USER MANUAL

Metasys N2 OPTION OPC-G11S-MN2

for Fuji FRENIC5000G11S/P11S & GE Fuji AF-300G11/P11

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Revision Notes

Date:	Document:	Notes:
00.01.03 **00.01.10** **00.01.21** **00.02.01** **00.05.015** **00.05.19** **00.08.02** **00.11.06**	Revision 0.10 Revision 0.11 Revision 0.12 Revision 0.13 Revision 0.90 Revision 0.91 Revision 1.00 Revision 1.01	Created by Jonas Åkerlund (JAK) Added Point list (JAK) Updated Table 1 with terminal block pins (JAK) Update of 6.3, indication LED´s Update of 6.1, 6.3 (DSUB connection,picture added), Update Table2 Document released Added section 6.2.4

Preface

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Related documents

Document	Author
FRENIC5000G11S/P11S INSTRUCTION MANUAL, INR-Si47-0554-E	Fuji Electric

Table of Contents

1. Applicable inverters

Item	Description		
Inverter type	FRENIC5000G11S/P11S (AF-300G11/P11)		
Compatible Inverter Model number (GE Fuji version)	The last two digits of the model number should be B1 or later Example: 6KG1123X1B1		
Minimum inverter ROM version number	up to 22 kW(30HP)	EN version	S08000 and after (It is impossible to use version prior to S08000 inverter.)
		Japanese standard, JE and CN version	Cannot be used
		UX and GE Fuji version	S08000 and after (It is impossible to use version prior to S08200 inverter.)
	30 kW(40HP) and above	EN, Japanese standard, JN, JE, AN, CN, UX and GE Fuji 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.

And in the case of installing this option in the G11/P11 inverter that is a Japanese standard, JN, JE or CN version, please contact Fuji Electric or its distributors.

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. MAINTENANC" with the cursor and press the [FUNC/DATA] key.

d. Press the down cursor key to increment the display at the MAINTENANC screen.

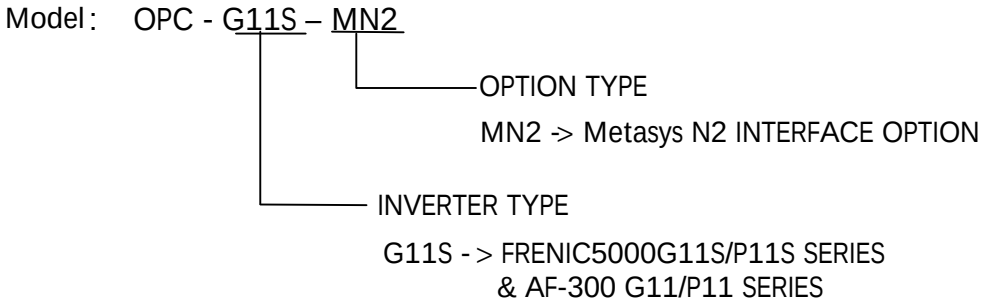
Finally, the ROM number is shown in the maintenance information, as indicated by the display "INV=Hxxxxx or Sxxxxx".

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

2. Receiving Inspection

Confirm the following items upon a receipt.

1 - The model number matches your purchase order?
Check the model number printed on the circuit board.



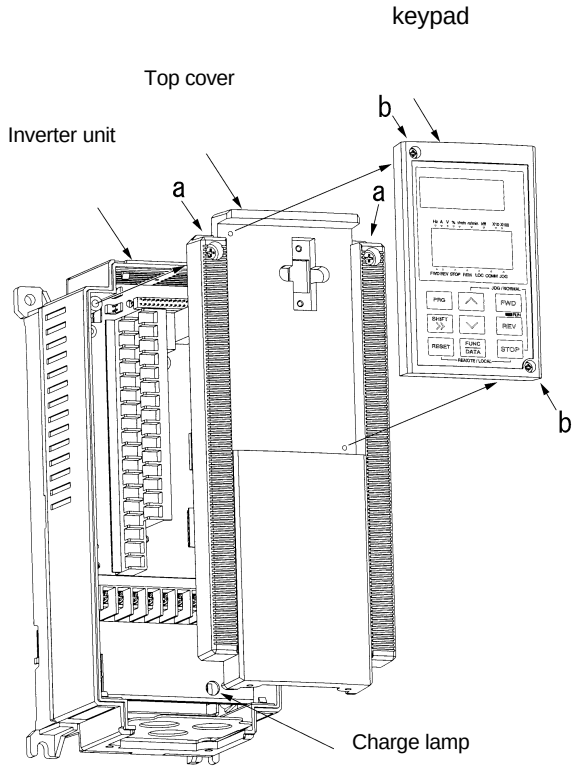
2 - Inspection for damage during transportation. Report damage to transportation carrier.

3. Installation

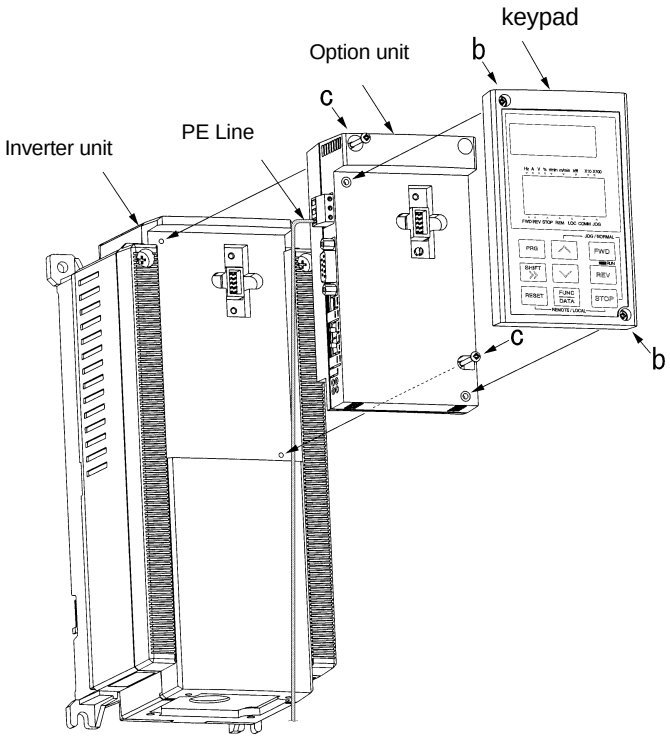
3.1 Installation Method

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.



Step1



Step2 to 4

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.

3.2 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)

4. Metasys N2 option card OPC-G11S-MN2

The OPC-G11S-PDP option card gives an instant connection between Fuji G11S drives (GE Fuji AF-300G11) and a Metasys N2 network. The option board will perform as an integrated part of the G11S drive and gives the user access to all relevant parameters, as well as control-/status signals needed to control the drive.

The OPC-G11S-MN2 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 OPC-G11S-MN2 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.

5. 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.

5.1 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. The figure below gives an overview of a Metasys N2 network.

6. OPC-G11S-MN2 Overview

These sections contain all necessary information to start-up and configure the OPC-G11S-MN2.

6.1 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 OPC-G11S-MN2 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 1.

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	-

Table 1 Pin Layout

- +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.

6.2 Configuration

6.2.1 Baudrate

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

6.2.2 Termination

The end nodes in a Metasys network can be terminated to avoid reflections on the bus line. The OPC-G11S-MN2 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

6.2.3 Node Address

Before power-on the OPC-G11S-PDP the node address has to be set. This is done with the DIP-switch on the module, this enables address settings from 1-255.

DIP switch nr.	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.

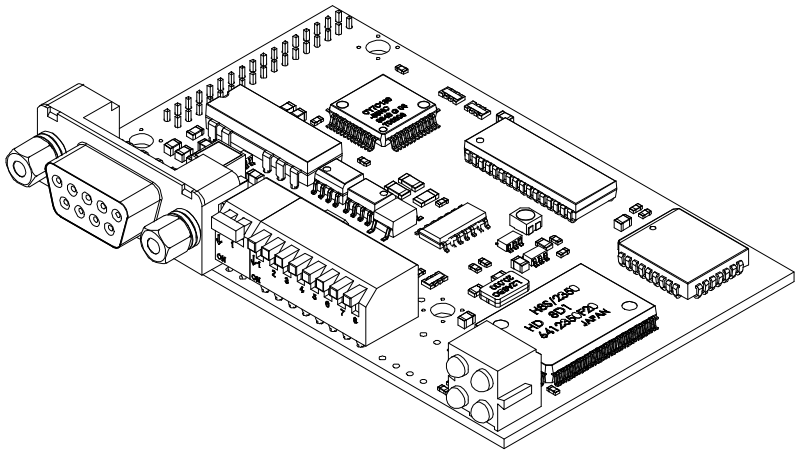
6.2.4 Configuration parameters

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

Operation parameter	Description	Valid input values	Default value
o27	Loss of network behavior : • 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.

6.3 Indication LED's



The OPC-G11S-MN2 is equipped with four LED's. The functions of the LED's are described in Figure 1 and Table 2.

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

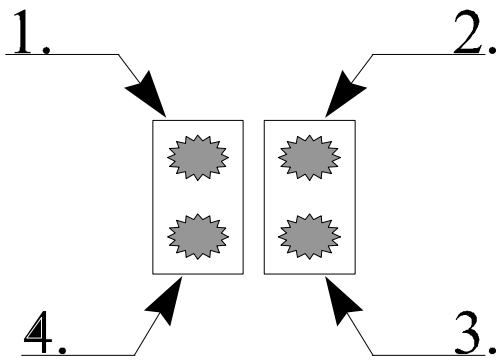


Figure 1 LED's

Name	Color	Function
Power/Error	Green Red	**Turned On –** Module running in normal mode **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

Table 2 LED functionality

7. Operating the drive via Metasys N2

This section describes how to control drive via control word/status word and how to access drive 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

NPT	NPA	Units	Point Description	Range/Value	Notes
A0	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