

MOBA PRODUCT PLATFORM CATALOG

MOBA GROUP:

MOBILE AUTOMATION SINCE 1972

MOBA Mobile Automation 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.**

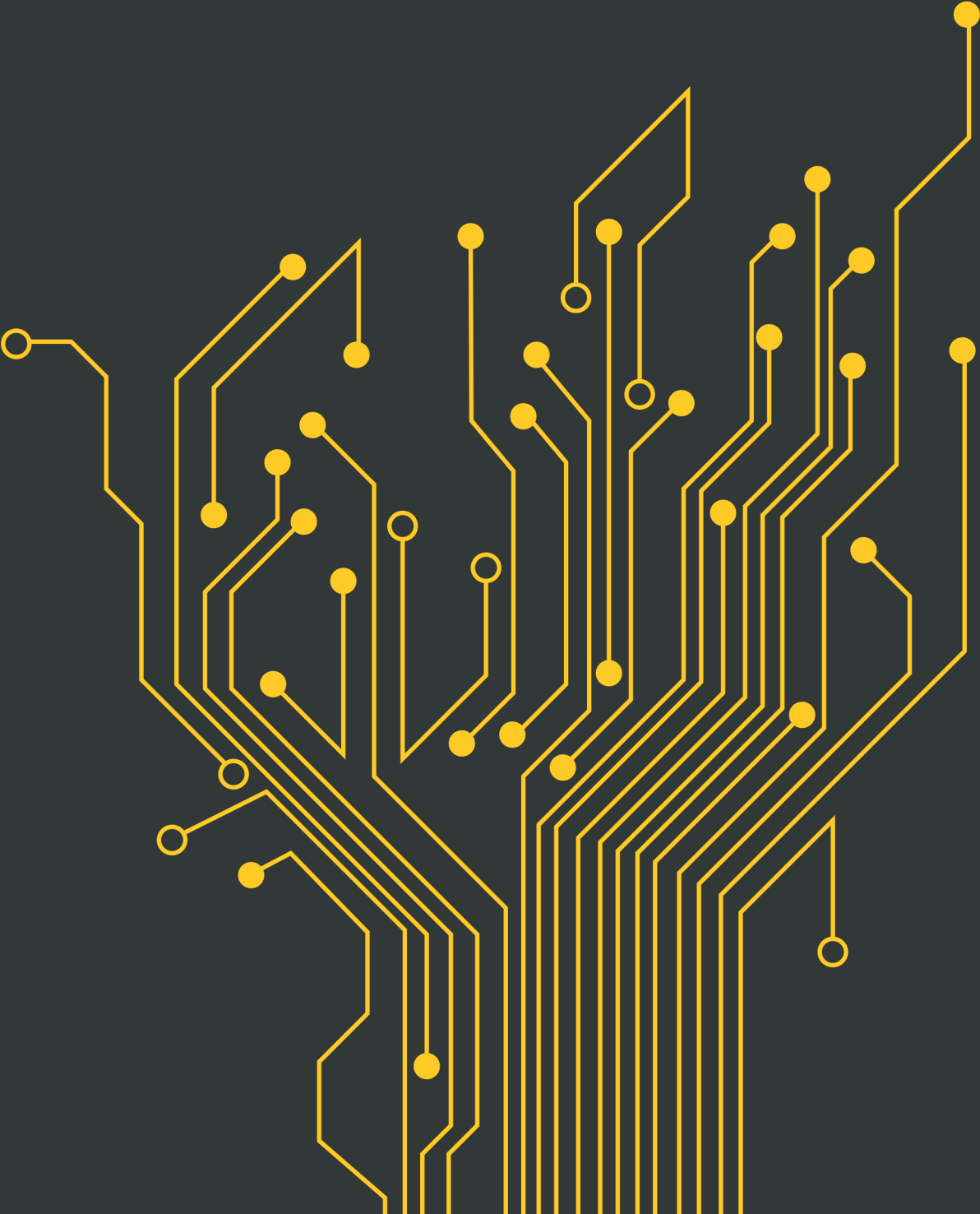
WORLDWIDE

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 GRAPHIC DISPLAY



MOBA

GDC-320

- » Compact graphic display / operating unit
- » 320 x 240 pixel, 16-bit color, 3.5" TFT
- » Connector: 8pin/M12



Voltage range	8 ... 32V DC
Current consumption	8V < 230mA 24V < 100mA 32V < 90mA
Size (L x W x H)	141mm x 141mm x 91mm
Weight	Approx. 800g
Protocol	CANopen



MOBA

GDC-800

- » High-end graphic display /operating unit
- » Robust die-cast housing
- » 800 x 400 pixel, 7" TFT
- » Connector: 8pin/M12



Voltage range	8 ... 35V DC
Current consumption	200mA @ 24V DC
Size (L x W x H)	261mm x 182mm x 64mm
Weight	Approx. 1,25kg
Protocol	CANopen

THE NEW MCP

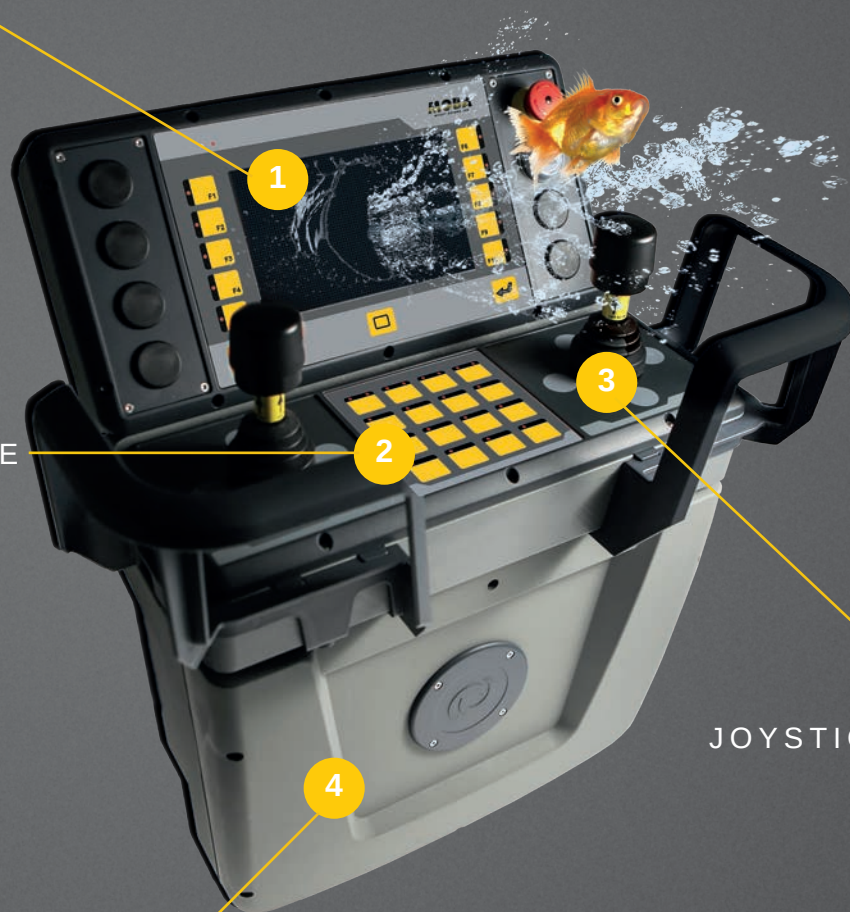
 NEXT STEP
AHEAD

HIGH-END 7" COLOUR DISPLAY

KEYPAD MODULE

JOYSTICK MODULE

CONTROLLER UNIT



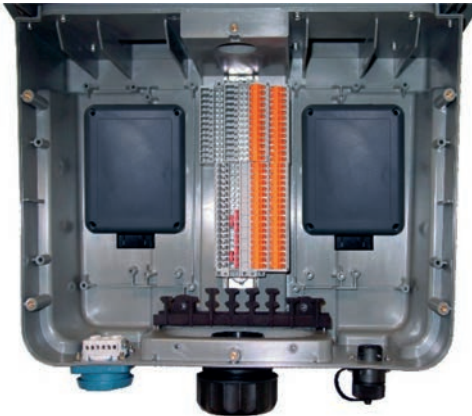


VARIATIONS:

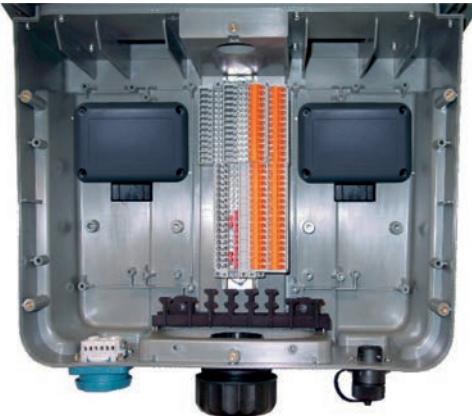


HUMAN MACHINE INTERFACES

MCP - TECHNICAL DETAILS
ONE HOUSING FITS FOR ALL CONTROLLERS
GET RID OF YOUR ADDITIONAL SWITCH CABINET



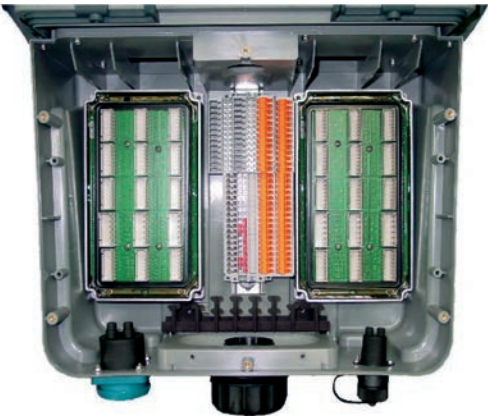
TWO MPC-113 CONTROLLER



TWO MSC-113 CONTROLLER



ONE MPC-330 CONTROLLER



TWO CONTROLLER MODULES

MOBA HMI^{mc}: ONE IDEA – NUMEROUS POSSIBILITIES

The MOBA **HMI^{mc}** (mc = modular concept) provides the opportunity of quickly creating Individual operating units even with small production quantities and without high development costs. CAN bus based modules enable the free configuration of display, 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 65 FRONT (with emergency stop: IP 65)
Operating temperature range	-30° ... +75°C
Storage temperature range	-40° ... +80°C
CAN interfaces	ISO 11898 - 24 V 125 kBit/sec, free selectable

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



reddot design award
winner 2012

CANopen



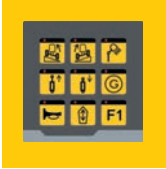
Triple unit with one display and two joystick modules, emergency stop and railing



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

HMI^{mc} THE NEW MOBA MODULAR CONCEPT

BASE MODULES



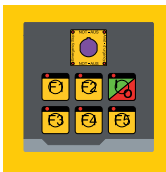
KEYPAD MODULES



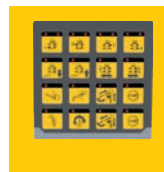
DISPLAY MODULES



JOYSTICK MODULES



6 KEYPAD WITH EMERGENCY



16 KEYPADS



LOCKABLE JOYSTICK



JOYSTICK MODULE WITH TWO KEYS ON BOARD

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

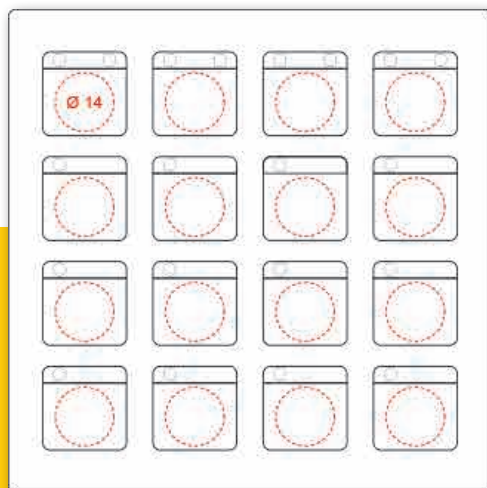
HMIS DESIGNED BY MOBA: USER-FRIENDLY, INNOVATIVE AND HIGH QUALITY

The MOBA **HMI^{mc}** (mc = modular concept) are manufactured with a basic white/neutral front foils. In order to make customization easy, giving customer high flexibility, OEMs can decide how to lay out keys/commands, related to machine features. The possibility is to customize color, symbols, adding also logo.

Foil customization could be handled directly by OEMs, or by MOBA with a special deal.

YOUR BENEFITS AT A GLANCE:

- » Easy customization
- » High flexibility
- » Individual designs



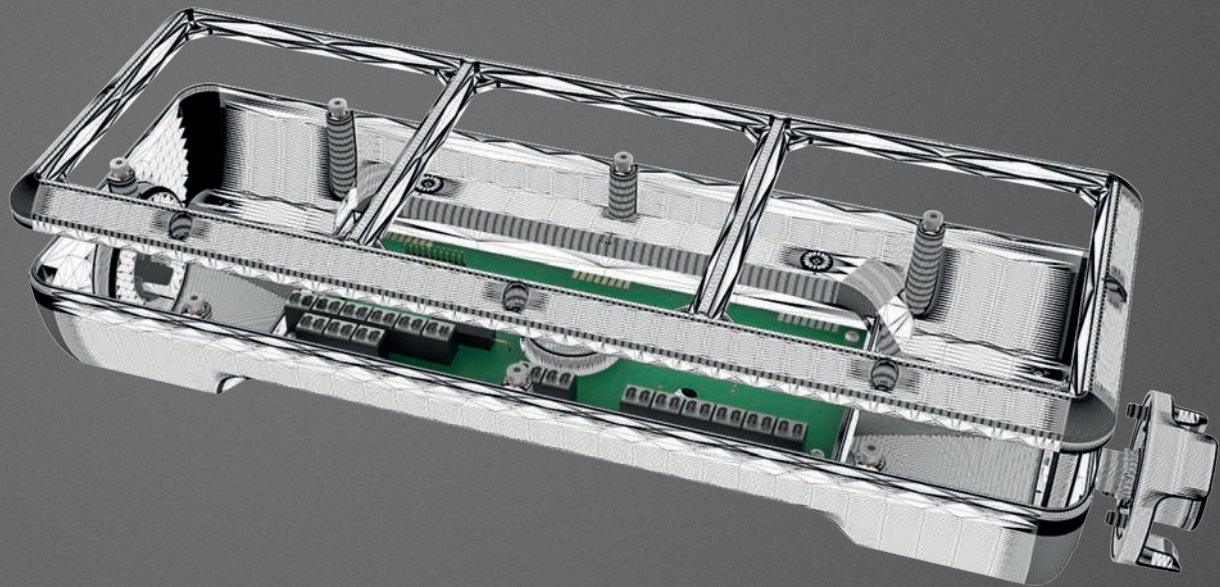
INDIVIDUAL LAYOUT
Customize your individual foil

WHITE BASIC

MOBA HMI^{mc} are manufactured with a basic white/neutral front foils

HMI^{mc}

THE NEW MOBA MODULAR CONCEPT



HUMAN MACHINE INTERFACES



- » Easy to operate
- » CODESYS programmable
- » Clear indication of all connected sensors
- » Clear, visual icon driven instructions
- » CAN Interface: CANopen

NAME	GDC-320
Article number	04-26-10041-A01
Ingress Protection Range	IP65 FRONT
Operating Temperature Range	-30...+70 °C
Storage Temperature Range	-40...+80 °C
Voltage Range	8...32Vdc
Current Consumption	< 230mA
Size	141x156x89
Weight	0,8kg
Processor System	ATMEL microprocessor AT91SAM9263B-CU 1GB NAND Flash 256MB SDRAM
Attachment Plugs	LTW-14poles
Interfaces	CAN Bus ISO 11898-24V, Baudrate programmable

CAN
CANopen®

HUMAN MACHINE INTERFACES



- » Display: 800 x 480 TFT
- » 7" TFT (Brightness continuously adjustable)
- » 600 cd/m² brightness / sunlight readable
- » Housing: Plastic PA6
- » Ingress Protection: IP55

NAME	GDC-800
Article number	04-25-40062
Ingress Protection Range	IP 55
Operating Temperature Range	-30...+70 °C
Storage Temperature Range	-40...+80 °C
Voltage Range	8...35Vdc
Current Consumption	< 200mA @24Vdc
Size	261x182x64
Weight	1,25kg
Processor System	ARM9 MOBA kernel 128 Mb NAND Flash 2x64 Mb SDRAM
Attachment Plugs	2xM12 – 5poles
Interfaces	CAN Bus ISO 11898-24V, Baudrate programmable



CONTROLLERS DESIGNED BY MOBA: QUICK 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.

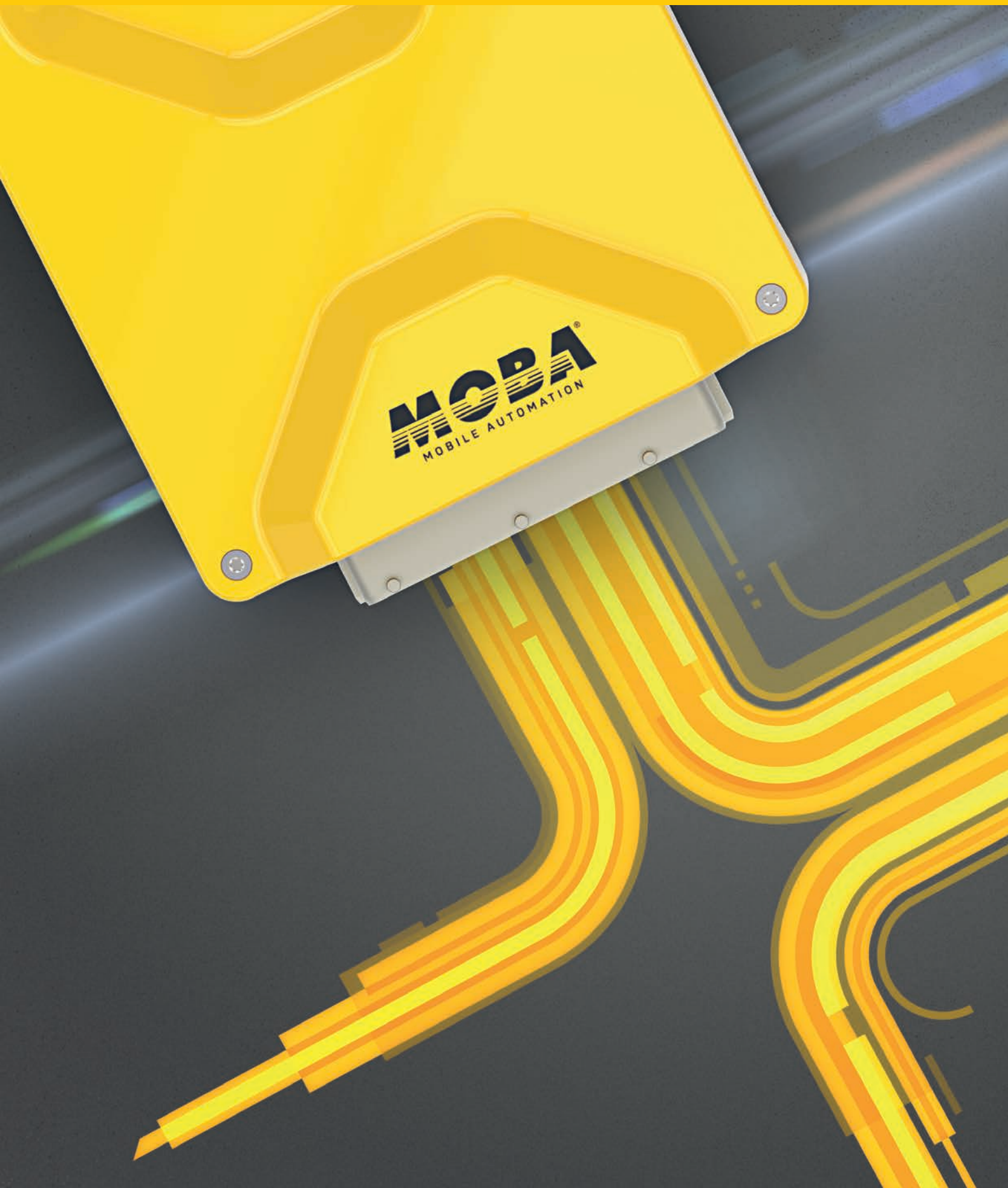
YOUR BENEFITS AT A GLANCE:

- » Programmed in CODESYS
- » CAN interfaces
- » Developed to be used under rugged conditions
- » Potting components to protect against vibration and environmental influences

MOBA is also available for System integration,
please contact Giovanni Saleme:
E-mail: gsaleme@moba.de
Phone: +39 329 40264912

If you have questions about the components,
please contact Boris Zils:
E-mail: bzils@moba.de
Phone: +49 6431 9577-123

CONTROLLERS



MOBILE PROCESS CONTROLLERS



- » 2 x 4 (8) of Inputs: digital high side or analogue 0-25 mA, 0-32 Vdc
- » open loop with ON-OFF status feedback input
- » 1 x CAN Bus ISO 11898 24 V
- » 2 x 2 (4) of Digital/PWM high side outputs 4 A open loop with ON-OFF status feedback input

NAME	MSC-113 (32 bit Slave Controller)
Article Number	04-25-70375
Ingress Protection Rating	IP 67
Operating Temperature Range	-40...+85 °C
Storage Temperature Range	-40° ... +85°C
Voltage Range	6...32Vdc
Current Consumption	<=200mA
Size	70,1x105,1x45,5
Weight	<0,5kg
Processor System	2x CPU 32bit 72MHz working frequency 32 Kbytes of CPU internal Flash memory 10 Kbytes of CPU internal RAM WDO circuit with free relay contact
Attachment Plugs	36pol. JST – eZRO
Interfaces	2 x CAN Bus interface 2.0 (ISO 11898 24V), with programmable Baudrate
Inputs	2x4 (8) Digital high side or Analogue Inputs (0-25mA, 0-32Vdc) 2x2 (4) Digital high side or Analogue Inputs (0-25mA, 0-5.5Vdc, 0-32Vdc with pull-up for PTC sensor)
Outputs	2x2 (4) Digital/PWM high side Outputs (2A, open loop, ON/OFF input status feedback) 2x2 (4) Digital/PWM high side Outputs (4A, open loop ON/OFF input status feedback)



MOBILE PROCESS CONTROLLERS

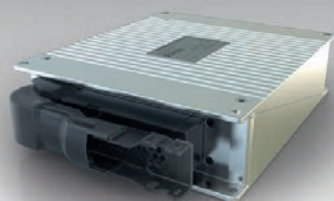


- » Controller connector: JXT 36pole
- » Interface: 2 CAN (ISO11898-24V, 50 - 1000 Bit/sek)
- » Programmable inputs
- » Digital-analog inputs: 2x6
- » Digital outputs: 2x6 PWM - 2A, current controlled outputs

NAME	MPC-113 (32 bit Master Controller CoDeSys 3.5)
Article Number	04-25-70115-B01
Ingress Protection Rating	IP 67
Operating Temperature Range	-40...+85 °C
Storage Temperature Range	-40° ... +85°C
Voltage Range	6...32Vdc
Current Consumption	<=200mA
Size	105x125,5x45,5
Weight	<0,5kg
Processor System	2x „APP“ CPU 32bit + 1 x „WDO“ CPU 32bit „CoDeSys APP“ version, CPU clock 168MHz 2 Mbytes of CPU internal Flash memory 256 Kbytes of CPU internal RAM 4 Kbytes of CPU internal RAM with lithium battery backup 64 Kbytes SPI Flash memory
Attachment Plugs	36pol. JST – eZRO
Interfaces	2 x CAN Bus interface 2.0 (ISO 11898 24V), with programmable Baudrate
Inputs	2x16 (12) Digital/Analogue Inputs (0-25mA, 0-5.5Vdc, 0-32Vdc)
Outputs	2x6 (12) Digital/PWM Outputs (2A, current loop, ON/OFF input status feedback) 2x1 (2) Digital Outputs (5A, ON/OFF input status feedback)



MOBILE PROCESS CONTROLLERS



- » Programmed in CODESYS or C (on request)
- » CAN interfaces
- » 70 Pin (Tyco 963484) attachment plug
- » Developed to be used under rugged conditions
- » Potting components to protect against vibration and environmental influences

NAME	MPC-330 (Master Controller 16 bit CoDeSys 2.5)
Article Number	04-25-70290-B01
Ingress Protection Rating	IP 67
Operating Temperature Range	-30° ... +80°C
Storage Temperature Range	-30...+80 °C
Voltage Range	10...30Vdc
Current Consumption	250mA @24Vdc
Size	210x180x55
Weight	2.3 kg
Processor System	XC167CI – 32D40 2x4 Mbyte Serial Flash 2x2 Mbyte RAM 2x8 kByte FRAM 2x128 kByte EEPROM
Attachment Plugs	70pol TYCO 963484
Interfaces	3 x CAN Bus interface (ISO 11898 24V), with programmable Baudrate
Inputs	2x7 (14) Digital Inputs (PNP or NPN as 0-32Vdc, 2x4 as Frequency Input) 2x6 (12) Analog Inputs (4-20mA, 0-5Vdc, 0-10Vdc)
Outputs	2x10 (20) Digital/PWM Outputs (2x6 with current loop) 2x4 (8) Digital Outputs (ON/OFF 0-24Vdc) 1 Analog Output 0...UB, I _{max} 35mA



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	CWG-200
Article Number	04-21-20610
Ingress Protection Range	IP 67
Operating Temperature Range	-20...+70 °C
Storage Temperature Range	-40...+70 °C
Voltage Range	8...32Vdc
Current Consumption	Max 250mA
Size	70x80x35
Weight	100g
Processor System	STM32F205 1 Mb Flash/128Kb SRAM 512 Mb Flash
Attachment Plugs	M12/A-Coding (CiA 303)
Interfaces	CAN Bus (CANopen) WLAN IEEE 802.11 b/g/n



ACCESSORIES FOR CONTROLLERS



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

TYPE	MTSC-201 – MOBA T-Connector
Article Number	04-50-06400-A03 (current 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 ² 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, the 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	04-03-00810 (42 pole connector + 42 pole connector panel) 04-03-00811 (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



MIRA
TYPE: MIRA-1000-1000-1000
1000-1000-1000
MADE IN GERMANY
CE

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)

CAN
CANopen®

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	MSS-517
Article Number	04-30-00250	04-21-20420	04-21-20422
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	1	1	2
Measuring Range	$-15^\circ \dots +15^\circ$	$-15^\circ \dots +15^\circ$	$-45^\circ \dots +45^\circ$
Zero point accuracy (25°C)	$\pm 0.1^\circ$	$\pm 0.1^\circ$	$\pm 0.1^\circ$
Zero point accuracy (-40...+85°C) typical drift	$\pm 0.0075^\circ/\text{K}$	$\pm 0.0075^\circ/\text{K}$	$\pm 0.0075^\circ/\text{K}$
Zero point accuracy (-40...+85°C) max. drift	$\pm 0.02^\circ/\text{K}$	$\pm 0.02^\circ/\text{K}$	$\pm 0.02^\circ/\text{K}$
Linearity (25°C)	$\pm 0.05^\circ$	$\pm 0.05^\circ$	$\pm 0.05^\circ$
Resolution	0.02°	0.02°	0.02°
Cut-off frequency	0.9 Hz	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	Simple bus lead via CAN IN/OUT wiring principle, 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	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Storage Temperature Range	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$	$-40^\circ \dots +85^\circ\text{C}$
Size (LxWxH)	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm	70 mm x 80 mm x 35 mm
Weight	0.2 kg	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	5 pin binder M12, male (CAN) 5 pin binder M12, female

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
- » Only for MSS-517

NAME	MSS-520	MSS-521
Article Number	04-21-20440	04-21-20441
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° ... +30°	-30° ... +30°
Zero Point Accuracy (25°C)	±0.1°	±0.1°
Zero Point Accuracy (-40...+85°C) typical drift	±0.0075°/K	±0.0075°/K
Zero Point Accuracy (-40...+85°C) max. drift	±0.02°/K	±0.02°/K
Linearity (25°C)	±0.05°	±0.05°
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° ... +85°C	-40° ... +85°C
Storage temperature range	-40° ... +85°C	-40° ... +85°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 5 SERIES



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

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

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

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 $< 5^\circ$)	$\pm 0.1^\circ$ (cross slope $< 5^\circ$)
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-322, MSS-505, MSS-515, MSS-517 sensor types within an absolute angle range of $\pm 2^\circ$

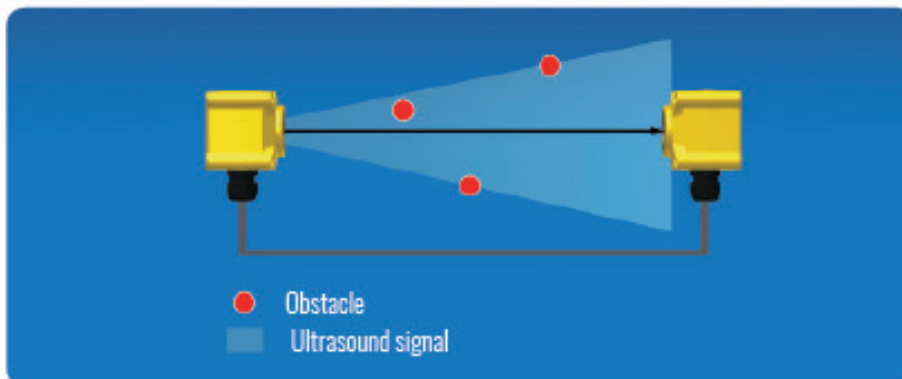
NAME	IRC-100
Article Number	04-01-05010
Voltage Range	2.4 ... 3.0 V DC
Current Consumption	50 mA
Ingress Protection Rating	IP 42
Operating Temperature Range, dependent on battery	-10° ... +50°C
Storage Temperature Range, dependent on battery	-10° ... +50°C
Housing Material	ABS
Color	RAL 9005, jet black
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

DISTANCE MEASUREMENT



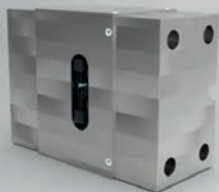
- » The DSM-500 ultrasonic measurement system consists of two sensors, a master and a slave
- » Each of these sensors acts alternately as transmitter and receiver
- » Additional safety measures result in approval according to DIN EN ISO 13849 PL d

NAME	DSM-500
Article Number	05-21-101XX
Ingress Protection Range	IP67
Measuring Range	0,05...5m
Resolution	1mm
Operating Temperature Range	-30...+70 °C
Storage Temperature Range	-40...+80 °C
Voltage Range	24 V DC
Current Consumption	<80 mA
Size (LxWxH)	72x85x71
Precision	+/- 1% of measured value
Output signal	CANopen
Attachment Plugs	M12
Wiring concept for external communication	Master Sensor: Simple bus lead via CAN IN/OUT wiring Slave Sensor: Version 1: without external CAN Bus extension Version 2: with external CAN Bus extension (1 Connector) Version 3: with external CAN Bus extension (CAN IN/OUT)



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.

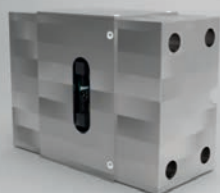
WEIGHT MEASUREMENT



- » 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, DIN VDE 0682-742
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 \leq 500 Ohm	4-20 mA / 0 - 1000 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	$-30^{\circ} \dots +70^{\circ}\text{C}$	$-30^{\circ} \dots +70^{\circ}\text{C}$
Storage Temperature Range	$-40^{\circ} \dots +80^{\circ}\text{C}$	$-40^{\circ} \dots +80^{\circ}\text{C}$
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	$\pm 0.03\%$ of rated output	$\pm 0.03\%$ of rated output
Insulation resistance	$> 2000 \text{ M ohm}$	$> 2000 \text{ M ohm}$
Insulation electric strength	Not insulated	1 kV, tested 3 kV, DIN VDE 0682-742
Deflection at rated capacity	$< 0.3 \text{ mm}$	$< 0.3 \text{ mm}$
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

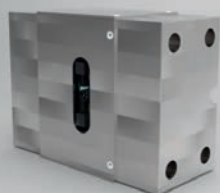
WEIGHT MEASUREMENT



- » 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, DIN VDE 0682-742
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

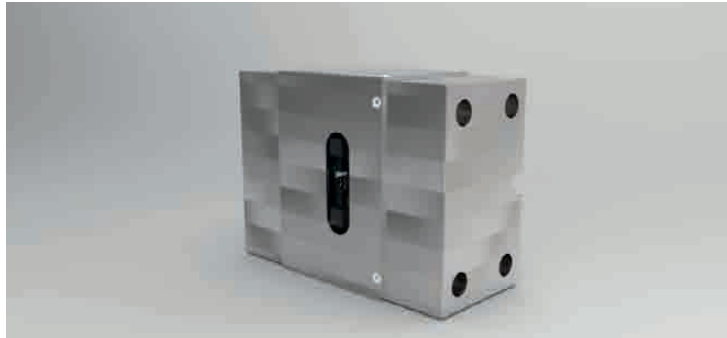


- » Moment compensated redundant load cell
- » For bigger aerial work platforms
- » 4-20 mA at 0-1000 kg
- » Load cell meets the requirements of the norm EN280 and EN13849-1 PL d
- » Additional variations on request
- » Cable: 5 m, open end

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, DIN VDE 0682-742
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

WEIGHT MEASUREMENT

MRW CAN not insulated



NAME	MRW CAN
Article Number	04-04-00595
Supply Voltage Range	8...32Vdc
Operating Temperature Range	-30° ... +70°C
Storage Temperature Range	-40° ... +80°C
Max. Temperature effect on zero	±0.01%/°C of rated capacity
Long term zero drift	< 0.5% of rated value
Ingress protection rating	IP 67
Type	Single point
Rated capacity	1000 kg
Electrical load saving	150% of rated capacity
Mechanical load saving	200% of rated capacity
Mechanical overload	300% of rated capacity
Combined error	±0,03% of rated capacity
Insulation resistance	> 2000 M ohm
Insulation electric strength	Not insulated
Deflection at rated capacity	< 0.3 mm
Size	176 mm x 130 mm x 80 mm
Weight	Approx. 5 kg
Material	AlZnMgCu1.5 F53
Interfaces	CAN Bus (CANopen)

WEIGHT MEASUREMENT

MRW CAN insulated



NAME	MRW CAN
Article Number	04-04-00595
Supply Voltage Range	8 ... 32 V DC
Operating Temperature Range	-30° ... +70°C
Storage Temperature Range	-40° ... +80°C
Max. Temperature effect on zero	±0.01%/°C of rated capacity
Long term zero drift	< 0.5% of rated value
Ingress protection rating	IP 67
Type	Single point
Rated capacity	1000 kg
Electrical load saving	150% of rated capacity
Mechanical load saving	200% of rated capacity
Mechanical overload	300% of rated capacity
Combined error	±0,03% of rated output
Insulation resistance	> 2000 M ohm
Insulation electric strength	1 kV, tested 3kV, DIN VDE 0682-742
Deflection at rated capacity	< 0.3 mm
Size	176 mm x 130 mm x 80 mm
Weight	Approx. 5 kg
Material	AlZnMgCu1.5 F53
Interfaces	CAN Bus (CANopen)

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