C-IPC Expansion VM 053

1 x VARAN OUT
1 x Ethernet 10/100 Mbits
1 x TTY Interface

With this expansion card, the C-IPC can be expanded with an Ethernet interface, a serial TTY interface and a VARAN Manager containing a VARAN Out port. This special design allows easy mounting and fixation of the expansion card.

The corresponding cover and mounting accessories are included with the delivery of the expansion card!

The C-IPC VM 053 expansion is functional starting from the OS version 01.02.083

Technical Data

Performance data

Interface connections	1 x VARAN Out (RJ45) (maximum length: 100 m) 1 x Ethernet 10/100 MBits (RJ45) 1 x TTY 20 mA interface (6-pin Weidmüller)	
Maximum transfer rate of the TTY interface	56 KBaud	
Status display	Green: Link	Yellow: Active
Connection to periphery device	Over SO-DIMM PCI-Bus Socket	

Electrical requirements

Internal power supply	Typically +5 V DC(supplied over the SO-DIMM socket)
Current consumption	Typically 500 mA

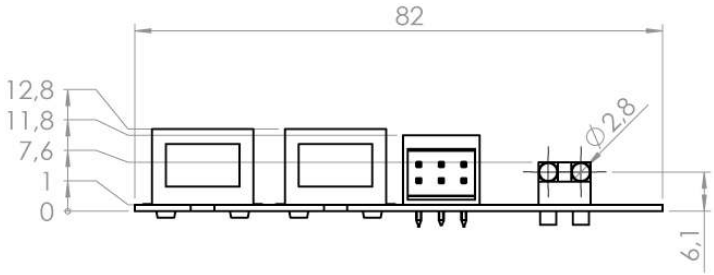
Miscellaneous

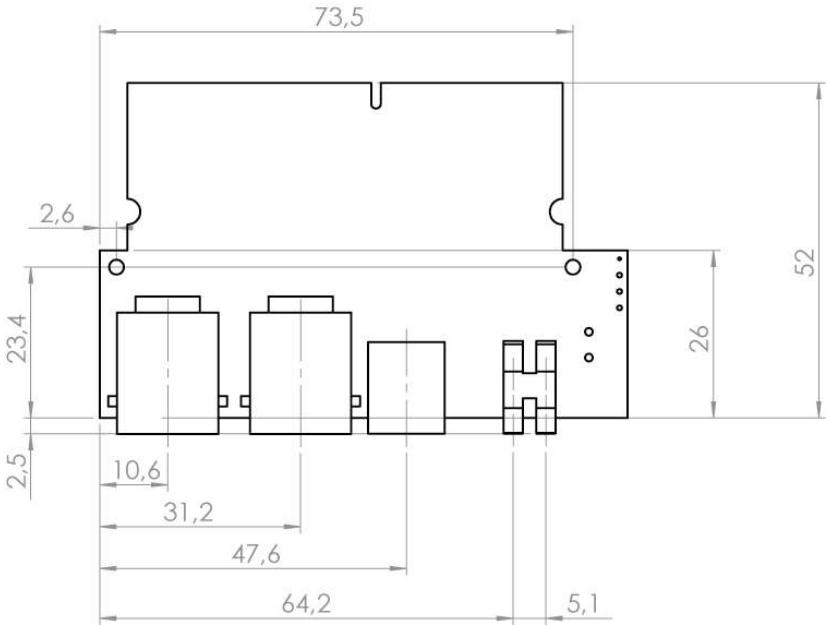
Article number	01-460-053
Hardware version	1.x
Required operating system	01.02.083 and higher

Environmental conditions

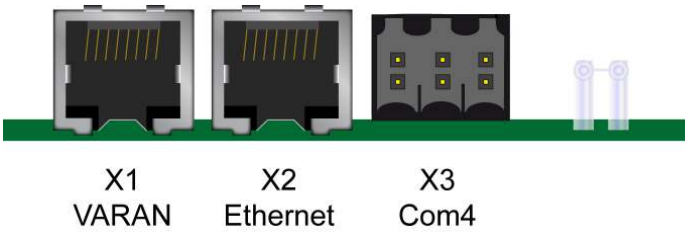
Storage temperature	-20 – +85 °C
Operating temperature	0 – +60 °C
Humidity	0 - 95 %, uncondensed
EMV stability	According to EN 61000-6-2 (industrial area)

Mechanical Dimensions

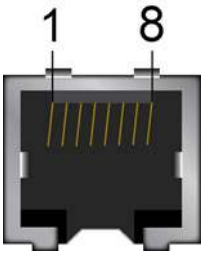




Connector Layout



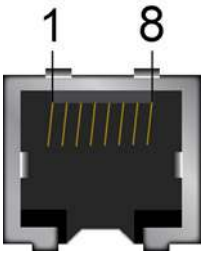
X1: VARAN Out (8-pin RJ45)



Pin	Function
1	TX/RX+
2	TX/RX-
3	RX/TX+
4	-
5	-
6	RX/TX-
7	-
8	-

More information on the VARAN bus can be found in the VARAN bus specifications!

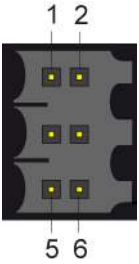
X2: Ethernet (8-pin RJ45)



Pin	Function
1	TX+
2	TX-
3	RX+
4	-
5	-
6	RX-
7	-
8	-

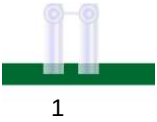
Problems can arise if a control is connected to an IP network, which contains modules that are not running with a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with such a high frequency (i.e. broadcasts), that the high interrupt load could cause a real time runtime error or runtime error. By configuring the packet filter (Firewall or Router) accordingly however, it is possible to connect a network with SIGMATEK hardware to a third party network without triggering the error mentioned above.

X3: TTY interface 20 mA (6-pin Weidmüller)



Pin	Function
1	TX+
2	TX-
3	RX+
4	RX-
5	20 mA
6	GND

Fiber optics: 2 x two-color LED



LED	Color	Function
1	Yellow	Active Ethernet
2	Yellow	Active VARAN Out
1	Green	Link Ethernet
2	Green	Link VARAN Out

X4: SO-DIMM (144-pin)

Conductor board

Pin	PCI-Bus	Pin	PCI-Bus	Pin	PCI-Bus
1	GND	49	\SERR	97	\INIT / \DIR *
2	GND	50	\PERR	98	\ERR / \HDSEL *
3	CLK2	51	\TRDY	99	GND
4	CLK3 *	52	\DEVSEL	100	GND
5	GND	53	\STOP	101	PD6 / \MOT0 *
6	GND	54	\IRDY	102	PD7 / DRV0 *
7	\REQ1	55	\RESET	103	PD4 / \DSKCHG *
8	\GNT1	56	\FRAME	104	PD5 / RES *
9	\REQ2 *	57	IRQ_W *	105	PD2 / \WP *
10	\GNT2 *	58	IRQ_X	106	PD3 / \RDATA *
11	AD00	59	IRQ_Y *	107	PD0 / \INDEX *
12	AD01	60	IRQ_Z *	108	PD1 / \TRKO *
13	AD02	61	GND	109	GND
14	AD03	62	GND	110	GND
15	AD04	63	GND	111	\AFD / DENSEL*
16	AD05	64	GND	112	GND
17	AD06	65	GND	113	LPT / \FLPY *
18	AD07	66	GND	114	\STB / RES *
19	AD08	67	EWP14	115	Solder pad
20	AD09	68	EWP15	116	I2C_CLK_DVI
21	AD10	69	EWP12	117	Solder pad
22	AD11	70	EWP13	118	I2C_DAT_DVI
23	AD12	71	EWP10	119	GND
24	AD13	72	EWP11	120	GND
25	AD14	73	EWP09	121	GND
26	AD15	74	GND	122	GND
27	AD16	75	EWP07	123	\RESPER_X *
28	AD17	76	EWP08	124	GND
29	AD18	77	EWP05	125	+5V *
30	AD19	78	EWP06	126	+5V *
31	AD20	79	EWP04	127	+5V *
32	AD21	80	GND	128	+5V *
33	AD22	81	EWP02	129	+5V *
34	AD23	82	EWP03	130	+5V *
35	AD24	83	EWP00	131	+5V *
36	AD25	84	EWP01	132	+5V *
37	AD26	85	GND	133	+3V3
38	AD27	86	GND	134	+3V3
39	AD28	87	GND	135	+3V3
40	AD29	88	GND	136	+3V3
41	AD30	89	GND	137	+3V3
42	AD31	90	GND	138	+3V3
43	\CBE0	91	GND	139	+3V3
44	IDSEL*	92	\SLCT / \WGATE *	140	+3V3
45	\CBE2	93	PE / \WDATA *	141	GND
46	\CBE1	94	\BUSY / MOT1*	142	GND
47	PAR	95	\ACK / DRV1 *	143	GND
48	\CBE3	96	\SLIN / \STEP *	144	GND

***These signals are NOT processed in the VM 053 (only in the C-IPC).**

Installing and Removing the Expansion Print

When installing the expansion print, the following process must be followed:

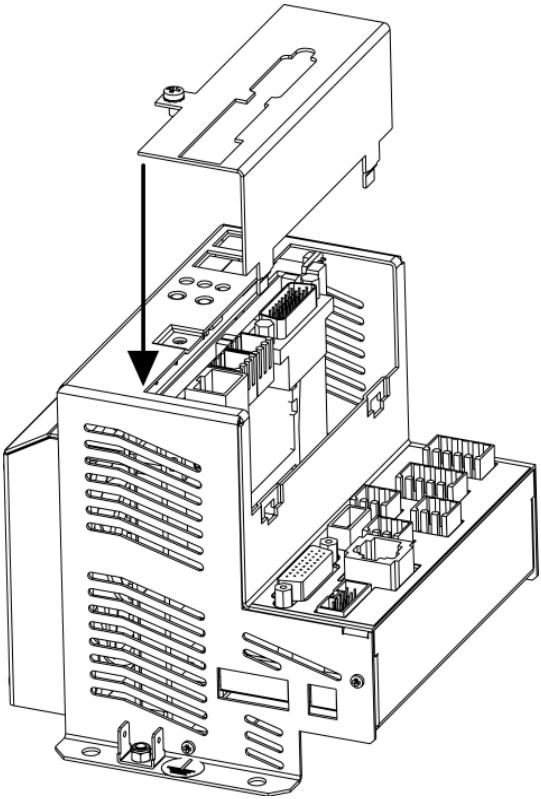
- The card is first inserted in the SO_DIMM socket on an angle.
- Next, the card must be pressed into the holder.
- Finally, it is then secured to the C-IPC with the M2x4 bolts!

The removal is completed in reverse:

- The card is first unscrewed from the C-IPC.
- Next, the card must be pulled forward in order to release from the holders.
- Finally, the care is removed from the SO-DIMM socket!

Mounting the Housing Cover

The housing cover is placed vertically on the C-IPC, the prongs inserted in the openings provided and then screwed down.



Recommended Shielding for VARAN

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

For applications in which the bus is run outside the control cabinet, the correct shielding is required. Especially when for structural reasons, the bus line must be placed next to strong electromagnetic interference. It is recommended to avoid placing Varan bus lines parallel to power cables whenever possible.

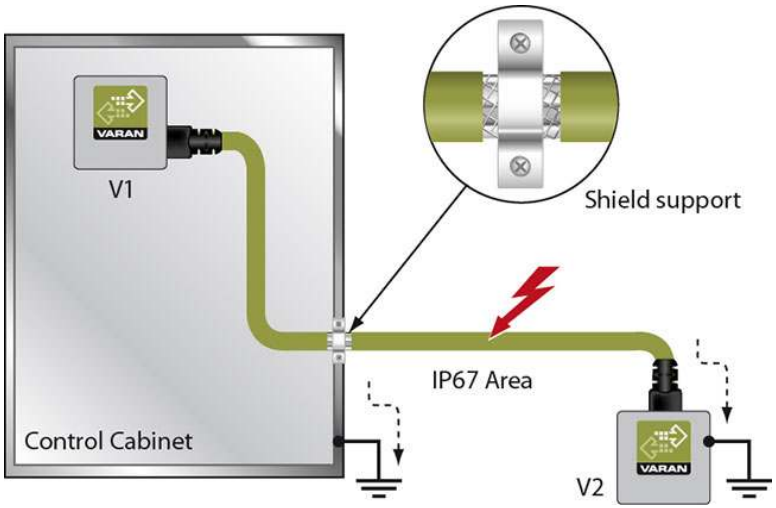
SIGMATEK recommends the use of CAT5e industrial Ethernet bus cables.

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

The VARAN cable must be secured at a distance of 20 cm from the connector for protection against vibration!

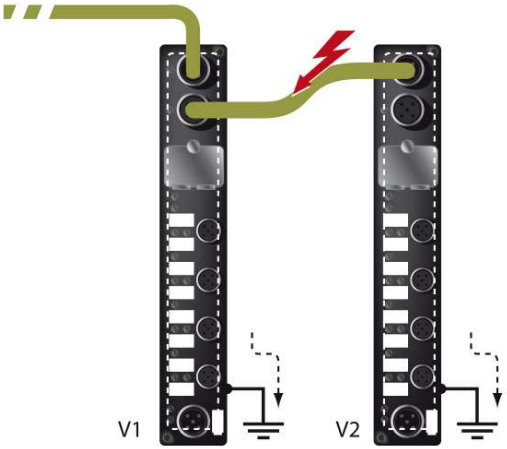
1. Wiring from the Control Cabinet to an External VARAN Component

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 dissipated before reaching the electronic components.



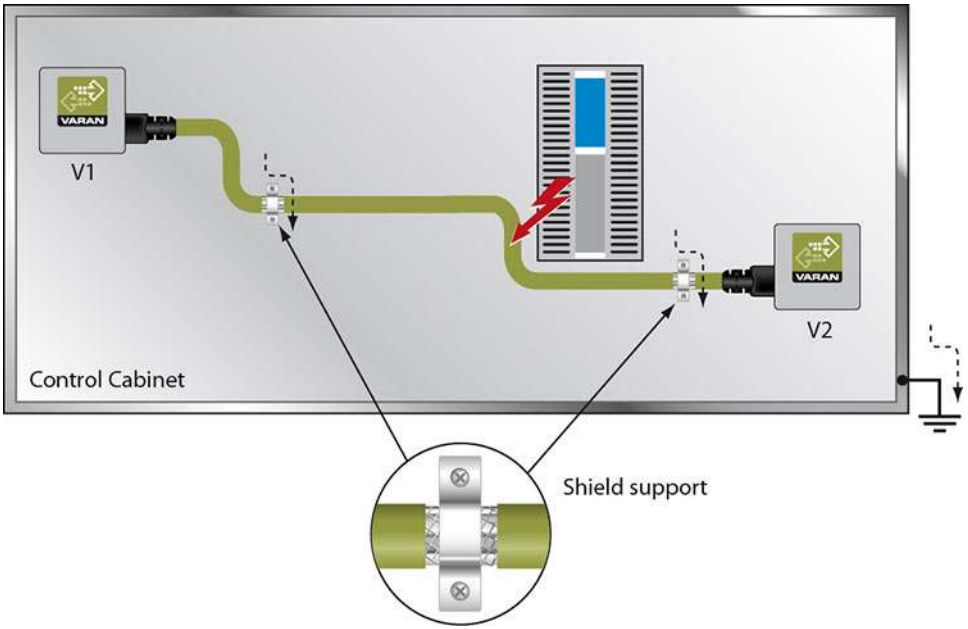
2. Wiring Outside of the Control Cabinet

If a VARAN bus cable must be placed outside of the control cabinet only, no additional shield connection is required. This requires that only IP67 modules and connectors be used. These components are very robust and noise resistant. The shielding for all sockets in IP67 modules are internally connected to common bus or electrically connected to the housing, whereby the deflection of voltage spikes does not flow through the electronics.



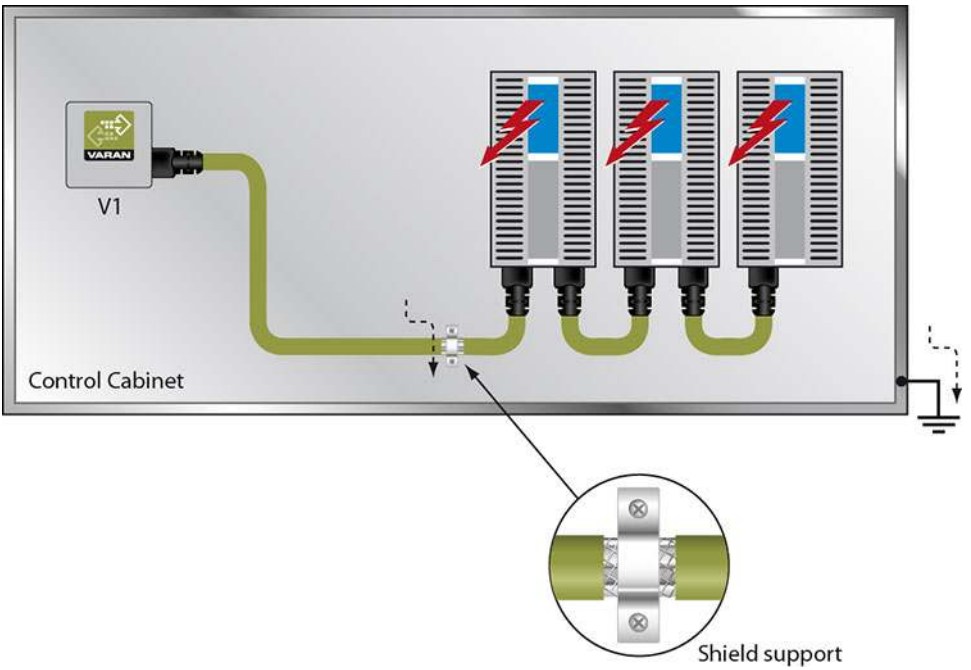
3. Shielding for Wiring Within the Control Cabinet

Sources of strong electromagnetic noise located within the control cabinet (drives, Transformers, etc.) can induce interference in a VARAN bus line. Voltage spikes are dissipated over the metallic housing of a RJ45 connector. Noise is conducted over the control cabinet without additional measures needed on the circuit board of electronic components. To avoid error sources with data exchange, it is recommended that shielding be placed before any electronic components in the control cabinet.



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).



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 each cabinet. Noise is therefore prevented from reaching the electronic components in both cabinets.