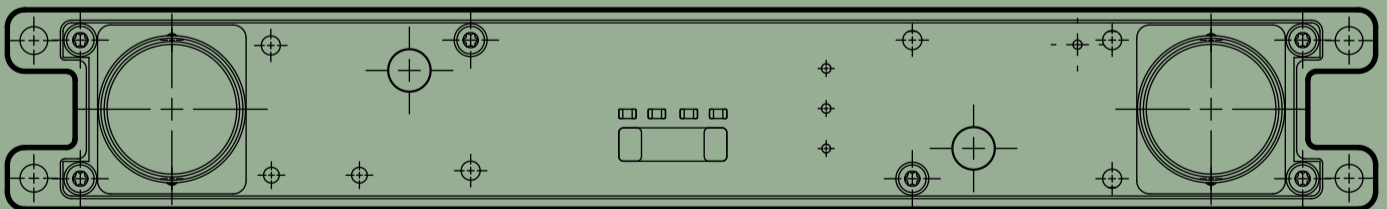


*ZED X OEM

Stereo Camera & SDK Overview

The barebone ZED X OEM and ZED X Mini OEM combine powerful vision hardware with intelligent software in ultra-compact form factors.

Specifically built for seamless integration, these lightweight modules easily embed directly into custom chassis and space-constrained environments. This architecture provides a highly flexible, space-efficient perception solution that is perfect for Physical AI, humanoids, and fully personalized deployments.



DRAFT – Rev1.0

*ZED X OEM

General Specifications

Seamless custom integration

Designed without a restrictive outer housing, the ZED X OEM cameras grant a complete freedom over deployments. It effortlessly adapts into tight spaces, making it ideal for integration into humanoid heads, robotics, and customized perception systems.

From narrow to fisheye

The ZED X OEM barebone architecture features multiple optic options. Choose from fisheye, wide or narrow lenses to match your field-of-view needs, from ultra-wide coverage to precise, focused environment perception.

Multi-camera synchronization

Hardware synchronisation for multiple connected cameras at frame-level within 100 microseconds. Capture RGB and depth images of the same scene with multiple cameras all triggered at the same time.

High quality lenses

Wide-angle 9-element all-glass dual lens with optically corrected distortion, and optional polarizing filter, ideal for highly reflective environments.

High-performance IMU

The all-new IMU combines a 16-bit triaxial accelerometer and gyroscope with vibration resistance, ultra low noise and bias for exceptional motion tracking

Secure GMSL2 connection

GMSL2 connectivity enables low-latency, EMI-resistant video transmission up to 15m. The lockable interface ensures a secure, high-bandwidth connection to edge computing platforms.

Technical Specifications

Output Resolution	Side by Side
1200p	2x (1920x1200) @60fps
1080p	2x (1920x1080) @60fps
600p	2x (960x600) @120fps
Interface	GMSL2
Baseline	
ZED X OEM	12cm (4.72")
ZED X Mini OEM	5cm (1.97")
Image Sensors	
Size	1/2.6" sensors
Resolution	Dual 2.3M pixels sensors with 3-micron pixels
Format	16/10
Shutter Sync	Electronic Synchronized Global Shutter
Motion Sensors	200 Hz 16-bits Accelerometer (up to 12g) 200 Hz 16-bits Gyroscope (up to 1000°/s)
Warranty	2-year hardware warranty

System Requirements

System	NVIDIA Jetson Thor NVIDIA Jetson Orin
OS	Jetson Linux (L4T) v35.1 or newer

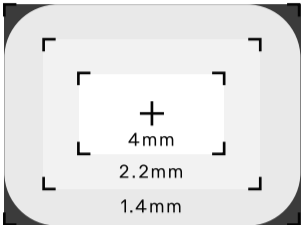
Physical Specifications

Dimensions	
ZED X OEM	
Fisheye lens	158.0 x 23.0 x 40.7mm (6.2 x 0.9 x 1.6")
Wide lens	158.0 x 23.0 x 45.5mm (6.2 x 0.9 x 1.8")
Narrow lens	158.0 x 23.0 x 44.6mm (6.2 x 0.9 x 1.8")
ZED X Mini OEM	
Fisheye lens	89.0 x 23.0 x 40.7mm (3.5 x 0.9 x 1.6")
Wide lens	89.0 x 23.0 x 45.5mm (3.5 x 0.9 x 1.8")
Narrow lens	89.0 x 23.0 x 44.6mm (3.5 x 0.9 x 1.8")
Weight	
ZED X OEM	
Fisheye lens	50g (0.11 lb.)
Wide lens	56g (0.12 lb.)
Narrow lens	48g (0.11 lb.)
ZED X Mini OEM	
Fisheye lens	42g (0.09 lb.)
Wide lens	46g (0.10 lb.)
Narrow lens	38g (0.08 lb.)
Connector	Serial Coax GMSL2 connector - FAKRA Z type
Mounting Options	4x M3 threads (back)
Environment	
Operating Temp.	-20°C to +60°C (-4°F to 140°F)
Power	Power via GMSL2 (PoC) Typical consumption ~1.4W

*ZED X OEM

Lens Options

Focal Lengths Available



Narrow - 4mm
The 4mm focal length lens is perfect for an enhanced resolution and depth accuracy at longer ranges.

Wide - 2.2mm
2.2mm focal lens offers an exceptionally wide field of view while also providing optically corrected distortion for enhanced image quality.

Fisheye - 1.4mm
The fisheye lens provides an ultra-wide field-of-view for global environment awareness and large-scale mid-range depth perception.

No More Reflections with Polarizing Filters

Experience the highest image quality possible outdoors with the built-in polarizing filter*. This filter effectively minimizes glare and reflections while enhancing color depth and overall quality.



ZED X OEM Available Models

Model	ZED X Mini OEM 4mm	ZED X OEM 4mm	ZED X Mini OEM 2.2mm	ZED X OEM 2.2mm	ZED X Mini OEM 1.4mm	ZED X OEM 1.4mm
SKU No Polarizer	ZED-312212	ZED-312112	ZED-311212	ZED-311112	ZED-313112	ZED-313212
SKU Polarizer	ZED-312222	ZED-312122	ZED-311222	ZED-311122		
Object Detection	Up to Max Depth (3D)					
Focal Length	3.8mm (0.15")		2.2mm (0.087")		1.38mm	
Field of View	Max. 80°(H) x 52°(V) x 91°(D)		Max. 110°(H) x 80°(V) x 120°(D)		Max. 204° (H) x 137° (V) x 218° (D) Rectified 142° (H) x 121° (V) x 146° (D)	
Aperture	f/1.8		f/2.2		f/2.0	
TV Distortion	<6.9%		<6.9%		<18.80%	
Connector	FAKRA Z Connector Type					

(*) Polarized optics are not available on the fisheye lens option

*ZED X OEM

Sensors Specifications

ZED X OEM seamlessly fuses visual and inertial data to enhance spatial awareness, position tracking, and motion-related tasks. Robotics application require the ability to sense, decide, and act. The ZED X OEM fulfil the necessary sensing technology for successful deployment.

Dual Image Sensors

Sensors

Sensor Type	1/2.6" 2.3MP RGB
Array Size	1928 x 1208 pixels
Pixel Size	3µm x 3µm
Shutter	Electronic synchronized global shutter
Output Resolution (Side by side)	2x 1920x1200 @15/30/60fps 2x 1920x1080 @15/30/60fps - cropping mode 2x 960x600 @ 15/30/60/120fps - binning 2x2 mode
Output Format	RAW10
Max S/N Ration	38 dB
Dynamic Range	71.4 dB
Sensitivity	22.3Ke/Lux*s
Camera Control	Exposure, analog & digital gain, gamma, white balance, saturation, sharpness, denoising, brightness, contrast

Distortion free images of fast moving objects



Rolling Shutter



Global Shutter

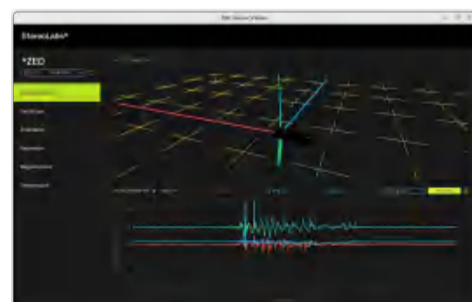
Motion Sensors

Accelerometer Range	+/- 12G
Accelerometer Resolution	0.36 mg
Accelerometer Noise Density	2.3 mg
Gyroscope Range	+/- 1000 dps
Gyroscope Resolution	0.03 dps
Gyroscope Noise Density	0.20 dps
Sensitivity Error	+/- 0.5%
Output Data Rate	200 Hz

Sensors API

You can access these sensors and acquire sensor data by using the Sensors API.

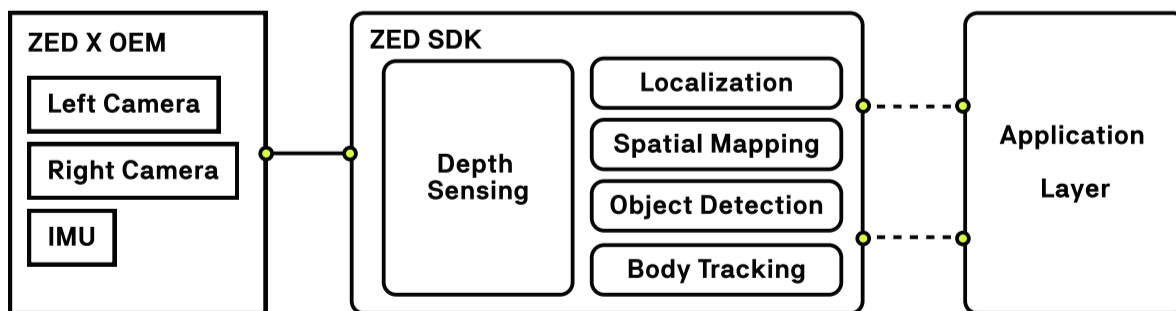
Please visit stereolabs.com/docs for tutorials.



SDK Modules

Stereo Capture	The ZED X OEM features dual lenses for capturing high-definition 3D video with an expansive field of view. It delivers two synchronized left and right video streams, processed by the integrated ISP, and provides images in RGB format on the host.	Spatial Mapping	The ZED continually scans its environment, generating a 3D map in real-time. This map is updated as the device moves and captures new scene elements. Thanks to its ability to perceive distances beyond the capabilities of conventional RGB-D sensors, the camera can rapidly reconstruct 3D maps for both expansive indoor and outdoor spaces.
Depth Sensing		Object Detection	Object detection involves identifying objects within an image. Leveraging depth sensing and 3D data, the ZED camera offers both 2D and 3D positional information for objects within the scene. Starting with ZED SDK 3.6, users can employ custom detectors via the API, with 2D detections being processed alongside 3D information, including object position and 3D bounding boxes. More informations in the documentation.
Depth Map	Depth maps captured by the ZED X OEM store a distance value (Z) for each pixel (X, Y) in the image. The distance is expressed in metric units (meters for example) and calculated from the back of the left eye of the camera to the scene object.	Body Tracking	Body tracking module focuses on skeleton bone detection and tracking. A detected bone is represented by its two end points also called keypoints. The ZED camera provides 2D and 3D information for each keypoint as well as local rotation. The ZED SDK supports four body formats: 18 or 34, 38 keypoints.
3D Point Cloud	A point cloud can be seen as a depth map in three dimensions. While a depth map only contains the distance or Z information for each pixel, a point cloud is a collection of 3D points (X,Y,Z) that represent the external surface of the scene and can contain color information.		
SLAM Localization			
Positional Tracking	The ZED X OEM uses visual tracking of its surroundings to understand the movement of the user or system holding it. As the camera moves in the real-world, it reports its new position and orientation. This information is called the camera 6DoF pose. Pose information is output at the frame rate of the camera, up to 100 times per second in WVGA mode.		

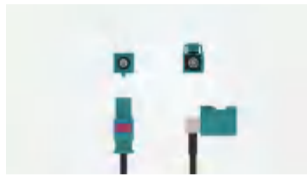
Functional SDK Diagram



*ZED X OEM Accessories

FAKRA Z Cables

A wide range of camera cables are readily available, tailored to diverse requirements and applications, offered in varying lengths to suit both compact and expansive setups.



Male to Female	
0.5m (1.6ft)	CBL-310800
1.5m (4.93ft)	CBL-310100
5m (16.4ft)	CBL-310200
10m (32.8ft)	CBL-310300
15m (49.2ft)	CBL-310400

Female to Female	
0.3m (0.98ft)	CBL-320100
1.5m (4.93ft)	CBL-320200
5m (16.4ft)	CBL-320300
10m (32.8ft)	CBL-320400

Female to Female 1-to-4	
0.5m (1.64ft)	CBL-320510

Right-Angle Extension	
0.3m (0.98ft)	CBL-310500
0.5m (1.6ft)	CBL-310900

ZED Box Embedded Computers

Stereolabs ZED Boxes are powered with NVIDIA Jetson Orin modules and serves as a robust AI embedded computers for autonomous robotics and AI applications.



Model	ZED Box Orin NX
Jetson Modules	Orin NX 8GB, NX 16GB
I/Os	3x USB 3.2 Gen2 (10 Gbps) 1x Gigabit Ethernet 1x HDMI 4x GMSL2 ** WiFi 6 connectivity 1x RTK GNSS GPS Ublox ZED F9P**

Model	ZED Box Mini
Jetson Modules	Orin Nano 4GB, Nano 8GB, NX 8GB
I/Os	2x GMSL2 1x USB 3.0 (5 Gbps) 1x Gigabit Ethernet 1x HDMI WiFi 6 connectivity**

** Available as options.

The Multiband GNSS antenna ANN-MB-00 is an additional accessory.

*ZED X OEM Accessories

Capture Cards

To capture the ZED X OEM on the NVIDIA Jetson AGX platform, one solution is to utilize a GMSL2 capture card that directly connects to the Jetson's CSI port.



Model	ZED Link Mono Capture Card
Compatibility	NVIDIA Jetson Orin Platform (NX/Nano)
Max. number of cameras	Capture 1x GMSL2 camera input in SD/HD, up to 1920x1200@60fps
Deserializer	MAX9296A
Power	Requires external 9-19V power supply

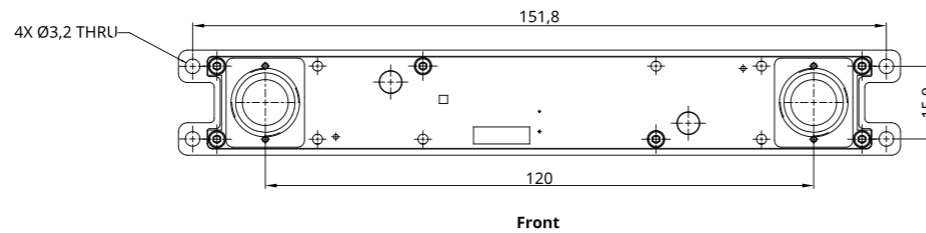
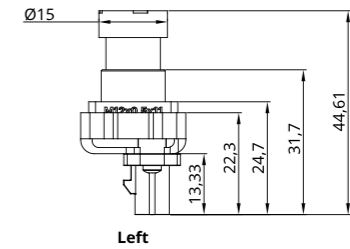
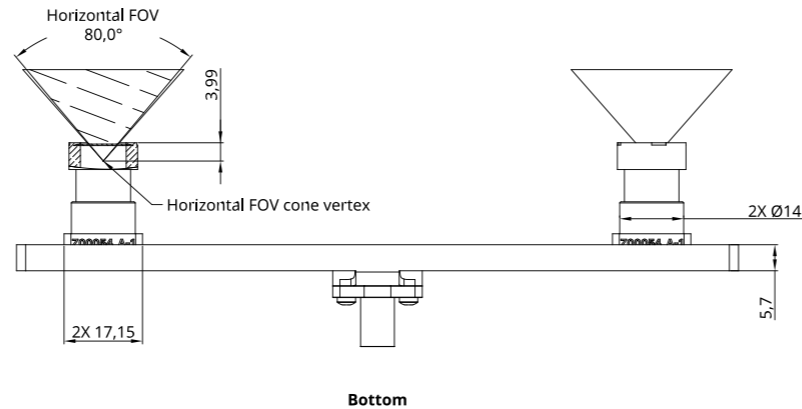
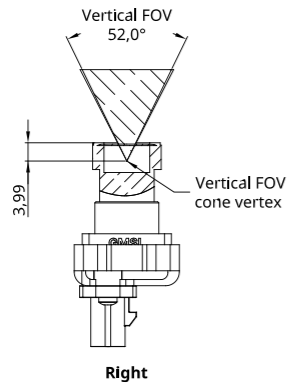
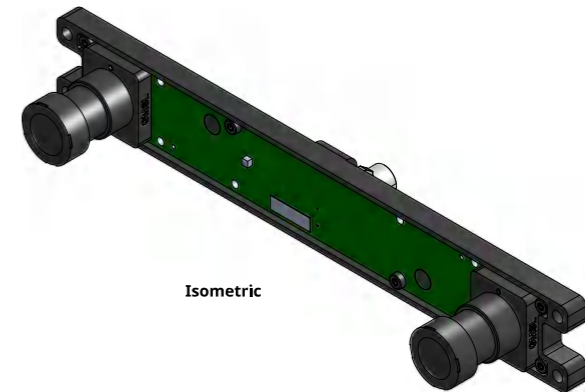
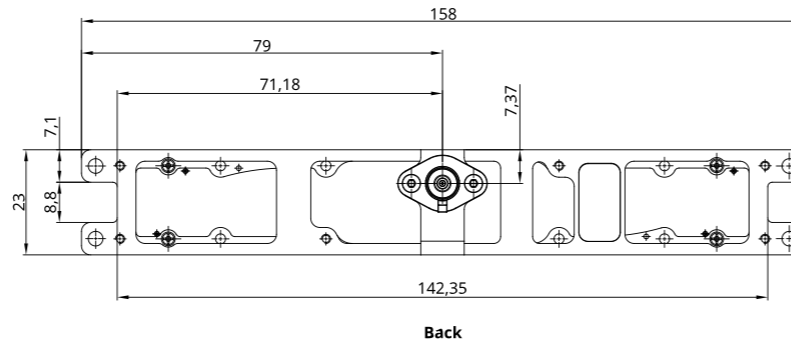


Model	ZED Link Duo Capture Card
Compatibility	NVIDIA Jetson Orin Platform (AGX/NX/Nano)
Max. Number of cameras	Capture 4x GMSL2 camera input in SD/HD, up to 1920x1200@30fps
Deserializer	MAX96712
Power	Connects to and is powered by the Samtec port of the Orin Developer Kit. Requires external power supply for NX/Nano (9V-19V) when using MIPI port

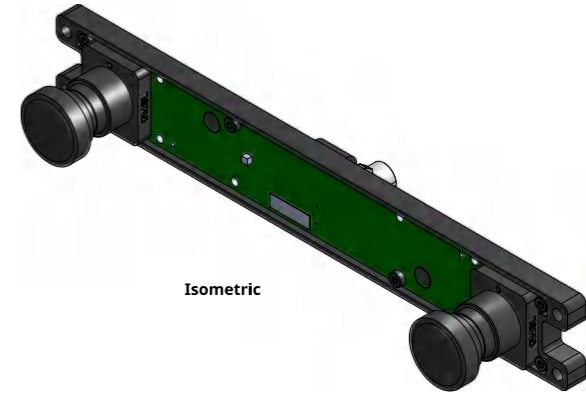
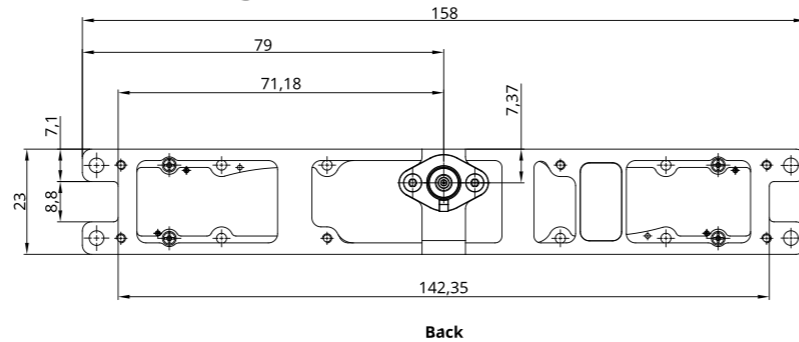


Model	ZED Link Quad Capture Card
Compatibility	NVIDIA Jetson Orin Platform (AGX)
Max. number of cameras	Capture 8x GMSL2 camera input in SD/HD, up to 1920x1200@30fps
Deserializer	2 x MAX96712
Power	Requires external 9-19V power supply

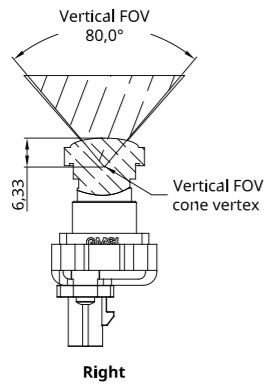
*ZED X OEM - Narrow lens Technical Drawings



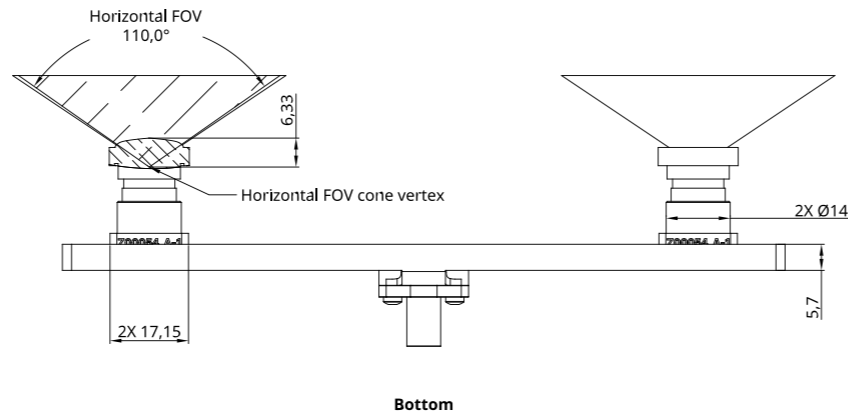
*ZED X OEM - Wide lens Technical Drawings



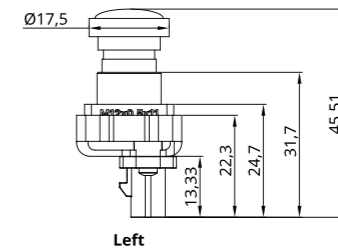
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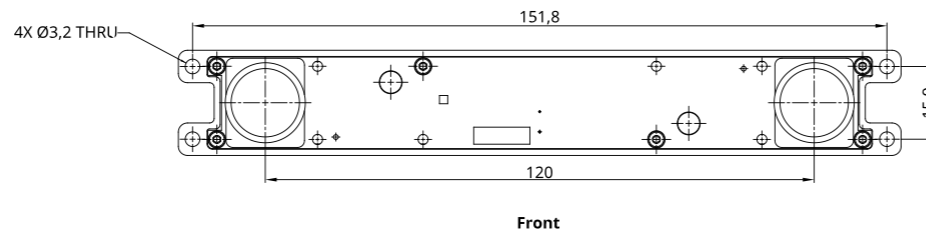
Right



Bottom

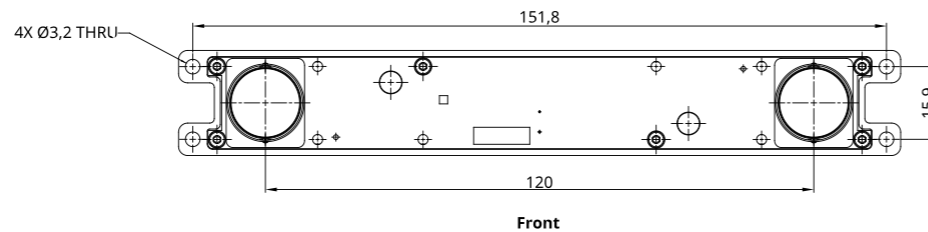
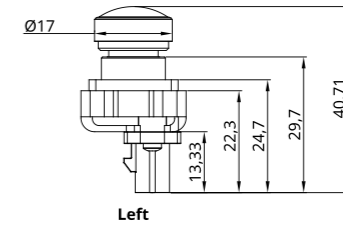
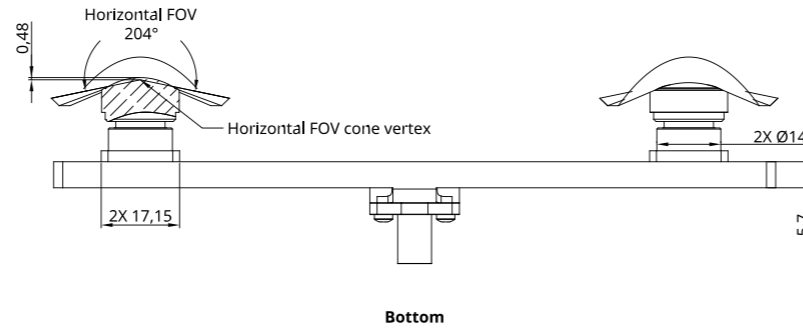
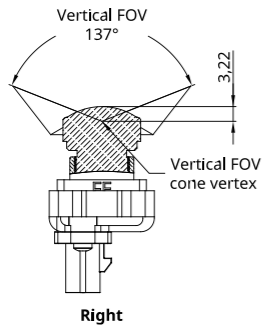
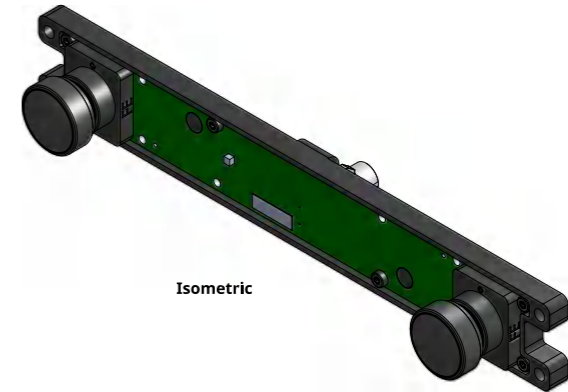
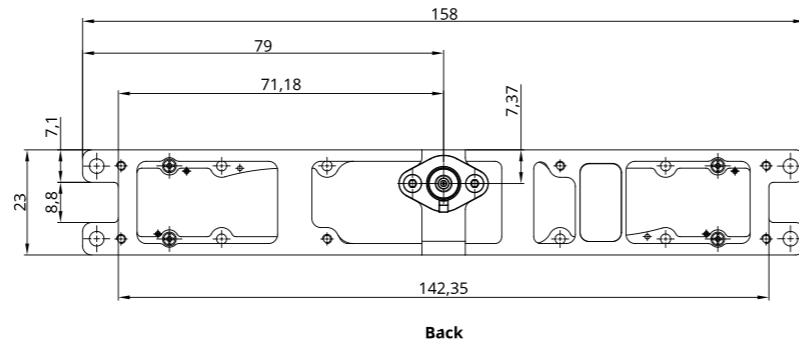


Left

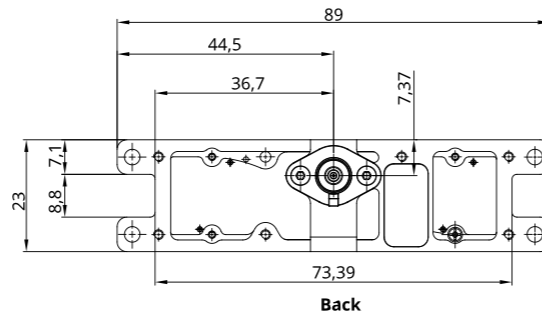


Front

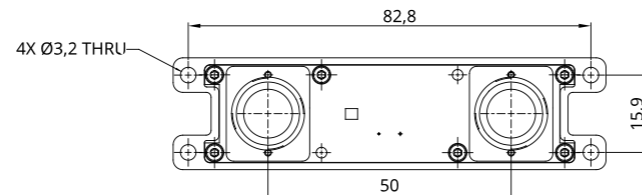
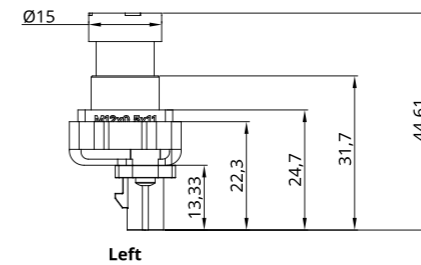
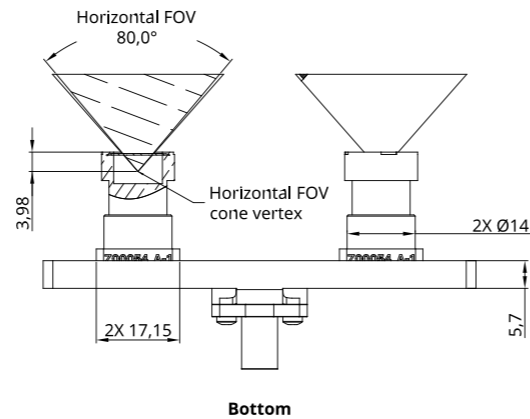
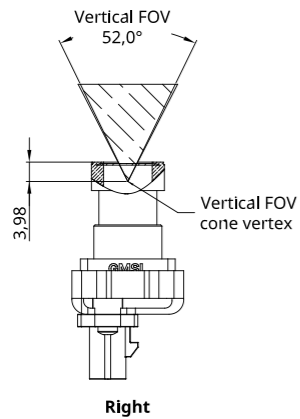
*ZED X OEM - Fisheye lens Technical Drawings



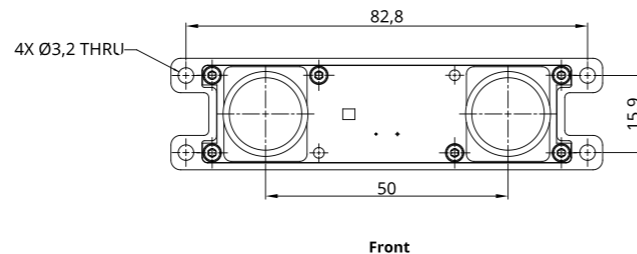
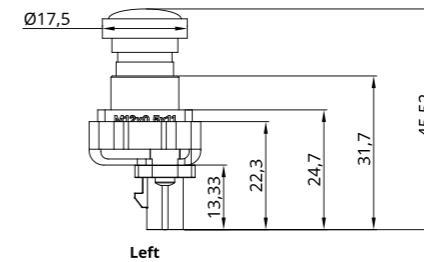
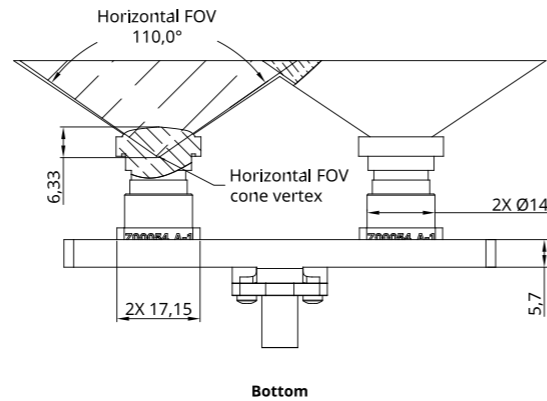
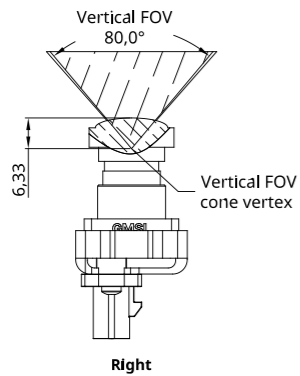
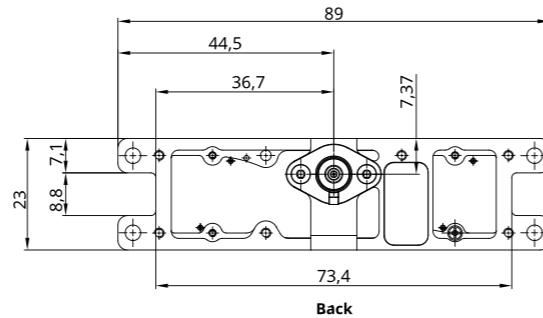
*ZED X Mini OEM - Narrow lens Technical Drawings



Isometric



*ZED X Mini OEM - Wide lens Technical Drawings



*ZED X Mini OEM - Fisheye lens Technical Drawings

