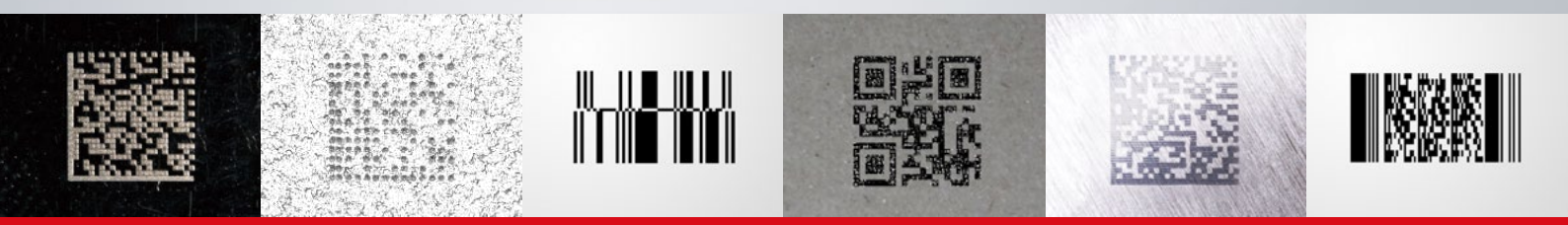
KEYENCE

Autofocus 1D and 2D Code Reader
SR-1000 Series

EtherNet/IP PROFINET CE

SETTING THE STANDARD FOR CODE READING

SR-1000 Series



3 CHALLENGES CODE READERS FACE

1 READER CANNOT BE MOUNTED AT DESIRED DISTANCE

"Selecting the right reader and lens combination for a given distance is frustrating."
"The system has to be designed to fit the specifications of the reader."

2 OPTIMUM SETTINGS ARE UNKNOWN

"Reading was successful during setup but there are many errors during actual operation."
"Setup requires a whole day."

3 READING FAILS DUE TO GLARE

"Do we need to mount the reader at a certain angle? What is the best angle?"
"Is external lighting required? What kind?"

1 ANSWER
JUST PRESS THE BUTTON

PRESS THE BUTTON

1 AUTOFOCUS

The reader can be mounted at any distance. (1000 mm max.)

2 AUTOMATIC TUNING

Determines optimum settings for exposure time, image processing filter, etc. [Approx. 750000 combinations]

3 AUTOMATIC POLARISATION

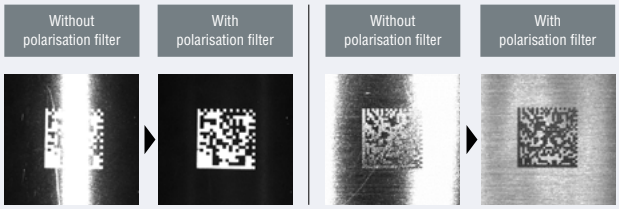
Glare can be eliminated. Reader angle adjustment or external lighting becomes unnecessary.

SET-UP COMPLETE

Autofocus 1D and 2D code reader
SR-1000 Series

WORLD'S FIRST AUTOMATIC POLARISATION CONTROL

The reader features both polarised and direct light sources. Automatic polarisation filter selection eliminates glare and allows flexible mounting.



1 **EASY SET-UP BY "JUST PRESSING THE BUTTON"**

AUTOFOCUS

ONE READER FOR MANY APPLICATIONS

Mounting is less restricted by the performance or specifications of the code reader itself, thus improving flexibility in machine designing for production lines and jigs.

A single reader can be used for targets with different heights

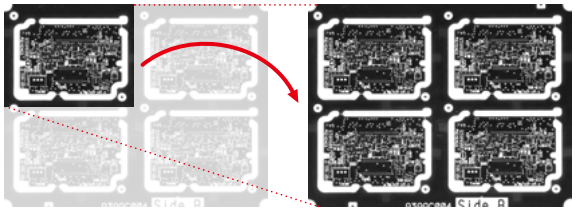
Provides safe movement range for a robotic arm

Reading extremely small codes

FIELD OF VIEW 4× LARGER

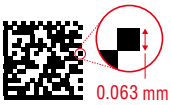
Conventional field of view

Field of view of the SR-1000 Series



EVEN IF THE CODE IS

SMALL



Distance: 110 mm

Range: 290 mm × 220 mm

4× WIDER
than conventional models

EVEN IF THE POSITION

CHANGES

Distance: 1000 mm

1.6× LONGER
than conventional models

EVEN IF THE DISTANCE IS

FAR

2 **EASY SET-UP BY "JUST PRESSING THE BUTTON"**

AUTOMATIC TUNING

OPTIMUM SETTING OF EXPOSURE TIME, FILTERS AND MORE

The code reader automatically optimises the exposure time, image processing filter and other parameters according to the target and mounting distance.

CLEAR IMAGE CAPTURE

CORRECTION ITEMS AND EXAMPLES OF AFFECTED CODES


Dark

CAPTURE BRIGHTNESS CORRECTION

Automatically configures various combinations of exposure time, dynamic range and gain in order to achieve the optimal brightness.


Black resin


PCB


Low contrast

CONTRAST THRESHOLD CORRECTION

Automatically corrects black/white thresholds and optimises the contrast between code and background.


Metal


Ceramic


Thin printing

FILTER CORRECTION

Automatically selects the best filter and filtering intensity to correct the captured image.


Bleeding


Thick printing


Distortion

GEOMETRIC CORRECTION

Corrects distorted codes, such as those on cylinders and other round surfaces or when the reader is mounted at an angle.


Parallel distortion


Trapezoidal distortion


Stray dots

IMAGE REDUCTION & CORRECTION

Reducing the image size may reduce background noise or missing spaces. Defects from background noise, dirt or scratches may appear insignificant after the image size reduction, hence causing them to be neglected.


Primary noise


Dot printing

APPLICATIONS

Transportation and metal works industries

CRANKSHAFTS

INSPECTIONS

The large field of view and autofocus function compensate for changes in both the position and reading distance of codes between product types.

CAMSHAFTS

PROCESSING

Automatic elimination of glare caused by cylindrical metals allow for stable reading.

Electronic devices industry

LEAD FRAMES

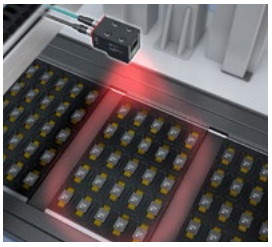
BONDING

This single device enables reading of extremely small codes and codes discoloured by heat or oxidation.

IC CHIPS

INSPECTIONS

Simultaneous reading of component codes for multiple ICs in a tray is possible.



Food, medical, and packaging industries

RETORT FOOD PRODUCTS

VARIETY INSPECTIONS

When transporting products on a conveyor belt, processing over a large field of view and with high-speed correction is possible even if the positions and orientations of the barcodes are different.

MEDICINAL PACKAGING

PACKAGING

With reliable capturing of barcodes and 2D codes traveling at high speeds help contribute to ever-increasing safety checks.

3 **EASY SET-UP BY "JUST PRESSING THE BUTTON"**

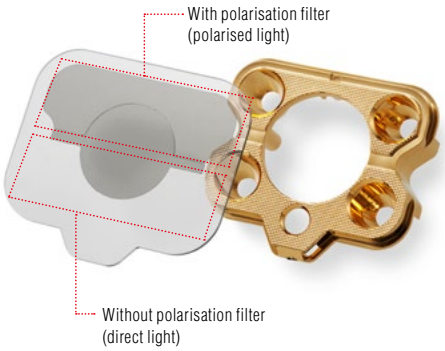
AUTOMATIC POLARISATION CONTROL

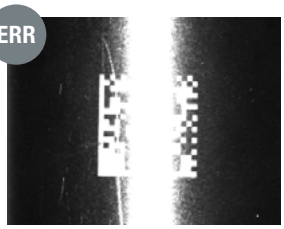
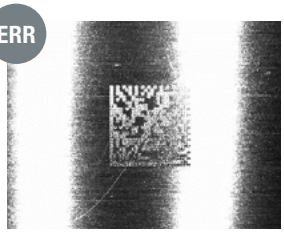
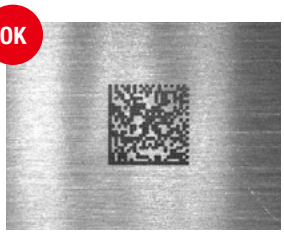
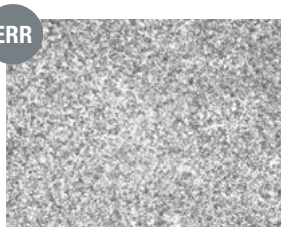
ENSURING FLEXIBLE MOUNTING

Automatic polarisation control function

World's First

The code reader automatically removes glare and eliminates the need for mounting angle adjustment or external lighting during installation. When combined with the autofocus function, mounting becomes highly flexible.



		Without polarisation filter	With polarisation filter
BLACK RESIN CYLINDER		ERR 	OK 
METAL HAIRLINE		ERR 	OK 
METAL DPM ON CAST SURFACE		OK 	ERR 

NEW OPTICAL DESIGN FOR STABLE READING

CPC (Compound Parabolic Concentrator) Illumination

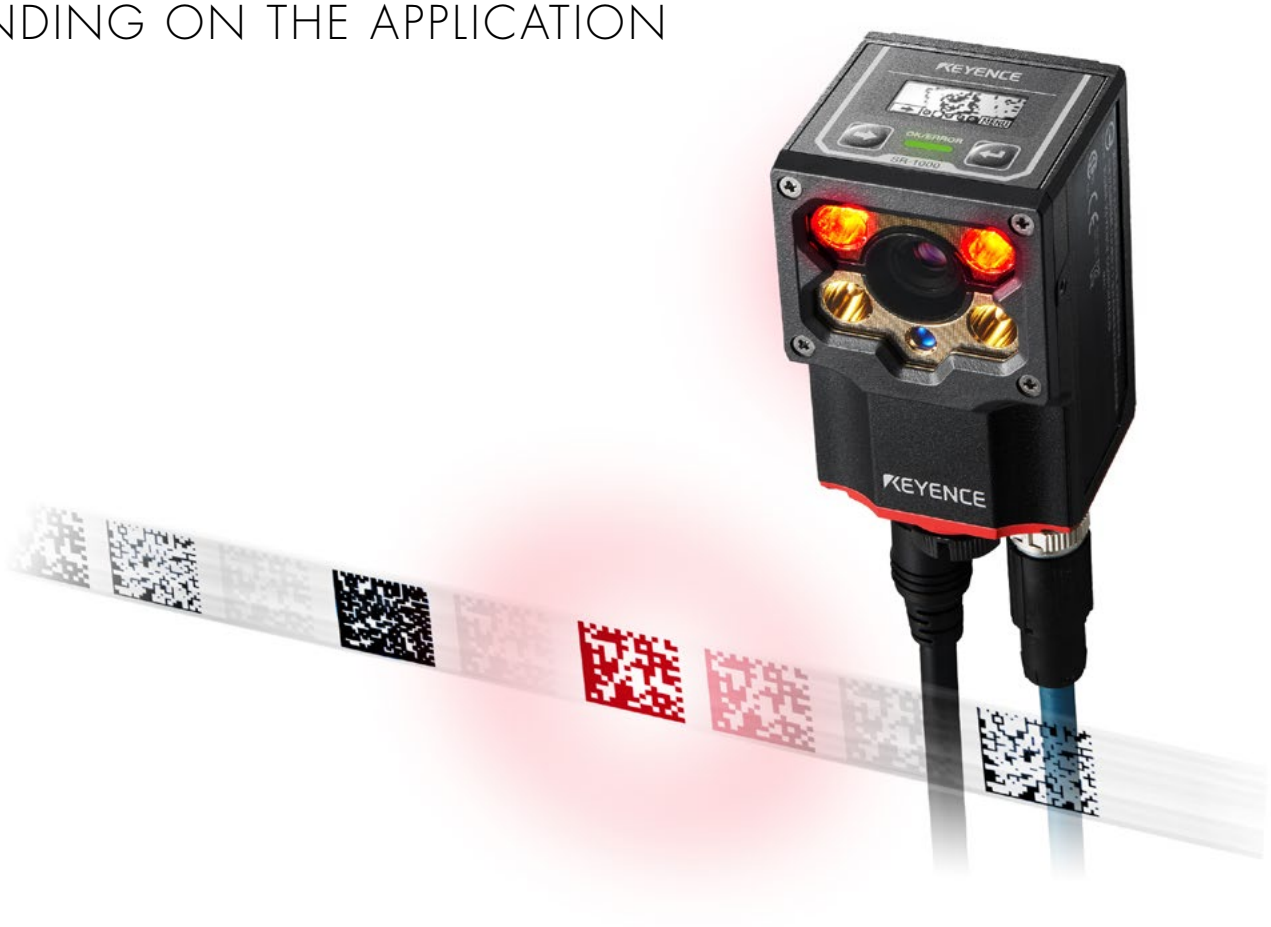
A specially shaped reflector has been designed to create high efficiency illumination by reducing loss in light intensity from the high intensity LEDs. Gold plating maximises the reflectance to achieve brightness exceeding conventional levels by 400%. This provides reading under bright, uniform illumination even at long ranges.

Conventional model

SR-1000N

Light is concentrated efficiently within the field of view to provide high intensity illumination.

TWO MODES CAN BE SELECTED DEPENDING ON THE APPLICATION



UNAFFECTED BY CHANGING CONDITIONS

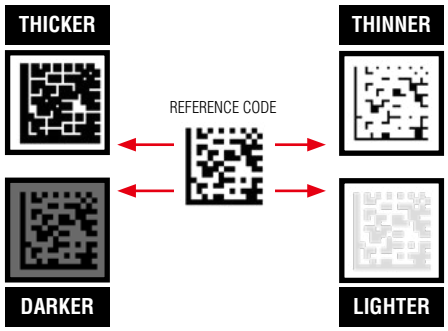
SMART MODE NEW

FOR CONSISTENT READING REGARDLESS OF CODE CONDITIONS

LOW CONTRAST CODE

Fluctuations in code conditions are predicted during tuning and extended reading settings are automatically generated. This ensures stable reading even when the contrast of the code changes, eliminating the need to reconfigure the code reader.

The reader predicts 43 patterns of alternative printing conditions.



DETECTING CHANGES IN CODE CONDITIONS

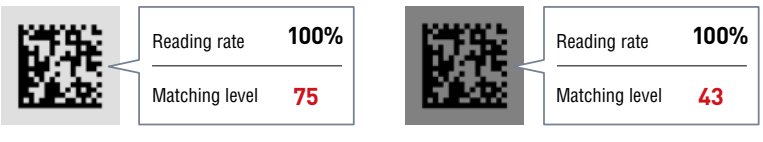
CUSTOM MODE

FOR CODE QUALITY MANAGEMENT

The SR-1000N has the functionality to make judgements on code quality. Because code quality degradation can be detected before reading errors occur, this mode can be used for predictive maintenance of the printing process.

Matching level judgement function — Provides code quality comparison

Two codes, which both have a reading rate of 100%, can still be distinguished by the matching level



Code quality verification function — Verification based on code quality standards

OUTPUT DATA **AD-ERMT-55841:B**

TOTAL GRADE JUDGEMENT

Judgement can also be given for each parameter

*This function is designed for 2D codes (QR, DataMatrix, GS1 Composite, PDF417).

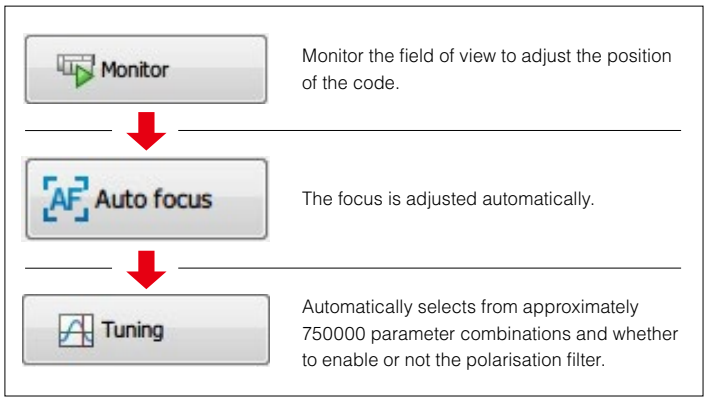
SUPPORTED STANDARDS

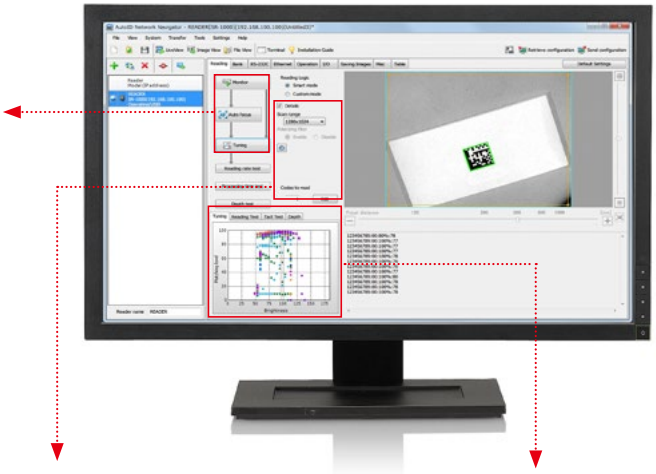
- ISO/IEC 15415
- ISO/IEC TR 29158 (AIM DPM-1-2006)
- ISO/IEC 16022
- SAE AS9132
- SEMI T10-0701

ADVANCED SETUP SOFTWARE

SR-H8W

The software now provides not only easy code reader setup but also functionality to reduce man-hours for preliminary tests.
It is possible to connect to the software through USB.





ADVANCED SETTINGS

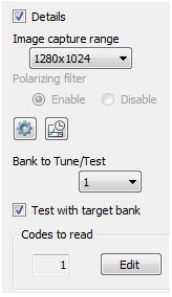


IMAGE CAPTURE RESOLUTION

The lower the resolution, the shorter the reading time becomes. The image capture resolution is selectable from 800 × 600, 1280 × 1024 and user defined.

POLARISATION FILTER

Selectable between enabled or disabled.

TARGET BANK (in custom mode only)

Specify the parameter bank number to modify.

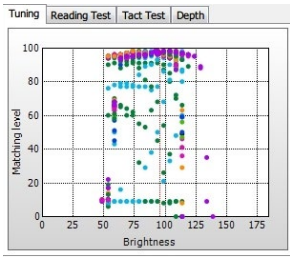
TUNING HISTORY (in custom mode only)

Tuning history can be reviewed.

NO. OF CODES FOR READING

Specify the number of codes to read simultaneously.

TUNING MONITOR



The optimum settings are automatically determined from multiple combinations of image processing filters and brightness levels.

ETHERNET COMMUNICATION WIZARD NEW

Setup can be completed in just four steps with a question-answer form including visual explanations. In previous versions, the user had to understand the available settings on the screen and determine which items are required to be input.
The new version uses a setup wizard to eliminate the need for item extraction, reducing man-hours for communication setup.

STEP 1 TRIGGER SETTINGS
(I/O input, command input)

STEP 2 DESTINATION FOR READ DATA
(Field network, PC)

STEP 3 COMMUNICATION PROTOCOL
(EtherNet/IP®, PROFINET, TCP, UDP, or PLC link)

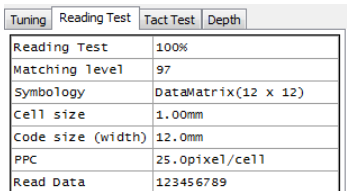
STEP 4 ADVANCED SETTINGS
(Detailed setting for each protocol)

SOPHISTICATED MEASUREMENT MODES

The SR-1000 Series provides pre-verification prior to line operation based on tuning results as well as measurement of applicable line speed for reading codes at high speeds.

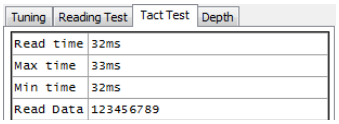
READING RATE MEASUREMENT

The reading success rate can be measured without conducting reading tests with multiple targets on the actual production line or equipment.



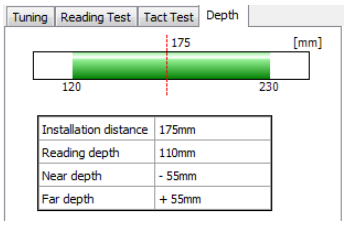
READING TACT MEASUREMENT

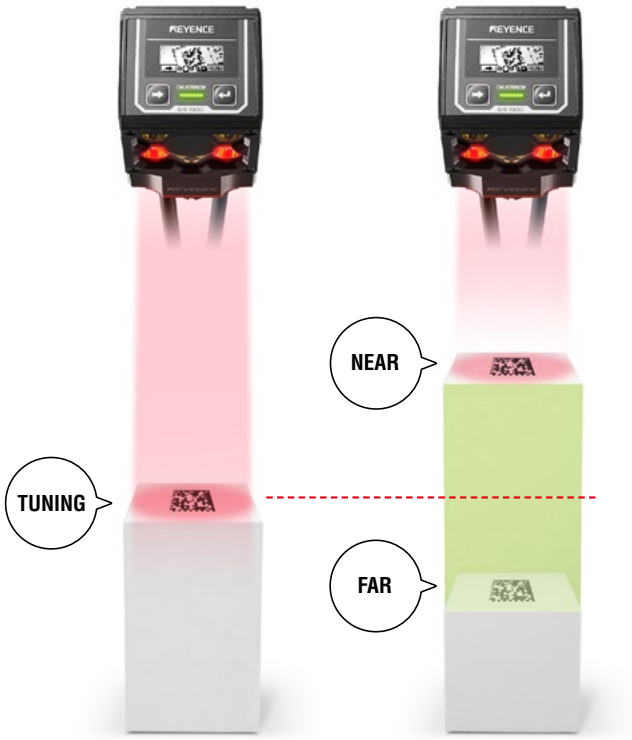
The reading cycle time (tact) can be determined without conducting reading tests with targets on the actual production line or equipment.



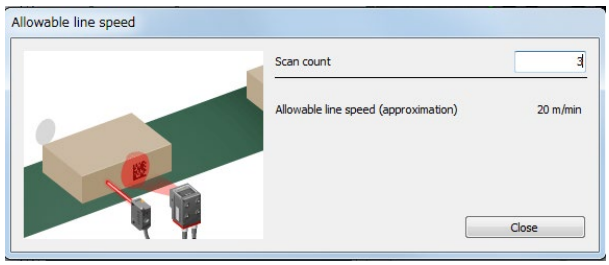
READING DEPTH MEASUREMENT NEW

The depth of field can be determined from the mounting distance and the code used for tuning, without conducting reading tests with targets on the actual production line or equipment.
(When the mounting distance changes, perform re-tuning to enable reading again.)





LINE SPEED MEASUREMENT NEW



You can check allowable line speed before installation. This helps to reduce man-hours that are spent to adjust the production line designs or jigs.

FIRST-IN-ITS-CLASS, BUILT-IN OLED DISPLAY

CHECK OPERATION ON-SITE WITHOUT A PC

There is no need for a personal computer or monitoring the facility. The code position adjustment and operating condition can be checked simply with the intuitive built-in display.

Live View

Readout data display

OK/ERROR count display

Ethernet setting data

I/O signal behaviour display

Data communication condition display

EASY SETUP WITHOUT A PC

You can set the optimum reading parameters after adjusting the code position and simply pressing the ENTER button to complete the fully-automatic tuning.

AUTOFOCUS SETTING

PARAMETER OPTIMISATION

AUTOMATIC POLARISATION FILTER CONTROL

Reading test starts automatically.

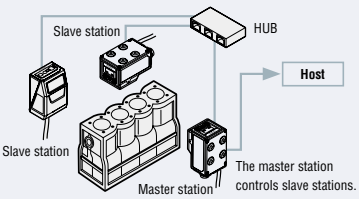
HIGHLY-ADVANCED FUNCTIONS OFFER SIMPLE OPERATION

MASTER/SLAVE FUNCTION FOR USING MULTIPLE READERS EFFICIENTLY

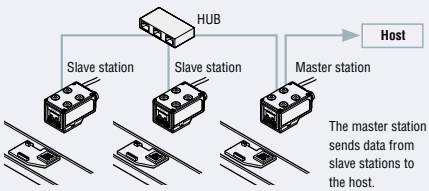
The master station can control up to 31 slave stations when multiple readers are used. (Up to 7 stations can be controlled in multi-head mode.) This function drastically reduces the programming load on the host computer/PLC.

* SR-D100/750 Series units can also be added (in combination with SR-1000 Series units) into this function.

MULTI-HEAD MODE



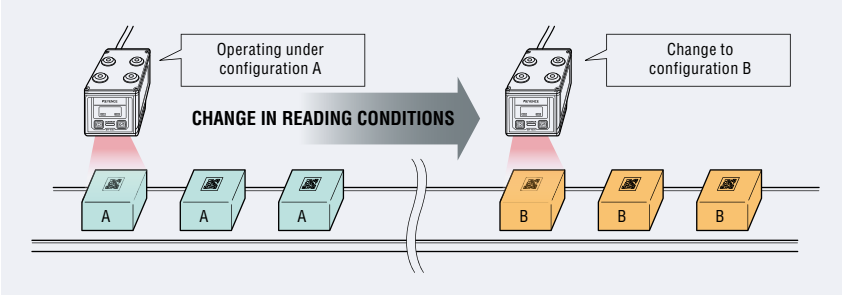
MULTI-DROP LINK MODE



Communication and control via EtherNet/IP® and PROFINET are also possible. (Only in multi-head mode)

TOOLING CHANGE FUNCTION UTILISES UP TO 8 CONFIGURATION FILES

By importing settings stored in ROM via a command, switching is possible even if the reading conditions (code type, marking style, reading distance) are completely different.

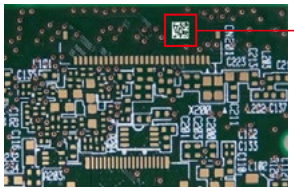


Switching instructions via EtherNet/IP® and PROFINET is also possible.

LATEST TECHNOLOGIES PROVIDE STABLE READING

HIGH-SPEED SEARCH

2D CODE SEARCH IN CAPTURED IMAGES

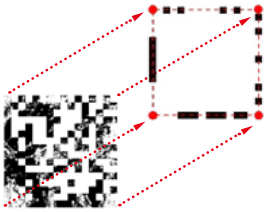


Binary processing enables immediate detection of 2D codes even if there is a code-like pattern in the field of view.

ADVANCED DETECTION

DEFECTIVE CODE POSITIONING PROGRAM

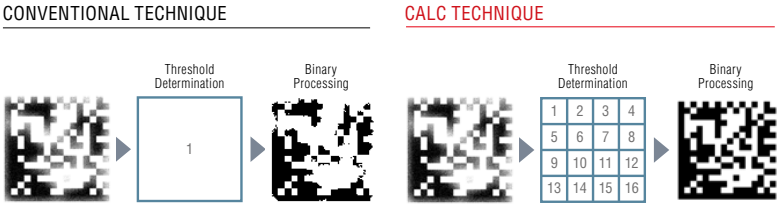
A newly developed positioning program for defective codes can identify the four corners of a 2D code based on a similar code detection pattern, leading to a significant improvement in code detection performance.



HIGH-LEVEL DECODING

CONTRAST ALGORITHM FOR LOCAL CONCENTRATION (CALC)

Our contrast algorithm for local concentration divides a code into smaller pieces to perform binary processing using thresholds specified for each division. This enables accurate black/white classification without being affected by uneven print density.

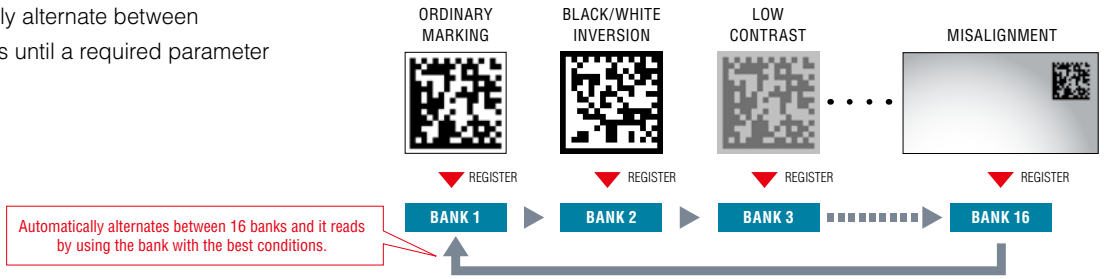


* The above illustration is only an example and it does not mean that a code will always be divided into 16 parts.

AUTOMATIC SELECTION OF OPTIMAL READING CONDITIONS (PARAMETER BANK FUNCTION)

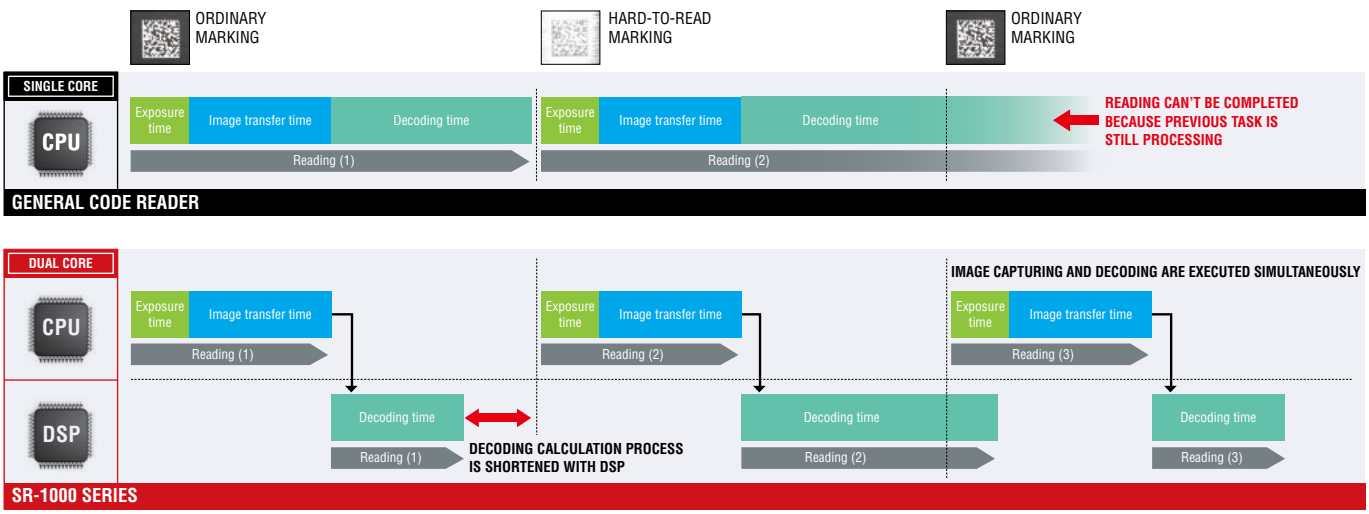
CUSTOM MODE ONLY

The reader will automatically alternate between registered parameter banks until a required parameter bank is selected.



SUSTAINABLE PERFORMANCE DURING MULTIPLE READING PROCESSES

RELIABLE READING THANKS TO BUILT-IN DUAL CORE PROCESSOR



COMPATIBILITY WITH VARIOUS COMMUNICATION PROTOCOLS

Built-in EtherNet/IP®, PROFINET, and PLC link protocols make PLC connections easier. In addition, general-purpose TCP/IP and FTP communication are also supported. With FTP communication, transmission of not only images but also text data is also possible.

Connection information for various PLC types can be found here: www.barcodereader.com/

CUSTOMISABLE OUTPUT FORMATS USING DATA EDIT FUNCTION

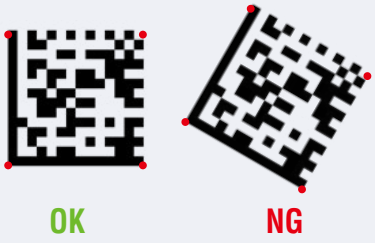
Thanks to customisable output formats for the code reader, programming corrections on the host side (PC, PLC, etc.) is not required, allowing for shorter data processing times.

(EXAMPLES OF DATA EDIT FUNCTION IN USE)

Extracting specific data

Adding additional information to image file names

Controlling OUT output signals



OK/NG output based on vertex coordinates of code

CONVENIENT SOFTWARE TOOLS ALSO PROVIDED

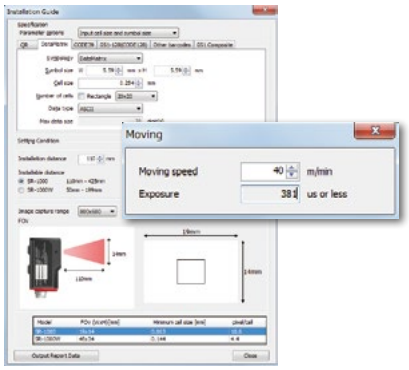
1. Specification examination and installation preparation

2. Operational testing and maintenance

3. Simple operations

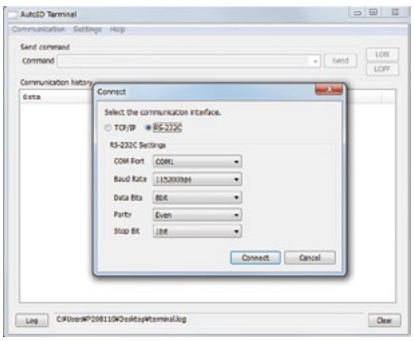
Installation Guide

The reading distance, field of view, and moving speed can be checked based on the code size.



AutoID Terminal

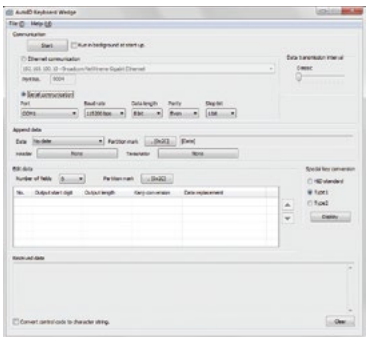
Establishing direct communication with the code reader allows problems due to communication failure to be isolated.



AutoID Keyboard Wedge

Input using the PC's keyboard interface is possible.

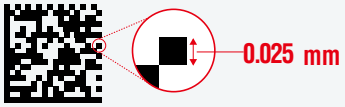
Both Windows and Mac versions are available.



Ensures stable reading of codes with a minimum resolution of 0.025 mm

HIGH RESOLUTION ATTACHMENT **SR-10AH**

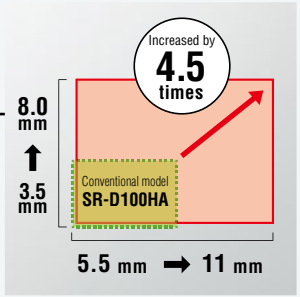
Improved reading of extremely small codes and codes printed on mirror finished surfaces.



Field of View: Increased by

4.5 times

Comparison with conventional models
Mounting distance 40 mm
When the image capturing range is 800 × 600 pixels

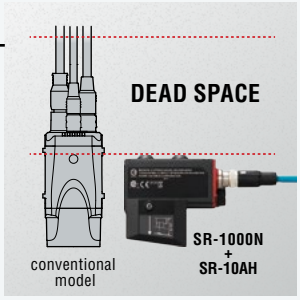


Good installation distance for extremely small codes

When KEYENCE's test codes are used
Cell size 0.04 mm

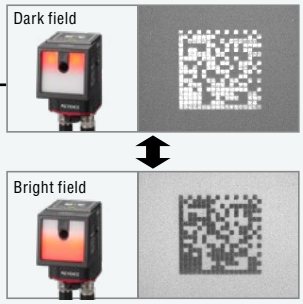
Highly flexible mounting

Comparison with conventional models



Automatic control of optimal reading conditions

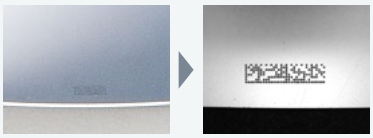
When auto-tuning is enabled



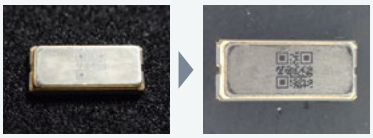
APPLICATION EXAMPLES

Micro-size sample (chip LED)

Mirror finished surface (wafer)



Metal (IC package)

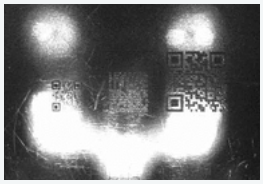


Superior reading of codes printed on mirror finished surfaces

REFLECTOR ATTACHMENT **SR-10AR**

By changing the reflected light of mirror finished surfaces to diffuse light, it's possible to achieve the same effect as when using external lighting.

When **SR-10AR** is not used

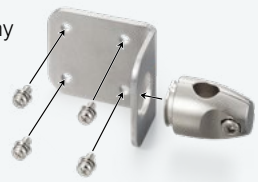


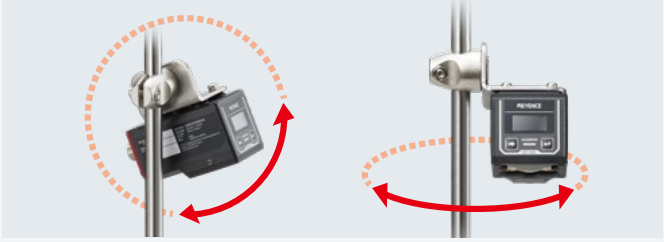
When **SR-10AR** is used

Reduces the costs of jigs and man-hour for installation

ADJUSTABLE BRACKET **OP-88002**

This bracket allows the reader to be attached in any position along either the vertical or horizontal axis.





SYSTEM CONFIGURATION DIAGRAM

SR-1000 Series

Standard type
SR-1000N

Wide-field type
SR-1000WN

Option

Mounting bracket
OP-87866

Adjustable bracket
OP-88002

High resolution attachment
SR-10AH

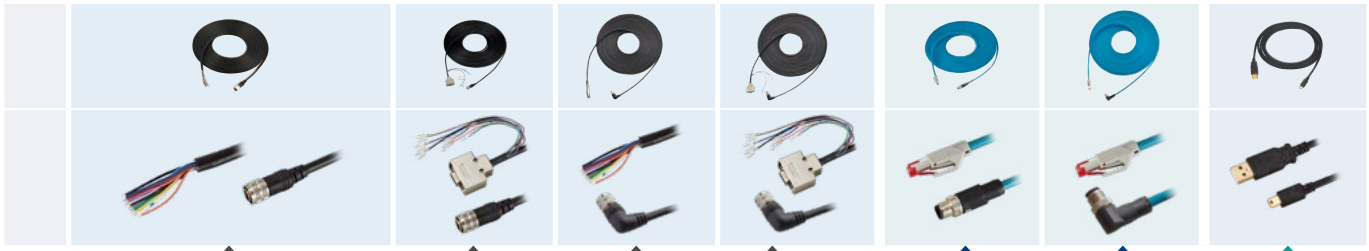
* SR-1000N only

Reflector attachment
SR-10AR

For details on optional accessories, see P. 13.

Cable

	Control cable					Ethernet cable (NFPA79-compliant)		USB cable (USB-A to Mini-B)
	–	NFPA79-compliant						
		–		Right angle connector		–	Right angle connector	
		–	D-sub 9-pin connector	–	D-sub 9-pin connector			
2 m	OP-87224	OP-87353	OP-87527	OP-88304	OP-88307	OP-87230	OP-88301	OP-51580
5 m	OP-87225	OP-87354	OP-87528	OP-88305	OP-88308	OP-87231	OP-88302	OP-86941
10 m	OP-87226	OP-87355	OP-87529	OP-88306	OP-88309	OP-87232	OP-88303	–



24 VDC

RS-232C
Serial communication, PLC link

I/O terminal

Ethernet
TCP/IP, FTP, PLC link
EtherNet/IP
PROFINET

USB
For setup

Power supply

24 VDC power supply

Host

PC/Panel PC/ Board PC

PLC

HMI [Touch panel]

PC

PC for setup

AutoID Network Navigator
SR-H8W

- AutoID Network Navigator
- AutoID Keyboard Wedge
- AutoID Terminal
- MultiMonitor
- FileView
- Various driver files
- EDS/GSDML files
- SR SDK
- AutoID Navigator (for older models)

READING RANGE CHARACTERISTICS [TYPICAL]

SR-1000N

MINIMUM RESOLUTION

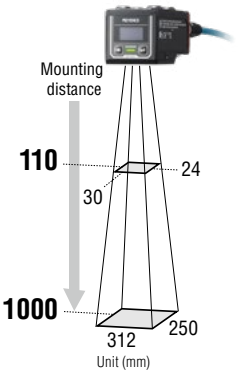
Unit (mm)

Distance	2D	Barcode
110	0.063	0.082
110 to 140	0.082	
110 to 230	0.14	
110 to 300	0.18	0.11
110 to 400	0.24	0.15
110 to 600	0.37	0.22
110 to 1000	0.61	0.37

FIELD OF VIEW

Unit (mm)

	Image capture range (1280 × 1024 pixels)		Image capture range (800 × 600 pixels)	
Distance	Width	Height	Width	Height
110	30	24	19	14
140	40	32	25	18
230	68	54	42	32
300	90	72	56	42
400	122	97	76	57
600	185	148	116	87
1000	312	250	195	146



SR-1000WN

MINIMUM RESOLUTION

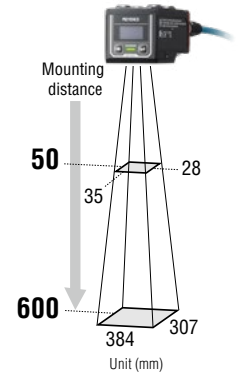
Unit (mm)

Distance	2D	Barcode
50	0.082	0.082
50 to 100	0.14	
50 to 150	0.20	0.12
50 to 230	0.30	0.18
50 to 300	0.38	0.23
50 to 400	0.51	0.31
50 to 600	0.76	0.45

FIELD OF VIEW

Unit (mm)

	Image capture range (1280 × 1024 pixels)		Image capture range (800 × 600 pixels)	
Distance	Width	Height	Width	Height
50	35	28	22	16
100	67	54	42	31
150	99	79	62	46
230	150	120	93	70
300	194	155	121	91
400	257	206	161	120
600	384	307	240	180



SR-1000N + SR-10AH

MINIMUM RESOLUTION

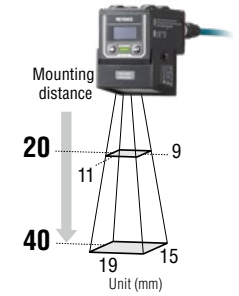
Unit (mm)

Distance	2D	Barcode
20	0.025	0.082
20 to 30	0.03	
20 to 40	0.04	

FIELD OF VIEW

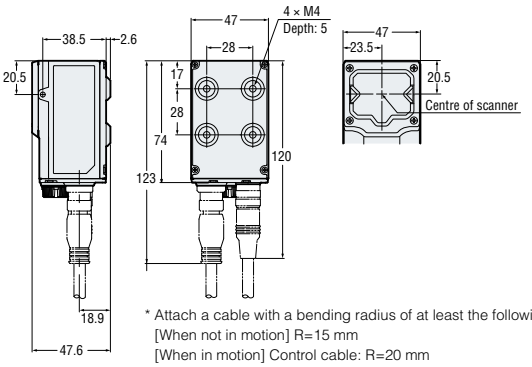
Unit (mm)

	Image capture range (1280 × 1024 pixels)		Image capture range (800 × 600 pixels)	
Distance	Width	Height	Width	Height
20	11	9	7	5
30	15	12	9	7
40	19	15	11	8

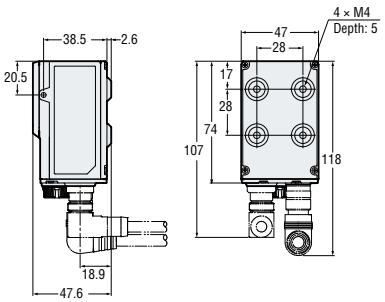


DIMENSIONS

Main unit
SR-1000N/1000WN

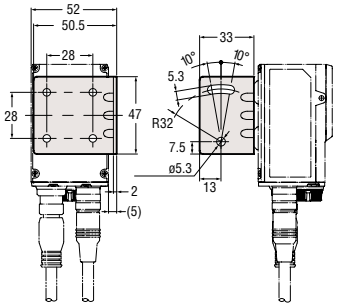


With right angle connector



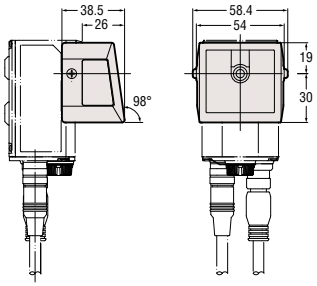
Adjustable bracket
OP-87866

Unit (mm)

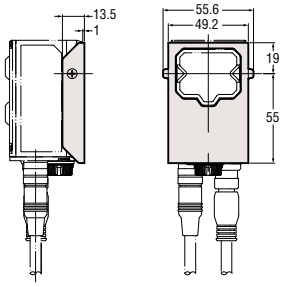


* Attach a cable with a bending radius of at least the following values.
[When not in motion] R=15 mm
[When in motion] Control cable: R=20 mm
Ethernet cable: R=50 mm

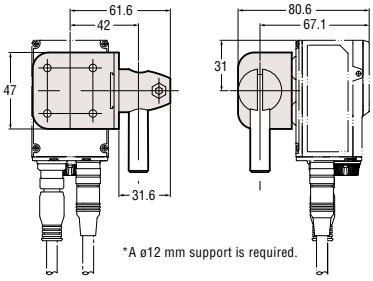
High resolution attachment
SR-10AH



Reflector attachment
SR-10AR



Adjustable bracket
OP-88002



*A ø12 mm support is required.

SPECIFICATIONS

Main unit

Model*2			SR-1000N	SR-1000WN	SR-1000N+SR-10AH
Type			Standard type	Wide-field type	When the high resolution attachment is used
Receiver	Sensor		CMOS Image Sensor		
	Number of pixels		1280 × 1024 pixels		
Light emitter	Illumination light source		High intensity red LED		
	Pointer light source		High intensity green LED		—
Focus adjustment			Autofocus*		
Reading specifications	Supported symbol	2D	QR, MicroQR, DataMatrix (ECC200), GS1 DataMatrix, PDF417, MicroPDF417, GS1 Composite (CC-A/CC-B/CC-C)		
		Barcode	CODE39, ITF, 2of5(Industrial 2of5), COOP 2of5, NW-7 (Codabar), CODE128, GS1-128, GS1 DataBar, CODE93, JAN/EAN/UPC, Trioptic CODE39, CODE39 Full ASCII, Pharmacode		
	Minimum resolution	2D	0.063 mm	0.082 mm	0.025 mm
		Barcode	0.082 mm	0.082 mm	0.082 mm
	Reading distance		110 to 1000 mm	50 to 600 mm	20 to 40 mm
	Field of view for reading		122 × 97 mm (Typical example at 400 mm)	257 × 206 mm (Typical example at 400 mm)	19 × 15 mm (Typical example at 40 mm)
I/O specifications	Control input	Number of inputs	2		
		Input type	Bidirectional voltage input		
		Maximum rating	26.4 VDC		
		Minimum ON voltage	15 VDC		
		Maximum OFF current	0.2 mA or less		
	Control output	Number of outputs	3		
		Output type	Photo MOS relay output		
		Maximum rating	30 VDC		
		Maximum load current	1 output: 50 mA or less, Total of 3 outputs: 100 mA or less		
		Leakage current when OFF	0.1 mA or less		
		Residual voltage when ON	1 V or less		
	Ethernet	Communication standard	IEEE 802.3 compliant, 10BASE-T/100BASE-TX		
		Supported protocol	TCP/IP, SNTP, FTP, BOOTP, MC protocol, Omron PLC link, KV STUDIO, EtherNet/IP®, PROFINET		
	Serial communication	Communication standard	RS-232C compliant		
		Transmission speed	9600, 19200, 38400, 57600, 115200 bps		
		Supported protocol	No-protocol, MC protocol, SYSWAY, KV STUDIO		
	USB	Communication standard	USB 2.0 Full Speed compliant		
Environmental resistance	Enclosure rating		IP65		
	Ambient temperature		0 to +45°C		
	Ambient storage temperature		–10 to +50°C		
	Relative humidity		35 to 85% RH (No condensation)		
	Storage ambient humidity		35 to 85% RH (No condensation)		
	Ambient luminance		Sunlight: 10000 lux, Incandescent lamp: 6000 lux, Fluorescent lamp: 2000 lux		
	Operating environment		No dust or corrosive gas present		
	Vibration		10 to 55 Hz Double amplitude 0.75 mm, 3 hours each in X, Y and Z directions		
Rating	Power voltage		24 VDC ±10%		
	Current consumption		Approx. 700 mA		
Weight			Approx. 200 g		Approx. 250 g

* The focal position can be adjusted automatically during installation.

Setup software (AutoID Network Navigator)

Model	SR-H8W
Supported OS	Windows 10 Professional or later, 32 bit/64 bit Windows 8 Professional or later, 32 bit/64 bit (Except for Windows RT) Windows 7 Professional or later, 32 bit/64 bit
Running environment	Processor 2.0 GHz or higher, Memory 8 GB or more, Required free space on hard disk 1 GB or more (space is also required for saving SR Management Tool data) DVD-ROM drive required for installation, Screen resolution 1440 × 1080 or higher

- .NET Framework 4.6.1 or higher is installed.
- Microsoft Visual C++ redistributable packages (x86) for Visual Studio 2015, 2017, and 2019 are installed.
- Windows, Visual Studio, Microsoft Edge, Internet Explorer, and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

SR SERIES LINEUP

Ultra-compact 1D and 2D Code Reader
SR-700 Series

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