

X C h a n g e X C - 1 0

MAINTENANCE & INSTRUCTION MANUAL

N I T T A C O P O R A T I O N

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REFERENCE DRAWINGS

PRECAUTIONARY NOTES

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This manual contains all the information about XC-10 for proper operation and maintenance. Please, make sure that all the personnel read and understand this manual thoroughly before using the Xchange XC-10 system, and certainly hand this manual to the person who operates this system.

Please, check the inside of packages, and make sure about next 2 items are inside of the shipment.

1. Installing bolts
2. Preliminary parts (depending on special arrangement)

We carefully pack our shipments. But, unfortunately you find any missing parts, please contact with our offices on the cover of this manual.

Thank you for choosing our Xchange system.

1. EQUIPMENT DESCRIPTION

The Xchange system is the pneumatic auto-tool exchanger. It is made up of two parts : a Robot Adaptor and a Tooling Adaptor. The system can be attached to any tooling by a optional adaptor plate, and also equips chucking mechanisms such as connecting pins.

1-1 Robot side

1-1-1 Robot Adaptor

The Robot Adaptor is the basic part of the XChange system.

[Chucking Mechanism]

The Robot Adaptor and the Tool Adaptor are connected each other by cams. These cams have special mechanism which automatically adjusts for any dimensional error that may occur during chucking.

These cams are driven by an air cylinder, and designed so that they will not release even if the units are subjected to more than rated load capacity. If an extreme load is applied, the chucking surfaces of both the robot and tooling adaptors separate slightly but never release. And the spring extend air cylinder provides fail-safe mechanism which avoids falling the tooling adaptor off even if the units loose air pressure accidentally.

[Interfaces]

Fifteen electrical signal contacts(standard version) are provided in the XChange XC-10.

1-1-2 Robot Adaptor Plate (option)

The Robot Adaptor plate allows the mating of the Robot Adaptor unit to your robot.

Nitta Corporation can provide with the Robot Adaptor plate, or you can provide with your own Robot Adaptor plate.

Refer to the Reference Drawings at the back of this manual for details on the bolt drilling locations.

1-2 Tool Side

1-2-1 Tooling Adaptor

The Tooling Adaptor is another basic part of XChange system and allows your tools to be attached. The locking cams of the Robot Adaptor will be engaged to the lock-ring of this adaptor.

2. COMPONENTS

This system is composed of the XC-10 Body and the signal-pin Assembly. This assembly consists of fifteen electrical signal contacts (standard version) with spring contact pin.

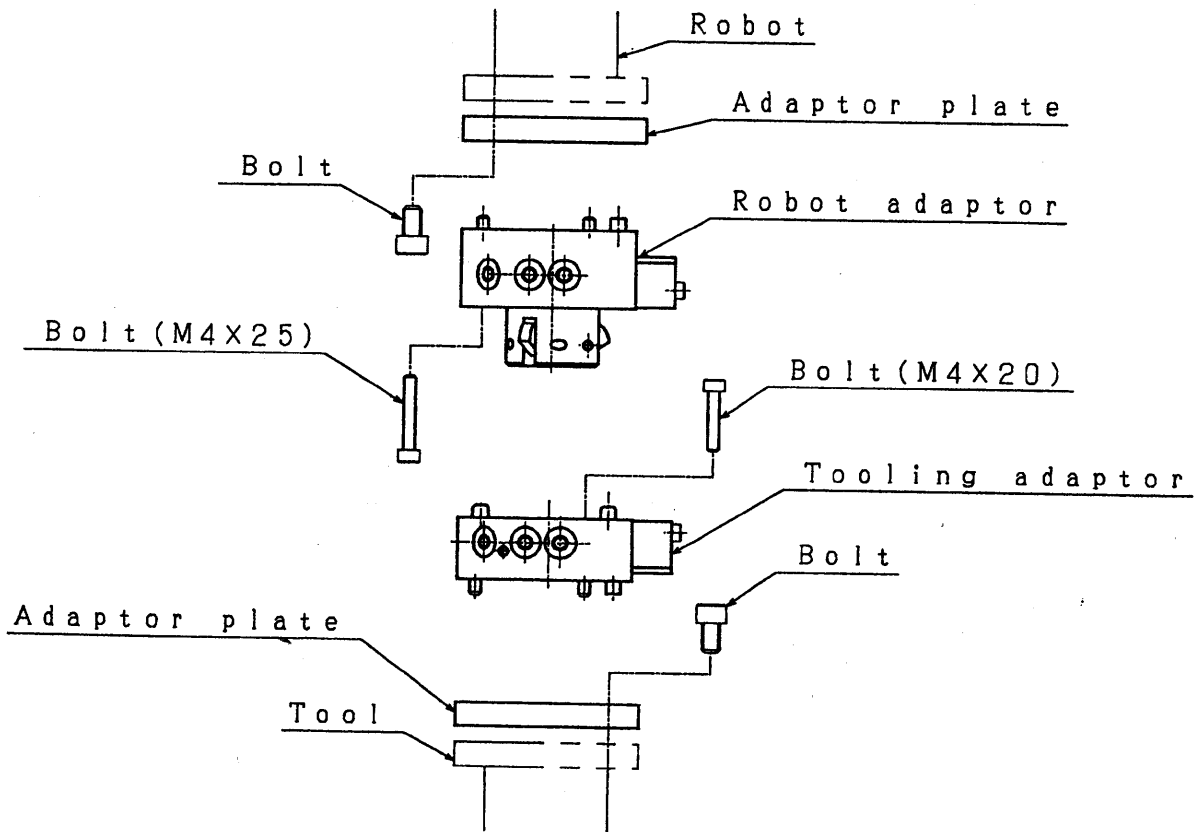


fig. 2 System

3. STANDARD SPECIFICATION

3-1 XC-10 Main Body specification.

| | | XChange Spec. | XC-10 |
|------------------------|--------------------|-------------------------------------|--------------------------|
| 1. | Main System | | |
| 1. Type | Robot Adaptor | | Refer to the drawing |
| | Tooling Adaptor | | Refer to the drawing |
| 2. Rating | Handling capacity | | 10 kg |
| | Allowable moment | | 300 kg·cm |
| | Allowable torque | | 350 kg·cm |
| | Operation pressure | | 4~8.7 kg/cm ² |
| 3. Repeat-ability | | | ±0.010 mm |
| 4. Interface | Electric | No. of contacts | 15 |
| | | Electric capacity | 2.5 A |
| | Pneumatic | No. of ports | 6 |
| | | Nomal pressure | 8.75 kg/cm ² |
| | | Effective sectional area (Cv value) | 4 mm ² |
| 5. System weight | Robot Adaptor | | 0.51 kg |
| | Tooling Adaptor | | 0.12 kg |
| 6. Dimension | Robot Adaptor | | Refer to the drawing |
| | Tooling Adaptor | | Refer to the drawing |
| Option (Special Order) | | | |
| | | | |
| | | | |
| | | | |

3-2 Loads Allowance and Installation Notes

The specified rating loads, moment and torque of XChange XC-10 expresses the active state after the system is installed on a robot.

The system should be set with consideration of inertia and acceleration generated by movements of the robot, so that the maximum load of normal operation will never be over those ratings.

The rating loads, moment and torque are explained on figure 3.

| | |
|---------------------------|---|
| Carrying load | $W=10\text{kg}$ |
| Eccentricity | $L=\sqrt{l_m^2+l_t^2}$ |
| Allowable bending moment | $M=L \times W \times G_R$ (note) $=20 \times 10 \times 1.5 \leq 300\text{kgf}\cdot\text{cm}$ (29.4N·m) |
| Allowable twisting torque | $T=l_t \times W \times G_R$ (note) $=20 \times 10 \times 1.5 \leq 350\text{kgf}\cdot\text{cm}$ (34.3N·m) |

(note) G_R represents the acceleration of the Robot at normal motion in automatic operations. G_R value of a robot will be different on each other. Please refer to the manufacture of your robots about the precise G_R value. (Generally, G_R is set between 1.5 to 2.0G.)

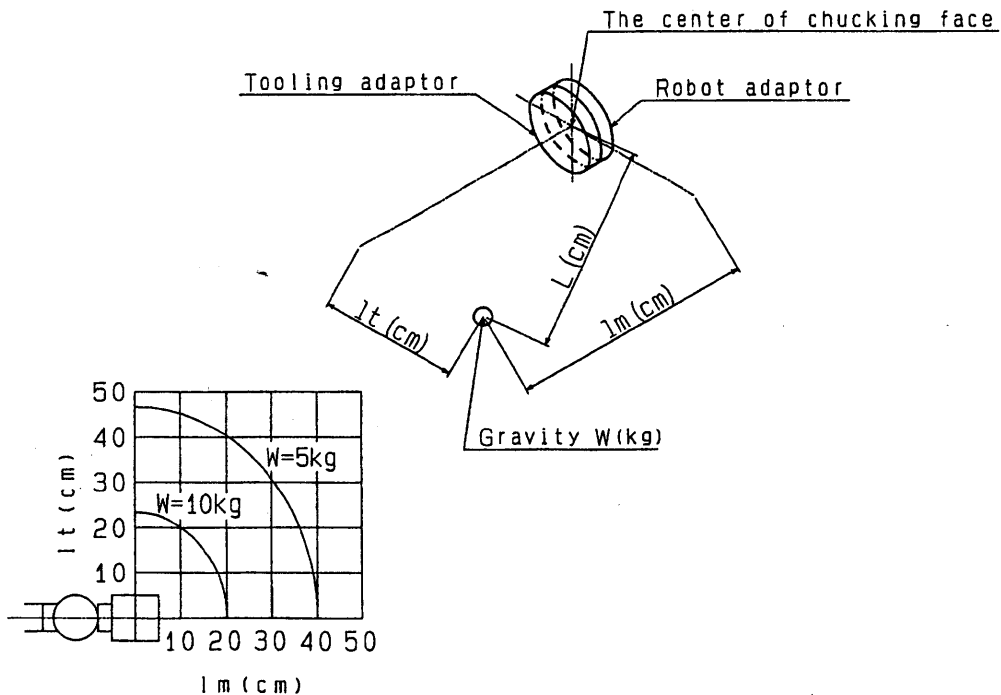


fig. 3 Definition of load rating

3-3 Power Load Allowance

The XChange XC-10 can carry 15A of the maximum current in all, when it has the standard signal-pin assembly (15 connecting pins). And it can carry 2.5A per pin. However, the current over 2.5A should not be applied on adjacent pins at the same time when the plural number of user signal pins are used.

4. IDENTIFYING THE XC-10

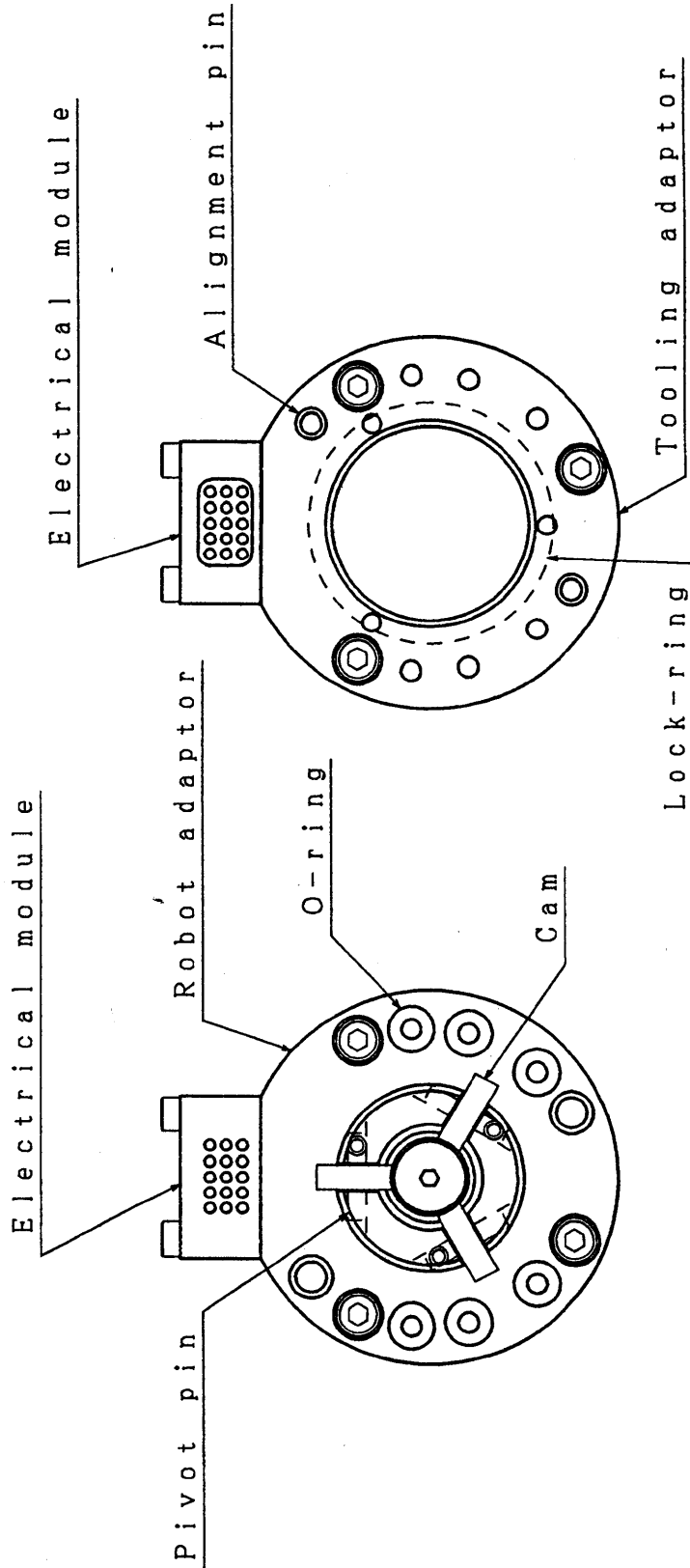


fig. 4 Identification

5-4 Wiring

Refer to the appropriate electrical schematic in the Reference Drawings section of this manual and wire your robot inputs and outputs as required by your application through the electrical connector mounted on the contact block mounted on the body of the Robot Adaptor.

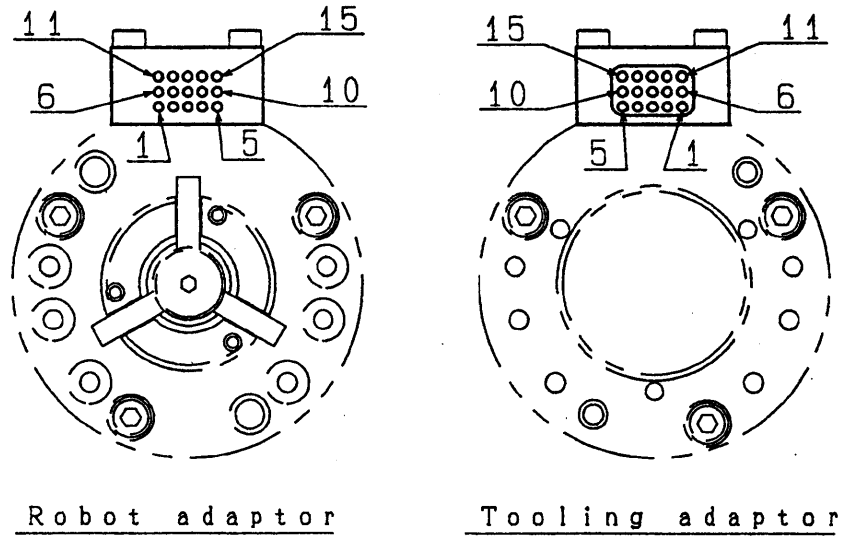


fig. 5 Number of signal pins of electrical module

5-5 Cable Settlement

Damage of connectors or electric module, or breakage of wires may occur when a extreme force of stress is applied. Fix the cables of robot side at a place arround the connector of the Robot Adaptor by using spiraltubes or bands, etc.

Make sure that a excessive force is not applied on the cables or hoses during your robot is rotating its hand. An example of fixing cable with suspender is showing on figure 6.

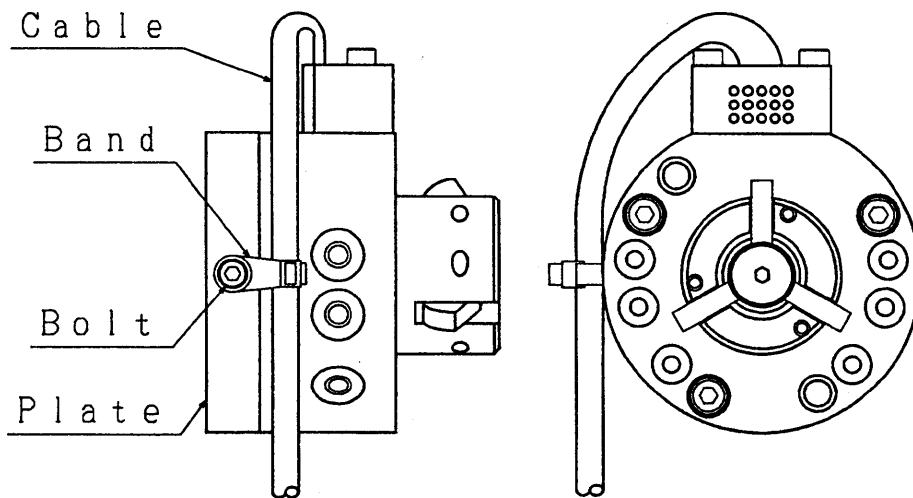


fig. 6 An example of cable fixation

5-6 Tool Changer Installing Considerations

The Tool Changer can be manually detached in urgent. The Tool changer can not be detached if any object obstructs an insertion of the jig into the hole which is provided on the Tooling Adaptor for detaching. Beware of that there is no object such as a terminal box on the material handling apparatus around the hole.

6. OPERATION AND PROGRAMMING

6-1 Operation and Programming

This chapter shows the example of the interlock signals surrounding the XC-10. Exchanging signals which synchronize the robot with peripheral systems or confirm movements of the robot are necessary to maintain reliance and safety on the XC-10.

6-2 Basic Flow of The XChange System

Please adjust the interlocks of your robot with reference to this flow chart

Table 1. Basic flow of the XChange system

| Robot motion | | Robot Output | | External Input |
|--------------------------------------|--|----------------------------|---------|----------------------|
| | | Controlling solenoid valve | | Fixture Limit switch |
| | | Chuck | Unchuck | Toolside |
| C H U C K I N G | Waiting position | OFF | ON | ON |
| | ↓ Moving | ↓ | ↓ | ↓ |
| | ↓ Near by chucking position | ↓ | ↓ | ↓ [] |
| | ↓ Approaching | ↓ | ↓ | ↓ [] |
| | ↓ Chucking position | ↓ | ↓ | ↓ [] |
| | ↓ Chuck | ON | OFF | ↓ [] |
| | ↓ Chucking completion | ↓ | ↓ | ↓ [] |
| | ↓ Moving | ↓ | ↓ | OFF |
| | ↓ Working | ↓ | ↓ | ↓ |
| | U N C H U C K I N G | Working | ON | OFF |
| ↓ Moving | | ↓ | ↓ | ↓ [] |
| ↓ Unchuck position | | ↓ | ↓ | ↓ [ON] |
| ↓ Unchuck | | OFF | ON | ↓ [] |
| ↓ Leaving | | ↓ | ↓ | ↓ [] |
| ↓ Near by unchucking position | | ↓ | ↓ | ↓ [] |
| ↓ Moving | | ↓ | ↓ | ↓ |
| ↓ Waiting position | ↓ | ↓ | ↓ | |

[] indicates processing condition.

6-5 Emergency

6-5-1 Manual Separation of XC-10

XC-10 has holes on the Tooling Adaptor.

So that the cams will be manually turned off for separation.

- ① Be sure that the falling prevention is prepared strong enough so that the Tooling will not fall. (example, suspending tools by rope)
- ② Confirm the air application on "UNCHUCK" port.
- ③ Turn back the cams carefully (without any scratching on the cam's surface) with a screwdriver, etc.

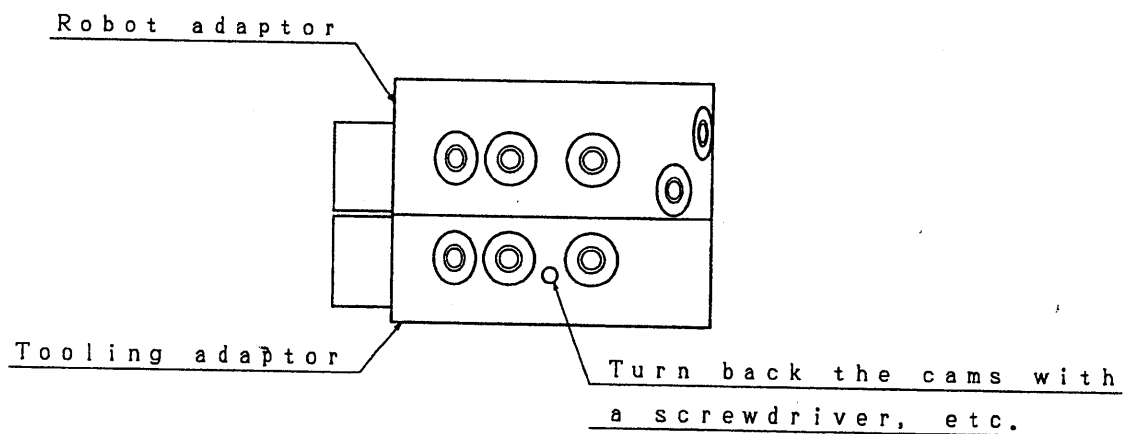


fig. 7 Manual separation

6-5-2 Collision or Interference Managements

When a robot or the jigs (gun, transformer, etc.) on the robot collides or interferes with the Work, checks and treat according to the following chart. A collision applies excessive force which cause deterioration of the durable years on the XChange system.

Therefore, making an earlier periodic inspection is suggested even though the any disorder is not found on the system. Refer the chapter "7.Maintenance and Inspection" about replacing the body and damaged parts.

Table 2. Interference, collision treatment

| | Inspection points | Method | Disorder management |
|---|--|---|---|
| 1 | Crack | Visually check | Body replacement |
| 2 | Housing distortion | Visually check | Body replacement |
| 3 | Bolt looseness | Check the part | Tighten up |
| 4 | Cam chuck/unchuck movement and signals | Manually turn ON/OFF the valve with checking the signal and the movement | Body replacement |
| 5 | Gap between chucking surfaces | Visually check the damages on cam surface, lock-ring, pivot pin, interface. | Replacing damaged parts |
| 6 | Jolt for rotating | Visually check the damage of tapered pin, bushing, the looseness of bolt | Replacing damaged parts |
| 7 | Damage on electric signal pin, connector and cable | Visually check check signals on I/O plate | Body replacement or replacing damaged parts |

6-5-3 Water splashing treatment

Avoid splashing with water for long period. The system does not matter with little spattering. But, if the system is covered with water, do the checks and treatments showing below.

Table 3. Water splashing treatment

| | Inspection points | Method | Treatment |
|---|--|---|---|
| 1 | Electric points and proximity switch signals | Check any short on I/O unit side. Visually check standing water | Wipe off with cloth |
| 2 | Cam, lock-ring tapered pin | Visually check | Apply grease |
| 3 | O-Ring fitting part | Visually check | Apply grease |
| 4 | Other spots covered with water | Visually check with standing water | Wipe and apply oil on naked part of metal |

7. INSPECTION AND MAINTENANCE

7-1 Inspection and Maintenance Schedule

Basic inspections are scheduled as seven stages such as daily, monthly, every 3 months, every 6 months, yearly, every 2 years and overhaul. Inspection points are added as the stage of inspection is proceeding. Refer the chart on next page about the Inspection points on each stage. A proper maintenance, not only saves from wear of mechanisms but also prevents from disorders and secures safety.

Observe periodic Inspections according to the schedule.

This Inspection schedule is based on the one shift system as a standard time so that the schedule should be adjusted depending on the frequency of the robot use.

For example, A monthly inspection should be done by every two weeks (every 10000 use) if the robot is used in the two shift system.

standard cycle time :

$$1^{use}/min \times 60^{min}/hr \times 8^{hrs}/day \times 22^{day}/month \\ = 10560^{use}/month$$

7-2 Inspection Spots

Inspection are distinguished with seven stages as shown on the table 4 which indicates points of inspection. Refer to the inspection points those are mentioned below about maintenance method.

Table 4. Inspection Points

| Period | Inspection points | Method |
|----------|---|---------------|
| daily | Check signal-pins | Visually |
| | Check parallelism of interface (no gap) | Visually |
| | Check foreign matters on the chucking surfaces | Visually |
| 1 month | Lubricat cams, lock-ring, tapered pins, and bushes. | Refer 7-3-1 |
| | Check tightness of the installation bolts | Refer 5 |
| | Check tightness of the electric connector connections | Tighten up |
| | Check smoothness of the cams movements | Visually |
| 3 months | Pivot-pin, lock-pin and housing fixation | Touching |
| 6 months | Cam, tapered pin, bushing, and interface fatigue | Visually |
| 1 year | Clean spring pin contact | Refer 7-3-2 |
| 4 years | Overhaul | Contact NITTA |

7-3 Maintenance outlines

Daily maintenance without removing the Adaptors from the system is mentioned in this chapter.

7-3-1 Lubrication on the XC-10 Body

Apply coating of Epinoc grease (Nippon-Sekiyu), Sumitech 731 (Sumikou-Junkatuzai), or equivalent to the sliding surfaces shown in the figure below. (Do not apply molybdenum-based grease)

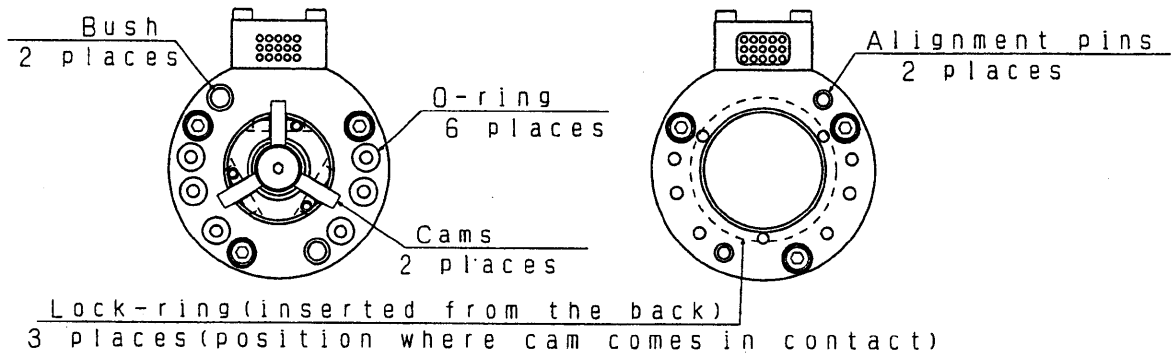


fig.8 XC-10 Lubricating spots

7-3-2 Replacing electrical contacts of the Tooling Adaptor

Grasp the tip of contact and pull directly upward, the pointed end and its brass receptacle will come off.

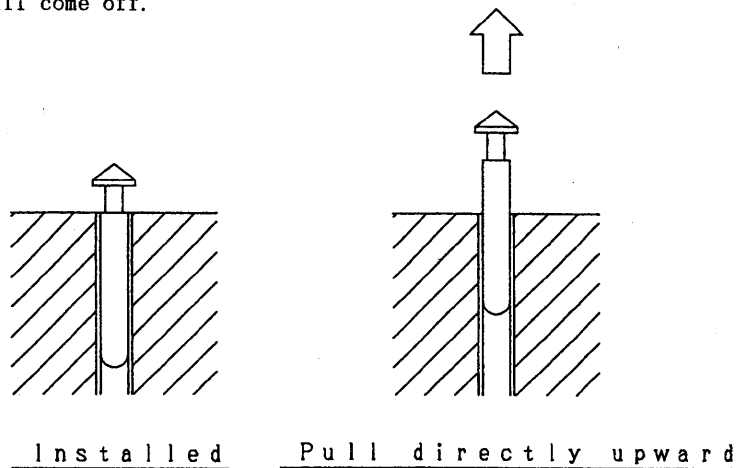


fig.9 Replacement of electrical contacts of the Tooling Adaptor

This work can be done by hands, and using a tool such as pliers makes it easy. After removing the damaged pin, a new pin is installed by fully pushing its receptacle into the body of the module. Check height and movement of the pins.

If a pin is broken in the receptacle, use a pointed file ($\phi 2 \sim 3\text{mm}$, mid) to pull out the pin.

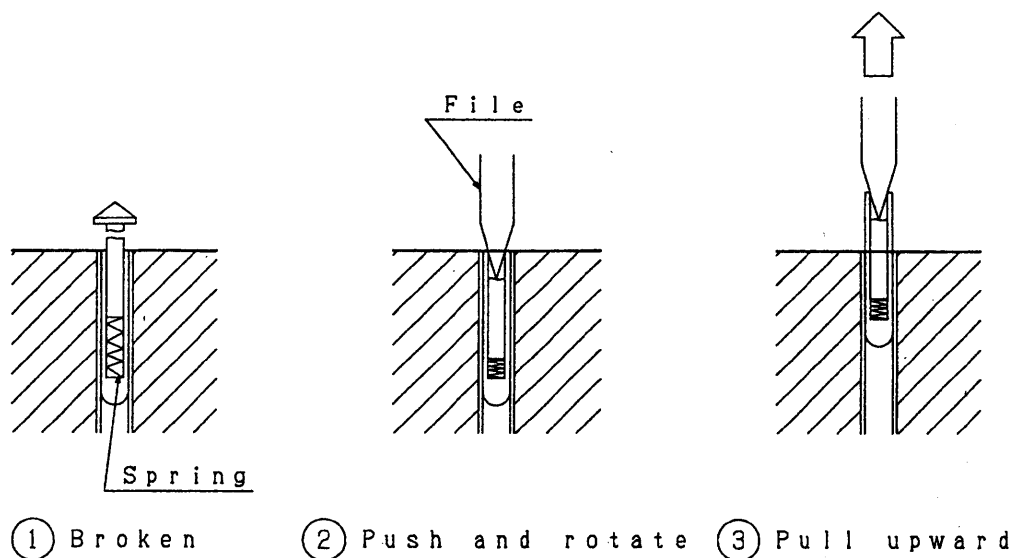


fig. 10 Removing a broken pin

7-3-3 Replacing O-rings of robot side pneumatic port

O-ring is installed on the robot adaptor connection side as shown in the figure below.

Please replace O-ring when some damage or an air leakage is found visually.

Please detach an old O-ring with the marking-off pin etc.

At this time, be careful not to damage the housing.

Please install a new O ring in the housing after spreading grease.

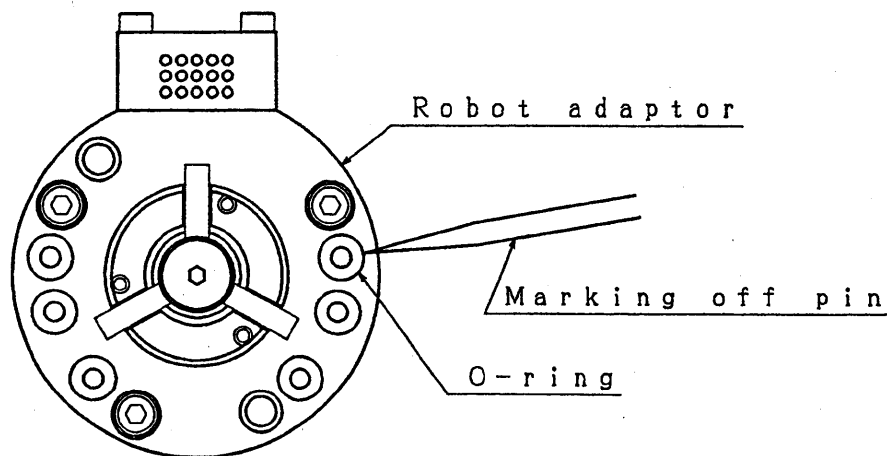


fig. 11 Replacing of O-ring

7-3-4 Replacing Alignment Pin

Alignment pins are screwed on the Tooling Adaptor body.

For removing Alignment pin, take off the installation bolt from inside of the Tooling Adaptor first, then punch out the pin.

For assembling, apply a coating of Locktight 242 (medium strength) on the tapered pin before screwing its installation bolt, and also check that the Alignment pin project by 4mm.

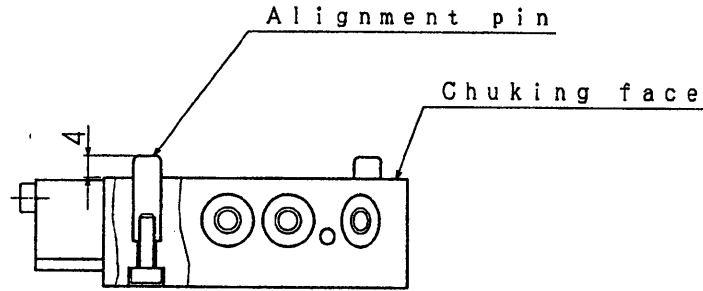


fig. 12 Replacing Alignment Pins

7-3-5 Replacing Tooling Adaptor Lock-ring

Lock-ring is assembled as slide fit. For disassembling Lock-ring, the ring should be punched out through holes #1, #2, and #3 after electrical modules is removed and then loosened 2 of set screws so that the Lock-ring can be released.

When reassembling the Lock-ring, confirm rounded internal corner of the ring is set facing to the direction of tooling adaptor plate.

Afterwards, tighten set screw on which "LOCTITE 222" is applied a little.

Moreover, applied "LOCTITE 222" on Electrical module installation screw.

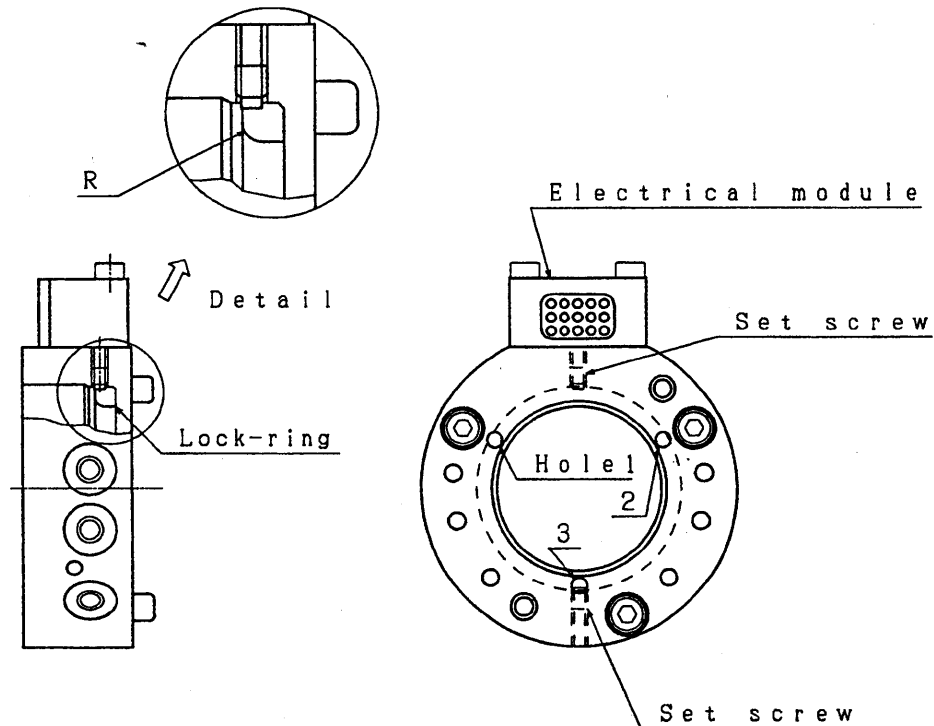


fig. 13 Replacing Lock-ring

7-3-6 Replacing cams

The cam comes off when the set screw is removed and the pivot pin is punched out etc.

Install cam in the direction and the position in figure below after applying grease on all surface of the cam.

Tighten set screw on which "LOCTITE 222" is applied until the point of set screw touches the ditch of pivot pin.

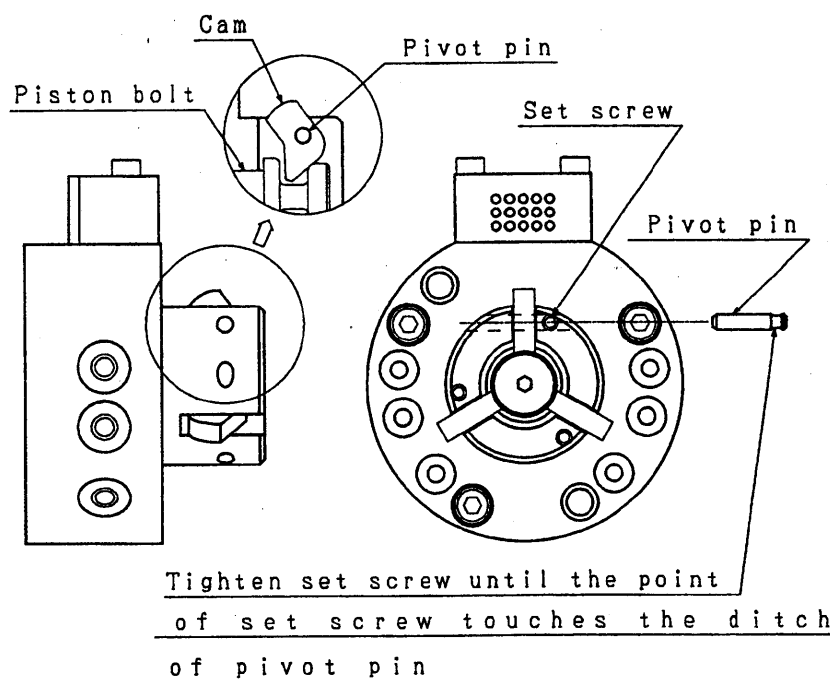


fig. 14 Replacing cams

8. SPARE PARTS

Preparing spare parts of the XC-10 with reference to the parts ranks as defined below is recommended. When purchasing spare parts, please ask us for the parts by their parts code (serial number).

A rank : articles of consumption, frequently replacing parts

B rank : parts of frequently moving mechanism

C rank : important parts

<XChange XC-10 body(standard version)>

| Rank | Parts name | Count | Material | Parts code |
|------|---------------------|-------|----------|----------------|
| A | O-ring | 6 | NBR | P4(Hardness50) |
| A | Signal pin(Tool) | 15 | — | GCSPP501S |
| B | O-ring (Cylinder) | 1 | Viton | AS568-025 |
| C | Cam (Robot) | 3 | Steel | TBR-002-00 |
| C | Pivot pin(Robot) | 3 | Steel | TBR-003-00 |
| C | Piston bolt(Robot) | 1 | Steel | TBR-004-00 |
| C | Alignment pin(Tool) | 2 | Steel | TBT-003-00 |
| C | Lock ring (Tool) | 1 | Steel | TBT-002-00 |

*** Refer to the drawing.

Note for Replacing Work

Please contact with us, if you find any damage on the changer body (housing, etc.) during parts replacement.

9. BACK UP SYSTEM

If a Tool Changer is required to rest for long period because of the occasion such as Inspection, Maintenance and Repairs, the Tool Changer can be replaced to the other Changer within $\pm 0.5\text{mm}$ accuracy of reproducibility unless the applied Adaptor Plates are special order.

We suggest preparing spare parts and spare body for the backup, to minimize downtime of the line, when the linetact is fast or the parts consumption is much.

10. TROUBLE SHOOTING

10-1 Trouble Factors (Cause Chart)

- The XChange system does not work.
 - Tools do not reposition for chucking.
 - Gap is produced at the chucking surfaces.
 - System is unable to be chucked.
 - System is unable to be unchucked.
- The XChange system gets heat.
 - The Adaptor body gets heat.
- Tool (Gun, Hand, etc.) does not work.
 - Unable to exchange signals through electric signal-pins.
 - Lost of pneumatics.

10-2 Trouble phenomena and shooting

10-2-1 The XChange System does not work.

Tools Do Not Reposition for Chucking

- | | | |
|---|-----------|---|
| 1) Check any gap between the Adaptors. | • • • • • | Readjust the teaching. |
| 2) Check any damage or extreme wear of alignment pins. | • • • • • | Replace the tapered pin. (Refer 7-3-4) |
| 3) Check any damage or extreme wear of locating bushings. | • • • • • | Replace the locating bushing. |
| 4) Check looseness of installation bolts. | • • • • • | Tighten up the bolt (refer 5) |
| 5) Check any overload on the body to change its shape. | • • • • • | Contact with our office. |
| 6) Check any load over the rating. | • • • • • | Contact with our office. |

Gap is Produced at the Chucking Surfaces

- | | | |
|---|-----------|---|
| 1) Check the chucking with proper gap. | • • • • • | Chuck at the position at 1mm in the distance between connected sides. |
| 2) Check any foreign matter on the chucking surfaces. | • • • • • | Take it off. |
| 3) Check any overload on the body to change its shape. | • • • • • | Contact with our office. |
| 4) Check the application of molybdenum based grease. | • • • • • | Immediate change to Epinoc grease (Nippon-Sekiyu) or equivalents. |
| 5) Check if O-ring which our company specified is used. | • • • • • | Confirm. |

System is unable to be chucked

- | | | |
|--|-----------|---|
| 1) Check pressure of the pneumatics. | • • • • • | Apply pneumatic at pressure of 4~8.7kg/cm ² . |
| 2) Check the function of solenoid valves. | • • • • • | Confirm. |
| 3) Check the distance of Adaptors. | • • • • • | Chuck at the position at 1mm in the distance between connected sides. |
| 4) Check any object which interferes the function of cams. | • • • • • | Remove it, take it out. |
| 5) Check air leakage from the cylinder. | • • • • • | Contact with our office. |
| 6) Check any damage of the cylinder. | • • • • • | Contact with our office. |
| 7) Check any overload on the cam to change its shape | • • • • • | Contact with our office. |
| 8) Check deflection of the Fixture. | • • • • • | Raise rigidity. |
| 9) Check looseness of the Fixture anchor bolts. | • • • • • | Tighten up the bolt. |

System is unable to be unchucked

- | | | |
|--|-----------|--|
| 1) Check pressure of the pneumatics. | • • • • • | Apply pneumatic at pressure of 4~8.7kg/cm ² |
| 2) Check the function of solenoid valves. | • • • • • | Confirm. |
| 3) Check any excessive partial load on the Tooling Adaptor. | • • • • • | Readjust the teaching. |
| 4) Check the function of interlock. | • • • • • | Confirm the circuit. |
| 5) Check any object which interferes the function of cams. | • • • • • | Remove the object |
| 6) Check any overload which changes the shape of cams. | • • • • • | Contact with our office. |
| 7) Check the grease on the cams. | • • • • • | Apply grease to avoid the cams get be twisted. |
| 8) Check deflection of the Fixture. | • • • • • | Gain the rigidity. |
| 9) Check looseness of the Fixture anchor bolts. | • • • • • | Tighten the bolts. |
| 10) Do not apply any machining on the center part of adaptor plate | • • • • • | Confirm |

10-2-2 The XChange system gets heat

The Adaptor body gets heat

- 1) Check the high temperature in atmosphere. Keep away from heat
- 2) Check the electric power on signal Confirm within the rating.
spring-pin.

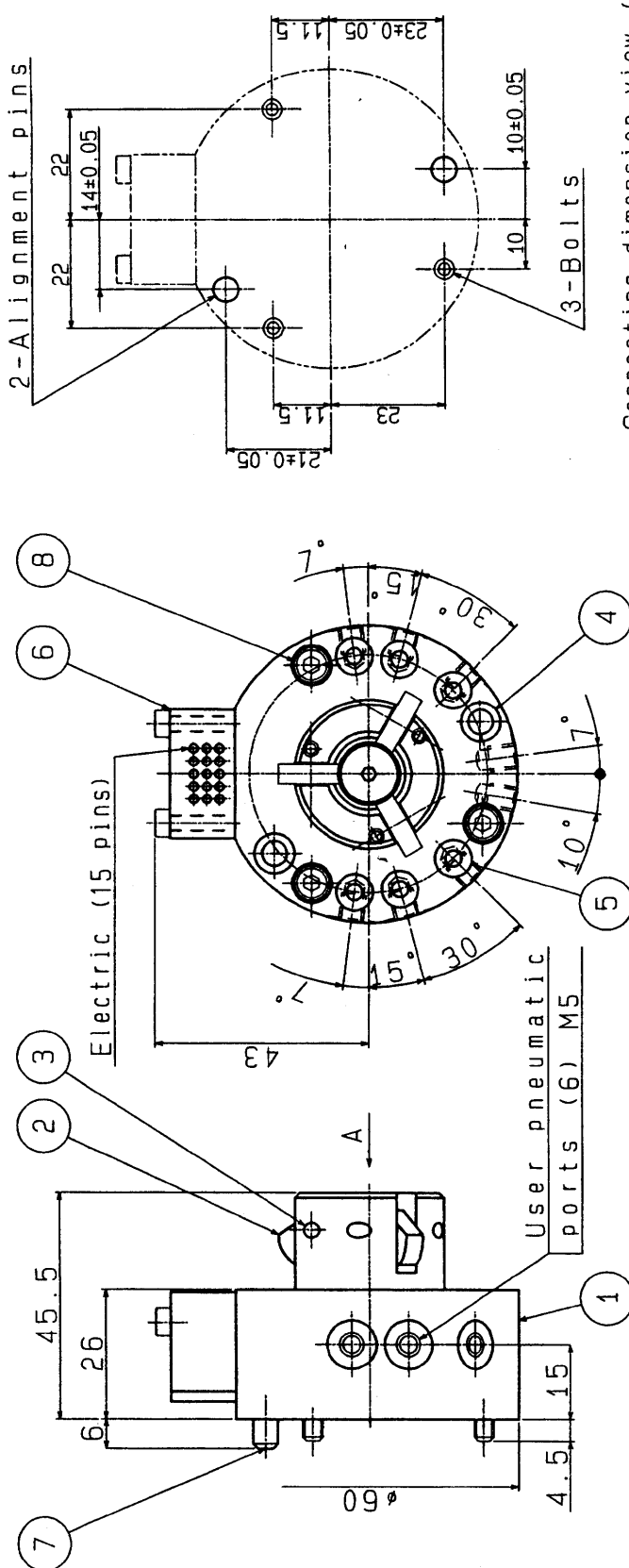
10-2-3 Tool (Hand, etc.) does not work

Unable to exchange signals through electric signal-pins

- 1) Check transmission of signals to electric Check with tester, etc.
signal-pins.
- 2) Check any damage on tools. Confirm.
- 3) Check extreme bending or twisting on the Confirm.
signal cables.
- 4) Check the connection of connectors. Connect completely.
- 5) Check the chucking of the Robot and Tooling Chuck completely.
Adaptor.
- 6) Check any damage on the electric signal-pin Contact with our office.
module.
- 7) Check any foreign matter or damage on Replace electric signal-pin.
electric signal-pins of module. (Refer 7-3-2)
- 8) Check any projection or dent of electric Contact with our office.
signal-pin (height of pins should be same).
- 9) Check the movement of electric signal-pin Replace electric signal-pins.
(movement should be smooth). (Refer 7-3-2)

10-2-4 Lost of pneumatics

- 1) Check O-ring which installed to connected Confirm.
side of the robot adaptor come off.
- 2) Check any damage above-mentioned O-ring. Replace O-ring.
- 3) Check fitting come off. Confirm.
- 4) Check air tube come off. Confirm.
- 5) Check any damage air tube. Replace tube.



2-Alignment pins

User pneumatic ports (6) M5

3-Bolts

Chucking actuation port (M5)

Unchucking actuation port (M5)

Connecting dimension view (View A)

Notes

- 1. Subassembly-electrical interface block to be wired by customer.

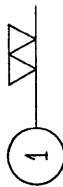
| 8 | SCR-SOC HD CAP | SCM435 | 3 | M4x25 |
|---------------|--|-----------------|-----|---------------|
| 7 | Parallel pin | Steel | 2 | φ5m6x12 |
| 6 | Subassembly-electrical interface block | --- | 1 | TAR-001-01 |
| 5 | O-ring | NBR | 6 | P4 (Hs 50) |
| 4 | Bush | Stainless Steel | 2 | TBR-00E-00 |
| 3 | Pivot pin | Steel | 3 | TBR-003-00 |
| 2 | Cam | Steel | 3 | TBR-002-00 |
| 1 | Housing | Alum | 1 | TBR-001-01 |
| ITEM | DESCRIPTION | MATERIAL | QTY | PART'S NUMBER |
| Xchange XC-10 | | | | NO. |
| ROBOT ADAPTOR | | | | CLASS |
| ATT-3S0019 | | | | TITLE |
| △ | | | | SCALE |
| | | | | DATE |

| | | | |
|------|----------|----------|---------|
| DATE | REVISION | CONTENT | REVISED |
| BY | CHECKED | DESIGNED | BY |
| BY | BY | BY | BY |
| BY | BY | BY | BY |
| BY | BY | BY | BY |

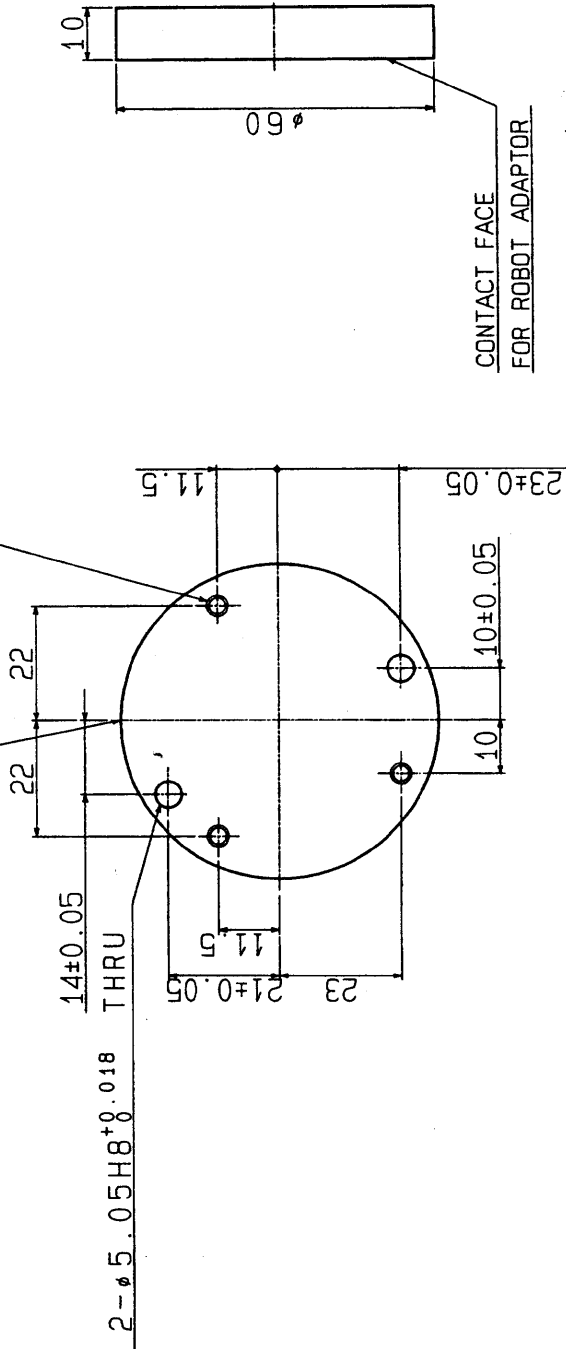
TR15-6JN10

NITTA CORPORATION

DIRECTION FOR ELECTRIC BLOCK



3-M4 HELICOIL 1.5 DIA.
INSTALLED FROM THIS SIDE



NOTES)

BREAK ALL SHARP EDGES 0.1-0.2mm.
SURFACE FINISH: BLACK ALUMITE.

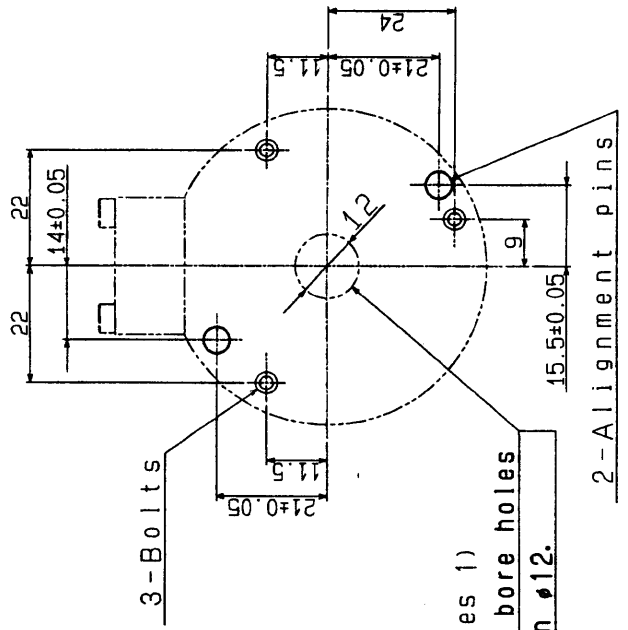
| | | | |
|---|-------|------|--------|
| TOLERANCES UNLESS OTHERWISE SPECIFIED | | | |
| MEASURE RANGE | 0.5-6 | 6-30 | 30-120 |
| ACCEPTABLE RANGE | ±0.1 | ±0.2 | ±0.3 |
| | ±0.5 | ±0.8 | ±1.2 |
| SCREW'S PRECISTION DEPENDS ON MIDDLE CLASS OF JISB0209. | | | |

TPRA10-000

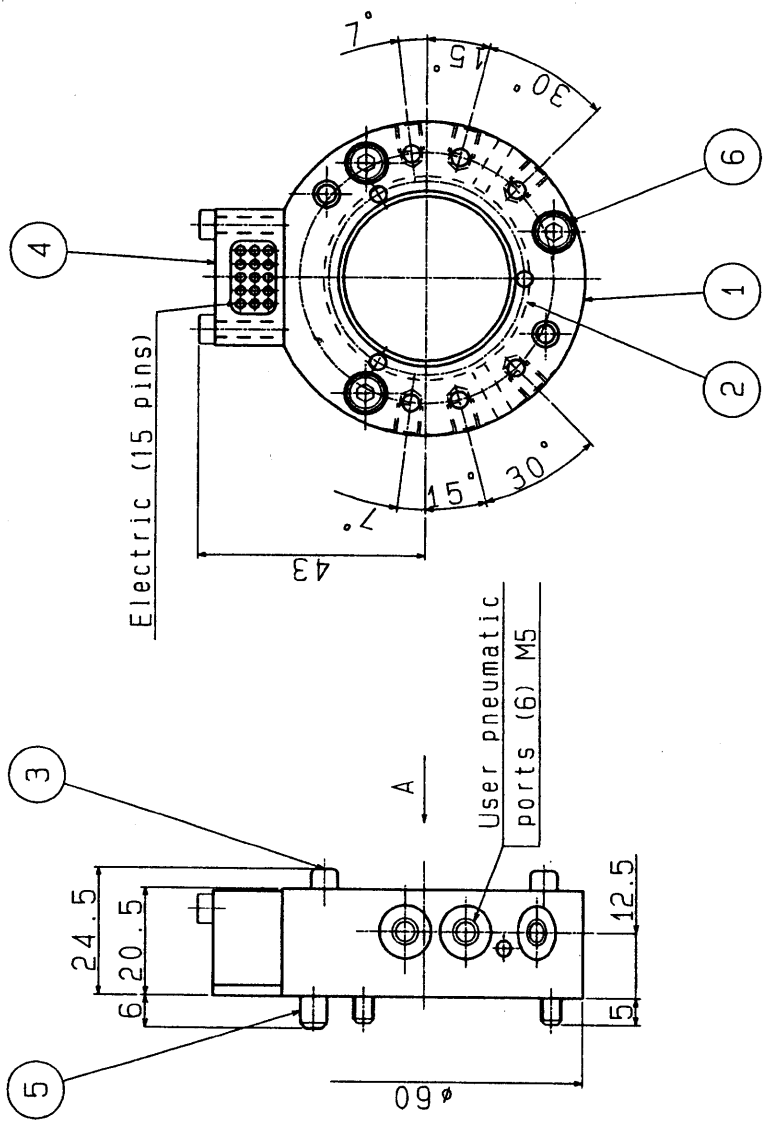
| | | | |
|-------------|------------|-------------|------------|
| DATE | REVISION | CONTENT | REVISED BY |
| APPROVED BY | CHECKED BY | DESIGNED BY | DRAWN BY |
| | | | |
| | | | |

| | | | | |
|------|---------------------|----------|-----|---------------|
| 2 | HELICOIL | SUS | 3 | M4x1.5D |
| 1 | PLATE | A6061-T6 | 1 | |
| ITEM | DESCRIPTION | MATERIAL | QTY | PART'S NUMBER |
| | Xchange XC-10 | | | NO. |
| | ROBOT ADAPTOR PLATE | | | CLASS. |
| | ATT-3S0021 | | | TITLE |
| | | | | SCALE |
| | | | | DATE |

NITTA CORPORATION



Connecting dimension view (View A)



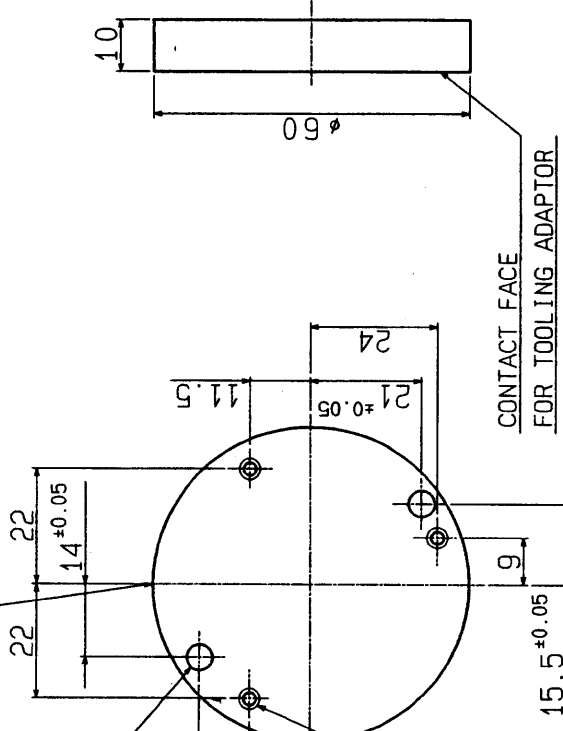
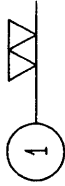
- Notes
1. Don't bore holes on tooling adaptor plate within $\phi 12$ as shown in "connecting dimension view".
 - The piston bolt of robot adaptor will push this position to disconnect tooling adaptor from robot adaptor.
 2. Subassembly-electrical interface block to be wired by customer.

| | | | | |
|-----------------|--|----------|----------|---------------|
| 6 | SCR-SOC HD CAP | SCM435 | 3 | M4x20 |
| 5 | Parallel pin | Steel | 2 | $\phi 5m6x12$ |
| 4 | Subassembly-electrical interface block | — | 1 | TAT-001-01 |
| 3 | Alignment pin | Steel | 2 | TBT-003-00 |
| 2 | Lock ring | Steel | 1 | TBT-002-00 |
| 1 | Housing | Alum | 1 | TBT-001-00 |
| ITEM | DESCRIPTION | MATERIAL | QTY | PART'S NUMBER |
| Xchange XC-10 | | NO. | | |
| TOOLING ADAPTOR | | CLASS. | | |
| ATT-3S0020 | | TITLE | | |
| △ | | SCALE | FREE | |
| | | DATE | 96.08.19 | |

| | | |
|-------------|------------------|-------------|
| DATE | REVISION CONTENT | REVISOR |
| APPROVED BY | CHECKED BY | DESIGNED BY |
| DRAWN BY | | |

TT15-6JN00

DIRECTION FOR ELECTRIC BLOCK



2 - $\phi 5.05H8^{+0.018}$ THRU

2 3-M4 HELICOIL 1.5 DIA.
INSTALLED FROM THIS SIDE

CONTACT FACE
FOR TOOLING ADAPTOR

NOTES)

BREAK ALL SHARP EDGES 0.1-0.2mm.
SURFACE FINISH: BLACK ALUMITE.

| TOLERANCES UNLESS OTHERWISE SPECIFIED | | | |
|---------------------------------------|--------------------------------------|------|--------|
| MEASURE RANGE | 0.5-6 | 6-30 | 30-120 |
| ACCEPTABLE RANGE | ±0.1 | ±0.2 | ±0.3 |
| SCREW'S PRECISION | DEPENDS ON MIDDLE CLASS OF JISB0209. | | |

TPTA10-000

| DATE | REVISION | CONTENT | DESIGNED BY | REVISOR |
|------|----------|---------|-------------|---------|
| | | | | |
| | | | | |
| | | | | |

| | | | | |
|------|-----------------------|----------|-----|---------------|
| 2 | HELICOIL | SUS | 3 | M4x1.5D |
| 1 | PLATE | A6061-T6 | 1 | |
| ITEM | DESCRIPTION | MATERIAL | QTY | PART'S NUMBER |
| | Xchange XC-10 | | | NO. |
| | TOOLING ADAPTOR PLATE | | | CLASS. |
| | | | | TITLE |
| | | | | SCALE |
| | | | | DATE |
| | | | | FREE |
| | | | | 96.08.20 |

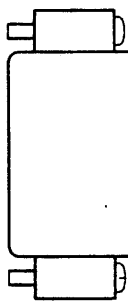
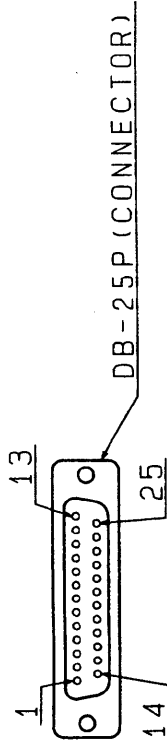
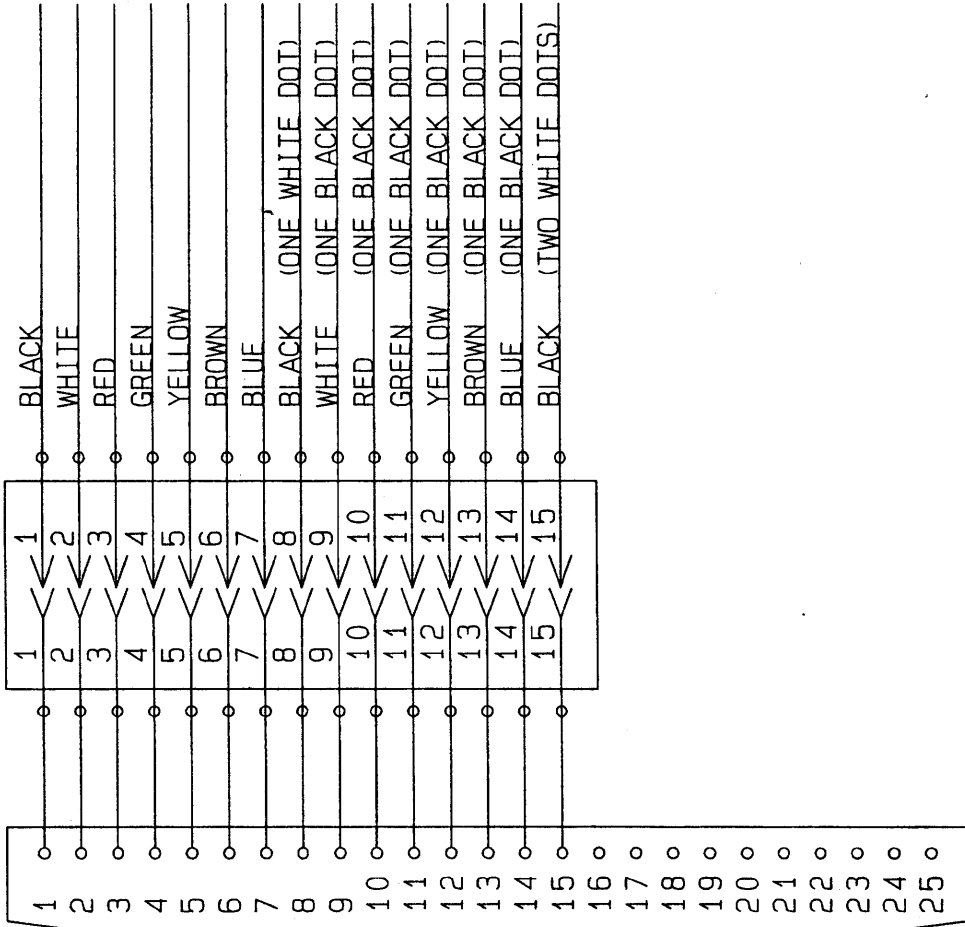
ATT-3S0022 Δ

NITTA CORPORATION

ROBOT ADAPTOR CONNECTOR
DB-25P

TOOLING ADAPTOR CABLE WIRE COLOR

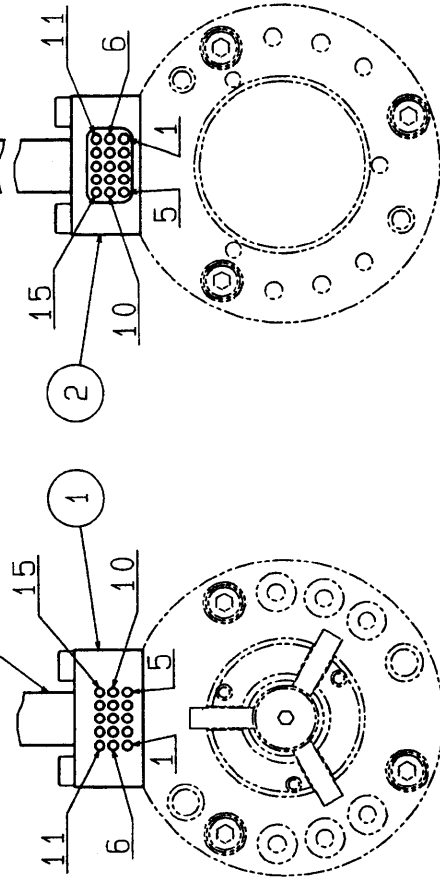
SPRING PIN No.



PCVV-SW 0.15SQx15C

DB-C2-J9 (CLAMP)

PCVV-SW 0.15SQx15C



ROBOT SIDE

TOOLING SIDE

CONNECTION FACE SIDE VIEW

| | | | |
|------|--------------------------|-----|---------------|
| 2 | *T* SIDE INTERFACE BLOCK | 1 | TAT-001-02 |
| 1 | *R* SIDE INTERFACE BLOCK | 1 | TAR-001-02 |
| ITEM | DESCRIPTION | QTY | PART'S NUMBER |
| 1 | Xchange XC-10 | | NO. |
| | WIRING DIAGRAM | | CLASS. |
| | ATT-3S0023 | | TITLE |
| | | | SCALE |
| | | | DATE |

| | | | |
|-------------|------------|-------------|----------|
| DATE | REVISION | CONTENT | REVISOR |
| APPROVED BY | CHECKED BY | DESIGNED BY | DRAWN BY |
| Y. H. K. | | J. K. | |

NITTA CORPORATION