

SFG Soft Finger Gripper User Manual



Safety notes

Thank you for purchasing the SFG Soft Finger Gripper of SRT. Please read the installation manual carefully before use so as to operate and use this product correctly.

This manual provides a safe and effective way of operation for users. Please keep it properly after reading for future reference.



Warning!

- Please strictly follow the safety precautions !
- Maintenance or wiring operation should be carried out after 30 seconds of disconnecting the power supply to prevent electric shock risk !
- Please do not carry out maintenance operation during robot movement !
- Please avoid sharp items during the use and storage of SFG soft flexible gripper!
- When SFG soft flexible gripper needs to be repaired, please contact our company for sales, and rework if necessary.
- When discarding SFG soft flexible gripper, please treat them according to industrial waste standards to avoid pollution to the environment !
- When the product is used in equipment directly related to personal safety (medical equipment, entertainment equipment, industrial machinery and equipment, etc.), we must pay attention to the preparation of auxiliary protective measures to avoid possible personal injury

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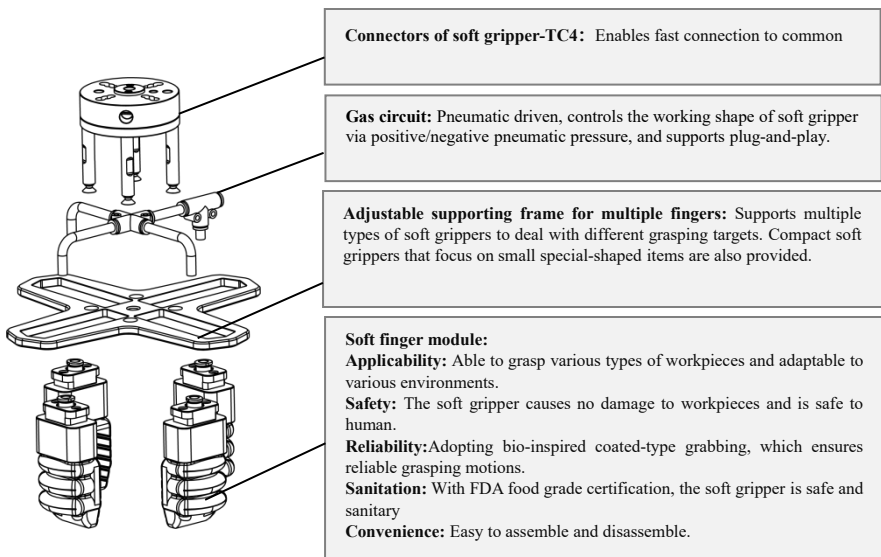
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1. Product Introduction

1.1 SFG soft flexible gripper

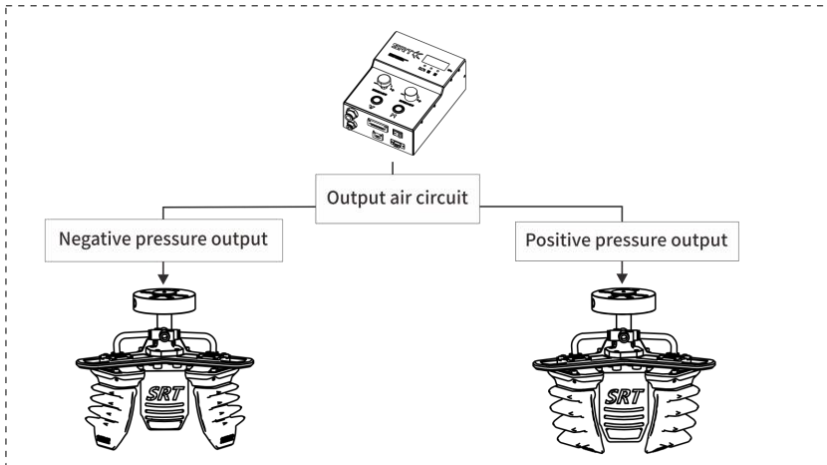
SFG series soft flexible gripper is the main product launched by SRT, which is mainly composed of flexible finger module, bracket and manipulator connector. Among them, the flexible finger module is formed by pouring special silicone rubber material, which has the characteristics of good flexibility, long life and high reliability. The bracket and connection parts are made of aviation grade high strength aluminum alloy with light weight and high strength, which can easily cope with various industrial occasions.

Different from the rigid structure of the traditional claw hand, the gripper relies on the soft pneumatic 'finger', which can perfectly simulate the grasping action of the human hand and adaptively wrap the target object without presetting according to the accurate size, shape and hardness of the object, and gets rid of the shackles of the traditional production line on the incoming material, especially suitable for irregular and vulnerable products.



1.2 Flexible gripping system

SFG soft flexible gripping system is mainly composed of end-effector, pneumatic controller and accessory gas path. By connecting gas source and industrial robot, the flexible clamping system is built conveniently and quickly. With the help of SRT communication protocol, SFG soft flexible gripper can work with industrial robots and seamlessly connect.



1.3 Application field

This soft gripper is suitable for small-scale automatic devices in industries such as intelligent assembly, automatic sorting, logistics warehouse and food processing, and also could be applied as a functional part in scientific research laboratory, intelligent entertainment equipment and serving robots. It is an ideal choice for guests who need intelligent, damage-free, highly safe and highly adaptable grasping motions.

2. Technical parameters

2.1 Working parameters

Drive medium	Clean air
Input air source	-70~100kPa
Pipe size	Φ4mm or Φ6mm
Working frequency	110cpm
Maximum repeat positioning accuracy	0.08mm
Standard life span	>3,000,000 times

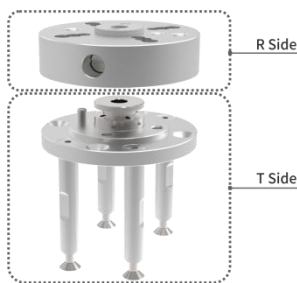
* If industrial air source is applied to drive the soft gripper, please ensure effective filtration of the air or the lifespan of the gripper would be affected.

* Input air pressure for SRT soft grippers should not be higher than 100kPa, or the lifespan of the gripper would be affected.

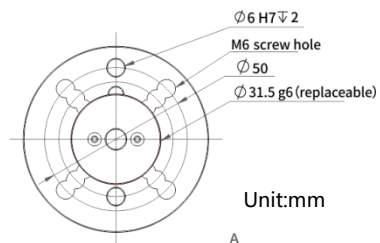
2.2 Installation dimentons

1) Connectors of soft gripper

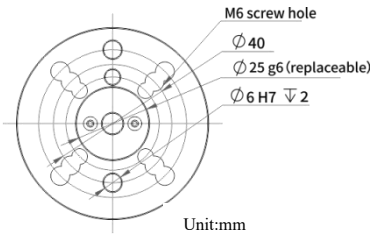
- Flexible gripper connector model : SFG-TC4, can be divided into connecting robot end TC4-R and connecting flexible gripper TC4-T.
- By matching the modular positioning table (rabbet), the installation interface can meet the three commonly used installation dimensions in ISO9409-1 and GB / T 14468.1.



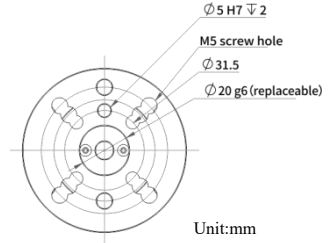
SFG-TC4



Installation dimensions 1(default)



Installation dimensions 2



Installation dimensions 3

* If flange of special dimension is needed, please contact our technicians in advance.

2) Please refer to the appendix for dimensions of soft fingers and each type of soft grippers.

3. Installation of soft gripper

3.1 Product parts and accessories

3.2 Product installation



After ensuring that all parts are intact and ready, installation can be started with the help of tools and materials listed below. Otherwise, contact us for after-sales support.

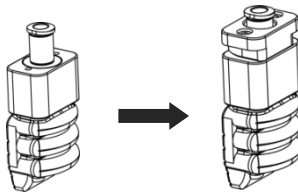


Tools needed:

- 1. 2.5mm hex wrench and slotted screwdriver
- 2. Pipe scissor
- 3. Screws, gaskets, pins that match your manipulator

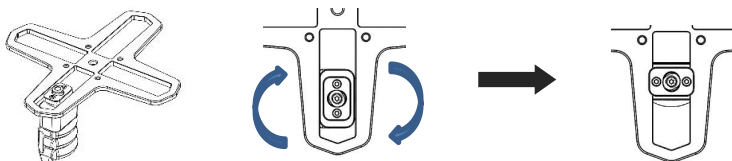
Step 1: Prepare the soft finger

Soft gripper, adjustable connectors and fastening steel block of the soft finger module should be removed before installation of gripper.



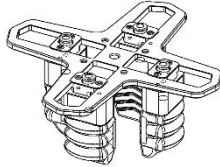
Step 2: Installing the bracket

Install the finger parallel to the bracket, pay attention to the direction of the bracket, laser engraving character upward, rotate the finger module clockwise, make the bracket slide into the finger module slot :



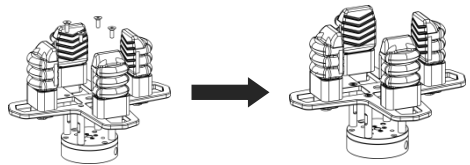
Step 3 : Adjust finger module spacing

According to requirements, reasonable assembly of finger module number and spacing, locking screw :



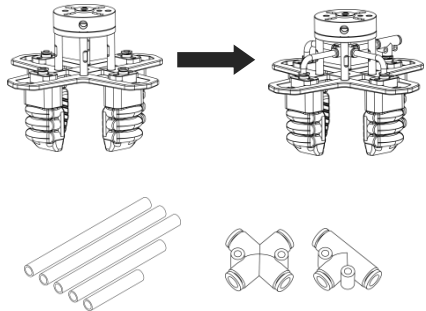
Step 4: TC4 assembly

Name	Amount
Soft gripper	1
T-shaped part	1
M2.5 hex wrench	1



Step 5:Pipe assembly

Name	Amount
Soft gripper	1
Φ6mm pipe	5
3-Φ6 pneumatic joint	1
4-Φ6 pneumatic joint	1
Pipe scissor	1



Lengths of pipes depend on requirements of use.

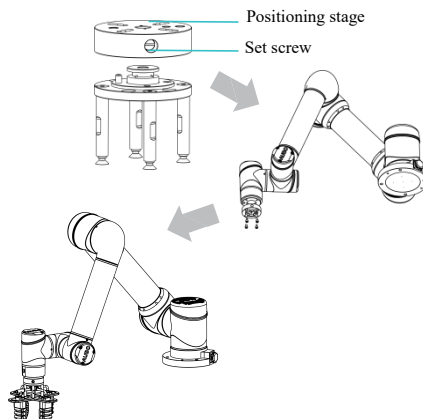
Step 6 : Install to the manipulator

Firstly, according to the mechanical interface of the robot to be installed, the corresponding size of the positioning table (selection) and positioning pin (self-provided) are selected. The screw was tightened by rotating the loose side, and TC4 - R was removed. The default positioning platform of TC4 - R was replaced by the selected positioning platform (matching). The selected positioning pin was installed in the pin hole corresponding to the robot installation interface.

The TC4-R is then installed on the robot installation interface using a manipulator-matched screw (self-contained).

Finally, TC4 - T was connected with TC4 - R, and the side screw was tightened by spinning, and the installation was completed. The following figure shows :

Name	Amount
Soft gripper	1
Screw and washer group suitable for your manipulator	4
Wrench	1
Slotted screwdriver	1
Robotic arm positioning pin	1
Connector accessories	2

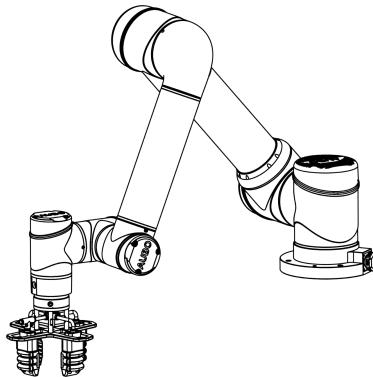


Step 7 : Connect to the Controller

The pneumatic interface of the flexible gripper is connected to the SRT controller through the Φ 6 mm trachea. The clamping and opening state of the flexible gripper can be controlled by inputting the positive / negative pressure. The detailed control method is shown in the instructions of the controller.



Note whether the gripper leak, if there is a problem, please check the tracheal air tightness, if you can not solve yourself please contact the official after-sales.



4. Cleaning and maintenance of soft gripper

4.1 Cleaning

a) Overall cleaning:

The whole fixture can be immersed in the ultrasonic cleaning equipment with detergent solution to clean, rinse with water, and dry the surface with dust-free cloth. At the gap of pneumatic joint, fine brush can be used to assist cleaning.

If the overall cleaning effect is not ideal, it can be disassembled and cleaned.

b) Dismantling cleaning :

The SRT flexible gripper finger module is removed from the whole fixture and cleaned directly with detergent solution. Silica gel bulk, sealing structure and other large plane area and large curved surface area can use dust-free cloth auxiliary cleaning, pneumatic joint gap can use soft brush auxiliary cleaning. Also can use ultrasonic equipment to enhance the cleaning effect, but pay attention to ultrasonic cleaning air path structure do not soak. If accidental immersion needs to be thoroughly dried to use. If the internal pollution of the trachea is serious, you can consider replacing part of the trachea.

c) Cleaning agent description:

Neutral detergents can be used, such as household detergents and other mild detergents. Acidic, alkaline, organic solvent cleaners are not recommended to avoid affecting service life.

d) Notes :

If the finger is due to improper disassembly resulting in poor finger seal, finger leakage, can not enjoy quality assurance services.

4.2 Disinfection

Steam disinfection is recommended, and the color change of products caused by temperature change is normal. When using alcohol disinfection, the dosage should not be too much, otherwise it will lead to yellowing. It is not recommended to use ultraviolet, ozone, 84 and other disinfection, and the resulting product aging needs to be borne by users themselves.

4.3 Protective measures

Silicone rubber has stable chemical properties and can resist weak acid and weak alkali at room temperature. However, long term exposure to some strong acid and strong alkali and organic solvents will have a great impact on its performance and life.



Acid	Alkali	Organic solvents	Others
HF、HCl、 H ₂ SO ₄ 、 PhCOOH	Alkali metal hydroxide、 Quaternary ammonium hydroxide、Quaternary phosphorus hydroxide	Gasoline、Diesel oil、 Kerosene、Acetone、 Dimethylbenzene	Chloride that hydrolyzes HCl(such as TiCl ₄ 、 SiCl ₄)

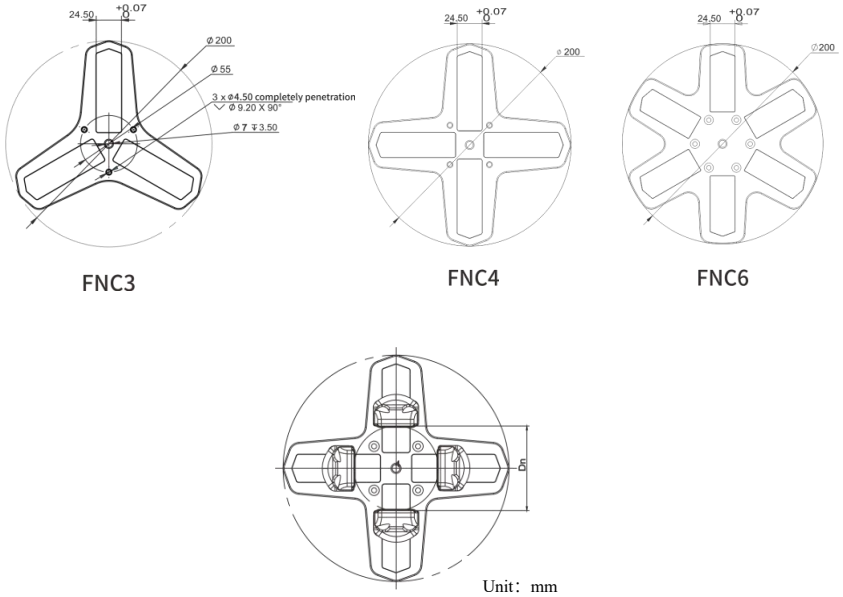
5. Common problems and solutions of soft gripper

If you encounter an exception when using this product, please refer to the following tips and processing methods. If the abnormal situation continues to occur, stop using this product immediately to prevent accidents. And immediately contact sales staff, please do not disassemble or repair this product.

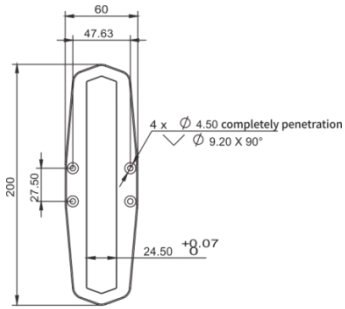
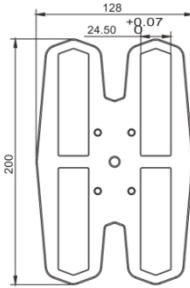
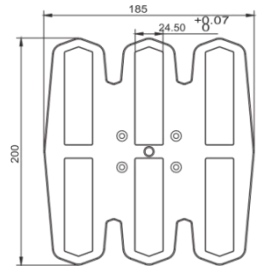
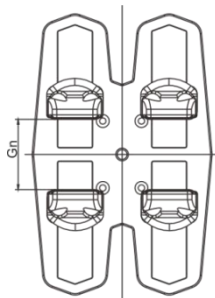
Abnormal condition	Possible cause	Solution
Frequent inflation when the gripper grasps tightly	Air leakage happens at air outlet pipe of the controller	Reconnect the gas circuit between controller and soft gripper and ensure good airtightness
Continuous working of vacuum generator when the gripper spreads	<ol style="list-style-type: none"> 1. Air leakage happens at air outlet pipe 2. Pressure in air inlet pipe is lower than normal working pressure of the controller 	<ol style="list-style-type: none"> 1. Reconnect the gas circuit between controller and soft gripper and ensure good airtightness 2. 0.5~0.7MPa Check output pressure of air source, and adjust its output pressure to a value in 0.5-0.7MPa

6. Appendix

6.1 Bracket



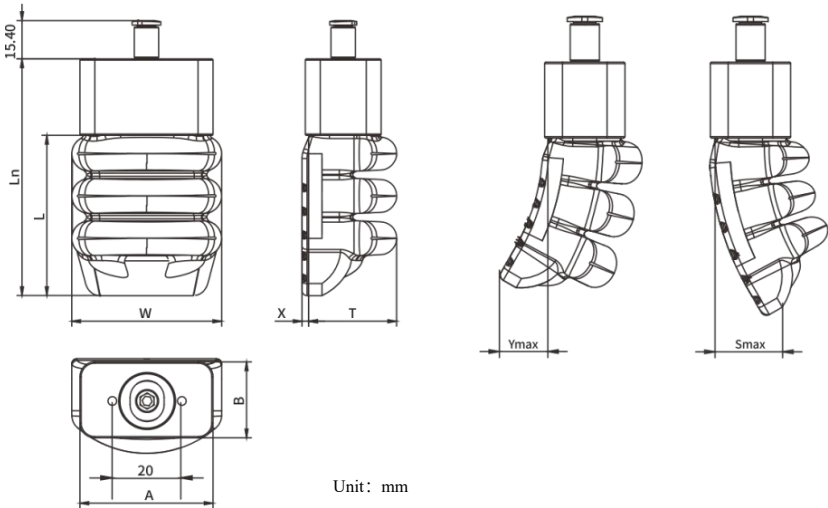
	FNC3	FNC4	FNC6	
weight/g	111	135	197	
Dn(mm)	N20	28-145	34-145	70-145
	N30	25-142	31-142	67-142
	N40	22-133	38-133	67-133
	N50	28-134	48-134	84-134
	N60	34-125	58-125	102-125


FNM2

FNM4

FNM6


Unit: mm

		FNM2	FNM4	FNM6
Weight/g		88	189	284
Gn(mm)	N20	6-145	16-145	16-145
	N30	3-142	13-142	13-142
	N40	0-133	6-133	6-133
	N50	3-134	7-134	7-134
	N60	0-125	0-125	0-125

6.2 Flexible finger module



Parameter	Model	N2020	N2027	N3025	N3034	N4036	N4049	N5041	N5056	N6047	N6064	
W/mm		20		30		40		50		60		
L/mm		19.2	26.5	25	34	35.5	48.5	40.5	56	47	64	
Ln/mm		34.2	41.5	44	53.5	59.5	72.5	66	81.5	77.7	94.7	
T/mm		16	16.8	20.5	21.5	26.5	28	31.5	33.5	35.2	38	
X/mm		1.5	1.5	1.5	1.5	0	0	1.5	1.5	0	0	
A/mm		22	22	30	30	40	40	48	48	53.5	53.5	
B/mm		16	16	19	19	24	24	27	27	30.5	30.5	
Smax/mm		5	10	6	15	9	19	12	20	18	31	
Ymax/mm		6	11.5	10	19	13	24	17	31	24	40	
Weight/g		18.9	20.6	40.8	44.3	74.4	85.5	104.3	121.2	158.1	186.6	
Pushing force on fingertip/N		4	3.8	8	7	12	11	19	17	26	25	
Single finger load coefficient/g	Vertical	200	180	370	300	560	500	710	670	750	750	
	Coated	290	300	480	500	690	710	1200	1300	1600	1750	
Working frequency/cpm		<110										
Standard working lifespan/times		>3,000,000										
Working pressure/kPa		-60~100kPa										
Air tube diameter/mm		4					6					

* Please control the pressure between the working pressure range of soft finger, otherwise it would affect lifespan of the product or even incur product damage.

* Smax and Ymax are measured in lab under pressure range between -50 ~ 100kPa.

7. Before and after sales services

The company provides free pre-sales test service for customers, customers can send the product samples to our company to verify the feasibility of SRT flexible gripper grasping.

The warranty period of this product is half a year or 3 million times. During this period, failure occurred. If the reason was determined to be the product problem of the company, maintenance or replacement would be carried out free of charge. However, product losses due to body failures (extended liability) are not included in this warranty. In addition, the damage or failure caused by the following reasons is not guaranteed :

- 1、 Faults and damages caused by fires, earthquakes, floods and other disasters.
- 2、 The wrong way of use;
- 3、 Improper repair and renovation.

Warranty service

- ① Free maintenance within 6 months from shipment date;
- ② If malfunctions of the product occur and they are verified to originate from quality problems of the product, free repairing or product replacement will be provided by our company. However, if they originate from misoperation of the user,our company shall not take any responsibility. Losses or accident responsibilities caused by product malfunctions are not covered by this guarantee.
- ③ In addition, the warranty is not available if product damage or failure are caused by following causes:
 - Malfunctions and damages caused by fire, earthquakes, floods and other force majeure.
 - Misoperations and other operations that disobey the user's manual.
 - Disassembly without permission when product malfunctions.
- ④ If some parts are damaged, assembly damaged module(example: soft fingers and the bracket)should be mail to our company for damage cause identifications, then measures are taken in accordance with article 1 of warranty service.

Note: Terms of service listed above are only available for guests purchased pneumatic controllers of our company.

* The right of final interpretation is reserved by our company.

Warranty card

Product name		
Product model		
Purchase date		
Guest name		
Guest phone number		
Guest address		
Maintenance time	Maintenance record	Signature of maintenance staff

* This card is the basic voucher of warranty, please fill in carefully and savethis card properly.

Product certificate

This product is qualified according to the delivery inspection.

Productmodel: _____

Inspector: _____

Manufacturing date: _____



**SRT IS A PIONEER OF ADVANCED TECHNOLOGY
AND A SUPPLIER OF INNOVATIVE PRODUCTS**

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