Robostar Robot Controller Manual

Robostar Robot

N1 Series Option C-net

↓ Option Module

- C-net



Robostar Co., Ltd

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Composition of User Manual

The User Manual of this product is composed of the following. If this is the first time to use this product, fully understand each and every detail in the manual before use.

C-net

Explains how to connect a N1 series connector using a C-net as well as how to use it.





Table of Contents

СНАРТ	FER 1.	OVERVIEW	1-1
1.1	Syste	CM CONFIGURATION	1-1
СНАРТ	FER 2.	FUNCTION	2-1
2.1	RS-23	2 COMMUNICATION	2-1
2.2	D-SUI	B 9Pin Connector	2-1
СНАРТ	FER 3.	INSTALLATION AND OPERATION SETTING	3-1
3.1	How T	TO INSTALL HARDWARE	3-1
3.2	How T	TO CONNECT CABLE	3-1
3.3	CONTR	ROLLER SETTING	3-2
3.3	R.1 R	S-232C Communication Setting	3-2
СНАРТ	FER 4.	EXAMPLES OF C-NET SETTING ON TOUCH PANEL	4-1
4.1	Execu	JTING EASYBUILDER8000 PROGRAM	4-1
4.2	ADD N	Jew	4-2
4.3	Syste	M PARAMETER SETTING	4-3
СНАРТ	FER 5.	MEMORY MAPPING	5-1
5.1	N1 Co	DNTROLLER DATA MAPPING	5-1
5.1	.1 N	V1 Series System Input #1	5-2
5.1	.2 N	V1 Series System Input #2 & FIELDBUS INPUT#1	5-3
5.1	.3 N	/1 Series FIELDBUS INPUT #2	5-3
5.1	.4 N	<pre>/1 Series System Output #1</pre>	5-3
5.1	.5 N	11 Series FIELDBUS Output #2	5-4
5.2	PRECA	AUTION FOR USE IN N1 SERIES SYSTEM MODE	5-4

Chapter 1. Overview

1.1 System Configuration

N1 controller makes use of C-net protocols to enable communication with such systems as PC or PLC. C-net protocol communication becomes possible through the use of Host Port on Main Board of N1 controller.



Fig. 1.1 C-net System Configuration

% N1 controller supports C-net protocols for "Master-K"/"GLOFA" series.



Chapter 2. Function

2.1 RS-232 Communication

RS232C communication distance is generally 15m, but the greater the communication speed gets, the shorter the distance becomes.





Fig. 2.1 Asynchronous Communications Format

- Start bit : Indicates the start of communications Format
- DATA bit : Configurable in bit sizes 5/6/7/8, indicating communication data value with LSB first
- Parity bit : Configurable to No/Even/Odd and detectable when 1 bit is changed by noise
- Stop bit: Configurable in sizes 1/1.5/2, indicating the end of data

~	F
DCD 1 6 DSR RXD 2 7 RTS TXD 3 8 CTS DTR 4 9 R1 GND 5 P R1	ł

	Description
TXD	Transmit Data, communication data output signal
RXD	Receive Data, communication data input signal
	Used for Ready To Send modem communication, displaying
RTS	communication preparation status and applicable as a general-
	purpose output port
	Used for Clear To Send modem communication, displaying
CTS	communication preparation status and applicable as a general-
	purpose input port
DTD	Signals for preparing Data Terminal Ready modem communication,
DIK	applicable as an output port
	Signals for preparing Data Set Ready modem communication,
DSK	applicable as an input port
DCD	Data Carrier Detect, input port
RI	Ring Indicator input port
GND	Ground

Table 2.1 Description of Connector

2.2 **D-SUB 9Pin Connector**



Chapter 3. Installation and Operation Setting

3.1 How to Install Hardware

Take the following procedure and you can use C-net protocols of N1 series controller.

1) Connect a Serial cable to N1 to communication port (HOST PORT) on controller's Main Board.



Fig. 3.1 How to Connect Serial Cable

3.2 How to Connect Cable

For how to connect cable, refer to Fig. "3.2 Cable Wiring Diagram".



Fig. 3.2 Cable Wiring Diagram

Pin No.	Name	Content Description of Function		
2	RXD	Received Data	Receive Data Signal	
3	TXD	Transmit Data	Transmit Data Signal	
5	GND	Ground	Ground	

Table 3.1 Description of Wiring Pin Numbers



3.3 Controller Setting

To use C-net protocols in N1 series controller, you should set RS-232C communication. Default value for baud rate is set to 115,200bps.

3.3.1 **RS-232C Communication Setting**



Step 1.	Move to PARA screen	
	<main menu=""> 1. JOB 2. RUN 3. HOST <u>4. PARA</u> 5. ORIGIN <u>6. I/O</u> 7. SYSTEM 8. GPNT 9. INT/FLT A. ALARM SELECT #</main>	Open initial menu screen Select 4: PARA L
	<parameter> NO TYPE *CH1 XYZW CH2 XY_TEST</parameter>	Open PUBLIC PARAMETER group screen
	SEL INFO PUB EXIT <public parameter=""> 1: HW CONF 2: PALLET 3: PLC 4: ETC group #</public>	Select 1:HW CONF
Step 2.	Move to COMM screen <public-hw conf(0)=""> 1: TMR 2: COMM 3: I/O 4: D-MAN 5: SVON 6: A I/O item #</public-hw>	Select 2: COMM 2 R

Step 3.	RS232 setup screen	
	<pre><hw -="" com="" conf=""> COMMUNICATION SET 1: COM PORT SET 2: FIELD BUS </hw></pre>	Select 1: RS232C
	group #	
	<pre><com -="" 1="" 2="" port="" set=""> PORT:HOST PROTOCOL: N1 BAUD RATE: 230400 SEPARATOR: CR+LF ID: 0 HOST RS485</com></pre>	Set C-Net protocol
	<pre><com -="" 2="" port="" set=""> PORT:HOST LENGTH: 8 bits STOP BIT: 1 bits PARITY: disable FLOW: NONE HOST RS485</com></pre>	Set C-Net protocol

Item	Set Value	Default Value
PROTOCOL	C-Net	N1
BAUD RATE	115,200	115200
LENGTH	8	8
STOP BIT	1	1
PARITY	disable	disable
FLOW	NONE	NONE
ID	0	0

 $\state{\state{M}}$ ID currently supports no functions.

Chapter 4. Examples of C-net Setting on Touch Panel

This Manual uses the Easyview model MT8056T supporting "Master-K" and "GLOFA" C-net. (Also available for use are other Touch Panel products supporting "Master-K" and "GLOFA" C-net.) For how to set C-net communication of model MT8056T, EasyBuilder8000 program provided by Easyview was adopted for use.

4.1 Executing EasyBuilder8000 Program

EasyBuilder8000	
Eile Tool Help	
🔆 🛠 塑 塑 😫 🖾 🖄 🎹 🐶 🗄 0 1 2 3 🕢 🕨 State 0 💿 🔹 📄 🖆 🔛 👗 🐚 💼 🕰	E N I
i 44 49 🖬 🗷 🖪 📄 🔊 🖏 🗨 📓 i 💽 🔹 🔹 🔹 🔹 🔺 🔺 🛎 🗏 I 🛆	
:••••••••••••••••••••••••••••••••••••	9
Windows 👻 🗙	
Object list	
For Help, press F1	
For help, press Fi	

Execute EasyBuilder8000 and a window comes up as shown in Fig. 4.1 below.

Fig. 4.1 Screen executing Easybuilder8000



Examples of C-net Setting

4.2 Add New

Select File->New from menu.



Select MT8056T from Model. (The product described in this Manual is a model MT8056T.)

EasyBuilder8000 (Copyright c 2006 Weintek Lab., Inc.)	
Welcome to EasyBuilder8000. Please select your model.	
Model: MT6056T/MT8056T (320 x 234)	~
Display mode : Landscape	~
✓ Use template (template8056.mtp)	
ОК	Cancel

Fig. 4.3 Product Selection Screen

Click OK button and a window comes up as shown in Fig. 4.4.



4.3 System Parameter Setting

Click New... button at the center of the window.

S	ystem Par	ameter S	ettings							×
ſ	For	t		Extend	ed Memory	nory Printer/Backup Server				
	Device		Model		General	Svs	tem Setting		Security	1
	Device list :									
	No.	Name	Location	Device	type	Interface	I/F Protocol	Station no.		
	Local HMI	Local HMI	Local	MT6056	6T/MT8056T	Disable	N/A	N/A		
	New		Delete		Settings					
	Project des	cription :								
									~	
									~	
	<								>	
L				_						
					확인	취소			도움말	

Fig. 4.4 Parameter Setting



Salact	DIC	from	tha	combo	hov	эt	ton	of	"Fig	15	1
Select	PLC	IIOIII	the	COMIDO	DOX	aι	ιορ	0I	гıy.	4.5	٠

Device Properties
Name : Mitsubishi FX0s/FX0n/FX1s/FX1n/FX2
◯ HMI
Location : Local Settings
PLC type : Mitsubishi FX0s/FX0n/FX1s/FX1n/FX2
V.1.20, MITSUBISHI_FX0N.so
PLC I/F : RS-485 4W
COM : COM1 (9600,E,7,1) Settings
PLC default station no. : 0
Default station no. use station no. variable
Use broadcast command
Interval of block pack (words) : 5
Max. read-command size (words): 32
Max. write-command size (words): 32
OK Cancel

Fig. 4.5 Device Setting

Next, select PLC type and a "Fig. 4.6" window comes up.

Select LS industrial System.

D	Device Properties						
	LS industrial Systems	~	S	earch			
	In the second se		1ax. ad 6383 2767 2767 3763 3763	Min 0 0 0 0 0			
	Parker Hannitin Corporation Rockwell Automation, Inc. RS Automation Sala-Burness Controls Ltd						
	Samsung Sanhe Schleicher Electronic GmbH Co. KG			Cancel			

Fig. 4.6 Product Group Selection Screen

Device Properties								
LS industrial Systems	LS industrial Systems Search							
LS GLOFA Cnet LS GLOFA FEnet (Ethernet) LS GLOFA GM3467 (LOADER) LS MASTER-K Cnet								
LS MASTER-K CPU Direct LS MASTER-K MODBUS RTU LS MASTER-KIOS1 LS XECH Cnet LS VECH Efeat (Ethernat)								
LS XGB Cnet LS XGB FEnet (Ethen	net)			~				
Device type	Bit//Word	Address format	Max. ad	Min 🛆				
F_word	Word	DDD	255	0				
L_word	Word	DDD	255	0				
M word	Word	DDD	255	0				
D	Word	DDDD	9999	0				
CV	Word	DDD	255	0				
TV	Word	DDD	255	0				
P	Bit	DDDh	255	0				
K	Rit	DDDh	255	n 💌				
<				>				
		ОК		Cancel				

Fig. 4.7 Select PLC Type

For Device, select Master-K C-net or Glofa C-net.



C-net protocols supported from N1 controller support "MASTER-K", "GLOFA" series ONLY.



Set COM PORT.

Device Properties						
Name : LS MASTER-K Cnet						
O HMI ⊙ PLC						
Location : Local Settings						
PLC type : LS MASTER-K Cnet						
V.1.10, LS_MASTER_K_CNET.so						
PLC I/F : RS-232						
COM : COM1 (38400,N,8,1)						
PLC default station no. : 0						
Use broadcast command						
Interval of block pack (words) : 5						
Max. read-command size (words) : 32 🛛 🖌						
Max. write-command size (words): 32						
OK Cancel						

Fig. 4.8 Device Setting

Click Settings.... in "Fig. 4.8".



OM Port Settings						
COM : COM 7 *	Timeout (sec) : 1.0					
Baud rate : 115200	Turn around delay (ms) : 0					
Data bits : 8 Bits 💌	Send ACK delay (ms) : 0					
Parity : None 💌	Parameter 1 : 0					
Stop bits : 1 Bit 💌	Parameter 2 : 0					
* PC only	Parameter 3 : 0					
The number of resending commands : 0						
OS version 20120920 or later support 144	400 baud rate OK Cancel					

Fig. 4.9 COM PORT Setting

Set the communication speed with RS-232 communication PORT.

CAUTION

> For settings related to N1 controller communications, refer to "3.3 Controller Setting"

ystem Para	neter Settings						
Font	F	xtended Me	mory		Printer/Ba	ackun Serve	er
Device	Model	Gene	ral	System	Setting	Sec	urity
Device list :							
No.	Name	Location	Device type		Interface		I/F Prot
Local HMI	Local HMI	Local	MT6056T/M	T8056T	Disable		N/A
Local PLC 7	LG_MASTER_K_CNE	T Local	LS MASTER	-K Cnet	COM 7 (11	(5200, N, 8, 1)	RS232
<							>
New Proiect descri	Delete	Se	ttings				
<							>

Fig. 4.10 System Parameter

Fig. 4.10 shows a window where System Parameter setup is complete for C-net protocols to be used.

Chapter 5. Memory Mapping

Controller Data Mapping							
Data		Description	Data		Description		
M0.0~0.F	IN	System Input #1	M10.0~10.F	OUT	System Output #1		
M1.0~1.F	IN	User Input	M11.0~11.F	OUT	User Output		
M2.0~2.F	IN	Option Input 0	M12.0~12.F	OUT	Option Output 0		
M3 0~3 F	IN	System Input #2	M13.0~13 F	OUT	Error Code Read		
1013.0 3.1	IN	FieldBus Input #1	10113.0 13.1	001			
M4.0~4.F	IN	Option Input 1	M14.0~14.F	OUT	Option Output 1		
M5.0~5.F	IN	Option Input 2	M15.0~15.F	OUT	Option Output 2		
M6.0~6.F	IN	Option Input 3	M16.0~16.F	OUT	Option Output 3		
M7.0~7.F	IN	FieldBus Input #2	M17.0~17.F	OUT	FieldBus Output #1		
D0	IN/OUT	Global Point Data X(A)	D80	OUT	Current Position X(A)		
D2	IN/OUT	Global Point Data Y(B)	D82	OUT	Current Position Y(B)		
D4	IN/OUT	Global Point Data Z	D84	OUT	Current Position Z		
D6	IN/OUT	Global Point Data W	D86	OUT	Current Position W		
D8	IN/OUT	Global Integer Input	D88	OUT	ERROR CODE		
D9	IN	Global Integer Index	D89	OUT	AUTO VEL		
D10	IN	JOG VEL Rate Input	D90	IN	RESERVED		
D11	IN	Global Point Index	D91	OUT	Info Data 1 Output		
D12	IN	Pull Up Value Input	D92	OUT	Info Data 2 Output		
D12		Clabel Fleet Insut	D93	OUT	Info Data 3 Output		
013		Giodal Float Input	D94	OUT	Info Data 4 Output		
D15	IN	Global Float Index	D95	OUT	Running JOB Number		

5.1 **N1 Controller Data Mapping**

Note) When using Option I/O, change Parameter I/O EXT B/D value to 2.

(Refer to Handling Manual "1.3.1.3 Extension I/O Board Setting".)

Note) JOG Velocity Rate Input in D10 applies in JOG Mode whose setup range is 1~100%. The values set are converted to percentage per axis based on Jv value for JOINT MOTION parameters.

5.1.1 N1 Series System Input #1

N1 series holds the System Bits commonly used between Robot Channel 1 and 2, and these common Bits operate differently between channels depending on CH_SEL Bit settings.

When the set value for CH_SEL Bit is Low, it corresponds to Robot Channel 1, with High corresponding to Robot Channel 2.

System Input #1 (M0.0 ~ M0.F)						
0	CH SEL	8	MODE 1 / AXIS 1			
1	PROG 0	9	MODE SEL			
2	PROG 1	А	JOG VEL			
3	PROG 2	В	VEL+ / MOV+			
4	PROG 3	С	VEL- / MOV-			
5	PROG 4	D	REBOOT			
6	PROG SEL	E	ORG #1			
7	MODE 0 / AXIS 0	F	START #1			

Commonly-used bits are PROG_0 ~ PROG_4, PROG_SEL, MODE0/AXIS0, MODE1/AXIS1, MODE SEL, JOG VEL, VEL+/MOV+, and VEL-/MOV-. When using the common Bit, check the set value for CH SEL Bit. If the set value for CH SEL Bit is not correct, an unwanted robot channel may operate. The FieldBus timing diagram represented in this Manual is examples for Channel 1, and for handling and operating Channel 2, change the set value for CH_SEL Bit to High in Channel 1 timing diagram. Reading and writing Global Integer and Global Float Data can be used regardless of CH_SEL Bit setup.

🔨 CAUTION

For description of the functions of each Bit, refer to Handling Manual "3.3.4 System Input/Output Functions".

System	Input #2 (M3.0 ~ M3.7)	Field	Bus Input #1 (M3.8 ~ M3.F)	
0	STOP #1	8	DATA TYPE: XY좌표	
1	Reserved	9	DATA TYPE: Angle 좌표	
2	SERVO ON #1	А	Data Type: Pulse (Read Only)	
3	ORG #2	В	Mode Select (/Current OR GPNT)	
4	START #2	С	Write Enable Flag(Position,GINT)	
5	STOP #2	D	READ Enable Flag(Position, GINT)	
6	Reserved	E	Reserved	
7	SERVO ON #2	F	Reserved	

5.1.2 N1 Series System Input #2 & FIELDBUS INPUT#1

5.1.3 N1 Series FIELDBUS INPUT #2

	FieldBus Input #2	(M7.0 ~ N	10.F)
0	JOG A(X)+	8	AUTO RUN MODE
1	JOG A(X)-	9	STEP RUN MODE
2	JOG B(Y)+	А	JOG MODE
3	JOG B(Y)-	В	JOG Forward SEL
4	JOG Z+	С	Reserved
5	JOG Z-	D	Reserved
6	JOG W+	E	Info Data Mode SEL #0
7	JOG W-	F	Info Data Mode SEL #1

5.1.4 N1 Series System Output #1

	System Output #1	(M10.0 ~ N	И10.F)
0	CH SEL	8	ORG OK #2
1	ALL ALARM	9	RUNNING #2
2	READY #1	А	INPOS/INRNG #2
3	ORG OK #1	В	SERVO ON #2
4	RUNNING #1	С	Reserved
5	INPOS/INRNG #1	D	Reserved
6	SERVO ON #1	E	Reserved
7	READY #2	F	Reserved



5.1.5 N1 Series FIELDBUS Output #2

	FieldBus Output #1	(M17.0 ~ I	M17.F)
0	Write Complete Flag	8	Auto Run Mode DIS
1	Read Complete Flag	9	Step Run Mode DIS
2	Reserved	А	JOG Mode DIS
3	Forward Moving State DIS	В	Reserved
4	Reserved	С	Info Data Mode SEL #0
5	Brake State DIS	D	Info Data Mode SEL #1
6	Reserved	E	Reserved
7	Reserved	F	Reserved

5.2 **Precaution for Use in N1 Series System Mode**

1. < Precautions for Use in Auto Mode >

- **①** GINT, GFLOAT and GPNT commonly use Read / Write Enable Flag so the Index value of an unused variable is allocated at a time no change is intended.
- ② Coordinate Write functions, among Data Types, allow XYZW and ABZW ONLY to be available for use.
- **③** Only PROGRAM NUM entered from SYSTEM MODE is sent out.
- ④ VEL output enables sending out robot's travel speed in JOG MODE and AUTO MODE.

2. < Precautions for Use in JOG Mode >

- JOG_VEL input is applicable only in JOG MODE and when the value is 0 it operates at 1% speed.
- ② VEL output enables sending out robot's travel speed in JOG MODE and AUTO MODE.
- ③ AUTO RUN MODE, STEP RUN MODE and JOG MODE in Field Bus Input #2 should be entered by pulse input. (When each mode is set to High, the Bit selected on Jog axis in FieldBus Input #2 operates in an abnormal manner.)

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