



Metasys N2 Option Card for the GP10 & VG10 Inverter Series

Option Card Part Number
SOPCG11SMN2

Saftronics, Inc.

5580 Enterprise Pkwy., Ft. Myers, FL 33905

Telephone: (239) 693-7200

Fax: (239) 693-2431

www.saftronics.com

Doc Part Number 027 - 2114

SAFETY FIRST !

LETHAL VOLTAGES MAY BE PRESENT

PLEASE READ THIS MANUAL THOROUGHLY BEFORE ATTEMPTING ANY INSTALLATION, OPERATION, MAINTENANCE, OR INSPECTION. FAILURE TO FOLLOW THE RECOMMENDED PROCEDURES OR CAUTIONS IN THIS MANUAL COULD RESULT IN INJURY TO PERSONNEL AND / OR DAMAGE TO THE EQUIPMENT.

CAUTION

- 1 – CHECK THE NAME WRITTEN ON THE PRODUCT AND INSURE THAT THE PROPER PART HAS BEEN RECEIVED.
- 2 – THOROUGHLY INSPECT THE PART(S) FOR ANY DAMAGE DUE TO SHIPMENT OR HANDLING.
- 3 - THE PART(S) MAY CONTAIN CMOS CHIPS AND CAN BE DAMGED BY STATIC ELECTRICITY. HANDLING SHOULD BE IN ACCORDANCE WITH INDUSTRY STANDARDS.
- 4 - BEFORE INSTALLING THE PART(S) TURN OFF ALL POWER TO THE EQUIPMENT AND INSURE THE CHARGE INDICATOR LAMP ON THE INVERTER IS **OFF**. **LETHAL VOLTAGES ARE PRESENT**
- 5 - DO NOT CONNECT OR DISCONNECT WIRING WHILE POWER IS **ON!**
- 6 - FOLLOW GOOD STANDARD WIRING PRACTICES AND ANY APPLICABLE CODES THAT MAY APPLY.

Table of Contents

Safety First !	1
1. Applicable inverters.....	3
Table 1 Applicable Inverters.....	3
2. Installation	4
2.1 Installation Method.....	4
Fig. 1 Installation Steps.....	4
2.2 Installation Checklist.....	4
3. Metasys N2 option card SOPCG11SMN2.....	5
4. Introduction to Metasys N2	5
4.1 Technical features of Metasys N2.....	5
Fig. 2 Metasys N2 Network Overview.....	6
5. SOPCG11SMN2 Overview	6
5.1 Physical interface.....	6
Table 2 Pin Layout.....	6
5.2 Configuration	7
5.2.1 Baudrate.....	7
5.2.2 Termination	7
5.2.3 Node Address	7
Table 3 DIP Switch Address Setting.....	7
5.2.4 Configuration parameters	8
Table 4 Configuration Parameters.....	8
5.3 Indication LED's.....	8
Fig. 3 SOPC11SMN2 Board Layout.....	8
Fig. 4 LED,s.....	9
Table 5 LED Functions.....	9
6. Operating the drive via Metasys N2.....	10
Tables 6 & 7 Control Parameters.....	10
Warning !	11

1. Applicable inverters

Table 1 Applicable Inverters

Item	Description		
Inverter type	Safronics GP10 / VG10		
Minimum inverter ROM version number	up to 22 kW(30HP)	Safronics Version	S08000 and after (It is impossible to use version prior to S08000 inverter.)
	30 kW(40HP) and above	Safronics Version	H07602 and after (It is impossible to use versions of H00000 to H07601.)

NOTE:

This product can only be used for Inverters with ROM version numbers greater than or equal to the versions shown above.

Check the ROM number of your Inverter as follows using the inverter keypad.

- a. Check that the Inverter Operation monitor (Operation mode) screen is displayed.
- b. Press the [PRG] key of the Inverter once.
- c. Select the "5. MAINTENANCE" with the cursor and press the [FUNC/DATA] key.
- d. Press the down cursor key to increment the display at the MAINTENANC screen.

Finally, the ROM number is shown in the maintenance information, as indicated by the display "INV=Hxxxxx or Sxxxxx".

The maintenance and inspection items are similar to the Inverter unit, for detail refer to the Inverter Instruction Manual.

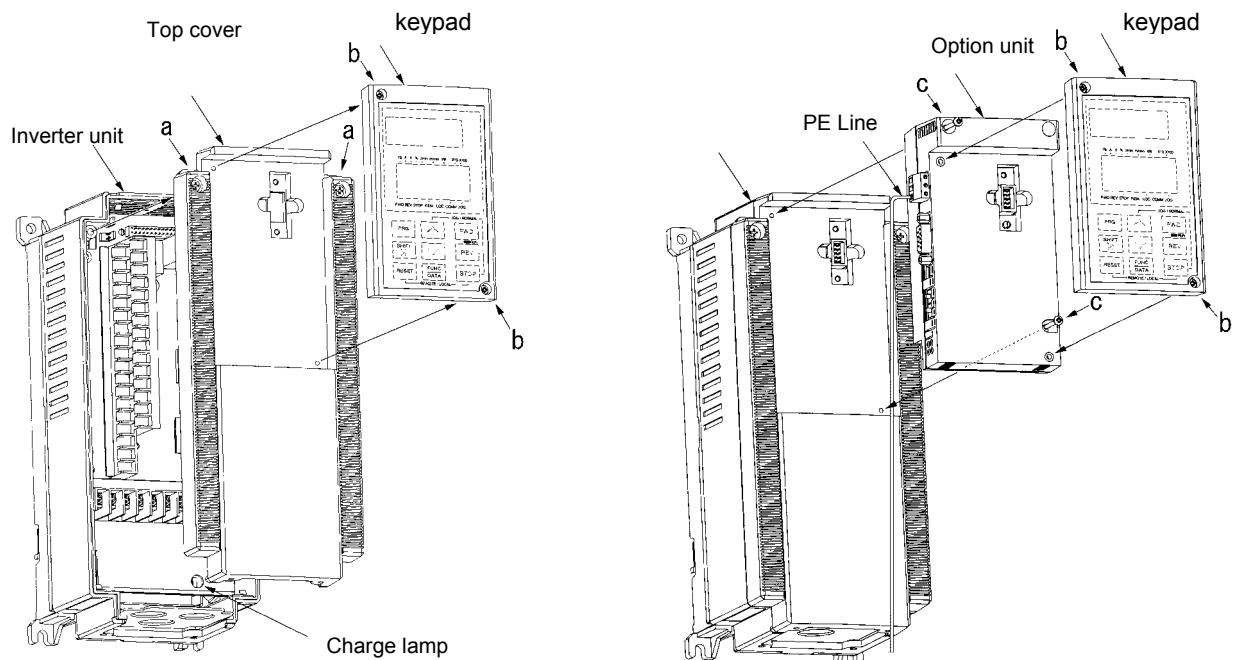
2. Installation

2.1 Installation Method

Please follow the installation procedure described as follows. Please install or detach the option after turning off the input power supply of the inverter and confirming the charge lamp (CHARGE or CRG) is gone out.

The shape, the dimensions and the position of the charge lamp of the inverter are different by each capacity.

Fig. 1 Installation Steps



Step1

Step1

Loosen two screws (M4) at **a** and remove the top cover. Loosen two screws (M3) at **b** and detach the keypad panel. (For the 30kW [40HP] and above inverters, the keypad panel can be detached if the front cover is removed and the screws loosened at **b**.)

Step2

Reassemble the top cover, push-in the option unit and secure it with two screws(M3) at **c**.

Step3

Secure the keypad panel to the option unit with two screws at **b**.

Step4

Connect the ground cable to the PE terminal of the option unit.

2.2 Installation Checklist

After installation and wiring, check the following items.

[1] The wiring is correct.

[2] No loose wires or screws remain inside the Inverter.

[3] The screws and terminals are all tight.

[4] There are no loose threads of wires at terminals that may contact other terminals.

[5] The switch positions on the Anybus-S module, JP6 on the conversion-board are suitable for the use purpose. (Do not change the JP4 on the conversion-board !)

[6] Inverter parameters such as H30, o27, o28, o30 to o38, are set correctly. (H30: Link Active/Inactive, o27 and o28: for RAS)

3. Metasys N2 option card SOPCG11SMN2

The SOPCG11SPDP option card gives an instant connection between Safronics GP10 or VG10 drive and a Metasys N2 network. The option board will perform as an integrated part of the GP10 or VG10 drive and gives the user access to all relevant parameters, as well as control-/status signals needed to control the drive.

The SOPCG11SMN2 option card communicates according to the Metasys N2 standard from Johnson Control. This means that it can communicate with all masters that comply with this standard, but it does not necessarily mean that all services available in the Metasys N2 standard are supported.

In a control system the SOPCG11SMN2 will act as a slave that can be read and written to, from a Metasys N2 master. It will not initiate communication to other nodes, it will only respond to incoming telegrams.

4. Introduction to Metasys N2

MetaSys N2 is a fieldbus system from the Johnson Controls company. More than 10,000 systems are installed around the world in colleges and universities, hospitals, commercial offices, factories, government facilities and on military bases. MetaSys N2 is mainly a fieldbus for building and automation industry.

4.1 Technical features of Metasys N2

- Physical media: EIA RS 485 twisted pair cable.
- Baud rate: 9.6 kbps (fixed)
- Maximum number of nodes: 255
- Bus topology : Master-Slave communication. Fig. 2 gives an overview of a Metasys N2 network.

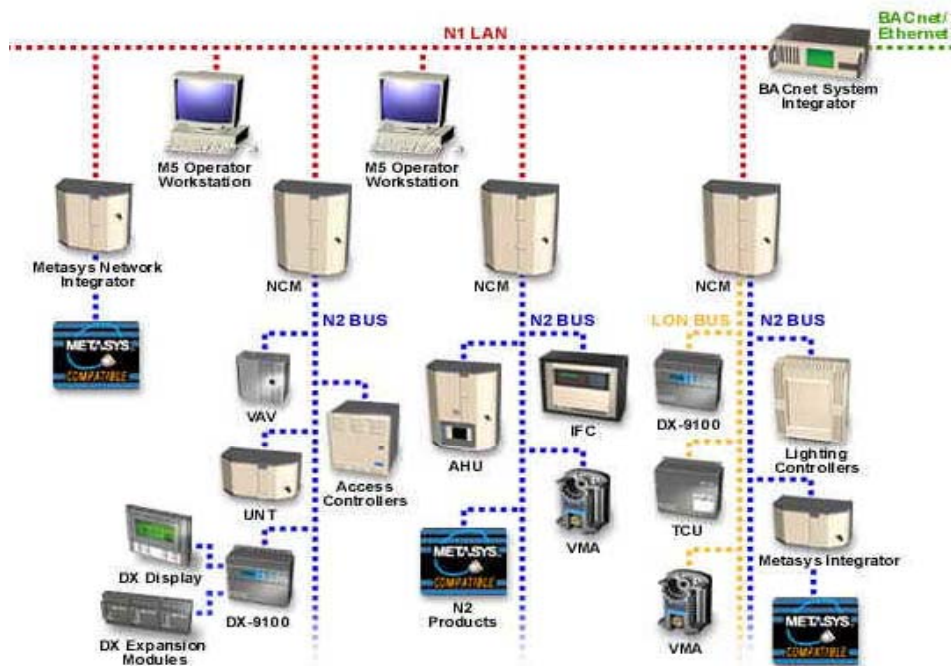


Fig. 2 Metasys N2 Network Overview

5. SOPCG11SMN2 Overview

These sections contain all necessary information to start-up and configure the SOPCG11SMN2.

5.1 Physical interface

Isolation: The bus is galvanically separated from the other electronics with an on board DC/DC converter. Bus signals (N2+ and N2-) are isolated via opto-couplers.

Bus connection: The SOPCG11SMN2 connects to the Metasys network with a 9-pin female DSUB connector or a 6-pole terminal block. For the pin layout, refer to Table 2

Table 2 Pin Layout

Pin Terminal	Pin DSUB	Name	Function
6	Housing	Shield	Connected to PE (Physical Earth)
-	1	Not used	-
-	2	Not used	-
-	3	Not used	-
-	4	Not used	-
2	5	Ref	Isolated GND from RS 485 side *
-	6	+5V BUS	Isolated +5V from RS 485 side *
4	7	N2-	Negative RxD/TxD according to RS 485 specification
3	8	N2+	Positive RxD/TxD according to RS 485 specification
-	9	Not Connected	-

- +5V BUS and Ref are used for bus termination. Some devices, like optical transceivers (RS485 to fiber optics) might require external power supply from these pins.

5.2 Configuration

5.2.1. Baudrate

The baudrate on a Metasys N2 network is always 9600kbps.

5.2.2 Termination

The end nodes in a Metasys network can be terminated to avoid reflections on the bus line. The SOPCG11SMN2 is equipped with a termination switch to accomplish this in an easy way. If the module is used as the first or last module in a network the termination switch should be in ON position. Otherwise the switch has to be in OFF position.

Please Note: If an external termination connector is used the switch must be in OFF position.

Termination switch ON	Bus termination enabled If the module is the last or first module, the bus termination has to be set on, or an external termination connector has to be used
Termination switch OFF	Bus termination disabled

5.2.3 Node Address

Before power-on the SOPCG11SPDP the node address has to be set. This is done with the DIP-switch on the module, this enables address settings from 1-255.

Table 3 DIP Switch Address Setting

DIP switch number	Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128

Example: Setting DIP switch 1,3 and 6 to "ON" gives node address 37 (1+4+32).

Please Note: The node address can not be changed during operation.

5.2.4 Configuration parameters

The following parameters affect the operation of the Metasys N2 option card :

Table 4 Configuration Parameters

Operation Parameter	Description	Valid Input Values	Default Value
o27	Loss of network behavior : <ul style="list-style-type: none">• 0 = Immediate trip – Code ERR5• 1 = ERR5 trip after timer setting o28• 2 = Re-check after timer setting 028• 3 = Ignore communication error	0-3	0
o28	ERR5 timer setting (used with o27)	0.0-60.0 s	0.0 seconds

Description of Parameters o27 and o28

Parameters o27 configures how the drive reacts to a loss of network. Out of the four settings, the first (0) setting allows for an immediate trip when a network problem occurs. The last setting (3) configures the drive to ignore the error. The middle two settings (1 and 2) use a timer setting (o28) in conjunction with the error setting. Parameter o28 contains the timer setting that is used when o27 is configured for a value of 1 or 2.

5.3 Indication LED's

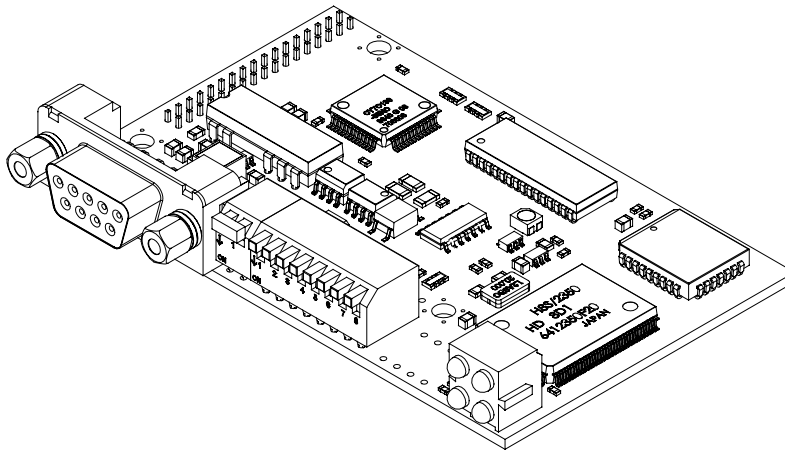


Fig. 3 SOPC11SMN2 Board Layout

The SOPC11SMN2 is equipped with four LED's. The functions of the LED's are described in Fig. and Table 2

1. Power/Error
2. Not Used
3. Not Used
4. Fieldbus diagnostics

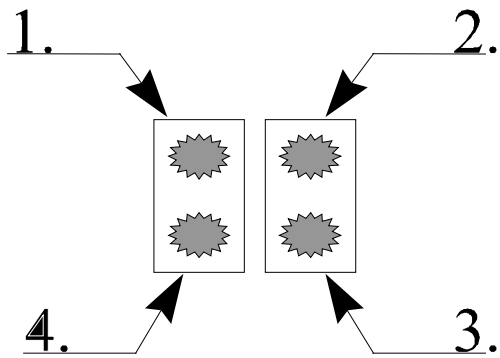


Fig. 4 LED's

Table 5 LED functionality

Name	Color	Function
Power/Error	Green	Turned On – Module running in normal mode
	Red	Turned On – Hardware fault Flashing Red 1 Hz – Error during initialization of inverter communication
Fieldbus diagnostics	Red	Turned On – Permanent communication error/Module Offline
		Irregular Flash – Communication error
		Flashing Red 1 Hz - Error during initialization of the Metasys channel
		Turned Off - No diagnostics present

6. Operating the drive via Metasys N2

The following tables describe how to control drive via control word/status word and how to access drive parameters.

Table 6 Control Parameters

NPT	NPA	Units	Point Description	Range/Value	Notes
AI	1	Hz	Output Frequency	0 – 400.00	Par. M09
AI	2	%	Actual Torque	-200.00 to 200.00	Par. M07
AI	3	%	Output Current	0 to 200.00	Par. M11
AI	4	%	Motor output power	0 to 200.00	Par. M10
AI	5	Vrms	Output Voltage	0.0 to 600.0	Par M12
AI	6	-	Fault memory 0	0 to 37	ParM16 [Format 10]
AI	7	-	Last Fault	0 to 37	Par M17 [Format 10]
BI	1	-	FWD	0 – Off, 1 – On	
BI	2	-	REV	0 – Off, 1 – On	
BI	3	-	Fault	0 – Off, 1 – On	
BI	4	-	Frequency At Ref	0 – Off, 1 – On	
BI	5	-	Freq. Level Detect	0 – Off, 1 – On	
BI	6	-	Ready	0 – Off, 1 – On	
BI	7	-	Torque Limit Active	0 – Off, 1 – On	
BI	8	-	Voltage Limit Active	0 – Off, 1 – On	
BI	9	-	Current Limit Active	0 – Off, 1 – On	
BI	10	-	In Acceleration	0 – Off, 1 – On	
BI	11	-	In Deceleration	0 – Off, 1 – On	
BI	12	-	Remote/Local	0 – Loc, 1 – Rem	
BI	13	-	Y1 (Programmable)	0 – Off, 1 – On	Defined by Config E20
BI	14	-	Y2 (Programmable)	0 – Off, 1 – On	Defined by Config E21
BI	15	-	Y3 (Programmable)	0 – Off, 1 – On	Defined by Config E22
BI	16	-	Y4 (Programmable)	0 – Off, 1 – On	Defined by Config E23
BI	17	-	Y5 (Programmable)	0 – Off, 1 – On	Defined by Config E24

Table 7 Control Parameters

NPT	NPA	Units	Point Description	Range/Value	Notes
AO	1	Hz	Reference Frequency	0 – 400.00	Par. S05
AO	2	-	Universal Analog Out	-20000 to 20000	Must set E31 to 10
AO	3	%	Driving torque limit	20.00-200.00, 999	Par. S08
AO	4	%	Braking Torque Limit	20.00-200.00,999	Par. S09
AO	5		User Defined		
AO	6		User Defined		
BO	1	-	Forward	0 – Off, 1 – On	Par. S06 bit 0
BO	2	-	Reverse	0 – Off, 1 – On	Par. S06 bit 1
BO	3	-	X1 (Programmable)	0 – Off, 1 – On	Defined by Config E01
BO	4	-	X2 (Programmable)	0 – Off, 1 – On	Defined by Config E02
BO	5	-	X3 (Programmable)	0 – Off, 1 – On	Defined by Config E03
BO	6	-	X4 (Programmable)	0 – Off, 1 – On	Defined by Config E04
BO	7	-	X5 (Programmable)	0 – Off, 1 – On	Defined by Config E05
BO	8	-	X6 (Programmable)	0 – Off, 1 – On	Defined by Config E06
BO	9	-	X7 (Programmable)	0 – Off, 1 – On	Defined by Config E07
BO	10	-	X8 (Programmable)	0 – Off, 1 – On	Defined by Config E08
BO	11	-	X9 (Programmable)	0 – Off, 1 – On	Defined by Config E09
BO	12	-	RT4 (Selects Ramp 4)	0 – Off, 1 – On	
BO	13	-	Reset	Toggle 1→0	Min on time = 20msec
BO	14	-	Universal Dig. Out 1	0 – Off, 1 – On	E20 = 27
BO	15	-	Universal Dig. Out 1	0 – Off, 1 – On	E21 = 27
BO	16	-	Universal Dig. Out 1	0 – Off, 1 – On	E22 = 27
BO	17	-	Universal Dig. Out 1	0 – Off, 1 – On	E23 = 27
BO	18	-	Universal Dig. Out 1	0 – Off, 1 – On	E24 = 27

WARNING!

Saftronics manufactures component parts that can be used in a wide variety of industrial applications. The selection and application of *Saftronics* products remains the responsibility of the equipment designer or end user. *Saftronics* accepts no responsibility for how its products may be incorporated into the final design.

Under no circumstances should any *Saftronics* product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to dynamically fault detect and fail safe under all circumstances. All products designed to incorporate a component part manufactured by *Saftronics*, must be supplied to the end user with appropriate warnings and instructions as to the safe use and operation. Any warnings provided by *Saftronics* must be passed through to the end user.

Saftronics offers an express warranty only as to the quality of its products to conform to the catalog specifications. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. *Saftronics* assumes no liability for any personal injury, property damage, losses or claims, arising out of the misapplication of its' products.