

SAFELINE VARIO

MANUAL

multi-functional safety system

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Table of Contents

1	Structure of the document	1
1.1	Conventions.....	1
1.1.1	Emphasizing information	1
1.1.2	Emphasizing paragraphs using typography	1
1.1.3	Emphasizing words using typography	1
1.2	Your opinion is important to us!.....	2
2	Safety.....	3
2.1	Warnings	3
2.1.1	Function of warnings	3
2.1.2	Design of warnings.....	3
2.1.3	Hazard symbols.....	4
2.2	Qualification of personnel	4
2.2.1	Electrician.....	4
2.2.2	Electrical designers	4
2.3	Intended use and improper use	5
2.3.1	Certification data	5
2.4	Documentation	6
2.5	Safety regulations	6
2.5.1	Retrofitting and conversion.....	7
2.5.2	Basic safety regulations.....	7
2.6	Working on live parts	8
3	EC declaration of conformity	9
4	SAFELINE VARIO modules	10
4.1	Overview	10
4.2	Product description	11
4.2.1	SL VARIO-Designer	12
4.2.3	Application examples	14
4.2.4	Construction	14
4.2.5	Terminals	14
5	Central modules.....	14
5.1	Product description	14

5.2	Overview	15
5.2.1	DNSL-ZMV pin assignment	16
5.2.2	DNSL-ZMVK pin assignment.....	17
5.2.3	DNSL-ZMVD pin assignment.....	18
5.2.4	DNSL-ZMV block diagrams and expansions	19
5.2.4.1	DNSL-ZMV block diagram	19
5.2.4.2	DNSL-ZMVK block diagram (expansion)	20
5.2.4.3	DNSL-ZMVD block diagram (DS1 expansion)	

6.6	DNSL-NIV/NRV network module	37
6.6.1	DNSL-NIV pin assignment.....	38
6.6.1.1	Block diagram	38
6.6.2	DNSL-NRV pin assignment	39
6.6.2.1	Block diagram	39
7	Safety functions.....	40
7.1	Safety circuits	40
7.1.2	Inputs for safety circuits with acknowledgment	41
7.1.3	Inputs for safety circuits with external acknowledgment input	42
7.2	Two-handed monitoring	42
7.3	Inputs for safety mats, switching strips and bumpers on the central module	43
8	Standstill and speed monitoring	44
8.1.1	Features of rotation monitoring	44
8.1.1.1	Requirements for the incremental encoder	45
8.1.1.2	Requirements for the proximity switch	45
8.1.1.3	Overview of measurement systems.....	46
8.1.1.4	Connection options at the measurement inputs on the DNSL-ZMV	47
8.1.1.5	DNCO functions	48
9	Diagnostics and switching status displays	49
9.1	LED indicators	49
9.2	Diagnostics LEDs	51
11	Technical data.....	53
11.1	Supply	53
11.2	Inputs.....	53
11.3	Semiconductor outputs	55
11.4	Contact outputs	56
11.6	Connection data	57
11.7	Environmental conditions.....	57
11.8	Dimensions.....	57
11.9	Safety-related parameters acc. to DIN EN ISO 13849-1:2016-06	59
11.10	Contact service life	60
12	Installation and removal.....	65
12.1	Installing a module.....	65
12.1.1	Overview	65

12.2	Removing a module.....	65
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1 Structure of the document

1.1 Conventions

Information of particular importance is emphasized in this documentation through the use of symbols, typography or formulations.

1.1.1 Emphasizing information

The following symbols indicate important information:



Degree of hazard (e.g. WARNING): Triangular symbols indicate the degree of hazard in warnings.



Type of hazard (e.g. electrical shock dangerous voltage): Triangular symbols indicate the type of hazard in warnings.



Information: Additional clarification.



Tip: Additional information to help optimize the workflow.

1.1.2 Emphasizing paragraphs using typography

The following typography is used to emphasize paragraphs with special functions:

	Indicates an instruction.
	Indicates an expected reaction.
	Indicates an unexpected reaction.
	Indicates an item in a list.

1.1.3 Emphasizing words using typography

The following typography is used to emphasize words with special functions:

(1)	Represents a numbered item in a figure.
	Indicates a cross-reference to another page, figure or document.

1.2 Your opinion is important to us!

We do all we can to provide complete, accurate documentation for the product. If you have any suggestions for improvement or advice for us, please share your thoughts with us. Send us your comments by e-mail to the following address.

E-mail: info@dina.de

2 Safety

2.1 Warnings

2.1.1 Function of warnings

Warnings warn users about hazards when handling the product. The hazards are classified, specified, described and supplemented with information about how to avoid them.

If there is a warning before a list of instructions, the hazard is present throughout the entire activity.

If there is a warning immediately before an instruction, the hazard is present during the next step.

2.1.2 Design of warnings

All warnings are indicated by a signal word

2.3 Intended use and improper use

The product has exclusively been developed for use for the purpose described here. The specifications set out in these operating instructions must be strictly complied with.

- **SAFELINE VARIO** is a multi-functional, modular, configurable safety system.
- The safety system is intended for use on machines and plants to prevent hazards from arising.
- It monitors protective equipment and records/monitors standstill and speeds of electric drives.

Any other form of use is regarded as improper use.

If the product is

not used as intended,
improperly maintained or
incorrectly operated,

the manufacturer will not assume any liability for any damage that results. In this case, the risk shall be borne exclusively by the user.

2.3.1 Certification data

The product is certified as safety equipment in accordance with:

DIN EN ISO 13849-1:2016-06, Category 4, PLe	
DGUV Test: GS-ET-20:2016-10 EC type examination certificate	Notified body: DGUV Test Prüf- und Zertifizierungsstelle, Elektrotechnik, Fachbereich: ETEM Gustav-Heinemann-Ufer 130 50968 Cologne, Germany (Reg. no.: 0340)
EMC Directive	Certified by: ELMAC GmbH Bondorf
CNL, USL	File E227037
QA system certified as per DIN EN ISO 9001:2015	Certified by: DQS GmbH, 60433 Frankfurt am Main, Germany

Note

You can download the certificates from our website:

<https://www.dina.de/downloads>

2.4 Documentation

Documentation contain instructions on how to use a product safely, correctly and cost-effectively. Follow the instructions in these document in order to prevent hazards, avoid repair costs and standstill, and improve the reliability and service life of the product. You must read the operating instructions and ensure that you understand them.

Before working with the , read the operating instructions that come with the product.

SAFELINE VARIO eW*anual

SAFELINE VARIO Designer eW*anual

SAFELINE VARIO Diagnostics eW*anual

You can find the eW*anuals at TJETQq115.22.442.61.418.15.156.02@reW*nBT/F1.9.96.Tf1.0.0

in use.

2.5 Safety regulations

The safety regulations listed below must always be complied with. In the event that these safety regulations are not complied with or the device is used improperly, **DINA Elektronik GmbH** accepts no liability for any resulting injury or damage.

The device must be installed and commissioned by a skilled electrician or a trained, instructed person, who is familiar with these operating instructions and the applicable specifications regarding occupational health and safety and accident prevention.

WARNING

Danger to persons and materials! In the event that specifications are not complied with, this can result in death, severe injuries or significant material damage.

Observe VDE, EN and local regulations, in particular with regard to protective measures.

If the emergency

Assemble the device in a control cabinet with at least IP54 degree of protection. Otherwise, dust and moisture can impair the functions. The device must be installed in a control cabinet.

Ensure that the output contacts have sufficient protective circuitry for capacitive and inductive loads.

Follow the specifications in the general technical data.

Note

More detailed information can be found in the **Technical data** section.

WARNING

Electric shock dangerous voltage! During operation, switching devices conduct

The manufacturer's specifications for the system or machine with regard to maintenance intervals must be complied with.

DINA Elektronik GmbH is not able to make any guarantees regarding the properties of an overall system not designed by the company.

DINA Elektronik GmbH accepts no liability for any recommendations given or implied in the following description.

No new guarantee, warranty or liability claims that go beyond **DINA Elektronik GmbH's** general delivery conditions can be derived from the following description.

To prevent EMC disturbances, the physical environmental and operating conditions where the product is installed must correspond to the EMC section of DIN EN 602041.

If contact outputs are used, the safety function 77 611()-47(rq5()-3(t)-4(e-3(an)dan)-3(77 6a4(t)-4(ac

3 EC declaration of conformity

4 SAFELINE VARIO modules

4.1 Overview

(A)	Central module	(B)	Speed monitoring
(1)	DNSL-ZMVK	(2)	DNSL-DSV
		(3)	DNSL-DRV
(C)	Input/output modules	(D)	Additional
(4)	DNSL-INV	(7)	Bus
(5)	DNSL-IOV		
(6)	DNSL-RMV		
(E)	Fieldbus module		
(8)	DNSL-ECV		

4.2 Product description

SAFELINE VARIO is a multi-functional, modular, configurable safety system.

The safety system is intended for use on machines and plants to prevent hazards from arising.

The safety system consists of a central module and various function modules and fieldbus modules.

A range of safe digital and analog inputs, semiconductor outputs and contact outputs are available.

The status of the inputs and outputs, the operating voltage and other diagnostic functions are indicated by LEDs.

The modules can be parameterized using the **SL VARIO-Designer** graphical programming software.

A storage medium is integrated in the central module. This contains the parameterization software and the operating instructions. The safety application can be transferred via the USB interface and saved in the storage.

The central module can be supplied in three housing sizes, depending on the functionality.

Technical data	
Housing 1 for central module	45.0 mm (1.772 in)
Housing 2 for central module	67.5 mm (2.657 in)
Housing 3 for central module	90.0 mm (3.543 in)
Housing size for all additional modules	22.5 mm (0.886 in)

The modules are constructed on a DIN rail.

Technical data	
Size of DIN rail	35.0 mm (1.378 in)
Number of modules for one application	15

The modules are connected to one another via bus connectors on the rail side.

Potential overvoltages and overcurrents are monitored.



Note

For voltages ≥ 30 V or if there is a wire break at terminal **(A2)**, terminals **(A1)** and **(P)** are switched off internally.

The semiconductor outputs are protected against overload and short circuiting.

4.2.1 SL VARIO-Designer

The **SL VARIO-Designer** graphical programming software en171 0 595.o595l3(i)-471 (p)13(ra471 (p)13(rs

Symbol	Function	Available quantity	Symbol	Function	Available quantity
	Adder	8		Analog input comparator	4
	Subtractor	4		Analog step switch	4
	Copier	4		Threshold switch	2

4.2.3 Application examples

A list of potential application examples for the **SAFELINE VARIO** modules is provided below:

- Metalworking machines
- Woodworking machines
- Filling systems
- Packaging machines
- Escalators
- Elevators
- Platform technology
- Driverless transport systems
- etc.

4.2.4 Construction

The central module is positioned on the left. All other modules are always arranged in a row to the right of the central module. A central module is required for an application. The number of function modules needed depends on the requirements. The RJ45 sockets on the measurement systems for speed monitoring and the communication interface for the network and cascade module are located on the top of the module when installed. For DNSL-ZMVD and DNSL-NRV, the RJ45 sockets are also positioned on the bottom of the module. These must only be used for the specified functions. The connection cable for these can be inserted directly into the cable duct in the control cabinet. The connection sockets for the fieldbus connection are attached at the front.

4.2.5 Terminals

The modules are fitted with single terminals as standard.

All modules are available with double terminals.

5 Central modules

5.1 Product description

The central module is the base device and, depending on the device type, is equipped with:

- Inputs
- Relay outputs
- Safe semiconductor outputs
- Analog inputs
- Connections for movement monitoring
- USB interface

Micro-SD memory card

The central module can be used alone or expanded using up to 14 function modules. The user-specific application is created using **SL VARIO-Designer**.

Central modules are available in a range of expansion levels.

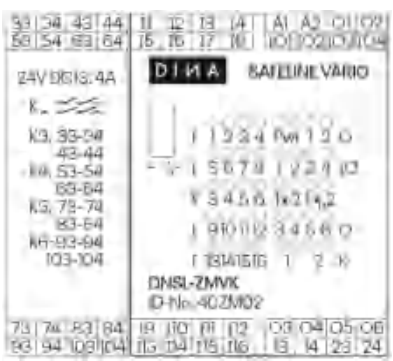
5.2 Overview

		DNSL-ZMVK	DNSL-ZMVD
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5.2.1 DNSL-ZMV pin assignment

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5.2.2 DNSL-ZMVK pin assignment

	I1 to I8	Configurable as digital inputs or analog inputs
	I9 to I16	Configurable as digital inputs or Inputs for recording movement via initiators or HTL measurement systems.
	IO1 to IO4	Configurable as input or output
	A1	Operating voltage +24 V DC
	A2	Operating voltage 0 V
	O1 to O6	Semiconductor outputs
	13-14, 23-24	Relay outputs K1, K2
	33-34/43-44	Relay output K3
	53-54/63-64	Relay output K4
	73-74/83-84	Relay output K5
	93-94/103-104	Relay output K6
	USB port	Mini USB for connection to the PC
	PWR LED	Operational readiness display
	LED I1 to I16	Inputs status display
	LED O1 to O6	Outputs status display
	LED IO1 to IO4	Inputs/outputs status display
	LED K1 to K6	Relay outputs status display

	LED	Speed monitoring status display
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The ZMVD can be operated with one (DS1) or two (DS1 and DS2) expansion modules.

5.2.4 DNSL-ZMV block diagrams and expansions

5.2.4.1 DNSL-ZMV block diagram

Inputs

Outputs

Configurable inputs/outputs

Expansion modules interface

USB

5.2.4.2 DNSL-ZMVK block diagram

5.2.4.4 DNSL-ZMVD block diagram (DS2 expansion)



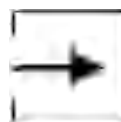
Expansion



RJ45 socket



Expansion modules interface



Inputs

6 Function modules

6.1 Product description

A range of function modules are available to expand the functionality. All modules are connected to each other using T-bus connectors and mounted on a 35 mm DIN rail.

The following function modules are available:

- Input/output modules
- Standstill and speed monitoring modules
- Fieldbus modules
- Cascade module
- Network module

6.2 Input/output modules

Both the number of inputs and outputs, and the number of safety circuits (emergency stop, safety doors, two-

6.2.2 DNSL-INV pin assignment

	I1 to I12	digital inputs
	IO1 to IO4	Configurable as input or output
	LED I1 to I12	Inputs status display
	LED IO1 to IO4	Inputs/outputs status display
	DIAGN	Diagnostics display

6.2.2.1 Block diagram



Inputs



Configurable inputs/outputs



Expansion modules interface

6.2.3 DNSL-RMV pin assignment

6.3 Speed monitoring modules

These function modules record and evaluate movements and guarantee safe switching off in the event of overspeed or movement from a standstill. These modules identify the direction of rotation and monitor the braking ramp.

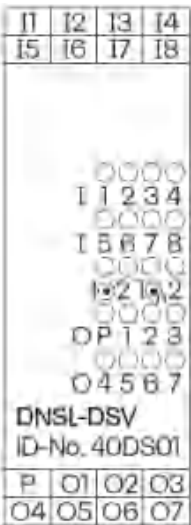
Depending on the device type, a range of measurement systems can be used.

The safe inputs and outputs enable safety functions to be implemented.

The following speed monitoring modules are available:

	DNSL-DSV	DNSL-DRV	DNSL-BIV
Safe digital inputs	8	8	8
Analog inputs	-/-	-/-	-/-
Safe semiconductor outputs	5	5	7
Semiconductor outputs	2	2	-/-
Configurable inputs/outputs	-/-	-/-	-/-
Relay outputs	-/-	-/-	-/-
Measurement system encoder inputs	2 sin/cos, TTL, HTL, HTL only track A/B	2 resolvers	2 BiSS

6.3.1 DNSL-DSV and DRV, BIV pin assignment

	I1 to I8	digital inputs
	O1 to O7	Semiconductor outputs
	P	Operating voltage +24 V DC
	RJ45 socket 1 to 2	Encoder interface
	LED P	Status of the supply voltage of the semiconductor outputs
	LED I1 to I8	Inputs status display
	LED O1 to O7	Outputs status display
	LED 	standstill monitoring status display
	LED 	Speed monitoring status display

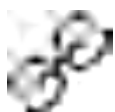
6.3.1.1 Block diagram



Inputs



Outputs



Expansion modules interface



+24 V DC

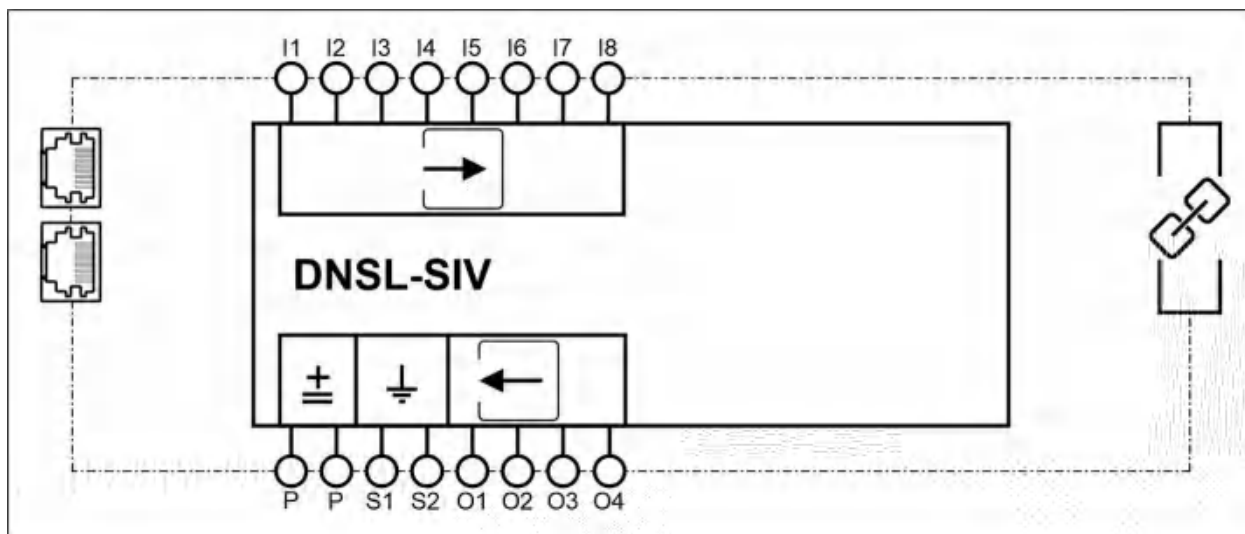


RJ45 socket

6.3.2 DNSL-SIV pin assignment

	I1 to I8	digital inputs
	O1 to O4	Semiconductor outputs
	S1, S2	RJ45 socket shield connection S1 for enc RJ1 S2 for enc RJ2
	P	Operating voltage +24 V DC
		Hinweis Terminal P is not intended for operational switching and must be connected directly to +24V.
RJ45 socket 1 to 2		Encoder interface

6.3.2.1 Block diagram



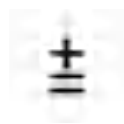
Inputs



Outputs



Expansion modules interface



+24 V DC



RJ45 socket



Shielding

6.4 Fieldbus modules

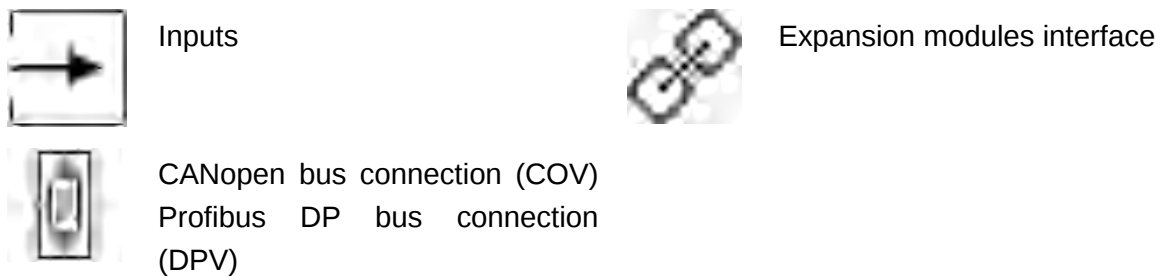
Fieldbus modules are used for exchanging diagnostic data and non-safety-relevant control commands between **SAFELINE VARIO** and the superordinate control system.

The digital inputs on the modules can be used for safety functions.

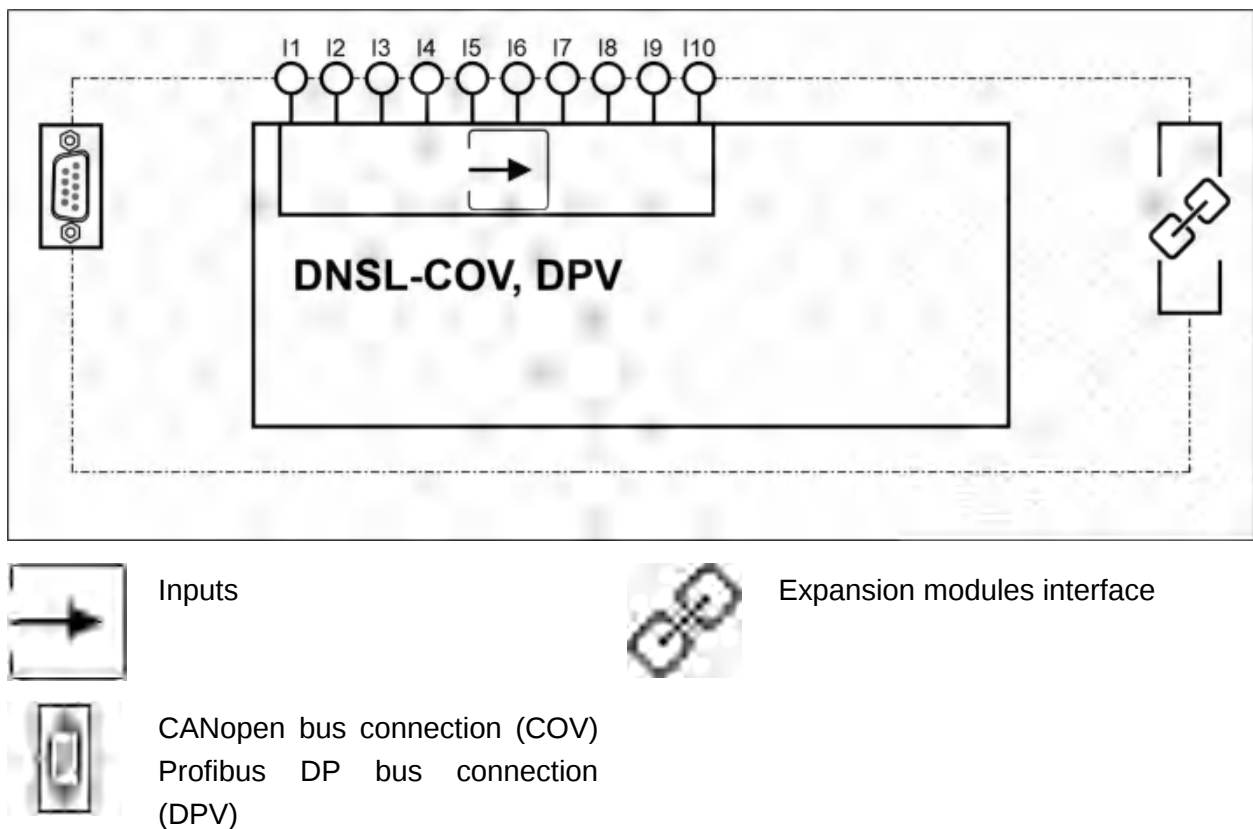
The fieldbus modules are available with different protocols.

	DNSL-COV	DNSL-DPV	DNSL-ECV	DNSL-EPV
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6.4.1.1 DNSL-COV/DPV block diagram, 8-pin



6.4.1.2 DNSL-COV/DPV block diagram, 10-pin



6.5 DNSL-CMV cascade module

The cascade module enables a safety system to be constructed decentrally. This makes it possible to house function modules in a range of control cabinets. The number of function modules must not exceed the maximum of 15.

A cascade consists of a base unit with a central module and up to five peripheral units. Each unit requires a cascade module. The units are connected to one another via patch cables. We recommend patch cables with connectors made by Hirose with the designation TM11AP 88P(61). The length of all patch cable must not exceed 100 m.

The cascading can be serial or star shaped.

The addressing (1 14) is implemented using binary coding via the cascade module input terminals.

6.5.1 Structure of a cascade

Base unit with

- Central module
- One or more function modules
- 1 cascade module in the last slot

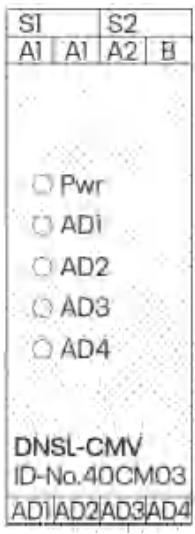
Peripheral units with

- 1 cascade module in the first slot
- One or more function modules

Base unit	Peripheral unit 1	Peripheral unit 2
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Serial cascade

6.5.2 DNSL-CMV pin assignment

 Diagram of the DNSL-CMV terminal block showing pins S1, S2, A1, A2, B, and AD1-AD4 with their respective functions.	A1	Operating voltage Peripheral unit +24 V DC
	A2	Operating voltage Peripheral unit +0 V DC
	B	Operating voltage Peripheral unit +24 V DC
	S1, S2	RJ45 patch cable shield connection S1 for RJ1, upper socket S2 for RJ2, lower socket
	AD1 to AD4	Addressing inputs
	PWR LED	Operational readiness display
	LED AD1 to AD4	Addressing inputs status display



Note

The operating voltage at terminals A1/A2 and B must be connected at the peripheral unit.

These terminals must remain free on the base unit.



Note

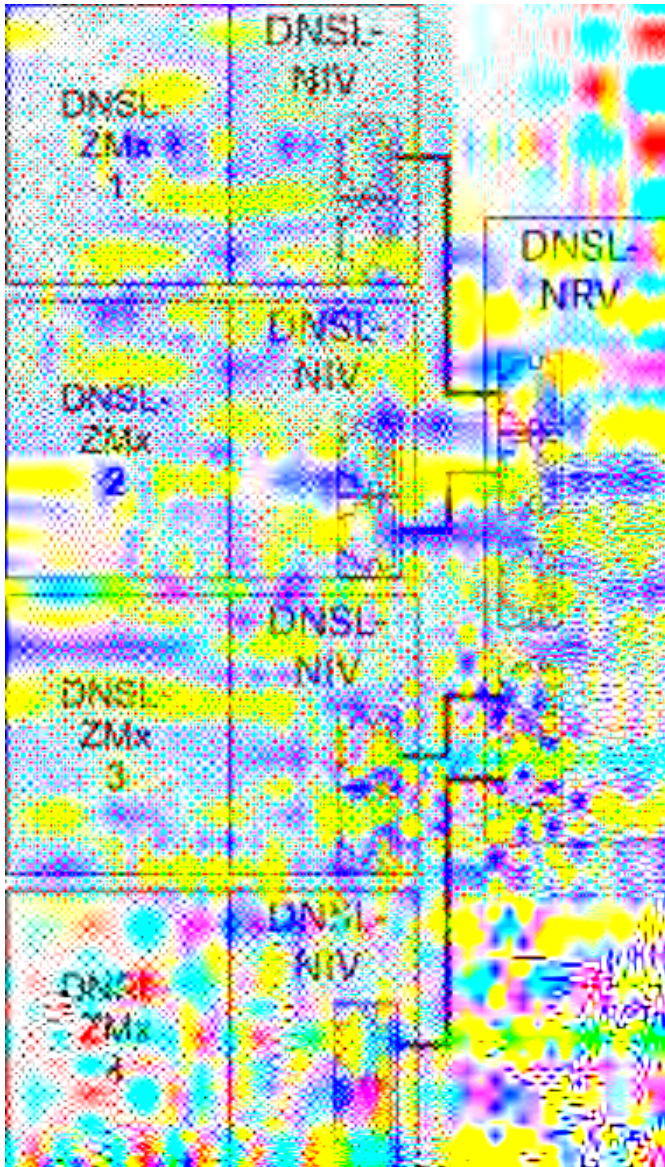
In the event of EMC interference, the connections S1 and S2, which are connected to the shielding of the patch cable, can optionally be grounded. However, the patch cables may only be grounded at one end so that no equalizing currents can flow through the shielding.

6.6 DNSL-NIV/NRV network module

The DNSL-NIV and -NRV network module is used for data exchange between up to eight base units. Each base unit requires a DNSL-NIV module, which is connected to the DNSL-NRV module.

The maximum cable length between NIV and NRV is 150 m.

For data exchange, 32 virtual inputs and 32 virtual outputs are available.



Maximum cable length NIV NRV
150 m

6.6.1 DNSL-NIV pin assignment

	I1 to I8	digital inputs
	O1 to O4	Semiconductor outputs
	P	Operating voltage +24 V DC
	S1, S2	RJ45 socket shield connection

6.6.2 DNSL-NRV pin assignment

	A1	Operating voltage +24 V DC
	A2	Operating voltage +0 V DC
	MH, ML, SH, SL	Test terminals (for internal use by DI-NA Elektronik GmbH only)
	RJ45 socket 1 to 4, lateral	Data interfaces to DNSL-NIV 1 to 4
	RJ45 socket, front	Interface to additional DNSL-NRV
	PWR LED	Operational readiness display
	LED NW1 to NW4	Network connection display

6.6.2.1 Block diagram



Expansion modules interface



RJ45 socket



RJ45 socket, front

7 Safety functions

The inputs for the central module and function modules are intended for connecting a range of safety equipment and enable a variety of safety function.c732 842.04 re8unction.

Activation of a safety circuit without acknowledgment

static

clocked

antivalent

Example: Protective cover with static activation E1, E2 without acknowledgment

Circuit diagram	Signal

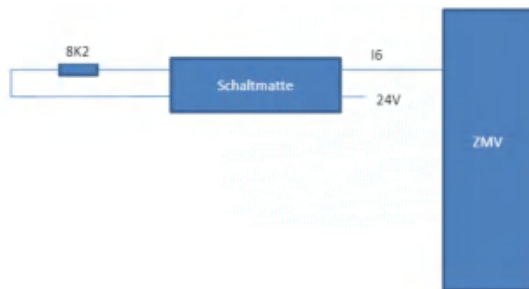
7.1.3 Inputs for safety circuits with external acknowledgment input

SK1			SK2			SK3			
E1	E2	Q	E1	E2	Q	E1	E2		

7.3 Inputs for safety mats, switching strips and bumpers on the central module

Up to eight short-circuit-forming safety mats, switching strips or bumpers can be connected at inputs I1 to I8 on the central modules.

Connection scheme:



Important information for the use of switching mats, switching strips and bumpers

The safety equipment must only be installed and commissioned by a skilled electrician or a correspondingly trained person, who is familiar with these operating instructions and the corresponding country-specific applicable specifications regarding occupational health and safety and accident prevention.

Before commissioning for the first time, and at regular intervals that depend on the signaling device, all required tests (function, status, measurement and arrangement) must be performed on the safety equipment by the operator.

If contact outputs are used, the safety function must be requested at least once per month for Performance Level e (PLe) and once per year for Performance Level d (PLd).

The maximum length of the connection wire depends on the surroundings and wire cross section, and must be observed. Recommended: $L_{max} = 20 \text{ m}$.

The minimum distance between the signaling device and protective equipment must be determined in accordance with DIN EN ISO 13855. When doing so, the reaction time of the entire system must be considered.

The specifications in the operating instructions for the signaling device in use must be observed and followed.

The functional parameters for the signaling device and evaluation unit must always be complied with.

The contact load for the output switching equipment must be chosen so that the application-specific minimum switching cycles can be reached. This equipment must be replaced at the end of its service life. After successful replacement, the efficacy of the entire implemented safety system must be validated.

Replaced parts must be disposed of properly.



8 Standstill and speed monitoring

On the central modules, inputs I9 to I16 are available to record speed. The rotation can be recorded by a proximity switch or incremental HTL measurement system.

On the speed monitoring modules, the measurement system is only connected to the RJ45 socket connectors.

8.1.1 Features of rotation monitoring

- Safe monitoring of multiple independent axes

- Connection option per axle

 - 1 incremental encoder

 - or

 - 2 proximity switches (module-dependent)

- Measured values

 - Standstill

 - Speed

 - Direction of rotation

 - Brake

 - Braking ramp (module-dependent)

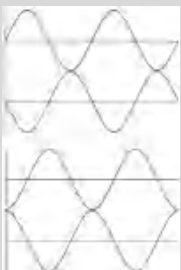
- 4 operating modes

- Encoder types can be selected in the configurator

A range of cable adapters with different plug connectors are available for connecting the speed monitoring to the measurement system. For more information, please contact **DI-NA Support**.

8.1.1.1 Requirements for the incremental encoder

It is possible to assess the following incremental encoders:

Measurement system		Measurement system	
sin/cos 1 Vss		TTL Low : < 0,5V High : > 4V HTL Low : < 3V High : > 20 V	
Resolver 1 V 10 V		SSI BiSS	

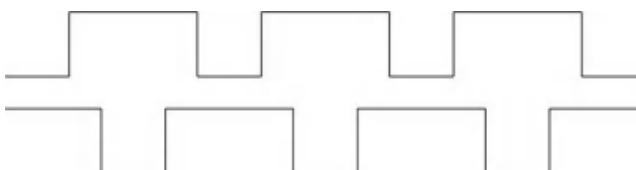
8.1.1.2 Requirements for the proximity switch

The proximity switch

- must be PNP-switching
- must have a supply voltage of 24 V DC
- must be connected so that at least one is always dampened (high signal leads)
- must be connected so that the recorded signals overlap

Proximity switch 1

Proximity switch 2



8.1.1.3 Overview of measurement systems

Module	Measurement inputs	Measurement system	Number	Functions	PL	Frequency range
DNSL-ZMV	I9 to I12	Proximity switch	4x single-channel	Standstill Speed	PLc	5

8.1.1.4 Connection options at the measurement inputs on the DNSL-ZMV

Speed recording (DSx) at inputs I9 to I16 on the DNSL-ZMV can be single-channel (1 sensor), double-channel (2 sensors) or via HTL encoders.

Variant 1:

	DS1	DS2	DS3	DS4	DS6			
Measurement system	Sensor 1	Sensor 2	Sensor 3	Sensor 4	HTL			
					+A	+B	-A	-B
Inputs	I9	I10	I11	I12	I13	I14	I15	I16

Variant 2:

	DS1		DS3	DS4	DS6			
Measurement system	Sensor 1	Sensor 2	Sensor 3	Sensor 4	HTL			
					+A	+B	-A	-B
Inputs	I9	I10	I11	I12	I13	I14	I15	I16

Variant 3:

	DS1		DS3		DS6			
Measurement system	Sensor 1	Sensor 2	Sensor 3	Sensor 4	HTL			
					+A	+B	-A	-B
Inputs	I9	I10	I11	I12	I13	I14	I15	I16

Variant 4:

	DS5				DS6			
Measurement system	HTL				HTL			
	+A	+B	-A	-B	+A	+B	-A	-B
Inputs	I9	I10	I11	I12	I13	I14	I15	I16

8.1.1.5 DNCO functions

The

Additional statuses:

LED on => inputs and outputs are wired (applies to all modules) putilfLEN(LE0 GL(6(es))TJETQq0

If the inputs on the central module are used as analoTf1:tatu7/(r)7(al)4()-4(t)-4(hG[]-4o(od)3(na)0()8(>)-s)-

9.2 Diagnostics LEDs

Function modules

DNSL-INV

DNSL-IOV

DNSL-RMV

have 4 diagnostics LEDs.

Module					State
DNSL-INV					CAN communication OK
					Module function OK
					No CAN communication
DNSL-IOV					Always lit
DNSL-RMV					Always lit

10 Example of application

Legend:



Two-hand button



Protective door

S1 Unlocking protective door

11 Technical data

11.1 Supply

Module	Operating voltage (A1+A2)	Input current (A1)	Input current (P)	Power consumption
DNSL-ZMV	24 V DC (-15/+10%)	4 A	-/-	2.9 W
DNSL-ZMVD	24 V DC (-15/+10%)	4 A	-/-	3.0 W
DNSL-ZMVK	24 V DC (-15/+10%)	4 A	-/-	7.7 W
DNSL-DSV	-/-	-/-	4 A	2.5 W
DNSL-DRV	-/-	-/-	4 A	2.5 W
DNSL-SIV	-/-	-/-	4 A	2.2 W
DNSL-BIV	-/-	-/-	4 A	2.2 W
DNSL-INV	-/-	-/-	-/-	1.7 W
DNSL-IOV	-/-	-/-	4 A	2.2 W
DNSL-CMV	-/-	-/-	-/-	0.5 W
DNSL-NIV	-/-	-/-	4 A	2.2 W
DNSL-NRV	-/-	-/-	-/-	2.2 W
DNSL-RMV	-/-	-/-	-/-	4.8 W
Fieldbus	-/-	-/-	-/-	1.0 W

11.2 Inputs



Note

Signal inputs must not become active before stable, valid voltage at A1!

Voltage at the inputs	24 V DC (-15/+10%), 10% residual ripple
Current consumption of inputs	Max. 4.0 mA
Input voltage for terminal P on -DSV, -DRV, -BIV, -SIV, -IOV, -NIV	24 V DC (-15/+10%)
Input frequency for I9 to I12 on the central module on DNSL-ZMV, -ZMVK	500 Hz via 2 sensors, e.g. proximity switch
Input frequency for I9 to I16 on the central module on DNSL-ZMV, -ZMVK	50 KHz for HTL signals via incremental measurement system
Input frequency for DNSL-DSV	500 KHz sin/cos 1 Vss or TTL signals
Input frequency for DNSL-DRV	1200 Hz sin/cos 1 to 10 Vss
Input signal for DNSL-BIV	Max. 10 MHz
Input signal for DNSL-SIV	SSI interface signals
Accuracy of analog inputs	± 3% of the end value
Input impedance of analog inputs	At 4 to 20 mA = 500 at 0 to 10 V = > 5
Type of two-hand device	accog[0 G[)TJETC

11.3 Semiconductor outputs

Note

The utilization categories considered as standard apply to the semiconductor outputs.

Semiconductor outputs are switched off internally at A2 in the event of a wire break. There is no residual voltage/current.

The voltage drop in the conductive state and $I = 1A$ measures 23.7V.

Semiconductor outputs are short circuit- and overload-safe.

Module	Outputs	Output type	Switching/ continuous current	Total switching/ continuous current	Min. switching current
DNSL-ZMV DNSL-ZMVK DNSL-ZMVD	IO1 to IO4				

11.4 Contact outputs

	DNSL-ZMV DNSL-ZMVK DNSL-ZMVD	DNSL-ZMVK	DNSL-RMV
Outputs	K1, K2	K3 to K6	K1, K2
Contact material	AgNi	AgCuNi	AgNi
Output guidance			
Min. switching current	10 mA	10 mA	10 mA
Switching capacity as per DIN EN 60947-4-1 and -5-1	DC13: 24 V / 2 A AC15: 250 V / 3 A	DC1: 24 V / 6 A DC13: 24 V / 4 A / 0,1 Hz	DC13: 24 V / 2 A DC13: 24V / 4 A / 0,1 Hz AC15: 250 V / 3 A
Switching capacity according to UL 508	R300	B300/R300	B300/R300

	250 V AC	50 V AC	250 V AC
Rated surge voltage/insulation	4 KV	0,8 kV	4 KV
Degree of contamination	2		
Overvoltage category	III		
Housing material	Polyamide (PA), not reinforced		

11.6 Connection data

Terminals	Push-in terminals, pluggable
Connection cross-section	0.25 to 2.5 mm ²
Connection cross-section AWG	
Wiring type	Flexible with ferrules
Stripping length	10 mm

11.7 Environmental conditions

Operating temperature	-10 °C to +55 °C
Storage temperature	-40 °C to +85 °C
Altitude of place of use	< 2000 m above sea level
Vibration resistance (in 3 planes)	sin 10 to 55 Hz, 0.35 mm (0.014 in), 10 cycles, 1 octave/min.
Output relay shock resistance (in 3 planes)	5 g, 11 ms

11.8 Dimensions

Module	Height
All	114 mm (4.488 in)
Module	Depth
All	111 mm (4.370 in)

Module	Width
DNSL-ZMV	45 mm (1.772 in)
DNSL-ZMVK	67.5 mm (2.657 in)
DNSL-ZMVD (44ZM01 with 4 standstill and speed monitoring)	67.5 mm (2.657 in)
DNSL-ZMVD (48ZM01 with 8 standstill and speed monitoring)	90 mm (3.543 in)
DNSL-DSV, -DRV, -SIV, -BIV	22.5 mm (0.886 in)
DNSL-INV, -IOV, -RMV	22.5 mm (0.886 in)
DNSL-CMV	22.5 mm (0.886 in)
DNSL-NIV, DNSL-NRV	22.5 mm (0.886 in)
DNSL-COV, -DPV, -ECV, -EPV, -MOV, -PLV, -PNV	22.5 mm (0.886 in)
Module	Weight
DNSL-ZMV	350 g
DNSL-ZMVD	450 g
DNSL-ZMVK	570 g
DNSL-DSV	130 g
DNSL-DRV	130 g
DNSL-SIV	130 g
DNSL-BIV	130 g
DNSL-INV	130 g
DNSL-IOV	130 g
DNSL-CMV	130 g
DNSL-NIV	130 g
DNSL-NRV	130 g

DNSL-RMV	140 g
Fieldbus	130 g

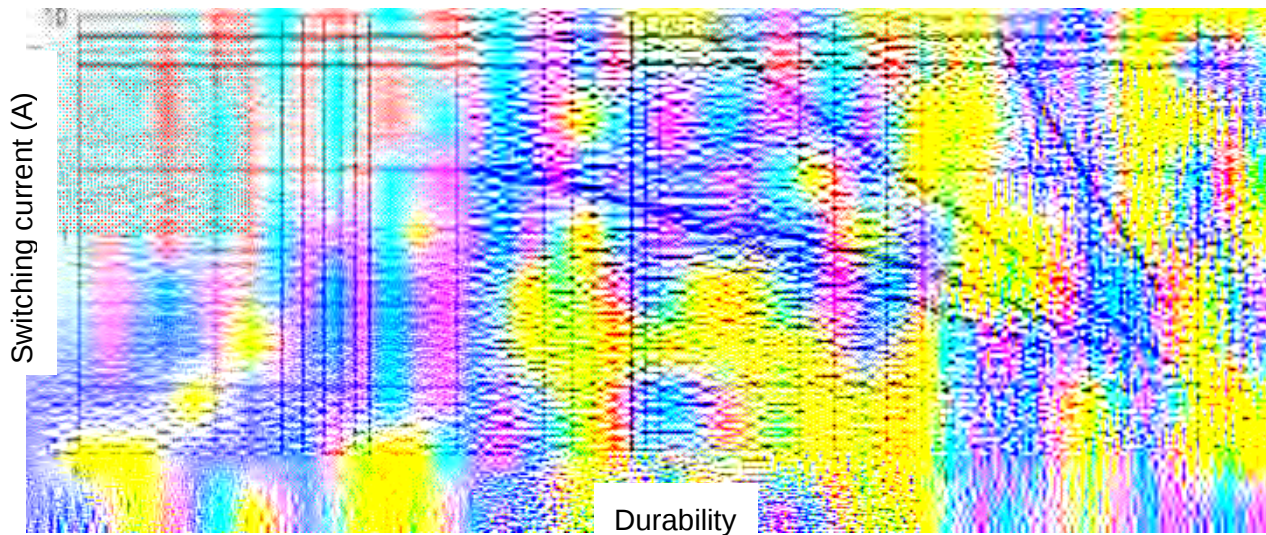
11.9 Safety-related parameters acc. to DIN EN ISO 13849-1:2016-06

Module	MTTFd [a]	Cat./PL	PFHd
DNSL-ZMV	98	4/e	2.4×10^{-8}
DN [REDACTED]	87	4/e	7.7×10^{-8}
DNSL-ZMVD	92	4/e	2.7×10^{-8}
DNSL-ZMVD2	86	4/e	3.0×10^{-8}
DNSL-DSV	97	4/e	2.5×10^{-8}

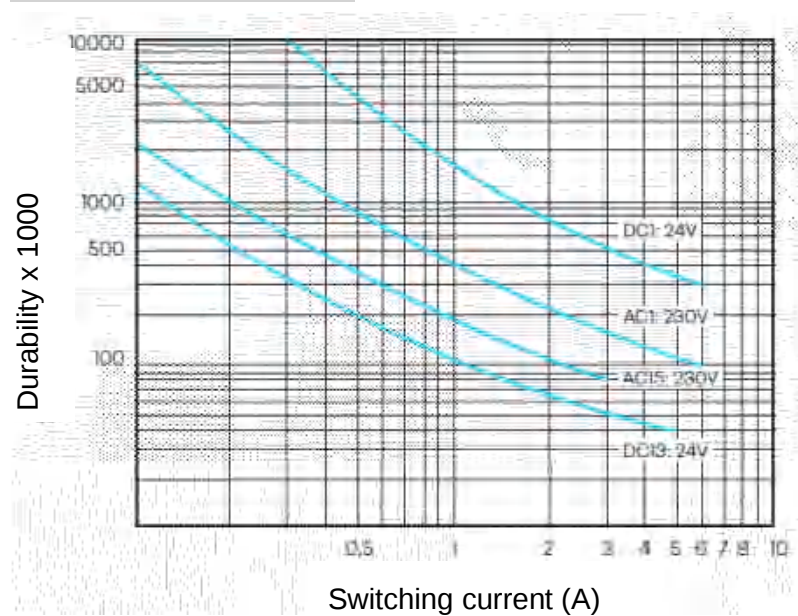
11.10 Contact service life

Electrical life of the output contacts determined by DIN EN 60947-5-1 / Annex C.3

DNSL-ZMV, -ZMVK, ZMVD K1 und K2



DNSL-ZMVK K3 bis K6



Module	Outputs	Load type	Switching current	Switching cycles per hour	Years
DNSL-ZMV	K1, K2	DC13	2,0 A	4	5
DNSL-ZMVK				2	10
DNSL-ZMVD					

Module	Outputs	Load type	Switching current	Switching cycles per hour	Years
DNSL-RMV	K1, K1,				

12 Installation and removal

12.1 Installing a module

12.1.1 Overview

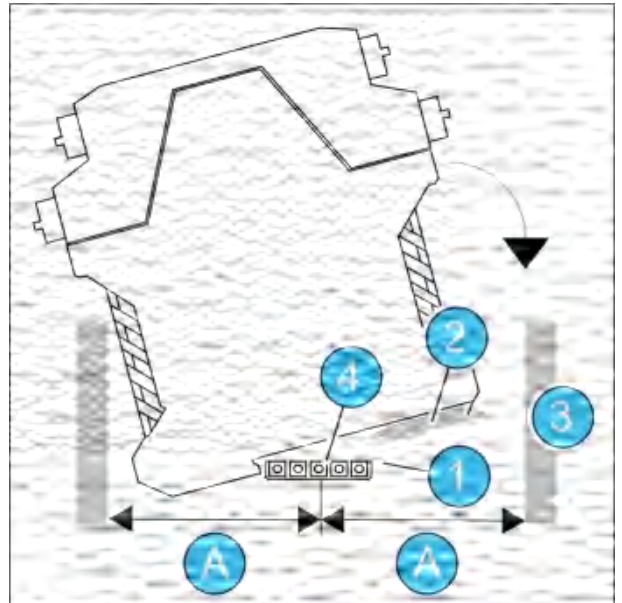
- (A) 70 75 mm (2.756 2.953 in)
- (1) Top hat rail
- (2) Locking slider
- (3) Cable duct
- (4) Bus connector

Procedure

Mount the bus connector **(4)** on the top hat rail **(1)**.

Hook the module onto the top hat rail and press it downward.

The locking slider **(2)** engages under the top hat rail.



12.2 Removing a module

Procedure

Use a screwdriver **(1)** to move the locking slider away from the module.

Move the module upward and remove it from the rail.

