

Fanuc CRX 10IA Collaborative Robot: Opening and Running a Program

By: Matthew Jourden
Brighton High School
Brighton, MI

Objective: Create a program that will move the robot around three objects then combine them together.

1. Turn On (See Tutorial 1 Fanuc CRX-10IA Collaborative Robot Basics for Screenshots)

- a. Controller
- b. Tablet Teach Pendant (Tablet TP)
 - i. Verify Payload > Code = 1111
 - ii. Payload 1 > Yes > Ok > Ok

2. Manually Jog or Move the Robot to any position other than its start position

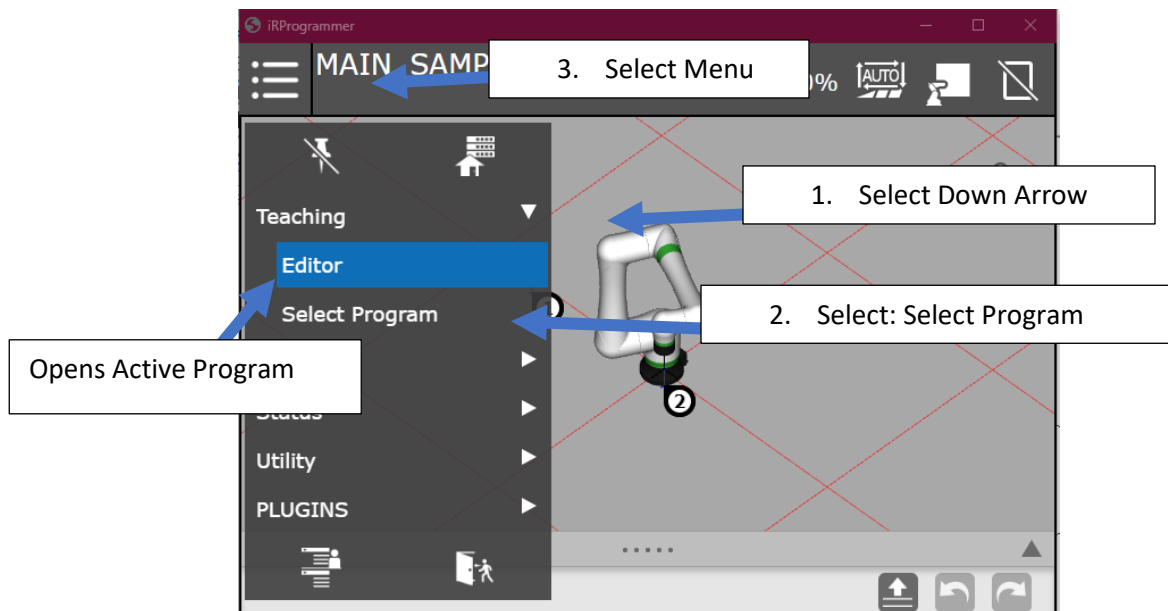
3. Running a Program

- a. Select Menu Icon on the Tablet TP (Top Left Corner)

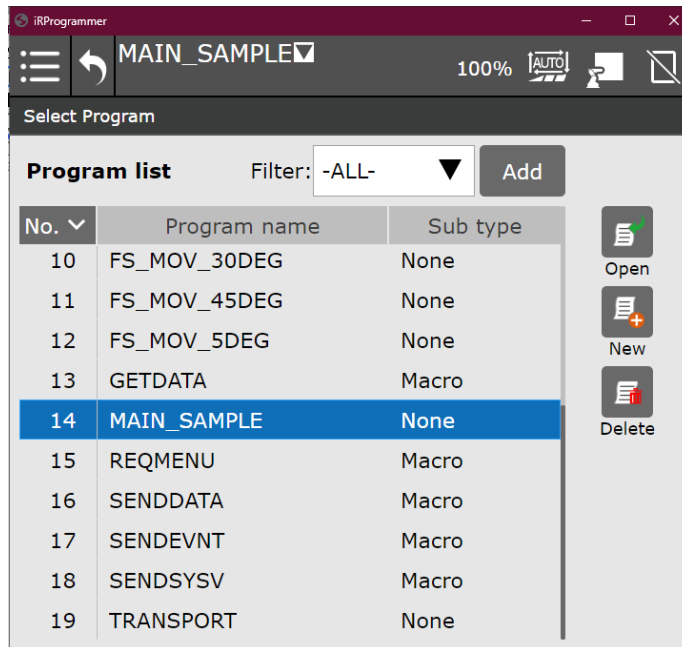


- b. Select the Down Arrow Next Teaching > Select: Select Program

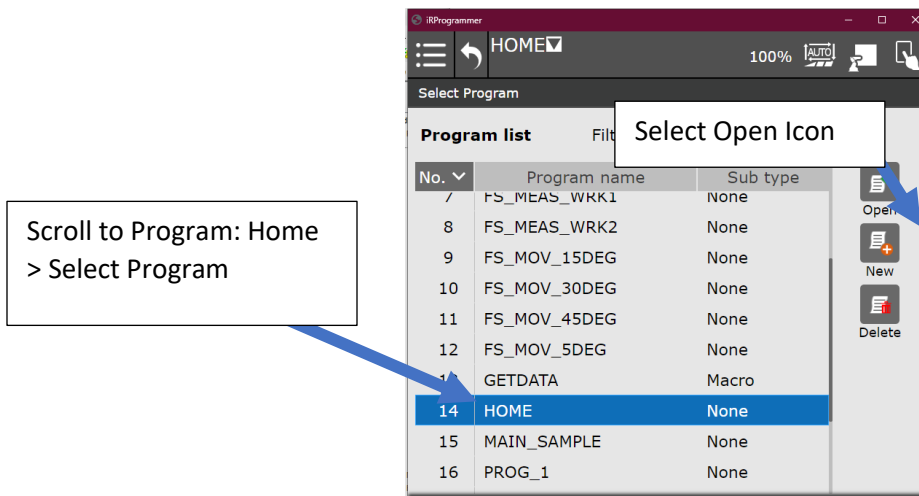
NOTE: Teaching > Editor allows the user to open the current program and show a preview screen of the robot



- c. Program Screen: Shows all Existing Programs, Operator may also create New Programs or Delete Programs

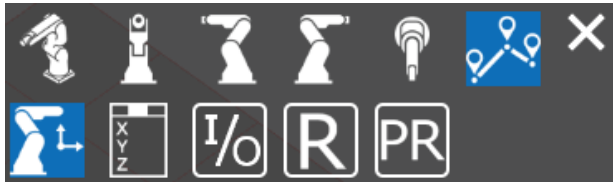


- d. Scroll with your finger to Home Program > Select so the Program Highlights Blue > Press the Open Icon



e. Program Screen

View and I/O Data Screen: Allows user to set robot to Orthographic/Pictorial Orientation and see Coordinate, I/O Status, etc.



Robot Preview Screen: Movements
 Rotate: 1-Finger
 Zoom: 2-Finger Pinch
 Pan: 3-Fingers

Program Timeline

Programming

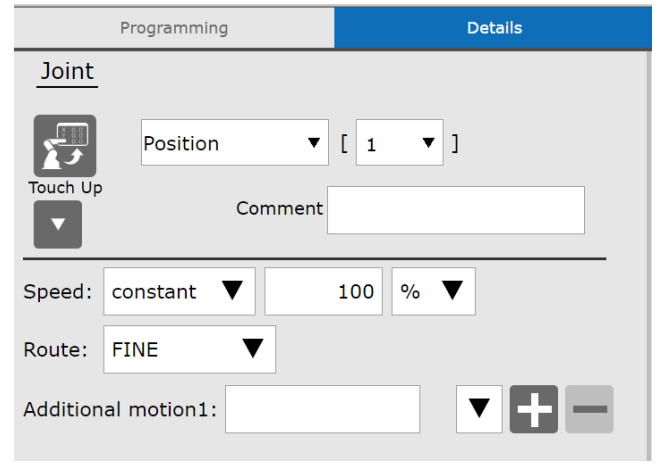
Details

Joint

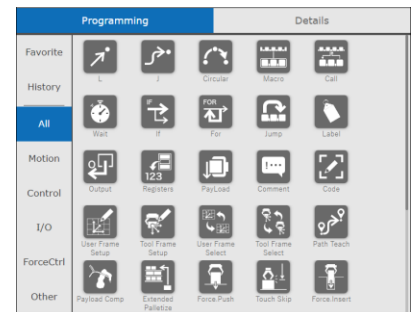
▲ Play

▲ Robot Operation

Details: When a Program Code Block is selected on the Program Timeline the Details will showing information about the Code Block




Programming: Shows various Code Blocks that can be Drag + Dropped onto the Program Timeline



f. **Play Tab:** Allows the Operator to Run the Program in Teach Mode or Auto Mode (Production Mode)

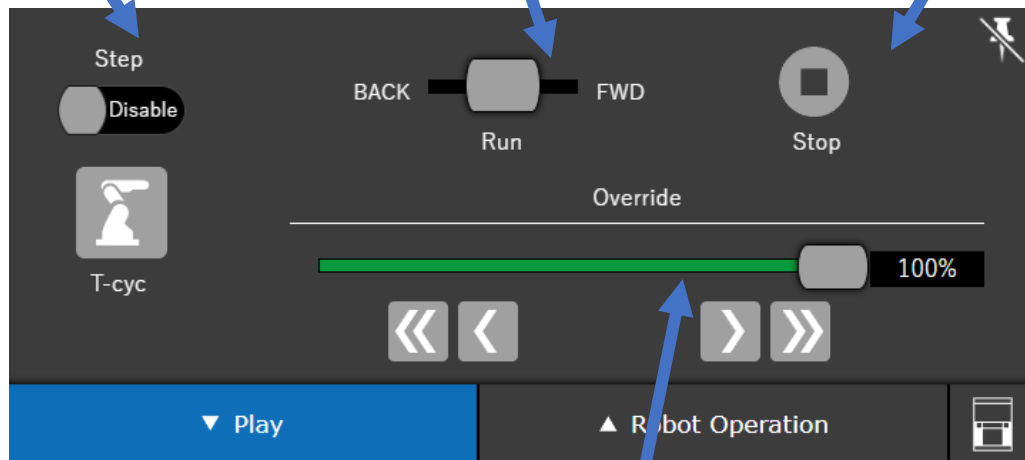
i. Teach Mode

1. Set Tablet TP in Teach Mode > Press Reset to Clear any Fa 
2. Press the Play Tab at the bottom of the screen

Step: Allows the operator to activate 1 Code Block at a time to assist in verifying a program

Run: User slides Slider Forward (FWD) or Back to execute Code Blocks along the Timeline

Stop: Stops a program and leaves the program at that location or if double tapped abort the program and reset the program back to the beginning

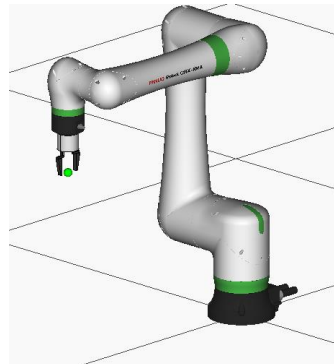


Override: Allows the user to override the set speed of the movements to either speed up or slow down the robot's movements to assist in verification of the program


3. Slide the Run Slider FWD to see the robot begin movement > Complete the Full Movement

NOTE: if the robot appears to moving slowly increase the Override Speed.

Final Robot Position



ii. Auto Mode

1. Jog Robot to any position > Set Tablet TP to Auto Mode  > Press Reset to Clear any Faults
2. Play Tab > Select Run

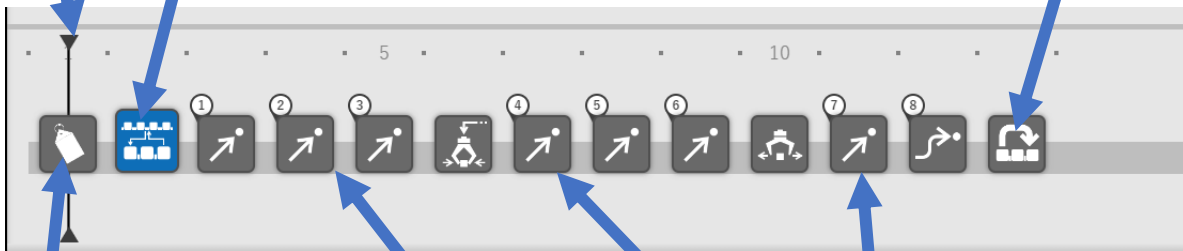
4. Open Sample_Pick_and_Place Program

a. Program Overview

Program Timeline Locator: Shows what Code Block is being ran. User can drag the Locator to different parts of the program.
NOTE: User needs to be careful moving Locator to any other spot than the beginning of the program because the robot maybe in a wrong position and crash un-expectantly into an object/barrier.

Call Command: Command allows user to run a different program. In this case the Home Program is being called

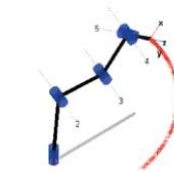
Jump Command: Moves the Program to an assigned Label. In this case Label 1 at the beginning of the program



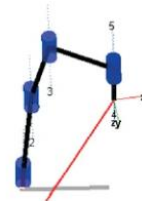
Label Command: Allows the user to mark spot in the program to jump to if desired. I.E Palletizing objects and the pallet is full > program would jump to another part of the program to change the pallet out with an empty one

Gripper Command

Movement Commands: 2 Types of Movements
Joint: Curved/Arced Movements
Linear: Straight Line Movements



a) Joint motion.



b) Linear motion.

- b. Run the Sample_Pick_and_Place Program the following ways

NOTE: Program needs to start at the beginning. Reset Program back to the beginning by dragging the Timeline locator back to the beginning

NOTE: DO NOT place an object to be picked up or dropped.

- i. Set **Teach Mode** (Icon Top Right Corner of the Screen (Rectangular Box) Active as an open Rectangular Box > Press Reset to clear Faults > Select Play Tab at the Bottom of the Screen > Step = Enable > Drag Forward

Do the following while testing movements

1. Remove finger from the Forward Command
2. Adjust Override Speed
3. Press the Stopped Button
4. Move the Run to Backward

- ii. Set **Teach Mode** (Icon Top Right Corner of the Screen (Rectangular Box) Active as an open Rectangular Box > Teach Mode > Press Reset to clear Faults > Select Play Tab at the Bottom of the Screen > Step = Disable > Drag Forward

Do the following while testing movements

1. Remove finger from the Forward Command
2. Adjust Override Speed
3. Press the Stopped Button
4. Move the Run to Backward

- iii. Set **Auto Mode** (Icon Top Right Corner of the Screen (Rectangular Box) Active when box has a line thru it > Press Reset to clear Faults > Select Play

Do the following while testing movements

1. Adjust Override Speed
2. Select Stop
3. Select Pause
4. Step Command: Enable
5. Step Command: Disable

- iv. Set Teach or Auto Mode

1. Creating a Contact Stop

- a. Two Types of Forces

- i. **Quasi:** occurs when the robot makes contact with a non-moveable object (i.e. table, wall, etc.). Note: A fault will occurred called a Push to Escape
- ii. **Transient:** occurs when the robot makes contact with a moveable object, that moves away from the robot after contact but exceeds the max 150 Newtons of force

- b. While the robot is running and the teacher is present

- i. Create a Quasi Force
- ii. Create a Transient Force