

A World Leading Long Range Surveillance Platform

The Jaegar is a highly modular ready to go Single Mast Surveillance solution, ideal for medium to long range surveillance applications using video and thermal cameras.

The fixed through shaft, running through the Jaegar Pan and Tilt (PT) allows the cameras to rotate 360° continuously while keeping a payload on top, fixed in position, perfect to twin with radar and other detection technologies.

A wide range of thermal and video cameras are available, all supplied in cable managed housings for protection in the harshest environments. With harmonic drive gears as standard the Jaegar has virtually zero backlash ensuring the capture of stable images even at very long distances over land or water.

All Silent Sentinel Pan and Tilt systems are designed with absolute positing feedback as standard. When twinned with radar or any automated control program, it can be driven automatically to any threat detected and remain on target as the threat moves. As with all Silent Sentinel products the Jaegar can easily be deployed as a standalone system or a combined solution to increase the performance.

The Jaegar platform can be configured and optimised for a broad range of applications and operational theatres with the ability to detect, identify, track and react to the surveillance requirement.



Key Features

- Supporting ranges up to 31km for human detection and 50km for vehicle detection.
 - Long range thermal cameras (up to 960mm) including HD thermal.
 - Ultra Low Light long range video / day cameras (up to 2000mm) including HD and 4K.
 - Focal length dependent speed control (zoom).
 - Anti fog and image stabilization capabilities.
 - Absolute positioning feedback for radar control.
 - 360° continuous rotation.
 - Ultra slow pan / tilt speeds down to 0.0002° per second (and up to 80° per second).
 - Virtually zero backlash with automatic self position correction.
 - Optical encoders for preset accuracy (0.0002° repeatability).
 - Unique rapid release mechanism allows cameras to be quickly changed in the field.
 - Unique boresight positioning for fast alignment.
 - ONVIF Profile S compliant.
 - Highly ruggedised for extreme and marine environments.
 - Wiper options available on all video only cameras.
 - IP67, REACH, ROHS & CE Compliant.
-
- Options include: Automatic Object Tracking, Image Stabilization, Laser Range Finders, Mid to Long Range IR Illuminators, Laser Illuminators, UAV Effectors, Signal Light Guns, Protective Window Flap/Cover, Heater, Radar and more.



Boresight Adjustment



Rapid Release Mechanism

The Silent Sentinel Range

Silent Sentinel offer an extensive range of camera and lens configurations to meet your exact surveillance requirements

Tel: +44 (0) 1920 871 734
www.silentsentinel.com



Jaegar Uncooled Short to Medium Thermal Fixed Lens Cameras

The Silent Sentinel short to medium range uncooled thermal fixed lens cameras are designed to provide the perfect value added video surveillance solution when partnered with the Jaegar PT platform.



Lens

Focal Length	14mm	25mm	35mm	50mm	65mm	100mm
Optical Zoom (Continuous)	-	-	-	-	-	-
F Number	F1.4	F1.2	F1.2	F1.2	F1.2	F1.6
Horizontal Field of View	44°	24.8°	17.6°	12.4°	9.6°	6.2°
Focus	Fixed, preset with Athermalization					

Camera

Detector Type	Uncooled VOx Microbolometer
Resolution	640 x 480 (Lower resolution 320 x 240 versions are available upon request)
Pixel Size	17 µm
Spectral Band	8 to 14 µm (LWIR)
Sensitivity	< 50 mK (NEΔT) f/1.0 @ room temperature
Frame Rate	25 Fps (9 fps, 30fps options)
Frequency	25Hz (9Hz, 30Hz options)
Digital Zoom and Pan	4x Digital zoom, Region of Interest
Digital Video	14/8-bit LVCMOS/Camera Link®
Image Stabilisation	Yes (cost option)
Image Enhancement	Image Contrast Enhancement (ICE™)
Image Control	Polarity: White Hot / Black Hot, Orientation: Invert / Revert

Detection, Recognition and Identification Ranges (Johnsons Criteria*)

Detection (Human / Vehicle)	740m / 950m	1320m / 1690m	1850m / 2370m	2650m / 3390m	3440m / 4400m	5290m / 6760m
Recognition (Human / Vehicle)	190m / 240m	330m / 420m	460m / 580m	660m / 850m	860m / 1100m	1320m / 1690m
Identification (Human / Vehicle)	110m / 150m	200m / 260m	285m / 360m	410m / 520m	530m / 680m	810m / 1040m

* Human at 1.8m², vehicle at 2.3m², Detection at 2 pixels, Recognition at 8 pixels and Identification at 13 pixels. 50% probability subject to environmental conditions.

Electrical and Mechanical

Boresight	Yes
Rapid Release Mechanism	Yes
Video Output	IP and Composite (PAL / NTSC)
IP rating	IP67
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)
Power	28-32VDC, 0.6A, 16W (excludes heater at 65W)
Window	Germanium thermal optical quality glass, with a Low Reflection Hard Carbon (HCLR) coating
Fixing Material	Stainless steel with external fall protection
Housing Material	Iridited aluminium
Housing Finish	White powder marine grade paint finish (other colours are available upon request)
Housing Model	HT06
Weight	Typically 4Kg / 8.8lb
Dimensions (mm)	L460 x W184 x H156
Part Number (Camera Only)	RHT06IDB44FW RHT06IDB25FW RHT06IDB18FW RHT06IDB12FW RHT06PIB09FW RHT06IDB06FW

Jaegar Uncooled Medium to Long Range Thermal Zoom Cameras

The Silent Sentinel medium to long range uncooled thermal zoom cameras are designed to provide the perfect video surveillance solution when partnered with the Jaegar PT platform.



Lens

Focal Length	15mm to 100mm	26 mm to 105mm	50mm to 150mm	25mm to 150mm	25mm to 225mm	40mm to 300mm
Optical Zoom (Continuous)	6.6x, Motorised	4x, Motorised	3x, Motorised	6x, Motorised	9x, Motorised	7.5x, Motorised
F Number	F1.4	F1.6	F1.6	F1.4	F1.5	F1.5
Horizontal Field of View	42.2° (W) to 6.2° (T)	25.3° (W) to 5.9° (T)	12.5° (W) to 4.1° (T)	25.3° (W) to 4.1° (T)	22.3° (W) to 2.8° (T)	16.6° (W) to 2.1° (T)
Focus	Fixed, preset with Athermalization					

Camera

Detector Type	Uncooled VOx Microbolometer
Resolution	640 x 480
Pixel Size	17 µm
Spectral Band	8 to 14 µm (LWIR)
Sensitivity	< 50 mK (NEΔT) f/1.0 @ room temperature
Frame Rate	25 Fps (9 fps, 30fps options)
Frequency	25Hz (9Hz, 30Hz options)
Digital Zoom and Pan	4x Digital zoom, Region of Interest
Digital Video	14/8-bit LVCMOS/Camera Link®
Image Stabilisation	Yes (cost option)
Image Enhancement	Image Contrast Enhancement (ICE™)
Image Control	Polarity: White Hot / Black Hot, Orientation: Invert / Revert

Detection, Recognition and Identification Ranges (Johnsons Criteria*)

Detection (Human / Vehicle)	5290m / 6760m	5560m / 7100m	7940m / 10150m	7940m / 10150m	11910m / 15220m	15880m / 20290m
Recognition (Human / Vehicle)	1320m / 1690m	1390m / 1780m	1990m / 2540m	1990m / 2540m	2980m / 3800m	3970m / 5070m
Identification (Human / Vehicle)	810m / 1040m	860m / 1090m	1220m / 1560m	1220m / 1560m	1830m / 2340m	2400m / 3120m

* Human at 1.8m², vehicle at 2.3m², Detection at 2 pixels, Recognition at 8 pixels and Identification at 13 pixels. 50% probability subject to environmental conditions.

Electrical and Mechanical

Boresight	Yes					
Rapid Release Mechanism	Yes					
Video Output	IP and Composite (PAL / NTSC)					
IP rating	IP67					
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)					
Power	28-32VDC, 1.2A, 33W Peak (excludes heater at 65W)					
Window	Germanium thermal optical quality glass, with a Low Reflection Hard Carbon (HCLR) coating					
Fixing Material	Stainless steel with external fall protection					
Housing Material	Iridited aluminium					
Housing Finish	White powder marine grade paint finish (other colours are available upon request)					
Housing Model	HT07	HT06	HT07			
Weight	Typically 14Kg/30.9lb	Typically 4Kg / 8.8lb	Typically 14Kg / 30.9lb			
Dimensions (mm)	L700 x W254 x H226	L460 x W184 x H156	L700 x W254 x H226			
Part Number (Camera Only)	RHT07IDB15Z100FW	RHT06IDB26Z105FW	RHT07IDB50Z150FW	RHT07IDB25Z150FW	RHT07IDB25Z225FW	RHT07IDB40Z300FW

Jaeger Cooled Medium to Ultra Long Range Thermal Zoom Cameras

The Silent Sentinel medium to ultra long range cooled thermal zoom cameras are designed to provide the perfect high quality video surveillance solution when partnered with the Jaeger PT platform.



Lens				
Focal Length	15mm to 300mm	35mm to 690mm	45mm to 900mm	80mm to 960mm
Optical Zoom (Continuous)	20x, Motorised	19.7x, Motorised	20x, Motorised	12x, Motorised
F Number	F4.0	F4.0	F4.0	F4.0
Horizontal Field of View	35.5° (W) to 1.83° (T)	15.6° (W) to 0.8° (T)	12.2° (W) to 0.61° (T)	11.0° (W) to 0.9° (T)
Focus	Motorized zoom and focus with autofocus			Motorized zoom and focus with athermalization and autofocus

Camera		
Detector Type	Cooled InSb FPA	CMT
Resolution	640 x 512	1280 x 720 HD
Pixel Size	15 µm	12 µm
Spectral Band	3.5 to 5.1 µm (MWIR)	3.7 to 4.95 µm (MWIR)
Sensitivity	< 25 mK (NEΔT) @ room temperature	27.5 mK (NETD) Typical
Frame Rate / Frequency	25Hz (30Hz option)	60Hz
Cooler Type	Stirling cycle, integrated (20,000hrs)	Long life linear (50,000hrs)
Cool Down Time	< 10 Minutes, 6 minutes typical	3 to 4 Minutes typical
Image Enhancement	Linear AGC, CLAHE, LAP	Linear, lace, edge enhancement
Digital Zoom	4x	8x
Turbulence Mitigation	-	Yes
Image Stabilisation	Yes	
Image Control	Noise reduction, sharpen, alpha-blend. Palettes: Black-hot, white-hot, ironbow, rainbow + more	Polarity: White-hot / black-hot

Detection, Recognition and Identification Ranges*				
Detection (Human / Vehicle)	10970m / 20110m	21610m / 29400m	24170m / 31170m	30300m / 50000m
Recognition (Human / Vehicle)	2360m / 8790m	5380m / 19040m	6950m / 22670m	8000m / 20600m
Identification (Human / Vehicle)	1440m / 5960m	3300m / 13350m	4280m / 16830m	6300m / 16900m

* Ranges are based upon 50% probability on a MODTRAN standard atmosphere. Detailed calculation notes available upon request.

Electrical and Mechanical			
Boresight	Yes		-
Rapid Release Mechanism	Yes		-
Video Output	IP and Composite (PAL / NTSC)		IP and Composite (PAL / NTSC)
IP rating	IP67		IP67
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)		-32°C (-25°F) Up to 55°C (131°F)
Power	28-32vDC, 1.7A, 49W Peak (excludes heater at 65W)		28vDC, 0.9A, 25W Peak
Window	Vanadium thermal optical quality glass, with a Low Reflection Hard Carbon (HCLR) coating		Silicon Window Enhanced Diamond Like Carbon (EDLC) coating
Fixing Material	Stainless steel with external fall protection		Black anodised aluminium alloy
Housing Material	Iridited aluminium		Glass fibre polyester resin & gelcoat
Housing Finish	White powder marine grade paint finish (other colours are available upon request)		Gloss white polyurethane finish
Housing Model	HT06	HT07	HT07 Custom
Weight	Typically 4Kg / 8.8lb	Typically 14Kg / 30.9lb	Typically 23Kg / 50.7lb
Dimensions (mm)	L460 x W184 x H156	L700 x W254 x H226	L597 x W299 x H299
Part Number (Camera Only)	RHT06IGB15Z300FW	RHT07IGB35Z690FW	RHT07IGB45Z900FW

Jaegar Short to Long Range HD Video Cameras

The Silent Sentinel short to long range HD video day / night cameras are designed to provide the perfect surveillance solution when partnered with the Jaegar PT platform.

Featuring superb low light performance, dynamic noise reduction (saving bandwidth), intelligent auto exposure and autofocus to enable a crisp image at range.



HD

Lens

Focal Length	4.3mm to 129mm	6mm to 216mm	15.2mm to 500mm	16.7mm to 1000mm
Optical Zoom (Continuous)	30x, motorised	36x, motorised	33x, motorised	60x, motorised
F Number	F1.6 to F4.7	F1.5 to F4.8	F3.0 to F32	F3.5 to F16
Horizontal Field of View	63.7° (W) to 2.32° (T)	56.5° (W) to 2.12° (T)	28.0° (W) to 0.74° (T)	23.1° (W) to 0.41° (T)
Extender	-	-	-	2x Extender available (doubles figures above)
Format Size	1/2.8"	1/2"		1/1.8"
Focus	Auto focus and motorised manual focus			
Iris	Auto iris			

Camera

Sensor	1/2.8" CMOS Exmor (2.13MP)	1/2" CMOS Exmor (2.17MP)	1/1.8" CMOS (Total sensor pixels 6.1MP)	
Sensor Mode	Full HD 1080p (1920 x 1080) HD			
Wide Dynamic Range	Yes (120 dB)	Yes (100dB)	Yes (103 dB)	
Video Performance (High Sensitivity Mode)	Colour 0.01 lux Mono 0.0008lux	Colour 0.01 lux Mono 0.0002 lux	Colour 0.00825 lux Mono 0.00275 lux	
White Balance	Auto, push and manual			
Automatic Level Control (ALC)	Auto / manual			
Shutter	1/1 s to 1/10,000	1/25 [30] to 1/60,000	1/25 [30] to 1/15,000	
Day/Night Mode	Auto, colour, monochrome			
Backlight Compensation	On / off			
Noise Reduction	Yes			
Digital Zoom	12x (360x combined)	32x (1152x combined)	-	-
Defog	Yes			
Image Stabilisation	Yes		Yes (cost option)	Gyro image stabilisation (lens cost option)

Electrical and Mechanical

Boresight	Yes			
Rapid Release Mechanism	Yes			
Video Output (PAL / NTSC)	IP (HD-SDI option)	IP & Composite (HD-SDI option)	IP and Composite	
IP rating	IP67			
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)			
Power	28-32vDC, 1.4A, 40W Peak (excludes heater at 65W)			
Window	High Definition optical quality glass, with a low reflection and water resistant coating			
Fixing Material	Stainless steel with external fall protection			
Housing Material	Iridited aluminium			
Housing Finish	White powder marine grade paint finish (other colours are available upon request)			
Housing Model	HT06		HT07	
Weight	Typically 4Kg / 8.8lb		Typically 14Kg / 30.9lb	
Dimensions (mm)	L460 x W184 x H156		L700 x W254 x H226	
Part Number (Camera Only)	RHT06IYJ30XW	RHT06IVJ36XW	RHT07IBA16Z500W	RHT07IBA16Z1000W

Jaegar Ultra Low Light Video Cameras

The Silent Sentinel ultra low light video day / night cameras are designed to provide the excellent images in low light conditions, they create the perfect video surveillance solution when partnered with the Jaegar PT platform.

Featuring industry leading low light performance, intelligent auto exposure and autofocus to enable a crisp image at range in poor lighting conditions.



HD 4K

Lens					
Focal Length	15.2mm to 500mm	16.7mm to 1000mm	35mm	100mm to 400mm	200mm to 800mm
Optical Zoom (Continuous)	33x, motorised	60x, motorised	-	4x, manual	4x, manual
F Number	F3.0 to F32	F3.5 to F16	F1.4	F4.5 to F5.6	F2.5 to F5.6
Horizontal Field of View	20.02° (W) to 0.64° (T)	23.1° (W) to 0.41° (T)	63°	24° (W) to 6° (T)	12° (W) to 3° (T)
Extender	No	2x Extender available (doubles figures above)	No	No	No
Format Size	1/2"	1/1.8"	35mm Full Frame		
Focus	Auto focus and motorised manual focus				
Iris	Auto iris				

Camera			
Sensor	2/3" CMOS Sensor		35mm Full Frame Exmor CMOS Sensor (Total sensor pixels 12.2MP)
Sensor Mode	1280 x 720 HD		4240 x 2832 4K
Wide Dynamic Range	78dB		100dB
Video Performance (High Sensitivity Mode)	Colour 0.00016 lux at F1.2 / 50 IRE Mono 0.00004 lux at F1.2 / 50 IRE		Colour 0.0006 lux at F1.2 / 50 IRE Colour 0.0004 lux at F1.2 / 30 IRE
White Balance	Auto and manual		Auto, push and manual
Automatic Level Control (ALC)	Auto / manual		
Shutter	Up to 1/10,000 (variable)		
Day/Night Mode	Auto, colour, monochrome		Day only
Backlight Compensation	On / off		
Noise Reduction	Yes		Yes, XDNR® Technology
Digital Zoom	10x (330x combined)	10x (600x combined)	2x
Defog	Yes		
Image Stabilisation	Yes (cost option)	Gyro image stabilisation (lens cost option)	No

Electrical and Mechanical					
Boresight	Yes				
Rapid Release Mechanism	Yes				
Video Output	IP or Composite (HD-SDI option) (PAL / NTSC)			IP (PAL / NTSC)	
IP rating	IP67				
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)				
Power	28-32VDC, 1.4A, 40W Peak (excludes heater at 65W)				
Window	High Definition optical quality glass, with a low reflection and water resistant coating				
Fixing Material	Stainless steel with external fall protection				
Housing Material	Iridited aluminium				
Housing Finish	White powder marine grade paint finish (other colours are available upon request)				
Housing Model	HT07				
Weight	Typically 14Kg / 30.9lb				
Dimensions (mm)	L700 x W254 x H226				
Part Number (Camera Only)	RHT07ICB16Z500W	RHT07ICB16Z1000W	RHT07IYM63W	RHT07IYM24W	RHT07IYM12W

Jaegar Pan and Tilt (PT) Platform

The robust aluminium housing is rated to IP67, it is anodised and powder coated to withstand harsh environmental conditions. The PT employs harmonic drive gearing with virtually zero backlash and the optical encoder ensures the unit retains position and will even self correct.



Pan and Tilt Unit

	Standard	High Powered
Repeatability	0.002°	0.0002°
Speed Control	Zoom dependant speed control	
Pan Rotation	360° Continuous	
Pan Speed	0.02° to 45° per second	0.002° to 80.0° per second (selectable ultra slow speed down to 0.0002°)
Tilt Range	+90° To -90°	
Tilt Speed	0.02° to 45° per second	0.002° to 80.0° per second (selectable ultra slow speed down to 0.0002°)
Actuation	Pan and tilt stepper motors	
Position encoders	Optical encoders on pan and tilt motors	
Housing Material	Cast hard anodised aluminium	
Housing Finish	Powder marine grade paint finish	
Colour	White (other colours available upon request)	
Fixing Material	Stainless steel with external fall protection	
IP rating	IP67	
Temperature Range	-30°C (-22°F) Up to 65°C (149°F) (-40°C with optional heater)	
Power	28-32vDC, 1.5A, 41W Nominal / 2.2A, 63W Peak (excluding camera payload)	28-32vDC, 1.8A, 50W Nominal / 3.5A, 99W Peak (excluding camera payload)
Dimensions	391mm (H) x 248mm (W) x 245mm (D) (including mounting adaptor, excluding through shaft and payloads)	
Weight	20kg / 44.1lb (excluding camera payload, payload capacity 30kg)	20kg / 44.1lb (excluding camera payload, payload capacity 50kg)
Part Number	JPT-I36530W	JPT-I36580W

Telemetry

Presets	127x Preset positions, 16x preset tours
Protocols	Pelco D, Pelco D Extended, SSP, ONVIF Profile-S
Parameter Programming	Via RS485 or RS422
Privacy Zones	4
Positioning	Absolute positioning feedback
Additional features	Programmable text within picture (camera ID), parameter control (RS232 or RS485) TCP/IP prepared, compass heading (cardinal point and/or degrees), focal length dependant pan and tilt control

Network

Ethernet	10/100 Base T, auto sensing, half/full duplex
Connectivity	ONVIF Profile S, auto MDIX, port forwarding
Configuration	Via web browser
Network Protocols	Networking: IPv4/v6, UDP, TCP, IGMP, ARP, DHCP, DNS, NT Streaming: RTSP, RTP, HTTP, Web Sockets Management: HTTP, HTTPS, Bonjour, ONVIF, PSIA, ION API, SNMP, SMTP Security: Basic / Digest Authentication, SSL
Latency	Can reach less than 100ms latency

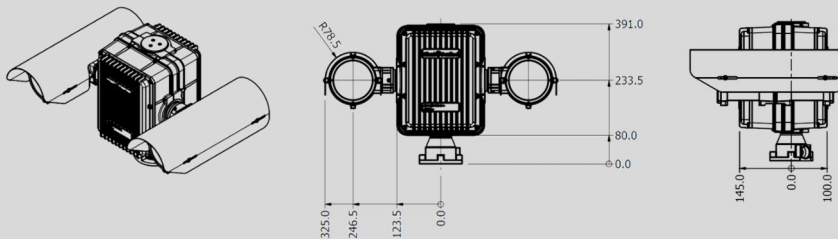
Image Processing

Video Compression	H.264/MPEG4 Part 2, M-JPEG
H.264 Performance (standard)	Total D1 at 390 fps or Full HD 1080p at 65 fps Examples: 2x 1080p at 30 fps (HD video/thermal) or 2x D1 at 30 fps (thermal / SD)
H.264 Performance (6.1MP cameras)	3x 1080p at 30 fps or 3x 1080p at 25 fps (various resolutions from 768 x 432 available)
H.264 Performance (4K cameras)	30 fps at 3840 x 2160 (supports up to 20 clients/connections over 5 streams) (various resolutions from 320 x 180 available)
Image Processing	Image resizing and scaling ratio, noise reduction, edge enhancement (sharpness), ROI based video compression
Software Update	Remote / IP accessible
Other Features	Email Notifications, Text Overlay, 2x Dry-Contacts

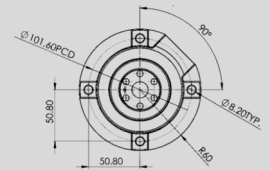
Options

Through Shaft and Brackets	'Thru-shaft' top mount 200mm & 130mm extensions, top mount brackets and side mount L brackets
Wiper	Wiper, wiper nozzle and wash tank (for the video camera only)
Gyro	2 Axis gyro stabiliser on Jaegar Unit
Analogue	Analogue composite camera alternatives are available upon request
Storage	Up to 64GB in total via SD/MMC (32GB available per channel if using thermal and video / 2x cameras)
Additional Optional Modules	Automatic object tracking, image stabilisation, laser range finder, laser illuminator, white light, IR illuminator, signal light gun, radar, UAV effector, window flap/cover, heater Please contact us if you have a specific requirement that is not mentioned

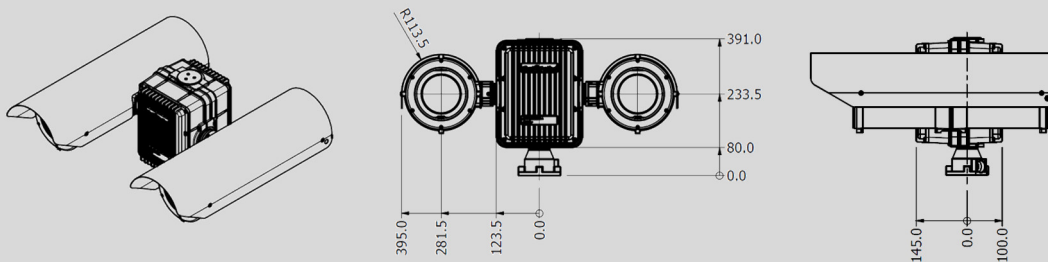
Jaegar PT Platform with HT06 Housings



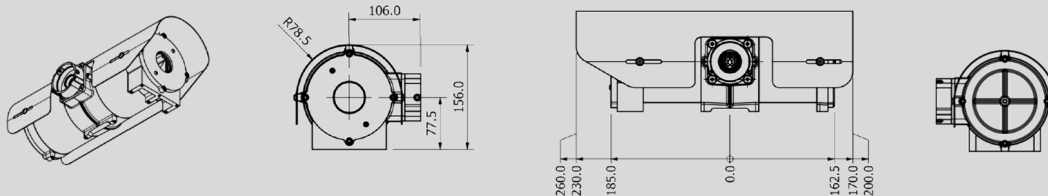
Jaegar PT Platform Mounting



Jaegar PT Platform with HT07 Housings



HT06 Camera Housing



HT07 Camera Housing * 'HT07 Custom Housing' drawing available upon request

