



# IntelliSpense Robots

Industrial Benchtop  
Dispensing Made Simple

IntelliSpense Robots offer a combination of substantial cost savings and overall performance offer a footprint that has a depth and height that are perfect for an industrial bench and the pricing advantage of a compact robot while offering many of the advantages of higher priced robots.

When choosing a robot, please talk first with an experienced IDS applications representative. We have several lines and models to offer to make sure that you get the right robot for your exact application. Whether you are working off-line, doing rework or integrating into a larger production line, we have the ideal automation robot built specifically for saving time, cutting costs and increasing throughput, so your project is implemented quickly. Call (818) 597-4300

### **System Components**

The choice of dispensing accessories and mounting hardware vary from application to application. The simplest configuration includes a syringe dispenser, with a controller dispensing directly from a 30cc barrel mounted on the robot of your choice. A more complex system may include an extruder pump supplying material from a 50 gallon drum to a high pressure valve mounted on the robot.

When choosing the dispensing accessories, the specifics of the application must be taken into account;

**Volume of Material Used** – If the application requires 50 cc of material to be dispensed every 30 minutes, obviously a 30 cc barrel is not suitable for the application. A high capacity reservoir and dispensing valve must be used.

**Shot Size** – Some valves are designed for very accurate dispensing of small shot sizes, while other valves are designed for high volume dispensing. Be sure to choose a valve which is appropriate for your application.

**Material Compatibility** – Some materials, such as UV resins, should only be dispensed through valves made of stainless steel and can not be exposed to light. Abrasive materials and materials containing solvents must be dispensed through valves which have seals which are designed for use with such materials. Be sure to choose accessories which are compatible with the material to be dispensed.

**Material Pot Life** – Some materials harden after a very short time once they are exposed to air. A reservoir and accessories should be chosen which consume the material before the pot life has expired.

Also, certain accessories are designed for dispensing two part materials or materials which are more likely to harden in the valve. These accessories, such as the 710PTNM, isolate the material from the inner parts of the valve and use disposable components where material contacts the valve. It is important to choose the correct mounting hardware for the dispensing accessories you have selected. For example, if an application requires the use a valve on a SCARA robot, be sure to purchase the correct mounting hardware to mount the valve.

## Setup

Setup procedures vary from robot to robot and application to application. Basic setup includes the following procedures:

**Secure The Robot** – When using a desktop robot, the robot should be placed on a sturdy table. The table should not shake or move while the robot is running. When using the SCARA robot, the robot should be bolted to a secure location using the mounting bolts on the base of the robot. IDS tables can be viewed on the IDS website at: [http://www.dispensinglink.com/automation\\_platforms.htm](http://www.dispensinglink.com/automation_platforms.htm)

**Assemble Dispensing Accessories** - Mount the dispensing accessories, such as the dispensing valve or barrel, on the head of the robot. Be sure to use the correct mounting hardware for the accessories and robot you are using.

**Connect the dispensing controller** - to the robot by connecting the robot I/O cable to the foot pedal connector on the dispenser or by following the instructions to hook up the controller as follows:

On the **200MM – 500MM** robots, the dispense controller is connected to the I/O 1 port on the robot. On the SCARA robot, the dispense controller is connected to the I/O 2 port on the robot.

For most applications, the **MANUAL** switch on the dispense controller should be in the **MANUAL** position.

**Mount The Work Piece Fixture** – When using one of the desktop robots, a fixture must be mounted to the X axis work table of the robot. When using the SCARA robot, the fixture is secured to a work table or conveyor in front of the robot. On almost all mounting procedures, the IDS Mounting Bars are required for this step.

**Connect The Teaching Box And Operation Box** – the teaching box is connected to the robot at the teaching box connector. This connector is on the front of the 200MM – 500MM robots. On the SCARA robot, the teaching box connector is on the back of the robot.

The SCARA also uses an Operation Box, which holds a start switch and program number selection switches. The operation box should be connected to the operation box connector on the back of the robot.

The SCARA robot also has a Safety Guard connector on the back of the robot. This connector is used to connect the enclosure door switch for applications where the robot is housed by an enclosure. If an enclosure is not used, a shorting plug must be connected to the safety guard connector. This shorting plug is included with the SCARA robot.

A safety guard connector can also be found on 'CE' versions of the desktop robots. Again, if an enclosure is not used, the shorting plug must be connected to the safety guard connector.

**Tie Back Cables And Dispensing Lines** – All air lines, material lines and cables should be neatly secured so that they do not interfere with motion of the robot. The robot head should be able to move freely through its entire work area without interference from cables or lines. The importance of this can not be overstated - the head of any of the robots will be in constant motion and **MUST BE SECURE**.

**Connect Power Lines** – All IDS robots are available in both 110 volt and 220 volt versions, most via the built in universal power supply. Be sure to connect to the correct power source for the robot you are using.

**Connect Air Lines** - Most dispensing applications require the use of compressed air. Be sure to use **clean, filtered air**. An air pressure regulator with filter should be connected to the air line before the robot or the dispensing accessories to ensure that clean air is delivered and the maximum air pressure for the accessories is not exceeded.

### Overview of Programming

Teaching a program consists of registering the desired dispensing point locations, then adjusting the parameters found in PROGRAM DATA settings to 'fine-tune' the program.

### Teaching Point Locations

Teaching point locations is done at the POINT SETTING screen on the teaching box. At the POINT SETTING screen, the dispensing tip can be moved by either 'jogging' to the desired location (by pressing keys on the teaching box) or by directly typing values of the X, Y, and Z locations on the teaching box. The point setting screen looks like this:

#### Point Setting Screen (New Point)

<b>No.3</b>		
<b>0002</b>		
X		24.5 mm
Y		75.2 mm
Z		85 mm
R		0 deg
Low		
<b>JOG</b>	<b>MDI</b>	<b>INIT</b>
(F1)	(F2)	(F3)

#### Point Setting Screen (Existing Point)

<b>No.3</b>		
<b>0008</b>		
<b>X+70 Y+120 Z+85 R+0</b>		
<b>Point Type</b>	<b>Point</b>	
<b>Dispense</b>		
Dispense Time		1 sec
(F1)	(F2)	(F3)

When the tip position is correct, the location is registered by pressing the **ENTER** key on the teaching box. A pop-up list will then allow you to specify the point type.

Depending on the type of point registered, the teaching box will display prompts to allow the user to enter additional information required for that point type. For example;

POINT DISPENSE: when teaching point dispensing location, the display will show:

**DISPENSE TIME = 0.50 sec**

The user can now change the dispensing time at this point. Increasing the time will allow more material to be dispensed. Decreasing the time will cause less material to be dispensed.

LINE START and LINE PASSING: when teaching a line point start point or a line passing point, the teaching box will display:

DISPENSE  
ON  
DISPENSE  
OFF

This allows the user to select whether the dispenser is turned on or off during that line segment.

The teaching box will also display:

**LINE SPEED = XX mm/s**

The user can change the line speed at this point as required by the program. When dispensing lines, increasing the line speed will create a thinner bead of material (less material). Decreasing the line speed will create the thicker bead of material (more material). To change a numeric value such as the line speed, press the CLEAR key, and then type the new value on the numeric keypad.

### Teaching Box Keys

When using the teaching box, the following keys have universal functions:

<b>ENTER</b>	Enter	Confirms the selection currently displayed
<b>ESC</b>	Escape key	Exits to the previous screen
<b>SEL ↓</b>	Select down	Selects the next item down in a list

<b>SEL</b> ↑	Select up	Selects the previous item in a list
<b>SHIFT + SEL</b> ↓	Shift Select Down	Move one page down in a list
<b>SHIFT + SEL</b> ↑	Shift Select Up	Move one page up in a list
<b>DISP</b> →	Display Right	Move to the next point in the display
<b>DISP</b> ←	Display Left	Move to the previous point in the display
<b>SHIFT + DISP</b> →	Shift Display Right	Move to the last point in the program
<b>SHIFT + DISP</b> ←	Shift Display Left	Move to the first point in the program
<b>CLEAR</b>	Clear	Clears the numeric value currently in the display
<b>SHIFT + ALT</b>	Alt Escape	Change from Teach mode to Run mode
<b>Deadman + DISP</b> →	Deadman + Display Right	Moves the tip to the point location currently in the display and advances the display to the next point

<p><b>Deadman + DISP</b> ←</p>	<p>Deadman + Display Left</p>	<p>Moves the tip to the point location currently in the display and changes the display to the previous point</p>
<p><b>GO</b></p>	<p>Go</p>	<p>Moves the tip to the point location currently in the display</p>

Press the **SEL** ↓ and **SEL** ↑ keys to move through items in a list.

Press there **ENTER** key to confirm the selection of an item in a list

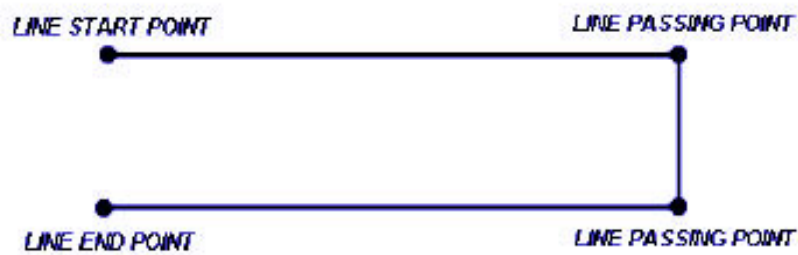
You can also press one of the number keys to directly select that item number in a list. For example, pressing 3 will select the third item in the list.

## Use of Point Types

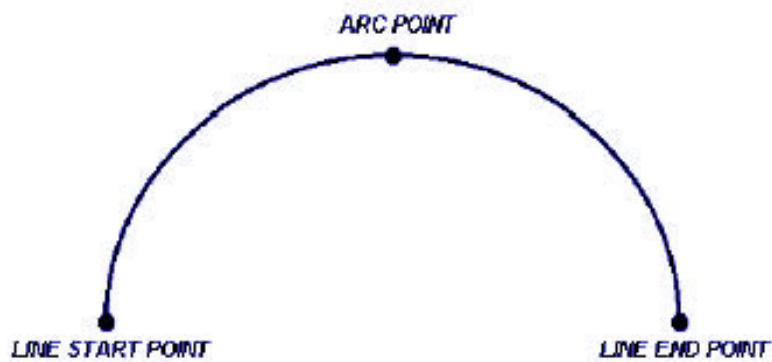
### POINT DISPENSING



### LINE DISPENSING

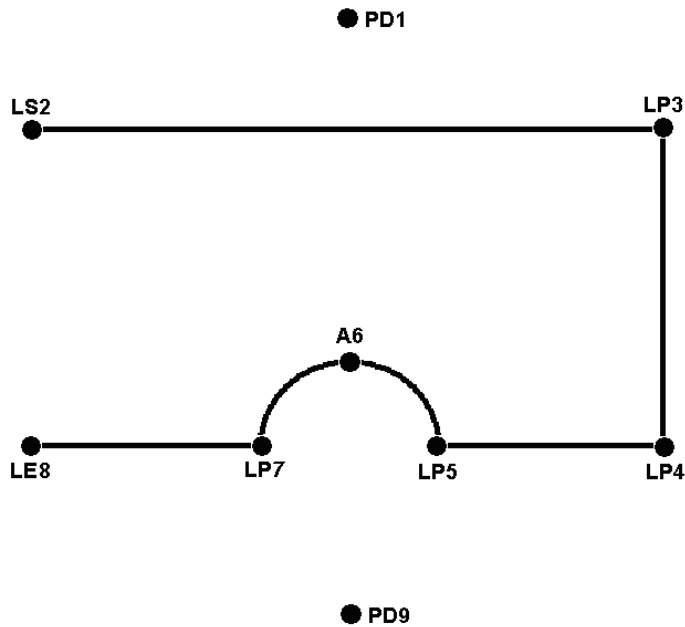


### ARC DISPENSING



## Sample Program

We will now create a program to dispense at the following locations:



With the power **OFF**, connect the teaching box to the teaching box connector on the front of the machine.

Turn the robot power **on** using the power switch at the back of the machine.

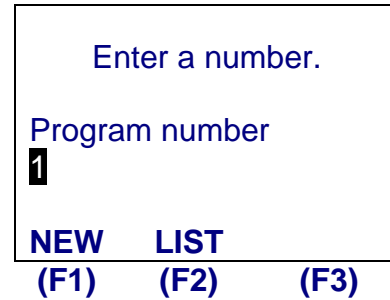
After a moment, the display will show:

<p><b>Teaching Mode</b></p> <p>Press F3 key For Mechanical Initializing</p> <p>INIT (F3)</p>
--

**Press the F3 key to initialize the robot.**

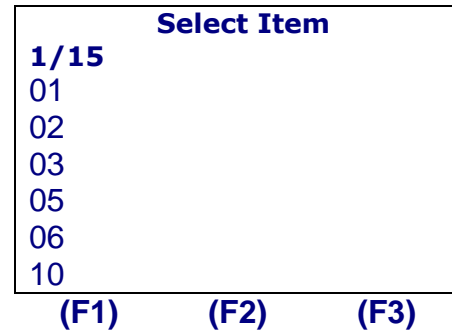
**All axes will move to their home position.**

Once the robot has completed the homing procedure, press the PRG. NO key to select the program number to be used. The display will show:



Pressing the **F1** key will display the NEW, unused, available program numbers. Pressing the **F2** key will show a LIST of the existing programs.

Press the **F1** key. The display will show:

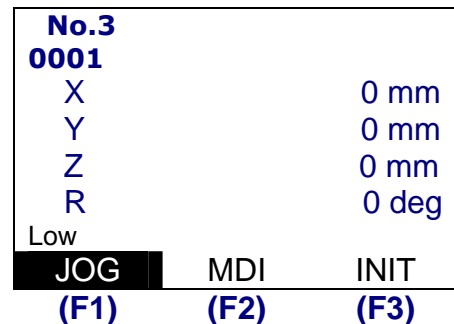


Press the **SEL ↓** key until **03** is highlighted; press **ENTER** to select program 3.

The display will now show the point setting screen for new program number 3:

The current X, Y, Z, and R locations are shown in millimeters.

The **JOG**, **MDI**, and **INIT** options on the last line of the display indicate that **the robot is waiting to be taught the location this point.**



Pressing the **F1** or **F2** keys would select **JOG** teaching mode or **MDI** teaching mode.

**Jog mode** allows the location to be taught by physically jogging the tip to the desired location using keys on the teaching box. **MDI** (Manual Data Input) mode allows the X, Y, Z and R values of the location to be entered directly by pressing the number keys on the teaching box.

We now must move the dispensing tip to the first point location (point PD1 in the diagram on page 18. To move the dispensing tip, press the F1 key to select JOG mode. Jog the tip to location **PD1** by pressing the X+, X-, Y+, Y-, Z UP, and Z DOWN keys.

If the SHIFT key is pressed and held BEFORE the directional key (X+, X-, Y+ ...), the robot will move at maximum jogging speed. If the SHIFT key is pressed and held AFTER pressing the directional key (X+, X-, Y+ ...), the robot will accelerate. If the SHIFT key is released while jogging, the robot will move decelerate.

Once the location is correct, press the **ENTER** key to register this location as point # 0001.

The display will prompt you to select the point type. Since a dispense point is required at this location, select Point Dispense point by using the SEL ↓ and SEL ↑ keys, then press **ENTER**.

Select Item		
1/2		
Point Dispense		
Start of Line Dispense		
Line Passing		
Arc Point		
End of Line Dispense		
PTP Evasion Point		
(F1)	(F2)	(F3)

The display will then show:

The robot is now waiting for confirmation of the dispensing time. To change the dispensing time to 1.25 seconds, press the CLEAR key, and then type 1.25 and press **ENTER**.

Enter a number.		
Dispense Time	0.5	sec
(F1)	(F2)	(F3)

The first line of the display now indicates that we are in program #3, point number 0002.

The **JOG**, **MDI**, and **INIT** options on the last line of the display indicate that the robot is waiting to be taught the location this point.

<b>No.3</b>		
<b>0002</b>		
X		24.5 mm
Y		75.2 mm
Z		85 mm
R		0 deg
Low		
JOG	MDI	INIT
(F1)	(F2)	(F3)

Now jog the tip to location **LS2** as was done in step 9 above. Once the location is correct, press the **ENTER** key to register this location as point # 0002.

Select Item		
1/2		
Point Dispense		
Start of Line Dispense		
Line Passing		
Arc Point		
End of Line Dispense		
PTP Evasion Point		
(F1)	(F2)	(F3)

The display will prompt you to select the point type. Since this point is the start of line dispensing, select Start of Line Dispense by using the SEL ↓ key, then pressing **ENTER**.

Because the point type was a Line Dispensing Start, you can now select either dispensing ON or dispensing OFF for this line segment. To accept dispensing on, press **ENTER**.

Select Item	
Dispense	ON
Dispense	OFF

(F1) (F2) (F3)

The display will now prompt for the line speed to use for this line segment. To change the line speed to 30 mm/sec, press the **CLEAR** key, then 30 and press **ENTER**.

Enter a number.	
Line Speed	30 mm/s

(F1) (F2) (F3)

The first line of the display now indicates that we are in program #3, point number 0003.

The **JOG**, **MDI**, and **INIT** options on the last line of the display indicate that the robot is waiting to be taught the location this point.

<b>No.3</b>	
<b>0003</b>	
X	24.5 mm
Y	75.2 mm
Z	85 mm
R	0 deg
Low	
<b>JOG</b>	<b>MDI</b> <b>INIT</b>
(F1)	(F2) (F3)

Now jog the tip to location LP3 as was done in step 9 above. Once the location is correct, press the **ENTER** key to register this location as point # 0003.

The display will prompt you to select the point type. Select Line Passing by using the **SEL** ↓ key, then pressing **ENTER**.

Select Item	
<b>1/2</b>	
Point Dispense	
Line Dispense Start	
<b>Line Passing</b>	
Arc Point	
End of Line Dispense	
PTP Evasion Point	

(F1) (F2) (F3)

Because the point type was a Line Passing, you can now select either dispensing **ON** or dispensing **OFF** for this line segment. To accept dispensing on, press **ENTER**.

Select Item	
Dispense	<b>ON</b>
Dispense	OFF

(F1) (F2) (F3)

The display will now prompt for the line speed to use for this line segment. To confirm the line speed of 30 mm/sec, press **ENTER**.

Enter a number.	
Line Speed	<b>30</b> mm/s

(F1) (F2) (F3)

The display now indicates that we are in program #3, point number 0004. Jog the tip to location LP4.

Once the location is correct, press the **ENTER** key to register the point.

Press the **SEL** ↓ key to select Line Passing, and then press **ENTER**.

Confirm dispensing **ON** and a line speed of 30 mm/sec by pressing then **ENTER** key when prompted.

<b>No.3</b>	
<b>0004</b>	
X	24.5 mm
Y	75.2 mm
Z	85 mm
R	0 deg
Low	
<b>JOG</b>	<b>MDI</b> <b>INIT</b>
(F1)	(F2)    (F3)

### Jog the tip to location LP5.

Once the location is correct, press the **ENTER** key to register the point.

When prompted for the point type, select Line Passing.

Confirm dispensing ON and a line speed of 30 mm/sec by pressing then **ENTER** key when prompted.

**Jog the tip to location A6.**

Once the location is correct, press the **ENTER** key to register the point.

When prompted for the point type, select Arc Point.

Confirm the line speed of 30 mm/sec by pressing then **ENTER** key when prompted.

**Jog the tip to location LP7.**

Once the location is correct, press the **ENTER** key to register the point. When prompted for the point type, select Line Passing.

Confirm dispensing ON and a line speed of 30 mm/sec by pressing then **ENTER** key when prompted.

**Jog the tip to location LE8.**

Once the location is correct, press the **ENTER** key to register the point.

When prompted for the point type, select End of Line Dispense.

**Jog the tip to location DP9.**

Once the location is correct, press the **ENTER** key to register the point.

When prompted for the point type, select Point Dispense.

When prompted for the dispensing time, use a dispense time of 2.0 seconds.

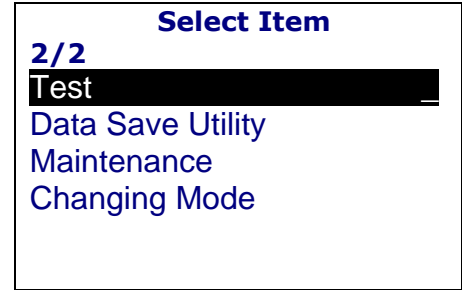
**Test Run the Program**

After teaching point locations, the program data should be checked by the following procedure:

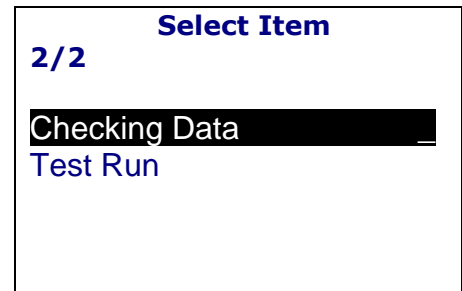
At the point setting screen, press the **MENU** key to display the main menu:

Select Item
1/2
Program Data Settings
Point Job Settings
Additional Function Data
System Settings
Sequencer Settings
Teaching Data Copy, Delete

Press the and hold the **SHIFT** key, then press the **SEL** ↓ to go down to page 2. The display will show:



Press **ENTER** to select the TEST function. The display will then show:



Press **ENTER** to select Checking Data.

The robot will check the program data. After a moment, if the sequence of points is correct and all of the point locations are inside the robot working area, the display will show OK.

If there is a problem with the program data, the display will display the number of the point which is incorrect and a message describing the type of error.

See the following page for examples of possible error messages.

If the display showed OK, you can now test run your program. Press the **SEL** ↓ key, and then **ENTER** to select **TEST RUN**.

Press the **F3** key to START the program. All point to point motion in the program will run at a slower than programmed speed for the test run.

### **Point Registration Errors:**

There are several conditions which can generate a point registration error.

Some examples are:

The most common error is a **point type error**. This indicates that the sequence of point types is not correct. For example, if a Line Start point was taught, there must be a line end point somewhere after it. There can not be any Point Dispense points between the Line Start and Line End points.

### **Also, two Arc points can not be programmed in sequence.**

- An Arc point must have either a Line Start or Line Passing point before it.
- An Arc point must have either a Line End or Line Passing point after it.
- An error message will be displayed if a point location was taught which is outside the working area of the robot.
- If a curve or line was interpolated which moves the tip outside the robot working area, an error will be displayed.
- If a line speed is taught which exceeds the maximum line speed, an error will be displayed.

### **Using the Program Data Settings / Dispense Conditions**

After test running your program and confirming that the taught locations are correct, final adjustments should be made to the Program Data Settings.

### **Z Axis Upward Motion after Dispensing**

At the end of dispensing, at both dispense points and end of line points, the tip should raise directly in the Z axis at a controlled speed and to a controlled distance.

This upward motion should break the tip free from the dispensed material and move away from the material in a way that does not accidentally apply material where it is not needed.

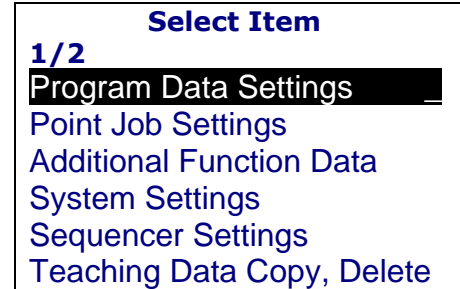
The speed and distance of this upward motion is controlled by settings under Program Data Settings -> Dispense Condition. The values to use for these settings will vary from application to application.

If the material is relatively low viscosity and is not very 'stringy', meaning the tip can break free quickly and cleanly, a short distance of Z axis motion at a quick speed is appropriate, such as 4 or 5 mm at 45 mm/second.

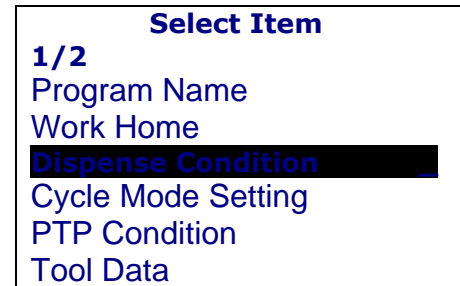
If the material is relatively high viscosity and / or is 'stringy', a longer distance of Z axis motion is required at a slower speed, such as 15 mm at 10 mm /second.

The **Up Amount** and **UP Speed** settings are used to control the Z axis motion after dispensing. To set the Up Amount and UP Speed for you program, please do the following:

At the point setting screen, press the **MENU** key to display the main menu:

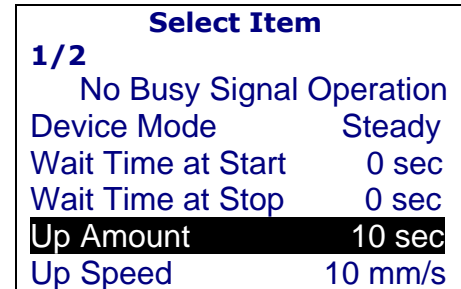


Press **ENTER** to select the PROGRAM DATA SETTINGS function. The display will show:



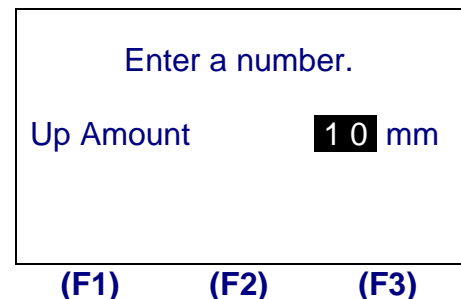
Press the **SEL ↓** key until Dispense Condition is highlighted, then press the **ENTER** key to select it

The display will show:



Press the **SEL ↓** key until Up Amount is highlighted, then press the **ENTER** key to select it

The display will show:



Press the **CLEAR** key to clear the old value, and then type the value you want to use for the Z axis upward distance using the number keys on the teaching box.

Press the **ENTER** key to confirm your selection.

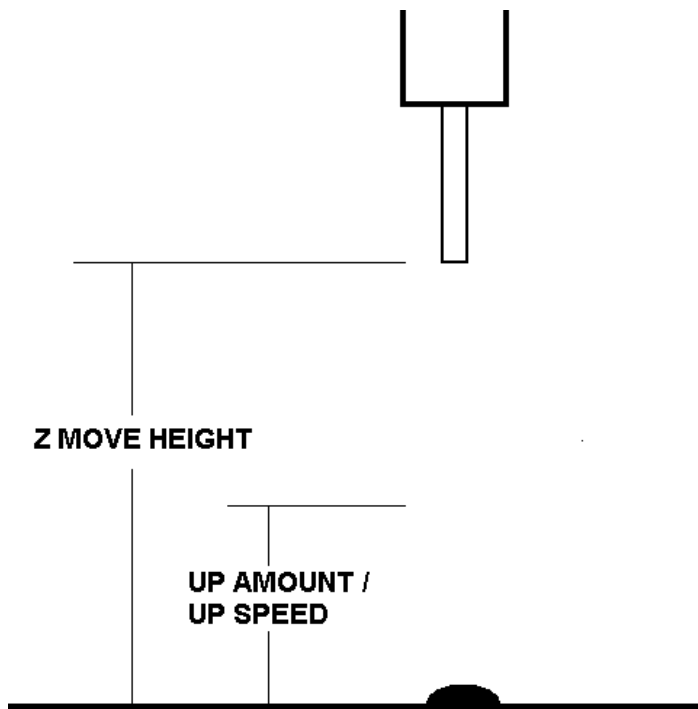
After pressing enter on the Up Speed screen, the Program Data Settings menu will reappear. Press the **SEL ↓** key until Up Speed is highlighted, and then press **ENTER** to confirm it.

The display will show:

Enter a number.		
Up Speed	<b>10</b>	mm/s
(F1)	(F2)	(F3)

Press the **CLEAR** key to clear the old value, and then type the value you want to use for the Z axis upward speed by using the number keys on the teaching box.

Press the **ENTER** key to confirm your selection.



## Controlling Z Axis Motion after dispensing/ PTP Conditions

After dispensing, the tip will raise the distance set in the Up Amount setting and at the speed set in the Up Speed setting under Program Data Settings->Dispense Condition as described above.

After this Z axis motion, the tip will continue to rise to the top of the Z axis at maximum speed. This is done so that the tip will clear any obstacles that may be in its way as it moves to the next point.

It is normally not necessary to make the tip rise all the way to the top of the Z axis before moving to the next point. If the work piece is flat, it is enough for the tip to rise to the distance set in Up Amount and then move directly to the next point. This will reduce the program cycle time.

To control the distance that the tip raises AFTER the Up Amount value, please do the following:

At the point setting screen, press the **MENU** key to display the main menu:

Select Item	
1/2	<b>Program Data Settings</b>
	Point Job Settings
	Additional Function Data
	System Settings
	Sequencer Settings
	Teaching Data Copy, Delete

Press **ENTER** to select the **PROGRAM DATA SETTINGS** function. The display will show:

Select Item	
1/2	Program Name
	Work Home
	<b>Dispense Condition</b>
	Cycle Mode Setting
	<b>PTP Condition</b>
	Tool Data

Press the SEL ↓ key until **PTP Condition** is highlighted, then press the **ENTER** key to select it

The display will show:

Select Item	
1/2	
PTP Speed	100 %
R Axis Rotate Speed	100 %
	Absolute Mode
Z Move Height	100 mm
Z Up Distance	0 mm
Z Down Distance	0 mm

Press the SEL ↓ key until Z Move Height is highlighted, then press the **ENTER** key to select it. The display will show:

Enter a number.		
Z Move Height		<b>100</b>
mm		
(F1)	(F2)	(F3)

Press the **CLEAR** key to clear the old value, and then type the value you want to use for the Z axis height for clearing obstacles. If you want to reduce the Z axis height so that it only rises to the distance set in Program Data Settings->Dispense Conditions->Up Amount, use a value of ZERO for Z Move Height.

Press the **ENTER** key to confirm your selection.

### Modifying Point Locations

Programmed point locations, point types, dispensing times, etc. can easily be modified after the original program was created.

### Changing Numeric Values *(Line Speed, Dispense Time, etc.)*

In the point settings screen, press the DISP → and DISP ← keys until the point number you want to modify appears in the display.

<b>No.3</b>			
<b>0008</b>			
<b>X+70</b>	<b>Y+120</b>	<b>Z+85</b>	<b>R+0</b>
<b>Point Type</b>	<b>Point</b>		
<b>Dispense</b>			
Dispense Time			1 sec
(F1)	(F2)	(F3)	

Press the SEL ↓ and SEL ↑ keys to highlight the item you want to change, then press the **ENTER** key to select it. For example, to change the dispense time, move to the Dispense Time line, then press **ENTER**.

Type the new value for the setting you want to change, and then press **ENTER** to confirm it.

### Changing a Point Location

If you want to change a point location (XYZR values), select the top line of the display, which shows the current XYZR location, then press **ENTER**.

<b>No.3</b>			
<b>0008</b>			
<b>X+70</b>	<b>Y+120</b>	<b>Z+85</b>	<b>R+0</b>
<b>Point Type</b>	<b>Point</b>		
<b>Dispense</b>			
Dispense Time			1 sec
(F1)	(F2)	(F3)	

Press the GO key to move the tip to the currently programmed location.

Jog the tip location to the desired location or use MDI mode to numerically type the new location. When the location is correct, press the **ENTER** key to confirm the change.

### Insert or Delete a Point

To insert a new point just before the point currently in the display at the point settings screen, press the **EDIT** key, then select Insert Point.

To delete the point currently in the display at the point settings screen, press the **EDIT** key, then select Delete Point.

### Changing the Work Home Position

At the completion of a program cycle, the tip will move to the work home position and wait there until the start signal is sent again.

To reduce the program cycle time, the work home position can be changed so that it is closer to the first programmed point location.

To change the work home position, please do the following:

At the point setting screen, press the **MENU** key to display the main menu:

<b>Select Item</b>	
<b>1/2</b>	
<b>Program Data Settings</b>	<b>_</b>
Point Job Settings	
Additional Function Data	
System Settings	
Sequencer Settings	
Teaching Data Copy, Delete	

Press **ENTER** to select the **PROGRAM DATA SETTINGS** function. The display will show:

Select Item
1/2
Program Name
<b>Work Home</b>
<b>Dispense Condition</b>
Cycle Mode Setting
<b>PTP Condition</b>
Tool Data

Press the **SEL** ↓ key until Work Home is highlighted, then press the **ENTER** key to select it. The display will show:

Work Home			
<b>X=0</b>	<b>Y=0</b>	<b>Z=0</b>	<b>R=0</b>
Type	PTP Point		
Job Number at Start	<b>0</b>		
Job Number at End	<b>0</b>		

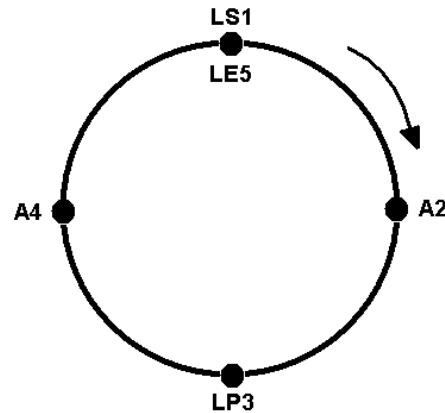
Highlighted the top line of the display, which shows X=, Y=, Z=, R= and press **ENTER**. The display will show:

Work Home		
X	0mm	
Y	0mm	
Z	0mm	
R	0 deg	
<b>JOG</b>	<b>MDI</b>	<b>INIT</b>
<b>(F1)</b>	<b>(F2)</b>	<b>(F3)</b>

Jog the tip to the new work home position or type the position numerically using MDI mode. When the position is correct, press **ENTER** to confirm it.

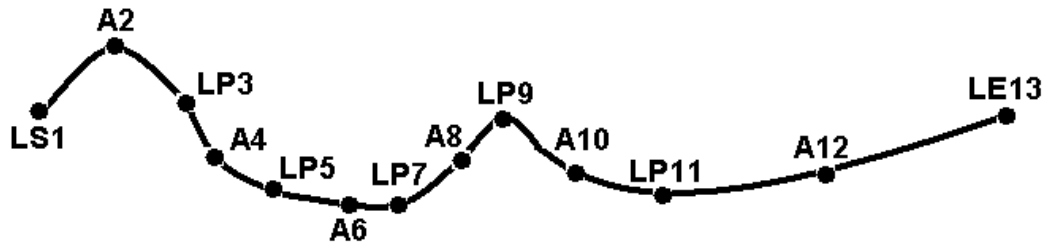
### Teaching Circles

A circle can be created by teaching a Line Dispense Start point (LS1), then an Arc Point (A2), then a Line Passing point (LP3), then an Arc Point (A4), and finally a End of Line Dispense point (LE5) at the same location as the start point.



## Teaching Irregular Curves

An irregular curve can be programmed by using a series of LINE PASSING and ARC points in sequence. This is equivalent to breaking the curve into a series of perfect curves. For example:



LS = LINE START
A = ARC POINT
LP = LINE PASSING
LE = LINE END

In areas where the curve is very irregular, teach more points along the curve, such as points LS1 – LP5 above

In areas where the curve is relatively flat or of a consistent slope, fewer point can be used, such as points LP11 – LE13 above

Always alternate between LINE PASSING and ARC points. It is not possible to have two ARC points without a LINE PASSING point between them.

If two LINE PASSING points are taught in sequence, there will be a straight line between the two points, not a curve.

## Saving Point Data

When program data, such as point locations, dispense conditions, etc. it taught to the robot, it is stored in the chip memory of the machine.

Once the final version of the program has been completed, the program data should be saved to the robot memory card for backup purposes.

The fastest way to save your data to the memory card is to press the SAVE key while at the point settings screen. The display will prompt you to confirm that you wish to save all data to the memory card. Press **ENTER** to confirm the save.

The complete data save utility, which includes the ability to both read and write to the memory card, can be found under **MENU-> DATA SAVE UTILITY**.

### Block Editing Functions

The robot software allows the user to apply changes to a group of selected points in a program. This is called Block Editing. A block of points is defined by a starting point number and an ending point number.

For example, it is possible to add 10 mm to the X values of point number 10 – point number 20 in a program. It is also possible to copy, move or delete a block of points in a program.

The functions which are available under block edit are:

**Delete Block Points**

**Move Block Points**

**Copy Block Points**

**Mirror Copy (Right-Left)**

**Mirror Copy (Front-Back)**

**X Offset**

**Y Offset**

**Z Offset**

**Block Rotation**

**Reset Line Speed**

### Adjusting X, Y, Z Values

To adjust the X, Y, or Z value of a range of points in a program, please do the following:

1. At the point settings screen, press the **EDIT** key.
2. Select Block Editing and press **ENTER**.
3. The display will prompt you for the Block Start Number. Type the point number of the first point in the block of points that you want to apply the changes to. If you want to apply the changes to the entire program, type 1 then press **ENTER**.
4. The display will now prompt you for the Block End Number. Type the point number of the last point in the block of points that you want to apply the changes to.
5. If you want to apply the changes to the entire program, press the F3 key to select the LAST of the program, or type the point number of the last point in the block, and then press **ENTER**.
6. Select X Offset, Y Offset or Z Offset as needed and press **ENTER**.
7. Type the value you want to adjust the axis by, and then press **ENTER**. For example, if you want to add 10 mm to all of the X axis values for the block of points, type 10 then press **ENTER**.

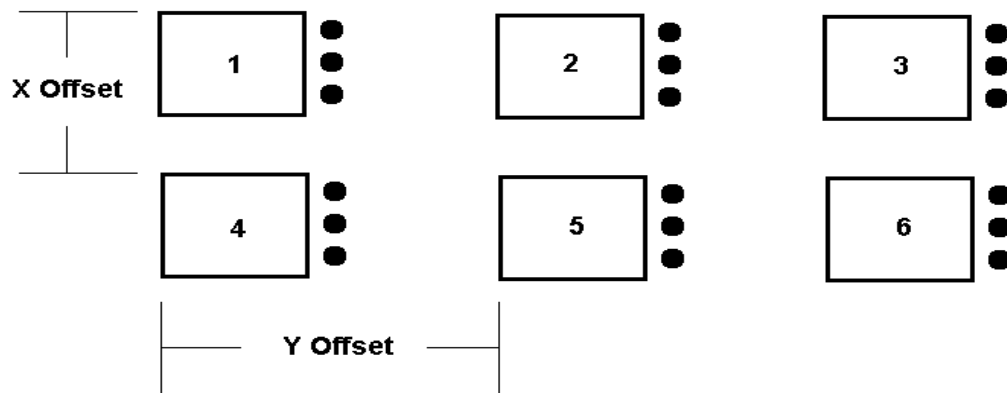
## Resetting Line Speeds

To change the line speed for all line points in a range of points in your program, please do the following:

1. At the point settings screen, press the **EDIT** key.
2. Select Block Editing and press **ENTER**.
3. The display will prompt you for the Block Start Number. Type the point number of the first point in the block of points that you want to apply the changes to. If you want to apply the changes to the entire program, type 1 then press **ENTER**.
4. The display will now prompt you for the Block End Number. Type the point number of the last point in the block of points that you want to apply the changes to.
5. If you want to apply the changes to the entire program, press the F3 key to select the LAST of the program, or type the point number of the last point in the block, and then press **ENTER**.
6. Select Reset Line Speed on page two and press **ENTER**.
7. Type the value you want to set as the line speed for all line points in the block, and then press **ENTER**.

## Block Copy

The Block Copy function allows you to duplicate a range of points in a program, adding an X offset or a Y offset between each copy. This is a very useful function for applications which use a fixture to hold many pieces of the same part. Rather than recreating the program for each part in the fixture, you can create the program once, and then copy it to all of the other pieces in the fixture.



**Notes:**

- Normally, it is simplest to copy part number one to parts two and three first, then make a copy the entire first row (parts 1 –3) to create the second row (parts 4 – 6).
- When performing a copy, in most cases, either the X Offset or the Y Offset will be zero.
- When copying from part 1 to parts 2 –3 above, the X Offset is zero because all parts have the same X axis values.
- When copying from parts 1 - 3 to parts 4 - 6 above, the Y Offset is zero because all parts have the same Y axis values.

To use the **Block Copy** function, please do the following:

1. At the point settings screen, press the **EDIT** key.
2. Select Block Editing and press **ENTER**.
3. The display will prompt you for the Block Start Number. Type the point number of the first point in the block of points that you want to apply the changes to. If you want to apply the changes to the entire program, type 1 then press **ENTER**.
4. The display will now prompt you for the Block End Number. Type the point number of the last point in the block of points that you want to apply the changes to.
5. If you want to apply the changes to the entire program, press the F3 key to select the LAST of the program, or type the point number of the last point in the block, and then press **ENTER**.
6. Select Copy Block Points and press **ENTER**.
7. The display will prompt you for the X Distance. Type the X axis distance between pieces one and pieces two, then press **ENTER**.
8. The display will prompt you for the Y Distance. Type the Y axis distance between pieces one and two, then press **ENTER**.
9. The display will prompt you for the Copy Times. Type the number of copies you wish to make, and then press **ENTER**.

## Troubleshooting

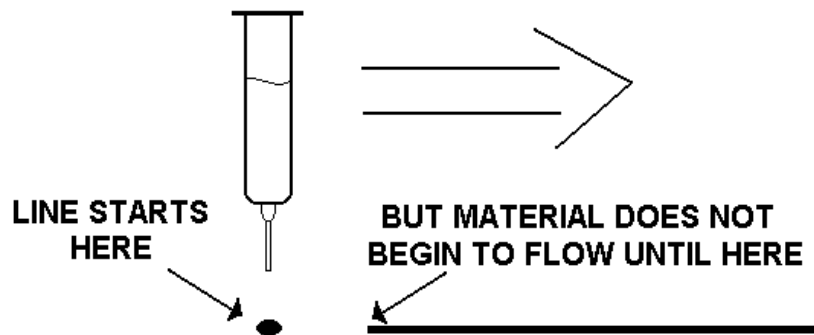
### Line START and line END problems

There are certain problems which commonly occur at the start of line dispensing and at the end of line dispensing. These problems often occur when dispensing high viscosity materials, such as silicone.

**PROBLEM: no material is dispensed at the beginning line.**

(High viscosity materials)

When dispensing high viscosity materials, it is common that the material does not flow immediately at the start of dispensing.



This occurs because it takes a moment before the pressure on the material has reached a level where the material begins to flow. There are several methods to overcome the problem above. **The simplest solution is described below:**

**SOLUTION: use wait time at start parameter**

Under **MENU->PROGRAM DATA SETTINGS->DISPENSE CONDITIONS** on the teaching box, there is a setting called **WAIT TIME AT START**. This setting holds a time value in seconds.

If a value greater than zero is used in the **WAIT TIME AT START**, the dispenser will turn on for that specified period of time before movement begins.

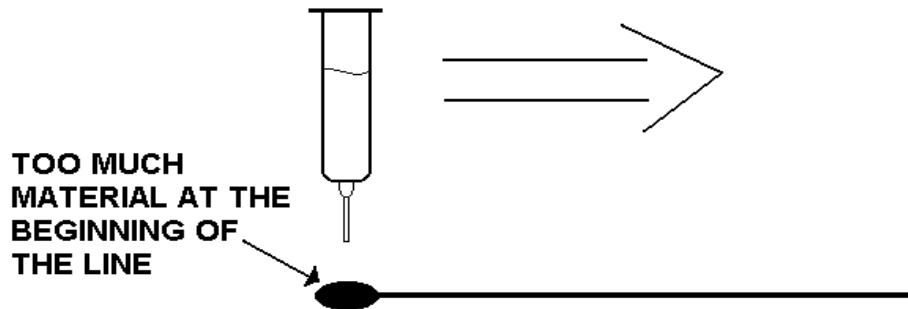
For example, if a value of 0.40 seconds is programmed in **WAIT TIME AT START**, the following will occur:

- The dispense tip will move to the start of the line.
- The tip will not yet begin to move, but the dispenser will turn ON.
- After 0.40 seconds, the tip will begin to move along the path of the line.
- The delay of 0.40 seconds (in this example) allows the material to begin to flow before the tip movement begins.

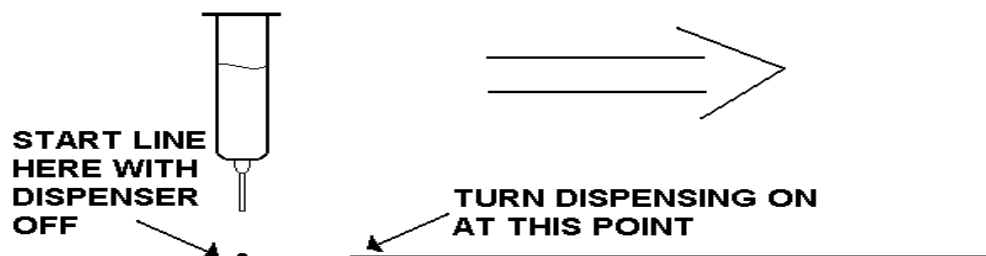
**PROBLEM: too much material at the beginning of a line**

(Low viscosity materials)

A common problem when dispensing low viscosity materials is that the material flows so quickly that there is a 'blob' of material at the beginning of a line.

**SOLUTION: begin tip movement before turning the dispenser on**

To overcome this problem, begin the tip moving along the path of the line **BEFORE** turning the dispenser on. If the tip is already in motion, there should be no 'blob' of material at the start of the line.

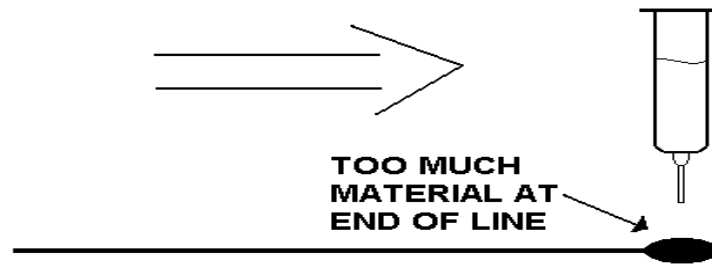


This can be accomplished by programming the **LINE START** point with dispensing **OFF**. When a **LINE START** point is registered, a prompt will appear allowing DISPENSE ON or DISPENSE OFF to be selected.

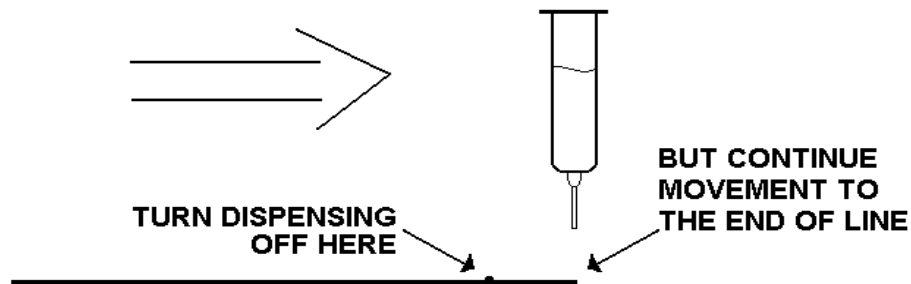
Teach a **LINE PASSING** point at the location where you actually want to begin dispensing. At this point, use **DISPENSING ON**.

**PROBLEM: too much material at the end of a line**

A common problem when dispensing lines is to have too much material at the end of the line, especially if the end of the line meets the beginning of the line, such as in a gasketing application.

**SOLUTION: turn dispenser off before the end of the line.**

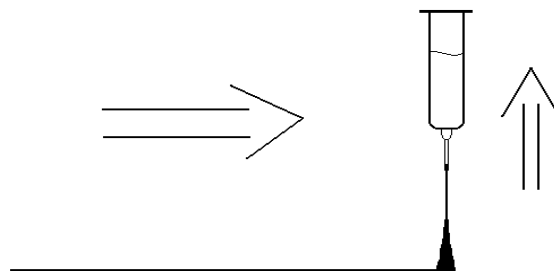
To correct this problem, turn the dispenser OFF before the end of the line, but continue moving the tip to the end of the line. Even though the dispenser is turned off, the last bit of material will fall to complete the line.



This can be done by registering a **LINE PASSING** point a short distance before the end of the line (LINE END POINT) and selecting DISPENSE OFF.

**PROBLEM: Stringing or tails at end of lines**

A common problem with certain types of materials is 'stringing.' This is when the material does not disconnect from the dispense tip, but instead stretches, similar to stretching a piece of chewing gum. As the tip moves away, a tail is often left behind as the string of material falls back on the work piece. Stringing often occurs when dispensing materials such as silicone.



**There are several methods to correct stringing problems:**

In general, the first step to take if stringing occurs is to USE A SMALLER DIAMETER TIP. This is not always practical as using a smaller tip will also reduce the flow rate of the material, but using a smaller tip is the simplest method for correcting stringing.

If the correct tip has already been chosen, adjust the UP AMOUNT and UP SPEED settings under **MENU->PROGRAM DATA SETTINGS->DISPENSE CONDITIONS** to control the tip movement at the end of line and point dispensing.

**UP AMOUNT:** this setting holds a distance in millimeters. After dispensing (either points or lines), the dispense tip will rise the distance specified under UP AMOUNT at the speed programmed under UP SPEED (see below).

**UP SPEED:** this setting holds a speed in millimeters per second. This is the speed at which the tip rises the distance specified in UP AMOUNT, after dispensing.

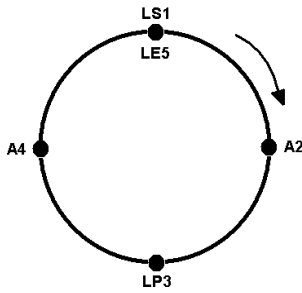
Use UP AMOUNT and UP SPEED to **control the tip motion after dispensing**. The height and speed should be adjusted so that the tip rises far enough and slow enough that the string of material has a chance to break free and fall neatly down before the tip moves to the next point.

**Typical values for UP AMOUNT** are 2 mm – 20 mm, depending on the material. Use a height value large enough so that the dispensed material can break free of the dispense tip, **but to maximize the program speed, use the smallest value possible.**

**Typical values for the UP SPEED** are 5 mm/sec – 25 mm / sec. If the string of material is being thrown up or to the side as the tip rises, use a slower speed. **Use the fastest speed possible which does not throw the material as the tip rises.**

**A delay time** can also be programmed before the tip rises after dispensing. This delay time can be found under:

**MENU->PROGRAM DATA SETTINGS->DISPENSE CONDITIONS->WAIT TIME AT STOP**. Delaying the upward Z axis motion can also help minimize the affects of stringing. **Typical values are 0.2 – 0.5 seconds.**



### Making perfect circles

There are several ways to program the robot to move in a circular pattern. The most common method is shown below.

**METHOD #1:** A five point, two arc circle.

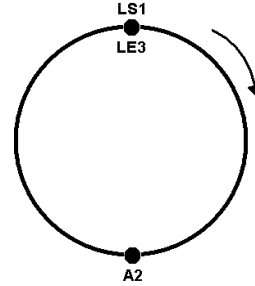
To make a good circle, try to keep the opposing points as symmetrical as possible. In other words, the two Line points (LS1 and LP3) should be **EXACTLY** in-line with each other and the two Arc points (A2 and A4) should be **EXACTLY** in-line.

#### Method #2:

1. Teach the Line Start point (**LS1**) which starts the circle.
2. Now jog across to Line Passing point (LP3), **WITHOUT MOVING THE Y AXIS**.
3. Register the point by pressing **ENTER**.
4. Now jog the tip to the first Arc point (A2).
5. Press the DISP ← key so that the teaching box display shows the last point (LP3).
6. Insert the a point before the Line Passing point shown in the display by pressing **EDIT** key, then select Insert Point. Press **ENTER** to register the Arc Point.
7. Now move directly across to the second Arc point (A4), **WITHOUT MOVING THE X AXIS**.
8. Press the DISP → key so that the Line Passing point is not overwritten.
9. Register the point by pressing **ENTER**.
10. Press the DISP ← key four times so that the display returns to the first Line Start point (LS1).
11. Press the GO key so that the tip moves to the location of the first Line Start point.
12. Press the DISP → key four times so that the display shows the new, empty point just past the Arc point (A4).
13. Press the **ENTER** key to register the last point in the circle (LE5). Since the tip is in the exact location the circle was started at (LS1), the end of the circle will be in exactly the same location as the start of the circle.

**METHOD #3: A three point, one arc circle.**

The second method for creating circles will make an even BETTER circle and uses LESS POINTS and, more importantly, LESS LINE/ARC POINTS:



When using this method, it is very important that certain criteria **MUST** be met:

The Line Start point (LS1) and the Arc point (A2) **MUST** be exactly in-line. Also, they must have exactly the same Z position.

The Line Start point (LS1) point and the Line End point (LE3) **MUST** be in-line and must be one or two steps apart. The points must have exactly the same Z position.

To **create a circle** as described above, do the following:

1. Teach the Line Start point (LS1) to start the circle.
2. Move **DIRECTLY** across to the Arc point (A2), moving **ONE** axis only. Register the point by pressing **ENTER**.
3. Press the DISP ← key two times so that the display shows the LS1 point.
4. Press the GO key to move the tip to the location of point LS1.
5. Press one of the jog keys one or two times to step the tip just slightly to the left or right of the LS1 point.
6. Press the DISP → key two times so that the Line Start point will not be overwritten.
7. Press the **ENTER** key to register point LE3. If the LE3 point is on the left side of the LS1 point, the tip moves in a clock-wise direction around the circle. If the LE3 point is to the right of the LS1 point, the tip will rotate counter-clockwise.

## **Optional Accessories**

### **Windows Software**

The optional Windows Software CDROM allows the robot to be programmed from a PC running Windows 98 or Windows 2000 or better. All of the robots use the same Windows software package (p/n 200MM-Win).

The Windows software package contains all of the programming functions of the teaching box software and also allows data to be imported from CAD files (AutoCAD DXF files) or from Microsoft Excel spreadsheets.

Some hardware diagnostic functions are NOT available in the Windows Software package, so it is not a replacement for the teaching box.

### **Vision System**

A CCD camera system is available for the 200MM – 500MM, and SCARA robots. This vision system allows the robot to ‘see’ the position of the work piece before the program runs. The software can then correct the program position, making adjustments for X and Y axis offsets and angle of rotation for each individual work piece.

The vision system is useful for applications where the part may be delivered to the robot in a slightly different location each time.

### **Z Height Sensor**

A Z axis height sensor is available for the 200MM – 500MM, and SCARA robots. This sensor allows the system to measure the height of the part before running the program. The software can then adjust all of the Z axis values of the program for each individual work piece.

The Z Height Sensor is useful for applications where the height of the part varies from part to part.

### **CE Enclosures**

All robots sold in the European Community are sold with an enclosure. The enclosure surrounds the robot and prevents an operator from entering the robot work area while it is running. The enclosure can have a physical ‘door’ to allow access to the work area, or an electronic Light Curtain can be used for easier access. If you are in the US and plan to export your new robot, please check on local regulations in the country in which it will be used.

## Optional Accessories (continued)

### Dead Man Switch

When using the SCARA robot, any teaching box operation which moves the robot arm, such as jogging (X+, X-, Y+, etc.) or the GO function, requires that the user press and hold in the DEAD MAN switch on the teaching box before performing the function.

The Dead Man switch is a small black switch on the left side of the teaching box. For example, to jog the robot, you must press and hold the dead man switch before pressing a axis jog key (X+, X-, Y+, etc). Also, to start the program under Test mode, you must hold in the dead man key when pressing start (F3) on the teaching box.

### TCP Settings

Due to the nature of its design, the **SCARA** robot is much more sensitive to errors in the tool mounting position than the desktop robots. It is very important that the dispensing tip is mounted exactly dead center and 60 mm from the flush surface of the robot arm on three axis models or exactly in the center of rotation of the R axis on the four axis models. If the dispensing barrel or valve is not mounted in the correct position, the robot will not be able to make straight lines and block copy functions will be affected, and many other problems can occur.

To ensure that the tool is mounted in the correct position, be sure to order the correct mounting hardware for the specific barrel / valve / cartridge that you are mounting on the robot.

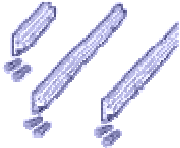
The SCARA robot does have a software utility to correct for small errors in the tool center location. This software correction is call the Direct TCP setting and can be found under:

**MENU->PROGRAM DATA SETTINGS->TOOL DATA->DIRECT TCP.**

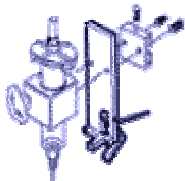
The **Direct TCP function** should be used on all machines **prior to programming** to correct for any error in the tool center point location.

## Mounting Hardware

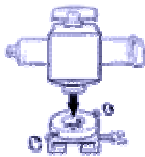
IntelliSpense Economy Stepper, Economy Flex and Full Featured Industrial Cartesian dispensing robots come standard with mounting hardware to dispense from a 30cc syringe. The following options are available for each unit:



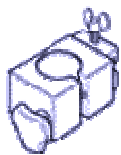
**Mounting Bars** for all IDS robots, allow the mount of several valves, barrels, or cartridges on a single robot. Combine them in whatever configuration you require for your exact application.



**The Tip Locator Kit** ensures a new tip is in the same location each time. When the dispensing tip is removed or replaced, a new tip is often in a slightly different position, a problem for precision dispensing.



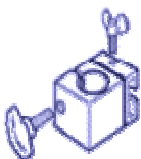
**The 360-degree Conversion Kit** can be used with a barrel, cartridge, or valve. The conversion kit fits on all mounting hardware and allows the operator to dispense material onto a tray at a specific angle.



**Valve Holders** are designed to mount dispensing valves which can dispense material directly from a reservoir. Valve holders work with mounting bars.



**Cartridge Holders** mount 2.5oz, 6oz, 8oz, and 12oz cartridges and comes as a complete assembly. Works with all mounting bars.



**Syringe Holders** mount syringes of different sizes up to a 30/55cc syringe barrel (same dimensions). Each syringe holder comes as a complete assembly and works with all mounting bars (above).



**Integrated Dispensing Solutions • 5311 Derry Avenue • Building D  
Agoura Hills CA 91301 • Ph (818) 597-4300 • Fax (818) 597-4301  
Email: [service@dispensinglink.com](mailto:service@dispensinglink.com)**

Welcome to Integrated Dispensing Solutions, Inc., or **IDS**. As we begin our second decade of service to the field of industrial assembly, we are pleased to introduce more new IntelliSpense brand products and increase our ability to serve our customers from larger, new headquarters in Agoura Hills, CA.

IDS offers a complete one-stop shop for assembly applications, from simple manual glue syringes to fully automated dispensing robots and accessories. IDS offers you working partners with fast delivery and knowledgeable service people. IDS is a favorite stop for engineers, assembly technicians, automation engineers, scientific and medical device users, lab techs and integrators.

R&D, prototyping, small batch or assembly projects for almost any production environment can be easily and quickly supplied from locations around the country.

Please be assured, the Service Team at IDS takes your application very seriously. From a simple manual syringe to a fully automated robotic work station, we will always search for the best solution to your dispensing application. If you find our service or products to be deficient in any way please contact me directly.

Welcome to IDS.

*Jeremiah Donohue, CEO*

Integrated Dispensing Solutions  
5311 Derry Ave.  
Building D  
Agoura Hills CA 91301  
Phone (818) 597-4300  
Fax (818) 597-4301