

0.4M Monochrome/Color Vision Sensor (Internal illumination)

VG Series

INSTRUCTION MANUAL

TCD210213AF



Thank you for choosing our Autonics product.

Read and understand the instruction manual and manual thoroughly before using the product.

For your safety, read and follow the below safety considerations before using.

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.

Keep this instruction manual in a place where you can find easily.

The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Follow Autonics website for the latest information.

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

- Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)
Failure to follow this instruction may result in economic loss, personal injury or fire.
- Do not use or store the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
Failure to follow this instruction may result in fire or explosion.
- Do not use this product for protecting human body or part of body.**
- Do not see light LED directly or direct beam at person.**
Failure to follow this instruction may result in damage on eyes.
- Do not connect, repair, or inspect the unit while connected to a power source.**
Failure to follow this instruction may result in fire.
- Check connections and connect cables.**
Failure to follow this instruction may result in fire.
- Do not disassemble or modify the unit.**
Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

- Use the unit within the rated specifications.**
Failure to follow this instruction may result in fire or product damage.
- Use dry cloth to clean the unit. Do not use water or organic solvent when cleaning the unit.**
Failure to follow this instruction may result in fire.
- Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
Failure to follow this instruction may result in fire or product damage.

Cautions during Use

- Follow instructions in Cautions during Use. Otherwise, it may cause unexpected accidents.
- Power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- In order to avoid malfunction from static electricity or noise, ground shield wire of the power I/O cable.
- Do not disconnect the power supply while setting operation or saving set information. It may cause data loss.
- Do not disconnect the power supply while updating firmware. It may cause product damage.
- Keep optical section of the sensor away from the contact with water, dust and oil. It may cause malfunction.
- When changing the light or filter, use the assembly tool and observe installation instruction.
- When the sensor is not used for a long time, separate the power cable to store.
- When connecting network, connection must be operated by technical expert.
- In the following case, disconnect the power supply immediately. It may cause fire or product damage.
 - When water or foreign substance is detected in the product
 - When the product is dropped or case is damaged
 - When smoke or smell is detected from the product
- Do not use the product in the place where strong magnetic field or electric noise is generated.
- This unit may be used in the following environments.
 - Indoor (in the environment conditions in specifications)
 - Altitude max. 2,000m
 - Pollution degree 2
 - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

VG	-	1	2	3	-	4	5
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1 Image element

M: Mono CMOS
C: Color CMOS

2 Resolution

04: 0.4 MP (752 × 480 pixel)

3 Color of light

W: White
R: Red
G: Green
B: Blue

4 Effective focal length

Number: Effective focal length (unit: mm)

5 Communication

E: Ethernet (TCP/IP)

Product Components

- Product (+ built-in light)
- Instruction manual
- Bracket A (BK-VG-A) × 1
- Mounting screw × 2
- Assembly tool (ASST-VG) × 1

Sold Separately

- Bracket B (BK-VG-B)
- Ethernet connector protection cover (P96-M12-1)
- Light (LR-□-06-VG), Color filter (FL-□-VG), Polarizing filter (FL-□-VG)
- M12 connector cable (C□D-□-VG, C□D12-□)
- M12 connector communication cable (C□R-□-VG, C□M8-□PR, C□8-□PR)

Software

Download the installation file and the manuals from the Autonics website.

■ Vision Master

Vision Master is the vision sensor program that allows setting of vision sensor parameters and management of monitoring data such as inspection status and status information.

Network Setting

IP address	192.168.0.2	<ul style="list-style-type: none"> Configure the network settings of vision sensor via Vision Master. For initial IP address, refer to the table.
Subnet mask	255.255.255.0	
Gateway	192.168.0.1	

Order of Installation

For more information, refer to the Vision Master software manual.

- Install the vision sensor.**
Refer to the Cautions for Installation and the Working Distance and FOV by Effective Focal Length.
- Install the vision sensor program, Vision Master, to PC.**
- Connect the vision sensor and the PC, and set the network.**
Refer to the Network Setting.
- Adjust vision sensor focus.**
To adjust focus, run Vision Master and activate the 'Focusing Guide' function in the camera setting menu, or use the focus adjuster.

Cautions for Installation

- Install the unit correctly with the usage environment, location, and the designated specifications. For more information, refer to the manual.
- According to the installation direction, necessary bracket type and fixing method are different.

Horizontally from bottom	Vertically from bottom	Vertically from back side
Bracket A	Bracket B	

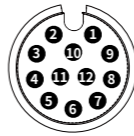
- Check Working Distance and FOV by Effective Focal Length.
- Place the sensing target at the center of the vision sensor lens.
- Using (-) screwdriver, turn focus adjuster to right and left to adjust the focus. (allowable adjusting torque: ≤ 0.343 N m)
- At the focusing guide function of Vision Master, adjust the focus.



Connections

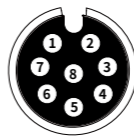
■ Power I/O connector cable (M12 12-pin connector, Plug - Male)

Pin	Cable color	Signal	Function		
1	Brown	Brown	24VDC≐		
2	Blue	Blue	GND		
3	White	White	TRIG	Trigger input	
4	Green	Green	IN0	Work group change Bit 0	Work group change Clock
5	Pink	Orange	IN1	Work group change Bit 1	
6	Yellow	Yellow	IN2	Work group change Bit 2	Encoder - Up counter - Quadrature A
8	Gray	Gray	IN3	Work group change Bit 3	
11	Gray/Pink	Sky	COMMON		Alarm cleared
7	Black	Black	OUT0	Inspection completion, inspection result, external light trigger, alarm, camera busy, changing work group completed	
9	Red	Red	OUT1		
10	Purple	Purple	OUT2		
12	Red/Blue	Bright green	OUT3		



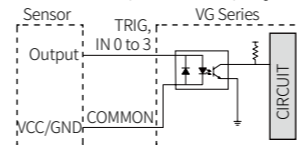
■ Ethernet connector cable (M12 8-pin-RJ45 connector, Socket - Female)

M12 8-pin	Signal	RJ45	Signal
6	RX+	1	TX+
4	RX-	2	TX-
5	TX+	3	RX+
8	TX-	6	RX-
1	-	5	-
7	-	4	-
2	-	7	-
3	-	8	-

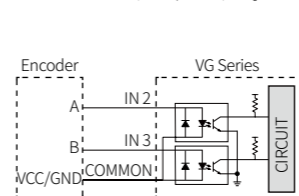


Inner Circuit

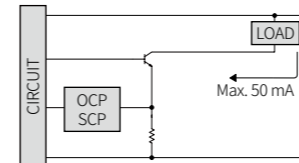
■ External trigger (TRIG) Work group change, Alarm cleared (IN0 to IN3) input



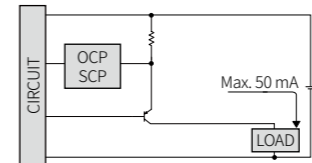
■ Encoder (IN2, IN3) input



■ NPN open collector output

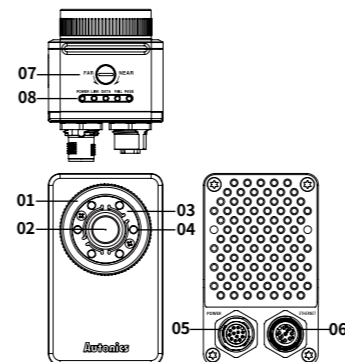


■ PNP open collector output



- OCP (over current protection), SCP (short circuit protection)
- If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the output short over current protection circuit.

Parts Descriptions



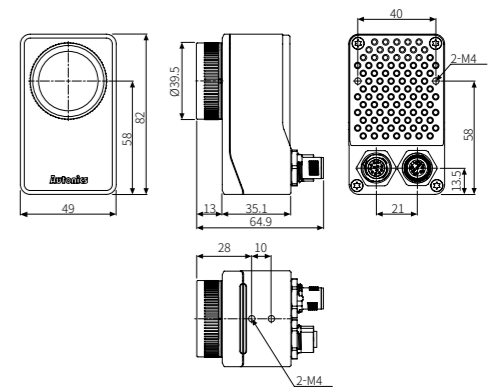
- Lens cover
- LED light
- Power I/O connector
- Ethernet connector
- Focus adjuster
- Indicators

■ Indicators

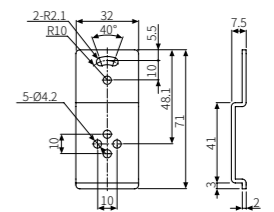
Mark	Color	Name	Function
POWER	Green	Power indicator	Turns ON when power is supplied.
LINK	Green	Ethernet connection indicator	Turns ON in Ethernet communication status.
DATA	Orange	Data transmission indicator	Flashes when data is transmitted from vision sensor to PC.
FAIL	Red	Failure indicator	Flashes when detects failure during work group inspection.
PASS	Green	Pass indicator	Flashes when passed inspection during work group inspection.

Dimensions

- Unit: mm, For the detailed drawings, follow the Autonics website.



■ Bracket A (BK-VG-A)



Specifications

Model	VG-M04□-□E	VG-C04□-□E				
Effective focal length	8 mm	16 mm	25 mm	8 mm	16 mm	25 mm
Min. working distance	50 mm	100 mm	200 mm	50 mm	100 mm	200 mm
Image filter	Preprocessing, external filter (color filter, polarizing filter)					
Image element	1/3 inch mono CMOS			1/3 inch color CMOS		
Resolution	0.4 MP (752 × 480 pixel)					
Image snap camera frame per second ⁰¹⁾	≤ 60 fps					
Shutter	Global shutter					
Exposure time	20 to 50,000 μs					
Inspection work group	32 (simultaneous inspection: 64)					
Light ON/OFF method	Pulse					
Light color ⁰²⁾	White / Red / Green / Blue model					
Trigger mode	External - Internal - Free run setting (software)					
Communication	Ethernet (TCP/IP), 100BASE-TX / 10BASE-T					
FTP trans. output	YES					
Certification	CE, RoHS, ENEC					
Unit weight (package)	≈ 273 g (≈ 415 g)	≈ 274 g (≈ 416 g)	≈ 274 g (≈ 416 g)	≈ 273 g (≈ 415 g)	≈ 274 g (≈ 416 g)	≈ 274 g (≈ 416 g)

01) The number of camera frames per second can be different by image setting or inspection item.
02) Available to buy separately and replace.

Power supply	24 VDC≐ ± 10 %
Current consumption	1 A
Rated input signal	24 VDC≐ ± 10 %
Output signal	NPN-PNP open collector output setting (software)
Load voltage	24 VDC≐
Load current	≤ 50 mA
Residual voltage	≤ 1.5 VDC≐
Protection circuit	Output short over current protection circuit, reverse voltage polarity protection circuit
Insulation resistance	≥ 20MΩ (500 VDC≐ megger)
Dielectric strength	500 VAC~ 50/60 Hz for 1 min.
Vibration	1.5 mm amplitude at frequency of 10 to 55 Hz in each X, Y, Z direction for 2 hours
Shock	300 m/s ² (≈ 30 G) in each X, Y, Z-direction for 3 times
Ambient temperature	0 to 45 °C, storage: -20 to 70 °C (no freezing or condensation)
Ambient humidity	35 to 85%RH, storage: 35 to 85%RH (no freezing or condensation)
Protection structure	IP67 (IEC standards)
Connection	Connector type
Connector	Power I/O: M12 12-pin, Ethernet: M12 8-pin-RJ45 (cable tightening torque: 0.4 N m)
Material	Case: AL, lens cover: PC, focus adjuster: SUS