



Brushless Motor for Light load conveying.

PM380/427VS

Motor Driven Roller

〈 User Manual 〉



* The photo is unit with VG-pulley option.

Read this manual before use

Thank you for purchasing PM380/427VS.

In this manual, the Brushless Motor for Handling Light Loads
“PM380/427VS” is described as MDR or this product.

“PM380VS” and “PM427VS” are described separately, when
needed.

* Applicable driver is not included.



Before using this product, carefully read this user manual and fully
understand the content.

Keep this document readily accessible for future reference.

For more details about applicable driver(CBV30), please download the user
manual from our web page.

ITOH DENKI



Home > Download/Support > User Manual
<https://itohdenki.co.jp/english/support/manual.html>



1. Introduction

Features

- Dia. 38mm roller makes small package transfer.
- 6Pin D shaped Motor connector.

Disclaimer

- This product is designed as a general industrial device. Do not use for other applications. We do not take any responsibility for any damage that may result from the disregarding of these warnings.
- In the event that an accident results from the use of this product, we do not compensate for any damage, including abnormalities of equipment, connection devices, and/or software, any damage resulting from malfunctions, and/or any other secondary damage.
- Caution : Installation, operation and usage of ITOH DENKI MDRs in combination with a control card designed by a third party could result in fatal phenomena such as fire, electric shock, injuries etc which are out of the responsibility of ITOH DENKI.

Notes on industrial property rights

There are some examples of parts that need to be prepared by customers, as explained within this manual. However, this does not provide any guarantee against the existence of any rights, such as our industrial property rights, or those of other companies, in advance.

Notes on technical support

We respond to technical inquiries based on the contents described within this manual, and on this product within the range of general items for this product unit with standard specifications, and for the options prepared by us.

There are some descriptions in this manual, about parts, equipment, and wiring arranged by customers, as well as the controls and operation under such circumstances. However, these are not included in the guaranteed operating range and/or support.

Check and/or test by your own risk or your responsibility.

About the performance level (PL) for this system

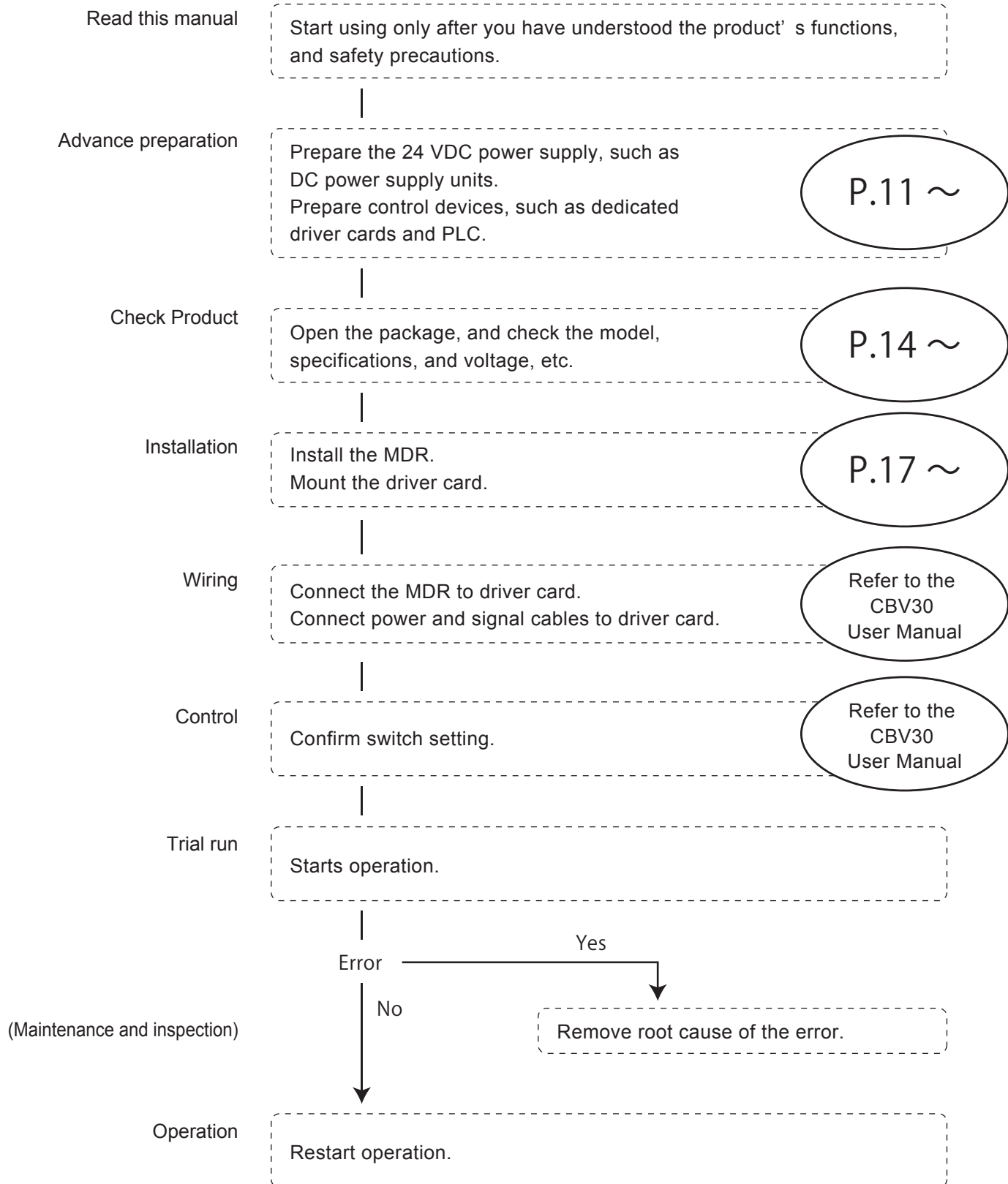
This product is based on the performance level “C”^{*2} in ISO13849-1^{*1}.

* 1 : International Organization for Standardization

* 2 : This indicates that even though events that would result in serious injury occur infrequently under assumed risk environment, there is a high probability to avoid danger if you observe the safety contents described in this manual.

2. Procedures from installation to operation

Procedures from installation to operation



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3. Safety precautions

Refer to 5. Check Product (P.14) for parts name.

3. Safety precautions

Danger level

To prevent hazards to users and/or others, and/or damage to property in advance, we explain important precautions to be followed securely as below.

- We categorize the degree of hazard and/or damage that may result if a user disregards the description, and operates the product improperly, using and explaining the following symbols.

 WARNING	This indicates a high possibility that severe injury or even death may result.
 CAUTION	This indicates a high possibility that injury, or only property damage may result.

Symbol explanation

- We categorize the type of those precautions using the following symbols throughout the manual.

	This symbol indicates to tells that shall follow the instruction.
	This symbol indicates operations that are prohibited.

3. Safety precautions

3-1.

General precautions



WARNING



Do not use the product near places subject to explosive, flammable gas, and/or corrosive atmosphere, and/or combustible materials.

Failure to follow this could result in explosion, fire, electric shock and/or injury.



When using the product in places where serious accidents and/or damage may possibly occur, install backup and/or fail-safe functions systematically.

Failure to follow this could result in the inability to control this product due to driver card malfunction, which could lead to serious accidents.



CAUTION



Never remodel the product.

Failure to follow this could result in serious accidents. We assume no responsibility for remodeled products.



Make sure to attach ground wires to the conveyor body.

Failure to follow this could result in electric shock if any malfunction or leakage occurs.



While the MDR is running, do not touch the product when operation has just ceased.

Failure to follow this could result in hands/clothes getting caught, and/or burns.



Do not apply strong impact and/or excessive force to the product, such as hitting it with objects, or dropping it. Also, do not use the equipment if strong impact has been applied, and/or if the appearance has become deformed.

Failure to follow this could result in malfunction due to applied impact.



Do not apply heavy loads to this product, such as stepping on it.

Failure to follow this could result in people falling and/or malfunction.



Stop operation when abnormal sound is heard during operation.

Failure to follow this could result in unexpected accidents.



Do not use in a way exceeding the range of the product specifications.

Failure to follow this could result in malfunction, fire, and/or injury.



Turn off the power supply to the product before moving, installing, maintenance and/or inspection (excluding those during operation).

Working while the power is on could result in accidents due to unexpected operation.

3. Safety precautions

3-1.

General precautions



CAUTION



Do not turn on/off relays and/or contactors near power cables, signal cables, and/or driver cards.

Failure to follow this could result in malfunction due to noise generation.



LED or Pull-up/Pull-down circuits implemented in the output circuit of control devices could result in unexpected operation.

Carefully check the output circuit.



Do not unplug power and/or signal cables during operation.
Do not run/stop this product using the power supply.

Failure to follow this could result in malfunction.



Do not forcibly rotate the MDR in its stopped state with external force.

Failure to follow this could result in damage to driver cards, and/or their lifetime to be significantly shortened.



When disposing of the product, make consigning contracts with licensed industrial waste disposers, and consign the disposal to them.

3. Safety precautions

3-2.

Precautions on installation

CAUTION



When handling, wear protective equipment, such as gloves.
 Since this product consists in large part of metal, careless handling could result in hands getting injured.



Make sure to use the recommended tightening torque to tighten fixing screws of the mounting bracket.
 Failure to follow this could result in bolts and/or screws loosening, and/or malfunction. ⇒ P.20



If necessary warning/caution labels become hidden after installation, affix again on places where they can be seen.



Fix the product securely using the mounting bracket designated by us.
 Failure to follow this could result in injury and/or damage to the product. ⇒ P.20



Make sure to check the direction of rotation before connecting the product to other devices.
 Failure to follow this could result in injury and/or damage to devices.

3-3.

Precautions on wiring

CAUTION



When attaching or removing connectors, turn off the power first, securely hold connectors, and perform operation.
 Do not apply excessive force to the driver connection parts, such as obliquely attaching or removing connectors.
 Failure to follow this could result in electric shock, malfunction, and/or accidents due to unexpected operation.



Perform wiring to connectors so that cables make secure contact with connectors.
 Barb lines from the cable core could result in heat generation and/or fire due to changes of contact resistance, and/or short circuit with the adjacent contact.



Do not forcibly bend and/or pull cables.
 Also, do not put heavy materials on cables, or do not get them stuck between cables.
 Failure to follow this could result in fire and/or electric shock due to cable damage.



Do not wire in places subject to water, and/or with wet hands.
 Failure to follow this could result in electric leakage, short circuit, and/or fire.

3. Safety precautions

3-4.

Precautions on maintenance and inspection



WARNING



If any abnormalities are found, do not use this product until the causes have been eliminated completely .

Using this product with unattended abnormalities could result in not only damage to the devices, but also unexpected accidents.



Maintenance shall be done by specialists (or people who have sufficiently acquired skills) under instructions by management supervisors.



At the time of maintenance and inspection, post warning labels so as to prevent unauthorized persons from turning on the power.

Failure to follow this could result in unexpected accidents.



CAUTION



When repairing/replacing, wear protective equipment, such as gloves.

Failure to follow this could result in hands getting injured by metal parts.



Do not disassemble sections and/or parts other than those specified.

Failure to follow this could result in malfunction and/or unexpected accidents.



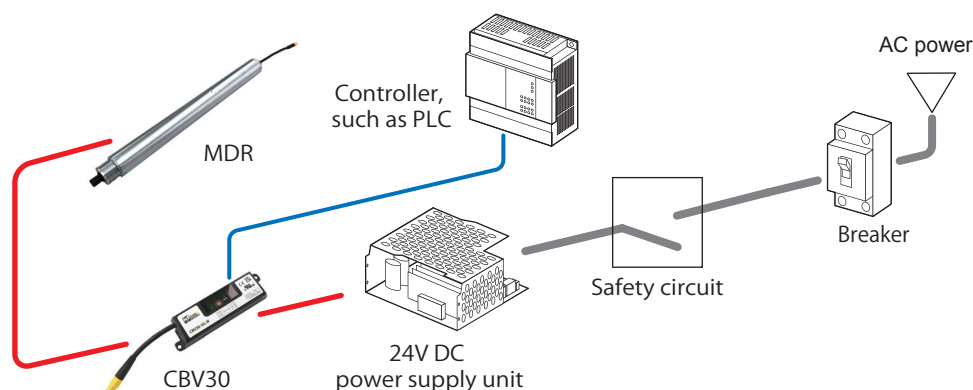
Make sure to prepare repair/replacement parts designated by us.

Using parts other than those designated by us could result in malfunction.

4. Advance preparation

4. Advance preparation

Wiring image



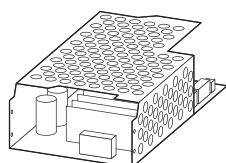
- As for the sensor input, and input/output signals of driver cards, adopt the number of inputs/outputs based on operation.
- The safety circuit includes the emergency stop equipment and magnet contactor.

The other devices need to be prepared

Before introducing this product, prepare the following devices separately.

① 24V DC power

Power supply equipment to supply 24V DC to this product



- Switching power supply (24V DC)
3 A 72 W or more per MDR
- 24V DC battery



- A switching power supply is recommended as the DC power supply (24 VDC±10%) for drivers.
- Use a stabilized power supply that has an adequate capacity of 24V DC and 3A or higher and does not fluctuate due to load variation.
- A transformer type power supply cannot be used.
- Secure a voltage of 24V DC±10% at the power supply terminal of a driver card.
- If the power supply capacity is smaller than the rated power of the dedicated driver card multiplied by the number of MDRs to be used, the supply voltage may drop and cause failure or damage of the MDR and driver card. Be sure to use a power supply with a capacity larger than the rated power of the dedicated driver card multiplied by the number of MDRs to be used.
* When starting multiple MDRs simultaneously, use a power supply with a capacity of 3A multiplied by the number of MDRs to be used.
- The power supply should not activate protection with peak current 20A, 1 ms or below.
- For the power supply unit, use an isolation type switching power supply compliant with the safety standard (IEC62368-1). Do not use a non-isolation type power supply for safety reasons, since it may not conform to the radiation noise regulations.

② Driver card

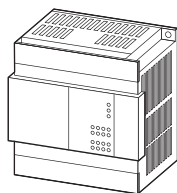
CBV30



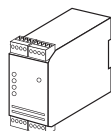
4. Advance preparation

③ Control devices

Devices to control this product, such as PLC



④ Safety relay

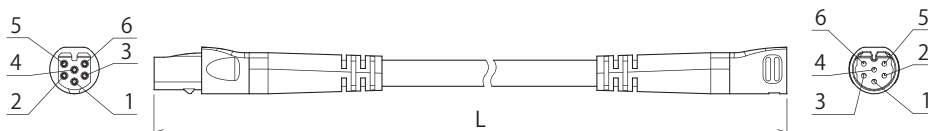


⑤ MDR extension cables (Option)

Necessary when the installing location of the MDR is far from that of the driver card.

■ 6-pin D shaped connector extension cable

Model	6-pin D shaped connector extension cable
ACE-CBL-K0600	L= 600mm
ACE-CBL-K1200	L=1200mm
ACE-CBL-K2700	L=2700mm



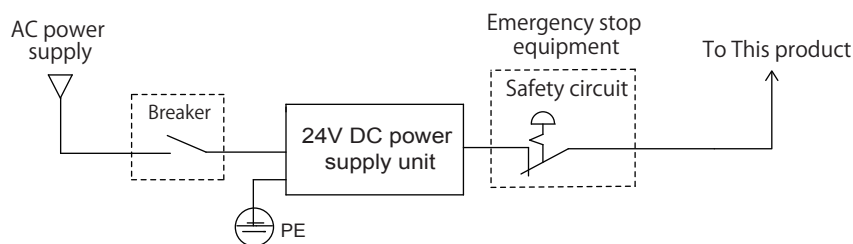
- Cables can be extended up to 3000mm, including the MDR cable length.
- Do not extend cables by connecting multiple extension cables.

⑥ Emergency stop equipment



This product does not include the emergency stop equipment. Customers must make sure to install it.

Install the emergency stop equipment on the side of the 24V DC power unit to which the power is supplied.



⑥-1 Checking the breaker

Regarding equipment where this product is installed, check that a breaker with appropriate capacity for AC input specifications of the 24V DC power supply unit has been installed. If abnormal operation should occur, protection through the breaker could be effective.

Note that when using an earth leakage breaker, select one that is "inverter corresponding". Some inverter non-corresponding earth leakage breakers could result in malfunction, since they may recognize high-frequency components of the switching power supply as leakage.

⑥-2 Operation check

When the 24V DC power supply unit has been installed, check that the breaker and safety circuit can work properly. Perform operation following the trial operation after checking them.

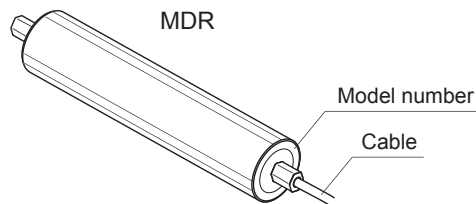
- ① Input to the 24V DC power supply unit (AC power) is securely turned ON/OFF when turning ON/OFF the breaker.
- ② This product input (24V DC) is securely turned OFF/ON when turning ON/OFF the safety circuit.

5. Check Product

5. Check Product

Checking the model

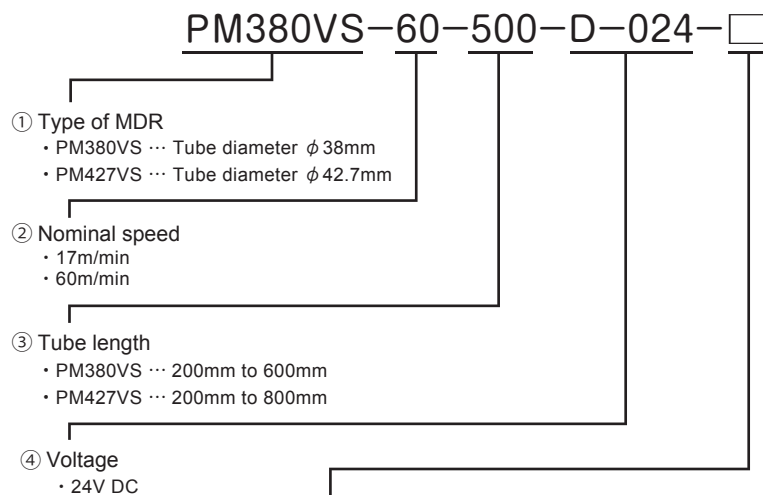
Unpack the product, and check that the product model is what you ordered.



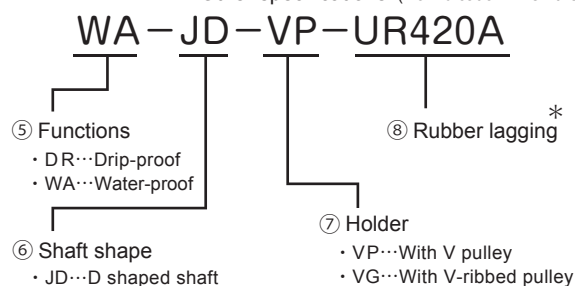
Mounting bracket
(Refer to P.16)



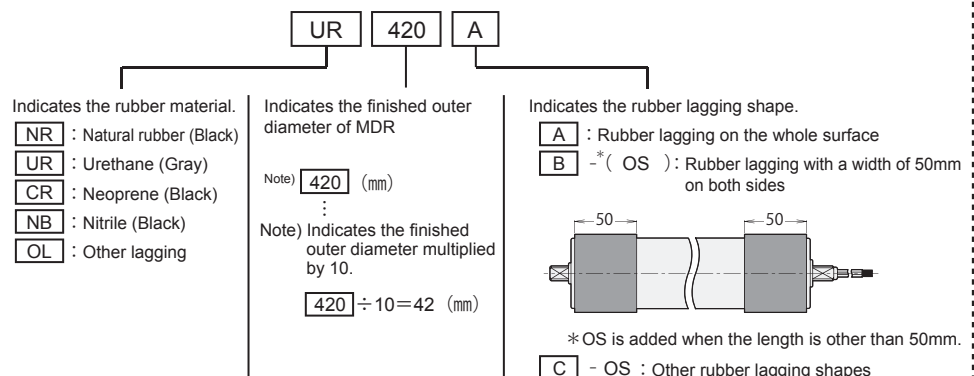
Model description sample



Other specifications (No indication when the other specification is not required.)



*About description of the rubber lagging specifications (rubber lagging is described as below.)



■ Peeled rubber may be adhered to tray during transfer.

■ For models with the rubber lagging specifications, the peripheral velocity will increase since the diameter becomes larger due to the lagging.



Nominal speed

The speed on the MDR roller surface (m/min), and the nominal speed with a nice round value for convenience. As such, values differ slightly from the actual speed.

Term

5. Check Product

Checking appearance

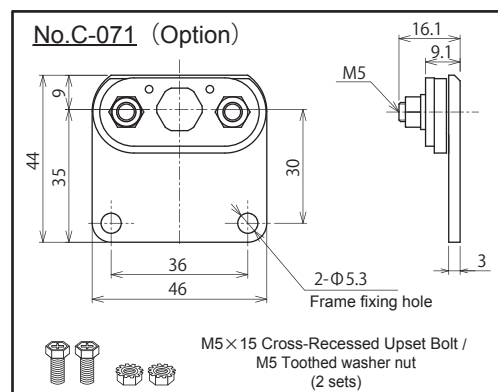
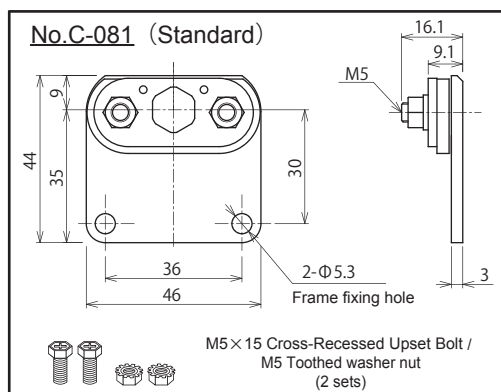
- ① Check any abnormalities, such as traces of scratches, dents, dirt, and/or corrosion (rust) on MDR.
- ② Confirm parts that are supposed to be included such as screws.

* If any abnormalities are found, contact the supplier immediately.

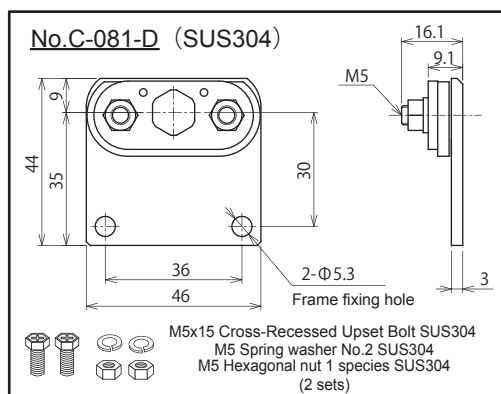
Checking accessories

Mounting bracket

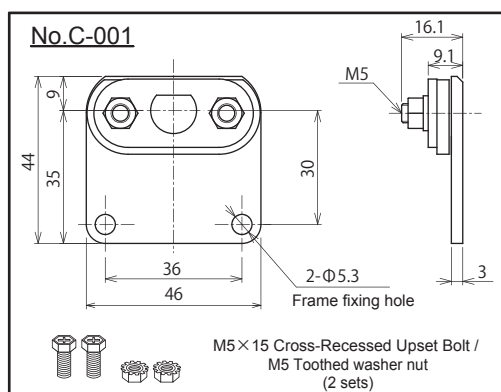
Hexagon shaped shaft



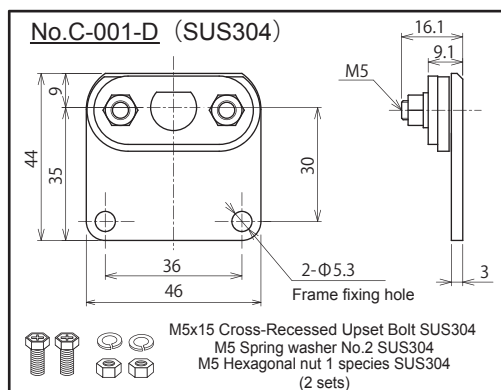
Hexagon shaped shaft (for water-proof)



D shaped shaft



D shaped shaft (for water-proof)



6. Installation

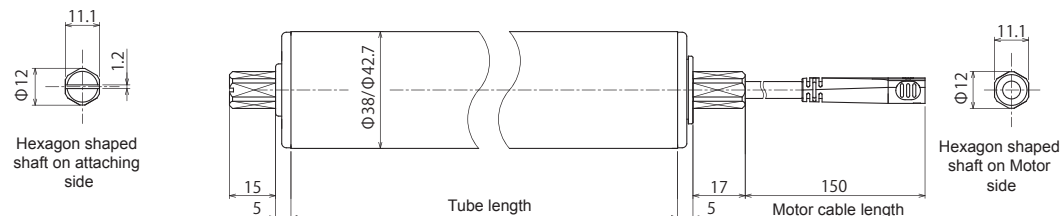
6. Installation

6-1.

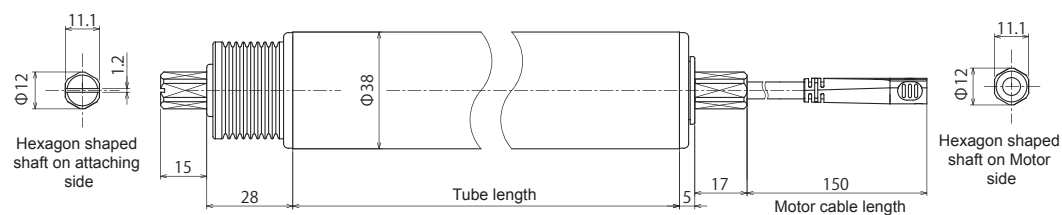
Preparation for install MDR

MDR dimensions

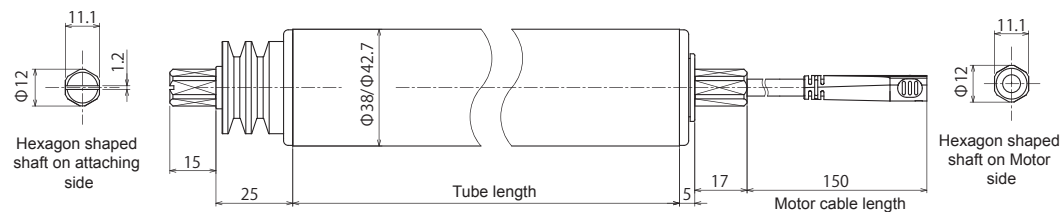
Standard



V-ribbed pulley specifications

* $\Phi 38$ only

V pulley specifications



■ Motor cable length for any specification is fixed to 150mm.

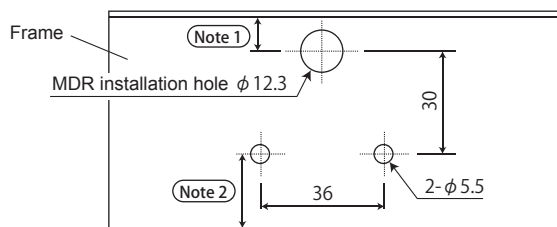
Figure of MDR mounting
holes

Holes for installation on frame.

1

Make mounting holes of MDR installation.

* For Installation hole processing positions, refer to the figure below.



■ 1 Secure a space of 9 mm or more.

■ 2 Secure a space of 6 mm or more.

■ For 1 and 2, do not include the frame bend radius in the stated values.

6. Installation

6-2.

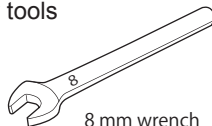
Install the MDR



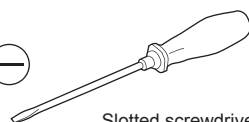
■ Use proper mounting brackets produced by ITOH DENKI to tighten shaft of MDR.

If the shaft rattles or spins free inside the frame, it could result in cable damage and/or damage to the MDR.

Necessary tools



8 mm wrench



Slotted screwdriver

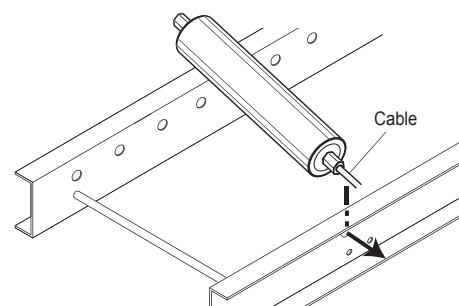
Install the MDR

1

Put the shaft on the cable side into the conveyor frame.



■ Be careful not to get the cable caught in the frame.

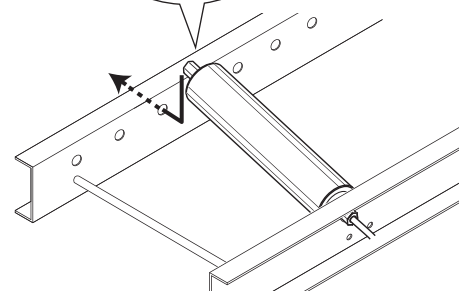
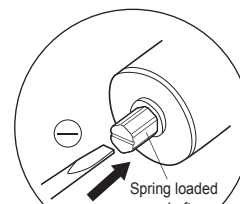
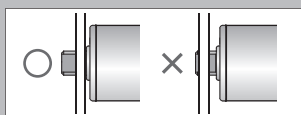

2

Push the spring loaded shaft using the tip of a slotted screwdriver, etc., and pass it through the frame hole.

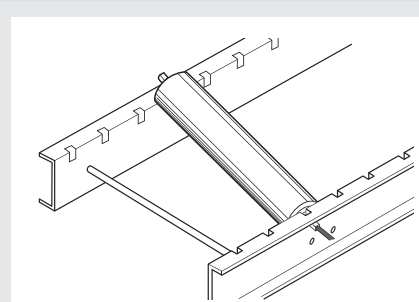


■ Do not push the shaft beyond the thrust shaft collar.

■ Check that the spring loaded shaft has sufficiently come out of the external side of the frame, as shown in the figure below.



■ Some rollers do not equipped a spring loaded shaft depending on specifications or tube length. In that case, install the roller to a frame applied an additional processing.



6. Installation

- 3** Pass the cable and shaft through hole of mounting bracket and mount the mounting bracket to the frame.



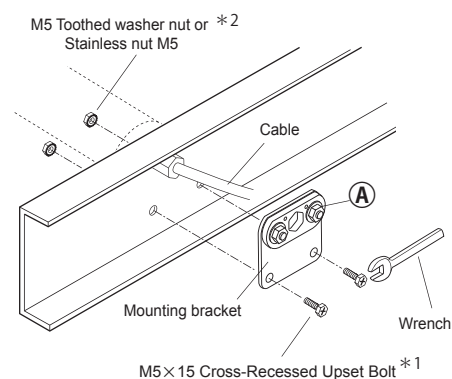
- Loosen (remove) attached nut (A in fig) in advance to make the mounting bracket easier to mount.



- Recommended tightening torque**
 $3.1\text{N}\cdot\text{m}^*$

* If case of using a Phillips screwdriver, the required torque is $3.5\text{N}\cdot\text{m}$.

- Do not forcibly bend and/or pull cables and/or connectors.



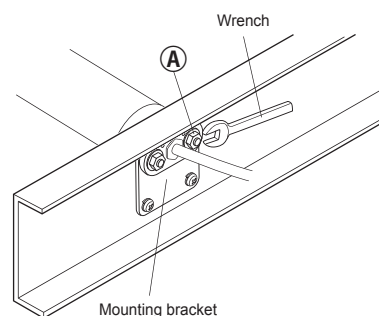
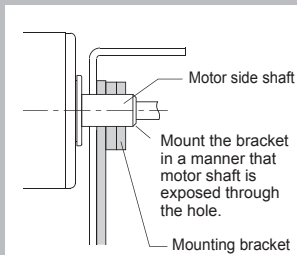
- *1 Stainless steel Cross-Recessed Upset Bolt is supplied for waterproof option.
 *2 Stainless steel spring washer and hex nut are supplied for waterproof option.

- 4** Tighten the hexagon nut with the flange (A in fig) of the mounting bracket to fixing the MDR.

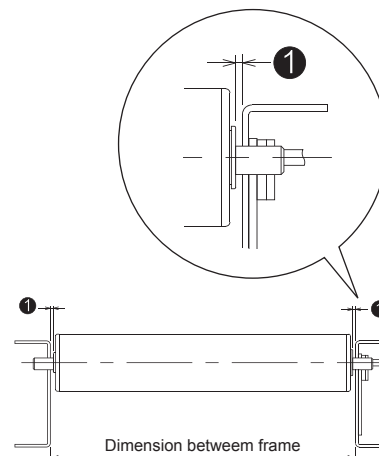


- Recommended tightening torque**
 $3\text{N}\cdot\text{m}$

- Confirm the shaft is must be passed through three plates before tighten nut.



- Secure a space between the frame inside and MDR should be 2 mm to 5mm total and both of side should have the space.



7. Maintenance/Inspection

7. Maintenance/Inspection

MDR inspection

MDR inspection

No.	Items to be checked	Countermeasures	References
1	Screws and/or Nut of mounting bracket is loose.	Tighten Screws or Nut by proper torque.	P.20
2	There are errors (abnormal sound and/or operation failure) when running the MDR.	Replace MDR, if necessary.	—
3	The MDR's mounting shaft has not passed through all the three mounting bracket plates.	Pass through Motor shaft into three plates of mounting bracket.	P.20



■ Make sure to inspect items 1 to 3 once every day.

Specifications

Specifications

Appendix Product specifications

MDR specifications

MDR	Tube diameter		PM380VS : ϕ 38 / PM427VS : ϕ 42.7
	Tube length		ϕ 38 : 200mm to 600mm / ϕ 42.7 : 200mm to 800mm
	Tube material	Standard / Drip-proof	STKM12 equivalent
		Water-proof	SUS304TKA
	Shaft shape		Hexagon shaped shaft (Standard)
			D shaped shaft
Motor cable length		150mm	
Speed	Nominal speed		17 m/min / 60 m/min
Power supply	Voltage		24V DC $\pm$ 10%
Operating environment	Ambient temperature		0 to 40°C (no freezing)
	Ambient humidity		90%RH or less (no condensation)
	Location		Indoor
	Atmosphere		No corrosive gas
	Vibration		0.5 G or less
	Degree of protection	Standard	IP54
		Drip-proof	IP55
		Water-proof	IP65
	Gradient ratio of MDR installation		0.5% or less
Pollution Degree (Standard)		2 (IEC60664-1)	

* Since the dedicated driver card CBV30 has the degree of protection of IP20, do not install in places subject to water.

(Refer to the CBV30 User Manual)

		Size	Weight	Static load	Thrust load
Product weight	PM380VS	200	1.0kg	50kg	30kg
		300	1.1kg	45kg	
		400	1.2kg	40kg	
		500	1.3kg	35kg	
		600	1.4kg	30kg	
	PM427VS	200	1.3kg	75kg	
		300	1.4kg	65kg	
		400	1.5kg	55kg	
		500	1.6kg	45kg	
		600	1.7kg	35kg	
		700	1.8kg	30kg	
		800	1.9kg	25kg	

Technology for tomorrow



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Specifications or appearance of product are subject to change without prior notice.

Ver. 2.0