

## C-IPC VM 052-3 Expansion (C-IPC VARAN Manager 052-3)

Versatile Automation Random Access Network

**2 x VARAN OUT**

**1 x Ethernet 10/100 Mbits**

With this expansion card, the C-IPC can be expanded with a VARAN Manager containing 2 VARAN Out interfaces. This special design allows easy mounting and fixation of the expansion card.



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

**Le cache et les accessoires de montage sont inclus avec la livraison de la carte!**

## Technical Data

### Performance data

Internal memory	Serial EEPROM (24C02 identification) 16 Mbit SPI-Flash (W25P16)	
Interface connections	2 x VARAN Out (RJ45) (maximum length: 100 m) 1 x Ethernet 10/100 MBit (RJ45)	
Status display	Green: Link	Yellow: Active
Connection to periphery device	Over SO-DIMM Socket PCI-Bus	

### Electrical requirements

Internal power supply	Typically +5 V DC (supplied over the SO-DIMM socket)	
Current consumption	Minimum 300 mA	Maximum 600 mA

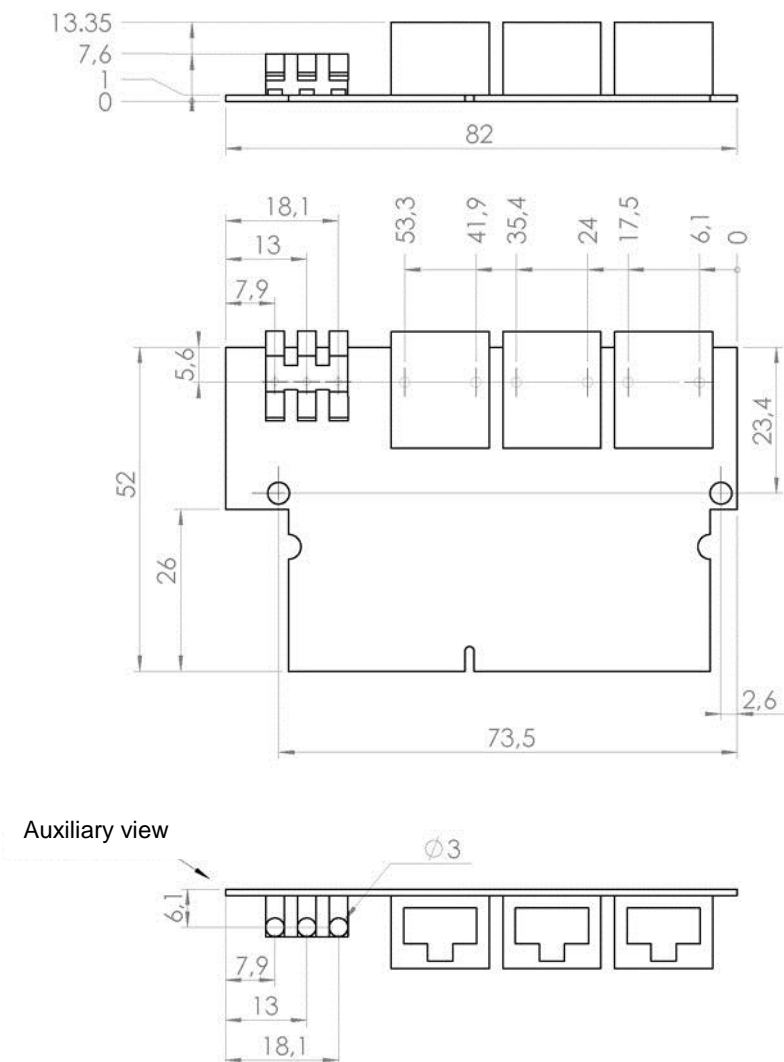
### Miscellaneous

Article number	01-460-052-3	
Hardware version	1.x	
Standard	UL (E247993)	

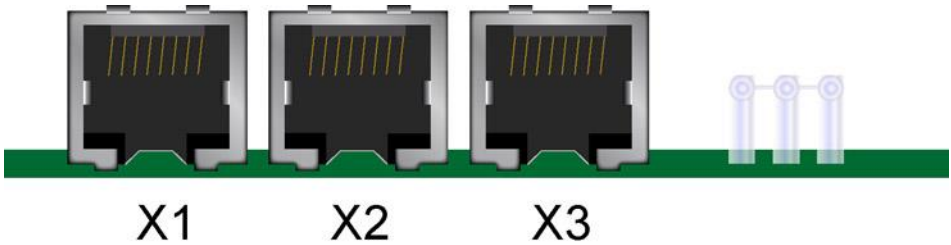
### Environmental conditions

Storage temperature	-20 – +85 °C	
Environmental temperature	0 – +60 °C	
Humidity	0 – 95 %, uncondensed	
EMV stability	According to EN 50082 section 2 (industry area)	

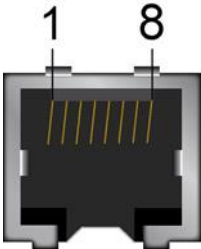
## Mechanical Dimensions



## Connector Layout

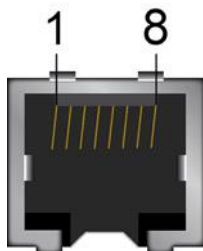


X1/X2: VARAN Out 1/2 (8-pin RJ45)



Pin	Function
1	TX/RX+
2	TX/RX-
3	RX/TX+
4	Not used
5	Not used
6	RX/TX-
7	GND
8	GND

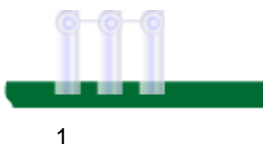
**More information on the VARAN bus can be found in the VARAN bus specifications!**

**X3: Ethernet (8-pin RJ45)**


Pin	Function
1	Tx+
2	Tx-
3	Rx+
4	n.c.
5	n.c.
6	Rx-
7	n.c.
8	n.c.

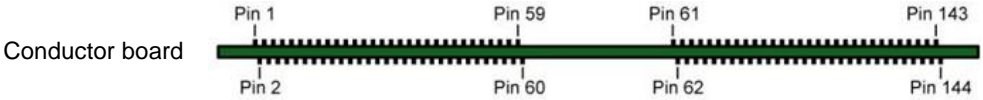
Problems can arise if a control is connected to an IP network, which contains modules that are not running with a SIGMATEK operating system. With such devices, Ethernet packets could be sent to the control with so high a frequency (i.e. broadcasts), that the high interrupt load could cause a real time 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.

Des problèmes peuvent survenir si un automate est connecté à un réseau IP contenant des modules qui ne fonctionnent pas sous un système d'exploitation SIGMATEK. Avec de tels dispositifs, les paquets Ethernet peuvent être envoyés à l'automate avec une fréquence tellement élevée (càd. diffusion), que les interruptions ainsi générées peuvent provoquer une erreur d'exécution. En configurant d'une façon appropriée le filtre de paquets (pare-feu ou un routeur) il est toutefois possible de connecter un réseau avec le matériel SIGMATEK à un réseau tiers sans déclencher l'erreur mentionnée ci-dessus.

**Fiber optics: 3 x two-color LED**


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

## X4: SO-DIMM (144-pin)



Pin	PCI-Bus	Pin	PCI-Bus	Pin	PCI-Bus
1	GND	49	\SERR	97	\INIT / \DIR *
2	GND	50	\PERR	98	\ERR / \HSEL *
3	CLK2	51	\TRDY	99	GND
4	CLK3 *	52	\DEVSEL	100	GND
5	GND	53	\STOP	101	PD6 / \MOT0 *
6	GND	54	\RDY	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	Lötpad
20	AD09	68	EWP15	116	I2C_CLK_DVI
21	AD10	69	EWP12	117	Lötpad
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	\CBE1	93	PE / \WDATA *	141	GND
46	\CBE2	94	\BUSY / MOT1*	142	GND
47	PAR	95	\ACK / DRV1 *	143	GND
48	\CBE3	96	\SLIN / \STEP *	144	GND

**\* THESE SIGNALS ARE NOT IMPLEMENTED ON THE VM 052-3 (only on the C-IPC).**

**\* Ces signaux ne sont pas implémentés sur le VM 052-3 (uniquement sur le C-IPC).**

## Addressing

Addressing the FPGA and serial FLASH, see VARAN bus specifications.  
The I<sup>2</sup>C EEPROM serves as the module identification.

Address (hex)	Size (bytes)	Device ID (hex)	Description
00000			PCI Bar1 for VM program memory
Specific Address Space			
03010	2	0E30	Reset Logic

## Reset signals VM 052-3

Signalname	Signal	Description
pci_reset	in	PCI reset signal
wd_reset	intern in	Timer / counter watchdog reset
cli_reset	intern in	OS CLI reset from PLL
clk_lost_0	intern in	Clock signal lost
reset_power_on	intern out	Power on reset intern
reset	intern out	FPGA intern reset signal
phy_reset_n_1	out	Phy1 reset (min. 100 us)
phy_reset_n_2	out	Phy2 reset (min. 100 us)
phy_reset_n_3	out	Phy3 reset (min. 100 us)

## 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!

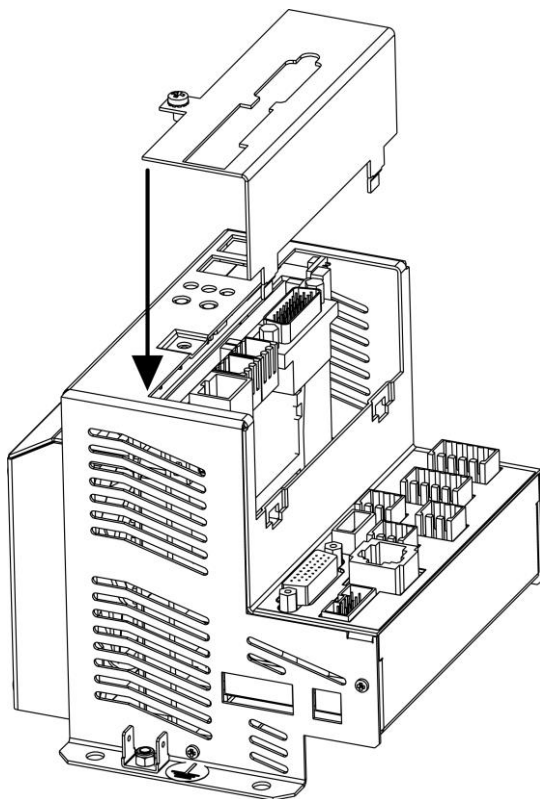
The removal is done in reverse:

- 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 card 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.



## VARAN Recommended Shielding

The VARAN real-time Ethernet bus system offers robust performance in harsh industrial environments. Through the use of IEEE 802.3 standard Ethernet physics, the potential between an Ethernet line and sending/receiving components is kept separate. The VARAN Manager resends messages to a bus participant immediately when an error occurs. It is principally recommended that the shielding guidelines below be followed.

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

SIGMATEK recommends the use of **CAT5e** industrial Ethernet bus lines.

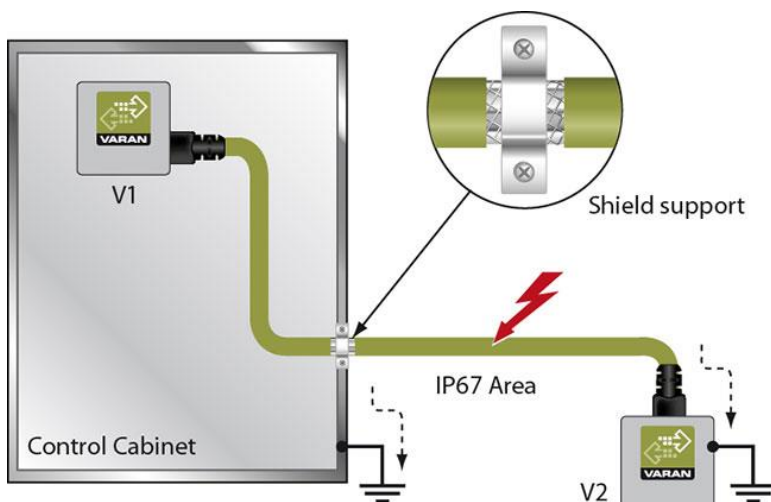
For the shielding variants, an S-FTP bus line is recommended, which is a symmetric, multi-wire cable with unshielded pairs. For the total shielding, a combination of foil and braiding is used; it is recommended that an unvarnished variant be used.

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

**Le câble VARAN doit être protégé contre les vibrations à moins de 20 cm du connecteur (par exemple à l'aide d'une pince)!**

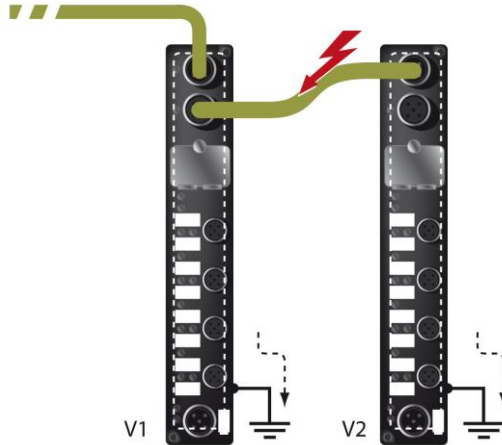
## 1. Wiring from the Control Cabinet to an External VARAN Component

If the Ethernet lines are connected from a VARAN component to a VARAN node 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.



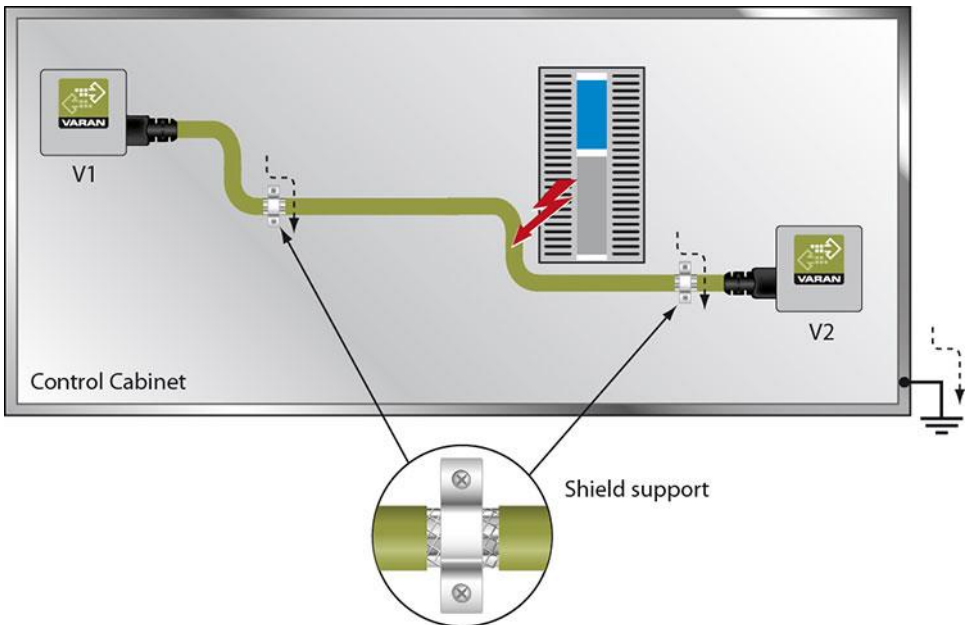
## 2. Wiring Outside of the Control Cabinet

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.



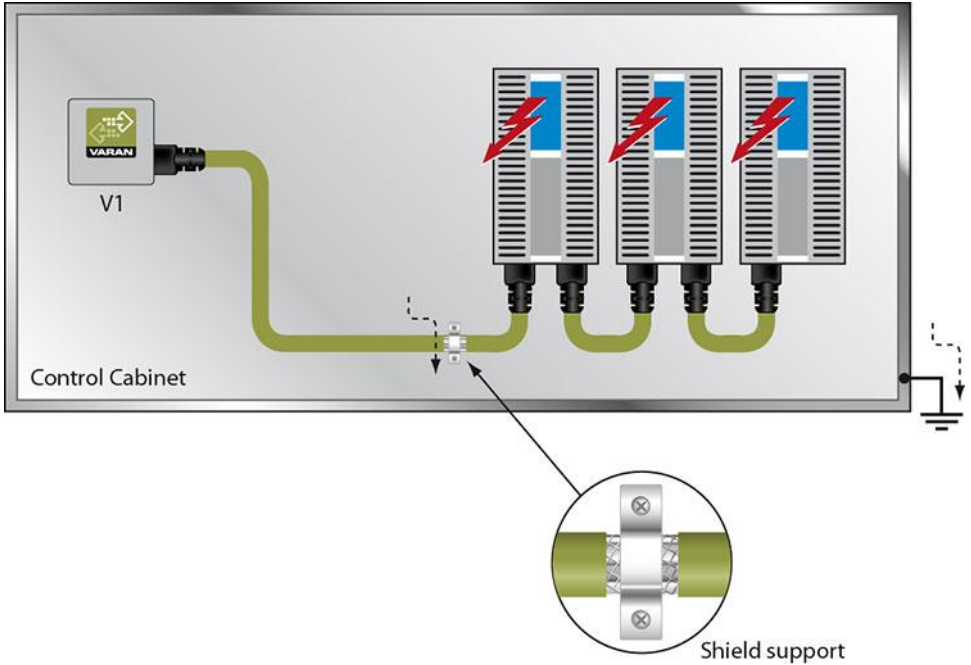
### 3. Shielding for Wiring Within the Control Cabinet

Sources of strong electromagnetic noise located within the control cabinet (drives, Transformers, etc.) can induce interference in a VARAN bus line. Spike voltages are deflected 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 from all electronic components be connected within the control cabinet.



## 4. Connecting Noise-Generating Components

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



## 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 to both cabinets. Noise can thereby be kept from reaching the electronics within the control cabinet.

