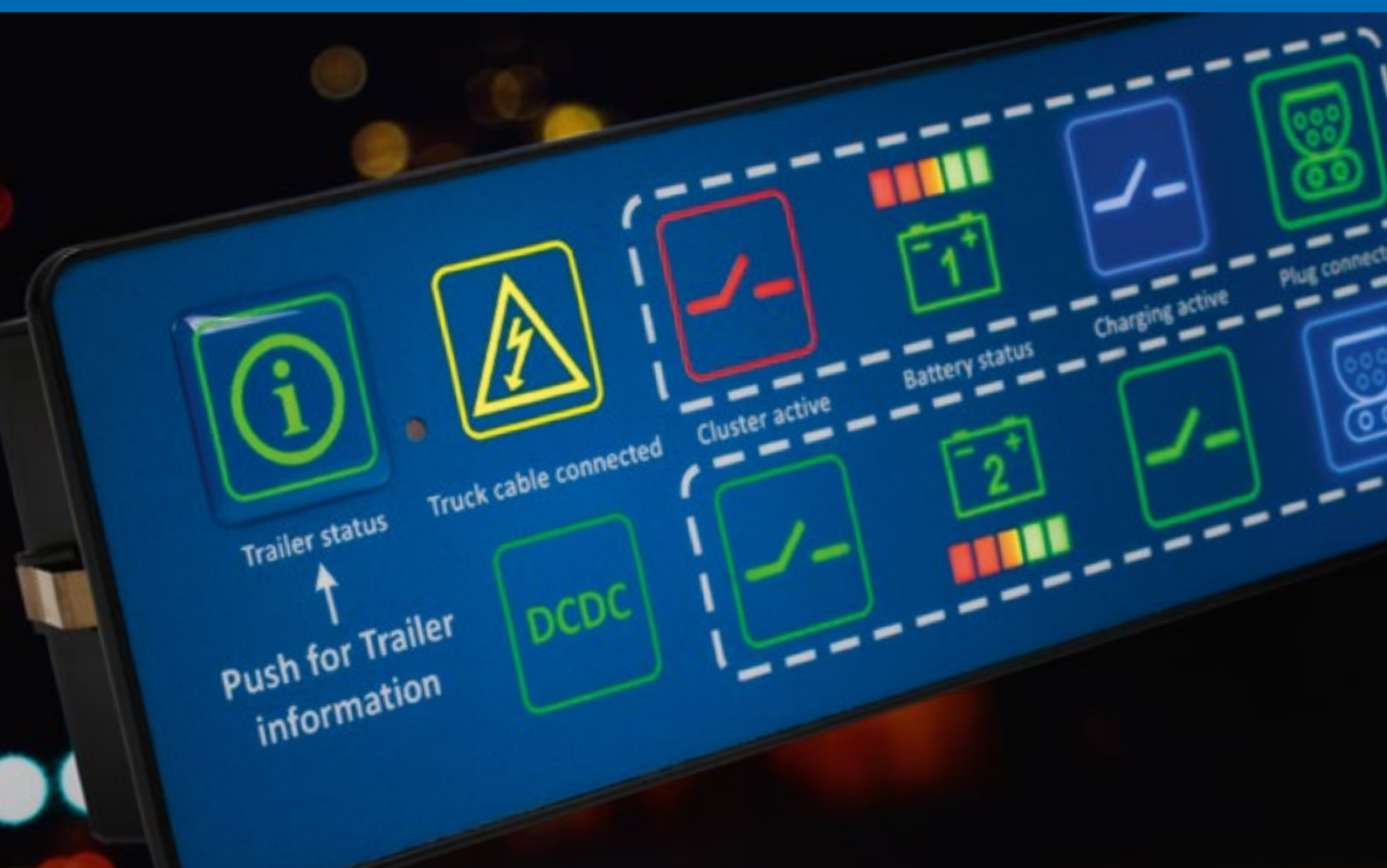# miunske

miunske CAN World

english

miunske

J 1939
Trucks / Systems on vehicle chassis

CIA 447
Rescue and emergency vehicles / Roof frame and signal lights

FIRE CAN
Fire brigade / Roof frame, signal lights, ladders

CANOPEN
Construction vehicles / Hydraulics, pneumatics, automation

All miunske® CAN components support the bus protocols J1939, CiA447, FireCAN and CANopen. This enables the operation of a wide range of control requirements for commercial vehicles and mobile working machines.

REFERENCES FROM THE MIUNSKE CAN WORLD

Complex control panel for IHC Fundex Equipment B.V.

Control and display systems for boats and yachts

Impressive sound diversity in the cockpit

https://www.miunske.com/en/development-892/references

CAN KEYPADS FOR SWITCHING AND DISPLAY FUNCTIONS

Commercial vehicles work with huge forces, move large quantities of critical goods or travel at high speeds - in every weather, during the day and at night. The driver's cabins are almost the same like the cockpit of an airplane today. A workplace where operating errors are fatal, but often only a hand's breadth away. Miunske CAN switching and display units give drivers and operators safety in their harsh everyday work. They meet the highest demands on ergonomics, usability, comprehensibility and design. With their perfect night design, robust design and individual design possibilities, our CAN keypads set the standard in modern commercial vehicles.

Individual design possibilities

Miunske CAN keypads are available with 4, 6 or 12 fields which can be defined as switches, buttons or pulse buttons. The fields are illuminated with multicolour LEDs. In addition, each field can be fitted with vertical or horizontal bar graph display elements. The colour of these unicoloured LEDs is defined through the hardware. The lengths and widths of CAN keypads are based on the dimensions of standard frames. That's why they fit easily into existing recesses both vertically and horizontally.

Perfect night design

In the dark, miunske CAN keypads reveal their superiority: extremely bright, without glare and homogeneously illuminated panel. This is made possible by placing lighting elements in individual light shafts, which are movable for switch elements and stationary for display fields. This spatial separation prevents stray light.

An integrated light sensor ensures the automatic adjustment of the light intensity. This works in a pulse width modulated way so that color fidelity is maintained even at low brightness. Through the use of multicolor LEDs, the individual display elements can be lit in all colors. The fine-grained classification even allows adaptation to individual color schemes or given product designs. The installation depth of 25mm is significantly lower than the conventional rocker switch. Nevertheless, the light shafts are deep enough to meet all thermal requirements even with full control.

Robust construction

Micro switches ensure for functional safety even after 1 million times of pressing the key. The high-quality injection moulding housings are very robust. This protects the electronics inside allows an easy and faultless installation. The housing is front-sided designed in compliance with IP67.

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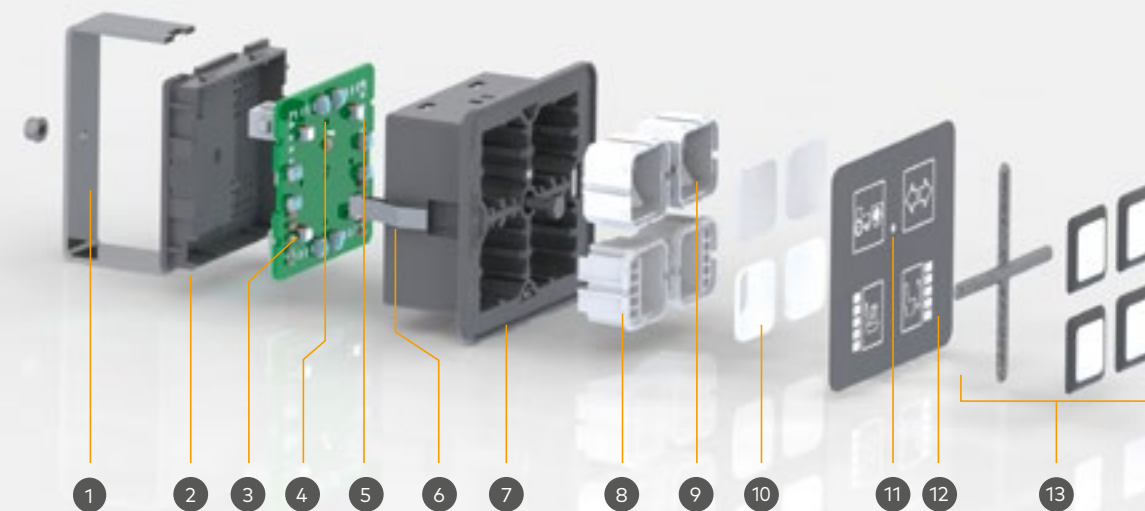
1. Support bracket with screw fitting (optional) for panel-mounted version IP67
2. Rear housing cover for mechanical protection of electronics
3. 5 freely selectable unicolour – LEDs in horizontal and vertical alignment per element with adjustable brightness
4. 2 redundant micro buttons per field for safe switching behaviour and a very good haptic feedback
5. Multicolour high-performance LED, adjustable color and brightness at runtime, to display various status data
6. Clamps in various designs provide for secure hold of the keypad when installed in panels of varying thickness
7. Switch frame in 3 different versions for 4, 6 and 12 switch and display elements complying with installation dimensions of commercially available rocker switches, optionally with IP67 on front
8. Light well for excellent illumination, optionally with 5 separate light chambers for bar graph LEDs for switch and display elements
9. Light shafts movable for operating controls and stationary for display elements
10. Diffusion lens for homogeneous symbol illumination
11. Brightness sensor for automatic brightness control
12. Keypad foil transparent and roughened because of durable polyester, printed on the back in freely selectable color and design versions, individual symbol choice for small quantities due to laser processes, front-side printable with logo or application-specific information (optional)
13. Doming elements (optional) for haptic separation of the individual operating fields

TECHNICAL FEATURES AT A GLANCE

▶ Keys parametrisable in different fixed states, or full control via CAN information (colour, brightness or flashing)

▶ Absolute colour fidelity during dimming even at the lowest brightness settings

▶ Bar graph LEDs assignable to 60 different positions and individually selectable colours (red, green, yellow, white, blue, orange)

▶ Connection of external encoders for operation of CAN based function parameters

▶ Two Inputs to control the location lighting, the idle bus or as digital input

▶ Flashing frequency freely parametrisable with customisable flashing harmony (range: 0.2 Hz – 50 Hz)

▶ CAN speeds of 20 kbit/s up to 1 Mbit/s, adaptable to existing CAN systems

▶ CAN messages bit-by-bit freely configurable in a graphical symbol editor to illustrate the entire network communication

▶ Build your own graphical user interface for your device within minutes using the handy FlexGUI interface, freely delivered as part of the miunske-toolchain

▶ Use internal flash memory for your own purposes, write- readable by CAN, e.g. for redundant data storage or machine parameters

▶ Cyclic sending of a freely configurable, fixed value as CAN message for function monitoring and self-diagnosis (heartbeat)

▶ Software update in the installed network, during runtime

▶ Timeout control (RX) through monitoring received messages based on time

▶ Voltage control through cyclic measurement of supply voltage, signal output if voltage drops below a minimum voltage and/or if the keypad is shut off

▶ Front side, in compliance with IP 67

MIUNSKE CAN KEYPADS - CUSTOMISED CONFIGURATIONS AND COMBINATIONS
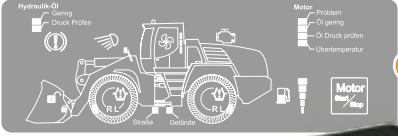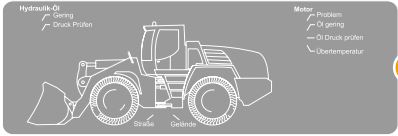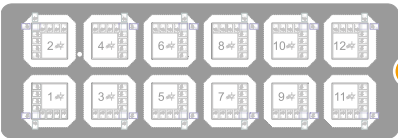
Development of a CAN control unit with application-specific function layout

1. Definition of hardware properties
Each field is defined either as a mere display field or a combined display/actuation field. Each switching and display field on a miunske CAN keypad can be configured with a vertical or horizontal bar graph display. The maximum number of possible bar graph displays depends on the layout (12 button keypad with max. 4 fully equipped bar graphs, for 4 and 6 button keypads, max. 2 bar graphs). Alternatively, individual bar graph LEDs can be punctually actuated on several fields.

2. Creation of the functional design
The first step is to define the functions: what function is to be assigned to each individual switching and display field. For the layout of the backlit symbols and status fields, developers can draw from an extensive database with graphics, which is part of the miunske-toolchain software. The database can be complemented with individual symbols anytime. In subsequent production steps, a special laser procedure incorporates these symbols in a transparent surface.

3. Surface design and cover foil
In addition to the switching and display fields, the keypad foil can also be printed with a functional representation. This way, explanatory hints and pictograms can be integrated. In the simplest case, the manufacturer's logo is placed here.

4. Procurement of application-specific keypad hardware
The finished foil layout. Small batches of switching and display fields are manufactured cost-efficiently using laser technology. Larger batches are realised by means of printing technology.

TECHNICAL DATA OF CAN KEYPADS

Description [number of display fields]	CAN keypad 4	CAN keypad 6	CAN keypad 12
Article number	N6-2001-4000	N6-2001-2000	N6-2001-0000
Size (W × H × D) [mm]	63.4 × 58.4 × 28.8	90 × 58.4 × 28.8	168 × 55.8 × 28.8
Weight [g]	80	90	110
Protection class (front)	IP67	IP67	IP67
Pull-down digital switching inputs	2		
CAN interfaces	1 × ISO11898		
Bus protocol	J1939, CiA447, CANopen, FireCAN		
On-board power supply [V]	12 and 24 (9−36)		
Quiescent current consumption at 12 V [mA]	≥2/4		
Baud rates [kBit/s]	20; 33,3; 50; 83,3; 95,2; 100; 125; 250; 500; 800; 1000		
Accessories	CAN USB interface, miunske-toolchain parametrising software		

63,4 51,0

90,0 76,0

58,4 47,5 28,8

168,0 155,8
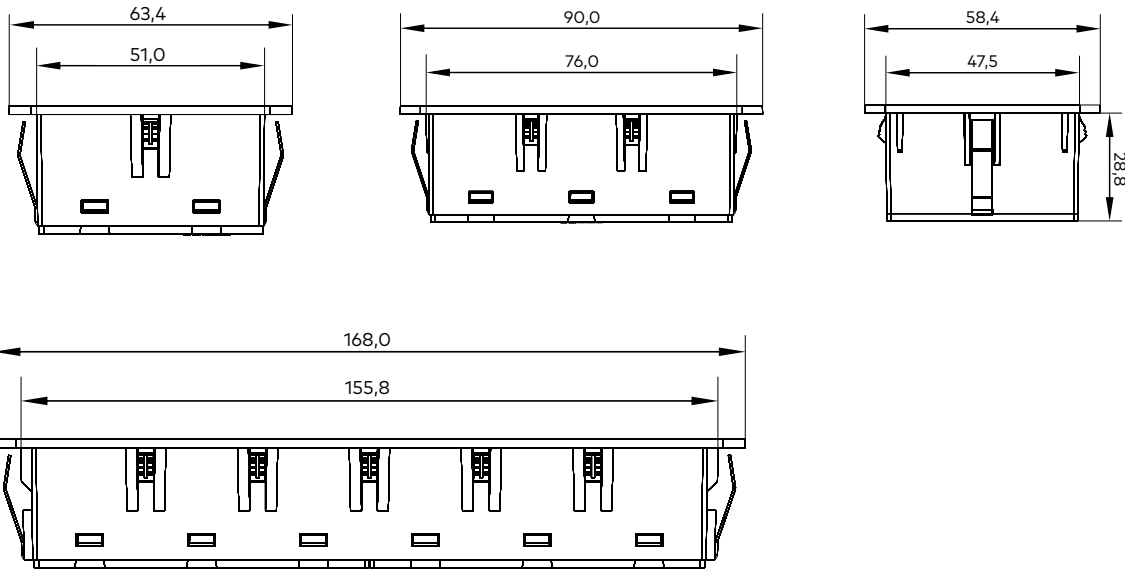
THE SOFTWARE FOR CAN SOLUTIONS

toolchain
by miunske

Good products need good developers. And good developers need good tools. Otherwise, a lot of time and energy will be lost with unproductive work. This creates frustration and prolongs development times. An efficient development environment is therefore an important building block in the CAN world of miunske.

The miunske-toolchain software package developed in-house offers a uniform interface for parameterization and configuration of processor-controlled electronic components. This software package comes free of charge with hardware components. Thus, miunske® provides a holistic, flexible and cost-effective tool to develop individual control components for commercial vehicles. With every new product development, the miunske-toolchain expands.

You can find the software miunske-toolchain for free download at
miunske.com/en/service/download

5 STEPS TOWARDS YOUR CUSTOMISED KEYPAD

Step 1:
Install the Toolchain software on your PC.

Step 2:
Connect a CAN interface to the PC's USB port.

Step 3:
Connect the CAN keypad to the connecting adapter and power supply.

Step 4:
Start the Toolchain software on the PC. Set the baud rate to 250 kBit/s and let the software locate the device.

Step 5:
Done! Now you can start development work: Use miunske-toolchain to draft your own keypad configuration.

DESIGN OPTIONS OF CAN KEYPADS

SYMBOLS & BARGRAPH

Multicolor LEDs enable to display the field symbols in all colors (RGB).

Up to 5 additional unicolour LEDs per field can be used in horizontal or vertical orientation as a

DESIGN OF FOILS Colors, Fields, Layout

The transparent material of the keyboard foils can be printed in all color and design variations (CMYK).

It is possible to apply customized graphics such as vehicle contours or logos.

HAPTICS OF FOILS

Doming variants haptically support the secure use of the panel keys:

a) grid doming black **b)** grid doming transparent **c)** doming pads transparent black-rimme **d)** doming pads transpare

ⓘ When using the light sensor, please select the grid doming transparent or doming pads.

KEYPAD FRAME Standard & Deluxe

In addition to the standard black frames various color variants as well as decorative metallic coatings are available.

The different metallic coatings are available in gloss levels "polished" or "satin-gloss finish":
• chrome • copper
• stainless steel • gold

PROTECTION CLASS IP67

The IP67 option on the front side of CAN keypads is realized by frames with sealing in combination with metal holding brackets on the rear. The metal holding bracket pushes the keypad on the surface of the installation location to guarantee IP67 protection, especially on rough surfaces.
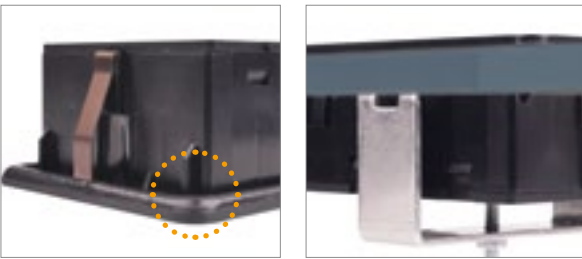
HOLDING CLIPS FOR DIFFERENT MATERIAL THICKNESSES

Holding clips of different lengths are available for a secure installation of CAN keypads. For installation locations with material thicknesses > 5mm (e.g. furniture chipboard) shorter holding clips ensure the proper fit of the keypad.

LATERAL PLUG CONNECTION

Installation situations with the lowest depths can be realized by lateral plug connection instead of the standard connection with a routed cable to the rear side.

COMBINATION WITH ENCODER

It is possible to add external encoders. 6-field keypads can be equipped with one encoder, 12-field keypads with two encoders. The length of the 152 mm connecting cable is customizeable on request.

ⓘ You will find the form „CAN-keypad_form" for defining individual keyboard configurations in the download area at www.miunske.com.

Equipment, options, accessories
Miunske's CAN keypads can be configured in a variety of ways, but best with our simple registration sheet. And if there are questions, our consultants are happy to help.
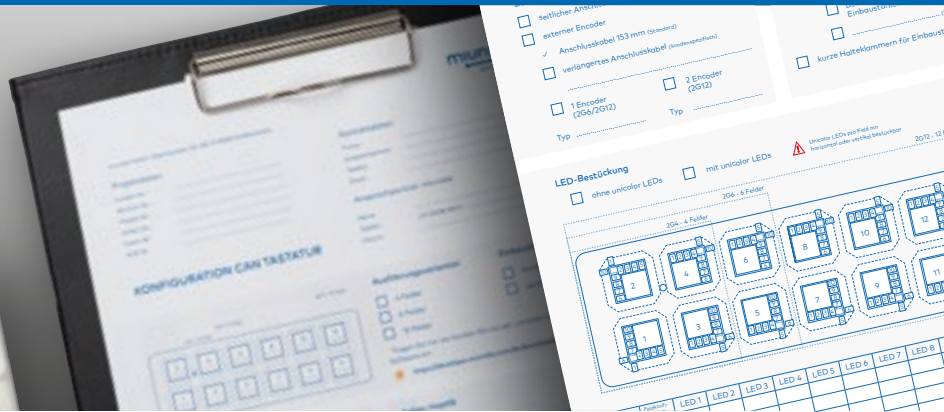
HARD AND SOFTWARE FOR THE DEVELOPMENT OF CAN SOLUTIONS

MIUNSKE CAN-STARTER KIT

Unpack, plug in, develop - our CAN sample kit is individually assembled and contains exactly the hardware components you need to develop your CAN controller. You can order it for trial or permanent use in your development environment.
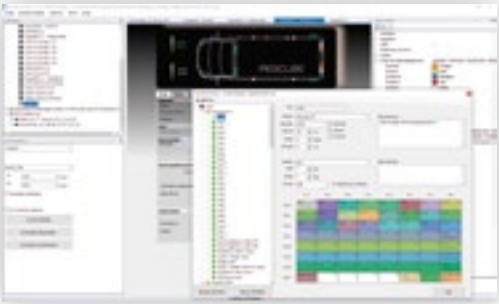
Using the miunske-toolchain software for Windows, CAN devices can be parameterized directly on the PC.

TECHNICAL ACCESSORIES FOR CAN KEYPADS

CAN connecting adapter
Serves as power supply for miunske CAN devices and adapter for CANfox.

CANfox
CANfox is the interface between miunske CAN devices and the computer. The connection is made via the computer's USB interface.

Programming adapter
For all miunske CAN devices incl. power supply and all device adapters.

DIN mounting frame
For mounting CAN keypads (single and combined) available for 4, 6 or 12 CAN keypads.

Further accessories

DESCRIPTION	Article number/note
Micro MATE-N-LOK 3 mm socket housing, 6-pin, 2x3, black	0-0794617-6
Micro MATE-N-LOK 3 mm socket housing, 0,2 - 0,6 mm², tin-plated	0-0794610-1
Micro MATE-N-LOK 3mm with CAN terminating resistor 120 Ohm for Y adapter cable	W3-0000-0130
Cable set for CAN keypad 4m, 6m with/without terminator	on demand
Y adapter cable Micro MATE-N-LOK 3 mm for CAN keypads, 20 cm and other lengths, 2x plug, 1x socket	on demand

toolchain
by miunske

You can find the software miunske-toolchain for free download at
miunske.com/en/service/download

MODULES FOR CAN COMMUNICATION IN COMMERCIAL VEHICLES

Designs of miunske® CAN I/O modules

1 CAN I/O module "Standard" 1–4
2 CAN I/O module "Nano"
3 CAN I/O module "Power" 5

At miunske®, we believe in the strategy of solution-based application of CAN products. This means that CAN I/O modules can be used in existing CAN networks or designed as a stand-alone CAN system created from Miunske components. With CAN I/O modules, CAN gateway and CAN WLAN interface, we offer a complete product family for CAN technology in commercial/special vehicles and mobile working machines. This enables us to develop tailor-made solutions for our customers.

As a provider of systems for commercial vehicle electronics, we know that switching high currents is of crucial importance to our customers. All I/O modules with Miunske power outputs can permanently **switch currents up to 5A** per output. This means that the additional power relays required by other modules are not required here. All outputs are protected against overload, short-circuiting and excessive temperatures.

Miunske's components for commercial vehicle electronics are of robust design. Nevertheless, replacement of parts is day-to-day business in your industry. Therefore, miunske's CAN modules are easy to exchange. You do not require specialist knowledge in order to exchange hardware.
System administrators can program the exchanged assemblies via a service interface (using CAN connection) with the CAN function parameters.

SMALL AND FLEXIBLE WITH I/O NANO

This I/O module **can be plugged in a mini relay socket** and allows for **cost-efficient** expansion of systems with up to two inputs and outputs. The integrated PLC realises functions such as time-delayed switching, voltage monitoring, pulse-width modulation, A/D conversion etc. The IO Nano is available in **various versions with high-side, low-side or analogue outputs** and is **freely programmable** for specific applications.

CAN I/O module "Nano" – the smallest module of the product family

FOR RETROFITS OR NEW PROJECTS - I/O1, I/O2, I/O3, I/O4

The miunske I/O modules I/O 1 to I/O 4 were developed and optimised with the focus on "retrofitting" and easy expansion of existing CAN systems and coexistence of conventional wiring and a local CAN system. Therefore, the plug-in connections of these I/O modules are designed to fit **two "mini relay sockets"**.

Another benefit for use in existing architecture: **All inputs can be configured individually – both analogue and digital (pull-up/pull-down/analogue)** and programmed to receive the incoming input signal type. This enables component providers to use one system for different CAN architectures in different basic vehicles.

The I/O modules type I/O2 and I/O3 have been developed focusing on functional reliability of contacts, particularly for cold signals. During the switching operation, the **input can drive an increased current of 2 to 32 mA**. This counteracts contact corrosion. This in turn is cost-efficient and increases your system's service life.

I/O 2 module – fits two "mini relay sockets"

BETTER PERFORMANCE WITH I/O 5

Many customers want even more functionality of the components. We responded with the development of the I/O 5 module. With 12 inputs and outputs in all, the I/O 5 provides for an even more comprehensive range of application options. Optionally, the 12 outputs can be separated into 6 high-side and 6 low-side outputs. Up to 6 **outputs are galvanically decoupled from the supply voltage,** thus enabling control of safety-relevant consumers with separate power supplies.

1. Expansion socket for relay or fuse holders
2. Screw-on plastic brackets

Install I/O 5 flexibly

Parallel to the electronics of the IO5 module, Miunske developed a **universal housing** that is equipped with a **multi-version mounting system** and provides for different mounting options. The housing accommodating the I/O5 is available in the following variants:

• With metal or plastic brackets
• Mounting option on EN 50022 top-hat rail
• Clip-on option to existing housings
• With different levels of insertion for printed circuit boards

Furthermore, the latching of mini-relay sockets and / or fuse holders is possible. The housing cover can be realized by a separate screw-on front panel (IP53) or in potting technique (IP67).

MIUNSKE – PROJECT PARTNER FROM A TO Z

In-house developments and system solutions must meet the specified requirements and function reliably. In addition to each individual component, the perfect interaction of all components is crucial. Miunske helps you to realize individual projects, from the development of the prototype to serial production. You can rely on our expertise.

Whether it is about the special functionality of a CAN module, a central electrical system or a complex CAN system - the development department of miunske is the point of contact for problem solutions that need to be rethought.

The range of services include consulting and conception, project planning and circuit development as well as the preparation of feasibility studies. Upon request, our engineers and computer scientists also develop suitable software solutions.

CAN MODULES AT A GLANCE

		I/O Nano		I/O Standard				I/O Power I/O5	
		High Side	Low Side	I/O1	I/O2	I/O3	I/O4	High Side	Low Side
	Article number	N6-3007-0001	N6-3008-0001	N6-3001-00xx	N6-3002-00xx	N6-3003-00xx	N6-3004-00xx	N6-3005-00xx	N6-3006-00xx
	Size [W × D × H] [mm]	30 × 30 × 50		30 × 60 × 60				150 × 60 × 88	
	Moulded	-		-	-	-	-	-	×	-	×
	Weight [g]	35		60				150	700	150	700
	On-board power supply [V]	12 and 24 (9 – 36)							
	CAN interfaces	1 × ISO11898							
	Busprotokoll	J1939, CiA447, CANopen, FireCAN							
Mounting	Pluggable in mini relay socket	×		×				-	
	for top-hat rail	-		-				×	
Inputs	Quantity	2	2	2	8	12	2	12	
	Constant current source				×	×	×		
	digital (pull-up/pull-down)	0/2	0/2	0/2	×/×	×/4+×	0/2	12/0 0/12 7/5 5/7	12/0 0/12 7/5 5/7	12/0 0/12 7/5 5/7	12/0 0/12 7/5 5/7
	for analogous use	2	2	2	8	12	2	8	
Outputs	Power outputs 5 A high-Side/low-Side	2/0	0/2	4/0	4/0	-	6/0	12/0	12/0	0/12	0/12
	Low-voltage outputs	6 (Σ 350 mA)		-	-	-		-	
	PWM outputs	×		×		×		×	
	Current-monitored outputs	×		×	-	×		6	
Safety	Protection class	IP53		IP53				IP53	IP67	IP53	IP67
	Short-circuit, overload and overtemperature proof	-		×					
	e1 72/245 E1 R10	-		×					

TECHNICAL ACCESSORIES FOR CAN MODULES

|		I/O Nano	I/O 1	I/O 2	I/O 3	I/O 4	I/O 5
Attachment							
Bracket for insertion in relay housing	Metal	×	×	×	×	×	×
	Plastic, black	×	×	×	×	×	-
Connections							
Mini relay socket 4 × 2.8 mm + 5 × 6.3 mm	K9-1120-0001	×	×	×	×	×	-
	with expansion socket and block forming option for both sides K9-1120-0010	×	×	×	×	×	-
	with expansion socket and block forming option for both sides K9-1120-0011	×	×	×	×	×	-
Junior-Power-Timer housing, 16-pole (2 × 8) with lock, for Seal	Coding A1	-	-	-	-	-	×
	Coding B1 grey	-	-	-	-	-	×
Connecting adapter for CAN interface on 16-pole JPT-socket housing; 0.5 m		-	-	-	-	-	×

For suitable accessories complementing our modules, please see our online catalogue on www.miunske.com.

FlexGUI –
THE PARAMETERIZATION INTERFACE FOR CUSTOMER-SPECIFIC PRODUCTS

Whenever it comes to adapting existing hardware-related products or developing a new product entirely according to individual wishes, the customer needs a special user interface for this purpose. Which means he can parameterize his component himself. However, the cost of providing such surfaces is often disproportionate to product development.

With FlexGUI, miunske® provides an individual graphical user interface for every programmable product. In addition of setting the software parameter, FlexGUI also offers the option of storing graphic elements such as logo, company CI and language-dependent explanations. This can be independently extended and adapted by the customer to translate descriptions and help texts for individual parameters into another language or to explain certain functions with graphics.
The parameterization interface integrated in miunske-toolchain allows access to the parameter set and its adaptation. In particular during test phases or during support, this creates flexibility and shortens development times.
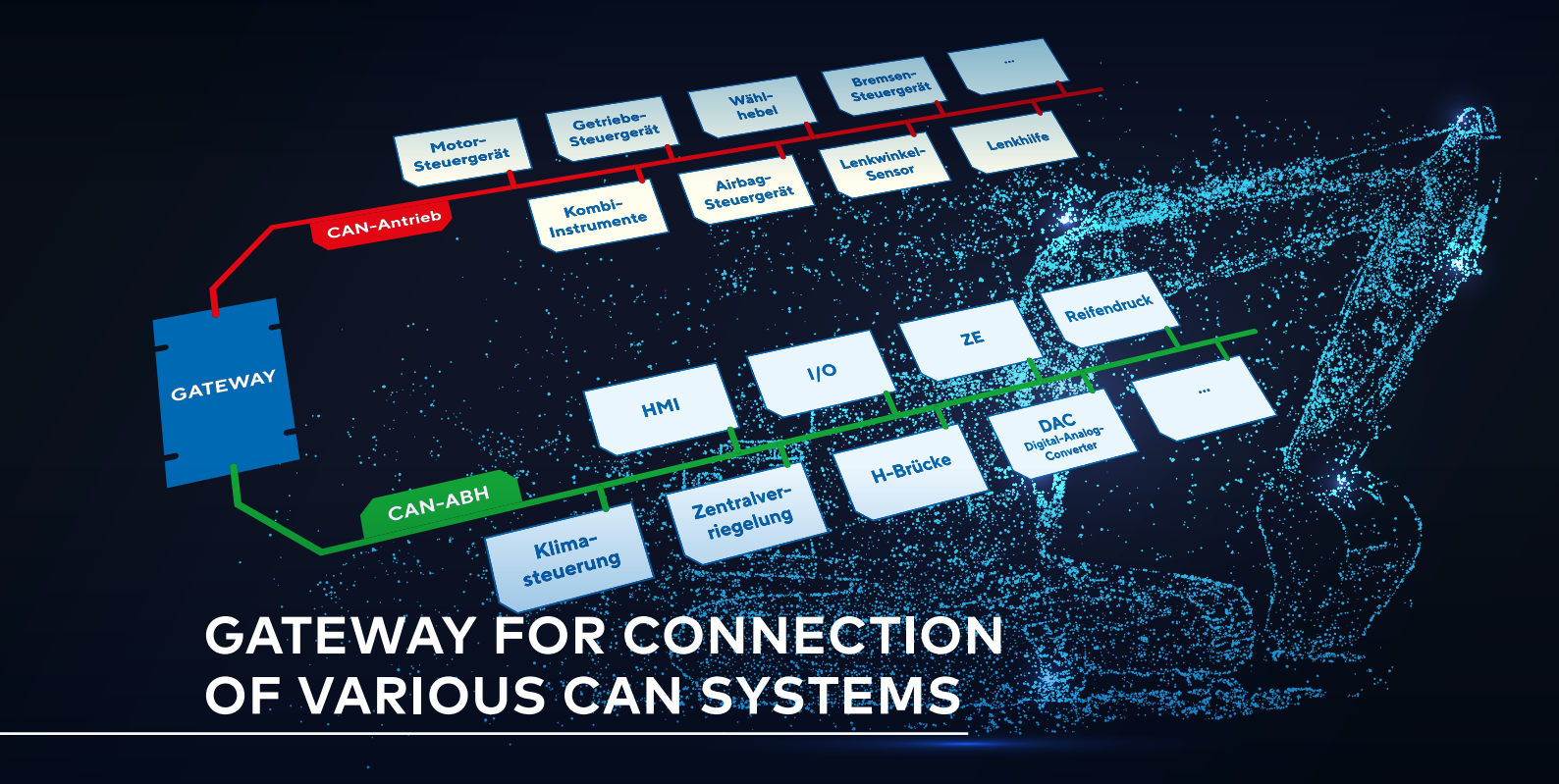
GATEWAY FOR CONNECTION OF VARIOUS CAN SYSTEMS

The miunske® Gateway allows you to use information from other, already established CAN networks. This product provides manufacturers with the opportunity to provide **interfaces for external applications** on their machines without allowing access to their own network. Furthermore, manufacturer of bodies and special vehicles have the opportunity to tap into **application-specific information from closed CAN networks.**

Extended possibilities with CAN Gateway
- Creation of interfaces for external applications on the machine without granting access to the own network
- Access to application-specific information from closed CAN networks such as a drive CAN
- Restructure data for other applications/protocols
- state simulation

The miunske CAN Gateway fits (same as the I/O Nano) all miunske mini relay sockets

Technology at a glance

		Gateway	
		unidirec-tional	bidirec-tional
	Article number	N6-3000-2000	N6-3000-2010
	Size W × D × H [mm]	30 × 30 × 60	
	Moulded	-	
	Weight [g]	35	
	On-board power supply [V]	9-36	
	CAN interfaces	2 × ISO11898	
Mounting	Pluggable in mini relay socket	×	
	for top-hat rail	-	
Inputs	Quantity	1	
	Constant current source	-	
	digital (pull-up/pull-down)	0/1	1
	for analogous use	-	
	Frequency measurement	-	2 Hz - 40 kHz
Outputs	Power outputs 5 A high-Side/low-Side	-	
	Low-voltage outputs	-	2 (per 400 mA)
	PWM outputs	-	
	Current-monitored outputs	-	
Safety	Protection Class	IP 53	
	Short-circuit, overload and overtemperature proof	-	
	e1 72/245 E1 R10	×	

CAN WLAN INTERFACE

WLAN FOR COMMERCIAL AND SPECIAL VEHICLES AND MOBILE WORKING MACHINES

With this interface, the **WLAN technology can be used easily and inexpensively** in commercial and special vehicles or mobile work machines. The module not only allows dial-up into existing Wi-Fi networks, but also provides its own network that allows **independent connection with any Wi-Fi enabled device** such as PC or tablet. The degree of cross-linking achieves a multitude of applications - from vehicle diagnosis and monitoring to fleet management. The CAN WLAN interface is available in 2 different designs.

TECHNICAL SPECIFICATIONS

	N6-4001-0001	N6-4002-0001
Size (W × D × H mm)	30 × 30 × 60	130 × 95 × 43
Housing	Standard relay socket	CINCH ModICE housing
Weight (g)	31	199
On-board power supply (V)	12V, 24V and 48V (9V-60V)	
CAN interfaces	ISO11898	
Bus protocol	application-specific	
Inputs	2 × CAN	
Processing rate	50-100 CAN messages per second	
Transmission standard	802.11 a/b/g	
Range	approx. 30 m bidirectional	
Baud rates	adjustable from 33 kBit/s to 1 MBit/s	
WLAN frequency band	2,4 GHz	
Connection	Standard relay socket	18-pin SHS plug
Protection class	IP 53	IP 67

HIGHLIGHTS

- Cost effective interface for wireless transmission of vehicle data
- Two housing versions for IP 53 and IP 67
- miunske provides the parameterization software free at www.miunske.com/en/service/download

CAN MULTI-SOUND-MODUL

MULTI-SOUND-MODULE WITH CAN INTERFACE AND SOUND DATABASE

With the large number of acoustic signals in the cockpit, it is important that they are assigned quickly and safely. Miunske's Multi-Sound-Module helps drivers to immediately recognize every acoustic message in the cabin. There are a variety of signal variants and voice messages available.

The module, equipped with a CAN interface to ISO11989, offers a wide variety of sounds, noises, voice messages or melodies. The signals can be controlled via CAN and retrieved from the integrated sound database. A special CAN protocol is not used. Functions for use in CAN networks with protocols such as J1939 or CANOpen can be implemented via customer-specific adaptations.

In addition to the CAN interface, there are 6 additional digital inputs, for example to play a certain analogue sound (for example turn signal click/ click) or to mute the module (mute function).

TECHNICAL SPECIFICATIONS

Size (W × D × H mm)	111 × 34 × 102
Weight (g)	120 g
On-board power supply (V)	9 to 36
CAN interface	ISO11898
Bus protocol	application-specific
Inputs	2 × CAN and 6 x digital, pull down
	1 × Line In Mono for external audio sources
Sound output	Edge-triggered, 8 different tones can be parameterized
max. volume level	95 dB (A)
Connection	Molex SD-33472-121
Mounting	with fastening straps
Protection class	IP67

HIGHLIGHTS

- Parameterizable via USB
- Usable as active loudspeaker via line in input
- Clock signal input for e.g. blinker function with a separate tone for rising and falling edge
- Supply voltage monitoring with separate sound

Further application examples of miunske CAN world
www.miunske.com/en/news/customer-magazine-bywire

miunske