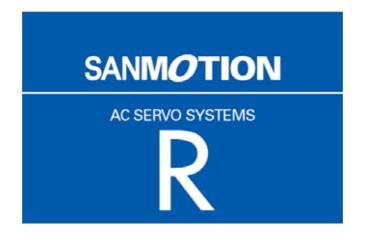
# SANYO DENKI Servo Amplifier SANMOTION R and Pro-face AGP-3\*\*\*\*-CA1M/LT Connection Procedure

# **Instruction Manual**

Version1.0 (2009.2.25)



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# 1 Applicable devices

This manual refers to the following devices and equipment:

- SANYO DENKI servo amplifier SANMOTION R
- Pro-face AGP3400-T1-D24-CA1M
- Pro-face GP-Pro EX version 2.5
- Pro-face USB transfer cable CA3-USBCB-01 (for transfer of screen data)

# [MEMO]

For information on display unit models supporting CANopen, see the GP3000 Series Hardware Manual or the LT3000 Series Hardware Manual.

# 2 Installation of GP-Pro EX version 2.5

- 1) Insert the GP-Pro EX installation CD into the PC, and the SET UP MENU window will appear.
- 2) Select "GP-Pro EX," and the Microsoft .NET Framework 2.0 set up window will appear. Follow the Wizard to install Microsoft .NET Framework 2.0.
- 3) The GP-Pro EX 2.5-InstallShield Wizard window will appear. Follow the directions.
  - Enter the Serial Number (11 digits) on the Customer Information window.
  - Enter the Key-Code.
  - Follow the direction of the Wizard to install.

# **3** Creation of screens/programs

- 1) When you start up GP-Pro EX, the [Welcome to GP-Pro EX] window will appear. Select [New].
- 2) In the [Display Unit] setting screen, set the [Series] to GP-34\*\*Series and the [Model] to AGP-3400T-CA1M.

[MEMO]

If you select the LT3000 series for the display unit, the [I/O Driver] setting window will be shown next. Please select [CANopen Driver] from the pull-down menu.

- 3) In the [Device/PLC] setting screen, click [New Logic] or [New Screen].
- 4) Create screens and/or a logic program.

# 4 Setting up CANopen in GP-Pro EX 2.5

# 4.1 Displaying the I/O Driver setting screen

- 1) Select the [View] menu -> [Work Space] -> [System Settings].
- 2) In the [System Settings] window, click [I/O Driver] in the Peripheral Settings area, and the [I/O Driver] screen will be shown.

1

[MEMO]

If you are using the LT3000 series, open the [External Driver] tab.

# 4.2 Importing the EDS file

This section shows the procedure to import the EDS file of a SANMOTION R slave unit.

1) In the [I/O Driver] screen, click [Catalog manager].

I/O Driver		Add I/O Driver	Remove I/O Driver
Int. Driver 1			
CANopen master Rev.: 10067 Assigned slaves		Baudrate: 250 kbps Node ID: 127	Settings Catalog manager
ID Product name	Rev. Mandatory	Alias	Кеу

# 2) Click [Import].

Ca	talog manager										
	Registered devices						0	Device information			
	Product name	Product ID	Vendor	Vendor ID	Revision No.	Кеу		Parameter	Value		
	<		IIII			>	1	Catalan anastiana			-
	- Device operations							- Catalog operations			
(	Import	Delet	e []	Rename	Export			Import	Export	Close	

3) The [Open] dialog box will appear. Specify the sanyo\_rco.eds file in the save-in location. Click [Open], and the file will be registered into the [Catalog manager].

Open						? 🔀
Look jn:	🗀 CANopen		*	G 🦻	جي 🧐	
My Recent Documents	anyo_rco.eds					
Desktop						
My Documents						
My Computer	File <u>n</u> ame: Files of <u>ty</u> pe:	sanyo_rco EDS files (*.eds)			<b>v</b>	<u>O</u> pen Cancel

4) Click [Close].

Catalog manager						×
Registered devices				Device information		
Product name Product ID Vend	dor Vendor ID	Revision No.	Key	Parameter	Value	^
R_CANopen Ser 0 SAN	YO D 189	0	sanyo	Catalog key	sanyo_rco	
				Product name	R_CANopen Servo Amplifier	
				Product number	0	
				Vendor name	SANYO DENKI Co., Ltd.	
				Vendor number	1B9	
				Revision number	0	=
				Order code		
				Baudrates (Kbps)	1000, 800, 500, 250, 125, 50, 20, 10	
				EDS version	4.0	
				EDS description	EDS for SANMOTION_R_CANopen	
				Created by	K.Machida	
				Created at	4/25/2006 11:06 AM	
				Modified by	K.Machida	~
				<	·····	
Device operations				Catalog operations		
Import Delete	Rename	Export			Export	$\supset$

# 4.3 Adding a slave

- 1) In the [I/O Driver] screen, click [Settings], and the [Network configuration] window will appear.
- 2) Select the item whose Key is sanyo\_rco from the [Registered devices] list and click [Add slave], and "R\_CANopen Servo Amplifier" will be added in the [Assigned slaves] list.

N	letwork configuratio	n							- 🗆 🛛
	Master CANopen ma Rev.: 10067	aster		ode ID: 12 audrate: 25				<b></b>	
			Do	auurate. 21	JO KOPS			Master configu	uration
	Assigned slaves								
	ID Product name		R	ev.	Mandatory	Alias	Key		
<	Add slave Registered devices	Delete slave						Slave configu	ration
	Product name	Vendor	Rev.	Key		Device information			
	HTB 1C0 DMSLP	Pro-race	5	PFHTB	001F	Parameter	Value		
$\checkmark$	R_CANopen Servo Am	SANYO DENKI C	0	sanyo_r	co	Satalog key	sanyo_rco		
				-		Product name	R_CANopen Servo	Amplifier	
						Product number	0		
						Vendor name	SANYO DENKI Co.	, Ltd.	-11
						Vendor number	1 B9		-11
						Revision number	0		
	<	IIII			>	Order code			<b>~</b>
							OK	Ca	ncel .:

# 4.4 Slave configuration

- Click [Slave configuration].

Network configuration							
Master							
CANopen master	No	de ID: 12	7				
Rev.: 10067	Ba	udrate: 28	50 kbps		ſ	Master configura	tion
Assigned slaves							
ID Product name	Re	ev.	Mandatory	Alias	Key		
1 R_CANopen Servo Amplifier	0				sanyo_rco		
Add slave Delete slave						Slave configurat	ion
Registered devices							
Product name Vendor	Rev.	Кеу		Device information			
HTB 1C0 DM9LP Pro-face	5	PFHTB_	001E	Parameter	Value		
R_CANopen Servo Am SANYO DENKI C	0	sanyo_r	co	Catalog key	sanyo_rco		
				Product name	R_CANopen Servo A	mplifier	
				Product number	0		
				Vendor name	SANYO DENKI Co., L	.td.	
				Vendor number	189		
				Revision number	0		
			>	Order code			
					<b></b>		
					OK	Cance	3

- The [Slave configuration] dialog box will appear.

# 4.4.1 PDO: Mapping input and output

Set PDOs (Process Data Objects), as continuous communication data.

The following table shows an overview of the object directory as per the CANopen agreement.

Index (hex)	Object
1000-1FFF	Communication Profile Area
2000-5FFF	Manufacturer Specific Profile Area
6000-9FFF	Standardized Device Profile Area
A000-FFFF	Reserved for further use

[MEMO]

For the details of the objects, refer to the SANMOTION R instruction manuals.

- As an example of inputs, select "Index = 0x6064.0" (Position\_actual\_value) from the list of the [Available objects from device profile] in the [Parameters] tab.
- 2) If you select "TPDO1" in the [Configured objects], the [Map] button will be enabled.

Slave configuration							
Current node							
R_CANopen Servo Amplifier Rev.: 0							
Manufacturer: SAN	YO DENKI Co., Ltd.		Node ID: 1				
Parameters Advan Available objects fr	ced Error Control Advanced Object Configuration						
Index	Parameter	Data type	Access				
0x6061.0	Modes_of_operation_display	Integer8	read-only				
0x6064.0	Position_actual_value	Integer32	read-only				
0x606C.0	Velocity_actual_value	Integer32	read-only				
0x6071.0	Target_torque	Integer16	write-only (rww)				
0x6072.0	Max_torque	Unsigned16	write-only (rww)	~			
TPDO2 TPDO2 TPDO3 TPDO3 RPDO4	ervo Amplifier 6041.0] Statusword (WORDx1) 2 3 6040.0] Controlword (WORDx1) 1 2		tting  Transmission type 255 nhibit time (1/10ms) 20 Event timer (ms) 0 Settings				
				Cancel			

- 3) Click [Map], and "[0x6064.0] Position\_actual\_value" will be appended under "TPDO1."
- 4) Set the [Data representation] in the [Setting] area to "Dword."

Configured objects Map Unmap	Setting
R_CANopen Servo Amplifier     Input     TPD00     Units (WORDx1)     TD001	Data representation
<ul> <li>TPD01</li> <li>[0x6064.0] Position_actual_value (DW0RDx1)</li> <li>TPD02</li> <li>TPD03</li> </ul>	Dbject data type
Output     PPD00     Image: [0x6040.0] Controlword (W0RDx1)	
- BPD01 - BPD02	

- 5) As an example of outputs, select "Index = 0x607A.0" from the list of the [Available objects from device profile" on the [Parameters] tab.
- 6) Select "RPDO1" in the [Configured objects] and click [Map], and "[0x607A.0] Target\_position" will be appended under "RPDO1."

Slave configuration								
Current node								
R_(	R_CANopen Servo Amplifier Rev.: 0							
Manu	facturer: SAN	YO DENKI Co., Ltd.		Node ID: 1				
Param	eters Advan	ced Error Control Advanced Object Configuration						
Avail	able objects fr	om device profile						
Inde	x	Parameter	Data type	Access				
0x60	78.0	Current_actual_value	Integer16	read-only				
0x60	7A.0	Target_position	Integer32	write-only (rww)				
0x60	81.0	Profile_velocity	Unsigned32	write-only (rww)				
0x60	83.0	Profile_acceleration	Unsigned32	write-only (rww)				
0x60	84.0	Profile_deceleration	Unsigned32	write-only (rww)	~			
	TPD01  TPD02  TPD03  Output  RPD00  Control RPD00  RPD0  RPD  RPD	6064.0] Position_actual_value (DWORDx1) 2 3 6040.0] Controlword (WORDx1) 1 607A.0] Target_position (DWORDx1) 2		Data representation Dword Dispect data type Integer32				
				ОК Са	ancel			

7) Set the [Data representation] in the [Setting] area to "Dword" and click [OK].
 Then click [OK] in the [Network configuration] window, and it will be closed and the [I/O Driver] screen will be shown.

#### 4.4.2 Allocating I/O variables to the I/O tree

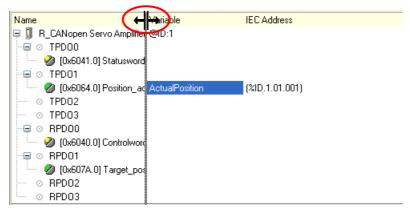
Allocate I/O variables after the PDO settings (mapping).

- 1) Click [I/O Screen] in the [I/O Driver] screen.
- 2) The [R\_CANopen Servo Amplifier] tree will be shown. As an example, allocate a variable "ActualPositon" to an item "Position\_actual\_value" (an object at the actual position), which is under "TPDO1." To set a variable, double click the corresponding variable field and enter the variable.

Name	Variable	IEC Address
📮 🚺 R_CANopen Servo Amplifier @ID:1		
-== 💿 TPD00		
🦢 🤣 [0x6041.0] Statusword Word-0		
= 💿 TPD01		
🚽 🔤 💋 [0x6064.0] Position_actual_value DWord-🏹	ActualPosition	(%ID.1.01.001)
⊙ TPD02		
○ TPD03		
- 🗐 💿 RPD00		
🧼 🤣 [0x6040.0] Controlword Word-0		
- 🗐 💿 RPD01		
🥏 🖉 [0x607A.0] Target_position DWord-0		
── ◎ RPD02		
© RPD03		
D		

#### [MEMO]

By pointing the cursor on the red marked area and dragging, you can change the column width.



3) In the same way, set a variable "TargetPosition" to an item "Target\_position" (an object at the target position), which is under "RPDO1."

Name	Variable	IEC Address
📮 🗍 R_CANopen Servo Amplifier @ID:1		
- 📮 💿 TPD00		
🧼 🤣 [0x6041.0] Statusword Word-0		
- 🗐 🔿 TPD01		
🧶 🥙 [0x6064.0] Position_actual_value DWord-0	ActualPosition	(%ID.1.01.001)
◎ TPD02		
🖳 🖶 🛇 RPD00		
🥏 🖉 [0x6040.0] Controlword Word-0		
📮 📀 RPD01		
🛛 💆 [0x607A.0] Target_position DWord-0 🛛 🤇	TargetPosition	(%QD.1.01.003)
◎ RPD02		
⊗ RPD03		

4) Click [CANopen Driver] to return to the [I/O Driver] screen.

## 4.5 Master configuration

- In the [I/O Driver] screen, click [Settings].

#### 4.5.1 Setting a baud rate

In the Master configuration, you can make baud rate settings.

1) In the [Network configuration] window, click [Master configuration].

Network configuration	)									-08
CANopen ma	ster	No	ode ID: 12	.7						
Rev.: 10067		Ba	iudrate: 2	50 kbps					Master con	figuration
Assigned slaves										
ID Product name		R	ev.	Mandatory	A	lias	Ke	y		
1 R_CANopen Servo	Amplifier	0					sai	nyo_rco		
Add slave	Delete slave							٦	Slave conf	iguration
Registered devices		_								
Product name	Vendor	Rev.	Key		Devic	e information				
HTB 1C0 DM9LP	Pro-face	5	PFHTB	_001E	Para	imeter	Value			
R_CANopen Servo Am	SANYO DENKI C	0	sanyo_r	со		og key	sanyo_rco			
						uct name	R_CANoper	i Servo Ar	nplifier	
						uct number	0			
						or name	SANYO DEI	NKI Co., L	td.	_
						or number	1B9			_
Fre Management				>		sion number r code	0			_
<					Orde	rcode				
								OK		Cancel

## [MEMO]

To set the baud rate on the slave unit, use R-SETUP - Setup Software made by SANYO DENKI. For the details, refer to the manuals for the servo amplifier.

The factory default of the baud rate on the servo amplifier is 500 kbps.

2) In the [Master configuration] dialog box, specify the [Baud rate].

Master configuration	
CANopen master Manufacturer: Pro-face	Rev.: 10067 Node ID: 127
	sject Configuration On Error Control Event of a mandatory slave Stop all nodes Reset all nodes Treat the slave individually
	OK Cancel

# [IMPORTANT]

The baud rate cannot be set to 800 kbps when connecting with SANMOTION R.

If you set it to 800 kbps, a transmission speed error will occur between the SANYO servo amplifier and the Digital display unit.

# **5** Details of settings with the software

#### 5.1 Catalog manager

#### 5.1.1 Device operations

Ca	talog manager								×
F	Registered devices					Device information			
	Product name	Product ID	Vendor	Vendor ID	F	Parameter	Value	^	
	R_CANopen Servo Amplifier	0	SANYO DENKI Co., Ltd.	1B9	0	Catalog key	sanyo_rco		
						Product name	R_CANopen Servo Amplifier		
						Product number	0		
						Vendor name	SANYO DENKI Co., Ltd.		
						Vendor number	189		
						Revision number	0		
						Order code			
						Baudrates (Kbps)	1000, 800, 500, 250, 125, 50, 20, 10		
						EDS version	4.0		
						EDS description	EDS for SANMOTION_R_CANopen		
						Created by	K.Machida		
						Created at	4/25/2006 11:06 AM		
						Modified by	K.Machida	~	
	<	1111			2	<			
1	Device operations					<ul> <li>Catalog operations</li> </ul>			
C	Import	elete	Rename	Export	>	Import	Export Close		

#### \* Import

Imports an EDS (Electronic Data Sheet) file.

The EDS file is registered in the Catalog manager of GP-Pro EX and the contents in the EDS file is shown in the Catalog manager.

## \* Delete

Deletes a designated device from the catalog in GP-Pro EX.

\* Rename

Allows you to rename the key of a device registered in the catalog.

The name of the key when importing an EDS file is the EDS file name without the extension. Up to 256 characters

\* Export

Exports contents in a device registered in the catalog as an EDS file.

# 5.1.2 Catalog operations

Registered devices				D	evice information	
Product name	Product ID	Vendor	Vendor ID   F		Parameter	Value
R_CANopen Servo Amplifier		SANYO DENKI Co., Ltd.	1B9 O	-	Catalog key	sanyo_rco
				F	Product name	R_CANopen Servo Amplifier
				F	Product number	0
				1	Vendor name	SANYO DENKI Co., Ltd.
				1	Vendor number	189
				F	Revision number	0
				0	Order code	
				E	Baudrates (Kbps)	1000, 800, 500, 250, 125, 50, 20, 10
				E	EDS version	4.0
				I	EDS description	EDS for SANMOTION_R_CANopen
					Created by	K.Machida
				0	Created at	4/25/2006 11:06 AM
				1	Modified by	K.Machida
<	111		>		<	
Device operations					Catalog operations	
Import D	elete	Rename	Export	$\langle$	Import	Export Close

# \* Export

Exports registered devices into one file (a catalog file; \*.cat).

By doing so, it will be easier to make the same environment in another PC.

Export catalog
<ul> <li>Export all the registered devices.</li> </ul>
Export only the devices in use.
Export only the selected devices.

\* Import

Imports a catalog file.

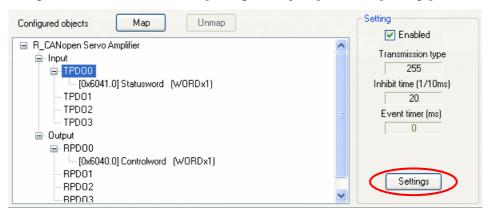
#### 5.2 Slave configuration

#### 5.2.1 Parameters (PDO settings)

Up to 8 bytes (64 bits) of data can be assigned per PDO.

The transmission type can be set by each PDO.

- In the [Network configuration] window, click [Slave configuration]. In the [Slave configuration] dialog box, select "TPDO0" in the [Configured objects] and click [Settings].



The [TPDO configuration] dialog box will appear.

TPDO configuration	
PD0 Communication Parameter	
Transmission types	Resulting PDO transmission type
<ul> <li>Acyclic synchronous</li> </ul>	255
Cyclic synchronous	SYNC cycle rate
Asynchronous event	E vent timer (ms)
<ul> <li>Asynchronous event</li> </ul>	Inhibit time (1/10 ms)
(depending on Device profile)	20
	OK Cancel

\* Asynchronous event

A PDO is received immediately when an event occurs regardless of the SYNC signal.

For 254, this is defined by the manufacturer.

For 255, this is defined in the device profile.

\* Acyclic synchronous / Cyclic synchronous

A PDO is sent synchronizing in synchronization with the SYNC signal flowing into the network. For the cyclic synchronous, whose SYNC cycle rate can be set from 1 to 240, when 1 is set, a PDO is sent for every SYNC object.

When 3 is set, a PDO is sent each time that three SYNC signals flow into the network.

\* Event timer, Inhibit time

The Event timer and the Inhibit time can be set when the transmission type is set to Asynchronous event. The Event timer is the setting to send data consistently as well as when it changes.

The Inhibit time is the setting to inhibit the increase of communication load by continuous data change.

\* Identity settings

The master unit makes an identity check between the device information (the contents of the imported EDS file) and the actual slave unit when communication starts.

Items to be checked are as follows.

- Device type
- Vender ID
- Product code
- Revision number

Configured objects Map Unmap	Setting
R_CANopen Servo Amplifier     Input     TPD00	Device type     Dx 2 192     Vendor ID     Product code     Revision number
	Restore All
	OK Cancel

When connecting to a SANMOTION R, only the following can be checked. (Depending on the description of the EDS file)

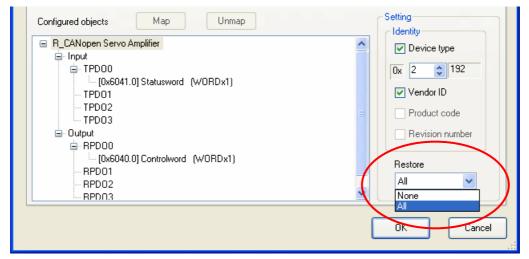
- Device type
- Vender ID

If the item(s) cannot be identified, an error code "150: Identity error of an optional slave" will be displayed on the GP/LT unit.

#### \* Restore

Tells the master unit whether or not to restore, or write, the parameters of slave units on occasions such as when a communication cable is disconnected and the system is recovered.

If you select "None," the slave units will operate retaining the output signals.



Select from the following two items for the parameter restoration.

- None: Parameters are not restored.
- All (default): All parameters are restored.

## 5.2.2 Advanced error control

#### \* HeartBeat

Each node (the master and slaves) sends heartbeat messages.

By monitoring (receiving) heartbeat messages, the master can check each node is active.

The producer is the one that sends messages, and the consumer is the one that receives the messages.

Currently, HeartBeat is recommended over NodeGuard.

In the [Network configuration] window, click [Slave configuration] to set the heartbeat in the [Advanced Error Control] tab.

	CSelect Error Control Protocol		
	⊙ Use HeartBeat	🔘 Use NodeGuard	
Producer he	artbeat time (ms) 200	\$	

#### [Remark]

The heartbeat can be set in the Master configuration dialog box normally.

Set the [Global heartbeat timing] on the [Network settings] tab and click [Apply] to apply the setting to all slaves.

Master configuration		
Current node CANopen master Manufacturer: Pro-face	Rev.: 10067 Node ID: 127	
Network settings Error Control Overview Network-wide configuration Baud rate 500 kbps Global SYNC period (ms) 50 Apply Global heartbeat timing (ms 200 Apply NMT inhibit time (1/10m 50	<ul> <li>On Error Control Event of a mandatory slave</li> <li>Stop all nodes</li> <li>Reset all nodes</li> <li>Treat the slave individually</li> </ul>	
	OK Ca	incel

## \* NodeGuard

The master unit monitors slaves by polling (guarding) for the time of the Guard time multiplied by the Life time factor.

Parameters	Advanced Error C		onfiguration	
	Sele	et Error Control Protocol		
		🔘 Use HeartBeat	💿 Use NodeGuard	
		Guard time (ms)	200	
		, , ,		
		Life time factor	2	

# 5.2.3 Advanced object configuration

The Advanced Object Configuration tab shows the object list of the slave units. The contents of objects vary depending on the type of the slave unit.

	ANopen Sen sturer: SANYO DENKI	•				w.: 0 de ID: 1
aramete	Advanced Error C at search Search Reset the object	Object Type Filte	e V	n ReadOnly ReadWrite WriteOnly		nication area cturer area area
Set	Index 🔺	Parameter	Value	Default	Data type	Access
No	0x1000.00	Device Type	0x00020192	0x000201	Unsigned32	read-only
No	0x1001.00	Error Register	0		Unsigned8	read-only
No	0x1003.00	Number of Errors	0	0	Unsigned8	read-write
No	0x1003.01	Standard Error Field 1	0	0	Unsigned32	read-only
No	0x1003.02	Standard Error Field 2	0	0	Unsigned32	read-only
No	0x1003.03	Standard Error Field 3	0	0	Unsigned32	read-only
No	0x1003.04	Standard Error Field 4	0	0	Unsigned32	read-only
No	0x1003.05	Standard Error Field 5	0	0	Unsigned32	read-only
No	0x1003.06	Standard Error Field 6	0	0	Unsigned32	read-only
No	0x1003.07	Standard Error Field 7	0	0	Unsigned32	read-only
No	0x1003.08	Standard Error Field 8	0	0	Unsigned32	read-only
No	0x1003.09	Standard Error Field 9	0	0	Unsigned32	read-only
No	0x1003.0A	Standard Error Field	0	0	Unsigned32	read-only

## 5.3 Master configuration

#### 5.3.1 Network settings

Master configura	ation			
Current node				
CANopen	n master		Rev.: 10067	
Manufacturer: Pr	o-face		Node ID: 127	
			~	2
Network settings	Error Control Overview	Advanced Object Configuration		
- Network-wi	ide configuration	On Error	Control Event of a mandatory slave	
E	Baud rate			
Į	500 kbps 🛛 🔽	0	Stop all nodes	
	al SYNC period (ms)	0	Reset all nodes	
<u>ا</u>	50 🗢	۲	Treat the slave individually	
	Al heartbeat timing (ms) 200			
			OK Cancel	] ) .:i

\* Baud rate

Select the baud rate of the master unit. 50 kbps to 1000 kbps (default: 250 kbps)

\* Global SYNC period

Set the send cycle time of SYNC messages. 0 (disabled), 3 to 32767ms (default: 50ms)

\* Global heartbeat timing

To check, or monitor, whether the slave unit is active or not, use the heartbeat or the node guarding. 50 to 21844ms (default: 200ms)

\* NMT inhibit time

This is the setting to inhibit the master unit to send NMT messages continuously. NMT stands for "Network Management." 0 to 3276.7ms (default: 5ms) \* On Error Control Event of a mandatory slave

Select from the following 3.

- Stop all nodes
- Reset all nodes
- Treat the slave individually (default)

If you select [Treat the slave individually], each slave unit sends the reset signal, instead of the master unit sending the reset signal by broadcast.

# 5.3.2 Error control overview

The Error Control Overview tab allows you to check the list of the node monitor (Heartbeat / Node guard).

N	Network settings Error Control Overview Advanced Object Configuration							
		Producer ł	ieatbeat time (ms)		200			
ſ	ID	Product name	Alias	Cons.	HB (ms)	Guard t. (ms)	Life time factor	
	1	R_CANopen Servo Ampli		300				

# 5.3.3 Advanced object configuration

The Advanced Object Configuration tab shows the list of objects in the master unit.

letwork s	ettings Error Contr	ol Overview Advanced	l Object Configu	uration			
	t search Sear Reset the object	ch Object Type Filt Mappable V Not mappab	le 🔽	ReadOnly ReadWrite WriteOnly		nication area cturer area rea	
Set	Index 4	Parameter	Value	Default	Data type	Access	^
No	0x1000.00	Device Type	0x00000195	0x000001	Unsigned32	read-only	
No	0x1001.00	Error Register	0		Unsigned8	read-only	
No	0x1003.00	number of elements	0	0	Unsigned8	read-write	
No	0x1003.01	standard error field	0x00000000		Unsigned32	read-only	
No	0x1003.02	standard error field	0x00000000		Unsigned32	read-only	1
Yes	0x1005.00	COB-ID SYNC mes	0x40000080	0x800000	Unsigned32	read-write	

# 6 PDO protocol, SDO protocol

# 6.1 PDO (Process Data Object) protocol

The PDO protocol is used for communicating data such as digital inputs and outputs continuously.

# 6.2 SDO (Service Data Object) protocol

The SDO protocol is used for communicating data that does not need to be sent continuously, such as infrequent changes of setting values.

Data assigned to SDOs are communicated by the SDO instructions (SDOR, SDOW) of the logic program.

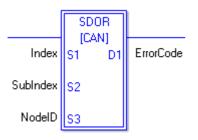
# 7 I/O driver instructions

# 7.1 SDOR, SDOW

Reads from / writes to objects of the slave unit.

SDOR (SDO Read)

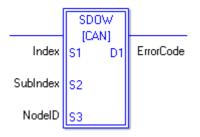
- S1: index number of the object
- S2: sub index number of the object
- S3: node ID
- S4: length (byte number) of the object access
- S5: location to store read data (offset number of #L\_IOMasterDrv[])
- D1: error code



💑 [CAN]SDOR	
S1	D1
Index 🔽	ErrorCode 🔽
S2	
SubIndex 🗸	
S3	
NodelD 🗸	
S4	
Length 🔽	
S5	
Offset 💌	
	OK ( <u>D)</u> Cancel

# SDOW (SDO Write)

- S1: index number of the object
- S2: sub index number of the object
- S3: node ID
- S4: length (byte number) of the object access
- S5: location to store data to be written (offset number of #L\_IOMasterDrv[])
- D1: error code



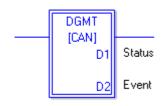
💰 [CAN]SDOW	
S1	D1
Index 🗸 🗸 🗸	ErrorCode 🔽
S2	
SubIndex 🗸 🗸 🗸	
S3	
NodelD 🔽	
S4	
Length 💌	
S5	
Offset 💌	
	OK (D) Cancel

# 7.2 DGMT, DGSL

Reads the status of the master unit / slave unit.

DGMT (Diagnostic Master)

- D1: status information
- D2: event information



DGSL (Diagnostic Slave)

- S1: node ID
- D1: slave diagnostic information



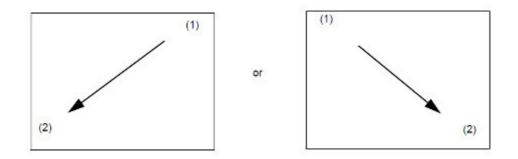
# 8 Transferring I/O firmware

Firmware for the CANopen board is not yet installed in CANopen units for the AGP-3\*\*\*\*-CA1M/LT by factory default. The firmware is transferred and written during the first screen data transfer. This I/O firmware is written when the unit is restarted after transferring the project file.

# 9 AGP-3\*\*\*\*-CA1M/LT unit

# 9.1 Offline menu

In the Offline mode, you can check the communication status when the master unit and the slave unit are connected. To enter the Offline mode, touch either the upper right and lower left corners or the upper left and lower right corners (within 40 pixels of the edges) of the panel in this order within 0.5 second.



# [MEMO]

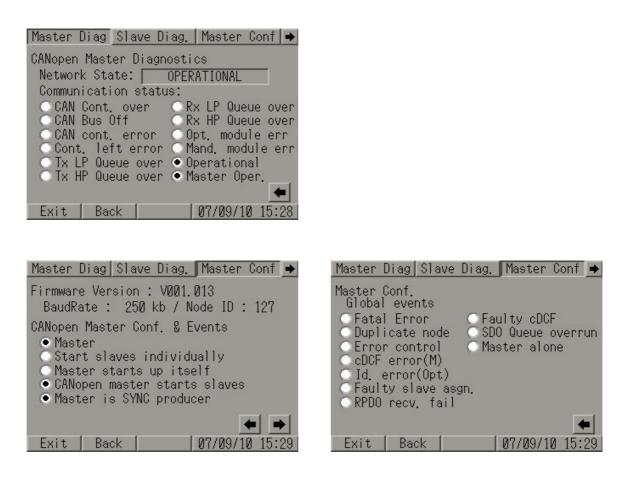
For the details of the Offline mode, refer to the Maintenance/Troubleshooting manual of GP-Pro EX.

Ma	ster Dia	agnostics	
\$1	aves Dia	agnostics	
aster (	Configur	ation & Eve	nts

\* Master Diagnostics, Master Configuration & Events

These menus have the same contents as the DGMT instruction does, which is one of the I/O driver instructions.

The Master Diagnostics screen includes status information and the Master Configuration & Events screen includes event information.



\* Slave Diagnostics

This menu has the same contents as the DGSL instruction does, which is one of the I/O driver instructions.

You can select the status of the slaves and check nodes in the list.

Mast	cer [	Diag	Sla	ve Diag. Master Conf 🔶
Slav	e Di	ag.		Assigned slaves 💌
01 11 21 31 41 51 61	02 12 22 32 42 52 62	03 13 23 33 43 53 63	04 14 24 34 44 54	Assigned slaves Configured slaves Faulty slaves Emergency slaves Operational slaves Stopped slaves Preoper. slaves Inconsistent cDCF
Ex	it	Ba	ck	07/09/10 15:29

Mast	er [	)iag	Sla	ive D	iag.	Ma	ster	Con	f   🔶
Slav	e Di	ag.		Ass	i gne	d sl	aves	s ]	•
01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63							
									+
Ex	it	Ba	ck			07/	09/1	0 15	5:28

# **10** Precautions

The maximum number of objects that can be assigned to each PDO is 4.
 This is not because GP-Pro EX has such a restriction, but because of the definition in the SANMOTION R EDS file.

Therefore, you cannot assign more than 5 objects even if the data size of one object is less than 8 bytes.

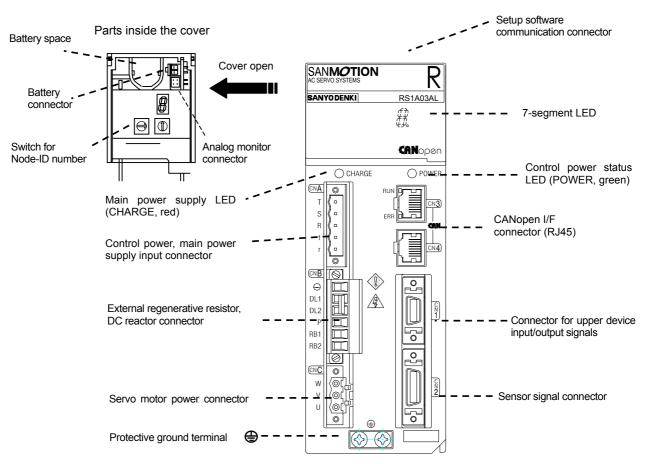
- The EDS file defines that the SANMOTION R's object "0x1200" (1<sup>st</sup> server SDO parameter) is a read-only object, and if you read data via SDO communication, an error occurs; the SDO error code is "0602 0000h: Object does not exist in the object dictionary."

As for the object "0x1200," reading data via SDO communication causes an error, however, connection with a GP/LT unit will not be affected by this.

# 11 Installation of SANMOTION R servo amplifier

#### **11.1 Hardware structure**

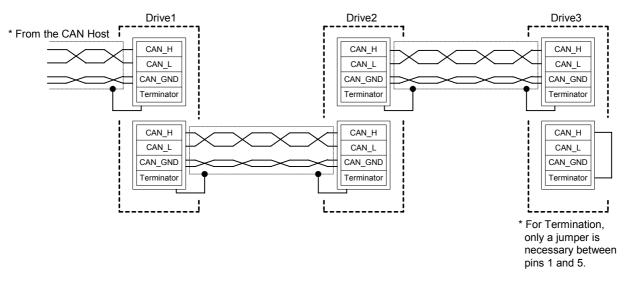
This section introduces the servo amplifier's parts name, referring to RS1D03AL.



For the information on pin assignment of each connector other than the CANopen interface connector, see SANMOTION R with CANopen Interface Instruction Manual (M0007951.)

For the information on pin assignment of the CANopen interface connector, see the following pages.

# 11.2 Cabling example



- To avoid communication malfunctions, a shielded cable with two twisted pairs is recommended.
  - One twisted pair is used for CAN\_H (Pin 1) and CAN\_L (Pin 2.)
  - Another twisted pair is used for CAN\_GND (Pin 3 and Pin 7.)
  - The cable shield has to be connected to the metal body plug of the RJ-45 type connector.
- Both ends of the CAN cable have to be terminated by a resistor of 120Ω. The SANMOTION R CANopen interface amplifier has an internal termination resistor. It is necessary to plug a modular connector with a jumper between Pin 1 and Pin 5 for termination.

# 11.3 Connector pin assignment

The SANMOTION R CANopen interface amplifier has two RJ-45 modular connector ports for the CAN connection. Pin assignment of both connectors is the same, and it is shown in the following figure.

CN3, CN4	Pin No.	Signal Name	
	1	CAN_H	
<b>P</b>	2	CAN_L	
	3	CAN_GND	
للجيل	4	No connection	
(finite state)	5	Terminator	
ľ≣I	6	(CAN_SHLD)	
사릚	7	CAN_GND	
	8	No connection	

#### Note

- 1. CN3 has two LED's which show the status of CAN communication. (See Chapter 11.4.2)
- A termination resistor (120Ω) is integrated in this amplifier that can be connected between CAN\_H and CAN\_L by plugging a modular connector with a jumper between pins 1 and 5.
- 3. The CAN\_GND pin is connected to the amplifier internal signal ground.
- 4. The CAN\_SHLD is optional.

#### 11.4 Status display on the front panel of the servo amplifier

## 11.4.1 7-segment LED

One digit of the 7-segment LED displays the following drive states.

- Settled Node-ID for CAN communication
- Servo status
- Alarm codes

#### 11.4.1.1 Settled Node-ID for CAN communication display

Right after the control power is turned ON, a timeshared, 3-digit, settled Node-ID for CAN communication is displayed.

The settled node-ID when it displays '1' -> '2' -> '3' is "123" in decimal numbers.

#### 11.4.1.2 Drive status display

After displaying the settled Node-ID, the following display appears if there is no error occurrence.

Servo amplifier status	Display
Control power supply established (NOT RDY) Control power supply has been established, but amplifier (RDY) is OFF because the state of CAN communication has not been raised up to "Ready to switched ON" state	", Flashing
Control power supply established (RDY) Control power supply has been established and amplifier (RDY) is ON	-
Main power supply established (NOT RDY) Main power supply is ON or has been established, but amplifier (RDY) is OFF because the state of CAN communication has not been raised up to "Ready to switched ON" state	"" Flashing
Main power supply being established Main power supply is ON or has been established, but Operation Preparation Completion signal is OFF	
Main power supply established Main power supply has been established and Operation Preparation Completion signal is ON	
Servo is ON Power has been applied to the motor after servo ON Continuously draws the character "8"	
Over Travel status at Positive rotation Positive rotation is in "Over Travel" status	-
Over Travel status at Negative rotation Negative rotation is in "Over Travel" status	⊦

#### 11.4.1.3 Alarm code display

When an alarm occurs, a timeshared, 2-digit, Alarm Code (R-CANopen amplifier specific)" will be displayed continuously.

For the details of the alarm codes, see SANMOTION R with CANopen Interface Instruction Manual (M0007951.)

#### 11.4.2 Red and green LED on CN3

The status of CAN communication can be displayed by following two single LED's on the CN3.

- Red LED: ERR\_LED; displays error state of CAN communication
- Green LED: RUN\_LED; displays running state of CAN communication

The following table shows how to display the error state by one ERR\_LED.

Status ERR LED		Description
No error	Off	The device is in working condition
		At least one of the error counters of the CAN
Warning limit reached	Single flash	controller has reached or exceeded the warning level
		(REC ≥ 96 or TEC ≥ 96)
Error control event	Double flash	A guard event or a heartbeat event has occurred
0.410	Triala Octob	The SYNC message has not been received within
SYNC error	Triple flash	the configured communication cycle period time
Bus off	0.5	The CAN controller has detected the "Bus OFF"
	On	status

#### Description of CANopen ERR LED

The following table shows how to display the running state by RUN\_LED.

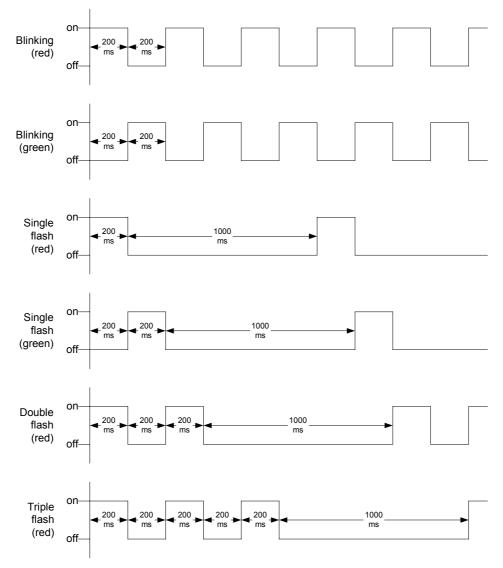
Status RUN LED		Description			
PRE-OPERATIONAL	Blinking	The device is in state PRE-OPERATIONAL			
STOPPED	Single flash	The device is in state STOPPED			
OPERATIONAL	On	The device is in state OPERATIONAL			

#### Description of CANopen RUN\_LED

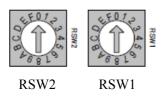
#### [NOTE]

The differences between "Blinking," "Single flash," "Double flash," and "Triple flash" are distinguished by flashed rate of each indicator that is shown in the following figure.

#### Indicator states and flash rates



#### 11.5 Node-ID



Each drive within the CANopen network has to have a unique Node-ID number. The Node-ID of this servo amplifier is set using the two 16 (0h to Fh) position rotary switches on the front panel of the amplifier [from 1 (RSW2: 0h, RSW1: 1h) to 127 (RSW2: 7h, RSW1: Fh)].

If both rotary switches are set to "0h" or "Fh" position, the value that has already been stored in non-volatile memory by using R-SETUP – Setup Software or written via SDO (object index 2250h) becomes effective as Node-ID number.

If the setting of Node-ID is changed while the control power is ON, it is necessary to turn OFF the control power once or execute the "Reset node" command to activate the new set Node-ID number.

## 11.6 Bit rate (transmission baud rate) and bus length

Bit rate can change via R-SETUP – Setup Software or via SDO (object index 2251h). Selectable bit rate and maximum bus length depending on the bit rate are shown in the following table.

If the setting of the bit rate is changed while the control power is ON, it is necessary to turn OFF the control power once or execute the "Reset node" command to activate the new set bit rate.

Bit rate	Max. bus length	Bit rate code
1 Mbps	25m	8
800 kbps	50m	7
500 kbps (factory default)	100m	6
250 kbps	250m	5
125 kbps	500m	4
(100 kbps; not supported)		3 (cannot be selected)
50 kbps	1000m	2
20 kbps	2500m	1
10 kbps	5000m	0

#### Bit rate and bus length

The bit rate must be the same for all units in one network.

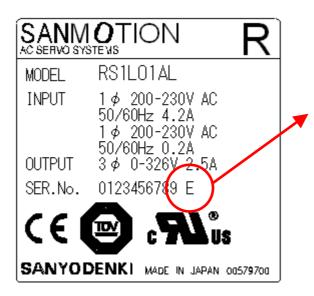
# **11.7** About the EDS file and the revision level of the servo amplifier

The revision level of the servo amplifier's communication firmware may change without prior notice. This section explains about the EDS file provided on the homepage, for this case.

Description	of EDS file
Description	

File name	sanyo_rco.eds
Revision level of amplifier	Rev. E or later
Version of communication firmware	Ver. 000B or later

• Even after the change of the revision level of the servo amplifier, the existing functions will not be changed and the EDS file will be still available as before.



How to check the revision level of the servo amplifier

- Find a label on the back of the servo amplifier.
- This letter indicates the revision level of the servo amplifier.

How to check the version of the communication firmware

- Read out the object 100Ah (software version) via SDO communication.
- "V.\*\*-□□" will be read out in the ASCII code. "□□" indicates the version of the communication firmware. If it is "0B", it means "Ver. 000B."