MA1678YHG
Version (20260323)

INSTRUCTION MANUAL

MODEL NTS3_S

3-jaw Parallel Gripper with Length Measuring Scale

DANGER

- This Instruction Manual has been prepared for intended use for production engineers and maintenance persons who operate this product. When the beginners use this product, be sure to receive the guidance from skilled persons, sales agents, or us in advance.
- Before installing, using, or maintaining this product, read carefully the safety precautions given in this manual so as to understand them completely. If you do not heed given instructions or safety precautions, serious human accidents, death, or physical damage may occur.
- Store this manual with care in the specified place at hand, and reread it as necessary for correct use of the product.
- Please contact the sales agent if you have any uncertainty or doubt about this manual.

Preface

This manual provides detailed information on the 3-jaw parallel gripper with the length measuring sensor (model NTS3_S) so that you can understand its performance and functions and use it safely and correctly.
Before using this gripper, read this manual and the instruction manual of the 3-jaw parallel gripper (model NTS3) carefully to understand how to use the gripper correctly. The contents of the instruction manual for the 3-jaw parallel gripper (NTS series) are common to all sizes.
Always follow the instructions and warnings given in **"Important Safety Precautions"** and **"Precautions for Use"**. Failure to follow these precautions could result in serious human accidents.

Terms and Symbols Used for Safety Messages

In this manual, handling precautions that are considered especially important are classified and presented as shown below according to the degree of risk (severity of harm) that may result. Please completely understand the meaning of these terms and follow the instructions for safe operation.

Safety Alert Symbol

This triangle is a safety alert symbol used to alert you to potential safety hazards. To avoid death or injuries that may occur, follow the safety messages given with this safety alert symbol.

DANGER	**Failure to follow the safety precautions below will result in death or serious injuries.**
WARNING	**Failure to follow the safety precautions below could result in death or serious injuries.**
CAUTION	**Failure to follow the safety precautions below may result in minor or moderate injuries.**
NOTICE	**Indicates instructions which, if you do not heed given instructions, could result in damage to the product or shortened service life, or damage to peripheral equipment.**

Disclaimer and How to Use Instruction Manual

This product is suitable for mounting on robots or loaders to grip and transport workpieces, as well as for use as a dimensional inspection device for gripped workpieces. Please note that this product is not a measuring instrument intended to obtain absolute measurement values, rather, it is designed to verify whether the dimensions of a gripped workpiece fall within a specified range by comparing it with a reference master workpiece. In addition, this product is equipped with air-pressure-operated jaws for gripping the conveyed workpiece. For any other applications, please consult our company.
Kitagawa Corporation shall not be held liable for human accidents, death, damage, or loss that occurred due to a failure to follow the safety precautions given in this manual.

This manual does not predict all potential hazards in operation, inspection, and maintenance under all environmental conditions. There will be an infinite number of matters that cannot or must not be done, and it is impossible for the manual to cover all of them.
Therefore, the matters, unless otherwise mentioned clearly as “can be done” or “may be done” in this manual, should be considered as “cannot be done” or “must not be done”. Please contact us or our agents if you have an uncertainty about safety when you try to perform operation, inspection, or maintenance not mentioned in this manual.

Warranty and Disclaimer

The product is warranted for one year after the date of delivery.
All parts used shall be those delivered by Kitagawa Corporation. Kitagawa Corporation shall not be held liable for human accidents, death, damage, or loss that occurred due to the use of parts which are not genuine parts manufactured by Kitagawa. Also, the use of parts other than Kitagawa’s genuine parts will void the warranty.

Contents

1. Structural Drawing and Parts List

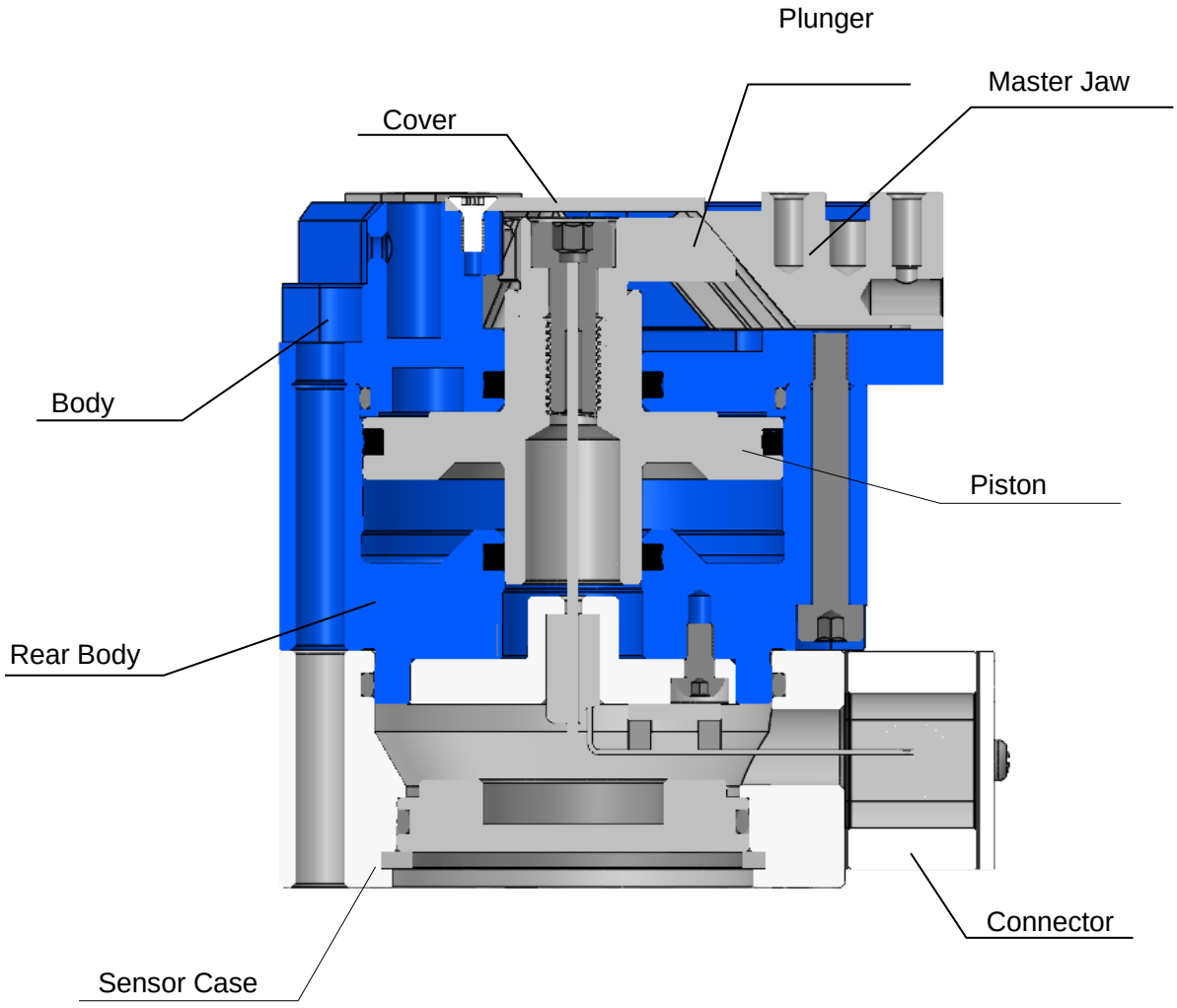
1-1. Model indication

The model indication is as follows:

NTS3 07 S

Series			Size				Length measuring sensor	
NTS3	NBR seal		07	09	11		**Nil**	Not equipped
							S	Equipped

1-2. Structural drawing

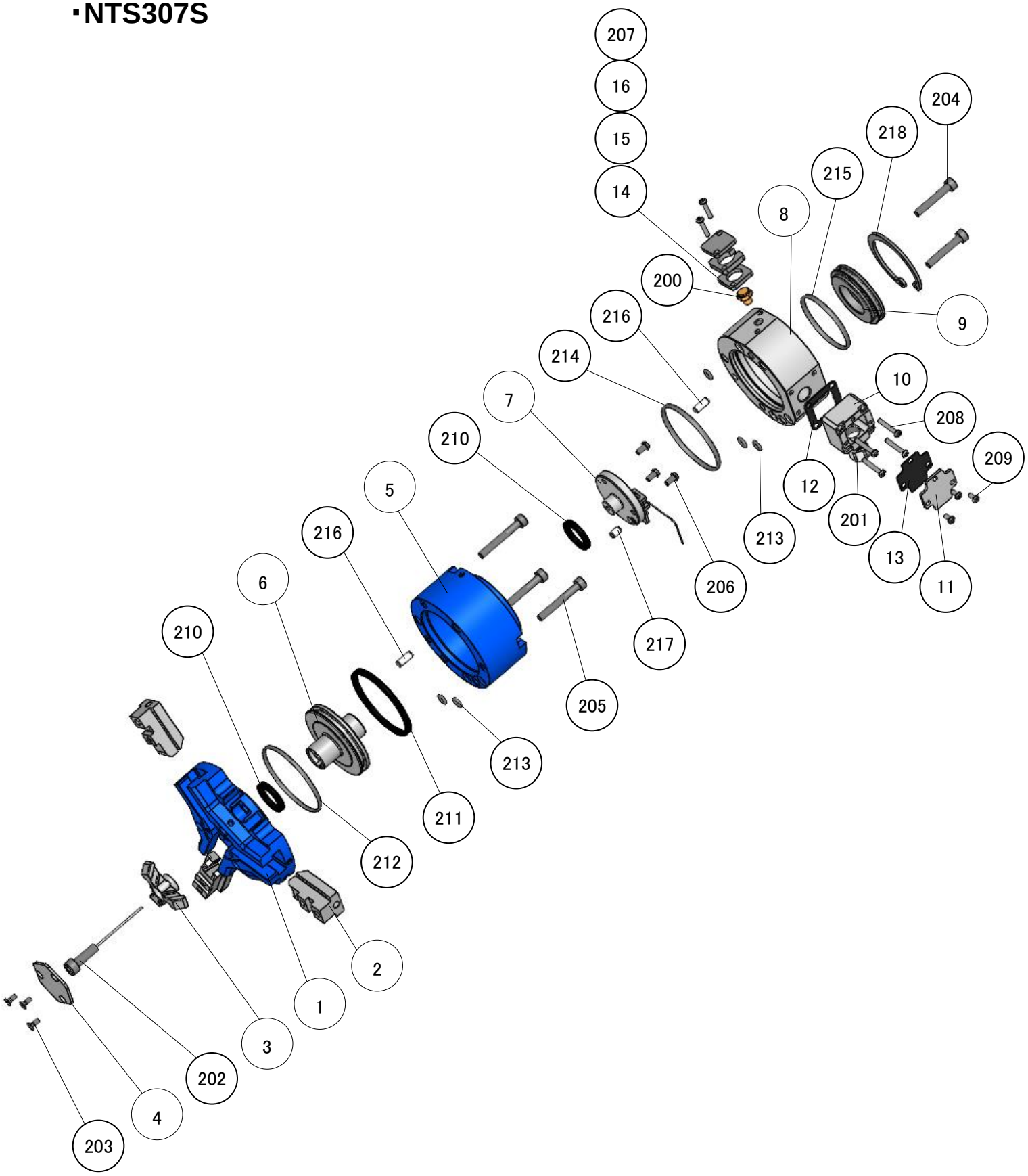


1-3. Seal list

	No.					
Model	210	211	212	213	214	215
NTS307S	X-ring X114	X-ring X130	O-ring AS568-30	O-ring P4	O-ring S44	O-ring S36
NTS309S	X-ring X116	X-ring X137	O-ring AS568-34	O-ring SS4.5	O-ring S42	O-ring S45
NTS311S	X-ring X118	X-ring X232	O-ring S71	O-ring P4	O-ring S60	O-ring S63

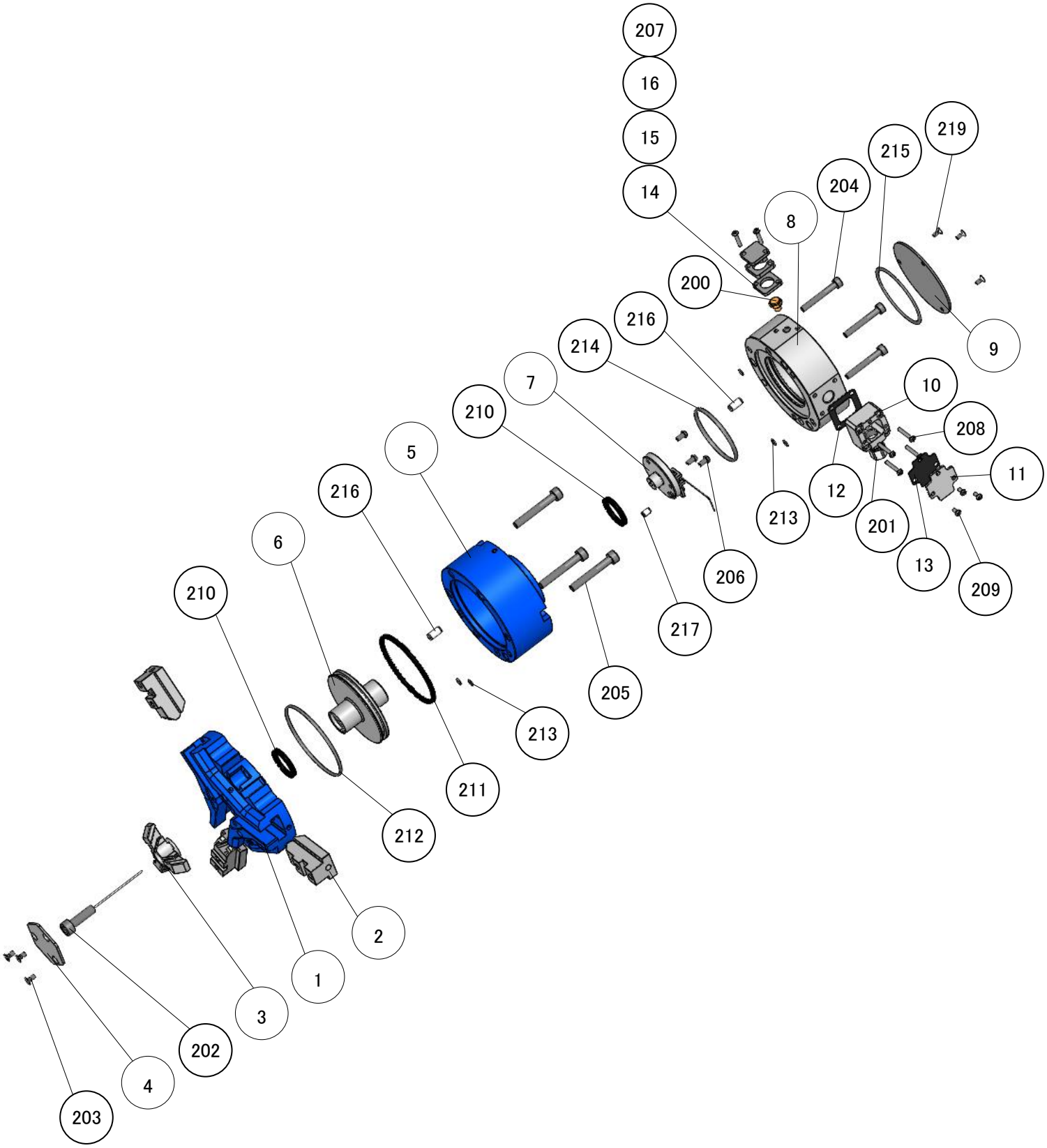
1-4. Parts list

・NTS307S



No.	Parts Name	Qty	No.	Parts Name	Qty
1	Body	1	201	Cable gland	1
2	Master Jaw	3	202	Plunger Fixing Bolt	1
3	Plunger	1	203	Cover Fixing Bolt	3
4	Cover カバー	1	204	Sensor Case Fixing Bolt	2
5	Rear body	1	205	Rear Body Fixing Bolt	3
6	Piston	1	206	Sensor Adapter Fixing Bolt	3
7	Sensor Adapter	1	207	Silencer Fixing Bolt	2
8	Sensor Case	1	208	Connector Fixing Bolt	4
9	Sensor Cover	1	209	Connector Cover Fixing Bolt	3
10	Connector	1	210	Shaft Packing	2
11	Connector Cover	1	211	Piston Packing	1
12	Sheet Packing A	1	212	O-ring	1
13	Sheet Packing B	1	213	O-ring	5
14	Silencer Cover A	1	214	O-ring	1
15	Silencer Cover B	1	215	O-ring	1
16	Silencer Cover C	1	216	Dowel Pin	2
			217	Dowel Pin	1
200	Silencer	1	218	Retaining Ring	1

・NTS309S/NTS311S



No.	Parts Name	Qty	No.	Parts Name	Qty
1	Body	1	201	Cable gland	1
2	Master Jaw	3	202	Plunger Fixing Bolt	1
3	Plunger	1	203	Cover Fixing Bolt	3
4	Cover カバー	1	204	Sensor Case Fixing Bolt	2
5	Rear body	1	205	Rear Body Fixing Bolt	3
6	Piston	1	206	Sensor Adapter Fixing Bolt	3
7	Sensor Adapter	1	207	Silencer Fixing Bolt	2
8	Sensor Case	1	208	Connector Fixing Bolt	4
9	Sensor Cover	1	209	Connector Cover Fixing Bolt	3
10	Connector	1	210	Shaft Packing	2
11	Connector Cover	1	211	Piston Packing	1
12	Sheet Packing A	1	212	O-ring	1
13	Sheet Packing B	1	213	O-ring	5
14	Silencer Cover A	1	214	O-ring	1
15	Silencer Cover B	1	215	O-ring	1
16	Silencer Cover C	1	216	Dowel Pin	2
			217	Dowel Pin	1
200	Silencer	1	219	Sensor Cover Fixing Bolt	3

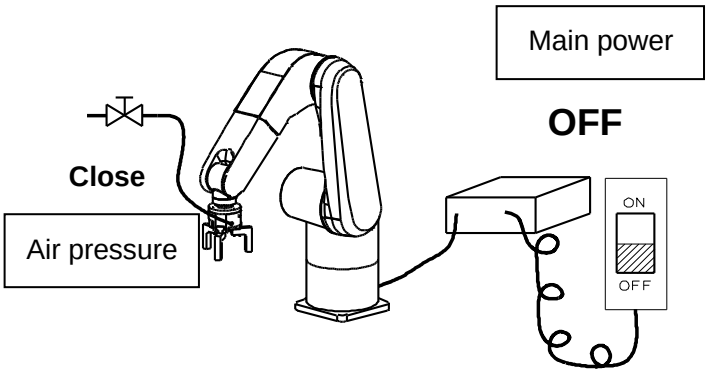
2. Important Safety Precautions

Important safety precautions that particularly you should know or follow are summarized below. Please read them before starting to use the product.

DANGER **Failure to follow the safety precautions below will result in death or serious injuries.**

Be sure to turn off the main power supply when installing, checking, oiling, or replacing the gripper.
Also, shut down the air pressure in the work area.

- During work, the robot or gripper could move abruptly and collide with your body.
- After shutting down the air pressure, release the air pressure remaining inside the gripper.

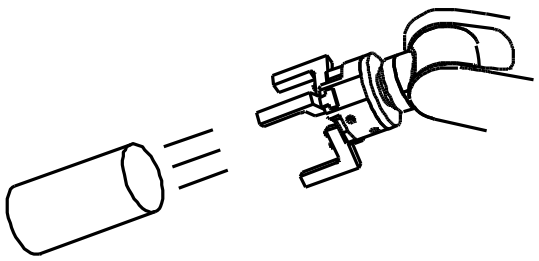


When installing, checking, oiling, or replacing the gripper, post a sign or notice, or provide a fence, and so on to notify people around the machine that work is in progress.

- Notify people around the machine that work is in progress and take measures to keep people other than the operator out of the work area.
  Machine motion not predicted by a third party could cause serious danger.

Take safety measures so that the operator is not injured even if the conveyed workpiece flies out due to the reduced air pressure.

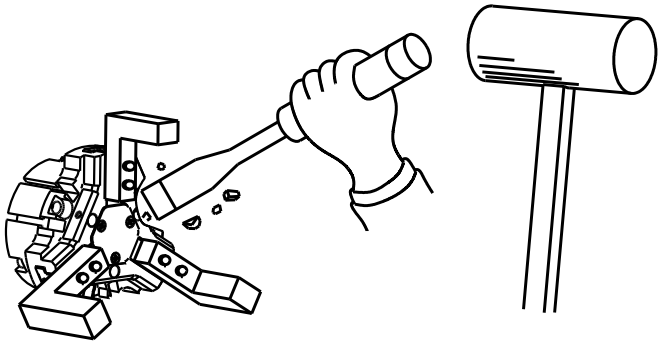
- Observe the legal safety standards defined by each country, such as installation of safeguards or fall prevention covers.



DANGER **Failure to follow the safety precautions below will result in death or serious injuries.**

Do not modify the gripper.

- Not only the gripper is damaged but also the gripper and fixed workpiece may fly out.



If using the gripper as a workpiece fixture when the workpiece is drilled, deburred, welded, or modified additionally, confirm the specifications.

- If the gripper is used out of the specifications, not only the gripper is damaged but also the fixed workpiece may fly out.

Be sure to tighten the bolts with the specified torque.

- Lack of bolt quantity or tightening torque, or excessive torque could damage the bolt, causing the gripper or conveyed workpiece to fly out.
- When tightening the bolts, fix the gripper so that it will not rotate. Failure to do so may result in injury by slipping your hands when tightening the bolts.

Other than plunger fixing bolt

Bolt size	Tightening torque		Bolt size	Tightening torque	
M3	1.2	N·m	M5	6.8	N·m
M4	2.7	N·m	M6	12.7	N·m
M5	5.5	N·m	M8	33.3	N·m
M6	10.8	N·m	M10	72.6	N·m
M8	26.5	N·m			
M10	60	N·m			

Plunger fixing bolt

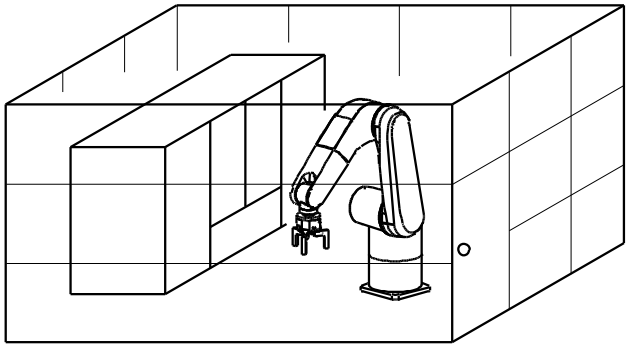
Hexagon socket button head screw

Bolt size	Tightening torque	
M3	1.0	N·m

DANGER **Failure to follow the safety precautions below will result in death or serious injuries.**

Use the gripper in accordance with the legal safety standards.

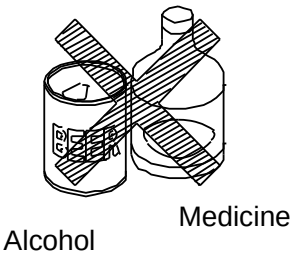
- Use the gripper in accordance with the legal safety standards defined by each country, such as installation of safeguards or safety covers.



WARNING **Failure to follow the safety precautions below will result in death or serious injuries.**

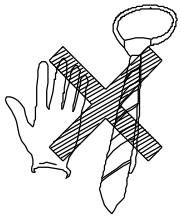
Do not operate the machine after drinking alcohol or taking medicine.

- Impaired judgment or operation mistake may cause serious hazards.



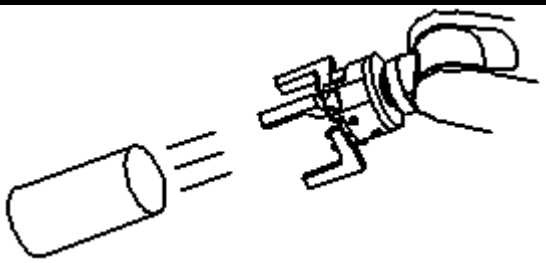
Do not wear clothing or accessories such as a necktie, necklace, etc. which are easy to be caught in.

- You may be caught in the gripper.



Use the gripper within the range of specification values.

- Have the gripper grip the conveyed workpiece at the position of its center of gravity.
- If not, not only the gripper is damaged but also the conveyed workpiece may scatter.



3. Specifications

3-1. Specifications table

Model		NTS		
		307S	309S	311S
Working Fluid		Air pressure		
Operating Air Pressure	(MPa)	0.2～0.6		
Ambient temperature range	(℃)	5～60		
Jaw Stroke in diameter	(mm)	12	16	20
Cylinder internal Volume (per cycle)	(cm^3)	22.8	47.5	106.1
Body mass	(kg)	0.71	1.20	1.96
Measure repeatability	(mm)	0.004		
Ambient humidity range	(%)	30～95		
Storage temperature range	(℃)	-10～60		
Noise level	(dB)	48		

*Measure repeatability is defined under an operating air pressure of 0.2 MPa and with the jaw geometry described on p.30.

*Noise level is measured at a distance of 1m from the gripper in front, rear, left, and right, four positions of the gripper.

3-2. Gripping force

① Model selection

Perform the following calculation and select the model that provides a gripping force exceeding the calculation result, though a gripping force varies depending on the shapes of jaws created by the customer and conveyed workpiece or the friction coefficient.

F=m（g+a）/μ

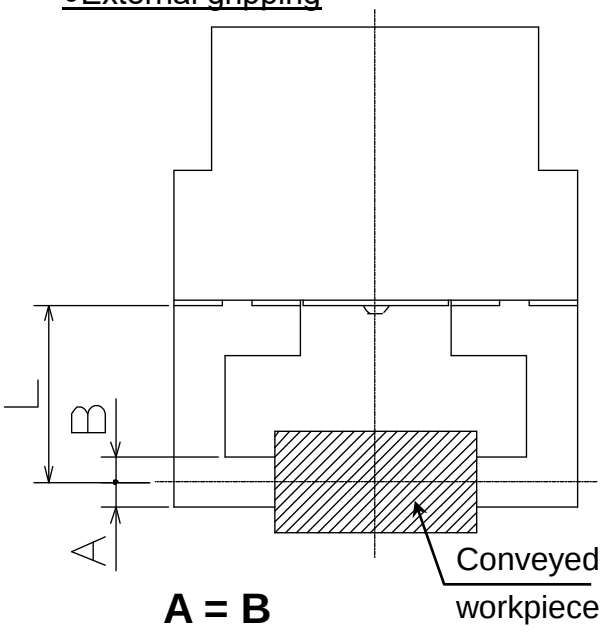
(Example)

When mass of conveyed workpiece = 8 kg, friction coefficient = 0.1, and robot acceleration = 10m/s^2:
F=8（9.8+10）/0.1＝1584（N）

F = Gripping force (N)
m = Mass of conveyed workpiece (kg)
g = Gravitational acceleration (m/s^2)
a = Acceleration of robot/loader (m/s^2)
μ = Friction coefficient of gripping part

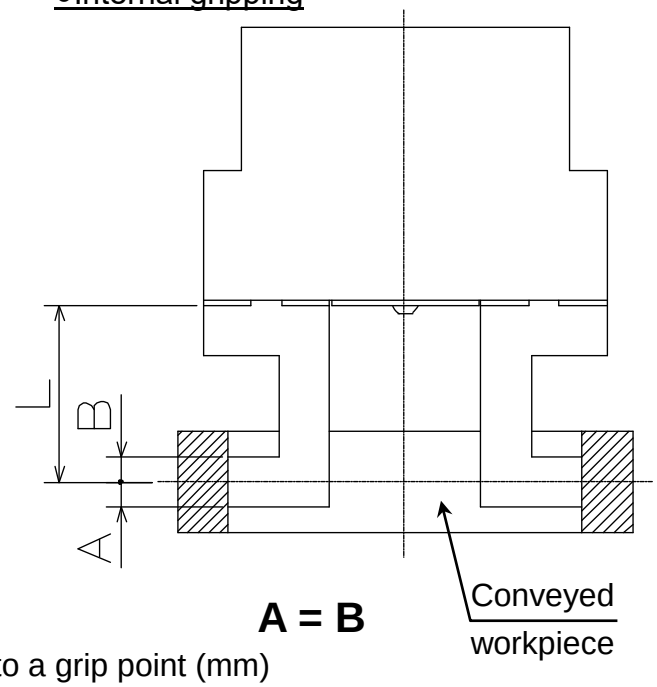
②Gripping force

●External gripping



A = B

●Internal gripping



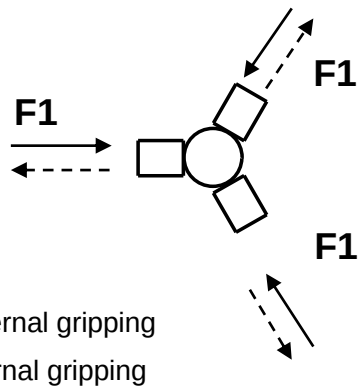
A = B

L: Distance up to a grip point (mm)

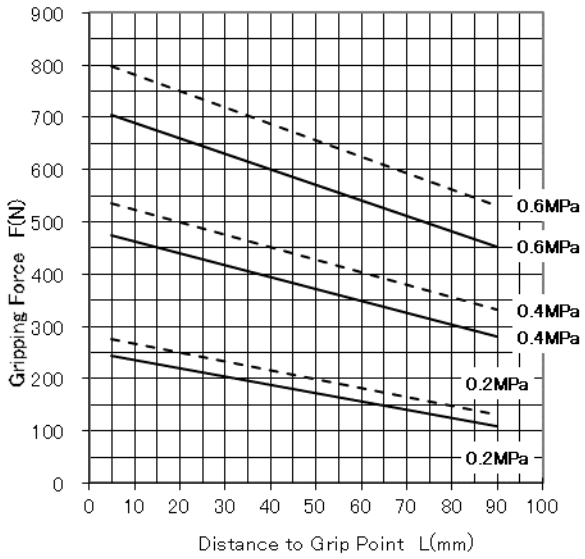
●Expression of gripping force

A gripping force F shown in graph is actually measured gripping force per jaw F1 x the number of jaws.

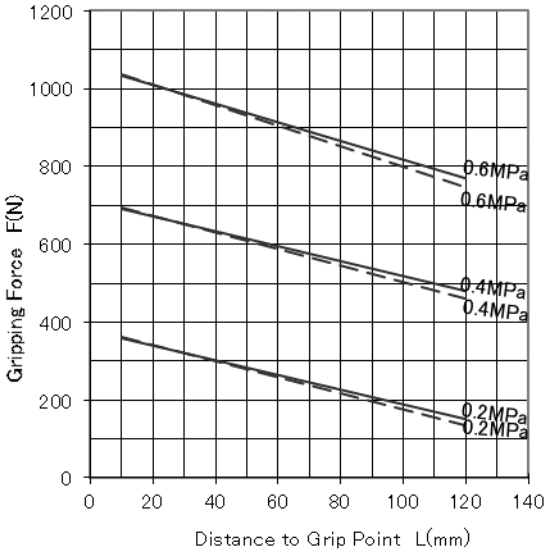
（F=F1×3）



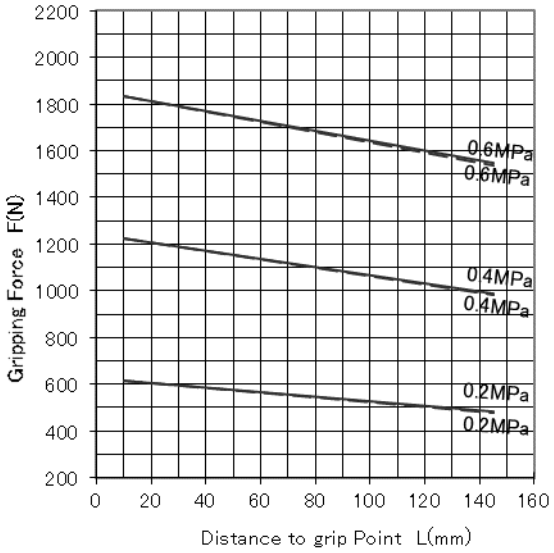
■NTS307S



■NTS309S



■NTS311S



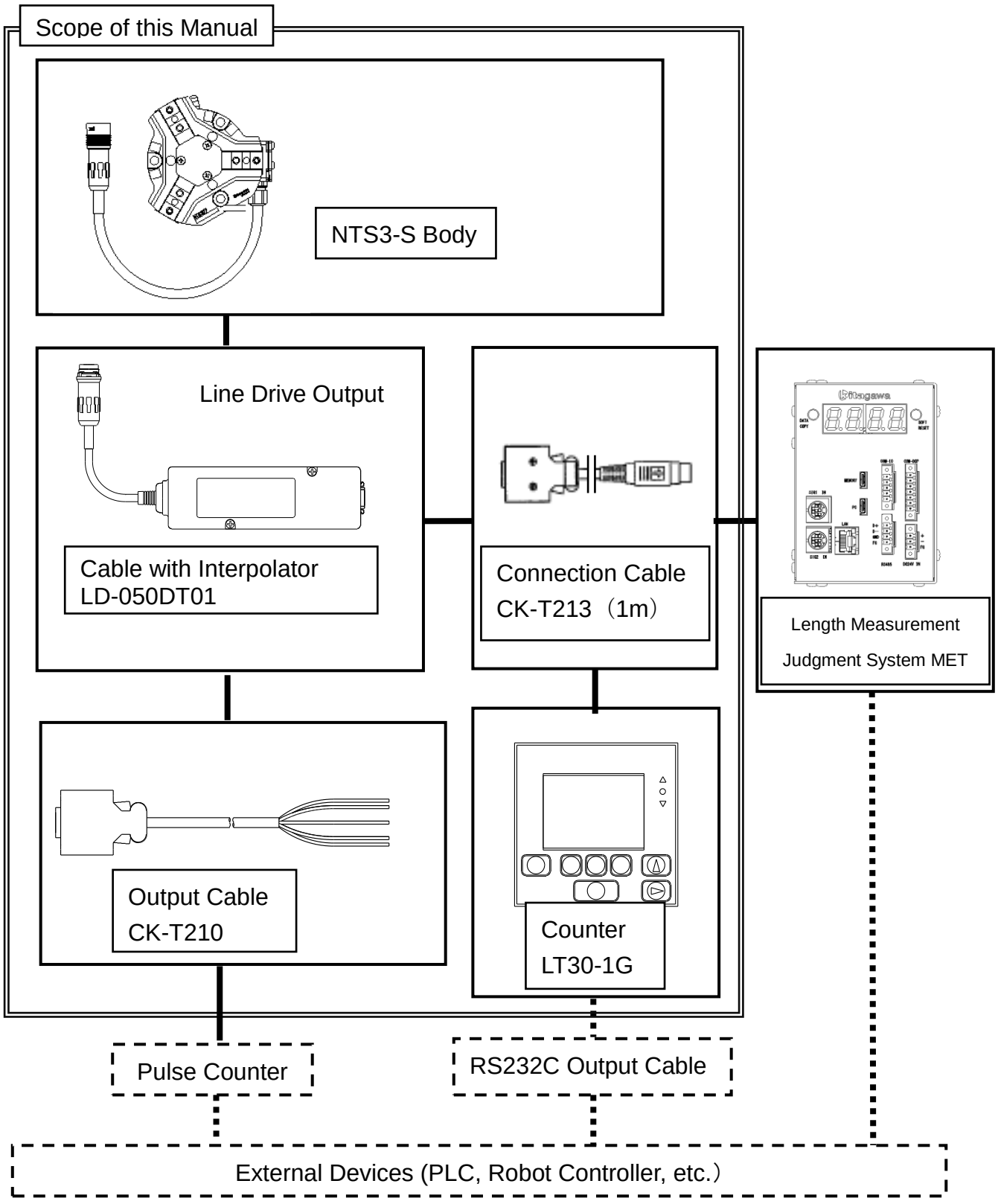
NOTICE

- **Determine the distance up to a grip point L as short as possible when designing the jaws. Also, the distance up to a grip point L should be used within a range shown in graph. If it is used out of the range, not only the specified gripping force may not be obtained but also the wear of sliding parts may be increased.**

4. Cable Connection

4-1. Cable Configuration

The connection configuration is shown below. For details on connecting the measurement judgment system (MET), please refer to its instruction manual.



4-2 Cable Specifications

NOTICE

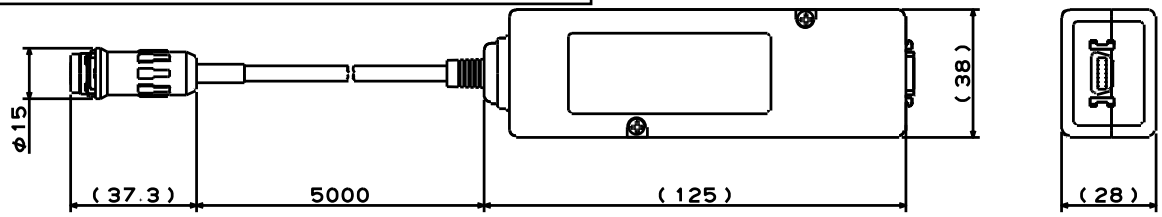
To prevent noise and electromagnetic interference from other equipment, please observe the following:

- **Do not route the lead cable or connection cables in the same duct as power lines.**
- **Install the unit at least 0.5 m away from high-voltage sources, large-current sources, and high-power relays.**

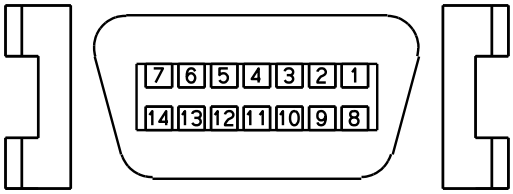
To prevent cable disconnection or short circuits, please observe the following:

- **Avoid using the interpolator cable, output cable, and counter in locations exposed to cutting chips, cutting oil, or machine oil. (These components are not oil-proof or waterproof.)**
- **Ensure that the lead cable maintains a minimum bending radius of 50 mm or more.**

Cable with interpolator LD-050DT01(5m)



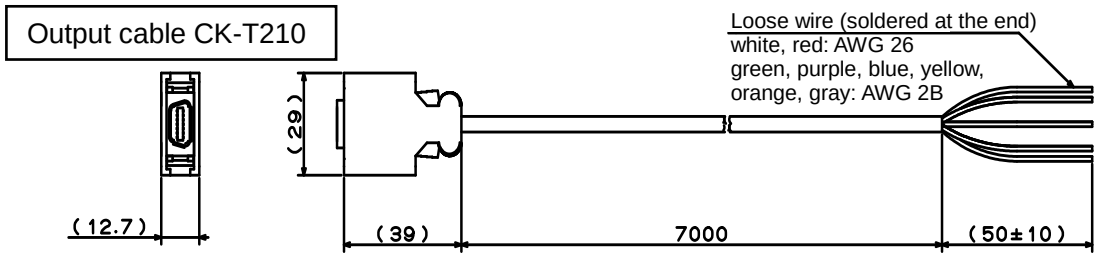
Output connector: 10214-52A2PL manufactured by 3M (MDR connector receptacle)



Specification

項目	仕様
Resolution	0.5 μm
Minimum phase difference	200ns
Output	A/B phase （EIA-422 compliant）
Supply voltage	DC5V±5%
Current consumption	300mA
Max. response speed	1m/s
Operating temperature range	0~40℃
Storage temperature range	-10~50℃

*The FG(shield) is not connected to the housing



Output Connector	Signal	Output cable (CK-T210)	
		Wire color	Twisted pair
1	A	Blue	①
2	*A	Yellow	①
3	B	Orange	②
4	*B	Gray	②
5	N.C.		
6	N.C		
7	Not connectable		
8	N.C		
9	N.C		
10	N.C		
11	0V	Green	③
12	0V	White	④
13	+5V	Red	④
14	+5V	Purple	③

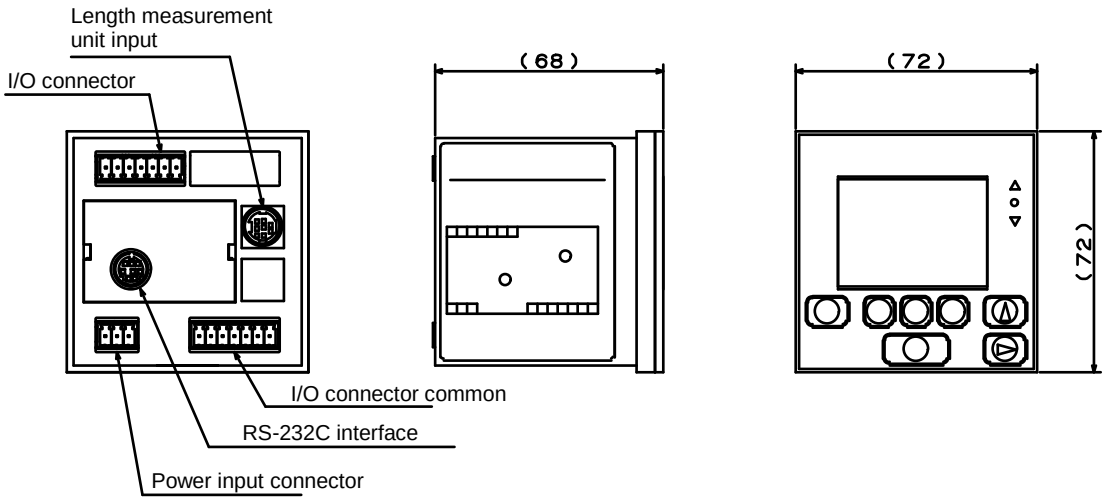
* Be sure to connect two wires respectively for the +5 V and 0 V signals.

Input side connector： 3M MDR connector
Plug 10114-3000PE, Shell 10314-52F0-008

*The pulse counter and PLC must be prepared by the customer.
*Select a pulse counter with 2-phase quadrature (×4) and a frequency of 500 kHz or higher.

4-3 Counter Specification

Counter LT30-1GC



For details, refer to the instruction manual of Magnescale counter LT30-1GC.
http://www.magnescale.com/

* The RS-232C cable and PLC are to be prepared by the customer.

5. Use Instructions

This product supplies pneumatic pressure to the unit to move the jaws in the open or close direction to grip the workpiece being transported and transport it to any desired location. After transport, the jaws are moved in the close or open direction to release the workpiece. Additionally, the dimensions of the gripped section are measured by moving the jaws in an open or closed direction to grip the workpiece.

NOTICE

- **This product is not oil- and water-resistant. (Equivalent to IP40)**
- **Do not use this product in the following environments.**
  - **・Where cutting fluid splashes directly**
    Especially when the cutting fluid includes abrasives
  - **・Where substances such as organic solvent, chemical agent, acid, alkali, and kerosene are included in the atmosphere**
  - **・Where water splashes directly**

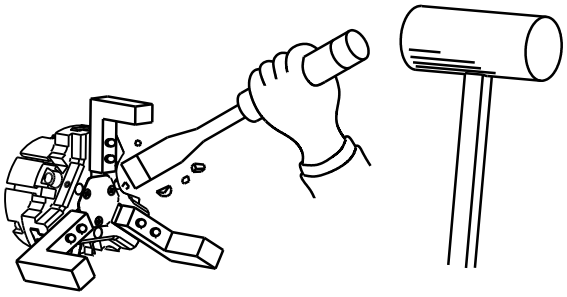
NOTICE

<For stable measurement>

- **Install a flow control valve in the pneumatic circuit and adjust the flow rate so that a full stroke of the jaw (open to closed or closed to open) takes at least 0.5 seconds.**
- **If no flow control valve is used, the jaw opening/closing speed may increase, causing a display error.**
- **If the display error alarm occurs, reduce the speed using the flow control valve.**
- **Do not use the stroke end of the jaw as a measurement standard. Jaw position in opening end and closing end is not repeatable.**
- **Since it takes some time for the supply air pressure to reach the set value after the movement starts, please set the measurement timing after confirming when the readings stabilize following completion of the workpiece gripping operation.**

DANGER

- **Do not modify the gripper. Using the modified product could cause unexpected accidents. Kitagawa shall not be held liable for human accidents, death, damage, or loss that occurred due to the modification.**



- **If using the gripper as a workpiece fixture when the workpiece is drilled, deburred, welded, or modified additionally, confirm the specifications. If the gripper is used out of the specifications, not only the gripper is damaged but also the fixed workpiece may scatter.**

NOTICE

- **Do not use the product in the environment of corrosive chemicals, corrosive gas, dust, and vibration, avoiding high temperature or direct sunlight.**
- *** When storing the product, apply antirust treatment and then store it in a place free from water leakage, dew condensation, or freeze.**

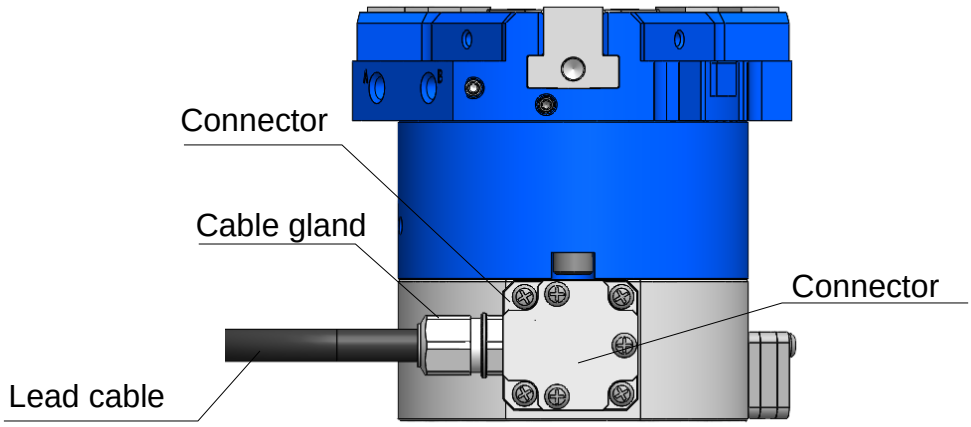
5-1 Handling of Lead Cable

At shipment of the product, the lead cable is fixed horizontally.
During use, the lead cable outlet direction can be changed to one of the three directions shown in the figure 3 below. Follow the procedure below to make the change.

① Hold the lead cable by hand and loosen the cable gland while supporting it to prevent twisting. (If the procedure is performed without loosening it, the cable may be pulled and damaged.)
② Remove the connector cover, and while ensuring that the internal lead cable is not twisted or under tension, rotate the connector counterclockwise from the factory default position. (Set it at 90° or 180° counterclockwise from the factory position.)
③ Once the lead cable outlet direction is determined, check that Sheet Packing A is correctly installed, and secure the connector.
④ While supporting the lead cable to prevent twisting, tighten the cable gland. (Recommended torque: 0.2 N·m)
⑤ Check that Sheet Packing B is correctly installed, and attach the connector cover.

NOTICE

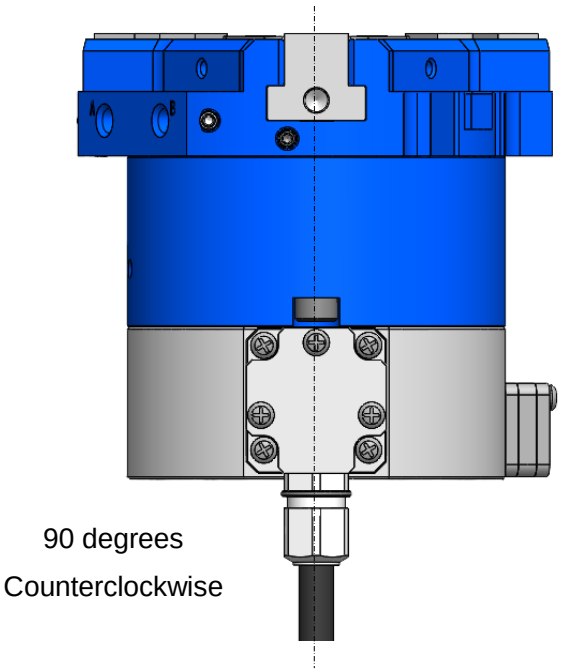
- **Do not apply any external load in a direction that would rotate the connector while the gripper is in use. (The connector may be damaged.)**
- **After changing the lead cable outlet direction, ensure that the connector and lead cable do not interfere with each other. (Interference may cause damage to the unit or lead cable breakage.)**



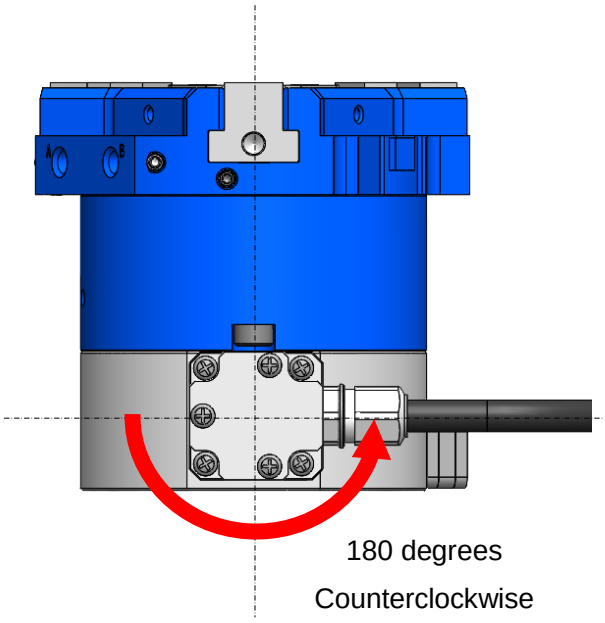
Lead Cable Pull-out default direction at moment of shipping

Adjustable Directions

The lead cable can be rotated 90 degrees or 180 degrees from its default orientation at the time of shipment.



90 度



180 度

5-1 Fixing of Lead Cable

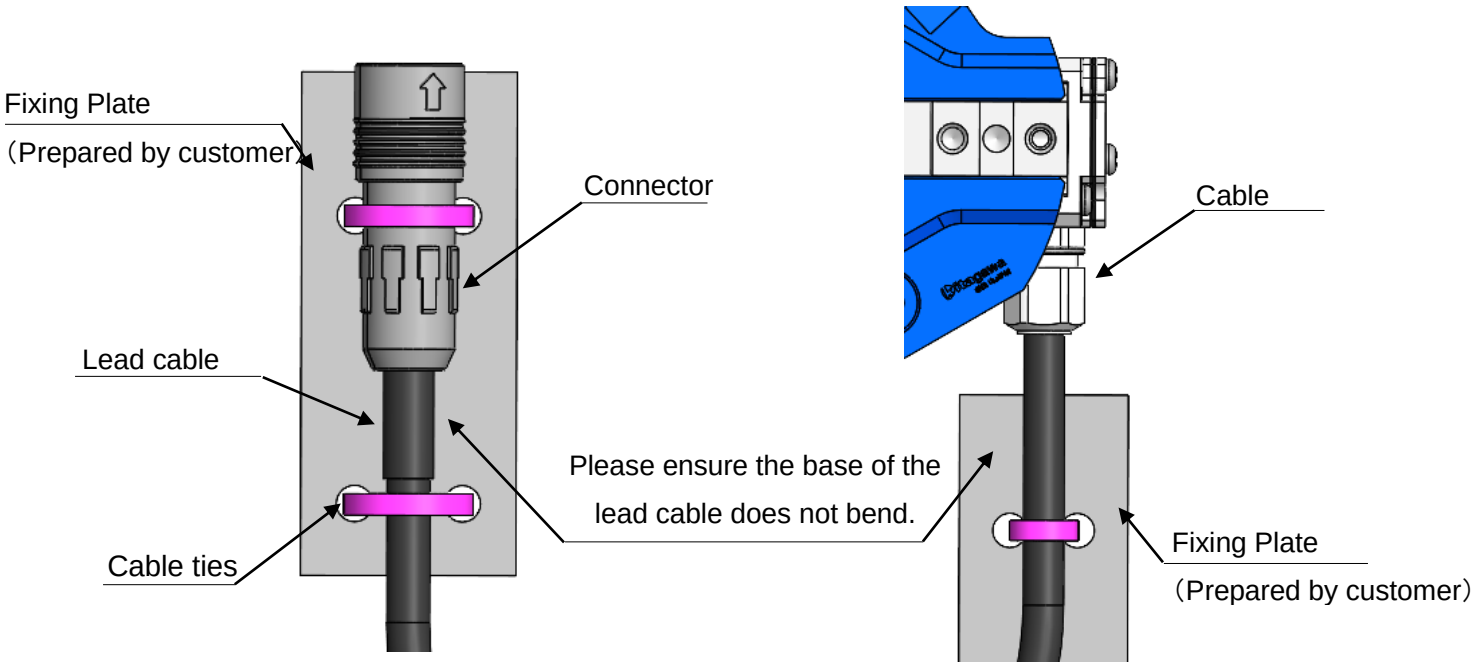
If the lead cable is repeatedly subjected to bending, twisting, or tensile stress, it may cause wire breakage and lead to failure. Therefore, when starting use, secure the cable by utilizing the connector at the end of the lead cable so that no load is applied to the cable.

The cable with interpolator connected to the lead cable is a robot cable. If the system configuration requires the cable to move, fix the lead cable so that the cable with interpolator is the one that moves.

NOTICE

- **When using the product, ensure that the lead cable extending from the gripper body is not subjected to repeated bending, twisting, or tensile stress.**
- **Ensure that the minimum bending radius of the lead cable is 50 mm or greater.**

When securing the lead cables, please pay attention to the following points:
Ensure that the lead cables near the connectors and caps are not bent.



5-3 How to Use Length Measuring Function

Dimensional measurement with this device is performed by comparing against the diameter of a reference master workpiece. A sensor built into the internal components detects the amount of displacement when gripping the master workpiece and the target object, allowing the diameter difference to be obtained.

The sensor output is an incremental A/B phase signal and does not provide an absolute position. Always perform a reference setup (measurement origin setting) after powering on, with the master workpiece gripped, before use.

Please note the following when performing the reference setup:

[Notes for Reference Setup]

- Install a flow control valve in the pneumatic circuit and restrict the flow to adjust the jaw opening/closing speed. If a flow control valve is not used, the jaw speed may become too fast, which can result in display errors.
- Be sure to grip the master workpiece when performing the reference setup.
  *Do not use the stroke end positions of the master jaw as the measurement reference, as repeatability at the fully open and fully closed positions of the jaw is not guaranteed.

5-3-1 Conversion of Sensor Output Values to Diameter

This device outputs the piston displacement from the sensor. To obtain the diameter displacement, convert the piston displacement into diameter displacement using conversion formula (1) below.

$$\Delta D = 2\Delta P \tan\theta \quad \cdots (1)$$

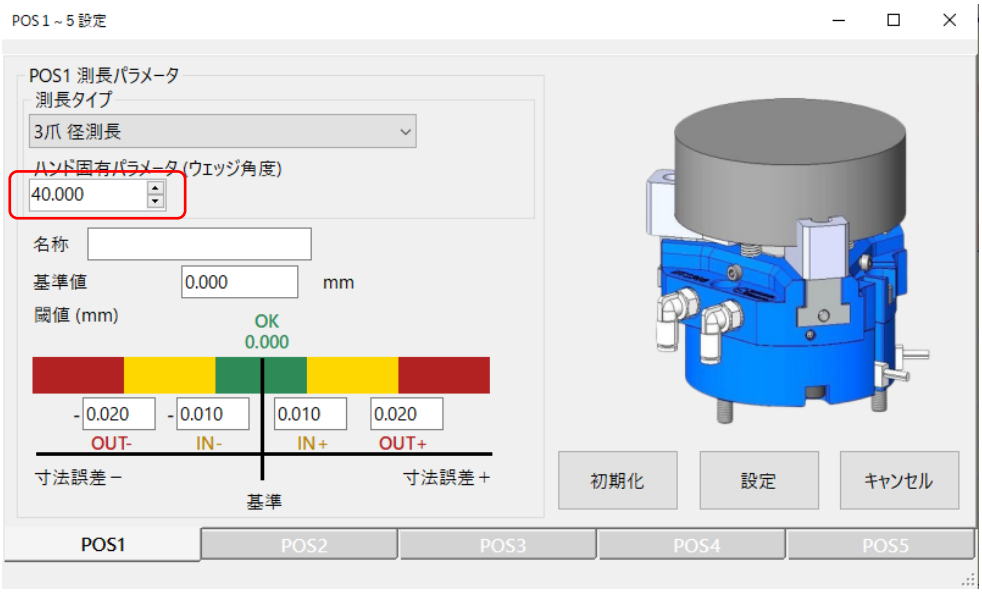
ΔD: Diameter displacement

ΔP: Piston displacement (sensor output value)

θ: Angle

*please perform the conversion using the above formula, when $\theta = 40°$.

When using the Length measurement judgment system MET, enter the hand-specific parameters in the application settings screen shown below. (For details, refer to the instruction manual of Length measurement judgment system MET)



5-3-2 Calibration of Measurement Values

Measurement values from this device may differ from those obtained with a calibrated reference measuring instrument due to the influence of the device's orientation, operating conditions, and installation environment during measurement. Calibration (linearity adjustment) can correct these errors and obtain accurate measurements.

An example of the calibration method is shown in the image below.

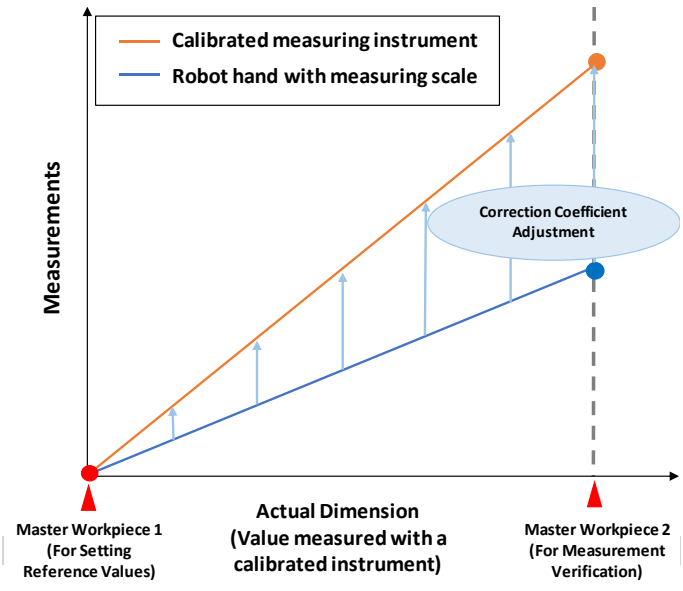
[Calibration Method]

① Set the reference using Master Work 1, which serves as the reference for diameter difference measurement.

② Measure Master Work 2 for measurement value verification and check the error with the actual dimension (value measured with a calibrated measuring instrument).

③ Multiply the sensor output value by a correction coefficient and adjust to match the actual dimension.

*If you are using the MET length measurement judgment system, you can adjust the linearity by adjusting the value of θ on the application screen described on page 22.

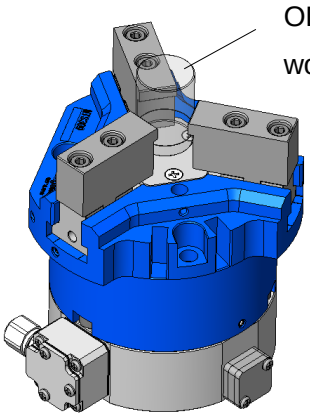


5-4 Operational Guidelines for Stable Measurements

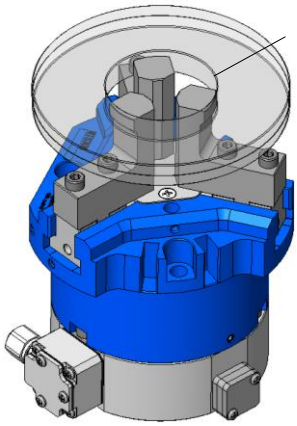
This device can reduce measurement variability and errors by optimizing the design of the jaws, the position during measurement, the air circuit, and the timing of measurement acquisition.
Furthermore, by appropriately setting the size and number of master workpieces used for comparison, it becomes possible to check the error in the obtained measurement values, enabling more accurate dimensional determination. An example of effective setting conditions is shown below.

5-4-1 Jaw Design

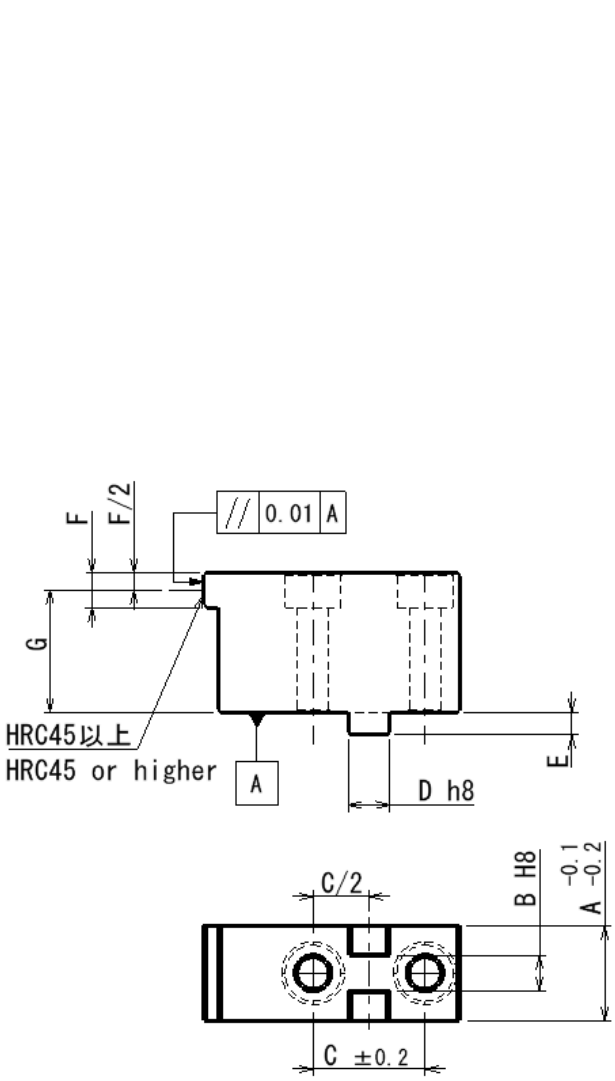
To reduce measurement variations and errors, it is important to reduce jaw distortion and manufacture the jaw shape with high precision to the geometric tolerances. Below are some key points and examples of jaw shapes.



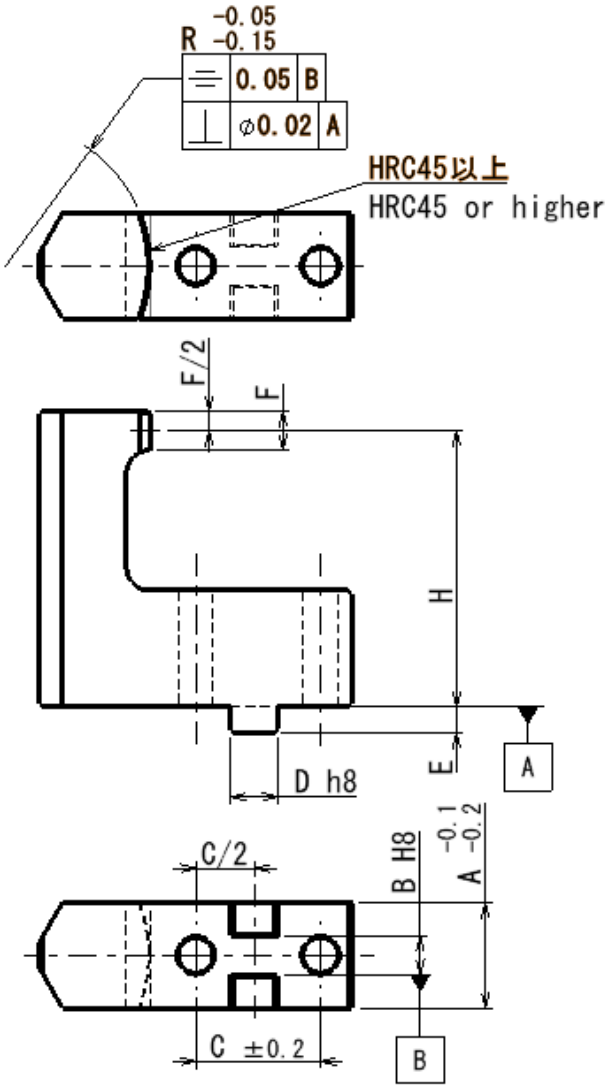
Outer Diameter Gripping



Inner Diameter Gripping



Jaw Shape (Outer Diameter)



Jaw Shape (Inner Diameter)

Model	A	B(*)	C	D(*)	E(*)	F	G	H
NTS307S	11	4	13	5	2.5	5	20	20
NTS309S	13.5	5	16	6	3	5	20	35
NTS311S	18.5	6	20	8	3.5	5	20	35

*The B, D, and E dimensions in the table are used for positioning the jaws. The B dimension is used for left-right positioning, while the D and E dimensions are used for front-back positioning.

[Key Points for Jaw Design]

- Make the jaw lengths G and H as short as possible.
- To reduce deformation caused by gripping the workpiece, implement measures such as increasing the jaw thickness and smooth radius shapes to corners.
- Ensure that the contact surface with the workpiece is perpendicular to mounting surface A.

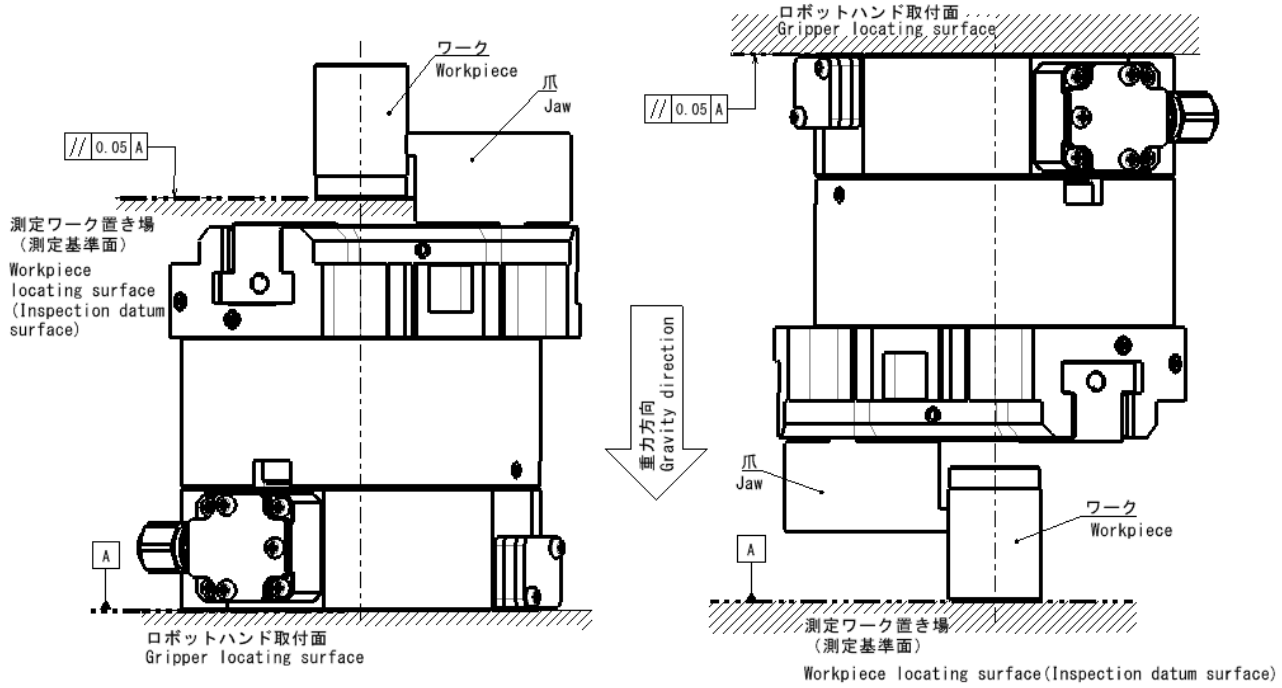
- Provide a contact width F of approximately 5 mm with the workpiece. If the width is too small, it may cause tilting of the workpiece or indentation marks during measurement.
- The hardness of the contact surface with the workpiece should be HRC 45 or higher.
- For inner diameter gripping, ensure that the contact position aligns with the center of dimension B (left-right positioning of the jaws).

5-4-2 Design of robot Hand Mounting Adapter and Workpiece Placement Area

To reduce measurement variations and errors, it is crucial to align the tilt of the robot hand with that of the workpiece. This document shows key design points for the robot hand mounting adapter and the workpiece holder, as well as an example of a gripping posture.

[Key Design Points for Robot Hand Mounting Adapter and Workpiece Placement Area]

- As shown in the diagram below, design the robot hand mounting surface and the top surface of the workpiece holder (measurement reference surface) to be parallel.

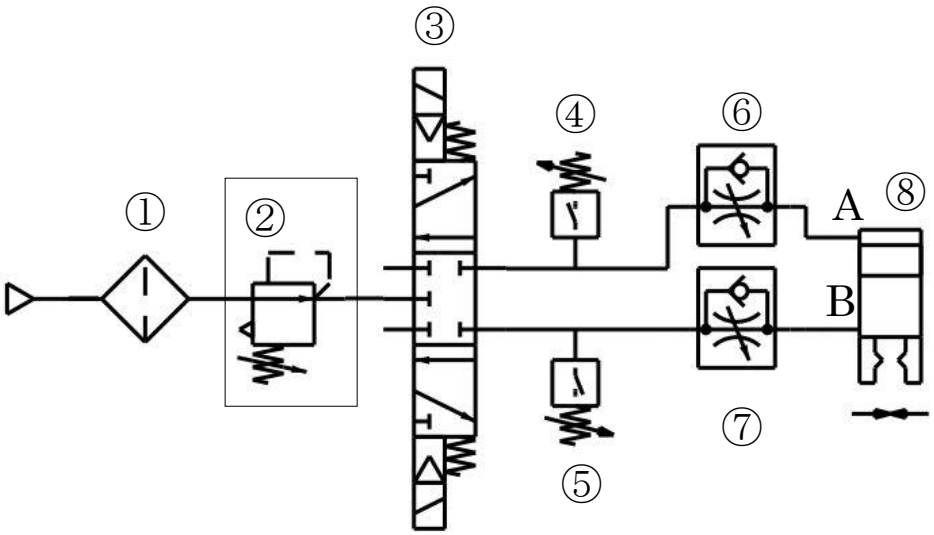


5-4-3 Air Circuit

By configuring the air circuit described below, you can reduce the variation in measured values.

For instructions on configuring and adjusting each air device, please refer to the explanations of symbols ① to ⑧ in the circuit diagram.

(Devices ④ and ⑤ are not required when connecting to the MET length measurement judgement system.)



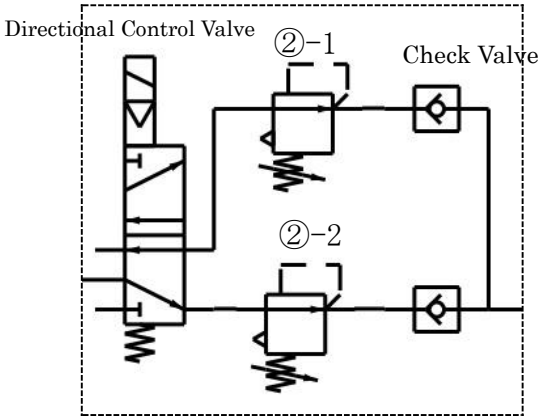
<Description of Air Equipment>

① Filter (filtration rating: 5 μm)

② Pressure regulator

By setting the air pressure during measurement to the minimum specified pressure of 0.2 MPa, variation caused by deformation of the workpiece or jaws can be reduced. If you want to switch the air pressure between measurement and workpiece transfer, modify configuration ② as shown below. This allows switching between ② -1 (measurement regulator) and ②-2 (transfer regulator), enabling pressure adjustment.

* After switching from ②-2 to ②-1, switch the directional control valve ③ once to release the remaining pressure.



③ Directional Control Valve (5-port, 3-position Pressure Center)
By using a pressure center, internal pressure is maintained during power outages, preventing workpieces from falling.

④ Pressure Sensor (Exhaust Side)
This sensor confirms that the air pressure on the robot hand's exhaust side is 0 MPa when acquiring measurement values.

⑤ Pressure Sensor (Supply Side)
This sensor confirms that the air pressure on the robot hand's supply side is the set pressure when acquiring measurement values.

⑥ Speed Controller (Meter Out)
By setting the time for the claws to reach full stroke (open to close) to 0.5 s or longer, variations in measurement values due to workpiece collisions can be reduced.

⑦ Speed Controller (Meter Out)
By setting the time for the claws to reach full stroke (open to close) to 0.5 s or longer, variations in measurement values due to workpiece collisions can be reduced.

⑧ Robot Hand (A Port/Open, B Port/Close)

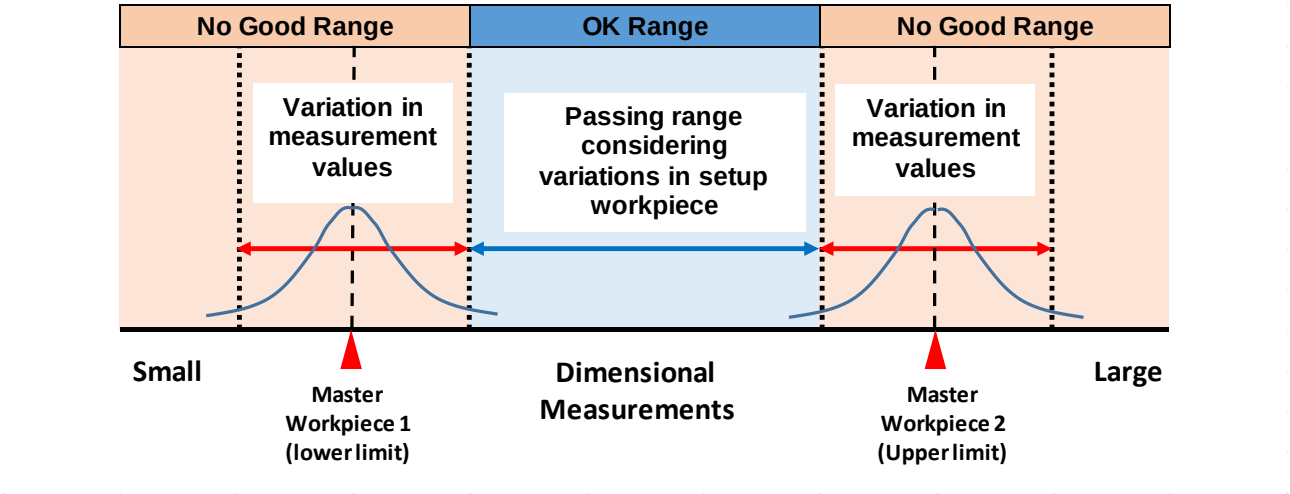
5-4-4 Master Workpiece Setup

This device outputs the diameter difference between the measured workpiece and a master workpiece used for comparison. This diameter difference always contains a certain degree of error, but this can be reduced by setting the master workpiece diameter close to the measured workpiece diameter.

The following shows an example of setting criteria for pass/fail judgment in workpiece diameter measurement.

In the example below, two types of master workpieces are provided: a lower limit and an upper limit, which serve as the threshold for the pass/fail range.

Use a robot hand with a measuring scale to measure these two types of master workpieces and check the variation and error to determine the pass/fail range.By configuring the air circuit described below, you can reduce the variation in measured values.



5-4-5 Frequency of Measurement Reference Setting

Measurement results from this device will change over time due to changes in equipment and the environment. To compensate for the deviation caused by these effects, regular reference setting using a master workpiece will ensure consistently reliable measurements.

[Reference Setting Frequency]

- Perform a reference setting at least once a day.
  *Please note that the change in measured values over time will vary depending on the usage conditions, so this should be considered only as a guideline.

5-4-6 Calibration Frequency of Measurement Reference Setting

Measurement results from this device will change over time due to changes in equipment and the environment. To compensate for the deviation caused by these effects, regular reference setting using a master workpiece will ensure consistently reliable measurements.

Cases where calibration is required
1) Replaced the jaws
2) Replaced the robot hand (this device) with a different unit.
3) Performed greasing.
4) Changed the jaw opening/closing speed.
5) Changed the jig, such as the measurement area.
6) Re-teaching of the robot.
7) Changed the master workpiece.

6. Troubleshooting

6-1 Gripper is faulty

Check the following, and take corrective actions.

Symptom	Cause	Corrective actions
Gripper does not operate	Gripper internal part is broken	Replace the gripper with a new one
	Slideways get seized	Disassemble, and correct the seized part with an oilstone, or replace the gripper with a new one
	The piston does not operate	Check that the air pressure is within the operating pressure range
		Check for air leakage
		Check the piping and solenoid valve, and if normal, disassemble and clean the cylinder
	The switch is faulty or installed incorrectly	Check that the switch can detect normally
Lack of master jaw stroke	Much dust exists in master jaws	Disassemble the gripper, clean it, replace the seals, and apply grease
Low gripping force	Low air pressure	Check that the air pressure is within the operating pressure range
	Air leaks from the seal	Disassemble the gripper, clean it, replace the seals, and apply grease
	Master jaw movements are not smooth	Remove the cover and supply grease, and open and close the master jaws several times without gripping any conveyed workpiece
		Disassemble the gripper, clean it, and apply grease

WARNING

- **If the gripper failed due to a seizure or damage, disassemble the gripper following the disassembly procedure. If the gripper is in the state that you cannot disassemble, do not disassemble it forcibly but please contact us or our agents.**
- **Stop using the gripper immediately if the situations are not improved though corrective actions given in above table were taken. Continuous use of faulty product or part could cause serious human accidents due to flying gripper or conveyed workpiece.**
- **The gripper must be repaired only by skilled persons who have received the training course. Repair by unskilled persons or persons other than us or our agents could cause serious human accidents.**

6-2 Contact Address in Case of Trouble

Please get in touch with our sales agent from which you purchased the gripper or our office of the address given on the back cover when the gripper troubled.

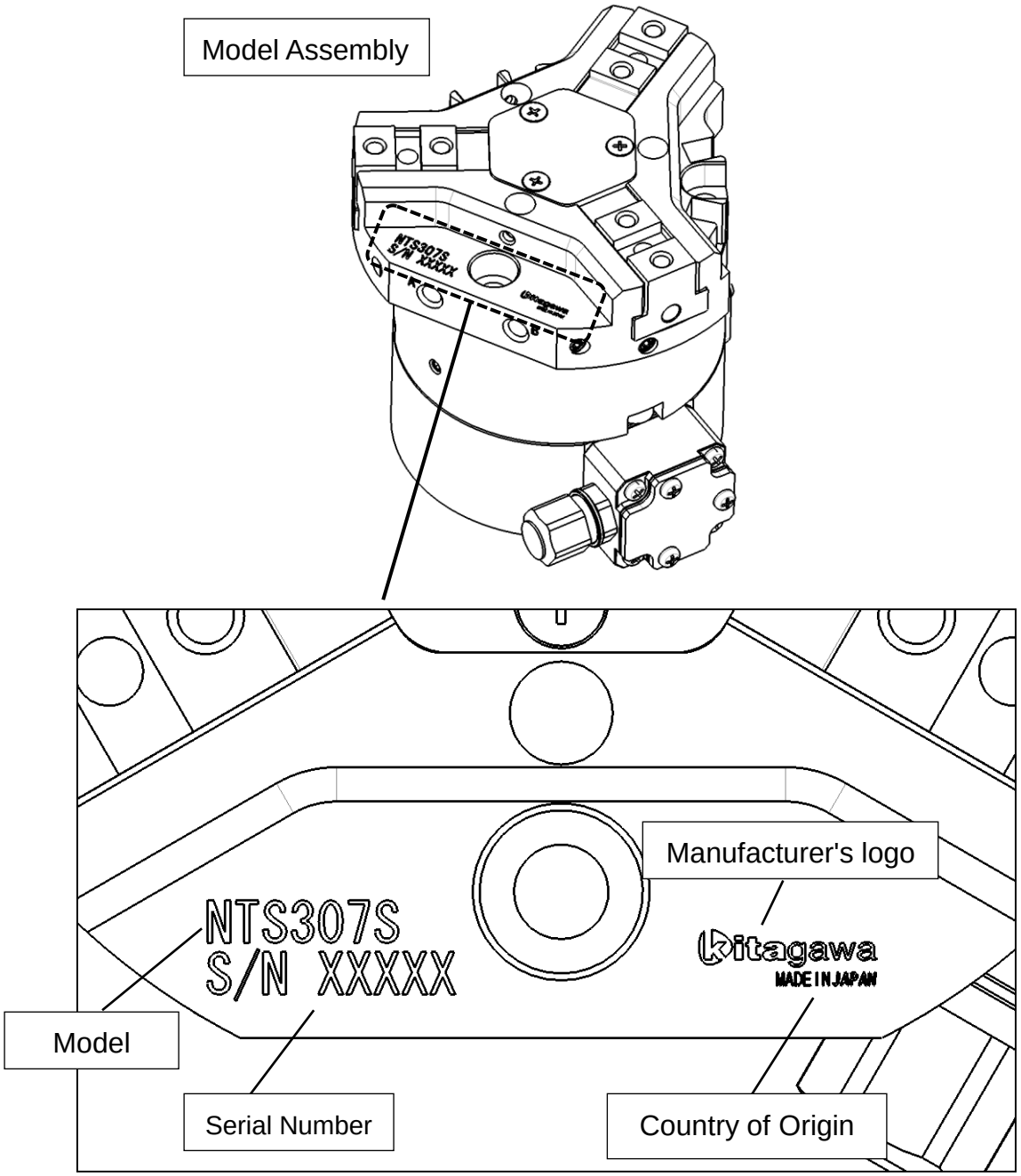
7. Others

7-1 Standards and directives to which the gripper conforms

This product conforms to the following standards and directives:

- Machinery Directive:2006/42/EC Annex I
- EN ISO 12100:2010

7-2 Product Marking



7-3 Disposal of the Gripper

Dispose of this unit in accordance with the laws and regulations of your country.

kitagawa

https://www.kiw.co.jp
https://www.kitagawa.com

Kitagawa Corporation Kitagawa Global hand Company

77-1,Motomachi,Fuchu-shi,Hiroshima,726-8610,Japan Tel. +81-847-40-0561 Fax. +81-847-45-8911

■ JAPAN DOMESTIC

Tokyo office	1-405-1,Kita-ku,Yosino-cho,Saitama-shi,Saitama,331-9634,JAPAN **Tel. +81-48-667-3469 Fax. +81-48-663-4678**
Sendai office	4-15-13,Yamatomachi,Wakabayashi-ku,Sendai-shi,Miyagi,984-0042,Japan **Tel. +81-22-232-6732 Fax. +81-22-232-6739**
Nagoya office	2-62,Kamitakabata,Nakagawa-ku,Nagoya-shi,Aichi,454-0873,Japan **Tel. +81-52-363-0371 Fax. +81-52-362-0690**
Osaka office	3-2-9,Kitakagaya,Suminoe-ku,Osaka-shi,Osaka,559-0011,Japan **Tel. +81-6-6685-9065 Fax. +81-6-6684-2025**
Hiroshima office	77-1,Motomachi,Fuchu-shi,Hiroshima,726-8610,Japan **Tel. +81-847-40-0541 Fax. +81-847-46-1721**
Kyushu office	7-6-39,Itazuke,Hakata-ku,Fukuoka-shi,Fukuoka,812-0888,Japan **Tel. +81-92-501-2102 Fax. +81-92-501-2103**
Overseas office	77-1,Motomachi,Fuchu-shi,Hiroshima,726-8610,Japan **Tel. +81-847-40-0526 Fax. +81-847-45-8911**

■ OVERSEAS

America Contact	**KITAGAWA-NORTHTECH INC.** **https://www.kitagawa-usa.com** 301 E. Commerce Dr,Schaumburg,IL. 60173 USA **Tel. +1 847-310-8787 Fax. +1 847-310-9484**
	KITAGAWA MEXICO S.A. DE C.V Circuito Progreso No. 102, Parque Industrial Logistica Automotriz, Aguascalientes, Ags., C.P.20340 **Tel. +52 449-917-8825 Fax. +52 449-971-1966**
Europe Contact	**KITAGAWA EUROPE LTD.** **https://www.kitagawa.global/en** Unit 1 The Headlands,Downton,Salisbury,Wiltshire SP5 3JJ,United Kingdom **Tel. +44 1725-514000 Fax. +44 1725-514001**
	KITAGAWA EUROPE GmbH **https://www.kitagawa.global/de** Borsigstrasse 3,40880,Ratingen Germany **Tel. +49 2102-123-78-00 Fax. +49 2102-123-78-69**
	KITAGAWA EUROPE GmbH Poland Office **https://www.kitagawa.global/pl** 44-240 Zory,ul. Niepodleglosci 3 Poland **Tel. +48 607-39-8855**
	KITAGAWA EUROPE GmbH Czech Office **https://www.kitagawa.global/cz** Purkynova 125,612 00 Brno,Czech Republic **Tel. +420 603-856-122 Fax. +420 549-273-246**
	KITAGAWA EUROPE GmbH Romania Office **https://www.kitagawa.global/ro** Strada Heliului 15,Bucharest 1,013991,Romania **Tel. +40 727-770-329**
	KITAGAWA EUROPE GmbH Hungary Office **https://www.kitagawa.global/hu** Dery T.u.5,H-9024 Gyor,Hungary **Tel. +36 30-510-3550**
Asia Contact	**KITAGAWA INDIA PVT LTD.** **https://www.kitagawa.global/in** Plot No 42, 2nd Phase Jigani Industrial Area, Jigani, Bangalore – 560105, Karnataka, India **Tel. +91-80-2976-5200 Fax. +91-80-2976-5205**
	KITAGAWA TRADING (THAILAND) CO., LTD. **https://www.smri.asia/jp/kitagawa/** 9th FL,Home Place Office Building,283/43 Sukhumvit 55Rd. (Thonglor 13),Klongton-Nua,Wattana,Bangkok 10110,Thailand **Tel. +66 2-712-7479 Fax. +66 2-712-7481**
	Kitagawa Corporation(Shanghai) **https://www.kitagawa.com.cn** Room308 3F Building B. Far East International Plaza,No.317 Xian Xia Road,Chang Ning,Shanghai,200051,China **Tel. +86 21-6295-5772 Fax. +86 21-6295-5792**
	Kitagawa Corporation(Shanghai) Guangzhou Office B07,25/F,West Tower,Yangcheng International Trading Centre,No.122 East Tiyu Road,Tianhe District,Guangzhou,China **Tel.+86 20-2885-5276**
	DEAMARK LIMITED **https://www.deamark.com.tw** No. 6,Lane 5,Lin Sen North Road,Taipei,Taiwan **Tel. +886 2-2393-1221 Fax. +886 2-2395-1231**
	KITAGAWA KOREA AGENT CO., LTD. **http://www.kitagawa.co.kr** 803 Ho,B-Dong,Woolim Lion's Valley,371-28 Gasan-Dong,Gumcheon-Gu,Seoul,Korea **Tel. +82 2-2026-2222 Fax. +82 2-2026-2113**
Oceania Contact	**DIMAC TOOLING PTY. LTD.** **https://www.dimac.com.au** 69-71 Williams Rd,Dandenong South,Victoria,3175 Australia **Tel. +61 3-9561-6155 Fax. +61 3-9561-6705**