

**MOBA** PRODUCT PLATFORM CATALOG

## MOBA GROUP:

### MOBILE AUTOMATION SINCE 1972

**MOBA Mobile Automation AG** has been an established name in Mobile Automation for more than 40 years. Our know-how and years of experience in automation technology, distinguish us globally as recognized by experts in the development and production of machine control systems, identification, mobile weighing technology, and flexible software solutions.

#### SOLUTIONS

Founded in 1972 as an engineering office, we have developed into a global player with the market-leading MOBA-leveling technology MOBA-matic II and innovation systems, such as PAVE-IR. Thanks to those years of experience, we know what is important on the construction site. We have always been known for precise, robust and state-of-the-art technologies with a focus on good usability. In the waste disposal industry, we have been a recognized expert for 25 years. In-depth knowledge and innovative strength have made MOBA Group a pioneer in identification and mobile weighing technology. Some of our well-known customers are **Caterpillar, Volvo, Dynapac, Bomag, Vögele, Ammann, Ruthmann, and many more.**

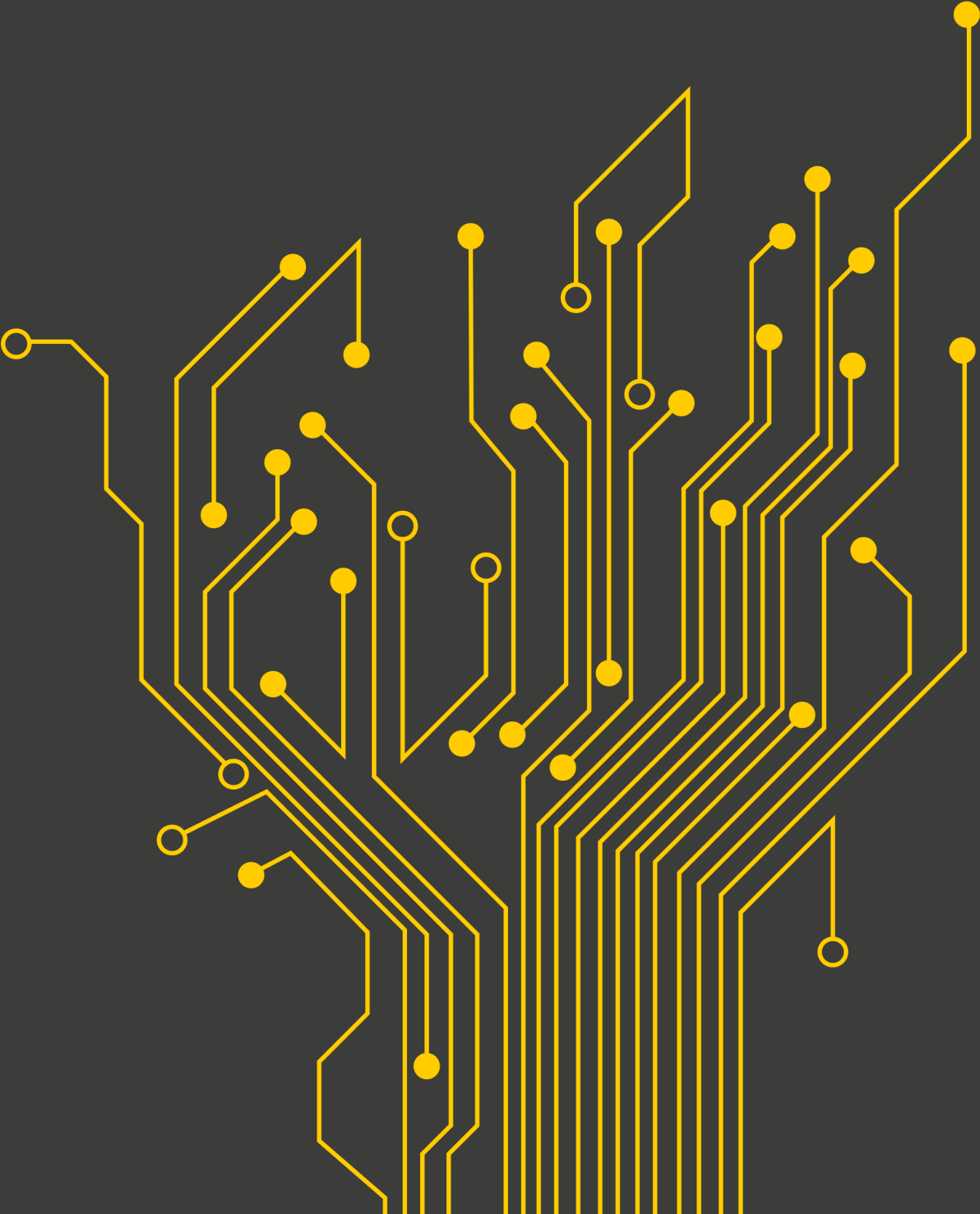
#### WORLDWIDE

The first choice in mobile automation – that's us. More than 100 development experts and 500 employees worldwide work on a common goal every day: to sustainably change the mobile automation sector. Close collaborations between the headquarter in Limburg an der Lahn and subsidiaries all over Europe, Asia, North and South America create new perspectives for recent and future developments. Our international dealer network helps us to be present all over the world to drive innovation globally.

#### OUR TECHNOLOGY COMPETENCES:

- » Process automation and process visualization for a great variety of working machines
- » 2D and 3D leveling and positioning for machines in road construction, earthmoving and mining
- » Compaction control and temperature monitoring in road construction
- » Mobile weighing technology for different machines in mining and earthmoving, for aerial work platforms and waste trucks
- » Safety applications for cranes and lifters
- » Identification technology with RFID as well as telematics and software applications

MOBA- **THE EXPERT IN MOBILE AUTOMATION**



## HMIS DESIGNED BY MOBA: USER-FRIENDLY, INNOVATIVE AND HIGH QUALITY

MOBA **HMIs** guarantee the easy operation of various mobile machines. Integrating different operating units such as switches, joysticks, indicator lights or displays into one general system, the **HMIs** allow the operation of a precise system. Interacting via CAN Bus saves cabling resources and I/O requirements of process control units. Field-tested under harsh conditions, the **HMIs** are optimized for use in off-road conditions. The **HMIs** are completely potted, they are resistant against vibration, shock and moisture. In this way, the components meet the environmental requirements placed on heavy mobile machines without putting further demands on the housing. The clearly structured menu allows a user-friendly operation.

### YOUR BENEFITS AT A GLANCE:

- » CAN Bus saves cabling resources and I/O requirement
- » Designed for mobile machinery
- » Application versatility
- » Easy to use, self-explanatory operation
- » Customized solutions on request
- » Vibration- and shock-proof
- » Proven potting technology
- » Water resistant

### ADVANTAGES

1.	Individual, customized HMI	7.	Easily modifiable
2.	Proven modules	8.	CANopen
3.	Wide range of module combinations	9.	Lifetime extending materials
4.	Short development times	10.	Durability by modularity
5.	Flexible extension possibilities	11.	Small production quantities possible
6.	Anytime upgradable	12.	Service-friendly

# HUMAN MACHINE INTERFACES



## MOBA HMI<sup>mc</sup>: ONE IDEA – NUMEROUS POSSIBILITIES

The MOBA **HMI<sup>mc</sup>** (mc = modular concept) provides the opportunity of individually creating operating units quickly even with small production quantities and without high development costs. CAN bus based modules enable the free configuration of graphics, keypad and joystick modules according to your specifications. Each module can be configured separately with CANopen; the modular design makes the extension of the **HMI** possible at any time. Therefore you can react quickly when additional options are requested and single modules can easily be exchanged or added.

Housing material	PA06 GK30 sw
Ingress protection rating	IP 67 (with emergency stop: IP 65)
Operating temperature range	-20° ... +70°C
Storage temperature range	-30° ... +80°C
CAN interfaces	ISO 11898 - 24 V 125 kBit/sec

A display module as well as a keypad module and a joystick module are available for building your individual **HMI**.



**CANopen**

reddot design award  
winner 2012

Triple unit with one display and two joystick modules, emergency stop and railing

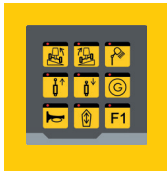


Triple unit with two joysticks, one keypad module with 6 keys, emergency stop and railing



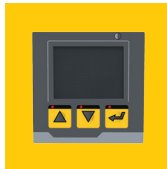
# HMI<sup>mc</sup> THE NEW MOBA MODULAR CONCEPT

## BASE MODULES



### KEYPAD MODULES

Freely select the amount of keys (6 - 16) and their functions. Optionally integrate an emergency stop into the keypad for optimum protection.



### DISPLAY MODULES

Choose between a monochromatic or high-end color display to complete your individual operating unit.



### JOYSTICK MODULES

Profit from wear-free joysticks, either lockable or non-lockable, which are magnetically attached to the operating unit.

## ADDITIONAL OPTIONS



Encoder for a quick selection of functions



Emergency stop for constant safety



Display protection from environmental influences



Triple unit with two joysticks, one keypad module with 16 keys, emergency stop and railing



Triple unit with two joysticks and one keypad module with 16 keys and emergency stop

# HUMAN MACHINE INTERFACES



- » WIN CE board computer
- » Robust die-cast housing
- » Display: 800 x 480 color TFT

NAME	Operand D
Article number	04-55-01053
Housing material	Aluminium die casting with powder coating
Ingress protection rating	IP 64 (optional up to IP 66)
Size (LxWxH)	205 mm x 155 mm x 52 mm
Weight	Approx. 1.5 kg
Operating temperature range	-30° ... +70°C
Storage temperature range	-40° ... +70°C
Voltage range	8 ... 30 V DC max. 1.5 A
Computer core	Marvell X-Scale PXA 320 with 806 MHz up to PXA 166/168 with up to 1.1 GHz, other processors and versions upon request
Memory	NOR/NAND Flash 32/256 (... 512) MB, DDRAM/DDR2-RAM128 (... 512) MB, 4 KB FRAM
Display	7" transmissive color TFT, 800 x 480 pixel, format 16:9, brightness 600 ... 800 cd/m <sup>2</sup> , continuously adjustable, integrated light sensors
Keyboard	Illuminated keyboard, touch display, integrated loudspeaker (up to IP 64)
Data carriers	Robust USB memory stick, 1 (... up to 16) GB (up to IP 64)
Interfaces	2x CAN, 1x RS 232 with current limit, 1x GPS mouse, 1x USB host
Operating system	Microsoft Windows Embedded CE 5.x CE 6.x, CE 7.x
Options	External changeable micro SDHC card and SIM card (for GPRS), further internal micro SDHC card up to 32 GB, up to 4x RS 232 with power supply, up to 4 PAL cameras can be connected, up to 5 USB hosts (partly internal), 1x USB slave, Ethernet access, headset for telephony





# HUMAN MACHINE INTERFACES



- » Graphic display/operating panel
- » Robust die-cast housing
- » Display: 320 x 240 monochrome
- » Connector: 5pin/M12

NAME	GD-320
Article number	04-25-40050
Ingress protection rating	IP 65
Size (LxWxH)	240 mm x 181 mm x 94 mm
Weight	Approx. 1.9 kg
Operating temperature range	-20° ... +70°C
Storage temperature range	-30° ... +75°C
Voltage range	10 ... 32 V DC
Current consumption	12 V < 400 mA or 24 V < 200 mA
Display	320 x 240 pixel, monochrome, backlit, transfective and automatic contrast control
Life expectancy membrane keyboard	≥ 10 <sup>6</sup> operations
CAN interface	250 Kbit/s

**CAN**  
**CANopen**®

## CONTROLLERS DESIGNED BY MOBA: QUICKLY AND RELIABLY

MOBA Mobile Process Controllers (**MPC**) are designed and manufactured for use on heavy duty machines. MOBA **MPCs** distinguish themselves through their outstanding quality and are suitable for application in different domains.

MOBA controllers with their open, modular structure can be implemented into different systems. CAN interfaces make configuration via CODESYS according to customer demands possible.

### YOUR BENEFITS AT A GLANCE:

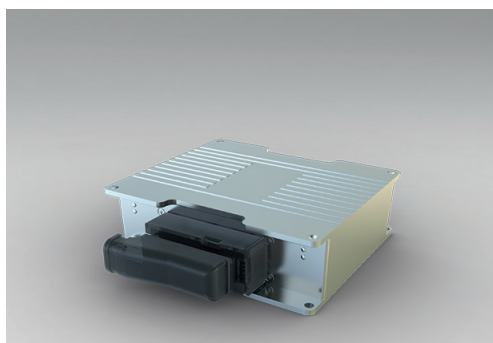
- » Programmed in CODESYS or C (on request)
- » CAN interfaces
- » Developed to be used under rugged conditions
- » Potting components to protect against vibration and environmental influences

MOBA is also available for program software,  
please contact Boris Zils:  
E-mail: [info@moba-platform.com](mailto:info@moba-platform.com)  
Phone: +49 6431 9577 123

# CONTROLLERS



# MOBILE PROCESS CONTROLLERS

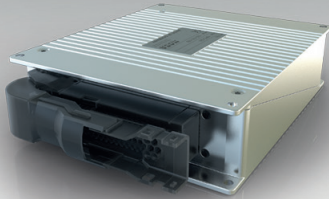


- » 8 digital inputs
- » 4 analog inputs
- » 8 digital/PWM outputs
- » 3 CAN Connector: Tyco 42pole, M12 8pole
- » Incl. CODESYS license
- » Compact dimensions

NAME	MPC-120 smart casing
Article number	04-25-70240
Ingress protection rating	IP 67
Operating temperature range	-40° ... +70°C
Storage temperature range	-40° ... +85°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 200 mA @ 12 V, ≤ 170 mA @ 24 V
Size	165 mm x 145 mm x 50 mm
Weight	1.18 kg
Processor system	XC167C , 4 MB Flash, 2 MB RAM, 128 KB EEPROM, 8 KB FRAM
Attachment plugs	42pol. Tyco 967280, 8pol. M12, USB-100
Interfaces	3x CAN ISO 11898 - 24 V 125 KBit/sec, 1x RS-232
Inputs	8x digital (0 V/ 24 V), programmable to PNP or NPN, 4x analog, programmable to 0-5 V, 0-10 V or 0-20 mA
Outputs	8x digital (PWM – 0 V/ 24 V) 0.6-1000 Hz



# MOBILE PROCESS CONTROLLERS

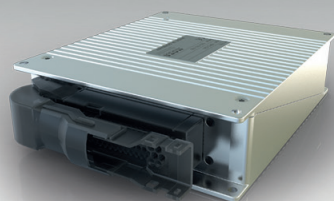


- » 8 digital inputs
- » 4 analog inputs
- » 8 digital/PWM outputs
- » 3 CAN Connector: Tyco 42pole, M12 8pole Incl. CODESYS license
- » Extendable

NAME	MPC-120
Article number	04-25-70260
Ingress protection rating	IP 67
Operating temperature range	-40° ... +70°C
Storage temperature range	-40° ... +85°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 200 mA @ 12 V, ≤ 170 mA @ 24 V
Size	180 mm x 210 mm x 55 mm
Weight	2.33 kg
Processor system	XC167C , 4 MB Flash, 2MB RAM, 128 KB EEPROM, 8 KB FRAM
Attachment plugs	42pol. Tyco 967280, 8pol. M12, USB-100
Interfaces	3x CAN ISO 11898 - 24 V 125 KBit/sec, 1x RS-232
Inputs	8x digital (0 V/ 24 V), programmable to PNP or NPN, 4x analog, programmable to 0-5 V, 0-10 V or 0-20 mA
Outputs	8x digital (PWM – 0 V/ 24 V) 0.6-1000 Hz



# MOBILE PROCESS CONTROLLERS

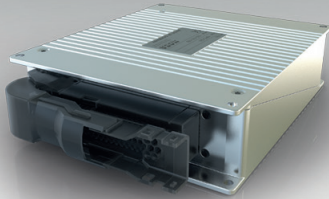


- » 10 digital inputs
- » 8 analog inputs
- » 20 digital/PWM outputs
- » 14 digital outputs (on/off)
- » 2 CAN
- » Connector: Tyco 70pole
- » Incl. CODESYS license
- » Extendable

NAME	MPC-340
Article number	04-25-70120
Ingress protection rating	IP 67
Operating temperature range	-30° ... +80°C
Storage temperature range	-40° ... +80°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 170 mA @ 24 V
Size	180 mm x 210 mm x 55 mm
Weight	2.31 kg
Processor system	XC167CI, 1 MB Flash, 1 MB RAM, 8 KB EEPROM, 8 KB FRAM
Attachment plugs	70pol. Tyco 963484
Interfaces	2x CAN ISO 11898 –24 V 50 kBit/sec – 1 Mbit/sec, 1x RS-232
Inputs	10x digital (0 V/ 24 V), programmable to PNP or NPN 8x analog, programmable to 0-5 V, 0-10 V or 4-20 mA
Outputs	14x digital (on/off), 20x digital (PWM – 0.6-1000 Hz) 4 outputs with current control



# MOBILE PROCESS CONTROLLERS

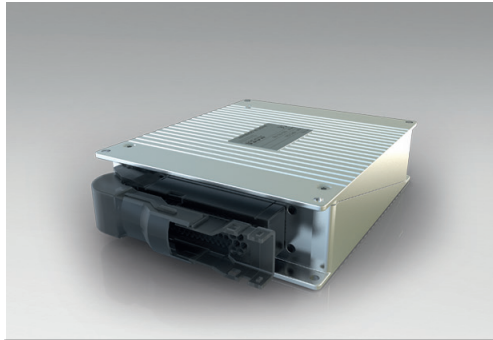


- » Redundant: 2 independent controllers
- » Self-diagnosis function
- » Ready for PL d applications
- » Safety functions already implemented
- » 2x 8 digital inputs / 2x 4 analog inputs
- » 2x 8 digital/PWM outputs / 2x 3 CAN, 2x RS-232
- » Connector: 2x Tyco 42pole
- » Incl. 2 CODESYS licenses

NAME	MPC-240
Article number	04-25-70270
Ingress protection rating	IP 67
Operating temperature range	-40° ... +70°C
Storage temperature range	-40° ... +85°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 200 mA @ 12 V ≤ 170 mA @ 24 V
Size	180 mm x 210 mm x 55 mm
Weight	2.65 kg
Processor system	2x XC167C, 2x 4 MB Flash, 2MB RAM, 2x 128 KB EEPROM, 8 KB FRAM
Attachment plugs	2x 42pol. Tyco 967280, 8pol. M12, USB-100
Interfaces	6x CAN ISO 11898 - 24 V 125 KBit/sec, 2x RS-232
Inputs	2x 8 digital (0 V/ 24 V), programmable to PNP or NPN, 2x 4 analog, programmable to 0-5 V, 0-10 V or 0-20 mA
Outputs	2x 8 digital (PWM – 0 V/ 24 V) 0.6-1000 Hz



# MOBILE PROCESS CONTROLLERS



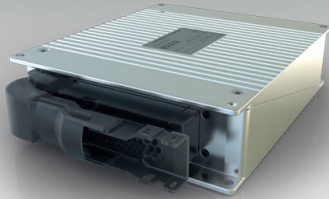
- » Redundant: 2 independent controllers
- » Self-diagnosis function
- » Ready for PL d applications
- » Safety functions already implemented
- » 2x 8 digital inputs / 2x 4 analog inputs
- » 2x 8 digital/PWM outputs / 2x 3 CAN, 2x RS-232
- » Connector: 2x Tyco 42pole
- » Incl. 2 CODESYS licenses

NAME	MPC-460
Article number	04-25-70280
Ingress protection rating	IP 67
Operating temperature range	-30° ... +80°C
Storage temperature range	-40° ... +80°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 200 mA @ 12 V, ≤ 170 mA @ 24 V
Size	180 mm x 210 mm x 55 mm
Weight	2.64 kg
Processor system	XC167C, XC167CI, 4 MB Flash 2 MB RAM, 1 MB Flash 1 MB RAM, 128 KB EEPROM, 8 KB FRAM, 8 KB EEPROM, 8 KB FRAM
Attachment plugs	1x 42pol. Tyco 967280, 1x 70pol. Tyco 963484, 1x 8pol. M12, USB-100
Interfaces	3x CAN ISO 11898 – 24 V 125 KBit/sec, 2x CAN ISO 11898 – 24 V 50 kBit/sec – 1 Mbit/sec, 2x RS-232
Inputs	2x 8 digital (0 V/24 V) + 2 digital (0 V/24 V), programmable to PNP or NPN, 2x 4 analog, programmable to 0-5 V + 4 analog, programmable to 0-5 V, 0-10 V or 4-20 mA
Outputs	14x digital (on/off), 2x 8 digital (PWM – 0.6-1000 Hz) + 12x digital (PWM – 0.6-1000 Hz), 4 outputs with current control





# MOBILE PROCESS CONTROLLERS

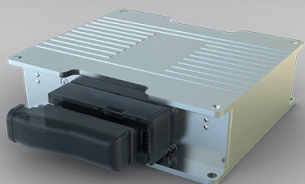


- » Redundant: 2 independent controllers
- » Self-diagnosis function
- » Ready for PL d applications
- » Safety functions already implemented
- » 2x 8 digital inputs / 2x 4 analog inputs
- » 2x 8 digital/PWM outputs / 2x 3 CAN, 2x RS-232
- » Connector: 2x Tyco 42pole
- » Incl. 2 CODESYS licenses

NAME	MPC-680
Article number	04-25-70390
Ingress protection rating	IP 67
Operating temperature range	-30° ... +80°C
Storage temperature range	-40° ... +80°C
Voltage range	10 ... 30 V DC
Current Consumption	≤ 340 mA @ 24 V
Size	180 mm x 210 mm x 55 mm
Weight	2.62 kg
Processor system	2x XC167CI, 2x 1 MB Flash, 2x 1 MB RAM, 2x 8 KB EEPROM, 2x 8 KB FRAM
Attachment plugs	2x 70pol. Tyco 963484
Interfaces	4x CAN ISO 11898 – 24 V, 50 kBit/sec – 1 Mbit/sec, 2x RS-232
Inputs	2x 10 digital (0 V/24 V), programmable to PNP or NPN, 2x 8 analog, programmable to 0-5 V, 0-10 V or 4-20 mA
Outputs	2x 14 digital (on/off), 2x 20 digital (PWM – 0.6-1000 Hz), 2x 4 outputs with current control



# MOBILE SIGNAL CONTROLLERS

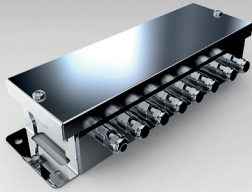


- » I/O extension for PLC applications
- » Redundant structure
- » Self-diagnosis function
- » 2x 3 digital inputs (0 V/24 V), 10 Hz ... 5 kHz
- » 2x 1 digital inputs (0 V/24 V)
- » 2x 4 analog inputs
- » 2x 4 valve outputs (PWM), current controlled
- » 2x 1 fixed voltage source 12 V/500 mA
- » Connector: Tyco 42pole
- » Compact dimensions & CODESYS Library available

NAME	MSC-01
Article number	04-25-70370
Ingress protection rating	IP 67
Operating temperature range	-30° ... +80°C
Storage temperature range	-40° ... +85°C
Voltage range	15 ... 32 V DC (if fixed voltage source is used), 08 ... 32 V DC
Current consumption	≤ 200 mA @ 12 V, ≤ 180 mA @ 24 V
Size	165 mm x 145 mm x 50 mm
Weight	Approx. 1.3 kg
Processor system	2x STM32F103C, 2x 128 KB Flash, 2x 64 KB EEPROM, 2x 20 KB SRAM
Attachment plug	42pol. Tyco 967280
Interfaces	2x CAN ISO 11898 – 24 V 250 kBit/sec, 1x RS-232
Inputs	2x 3 digital (0 V/24 V), 10 Hz ... 5 kHz, programmable to PNP or NPN, 2x 1 digital input (0 V/24 V), programmable to PNP or NPN 2x 4 analog, programmable to 0-5 V, 0-10 V or 0-20 mA
Outputs	2x 4 valve outputs (PWM), current controlled, 2x 1 fixed voltage source 12 V/500 mA

**CAN**

# MOBILE SIGNAL CONDITIONERS

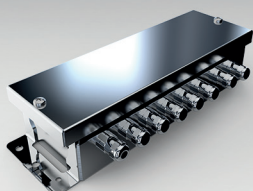


- » Input signal conditioner for high precision analog signals for e.g. mobile weighing
- » Differentiated input, e.g. full graphic
- » 6 analog sensor inputs
- » 2x CAN

NAME	SC-106
Article number	04-50-06100
Ingress protection rating	IP 67
Operating temperature range	-20° ... +70°C
Voltage range	8 ... 35 V DC
Power consumption	1.2 W
Load cell voltage range	5 V DC
Number of load cell	1/4/ max. 6
Max. load cell impedance	1200 ohm +10% / channel
Min. load cell impedance	350 ohm - 10% / channel
Signal input	0 - 2.5 V
Signal sensitivity	3.3 $\mu$ V/digit
Internal resolution	24 bit
Linearity of full scale	0.005%
Zero point drift	$\pm$ 0.000125% /°C
Amplification drift	$\pm$ 0.000125% /°C
Measurement rate	10-60 Hz/6 channel; 100 Hz/4 channel; 200 Hz/2 channel
Size	260 mm x 80 mm x 57 mm
Weight	Approx. 1.4 kg
Interfaces	CANopen
Bluetooth module (opt.)	2.0 class 1
Housing material	Stainless steel



# MOBILE SIGNAL CONDITIONERS



- » Input signal conditioner for high resolution analog signals, e.g. temperature sensors
- » 6 analog sensor inputs
- » 2x CAN

NAME	SC-106 PAVE-IR
Article number	04-50-06102
Ingress protection rating	IP 67
Operating temperature range	-20° ... +70°C
Voltage range	8 ... 35 V DC
Power consumption	1.2 W
Load cell voltage range	5 V DC
Number of sensors	6
Signal input	0-2.5 V
Signal sensitivity	1.0 $\mu$ V/digit
Internal resolution	8.000000 dd, 2.000000 dd/10 mV
Linearity of full scale	0.005%
Zero point drift	$\pm$ 0.000125% /°C
Amplification drift	$\pm$ 0.00025% /°C
Measurement rate	60 Hz/6 channel
Size	260 mm x 80 mm x 57 mm
Weight	Approx. 1.4 kg
Interfaces	CANopen
Housing material	Stainless steel

**CAN**  
CANopen®

# MOBILE CAN-GATEWAYS

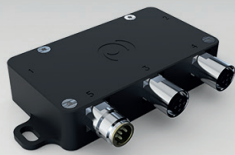


- » Versatile CAN/GPRS/Bluetooth gateway
- » Display and keypad
- » Optional: GPS, WLAN
- » 2 digital inputs (PNP/NPN)
- » 2 sensor inputs
- » 2x power supply outputs
- » 2x CAN, 3x RS-232

NAME	CG-1
Article number	04-55-02505
Ingress protection rating	IP 67
Operating temperature range	-25° ... +75°C
Storage temperature range	-25° ... +75°C
Voltage range	8 ... 30 V DC max. 0.3 A
Memory	8 KB FRAM, industrial SLC micro SD card (SDHC capable)
Display	B/W, 128 x 64 Pixel, LED backlights
Keyboard	16 unit keyboard with RESET-function
Size (LxWxH)	162 mm x 82 mm x 62 mm (without screw connection) 220 mm x 82 mm x 65 mm (with fitting panel, without screw connection)
Weight	Approx. 1.0 kg
Input	2x configurable npn/pnp, 1x universal sensor input (signal threshold at approx. 7 V) and 1x fixed assignment sensor input for switching the device (e.g. for clamp 15 in vehicles)
Output	2x digital (operating voltage), for load up to 2.6 A
RTC	battery driven, justable
Internal features	GSM/GPRS/UMTS module, GPRS antenna, Bluetooth module, micro SD card, GPS receiver internal, CAN termination
Internal clamps	2x CAN, 3x RS 232, partly with current limit, external GPS mouse
Cable inlets	2x M20 cable glands with different inserts according to cable diameters
External connection	CAN service socket
Housing material	Polyester, gray



# ACCESSORIES FOR CONTROLLERS



- » T-Connector signal conditioner to convert digital/analog signal to CANopen
- » Small, robust design
- » Automatic or manual addressing
- » CANopen interface
- » Connector: 5pole binder M12

TYPE	MTSC-201 – MOBA T-Connector
Article number	04-50-06200 (standard version)
Ingress protection rating	IP 67
Voltage range	8 ... 32 V
Current consumption	100 mA
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication
Inputs	Digital, current, voltage, I <sup>2</sup> C, PT-100
Operating temperature range	-40° ... +75°C
Storage temperature range	-40° ... +85°C
Weight	Approx. 0.3 kg, fully sealed aluminum body
Size	74 mm x 43 mm x 20.5 mm
Plugs	5pole binder M12, male (CAN IN), 5pole binder M12, female (CAN OUT), 5pole binder M12, female (input)



# ACCESSORIES FOR CONTROLLERS



With the MOBA SIMBox, MOBA offers developers the possibility of quickly implementing solutions based on MOBA controllers. Furthermore, it is a programmable simulation box, which can be configured by a specially designed software tool. In this way, machine control can be simulated, e.g. with hydraulic valves. The interface of the box is based on CAN. The box consists of a pinout part and the simulation part.

NAME	SIMBox	
Article numbers	<b>04-03-00810</b> (42 pole connector + 42 pole connector panel) <b>04-03-00811</b> (70 pole connector + 70 pole connector panel)	
Voltage range	10 ... 35 V	
Current range	0.2 ... 3 A	
Inputs	8x digital (connected with MPC-OUT)	LED
Outputs	8x digital (connected with MPC-IN) 2x PWM or frequency potentiometer 4x analog potentiometer	Tri-state switch Programmable behavior and limits 0 ... 10 V or 0 ... 24 mA
CAN Interfaces	1x	Parameter settings and status of simulated valves and PWM outputs
Valve simulation	2x valve simulation with up/down, PWM-IN and analog position output	Programmable behavior and limits



## CASE (ARTICLE NUMBER 04-99-00050) INCLUDING:

- » 1x 04-03-00810, SIMBox for controller with 42 pole connector
- » Software
- » Connecting cables
- » PCAN-Doungle USB adapter

## CASE (ARTICLE NUMBER 04-99-00060) INCLUDING:

- » 1x 04-03-00811, SIMBox for controller with 70 pole connector
- » Software
- » Connecting cables



## **SENSORS DESIGNED BY MOBA:** FAST, PRECISE AND APPLICATION-ORIENTED

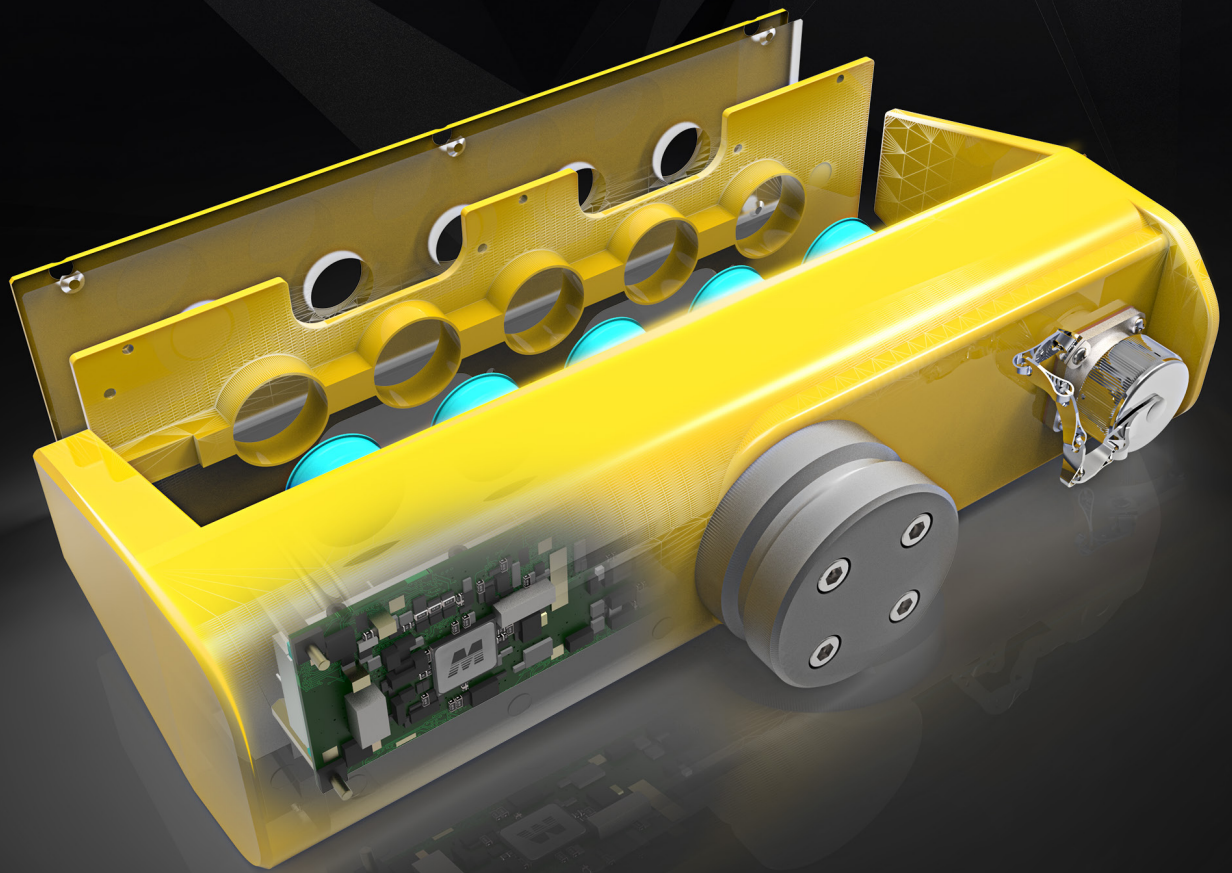
MOBA sensors guarantee optimal functionality in versatile applications. Being quick and precise, the sensors deliver a reliable technology for mobile applications. Fitted with CAN Bus interfaces, all MOBA sensors can be easily integrated into existing systems. Designed for mobile use, MOBA sensors will win you over with their ruggedness and tested and proven potting compound sealing which protects the electronic components from vibration, dust, cold, heat and moisture. The compact design of the sensors is perfect for quick and simple attachment to the machine.

### **YOUR BENEFITS AT A GLANCE:**

- » High precision combined with a rugged and compact design
- » Proven potting compound protects the electronic components from vibration and environmental influences
- » CAN interfaces



# SENSORS



# SLOPE MEASUREMENT

## MSS TYPE 3 SERIES



- » 2-axis,  $\pm 60^\circ$
- » CAN interface
- » Compact, flat design
- » Connector: 2x 5pole (CAN IN/OUT)
- » Zero adjustment via infrared interface

NAME	MSS-322
Article number	04-21-20430
Voltage range	8 ... 32 V DC
Current consumption	0.03 A @ 24 V
Axis	2
X-axis/Y-axis measuring range	$-60^\circ \dots +60^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.0075^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.02^\circ/\text{K}$
Linearity (25°C)	$\pm 0.05^\circ$
Resolution	0.05°
Cut-off frequency	0.9 Hz
Interfaces	Simple bus lead via CAN IN/OUT wiring principle CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67
Insulation voltage	3 kV DC
Operating temperature range	$-40^\circ \dots +85^\circ\text{C}$
Storage temperature range	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm
Weight	0.2 kg
Plugs	5 pin binder M12, male (CAN IN), 5 pin binder M12, female (CAN OUT)

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# SLOPE MEASUREMENT

## MSS TYPE 5 SERIES



- » 1-axis,  $\pm 15^\circ$ , redundant safety switch
- » Operates with two completely independent channels
- » CAN interface
- » Compact, flat design
- » Zero adjustment via infrared interface

NAME	MSS-505	MSS-515
Article number	04-30-00250	04-21-20420
Voltage range	8 ... 32 V DC	8 ... 32 V DC
Current consumption	0.05 A @ 24 V	0.05 A @ 24 V
Axis	1	1
Measuring range	$-15^\circ \dots +15^\circ$	$-15^\circ \dots +15^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$	$\pm 0.1^\circ$
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.0075^\circ/\text{K}$	$\pm 0.0075^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.02^\circ/\text{K}$	$\pm 0.02^\circ/\text{K}$
Linearity (25°C)	$\pm 0.05^\circ$	$\pm 0.05^\circ$
Resolution	0.02°	0.02°
Cut-off frequency	0.9 Hz	0.9 Hz
Interfaces	Safety switch (S1/S2) closed $\leq 8.5^\circ$ , indicator switch (K1/K2) K1 closed $\geq +3.0^\circ$ K2 closed $\geq -3.0^\circ$	Safety switch (S1/S2) closed $\leq 8.5^\circ$ , CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67	IP 67
Insulation voltage	3 kV DC	3 kV DC
Operating temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Storage temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	0.2 kg
Plugs	5 pin binder M12, male, 5 pin binder M12, female	5 pin binder M12, male (CAN), 5 pin binder M12, female



\*only for MSS-515

# SLOPE MEASUREMENT

## MSS TYPE 5 SERIES



- » 2-axis, redundant safety switch
- » Operates with two completely independent channels
- » CAN interface
- » Compact, flat design
- » Zero adjustment via infrared interface

NAME	MSS-517	MSS-520	MSS-521
Article number	04-21-20422	04-21-20440	04-21-20441
Voltage range	8 ... 32 V DC	8 ... 32 V DC	8 ... 32 V DC
Current consumption	0.05 A @ 24 V	0.05 A @ 24 V	<0.05 A @ 24 V
Axis	2	2	2
Measuring range	-45° ... +45°	-30° ... +30°	-30° ... +30°
Zero point accuracy (25°C)	±0.1°	±0.1°	±0.1°
Zero point accuracy (-40...+85°C) typical drift	±0.0075°/K	±0.0075°/K	±0.0075°/K
Zero point accuracy (-40...+85°C) max. drift	±0.02°/K	±0.02°/K	±0.02°/K
Linearity (25°C)	±0.05°	±0.05°	±0.05°
Resolution	0.02°	0.02°	0.02°
Cut-off frequency	0.9 Hz	0.9 Hz	0.9 Hz
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication in compliance with spec. CIA DS 301	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication in compliance with spec. CIA DS 301	Separate CAN Bus wiring of each channel, CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67	IP 67	IP 67
Insulation voltage	3 kV DC	3 kV DC	3 kV DC
Operating temperature range	-40° ... +85°C	-40° ... +85°C	-40° ... +85°C
Storage temperature range	-40° ... +85°C	-40° ... +85°C	-40° ... +85°C
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	0.2 kg	0.2 kg
Plugs	5 pin binder M12, male (CAN) 5 pin binder M12, female	5 pin binder M12, male (CAN IN), 5 pin binder M12, female (CAN OUT)	5 pin binder M12, male (CAN 1), 5 pin binder M12, male (CAN 2)

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# SLOPE MEASUREMENT

## MSS TYPE 5 SERIES



- » 1-axis,  $\pm 180^\circ$ , redundant safety switch
- » Operates with two completely independent channels
- » CAN interface
- » Compact, flat design
- » Zero adjustment via infrared interface

NAME	MSS-530	MSS-531
Article number	04-21-20450	04-21-20451
Voltage range	8 ... 32 V DC	8 ... 32 V DC
Current consumption	<0.05 A @ 24 V	<0.05 A @ 24 V
Axis	1	1
Measuring range	$-180^\circ \dots +180^\circ$	$-180^\circ \dots +180^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$ (cross slope < 5°)	$\pm 0.1^\circ$ (cross slope < 5°)
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.01^\circ/\text{K}$	$\pm 0.01^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.03^\circ/\text{K}$	$\pm 0.03^\circ/\text{K}$
Linearity (25°C)	$\pm 0.2^\circ$	$\pm 0.2^\circ$
Resolution	$\pm 0.02^\circ$	$\pm 0.02^\circ$
Cut-off frequency	0.9 Hz	0.9 Hz
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication in compliance with spec. CIA DS 301	Separate CAN Bus wiring of each channel, CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67	IP 67
Insulation voltage	3 kV DC	3 kV DC
Operating temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Storage temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	0.2 kg
Plugs	5 pin binder M12, male (CAN IN), 5 pin binder M12, female (CAN OUT)	5 pin binder M12, male (CAN 1), 5 pin binder M12, male (CAN 2)



# SLOPE MEASUREMENT

## MSS TYPE 7 SERIES



- » 2-axis,  $\pm 30^\circ$ , redundant safety switch
- » Temperature compensated
- » Operates with two completely independent (and redundant) channels
- » CAN interfaces
- » Compact, flat design
- » Zero adjustment via infrared interface

NAME	MSS-720	MSS-721
Article number	04-21-20442	04-21-20443
Voltage range	8 ... 32 V DC	8 ... 32 V DC
Current consumption	0.05 A @ 24 V	0.05 A @ 24 V
Axis	2	2
Measuring range	$-30^\circ \dots +30^\circ$	$-30^\circ \dots +30^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$	$\pm 0.1^\circ$
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.002^\circ/\text{K}$	$\pm 0.002^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.004^\circ/\text{K}$	$\pm 0.004^\circ/\text{K}$
Linearity (25°C)	$\pm 0.05^\circ$	$\pm 0.05^\circ$
Resolution	0.02°	0.02°
Cut-off frequency	0.9 Hz	0.9 Hz
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication in compliance with spec. CIA DS 301	Separate CAN Bus wiring of each channel, CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67	IP 67
Insulation voltage	3 kV DC	3 kV DC
Operating temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Storage temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	0.2 kg
Plugs	5 pin binder M12, male (CAN IN), 5 pin binder M12, female (CAN OUT)	5 pin binder M12, male (CAN 1), 5 pin binder M12, male (CAN 2)



# SLOPE MEASUREMENT

## MSS TYPE 7 SERIES



- » 1-axis,  $\pm 180^\circ$ , redundant safety switch
- » Operates with two completely independent channels
- » CAN interface
- » Compact, flat design
- » Zero adjustment via infrared interface

NAME	MSS-730	MSS-731
Article number	04-21-20452	04-21-20453
Voltage range	8 ... 32 V DC	8 ... 32 V DC
Current consumption	0.05 A @ 24 V	0.05 A @ 24 V
Axis	1	1
Measuring range	$-180^\circ \dots +180^\circ$	$-180^\circ \dots +180^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$ (cross slope < 5°)	$\pm 0.1^\circ$ (cross slope < 5°)
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.003^\circ/\text{K}$	$\pm 0.003^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.006^\circ/\text{K}$	$\pm 0.006^\circ/\text{K}$
Linearity (25°C)	$\pm 0.2^\circ$	$\pm 0.2^\circ$
Resolution	0.02°	0.02°
Cut-off frequency	0.9 Hz	0.9 Hz
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication in compliance with spec. CIA DS 301	Separate CAN Bus wiring of each channel, CANopen communication in compliance with spec. CIA DS 301
Ingress protection rating	IP 67	IP 67
Insulation voltage	3 kV DC	3 kV DC
Operating temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Storage temperature range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	0.2 kg
Plugs	5 pin binder M12, male (CAN IN), 5 pin binder M12, female (CAN OUT)	5 pin binder M12, male (CAN 1), 5 pin binder M12, male (CAN 2)

# SLOPE MEASUREMENT

## INFRARED REMOTE CONTROL (ZERO POINT ADJUSTMENT)

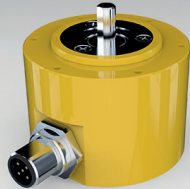


- » Infrared remote handset for zeropoint setting
- » Recalibrates the zero point for MSS sensor types within an absolute angle range of  $\pm 2^\circ$

NAME	IRC-100
Article number	04-01-05010
Voltage range	2.4 ... 3.0 V DC
Current consumption	50 mA
Ingress protection rating	IP 42
Operating temperature range, dependent on battery	-10° ... +50°C
Storage temperature range, dependent on battery	-10° ... +50°C
Housing material	ABS
Color	RAL 9005, jet black
Size (LxWxH)	96 mm x 47 mm x 25.6 mm
Weight	Approx. 65 g
Batteries, 2 pieces	Type Micro AAA
INFRARED DATA TRANSMISSION:	
Wave length	950 nm
Angle of radiation, half intensity	$\pm 14^\circ$
Carrier frequency	38 kHz
Range, dependent on receiver	30 cm
Protocol	MOBA proprietary
Data protection	Plausibility, CRC 16



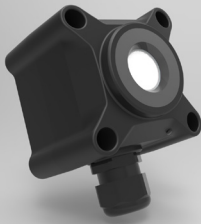
# ROTARY MEASUREMENT



- » Rotation sensor with wear resistant encoder  
0 ... 360°
- » The rotation movement is converted into a linear movement
- » The required factor is calculated at the initial calibration
- » Connector: 5pole binder M12
- » Sensor interface: PWM/analog
- » The rotation sensor serves e.g. to record the drill hole size/depth

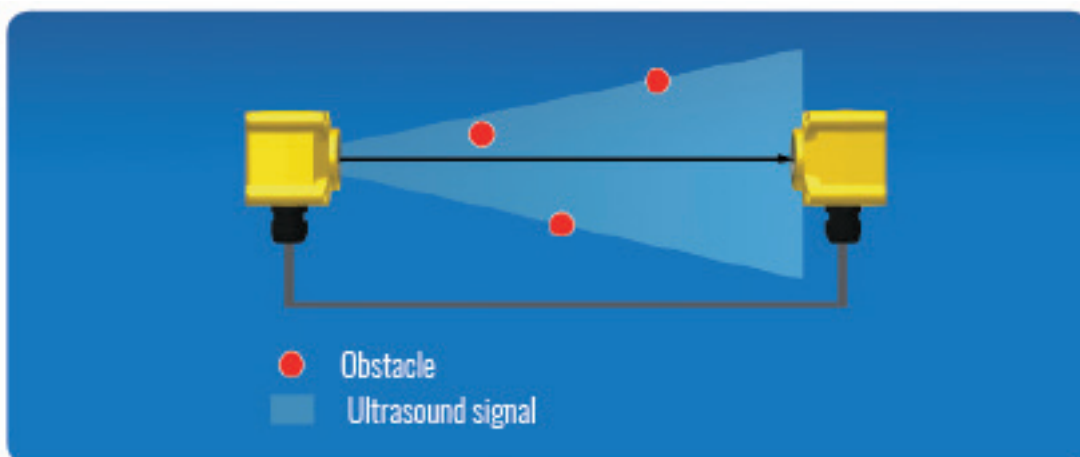
NAME	MRS-305
Article number	04-20-40030
Voltage range	5 ... 8 V DC
Current consumption	< 65 mA
Ingress protection rating	IP 67
Measuring range	0° ... 360°
Operating temperature range	-40° ... +80°C
Storage temperature range	-40° ... +80°C
Reproducibility	± 0.1°
Size (LxWxH)	69.5 mm x 54 mm x 50 mm (with plug)
Weight	Approx. 350 g
Plug	Male connector 5-pin M12
Output	PWM

# DISTANCE MEASUREMENT



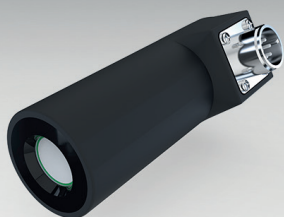
- » The DSM-500 ultrasonic measurement system consists of two sensors, a master and a slave
- » Each of these sensors acts alternately as transmitter and receiver
- » Additional safety measures result in approval according to DIN EN ISO 13849 PL d

NAME	DSM-500
Article number	04-21-10150
Voltage range	9 ... 30 V DC
Current consumption	< 150 mA
Ingress protection rating	IP 67
Measuring range	0.05 ... 5 m
Operating temperature range	-20° ... +70°C
Storage temperature range	-40° ... +80°C
Resolution	5 mm
Size (LxWxH)	99 mm x 71 mm x 68 mm
Output signal	2x CANopen



Through the transmitter-receiver principle, reflections are disregarded during measurement. The first sound pulse is used for the time or length measurement. This always results in the determination of the shortest distance. Obstacles have no influence on the result.

# DISTANCE MEASUREMENT



- » Ultrasonic sensor
- » Measuring range: 200-1000 mm
- » Connector: 6pin
- » Sensor interface: PWM

NAME	MOBA Sonic III
Article number	04-37-36130
Voltage range	10.5 ... 35 V DC
Current consumption	< 65 mA
Ingress protection rating	IP 67
Operating temperature range	-20° ... +85°C
Storage temperature range	-40° ... +90°C
Working range	20 ... 104 cm
Diameter	44.8 mm
Size (LxH)	126 mm x 66.8 mm
Weight	Approx. 350 g
Output	PWM
Output topology	Open collector (NPN)
Max. Output current	70 mA
PWM frequency	400 Hz
PWM duty cycle	5 ... 95%

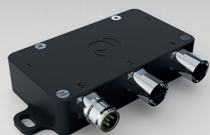
# TEMPERATURE MEASUREMENT



- » Temperature sensor
- » Aluminium solid with shielded connecting cable
- » Temperature range -40° ... +250°C
- » Cable: 6.3 m

NAME	MOBA PT-100
Article number	04-10-40020
Limit deviation	Class B
Norm	150 DIN IEC 751
Temperature range	-40° ... +250°C
Measuring resistor	Pt 100
Size	50 mm x 20 mm x 30 mm
Connecting cable	2x 0.5 mm <sup>2</sup>
Cable length	6.3 m

# ACCESSORIES FOR SENSORS

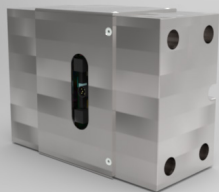


- » T-Connector signal conditioner to convert digital/analog signal to CANopen
- » Small, robust design
- » Automatic or manual addressing
- » CANopen interface
- » Connector: 5pole binder M12

TYPE	MTSC-201 – MOBA T-Connector
Article number	04-50-06200 (standard version)
Ingress protection rating	IP 67
Weight	Approx. 0.3 kg, fully sealed aluminum body
Size	74 mm x 43 mm x 20.5 mm
Voltage range	8 ... 32 V
Current consumption	100 mA
Interfaces	Simple bus lead via CAN IN/OUT wiring principle, CANopen communication
Inputs	Digital, current, voltage, I <sup>2</sup> C, PT-100
Operating temperature range	-40° ... +75°C
Storage temperature range	-40° ... +85°C
Plugs	5pole binder M12, male (CAN IN), 5pole binder M12, female (CAN OUT), 5pole binder M12, female (input)



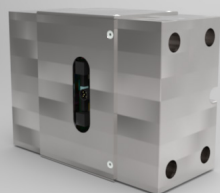
# WEIGHT MEASUREMENT



- » Moment compensated redundant load cell  
4-20 mA at 0-500 kg
- » Load cell meets the requirements of norms EN280 and EN13849-1 PL d
- » Cable: 5 m, open end

NAME	MRW 500, 4-20 mA not insulated	MRW 500, 4-20 mA insulated
Article number	04-04-00516	04-04-00515
Supply voltage range	8.5 ... 32 V DC	8.5 ... 32 V DC
Current consumption	4-20 mA / 0 - 500 kg, burden resistor per channel $\leq$ 500 Ohm	4-20 mA / 0 - 500 kg, burden resistor per channel $\leq$ 500 Ohm
Max. temperature effect on zero	$\pm 0.01\%/^{\circ}\text{C}$ of rated capacity	$\pm 0.01\%/^{\circ}\text{C}$ of rated capacity
Long term zero drift	< 0.5% of rated value	< 0.5% of rated value
Operating temperature range	-30° ... +70°C	-30° ... +70°C
Storage temperature range	-40° ... +80°C	-40° ... +80°C
Ingress protection rating	IP 67	IP 67
Type	Single point	Single point
Rated capacity	500 kg	500 kg
Electrical load saving	150% of rated capacity	150% of rated capacity
Mechanical load saving	200% of rated capacity	200% of rated capacity
Mechanical overload	300% of rated capacity	300% of rated capacity
Combined error	$\pm 0.03\%$ of rated output	$\pm 0.03\%$ of rated output
Insulation resistance	> 2000 M ohm	> 2000 M ohm
Insulation electric strength	Not insulated	1 kV, tested 3 kV
Deflection at rated capacity	< 0.3 mm	< 0.3 mm
Size	176 mm x 130 mm x 80 mm	176 mm x 130 mm x 80 mm
Weight	Approx. 5 kg	Approx. 4.6 kg
Material	AlZnMgCu1.5 F53	AlZnMgCu1.5 F53

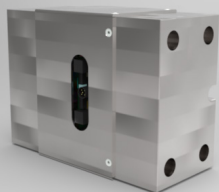
# WEIGHT MEASUREMENT



- » Moment compensated redundant load cell  
4-20 mA at 0-1000 kg
- » Load cell meets the requirements of the norm  
EN280 and EN13849-1 PL d
- » Cable: 5 m, open end

NAME	MRW 1000, 4-20 mA not insulated	MRW 1000, 4-20 mA insulated
Article number	04-04-00511	04-04-00510
Supply voltage range	8.5 ... 32 V DC	8.5 ... 32 V DC
Current consumption	4-20 mA / 0 - 1000 kg, Burden resistor per channel ≤ 500 Ohm	4-20 mA / 0 - 1000 kg, Burden resistor per channel ≤ 500 Ohm
Max. temperature effect on zero	±0.01%/°C of rated capacity	±0.01%/°C of rated capacity
Long term zero drift	< 0.5% of rated value	< 0.5% of rated value
Operating temperature range	-30° ... +70°C	-30° ... +70°C
Storage temperature range	-40° ... +80°C	-40° ... +80°C
Ingress protection rating	IP 67	IP 67
Type	Single point	Single point
Rated capacity	1000 kg	1000 kg
Electrical load saving	150% of rated capacity	150% of rated capacity
Mechanical load saving	200% of rated capacity	200% of rated capacity
Mechanical overload	300% of rated capacity	300% of rated capacity
Combined error	±0.03% of rated output	±0.03% of rated output
Insulation resistance	> 2000 M ohm	> 2000 M ohm
Insulation electric strength	Not insulated	1 kV, tested 3 kV
Deflection at rated capacity	< 0.3 mm	< 0.3 mm
Size	176 mm x 130 mm x 80 mm	176 mm x 130 mm x 80 mm
Weight	Approx. 5 kg	Approx. 5 kg
Material	AlZnMgCu1.5 F53	AlZnMgCu1.5 F53

# WEIGHT MEASUREMENT

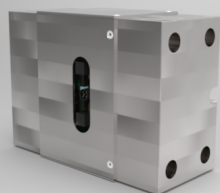


- » Moment compensated redundant load cell
- » Load limitation with safety contact
- » TÜV certified: load cell meets the requirements of norms EN280, SK3 according to EN954-1, SIL2 EN62061 and PL d ISO 13849-1
- » 0-1000 kg
- » 3 limit switches
- » Cable: 5 m, open end

NAME	MRW 1000 LIMIT not insulated	MRW 1000 LIMIT insulated
Article number	04-04-00535	04-04-00530
Supply voltage range	8.5 ... 32 V DC	8.5 ... 32 V DC
Operating temperature range	-30° ... +70°C	-30° ... +70°C
Storage temperature range	-40° ... +80°C	-40° ... +80°C
Max. temperature effect on zero	±0.01%/°C of rated capacity	±0.01 %/°C of rated capacity
Long term zero drift	< 0.5% of rated value	< 0.5% of rated value
Ingress protection rating	IP 67	IP 67
Type	Single point	Single point
Rated capacity	1000 kg	1000 kg
Electrical load saving	150% of rated capacity	150% of rated capacity
Mechanical load saving	200% of rated capacity	200% of rated capacity
Mechanical overload	300% of rated capacity	300% of rated capacity
Combined error	±0.03% of rated output	±0.03% of rated output
Insulation resistance	> 2000 M ohm	> 2000 M ohm
Insulation electric strength	Not insulated	1 kV, tested 3 kV
Deflection at rated capacity	< 0.3 mm	< 0.3 mm
Size	176 mm x 130 mm x 80 mm	176 mm x 130 mm x 80 mm
Weight	Approx. 5 kg	Approx. 5 kg
Material	AlZnMgCu1.5 F53	AlZnMgCu1.5 F53



# WEIGHT MEASUREMENT



- » Moment compensated redundant load cell
- » For bigger aerial work platforms
- » 4-20 mA at 0-1000 kg
- » Load cell meets the requirements of the norm EN280 and EN13849-1 PL d
- » Additional variations on request
- » Cable: 5 m, open end

NAME	MRW-XL 4-20 mA not insulated	MRW-XL 4-20 mA insulated
Article number	04-04-01511	04-04-01510
Supply voltage range	8.5 ... 32 V DC	8.5 ... 32 V DC
Operating temperature range	-30° ... +70°C	-30° ... +70°C
Storage temperature range	-40° ... +80°C	-40° ... +80°C
Max. temperature effect on zero	±0.01%/°C of rated capacity	±0.01 %/°C of rated capacity
Long term zero drift	< 0.5% of rated value	< 0.5% of rated value
Ingress protection rating	IP 67	IP 67
Type	Single point	Single point
Rated capacity	1000 kg	1000 kg
Electrical load saving	150% of rated capacity	150% of rated capacity
Mechanical load saving	200% of rated capacity	200% of rated capacity
Mechanical overload	300% of rated capacity	300% of rated capacity
Combined error	±0.03% of rated output	±0.03% of rated output
Insulation resistance	> 2000 M ohm	> 2000 M ohm
Insulation electric strength	Not insulated	1 kV, tested 3 kV
Deflection at rated capacity	< 0.3 mm	< 0.3 mm
Size	196 mm x 102 mm x 116 mm	196 mm x 102 mm x 116 mm
Weight	Approx. 7.5 kg	Approx. 7.5 kg
Material	AlZnMgCu1.5 F53	AlZnMgCu1.5 F53

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**If you have any questions or need further information, don't hesitate to contact us:**

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The **MOBA GROUP** is a leading global player in the world of mobile automation. Close collaborations between the headquarter in Limburg an der Lahn and subsidiaries all over Europe, Asia, North and South America create new perspectives for recent and future developments..

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