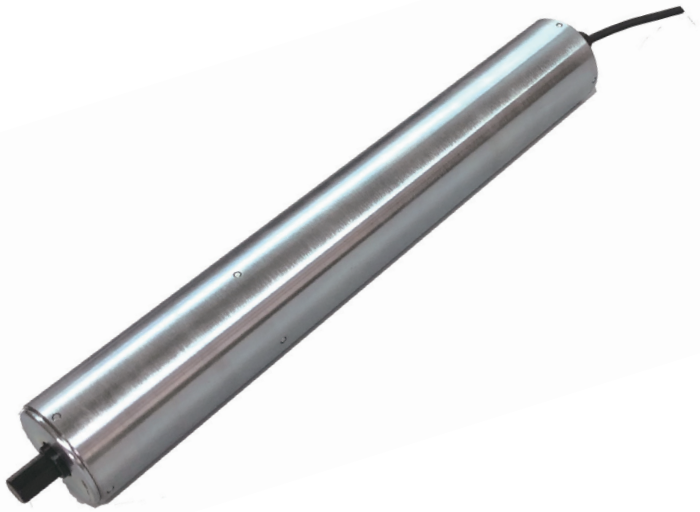
ITOH DENKI
TECHNOLOGY FOR TOMORROW

POWER MOLLER 24
MDR -Motor Driven Roller-

Convey



Brushless DC MDR for heavy duty pallet handling

PM570/605KT

Motor Driven Roller

〈 User Manual 〉

Read this manual before use

Thank you for purchasing ITOH DENKI products.
(hereinafter referred to as “This Product”)

＊This Product does not include the dedicated driver card.

Read this manual carefully and familiarize yourself to the product as well as the information on safety and precautions before using and operating the product.
Keep this manual readily accessible for future reference.

User Manual for the dedicated driver card can be downloaded from our website:

ITOH DENKI Home > Download/Support > User Manual

https://itohdenki.co.jp/english/support/manual.html

ITOH DENKI

No.630

1. Introduction

Features

- Allows heavy duty pallet handling with 57 or 60.5 diameter roller.
- Allows the creation of low profile conveyor.
- Available roller tube length minimum 360mm up to 1200mm maximum. (minimum 410mm with integral mechanical brake option)
- Use of mechanical brake allows precise stop and holding the goods in position.

■ Mechanical brake option is not recommended for decline conveyor application.

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

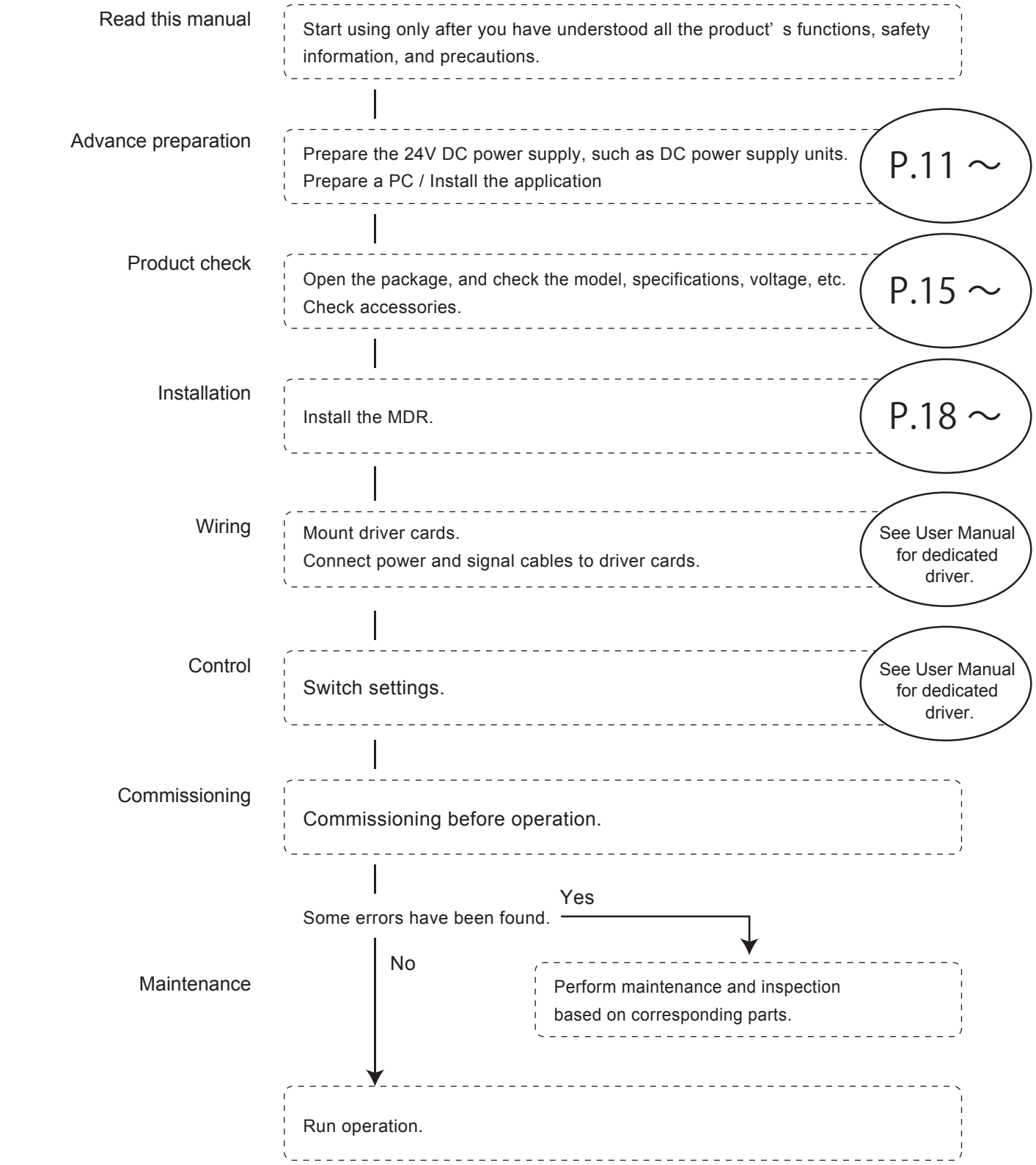
We respond to technical inquiries based on the contents described within this manual, and on this product within the range of general items for this product unit .
There are some descriptions in this manual, about parts, equipment, and wiring arranged by customers, as well as the controls and operation under such circumstances. However, these are not included in the guaranteed operating range and/or support.
When in use, please check and perform the aforementioned based on your responsibility according to operation.

About product reference

On the document, PM570/605KT series heavy duty pallet handling motorized roller is referred to as MDR.
Model number PM570/605KT is also referred to in parallel from time to time.

2. Procedures from installation to operation

Procedures from installation to operation



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3. Safety precautions

For parts names in sentences, refer to 5. Check product (P.15).

3. Safety precautions

Danger level

To prevent hazards to users and/or others, and/or damage to property in advance, the important precautions to be followed securely is described below.

■ The degree of hazard and/or damage that may result if a user disregards the description and operates the product improperly is caregorized as the following symbols and explained below.

⚠ 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

■ The type of precautions is categorized as the following symbols and explained below.

	This symbol indicates operations that are prohibited.
	This symbol indicates forced operations that users should always perform.

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

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.

Never modify the product and/or driver cards.
Failure to follow this could result in serious accidents.

Make sure to attach ground wires to this product and the DC power supply unit.
Failure to follow this could result in electric shock if any malfunction or leakage occurs.

Do not touch the product when it is running or after it has just stopped operation.
Failure to follow this could result in burns.

Do not put water and/or oil on the product, and do not transfer wet and/or oily trays.
Failure to follow this could result in electric shock, and/or malfunction.

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.

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.

3. Safety precautions

3-1. General precautions

⚠ CAUTION

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

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

Observe the safety regulations required for installation locations, and/or products in use.

Securely wire each cable to connection parts.

Improper wiring could result in electric shock and/or malfunction.

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. Also, do not run/stop this product by the power supply. (Use the signal.)

Failure to follow this could result in malfunction.

Do not forcibly rotate the MDR at times other than maintenance and inspection.

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

Do not turn off the power during transfer (during MDR rotation).

Failure to follow this could result in malfunction.

Make sure to perform the start-up inspection, and check that devices are free from any abnormalities, and that safety equipment functions correctly before using the product.

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 bolts for installing the **mounting bracket**.

Failure to follow this could result in bolts and/or screws loosening, and/or malfunction.

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

Never fail to use the dedicated mounting bracket supplied to mount this Product With the specified fastening toruqe.

Failure to follow this could result in workers getting injured or the damage to the Producut.

Check the corresponding installing direction to the loading/discharging sides before installing.

Failure to follow this could result in objects/body parts getting caught and/or stuck.

Allow the 2 to 5mm gap between MDR and conveyor frame to facilate the installation and removal.

Install the roller with the appropriate number of person according to the product weight.

3-3. Precautions on wiring

⚠ WARNING

Do not pull, injure, cut, and reconnect the power cables.

Failure to follow this could result in electric shock, fire or malfunction.

⚠ CAUTION

Wire when the power is shut off.

Failure to follow this could result in electric shock and/or accidents due to unexpected operation.

Never perform wiring in wet watery environment or with wet fingers.

Failure to follow this could result in leakage, short-circuit or fire.

3. Safety precautions

3-4. Precautions on maintenance

⚠ 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.

Have specialists (or people who have sufficiently acquired skills) perform maintenance and inspection under instructions by management supervisors.

At the time of repair and replacement work, turn off the power to all connecting devices.

To prevent wraparound for the power circuits and/or signals, shut off the power, wait a sufficient amount of time, and discharge electricity inside the DC power supply equipment.

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 malfunction and/or 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.

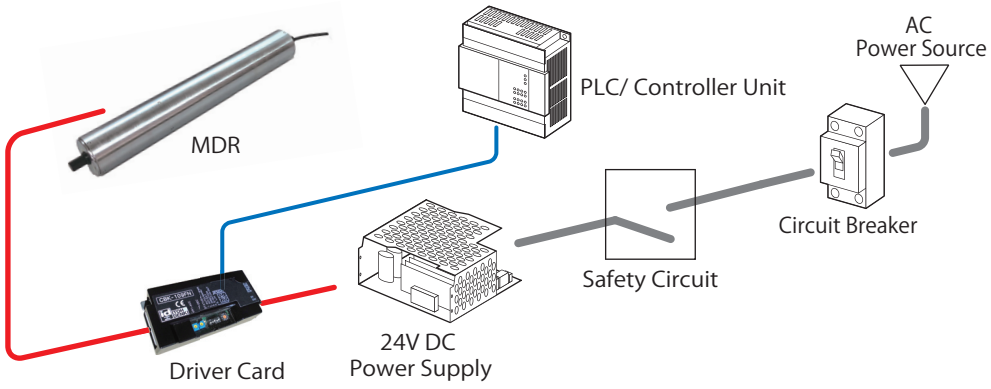
Make sure to prepare repair/replacement parts designated by ITOH DENKI.

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

4. Preparation Before Installation

4. Preparation Before Installation

Configuration example



■ The number(s) of input and output signals to and from the driver cards should match your operation design.

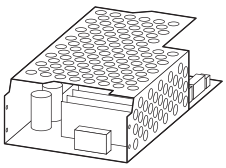
■ Safety circuit should include emergency stop button and magnetic contact switches.

Components and devices to be provided by customer. (Not included with this product)

Prior to installation, following components and devices need to be prepared by customer.

① 24V DC power supply

Equipment to feed 24V DC power source.



• Switched-mode power supply (24V DC)

8A 192W per one PM570/605KT unit

• 24V DC battery

■ Switched-mode power supply for DC Power Supply (DC 24V ± 10%) is recommended to be used for Driver Card

■ Select the DC power supply with sufficient capacity, over 24V DC, 10A, to avoid power fluctuations.

■ Use of transformer type power supply is prohibited.

■ Verify the supplied voltage is stable at DC24V ± 10% at terminal for the Driver card.

■ Make sure to use the power supply having a capacity larger than the rated input of the dedicated driver card multiplied by the number of MDR employed. If the capacity of the power supply is insufficient, it may cause supply voltage drop resulting malfunction or damage.
Note: In case multiple MDR start running simultaneously, power supply capacity should not be less than 10A x number of MDR.

■ Select the power supply with protective mechanism that will not trigger below 30A-1msec peak current.

■ Select isolated switched-mode power supply conforming to safety standard rated IEC62368-1. Do not use non isolated type power supply for safety reasons and for radiation noise restrictions.

4. Preparation Before Installation

② Driver card

Driver card is required to control MDR operation.
CBK-109、HBK-608、IB-E04、IB-P02
＊Mechanical brake option is applicable only to CBK-109 driver card.


CBK-109
（Standard driver）

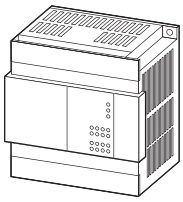

HBK-608
（Built-in logic driver）


IB-E04
（EtherNet/IP based Controller）

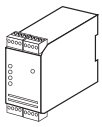

IB-P02
(Profinet based Controller)

③ Control equipment

Control equipment such as PLC for Driver cards.



④ Safety relay

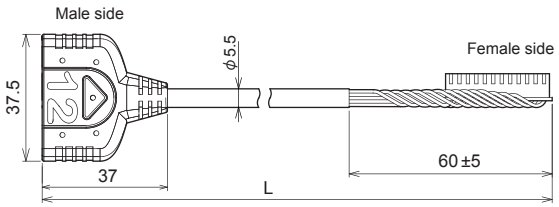


⑤ MDR extension cable (Optional)

The extension cable is required when distance between MDR and driver card is longer than standard cable length.

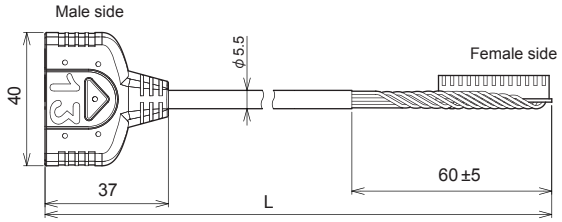
■ CBK-109 / HBK-608 / IB-E04 / IB-P02：12P Extension cable

Part number	12 Pin extension cable length
ACE-CBM-G0600	L= 600mm
ACE-CBM-G1200	L= 1200mm
ACE-CBM-G2000	L= 2000mm



■ CBK-109：13P Extension cable（for Mechanical brake option）

Part number	13 Pin extension cable length
ACE-CBK-H1000	L= 1000mm
ACE-CBK-H2000	L= 2000mm

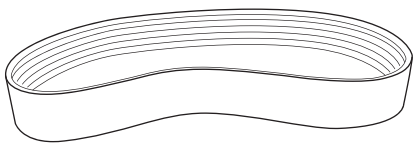


■ Total length of cable including cable on MDR must not be longer than 3000 mm.
■ Do not use multiple extension cables per MDR.

⑥ Power transmission belt (Optional)

Applicable for V-ribbed pulley option

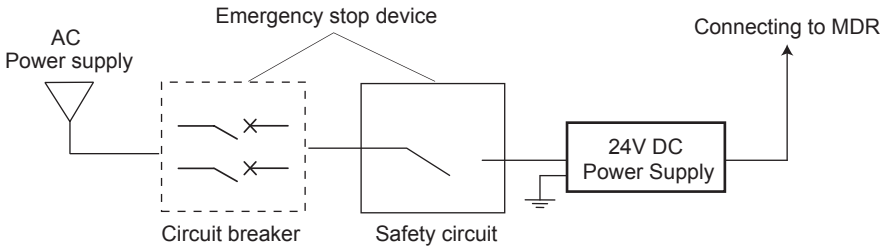
Specifications	Part number
150 mm pitch transmission belt (Poly-V)	6PJ486



4. Preparation Before Installation

⑦ Emergency Stop Device

Emergency Stop Device is not included with this product.
Customer need to provide Emergency Stop Device.



⑦-1 Circuit breaker check points

Select the circuit breaker with appropriate capacity to your 24V DC power supply. Selecting the proper circuit breaker will provide additional protection to overflow current situation.
When selecting earth leakage breaker, select inverter compatible type. Some non-inverter type may incorrectly respond to the high frequency component of the switching power supply as earth leakage.

⑦-2 Device Operation Test

When the 24VDC power supply unit has been installed, check that the circuit breaker and emergency stop switch function properly. Perform operation following the test operation after checking them.

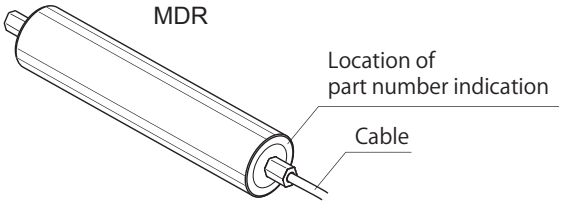
1) Input to the DC power supply is securely turned ON and OFF when turning ON and OFF the breaker.
2) Input to this Product (24V DC) is securely turned ON and OFF when turning the emergency stop switch OFF and ON.

5. Check product

5. Check product

Checking the model

Open the package, and verify the product part number matches what you ordered.



Part Number Example

PM570KT−55−500−D−024−□

① Tube Diameter
- 570 ··· 57.0 mm dia.
- 605 ··· 60.5 mm dia.

② Nominal Speed
- 15 ··· 15m/min
- 55 ··· 55m/min

③ Tube Length
- Available from minimum 360 mm up to 1200 mm maximum

＊For mechanical brake option, tube length is available from 410 mm minimum up to 1200 mm maximum.

④ Voltage
- 24V DC

Options:

BR−KV−UR630A

⑤ Additional function
- BR ··· Mechanical brake

⑥ End Cap
- KV / KT: V ribbed pulley end-cap. (Available for PM605KT only)

⑦ Rubber lagging ＊

■ No code indication in case of no option.

＊Rubber lagging specifications: (Rubber lagging specifications are coded as below.)

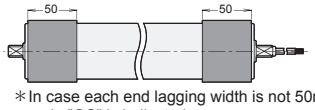
UR | 630 | A

Rubber lagging material
- NR : Natural (black)
- UR : Polyurethane (gray)
- CR : Neoprene (black)
- NB : Nitrile (black)
- OL : Other lagging

Power Moller (Roller) final diameter
- 630 : φ57
- 700 : φ60.5

NOTE: 630 (mm) Finished diameter multiplied by 10 is coded. i.e., 630 ÷ 10 = 63 (mm)
- 630 ÷10=63 (mm)
- 700 ÷10=70 (mm)

Length of rubber lagging is coded.
- A : Whole surface rubber lagging
- B -＊(OS) : Each ends 50 mm wide rubber lagging (figure below)



＊In case each end lagging width is not 50mm, code "OS" is indicated.
- C - OS : Other rubber lagging profile.

■ Due to wear of the rubber lagging, the dirt may leave residue on the transferred product.
■ Roller lagging makes the roller diameter larger, thus resulted speed gets faster. .

Term

Nominal speed

Nominal speed is rounded speed value for classifying the speed range, thus the nominal speed is slightly different from the actual speed.

5. Check product

Visual validation

① Verify the MDR product has no scratch, dent, residue, corrosions (rust etc.)
② Verify there is no missing parts such as screws etc.
NOTE : Should any irregularity be found, contact purchased agent immediately.

Verify accessories

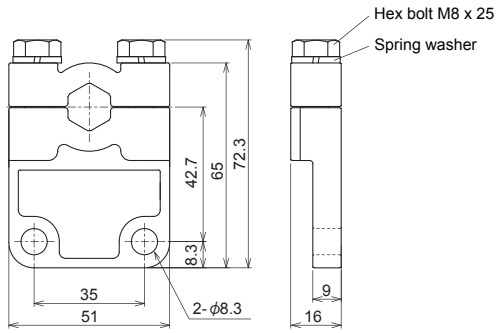
Mounting bracket

■ Use only the hex bolts contained in the package.

Cable side shaft

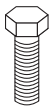
Mounting bracket

No.MBK-0K1



1 pce

Hex bolt M8 x 25
Strengthening category 10.9



2 pcs

Spring washer: M8

2 pcs

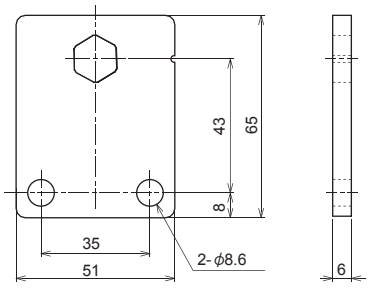
Toothed washer nut: M8

2 pcs

Spring-loaded shaft (non cable side)

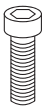
Mounting bracket

No.MBK-0K1-7



1 pce

Hex socket head cap bolt：M8×25

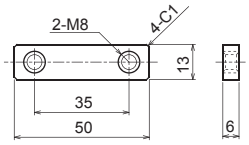


2 pcs

Spring washer: M8

2 pcs

D-35 (Dedicated nut)



1 pce

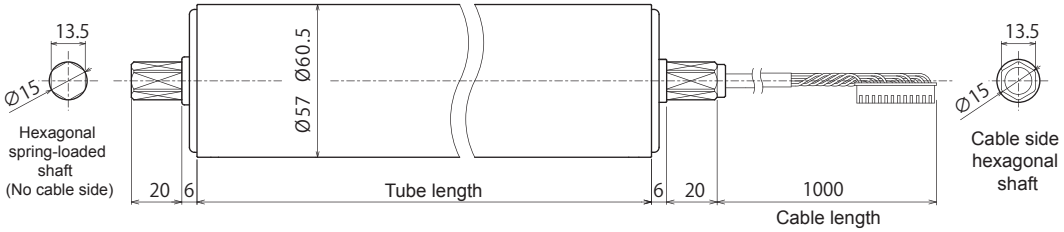
6. Installation

6. Installation

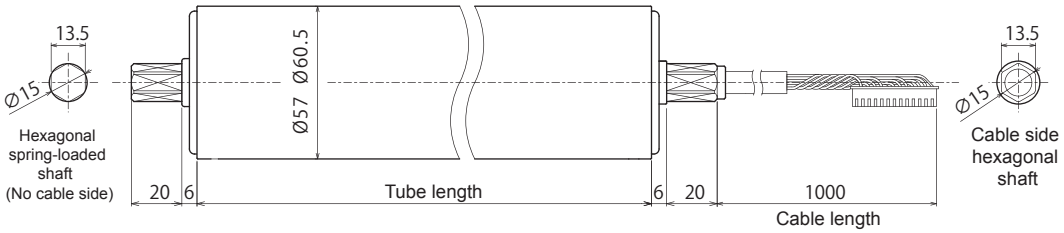
6-1.
Preparation to install MDR

MDR dimensions

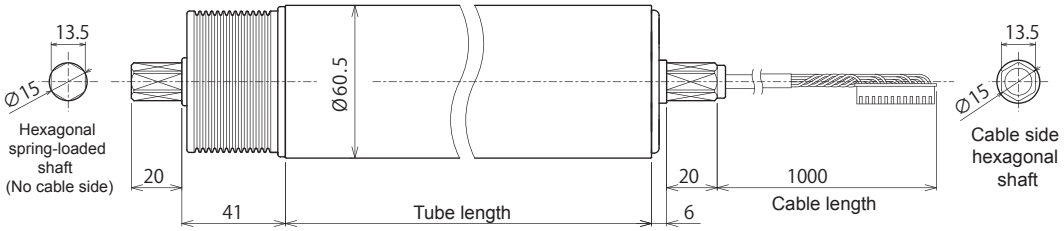
Standard



Brake option



V- Ribbed pulley end-cap option

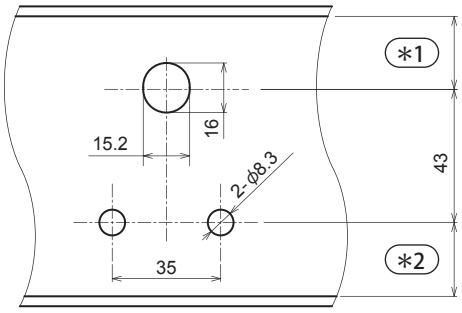


Frame mounting hole dimension

Frame hole punching

1 Punch frame holes required to install MDR.

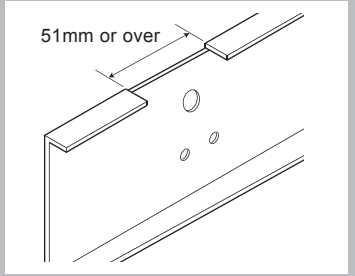
＊See fig. below for the position and dimensions of frame holes.



■ (＊1) 33mm minimum gap is required. Note)

■ (＊1) Leave enough room to tighten hex bolts with hex wrench.

Note) If this distance is 23 to 33mm, cut the bent part of top of frame for 51mm or over to make a space for M8x25 bolt attaching of the mounting bracket.



■ (＊2) 9mm minimum gap is required.

■ (＊1) & (＊2) Minimum gap should not include bending radius of the frame.

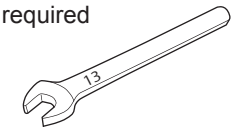
6. Installation

6-2. MDR installation

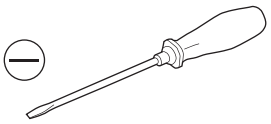
■ MDR shaft must be tightened firmly with the mounting bracket supplied as standard accessory.
Failure in tightening MDR shaft causes rattling, resulting cable disconnection and malfunction.

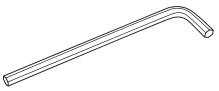
■ Install the roller with the appropriate number of person according to the product weight.

Tools required



13mm wrench (spanner)

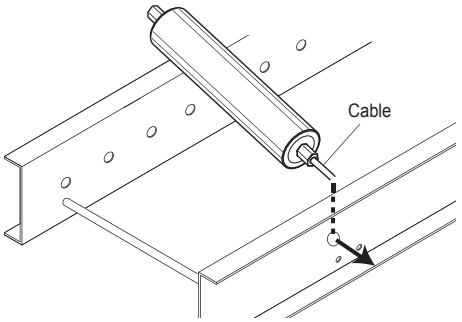

Flat head screw driver


6 mm hex wrench

MDR installation

1 Insert cable side shaft through frame shaft hole.

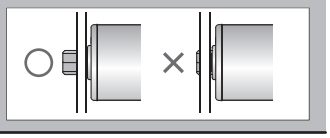
■ Care must be paid not to pinch the cable.

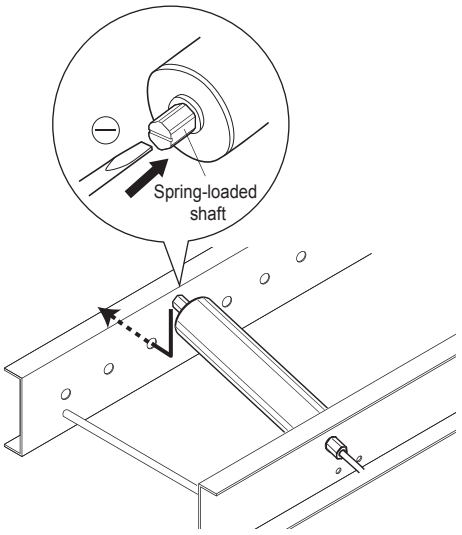


2 Press the spring loaded shaft (non cable side) with flat head screw driver and carefully insert it to the frame shaft hole.

■ Do not press the shaft beyond thrust collar.

■ As shown in figure below, verify that spring loaded shaft is sufficiently exposed from the frame shaft hole.





6. Installation

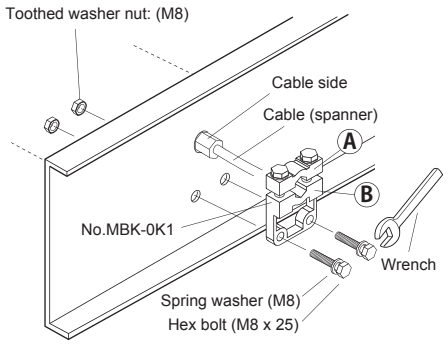
3 Insert the Cable and Shaft from MDR through Mounting Bracket then tighten.

＊ If the distance between motor side attaching shaft and top of frame is 23 to 33mm, cut the bent part of top of frame for 51mm or over. (Reffer to page 19)

■ Leave enough gap between Ⓐ and Ⓑ in figure to the right the attach the Mounting Bracket to ease the installation.

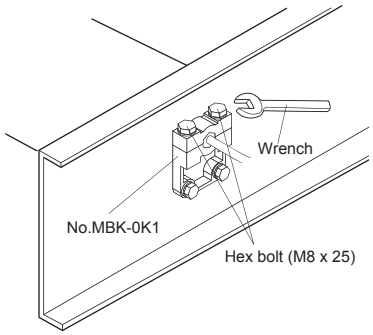
■ Recommended tightening Torque: 13.1 N･m

■ Do not force through the cable and housing connector, avoid damage during tightening of the Mounting Bracket.



4 Tighten the MDR shaft firmly by fastening hex bolts (M8 x 25) for mounting bracket .

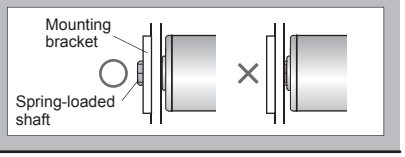
■ Recommended tightening Torque: 13.1 N･m



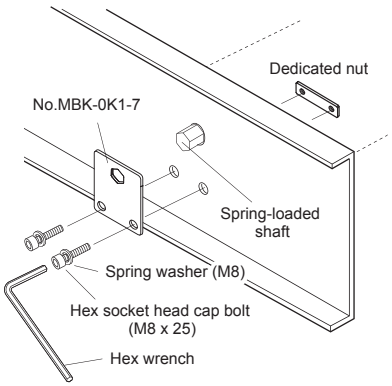
5 Hold the MDR attaching shaft into the bracket, and fastening Hex socket head cap bolt (M8×25) and dedicated nuts.

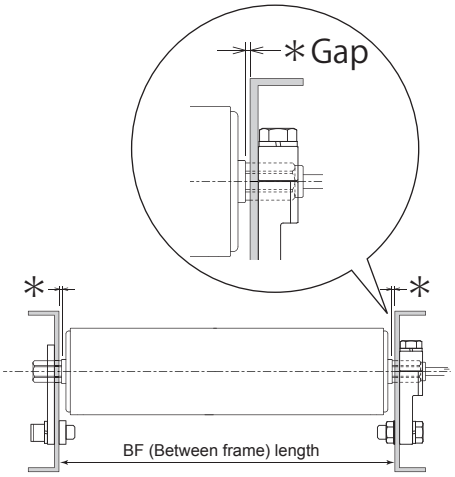
■ Recommended tightening Torque: 27 N･m

■ As shown in figure below, verify that spring loaded shaft is sufficiently exposed from the frame shaft hole.



■ BF (between frame length) must be the tube (L) length (mm)＋ 17mm. A gap is required on both sides of roller end.





7. Maintenance

7. Maintenance

MDR Check Points

No.	Check points	Recommended solutions	Details
1	Fixing screw of mounting bracket is loose.	Fasten the screw(s) with appropriate torque.	P.21
2	MDR behaves abnormally (abnormal noise or motion) when it starts running.	Replace the MDR unit if necessary.	—
3	Any slip or wear in transmission belts?	Replace the belts with new ones.	P.14

■ Those three points need to be checked everyday without fail.

Appendix

Appendix

Specifications

MDR specifications

MDR	Roller diameter		ϕ57 ／ϕ60.5		
	Roller length available		360mm minimum up to 1200mm maximum ＊410mm minimum with brake option		
	Roller tube material		STKM equivalent		
	Roller tube wall thickness	ϕ57	1.5mm		
		ϕ60.5	3.2mm		
	Shaft shape		Hexagonal		
	Shaft diameter		ϕ15		
	Outgoing cable length		1000mm		
	Brake (Mechanical brake) option		Brake torque ＊	Nominal speed 15m/min	35.9N･m
				Nominal speed 55m/min	8.5N･m
			Brake release current		Maximum 0.3A
Applicable driver card	Standard		CBK-109, HBK-608, IB-E04, IB-P02		
	Brake		CBK-109		
Speed	Nominal speed		15m/min, 55m/min		
Power	Power specifications		24V DC±10%		
Environment	Ambient temperature		0 to 40 degree C (no freeze)		
	Ambient humidity		≦90% RH (no condensation)		
	Installation		Indoor		
	Atmosphere		No corrosive gas		
	Vibration		≦ 0.5G		
	Index of protection		IP53		
	Pollution degree		2（IEC60664-1）		

＊ Brake torque values are for reference, and are not guaranteed.

		Tube length (mm)	Weight	Static load
Product weight	PM570KT	400	4.0kg	100kg
		500	4.2kg	80kg
		600	4.4kg	80kg
		700	4.6kg	60kg
		800	4.8kg	60kg
		900	5.0kg	50kg
		1000	5.2kg	50kg
		1100	5.4kg	40kg
		1200	5.6kg	40kg
	PM605KT	400	5.1kg	160kg
		500	5.4kg	
		600	5.9kg	
		700	6.3kg	
		800	6.8kg	
		900	7.2kg	
		1000	7.7kg	
		1100	8.1kg	
		1200	8.6kg	

＊ The roller weight with brake option will be increased approx. 0.5kg than standard roller.

Term

Mechanical brake

- Mechanical brake is a dedicated electromagnetic brake that is released when power on.
- Mechanical brake activates to retain stop position as holding effect.

Technology for tomorrow

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