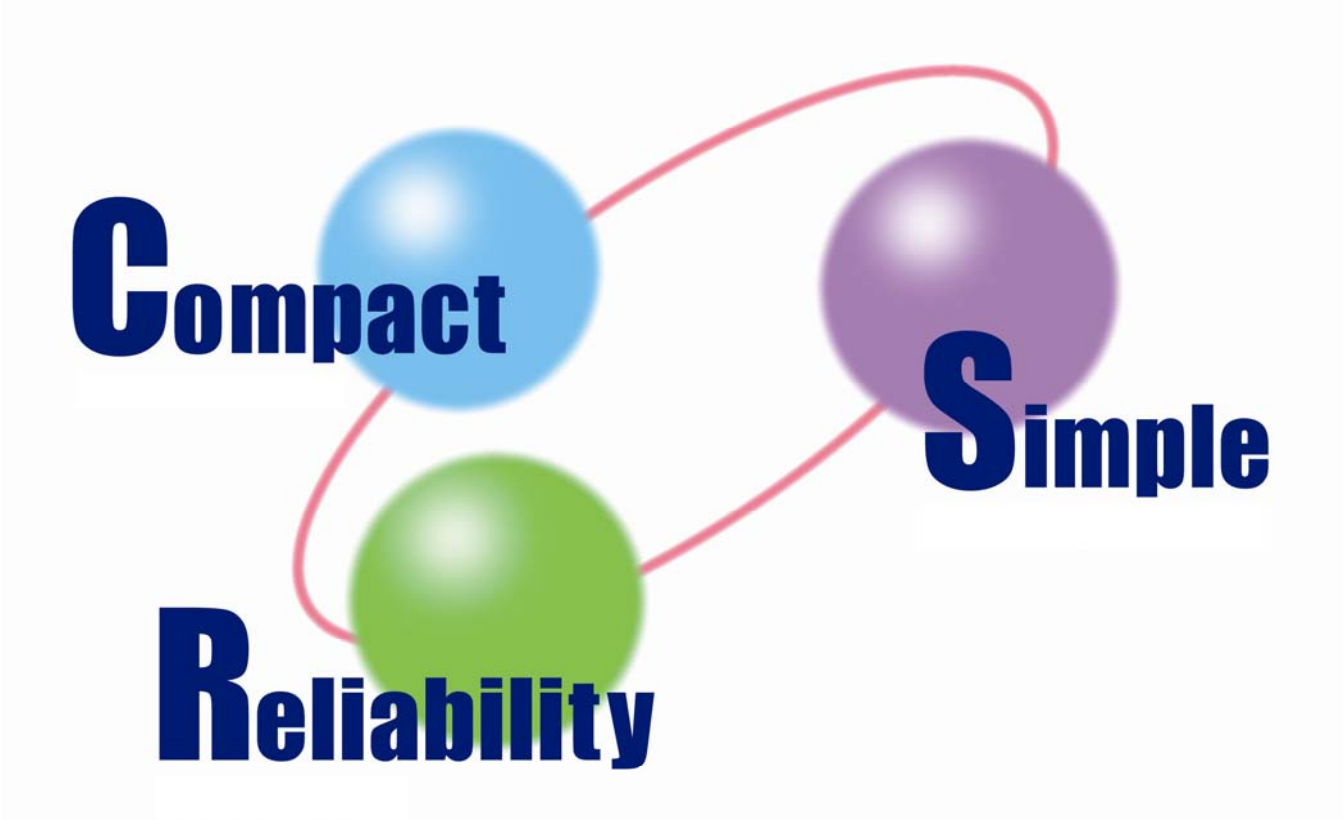
Motortronics®

SV-NET CONTROLLER



SVCC Series

Users Manual

TAMAGAWA SEIKI CO.,LTD

Introduction

Thank you very much for purchasing the SV-NET Controller.

SVCC is an abbreviation for SV-NET Controller Compact. You can architect a compact motion control system by using this product in combination with our SV-NET drivers. The SVCC series provides the functions required for motion control in a compact body. This feature makes this series with abundant functions in no way inferior to ordinary motion controllers. This manual describes the functions of the SVCC series and its system configuration. Your thorough understanding of this series is recommended before you use it for your system.

■ Abbreviations

This manual uses the abbreviations shown in the following table:

Abbreviation	Meaning
SVC or controller	SV-NET Controller
SVD or driver	SV-NET driver
Servo motor or motor	AC Servo motor
SVCC	SV-NET Controller Compact
TMasM	Tamagawa motion assembler language
Program	SV-NET Controller motion program

■ Manual Number of this manual

Manual number: MNL000390Y00

■ Revision History

Version	Date	Item	Description	Page
1.0	2008/03/10	New	New	New
2.0	2008/08/26	Safety Precautions	The item “Technical Personnel Dispatching Service” is added.	Safety Precautions
		All Items	Updates are made according to SV Programmer Description Window Version1.6.0.0.	All pages
		Section 4.8	All move instructions except the arc interpolation instruction are made valid on the infinite length set axis. (In the previous version, only JOGJ and MOVIJ were valid.)	Page 71
		Section 5	The following commands are added to the Command List and the Details of Commands. COPY, BITON, BITOFF, BITIN, RUNRS, STOPRS, FINRS	Page 83
		Section 6	The “RS232C basic settings" and “RS232C automatic send/receive settings” are added to the Parameter List for the SVCC Series.	Page 92
		Section 7	Initial values are changed in Details of Parameters as shown below: 【Axis Type】: 1 (rotation axis) → 0 (linear-motion axis) 【Pulse Rate_n】: 3600 → 1000 【Infinity Reset】: 36000 → 3600000	Pages 111 and 113
		Section 8	The Monitor Item List for the Mechanism Status is updated as follows: The forward direction stroke limit and the reverse direction stroke limit are added.	Page 122
		Section 8	The Monitor Item List is updated as follows: Override values are added for Group 100 of the class “Mechanism n.”	Page 123
		Section 9	List of Network Errors is added as an SVCC Error Code.	Pages 138 to 139

■ Safety Precautions

● Warranty

○Period of Warranty

This warranty covers repair or replacement of the product only if the customer contacts us or returns the defective product within one year after shipment.

○Scope of Warranty

Please note that we are not liable for any quality deterioration of the product resulting from use or storage that differs in the following manner from that described in this manual, even if the pertinent product is still under warranty:

- The product is used under any condition, in any environment, or by any method other than those described in the product specifications, manuals, or others.
- The product is modified or repaired by any person other than our service engineers.
- The product is used in a way not originally intended.
- The problem in question could not be predicted with the technology available at the time the product was shipped.

○Limitations of Warranty

- We are not liable for any damage to others arising from our products.
- We are not liable for any results caused by programs prepared by any person other than our representatives.

● Conditions of Use

○This product is designed and manufactured for general industrial applications. It cannot be used with equipment and systems operated under conditions where there is a risk to life.

○This product is not intended for use in applications which require extremely high reliability.

If this product is used in any of the applications listed below, consult specifications, manuals, or other documents to narrow your questions and then contact our sales representatives.

Be sure to take necessary safety measures, including implementation of safety circuits to minimize danger in case of a failure.

- Atomic energy control equipment, spaceships, trains, airplanes, vehicle equipment, medical equipment, safety devices, and incinerators
- Systems, machines, and equipment that may endanger human life or property
- Facilities that require high reliability such as gas, water, and power utilities, and equipment used for 24-hour continuous operation
- Outdoor use or use under conditions not described in the manuals or other documents
- Other applications comparable to the above that require high reliability

○We make continuous efforts to improve the quality and reliability of this product. However, there is always a possibility that this product may malfunction.

For the use of this product, we recommend you take numerous safety measures to prevent a malfunction of this product from propagating or escalating.

○Program samples and application examples shown in the manuals and other documents are for reference only.

Please make sure of the safety and functions of the systems, machines, and equipment in which this product is to be used before use.

● **Changes to Specifications**

The specifications, manuals, data sheets, and other documents for this product may be changed as needed for improvement of performance, expansion of specifications, or addition of accessories. For the latest technical data, please contact our sales representative.

● **Upgrading**

The software for the main unit of this product may be upgraded for improvement of performance or expansion of specifications.
Please check that you have the latest software version installed before use. If an update is required, consult our sales representative.

● **Service limitations**

The price of this product does not include fees for dispatching technical personnel or other services.
Consult our sales representative for details if necessary.

● **Technical Personnel Dispatching Service**

We offer a technical personnel dispatching service for a small fee to help customers to launch their equipment.
This service covers:

- Adjusting servo gains
- Preparing programs to operate the SV-NET controller
- Explaining how to adjust servo gains
- Explaining how to handle the SV Programmer

It will take time to initially start equipment or implement a new system.
It is particularly recommended to use our technical personnel dispatching service if you want to implement a new system or change an existing system.
If you have any questions about service fees or details of the service, please contact our sales representative.

■ Contents

1. Overview

1.1 Outline of SVCC

SVCC is an abbreviation for SV-NET Controller Compact. The SVCC Series products contain functions required for axis motion control in their compact body. This series provides a maximum of 8 connectable axes, handles a maximum of eight user tasks, and can use more than 100 commands. Combined use of the SVCC series with the SV-NET compatible driver of Tamagawa Seiki reduced the useless control panel space, allowing for equipment sizes that were practically unavailable.

1.2 Features of SVCC

■ Compact Size

The main body of the SVC series is compact.

Example) SVCC-I H: 116 W: 42 D: 75

SVCC-II H: 116 W: 55 D: 75

The control panel space, which had been unnecessarily large, can be reduced.

■ Installation of Standard I/O

The SVCC series is provided with digital I/O as standard.

Example) SVCC-I 16 points for IN and OUT respectively

SVCC-II 32 points for IN and OUT respectively

You need not purchase extra I/O other than the CPU. You need not make complicated settings before creating programs.

■ SV Programmer

The SV Programmer, a programming tool designed specifically for the SV-NET Controller supports starting and maintenance of the system, and programming and debugging work. The SV Programmer can be downloaded free of charge from the web page of Tamagawa Seiki.

■ A Maximum of Eight User Tasks

A maximum of eight user tasks are prepared. The SVCC permits a maximum of eight tasks to be processed in parallel, and is adaptable to a variety of systems.

■ Wealth of Commands

The SVCC supports more than 100 commands. They include arithmetic instructions, branch instructions, move instructions, system instructions, and others. These commands enable you to create programs that support more diversified situations. The abundance of commands is a great help to the programming work at the customer's system.

■ Compound Move Commands

Move instructions of the SVCC have the following two major features:

- No-wait type move
- Differentiated move

These features permit the user to create any acceleration and deceleration patterns that have not ever been used. They also enable conditional branching during move, allowing the user to create a program according to the status of the SVCC or motors during axis moving.

■ Monitor Instructions

The SVCC has monitor instructions that can be used in a program to monitor the status of the motor or the SVCC.
They enable you to create programs according to the status of the SVCC or motors.

■ Variables

The SVCC has a 32-Kbyte area for variables available to a program. The user can define it under any name on the SV Programmer. Indirect reference to variables is also possible. The indirect reference function to variables enhances program efficiency.

■ Support of PLC (under development)

The SVCC can be connected to an upper-order PLC.

- CC-Link (under development)
- DeviceNet (under development)

Separation of the equipment system programs from the motion programs defines more clearly the system design work assignment.
The PLC support function of the SVCC helps customers' system design work.

1.3 SV-NET

The SV-NET is a motion network that uses CAN in the physical layer. It employs a simple protocol specialized in motion control, from which useless functions are reduced to control transmission time.

■ About the MAC-ID

The SV-NET is in a master-slave configuration. The master is the upper-order controller of the motion controller or PC. The slave is equivalent to the driver or an I/O unit. One master may connect one or more slaves. Therefore, a MAC-ID (media access control number) must be set for each slave to keep itself unique in the network. Otherwise, data collision may occur causing normal communication to fail.

■ About the MAC-ID of the Upper-Order Controller (Master)

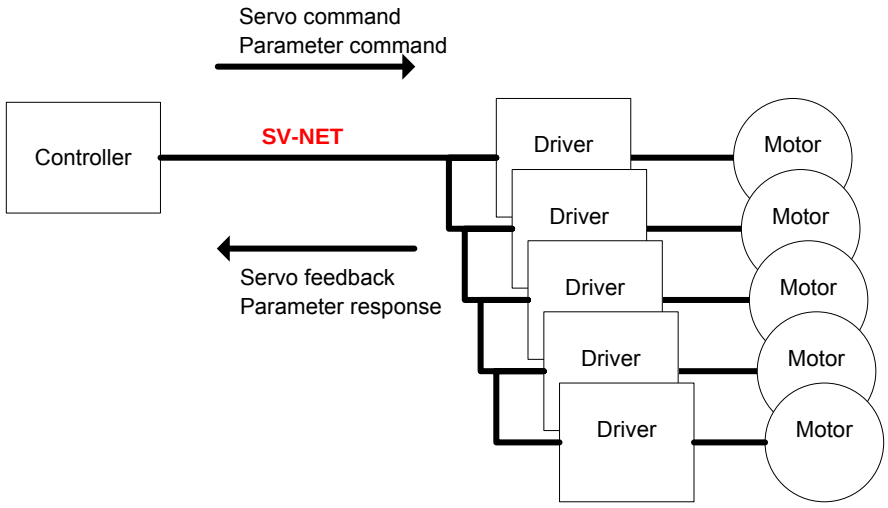
The MAC-ID of the upper-order controller (master) is always 【0】.

■ About the MAC-ID of a Driver (Slave)

The drivers can be assigned any MAC-ID from among 1 to 31 unless it overlaps others.

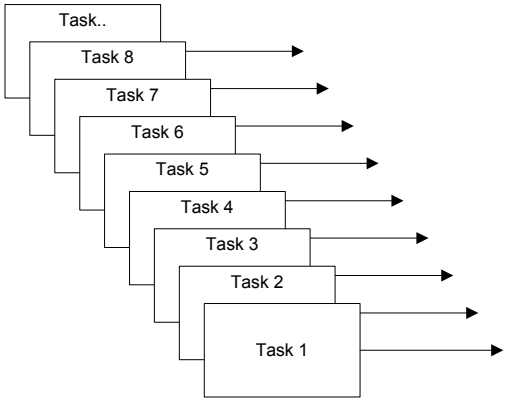
■ Configuration of the SV-NET Motion Control System

Example) The following is a conceptual diagram of the SV-NET in which an upper-order controller connects to several drivers.



1.4 Program and Task

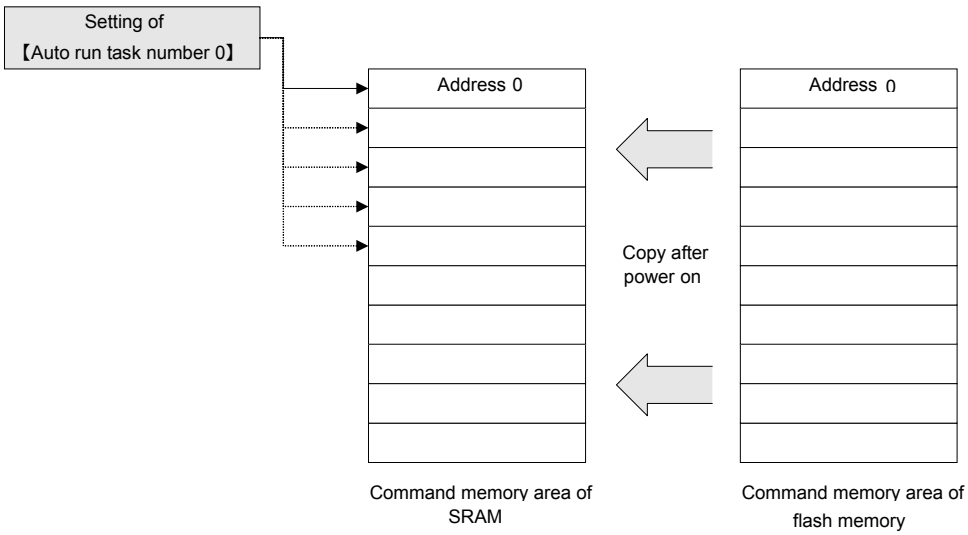
A program for the SVCC series can contain a maximum of 5000 steps and up to 8 tasks are allowed. A task refers to internal software that executes a program. Multiple programs can be executed in parallel by starting multiple tasks.



Several programs are executed in parallel.

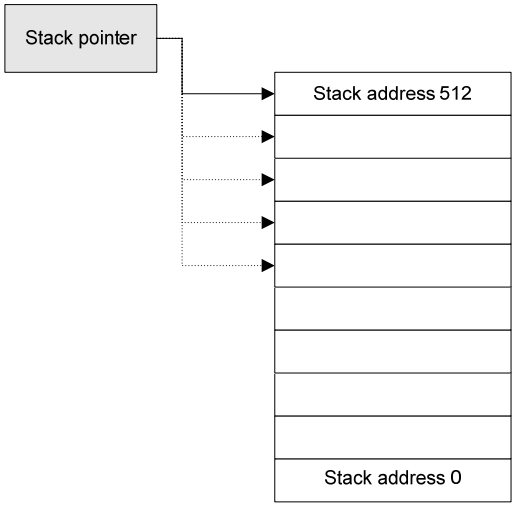
1.5 Command Memory

The area for storing programs is referred to as command memory. The data in the command memory area is copied from flash memory to SRAM after power-on. If 【Auto run task number 0】 of the SVC memory switch setting is ON, task 0 executes the program automatically beginning with the start address of the command memory.



1.6 Stack and Subroutine

Each task is provided with an independent stack. Each stack generally has a size of 512 32-bit data elements. (The size varies according to the type of SVC.) The stack top is initially at stack address 512. As the stack is used, the stack top moves sequentially toward address 0. When a stack now in use is released, the stack top moves to a larger address. A subroutine begins at the start index and ends at a RET instruction. A subroutine call is performed by a CALL instruction that has a subroutine branch to the start index after pushing the step next to the instruction itself to the stack as the return destination. A RET instruction pops the return destination from the stack and transfers control to its step. Although subroutines can be shared among tasks, local variables are independent for each task. Therefore, data to be shared among tasks should be placed in a global variable.



Stack area

1.7 Specifications of SVCC Series Motion Control

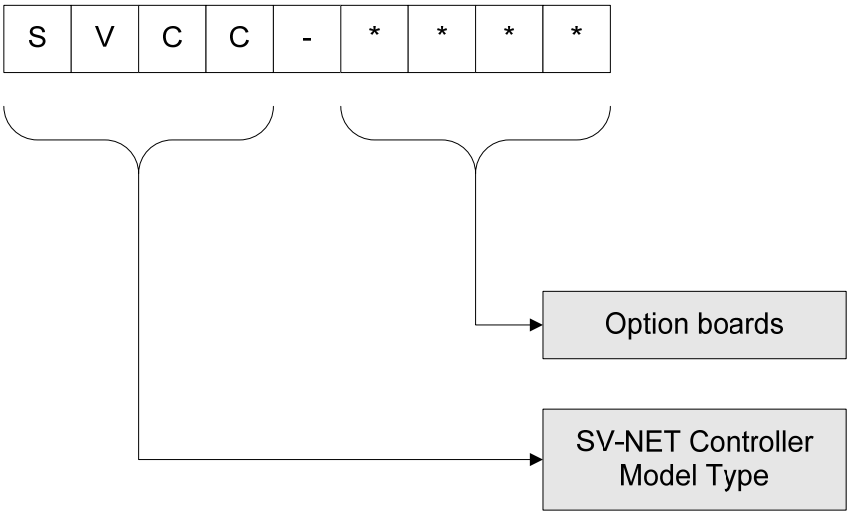
Item	Specifications	Remarks
Number of control axes	8 axes max.	
Transfer period	2.0 ms	
Interpolation period	4.0 ms	8 axes
Control mode	Position control, speed control, torque control	
Interpolation function	Linear interpolation (8 axes), arc interpolation (2 axes)	
Compensation function	Electronic gear	
Instruction unit	mm, deg	
Maximum instruction values	-2147483648 to 2147483647	Signed 32-bit integer
Instruction unit for speed	%, mm/sec, deg/sec, min^{-1}(rpm)	
Acceleration/deceleration processing	S-shape control, trapezoidal control	
Infinite length feed	Available	
Homing mode	Home sensor signal + limit signal	The zero point for the motor can be specified by the origin and limits.
	Home sensor signal 1	The zero point for the motor is the origin.
	Home sensor signal 2	The origin is obtained immediately after the home sensor signal is input.
	Home sensor signal 3	The origin is obtained after the home sensor signal is reset.
	Mechanical stopper thrust	At the far end of the mechanical stopper
JOG operation function	Available	
Override function	Available	0 to 100%
Number of SV-NET channels	1	
Program size	640 KB	
Number of program steps	5000	
Number of user tasks	8 max.	
Memory backup	Available	Stored in flash memory.
Variable size	32 Kbyte	Limitations are imposed by each program language.
Variable type	Signed 32-bit integer	-2147483648 to 2147483647
Arithmetic operation	Available	Assignment, unary, addition, subtraction, multiplication, division, remainder
Logical operation	Available	Logical inversion, logical conjunction, logical disjunction, exclusive logical disjunction, logical shift
JUMP instruction	Available	Unconditional jump, unary, logical conjunction, equal sign relation, inequality sign relation, equal to or less than relation, equal to or greater than relation, less than relation, greater than relation
Subroutine call	Available	CALL instruction
Stack pointer	Can point to 512 elements.	

2. System Configuration

2.1 SVCC List

■ SVCC Unit Configuration

The SVCC unit consists of several boards. Each unit mounts a CPU board and option boards. The product type of the SVCC is indicated as shown below:



■ List of SVCC Option Boards

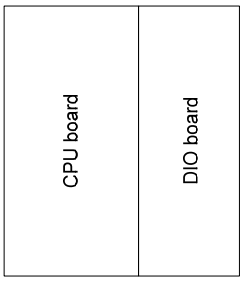
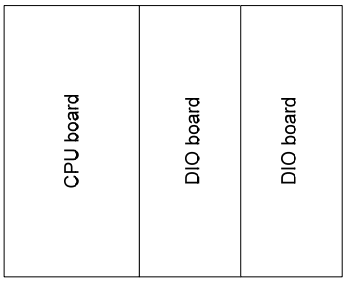
The following table shows the boards mounted on the SVCC:

Type	Name	Description	Option number
CPU board	CPU board	SV-NET: 1 system, Upper-order I/F: USB and RS232C	None
I/O board	DIO board	Input: 16 points, Output: 16 points	I
	AIO board	(Under development)	A
Communication board	CC-Link board	(Under development)	C
	DeviceNet board	(Under development)	D

The priority order of the option boards is C = D > A > 1. The higher the priority order of the board, the closer it is mounted to the CPU board. The type of selectable communication boards is limited to one. Selection of different types is not allowed.

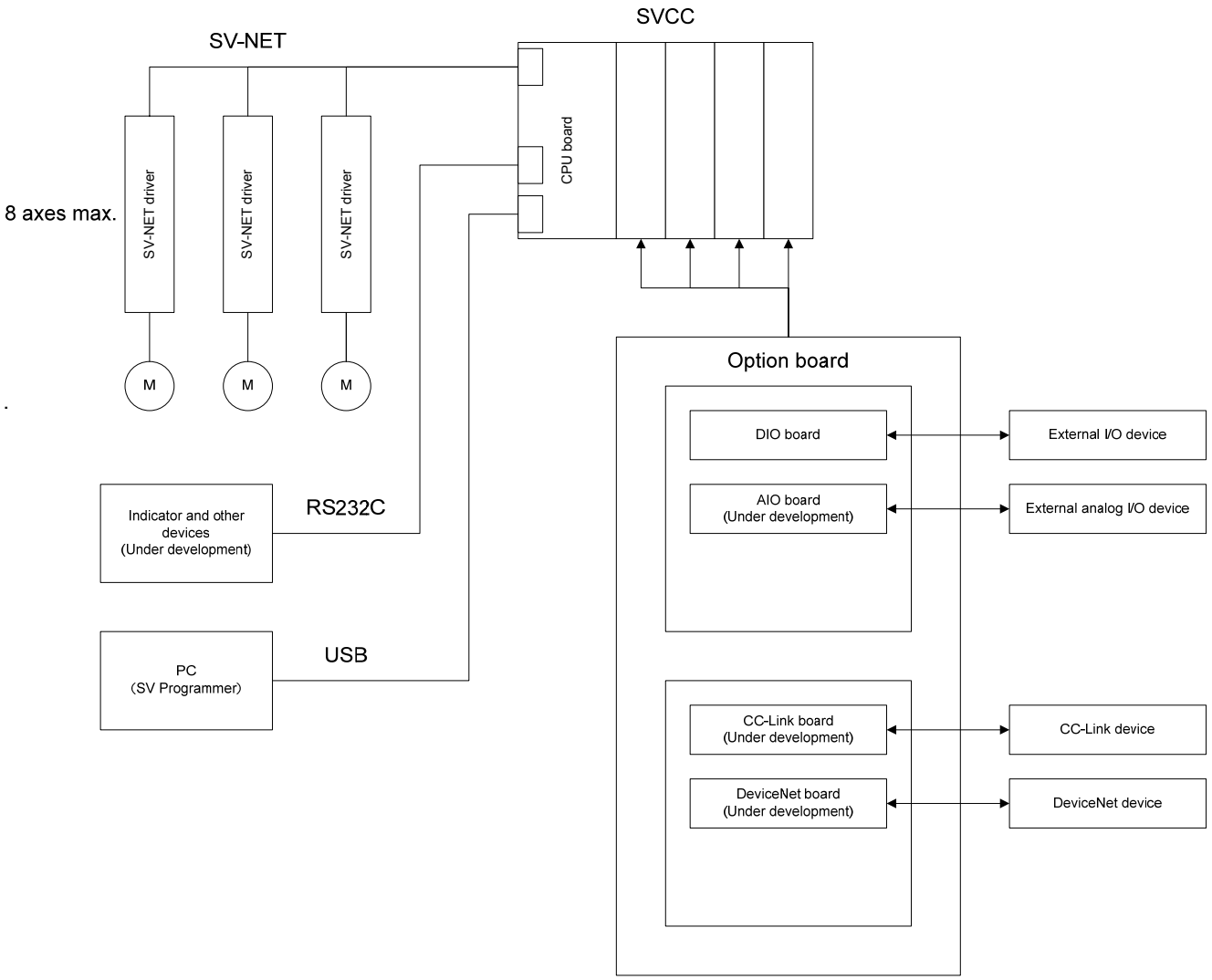
■ List of SVCC Models

The following table shows the product types of the SVCC and the associated models:

Product type	Model	Unit configuration
SVCC-I	TA8440N1000E100	
SVCC-II	TA8440N2000E100	

2.2 Example of System Configuration

The following figure shows an example of SVCC system configuration:



■ SV-NET Driver

The following table shows a list of SV-NET drivers:

Product type	Model	Specifications	
DC power input type	TA8410 Series	Motor to be combined	TBL-iⅡ/TBL-V
		Motor output	Up to 200 W
		Control power supply	24 VDC
		Drive power supply	24 VDC/48 VDC
		Supported sensor	Resolver/encoder
AC power input type	TA8411 Series	Motor to be combined	TBL-iⅡ/TBL-V
		Motor output	Up to 750 W
		Control power supply	24 VDC
		Drive power supply	100 VAC/200 VAC
		Supported sensor	Resolver/encoder
SV-NET dedicated driver (288 VDC input type)	TA8420 Series	Motor to be combined	TBL-iⅡ/TBL-V
		Motor output	Up to 750 W
		Control power supply	24 VDC
		Drive power supply	280 to 325 VDC
		Supported sensor	Resolver/encoder

For detailed specifications of the drivers, refer to the individual product specifications or operation manuals.

■ Accessories and Options

The table below shows a list of the SVCC series accessories, cables and connectors for connection, and software products. The accessories are packed with the SVCC. Cables and connectors except DIO connectors are available as options from Tamagawa Seiki.

Item	Name	Model	Maker	Description
Accessory	USB cable	MUSBAB-2	MISUMI	For PC connection
	Communication cable	EU6517N2	Tamagawa Seiki	For upgrading of the SVCC firmware
Cable	Power supply cable	EU9611	Tamagawa Seiki	Control power supply cable for the controller
	SV-NET cable	EU9610	Tamagawa Seiki	*1 SV-NET connection cable
Connector	Connector for power pins	734-104	WAGO	Connector for power pins (without EU9611 cable)
	SV-NET connector	734-105	WAGO	Connector for SV-NET (without EU9610 cable)
	DIO connector	HIF3BA-40D-2.54R	Hirose Electric	
Software	SV Programmer	-	Tamagawa Seiki	Downloadable from Tamagawa Seiki web site free of charge.

*1 Contact our person in charge when you need branch cables.

3. Specifications of Boards

This section describes the specifications of the CPU board and option boards. The specifications of each board of the SVCC-II controller are described as an example.

3.1 Outside View

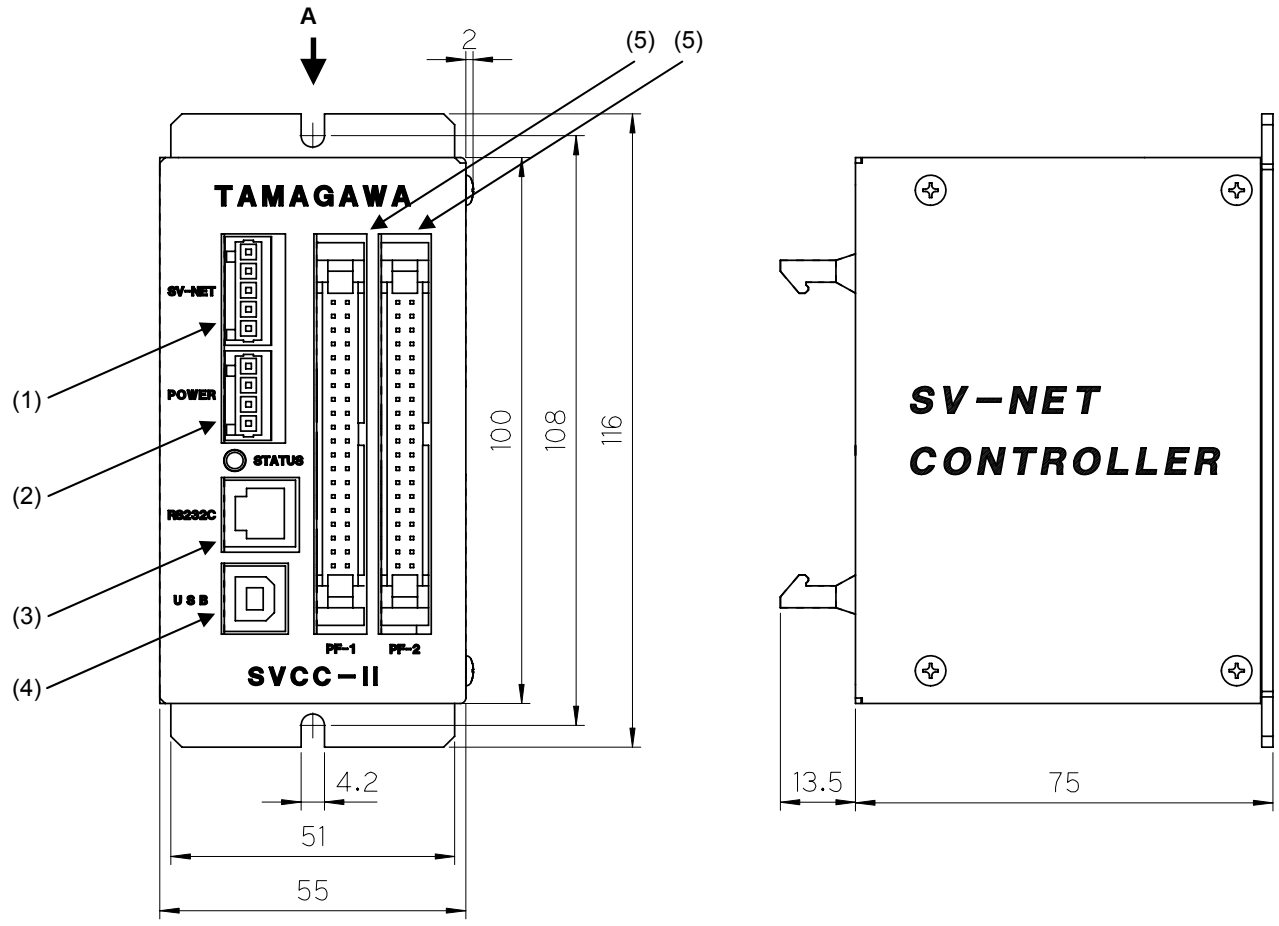
■ **SVCC-II**

● **Mounted boards**

CPU board ×1

DIO board ×2

● **Outside view and outside dimensions**



■ CPU Board

(1) SV-NET connector

(2) Control power supply connector

(3) RS232C connector

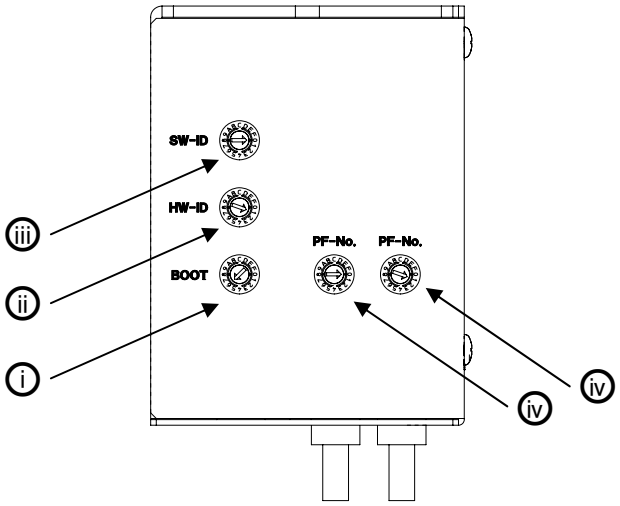
(4) USB connector

■ DIO board (1st)

(5) DIO connector

■ DIO board (2nd)

(5) DIO connector



Arrow view A (Top view)

■ CPU Board

ⓘ CPU operation mode set switch

ⓘⓘ SVCC hardware ID set switch

ⓘⓘⓘ SVCC software ID set switch

■ DIO board (1st)

ⓘⓥ DIO board ID set switch

■ DIO board (2nd)

ⓘⓥ DIO board ID set switch

3.2 CPU Board

■ Functions

The CPU board controls motion control operations, tasks, communication with the PC, and other functions. Each SVCC should mount a CPU board.

■ Specifications of the CPU Board

Item	Specifications	Remarks
Control power supply voltage	24 VDC ± 10%	
Electric current consumption	200 mA or less	Internal power supply 5.0 V
Number of SV-NET channels	1	
Upper-order I/F	USB and RS232C	USB2.0 Full Speed
CPU operation frequency	80 MHz	SH7058F (From Renesas)
SRAM size	16 Mbit	
Flash memory size	16 Mbit	

■ Specifications of the Rotary Switches

This paragraph describes the specifications of the rotary switches mounted on the CPU board.

Numbers in a small circle correspond to those shown in “Outside view and outside dimensions” under “SVCC-II” of Section 3.1 “Outside View.”

ⓘ CPU operation mode set switch

Used to upgrade the firmware version of the SVCC.

Ordinary operation : “6”

For upgrading : “C”

*Note:

Be sure to set the rotary switch to “6” for ordinary operation of the SVCC.

The SVCC does not work if the switch is set to any other position.

ⓙ SVCC hardware ID set switch

Used to set hardware configuration of the SVCC.

For example, set this switch to “1” for SVCC-I and “2” for SVCC-II.

Operation is not guaranteed if this switch is set to any other position.

The user need not set this switch.

ⓚ SVCC software ID set switch

Used to set options of the SVCC internal software.

The normal setting is “0.” Operation is not guaranteed if this switch is set to any other position.

The user need not set this switch.

■ Specifications of the Connectors

This paragraph describes the specifications of the connectors mounted on the CPU board.

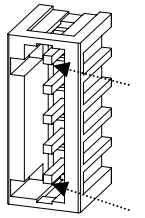
Numbers in a small circle correspond to those shown in “Outside view and outside dimensions” under “SVCC-II” of Section 3.1 “Outside View.”

(1) SV-NET connector

Connector for connection to the SV-NET.

Model of the connector: 734-165

Maker: WAGO

Shape of the connectors	Pin number	Pin name	Remarks
	1	GND	
	2	CAN_L	
	3	SHIELD	
	4	CAN_H	
	5	+24 V	

* Associated connector

Model of the connector: 734-105

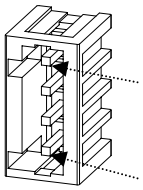
Maker: WAGO

(2) Control power supply connector

Used for connection to 24-VDC control power supply.

Model of the connector: 734-164

Maker: WAGO

Shape of the connectors	Pin number	Pin name	Remarks
	1	GND	
	2	N.C.	Cables cannot be connected.
	3	N.C.	Cables cannot be connected.
	4	+24 V	

* Associated connector

Model of the connector: 734-104

Maker: WAGO

* The power supply pins (+24 V, GND) of the control power connector are internally connected to those (+24 V, GND) of the SV-NET connector. Control power can be supplied to the driver through the SV-NET cable.

(3) RS232C connector

Used to connect RS232C cables. Usually left open.

This connector can be used to upgrade the firmware version of the SVCC.

Model of the connector: TM5RU1-66

Maker: Hirose Electric

(4) USB connector

An ordinary USB connector (type B). Cables on the market are connectable.

Model of the connector: UBB-4R-D14T-4D

Maker: JST

■ Specifications of the LED (STATUS)

The STATUS LED indicates SVCC status. The present status of the SVCC is indicated by the following LED lighting sequences.

<Sequence in normal status>

1. The LED turns ON orange and red alternately for about 5 seconds after power-on.
2. The LED turns ON green and turns OFF (indicating that the SVCC initialization is over).
3. The LED flickers green continuously.

<Sequence when saving data in flash memory>

1. The LED turns ON orange and red alternately (indicating that data is being saved in flash memory).
2. The LED turns ON green and turns OFF (indicating that data has been saved in flash memory).
3. The LED flickers green continuously.

<Sequence when issuing an alarm>

1. The LED turns OFF for about 3 seconds.
2. The LED flickers red the number of times corresponding to the major classification code of the error.
3. The LED turns ON green and turns OFF.
4. The LED flickers red the number of times corresponding to the tens digit of the error code (minor classification of the error).
5. The LED turns ON green and turns OFF.
6. The LED flickers red the number of times corresponding to the units digit of the error code (minor classification of the error).
7. The LED turns ON green and turns OFF.
8. The LED returns to the status of step 1.

<Sequence during initialization of parameters>

1. The LED turns ON red for about 20 seconds after power-on.
2. The LED turns ON green (indicating that the initialization is over).
3. The LED turns ON green steadily.

<Sequence during boot mode (firmware upgrade)>

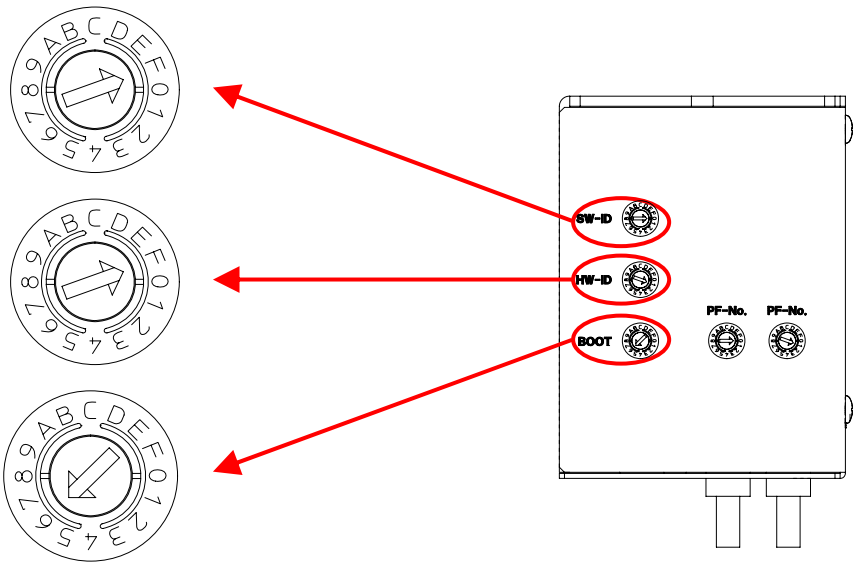
1. The LED turns ON orange after power-on.
2. The LED turns ON orange steadily.

■ How to Initialize SVCC Parameters

The SVCC parameters can be initialized by setting rotary switches. Initialize the parameters in case a flash memory alarm is issued and cannot be recovered even after the power is reset or normal operation fails due to erroneous parameter setting.

How to Initialize Parameters

1. Turn OFF the SVCC control power.
2. Note the settings of the HW-ID and the SW-ID rotary switches.
   (Reset the switches to the previous settings after initialization.)
3. Set both of the HW-ID and the SW-ID rotary switches to “F.”
4. Turn ON the SVCC.
5. The STATUS LED turns ON red.
   (The STATUS LED indicates that initialization is in progress while it is lit red. Never turn OFF the SVCC during initialization.)
6. The STATUS LED goes green, indicating that initialization is over.
7. Turn OFF the SVCC power.
8. Reset the HW-ID and the SW-ID rotary switches to the previous settings.
9. Turn ON the SVCC.
10. The STATUS LED should flicker green indicating that the SVCC is in normal operation.



3.3 DIO Boards

■ Functions

The DIO boards function as the interface between external I/O signals and the CPU board.

■ Specifications of the DIO Boards

Item	Specifications	Remarks
Control power supply voltage	3.3 VDC	Supplied from the CPU board
Electric current consumption	200 mA or less	Supplied from the CPU board
Number of input points	16 points	Photocoupler insulation
Number of output points	16 points	Photocoupler insulation
Input pin power supply voltage	24 VDC±10%	Pins 1, 2, 11, and 12
Allowable output electric current	100 mA Max.	

■ Specifications of the Rotary Switches

This paragraph describes the specifications of the rotary switches mounted on the DIO board.

Numbers in a small circle correspond to those shown in “Outside view and outside dimensions” under “SVCC-II” of Section 3.1 “Outside View.”

ⓘⓥ Extension board ID number

Used to set ID numbers for identification of DIO boards.

A smaller ID number is assigned to a board closer to the CPU board on the factory set SVCC. Counting begins with 0.

The user need not set this switch.

■ Specifications of the Connectors

This paragraph describes the specifications of the connectors mounted on the DIO board.

Numbers in a small circle correspond to those shown in “Outside view and outside dimensions” under “SVCC-II” of Section 3.1 “Outside View.”

(5) DIO connector

Connects external I/O signals.

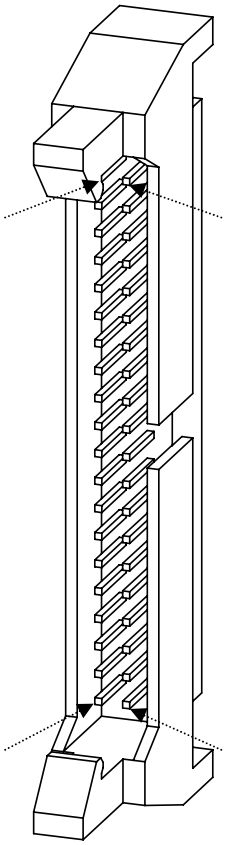
Model of the connector : HIF3BA-40PA-2.54DS

Maker : Hirose Electric

* Associated connector

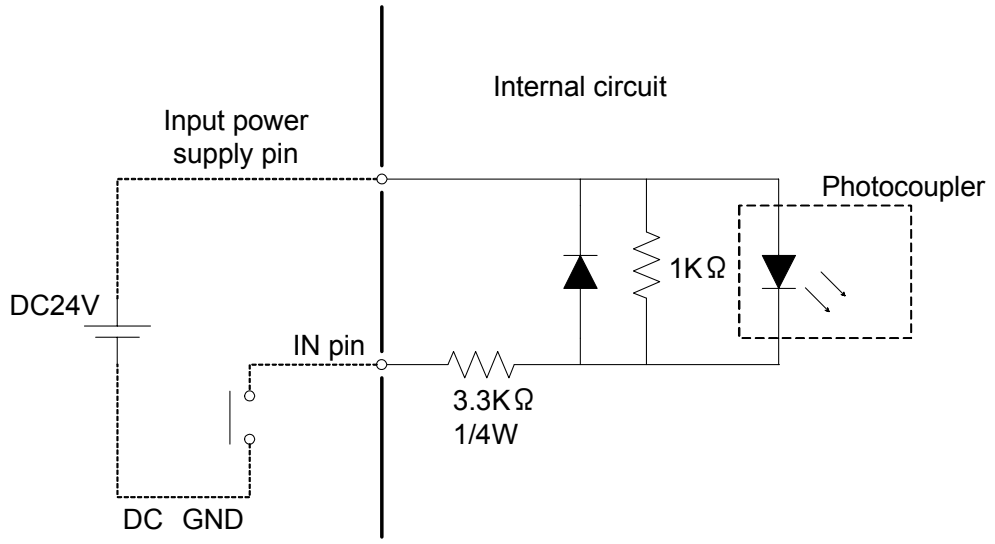
Model of the connector: HIF3BA-40D-2.54R

Maker: Hirose Electric

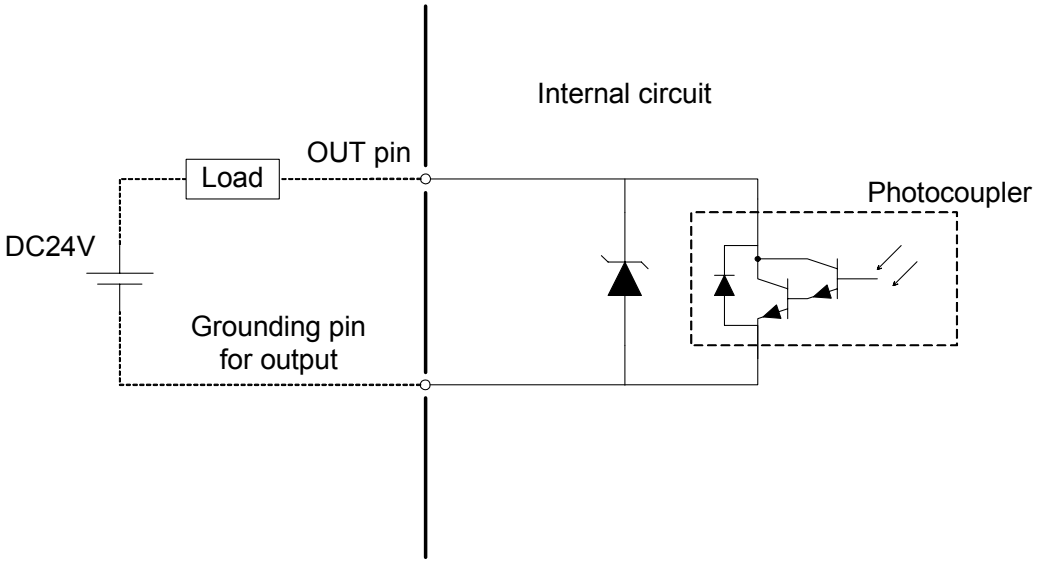
Shape of the connectors	Pin number	Pin name	Pin number	Pin name
	1	24 V power supply for input (Common to IN0 to IN3)	21	Grounding pin for output (Common to OUT0 to OUT3)
	2	24 V power supply for input (Common to IN4 to IN7)	22	Grounding pin for output (Common to OUT4 to OUT7)
	3	IN 0	23	OUT 0
	4	IN 1	24	OUT 1
	5	IN 2	25	OUT 2
	6	IN 3	26	OUT 3
	7	IN 4	27	OUT 4
	8	IN 5	28	OUT 5
	9	IN 6	29	OUT 6
	10	IN 7	30	OUT7
	11	24 V power supply for input (Common to IN8 to IN11)	31	Grounding pin for output (Common to OUT8 to OUT11)
	12	24 V power supply for input (Common to IN12 to IN15)	32	Grounding pin for output (Common to OUT12 to OUT15)
	13	IN 8	33	OUT 8
	14	IN 9	34	OUT 9
	15	IN 10	35	OUT 10
	16	IN 11	36	OUT 11
	17	IN 12	37	OUT 12
	18	IN 13	38	OUT 13
	19	IN 14	39	OUT 14
	20	IN 15	40	OUT 15

■ I/O Circuit

Input circuit



Output circuit



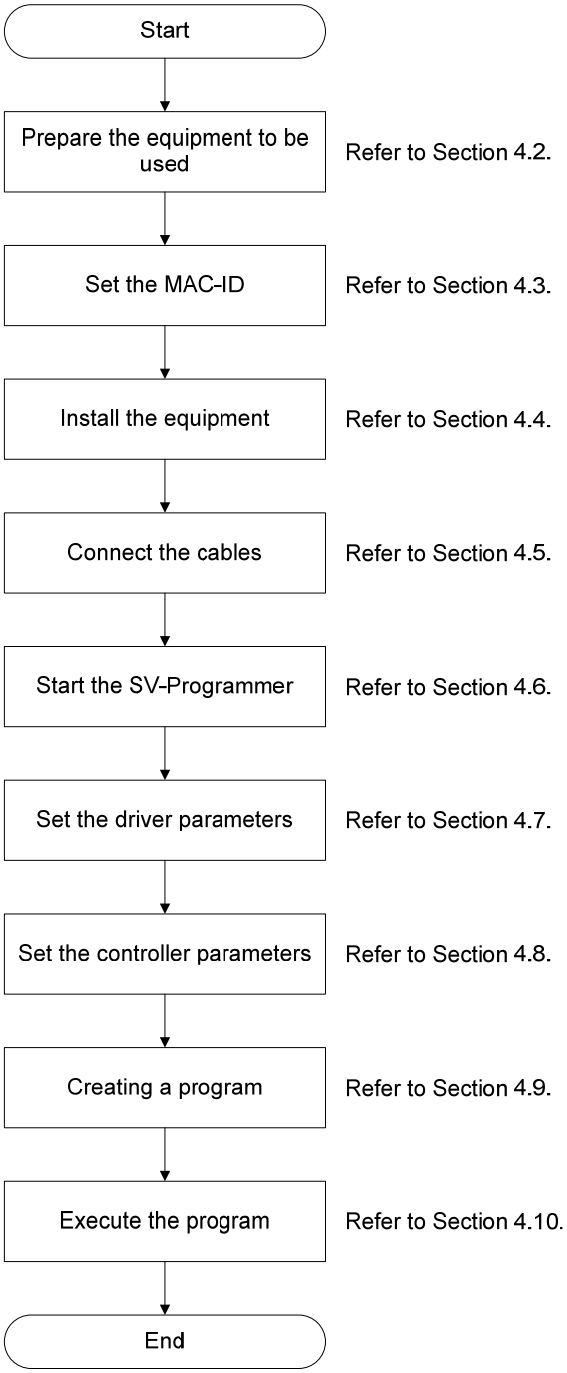
4. Starting the System

4.1 Procedure

This section describes an example of the procedure for starting the system with SVCC-I. The example uses TA8410 series drivers for the SV-NET and TBL-iⅡ motors for three axes.

■ Flow of Starting the System

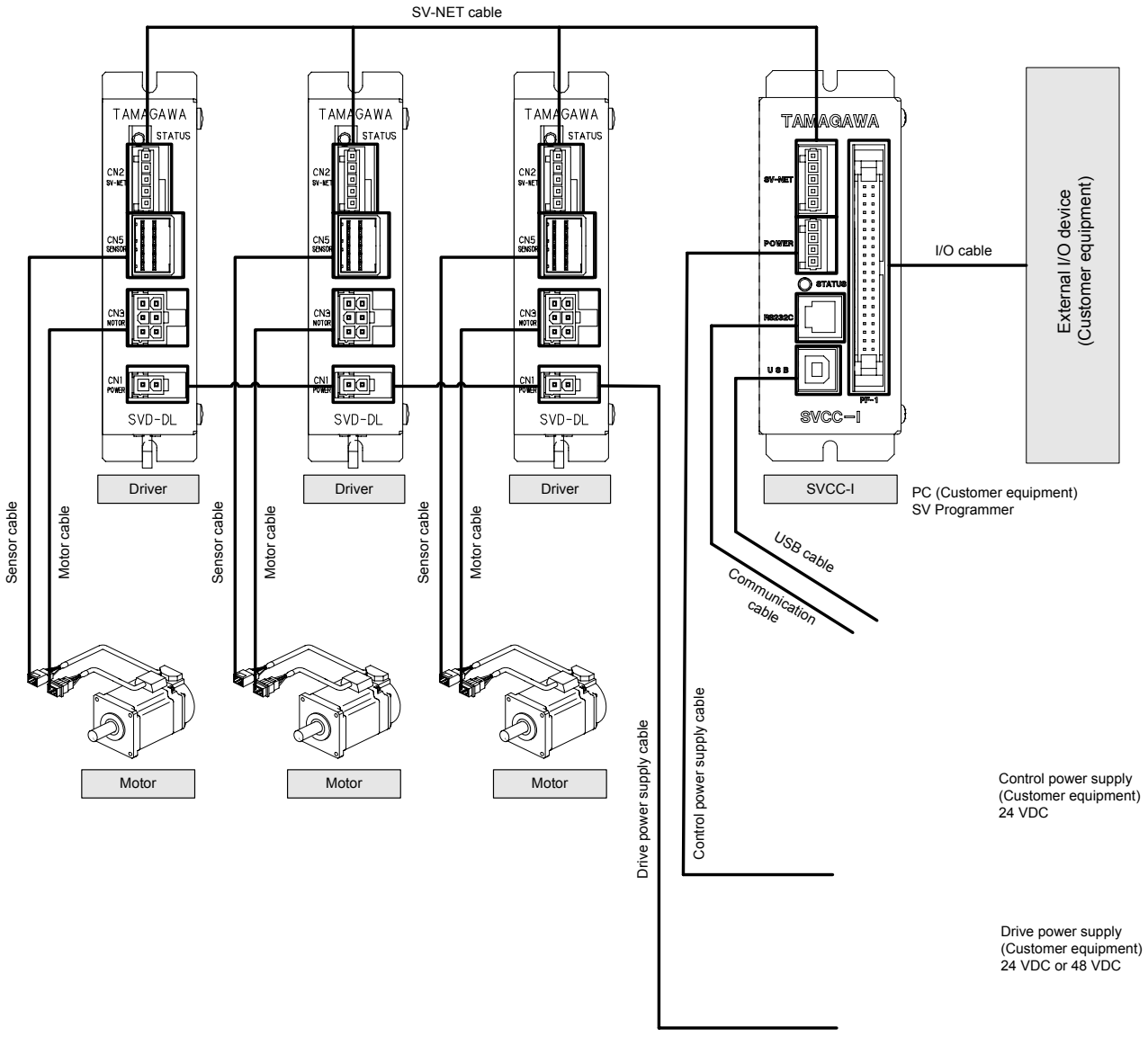
This Section first shows a flowchart of starting the system and then describes each step in the chart in depth.



4.2 Prepare the Equipment to Be Used

This section describes the equipment required for starting the system.

■ **Example of System Configuration**



* The control power of the driver can be supplied through the SV-NET cable.

The power pins of the controller and those of the SV-NET cable are connected inside.

■ List of the Equipment Units to Be Used

• Equipment units to be prepared by the customer

Item	Description	Quantity	Remarks
PC	PC/AT-compatible machine	1	SV Programmer installed machine
Control power supply	24 VDC	1	The power capacity depends on the SVC and the number of drivers.
Drive power supply	24 VDC or 48 VDC	1	The power capacity depends on motor outputs.
I/O cable	Connectors on the SVCC HIF3BA-40D-2.54R (HIROSE)	1	Cable sets can be purchased from MISUMI Corporation.
External I/O devices	IN: 16 points, OUT: 16 points	A set of I/O devices	The I/O devices use 24 VDC power supply.

• SVCC-I and accessories

Item	Model	Quantity	Remarks
SVCC-I	TA8440N1000E100	1	Standard type SVCC-I
USB cable	MUSBAB-2 (MISUMI)	1	Accessory
Communication cable	EU6517N2	1	Accessory
SV Programmer	-	1	The SV Programmer can be downloaded free of charge from the web site of Tamagawa Seiki.
Control power supply cable	EU9611	1	Option (The length can be specified.)
SV-NET cable	EU9610	1	Option (The length can be specified.)

• Driver and options

Item	Model	Quantity	Remarks
SV-NET Driver	TA8410 Series	3	For more information, refer to the driver specifications.
Drive power supply cable	EU9613	3	Option (The length can be specified.)
Motor cable	EU9614	3	Option (The length can be specified.)
Sensor cable	EU9615	3	Option (The length can be specified.)
SV-NET cable	EU9610	3	Option (The length can be specified.)

• Motor

Item	Model	Quantity	Remarks
TBL-iⅡ	TS460* Series	3	For more information, refer to the motor specifications.

4.3 Set MAC-ID

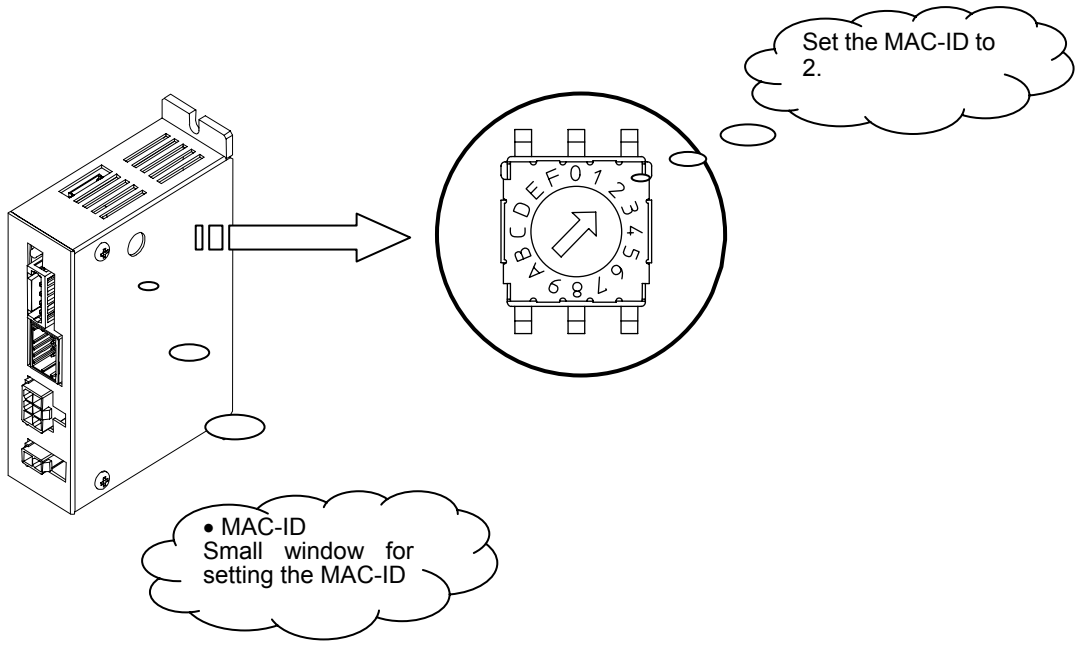
Set the MAC-ID before installing and wiring the drivers. The MAC-ID is the ID for the identification of a device on the SV-NET. The driver must be assigned a MAC-ID other than 0 before it can start communication with the controller. Number 0 is the reserved number of the upper-order master (controller). The slave (driver) must be assigned a unique MAC-ID number on the network. Normal communication is hampered if several drivers with the same MAC-ID exist on the network. The factory set MAC-ID for the driver is 31. The MAC-ID can be set in either of the following two methods:

- Use the rotary DIP switch.
- Change the ID5 MAC-ID Default parameter via SV-NET communication.

The following section describes the method that uses the rotary DIP switch.

■ Use the rotary DIP switch

- Make sure both of the control power and the drive power are turned off.
- Rotate the rotary DIP switch and select the MAC-ID.
  You can set any of numbers 1 to 15 as the MAC-ID using the rotary DIP switch.
- The selected MAC-ID is registered when you turn on the control power.



• Examples of setting MAC-ID

Setting of the rotary DIP switch	MAC-ID
0	The internal parameter value is enabled.
1	MAC-ID is set to 【1】.
2	MAC-ID is set to 【2】.
3	MAC-ID is set to 【3】.
4	MAC-ID is set to 【4】.
5	MAC-ID is set to 【5】.
6	MAC-ID is set to 【6】.
7	MAC-ID is set to 【7】.
8	MAC-ID is set to 【8】.
9	MAC-ID is set to 【9】.
A	MAC-ID is set to 【10】.
B	MAC-ID is set to 【11】.
C	MAC-ID is set to 【12】.
D	MAC-ID is set to 【13】.
E	MAC-ID is set to 【14】.
F	MAC-ID is set to 【15】.

* The internal parameter value is enabled when the rotary switch is set to 0.

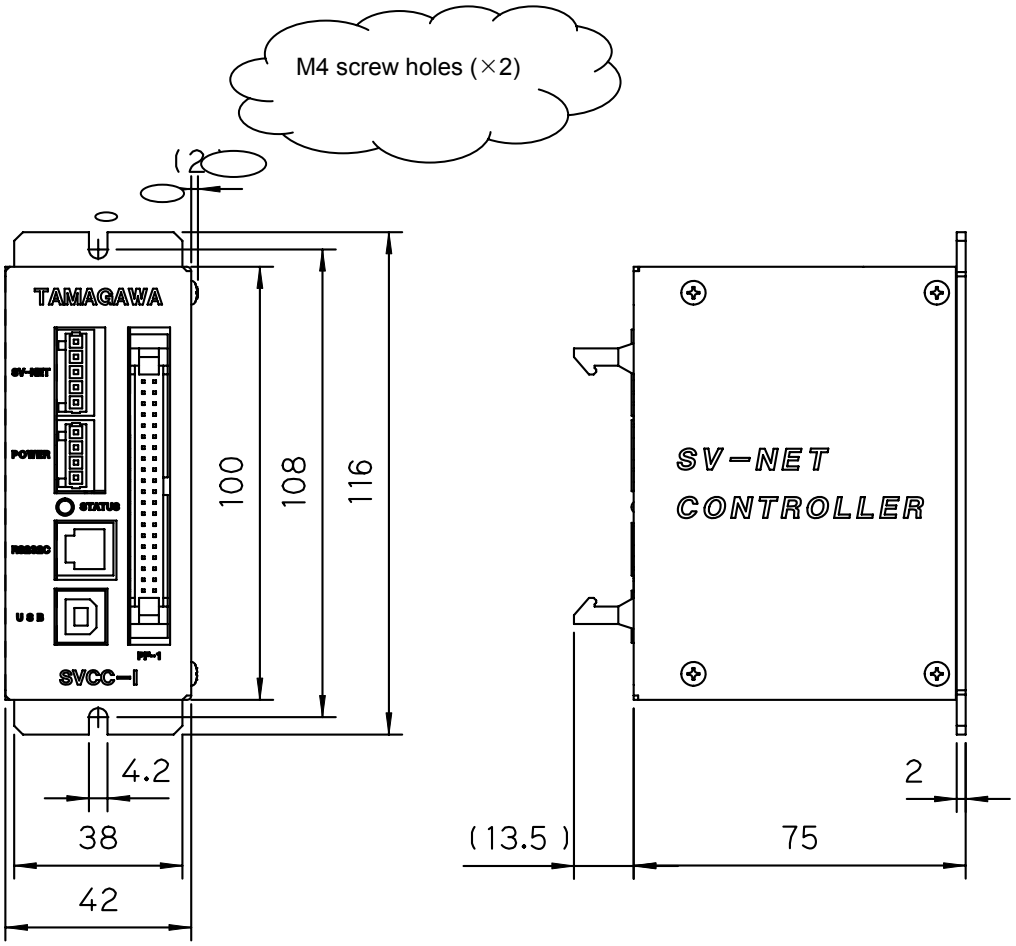
The initial internal parameter value is factory set to MAC-ID 31.

4.4 Install the Equipment

This section describes how to fasten the SVCC and connect cables.

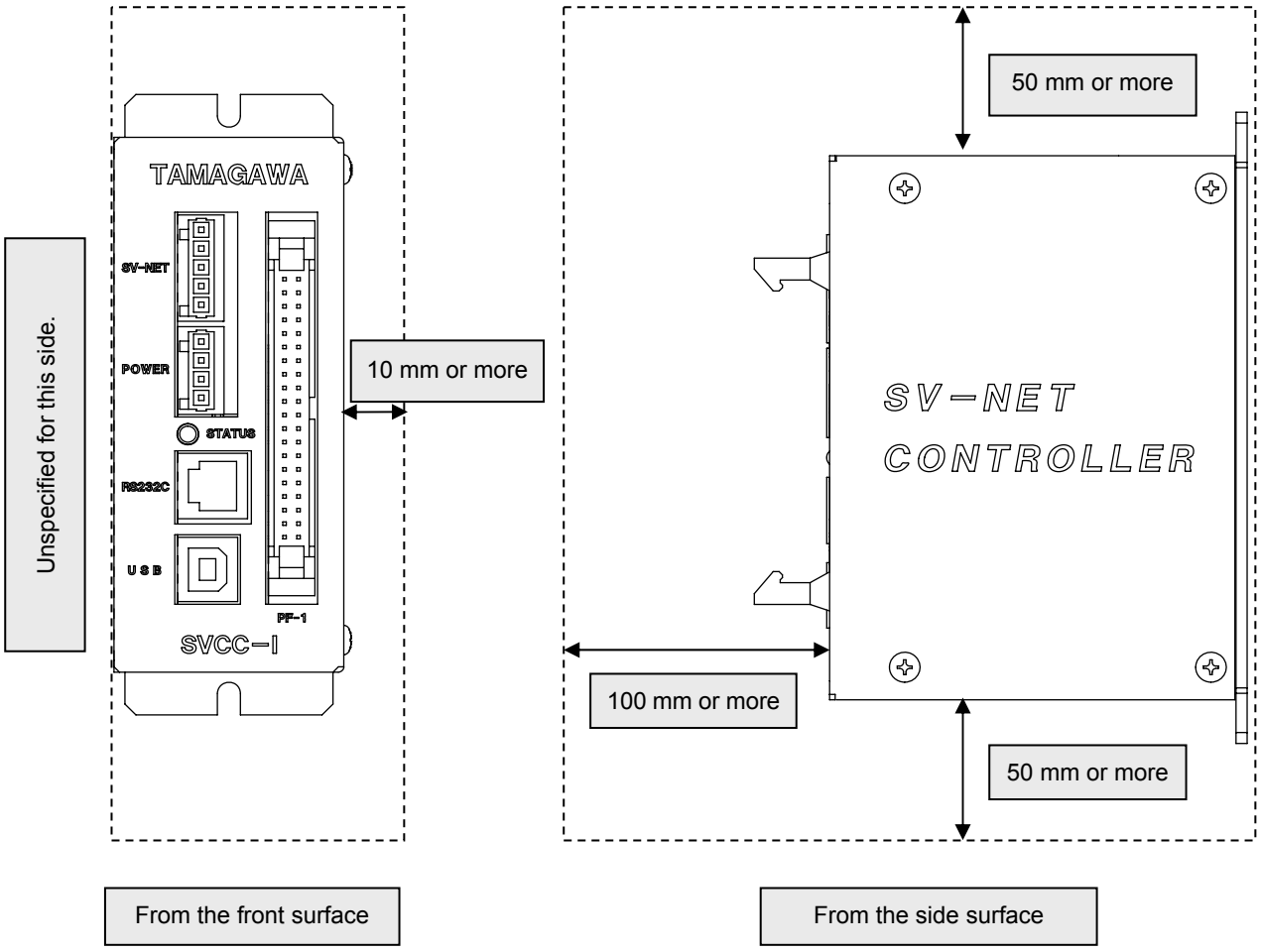
■ How to Fasten the SVCC

Fasten the SVCC using the M4 screw holes provided on the main body base. You can fasten the main body in any direction.



■ Distance from Adjacent Equipment

Separate the SVCC from other equipment as shown below unless otherwise specified.



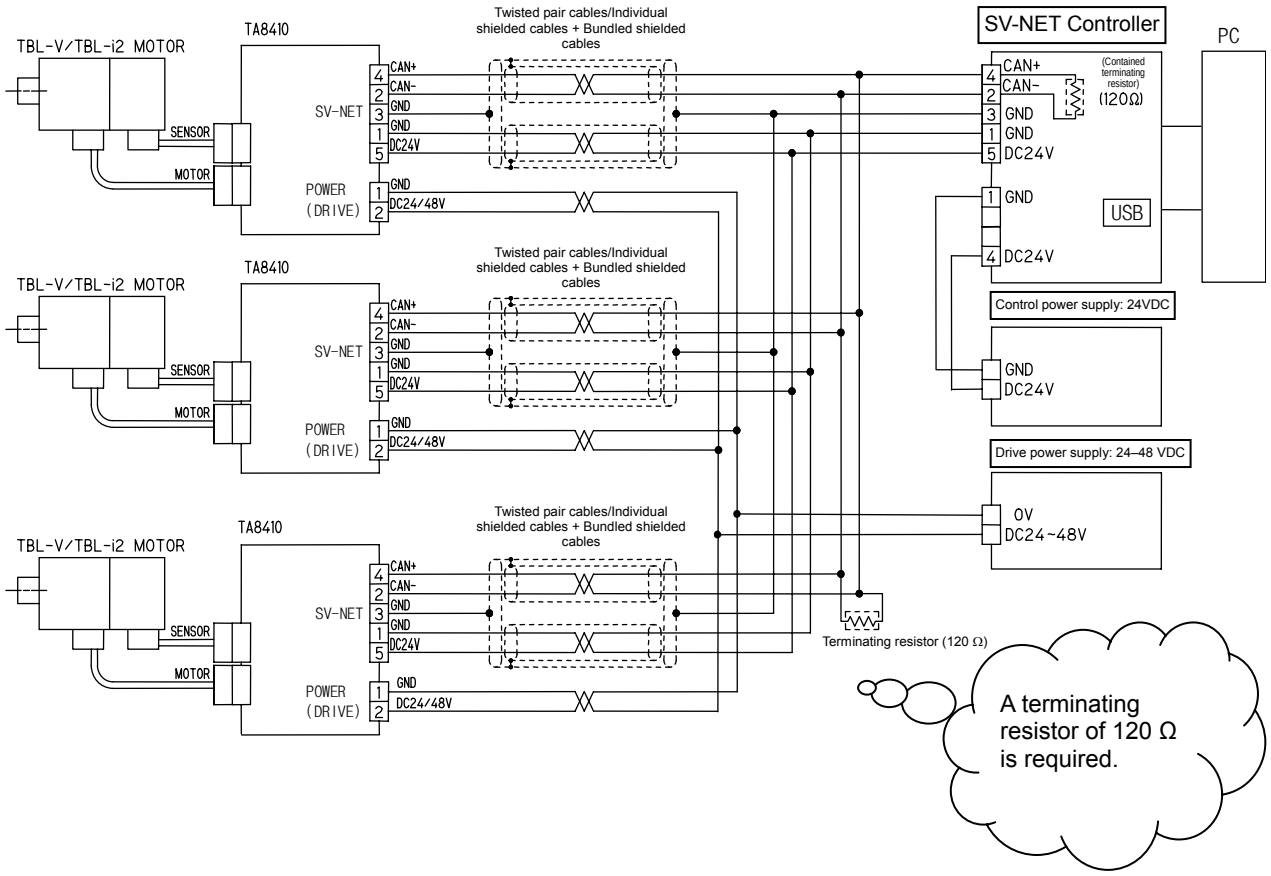
■ Fasten the Drivers and Motors

For how to fasten the drivers and motors, refer to the respective operation manuals. Heat generation increases if the driver is used repeatedly with its output around the rating. In such cases, an appropriate cooling device is required because heat can rise if the driver is used in a closed space until it detects an abnormal temperature. This is true also for the motor.

4.5 Connect the Cables

■ Cable Connection Diagram

The following is a cable connection diagram of the SVCC, drivers, and motors.



* The control power of the driver can be supplied through the SV-NET cable.

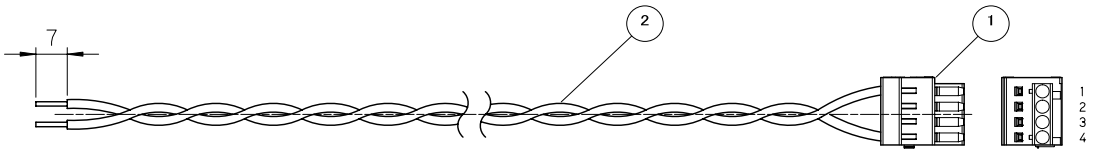
The power pins of the controller and those of the SV-NET cable are connected inside.

■ Standard SVCC Cables

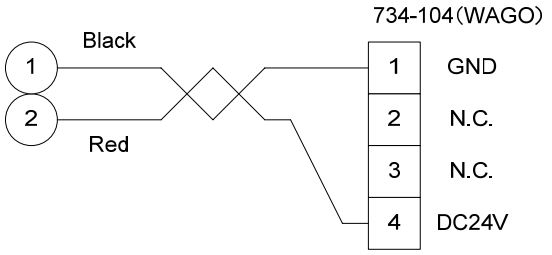
The following is a description of the standard cables for the SVCC.

Control power supply cable for the controller	Model: EU9611

External view



Connection diagram

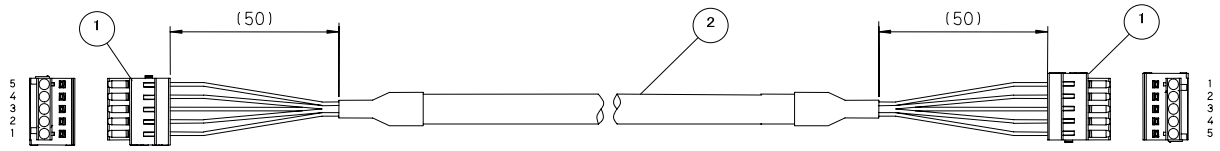


Parts configuration

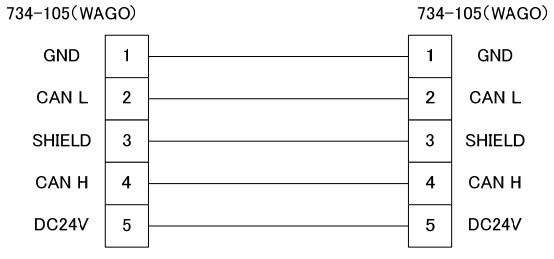
Part name	Model or standard	Maker	Remarks
① Connector	734-104	WAGO	
② Cable	Equivalent to AWG-20	-	

SV-NET cable	Model: EU9610

External view



Connection diagram



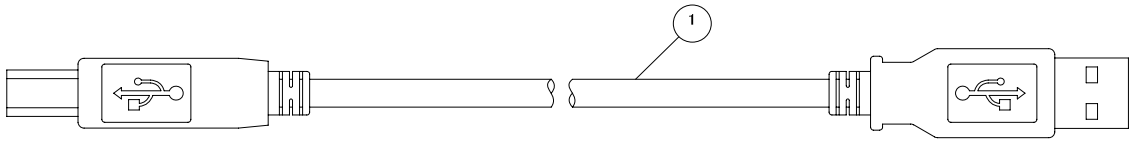
Both of the signal cable and
power cable are twisted pair cables.

Parts configuration

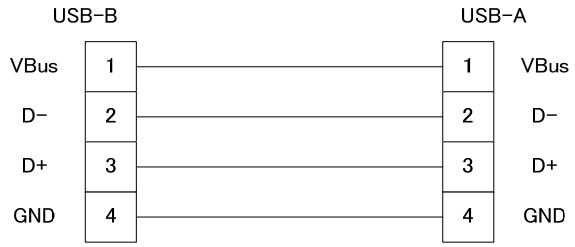
Part name	Model or standard	Maker	Remarks
① Connector	734-105	WAGO	
② Cable	NADNR24	MISUMI	

USB cable (accessory)	Accessory

External view



Connection diagram

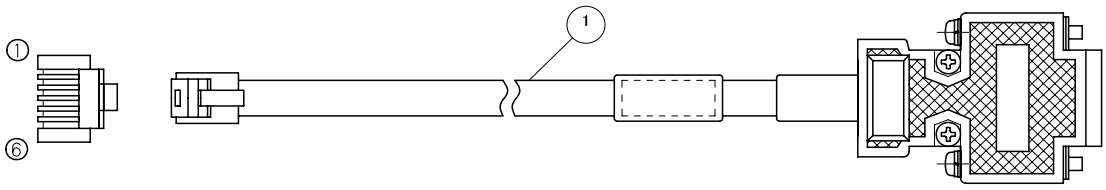


Parts configuration

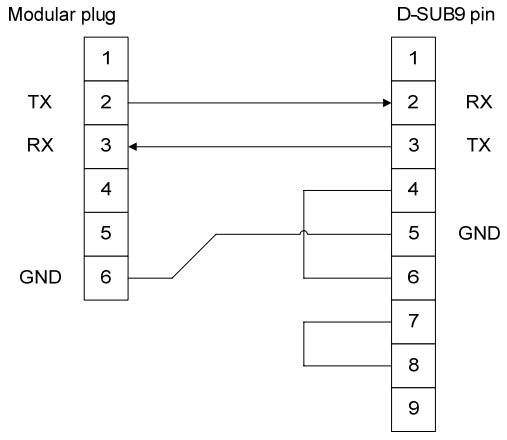
Part name	Model or standard	Maker	Remarks
① USB cable	MUSBAB-2	MISUMI	2 m

Serial communication cable (accessory)	Model: EU6517

External view



Connection diagram

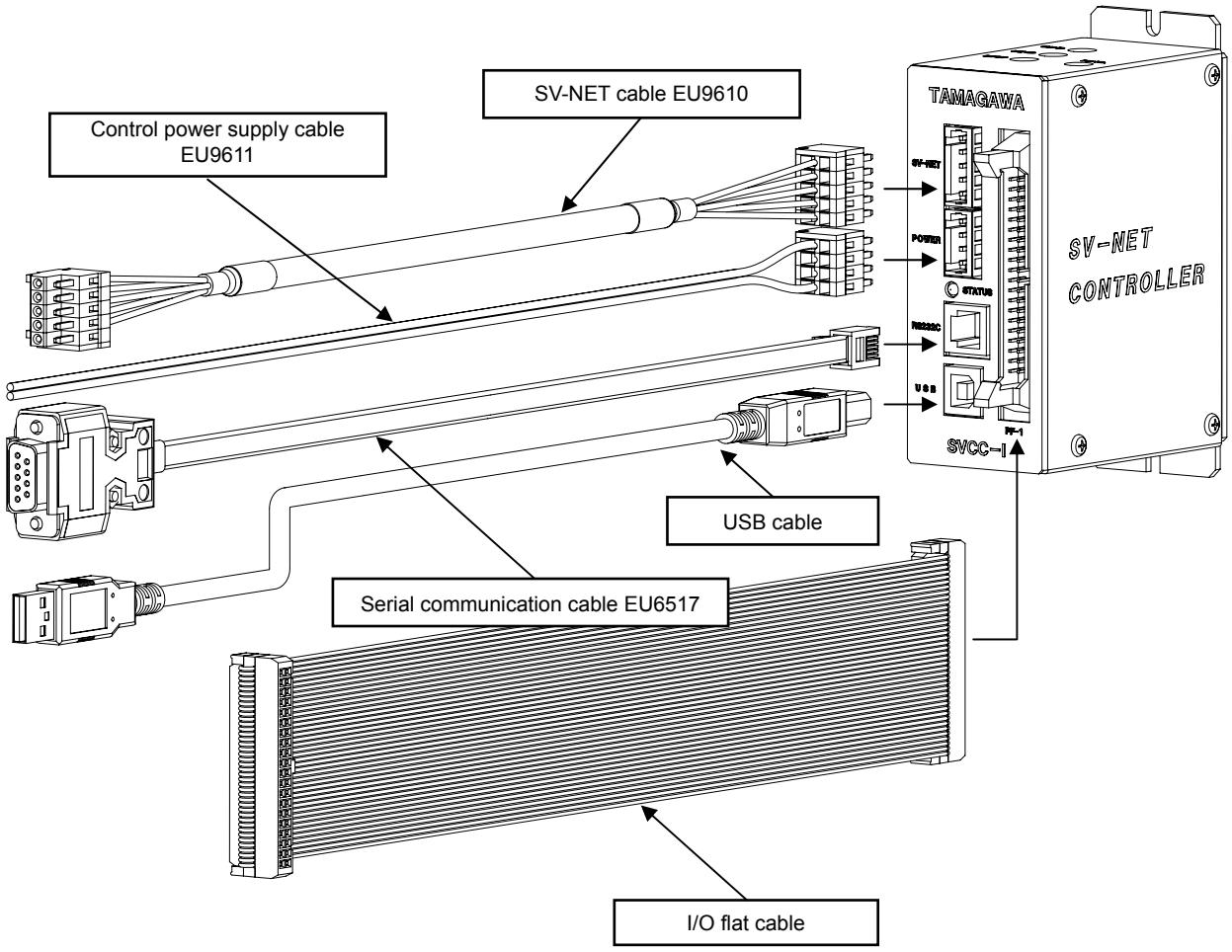


Parts configuration

Part name	Model or standard	Maker	Remarks
① Cable	EU6517	-	2 m

■ Cabling Diagram

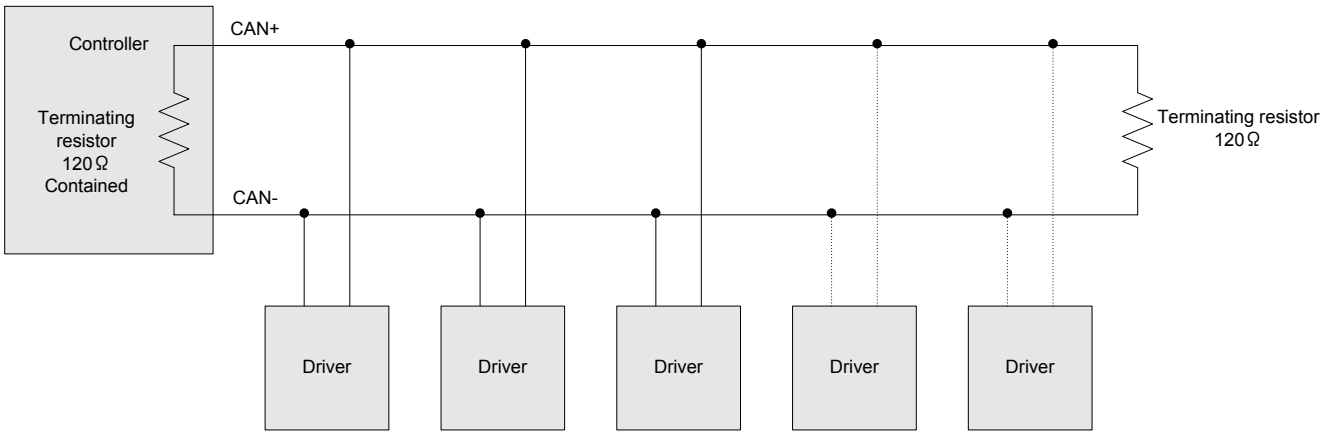
Connect the cables as shown in the following figure:



* The serial communication cable is not ordinarily used.

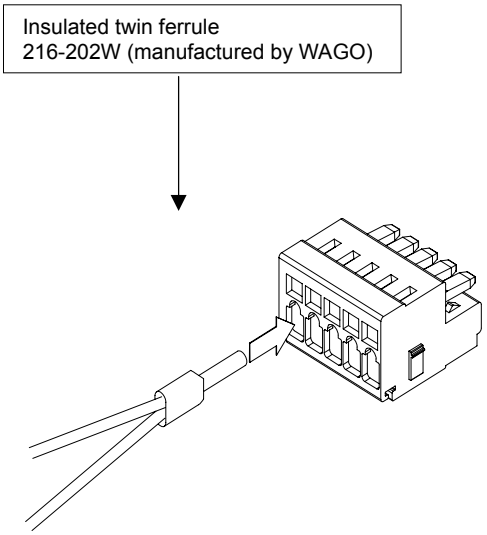
■ Terminating Resistor

Pay attention to the connection of terminating resistors in the cabling work. Unless the terminating resistors are connected, normal communication can fail. The master equipment (controller) contains a terminating resistor, while the slave equipment (driver) does not. A terminating resistor must be inserted close to the slave equipment farthest from the master equipment.

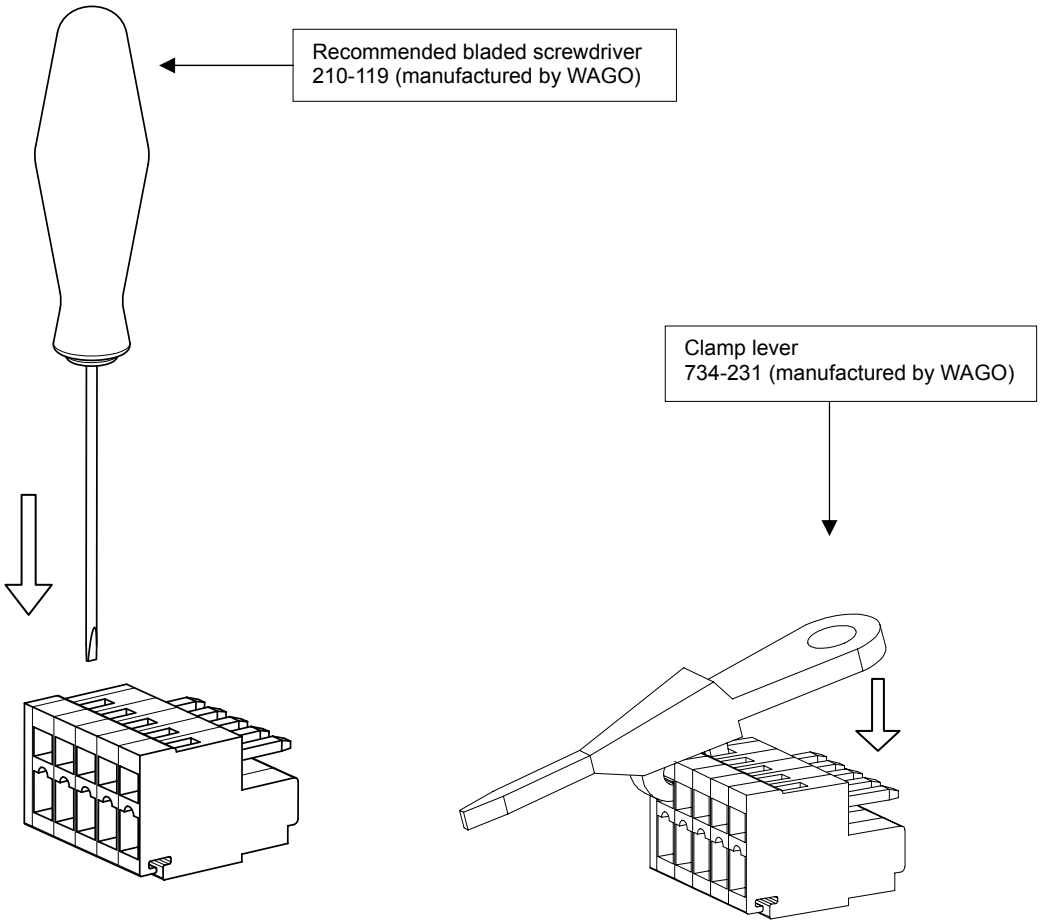


■ Recommended Method of Connecting the SV-NET Cable

To connect two cables to the SV-NET connector, crimp them using an insulated twin ferrule 216-202W (WAGO) and attach them to the SV-NET connector.



The core wire is clamped on the connector with a bladed screwdriver or the lever.

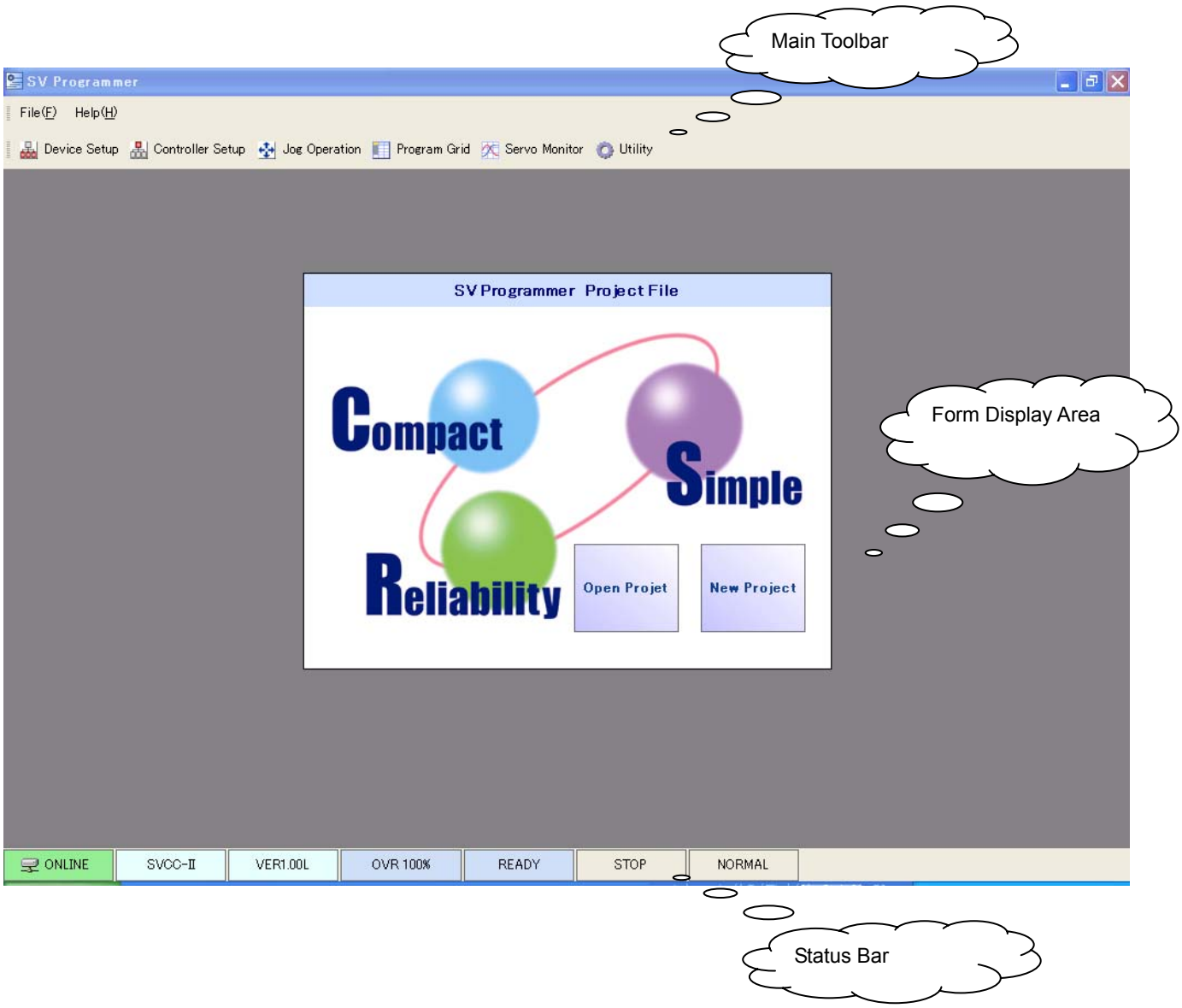


4.6 Start the SV Programmer

Start the SV Programmer to set the parameters of the controller and the driver. For more information on the installation and operation of the SV-Programmer, refer to the separate manual “SV Programmer Software Manual.” This section describes the basic window configuration and the functions required for setting parameters.

■ Starting Window of the SV Programmer

The figure below shows the SV Programmer window after you start it. The display area is broadly divided into the three parts: main toolbar, form display area, and status bar.



■ Description of the Main Toolbar

The main toolbar contains the main menu and several icon buttons arranged by function. To use the SV Programmer, click the icon button for the desired function to start the form. The icon buttons displayed in the main menu change with the currently active form. The function associated with each icon is described below.

- **Device Setup**

  Starts 【Device Setup】, which allows you to reference and set parameters of the driver.

- **Controller Setup**

  Starts 【Controller Setup】, which allows you to reference and set parameters of the controller.

- **JOG Operation**

  Starts 【Jog Operation】, which performs a test run of the servo motor.

- **Program Grid**

  Starts 【Program Grid】, which creates, edits, and executes a program.

- **Servo Monitor**

  Starts 【Servo Monitor】, which monitors the statuses of the servo monitor and controller.

- **Utilities**

  Starts 【Utility】, which makes display settings and operates special functions of each window.

■ Form Display Area

The form display area is a client area where a form window is displayed.

The project select (create or open) window is displayed immediately after you start the SV Programmer.

■ Status Bar

The status bar displays the execution status of the SV Programmer as the status.

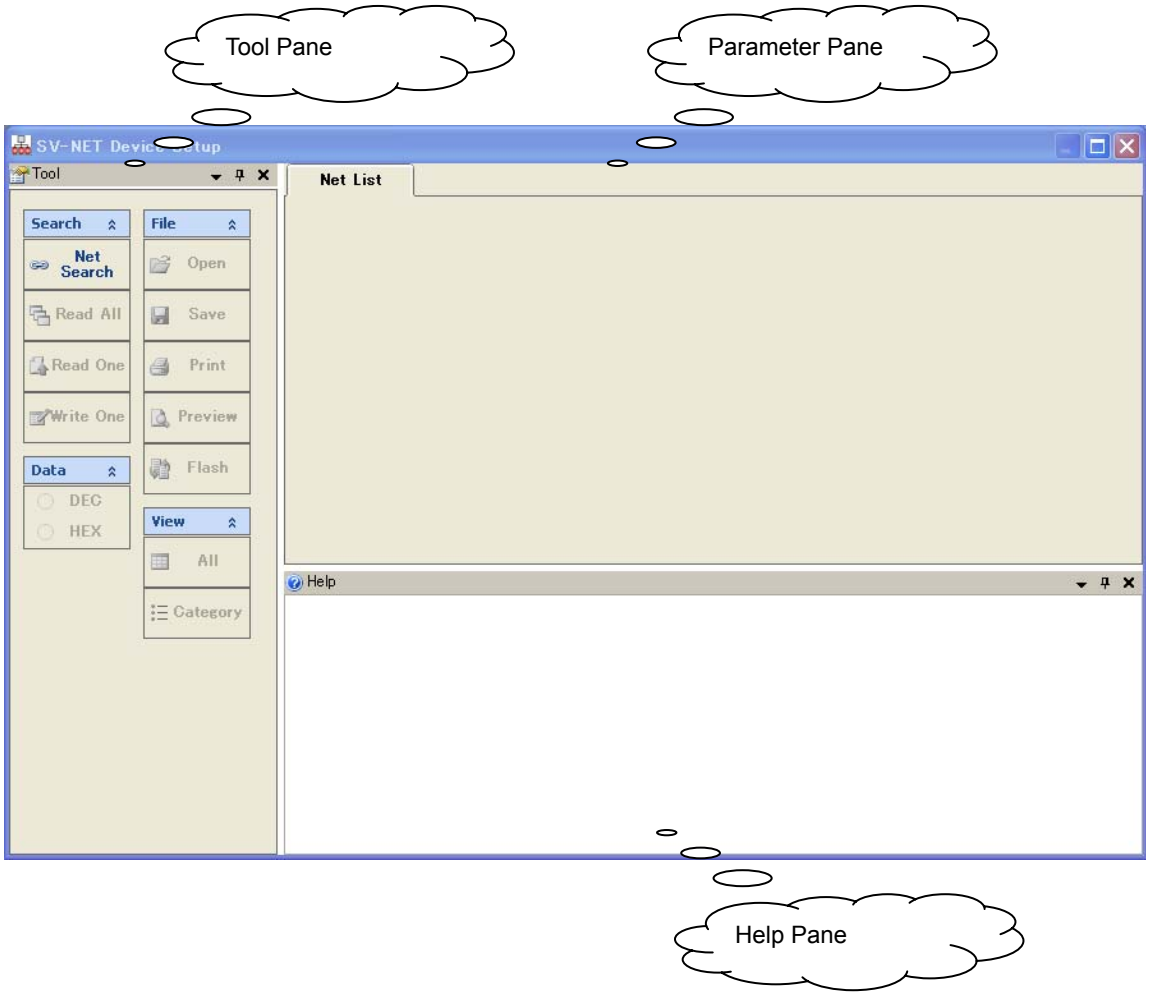
In the starting window, the status of connection between the PC and the controller is displayed. When the PC and the controller are connected, the icon indicating that they are connected and the string【ON LINE】are displayed. When they are not connected, another icon indicating that they are disconnected and the string 【OFF LINE】 are displayed.

4.7 Set the Driver Parameters

Start the SV Programmer and set the driver parameters after confirming the cabling of the equipment and power-on tests. Use the 【Device Setup】 function of the SV Programmer for setting the driver parameters. This function permits you to make reference to the existing parameters of the driver connected to the SV-NET and to set new parameters except for prohibited IDs of that driver. This section describes setting of the basic driver parameters using the 【Device Setup】 function.

■ Device Setup Start Window

The window shown below appears after you start Device Setup. The display area is broadly divided into three parts: tool pane, parameter pane, and help pane.



- **Tool pane**

The tool pane contains the function buttons used for 【Device Setup】.

- **Parameter pane**

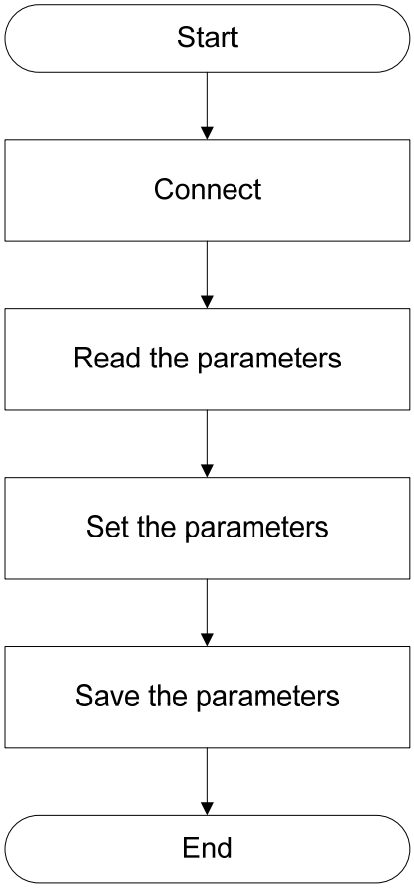
The parameter pane displays the read driver parameters.

- **Help pane**

The help pane displays the help information of the selected parameter item.

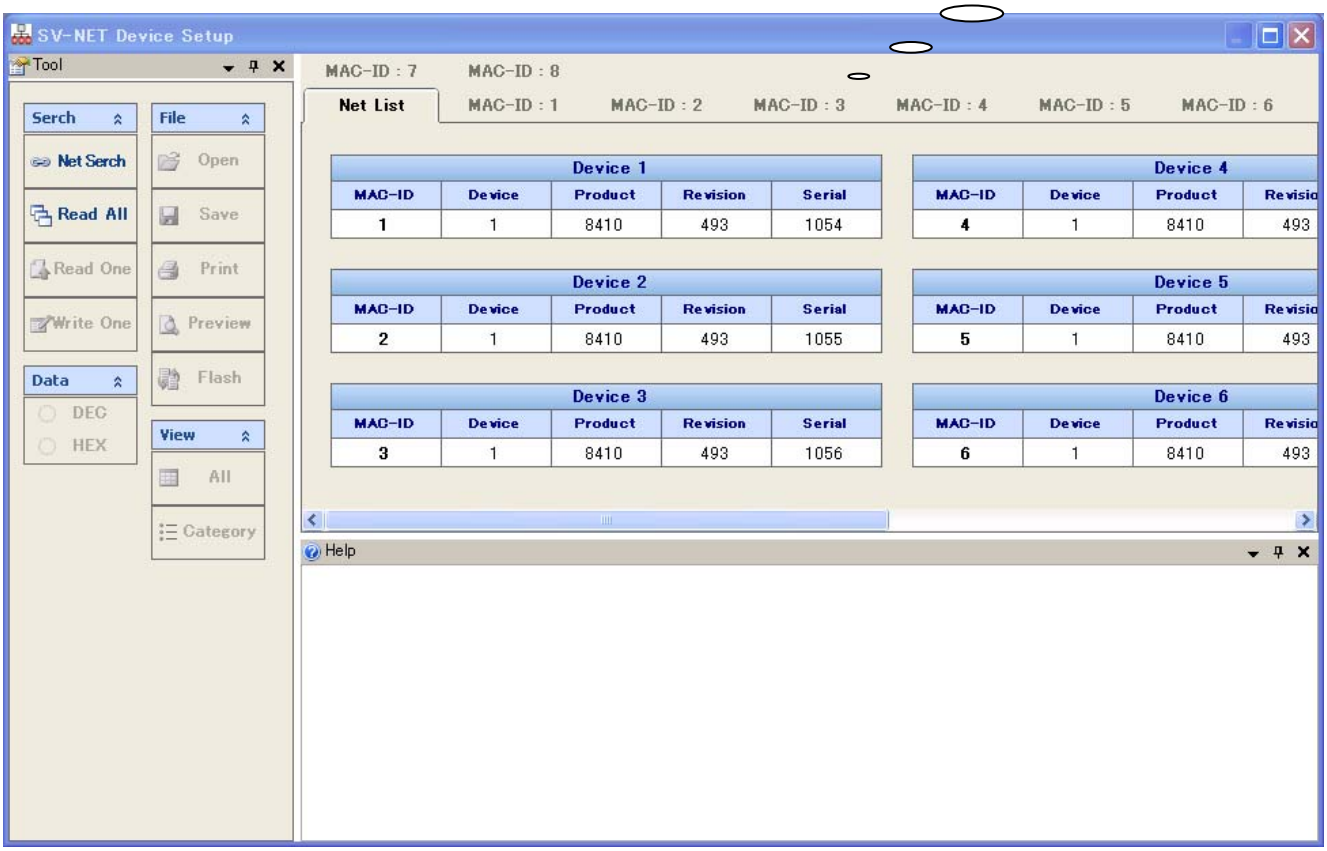
■ How to Set the Driver Parameters

This paragraph first shows a flowchart of setting the driver parameters and then describes each step in the chart.



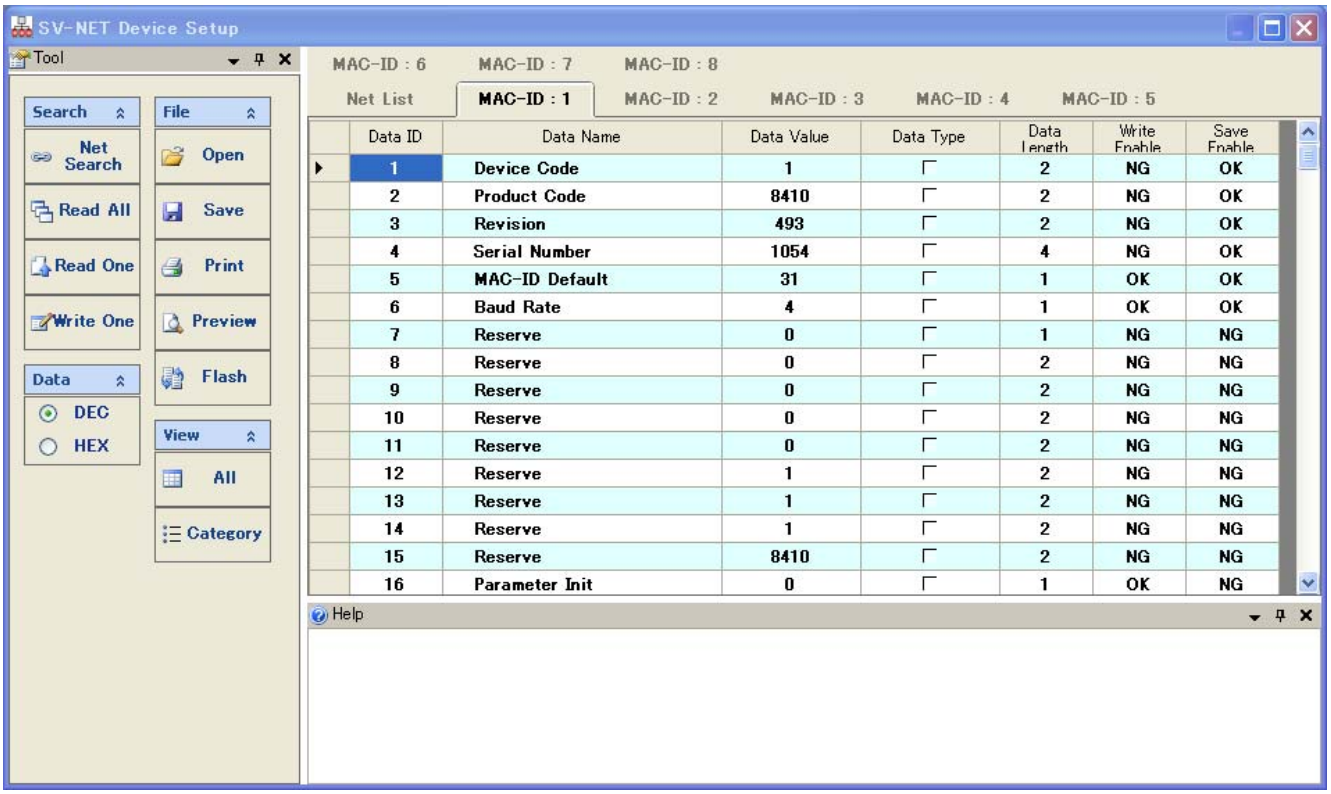
■ Connect

Click the 【Net Search】 button in the tool pane to search for the drivers currently connected to the SV-NET. A message indicating the number of currently connected axes is displayed and the driver product information for each connected axis is displayed in the parameter pane.



■ Read the Parameters

Click the 【Read All】 or 【Read One】 button in the tool pane to read the driver parameters. 【Read All】 reads the parameters of all the drivers connected to the SV-NET. 【Read One】 reads the parameters of the axis of the driver associated with the currently active tab. The figure below is a window displayed after the parameters are read (MAC-ID = 1). The default setting displays a list of ID1 to ID255.



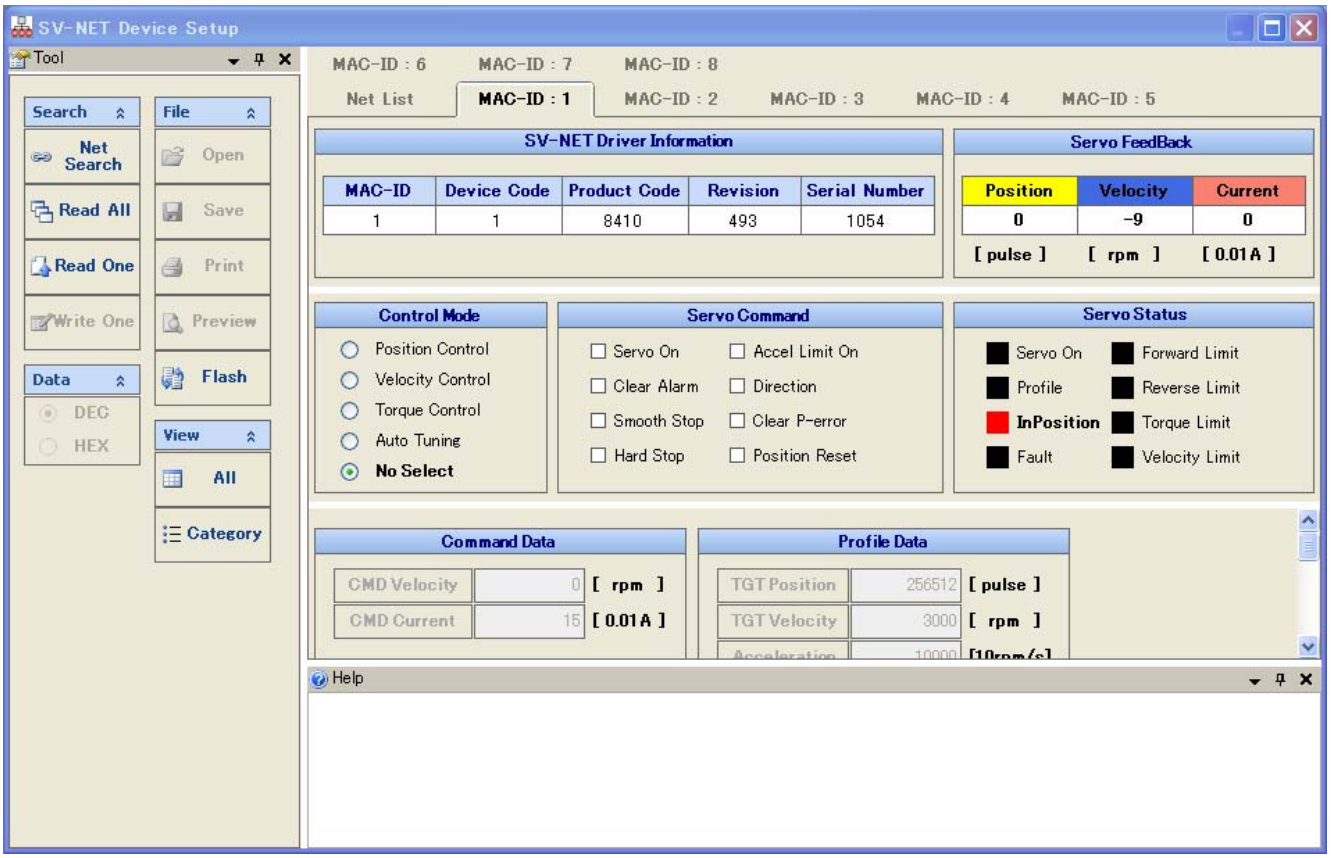
Data ID	Data Name	Data Value	Data Type	Data Length	Write Enable	Save Enable
1	Device Code	1		2	NG	OK
2	Product Code	8410		2	NG	OK
3	Revision	493		2	NG	OK
4	Serial Number	1054		4	NG	OK
5	MAC-ID Default	31		1	OK	OK
6	Baud Rate	4		1	OK	OK
7	Reserve	0		1	NG	NG
8	Reserve	0		2	NG	NG
9	Reserve	0		2	NG	NG
10	Reserve	0		2	NG	NG
11	Reserve	0		2	NG	NG
12	Reserve	1		2	NG	NG
13	Reserve	1		2	NG	NG
14	Reserve	1		2	NG	NG
15	Reserve	8410		2	NG	NG
16	Parameter Init	0		1	OK	NG

■ Set the Parameters

The following driver parameters are those which need to be changed most often from the initial settings in a system with a controller:

- Parameters for limits (rotation direction limit, speed limit, etc.)
- Parameters for gains (servo gain)

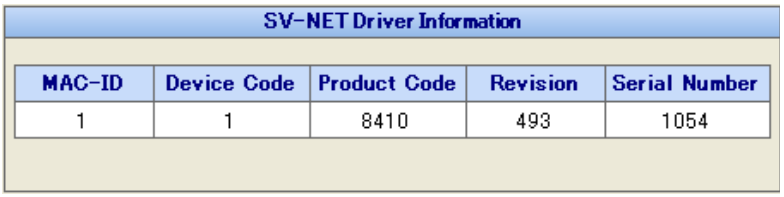
You may need to test run the driver or motor alone after the system cabling is over. In that case, you can test run the motor using the control mode for the driver alone. If parameter setting is too difficult with the display format of the parameter list, you can switch the format to the display by category items with the 【Category】 button under the 【All】 group in the tool pane. A window of parameter display by category is shown below:



The user has to understand what each bit means in the list form data, while the user can refer to or set various parameters such as 【Servo Status】, 【Servo FeedBack】, 【Control Mode】, and 【Servo Command】 with ease in a category window. This simplifies parameter setting for the basic operation of the servo motor. Functions required for test run of the motor are assigned for the parameter items. The category window is suited for motor test run and gain setting with the driver placed in the speed control or position control mode. The following paragraphs describe each item in the category window.

- **SV-NET Driver Information**

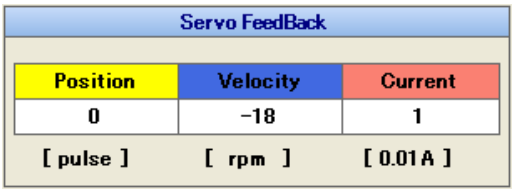
Displays the product information of the driver.



Group	Item	Description
SV-NET Driver Information	MAC-ID	Displays the MAC-ID of the driver. If the rotary DIP switch is set to any of the positions other than 【0】, the set value of the switch is displayed.
	Device Code	Displays the type of the connected device.
	Product Code	Displays the model of the connected device.
	Revision	Displays the revision of the connected device.
	Serial Number	Displays the serial number of the connected device.

- **Servo Feedback**

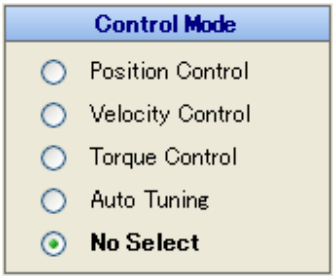
Displays the feedback information of the driver.



Group	Item	Description
Servo FeedBack	Position	Displays the present position of the driver (unit: pulse).
	Velocity	Displays the present speed of the driver (unit: rpm).
	Current	Displays the present electric current of the driver (unit: 0.01 A).

- **Control Mode**

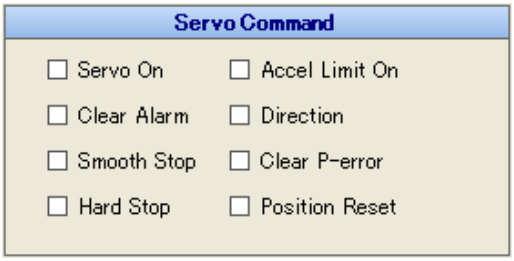
Sets the control mode for the driver.



Group	Item	Description
Control Mode	Position Control	Sets the driver to the position control mode.
	Velocity Control	Sets the driver to the speed control mode.
	Current Control	Sets the driver to the electric current control mode.
	Auto Tuning	Sets the driver to the auto-tuning mode. If settings are changed in the Servo ON status, tuning starts automatically.
	No Control	Sets the driver to a mode other than the above.

- **Servo Commands**

Sets commands to the driver. Click the desired checkboxes.



Group	Item	Description
Servo Command	Servo On	Turns the servo ON.
	Clear Alarm	Clears the driver alarm.
	Smooth Stop	Deceleration-stops the motor rotation.
	Hard Stop	Immediately stops the motor rotation.
	Accel Limit On	Enables the acceleration/deceleration function in the speed control mode.
	Direction	Changes the rotation direction.
	Clear P-error	Clears the position deviation counter. (This counter is used when pulse strings are input.)
	Position Reset	Resets the position information.

*** Supplementary information about "Servo Command"**

"Servo Command" contains items to which a function is added that turns those items OFF automatically after their checkboxes are checked.

These items are 【Clear Alarm】, 【Clear P-error】, and 【Position Reset】. Since these items need not always be turned ON, the SV Programmer turns them OFF automatically after data is transferred to the driver.

The items【Smooth Stop】,【Hard Stop】, and【Accel Limit On】turn ON or OFF automatically when you click the【Stop】, 【Set】, or 【Start】 buttons on 【Command Data】 and 【Profile Data】 described in the next section.

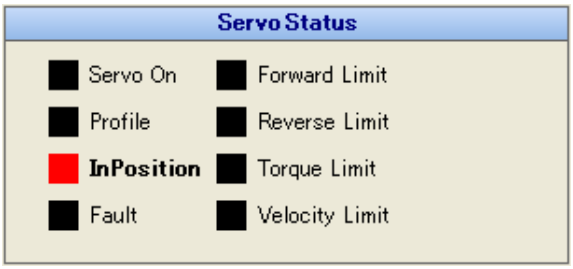
【Stop】 button : When you click this button, 【Smooth Stop】 and 【Accel Limit On】 turn ON automatically.

【Set】 button : When you click this button, 【Accel Limit On】 turns ON automatically; 【Smooth Stop】 and 【Hard Stop】 turn OFF automatically.

【Start】 button : When you click this button, 【Smooth Stop】 and 【Hard Stop】 turn OFF automatically.

- **Servo Status**

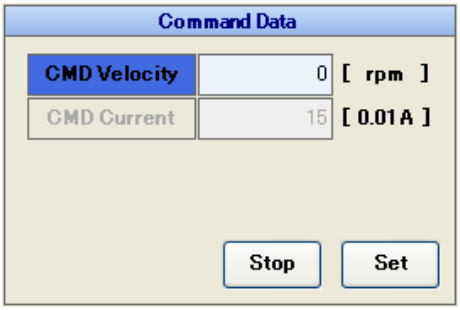
Displays the servo status. The status is ON while this is lit red.



Group	Item	Description
Servo Status	Servo On	Turns the status ON during Servo ON.
	Profile	Turns the status ON while profile operation is in progress.
	InPosition	Turns the status ON when in-position is achieved.
	Fault	Turns the status ON when an alarm is detected.
	Forward Limit	Turns the status ON when the forward direction soft limit is reached.
	Reverse Limit	Turns the status ON when the reverse direction soft limit is reached.
	Torque Limit	Turns the status ON when the torque limit is reached.
	Velocity Limit	Turns the status ON when the speed limit is reached.

- **Command Instruction**

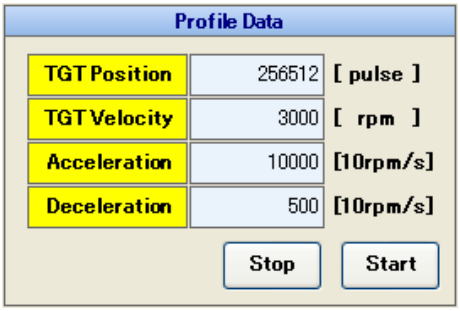
Sets a command value of speed control and of electric current control.



Group	Item	Description
Command Data	CMD Velocity	Sets a command value of speed control (ID: 37) (unit: rpm).
	CMD Current	Sets a command value of electric current control (ID: 38) (unit: 0.01 A).
Button	Set	Sets the command value.
	Stop	Stops the motor.

- **Profile Data**

Sets the profile operation. The profiling status of the servo status remains ON while the profile operation is in progress.

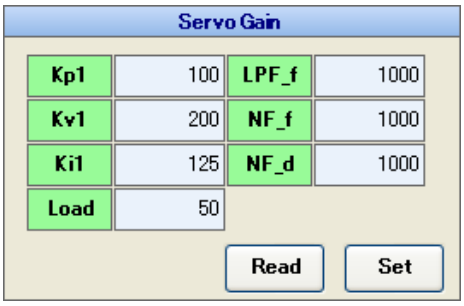


Group	Item	Description
Profile Data	TGT Position	Sets the target position (ID:32) of the profile operation (unit: pulse).
	TGT Velocity	Sets the target speed (ID:33) of the profile operation (unit: rpm).
	Acceleration	Sets the acceleration (ID:34) of the profile operation (unit: 10 rpm/sec).
Button	Start	Starts the profile operation.
	Stop	Stops the profile operation.

* The value of ID:34 is used for both acceleration and deceleration of profile operation.

- **Servo Gain**

Sets the servo gains. For the procedure for setting the servo gains, refer to the instruction manual for the driver.



Group	Item	Description
Servo Gain	Kp1	Sets the position loop proportional gain 1.
	Kv1	Sets the speed loop proportional gain 1.
	Ki1	Sets the speed loop integral gain 1.
	Load	Sets the load inertia (unit: g•cm^2).
	LPF_f	Sets the lowpass filter frequency (unit: Hz).
	NF_f	Sets the notch filter center frequency (unit: Hz).
	NF_d	Sets the notch filter attenuation (0 to 32767).
Button	Set	Sets the present servo gain values to the driver.
	Read	Obtains the present servo gain values from the driver.

■ Save the Parameters

After the parameters have been set, save those parameters in the flash memory of the driver. If the parameters are not saved, they are lost after the power is turned ON again. If there are no problems with the set parameter, click the 【Flash】 button under the 【File】 group in the tool pane to save them. To save a list of the parameters in a file, click the 【Save】 button with the desired file name. The extension of parameter file is .svd.

4.8 Set the Controller Parameters

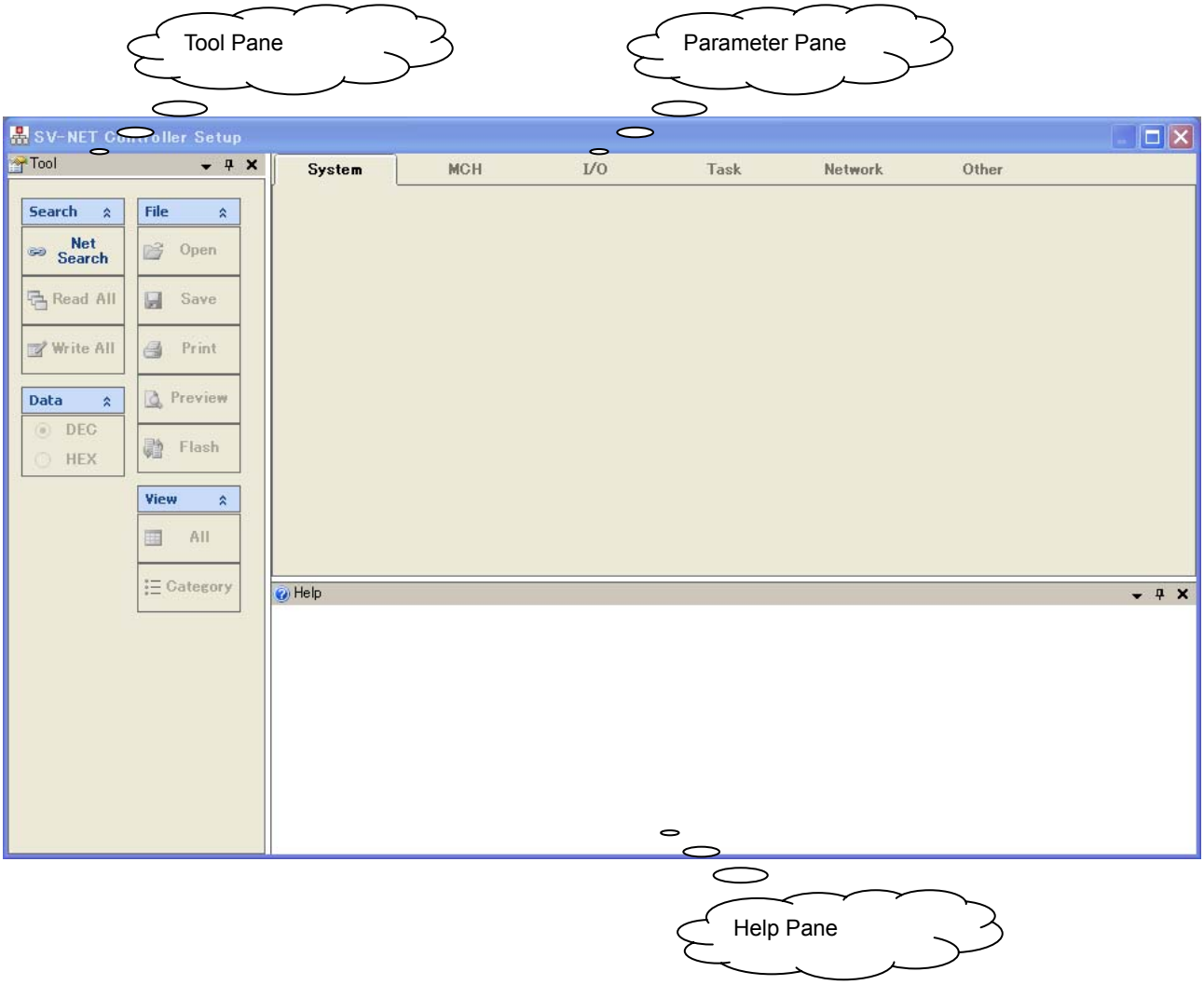
After setting the drive parameters, set the controller parameters. Use the 【Controller Setup】 function of the SV Programmer for setting the controller parameters. This function permits you to reference and set all the parameters of the controller except for prohibited IDs of the controller. This section describes setting of the basic controller parameters using the 【Controller Setup】 function.

* Note:

Before changing a controller parameter value, stop the program and turn the servo OFF.

■ Controller Setup Start Window

The window shown below appears after you start Controller Setup. The display area is broadly divided into three parts: tool pane, parameter pane, and help pane.



- **Tool pane**

The tool pane contains the function buttons used for 【Controller Setup】.

- **Parameter pane**

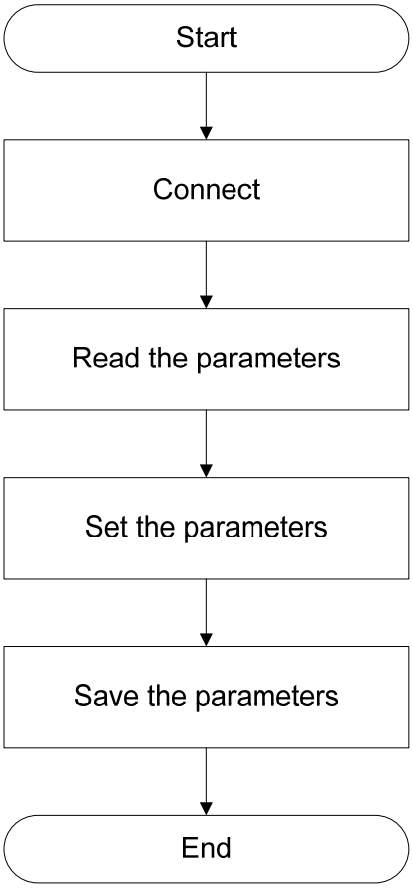
The parameter pane displays the read controller parameters.

- **Help pane**

The help pane displays the help information of the selected parameter item.

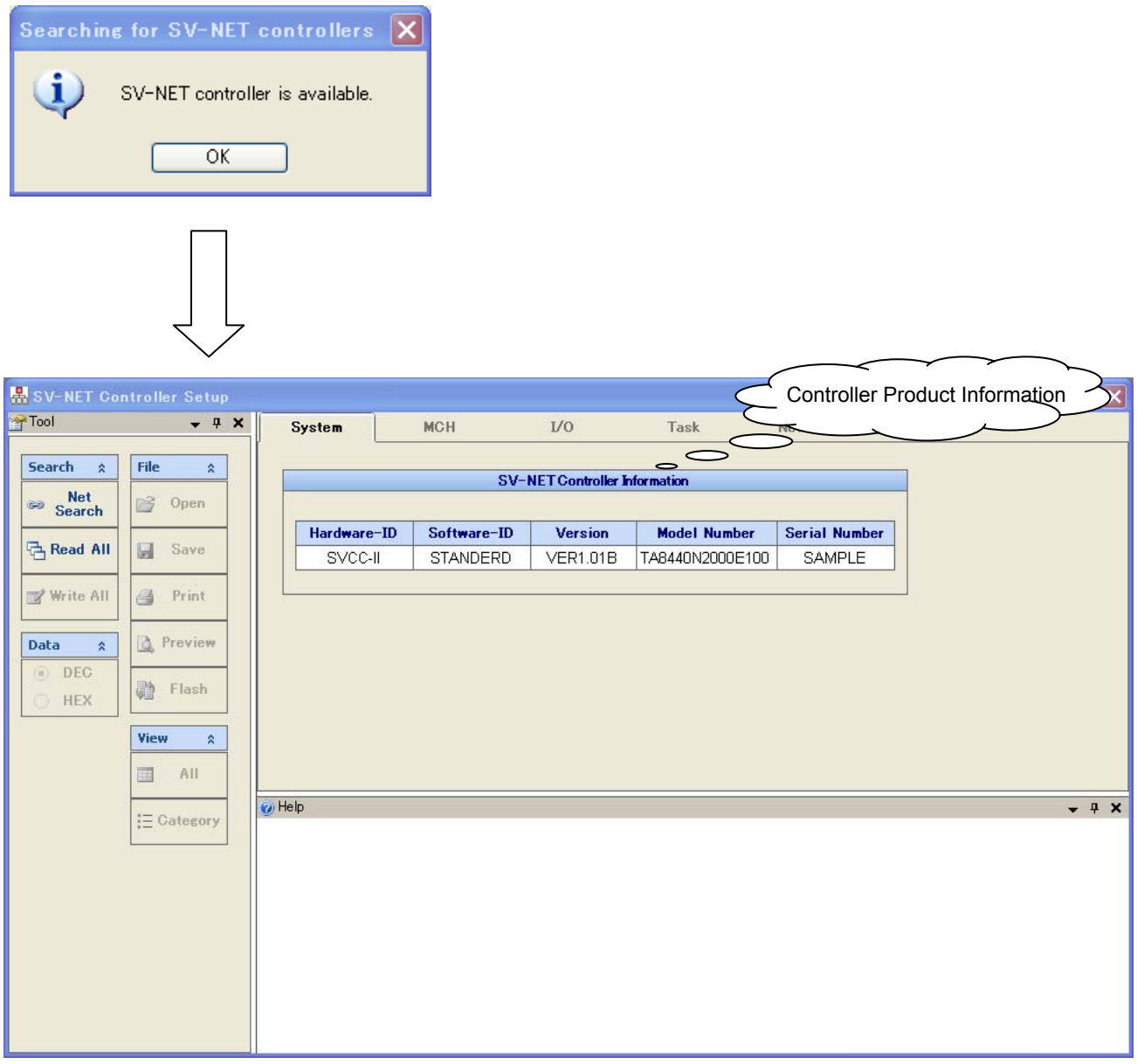
■ How to Set the Controller Parameters

This paragraph first shows a flowchart of setting the controller parameters and then describes each step in the chart.



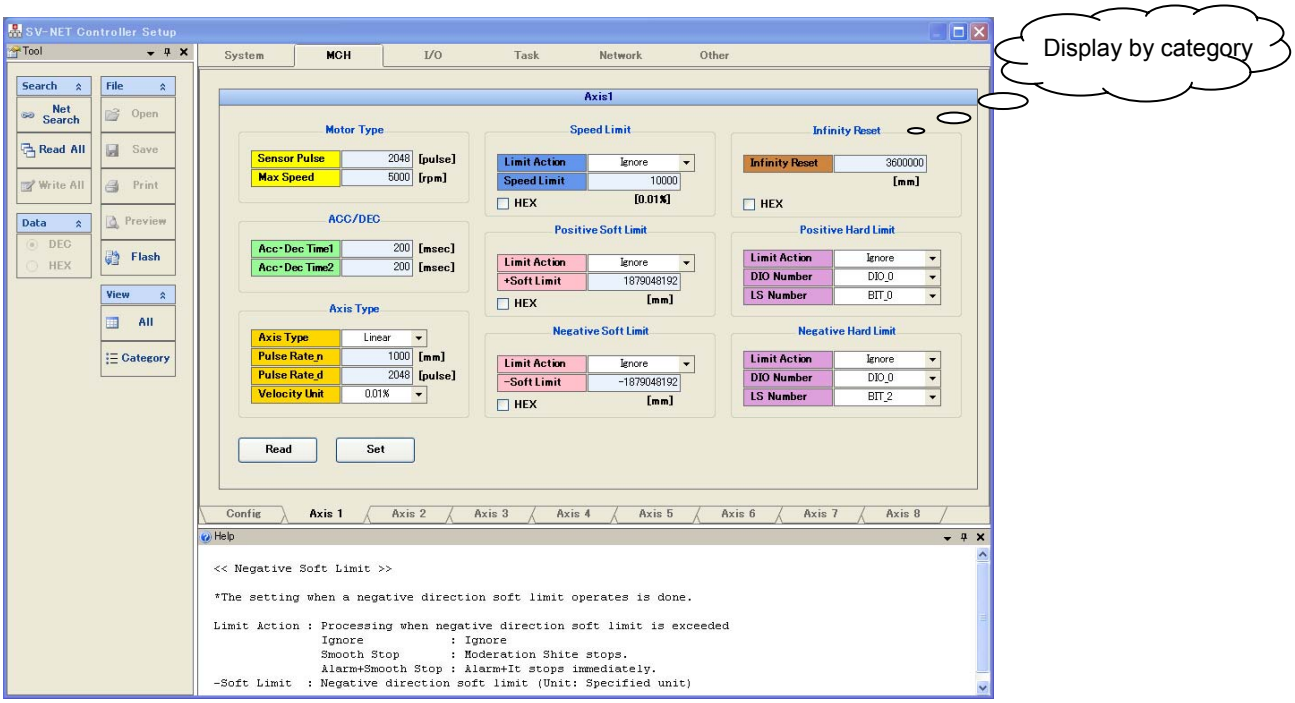
■ Connect

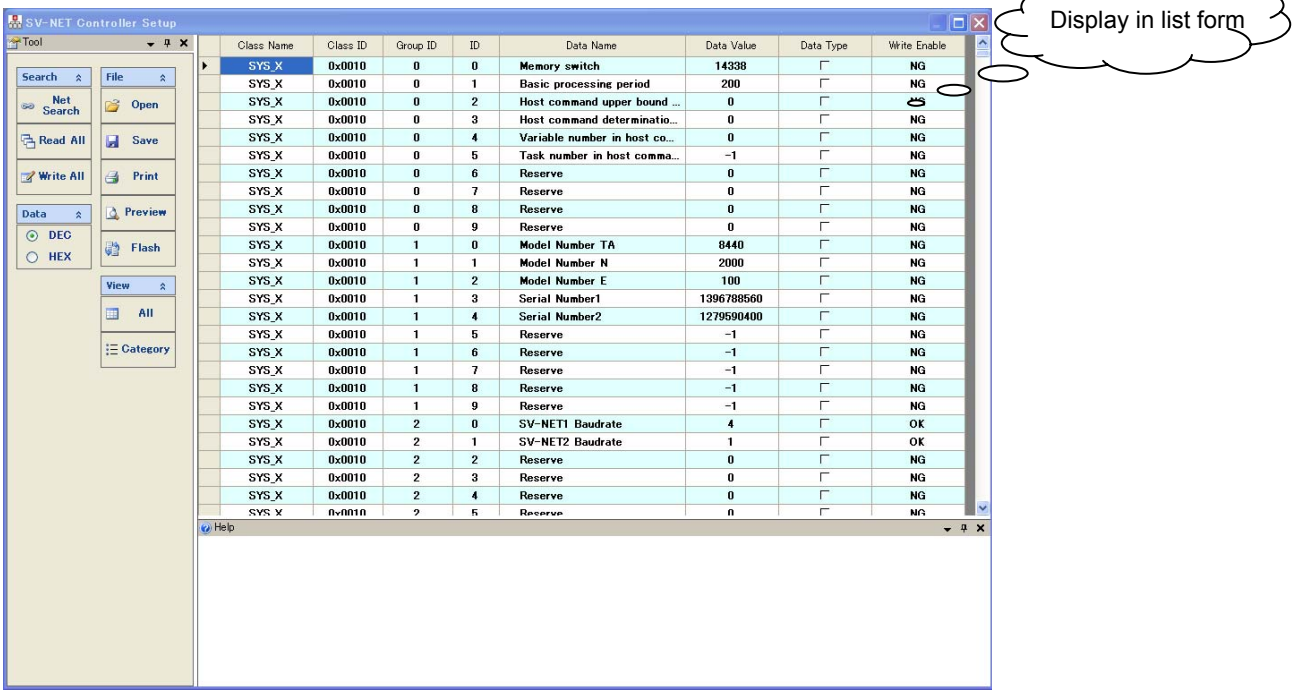
Click the 【Net Sarch】 button in the tool pane to search for the connected controller. A message indicating that the controller is connected is displayed and the product information of the controller is displayed in the parameter pane.



■ Read the Parameters

Click the 【Read All】 button in the tool pane to read the controller parameters. The read parameters are displayed in each tab area. Although the default setting displays the parameters by category, you can display all the parameters in a list by clicking the【All】button under the【Category】group in the tool pane. The figures below are examples of category windows and list windows displayed after the parameters are read. The category window example displays 【Axis 1】 in the 【MCH】 tab page.





■ Set the Parameters

The following controller parameters are those which need to be changed most often from the initial settings:

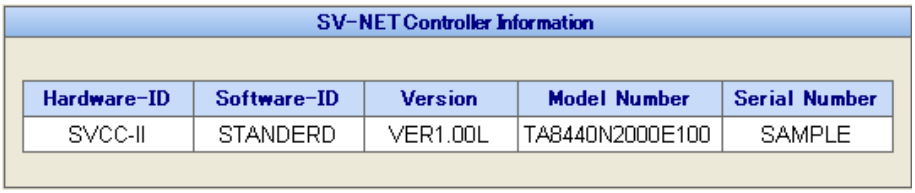
- Parameters of each axis (acceleration/deceleration time constants, axis type, pulse rate, limit data, etc.)
- I/O settings (polarity, stroke limit, etc.)

The following paragraphs describe each item in the controller parameter setting window (displayed by category).

■ Settings on the “System Information” Tab Page

・【SV-NET Controller Information】SV-NET Controller Information

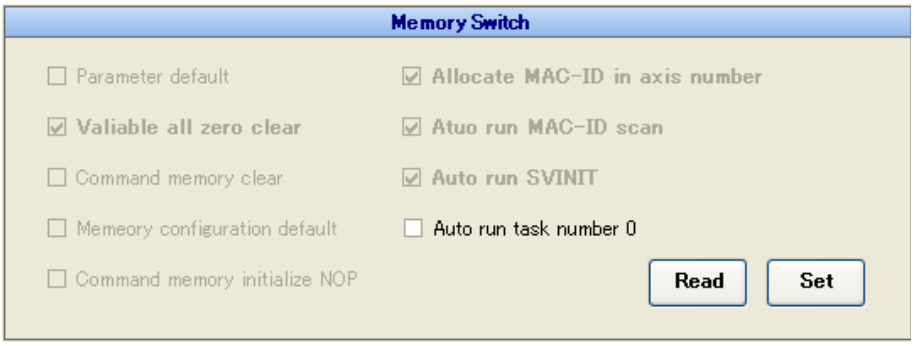
This window displays product information for the SVC. The information is displayed after you click the 【Net Sarch】 button if the USB-connected SVC is operating normally.



Group	Item	Description
SV-NET Controller Information	Hardware-ID	Displays the product type of the SVC.
	Software-ID	Displays the software option ID.
	Version	Displays the software version.
	Model Number	Displays the model name of the product.
	Serial Number	Displays the serial number of the product.

・【System】Memory Switch

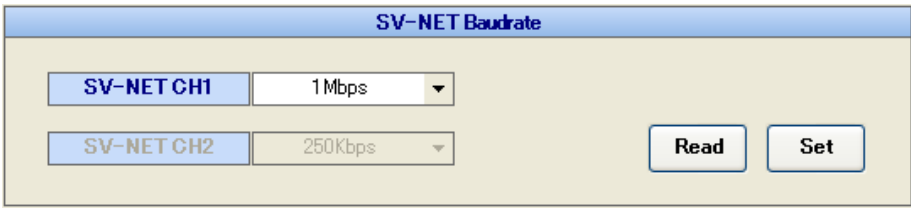
This switch is used to determine the operation to be started after the SVC is powered on. You need not set any item other than 【Auto run task number 0】. (Other items are inaccessible.)



Group	Item	Description
Memory Switch	Auto run task number 0	Automatically starts Task 0 and executes it beginning with address 0 of the command memory after the SVC is powered on. The program must be saved to flash memory.
Button	Read	Obtains the memory switch data.
	Set	Sets the memory switch data.

・【Sysytem】SV-NET Baud Rate

This switch is used to set the SV-NET baud rate.



* Note:

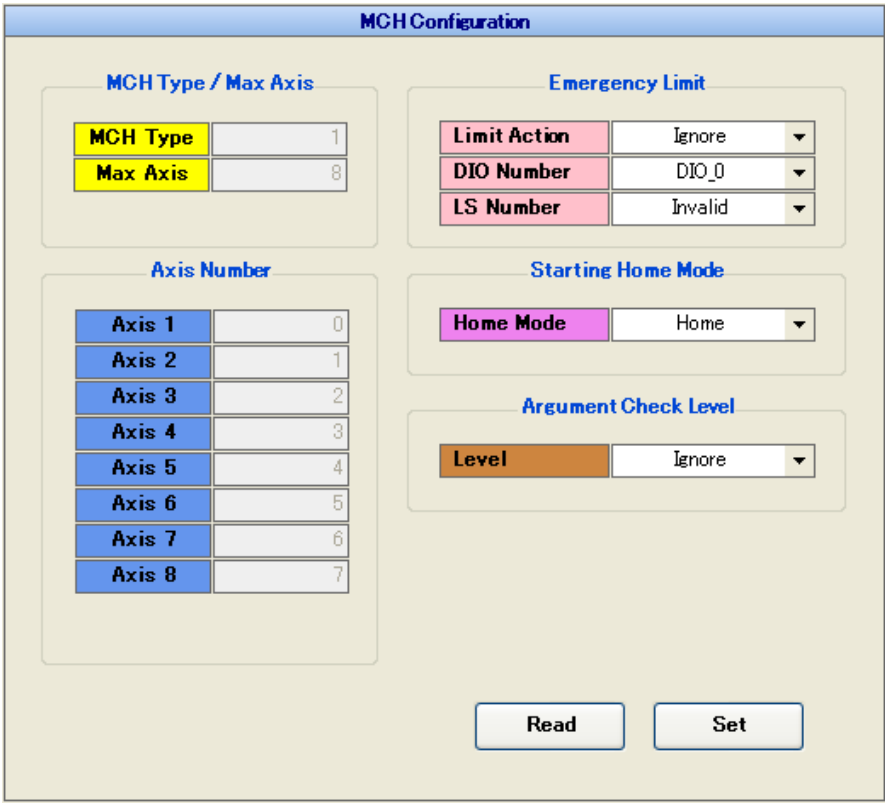
The default baud rate of the SV-NET driver is 1 Mbps. Communication is disabled if the baud rate is changed. Ordinarily, the SVC baud rate need not be changed.

Group	Item	Description
SV-NETBaud Rate	SV-NET CH1	Sets the baud rate for SV-NET Channel 1. The baud rate options are 250 Kbps, 500 Kbps, and 1 Mbps. The default value is 1 Mbps.
	SV-NET CH2	Sets the baud rate for SV-NET Channel 2. The baud rate options are 250 Kbps, 500 Kbps, and 1 Mbps. The default value is 250 Kbps. Some SVC models do not support SV-NET Channel 2.
Button	Read	Obtains the SV-NET baud rate value.
	Set	Sets the SV-NET baud rate value.

■ Settings on the “Mechanism Information” Tab Page

・【MCH Configuration】Mechanism Configuration

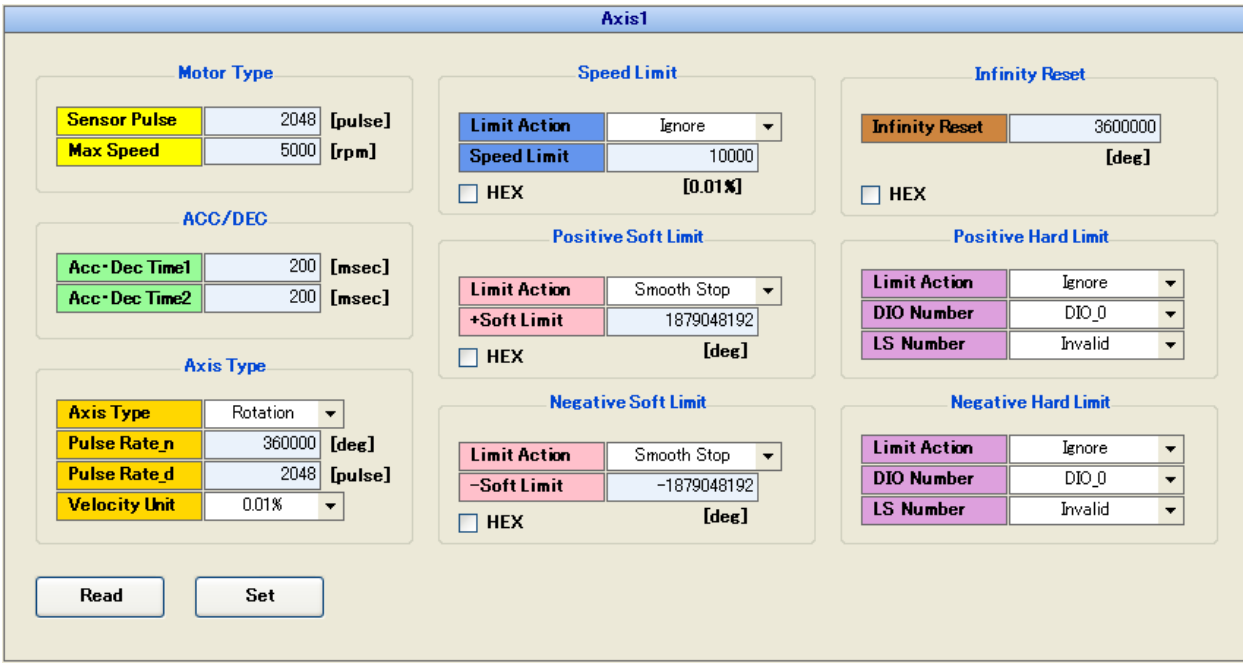
This window is used to set the mechanism configuration.



Group	Item	Description
MCH Type・Max Axis	MCH Type	Sets the mechanism type. This parameter is fixed in accordance with the SVC type. This value cannot be changed.
	Max Axis	Sets the maximum number of axes permitted to belong to the mechanism. This parameter is fixed in accordance with the SVC type. This value cannot be changed.
Axis Number	Axis *	Sets the driver axis number for an axis that belongs to the mechanism. The driver axis number is different from the MAC-ID. Under the default setting, driver axis numbers are assigned to MAC-IDs in ascending order and axis numbers in the mechanism are assigned to driver axis numbers in ascending order. These settings cannot be changed.
Emergency Limit	Limit Action	Sets the operation after stop caused by the emergency stop limit. The default setting is 【Ignore】.
	DIO Number	Sets the DIO number to which the emergency stop limit switch is assigned.
	LS Number	Sets the LS number to which the emergency stop limit switch is assigned by a bit pattern.
Starting Home Mode	Home Mode	Sets “Home” or “Not Home” for the servo motor position after power-on.
Argument Check Level	Level	Sets the move to be performed if 0 is given as the argument for speed or time in a move instruction. The default is to ignore this (no move is performed or the moving axis slows down and stops).
Button	Read	Obtains the mechanism configuration information.
	Set	Sets the mechanism configuration information.

・【MCH】Axis Configuration

This window is used to set the configuration of each axis belonging to the mechanism.

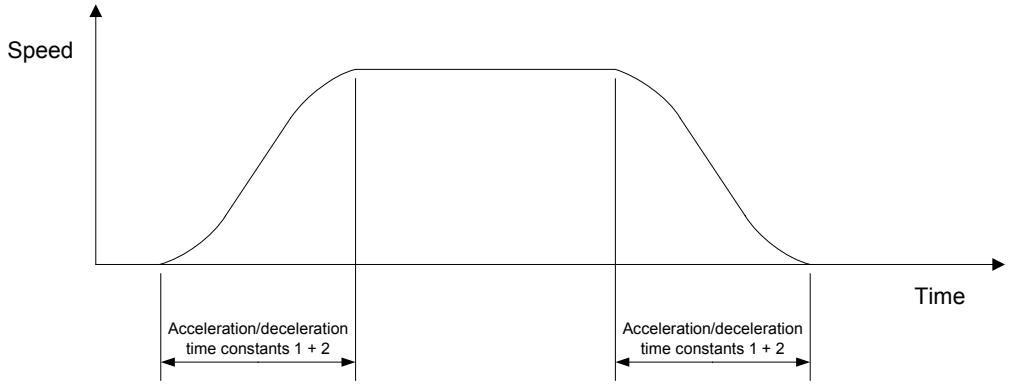


Group	Item	Description
Mortor Type	Sensor Pulse	Sets the sensor resolution. Note that the value after internal processing of the driver should be set.
	Max Speed	Sets the maximum speed value for the motor. This parameter is used when the speed unit is 【0.01%】.
ACC / DEC	Acc Dec Time 1	Sets the acceleration/deceleration time constant in the first line.
	Acc Dec Time 2	Sets the acceleration/deceleration time constant in the second line.
Axis Type	Axis Type	Sets the axis type. The options are 【Linear】, 【Rotation】, 【Linear2】, and 【Rotation2】. The instruction units are mm for the linear-motion axis and deg for the rotation axis.
	Pulse Rate_n	Sets the numerator value for the pulse rate.
	Pulse Rate_d	Sets the denominator value for the pulse rate.
	Velocity Unit	Sets the speed unit. The options are 【0.01%】, 【Command unit / sec】, and 【rpm】. A speed unit of 0.01% is based on the set value for 【Max Speed】 of the motor type. If 1000 is specified for a move instruction argument when the motor maximum speed is 5000 rpm, the rotation speed is 5000 rpm × 10.00% = 500 rpm.

Group	Item	Description
Speed Limit	Limit Action	Sets the move performed when the specified speed limit is reached. The options are【Ignore】,【Smooth Stop】,【Hard Stop】,【Clamp】,【Warning＋Clamp】, 【Alarm＋Smooth Stop】, and 【Alarm＋Hard Stop】.
	Speed Limit	Sets the speed limit value using the unit specified for the speed unit.
Infinity Reset	Infinity Reset	Sets the coordinate reset value for an infinite length axis. The setting is valid if the axis type is set to infinite rotation axis or infinite linear-motion axis.
Positive Soft Limit	Limit Action	Sets the move performed when the specified forward direction soft limit is reached. The options are 【Ignore】, 【Smooth Stop】, and 【Alarm＋Smooth Stop】.
	+Soft Limit	Sets the forward direction soft limit value. The default setting is 0x70000000.
Negative Soft Limit	Limit Action	Sets the move performed when the specified reverse direction soft limit is reached. The options are 【Ignore】, 【Smooth Stop】, and 【Alarm＋Smooth Stop】.
	-Soft Limit	Sets the reverse direction soft limit value. The default setting is 0x90000000.
Positive Hard Limit	Limit Action	Sets the move performed when the specified forward direction stroke limit is reached. The options are 【Ignore】, 【Smooth Stop】, 【Hard Stop】, 【Alarm＋Smooth Stop】, and 【Alarm＋Hard Stop】.
	DIO Number	Sets the DIO number to which the forward direction stroke limit is assigned.
	LS Number	Sets the LS number for the forward direction stroke limit by bit pattern.
Negative Hard Limit	Limit Action	Sets the move performed when the specified reverse direction stroke limit is reached. The options are 【Ignore】, 【Smooth Stop】, 【Hard Stop】, 【Alarm＋Smooth Stop】, and 【Alarm ＋Hard Stop】.
	DIO Number	Sets the DIO number to which the reverse direction stroke limit is assigned.
	LS Number	Sets the LS number for the reverse direction stroke limit by bit pattern.
Button	Read	Obtains the axis configuration data.
	Set	Sets the axis configuration data.

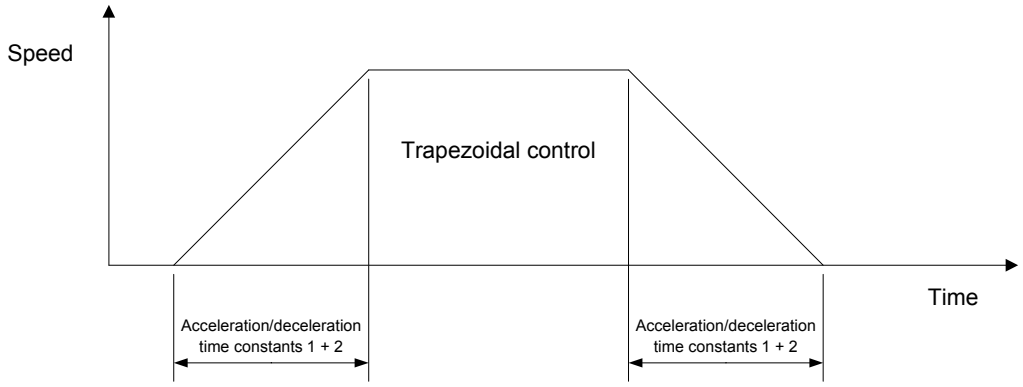
● **Acceleration/Deceleration Time Constants**

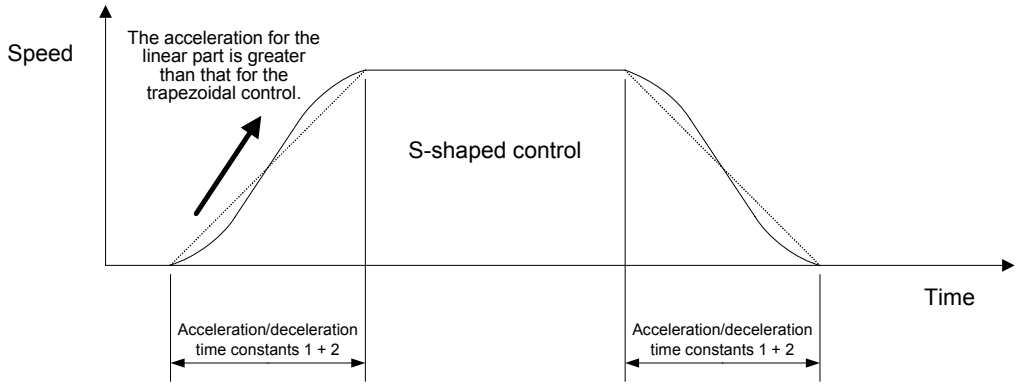
The acceleration/deceleration time constant values can be set by the ACCSET command. However, it is recommended that the values be set in advance by parameters unless they are changed within the program. The following graph shows the acceleration/deceleration time when acceleration/deceleration time constant values are set:



The values for acceleration/deceleration time constants 1 + 2 are set for both acceleration and deceleration.

If 0 is set to either acceleration/deceleration time constant 1 or 2, the acceleration and deceleration pattern is trapezoidal. If acceleration/deceleration time constants 1 and 2 are equal, the S-shaped ratio is the maximum.

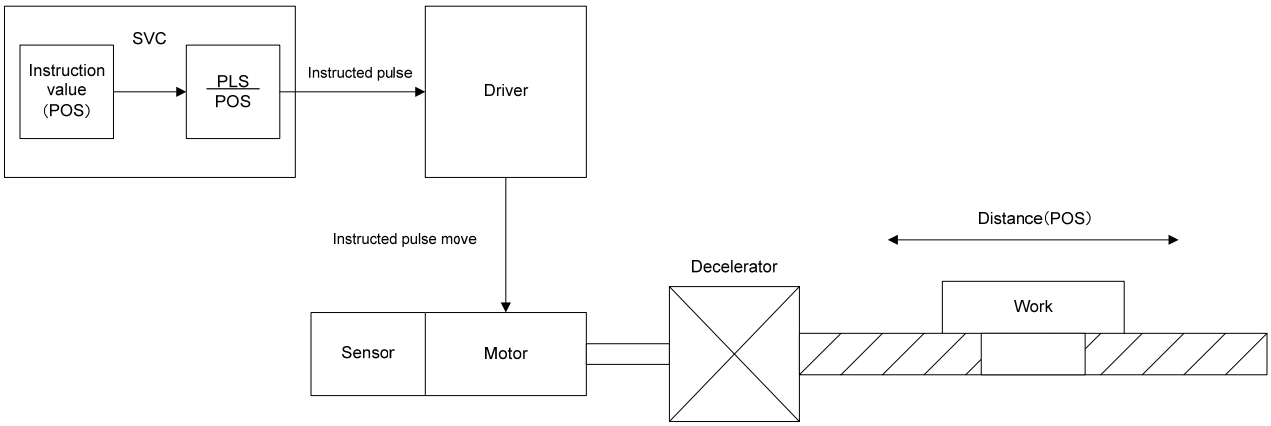




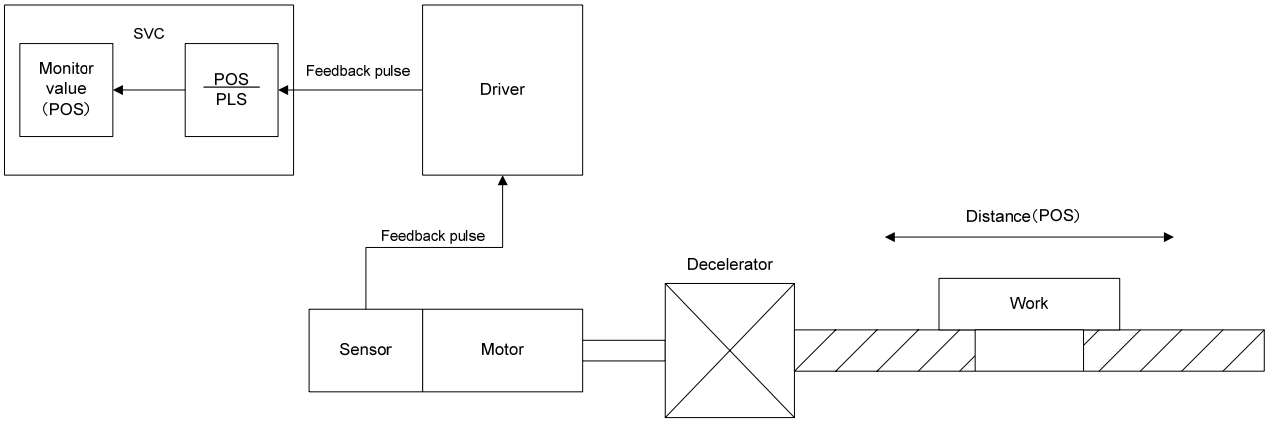
● **Setting Pulse Rates**

The pulse rate determines the number of rotations of the motor required to move the machine the distance instructed by the program. Set the distance (POS) to be travelled by the machine to the numerator of the SVC pulse rate and the number of pulses (PLS) to the denominator. The following figure shows the SVC control blocks and a setting example for an actual machine:

- **If an instruction value is given:**



- **If feedback data is obtained:**



- **If the target machine is a ball screw:**

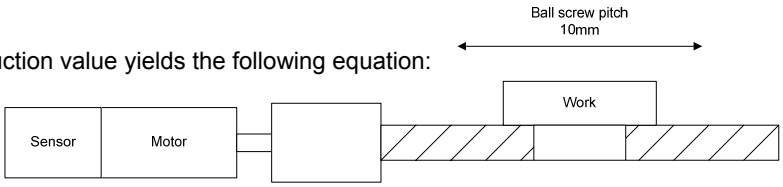
Set linear-motion axis for the axis type in the settings for each axis in the mechanism of SVC parameters if the ball screw pitch is 10 mm, the motor sensor resolution is 2048 pulses, and no decelerator is provided.

PLS = 2048 [pulses] (the number of pulses per rotation of the motor)

POS = 10 [mm] (the distance travelled by the machine per rotation of the motor)

Assigning the pulse rate with reference to the instruction value yields the following equation:

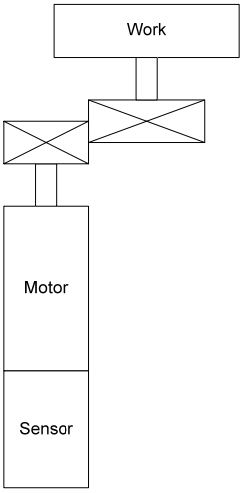
$$\frac{PLS}{POS} = \frac{2048\ [pulses]}{10\ [mm]}$$



If 10 is specified for the move command argument, the motor makes one rotation and the machine moves 10 mm. For more precise control of the machine, set 100 for the POS value. In this case, the minimum instruction unit is 0.1 mm, so the machine moves 10.5 mm if you specify 105 for the move command argument. The distance to be travelled per motor pulse is 10/2048 = 0.0049 [mm] for the above machine configuration. If the value for the distance to be travelled is a non-integer, the fraction is added to the next move data.

- **If the target machine is a rotating table:**

Set the rotation axis for the axis type in the settings for each axis in the mechanism of SVC parameters if the motor sensor resolution is 2048 pulses and the deceleration ratio is 1/3.



PLS = 2048 [pulses] (the number of pulses per rotation of the motor)

POS = 120 [deg] (the distance travelled by the machine per rotation of the motor)

Assigning the pulse rate with reference to the instruction value yields the following equation:

$$\frac{PLS}{POS} = \frac{2048\ [pulses]}{120\ [deg]}$$

If 360 is specified for the move command argument, the motor makes three rotations and the machine rotates 360°. For more precise control of the machine, set 1200 for the POS value. In this case, the minimum instruction unit is 0.1°, so the machine moves 360.5° if you specify 3605 for the move command argument. The distance to be travelled per motor pulse is 120/2048 = 0.059 [deg] for the above machine configuration. If the value for the distance to be travelled is a non-integer, the fraction is added to the next move data.

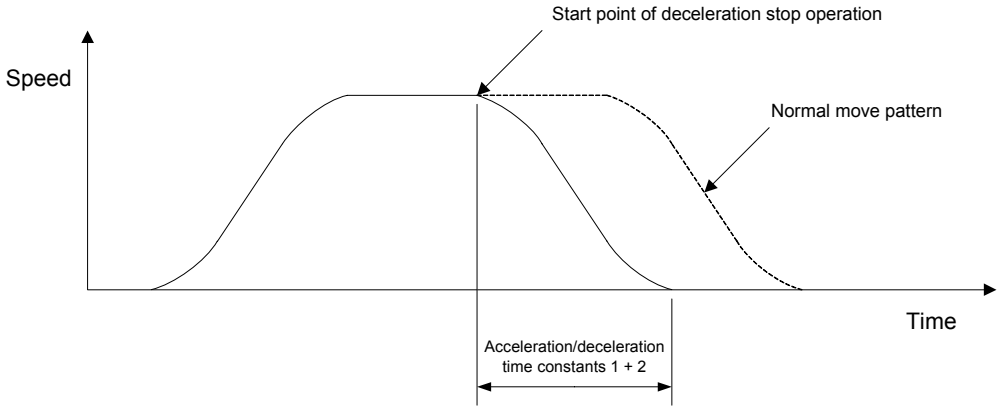
- **Minimum instruction units**

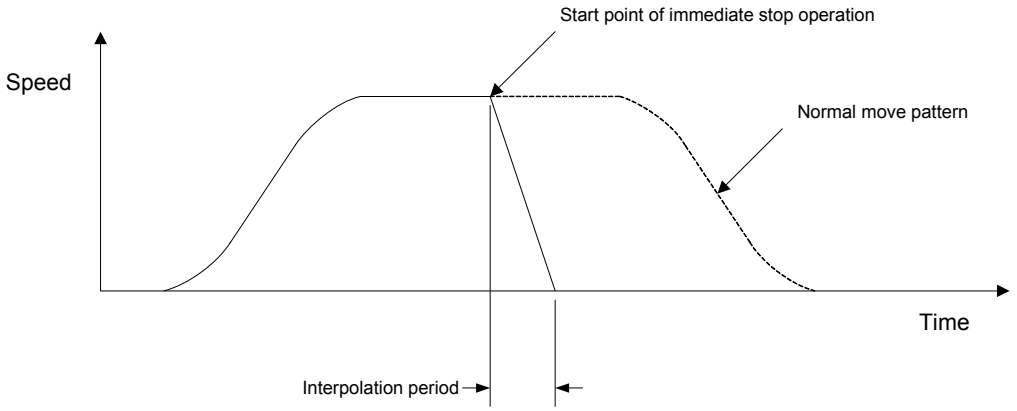
The resolution of the sensor in the motor must be reviewed in a machine for which a smaller minimum instruction unit is desired.

The reason this is necessary is because, for example, for a rotating axis, a positioning of 360°/2048 ≈ 0.18° or smaller is impossible at an encoder resolution of 2048. If the minimum instruction unit is 0.01°, although the instruction position is held in the SVC, an error of 18 (0.18°) is generated in the real position monitor data.

● **Deceleration Stop/Immediate Stop**

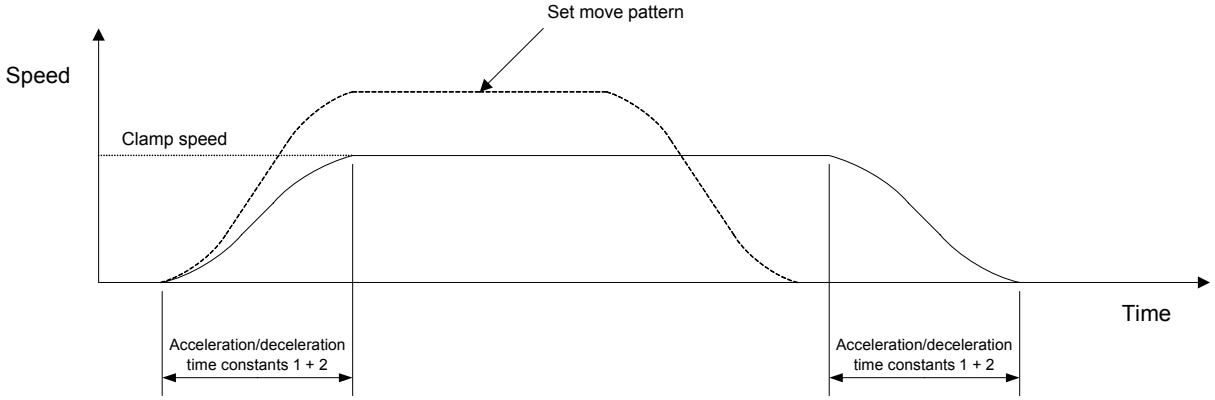
The following two modes are available for a machine stop during a limit operation: deceleration stop and immediate stop. In deceleration stop mode, the machine stops after completion of data delivery from the acceleration/deceleration filter, while in immediate stop mode, the machine stops regardless of the acceleration/deceleration filter status. The following figure shows an example operation for each mode at the instruction values:





● **Speed Limit Clamp Processing**

The figure below shows a move pattern for clamp processing when the speed limit is reached. The move speed is clamped when the set speed limit is reached. The move time is extended by the clamped distance to be travelled.

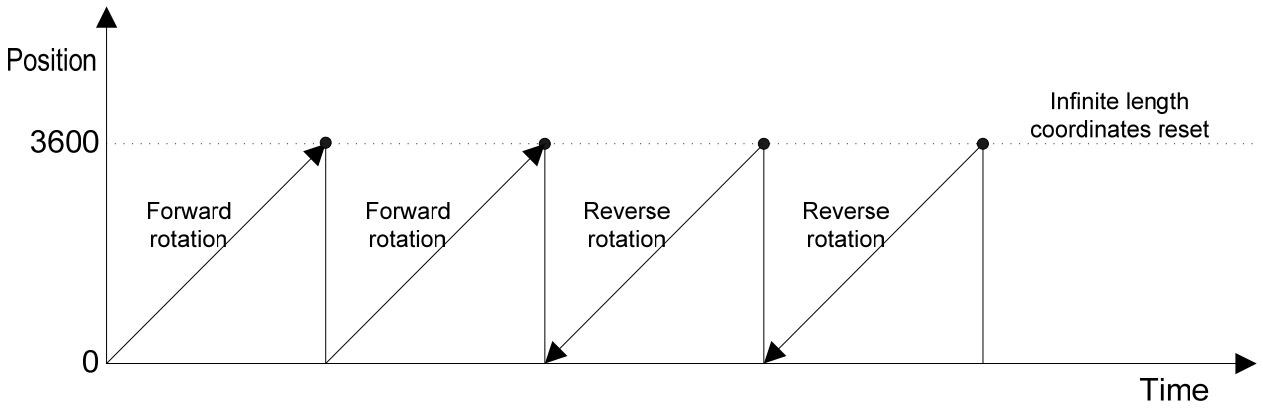


● **Infinite Length Axis**

The axis can be fed indefinitely by specifying the infinite length coordinate reset parameter if infinite rotation axis or infinite linear-motion axis is specified for the axis type. All move instructions except the arc interpolation instruction are valid on the infinite length set axis. An alarm (at the task level) is returned if an arc interpolation instruction is executed. Infinite length axis must also be set for the driver if a move command is used for the infinite length axis setting. Specifically, a value of 1 must be set to bit 7 of parameter ID 73.

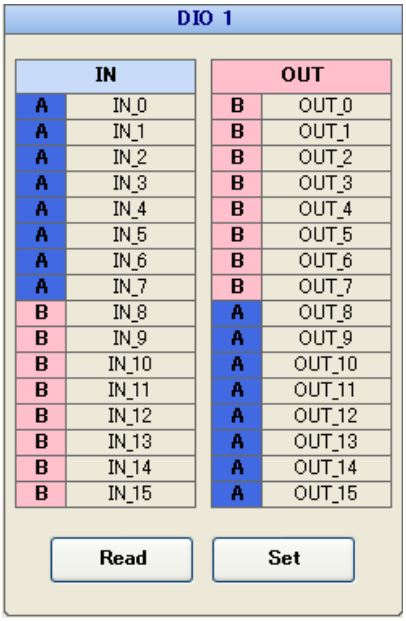
Only a positive integer can be set for the infinite length coordinate reset parameter. If a negative integer is set for this parameter, it is automatically converted to a positive integer in the SVC.

The position data assumes a ring address as shown below if the infinite length coordinate reset parameter is set for an infinite length set axis. The following figure shows data for the case that the infinite length coordinate reset parameter is set to 3600.



The position data is updated in the range of 0 to 3599.

■ Settings on the “I/O Information” Tab Page



Group	Item	Description
IN	Label 【A】	Sets inputs to contact A. Clicking this label causes contacts A and B to switch.
	Label 【B】	Sets inputs to contact B. Clicking this label causes contacts A and B to switch.
OUT	Label 【A】	Sets outputs to contact A. Clicking this label causes contacts A and B to switch.
	Label 【B】	Sets outputs to contact B. Clicking this label causes contacts A and B to switch.
Button	Read	Obtains the I/O information.
	Set	Sets the I/O information.

■ Save the Parameters

After the parameters have been set, save those parameters in the flash memory of the controller. If the parameters are not saved, they are lost after the power is turned ON again. If there are no problems with the set parameter, click the 【Flash】 button under the 【File】 group in the tool pane to save them. To save a list of the parameters in a file, click the 【Save】 button with the desired file name. The extension of parameter file is .svcc.

4.9 Creating a Program

This section describes the procedure for downloading the Tamagawa-prepared sample program to the SVCC for execution. In the description, the sample program is edited by using the 【Program Grid】 tool of the SV Programmer. It is assumed that the SVCC parameters are set to each axis as shown in the table below. All axes are linear-motion (ball screws) and the pitch is 10 mm. Since 100 is set for the pulse rate numerator in the following example, the minimum instruction unit is 0.1 mm.

Axis numbers in the mechanism	Set group	Set item	Set data
Axis 1 (X axis)	Motor type	Sensor resolution	2048
		Maximum speed of the motor	5000 (unit: rpm)
	Acceleration/ deceleration time constants	Acceleration/deceleration time constant 1	200 (unit: msec)
		Acceleration/deceleration time constant 2	200 (unit: msec)
	Axis type	Axis type	Linear-motion axis
		Pulse rate numerator	100
		Pulse rate denominator	2048
		Speed unit	0.01%
Axis 2 (Y axis)	Motor type	Sensor resolution	2048
		Maximum speed of the motor	5000 (unit: rpm)
	Acceleration/ deceleration time constants	Acceleration/deceleration time constant 1	200 (unit: msec)
		Acceleration/deceleration time constant 2	200 (unit: msec)
	Axis type	Axis type	Linear-motion axis
		Pulse rate numerator	100
		Pulse rate denominator	2048
		Speed unit	0.01%
Axis 3 (Z axis)	Motor type	Sensor resolution	2048
		Maximum speed of the motor	5000 (unit: rpm)
	Acceleration/ deceleration time constants	Acceleration/deceleration time constant 1	200 (unit: msec)
		Acceleration/deceleration time constant 2	200 (unit: msec)
	Axis type	Axis type	Linear-motion axis
		Pulse rate numerator	100
		Pulse rate denominator	2048
		Speed unit	0.01%

■ Program Grid Start Window

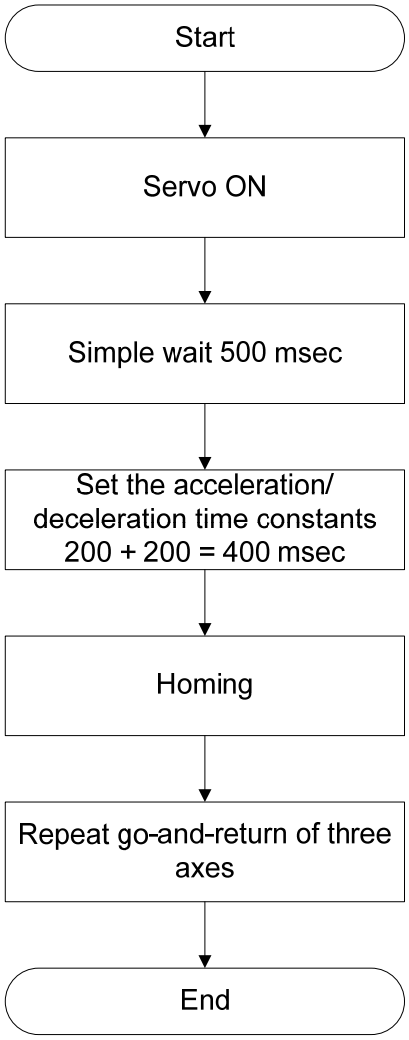
【Program Grid】 is the SVC-specific motion programming tool implemented in the SV Programmer. This tool creates programs by using an editor in tabular form. This tool provides an abundance of convenient functions for motion programming such as allowing the user to select commands from a command list and automatically displaying and updating the command arguments according to the selected commands. For the detailed functions of 【Program Grid】, refer to the separate "Programming Manual, Program Grid Edition." This section only describes the outline of the sample program and the procedure up to executing the created program, bypassing the description of 【Program Grid】 functions. The following figure shows an example of the 【Program Grid】 start window:

■ Reading the Program

To read the program, click the 【Open】 button under the 【File】 group in the tool pane. The extension of the program created by the program grid is .asm. The sample program is stored in the install directory C¥Progaram Files¥Tamagawa¥SV Programmer¥Samples of the SV Programmer.

■ Description of the Sample Program

The figure below is a flowchart of the sample program. It is a simple program that performs Servo ON, setting of acceleration/deceleration time constants, homing, and repetition of go-and-return of three axes in this order.



■ Sample Program List

Label	Command	Argument number	Argument list	Argument value	Description		
	SVON	0	MCH	0	Mechanism number	0	
		1	SETUP	0x0007	Setup axis number	Specify Axes 1, 2, and 3.	
	WAIT	0	TIMER	0	Timer number 0		
		1	WAIT	500	Wait time	500 msec	
	ACCSET	0	MCH	0	Mechanism number	0	
		1	SETUP	0x0007	Setup axis number	Specify Axes 1, 2, and 3.	
		2	T1	200	Acceleration/deceleration time constant 1	200 ms	
		3	T2	200	Acceleration/deceleration time constant 2	200 ms	
	HOME	0	MCH	0	Mechanism number	0	
		1	SETUP	0x0007	Setup axis number	Specify Axes 1, 2, and 3.	
		2	HS1	1000	Axis 1 is set.	Homing start move speed	5000 × 10% = 500 rpm
		3	MS1	200		Home sensor LS move speed	5000 × 2% = 100 rpm
		4	ZS1	100		Z search speed	5000 × 1% = 50 rpm
		5	HMIO1	0		Home sensor DIO number	Specify DIO_0.
		6	HMLS1	0x0001		Home sensor LS number	Specify BIT_0.
		7	LMIO	0		Limit DIO number	Specify DIO_0.
		8	LMLS1	0x8000		Limit LS number	Specify BIT_15.
		9	HS2	-1000	Axis 2 is set.	Homing start move speed	5000 × 10% = -500 rpm
		10	MS2	-200		Home sensor LS move speed	5000 × 2%= -100 rpm
		11	ZS2	-100		Z search speed	5000 × 1%= -50 rpm
		12	HMIO2	0		Home sensor DIO number	Specify DIO_0.
		13	HMLS2	0x0002		Home sensor LS number	Specify BIT_1.
		14	LMIO2	0		Limit DIO number	Specify DIO_0.
		15	LIM2	0x4000		Limit LS number	Specify BIT_14.
		16	HS3	1000	Axis 3 is set.	Homing start move speed	5000 × 10% = 500 rpm
		17	MS3	200		Home sensor LS move speed	5000 × 2%= 100 rpm
		18	ZS3	-100		Z search speed	5000 × 1% = -50 rpm
		19	HMIO3	0		Home sensor DIO number	Specify DIO_0.
		20	HMLS3	0x0004		Home sensor LS number	Specify BIT_2.
		21	LMIO3	0		Limit DIO number	Specify DIO_0.
		22	LIM3	0x2000		Limit LS number	Specify BIT_13.
	ORGM	0	MCH	0	Mechanism number	0	

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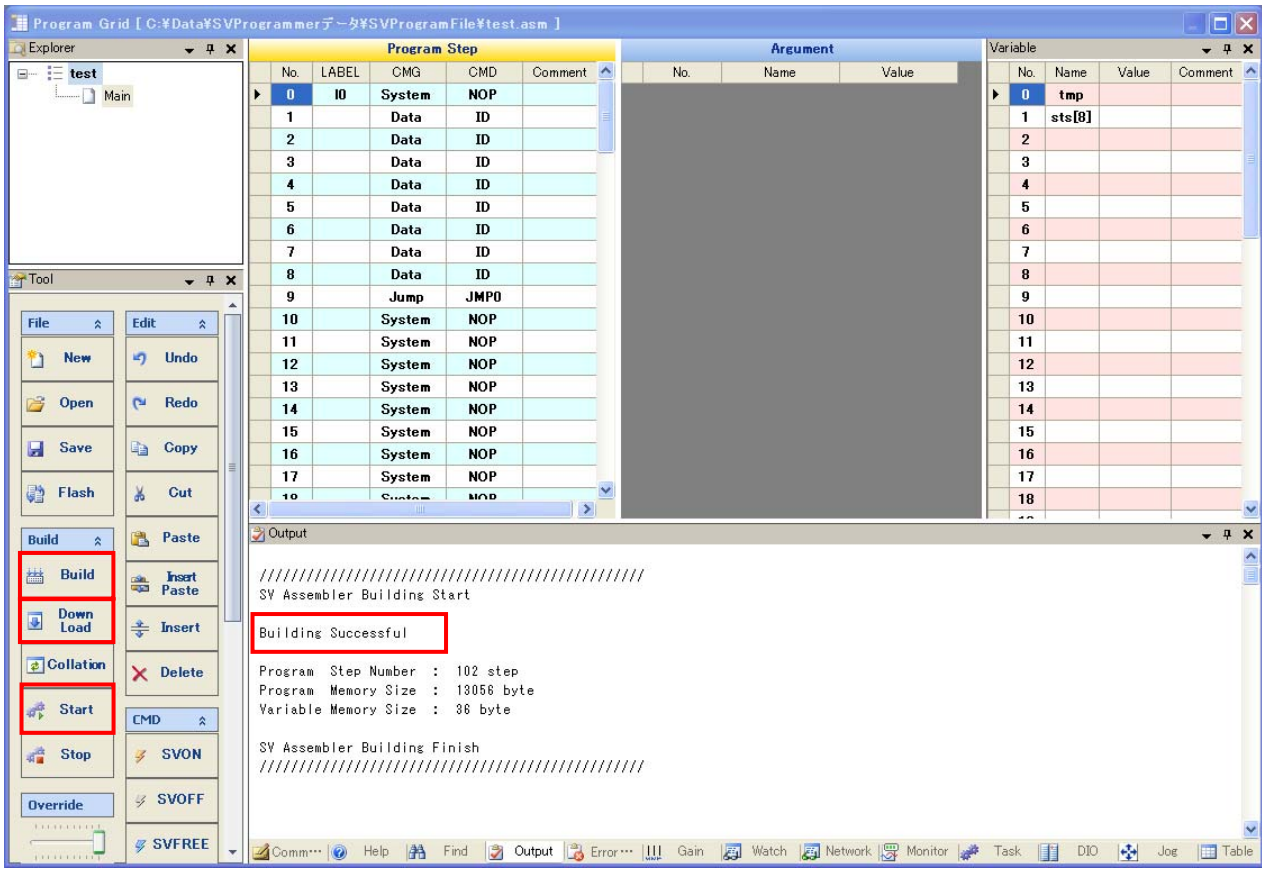
Label	Command	Argument number	Argument list	Argument value	Description		
L1	MOVAJ	0	MCH	0	Mechanism number	0	
		1	SETUP	0x0007	Setup axis number	Specify Axes 1, 2, and 3.	
		2	P1	X_POS_5000	Axis 1 is set.	Target position	500.0 mm
		3	V1	X_VEL_2000		Target speed	1000 rpm 5000 × 0.2
		4	P2	Y_POS_5000	Axis 2 is set.	Target position	500.0 mm
		5	V2	Y_VEL_2000		Target speed	1000 rpm 5000 × 0.2
		6	P3	Z_POS_2500	Axis 3 is set.	Target position	250.0 mm
		7	V3	Z_VEL_2000		Target speed	1000 rpm 5000 × 0.2
	INPOSM	0	MCH	0	Mechanism number	0	
	WAIT	0	TIMER	0	Timer number 0		
		1	WAIT	1000	Wait time.	1000 msec	
	MOVAJ	0	MCH	0	Mechanism number	0	
		1	SETUP	0x0007	Setup axis number	Specify Axes 1, 2, and 3.	
		2	P1	X_POS_0	Axis 1 is set.	Target position	0.0 mm
		3	V1	X_VEL_2000		Target speed	1000 rpm 5000 × 0.2
		4	P2	Y_POS_0	Axis 2 is set.	Target position	0.0 mm
		5	V2	Y_VEL_2000		Target speed	1000 rpm 5000 × 0.2
		6	P3	Z_POS_0	Axis 3 is set.	Target position	0.0 mm
		7	V3	Z_VEL_2000		Target speed	1000 rpm 5000 × 0.2
	INPOSM	0	MCH	0	Mechanism number	0	
	WAIT	0	TIMER	0	Timer number	0	
		1	WAIT	500	Wait time.	1000 msec	
	JMP0	0	LABEL	L1	Branch destination label	L1	

4.10 Executing the Program

Once reading of the program has been completed, build and download the program and then execute it. Use the 【Build】, 【Download】, and【Start】buttons under the【Build】group in the program grid tool pane. The following window is displayed after the building step has been completed:



■ Building Successful

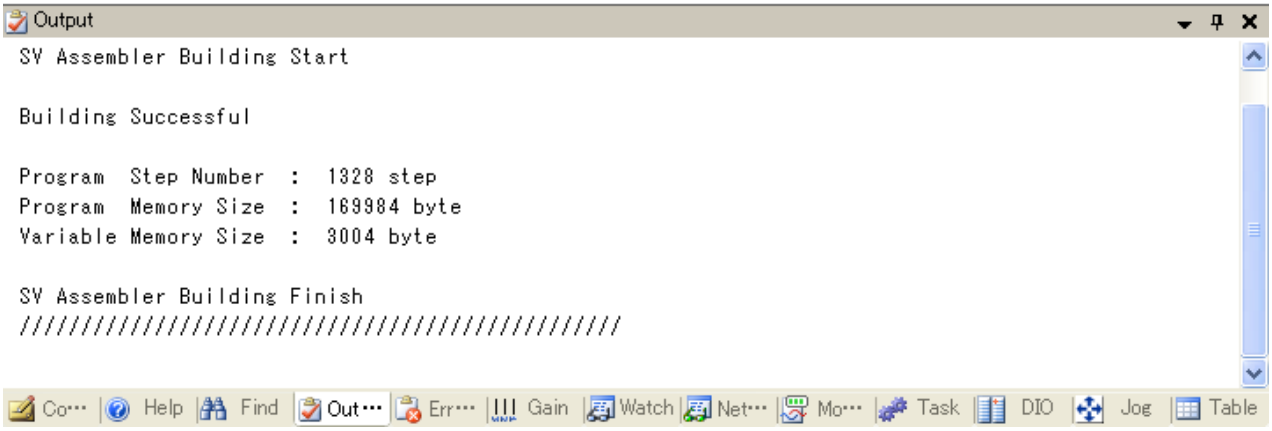
The message “Building Successful” is displayed in the output pane on successful completion of a build operation.

Other messages and a description of their meanings are as follows:

- Program Step Number — Indicates the number of steps in the created program.

  * Note:

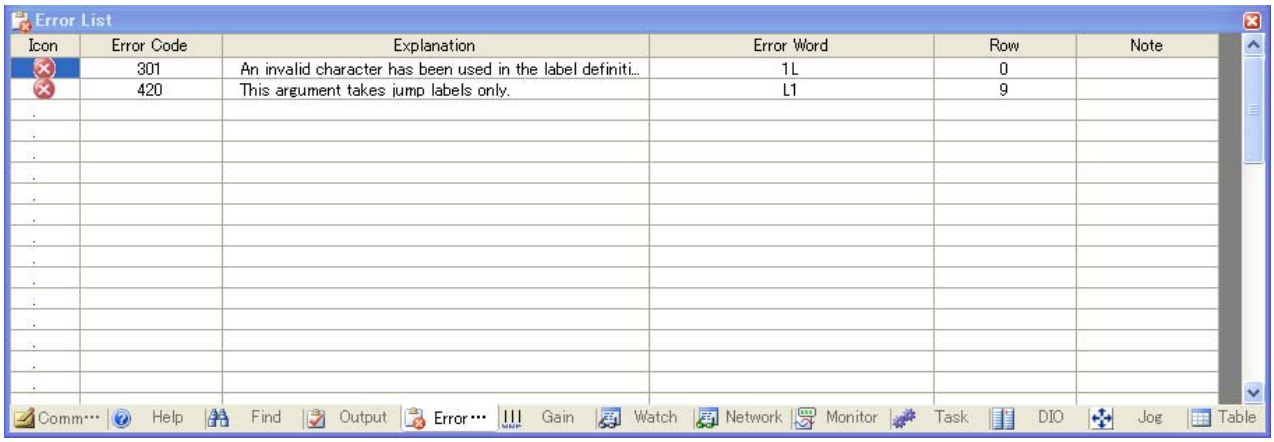
  The number of steps does not always match the number of lines on the program grid.
- Program Memory Size — Indicates the size of the command memory being used.
- Variable Memory Size — Indicates the size of the variable being used.



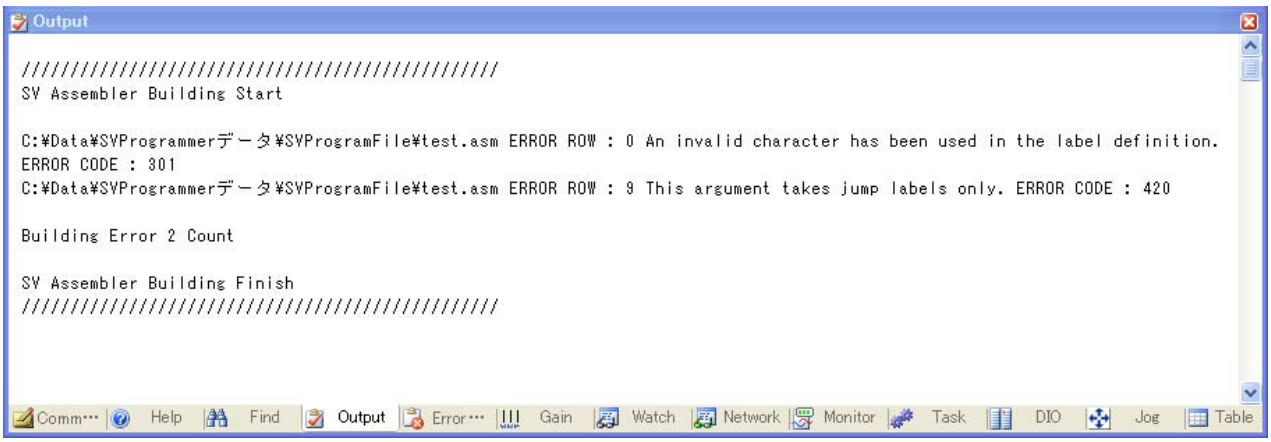
The currently displayed program is automatically overwritten to the existing program and saved when build is executed. For a newly created program, the file save dialog box is displayed. Save the current program before executing build.

■ Building Failed

Try executing build with the name of label 【L1】 changed to 【1L】.



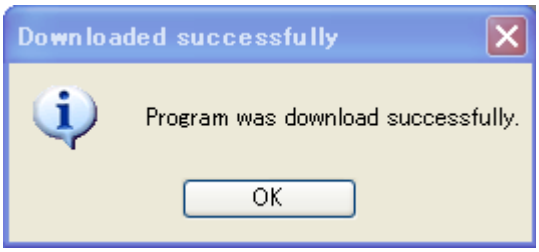
The error information pane is activated and outputs detailed error information. To go to the location of a particular error, double click the relevant error information line. The output pane reads as follows when an error occurs:



Detailed error information, including the number of errors that occurred, is output. The program is overwritten and saved even if building failed.

■ Downloading

When the 【Download】 button is clicked, the program is built and the object file (executable file) is then downloaded to the SVC main unit. The following message is output on successful completion of a download:



The【F6】function key can also be used for downloading. Combining use of【F6】and【F5】(program execution) simplifies operation of the program grid.

■ Executing the Program

Click the 【Start】 button to execute the program. The program starts Task 0 and the command memory is executed sequentially beginning with address 0. Click the 【Stop】 button to stop program execution.

The 【F5】 function key can also be used for program execution. To stop execution of the program, press 【SHIFT＋F5】.

■ Saving the Program

Save the created program to flash memory if it works correctly. For automatic execution after power-on, set 【Auto run task number 0】 of the 【Memory Switch】 group of the SVC to ON before saving the program to flash memory. Program creation completes if automatic execution is confirmed when the power is turned on again after the settings for saving the program have been completed.

5. Command List

This section shows the commands implemented in the SVCC and their functions in list form. The assembler function implemented in the SV Programmer is referred to as the Tamagawa Motion Assembler Language (TMasM). TMasM is associated with the command interpreter section of the SVC Main Unit Software. It finally outputs assembler code for creation of object files, regardless of what upper-order language is used. For details on the commands of the upper-order language, refer to the relevant programming manual. This section only shows a list of the assembler commands implemented in the SVCC.

■ System Instructions

Command type	Command name	Description
System instruction	NOP	No operation
	ALMRST	Resetting of abnormal condition
	ACCSET	Setting of acceleration/deceleration time constants
	PRMSET2	Setting of parameters
	END	End

■ Data Instructions

Command type	Command name	Description
Data instruction	ID	Assignment
	NOT	Logical inversion (bit-by-bit operation)
	NEG	Sign inversion
	ABS	Absolute value
	ADD	Addition
	SUB	Subtraction
	MUL	Multiplication
	DIV	Division
	MOD	Remainder
	AND	Logical conjunction (bit-by-bit operation)
	OR	Logical disjunction (bit-by-bit operation)
	XOR	Exclusive logical disjunction (bit-by-bit operation)
	ROT	Rotate
	SHIFT	Bit shift
	FIELD1	Field extraction 1
	FIELD2	Field extraction 2
	SCALE	Scaling
	SIN	Sine
	COS	Cosine
	MERGE	Merge
	PRMGET	Acquisition of parameter values
	MONGET	Acquisition of monitor item values
	COPY	Data copy

■ Branch Instructions

Command type	Command name	Description
Branch instruction	CALL	Subroutine call
	RET	Subroutine return
	JMP0	Unconditional jump
	JMP1	Condition: Unary
	JMPAND	Condition: Logical conjunction
	JMPEQ	Condition: Equal sign relation
	JMPNE	Condition: Inequality sign relation
	JMPLT	Condition: Less than relation
	JMPGT	Condition: Greater than relation
	JMPLE	Condition: Equal to or less than relation
	JMPGE	Condition: Equal to or greater than relation
	JMPBIT	Condition: Specified data bits are ON.
	JNPBIT	Condition: Specified data bits are OFF.
	JMPAXIS	Condition: PASS point for each axis
	JMPMCH	Condition: PASS point in the mechanism
	JMPDIO	Condition: Specified DIN bits are ON.
	JNPDIO	Condition: Specified DIN bits are OFF.

■ Task Instructions

Command type	Command name	Description
Task instruction	TSTART	Task start
	GETTID	Acquisition of current task ID
	GETTST	Acquisition of task starting status
	TRESTART	Task restart
	TSTEP	Task step execution
	TEND	Task stop

■ Timer Instructions

Command type	Command name	Description
Timer instruction	TIME	Setting of timers
	WAIT	Simple wait

■ I/O Instructions

Command type	Command name	Description
I/O instruction	DOUT	DIO output
	DIN	DIO input
	AOUT	Analog output
	AIN	Analog input
	BITON	Bit output (ON)
	BITOFF	Bit output (OFF)
	BITIN	Bit input

■ PASS Instructions

Command type	Command name	Description
PASS instruction	PASSM	Wait for completion of interpolation calculation for all axes in mechanism
	DECELM	Wait for deceleration completion for all axes in mechanism
	INPOSM	Wait for in-position for all axes in mechanism
	ORGM	Wait for homing completion for all axes in mechanism
	PASSA	Wait for completion of interpolation calculation for each axis in mechanism
	DECELA	Wait for deceleration completion for each axis in mechanism
	INPOSA	Wait for in-position for each axis in mechanism
	ORGA	Wait for homing completion for each axis in mechanism

■ Servo Instructions

Command type	Command name	Description
Servo instruction	SVON	Servo ON
	SVOFF	Servo OFF
	SVFREE	Servo FREE
	SVMODE	Servo mode change
	SVVEL	Setting of speed for speed control
	SVCUR	Setting of electric current value for torque control
	SVPRM2	Setting of servo parameters

■ Homing Instructions

Command type	Command name	Description
Homing instruction	HOME	Homing
	HOME2	Homing (for resolver 2X)
	HOMESET	Setting of ad hoc origin
	HOMESET2	Setting of ad hoc origin (preset value)
	HOMECLR	Clearing of homing completed status
	HOMINGS	Declaration of homing processing start
	HOMINGE	Declaration of homing processing end
	HOMEBUMP	Homing (mechanical stopper thrust method)
	HOMESV	Homing (origin detection)

■ Network Instructions

Command type	Command name	Description
RS232C data instruction	RUNRS	Start of automatic send/receive mode
	STOPRS	Stop of automatic send/receive mode
	GETRS	Acquisition of data from an RS232C device
	SETRS	Setting of data to an RS232C device
	FINRS	Wait for completion of an RS command

■ JOG Instructions

Command type	Command name	Description
JOG instruction	SETJOGJ	Setting of individual-axis continuous feed
	JOGJ	Individual-axis continuous feed

■ Absolute Position Move Target Set Instructions

Command type	Command name	Description
Absolute position move target set instruction	SETMOVAJ	Setting of individual-axis absolute position move target
	SETMOVAJT	Setting of time-specified individual-axis absolute position move target
	SETMOVAJFS	Setting of primary-speed individual-axis absolute position move target
	SETMOVAJCU	Setting of secondary-speed individual-axis absolute position move target
	SETMOAJTW	Setting of wait-type time-specified individual-axis absolute position move target
	SETMOVAJA1	Setting of right angle arc interpolation individual-axis absolute position move target
	SETMOVAJA2	Setting of arc interpolation individual-axis absolute position move target
	SETMOVAJBL	Setting of tertiary-speed individual-axis absolute position move target

■ Relative Position Move Target Set Instructions

Command type	Command name	Description
Relative position move target set instruction	SETMOVIJ	Setting of individual-axis relative position move target
	SETMOVIJT	Setting of time-specified individual-axis relative position move target
	SETMOVIJFS	Setting of primary-speed individual-axis relative position move target
	SETMOVIJCU	Setting of secondary-speed individual-axis relative position move target
	SETMOVIJTW	Setting of wait-type time-specified individual-axis relative position move target
	SETMOVIJA1	Setting of right angle arc interpolation individual-axis relative position move target
	SETMOVIJA2	Setting of arc interpolation individual-axis relative position move target
	SETMOVIJBL	Setting of tertiary-speed individual-axis relative position move target

■ Absolute Position Move Instructions

Command type	Command name	Description
Absolute position move instruction	MOVAJ	Individual-axis absolute position move
	MOVAJT	Time-specified individual-axis absolute position move
	MOVAJFS	Primary-speed individual-axis absolute position move
	MOVAJCU	Secondary-speed individual-axis absolute position move
	MOAJTW	Wait-type time-specified individual-axis absolute position move
	MOVAJA1	Right angle arc interpolation individual-axis absolute position move
	MOVAJA2	Arc interpolation individual-axis absolute position move
	MOVAJBL	Tertiary-speed individual-axis absolute position move

■ Relative Position Move Instructions

Command type	Command name	Description
Relative position move instruction	MOVIJ	Individual-axis relative position move
	MOVIJT	Time-specified individual-axis relative position move
	MOVIJFS	Primary-speed individual-axis relative position move
	MOVIJCU	Secondary-speed individual-axis relative position move
	MOVIJTW	Wait-type time-specified individual-axis relative position move
	MOVIJA1	Right angle arc interpolation individual-axis relative position move
	MOVIJA2	Arc interpolation individual-axis relative position move
	MOVIJBL	Tertiary-speed individual-axis relative position move

■ Move Control Instructions

Command type	Command name	Description
Move control instruction	MOVE	Move instruction
	STOP	Stop instruction
	SETOVR	Setting of speed override data
	GETOVR	Acquisition of speed override data
	SETWAIT	Setting of move completion mode
	GETWAIT	Acquisition of move completion mode
	STOPJ	Individual-axis stop instruction

6. Parameter List

This section shows the SVCC internal parameters and their description in list form. To set or reference SVCC internal parameters, use the 【Controller Setup】 function of the SV Programmer. SVCC internal parameters can be set or referenced by the PRMSET2 or PRMGET command during program execution. However, it is recommended that the parameters be set in advance by the 【Controller Setup】 function unless they need to be set or referenced during program execution. The tables below are lists of SVCC parameters by category.

* Note:

Before changing a controller parameter value, stop the program and turn the servo OFF.

■ System-Related Parameters

Class number	Group number	ID number	Description	W	S
0x0010 System-related parameter	0 Basic configuration	0	Memory switch	×	O
		1	Basic processing period (unit: μsec)	×	O
		2	Upper limit for host command reception interval (unit: msec) Not checked if 0 is specified.	×	O
		3	Time for determining whether or not the host command is executable (unit: msec) Not checked if 0 is specified.	×	O
		4	Variable number to be written in the event of a host command error	×	O
		5	Task number to be written in the event of a host command error	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O
	1 Product information	0	Product model (TA number)	×	×
		1	Product model (N number)	×	×
		2	Product model (E number)	×	×
		3	Serial number (first 4 characters)	×	×
		4	Serial number (second 4 characters)	×	×
		5	Reserved	×	×
		6	Reserved	×	×
		7	Reserved	×	×
		8	Reserved	×	×
		9	Reserved	×	×

Class number	Group number	ID number	Description	W	S
0x0010 System-related parameter	2 SV-NET	0	Default of the SV-NET CH1 baud rate: 4 (1 Mbps)	○	○
		1	Default of the SV-NET CH2 baud rate: 1 (250 Kbps)	○	○
		2	Reserved	×	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Reserved	×	○
		6	Reserved	×	○
		7	Reserved	×	○
		8	Reserved	×	○
		9	Reserved	×	○
	3 RS232C basic configuration	0	Default of the RS232C baud rate: 2 (38400 bps)	○	○
		1	Default of the number of data elements: 0 (8 bits)	○	○
		2	Default of the stop bit polarity: 0 (1 bit)	○	○
		3	Default of the parity: 0 (none)	○	○
		4	Reserved	×	○
		5	Operation in the event of an alarm	○	○
		6	Reserved	×	○
		7	Communication mode	○	○
		8	Communication timeout	○	○
		9	Response wait	○	○
	4 Configuration of RS232C automatic send/receive	0	Automatic send/receive mode	○	○
		1	First address of the device in automatic send/receive mode (Read)	○	○
		2	First address of the device in automatic send/receive mode (Write)	○	○
		3	Number of data elements per session in automatic send/receive mode	○	○
		4	Number of times the automatic send/receive mode is repeated	○	○
		5	First address of the network variable (Read)	○	○
		6	First address of the network variable (Write)	○	○
		7	Communication interval	○	○
		8	Device type (ASCII character at the first position)	○	○
		9	Device type (ASCII character at the second position)	○	○

Class number	Group number	ID number	Description	W	S
0x0010 System-related parameter	7 Reserved	0	Reserved	×	O
		1	Reserved	×	O
		2	Reserved	×	O
		3	Reserved	×	O
		4	Reserved	×	O
		5	Reserved	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O
	5 Reserved	0	Reserved	×	O
		1	Reserved	×	O
		2	Reserved	×	O
		3	Reserved	×	O
		4	Reserved	×	O
		5	Reserved	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O
	6 Reserved	0	Reserved	×	O
		1	Reserved	×	O
		2	Reserved	×	O
		3	Reserved	×	O
		4	Reserved	×	O
		5	Reserved	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O

Class number	Group number	ID number	Description	W	S
0x0010 System-related parameter	8 Alarm history 1	0	Alarm history 1	×	×
		1	Alarm history 2	×	×
		2	Alarm history 3	×	×
		3	Alarm history 4	×	×
		4	Alarm history 5	×	×
		5	Alarm history 6	×	×
		6	Alarm history 7	×	×
		7	Alarm history 8	×	×
		8	Alarm history 9	×	×
		9	Alarm history 10	×	×
	9 Alarm history 2	0	Alarm history 11	×	×
		1	Alarm history 12	×	×
		2	Alarm history 13	×	×
		3	Alarm history 14	×	×
		4	Alarm history 15	×	×
		5	Alarm history 16	×	×
		6	Alarm history 17	×	×
		7	Alarm history 18	×	×
		8	Alarm history 19	×	×
		9	Alarm history 20	×	×

■ SVD Axis n

Class number	Group number	ID number	Description	W	S
0x1000 + n SVD Axis n	0 Motor type & encoder type	0	Reserved	×	○
		1	Reserved	×	○
		2	Reserved	×	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Number of encoder pulses per rotation of the motor (Value after internal processing of the driver)	○	○
		6	Reserved	×	○
		7	Maximum rotation speed of the motor (unit: rpm)	○	○
		8	Reserved	×	○
		9	Reserved	×	○
	1 Acceleration/ deceleration time constant	0	Reserved	×	○
		1	Length of the 1st acceleration/deceleration buffer (unit: msec)	○	○
		2	Length of the 2nd acceleration/deceleration buffer (unit: msec)	○	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Reserved	×	○
		6	Reserved	×	○
		7	Reserved	×	○
		8	Reserved	×	○
		9	Reserved	×	○
	2 Configuration of network servo communication	0	Address ID (1 to 63)	×	○
		1	Group ID (1 to 63)	×	○
		2	Sub-ID for the group (0 to 2)	×	○
		3	Network access period (unit: μsec)	×	○
		4	Position output period (unit: μsec)	×	○
		5	Internal data ID (If a value other than 0 is specified, the data associated with the input ID is changed.)	×	○
		6	Set value of internal data (Set value for internal data ID is described above.)	×	○
		7	Internal data ID for the monitor	×	○
		8	Number of bytes of the internal data for the monitor (1, 2, and 4)	×	○
		9	Reserved	×	○

■ DIO Board n

Class number	Group number	ID number	Description	W	S
0x1100 + n DIO Board n	0 Configuration of digital input	0	Reserved	×	○
		1	Masking of 32 polarity points (The signal for the set bit (1) is contact B and the signal for the reset bit (0) is contact A.)	○	○
		2	Reserved	×	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Reserved	×	○
		6	Reserved	×	○
		7	Reserved	×	○
		8	Reserved	×	○
		9	Reserved	×	○
	1 Configuration of digital output	0	Reserved	×	○
		1	Masking of 32 polarity points (The signal for the set bit (1) is contact B and the signal for the reset bit (0) is contact A.)	○	○
		2	Reserved	×	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Reserved	×	○
		6	Reserved	×	○
		7	Reserved	×	○
		8	Reserved	×	○
		9	Reserved	×	○

■ **AIO CH n**

Class number	Group number	ID number	Description	W	S
0x1200 + n AIO CH n	0 Configuration of analog input	0	Reserved	×	O
		1	Reserved	×	O
		2	Reserved	×	O
		3	Reserved	×	O
		4	Reserved	×	O
		5	Reserved	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O
	1 Configuration of analog output	0	Reserved	×	O
		1	Reserved	×	O
		2	Reserved	×	O
		3	Reserved	×	O
		4	Reserved	×	O
		5	Reserved	×	O
		6	Reserved	×	O
		7	Reserved	×	O
		8	Reserved	×	O
		9	Reserved	×	O

■ Mechanism n

Class number	Group number	ID number	Description	W	S
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	0	Mechanism type 0: Not used; 1: Simple mechanism	×	○
		1	Number of axes	×	○
		2	SVD axis number to be assigned to Axis 1. -1 in the case of a virtual mechanism.	×	○
		3	SVD axis number to be assigned to Axis 2. -1 in the case of a virtual mechanism.	×	○
		4	SVD axis number to be assigned to Axis 3. -1 in the case of a virtual mechanism.	×	○
		5	SVD axis number to be assigned to Axis 4. -1 in the case of a virtual mechanism.	×	○
		6	SVD axis number to be assigned to Axis 5. -1 in the case of a virtual mechanism.	×	○
		7	SVD axis number to be assigned to Axis 6. -1 in the case of a virtual mechanism.	×	○
		8	SVD axis number to be assigned to Axis 7. -1 in the case of a virtual mechanism.	×	○
		9	SVD axis number to be assigned to Axis 8. -1 in the case of a virtual mechanism.	×	○
		:	:	×	○
		33	SVD axis number to be assigned to Axis 32. -1 in the case of a virtual mechanism.	×	○
		:	:	×	○
		40	DIO number for the emergency stop signal	○	○
		41	LS number for the emergency stop signal (bit pattern)	○	○
		42	Emergency stop post-processing 0: Ignored; 1: Deceleration stop for all axes; 2: Immediate stop for all axes 3: Deceleration stop for all axes + Servo OFF 4: Immediate stop for all axes + Servo OFF 5: Alarm + Deceleration stop for all axes 6: Alarm + Immediate stop for all axes 7: Alarm + Deceleration stop for all axes + Servo OFF 8: Alarm + Immediate stop for all axes + Servo OFF	○	○
		:	:	×	○
		48	Specification of 0 time and 0 speed 0: Ignored (deceleration stop) 1: Warning 2: Alarm + Deceleration stop for all axes	○	○
		49	Origin mode at power-on 0: The origin is fixed at the position of the servo motor at power-on. 1: Origin not fixed until completion of homing after power-on.	○	○

Class number	Group number	ID number	Description	W	S
0x2000 + n Mechanism n	j Axis j	0	Axis type 0: Linear-motion axis; 1: Rotation axis; 2: Infinite linear motion axis; 3: Infinite rotation axis	○	○
		1	Pulse rate numerator (unit: instruction unit [mm or deg])	○	○
		2	Pulse rate denominator (unit: pulse)	○	○
		3	Speed unit 0: 0.01% (with respect to the maximum rotation speed of the motor) 1: Instruction unit (per second); 2: min^{-1} [rpm]	○	○
		4	Speed limit (unit: speed unit)	○	○
		5	Processing when the maximum speed is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Clamp; 4: Warning + Clamp 5: Alarm + Deceleration stop; 6: Alarm + Immediate stop	○	○
		6	Forward direction soft limit (unit: instruction unit)	○	○
		7	Processing when the forward direction soft limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Alarm + Deceleration stop	○	○
		8	Reverse direction soft limit (unit: instruction unit)	○	○
		9	Processing when the reverse direction soft limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Alarm + Deceleration stop	○	○
		10	DIO number for the forward direction stroke limit	○	○
		11	LS number for the forward direction stroke limit (bit pattern)	○	○
		12	Processing when the forward direction stroke limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Alarm + Deceleration stop; 4: Alarm + Immediate stop	○	○
		13	DIO number for the reverse direction stroke limit	○	○
		14	LS number for the reverse direction stroke limit (bit pattern)	○	○
		15	Processing when the reverse direction stroke limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Alarm + Deceleration stop; 4: Alarm + Immediate stop	○	○
		16	DIO number for the home sensor signal	○	○
		17	LS number for the home sensor signal (bit pattern)	○	○
		18	Reserved	×	○
		19	Reserved	×	○
		20	Infinite length axis coordinate reset (unit: instruction unit)	○	○
		:	:	×	○
		:	:	×	○
		49	Reserved	×	○

Class number	Group number	ID number	Description	W	S
0x2000 + n Mechanism n	50 Motion control	0	Interpolation period (unit: μsec)	×	O
		1	SVD monitoring period (unit: μsec)	×	O
		2	Reserved	×	O
		:	:	×	O
		:	:	×	O
		49	Reserved	×	O

■ **Task-Related Parameters**

Class number	Group number	ID number	Description	W	S
0x4000 Task-related parameter	0 Assignment of global variables	0	Number of global variables	×	O
		1	Number of network variables 1	×	O
		2	Number of network variables 2	×	O
		3	Number of network variables 3	×	O
		4	Number of network variables 4	×	O
		5	Number of network variables 5	×	O
		6	Number of network variables 6	×	O
		7	Number of network variables 7	×	O
		8	Number of network variables 8	×	O
		9	Reserved	×	O
		10	Reserved	×	O
		11	Reserved	×	O
		12	Reserved	×	O
		13	Reserved	×	O
		14	Reserved	×	O
		15	Reserved	×	O
		16	Reserved	×	O
		17	Reserved	×	O
		18	Reserved	×	O
		19	Reserved	×	O

■ Task n

Class number	Group number	ID number	Description	W	S
0x4000 + n Task n	0 Assignment of local variables and stack variables	0	Number of local variables	×	○
		1	Number of stack variables	×	○
		2	Reserved	×	○
		3	Reserved	×	○
		4	Reserved	×	○
		5	Reserved	×	○
		6	Reserved	×	○
		7	Reserved	×	○
		8	Reserved	×	○
		9	Task stop processing in the event of an alarm 0: Stop the task in the event of an alarm 1: Do not stop the task in the event of an alarm	○	○

7. Details of Parameters

This section details the SVCC internal parameters with spotlights only on the items that are used ordinarily.

* Note:

Before changing a controller parameter value, stop the program and turn the servo OFF.

■ System-Related Parameters

<Memory Switch>

This switch is used to determine the operation to be started after the SVCC is powered on. Note, however, that only 【Auto run task number 0】 can be set from the SV Programmer. Ordinarily, other settings are not needed. Once creation and debugging of the program have been completed, turn 【Auto run task number 0】 ON. Task 0 is started and program execution begins with address 0 of the command memory after the SVCC is powered on.

Class number	Group number	ID number	Description
0x0010 System-related parameter	0 Basic configuration	0	Memory switch Bit 0 : Defaults the parameter. (As a result, this switch returns to 0.) Bit 1 : Sets the variable to 0 at all bit positions. Bit 2 : Clears the command memory. : Bit 7 : Defaults the memory configuration. Bit 8 : Uses not END but NOP at initialization of the command memory. : Bit B : Assigns the axis numbers automatically according to the results of MAC-ID scan. Bit C : Executes MAC-ID scan automatically at startup. Bit D : Executes SVINIT automatically at startup. Bit E : Starts Task 0 automatically.

* Supplementary information

Under the default SVCC setting, all of【Sets the variable to 0 at all bit positions】,【Assigns the axis numbers automatically according to the results of MAC-ID scan】, 【Executes MAC-ID scan automatically at startup.】, and 【Executes SVINIT automatically at startup.】 are set ON regardless of how the memory switch is set. (These items cannot be set OFF.)

<Product Information>

The product information is a factory-set item. Although the data in SRAM can be changed temporarily by using the 【Controller Setup】 function or the PRMSET2 command, it cannot be saved in flash memory, so the changed data is reset to the factory-set values after power-on. This information is displayed under the 【SV-NET Controller Information】 group by clicking the 【Net Search】 button of the 【Controller Setup】 function.

Class number	Group number	ID number	Description	Initial value
0x0010 System-related parameter	0 Product information	0	Product model (TA number) 4-digit number	Factory set
		1	Product model (N number) 4-digit number	Factory set
		2	Product model (E number) 3-digit number	Factory set
		3	Serial number (first 4 characters) ASCII code	Factory set
		4	Serial number (second 4 characters) ASCII code	Factory set
		5	Reserved	0
		6	Reserved	0
		7	Reserved	0
		8	Reserved	0
		9	Reserved	0

Assume that the following data is set to each product model:

ID number: 0 Product model (TA number) “8440“

ID number: 1 Product model (N number) “1000“

ID number: 2 Product model (E number) “100“

In this case, the product model is TA8440N1000E100.

<SV-NET>

The SV-NET item indicates the SV-NET baud rate. Ordinary, it need not be set. In the SVCC, the SV-NET CH1 (channel 1) is initially set to 1 Mbps, and CH2 (channel 2) to 250 Kbps. Since the SVCC has only one channel of SV-NET, setting of CH2 is meaningless.

Class number	Group number	ID number	Description	Initial value
0x0010 System-related parameter	2 SV-NET	0	SV-NET CH1 baud rate	4 (1 Mbps)
		1	SV-NET CH2 baud rate	1 (250 Kbps)
		2	Reserved	
		3	Reserved	
		4	Reserved	
		5	Reserved	
		6	Reserved	
		7	Reserved	
		8	Reserved	
		9	Reserved	

* Note:

Ordinarily, the SV-NET baud rate of the SV-NET driver is 1 Mbps. Normal communication is disabled if the SVCC baud rate is changed. This setting need not be changed in the ordinary servo system.

<Alarm History>

The alarm history displays the SVCC alarm history. Up to 20 alarm histories can be displayed. Latest alarm information is displayed in ascending order of group numbers and ID numbers.

Class number	Group number	ID number	Description	Initial value
0x0010 System-related parameter	8 Alarm history	0	Alarm history 1 Latest alarm history	0
		1	Alarm history 2	0
		:	:	0
		9	Alarm history 10	0
0x0010 System-related parameter	9 Alarm history	0	Alarm history 11	0
		1	Alarm history 12	0
		:	:	0
		9	Alarm history 20 Earliest alarm history	0

■ SVD Axis n

<Number of Encoder Pulses per Rotation of the Motor>

Sets the number of encoder pulses per rotation of the motor. This item is set to the same value as for the parameter ID 70 of the driver.

In the SVCC, this parameter is initially set to 2048.

Class number	Group number	ID number	Description	Initial value
0x1000 + n SVD Axis n	0 Motor type & encoder type	5	Sets the number of encoder pulses per rotation of the motor after internal processing of the driver.	2048

<Maximum Speed of the Motor>

Sets the maximum speed value for the motor. This parameter is used as the reference when the speed unit is 【0.01%】. In the SVCC, this parameter is initially set to 5000 (rpm).

Class number	Group number	ID number	Description	Initial value
0x1000 + n SVD Axis n	0 Motor type & encoder type	7	Sets the maximum speed value of the motor (unit: rpm).	5000

This parameter sets the reference to the speed argument of move instructions. It is different from the maximum speed described in the specifications of the main unit of the motor. For the maximum speed of the motor, refer to the specifications of the relevant motor.

<Acceleration/Deceleration Time Constants>

Sets the acceleration/deceleration time constants for each axis. For setting of the acceleration/deceleration time constants, refer to “Acceleration/Deceleration Time Constants” in “Settings on the ‘Mechanism Information’ Tab Page” of Section 4.8, “Set the Controller Parameters.”

Class number	Group number	ID number	Description	Initial value
0x1000 + n SVD Axis n	1 Acceleration/deceleration time constant	1	Length of the 1st acceleration/deceleration buffer (unit: msec)	200
		2	Length of the 2nd acceleration/deceleration buffer (unit: msec)	200

■ DIO Board n

<Configuration of Digital Input 【Polarity】>

Sets the polarity of DIO input. The signal for the reset bit (0) is contact A and the signal for the set bit (1) is contact B.

Class number	Group number	ID number	Description	Initial value
0x1100 + n DIOI Board n	0 Configuration of digital input	1	Polarity of digital input The signal for the set bit (1) is contact B and the signal for the reset bit (0) is contact A.	0

<Configuration of Digital Output 【Polarity】>

Sets the polarity of DIO output. The signal for the reset bit (0) is contact A and the signal for the set bit (1) is contact B.

Class number	Group number	ID number	Description	Initial value
0x1100 + n DIOI Board n	1 Configuration of digital output	1	Polarity of digital output The signal for the set bit (1) is contact B and the signal for the reset bit (0) is contact A.	0

■ Mechanism n

<Mechanism Type>

Sets the mechanism type. Ordinarily, the user need not set this parameter. In the SVCC, this parameter is initially set to 1 (simple mechanism).

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	0	Mechanism type 0: Not used; 1: Simple mechanism	1

*** Supplementary information about the mechanism**

Each SVC control target consists of several “axes.” Each group of these axes is referred to as a “mechanism.” In a predefined configuration, each existing axis is registered as a corresponding coordinate system in a mechanism. Each SVC move instruction always has a mechanism number as an argument. The SVC, which has two channels of SV-NETs, is provided with a different mechanism group for each channel.

<Number of Axes and Axis Assignment>

Sets the number of axes belonging to the mechanism and the SVD axis numbers to be assigned to the mechanism. Ordinarily, the user need not set this parameter. Under the SVCC default setting, a maximum of eight axes are assigned to one mechanism (the number of mechanisms is one maximum). Axis assignment is performed automatically according to the setting of the memory switches 【Allocate MAC-ID in axis number】 and 【Auto run MAC-ID scan】after power-on.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	1	Number of axes	8
		2	SVD axis number to be assigned to Axis 1	According to MAC-ID scan
		3	SVD axis number to be assigned to Axis 2	According to MAC-ID scan
		4	SVD axis number to be assigned to Axis 3	According to MAC-ID scan
		5	SVD axis number to be assigned to Axis 4	According to MAC-ID scan
		6	SVD axis number to be assigned to Axis 5	According to MAC-ID scan
		7	SVD axis number to be assigned to Axis 6	According to MAC-ID scan
		8	SVD axis number to be assigned to Axis 7	According to MAC-ID scan
		9	SVD axis number to be assigned to Axis 8	According to MAC-ID scan
		:	:	:
		33	SVD axis number to be assigned to Axis 32	According to MAC-ID scan

<Emergency Stop Signal>

Sets emergency stop signal input and stop processing. Different from the stroke limit to be set for each axis, this parameter allows the user to set stop processing for all axes belonging to the mechanism.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	40	DIO number for the emergency stop signal	0
		41	LS number for the emergency stop signal (bit pattern)	0
		42	Emergency stop post-processing 0: Ignored; 1: Deceleration stop for all axes; 2: Immediate stop for all axes 3: Deceleration stop for all axes + Servo OFF 4: Immediate stop for all axes + Servo OFF 5: Alarm + Deceleration stop for all axes 6: Alarm + Immediate stop for all axes 7: Alarm + Deceleration stop for all axes + Servo OFF 8: Alarm + Immediate stop for all axes + Servo OFF	0

* Note:

For emergency stop processing of the system, be sure to install external safety circuits in addition to making the emergency stop setting described in this paragraph.

・ Setting example

ID number: 40 Emergency stop signal DIO number “0“

ID number: 41 Emergency stop signal LS number “0x0080“

ID number: 42 Emergency stop post-processing “2“

This example sets LS bit 7 of DIO_0 as the emergency stop signal. It also sets immediate stop for all axes as the emergency stop post-processing.

<Speed/Time Argument Alarm Level>

Sets the alarm level to be used if 0 is given as the argument for speed or time of a move instruction.

In the SVCC, this parameter is initially set to 0 【Ignore】. If 0 is given as the argument for speed or time while an axis is moving with 【Ignore】 set, the motor is deceleration-stopped.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	48	Specification of 0 time and 0 speed 0: Ignored (deceleration stop) 1: Warning 2: Alarm + Deceleration stop for all axes	0

<Origin Mode at Power-on>

Sets the origin mode at power-on. In the SVCC, this parameter is initially set to 0【Home】. For the system that needs to be moved after homing, be sure to set this parameter to 1 【Not Home】. An alarm (at the task level) is returned if a move instruction is executed before completion of homing.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	0 Mechanism type, number of axes, and axis assignment	49	Origin mode at power-on 0: The origin is fixed at the position of the servo motor at power-on. 1: Origin not fixed until completion of homing after power-on.	0

<Axis Type>

Sets the type of each axis belonging to the mechanism. If the infinite length feed function is used, set either of infinite linear-motion axis or infinite rotation axis as the axis type.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	0	Axis type 0: Linear-motion axis; 1: Rotation axis; 2: Infinite linear motion axis; 3: Infinite rotation axis	0

<Pulse Rate>

Sets the pulse rate of each axis belonging to the mechanism. For setting of the pulse rate, refer to “Setting Pulse Rates” in “Settings on the ‘Mechanism Information’ Tab Page” of Section 4.8 “Set the Controller Parameters.”

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	1	Pulse rate numerator (unit: instruction unit [mm or deg])	1000
		2	Pulse rate denominator (unit: pulse)	2048

<Speed Unit>

Sets the speed unit of each axis belonging to the mechanism.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	3	Speed unit 0: 0.01% (with respect to the maximum rotation speed of the motor) 1: Instruction unit per second (mm/secm or deg/sec) 2: min^{-1} [rpm]	0

<Speed Limit>

Sets the speed limit of each axis belonging to the mechanism.

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	4	Speed limit (unit: speed unit)	10000
		5	Processing when the maximum speed is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Clamp; 4: Warning + Clamp 5: Alarm + Deceleration stop; 6: Alarm + Immediate stop	0

<Soft Limit>

Sets the soft limit of each axis belonging to the mechanism

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	6	Forward direction soft limit (unit: instruction unit)	0x70000000
		7	Processing when the forward direction soft limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Alarm + Deceleration stop	1
		8	Reverse direction soft limit (unit: instruction unit)	0x90000000
		9	Processing when the reverse direction soft limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Alarm + Deceleration stop	1

<Stroke Limit>

Sets the stroke limit of each axis belonging to the mechanism

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	10	DIO number for the forward direction stroke limit	0
		11	LS number for the forward direction stroke limit (bit pattern)	0
		12	Processing when the forward direction stroke limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Alarm + Deceleration stop; 4: Alarm + Immediate stop	0
		13	DIO number for the reverse direction stroke limit	0
		14	LS number for the reverse direction stroke limit (bit pattern)	0
		15	Processing when the reverse direction stroke limit is exceeded 0: Ignored; 1: Deceleration stop; 2: Immediate stop 3: Alarm + Deceleration stop; 4: Alarm + Immediate stop	0

・ Setting example

ID number: 10 Emergency stop signal DIO number “0“

ID number: 11 Emergency stop signal LS number “0x8000“

ID number: 12 Emergency stop post-processing “2“

This example sets LS bit 15 of DIO_0 as the forward direction stroke limit signal. It also sets immediate stop as the processing after stroke limit stop.

<Infinite Length Axis Coordinates Reset>

Sets the infinite length axis coordinates reset function. The setting is valid if the axis type is set to infinite rotation axis or infinite linear-motion axis. The position data of an infinite length axis assumes a ring address at the position of infinite length coordinates reset. Infinite length axis must also be set for the driver if a move command is used for the infinite length axis setting. For details, refer to “Infinite Length Axis” in “Settings on the ‘Mechanism Information’ Tab Page” of Section 4.8, “Set the Controller Parameters.”

Class number	Group number	ID number	Description	Initial value
0x2000 + n Mechanism n	j Axis j	20	Infinite length axis coordinate reset (unit: instruction unit)	3600000

■ Task n

<Task Stop Processing in the Event of an Alarm>

Sets the task stop processing to be performed when an alarm is issued. Under the SVCC initial setting, all tasks stop in the event of an alarm. If there are tasks that are set to remain active in the event of an alarm (by using the alarm reset switch or others), set this parameter to 1 【Do not stop the task in the event of an alarm】.

Class number	Group number	ID number	Description	Initial value
0x4000 + n Task n	0 Assignment of local variables and stack variables	9	Task stop processing in the event of an alarm 0: Stop the task in the event of an alarm. 1: Do not stop the task in the event of an alarm.	0

* Note:

When changing this setting, be sure to thoroughly check beforehand what effect is produced to the system and program. Do not execute move instructions in the tasks for which 【Do not stop the task in the event of an alarm】 has been set.

8. List of Monitor Items

This section shows the SVCC monitor items and their description in list form. Items in the list can be referenced during program execution by using the MONGET command. The tables below are lists of SVCC monitor items by category.

■ System-Related Monitor Items

Class number	Group number	ID number	Description
0x0010 System-related monitor item	0 System information	0	Hardware type (first 4 characters)
		1	Hardware type (second 4 characters)
		2	Hardware type (third 4 characters)
		3	Hardware type (fourth 4 characters)
		4	Software type (first 4 characters)
		5	Software type (second 4 characters)
		6	Software type (third 4 characters)
		7	Software type (fourth 4 characters)
		8	Version information (first 4 characters)
		9	Version information (second 4 characters)
		10	TA number for the product model
		11	N number for the product model
		12	E number for the product model
		13	Serial number (first 4 characters)
		14	Serial number (second 4 characters)

■ SVD-Related Monitor Items

Class number	Group number	ID number	Description	
0x1000 SVD-related monitor item	0 Present position of each axis	0	Present instructed position of SVD Axis 1	(unit: pulse)
		1	Present actual position of SVD Axis 1	(unit: pulse)
		2	Present instructed position of SVD Axis 2	(unit: pulse)
		3	Present actual position of SVD Axis 2	(unit: pulse)
		:	:	

Class number	Group number	ID number	Description	
0x1000 SVD-related monitor item	1 Present speed of each axis	0	Present instructed speed of SVD Axis 1	(unit: rpm)
		1	Present actual speed of SVD Axis 1	(unit: rpm)
		2	Present instructed speed of SVD Axis 2	(unit: rpm)
		3	Present actual speed of SVD Axis 2	(unit: rpm)
		:	:	

Class number	Group number	ID number	Description	
0x1000 SVD-related monitor item	2 Present electric current of each axis	0	Present instructed electric current of SVD Axis 1	(unit: 0.01 A)
		1	Present actual electric current of SVD Axis 1	(unit: 0.01 A)
		2	Present instructed electric current of SVD Axis 2	(unit: 0.01 A)
		3	Present actual electric current of SVD Axis 2	(unit: 0.01 A)
		:	:	

Class number	Group number	ID number	Description
0x1000 SVD-related monitor item	3 Present status of each axis	0	SVD Axis 1 servo status
		1	SVD Axis 1 alarm code
		2	SVD Axis 2 servo status
		3	SVD Axis 2 alarm code
		:	:

Class number	Group number	ID number	Description	
0x1000 SVD-related monitor item	100 Data for 8 SVD Axes	0	Present instructed position of SVD Axis 1	(unit: pulse)
		1	Present actual position of SVD Axis 1	(unit: pulse)
		2	Present actual speed of SVD Axis 1	(unit: rpm)
		3	Present actual electric current of SVD Axis 1	(unit: 0.01 A)
		4	SVD Axis 1 servo status	
		5	SVD Axis 1 alarm code	
		6	Present actual position of SVD Axis 1	(unit: pulse with no origin offset)
		7	Present instructed position of SVD Axis 2	(unit: pulse)
		8	Present actual position of SVD Axis 2	(unit: pulse)
		9	Present actual speed of SVD Axis 2	(unit: rpm)
		10	Present actual electric current of SVD Axis 2	(unit: 0.01 A)
		11	SVD Axis 2 servo status	
		12	SVD Axis 2 alarm code	
		13	Present actual position of SVD Axis 2	(unit: pulse with no origin offset)
		:	:	
		:	:	
		49	Present instructed position of SVD Axis 8	(unit: pulse)
		50	Present actual position of SVD Axis 8	(unit: pulse)
		51	Present actual speed of SVD Axis 8	(unit: rpm)
		52	Present actual electric current of SVD Axis 8	(unit: 0.01 A)
		53	SVD Axis 8 servo status	
		54	SVD Axis 8 alarm code	
		55	Present actual position of SVD Axis 8	(unit: pulse with no origin offset)

■ SVD Axis n

Class number	Group number	ID number	Description	
0x1000 + n SVD Axis n	0 Data for SVD Axis n	0	Present instructed position of SVD Axis n	(unit: pulse)
		1	Present actual position of SVD Axis n	(unit: pulse)
		2	Present instructed speed of SVD Axis n	(unit: rpm)
		3	Present actual speed of SVD Axis n	(unit: rpm)
		4	Present instructed electric current of SVD Axis n	(unit: 0.01 A)
		5	Present actual electric current of SVD Axis n	(unit: 0.01 A)
		6	SVD Axis n servo status	
		7	SVD Axis n alarm code	
		8	Present actual position of SVD Axis n	(unit: pulse with no origin offset)

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	1 System information for SVD Axis n	0	SVD Axis n version information
		1	SVD Axis n serial number
		2	SVD Axis n internal data monitor
		3	SVD Axis n driver temperature (0.1°C)
		4	Driving power voltage for SVD Axis n (0.1 V)

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	0x0A Internal data list ① for SVD Axis n	0	Internal data 0
		1	Internal data 1
		:	:
		49	Internal data 49

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	0x0B Internal data list ② for SVD Axis n	0	Internal data 50
		1	Internal data 51
		:	:
		49	Internal data 99

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	0x0C Internal data list ③ for SVD Axis n	0	Internal data 100
		1	Internal data 101
		:	:
		39	Internal data 139

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	0x0D Internal data list ④ for SVD Axis n	0	Internal data 140
		1	Internal data 141
		:	:
		58	Internal data 198

Class number	Group number	ID number	Description
0x1000 + n SVD Axis n	0x0E Internal data list ⑤ for SVD Axis n	0	Internal data 200
		1	Internal data 201
		:	:
		55	Internal data 255
		56	Internal data 199

■ DIO-Related Monitor Items

Class number	Group number	ID number	Description
0x1100 DIO-related monitor item	0 DIO data	0	DIO Board 1 input data
		1	DIO Board 1 output data
		2	DIO Board 2 input data
		3	DIO Board 2 output data
		4	DIO Board 3 input data
		5	DIO Board 3 output data
		6	DIO Board 4 input data
		7	DIO Board 4 output data
		:	:

■ DIO Board n

Class number	Group number	ID number	Description
0x1100 + n DIO Board n	0 DIO data	0	DIO Board n input data
		1	DIO Board n output data

■ AIO-Related Monitor Items

Class number	Group number	ID number	Description
0x1200 AIO-related monitor item	0 AIO data	0	AIO CH1 A/D input data
		1	AIO CH1 D/A output data
		2	AIO CH2 A/D input data
		3	AIO CH2 D/A output data
		4	AIO CH3 A/D input data
		5	AIO CH3 D/A output data
		6	AIO CH4 A/D input data
		7	AIO CH4 D/A output data
		:	:

■ AIO Board n

Class number	Group number	ID number	Description
0x1200 + n AIO Channel n	0 AIO data	0	AIO CH n A/D input data
		1	AIO CH n D/A output data

■ Mechanism-Related Monitor Items

Class number	Group number	ID number	Description
0x2000 Mechanism-related monitor item	0 Present status of each mechanism	0	Present status of Mechanism 1
		1	Present status of Mechanism 2
		:	:

■ Mechanism Status

Bit number	Description
0	Interpolation calculation in progress
1	Acceleration/deceleration in progress
2	Axis is moving.
3	Homing
4	Speed limit
5	Forward direction soft limit
6	Reverse direction soft limit
7	
8	An alarm has been generated.
9	A warning has been generated.
10	
11	
12	Stop in the course of a move instruction.
13	Forward direction stroke limit
14	Reverse direction stroke limit
15	Homing completed.
:	:

■ Mechanism n

Class number	Group number	ID number	Description
0x2000 + n Mechanism n	j Data for Axis j in Mechanism n	0	Present instructed position (unit: pulse)
		1	Present actual position (unit: pulse)
		2	Present instructed speed (unit: rpm)
		3	Present actual speed (unit: rpm)
		4	Present instructed electric current (unit: 0.01 A)
		5	Present actual electric current (unit: 0.01 A)
		6	Servo status
		7	Servo alarm code
		8	Present instructed position (instruction unit)
		9	Present actual position (instruction unit)

Class number	Group number	ID number	Description
0x2000 + n Mechanism n	100 Status of Mechanism n	0	Mechanism n status
		1	Mechanism n alarm number
		2	Mechanism n alarm index
		3	Mechanism n warning number
		4	Mechanism n warning index
		5	Numerator for Override 1 of Mechanism n
		6	Denominator for Override 1 of Mechanism n
		7	Numerator for Override 2 of Mechanism n
		8	Denominator for Override 2 of Mechanism n
		:	:

Class number	Group number	ID number	Description
0x2000 + n Mechanism n	200 Status 2 of Mechanism n	0	Present instructed position of Axis 1 (instruction unit)
		1	Present actual position of Axis 1 (instruction unit)
		2	Axis type of Axis 1
		3	Pulse rate numerator of Axis 1
		4	Pulse rate denominator of Axis 1
		5	Speed unit of Axis 1
		6	Maximum motor speed for Axis 1 (The relevant SVD parameter is copied.)
		7	Present instructed position of Axis 2 (instruction unit)
		8	Present actual position of Axis 2 (instruction unit)
		9	Axis type of Axis 2
		10	Pulse rate numerator of Axis 2
		11	Pulse rate denominator of Axis 2
		12	Speed unit of Axis 2
		13	Maximum motor speed for Axis 2 (The relevant SVD parameter is copied.)
		:	:

■ Task-Related Monitor Items

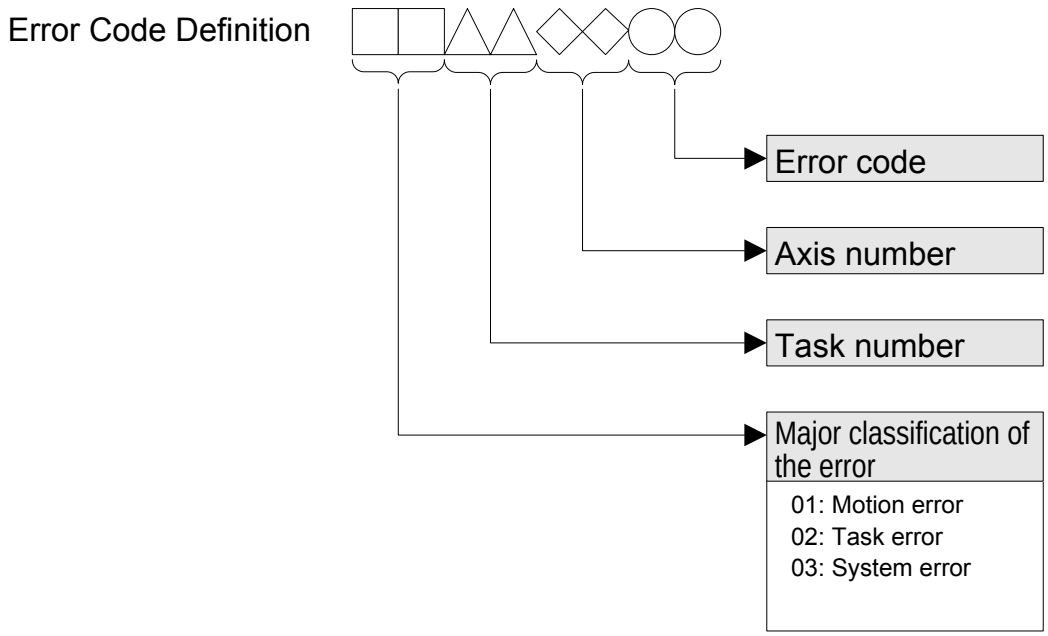
Class number	Group number	ID number	Description
0x4000 Task-related monitor item	0 Present status of each task	0	Present status of Task 0 (1: Being executed; 0: Stopped)
		1	Present status of Task 1 (1: Being executed; 0: Stopped)
		2	Present status of Task 2 (1: Being executed; 0: Stopped)
		:	:

Class number	Group number	ID number	Description
0x4000 Task-related monitor item	0x8000 Present status 2 of each task	0	Present status of Task 0 (1: Being executed; 0: Stopped)
		1	Present step index of Task 0
		2	Present stack pointer of Task 0
		3	Present status of Task 1 (1: Being executed; 0: Stopped)
		4	Present step index of Task 1
		5	Present stack pointer of Task 1
		6	Present status of Task 2 (1: Being executed; 0: Stopped)
		7	Present step index of Task 2
		8	Present stack pointer of Task 2
		:	:

9. List of Error Codes

■ SVC Error Definitions

An SVC error code consists of eight digits. The first two digits indicate the major classification of the error and the last two digits indicate the error code. The two digits after the major classification code indicate the task number and the next two digits after that indicate the axis number, which may be omitted depending on the error content.
The following figure indicates the error code definition:



The SVCC displays the error code on the STATUS LED in the event of an alarm. The STATUS LED lights in the following sequence in the event of an error:

<LED Lighting Sequence in the Event of an Alarm>

1. The LED turns OFF for about 3 seconds.
2. The LED flickers red the number of times corresponding to the major classification code of the error.
3. The LED turns ON green and turns OFF.
4. The LED flickers red the number of times corresponding to the tens digit of the error code (minor classification of the error).
5. The LED turns ON green and turns OFF.
6. The LED flickers red the number of times corresponding to the units digit of the error code (minor classification of the error).
7. The LED turns ON green and turns OFF.
8. The LED returns to the status of step 1.

■ Motion Errors Error Classification: 01000000

Error code	Error name	Cause	Action to be taken	Error processing
01	Driver alarm input	Refer to the driver error code.	Refer to the driver operation manual.	All tasks stop. Deceleration stop performed for all axes. (The driver performs stop processing for the axis that generated the alarm.)
11	Forward direction soft limit	The forward direction soft limit was reached. For an alarm to be output, this parameter must be set accordingly.	Check the value set for the soft limit and the task.	All tasks stop. Deceleration stop performed for all axes.
12	Reverse direction soft limit	The reverse direction soft limit was reached. For an alarm to be output, this parameter must be set accordingly.	Check the value set for the soft limit and the task.	All tasks stop. Deceleration stop performed for all axes.
13	Excessive speed	The speed limit was reached. For an alarm to be output, this parameter must be set accordingly.	Check the value set for the speed limit, the speed unit parameter, and the task.	All tasks stop. Deceleration stop performed for all axes.
14	Forward direction over travel	The forward direction limit LS signal was detected. For an alarm to be output, this parameter must be set accordingly.	Check the forward direction limit LS signal and the task.	All tasks stop. Immediate or deceleration stop performed for all axes.
15	Reverse direction over travel	The reverse direction limit LS signal was detected. For an alarm to be output, this parameter must be set accordingly.	Check the reverse direction limit LS signal and the task.	All tasks stop. Immediate or deceleration stop performed for all axes.
16	Emergency stop switch input	The emergency stop switch was activated. For an alarm to be output, this parameter must be set accordingly.	Reset the emergency stop switch.	All tasks stop. Immediate or deceleration stop performed for all axes.

■ Task Errors Error Classification: 02000000

Error code	Error name	Cause	Action to be taken	Error processing
01	Division by 0	Division by 0 was performed by an operation instruction.	Check the argument of the operation instruction.	All tasks stop. Deceleration stop performed for all axes.
02	Operation overflow	The results of the operation instruction overflowed.	Check the argument of the operation instruction.	All tasks stop. Deceleration stop performed for all axes.
03	Excessive rotation	The rotation specified for the rotate instruction is too large.	Check the argument of the ROT command.	All tasks stop. Deceleration stop performed for all axes.
04	Excessive shift	The shift specified for the shift instruction is too large.	Check the argument of the SHIFT command.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
11	Wait level specification error	Specification for the SETWAIT command wait level is invalid.	Check the argument of the SETWAIT command.	All tasks stop. Deceleration stop performed for all axes.
12	Override-type specification error	Specification for the override type in the SETOVR or GETOVR command is invalid.	Check the override type.	All tasks stop. Deceleration stop performed for all axes.
13	Override number specification error	The override number for the SETOVR or GETOVR command is invalid.	Check the override number.	All tasks stop. Deceleration stop performed for all axes.
14	Override data specification error	Specification for the override data in the SETOVR command is invalid.	Check the override data.	All tasks stop. Deceleration stop performed for all axes.
15	Post-stop processing specification error	Specification for post-stop processing in the STOP or STOPJ command is invalid.	Check the argument for post-stop processing.	All tasks stop. Deceleration stop performed for all axes.
16	Stop request level specification error	Specification for the stop request level in the STOP or STOPJ command is invalid.	Check the argument for the stop request level.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
21	AIO number specification error	A nonexistent AIO number was specified.	Check the specification for the AIO number.	All tasks stop. Deceleration stop performed for all axes.
22	DIO number specification error	A nonexistent DIO number was specified.	Check the specification for the DIO number.	All tasks stop. Deceleration stop performed for all axes.
23	PASS point specification error	An invalid PASS point was specified.	Check the PASS point.	All tasks stop. Deceleration stop performed for all axes.
24	Monitor number specification error	A nonexistent monitor number was specified.	Check the monitor number.	All tasks stop. Deceleration stop performed for all axes.
25	Timer number specification error	A nonexistent timer number was specified.	Check the timer number.	All tasks stop. Deceleration stop performed for all axes.
26	SVD number specification error	A nonexistent SVD number was specified.	Check the SVD number.	All tasks stop. Deceleration stop performed for all axes.
27	Axis number specification error	A nonexistent axis number was specified.	Check the axis number.	All tasks stop. Stop performed for all axes.
28	Mechanism number specification error	A nonexistent mechanism number was specified.	Check the mechanism number.	All tasks stop. Deceleration stop performed for all axes.
29	Task number specification error	A nonexistent task number was specified.	Check the task number.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
31	Specification of 0 speed	The value 0 was specified for the speed argument of the move instruction. For an alarm to be output, this parameter must be set accordingly.	Check the speed argument of the move instruction.	All tasks stop. Deceleration stop performed for all axes.
32	Specification of 0 time	The value 0 was specified for the time argument of the move instruction. For an alarm to be output, this parameter must be set accordingly.	Check the time argument of the move instruction.	All tasks stop. Deceleration stop performed for all axes.
33	Excessive move distance	The value for the position argument of the move instruction is too great.	Check the position argument of the move instruction.	All tasks stop. Deceleration stop performed for all axes.
34	Excessive speed	The value for the speed argument of the move instruction is greater than the set maximum speed.	Check the speed argument and the maximum speed parameter of the move instruction.	All tasks stop. Deceleration stop performed for all axes.
35	Acceleration factor setting error	The value for the acceleration factor argument of the move instruction is invalid.	Check the acceleration factor argument of the move instruction.	All tasks stop. Deceleration stop performed for all axes.
36	Excessive acceleration/ deceleration time constant	The value for the acceleration/deceleration constant is greater than the predetermined value.	Check the argument of the ACCSET command.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
41	Arc interpolation mode specification error	The value for the mode argument of the arc interpolation instruction is invalid.	Check the mode argument of the arc interpolation instruction.	All tasks stop. Deceleration stop performed for all axes.
42	Arc interpolation option specification error	The value for the option argument of the arc interpolation instruction is invalid.	Check the option argument of the arc interpolation instruction.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
81	Origin not yet fixed	A prohibited command was executed with the origin not fixed.	Execute homing.	All tasks stop. Deceleration stop performed for all axes.
82	Override set value error	The override value is greater than 100%. The value 0 was specified for the denominator when the numerator and denominator were set.	Check the argument of the SETOVR command.	All tasks stop. Deceleration stop performed for all axes. Clear the override value.
83	Acceleration/ deceleration time constant setting error	An attempt was made to change the acceleration/deceleration time constant while axis moving is in progress.	Check the ACCSET command.	All tasks stop. Deceleration stop performed for all axes.
84	Infinite length axis command error	A prohibited command was executed in infinite length axis mode.	Check the MOV-related commands for the infinite length set axis.	All tasks stop. Deceleration stop performed for all axes.
85	Network command error	A network command was executed for a nonexistent device.	Check the network command.	All tasks stop. Deceleration stop performed for all axes.
86	Homing instruction servo ON incompletion error	A homing instruction was executed before the servo ON processing had been completed.	Check the homing instruction.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
91	Monitor size specification error	The monitor request size is greater than the predetermined limit.	Check the number of monitor items to be obtained in the MONGET instruction.	All tasks stop. Deceleration stop performed for all axes.
92	Parameter size specification error	The parameter request size is greater than the predetermined limit.	Check the number of parameters to be obtained in the PRMGET instruction.	All tasks stop. Deceleration stop performed for all axes.
93	No return destination	The return destination of the subroutine is not specified.	Check the RET instruction.	All tasks stop. Deceleration stop performed for all axes.
94	Stack overflow	The stack overflowed.	Check the nesting depth of the CALL instruction.	All tasks stop. Deceleration stop performed for all axes.

■ System Errors Error Classification: 03000000

Error code	Error name	Cause	Action to be taken	Error processing
21	SV-NET communication error Request error	A command not defined in the SV-NET was issued. “Cable defective,” “No terminating resistor,” “Noise,” or the like may be the cause.	Check the cabling.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
22	SV-NET communication error Reception overrun	Data was overwritten before a received message was read. “Cable defective,” “No terminating resistor,” “Noise,” or the like may be the cause.	Check the cabling.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
71	Control power supply voltage drop	The voltage of the internal 5-V power supply dropped to 4.5 V or lower. “Control power supply capacity insufficient,” “Noise,” or the like may be the cause.	Check the control power supply voltage, wiring, and other possible causes.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
91	Command memory write error	Write to command memory failed. “Flash memory failed” or the like may be the cause.	Re-write the parameters. If the error persists, initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
92	Parameter write error	Write of parameters failed. “Flash memory failed” or the like may be the cause.	Re-write the parameters. If the error persists, initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
93	Alarm history error	The alarm history area has been destroyed. “Powered off during alarm history re-writing,” “Flash memory failed,” or the like may be the cause.	Initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
94	Command memory read error	The command memory has been destroyed. “Powered off during flash memory writing,” “Flash memory failed,” or the like may be the cause.	Re-write the task from the SV Programmer, save it to the flash memory, turn the power off, and then turn it back on again. If the error persists, initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
95	Parameter read error	The parameters have been destroyed. “Powered off during flash memory writing,” “Flash memory failed,” or the like may be the cause.	Re-write the parameters from the SV Programmer, save them to the flash memory, turn the power off, and then turn it back on again. If the error persists, initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.
:	:	:	:	:
99	Flash memory error	Flash memory initialization failed. “Powered off during flash memory re-writing,” “Flash memory failed,” or the like may be the cause.	Initialize the parameters.	SV-NET communication stops. All tasks stop. Deceleration stop performed for all axes.

■ Network Errors Error Classification: 04000000

• RS232 Communication Errors Error Classification: 04010000

Error code	Error name	Cause	Action to be taken	Error processing
11	RS232C communication timeout	No RS232C response is returned. “Parameter setting faulty,” “Cable defective,” or the like may be the cause.	Check the RS232C communication parameters.	All tasks stop. Deceleration stop performed for all axes.
21	Communication data checksum error	A checksum error was found in the received data. “Noise” or the like may be the cause.	Check the cabling.	All tasks stop. Deceleration stop performed for all axes.
31	Error code of connected device received	An error code was received from the connected device. “Parameter setting faulty,” “Noise,” or the like may be the cause.	Check the RS232C communication parameters and cabling.	All tasks stop. Deceleration stop performed for all axes.
81	Parity error	A parity error was found in the received data. “Parameter setting faulty,” “Noise,” or the like may be the cause.	Check the RS232C communication parameters and cabling.	All tasks stop. Deceleration stop performed for all axes.
82	Framing error	A framing error was found in the received data. “Parameter setting faulty,” “Noise,” or the like may be the cause.	Check the RS232C communication parameters and cabling.	All tasks stop. Deceleration stop performed for all axes.
83	Overrun error	An overrun error occurred. “Parameter setting faulty,” “Noise,” or the like may be the cause.	Check the RS232C communication parameters and cabling.	All tasks stop. Deceleration stop performed for all axes.

Error code	Error name	Cause	Action to be taken	Error processing
91	DMA address error	An address error occurred during DMA transfer. “Noise” or the like may be the cause.	Check the cabling.	All tasks stop. Deceleration stop performed for all axes.
92	DMA NMI error	An NMI error occurred during DMA transfer. “Noise” or the like may be the cause.	Check the cabling.	All tasks stop. Deceleration stop performed for all axes.

10. Version Upgrade

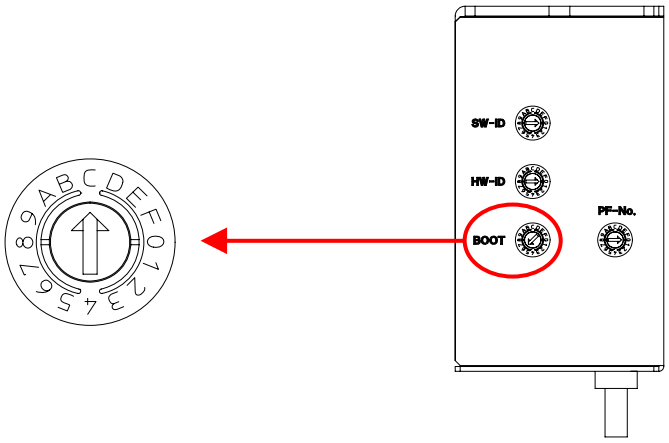
The firmware for the main unit of the SVCC is upgraded as needed for improvement of performance or expansion of specifications. The SVCC provides the users with updated performance and functions by allowing them to obtain upgrades of the SVCC main unit firmware from the SV Programmer. Before obtaining an upgrade, be sure to check the upgrade information on the Tamagawa Seiki web site. The following is a description of the procedure for upgrading the SVCC main unit firmware:

■ Saving the Parameter File

1. Use the 【Controller Setup】 function of the SV Programmer to save the SVCC parameter file.
   The extension of parameter file is .svcc.
   * Note:
     Be sure to save the parameter file. Although parameters are not updated in ordinary version upgrades, they need to be re-written depending on what is updated.
     Check the upgrade information to see what is updated.

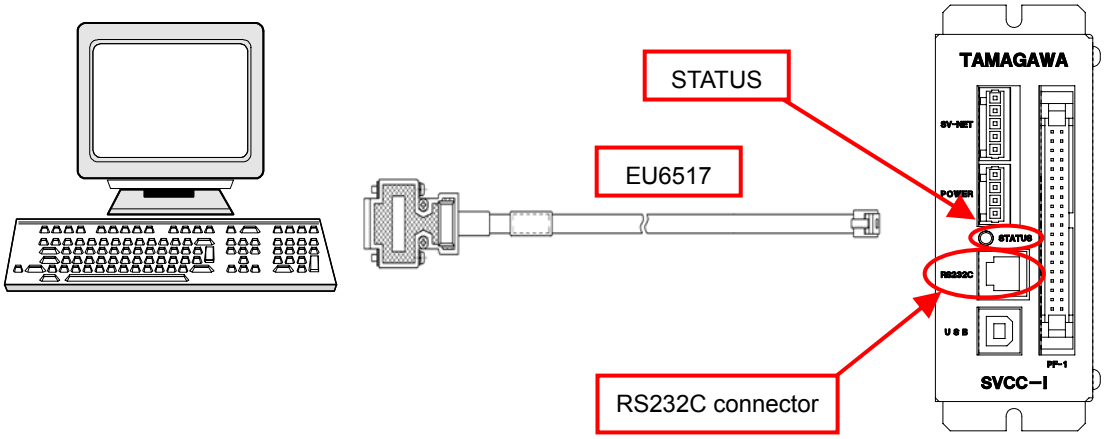
■ Setting the Rotary Switch Boot Mode

1. Set the 【BOOT】 rotary switch of the SVCC to “C.”



■ **Connecting the Communication Cable (Model EU6517 Supplied with the SVCC) and Energizing the Control Power Supply Cable**

1. Connect the communication cable to the RS232C connector of the SVCC and COM port of your PC.
2. Connect the control power supply cable to the POWER connector and energize it.
3. Check that STATUS (LED) is lit in orange.



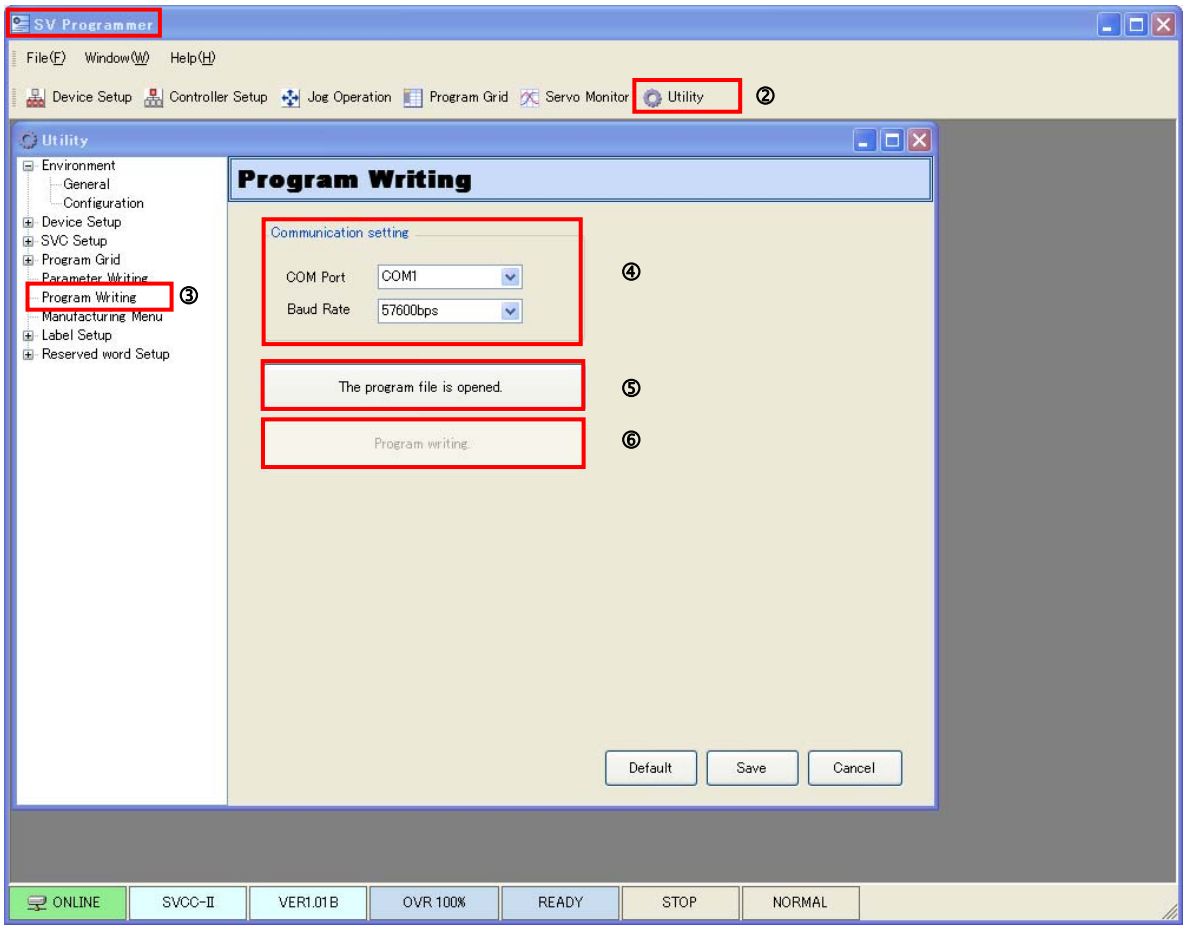
■ Writing the CPU Software

1. Start the SV Programmer. _____①
2. Starts 【Utility】. _____②
3. Select 【Program Writing】 from the Tree View. _____③
4. For communication configuration, set the COM number to use as the port number and 57600 bps as the communication speed. _____④
5. Click the 【The program file is opened.】 button to select the file to write.
6. The file name is SVCC_RELEASE_REV###.mot, where ### is the latest revision number. _____⑤
7. When the file has been read, click the 【Program writing.】 button to write the program. It will take about 30 seconds before the completion of reading the file[*Note]. _____⑥

* Note:

Writing the file will take more time if a USB-RS232C conversion adapter is used.

①



■ Setting the Rotary Switch Operation Mode

1. Set the 【BOOT】 rotary switch of the SVCC to “6.”
2. Power on the SVCC. The STATUS LED should flicker green indicating that the SVCC is in normal operation.

*Note:

The SVCC does not operate if the rotary switch is set to a position other than “6.”

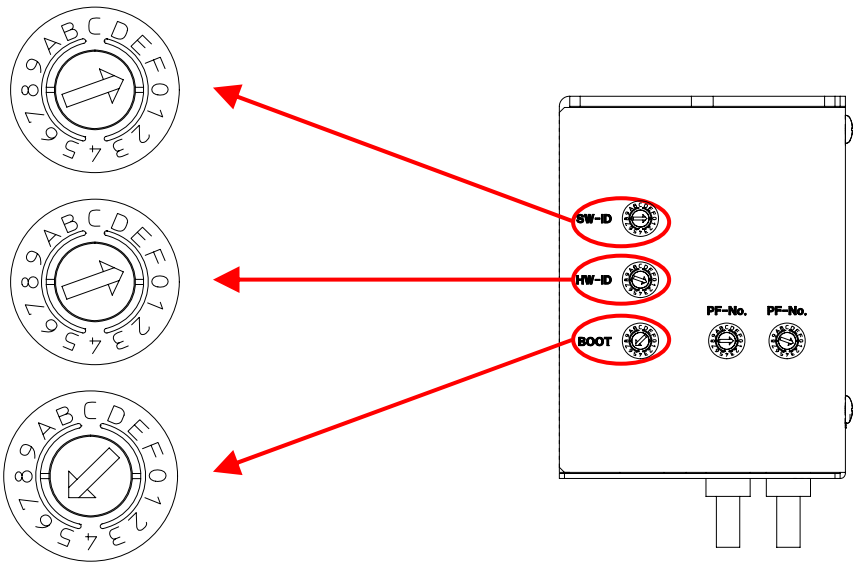
■ Initializing the Parameters*Note

Initialize the parameters as needed.

*Note:

You do not necessarily need to initialize the parameters. Refer to the upgrade information on the Tamagawa Seiki web site for whether the parameters need to be initialized. If you have any questions, please contact our sales representative.

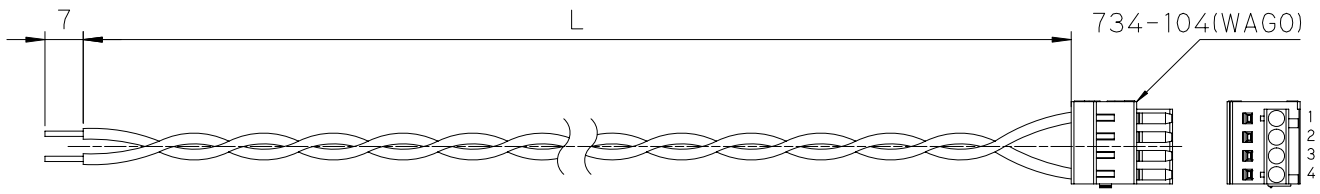
1. Turn OFF the SVCC control power supply.
2. Note the settings of the HW-ID and the SW-ID rotary switches.
   (Return the switches to the previous settings after initialization.)
3. Set both of the HW-ID and the SW-ID rotary switches to “F.”
4. Turn ON the SVCC.
5. The STATUS LED turns ON red.
   (The STATUS LED indicates that initialization is in progress while it is lit red. Never turn OFF the SVCC during initialization.)
6. The STATUS LED goes green, indicating that initialization is over.
7. Turn OFF the SVCC power.
8. Reset the HW-ID and the SW-ID rotary switches to the previous settings.
9. Turn ON the SVCC.
10. The STATUS LED should flicker green indicating that the SVCC is in normal operation.



11. Appendix

■ Cables and Accessories

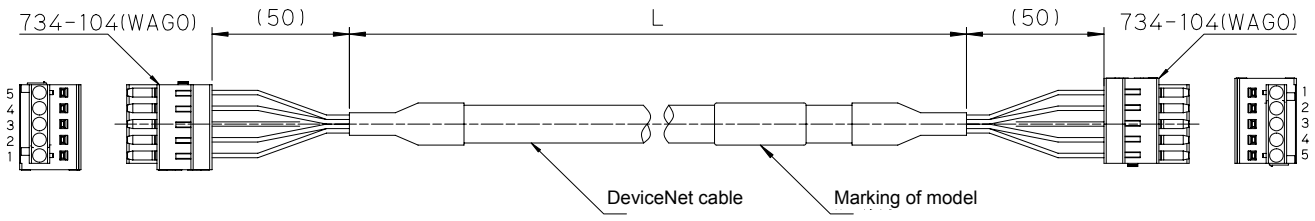
<Control Power Supply Cable for the Controller> (For TA8440)



Model	Length (L)
EU9611 N0010	1 m
NA0030	3 m
N0050	5 m
N0100	10 m

Control power supply cable for the SVCC (TA8440)

<SV-NET Cable> (For TA8440, TA8410, and TA8411)



Model	Length (L)
EU9610 N * 010	1 m
N * 030	3 m
N * 050	5 m
N * 100	10 m

* = 2: With a connector on both sides

* = 1: With a connector on one side

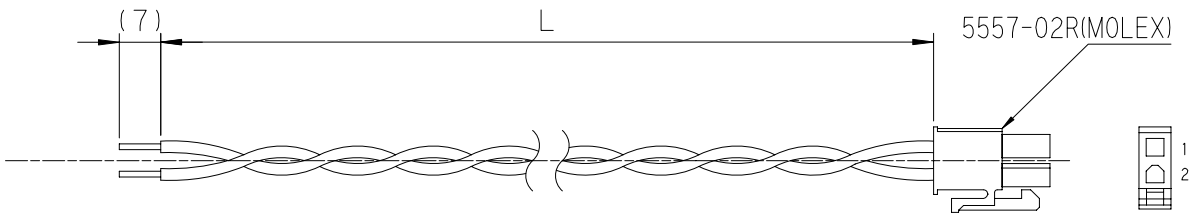
* = 0: With no connector on both sides

SV-NET cable for the TA8410 and TA8411 drivers of the SVCC (TA8440)

If multiple axes are daisy-chained, an E9610N1*** cable (with a connector on one side) can also be used in combination.

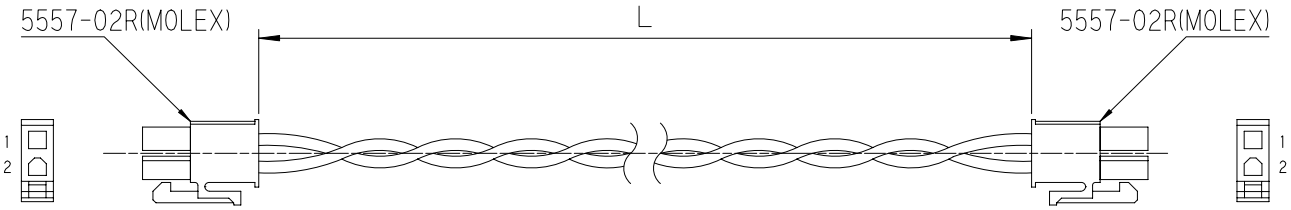
You can order an SV-NET cable with E9610N1*** preconnected. Contact our sales representative if necessary.

<Drive Power Supply Cable for Driver> (For TA8410, TA8411, and TA8413)



EU9613N0□□□

Note) □□□ indicates the cable length. See the following tables.



EU9613N1□□□

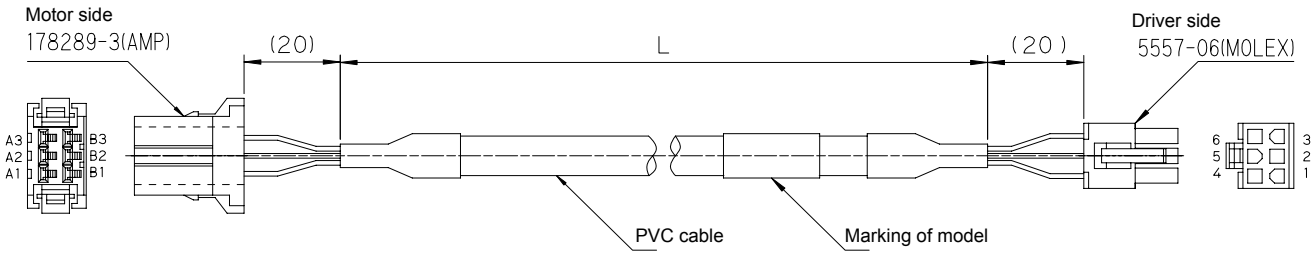
Note) □□□ indicates the cable length. See the following tables.

Model	Length (L)
EU9613 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

Model	Length (L)
EU9613 N1010	1 m
N1030	3 m
N1050	5 m
N1100	10 m

The EU9613N1**** cable is used when a regeneration and communication unit (TA8413) is connected.

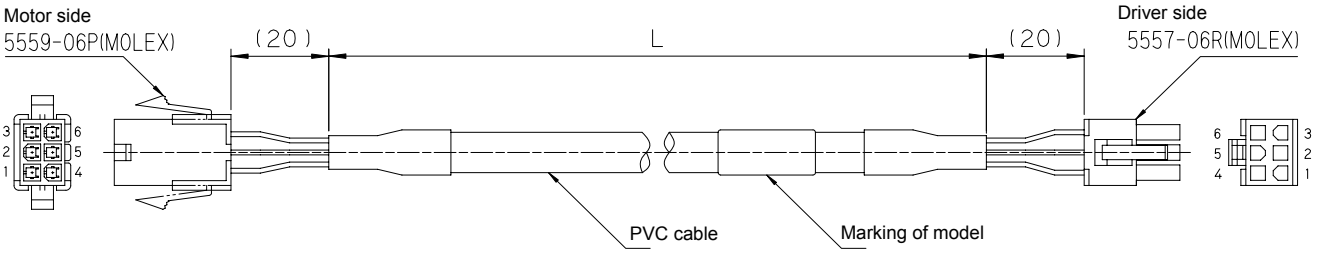
<Motor Cable> (For TA8410-TBL-iⅡ)



Model	Length (L)
EU9614 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

The EU9614 motor cable is used when TA8410 and the TBL-iⅡ motor are connected.

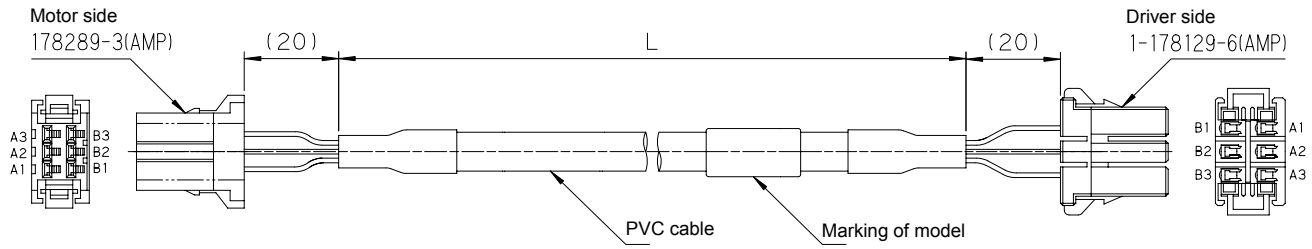
<Motor Cable> (For TA8410-TBL-V)



Model	Length (L)
EU9621 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

The EU9621 motor cable is used when TA8410 and the TBL-V motor are connected.

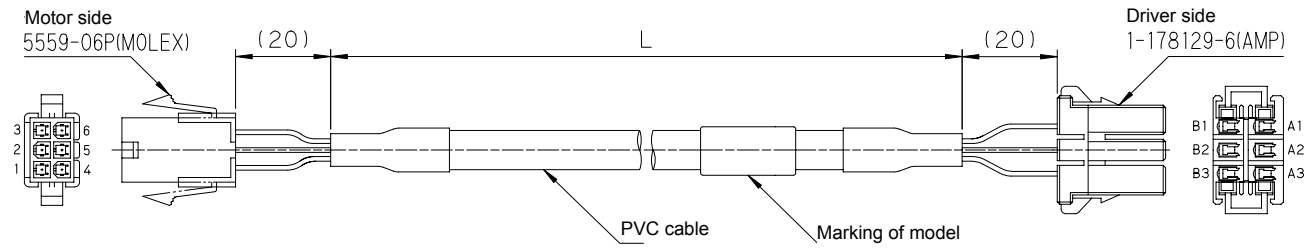
<Motor Cable> (For TA8411-TBL-iⅡ)



Model	Length (L)
EU9635 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

The EU9635 motor cable is used when TA8411 and the TBL-iⅡ motor are connected.

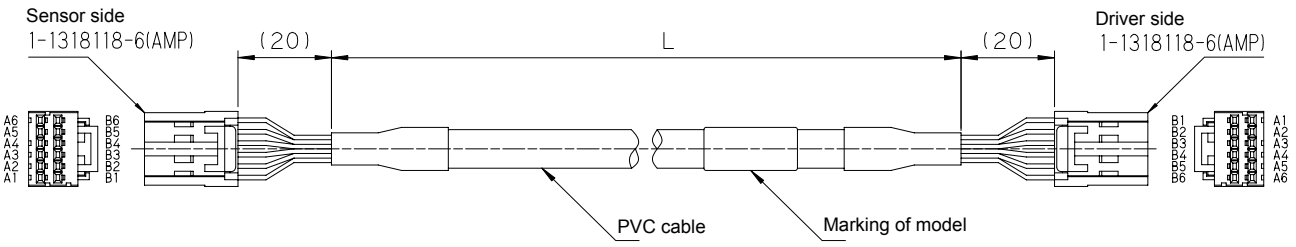
<Motor Cable> (For TA8411-TBL-V)



Model	Length (L)
EU9638 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

The EU9638 motor cable is used when TA8411 and the TBL-V motor are connected.

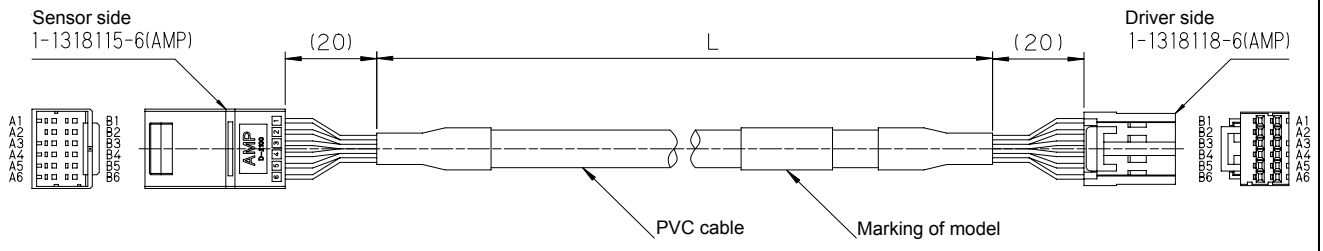
<Sensor Cable> (For TA8410-TBL-iⅡ and TA8411-TBL-iⅡ)



Model	Length (L)
EU9615 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

The EU9615 sensor cable is used when TA8410 or TA8411 is connected with the TBL-iⅡ motor.

<Sensor Cable> (For TA8410-TBL-V and TA8411-TBL-V)



Model	Length (L)
EU9622 N0010	1 m
N0030	3 m
N0050	5 m
N0100	10 m

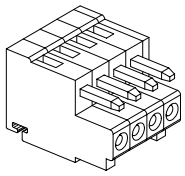
The EU9622 sensor cable is used when TA8410 or TA8411 is connected with the TBL-V motor.

<Accessories>

■ Control power supply cable connector

Model: 734-104 (manufactured by WAGO)

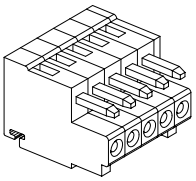
Connector for control power supply cable



■ SV-NET cable connector

Model: 734-105 (manufactured by WAGO)

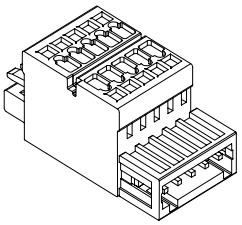
Connector for SV-NET cable



■ Branch connector for SV-NET cable

Model: 734-365 (manufactured by WAGO)

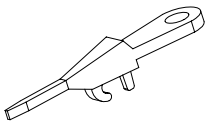
Daisy chaining is simplified if this connector is attached to one side of an SV-NET cable.



■ Handling tool

Model: 734-231 (manufactured by WAGO)

This tool is used to attach a cable to connectors 734-104 and 734-105.



■ Insulated twin ferrule

Model: 216-202W (manufactured by WAGO)

This part is used to pressure-weld two electric wires for daisy chaining by an SV-NET cable connector (734-105).

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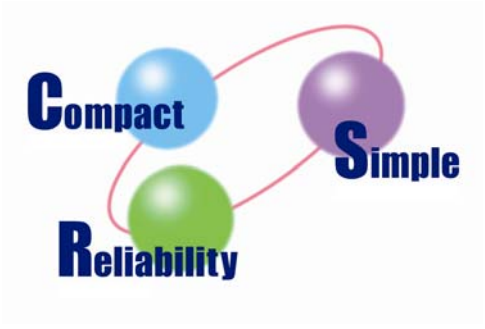
Please note that this manual may be changed without prior notice.

Manual number: MNL000390Y00



●Company Web site: http://www.tamagawa-seiki.co.jp

●SV-NET Web site: http://sv-net.tamagawa-seiki.com