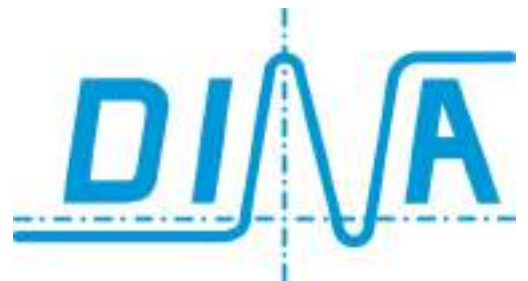


SLVARIO

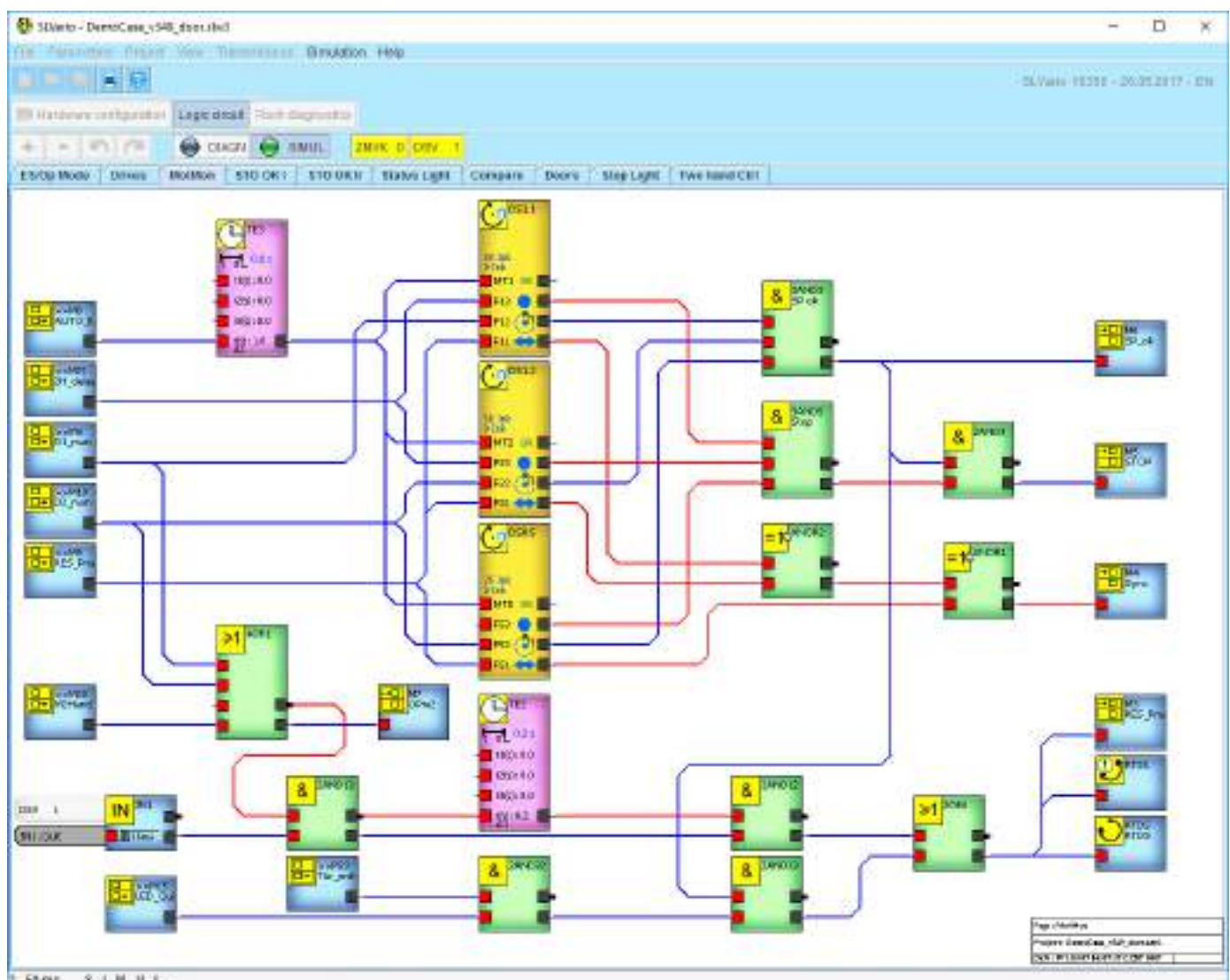
Brief description



wir sind sicherheit.

SLVARIO

The direct way to safe automation



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1 SL VARO Modules

Central modules	Speed Monitoring	In- output modules	Network modules	Field bus modules	Cascade modules
DNSL-ZMV DNSL-ZMVA DNSL-ZMVD DNSL-ZMVK	DNSL-DSV DNSL-DSIV DNSL-DRV DNSL-SIV	DNSL-INV DNSL-IOV DNSL-RMV	DNSL-NIV DNSL-NRV	DNSL-COV DNSL-DPV DNSL-ECV DNSL-EPV DNSL-MOV DNSL-PLV DNSL-PNV	DNSL-CMV

2 Intended purpose

Testing based on:

EN 55011: 2009+A1 2010 (class A), DIN EN 61326-1: 2013-07, EN 61000-6-2: 2016-05, EN 61326-3-1: 2015-06, EN 61000-4-11: 2005-02

- DIN EN 60947-5-1: 2015-05
Low-voltage switch gear, part 5.1: Control circuit devices and switching elements-electromechanical control circuit devices
- DIN EN ISO 13849-1: 2016-06
Safety-related parts of control systems; Part 1: General principles for design category 4, PL_e
- DIN EN ISO 13849-2: 2013-02
Safety-related parts of control systems; Part 2: Validation
- DIN EN 62061: 2016-05
Functional safety of safety-related electrical, electronic and programmable electronic control systems SIL CL3
- DIN EN 574, type IIC, two-hand control devices, DNSL-SIV type IIIB
- DIN EN ISO 13856-1:2013-08 / -2:2013-08 / -3:2013-12, for signal processing only
- GS-ET-20: 2016-10, basic principles for testing and certification of safety switch devices

Authorized person for the combination of the technical documents: Dirar Najib, CEO

Esslinger Str. 84, D 72649 Wolfschlügen,
Wolfschlügen, 2017-07-27

2.1 Certification data

Modul	MTTFd	PL	DC	SFF	PFHd	 ET 13033 Sicherheit geprüft tested safety  T _M : 20 years	 US LISTED IND. CONT. EQ 1ZD7 
DNSL-ZMV	79 years	E	high	99%	3.0×10^{-8}		
DNSL-ZMVK	141 years	E	high	99%	1.6×10^{-8}		
DNSL-DSV	97 J years	E	high	96%	2.5×10^{-8}		
DNSL-DRV	97 years	E	high	96%	2.5×10^{-8}		
DNSL-SIV	165 years	D	high	95%	3.3×10^{-8}		
DNSL-INV	238 years	E	high	95%	1.4×10^{-8}		
DNSL-IOV	97 years	E	high	96%	2.5×10^{-8}		
DNSL-RMV	91 years	E	high	98%	2.5×10^{-8}		
DNSL-CMV	91 years	E	high	98%	2.5×10^{-8}		
DNSL-NIV	214 years	D	high	95%	1.1×10^{-8}		
DNSL-DPV	305 years	E	high	95%	8.0×10^{-9}		
DNSL-ECV	305 years	E	high	95%	8.0×10^{-9}		
DNSL-COV	305 years	E	high	95%	8.0×10^{-9}		

Product is evaluated as safety device according:

- DIN EN ISO 13849-1: 2008-12, category 4, PL_e, DIN EN 62061: 2005-10, SIL CL 3
- Certificated by: (Fachausschuss für Elektrotechnik, Prüf- und Zertifizierungsstelle Köln), European notified institution, Identification-number 0340
EC-Type Test certificate (DGUV Test: ET 13032 from 13-05-2013)
- EMC-directive certificated by "ELMAC GmbH Bondorf", Reg. No.: DAT-P-206/05-00
- CNL, USL: File E227037
- QM System certificated according to DIN EN ISO 9001:2015 by "DQS, Frankfurt", Reg.-No.: 067542 QM 08
- Certificate and declaration of conformity: See www.dina.de, download

3 Product description

- SL VARIO is a multi-functional, modular and configurable safety system.
- The system consists of a central module and different function- and field bus modules.
- The field bus enables a communication between SL VARIO and the field bus master.
- The product is appropriated to be used in machines and automation to avoid dangers.
- The central module is available in 45 or 67.5 mm housing depending on the quantity of outputs.
All other modules are in 22.5 mm housing.
- Mounting happens on a 35 mm standard rail.
- The modules are connected directly to the ground via the standard rail.
- The modules are plugged together via a bus connector at the rail side. The bus is on 2 channels.
- Up to 15 modules can be used in one application.
- Modules with different functions are available.
- A variety of functions are available such as speed monitoring, logic modules, timers, safety circuits, mode selector, generator, counters, comparators, feedback, restart interlock functions.
- A lot of safe digital and analogue inputs, safe semiconductor and contact outputs are available.
- The status of inputs, outputs, power supply and diagnostic functions is displayed via LED.
- Online and rack diagnostic are available via the Designer.
- An application can be simulated without hardware.
- Overvoltage and overcurrent are monitored.
Voltage $\geq 30V$ or not connected terminal (A2) disconnects internally the terminals (A1) and (P).
- Semiconductor outputs are overload and short-circuit-proof.
- An internal temperature sensor for diagnostic function via the Designer is available in all modules.
- The user's application will be developed through the Designer. The data transfer happens via the USB interface at the central module.
- The Designer is software developed by DINA.
- A memory chip is installed inside the central module. Documents as application software, Designer and instruction manuals can be transferred to the memory using the USB interface.
- The memory chip can be used as a drive.

Remark

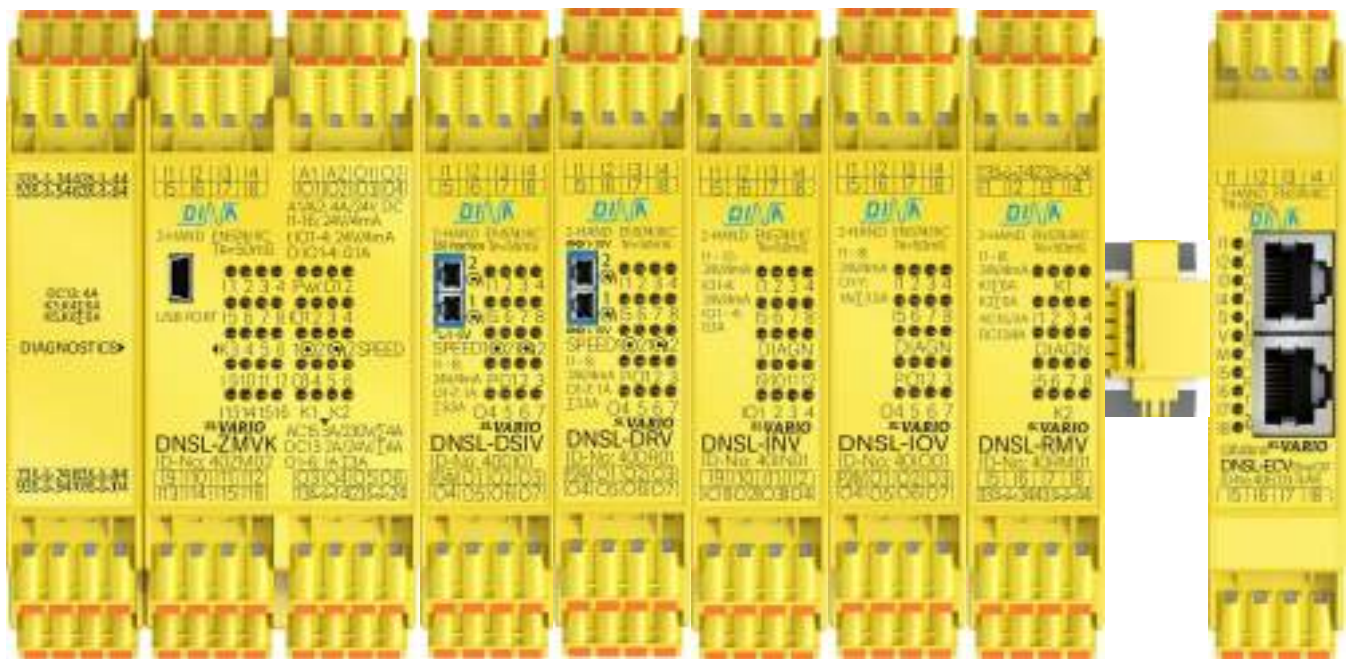
The function devices are tested safe and certificated as a part of the firmware.

A modification of the certified function devices as part of the firmware is excluded.

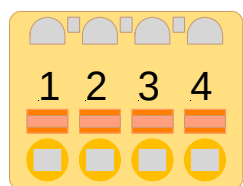
3.1 Mounting

- The central module is placed on the left side. All other modules must be added to the right side.
- For an application a central module is necessary.
- The number of the functional modules depends on the requirements.
- The plugs for measurement systems at the speed monitoring and for the data interface at the network and cascade module are on the top side of the module after mounting.
- RJ45 plugs are also at the bottom side of DNSL-ZMD and DNSL-NRV for speed monitoring and network. They are to use for description function only.
- The connecting cable can be fed directly into the cable channel.
- The field bus connector is at the front side.

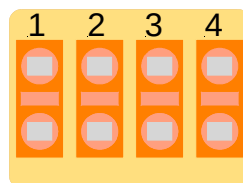
Central module	Speed monitoring		In-, output modules				EtherCAT
DNSL-ZMVK	DNSL-DSIV	DNSL-DRV	DNSL-INV	DNSL-IOV	DNSL-RMV	Bus	DNSL-ECV



3.2 Terminals

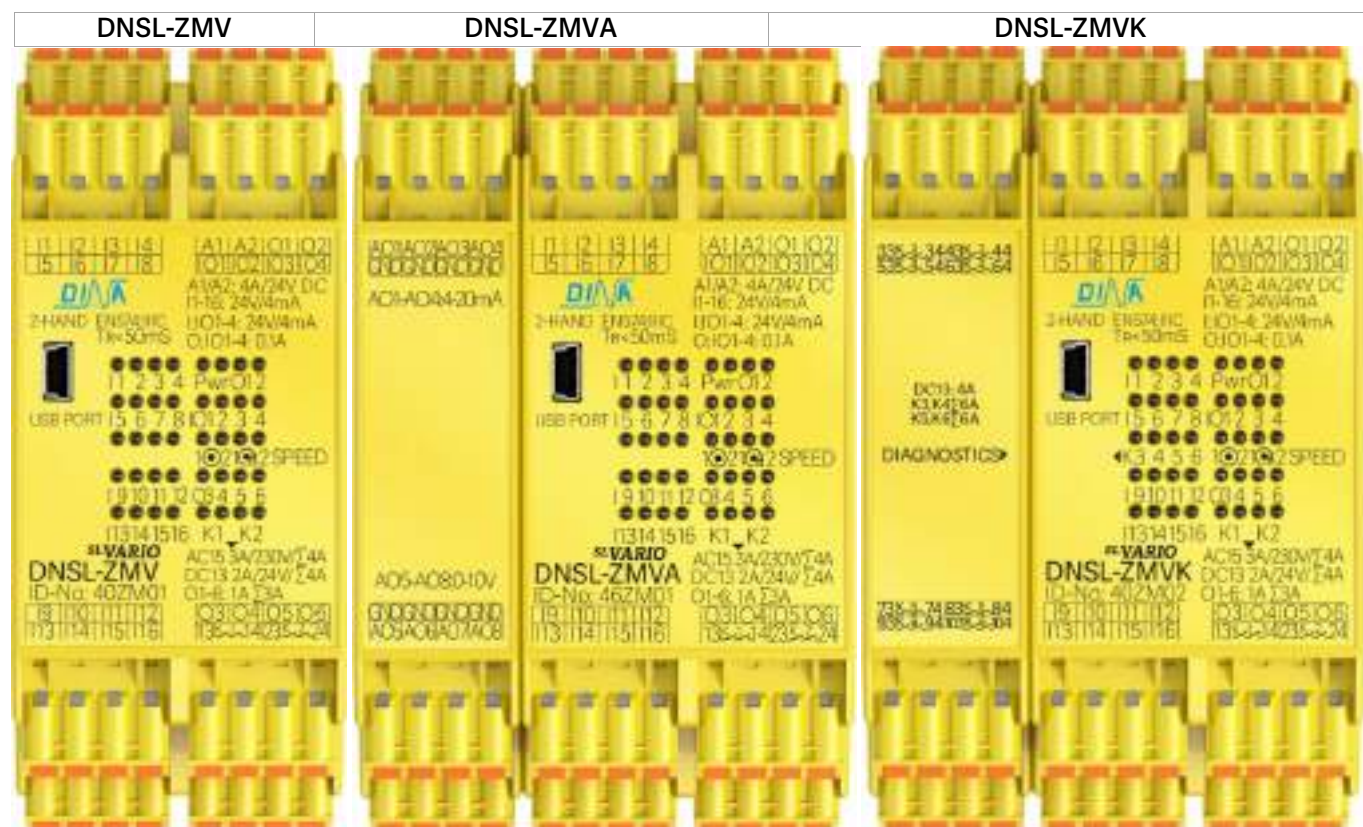


Die Module sind Standard mit Einzelklemmen bestückt.
Entriegelung oberhalb der Klemme



Alle Module sind mit Doppelklemmen erhältlich.
Entriegelung: oben oder zwischen den Klemmen

4 Central modules



DNSL-ZMV

- eight safe analogue-digital inputs for safety functions
- eight safe digital inputs for safety functions
- four digital inputs or safe semi-conductor outputs
- six safe semi-conductor outputs
- two safe contact outputs
- two safe monitoring of standstill and speed via sensor with 24V signals in different operating modes and one safe monitoring of standstill, speed, position, direction and brake in different operating modes, HTL measuring system or
- two safe monitoring of standstill, speed, position, direction and brake in different operating modes, HTL measuring system

DNSL-ZMVA

- as DNSL-ZMV added
- four analogue outputs 4 to 20mA
- four analogue outputs 0 to 10V

DNSL-ZMVD (44ZM01)

- as DNSL-ZMV added
- four safe monitoring of standstill, speed, position, direction and brake in different operating modes Sin/ Cos or TTL measuring system, HTL measuring system using HTL-cable adapter
- 16 safe digital inputs for safety functions

DNSL-ZMVD (48ZM01)

- as DNSL-ZMV added
- eight safe monitoring of standstill, speed, position, direction and brake in different operating modes Sin/ Cos or TTL measuring system, HTL measuring system using HTL-cable adapter
- 32 safe digital inputs for safety functions
-

DNSL-ZMVK

- as DNSL-ZMV added
- four Relay outputs every with 2 safe contacts

Power supply (24 VDC) is to connect to A1/ A2 terminals for the central module and the other modules in the application

5 Standstill and speed monitoring

DNSL-DSV	DNSL-DSV2	DNSL-DSIV	DNSL-DRV	DNSL-SIV	obere Seite
  2-HAND EN57411C VI-5V Tr=50mS  VI-5V SPEED1 ② ① ② II-8: 24W4mA PO12 3 O1-7:1A I35A O4 5 6 7 stVARIO DNSL-DSV ID-No: 40DS01 P24V O1 O2 IO3 IO4 IO5 IO6 IO7 	  2-HAND EN57411C VI-5V Tr=50mS  VI-5V SPEED1 ② ① ② II-8: 24W4mA PO12 3 O1-7:1A I35A O4 5 6 7 stVARIO DNSL-DSV2 ID-No: 40DS51 P24V O1 O2 IO3 IO4 IO5 IO6 IO7 	  2-HAND EN57411C SS interface Tr=50mS  VI-5V SPEED1 ② ① ② II-8: 24W4mA PO12 3 O1-7:1A I35A O4 5 6 7 stVARIO DNSL-DSIV ID-No: 40DSI01 P24V O1 O2 IO3 IO4 IO5 IO6 IO7 	  2-HAND EN57411C O0-10V Tr=50mS  O0-10V SPEED1 ② ① ② II-8: 24W4mA PO12 3 O1-7:1A I35A O4 5 6 7 stVARIO DNSL-DRV ID-No: 40DR01 P24V O1 O2 IO3 IO4 IO5 IO6 IO7 	  2-HAND EN57411C SS interface Tr=50mS  SS interface SPEED1 ② ① ② II-8: 24W4mA PDIAGN O1-6:1A I2A O1 2 3 4 stVARIO DNSL-SIV ID-No: 40SIO1 P24V SS Tr=50mS O1 IO2 IO3 IO4 	 SYSTEM1  SYSTEM2

DNSL-DSV

- eight safe digital inputs for safety functions
- five safe semi-conductor outputs and 2 switch outputs
- two safe monitoring of standstill, speed, position, direction and brake in different operating modes
Sin/ Cos or TTL measuring systems, HTL measuring system using HTL-cable adapter

DNSL-DSV2

- as DNSL-DSV but seven safe semi-conductor outputs

DNSL-DSIV

- eight safe digital inputs for safety functions
- seven safe semi-conductor outputs
- one safe monitoring of standstill, speed, position, direction and brake in different operating modes
Sin/ Cos or TTL measuring system, HTL measuring system using HTL-cable adapter
- one safe monitoring of standstill, speed, position, direction and brake in different operating modes
SSI interface measuring system
- comparator function to compare both monitoring

DNSL-DRV

- as DNSL-DSV but for Resolver measuring systems

DNSL-SIV

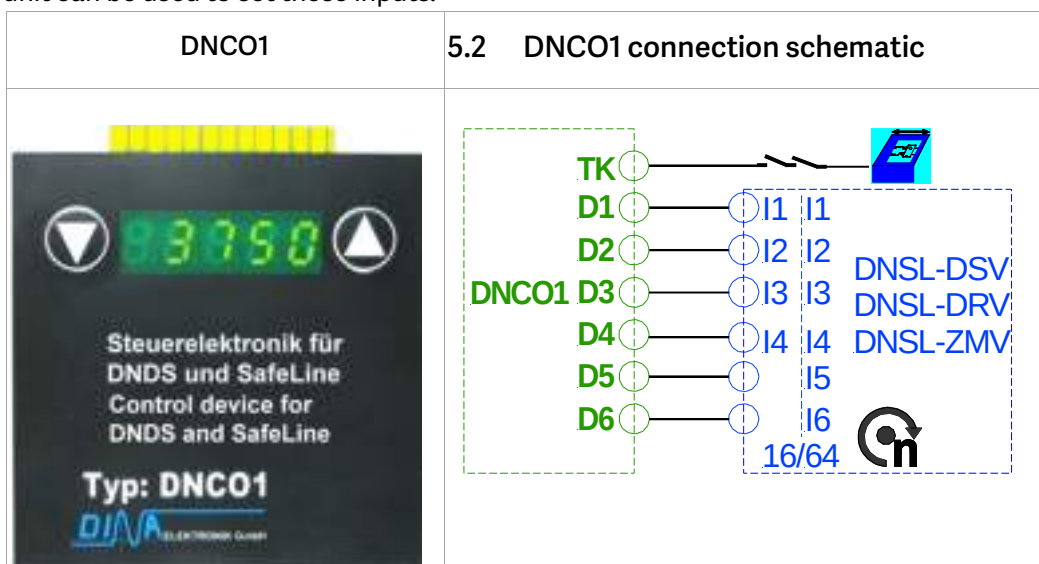
- eight safe digital inputs for safety functions
 - four safe semi-conductor outputs
 - two safe monitoring of standstill, speed, position, direction and brake in different operating modes
- SSI interface measuring system

Power supply (24 VDC) for the semi-conductor outputs is to connect to P terminal

5.1 DNCO function to monitor the Peripheral speed

16 monitored speeds				64 monitored speeds					
I1	I2	I3	I4	I1	I2	I3	I4	I5	I6

- The DNCO function by DNSL-DSV, DRV and ZMV enables the monitoring of the peripheral speeds of machined parts or tools.
- 16 different speeds for two monitoring and for every operating mode or
- 64 different speeds for two monitoring during the automatic mode.
- The speeds can be entered in two frequency tables at the Designer.
- The selection of the monitored speeds happens via the bit code wiring of the terminal inputs.
- 4 inputs enable to monitor 16 speeds in all operating modes. For up to 64 speeds 6 terminal inputs are required.
- The DNCO1 unit can be used to set these inputs.



6 Cable adapter DNDA

The DNDA is used as an interconnection between the measuring system of the axle and the speed monitoring system. It is available for all CNC variations. See instruction manual „Cable adapter“.



DNRJ45-HTL-SL is to use with incremental Measuring system with HTL-signals

DNRJ45 HTL-SL ID-No.: 95RJ20	Wire colours
	: 0V : A : A/ : B : B/

7 In-, output modules

DNSL-INV



DNSL-IOV



DNSL-RMV



DNSL-INV

- 12 safe digital inputs for safety functions
- four safe semi-conductor outputs or four safe digital inputs

DNSL-IOV

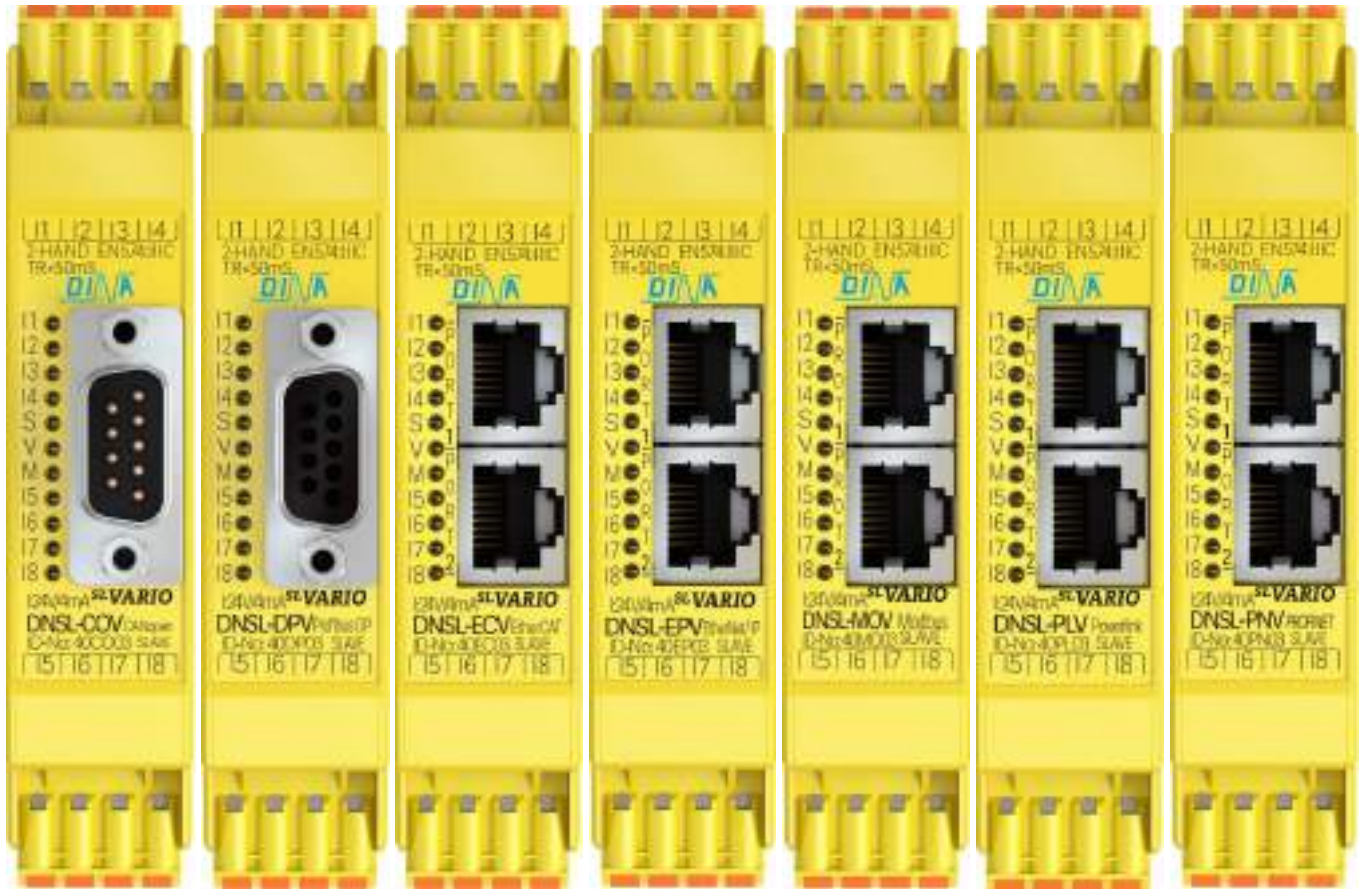
- eight safe digital inputs for safety functions
- seven safe semi-conductor outputs,
Power supply (24 VDC) for the semi-conductor outputs is to connect to P terminal

DNSL-RMV

- eight safe digital inputs for safety functions
- two relay outputs every with 2 safe contacts

8 Feild bus modules

DNSL-COV CANopen	DNSL-DPV Profibus DP	DNSL-ECV EtherCAT	DNSL-EPV Ethernet /IP	DNSL-MOV Modbus	DNSL-PLV Powerlink	DNSL-PNV ProfiNET
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All field bus modules

- eight safe digital inputs for safety functions
- four Byte input data
- eight Byte output data, number of the Byte is configurable.

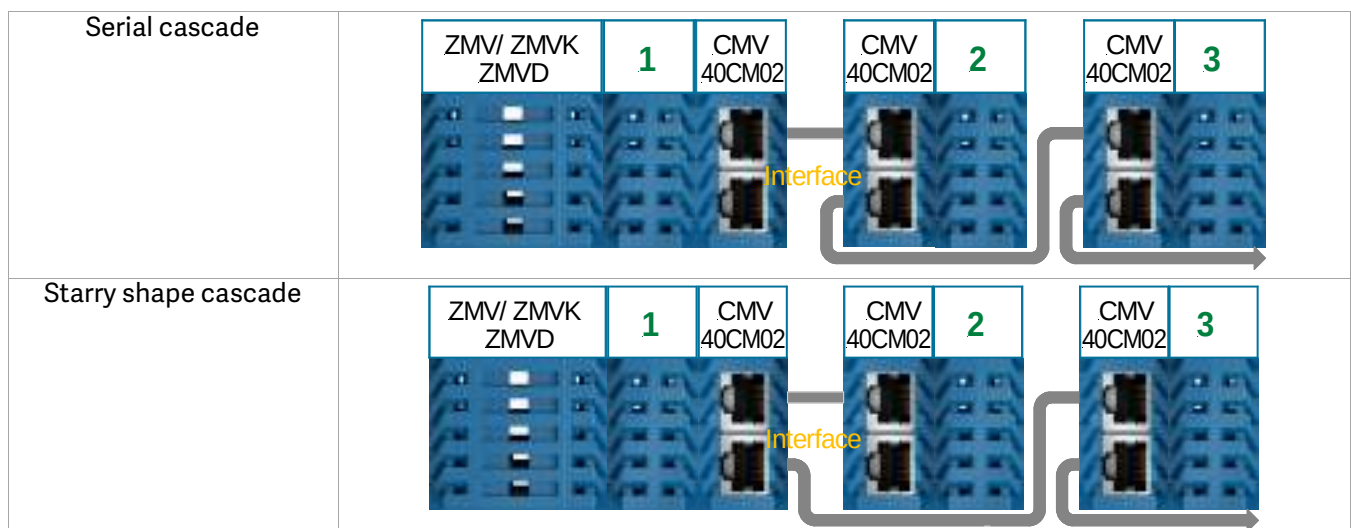
Others on request

9 Cascade module DNSL-CMV



Usage

- Mounting of the modules of an application on different places to avoid costly wiring
- A cascade contains a base unit BU with central module and up to 5 periphery units PU
- In every unit is one DNSL-CMV.
- In the PU DNSL-CMV replaces the central module.
- Serial or starry cascade is possible.
- The units are via patch cables connected together. The maximal length of all patch cables is 100 m.
- The power supply 24V DC happens via A1/ A2 at CMV
- The addressing of the first FM in the PU happens via AD1–AD4 at CMV.
- The addressing of the follow modules in the PE happens automatically.
- 15 modules are possible in one application.
- The binary code enables 1 to 14 addresses. 0 and 15 are not allowed.



10 Network module DNSL-NIV



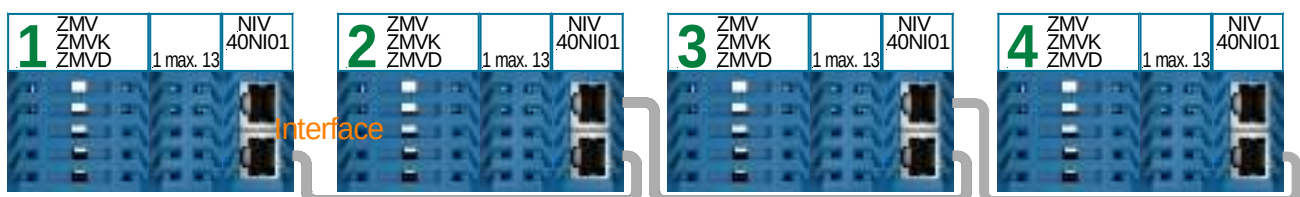
DNSL-NIV

- eight safe digital inputs for safety functions
 - four safe semi-conductor outputs
- Power supply (24 VDC) for the semi-conductor outputs is to connect to P terminal

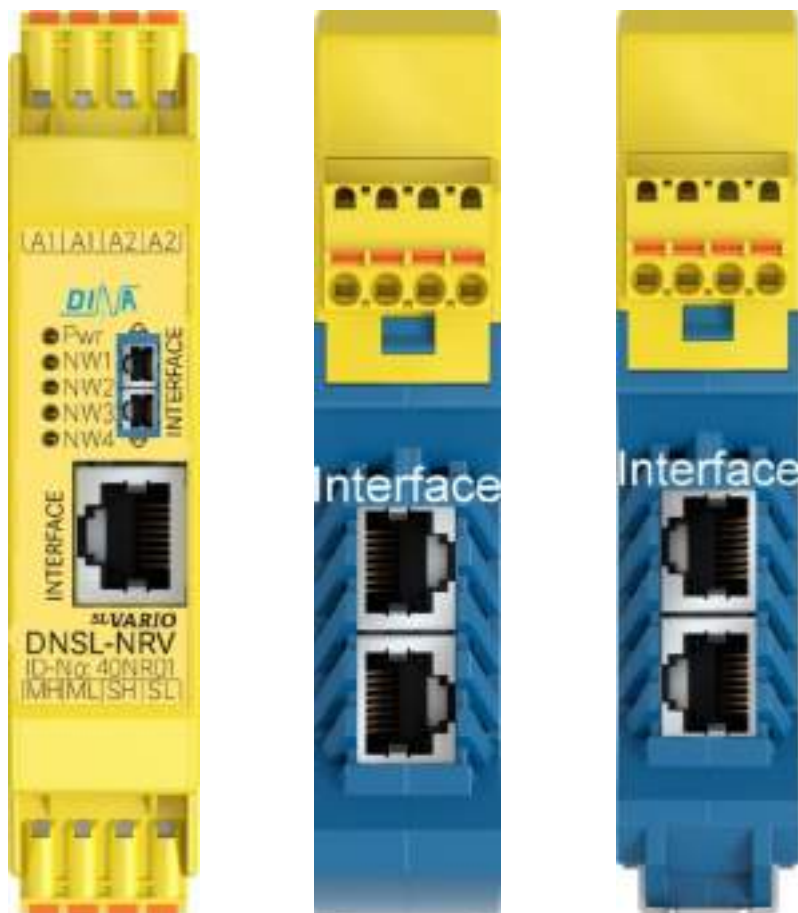
Verwendung

- Data transfer between up to 8 applications
- For every application a DNSL-NIV necessary.
- The applications are to connected serial using patch cable .
- For Data transfer 32 in- and 32 outputs are available.

Networking of 4 applications



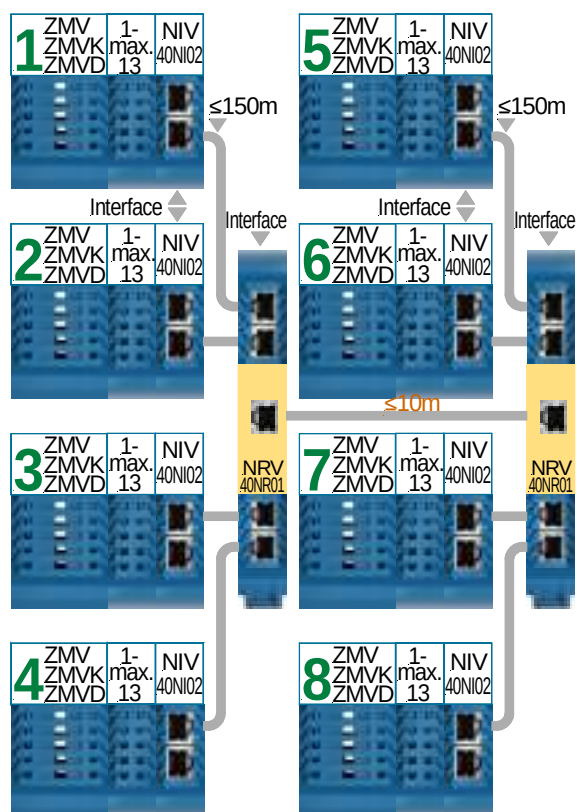
11 Network Module DNSL-NRV



Usage

- Networking up to 8 applications.
- The length of patch cable between the applications can be up to 150 m.

Networking of 8 applications



12 Terminals for safety functions

The following table shows modules with their available inputs (I) and in- outputs (IO). These can be used for different safety and not safety relevant functions.

Modules DNSL	Inputs																in- outputs				Designer Symbol
ZMV / ZMVK	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16	IO1	IO2	IO3	IO4	
INV	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12					IO1	IO2	IO3	IO4	
DSV / DRV	I1	I2	I3	I4	I5	I6	I7	I8													
SIV / IOV	I1	I2	I3	I4	I5	I6	I7	I8													
RMV / FBV	I1	I2	I3	I4	I5	I6	I7	I8													
NIV	I1	I2	I3	I4	I5	I6	I7	I8													

FBV: Field bus

12.1 Analogue inputs at the central module

- I1 to I8 safe inputs for safety shutdown mats
- I1 to I8 safe analogue inputs for 0 to 10V
- I1 to I8 safe analogue inputs for 4 to 20mA

12.2 Inputs for function mode selection switch (FMSS) at central module

- 2 FMSS functions are at the central module available.
- Any inputs at SL VARIO and internal designer wiring can be used also.
- One switching position can be selected. No output signal if more or none

Selection	Diagram	Designer Symbol
1 to 4 : function mode 1 to 4		

12.3 Inputs for Tow-Hand function according EN 574: Type IIIC

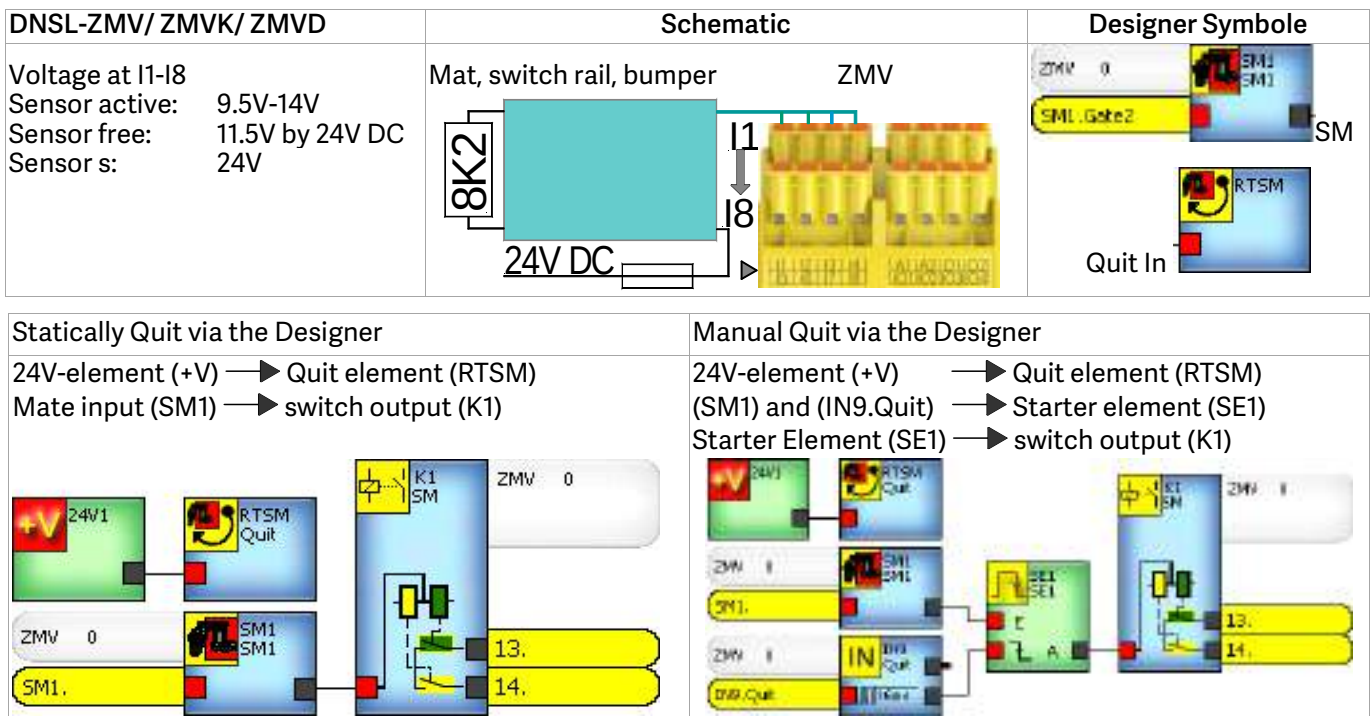
Activate both buttons within 500ms.

Response time: < 50ms

Modules	Inputs				Control	Diagram	Designer Symbol
DNSL-	E1	Q1	E2	Q2			
ZMV / ZMVK	I1	I2	I3	I4			
ZMV / ZMVK	I5	I6	I7	I8			
DRV/ DSV	I1	I2	I3	I4			
INV / IOV	I1	I2	I3	I4			
RMV / FBV	I1	I2	I3	I4			

12.4 Inputs for shut down mats, switch rails and bumpers at central module

- Up to eight short generating shutdown mats, switch rails or bumpers can be monitored safely.
- The sensors have to be connected to I1-I8 accordingly to the schematic down.
- The output SM at the symbol has to be activated via the quit symbol. The quit symbol activate all available shutdown mats.
- Mix configuration of the inputs I1-I8 is possible.
- The reaction time is $\leq 20\text{ms}$
- Power supply: 24V DC +10%, -15% (PLV)
- Safety category 4/ PLe
- For other specifications see general technical data



12.5 Important notes with using of shutdown mats, switch rails and bumpers

- The unit may only be installed and operated by those who are qualified electrical engineers or have received sufficient training and are familiar with both these instructions and the current regulations for safety at work and accident prevention.
- At begin of the implementing and in frequently time distance the necessary checks (function, status, rating and arrangement) must be undertaken of the user depending of the signal generator at the safety device.
- The safety function must be required every month if there is performance level (e) and every year if there is PLd is required by using contact outputs.
- The maximal length of the connection wire is depended of the environment and the cross section of the wire. Recommended maximal length 100 m
- The minimal safety distance of the signal generator of the protection device has to be determined according of DIN EN ISO 13855.
- The details in the instruction manual of the used signal generator must be considered and observed.
- Function parameters of the signal generator and control unit must be observed.
- Only signal generators with minimum 500.000 switch cycles respectively switch rails with minimum 11.000 switch cycles can be used.
- The contact load of the switch device outputs is to determinate according part: 14.5, page 22 to arrive the necessary switch cycles.
- The reaction time of the whole system is to consider.
- At the end of the service life the units have to be replaced.
- The replaced units have to be properly disposed.
- Faults and diagnostics via switching status LED the online diagnostics via the USB interface at the control unit.

Follow details have to be considered
 general technical data (page 21 and 22),
 details in the Instruction manual of SL VARIO Designer

12.1 Inputs for Safety circuits (SC) with manual Quit

Safety circuits (SC) / input name (E, Q) / input (I)

Module	SC1			SC3			SC5			SC7		
DNSL-	E11	E12	Q1	E21	E22	Q2	E31	E32	Q3	E41	E42	Q4
ZMV/ ZMVK	I1	I2	I3	I5	I6	I7	I9	I10	I11	I13	I14	I15
INV	I1	I2	I3	I5	I6	I7	I9	I10	I11			
DSV / DRV	I1	I2	I3	I5	I6	I7						
DSIV / SIV	I1	I2	I3	I5	I6	I7						
IOV / RMV	I1	I2	I3	I5	I6	I7						
FBV/ NIV	I1	I2	I3	I5	I6	I7						

The control happens: parallel static, parallel via clock signal from SL VARIO or static antivalent.

12.2 Inputs for Safety circuits (SC) with Quit via Q

The quit signal is created in the Designer and wired to Q-input at the symbol.

The quit signal happens via a terminal input, input at the field bus or a virtual output.

Safety circuits (SC) / input name (E, Q) / input (I)

Module	SC1			SC2			SC3			SC4			SC5			SC6			SC7			SC8		
DNSL-	E11	E12	Q1	E21	E22	Q2	E31	E32	Q3	E41	E42	Q4	E51	E52	Q5	E61	E62	Q6	E71	E72	Q7	E81	E82	Q8
ZMV/ ZMVK	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q	I9	I10	Q	I11	I12	Q	I13	I14	Q	I15	I16	Q
INV	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q	I9	I10	Q	I11	I12	Q						
DSV/ DRV	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q												
DSIV / SIV	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q												
IOV / RMV	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q												
FBV / NIV	I1	I2	Q	I3	I4	Q	I5	I6	Q	I7	I8	Q												

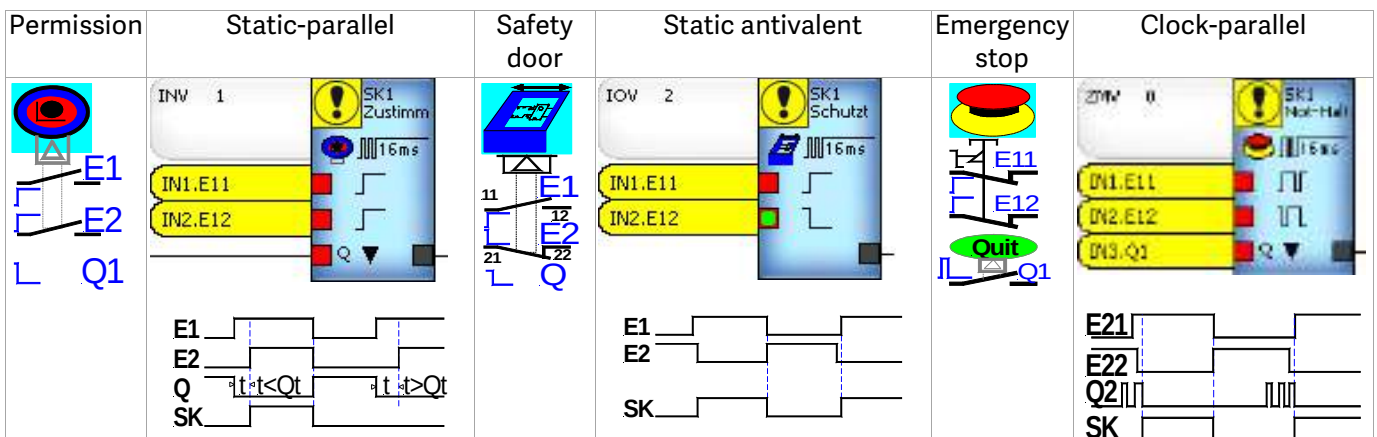
FBV: Field bus

12.3 Inputs for Safety circuits (SC) without Quit

Safety circuits (SC) / input name (E) / input (I)

Module	SC1		SC2		SC3		SC4		SC5		SC6		SC7		SC8	
DNSL-	E11	E12	E21	E22	E31	E32	E41	E42	E51	E52	E61	E62	E71	E72	E81	E82
ZMV / ZMVK	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12	I13	I14	I15	I16
INV	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10	I11	I12				
DSV / DRV	I1	I2	I3	I4	I5	I6	I7	I8								
DSIV / SIV	I1	I2	I3	I4	I5	I6	I7	I8								
IOV / RMV	I1	I2	I3	I4	I5	I6	I7	I8								
FBV / NIV	I1	I2	I3	I4	I5	I6	I7	I8								

FBV: Field bus



13 Outputs at SL VARIO

Short-circuit-proof positive switching semiconductor outputs

DNSL-		Switch current	P-Level	Description
ZMV ZMVK	A1 IO1-O6	1A, Σ 3A	PLe	6 safe outputs O1, O2 monitored current
ZMV ZMVK	A1 IO1/2 IO3/4	0.1A Σ 0.4A	PLe	4 clock outputs 4 safe outputs 4 safe digital inputs
DSV DRV	P IO1/ O2	0.25A Σ 0.4A	PLc	2 clock or switching outputs
DSV DRV	P IO3-O7	1A Σ 2.5A	PLe	5 safe outputs O1, O4 also clock outputs
SIV NIV	P IO1-4	1A Σ 2A	PLd	4 safe outputs
INV	A1 IO1-IO4	0.1A	PLe	4 safe or clock outputs
IOV DSIV DSV	P IO1-O7	1A Σ 3,5A	PLe	7 safe outputs O1-O4 also clock outputs

Safe contact outputs

DNSL-		Switch current	P-Level	Description
ZMV ZMVD	K1 13 14 K2 23 24	$\geq 10\text{mA}$ $\leq 6\text{A}$ $\Sigma K1+K2:$ 6A	PLe	2 safe NO contact DC13: 24V/ 2A AC15: 230V/ 3A 40ZM31/ 32 not available
ZMVK	K3 33 34 43 44 K4 53 54 63 64 K5 73 74 83 84 K6 93 94 103 104	$\geq 10\text{mA} \leq 6\text{A}$ $\Sigma K3+K4: 6\text{A}$ $\Sigma K5+K6: 6\text{A}$	PLe	Output extension 4 outputs each 2 safe NO contacts DC13: 24V/ 5A
DNSL-RMV	K1 13 14 23 24 K2 33 34 43 44	$\geq 10\text{mA}$ $\leq 6\text{A}$ $\Sigma K1+K2:$ 6A	PLe	2 outputs each 2 safe NO contacts DC13: 24V/ 4A AC15: 230V/ 3A

Designer Symbols

Safe output	Clock output	Safe contact	Safe contacts	Safe contacts
Safe output	Clock output	Clock output	Safe output	Safe output

The configuration of the outputs happens at Designer.

A lot of diagnostics functions are available. This is useful for the setting-up operation and debugging.

14 General technical data

14.1 Electrical characteristics

Operation voltage via A1, A2 at ZMV, ZMVK	24V DC, -15% + 10% for all modules, ≤10% Ripple
Input current at A1	≤ 4A / internal fuse: 6A

DNSL-	ZMV	ZMVA	ZMVD	ZMVK	DSV	DSV2	DSIV	DRV
Power consumption in W	2.9	3.0	3.0	7.7	2.5	2.5	2.5	2.5
Wight in g	350	450	450	570	130	130		130

DNSL-	SIV	INV	IOV	CMV	NIV	NRV	RMV	Feld Bus
Power consumption in W	2.2	1.7	2.2	0.5	2.2	0.5	4.8	1.0
Wight in g	130	130	130	130	130	130	140	130

14.2 Environment conditions

Operating temperature: -10 +55°C	Storage temperature: -40 +85°C
Vibration resistance 3 axle	Sinus 10–55Hz, 0,35mm, 10 cycles, 1 octave /min
Shock resistance 3 axle for output relay	≤ 5g, 11ms
Max. cable cross section	1 x(0,2-1,0mm ²)with wire end sleeve
Terminal	Spring load clamps, pluggable
Connection wire	60/75°C copper only
Housing material	Polyamide PA unreinforced
Protection class	Installation in a closed cabinet with ≥ IP 54
Voltage at the inputs by shutdown mat	I1 to I8: 9.5 to 14V, 11.5V with 24V shutdown mat voltage
Reaction time by shutdown mat	< 20ms
Voltage at the inputs	24V DC -15%, + 10%
Input current consumption	Max. 4mA
Input voltage terminal(P) at DSV, DRV, SIV, IOV, NIV	24V DC -15% + 10%
Input current terminal(P) at DSV, DRV, SIV, IOV, NIV	≤ 4A
Input frequency at I9 – I12 at central module	≤ 1200Hz HTL-signals via as example proximity switches
Input frequency at I9 – I16 at central module	≤ 50KHz HTL-signals via incremental measuring system
Input frequency Encoder 1 and 2 at DNSL-DSV	≤ 500KHz Sin / Cos 1Vpp or TTL signals
Input frequency resolver 1 and 2 at DNSL-DRV	≤ 1200Hz Sin/ Cos 1 to 10Vpp
Input signals at DNSL-SIV	SSI interface signals
Accuracy of the analogue inputs	± 3% of the maximal input value over -10 to +60°C
Input impedance of the analogue inputs	With 4-20mA ca. 500Ω, with 0-10V > 5KΩ

Remark: current inputs (4-20mA) can be destroyed wit input voltage >12V

14.3 Technical data of the Semiconductor outputs

Technical data Semiconductor outputs	ZMV/ ZMVK		DSV, DRV		INV	IOV	NIV, SIV
Outputs	IO1 - IO4	O1 – O6	O1, O2	O3 – O7	IO1 - IO4	O1 – O7	O1 – O4
Performance level	PLe	PLe	PLc	PLe	PLe	PLe	PLd
Schematic of outputs							
Switch and continuous current Ω / L	0,1A	1A	0,25A	1A	100mA	1A	1A
Sum of Switch/continuous current Ω/L	0,4	3A	0,4A	2,5A	0,4A	3,5A	2A
Minimal Switch current Ω / L	1mA	1mA	1mA	1mA	1mA	1mA	1mA

- The power supply of the semiconductor outputs will be disconnected if the terminal A2 is not connected to 0V. Therefor residual voltage at the output loads is not possible.
- All semiconductor outputs are short circuit and overload proof.
- Every output has a recovery diode.

14.4 Technical data of the contact outputs

Technical data contact outputs	DNSL-ZMV/ ZMVK K1, K2	DNSL-ZMVK K3 – K6	DNSL-RMV K1, K2
Outputs			
outputs schematic, Performance level: PLe			
Minimum switch current	10mA	10mA	10mA
switch current, 0,1Hz cycles according to DIN EN 60947-4-1/ EN 60947-5-1	DC1: 24V/6A DC13: 24V/2A	DC1: 24V/6A DC13: 24V/5A	DC1: 24V/6A DC13: 24V/4A
switch current according to DIN EN 60947-4-1/ EN 60947-5-1	AC1:250V/6A AC15: 230V/3A		AC1:250V/6A AC15: 230V/3A
Sum of the switch and continuous current	≤ 4A	K3, K4: ≤ 6A, K5, K6: ≤ 6A	K1: ≤ 4A, K2: ≤ 4A
Electrical life DC13: 24V/ 1A	1.5x10 ⁵	1x10 ⁵	9x10 ⁵
Electrical life DC13: 24V/ 4A	10 ⁴	4x10 ⁴	7x10 ⁴
Electrical life AC15: 230V/ 1A	2x10 ⁵		7x10 ⁵
Electrical life AC15: 230V/ 2A			5x10 ⁵
Mechanical life	> 50x10 ⁶	> 10 ⁷	> 40 x 10 ⁶
Maxim switch cycles DC13: 4A	360 cycles/h	360 cycles /h	360 cycles /h
Maxim switch cycles AC15: 3A	360 cycles /h		360 cycles /h
Contact fuse	6A slow	6A slow	6A slow
Short circuit strength: Automat safety fuse gG	200A/ B6 800A/ 6AgG	1000A SCPD 6A	200A/ B6 800A/ 6AgG
Rated insulation voltage	250V AC		250V AC
Impulse withstand voltage	4KV		4KV
Use in pollution degree 2 environment.			
Reaction time, drop out time	15mS/12mS	10mS/ 3mS	10mS
AC1: control of none or low inductive load, AC voltage AC15: control of electro-magnetically load, AC voltage		DC1: control of none or low inductive load, DC voltage DC13: control of electro-magnetically load, DC voltage	

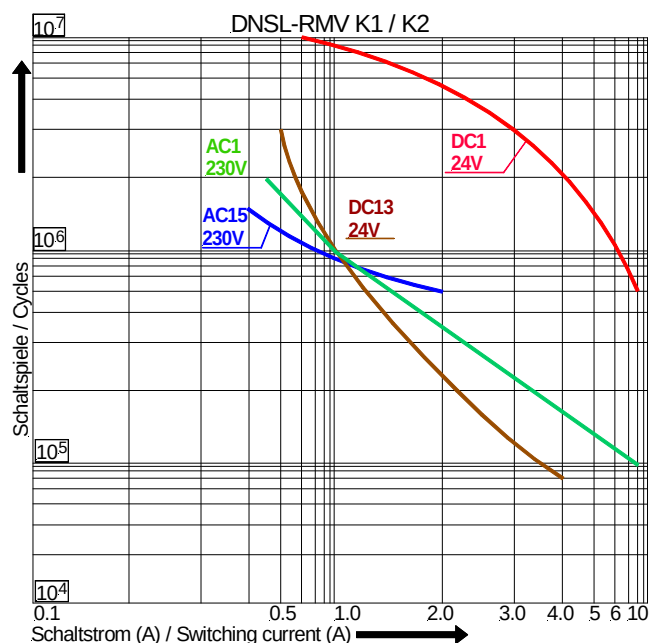
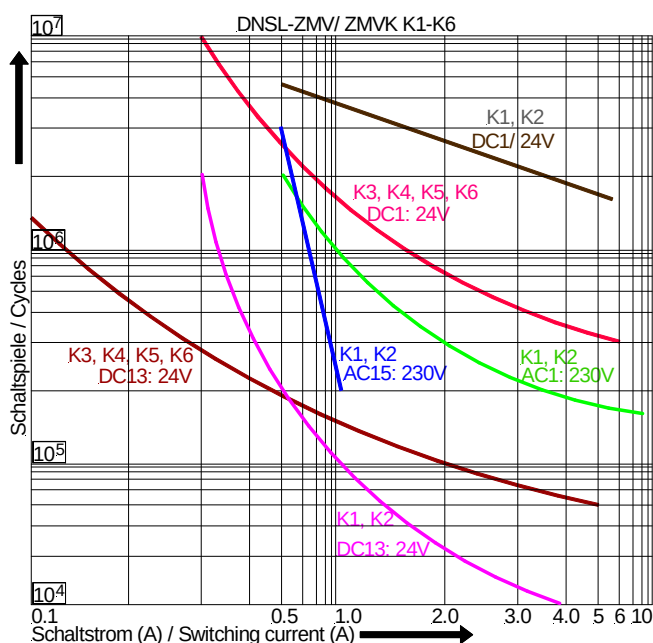
14.5 Electrical life of the contact outputs

260 Work days / year/ 8h work time/ day/ switch voltage 24V DC

Modules	DNSL-ZMV, ZMVK: K1, K2					DNSL-ZMVK: K3-K6					DNSL-RMV: K1,K2					
Last Art	DC1	DC1	DC1	DC13	DC13	DC1	DC1	DC1	DC13	DC1	DC1	DC1	DC1	DC13	DC13	
Schaltstrom	1.0A	4.0A	6.0A	1.0A	4A	1.0A	4.0A	6.0A	1.0A	4.0A	1.0A	4.0A	6.0A	1.0A	4.0A	Jahre
Schaltspiele/	384	192	153	15	1	144	36	29	15	5	769	192	96	91	67	5
Stunde	192	96	76	7	0.5	77	17	14	7	2	384	96	48	45	33	10
	96	48	38	3.6	0.25	38	8	7	3.6	1	192	48	24	23	17	20

260 Work days / year/ 8h work time/ day/ switch voltage 230V AC

Modules	DNSL-ZMV, ZMVK: K1, K2					DNSL-ZMVK: K3-K6					DNSL-RMV: K1,K2					
Last Art	AC1	AC1	AC1	AC15	AC15	AC1	AC1	AC1	AC15	AC15	AC1	AC1	AC1	AC15	AC15	
Schaltstrom	0.5A	1.0A	3.0A	0.5A	1.0A						0.5A	1A	3.0A	0.5A	2A	Jahre
Schaltspiele/	192	96	20	288	20						174	96	20	116	48	5
Stunde	96	48	10	144	10						87	48	10	58	24	10
	48	24	5	72	5						44	24	15	28	12	20



15 Dimensions

DNSL-ZMV 45 mm	DNSL-ZMVA, DNSL-ZMVK: 67.5 DNSL-ZMVD: 67.5 mm or 90 mm	Others 22.5 mm	Others 22.5 mm	Others 22.5 mm

DNSL-ZMVD: 67.5 mm with 4 standstill and speed monitoring
90.0 mm with 8 standstill and speed monitoring

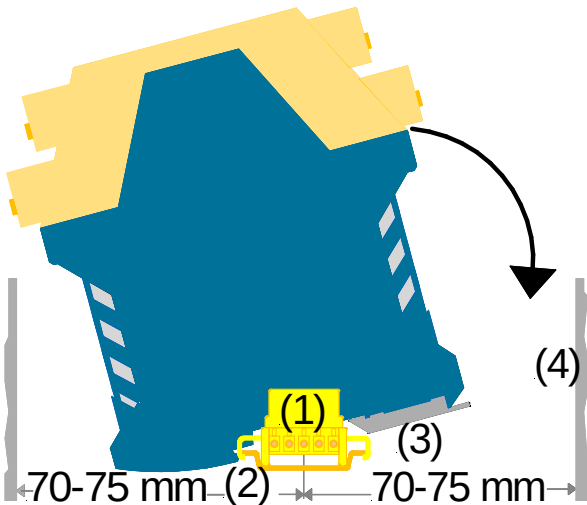
15.1 Fitting and remove

Fitting:

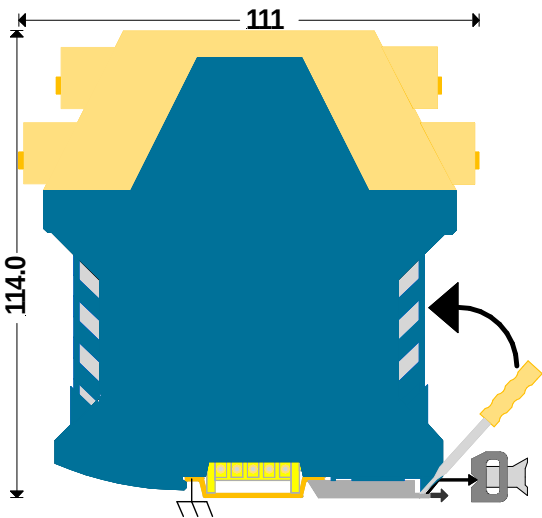
Plug bus connector at the cap rail. Hook the module up side at the cap rail. Push it down.

Remove:

Screwdriver to unlock the module from the cap rail. Move the module to the up direction and take it out.

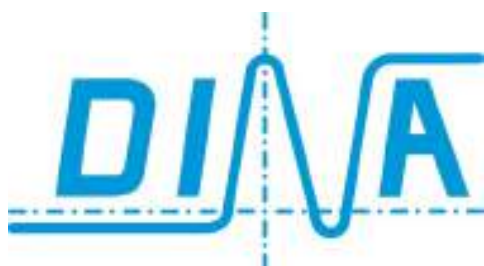


Cable channel distance



⏏: Grounding via DIN rail

- (1) (1) Bus connector
- (2) Cap rail
- (3) Locking feeder
- (4) Cable channel



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we are safety.

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