



Reliable components – intelligent system solutions
Heavy-duty camera monitoring solutions





Custom-made products

ADVANTAGE THROUGH DEVELOPMENT KNOW-HOW

- . 25 years of industry experience
- . In-house development centre
- . Modular product program
- . Certified product quality

MOTEC – CAMERA MONITOR SYSTEMS

Whether in the construction industry, in goods traffic, industry, logistics or agriculture – Motec has been one of the leading manufacturers of high-quality and intelligent heavy-duty camera monitoring systems for commercial vehicles and mobile applications.

In the past 25 years, we developed from a camera manufacturer to a system provider. Today, the name Motec stands for intelligent solutions that are tailor-made for the respective requirements and applications of our customers. It is our objective to offer solutions that are best suited to solve your viewing challenges. In addition to efficient technologies we count on the experience and comprehensive market and industry knowledge of our employees.

Motec complies with all international industry and quality standards. All of our processes are monitored and documented 100%. Furthermore, we count on a high level of integration – it's quality "Made in Germany". Selection and processing of raw and finished materials as well as development, production, and service procedures are at OEM level.

MOTEC – HIGHLY EFFICIENT SERVICE

Excellent service made simple:

- . **Simply call our hotline**
- . **Within 24 hours we will ship a replacement unit**
- . **Just return faulty devices**
- . **We inspect the damage and calculate the cost for the repair**
- . **Repair or keep the replacement device – it's your decision**

HOTLINE

Phone +49 6433 9145-9888
 Fax: +49 6433 9145-9877
service@motec-cameras.com

ELECTRONIC SYSTEM DEVELOPMENT

Motec has many years of experience in the development of robust cameras for mobile use and their adaptation to customer- and application-specific features. This expertise extends to the development of complex and reliable video control monitors, e.g., CMOS technology. In addition, we develop complex high-speed designs with Altera or Xilinx-FPGA memory integration.

Our developments consider the environmental effects in the application of commercial vehicles (vibration, shock, and temperature resistance, electromagnetic compatibility, protective circuits, etc.) to the same extent as special requirements of mobile power supply systems (wide voltage range, load dump, etc.). In addition, we comply with specific requirements and standards (e.g., industry and MIL standards) of the respective industry sector in which we work.

SOFTWARE DEVELOPMENT

Our software development engineers have years of extensive experience in the programming of:

- . Complex embedded systems including FPGA- and micro controller programming (Hardware/Software Codesign, In-the-loop testing)
- . CAN bus and the evaluation and programming of analogue and digital control signals
- . Image processing and image evaluation, such as image optimisation, pattern recognition, stitching, etc.
- . Ergonomic user interfaces and development of applications
- . Apps for operating systems of mobile terminals such as Android or iOS

DESIGN DEVELOPMENT

The optimum protection of our product housing requires extensive development with regard to:

- . Durability and air-tightness, especially when it comes to the protection from environmental effects (waste water, dust, chemicals, electromagnetic radiation)
- . Material properties, e.g., aluminium die casting and housings made of plastic injection moulding, housings made of milled aluminium and stainless steel, bent sheet metal parts and surface finishing
- . Robust design, especially for explosion-hazardous areas of Zone 1 and 2
- . View angle and field of vision design
- . Ergonomics

CABLE PRODUCTION

To achieve an optimum connection between robust camera monitoring systems, it requires standardised cables with a long service life. In order to ensure our systems comply with these conditions, the following are considered the minimum requirements for our cable production:

- . 100 % traceability (via batch and serial numbers)
- . 100% semi-automatic, logged and functional end test
- . Crimp height measuring
- . Automatic crimping force monitoring
- . Pull testing
- . Micrograph laboratory
- . EDP-supported merchandise management and production planning and control systems
- . Operational data recording via bar code



6



16



22



28



38

Motec product program

TABLE OF CONTENTS

HEAVY-DUTY CAMERAS

8	MC3000B	Universal camera
8	MC3000B-VA	Stainless steel camera
9	MCDE3000	Ethernet camera
9	MC6000D	Universal camera
10	MC7000P-GH	Universal camera
10	MC7000P-4-E	Universal camera
11	MC7180N	Wide angle camera
11	MC5200	Motor zoom camera
12	MC9000	Fork camera
12	MC9150P	Fork camera
13	MC9250P	Fork camera
13	MC925C	Fork camera
14	MC4000A-IR	Infra-red camera
14	PathFindIR II	Thermal imaging camera

HEAVY-DUTY MONITORS

18	MD3071A	7" Monitor
18	MD3071A-V	7" Monitor vertical
19	MD3072B-Quad	7" Monitor
19	MD3074A-Quad	7" Monitor
20	MD3100	10.2" Monitor
20	17" LCD monitor	
21	19" LCD monitor	

VIDEO CONTROL UNITS

24	MB1205	Video control unit
24	MB1405-Quad	Video control unit
25	MBE5200-1	Operator control unit
25	MVCD1000	Video control unit
26	MVCU1300	Video control unit
26	MVCU1400	Video control unit
27	MVCU1500	Video control unit
27	MVCU1600	Video control unit

RADIO SYSTEMS, DATA LOGGING, CABLES

30	MVR6000	Analogue radio system
30	MVRD1000	Digital wireless system
31	MVR5200-1	Digital wireless system
32	DVR-EMV200S	2-Channel recorders
32	DVR-EMV400	4-Channel digital recorder
32	DVR-EMV400-WLAN	4-Channel digital recorder
33	DVR-BD-301W 3G/-WIFI	Digital recorder 3G/-WIFI
34	Plug-in connector	
36	Standard cables	
37	Special cables	

ACCESSORY

40	Camera accessories
41	Camera light shield
41	Camera cleaning unit
42	Monitor brackets
44	Monitor light shield covers
44	Monitor damping sets
45	Batteries and charging units
46	Voltage transformers
46	Power packs
47	Miscellaneous
48	Pulley, strain relief set

APPENDIX

52	Camera match code
53	Angle of view
54	Camera image
55	IP protection types

Legal notice

Copyright © Motec GmbH 2017
Images: Motec GmbH, Fotolia.com
All data without guarantee. Errors and omissions excepted.

Heavy-duty cameras

Heavy-duty monitors

Control and operating units

Data transfer and recording

Accessory

Appendix

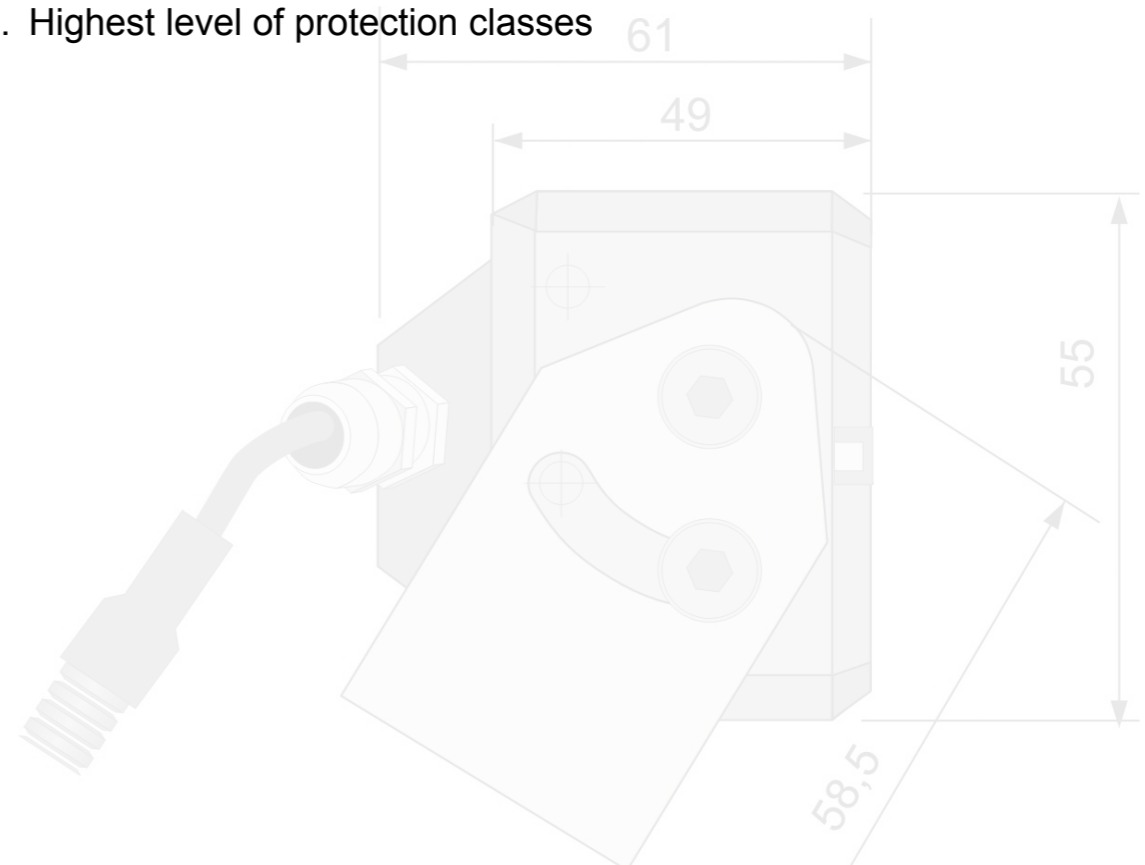


Heavy-duty cameras: robust, reliable, versatile

MOTEC CAMERAS CAN TAKE A LOT AND GIVE EVEN MORE

Motec cameras are easy to integrate thanks to their modular design:

- . Numerous connection cables and a variety of plug options
- . Support of many video protocols
- . Analogue and digital video engines in SD and HD resolution
- . Lenses with horizontal angle of view from 20° to 180°
- . With and without IR illumination
- . Highest level of protection classes



HEAVY-DUTY CAMERAS



MC3000B series

Based on its design and equipment, the MC3000B is a **heavy-duty camera** with many applications. Multiple angles of view and the robust aluminium housing makes this design the optimum camera for large view-obstructing machines that are subject to extreme weather and environmental conditions. The MC3000B is also available as EX2 variant.



MC3000B-VA series

The MC3000B-VA **heavy-duty camera** is made of **alloy steel** and suitable for the use in maritime applications and in areas requiring a high degree of hygiene. The VA steel and the applicable protection class allows the use of steam for cleaning purposes and increases the camera's resistance to corrosion and acid.



MCDE3000 series

The MCDE3000 is a **heavy-duty Ethernet camera** and can be used in networks compliant with IEEE 802.3 (LAN). Fitted with intelligent image processing and dynamic overlays, the camera functions as a smart sensor in a variety of applications, e.g., integration into video monitoring systems or video streaming.



MC6000D series

Based on its design, the MC6000D is a very flexible **heavy-duty camera** that can be used for municipality purposes as well in the agriculture and transportation area. The camera's robust design and special surface treatment makes it suitable for use in inclement weather conditions.

Technical Data	MC3xxx-B-x	MC3xxxB-x-VA
Image sensor	CMOS 1/4"	CMOS 1/4"
Horizontal angle of view	20° 40° 70° 90° 100° 115°	20° 40° 70° 90° 100° 115°
Resolution	H 640 x V 480 pixels	H 640 x V 480 pixels
Luminous sensitivity	< 0.05 lx	< 0.05 lx
Window heater	✓	✓
Protective glass	✓	✓
Voltage supply	9 V to 32 V DC	9 V to 32 V
Video system	PAL	PAL
Type of protection	IP68 IP69K	IP68 IP69K
Shock-resistant	50 g	50 g
Vibration-resistant	5 g	5 g
Storage temperature	-60 °C to +85 °C	-60 °C to +85 °C
Operating temperature	-60 °C to +85 °C	-60 °C to +85 °C
Housing	Aluminium, anodised	Stainless steel
Weight	0.40 kg	1.10 kg

MCDE3xxx	MC60xxD-x	Technical Data
CMOS 1/4"	CMOS 1/4"	Image sensor
20° 40° 70° 90°	70° 90°	Horizontal angle of view
H 640 x V 480 pixels	H 640 x V 480 pixels	Resolution
< 0.05 lx	< 0.05 lx	Luminous sensitivity
✓	✓	Window heater
✓	✓	Protective glass
PoE+ acc. to IEEE 802.3at	9 V to 32 V DC	Voltage supply
PAL	PAL	Video system
IP68 IP69K	IP68 IP69K	Type of protection
50 g	50 g	Shock-resistant
10 g	5 g	Vibration-resistant
-40 °C to +85 °C	-40 °C to +85 °C	Storage temperature
-40 °C to +70 °C	-40 °C to +85 °C	Operating temperature
Aluminium, anodised	Aluminium, anodised	Housing
0.40 kg	0.40 kg	Weight

HEAVY-DUTY CAMERAS



MC7000P-GH series

Based on its **mini module design**, the MC7000P-GH is suitable for the installation in mobile machines with limited space available. The individually adjustable lens makes it possible to install the camera vertically, horizontally, at an angle, or overhead. The material of the housing has a high content of elastomer that allows for the elastic deformation during periods of tensile and pressure loads. However, subsequently, this allows the housing to return to its original shape.



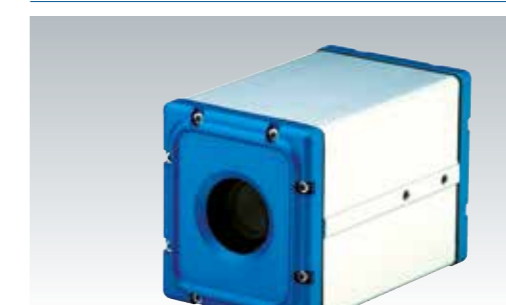
MC7000P-E series

Based on its **small design**, the MC7000 P-4-E is perfectly suitable for the installation on mobile machines with limited space available. The individually adjustable lens makes it possible to install the camera vertically, horizontally, at an angle, or overhead. The stainless steel housing guarantees a high level of durability to prevent corrosion and resist acids.



MC7180N-4

The MC7180N is a **heavy-duty wide-angle camera**, used with 270°/360° visual systems. The 180° angle of vision and the small robust design guarantee a long service life even during rough applications. The high flexibility of the system allows the adaptation to different vehicles and visual problems.



MC5200

The MC5200 is a **heavy-duty motor zoom camera** to monitor crane hooks, winches and loads. State-of-the-art video module technology provides sharp and high-contrast images allowing for an 18-times optical zoom and a 26-times digital zoom. The Motec System-Bus (MSB) controls the camera. The MC5200 it is also available as EX2 version.

Technical Data	MC7xxxP-x-GH	MC7xxx-P-x-E
Image sensor	CMOS 1/4"	CMOS 1/4"
Horizontal angle of view	70° 90° 115°	70° 90° 115°
Resolution	H 640 x V 480 pixels	H 640 x V 480 pixels
Luminous sensitivity	< 1 lx	< 1 lx
Window heater	Passive	Passive
Protective glass	---	---
Voltage supply	9 V to 16 V DC	9 V to 16 V DC
Video system	PAL	PAL
Type of protection	IP68 IP69K	IP68 IP69K
Shock-resistant	50 g	50 g
Vibration-resistant	10 g	10 g
Storage temperature	-40 °C to +85 °C	-40 °C to +85 °C
Operating temperature	-35 °C to +65 °C	-35 °C to +65 °C
Housing	Plastic (elastomer)	Stainless steel
Weight	0.15 kg	0.25 kg

MC7180N-4	MC5200	Technical Data
CMOS 1/3"	CCD, 1/4" EX View HAD	Image sensor
180°	1.6° to 47.5°	Horizontal angle of view
H 672 x V 492 pixels	H 850 x V 670 pixels	Resolution
< 0.5 lx	< 0.7 lx	Luminous sensitivity
Passive	✓	Window heater
---	✓	Protective glass
9 V to 16 V DC	18 V to 32 V DC	Voltage supply
NTSC	PAL	Video system
IP68 IP69K	IPX5 IP68	Type of protection
50 g	50 g	Shock-resistant
5 g	--	Vibration-resistant
-40 °C to +85 °C	-40 °C to +85 °C	Storage temperature
-35 °C to +65 °C	-35 °C to +60 °C	Operating temperature
Aluminium, anodised	Aluminium, anodised	Housing
0.11 kg	1.13 kg	Weight

HEAVY-DUTY CAMERAS



MC9000

The MC9000 **fork camera** is designed especially for forklift trucks and is mounted to the **inside of the fork**. This places the camera at the eye level of the pallet. Based on its pinhole size opening in the housing, the lens is protected from damage that may be caused by lattice boxes or pallets.



MC9150P

The MC9150P camera is designed especially for forklift trucks and is mounted to the **back of the fork**. The 50° viewing angle makes it possible to observe both forks. Based on its pinhole size opening in the housing, the lens is protected from damage that may be caused by lattice boxes or pallets.



MC9250

The MC9250 **fork camera** is designed especially for fork lift trucks and is integrated into the **tips of the lift's fork**. This places the camera at the eye level of the pallet. Based on its pinhole size opening in the housing, the lens is protected from damage that may be caused by lattice boxes or pallets.



MC925C

The MC925C **fork camera** is designed especially for forklift trucks and is mounted to the **inside of the fork**. Two **LED** high resolution modules let the forklift operator maintain visual contact with the forks even during poor lighting conditions. Based on its pinhole size opening in the housing, the lens is protected from damage that may be caused by lattice boxes or pallets.

Technical Data	MC90xx	MC9150P
Image sensor	CMOS 1/4"	CMOS 1/4"
Horizontal angle of view	30° 50°	50°
Resolution	H 640 x V 480 pixels	H 640 x V 480 pixels
Luminous sensitivity	< 0.2 lx	< 0.2 lx
Window heater	Passive	Passive
Protective glass	✓ (plastic)	✓ (plastic)
Voltage supply	12 V DC ±10%	12 V DC ±10%
Video system	PAL	PAL
Type of protection	IP68 IP69K	IP68 IP69K
Shock-resistant	100 g	100 g
Vibration-resistant	10 g	10 g
Storage temperature	-40 °C to +85 °C	-40 °C to +85 °C
Operating temperature	-40 °C to +85 °C	-40 °C to +85 °C
Housing	Stainless steel	Stainless steel
Weight	0.30 kg	0.21 kg

MC9250	MC925C	Technical Data
CMOS 1/4"	CCD 1/4"	Image sensor
30° 50°	45°	Horizontal angle of view
H 640 x V 480 pixels	H 542 x V 586 pixels	Resolution
< 0.2 lx	< 0.5 lx	Luminous sensitivity
Passive	Passive	Window heater
✓ (plastic)	✓ (plastic)	Protective glass
12 V DC ±10%	12 V DC ±10%	Voltage supply
PAL	CCIR	Video system
IP68 IP69K	IP68	Type of protection
100 g	100 g	Shock-resistant
10 g	10 g	Vibration-resistant
-40 °C to +85 °C	-35 °C to +75 °C	Storage temperature
-40 °C to +85 °C	-30 °C to +65 °C	Operating temperature
Stainless steel	Stainless steel	Housing
0.30 kg	0.40 kg	Weight

HEAVY-DUTY CAMERAS



MC4000A-IR

The MC4000A-IR is a **heavy-duty camera** with a high degree of electromagnetic compatibility (**EMC**) and **infra-red lighting**. This enables the camera to be used especially in the dark and in areas where the changing conditions of electric or electromagnetic effects must be eliminated.



PathFindIR II

The **PathFindIR II** is a **thermal imaging camera**, that is used especially in 100% darkness, in areas with high smoke concentration, in fog, or during snowstorms. The operator receives a clear image and can see five times farther than with conventional floodlights and, therefore, can detect persons, animals and objects well ahead of time.

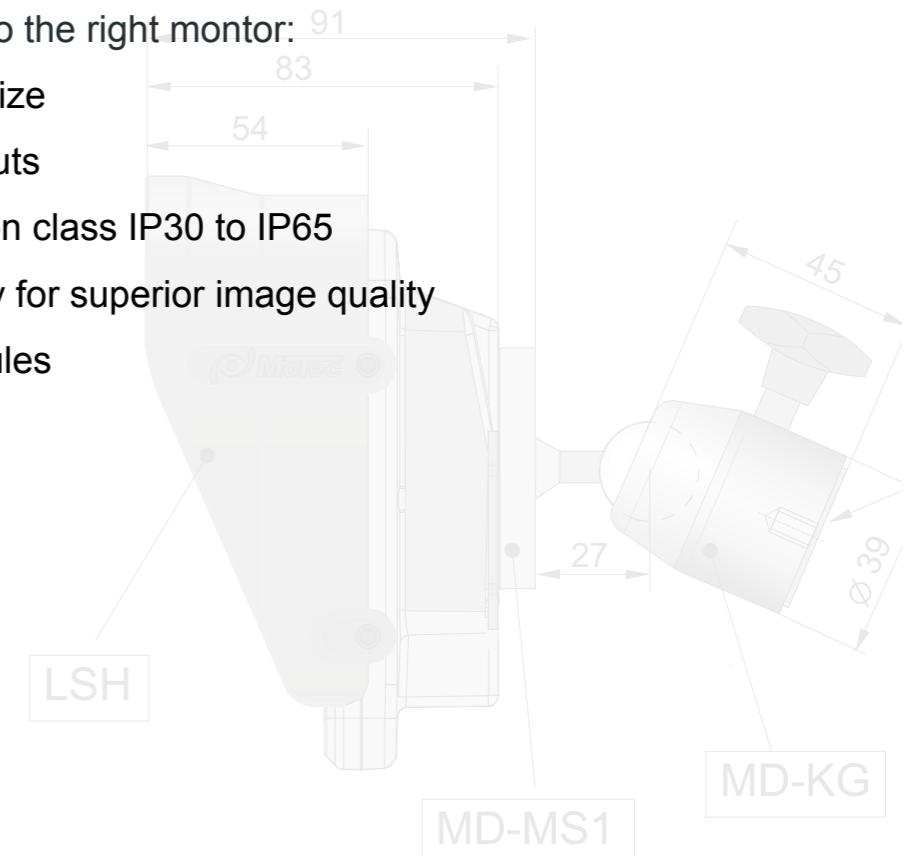
Technical Data	MC4000A-IR	PathFindIR II
Image sensor	CMOS 1/4"	Microbolometer without cooling
Horizontal angle of view	20° 40° 70° 90° 100° 115°	H 24° x V 18°
Resolution	H 640 x V 480 pixels	320 x 240 pixels
Luminous sensitivity	0 lx	0 lx
Window heater	✓	✓
Protective glass	✓ (extremely scratch-resistant)	✓
Voltage supply	9 V to 32 V DC	6 V DC to 16 V DC
Video system	PAL	NTSC
Type of protection	IP68 IP69K	IP69K
Shock-resistant	50 g	✓
Vibration-resistant	5 g	✓
Storage temperature	-46 °C to +85 °C	-55 °C to +95 °C
Operating temperature	-46 °C to +85 °C	-40 °C to +80 °C
Housing	Aluminium, anodised	Aluminium
Weight	0.40 kg	0.30 kg



Heavy-duty monitors provide the best possible images, regardless of the situation

MOTEC CAMERAS CAN BE PLACED ALMOST ANYWHERE

- For every applicatio the right montor:
- . 7" to 19" screen size
 - . Up to 4 video inputs
 - . Housing protection class IP30 to IP65
 - . Digital technology for superior image quality
 - . Available in modules



HEAVY-DUTY MONITORS



MD3071A

Based on its design and accessories, the MD3071A is a **heavy-duty monitor** that can be used in all industry sectors. The images of the display are crystal clear, even under the most severe environmental conditions. The option to upgrade the software keeps the MD3071A at the state-of-the-art technology level and makes the camera future-proof.



MD3071A-V

The MD3071A-V is especially designed for the Motec 360° birdseye view system (MVS). The camera's **vertical design** displays the vehicle in a bird's eye view and in the direction of travel. The option to update the software ensures that the MD3071A can be updated any time and, therefore, makes the product future-proof.



MD3072B-Quad

The MD3072B-Quad is designed especially for mobile machines on which several cameras are mounted. When using the **integrated video control unit**, the monitor can display 4 camera images simultaneously. The integrated menu function and control leads for the automatic control of the cameras ensure the quick change of images.



MD3074A-Quad

The MD3074A-Quad is designed especially for mobile machines on which several cameras are mounted. When using the **integrated video control unit**, the monitor can display 4 camera images simultaneously. Compliance with this protection types makes the monitor watertight and suitable for storage monitoring. The integrated menu function and control leads for the automatic control of the cameras ensure the quick change of images.

Technical Data	MD3071A	MD3071A-V
Screen size	7" 17.8 cm 16:9 format	7" 17.8 cm 16:9 format
Resolution	H 800 x V 480 pixels	H 480 x V 800 pixels
Video inputs	3	3
Image display	Single image	Single image
Menu guide	Multiple languages	Multiple languages
Voltage supply	9 V to 60 V DC	9 V to 60 V DC
Video system	PAL NTSC	PAL NTSC
Type of protection	IP30	IP30
Shock-resistant	50 g	50 g
Vibration-resistant	5 g	5 g
Storage temperature	-30 °C to +80 °C	-30 °C to +80 °C
Operating temperature	-30 °C to +80 °C	-30 °C to +80 °C
Weight	0.61 kg	0.48 kg
Scope of delivery	Monitor, connection cable, operating instructions	Monitor, connection cable, operating instructions

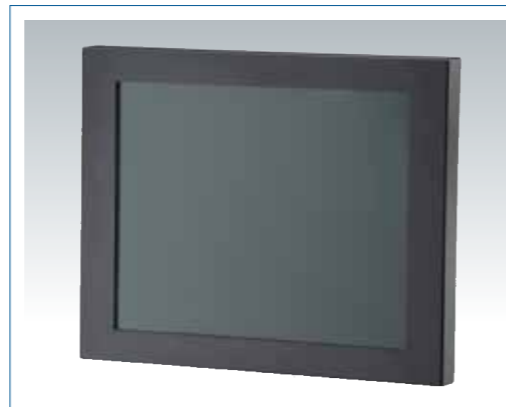
MD3072B-Quad	MD3074A-Quad	Technical Data
7" 17.8 cm 16:9 format	7" 17.8 cm 16:9 format	Screen size
H 800 x V 480 pixels	H 800 x V 480 pixels	Resolution
4	4	Video inputs
Single split triple quad image	Single split triple quad image	Image display
✓	✓	Menu guide
10 V to 32 V DC	12/24 V DC (with MPM48, 48 V DC)	Voltage supply
PAL NTSC	PAL NTSC	Video system
IP30	IP66	Type of protection
20 g	25 g	Shock-resistant
10 g	10 g	Vibration-resistant
-30 °C to +85 °C	-30 °C to +85 °C	Storage temperature
-20 °C to +80 °C	-30 °C to +80 °C (at -40°C, warm-up/start-up period of 5 min.)	Operating temperature
0.62 kg	1.10 kg	Weight
Monitor, connection cable, operating instructions	Monitor, connection cable, operating instructions	Scope of delivery

HEAVY-DUTY MONITORS



MD3100

The MD3100 is a **10.2" LCD monitor** for industrial application with powder-coated metal housing. The front of the monitor complies with the regulations of the dust and spray water protection class.



17"-LCD Monitor

The 17" LCD monitor is a monitor for industrial applications and stationary use with powder-coated metal housing. The large screen size ensures the display of complex image combinations. The higher resolution provides sharp camera images that are true to the detail.



19"-LCD Monitor

The 19" LCD monitor is a monitor for industrial applications and stationary use with **non-reflecting lens** and powder-coated metal housing. The large screen size ensures the display of complex image combinations. The higher resolution provides sharp camera images that are true to the detail.

Technical Data	MD3100	17" LCD monitor
Screen size	10.2" 25.9 cm 16:9 format	17" 43.2 cm 4:3 format
Resolution	H 800 x V 480 pixels	H 1280 x V 1024 pixels
Video inputs	1	1
Image display	Single image	Single image
Menu guide	Multiple languages	Multiple languages
Voltage supply	10 V DC to 32 V DC	230 V AC (alternatively available as 24 V DC)
Video system	PAL NTSC	PAL NTSC
Type of protection	IP54 (front)	IP65 (front)
Shock-resistant	25 g	5 g
Storage temperature	-30 °C to +85 °C	-20 °C to +60 °C
Operating temperature	-20 °C to +70 °C	0 °C to +50 °C
Weight	1.66 kg	4.50 kg
Scope of delivery	Monitor, operating instructions	Monitor, operating instructions

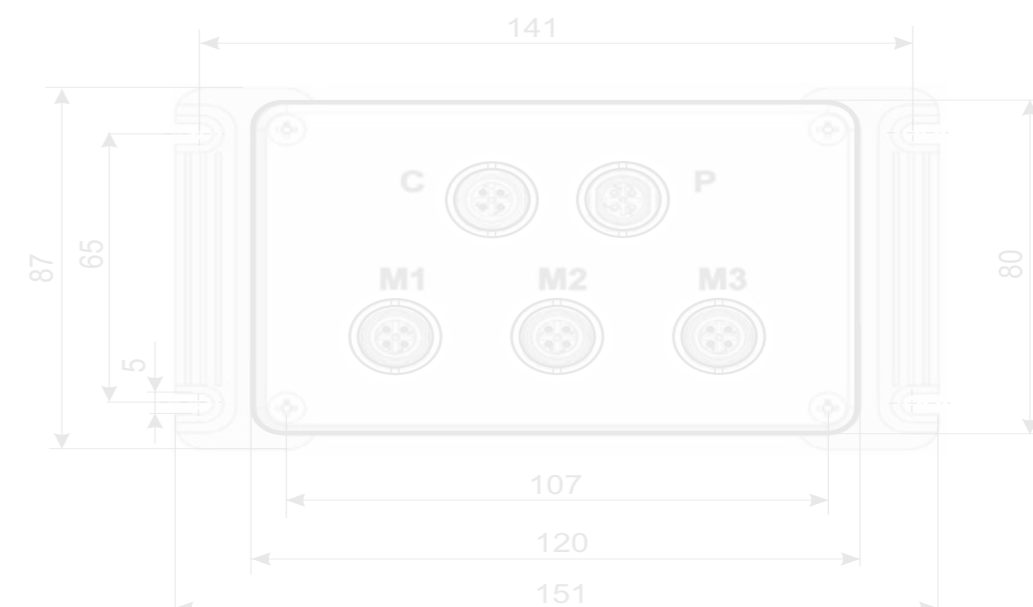
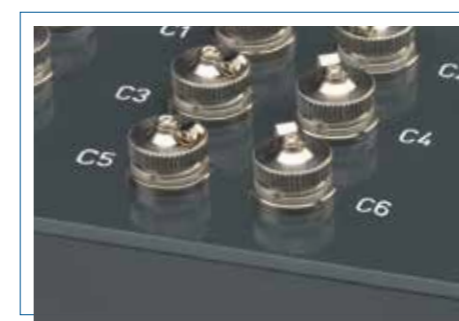
19" LCD monitor	Technical Data
19" 48.3 cm 4:3 format	Screen size
H 1280 x V 1024 pixels	Resolution
1	Video inputs
Single image	Image display
Multiple languages	Menu guide
24 V DC	Voltage supply
---	Video system
IP54 IP65 (front)	Type of protection
5 g	Shock-resistant
-20 °C to +60 °C	Storage temperature
0 °C to +50 °C	Operating temperature
7.00 kg	Weight
Monitor, operating instructions	Scope of delivery

WHETHER 1, 2 OR 8 CAMERAS

WITH MOTEC CONTROL UNITS, THE OPERATOR WILL ALWAYS BE TOP OF IT

These are your advantages:

- . Up to 8 heavy-duty cameras
- . Up to 5 heavy-duty monitors
- . Analogue and digital radio transmission



Heavy-duty cameras

Heavy-duty monitors

Video control units

Data transfer and recording

Accessory

Appendix

HEAVY-DUTY CONTROL UNITS



MB1205

The MB1205 is a **video control unit** for 2 cameras mounted on tractor vehicles. The functions of the MB1205, e.g., automatic switching of camera images for articulated trucks, cycle signals to activate the camera change-over, adjustable image mirroring for each camera, and third-party installations, are the outstanding features of the video control unit.



MB1405-Quad

The **video control unit** MB1405-Quad allows the display of up to 4 camera images simultaneously in what is referred to as quad split mode. The supplied remote control is used to switch between the different camera images.



MBE5200-1

The MBE5200-1 **operator control unit** makes it easy to manipulate all functions of the MC5200-1 motor zoom camera with a single device. Furthermore, the control module offers the opportunity to expand the system for the connection of an additional camera with a prime lens.



MVCD1000

The MVCD1000 is a digital, FPGA-SoC based, Ethernet and CAN-Bus heavy-duty **video control unit**. It is capable of processing 4 camera images in parallel, can merge additional sensor data and uses a monitor output or Ethernet video streaming to display these images.

Technical Data	MB1205	MB1405-Quad
Camera inputs	2	4
Monitor connections	1	1
Control leads	2 x SEL IN	4 x SEL IN, quad
Image modes	Single image	Single split triple quad image
Voltage supply	10 V to 32 V DC	12 V to 24 V DC
Video system	PAL NTSC	PAL NTSC
Type of protection	IP30	IP30
Shock-resistant	10 g	10 g
Vibration-resistant	5 g	5 g
Storage temperature	-40 °C to +95 °C	-30 °C to +80 °C
Operating temperature	-30 °C to +75 °C	-25 °C to +75 °C

MBE5200-1	MVCD100x	Technical Data
2	4	Camera inputs
2	1	Monitor connections
4	0 4 x GPIO*	Control leads
1	2 1*	CAN bus
--	Static dynamic	Overlays
Single image	Single split triple quad image PIP H	Image modes
---	Ultrasound radar inclination laser	Sensors
18 V to 32 V	9 V to 60 V	Voltage supply
PAL	PAL NTSC	Video system
IP54 (front)	IP68	Type of protection
50 g	50 g	Shock-resistant
5 g	5 g	Vibration-resistant
-40 °C to +80 °C	-40 °C to +85 °C	Storage temperature
-30 °C to +80 °C	-30 °C to +85 °C	Operating temperature

* Only available in combination:
0 control leads + 2 CAN bus connections or 4 control leads and one CAN bus connection

HEAVY-DUTY CONTROL UNITS



MVCU1300

The MVCU1300 is an intelligent, CAN-controlled **heavy-duty-video control unit**. It combines video and sensor data (max. 12 sensors, e.g., ultrasound to measure distance) and can display this information on up to 2 monitors.



MVCU1400

The MVCU1400 is an intelligent, CAN-controlled **heavy-duty multi camera video control unit**. It can process up to 4 camera images and display these images on up to 2 monitors in a variety of modes.



MVCU1500

The MVCU1500 is an intelligent, CAN-controlled **heavy-duty multi camera video control unit**. It can process up to 8 camera images and display these images on up to 2 monitors in a variety of modes.



MVCU1600

The MVCU1600 is an intelligent, CAN-controlled high-end **heavy-duty multi camera video control unit**. It can process up to 8 camera images and display these images on up to 5 monitors in a variety of modes and with individual overlays.

Technical Data	MVCU1300	MVCU1401	MVCU1402
Camera inputs	1	4	
Monitor connections	2	2	
Control leads	4 x SEL IN	4 x SEL IN	2 x SEL IN
CAN bus	1	1	
Overlays	Static dynamic	Static	
Image modes	Single image	Single split triple quad image PIP H	
Sensors	Ultrasound inclination laser	--	
Voltage supply	9 V to 60 V	9 V to 32 V DC	18 V to 32 V DC
Video system	PAL NTSC	PAL NTSC	
Type of protection	IP69K	IP69K	
Shock-resistant	50 g	50 g	
Vibration-resistant	5 g	5 g	
Storage temperature	-40 °C to +85 °C	-35 °C to +85 °C	
Operating temperature	-30 °C to +85 °C	-30 °C to +70 °C	

MVCU1500	MVCU1600	Technical Data
8	8	Camera inputs
2	5	Monitor connections
8 x SEL IN	8 x GPIO	Control leads
1	1	CAN bus
Static	Static dynamic	Overlays
Single split triple quad image PIP H	Single split triple quad octal image PIP H	Image modes
--	--	Sensors
18 V to 32 V DC	9 V to 60 V	Voltage supply
PAL NTSC	PAL NTSC	Video system
IP65	IP68	Type of protection
100 g	50 g	Shock-resistant
5 g	5 g	Vibration-resistant
-40 °C to +85 °C	-50 °C to +85 °C	Storage temperature
-30 °C to +65 °C	-46 °C to +85 °C	Operating temperature

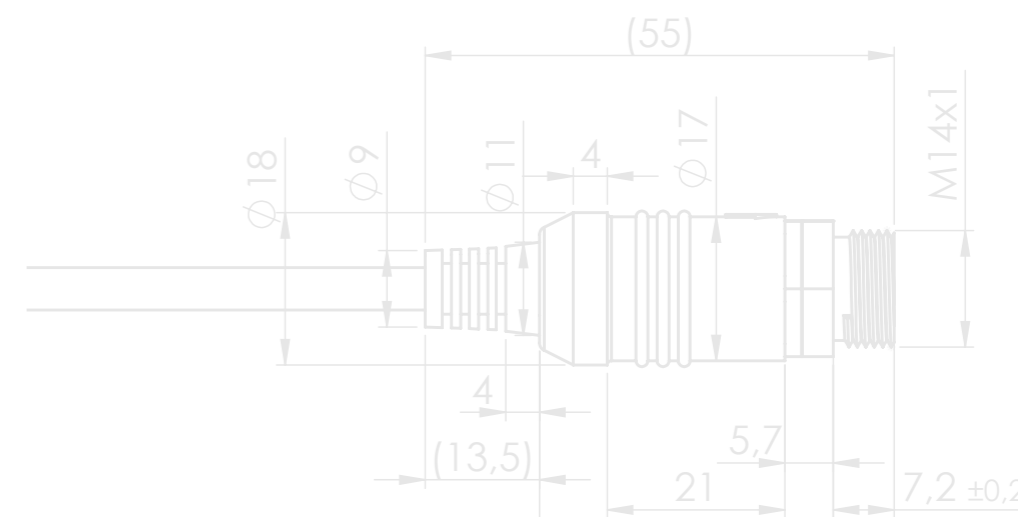
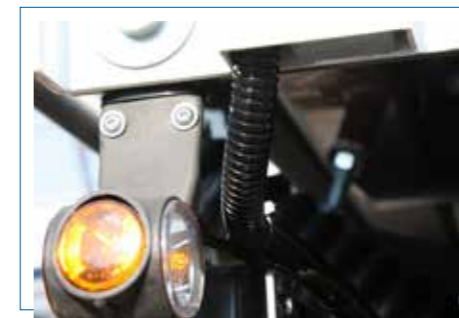
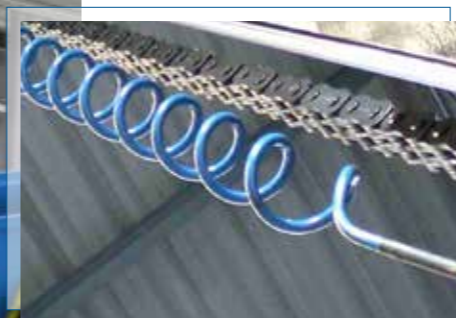


The Motec radio systems and cables connect all components

RADIO, DATA TRANSMISSION AND RECORDING, CABLE AND WLAN

The transmission mode and link for any requirement:

- . Analogue and digital radio transmission
- . In-house cable production
- . All cables come in a variety of lengths and designs
- . Reinforced cables and plugs – robust and durable



MOTEC RADIO SYSTEMS



MVR6000

The **analogue radio system** MVRD6000 is a robust transmitter/receiver system for a wireless image transmission. Camera images are transmitted across great distances and displayed on the monitor without time delay. Several vehicles can seem signals broadcasted by a single transmitter.



MVRD1000

The **digital radio system** MVRD1000 is a robust transmitter/receiver system for a wireless image transmission. Using the compact wireless units, digital camera signals are quickly and without delay sent over long distances to the monitor.



MVR5200-1

The **digital crane radio system** MVR 5200-1 makes it possible to transmit a camera image of the motor zoom camera type MC5200-1 without any interference. In addition to the image transmission to the video receiver, the signals required for camera control are also sent to the camera via integrated data radio transmission.

Technical Data	MVR6000-TX	MVR6000-RX	MVRD1000-TX	MVRD1000-RX
Function	Video transmitter	Video receiver	Video transmitter	Video receiver
Range	Up to 500 m		Up to 120 m	
Channels	3		1	
Transmitter output	10 mW		18 dBm EIRP	
Signal input		1Vpp (30% Sync neg) /75Ω		-86 dBm
Frequency range	2400 MHz		2400 MHz to 2483.5 MHz	
Voltage supply	12 V DC		9 V to 32 V DC	
Video system	PAL		PAL 25 f/s, NTSC 30 f/s	
Type of protection	IP30		IP69K	
Shock-resistant	5 g		30 g	
Storage temperature	-20 °C to +75 °C		-30 °C to +80 °C RH 90%	
Operating temperature	+10 °C to +65 °C		-20 °C to +70 °C RH 90%	

VS5200.24-1	VE5200.24-1	Technical Data
Video transmitter	Video receiver	Function
300 m unobstructed view connection		Range
1		Channels
Max. 25 mW		Transmitter output
	Max. 10 mW (1% ED)	Signal input
5775 to 5830 MHz	868.0 to 868.6 MHz	Frequency range
18 V to 32 V		Voltage supply
CCIR		Video system
IP65		Type of protection
30 g		Shock-resistant
-40 °C to +85 °C		Storage temperature
-35 °C to +60 °C		Operating temperature

MOTEC DIGITAL RECORDER



DVR-EMV200S

The DVR-EMV200S is a 2-channel H264 **mobile recorder** that supports up to 2 cameras. The recorder uses the functions 'Permanent recordings' or 'Proceed with event-controlled recordings'. The recording takes place during real time FullID1 with up to 50 images. An Ethernet interface is used as remote control and networks are used to control the recorder.



DVR-EMV400/-WLAN

The DVR-EMV400 or DVR-EMV400-WLAN is a 4-channel MPEG4 **digital recorder** used in mobile application for efficient hard drive and network utilisation. The graphic user interface, the recording speed, resolution, and quality can be adjusted individual for each camera. The recorder is equipped with a thermostatically-control heater. An Ethernet interface is used as remote control and networks are used to control the recorder.



DVR-BD-301W-3G/-WIFI

The DVR-BD-301 W-WIFI is a WLAN enabled digital recorder for mobile application. Up to 2 heavy-duty cameras can be connected. The recording is started by simply pressing a button, it can be event- and time-controlled or controlled by movements in the AVI format. Live view and still images are possible in parallel and image quality and frame rate can also be set. GPS data can be displayed in the image. Housing with a locking mechanism.

Technical Data	DVR-EMV200S	DVR-EMV400 / DVR-EMV400-WLAN
Video format	PAL NTSC	PAL NTSC
Video input	2	4
Video output	1	2
Recording resolution	704 x 576/704 x 288/352 x 288 704 x 480/704 x 240/352 x 240	704 x 576/704 x 288/352 x 288 pixels
Recording speed	1 ~ 50 images for all resolutions	1 to 100 images 1 to 50 images
Memory	SD/SDHC/SDXC, 64 GB max.	2.5" SATA removable hard drive
Data export	USB SD card	USB Network
GPS	Integrated	Optional
Ethernet	✓	✓
Interfaces	1 x USB 1 x RS-232	1 x RS-232 1 x RS-485 3 x USB 1 x GPS
Operating voltage	10 V DC to 32 V DC	10 V DC to 36 V DC
Shock-resistant	---	8 g
Vibration-resistant	---	0.75 g
Storage temperature	-40 °C to +85 °C	-40 °C to +85 °C
Operating temperature	-10 °C to +55 °C	-40 °C to +55 °C

DVR-BD-301W-3G/-WIFI		Technical Data
PAL	NTSC	Video format
2		Video input
1		Video output
1280 x 512 pixels	1248 x 416 pixels	Recording resolution
1-50	1-60	Recording speed
SD SDHC SDXC 128 GB		Memory
USB SD Network		Data export
Optional		GPS
✓		Ethernet
1 x USB 1 x RS-45 2 x RS-232 1 x RS-485		Interfaces
8 V DC to 40 V DC		Operating voltage
---		Shock-resistant
---		Vibration-resistant
-10 °C to +60 °C		Storage temperature
-10 °C to +60 °C		Operating temperature

MOTEC STANDARD PLUG-IN CONNECTOR

(excerpts)



M12

Plug-in connector for increased requirements. A special shielding concept ensures compliance with higher levels of the EMC standard.



Mini DIN

Robust mini DIN plug-ins with a watertight hexagon threaded permanent connections.



RD24

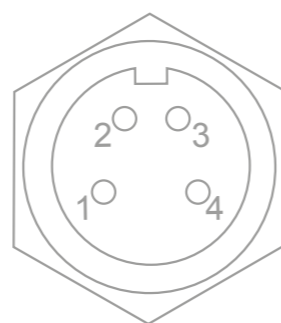
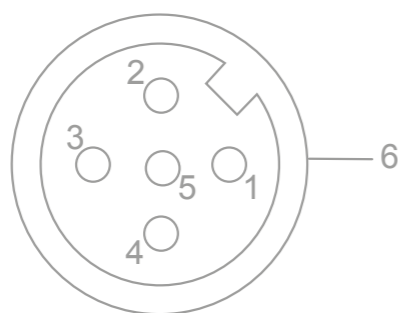
Robust watertight plastic plug with dirt-resistant coarse thread. Recommended for use during wintertime and when using gloves is necessary. A lockable protective cap prevents the permeation of road salt.



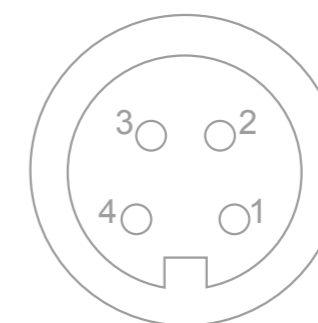
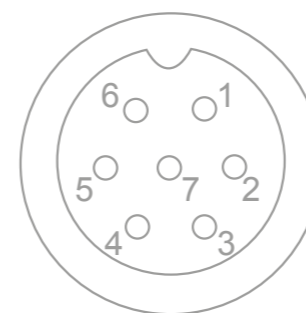
M16

Robust all-metal plug-in with threaded locking device. Suitable for connections that require only occasional removal.

PIN assignment	Function	Colour	Function	Colour
1	Video signal	Coax cable core	Video signal	Coax cable core
2	Mirror	White	Mirror	White
3	12 V DC	Red	Switch signal	Black
4	Earth	Black	12 V DC	Red
5	Video shield	Coaxial shield	Earth/video shield	Coaxial shield
6	Exterior shield	Exterior shield	---	---
7	---	---	---	---



Function	Colour	Function	Colour	PIN assignment
Video signal	Coax cable core	Video signal	Coax cable core	1
Video shield	Coaxial shield	Video shield	Coaxial shield	2
12 V DC	Red	12 V DC	Red	3
Earth	Coaxial shield (MKW)	Earth	Coaxial shield	4
---	Black (MKS)	---	---	5
---	---	---	---	6
---	---	---	---	7



MOTEC STANDARD CABLE

(excerpts)

Connecting cable



MK496
Connecting cable

Plug-in connector:
Mini DIN to M12, male 4p - female 5p
Various lengths



MKS
Connecting cable

Plug-in connector:
M12 to M12, male 5p - female 5p
Various lengths



MKW
Connecting cable

Plug-in connector:
Mini DIN to Mini DIN, male 4p - female 4p
Various lengths



MKWW
Connecting cable

Plug-in connector:
Mini DIN to Mini DIN, male 4p - female 4p
Various lengths



MK24

Plug-in connector:
Mini DIN to M16, male 4p - female 4p
Various lengths



MK5

Plug-in connector:
M16 to M16, male 4p - female 4p
Various lengths

MOTEC SPECIAL CABLE

(excerpts)



MK588
Spiral cable

Plug-in connector:
M12 to M12, male 5p - female 5p
Various lengths



MK701
Duo-mast cable

Plug-in connector:
M12 to M12, male 5p - female 5p
Various lengths



Spring-operated cable reel
FLT-S-1.10-MTP-M12

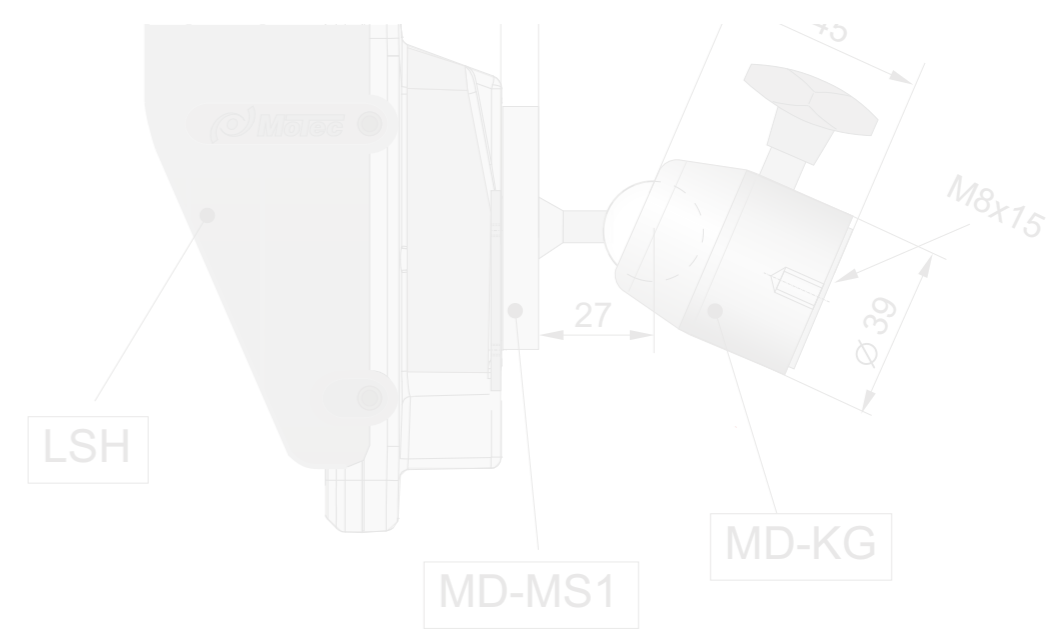
Spring-operated cable reels are used to wind up wires/cable automatically on mobile consumers. Flat spiral springs are used for the activation. This device is intended for mobile applications and connection to Motec products.



Spring-operated cable reel
FLT-S-4.6-MTP-M12

Mast and spiral cable

Spring-operated cable reels



Useful product supplements

THE MOTEC ACCESSORY PROGRAM OFFERS PROFESSIONAL ADD-ONS

Harmonised product supplements for Motec camera monitor systems:

- . Modularly applicable
- . Customized and functional
- . Enhanced comfort and protection



MOTEC ACCESSORIES FOR CAMERAS

Retainers



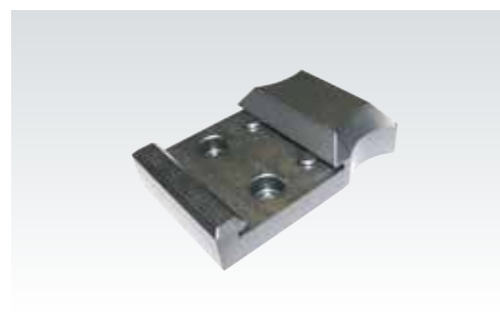
**Quick-change bracket
MC3000-SWH-1**

Stainless steel bracket for easy and fast retrofitting vehicles that use multiple cameras. For cameras of the MC3000B series.



**Vibration bracket/damper set
MC1000**

Reliable vibration dampers for cameras of the MC4000 and MC3000B series. The retaining bracket makes installation easy.



**Quick-change bracket
MC6000-SWH**

Stainless steel bracket for easy and fast retrofitting vehicles that use multiple cameras. For cameras of the MC6000D series.



**Retaining bracket set
MC9000-H1**

Stainless steel retainer for the MC9150 camera installation on the back of the fork. Protects the camera from damage.



**Pendulum bracket
MP5000-2**

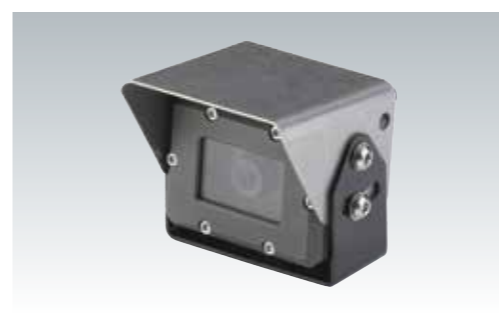
The bracket and damper for the MC5200-1 motor zoom camera. This assembly will keep the camera steady even during heavy winds and movements of the boom.



**Installation bracket
MC7000-MH10**

Installation bracket for the heavy-duty camera MC7180N-4. Protects the camera from damage caused by tree branches or similar obstacles.

Light shield



**Light shield for MC3000B
MC3000-LSL (long)**

Effective glare shield made of 1 mm stainless steel for guaranteed sharp images, even in direct sunlight.

Cleaning system













**High-pressure cleaning set
RS3000 for MC3000B**

High-pressure cleaning set with pump, 5 m hose and 13 litre water tank. For cleaning dirty camera lenses, even while driving the vehicle.

For additional information and more products go to our website: www.motec-cameras.com

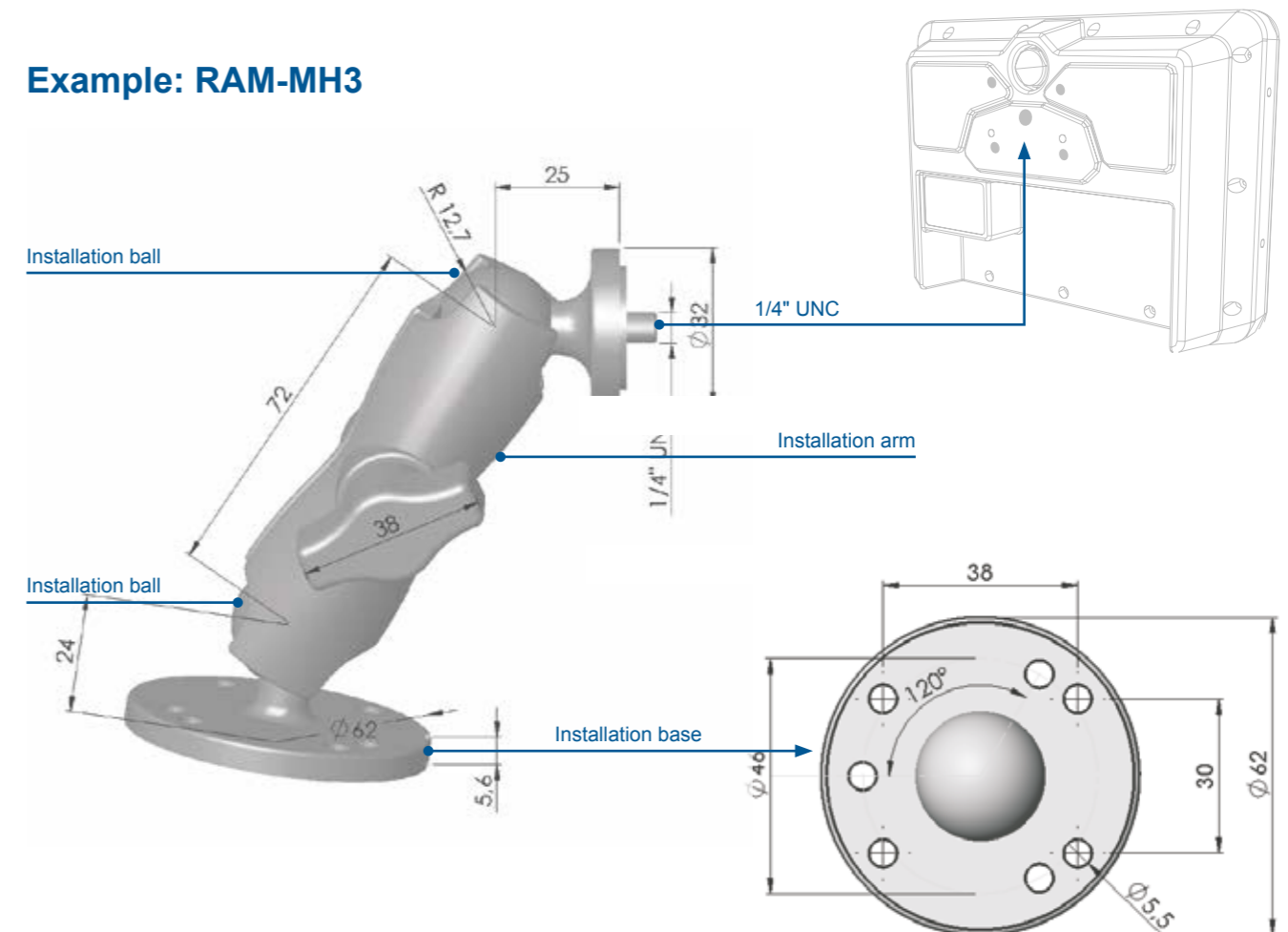
MOTEC ACCESSORIES FOR MONITORS

Retainers

RAM-MH1	Total length 187 mm	Ball joint 1.5" with flange Installation base ball joint 1.5"	
RAM-MH2	Total length 187 mm	Ball joint 1.5" with flange Installation base ball joint 1.5" Installation plate VESA (powder-coated)	
RAM-MH3	Total length 125 mm	Installation of ball 1" Installation arm ball joint 1" Round installation base ball joint 1"	
RAM-MH4	Total length 218 mm	Ball joint 1.5" with flange Connecting element/arm 1.5" ball Dual clamp shell with C-ball 1.5"	
RAM-MH5	Total length 149 mm	Installation of ball 1" Installation arm ball joint 1" Installation base with 1" ball	
RAM-MH6	Total length 274 mm	Ball joint 1.5" with flange Connecting element/arm 1.5" ball Installation base with 2.5"/1.5" ball	
RAM-MH7	Total length 169 mm	Installation of ball 1" Installation arm ball joint 1" Suction base	
RAM-MH8	Total length 125 mm (+M6 170 mm)	Installation of ball 1" Installation arm ball joint 1" Installation base	
RAM-MH9	Total length 125 mm	Installation of ball 1" Installation arm ball joint 1" Round installation base ball joint 1" Retainer plate Chassis disk	
RAM-MH10	Total length 111 mm	Ball joint 1.5" with flange Installation arm Installation base for 1.5" ball	



Example: RAM-MH3



(All sets including fastening materials, some special tools and installation instruction.)

MOTEC ACCESSORIES FOR MONITORS

MOTEC ACCESSORY VOLTAGE/CURRENT

Batteries and charging units

Light shields



**Light shield
MD3100-LSH**

Light shields and glare protection for monitors improve visibility and readability, even if exposed to direct sunlight.



**Light shield
MD3071A-LSH**



**Battery box
MAB5000**

The battery box MAB5000 can supply the MVR5200 video radio system from the transmitter side. 24 V DC.



**Battery box
MAB5000-1**

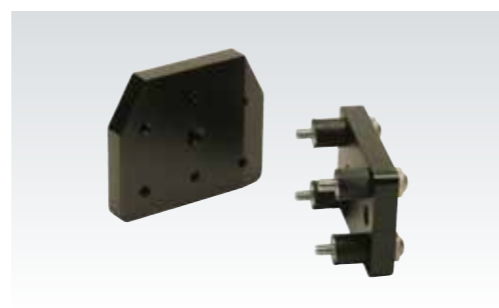
Battery box with additional time relay which switches off the connected consumer if movement does not occur.

Damping sets

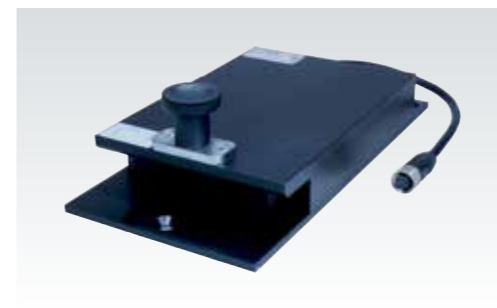


**Installation and damping set
MD-MS.V**

Installation and damping sets absorb vibrations and shocks and, therefore, prevent the transmission of vibrations onto the monitor.



**Installation and damping set
MD-MS1.V1**



**Battery box
MAB1000**

Flexible battery boxes that can be easily installed for the digital Motec radio system. Robust housing including lithium-ion battery.



**Replaceable battery
MAB1000 battery**

Supply voltage 12.6 V DC. Operating time up to 23 hours. Resistant to temperatures up to -20 °C. Charging time 3 to 5 hours. Li-Ion battery.



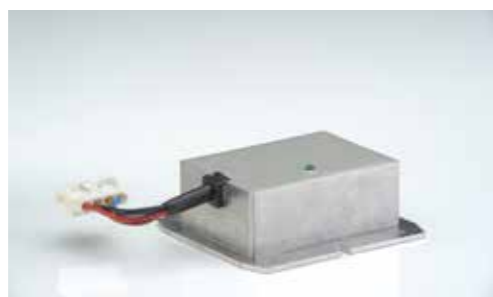
**Battery charging unit
MAB1000-LG-1**

The MAB1000-LG1 charger allows the user to charge a battery of type MAB1000. Charging temperature 0 to 40 °C.

MOTEC ACCESSORY VOLTAGE/CURRENT

MOTEC ACCESSORY MISCELLANEOUS

Voltage transformers



Voltage transformers
SW103.48.24/SW103.80.24

DC voltage converters for the uninterrupted power supply of camera systems. Available for 48 V DC and 80 V DC input voltage.



Voltage transformers
MPM48

Voltage converter suitable for the use in cold storage and easy "piggyback" installation to the MD3074A monitor. For input voltage 48 V DC.

Power packs



Power pack
NG230.12

Power packs guarantee an uninterrupted power supply of 12 or 24 Volt V DC.



Power pack
NG230.24



MV13
Signal boosting and distribution

The video distribution box MV13 distributes an analogue video signal and transmits this video signal to up to 3 outputs.



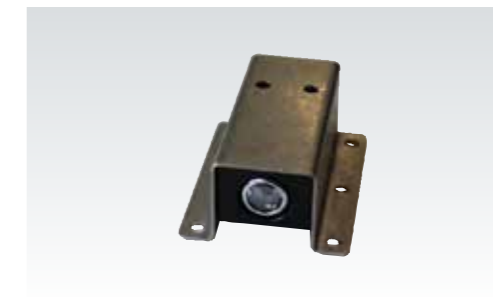
Video signal distributor 4x8

Video distributor with 4 inputs and 8 outputs. BNC connection on video distributor. Power supply 12 V DC.



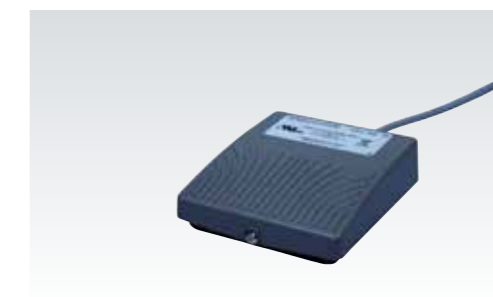
MBE1000
Operator control unit

The MBE1000 is a CAN bus-enabled operating unit.



Motec Power Light
MPL-LED

LED signal light with ultra-bright LED and lens. Protection class IP67. Power supply 12 V DC.



MBE5200 Foot switch

The foot-operated rocker switch MBE5200 allows the machine operator to activate the simple zooming function of a Motec MC5200 motor zoom camera.

Miscellaneous

MOTEC ACCESSORIES FOR MAST CABLES

Pulleys



Pulley
MPS, MPS-2, MPS-3

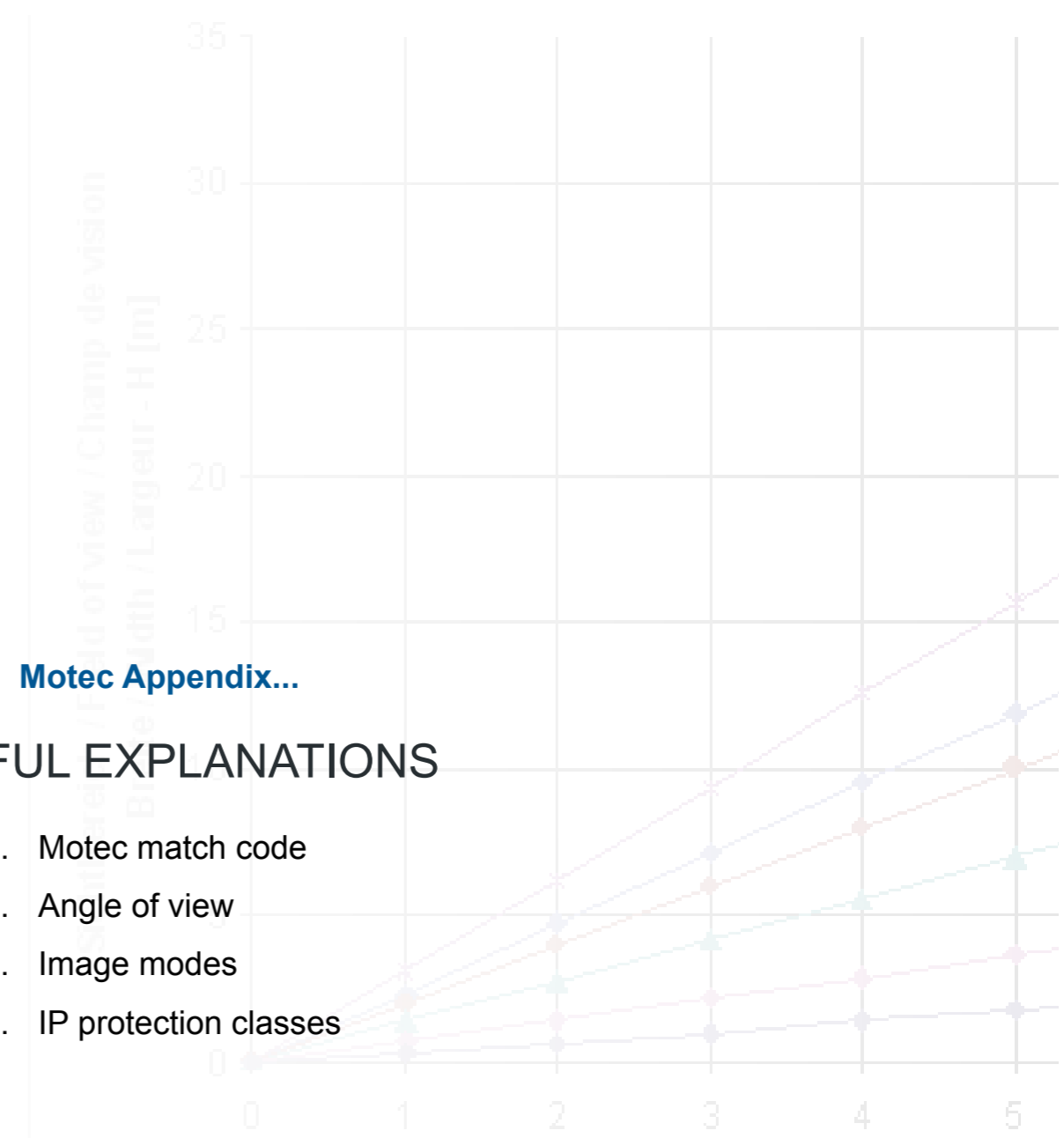
Pulley for the selective guidance of a mast cable during the lifting process. Available for a variety of diameters.

Tension relief set



Tension relief set
for mast cables

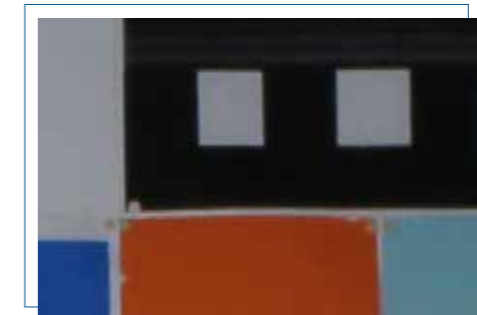
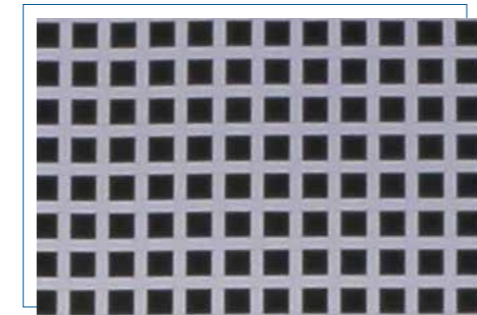
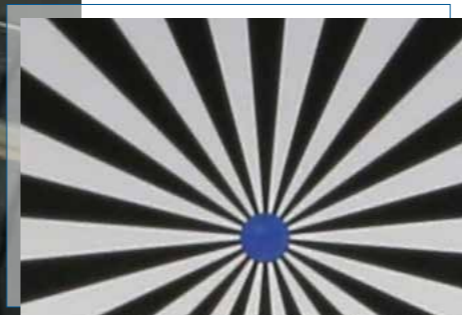
Designed for the prevention of damage to the mast cable's plug-in connection.



Motec Appendix...

USEFUL EXPLANATIONS

- . Motec match code
- . Angle of view
- . Image modes
- . IP protection classes



Heavy-duty cameras

Heavy-duty monitors

Video control units

Data transfer and recording

Accessory





Appendix

PRODUCT KEY FOR MOTEC CAMERAS

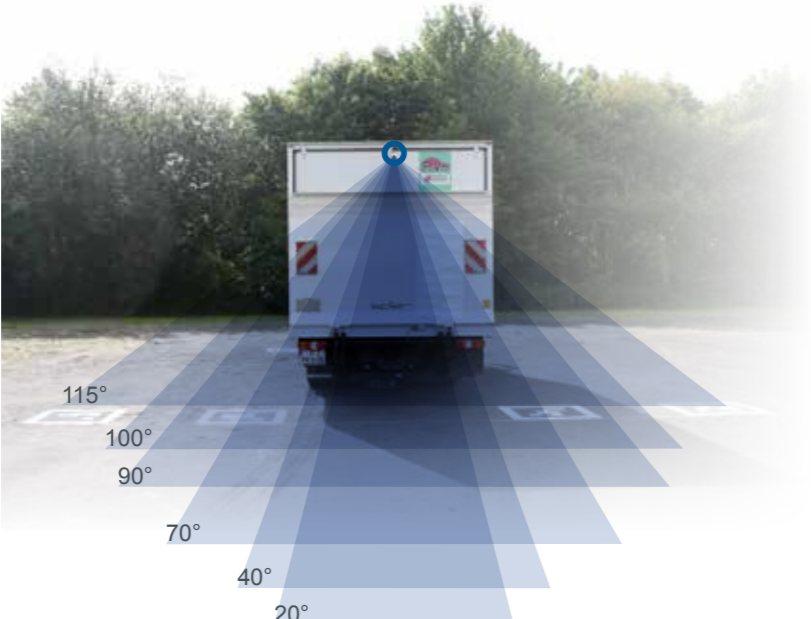
Camera match code

M	C	X	X	X	X	X	X	-	X	R*
O	A									
T	M									
E	E									
C	R									
A	A									

* = Mirrored camera

- 2 = Plug RD24/7pin 
- 3 = Plug MiniDIN4pin (14x1) 
- 4 = Plug M12/5pin 
- = Plug M16/4pin 

Horizontal angle of view (20°=020,
3 = Cameras of series 3000
5 = Motor zoom camera 5200
6 = Cameras of series 6000
7 = Cameras of series 7000
9 = Cameras of series 9000



ANGLE OF VIEW HORIZONTAL AND VERTICAL

Angle of view

ILLUSTRATION OF THE HORIZONTAL ANGLE OF VIEW:

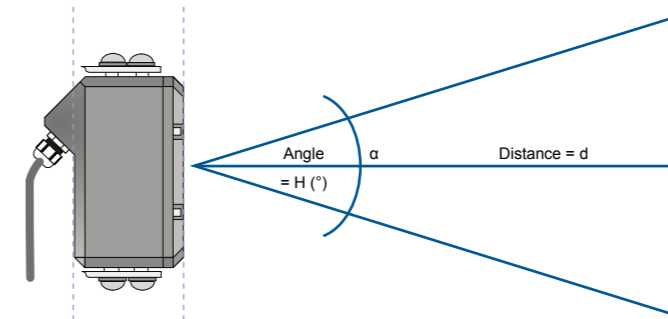
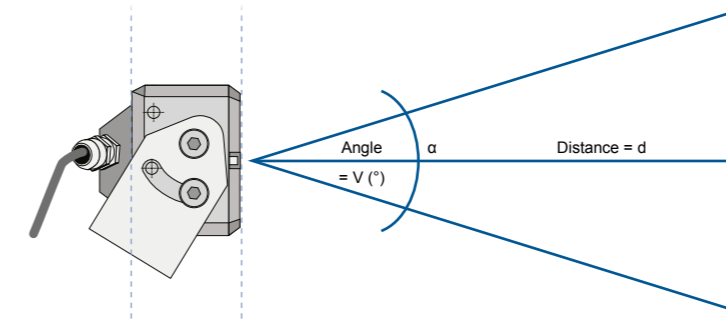


ILLUSTRATION OF THE VERTICAL ANGLE OF VIEW:



CALCULATING THE REFERENCE POINT

The correlation between the displayed object field or the detection range and the distance (to the object) as a function of the selected camera's angle of view can be calculated by applying the following formula:

$$S = 2 * d * \tan(\alpha/2)$$

S = Size of object field
d = Distance (optical axis)
α = Aperture angle

POSSIBLE ILLUSTRATIONS OF VARIOUS CAMERA IMAGES

Image modes

Single mode	Split mode (horizontal)	Triple mode 1/4 images, right
PIP mode (flexible PIP)	Split mode (vertical)	Triple mode 1/4 images, top
Triple mode 1/4 images, left	H mode	Quad mode (vertical)
Triple mode 1/4 images, bottom	PIP mode (1-3 PIP)	Octal mode

(See also page 18-19.)

OVERVIEW OF IP PROTECTION CLASSES

IP CODE ACCORDING TO IEC 60529

Dust, water, vibrations – cameras must operate reliably even under difficult conditions. The IP code according to IEC 60529 specifies the environmental conditions under which the camera must be operating properly. The abbreviation IP stands for "Ingress Protection". In the IP code consists of 2 digits. The first digit defines the protection from contact and a specified test tool (1 mm test finger) and the ingress of solid materials (parts, wire, dust, etc.). The second digit defines the behaviour towards liquids (water drops, splash & spray water, high-pressure cleaners, etc.).

IP code

Code number 1	Scope of protection	Code number 2	Scope of protection
0	No protection against contact, no protection against solid foreign objects	0	No water protection
1	Protection against large-area contact by hand, protection against foreign objects with $\varnothing > 50$ mm	1	Protection against vertical water drops
2	Protection against finger contact, protection against foreign objects	2	Protection against water drops contacting the surface at a random angle up to 15° from the vertical plane
3	Protection against contact with tools, wires or similar objects with $\varnothing > 2.5$ mm, protection against foreign objects with $\varnothing > 2.5$ mm	3	Protection against water drops contacting the surface at a random angle up to 60° from the vertical plane
4	Similar to 3, however, with the specification of $\varnothing > 1$ mm	4	Protection against splash water from all directions
5	Protection against contact, protection against dust deposits on the inside	5	Protection against water jet (nozzle) from any random angle
6	Complete protection against contact, protection against ingress of dust	6	Protection from water permeation during temporary flooding
		7	Protection from water permeation during temporary immersion in water
		8	Protection from water permeation during permanent immersion in water
		9K	Protection against permeating water during exposure to high pressure/steam operation (specified at 100 bar/80 °C and 16 L/min)

Motec GmbH

Oberweyerer Straße 21
65589 Hadamar-Steinbach
GERMANY

Phone +49 6433 9145-0

Fax +49 6433 9145-45

motec.info@ametek.com

www.motec-cameras.com

