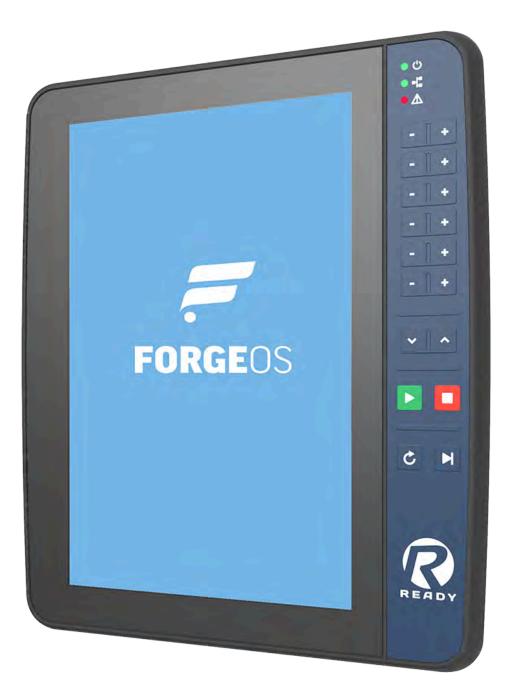
EPSON VT6L Startup Guide



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Chapter 1. Overview

This guide helps you set up your EPSON robot to work with ForgeOS 5.

You will complete these steps:

- 1. Check for the requirements.
- 2. Connect all the devices and power on.
- 3. Set up Forge/OS.
- 4. Transfer Forge/OS robot configuration files to the robot.
- 5. Configure the robot in RC+ and Forge/OS.
- 6. Program your robot with Forge/OS!

Note:

This guide assumes that you have installed the robot following EPSON instructions.

Important:

Before you start programming, please read the Known Issues (on page 56) section. The robot may behave unexpectedly when near a singularity. THESE ISSUES ARE NATIVE TO EPSON AND NOT AT THE FAULT OF FORGE/OS.

Chapter 2. Hardware Requirements

Image	Part Name	Description	Vendor	Part Number
OR	READY IPC	Hosts Forge/OS. Note: READY offers two IPCs: Forge/Hub and Forge/Ctrl (legacy)	READY Robotics	
R	READY pendant	The touch screen interface for Forge/ OS.	READY Robotics	112563
	READY pendant Junction Box (Forge/Ctrl only)	Connects the READY pendant to the Forge/Ctrl and robot controller.	READY Robotics	R-101257
1	12-Pin M12 to Fly- ing Leads Cable	Connects to the READY pendant Junction Box or Forge/Hub to termi- nals.	READY Robotics	
	Robot Controller	Connects the robot arm to power and to other devices.	EPSON	
	USB A-Male to B- Male Cable	Connects a Windows PC to the robot controller.	EPSON (Included with ro- bot)	

EPSON VT6L Startup Guide | 2 - Hardware Requirements | 5

Image	Part Name	Description	Vendor	Part Number
FFON EXPENSION CF-72	Windows PC	Required to load Forge/OS configura- tion files to the robot controller.		
	Emergency Termi- nal Block Kit (with Cable)	Connects the robot controller to the READY pendant and safety devices.	EPSON	RE000975-1
	24V/2.5A Power Supply	Powers the READY pendant and other devices. Min./Max. current: 2.5/5.0 Amps.		e.g., Siemens 6EP1332-5BA00
	Polycarbonate En- closure or Cabinet	Protects the Terminal Block Kit and the Power Supply in an enclosure.		
	Cat5e Shielded Ethernet Cable (x2)	 Connects the robot controller to an IPC. Connects the READY pendant to an IPC. 	McMaster-Carr	7734T6
Transa and the second	USB Flash Drive (with at least 2GB of available mem- ory)	Transfers Forge/OS configuration files to the robot controller	READY Robotics (or other)	R-400030

Chapter 3. Software Requirements

EPSON RC+ is the software that you use to communicate with the robot in its native language. Access to the full version of RC+ came with the purchase of your robot. Install it on a Windows PC to load Forge/OS configuration files.



Note:

EPSON offers a free trial of RC+ for testing on a simulated robot. This free trial will NOT work for setting up Forge/OS.

Important:

If you have built or loaded projects on the controller before, you may need to do a factory reset. Contact EPSON Support for help.

Refer to the table below for the minimum required RC+, controller firmware, and Forge/OS versions.

Controller	Minimum Software Version
VT6L	RC+ 7.0, v7.5.2
	Firmware v7.5.53.0

i Tip:

Refer to Checking the Firmware Version (on page 6) for instructions on how to check your controller firmware version.

Checking the Firmware Version

Follow these steps to check what firmware version your EPSON controller is on.

- 1. Plug the robot controller's power cable into a power outlet. Follow EPSON documentation for powering it on.
- 2. Plug the USB Cable into the robot controller's **PC** port. Plug the other end into a Windows PC with EPSON RC+ installed.



- 3. Open EPSON RC+ in Program Mode.
 - If you see the pop-up below, click Change To Program Mode before the 5 second countdown expires.
 - If the default boot mode is set to Program Mode, wait for the 5 second countdown to expire.

RC+	7.0
Auto M	lode
Control Device:	Remote I/O
Starting in 4	seconds.

4. If you set a password, enter it. Then click **OK**.

Char	ige To Program	1 Mode	×
	Enter Passwor	d:	
C	ОК	Cancel	

5. If you see a pop-up about monitoring controller operation before Program Mode boots, click **Yes**. If you see it after Program Mode boots, click **No**.

EPSON I	RC+ 7.0	×
?	The controller is running tasks for the co Would you like to monitor controller op	
	Yes	No

6. If you see a pop-up about starting another session, click **Yes**.

You are already running one or more EPSON RC+ 7.0 se Do you want to start another session?	essions,
Do you want to start another session?	

7. If you see a pop-up about current tasks running, select **Stop all tasks**.

Connect
The controller is running tasks but there is no project open on the PC.
What do you want to do?
O Monitor the currently running tasks
Stop all tasks
ОК

8. In the top menu, select a **Connection** type of **USB**.





9. Go to **Tools**. Select **Controller** in the dropdown.

EPSON RC+ 7.5.0 - Project C:\EpsonRC70\Projects\ready-epson-driver\EPSON_DRIVER

File Edit View Project Run	Tool	s Setup Window	Help							
D 🖻 🖉 🎒 👗 🖻 f)	Robot Manager	F6	•••	≚	啣	•	뽯	-8	Ô
	Σ	Command Window	Ctrl+M							
	:::	I/O Monitor	Ctrl+l							
	啣	Task Manager	Ctrl+T							
	*	Macros								
	••••	I/O Label Editor	Ctrl+L							
	ERR	User Error Editor	Ctrl+U							
	☆	Controller								
	뽷	Simulator	Ctrl+F5							
	-8	GUI Builder	Ctrl+F7							
	0="	Conveyor Tracking	Ctrl+F8							

10. Click Backup Controller.

Backup Controller	Save all controller data and status to a PC folder.
Restore Controller	Restore all controller data from a previous backup.
View Controller Status	View controller status from a previou backup.
Maintenance	View maintenance data and configure alarms.
Reset Controller	Reset controller to startup state

11. Select the location where you would like to store your backup. Click **OK**.

		Browse For Folde
		Towse for folde
	ontroller backup	Select folder for c
	 uments	> 🖹 Doci
	nloads	> 🕹 Dow
- 13	ic	🔉 🎝 Musi
		> 📰 Pictu
		> 📑 Vide
	I Disk (C:)	
	DRIVERS	
	psonRC70	~ <u>E</u>
	API	2
	Backup	
	Calib	
	Config Controller	
	Conveyor	
	EasySetupSoftware	
	cusysecupsortinate	

12. Click View Controller Status.

Backup Controller	Save all controller data and status to a PC folder.
Restore Controller	Restore all controller data from a previous backup.
View Controller Status	View controller status from a previou backup.
Maintenance	View maintenance data and configure alarms.
Reset Controller	Reset controller to startup state

13. Select the backup file that you just created. Click **OK**.

		owse For Folde
	status to view	elect folder for
	70	~ .
		>
	up	*
	_VT_VT60010021_2021-08-30_160837	
	ig	
	roller	>.
	reyor	>
	SetupSoftware	>
		>
	bus	>
		2
	lock	
		>
-	ects	>

14. Find the Firmware Version.

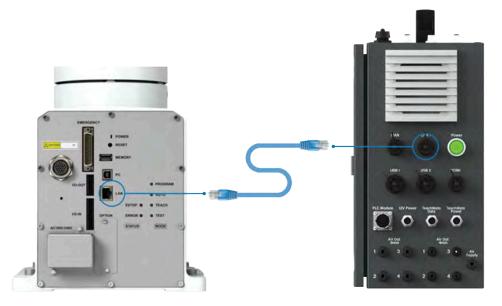
EPSON VT6L Startup Guide | 3 - Software Requirements | 12

atus Folder, b_v1_v160	010021_2021-08-30_160837 9	tatus Date / Time: 2021-08-30 16:08:37	
General	General		
III Input / Output			
- Tasks	Item	Value	-
E- Robots	Controller Name	VT6-A9015	
- System History	Controller Serial #	VT60010021	
Program Files	Firmware Version	7.5.50.6	
Include Files	Controller Total Hours	W 762.4	
- Robot Points	Controller Max On Hours	89.0	
E Force	Project Name	READY_DRIVER	
E Force Sensor I/F	IP Address	172.16.255.251	
- Maintenance	IP Mask.	255.255.255.0	
	IP Gateway	0.0.00	
	Options		
	EStop Count	97	
	EStop	Off	
	Safeguard	011	_
	Error	Off	
	Operation Mode	Program	
	Control Device	Remote I/O	
	Display Device	PC	_
	E Controller Preferences		_

15. Verify that your firmware version matches the requirement. If you need to upgrade, contact EPSON Support.

Chapter 4. Connecting the Robot Controller

1. Plug an Ethernet cable into the LAN port on the robot controller. Plug the other end into a LAN port on your IPC.



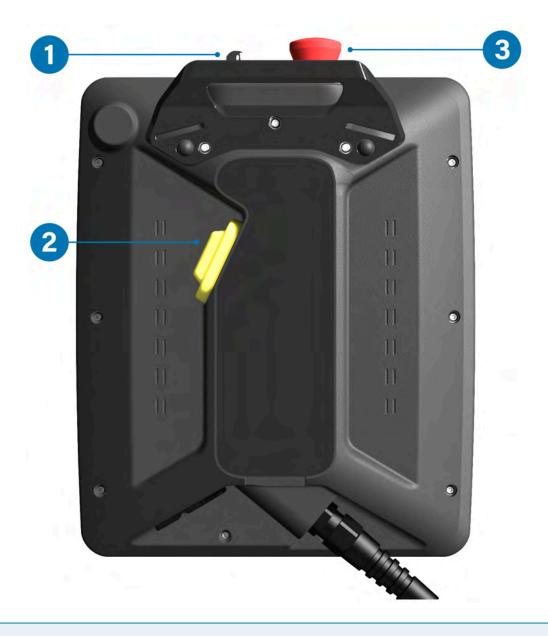
2. Plug one end of the EPSON Emergency Cable into the **EMERGENCY** port on the robot controller. Plug the other end into the Terminal Block Kit.



Chapter 5. 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



Note:

j.

For EPSON robots, you connect the READY pendant Emergency Stop, but not the Key Switch and Enabling Switch. Always perform a risk assessment and use appropriate safeguards, like a safety fence.



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

1. If you are using a Forge/Ctrl, prepare the READY pendant Junction Box:



- a. Connect a Cat5e STP Ethernet cable from the junction box Ethernet port (1) into a LAN port (5) on the Forge/Ctrl.
- b. Connect the 8-Pin power cable (4) from the junction box into one of the Module ports (6) on the Forge/Ctrl.
- c. Connect the 12-Pin flying leads cable to the safety port (3) on the junction box.
- 2. If you are using a Forge/Hub, connect the 12-Pin flying leads cable to the **Safety** port on the Forge Hub.



3. Wire the 12-Pin M12 Cable's flying leads to the Terminal Block Kit:



12-Pin Cable	EPSON Emer- gency Connector	Function
Brown	N/A	Enabling Switch
Blue	N/A	Enabling Switch
White	N/A	Enabling Switch
Green	N/A	Enabling Switch
Pink	Pin 1	Emergency Stop
Yellow	Pin 9	Emergency Stop
Black	Pin 10	Emergency Stop
Grey	Pin 14	Emergency Stop
Red	N/A	Key Switch
Violet	N/A	Key Switch
Grey/Pink	N/A	Key Switch
Red/Blue	N/A	Key Switch
	Pin 2, 3	Jumper
	Pin 15, 16	Jumper
	Pin 4, 11	Jumper
	Pin 12, 17	Jumper

4. Wire the safeguard device (e.g., safety fence) and latching system. You can wire a button or switch to the latch release pins to control the latching mechanism. Or you can jumper the latch release inputs so the safeguard auto resets when you close the fence (shown in the table below).

EPSON Emergency Connector	External 24V Pow- er Supply	Safeguard Device	Function
	24V	Safeguard Contact 11	Safeguard Input 1 Circuit
Pin 7		Safeguard Contact 12	Safeguard Input 1 Circuit
Pin 8	0V		Safeguard Input 1 Circuit
	24V	Safeguard Contact 21	Safeguard Input 2 Circuit
Pin 20		Safeguard Contact 22	Safeguard Input 2 Circuit
Pin 21	0V		Safeguard Input 2 Circuit
Pin 18	24V		Latch Release Input (Jumpered)
Pin 19	24V		Latch Release Input (Jumpered)



Refer to EPSON documentation for more information on safeguard wiring and pin assignments.

Chapter 6. Powering On

- 1. Plug the robot controller's power cable into a power outlet.
- 2. Power on the robot controller.
- 3. Plug your IPC's power cable into a power outlet.

Chapter 7. Signing In to Forge/OS

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

1. If you need to install Forge/OS 5 on your IPC, stop here and follow all the steps in Appendix A *(on page 44)*, then come back to these steps.

7 Tip:

Forge/OS 5 is installed on all Forge/Ctrls and Forge/Hubs shipped after June 1, 2021.

- 2. The READY pendant automatically finds and pairs with the IPC. The three LEDs on the screen help you track the status:
 - **Pendant Network Connection**: This condition is satisfied when the READY pendant has a valid network connection (i.e., the Ethernet cable is plugged in).
 - Forge/OS IPC Detected: This condition is satisfied when the READY pendant detects a Forge/OS IPC on the network.
 - **Forge/OS IPC Paired**: This condition is satisfied when the READY pendant successfully pairs with the IPC. If pairing fails, it is automatically retried indefinitely.

When a condition is not satisfied, the LED is red. When a condition is in progress of becoming satisfied, a spinner around a READY logo appears to the right of the text. When a condition becomes satisfied, the LED turns green.

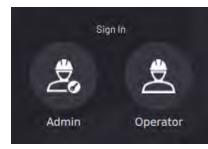


The UI shows the real-time state of each step. For example, if the pendant loses its network connection during pairing, all steps become undone.

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If the READY pendant spends more than 60 seconds on any step, troubleshooting text displays. Common things to check are if the READY pendant network cable is plugged in, if the IPC is powered on, if the READY pendant and IPC are connected to the same network, and if there's only one READY pendant and one IPC on that network.

3. Tap Admin and sign in. The default Admin password is "forgeadmin".



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 Activating ForgeOS with a License Code (*on page 51*) in Appendix A.

Settings	0
Network	>
Fieldbus Configuration	>
General Settings	>
Remote Access	>
System Update	>
Package Manager	>
License ISKRIRED/INVALID)	>
3 System Information	>

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

Chapter 8. Device Configuration - Pt.1

1. In the Admin role, open the Device Configuration app.



2. Tap **New +** to open the Device Library.



3. In the Device Library list, select **EPSON industrial robot**. Then tap **NEXT**.

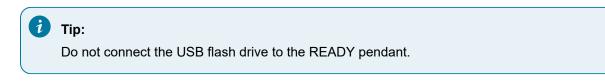
EPSON VT6L Startup Guide | 8 - Device Configuration - Pt.1 | 22

Device Library	
Filter by	
Robot	
1 item(s) selected	Cancel
🔱 Device Name	î↓ Vendor î↓ Type Version
🔘 📽 ABB robot	Robot 1.2.0
🔘 🌋 EPSON robot	EPSON Robot 1.6.0
O 🚏 FANUC robot	FANUC Robot 1.5.0
🔘 🌋 Kawasaki robot	Kawasaki Robot 1.0.0
🔘 ኛ Stäubli Robot	STÄUBLI Robot 14.0
🔘 ኛ Universal Robots robot	Robot 1.1.0
🔿 🐨 Yaskawa Motoman robot	VASKAWA Robot 12.0
1-7 of 7) of 1 page(s)

4. Select VT6L for the Controller Model. Fill in the other information later.

Device Name		IP Address	
Description			
Controller Model		Robot Model	
VT6L	~	VT6L	~
Force Sensor Device			
Select a Force Device			~
complete the setup of your ro NOTE: USB file sy	stem must be exFAT, FAT1	to copy the configuration files needed to formatted in one of the following: 6, FAT32, NTF5 evice into Forge/OS IPC	
Required Field			

5. Insert a USB flash drive into the IPC as instructed on the screen. Use an empty flash drive with at least 2GB of storage.



- 6. Tap **Start Transfer** and wait for it to finish.
- 7. Remove the USB flash drive when prompted.

Chapter 9. Importing the Project in RC+

- 1. Insert the USB flash drive (that has the configuration files from the IPC) into the Windows PC.
- 2. In File Explorer, go to your USB flash drive's storage. Open the forge-os folder.

Me	emorex USB (D:)	~	C	P Sei	arch Memorex USB	(D:)
	Name ^	Date	e modit	ied	Туре	Size
Quick access	✓ forge-os	9/14	/2021	5:04 PM	File folder	
OneDrive	Reading of the second se					
This PC						
3D Objects						
Desktop						
Documents						
Downloads						
Downloads Music						
 Documents Downloads Music Pictures Videos 						
Downloads Music Pictures						
Downloads Music Pictures Videos						
 Downloads Music Pictures Videos Windows (C:) Memorex USB (D:) 						
Downloads Music Pictures Videos Windows (C:)						

3. In that forge-os folder, right-click the ready-epson-driver folder to copy it.

	e-os 🗸 🗘 🔎 Search forge-os
Quick access	Date modified Type Size
ready-epson-driver	0.111/2021.5-01.0M File folde:
OneDrive	Open
This PC	Open in new window
3D Objects	Pin to Quick access
Desktop	Add to VLC media player's Playlist
Documents	 Git GUI Here Git Bash Here
Downloads	A Play with VLC media player
Music	7-Zip
Pictures	CRC SHA
📱 Videos	Scan with Microsoft Defender
Uindows (C:)	Give access to
Memorex USB (D:)	Include in library
Google Drive (G:)	Pin to Start
Memorex USB (D:)	Send to

4. In your **Windows (C:)** drive, open the **EpsonRC70** folder that was made when you installed the EPSON RC+ software.

Th	is PC >	Windows (C:) >	~ (lows (C:)	
		lame		Date modified	Туре	Size
Quick access		EpsonRC70	5	5/18/2021 1:13 PM	File folder	
OneDrive		PerfLogs		12/7/2019 4:14 AM	File folder	
This PC		Program Files	1	7/6/2021 5:03 PM	File folder	
3D Objects		Program Files (x86)	9	0/14/2021 5:06 PM	File folder	
Desktop		SOLIDWORKS Data		5/11/2020 5:35 PM	File folder	
Documents		SOLIDWORKS Data (2)	-	5/11/2020 5:58 PM	File folder	
		Solidworks_vault_data	5	5/11/2020 6:44 PM	File folder	
Downloads		updates	-	5/11/2020 6:53 PM	File folder	
Music		Users		3/19/2021 12:15 AM	File folder	
Pictures		VM-Systems	1	I/28/2021 4:19 PM	File folder	
Videos		Windows		9/18/2021 9:25 AM	File folder	
Windows (C:)						
Memorex USB (D:)						
Google Drive (G:)						

5. In that EpsonRC70 folder, open the **projects** folder.

- 🚽 🗠 🛧 📥 🤌 This PC	> Windows (C:) > EpsonRC70 >	V U 🔎 Sea	rch EpsonRC70	
E	Name	Date modified	Туре	Size
reference de la construction de	API	5/18/2021 1:11 PM	File folder	
 OneDrive 	Backup	6/10/2021 5:18 PM	File folder	
This PC	Calib	5/14/2021 12:36 PM	File folder	
- Walter and	Config	5/14/2021 12:36 PM	File folder	
3D Objects	Controller	5/18/2021 1:11 PM	File folder	
Desktop	Conveyor	5/18/2021 1:11 PM	File folder	
Documents	EasySetupSoftware	5/18/2021 1:11 PM	File folder	
Downloads	sexe	5/18/2021 1:12 PM	File folder	
Music	Fieldbus	5/18/2021 1:11 PM	File folder	
E Pictures	force	5/14/2021 12:36 PM	File folder	
Videos	GUI	5/18/2021 1:11 PM	File folder	
Windows (C:)	Hardlock	5/18/2021 1:11 PM	File folder	
Memorex USB (D:)	help	5/18/2021 1:11 PM	File folder	
Google Drive (G:)	manuals	5/18/2021 1:11 PM	File folder	
	Disprojects	9/22/2021 3;48 PM	File folder	
Memorex USB (D:)	security	5/18/2021 1:11 PM	File folder	
Network	Simulator	6/10/2021 2:54 PM	File folder	
	Status	5/14/2021 12:36 PM	File folder	
	system	5/18/2021 1:11 PM	File folder	

6. In that projects folder, right-click to **paste** the **ready-epson-driver** folder that you copied.

EPSON VT6L Startup Guide | 9 - Importing the Project in RC+ | 26

Wii	ndows (C:) > EpsonRC70 > projects >	v U Ps	earch projects	
	Name ^	✓ Date modified	Туре	Size
references access	API_Demos	5/18/2021 1:11 PM	File folder	
 OneDrive 	BOX_sample	6/10/2021 2:51 PM	File folder	
This PC	LabVIEW	5/18/2021 1:11 PM	File folder	
3D Objects	Old projects	9/16/2021 5:19 PM	File folder	
Desktop	🖂 📕 ready-epson-driver	9/16/2021 7:36 PM	File folder	
	Samples	5/18/2021 1:11 PM	File folder	
Documents	SimulatorDemos	5/18/2021 1:11 PM	File folder	
Downloads				
Music				
E Pictures				
Videos				
Uindows (C:)				
Memorex USB (D:)				
🧹 Google Drive (G:)				
- Memorex USB (D:)				
Network				

- 7. Open RC+ in Program Mode.
 - If you see the pop-up below, click Change To Program Mode before the 5 second countdown expires.
 - If the default boot mode is set to Program Mode, wait for the 5 second countdown to expire.

EPSON RC+ 7.0	
Auto Mode	e
Control Device: Rer	note I/O
Control Device. Rei	
Starting in 4 second	

8. If you set a password, enter it. Then click **OK**.

Char	nge To Program N	lode	×
	Enter Password:		
	ОК	Cancel	

9. If you see a pop-up about monitoring controller operation before Program Mode boots, click **Yes**. If you see it after Program Mode boots, click **No**.

0	The controller is running tasks for the current PC project
	Would you like to monitor controller operation?

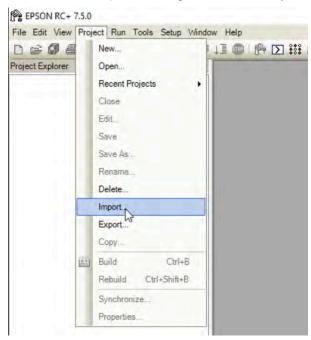
10. If you see a pop-up about starting another session, click Yes.

EPSON	RC+ 7.0			
?		eady running o ont to start anot	ne or more EPSON RC+ her session?	7.0 sessions.
			Yes	No

11. If you see a pop-up about current tasks running, select Stop all tasks.

Connect	
The o PC.	controller is running tasks but there is no project open on the
What	do you want to do?
	O Monitor the currently running tasks
	Stop all tasks
	OK

12. In the menu bar across the top of EPSON RC+, open the Project tab. Click Import.



13. Set the import location as **PC**. Then click **Next**.

Import Project		?	×
Select Import Location			
Import proje	ct from where?		
	PC		
) Controller		
()) Controller Backup Fold	ler	
Cancel	Next >		00

14. Select a project type of **EPSON RC+ 7.x**. Select the copied "ready-epson-driver" project. Then click **Next**.

Import Project			? ×
Select Project To In	nport		
	Project Type:		
	EPSON RC+7.x	~	
	Select Drive:		
	C: [Windows]	~	
	Select Project To Import		
	API_Demos LabVIEW Old projects ready-epso		
	Samples SimulatorDe BOX samp	emos	
Cancel	< Back	Next >	and a

15. Type "EPSON_DRIVER" in the **Destination Project Name** field. Then click **Next**.

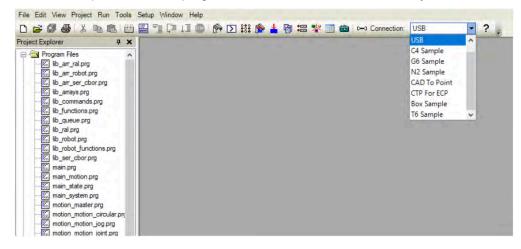
Project	
Destination Project Name:	
EPSON_DRIVER	
Destination Drive:	
C: [Windows]	ła
Select Project Folder:	
Projects API_Demos API_Demos LabVIEW Old projects Projects Samples SimulatorDemos BOX_sample EPSON DRIVER	New Folder

16. Select the **Open Destination Project After Import** checkbox. Then click **Import**.

Import Pr	oject			?	×
Import					
	Import Source:	PC.			
	Import Project:	C:\EpsonRC70)\Projects\ready	√-epson-driver\	R
	Destination Project:	C:\EpsonRC70)\Projects\EPS(ON_DRIVER	
	Open Destination	n Project After Imp	ort		
	Ready	to import project f	iles		
	Click Ir	mport to start			
	Cancel < 8	Back	Nec :	Impo	t

Chapter 10. Configuring the Robot

1. Expand the Connection dropdown in the top-right corner. Select USB to connect to your robot.



i Tip:

The USB option is only available when:

- You are using the full version of RC+.
- Your USB cable is connected to the robot controller and Windows PC.

2. In the top menu bar, select Setup. Go into System Configuration.

File Edit View Project Run Tools	Setu	p Window Help	_						
0 🚅 🖉 🎒 👗 🖻 🛍 🛗	PC to Controller Communications		+	•	•	-	6	D-O C	onnection
Project Explorer		System Configuration							
Program Files Ib_arr_ral.prg Ib_arr_robot.prg		Preferences Options							
Ib_arr_ser_cbor.prg Ib_arrays.prg Ib_commands.prg Ib_functions.prg Ib_functions.prg Ib_functions.prg	1								

3. The Startup menu automatically appears. If Auto mode is not already selected, select it and click Apply.

System Configuration			? ×
⊞-Startup ⊞-Controller	Start Mode		Close
i≟-Security i∄-Vision			Apply
		Auto	Restore
		O Program	
		Password	
111			
	1.00		

4. In the Controller menu, select Configuration:

System Configuration				? >
⊕-Startup	Controller Configuration			0
General	Name:	VT6-AS	901S	Close
Configuration Preferences	IP Address:	172.16	.255.251	. Ppm
Simulator ⊕ Drive Units	IP Mask:	255.25	5.255.0	- Suctors
Robots Inputs / Outputs	IP Gateway:	0.0.0.0		
	USB Speed:	Auto	~	
e - Security ≟- Vision	Control Device:	Remot	te I/O 🗸	
	Connection Passw	vord:	Change	
1	TP Password:		Change	
• • • • •	T2 Password:	1	Change	

- a. Set the IP Address and Subnet Mask according to the READY IPC you have:
 - Forge/Ctrl: set the IP Address to 172.16.255.251 and set the Subnet Mask to 255.255.255.0.
 - Forge/Hub: set the IP Address to 192.168.1.20 and set the Subnet Mask to 255.255.255.0.
- b. Select a **Control Device** of **Remote I/O**. This allows your robot to run through a READY pendant instead of through a Windows PC.
- c. Click Apply.
- 5. In the Controller menu, select Preferences:

EPSON VT6L Startup Guide | 10 - Configuring the Robot | 32

⊕ Startup	Controller Preferences	
-Controller		Close
General	Reset command turns off outputs	the second second
Configuration	Outputs off during emergency stop	Apply
Preferences	Allow motion with one or more joints free	
Simulator	Walk stops for output commands	Restore
⊕ Drive Units	Dry run	ricatore
E Robots	Virtual I/O	
Inputs / Outputs	Include project files when status exported	Defaults
Remote Control	Safeguard open stops all tasks	Derduits
⊞ RS232	Auto safeguard position recovery	
I TCP / IP	Independent mode	
Security	Clear globals when MainXX function started	
	Enable background tasks	
	Enable advanced task commands	
	Enable CP - PTP connection when CP is on	
	Auto LJM (Least Joint Motion)	1
	Reserved tasks for API: 0 ~	

- a. Uncheck Virtual I/O to disable it.
- b. Uncheck Auto safeguard position recovery to disable it.
- c. Select Independent mode.
- d. Select Enable background tasks.
- e. Select Enable advanced task commands.
- f. Click Apply.

6. In the Inputs/Outputs menu, select Fieldbus Slave. Select a Fieldbus Type of Modbus TCP. Click Apply.

Close		Fieldbus I/O Slave	⊕ Startup ⊖ Controller
Apply Restore	Modbus TCP V	Fieldbus Type: Port:	General Configuration Preferences Simulator ⊞-Drive Units
	256 9	Input Bytes: Output Bytes:	Vision
			B RS232 B TCP / IP

7. In the **TCP/IP** menu, set the **TCP/IP Ports** to the values listed below. Use the same **IP Address** as earlier for each port.

system Configuration			? ×
- Inputs / Outputs - Fieldbus Slave - Remote Control	TCP / IP Port 201		Close
RS232 □- TCP / IP			1995
Port 201 Port 202	IP Address:	172.16.255.251	C Sata
Port 203 Port 204 Port 205	TCP/IP Port:	49152	Defaults
Port 205 Port 206 Port 207	Protocol:	TCP V	L
Port 208 Port 209	Terminator:	CRLF ~	
Port 210 Port 211	Timeout:	0 seconds	
Port 212 Port 213			
Port 214 Port 215			
Port 216			

- a. Set Port 201 to 49152, enter the correct IP address, then Apply.
- b. Set Port 202 to 49153, enter the correct IP address, then Apply.
- c. Set Port 203 to 49154, enter the correct IP address, then Apply.
- 8. Click Close.
- 9. Open the **Project** tab. Click **Properties**.

no

File Edit View P	oject Run Tools Setup Window Help
	New Open Recent Projects · Close Edit Save Save As Rename Delete Import Export Copy
iiii	Build Ctrl+B Rebuild Ctrl+Shift+B Synchronize
	Properties

10. In the Compiler menu, expand the Compiler Version dropdown. Select 7.5.2.x (or later).

EPSON VT6L Startup Guide | 10 - Configuring the Robot | 34

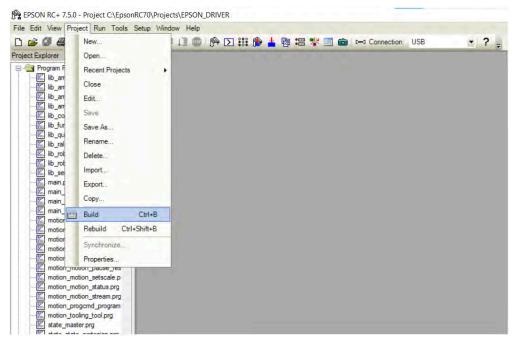
General	Compiler	in the second second
Source Files In Controller Encrypted Files		Close
<mark>Compiler</mark> Operator Settings Vision	Compiler Version: 7.5.2.x	
GUI Builder	Strict Compile	. 6500
	Globals must be declared in e	ach file used

11. Click **Apply**, then **Close** out of the pop-up.

Chapter 11. Building the Driver

It's time to build the driver. This step sends the program files to the robot.

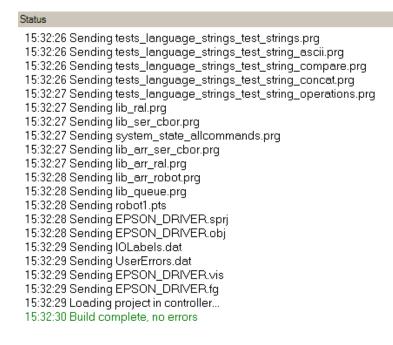
1. In the top menu bar, open the **Project** dropdown. Click **Build**.



2. If you see the prompt below, select Yes to overwrite the project on the controller.

P EPSON RC+ 7.5.0 - Project C:\EpsonRC70\Pro	jects\EPSON_DRIVER	- 🗆	\times
File Edit View Project Run Tools Setup Win	dow Help		
	🗏 📜 🌚 隆 ∑ 🇱 🎥 🛓 🖓 🚟 🤻 🗐 💼 🛏 Connection: USB 🔹	? 📮	
Ib_arrays.prg Ib_commands.prg Ib_functions.prg	WN RC+ 7.0 X Warning: Project in controller is 'EPSON_DRIVER'. This is not the same as current RC project. The project in the controller will be overwritten. Continue? Yes No		
Status			д X
15:14:09 Linking			^
5			×
	Program EStop Safety Error Warning Robot: 1, VT6A901S, VT6-A901S No Tasks Running		

3. Check that you have a successful build by looking for a "**Build complete, no errors**" message in the **Status** window.



<

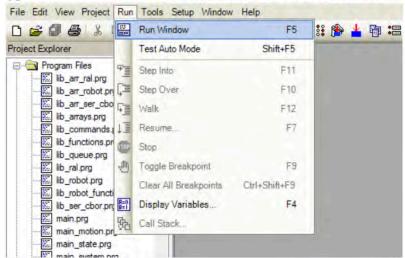
i Tip:

If you see build errors, refer to Appendix C: Troubleshooting (on page 58).

Chapter 12. Starting the Driver

1. In the top menu bar, open the Run dropdown. Click Run Window.

Projects\ready-epson-driver\EPSON_DRIVER

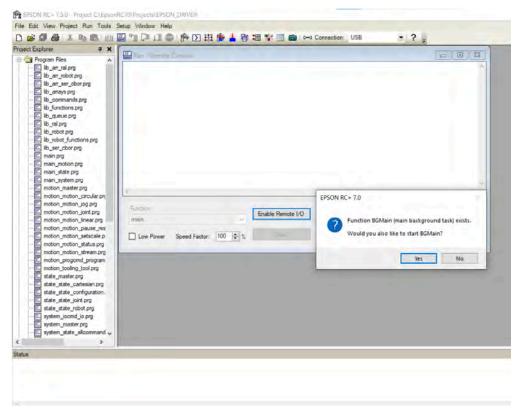


2. To start the driver in Remote I/O mode, click Enable Remote I/O.

	Run - Remote Console	×
Program Files A But, and project program But, and project program But, and project program But, and project program But, and proj But, and pr		
- C motion_motion_oircular.prg		1
 motion_motion_joint.prg motion_motion_linear.prg 	Enable Remote I/O	
motion_motion_pause_res motion_motion_setscale p motion_motion_status pro motion_motion_stream.pro	Low Power Speed Factor: 100 🔄 🗶	
motion_progend_program motion_tooling_tool.prg motion_tooling_tool.prg state_master.prg state_state_cartenian.prg state_state_configuration. state_state_configuration. state_state_prof.prg		
state_state_robot.prg system_locmd_lo.prg system_master.prg system_state_allcommand v		

EPSON VT6L Startup Guide | 12 - Starting the Driver | 38

3. In the pop-up below, click Yes to start BGMain.



Chapter 13. Device Configuration - Pt.2

In these steps, you save the robot in the Device Configuration app and finish the setup.

- 1. Finish entering your EPSON device information.
 - a. Give your device a name.
 - b. If you are using the READY-made Forge/Ctrl, enter the IP Address 172.16.255.251. If you are using the READY-made Forge/Hub, enter the IP Address 192.168.1.20. If the IP address you assigned to the robot is different, enter that.

Device Name		IP Address	
Description			
Controller Model		Robot Model	
	~	VT6L	~
Force Sensor Device			
Select a Force Device			~
nsert a 2GB flash drive into the F complete the setup of your robot	Forge/OS IPC	to copy the configuration files needed to	
NOTE: USB file system	m must be	formatted in one of the following:	
		5, FAT32, NTFS evice into Forge/OS IPC	

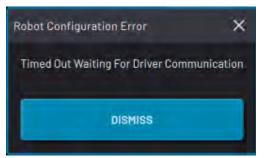
2. In Forge/OS, confirm your device settings and tap **SAVE**. Forge/OS attempts to connect with the robot controller for up to 20 seconds.



When you first connect to a robot, it's normal to see some robot errors and/or warnings on the READY pendant. Ignore these for now. You will clear them after you finish adding the robot to Forge/OS.

EPSON VT6L Startup Guide | 13 - Device Configuration - Pt.2 | 40

a. If the robot controller fails to connect, you see this pop-up.



Click **DISMISS**, do the following, then try to tap **SAVE** again:

- Check the Ethernet connection between the robot controller and IPC.
- Check the network settings on the robot controller.
- Check if the robot controller is on and in the correct operating mode (in auto or remote mode).
- Select the correct robot controller and robot models in Device Configuration.
- 3. When the robot connects, you can add Tool Center Points (TCPs) or Payloads for the robot. You can come back to this later by editing the device's configuration. Tap **SAVE** to continue.



The default TCP is at the robot's tool flange. The default Payload is zero.

	Q Acti	ve On Boot Edit Delete Cance
— 💶 ТСР	Offset	Active On Boot
Default	(0, 0, 0) mm, (0, 0, 0)	1° 🐻
TCP-1	(0, -146.81, 268.73) m	nm, (45, 0, 0) °
TCP-2	(-146.81, 0, 268.73) m	nm, (0, -45, 0)°
TCP-3	(146.81, 0, 268.73) mi	m, (0, 45, 0)°
	litem selected of 1 page	
1-4 of 4		
1-4 of 4		Q, New
1-4 of 4 □ ↓ Payload	†↓ Mass And Offset	

4. (Optional): Set up the robot controller's Input/Output (IO) signals for use in the Device Control Panel and Task Canvas.

Inp	out Signals	Output Signal	
			C
Signals	Display Name	Data Type	DCP
CI_O		BOOL	
CL1		BOOL	
Ci_2		BOOL	
CI_3		BOOL	
CI_4		BOOL	
CI_5		BOOL	
CI_6		BOOL	
CL7		BOOL	
DILO		BOOL	
DILT		BOOL	
DI_2		BOOL	
DL3		BOOL	
DL4		BOOL	
1-13 of 22		1 of 2 page(s)	

- a. Enter a **Display Name** (i.e. "Open Machine Door", "Open Pneumatic Vise", or "Start Machining Cycle") to show what each signal does in other apps.
- b. If you want a signal to appear in the Device Control Panel, check the **DCP** box next to that signal.

	Note: To use these I/O signals, integrate your I/O devices with the robot controller.
c. Tap S	SAVE. Forge/OS returns to the Configured Devices list, which shows the new robot as enabled .

Note:

A device is **enabled** when its switch is green and toggled to the right.

5. Follow these steps to clear robot errors:

EPSON VT6L Startup Guide | 13 - Device Configuration - Pt.2 | 42

a. Tap the **Device Status** button on the Toolbar to expand the Device Status Panel. The robot is listed with two buttons: **MORE** and **RESET**.



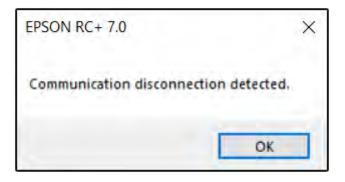
b. Tap **RESET** to try to recover from the errors. If you can't **RESET** an error, tap **MORE** to get more details and instructions.

Congratulations! You are ready to control your robot in the Device Control Panel and Task Canvas apps.

Chapter 14. Closing RC+

You can now control the robot arm with just the READY pendant. Follow these steps to disconnect your PC from RC+.

1. Unplug the USB cable from your Windows PC and robot controller. A "Communication disconnection detected" pop-up appears in RC+.



- 2. Check the READY pendant for errors, such as the "Communication Disconnection Between RC+ and Controller" error. Follow these substeps to resolve it:
 - a. Tap the **Device Status** button on the Toolbar to expand the Device Status Panel. The robot is listed with two buttons: **MORE** and **RESET**.

Devices	
H Force Sensor	ok 🌔
OK	
Clamping Gripper	ок
ок	
😴 Robat arm	DISCONNECTED
ERROR - Robot is disconnected.	MORE S RESET
💠 💽 🗰 🖪 🛑 DEVICE ST	Admin > 2:21 PM 5.5.21

b. Tap **RESET** to try to recover from the error. If you can't **RESET** the error, tap **MORE** to get more details and instructions.

Chapter 15. Appendix A: Setting Up Forge/OS

Installing ForgeOS

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

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



Important:

Installing ForgeOS will erase all data on the target hard drive.

a. Connect a monitor, keyboard, and mouse to the IPC where you want to install ForgeOS.



b. Plug the ForgeOS installation USB flash drive into the IPC.



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

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



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.

Note:

If you're installing Forge/OS on a **Forge/Ctrl**, press F11. You may need to enter the **BIOS Admin password**. Contact READY Support if you run into this issue.

- d. From the boot options, select **Install ForgeOS** to boot from the installation USB flash drive.
- e. The installer may take several minutes to load. Wait until the installation wizard opens.
- f. Select your language. Then click Install Forge.

English Español	
Esperanto	• arongelos el
Euskara Français	Install Forge
Gaeilge	instant or ge
Galego	
Hrvatski	
Íslenska	
Italiano	
Kurdî	
Latviski	
lietuviškai	

g. Choose a keyboard layout. Then click **Continue**.

hoose your keyboard layout:				
English (Nigeria) English (South Africa) English (UK) English (US) Esperanto Estonian Faroese	Engli Engli Engli Engli Engli Engli Engli	sh (US) sh (US) - Cherokee sh (US) - English (D sh (US) - English (D	olemak) vorak) vorak, alt. intl.) vorak, intl., with vorak, left-hand	ed)
Type here to test your keyboard				
Detect Keyboard Layout				
		Quit	Back	Continue

h. Select Minimal installation. Uncheck Download updates while installing forgeos. Then click Continue.

EPSON VT6L Startup Guide | 15 - Appendix A: Setting Up Forge/OS | 46

What apps would you like to install to start with?			
O Normal installation			
Web browser, utilities, office software, games, and media players.			
O Minimal installation			
Web browser and basic utilities.			
Other options			
Download updates while installing forgeos 5.0.6 This saves time after installation.			
Install third-party software for graphics and Wi-Fi hardv	vare and additional me	dia formats	
This software is subject to license terms included with its document	tation. Some is proprietary.		
	Quit	Back	Continue

i. Select Erase disk and install forgeos. Then click Continue.

tallation type			
computer currently has no detected ope	rating systems. What would	d you like to do?	
Warning: This will delete all your programs, do		other files in all operating sys	iems.
Something else You can create or resize partitions yourself, or	r choose multiple partitions for f	orgeos 5.0.6.	
s	s computer currently has no detected ope Erase disk and install forgeos 5.0.6 Warning: This will delete all your programs, do Advanced features None selecter Something else	s computer currently has no detected operating systems. What would Erase disk and install forgeos 5.0.6 Warning: This will delete all your programs, documents, photos, music, and any Advanced features None selected Something else	s computer currently has no detected operating systems. What would you like to do? Erase disk and install forgeos 5.0.6 Warning: This will delete all your programs, documents, photos, music, and any other files in all operating syst Advanced features None selected

j. Select the IPC hard drive for ForgeOS and click **Install Now**.

elect drive:	SCSI33 (0,0,0) (sda)	•				
he entire dis	k will be used:					
			0			
			forgeos 5.0.6			
			/dev/sda (ext4)			
				Quit	Back	Install Now

- k. Confirm that you want to erase the entire disk by clicking **Continue**.
- I. Make a note of the pendant instructions. If you're using a Forge/Ctrl, select the checkbox next to **This** hardware is a Forge CTRL.

this computer that c	Keba Touch Pen orresponds to th	dant, please atta ne network device	ach the Keba Touc e named:	h Pendant's E	thernet cable	to the port of
ens33						
This hardware is	a Forge CTRL					
Sets gateway for int	ernet connection					
					Back	Continue

m. Choose your timezone. Then click **Continue**.

Where are you?	
New York	Back Continue

n. Choose your IPC's host name. The host name identifies the IPC on the network. Pick a username and password. Then click **Continue.**

Note:
The username and password that you create here are for accessing the IPC desktop. They are NOT
for signing into ForgeOS on the READY pendant.
Who are you?

Your name:	Forge User	_	Ø	
Your computer's name:	YOUR-HOSTNAME	0		
	The name it uses when it talks	to other computers.		
Pick a username:	forge 🥥			
Choose a password:	1	1		
Confirm your password:				
	O Log in automatically			
	Require my password	to log in		
			Back	Continue

o. Wait for the installer to copy and install ForgeOS.

EPSON VT6L Startup Guide | 15 - Appendix A: Setting Up Forge/OS | 49

Welcome to Forge/OS 5



Anyone can program robots

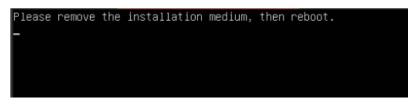
Forge/OS enables anyone on the factory floor to quickly learn, and program automation. No robotics programming experience necessary. Rapidly modify programs when parts change. Troubleshoot problems in minutes.



p. Once the installation completes, click Restart Now.



q. When prompted, remove the installation flash drive. Then reboot.



r. Wait for ForgeOS to finish booting.

EPSON VT6L Startup Guide | 15 - Appendix A: Setting Up Forge/OS | 50

s. When you see the login screen with the ForgeOS 5 logo, ForgeOS is ready to run on the READY pendant! You don't need to sign in to the desktop. Disconnect the monitor, keyboard, and mouse that you used to install ForgeOS.



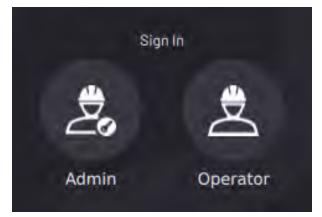
- 2. The READY pendant automatically finds and pairs with the IPC. The three LEDs on the screen help you track the status:
 - **Pendant Network Connection**: This condition is satisfied when the READY pendant has a valid network connection (i.e., the Ethernet cable is plugged in).
 - ForgeOS IPC Detected: This condition is satisfied when the READY pendant detects a Forge/OS IPC on the network.
 - ForgeOS IPC Paired: This condition is satisfied when the READY pendant successfully pairs with the IPC. If pairing fails, it is automatically retried indefinitely.

When a condition is not satisfied, the LED is red. When a condition is in progress of becoming satisfied, a spinner around a READY logo appears to the right of the text. When a condition becomes satisfied, the LED turns green.



The UI shows the real-time state of each step. For example, if the pendant loses its network connection during pairing, all steps become undone. If the READY pendant spends more than 60 seconds on any step, troubleshooting text displays. Common things to check are if the READY pendant network cable is plugged in, if the IPC is powered on, if the READY pendant and IPC are connected to the same network, and if there's only one READY pendant and one IPC on that network.

3. Tap Admin and sign in. The default Admin password is "forgeadmin".



Note:

After installation, you have limited access to ForgeOS until you activate it with a license code. See Activating ForgeOS with a License Code (on page 51).

Activating ForgeOS with a License Code

There are two methods to activate ForgeOS: Online license activation and offline license activation.

The table below lists the requirements for each method.

EPSON VT6L Startup Guide | 15 - Appendix A: Setting Up Forge/OS | 52

Online License Activation	Offline License Activation
 An internet-connected ForgeOS A valid ForgeOS license code 	 A 2GB or larger USB flash drive An internet-connected PC A valid ForgeOS license code

Tip:

i

Connect a USB keyboard to the port on the bottom of the READY pendant to type in any text field in ForgeOS.

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

Settings	C
Network	>
Fieldbus Configuration	>
General Settings	>
Remote Access	>
System Update	\rightarrow
Package Manager	>
License (EXPIRED/(NYALID)	>
3 System Information	>

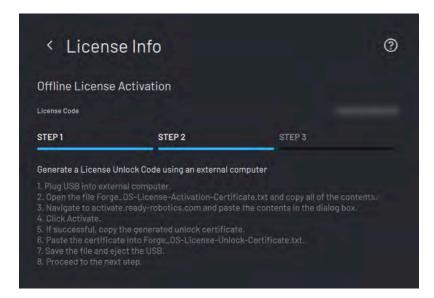
- 2. Type in your license code.
- 3. Choose ONLINE LICENSE ACTIVATION if ForgeOS is connected to the internet. If not, choose OFFLINE LICENSE ACTIVATION.

License Information	
License Status	
Expired	
License Code	<empty< th=""></empty<>
License Name	Unknown License Typ
Enter License Code:	
ONLINE LICENSE ACT	IVATION
OFFLINE LICENSE AC	TIVATION

- 4. If you chose online license activation, you're done!
- 5. If you chose offline license activation, follow these substeps:
 - a. Insert the USB flash drive into your IPC. Tap **START WRITING CERTIFICATE TO USB DRIVE**.

< License Info						
Offline License	Activation					
STEP 1	STEP 2	STEP 3				
Transfer License A	ctivation Certificate to USB					
	ctivation Certificate to USB to transfer the activation certificate Click start to begi	n writing				

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.



c. Insert the USB flash drive back into your IPC. Tap UNLOAD UNLOCK CERTIFICATE FROM USB DRIVE.

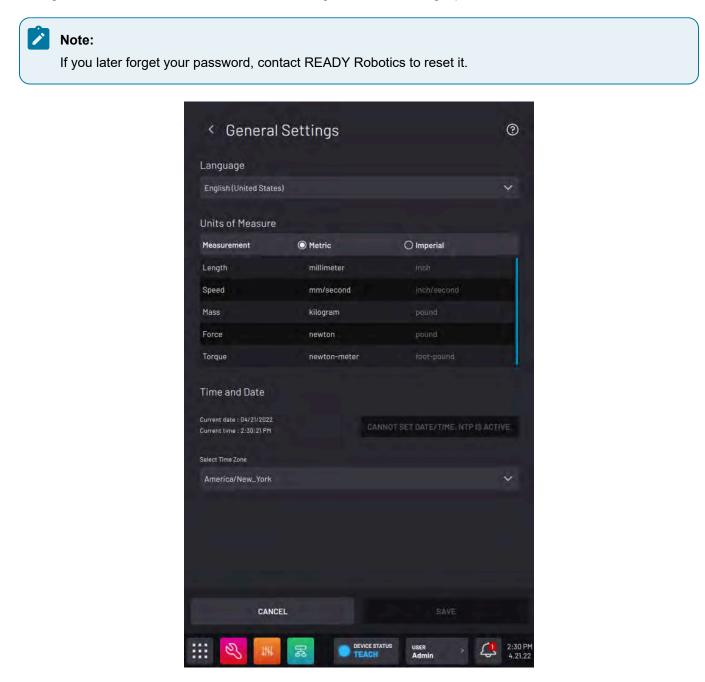
- d. Wait for the file to finish transferring. When the file transfer is complete, remove the USB flash drive and tap **SAVE**.
- e. ForgeOS returns to the licensing home screen and shows an active license. If the license status isn't active, restart these license activation steps. Double-check your license code.

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:

- a. On the Settings app main screen, tap General Settings.
- b. Change the Units of Measure, Time and Date settings, or the Admin login password.

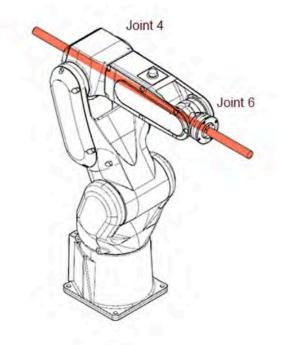


c. Tap SAVE to save changes and exit the General Settings menu.

Chapter 16. Appendix B: Known Issues

You may encounter programming issues when the EPSON robot comes near a singularity. **THESE ISSUES ARE NATIVE TO EPSON AND ARE NOT CAUSED BY FORGE/OS.**

What is a singularity? A singularity is a position that prevents a robot from making certain movements. A singularity can occur when two or more joint axes are co-linear, such as the axes of Joint 4 and Joint 6.



In a singularity, a robot cannot reach a specified waypoint due to physical limitations. This doesn't mean that it can't reach the waypoint, but it is unable to move to the position in that way.

Important:

When you move a robot near a singularity, the robot may move unexpectedly, speed up, or enter an error state.

Two behaviors you may see near a singularity are excess jogging and rejected stop requests.

Excess Jogging At a Singularity

When you jog the robot near a singularity, the robot may move for an extra 1-2 seconds after letting go of the jog button.

This issue is the common with linear jogs on EPSON robots. Linear jogs move the robot's tool center point (TCP) in the Cartesian space (X, Y, Z, Rx, Ry, Rz). Use joint moves around singularities.

When jogging the robot near objects, use a low speed to avoid unpredictable collisions.

Stop Requests Rejected by the Robot

When the robot is moving through a singularity, it might not immediately stop with the READY pendant **Stop** button or with an external safety device (such as a light curtain or a safety fence). However, the robot will always immediately stop with the E-Stop.

Important:

ļ

In emergency situations, ALWAYS hit an emergency stop button that is wired to the emergency stop circuit of the EPSON controller.

For example, if you execute a circle move that has an arc point near a singularity, the robot might finish its entire path of programmed motion regardless of any stop signal it receives (other than the E-Stop).

To minimize risk, use a low speed as you first build out your task. This will help avoid unpredictable collisions.

Chapter 17. Appendix C: Troubleshooting

Use this section to recover from an unresponsive robot or from build errors.

Driver Kill Switch for Unresponsive Robot

If a port fails to configure when you load the driver, you may lose all connection to the robot when you reboot.

To shut down an unresponsive driver, set IO23 (pin 27) to HIGH by making these connections:

- 0V to Pin 14 (Input common)
- 24V to Pin 27 (Input No. 23)

Pin No.	Signal Name	Pin No.	Signal Name
1	Input No. 0 (Start)	15	Input No. 1 (SelProg1)
2	Input No. 2 (SelProg2)	16	Input No. 3 (SelProg4)
3	Input No. 4 (Stop)	17	Input No. 5 (Pause)
4	Input No. 6 (Continue)	18	Input No. 7 (Reset)
5	Input common No. 0 to 7	19	Input common No. 8 to 15
6	Input No. 8	20	Input No. 9
7	Input No. 10	21	Input No. 11
8	Input No. 12	22	Input No. 13
9	Input No. 14	23	Input No. 15
10	Input No. 16	24	Input No. 17
11	Input No. 18	25	Input No. 19
12	Input No. 20	26	Input No. 21
13	Input No. 22	27	Input No. 23
14	Input common No. 16 to 23	28	Not Used

Remote function inside () in the table above is initially assigned to input from 0 to 7. For further details, refer to Setup & Operation 14. I/O Remote Settings.

i Tip:

To check if IO23 is set to HIGH, open the **I/O Monitor** from the **Tools** menu. In the pop-up, select **All Inputs**. Check if there's a red dot next to input **23**.

While IO23 is set to HIGH, restart the robot. This setting prevents the driver from launching when the robot powers up, allowing you to reconfigure the robot. The Runtime Controls window reads "Kill switch enabled, disable to start driver" until you set **IO23** back to **LOW** (turning the red dot off).

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ect Explorer 4 X	Run + Venicle Canalie							
	2022/09/22 07:55:28 Tsk(65) - BGMain - Waiting for main	I/O Monitor					? ×	
	2022/09/22 07:55:28 Tak(1) - JNT(1) LowerLimit(-8488472)	tandard View					and the second second	
	2022/09/22 07:55:28 Tak(1) - JNT(2) LowerLimit(-9986438, 2022/09/22 07:55:28 Tak(65) - BGMain - Walting for main					-		
	2022/09/22 07:55:28 Tsk(05) - Donain - Walting for main 2022/09/22 07:55:28 Tsk(1) - JNT(3) LowerLimit(-2366604)	All Inputs		All	Outputs	· · · ·	_	
	2022/09/22 07:55:28 Tsk(1) = JNT(4) LowerLimit(-8128764)	Bt O Byte	O Word	۲	Bt O By	te O Word		
	2022/09/22 07:55:28 Tak(1) - JNT(5) LowerLimit(-4599018.	Bit Status	Label	1 8	t Status	Label	7	
	2022/09/22 07:55:28 Tsk(1) - JNT(6) LowerLimit(-1341073) 2022/09/22 07:55:28 Tsk(65) - BGMain - Waiting for main	0 O Start	Laber				-	
	2022/09/22 07:55:29 Tsk(1) - main() - initialization cor	1 O SelProg1			O Run			
	exiting start_motion loop	2 O SelProg2			O Paus			
	2022/09/22 07:55:29 Tsk(65) - BGMain - Waiting for main exiting launch loops	3 O SelProg4						
	Kill switch enabled, disable to start driver	4 O Stop 5 O Pause				pOn guardOn		
		6 O Continue						
		7 O Reset			O War			
		8 O						
	Forders	9 O						
	and the second s	10 O		1				
		11 O 12 O		1				
	Los Pover Samid Factor 25 1	13 0		1				
		14 0		1				
	the second se	15 O		1	5 0			
		16 Ó		5				
		17 O		51				
		18 O 19 O		51				
		20 0		5				
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		22 O		51				
		23 🔘		5				_
X		512 O		52				-
		513 O 514 O		52				
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		516 O		5				
	14			¥			¥	
		Edt	a destruction of the local data	Hexadecimal				

Initial Device Configuration Error

When you set up your robot for the first time, you may see build errors.

	system_state system_syste system_syste system_syste	
Status		
15:3	4:47 Build aborted d	ue to errors

Try deleting and re-adding the robot in System Configuration.

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1. In the top menu bar, select Setup. Go into System Configuration.

File Edit View Project Run Tools	Setu	p Window Help	_							
D 🚅 🖉 🍯 🕹 🖻 🖻 🗎	0-0	PC to Controller Communications	1	审	•	*	-		D-Connec	tion:
Project Explorer	(III)	System Configuration						-		
Program Files Ib_arr_ral.prg Ib_arr_robot.prg		Preferences Options								
- E lib_ar_ser_cbor.prg - E lib_arrays.prg - E lib_commands.prg - E lib_functions.prg - E lib_functions.prg										

2. Expand the **Controller** menu. Open **Robot 1**. Note what the settings of the configured robot are. If they don't match your robot model, make a note of that.

	Robot 1: Model			Close
Controller			1000 10000	Close
General Configuration	-	Model:	VT6-A9015	1 1 1 million
Preferences		Type:	Six Axis	-00
Simulator		Reach:	920 mm	
Drive Units Robots		Max payload:	6 kg	
E-Robot 1				
Inputs / Outputs				Add
Remote Control B RS232		-		Delete
TCP / IP		1 1 1 1 1 1	-)0	
E Security		1.		Change
± Vision		1.5		
		10	2	
		1.000		
			L	

3. Click **Delete** and **Yes** to re-configure the Robot 1 file.

Startup	Robot 1: Model			
Controller				Close
General		Model:	VT6-A901S	
Configuration		Type:	Six Axis	wyorky .
Preferences		Reach:	920 mm	1
Simulator				Restore
Drive Units		Max payload:	6 ka	
⊟ Robots ⊟ Robot 1	EPSON RC+ 7.0			
Model				Add
Additional Axes			Sector Contractor	
Configuration	Are you su	re that you want t	o delete Robot #1, MNP01?	Delete
Calibration				
Amplifiers				Change
Inputs / Outputs			Yes No	
Remote Control			10	
⊞-RS232		E		
IE-TCP / IP		1		
Security				

4. Click Add. Enter the robot's information. Then click OK.

ž	Add New Robot			? X	1 1 1
System	Robot Name: Robot Senal #: Motion System:	VT6A901S VT60T30112 Standard v	Selected Robot Model: Type: Reach: Max payload:	VT6-A901S Six Axis 920mm 6 kg	? Close
Oriv Rob Inpu Rob Inpu Rer RrS2 TCF Security Vision	Drive Unit: Robot Type: Robot Joints: Series: Model:	CU ~ Six Axis ~ 5 ~ VT6 ~ VT6-A901S ~			Add
		ОК	Cancel		

- 5. Close out of the System Configuration menu.
- 6. **Rebuild** the project (as outlined in the next section).

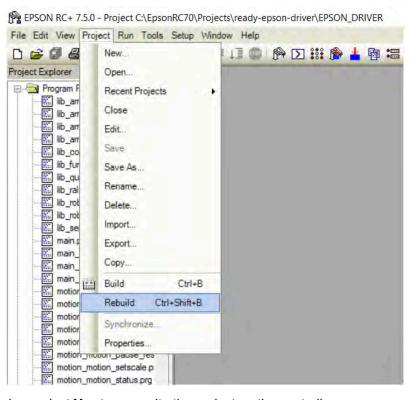
Rebuilding the Source Code

You need to rebuild the source code:

- after you resolve a build error.
- if the Epson encounters a stack error in the Epson logs while you are running a task. When this happens, you will receive a Forge/OS message asking you to rebuild.

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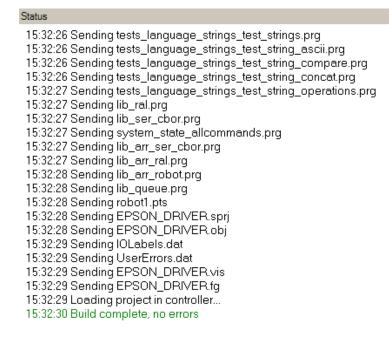
1. In the top menu bar, open the **Project** dropdown. Click **Rebuild**.



2. If you see the prompt below, select Yes to overwrite the project on the controller.

EPSON RC+ 7.5.0 - Project C:\EpsonRC70\Pr	jects\EPSON_DRIVER	_	\times
File Edit View Project Run Tools Setup Win	dow Help		
	🗏 📋 💿 р 🔀 🎥 🎽 🕅 🕽 🧚 💼 🍺 🕞 Connection: 🛛 USB	• ? -	
E b_array prig E b_array prig E b_contrants prig E b_contains prig E b_contains prig E b_contains prig E b_contains prig E b_orlok prig E b_orbot prig E b_orbot prig E b_orbot prig E b_set_cotor prig E main_state prig E main_state prig E motion_motion_oint prig E motion_motion_inter prig E motion_motion_motion_inter prig E motion_motion_motion_inter prig E motion_motion_motion_inter prig E motion_motion_motion_inter prig E motion_mot	Warning: Project in controller is 'EPSON_DRIVER'. This is not the same as current PC project. The project in the controller will be overwritten. Continue? Yes No		
Status			ч×
15:14:09 Linking			^
			\sim
<			>
	Program EStop Safety Error Warning Robot: 1, VT6A901S, VT6-A901S No Tasks Running		

3. Verify that you have a successful rebuild by looking for "Build complete, no errors" in the Status window.



4. Start the updated driver. Navigate to the top menu bar, open the Run dropdown, and click Run Window.

Projects\ready-epson-driver\EPSON_DRIVER

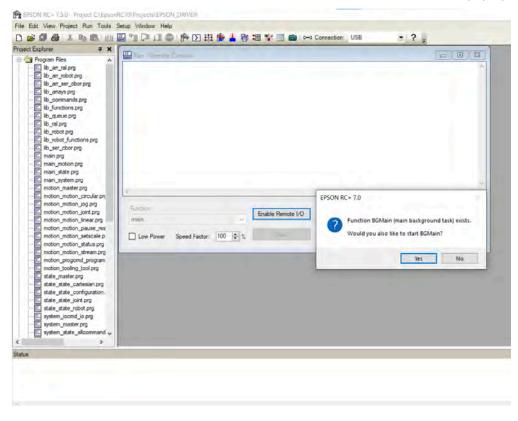
File	Edit	View	Project	Run	Tools	Setup	Window	Help	
				-					

<

	113 1244	Run Window	F5	👬 隆 🛓 🛅 🏣
Project Explorer		Test Auto Mode	Shift+F5	The second second
Program Files	1	Step Into	F11	
lib arr robot.pn		Step Over	F10	
lib_arr_ser_cbo	稙	Walk	F12	
	I	Resume	F7	
	-	Stop		
ib_queue.prg	Ð	Toggle Breakpoint	F9	
lib_robot.prg		Clear All Breakpoints	Ctrl+Shift+F9	
lib_ser_cbor.prg	R=0 B=1	Display Variables	F4	
main.prg	品	Call Stack		
main_state.prg				

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5. To start the driver in Remote I/O mode, click the Enable Remote I/O button. Click Yes in the pop-up window.



Digital Output Configured as System Output Error

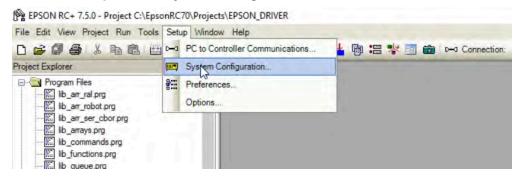
You may see a "Digital Output Configured as System Output" error in Forge/OS or an "Error 2342: Cannot change the status for output bit configured as remote output" in RC+.

For example, suppose you have Output 0 linked to the "Ready" signal. In the **I/O Monitor**, output bit #0 has the label "Ready". On the READY Pendant, if you select the **DCP** checkbox next to Output 0 in the robot's device configuration and then try to change the state of Output 0 in the robot's **Signals** tab in the Device Controls app, you will get an error.

					REMOTE - Quartator Window
System Configuration				? ×	Emergency Stop: OFF Safeguard: OFF
- Startup Controller	Remote Control Outputs			Close	
General					键 I/O Monitor ? ×
Configuration				Apply	Standard View Custom View 1
Preferences	Output Signal	Output #	^	1994	All Inputs V All Outputs V
Simulator The Units	Ready	0 🗸	3. 1		Bit O Byte O Word Bit O Byte O Word
E Robots	Running	Not used			Bit Status Label A Bit Status Label A
Inputs / Outputs	Paused	Not used			0 O Start 0 🖲 Ready
Remote Control	Error	Not used		Defaults	1 O SelProg1 1 O 2 O SelProg2 2 O
Inputs	EStopOn	Not used		Load	3 O SelProg4 3 O 4 O Stop 4 O
Outputs User Outputs	SafeguardOn	Not used		Ludu	5 O Pause 5 O
Ethernet	SError	Not used		Save	6 O Continue 6 O 7 O Reset 7 O
RS232	Warning	Not used		1000	8 0 8 0
⊕ RS232	MotorsOn	Not used			9 O v 9 🖷 v
TCP / IP	AtHome	Not used	~		Edit Hexadeomal Values
Conveyor Encoders Security Vision					LO Montor System History

Follow these steps to unlink Output 0 (or other outputs) in RC+.

1. In the top menu bar, click Setup. Go into System Configuration.



2. In the Controller menu, select Remote Control and then Outputs.

📖 System Configuration					?	×
Startup Controller General Configuration	Remote Con	trol Outputs			Close	
Preferences		Output Signal	Output #	^		
Simulator ⊕⊡Drive Units		Ready	0			
		Running	1			
		Paused	2		D ()	
Remote Control		Error	3		<u>D</u> efaults	
Inputs		EStopOn	4		Load	
Outputs User Outputs		SafeguardOn	5		Load	
- Ethemet		SError	6		Save	
PLC		Warning	7			
		MotorsOn	Not used			
in TCP / IP		AtHome	Not used	v		
⊛- Security ⊛- Vision		<u></u>				

3. Configure the output signals to an output bit (or select "Not used").

Note:

You cannot select Output #8 or #9. These outputs are reserved by Forge/OS.

Chapter 18. Appendix D: Error Recovery

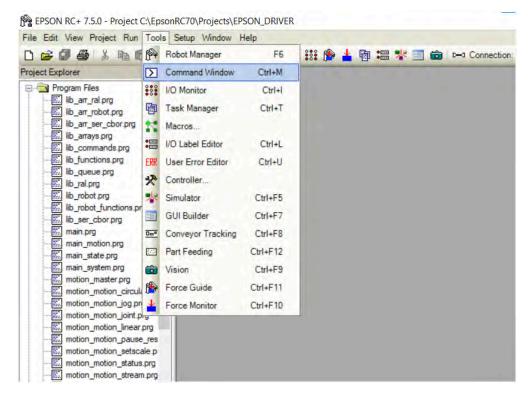
Some errors are not recoverable from Forge/OS. One such error is Error 4066: "Motion Command was attempted in the prohibited area depended on joint combination." This error occurs when you move the robot outside of its joint limits.

In these situations, the robot is not movable in Forge/OS or in the EPSON RC+ Robot Manager. In this case, use the instructions below to recover your robot to an operable state.

- 1. Restart RC+ by closing out of it and re-opening it in Program Mode.
- 2. If necessary, reload your project:

		New	🞼 💷 🏟 💽 🗱 🎥 🛓 🔯 🔚 🧩 🧾 📾 🖂 Connection: USB	? =
Project Explorer		Open		
		Recent Projects	1 C:\EpsonRC70\Projects\EPSON_DRIVER	
1.1.5		Close	2 C:\EpsonRC70\Projects\ready-epson-driver\EPSON_DRIVER	
		Edit	3 C:\EpsonRC70\Projects\READY_EPSON_DRIVER	
		Save	4 C:\EpsonRC70\Projects\BOX_sample	
		Save As	5 C:\EpsonRC70\Projects\SimulatorDemos\C4_sample	
		Rename		
		Delete		
		Import		
		Export		
		Copy		
	*	Build Ctrl+B		
		Rebuild Ctrl+Shift+B		
		Synchronize		
1.1.1.1.1		Properties		

- a. In the top menu bar, open the **Project** dropdown.
- b. Expand the Recent Projects menu.
- c. Select the EPSON_DRIVER file.
- 3. If you see a pop-up asking if you want to disconnect from the controller, click No.
- 4. In the top menu, go to the Tools menu. Open the Command Window.



- 5. Turn motors off.
 - a. In the Command Window, type "Motor Off", then hit Enter.

```
> Motor Off
>
```

- 6. Turn a joint brake off.
 - a. Check which joint is out of the movable zone or in a state that it cannot move.
 - b. In the Command Window, type "Brake Off, [JOINT#]", then hit **Enter**. For example, to release the joint 3 brake:



Depending on which joint that you are releasing the brake for and what position that joint is in, you may need to catch the robot as it falls. Avoid damage to the robot and any nearby objects that it might collide with.

```
> Brake Off, 3
> |
```

7. Move the joint and turn its brake back on.

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- a. Use your hands to move the joint back within the movable zone.
- b. In the Command Window, type "Brake On, [JOINT#]", then hit Enter.

```
> Brake Off, 3
> Brake On, 3
>
```

8. Turn motors on.

a. In the Command Window, type "Motor On", then hit Enter.



9. Restart the driver in Auto Mode.

Chapter 19. Contacting READY

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

Visit our Support site for robot startup guides, FAQs, and more.

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

