

0.4M Monochrome/Color Vision Sensor (Internal illumination)

VG Series

INSTRUCTION MANUAL

TCD210213AC



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 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.
- 24VDC 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.
For selecting the specific model, follow the Autonics web site.

VG - ① 04 ② - ③ E

- ① Image element**
M: Mono CMOS
C: Color CMOS
- ② Color of light**
W: White
R: Red
G: Green
B: Blue
- ③ Effective focal length**
Number: Effective focal length (unit: mm)

Product Components

- VG body × 1, Built-in light × 1
- Instruction manual
- Bracket A (BK-VG-A) × 1
- Mounting screw × 2
- Assembly tool (ASST-VG) × 1

Sold Separately

- Power I/O cable (CID-□-VG, CLD-□-VG)
- Ethernet cable (CIR-□-VG, CLR-□-VG)
- Light (LR-□-06-VG), Color filter (FL-□-VG), Polarizing filter (FL-□-VG)
- Connector protection cover (P96-M12-1)
- Bracket B (BK-VG-B)

Software

Visit Autonics web site to download software and software manual.

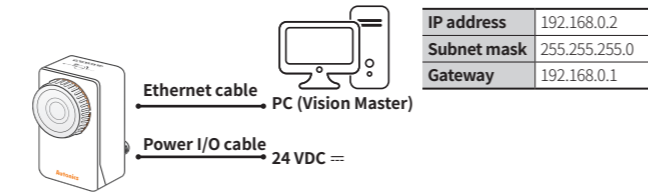
• Vision Master

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.

| Item | Minimum specifications |
|------------|--|
| System | 32bit (×86) or 64bit (×64) processor over 1GHz |
| Operations | Microsoft Windows 7/8/10 |
| Memory | 1GB + |
| Hard disk | 400MB+ of available hard disk space |
| VGA | Resolution: 1024×768 or higher |
| Others | RJ45 Ethernet port |

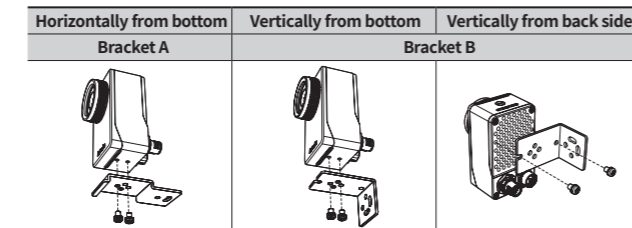
Network Setting

- Configure the network settings of vision sensor via Vision Master.



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.



- 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)

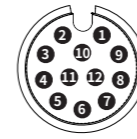
At the focusing guide function of Vision Master, adjust the focus.



Connections

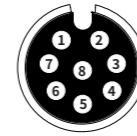
■ Power I/O connector cable (M12 12-pin connector, Plug - Male)

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



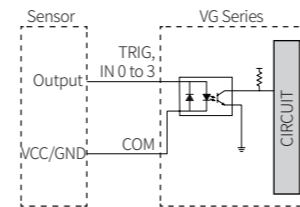
■ Ethernet connector cable (M12 8-pin-RJ45 connector, Socket - Female)

| M12 8-pin | | RJ45 | |
|-----------|--------|------|--------|
| Pin | Signal | Pin | 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 | |

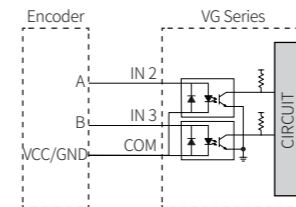


Inner Circuit

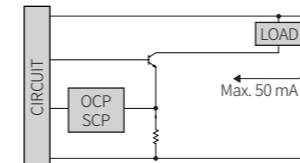
■ External trigger (TRIG) Work group change, Alarm cleared (IN0 to IN3) input



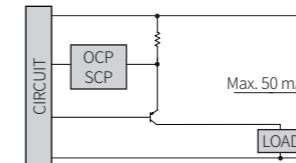
■ Encoder (IN2, IN3) input



■ NPN open collector output



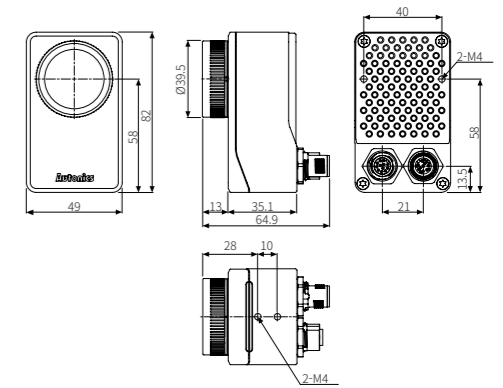
■ PNP open collector output



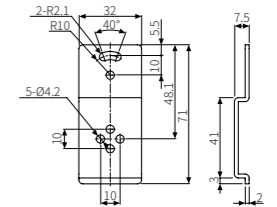
- OC (over current protection), SCP (short circuit protection)
- If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the output short over current protection circuit.

Dimensions

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



■ 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 | 752 × 480 pixel | |
| Image snap camera frame per second | ≤ 60 fps ⁰¹⁾ | |
| Shutter | Global shutter | |
| Exposure time | 20 to 50,000 μs | |
| Inspection work group | 32 (simultaneous inspection: 64) | |
| Inspection camera frame per second | ≤ 60 fps ⁰¹⁾ | |
| Dedicated software | Vision Master | |
| Light ON/OFF method | Pulse | |
| Light color | White / Red / Green / Blue model ⁰²⁾ | |
| Trigger mode | External - Internal - Free run setting (software) | |
| Communication | Ethernet(TCP/IP), 100BASE-TX/10BASE-T | |
| FTP trans. output | YES | |
| Indicators | POWER (green), LINK (green), PASS (green), DATA (orange), FAIL (red) | |
| Approval | CE ENEC | |
| Unit weight (package) | ≈ 273 g (≈ 415 g) | ≈ 274 g (≈ 416 g) |
| | ≈ 274 g (≈ 416 g) | ≈ 273 g (≈ 415 g) |
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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 |
| 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 (for 1 min) 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 (non-freezing or non-condensation) |
| Ambient humidity | 35 to 85%RH, storage: 35 to 85%RH (non-freezing or non-condensation) |
| Protection structure | IP67 (IEC standards) |
| Connection | Connector type |
| Connector | Power I/O: M12 12-pin, Ethernet: M12 8-pin-RJ45 |
| Material | Case: AL, lens cover: PC, focus adjuster: SUS, cable: PUR |