



FANUC R-30iB Mate Plus Start Up Guide (FANUC Safety)





The documentation, best practices, and recommendations provided by READY Robotics do NOT constitute safety advice. Products sold through READY Robotics are not by themselves a fully integrated workcell. As required in ISO 10218-2, READY Robotics strongly recommends performing a complete risk assessment of the integrated workcell per ISO 12100. You may wish to use the methodology found in the ANSI/RIA TR R15.306 Task-based Risk Assessment Methodology.



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### **OVERVIEW**

Welcome to the FANUC Start Up Guide Forge/OS 5. This guide covers the following hardware:

Robot Controller	R-30iB Mate or R-30iB Mate Plus
Safety Hardware	FANUC Safety I/O Board Kit (FANUC option) - integrates the READY pendant Key Switch, Enabling Switch, and Emergency Stop to the robot safety I/O.
READY Hardware	READY pendant and a non-READY industrial PC (IPC).

Here are the steps you will follow:

- 1. Prepare safety hardware.
- 2. Connect the READY pendant.
- 3. Connect the IPC.
- 4. Power on the system.
- 5. Configure your robot for Forge/OS.
- 6. Control your robot with Forge/OS!

## HARDWARE REQUIREMENTS

Image	Part Name	Description	Vendor	Part Number
		Hosts Forge/OS.		
	Industrial PC (IPC)	<b>Note:</b> Refer to the Forge/OS 5 User Manual for IPC requirements.		
	READY pendant	The touch screen interface for Forge/OS.	READY Robotics	112563
	R-30iB-Mate or Mate Plus Robot Controller	Connects the robot arm to power and to other devices.	FANUC	
	Safety I/O Board			A05B-2600-J131
	Safety I/O Conversion Unit with Mounting Hardware and Cable	Required for pendant safety features and other safeguard devices (i.e. safety fence).	FANUC (included in MATE- SAFETY- IO, Safe I/O PCB Kit)	A05B-2650-J132
	Safety I/O Board Cable - Non- Collaborative robots only			A05B-2650-J180



Image	Part Name	Description	Vendor	Part Number
	Safety I/O Board Cable - <b>CR-Series only</b>			A05B-2650-J181
	FANUC Teach Pendant	Required for setup and error recovery.	FANUC	
	24V/2.5A Power Supply	Powers the READY pendant and more. Min./Max. current: 2.5/5.0 Amps.		e.g., Siemens 6EP1332-5BA00
	Polycarbonate Enclosure or Electrical Cabinet	Protects the electrical parts in an enclosure.		
	Cat5e Shielded Ethernet Cable (x2)	<ul> <li>Connects the robot controller to a IPC.</li> <li>Connects the READY pendant to a IPC.</li> </ul>		



### SOFTWARE REQUIREMENTS

This section explains how to check your FANUC software for these version and option requirements.

Required Option	Description
R-30iB Mate Firmware: V8.10P/30 (05/2018) or equivalent R-30iB Mate Plus Firmware: V9.10P/33 (02/2021) or equivalent	Minimum firmware version supported by Forge/OS.
RTL-R632 KAREL	Required for Forge programs to run on the robot
RTL-R648 User Socket Messaging	controller.
RTL-R859 Advanced DCS	Required to jog the robot with the READY pendant.

- 1 Plug the FANUC controller into a power source. Follow FANUC instructions for powering the controller.
- 2 Turn the power switch on the FANUC controller clockwise to power the controller on. Wait for the controller to boot up.

3 On the teach pendant keypad, press the **STATUS** button at the bottom.

#### 4 In the STATUS menu, press **[TYPE] (F1)**, then press **Version ID (2)**.

Flag Bits 1	GRP[1]	
TYPE 1	Program	
2 Version ID	Reminder	
3 Stop Signal	Notifications	
4 Exec-hist		
5 Memory		
6 Robot Condition		
7 Prg Timer		
8 Sys Timer		
9 Condition	NEXT	
9 Condition		

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5 Look for **Software Edition No.** and note the version number next to it. If your system version is older than the requirement, contact your FANUC distributor to upgrade.

O Prod TCyc Version ID SOFTWARE: HandlingTool S/W Serial No. Controller ID Robot No. Manufacturing ID Default Personality ARC Mate 1201C	ID: 7DF1/33 88340 F00000 F00000 (from FD)			13/24
Version ID SOFTWARE: HandlingTool S/W Serial No. Controller ID Robot No. Manufacturing ID Default Personality RC Mate 1201C	ID: 7DF1/33 88340 F00000 F00000 (from FD)			+
SOFTWARE: HandlingTool S/W Serial No. Controller ID Robot No. Manufacturing ID Default Personality RC Mate 1201C	ID: 7DF1/33 88340 F00000 F00000 (from ED)			13/24
HandlingTool S/W Serial No. Controller ID Robot No. Manufacturing ID Default Personality ARC Mate 120iC	7DF1/33 88340 F00000 F00000 (from FD)			
S/W Serial No. Controller ID Robot No. Manufacturing ID Default Personality ARC Mate 1201C	88340 F00000 F00000 (from FD)			
Controller ID Robot No. Manufacturing ID Default Personality ARC Mate 1201C	F00000 F00000 (from FD)			
Robot No. Manufacturing ID Default Personality ARC Mate 120iC	F00000 (from FD)			
Manufacturing ID Default Personality ARC Mate 120iC	(from FD)			
Default Personality ARC Mate 120iC	(from FD)			
ARC Mate 120iC				
	V9.10P/33			
Servo Code	1234567890			
Cart. Mot. Parameter	V3.00			
Joint Mot. Parameter	V3.00			
DCS	V4.2.14			
Stop pattern	A			
Software Edition No.	V9.10P/33			
Update Version	None			
Customization Ver.	None			
Root Version	V9.10233			
Boot MONITOR	V0.00P/00			
Teach Pendant	7D0D/01P			
Browser Plugins	V9.40083			
TP Core Firmware	V9.40P/13			
[ TYPE ] SOF	TWARE CONFIG	MOTOR	SERVO	>
	In the second se	AIL: HOL: Farameter     V3.00       Doint Mot. Parameter     V3.00       DCS     V4.2.14       Stop pattern     A       Software Edition No.     V9.10P/33       Jpdate Version     None       Dustomization Ver.     None       Soot Worsion     V9.10233       Soot MONITOR     V0.00P/00       Feach Pendant     7D0D/01P       Browser Plugins     V9.40083       FF Core Firmware     V9.40P/13	AIL: NOL. Farameter     V3.00       Doint Mot. Parameter     V3.00       DCS     V4.2.14       Stop pattern     A       Software Edition No.     V9.102/33       Jpdate Version     None       Customization Ver.     None       Stot Version     V9.10233       Soot MONITOR     V0.00P/00       Peach Pendant     7D0D/01P       Browser Plugins     V9.40083       FP Core Firmware     V9.40P/13	AIL: NOL. Farameter     V3.00       Doint Mot. Parameter     V3.00       DCS     V4.2.14       Stop pattern     A       Software Edition No.     V9.102/33       Jpdate Version     None       Notore     None       Out Version     V9.102/33       Soot Worsion     V9.10233       Soot MONITOR     V0.00P/00       Peach Pendant     7DDD/01P       Browser Plugins     V9.40083       FP Core Firmware     V9.40P/13

Press the right arrow on the touchscreen menu bar, then press **ORDER FI**. The installed options appear with their part numbers.

5	Manufacturing ID	10:	13724	
6	Default Personality (	from FD)		
7	ARC Mate 1201C	V9.10P/33		
0	Servo Code	1234567890		
10	Toint Mot Darameter	V3.00		
11	DCS	VA 2 14		
12	Stop pattern	2		
13	Software Edition No.	V9.10P/33		
14	Update Version	None		
15	Customization Ver.	None		
16	Root Version	V9.10233		
17	Boot MONITOR	V0.00P/00		
18	Teach Pendant	7D0D/01P		
19	Browser Plugins	V9.40083		
20	TP Core Firmware	V9.40P/13		
21	TP Operating System			
22	HIMLS Browser	N/A		
23	Media from FRA	02/04/2021		
24	IFGA VEISION	1		



Look for the required options. Under "Continue displaying?", press YES to see more of the installed options. If 7 any of your controller's required options are missing, contact your FANUC distributor to upgrade.

LANSE-2600-R655 1 LANSE Calser/Remarky LANSE-2600-R7565 1 LANSE Calser/Remarky LANSE-2600-R305 1 Ascil Frogram Loader LANSE-2600-R305 4 Collision Guard Pack LANSE-2600-R53 4 Collision Guard Pack LANSE-2600-R545 1 Cycle Time Friceity LANSE-2600-R545 1 Cycle Time Friceity LANSE-2600-R556 1 CX Safe L/O connect LANSE-2600-R550 1 FRA Frame LANSE-2600-R550 1 FRA Frame	<pre>! Generated by PCNCIA 9.40083.5 for F00000 ! on LAPTOP-VVPLD783 lA058-2600-8552 ! RandlingTool lA058-2600-851 ! English Dictionary lA058-2600-851 ! English Dictionary lA058-2600-851 ! 4D Graphics</pre>	1A058-2600-R603 : ROS Ethernet Pack 1A058-2600-R648 : User Socket Mag 1A058-2600-FVRC : Virtual Robot 1A058-2600-H844 : ARC Mate 1201C Z	ets
1A058-2600-3568 / DCS Safe 1/O connect 1A058-2600-R850 / FRA parama 1A058-2600-R854 / HTAREL 1A058-2600-R854 / ECITAETAce 1A058-2600-R854 / ECITAETAce	1A058-2000-R655   Alaria Cause/Remedy 1A058-2000-R796   Ascil Frogram Loader 1A058-2000-R796   Ascil Frogram Loader 1A058-2000-R507   Ascil Topload 1A058-2000-R507   Collsion Guard 1A058-2000-R507   Collsion Guard Pack 1A058-2000-J567   CCS Fox./Speed check		
1A05B-2600-NVDT ! Persistent Strg	1A058-2600-7568 / DCS Safe I/O connect 1A058-2600-R650 / TRA Farama 1A058-2600-R632 / TRAEL 1A058-2600-R634 / TOALINE Help 1A058-2600-R641 / BC Interface 1A058-2600-R641 / BC Interface		



### **INSTALLING FANUC SAFETY HARDWARE**





b Make sure that each screw has a washer on it. Use two of the screws and a magnetic screwdriver to attach the Mounting Bracket to the inside of your FANUC controller. This will attach to the right side of the back panel.



c Use the remaining four screws and washers to attach the Safety I/O Conversion Unit to the Mounting Bracket. Orient the Safety I/O Conversion Unit so that the black connectors are positioned on the right.



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5 Install the Safety I/O Board.

a The inside of the FANUC Controller's door has a large yellow device mounted to it. This is your FANUC's Backplane. On the right side of the Backplane, there are two gray, plastic Mounting Brackets.



**b** Remove the innermost plastic Mounting Bracket. To do so, grab onto the top plastic tab with your left hand and then place your right index finger on the side of the bottom tab that faces away from you. With your left hand, pull the bracket out of its slot while applying pressure towards yourself with your right index finger at the base of the tab.

Find the Safety I/O Board. Slide the bracket over it.

Important: Do not touch the top or bottom faces of the board. Doing so may damage the board.



Slide the Safety I/O Board and Mounting Bracket assembly into the Backplane. The Safety I/O Board may require some force to install. Make sure that it sits flush with the Backplane. You will hear a click when it pops in the correct position.

Connect Safety I/O Board to the Safety I/O Conversion Unit.

Find the conversion unit cable. One end of the cable is labeled **SAFETY I/O CRMA90**.









a Use a Phillips 2 screwdriver to open the Force Torque Cabinet on the left side of your FANUC controller.



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## **CONNECTING THE READY PENDANT**

The READY pendant includes these safety outputs:

- 1. Key Switch (Robot Operation Mode)
- 2. Three-Position Enabling Switch
- 3. Emergency Stop Button



The end of the READY pendant cable includes:

- 1. One RJ45 Ethernet cable for communication with the IPC.
- 2. 15 Flying leads—2 for power, 12 for safety I/O, and 1 unused lead.



**Electric Shock Warning:** Disconnect all components from power sources before attempting this installation.

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Follow these sub-steps to connect the READY pendant communication, power, and safety wiring.

When connecting the READY pendant flying leads, refer to the destinations in this table.

Pendant Flying Leads	Function	Destination
Brown	Three-Position Enabling Switch Circuit 1	TBOP17 - 1
Yellow	Three-Position Enabling Switch Circuit 1	TBOP16 - 11
Green	Three-Position Enabling Switch Circuit 2	TBOP17 - 4
Grey	Three-Position Enabling Switch Circuit 2	TBOP16 - 21
Pink	24V DC	External Power Supply
Green/Brown	Emergency Stop Circuit 1	TBOP20 - EES1
White/Green	Emergency Stop Circuit 1	TBOP20 - EES11
Grey/Pink	Emergency Stop Circuit 2	TBOP20 - EES2
Red/Blue	Emergency Stop Circuit 2	TBOP20 - EES21
Black	0V DC	External Power Supply
Violet	Key Switch Circuit 1	TBOP17 - 2
White/Pink	Key Switch Circuit 1	TBOP16 - 12
White	Key Switch Circuit 2	TBOP17 - 5
Blue	Key Switch Circuit 2	TBOP16 - 22
White/Blue	Not Connected	

Connect the READY pendant's Ethernet cable to the IPC. You may connect the pendant through an Ethernet switch to increase the number of Ethernet ports.

- Connect the pendant's power leads to a 24V DC, 2.5A source. Connect the Pink wire to +24V and the Black wire to 0V.
- Connect the remaining safety I/O leads to your control panel or safety cabinet. Make your own cable/ wiring for the 12 safety signals long enough to reach their destinations in the table. Include ferrules at the end of your wiring to insert in the terminal blocks.





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labeled for reference.



#### TBOP17



### TBOP20



Wire the external safety fencing or another safeguarding device.

a **If you are using safety fencing or another safeguard device**, connect it to the Safety I/O Conversion board: On the E-Stop board terminal block **TBOP20**, use jumpers to bridge **EAS1** and **EAS11**. Then bridge **EAS2** and **EAS21**. Wire the fencing as shown in the table below.

Function	Destination
Fence Contact 11 (Circuit 1)	TBOP17 - 3 (+24E)
Fence Contact 12 (Circuit 1)	TBOP16 - 13
Fence Contact 21 (Circuit 2)	TBOP17 - 6 (0V)
Fence Contact 22 (Circuit 2)	TBOP16 - 23
	I BOP 10 - 23

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b If you choose to NOT use a safeguard device, jumper the safety fencing circuits: On the E-Stop board terminal block TBOP20, use jumpers to bridge EAS1 and EAS11. Then bridge EAS2 and EAS21. On the Safety I/O Conversion board, use jumpers to connect TBOP17-3 and TBOP16-13, and connect TBOP17-6 and TBOP16-23.

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After connecting the wires, insert the terminal block connectors back into their headers.

**Note:** You can only insert the terminal block connectors one way. Match the connector to the header's orientation.

### READY

# **CONNECTING THE ROBOT AND IPC**

Forge/OS must be able to communicate with the FANUC robot controller. This section will help you connect the IPC and robot controller using a Cat5e STP Ethernet cable.

Find a Cat5e STP Ethernet cable long enough to reach from the IPC to inside the FANUC controller. Plug one end of the Ethernet cable into a LAN port on the IPC device (or a network switch connected to the IPC). Inside the FANUC controller, remove one of the knockouts on the foam cable panel. Feed the Ethernet cable through it. Plug the cable into LAN Port 1 (CD38A) on the Main Board below the backplane. 5 Manage the cables.

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Use zip ties to bind cables at the top and bottom of the controller enclosure.

Important: Ensure that there is enough slack for the door to open and close without creating tension.

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### **POWERING ON**

In this section, you power on the system and prepare the FANUC teach pendant.

1	Reconnect the FANUC controller to power and power it on. Consult your Manufacturer's manual for instructions on powering the FANUC controller.
2	Power on your IPC device and other devices.
3	If there are issues, power off each device, disconnect from power supplies, and check your wiring.
4	Turn the switch on the front panel of the FANUC controller to <b>T1</b> mode.
5	Turn the switch on the FANUC teach pendant to <b>ON</b> .

### **INITIALIZING FANUC SAFETY**

In these steps, you initialize the FANUC Safety I/O board and set the robot's IP address for Forge/OS.

1	Initialize the FANUC Safety I/O board.		
	a	On the FANUC Teach Pendant, go to the DCS screen by pressing the <b>MENU</b> button, <b>NEXT (0)</b> , <b>SYSTEM</b> (6), then <b>DCS</b> .	
	b	Press <b>PREV</b> to ensure you are on the main DCS screen. There should be items named Safe I/O Status, Safe I/O connect, etc.	
	C	Use the arrow keys to select the <b>Safe I/O device</b> setting. Press <b>Enter</b> .	
	d	Press INIT (F2), then YES (F4). Do this process twice.	
	e	The <b>Safe I/O Board</b> appears under one of the device headings. Scroll down with the arrow keys and make sure it's there. A new FANUC warning related to new DCS parameters may appear at the top of the FANUC Teach Pendant.	
	f	If the device does not appear, turn the FANUC controller off and check the wiring to the Safety I/O Board and the Conversion Unit. Then reboot the controller and try again.	



2	On the FANUC teach pendant, set the robot's Port 1 IP address for Forge/OS:	
	a On the FANUC teach pendant, go to the Host Communication screen: Press the <b>MENU</b> button, then screed down to <b>SETUP (6).</b> Then scroll right to <b>Host Comm (8)</b> . Press <b>ENTER.</b>	oll
	Tip: Or on the SETUP screen, press [TYPE] (F1), select NEXT, then select Host Comm.	
	b On the list of Protocols, select TCP/IP and press ENTER.	
	<ul> <li>C For Port 1, select the line that reads Port#1 IP addr and press ENTER.</li> <li>d Set the IP Address to 192.168.1.20 and set the Subnet Mask to 255.255.255.0.</li> </ul>	
	_	••••



## SIGNING IN TO FORGE/OS

Follow these steps to pair the READY pendant with the IPC and sign in to Forge/OS 5.





4 If Forge/OS is inactive, it opens the Settings app and prevents you from opening other apps. If you see the screen below, follow <u>Activating Forge/OS with a License Code</u> in Appendix A.

Settings	
Network	
BIO Fieldbus Configuration	
General Settings	
Rémote Access	
System Update	
Package Manager	
License IEXPIRED/(NYALID)	
System Information	

With Forge/OS active, move on to the next section.

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# **CONFIGURING THE ROBOT FOR FORGE/OS**

This section shows you how to add a robot in the Forge/OS Device Configuration app and configure the FANUC controller. Make sure the FANUC controller and Forge/OS devices are powered on.









Give the robot a **Device Name** and enter the **IP Address**.

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Note: Enter the same IP address that you set on the FANUC controller.

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	FANUC robot		0
	Device Name	IP Address	
	Description		
	Controller Model	Robot Model	
	R-30iB Mate Plus 🔨 🔨	CR-15iA	
	R-30/B Plus - No DCS		
	R-30iB Mate Plus		¥.
	R-30iB Mate Plus - CIP Safety		
	R-30iB Mate Plus - No DCS R-30iB Mini Plus	<sup>2</sup> C to copy the configuration files ne	eded to
	NOTE: USB file system must b	Formatted in one of the follow FAT32	ing:
	Insert USB storage	e device into Forge/OS IPC	
sert a USB flash orage.	drive into the IPC as instructed on t	he screen. Use an empty	flash drive with at least 20
•			



Insei conf	rt the USB drive into the USB slot on the FANUC controller. Complete these sub-steps to install the iguration files on the FANUC controller:
a	Press the <b>SELECT</b> button. A list of programs appears.
b	Press <b>MONITOR (F4)</b> to show the list of running programs. If any programs appear, press the <b>FCTN</b> button. Then press <b>1</b> to <b>ABORT (ALL)</b> . Press <b>1</b> and <b>ABORT (ALL)</b> at least one more time to make sure th all running programs stop.
	<b>Note:</b> If you do not abort all running programs, the Forge configuration files might not update properly. This could result in a "Specified program is in use" message during file transfer.
c	Press the <b>MENU</b> button on the FANUC teach pendant.
d	Press FILE (7).
e	Press <b>UTIL (F5)</b> , highlight the <b>Set Device (1)</b> option, and press the <b>ENTER</b> button.
f	Choose the USB Disk (UD1:) option.
	Note: If you inserted the USB drive into the teach pendant, choose the UT1: option.
g	Highlight the <b>All Files</b> option by using the arrow keys and press <b>ENTER</b> .
h	The contents of the USB drive will appear. Use the arrow keys and the ENTER key to find and highlight FORGE-OS > READY-FANUC-DRIVER > FORGE_INSTALL, then press ENTER.
i	Press <b>Yes (F4)</b> for the prompt asking if you want to execute the file.
j	The FANUC Controller first displays <b># Backing Up Controller Config #</b> . Wait for the FANUC Controller say <b>Execution is completed successfully</b> . At a later time, you may copy the backup files in the FANUC Backup folder off of the USB drive.
	<b>Note:</b> If you get a "Specified program is in use" message instead of "Execution is completed successfully", try aborting all programs again. Press <b>FCTN</b> then <b>1</b> for <b>ABORT (ALL)</b> .
k	Press <b>OK (F4)</b> and remove the USB drive from the FANUC controller.



10	App	ly changes to the FANUC DCS settings:
	a	Go to the DCS screen by pressing the <b>MENU</b> button, <b>NEXT (0)</b> , <b>SYSTEM (6)</b> , then <b>DCS</b> .
		Tip: Or on the SYSTEM screen, press [TYPE] (F1), then select DCS.
	b	Press <b>PREV</b> to ensure you are on the main DCS screen.
	c	Press <b>APPLY (F2)</b> to confirm the settings. If you installed Forge/OS files onto the FANUC controller before, there may not be changes to apply.
	d	Enter the password (default: <b>1111</b> ). Confirm the settings by pressing <b>OK (F4)</b> .
11	Rest cont on th	art the FANUC controller to apply the settings (power the controller off, then power it on). While the roller is restarting, set the switch on the front panel of the FANUC controller to <b>AUTO</b> mode. Turn the switch ne FANUC pendant to <b>OFF</b> .
12	For a each	a <b>collaborative</b> robot, follow these sub-steps to confirm the payload each time the controller boots up and In time a READY pendant notification tells you to.
	a	Go to the Collaborative Robot DCS screen by pressing the <b>MENU</b> button, <b>NEXT (0)</b> , <b>System (6)</b> , then <b>DCS</b> .
	b	Press <b>PREV</b> , highlight the <b>Collaborative Robot</b> option, and press <b>ENTER</b> .
	C	Press CONFIRM (F2). Enter the password (default 1111) and follow the prompts by answering YES (F4).
		<b>Note:</b> Each time a FANUC collaborative robot is turned off and then on again, the payload must be confirmed. If possible, wait for 30 minutes after booting. It can take up to 30 minutes for the Force Sensor to calibrate.
13		
14	Cont of pr	firm that the Forge/OS programs are running on the FANUC teach pendant. Press the <b>SELECT</b> button. A list ograms appears.
15	Pres noth follo	s <b>MONITOR (F4)</b> to show the list of running programs. There should be three "FOS" programs running. If ing happens when you press <b>MONITOR (F4)</b> or you see fewer than three "FOS" programs on the monitor, w these sub-steps.
	a	Turn the switch on the FANUC teach pendant back to <b>ON</b> .



Ь	On the FANUC teach pendant, press the <b>PREV</b> button to return to the list of saved programs.
C	Use the arrow keys to highlight the program labeled <b>Forge_OS.</b>
d	Hold down one of the three-position enabling switches on the back of the FANUC pendant to the middle position.
e	While holding down the enabling switch, press and hold the <b>SHIFT</b> button and then press the <b>FWD</b> button once. Then release <b>SHIFT</b> and the enabling switch.
f	Check the monitor again. Press <b>MONITOR (F4)</b> . There should be three programs listed.
g	Set the switch on the front panel of the FANUC controller to <b>AUTO</b> mode. Switch the FANUC teach pendant to <b>OFF</b> .
6 In Fo conti	orge/OS, confirm your device settings and tap <b>SAVE</b> . Forge/OS attempts to connect with the robot roller for up to 20 seconds.
No RE	<b>te:</b> When you first connect to a robot, it's normal to see some robot errors and/or warnings on the <b>ADY pendant</b> . Ignore these for now. You will clear them after you finish adding the robot to Forge/OS.
a	If the robot controller fails to connect, you see this pop-up.           Robot Configuration Error         X           Timed Out Waiting For Driver Communication         DISMISS
	<ul> <li>Click <b>DISMISS</b>, do the following, then try to tap <b>SAVE</b> again:</li> <li>Check the Ethernet connection between the robot controller and IPC.</li> <li>Check the network settings on the robot controller.</li> <li>Check if the robot controller is on and in the correct operating mode (in auto or remote mode).</li> <li>Select the correct robot controller and robot models in Device Configuration.</li> </ul>
17 Whe to thi	n the robot connects, you can add Tool Center Points (TCPs) or Payloads for the robot. You can come back is later by editing the device's configuration. Tap <b>SAVE</b> to continue.

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			Q NEW+		
		Offset			
	Dofault	(0, 0, 0) mm			
	Fi of †				
			Q NEW+		
	11 Payload	11 Mass			
	Default	0 kg			
<i>(Optional):</i> Set up the robot Canvas.	controller's Input/Outp	out (IO) signals fo	or use in the Device	e Control Pa	nel and Tas
	Input Signals	Outpu	ut Signals		
			Q		

Display Name

BOOL

SAVE

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1 of 2 page(s)

Enter a Display Name (i.e. "Open Machine Door", "Open Pneumatic Vise", or "Start Machining Cycle") to

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CANCEL

show what each signal does in other apps.

Signals





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# **APPENDIX A: SETTING UP FORGE/OS**

### **INSTALLING FORGE/OS**

Follow these steps to install Forge/OS and sign in to the Admin role. Installation takes about 30 minutes, depending on the resources of the IPC.

To install Forge/OS, follow these substeps. You need a Forge/OS installation USB flash drive. Contact your READY Robotics distributor for an installation USB drive.

Important: Installing Forge/OS will erase all data on the target hard drive.

a Connect a monitor, keyboard, and mouse to the IPC where you want to install Forge/OS.



Plug the Forge/OS installation USB flash drive into the IPC.

Tip: If you need more USB ports, use a USB 3.0 hub.

Restart the IPC. While the IPC is powering on, press the keyboard hotkey that takes you to the Boot Menu.

*Tip:* The key that opens the Boot Menu depends on the *IPC* model. The most common keys that do this are ESC, F10, F11, or F12. Refer to your computer's documentation for boot options.

d From the boot options, select **Install Forge/OS** to boot from the installation USB flash drive.

The installer may take several minutes to load. Wait until the installation wizard opens.



READY











Where are you?	
New York	
	Back Continue
choose your IPC's nost name. The host na bassword. Then click <b>Continue.</b>	me identifies the IPC on the network. Pick a username a
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3 Tap Admin and sign in. The default Admin password is "forgeadmin".



**Note:** After installation, you have limited access to Forge/OS until you activate it with a license code. See <u>Activating Forge/OS with a License Code</u>.



### ACTIVATING FORGE/OS WITH A LICENSE CODE

There are two methods to activate Forge/OS: Online license activation and offline license activation.

The table below lists the requirements for each method.

Online License Activation	Offline License Activation
<ul> <li>An internet-connected Forge/OS</li> <li>A valid Forge/OS license code</li> </ul>	<ul> <li>A 2GB or larger USB flash drive</li> <li>An internet-connected PC</li> <li>A valid Forge/OS license code</li> </ul>

*Tip:* Connect a USB keyboard to the port on the bottom of the **READY pendant** to type in any text field in Forge/OS.

On the Settings app main screen, tap **License**.

Settings	0
Network	>
Fieldbus Configuration	>_
General Settings	>
Rémote Access	>
System Update	>
Package Manager	
	>
System Information	>

Type in your license code.



3	Choose ONLINE LICENSE ACTIVATION if Forge/OS is connected to the internet. If not, choose OFFLINE
	LICENSE ACTIVATION.

	/ 11	1.6.			
	< License	enno		9	
	License Informat	tion			
	License Status				
	Expired				
	License Code			<empty></empty>	
	License Name		Unknown I	License Type	
	Enter License Code:				
		ONLINE LICENSE ACTIV	ATION		
	1.1	OFFLINE LICENSE ACTI	VATION	2.0	
	and the second s				
If you chose on If you chose off a Insert the	line license activation, you line license activation, fol USB flash drive into you	u're done! low these substeps: r IPC. Tap <b>START WRI</b>	TING CERTIFICA	TE TO USB DRIVE	
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If you chose on If you chose off a Insert the	line license activation, you line license activation, fol e USB flash drive into your Chicense Code STEP 1 Transfer License A Insert a USB Flash Drive	u're done! low these substeps: r IPC. Tap <b>START WRI</b> SE Info re Activation STEP 2 Activation Certificate to USB e to transfer the activation certificate	TING CERTIFICA	TE TO USB DRIVE	
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**b** When the files finish transferring, tap **NEXT**. Follow the instructions on the screen to convert the Activation Certificate to an Unlock Certificate using an internet-connected PC.

	Offline License	Activation				
	License Code	Activition				
	STEP 1	STEP 2	STEP 3			
	Generate a License I	Jnlock Code using an external o	computer			
	1. Plug USB into exte 2. Open the file Forg 3. Navinate to activa	mal computer. e_OS-License-Activation-Certi	ficate.txt and copy all of the c	ontents.		
	4. Click Activate. 5. If successful, cop	the generated unlock certific	ate.	10.4.		
	6. Paste the certifica 7. Save the file and e 8. Proceed to the ne	ate into Forge_OS-License-Unk ject the USB. vt sten	ock-Certificate.txt.			
	all receed to the file.					
Insert the USB f	flash drive back into	your IPC. Tap UNLC	DAD UNLOCK CER	TIFICATE FROM USB I		
		. Alexandra		1.000		
	< Licens	se Info		0		
	Offline License	Activation				
	License Code					
	STEP 1	STEP 2	STEP 3			
	Import the License	Unlock Certificate from USB				
	Incost the LICP Rest doi:	e containing the Unlock Certificate int	o the Forge/OS IPC			
	inservice USB hash brive					
	insert the OSB hash brive					
		Cilick start to beg	in loading			
		Click start to beg	in loading			
		Click start to beg	in loading TE FROM USB DRIVE			
		Click start to beg	in loading TE FROM USB DRIVE			
		Click start to beg	in loading TE FROM USB DRIVE			
Wait for the file tap <b>SAVE</b> .	to finish transferring	Click start to beg LOAD UNLOCK CERTIFICA 9. When the file trans	n loading TE FROM USB DRIVE fer is complete, ren	nove the USB flash drive		
Wait for the file tap <b>SAVE</b> .	to finish transferring	Click start to beg LOAD UNLOCK CERTIFICA g. When the file trans	n loading TE FROM USB DRIVE fer is complete, ren	nove the USB flash drive		



### CHOOSING PREFERENCES

These steps help you choose system preferences, including language, units, time, and network settings.

To change preferences for the first time, go to General Settings	To change	preferences	s for the first	time, go to	General	Settings:
--	-----------	-------------	-----------------	-------------	---------	-----------

a

b

1

On the Settings app main screen, tap General Settings.

Change the Units of Measure, Time and Date settings, or the Admin login password.

*Note:* If you later forget your password, contact READY Robotics to reset it.

Language			
English (United Stat	es)		~
Units of Measure			
Measurement	O Metric	O Imperial	
Length	millimeter		
Speed	mm/second	inch/second	
Mass	kilogram		
Force	newton	pound	
Torque	newton-meter		
Select Time Zone			
Select Time Zone			100
America/New_York			~
CAN	CEL		
CAN	CEL	SAVE	







# **APPENDIX B: TOOL LOADING STEPS**

Follow these steps to add new TCPs/Payloads in Forge/OS and update the configuration on the FANUC controller.

Here is an outline of the tool loading process:

- Add TCPs/Payloads to the robot's configuration in Forge/OS and save.
- Apply DCS parameters.

- Restart the FANUC controller.
- Confirm the Collaborative DCS settings (collaborative only).
- Reset the controller from Forge/OS.
- In Forge/OS, go to the Device Configuration app and find the FANUC robot under Configured Devices. Select the device and tap **Edit** to open the robot configuration.

#### 2 Tap TCP AND PAYLOAD CONFIGURATION.

TCP AND PAYLOAD CONFIGURATION	ROBOT IO CONFIGURATION

2	Add all the TCPs and Pa	avloads you need for your wo	kcell and tan SAVE		
				Q NEW+	
			Offset		
		Default	(0, 0, 0) mm		
		11.61		A DALLA	
		FOIT	1011Dadelov		
				Q NEW+	
		11 Payload	11 Mass		
		Default	0 kg		
					•••
4	Tap <b>SAVE</b> to exit the role	oot configuration. Forge/OS u	ploads the tool data	a to the FANUC controller. Forge/OS	
					•••
5	Install your end of arm t	ooling on the robot.			•••
6	Apply changes to the FA	ANUC DCS settings:			
	Go to the DCS sci	reen by pressing the <b>MENU</b> b	outton, NEXT (0), SY	<b>/STEM (6)</b> , then <b>DCS</b> .	
	Tip: Or on the S	YSTEM screen, press [TYPE]	(F1), then select DC	S.	
	b Press PREV to en	sure you are on the main DC	S screen.		
	C Press APPLY (F2) before, there may	) to confirm the settings. If you not be changes to apply.	u installed Forge/OS	S files onto the FANUC controller	
	d Enter the passwor	rd (default: <b>1111</b> ). Confirm the	settings by pressing	9 <b>OK (F4)</b> .	
	d Enter the passwor	rd (default: <b>1111</b> ). Confirm the	settings by pressing	9 OK (F4).	

READY





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### RESOURCES

Want to learn more about how Forge/OS can empower you?

Visit **READY.academy** (ready.academy) for FREE hands-on courses to help you deploy a robotic system.

Visit READY.market (market.ready-robotics.com) for products and services offered by READY and our partners.

Visit our Support site (support.ready-robotics.com) for robot startup guides, FAQs, and more.

Visit our **Resources** page (<u>ready-robotics.com/resources</u>) for articles, whitepapers, and other resources.

If you encounter a problem and need to talk to someone, reach out to us.

- Email READY Robotics: support@ready-robotics.com
- Call READY Robotics: +1-833-732-3977



