

# INSTRUCTION MANUAL MODEL NPGT-S

## Thin 2-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 thin 2-jaw parallel gripper with the length measuring sensor (model NPGT-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 thin 2-jaw parallel gripper (model NPGT) carefully to understand how to use the gripper correctly. 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 displayed as shown below according to the degree of risk (seriousness of harm) that could 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 could occur, follow the safety messages given with this safety alert symbol.



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



Failure to follow the safety precautions below could result in death or serious injuries.



Failure to follow the safety precautions below may result in minor or moderate injuries.



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 gripping a conveyed workpiece by being installed on the robot or loader. The product is equipped with the jaws to grip the conveyed workpiece and they are operated by air pressure. For any other applications, please contact us.

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.

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# 1. Structural Drawing and Parts List

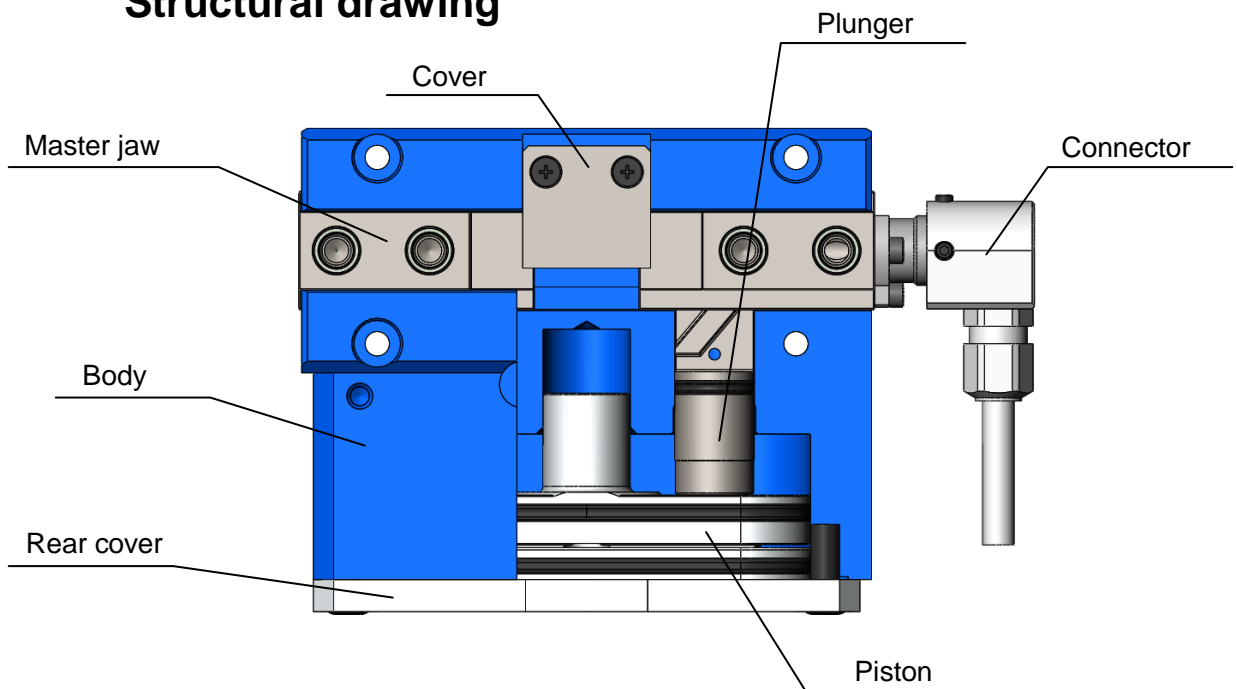
## 1-1. Model indication

The model indication is as follows:

**NPGT 08 S**

Series		Size			Length measuring sensor	
<b>NPGT</b>	NBR seal	08	10		<b>Nil</b>	Not equipped
					<b>S</b>	Equipped

## 1-2. Structural drawing

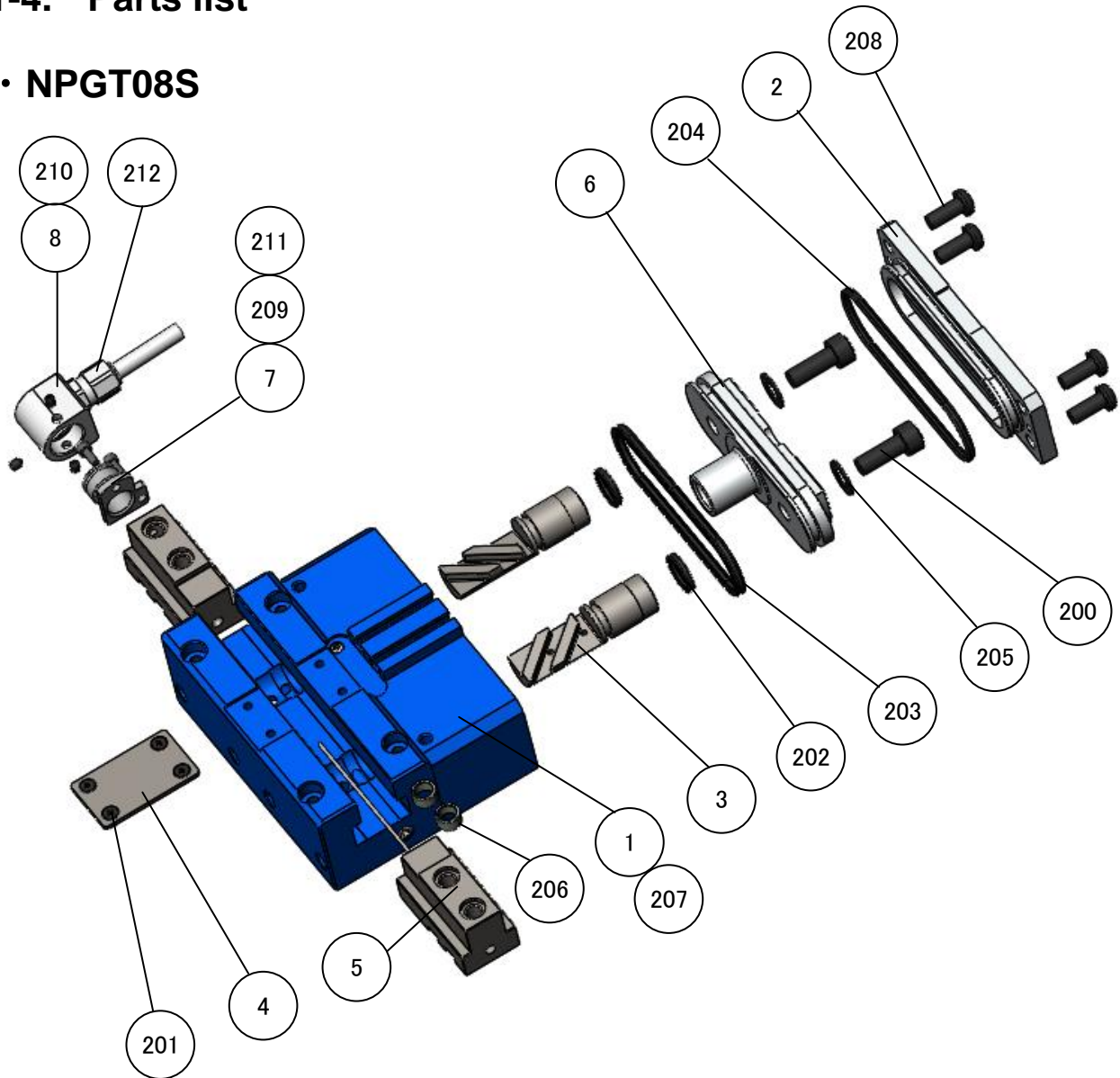


## 1-3. Seal list

Model	No.				
	202	203	204	205	209
NPGT08S	X-ring X013	X-ring X136	O-ring S55	W seal 6S1	-
NPGT10S	X-ring X014	X-ring X146	O-ring S71	W seal 6S1	O-ring S11.2

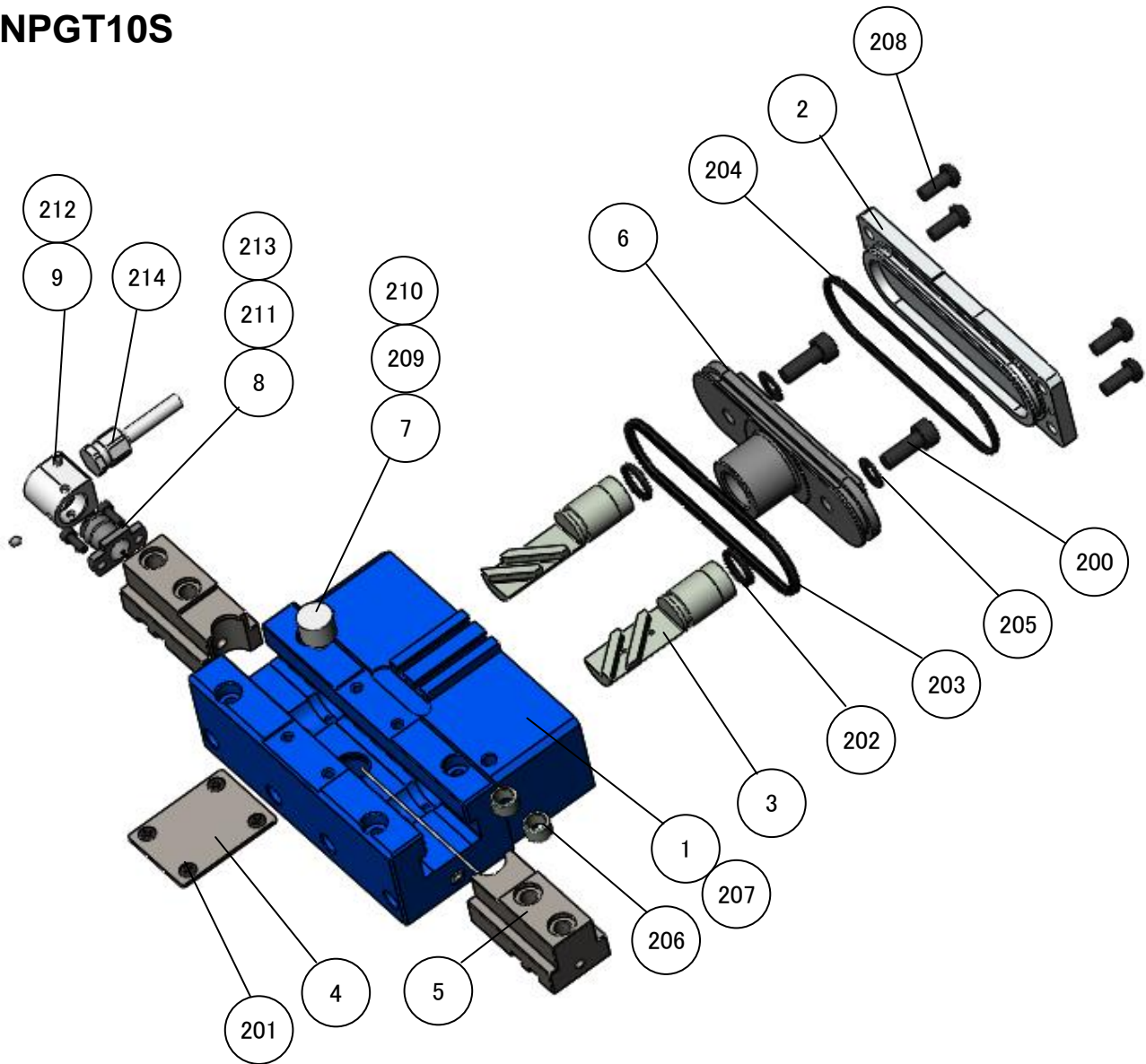
## 1-4. Parts list

### • NPGT08S



No.	Parts name	Quantity	No.	Parts name	Quantity
1	Body	1	200	Plunger fixing bolt	2
2	Rear cover	1	201	Cover fixing bolt	4
3	Plunger L (R)	1 (1)	202	Shaft packing	2
4	Cover	1	203	Piston packing	1
5	Master jaw L (R)	1 (1)	204	O-ring	1
6	Piston	1	205	W seal	2
7	Sensor block	1	206	Positioning bushing	4
8	Connector	1	207	Setscrew	8
			208	Rear cover fixing bolt	4
211	Sensor block fixing bolt	2	209	O-ring	1
212	CAPCON (cable gland)	1	210	Cone point setscrew	3

# NPGT10S



No.	Parts name	Quantity	No.	Parts name	Quantity
1	Body	1	200	Plunger fixing bolt	2
2	Rear cover	1	201	Cover fixing bolt	4
3	Plunger L (R)	1 (1)	202	Shaft packing	2
4	Cover	1	203	Piston packing	1
5	Master jaw L (R)	1 (1)	204	O-ring	1
6	Piston	1	205	W seal	2
7	Collar	1	206	Positioning bushing	4
8	Sensor block	1	207	Setscrew	8
9	Connector	1	208	Rear cover fixing bolt	4
212	Cone point setscrew	3	209	O-ring	1
213	Sensor block fixing bolt	2	210	Snap ring	1
214	CAPCON (cable gland)	1	211	O-ring	1



## 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

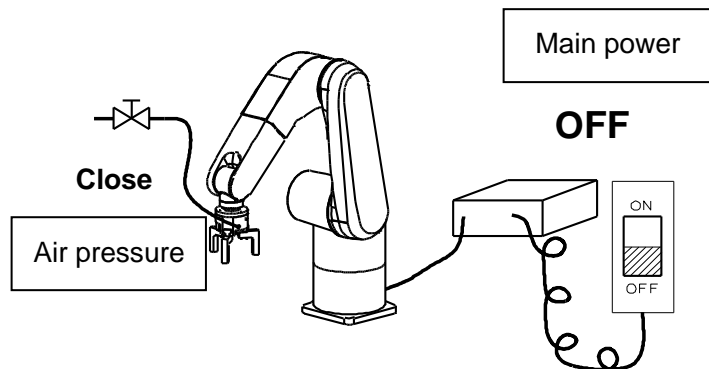
Failure to follow the safety precautions below will result in death or serious injuries.



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.



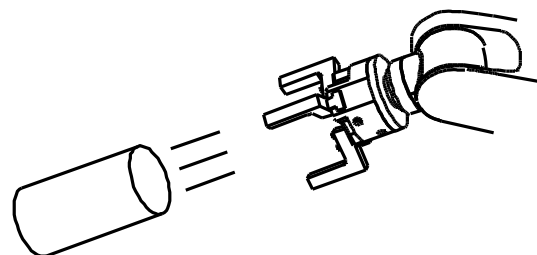
When installing, checking, oiling, or replacing the gripper, post a sign or notice, or provide a fence, and so on to notify people around the machine that work is in progress.

- 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.





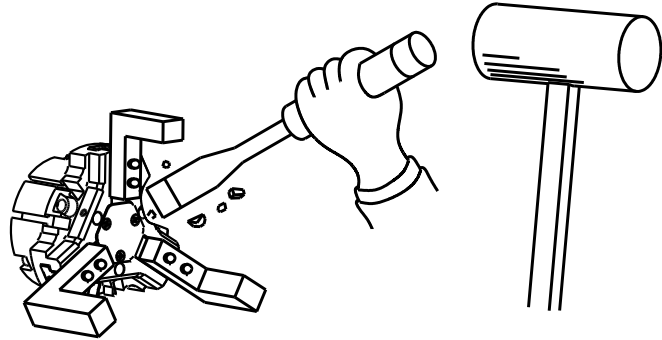
# DANGER

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

Plunger fixing bolt

Bolt size	Tightening torque		Bolt size	Tightening torque	
M3	1.0	N·m	M5	6.8	N·m
M4	2.0	N·m	M6	12.7	N·m
M5	4.5	N·m	M8	33.3	N·m
M6	7.65	N·m			
M8	18.0	N·m			



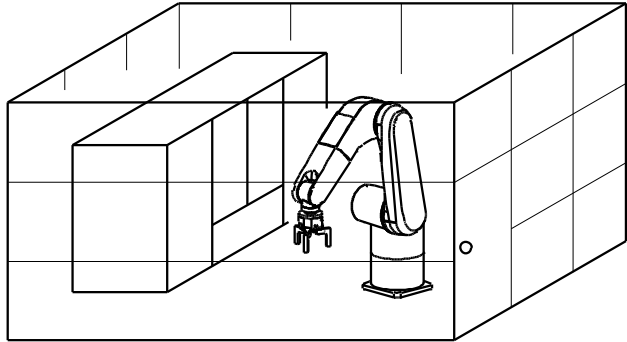
# DANGER

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.





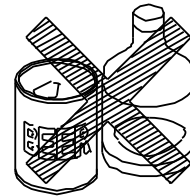
## WARNING

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.



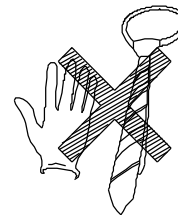
Alcohol

Medicine



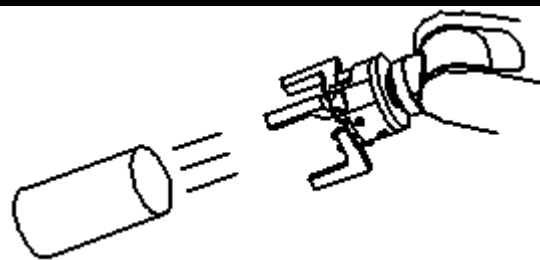
**Do not wear clothing or accessories such as a necktie, necklace, etc. which are easy to be caught in.**

- You may be caught in the gripper.

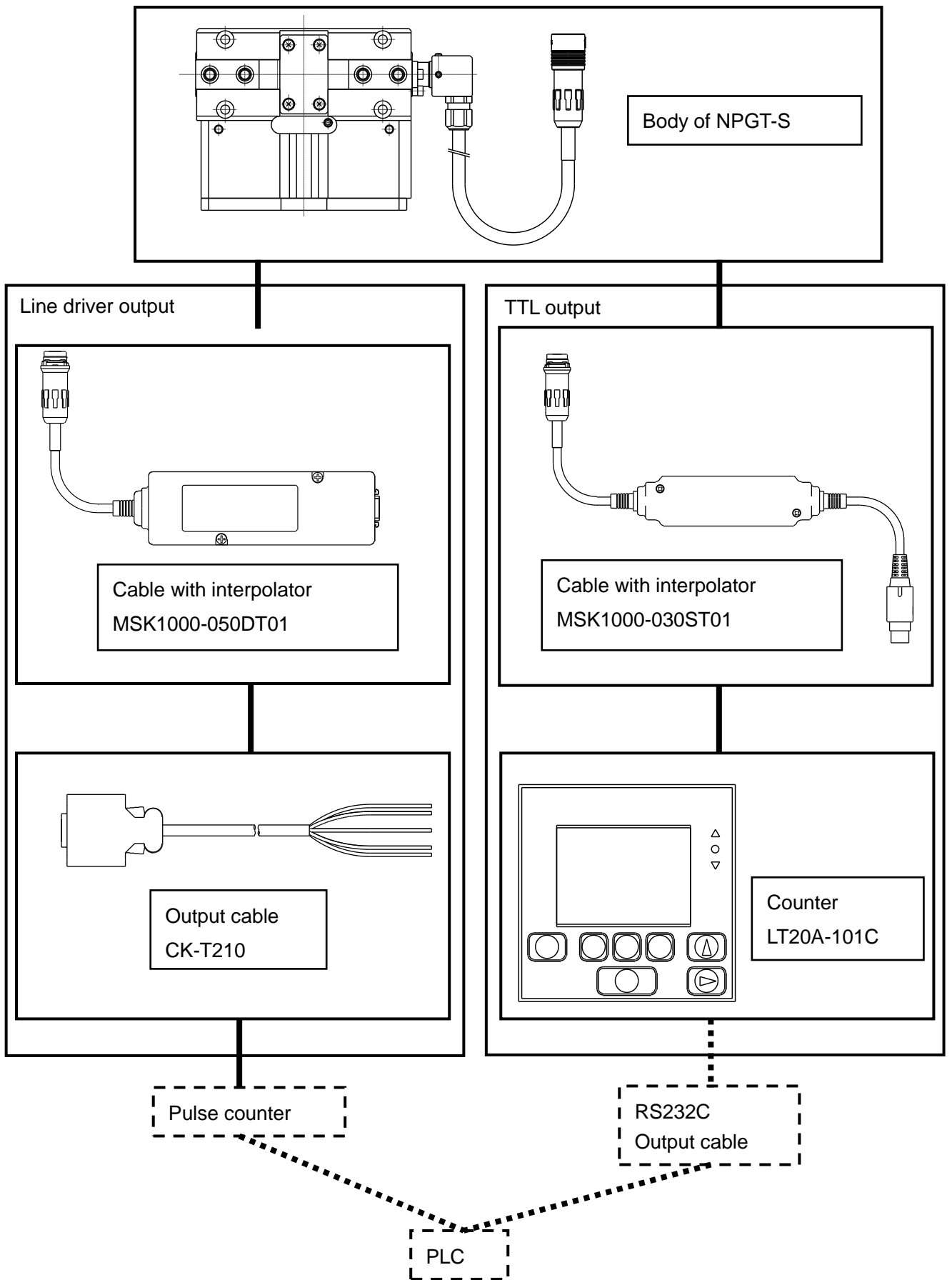


**Use the gripper within the range of specification values.**

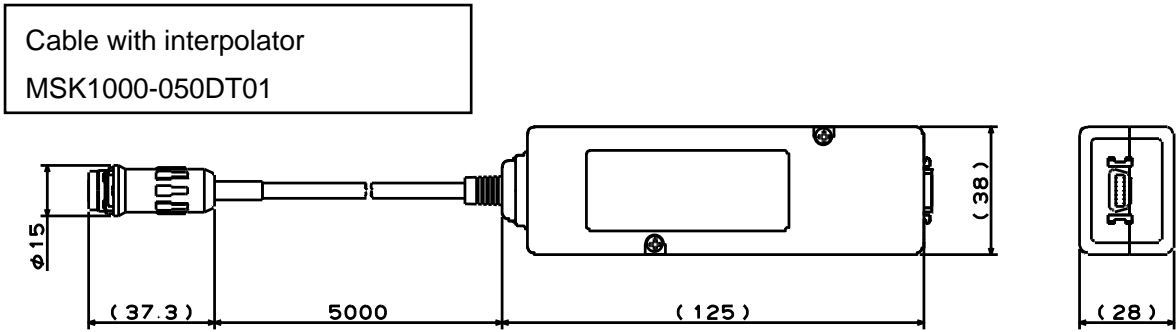
- When selecting a gripper, select the model by referring to "Model selection" in page 11.
- Have the gripper grip the conveyed workpiece at the position of its center of gravity.
- If not, not only the gripper is damaged but also the conveyed workpiece may fly out.



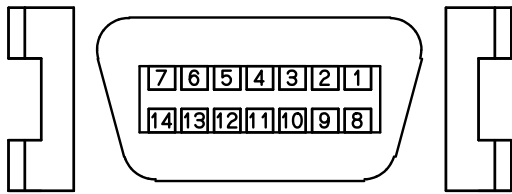
### 3. Configuration



### 3-1 Line driver output



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

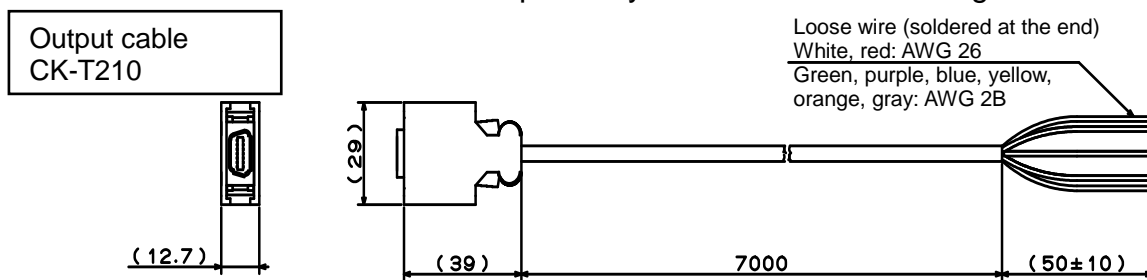


Output Connector	Signal	Output cable (CK-T210)	
		Wire color	Twisted pair
1	A	Blue	①
2	*A	Yellow	①
3	B	Orange	②
4	*B	Gray	②
5	N.C.		
6	N.C		
7	Unconnectable		
8	N.C		
9	N.C		
10	N.C		
11	0V	Green	③
12	0V	White	④
13	+5V	Red	④
14	+5V	Purple	③

### Specification

Item	Specification
Resolution	0.5 μm
Min. 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°C
Storage temperature range	-10~50°C

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



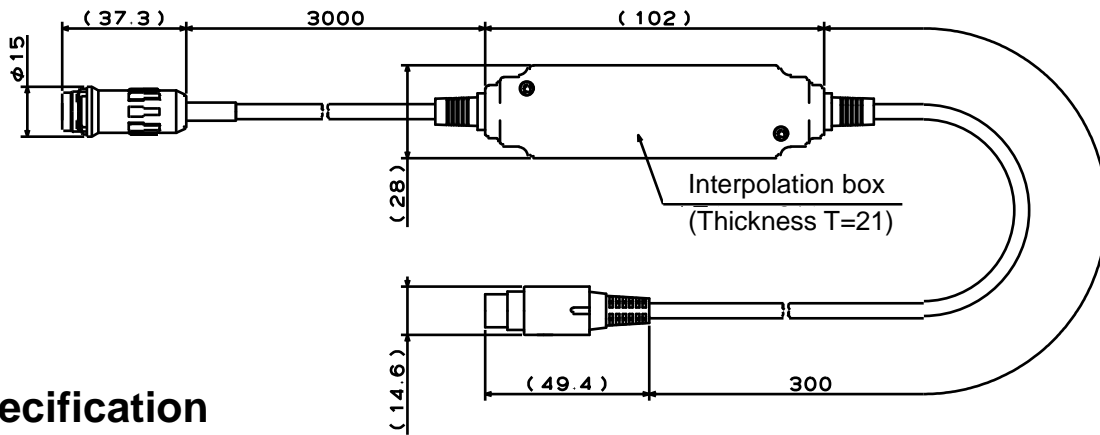
Input side connector : 3M MDR connector  
Plug 10114-3000PE, Shell 10314-52F0-008

\* The pulse counter and PLC are to be prepared by the customer.

\* Select a pulse counter having specifications of 2 phases, x4 multiplication, and 500 kHz or higher.

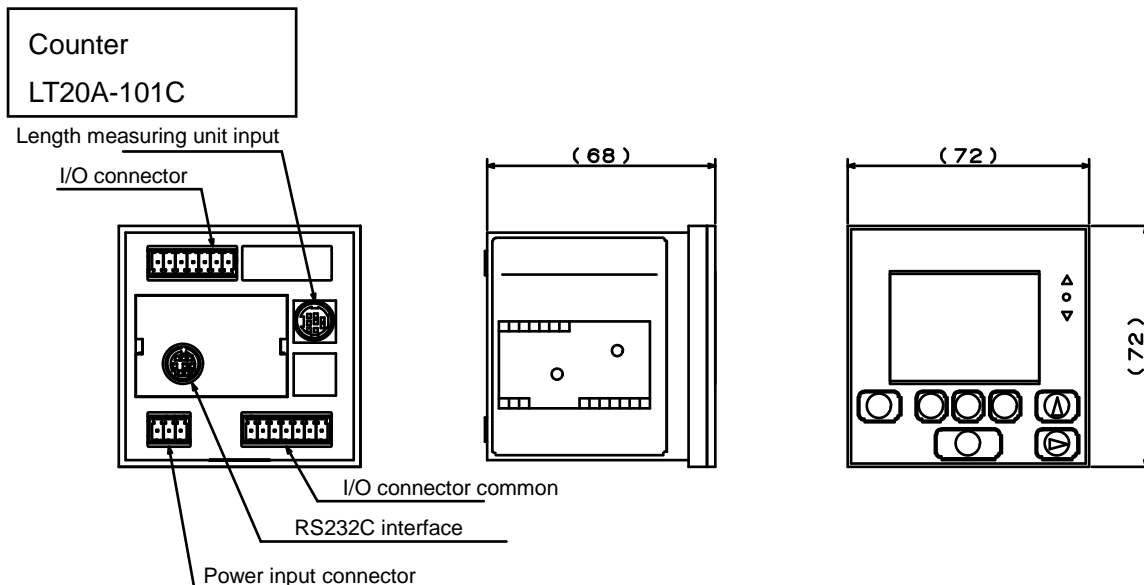
### 3-2 TTL output

Cable with interpolator  
MSK1000-030ST01



### Specification

Item	Specification
Resolution	0.5 $\mu$ m
Min. phase difference	200ns
Output	A/B phase/alarm, TTL
Supply voltage	5V $\pm$ 5%, -5V $\pm$ 5%
Operating temperature range	0~40 $^{\circ}$ C
Storage temperature range	-10~50 $^{\circ}$ C



For details, refer to the instruction manual of Magnecale counter LT20A-101C.

<http://www.magnescale.com/>

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

## 4. Use

This product supplies pneumatic pressure to the unit to move the jaws in the open or close direction for gripping the conveyed workpiece and transfers the conveyed workpiece up to any location. After transfer, the jaws are moved in the close or open direction for removing the conveyed 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 (The scale may be damaged.)  
Especially when the cutting fluid includes abrasives (The scale may be damaged soon.)
  - Where substances such as organic solvent, chemical agent, acid, alkali, and kerosene are included in the atmosphere
  - Where water splashes directly (The scale may be damaged soon or cause a short.)

### NOTICE

- The output cable coming out from the gripper body is not a robot cable.
- · Fix the output cable coming out from the gripper body so that the minimum bend radius becomes 50 mm or more, and route the cable to avoid repeated bending as far as possible when using the product.  
When fixing the cable using cable ties, be careful not to tie the cable at a point where a load is applied to the cable and also not to fix the cable too tightly.
- The cable with interpolator is the robot cable.
- In a case where the cables can move, fix and route the cables other than the cable with interpolator so that only that cable is movable when using the product.

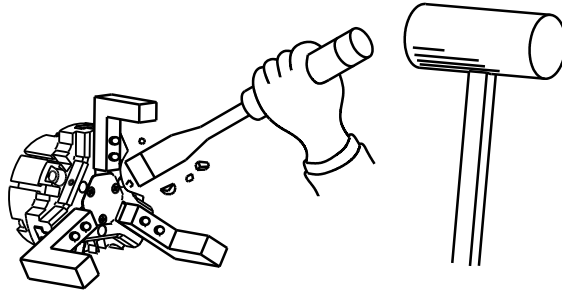
### NOTICE

- For stable measurement, provide a flow control valve on the pneumatic circuit and adjust the jaw opening/closing speed by reducing the flow rate.
- 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.



## **! 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 fly out.

## **! WARNING**

- Wear appropriate clothing suitable for the work and wear gloves, safety glasses, safety shoes, and helmet.
  - Wearing inappropriate clothing causes the clothing to be stuck, resulting in danger.
  - Appropriate clothing will be preventive measures to prevent hazards due to the carelessness or unexpected accidents during work.

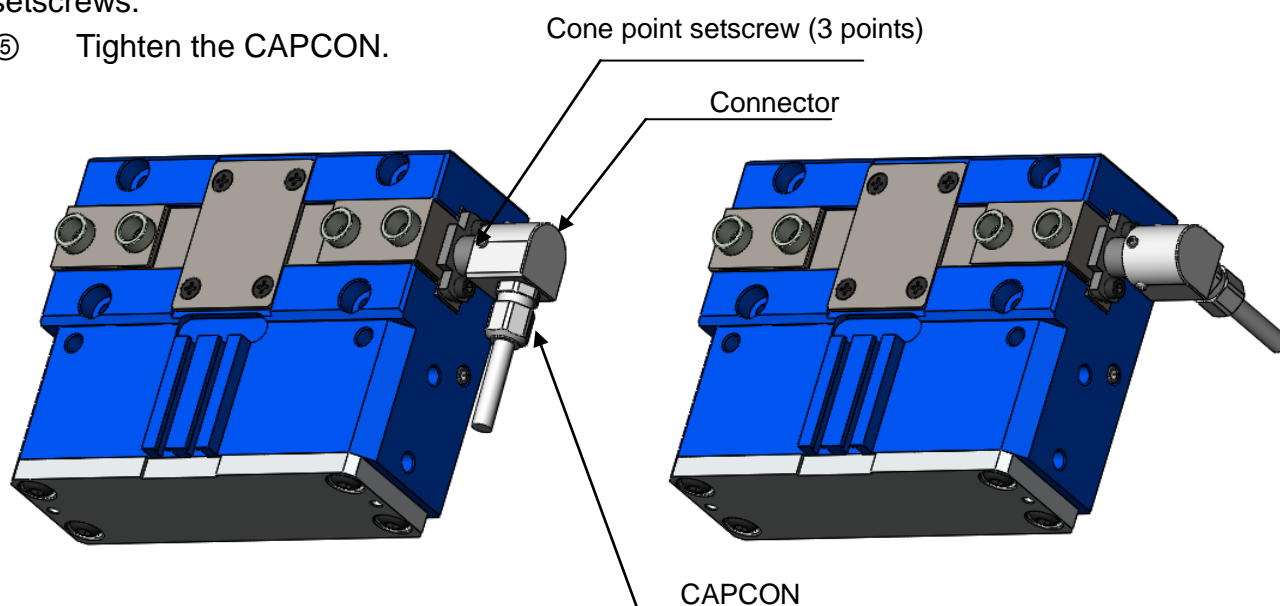
## **NOTICE**

- 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. Output Cable Pull-out Direction

The output cable pull-out direction can be changed from the original direction. Follow the procedure described below to change the direction.

- ① Loosen the CAPCON (cable gland).(Otherwise, the cable may be pulled and broken.)
- ② Loosen the three cone point setscrews.
- ③ Turn the connector.(Up to  $\pm 180^\circ$  from the original position)
- ④ After determining the output cable pull-out direction, tighten the three cone point setscrews.
- ⑤ Tighten the CAPCON.



## 6. How to Use Length Measuring Function

Output: A/B phase incremental

When using the function, turn on the power and then perform presetting.

## 7. Precautions With Regard to Installation

- Do not pass the lead cables and connection cables together with the power wire through the same duct.
- Be sure to install the product at least 0.5 m away from any high voltage source, large current source, and large power relay.
- Do not use the cable with interpolator, output cable, and counter in a place where chips, coolant, and machine oil will splash.(This product is not oil- and water-resistant.)
- Fix the output cable coming out from the gripper body so that the minimum bend radius becomes 50 mm or more, and route the cable to avoid repeated bending as far as possible when using the product.  
(If the cable is bent repeatedly, it may be broken.)

## 8. Troubleshooting

### 8-1. Problems and countermeasures

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.

### 8-2. Contact address in case of trouble

Please get in touch with our sales agent from which you purchased the gripper or our office when the gripper troubled.

## **9. Others**

### **9-1. 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
- FCC Part 15 Subpart B Class A Digital Device
- ICES-003 Class A Digital Device
- EN61000-6-4
- EN61000-6-2

### **9-2. Disposal of gripper**

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

## DECLARATION OF INCORPORATION

of partly completed machinery

Copy of original

We hereby declare that the following our product conform with the essential health and safety requirements of the EC Machinery Directive so that the product is to be incorporated into end-machinery. The product must not be put into service until end-machinery has been declared in conformity with the provisions of the EC Machinery Directive 2006/42/EC Annex II part 1.A.

We also declare that the specific technical documentation for this partly completed machinery was drawn up according to the EC Machinery Directive 2006/42/EC Annex VII part B.

Product : Gripper

Model : NTS2 Series, NTS3 Series, NTB Series,  
NPGT Series, QG Series

Serial number : See original declaration

Manufacturer : Kitagawa Corporation  
77-1, Motomachi, Fuchu-shi,  
Hiroshima 726-8610, Japan

Authorized compiler : Peter Soetebier / Prokurist  
in the community : Kitagawa Europe GmbH  
Borsigstr.3 D-40880 Ratingen, GERMANY

The essential health and safety requirements in accordance with the EC Machinery Directive 2006/42/EC Annex I were applied and fulfilled:  
1.1.2, 1.1.3, 1.1.5, 1.1.6, 1.3.1, 1.3.2, 1.3.4, 1.5.3, 1.5.4, 1.5.8, 1.5.9, 1.6.1, 1.7.1,  
1.7.2, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2, 1.7.4.3

The following harmonized standards were applied:  
EN ISO 12100:2010

Signature : See original declaration

Place / Date : See original declaration

Name / Title : Tomonari Hiromoto / Manager, Technical section 1  
Technical department  
Kitagawa Global hand Company

Being the responsible person appointed and employed the manufacturer.

**Kitagawa Corporation Kitagawa Global hand Company**  
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■ OVERSEAS

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	<b>KITAGAWA EUROPE GmbH Romania Office</b> Strada Heliului 15, Bucharest 1, 013991, Romania Tel. +40 727-770-329 <a href="https://www.kitagawa.global/ro">https://www.kitagawa.global/ro</a>
	<b>KITAGAWA EUROPE GmbH Hungary Office</b> Dery T.u.5, H-9024 Győr, Hungary Tel. +36 30-510-3550 <a href="http://www.kitagawa.global/hu">http://www.kitagawa.global/hu</a>
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