

We are:

**Greabonix LLC
Archbold,
Ohio 43502**

www.greabonix.com



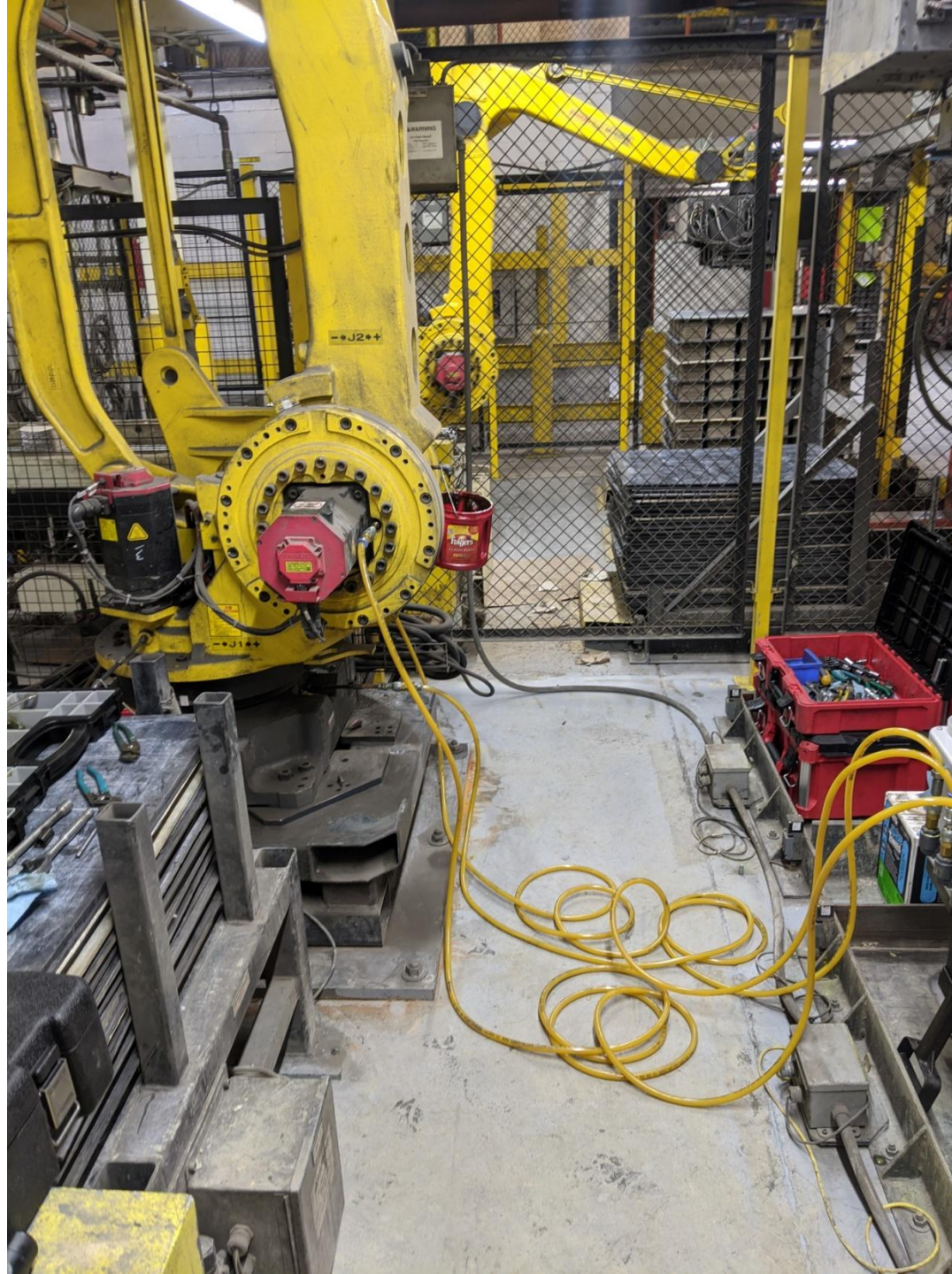


Greabonix
STQ 23 Lubrication
Pumping SYSTEM
Low Pressure Low Volume Greasing
patent pending















FANUC Robot **R-2000iB**

MECHANICAL UNIT OPERATOR'S MANUAL

Greabonix LLC was asked why our services costs more than our competitors?

As you will find in the following Fanuc R2000iB Manual:

There is a correct way to do your robots and there is just saying: "they're done"

In the information that follows Greabonix LLC will give you the truth so you can know for certain your robots are being serviced properly.

QUESTIONS:

Douglas Haase
Greabonix LLC
4773 Co. Rd. 22
Archbold, Ohio 43502
419-551-1009

B-82234EN/13

7.3.3 Replacing the Grease of the Drive Mechanism (3 years (11520 hours) Periodic Maintenance or 1 year (3840 hours) Periodic Maintenance)

According to below, replace the grease of the reducers of J1, J2, and J3 axes, the J4-axis gearbox, and the wrist at the intervals based on every 3 years or 11520 hours (every 1 year or 3840 hours for 210W1), whichever comes first. See table 7.3.3 (a) for the grease name and the quantity.

Table 7.3.3 (a) Grease for 3-years (11520 hours) periodical replacement

Models	Grease supplying position	Quantity	Gun tip pressure	Grease name
R-2000/B/165F R-2000/B/165R R-2000/B/125L R-2000/B/150U	J1-axis reducer	4900g (5500ml)	To purge the grease in all six axis on a Fanuc R-2000IB will take around 15,700 ml of grease or more if it is first time.	Nebtesco VEGO Grease 170KG Costs \$4000
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2200g (2500ml)		
	J4-axis gearbox	1700g (1900ml)		
	wrist 1	2100g (2400ml)		
	wrist 2	700g (800ml)		
R-2000/B/210F R-2000/B/185L R-2000/B/250F R-2000/B/200R R-2000/B/175L R-2000/B/220U	J1-axis reducer	4900g (5500ml)	.15MPa is = 21.5 PSI Service usage 15,700ml per six axis R2000 robot	170,000 ml = \$.024 ml 15,700 X .024 \$ \$367.80 Grease Cost Per Robot
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2350g (2640ml)		
	J4-axis gearbox	1700g (1900ml)		
	wrist 1	3400g (3800ml)		
	wrist 2	1000g (1100ml)		
R-2000/B/100P	J1-axis reducer	4900g (5500ml)	0.15MPa or less (NOTE)	Kyodo yushi VIGOGREASE RE0 Spec : A98L-0040-0174
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2200g (2500ml)		
	J4-axis gearbox	1700g (1900ml)		
	wrist 1	3400g (3800ml)		
	wrist 2	1000g (1100ml)		
R-2000/B/170CF	J1-axis reducer	4700g (5300ml)	Greabonix pumps each axis at less than 21psi	
	J2-axis reducer	2400g (2700ml)		
	J3-axis reducer	2400g (2700ml)		
	J3-axis gearbox	300g (340ml)		
	J4-axis gearbox	1900g (2100ml)		
	wrist 1	2100g (2400ml)		
R-2000/B/100H	J1-axis reducer	4900g (5500ml)	We have a built in systems fault at 27PSI	
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2200g (2500ml)		
	J4-axis gearbox	1700g (1900ml)		
	wrist 1	1400g (1600ml)		
	wrist 2	700g (800ml)		
R-2000/B/210FS R-2000/B/220US	J1-axis reducer	4900g (5500ml)	Hand Pump or Pneumatic Pump has a min. of 3500psi potential	
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2350g (2640ml)		
	J4-axis gearbox	1700g (1890ml)		
	wrist 1	2500g (2780ml)		
	wrist 2	500g (560ml)		
R-2000/B/165CF	J1-axis gearbox	3600g (4100ml)		
	J2-axis gearbox	2300g (2600ml)		
	J3-axis gearbox	1400g (1600ml)		
	J4-axis gearbox	3400g (3950ml)		
	wrist 1			
	wrist 2	350g (400ml)		

7. CHECKS AND MAINTENANCE

R-82234EN/13

Table 7.3.3 (b) Grease for 1-year (3840 hours) periodical replacement

Models	Greasing	Quantity	Gun tip pressure	Grease name
R-2000iB/210WE	J1-axis reducer	4900g (5500ml)	0.15MPa or less (NOTE)	Kyodo yushi VIGOGREASE REO Spec. A98L-0040-0174
	J2-axis reducer	3100g (3500ml)		
	J3-axis reducer	2350g (2640ml)		
	J4-axis gearbox	1700g (1900ml)		
	wrist 1	3400g (3800ml)		
	wrist 2	1000g (1100ml)		

NOTE

When a manual pump is used for greasing, the standard rate is two pumping cycles per three seconds. 15,700ml of grease at 2ml per 3 seconds = 392.5 Minutes to pump
this could take up to 6.5 hours.

WARNING

Greabonix pumps 3 axis at a time reducing to 2.5 hrs. to do a fair job.

Hot grease might eject suddenly when you open the grease outlet. Attach bags for collecting grease, and use appropriate protective equipment such as heat-resistant gloves, protective glasses, a face shield, or a body suit if necessary.

NOTE: ***** If your service company is pumping one axis at a time. They should be taking 6.5 hrs for a Fanuc R2000iB*****
For grease replacement or replenishment, use the posture indicated below.

Table 7.3.3 (c) Postures for greasing
(R-2000iB/165F/210F/185L/250F/210WE/125L/175L/100H/150U/220U/210FS/220US/165CF)

Supply position	Posture					
	J1	J2	J3	J4	J5	J6
J1-axis reducer	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
J2-axis reducer		0°				
J3-axis reducer		0°				
J4-axis gearbox		0°				
Wrist		Arbitrary	0°	0°	0°	0°

Table 7.3.3 (d) Postures for greasing (R-2000iB/165R/200R/100P)

Supply position	Posture					
	J1	J2	J3	J4	J5	J6
J1-axis reducer	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
J2-axis reducer		-90°				
J3-axis reducer		-90°	90°			
J4-axis gearbox		Arbitrary	90°			
Wrist			90°	0°	0°	0°

Table 7.3.3 (e) Postures for greasing (R-2000iB/170CF)

Supply position	Posture					
	J1	J2	J3	J4	J5	J6
J1-axis reducer	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary	Arbitrary
J2-axis reducer		0°				
J3-axis reducer		0°	0°			
J3-axis gearbox		0°	0°			
J4-axis gearbox		Arbitrary	0°			
Wrist			0°	0°	0°	0°



Robot Service Report

Customer:	LyondellBasell	Technician:	Robotics @ Greabonix
Contact:	Douglas Haase	Greabonix Phone:	(419) 551-1009
Phone:	419-551-1009	Greabonix Email:	Greabonix@gmail.com
Email:	Greabonix@gmail.com	Date:	10/09/2021

Robot	
Model:	M101A /12 Cube 4
Serial Number:	F- 205541
Name:	Fanuc



Controller	
Model:	R30
Serial Number:	E16832958
Software:	

Service	Yes	No	NA	Comments
11 Grease Replacement	X			
J2 Grease Replacement	X			
J3 Grease Replacement	X			
J4 Grease Replacement	X			
J5 Grease Replacement	X			
16 Grease Replacement	X			
Grease Samples Collected	X			
Used Grease Disposal	X			
J1 Motor Connections	X			
J2 Motor Connections	X			
J3 Motor Connections	X			
J4 Motor Connections	X			
J5 Motor Connections	X			
J6 Motor Connections	X			
11 Backlash Testing				
J2 Backlash Testing				
J3 Backlash Testing				
J4 Backlash Testing				
J5 Backlash Testing				
J6 Backlash Testing				
Controller Battery Replaced				
Encoder Batteries Replaced	X			
Robot Mounting Torque Check				
EOAT Inspection	X			
Controller Cleaned				
Controller Cables Inspection				
Robot Backups				

Additional Comments/Observations:



**Predictive
Maintenance
Services, Inc.**
111 N. Walnut St
Dover, Ohio 44622
740-922-2025

www.theoilab.com

Unit ID: PASTING LINE 2 AXIS 4

Client ID: 21648 GREABONIX LLC

Unit Type: GREASE SAMPLE

Unit Make: NONE GIVEN

Unit Model: NONE GIVEN

Component Make: NONE GIVEN

Component Model: NONE GIVEN

Year

Lube Type: VIGO GREASE

Grade: NONE GIVEN

Capacity:

Oil Changed:

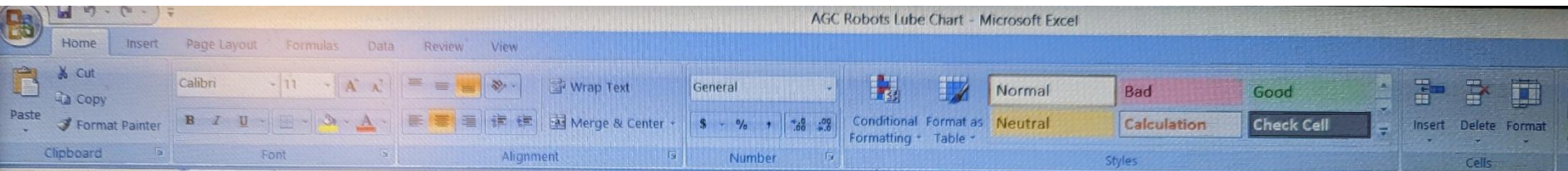
ATTENTION CODE:

Normal

Condition Monitoring Report

REMARKS	*WEAR AND CONTAMINATION LEVELS APPEAR NORMAL. NO CORRECTIVE ACTION IS INDICATED BY TESTS PERFORMED. CONTINUE NORMAL OEM MAINTENANCE & SAMPLE INTERVALS.																			
	ATTENTION CODES AAA Acceptable III Critical EEE Excessive *** Severe CCC Severe - Below === Caution --- Slightly Above Normal LLL Slightly Below Normal TTT Trend NNN Negative DDD Critical - Below MMM Moderate BBB Caution - Below																			

ASTM D6595 (PPM) WEAR METALS										MULTISOURCE										ADDITIVES			
IRON	CHROMIUM	LEAD	COPPER	TIN	ALUMINUM	NICKEL	SILVER	CADMIUM	VANADIUM	SILICON	BORON	SODIUM	POTASSIUM	MAGNESIUM	TITANIUM	MOLYBDENUM	MANGANESE	LITHIUM	ANTIMONY	CALCIUM	PHOSPHORUS	ZINC	BARIUM
Lab #: 1107520 Dt Tkn: 4/16/2021 Dt Recd: 4/19/2021 HrO: HrU: MiO: MiU: Make Up Oil: 0 qts																							
17	1	0	2	25	10	0	0	0	13	9	1	18	2	13	1	6398	0	1812	0	2628	733	1012	8
Lab #: 1063513 Dt Tkn: 3/19/2018 Dt Recd: 10/27/2020 HrO: HrU: MiO: MiU: Make Up Oil: 0 qts																							
14	0	0	1	14	7	0	0	0	9	10	0	80	2	9	0	3527	0	1295	0	2557	800	621	14
Lab #: 1038145 Dt Tkn: 7/19/2020 Dt Recd: 7/27/2020 HrO: HrU: MiO: MiU: Make Up Oil: 0 qts																							
21	1	0	2	24	10	0	0	0	12	10	1	25	2	12	1	4354	0	1743	0	2541	915	894	29
Lab #: 1020288 Dt Tkn: 5/7/2020 Dt Recd: 5/11/2020 HrO: HrU: MiO: MiU: Make Up Oil: 0 qts																							
30	1	0	2	26	9	0	0	0	14	10	1	78	6	13	1	4181	0	1991	0	3652	812	988	80



	A	B	C	D	E	F	G	H	I	J	K	L
69	F205961	B95 Fanuc R2000iC	7/6/2022	IRON	17ppm	35ppm	42ppm	11ppm	21ppm	20ppm	12	
70	F205961	B95 Fanuc R2000iC	7/6/2022	COPPER	1ppm	1ppm	1ppm	1ppm	1ppm	1ppm		
71	F205961	B95 Fanuc R2000iC	7/6/2022	Tin	41ppm	42ppm	48ppm	45ppm	41ppm	44ppm		
72	F205961	B95 Fanuc R2000iC	7/6/2022	ALUM	5ppm	5ppm	6ppm	6ppm	5ppm	6ppm		
73	F205961	B95 Fanuc R2000iC	7/6/2022	SILICON	9ppm	8ppm	7ppm	9ppm	9ppm	10ppm		
74												
75	E111672	B95 Fanuc M710	7/6/2022	IRON	25ppm	69ppm	28ppm	24ppm	148ppm	N/S	13	
76	E111672	B95 Fanuc M710	7/6/2022	COPPER	1ppm	1ppm	1ppm	1ppm	12ppm	N/S		
77	E111672	B95 Fanuc M710	7/6/2022	Tin	32ppm	64ppm	46ppm	36ppm	68ppm	N/S		
78	E111672	B95 Fanuc M710	7/6/2022	ALUM	4ppm	9ppm	6ppm	5ppm	13ppm	N/S		
79	E111672	B95 Fanuc M710	7/6/2022	SILICON	6ppm	12ppm	8ppm	7ppm	19ppm	N/S		
80												
81	E109722	B95 Fanuc R2000iC	7/6/2022	IRON	34ppm	71ppm	7ppm	10ppm	47ppm	27ppm	14	
82	E109722	B95 Fanuc R2000iC	7/6/2022	COPPER	1ppm	1ppm	0ppm	1ppm	3ppm	2ppm		
83	E109722	B95 Fanuc R2000iC	7/6/2022	Tin	60ppm	75ppm	19ppm	43ppm	59ppm	55ppm		
84	E109722	B95 Fanuc R2000iC	7/6/2022	ALUM	8ppm	9ppm	4ppm	5ppm	7ppm	8ppm		
85	E109722	B95 Fanuc R2000iC	7/6/2022	SILICON	15ppm	11ppm	9ppm	8ppm	16ppm	9ppm		
86												
87	E110742	B95 Fanuc R2000iC	7/6/2022	IRON	24ppm	85ppm	114ppm	12ppm	49ppm	16ppm	15	
88	E110742	B95 Fanuc R2000iC	7/6/2022	COPPER	1ppm	2ppm	1ppm	2ppm	2ppm	1ppm		
89	E110742	B95 Fanuc R2000iC	7/6/2022	Tin	48ppm	69ppm	59ppm	67ppm	64ppm	48ppm		
90	E110742	B95 Fanuc R2000iC	7/6/2022	ALUM	6ppm	9ppm	8ppm	8ppm	8ppm	7ppm		
91	E110742	B95 Fanuc R2000iC	7/6/2022	SILICON	14ppm	12ppm	12ppm	14ppm	18ppm	9ppm		
92												
93	E109724	B95 Fanuc R2000iC	7/6/2022	IRON	71ppm	171ppm	1356ppm	9ppm	24ppm	17ppm	16	
94	E109724	B95 Fanuc R2000iC	7/6/2022	COPPER	1ppm	2ppm	2ppm	1ppm	4ppm	2ppm		
95	E109724	B95 Fanuc R2000iC	7/6/2022	Tin	70ppm	88ppm	63ppm	53ppm	41ppm	55ppm		
96	E109724	B95 Fanuc R2000iC	7/6/2022	ALUM	9ppm	11ppm	8ppm	6ppm	5ppm	7ppm		
97	E109724	B95 Fanuc R2000iC	7/6/2022	SILICON	16ppm	15ppm	16ppm	9ppm	14ppm	9ppm		
98												
99	E137758	B95 Fanuc R2000iC	7/6/2022	IRON	21ppm	112ppm	101ppm	7ppm	35ppm	38ppm	17	



2022 Greabonix LLC – Work Scope for Fanuc Robots

Robotic Arm Assignments

1. Pre inspect for damage and leaks.
2. Mechanical inspection for wear and loose bolts.
3. Touch checks all cable connectors.
4. Visual check all cables and hoses for wear.
5. Inspect EOAT for breakage and wear.
6. Grease all points. (bearings and counterbalance)
7. Check counterbalance for clevis and trunnion wear.
8. Purge all axis with Factory Recommended Nabtesco VegoGrease RE0.
9. Collect grease samples for professional analysis from each axis.
10. Full report with analysis and suggestions for P.M. Scheduling.

Robotic Control Cabinet Assignments

1. Visual check of wiring and teach pendant.
2. Sweep controller cabinet and change Filters.
3. Change controller and servo batteries in applicable.
4. Do full backups with your company supplied memory stick. (For your protection) (Greabonix sticks w- permission)
5. Check for non-working lights and buttons.
6. Full report on any electrical concerns and suggestions.

4773 County Rd 22 . Archbold, Ohio. 4350

www.greabonix.com

PH. 419-551-1009



ADVANCED ROBOT LUBRICATION & MAINTENANCE

HOURS:
WE WORK WHEN
ROBOTS DON'T!
"24/7 ON CALL CREW!"
419-551-1009
greabonix@gmail.com

GREABONIX
 Archbold, OH • United States

Welcome,

We are Greabonix LLC.

If you haven't heard about us we are a Preventive Maintenance Company for Industrial Robots. We have been in business for about 7 years now and serviced hundreds of robots. We specialize in the **Fanuc** brand but also have done several **ABB**, **Motoman**, & **KUKA**. (If you have Brands that are not included in this list please call for a quote anyways.)

We also work with many affiliates:

1. **General Motors**, Defiance, Ohio
2. **RTSS**, Holland, Ohio
3. **ACT/ Whelco**, Perrysburg, Ohio
4. **DECC**, Grand rapids, Michigan
5. **Saginaw Controls**, Saginaw, Michigan
6. **Piston Automotive**, Toledo, Ohio
7. **Quickrete**, Toledo, Ohio
8. **Ball Corporation**, Findley, Ohio
9. **Clarios**, Toledo, Ohio
10. **CK Technologies**, Montpelier, Ohio
11. **Alliance Automation LLC**, Flint, Michigan
12. **Wauseon Machine**, Wauseon, Ohio
13. **Pioneer Industrial Products**, Pioneer, Ohio
14. **AM General Dayton**, Ohio
15. **Reifel Industries**, Pioneer, Ohio
16. **Amcor Products**, Johnston, Ohio
17. **KanPak LLC**, Arkansas City, Kansas
18. **Lyondell Basell**, Conneaut, Ohio
19. **RoBEX**, Perrysburg, Ohio
20. **AGC**, Bellefontaine, Ohio

**Thank you from the crew of
Greabonix LLC!!**

Hope your day is wonderful!!

419-551-1009