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MIUNSKE CAN WORLD
ENGLISH

CAN Switch and display units

CAN Development tools

CAN Modules

CAN Gateway

miunske
SYSTEMS FOR COMMERCIAL VEHICLE ELECTRONICS

YES WE CAN

## REFERENCES FROM THE MIUNSKE CAN WORLD

CAN systems in rescue missions
Application at B.A.U.S AT
www.miunske.com/de/CAN-Rettung

Police department shifts up a gear with Miunske
Application at Baumeister & Trabandt
www.miunske.com/de/CAN-Polizei

Four-wheel drive control for IVECO Daily 4x4 All-Road by Achleitner
Application at Achleitner Fahrzeugbau
www.miunske.com/de/CAN-4x4

www.miunske.com
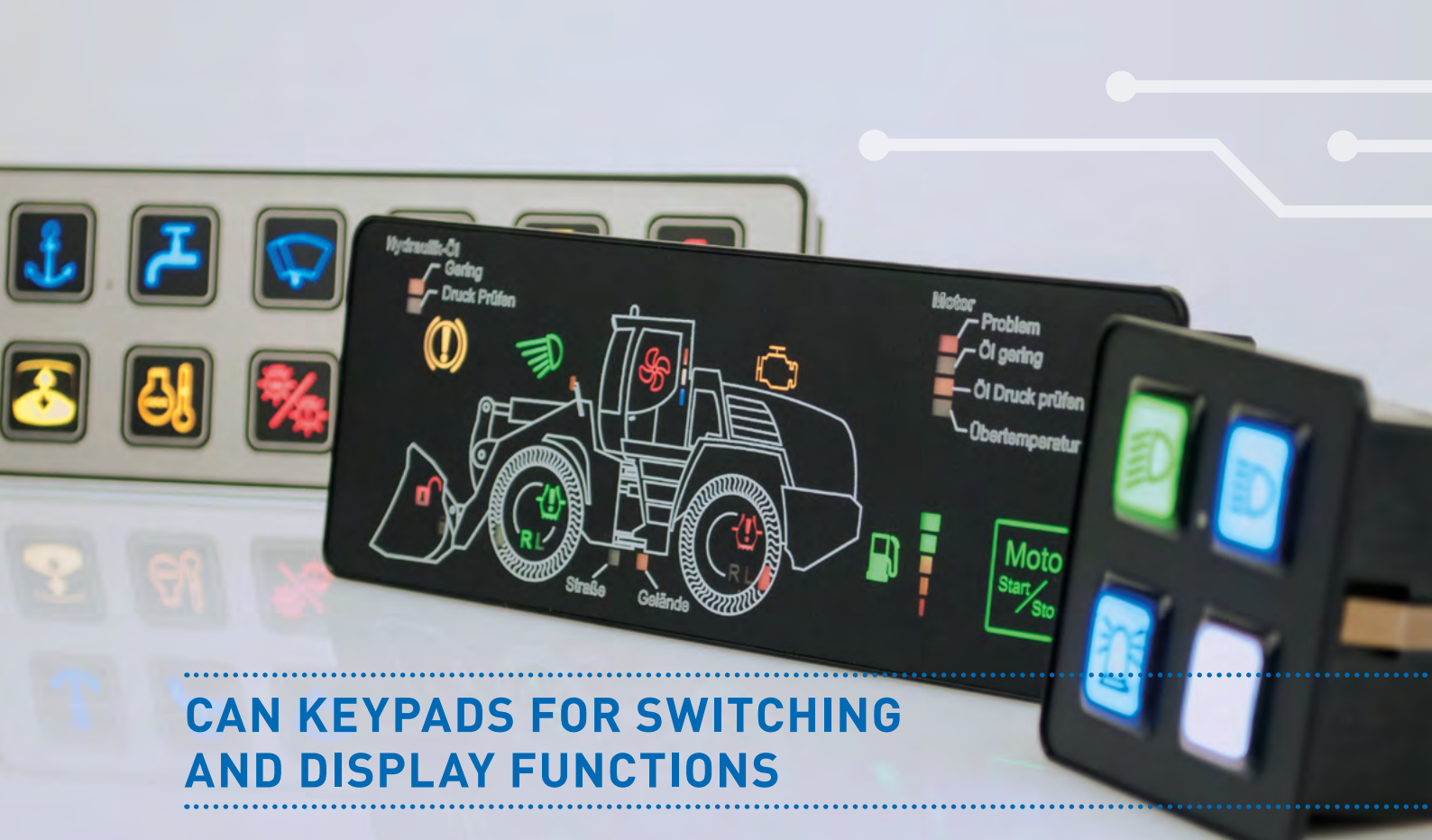
CAN KEYPADS FOR SWITCHING AND DISPLAY FUNCTIONS

Today, drivers' cabs in vehicles (whether utility vehicles or special purpose vehicles) are more and more resembling the cockpit of an airplane or a control centre. Requirements regarding ergonomics, operability and visual perceptibility and design are becoming increasingly stringent. Miunske switch and display elements – we refer to them as CAN keypads – set the standard in modern utility vehicles

Utility vehicle drivers handle immense powers, move large quantities of often critical goods and are travelling at high speed. Often in rain, snow and darkness. A workplace unforgiving of mistakes, which - when working under difficult conditions - are just a handbreadth away. The perfect night design, robust construction and individual design options of Miunske CAN keypads provide drivers and users with precisely that safety they need in their tough daily work routines.

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. At the same time, all light shafts are deep enough to comply with any thermal requirements.

Even at full level control, when brightly illuminated by sunlight. Even so, at 25 mm, installation depth is significantly lower than in conventional rocker switches. And by the way, length and widths of our CAN keypads are designed to fit standard panel dimensions. This way, they can be easily installed either vertically or horizontally in existing recesses. An integrated light sensor automatically adjusts lighting intensity. This is based on pulse width modulation in order to maintain colour accuracy even in poor lighting conditions. By using multi-colour LEDs, the individual display elements can be illuminated in any colour. The precision graduation even provides for adaptation to individual colour schemes or predefined product designs.
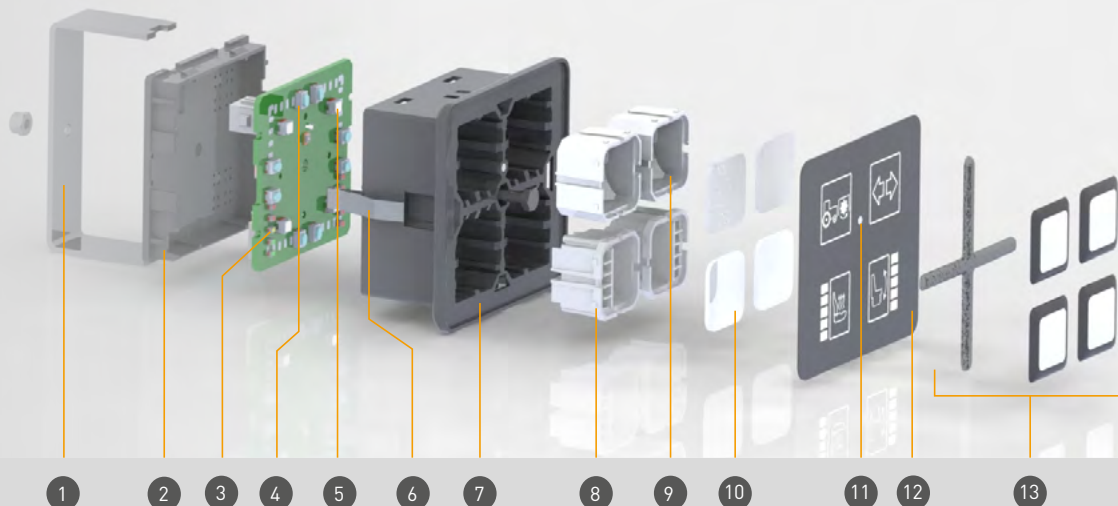
1. **Support bracket with screw fitting** (optional) for panel-mounted version IP67

2. **Rear housing cover** for mechanical protection of electronics

3. **5 freely selectable unicolour** – LEDs in horizontal and vertical alignment per element with driver based brightness control

4. **2 redundant micro buttons per field** for safe switching behaviour and haptic improvement of switching torque by increasing compressive force

5. **Multicolour high-performance LED** with driver based colour control and dimmer function for status display of the operating and display elements

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

8. **Light well combined for bar graph function** 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. **Sensor eye** for automatic brightness control

12. **Foil, transparent and roughened,** made of durable 200 μm thick polyester > Rear printed in freely selectable colouring and design versions > Symbols individually selectable for small lots per laser method > Front side printing with logo or application-specific information (optional)

13. **Doming elements** (optional) for haptic separation of the individual operating fields

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.

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.

Technical features at a glance

- Two Inputs to control the location lighting, the idle bus or as digital input for analysing on the CAN-Bus.

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

- Bar graph LEDs assignable to 72 different positions and individually selectable colours (red, green, yellow, white, blue, orange)

- Absolute colour fidelity during dimming even at the lowest brightness settings.

- Keys parametrisable in 4 different fixed states, or full control via CAN information (colour, brightness or flashing)

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

- CAN messages can be freely parametrised bit-by-bit and both be assigned to the receive (RX) and the transmit side (TX)

- Cyclic transmission of a freely parametrisable fixed value as CAN message, serves as function control and self diagnosis (heartbeat)

- 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.

- Configuration of variables (meta data) for customer-specific functions

- Software update in the installed network, during runtime

- Front side, in compliance with IP 67

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

TECHNICAL DATA OF CAN KEYPADS

	4-button field	6-button field	12-button field
Size (W × H × D) [mm]	63 × 58 × 27	90 × 58 × 27	167 × 58 × 27
Weight [g]	80	90	110
Protection class (front)	IP 67	IP 67	IP 67
Pull-down digital switching inputs	2		
CAN interfaces	1 × ISO 11898		
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, parametrising software		

Mounting dimensions
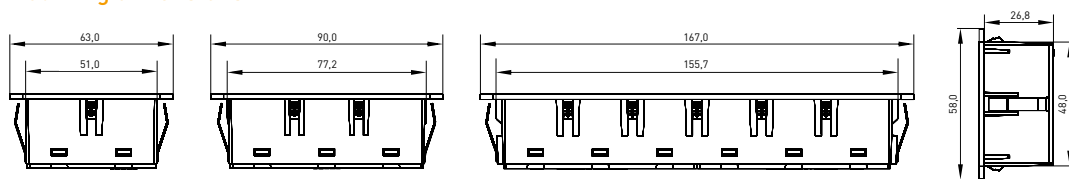
Keypads with encoder

Optionally, CAN keypads can be combined with encoders. For externally connected encoders, one keypad field is connected in parallel for the encoder's switching function. This means that even an encoder without push function can be supplemented with this switching function via this keypad field. If the parallel or extended switching functions are not required, this keypad field can be used as display element or for other functions.

Encoder for control tasks

IP 67 version

In order to meet even the most rigorous demands reliably, all keypad fronts are optionally available in a **dust and water-proof version acc. to IP 67**. Thanks to the cellular rubber seal, they are ideally suited for outdoor applications.

Doming for haptic feedback

Handling a machine requires the operator's full concentration and even small distractions can be safety-critical. For this reason, we offer our CAN keypads in **2 doming versions which ensure blind keypad handling**. For haptic user support, keypads may feature a grid structure, which makes individual keys clearly discernible from each other. Or buttons may feature domed surfaces, the so-called doming pads. These buttons are slightly elevated. For customised installation, we will gladly supply you with a positioning aid.

Surface and frame designs

CAN keypads can be further customised by application-specific surfaces. In addition to the classical, robust and black surface, you may choose from sportive designs with an aluminium or carbon appearance. If however the cockpit must look particularly classy, it is possible to use the wooden appearance. You can even choose the haptic design of the surface. In line with surface design, the frames of CAN keypads can be individualised. In addition to the black standard version, clients can also choose from various metal design options.

The haptic control elements can be located just by touch.

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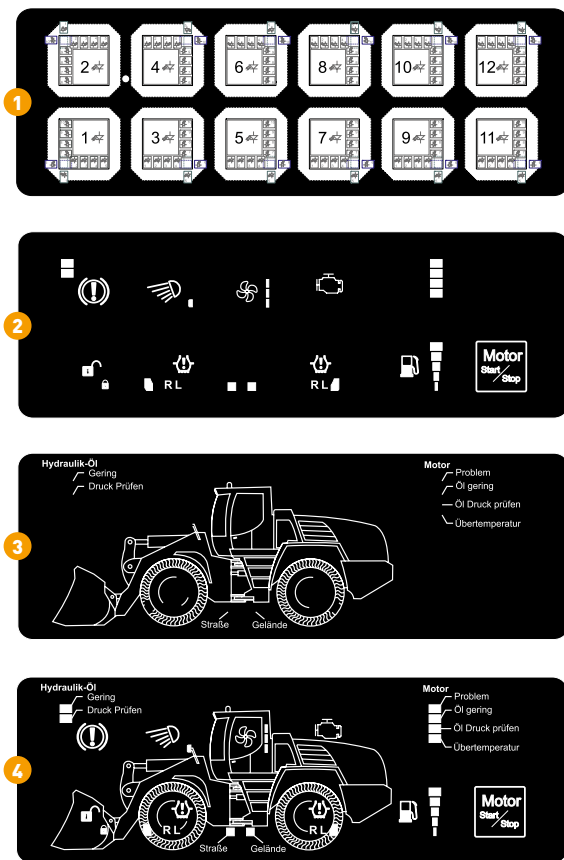
Development of a CAN control unit with application-specific function layout

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 depend 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.
**Procurement of application-specific keypad hardware**

④ 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.

Example of a 12 button keypad for important control and display functions of a construction machine.

Development made easy

For optimal support with the Miunske CAN system, developers are provided with the Miunske software Toolchain. This developer software offers multifaceted functionalities aiding in the creation of keypad layouts. Read more on the following pages in chapter „Toolchain".
Developer keypads for rapid modification of settings in the draft, construction and trial phase.
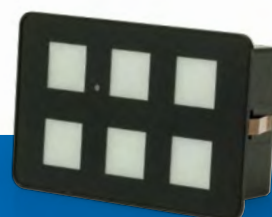
For developers:
Keypads in the development phase. In the development phase, settings for switching and display logic are constantly being changed. For this scenario, we provide our customers with special developer keypads the button assignment of which can be swiftly and easily changed.

HARD AND SOFTWARE
FOR THE DEVELOPMENT
OF CAN SOLUTIONS

Good products need good developers. And good developers require good tools. Otherwise, a lot of time and money is lost on unproductive tasks. This not only leads to frustration, but development cycles are much longer. Therefore, a productive development environment is a key factor in the Miunske CAN World.

MIUNSKE CAN-STARTER-KIT

Unpack, plug in and develop - the CAN starter kit contains exactly all the hardware components which are necessary for you to develop a CAN keypad.

»Toolchain« - the free Miunske software for developers – available for download under: **developer.miunske.com**.
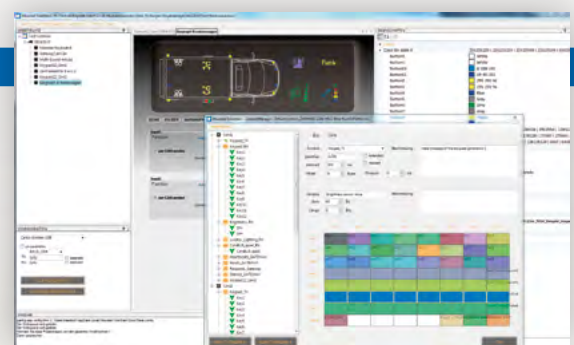
CANfox

CANfox is the interface between Miunske CAN devices and the computer. The connection is made via the computer's USB interface. Miunske CAN devices are connected via DIN socket and CAN connecting adapter.

CAN connecting adapter

Serves as power supply for Miunske CAN devices and adapter for CANfox.

6 button developer keypad

Optional: Developer keypad (here the 6 button version): This keypad features a neutral cover foil, which allows for free assignment of switching and display elements during the development phase.

PCAN USB

As an alternative to CANfox, the Miunske software also supports the PCAN interface, which connects a CAN device to the PC via USB.

PCAN USB Pro

PCAN USB Pro is used for simultaneous connection of two CAN devices.

PCAN PCI

Instead of connecting two CAN devices to the computer via USB interface, connection may also be realised via a plug-in card and PCI express.

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 the Toolchain software to draft your own keypad configuration.

Via the Toolchain software for Windows, Miunske CAN devices can be parametrised directly from your PC.

This is where developers meet!
Continue at **developer.miunske.com**. Here you can order your starter kid and find instructions and inspiration from the Miunske CAN world.

developer.miunske.com

HARDWARE COMPONENTS   CAN   SOFTWARE COMPONENTS   DESIGN
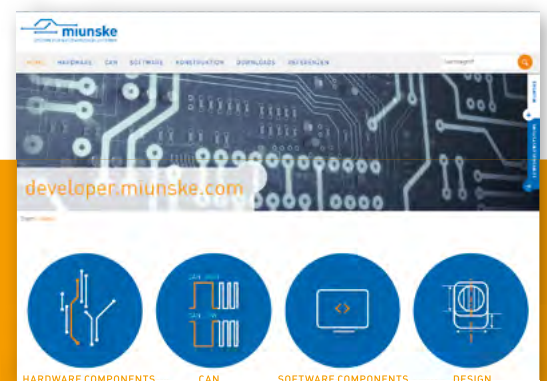
MODULES FOR CAN COMMUNICATION
IN COMMERCIAL VEHICLES

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 the CAN Input/Output modules I/O Nano, I/O 1, I/O 2, I/O 3, I/O 4, I/O 5 and Gateway, Miunske provides you with a full range of CAN technology for the commercial vehicle industry and is thus able to develop customer-specific products.

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

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

IDEAL FOR RETROFITS –
I/O 1, I/O 2, I/O 3, I/O 4

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 IO modules type IO2 and IO3 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"

N6-3006-0001
CAN-IO digitales Ein-/Ausgangsmodul 12/24V
12x Output (je 5 A Low-Side)
12x Input PullDown

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BETTER PERFORMANCE WITH I/O 5

With the development of the I/O 5, we meet our customers' demands for even more functionality. With 12 inputs and outputs in all, the IO5 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.

Flexible mounting options with I/O 5

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 IO5 is available in the following variants:

• With metal brackets
• Mounting option on EN 50022 top-hat rail
• Clip-on option to existing housings
• Mini relay sockets and/or fuse holder can also be mounted
• There are various insert levels for PCBs.
• The housing cover can either feature a separate front panel (IP 53) or be designed in casting technology (IP 67)

① Expansion socket for relay or fuse holders
② Screw-on metal brackets
③ Sockets for commercially available vehicle connectors

CAN MODULES AT A GLANCE

Article number	
Size [W × D × H] [mm]	
Moulded	
Weight [g]	
On-board power supply [V]	
CAN interfaces	
Mounting	Pluggable in mini relay socket
	for top-hat rail
Inputs	Quantity
	Constant current source
	digital (pull-up/pull-down)
	for analogous use
Outputs	Power outputs 5 A high-Side/low-Side
	Low-voltage outputs
	PWM outputs
	Current-monitored outputs
Safety	Protection class
	Short-circuit, overload and overtemperature proof
	e1 72/245 E1 R10

For technical data on the suitable CAN Gateway please refer to page 14, chapter Gateway.

Options and accessories

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

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

I/O Nano		I/O 1	I/O 2	I/O 3	I/O 4	I/O 5			
High Side	**Low Side**					**High Side**		**Low Side**	
N6-3007-0001	N6-3008-0001	N6-3001-0001	N6-3002-0001	N6-3003-0001	N6-3004-0001	N6-3005-00xx		N6-3006-00xx	
30 × 30 × 50		30 × 60 × 60				150 × 60 × 88			
-		-	-	-	-	-	×	-	×
35		60				150	700	150	700
12 and 24 (9 - 36)									
1 × ISO11898									
×		×				-			
						×			
2	2	2	8	12	2	12			
			×	×	×				
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
2	2	2	8	12	2	8			
2/0	0/2	4/0	4/0	-	6/0	12/0	12/0	0/12	0/12
6 (∑ 350 mA)		-	-	-	-				
×		×		×		×			
×		×		-	×	6			
IP 53		IP 53				IP 53	IP 67	IP 53	IP 67
-		×							
-		×							

	I/O Nano	I/O 1	I/O 2	I/O 3	I/O 4	I/O 5
	×	×	×	×	×	×
	×	×	×	×	×	-
	×	×	×	×	×	-
	×	×	×	×	×	-
	×	×	×	×	×	-
	-	-	-	-	-	×
	-	-	-	-	-	×

To the Miunske CAN world
Explore on www.miunske.com

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, such as a drive technology CAN.

CAN GATEWAY OPENS UP NEW WORLDS

The Miunske CAN Gateway connects the Miunske CAN world with networks based on different standards. The hardware is flexible enough for one Gateway supporting all major CAN standards.

J 1939
Commercial vehicles (digger, tractor or similar)

CAN OPEN
Commercial vehicles

CAN GATEWAY

CIA447
Rescue vehicles, emergency doctor, police

FIRE CAN
Fire Brigade

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

Technical features at a glance

|		Gateway	
		unidirectional	bidirectional
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 sockets	×	
	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	×	

CIA447 READY BY MIUNSKE

The high-performance CAN keypads can be easily integrated in existing CiA447 CAN worlds. These keypads are pre-configured and ready for installation, in other words: „CiA447 Ready". You only have to plug in and parametrise them.

Example application: Roof frame control with Miunske CAN in CiA447 network

With its CAN keypads, Miunske offers switch and display units that are much superior to other solutions. Via the CAN Gateway, these keypads easily integrate into existing CAN architectures and supplement or replace existing operating controls. For example, it is possible to expand control and display elements for roof frames based on the CiA 477 standard.

CAN Keypad

CAN Gateway

CAN Keypad
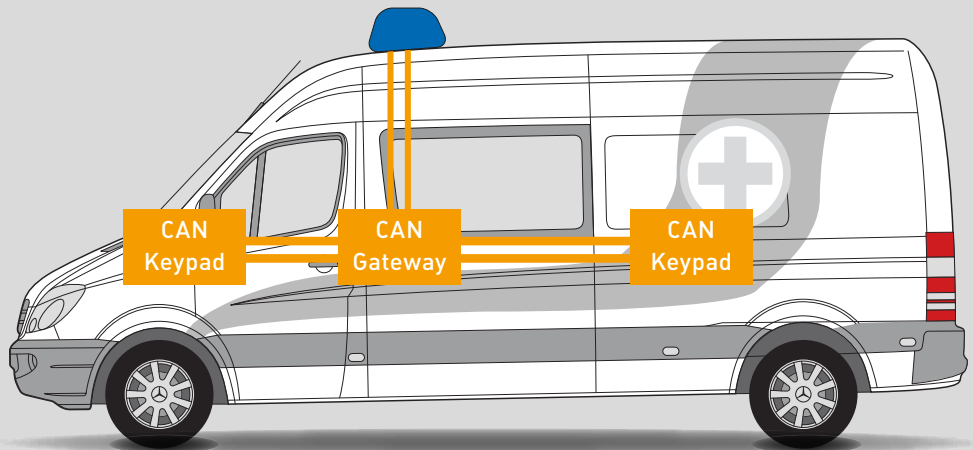
Here you can find application examples from the Miunske CAN world.
The Miunske magazine ByWire regularly reports on exiting and exceptional solutions from the Miunske CAN world. For example the control for an emergency vehicle for undercover investigations or the four-wheel drive control for an IVECO Daily 4x4 All-Road from Achleitner.

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READY FOR TAKE OFF

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