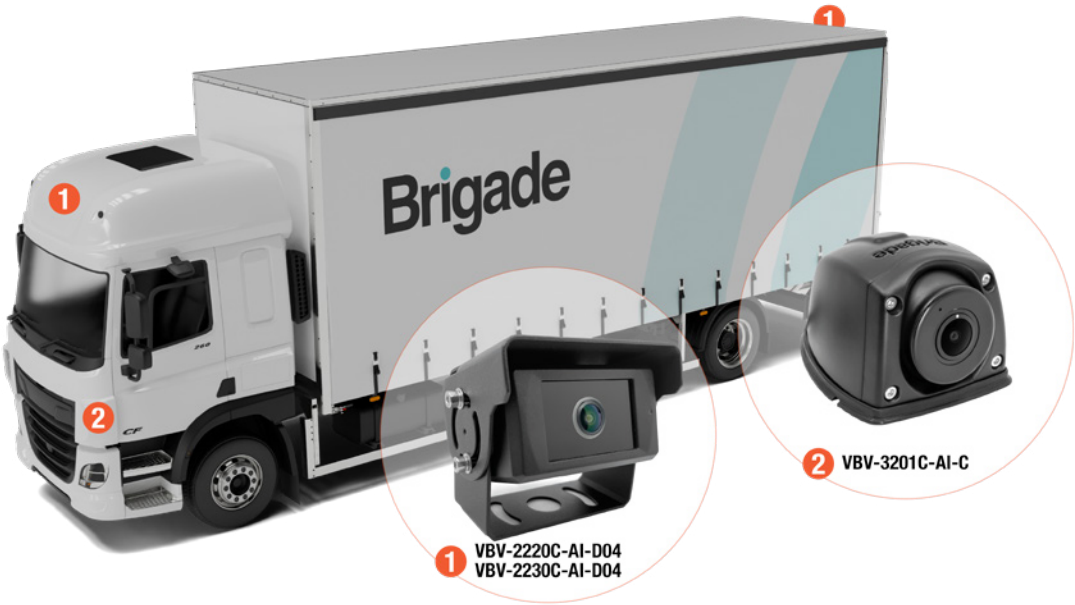
Brigade

You're safer with us

VBV-X2XXC-AI (7321, 7396, 8156) Installation Guide

Please read this manual thoroughly before operating the device and keep it for future reference.
V1.1

Solution



Contents

1 Precautions

Important Safety Information

Brigade AI camera systems and solutions are designed to assist vehicle and machine operators by enhancing visibility and aiding the detection of people in the surrounding environment by alerting operators to the potential presence of people or Vulnerable Road Users (VRUs). These systems are driver aids only and do not replace the operator's own judgment, attention, or responsibility to safely operate and control the vehicle or machine.

This AI camera system is intended solely for informational and monitoring purposes. It is not designed, tested, or certified for use in any safety-critical control functions of a vehicle.

Important information for EU customers

This AI camera system is classified under the EU AI Act as a low-risk AI system. This system must not be used or relied upon as a safety component as defined in the EU AI Act.

System Capabilities and Limitations

AI human form recognition systems assist in identifying people and VRUs within a defined detection range. While these systems provide enhanced visibility, they should not be solely relied upon to detect every person or VRU in every situation. System performance may be affected by:

1. Environmental conditions (weather, lighting, visibility)
2. Physical obstructions or sensor blockages
3. Camera positioning and field of view
4. Complex backgrounds or crowded environments
5. Speed of vehicle operation
6. Clothing or posture of individuals

The AI system provides visual and/or acoustic warnings as an aid to the operator. False negatives (missed detections) and false positives (incorrect detections) may occur. The system does not guarantee detection of all people or obstacles.

Operator Responsibility

When driving or manoeuvring, the vehicle operator remains completely responsible for:

1. Making all assessments and decisions for safe operation
2. Maintaining continuous attention to surroundings
3. Taking every normal precaution when conducting manoeuvres
4. Obeying all traffic rules and local regulations
5. Using training, judgment, and other safety aids (such as mirrors)

The presence of this system does not reduce or remove the operator's responsibility to operate the vehicle or machine in a safe, fully attentive and lawful manner.
The manufacturer accepts no liability for any injury, damage, or loss arising from.

1. Negligent operation of the system;
2. Misuse or incorrect installation of the system;
3. Failure to maintain or update the system as recommended; or
4. Overreliance on the AI functionality in situations requiring human judgment or intervention

Installation and Training Requirements

Brigade AI camera systems must be installed and commissioned by competent, trained technicians. The installer is responsible for ensuring the system is fit for the purpose and complies with all relevant regulations and legislation.

Operators should receive appropriate training on:

1. How to interpret system warnings and alerts
2. System capabilities and limitations
3. Appropriate response to system notifications

Maintenance

Regular visual inspections, functional testing, calibration , software updates and maintenance are essential to ensure proper system operation. Refer to the maintenance section of this guide for specific requirements.

AI System Transparency

This product uses artificial intelligence to analyse camera images and detect human forms. Users should be aware that the system's operation involves automated human form recognition (identifying an object as a human) that may be affected by the factors listed under "System Capabilities and Limitations" above. This product does not perform autonomous decision-making with respect to vehicle operation or otherwise automatically control the vehicle.

Storage and Operation

1. Storage temperature: -40~+85°C, operating temperature: -20~+70°C
2. Avoid dropping or striking this device.
3. Never use sharp tools, scratch, or use abrasive cleaning material as this may damage the housing on this device.
4. Do not place external wiring material where they may be pinched or stepped on.

Operating Precautions

1. Working voltage: 10-32V DC. Using the incorrect power supply and incorrect voltage may cause the device damage permanently.
2. Make sure all cables are connected properly.
3. Please ensure lens is not obscured.
4. Once installed if the device position is manually adjusted, it will need to be re-calibrated to ensure correct operation/ detection.

⚠ Warning

1. Excessive working voltage will damage the equipment.
2. If a monitor is used, please only use when necessary to minimise distraction while driving
3. Never try to disassemble this device without professional assistance

⚠ Caution

Never try to repair this device by yourself. In case of any problems, please turn off the device at once and notify our company or authorised dealer.

The device is a complex device. Any disassembly or modification may lead to damage and void the warranty.

Maintenance

1. Remove all the cable connections from the device before cleaning the device.
2. Use a mild household detergent and clean the unit with a slightly damp, soft cloth.
3. Never use strong solvents such as thinner, as they might damage the finish of the device.

Caution

Risk of electric shock
Do not open

Caution: to reduce the risk of electric shock,
Do not remove cover (or back).
No user-serviceable parts inside.
Refer servicing to qualified service personnel.

This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute risk of electric shock to persons.

This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

This symbol is intended to alert the user not to dispose of electrical and electronic equipment.

CAUTION

You are cautioned that any changes or modifications not expressly approved in this manual could void your warranty and necessitate expensive repairs.

2 What's in the box

VBV-2220C-AI-D04 (Front)

Packing Contents Bill of Materials (BOM)

Part Number: 7321

Model Number: VBV-2220C-AI-D04 (Front) - UK/EU/NA

System	System Description	Sub-System	Qty	Sub-System
VBV-2220C-AI-D04	AI-VRU detection (1080P) Forward facing Camera Only		1	Part Number 7389
VBV-22X0C-CA	VBV-22X0C-CA		1	Part Number S7346
VBV-22X0C-AI-AK3	3mm Allen Key		1	Part Number 7345
VBV-2220C-AI-D04 (Front) Link Card	VBV-2220C-AI-D04 (Front) Link Card		1	Part Number 7338

2 What's in the box Continued

VBV-2230C-AI-D04 (Rear)

Packing Contents Bill of Materials (BOM)

Part Number: 7396

Model Number: VBV-2230C-AI-D04 (Rear) UK/EU/NA

System	System Description	Sub-System	Qty	Sub-System
VBV-2230C-AI-D04	AI-VRU detection (1080P) Rear facing Camera		1	Part Number 7397
VBV-22X0C-CA	VBV-22X0C-CA		1	Part Number S7346
VBV-22X0C-AI-AK3	3mm Allen Key		1	Part Number 7345
VBV-2230C-AI-D04 (Rear) Link Card	VBV-2230C-AI-D04 (Rear) Link Card		1	Part Number 7400

2 What's in the box Continued

VBV-3201C-AI (Side)

Packing Contents Bill of Materials (BOM)

Part Number: 8156

Model Number: VBV-3201C-AI UK/EU/NA

System	System Description	Sub-System	Qty	Sub-System
VBV-3201C-AI-C	AI HD F/mount Eyeball Camera (Mirror) 720p Camera Only		1	Part Number 8157
VBV-22X0C-CA	VBV-22X0-CA		1	Part Number S7346
VBV-3XXC-FIX	Fixing Kit		1	Part Number 5244
VBV-3201C-AI-QR	QR-Link Card for VBV-3201C-AI		1	Part Number 8330

3 Product Specification

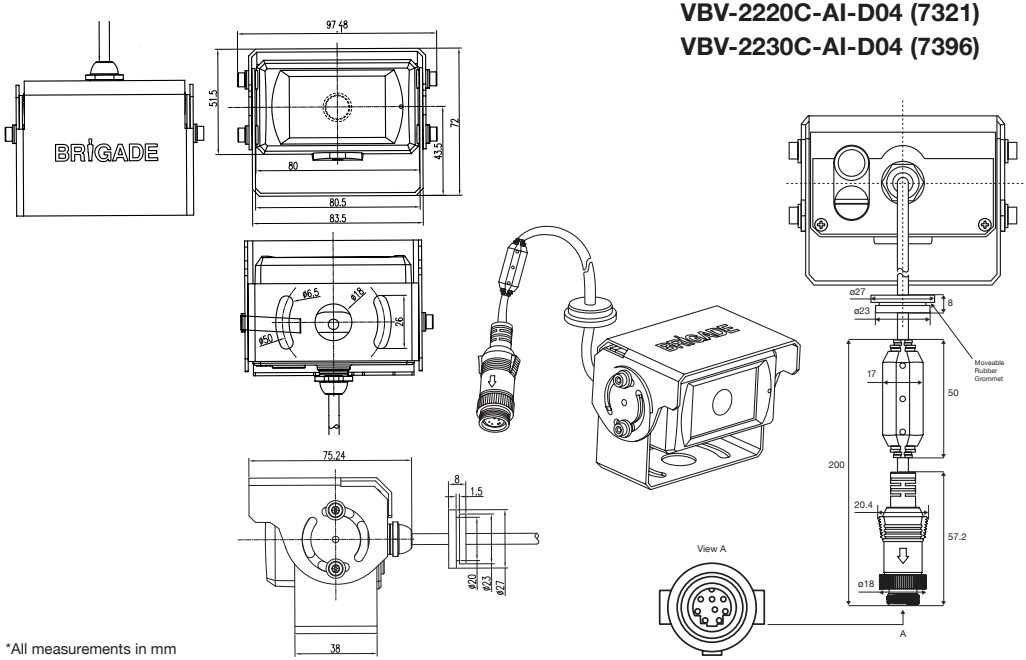
AI-VRU detection (1080P)

Product Specification

Model Number:

VBV-2220C-AI-D04 (7321)

VBV-2230C-AI-D04 (7396)



*All measurements in mm

Package Contents

Depending on camera model chosen:

1 x VBV-2220C-AI-D04 (7321) - Camera

or

1 x VBV-2230C-AI-D04 (7396) - Camera

Below included in camera box:

1 x VBV-22X0C-CA (S7346) - Camera cable adapter

1x VBV-22X0C-AI-D04-QR (7338) - QR link card

1 x VBV-22X0C-AI-AK3 (7345) - 3mm Allen Key

Key Features

Detection Range:

- VBV-2230C-AI-D04 - 11 metres Max
- VBV-2220C-AI-D04 - 19 metres Max
- VRU detection warning box
- Audio alarm output through monitor
- Alarm trigger output when using VBV-22X0C-CA
- Camera is 8 pin connection, when using VBV-22X0C-CA this changes to the standard 4 pin VBV Type Female Connector (Included in kit)

Technical Specifications

- Operating Voltage: DC 10V-32V
- Current Consumption: 260mA @12V, 140mA @24V

TV Systems:

- 30fps
- Picture Elements: 1920 X 1080P

Visual Resolution: 1080P AHD Viewing Angles:

- VBV-2230C-AI-D04: 129°(H), vertical 70°(V)
- VBV-2220C-AI-D04: 52°(H), vertical 30°(V)

Video Output:

- Approx 1.0 Vp-p / 75Ω

Length of Cable:

- 390mm, extensions cables available

Overall Dimensions:

- 97.5 × 75.3 × 72mm

Housing Material: Metal

Finish: Black

Assembled Weight:

- 500 Grams

Environmental Specifications

- Operating Temperature: -20° to +70°C
- IP Rating: IP69K
- Vibration Resistance: 5.9G

Approved Standards

- E-mark UNECE R10 Compliant
- CE
- UKCA
- FCC
- ICES
- REACH
- WEEE

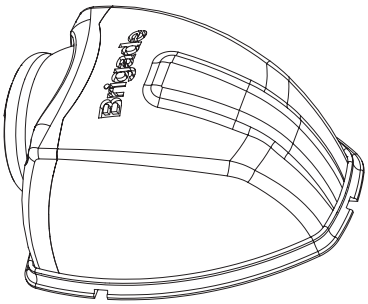
3 Product Specification Continued

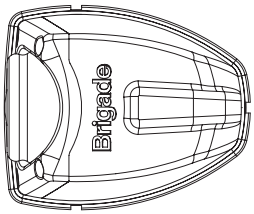
AI-VRU detection (720P)

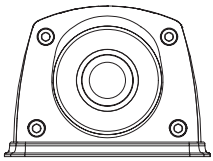
Product Specification

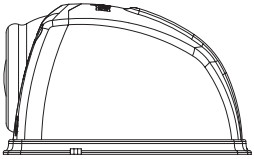
Model Number:

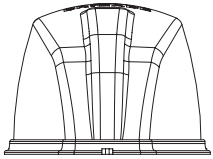
VBV-3201C-AI (8156)











Package Contents

Depending on camera model chosen:

1 x VBV-3201C-AI (8156) - Camera

Below included in camera box:

1 x VBV-22X0C-CA (S7346) - Camera cable adapter

1 x VBV-3201C-AI-QR (8330) - QR link card

1 x VBV-3xxC-FIX (5244) - Fixing kit

Key Features

Detection Range:

- VBV-3201C-AI - 15 meters max
- Audio alarm output through monitor
- Alarm trigger output when using VBV-22X0C-CA
- Camera is 8 pin connection, when using VBV-22X0C-CA this changes to the standard 4 pin VBV Type Female Connector (Included in kit)

Technical Specifications

- Operating Voltage: DC 10V-32V
- Current Consumption: 92±8mA@12V

TV Systems:

- 25fps/30fps configurable in WebUI
- Picture Elements: 1280 X 720P

Visual Resolution: 720P AHD Viewing Angles:

- VBV-3201C-AI 132°(H), 70°(V), 150°(D)

Video Output:

- Approx 1.0 Vp-p / 75Ω

Length of Cable:

- 300mm, extensions cables available

Overall Dimensions (HxLxW):

- 41.46 x 68.35 x 56.76mm

Housing Material: Metal

Finish: Black

Assembled Weight:

- 320g

Environmental Specifications

- Operating Temperature: -20° to +70°C
- IP Rating: IP69K
- Vibration Resistance: 5.9G

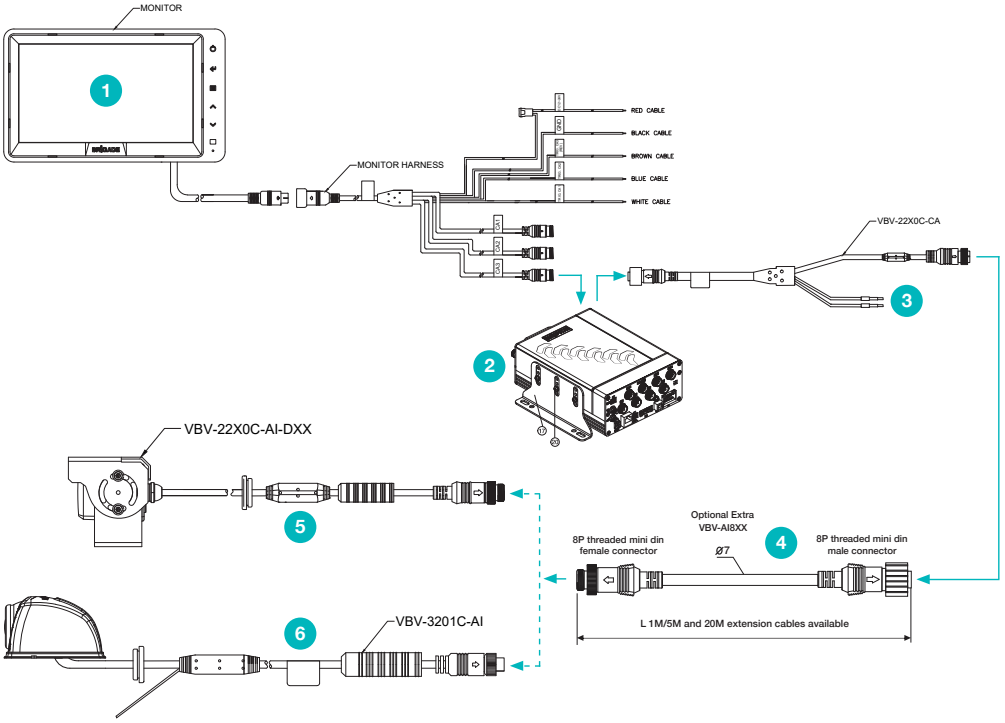
Approved Standards

- E-Mark - UN-ECE Regulation 10.06
- CE - EN IEC 61000-6-2:2019 / EN IEC 61000-6-3:2021
- UKCA - BS EN IEC 61000-6-3:2021 / BS EN IEC 61000-6-2:2019
- FCC - FCC Part 15B, Class B
- ICES - ICES-003, Class B
- REACH
- WEEE

4 System Connection

Camera, camera extension cable, camera adapter, MDR to monitor

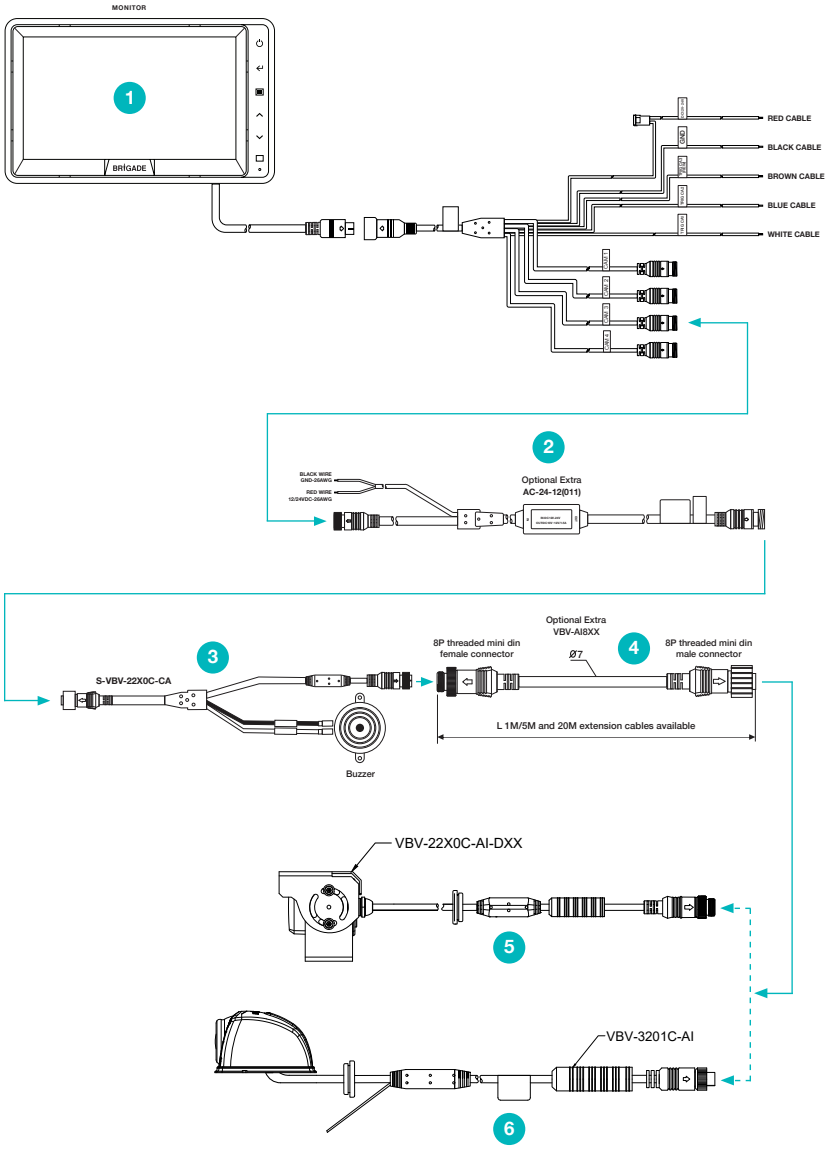
Description	Model	Included
1 - Monitor	Brigade AHD Monitor	Optional
2 - MDR	Brigade MDR	Optional
3 - Camera adapter	VBV-22X0C-CA	Yes
4 - Camera extension cable	VBV-AI8XX	Optional
5 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
6 - Camera	VBV-3201C-AI	Depending on chosen camera



4 System Connection Continued

Camera, camera extension cable, camera adapter, buzzer, monitor

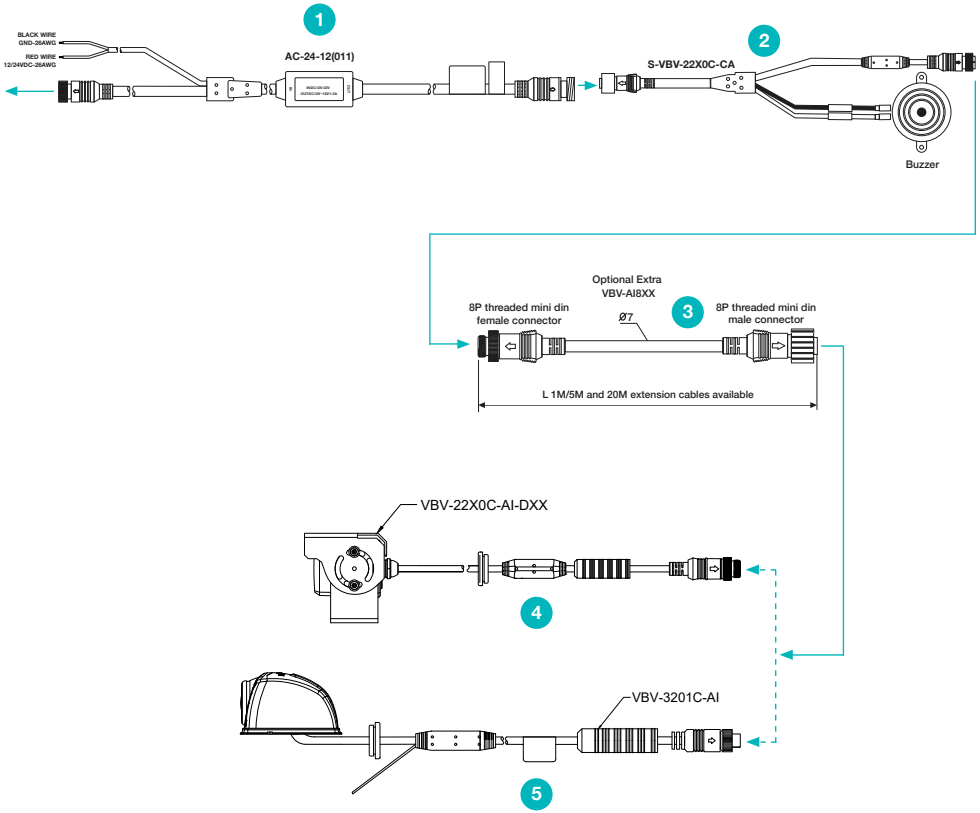
Description	Model	Included
1 - Monitor	Brigade AHD Monitor	Optional
2 - Camera power cable	AC-24-12(011)	Optional
3 - Camera adapter	VBV-22X0C-CA	Yes
4 - Camera Extension Cable	VBV-AI8XX	Optional
5 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
6 - Camera	VBV-3201C-AI	Depending on chosen camera



4 System Connection Continued

Camera, camera extension cable, camera adapter, buzzer

Description	Model	Included
1 - Camera power cable	AC-24-12(011)	Optional
2 - Camera adapter	VBV-22X0C-CA	Yes
3 - Camera extension cable	VBV-AI8XX	Optional
4 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
5 - Camera	VBV-3201C-AI	Depending on chosen camera

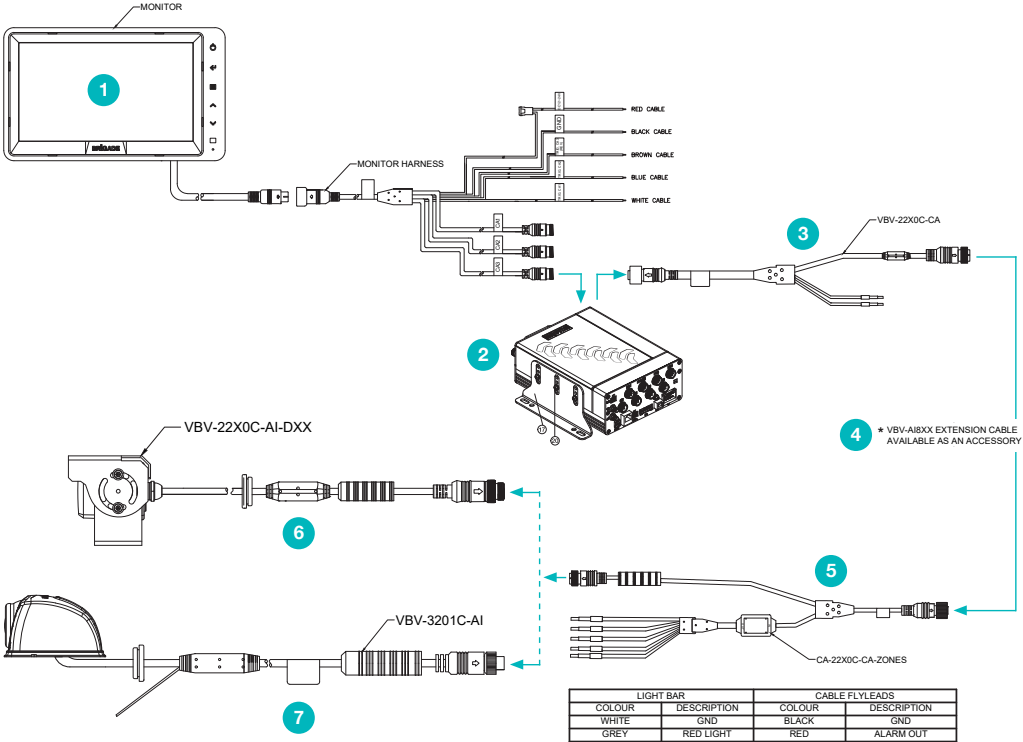


4 Zone Cable System Connection

Description of what cable does with current consumption etc.

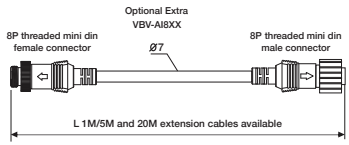
Camera, camera extension cable, camera adapter, MDR to monitor

Description	Model	Included
1 - Monitor	Brigade AHD Monitor	Optional
2 - MDR	Brigade MDR	Optional
3 - Camera adapter	VBV-22X0C-CA	Yes
4 - Camera extension cable	VBV-AI8XX	Optional
5 - Adapter cable for Alarm output Detection zones for VBV-22X0C-AI/VBV-3201C-AI	VBV-22X0C-CA-ZONES	Optional
6 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
7 - Camera	VBV-3201C-AI	Depending on chosen camera



LIGHT BAR		CABLE FLYLEADS	
COLOUR	DESCRIPTION	COLOUR	DESCRIPTION
WHITE	GND	BLACK	GND
GREY	RED LIGHT	RED	ALARM OUT
YELLOW	YELLOW LIGHT	YELLOW	ALARM OUT
GREEN	GREEN LIGHT	GREEN	ALARM OUT
BROWN	NOT USED	WHITE	ALARM IN (NOT USED)

***VBV-AI8XX Extension cable available as an accessory**

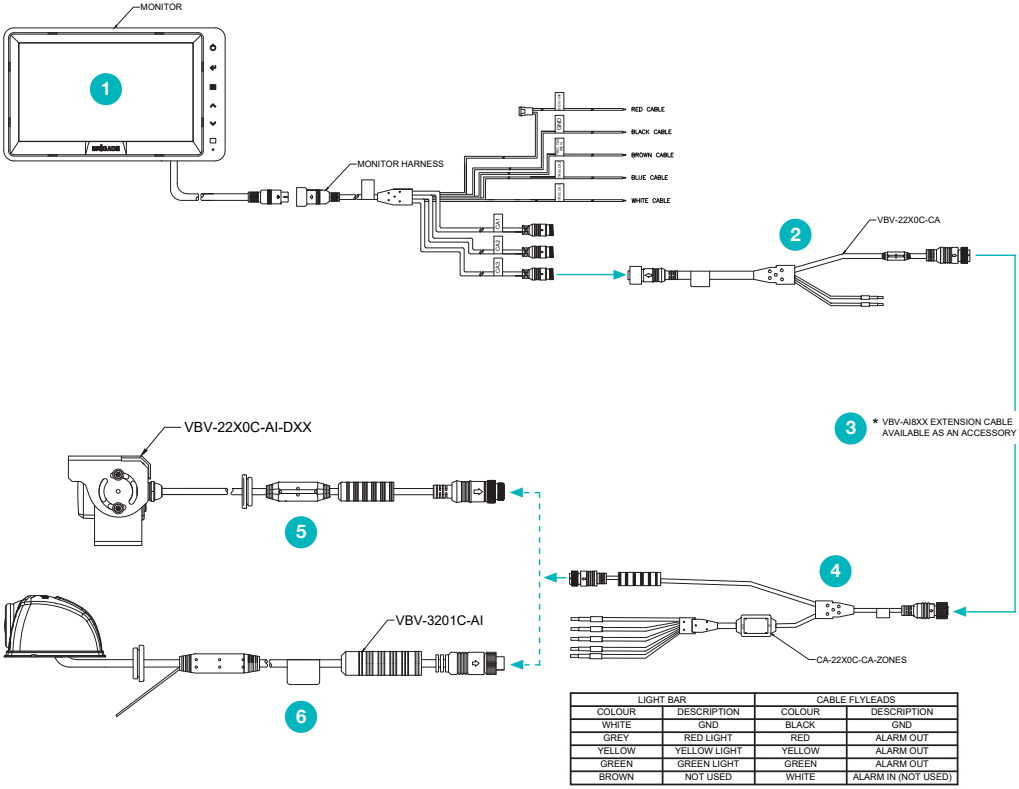


4 Zone Cable System Connection Continued

Description of what cable does with current consumption etc.

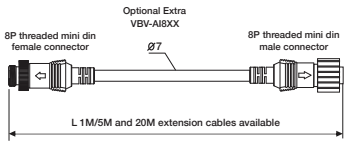
Camera, camera extension cable, camera adapter, monitor

Description	Model	Included
1 - Monitor	Brigade AHD Monitor	Optional
2 - Camera adapter	VBV-22X0C-CA	Yes
3 - Camera extension cable	VBV-AI8XX	Optional
4 - Adapter cable for Alarm output Detection zones for VBV-22X0C-AI/VBV-3201C-AI	VBV-22X0C-CA-ZONES	Optional
5 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
6 - Camera	VBV-3201C-AI	Depending on chosen camera



LIGHT BAR		CABLE FLYLEADS	
COLOUR	DESCRIPTION	COLOUR	DESCRIPTION
WHITE	GND	BLACK	GND
GREY	RED LIGHT	RED	ALARM OUT
YELLOW	YELLOW LIGHT	YELLOW	ALARM OUT
GREEN	GREEN LIGHT	GREEN	ALARM OUT
BROWN	NOT USED	WHITE	ALARM IN (NOT USED)

***VBV-AI8XX Extension cable available as an accessory**

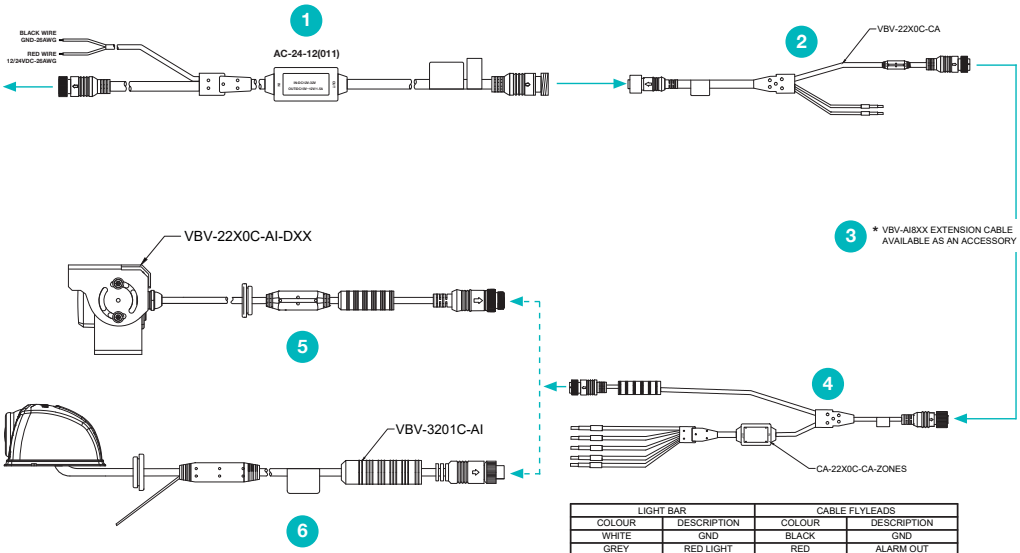


4 Zone Cable System Connection Continued

Description of what cable does with current consumption etc.

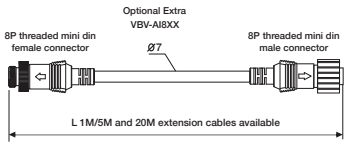
Camera, camera extension cable, camera adapter

Description	Model	Included
1 - Camera power cable	AC-24-12(011)	Optional
2 - Camera adapter	VBV-22X0C-CA	Yes
3 - Camera extension cable	VBV-AI8XX	Optional
4 - Adapter cable for Alarm output Detection zones for VBV-22X0C-AI/VBV-3201C-AI	VBV-22X0C-CA-ZONES	Optional
5 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
6 - Camera	VBV-3201C-AI	Depending on chosen camera



LIGHT BAR		CABLE FLYLEADS	
COLOUR	DESCRIPTION	COLOUR	DESCRIPTION
WHITE	GND	BLACK	GND
GREY	RED LIGHT	RED	ALARM OUT
YELLOW	YELLOW LIGHT	YELLOW	ALARM OUT
GREEN	GREEN LIGHT	GREEN	ALARM OUT
BROWN	NOT USED	WHITE	ALARM IN (NOT USED)

***VBV-AI8XX Extension cable available as an accessory**

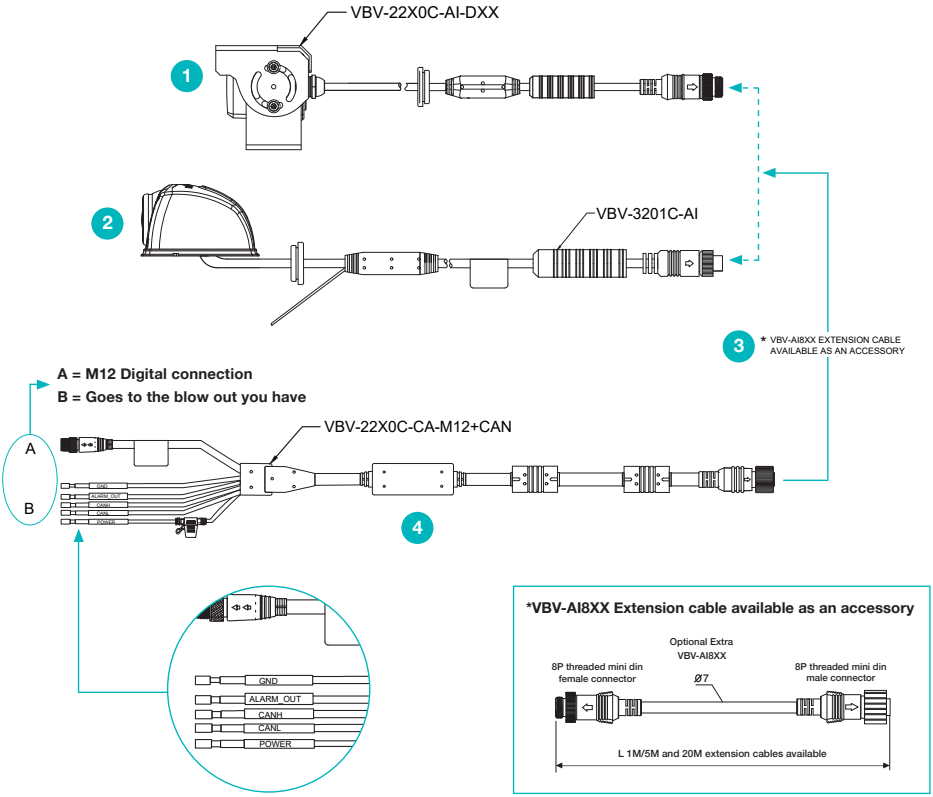


4 CAN and M12 Cable System Connection

Explanation of what cable does with current consumption etc. CAN+M12 cable cannot be used in parallel with ZONE cable etc. (see appendix).

Camera, camera extension cable, camera adapter

Description	Model	Included
1 - Camera	VBV-22X0C-AI-DXX	Depending on chosen camera
2 - Camera	VBV-3201C-AI	Depending on chosen camera
3 - Camera extension cable	VBV-AI8XX	Optional
4 - Adapter cable for VBV-22X0C-AI/VBV-3201C-AI to support M12 connection and CAN integration	VBV-22X0C-CA-M12+CAN	Optional



5 VRU/HFR Explained

When VRUs are entering the detection zone, the machine operator can receive either/ or the following alerts:

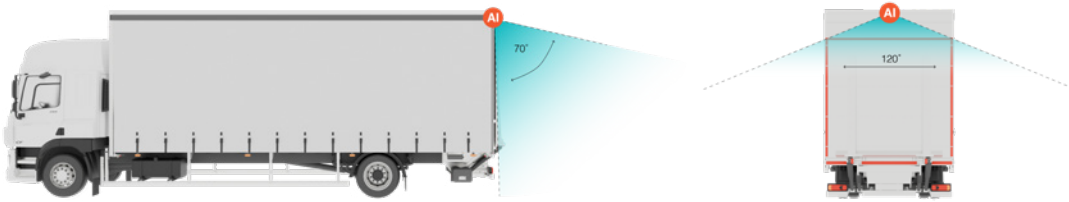
1. When connected to a monitor, every VRU detected within the detection zone is tracked and identified with a red frame around them and an audible alarm (if supported by the monitor), the alarm will continue until the VRU leaves the detection zone.
2. When connected to an internal buzzer, the machine operator will receive a visual alert (if connected to a monitor) and an audible alarm, the alarm will continue until the VRU leaves the detection zone.

6 Suggested Installation Location

VBV-2220C-AI-D04: 52° (H), vertical 30° (V)
Typical installation for front camera.

VBV-2230C-AI-D04: 129° (H), vertical 70° (V)
Typical installation for rear camera.

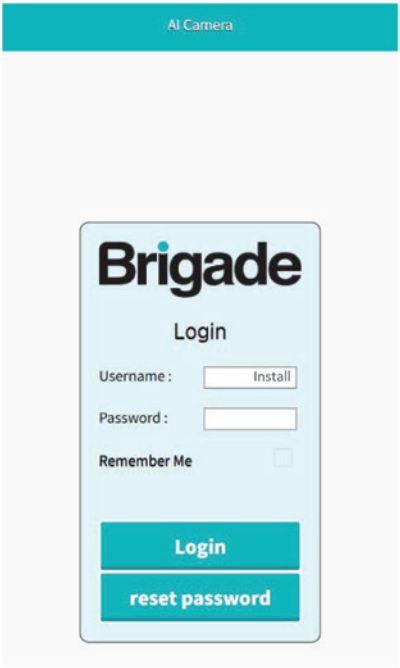
The camera installation minimum height is recommended to be 1m.



VBV-3201C-AI: 132° (H), vertical 70° (V)
Typical installation for side camera.

The AI VRU/HFR detection area is not representative of the camera viewing angle.

Ethernet/webinterface



Contents

1 Introduction Technology

Brigade Internet Protocol (IP) Cameras are compatible with multiple network protocols such as:

MDR, ONVIF, RTSP, TCP/IP and FTP

This enables data transmission over a network. The Cameras and AI-Boxes also have a web interface.

A web interface is a graphical user interface installed on a device. This can be accessed via a web browser (Firefox/Chrome/Internet Explorer) even without internet if it is active in your own network.

The web interface has the advantage of being able to quickly make settings or receive live images without being integrated into a complex network.

Information on hardware and MDR-related settings can be found on our homepage under product support.

⚠ Warning

1. Working voltage: 10-32V. Below 7V, it will no longer function and may damage the camera.
2. Make sure all cables are properly connected. Observe polarity.
   Improper cable connections can damage the camera.
3. A 100% detection rate cannot be guaranteed.
4. Never attempt to repair this device yourself.
5. No guarantee or warranty is given for any changes or modifications that are not part of this manual.

2 Prerequisite

To configure the devices you have connection options:

Connection Setup

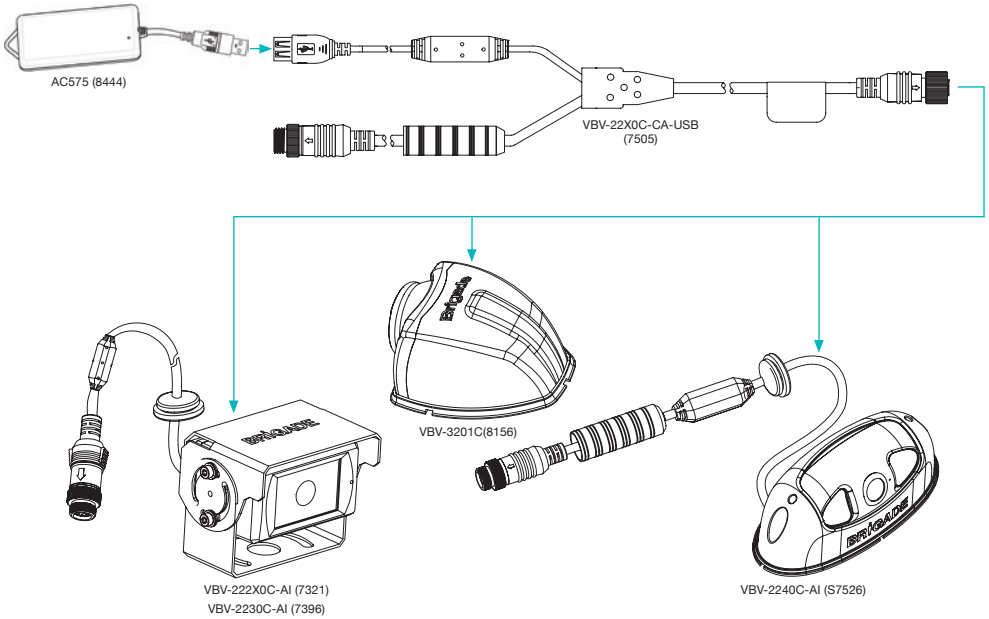
Option 1: Camera VBV-22X0C AI
VBV-22X0C-CA-USB (7505)
WIFI-Adapter (AC575) (8443)

Option 2: Camera VBV-22X0C AI
Adapter VBV-22X0C-CA-RJ45 (7507) or
VBV-22X0C-CA-M12+CAN (8260)
Adapter AC-24-12(011) (5760)

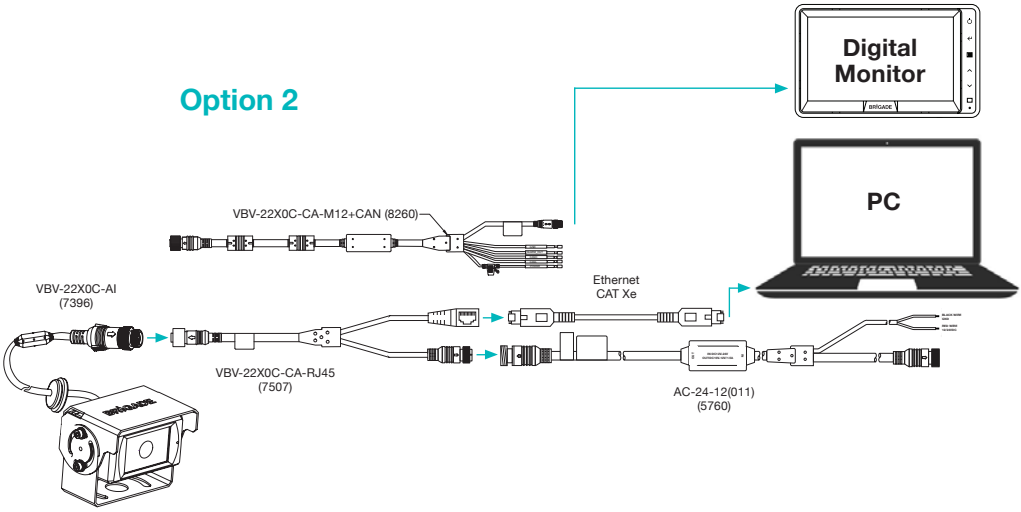
3 Hardware

Hardware Example

Option 1



Option 2



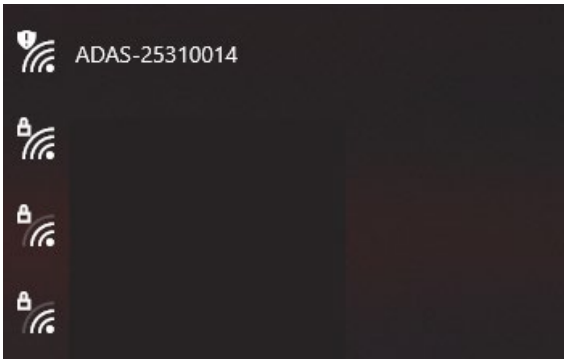
The USB cable or CAN/M12 cable needs to be connected directly to the camera. Connection via extension cable may cause loss of data signal.

4 Option 1 Config - WiFi Dongle

Option 1 Config

1. Connect the Wifi-Dongle to the Camera as shown above.
2. Switch to a computer or Mobile device. Here is a Windows 10 example:

   Go to network/connection settings on your device, search for available networks and select “ADAS-xxxxxxx” from the list.



The password is “88888888”

The communication distance of WIFI is around 7m.

Skip to section Web Interface page 33.

5 Option 2 Ethernet/M12 config

Option 2 Config

The devices have an integrated web server.

Therefore, it also has its own IP address, which allows access to the user interface.

Communication between the IP camera and the computer only works if the correct IP address is used.

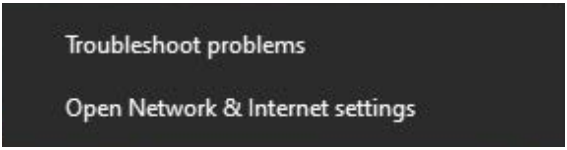
The camera's default IP address is: 192.168.66.76

The AI-Box´s default IP address is: 192.168.66.142

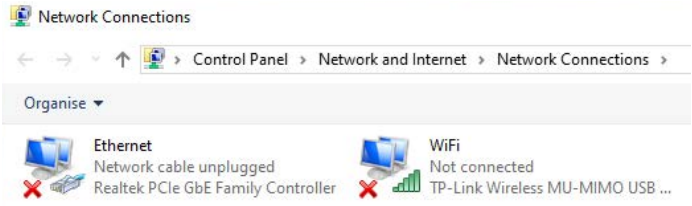
Computer Network Connection Windows 10

Connect the IP camera to a computer, then go to the computer network settings. Here is a Windows 10 example:

1. Right click the network icon, choose the "Open Network & Internet settings"



2. In the setting page choose the "Change adapter options". Double click the "Ethernet" option.



3. In the pop-up window click the "Properties" – "Internet Protocol Version 4 (TCP/IPv4)".

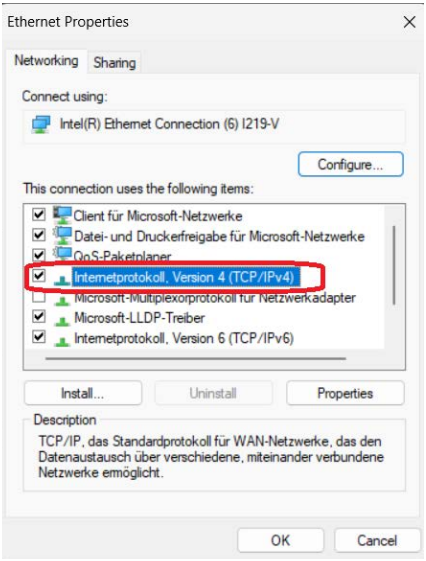
5 Option 2 Ethernet/M12 config Continued

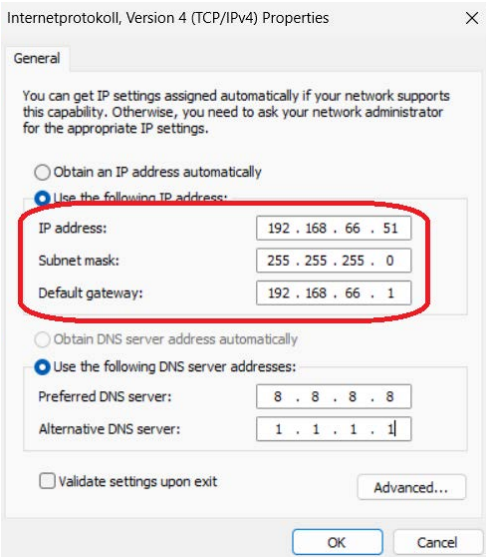
4. Choose the “Use the following IP address:”. In the box please enter the same 3 groups of numbers as the IP camera. The last group can be any number from 2 to 255. This IP address must be unique as it is the only way for it be recognised.

   Therefore, please choose a number different from other existing IP cameras.

   IP= 192.168.66.XX / Gateway= 192.168.66.1

   The Subnet Mask is automatically filled in. Save after configuring the IP address.

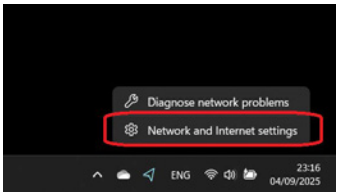




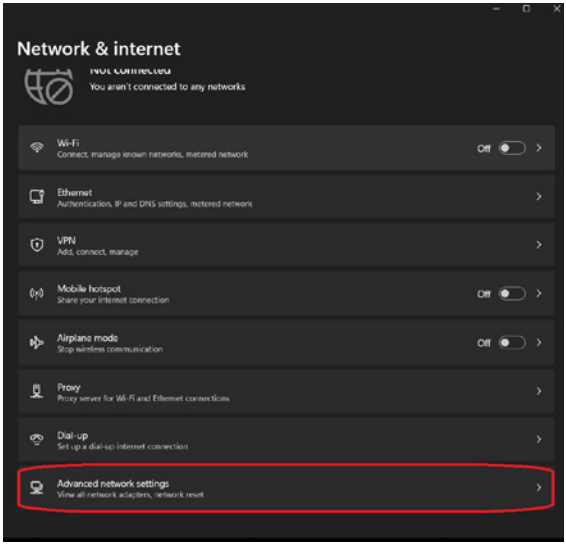
Computer Network Connection Windows 11

Connect the IP camera to a computer, then go to the computer network settings. Here is a Windows 11 example:

1. Right click the network icon, choose the “Open Network & Internet settings”

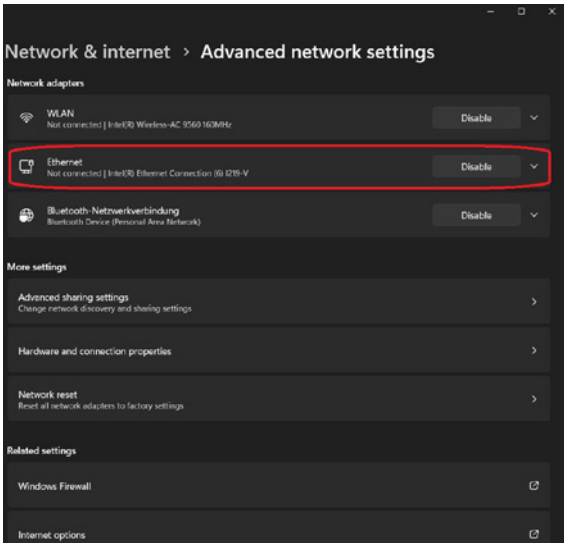


2. In the setting page choose the “advance network options”.

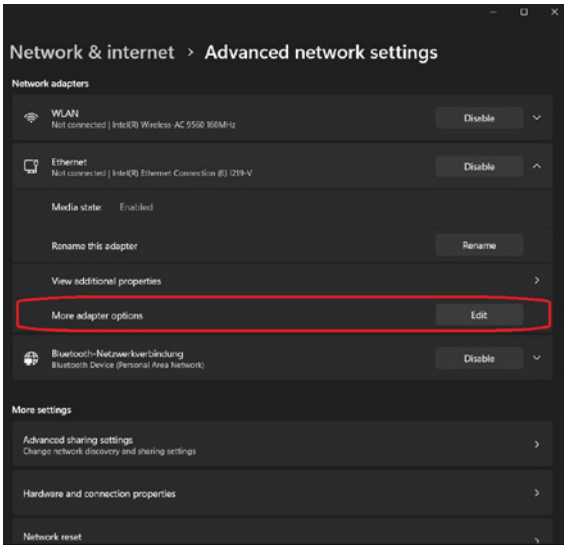


5 Option 2 Ethernet/M12 config Continued

3. Click on the “Ethernet” register.



4. In the setting page choose the “advance network options”.



5 Option 2 Ethernet/M12 config Continued

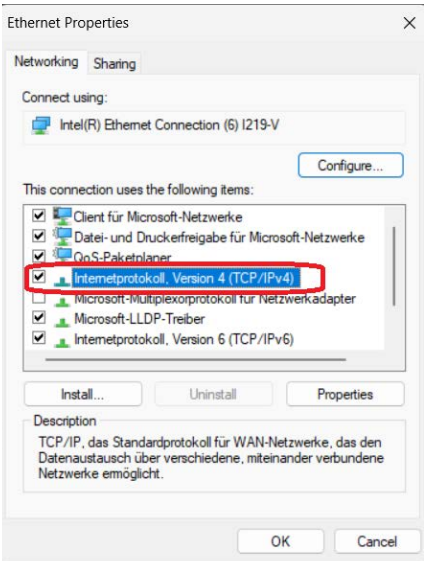
5. In the pop-up window click the “Properties” – “Internet Protocol Version 4 (TCP/IPv4)”.

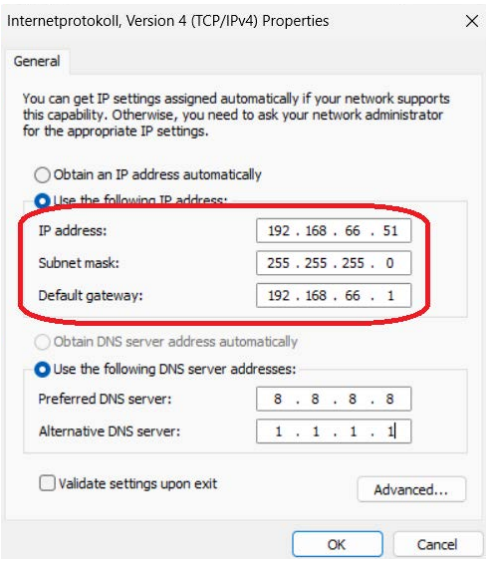
   Choose the “Use the following IP address:”. In the box please enter the same 3 groups of numbers as the IP camera. The last group can be any number from 2 to 255. This IP address must be unique as it is the only way for it be recognised. (Not .76 or .142)

   Therefore, please choose a number different from other existing IP cameras.

   IP= 192.168.66.XX / Gateway= 192.168.66.1

   The Subnet Mask is automatically filled in. Save after configuring the IP address.





6 Web Interface/Settings

Web Interface

1. Open a web brouser (Firefox/Chrome/Internet Explorer).

   From there, enter the IP address of the IP camera (e.g. 192.168.66.76) in the address field.

   If you use the Dongle, please enter 192.168.60.1 in your brouser address line. The website will load in a few seconds.

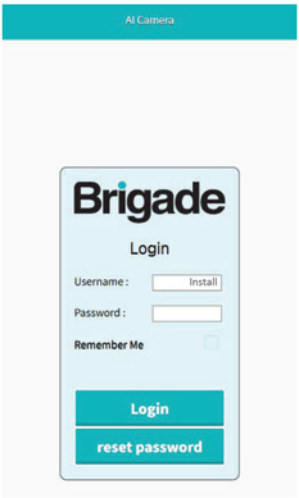
   After entering the IP address, a login page is displayed.

   OSD and passwords can be found in UAC (User Access Controls) Page at the end of this manual.

   The username is: “Install”.

   The password is: “Br1GaDeAI”

   The password can be changed on the settings page.



⚠ Warning

1. If you change the password please make a note of the new password, there is no way to gain access if you forget your password, Please contract Technical support.

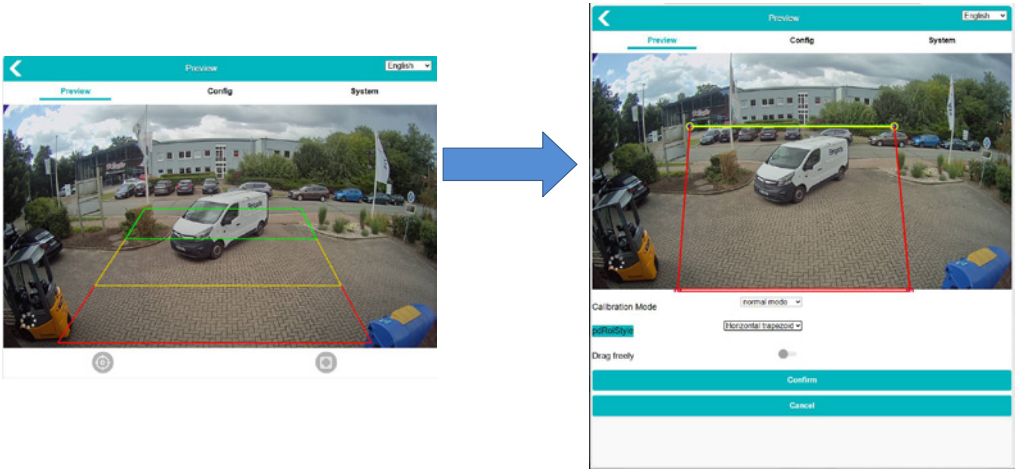
2. After finishing the M12/Wi-Fi IP setup, we can calibrate the HFR detection alarm system and operate some other settings on the device web interface.

   Please refer to the UAC section in Appendix 1 for login details.

Operations of Detection Zone Calibrating

Calibration Mode

Click the Calibration button on the web page, and choose “normal mode”. The area on the phone/PC screen corresponds to the “Detection Zone” on the monitor. “pdRoiStyle” has four types of ROI to choose, which are horizontal trapezoid, vertical (red frame on the left), vertical (red frame on the right), and semicircle.



Choose the corresponding ROI type and drag the corresponding line segment or point to manually modify the ROI area. Click “Confirm” button for calibration. The calibration will take effect immediately and the “Detection Zone” displayed on the monitor will be updated immediately.

VRU Detection Functions

Function description: When a HFR appears in Detection Zone, the camera will frame them with the corresponding color depending what zone the HFR is detected in, and a “ding” alarm will be heard.

The alarm continues until the HFR leave the Detection Zone area.

Note: The Vertical side-view camera and horizontal camera have the same function. The following is the difference in the graphical way.

1. The red box alarm

When the HFR is detected the red box is generated, it means that the HFR has entered the red Detection Zone area. The output alarm sound is “ding ding ding”, and the alarm sound frequency is relatively short.

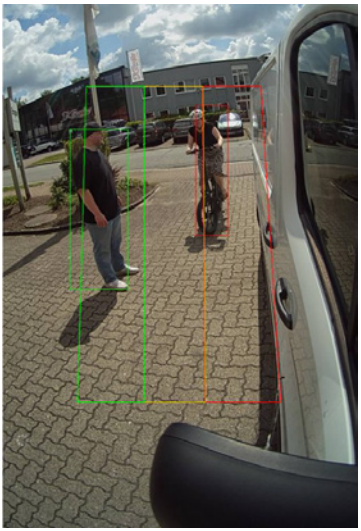
2. The yellow box alarm

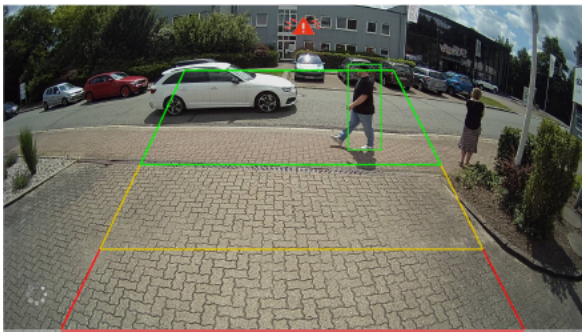
When the HFR is detected and the yellow box is generated, the output alarm sound is “ding ding”. The alarm sound frequency is moderate.

3. The green box alarm

When the HFR is detected and the green box is generated, the output alarm sound is “ding”, and the alarm sound frequency is flat.

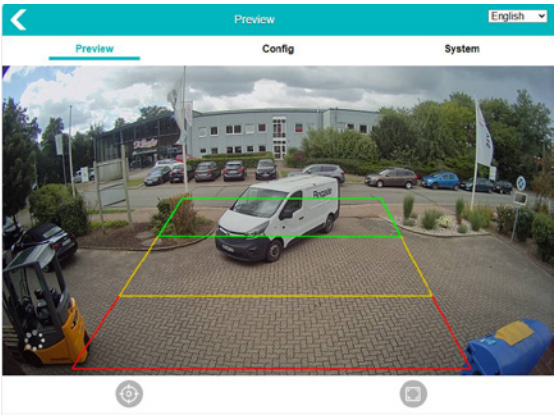
Note: when there are multiple boxes for HFR detection,s the priority of alarm sound is: red box (highest) yellow box (second) green box (lowest). For example, when there are three boxes of red, yellow and green, the default alarm sound is the alarm sound of red box.



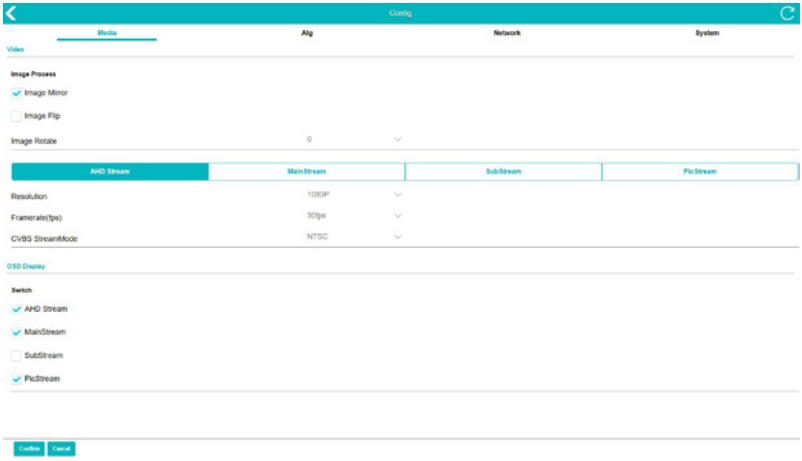


7 Settings - Media

System Settings



Click “Config” button to enter the parameter setup interface.
As shown below:

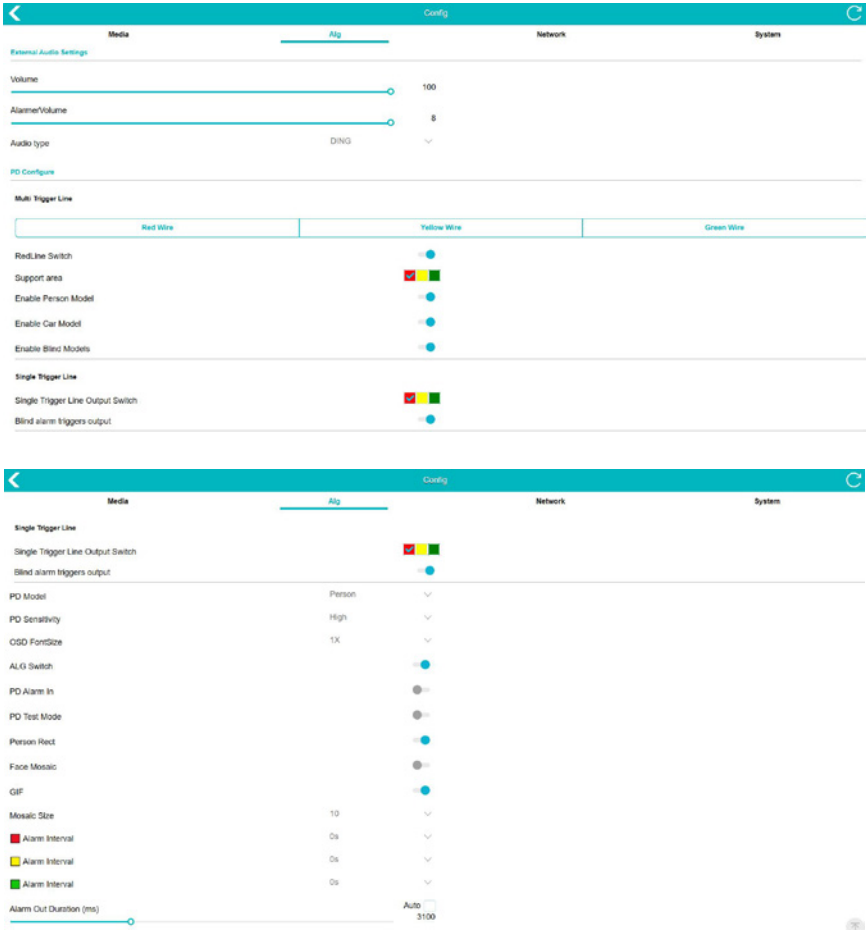


Media Configuration

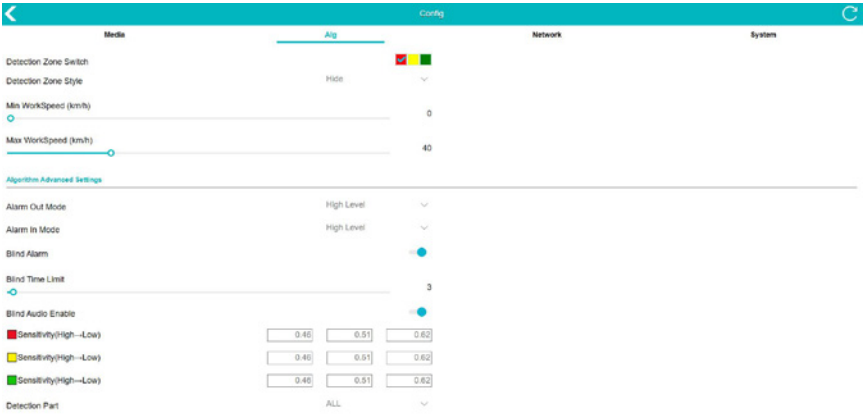
Image Mirror	Switches image mirror or non mirror
Image Flip	Switches image flip or non flip
Image Rotate	Can be set to 0 and 90, clockwise. When set to 0, the screen will not rotate. When set to 90, clockwise, the screen will rotate 90° clockwise
AHD Stream	Set the display resolution and output frame rate CBVS mode can be set to NTSC and PAL
MainStream	When the encoding format is set to MJPEG, the device needs to be restarted for it to take effect. The minimum I-frame interval changes as the frame rate changes
OSD Display	OSD switch controls whether pic-stream is enabled or time/ passage is displayed

8 Settings - Alg

Algorithm Configuration



8 Settings - Alg Continued



Volume	The alarm sound level is set to the default level 100. Level 0 indicates no sound. While level 100 represents the maximum volume.	
AlarmerVolume	To set the volume of audible and visual alarm, with a default setting of level 8.	
Audio type	To switch the audio alert sound. 6 audio sounds available, with DING sound set by default.	
PD Configure	The following settings function only when three trigger lines are connected. It supports to separately set the triggering parameters for the single trigger line output: red line, yellow line, and green line.	
	Red/Yellow/Green Line Switch	To turn on/off the Red/Yellow/Green line switch. When turned on the trigger lines will generate trigger output.
	Support Area	When three trigger lines are connected at the same time and a specific trigger line color is set, alarm output from the trigger line will be activated when a HFR is detected within the detection area of the corresponding color. For instance: Red line setting In the Support Area setting of the Red Wire, selecting red color implies that the red trigger line will only produce output when a HFR is detected within the red color area. Selecting red or yellow colors indicates that red or yellow trigger line will produce output when a target is detected within red color or yellow color area.
	Enable Person Model	To set whether trigger lines produce output when HFR alarm occurs. When enabling Person Model, the trigger line will generate outputs upon detecting HFRs within the detection area of the specified color.
	Enable Car Model	To set whether trigger line produces output when vehicles are detected. When enabling Car model, the trigger line will generate outputs upon detecting vehicles within the detection area of the specified color.*Currently not supported.
	Enable Blind Model	When activating Blind Models, the trigger line will generate outputs upon detecting the camera is blind (Covered) producing Blind alarm.
Single Trigger Line	Single Trigger Line Output Switch	After checking the red/yellow/green, the single trigger line will have an output when a HFR is detected in the corresponding color area
	Single Trigger Line Output Switch	After activation, the single trigger line will have an output when there is Blind alarm.

8 Settings - Alg Continued

PD Model	To set algorithm model. HFR detection: HFR only; HFR and vehicles detection: HFR and vehicles only; Vehicle detection: vehicle only.
PD Sensitivity	Sensitivity adjustment: Higher settings increase the susceptibility of false positives, whereas lower settings increase the likelihood of false negatives.
OSD Font Size	OSD fontsize display, with the option to disable confidence and adjust confidence fontsize.
ALG Switch	Algorithm switch setting. HFR detection will not be performed when the algorithm switch is off.
PD Alarm In	To set HFR detection trigger input. When PD Alarm In is enabled, the HFR detection algorithm will only be activated when connected to a multifunctional. CAN cable or a device with Alarm In input, and when the Alarm In provides a 12V voltage.
PD Test Mode	To enable/disable PD Test Mode. When enabled, HFRs detected outside specific areas will be enclosed in blue rectangular boxes on display, along with confidence values display of detected HFRs.
Person Rect	To select whether to display rectangular boxes after HFRs being detected.
Face Mosaic	When activated, HFR faces within the detection area will be pixelated.
Mosaic Size	The size of the pixelated cells can be adjusted(5/10/15), with smaller cells resultingin more blur.
GIF Default On	This spinning wheel (Bottom left of display)will stop when the unit is frozen. If turned off this will not show.
Alarm Interval	To set the lowest interval between two alarms in the red/yellow/green zones. During inverval, no alarm will be triggered;
Alarm Out Duration	After detecting HFRs within the detection areas, set the duration of outputting highlevel voltage from trigger lines. The default is “AUTO”(2 seconds). When connecting to an MCU cable with a trigger line, “AUTO” (1s) means an output duration of 1 second; When “Alarm Output Mode” is set to high level voltage, the trigger line outputs a high level voltage signal after detecting VRUs. When no VRUs are detected, the high level voltage output lasts 2 seconds before dropping to a low level voltage.
Detection Zone Switch	The detection area in the red/yellow/green area can be set. When the red detection area is off, it will not be displayed on the screen, and the alarm will not be triggered in the corresponding area.
Detection Zone Style	To set whether to display filled colors, outline, or hide in the detection areas. Settings function immediately.
Min Work Speed	After connecting external GPS, the algorithm will be activated when the driving speed exceeds the minimum speed.*Currently not supported.
Max Work Speed	After connecting external GPS, when the driving speed is below the maximum speed, the algorithm will also be activated.*Currently not supported.
Alarm Out Model	Alarm Out Model can be set to either high level voltage or low level voltage. When set to high level, the trigger line outputs a high level voltage when HFRs are detected within the detection areas, and a low level when no HFRs are detected. Conversely, when set to low level voltage, the trigger line outputs a low level voltage when HFRs are detected, and a high level when no HFRs are detected.
Alarm In Mode	It can be set to high electrical level and low electrical level. When set to high level, only high level input to the trigger input line can start the algorithm to detect HRFs. When set to low level, only low level input to the trigger input line can start the algorithm to detect VRUs.
Blind Alarm	The camera will produce alarm notifications when the camera is Blind.
Blind Time Limit	1~300 adjustable to control the blind time alarm. The default value is 3, which means that the alarm will be triggered only when the camera is blind for 3 seconds.
Blind Audio Enable	The sound is on by default. If it is turned off, when the blind alarm is triggered, the display will only show the shelter alarm icon without the sound alarm.
Sensitivity	Sensitivity can be set between 0 and 1, with two decimal places, where a sensitivity setting of 0 corresponds to maximum sensitivity for the detection algorithm, and a setting of 1 corresponds to minimum sensitivity.
Detection Part	All detection area and the bottom of the detection are can be chosen. When Bottom is selected, the bottom of the HFR detection frame needs to intersect with the detection frame to trigger the alarm.

9 Settings - Network

Networking Configuration

Set the device IP, mask, gateway and other parameters manually. When connected to the device

through a network/M12 cable, you could input http://IP to access the web page. You can also connect RTSP streams over IP.

ONVIF:

Use “ONVIF Device Manager” or other software that supports ONVIF protocol. The ONVIF DM is a free and open-source graphical user interface for the ONVIF protocol. With it the following is possible:

- live video stream
- Video picture settings
- Encoder settings
- Video settings
- Event and metadata settings
- Firmware upgrade
- Local storage / network storage recordings

RTSP:

Use video software to open the RTSP stream. The VLC player is listed here as an example. Establish the network connection and open the VLC player or other comparable software.

Click Media->Open Network Streaming->

rtsp://camera IP address:port/live/mainstream

(rtsp://192.168.66.126:544/live/mainstream)

Enter your login data.

With some software applications it is necessary to integrate the login data into the address.

(rtsp://username:password@192.168.66.126:554/live/mainstream)

Dynamic IP timeout (seconds): When DHCP is turned on and no assignable IP is found within the

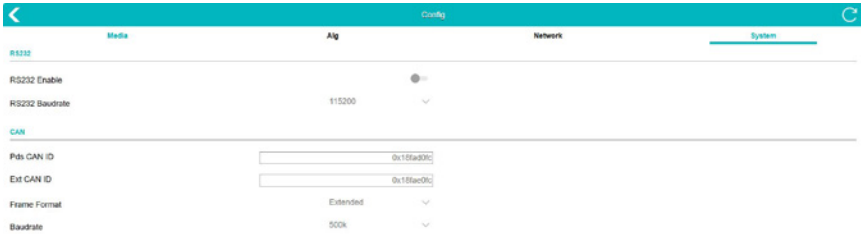
settime (default is 16 seconds), the device as the device's IP address.

Part No.	Model	IP Address	RTSP Address	ONVIF Support
7321	VBV-2220C-AI-D04	192.168.76.101	rtsp://192.168.76.101:554/live/mainstream	Live video stream
7396	VBV-2230C-AI-D04	192.168.66.126	rtsp://192.168.76.102:554/live/mainstream	Video picture settings
			rtsp://192.168.76.100/live -- Surround view	Encoder settings
			rtsp://192.168.76.100/left -- Left single view	Video settings
			rtsp://192.168.76.100/right	Event & metadata settings
			rtsp://192.168.76.100/front	Firmware upgrade
7525	VBV-1000-360-AI	192.168.76.100	rtsp://192.168.76.100/back	Local storage/network storage

10 Settings - System

System Configuration

Supports modifying the device CAN ID, frame format, and baud rate parameters. When the device is externally connected to the CAN adapter, you can open the CAN adaptation host computer software on the computer, set the corresponding baud rate, and then open and view the CAN data sent by the device (including frame ID, time, and frame content).*SeeVBV-22X0C-AI-DXX CAN Communication Protocol for detailed information.

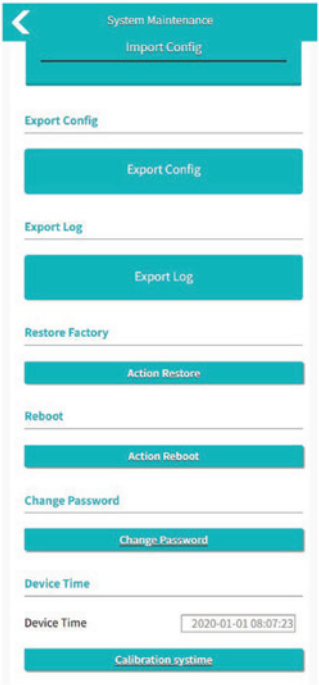


RS232 Enable	After enabling RS232, connecting the RS232 related cables and opening the serial port tool with the corresponding baud rate, the data sent by the device can be viewed. The data format is consistent with the CAN data format.
RS232 Baudrate	The baud rate can be set to 4800/9600/14400/19200/38400/43000/57600/76800/115200, and the default is 115200.
Pds CAN ID	Configure the CAN ID when applying the default CAN protocol.
Ext CAN ID	Set the CAN ID for extended protocols.
Baudrate	When the device is connected to a CAN adapter, user can open the host software of the CAN adapter on the computer and set the corresponding baud rate. Then the CAN data sent by the device (including frame ID, time, and frame content) can be viewed. The baud rate can be set to 100k/125k/250k/500k/800k/1000k, and the default is 500k.

10 Settings - System Continued

System Function

Click “System” button and enter into system page, series number, software version, hardware version, and UUID are shown.



Import Config	Import configuration files. The imported configuration file must be a compressed package containing (config. xml, config_bak1.xml, config_bak2.xml).
Export Config	Export the device configuration file. Export Log.
Export Log	Export device log files.
Restore Factory	Restore the device to factory settings and all parameters are restored to default values.
Reboot	Restart the device.
Change Password	Modify the device login Password.
Device Time	Manually synchronize device time.

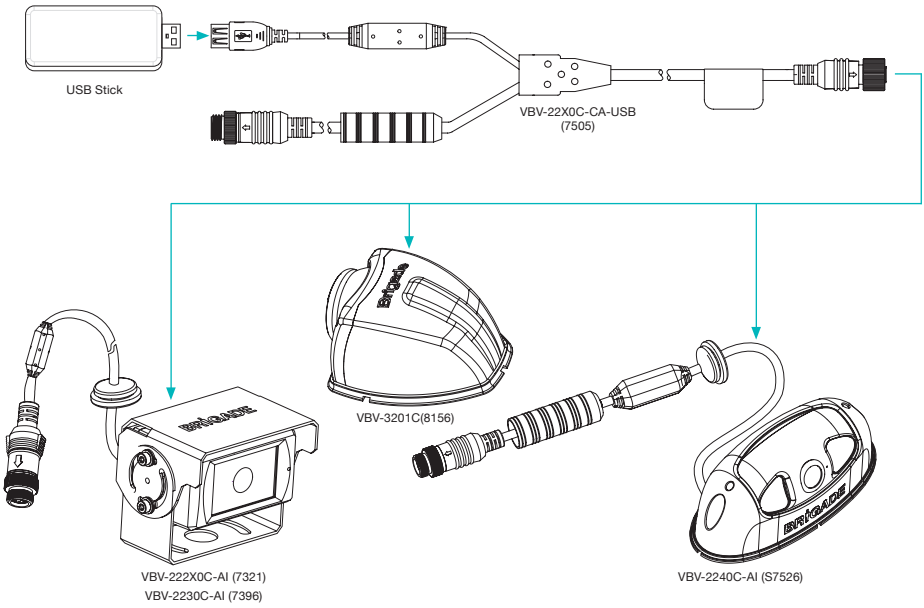
System Upgrade

USB flash drive upgrade

The device can be upgraded with a flash disk. Specific methods:

1. Format the flash disk as Fat32 file system.
2. Place the upgrade package named “XXXX_upgrade_ XXXXXXXX.XXXX.bin” on the flash disk*, connect the flash disk to the device, restart the device, and wait for a few minutes to complete the upgrade. If you want to realize batch upgrade without automatically deleting the upgrade package after upgrade, you can rename the update report a “XXXX_upgrade_fixed_XXXXXXXX.XXXX_.bin”.
3. After the upgrade, the software version number of the device will also change synchronously. Check the version number in the lower left corner of the monitor when the device is turned on. Or view the version number in the “System”->”Software Version” on the web page.

* Do not power the camera without the USB connected or you will need to reboot the device.



Network (LAN) Update

The device can also be upgraded through the Network (LAN) function.
Steps:

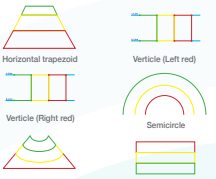
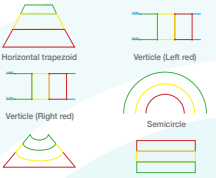
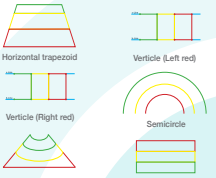
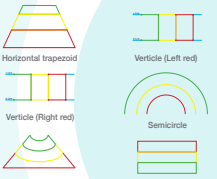
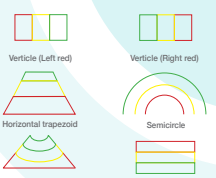
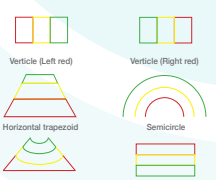
1. Enter the system maintenance interface of the web page.
2. Click the “Click to open the file Browser” button to upload the upgrade package, or drag the upgrade package to the upgrade button on the web page. After the upgrade package is transferred 100%, the device will automatically restart for upgrading.
3. The software version number of the device will change correspondingly after the upgrade. The version number can be checked in the lower left corner of the display when the device is powered on, or in “System” -> “Software Version”.

Note:

1. During the online upgrade process, the device cannot be powered off. The device may have problems if it loses power during the online upgrade process. In this case, a USB flash drive should be used to upgrade the device. The device will return to normal after this upgrade.
2. Only versions 20241118.5361 and above support online upgrades. Versions before 20241118.5361 need to use a USB flash drive to upgrade to version 20241118.5361 before online upgrades.
3. The USB cable needs to be connected directly to the camera. Connection via extension cable may cause issues with firmware update.

11 Appendix 1

User Account Controls

Menu	Sub Menu	Parameter				
Login	Username	-				Install
	Password	-				Br1GaDeAI
	Remember	On/Off				Off
Setting	Preview	Language	English/简体中文/日本语/ Español/Português/Русский/Türkiye/Deutsch/ Français			X
			Normal Mode/Measure Mode			Normal Mode Only
		Calibration Mode	pdRoiStyle	Horizontal version 2.3 mm focal length		
				Horizontal version 6.0 mm focal length		
				Horizontal version 1.45 mm focal length		
				Horizontal version 1.99 mm focal length		
				Horizontal version 2.3 mm focal length		
				Horizontal version 6.0 mm focal length		

11 Appendix 1 Continued

User Account Controls

Menu	Sub Menu	Parameter				
						Install
			Select Zone	The option is only displayed when the pdRoiStyle option is Canvas		
			Smoothness	The option is only displayed when the pdRoiStyle option is Canvas	0.00 - 1.00	0
			Hide Other Zones	The option is only displayed when the pdRoiStyle option is Canvas	ON/OFF	OFF
	Config	Media	Image Mirror	ON/OFF		ON (Horizontal version 2.3 mm or 2.8 mm focal length) & OFF (other Horizontal version)
			Image Flip	ON/OFF		OFF
			Image Rotate	0/90,CW		0
			AHD Stream	Resolution	1080P/720P	1080P
				Framerate (fps)	25fps/30fps	25fps
				CVBS Stream Mode	NTSC/PAL	PAL
			Main Stream	Video Encode	H264/H265/MJPEG	H264
				Resolution	1080P/720P/SVGA/D1	1080P
				Framerate (fps)	2fps/5fps/6fps/10fps/12fps/20fps /24fps/25fps/30fps	25fps
			Sub Stream	Video Encode	H264/H265	H264
				Resolution	D1/CIF	D1
				Framerate (fps)	2fps/6fps/12fps/20fps/25fps/30fps	12fps
			OSD Display	AHD Stream	ON/OFF	ON
				Main Stream	ON/OFF	ON
				Sub Stream	ON/OFF	OFF
				Pic Stream	ON/OFF	ON
		Alg	Volume	0 - 100		100
			Alarmer Volume	0/1/2/3/4/5/6/7/8		8
			Red Wire	Red Line Switch	ON/OFF	ON
				Support Area		
			Yellow Wire	Yellow Line Switch	ON/OFF	ON
				Support Area		
			Green Wire	Green Line Switch	ON/OFF	ON
				Support Area		
			Single Trigger Line Output Switch	Red	ON/OFF	ON
				Yellow	ON/OFF	ON
				Green	ON/OFF	ON
			Blind Alarm Triggers Output	ON/OFF	ON/OFF	ON
			PD Alarm In	ON/OFF		OFF
			Person React	ON/OFF		ON
			Face Mosaic	ON/OFF		OFF
			GIF	ON/OFF		ON
			Alarm Out Duration (ms)	0-10000/Auto		3100
			Detection Zone Switch	Red	ON/OFF	ON
				Yellow	ON/OFF	OFF
				Green	ON/OFF	OFF
	System	Serial Number	-			0
		Software Version	-			Corresponding Parameters

11 Appendix 2

Contents

11 Appendix 2

VBV-22X0C-AI-DXX CAN Communications Protocol

CAN communication baud rate: CANDEVICE_BITRATE_500K = 500K (default)

Frame Format Type: Extended Frame

CAN id: 0x18FAD0FA (default)

Complete data packet: The protocol is tentatively set to three frames of can data, including the first frame, data frame, and end frame.

First frame: FE 03 70 FE FE FE FE FE

Instruction: (FE) First frame symbol

(03) Data length

(70) CRC8 check value of data

Data frame: 0F 01 02 03 00 00 00 00

Instruction:

0F: Data frame number (0F~EF)

01: Number of people in the red area

02: Number of people in the yellow area

03: Number of people in the green area

00 in the end: Expansion

End frame: FF FF FF FF FF FF FF FF

Instruction: (FF) End frame symbol

Example:

0x18FAD0FA FE 03 70 FE FE FE FE FE (First frame)

0x18FAD0FA 0F 01 02 03 00 00 00 00

0x18FAD0FA FF FF FF FF FF FF FF FF (End frame) CAN protocol

CAN Packaging Description

The CAN packet consists of three parts: the start frame, the data frame and the end frame.

Start Frame

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Meaning	Fixed Byte	Command	The total length of the data frame		crc8 check	Reserved bit		
Example	FE	0x01	D0	07	31	FE		
Example meaning	Meaningless fixed byte	Command	llittle endian, which means 0x07D0 is the hexadecimal representation of the decimal value 2000		crc8 check value, the check range is in the first frame of the data frame	Reserved bit, meaningless for the time being		

Explanation: the valid length is sorted by little-endian, and the command will be given in the following chapters.

Data Frame

The first frame of the data frame contains the crc32 check value of the following valid data segment and the length of the valid data, which is defined as follows:

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Meaning	crc32 check value of valid data (beginning from the second frame of the data frame)				Valid data length		Reserved bit	

Data starting from Byte0 of the second frame data frame is valid data, and the maximum length is 10240 bytes, with no special limit for the time being.

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7

End Frame

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Example	FF	FF	FF	FF	FF	FF	FF	FF

Description: The 8 bytes of the end frame are all filled with FF.

CANID Description

Device side:

Taking VBV-22X0C-AI-DXX as an example, the default CANID of the device is 0x18FAD0FC. When multiple devices are connected to the CAN bus at the same time, you need to access webui to modify the CANID, otherwise, the CANID will conflict, and the user side cannot specify the device to send instructions. When modifying the CANID, it follows the format of the CANID and increases from 0x18, such as 0x19FAD0FC, 0x1AFAD0FC and 0x1BFAD0FC...

User side:

The CANID for the user side to send data should be in the format of xxFBD1EE. Example: 0x10FBD1EE. If you want to set a device with a specified CANID, the high-order bytes of the CANID should be the same as the device side. For example, if you want to set ADA32 with a CANID of 0x18FAD0FC, you need to use the CANID of 0x18FBD1EE when sending data; if you want to set ADA32 with a CANID of 0x19FAD0FC, you need to use the CANID of 0x19FBD1EE when sending data, and so on.

Command Description

The following command corresponds to the command byte in the start frame and is used for the identification of what type of functionality the current packet belongs to.

Command	Description	Data Direction (For Cameras)
HFR camera function opcode		
0x01	VRU detection status information	Input/Output
0x02	VRU detection reservation function 2	Input/Output
0x03	VRU detection reservation function 3	Input/Output
0x04	VRU detection classification (people and *vehicles *not yet available, and corresponding coordinate points (not yet realised)	Output
0x05	AlarmIn settings	Input
0x06	The number of people wearing helmets	Output

HFR/VRU Camera Function

VRU Detection Status Information

VRU detection status information with command ID 0x01. ADA32 series VRU detection status information is sent from the camera to external devices, including the number of people in red, yellow and green areas and whether the camera is blocked.

Data Frame Description

The first frame of the data frame contains crc32 and the valid data length, which is defined as follows:

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Meaning	crc32 check value of valid data (beginning from the second frame of the data frame)				Valid data length		Reserved bit	
Example	96 20 dd 9a				08 00		00	

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Example	Here, the packet is parsed according to the following structure							

HFP/VRU Camera Function

AlarmIn Settings

AlarmIn setting with command ID 0x05. The alarmIn configuration is modified specifically for the VBV-22X0C-AI-DXX, which is input to the camera by external devices.

Data Frame Description

The first frame of the data frame contains crc32 and the valid data length, which is defined as follows:

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Meaning	crc32 check value of valid data (beginning from the second frame of the data frame)				Valid data length		Reserved bit	
Example	08 20 77 56				08 00		00	

Byte	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
Meaning	AlarmIn 01-Open 02-Close	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved
Example	00	00	00	00	00	00	00	00

Packet Example

Open alarmIn:

FE 05 10 00 70 FE FE FE (start frame)
08 20 77 56 08 00 00 00 (data frame0, extra info: crc32 + validDataLen)
01 00 00 00 00 00 00 00 (data frame1, valid data)
FF FF FF FF FF FF FF FF (end frame)

Close alarmIn:

FE 05 10 00 FA FE FE FE
EB 27 F8 D8 08 00 00 00
02 00 00 00 00 00 00 00
FF FF FF FF FF FF FF FF

12 Troubleshooting

The symptoms described below do not necessarily mean a failure within the camera. Please check the following items before you initiate a request for support.

Symptoms	Possible Causes/Solutions
No picture, no sound	Check cable connection. Check power supply is within DC 10~32V. The volume is set “0 “ on the monitor.
Camera boot up	Remove the extension cable connection and connect again.
Cable installation length	Please note that if you use an extension cable more than 20m this will cause degeneration on the camera’s image.
Image shown but no AI functions	The image may have been flipped using an MDR interface. If so return the image to its original view on the MDR, then either flip the image through the monitors settings, or turn the camera round.
Image is flickering	**Two solutions:** 1. Use the approved extension cable 2. If the approved extension cable is not being used, please note you will require to find a earth (GND) for the output trigger wire.

For more technical tips scan the QR code

For additional Technical support please contact:

technical@brigade-electronics.com

Brigade

www.brigade-electronics.com

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https://brigade-electronics.com/warranties/

Specifications subject to change.