VV0 323

VARAN Valve Interface

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Translation from German

VARAN VALVE INTERFACE VVO 323

with 32 short-circuit proof digital outputs for valve terminal with EX250 flange connection (e.g. series SY, VQC, VQM, SV, S0700, ...)

The VVO 323 module has 32 short-circuit digital outputs proof (+24 V/50 mA/short-circuit proof). The supply voltage is divided into two groups. Both groups are monitored for under and over voltage.

Contents

1 Technical Data

1.1 Digital Output Specifications

Number	max. 32 digital outputs
Short-circuit proof	yes
Maximum continuous current load allowed per channel	50 mA
Maximum total current (entire module)	1.6 A (100% of on-time)
Residual current (off)	≤ 10 µA
Turn-on delay	< 100 µs
Turn-off delay	< 100 µs

1.2 Electrical Requirements

Supply voltage +24 V DC	+18.2-30 V DC
Current consumption of +24 V supply voltage(1)	corresponds to the load on the digital outputs
UL standard	for UL: must be supplied with SELV / PELV and Limited energy(2)

(1) The module has an input capacity of 20 µF (15 µF on +24 V DC for the electronics, 5 µF on +24 V DC for outputs) at the +24 V DC supply input.

(2) In US according to Class 2 UL 1310 or UL 61010-1, 3rd edition, chapter 9.4 or LPS (limited power supply) UL 60950-1 or Limited Energy UL 1585

1.3 Voltage Monitor

Power supply +24 V	supply voltage > 18 V (corresponding DC OK-LED lights green) supply voltage < 30 V (corresponding DC OK-LED lights green)

1.4 Miscellaneous

Article number	16-050-323
Hardware version	1.x
Standard	UL 61010-1, 3rd edition UL 61010-2-201, 1st edition CAN/CSA-C22.2 No. 61010-1-12, 3rd edition CAN/CSA-IEC 61010-2-201:14, 1st edition Report E247993-D1002-1/A0/C0-UL
Dimensions	Standard 167 x 89 x 79.8 mm (L x W x H)

1.5 Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +60 °C	
Humidity	0-95 %, non-condensing	
EMV resistance	in accordance with EN 61000-6-2 (industrial area)	
EMC-noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP67 (not UL evaluated)

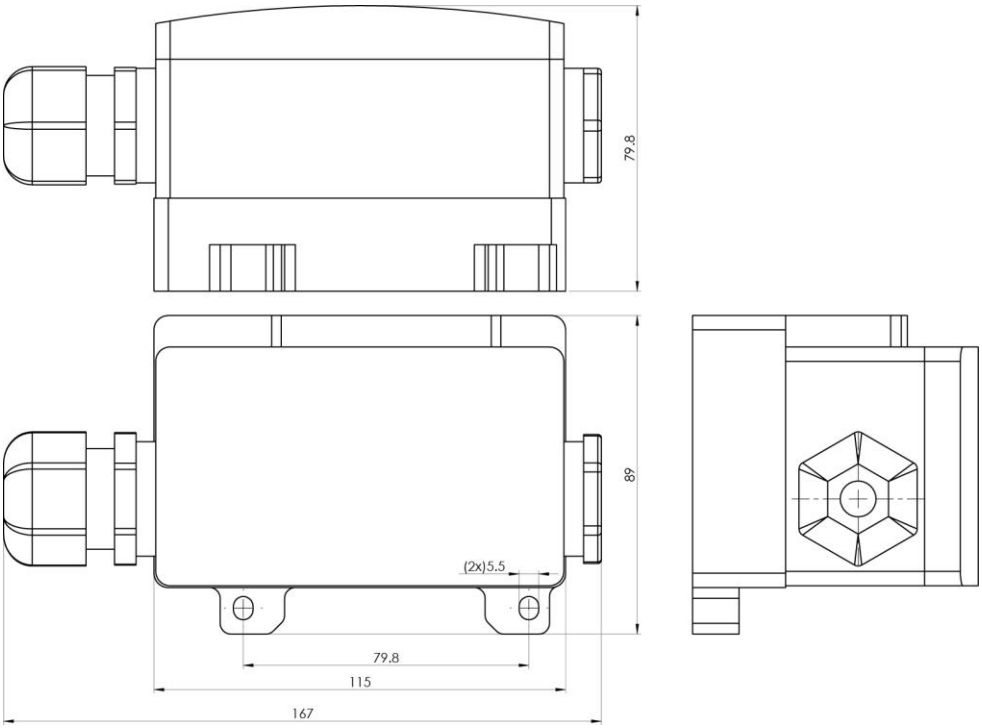
	Proportional valve connection cables min. 80 °C temperature resistance.

	Device must be installed within a separate overall enclosure or end-product equipment enclosure.

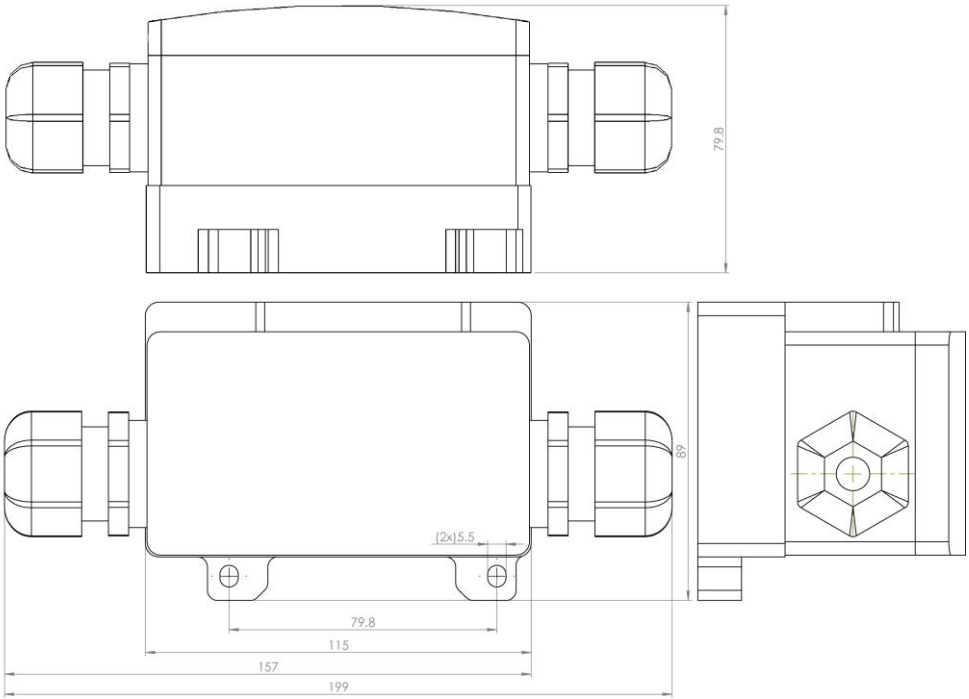
	If the equipment is used for a purpose other than its designated use, the protection it provides may be insufficient.

2 Mechanical Dimensions

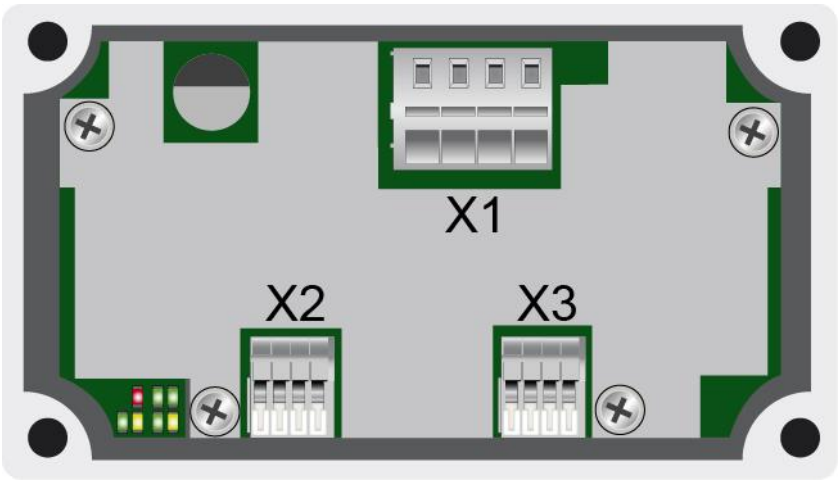
2.1 Standard

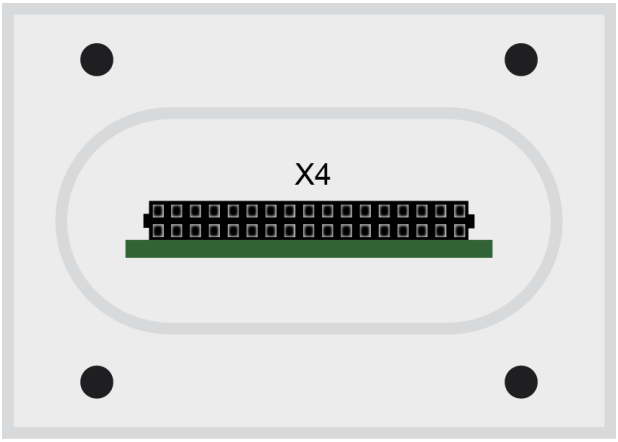


2.2 with Accessories (16-050-323-Z1)



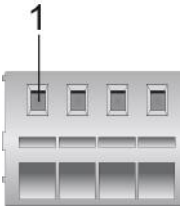
3 Connector Layout





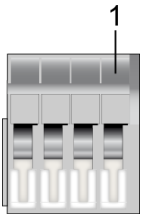
3.1 Connectors

X1: Supply (WAGO 236-404)



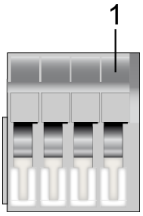
Pin	Function
1	GND
2	+24 V DC for electronics
3	+24 V DC for electronics
4	+ 24 V DC for digital outputs

X2: VARAN In (WAGO 218-104) (maximum cable length: 100 m)



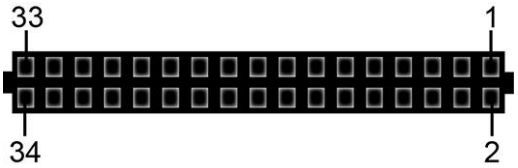
Pin	Function
1	Tx+/ WH
2	Tx-/ BU
3	Rx+/ YE
4	Rx-/ OG

X3: VARAN Out (WAGO 218-104) (maximum cable length: 100 m)



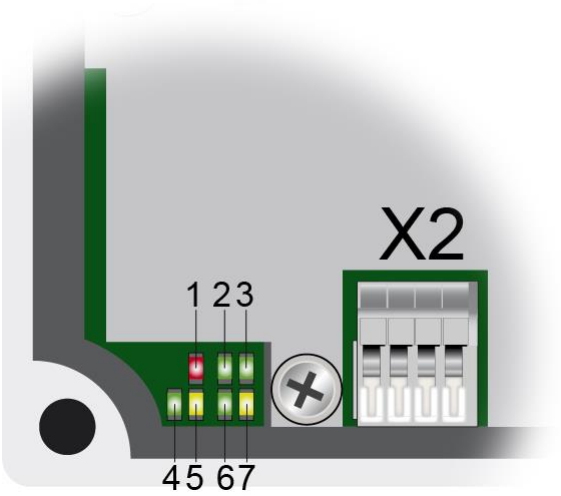
Pin	Function
1	Tx+/ WH
2	Tx-/ BU
3	Rx+/ YE
4	Rx-/ OG

X4: Digital Out (34-pin socket terminal, 2-row)



Pin	Function
1	EXGND
2	EXGND
3	digital output 2
4	digital output 1
5	digital output 4
6	digital output 3
7	digital output 6
8	digital output 5
9	digital output 8
10	digital output 7
11	digital output 10
12	digital output 9
13	digital output 12
14	digital output 11
15	digital output 14
16	digital output 13
17	digital output 16
18	digital output 15
19	digital output 18
20	digital output 17
21	digital output 20
22	digital output 19
23	digital output 22
24	digital output 21
25	digital output 24
26	digital output 23
27	digital output 26
28	digital output 25
29	digital output 28
30	digital output 27
31	digital output 30
32	digital output 29
33	digital output 32
34	digital output 31

3.2 Status LEDs



1 Error Reset	red	ON	FPGA error display
2 DC OK External	green	ON	digital output supply voltage OK
3 DC OK	green	ON	electronics supply voltage OK
4 VARAN In Link	green	ON	connection between the two PHYs made
		BLINKS	VARAN In of the primary client has no link
5 VARAN In Active	yellow	ON	data is exchanged over the VARAN bus
6 VARAN Out Link	green	ON	connection between the two PHYs made
		BLINKS	there is no connection between VARAN In and the primary client
7 VARAN Out Active	yellow	ON	data is exchanged over the VARAN bus

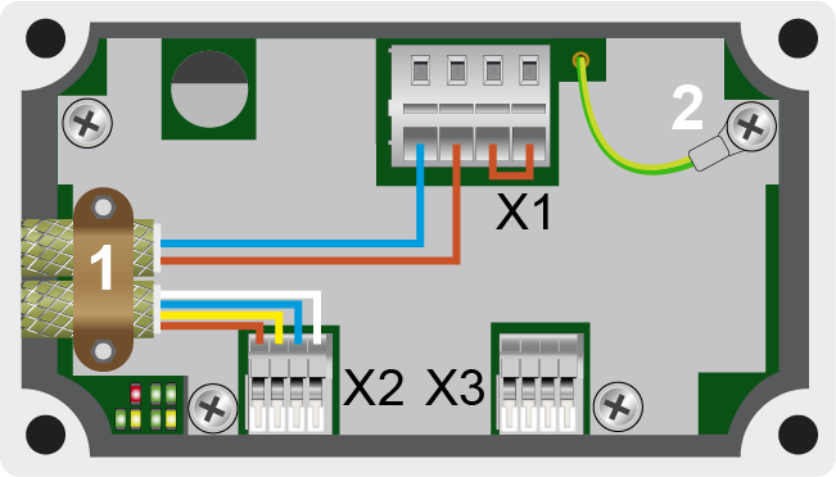
3.3 Accessories

The EX250 flange connection for VARAN Out is available from SIGMATEK under the article number 16-050-323-Z1.

4 Mounting Instructions

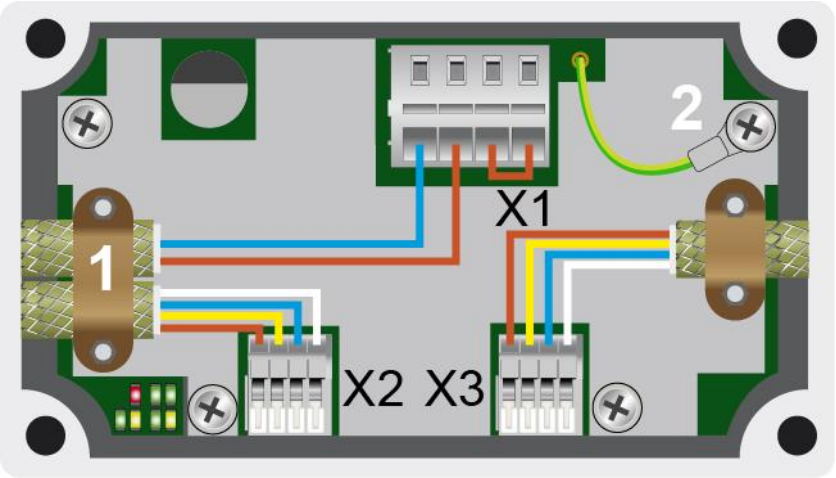
Color coding of the cables to X1, X2 and X3 according the Sigmatek VARAN cables.

4.1 with VARAN In

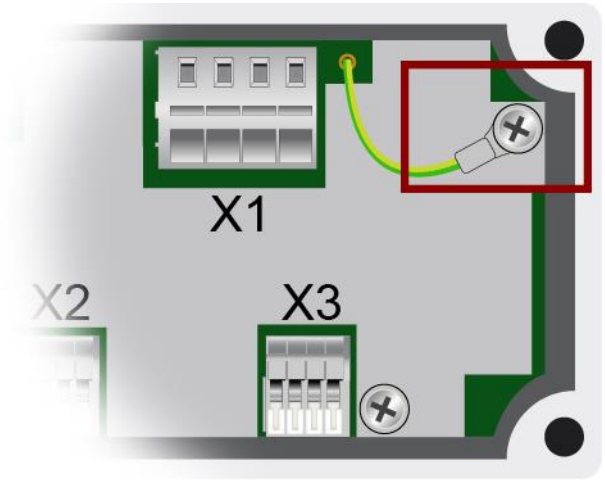


1) The protective network of the connection line must be screwed onto the protective plate with stress relief on the cable.

4.2 with VARAN In and VARAN Out



4.3 Shielding



2) The ground connection for the card is wired with a grounding cable from the housing as shown below.

5 Wiring

5.1 General Information on the Digital Outputs

The cross sectional area of the +24 V supply must be designed for the maximum output current drawn by a group.

AWG 22 copper wire or equivalent with a larger wire cross-section is recommended.

The outputs can be turned off by turning off the +24 V supply voltage.

Applying power to an output whose supply voltage exceeds 1.0 V is not allowed.

The outputs are electrically protected against +24 V. Typically, the braking of inductive loads is internally limited to -1.0 V.

6 Recommended Shielding for VARAN

The VARAN real-time Ethernet bus system exhibits a very robust quality in harsh industrial environments. Through the use of IEEE 802.3 standard Ethernet physics, the potentials between an Ethernet line and sending/receiving components are separated. In the event of an error, the VARAN Manager resends messages to a bus participant immediately. The shielding described below is mainly recommended.

For applications in which the bus is operated outside the control cabinet, the correct shielding is required. This is especially important, if due to physical requirements, the bus cables must be placed next to sources of strong electromagnetic noise. It is recommended to avoid placing VARAN bus lines parallel to power cables whenever possible.

SIGMATEK recommends the use of CAT5e industrial Ethernet bus cables.

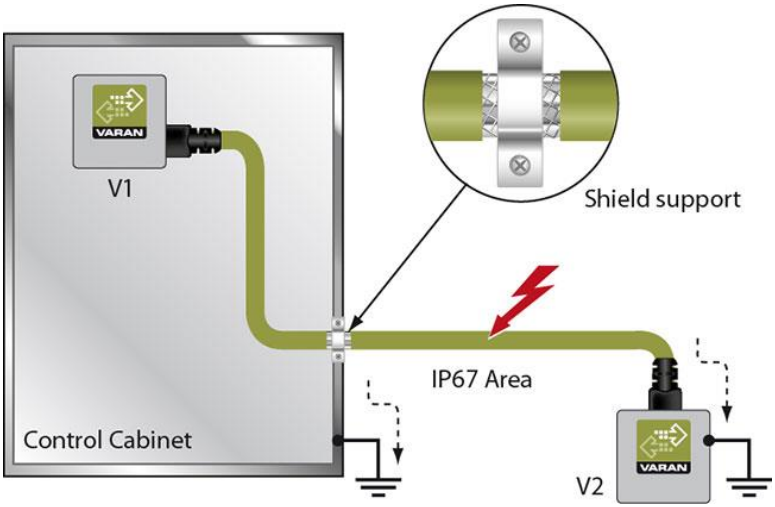
An S-FTP cable should be used for the shielding.

An S-FTP bus is a symmetric, multi-wire cable with unshielded pairs. For the entire shielding, a combination of foil and braiding is used. A non-laminated variant is recommended.

The VARAN cable must be secured at a maximum distance of 20 cm from the connector to protect against vibration!

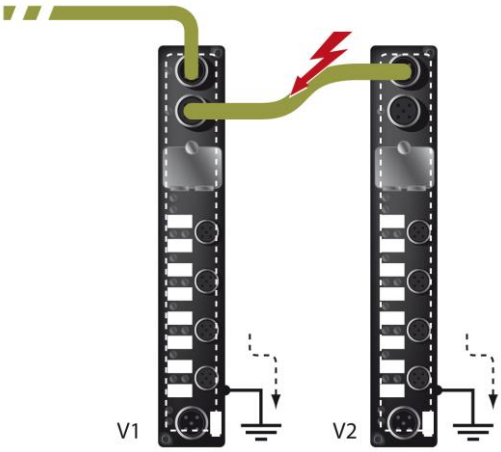
6.1 Wiring from the Control Cabinet to an External VARAN Component

If the Ethernet lines are connected from a VARAN component to a VARAN node located outside the control cabinet, the shielding should be placed at the entry point to the control cabinet housing. All noise can then be deflected from the electronic components before reaching the module.



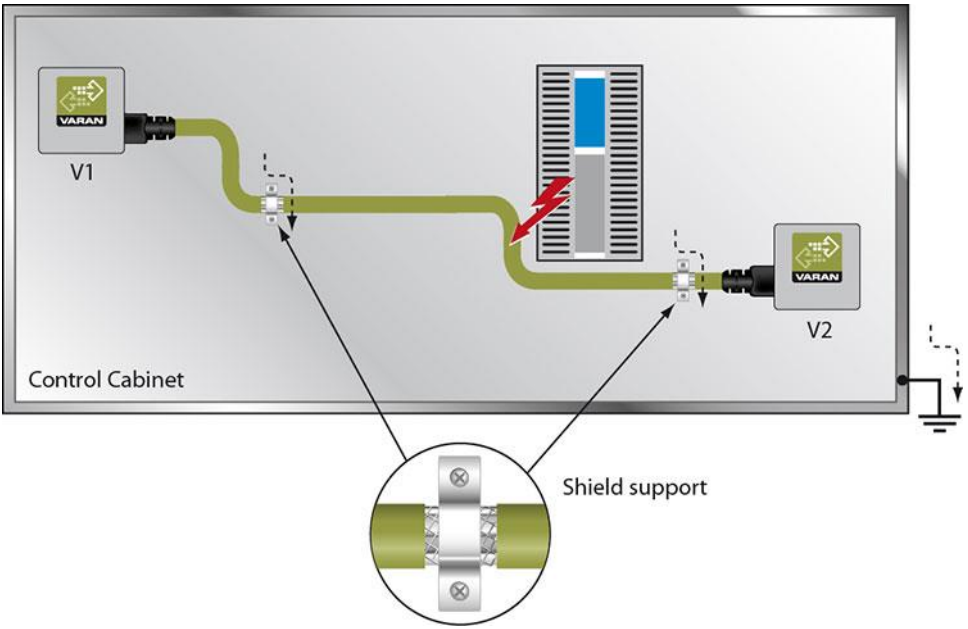
6.2 Wiring Outside of the Control Cabinet

If a VARAN bus line must be connected outside of the control cabinet only, no additional shield support is required. A requirement therefore, is that only IP67 modules and connectors can be used outside the control cabinet. These components are very robust and noise resistant. The shielding for all sockets in IP67 modules is electrically connected internally or over the housing, whereby voltage spikes are not deflected through the electronics.



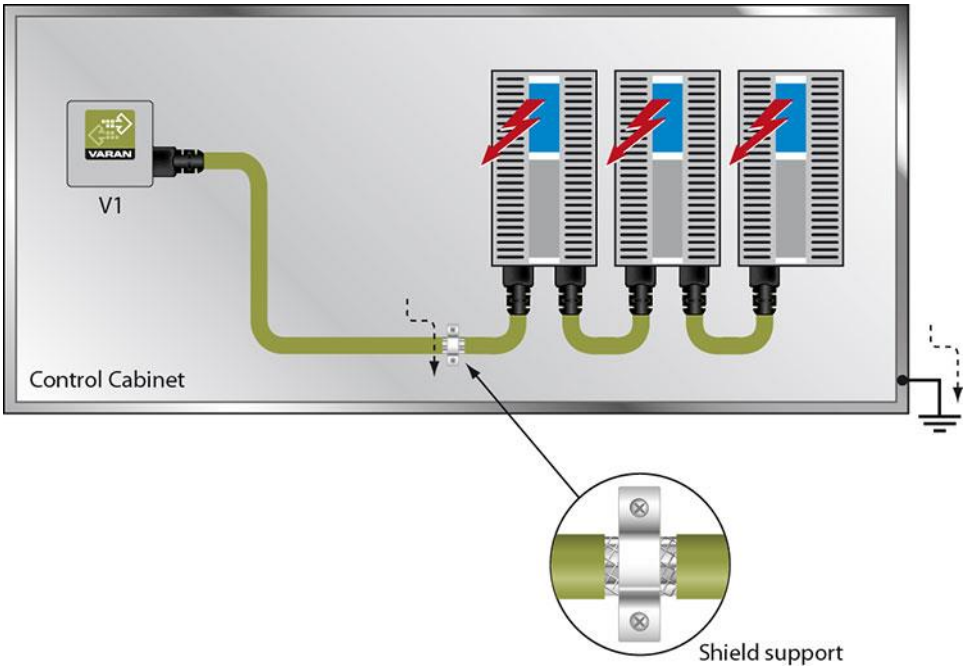
6.3 Shielding for Wiring Within the Control Cabinet

Sources of strong electromagnetic noise located within the control cabinet (drives, Transformers, etc.) can induce interference in a VARAN bus line. Spike voltages are dissipated over the metallic housing of a RJ45 connector. Noise is conducted through the control cabinet housing without further action from the electronic components. To eliminate sources of noise during data transfer, it is recommended that the shielding for all electronic components be connected within the control cabinet.



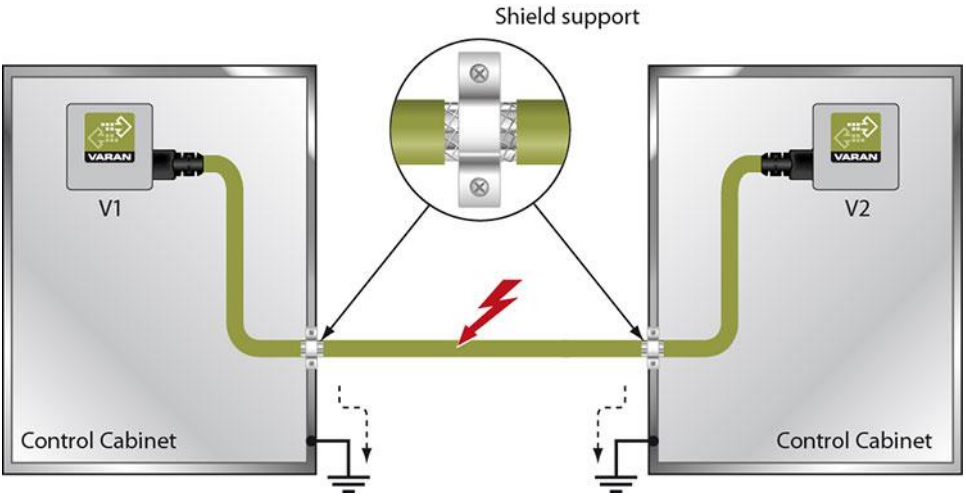
6.4 Connecting Noise Generating Components

With the connection of power components that generate strong electromagnetic interference, it is also critical to ensure correct shielding. The shielding should be placed before a power element (or group of power elements).



6.5 Shielding Between Two Control Cabinets

If two control cabinets must be connected over a VARAN bus, it is recommended that the shielding be located at the entry points of both cabinets. Noise can be thereby prevented from reaching the electronics within the control cabinet.



Documentation Changes

Change date	Affected page(s)	Chapter	Note
21.01.2016	6	2 Mechanical Dimensions	New graphics
19.04.2017	4	1.1 Digital Output Specifications	Changed description of the Number paragraph
		1.2 Electrical Requirements	Changed supply voltage values Added UL standard
	5	1.4 Miscellaneous	Added UL standard
		1.5 Environmental Conditions	Added note for protection type Added cable warning notice
07.06.2017	5	1.5 Environmental Conditions	Removed table footnote Added warning note regarding the device mounting
12.07.2017	5	1.4 Miscellaneous	Removed line in section “Standard”
		1.5 Environmental Conditions	Added warning note
	14	5.1 General Information on the Digital Outputs	Added note regarding the recommended wire
16.07.2019	12	4 Mounting instructions	Color coding added
24.06.2020	4	1.2 Electrical Requirements	Additional footer line added