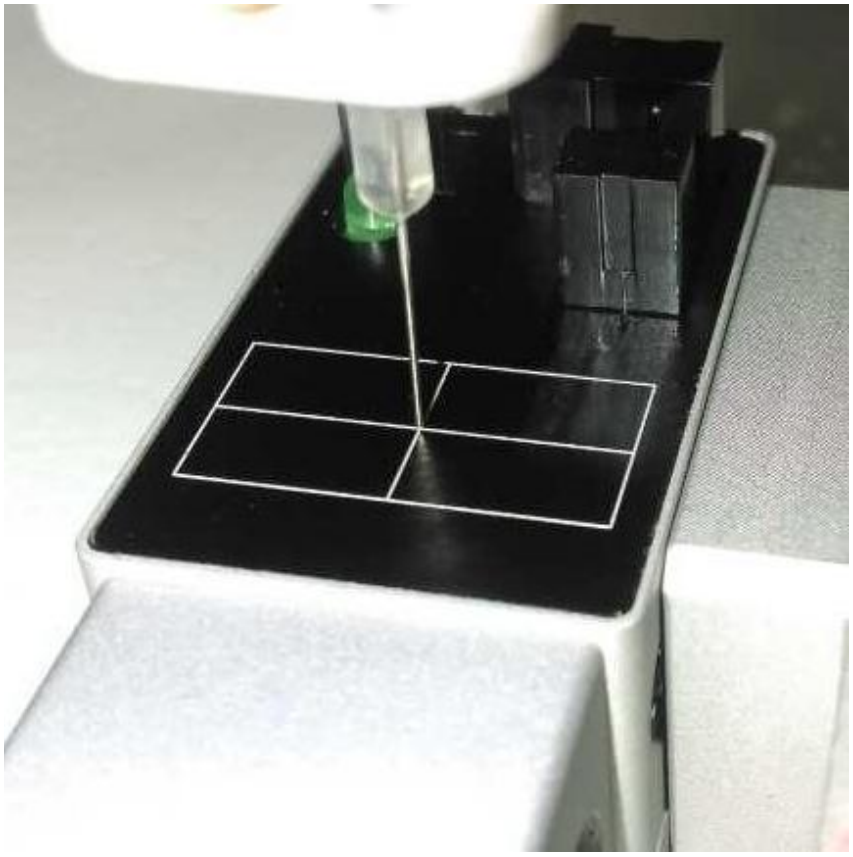
F7000N Tip Alignment Device Guide



Contents

i. Tip Alignment Device Overview

The Tip Alignment Device use sensors to check position of the dispensing tip and will correct position if the tip is changed or damaged. The device is connected to the user Input port on the back of the robot.

The Sequence of Tip Alignment is

1) Set Base Tip Position (first time only)
2) Run Setup Tip Alignment.
3) Create dispensing program.
4) Run program
5) After tip change, run XYZ Search to correct for any offsets.

The Tip Alignment Device only affects the current program. So if a new program is created, Tip Search Position and Tip Alignment for the new program must be completed.

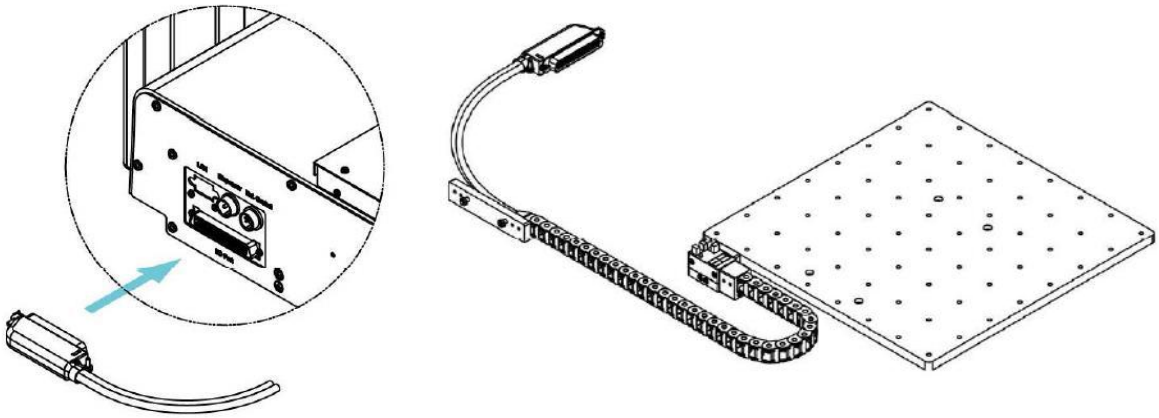
Minimum Robot Software Required for Tip Alignment Device: Version 26.5

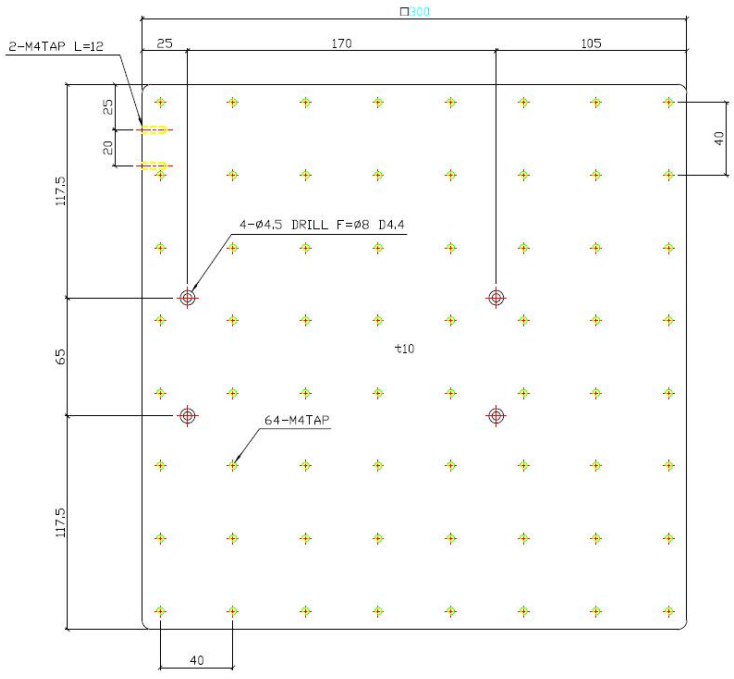
ii. Hardware

Tip Alignment Tool	
Item	Specification
External Diameter of Tip application	0.23-1.83mm(OD) (Gauge14~32)
Minimum of Alignment Accuracy	0.05 mm *
Cable Length	100cm
Working Voltage	DC 12V / 24V
Dimension(W*D*H)	25*60*33.15mm

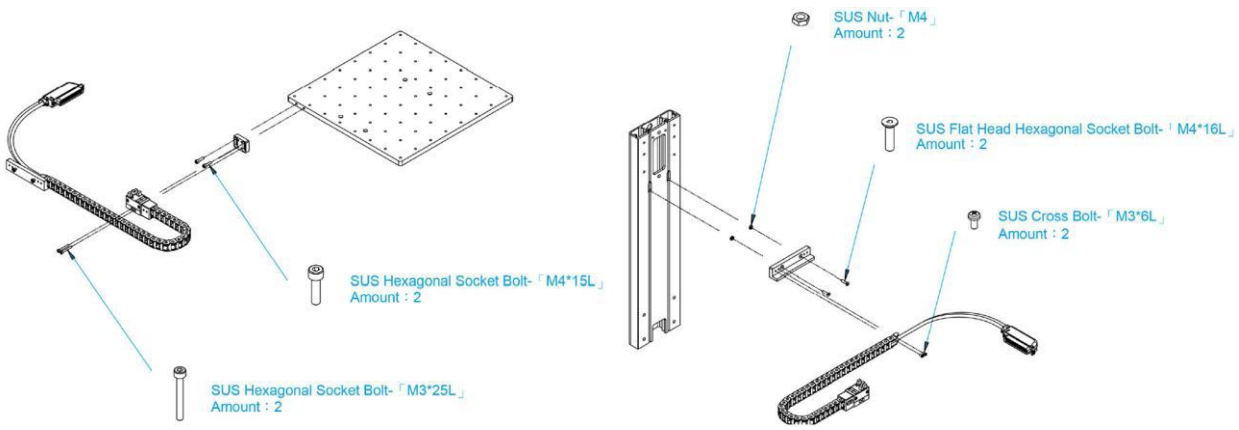
Please understand the accuracy will be changed accordingly when you use or set up different tip or tip offset value.

Included in each Tip Alignment Device Package is the device itself and the work plate that it is attached to.



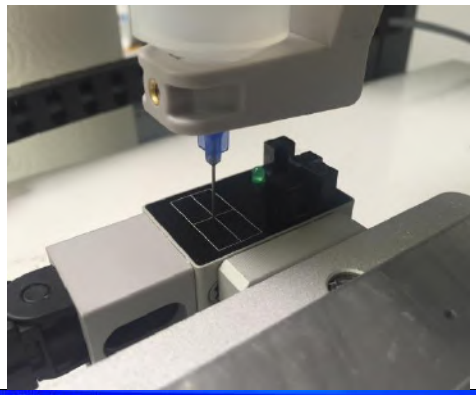
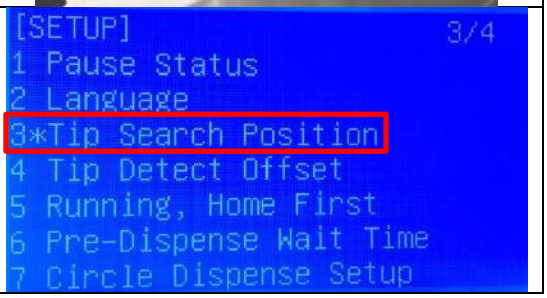


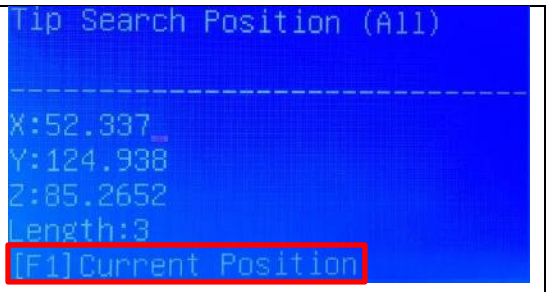
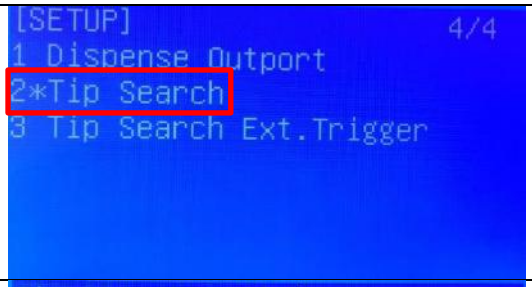
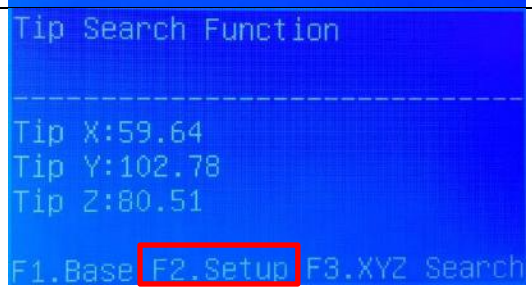
iii. Hardware Installation



Shown above is the device connection to the robot work plate as well as a way to secure it to the robot side. During installation, please try and correctly level the device as any offsets can affect the tip correcting functionality.

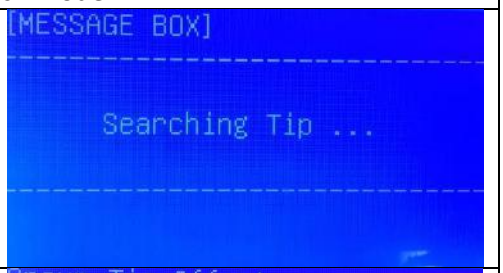
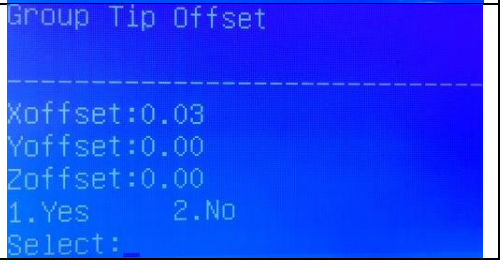
iv. Setting the Device

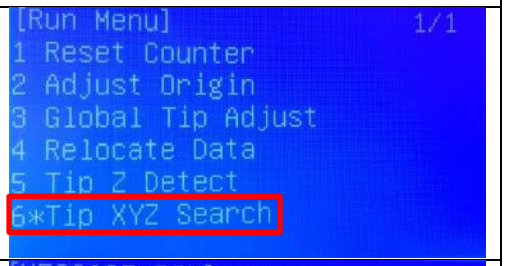
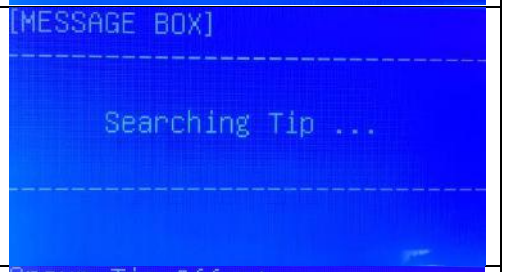
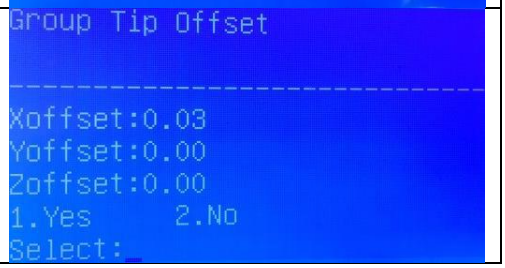
Step 1. Jog the dispensing tip to the middle of square position as shown by the picture to the right. In step 1, please try to move the tip as close to the surface of the center as possible so that it could save searching time.	
Step 2: Enter Setup Menu→ Select “Tip Search Position” Function on page 3/4.	

Step 3: Enter Tip Search Position. (1) Press [F1] on the Teach Pendant to record the dispensing tips current position. (2) Length input will adjust how far down in the Z direction the tip will search from the starting position.	
Step 4: Enter Setup Menu→ Select Tip Search on page 4/4.	
Step 5: Enter Tip Search Function and choose F2 Setup. The device will run and will know the initial tip position and could correct for offsets based on this location. <F1> Base： Move to Tip Search Position previously set. <F2> Setup: To get initial value of tip position. <F3> XYZ Search: To adjust the offset value of Tip.	

The Tip Alignment Device is now setup and can correct the position if dispensing tip is changed or damaged.

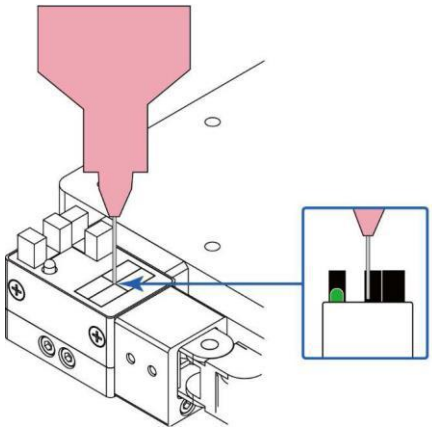
If the dispensing tip is changed, follow the steps below to correct for any XYZ offsets.

Correcting for XYZ Offsets in Teach Mode	
Step 1: Enter Tip Search on page 4/4 of Setup Menu and select F3. XYZ Search. The tip will now search for its initial position and correct for any offsets. This is the Teach Mode correction option. To correct for offsets in Run Mode, proceed to step 3 below.	
Step 2: If Tip has offset, the screen will show the X, Y, Z offset values. Click enter on each offset to accept its value. To offset the program, select 1 and click enter again. Run the program to ensure the offsets have been correctly adjusted for.	

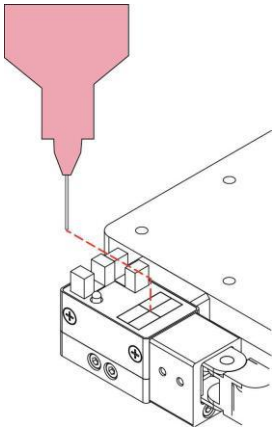
Correcting for XYZ Offsets in Run Mode	
Step 1: Change the robot to Run Mode using the switch on the front panel. Press <F1> to enter Run Menu and choose Tip XYZ Search.	
Step 2: After choosing Tip XYZ Search, Tip will search on Tip Detect Position.	
Step 3: If Tip has offset, the screen will show the X, Y, Z offset values. Click enters on each offset to accept its value. To offset the program, select 1 and click enter again. Run the program to ensure the offsets have been correctly adjusted for.	

v. Device Movement

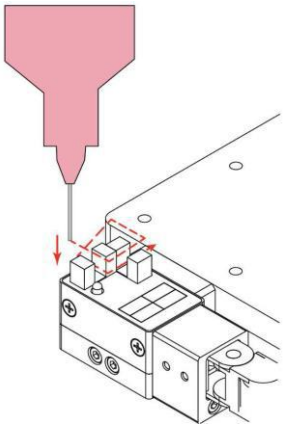
As the tip moves, it is triggering the sensors and its position is being recorded. If the Tip Alignment fails, make sure the tip is triggering the sensor as it moves in the X, Y and Z direction. This can be easily done by adjusting the starting position of the tip in the Tip Search Position command as well as the Length it is searching in the Z direction.



Home Position



Tip Starting Position



Tip Search Pattern

The above images show the movements and positions the Tip Alignment Device makes when it is correcting for offsets. Home Position, Tip Starting Position and the Tip Search Pattern are all shown above.

vi. Tip Changing Examples

1). Program 0 and program 1 are using an 18 Gauge tip with the same Setup Position.

If the tip is changed to another 18 Gauge tip,

To use program 0 => load program 0 =>run XYZ Search.

To use program 1 => load program 1 =>run XYZ Search.

2). Program 0 and program 1 are using an 18 Gauge tip with the same Setup Position.

If the tip is changed to a 20 Gauge tip, as long as the tip is the same length,

To use program 0 => load program 0 => run XYZ Search.

To use program 1 => load program 1 => run XYZ Search.

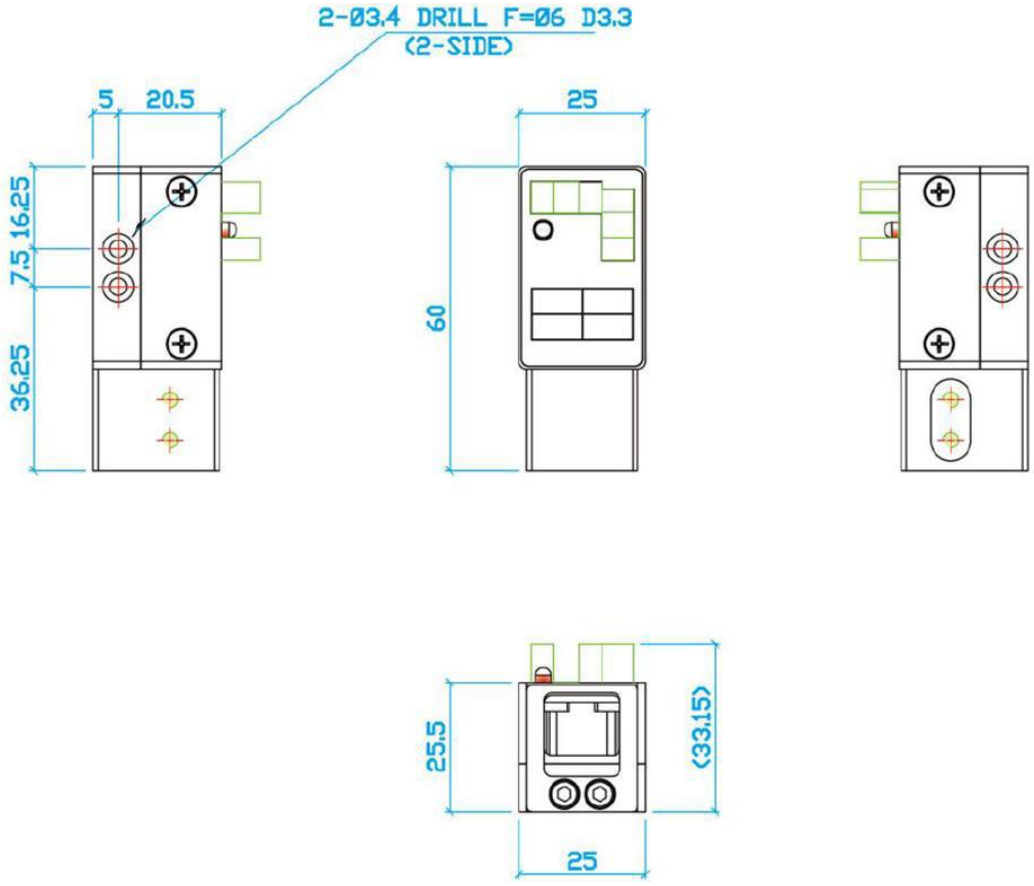
3). Program 0 and program 1 are using an 18 Gauge tip with the same Setup Position.

If the tip is changed to a longer 16 Gauge tip, Base Tip Position as well as Setup alignment must be redone to change the searching characteristics. Once Setup is completed, run XYZ Search.

To use program 0 => load program 0 => New Base Tip Position => Setup Tip Initial Position =>run XYZ Search.

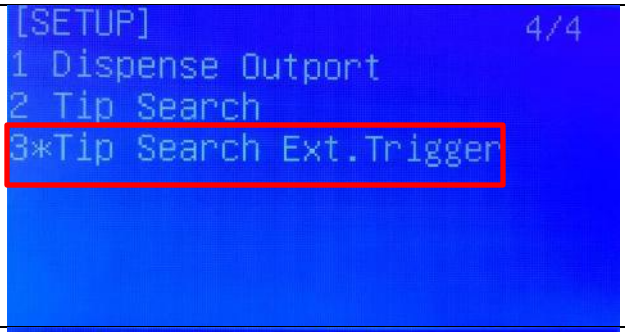
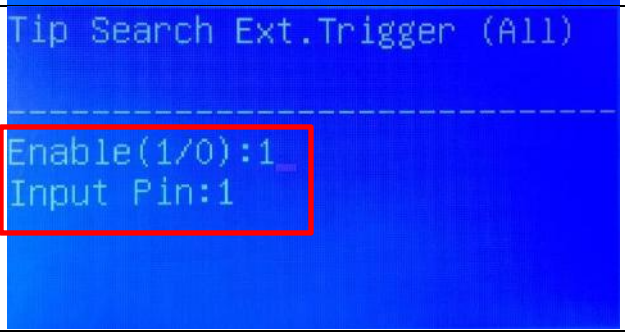
To use program 0 => load program 0 => New Base Tip Position => Setup Tip Initial Position =>run XYZ Search.

vii. Technical Drawing of Tip Alignment Device



viii. Connecting an External Device

To allow the Tip Alignment Tool to be better integrated into more complex systems, an external device such as a Push Button can be utilized to trigger the Alignment device without the use of the standard Teach Pendant. This feature is only available in robot RUN mode.

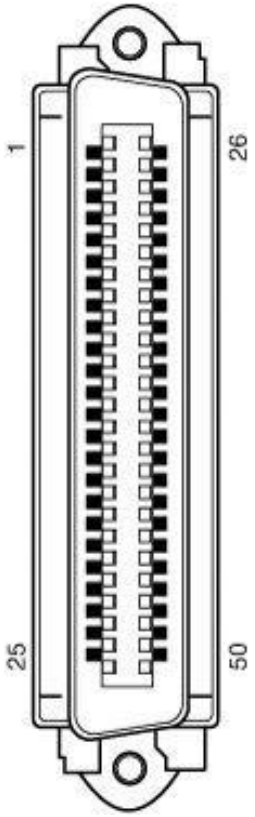
Step 1: Return to the Setup Menu and select Tip Search Ext. Trigger on page 4/4.	
Step 2: Set Enable (1/0) to 1. This will allow an input to be used to trigger the Tip Alignment Device. Enter the corresponding Input Pin that will be used.	

Please follow the information below to properly connect an external device to the Tip Alignment Device.

Example. Connect the external device to pin 26 (Input 1) and any open pin from 34-50 (COM). In the Tip Search Ext. Trigger function make sure the correct input is entered. Change the robot into RUN Mode and once the input signal is closed, the Tip Alignment Device will run XYZ Search and correct for any offsets.

Connector Pin	***Description***
26	IN # 1
27	IN # 2
28	IN # 3
29	IN # 4
30	IN # 5
31	IN # 6
32	IN # 7
33	IN # 8
34	COM
35	COM
36	COM
37	COM
38	COM
39	COM
40	COM
41	COM
42	COM
43	COM
44	COM
45	COM
46	COM
47	COM
48	COM
49	COM
50	COM

Connector Pin Locations



Notes:

To close an input signal, short the circuit between the input pin (26 – 33) and a COM / ground pin (ANY pin # 34 - pin 50).

Input signals are powered by the robot internal power supply: 5 volts, maximum 2.5 mA When the input pin (pin 26 – 33) is connected to a COM pin (pin #34 - #50), the value of the input is 0.

For additional information please refer to the F7000N Robot User Manual.

ix. F7000N Input/ Output Schematic