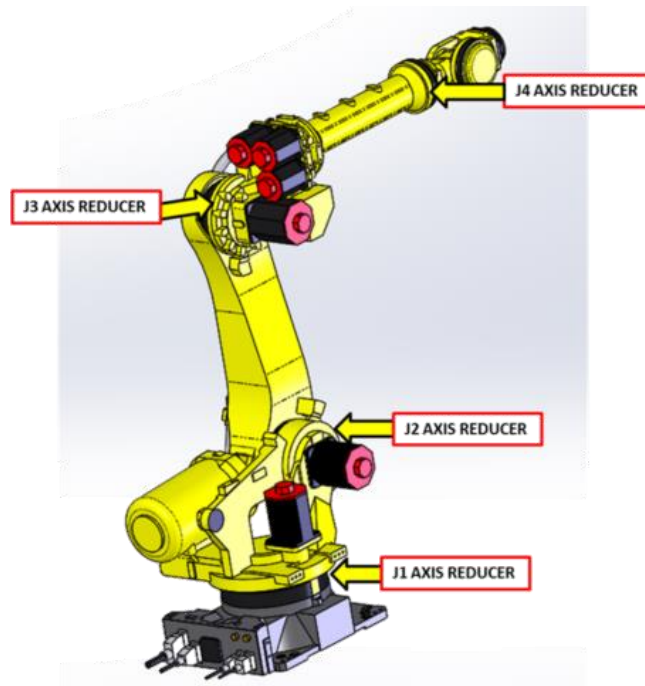


STANDARD MAINTENANCE PROCEDURE – Replace

Component:	J4 AXIS REDUCER AND WRIST	Model:	R-2000iC-165F, 210F, 125L, 165R, 210R Replacement
Manufacturer:	FANUC	Mech /Elec:	MECHANICAL / ELECTRICAL
Tool Required:	<ul style="list-style-type: none"> Adjustable Wrench Hex Wrench Tweezer Grease Gun 	PPE:	<ul style="list-style-type: none"> Bump Cap Protection Eye protection Sleeve Protection Lock Out Protection Shoe Protection Ear Protection
Time Est:	240 min	Frequency:	AS NEEDED

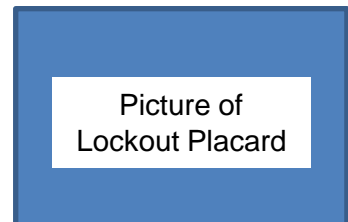
Overview Picture



REPLACE THE J4 AXIS REDUCER: DISASSEMBLE

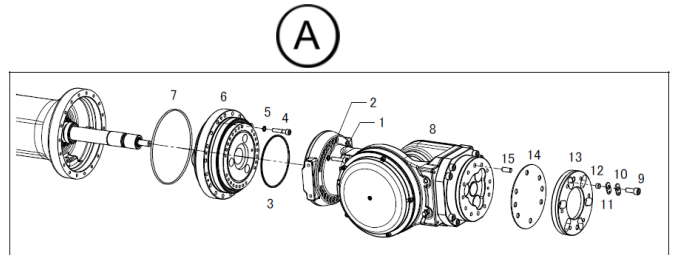
1) Perform lockout/tagout procedure.

Always refer to posted ECPL Placards for current Lockout procedures.



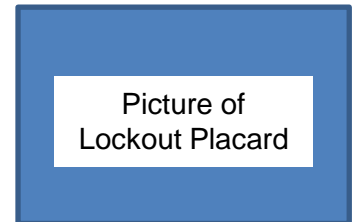
STANDARD MAINTENANCE PROCEDURE – Replace

- 2) Remove loads (end effector, welder, etc.) from the wrist.
- 3) Prepare for single axis mastering following replacement.
- 4) Turn off the controller power.
- 5) Remove wrist mounting bolts (A)(1), washers (A)(2), and O-ring (A)(3). Remove wrist unit.
- 6) Remove reducer mounting bolts (A)(4), washers (A)(5), and O-ring (A)(7). Remove reducer (A)(6) from J3 arm.



R-2000iC/165F/210F/125L/165R/210R

- 7) Remove lock and place the line back in running order.

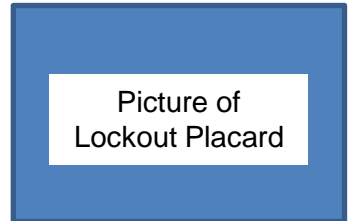


STANDARD MAINTENANCE PROCEDURE – Replace

REPLACE THE J4 AXIS REDUCER: ASSEMBLE

1) Perform lockout/tagout procedure.

Always refer to posted ECPL Placards for current Lockout procedures.



2) Turn off controller power.

3) When the insulated flange option is specified, attach bolts(9), washer (11), and collars(12), the adapter (13), insulation plate (14), and pins (15). (When the wrist is not replaced, this procedure is unnecessary)

4) Attach O-ring (7) to reducer (6).

5) Install reducer (6) on J3 arm, and fasten with mounting bolts (4) and washers (5).

6) Attach O-ring (3) to the groove in the reducer.

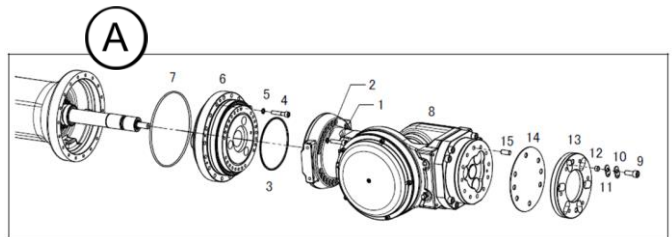
7) Fasten the wrist unit with the mounting bolts (1) and washers (2).

8) Apply grease to the wrist unit see grease SMP

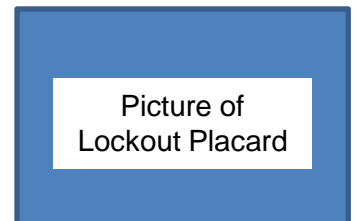
9) Fasten the wrist unit with the wrist unit mounting bolts (1) and washers (2).

10) Apply grease to the wrist. (See Section 2.3.)

11) Perform single axis mastering for the J4/J5/J6-axis. Refer to the SINGLE AXIS MASTERING section of the robot-specific Operator’s Manual.



12) Remove lock and place the line back in running order.



After completion of maintenance, replace all guards, remove all tools and remove all pins and locks from equipment.

STANDARD MAINTENANCE PROCEDURE – Replace

D STRENGTH OF BOLT AND BOLT TORQUE LIST

NOTE

When applying LOCTITE to a part, spread the LOCTITE on the entire length of the engaging part of the female thread. If applied to the male threads, poor adhesion can occur potentially loosening the bolt. Clean the bolts and the threaded holes and wipe off the oil on the engaging section. Make sure that there is no solvent left in the threaded holes. In this case, remove all the excess LOCTITE when you are finished screwing the bolts into the threaded holes.

Use the following strength bolts. Comply with any bolt specification instructions as specified.
Hexagon socket head bolt made of steel:

- Size M22 or less: Tensile strength 1200N/mm² or more
- Size M24 or more: Tensile strength 1000N/mm² or more
- All size plating bolt: Tensile strength 1000N/mm² or more

Hexagon bolt, stainless bolt, special shape bolt (button bolt, low-head bolt, flush bolt .etc.)
Tensile strength 400N/mm² or more

Refer to the following tables if the bolts tightening torque are not specified.

Recommended bolt tightening torques

Unit: Nm

Nominal diameter	Hexagon socket head bolt (steel)		Hexagon socket head bolt (stainless)		Hexagon socket head button bolt Hexagon socket head flush bolt Low-head bolt (steel)		Hexagon bolt (steel)	
	Tightening torque		Tightening torque		Tightening torque		Tightening torque	
	Upper limit	Lower limit	Upper limit	Lower limit	Upper limit	Lower limit	Upper limit	Lower limit
M3	1.8	1.3	0.76	0.53	-----	-----	-----	-----
M4	4.0	2.8	1.8	1.3	1.8	1.3	1.7	1.2
M5	7.9	5.6	3.4	2.5	4.0	2.8	3.2	2.3
M6	14	9.6	5.8	4.1	7.9	5.6	5.5	3.8
M8	32	23	14	9.8	14	9.6	13	9.3
M10	66	46	27	19	32	23	26	19
M12	110	78	48	33	-----	-----	45	31
(M14)	180	130	76	53	-----	-----	73	51
M16	270	190	120	82	-----	-----	98	69
(M18)	380	260	160	110	-----	-----	140	96
M20	530	370	230	160	-----	-----	190	130
(M22)	730	510	-----	-----	-----	-----	-----	-----
M24	930	650	-----	-----	-----	-----	-----	-----
(M27)	1400	960	-----	-----	-----	-----	-----	-----
M30	1800	1300	-----	-----	-----	-----	-----	-----
M36	3200	2300	-----	-----	-----	-----	-----	-----



STANDARD MAINTENANCE PROCEDURE – Replace

MATCH MARKING

While performing this PM, if you discover any problems that are outside the scope of the work covered by this PM, generate a work ticket to initiate the necessary repairs and report to your supervisor.

After completion of maintenance, replace all guards, remove all tools, remove all pins and locks from equipment and restore equipment to the state it was in before maintenance began.

After completion of SMP, mark the Machine Ledger and PM Calendar, if applicable.

If this SMP has been performed in response to a TMS generated activity, be certain to buy off the activity in TMS.

- 1) Perform lockout/tagout procedure.

Always refer to posted ECPL Placards for current Lockout procedures.

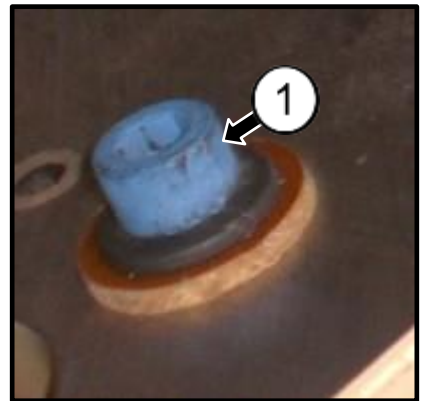


Picture of
Lockout Placard

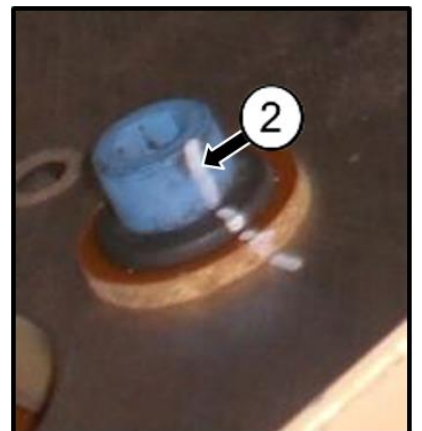
- 2) Torque all bolts to its NAAMS requirement.

NOTE: *Torque requirements will be included in a procedures steps and is shown in Newton Meters (Nm).*

NOTE: *Clean old match marking off bolt and surface.*

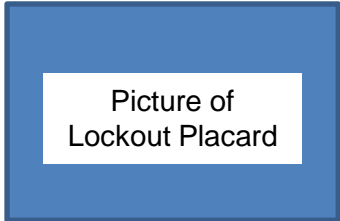


- 3) After torqueing is complete, draw a straight line (match mark) from the wall of the fastener head on the seating surface using a white steel paint pen. Ensure the line is easily visible for inspections.



STANDARD MAINTENANCE PROCEDURE – Replace

- 4) Remove lock and place the line back in running order.



STANDARD MAINTENANCE PROCEDURE – Replace

SPARE PARTS REQUIRED

Part Number	Description
	A97L-0218-0990#36 REDUCER
	JB-OR1A-G125 ORING
	A98L-0040-0041#262 ORING
	A290-7333-T501 WRIST UNIT

	Number	Work Time (Min)
Electric Skilled Trade		
Mechanic Skilled Trade	1	240
Tool / Die		
Total	1	240

CREATE/MODIFICATIONS	VERSION	PLANT	DATE
Initial SMP Created	1.0	Alabama – SKB Program	03/04/2021

- Make sure you are wearing proper PPE before beginning this maintenance activity.
- Lockout all stored energy sources in the work area using proper posted procedure.
- If you are unclear how to preform this task, ask your supervisor or a shift maintenance tech for clarification.
- While performing this PM, if you discover any problems or this PM is not accurate please document any changes or additions that should be made and give them the Supervisor.
- After completion of maintenance, replace all guards, remove all tools, remove all pins and locks from equipment and restore equipment to the state it was in before maintenance began.