Ex-Sight.Com

3DV - Stereoscopic Vision System

For Robotic Tele Operation

Rev. **A1**

Date **01/2021**

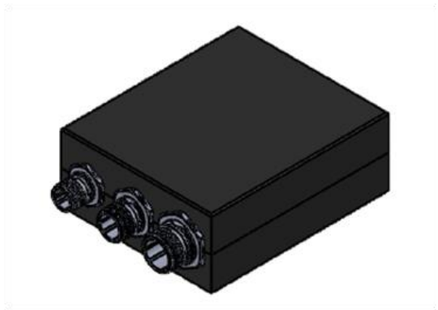
Ex-Sight.Com

3DV - Stereoscopic Vision System

System Overview

Video
Matrix

RC Mission
Computer



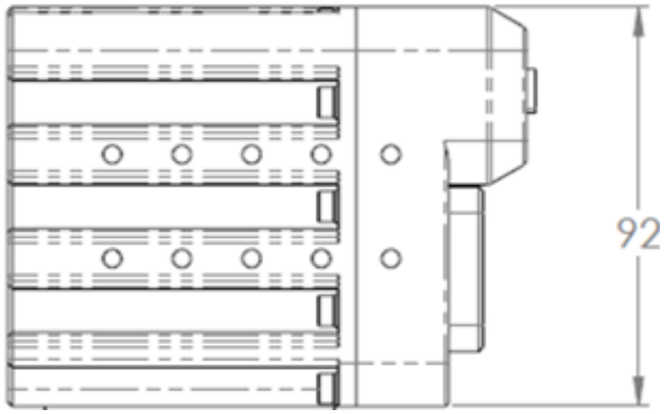
Decoder

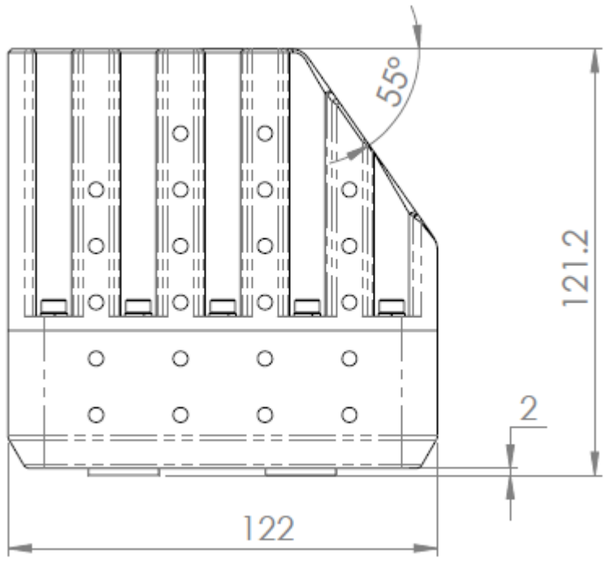
3DV-O

LWIR OPGAL EYE-R CORE 640x480 OFC 8.5mm
Day PHEONIX2 1000TVL

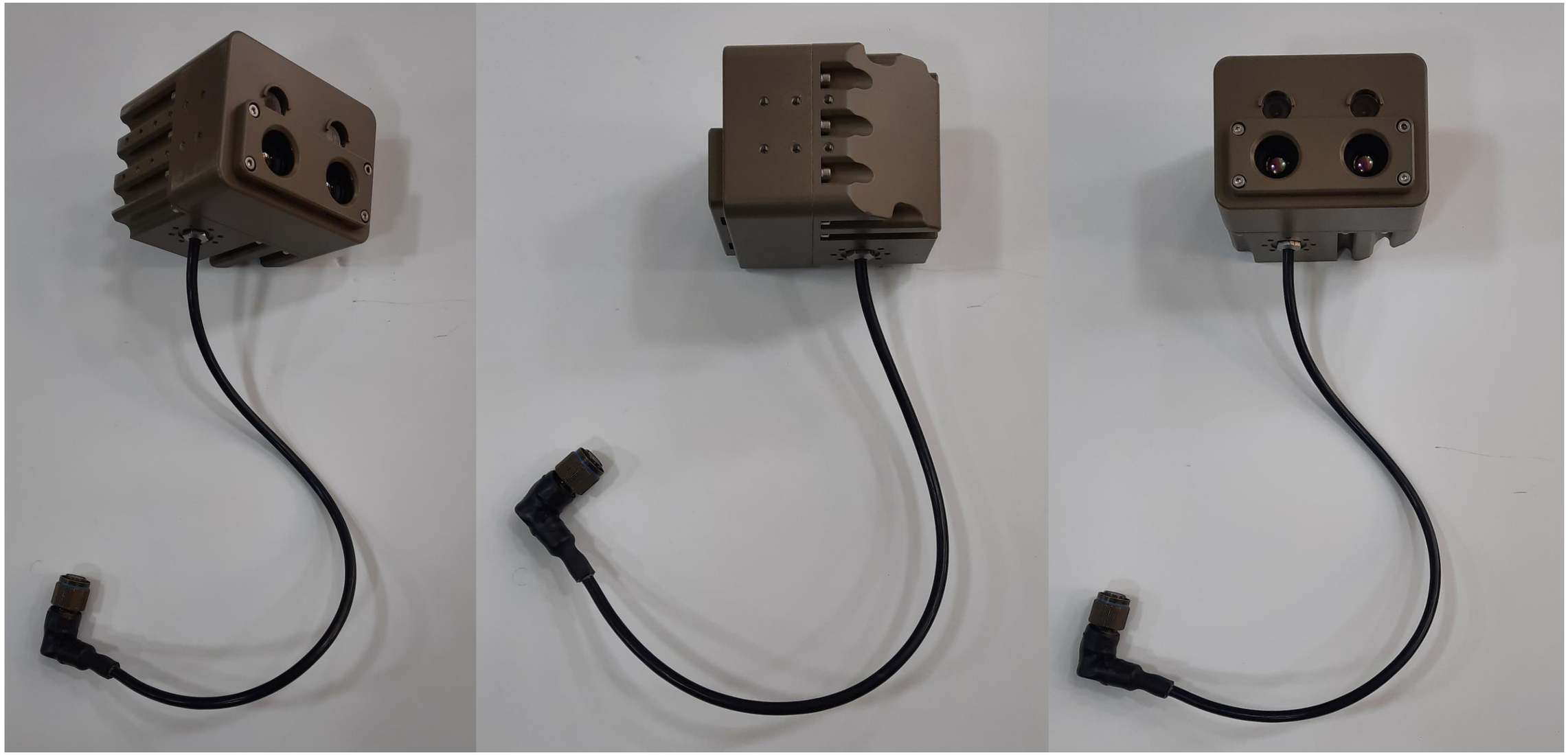
3DV-O

EyeR CORE 640x480 OFC 8.5mm

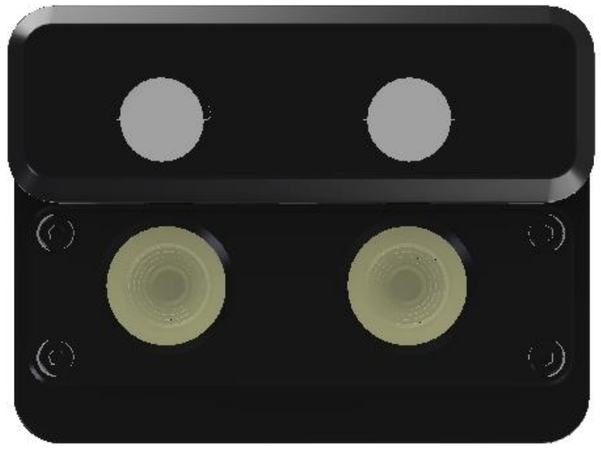


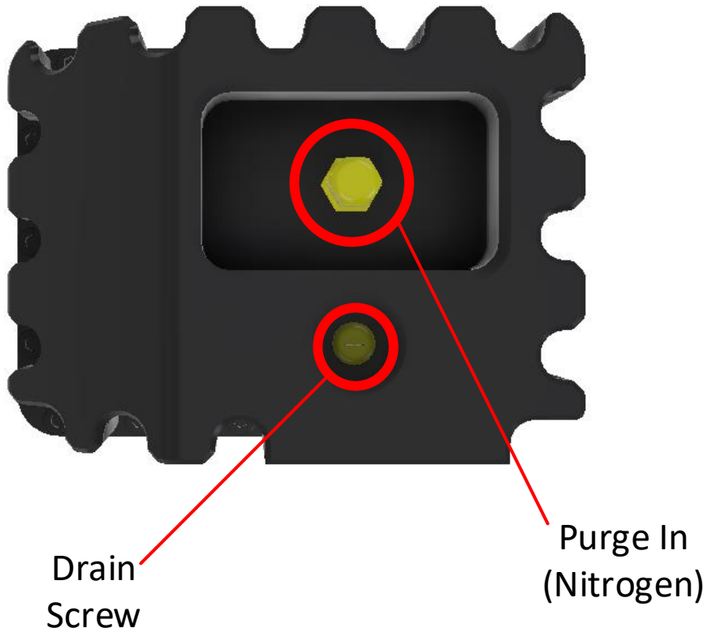


Model Pictures

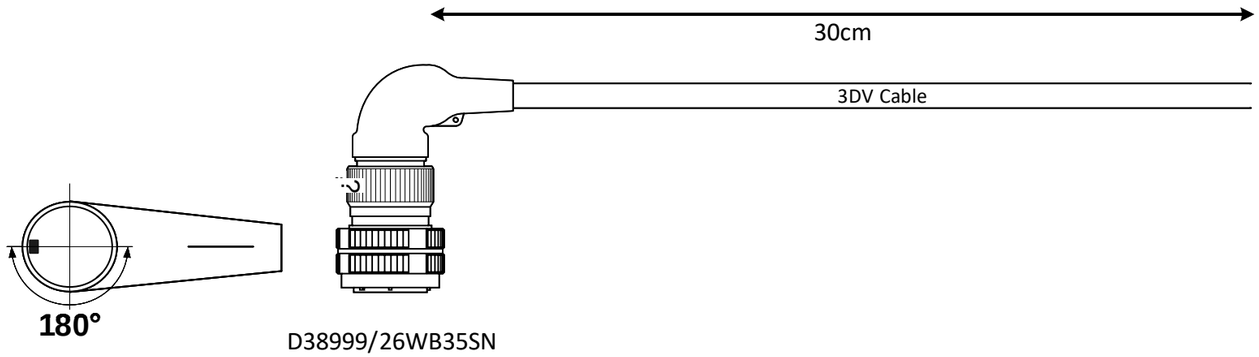


Cameras Functionalities





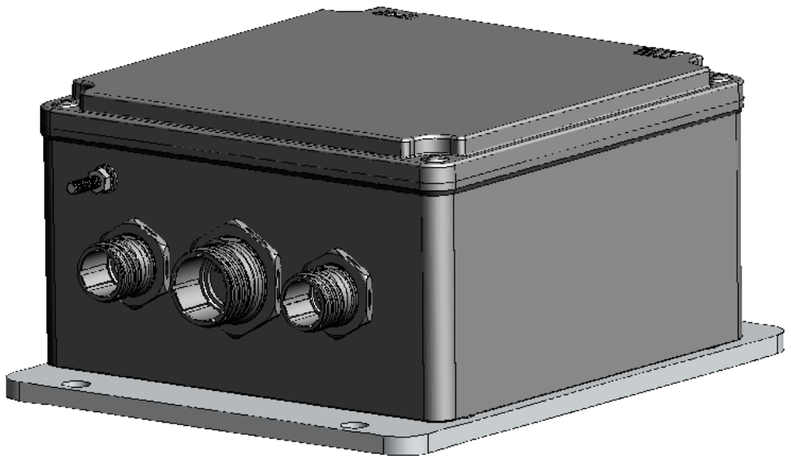
Pig Tail Cable



24WB35PN 3DV Camera Input	
PIN#	
1	+12VDC
2	GND
3	Right Day Video Signal
4	Right/Left Video GND
5	Left Day Video Signal
6	Right LWIR Video Signal
7	Right LWIR Video GND
8	Left LWIR Video Signal
9	Left LWIR Video GND
10	TX - Right LWIR Camera
11	RX - Right LWIR Camera
12	TX - Left LWIR Camera
13	RX - Left LWIR Camera

3DV - Stereoscopic Vision System

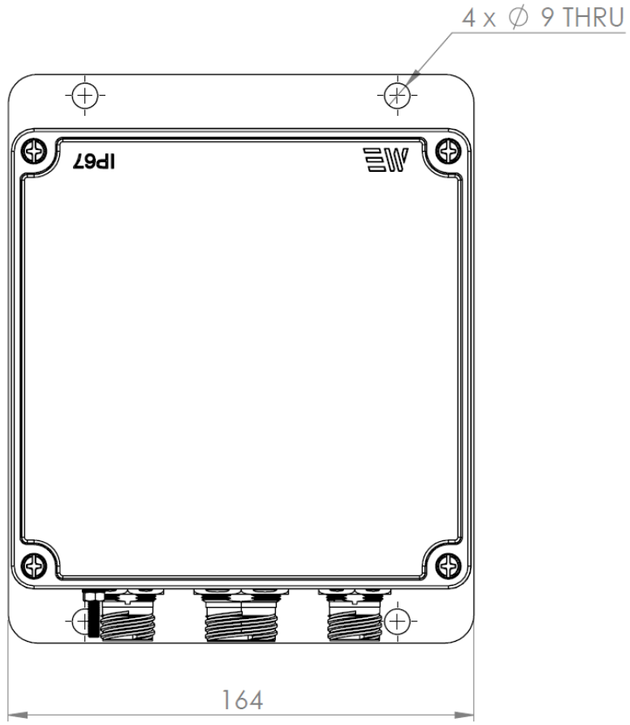
3DV Video Matrix

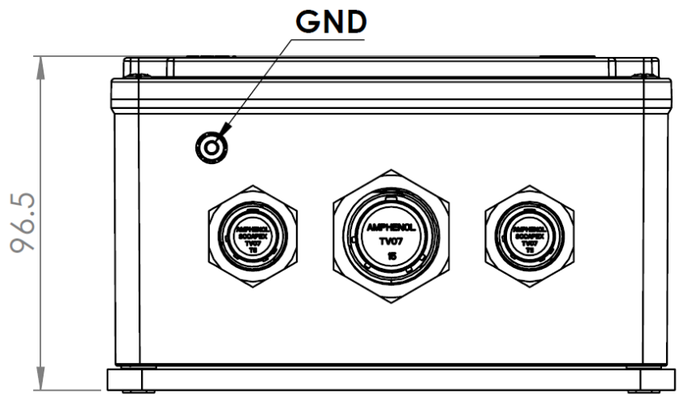


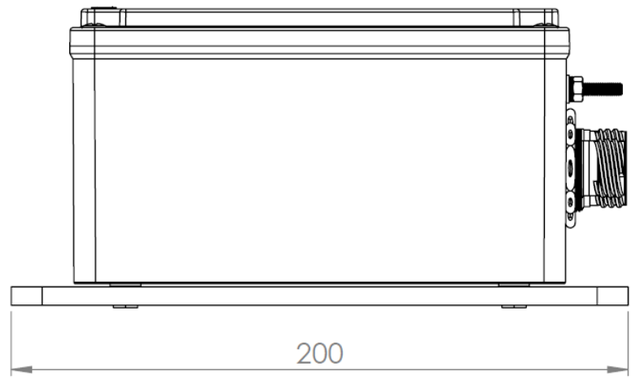
24WB35PN
Matrix Out Video

24WD35PN
RSU Fixed Video Quad

24WB35PN
3DV Camera Input







3DV - Stereoscopic Vision System

3DV Video Matrix Connectors

24WD35PN (RSU Fixed Video Quad)

- 12VDC Power, Max. 1A
- RS232 “TAVOR” Control for LWIR Cameras - Single interface for both LWIR Cameras
- Fixed Day CVBS Channel (PAL 25FPS)
- Fixed LWIR CVBS Channel (PAL 25FPS) - “Tavor” Interface will control Polarity and Gain

24WD35PN RSU Fixed Video Quad	
PIN#	
1	+12VDC
2	GND
28	Day Video
29	Day Video RTN
30	LWIR Video
31	LWIR Video RTN

24WB35PN (Matrix Out Video)

- Dual Video Matrix for 3DV, 4 In 2 Out
- Single RS232 “TAVOR” Control for Matrix Cameras (Day/LWIR selection)
- 12VDC Power Max. 1A

24WB35PN Matrix Out Video	
PIN#	
1	+12VDC
2	GND
6	Right Video
7	Right Video RTN
8	RS 232 GND
9	RS232 Tx
10	RS232 Rx
12	Left Video
13	Left Video RTN

24WB35PN (3DV Camera Input)

- 4 Video Channels (2 Day, 2 LWIR)
- Dual LWIR RS-232 Communication
- 12VDC for 3DV Max 1A

24WB35PN 3DV Camera Input	
PIN#	
1	+12VDC
2	GND
3	Right Day Video Signal
4	Right/Left Video GND
5	Left Day Video Signal
6	Right LWIR Video Signal
7	Right LWIR Video GND
8	Left LWIR Video Signal
9	Left LWIR Video GND
10	TX - Right LWIR Camera
11	RX - Right LWIR Camera
12	TX - Left LWIR Camera
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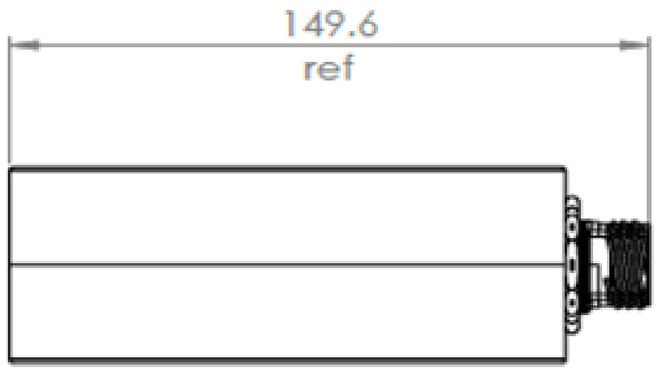
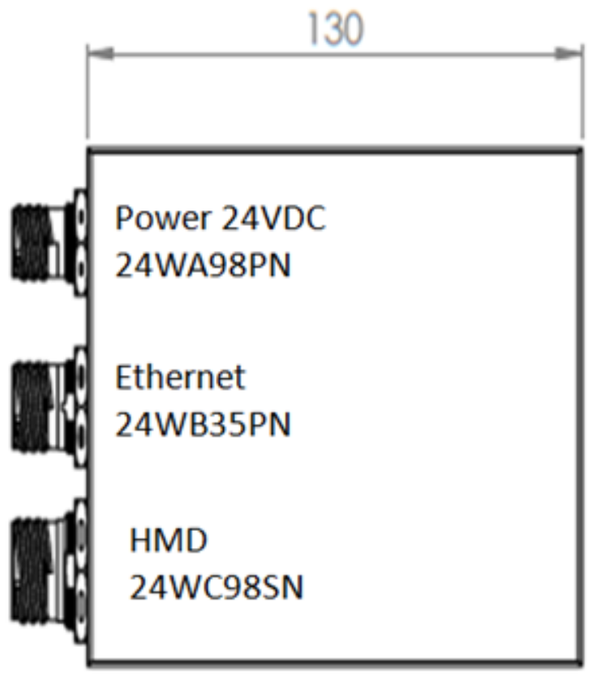
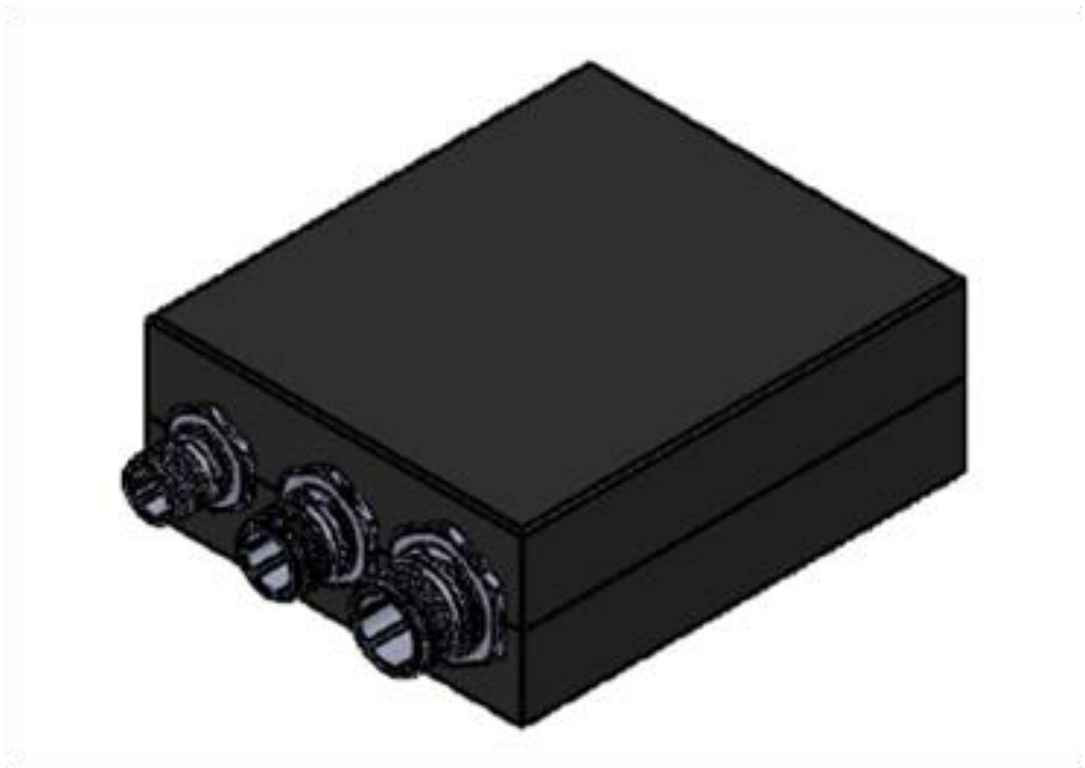
3DV - Stereoscopic Vision System

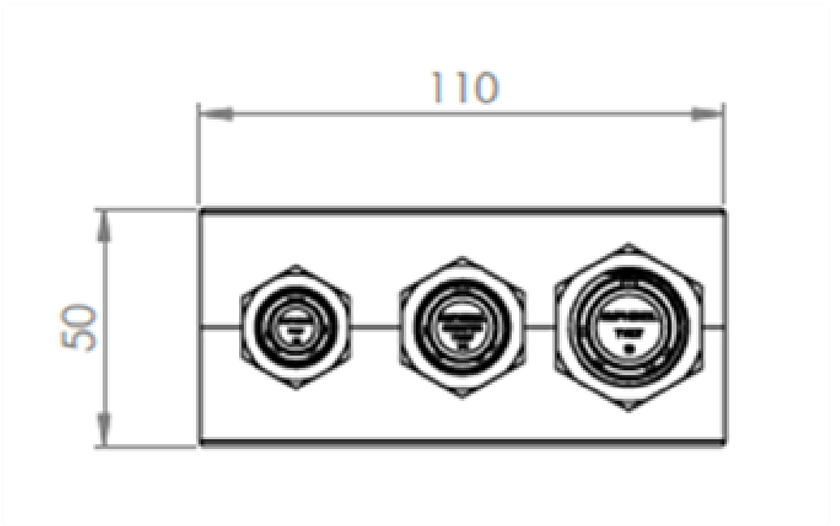
Decoder

IP67 – Sealed D38999 Connectors
Dual Channel HMD Decoder
24VDC Power Input
Dual AXIS P7701 Decoders
Ethernet Output
Ex-Sight 3DV HMD Connector









Decoder Connectors

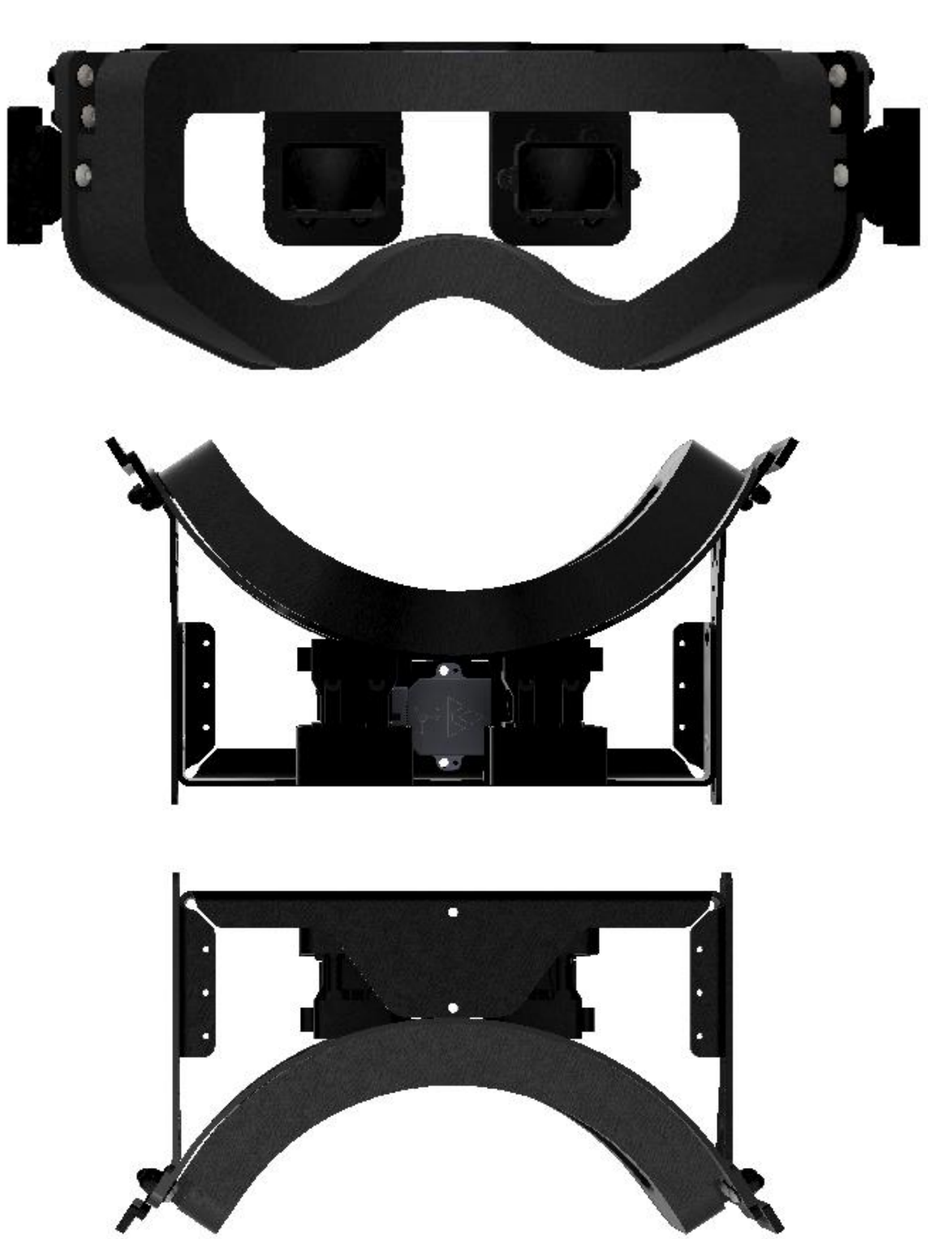
POWER 24VDC	
Panel connector: 24WA98PN, Cable connector:26WA98SN	
#PIN	**Function**
A	24VDC+
B	24VDC+
C	GND

ETH	
Panel connector: 24WB35PN, Cable connector: 26WB35SN	
#PIN	**Function**
1	**TX+**
2	TX-
3	RX+
4	RX-
5	NC
6	NC
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC
13	NC

HMD	
Panel connector: 24WC98SN, Cable connector: 26WC98PN	
#PIN	**Function**
A	12VDC+
B	GND
C	Spare
D	Spare
E	Right Screen Signal
F	Right Screen GND
G	Left Screen Signal
H	Left Screen GND
J	Spare
K	Spare

HMD Model

Head Mounted Display



3DV - Stereoscopic Vision System

3DV-O

EyeR CORE 640x480 OFC 8.5mm

Main Features

- High resolution 640 x 480 pixel, 17µ pitch
- NETD < 35mK for F#1
- Operation input voltage 5-14 volt
- Time to image - < 11 seconds
- Spectral Range - 7.5-14 µm
- Operational power consumption < 2W with interface card

Environmental (According to MIL STD 810F)

- Operating temperature range: -40 ºC to +71 ºC
- Storage temperature range: -40 ºC to +75 ºC
- SRS gun-fire shock resistance certified
- Vibration (endurance and performance)
- Mechanical shocks

Mechanical

- Small size: 39 mm x 48.5 mm x 31 mm (Pagoda without Interface card)
- Weight: less than 80 gr.
- Size: 39.2mm x 48.5mm x 39.2mm (with interface card)
- Weight: less than 110 gr

Image Processing and Video

- Parallel analog and digital video output
- Opgal's state of the art image processing algorithms
- Analog video protocols: NTSC, PAL
- Digital video: TTL (Internal Board)
- Drives video sync to peer equipment

System

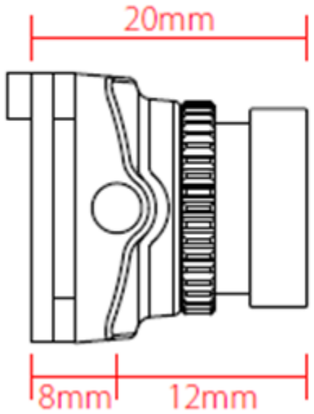
- Built in support for motorized lens
- Modular architecture to meet customer requirements

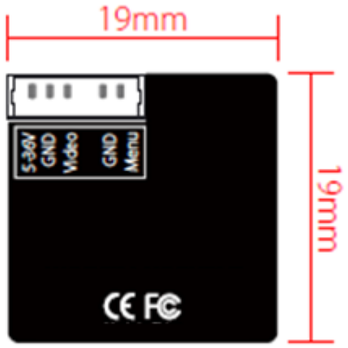
Performance

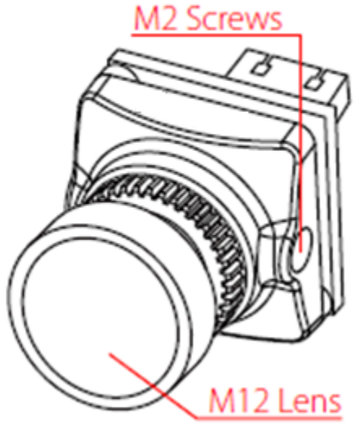
Parameter	Min.	Typical	Max.	Conditions
NETD		<35 mK		25ºC, F/1 ,30Hz output
Time to image		11 sec		25 ºC
NTSC analog video latency		70 ms		Nominal
PAL analog video latency		90 ms		Nominal
Digital video latency		70 µs		30Hz, NUC&BPR output, from detector readout
MTBF		30,000 hours		Engine in Pagoda configuration

Day Camera 1000TVL

Dimensions & Installation







Parameters

Image Sensor	1/2" CMOS Sensor	
Horizontal Resolution	1000TVL	
Lens	4mm FOV90°	
Screen Format	4:3 / 16:9 switchable	
Mirror/Flip	Available	
Signal System	PAL / NTSC Switchable	
S/N Ratio	>50dB (AGC OFF)	
Electronic Shutter Speed	Auto	
Auto Gain Control (AGC)	Auto	
Min. Illumination	0.001Lux@1.2F	
WDR	Global WDR	
Day/Night	Color/BW/EXT/Auto	
Menu Control	Cable Control	
Power	DC 5-36V	
Current	200mA@5V	85mA@12V
Housing Material	ABS	
Net Weight	9g	
Dimensions	19mm*19mm*20mm	

Ex-sight Camera ICD

1. General

1.1 The camera shall be connected to the Control Unit via serial interface RS232 according to the following setup:

1.1.1 UART configuration:

1.1.2 Baud Rate 115200 bps

1.1.3 Data Bits 8

1.1.4 No parity

1.1.5 No flow control

1.1.6 1 Stop bit

1.1.7 Voltages: 0V – 3.3V.

1.2 The camera receives a "Configuration Message".

1.3 The camera outputs a "Status Message".

1.4 The massages are considered as valid, if CRC16-CCITT calculated by the receiver corresponds to the received CRC16-CCITT value.

1.5 CRC16-CCITT is calculated on the whole message excluding the two CRC bytes.

2. Configuration Message – 2Hz (from camera to control unit)

Byte	Field	Units/Type	Description
1	SyncByte1	uint8	0xAA
2	SyncByte2	uint8	0x55
3	Message Length	uint8	Message data length in bytes, from next byte till end of message, excluding the CRC
4	Reserved	uint8	Reserved
5	Reserved	uint8	Reserved
6	Reserved	uint8	Reserved
7	Reserved	uint8	Reserved
8	Reserved	uint8	Reserved
9	Reserved	uint8	Reserved
10	Reserved	uint8	Reserved
11	Reserved	uint8	Reserved
12	Reserved	uint8	Reserved
13	Reserved	uint8	Reserved
14	Thermal Auto Gain	uint8	0- Auto 1- 10 Manual levels of gain The gain range shall be divided to 10 gain presets.
15	Requested Display	uint8	bit 0: Current Analog Video channel selection: 0-Thermal (night), 1-Vis (day)
16	Color Palette Command	uint8	Only for thermal Display: 0xff – Grayscale(White Hot), 0xf0 - Grayscale(Black Hot),
17	Reserved	uint8	Reserved
18-19	CRC	uint16	CRC16-CCITT

Ex-sight Camera ICD

3. Status Message- 2Hz (from control unit to camera)

Byte	Field	Units/Type	Description
1	SyncByte1	uint8	0xAA
2	SyncByte2	uint8	0x55
3	Message Length	uint8	Message data length in bytes, from next byte till end of message, excluding the CRC
4	System Mode	uint8	1- Init, 2- Fail, 3- Degraded, 4- Ready
5	System Bit Report	uint8	Bit 0 – reserved
			Bit1 –1 if thermal camera selected
			Bit2 –1 if VIS camera selected
			Bits6-7 :reserved for BIT report (vendor defenition)
6	Color Palette Report	uint8	Only for thermal Display: (For Vis-0)
			0xff – Grayscale(White Hot),
			0xf0 - Grayscale(Black Hot),
7	Thermal Auto Gain Report	uint8	2- Auto
			1- 10 Manual levels of gain
			The gain range shall be divided to 10 gain presets.
8-9	CRC	uint16	CRC16-CCITT