example:

- Detecting the alignment of components
- Controlling the dimensional accuracy of components

Design

All SIMATIC MV440 stationary optical code reader are basic units under the terms of the "Object recognition" functionality, which is subject to license. The text recognition functionality is enabled by transferring the license key from the supplied USB flash drive to the MV440 reader by means of SIMATIC License Manager.

The functionality is available without a license in demo mode. This function subject to licensing is fully available without performance restrictions in Demo mode. Only output of the results on the communication channels is disrupted. Users can therefore determine in Demo mode whether the functions and performance fulfill their requirements.

Function

The object recognition detects deviations in the current camera image relative to a learned structure using edge structures.

Accordingly, the basic test sequence is as follows:

- Training the object test parameters using one or more good objects
- Testing an object and/or pattern with the features taken from the training
- Testing can be performed on stationary and moving objects
- Checking for a match with the reference provides a good/poor indication after comparison with set-value criteria
- Test results output to three control outputs:
  - OK: Presence of the trained objects and/or pattern recognized by characteristics
  - OK: Level of agreement greater than setpoint
  - ...
  - N_OK: NO presence of trained objects with the specified characteristics
  - N_OK: Deviation from degree of conformity to setpoint
  - ...
- Output of the result information onboard via PROFINET IO, Ethernet, RS232 interface – further interfaces are available via communication modules
- "Stand-alone" mode possible using integrated DI/O
- Remote control via PROFIBUS IO, PROFINET DP (via communication module), DI/O or Ethernet
- Platform-independent, web-based interface (Internet-enabled):
  - Monitoring (live image in read mode)
  - Diagnostics (fault image, log information, ...)
  - System administration (software update, ...)
  - Error analysis for troubleshooting for faulty readings
- Triggering of external ring lights

The overall result and the components of a measurement result can be output after a test via different interfaces, and are then available for further processing on an external system, e.g. for archiving or creating a test report.

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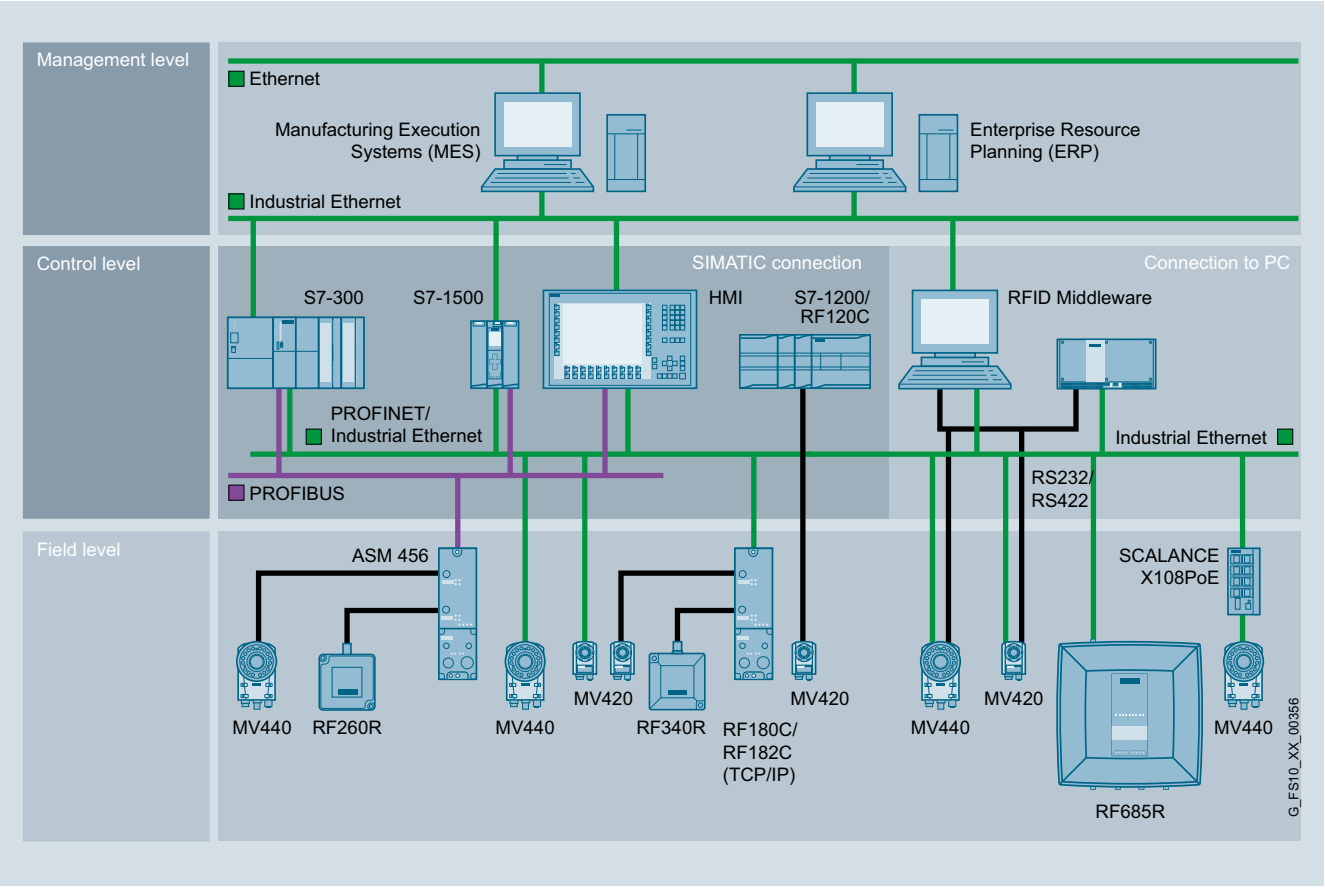

Selection and ordering data

	Article No.
IMATIC "Pat-Genius" license Software license for object recognition in image information on products of the SIMATIC MV440 family. The license is supplied on a USB flash drive; usable on all optical SIMATIC MV440 readers as of firmware V6.0 (SIMATIC MV440 not included in the scope of delivery).	**6GF3400-0SL03**