Overview

This document outlines the steps necessary to set up and program a Fanuc CRX robot in **MachineLogic**. By following this guide, you'll be able to seamlessly integrate your Fanuc robot with Vention's motion components ecosystem using **MachineMotion AI**.

> Compatibility Notice
>
> This user guide is compatible for MachineMotion AI only. To access the guide for the previous MachineMotion v2, follow the following link: MachineMotion v2 - Fanuc Configuration Guide

Supported Models

- CRX-5iA
- CRX-10iA
- CRX-10i/L
- CRX-20iA/L
- CRX-25iA

Required Software and Hardware

Software Option

- **Remote Motion Interface (R912)** — *PR-FA-002-0022*
  Enables remote control capabilities between MachineLogic and the Fanuc controller.
- **Advanced DCS Package (R859)**
  The Advanced DCS Package includes safety options and the powerful 4D Graphics option.

Hardware Option

- **CRX Safe I/O** — *PR-FA-002-0021*
  Integrates safety signals with the Fanuc robot.

Installation Steps

System Connection

To program a Fanuc CRX series Robot with MachineMotion AI, ensure you have the following components:

- ✅ **MachineMotion AI Controller**

- **Pendant V3**
- **Robot Safety Module**
- **E-Stop Module with Reset**
- **Fanuc Robot** with controller
- **Safety Extension Cables**

> **Note:** This list depicts the minimum set of components needed to configure and control your Fanuc robot with MachineMotion AI. Your system may have a different set of components according to your safety needs.

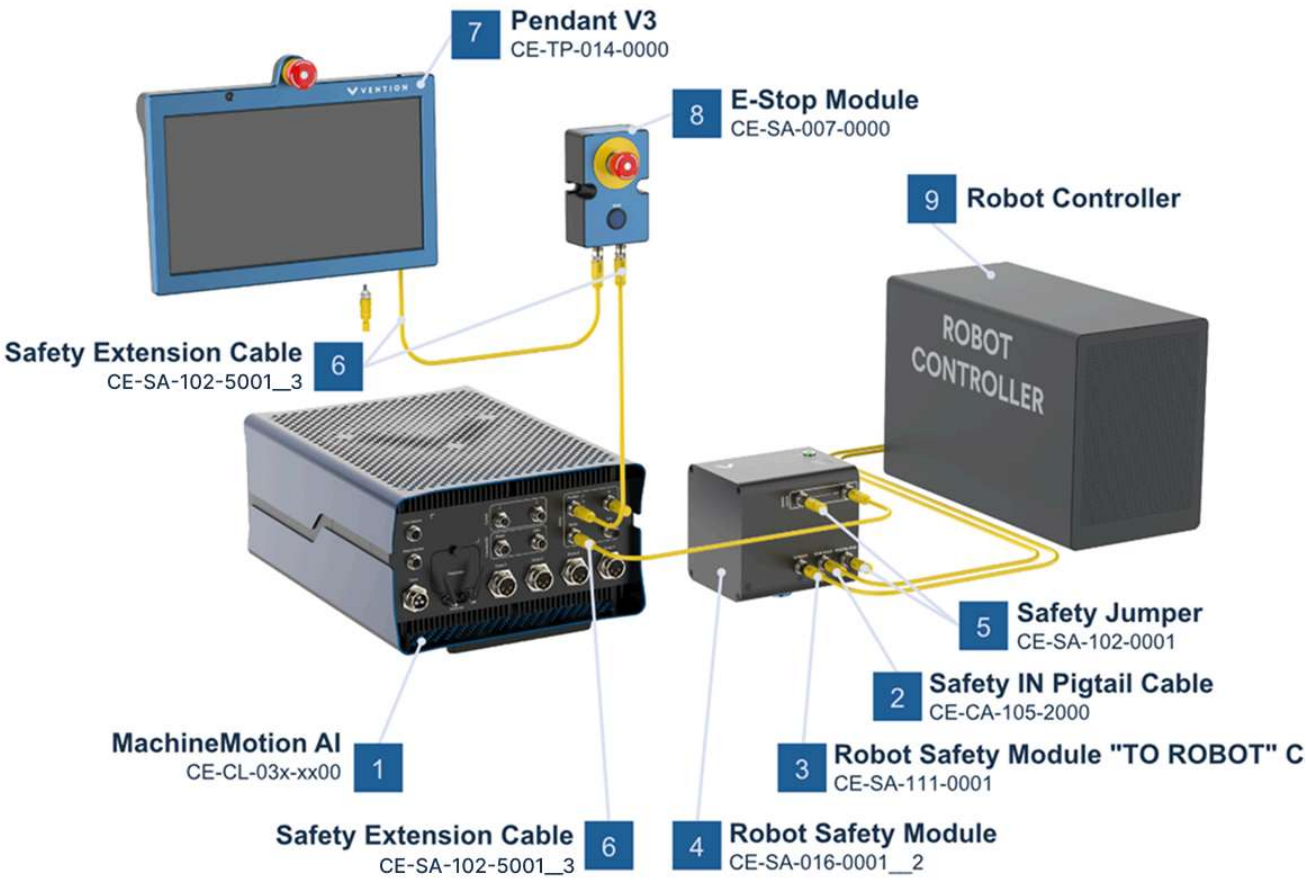


Figure 1. Safety Components Connection

Safety Wiring

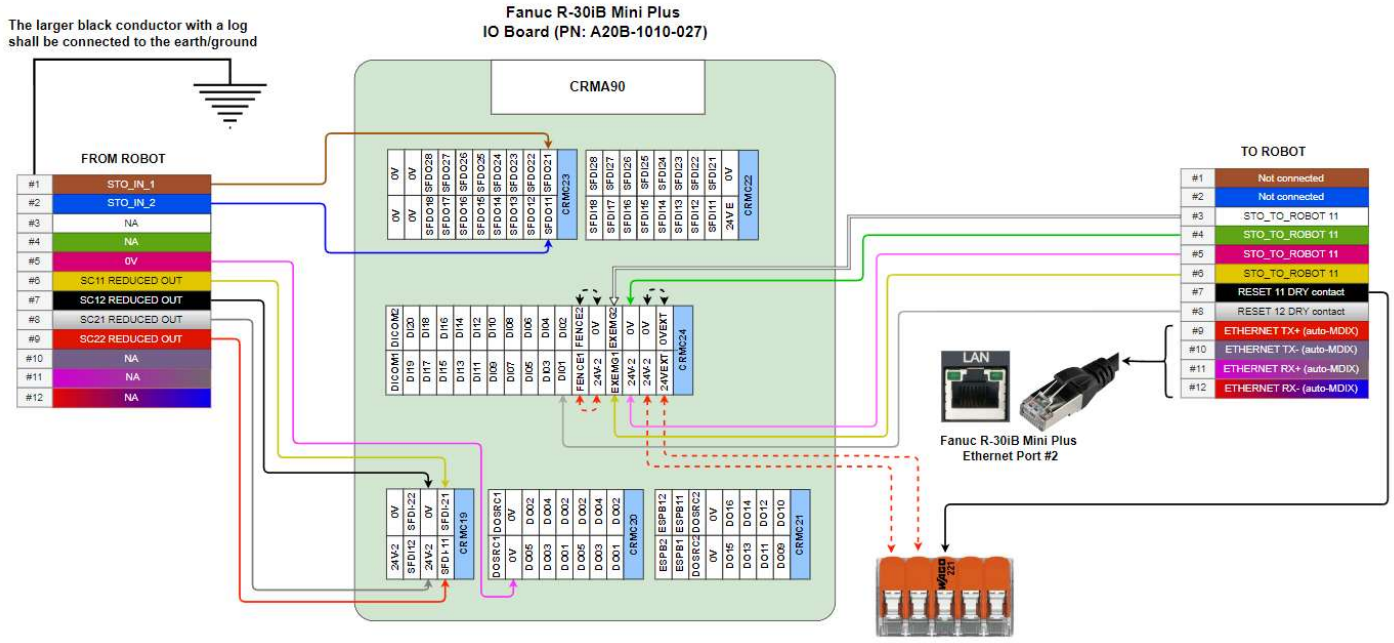
Vention's Robot Safety Module is used to interface safety signals and Ethernet connection to the FANUC controller. Please follow the Automation System Diagram (ASD) made by your Application Engineer, or one of the diagrams in the Robot Safety Module AI Datasheet.

Safety behaviour

1. In case of an E-stop (Vention or FANUC Pendant), or any other device that detects a dangerous situation on the Vention Safety Chain:
    a. Safe Behaviour:
        i. MachineMotion axis falls into STO.
        ii. FANUC CRX Falls into STO or SS1, as configured.
    b. Recovery
        i. Pressing on the reset (blue) button will give power back to the MachineMotion and activate FANUC CRX safety signals from Robot Safety Module.
2. In case of a reduced speed situation from the laser area scanner:
    a. Safe Behaviour:
        i. FANUC CRX will activate collision detection and slow down to collaborative speed.
        ii. MachineMotion is not influenced by this situation. This needs to be taken into account in the risk assessment. Axis will run at configured speed.
    b. Recovery:
        i. If the laser area scanner is not able to detect a human everywhere where there is a danger, but can detect the entry points, then the laser scanner should be configured with manual reset. In this case, pressing the reset button will bring back the FANUC CRX to normal speed.

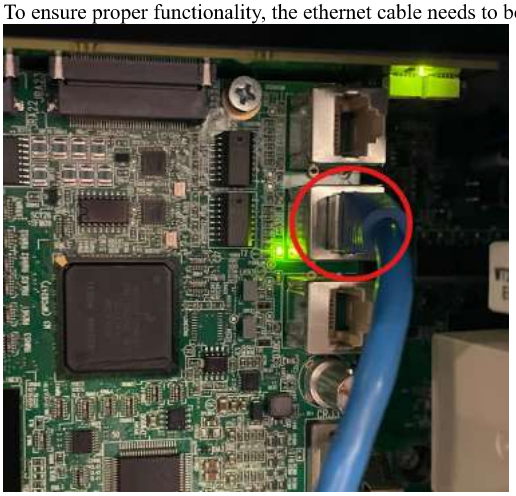
ii. If the laser scanner is able to detect a human everywhere where there is a danger, then the laser area scanner can be configured with an Auto-Reset Safety Module AI (to be determined and confirmed by risk assessment). In this case, if the laser area scanner does not detect a human in the workspace anymore, the FANUC CRX will resume to full speed.

Robot Controller Safety Wiring Diagram



Important: Ethernet Cable Connection

To ensure proper functionality, the ethernet cable needs to be connected to the port#2 in the Fanuc controller as shown in the following picture.



1. Download Deployment Files

1. Download and extract the deployment zip file from:

Fanuc_Configuration_Files_MMAI.zip 21.36 KB Download

You should get:

- FanucConfig_Step1
- FanucConfig_Step2
- FanucConfig_Step3

2. Configure Controller

2.1 Initial Setup

This step prepares the Fanuc controller in order to set each variable automatically in the following steps.

1. Power on the robot controller
2. Insert USB drive in the robot controller (not the Teach Pendant).
3. Open the **virtual iPendant** via the icon at the bottom right

4. Navigate: `MENU → 7 FILE → F5 [UTIL] → 1 SET DEVICE → 6 USB DISK (UD1:)`
5. Open `FanucConfig_Step1` folder
6. Load files:
   - `FANUC.CVR`
   - `GET_PARAMS.TP`
   - `RMI_Move.TP`

> Action
>
> - Go to each file → Press `F3 [LOAD]` → Confirm with `YES`
> - Overwrite if prompted.

Restart the Controller:

- Make sure to be in Teach Pendant mode (see the icon at the top right of the screen)
- Navigate: `FCTN → 0 NEXT → 8 START MODE → CTRL`
- Power off → Wait 10 sec → Power on

Override Settings

- Navigate: `MENU → 4 Variables`
- Update: `$PLST_SCHNUM` → `256`
  - Tip: to scroll fast via the touch screen, you can press the empty space below the list
- Navigate: `MENU → 0 NEXT → 1 Program Setup → Numeric Registers`
- Set value: `256`

Cold Restart:

- `FCTN → Start (COLD)`

2.2 I/O and Controller Configuration

2.2.1 Load Configuration Files

1. Open iPendant
2. Navigate: `MENU → 7 FILE → UTIL → SET DEVICE → USB DISK (UD1:) → FanucConfig_Step2`
3. Load files:
   - `FANUC.XVR`
   - `DIOCFGSV.IO`

> **Action**
>
> - Go to each file → Press `F3 [LOAD]` → Confirm with `YES`
> - Overwrite if prompted.

2.2.2 Apply DCS (Dual Check Safety)

1. Navigate: `MENU → 0 NEXT → 6 SYSTEM → F1 [TYPE] → 7 DCS`
2. Select: `F2 [APPLY]`
3. Code: `1111`
4. Confirm.
5. Navigate: `FCTN → 0 NEXT → 8 START MODE → CTRL`
6. Power off → Wait 10 sec → Power on

2.3 Payload Creation

1. Navigate to: `MENU → 7 FILE → FanucConfig_Step3`
2. Load: `SET_PAYLOADS.TP`
3. Execute the program:

- Select `SET_PAYLOADS`
- Enable the teach pendant
- Press **Play**
- Hold **Run** toggle in **FWD** until completion

You may see an alarm: `SYST-212 Need to apply to DCS param .`

> Re-apply DCS as shown in Step 2.

Connecting to the Robot Controller from MachineMotion

You're now ready to deploy your MachineLogic application from your **Vention project** to the MachineMotion AI controller!

Follow the steps detailed in the Deploy your Application and Configuration to Controller documentation.

Support

If you need further assistance, reach out to our support team:

support@vention.io
+1-800-940-3617 (ext. 2)

Additional Information

Manual - IO Configuration

To access IO configuration on the Fanuc controller:

```
MENU → 5 I/O → [TYPE] → Select the type you wish to access from the list (UOP or Digital)
```

Select Config and then configure it as shown bellow.

UOP Configuration - Outputs

#	RANGE	RACK	SLOT	START
1	UO [1-5]	0	0	0
2	UO [6-6]	0	0	1
3	UO [7-20]	0	0	0

UOP Configuration - Inputs

#	RANGE	RACK	SLOT	START
1	UI [1-3]	35	1	1
2	UI [4-4]	0	0	0
3	UI [5-5]	48	1	1
4	UI [6-7]	0	0	0
5	UI [8-8]	35	1	1

6	UI [9-18]	0	0	0

Digital Configuration - Outputs

#	RANGE	RACK	SLOT	START
1	DO [1-1]	0	0	0
2	DO [2-3]	0	0	2

Digital Configuration - Inputs

#	RANGE	RACK	SLOT	START
1	DI [1-3]	0	0	1

Manual - Controller and Collaborative Robot Configuration

Controller Reset Configuration

1. [MENU]→ 0 [NEXT] → 6 [SYSTEM] → [TYPE] -> 6 Config
2. Go to Line 7: Enable Ui Signal -> Select -> TRUE

Network Configuration

1. [MENU]→ 6 [SETUP] → [TYPE] → 0 [NEXT] -> 6 [Host Comm]
2. Select 1 [TCP/IP] and then [DETAIL].
3. Ensure Line 2 indicates Port #2.
4. If Line 2 indicates Port #1, select [PORT].
5. Configure the IP settings for Port #2:
6. IP Address: 192.168.5.3
7. Subnet Mask: 255.255.255.0
8. Router IP Address: 192.168.5.1
9. Make sure the Port #1 is not in the same subnet as port #2 to ensure no network conflict problems will occur.

Collaborative Robot Configuration

1. **Initiate the Safe I/O card**
   a. [MENU]→ 0 [NEXT] → 6 [SYSTEM] → 7 [DCS]
   b. Safe I/O device (Line 16) and Enter
   c. Init two times
   d. [PREV]
2. Go to **7. Cart. Speed check ,** Enter
   a. Select No. 1 -> Detail
   b. 2. Enable/Disable -> Choice -> Enable
   c. 7 Limit: Set Value to 250
   d. 8 Stop type -> Choice -> Not Stop
   e. 9 Speed Control -> Choice -> Cart Speed
   f. 11 Disabling Input -> Choice -> SPI -> [1:SFDI1]
   g. [PREV]
   h. Select No. 2 -> Detail
   i. 2. Enable/Disable -> Choice -> Enable
   j. 7. Limit: Set Value to 250
   k. 11 Delay time -> Set Value to 500 ms
   l. 12 Disabling Input -> Choice -> SPI -> [1:SFDI1]
3. Return to the DCS main page and select **Safe I/O Connect**
   a. SIR[1] =! CSC[2] - - - [0] OK
   b. @SPO[9]= SSI[10] AND! SIR[2] OK
4. Return to the DCS main page and select **Collaborative robot** then ENTER
   a. Line 4 External Force Limit / Disabling input -> Limit 1: 150N -> SIR[1]
   b. Force Limit Sensitivity: LOW

c. Line 33 Set collaborative speed to the desired value (Default is 250
d. Line 35 Disabling Input F [20]
e. Line 37 Define Max Speed to 2000 mm/s
f. Line 43 STOP -> Choice -> SIR [2] -> Enter
g. Line 68 Manual Guided Teaching -> Enter
h. Activation input -> Choice -> DI -> Set value to 2

Backup and Restore

Backup Steps

1. On teach pendant:
   - `FCTN → Abort All`
   - `MENU → 7 FILE → UTIL → Set Device → USB DISK (UD1:)`
   - Create directory via `UTIL → Make DIR`
   - Navigate into directory
   - Select `8 All of Above → YES`

Restore Steps

1. Insert a USB stick with your MD backup
2. Perform a **Controlled Start**:
   - Cycle power
   - Hold **PREV + NEXT**
   - Enter `3 → ENTER`
3. Navigate: `MENU → File → F5 [UTIL] → Set Device`
4. Access backup folder
5. Select Restore Type:
   - System files, TP programs, Application, etc.
   - Or choose `All of above`
6. Confirm and start the restore:
   - Press `F4 YES`
7. Perform Cold Start
   a. `FCTN → Start (COLD)`

MachineMotion v2 Previous Documentation

MachineMotionv2 - Fanuc Configuration Document

Configuration Files for MachineMotion v2: Download