ZEF005041209

VARILIMIT®

Electronic Limit Switch

VS-10G Series

Basic function version

Specifications and Instruction Manual

100VAC Model	24VDC Model
VS-10G-[ ]	VS-10G-1-[ ]
VS-10G-D-[ ]	VS-10G-D-1-[ ]
VS-10G-A-[ ]	VS-10G-A-1-[ ]
VS-10G-C-[ ]	VS-10G-C-1-[ ]

Please read first.

Read this manual when considering to use the VS-10G Series.

The specifications and instruction manuals of the VS-10G Series have two versions (the basic function and extended function versions).

This manual describes the following contents.

- Model selection
- Specifications and operating instructions of the basic function version

For the specifications and operating instruction of the extended function version, read the manual of the extended function version (separated manual).

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INTRODUCTION

Thank you very much for purchasing our product.
Before operating this product, be sure to carefully read this manual so that you may fully understand the product, safety instructions and precautions.
- Please submit this manual to the operators actually involved in operation.
- Please keep this manual in a handy place.

HOW TO READ THIS MANUAL

This manual is composed as follows by each purpose.

OVERVIEW : Describes about overview and model selection.
SPECIFICATION : Describes about specifications and outer dimensions.
INTRODUCTORY: Describes about packing contents, mounting methods, and wiring methods.
OPERATION : Describes about the operation of product
MAINTENANCE : Describes about daily inspections and countermeasures for errors.
APPENDIX : Attaches descriptions of the CE marking and UL standard compliance, the data sheets, and the upgrading guide.

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GENERAL SAFETY RULES

● Application Limitation

This product is not designed to be used under any situation affecting human life. When you are considering using this product for special purposes such as medical equipment, aerospace equipment, nuclear power control systems, traffic systems, and etc., please consult with NSD.

This product is designed to be used under the industrial environments categorized in Class A device.
The supplier and user may be required to take appropriate measures.

● Signal Words

Safety precautions in this guide are classified into DANGER and CAUTION.

Symbol	Meaning
⚠ DANGER	Incorrect handling may cause a hazardous situation that will result in death or serious injury.
⚠ CAUTION	Incorrect handling may cause a hazardous situation that will result in moderate injury or physical damage.

Instructions accompanied by a symbol ⚠ CAUTION may also result in serious damage or injury. Be sure to follow the all instructions accompanied by the symbol.

● Graphic Symbols

Symbol	Meaning
⃠	Indicates prohibited items.
❗	Indicates items that must be performed to.

1. Handling Precautions

⚠ DANGER	
⃠	- Do not touch components inside of VARILIMIT; otherwise, it will cause electric shock. - Do not damage the cable by applying excessive load, placing heavy objects on it, or clamping; otherwise, it will cause electric shock or fire.
❗	- Turn the power supply OFF before wiring, transporting, and inspecting VARILIMIT; otherwise, it may cause electric shock. - Provide an external safety circuit so that the entire system functions safely even when VARILIMIT is faulty. - Connect the grounding terminal of VARILIMIT; otherwise, it may cause electric shock or malfunction.

⚠ CAUTION	
⃠	- Do not use VARILIMIT in the following places; water splashes, the atmosphere of the corrosion, the atmosphere of the flammable vapor, and the side of the combustibility. Doing so may result in fire or VARILIMIT may become faulty.
❗	- Be sure to use VARILIMIT and the ABSOCODER in the environment designated by the general specifications in the manual. Failure to do so may result in electric shock, fire, malfunction or unit failure. - Be sure to use the specified combination of the ABSOCODER, VARILIMIT and sensor cable; otherwise, it may cause fire or VARILIMIT malfunction.

2. Storage

⚠ CAUTION	
	- Do not store VARILIMIT in a place exposed to water, or toxic gas and liquid.
	- Be sure to store VARILIMIT in designed temperature and humidity range, and do not expose to direct sunlight. - Be sure to consult with NSD when VARILIMIT is stored for long periods.

3. Transport

⚠ CAUTION	
	- Do not hold the cable or shaft of ABSOCODER during transport; otherwise, it will cause injury or malfunction.

4. Installation

⚠ CAUTION	
	- Do not step on ABSOCODER or place heavy objects on VARILIMIT; otherwise, it will cause injury or malfunction. - Do not block the exhaust port or allow any foreign matter to enter VARILIMIT; otherwise, it will cause fire or VARILIMIT failure.
	- Be sure to secure VARILIMIT and ABSOCODER with the provided brackets; otherwise, it may cause malfunction, injury, or drop. - Be sure to secure the specified distance between VARILIMIT and the control panel or other equipment; otherwise, it may cause malfunction.

5. Wiring

⚠ DANGER	
	- Be sure to secure the terminal block firmly; otherwise, it will cause fire. - Be sure to mount the terminal cover provided with VARILIMIT, before supplying the power, starting operation after the installation, and wiring; otherwise, it may cause electric shock.

⚠ CAUTION	
	- Be sure to keep the sensor cable, control cable, and communication cable at least 300 mm away from the main circuit and power line; otherwise it may cause injury or malfunction. - Be sure to connect all cables correctly; otherwise, it may cause injury or malfunction. - Be sure to firmly connect the external I/O connectors and sensor connectors; otherwise, it may cause incorrect inputs and outputs or injury.

6. Operation

⚠ CAUTION	
⊘	- Do not change the VARILIMIT's function switch settings during the operation; otherwise, it will cause injury. - Do not approach the machine after instantaneous power failure has been recovered. Doing so may result in injury if the machine starts abruptly.
❗	- Be sure to check that the power supply specifications are correct; otherwise, it may cause VARILIMIT failure. - Be sure to provide an external emergency stop circuit so that operation can be stopped with power supply terminated immediately. - Be sure to conduct independent trial runs for VARILIMIT before mounting ABSOCODER to the machine; otherwise, it may cause injury. - When an error occurs, be sure to eliminate the cause, ensure safety, and reset the error before restarting operation; otherwise, it may cause injury.

7. Maintenance and Inspection

⚠ CAUTION	
⊘	- Do not disassemble, remodel, or repair the unit; otherwise, it will cause electric shock, fire, and unit malfunction.
❗	- The capacitor of the power line deteriorates through prolonged use. We recommended that the capacitor be replaced every five years to prevent secondary damage.

8. Disposal

⚠ CAUTION	
⊘	- Be sure to handle VARILIMIT and ABSOCODER as industrial waste while disposing of it.

REVISION HISTORY

The Document No. appears at the upper right of this manual's cover page.

Document No.	Date	Revision Description
ZEF005041200	4, Apr., 2011	1st Edition Japanese document: ZEF005041000
ZEF005041201	17, July, 2012	2nd Edition Japanese document: ZEF005041001
ZEF005041202	17, Jun., 2013	3rd Edition Japanese document: ZEF005041002
ZEF005041203	30, Jan., 2015	4th Edition Japanese document: ZEF005041003
ZEF005041204	23, Mar., 2016	5th Edition Japanese document: ZEF005041004
ZEF005041205	31, Jul., 2019	6th Edition Japanese document: ZEF005041005
ZEF005041206	18, Oct., 2021	7th Edition Japanese document: ZEF005041006
ZEF005041207	6, Jun., 2022	8th Edition Japanese document: ZEF005041007
ZEF005041208	21, Jul., 2022	9th Edition Japanese document: ZEF005041008
ZEF005041209	23, May, 2023	10th Edition Japanese document: ZEF005041009

OVERVIEW

Describes about overview and model selection.

1. OVERVIEW
2. MODEL SELECTION WHEN ORDERING

1. OVERVIEW

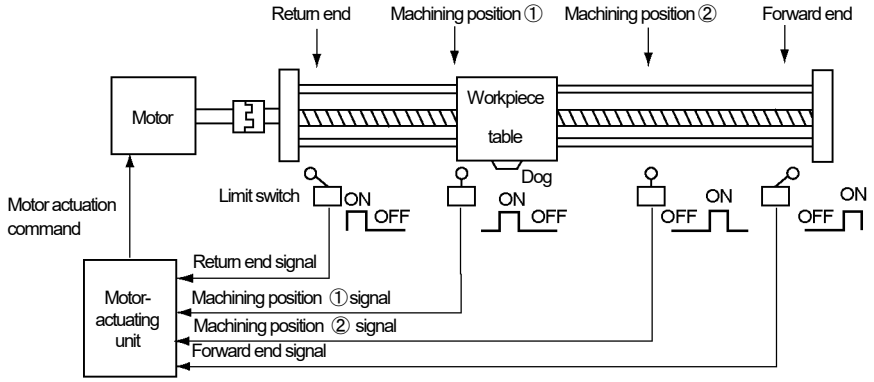
1-1. Overview

Difficult and time-consuming limit switch adjustment operation is replaced with simple and safe electronic procedure! Position measurement can also be obtained at the same time.

Employed in almost all types of automated industrial equipment such as transfer systems, packing machines, presses, assemblers and machining units are mechanical distance-sensing devices such as limit switches and proximity switches, but adjustment and replacement of these switches are extremely difficult, time-consuming and also dangerous.
The VARILIMIT VS-10G Series is a family of electronic limit switches that replace these mechanical switches. An environment-tolerant position-sensing device "ABSOCODER" is fitted to the machine detection shaft. The VARILIMIT will be capable of providing switch outputs that accurately match the machine position by registering switch ON and OFF positions with simple and easy steps.

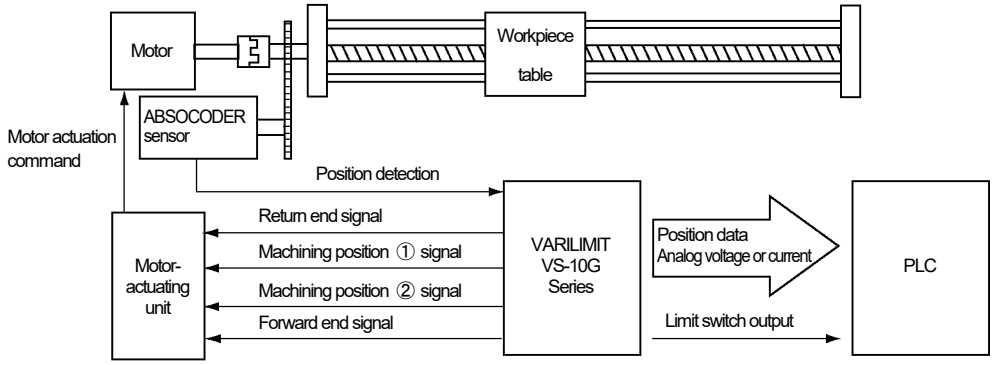
● With conventional limit switches:

Workpiece table position is determined using mechanical limit switches.



● With the VS-10G Series:

Workpiece table position is determined using the ABSOCODER.



●VS-10B Mode and Extended Mode

The VS-10G Series provides the VS-10B Mode and the Extended Mode. You can specify which mode to use at a parameter.

Specify the VS-10B Mode when it will be the replacement of the VS-10B Series.
Specify the Extended Mode when the VS-10G Series is newly employed or its new functions will be newly added.

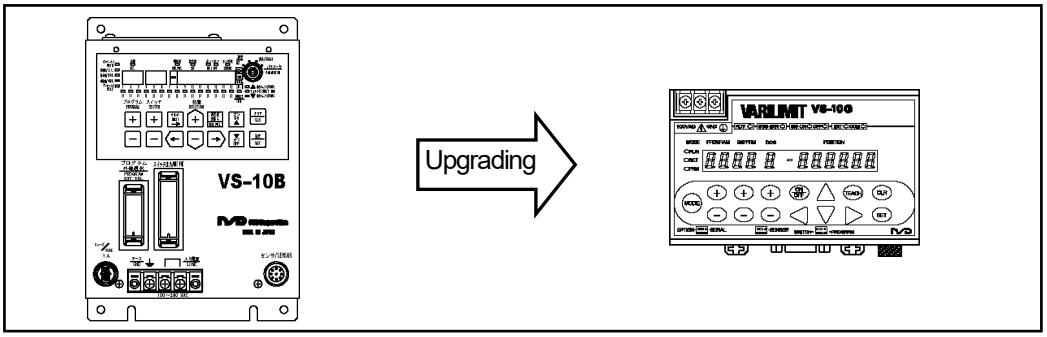
VS-10B Mode

In the VS-10B Mode, all parameter numbers and settings are the same as the VS-10B Series.
The newly added Communication function enables PC data management using setting and editing software.

For the each function's overview of VS-10B mode, refer to "1-4".

For easier replacement from the VS-10B Series, the VS-10G Series offers compatible replacement fixtures and I/O connector cables.

For details, refer to APPENDIX 4, UPGRADING.



Extended Mode

In addition to the existing position decision functions such as Switch Output and Current Position Output, many new functions such as Measuring and Communication are added.

For the each functions overview of the Extended mode, refer to "1-4" in the extended function version of the manual.

Specification and Instruction Manual	Document No.
VS-10G Series Extended function version	ZEF0050425**

**: Revision number

1-2. Features

(1) High reliability

An absolute position detection format ensures accurate position detection even if a power interruption or unexpected noise condition occurs. An origin returning operation is not required.

Applicable ABSOCODER: MRE, VLS-[ ]PW(PY), VRE, NT Coder

(2) Superior durability

ABSOCODER is not used electronic parts except coils and resistance, and it features a no-contact construction excepting bearing. This sensor offers problem-free operation, even in environments where it is exposed to vibration, impact shocks, extreme temperatures, oil, and dust.

(3) Cable extends max. 100 meters

The connection between ABSOCODER and VARILIMIT is able to extend max 100 meters by using the special extension cable.

(4) Compact design

The VARILIMIT's outside dimensions 130(W)×81(H)×99(D) were miniaturized, and DIN rail mounting is also possible.

(5) Easy setting procedure

ON/OFF-position settings are specified by a simple key input operation. Settings can also be specified using the THEACH function.

(6) Automated setup change

The VS-10G Series can register up to 8 programs for each product in advance.

The setup can be easily changed by selecting program numbers.

(7) Current Position Output function

VARILIMIT's current position value can be output in BCD or binary code.

Applicable models: VS-10G-D, VS-10G-D-1

(8) Analog Output function

This is a function to enable analog voltage output that corresponds to the current position value.

A deadband can be set to slowdown response at an origin or any other specified point.

Some models are specified for analog current output

Applicable models: VS-10G-A, VS-10G-A-1, VS-10G-C, VS-10G-C-1

(9) Compliance with UL and CE standards

24VDC model of VARILIMIT complies with both UL (UL508) and CE (EMC Directive) standards.

Applicable models: VS-10G-1, VS-10G-D-1, VS-10G-A-1, VS-10G-C-1

(10) Compliance with KC mark (Korea Certification Mark)

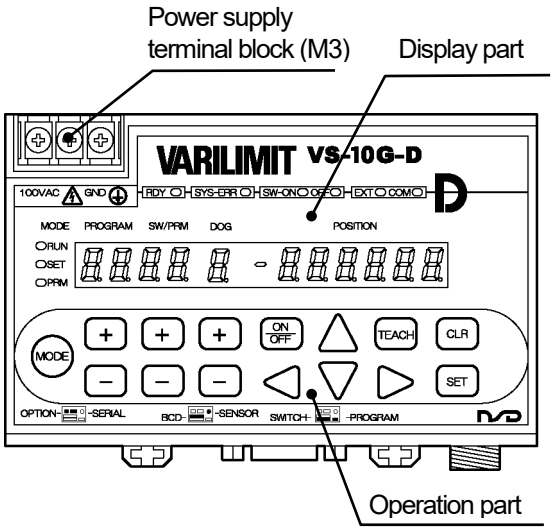
24VDC model of VARILIMIT complies with KC mark. (It is only certified under the Radio Waves Act of South Korea.)

KC mark is the same directives as CE marking. For more details, refer to "APPENDIX 1. CE MARKING".

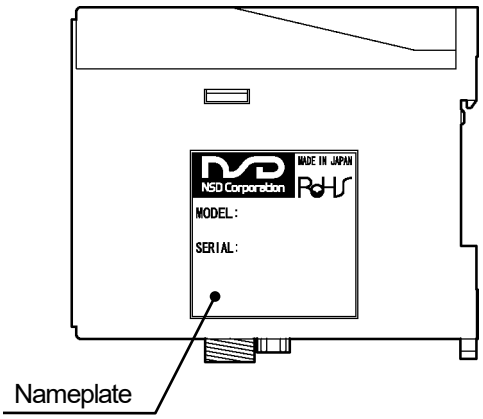
Applicable models: VS-10G-1, VS-10G-D-1, VS-10G-A-1, VS-10G-C-1

1-3. Nomenclature

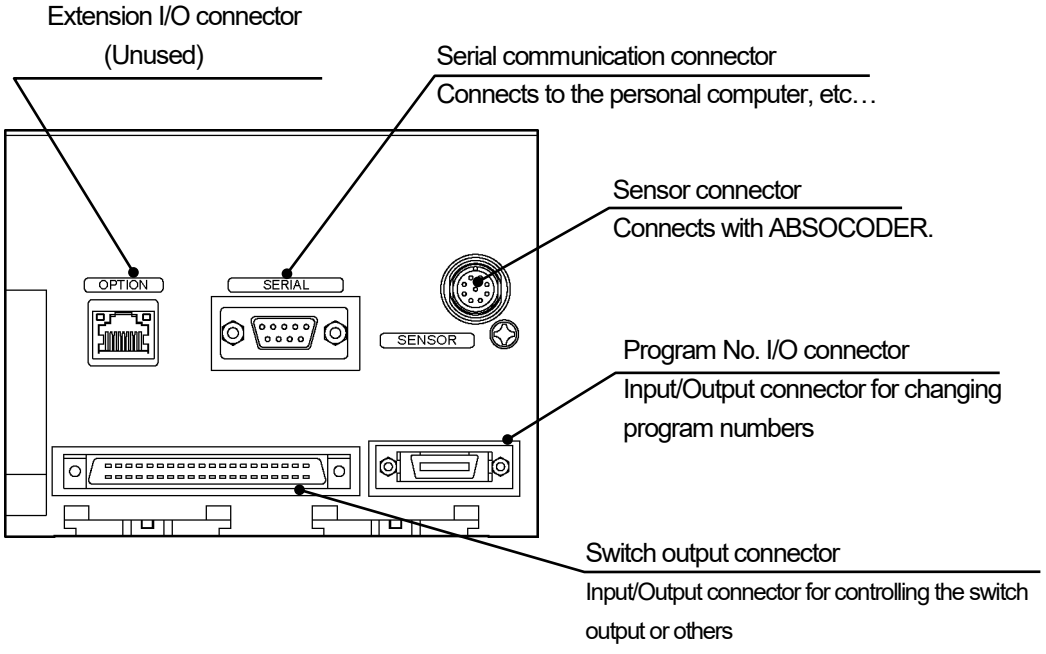
●Front side



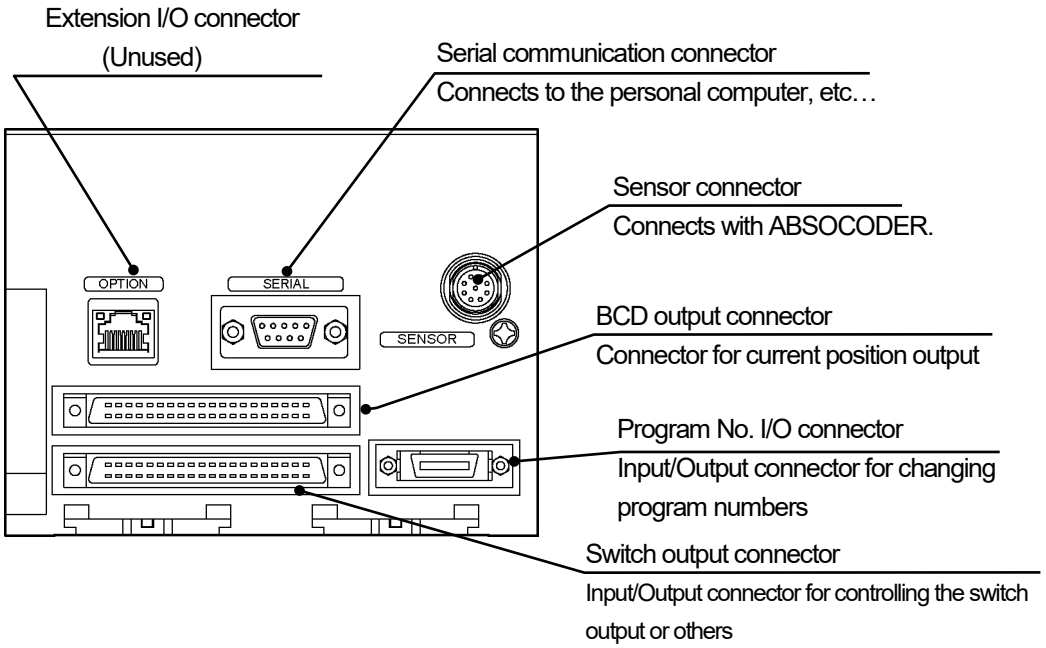
●Right side



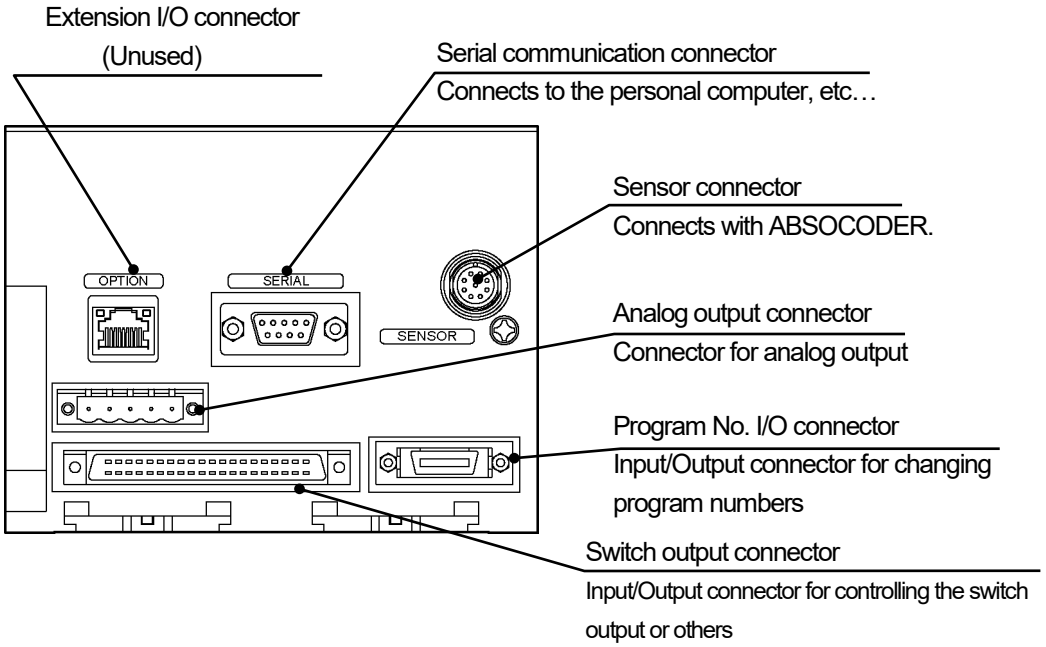
●Bottom side VS-10G, VS-10G-1



●Bottom side VS-10G-D, VS-10G-D-1



●Bottom side VS-10G-A, VS-10G-A-1, VS-10G-C, VS-10G-C-1



1-4. Terminology and Functions

1-4-1. VARILIMIT function list

This section shows functions of each product model of the VARILIMIT VS-10G Series. The functions differ depending on the operation mode. It can be switched using Parameter E0 for the VARILIMIT Mode Selection.

Refer to the following sections for details of the operation modes: VS-10B Mode: Chapter 10-1, Extended mode: extended function version of the manual

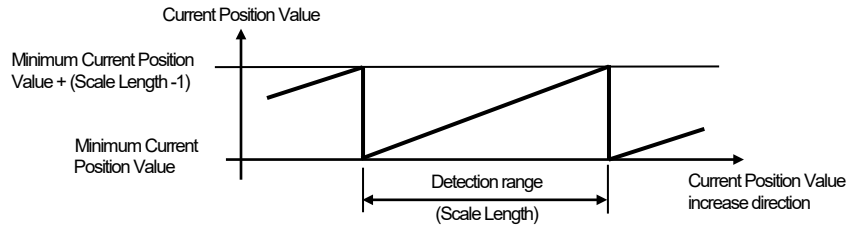
	Model	VS-10G VS-10G-1		VS-10G-D VS-10G-D-1 (with Current Position Value output)		VS-10G-A VS-10G-A-1 (with voltage output)		VS-10G-C VS-10G-C-1 (with current output)	
	Operation Mode / Item	VS-10B Mode	Extended Mode	VS-10B Mode	Extended Mode	VS-10B Mode	Extended Mode	VS-10B Mode	Extended Mode
Existing Functions	Switch Output	○	○	○	○	○	○	○	○
	Protected Switch	○	○	○	○	○	○	○	○
	Multi-Dog	○	○	○	○	○	○	○	○
	Program	○	○	○	○	○	○	○	○
	TEACH Setting	○	○	○	○	○	○	○	○
	Current Position Output			○	○				
	Current Position Preset by Travel Direction Input	○		○		○		○	
	Position Analog Output					○	○	○	○
New Functions	Current Position Preset by Auto-detecting Travel Direction		○		○		○		○
	Speed Analog Output						○		○
	Output HOLD		○		○		○		○
	Measuring		○		○		○		○
	Motion Recording		○		○		○		○
	Motion Detection		○		○		○		○
	Sensor Filter		○		○		○		○
	Hysteresis		○		○		○		○
	Switch Output Enabling		○		○		○		○
	External Error Cancel Input	○	○	○	○	○	○	○	○
	Multi-Origin		○		○		○		○
	Limitswitchless Preset *1		○		○		○		○
	Preset Error Absorption *1		○		○		○		○
	Limitswitch Timer		○		○		○		○
	Serial Communication	○	○	○	○	○	○	○	○
	Password	○	○	○	○	○	○	○	○

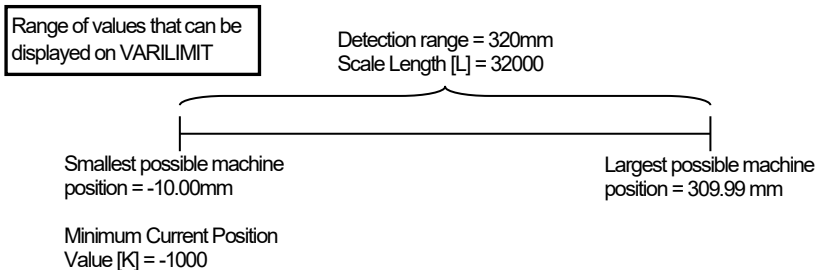
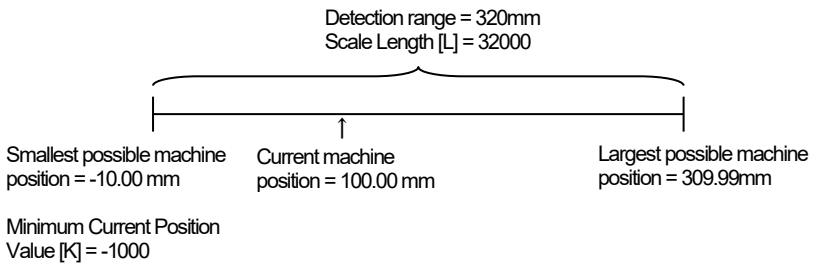
*1: This function cannot use when connecting to the single-turn type ABSOCODER (VRE).

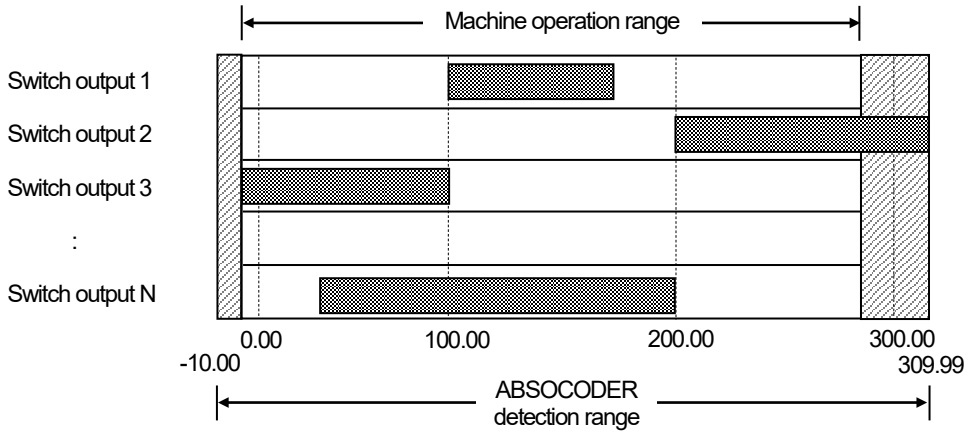
1-4-2. Terminology and functions

This section explains about product functions and the related terminology.

Item	Description
ABSOCODER	**"ABSOCODER"** is a generic name referring to the type of sensing devices that detects rotational and linear displacement as well as speed and acceleration in an absolute format and outputs them digitally (or analogously). **"ABSOCODER"** comprises a detection unit that converts displacement into a variation in magnetic resistance and a conversion unit that inputs an alternating-current energization signal into the detection unit and then issues an absolute-format data according to the output signal returned from the detection unit. **ABSOCODER** sensors can be divided into two types, the rotary type that detects rotational position and the linear type that detects linear position. VARILIMIT has a built-in conversion unit so as to be able to use an ABSCODER sensor.
Scale Length	**"Scale Length"** refers to the "longest distance that the ABSCODER sensor will be able to detect in an absolute format". The scale length can be set using a unit of length appropriate for the amounts of travel involved (millimeter, centimeter, inch etc.). Parameter 99 (Scale Length [L]) can be used for Scale Length setting. ●With the Multi-turn type ABSOCODER (MRE) The **"Scale Length"** is the amount of machine travel attained after the sensor shaft has completed a total number of turns (32, 64, 128, 160, 256, 320). Example: If a 32-turn MRE is directly connected to the feed mechanism of a 10 mm-lead ball screw, the detection range can be calculated by the following equation. Detection range: [10 mm/turn] x 32 turns = 320 mm If the number of decimals to shown on the VARILIMIT display is set to two ("0.01 mm"), the Scale Length [L] should be as follows: $\text{Scale Length [L]} = \frac{\text{Detection range}}{\text{Smallest unit of length}} \qquad L = \frac{320}{0.01} = 32000$ Set the number of decimals to be shown using Parameter 90 (Decimal Point Position). To display in inches, convert the scale length in millimeters into that in inches. Example: **Scale Length [L]** should be as follows: Scale Length [L] = 320 ÷ 25.4 = 12.598 The Scale Length value should be set "12.598". Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

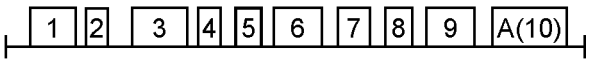
Item	Description
Scale Length	●With the Linear-type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY) In millimeters, the Scale Length should be set to the same value as the Absolute Detection Range value contained in the sensor model code. Example: In the case of VLS-**512**PW350B, "512" represents the Absolute Detection Range. If the number of decimals to be shown on the VARILIMIT display is set to two ("0.01 mm"), the Scale Length [L] should be set as follows: $\text{Scale Length [L]} = \frac{\text{Absolute Detection Range}}{\text{Smallest unit of length}}$ $L = \frac{512}{0.01} = 51200$ Set the number of decimals to be shown using Parameter 90 (Decimal Point Position). To display in inches, convert the scale length in millimeters into that in inches. Example: In the case of VLS-**512**PW350B, the Scale Length [L] should be set as follows: Scale Length [L] = 512 ÷ 25.4 ＝ 20.157 The Scale Length should be set "20.157". Set the number of decimals to be shown using Parameter 90 (Decimal Point Position). **NOTES** As soon as the machine travels out of the detection range, the VARILIMIT display value (Current Position Value) will jump by the whole **Scale Length**. Make sure that the machine never travels beyond the detection range. 

Item	Description
Minimum Current Position Value	**"Minimum Current Position Value"** is the smallest possible Current Position Value that can be displayed on the VARILIMIT and can be set to any given value in the range of [-999999 to (1000000 - Scale Length)]. Set the value using Parameter 98 (Minimum Current Position Value [K]). Example: If the smallest possible machine position is -10 mm and all the other conditions are the same as those described in the previous Scale Length of the Multi-turn type ABSOCODER example, the Minimum Current Position Value [K] should be as follows: Minimum Current Position Value [K] = Smallest possible machine position / Smallest unit of length K = -10 / 0.01 = -1000 
Current Position Value	**"Current Position Value"** is a value that represents where in the detection range the machine is currently located. The Current Position Value can be set to any given value within the range of [Minimum Current Position Value to (Minimum Current Position Value + Scale Length - 1)]. Set the value using Parameter 97 (Current Position Setting). Example: If the **Current Position Value** is set to "10000" (arrowed position) under the same conditions as those described in the previous Scale Length of the Multi-turn type ABSOCODER example: 
ABSOCODER Rotation (Travel) Direction	The current position value increases or decreases depending on **the ABSOCODER sensor's rotation direction (or on the rod travel direction when a linear-type ABSOCODER sensor is used)**. The current position value increase direction can be set according to a specified ABSOCODER sensor **rotation (travel) direction.** Set the direction using Parameter 91 (Sensor Selection / Sensor Rotation (Travel) Direction). For setting details, refer to Chapter 10-4.

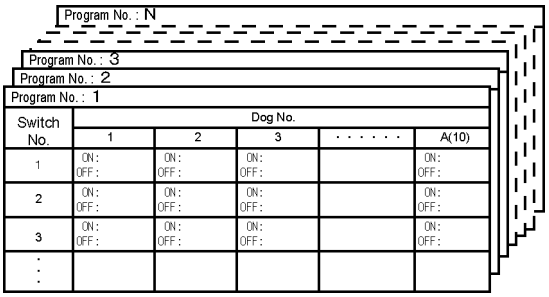
<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Switch Output</td><td>
The <u>Switch Output</u> function works in the same way as outputs from a mechanical limit switch or proximity switch. With ON and OFF positions registered to the VARILIMIT, the switch output will come on or go off depending on the machine position detected by the ABSOCODER.
<table>
<tr><th><Setting example></th><th>ON position</th><th>OFF position</th></tr>
<tr><td>Switch output 1</td><td>100.00</td><td>170.00</td></tr>
<tr><td>Switch output 2</td><td>200.00</td><td>309.99</td></tr>
<tr><td>Switch output 3</td><td>−5.00</td><td>100.00</td></tr>
<tr><td>:</td><td></td><td></td></tr>
<tr><td>Switch output N</td><td>30.00</td><td>200.00</td></tr>
</table>
● Described below is the relationship between the Switch Output setting values and the actual output.
- In the above example, Switch Output 1 ON and OFF positions are set to 100.00 and 170.00, respectively. With this, the switch output will remain on through the range of 100.00 ≦ Current position ＜ 170.00. This means that, when the Current Position Value increases from "0.00", the switch output will come on as soon as the displayed Current Position Value has reached "100.00" to remain on up to "169.99", and then will go off as soon as the value reaches "170.00".
When the Current Position Value decreases, the switch output will remain off through to "170.00" and then will come on as soon as the value goes down to "169.99".
The output will go off again when the value has further decreased to "99.99".


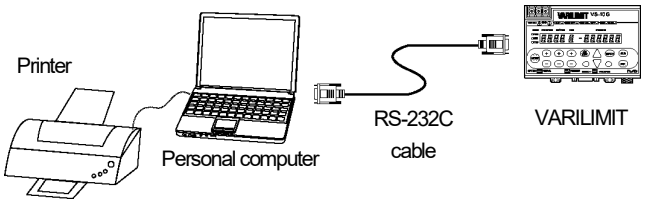
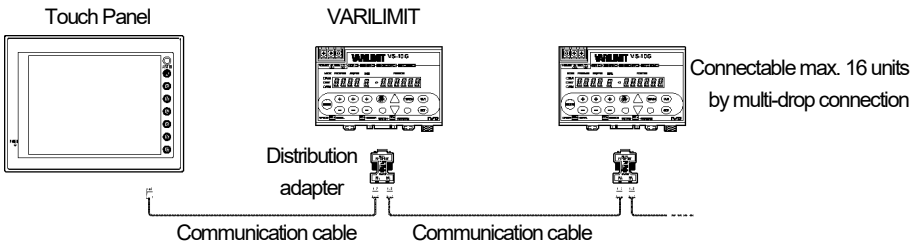
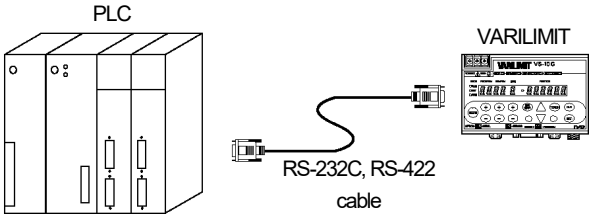
</td></tr>
<tr><td>Protected Switch</td><td>
One of the advantages of VARILIMIT is that the switch output settings can be entered and changed easily. Depending on the machine application, however, critical switch outputs may need to be guarded against careless changes. The <u>Protected Switch</u> function is provided to serve such needs.
Settings of a <u>Protected Switch</u> cannot be entered or changed by regular steps. Before a <u>Protected Switch</u>'s output settings can be entered, changed or deleted, the switch protection needs to be canceled first.

For setting details, refer to Chapter 10-9.
</td></tr>
<tr><td>Multi-Dog</td><td>
Up to ten or four ON and OF F positions ("Dogs") can be set for each switch output.
8-program mode (Parameter E0: 0): The Dogs are numbered from 1 to A (10).

Switch output ON / OFF


For setting details, refer to Chapter 11-3.
</td></tr>
</table>

Item	Description
Program	This function registers one switch output pattern as a program. The setup is easily changed by switching **this Program.**  ● Number of Programs 8-program mode (Parameter E0: 0): Up to 30 switch data for each program can be set with up to 10 Dogs for each switch ● Method to Input the Program Number 8-program mode (Parameter E0: 0): Input each of 8 points signals individually. 1 input = 1 program
TEACH Setting	TEACH setting is able to set ON/OFF position of each switch by actually moving the machine. For setting details, refer to Chapter 11-2.
Current Position Output	For external display devices or for control purposes, the VARILIMIT current position value output is made in binary or BCD code. ● In the VS-10B Mode (Parameter E0: 0): The logic and the update cycle of this **Current Position Output** can be set using Parameters 94 and 79. For setting details, refer to Chapter 10-11. Applicable models: VS-10G-D, VS-10G-D-1
Analog Position Output	This function outputs positions using voltage or current signals. Two channels are provided for this output. ●In the VS-10B Mode (Parameter E0: 0): The position range can be set as desired using Parameters 86 and 87. The voltage range can be set either to “0 to10V” or to “-10V to +10V” using Parameter 85. For setting details, refer to Chapter 10-12. Applicable models: VS-10G-A, VS-10G-A-1 for analog voltage output VS-10G-C, VS-10G-C-1 for analog current output
Current Position Preset by Travel Direction Input	This function applies only to the VS-10B Mode (Parameter E0: 0). It functions in the same way as the existing VS-10B Series. It consists of the current position preset directional selection input and the current position preset input 1 (2). The combined use of those enables current position value correction. For setting details, refer to Chapter 10-7.
External Error Cancel Input	Cancels an error by inputting the external signal.

Item	Description
Serial Communication	Following connections are available since the **serial communication** connector is equipped. Contact our sales representative for serial communication details. (1) Setting and editing software (VS-10F/G-EDW2) This software makes a computer enable to read, edit, write, and print of the VARILIMIT setting data.  (2) Connectable with Touch Panel (VARIMONI) VARILIMIT setting data is able to read, edit, write, and print by using the Touch Panel. Touch Panel can control centrally maximum 16 units of VARILIMIT.  (3) Connectable with programmable controllers (PLC) which are made by Mitsubishi Electric Co. or OMRON Corporation.  (4) RS-232C communication Connecting with a personal computer or programmable controller (PLC), data is able to read, edit, write, and print by a communication program that is made by the customer.
Password	This section applies all the VS-10G Series models. This is the function to ask inputting the password when the mode of VARILIMIT changes form the operation (RUN) mode. Customers can pick and set the password which consists of 3 digits of numeric values. The mode cannot be changed without the password after setting numbers; therefore, the value of “switch setting” and “parameter setting” can be protected. It can also be protected from changing the program No. from panel side. If the password is not set, the mode could be changed by conventional operation. For setting details, refer to Chapter 15.

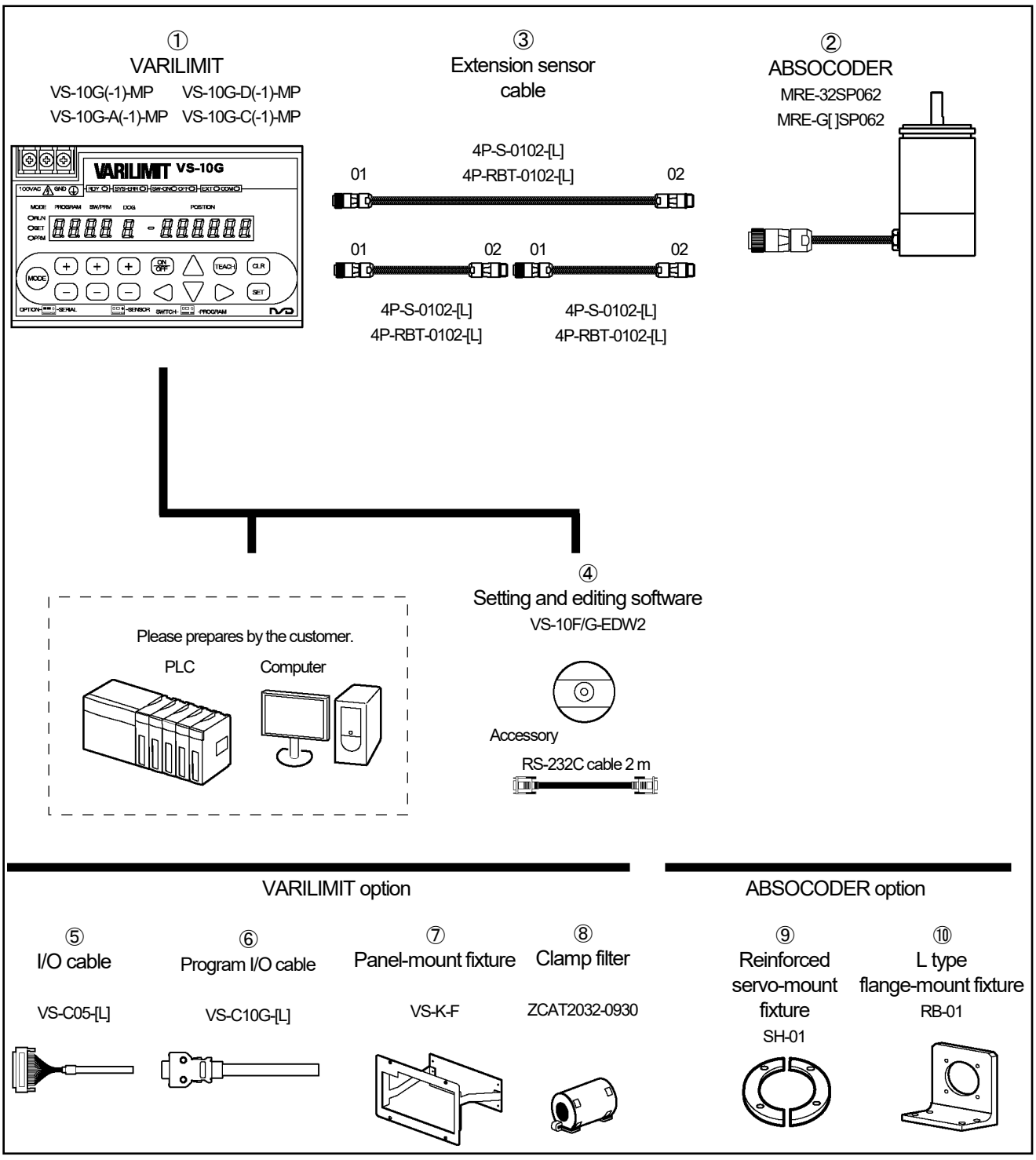
2. MODEL SELECTION WHEN ORDERING

The following figure is an indicated connecttion configuration of the VARILIMIT VS-10G Series. Models and connection configurations vary according to the ABSOCODER type to be used. Please refer to the appropriate information and place orders.

2-1. Using the Multi-turn Type ABSOCODER

Please prepare equipments by the customer except ①-⑩ in the connection configuration.

●Connection configuration



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-MP	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-MP			Current Position Output function (in six-digit)
	VS-10G-A-MP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-MP			Position/Speed Current Output function (at two-point)
	VS-10G-1-MP	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-MP			Current Position Output function (in six-digit)
	VS-10G-A-1-MP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-MP			Position/Speed Current Output function (at two-point)

◆Multi-turn type ABSOCODER

No.	Model	Description
②	MRE-32SP062SAC	Total number of turns: 32, diameter: ϕ62, shaft shape: flat, servo-mount type
	MRE-32SP062SBC	Total number of turns: 32, diameter: ϕ62, shaft shape: key way, servo-mount type
	MRE-32SP062FAC	Total number of turns: 32, diameter: ϕ62, shaft shape: flat, flange-mount type
	MRE-32SP062FBC	Total number of turns: 32, diameter: ϕ62, shaft shape: key way, flange-mount type
	MRE-G[ ]SP062FAC	[ ]: total number of turns: 64,128,160,256,320 diameter: ϕ62, shaft shape: flat, flange-mount type
	MRE-G[ ]SP062FBC	[ ]: total number of turns: 64,128,160,256,320 diameter: ϕ62, shaft shape: key way, flange-mount type

◆Extension sensor cable

No.	Model	Description
③	4P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	4P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)
⑨	Reinforced servo-mount fixture	SH-01	This fixture is able to use with MRE-32SP062SAC and MRE-32SP062SBC.
⑩	L type flange-mount fixture	RB-01	This fixture is able to use with MRE-32SP062 and MRE-G[ ]SP062. In the case of using the servo-mount type (SAC, SBC), the reinforced servo-mount fixture (SH-01) must be used.

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

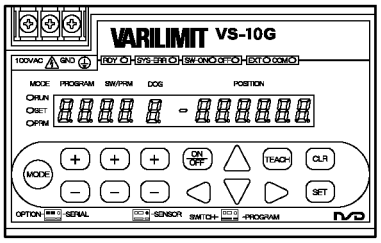
2-2. Using the Linear-type ABSOCODER (Dual-rod)

Please prepare equipments by the customer except ①-⑧ in the connection configuration.

●Connection configuration

① VARILIMIT

VS-10G(-1)-L VS-10G-D(-1)-L
VS-10G-A(-1)-L VS-10G-C(-1)-L

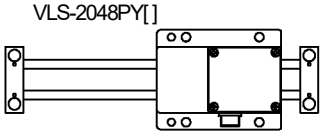


③ Extension sensor cable

4P-S-0102-[L] 4P-RBT-0103-[L]
4P-RBT-0102-[L]

② ABSOCODER

VLS-256PW[ ]B VLS-512PW[ ]B
VLS-1024PW[ ]
VLS-512PY[ ]B VLS-1024PY[ ]B
VLS-2048PY[ ]



④ Setting and editing software

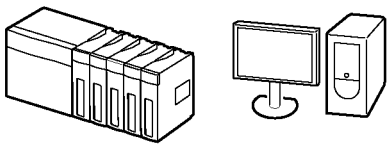
VS-10F/G-EDW2

Accessory

RS-232C cable 2 m

Please prepares by the customer.

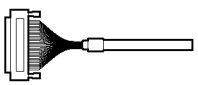
PLC Computer



VARILIMIT option

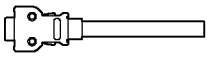
⑤ I/O cable

VS-C05-[L]



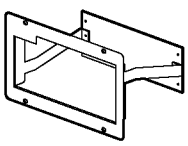
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



⑧ Clamp filter

ZCAT2032-0930

●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-L	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-L			Current Position Output function (in six-digit)
	VS-10G-A-L			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-L			Position/Speed Current Output function (at two-point)
	VS-10G-1-L	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-L			Current Position Output function (in six-digit)
	VS-10G-A-1-L			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-L			Position/Speed Current Output function (at two-point)

◆Linear type ABSOCODER (Dual-rod)

No.	Model	Description	
②	VLS-256PW[ ]B	[ ]: Detection stroke (Max. 256mm)	For detection stroke details, refer to "4-2. Linear Type ABSOCODER (Dual-rod)".
	VLS-512PW[ ]B	[ ]: Detection stroke (Max. 512mm)	
	VLS-1024PW[ ]	[ ]: Detection stroke (Max. 1024mm)	
	VLS-512PY[ ]B	[ ]: Detection stroke (Max. 512mm)	
	VLS-1024PY[ ]B	[ ]: Detection stroke (Max. 1024mm)	
	VLS-2048PY[ ]	[ ]: Detection stroke (Max. 2048mm)	

◆Extension sensor cable

No.	Model	Description
③	4P-RBT-0103-[L]	Robotic cable [L]: Cable length [m] 4, 6, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)
	4P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	4P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

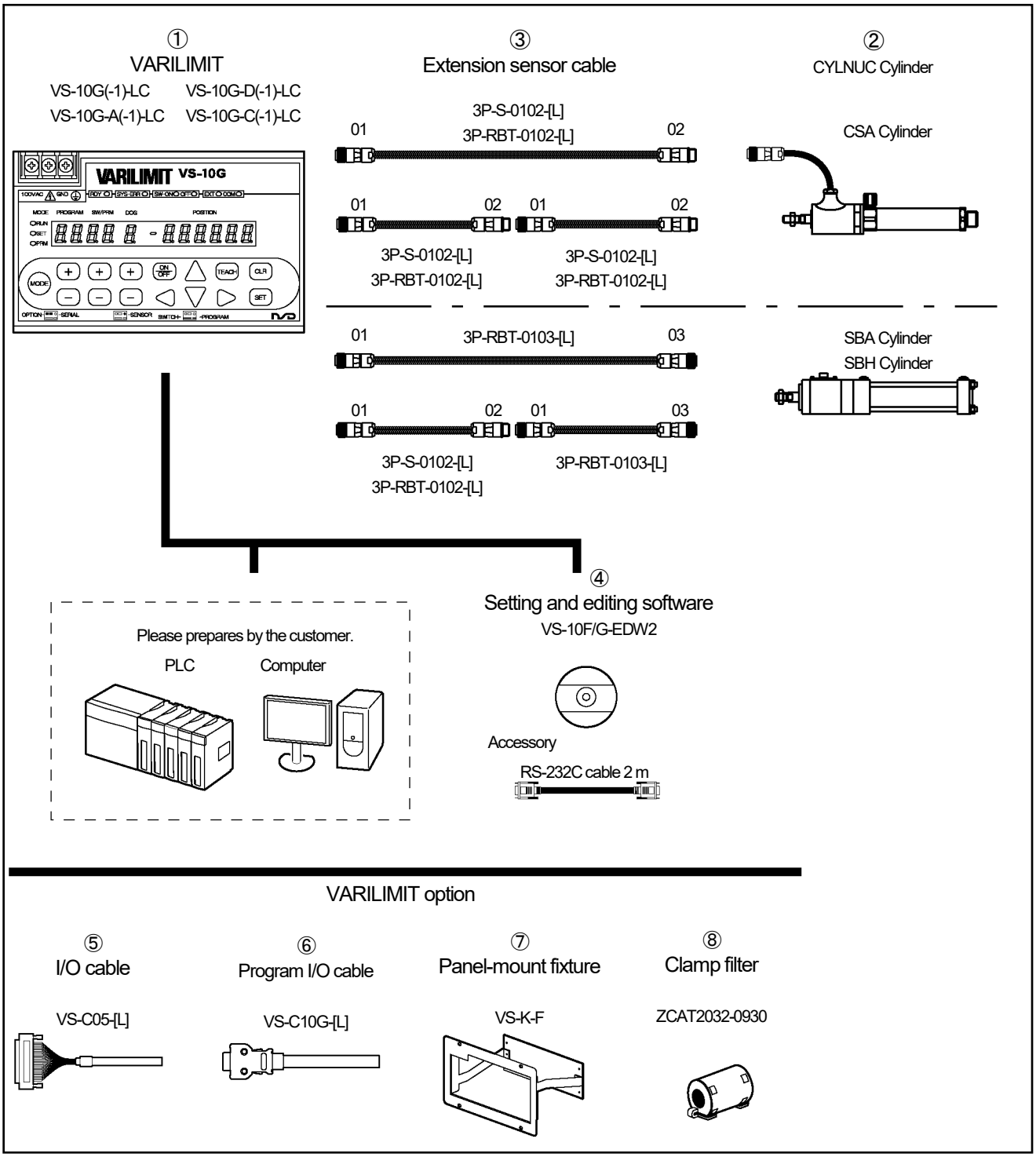
No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

2-3. Using the CYLNUC Cylinder

Please prepare equipments by the customer except ①-⑧ in the connection configuration.

●Connection configuration



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-LC	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-LC			Current Position Output function (in six-digit)
	VS-10G-A-LC			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-LC			Position/Speed Current Output function (at two-point)
	VS-10G-1-LC	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-LC			Current Position Output function (in six-digit)
	VS-10G-A-1-LC			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-LC			Position/Speed Current Output function (at two-point)

◆CYLNUC Cylinder

No.	Model	Description	
②	CSA Cylinder	Pneumatic cylinder	For more details, refer to the general ABSOCODER catalogue.
	SBA Cylinder	Pneumatic cylinder	
	SBH Cylinder	Hydraulic cylinder	

◆Extension sensor cable

No.	Model	Description
③	3P-RBT-0103-[L]	Robotic cable [L]: Cable length [m] 4, 6, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)
	3P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	3P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

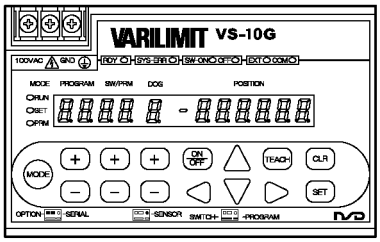
2-4. Using Inrodsensor

Please prepare equipments by the customer except ①-⑧ in the connection configuration.

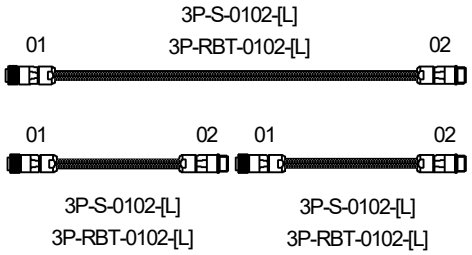
●Connection configuration

① VARILIMIT

VS-10G(-1)-LC VS-10G-D(-1)-LC
VS-10G-A(-1)-LC VS-10G-C(-1)-LC

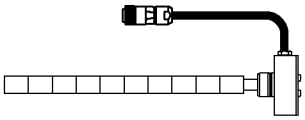


③ Extension sensor cable



② Inrodsensor

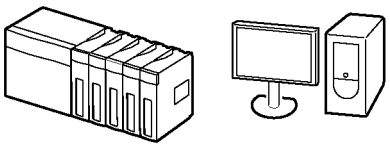
IRS-51.2P



For Inrodsensor details, contact our sales representative.

Please prepares by the customer.

PLC Computer



④ Setting and editing software

VS-10F/G-EDW2

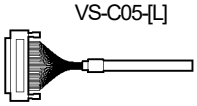
Accessory

RS-232C cable 2 m

VARILIMIT option

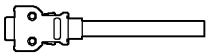
⑤ I/O cable

VS-C05-[L]



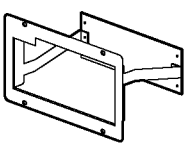
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



⑧ Clamp filter

ZCAT2032-0930

●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-LC	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-LC			Current Position Output function (in six-digit)
	VS-10G-A-LC			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-LC			Position/Speed Current Output function (at two-point)
	VS-10G-1-LC	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-LC			Current Position Output function (in six-digit)
	VS-10G-A-1-LC			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-LC			Position/Speed Current Output function (at two-point)

◆Inrodsensor

No.	Model	Description
②	IRS-51.2P	For Inrodsensor details, contact our sales representative.

◆Extension sensor cable

No.	Model	Description
③	3P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	3P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

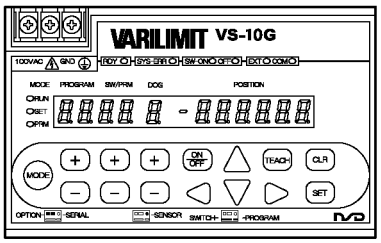
2-5. Using the Linear-type ABSOCODER (Single-rod)

Please prepare equipments by the customer except ①-⑧ in the connection configuration.

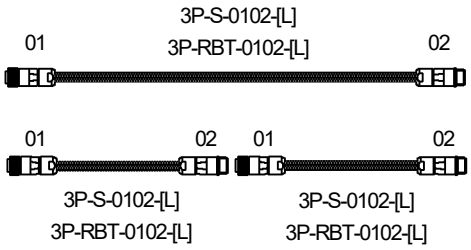
●Connection configuration

① VARILIMIT

VS-10G(-1)-LP VS-10G-D(-1)-LP
VS-10G-A(-1)-LP VS-10G-C(-1)-LP



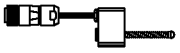
③ Extension sensor cable



② ABSOCODER

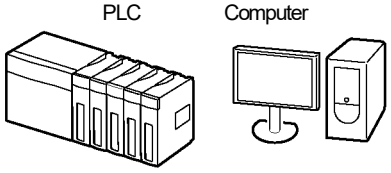
VLS-8PSA VLS-8PSM
VLS-10PS VLS-16PSA
VLS-32PSA VLS-16PS64B

VLS-8PSJ20A
VLS-8PSJ20B



Please prepares by the customer.

PLC Computer

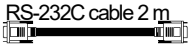


④ Setting and editing software

VS-10F/G-EDW2

Accessory

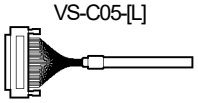
RS-232C cable 2 m



VARILIMIT option

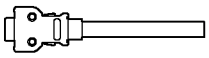
⑤ I/O cable

VS-C05-[L]



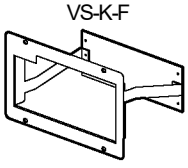
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



⑧ Clamp filter

ZCAT2032-0930

●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-LP	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-LP			Current Position Output function (in six-digit)
	VS-10G-A-LP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-LP			Position/Speed Current Output function (at two-point)
	VS-10G-1-LP	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-LP			Current Position Output function (in six-digit)
	VS-10G-A-1-LP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-LP			Position/Speed Current Output function (at two-point)

◆Linear type ABSOCODER (Single-rod)

No.	Model	Description		
②	VLS-8PSA	Absolute detection range: 8.192mm		With spring
	VLS-8PSM	Absolute detection range: 8.192mm		With spring
	VLS-10PS	Absolute detection range: 10mm		Without spring
	VLS-16PSA	Absolute detection range: 16mm		With spring
	VLS-32PSA	Absolute detection range: 32mm		With spring
	VLS-16PS64B	Absolute detection range: 16mm	Max. detection stroke: 64mm	Without spring
	VLS-8PSJ20A	Absolute detection range: 8.192mm	Max. detection stroke: 20mm	With spring
	VLS-8PSJ20B	Absolute detection range: 8.192mm	Max. detection stroke: 20mm	Without spring

◆Extension sensor cable

No.	Model	Description
③	3P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	3P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

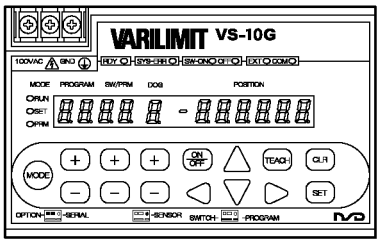
2-6. Using the Single-turn Type ABSOCODER

Please prepare equipments by the customer except ①-⑩ in the connection configuration.

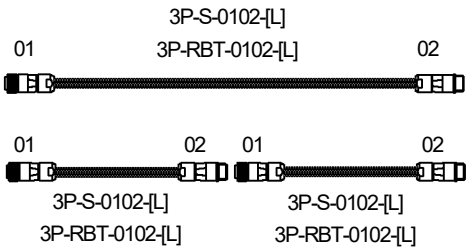
●Connection configuration

① VARILIMIT

VS-10G(-1)-VP VS-10G-D(-1)-VP
VS-10G-A(-1)-VP VS-10G-C(-1)-VP

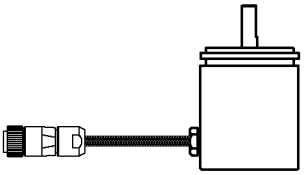


③ Extension sensor cable



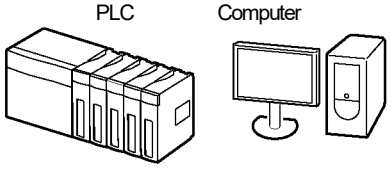
② ABSOCODER

VRE-P062
VRE-P028



Please prepares by the customer.

PLC Computer



④ Setting and editing software

VS-10F/G-EDW2

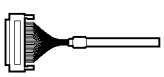
Accessory

RS-232C cable 2 m

VARILIMIT option

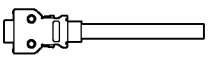
⑤ I/O cable

VS-C05-[L]



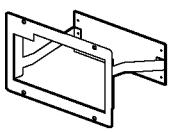
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



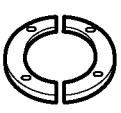
⑧ Clamp filter

ZCAT2032-0930

ABSOCODER option

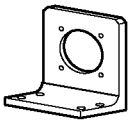
⑨ Reinforced servo-mount fixture

SH-01



⑩ L type flange-mount fixture

RB-01



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-VP	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-VP			Current Position Output function (in six-digit)
	VS-10G-A-VP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-VP			Position/Speed Current Output function (at two-point)
	VS-10G-1-VP	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-VP			Current Position Output function (in six-digit)
	VS-10G-A-1-VP			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-VP			Position/Speed Current Output function (at two-point)

◆Single-turn type ABSOCODER

No.	Model	Description
②	VRE-P062SAC	Diameter: ϕ62, shaft shape: flat, servo-mount type
	VRE-P062SBC	Diameter: ϕ62, shaft shape: key way, servo-mount type
	VRE-P062FAC	Diameter: ϕ62, shaft shape: flat, flange-mount type
	VRE-P062FBC	Diameter: ϕ62, shaft shape: key way, flange-mount type
	VRE-P028SAC	Diameter: ϕ28, shaft shape: flat, servo-mount type

◆Extension sensor cable

No.	Model	Description
③	3P-S-0102-[L]	Standard cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)
	3P-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)
⑨	Reinforced servo-mount fixture	SH-01	This fixture is able to use with VRE-P062.
⑩	L type flange-mount fixture	RB-01	This fixture is able to use with VRE-P062. In the case of using the servo-mount type (SAC, SBC), the reinforced servo-mount fixture (SH-01) must be used.

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

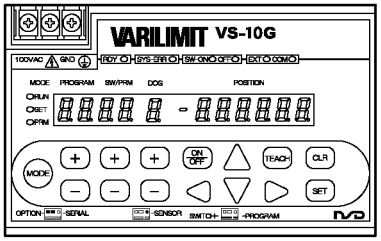
2-7. Using the Single-turn Type ABSOCODER (High-resolution)

Please prepare equipments by the customer except ①-⑨ in the connection configuration.

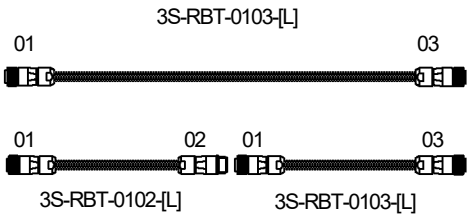
●Connection configuration

① VARILIMIT

VS-10G(-1)-V2 VS-10G-D(-1)-V2
VS-10G-A(-1)-V2 VS-10G-C(-1)-V2

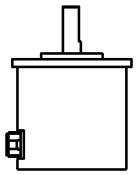


③ Extension sensor cable



② ABSOCODER

VRE-16TS062FAL



④ Setting and editing software

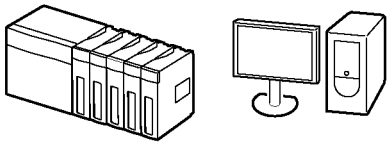
VS-10F/G-EDW2

Accessory

RS-232C cable 2 m

Please prepares by the customer.

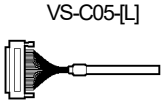
PLC Computer



VARILIMIT option

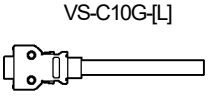
⑤ I/O cable

VS-C05-[L]



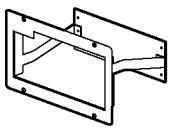
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



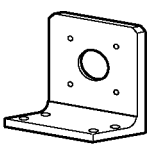
⑧ Clamp filter

ZCAT2032-0930

ABSOCODER option

⑨ L type flange-mount fixture

RB-02



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-V2	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-V2			Current Position Output function (in six-digit)
	VS-10G-A-V2			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-V2			Position/Speed Current Output function (at two-point)
	VS-10G-1-V2	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-V2			Current Position Output function (in six-digit)
	VS-10G-A-1-V2			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-V2			Position/Speed Current Output function (at two-point)

◆Single-turn type ABSOCODER (High-resolution)

No.	Model	Description
②	VRE-16TS062FAL	Diameter: ϕ62, shaft shape: flat, flange-mount type

◆Extension sensor cable

No.	Model	Description
③	3S-RBT-0103-[L]	Robotic cable [L]: Cable length [m] 4, 6, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)
	3S-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)
⑨	L type flange-mount fixture	RB-02	This fixture is able to use with VRE-16TS062FAL. In the case of using the servo-mount type (SAC, SBC), the reinforced servo-mount fixture (SH-01) must be used.

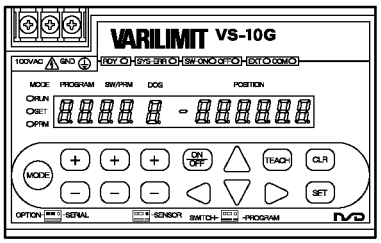
*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

2-8. Using the Multi-turn Type ABSOCODER (High-accuracy)

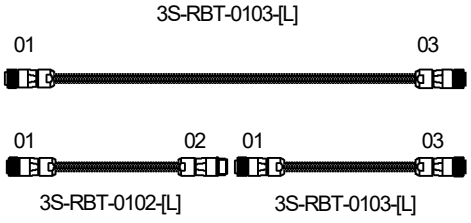
Please prepare equipments by the customer except ①-⑨ in the connection configuration.

●Connection configuration

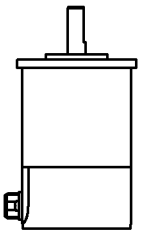
①
VARILIMIT
VS-10G(-1)-M2 VS-10G-D(-1)-M2
VS-10G-A(-1)-M2 VS-10G-C(-1)-M2



③
Extension sensor cable



②
ABSOCODER
MRE-32SS062FAL
MRE-G[ ]SS062FAL



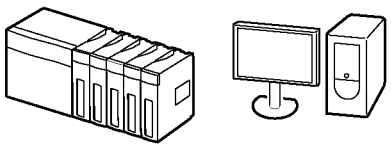
④
Setting and editing software
VS-10F/G-EDW2

Accessory

RS-232C cable 2 m

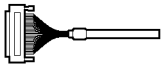
Please prepares by the customer.

PLC Computer

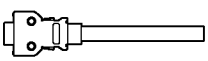


VARILIMIT option

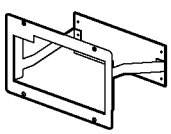
⑤
I/O cable
VS-C05-[L]



⑥
Program I/O cable
VS-C10G-[L]



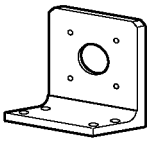
⑦
Panel-mount fixture
VS-K-F



⑧
Clamp filter
ZCAT2032-0930

ABSOCODER option

⑨
L type
flange-mount fixture
RB-02



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-M2	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-M2			Current Position Output function (in six-digit)
	VS-10G-A-M2			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-M2			Position/Speed Current Output function (at two-point)
	VS-10G-1-M2	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-M2			Current Position Output function (in six-digit)
	VS-10G-A-1-M2			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-M2			Position/Speed Current Output function (at two-point)

◆Multi-turn type ABSOCODER (high-accuracy)

No.	Model	Description
②	MRE-32SS062FAL	Total number of turns: 32, diameter: ϕ62, shaft shape: flat, flange-mount type
	MRE-G[ ]SS062FAL	[ ]: total number of turns: 64,128,160,256,320,640,1280,2560 diameter: ϕ62, shaft shape: flat, flange-mount type

◆Extension sensor cable

No.	Model	Description
③	3S-RBT-0103-[L]	Robotic cable [L]: Cable length [m] 4, 6, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)
	3S-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)

◆Option

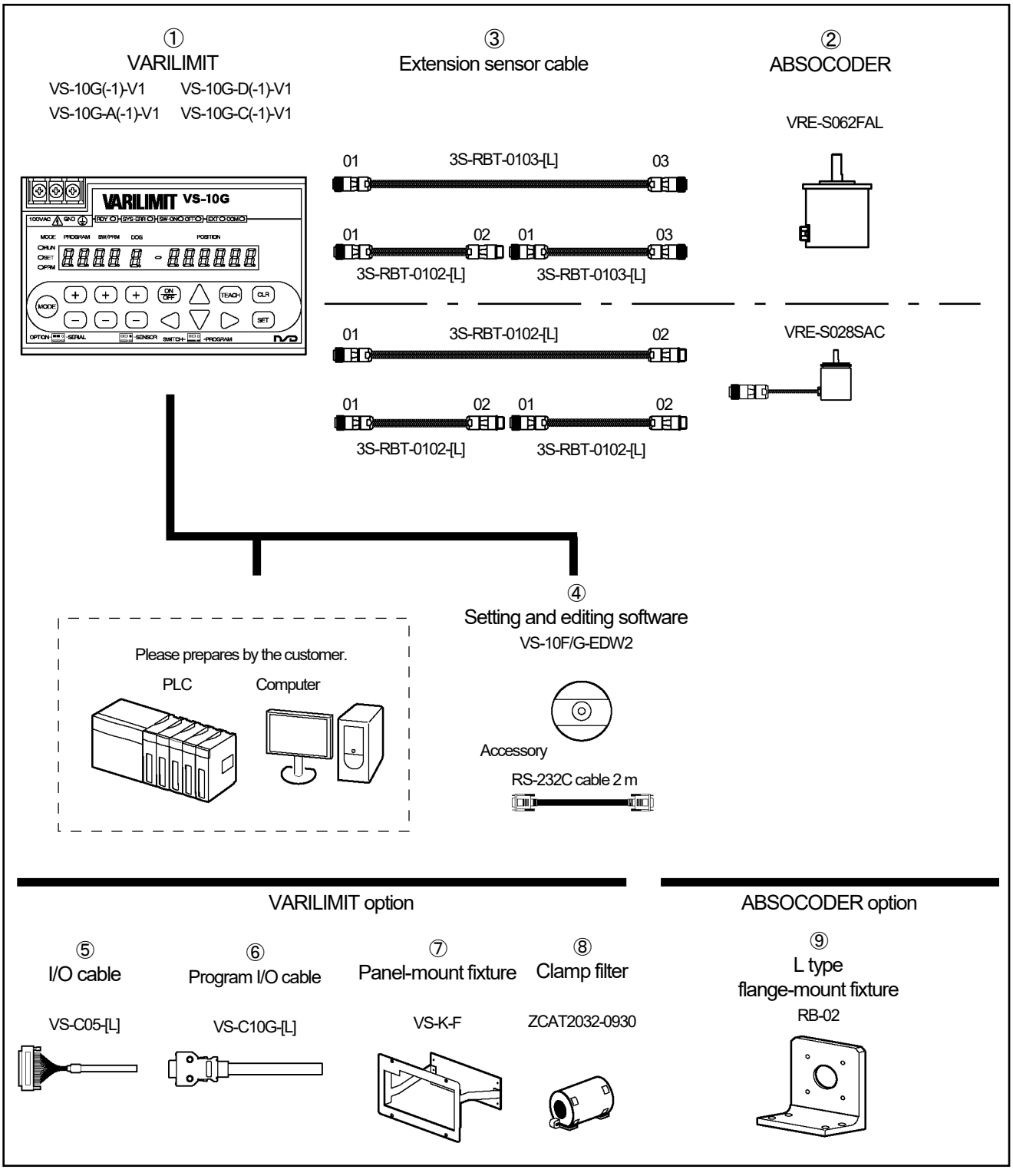
No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)
⑨	L type flange-mount fixture	RB-02	This fixture is able to use with MRE-32SS062FAL and MRE-G[ ]SS062FAL.

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

2-9. Using the Single-turn Type ABSOCODER (High-accuracy)

Please prepare equipments by the customer except ①-⑨ in the connection configuration.

●Connection configuration



●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-V1	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-V1			Current Position Output function (in six-digit)
	VS-10G-A-V1			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-V1			Position/Speed Current Output function (at two-point)
	VS-10G-1-V1	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-V1			Current Position Output function (in six-digit)
	VS-10G-A-1-V1			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-V1			Position/Speed Current Output function (at two-point)

◆Single-turn type ABSOCODER (high-accuracy)

No.	Model	Description
②	VRE-S062FAL	Diameter: ϕ62, shaft shape: flat, flange-mount type
	VRE-S028SAC	Diameter: ϕ28, shaft shape: flat, servo-mount type

◆Extension sensor cable

No.	Model	Description
③	3S-RBT-0103-[L]	Robotic cable [L]: Cable length [m] 4, 6, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)
	3S-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40 (If a cable length is 40m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)
⑨	L type flange-mount fixture	RB-02	This fixture is able to use with VRE-S062FAL.

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

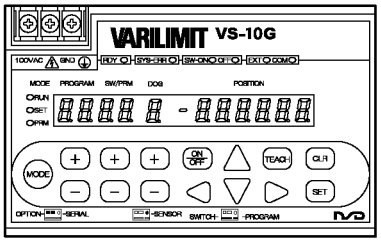
2-10. Using NT Coder

Please prepare equipments by the customer except ①-⑧ in the connection configuration.

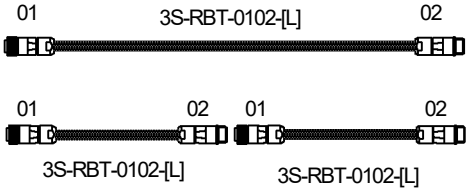
●Connection configuration

① VARILIMIT

VS-10G(-1)-V1 VS-10G-D(-1)-V1
VS-10G-A(-1)-V1 VS-10G-C(-1)-V1

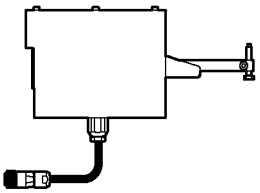


③ Extension sensor cable



② NT Coder

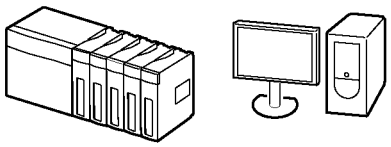
VRE-16TSWABC3



For NT coder details, contact our sales representative.

Please prepares by the customer.

PLC Computer



④ Setting and editing software

VS-10F/G-EDW2

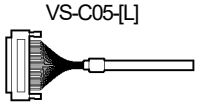
Accessory

RS-232C cable 2 m

VARILIMIT option

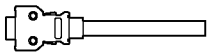
⑤ I/O cable

VS-C05-[L]



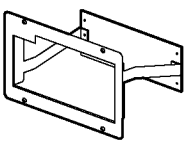
⑥ Program I/O cable

VS-C10G-[L]



⑦ Panel-mount fixture

VS-K-F



⑧ Clamp filter

ZCAT2032-0930

●Model list

◆VARILIMIT

No.	Model	Power supply voltage	Description	
①	VS-10G-V1	100VAC model	8 (32) programs, 30 points output	
	VS-10G-D-V1			Current Position Output function (in six-digit)
	VS-10G-A-V1			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-V1			Position/Speed Current Output function (at two-point)
	VS-10G-1-V1	24VDC model	8 (32) programs, 30 points output	
	VS-10G-D-1-V1			Current Position Output function (in six-digit)
	VS-10G-A-1-V1			Position/Speed Voltage Output function (at two-point)
	VS-10G-C-1-V1			Position/Speed Current Output function (at two-point)

◆NT Coder

No.	Model	Description
②	VRE-16TSWABC3	For NT coder details, contact our sales representative.

◆Extension sensor cable

No.	Model	Description
③	3S-RBT-0102-[L]	Robotic cable [L]: Cable length [m] 2, 3, 5, 8, 10, 15, 20, 25, 30, 35, 40, 45, 50 (If a cable length is 50m or more, it can be selected by each 10m.)

◆Option

No.	Name	Model	Description
④	Setting and editing software *1	VS-10F/G-EDW2	Data setting and editing are available by using a computer. OS: Microsoft Windows XP or new models
⑤	I/O cable	VS-C05-[L]	Used for the switch output connector and the BCD output connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑥	Program I/O cable	VS-C10G-[L]	Used for the program number I/O connector. [L]: Cable length: 1, 2, 3, 5, 7, 10m
⑦	Panel-mount fixture for VS-10G series	VS-K-F	Uses this fixture for panel mounting VARILIMIT on the control panel.
⑧	Clamp filter	ZCAT2032-0930	This is option parts for corresponding to CE marking. Inner dimensions: ϕ9 (Manufacturer: TDK Corporation)

*1: Please prepare the USB-RS-232C adapter when your computer doesn't have a RS-232C port.

- MEMO -

SPECIFICATION

Describes about specifications and outer dimensions.

3. VARILIMIT SPECIFICATIONS AND DIMENSIONS
4. ABSOCODER SPECIFICATIONS AND DIMENSIONS
5. CABLE SPECIFICATIONS AND DIMENSIONS

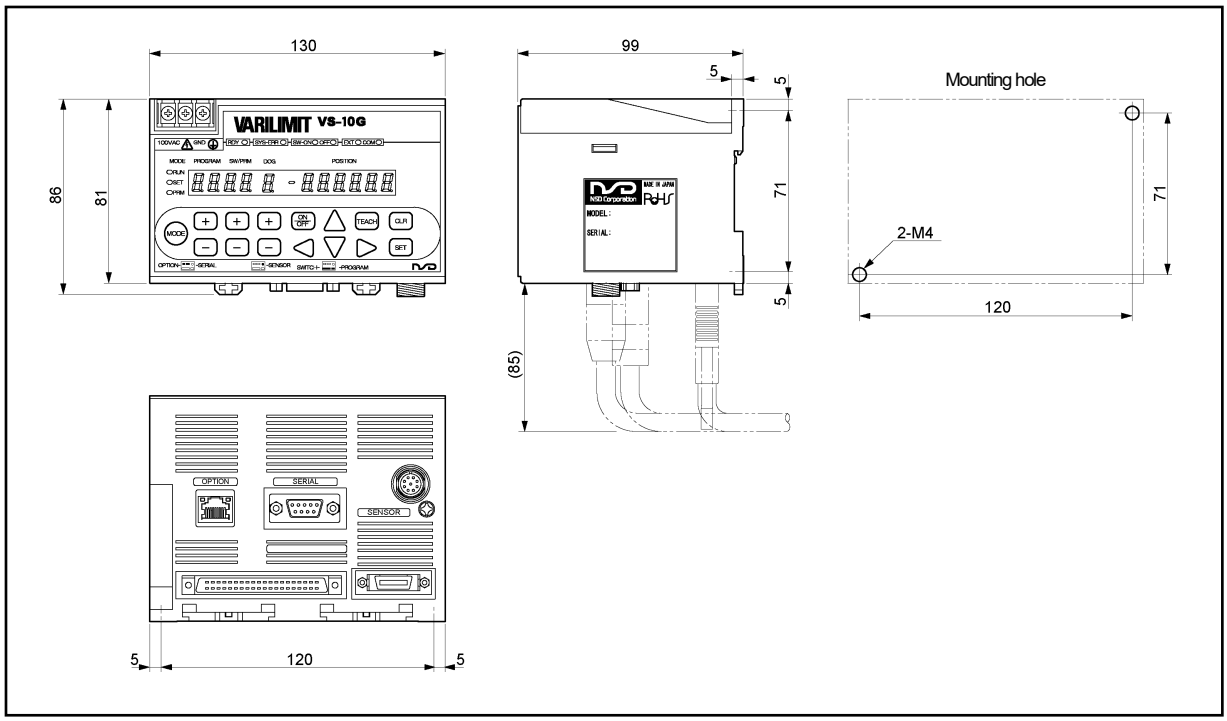
3. VARILIMIT SPECIFICATIONS AND DIMENSIONS

3-1. Outer Dimensions

●VS-10G

Units: mm

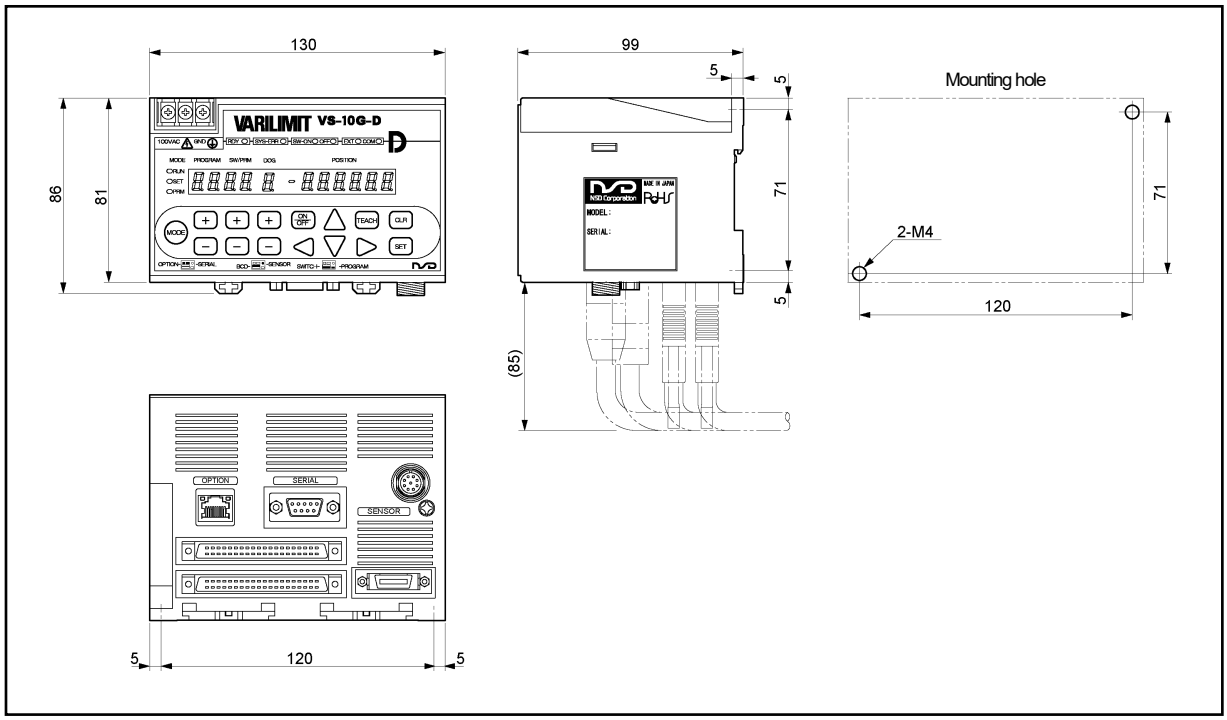
(VS-10G-1 is same size as VS-10G.)



●VS-10G-D

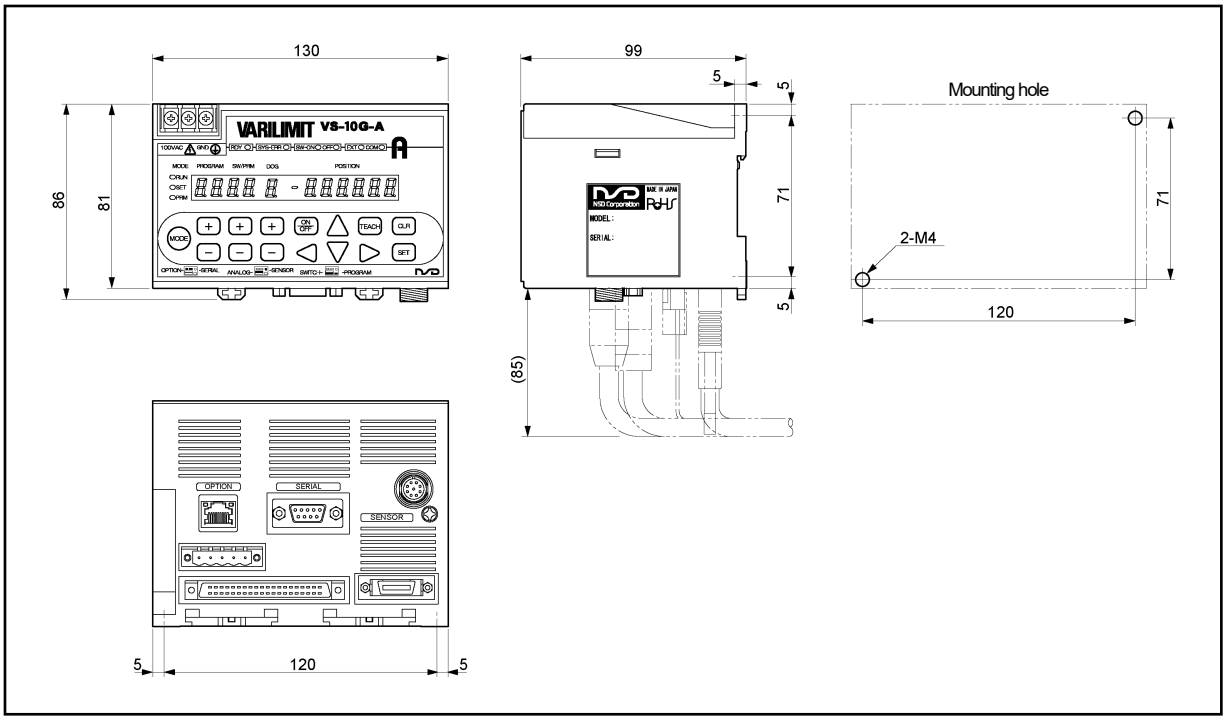
Units: mm

(VS-10G-D-1 is same size as VS-10G-D.)



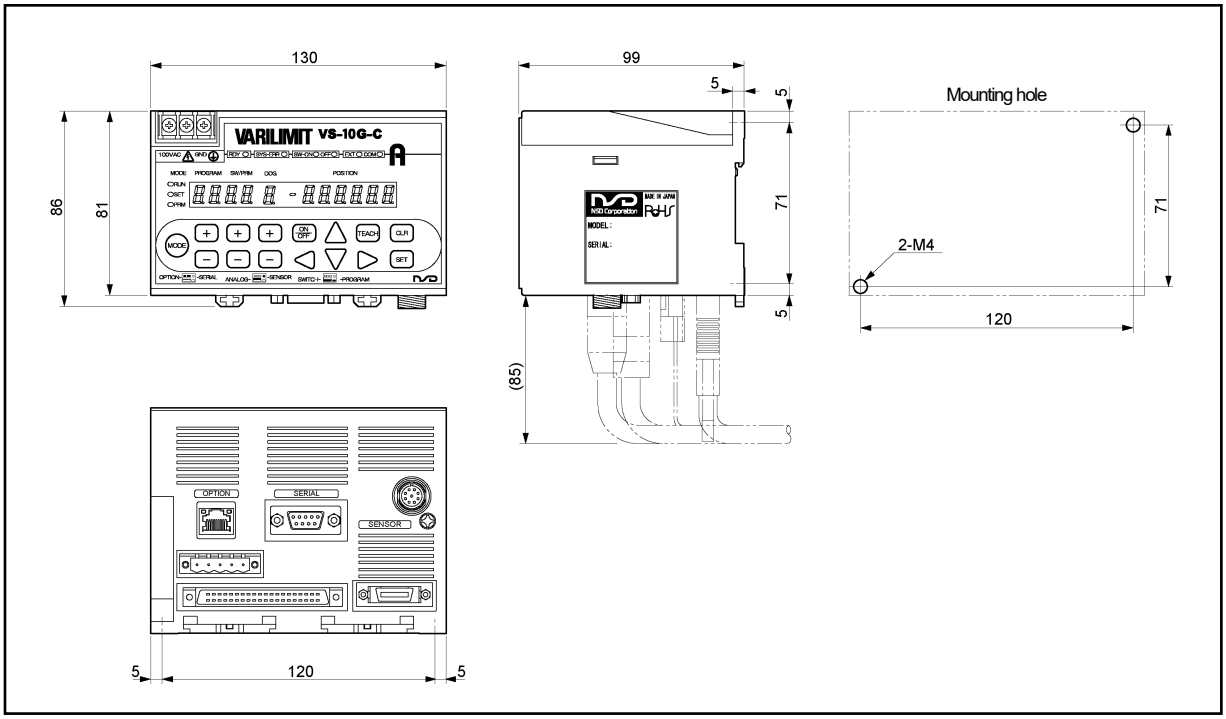
●VS-10G-A Units: mm

(VS-10G-A-1 is same size as VS-10G-A.)



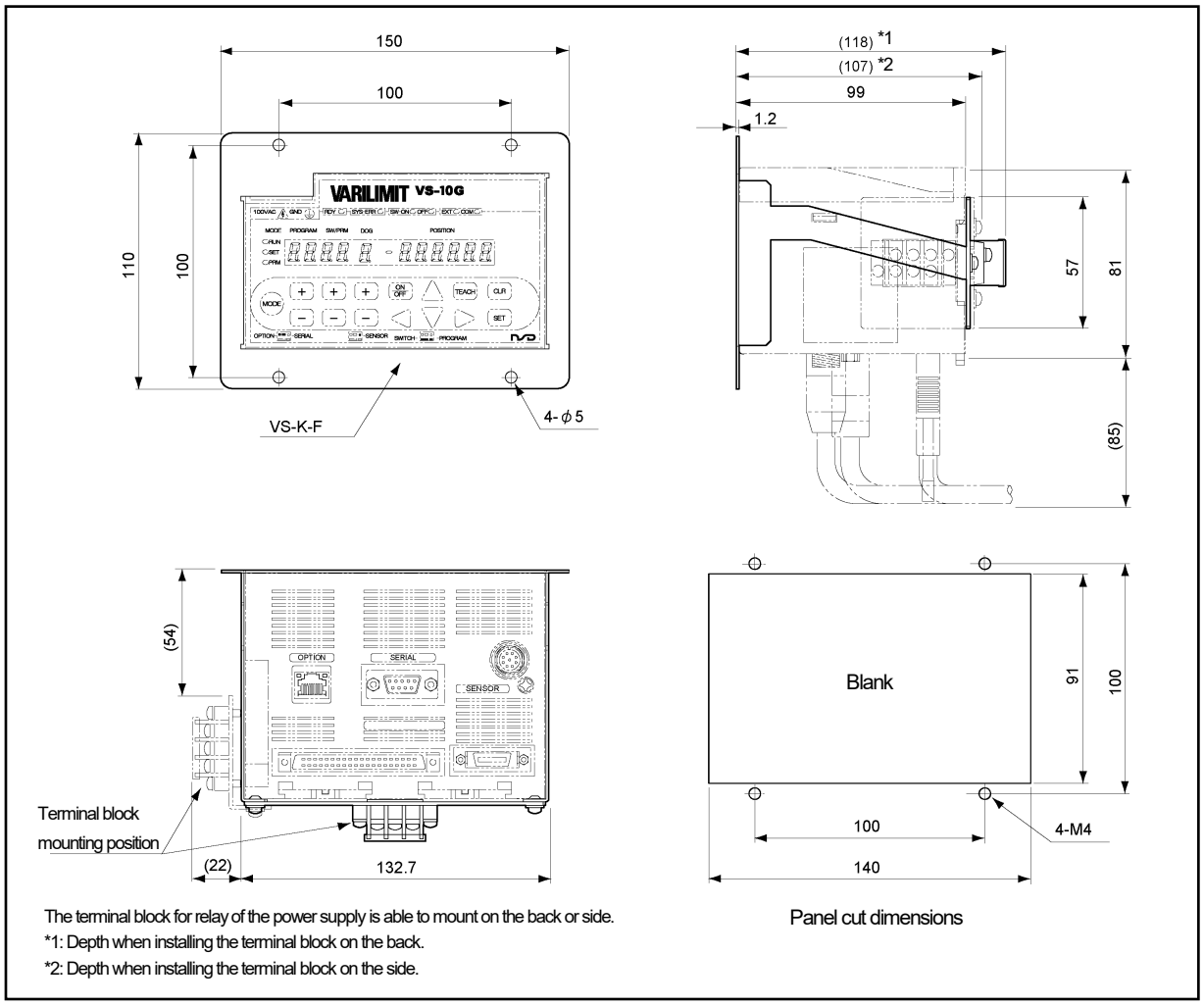
●VS-10G-C Units: mm

(VS-10G-C-1 is same size as VS-10G-C.)



●VS-K-F (Panel-mounting fixture) Units: mm

VS-K-F can be used with all VS-10G series.



The terminal block for relay of the power supply is able to mount on the back or side.

*1: Depth when installing the terminal block on the back.

*2: Depth when installing the terminal block on the side.

Panel cut dimensions

3-2. General Specification

Items	Specifications	
Model	VS-10G, VS-10G-D, VS-10G-A, VS-10G-C	VS-10G-1, VS-10G-D-1 VS-10G-A-1, VS-10G-C-1
Power supply voltage	100VAC 50/60Hz	24VDC
Permissible power voltage range	85 to 132VAC	21.6 to 30VDC
Power consumption	20VA or less	10W or less
Insulation resistance	20 MΩ or more between external AC power terminals and ground (by 500 VDC insulation resistance tester)	20 MΩ or more between external DC power terminals and ground (by 500 VDC insulation resistance tester)
Withstand voltage	1500 VAC, 60Hz for 1 minute between external AC power terminals and ground	500 VAC, 60Hz for 1 minute between external DC power terminals and ground
Vibration resistance	20m/s^2 10 to 500Hz, 10cycles of 5 minutes in 3 directions, conforms to JIS C 0040 standard	
Surrounding operating air temperature	0 to +55°C (No freezing)	
Surrounding operating humidity	20 to 95 %RH (No condensation)	
Surrounding operating environment	Free from corrosive gases and excessive dust	
Surrounding storage air temperature	−25 to +70°C	
Grounding	Must be securely grounded (ground resistance of 100Ω or less)	
Construction	Inside control panel	
Mounting	- Two-point screws mounting - DIN rail mounting - It is possible to mount on the panel when using a panel mounting fixture “VS-K-F”. Choose the method either one.	
Outside dimension (mm)	130(W)×81(H)×99(D) [Refer to dimensions for details.]	
Mass	Approx. 0.7kg	

3-3. Performance Specification

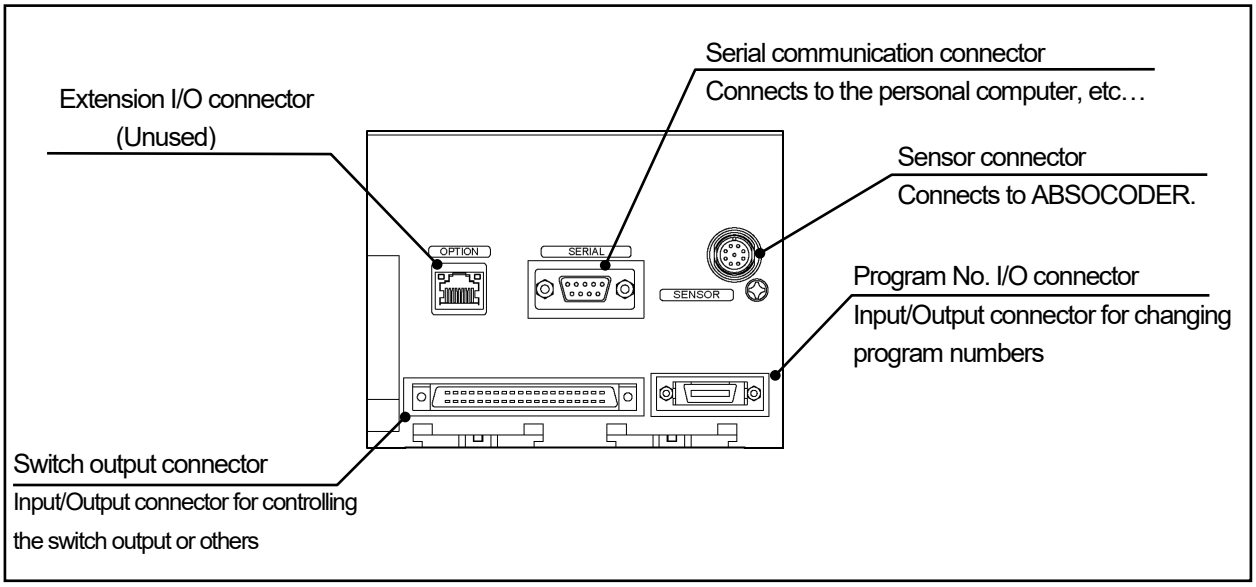
Items	Specifications			
Model	VS-10G VS-10G-1	VS-10G-D VS-10G-D-1	VS-10G-A VS-10G-A-1	VS-10G-C VS-10G-C-1
Number of programs	VS-10B mode: 8 (1-8)			
Number of switches	30			
Number of Multi-dogs	VS-10B mode: 10 (1-A)			
Position detection format	- Absolute position detection MRE-[ ]SP062, VLS-[ ]PW(PY), VRE-P062(028), VRE-16TS062, MRE-[ ]SS062, VRE-S062(028), NT Coder - Semi-absolute position detection CYLNUC, IRS-51.2P, VLS-[ ]PS			
Number of detection axes	1			
Output signal updating cycle	Switch output signal: 1ms			
Switch output setting method	Numeric setting with keys, or teaching setting by manual machine operation			
Minimum setting unit	0.00001			
Position data valid digit numbers	6 digits (−999999 to 999999)			
Setting value memory	Non-volatile memories (FRAM), (no battery)			
Display description	- Number display (7 segments LED: 5digits) Program No., Parameter No., switch No., dog No. - Data display (7 segments LED: 6 digits + sign) Setting value, current position value, error code, I/O states - Operation state indicator System ready, system error, mode selection, ON/OFF selection when setting the switch, communication state, program selecting method			
Input description from panel side	- Program No. - Switch No. - Dog No. - Parameter data, switch data - Error cancel - TEACH input - Mode selection			
Auxiliary functions	●Functions Related Current Position Preset - Current Position Preset ●Functions Related Switch Output - Protected Switch ●Other Functions - External Error Cancel Input - Password			
		Current Position Output	Voltage Ouput for Position	Current Ouput for Position
Communication functions	- RS-232 communication (The setting value can be saved, loaded, or monitored. Moreover, RUN operation is available.) - Connectable with the Touch Panel (VARIMONI) - Connects with MELSEC or MELSEC-A protocol - Connects with OMRON protocol			
Applicable standard	UL508 CSA C22.2 No.142 (Compliance with c-UL standard) CE Marking (EMC directive) KC mark (Korea Certification Mark)			

3-4. I/O Connector Specifications

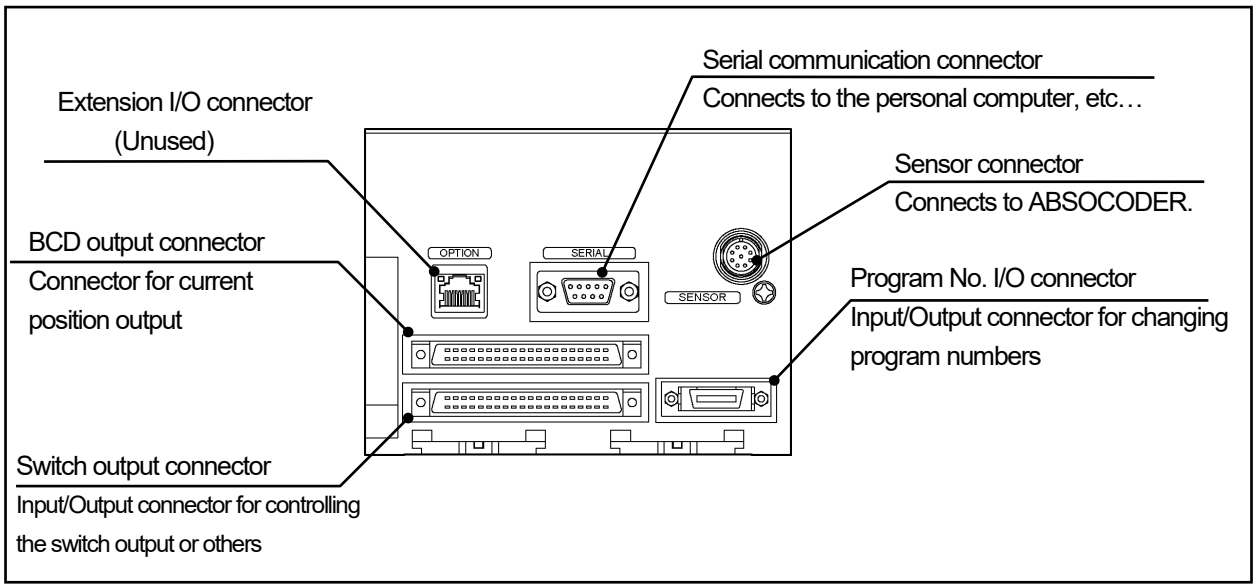
This section describes about I/O connectors.

3-4-1. Connector names and functions

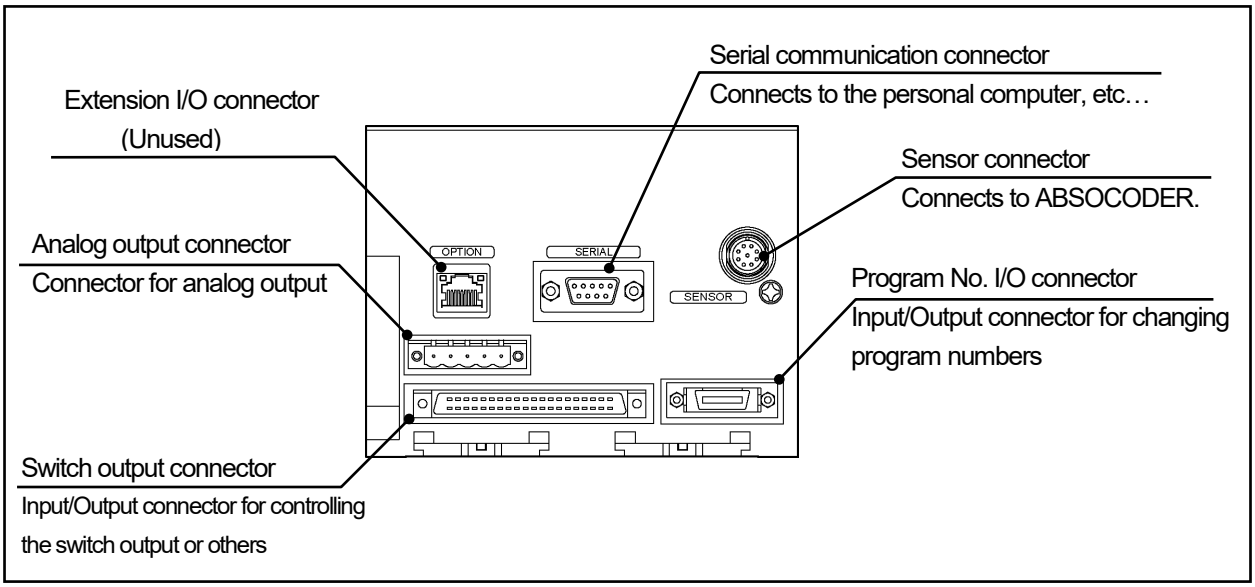
●VS-10G, VS-10G-1



●VS-10G-D, VS-10G-D-1



●VS-10G-A, VS-10G-A-1
VS-10G-C, VS-10G-C-1



3-4-2. I/O specification

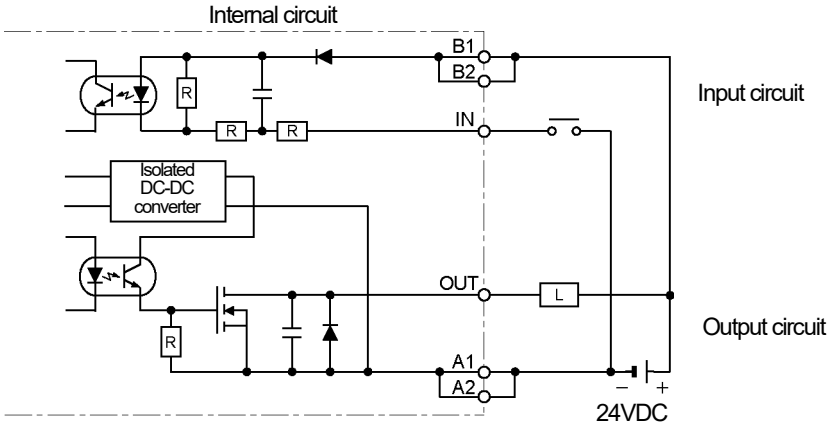
Items			Specifications			
Model			VS-10G VS-10G-1	VS-10G-D VS-10G-D-1	VS-10G-A VS-10G-A-1	VS-10G-C VS-10G-C-1
Input signals	Switch output connector	Current position preset	VS-10B Mode: 3 points (1 point for direction selection input and 2 points for preset input)			
		Error cancel	1 point			
	Program No. I/O connector	Program No.	8-program mode: 8 points (1-8 bit input)			
	BCD output connector	DTC	–	1 point	–	–
Output signals	Switch output connector	Switch	Max. 30 points			
		System ready	1 point			
	Program No. I/O connector	Program No.	8-program mode: 8 points (1-8 bit input)			
	BCD output connector	Current position value (BCD / binary)	–	- BCD: 24 points - Binary: 23 points + Binary sign	–	–
		BCD minus sign / Binary sign	–	1 point	–	–
		Latch pulse	–	1 point	–	–
		Decimal point	–	3 points (10^1 or 10^4 10^2 or 10^5 10^3 *1)	–	–
	Analog output connector	Analog output	–	–	Voltage 2-Channel	Current 2-Channel

*1: The position of decimal points can be set at Parameter 90 (Decimal Point Position).
The decimal point signals of the fifth and the second digits are in common use.
The decimal point signals of the sixth and the third digits are in common use.

● Switch output connector

Input specification				Output specification		
Items		Specifications		Items		Specifications
Isolation format		Photo-coupler isolation		Isolation format		Photo-coupler isolation
Rated input voltage		12VDC	24VDC	Rated load voltage		12/24VDC
Rated input current		4mA	10mA	Load voltage range		10.2 to 30VDC
Input voltage range		10.2 to 30VDC		Max. load current		100mA
ON voltage		10VDC or more		Current leakage when OFF		0.1mA or less
OFF voltage		4VDC or less		Max. voltage drop when ON		2.0V (at 100mA)
Response time	OFF→ON	0.04ms (input voltage 24V)		Response time	OFF→ON	1ms (at 100mA, resistance load)
	ON→OFF	0.2ms (input voltage 24V)			ON→OFF	1ms (at 100mA, resistance load)
Cable connection format		40 pins connector (FCN-361J040-AU / FCN-360C040-E, manufacturer: FUJITSU COMPONENT LIMITED or N361J040AU / N360C040E, manufacturer: OTAX CO.,LTD.)				
Compatible wire size		0.3 mm^2				

Circuit

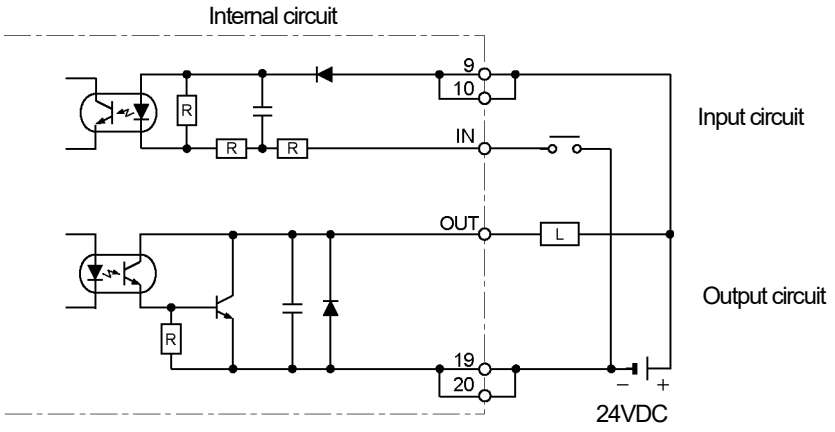


∗ Note that the total load current should not exceed 1A when using the I/O cable VS-C05-[L].

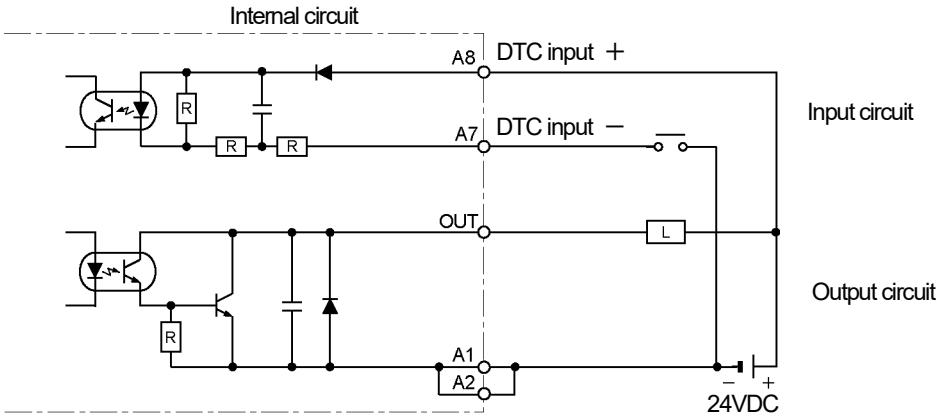
● Program No. I/O connector

Input specification				Output specification		
Items		Specifications		Items		Specifications
Isolation format		Photo-coupler isolation		Isolation format		Photo-coupler isolation
Rated input voltage		12VDC	24VDC	Rated load voltage		12/24VDC
Rated input current		4mA	10mA	Load voltage range		10.2 to 30VDC
Input voltage range		10.2 to 30VDC		Max. load current		100mA
ON voltage		10VDC or more		Current leakage when OFF		0.1mA or less
OFF voltage		4VDC or less		Max. voltage drop when ON		2.0V (at 100mA)
Response time	OFF→ON	0.04ms (input voltage 24V)		Response time	OFF→ON	1ms (at 100mA, resistance load)
	ON→OFF	0.2ms (input voltage 24V)			ON→OFF	1ms (at 100mA, resistance load)
Cable connection format		20 pins connector (PCR-S20FS+/PCR-LS20LA1, manufacturer: HONDA TSUSHIN KOGYO CO., LTD)				
Compatible wire size		0.5 mm^2				

Circuit



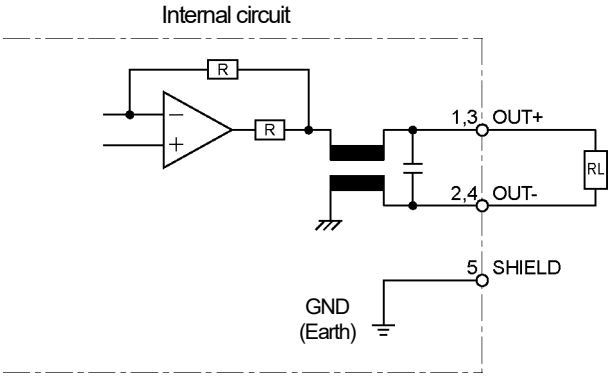
● BCD output connector

<table>
<tr><td colspan="4">Input specification</td><td colspan="4">Output specification</td></tr>
<tr><td colspan="2">Items</td><td colspan="2">Specifications</td><td colspan="2">Items</td><td colspan="2">Specifications</td></tr>
<tr><td colspan="2">Isolation format</td><td colspan="2">Photo-coupler isolation</td><td colspan="2">Isolation format</td><td colspan="2">Photo-coupler isolation</td></tr>
<tr><td colspan="2">Rated input voltage</td><td>12VDC</td><td>24VDC</td><td colspan="2">Rated load voltage</td><td colspan="2">12/24VDC</td></tr>
<tr><td colspan="2">Rated input current</td><td>4mA</td><td>10mA</td><td colspan="2">Load voltage range</td><td colspan="2">10.2 to 30VDC</td></tr>
<tr><td colspan="2">Input voltage range</td><td colspan="2">10.2 to 30VDC</td><td colspan="2">Current leakage when OFF</td><td colspan="2">0.1mA or less</td></tr>
<tr><td colspan="2">ON voltage</td><td colspan="2">10VDC or more</td><td rowspan="2">- Current position value
- Minus sign
- Decimal point</td><td>Max. load current</td><td colspan="2">20mA</td></tr>
<tr><td colspan="2">OFF voltage</td><td colspan="2">4VDC or less</td><td>Max. voltage drop when ON</td><td colspan="2">1.5V (at 20mA)</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td rowspan="2">Latch pulse</td><td>Max. load current</td><td colspan="2">100mA</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td>Max. voltage drop when ON</td><td colspan="2">1.5V (at 100mA)</td></tr>
<tr><td rowspan="2">Response time</td><td>OFF→ON</td><td colspan="2">0.04ms
(input voltage 24V)</td><td rowspan="2">Response time</td><td>OFF→ON</td><td colspan="2">1ms
(at 100mA, resistance load)</td></tr>
<tr><td>ON→OFF</td><td colspan="2">0.2ms
(input voltage 24V)</td><td>ON→OFF</td><td colspan="2">1ms
(at 100mA, resistance load)</td></tr>
<tr><td colspan="2">Cable connection format</td><td colspan="6">40 pins connector
(FCN-361J040-AU / FCN-360C040-E, manufacturer: FUJITSU COMPONENT LIMITED
or N361J040AU / N360C040E, manufacturer: OTAX CO.,LTD.)</td></tr>
<tr><td colspan="2">Compatible wire size</td><td colspan="6">0.3 mm^2</td></tr>
<tr><td colspan="8">Circuit</td></tr>
<tr><td colspan="8"> 
</td></tr>
</table>

＊ Note that the total load current should not exceed 1A when using the I/O cable VS-C05-[L].

● Analog output connector Position Voltage Output

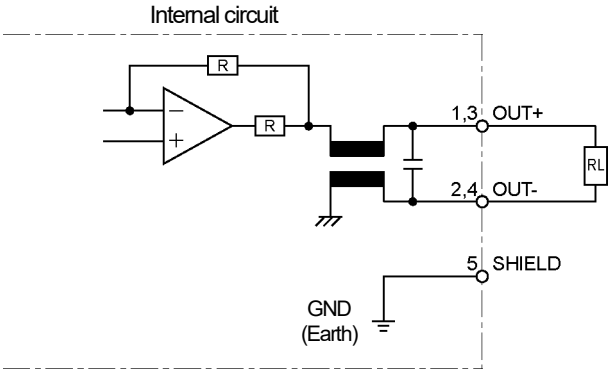
Output specification	
Items	Specifications
Output voltage range	−10V to +10VDC
Setting range	VS-10B Mode Position data A for 0VDC and Position data B for 10VDC can be set as required at the Parameter.
External load resistance	1kΩ to 1MΩ
Output voltage resolution	0.3051 mV (−10V to +10V / 65536 divisions)
Output voltage accuracy	100 mV (0 to 55°C)
Analog response time	Max. 100 μs (Switching between 10V and 0V)
Updating cycle	1ms
Isolation format	Insulated between control and output circuits
Cable connection format	Connector model: HR31-5.08P-5SC(72) Crimp contact: HR31-SC-121(71) Manufacturer: HIROSE ELECTRIC CO., LTD
Compatible wire size	0.25 to 1.65 mm^2
External power supply	Not required
Circuit	



● Analog output connector Position Current Output

Output specification	
Items	Specifications
Output current range	4mA to 20mADC
Setting range	VS-10B Mode Position data for 4mADC and Position data for 20mADC can be set as required at the Parameter.
External load resistance	510Ω or less
Output current resolution	0.24μA (4mA to 20mA / 65536 divisions)
Output current accuracy	200μA (0 to 55℃)
Analog response time	Max. 100μs (Switching between 20mA and 4mA)
Updating cycle	1ms
Isolation format	Insulated between control and output circuits
Cable connection format	Connector model: HR31-5.08P-5SC(72) Crimp contact: HR31-SC-121(71) Manufacturer: HIROSE ELECTRIC CO., LTD
Compatible wire size	0.25 to 1.65 mm^2
External power supply	Not required

Circuit



3-4-3. Signal names and descriptions

Name		Description	Applicable model			
			VS-10G	VS-10G-D	VS-10G-A	VS-10G-C
Output	Switch	Outputs ON/OFF signal outputs according to the switch output setting values.	○	○	○	○
	System ready	If VARILIMIT and ABSOCODER operate normally during selecting RUN mode, the system ready signal is output. Use this signal as the interlock signal.	○	○	○	○
	Program No.	The currently selected program No. is output.	○	○	○	○
	Current position value (BCD / Binary)	Outputs current position or measuring values in BCD or binary code.		○		
	Decimal point	Outputs decimal points when current position or measuring values are output in BCD code.		○		
	BCD minus sign / Binary sign	Outputs when negative current position or measuring values are output in BCD code or binary code of the sign magnitude.		○		
	Binary sign	Outputs when negative current position or measuring values are output in the binary code of two's complement.		○		
	Latch pulse	This is updating timing signal of the current position outputs.		○		
	Preset error	**VS-10B Mode (Parameter E0: 0)** When using the Current Position Preset by Travel Direction Input Outputs when the current position preset input is not turned on even though the machine passes the current position preset zone set at the Parameter.	○	○	○	○
	Analog output	A voltage output model outputs voltage according to the machine position. A current output model outputs current according to the machine position.			○	○
Input	Program No.	Inputs Program Numbers. When using in the 8-program mode: Inputs each of 8 points signals individually.	○	○	○	○
	Current position preset	This is a signal to externally change Current Position Value to the preset value.	○	○	○	○
	Current position preset directional selection	Use when do the Current Position Preset in the VS-10B Mode. When this signal is input, one of the two preset values set for ON or OFF at Parameter 80 will be selected depending on the machine travel direction. Current Position Value will be changed.	○	○	○	○
	DTC	Be used to read the Current Position Output into the host controller. While this signal is on, updating of the Current Position Output will be suspended.		○		
	Error cancel	Cancels an error when this input is turned ON.	○	○	○	○

3-4-4. I/O signal condition in the each mode

Indicates connector's I/O signal condition in each mode.

Signal name \ Mode		RUN mode (RUN)	Switch setting mode (SET)	Parameter setting mode (PRM)
Output	Switch	Valid	●**VS-10B Mode** Output is HOLD.	●**VS-10B Mode** Output is HOLD.
	System ready	Valid (output ON)	Valid (output OFF)	Valid (output OFF)
	Program No.	Valid	Invalid The Program Number that has been last selected in the RUN mode will be output.	Invalid The Program Number that has been last selected in the RUN mode will be output.
	Current position value (BCD / binary)	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	Decimal point	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	BCD minus sign / Binary sign	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	Binary sign	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	Latch pulse	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	Preset error	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
	Analog output	Valid	Valid (It is same as RUN mode.)	Valid (It is same as RUN mode.)
Input	Program No.	Valid	Invalid	Invalid
	Current position preset	Valid	Valid	Valid
	Current position preset directional selection	Valid	Valid	Valid
	DTC	Valid	Valid	Valid
	Error cancel	Valid	Valid	Valid

3-4-5. I/O Connector Pin Arrangement

Pin arrangement of input/output connectors is described in this section.

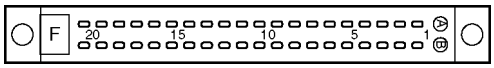
(1) VS-10G, VS-10G-1

① Switch output connector

[Connector model: FCN-361J040-AU / FCN-360C040-E (FUJITSU COMPONENT LIMITED)
or N361J040AU / N360C040E (OTAX CO.,LTD.)]

Pin No.	Signal name	Pin No.	Signal name
B20	Switch output 1	A20	Switch output 17
B19	Switch output 2	A19	Switch output 18
B18	Switch output 3	A18	Switch output 19
B17	Switch output 4	A17	Switch output 20
B16	Switch output 5	A16	Switch output 21
B15	Switch output 6	A15	Switch output 22
B14	Switch output 7	A14	Switch output 23
B13	Switch output 8	A13	Switch output 24
B12	Switch output 9	A12	Switch output 25
B11	Switch output 10	A11	Switch output 26
B10	Switch output 11	A10	Switch output 27
B9	Switch output 12	A9	Switch output 28
B8	Switch output 13	A8	Switch output 29
B7	Switch output 14	A7*1	Switch output 30 / Preset error output
B6	Switch output 15	A6	System ready output
B5	Switch output 16	A5	Current position preset directional selection input
B4	Error cancel input	A4	Current position preset input 1
B3		A3	Current position preset input 2
B2	+24V input common	A2	0V output common
B1		A1	

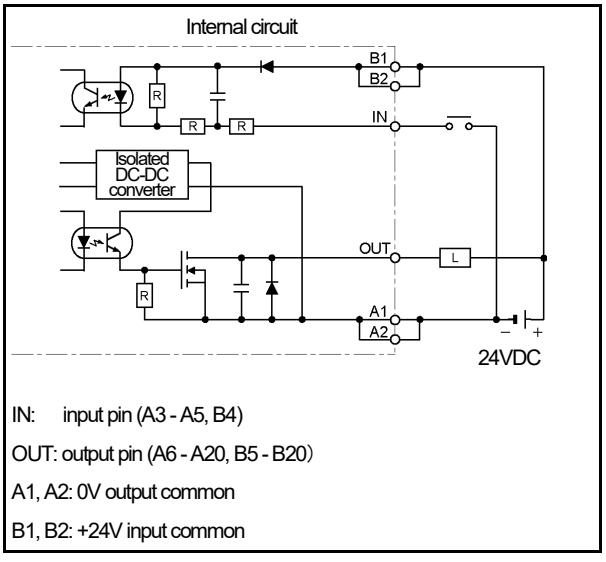
Shows the pin arrangement as viewed from the soldering terminals side.



Remarks

*1: Can be changed by the setting at Parameter 82

● Circuit



● External cable (VS-C05)

Indicates external cable wire colors and markings.

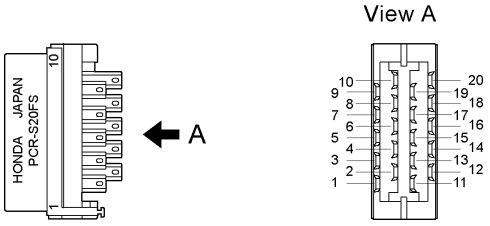
Pin No.	Wire colors & markings	Pin No.	Wire colors & markings
B20	Pink (Black■■■■)	A20	Pink (Red■■■■)
B19	Yellow (Black■■■■)	A19	Yellow (Red■■■■)
B18	White (Black■■■■)	A18	White (Red■■■■)
B17	Gray (Black■■■■)	A17	Gray (Red■■■■)
B16	Orange (Black■■■■)	A16	Orange (Red■■■■)
B15	Pink (Black■■■)	A15	Pink (Red■■■)
B14	Yellow (Black■■■)	A14	Yellow (Red■■■)
B13	White (Black■■■)	A13	White (Red■■■)
B12	Gray (Black■■■)	A12	Gray (Red■■■)
B11	Orange (Black■■■)	A11	Orange (Red■■■)
B10	Pink (Black■■)	A10	Pink (Red■■)
B9	Yellow (Black■■)	A9	Yellow (Red■■)
B8	White (Black■■)	A8	White (Red■■)
B7	Gray (Black■■)	A7	Gray (Red■■)
B6	Orange (Black■■)	A6	Orange (Red■■)
B5	Pink (Black■)	A5	Pink (Red■)
B4	Yellow (Black■)	A4	Yellow (Red■)
B3	White (Black■)	A3	White (Red■)
B2	Gray (Black■)	A2	Gray (Red■)
B1	Orange (Black■)	A1	Orange (Red■)

② Program No. I/O connector

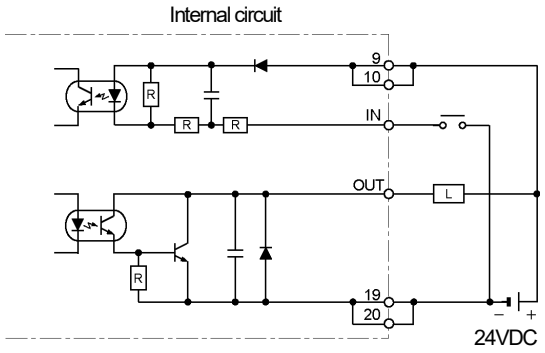
[Connector model: PCR-S20FS+ / PCR-LS20LA1 (HONDA TSUSHIN KOGYO CO., LTD)]

Pin No.	Signal name	Pin No.	Signal name
1	Program No. input 1	11	Program No. output 1
2	Program No. input 2	12	Program No. output 2
3	Program No. input 3	13	Program No. output 3
4	Program No. input 4	14	Program No. output 4
5	Program No. input 5	15	Program No. output 5
6	Program No. input 6	16	Program No. output 6
7	Program No. input 7	17	Program No. output 7
8	Program No. input 8	18	Program No. output 8
9	+24V input common	19	0V output common
10		20	

Shows the pin arrangement as viewed from the soldering terminals side.



● Circuit



IN: input pin (1 - 8)

OUT: output pin (11 - 18)

9, 10: +24V input common

19, 20: 0V output common

● External cable (VS-C10G)

Indicates external cable wire colors and markings.

Pin No.	Wire colors & markings
20	Pink (Black ■■)
19	Pink (Red ■■)
18	Yellow (Black ■■)
17	Yellow (Red ■■)
16	White (Black ■■)
15	White (Red ■■)
14	Gray (Black ■■)
13	Gray (Red ■■)
12	Orange (Black ■■)
11	Orange (Red ■■)
10	Pink (Black ■)
9	Pink (Red ■)
8	Yellow (Black ■)
7	Yellow (Red ■)
6	White (Black ■)
5	White (Red ■)
4	Gray (Black ■)
3	Gray (Red ■)
2	Orange (Black ■)
1	Orange (Red ■)

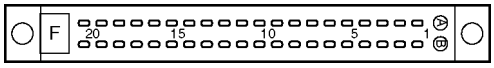
(2) VS-10G-D, VS-10G-D-1

① Switch output connector

[Connector model: FCN-361J040-AU / FCN-360C040-E (FUJITSU COMPONENT LIMITED)
or N361J040AU / N360C040E (OTAX CO.,LTD.)]

Pin No.	Signal name	Pin No.	Signal name	
B20	Switch output 1	A20	Switch output 17	
B19	Switch output 2	A19	Switch output 18	
B18	Switch output 3	A18	Switch output 19	
B17	Switch output 4	A17	Switch output 20	
B16	Switch output 5	A16	Switch output 21	
B15	Switch output 6	A15	Switch output 22	
B14	Switch output 7	A14	Switch output 23	
B13	Switch output 8	A13	Switch output 24	
B12	Switch output 9	A12	Switch output 25	
B11	Switch output 10	A11	Switch output 26	
B10	Switch output 11	A10	Switch output 27	
B9	Switch output 12	A9	Switch output 28	
B8	Switch output 13	A8	Switch output 29	
B7	Switch output 14	A7*1	Switch output 30	Preset error output
B6	Switch output 15	A6	System ready output	
B5	Switch output 16	A5	Current position preset directional selection input	
B4	Error cancel input	A4	Current position preset input 1	
B3		A3	Current position preset input 2	
B2	+24V input common	A2	0V output common	
B1		A1		

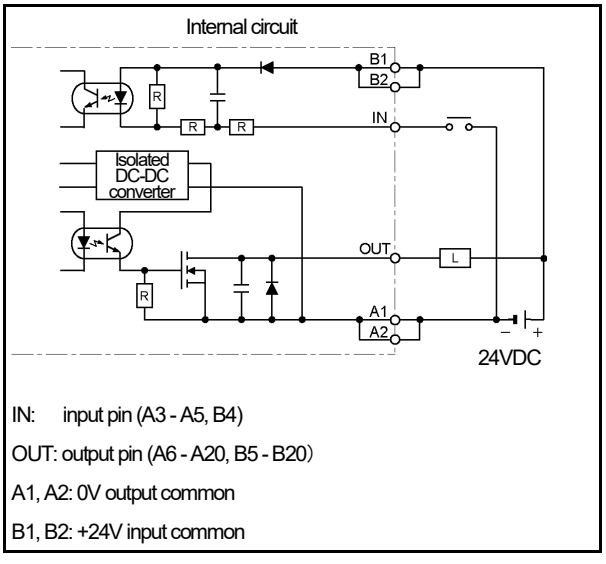
Shows the pin arrangement as viewed from the soldering terminals side.



Remarks

*1: Can be changed by the setting at Parameter 82

● Circuit



● External cable (VS-C05)

Indicates external cable wire colors and markings.

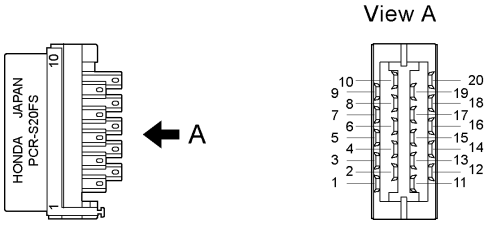
Pin No.	Wire colors & markings	Pin No.	Wire colors & markings
B20	Pink (Black■■■■)	A20	Pink (Red■■■■)
B19	Yellow (Black■■■■)	A19	Yellow (Red■■■■)
B18	White (Black■■■■)	A18	White (Red■■■■)
B17	Gray (Black■■■■)	A17	Gray (Red■■■■)
B16	Orange (Black■■■■)	A16	Orange (Red■■■■)
B15	Pink (Black■■■)	A15	Pink (Red■■■)
B14	Yellow (Black■■■)	A14	Yellow (Red■■■)
B13	White (Black■■■)	A13	White (Red■■■)
B12	Gray (Black■■■)	A12	Gray (Red■■■)
B11	Orange (Black■■■)	A11	Orange (Red■■■)
B10	Pink (Black■■)	A10	Pink (Red■■)
B9	Yellow (Black■■)	A9	Yellow (Red■■)
B8	White (Black■■)	A8	White (Red■■)
B7	Gray (Black■■)	A7	Gray (Red■■)
B6	Orange (Black■■)	A6	Orange (Red■■)
B5	Pink (Black■)	A5	Pink (Red■)
B4	Yellow (Black■)	A4	Yellow (Red■)
B3	White (Black■)	A3	White (Red■)
B2	Gray (Black■)	A2	Gray (Red■)
B1	Orange (Black■)	A1	Orange (Red■)

② Program No. I/O connector

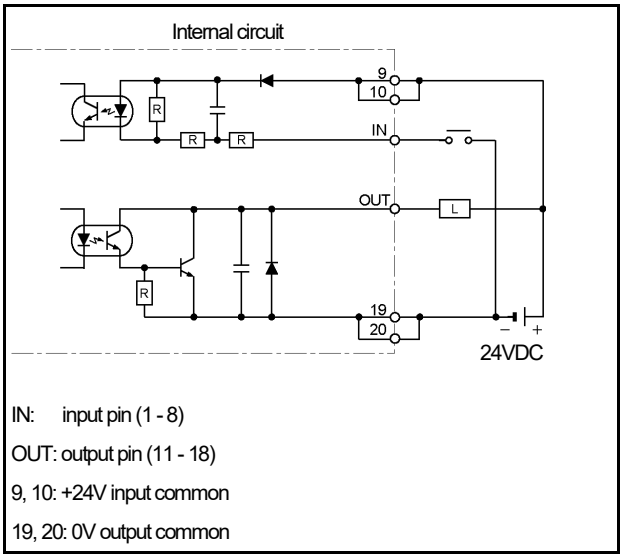
[Connector model: PCR-S20FS+ / PCR-LS20LA1 (HONDA TSUSHIN KOGYO CO., LTD)]

Pin No.	Signal name	Pin No.	Signal name
1	Program No. input 1	11	Program No. output 1
2	Program No. input 2	12	Program No. output 2
3	Program No. input 3	13	Program No. output 3
4	Program No. input 4	14	Program No. output 4
5	Program No. input 5	15	Program No. output 5
6	Program No. input 6	16	Program No. output 6
7	Program No. input 7	17	Program No. output 7
8	Program No. input 8	18	Program No. output 8
9	+24V input common	19	0V output common
10		20	

Shows the pin arrangement as viewed from the soldering terminals side.



● Circuit



IN: input pin (1 - 8)

OUT: output pin (11 - 18)

9, 10: +24V input common

19, 20: 0V output common

● External cable (VS-C10G)

Indicates external cable wire colors and markings.

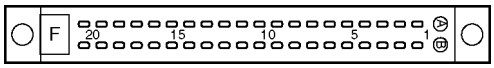
Pin No.	Wire colors & markings
20	Pink (Black ■■)
19	Pink (Red ■■)
18	Yellow (Black ■■)
17	Yellow (Red ■■)
16	White (Black ■■)
15	White (Red ■■)
14	Gray (Black ■■)
13	Gray (Red ■■)
12	Orange (Black ■■)
11	Orange (Red ■■)
10	Pink (Black ■)
9	Pink (Red ■)
8	Yellow (Black ■)
7	Yellow (Red ■)
6	White (Black ■)
5	White (Red ■)
4	Gray (Black ■)
3	Gray (Red ■)
2	Orange (Black ■)
1	Orange (Red ■)

③ BCD output connector

[Connector model: FCN-361J040-AU / FCN-360C040-E (FUJITSU COMPONENT LIMITED)
or N361J040AU / N360C040E (OTAX CO.,LTD.)]

Pin No.	Signal name		Pin No.	Signal name	
B20 *1	BCD output 1×10^0	Binary output 2^0	A20*1	BCD output 4×10^4	Binary output 2^{18}
B19 *1	BCD output 2×10^0	Binary output 2^1	A19*1	BCD output 8×10^4	Binary output 2^{19}
B18 *1	BCD output 4×10^0	Binary output 2^2	A18*1	BCD output 1×10^5	Binary output 2^{20}
B17 *1	BCD output 8×10^0	Binary output 2^3	A17*1	BCD output 2×10^5	Binary output 2^{21}
B16 *1	BCD output 1×10^1	Binary output 2^4	A16*1	BCD output 4×10^5	Binary output 2^{22}
B15 *1	BCD output 2×10^1	Binary output 2^5	A15*1	BCD output 8×10^5	Binary sign output *3
B14 *1	BCD output 4×10^1	Binary output 2^6	A14*2	Decimal point 10^1	Decimal point 10^4
B13 *1	BCD output 8×10^1	Binary output 2^7	A13*2	Decimal point 10^2	Decimal point 10^5
B12 *1	BCD output 1×10^2	Binary output 2^8	A12	Decimal point 10^3	
B11 *1	BCD output 2×10^2	Binary output 2^9	A11	BCD minus sign output	Binary sign output *3
B10 *1	BCD output 4×10^2	Binary output 2^{10}	A10	Latch pulse output	
B9 *1	BCD output 8×10^2	Binary output 2^{11}	A9		
B8 *1	BCD output 1×10^3	Binary output 2^{12}	A8	DTC input +	
B7 *1	BCD output 2×10^3	Binary output 2^{13}	A7	DTC input −	
B6 *1	BCD output 4×10^3	Binary output 2^{14}	A6		
B5 *1	BCD output 8×10^3	Binary output 2^{15}	A5		
B4*1	BCD output 1×10^4	Binary output 2^{16}	A4		
B3*1	BCD output 2×10^4	Binary output 2^{17}	A3		
B2	Not used		A2	0V output common	
B1	(Do not connect anything.)		A1		

Shows the pin arrangement as viewed from the soldering terminals side.

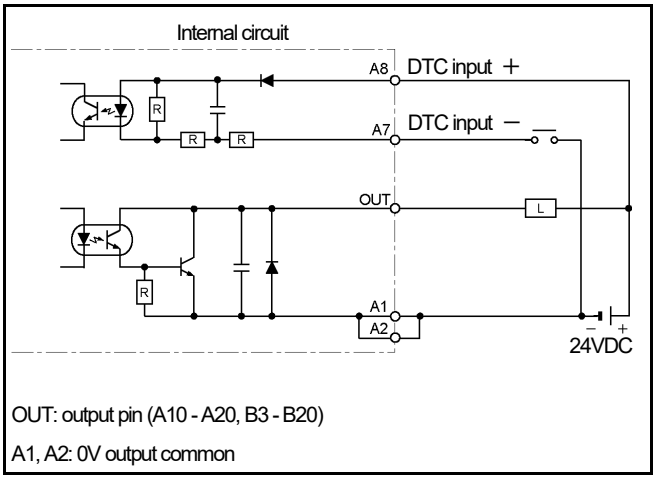


Remarks
*1: Can be either in BCD code or in binary code depending on the selection at Parameter 94.
*2: The position of decimal points can be changed by the setting of Parameter 90.

NOTES *3: Binary sign output method

- A11 pin is the sign output when selecting the binary output of the sign magnitude code (the setting value is 4 or 5) at Parameter 94.
- A15 pin is the sign output when selecting the binary output of the two's complement (the setting value is 6 or 7) at Parameter 94.

● Circuit



OUT: output pin (A10 - A20, B3 - B20)
A1, A2: 0V output common

● External cable (VS-C05)
Indicates external cable wire colors and markings.

Pin No.	Wire colors & markings	Pin No.	Wire colors & markings
B20	Pink (Black■■■■)	A20	Pink (Red■■■■)
B19	Yellow (Black■■■■)	A19	Yellow (Red■■■■)
B18	White (Black■■■■)	A18	White (Red■■■■)
B17	Gray (Black■■■■)	A17	Gray (Red■■■■)
B16	Orange (Black■■■■)	A16	Orange (Red■■■■)
B15	Pink (Black■■■)	A15	Pink (Red■■■)
B14	Yellow (Black■■■)	A14	Yellow (Red■■■)
B13	White (Black■■■)	A13	White (Red■■■)
B12	Gray (Black■■■)	A12	Gray (Red■■■)
B11	Orange (Black■■■)	A11	Orange (Red■■■)
B10	Pink (Black■■)	A10	Pink (Red■■)
B9	Yellow (Black■■)	A9	Yellow (Red■■)
B8	White (Black■■)	A8	White (Red■■)
B7	Gray (Black■■)	A7	Gray (Red■■)
B6	Orange (Black■■)	A6	Orange (Red■■)
B5	Pink (Black■)	A5	Pink (Red■)
B4	Yellow (Black■)	A4	Yellow (Red■)
B3	White (Black■)	A3	White (Red■)
B2	Gray (Black■)	A2	Gray (Red■)
B1	Orange (Black■)	A1	Orange (Red■)

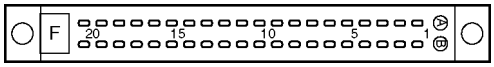
(3) VS-10G-A, VS-10G-A-1, VS-10G-C, VS-10G-C-1

① Switch output connector

[Connector model: FCN-361J040-AU / FCN-360C040-E (FUJITSU COMPONENT LIMITED)
or N361J040AU / N360C040E (OTAX CO.,LTD.)]

Pin No.	Signal name	Pin No.	Signal name	
B20	Switch output 1	A20	Switch output 17	
B19	Switch output 2	A19	Switch output 18	
B18	Switch output 3	A18	Switch output 19	
B17	Switch output 4	A17	Switch output 20	
B16	Switch output 5	A16	Switch output 21	
B15	Switch output 6	A15	Switch output 22	
B14	Switch output 7	A14	Switch output 23	
B13	Switch output 8	A13	Switch output 24	
B12	Switch output 9	A12	Switch output 25	
B11	Switch output 10	A11	Switch output 26	
B10	Switch output 11	A10	Switch output 27	
B9	Switch output 12	A9	Switch output 28	
B8	Switch output 13	A8	Switch output 29	
B7	Switch output 14	A7*1	Switch output 30	Preset error output
B6	Switch output 15	A6	System ready output	
B5	Switch output 16	A5	Current position preset directional selection input	
B4	Error cancel input	A4	Current position preset input 1	
B3		A3	Current position preset input 2	
B2	+24V input common	A2	0V output common	
B1		A1		

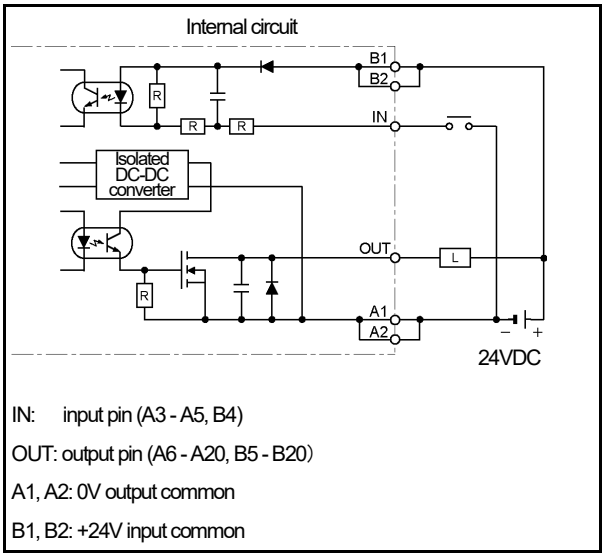
Shows the pin arrangement as viewed from the soldering terminals side.



Remarks

*1: Can be changed by the setting at Parameter 82

● Circuit



● External cable (VS-C05)

Indicates external cable wire colors and markings.

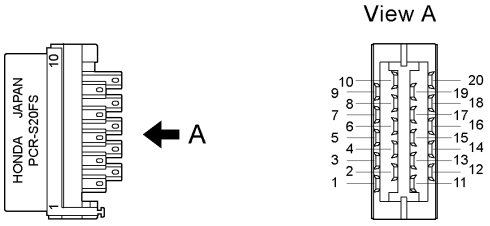
Pin No.	Wire colors & markings	Pin No.	Wire colors & markings
B20	Pink (Black■■■■)	A20	Pink (Red■■■■)
B19	Yellow (Black■■■■)	A19	Yellow (Red■■■■)
B18	White (Black■■■■)	A18	White (Red■■■■)
B17	Gray (Black■■■■)	A17	Gray (Red■■■■)
B16	Orange (Black■■■■)	A16	Orange (Red■■■■)
B15	Pink (Black■■■)	A15	Pink (Red■■■)
B14	Yellow (Black■■■)	A14	Yellow (Red■■■)
B13	White (Black■■■)	A13	White (Red■■■)
B12	Gray (Black■■■)	A12	Gray (Red■■■)
B11	Orange (Black■■■)	A11	Orange (Red■■■)
B10	Pink (Black■■)	A10	Pink (Red■■)
B9	Yellow (Black■■)	A9	Yellow (Red■■)
B8	White (Black■■)	A8	White (Red■■)
B7	Gray (Black■■)	A7	Gray (Red■■)
B6	Orange (Black■■)	A6	Orange (Red■■)
B5	Pink (Black■)	A5	Pink (Red■)
B4	Yellow (Black■)	A4	Yellow (Red■)
B3	White (Black■)	A3	White (Red■)
B2	Gray (Black■)	A2	Gray (Red■)
B1	Orange (Black■)	A1	Orange (Red■)

② Program No. I/O connector

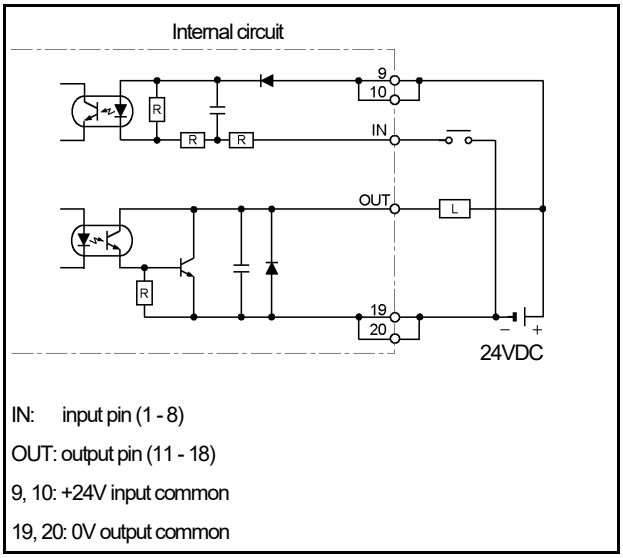
[Connector model: PCR-S20FS+ / PCR-LS20LA1 (HONDA TSUSHIN KOGYO CO., LTD)]

Pin No.	Signal name	Pin No.	Signal name
1	Program No. input 1	11	Program No. output 1
2	Program No. input 2	12	Program No. output 2
3	Program No. input 3	13	Program No. output 3
4	Program No. input 4	14	Program No. output 4
5	Program No. input 5	15	Program No. output 5
6	Program No. input 6	16	Program No. output 6
7	Program No. input 7	17	Program No. output 7
8	Program No. input 8	18	Program No. output 8
9	+24V input common	19	0V output common
10		20	

Shows the pin arrangement as viewed from the soldering terminals side.



● Circuit



IN: input pin (1 - 8)

OUT: output pin (11 - 18)

9, 10: +24V input common

19, 20: 0V output common

● External cable (VS-C10G)

Indicates external cable wire colors and markings.

Pin No.	Wire colors & markings
20	Pink (Black ■■)
19	Pink (Red ■■)
18	Yellow (Black ■■)
17	Yellow (Red ■■)
16	White (Black ■■)
15	White (Red ■■)
14	Gray (Black ■■)
13	Gray (Red ■■)
12	Orange (Black ■■)
11	Orange (Red ■■)
10	Pink (Black ■)
9	Pink (Red ■)
8	Yellow (Black ■)
7	Yellow (Red ■)
6	White (Black ■)
5	White (Red ■)
4	Gray (Black ■)
3	Gray (Red ■)
2	Orange (Black ■)
1	Orange (Red ■)

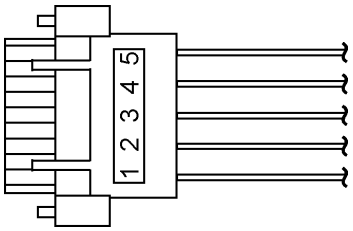
③ Analog output connector

[Connector model: HR31-5.08P-5SC(72), Crimp contact: HR31-SC-121(71), (HIROSE ELECTRIC CO., LTD)]

Pin No.	Signal name	Description	
1 *1	CH1＋	Voltage output	Current output
2 *1	CH1－	Voltage output common	Current output common
3 *1	CH2＋	Voltage output	Current output
4 *1	CH2－	Voltage output common	Current output common
5	SHIELD	Shield	

Crimp contact size ····· 1.25 mm^2
Crimp tool ····· Use crimp tool conforming to JIS C 9711 standards.
Applicable conductor cross area ··· 0.25 to 1.65 mm^2

For details, refer to the manufacturer's instructions.

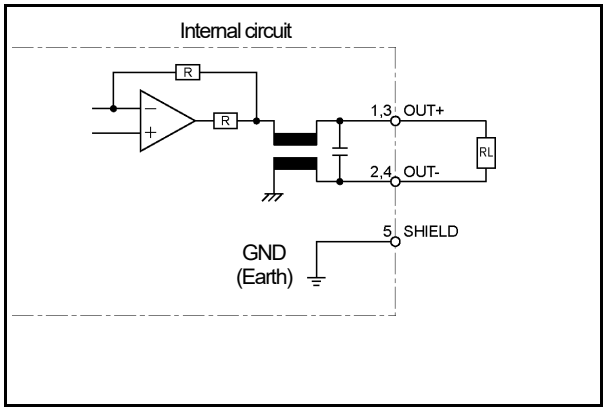


Remarks

*1: Contents to output

- Can be made in voltage using VS-10G-A and VS-10G-A-1.
- Can be made in current using VS-10G-C and VS-10G-C-1.

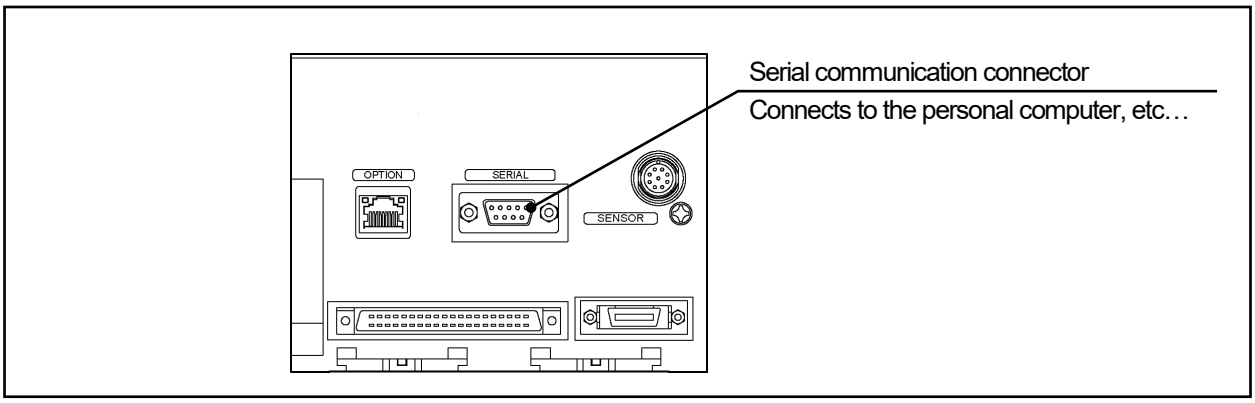
● Circuit



3-5. Serial Communication Connector Specifications

Contact our sales representative for serial communication details.

3-5-1. Connector names and functions



3-5-2. Communication interface specification

Items	Specifications	
Interface	RS-232C	RS-485
Communication format	Full duplex, start stop synchronization	Half duplex, start stop synchronization
Transmission speed	2400,4800,9600,19200,38400,57600 bps	
Communication signal	TXD, RXD, RTS, CTS, SG	DATA＋, DATA－, SG
Connector format	9-pin connector (D-sub male)	

3-5-3. Communication connector pin arrangement

Uses the serial communication connector when connecting the PLC, computer, or peripheral device.

◎Serial connector (SERIAL)
[Connector: D-Sub 9-pin]

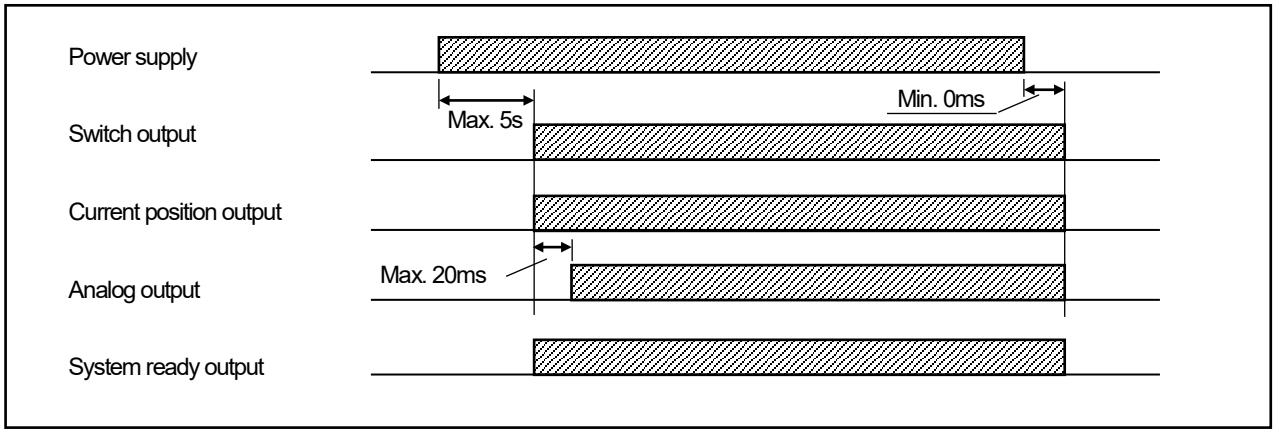
Pin No.	Signal name	Description	Notes
1	DATA－	－	
2	RXD	Receive Data	
3	TXD	Send Data	
4	DTR	Data Terminal Ready	
5	SG	Signal Ground	
6	DSR	Data Set Ready	
7	RTS	Request To Send	
8	CTS	Clear To Send	
9	DATA＋	－	
Mounting screw	SHIELD	Cable shield	Shield must be connected.

Connector on the VARILIMIT side
Model : DELC-J9PAF-13L6E (9-pin male)
Manufacturer : Japan Aviation Electronics Industry, Ltd.

3-6. Signal Timing Patterns

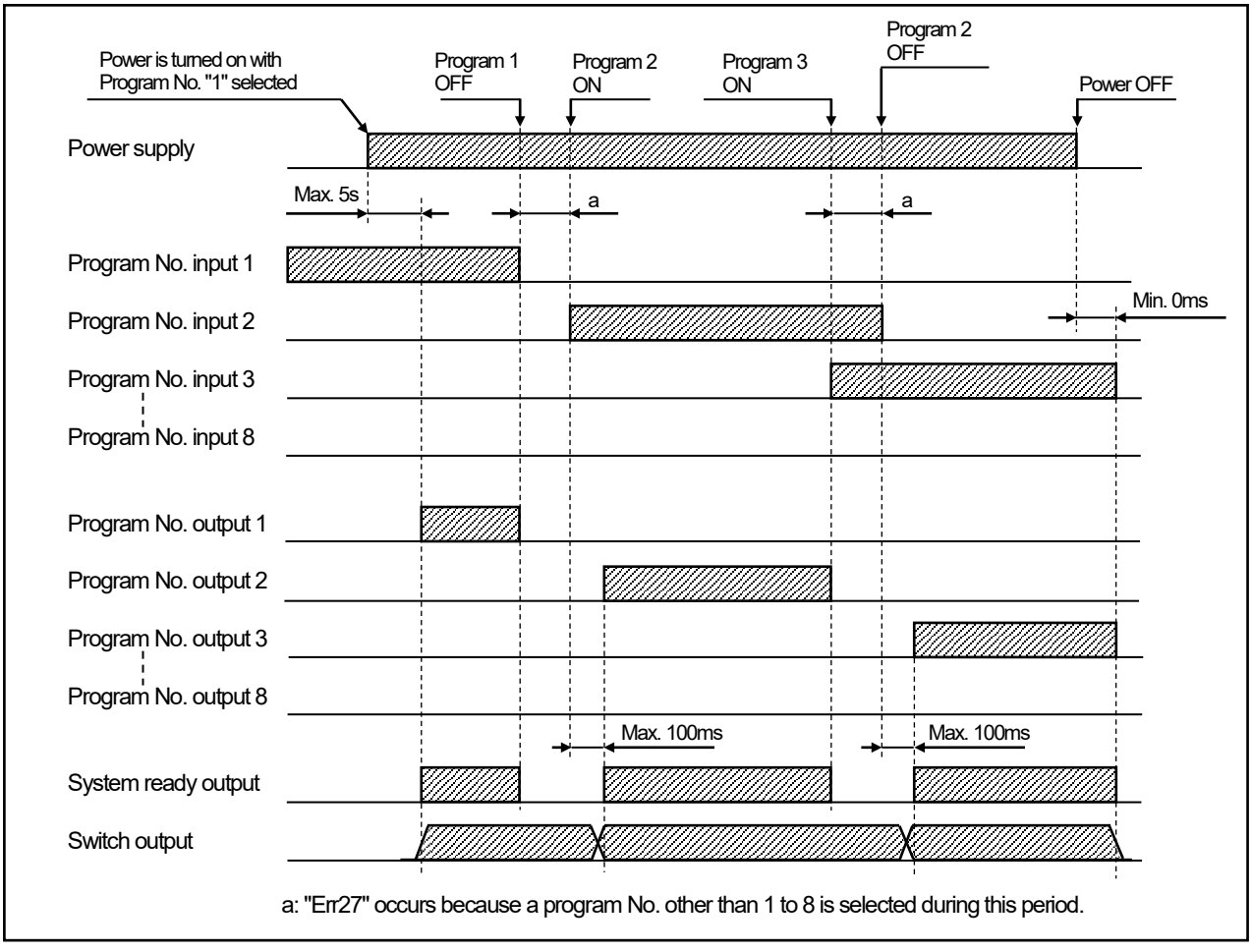
3-6-1. Power on/off timing

This is the timing pattern where power is turned on and off in RUN mode.



3-6-2. Program number change timing

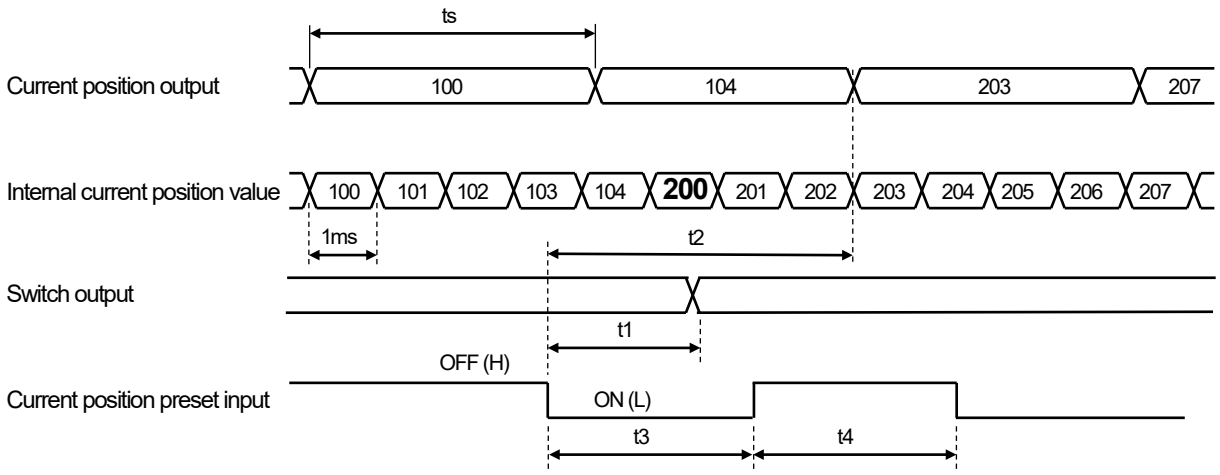
This is the timing pattern where program numbers are changed in the RUN mode.



a: "Err27" occurs because a program No. other than 1 to 8 is selected during this period.

3-6-3. Current position preset timing

This is an example where "Current Position Preset Value" is set to "200".



ts: Current Position Output Update Cycle (interval) (ms)
The update cycle can be set at the parameter.
VS-10B Mode: ts = [Parameter 79 setting (n)]

t1: Time to switch output change after current position preset signal input.
t1≦4ms

t2: Time to current position output change after current position preset signal input.
t2≦ts+1ms

t3: Time to accept a current position preset input
Hold the current position preset input ON longer than this time.
t3≧100ms

t4: Time to repeat a current position preset input
Hold the current position preset input OFF longer than this time to repeat the input.
t4≧100ms

3-6-4. Current position output timing

This timing pattern applies to VS-10G-D and VS-10G-D-1. These VARILIMIT models will output the current position value on a real-time basis. When a continuously changing current position value needs to be read, use of the latch pulse signal and the DTC signal will allow stable reading: The following section explains about the relationship between these signals and about related parameter settings and functions.

Positive and negative logics registered to Parameter 94 ("Current Position Output Code/Logic")

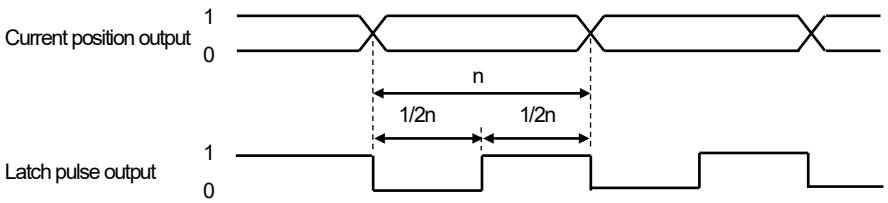
Current Position Output Code/Logic (Parameter 94)	Logic values for the following timings		Signals controlled
	0	1	
Positive logic	Transistor on (low level)	Transistor off (high level)	Current Position Value Minus sign Latch pulse
Negative logic	Transistor off (high level)	Transistor on (low level)	

Note: Regardless of the above settings, the DTC signal logic will work in the following timing patterns:

(1) Reading the current position output in synchronization with the latch pulse signal

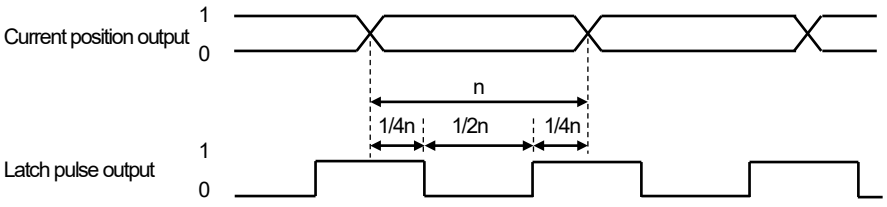
There are two ways for reading, either at edge timing or at level timing of the latch pulse output.
Set the latch pulse output timing at the parameter 79.

① Edge Timing (allowing stable reading when the latch pulse changes from 0 to 1)
When Parameter 79 is set between 0-7 (n: 4, 8, 16, 32, 64, 128, 256, 512 [ms])



n: Time for updating current position output
While the latch pulse output is changing from 0 to 1, the current position output is stable.
Read the output during this time.

② Level Timing (allowing stable reading when the latch pulse is "0")
When Parameter 79 is set between 8-15 (n: 4, 8, 16, 32, 64, 128, 256, 512 [ms])

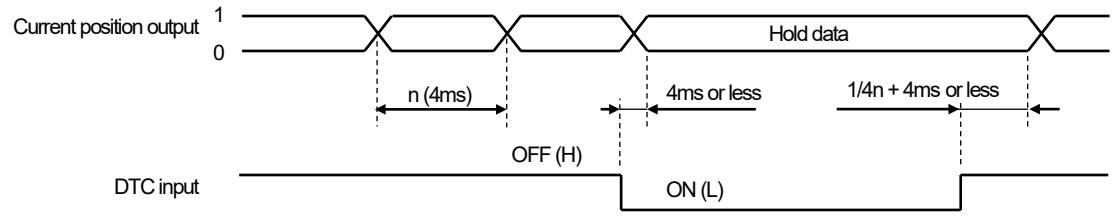


n: Time for updating current position output
While the latch pulse output is 0, the current position output is stable.
Read the output during this time.

(2) Reading current position output using DTC signal

When using the DTC signal, Parameter 79 should be set to "0" (edge timing, 4ms) in advance. (factory setting)

While the DTC signal is ON, updating of the current position output will be suspended to hold the data. Have the host controller read in the output during this time.

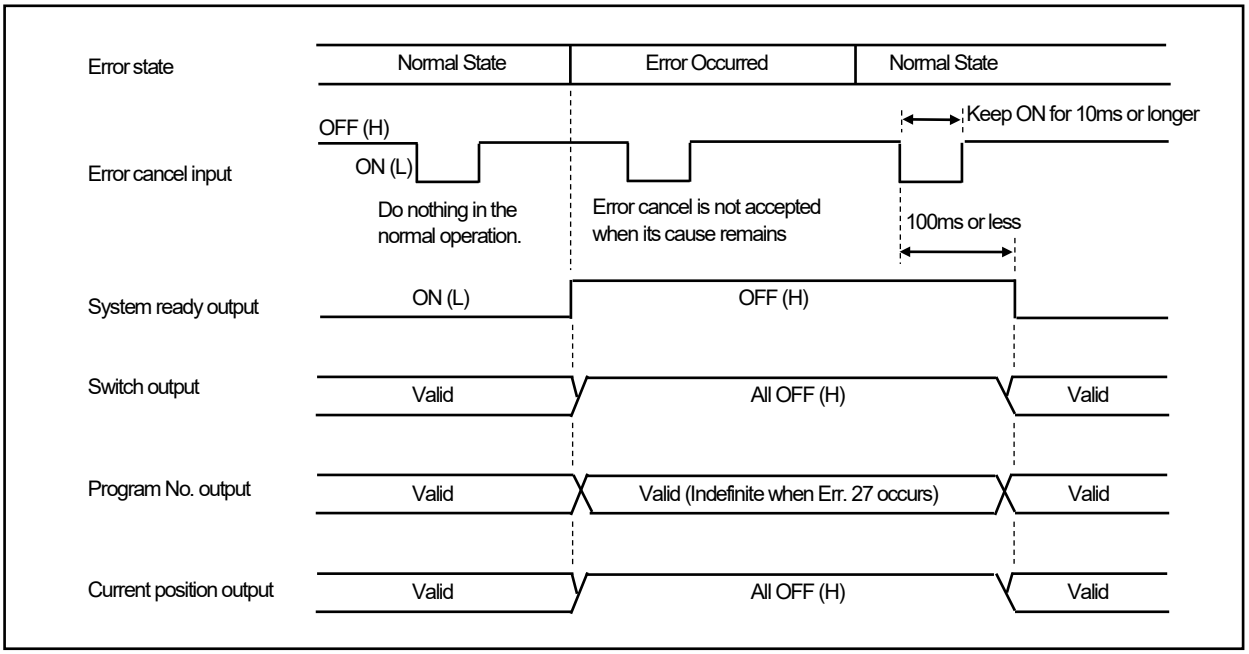


n: Time for updating current position output [ms]
Set “0” (edge timing, 4ms) at Parameter 79.

- When the DTC input signal is ON, updating of the current position output will be suspended to hold the data.
- When the DTC input signal is OFF, updating of the current position output will start again.

3-6-5. Error cancel input timing

This timing applies to all models of the VS-10G Series.



- MEMO -

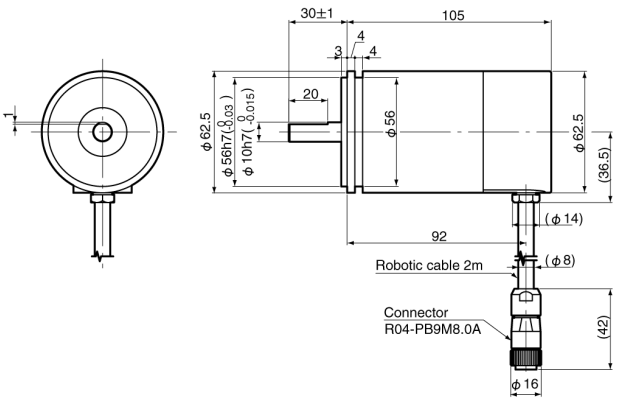
4. ABSOCODER SPECIFICATIONS AND DIMENSIONS

4-1. Multi-turn Type ABSOCODER

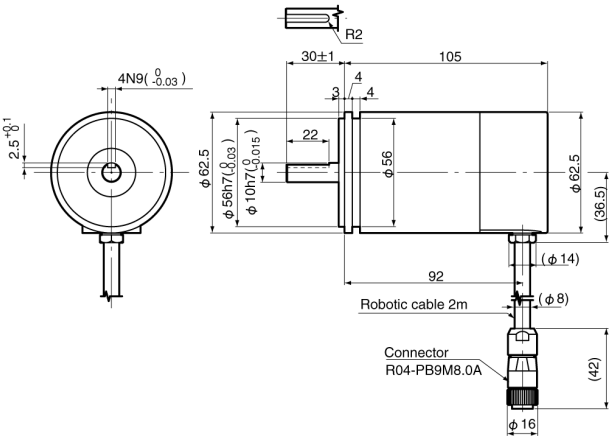
● **Outer dimensions**

Units: mm

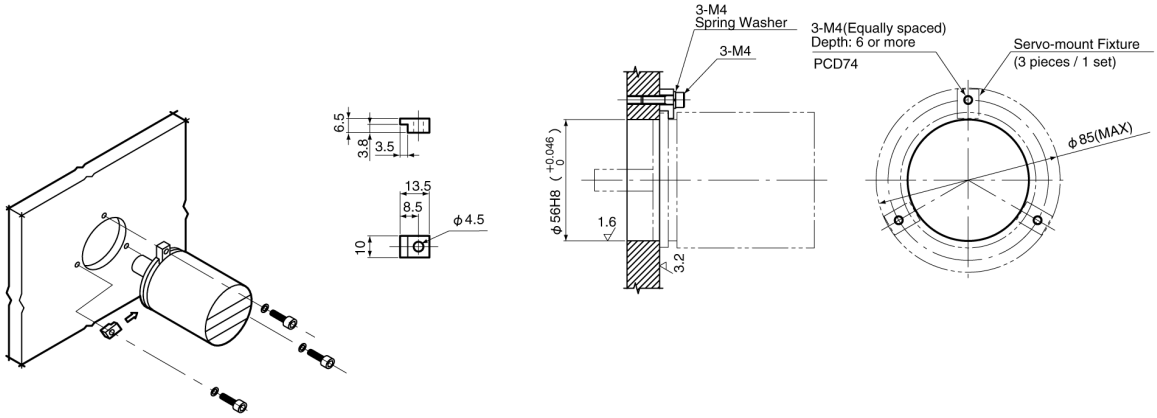
■ MRE-32SP062SAC



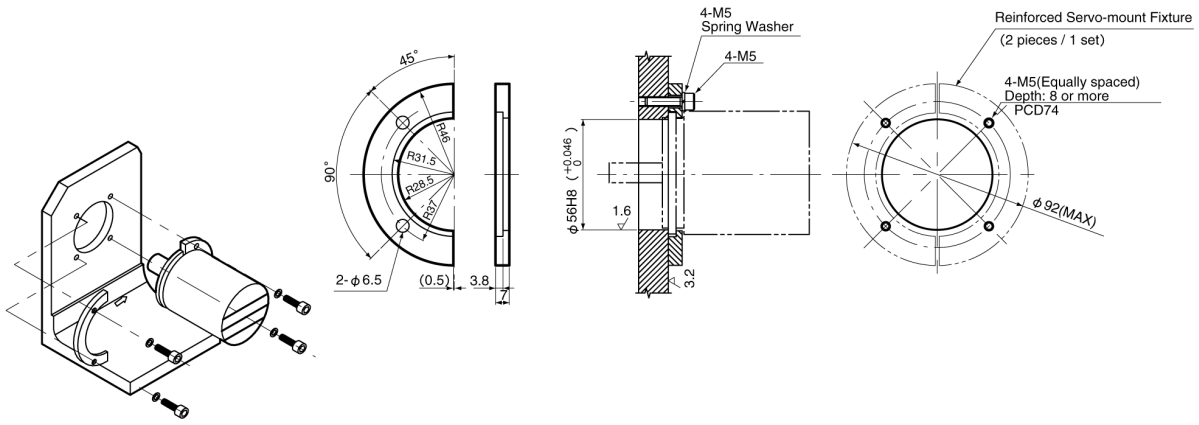
■ MRE-32SP062SBC



● Accessory Model: SB-01
Servo-mount fixtures for MRE-32SP062S[ ]C. (3 pieces set)

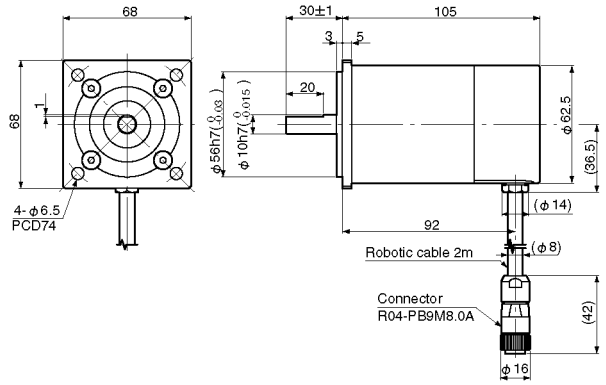


● Model: SH-01 (Option)
Reinforced servo-mount fixtures for MRE-32SP062S[ ]C. (2 pieces set)

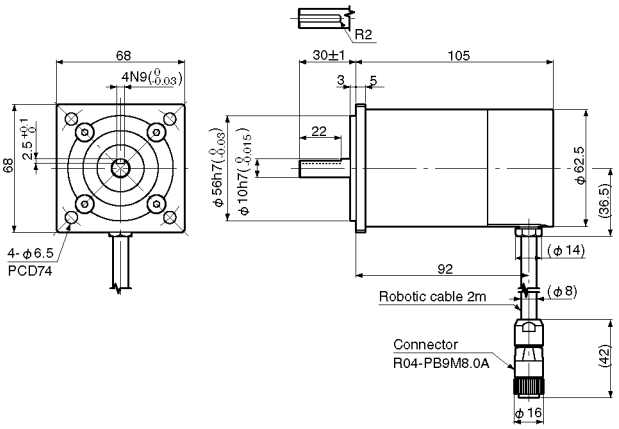


Units: mm

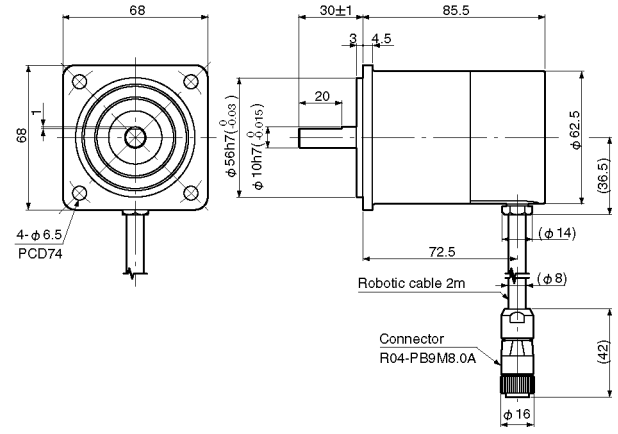
■ MRE-32SP062FAC



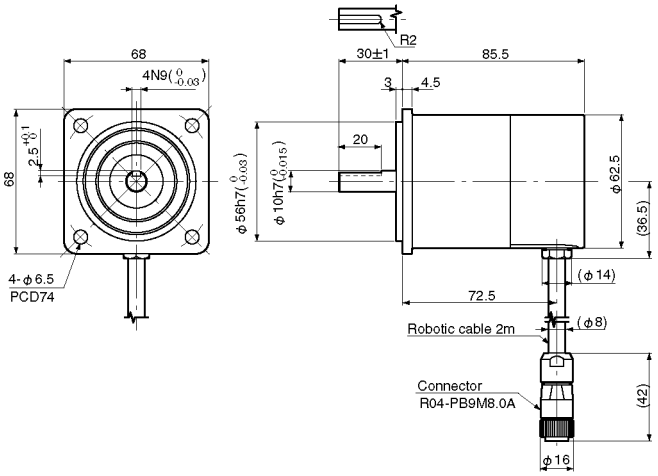
■ MRE-32SP062FBC



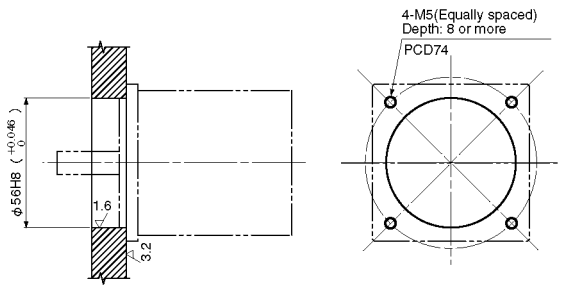
■ MRE-G[ ]SP062FAC ([ ]:64, 128, 160, 256, 320)



■ MRE-G[ ]SP062FBC ([ ]:64, 128, 160, 256, 320)

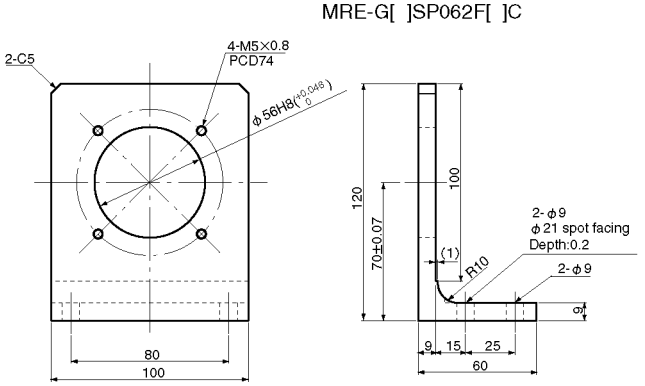


● Mounting hole dimensions for flange



● Model: RB-01 (Option)
L-type flange for MRE-32SP062・MRE-G[ ]SP062

Applicable sensors are following.
MRE-32SP062S[ ]C + SH-01
MRE-32SP062F[ ]C
MRE-G[ ]SP062F[ ]C



● **Specification**

MRE-32SP062, MRE-G[ ]SP062

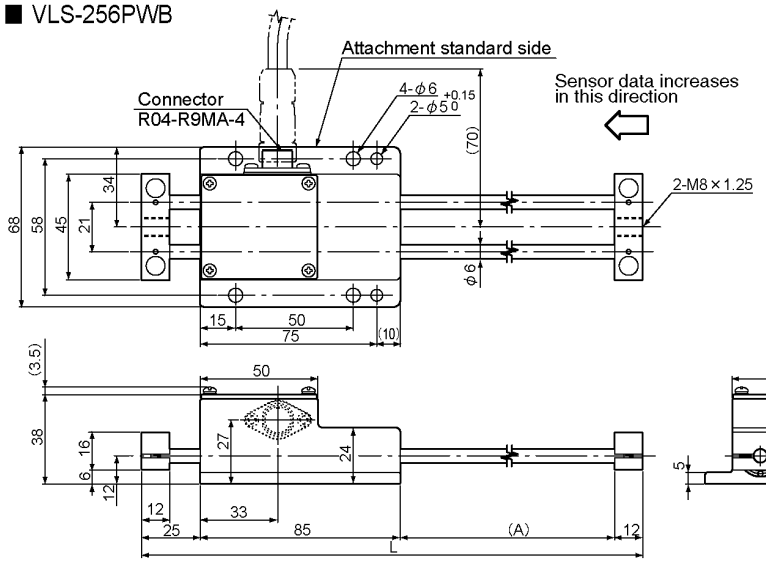
Items		Specifications					
Sensor model		MRE-32SP062	MRE-G[ ]SP062				
			[64]	[128]	[160]	[256]	[320]
Total number of turns		32	64	128	160	256	320
Divisions/Turn		4096	2048	1024	819.2	512	409.6
Total number of divisions		131072 (2^{17})					
Mass		1.5 kg	1.0 kg				
Linearity error		1° Max	2 Max.	4 Max.	5 Max.	8 Max.	10 Max.
Moment of inertia $GD^2/4(J)$		6.7×10^{-6}kg·m^2 (6.8×10^{-5}kgf·cm·s^2)	3.9×10^{-6} kg·m^2 (4.0×10^{-5}kgf·cm·s^2)				
Starting torque		4.9×10^{-2} N·m or less (0.5 kgf·cm or less)					
Permissible shaft load	Radial	98 N (10 kgf)					
	Thrust	49 N (5 kgf)					
Permissible mechanical speed		3600 r/min					
Bearing life		3.0×10^4 h (at 3600 r/min)	1.5×10^4 h (at 3600 r/min)				
Ambient temperature	Operating	−20 to +60°C					
	Storage	−30 to +90°C					
Vibration resistance		2.0×10^2 m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard					
Shock resistance		4.9×10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard					
Protection rating		IP52f, conforms to JEM 1030 standard					
Max. sensor cable length	Standard cable	100m (4P-S)					
	Robotic cable	40m (4P-RBT)	70m (4P-RBT)				
Interconnecting sensor cable		2m					

- MEMO -

4-2. Linear Type ABSOCODER (Dual-rod)

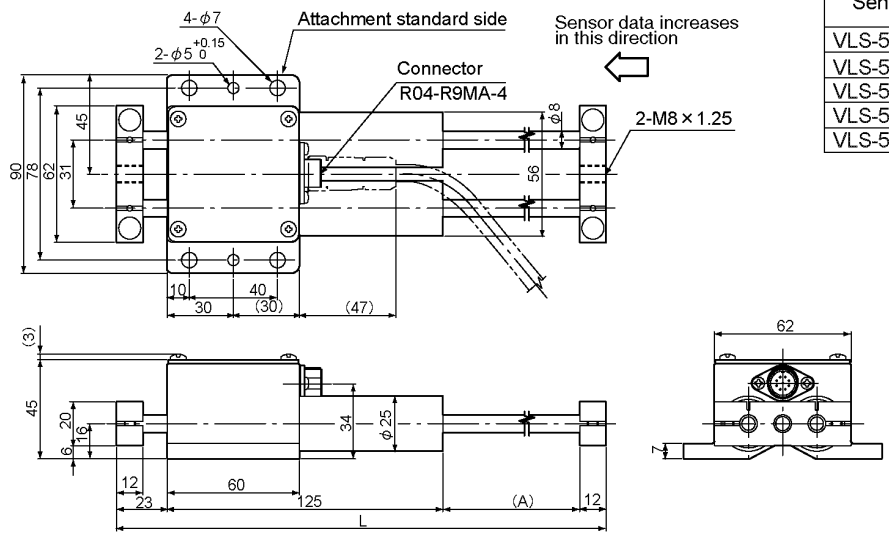
● **Outer dimensions** Units: mm

■ VLS-256PWB



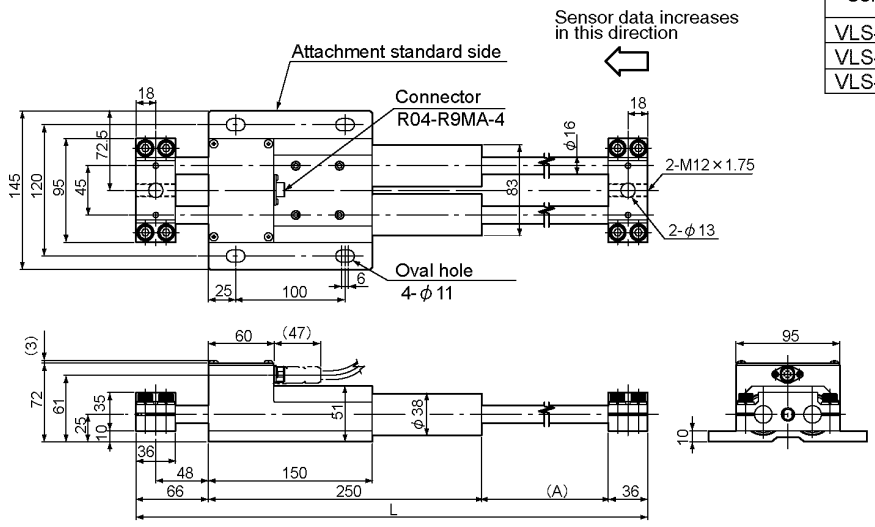
Sensor model	Max. detection stroke	L	(A)
VLS-256PWB	256	396	274
VLS-256PW200B	200	340	218
VLS-256PW128B	128	268	146
VLS-256PW100B	100	240	118
VLS-256PW58B	58	198	76

■ VLS-512PWB



Sensor model	Max. detection stroke	L	(A)
VLS-512PWB	512	682	522
VLS-512PW400B	400	570	410
VLS-512PW350B	350	520	360
VLS-512PW220B	220	390	230
VLS-512PW200B	200	370	210

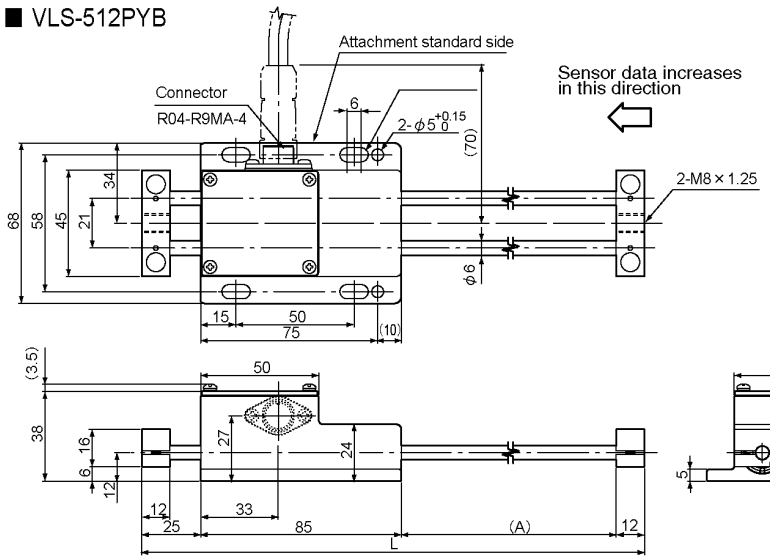
■ VLS-1024PW



Sensor model	Max. detection stroke	L	(A)
VLS-1024PW	1024	1414	1062
VLS-1024PW800	800	1190	838
VLS-1024PW600	600	990	638

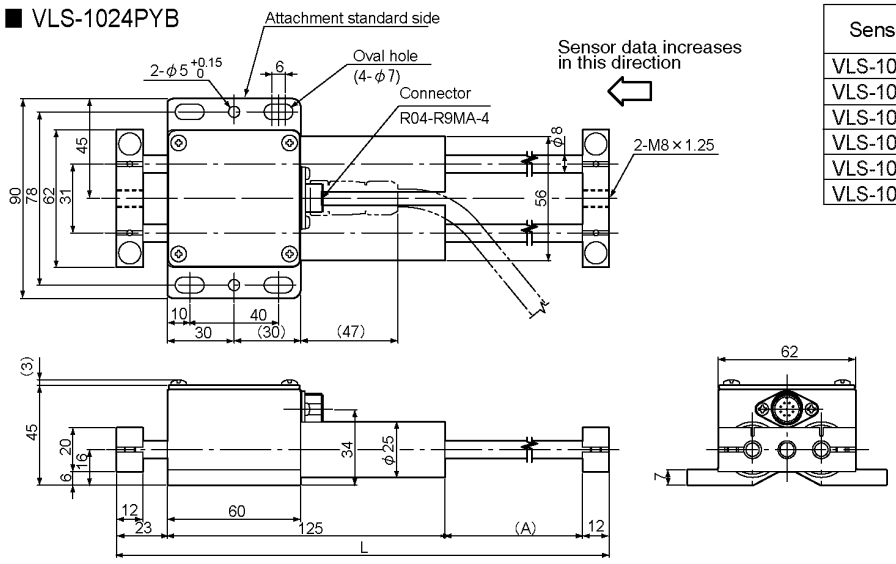
Units: mm

■ VLS-512PYB



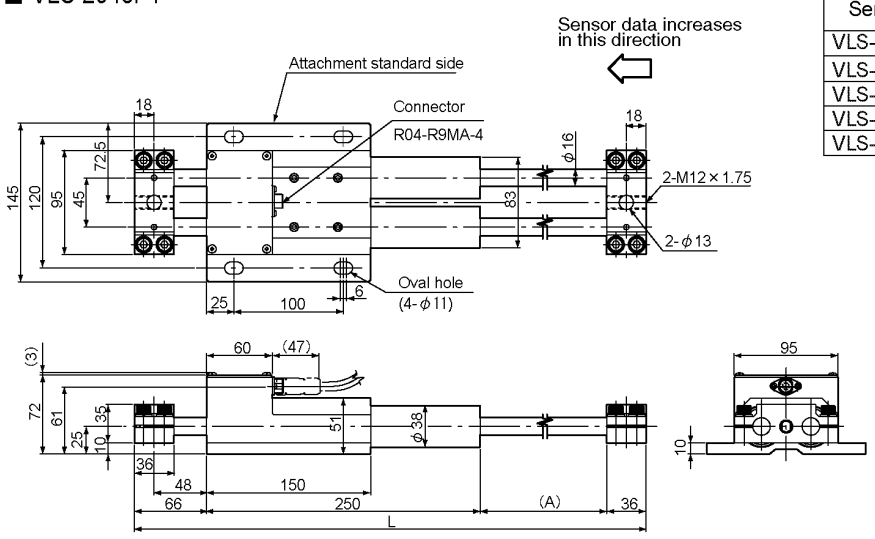
Sensor model	Max. detection stroke	L	(A)
VLS-512PYB	512	652	530
VLS-512PY350B	350	490	368
VLS-512PY256B	256	396	274
VLS-512PY150B	150	290	168
VLS-512PY110B	110	250	128
VLS-512PY70B	70	210	88
VLS-512PY58B	58	198	76

■ VLS-1024PYB



Sensor model	Max. detection stroke	L	(A)
VLS-1024PYB	1024	1194	1034
VLS-1024PY800B	800	970	810
VLS-1024PY600B	600	770	610
VLS-1024PY512B	512	682	522
VLS-1024PY350B	350	520	360
VLS-1024PY220B	220	390	230

■ VLS-2048PY



Sensor model	Max. detection stroke	L	(A)
VLS-2048PY	2048	2438	2086
VLS-2048PY1800	1800	2190	1838
VLS-2048PY1600	1600	1990	1638
VLS-2048PY1500	1500	1890	1538
VLS-2048PY1200	1200	1590	1238

● **Specification**

VLS-[ ]PW

Items		Specifications		
Sensor model		VLS-256PWB	VLS-512PWB	VLS-1024PW
Absolute detection range		256mm	512mm	1024mm
Resolution		3.90625 μm	7.8125 μm	15.625 μm
Total number of divisions		65536 (2^{16})		
Linearity error		0.05mm Max.	0.1mm Max.	0.4mm Max.
Mass		0.9kg	1.7kg	8.0kg
Sliding resistance		4.9N or less (0.5kgf or less)	7.8N or less (0.8kgf or less)	19.6N or less (2.0kgf or less)
Permissible mechanical speed		1000mm/s	1000mm/s	2000mm/s
Permissible mechanical parallelism		±0.1mm		
Ambient temperature	Operating	−20 to +60°C		
	Storage	−30 to +90°C		
Vibration resistance		110 m/s^2 (11.3G) 66.7Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard		
Shock resistance		2000 m/s^2 (200G), up/down x 3 times each, conforms to JIS C5026 standard		
Protection rating		IP40, conforms to JEM 1030 standard		
Max. sensor cable length	Standard cable	100m (4P-S)		
	Robotic cable	50m (4P-RBT)		

VLS-[ ]PY

Items		Specifications		
Sensor model		VLS-512PYB	VLS-1024PYB	VLS-2048PY
Absolute detection range		512mm	1024mm	2048mm
Resolution		3.90625 μm	7.8125 μm	15.625 μm
Total number of divisions		131072 (2^{17})		
Linearity error		0.1mm Max.	0.2mm Max.	0.5mm Max.
Mass		1.0kg	2.1kg	10.2kg
Sliding resistance		4.9N or less (0.5kgf or less)	7.8N or less (0.8kgf or less)	19.6N or less (2.0kgf or less)
Permissible mechanical speed		250mm/s	500mm/s	1000mm/s
Permissible mechanical parallelism		±0.1mm		
Ambient temperature	Operating	−20 to +60°C		
	Storage	−30 to +90°C		
Vibration resistance		110 m/s^2 (11.3G) 66.7Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard		
Shock resistance		1000 m/s^2 (100G), up/down x 3 times each, conforms to JIS C5026 standard		
Protection rating		IP40, conforms to JEM 1030 standard		
Max. sensor cable length	Standard cable	60m (4P-S)		
	Robotic cable	30m (4P-RBT)		

- MEMO -

4-3. CYLNUC Cylinder and Inrodsensor

CYLNUC Cylinder

Items		Specifications
Model		CSA, SBA, SBH
Absolute detection range		12.8 mm (0.5039 inch)
Resolution		1.5625 μm (12.8 mm/8192divisions)
Max. sensor cable length	Standard cable	100m (3P-S)
	Robotic cable	50m (3P-RBT)

Contact our sales representative for CYLNUC Cylinder details.

Inrodsensor

Items		Specifications
Model		IRS-51.2P
Absolute detection range		51.2 mm (2.0157 inch)
Resolution		6.25 μm (51.2 mm/8192 divisions)
Max. sensor cable length	Standard cable	100m (3P-S)
	Robotic cable	50m (3P-RBT)

Contact our sales representative for Inrodsensor details.

● **Limitations**

⚠ **NOTES** Cautions concerning power-on and error occurrence

If VARILIMIT is used together with CYLNUC Cylinder or Inrodsensor, the machine position may not be detected correctly when the sensor rod moves while the power of VARILIMIT is OFF or an error is present.
When that happens, check the actual machine position again and set the current position value by using the parameter 97 again. For more detail of the semi-absolute format and current position setting, refer to "10-6".

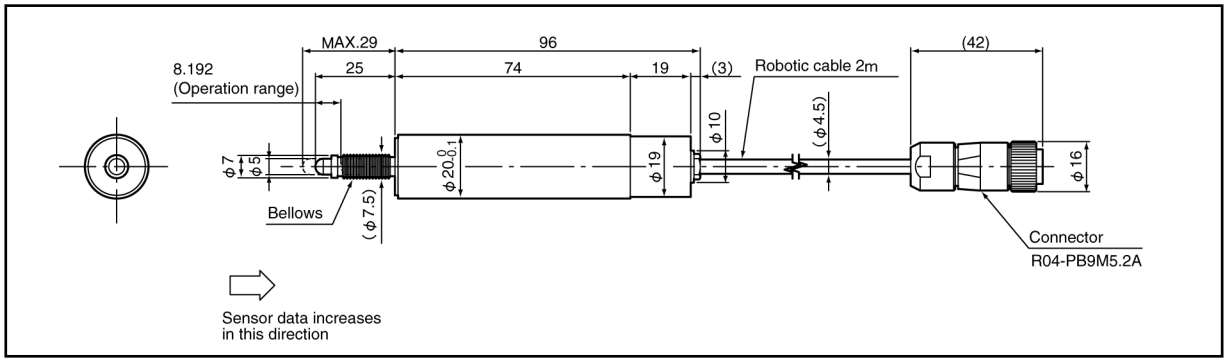
- MEMO -

4-4. Linear Type ABSOCODER (Single-rod)

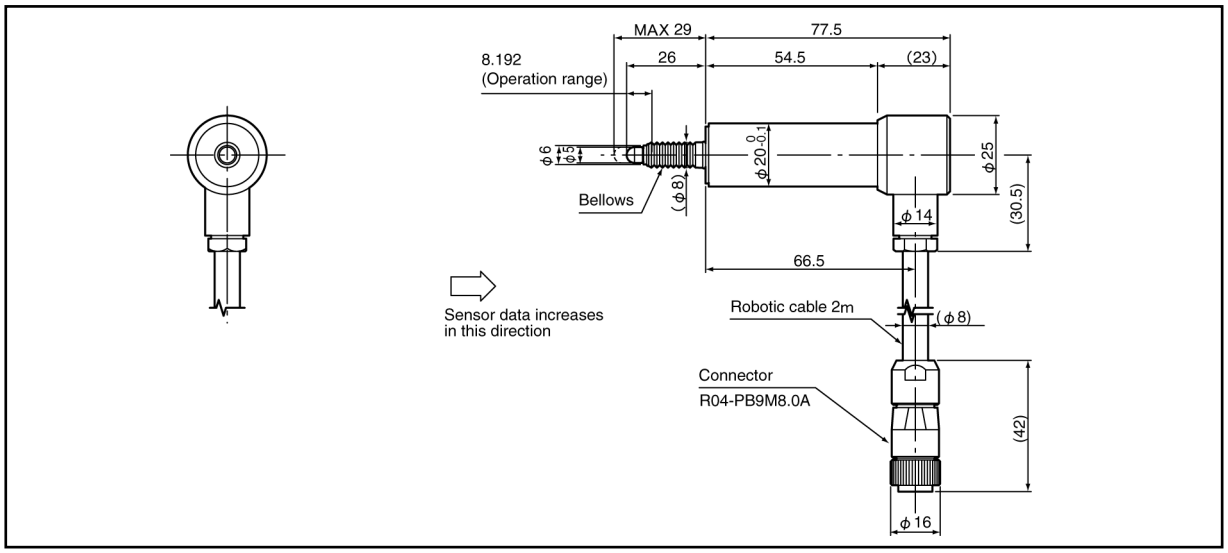
● Outer dimensions

■ VLS-8PSA

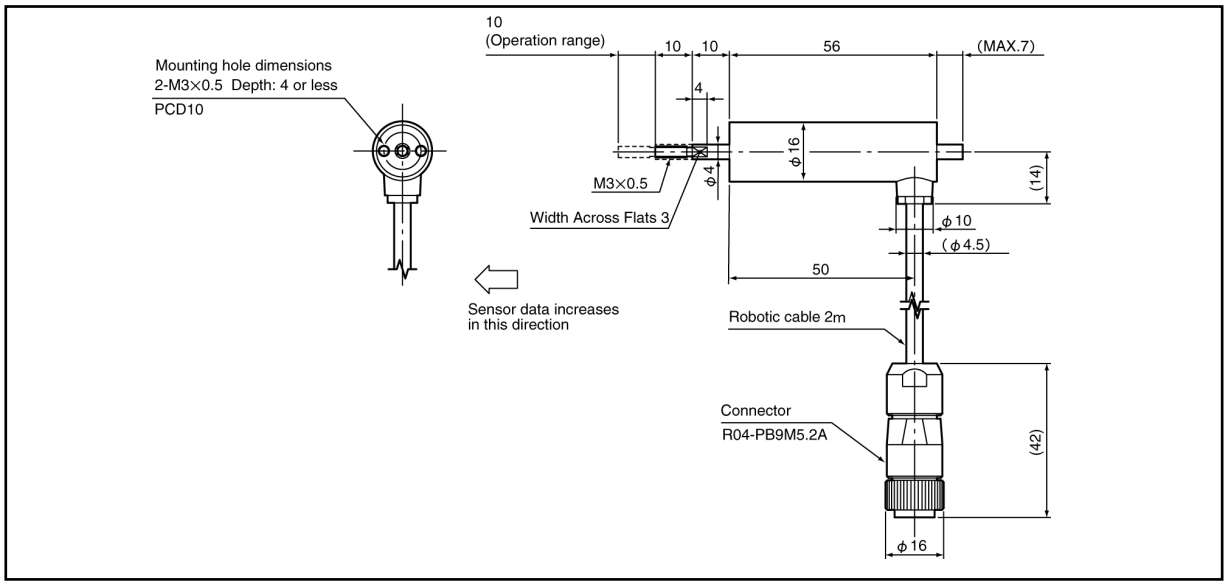
Units: mm



■ VLS-8PSM

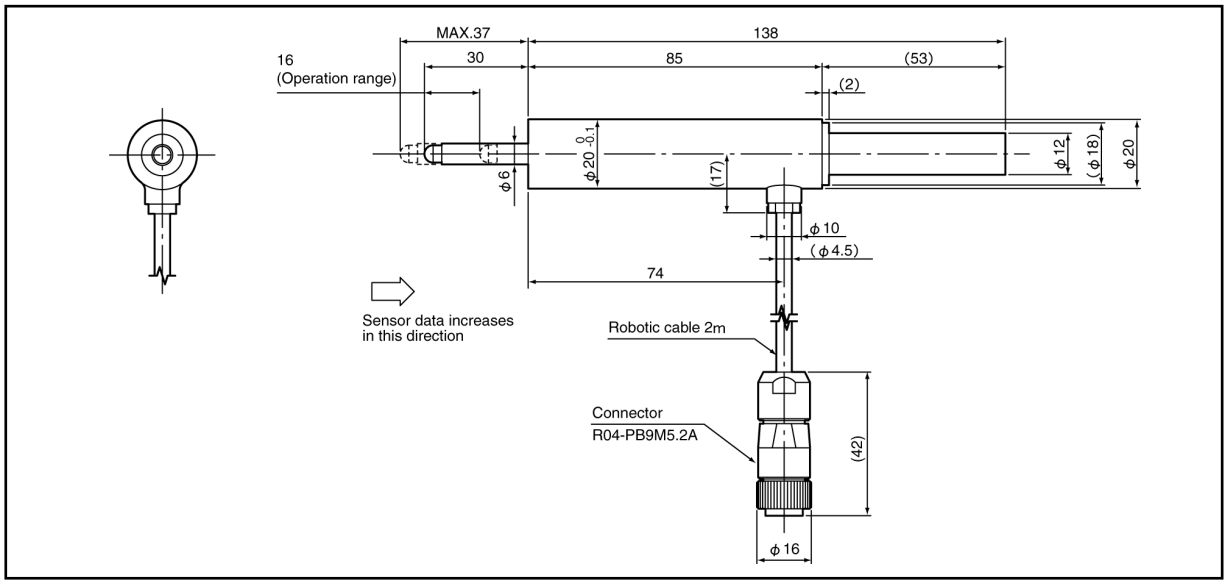


■ VLS-10PS

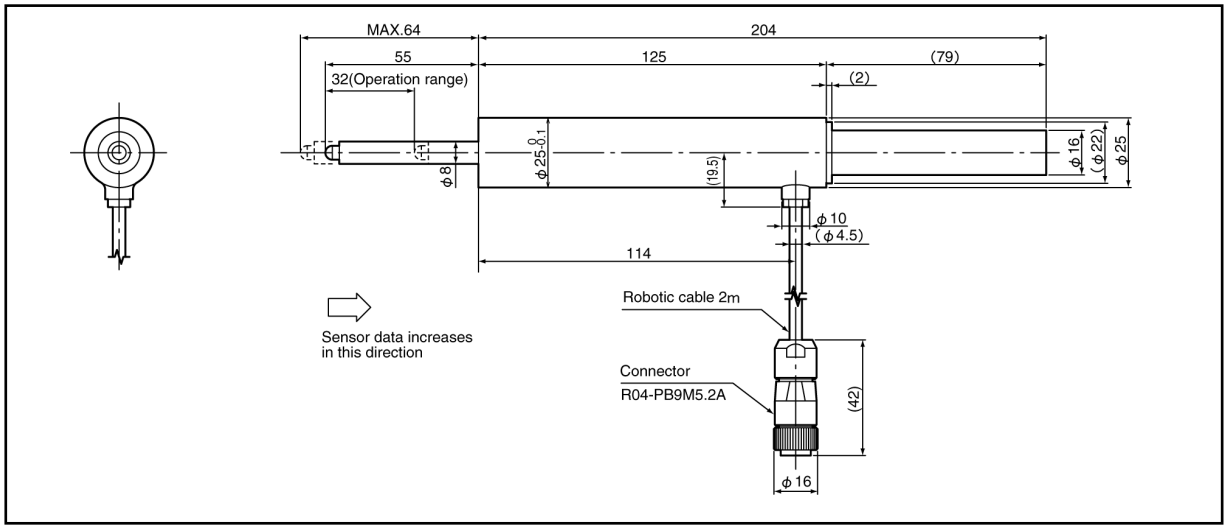


■ VLS-16PSA

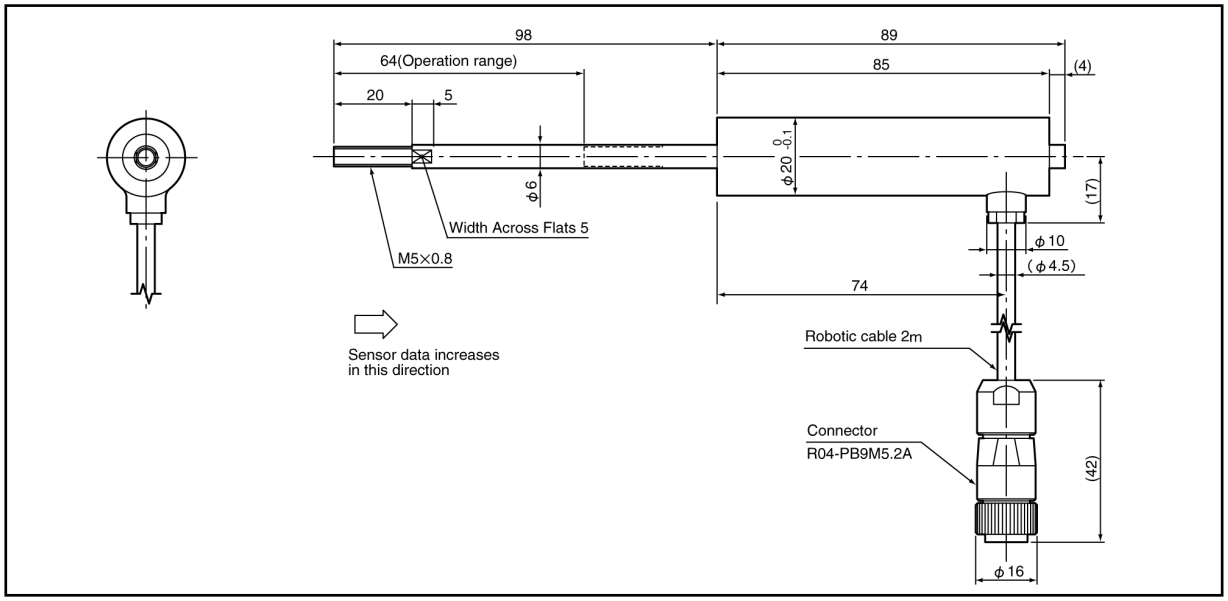
Units: mm



■ VLS-32PSA

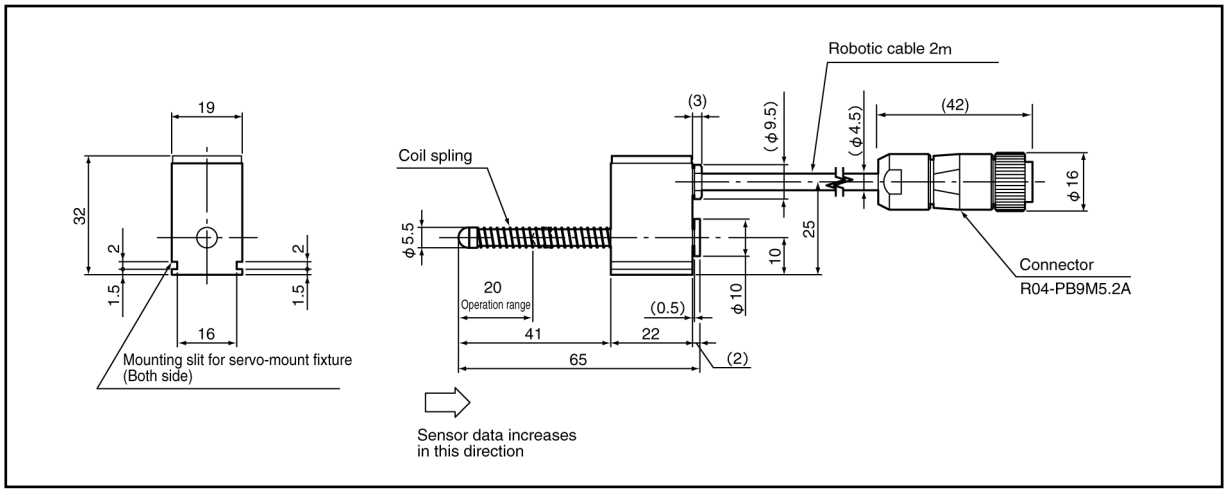


■ VLS-16PS64B

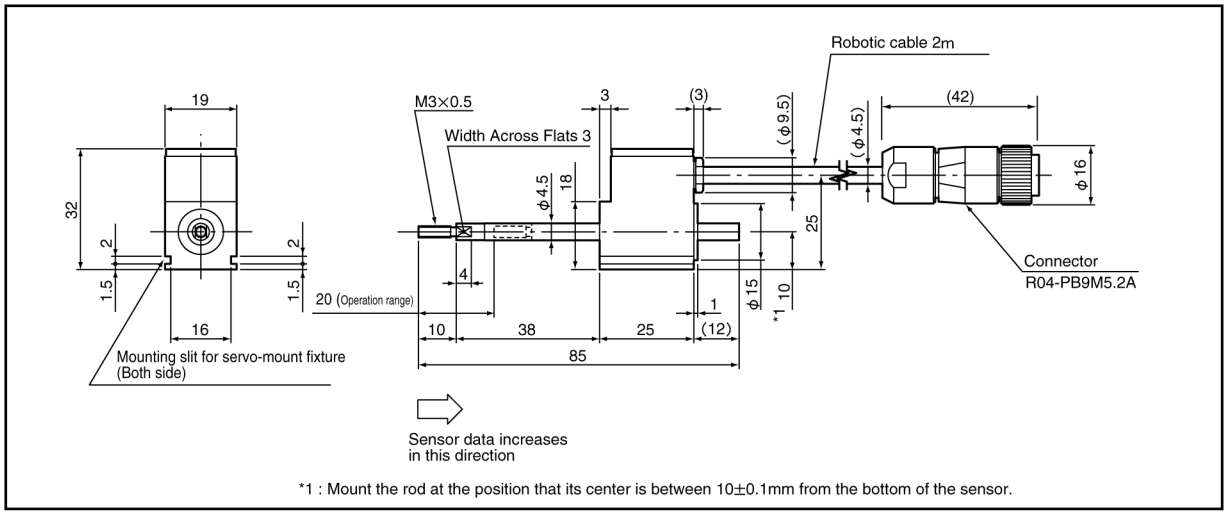


■ VLS-8PSJ20A

Units: mm



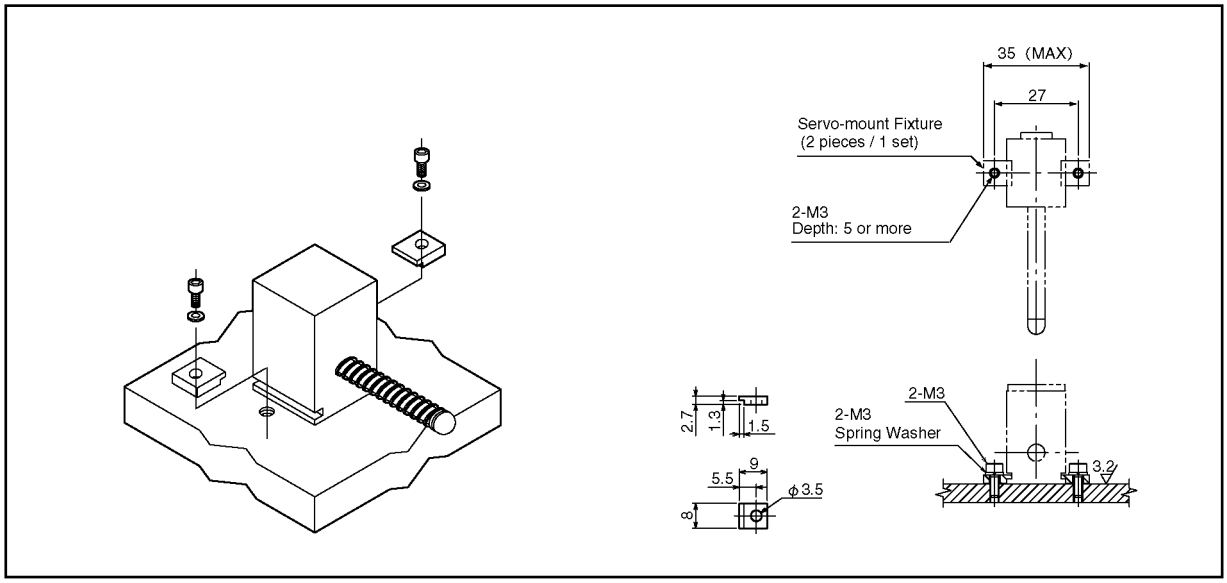
■ VLS-8PSJ20B



*1 : Mount the rod at the position that its center is between 10±0.1mm from the bottom of the sensor.

■ Accessory for VLS-8PSJ20A(B)

Servo-mount fixtures (2 pieces / 1set)



● Specification

VLS-[ ]PS

Items		Specifications			
Sensor model		VLS-8PSA	VLS-8PSM	VLS-10PS	VLS-16PSA
Absolute detection range		8.192mm	8.192mm	10mm	16mm
Resolution		1.0μm	1.0μm	1.22μm	1.95μm
Mass		0.21kg	0.34kg	0.15kg	0.25kg
Linearity error		0.1mm Max	0.08mm Max	0.2mm Max	0.1mm Max
Sliding resistance		0.3N/mm (0.031kgf/mm) *1		—	0.1N/mm (0.01kgf/mm) *1
Permissible mechanical speed		80mm/s		100mm/s	300mm/s
Ambient temperature	Operating	-10 to +60°C		-20 to +60°C	-10 to +60°C
	Storage	-30 to +90°C		-30 to +90°C	-30 to +90°C
Vibration resistance		40m/s² (4G) 10Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard *2		110m/s² (11.3G) 66.7Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard	50m/s² (5G) 10Hz up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard *2
Shock resistance		40m/s² (4G) 0.5ms, up/down x 3 times each, conforms to JIS C 5026 standard *2		200m/s² (20G) 0.5ms, up/down x 3 times each, conforms to JIS C 5026 standard	50m/s² (5G) 0.5ms, up/down x 3 times each, conforms to JIS C 5026 standard *2
Protection rating		IP40, conforms to JEM 1030 standard			
Max. sensor cable length	Standard cable	60m (3P-S)			
	Robotic cable	30m (3P-RBT)			

VLS-[ ]PS

Items		Specifications			
Sensor model		VLS-32PSA	VLS-16PS64B	VLS-8PSJ20A	VLS-8PSJ20B
Absolute detection range		32mm	16mm (Stroke: 64mm)	8.192mm (Stroke: 20mm)	8.192mm (Stroke: 20mm)
Resolution		3.9 μm	1.95 μm	1.0 μm	1.0 μm
Mass		0.45kg	0.24kg	0.16kg	0.18kg
Linearity error		0.2mm Max	0.1mm Max	0.1mm Max	
Sliding resistance		0.15N/mm (0.015kgf/mm) *1	4.9N (0.5kgf)	0.049N/mm 0.005kgf/mm *1	0.2N (0.02kgf)
Permissible mechanical speed		380mm/s	1000mm/s	80mm/s	
Ambient temperature	Operating	-10 to +60°C		-10 to +60°C	
	Storage	-30 to +90°C		-10 to +60°C	
Vibration resistance		30m/s^2 (3G) 6Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard *2	110 m/s^2 (11.3G) 66.7Hz, up/down 4h, forward/back/left/right 2h each, conforms to JIS D1601 standard	40m/s^2 (4G) 10Hz, up/down x 10^7 times, forward/back x 10^7 times, left/right x 10^7 times, conforms to JIS C0040 standard *2	
Shock resistance		30m/s^2 (3G) 0.5ms, up/down x 3 times each, conforms to JIS C 5026 standard *2	1000m/s^2 (100G) 0.5ms up/down x 3 times each, conforms to JIS C 5026 standard	40m/s^2 (4G) 0.5ms, 6 directon x 3 times each, conforms to JIS C 0041 standard *2	
Protection rating		IP40, conforms to JEM 1030 standard		IP65, conforms to JEM 1030 standard	
Max. sensor cable length	Standard cable	60m (3P-S)		100m (3P-S)	
	Robotic cable	30m (3P-RBT)		50m (3P-RBT)	

Remarks

*1: Sliding resistance

Applicable sensors: VLS-8PSA, VLS-8PSM, VLS-16PSA, VLS-32PSA, VLS-8PSJ20A

The ABSOCODER models shown above have a built-in coil spring which keeps the rod pressed against the detection object, and the spring constant of this built-in spring represents the sliding resistance.

*2: Vibration and shock resistance

The values of vibration and shock resistance is in the range where the sensor rod can be kept pressing to the detection object by the built-in coil spring.

It also applies for speed changes (accelerations) which occur within the permissible speed range.

● **Limitations**

⚠ **NOTES** Cautions concerning power-on and error occurrence

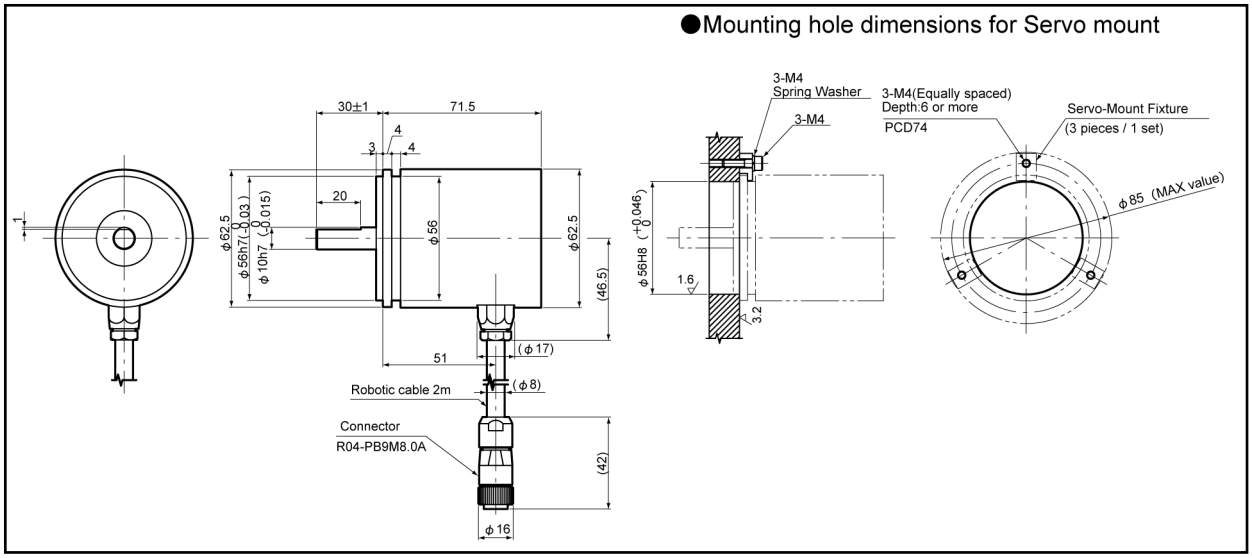
If VARILIMIT is used together VLS-16PS64B, VLS-8PSJ20A or VLS-8PSJ20B, the machine position may not be detected correctly when the sensor rod moves while the power of VARILIMIT is OFF or an error is present.
When that happens, check the actual machine position again and set the current position value by using the parameter 97 again. For more detail of the semi-absolute format and current position setting, refer to "10-6".

4-5. Single-turn Type ABSOCODER

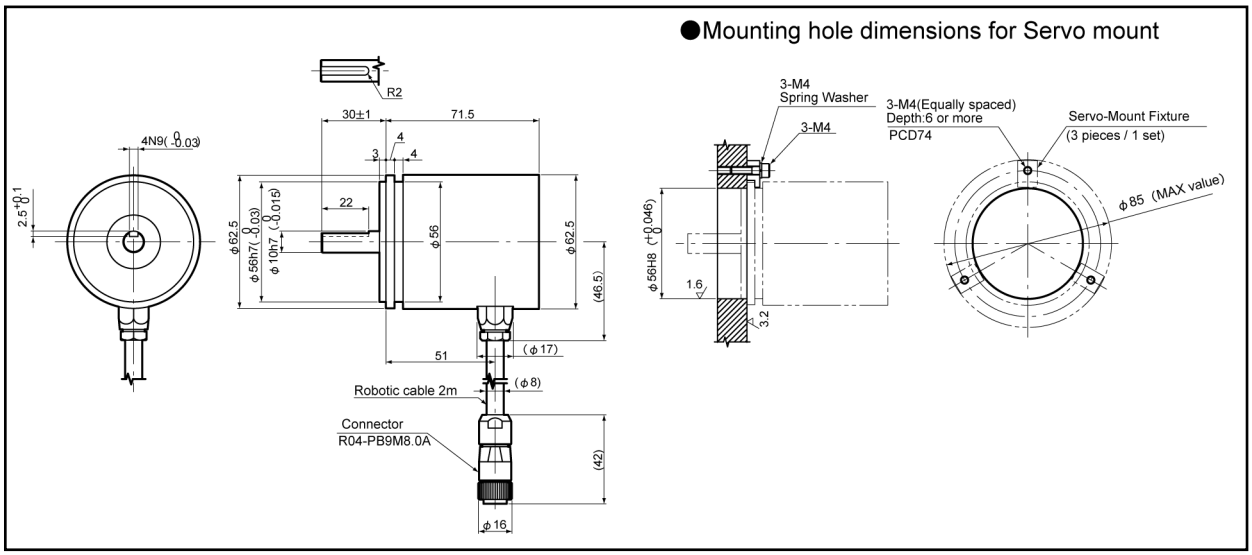
● Outer dimensions

■ VRE-P062SAC

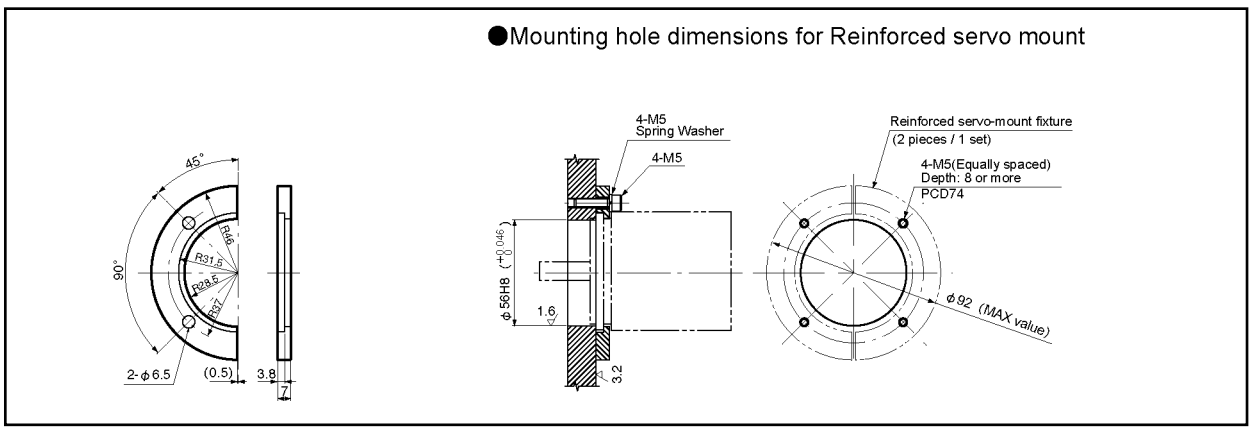
Units: mm



■ VRE-P062SBC

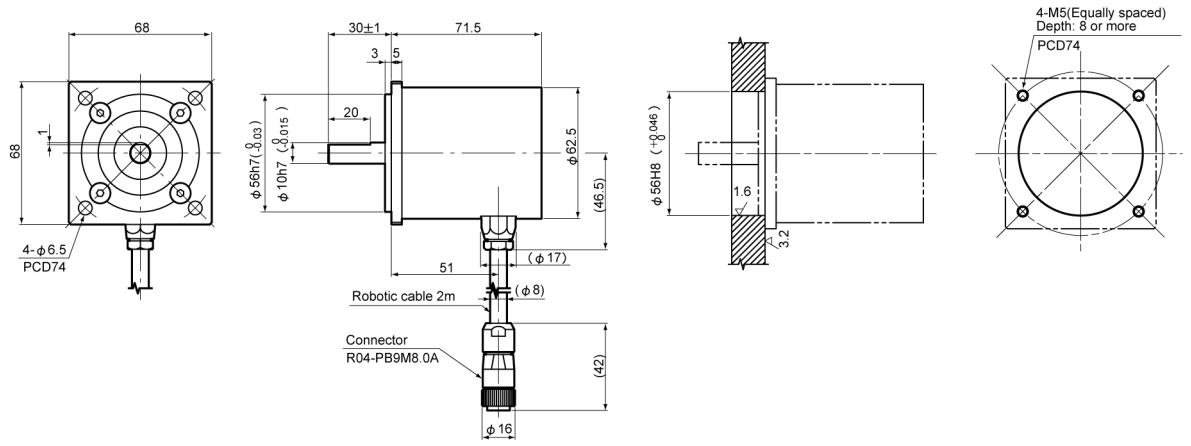


■ SH-01 (Reinforced servo-mount fixture for VRE-P062SAC / SBC)
Option (2 pieces / 1set)

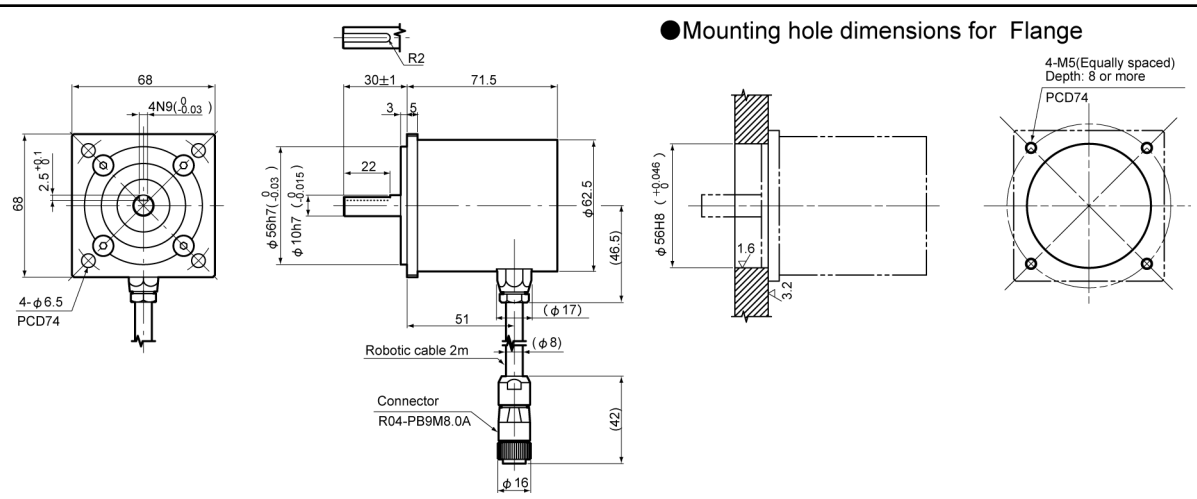


■ VRE-P062FAC

Units: mm

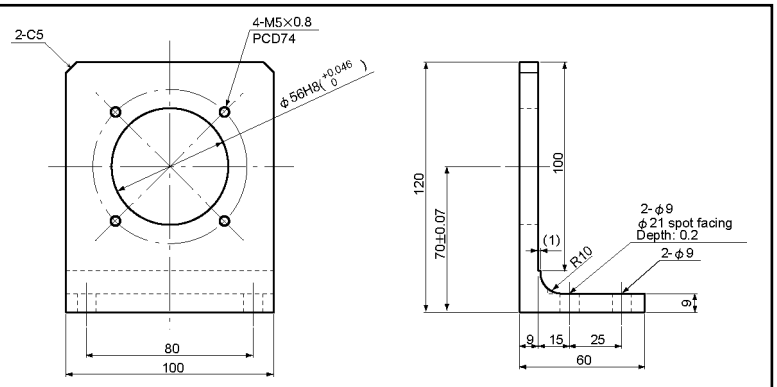


■ VRE-P062FBC



■ RB-01 (L type flange-mount fixture)

Option



L type flange-mount fixture is for VRE-P062.

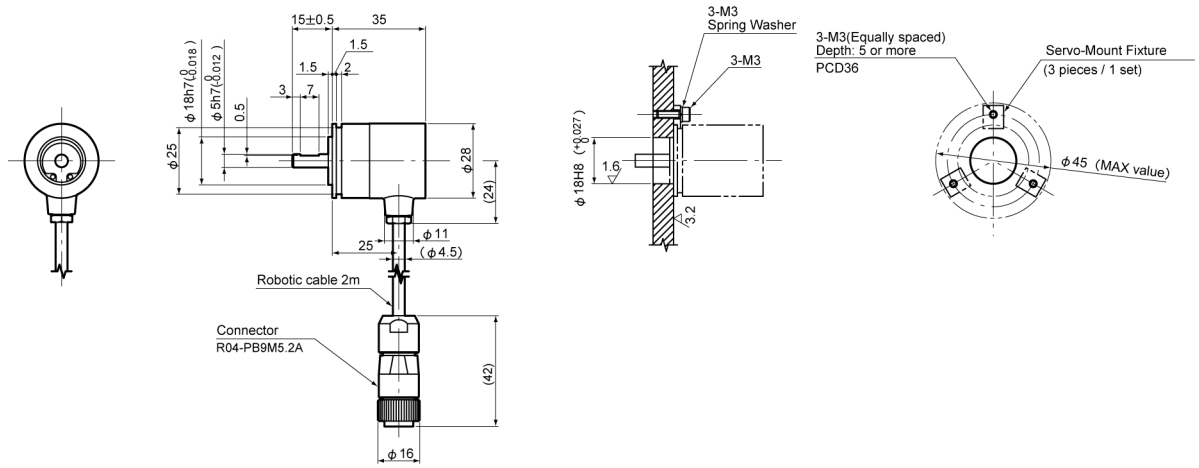
Following combinations are able to use with.

- VRE-P062SAC/SBC + SH-01
- VRE-P062FAC/FBC

■ VRE-P028SAC

Units: mm

●Mounting hole dimensions for Servo mount



● Specification

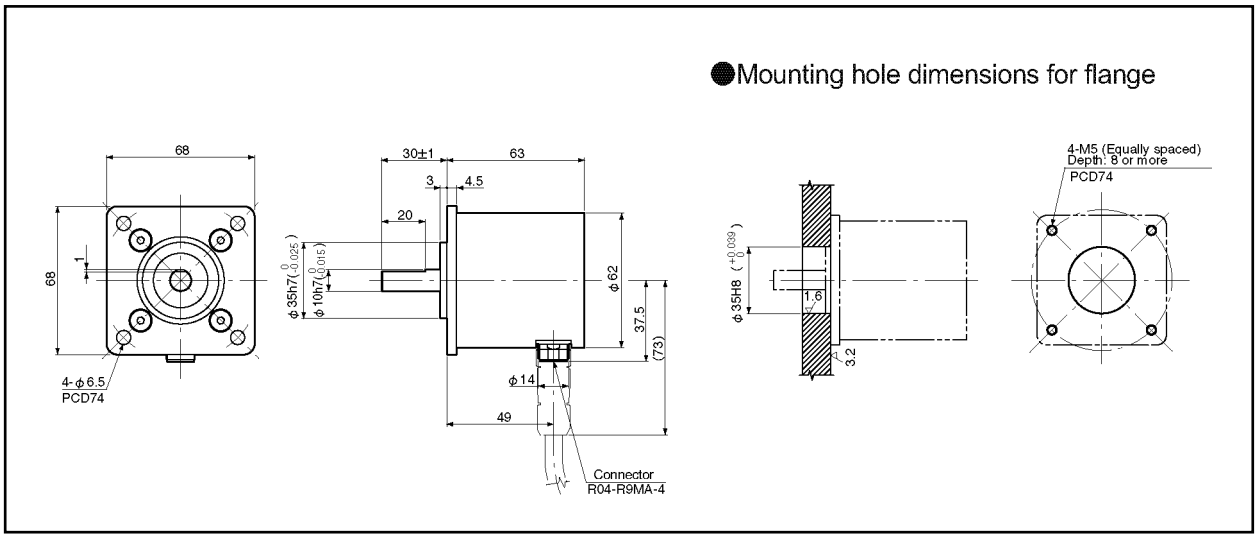
VRE-P028, VRE-P062

Items		Specifications	
Sensor model		VRE-P028	VRE-P062
Total number of turns		1	
Number of divisions		8192 (2^{13})	
Mass		0.25 kg	1.3 kg
Linearity error		1.5° Max.	1° Max.
Moment of inertia $GD^2/4(J)$		9.3×10^{-8} kg·m^2 (9.5×10^{-7} kgf·cm·s^2)	6.4×10^{-6} kg·m^2 (6.5×10^{-5} kgf·cm·s^2)
Starting torque		1.5×10^{-3} N·m or less (0.015 kgf·cm or less)	4.9×10^{-2} N·m or less (0.5 kgf·cm or less)
Permissible shaft load	Radial	15 N (1.5 kgf)	98 N (10 kgf)
	Thrust	9.8 N (1.0 kgf)	49 N (5 kgf)
Permissible mechanical speed		6000 r/min	3600 r/min
Bearing life		8 x 10^4 h (at 6000 r/min)	5.5 x 10^4 h (at3600 r/min)
Ambient temperature	Operating	-20 to +60°C	
	Storage	-30 to +90°C	
Vibration resistance		2.0 x 10^2 m/s^2 (20G) 2000Hz, up/down 4h, forward/back 2h, conforms to JIS D 1601 standard	
Shock resistance		4.9 x 10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard	
Protection rating		IP40, conforms to JEM 1030 standard	IP52f, conforms to JEM 1030 standard
Max. sensor cable length	Standard cable	100m (3P-S)	
	Robituc cable	100m (3P-RBT)	
Interconnecting sensor cable		2m	

4-6. Single-turn Type ABSOCODER (High-resolution)

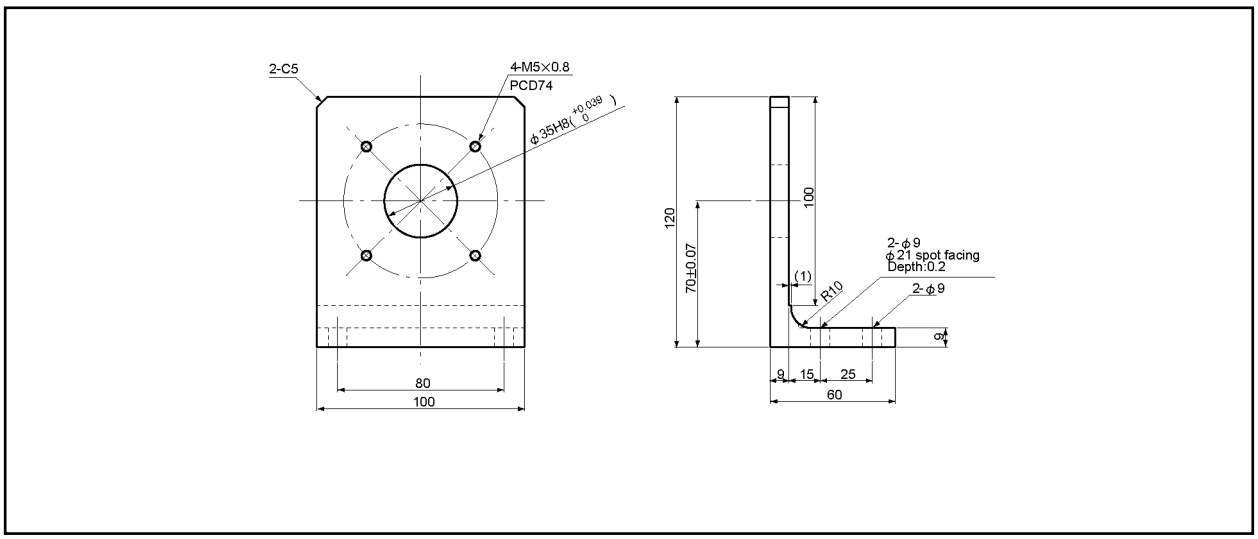
● **Outer dimensions**

■VRE-16TS062FAL Units: mm



■ RB-02 (Option)

(L type flange-mount fixture)



● **Specification**

VRE-16TS062

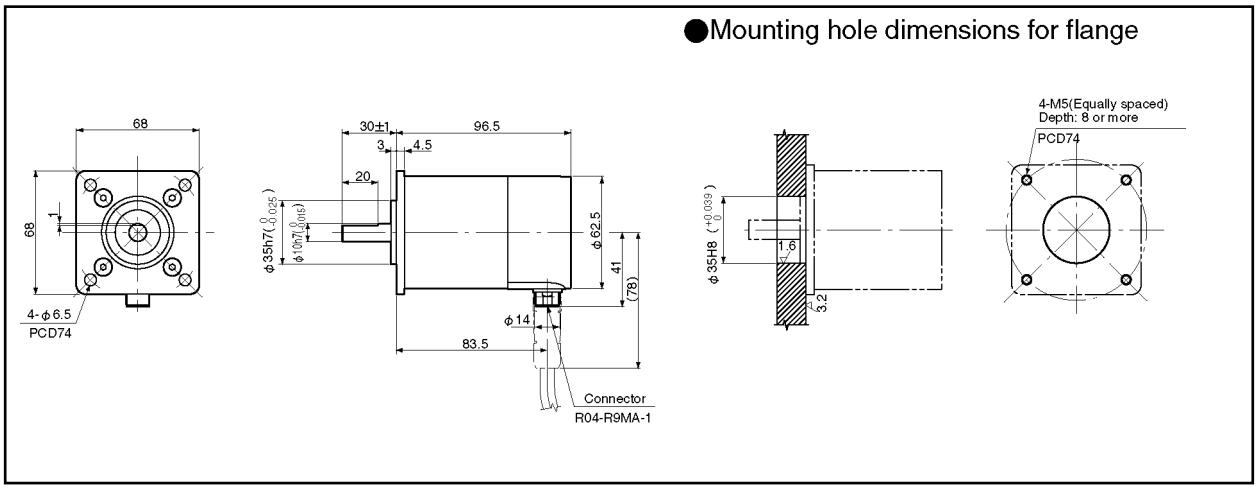
Items		Specifications
Sensor model		VRE-16TS062FAL
Total number of turns		1
Number of divisions		65536 (2^{16})
Mass		1.3kg
Linearity error		0.067° Max.
Moment of inertia $GD^2/4(J)$		7.4×10^{-6} kg·m^2 (7.5×10^{-5} kgf·cm·s^2)
Starting torque		4.9×10^{-2} N·m or less (0.5 kgf·cm or less)
Permissible shaft load	Radial	78N (8 kgf)
	Thrust	39N (4 kgf)
Permissible mechanical speed		3600 r/min
Bearing life		2.5×10^4 h (at 3600 r/min)
Ambient temperature	Operating	-20 to +60°C
	Storage	-30 to +90°C
Vibration resistance		2.0×10^2 m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard
Shock resistance		4.9×10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard
Protection rating		IP52f, conforms to JEM 1030 standard
Max. sensor cable length		100m (3S-RBT)

4-7. Multi-turn Type ABSOCODER (High-accuracy)

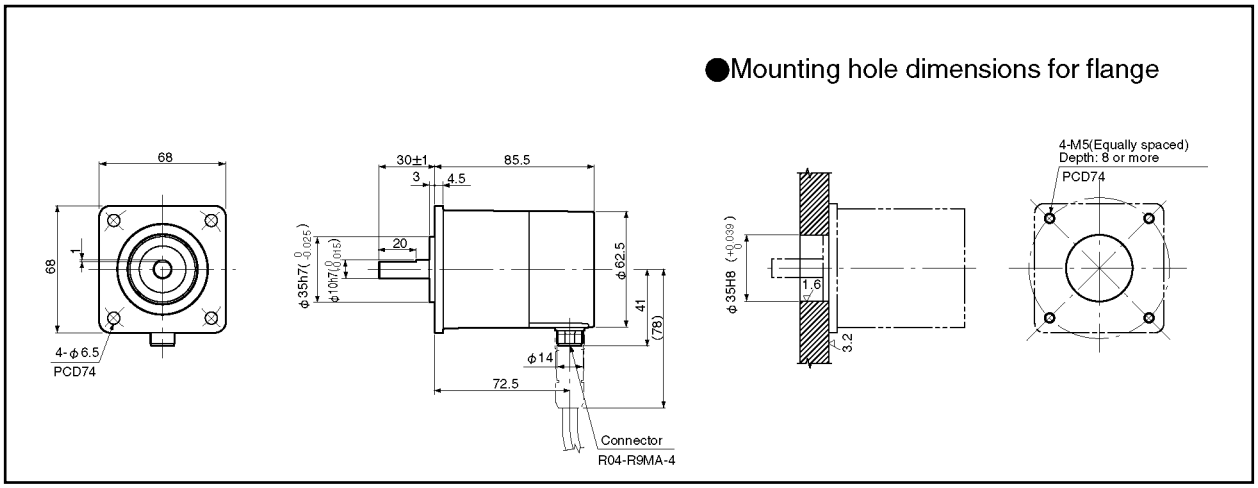
● Outer dimensions

■ MRE-32SS062FAL

Units: mm

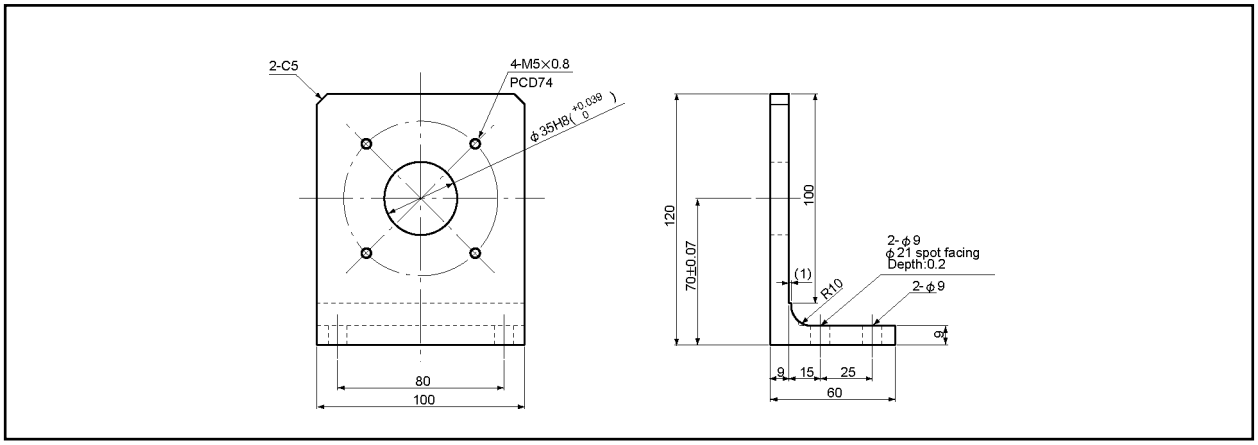


■ MRE-G□SS062FAL



■ RB-02 (Option)

(L type flange-mount fixture)



● **Specification**

MRE-32SS062, MRE-G[ ]SS062

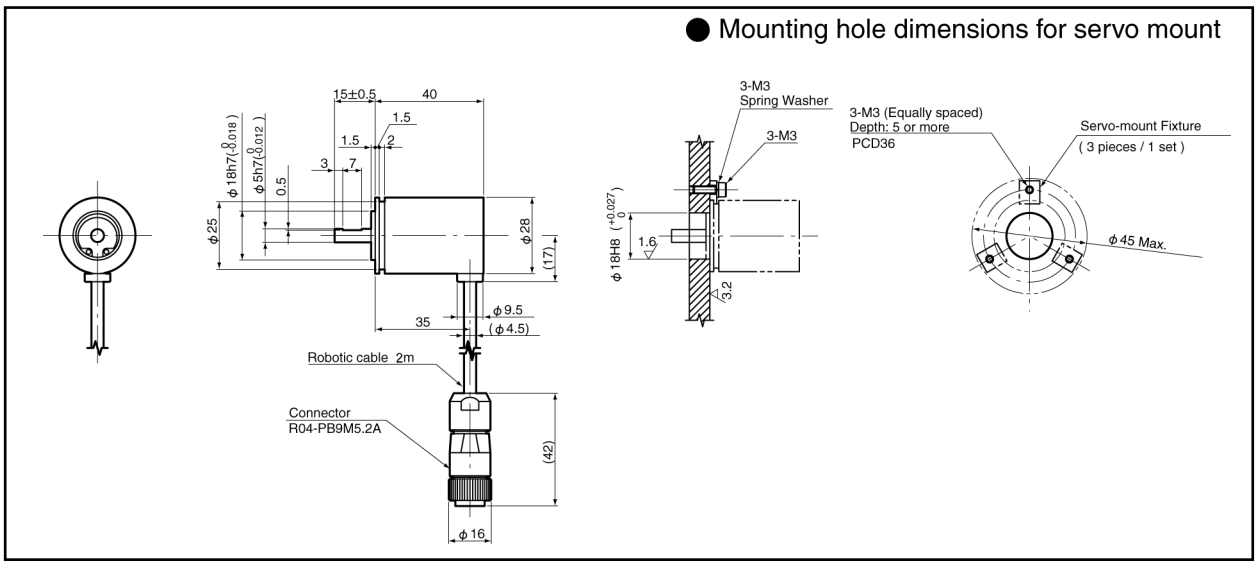
Items		Specifications							
Sensor model		MRE-32SS062FAL	MRE-G[ ]SS062FAL						
			[64]	[128]	[160]	[256]	[320]	[640]	[1280]	[2560]
Total number of turns		32	64	128	160	256	320	640	1280	2560
divisions/turn		4096	2048	1024	819.2	512	409.6	204.8	102.4	51.2
Number of divisions		131072 (2^{17})							
Mass		1.5 kg	0.8 kg						
Linearity error		0.4° Max	1.2° Max.	2.4° Max.	3.0° Max.	4.8° Max.	6.0° Max.	14° Max	28° Max	56° Max
Moment of inertia $GD^2/4$(J)		5.9 x 10^{-6}kg·m^2 (6.0 x ^{5}kgf·cm·s^2)	3.9 x 10^{-6} kg·m^2 (4.0 x ^{5}kgf·cm·s^2)							
Starting torque		4.9 x 10^{-2} N·m or less (0.5 kgf·cm or less)							
Permissible shaft load	Radial	78N (8 kgf)	59 N (6 kgf)						
	Thrust	39N (4 kgf)	29 N (3 kgf)						
Permissible mechanical speed		2000 r/min	3600 r/min						
Bearing life		4.5 x 10^4 h (at 2000 r/min)	2.5 x 10^4 h (at 3600 r/min)						
Ambient temperature	Operating	-20 to +60°C							
	Storage	-30 to +90°C							
Vibration resistance		2.0 x 10^2 m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard	98 m/s^2 (10G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard						
Shock resistance		4.9 x 10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard	2.9 x 10^3 m/s^2 (300G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard						
Protection rating		IP52f, conforms to JEM 1030 standard							
Max. sensor cable length	Robotic cable	100m (3S-RBT)	100m (3S-RBT)						
Interconnecting sensor cable		-	-						

4-8. Single-turn Type ABSOCODER (High-accuracy)

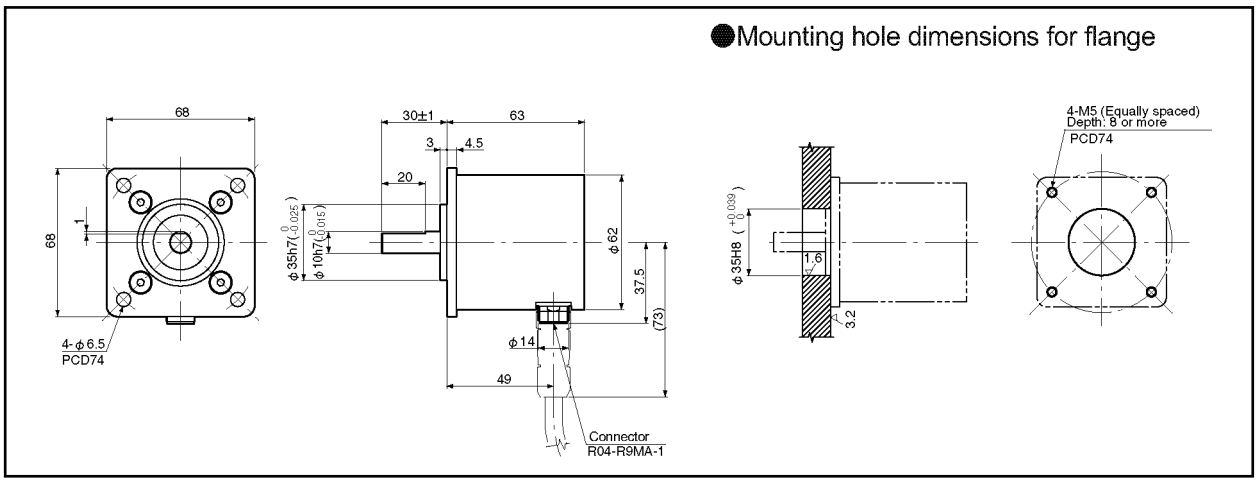
● Outer dimensions

■ VRE-S028SAC

Units: mm

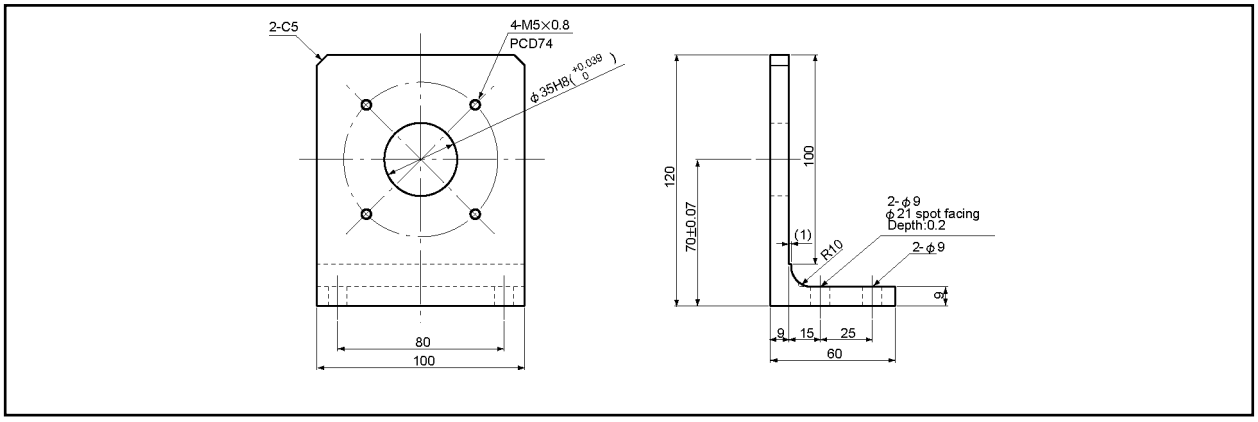


■ VRE-S062FAL



■ RB-02 (Option)

(L type flange-mount fixture)



● **Specification**

VRE-S028, VRE-S062

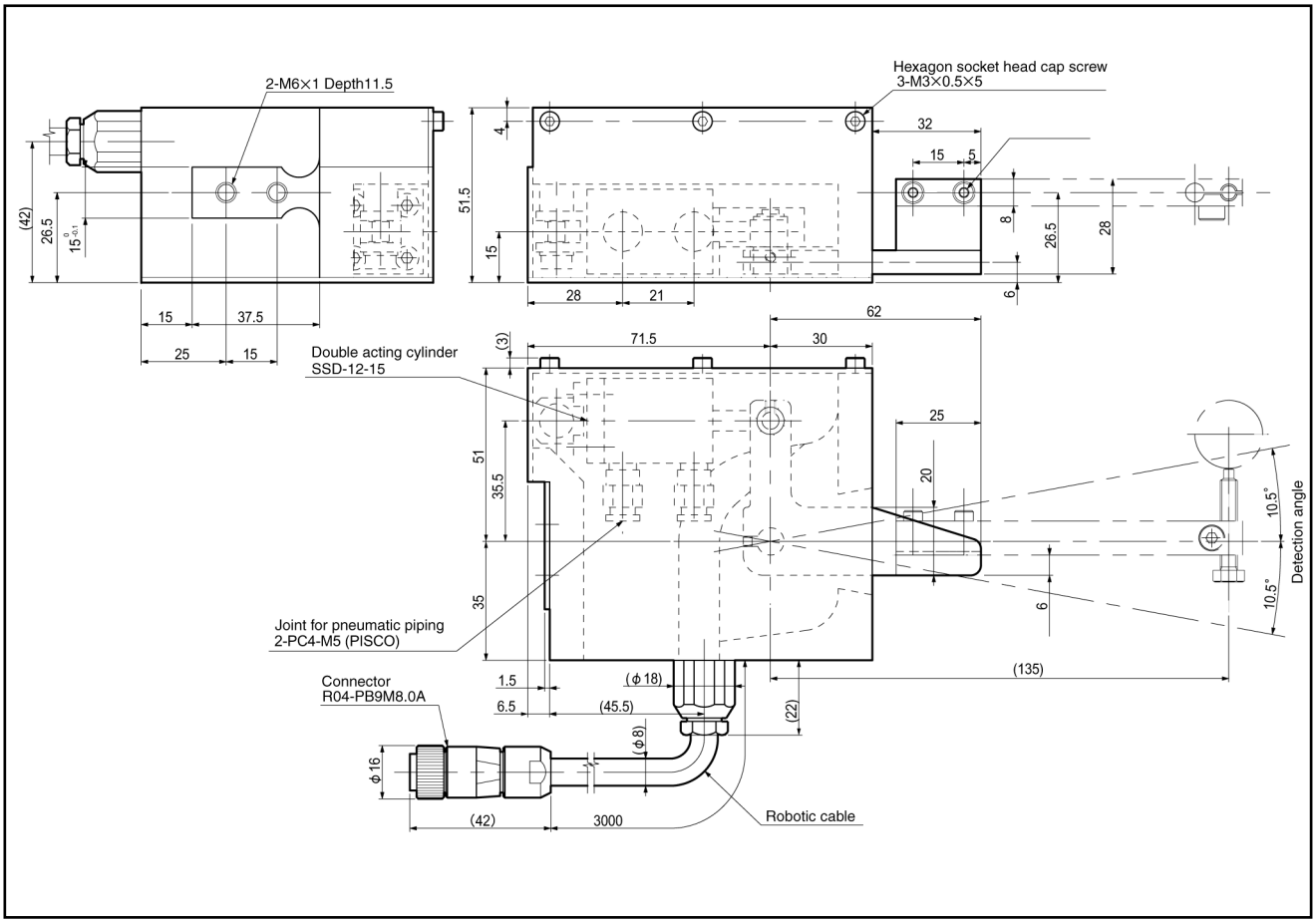
Items		Specifications	
Sensor model		VRE-S028SAC	VRE-S062FAL
Total number of turns		1	
Number of divisions		4096 (2^{12})	
Mass		0.21kg	1.2kg
Linearity error		0.5° Max.	0.4° Max.
Moment of inertia $GD^2/4$(J)		1.3×10^{-7} kg·m^2 (1.3×10^{-6} kgf·cm·s^2)	5.4×10^{-6} kg·m^2 (5.5×10^{-5} kgf·cm·s^2)
Starting torque		1.5×10^{-3} N·m or less (0.015 kgf·cm or less)	4.9×10^{-2} N·m or less (0.5 kgf·cm or less)
Permissible shaft load	Radial	15N (1.5 kgf)	78N (8 kgf)
	Thrust	9.8N (1.0 kgf)	39N (4 kgf)
Permissible mechanical speed		6000 r/min	3600 r/min
Bearing life		8.0×10^4 h (at 6000 r/min)	2.5×10^4 h (at 3600 r/min)
Ambient temperature	Operating	-20 to +60°C	
	Storage	-30 to +90°C	
Vibration resistance		2.0×10^2 m/s^2 (20G) 200Hz, up/down 4 h, forward/back 2 h, conforms to JIS D 1601 standard	
Shock resistance		4.9×10^3 m/s^2 (500G) 0.5 ms, up/down/forward/back x 3 times each, conforms to JIS C 5026 standard	
Protection rating		IP40, conforms to JEM 1030 standard	IP52f, conforms to JEM 1030 standard
Max. sensor cable length		100m(3S-RBT)	
Interconnecting sensor cable		2m	-

4-9. NT Coder

Contact our sales representative for NT Coder details.

● **Outer dimensions**

■VRE-16TSWABC3 Units: mm



● **Specification**

VRE-16TSWABC3

Items		Specifications
Sensor model		VRE-16TSWABC3
Detection angle		21°（±10.5°）
Mass		2.5 kg
Linearity error		0.1° Max
Temperature drift		-0.002 °/℃
Air pressure		0.2 MPa
Contact thrust		4.4 N (air pressure: 0.2Mpa, arm length: 135mm)
Permissible shaft load		3 x 10^7 h (60 r/min にて)
Ambient temperature	Operating	-20 to +60℃
	Storage	-30 to +90℃
Vibration resistance		98 m/s^2 (10G) 200Hz up/down 4h, forward/back 2h, conforms to JIS D 1601 standard
Shock resistance		2.9 x10^3 m/s^2 (300G) 0.5 ms up/down/forward/back x 3 times each, conforms to JIS C 5026 standard
Protection rating		IP67, conforms to JEM 1030 standard
Max. sensor cable length		50 m (3S-RBT)
Interconnecting sensor cable		3 m

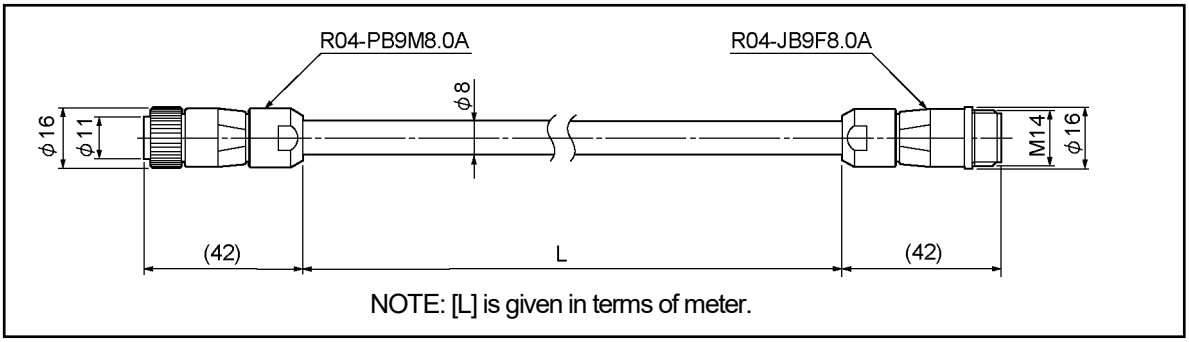
5. CABLE SPECIFICATIONS AND DIMENSIONS

5-1. Sensor Cable Specifications and Outer Dimensions

● **Outer dimensions**

◆ 4P-S-0102-[L], 4P-RBT-0102-[L]
3P-S-0102-[L], 3P-RBT-0102-[L]
3S-RBT-0102-[L]

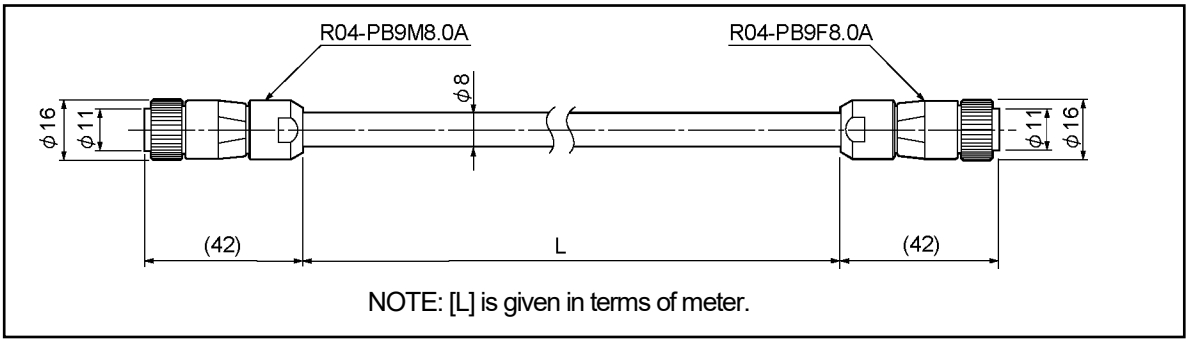
Units: mm



NOTE: [L] is given in terms of meter.

◆ 4P-RBT-0103-[L]
3P-RBT-0103-[L]
3S-RBT-0103-[L]

Units: mm



NOTE: [L] is given in terms of meter.

● **Specification**

4P-S, 4P-RBT

Items		Specifications	
Model code		4P-S	4P-RBT
Cable type		Standard cable	Robotic cable
Diameter		ϕ8	
Ambient temperature	Operating	−5 to +60°C	−5 to +60°C
	Storage	−5 to +60°C	−10 to +60°C
Insulator		Irradiated cross linked formed polyethylene	ETFE plastic
Sheath		Vinyl chloride mixture	
Construction		8-core, 2 pairs without shield + 2 pairs with shield	
Color of sheath		Gray	Black
Advantage		Extensible for long distances	Superior flexibility; ideal for moving place

3P-S, 3P-RBT

Items		Specifications	
Model code		3P-S	3P-RBT
Cable type		Standard cable	Robotic cable
Diameter		ϕ8	
Ambient temperature	Operating	−5 to +60°C	−5 to +60°C
	Storage	−5 to +60°C	−10 to +60°C
Insulator		Irradiated cross linked formed polyethylene	ETFE plastic
Sheath		Vinyl chloride mixture	
Construction		6-core, 2 pairs without shield + 1 pair with shield	
Color of sheath		Gray	Black
Advantage		Extensible for long distances	Superior flexibility; ideal for moving place

3S-RBT

Items		Specifications
Model code		3S-RBT
Cable type		Robotic cable
Diameter		ϕ8
Ambient temperature	Operating	−5 to +60°C
	Storage	−10 to +60°C
Insulator		ETFE plastic
Sheath		Vinyl chloride mixture
Construction		7-core, 1 triple with shield + 2 pairs with shield
Color of sheath		Blue
Advantage		Superior flexibility; ideal for moving place

5-2. Sensor Cable Length Limitation

Depending on your ABSOCODER model, there is a limitation to allowable sensor cable length extension.
Listed below are the longest allowable total cable lengths.

ABSOCODER model \ Cable model		4P-S (Standard)	4P-RBT (Robotic)	3P-S (Standard)	3P-RBT (Robotic)	3S-RBT (Robotic)
Multi-turn type	MRE-32SP062	100m	40m	—	—	—
	MRE-G[ ]SP062	100m	70m	—	—	—
Linear type (Dual-rod)	VLS-256PW[ ]B	100m	50m	—	—	—
	VLS-512PW[ ]B					
	VLS-1024PW[ ]					
	VLS-512PY[ ]B	60m	30m	—	—	—
	VLS-1024PY[ ]B					
	VLS-2048PY[ ]					
CYLNUC Cylinder	CSA	—	—	100m	50m	—
	SBA					
	SBH					
Inrodsensor	IRS-51.2P	—	—	100m	50m	—
Linear type (Single-rod)	VLS-8PSA	—	—	60m	30m	—
	VLS-8PSM					
	VLS-10PS					
	VLS-16PSA					
	VLS-32PSA					
	VLS-16PS64B					
	VLS-8PSJ20A	—	—	100m	50m	—
	VLS-8PSJ20B					
Single-turn type	VRE-P062	—	—	100m	100m	—
	VRE-P028					
Single-turn type (High-resolution)	VRE-16TS062FAL	—	—	—	—	100m
Multi-turn type (high-accuracy)	MRE-32SS062FAL	—	—	—	—	100m
	MRE-G[ ]SS062FAL					
Single-turn type (high-accuracy)	VRE-S028SAC	—	—	—	—	100m
	VRE-S062FAL					
NT Coder	VRE-16TSWABC3	—	—	—	—	50m

⚠ NOTES

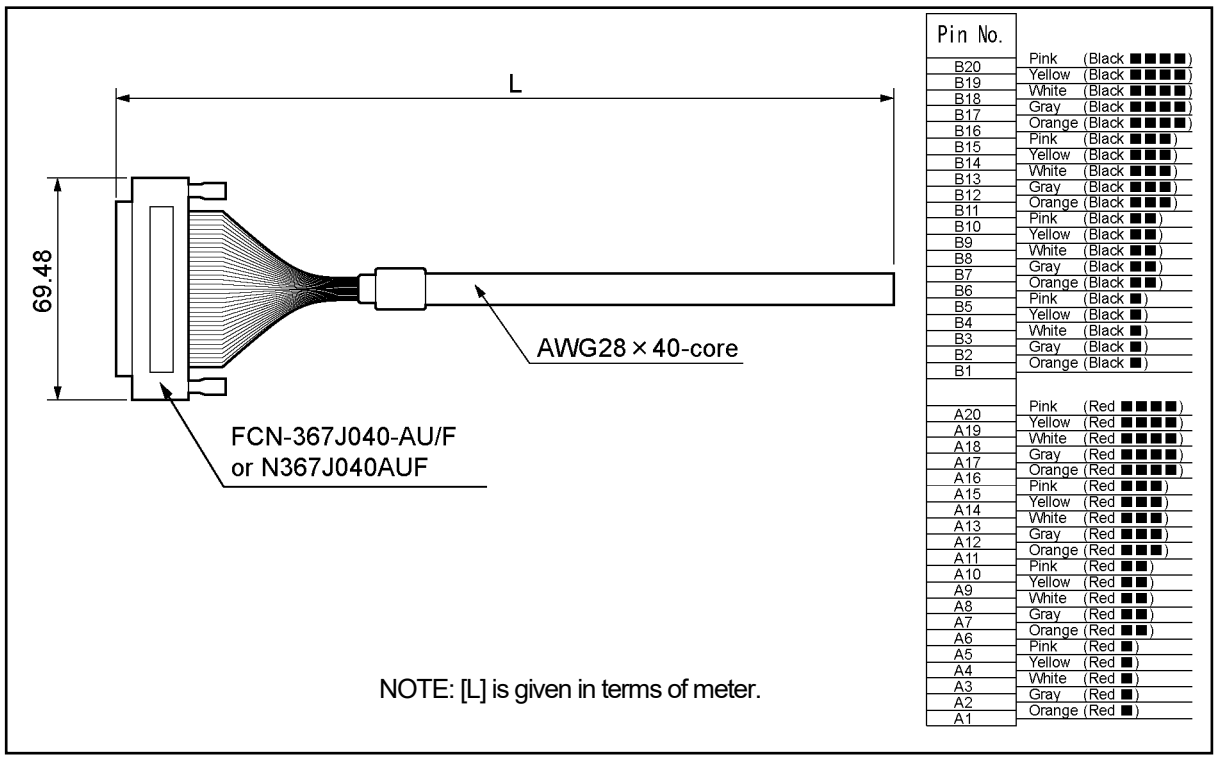
1. In cases where standard and robotic cables are used in combination, consult our sales representative about the allowable cable length.

2. The sensor cable is a dedicated product and is not interchangeable with any other type of cable.

5-3. External Cable Outer Dimensions

●VS-C05-[L]

Units: mm

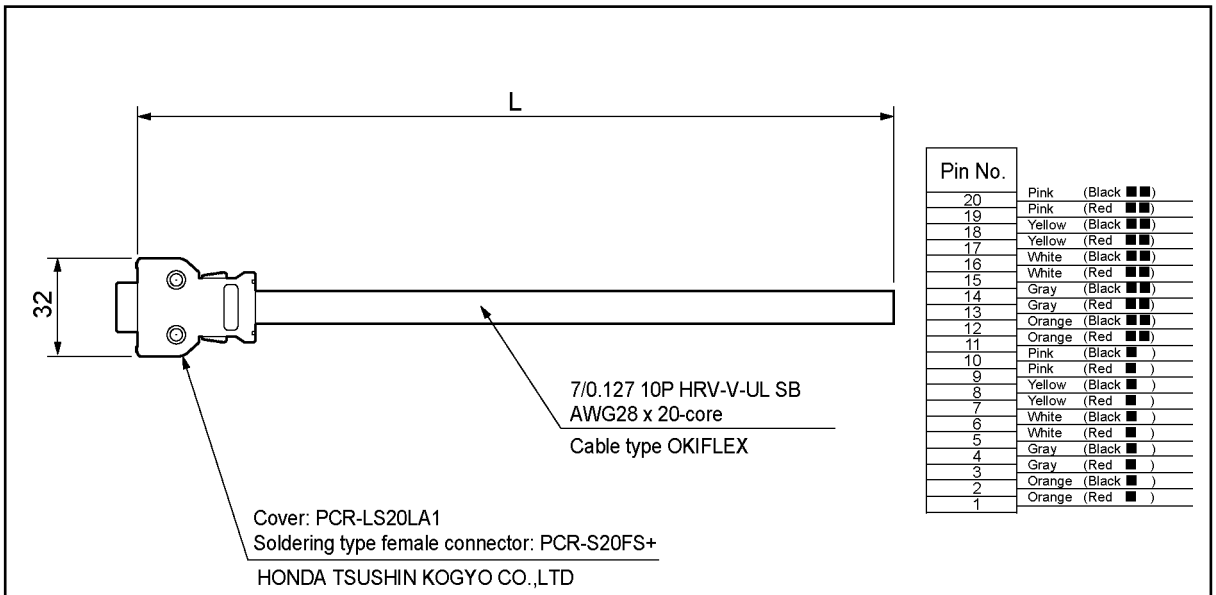


Pin No.	
B20	Pink (Black ■■■■)
B19	Yellow (Black ■■■■)
B18	White (Black ■■■■)
B17	Gray (Black ■■■■)
B16	Orange (Black ■■■■)
B15	Pink (Black ■■■)
B14	Yellow (Black ■■■)
B13	White (Black ■■■)
B12	Gray (Black ■■■)
B11	Orange (Black ■■■)
B10	Pink (Black ■■)
B9	Yellow (Black ■■)
B8	White (Black ■■)
B7	Gray (Black ■■)
B6	Orange (Black ■■)
B5	Pink (Black ■)
B4	Yellow (Black ■)
B3	White (Black ■)
B2	Gray (Black ■)
B1	Orange (Black ■)
A20	Pink (Red ■■■■)
A19	Yellow (Red ■■■■)
A18	White (Red ■■■■)
A17	Gray (Red ■■■■)
A16	Orange (Red ■■■■)
A15	Pink (Red ■■■)
A14	Yellow (Red ■■■)
A13	White (Red ■■■)
A12	Gray (Red ■■■)
A11	Orange (Red ■■■)
A10	Pink (Red ■■)
A9	Yellow (Red ■■)
A8	White (Red ■■)
A7	Gray (Red ■■)
A6	Orange (Red ■■)
A5	Pink (Red ■)
A4	Yellow (Red ■)
A3	White (Red ■)
A2	Gray (Red ■)
A1	Orange (Red ■)

NOTE: [L] is given in terms of meter.

●VS-C10G-[L]

Units: mm



Pin No.	
20	Pink (Black ■■)
19	Pink (Red ■■)
18	Yellow (Black ■■)
17	Yellow (Red ■■)
16	White (Black ■■)
15	White (Red ■■)
14	Gray (Black ■■)
13	Gray (Red ■■)
12	Orange (Black ■■)
11	Orange (Red ■■)
10	Pink (Black ■)
9	Pink (Red ■)
8	Yellow (Black ■)
7	Yellow (Red ■)
6	White (Black ■)
5	White (Red ■)
4	Gray (Black ■)
3	Gray (Red ■)
2	Orange (Black ■)
1	Orange (Red ■)

NOTE: [L] is given in terms of meter.

- MEMO -

INTRODUCTORY

Describes about packing contents, mounting methods, and wiring methods.

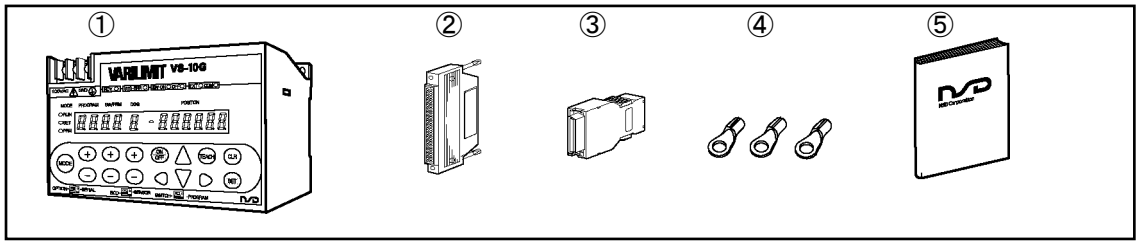
6. CHECKING THE CONTENTS OF THE SHIPPING CASE
7. VARILIMIT INSTALLATION
8. ABSOCODER INSTALLATIONS

6. CHECKING THE CONTENTS OF THE SHIPPING CASE

Open the packing case, and verify that all items are present.

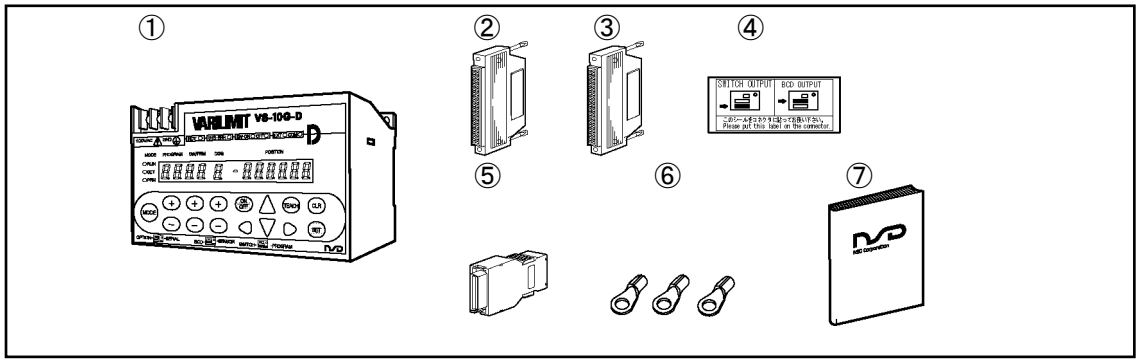
● VARILIMIT

(1) VS-10G and VS-10G-1



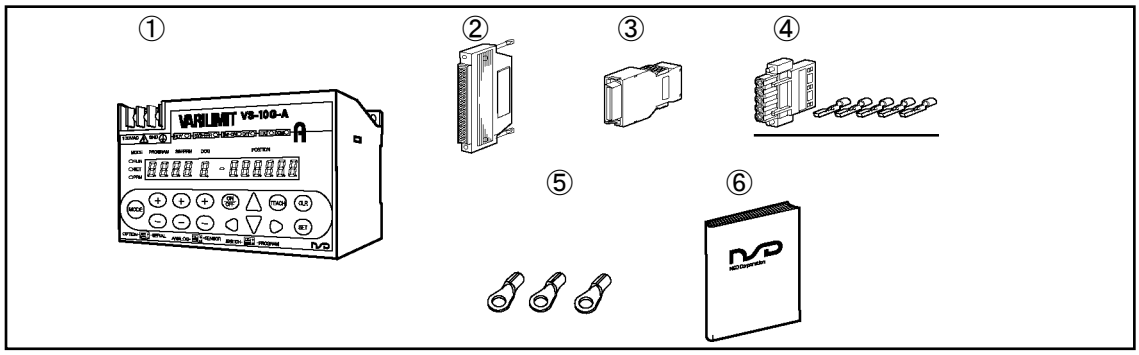
① VARILIMIT	1 unit	
② Switch output connector	1 piece	Connector: FCN-361J040-AU / N361J040AU Cover: FCN-360C040-E / N360C040E Manufacturer: FUJITSU COMPONENT LIMITED / OTAX CO.,LTD.
③ Program No. I/O connector	1 piece	Connector: PCR-S20FS+ Cover: PCR-LS20LA1 Manufacturer: HONDA TSUSHIN KOGYO CO., LTD
④ Crimping terminal 1.25-3 (Accessory for VS-10G.)	3 pieces	Manufacturer: NICHIFU Co., Ltd.
⑤ Precautions	1 piece	For this manual, contact our representative.

(2) VS-10G-D and VS-10G-D-1



① VARILIMIT	1 unit	
② Switch output connector	1 piece	Connector: FCN-361J040-AU / N361J040AU Cover: FCN-360C040-E / N360C040E Manufacturer: FUJITSU COMPONENT LIMITED / OTAX CO.,LTD.
③ BCD output connector	1 piece	Connector: FCN-361J040-AU / N361J040AU Cover: FCN-360C040-E / N360C040E Manufacturer: FUJITSU COMPONENT LIMITED / OTAX CO.,LTD.
④ Connector identifying seal	1 sheet	It is a seal for identifying a switch output connector and a BCD output connector. Puts a seal on the connector.
⑤ Program No. I/O connector	1 piece	Connector: PCR-S20FS+ Cover: PCR-LS20LA1 Manufacturer: HONDA TSUSHIN KOGYO CO., LTD
⑥ Crimping terminal 1.25-3 (Accessory for VS-10G-D.)	3 pieces	Manufacturer: NICHIFU Co., Ltd.
⑦ Precautions	1 piece	For this manual, contact our representative.

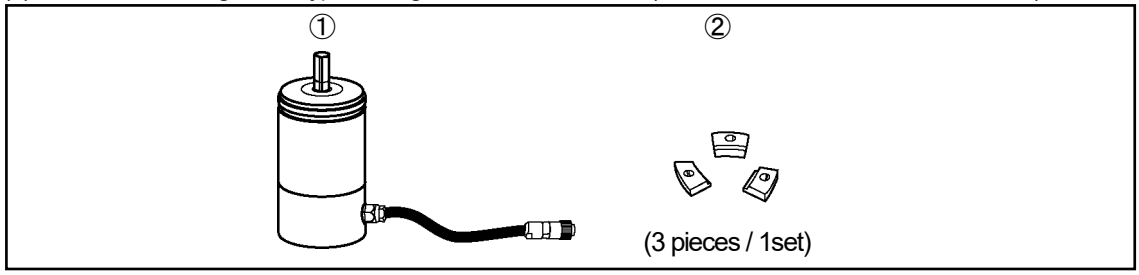
(3) VS-10G-A and VS-10G-A-1
VS-10G-C and VS-10G-C-1



① VARILIMIT	1 unit	
② Switch output connector	1 piece	Connector: FCN-361J040-AU / N361J040AU Cover: FCN-360C040-E / N360C040E Manufacturer: FUJITSU COMPONENT LIMITED / OTAX CO.,LTD.
③ Program No. I/O connector	1 piece	Connector: PCR-S20FS+ Cover: PCR-LS20LA1 Manufacturer: HONDA TSUSHIN KOGYO CO., LTD
④ Analog output connector	1 piece 5 pieces	Connector: HR31-5.08P-5SC(72) Crimp contact: HR31-SC-121(71) Manufacturer: HIROSE ELECTRIC CO., LTD
⑤ Crimping terminal 1.25-3 (Accessory for VS-10G-A and VS-10G-C.)	3 pieces	Manufacturer: NICHIFU Co., Ltd.
⑥ Precautions	1 piece	For this manual, contact our representative.

● ABSOCODER

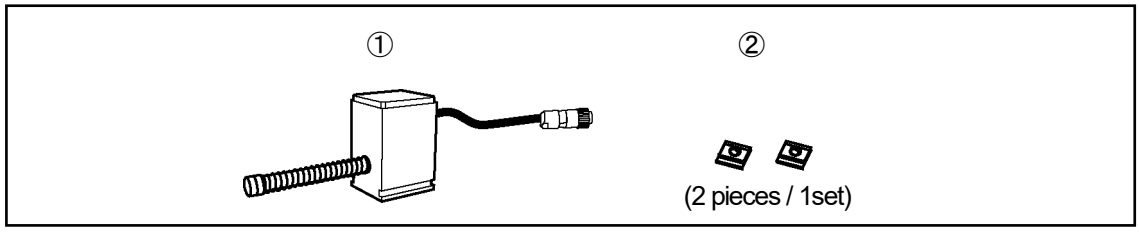
(1) Multi-turn and single-turn types using servo-mount fixtures (MRE-32SP062S*C, VRE-P062S*C)



① ABSOCODER	1 unit
② Servo-mount fixture	1 set

Included in the servo-mount type package. The flange-mount type does not include any accessory.

(2) Linear type ABSOCODER (Single-rod) (VLS-8PSJ20A, VLS-8PSJ20B)



① ABSOCODER	1 unit
② Servo-mount fixture	1 set

Remarks

When an extension sensor cable and panel-mount fixture (VS-K-F) are ordered, they are packed separately.
ABSOCODER models other than the ones listed above do not have any accessories.

7. VARILIMIT INSTALLATION

The VARILIMIT installation procedures and precautions are described in this section.
For mounting dimensions, refer to Chapter “3. VARILIMIT SPECIFICATIONS AND DIMENSIONS”.

7-1. VARILIMIT Installation

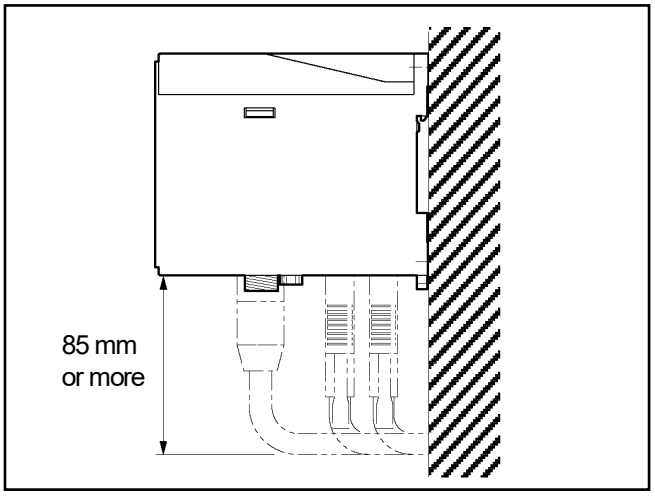
When installing VARILIMIT, the following conditions and precautions should be observed.

● **Installation site**

(1) Avoid sites where the unit is exposed to direct sunlight.
(2) The ambient temperature should never exceed a 0 to 55°C range.
(3) The ambient humidity should never exceed a 20 to 95% RH range.
(4) Do not install the unit in areas where condensation is likely to occur (high humidity with extreme temperature changes).
(5) Avoid sites where dust is excessive.
(6) Do not install in areas with an excessive amount of salt and/or metal chips.
(7) Do not install in areas where flammable and/or corrosive gases are present.
(8) Avoid areas where splashing water, oil or chemicals are likely to occur.
(9) Avoid areas where vibration and shocks are excessive.

● **Installation cautions**

(1) Secure tightly with 2-M4 screws.
(2) If the VARILIMIT is mounted on the DIN rail, secure tight on the rail.
Recommended DIN rail : PFP-50N, PFP-100N, PFP-100N2 [Omron Corporation]
Recommended end plate : PFP-M [Omron Corporation]
(3) In order to improve noise resistance, install as far away as possible from high-voltage and power cables.
(4) Allow 85mm or more space at the VARILIMIT’s bottom side for plugging in and unplugging the connectors.
(5) Install inside the control cabinet.



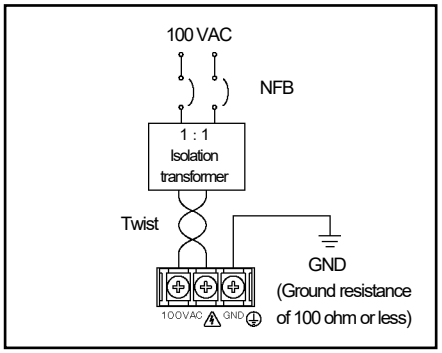
7-2. Power Supply Connection of VARILIMIT

The power supply connection is described in this section.

(1) Isolation transformer

In the case of using VARILIMIT with 100VAC model (VS-10G, VS-10G-D, VS-10G-A, VS-10G-C)

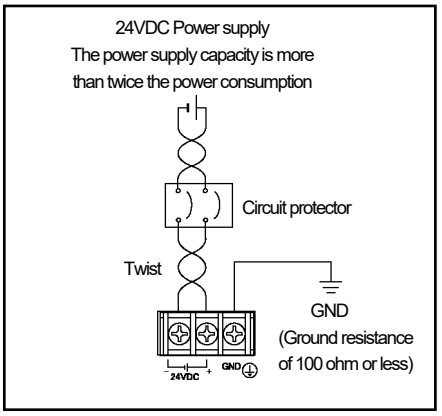
Connect the isolation transformer if the noise influences VARILIMIT.



(2) Power supply

In the case of using VARILIMIT with 24VDC model (VS-10G-1, VS-10G-D-1, VS-10G-A-1, VS-10G-C-1)

- The power supply should be isolated from the commercial power supply.
- Choose the power supply capacity which is more than twice the power consumption of VARILIMIT.
  The power consumption of the VARILIMIT is 10W or less.



(3) Wiring

- Twist the power cable for preventing noises.
- The power cable should be as thick as possible to minimize voltage drops.

(4) Crimping terminal

Use the crimping terminal as following:

- Use M3 size crimp lug terminal (ring type) of accessory when using VARILIMIT with 100VAC model.
- Use M3 size crimping lug terminal when using VARILIMIT with 24VDC model.
- The terminal block tightening torque is 0.6N·m (5.1Lb·In).

(5) Ground

- VARILIMIT should be grounded (ground resistance of 100ohm or less) to prevent electrical shocks.

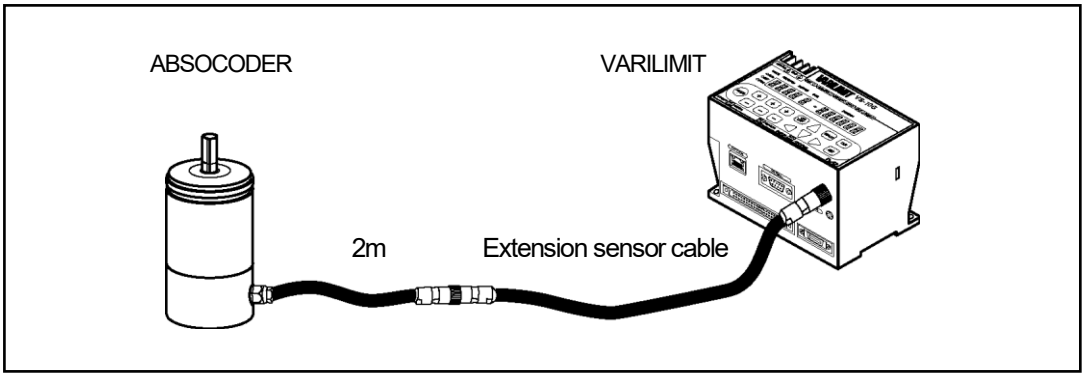
7-3. Connection between VARILIMIT and ABSOCODER

The connection between VARILIMIT and ABSOCODER is described in this section.

● **Sensor cable connection**

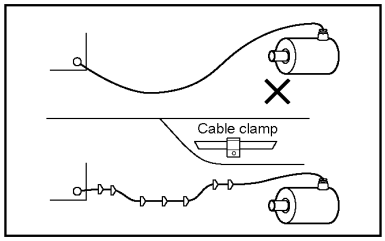
The length of the extendable cable has a limitation depending on the models of ABSOCODER and sensor cable.

For more details, refer to “5-2. Sensor Cable Length Limitation".

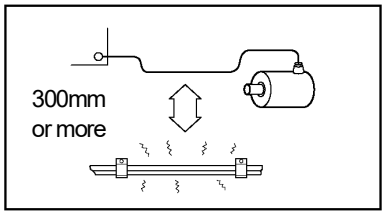


● **Wiring precautions**

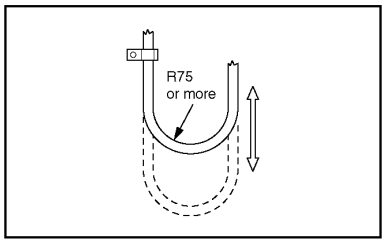
(1) The sensor cable should be clamped as shown in the right figure to prevent excessive tension from being applied to the cable connectors.



(2) The sensor cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise.



(3) If the cable is moved under the state of bending like a horseshoe, a robotic cable should be used. The bend radius should never be less than 75 mm.



- MEMO -

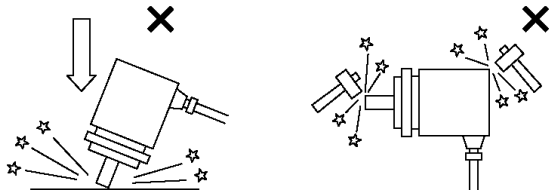
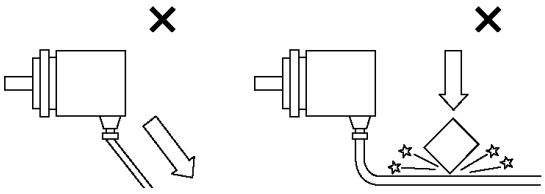
8. ABSOCODER INSTALLATIONS

The ABSOCODER installation procedures and precautions are described in this section.
For mounting dimensions, refer to Chapter "4. ABSOCODER SPECIFICATIONS AND DIMENSIONS".

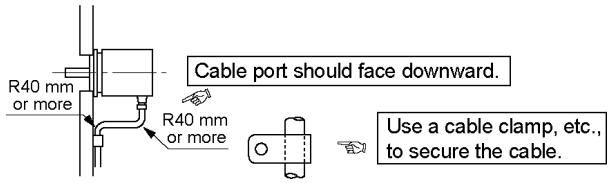
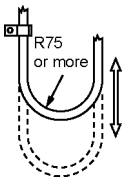
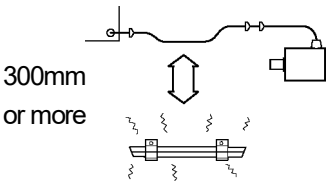
8-1. Installation of Turn-type ABSOCODER (MRE, VRE)

Precautions in handling turn-type ABSOCODER (MRE, VRE) are described in this section.

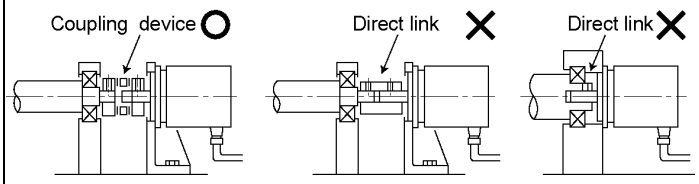
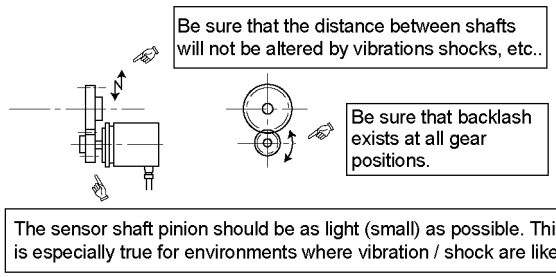
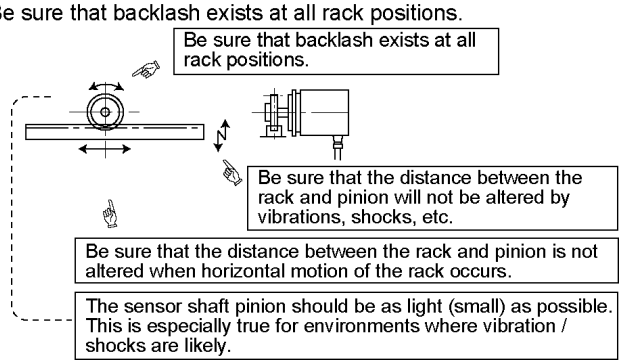
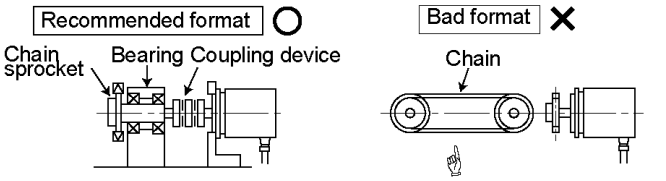
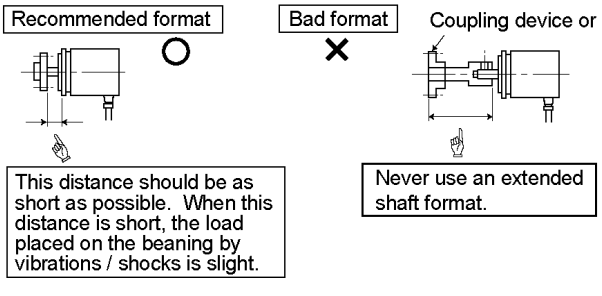
● **Handling of Turn-type ABSOCODER (MRE, VRE)**

Item	Explanation
(1) Main unit	Never drop the Sensor, or subject it to excessive forces or shocks. 
(2) Cable	Avoid stepping on, or applying excessive stress to the cable. 

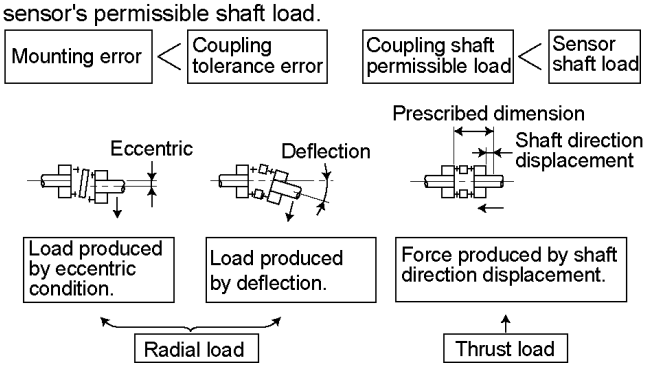
● **Mounting of Turn-type ABSOCODER (MRE, VRE)**

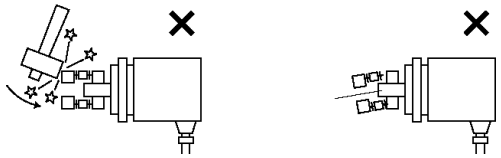
Item	Explanation	Precaution
(1) Mounting	For details regarding mounting dimensions, refer to each ABSOCODER dimensions.	
(2) Cable port	Cable port should face downward. 	
(3) Cable	The bend radius for movable parts should never be less than 75 mm(ϕ150) (robotic cable). 	Do not use the standard cable for movable parts. (Use robotic cable.)
(4) Wiring	The sensor cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise. 	

● **Mounting of Turn-type ABSOCODER (MRE, VRE)**

Item	Explanation	Precaution
(1) Coupling of machine shaft and sensor shaft	Be sure to use a coupling device to link the 2 shafts. 	A "direct-link" format will result in shaft fatigue and / or breakage after long periods. Therefore, be sure to use a coupling device to link the shafts.
(2) For gear-type linkage	If a gear linkage is used, be sure that some backlash exists.  The sensor shaft pinion should be as light (small) as possible. This is especially true for environments where vibration / shock are likely.	Incorrect gear mounting can result in shaft bending or breakage.
(3) For rack and pinion type linkage	Be sure that backlash exists at all rack positions. 	Incorrect rack and pinion mounting can result in shaft bending or breakage.
(4) Chain or timing belt linkage	When a chain or timing belt linkage format is used, there is an inherent risk of the shaft's load being increased by the resulting tension. Therefore, a bearing should be used, with the shafts being linked by a coupling device immediately behind the bearing. 	
(5) Shaft mounting position	The shaft should be attached to the coupling device or gear at a point which is as near to the sensor body as possible. 	

● **Coupling of Turn-type ABSOCODER (MRE, VRE)**

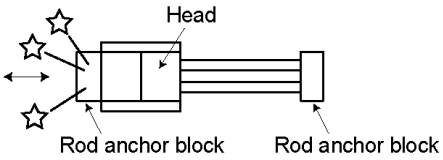
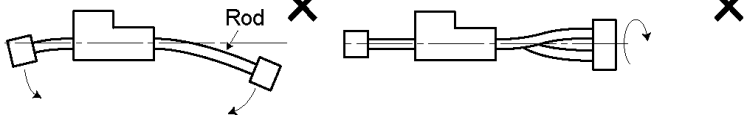
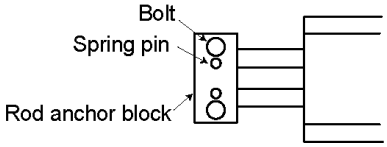
<table>
<tr><th>Item</th><th>Explanation</th><th>Precaution</th></tr>
<tr><td rowspan="3">(1) Coupling device selection precaution</td><td>1. When selecting a coupling, consider factors such as the design mounting error, the coupling tolerance error, and the sensor's permissible shaft load.
 
</td><td rowspan="3">The selection of a larger coupling than necessary will increase the shaft load which is caused by the mounting error amount.

Excessive force applied to the shaft can deform the coupling and reduce durability.</td></tr>
<tr><td>2. If the selected coupling device is larger than necessary (When used in high vibration/shock environments), the load which is applied to the shaft by the vibrations/shocks will be increased by the weight of the coupling device.</td></tr>
<tr><td>3. Be sure to select a coupling device with an adequate transmission torque surplus relative to the sensor shaft's torque.</td></tr>
<tr><td>(2) Coupling device installation precaution</td><td>Avoid bending or damaging the coupling.
  </td><td></td></tr>
</table>

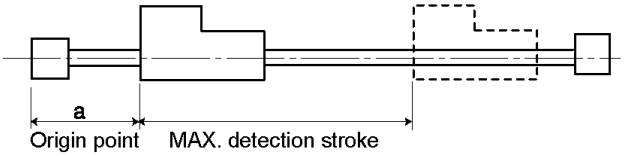
8-2. Installation of Linear-type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)

Precautions in handling linear-type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY) are described in this section.

● **Handling of Linear-type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)**

Item	Explanation
(1) ABSOCODER unit	Avoid a situation where the rod anchor blocks impact against head.  ✕
(2) Sensor rod	Avoid bending or twisting the sensor rod.  ✕ ✕
(3) Anchor method	Never remove or loosen the bolts and spring pins at the rod anchor block. 

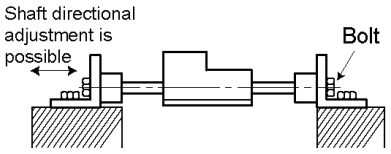
● **Operation Range of Linear type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)**

Item	Explanation
(1) Operation range	Please use linear-type ABSOCODER within the limits of the maximum detection stroke from the origin point. The maximum detection stroke changes with sensor model. Please refer to a sensor dimensions. 

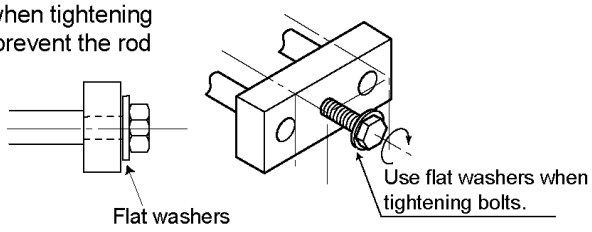
Model	Origin point (a) mm
VLS-256PWB	25±1
VLS-512PWB	23±1
VLS-1024PW	66±2
VLS-512PYB	25±1
VLS-1024PYB	23±1
VLS-2048PY	66±2

● Mounting of Linear-type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)

Item	Explanation
(1) Mounting conditions	1. The rod anchor blocks must be supported at both ends. (If only one side is supported, rod vibration and bending may occur, affecting the durability of the unit.)



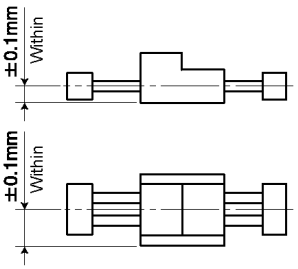
2. Secure the rod anchor block when tightening the mounting bolt, in order to prevent the rod anchor block from twisting. The bolt should be fitted with a flat washer.



3. The mounting parallelism and squareness should be as shown in the following figures.

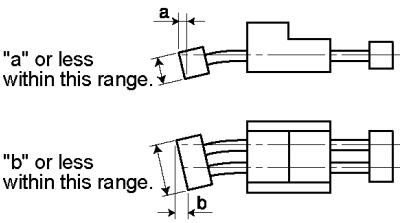
● Parallelism

When mounting the sensor, the parallelism of the sensor rod and the rod anchor block must be as shown in the figure at right.



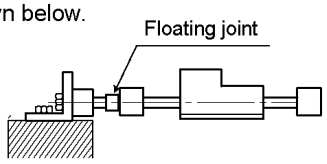
● Squareness

Model	a , b (mm)
VLS-256PWB	0.03
VLS-512PWB	0.05
VLS-1024PW	0.1
VLS-512PYB	0.03
VLS-1024PYB	0.05
VLS-2048PY	0.1



* In cases where the parallelism and squareness conditions shown above are not possible, use one of the mounting methods shown below.

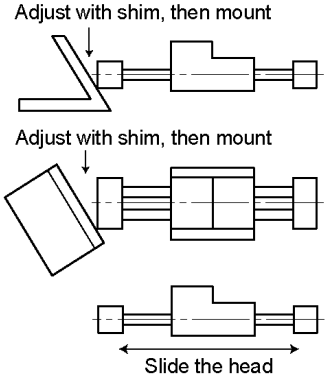
[Method 1]
Use a floating joint at the mounting area of the rod anchor block.



[Method 2]
Use the gauging method as shown in the figure at right. Use a shim at the rod anchor block, and adjust until the rod and head sliding action is smooth. The rod's flexibility will enable a smooth sliding action at the rod center.

The sliding action resistance should be as shown in the table below.

Model	Max. sliding resistance N (Kgf)
VLS-256PWB	4.9 N (0.5)
VLS-512PWB	7.8 N (0.8)
VLS-1024PW	19.6 N (2.0)
VLS-512PYB	4.9 N (0.5)
VLS-1024PYB	7.8 N (0.8)
VLS-2048PY	19.6 N (2.0)

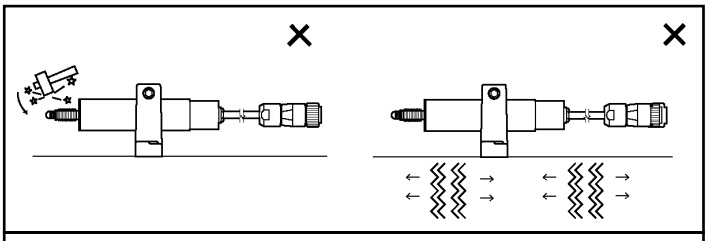


8-3. Installation of Linear-type ABSOCODER (VLS-[ ]PS)

Precautions in handling linear-type ABSOCODER (VLS-[ ]PS) are described in this section.

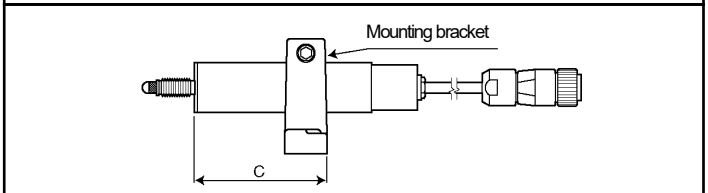
(1) Unit

Do not apply loads to the rod. Also take into consideration the vibration and impact shocks in the machine's thrust direction.



(2) Mounting

Clamp the center area of the head. The clamped positions of all sensors must be within the "C" dimension.



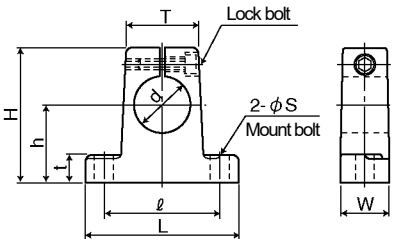
Models	VLS-8PSM	VLS-8PSA	VLS-10PS	VLS-16PSA VLS-16PS64B	VLS-32PSA
C mm	54	74	35	60	90

(3) Recommended mounting brackets

Models	Recommended bracket model
VLS-10PS	SB-16 or SF-16
VLS-8PSA	SB-20 or SF-20
VLS-8PSM	
VLS-16PSA	
VLS-16PS64B	
VLS-32PSA	SB-25 or SF-25

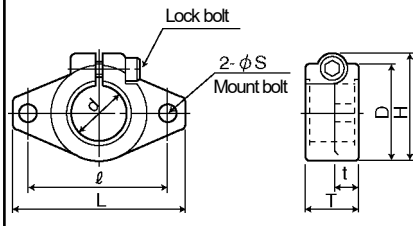
Manufactured by OZAK SEIKO CO., LTD.
TEL: 049-233-7691

● SB-[ ]



Models	Axis dia. mm	Main dimensions							Mount		Lock	Mass Kg
	d	h	H	t	L	ℓ	W	T	S	Bolt	Bolt	
SB-16	16	27	45	13	55	38	19	26	7	M5	M4	0.2
SB-20	20	31	53	13	65	45	20	30	8	M6	M5	0.3
SB25	25	35	61	13	76	56	24	36	8	M6	M6	0.4

● SF-[ ]



Models	Axis dia. mm	Main dimensions						Mount		Lock	Mass Kg
	d	D	H	L	ℓ	T	t	S	Bolt	Bolt	
SF-16	16	28	31	50	40	16	7	6	M5	M4	0.08
SF-20	20	34	37	60	48	20	8	7	M6	M5	0.13
SF25	25	40	42	70	56	25	10	7	M6	M6	0.24

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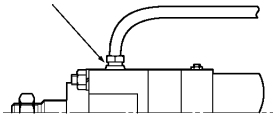
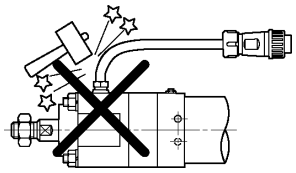
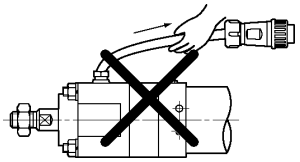
8-4. Installation of CYLNUC Cylinder (CSA, SBA, SBH)

The installation conditions and precautions for CYLNUC cylinder are described in this chapter.

● **Handling of CYLNUC cylinder (CSA, SBA, SBH)**

Item	Explanation
(1) Main unit	The cable terminal area (where cable is attached to the unit) is the weakest part of the CYLNUC cylinder. Handle this area with care. 
	Avoid pushing against the cable terminal with excessive force, and use care to avoid damaging the cable. 
	Avoid pulling the cable with excessive force. 
(2) Cylinder rod	A scratched cylinder rod can cause air or oil leakage. Handle the cylinder with care to avoid scratching it.

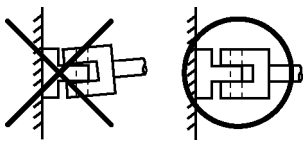
● **Mounting Precautions of CYLNUC cylinder (CSA, SBA, SBH)**

The part of a machine moved by the piston rod of the CYLNUC cylinder must travel in the same direction as the piston rod extends and contracts. Misalignment often causes excessive wear of a rod end bushing and jamming of the piston with the cylinder tube. To insure that the cylinder is in perfect alignment with the machine part, take measurements of deviations from their axes after the piston rod has been fully extended and contracted, and then adjust the cylinder mount for alignment with the machine part. Finally connect the rod end to the machine part.

[Example of Rod Joints]

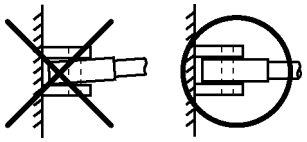
◆ Double-clevis

WRONG GOOD



◆ Single-clevis

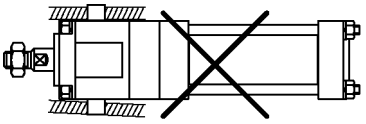
WRONG GOOD



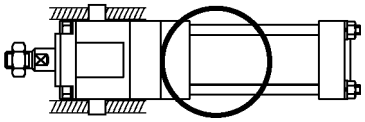
[Example of Cylinder Mounting]

◆ Trunnion

WRONG

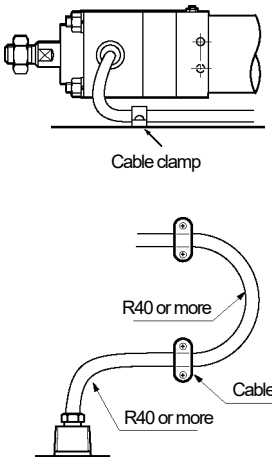
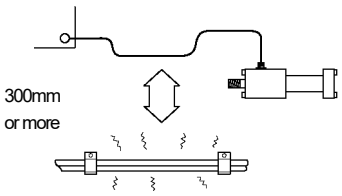
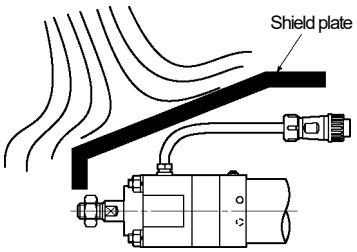
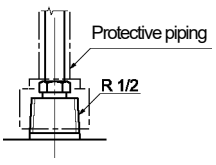


GOOD



● **Mounting Precautions of CYLNUC cylinder (CSA, SBA, SBH)**

When necessary, protect the CYLNUC cylinder's sensor area as shown described below.

(1) Secure the cable (with clamp) near the cylinder body to prevent it from being subjected to excessive pulling forces (vibration, etc.).	
(2) The sensor cable / control cable should be positioned 300mm or more from main circuits and power cables.	
(3) In cases where the cylinder rod and cable terminal area are directly exposed to water, oil, or hot air, etc., mount so that the cable terminal area is on the opposite side from these elements, or install a shield plate to protect this area.	
(4) Protective piping can be installed when the cable terminal is a screw type. When installing this piping, use care not to subject the cable to excessive pulling forces. (5) Be sure to flush out all connecting piping to ensure that foreign matter does not enter the cylinder. (6) The presence of foreign matter such as metal shavings, etc., can damage the packing seal and cause air or oil leakage.	

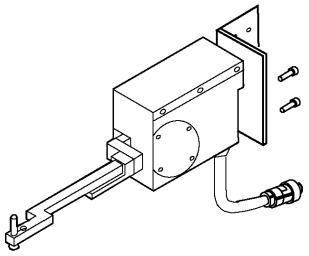
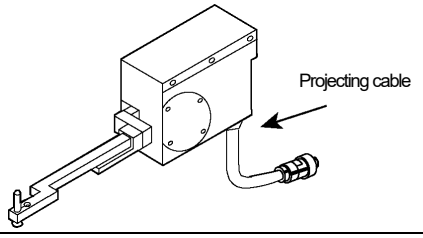
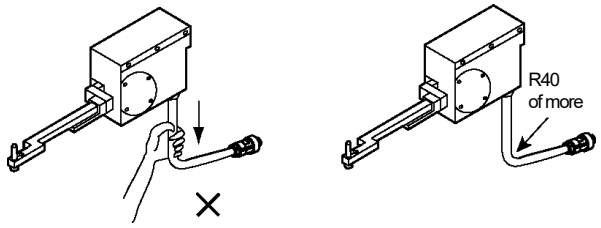
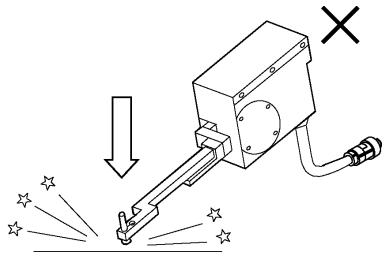
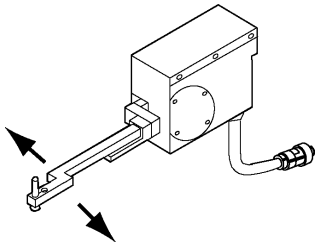
8-5. Installation of Inrodsensor (IRS-51.2P)

For precautions in handling Inrodsensor (IRS-51.2P), consult our sales representative.

- MEMO -

8-6. Installation of NT Coder

Precautions in handling NT Coder are described in this section.

(1) Fasten the sensor securely to a sufficiently rigid bracket using the screw holes opposite to the arm (2-M6 × 1).	
(2) Position the sensor with the projecting cable facing downward so as to let out any coolant that has entered the inside of the steel panel cover (SUS).	
(3) The sensor cable projection area is the weakest part of the NT coder unit. Do not pull the sensor cable hard. Do not bend the sensor cable more sharply than R40.	
(4) Use a ϕ4 polyurethane tube for air piping. The tube should be connected with the steel panel cover (SUS) on the sensor removed. When reinstalling the steel panel cover, it is recommended to apply caulking (silicone rubber) to the joint with the sensor body so as to assure waterproofness.	
(5) Avoid giving the unit excessive impact or unbalanced load.	
(6) Do not bend or twist the arm sideways.	

OPERATION

Describes about the operation of product.

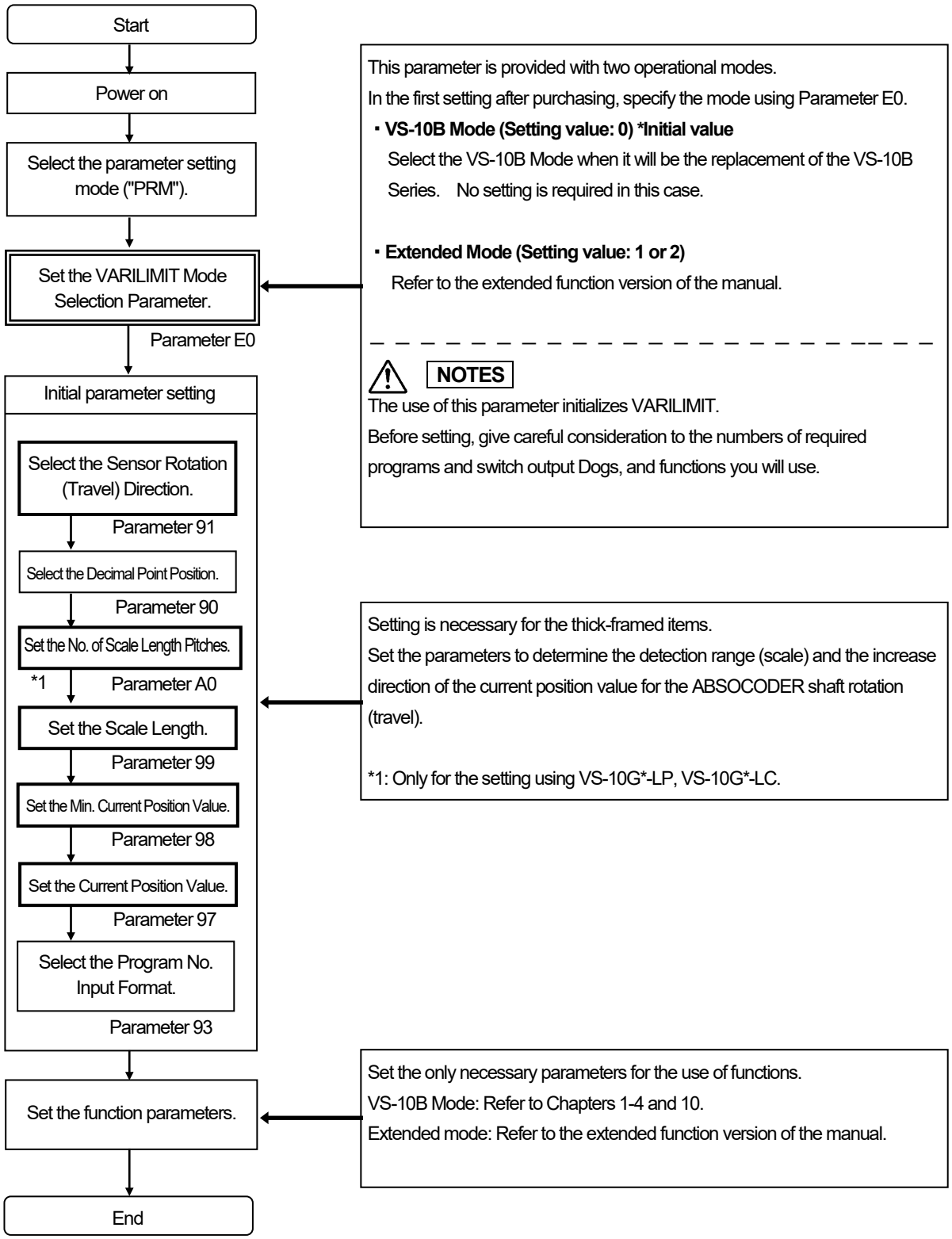
9. OPERATION FLOW
10. USE IN THE VS-10B MODE
11. SWITCH OUTPUT SETTING
12. OPERATION

9. OPERATION FLOW

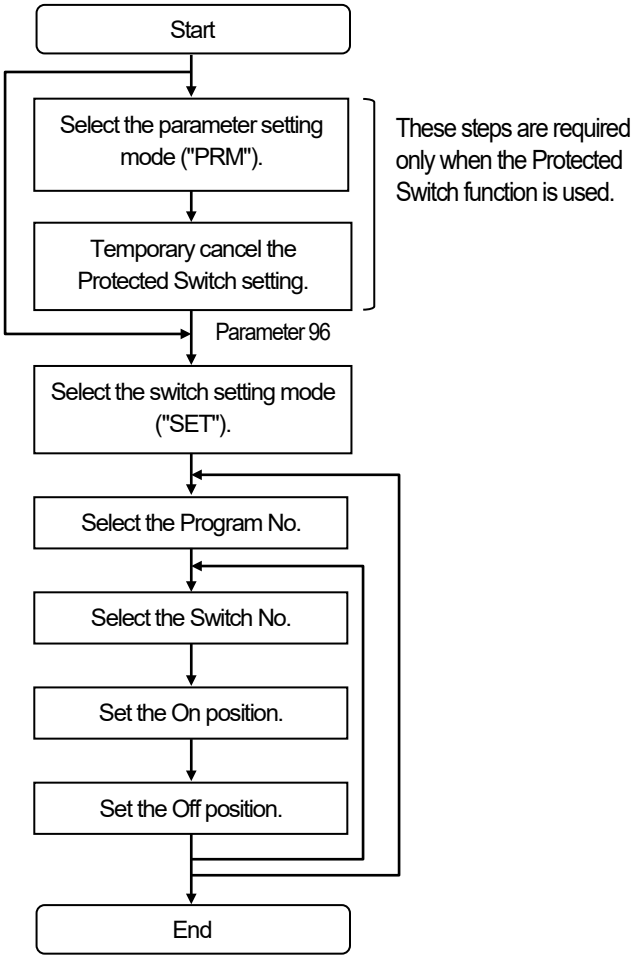
9-1. Procedure Before the Operation

The following chart shows the steps before starting VARILIMIT operation.

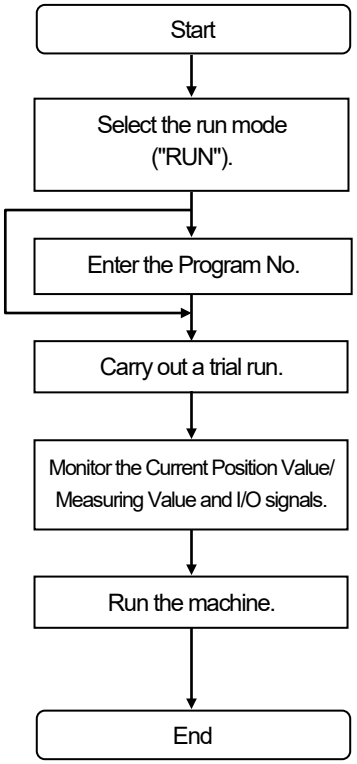
1 . Parameter setting



2. Switch output setting

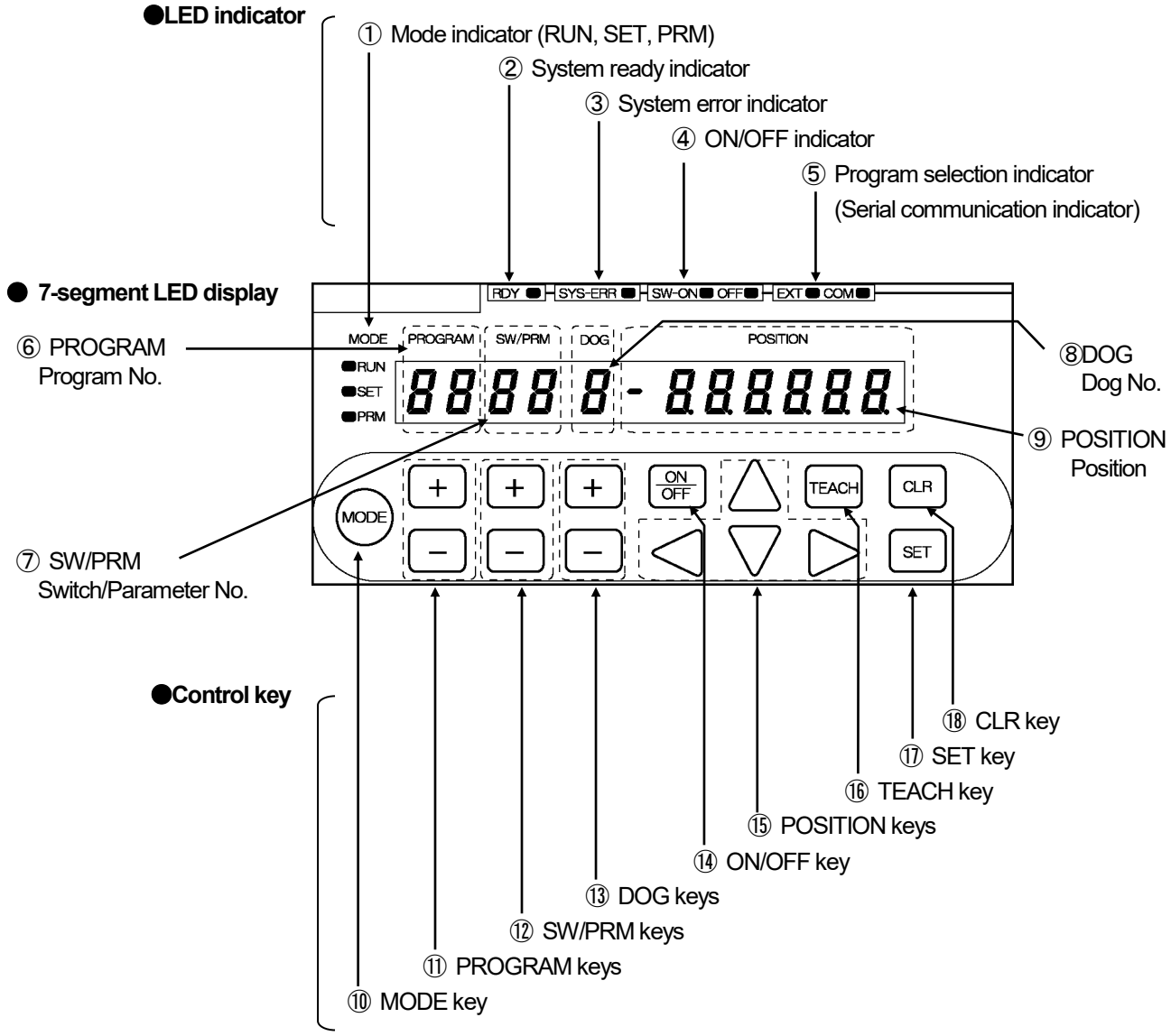


3. Unit operation



9-2. Nomenclature and Function of the Panel Side

Describes nomenclatures and functions of the panel side.



● **Indicators**

No.	Name	Descriptions
①	Mode indicator RUN, SET, PRM	Indicates selecting mode. RUN LED is ON: The run mode ("RUN") is selected. SET LED is ON: The switch setting mode ("SET") is selected. PRM LED is ON: The parameter setting mode ("PRM") is selected.
②	System ready indicator RDY	RDY LED is ON: Indicates that there is no error during selecting the run mode ("RUN"). This indicator is same condition as "System ready output signal" of the output connector.
③	System error indicator SYS-ERR	SYS-ERR LED is ON: Indicates that VARILIMIT hardware has a malfunction.
④	ON / OFF indicator SW-ON, OFF	SW-ON LED is ON: Displays ON setting value of the switch output on the display area ⑨ "POSITION" OFF LED is ON: Displays OFF setting value of the switch output on the display area ⑨ "POSITION"
⑤	Program selection indicator (Serial communication indicator) EXT, COM	(1) Indicates the program No. input method. Both EXT LED and COM LED are OFF: Selecting key input on the panel EXT LED is ON: Selecting the input from the program No. I/O connector COM LED is ON: Selecting following contents: - Inputs by the serial communication - Sets "2" or "3" at the parameter 54 (protocol)
		(2) Monitors the serial communication EXT LED is flickering : Sending the data COM LED is flickering: Receiving the data
⑥	Program No. display PROGRAM	Displays selecting program No..
⑦	Switch No. / parameter No. display SW / PRM	A switch No. is displayed when selecting the switch setting mode ("SET") or run mode ("RUN"). A parameter No. is displayed when selecting the parameter setting mode ("PRM").
⑧	Dog No. display DOG	A dog No. of the switch output is displayed.
⑨	Position display POSITION	A setting value is displayed when selecting the switch setting mode ("SET") or parameter setting mode ("PRM"). A current position value or an error code is displayed when selecting the run mode ("RUN").

● **Control keys**

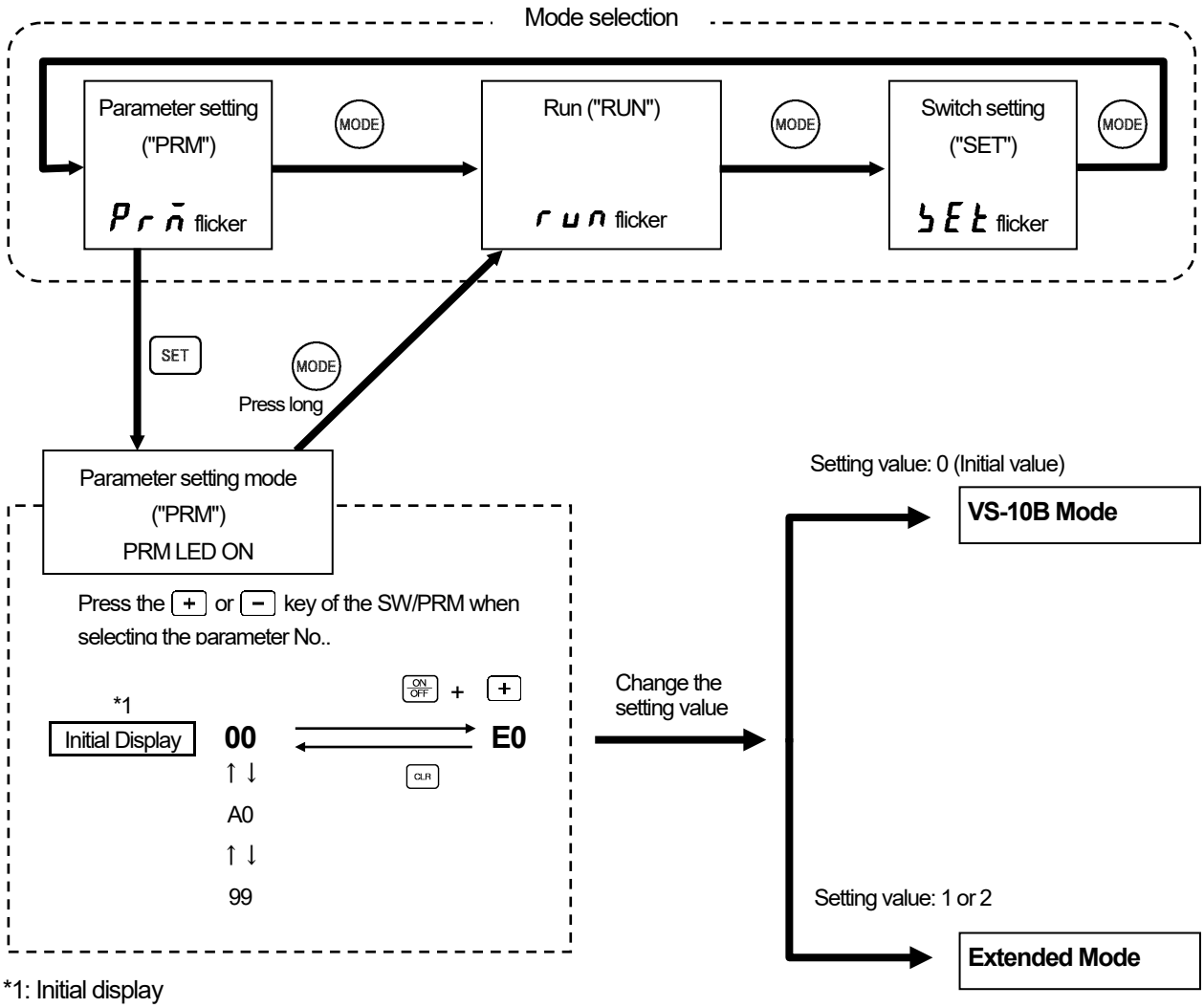
No.	Name	Descriptions
⑩	MODE key	Selects the mode from the run mode ("RUN"), switch setting mode ("SET"), and parameter setting mode ("PRM").
⑪	PROGRAM keys	Selects the program No..
⑫	SW/PRM keys	Selects the switch No. in the switch setting mode ("SET") or run mode ("RUN"). Selects the parameter No. in the parameter setting mode ("PRM").
⑬	DOG keys	Selects the dog No. of the switch output.
⑭	ON/OFF key	Changes either ON or OFF setting value of the switch output. Changes ④ "ON / OFF indicator" when pressing this key.
⑮	POSITION keys	Increases or decreases the setting value that is displayed at ⑨ "POSITION".
⑯	TEACH key	Uses this key when setting the switch output by the teaching. Reads the machine's current position by pressing this key when selecting the switch setting mode ("SET").
⑰	SET key	Confirms the mode by pressing this key when selecting a mode. Confirms the setting value by pressing this key when selecting the switch setting mode ("SET") or parameter setting mode ("PRM"). Changes the monitor types by pressing this key when selecting the run mode ("RUN").
⑱	CLR key	Uses this key following case: - Cancel the setting value when specifying the switch output or parameter. - Cancel the error.

9-3. Operation Flows in Different Modes

An operation flowchart is shown below.

●Operation Flow for VARILIMIT Mode Selection (Parameter E0)

The VARILIMIT VS-10G Series is provided with two operational modes.
In the first setting after purchasing, set this parameter for VARILIMIT Mode Selection.
- VS-10B Mode: Specify the VS-10B Mode when it will be the replacement of the VS-10B Series.
- Extended Mode: Refer to the extended function version of the manual.

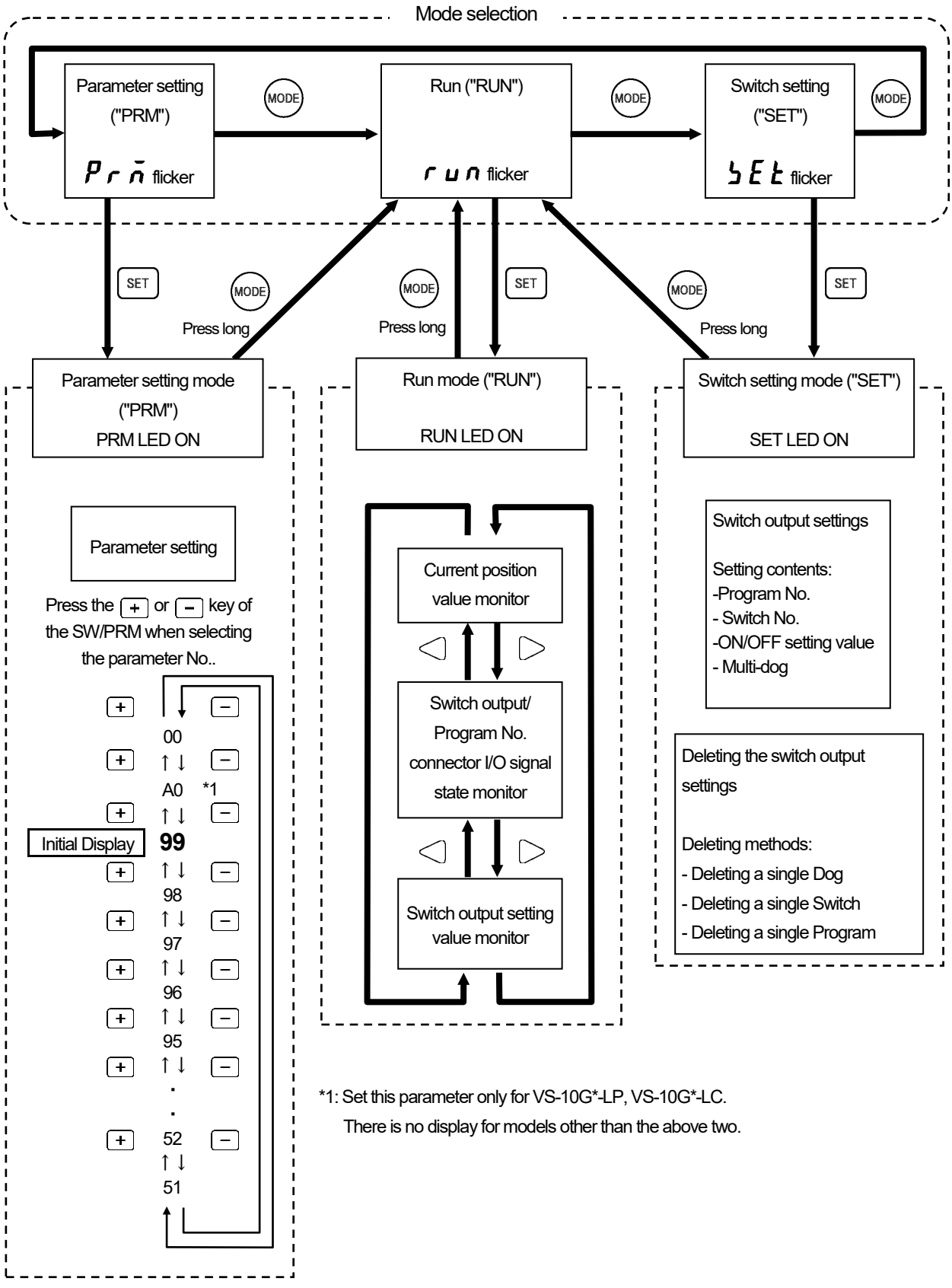


*1: Initial display
99 is displayed when the power is turned on for the first time after the purchase.
When the Extended Mode is selected, the initial display becomes 00.

⚠ NOTES

When the setting at the VARILIMIT Mode Selection parameter (E0) is changed, VARILIMIT will be initialized. All setting values of parameters and switch output will be erased. Not to change this parameter in mid-course, give careful consideration to the numbers of required programs and functions to use before setting.

●Operation Flow in the VS-10B Mode



1: Set this parameter only for VS-10G-LP, VS-10G*-LC.
There is no display for models other than the above two.

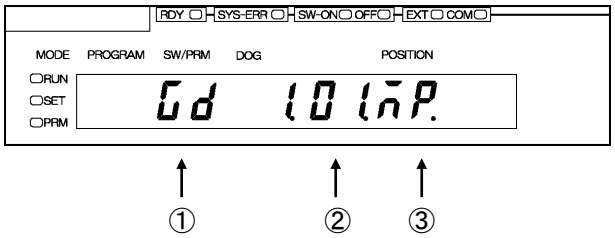
9-4. Turn ON the Power Supply

The VS-10G Series doesn't have any power supply switch; therefore, use external switch for turning ON / OFF the power supply.

Before turning ON the power supply, be sure that the wiring is correct and the screws of terminal block are securely tightened.

The screen displays as below figure when turning ON the power supply for the first time after delivery.

After turning ON the power supply, the screen below is displayed one second.



LED ON/OFF state
■: ON □: OFF

① : VARILIMIT model

G : VS-10G, VS-10G-1 Gd : VS-10G-D, VS-10G-D-1

GA : VS-10G-A, VS-10G-A-1 GC : VS-10G-C, VS-10G-C-1

② : Software version

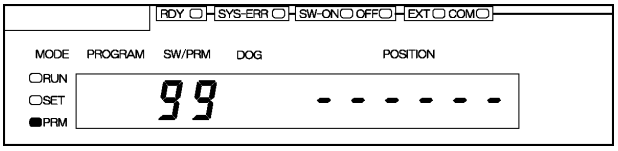
③ : ABSOCODER type:

nP : MRE-[ ]SP062 L VLS-[ ]PW(PY) LC CSA, SBA, SBH, IRS-51.2P

LP : VLS-[ ]PS(J) HP VRE-P062(P028) H2 VRE-16TS062

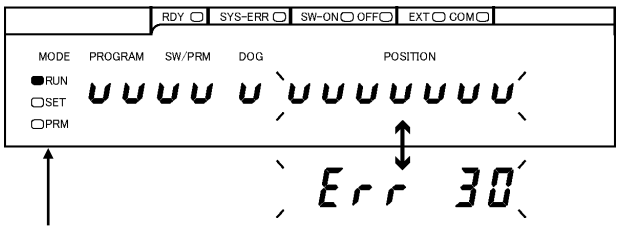
n2 : MRE-[ ]SS062 H1 VRE-S062(S028), VRE-16TSWABC3

Changes the Parameter setting mode ("PRM") automatically.



The screen displays below figure when changing mode to Run mode ("RUN") or Switch setting mode ("SET").

In the case of restarting the power supply, keeps the mode just before turning OFF.



"UUU····UUU" and Err 30 (31) alternately flicker.

Run mode ("RUN") : RUN LED is ON

Switch setting mode ("SET"): SET LED is ON

- MEMO -

10. USE IN THE VS-10B MODE

Functions and settings in the VS-10B Mode are described in this section.
For more detail of the Extended mode, refer to the extended function version of the manual.

10-1. Setting the VARILIMIT Mode Selection Parameter

Select 0 at Parameter E0 (VARILIMIT Mode Selection) for the VS-10B Mode. Set this parameter only in the first parameter setting after purchasing.

In the VS-10B Mode, parameter numbers and setting details are the same as of the existing VS-10B Series, which enables easy replacement. Also the newly added Communication function allows data management through PCs by using setting and editing software.
Refer to "1-4-1. VARILIMIT function list" for the function details.

●Numbers of programs, switches and Multi-Dogs
The numbers of available programs, switches and Multi-Dogs in the VS-10B Mode are as shown below.

Item	Setting Value at Parameter E0		
	0 (VS-10B Mode)	1 (Extended Mode) Refer to the extended function version of the manual.	2 (Extended Mode) Refer to the extended function version of the manual.
Number of Programs *1	8	8	32
Number of Switches	30	30	30
Number of Multi-Dogs for all switches	10	10	4

⚠ NOTES

When the setting at the VARILIMIT Mode Selection parameter (E0) is changed, VARILIMIT will be initialized.
All setting values of parameters and switch output will be erased. Not to change this parameter in mid-course, give careful consideration to the numbers of required programs and functions to use before setting.

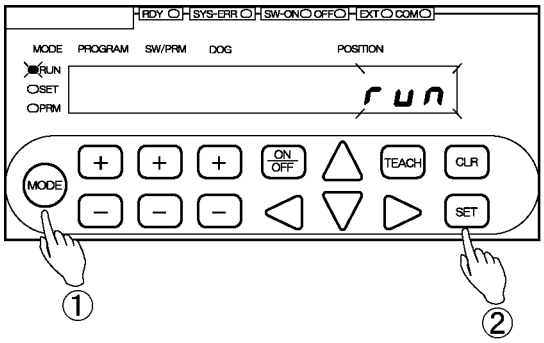
Perform the following steps to set the VARILIMIT Mode Selection parameter.

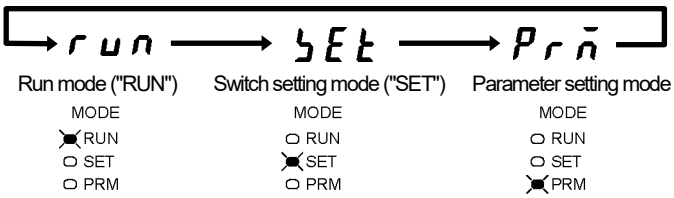
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

LED ON/OFF state

■: ON □: OFF

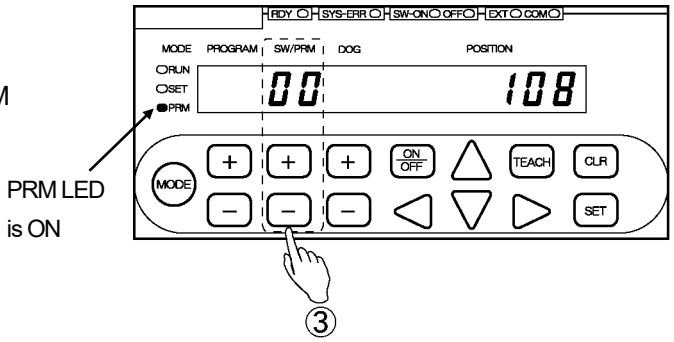
③ Select Parameter 00.

Use the (+) and (−) keys under the SW/PRM display to select "00".

The numbers in the POSITION display indicate the setting value at Parameter E0 and the number of usable programs.

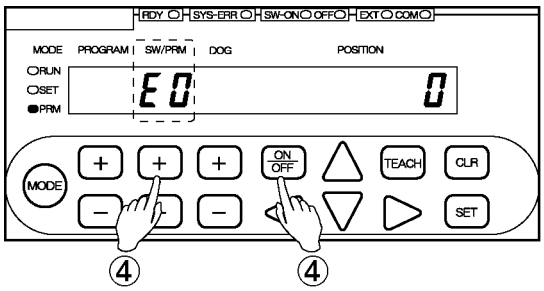
3rd digit: Setting value at Parameter E0

2nd and 1st digits: Number of usable programs



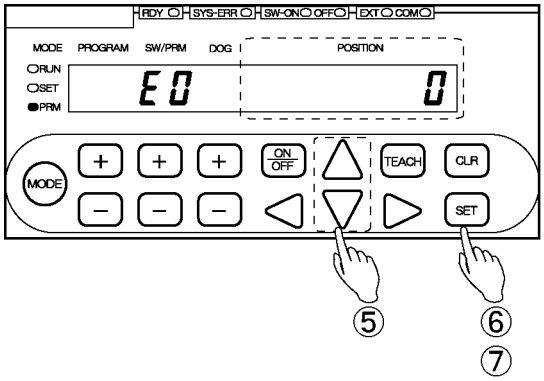
④ Select Parameter E0.

Press the (+) key under the SW/PRM display by holding down the (ON OFF) key.



⑤ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.



Options:

0: VS-10B Mode
(8 programs, 30 switches, 10 Dogs)

1: Extended Mode *1
(8 programs, 30 switches, 10 Dogs)

2: Extended Mode *1
(32 programs, 30 switches, 4 Dogs)

NOTES

*1: Never to select the Extended Mode.
For more detail of the Extended mode, refer to the extended function version of the manual.

The entered value can be canceled by pressing the CLR key at this point.

⑥ Check the entered value. *2

Press the SET key.
The POSITION display will flicker more quickly.
Check the entered value again carefully.

The entered value can be canceled by pressing the CLR key at this point.

POINT:

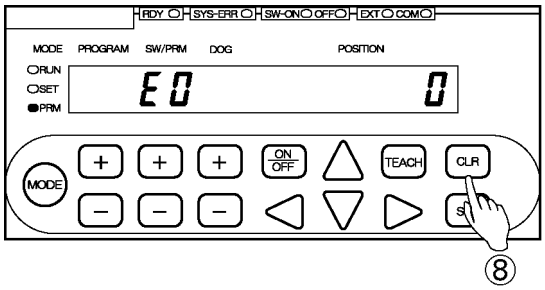
*2: As changing the setting value will initialize VARILIMIT settings, the SET key is required to be pressed twice to urge caution.

⑦ Confirm the entered value *2

Press the SET key again.
The POSITION display will show "CLEAr".
After confirming it, determine the entered value.

⑧ Return to Parameter 00

Press the CLR key and return to Parameter 00.



- MEMO -

10-2. Parameter List

This parameter list describes details of each function.
Values shown in ☐ are the initial (factory setting) values.
Parameters that do not need to be changed can be left as they are.

●VARILIMIT Mode Selection Parameter (1/1)

No.	Name	Description and setting range	Applicable model				Reference (Chapter No.)
			10G	10G -D	10G -A	10G -C	
E0	VARILIMIT Mode Selection	Selects the VARILIMIT Mode. ☐0: VS-10B Mode 8 programs, 30 switches, 10 Dogs Select "0" when the VS-10G Series will be the replacement of the VS-10B Series. 1: Extended Mode 8 programs, 30 switches, 10 Dogs Select "1" when the VS-10G Series is newly employed. 2: Extended Mode 32 programs, 30 switches, 4 Dogs Select "2" when the VS-10G Series is newly employed.	○	○	○	○	10-1

NOTES

When the setting at the VARILIMIT Mode Selection parameter (E0) is changed, VARILIMIT will be initialized.
All setting values of parameters and switch output will be erased. Not to change this parameter in mid-course, give careful consideration to the numbers of required programs and functions to use before setting.

●Initial parameters (1/1)

No.	Name	Description and setting range	Applicable model				Reference (Chapter No.)
			10G	10G -D	10G -A	10G -C	
00	Initial Display	The items selected using Parameter E0 will be shown.	○	○	○	○	
A0	Number of Scale Length Pitches[n] *1	Set the number of pitches to be detected. Setting range: 1 to 9999 [—]	○	○	○	○	10-6
99	Scale Length [L]	Set the longest distance that should be detectable by the ABSOCODER. Setting range: 10 to 999999 [—]	○	○	○	○	10-6
98	Minimum Current Position Value [K]	Set the smallest possible Current Position Value. Setting range: −999999 to (1000000−L) [—]	○	○	○	○	10-6
97	Current Position Setting	Set a value that represents the current machine position. Setting range: K to (K+L−1) [—]	○	○	○	○	10-6
91	Sensor Selection / Sensor Rotation (Travel) Direction	Select the ABSOCODER model and the direction of rotation (travel). The current position value will increase in the selected direction. 0: CW 1: CCW Using VS-10G**-L 0: VLS-PW / CW 1: VLS-PW / CCW 2: VLS-PY / CW 3: VLS-PY / CCW [—]	○	○	○	○	10-4
90	Decimal Point Position	Select the decimal point position. [0]: □□□□□□. 1 : □□□□□. □ 2 : □□□□. □□ 3 : □□□. □□□ 4 : □□. □□□□ 5 : □. □□□□□	○	○	○	○	10-5
93	Program No. Input Method	Select the method to enter the Program Number to be run. [0]: Panel key input 1 : External input via connector 2 : Serial communication	○	○	○	○	10-8

[Remarks]

*1: Set this parameter when using VS-10G**-LP or VS-10G**-LC.
Any other VARILIMIT model does not display this number.

●Current position output function parameters (1/1)

No.	Name	Description and setting range	Applicable model				Reference (Chapter No.)
			10G	10G -D	10G -A	10G -C	
94	Current Position Output Code/Logic	Select the output code and logic for the Current Position Output. 0: BCD output (negative logic) / decimal point output (positive logic) 1: BCD output (positive logic) / decimal point output (negative logic) 2: BCD output (negative logic) / decimal point output (negative logic) 3: BCD output (positive logic) / decimal point output (positive logic) 4: Binary output (sign magnitude code, negative logic), decimal point output (positive logic) 5: Binary output (sign magnitude code, positive logic), decimal point output (negative logic) 6: Binary output (two's complement, negative logic), decimal point output (positive logic) 7: Binary output (two's complement, positive logic), decimal point output (negative logic)		○			10-11
79	Latch Pulse Timing / Update Cycle	Select the latch pulse timing and the update cycle of the current position output. For Edge Timing 0: 4ms 1: 8ms 2: 16ms 3: 32ms 4: 64ms 5: 128ms 6: 256ms 7: 512ms For Level Timing 8: 4ms 9: 8ms 10: 16ms 11: 32ms 12: 64ms 13: 128ms 14: 256ms 15: 512ms		○			10-11

●Current position preset / protected switch function parameters (1/1)

No.	Name	Description and setting range	Applicable model				Reference (Chapter No.)
			10G	10G -D	10G -A	10G -C	
92	Current Position Preset Function Selection	Select whether to enable or disable the Current Position Preset function. 0: Preset Disabled 1 : Preset Enabled	○	○	○	○	10-7
95	Current Position Preset / Protected Switch Selection	Select whether or not to enable the Current Position Preset function and the Protected Switch function. When the Protected Switch function is enabled, the switch output setting data of Switches 1 to 10 cannot be changed. 0: Current Position Preset disabled, Protected Switch disabled 1: Current Position Preset disabled, Protected Switch enabled 2: Current Position Preset enabled, Protected Switch disabled 3: Current Position Preset enabled, Protected Switch enabled	○	○	○	○	10-7 10-9
96	Protected Switch Suspended	Suspend the protected switch function. Select "1: Protected Switch function suspended" to change the setting value for switch output. The protected switch function becomes active again by changing the RUN Mode or by restarting the power. 0: Protected Switch function enabled 1: Protected Switch function suspended	○	○	○	○	10-10
82	Current Position Preset Error Selection	Select the setting to enable or disable the current position preset error detection function. 0: Disabled SW30: Switch output, System ready output ON in case of errors, No error display 1: Enabled SW30: Error output, System ready output ON in case of errors, No error display 2. Enabled SW30: Switch output, System ready output OFF in case of errors, Error display ([Err23 or Err50]) 3. Enabled SW30: Error output, System ready output OFF in case of errors, Error display ([Err23 or Err50])	○	○	○	○	10-7
81	Current Position Preset Zone Setting	Specify the acceptable range for current position preset in order to prevent operational errors. No current position preset can be accepted outside the range. ●Preset Zone 1 1 ON: −999999 to 999999 1 OFF: −999999 to 999999 ●Preset Zone 2 2 ON: −999999 to 999999 2 OFF: −999999 to 999999	○	○	○	○	10-7
80	Current Position Preset Value Setting	Specify the current position value to reset by the current position preset. ●Preset Value 1 1 ON: −999999 to 999999 1 OFF: −999999 to 999999 ●Preset Value 2 2 ON: −999999 to 999999 2 OFF: −999999 to 999999	○	○	○	○	10-7

●Serial communication function parameters (1/1)

No.	Name	Description and setting range	Applicable model				Reference (Chapter No.)
			10G	10G -D	10G -A	10G -C	
59	Downloading Enabled Selection	Use this parameter when data needs to be written into VARILIMIT by communication (downloading). 0: Prohibited 1 : Permitted The setting will automatically return to "Prohibited" in the following events: - Changing the mode from the parameter setting mode ("PRM") to another mode. - Turning the Power off and then on again.	○	○	○	○	10-13
58	Baud Rate	Select the communication baud rate. 0 : 2400bps 3 : 19200bps 1 : 4800bps 4 : 38400bps 2: 9600bps 5 : 57600bps	○	○	○	○	10-14
56	Node Number	Specify this parameter when “9 (VARIMONI)” is selected at the parameter 54. Specify the node number to VARILIMIT. Setting range: 0 to 15 1	○	○	○	○	10-16
54	Protocol	Select the communication protocol. 0: NSD 1 : MELSEC-A 2 : MELSEC 3 : OMRON 9 : VARIMONI	○	○	○	○	10-15
53	Device Selection	Use this parameter when “2: MELSEC” is selected at the parameter 54. Selects the device of programmable controller. 0: D (Data register) 1 : R (File register)	○	○	○	○	10-17
52	Device No.	Use this parameter when the following protocol is selected at the parameter 54. - 2: MELSEC - 3: OMRON Specify the first number of selected device. Setting range: 0 to 9000 0	○	○	○	○	10-18
51	Communication Dog No.	Use this parameter when the following protocol is selected at the parameter 54. - 2: MELSEC - 3: OMRON Specify the last dog number of switch output data which reading by the programmable controller. Setting range: 1 to A (1 to 10) 1	○	○	○	○	10-19

●Analog output function parameters (1/1)

No.	Name	Description and setting range	Applicable model 10G	10G -D	10G -A	10G -C	Reference (Chapter No.)
87	Position Data B Setting	●Using VS-10G-A(-1) (Voltage output model) Specify the position corresponding to 10VDC. ●Using VS-10G-C(-1) (Current output model) Specify the position corresponding to 20mA. Setting range: ●Channel 1 1 −999999 to 999999 ●Channel 2 2 −999999 to 999999			○	○	10-12
86	Position Data A Setting	●Using VS-10G-A(-1) (Voltage output model) Specify the position corresponding to 0VDC. ●Using VS-10G-C(-1) (Current output model) Specify the position corresponding to 4mA. Setting range: ●Channel 1 1 −999999 to 999999 ●Channel 2 2 −999999 to 999999			○	○	10-12
85	Position Output Voltage Range Selection	Choose the voltage range of analog position output Options: ●Channel 1 1 0: 0V to 10VDC 1: 0V to ±10VDC ●Channel 2 2 0: 0V to 10VDC 1: 0V to ±10VDC			○		10-12

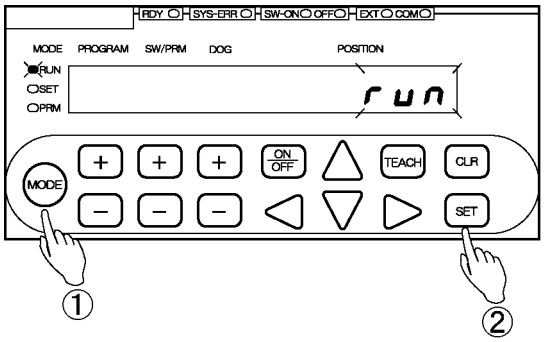
10-3. Basic Parameter Setting Procedure

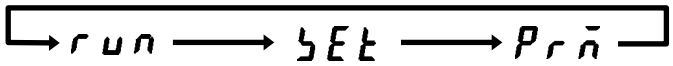
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN") | Switch setting mode ("SET") | Parameter setting mode ("PRM")

MODE	MODE	MODE
● RUN	○ RUN	○ RUN
○ SET	● SET	○ SET
○ PRM	○ PRM	● PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

③ Select the required Parameter Number.

(+) : The Parameter Number will increase.

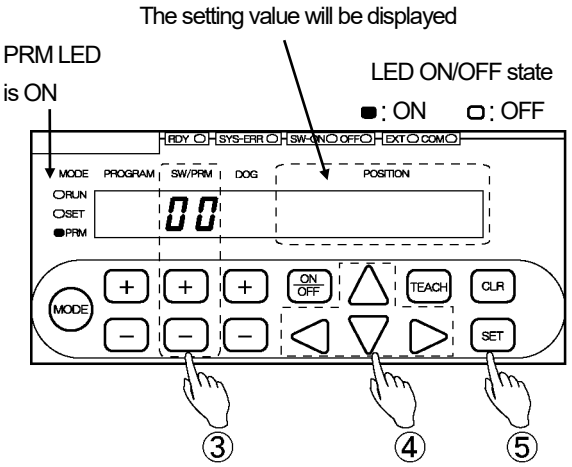
(−) : The Parameter Number will decrease

④ Enter the setting value. *1

◁ ▷ : Select a digit position in the setting value.

△ ▽ : Enter a figure into the selected digit position.

The entered value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the entered value. *2

Press the (SET) key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

POINT:

*1: Pressing and holding down the △ or ▽ key under the POSITION display will cause the value to be fast-forwarded or fast-reversed.

*2: When setting Parameter A0 (No. of Scale Length Pitches), 99 (Scale Length) or 98 (Minimum Current Position Value):
Pressing the (SET) key once will cause the POSITION display to flicker more quickly. Check the entered value again carefully.
Complete the setting by pressing the (SET) key one more time.

10-4. Setting the Direction of ABSOCODER Rotation (Travel)

This parameter defines the ABSOCODER rotation (travel) direction in which the Current Position Value should increase. The increase direction can be specified in CW and CCW.

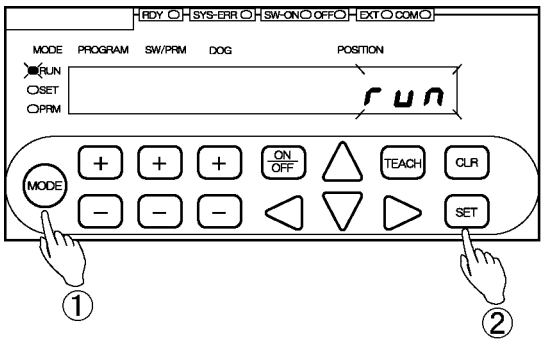
Set the parameter in the following steps:

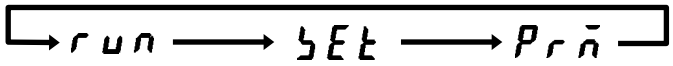
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

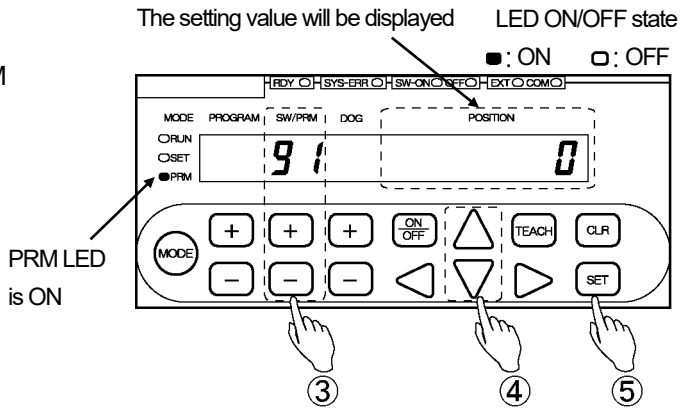
③ Select Parameter 91.

Use the [+] and [−] keys under the SW/PRM display to select "91".

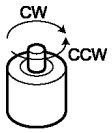
④ Select the direction in which the Current Position Value should increase.

Use the △ and ▽ keys under the display to select the Current Position Value increase direction

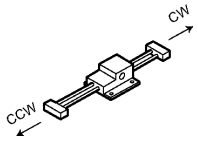
The selected value can be canceled by pressing the [CLR] key at this point.



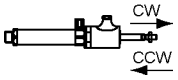
MRE, VRE
0: CW (clockwise)
1: CCW (counterclockwise)



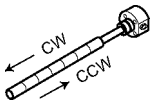
VLS-[ ]PW, VLS-[ ]PY
0: VLS-PW / CW 1: VLS-PW / CCW
2: VLS-PY / CW 3: VLS-PY / CCW



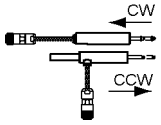
CSA, SBA, SBH
0: CW
1: CCW



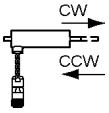
IRS-51.2P
0: CW
1: CCW



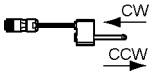
VLS-8PSA, VLS-8PSM, VLS-16PSA, VLS-32PSA, VLS-16PS64B
0: CW
1: CCW



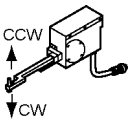
VLS-10PS
0: CW
1: CCW



VLS-8PSJ20A, VLS-8PSJ20B
0: CW
1: CCW



NT Coder
0: CW
1: CCW



⑤ Confirm the selected value.

Press the [SET] key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

⚠ NOTES

About Parameter 91 (Sensor Selection / Sensor Travel Direction) setting:

1. If the parameter is left unset, a "No Current Position Value Increase Direction Setting" error (Err17) will occur. Make sure to set the parameter once.

2. Once this parameter is changed, Parameter 97 (Current Position Setting) will be in a no-setting status and a "No Current Position Setting" error (Err19) will occur. Record the Current Position Value and carry out the Current Position Setting procedure again.
   For the Current Position Setting details, refer to "10-6-8. Detection Range (Scale) Setting Procedure".

10-5. Decimal Point Position Setting

Define how many decimals should be shown to display the VARILIMIT Current Position Value or other setting values.

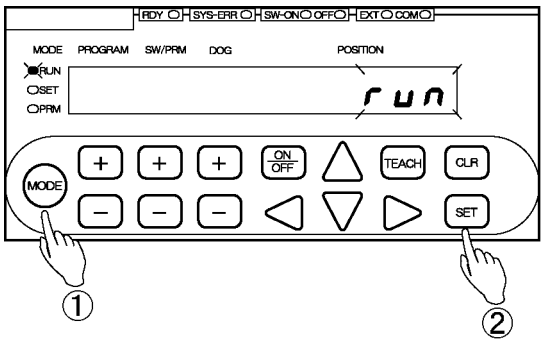
Set the parameter in the following steps:

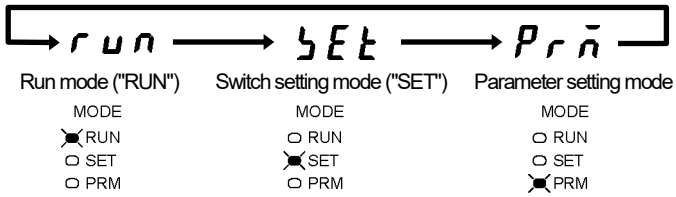
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
● RUN	○ RUN	○ RUN
○ SET	● SET	○ SET
○ PRM	○ PRM	● PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

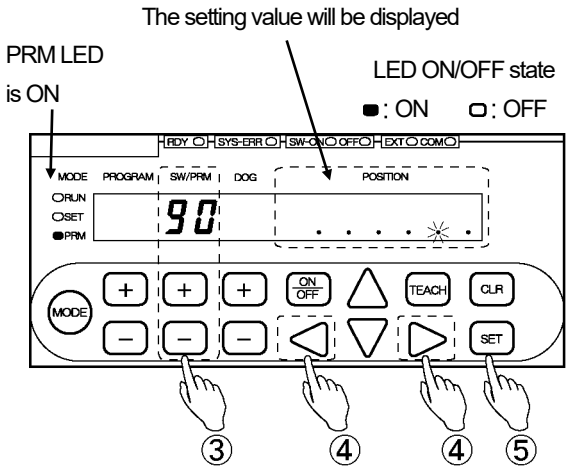
③ Select Parameter 90.

Use the (+) and (−) keys under the SW/PRM display to select "90".

④ Select the Decimal Point Position (number of decimals to be shown).

Use the ◁ and ▷ keys under the POSITION display to specify how many decimals should be shown.

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the Decimal Point Position setting.

Press the (SET) key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

10-6. Detection Range ("Scale") Setting

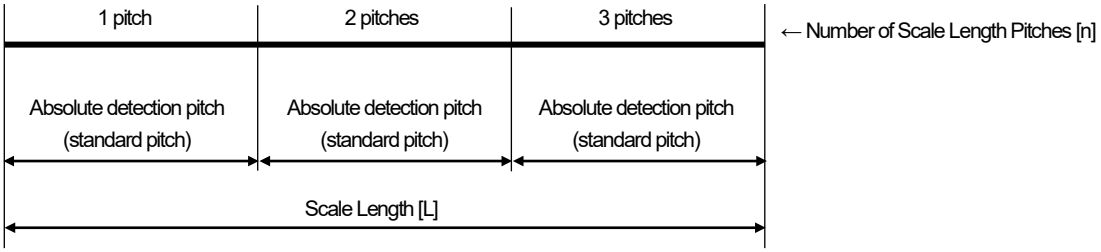
"Detection range (= scale) setting" refers to defining the ABSOCODER detection range as appropriate for the subject machine.
The following four parameters need to be set to define the detection range.

1. Parameter 99 (Scale Length, [L])

The Scale Length is the longest distance that the ABSOCODER sensor will be able to detect in an absolute format. Set the Scale Length in a unit of length (millimeter, inch) appropriate for the amounts of machine travel involved.

2. Parameter A0 (Number of Scale Length Pitches, [n])

With the CYLNUC Cylinder, Inrodsensor and linear-type ABSOCODER (Single-rod), position detection will be done in a semi-absolute format. In this format, the pitch of absolute detection will be used as the "standard pitch" by having the software count the number of pitches.
The Number of Scale Length Pitches, [n], should be set to the number of standard pitches contained in the Scale Length [L].



3. Parameter 98 (Minimum Current Position Value, [K])

The Minimum Current Position Value is the smallest possible position value which is detected by ABSOCODER sensor (it can be a value below zero).
This will be the smallest possible Current Position Value that can be shown on the VARILIMIT.

4. Parameter 97 (Current Position Setting)

The Current Position Value is a value that represents where in the detection range the machine is currently located.
Once the above all three parameters are set, the Current Position Value can be separately entered.

⚠ NOTES

1. The following three parameters cannot be set separately. Be sure to set them together, in the order of ① before ③. If separate setting is attempted, a "No Setting" error will occur (Err 29 to 33).

   ① Parameter A0 (Number of Scale Length Pitches, [n]))
   ② Parameter 99 (Scale Length)
   ③ Parameter 98 (Minimum Current Position Value)

2. Once the above three parameters are changed, Parameter 97 (Current Position Setting) will be in a no-setting status and a "No Current Position Setting" error (Err 19) will occur.
   If the pre-change Current Position Value needs to be saved, record the Current Position Value and repeat the Detection Range setting procedure again.

3. Switch Output and other parameter setting values
   Even after the above three parameters are changed, switch output and other parameter settings will remain as they were before the change.
   If necessary, re-enter the switch output and other necessary parameter settings as appropriate for the new detection range.

10-6-1. General description of the multi-turn type ABSOCODER setting

① Scale Length, [L] (Parameter 99)

The required Scale Length is determined based on the ABSOCODER's (MRE's) total number of turns and the travel amount per rotation, which depends on the machine.

● **If set in millimeters:**

Example: If a 32-turn MRE-32SP062 is used and the amount of machine travel per revolution is 10 mm, the detection range will be 320 mm.

Detection range = Total number of turns x amount of travel per revolution

= 32 x 10 = 320 mm

The Scale Length [L] should be set as follows according to the resolution:

- With a 1 mm resolution: "320"
- With a 0.1 mm resolution: "320.0".

Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

● **If set in inches:**

The detection range value in millimeters should be converted into inches.

Example: Scale Length [L] should be as follows:

Scale Length [L] = 320 ÷ 25.4 = 12.598

The Scale Length value should be set "12.598".

Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

② Minimum Current Position Value, [K] (Parameter 98)

The Minimum Current Position Value is the smallest possible position value which is detected by ABSOCODER sensor (it can be a value below zero).

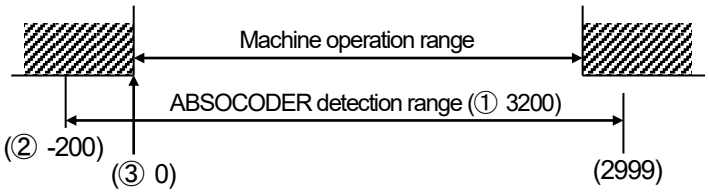
The valid indication range will be determined according to the Scale Length and the Minimum Current Position Value settings.

Indication range = [Minimum Current Position Value] to (Minimum Current Position Value + Scale Length−1)

③ Current Position Setting (Parameter 97)

Enter a value to represent where the machine is currently located.

Once ① and ② are set, the Current Position Setting can be separately entered.



① Scale Length [L] : 3200
Define the total length of the "ruler".

② Minimum Current Position Value [K] : −200
Define the ruler's indication range.

③ Current Position Setting : 0
Set the value so that the VARILIMIT's Current Position Value display matches the actual machine position.

10-6-2. General description of the linear-type ABSOCODER (dual-rod) setting

① Scale Length, [L] (Parameter 99)

The Scale Length value varies depending on the unit of length being used to display it (millimeters, inches, etc.).
In millimeters, the Scale Length should be set to the same value as the Absolute Detection Range value contained in the sensor model code.

> **⚠ NOTES**
>
> For example, "512" is the Absolute Detection Range and is set as the Scale Length when using VLS-512PW350B; however, the actual stroke length is "350".

Example 1: If set in millimeters:

In the case of VLS-**512**PW350B, "512" represents the Scale Length.
The Scale Length value should be set as follows:

With 0.1 mm resolution: "512.0".
With 0.01 mm resolution: "512.00".
Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

Example 2: If set in inches:

The Scale Length should be set to the same value as the Absolute Detection Range value converted into inches.
In the case of VLS-**512**PW350B, the Scale Length is determined by the following equation.

Scale Length = 512 ÷ 25.4 = 20.157
The Scale Length should be set "20.157".
Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

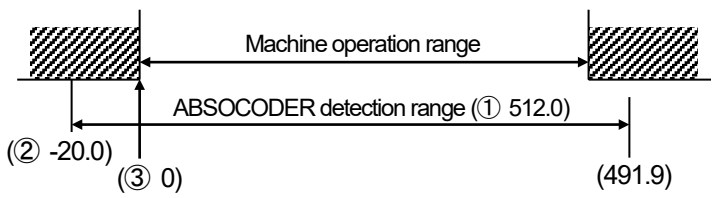
② Minimum Current Position Value, [K] (Parameter 98)

The Minimum Current Position Value is the smallest possible position value which is detected by ABSOCODER sensor (it can be a value below zero).
The detection range will be determined according to the Scale Length and the Minimum Current Position Value settings.

Detection range = [Minimum Current Position Value] to (Minimum Current Position Value + Scale Length - 1)

③ Current Position Setting (Parameter 97)

Enter a value to represent where the machine is currently located.
Once ① and ② are set, the Current Position Setting can be separately entered.



① Scale Length [L] : 512.0
Define the total length of the "ruler".
② Minimum Current Position Value [K] : −20.0
Define the ruler's indication range.
③ Current Position Setting : 0
Set the value so that the VARILIMIT's Current Position Value display matches the actual machine position.

10-6-3. General description of the CYLNUC cylinder setting

The required detection range settings depend on the CYLNUC Cylinder model being used.
Define the detection range by setting the following parameters.

● Detection range setting values

Parameter No.	Name	Setting value
		CSA-20 x 50-FA7-C2.0-A1
A0	Number of Scale Length Pitches [n]	4
99	Scale Length [L]	51.2
90	Decimal Point Position	1: □□□□□. □

● **Example of detection range calculation**
Shown below is the example of CSA-20 x 50-FA7-C2.0-A1.

① Parameter A0 (Number of Scale Length Pitches, [n])
Enter the number of pitches to be detected by your ABSOCODER model.
In the case of CSA-20 x 50-FA7-C2.0-A1, the absolute detection pitch (= standard pitch) is 12.8mmm and the maximum stroke is 50 mm.
The No. of Scale Length Pitches, [n], can be determined by the following equation.

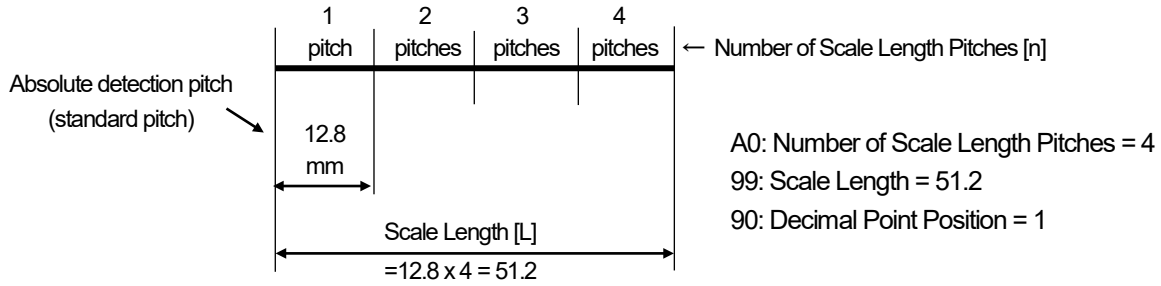
$$\text{No. of Scale Length Pitches [n]} = \frac{\text{Maximum stroke}}{\text{Absolute detection pitch}} \qquad n = \frac{50}{12.8} = 3.9 \text{ pitches}$$

As the No. of Scale Length Pitches [n] must be set as a whole number, the nearest whole number larger than 3.9, or 4, should be selected.

② Parameter 99 (Scale Length, [L])
The Scale Length, [L], can be determined by the following equation:

Scale Length [L] = [Absolute detection pitch] x [No. of Scale Length Pitches]
= 12.8mm x 4
= 51.2

③ Parameter 90 (Decimal Point Position)
This parameter should be set depending on the Scale Length ([L]) value obtained.
As the Scale Length value in this example has one digit after the decimal point, the Decimal Point Position should be set to "1".



10-6-4. General description of the lnrodsensor setting

The required detection range settings depend on the lnrodsensor model being used.
Define the detection range by setting the following parameters.

● Detection range setting values

Parameter No.	Name	Setting value
		IRS-51.2P18D128P0FAC
A0	Number of Scale Length Pitches [n]	3
99	Scale Length [L]	153.6
90	Decimal Point Position	1: □□□□□. □

● **Example of detection range calculation**
Shown below is the example of IRS-51.2P18D128P0FAC.

① Parameter A0 (Number of Scale Length Pitches, [n])
Enter the number of pitches to be detected by your ABSOCODER model.
In the case of IRS-51.2P18D128P0FAC, the absolute detection pitch (= standard pitch) is 51.2mmm and the maximum stroke is 128 mm.
The No. of Scale Length Pitches, [n], can be determined by the following equation.

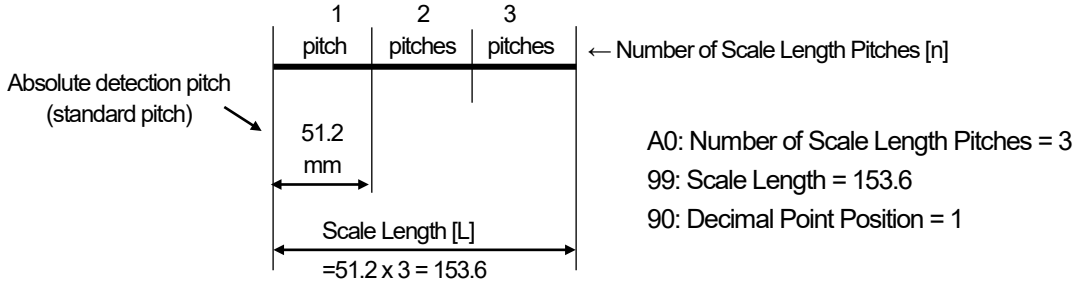
$$\text{No. of Scale Length Pitches [n]} = \frac{\text{Maximum stroke}}{\text{Absolute detection pitch}} \qquad n = \frac{128}{51.2} = 2.5 \text{ pitches}$$

As the No. of Scale Length Pitches [n] must be set as a whole number, the nearest whole number larger than 2.5, or 3, should be selected.

② Parameter 99 (Scale Length, [L])
The Scale Length, [L], can be determined by the following equation:

Scale Length [L] = [Absolute detection pitch] x [No. of Scale Length Pitches]
= 51.2mm x 3
= 153.6

③ Parameter 90 (Decimal Point Position)
This parameter should be set depending on the Scale Length ([L]) value obtained.
As the Scale Length value in this example has one digit after the decimal point, the Decimal Point Position should be set to "1".



10-6-5. General description of the linear-type ABSOCODER (single-rod) setting

The required detection range settings depend on the ABSOCODER model being used.
Define the detection range by setting the following parameters.

● Detection range setting values

Parameter No.	Name	Setting value					
		VLS-8PSA VLS-8PSM	VLS- 10PS	VLS- 16PSA	VLS- 32PSA	VLS- 16PS64B	VLS-8PSJ20A VLS-8PSJ20B
A0 (100)	Number of Scale Length Pitches [n]	1	1	1	1	4	3
99	Scale Length [L]	8.192	10.00	16.00	32.00	64.00	24.576
90	Decimal Point Position	3: □□□. □□□	2: □□□□. □□	2: □□□□. □□	2: □□□□. □□	2: □□□□. □□	3: □□□. □□□

● **Example of detection range calculation**
Shown below is the example of VLS-8PSJ20A.

① Parameter A0 (Number of Scale Length Pitches, [n])
Enter the number of pitches to be detected by your ABSOCODER model.
In the case of VLS-8PSJ20A, the absolute detection pitch (= standard pitch) is 8.192mmm and the maximum stroke is 20 mm.
The No. of Scale Length Pitches, [n], can be determined by the following equation.

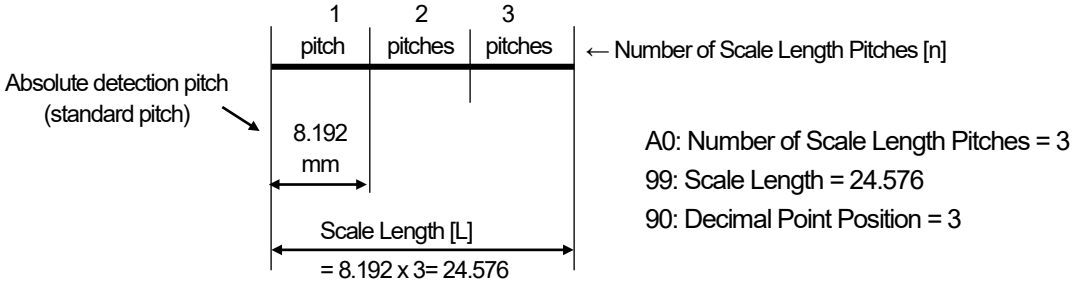
$$\text{No. of Scale Length Pitches [n]} = \frac{\text{Maximum stroke}}{\text{Absolute detection pitch}} \qquad n = \frac{20}{8.192} = 2.4 \text{ pitches}$$

As the No. of Scale Length Pitches [n] must be set as a whole number, the nearest whole number larger than 2.4, or 3, should be selected.

② Parameter 99 (Scale Length, [L])
The Scale Length, [L], can be determined by the following equation:

Scale Length [L] = [Absolute detection pitch] x [No. of Scale Length Pitches]
= 8.192mm x 3
= 24.576

③ Parameter 90 (Decimal Point Position)
This parameter should be set depending on the Scale Length ([L]) value obtained.
As the Scale Length value in this example has three digits after the decimal point, the Decimal Point Position should be set to "3".



10-6-6. General description of the single-turn type ABSOCODER setting

① Scale Length, [L] (Parameter 99)

If shown in degrees (°), the Scale Length is 360.

With 0.1-degree resolution, Scale Length should be set "360.0".

Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

② Minimum Current Position Value, [K] (Parameter 98)

The Minimum Current Position Value is the smallest possible position value which is detected by ABSOCODER sensor (it can be a value below zero).

The detection range will be determined according to the Scale Length and the Minimum Current Position Value settings.

Detection range = [Minimum Current Position Value] to (Minimum Current Position Value + Scale Length - 1)

③ Current Position Setting (Parameter 97)

Enter a value to represent where the machine is currently located.

Once ① and ② are set, the Current Position Setting can be separately entered.

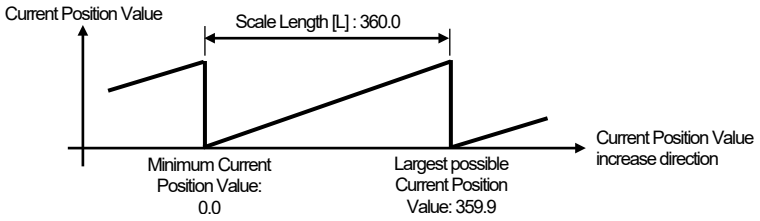
● Setting example:

For a Current Position Value indication range of 0.0° to 359.9°:

① Scale Length, [L]: 360.0

② Minimum Current Position Value, [K]: 0.0

Decimal Point Position: 1 (0.1-degree resolution)

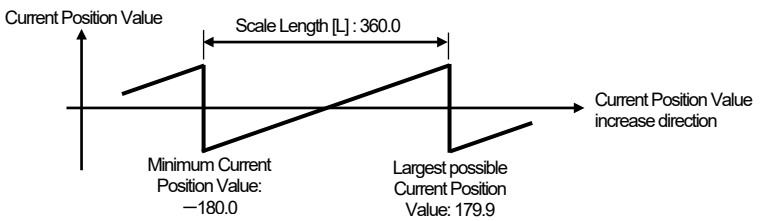


For a Current Position Value indication range of -180.0° to 179.9°:

① Scale Length, [L]: 360.0

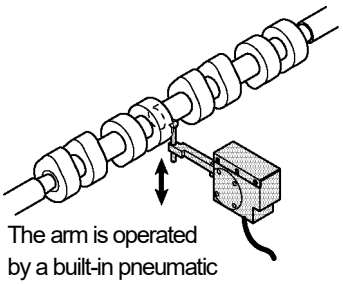
② Minimum Current Position Value, [K]: -180.0

Decimal Point Position: 1 (0.1-degree resolution)



10-6-7. General description of the NT Coder setting

NT Coder is designed to be used to distinguish engine camshafts.



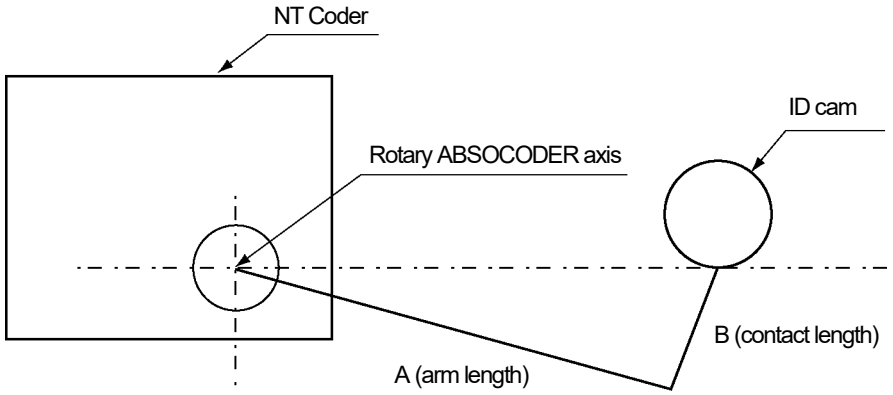
The arm is operated by a built-in pneumatic cylinder.

① Scale Length, [L] (Parameter 99)

As the NT Coder detects the workpiece position using a built-in rotary ABSOCODER, its Scale Length will be as follows:

● Calculation conditions

On a cam grinder, the NT Coder measures the diameter of the identification cam intended for workpiece type identification. As the rotation angle detected by the rotary ABSOCODER is converted to obtain the identification cam diameter at the tip of the arm, the product's absolute accuracy includes slight error. However, the error is so small as to be negligible for the size of the identification cam diameter. In addition, the repeatability is superior and can be considered good enough to be within the resolution tolerance.
The NT Coder dimensional relationship, which serves as the calculation basis, is illustrated below.



● Scale Length [L]

The **Scale Length** can be determined by the following equation:
A: Arm length, B: Contact length, L: Scale Length

Model	Scale Length calculation equation	A (fixed value)	B (referential)	L (referential)
VRE-16TSWABC3	$\sin 11.25° \times \sqrt{A^2 + B^2} \times 4$	135(mm)	25(mm)	107.2(mm)

Note 1: As the identification cam diameter is determined based on the distance from its center, the Scale Length must be twice the contact travel.
Note 2: Set the number of decimals to be shown using Parameter 90 (Decimal Point Position).

② Minimum Current Position Value, [K] (Parameter 98)

The Minimum Current Position Value is the smallest possible position value which is detected by ABSOCODER sensor (it can be a value below zero).
The valid indication range will be determined according to the Scale Length and the Minimum Current Position Value settings.

Indication range = [Minimum Current Position Value] to (Minimum Current Position Value + Scale Length - 1)

However, this parameter should normally set to "0" on an NT coder.

③ Current Position Setting (Parameter 97)

Enter a value to represent where the machine is currently located.
Once ① and ② are set, the Current Position Setting can be separately entered.

10-6-8. Detection range ("scale") setting procedure

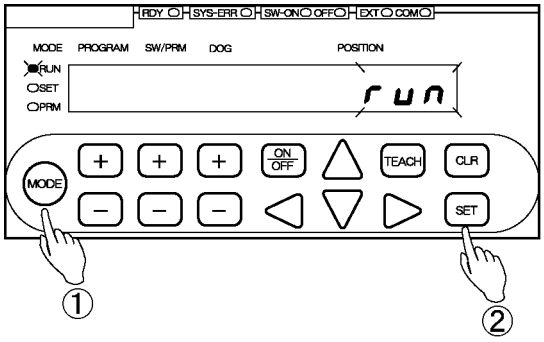
(1) Parameter setting mode ("PRM") selection

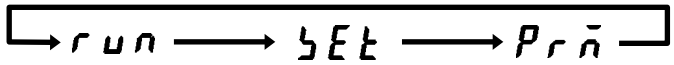
① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
● RUN	○ RUN	○ RUN
○ SET	● SET	○ SET
○ PRM	○ PRM	● PRM

② Confirm the mode selection

Press the SET key.

The mode is now set to the parameter setting mode ("PRM").

(2) Setting the No. of Scale Length Pitches

POINT:

The setting of the number of the scale length pitches applies to VS-10G**-LP and VS-10G**-LC only.

No setting is required for the other models.

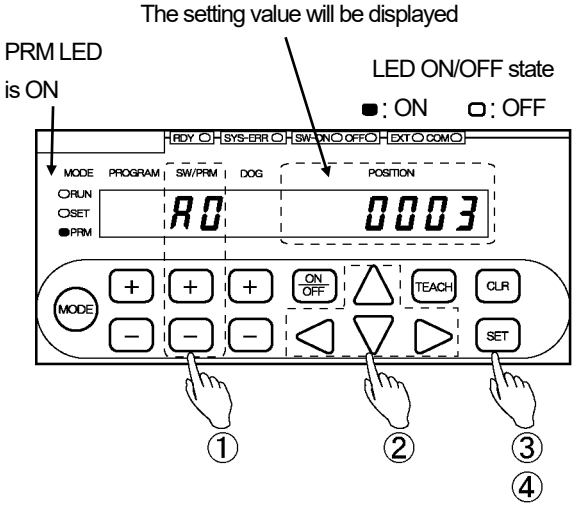
① Select Parameter A0.

Use the + and − keys under the SW/PRM display to select "A0".

② Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

The entered value can be canceled by pressing the CLR key at this point.



③ Check the entered value.

Press the SET key.

The POSITION display will flicker more quickly.

Check the entered value again carefully.

④ Confirm the entered value.

Press the SET key again.

The POSITION display will become solidly on, indicating that the setting value has been confirmed.

(3) Scale Length setting

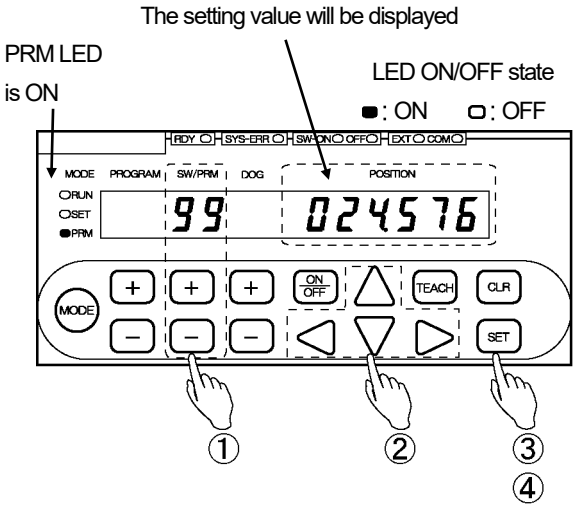
① Select Parameter 99.
Use the [+] and [−] keys under the SW/PRM display to select "99".

② Enter the setting value.
Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

The entered value can be canceled by pressing the [CLR] key at this point.

③ Check the entered value.
Press the [SET] key.
The POSITION display will flicker more quickly.
Check the entered value again carefully.

④ Confirm the entered value.
Press the [SET] key again.
The POSITION display will become solidly on, indicating that the setting value has been confirmed.



POINT:
As changing this parameter will nullify other parameter settings, the [SET] key is required to be pressed twice to urge caution.

(4) Minimum Current Position Value setting

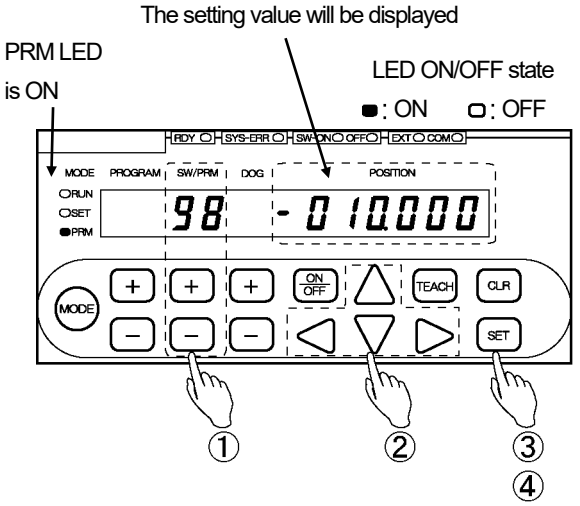
① Select Parameter 98.
Use the [+] and [−] keys under the SW/PRM display to select "98".

② Enter the setting value.
Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

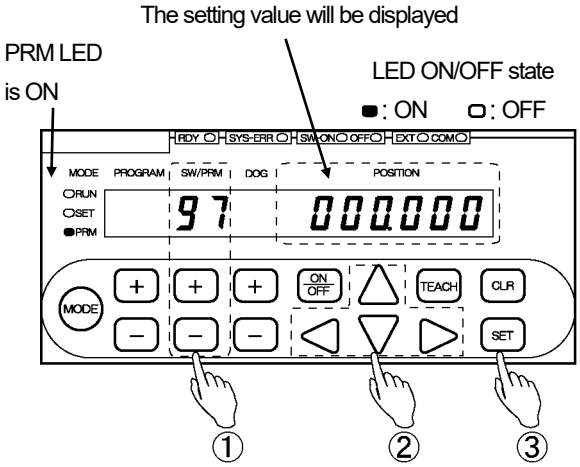
The entered value can be canceled by pressing the [CLR] key at this point.

③ Check the entered value.
Press the [SET] key.
The POSITION display will flicker more quickly.
Check the entered value again carefully.

④ Confirm the entered value.
Press the [SET] key again.
The POSITION display will become solidly on, indicating that the setting value has been confirmed.



(5) Current Position Value setting



① Select Parameter 97.

Use the [+] and [−] keys under the SW/PRM display to select "97".

② Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

The entered value can be canceled by pressing the [CLR] key at this point.

③ Confirm the entered value.

Press the [SET] key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

⚠ NOTES

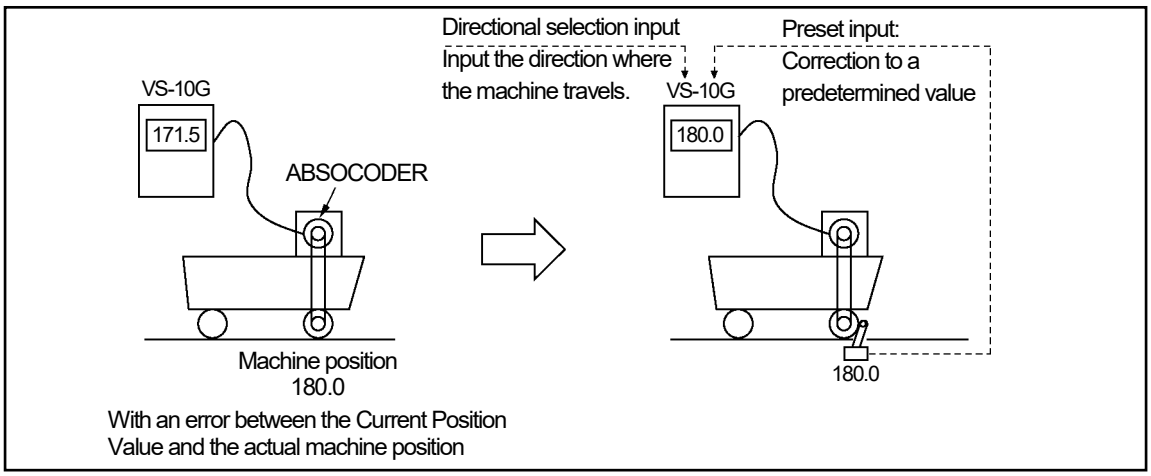
1. If selection of the Run mode is attempted without setting Parameter 97, a "No Current Position Setting" error (Err19) will occur.

2. Parameter 97 cannot be set without setting Parameters 91, 98, 99 and A0 first.

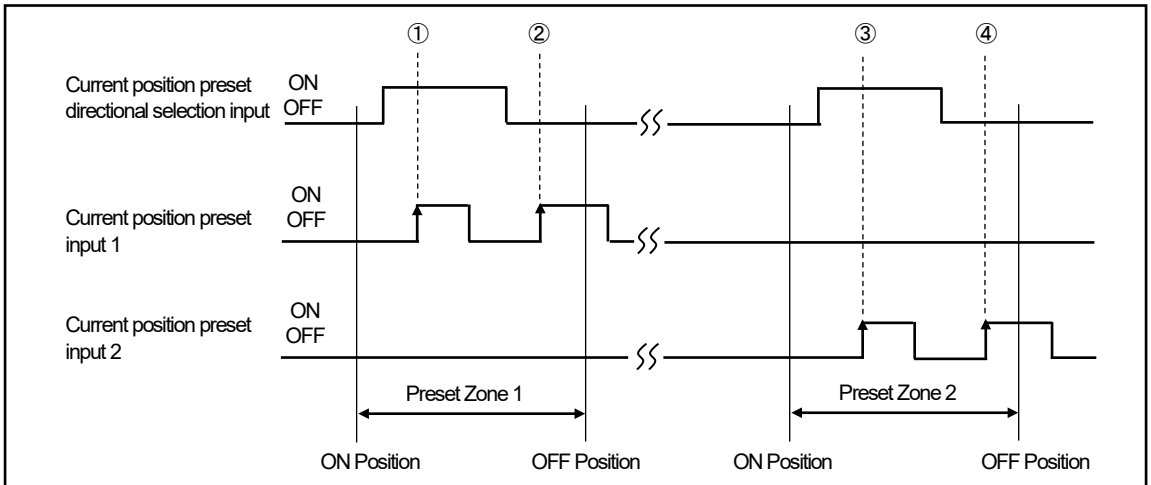
10-7. Current Position Preset Setting

Specify the required settings to use the Current Position Preset function. In the VS-10B Mode, use the Current Position Preset by Travel Direction Input. This function refers to correcting the current position value to the predetermined value by way of external input (the current position preset directional selection input and the current position preset input 1 (2)) when a gap is found between the actual machine position and the VARILIMIT's current position display value.

Preset zones can be specified to prevent preset errors at the parameter. For more details about Current Position Preset input/output timing, refer to "3-6-3. Current position preset timing".



●Procedure



Within the Preset Zone 1:

① When turning on the current position preset input 1 while the current position preset directional selection input is ON, the current position value will be corrected to the ON value specified at Parameter 80 (Preset Value 1),

② When turning on the current position preset input 1 while the current position preset directional selection input is OFF, the current position value will be corrected to the OFF value specified at Parameter 80 (Preset Value 1),

Within the Preset Zone 2:

③ When turning on the current position preset input 2 while the current position preset directional selection input is ON, the current position value will be corrected to the ON value specified at Parameter 80 (Preset Value 2),

④ When turning on the current position preset input 2 while the current position preset directional selection input is OFF, the current position value will be corrected to the OFF value specified at Parameter 80 (Preset Value 2),

●Current Position Preset Zone Setting (Parameter 81)

Major preset errors can be prevented by setting the current position preset zone.
Specify the current position value range to accept the preset input signals using ON and OFF positions.
When the machine stays outside the range, the current position value will not be preset even if the current position preset signals are sent.

Each of Preset Zones 1 and 2 applies to the current position preset inputs 1 and 2

⚠ NOTES

1. To preset the current position value, it is necessary to set Parameter 81 (Current Position Preset Zone) in addition to Parameter 80 (Current Position Preset Value).
   Preset will not start before these settings are completed.

2. Note that the preset zone will range from the ON position to the maximum current position value if only the ON position is specified.

●Current Position Preset Error Selection Setting (Parameter 82)

Change the switch output 30 signal to the Preset error output signal.
The preset error output will be ON when a preset error (Err 23) or a preset data error (Err 50) occurs.
Use this setting when required.

Specify the following five items at parameters for setting the Current Position Preset by Travel Direction Input

1. Parameter 95 (Current Position Preset / Protected Switch Selection)
2. Parameter 92 (Current Position Preset Function Selection)
3. Parameter 82 (Current Position Preset Error Selection)
4. Parameter 80 (Current Position Preset Value)
   ON and OFF values for Preset Values 1 and 2
5. Parameter 81 (Current Position Preset Zone)
   ON and OFF values for Preset Zones 1 and 2

POINT:

Two setting values can be stored to correspond to the current position preset inputs 1 and 2.
Preset input 1: Can be specified by the combined use of Parameters 95, 92, 82, 80-1 (ON and OFF), and 81-1 (ON and OFF).
Preset input 2: Can be specified by the combined use of Parameters 95, 92, 82, 80-2 (ON and OFF), and 81-2 (ON and OFF).

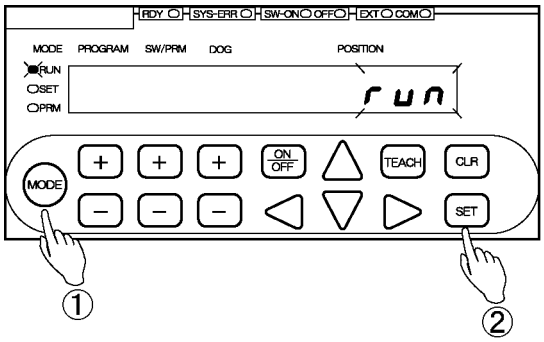
The following steps (1)-(6) describe an example of the preset input 1 combination.

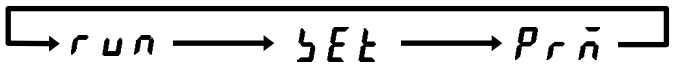
(1) Parameter setting mode ("PRM") selection

① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection

Press the SET key.
The mode is now set to the parameter setting mode ("PRM").

(2) Setting the Current Position Preset / Protected Switch Selection

① Select Parameter 95.

Use the [+] and [−] keys under the SW/PRM display to select "95".

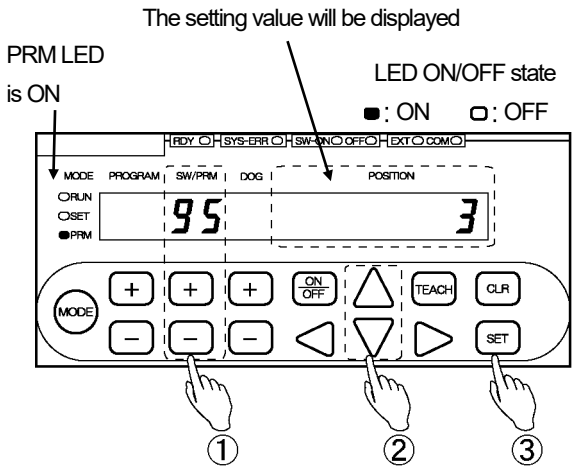
② Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: Current Position Preset disabled, Protected Switch disabled
1: Current Position Preset disabled, Protected Switch enabled
2: Current Position Preset enabled, Protected Switch disabled
3: Current Position Preset enabled, Protected Switch enabled

The selected value can be canceled by pressing the [CLR] key at this point.



POINT:
At Parameter 95, an appropriate combination of the Current Position Preset and the Protected Switch functions can be selected.

③ Confirm the selected value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

(3) Selection to enable/disable the Current Position Preset function

① Select Parameter 92.

Use the [+] and [−] keys under the SW/PRM display to select "92".

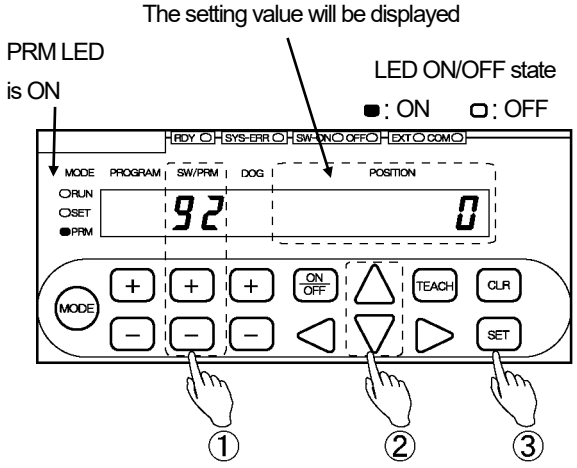
② Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: Preset Disabled
1: Preset Enabled

The selected value can be canceled by pressing the [CLR] key at this point.



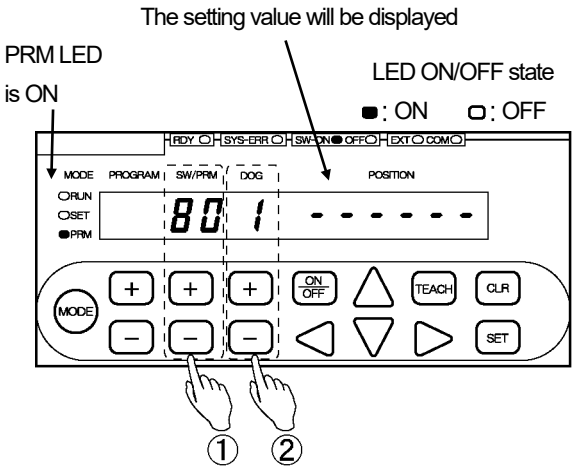
③ Confirm the selected value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

(4) Current Position Preset Value setting

① Select Parameter 80.

Use the [+] and [−] keys under the SW/PRM display to select "80".



② Select the preset input number *1

Press the [+] or [−] key under the DOG display to select the preset input number.

Options
1: Preset input 1
2: Preset input 2

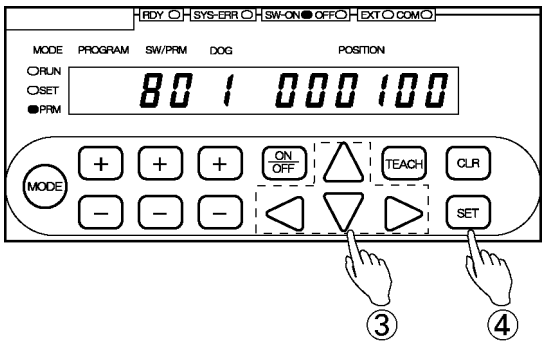
③ Enter the preset value for the time when the direction selection is ON

Enter the value to preset when the current position preset directional selection is ON.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.



④ Confirm the preset value for the time when the direction selection is ON

Press the [SET] key.

The POSITION display will become solidly on, indicating that the setting is complete.

POINT:

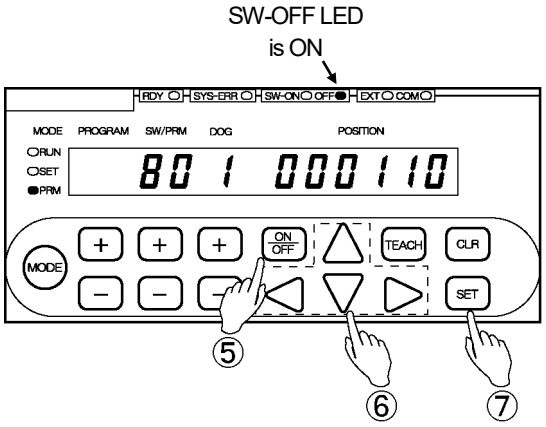
*1: Two points are provided for the current position preset input signal.
Apply the current position preset input signal number to the preset input number.

Select 1 for setting the value that will be changed when turning ON the current position preset input 1.
Select 2 for setting the value that will be changed when turning ON the current position preset input 2.

Repeat the steps ② to ⑦ to use the both of the two points.

⑤ Turn the OFF LED on *2

Press the [ON/OFF] key and turn the OFF LED on to enter the preset value for the time when the directional selection is OFF.



⑥ Enter the preset value for the time when the directional selection signal is OFF

Enter the value to preset when the current position preset directional selection is OFF.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.

⑦ Confirm the preset value for the time when the directional selection is OFF

Press the [SET] key.
The POSITION display will become solidly on, indicating that the setting is complete.

POINT:

*2: Each time the [ON/OFF] key is pressed, the LED light switches between SW-ON and OFF.
Turn the SW-ON LED on to set the preset value for the time when the directional selection is ON.
Turn the OFF LED on to set the preset value for the time when the directional selection is OFF.

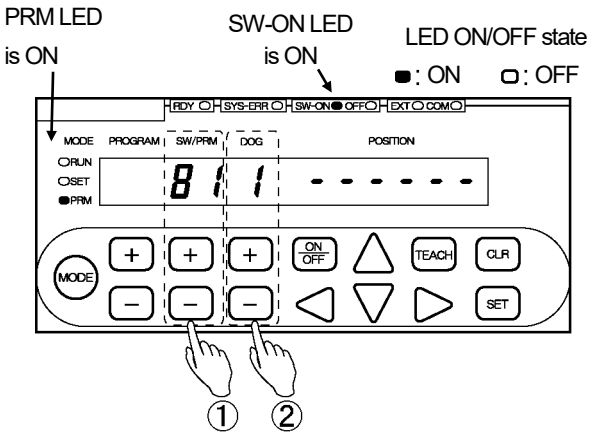
●Deletion of the preset value

Press the [ON/OFF] key by holding down the [CLR] key when conducting the operation ③ or ⑥.
The POSITION display will flicker with "- - - - - - -".
Press the [SET] key. Preset value is deleted.

(5) Current Position Preset Zone setting

① Select Parameter 81.

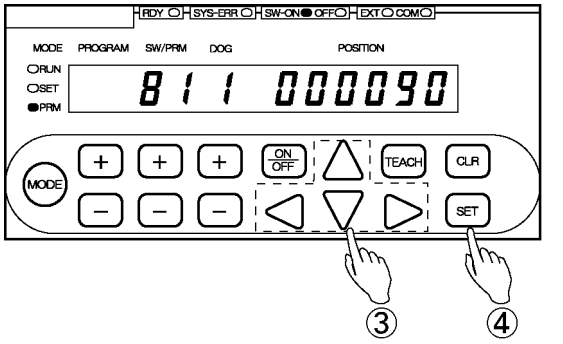
Use the [+] and [−] keys under the SW/PRM display to select "81".



② Select the preset zone No. *1

Press the [+] or [−] key to select the Preset Zone number.

Options:
1: Preset Zone 1
2: Preset Zone 2



③ Enter the preset zone ON value

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.

④ Confirm the preset zone ON value setting

Press the [SET] key.
The POSITION display will become solidly on, indicating that the setting is complete.

POINT:

*1: Two points are provided for the current position preset input signal.
Apply the current position preset input signal number to the preset zone number.

Select 1 for setting the preset zone where the current position preset input 1 is valid.
Select 2 for setting the preset zone where the current position preset input 2 is valid.

Repeat the steps ② to ⑦ to use the both of the two points.

⑤ Turn the OFF LED on *2

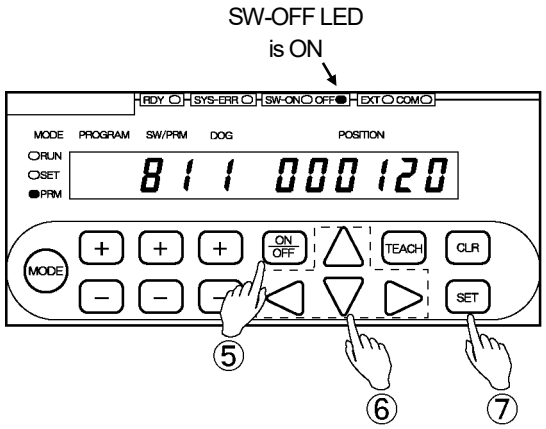
Press the [ON/OFF] key and turn the OFF LED on to enter the Preset Zone OFF Value.

⑥ Enter the preset zone OFF value

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.



⑦ Confirm the preset zone OFF value setting

Press the [SET] key.
The POSITION display will become solidly on, indicating that the setting is complete.

POINT:

*2: Each time the [ON/OFF] key is pressed, the LED light switches between SW-ON and OFF.
Turn the SW-ON LED on to enter the preset zone ON value.
Turn the OFF LED on to enter the preset zone OFF value.

●Deletion of the preset zone value
Press the [ON/OFF] key by holding down the [CLR] key when conducting the operation ③ or ⑥.
The POSITION display will flicker with "- - - - - - -".
Press the [SET] key. Preset zone value is deleted.

(6) Current Position Preset Error Selection setting

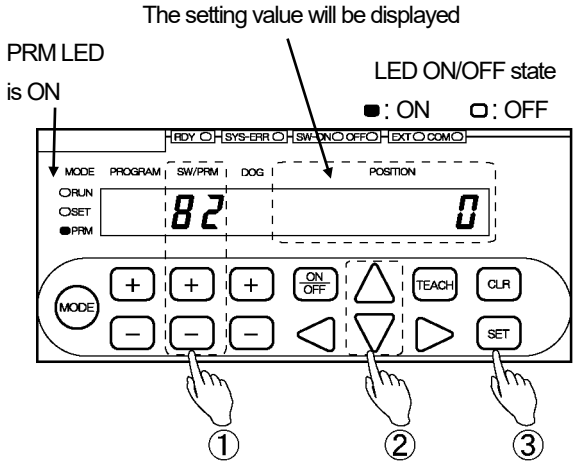
POINT:

Parameter 82 changes the switch output 30 signal to the preset error output signal.
Set the parameter as required.

The preset error output signals will be ON when the Preset Error (Err23) or the Preset Data Error (Err50) occurs.

① Select Parameter 82.

Use the (+) and (−) keys under the SW/PRM display to select "82".



② Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: Disabled
SW30: Switch output, System ready output ON in case of errors, No error display

1: Enabled
SW30: Error output, System ready output ON in case of errors, No error display

2. Enabled
SW30: Switch output, System ready output OFF in case of errors, Error display ([Err23 or Err50])

3. Enabled
SW30: Error output, System ready output OFF in case of errors, Error display ([Err23 or Err50])

The selected value can be canceled by pressing the (CLR) key at this point.

③ Confirm the selected value.

Press the (SET) key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

10-8. Program Number Input Method Selection

Select the method to input program numbers to run.
To input the Program Numbers through the program No. I/O connector, refer to "3-6-2. Program Number Change Timing".
To select Program Numbers via serial communication, consult our sales representative.

> **⚠ NOTES**
>
> If Parameter 54 for serial communication ("Protocol") is set to "2" or "3", Parameter 93 (Program Number Input Format) will be invalid and the Program Number will be fixed to "0".

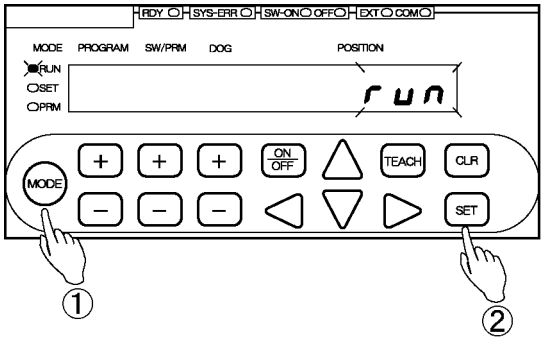
Set the parameter in the following steps.

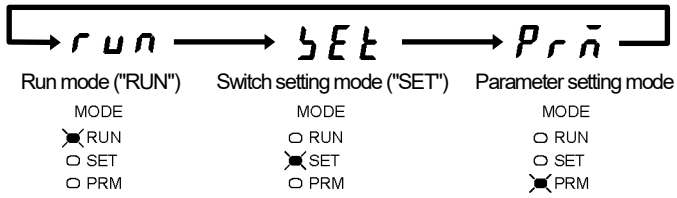
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
● RUN	○ RUN	○ RUN
○ SET	● SET	○ SET
○ PRM	○ PRM	● PRM

② Confirm the mode selection

Press the (SET) key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 93.

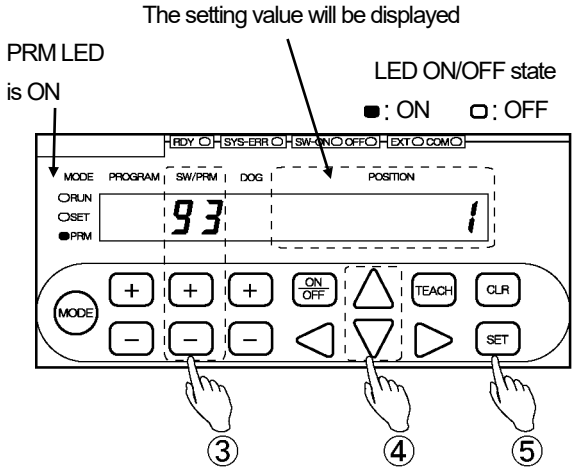
Use the (+) and (−) keys under the SW/PRM display to select "93".

④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:
- 0: Panel key input
- 1: External input via connector
- 2: Serial communication

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the selected value.

Press the (SET) key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

10-9. Setting the Protected Switch Function

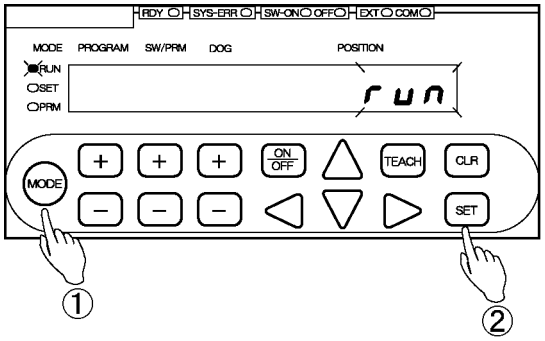
This is a function to disable setting and editing of the switch output setting values in regular operation.
When 1 or 3 (Protected Switch enabled) is selected, the switch outputs 1-10 will be set as protected switches.
At Parameter 95, an appropriate combination of the Current Position Preset and the Protected Switch functions can be selected.

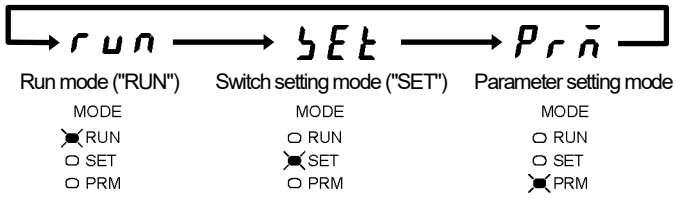
Set the parameter in the following steps.

① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.



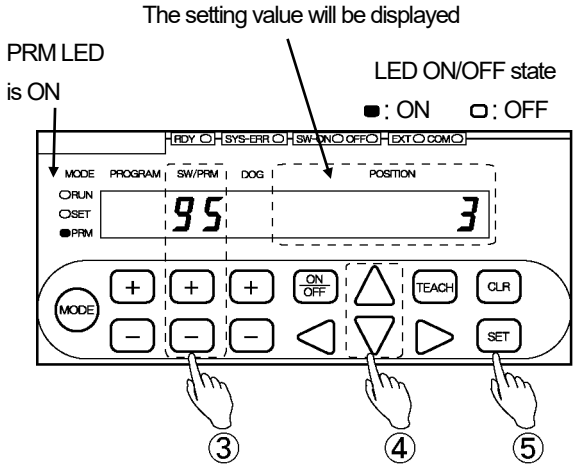


② Confirm the mode selection

Press the SET key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 95.

Use the + and − keys under the SW/PRM display to select "95".



④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: Current Position Preset disabled, Protected Switch disabled
1: Current Position Preset disabled, Protected Switch enabled
2: Current Position Preset enabled, Protected Switch disabled
3: Current Position Preset enabled, Protected Switch enabled

The selected value can be canceled by pressing the CLR key at this point.

⑤ Confirm the selected value.

Press the SET key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

10-10. Protected Switch Suspended Setting

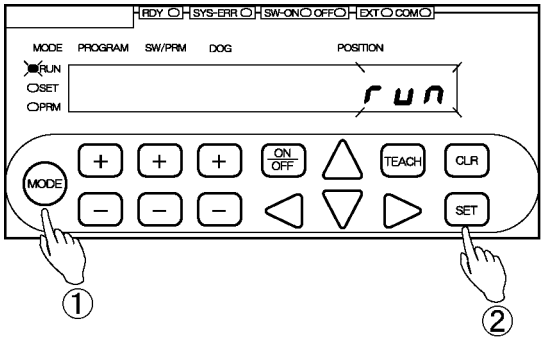
This parameter can be suspended the Protected Switch setting, which is entered by the steps described in 10-9. "Setting the Protected Switch Function".
The setting will automatically return to "Enabled" when one of the following actions has been taken.
- Changing the mode to the Run mode ("RUN").
- Turning the power off and then on again.

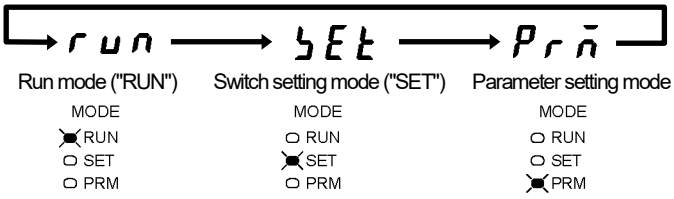
Temporarily cancel the Protected Switch setting in the following steps:

① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





② Confirm the mode selection

Press the (SET) key.
The mode is now set to the parameter setting mode ("PRM").

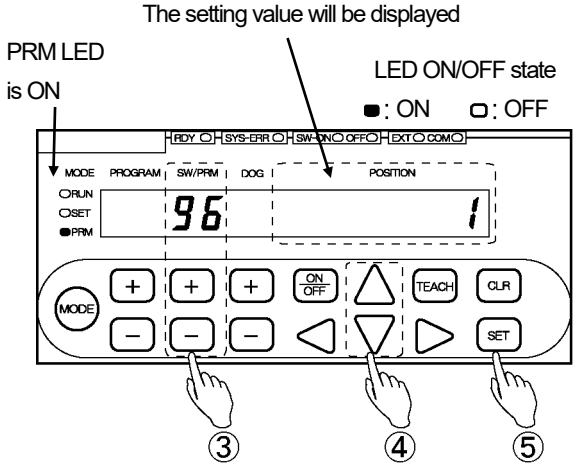
③ Select Parameter 96.

Use the (+) and (−) keys under the SW/PRM display to select "96".

④ Change the setting value to "1".

Press the △ key under the POSITION display to change the setting value to "1".

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the selected value.

Press the (SET) key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

10-11. Current Position Output Setting

This section applies to VS-10G-D and VS-10G-D-1.

Set this parameter if the Current Position Output needs to be used.
About input/output timing related to the Current Position Output, refer to "3-6-4. Current Position Output timing".

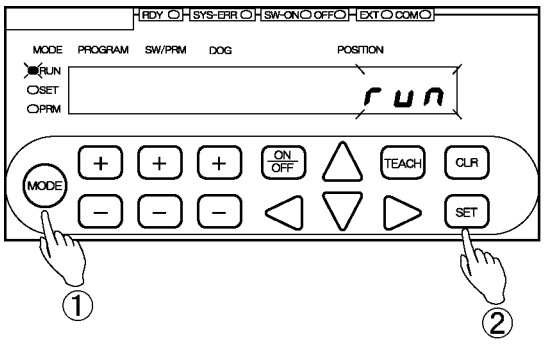
(1) Parameter setting mode ("PRM") selection

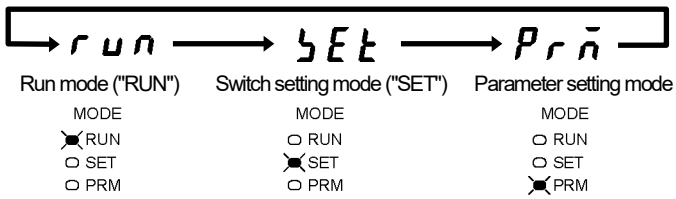
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

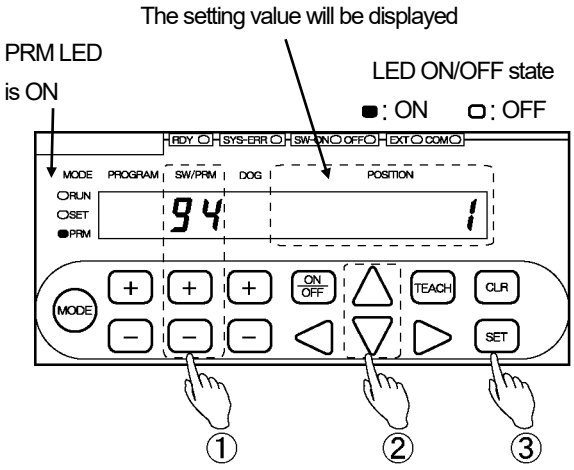
② Confirm the mode selection

Press the (SET) key.
The mode is now set to the parameter setting mode ("PRM").

(2) Current Position Output Code and Logic setting

① Select Parameter 94.

Use the [+] and [−] keys under the SW/PRM display to select "94".



② Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: BCD output (negative logic) / decimal point output (positive logic)
1: BCD output (positive logic) / decimal point output (negative logic)
2: BCD output (negative logic) / decimal point output (negative logic)
3: BCD output (positive logic) / decimal point output (positive logic)
4: Binary output (sign magnitude code, negative logic), decimal point output (positive logic)
5: Binary output (sign magnitude code, positive logic), decimal point output (negative logic)
6: Binary output (two's complement, negative logic), decimal point output (positive logic)
7: Binary output (two's complement, positive logic), decimal point output (negative logic)

The selected value can be canceled by pressing the [CLR] key at this point.

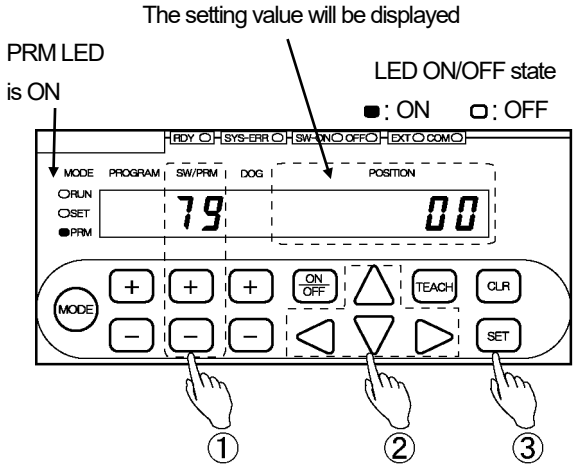
③ Confirm the selected value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

(3) Latch Pulse Timing and Update Cycle setting

① Select Parameter 79.

Use the [+] and [−] keys under the SW/PRM display to select "79".



② Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:

- For Edge Timing
  0: 4ms 1: 8ms 2: 16ms 3: 32ms,
  4: 64ms 5: 128ms 6: 256ms 7: 512ms
- For Level Timing
  8: 4ms 9: 8ms 10: 16ms 11: 32ms,
  12: 64ms 13: 128ms 14: 256ms 15: 512ms

The entered value can be canceled by pressing the [CLR] key at this point.

③ Confirm the entered value.

Press the [SET] key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

10-12. Setting the Analog Position Output

This function applies to the following models:
Voltage Output Models: VS-10G-A, VS-10G-A-1 Current Output Models: VS-10G-C, VS-10G-C-1

This is a function to output positions using voltage or current signals.
Two channels are provided for the analog output. The output items can be specified for each channel.
With the voltage output models, the voltage range can be chosen from 0 to 10V or -10V to +10V.
With the current output models, the current range is fixed to 4-20mA.

(1) Parameter Setting

Specify the following 3 items at the parameters. Set data for Channels 1 and 2 separately at each parameter.

①Parameter 85 (Position Output Voltage Range Selection)

This parameter applies only to the voltage output models.
With the current output models, the current range is fixed to 4-20mA.

- For Channel 1 / For Channel 2
- Output voltage range selection
  Choose 0-10V or -10V- +10V.

②Parameter 86 (Position Data A setting)

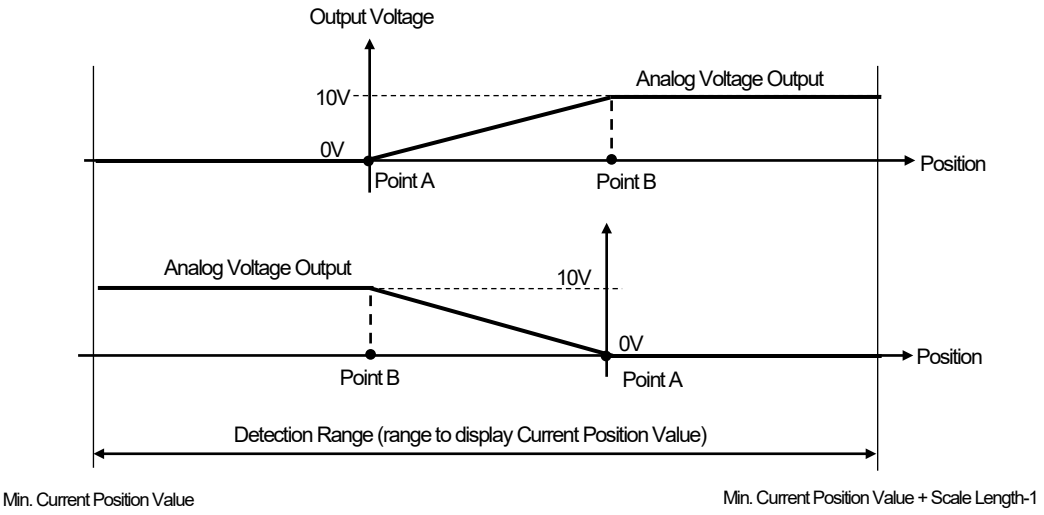
- For Channel 1 / For Channel 2
- With the voltage output models, set the position corresponding to DC0V.
- With the current output models, set the position corresponding to 4mA.

③Parameter 87 (Position Data B setting)

- For Channel 1 / For Channel 2
- With the voltage output models, set the position corresponding to DC10V.
- With the current output models, set the position corresponding to 20mA.

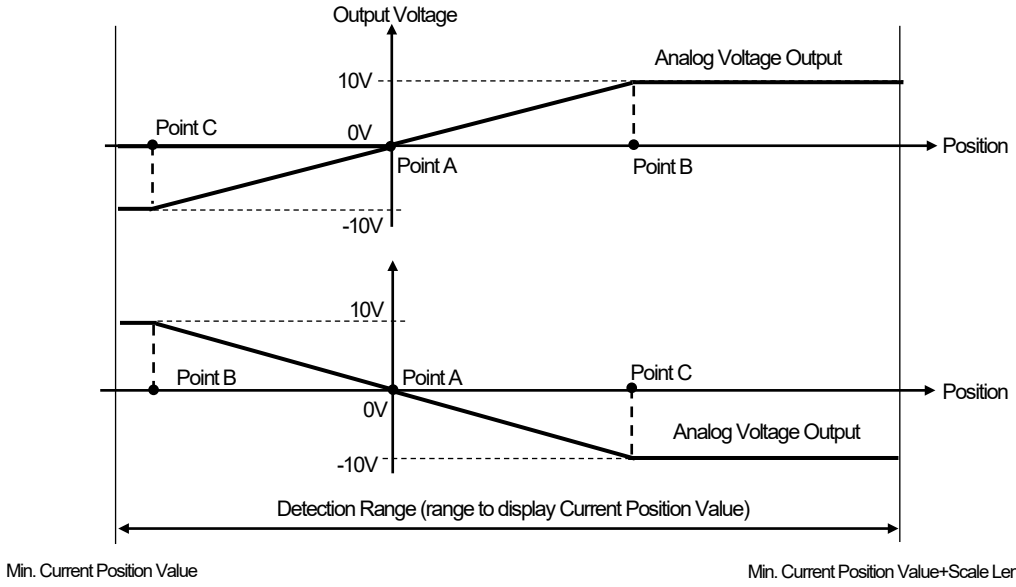
(2) Examples of setting the voltage output model

●Output of the position from Point A to Point B in voltage 0V to 10V



●Output of the position from Point B to Point C (twice as long as A to B) in voltage -10V to +10V

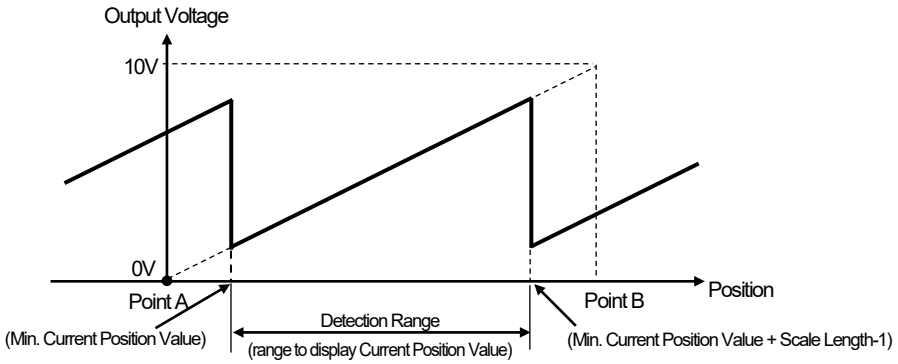
When Points A and B are specified at the parameter, the position of Point C (in negative) will be fixed.



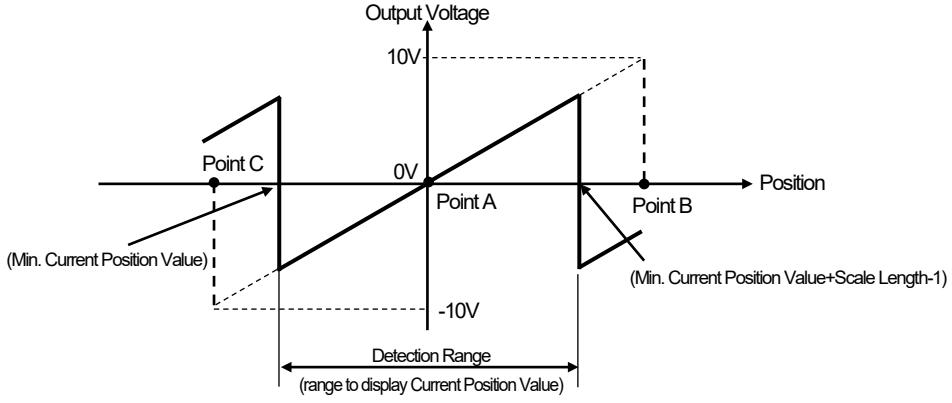
NOTES

Note that the output voltage will change at once when the position data A (Parameter 86) or B (Parameter 87) is specified outside the detection range. Remember to set those values within the detection range.

●Example of output of the position from Point A to Point B in voltage 0V to 10V



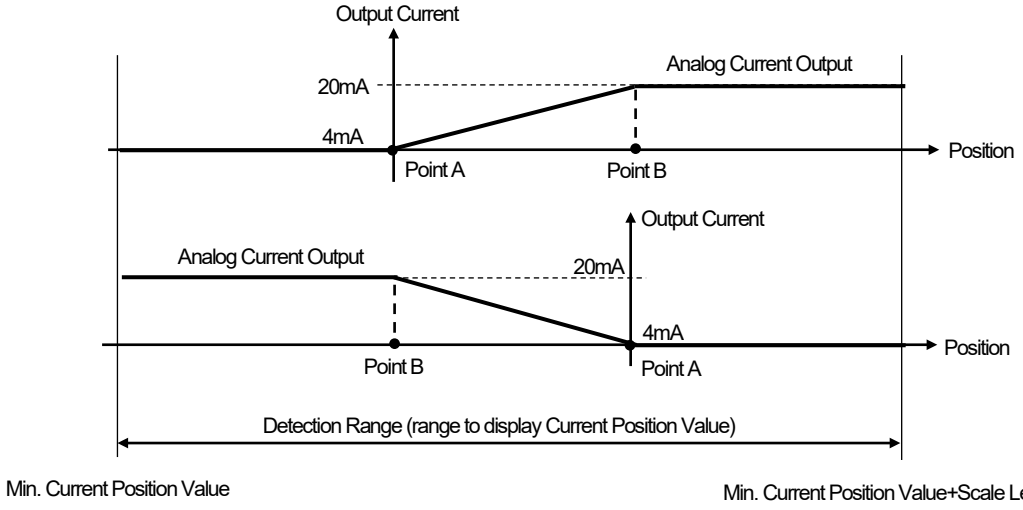
●Example of output of the position from Point B to Point C (twice as long as A to B) in voltage -10V to +10V



(3) Examples of setting the current output model

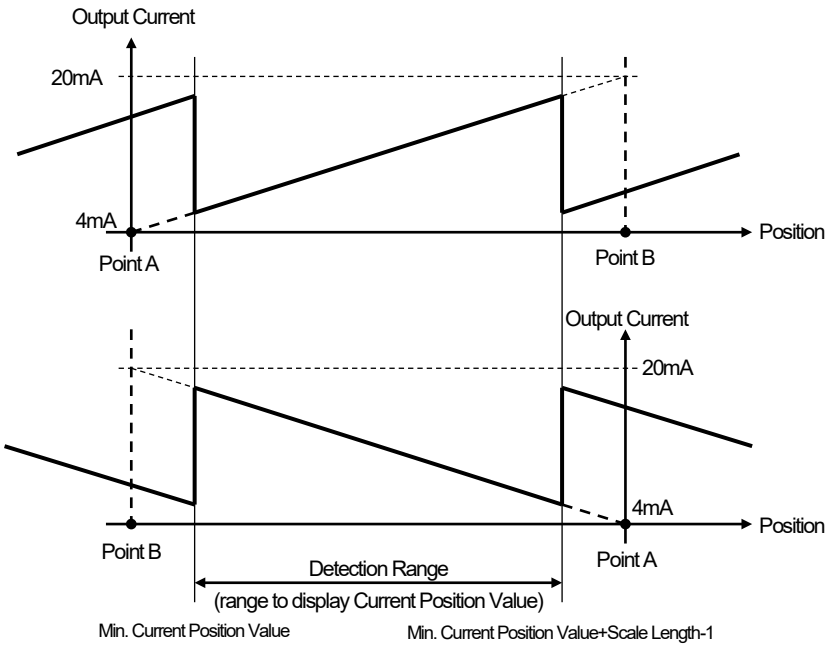
The current range is fixed to 4mA - 20mA.

●Output of the position from Point A to Point B.



NOTES

Note that the output current will change at once when the position data A (Parameter 86) or B (Parameter 87) is specified outside the detection range. Remember to set those values within the detection range.



Set the parameter in the following steps.

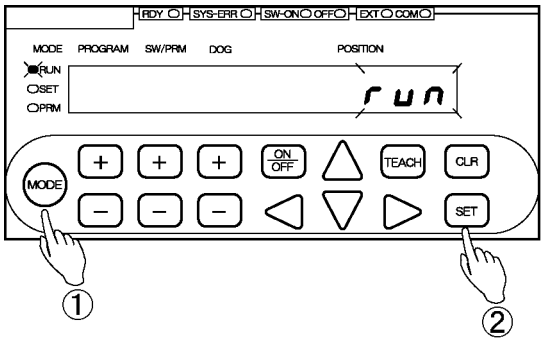
(1) Parameter setting mode ("PRM") selection

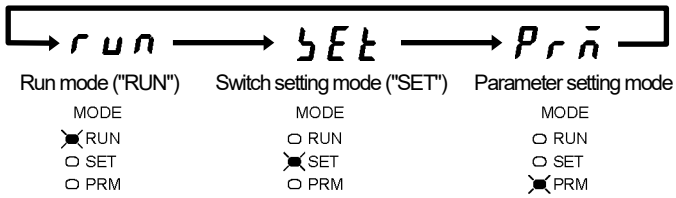
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
● RUN	○ RUN	○ RUN
○ SET	● SET	○ SET
○ PRM	○ PRM	● PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

(2) Output Voltage Range setting

This parameter applies only to the voltage output models.
With the current output models, the current range is fixed to 4-20mA. No setting is required at this parameter.

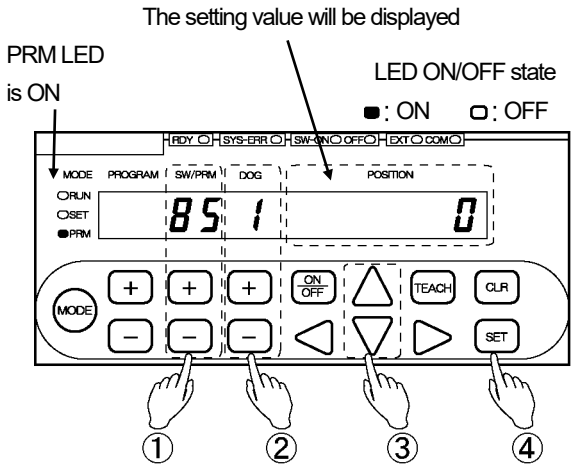
① Select Parameter 85.

Use the [+] and [−] keys under the SW/PRM display to select "85".

② Select the Channel No. *1

Press the [+] or the [−] key under the DOG display to select the channel number.

Options:
1: Channel 1
2: Channel 2



③ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:
0: 0V to 10VDC
1: 0V to ±10VDC

The selected value can be canceled by pressing the [CLR] key at this point.

④ Confirm the selected value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

POINT:

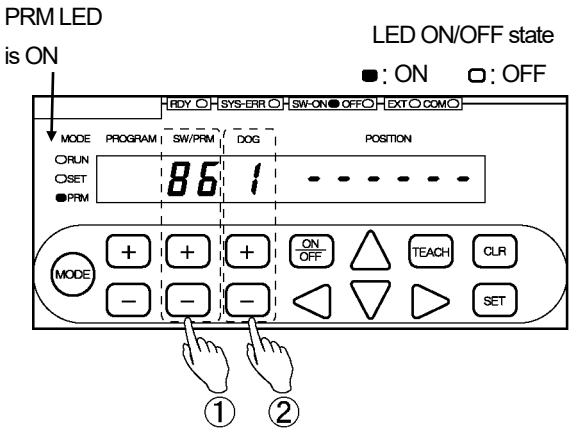
*1: Two channels are provided for the analog output.
For setting Channel 1, select 1.
For setting Channel 2, select 2.

Repeat the steps ② to ④ to use both of the two channels.

(3) Position Data A setting

① Select Parameter 86.

Use the [+] and [−] keys under the SW/PRM display to select "86".



② Select the Channel No. *1

Press the [+] or the [−] key under the DOG display to select the channel number.

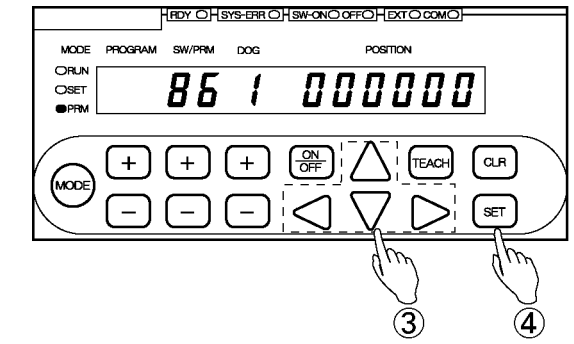
Options:
1: Channel 1
2: Channel 2

③ Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.



④ Confirm the entered value.

Press the [SET] key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

POINT:

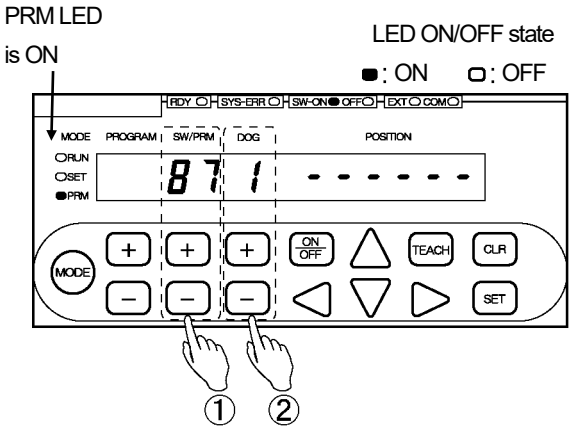
*1: Two channels are provided for the analog output.
For setting Channel 1, select 1.
For setting Channel 2, select 2.

Repeat the steps ② to ④ to use both of the two channels.

(4) Position Data B setting

① Select Parameter 87.

Use the [+] and [−] keys under the SW/PRM display to select "87".



② Select the Channel No. *1

Press the [+] or the [−] key under the DOG display to select the channel number.

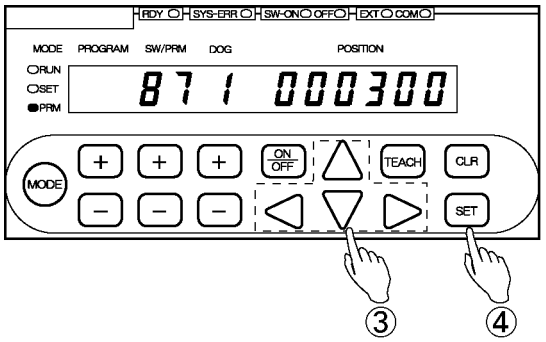
Options:
1: Channel 1
2: Channel 2

③ Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range:
−999999 to 999999

The entered value can be canceled by pressing the [CLR] key at this point.



④ Confirm the entered value.

Press the [SET] key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

POINT:

*1: Two channels are provided for the analog output.
For setting Channel 1, select 1.
For setting Channel 2, select 2.

Repeat the steps ② to ④ to use both of the two channels.

10-13. Selecting to Permit/Prohibit All-data Downloading

This parameter can be used when switch outputs and parameter setting values need to be written (downloaded) into the VARILIMIT by serial communication.

Contact our sales representative for serial communication details.

Select "1 : Permitted" to allow downloading.

The setting will automatically return to "Prohibit" after one of the following actions had been taken.

- Changing the mode from the parameter setting mode ("PRM") to another mode.
- Turning the power off and then on again.

⚠ NOTES

The Parameter 97 (Current Position Setting) cannot be written into the VARILIMIT by serial communication. Be sure to set this parameter on the VARILIMIT side. If the parameter is not set, a "No Current Position Setting" error (Err19) will occur.

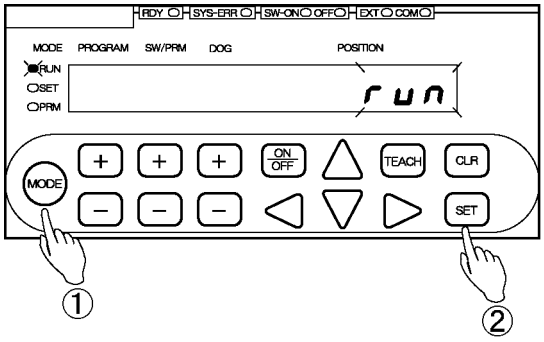
Set the parameter in the following steps.

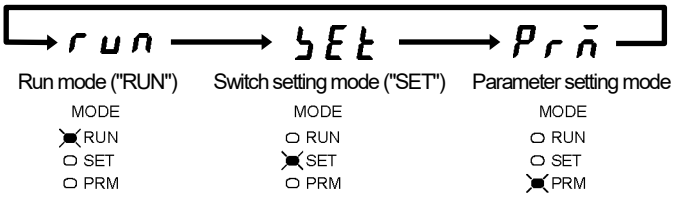
① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE ● RUN ○ SET ○ PRM	MODE ○ RUN ● SET ○ PRM	MODE ○ RUN ○ SET ● PRM

② Confirm the mode selection

Press the SET key.

The mode is now set to the parameter setting mode ("PRM").

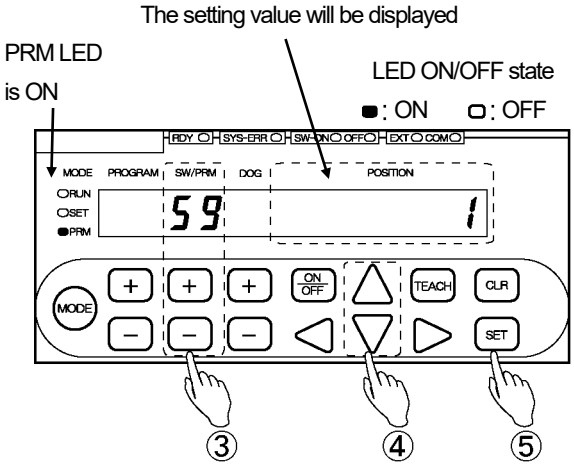
③ Select Parameter 59.

Use the + and − keys under the SW/PRM display to select "59".

④ Change the setting value to "1".

Use the △ or ▽ key under the POSITION display to change the setting value to "1".

The selected value can be canceled by pressing the CLR key at this point.



⑤ Confirm the selected value.

Press the SET key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

10-14. Communication Baud Rate Setting

The communication baud rate (communication speed) can be selected.

Contact our sales representative for serial communication details.

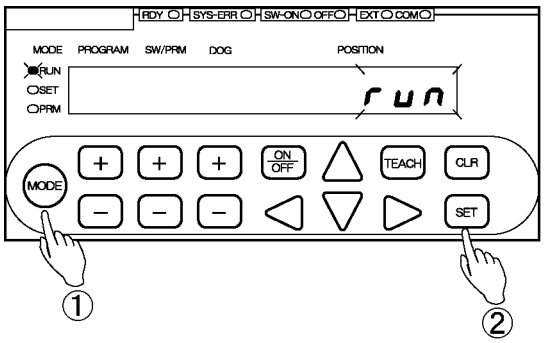
Set the parameter in the following steps.

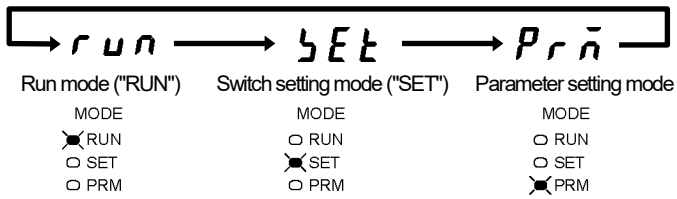
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 58.

Use the (+) and (−) keys under the SW/PRM display to select "58".

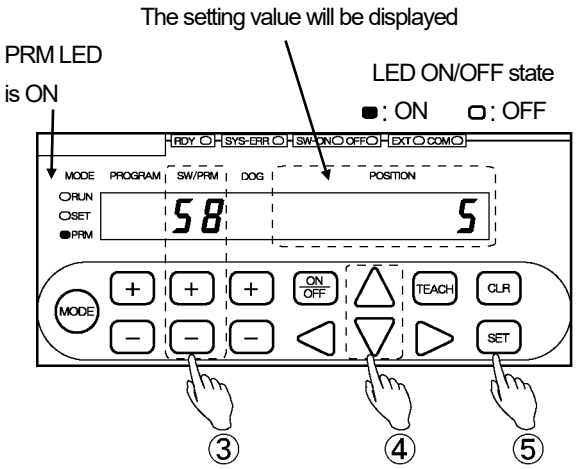
④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: 2400bps 1: 4800bps
2: 9600bps 3: 19200bps
4: 38400bps 5: 57600bps

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the selected value.

Press the (SET) key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

10-15. Communication Protocol Setting

The communication protocol can be selected.

Contact our sales representative for serial communication details.

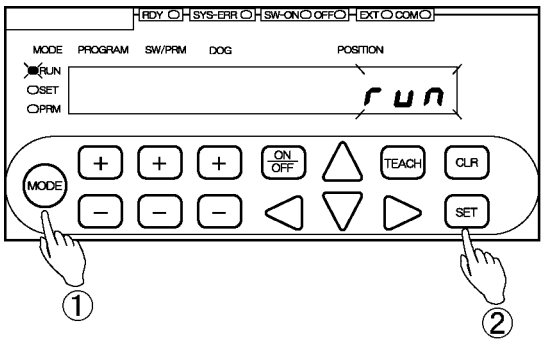
Set the parameter in the following steps.

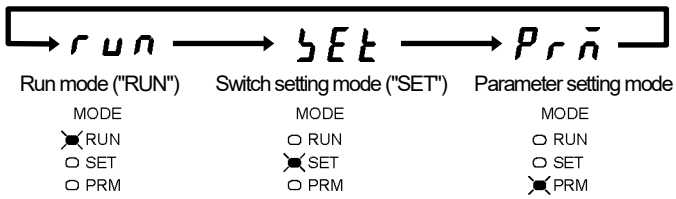
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection

Press the (SET) key.

The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 54.

Use the (+) and (−) keys under the SW/PRM display to select "54".

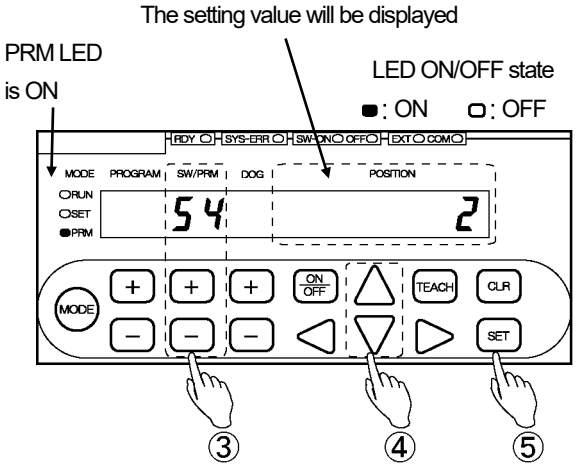
④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:

0: NSD
1: MELSEC-A
2: MELSEC
3: OMRON
9: VARIMONI

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the selected value.

Press the (SET) key.

The POSITION display will become solidly on, indicating that parameter setting is complete.

10-16. Node Number Setting

This parameter can be used to allocate a node number to VARILIMIT. Node number setting is required when Parameter 54 (Protocol) is set to "9: VARIMONI".

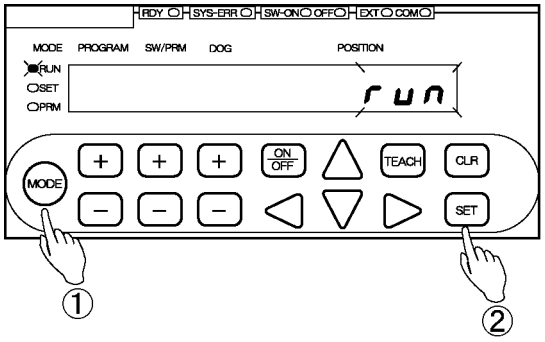
Contact our sales representative for serial communication details.

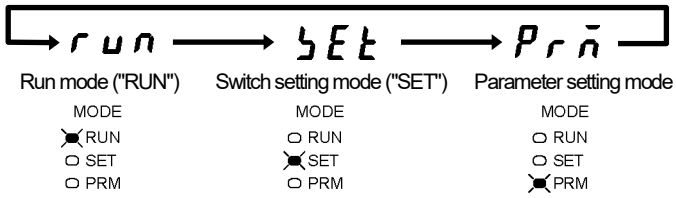
Set the parameter in the following steps.

① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.





② Confirm the mode selection

Press the SET key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 56.

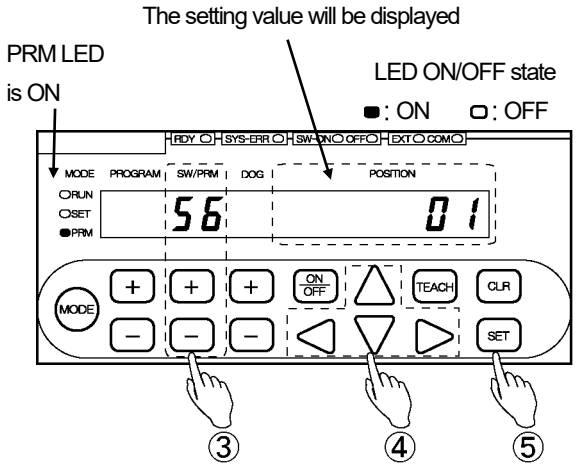
Use the + and − keys under the SW/PRM display to select "56".

④ Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range: 0 to 15

The entered value can be canceled by pressing the CLR key at this point.



⑤ Confirm the entered value.

Press the SET key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

10-17. Device Selection Setting

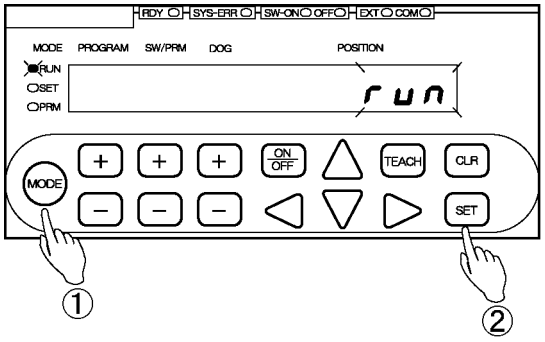
Contact our sales representative for serial communication details.

The programmable controller's device type can be selected.
Device type setting is required when Parameter 54 (Protocol) is set to "2: MELSEC".

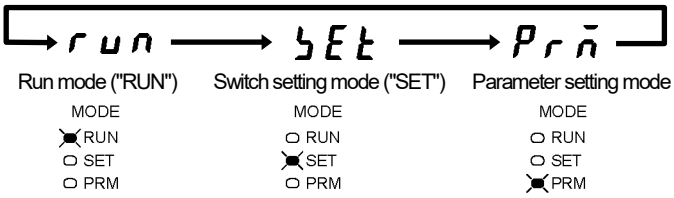
Set the parameter in the following steps.

① Select the parameter setting mode ("PRM").

Press and hold down the MODE key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.



Press the MODE key a number of times until the parameter setting mode ("PRM") is shown.



② Confirm the mode selection

Press the SET key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 53.

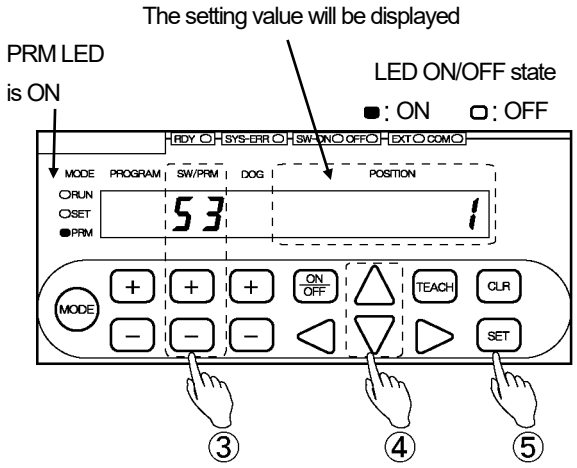
Use the + and − keys under the SW/PRM display to select "53".

④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options:
0: D (Data Register)
1: R (File Register)

The selected value can be canceled by pressing the CLR key at this point.



⑤ Confirm the selected value.

Press the SET key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

10-18. Device Number Setting

Contact our sales representative for serial communication details.

This parameter specifies the first device number to be used by the programmable controller.
Device number setting is required when Parameter 54 (Protocol) is set to either of the following options:
"2: MELSEC", or "3: OMRON".

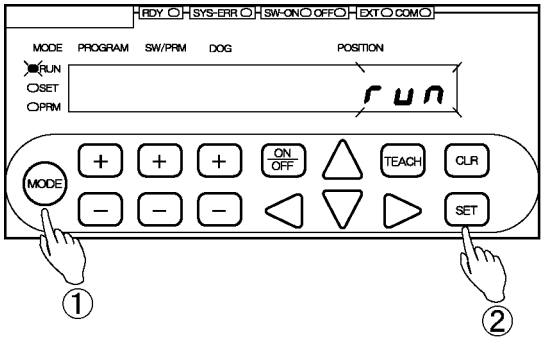
Set the parameter in the following steps.

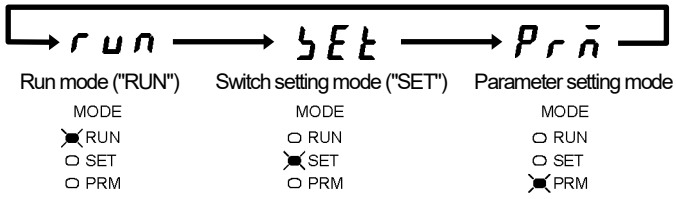
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





② Confirm the mode selection

Press the (SET) key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 52.

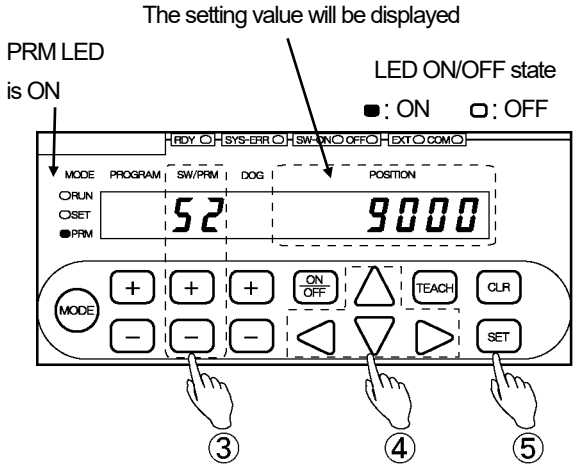
Use the (+) and (−) keys under the SW/PRM display to select "52".

④ Enter the setting value.

Use the ◁, ▷, △ and ▽ keys under the POSITION display to enter the setting value.

Setting range: 0 to 9000

The entered value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the entered value.

Press the (SET) key.
The POSITION display becomes solidly on, indicating that parameter setting is complete.

10-19. Communication Dog Number Setting

Contact our sales representative for serial communication details.

This parameter specifies the last switch-output Dog Number to be retrieved from the programmable controller.
Dog Number setting is required when Parameter 54 (Protocol) is set to either of the following options:
"2: MELSEC", or "3: OMRON".

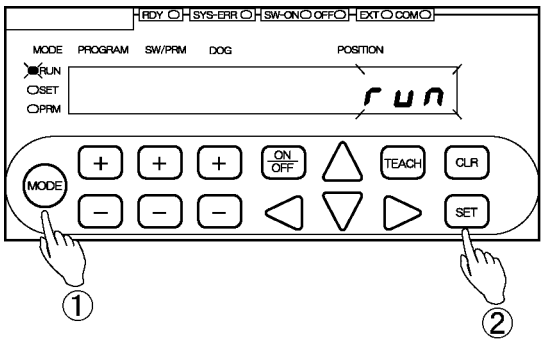
Set the parameter in the following steps.

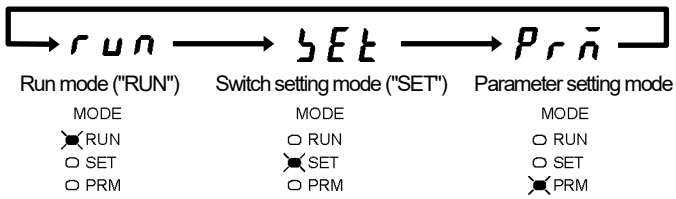
① Select the parameter setting mode ("PRM").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the parameter setting mode ("PRM") is shown.





② Confirm the mode selection

Press the (SET) key.
The mode is now set to the parameter setting mode ("PRM").

③ Select Parameter 51.

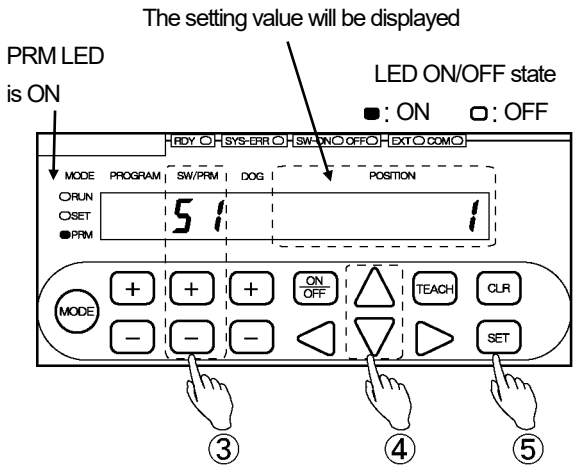
Use the (+) and (−) keys under the SW/PRM display to select "51".

④ Select the setting value.

Use the △ and ▽ keys under the POSITION display to select the setting value.

Options: 1 to A (1 to 10)

The selected value can be canceled by pressing the (CLR) key at this point.



⑤ Confirm the selected value.

Press the (SET) key.
The POSITION display will become solidly on, indicating that parameter setting is complete.

11. Switch Output Setting

This section explains the switch output setting procedure.

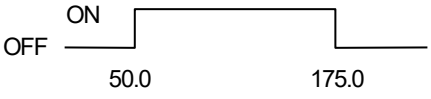
11-1. Switch output setting

Shown below is an example of switch setting.

Setting example

Program No.: 1, Switch No.: 1

ON position	50.0
OFF position	175.0

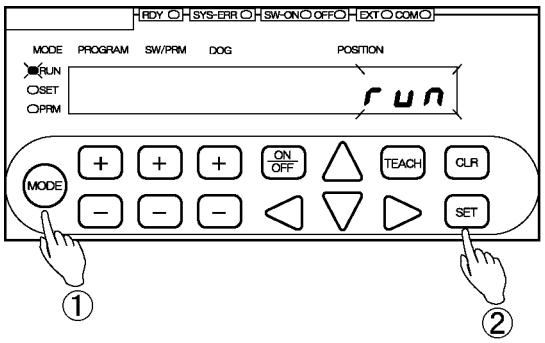


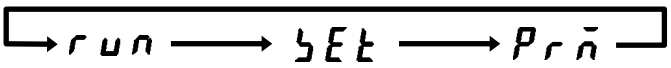
Enter the switch output settings in the following steps:

① Select the switch setting mode ("SET").

Press and hold down the MODE key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the MODE key a number of times until the switch setting mode ("SET") is shown.





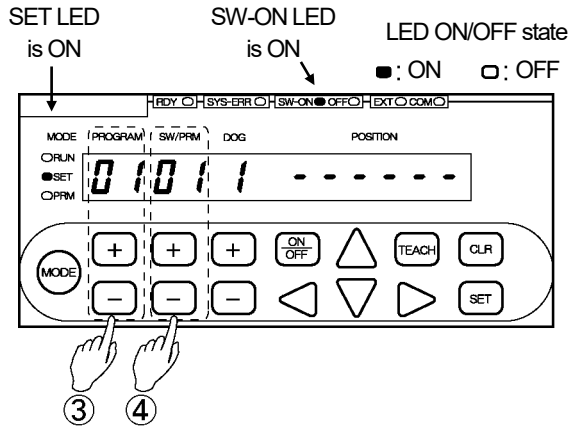
Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection.

Press the SET key.
The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the [+] and [−] keys under the PROGRAM display to select the Program Number.



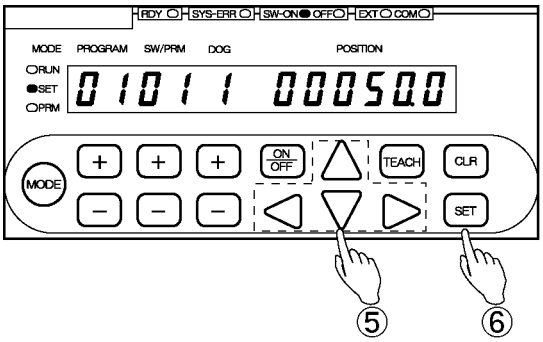
④ Select the Switch Number.

Use the [+] and [−] keys under the SW/PRM display to select the Switch Number.

⑤ Enter the ON position value.

Use the ◁, ▷, △, and ▽ keys under the POSITION display to enter the ON position value. The POSITION display will flicker with the entered value.

The entered value can be canceled by pressing the [CLR] key at this point.

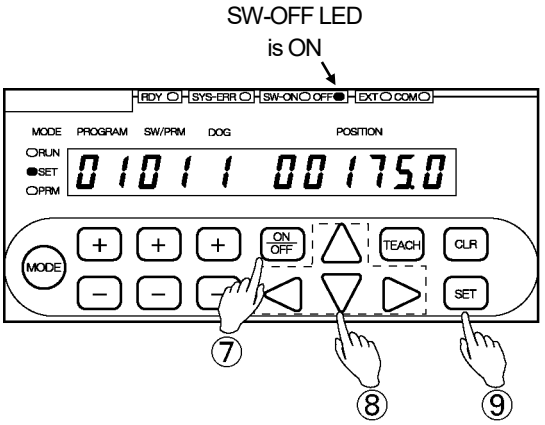


⑥ Confirm the ON position value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that ON position value has been accepted.

⑦ Turn the OFF LED on.

To enter an OFF position value, press the [ON OFF] key so that the "OFF" LED comes on.



⑧ Enter the OFF position value.

Use the ◁, ▷, △, and ▽ keys to enter the OFF position value.
The POSITION display will flicker with the entered value.

The entered value can be canceled by pressing the [CLR] key at this point.

⑨ Confirm the OFF position value.

Press the [SET] key.
The POSITION display will become solidly on, indicating that the OFF position value has been accepted.

⑩ Repeat the above steps as required.

Repeat Steps ④ to ⑨ for the number of switches.

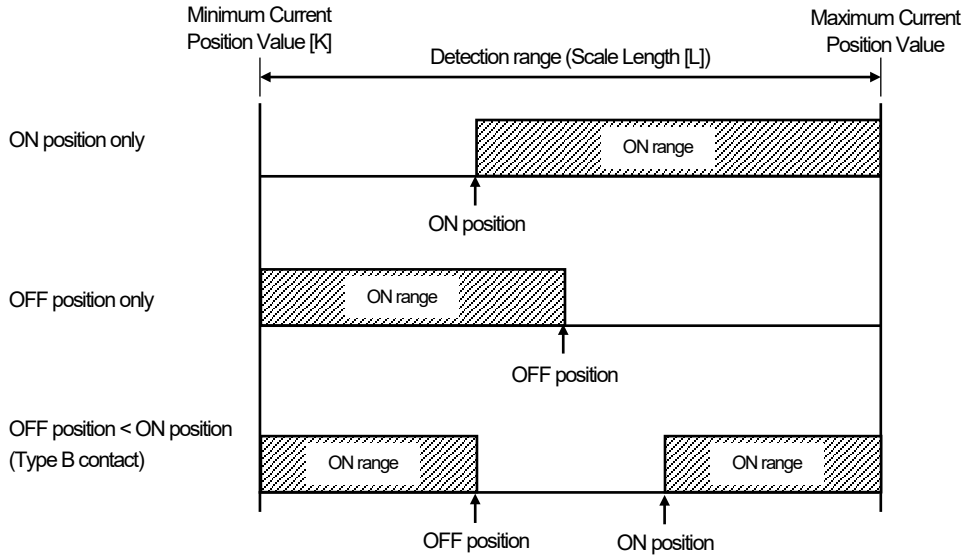
To enter switch output settings for another Program, repeat the procedure from Step ③.

POINT:

1. If no switch output setting is registered, the POSITION display will show "- - - - - -".

2. Each time [ON/OFF] key is pressed, the LED light switches between "SW-ON" and "OFF".
   Turn the "SW-ON" LED on to enter an ON position value.
   Turn the "OFF" LED on to enter an OFF position value.

3. When each of the following types of settings has been entered, the switch output ON range will be as shown in the chart below:
   - Entering the ON position only.
   - Entering the OFF position only.
   - OFF position < ON position ("Type B", or normally closed, contact)



NOTES

When changing the scale length or the minimum current position value after the switch output has been set, the switch output value may fall outside the detection range. The switch output value cannot be corrected in this case.

Delete the setting value by switch or by program before resetting.

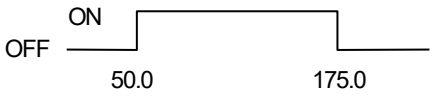
11-2. Setting by teaching

This section explains another switch output setting method.
In this method, the setting is entered by way of teaching.

Setting example

Program No.: 1, Switch No.: 1

ON position	50.0
OFF position	175.0

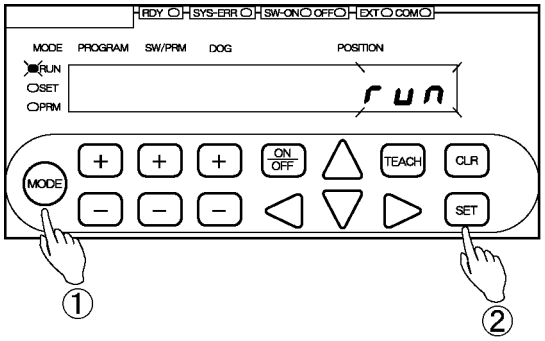


Switch output setting by teaching can be done in the following steps:

① Select the switch setting mode ("SET").

Press and hold down the (MODE) key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.



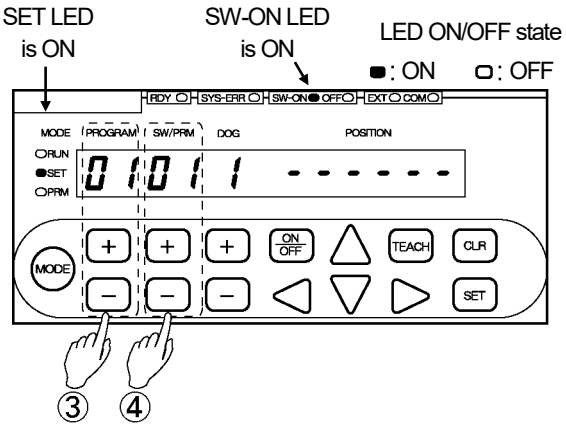
Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE ● RUN ○ SET ○ PRM	MODE ○ RUN ● SET ○ PRM	MODE ○ RUN ○ SET ● PRM

② Confirm the mode selection.

Press the (SET) key.
The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the [+] and [−] keys under the PROGRAM display to select the Program Number.

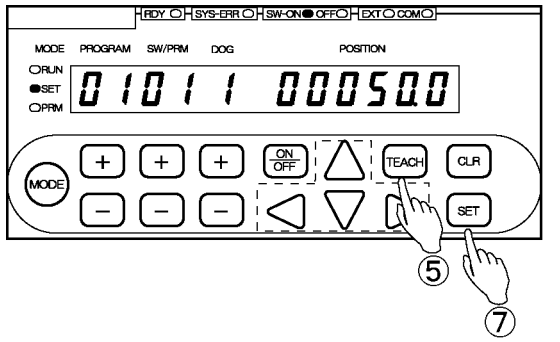


④ Select the Switch Number.

Use the [+] and [−] keys under the SW/PRM display to select the Switch Number.

⑤ Select the teaching mode.

Press the [TEACH] key.
The POSITION display will flicker with the Current Position Value.



⑥ Move the machine to the target ON position.

Move the machine to the position where the switch output should come on.

⑦ Confirm the ON position value shown.

Press the [SET] key.
The POSITION display will become solidly on, indicating that the ON position value has been accepted.

⑧ Turn the OFF LED on. *1

To enter an OFF position value, press the [ON/OFF] key so that the "OFF" LED comes on.

⑨ Repeat Step ⑤ to select the teaching mode again.

⑩ Move the machine to the target OFF position.

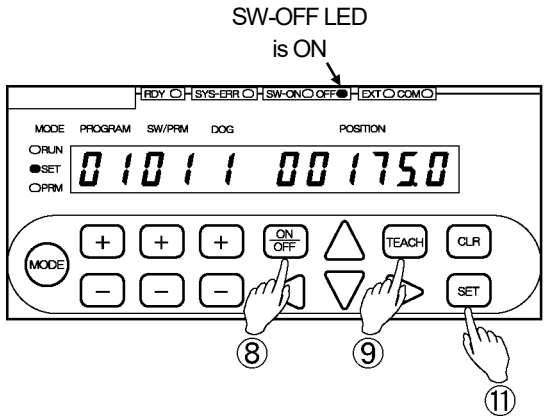
Move the machine to the position where the switch output should go off.

⑪ Confirm the OFF position value shown.

Press the [SET] key.
The POSITION display will become solidly on, indicating that the OFF position value has been accepted.

POINT:

*1: Each time the [ON/OFF] key is pressed, the LED light switches between "SW-ON" and "OFF".
Turn the "SW-ON" LED on to enter an ON position value.
Turn the "OFF" LED on to enter an OFF position value.



⑫ Repeat the above steps.

Repeat Steps ④ to ⑪ for the number of switches.
To enter switch output settings for another program, repeat the procedure from Step ③.

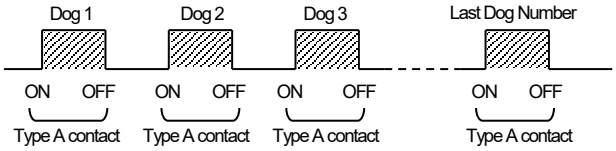
11-3. Multi-dog setting

Up to ten ON and OFF positions (Dogs) can be set for each switch output.
The Dogs are numbered from 1 to A (1 to 10).

POINT:
The following should be considered when entering Multi-Dog settings.

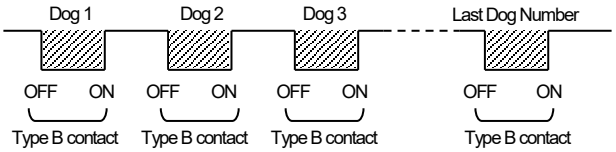
1. Type A (= normally open) (ON position < OFF position) and type B (= normally closed) (OFF position < ON position) contact settings cannot be combined.
   - If the first Dog (Dog 1) is a Type A contact, all the subsequent Dogs should also be Type A.

   Example: Type A contacts



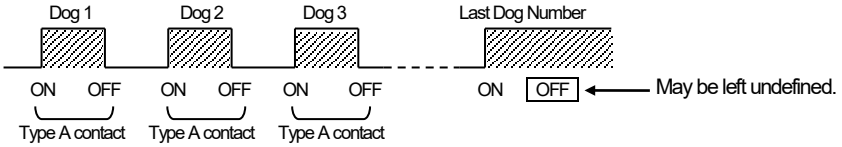
   - If the first Dog (Dog 1) is a Type B contact, all the subsequent Dogs should also be Type B.

   Example: Type B contacts



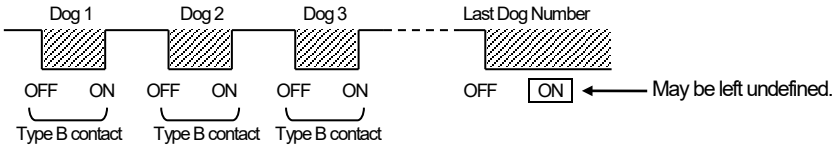
2. Or, when the first Dog (Dog 1) is a Type A contact, the last Dog may be ON position only.

   Example: Type A contacts



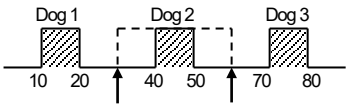
3. When the first Dog (Dog 1) is a Type B contact, the last Dog may be OFF position only.

   Example: Type B contacts

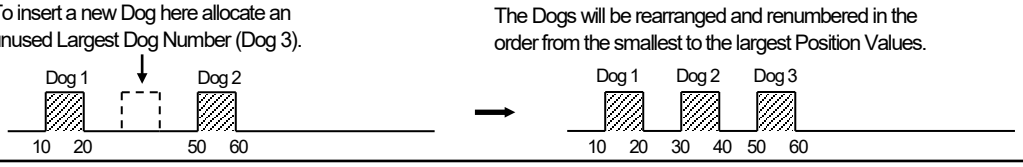


4. Correcting an existing Dog position
   Dog positions can be corrected as long as no overlap with adjacent Dogs occurs.

   Example: Correcting Dog 2



5. Inserting a new Dog
   A new Dog can be inserted between existing Dogs.
   Allocate an unused Largest Dog Number to the new Dog being inserted. Once the new Dog is accepted, the Dogs will be automatically rearranged and renumbered, in the order from the smallest to the largest position values.
   Example: Inserting an ON-at-30, OFF-at-40 Dog:



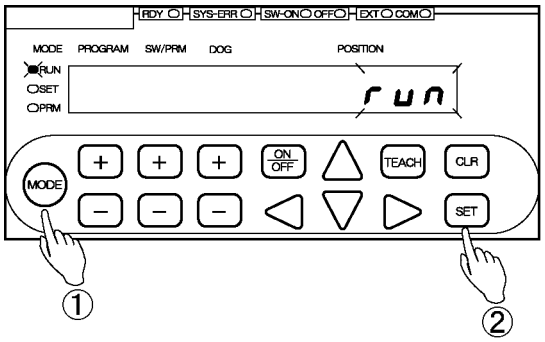
Enter Multi-Dog settings in the following steps:

① Select the switch setting mode ("SET").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.



Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE ● RUN ○ SET ○ PRM	MODE ○ RUN ● SET ○ PRM	MODE ○ RUN ○ SET ● PRM

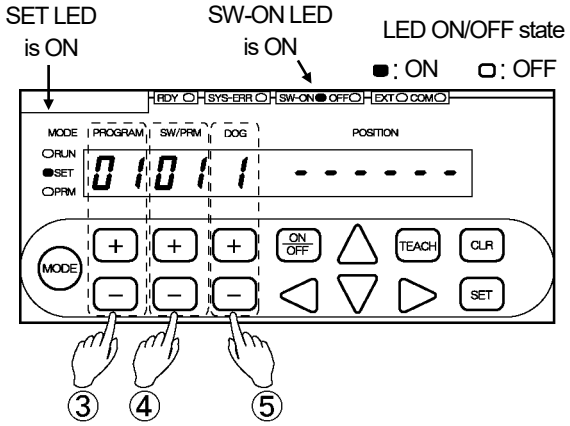
② Confirm the mode selection.

Press the (SET) key.

The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the (+) and (−) keys under the PROGRAM display to select the Program Number.



④ Select the Switch Number.

Use the (+) and (−) keys under the SW/PRM display to select the Switch Number.

⑤ Select the Dog Number. *1

Use the (+) and (−) keys under the "DOG" display to select the Dog Number.

Dog Number options: 1 to A

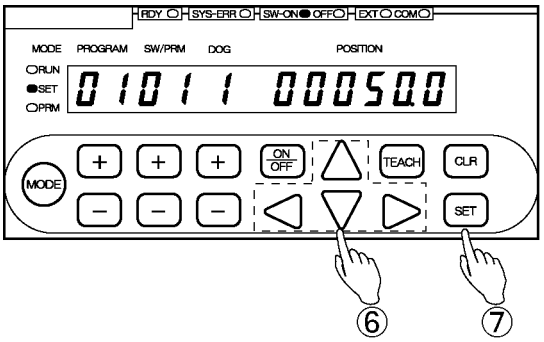
POINT:

*1: If no Dog is registered, the POSITION display will show "- - - - - -".
If a new Dog Number is selected in this condition, a "Multi-Dog Setting" error (Err40) will occur.

⑥ Enter the ON position value.

Use the ◁, ▷, △, and ▽ keys under the POSITION display to enter the ON position value. The POSITION display will flicker with the entered value.

The entered value can be canceled by pressing the CLR key at this point.



⑦ Confirm the ON position value.

Press the SET key.
The POSITION display will become solidly on, indicating that the ON position value has been accepted.

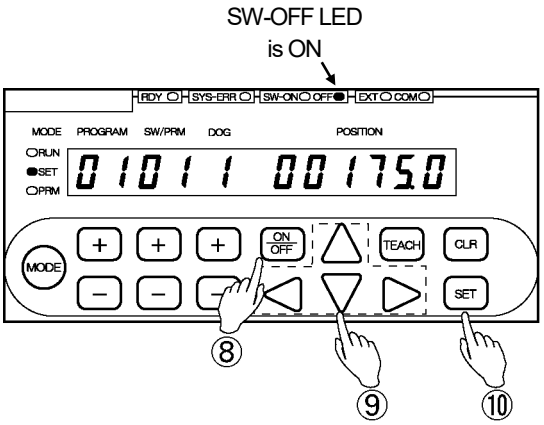
⑧ Turn the OFF LED on. *2

To enter an OFF position value, press the ON/OFF key so that the "OFF" LED comes on.

⑨ Enter the OFF position value.

Use the ◁, ▷, △, and ▽ keys to under the POSITION display to enter the OFF position value. The POSITION display will flicker with the entered value.

The entered value can be canceled by pressing the CLR key at this point.



⑩ Confirm the OFF position value.

Press the SET key.
The POSITION display will become solidly on, indicating that the OFF position value has been accepted.

⑪ Repeat the above steps as required.

Repeat Steps ⑤ to ⑩ for the number of Dogs.

POINT:

*2: Each time the ON/OFF key is pressed, the LED light switches between "SW-ON" and "OFF".
Turn the "SW-ON" LED on to enter an ON position value.
Turn the "OFF" LED on to enter an OFF position value.

11-4. Deleting Switch Output Settings

Switch output settings can be deleted by the following three methods:

(1) Deleting a single Dog

(2) Deleting a single Switch

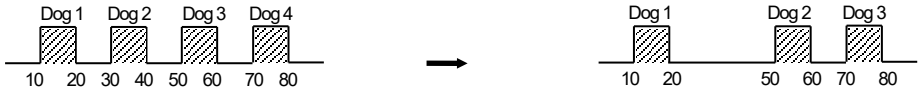
(3) Deleting a single Program

For the specific deleting steps, refer to the following pages.

11-4-1. Deleting a single dog

To delete a single Dog, select the unnecessary Dog and enter the same value to the ON and OFF positions.
Once a Dog is deleted, the remaining Dogs will be renumbered so as not to leave a blank Dog Number.

Deletion example:
Deleting Dog 2

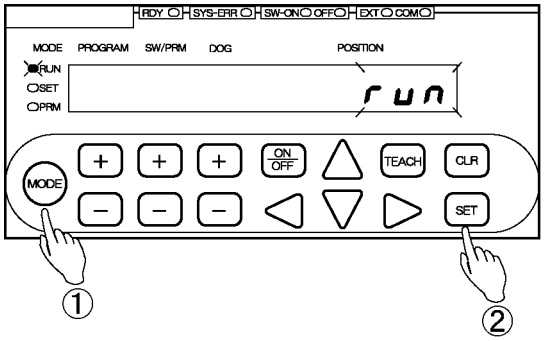


Single Dog deletion can be done in the following steps.

① Select the switch setting mode ("SET").

Press and hold down the (MODE) key (more than 1 second).
The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.



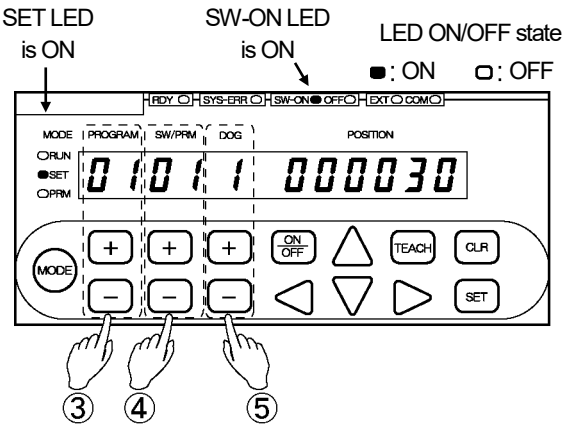
Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

② Confirm the mode selection.

Press the (SET) key.
The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the [+] and [−] keys under the PROGRAM display to select the Program Number.



④ Select the Switch Number.

Use the [+] and [−] keys under the SW/PRM display to select the Switch Number.

⑤ Select the Dog Number.

Use the [+] and [−] keys under the "DOG" display to select the Dog Number.

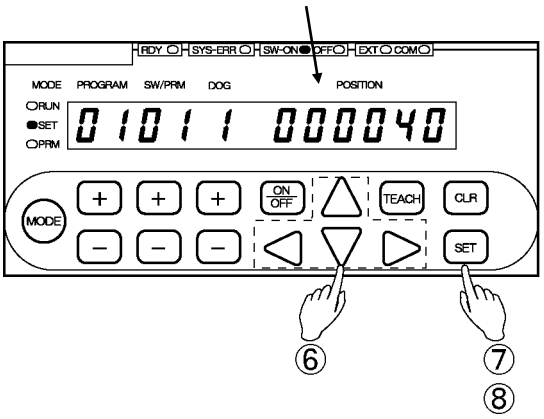
Dog Number options: 1 to A

⑥ Enter the same value to the ON and OFF positions. *1

Use the [◁], [▷], [△], and [▽] keys to under the POSITION display to enter the same value to the ON and OFF positions.

The entered value can be canceled by pressing the [CLR] key at this point.

Step ⑦ will cause the display to flicker more quickly.



⑦ Check the deletion details.

Press the [SET] key.
The POSITION display will flicker more quickly.

Check carefully again if the settings for the selected Dog Number should really be deleted.

The Dog deletion can be canceled by pressing the [CLR] key at this point.

⑧ Execute deletion.

Press the [SET] key one more time.
The POSITION display will become solidly on, indicating that the settings for the selected Dog Number have been deleted.

POINT:
*1: A single Dog can also be deleted in the steps below.
After Step ⑤, press the [ON/OFF] key by holding down the [CLR] key.
The POSITION display will flicker with "- - - - - - -".
Then follow Steps ⑦ and ⑧ to complete deleting.

11-4-2. Deleting a single switch

Deleting a Switch Number will cause all the Dog settings registered to that Switch Number to be deleted.

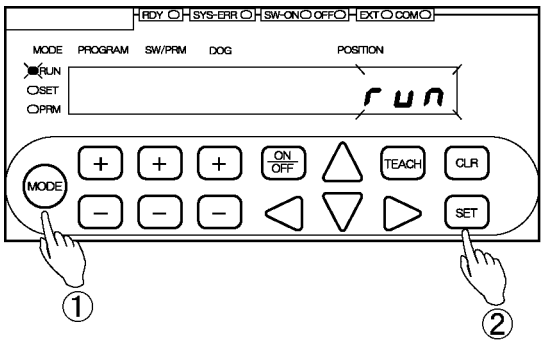
Single Switch deletion can be done in the following steps.

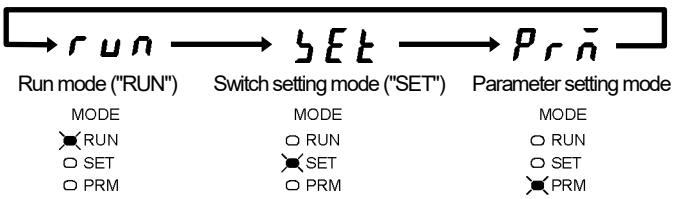
① Select the switch setting mode ("SET").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

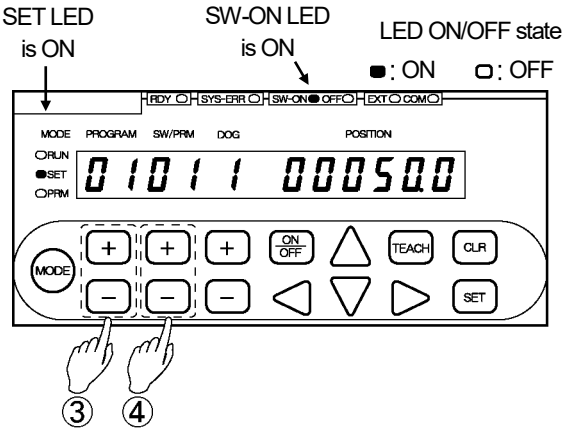
② Confirm the mode selection.

Press the (SET) key.

The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the [+] and [−] keys under the PROGRAM display to select the Program Number.



④ Select the Switch Number.

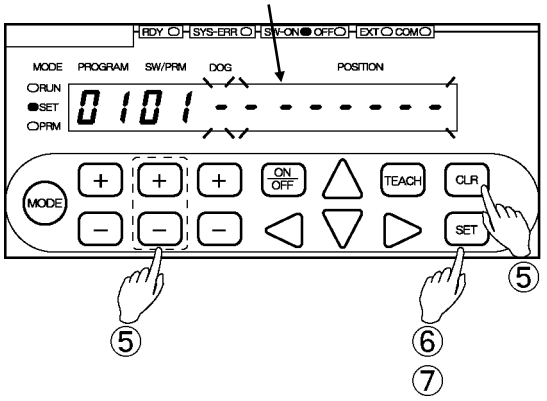
Use the [+] and [−] keys under the SW/PRM display to select the Switch Number.

⑤ Select the deletion mode.

Press the [+] or [−] key under the SW/PRM display while pressing the [CLR] key.
The DOG and the POSITION displays will flicker.

The switch deletion can be canceled by pressing the [CLR] key at this point.

Step ⑤ will cause the display to start flickering.
Step ⑥ will cause the display to flicker more quickly.



⑥ Check the deletion details.

Press the [SET] key.
The DOG and the POSITION displays will flicker more quickly.

Check carefully again if the settings for the selected Switch Number should really be canceled.

The switch deletion can be canceled by pressing the [CLR] key at this point.

⑦ Execute deletion.

Press the [SET] key one more time.
The DOG and the POSITION displays will become solidly on, indicating that the settings for the selected Switch Number have been deleted.

11-4-3. Deleting a single program

Deleting a Program will cause all the switch output settings registered to that Program to be deleted.

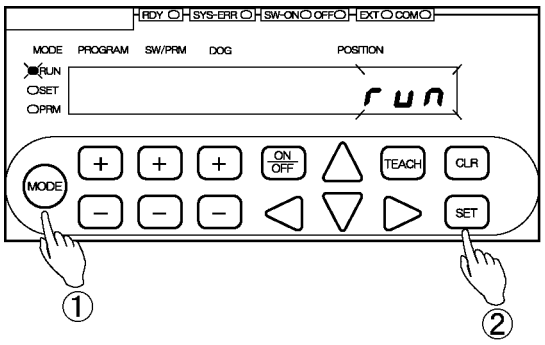
Single Program deletion can be done in the following steps:

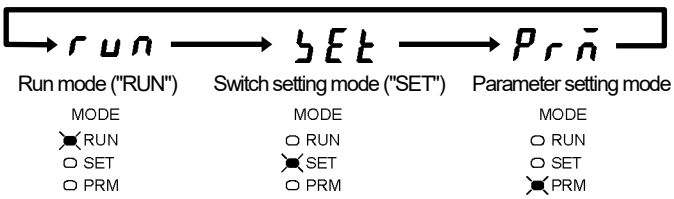
① Select the switch setting mode ("SET").

Press and hold down the (MODE) key (more than 1 second).

The POSITION display will flicker to indicate mode selection is possible.

Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.





Run mode ("RUN")	Switch setting mode ("SET")	Parameter setting mode ("PRM")
MODE	MODE	MODE
✕ RUN	○ RUN	○ RUN
○ SET	✕ SET	○ SET
○ PRM	○ PRM	✕ PRM

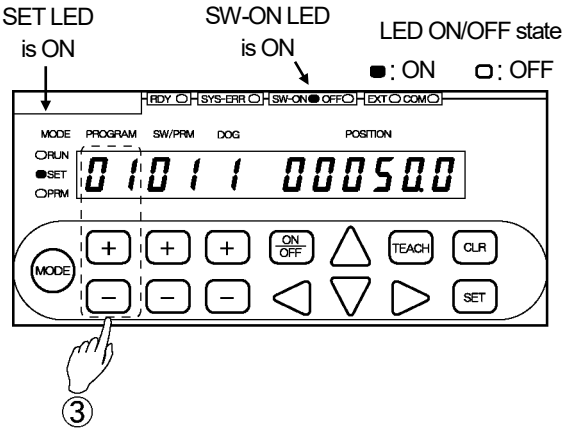
② Confirm the mode selection.

Press the (SET) key.

The mode is now set to the switch setting mode ("SET").

③ Select the Program Number.

Use the [+] and [−] keys under the PROGRAM display to select the Program Number.

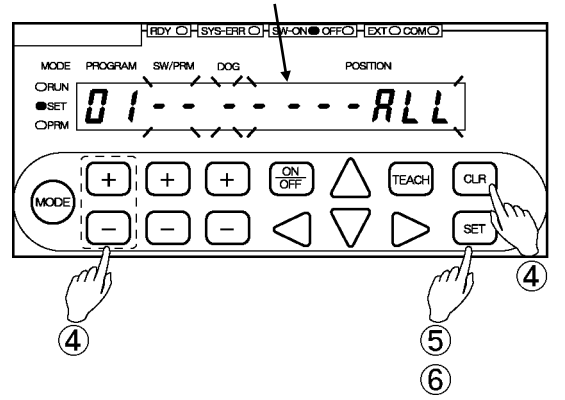


④ Select the deletion mode.

Press the [+] or [−] key under the PROGRAM display while pressing the [CLR] key.
The SW/PRM and the POSITION displays will flicker.

The Program deletion can be canceled by pressing the [CLR] key at this point.

Step ④ will cause the display to start flickering.
Step ⑤ will cause the display to flicker more quickly.



⑤ Check the deletion details.

Press the [SET] key.
The SW/PRM and the POSITION displays will flicker more quickly.

Check carefully again if the settings for the selected Program Number should really be deleted.

The Program deletion can be canceled by pressing the [CLR] key at this point.

⑥ Execute deletion.

Press the [SET] key one more time.
The SW/PRM, DOG, and the POSITION displays will become solidly on, indicating that all the switch output settings registered to the selected Program Number have been deleted.

- MEMO -

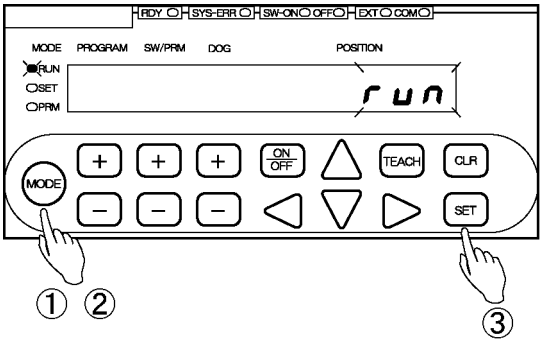
12. Operation

12-1. Starting operation

VARILIMIT operation can be started in the following steps.

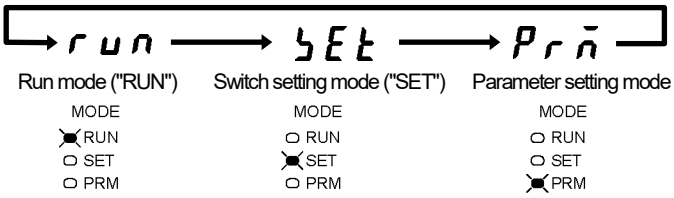
[1] Select the switch setting mode ("SET").
[2] Select the Program Number to be run.
[3] Select the Run mode ("RUN").
[4] Start operation.

[1] Select the switch setting mode ("SET").



① Press and hold down the (MODE) key (more than 1 second).
The POSITION display will flicker to indicate that mode selection is possible.

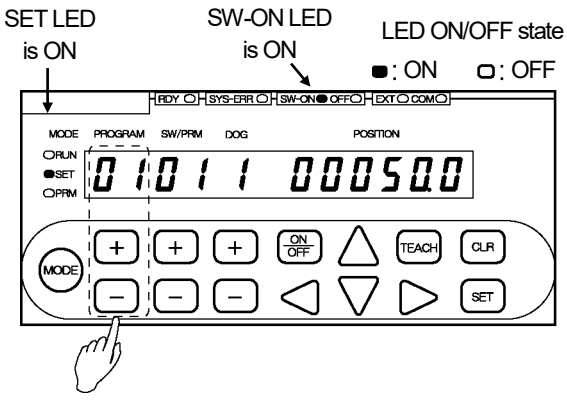
② Press the (MODE) key a number of times until the switch setting mode ("SET") is shown.



③ Press the (SET) key.
The mode is now set to the switch setting mode ("SET").

[2] Select the Program Number to be run.

Use the (+) and (−) keys under the PROGRAM display to select the Program Number.



POINT:

To select a Program Number through I/O, refer to "10-8. Program Number Input Format Selection".

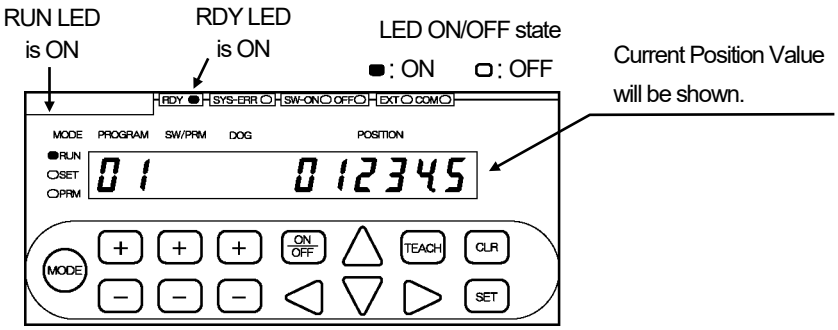
[3] Select the Run mode ("RUN").

Select the Run mode ("RUN") by the method described in Step [1].

[4] Start operation

During VARILIMIT operation, the switch outputs will come on or go off according to their respective setting values.

During unit operation, the Current Position Value will be shown in the POSITION display for monitoring.
For monitor details, refer to "10-2. Changing the Monitor Types".

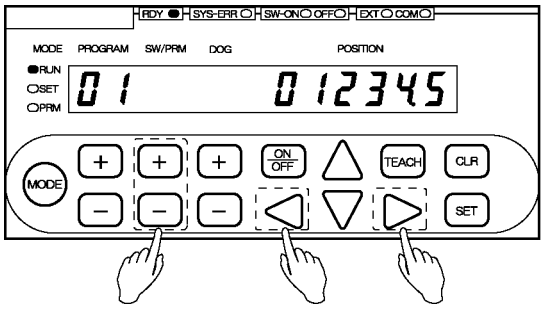


12-2. Changing the monitor types

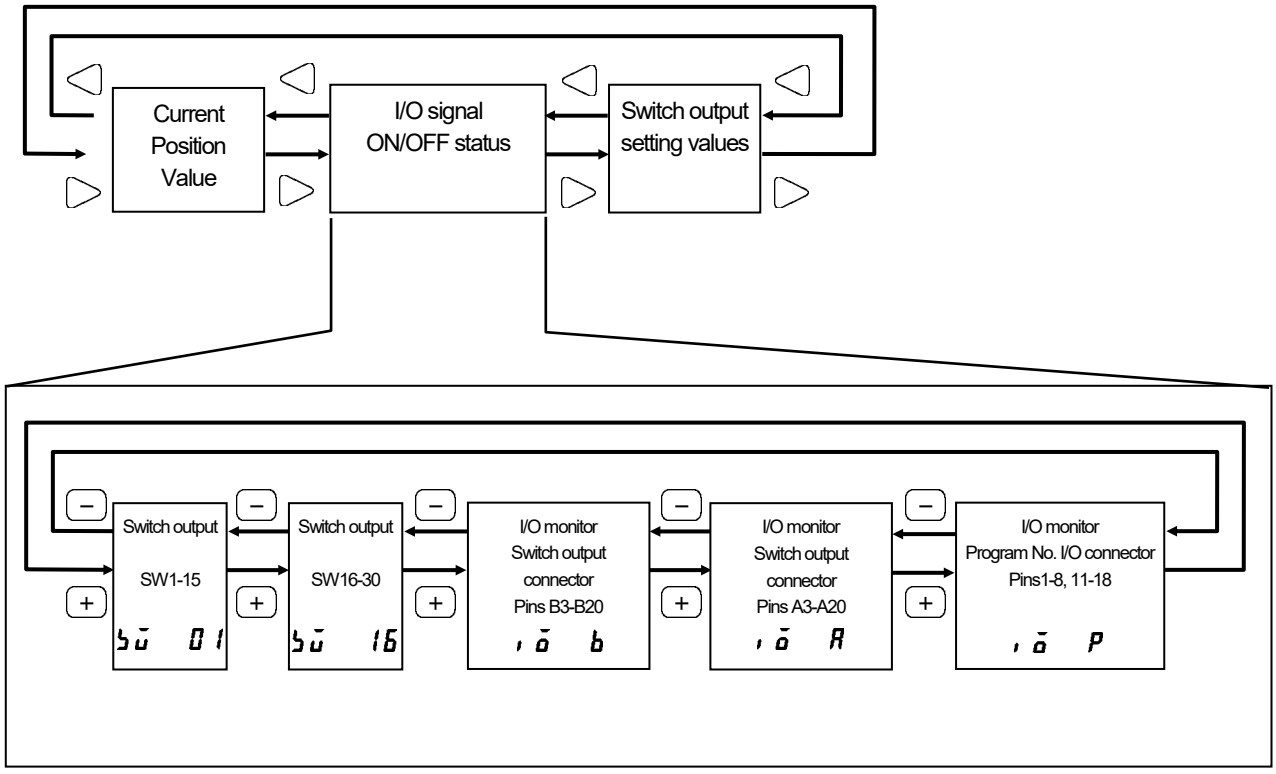
In the Run mode ("RUN"), the following three types of monitors can be viewed.

(1) Current Position Value monitor
(2) I/O signal ON/OFF status monitor
(3) Switch-output setting value monitor

The monitor type can be changed by pressing the ◁ or ▷ key under the POSITION display.
To switch between subscreens of (2), "I/O Signal ON/OFF status monitor", press the + or − key under the SW/PRM display.



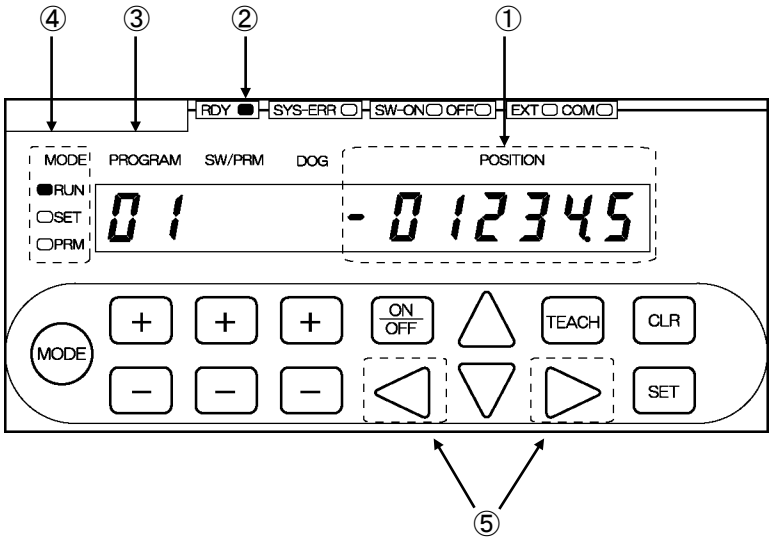
Shown below is the monitor screen configuration.
For monitor screen details, refer to "12-3. Monitors".



12-3. Monitors

(1) Current Position Value monitor

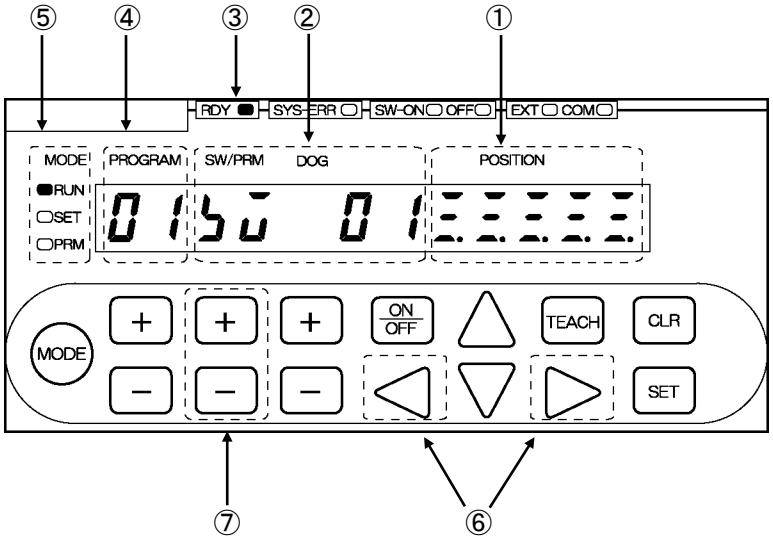
The Current Position Values can be viewed during unit operation.



Component	Description
① POSITION display	The Current Position Value can be viewed.
② RDY indicator	The RDY indicator will be on when the unit is in Run mode and no error is present. The conditions are the same as the switch output connector's "System Ready" output.
③ PROGRAM display	The currently selected Program Number will be shown.
④ MODE indicator	When RUN is lit, it indicates that the unit is currently in the Run mode.
⑤ POSITION keys	Use these keys to change the monitor types.

(2) I/O signal ON/OFF status monitor

Each signal of the switch output connector and the program No. I/O connector can be viewed.



Component	Description
① POSITION display	This is the I/O monitor screen. For further monitor details, refer to the next page.
② SW/PRM display	Shows the title of the currently selected I/O monitor subscreen: SW 01 : Switch output monitor SW1-15 SW 16 : Switch output monitor SW16-30 CN b : Switch output connector pin monitor B3-B20 CN A : Switch output connector pin monitor A3-A20 CN P : Program No. I/O connector pin monitor 1-8, 11-18
③ RDY indicator	The RDY indicator will be on when the unit is in Run mode and no error is present. The conditions are the same as the switch output connector's "System Ready" output.
④ PROGRAM display	The currently selected Program Number will be shown.
⑤ MODE indicator	When RUN is lit, it indicates that the unit is currently in the Run mode.
⑥ POSITION keys	Use these keys to change the monitor types.
⑦ SW/PRM keys	Use these keys to select the subscreen to be shown in the POSITION display. - Switch outputs SW1-15 - Switch outputs SW16-30 - Switch output connector pins B3-B20 - Switch output connector pins A3-A20 -Program No. I/O connector pins 1-8, 11-18

●POSITION display monitor details

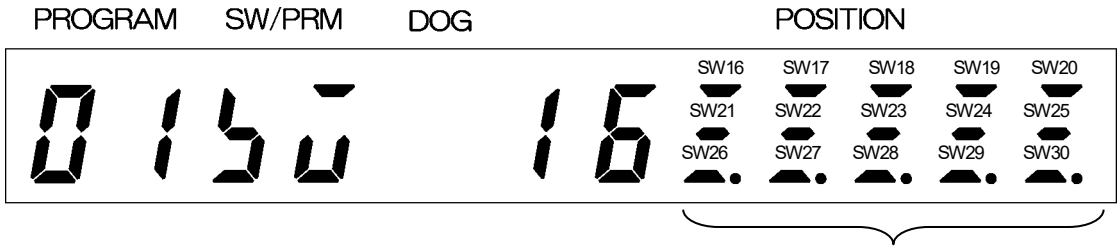
Shown below are the images of Switch and Connector Pin Numbers that are shown in the POSITION display.

1. Switch output monitor SW1-15

ON : ▬ (LED is ON)
OFF : ▭ (LED is OFF)

The LEDs under the currently-on Switch Numbers will be lit.

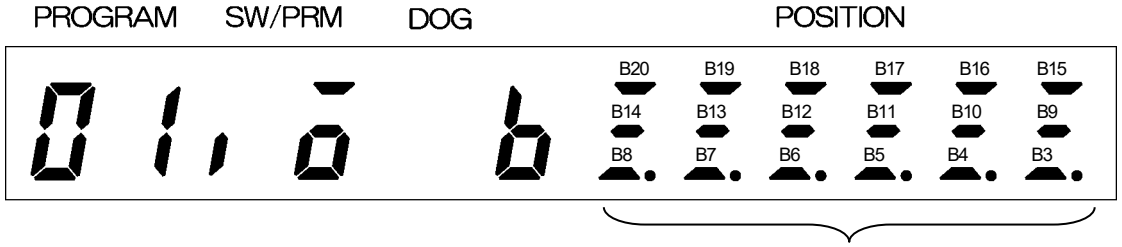
2. Switch output monitor SW16-30



The LEDs under the currently-on Switch Numbers will be lit.

3. Switch output connector pin monitor B3-B20

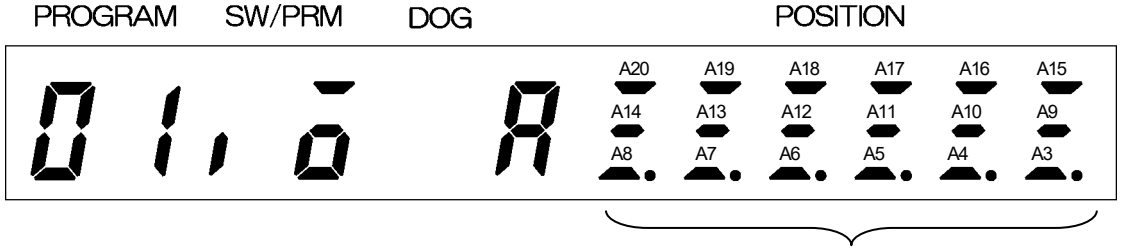
For the signal names, refer to "3-4-5. I/O Connector Pin Arrangement".



The LEDs under the currently-on Connector Pin Numbers will be lit.

4. Switch output connector pin monitor A3-A20

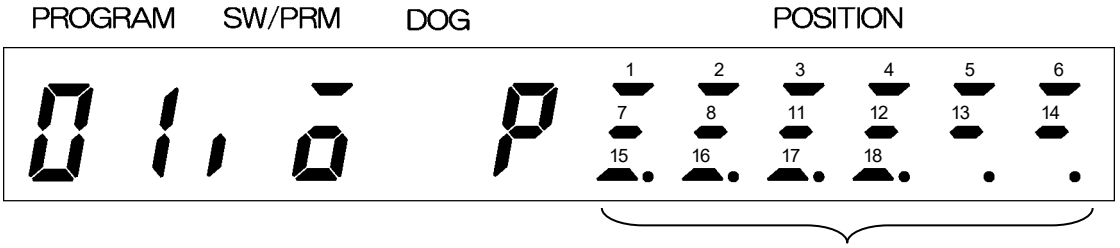
For the signal names, refer to "3-4-5. I/O Connector Pin Arrangement".



The LEDs under the currently-on Connector Pin Numbers will be lit.

5. Program No. I/O connector pin monitor 1-8, 11-18

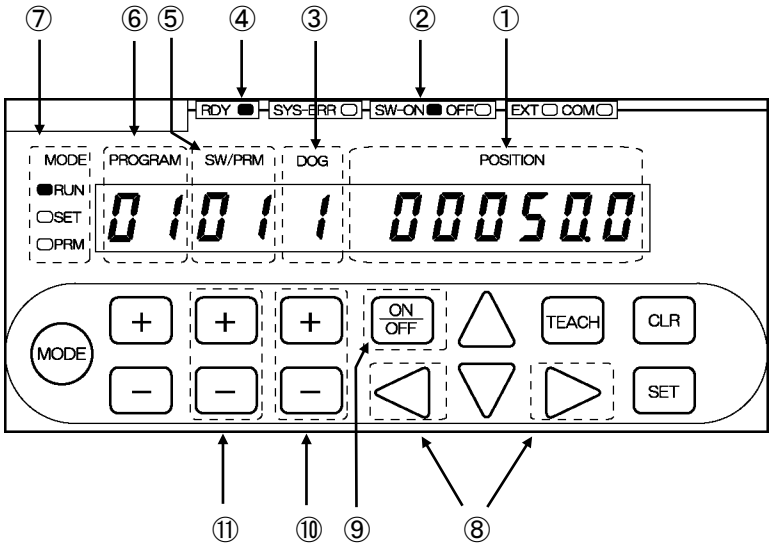
For the signal names, refer to "3-4-5. I/O Connector Pin Arrangement".



The LEDs under the currently-on Connector Pin Numbers will be lit.

(3) Switch output setting value monitor

The setting values associated with individual switch outputs can be viewed.



Component	Description
① POSITION display	The ON or OFF setting value will be shown.
② ON/OFF indicator	Indicates what is currently shown in the POSITION display: "SW-ON" lit : An ON setting value is displayed. "OFF" lit : An OFF setting value is displayed.
③ DOG display	The currently selected Dog Number is displayed.
④ RDY indicator	The RDY indicator will be on when the unit is in Run mode and no error is present. The conditions are the same as the switch output connector's "System Ready" output.
⑤ SW/PRM display	The currently selected Switch Number is displayed.
⑥ PROGRAM display	The currently selected Program Number is displayed.
⑦ MODE indicator	When RUN is lit, it indicates that the unit is currently in the Run mode.
⑧ POSITION keys	Use these keys to change the monitor types.
⑨ ON/OFF key	Use this key to switch between ON and OFF setting values.
⑩ DOG keys	Use these keys to select the required Dog Number to be viewed.
⑪ SW/PRM keys	Use these keys to select the required Switch Number to be viewed.

- MEMO -

MAINTANANCE

Describes about daily inspections and countermeasures for errors.

13. INSPECTIONS
14. TROUBLE SHOOTING
15. PASSWORD FUNCTION

13. INSPECTIONS

13-1. Turn-type ABSOCODER (MRE, VRE)

The inspection should be conducted once every 6 months to a year.
Inspected items which do not satisfy the criteria shown below should be repaired.

Inspection item	Inspection description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	100VAC model: 82 to 132VAC 24VDC model: 21.6 to 30.0VDC	Tester
Ambient conditions	Check the ambient temperature.	ABSOCODER: −20 to +60°C VARILIMIT: 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual inspection
Mount condition	Verify that the ABSOCODER is securely mounted.	There should be no looseness.	
	Verify that the ABSOCODER shaft is securely coupled to the machine shaft.	There should be no looseness.	
	Check for severed cables.	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the I/O connector is plugged in all the way.	There should be no looseness.	

13-2. Linear Type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)

The inspection should be conducted once every 6 months to a year.
Inspected items which do not satisfy the criteria shown below should be repaired.

Inspection item	Inspection description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	100VAC model: 82 to 132VAC 24VDC model: 21.6 to 30.0VDC	Tester
Ambient conditions	Check the ambient temperature.	ABSOCODER: −20 to +60°C VARILIMIT: 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual inspection
Mount condition	Verify that the ABSOCODER is securely mounted.	There should be no looseness.	
	Verify that the ABSOCODER is securely coupled to the machine.	There should be no looseness.	
	Check for severed cables	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the I/O connector is plugged in all the way.	There should be no looseness.	

13-3. Linear Type ABSOCODER (VLS-[ ]PS)

The inspection should be conducted once every 6 months to a year.
Inspected items which do not satisfy the criteria shown below should be repaired.

Inspection item	Inspection description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	100VAC model: 82 to 132VAC 24VDC model: 21.6 to 30.0VDC	Tester
Ambient conditions	Check the ambient temperature.	ABSOCODER: For the value of ambient temperature, refer to the chapter “4-4” VARILIMIT: 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual inspection
Mount condition	Verify that the ABSOCODER is securely mounted.	There should be no looseness.	
	Check for severed cables.	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the I/O connector is plugged in all the way.	There should be no looseness.	

13-4. CYLNUC Cylinder and Inrodsensor

The inspection should be conducted once every 6 months to a year.
Inspected items which do not satisfy the criteria shown below should be repaired.

Inspection item	Inspection description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	100VAC model: 82 to 132VAC 24VDC model: 21.6 to 30.0VDC	Tester
Ambient conditions	Check the ambient temperature.	ABSOCODER: Refer to “ABSOCODER specification”. VARILIMIT : 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual inspection
Mount condition	Verify that the CYLNUC Cylinder is securely mounted.	There should be no looseness.	
	Verify that the CYLNUC Cylinder rod is securely coupled to the machine.	There should be no looseness.	
	Check for severed cables	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the I/O connector is plugged in all the way.	There should be no looseness.	

13-5. NT Coder

The inspection should be conducted once every 6 months to a year.
Inspected items which do not satisfy the criteria shown below should be repaired.

Inspection item	Inspection description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block to determine if it is within the prescribed range.	100VAC model: 82 to 132VAC 24VDC model: 21.6 to 30.0VDC	Tester
Ambient conditions	Check the ambient temperature.	NT Coder: −20 to +60°C VARILIMIT: 0 to +55°C	Thermometer
	There should be no accumulation of dust.	None	Visual inspection
Mount condition	Verify that the NT Coder is securely mounted.	There should be no looseness.	
	Verify whether the NT coder arm's contact has contact with workpiece's measurement area.	No gap allowed.	
	Check for severed cables	Cable should appear normal.	
	Verify that the sensor cable connector is plugged in all the way.	There should be no looseness.	
	Verify that the I/O connector is plugged in all the way.	There should be no looseness.	

- MEMO -

14. TROUBLE SHOOTING

Error causes and countermeasures are described below.

14-1. Error Displays and Countermeasures

Displays the error on VARILIMIT when VARILIMIT or ABSOCODER has an error.
Refer to the following list and implement appropriate countermeasures.

● Lists of the error displays, probable causes, and error cancel procedures (1/3)

Error display	Name	Probable cause	Error cancel procedure
Err 05 flickers RDY.LED is OFF	Sensor Power Supply Error	The power supply inside of VARILIMIT for sensor breaks down.	Replace VARILIMIT. For more details, refer to the chapter "14-3".
Err 07 flickers RDY.LED is OFF	Sensor Data Error	Sensor connector is loose.	After connecting a connector tightly, cancels the error following methods: - Press the [CLR] key. - Input the error cancel signal from external. NOTE If the Current Position Value does not match the actual position, set Parameter 97 (Current Position Setting) again after the error status is canceled.
		Sensor cable is severed.	Replace the sensor cable. For more details, refer to the chapter "14-3".
		The ABSOCODER has received a severe impact.	After removing the error causes, cancels the error following methods: - Press the [CLR] key. - Input the error cancel signal from external. NOTE If the Current Position Value does not match the actual position, set Parameter 97 (Current Position Setting) again after the error status is canceled.
Err 08 flickers RDY.LED is OFF	Sensor Error	Sensor connector is disconnected and loose.	After removing the error causes, cancels the error following methods: - Press the [CLR] key. - Input the error cancel signal from external.
		Sensor cable is severed.	Replace the sensor cable. For more details, refer to the chapter "14-3".
		ABSOCODER failure	Replace ABSOCODER. For more details, refer to the chapter "14-3".
		VARILIMIT failure	Replace VARILIMIT. For more details, refer to the chapter "14-3".
Err 09 flickers RDY.LED is OFF	Memory Error	Memory data has been changed to due external noise, etc.	Do the initialization operation. For more details, refer to the chapter "14-4". NOTE Data needs to reset up because the parameter and switch output setting values are initialized.
Err 10	Reserved	Does not normally occur.	Contact us.
Err 17 flickers RDY.LED is OFF	No Current Position Value Increase Direction Setting Error	Parameter 91 is not set.	Set Parameter 91(Sensor Selection / Sensor Rotation (Travel) Direction).
Err 19 flickers RDY.LED is OFF	No Current Position Setting Error	Parameter 97 is not set.	Set Parameter 97 (Current Position Setting).

● Lists of the error displays, probable causes, and error cancel procedures (2/3)

Error display	Name	Probable cause	Error cancel procedure
Err 23 flickers RDY.LED is OFF by parameter setting	Preset Error	●When Parameter E0 is set to 0 No preset has been attempted after the machine passed the preset zone. ●When Parameter E0 is set to 1 or 2 The attempted preset exceeded the permissible correction amount.	Cancel the error following methods: - Press the [CLR] key. - Input the error cancel signal from external. After the error status is canceled, change the preset signal input position. Or change the preset zone or the preset permissible correction amount setting at parameters.
Err 27 flickers RDY.LED is OFF	Program Number Input Error	A program number other than 1-8 has been input when Parameter E0 is set to 0 or 1.	Input an appropriate program number
Err 29 flickers RDY.LED is OFF	No Minimum Current Position Value Setting Error	Parameter 98 is not set.	Set Parameter 98 (Minimum Current Position Value).
Err 30 flickers RDY.LED is OFF	No Scale Length Setting Error	Parameter 99 is not set.	Set Parameter 99 (Scale Length).
Err 31 flickers RDY.LED is OFF	Scale Length and the Number of Pitches Setting Error	Parameters 99 and A0 are not set.	Set Parameters 99 (Scale Length) and A0 (No. of Scale Length Pitches).
Err 33 flickers RDY.LED is OFF	Number of Pitches Setting Error	Parameters A0 is not set.	Set Parameters A0 (No. of Scale Length Pitches).
Err 40 flickers for two seconds	Multi-Dog Setting Error	The selection of a new Dog Number has been attempted but the currently selected Dog Number has no ON and OFF setting.	Enter ON and OFF position settings to the currently selected Dog Number.
Err 41 flickers for two seconds	Multi-Dog Setting Error	The selection of a new Dog Number has been attempted but the currently selected Dog Number has no ON setting.	Enter an ON position setting to the currently selected Dog Number.
Err 42 flickers for two seconds	Multi-Dog Setting Error	The selection of a new Dog Number has been attempted but the currently selected Dog Number has no OFF setting.	Enter an OFF position setting to the currently selected Dog Number.
Err 43 flickers for two seconds	Multi-Dog Setting Error	A new Dog setting is attempted but it overlaps with an existing Dog range.	Change the setting values so that the Dog will not overlap with existing Dog ranges.
Err 44 flickers for two seconds	Multi-Dog Setting Error	The insertion of an ON-position-only data into between existing Dogs has been attempted.	Insert ON and OFF position settings together, or change the setting value.
Err 45 flickers for two seconds	Multi-Dog Setting Error	The insertion of an OFF-position-only data into between existing Dogs has been attempted.	Insert ON and OFF position settings together, or change the setting value.
Err 46 flickers for two seconds	Multi-Dog Setting Error	The insertion of an ON-position-only data has been attempted into a position where an OFF-position only data is allowed.	Enter an OFF-position-only setting or ON- and OFF-position settings together.
Err 47 flickers for two seconds	Multi-Dog Setting Error	The insertion of an OFF-position-only data has been attempted into a position where an ON-position only data is allowed.	Enter an ON-position-only setting or ON- and OFF-position settings together.
Err 50 flickers RDY.LED is OFF by parameter setting	Preset Data Error	A Current Position Preset is attempted but the Preset Value falls outside the detection range.	Change the current position preset value to a value within the detection range defined by Parameters 99 (Scale Length) and 98 (Minimum Current Position Value).

● Lists of the error displays, probable causes, and error cancel procedures (3/3)

Error display	Name	Probable cause	Error cancel procedure
Err Hi ↑ Shown alternately ↓ at 2-sec interval Largest permissible setting value	Over the Upper Switch Setting Limit	The attempted setting value for switch output is larger than the upper setting limit.	Change the value to a value within the detection range defined by Parameters 99 (Scale Length) and 98 (Minimum Current Position Value).
Err Lo ↑ Shown alternately ↓ at 2-sec interval Smallest permissible setting value	Below the Lower Switch Setting Limit	The attempted setting value for switch output is smaller than the lower setting limit.	Change the value to a value within the detection range defined by Parameters 99 (Scale Length) and 98 (Minimum Current Position Value).
Err HL ↑ Shown alternately ↓ at 2-sec interval Disabled Setting Value	Switch Setting Value "Out of Detection Range" Error	The attempted value to change the setting value for switch output is out of the detection range.	Delete the setting value for switch output and reset it with a value within the detection range.
Err Eq ↑ Shown alternately ↓ at 2-sec interval Disabled Setting Value	Same Value Setting Not Accepted	The analog output setting has been attempted with the same maximum and minimum position values.	Enter a different value.
"uuuuuu" shown ↑ Shown alternately ↓ An error code	Necessary parameter missing	A parameter necessary for the RUN or the SET mode is not set.	Set the necessary parameter according to the error code shown.
SYS-ERR LED is ON	System Error	Power voltage is low.	Replace the power supply.
		VARILIMIT failure	Replace VARILIMIT. For more details, refer to the chapter "14-3".

14-2. Output Status upon Error Occurrence

Shown below are what the status of the output signals will be when various errors occur.

Item \ Output	Switch output	Program No. output	Motion detection output / HOLD measuring completed output	Preset error output	Current position output	System ready output	Analog output
Err 05 Sensor Power Supply Error	Output OFF	Output valid	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 07 Sensor Data Error	Output OFF	Output valid	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 08 Sensor Error	Output OFF	Output valid	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 09 Memory Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 12mA
Err 10 Reserved	Output OFF	Output valid	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 17 No Current Position Value Increase Direction Setting Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 19 No Current Position Setting Error	Output OFF	Output valid	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 23 Preset Error	Output valid	Output valid	Output valid	Depends on Parameter Setting	Output valid	Depends on Parameter Setting	Output valid
Err27 Program Number Input Error	Indefinite output	Indefinite output		Output valid	Output valid	Output OFF	Output valid
Err 29 No Minimum Current Position Value Setting Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 30 No Scale Length Setting Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err31 Scale Length and the Number of Pitches Setting Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err33 No. of Pitches Setting Error	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output OFF	Output 0V or 4mA
Err 40 to Err 47 Multi-Dog Setting Error	This is an error that may occur upon a Multi-Dog setting attempt.						
Err 50 Preset Data Error	Output valid	Output valid	Output valid	Depends on Parameter Setting	Output valid	Depends on Parameter Setting	Output valid

14-3. Procedure Contents after Replacing

Carry out the following measures after replacing VARILIMIT, ABSOCODER, and sensor cable.

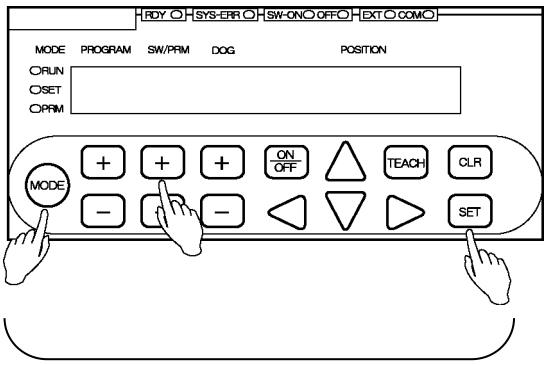
Replacing contents	Measures
In the case of replacing ABOSOCODER	Carry out the following steps after replacement: 1. Cancel the error status by one of the following methods: - Press the [CLR] key. - Input the error cancel signal from external. 2. Enter the Current Position Value to Parameter 97.
In the case of replacing the sensor cable	Carry out the following steps after replacement: 1. Cancel the error status by one of the following methods: - Press the [CLR] key. - Input the error cancel signal from external. 2. Enter the Current Position Value to Parameter 97.
In the case of replacing VARILIMIT	Set all the necessary parameters and switch outputs after replacement.

14-4. Initialization Operation

All the VARILIMIT setting contents are deleted after the initialization operation, and the setting is initialized as the factory setting value.

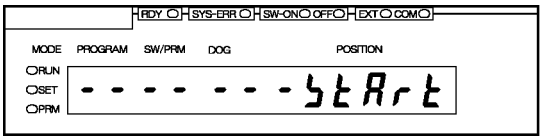
Initializes the setting in the following steps.

① Turn the power on with holding 3 keys (MODE, + of SW/PRM, and SET) at same time.
Holds 3 key more than 1 second, and the initialization will start.

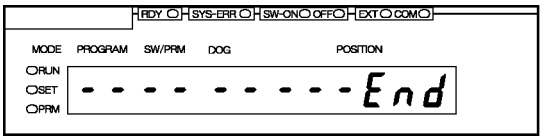


Presses 3 keys at same time.

② The display is following figure when the initialization starts.



The display is following figure when the initialization finishes.



③ Turn the power off and then on again.
This is the end of the initialization operation.

NOTES

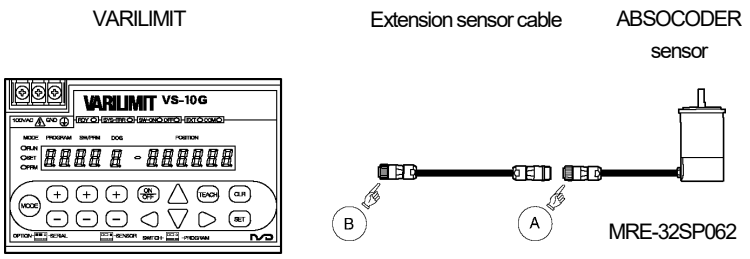
The parameter setting contents and switch output setting value are deleted after the initialization operation.
Before the initialization, check the machine position (origin point etc.) and setting contents and write it on data sheet which is attached with this manual.

14-5. ABSOCODER CHECK LISTS

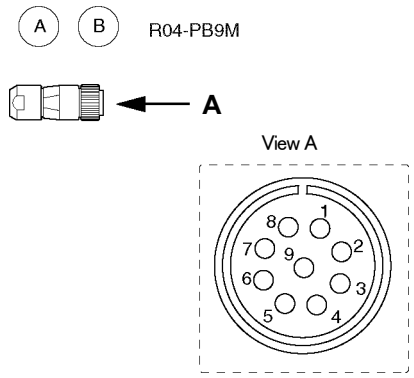
14-5-1. Multi-turn Type ABSOCODER (MRE-[ ]SP062)

● Applicable ABSOCODER sensor models
MRE-32SP062
MRE-G[ ]SP062 [ ] : 64, 128, 160, 256, 320

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]	
			MRE-32SP062	MRE-G[ ]SP062
1	SIN+	Brown	100 to 120	115 to 123
2	SIN-	Red		
3	-COS+	Orange	100 to 120	115 to 123
4	-COS-	Yellow		
5	OUT1+	Green	4 to 10	28.5 to 40.5
6	OUT1-	Blue		
7	OUT2+	Violet	113 to 137	28.5 to 40.5
8	OUT2-	Gray		
9	Shield	Shield	—	—
—	—	—		

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, violet, shield	∞
Between orange and yellow		Between orange and green, violet, shield	
Between green and blue		Between green and violet, shield	
Between violet and gray		Between violet and shield	
		Between frame and each wire	

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, violet, shield	10MΩ or more
Between orange and green, violet, shield	
Between green and violet, shield	
Between violet and shield	
Between frame and each wire	

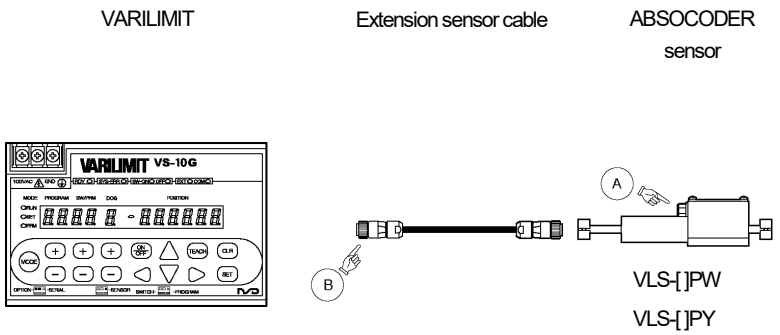
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

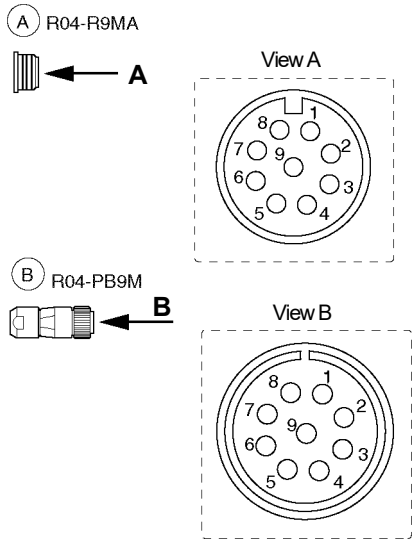
14-5-2. Linear Type ABSOCODER (VLS-[ ]PW, VLS-[ ]PY)

● Applicable ABSOCODER sensor models
VLS-[ ]PW
VLS-[ ]PY

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]		
			VLS-256PWB VLS-512PYB	VLS-512PWB VLS-1024PYB	VLS-1024PW VLS-2048PY
1	SIN+	Brown	46 to 66	90 to 125	141 to 181
2	SIN-	Red			
3	-COS+	Orange	46 to 66	90 to 125	141 to 181
4	-COS-	Yellow			
5	OUT1+	Green	24 to 32	27 to 35	27 to 37
6	OUT1-	Blue			
7	OUT2+	Violet	24 to32	27 to 35	27 to 37
8	OUT2-	Gray			
9	Shield	Shield	–	–	–
–	–	–			

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, violet, shield	∞
Between orange and yellow		Between orange and green, violet, shield	
Between green and blue		Between green and violet, shield	
Between violet and gray		Between violet and shield	
		Between frame and each wire	

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, violet, shield	10MΩ or more
Between orange and green, violet, shield	
Between green and violet, shield	
Between violet and shield	
Between frame and each wire	

⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

14-5-3. CYLNUC Cylinder (CSA, SBA, SBH)

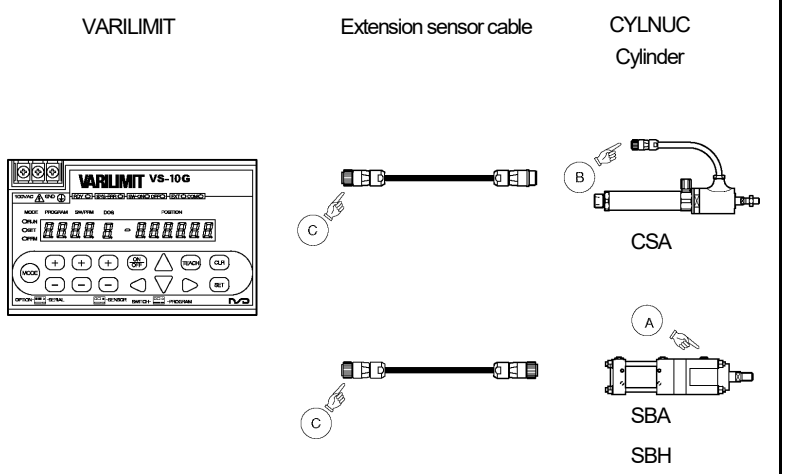
● Applicable CYLNUC Cylinder models

CSA

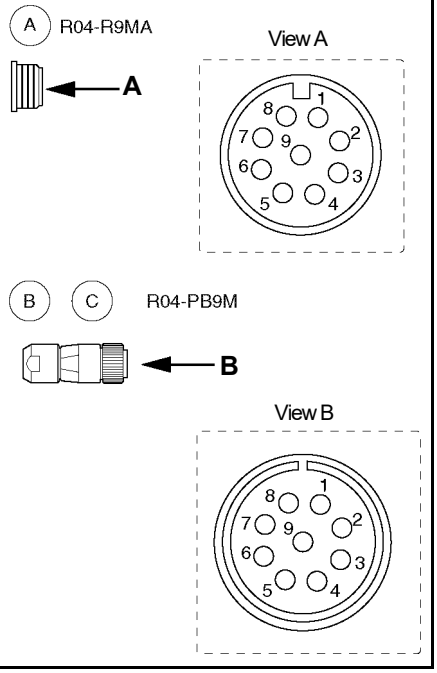
SBA

SBH

● Connection configuration



● Connector appearance and pin position



Checks at Point C should be carried out with Point A or B connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]						
			CSA		SBA / SBH				
			ϕ20	ϕ40	ϕ40	ϕ50	ϕ63	ϕ80	ϕ100
1	SIN+	Brown	61 to 136	71 to 146	20 to 60	23 to 63	25 to 65	30 to 70	42 to 82
2	SIN-	Red							
3	-COS+	Orange	61 to 136	71 to 146	20 to 60	23 to 63	25 to 65	30 to 70	42 to 82
4	-COS-	Yellow							
5	OUT1+	Green	185 to 215	203 to 233	57 to 77	61 to 81	67 to 87	81 to 101	100 to 128
6	OUT1-	Blue							
7	—	—	—	—	—	—	—	—	—
8	—	—							
9	Shield	Shield	—	—	—	—	—	—	—
—	—	—							

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A, B, or C using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, shield	∞
Between orange and yellow		Between orange and green, shield	
Between green and blue		Between green and shield	
		Between frame and each wire	

*1: If checks are done at Point C, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, shield	10MΩ or more
Between orange and green, shield	
Between green and shield	
Between frame and each wire	

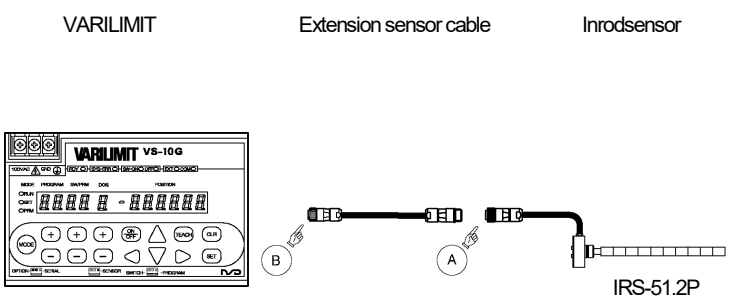
⚠ NOTES

1. Make sure to disconnect the CYLNUC Cylinder from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the CYLNUC Cylinder from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the CYLNUC Cylinder to the VARILIMIT.

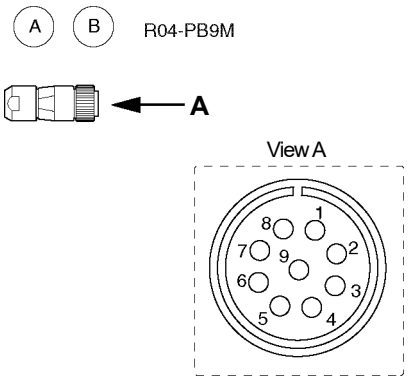
14-5-4. Inrodsensor (IRS-51.2P)

● Applicable Inrodsensor
IRS-51.2P

● Connection configuration



● Connector appearance and pin position



Checks at Point C should be carried out with Point A or B connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]
			IRS-51.2P (ϕ18)
1	SIN+	Brown	19 to 59
2	SIN-	Red	
3	-COS+	Orange	19 to 69
4	-COS-	Yellow	
5	OUT1+	Green	103 to 123
6	OUT1-	Blue	
7	—	—	—
8	—	—	
9	Shield	Shield	—
—	—	—	

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, shield	∞
Between orange and yellow		Between orange and green, shield	
Between green and blue		Between green and shield	
		Between frame and each wire	

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, shield	10MΩ or more
Between orange and green, shield	
Between green and shield	
Between frame and each wire	

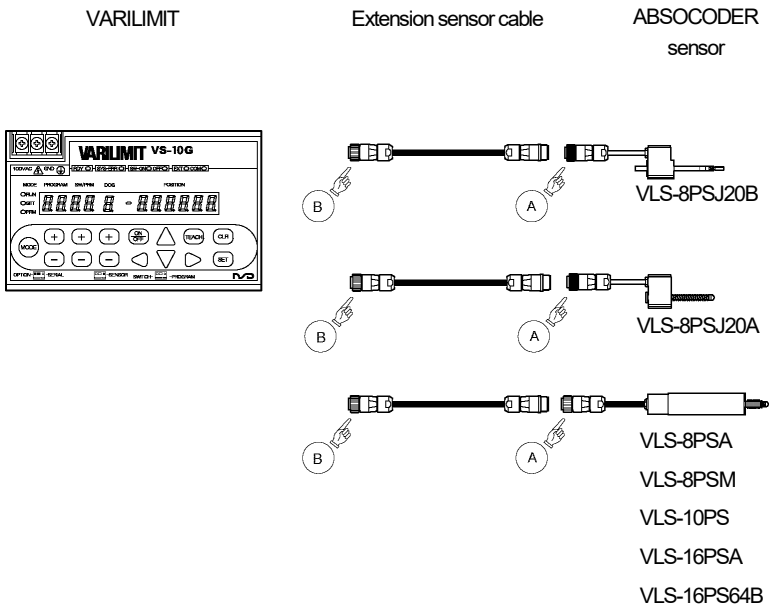
⚠ NOTES

1. Make sure to disconnect the Inrodsensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the Inrodsensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the Inrodsensor to the VARILIMIT.

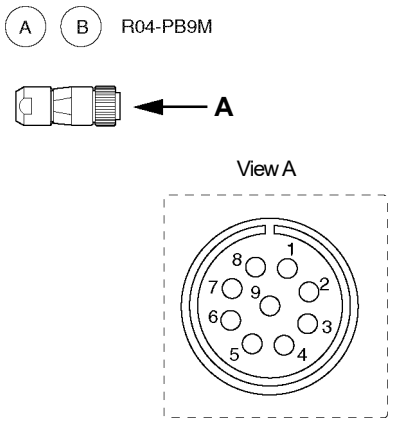
14-5-5. Linear Type ABSOCODER (VLS-[ ]PS)

● Applicable ABSOCODER sensor models
VLS-[ ]PS

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No..	Signal name	Wiring color	Standard coil resistance [Ω]				
			VLS-8PSA VLS-8PSM	VLS-8PSJ20A VLS-8PSJ20B	VLS-10PS	VLS-16PSA VLS-16PS64B	VLS-32PSA
1	SIN+	Brown	15 to 80	35 to 70	24 to 27	20 to 41	232 to 246
2	SIN-	Red					
3	-COS+	Orange	15 to 80	35 to 70	24 to 27	20 to 41	232 to 246
4	-COS-	Yellow					
5	OUT1+	Green	75 to 95	170 to 200	70 to 74	27 to 31	30 to 33
6	OUT1-	Blue					
7	—	—	—	—	—	—	—
8	—	—					
9	Shield *	Shield	—	—	—	—	—
—	—	—					

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, shield	∞
Between orange and yellow		Between orange and green, shield	
Between green and blue		Between green and shield	
		Between frame and each wire	

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, shield	10MΩ or more
Between orange and green, shield	
Between green and shield	
Between frame and each wire	

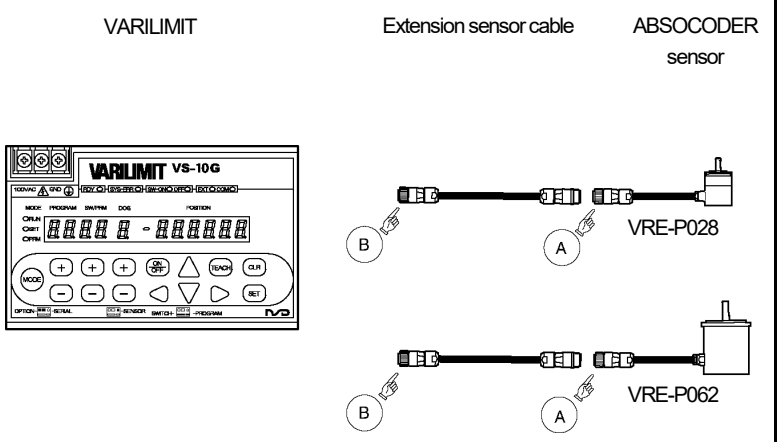
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

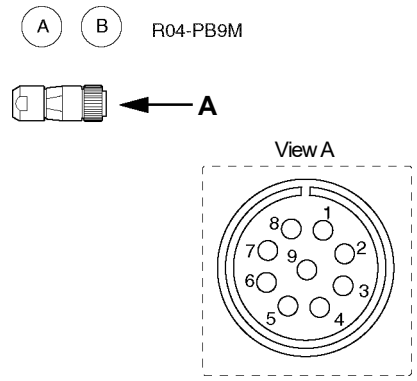
14-5-6. Single-turn Type ABSOCODER (VRE-P062, VRE-P028)

● Applicable ABSOCODER sensor models
VRE-P028
VRE-P062

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25℃)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]	
			VRE-P028	VRE-P062
1	SIN+	Brown	14.5 to 20.5	3 to 5
2	SIN-	Red		
3	-COS+	Orange	14.5 to 20.5	3 to 5
4	-COS-	Yellow		
5	OUT1+	Green	28.5 to 40.5	5 to 9
6	OUT1-	Blue		
7	—	—	—	—
8	—	—		
9	Shield	Shield	—	—
—	—	—		

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and orange, green, shield	∞
Between orange and yellow		Between orange and green, shield	
Between green and blue		Between green and shield	
		Between frame and each wire	

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and orange, green, shield	10MΩ or more
Between orange and green, shield	
Between green and shield	
Between frame and each wire	

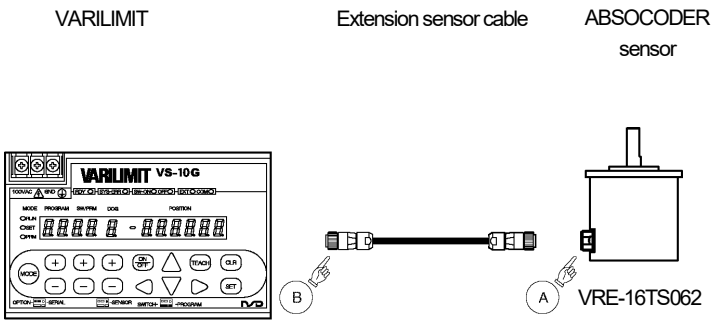
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

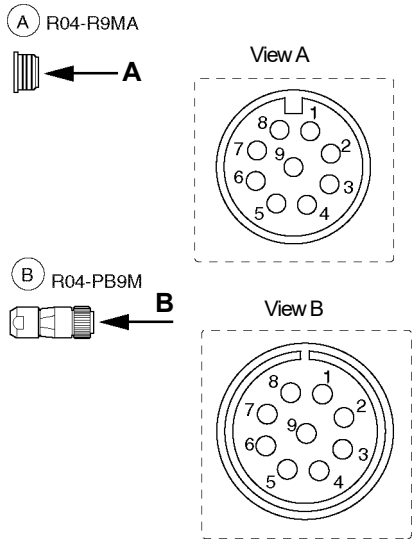
14-5-7. Single-turn Type ABSOCODER (VRE-16TS062)

● Applicable ABSOCODER sensor models
VRE-16TS062

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25℃)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]
			VRE-16TS062
1	U	Brown	115 to 135
2	V	Red	
3	W	Orange	
4	—	—	—
5	OUT1+	Green	18 to 28
6	OUT1-	Blue	
7	OUT2+	Violet	25 to 35
8	OUT2-	Gray	
9	Shield	Shield	—
—	—	—	

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and green, violet, shield	∞
Between brown and orange		Between green and violet, shield	
Between red and orange		Between violet and shield	
Between green and blue		Between frame and each wire	
Between violet and gray			

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and green, violet, shield	10MΩ or more
Between green and violet, shield	
Between violet and shield	
Between frame and each wire	

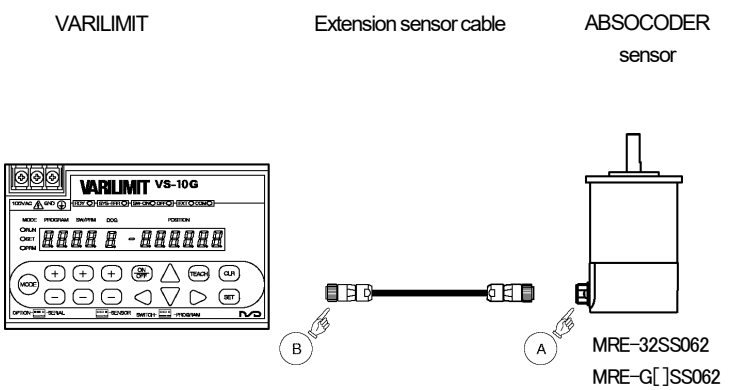
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

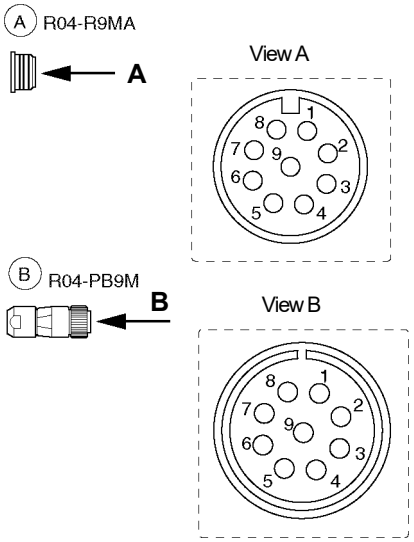
14-5-8. Multi-turn Type ABSOCODER (MRE-[ ]SS062)

● Applicable ABSOCODER sensor models
MRE-32SS062
MRE-G[ ]SS062 [ ]: 64, 128, 160, 256, 320, 640, 1280, 2560

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25℃)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]		
			MRE-32SS062	MRE-G[ ]SS062 ([ ]: 64, 128, 160, 256, 320)	MRE-G[ ]SS062 ([ ]: 640, 1280, 2560)
1	U	Brown	78 to 88	105 to 145	125 to 141
2	V	Red			
3	W	Orange			
4	–	–	–	–	–
5	OUT1+	Green	49 to 59	25 to 35	42 to 55
6	OUT1-	Blue			
7	OUT2+	Violet	25 to 35	25 to 35	42 to 55
8	OUT2-	Gray			
9	Shield	Shield			
–	–	–			

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]
Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]
Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and green, violet, shield	∞
Between brown and orange		Between green and violet, shield *2	
Between red and orange		Between violet and shield *2	
Between green and blue		Between frame and each wire	
Between violet and gray			

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

*2: With the following ABSOCODER sensors, resistance values of some measurement points are not infinite.
Refer to the following chart for the resistance values.

MRE-32SS062 MRE-G[ ]SS062 ([ ]: 64, 128, 160, 256, 320)	
Check position	Resistance value
Between green and violet	2.4kΩ
Between green and shield	1.2kΩ
Between violet and shield	1.2kΩ

● Insulation check

[Measurement method]
Measure using a 500 VDC insulation tester.

[Check details]
Refer to the previous page for the connector pin number.

MRE-32SS062 MRE-G[ ]SS062 ([ ]: 64, 128, 160, 256, 320)	
Check position	Criterion
Between brown and green, violet, shield	10MΩ or more
Between frame and each wire	

MRE-G[ ]SS062 ([ ]: 640, 1280, 2560)	
Check position	Criterion
Between brown and green, violet, shield	10MΩ or more
Between green and violet, shield	
Between violet and shield	
Between frame and each wire	

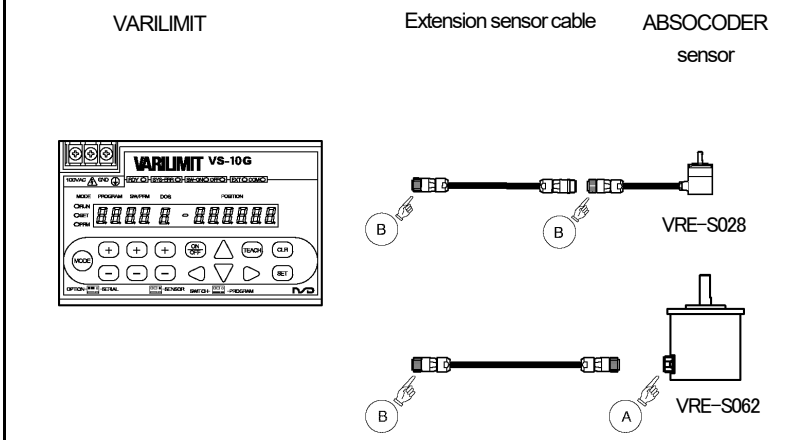
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

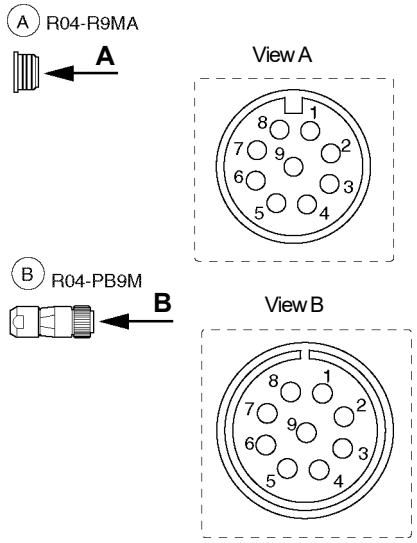
14-5-9. Single-turn Type ABSOCODER (VRE-S062, VRE-S028)

● Applicable ABSOCODER sensor models
VRE-S028
VRE-S062

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]	
			VRE-S028	VRE-S062
1	U	Brown	285 to 305	105 to 125
2	V	Red		
3	W	Orange		
4	–	–	–	–
5	OUT1+	Green	25 to 35	47 to 57
6	OUT1-	Blue		
7	–	–	–	–
8	–	–		
9	Shield	Shield	–	–
–	–	–		

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and green, shield	∞
Between brown and orange		Between frame and each wire	
Between red and orange		Between green and shield	1.2kΩ
Between green and blue			

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and green, shield	10MΩ or more
Between frame and each wire	

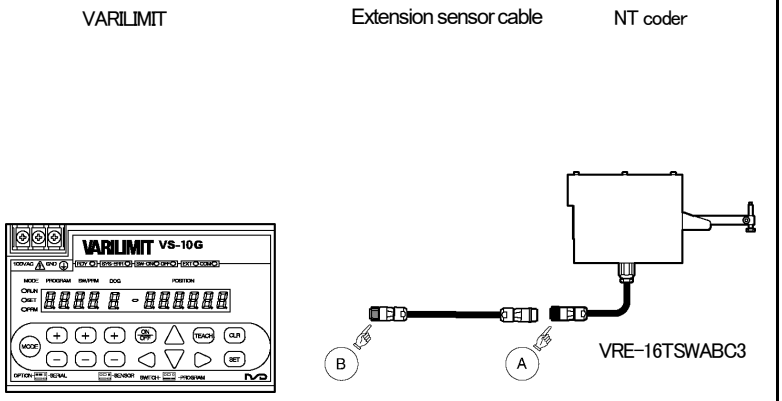
⚠ NOTES

1. Make sure to disconnect the ABSOCODER sensor from the VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the ABSOCODER sensor from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the ABSOCODER sensor to the VARILIMIT.

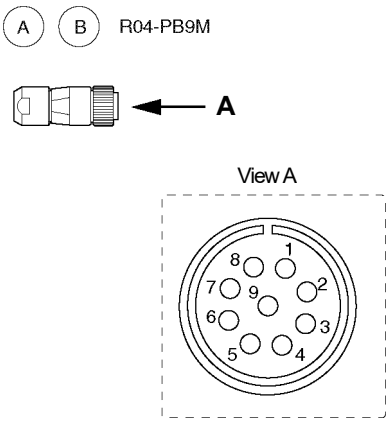
14-5-10. NT Coder

● Applicable NT coder models
VRE-16TSWABC3

● Connection configuration



● Connector appearance and pin position



Checks at Point B should be carried out with Point A connected.

● Connector pin position and standard coil resistance ranges (at 25°C)

Connector pin No.	Signal name	Wiring color	Standard coil resistance [Ω]
			VRE-16TSWABC3
1	U	Brown	265 to 285
2	V	Red	
3	W	Orange	
4	–	–	–
5	OUT1+	Green	18 to 28
6	OUT1-	Blue	
7	–	–	–
8	–	–	
9	Shield	Shield	–
–	–	–	

The above standard coil resistance ranges are referential data to assist wiring disconnection diagnosis and are not product specification values. There may be no wiring disconnection even when the resistance measurement is out of the standard resistance range.

● Circuit resistance check

[Measurement method]

Measure resistance at Point A or B using a circuit tester or other appropriate device.
If the connector is off, identify the line by the wiring color.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion	Check position	Criterion
Between brown and red	The measured value should be in the range of the standard coil resistance. *1	Between brown and green, shield	∞
Between brown and orange		Between green and shield	
Between red and orange		Between frame and each wire	
Between green and blue			

*1: If checks are done at Point B, the measurement value is [Standard coil resistance + extension sensor cable resistance (cable length (m) x 0.2 (Ω))].
The resistance value of the NSD special cable is 0.2Ω/m (loop resistance).
Consider resistance variations due to temperature, which, relative to the standard temperature (25°C), increases 0.4% when the temperature rises 1°C and decreases 0.4% when the temperature falls 1°C.

● Insulation check

[Measurement method]

Measure using a 500 VDC insulation tester.

[Check details]

Refer to the previous page for the connector pin number.

Check position	Criterion
Between brown and green, shield	10MΩ or more
Between green and shield	
Between frame and each wire	

NOTES

1. Make sure to disconnect the NT coder from VARILIMIT before carrying out insulation checks.
2. If there is a risk that energization may cause damages to the electronic circuits in and around the machine, remove the NT coder from the machine.
3. After completing the checks, short-circuit between the pins to discharge remaining voltage before connecting the NT coder to VARILIMIT.

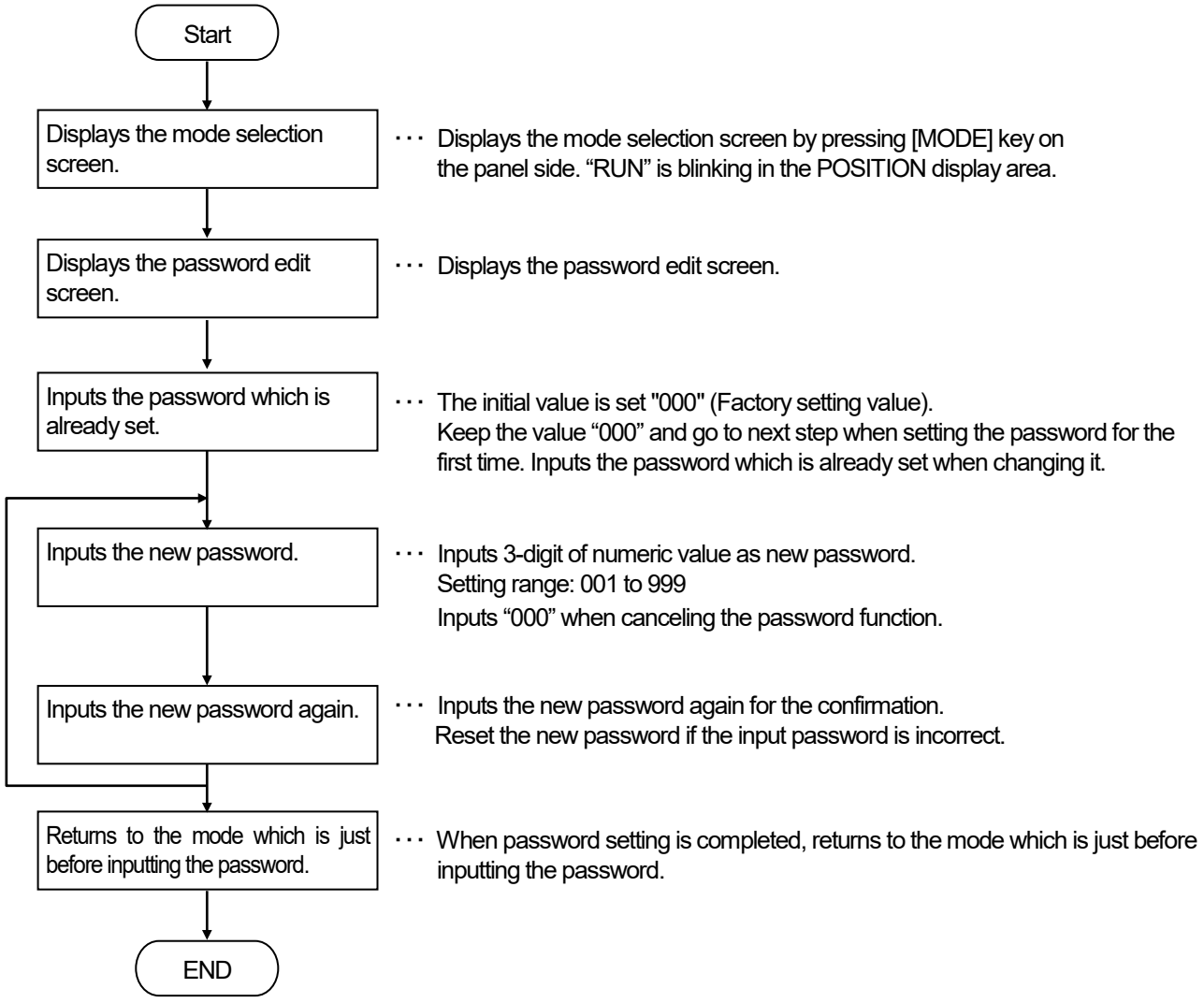
15. Password Function

This is the function to ask inputting the password when the mode of VARLIMIT changes from the operation (RUN) mode.
Customers can pick and set the password which consists of 3 digits of numeric values.
The mode cannot be changed without the password after setting numbers; therefore, the value of “switch setting” and “parameter setting” can be protected. It can also be protected from changing the program No. from panel side.

If the password is not set, the mode could be changed by conventional operation.

15-1. Password setting flow

The flowchart of setting the password is shown below.
A change or deletion of the password is the same as the following operation.
For more details regarding the setting procedure, refer to “15-3. Password Setting Procedures”.



15-2. Cautions when setting the password

● Important

Keep the password in a safe place.
The mode of VARILIMIT couldn't be changed if you forgot the password. As the result, setting values of the parameter and the switch output cannot be change or read by the panel side operation of VARILIMIT.
When using the setting and editing software "VS-10F/G-EDW2", setting values of the parameter and the switch output are able to read, but not able to write. (*1)
The password can be neither read nor written. (*2)
In this case, the initialization operation should be done. However, setting values of the parameter and the switch output are deleted after the initialization operation. (*3)
*1: It is available when selecting "0" at the parameter No.54 (protocol).
*2: If the parameter No.54 is selected a number except "0", setting values can be read and written by communication regardless of whether the password is set or not. Restrict to prevent reading and writing setting values by the host controller.
*3: Refer to the "14-4. Initialization Operation".

● Password memo

VARILIMIT users and machinery manufacturers who set the password must notate it for remembrance' sake.

Password memo

Check

☐ Ask _____ the password
Person's name

☐ Ask machinery manufacturer the password
Manufacturer : _____
Name : _____
Contact : _____

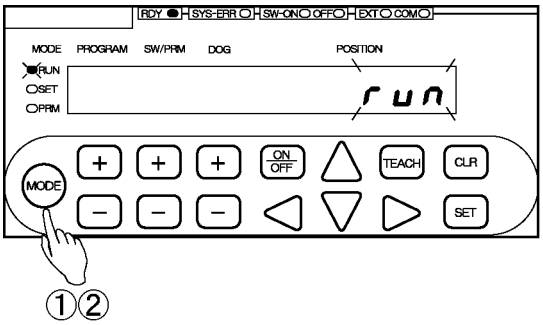
15-3. Password setting procedures

Sets the password by the following procedures.

LED ON/OFF state
● : ON
○ : OFF
⊗: Flicker

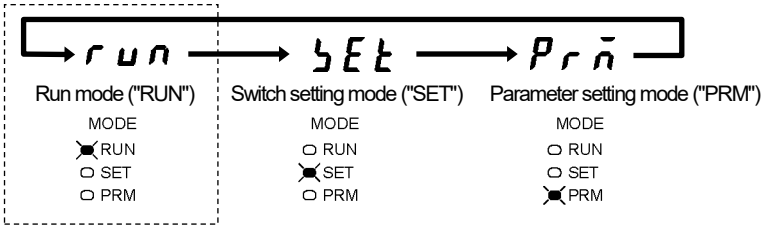
① Display the mode selection screen.

Press and hold down the (MODE) key (more than 1 second).
The POSITION and MODE display will flicker to indicate mode selection is possible.



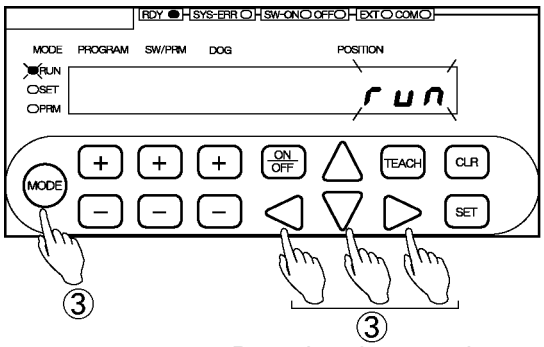
② Change the mode.

Press the (MODE) key a number of times until the run mode ("RUN") is shown.



③ Display the password edit screen.

Hold down ◁ ▽ ▷ keys of POSITION display, and then presses (MODE) key.
"En" and "PAS" are alternately flickering in the POSITION display area.

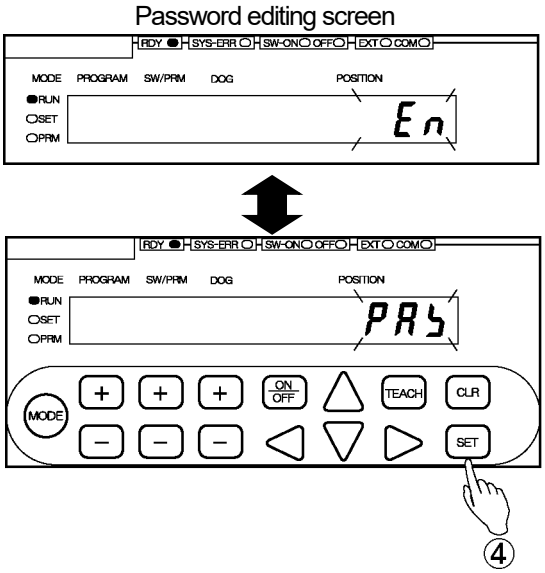


Press three keys at a time.

④ Display the current password entering screen.

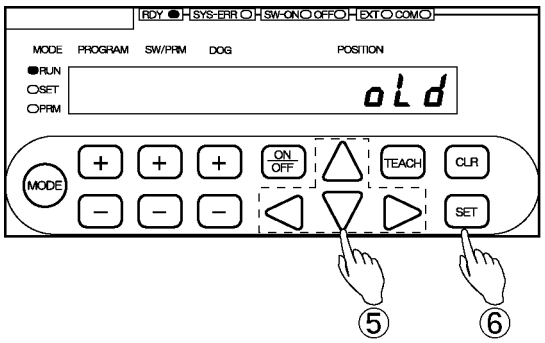
Press (SET) key.
"OLD" turns ON in the POSITION display area.

Password editing screen



⑤ Enter the current password.

Press △ or ▽ key of POSITION once,
"000" is flickering in the POSITION display area.



Go to the procedure ⑥ after the above-procedure when setting the password for the first time.

In the case of changing the password,
enter the password which is already set
by pressing ◁, △, or ▽ key of POSITION again.

If CLR key is pressed in this timing,
returns the run mode ("RUN").

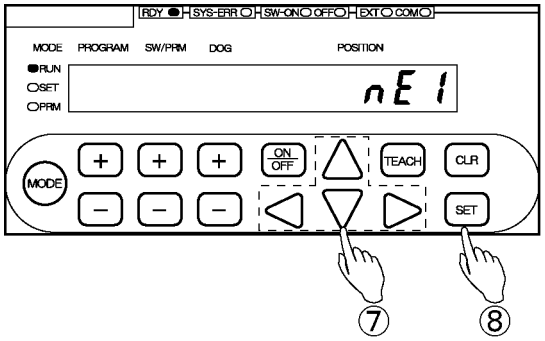
⑥ Enter the current password.

Press SET key.
Displays the new password input screen.

⑦ Enter the new password.(1st)*1*2

Enter the new password by pressing
◁, ▷, △, or ▽ key of POSITION.

New password entering screen



If CLR key is pressed in this timing,
returns the run mode ("RUN").

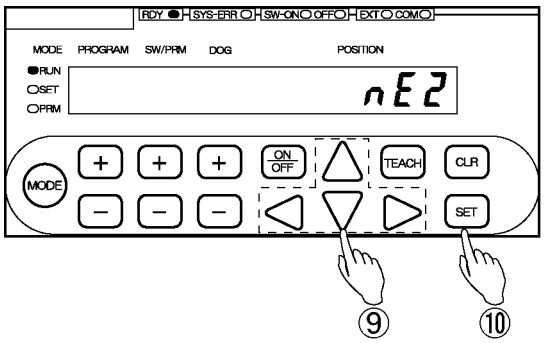
⑧ Confirm the new password.

Press SET key.
Display the password entering screen for the confirmation.

⑨ Enter the password for the confirmation. (2nd)*1*2

Enter the new password by pressing
◁, ▷, △, or ▽ key of POSITION again.

Password entering screen for a confirmation



If CLR key is pressed in this timing,
returns the run mode ("RUN").

⑩ Confirm the password for the confirmation.

Press SET key.

- The operation tone beeps when the password is completely set. The mode returns just before setting the password.
- If the password is different between (1st) and (2nd), the operation tone would beep out three times.
  In this case, the new password entering screen is displayed, so operate from the procedure ⑦ again.

POINT

*1: The password setting range is "001" to "999".
*2: Enter the "000" in the procedure ⑦ and ⑨ if the password function is canceled.

15-4. Mode selection procedure after setting the password

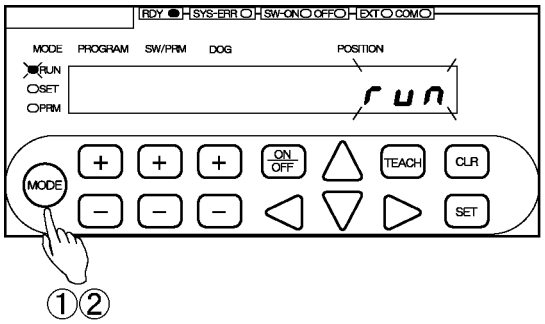
Explains the operation procedure of mode selection after setting the password.

The password must be input when changing the mode from run mode ("RUN") to parameter setting mode ("PRM") or switch setting mode ("SET").

LED ON/OFF state
● : ON
○ : OFF
⚡: Flicker

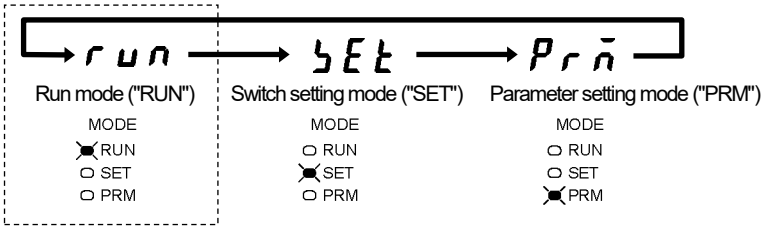
① Display the mode selection screen.

Press and hold down the (MODE) key (more than 1 second).
The POSITION and MODE display will flicker to indicate mode selection is possible.



② Change the mode.

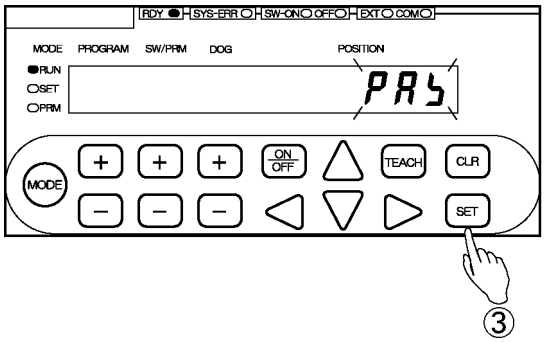
Press the (MODE) key a number of times until the parameter setting mode ("PRM") or switch setting mode "SET") is shown.



New password entering screen

③ Display the password entering screen.

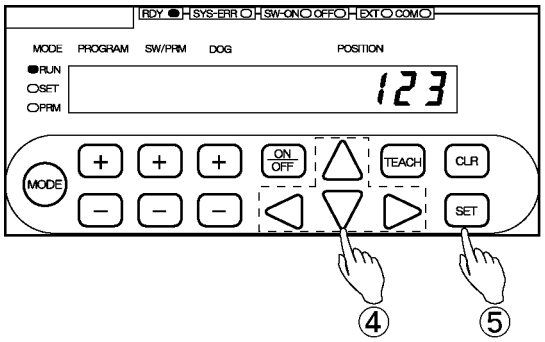
Press (SET) key.
"PAS" is flickering ON in the POSITION display area.



④ Enter the password.

Enter the password by pressing
◁, ▷, △, or ▽ key of POSITION.

If (CLR) key is pressed in this timing,
returns the run mode ("RUN").



⑤ Confirm the password.

Press (SET) key.
- Returns to the mode which is selected in procedure ② when the password is correct.
- Returns to the run mode ("RUN") if the password is incorrect.

APPENDIX

Attaches descriptions of the CE marking and UL standard compliance, the data sheets, and the upgrading guide.

APPENDIX 1. CE MARKING
APPENDIX 2. UL STANDERD
APPENDIX 3. DATA SHEET
APPENDIX 4. UPGRADING

APPENDIX 1. CE MARKING

The DC24V-type VARILIMIT models, VS-10G-1, VS-10G-D-1, VS-10G-A-1 and VS-10G-C-1, conform to the EMC Directive.

APPENDIX 1-1. EMC Directives

It is necessary to do CE marking in the customer's responsibility in the state of a final product.
Confirm EMC compliance of the machine and the entire device by customer because EMC changes configuration of the control panel, wiring, and layout.

APPENDIX 1-2. EMC Directive and Standards

EMC Directive consists of immunity and emission items.
It conforms to Table 01(see below) of EMC standards and Testing.

Table 01 EMC Standard and Testing

Class	Standard No.	Name
EMI (Emission)	EN61000-6-4	Generic standards. Emission standard for industrial environments
	EN55011 Class A	Electromagnetic Radiation Disturbance
EMS (Immunity)	EN61000-6-2	Generic standards. Immunity standard for industrial environments
	EN61000-4-2	Electrostatic Discharge
	EN61000-4-3	Radiated, Radio frequency, Electromagnetic Field
	EN61000-4-4	Electrical Fast Transient / Burst
	EN61000-4-5	Surge Immunity
	EN61000-4-6	Conducted Disturbances, Induced by Radio-Frequency Fields
	EN61000-4-8	Power Frequency Magnetic Field

APPENDIX 1-3. Low Voltage Directive

The low voltage directive is out of the range because VARILIMIT is activated by 24VDC power supply.

APPENDIX 1-4. Measures for EMC Compliance and Restriction

Describes measures for EMC compliance and restriction when testing the compatibility verification.

(1) Power wiring

A clamp filter was fitted to the power and grounding lines for testing.
The installation position was set within 200 mm of the VARILIMIT as shown in the figure ①.

(2) Sensor cable

If a 30m or longer sensor cable is to be used, cover the sensor cable with a shielded zippertubing, with the tube shield grounded (② in the figure).

Recommendation zippertubing

Mounting location	Model	Manufacturer
Sensor cable	MTFS 20ϕ	ZIPPERTUBING (JAPAN), LTD.

(3) I/O cable

The I/O cable to be connected to the switch output connector should be shorter than 30m (③ in the figure).

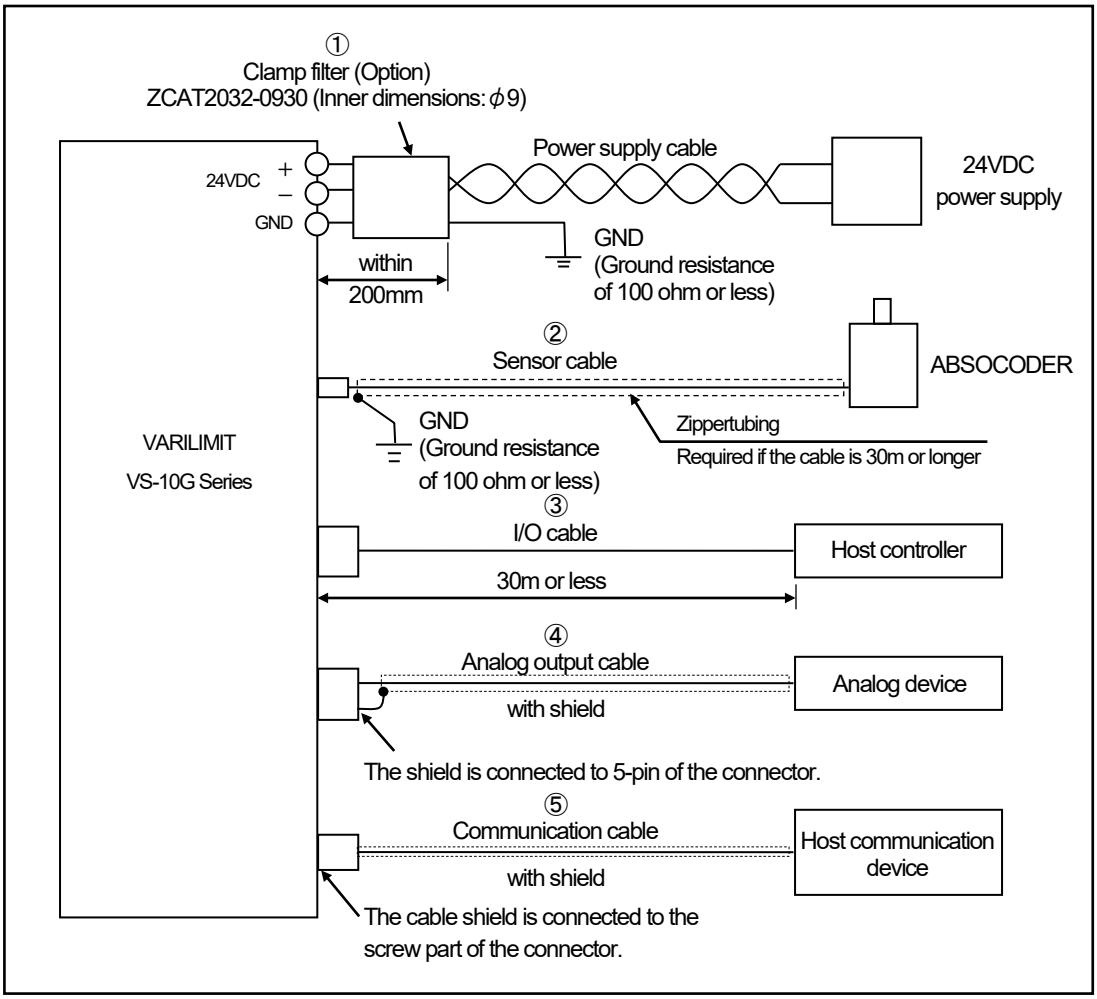
(4) Analog output cable (current output: 4-20 mA only)

If the length of the analog output cable is longer than 30m, use the twist pair cable with shield and connect the wire shield to the 5th pin of the analog output connector. (④ in the figure)

(5) Communication cable

A cable which connects to the communication connector must use with a shield, and the shield is connected to mounting screw.

The cable is used metallic shell connectors when NSD tested, and the cable shield is connected to the screw part of the connector. (⑤ in the figure)



Reference

It may be improved when clamp filter is added to the sensor or I/O cable.

- In the case of it operates faultily by the influence from the peripheral device
- In the case of it is effect to reduce the conduction and radiation noise

Recommendation clamp filter

	Mounting location	Clamp filter model	Manufacturer
1	Sensor cable	ZCAT2032-0930 (inner dimensions: ϕ9)	TDK
2	I/O cable	ZCAT3035-1330 (inner dimensions: ϕ13)	

APPENDIX 2. UL STANDARD

The DC24V-type VARILIMIT models, VS-10G-1, VS-10G-D-1, VS-10G-A-1 and VS-10G-C-1, correspond to the UL Standard.

Read this page carefully and use VARILIMIT by following the described items.

APPENDIX 2-1. Installation

- Install inside the control cabinet.
- For use in pollution degree 2 environment
- Within the surrounding air temperature 0℃ to 55℃.

APPENDIX 2-2. External Power Supply

Use a “Class 2” power supply.

APPENDIX 2-3. Wiring to the Power Supply and Ground

- Use field installed conductors with a temperature rating of 75°C or higher.
- Use electrical wires of copper “AWG18”or copper strand “AWG18”.
- The terminal block tightening torque is 0.6 N·m (5.1 lb·in).

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APPENDIX 3. DATA SHEET

APPENDIX 3-1. VS-10B Mode Data Sheet

APPENDIX 3-1-1. Parameter data sheet

●When Parameter E0 is set to 0 (1/3)

No.	Name	Setting ranges and initial values: The initial values are shown inside "□".	Applicable model				Reference (Chapter No.)	Setting value
			10G	10G -D	10G -A	10G -C		
E0	VARILIMIT Mode Selection	□0: VS-10B Mode 8 programs, 30 switches, 10 Dogs 1: Extended Mode 8 programs, 30 switches, 10 Dogs 2: Extended Mode 32 programs, 30 switches, 4 Dogs	○	○	○	○	10-1	
00	Initial Display	The items selected using Parameter E0 will be shown.	○	○	○	○		
A0	Number of Scale Length Pitches[n] *1	1 to 9999 □—	○	○	○	○	10-6	
99	Scale Length[L]	10 to 999999 □□□—	○	○	○	○	10-6	
98	Minimum Current Position Value [K]	−999999 to (1000000−L) □□—	○	○	○	○	10-6	
97	Current Position Setting	K to (K+L−1) □□—	○	○	○	○	10-6	
96	Protected Switch Suspended	□0: Protected Switch function enabled 1: Protected Switch function suspended	○	○	○	○	10-10	
95	Current Position Preset / Protected Switch Selection	□0: Current Position Preset disabled, Protected Switch disabled 1: Current Position Preset disabled, Protected Switch enabled 2: Current Position Preset enabled, Protected Switch disabled 3: Current Position Preset enabled, Protected Switch enabled	○	○	○	○	10-7 10-9	
94	Current Position Output Code/Logic	□0: BCD output (negative logic) / decimal point output (positive logic) 1: BCD output (positive logic) / decimal point output (negative logic) 2: BCD output (negative logic) / decimal point output (negative logic) 3: BCD output (positive logic) / decimal point output (positive logic) 4: Binary output (sign magnitude code, negative logic), decimal point output (positive logic) 5: Binary output (sign magnitude code, positive logic), decimal point output (negative logic) 6: Binary output (two's complement, negative logic), decimal point output (positive logic) 7: Binary output (two's complement, positive logic), decimal point output (negative logic)		○			10-11	

Remarks

*1: Set this parameter when using VS-10G**-LP or VS-10G**-LC.
Any other VARILIMIT model does not display this number.

●When Parameter E0 is set to 0 (2/3)

No.	Name	Setting ranges and initial values: The initial values are shown inside "□".	Applicable model 10G	10G -D	10G -A	10G -C	Reference (Chapter No.)	Setting value
93	Program No. Input Method	0: Panel key input 1 : External input via connector 2 : Serial communication	○	○	○	○	10-8	
92	Current Position Preset Function Selection	0: Preset Disabled 1 : Preset Enabled	○	○	○	○	10-7	
91	Sensor Selection / Sensor Rotation (Travel) Direction	0: CW 1: CCW Using VS-10G**-L 0: VLS-PW / CW 1: VLS-PW / CCW 2: VLS-PY / CW 3: VLS-PY / CCW □	○	○	○	○	10-4	
90	Decimal Point Position	0: [][][][][][]. 1 : [][][][][]. [] 2 : [][][][]. [][] 3 : [][][]. [][][] 4 : [][]. [][][][] 5 : []. [][][][][]	○	○	○	○	10-5	
87	Position Data B Setting	●Channel 1 1 −999999 to 999999 □ ●Channel 2 2 −999999 to 999999 □			○	○	10-12	----------
86	Position Data A Setting	●Channel 1 1 −999999 to 999999 □ ●Channel 2 2 −999999 to 999999 □			○	○	10-12	----------
85	Position Output Voltage Range Selection	●Channel 1 1 0: 0V to DC10V 1: 0V to ±DC10V ●Channel 2 2 0: 0V to DC10V 1: 0V to ±DC10V			○		10-12	----------
82	Current Position Preset Error Selection	0: Disabled SW30: Switch output, System ready output ON in case of errors, No error display 1: Enabled SW30: Error output, System ready output ON in case of errors, No error display 2. Enabled SW30: Switch output, System ready output OFF in case of errors, Error display ([Err23 or Err50]) 3. Enabled SW30: Error output, System ready output OFF in case of errors, Error display ([Err23 or Err50])	○	○	○	○	10-7	

●When Parameter E0 is set to 0 (3/3)

No.	Name	Setting ranges and initial values: The initial values are shown inside "□".	Applicable model				Reference (Chapter No.)	Setting value
			10G	10G -D	10G -A	10G -C		
81	Current Position Preset Zone Setting	●Preset Zone 1 1 ON: −999999 to 999999 □ 1 OFF: −999999 to 999999 □ ●Preset Zone 2 2 ON: −999999 to 999999 □ 2 OFF: −999999 to 999999 □	○	○	○	○	10-7	
80	Current Position Preset Value Setting	●Preset Value 1 1 ON: −999999 to 999999 □ 1 OFF: −999999 to 999999 □ ●Preset Value 2 2 ON: −999999 to 999999 □ 2 OFF: −999999 to 999999 □	○	○	○	○	10-7	
79	Latch Pulse Timing / Update Cycle	For Edge Timing 0: 4ms 1: 8ms 2: 16ms 3: 32ms 4: 64ms 5: 128ms 6: 256ms 7: 512ms For Level Timing 8: 4ms 9: 8ms 10: 16ms 11: 32ms 12: 64ms 13: 128ms 14: 256ms 15: 512ms		○			10-11	
59	Downloading Enabled Selection	0: Prohibited 1 : Permitted	○	○	○	○	10-13	
58	Baud Rate	0 : 2400bps 3 : 19200bps 1 : 4800bps 4 : 38400bps 2: 9600bps 5 : 57600bps	○	○	○	○	10-14	
56	Node Number	0 to 15 1	○	○	○	○	10-16	
54	Protocol	0: NSD 1 : MELSEC-A 2 : MELSEC 3 : OMRON 9 : VARIMONI	○	○	○	○	10-15	
53	Device Selection	0: D (Data register) 1 : R (File register)	○	○	○	○	10-17	
52	Device No.	0 to 9000 0	○	○	○	○	10-18	
51	Communication Dog No.	1 to A (1 to 10) 1	○	○	○	○	10-19	

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APPENDIX 3-2. Switch Output Data Sheet

Please copy required number of this data sheets.

Program No. :

Program Name :

Switch No.	Switch Name	Multi-dog No. 1	2	3	4	5	6	7	8	9	A
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:
		ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:	ON: OFF:

- MEMO -

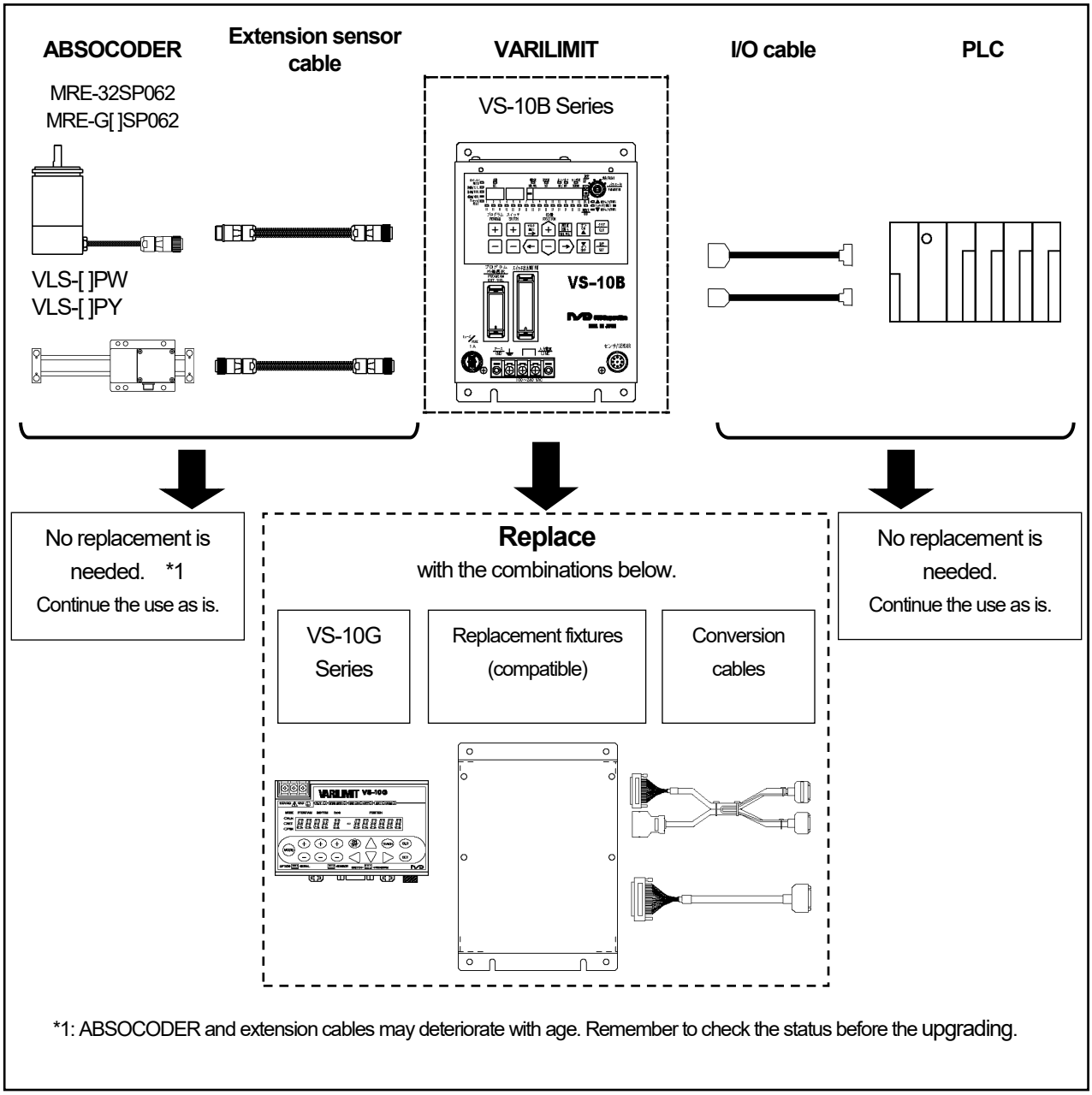
APPENDIX 4. UPGRADING

This section describes about upgrading from the existing VS-10B Series to the VS-10G Series.
The existing VS-10B Series can be updated to the VS-10G Series without replacing the host PLC, ABSOCODER and I/O cables by using replacement fixtures and cables. As these fixtures are compatible with the VS-10B Series, the attachment needs no new mounting holes.

APPENDIX 4-1. Upgrading Configuration

(1) Configuration

For Upgrading



*1: ABSOCODER and extension cables may deteriorate with age. Remember to check the status before the upgrading.

(2) Difference in Appearance

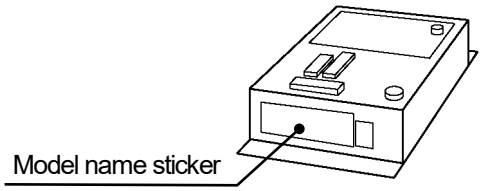
This section describes the difference in appearance between the existing VS-10B Series and the VS-10G Series with the replacement suggestions.

Item	VS-10B series	VS-10Gseries	Suggestion
Power supply voltage	AC100V / AC200V	AC100V or DC24V	Note that the power-supply voltage is different.
Outer Dimension	Built-In type VS-10B-UNNP 140(W) x 200(H) x 75(D)	130(W) x 81(H) x 99(D)	Compatible replacement fixtures are prepared for mounting. Note that the depth is substantially different.
	VS-10B-UDNP 167(W) x 200(H) x 75(D)		
	VS-10B-UANP 177(W) x 200(H) x 75(D)		
	Panel mount type VS-10B-PNNP 150(W) x 209(H) x 105(D)	130(W) x 81(H) x 99(D)	Compatible replacement fixtures are prepared for mounting.
	VS-10B-PDNP 178(W) x 209(H) x 105(D)		
Key Switch	Provided	Not provided	Mode change becomes possible by [MODE] button. Use the password function to prevent data change.
Switch output connector	MR-34LF (HONDA TSUSHIN KOGYO CO.,LTD)	40-pin connector FCN-361J040-AU (FUJITSU COMPONENT LIMITED) or N361J040AU (OTAX CO.,LTD.)	Conversion cables are provided.
Input connector for external program selection	MR-25LF (HONDA TSUSHIN KOGYO CO.,LTD)	20-pin PCR connector (HONDA TSUSHIN KOGYO CO.,LTD)	
Output Connector for External Display (Only with current position output)	MR-50LF (HONDA TSUSHIN KOGYO CO.,LTD)	40-pin connector FCN-361J040-AU (FUJITSU COMPONENT LIMITED) or N361J040AU (OTAX CO.,LTD.)	
Analog Position Output Terminal (Only with Position Voltage Output)	Terminal block (M3 size)	5-pin HR connector (HIROSE ELECTRIC CO.,LTD)	Wire to the terminal block of the replacement fixture.

APPENDIX 4-2. Confirming the VS-10B Series Product Model

Check the product model of the VS-10B Series. The product model is necessary for selecting replacement fixtures and conversion cables. It is also needed for parameter settings.

Details of the model can be confirmed with the model name sticker on the bottom of the unit.



Model: VS-10B-①②NP-③-④-N⑤⑥O

① Installation Method
U: Built-In type P: Panel mount type

② Current Position Output/Position Voltage Output
N: N/A D: Current Position Output A: Position Voltage Output *1

*1: When "P: Panel mount type" is chosen for ①, this setting will be lost.

③ Panel Language
0: Japanese 1: English

④ Production mark

⑤ Function selection

Code	Current position preset	Protected switch
0	None	None
1	None	Protected switch
2	Current position preset	None
3	Current position preset	Protected switch

⑥ Applicable sensor/Current Position Output Code/ Current Position Output Logic

Code	Applicable sensor	Current Position Output Code	Current Position Output Logic
0	MRE	BCD	Negative logic
*1 1			Positive logic
2	VLS-[ ]PY		Negative logic
*1 3			Positive logic
*1 4	MRE	Binary	Negative logic
*1 5			Positive logic
*1 6	VLS-[ ]PY		Negative logic
*1 7			Positive logic
A	VLS-[ ]PW	BCD	Negative logic
*1 B			Positive logic
*1 E		Binary	Negative logic
*1 F			Positive logic

*1: "N: N/A " or "A: Position Voltage Output" is selected for ②, this setting will be lost.

APPENDIX 4-3. Replacement Models

This section shows the models of the VARILIMIT VS-10G Series, replacement fixtures and conversion cables for replacement.

● Built-In type

Current Model	Upgrading VARILIMIT Model	Replacement Fixture	Conversion Cable
VS-10B-UNNP-0/1-[ ]-N0[*1]0	VS-10G-MP	VS-K10G	VS-C10G-R01
VS-10B-UNNP-0/1-[ ]-N1[*1]0			
VS-10B-UNNP-0/1-[ ]-N2[*1]0			
VS-10B-UNNP-0/1-[ ]-N3[*1]0			
VS-10B-UNNP-0/1-[ ]-N0[*2]0	VS-10G-L	VS-K10G	VS-C10G-R01
VS-10B-UNNP-0/1-[ ]-N1[*2]0			
VS-10B-UNNP-0/1-[ ]-N2[*2]0			
VS-10B-UNNP-0/1-[ ]-N3[*2]0			
VS-10B-UDNP-0/1-[ ]-N0[*1]0	VS-10G-D-MP	VS-K10G	2 types required - VS-C10G-R01 - VS-C10G-R02
VS-10B-UDNP-0/1-[ ]-N1[*1]0			
VS-10B-UDNP-0/1-[ ]-N2[*1]0			
VS-10B-UDNP-0/1-[ ]-N3[*1]0			
VS-10B-UDNP-0/1-[ ]-N0[*2]0	VS-10G-D-L	VS-K10G	2 types required - VS-C10G-R01 - VS-C10G-R02
VS-10B-UDNP-0/1-[ ]-N1[*2]0			
VS-10B-UDNP-0/1-[ ]-N2[*2]0			
VS-10B-UDNP-0/1-[ ]-N3[*2]0			
VS-10B-UANP-0/1-[ ]-N0[*1]0	VS-10G-A-MP	VS-K10BA	VS-C10G-R01
VS-10B-UANP-0/1-[ ]-N1[*1]0			
VS-10B-UANP-0/1-[ ]-N2[*1]0			
VS-10B-UANP-0/1-[ ]-N3[*1]0			
VS-10B-UANP-0/1-[ ]-N0[*2]0	VS-10G-A-L	VS-K10BA	VS-C10G-R01
VS-10B-UANP-0/1-[ ]-N1[*2]0			
VS-10B-UANP-0/1-[ ]-N2[*2]0			
VS-10B-UANP-0/1-[ ]-N3[*2]0			

One of the following values is entered in *1 or *2.

*1: 0, 1, 4, 5

*2: 2, 3, 6, 7, A, B, E, F

● Panel mount type

Current Model	Upgrading VARILIMIT Model	Replacement Fixture	Conversion Cable
VS-10B-PNNP-0/1-[ ]-N0[*1]0	VS-10G-MP	2 types required - VS-K10BP - VS-K-F	VS-C10G-R01
VS-10B-PNNP-0/1-[ ]-N1[*1]0			
VS-10B-PNNP-0/1-[ ]-N2[*1]0			
VS-10B-PNNP-0/1-[ ]-N3[*1]0			
VS-10B-PNNP-0/1-[ ]-N0[*2]0	VS-10G-L	2 types required - VS-K10BP - VS-K-F	VS-C10G-R01
VS-10B-PNNP-0/1-[ ]-N1[*2]0			
VS-10B-PNNP-0/1-[ ]-N2[*2]0			
VS-10B-PNNP-0/1-[ ]-N3[*2]0			
VS-10B-PDNP-0/1-[ ]-N0[*1]0	VS-10G-D-MP	2 types required - VS-K10BPD - VS-K-F	2 types required - VS-C10G-R01 - VS-C10G-R02
VS-10B-PDNP-0/1-[ ]-N1[*1]0			
VS-10B-PDNP-0/1-[ ]-N2[*1]0			
VS-10B-PDNP-0/1-[ ]-N3[*1]0			
VS-10B-PDNP-0/1-[ ]-N0[*2]0	VS-10G-D-L	2 types required - VS-K10BPD - VS-K-F	2 types required - VS-C10G-R01 - VS-C10G-R02
VS-10B-PDNP-0/1-[ ]-N1[*2]0			
VS-10B-PDNP-0/1-[ ]-N2[*2]0			
VS-10B-PDNP-0/1-[ ]-N3[*2]0			

One of the following values is entered in *1 or *2.

*1: 0, 1, 4, 5

*2: 2, 3, 6, 7, A, B, E, F

APPENDIX 4-4. Difference in Parameter Settings

1. Using the VS-10B Mode.

Parameter numbers and setting details in the VS-10B Mode are the same as of the existing VS-10B Series.

In the VS-10B Mode, select 0 at Parameter E0 (VARILIMIT Mode Selection).
(The initial value at this parameter is 0. The value setting is not required in the first setting after purchasing.)

For details, refer to "10-1. Setting the VARILIMIT Mode Selection Parameter".

2. Selecting the Current Position Preset and the Protected Switch Functions

In the VS-10B Series, the Current Position Preset and the Protected Switch functions are selected by product model. (See the APEENDIX 4-2. ⑤Function selection.)
In the VS-10G Series, these functions can be selected at Parameter 95.

Parameter No.	Name	Setting value
95	Current Position Preset / Protected Switch Selection	Check the VS-10B model and select one of the following options. 0: Current Position Preset disabled, Protected Switch disabled 1: Current Position Preset disabled, Protected Switch enabled 2: Current Position Preset enabled, Protected Switch disabled 3: Current Position Preset enabled, Protected Switch enabled

3. Selecting the Current Position Output Function

This section applies only to the VS-10G-D-** model.
In the VS-10B Series, the Current Position Output Code and Logic settings are selected by product model.
(See the APPENDIX 4-2. ⑥Applicable sensor/Current Position Output Code/Current Position Output Logic.)
In the VS-10G Series, these functions can be selected at Parameters 94 and 79.

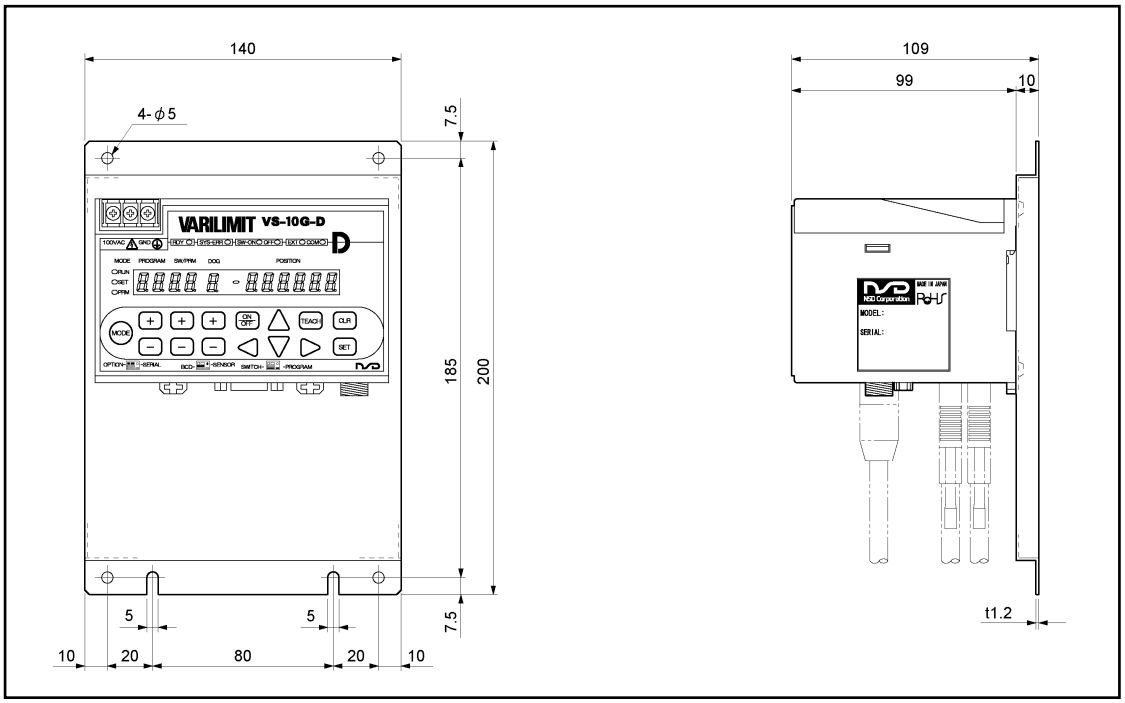
Parameter No.	Name	Setting value
94	Current Position Output Code / Logic	Check the VS-10B model and select one of the following options. ●When APPENDIX 4-2. ⑥ is "0, 2, A" 0: BCD output (Negative logic), Decimal point output (Positive logic) ●When APPENDIX 4-2. ⑥ is "1, 3, B" 1: BCD output (Positive logic), Decimal point output (Negative logic) ●When APPENDIX 4-2. ⑥ is "4, 6, E" 4: Binary output (sign magnitude code, negative logic), decimal point output (positive logic) ●When APPENDIX 4-2. ⑥ is " 5, 7, F" 5: Binary output (sign magnitude code, positive logic), decimal point output (negative logic)
79	Latch Pulse Timing / Update Cycle	Use the initial value as is. (0: 4ms)

APPENDIX 4-5. Outer Dimensional Drawing of Replacement Fixtures

This section shows the outline dimensional drawing of the replacement fixtures for the VS-10G Series.

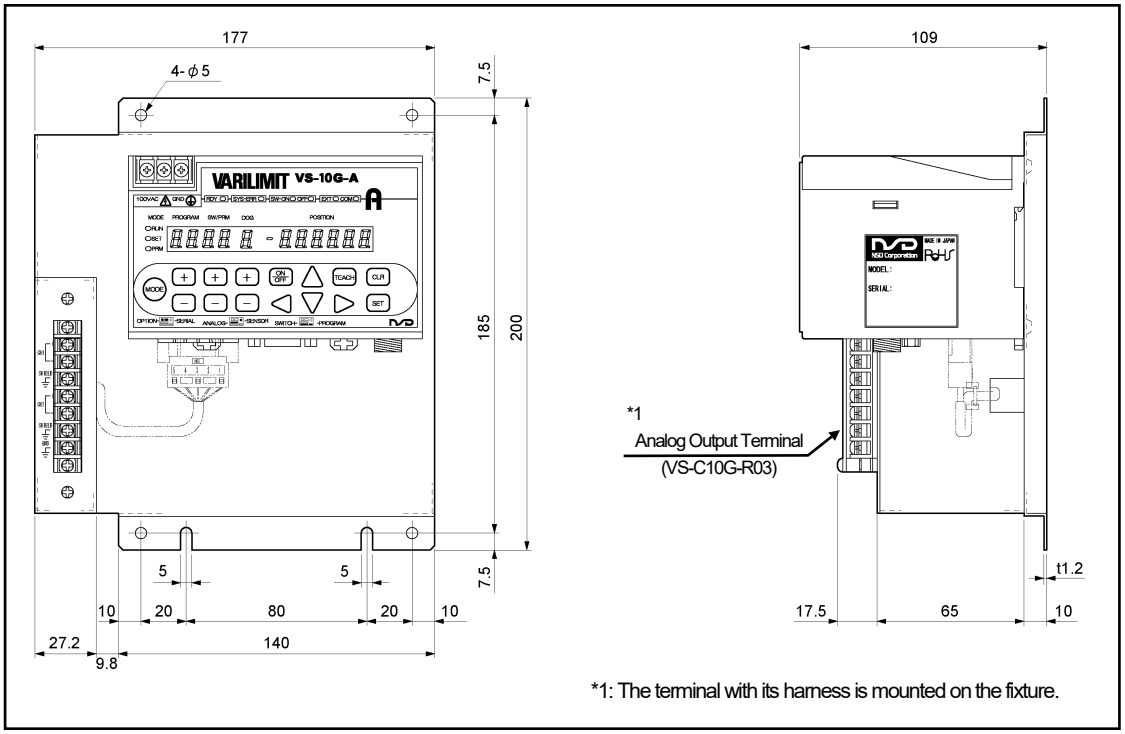
(1) Replacement Fixture for VS-10B-UNNP and VS-10B-UDNP

VS-K10G Units: mm



(2) Replacement Fixture for VS-10B-UANP

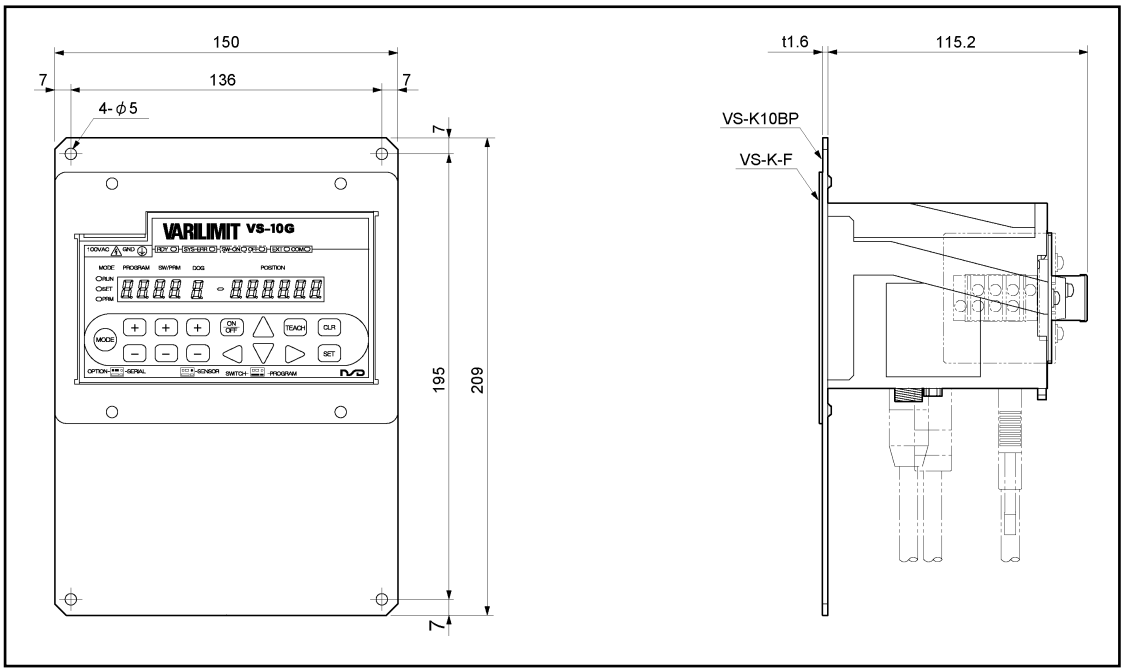
VS-K10BA Units: mm



(3) Replacement Fixture for VS-10B-PNNP

VS-K10BP+VS-K-F

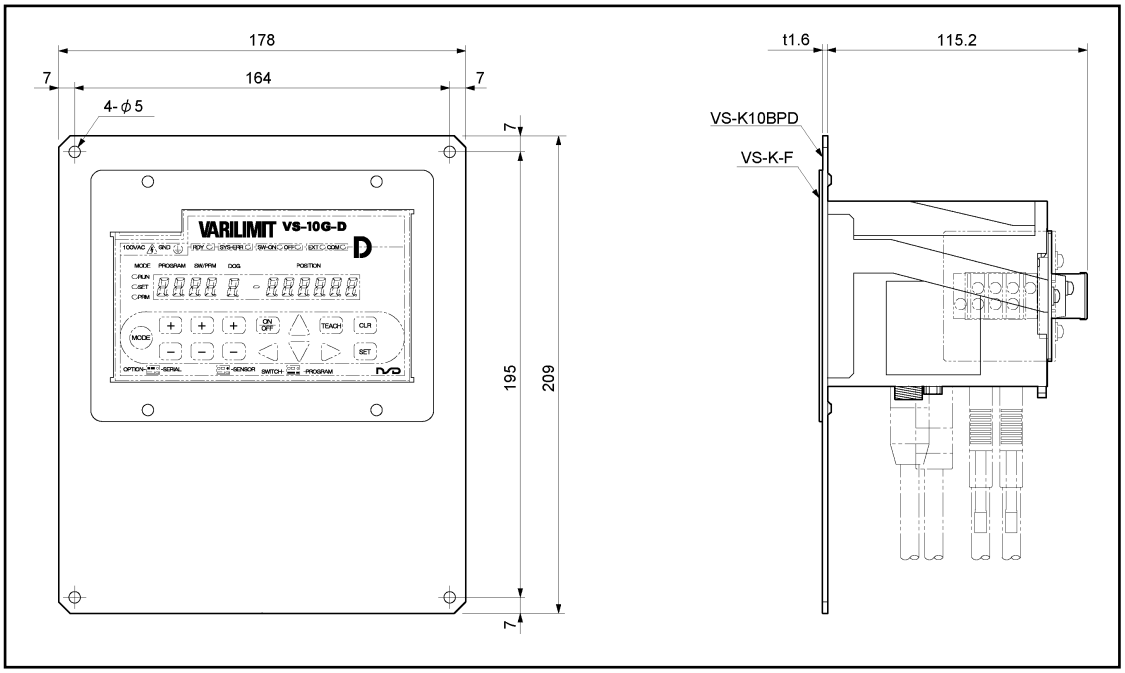
Units: mm



(4) Replacement Fixture for VS-10B-PDNP

VS-K10BPD+VS-K-F

Units: mm

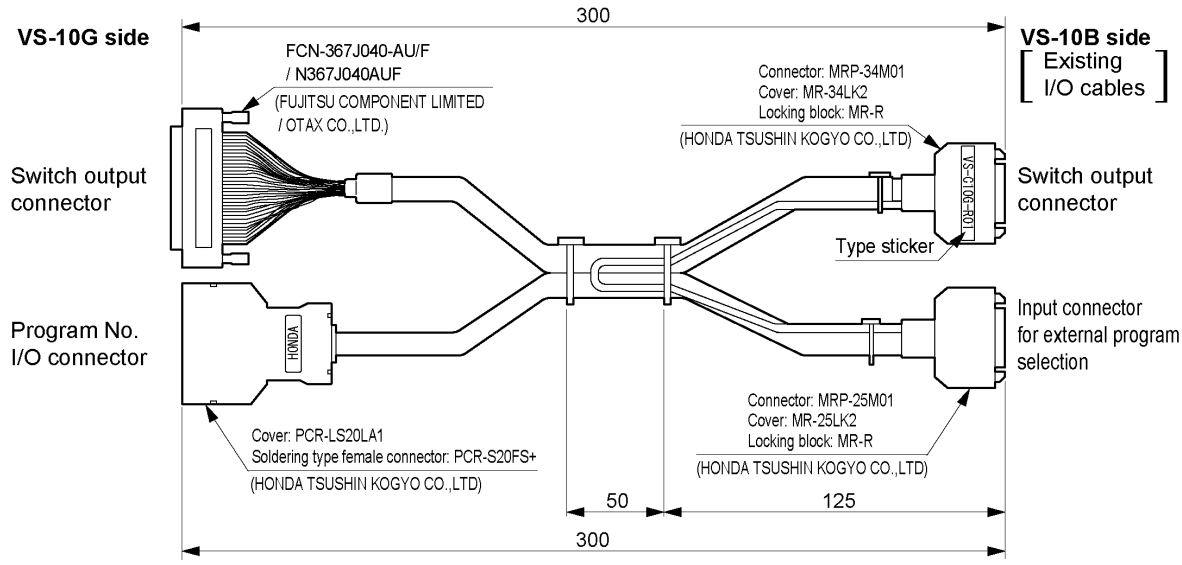


APPENDIX 4-6. Outline Dimensional Drawing of Conversion Cables

(1) VS-C10G-R01

Switch output, Program No. input

Units: mm



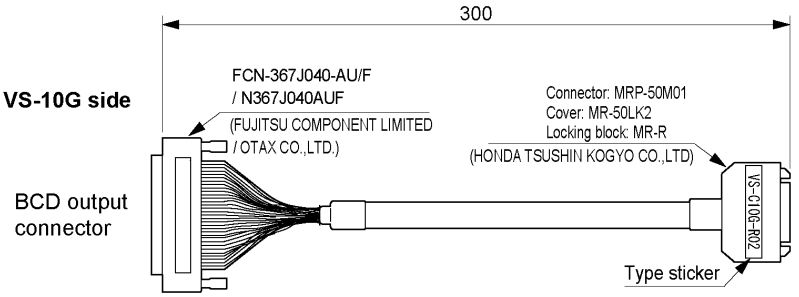
VS-10G side Switch output connector FCN-367J040-AU/F / N367J040AUF					VS-10B side Switch output connector MRP-34M01(male)	
	Signal name	Pin No.			Pin No.	Signal name
	Switch output 1	B20	Pink	(Black ■■■■)	1	Switch output 1
	Switch output 2	B19	Yellow	(Black ■■■■)	2	Switch output 2
	Switch output 3	B18	White	(Black ■■■■)	3	Switch output 3
	Switch output 4	B17	Gray	(Black ■■■■)	4	Switch output 4
	Switch output 5	B16	Orange	(Black ■■■■)	5	Switch output 5
	Switch output 6	B15	Pink	(Black ■■■)	6	Switch output 6
	Switch output 7	B14	Yellow	(Black ■■■)	7	Switch output 7
	Switch output 8	B13	White	(Black ■■■)	8	Switch output 8
	Switch output 9	B12	Gray	(Black ■■■)	9	Switch output 9
	Switch output 10	B11	Orange	(Black ■■■)	10	Switch output 10
	Switch output 11	B10	Pink	(Black ■■)	11	Switch output 11
	Switch output 12	B 9	Yellow	(Black ■■)	12	Switch output 12
	Switch output 13	B 8	White	(Black ■■)	13	Switch output 13
	Switch output 14	B 7	Gray	(Black ■■)	14	Switch output 14
	Switch output 15	B 6	Orange	(Black ■■)	15	Switch output 15
	Switch output 16	B 5	Pink	(Black ■)	16	Switch output 16
	Switch output 17	A20	Pink	(Red ■■■■)	17	Switch output 17
	Switch output 18	A19	Yellow	(Red ■■■■)	18	Switch output 18
	Switch output 19	A18	White	(Red ■■■■)	19	Switch output 19
	Switch output 20	A17	Gray	(Red ■■■■)	20	Switch output 20
	Switch output 21	A16	Orange	(Red ■■■■)	21	Switch output 21
	Switch output 22	A15	Pink	(Red ■■■)	22	Switch output 22
	Switch output 23	A14	Yellow	(Red ■■■)	23	Switch output 23
	Switch output 24	A13	White	(Red ■■■)	24	Switch output 24
	Switch output 25	A12	Gray	(Red ■■■)	25	Switch output 25
	Switch output 26	A11	Orange	(Red ■■■)	26	Switch output 26
	Switch output 27	A10	Pink	(Red ■■)	27	Switch output 27
	Switch output 28	A 9	Yellow	(Red ■■)	28	Switch output 28
	Switch output 29	A 8	White	(Red ■■)	29	Switch output 29
	Switch output 30 / Preset error output	A 7	Gray	(Red ■■)	30	Switch output 30
	System ready output	A 6	Orange	(Red ■■)	32	System ready output
	0V output common	A 2	Gray	(Red ■)	33	0V output common
	0V output common	A 1	Orange	(Red ■)	34	0V output common
	+24V input common	B 1	Orange	(Black ■)		
	Current position preset directional selection input	A 5	Pink	(Red ■)	9	External preset directional selection input
	Current position preset input 1	A 4	Yellow	(Red ■)	10	External preset input 1
	Current position preset input 2	A 3	White	(Red ■)	11	External preset input 2

VS-10G side Program No. I/O connector PCR-S20FS+					VS-10B side Input connector for external program selection MRP-25M01(male)	
	Program No. input 1	1	Orange	(Red ■)	1	Program switch input 1
	Program No. input 2	2	Orange	(Black ■)	2	Program switch input 2
	Program No. input 3	3	Gray	(Red ■)	3	Program switch input 3
	Program No. input 4	4	Gray	(Black ■)	4	Program switch input 4
	Program No. input 5	5	White	(Red ■)	5	Program switch input 5
	Program No. input 6	6	White	(Black ■)	6	Program switch input 6
	Program No. input 7	7	Yellow	(Red ■)	7	Program switch input 7
	Program No. input 8	8	Yellow	(Black ■)	8	Program switch input 8
	+24V input common	9	Pink	(Red ■)	16	+24V input common
	+24V input common	10	Pink	(Black ■)		
	Program No. output 1	11	Orange	(Red ■■)	17	Program No. answerback 1
	Program No. output 2	12	Orange	(Black ■■)	18	Program No. answerback 2
	Program No. output 3	13	Gray	(Red ■■)	19	Program No. answerback 3
	Program No. output 4	14	Gray	(Black ■■)	20	Program No. answerback 4
	Program No. output 5	15	White	(Red ■■)	21	Program No. answerback 5
	Program No. output 6	16	White	(Black ■■)	22	Program No. answerback 6
	Program No. output 7	17	Yellow	(Red ■■)	23	Program No. answerback 7
	Program No. output 8	18	Yellow	(Black ■■)	24	Program No. answerback 8
	0V output common	19	Pink	(Red ■■)	25	0V output common
	0V output common	20	Pink	(Black ■■)		

(2) VS-C10G-R02

Current position output

Units: mm



VS-10G side BCD output connector FCN-367J040-AU/F / N367J040AUF

Signal name	Pin No.		Pin No.	Signal name
BCD output 1 x 10^0 / Binary output 2^0	B20	Pink (Black ■■■■)	1	BCD output 1 x 10^0 / Binary output 2^0
BCD output 2 x 10^0 / Binary output 2^1	B19	Yellow (Black ■■■■)	2	BCD output 2 x 10^0 / Binary output 2^1
BCD output 4 x 10^0 / Binary output 2^2	B18	White (Black ■■■■)	3	BCD output 4 x 10^0 / Binary output 2^2
BCD output 8 x 10^0 / Binary output 2^3	B17	Gray (Black ■■■■)	4	BCD output 8 x 10^0 / Binary output 2^3
BCD output 1 x 10^1 / Binary output 2^4	B16	Orange (Black ■■■■)	5	BCD output 1 x 10^1 / Binary output 2^4
BCD output 2 x 10^1 / Binary output 2^5	B15	Pink (Black ■■■)	6	BCD output 2 x 10^1 / Binary output 2^5
BCD output 4 x 10^1 / Binary output 2^6	B14	Yellow (Black ■■■)	7	BCD output 4 x 10^1 / Binary output 2^6
BCD output 8 x 10^1 / Binary output 2^7	B13	White (Black ■■■)	8	BCD output 8 x 10^1 / Binary output 2^7
BCD output 1 x 10^2 / Binary output 2^8	B12	Gray (Black ■■■)	9	BCD output 1 x 10^2 / Binary output 2^8
BCD output 2 x 10^2 / Binary output 2^9	B11	Orange (Black ■■■)	10	BCD output 2 x 10^2 / Binary output 2^9
BCD output 4 x 10^2 / Binary output 2^{10}	B10	Pink (Black ■■)	11	BCD output 4 x 10^2 / Binary output 2^{10}
BCD output 8 x 10^2 / Binary output 2^{11}	B9	Yellow (Black ■■)	12	BCD output 8 x 10^2 / Binary output 2^{11}
BCD output 1 x 10^3 / Binary output 2^{12}	B8	White (Black ■■)	13	BCD output 1 x 10^3 / Binary output 2^{12}
BCD output 2 x 10^3 / Binary output 2^{13}	B7	Gray (Black ■■)	14	BCD output 2 x 10^3 / Binary output 2^{13}
BCD output 4 x 10^3 / Binary output 2^{14}	B6	Orange (Black ■■)	15	BCD output 4 x 10^3 / Binary output 2^{14}
BCD output 8 x 10^3 / Binary output 2^{15}	B5	Pink (Black ■)	16	BCD output 8 x 10^3 / Binary output 2^{15}
BCD output 1 x 10^4 / Binary output 2^{16}	B4	Yellow (Black ■)	17	BCD output 1 x 10^4 / Binary output 2^{16}
BCD output 2 x 10^4 / Binary output 2^{17}	B3	White (Black ■)	18	BCD output 2 x 10^4 / Binary output 2^{17}
	B2	Gray (Black ■)		
	B1	Orange (Black ■)		
BCD output 4 x 10^4 / Binary output 2^{18}	A20	Pink (Red ■■■■)	19	BCD output 4 x 10^4 / Binary output 2^{18}
BCD output 8 x 10^4 / Binary output 2^{19}	A19	Yellow (Red ■■■■)	20	BCD output 8 x 10^4 / Binary output 2^{19}
BCD output 1 x 10^5 / Binary output 2^{20}	A18	White (Red ■■■■)	21	BCD output 1 x 10^5
BCD output 2 x 10^5 / Binary output 2^{21}	A17	Gray (Red ■■■■)	22	BCD output 2 x 10^5
BCD output 4 x 10^5 / Binary output 2^{22}	A16	Orange (Red ■■■■)	23	BCD output 4 x 10^5
BCD output 8 x 10^5 / Binary sign output	A15	Pink (Red ■■■)	24	BCD output 8 x 10^5
Decimal point 10^1 / Decimal point 10^4	A14	Yellow (Red ■■■)	25	Decimal point 10^1
Decimal point 10^2 / Decimal point 10^5	A13	White (Red ■■■)	26	Decimal point 10^2
Decimal point 10^3	A12	Gray (Red ■■■)	27	Decimal point 10^3
BCD minus sign / Binary sign output	A11	Orange (Red ■■■)	28	Minus symbol (−) output
Latch pulse output	A10	Pink (Red ■■)	29	Latch pulse output
	A9	Yellow (Red ■■)	30	
DTC input +	A8	White (Red ■■)	31	HOLD input +
DTC input −	A7	Gray (Red ■■)	32	HOLD input −
	A6	Orange (Red ■■)		
	A5	Pink (Red ■)		
	A4	Yellow (Red ■)		
	A3	White (Red ■)		
0V output common	A2	Gray (Red ■)	33	0V output common
0V output common	A1	Orange (Red ■)	34	0V output common

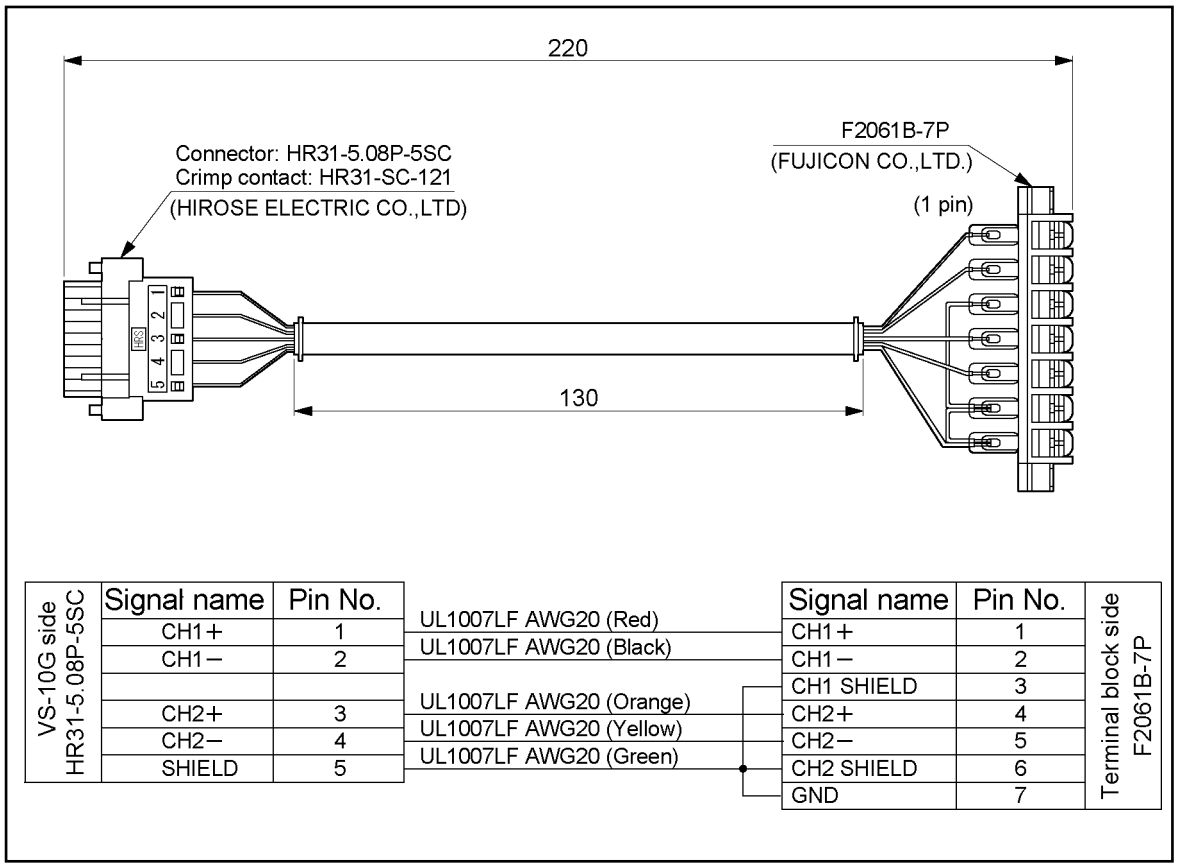
VS-10B side Current position BCD output connecor MRP-50M01(male)

Pin 35 and followers are not connected.

(3) VS-C10G-R03

Analog output Units: mm

This cable is attached to the replacement fixture VS-K10BA.



VS-10G side HR31-5.08P-5SC					Terminal block side F2061B-7P
Signal name	Pin No.		Signal name	Pin No.	
CH1＋	1	UL1007LF AWG20 (Red)	CH1＋	1	
CH1－	2	UL1007LF AWG20 (Black)	CH1－	2	
			CH1 SHIELD	3	
CH2＋	3	UL1007LF AWG20 (Orange)	CH2＋	4	
CH2－	4	UL1007LF AWG20 (Yellow)	CH2－	5	
SHIELD	5	UL1007LF AWG20 (Green)	CH2 SHIELD	6	
			GND	7	

NSD Group

Manufacturer
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