Specifications & Instruction Manual

ABSOCODER CONVERTER FOR CC-Link Ver. 1.10

VE-2CC
VM-2CC

Applicable sensor: VRE-P028
VRE-P062
MRE-32SP062
MRE-G☐SP062

GENERAL SAFETY RULES

(Please read this safety guide carefully before operation)

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.

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.

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

1. Handling Precautions

⚠ DANGER

- Do not touch components inside of the controller; 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 the controller; otherwise, it may cause electric shock.

- Provide an external safety circuit so that the entire system functions safely even when the controller is faulty.

- Connect the grounding terminal of the controller; otherwise, it may case electric shock or malfunction.

⚠ CAUTION

- Do not use the controller 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 the controller may become faulty.

- Be sure to use the controller and the ABSOCODER sensor 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 sensor, controller and sensor cable; otherwise, it may cause fire or controller malfunction.

2. Storage

⚠ CAUTION

- Do not store the controller in a place exposed to water, or toxic gas and liquid.

- Be sure to store the controller in designed temperature and humidity range, and do not exposed to direct sunlight.
- Be sure to consult with NSD when the controller is stored for long periods.

3. Transport

⚠ CAUTION

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

4. Installation

⚠ CAUTION

- Do not step on the ABSOCODER sensor or place heavy objects on the controller; otherwise, it will cause injury.

- Do not block the exhaust port or allow any foreign matter to enter the controller; otherwise, it will cause fire or unit failure.

- Be sure to secure the controller and ABSOCODER sensor with the provided brackets; otherwise, it may cause malfunction, injury, or drop.

- Be sure to secure the specified distance between the main body and the control panel or other equipments; otherwise, it may cause malfunction.

5. Wiring

⚠ DANGER

- Be sure to secure the terminal block firmly; otherwise, it may have risk of fire.

- Be sure to mount the terminal cover provided with the controller, 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 controller 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 controller'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, it will cause injury.

- Be sure to check that the power supply specifications are correct; otherwise, it may caused controller 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 the controller before mounting the controller to the machine; otherwise, it may cause injury.
- When an error occur, 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 the controller as industrial waste while disposing of it.

< VE-2CC / VM-2CC Specifications & Instruction Manual Revision History>
  * The Document No. appears at the upper right of this manual's cover page.

Document No.	Date	Revision Description
ZEF004410500	20, Mar., 2008	1st Edition Japanese document: ZEF004410206
ZEF004410501	3, Mar., 2014	2nd Edition Japanese document: ZEF004410207
ZEF004410502	5, Mar., 2014	3rd Edition Japanese document: ZEF004410208

CONTENTS

1. SUMMARY

1-1. Summary

This manual describes the specifications and instruction procedures for the VE-2CC/VM-2CC which is able to connect to the open-architecture network "CC-Link".

VE-2CC/VM-2CC is a converter which can detect the machine's current position value by ABSOCODER. The ABSOCODER sensor uses a magnetic position detection format, thereby the incremental format encoder which has been used can be replaced to VE-2CC/VM-2CC.
This converter can be used for the automatic controlling which needs position detections, such as the conveyor, press machine, assembly machine, packing machine and etc.

The detected position data can be read by the host controller via CC-Link, so the system is able to reduce the wiring.

1-2. Features

Features of VE-2CC/VM-2CC

(1) Absolute position detection

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

(2) High-resolution position detection

[1] VE-2CC: 8192 divisions / turn x 1 turn
[2] VM-2CC: 4096 divisions / turn x 32 turns (In the case of using MRE-32SP062)
If ABSOCODER that "the total number of turn" is twice as much as "MRE-32SP062" is used, the number of divisions is 1/2 per turn.

(3) Connects with CC-Link

The position data, current position value setting data, and error signal can be sent or received on CC-Link.

(4) Self-diagnosis function

The following self-diagnosis result can be checked by the remote input (RX).
- Internal CPU error (watchdog timer error)
- Memory error
- Sensor error (The sensor is disconnected or severed.)
- Low-voltage detection

(5) Current position setting function

The position data can be designated as desired value from the host controller.

2. CONFIGURATION

【Connection diagram】

PLC   Master station

①Converter
Remote device station

Communication cable

④Servo-mount fixture
(Accessory)

③Extension
sensor cable

【Communication cable】
-Connector: MVSTBW2.5/4-STF-5.08
　　　　　　(Manufactured by PHOENIX
　　　　　　CONTACT)
　　　*This connector is an accessory
　　　of the converter. (1 piece)
-Cable: dedicated cable for CC-Link
　　　　(commercially available cable)

②ABSOCODER

⑤Reinforced servo-mount
fixture (Option)

⑥L type flange-mount fixture
(Option)

●VE-2CC

No.	Name		Model	Note
①	Converter		VE-2CC	
②	ABSOCODER sensor (single-turn type)	φ62mm	VRE-P062SAC	Shaft shape: flat, servo-mount type
			VRE-P062SBC	Shaft shape: key way, servo-mount type
			VRE-P062FAC	Shaft shape: flat, flange-mount type
			VRE-P062FBC	Shaft shape: key way, flange-mount type
		φ28mm	VRE-P028SAC	Shaft shape: flat, servo-mount type
③	Extension sensor cable		3P-S-0102-□	Standard cable □: cable length[m]
			3P-RBT-0102-□	Robotic cable □: cable length[m]

●VM-2CC

No.	Name	Model	Note
①	Converter	VM-2CC	
②	ABSOCODER sensor (multi-turn type)	MRE-32SP062SAC	32-turn type, shaft shape: flat, servo-mount type
		MRE-32SP062SBC	32-turn type, shaft shape: key way, servo-mount type
		MRE-32SP062FAC	32-turn type, shaft shape: flat, flange-mount type
		MRE-32SP062FBC	32-turn type, shaft shape: key way, flange-mount type
		MRE-G□SP062FAC	□(Total number of turns): 64,128,160,256,320 Shaft shape: flat, flange-mount type
		MRE-G□SP062FBC	□(Total number of turns): 64,128,160,256,320 Shaft shape: key way, flange-mount type
③	Extension sensor cable	4P-S-0102-□	Standard cable □: cable length[m]
		4P-RBT-0102-□	Robotic cable □: cable length[m]

●Accessory

No.	Name	Model	Note
④	Servo-mount fixture	SB-01	Included with VRE-P062SAC, VRE-P062SBC, MRE-32SP062SAC, and MRE-32SP062SBC
		SB-02	Included with VRE-P028SAC

●Option

No.	Name	Model	Note
⑤	Reinforced servo-mount fixture	SH-01	For VRE-P062SAC, VRE-P062SBC, MRE-32SP062SAC, and MRE-32SP062SBC
⑥	L type flange-mount fixture	RB-01	For the flange-mount and reinforced servo-mount fixture

2

3. SPECIFICATIONS

3-1. Converter Specifications

(1) General Specification

Items	Specifications
Input power supply voltage	24VDC
Permissible power voltage range	21.6 to 26.4VDC
Power consumption	6W or less
Insulation resistance	20 MΩ or more between external DC power terminals and ground (by 500 VDC insulation resistance tester)
Withstand voltage	500 VAC, 60Hz for 1 minute between external DC power terminal and ground
Vibration resistance	20m/s^2 10 to 500Hz, 10cycles of 5 minutes in 3 directions, conforms to JIS C 0040 standard
Ambient operating temperature	0 to +55°C (No freezing)
Ambient operating humidity	20 to 90 %RH (No condensation)
Ambient operating environment	Free from corrosive gases and excessive dust
Grounding	Must be securely grounded (ground resistance of 100Ω or less)
Construction	Book-shelf type within enclosure
Outside dimension (mm)	45(W)×160(H)×115(D) Refer to dimensions for details.
Mass	Approx. 0.7kg

(2) Performance Specification

Items	Specifications	
Converter model	VE-2CC	VM-2CC
Applicable sensor	VRE-P028/062	MRE-32SP062, MRE-G□SP062
Position detection format	Absolute position detection by ABSOCODER	
Number of the position detection axes	1 axis	
Number of divisions	8192 divisions x 1 turn	4096 division x 32 turns to 409.6 divisions x 320 turns
Bit numbers of the current position value display	13(D0 to D12)	17(D0 to D16)
Position data sampling time	0.2ms	0.1ms
Error detection	Watchdog timer error, memory error, sensor error, and low voltage error	

(3) Communication Specification

Items	Specifications	
Version	CC-Link Ver. 1.10	
Number of occupied station	1 station	
CC-Link station type	Remote device station	
Number of remote points	Remote input (RX)	32 points
	Remote output (RY)	32 points
	Remote register (RWw)	4 words
	Remote register (RWr)	4 words
Communication speed	10M / 5M / 2.5M / 625K / 156Kbps	

3-2. ABSOCODER and Extension Sensor Cable Specifications

(1) VE-2CC

[ABSOCODER]

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 kg-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		8×10^4 h (at 6000 r/min)	5.5×10^4 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) 2000Hz, 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	3P-S	100 m	
	3P-RBT	100 m	
Interconnecting sensor cable		2 m	

[Extension Sensor Cable Specification]

Items		Specifications	
Model code		3P-S-0102-□	3P-RBT-0102-□
Cable type		Standard cable	Robotic cable
Diameter		ϕ 8	
Ambient temperature	Operating	-5 to +60°C	
	Storage	-5 to +60°C	-10 to +60°C
Insulator		Irradiated, 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	Usable with moving machine member thanks to excellent flexibility

[Remark]

Contact your NSD representative when the extension cable is combined to use with different kinds of cables.

(2) VM-2CC

[ABSOCODER]

Items		Specifications					
Sensor model		MRE-32SP062	MRE-G□SP062				
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 (4×10^{-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	4P-S	100 m	100 m				
	4P-RBT	40 m	70m				
Interconnecting sensor cable		2 m					

[Extension Sensor Cable Specification]

Items		Specifications	
Model code		4P-S-0102-□	4P-RBT-0102-□
Cable type		Standard cable	Robotic cable
Diameter		ϕ 8	
Ambient temperature	Operating	-5 to +60°C	
	Storage	-5 to +60°C	-10 to +60°C
Insulator		Irradiated, 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	Usable with moving machine member thanks to excellent flexibility

[Remark]

Contact your NSD representative when the extension cable is combined to use with different kinds of cables.

4. DIMENSIONS

4-1. Converter

● VE-2CC

Units: mm

φ5

VE-2CC

ZERO SET

24V DC
GND

CC-Link

DA
DB
DG
SLD

○ L RUN
○ L ERR
○ SD
○ RD
○ RUN

NODE
×10

×1

BR

SENSOR

160
145
126
5
45

(85)
115

● VM-2CC

φ5

VM-2CC

ZERO SET

24V DC
GND

CC-Link

DA
DB
DG
SLD

○ L RUN
○ L ERR
○ SD
○ RD
○ RUN

NODE
×10

×1

BR

SENSOR

160
145
126
5
45

(85)
115
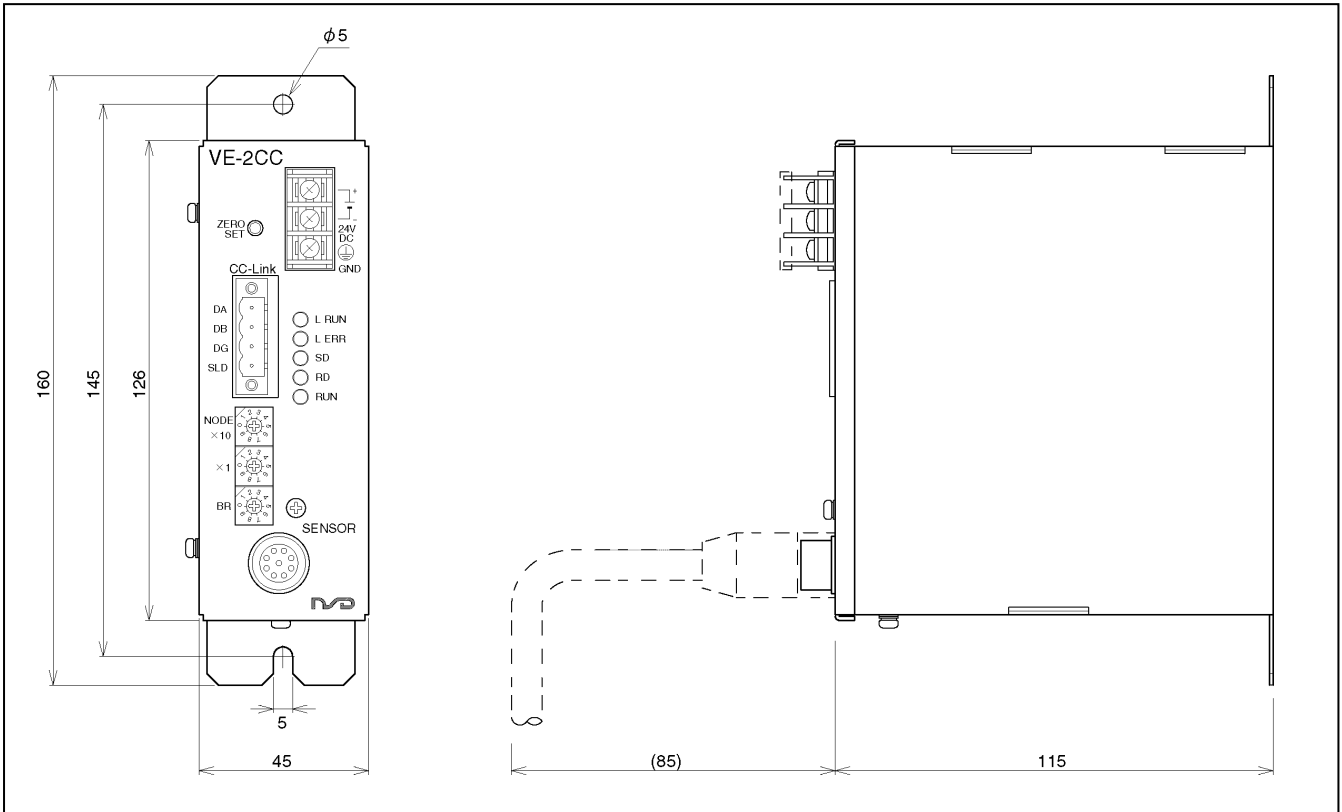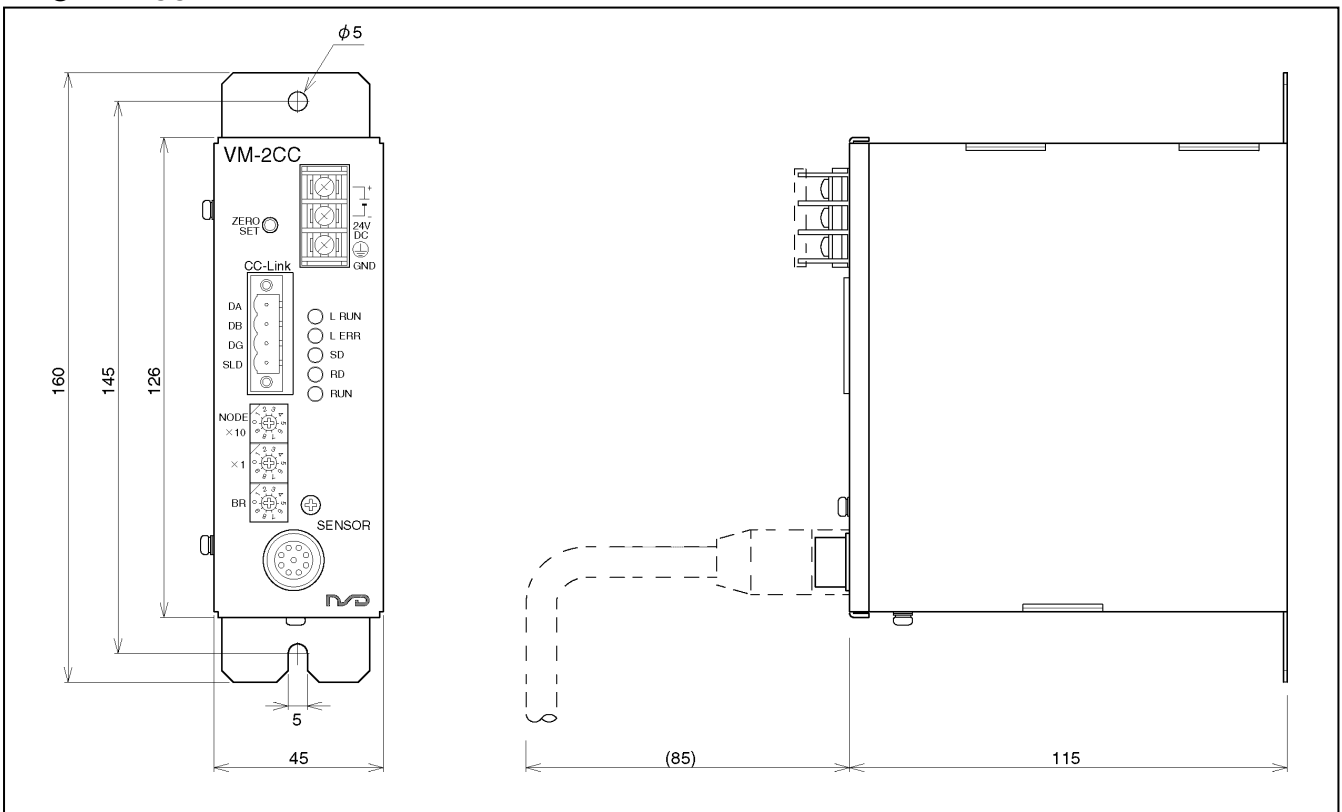
4-2. ABSOCODER Sensor
(1) VRE-P028   Units: mm
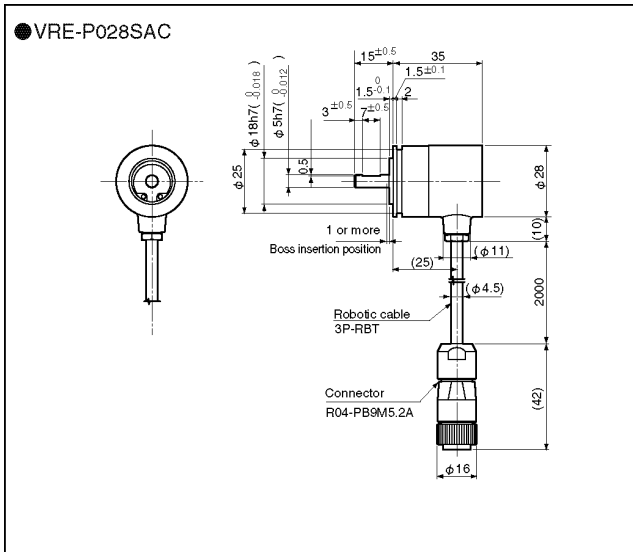
● VRE-P028SAC

● VRE-P028SAC Accessory   Model：SB-02
  Mounting fixture for VRE-P028SAC Servo mount . (3 pieces set)

●VRE-P062SAC

●VRE-P062SBC

30±1　　71.5
4±0.1
3　4
20
φ62.5
φ56h7
φ10h7
1.5 or more
Boss insertion position
φ62.5
(15)
51
(φ17)
2000
(φ8)
Robotic cable
3P-RBT
Connector
R04-PB9M8.0A
(42)
φ16

R2
4N9
30±1　　71.5
4±0.1
3　4
22
2.5
φ62.5
φ56h7
φ10h7
1.5 or more
Boss insertion position
φ62.5
(15)
51
(φ17)
2000
(φ8)
Robotic cable
3P-RBT
Connector
R04-PB9M8.0A
(42)
φ16
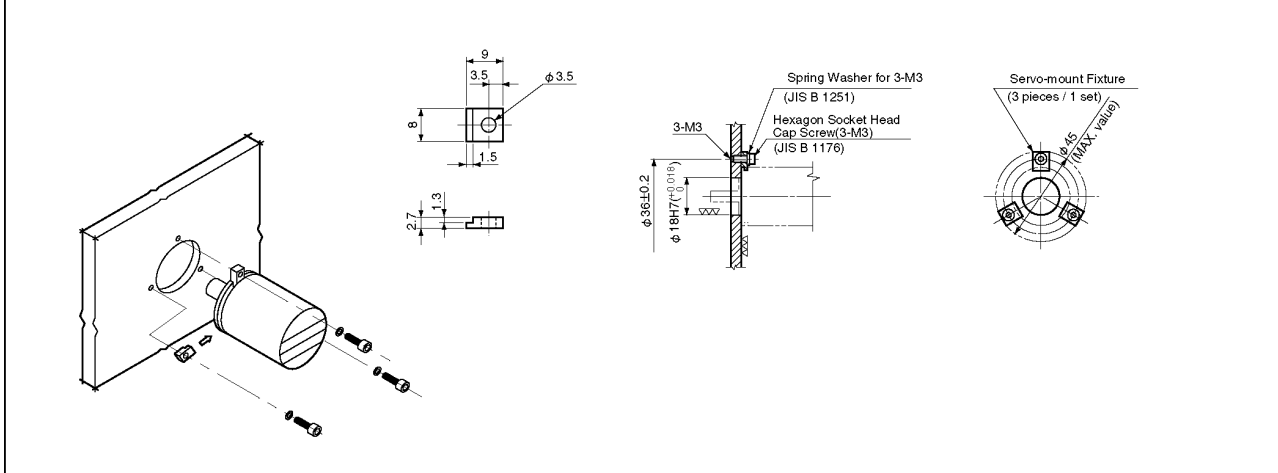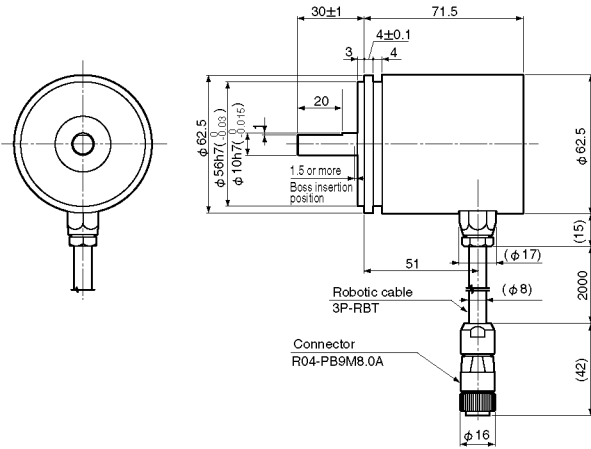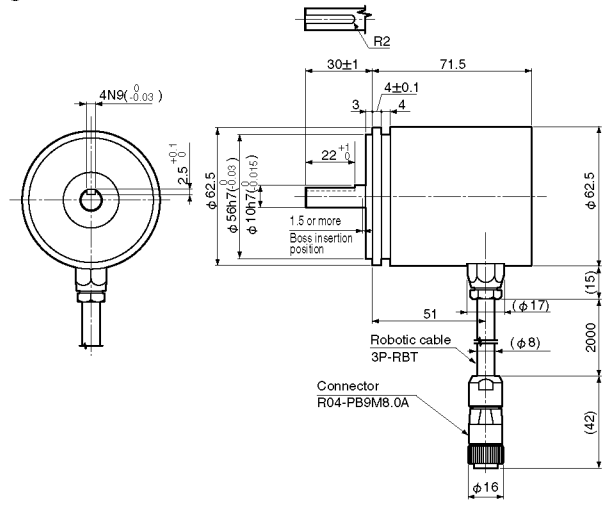
●VRE-P062S□C Accessory　　Model：SB-01
　Mounting fixture for VRE-P062S□C Servo mount . (3 pieces set)

13.5
5　φ4.5
10
3.5
3.8
6.5

Spring Washer for 3-M4
(JIS B 1251)
Hexagon Socket Head
Cap Screw(3-M4)
(JIS B 1176)
3-M4
φ74±0.2
φ56H7
Servo-mount Fixture
(3 pieces / 1 set)
φ85
(MAX. value)
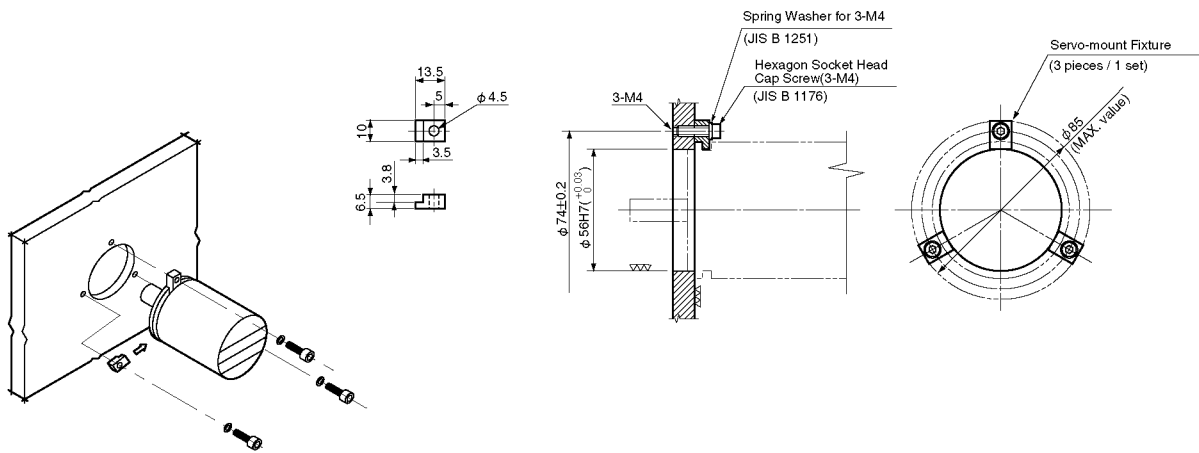
□Option　　Model：SH-01
　Mounting fixture for VRE-P062S□C Reinforced Servo mount. (2 pieces set)

A-A
Cross-Sectional
View
45°
R46
R31.5
R28.5
R37
90°
2-φ6.5
(0.5)　3.8
7
4-M5
φ74±0.2
φ56H7
Spring Washer for 4-M5
(JIS B 1251)
Hexagon Socket Head
Cap Screw(4-M5)
(JIS B 1176)
Reinforced Servo-mount Fixture
(2 pieces / 1 set)
φ92
(MAX. value)
A
A
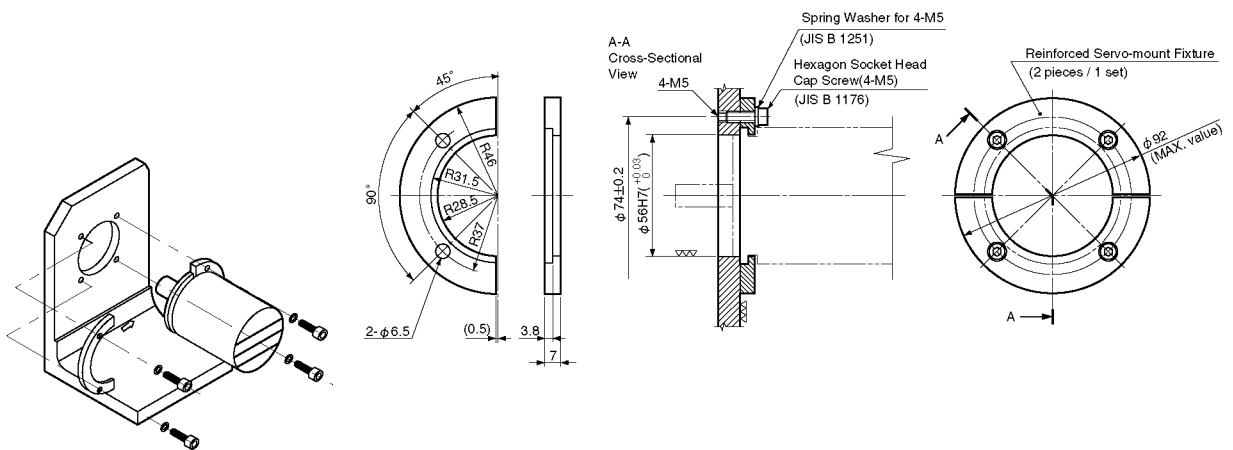
● VRE-P062FAC

●Mounting hole dimensions for flange

4-M5(Equally spaced) Depth: 6 or more

φ74±0.2

(52.3)

φ56H7($^{+0.03}_{0}$)

(52.3)

□68

30±1   71.5

3   5

20

φ56h7($^{0}_{-0.03}$)

φ10h7($^{0}_{-0.015}$)

1.5 or more

Boss insertion position

φ74

4-φ6.5

φ62.5

51

(φ17)

(15)

(φ8)

Robotic cable 3P-RBT

Connector R04-PB9M8.0A

2000

(42)

φ16
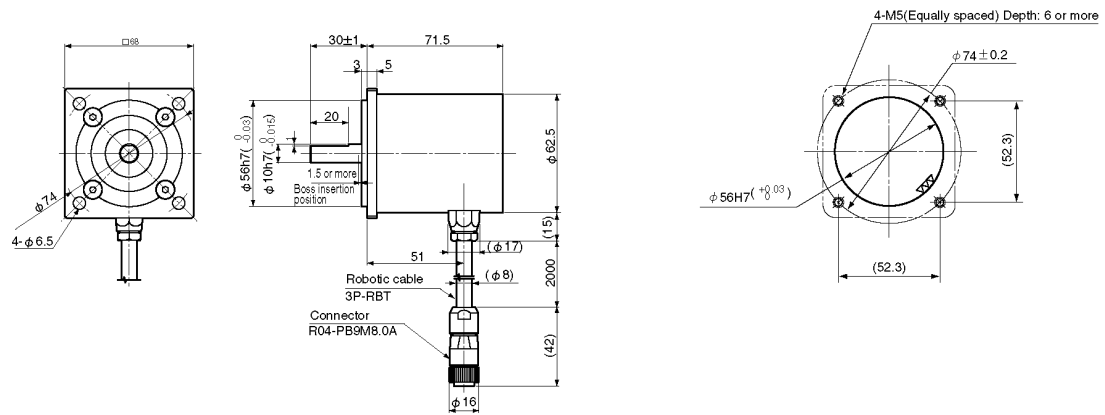
● VRE-P062FBC

●Mounting hole dimensions for flange

4-M5(Equally spaced) Depth: 6 or more

φ74±0.2

(52.3)

φ56H7($^{+0.03}_{0}$)

(52.3)

R2

□68

4N9($^{0}_{-0.03}$)

30±1   71.5

3   5

22$^{+0.1}_{0}$

2.5$^{+0.1}_{0}$

φ56h7($^{0}_{-0.03}$)

φ10h7($^{0}_{-0.015}$)

1.5 or more

Boss insertion position

φ74

4-φ6.5

φ62.5

51

(φ17)

(15)

(φ8)

Robotic cable 3P-RBT

Connector R04-PB9M8.0A

2000

(42)

φ16
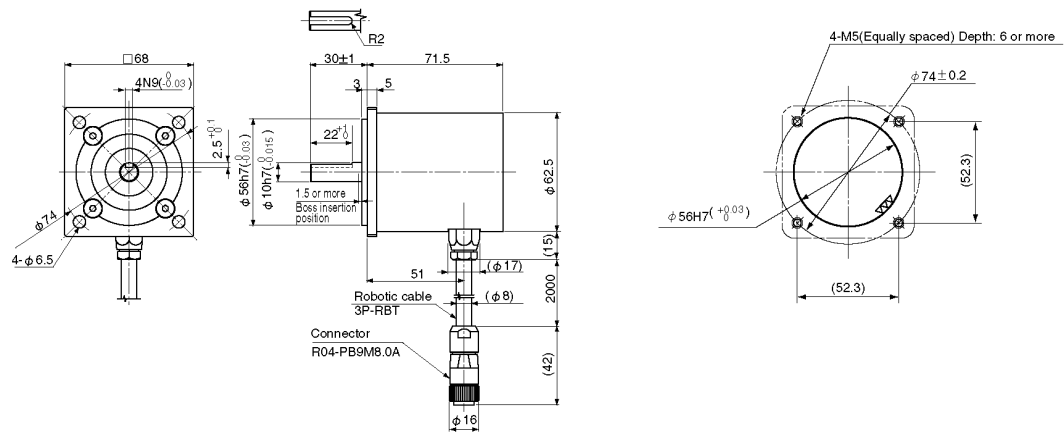
□Option   Model : RB-01
  L-type flange for VRE-P062

Applicable sensors are following.
VRE-P062S□C ＋ SH-01
VRE-P062F□C

4-M5×0.8 P.C.D.74

φ56H8($^{+0.046}_{0}$)

120

70±0.07

100

(1)

(R10) 4-φ9

80   10

100

9   15   25

60
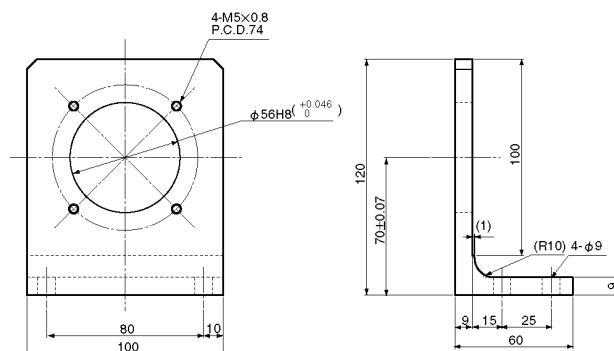
(3) MRE-32SP062, MRE-G□SP062

Units: mm

● MRE-32SP062SAC

● MRE-32SP062SBC

4±0.1
30±1
105
3
4
20
φ62.5
φ56h7(−0.03)
φ10h7(−0.015)
1.5 or more
Boss insertion position
φ62.5
(92)
(φ14)
(φ8)
(5)
Robotic cable
4P-RBT
2000
(42)
Connector
R04-PB9M8.0A
φ16

R2
4N9(0 −0.03)
4±0.1
30±1
105
3
4
2.5 +0.1 0
22 +1 0
φ62.5
φ56h7(−0.03)
φ10h7(−0.015)
1.5 or more
Boss insertion position
φ62.5
(92)
(φ14)
(φ8)
(5)
Robotic cable
4P-RBT
2000
(42)
Connector
R04-PB9M8.0A
φ16
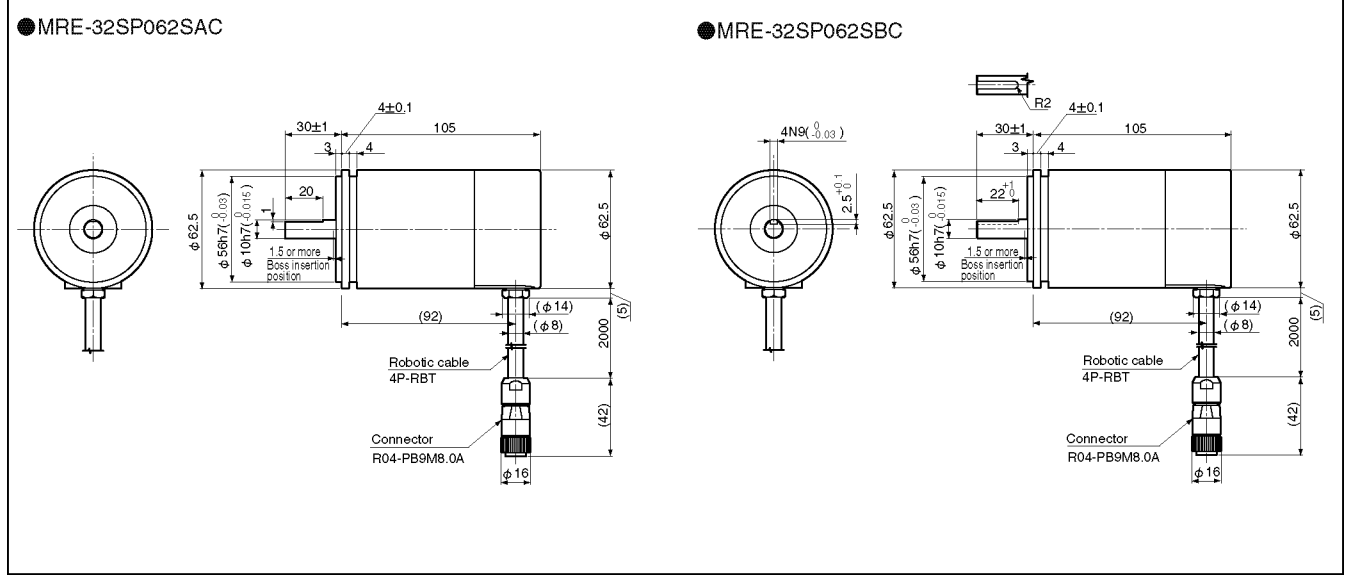
● MRE-32SP062S□C Accessory　Model：SB-01
　Mounting fixture for MRE-32SP062S□C Servo mount . (3 pieces set)

13.5
5
φ4.5
10
3.5
6.5
3.8

Spring Washer for 3-M4
(JIS B 1251)
Hexagon Socket Head
Cap Screw(3-M4)
(JIS B 1176)
3-M4
φ74±0.2
φ56H7(+0.03 0)
Servo-mount Fixture
(3 pieces / 1 set)
φ85
(MAX. value)
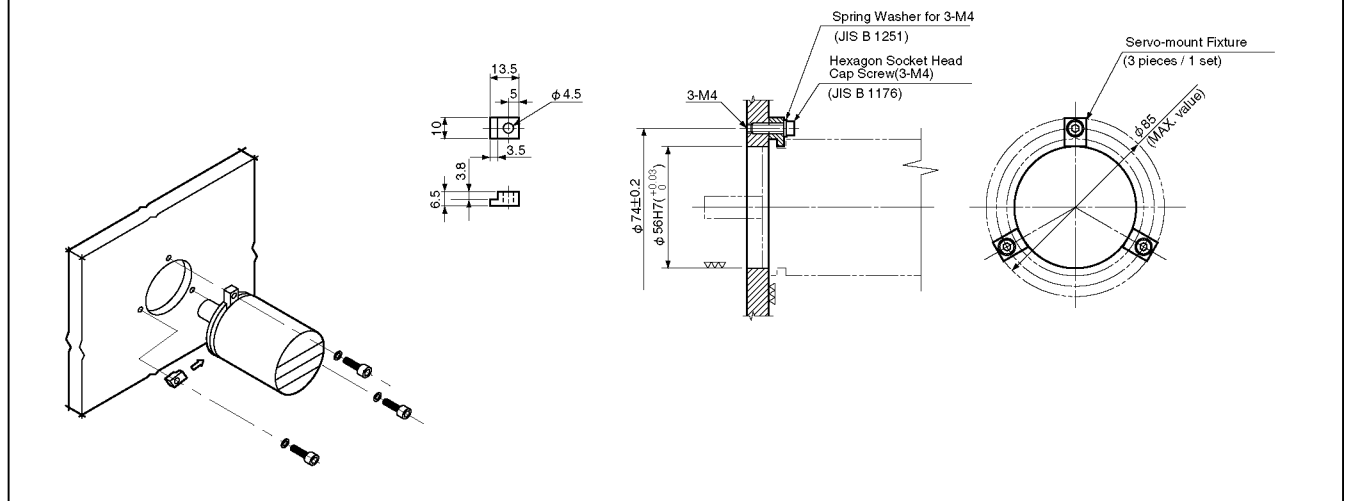
□ Option　Model：SH-01
　Mounting fixture for MRE-32SP062S□C Reinforced Servo mount. (2 pieces set)

45°
90°
R46
R31.5
R28.5
R37
2-φ6.5
(0.5)
3.8
7

A-A
Cross-Sectional
View
4-M5
Spring Washer for 4-M5
(JIS B 1251)
Hexagon Socket Head
Cap Screw(4-M5)
(JIS B 1176)
φ74±0.2
φ56H7(+0.03 0)
Reinforced Servo-mount Fixture
(2 pieces / 1 set)
A
A
φ92
(MAX. value)

10

●MRE-32SP062FAC

□68

30±1 105

3 5

20

$\phi 56h7(_{-0.03}^{0})$ $\phi 10h7(_{-0.015}^{0})$

1.5 or more
Boss insertion
position

φ74

4-φ6.5

(92)

$\phi 62.5$

(5)

(φ14)
(φ8)

2000

Robotic cable
4P-RBT

Connector
R04-PB9M8.0A

φ16

(42)

●MRE-32SP062FBC

R2

□68

4N9($_{-0.03}^{0}$)

30±1 105

3 5

22_0^{+1}

2.5_0^{+1}

$\phi 56h7(_{-0.03}^{0})$ $\phi 10h7(_{-0.015}^{0})$

1.5 or more
Boss insertion
position

φ74

4-φ6.5

(92)

$\phi 62.5$

(5)

(φ14)
(φ8)

2000

Robotic cable
4P-RBT

Connector
R04-PB9M8.0A

φ16

(42)

●MRE-G□SP062FAC (□:64, 128, 160, 256, 320)

□68

Mold extraction

30±1 85.5

3 4.5

(6.5)

(1)

20

$\phi 56h7(_{-0.03}^{0})$ $\phi 10h7(_{-0.015}^{0})$

(φ36) (φ50) (5)

1.5 or more
Boss insertion
position

φ74

4-φ6.5

(72.5)

$\phi 62.5$

(5)

(φ14)
(φ8)

2000

Robotic cable
4P-RBT

Connector
R04-PB9M8.0A

φ16

(42)
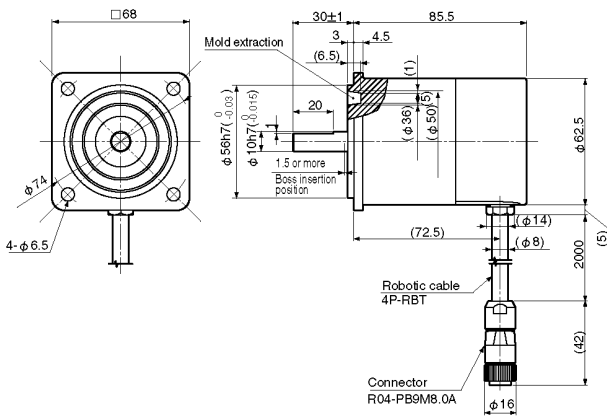
●MRE-G□SP062FBC (□:64, 128, 160, 256, 320)

R2

□68

4N9($_{-0.03}^{0}$)

Mold extraction

30±1 85.5

3 4.5

(6.5)

(1)

20±0.5

2.5_0^{+1}

$\phi 56h7(_{-0.03}^{0})$ $\phi 10h7(_{-0.015}^{0})$

(φ36) (φ50) (5)

1.5 or more
Boss insertion
position

φ74

4-φ6.5

(72.5)

$\phi 62.5$

(5)

(φ14)
(φ8)

2000

Robotic cable
4P-RBT

Connector
R04-PB9M8.0A

φ16

(42)

●Mounting hole dimensions for flange

4-M5 (Equally spaced) Depth: 6 or more

$\phi 74 \pm 0.2$

(52.3)

$\phi 56H7(_0^{+0.03})$

(52.3)
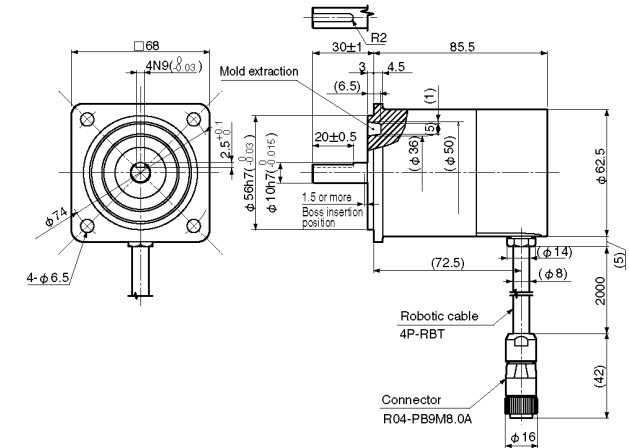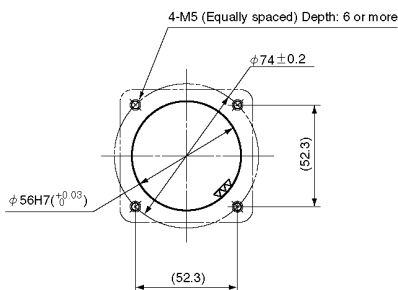
□Option   Model：RB-01
L-type flange for MRE-32SP062・MRE-G□SP062

Applicable sensors are following.
MRE-32PS062S□C ＋ SH-01
MRE-32SP062F□C
MRE-G□SP062F□C
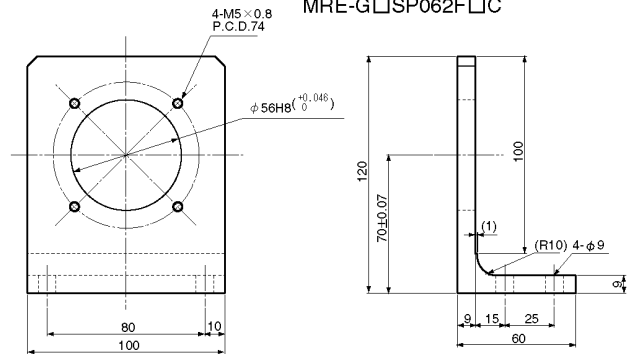
4-M5×0.8
P.C.D.74

$\phi 56H8(_0^{+0.046})$

120

70 ± 0.07

100

(1)

(R10) 4-φ9

9 15 25

80 10

100

60

11

4-3. Extension Sensor Cable

● 3P-S-0102- L ／3P-RBT-0102- L

● 4P-S-0102- L ／4P-RBT-0102- L

Units: mm

R04-PB9M8.0A

R04-JB9F8.0A

φ16

φ11

φ8

M14

φ16

(42)

L

(42)

12
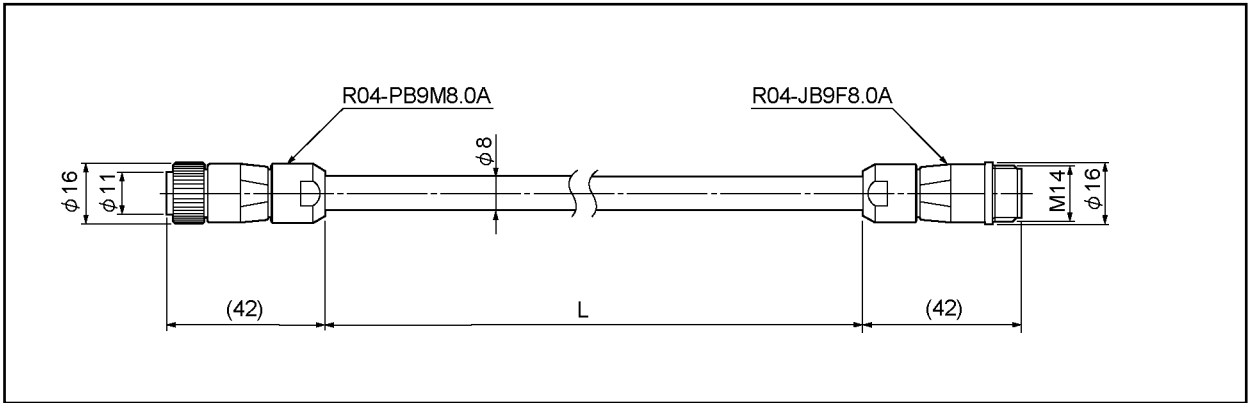
5. INSTALLATION AND PRECAUTIONS

5-1. Converter Installation Conditions and Precautions

The installation conditions and precautions for each of the system components are described in this section.

- 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 90% 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.

Converter
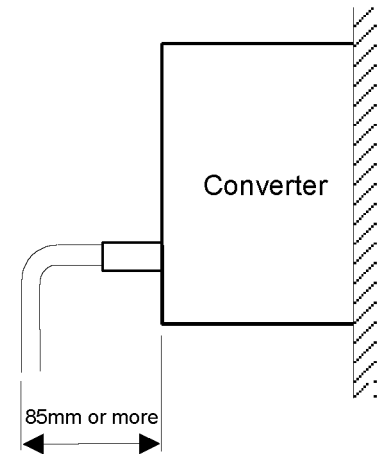
85mm or more

- Installation cautions

(1) Secure tightly with two pieces of M4 screws.
(2) Install as far from high voltage lines and power lines as possible in order to minimize noise influences.
(3) Allow 85mm or more space at the converter's front side for plugging in and unplugging the connector.

5-2. ABSOCODER Sensor Installation Conditions and Precautions

(1) Do not subject the sensor to excessive shocks and unbalanced loads.
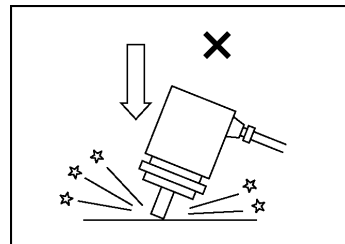
(2) If connected to a shaft, a coupling format should be used.

Coupling
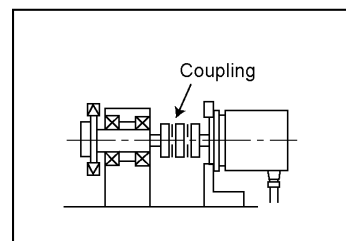
For the installation conditions and precautions for ABSOCODER sensor, refer to "ABSOCODER HANDLING PRECAUTION" (NSP-Z2022). This manual is available upon request.

6. WIRING

6-1. Connection between Converter and ABSOCODER Sensor

The cable connector is connected to the sensor connector of the converter. The ABSOCODER sensor is equipped with a 2-meter interconnecting sensor cable.   If a longer length is required, dedicated extension sensor cable must be used.

ABSOCODER

Converter

Extension sensor cable
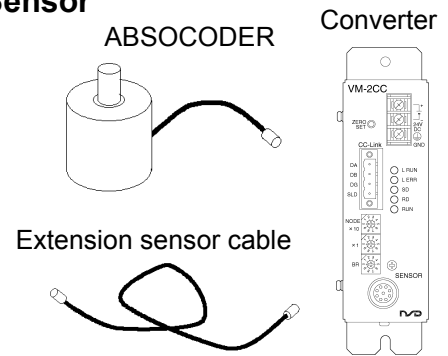
-**Wiring Precautions**

(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.
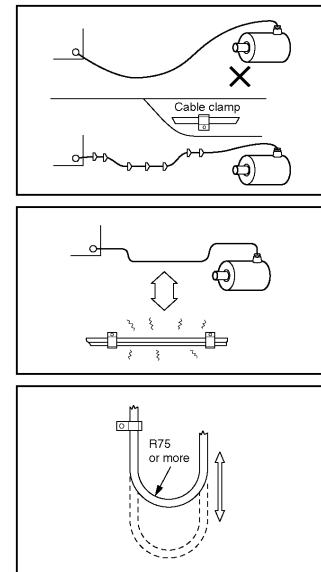
6-2. Power Supply Connection

The power supply should be connected as described below:

(1) Power Supply
  - The rush current is 10A (rush time of 20ms), so select the power supply after due consideration. Choose the capacity of the power supply over double of power consumption of converter.
  - Use a power supply of 24VDC, and 8A or less.
  - The input power supply should be isolated from the commercial power supply.
  - The power cable should be as thick as possible to minimize voltage drops.
  - Twist the power cable for preventing noises.
  - Use the M3 size crimp lug terminals with insulating sleeves in order to prevent short circuit caused by loose screws. (Torque: 0.6N-m).
  - Connect the power supply via a 4A (max.) over-current protection circuit.
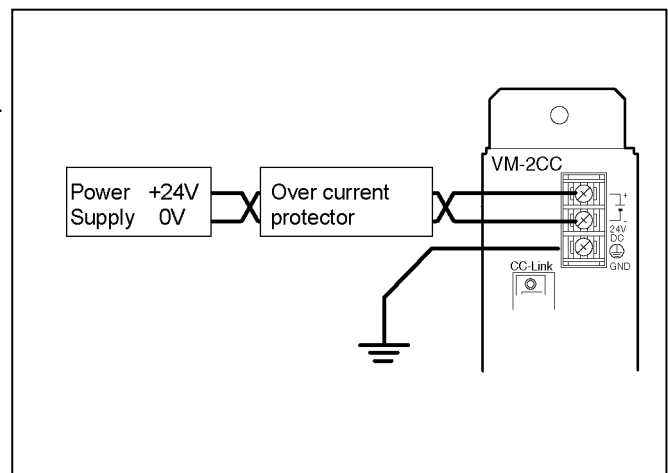
(2) Ground
  - The unit should be securely grounded (ground resistance of 100ohm or less) to prevent electrical shocks.
  - The power cable should be as thick as possible.

6-3. CC-Link Connection

●Connection configuration
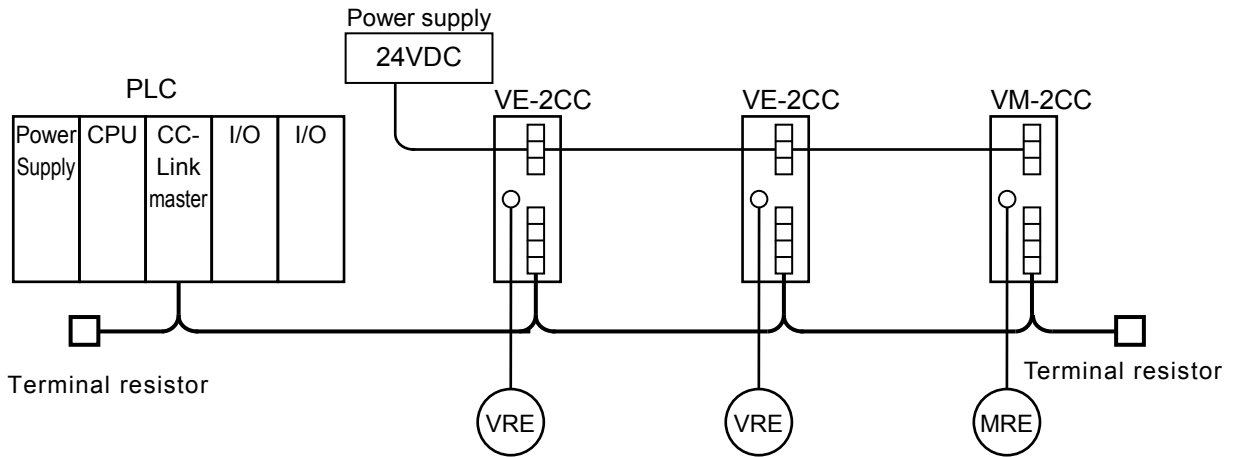
●Wiring

- Use the dedicated cable for CC-Link.
- Both sides of the unit of CC-Link must be connected with the terminal resistor.
- Connect the terminating resistance between "DA" to "DB".

- Wiring method
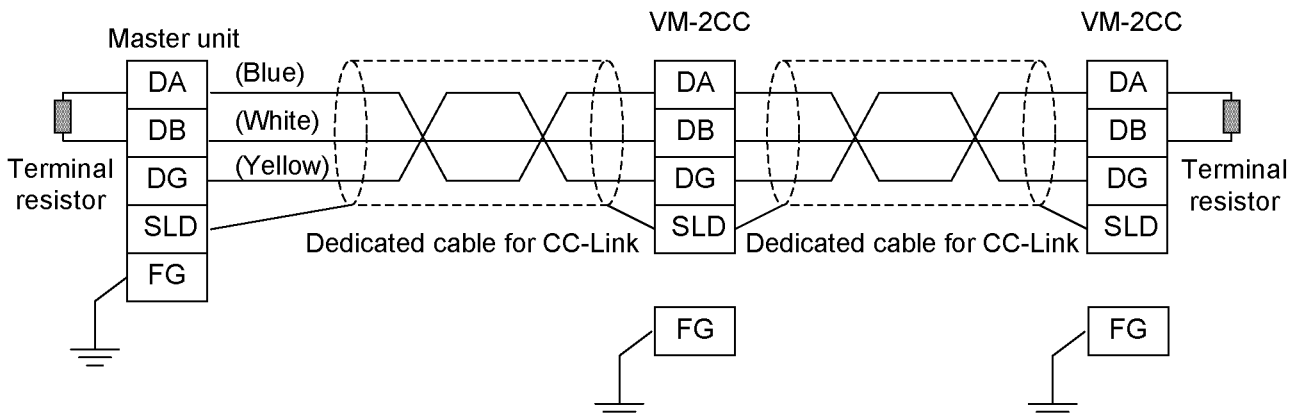
7. NOMENCLATURE and FUNCTION

7-1. Part Identification and Function
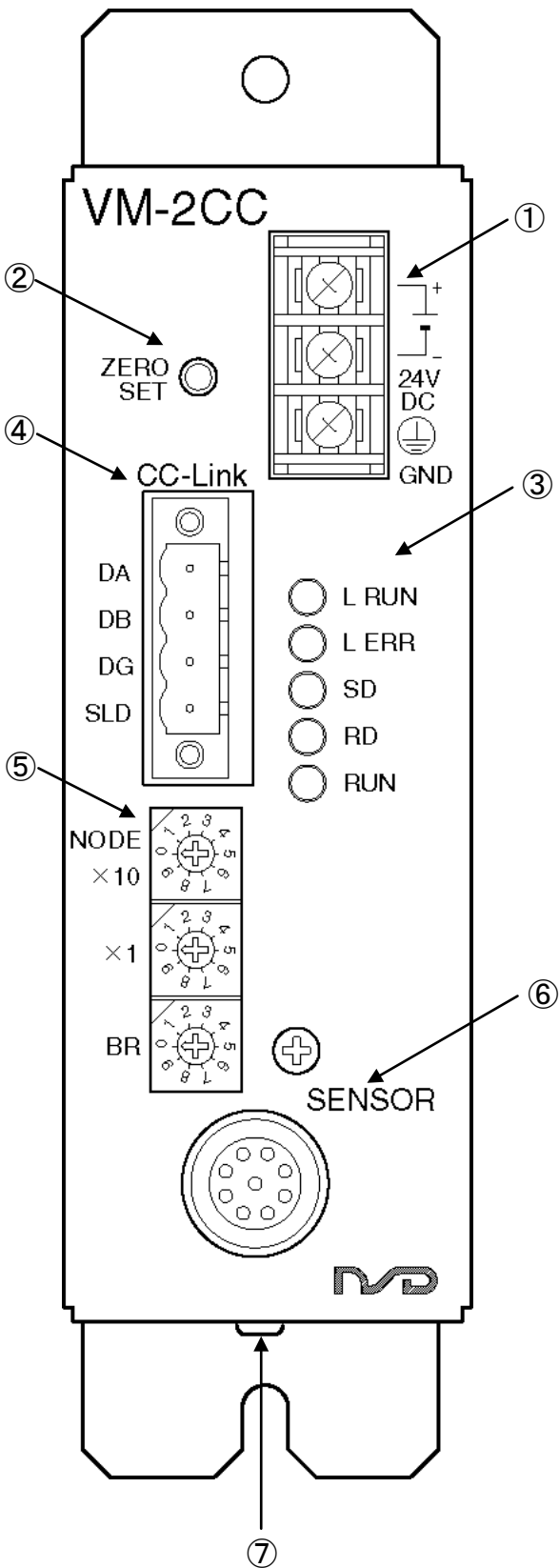
① Terminal block of external power supply

Connects to 24VDC and ground wire by the input terminal of the external power supply.

② ZERO SET button

The position data is "0" (zero point setting) when pressing the button more than 1 second.

③ LED

L-RUN: Lights ON when communicating with CC-Link.

L-ERR: Lights ON when SW settings of NODE and BR have an error.
SW setting is changed during the power supply is ON, and then LED blinks.

SD: Lights ON when sending the data.

RD: Lights ON when receiving the data.

RUN: Lights ON when the system operates normally.

④ Communication connector

Connects the connector of CC-Link.

⑤ NODE, BR

Sets the communication speed(baud rate) and station No. of CC-Link.

⑥ Sensor connector

Connects to ABSOCODER.

For more details, refer to "6. WIRING".

⑦ Rotation direction setting switch of ABSOCODER

Switch 1: Sets the rotation direction of ABSOCODER by turning

Switch 2 to 8: N/A

7-2. Zero Point Setting

"Zero point setting" is that the position data is designated on "0". Zero point setting is proceeded by pressing ZERO SET button on the panel side after moving the machine position to the zero point.
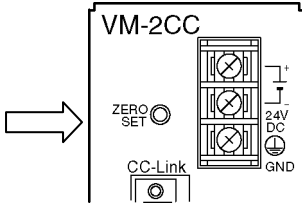
(1) Move the machine to the desired zero-point position.
(2) Verify that a normal status exists at the converter
(3) Hold "ZERO SET" button on the panel side more than 1 second.
(4) The current position sets as the zero point when releasing the button.

7-3. LED Display Contents

Indicates the LED lighting, extinction, and blinking conditions.
○: Lights ON ●: Lights OFF ◎: Blinks

LRUN	LERR	SD	RD	Operation
○	◎	○	○	Communicates normally. However, CRC errors sometimes occurred by noise interference.
○	0.4s◎	○	○	Station No.(NODE) or transmission speed (BR) switch setting was changed during normal operation.
○	◎	●	○	CRC errors are found in the receiving data.　Unable to response.
○	●	○	○	Communicates normally.
○	●	●	○	Unable to receive data address to the station.
●	◎	○	○	There is the polling response, but CRC errors are found in receiving the refresh data.
●	◎	●	○	CRC errors are found in the data address to the station.
●	●	○	○	Link is not started.
●	●	●	○	No data address exists to the station. The data is not received to the station address corresponding to noise interference. Communication speed setting of the host controller has a mistake.
●	●	●	●	- Unable to receive the data due to the wire disconnection. - The power supply is OFF. - H/W is during resetting
●	○	●	○ or ●	The station No. (NODE) or communication speed (BR) is invalid.
●	●	◎	○	The station type setting is invalid by the parameter.

RUN	Operation
○	System ready
●	Error detection Watchdog timer error, memory error, sensor error, low voltage error

8. CC-LINK COMMUNICATION

Explains the communication contents of the "master station" and "remote station".
Master station: Controls the data link system of the programmable controller side.
Remote station: VE-2CC, VM-2CC (remote device station)

Following contents are available on the network:
- Readout the position data
- Current position value setting
- Readout errors

8-1. Readout the Position Data (Remote to Master Station)

The master station can read the position data which is detected by the ABSOCODER.　It is communicated by using the remote register (RWr).

[Remote register RWr]

Device No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWr0(L)	D7	D6	D5	D4	D3	D2	D1	D0
RWr0(H)	D15	D14	D13	D12	D11	D10	D9	D8
RWr1(L)	D23	D22	D21	D20	D19	D18	D17	D16
RWr1(H)	0	0	0	0	0	0	0	0

[Signal explanation]

Signal name	Name	Contents
D0-23	Position data	Reads the position data which is detected by ABSOCODER to binary code. The valid number of bits is different by each ABSOCODER types. (The data except the valid number of bits is fixed at 0.) VE-2CC: D0 to D12: position data, D13 to D23 = fixed at 0 VM-2CC D0 to D16: position data, D17 to D23 = fixed at 0

8-2. Current Position Value Setting Data (Master to Remote Station)

The master station can change the position data of VE-2CC/VM-2CC at arbitrary values by using the remote register (RWw) and remote output (RY). (Current position value setting)
After setting, the remote station sends back the answer back signals by using remote inputs (RX).   The master station turns off the signal after checking the bit.

The information of setting position data is saved in non-volatile memory which is inside of the converter; therefore, it is unnecessary that the current position value sets each time to turn ON the power supply.

[Remote register RWw]

Device No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
RWw0(L)	PRD7	PED6	PRD5	PRD4	PRD3	PRD2	PRD1	PRD0
RWw0(H)	PRD15	PRD14	PRD13	PRD12	PRD11	PRD10	PRD9	PRD8
RWw1(L)	PRD23	PRD22	PRD21	PRD20	PRD19	PRD18	PRD17	PRD16
RWw1(H)	——	——	——	——	——	——	——	——

[Remote output RY]

Device No.	RY07	RY06	RY05	RY04	RY03	RY02	RY01	RY00
Signal name	——	——	——	——	——	——	——	ERROR RESET
Device No.	RY0F	RY0E	RY0D	RY0C	RY0B	RY0A	RY09	RY08
Signal name	——	——	——	——	——	——	——	PRESET

[Remote input RX]

Device No.	RX0F	RX0E	RX0D	RX0C	RX0B	RX0A	RX09	RX08
Signal name	0	0	0	0	0	0	0	PRESET ANSWER

[Signal explanation]

Signal name	Name	Contents
PRD0-23	Current position value setting data	The position data can be changed to an arbitrary value by switching "PRESET" signal to "1". (binary code: PRD0-23)
PRESET	Current position value setting input signal	(The data except the valid number of bits is fixed at 0.)*1
PRESET ANSWER	Answer back	The value is 1 when the current position setting is operated normally. "RRESET ANSWER" signal is 0 when "RRESET" is changed to 0.
ERROR RESET	Error clear	An error is cleared when switching this signal to "1" by following method. - Converter diagnosis data error (ME) (The sensor error is automatically returned when error causes are removed.)

*1: PRESET (RY08) signal should be turned OFF when the current position data and preset data are same value.
   The position data are changed when PRESET (RY08) signal is switched OFF to ON.

> **Note**
>
> In the state of having a sensor error, the current position setting is not available.

(1) Timing

The current position value is set by writing the current position setting data (PRD0-PRD23) and PRESET signals from the master station.

```
Current position
setting data      ────────────╲╱────────────────────────────────
PRD0～PRD23       ────────────╱╲────────────────────────────────
                              ┆
                              ┆  Link scan is more than one time
                              ┆ ←─────────→ ┌──────────────╲────────────
PRESET signal     ────────────┆─────────────┘              ╲     ╲
                                                            ╱      ╲
                                                           ╱        ╲
PRESET ANSWER     ──────────────────────────────────────┌─────────────┐──────
                                                         └─────────────┘

Current position  ─────────────────────────╲╱──────────────╲╱─────────────────
value data          Old current position    ╱╲New current  ╱╲ New current position updating
D0～D23                                      ╲ position     ╱
```

Note

● PRESET signal is turned ON after writing the current position setting data (PRD0 to PRD23).

● In the case of turning ON PRESET signal,
  - The link scan is needed more than one time after writing the current position setting data (PRD0 to PRD23).
  - Link scan time is changed according to the communication speed, number of connecting units, and station types per system.
  For more details, refer to the user's manual of the master unit.

---

(2) Current position value setting program

Indicates an program example for setting the current position value.

Following program example is using a programmable controller of MELSEC-Q series.

The parameter should be set as right figure.
Also, the station No. of VE-2CC / VM-2CC is set at 1 and 2.

This is a program example when setting the current position for the station No.1 of VE-2CC / VM-2CC.

For more details, refer to the user's manual of the master unit.

	1
Start I/O No	0000
Operational setting	Operational settings
Type	Master station ▼
Master station data link type	PLC parameter auto start ▼
Mode	Remote net mode ▼
All connect count	2
Remote input(RX)	X1000
Remote output(RY)	Y1000
Remote register(RWr)	D1000
Remote register(RWw)	D2000
Special relay(SB)	SB0
Special register(SW)	SW0
Retry count	2
Automatic reconnection station count	1
Stand by master station No.	
PLC down select	Stop ▼
Scan mode setting	Asynchronous ▼
Delay infomation setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

Readout the current position value (Station No.1)

Designating the current position setting data

PRESET signal ON

PRESET signal OFF

Readout the current position value (Station No.2)
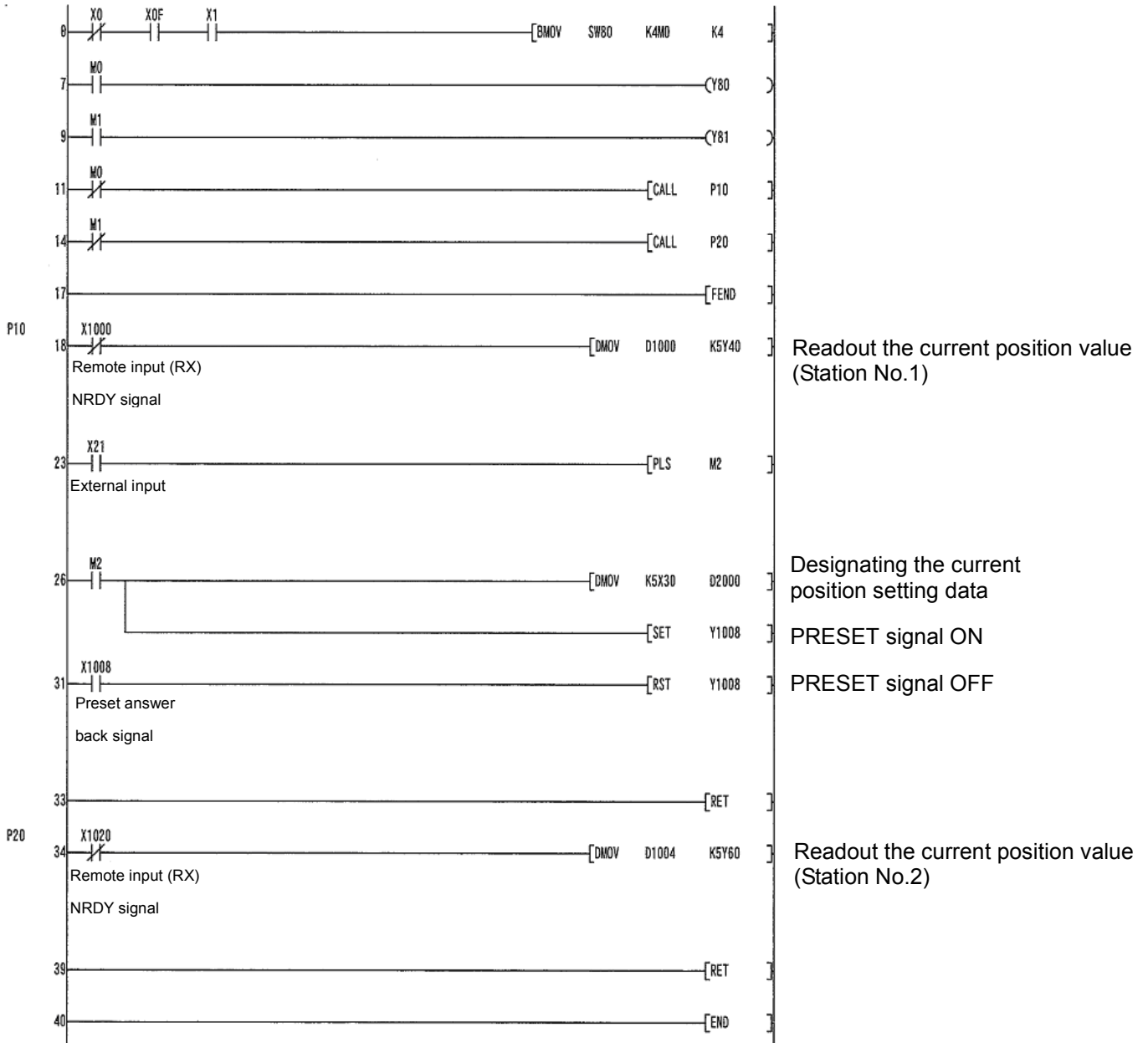
8-3. Readout Errors

The error signal inputs to the master station as following contents by using remote input (RX).
RX00 to 04 data is standard diagnosis data of VE-2CC/VM-2CC (remote station).

Device No.	RX07	RX06	RX05	RX04	RX03	RX02	RX01	RX00
Signal name	0	0	0	PF	SE	ME	WDTE	NRDY

Signal name	Contents	Detection timing	States	Clear method	Treatment
NRDY	Not Ready Error or non-operating state: "1" Normal: "0" In the case of having errors, either ME, WDTE, or SE has occurred.	Always	The position data is "indefinite" state. RUN LED is OFF.		Remove causes of ME, WDTE, and SE.
WDTE	Watchdog timer error Error: "1" Normal: "0" Runaway condition at the internal CPU	Always	The position data is "indefinite" state. RUN LED is OFF.	Restart the power supply	-Install as far from noise sources. -The converter has a malfunction
ME	Memory error Error: "1" Normal: "0" A memory error has occurred.	At power ON	The position data is "indefinite" state. RUN LED is OFF.	ERROR RESET (RY00: ON)	If the error is not cleared, the converter would be having a malfunction.
SE	Sensor error Error: "1" Normal: "0" Causes of the sensor error is following; - ABSOCODER is disconnected. - Sensor cables are severed. - ABSOCODER has a malfunction. - The converter has a malfunction.	Always	The position data is "indefinite" state. RUN LED is OFF.	Automatic recovery	-Connect to ABSOCODER. -Check the sensor cable conduction. -Replace ABSOCODER. -The converter has a malfunction.
PF	Low voltage Error: "1" Normal: "0" The input power supply voltage is dropped.	Always	The position data is "indefinite" state. RUN LED is OFF.	Automatic recovery	Check the input voltage.

9. SETTING METHODS

9-1. Setting and Procedure Before the Operation

Explains usage procedures of ABSOCODER.

```
┌─────────────────────────────────────┐
│               START                  │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│ Converter mounting                   │
│ Mounting the converter (VE-2CC/VM-2CC).│
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│ Connect with external device         │
│ Connect ABSOCODER sensor and dedicated cable for │
│ CC-Link.                             │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│ Switch setting                       │
│ Set the station No. and communication speed setting switch. │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│ Test run                             │
│ Check the operation.                 │
│ -Check the current position value can be read. │
│ -Check the current position value can be set.  │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│ Operation                            │
│ Execute operation.                   │
│                                      │
└─────────────────────────────────────┘
                    │
                    ▼
┌─────────────────────────────────────┐
│               END                    │
└─────────────────────────────────────┘
```

9-2. Switch Setting

● Station No. setting switch

NODE ×10

×1
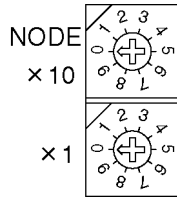
Sets station No. of the converter.
Setting range: 1 to 64
The occupied station number of VE-2CC / VM-2CC is 1.
"LERR" LED will be ON if the number is set except 0 to 64.

(Factory setting: 0)

● Communication speed setting switch

BR
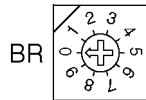
(Factory setting: 0)

Sets the communication speed (baud rate).

Number	Baud rate
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps

"LERR" LED will be ON if the number is set except 0 to 4.

Note
Designate the communication speed (baud rate) as same setting in the system. If the settings are different, the data link will not be available.

● Rotation direction setting switch of ABSOCODER

ON 1 2 3 4 5 6 7 8

(Factory setting: all OFF)

Sets the increased rotation direction of the current position value.

DIP switch 1-OFF: CW direction
DIP switch 1-ON: CCW direction

Axial end

CCW   CW
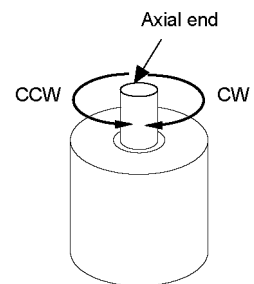
Note
DIP switch 2 to 8 are not used. Set switches OFF.

10. TROUBLESHOOTING

Explains the troubleshooting when using the VE-2CC/VM-2CC.

```
┌─────────────────────────────┐
│        Error occurs          │
└─────────────────────────────┘
              │
              ▼
        ╱───────────╲                          ┌──────────────────────────────┐
       ╱  Is "ERR "LED of ╲        YES          │ Is the communication cable     │
      ╱  the master unit ON? ╲───────────────▶  │ connector disconnected?        │
       ╲                 ╱                       │ Check the connection of the cable. │
        ╲───────────╱                           └──────────────────────────────┘
              │ NO
              ▼
        ╱───────────╲                          ┌──────────────────────────────┐
       ╱  Is "RUN "LED of ╲      YES            │ Refer to "7-3. LED Display Contents". │
      ╱  VE/VM-2CC ON?  ╲───────────────────▶  │                                │
       ╲               ╱                        │                                │
        ╲───────────╱                           └──────────────────────────────┘
              │ NO
              ▼
        ╱───────────╲                          ┌──────────────────────────────┐
       ╱ Are there remote input (RX) ╲  YES     │ Check the error state.         │
      ╱  signals?        ╲──────────────────▶  │ Refer to "10-1. Flowchart When │
       ╲  (RX0 to 7)    ╱                       │ Having Error Signals".         │
        ╲───────────╱                           └──────────────────────────────┘
              │ NO
              ▼
        ╱───────────╲                          ┌──────────────────────────────┐
       ╱ Is "PRESET" signal ON? ╲   YES         │ Turn OFF the "PRESET" signal.  │
      ╱                  ╲──────────────────▶   │ Check the PLC program.         │
       ╲                ╱                       │                                │
        ╲───────────╱                           └──────────────────────────────┘
              │ NO
              ▼
        ╱───────────╲
       ╱ Would VE-2CC/VM-2CC operate ╲  YES
      ╱  normally if ABSOCODER is ╲─────────────────┐
       ╲  replaced?   ╱                             │
        ╲───────────╱                               │
              │ NO                                   │
              ▼                                       ▼
┌──────────────────────────────┐      ┌──────────────────────────────┐
│ VE-2CC/VM-2CC has a malfunction. │   │ ABSOCODER has a malfunction.   │
│ Contact your NSD representative. │   │ Contact your NSD representative. │
└──────────────────────────────┘      └──────────────────────────────┘
```

10-1. Flowchart When Having Error Signals

(1) Sensor error

```
┌─────────────────────────────┐
│      Is "SE" LED ON?         │
└─────────────────────────────┘
                │
                ▼
        ╱─────────────────╲                    NO      ┌──────────────────────────────────┐
       ╱  Do ABSOCODER and  ╲────────────────────────▶ │ Connect wires correctly with       │
       ╲ sensor cable connect╱                          │ reference to 6-1. Connection       │
        ╲   correctly?      ╱                           │ between Converter and              │
         ╲─────────────────╱                            │ ABSOCODER Sensor.                  │
                │                                        └──────────────────────────────────┘
                │ YES
                ▼
┌───────────────────────────────────────────────────┐
│ The causes are as follows:                         │
│ - Sensor cables are severed.                       │
│ - The internal circuit of VE-2CC/VM-2CC has a      │
│   malfunction.                                     │
│ - ABSOCODER has a malfunction.                     │
│ Contact your NSD representative.                   │
└───────────────────────────────────────────────────┘
```

(2) Memory error

```
┌─────────────────────────────┐
│      Is "ME" LED ON?         │
└─────────────────────────────┘
                │
                ▼
        ╱─────────────────╲                    NO      ┌──────────────────────────────────┐
       ╱ Does an error clear╲────────────────────────▶ │ VE-2CC/VM-2CC has a malfunction.   │
       ╲ by the "ERROR RESET"╱                          │ Contact your NSD representative.   │
        ╲ signal of remote   ╱                          └──────────────────────────────────┘
         ╲ output (RY)?     ╱
          ╲───────────────╱
                │
                │ YES
                ▼
┌───────────────────────────────────────────────────┐
│ Set the current position value again.              │
└───────────────────────────────────────────────────┘
```

(3) Watchdog timer error

```
┌─────────────────────────────┐
│      Is "WDTE" LED ON?       │
└─────────────────────────────┘
                │
                ▼
┌───────────────────────────────────────────────────┐
│ If WDTE signal is not OFF even though the power     │
│ supply restarts, contact your NSD representative.   │
└───────────────────────────────────────────────────┘
```