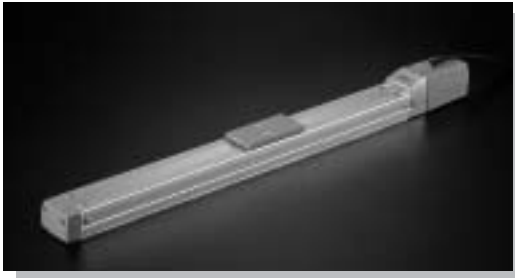


# Robo Cylinder Automation Examples Manual (Part 1)



This publication was written to assist you in better understanding this part of your IA system. If you require further assistance, please contact IA Technical Support. For Central and East Coast Time Zones, please call our Itasca, IL office at 1-800-944-0333 or FAX 630-467-9912. For Mountain and Pacific Time Zones, please call our Torrance, CA office at 1-800-736-1712 or FAX 310-891-0815; Monday thru Friday from 8:30AM to 5:00PM.



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## Application Example 1:

**Device Function:** To sort items traveling on a conveyor  
**Movement:** Line diverter

### Speed - Acceleration Setting Function:

#### Characteristics:

- The Robo Cylinder allows the speed allows the speed and acceleration to be set for each position with a numeric value. Speed is set in 1mm/sec increments (minimum input is 1mm/sec), and the acceleration is set in 0.01G increments (minimum input acceleration is 0.01G).
- By adjusting the velocity and acceleration on the fly, movement of the item is possible without causing damage from the impact.

#### Existing specifications:

An air cylinder is used to push items traveling on a conveyor onto a different line.

#### Existing problems:

The air cylinder causes damage when the rod tip plate impacts the item at high speed. Therefore, cycle time cannot be reduced because speed is restricted.

#### Machine Changes:

Line diverter was modified from air cylinder to the Robo Cylinder.

#### Appropriate Robo Cylinder:

RCS-SA5 Slider High Speed Type 400 stroke (Model type: RCS-SA5I-20-H-400)

RCS-SA5  
Slider High Speed Type  
Specifications Range

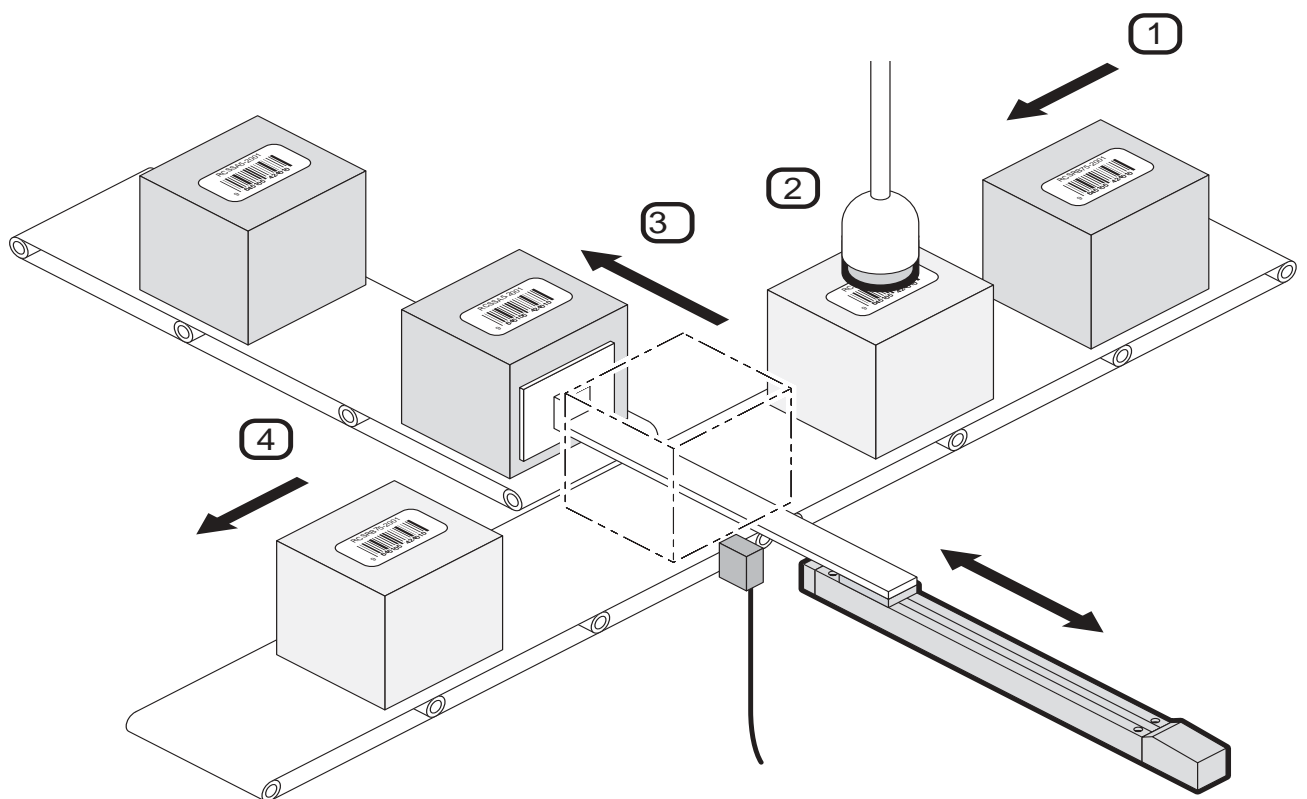
Speed	Maximum 800mm/sec (Minimum setting of 1mm/sec)
Payload	Horizontal: Maximum 4kg Vertical: Maximum 1kg
Stroke	Stroke 50~500mm (50mm increments)

#### Benefits:

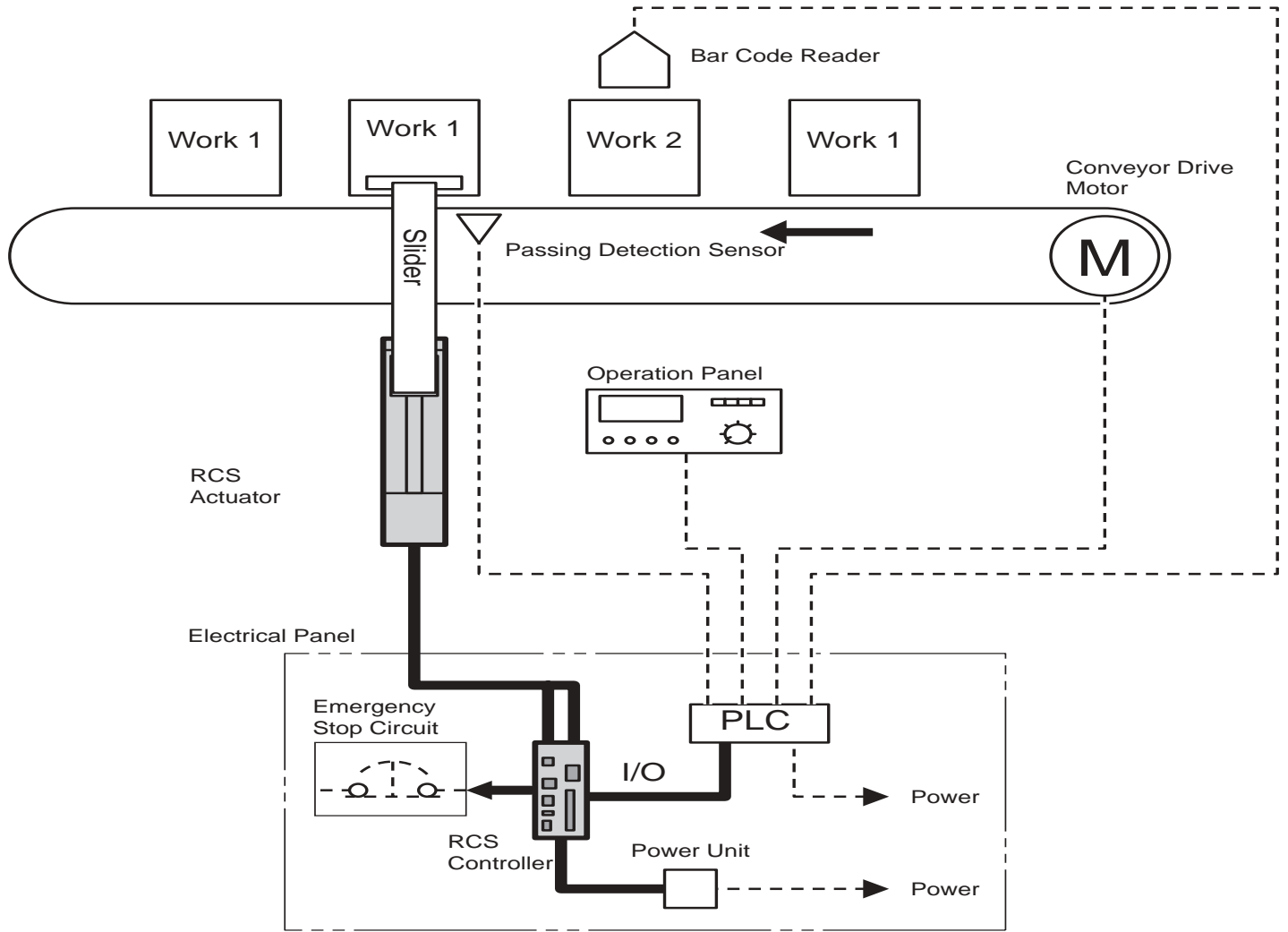
- 1) By decreasing the acceleration during start to 0.05G and setting speed to 800mm/sec, not only is damage to the item from impact avoided, but also the item is quickly transferred to a separate conveyor reducing cycle time.

## Movement Flow:

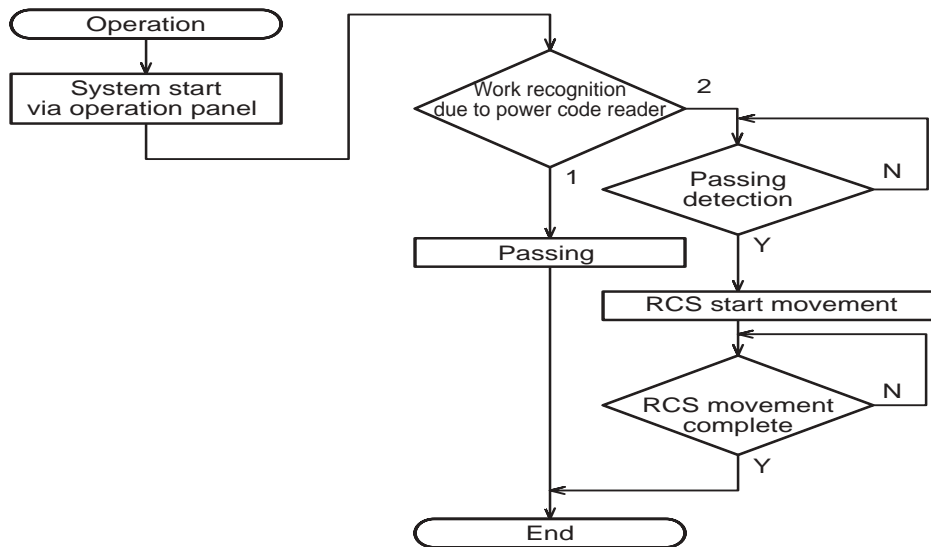
- 1) Boxes are traveling across the conveyor.
- 2) The bar code scanner reads the bar code of the box and determines whether or not sorting is needed.
- 3) When sorting is needed, the box reaches the set position, and the slider moves forward sliding the box onto the opposite conveyor.
- 4) In case sorting is not needed, continues passing.



# System Diagram



< General Operation Flow Chart >



## Control Specifications:

- 1) Under normal circumstances, Servo ON Signal and Hold Signal are turned ON.
- 2) When Robo Cylinder receives Operation Ready Signal from the Conveyor Control Sequence, move to Position 0\*.
- 3) Once the Sorting Signal is received from the Conveyor Control Sequence, move to position 1\*.
- 4) When the Conveyor Control Sequence receives the Movement Complete Signal from the Robo Cylinder, return the Robo Cylinder back to Position 0\*.
- 5) Then, repeat steps, 3 and 4.
- 6) If the Positioning Complete Signal does not turn ON within 2 seconds after the Robo Cylinder Start Signal turns ON, the alarm will turn ON.
- 7) In case the Alarm Signal from the Alarm Signal turns OFF, the alarm LED will turn ON.

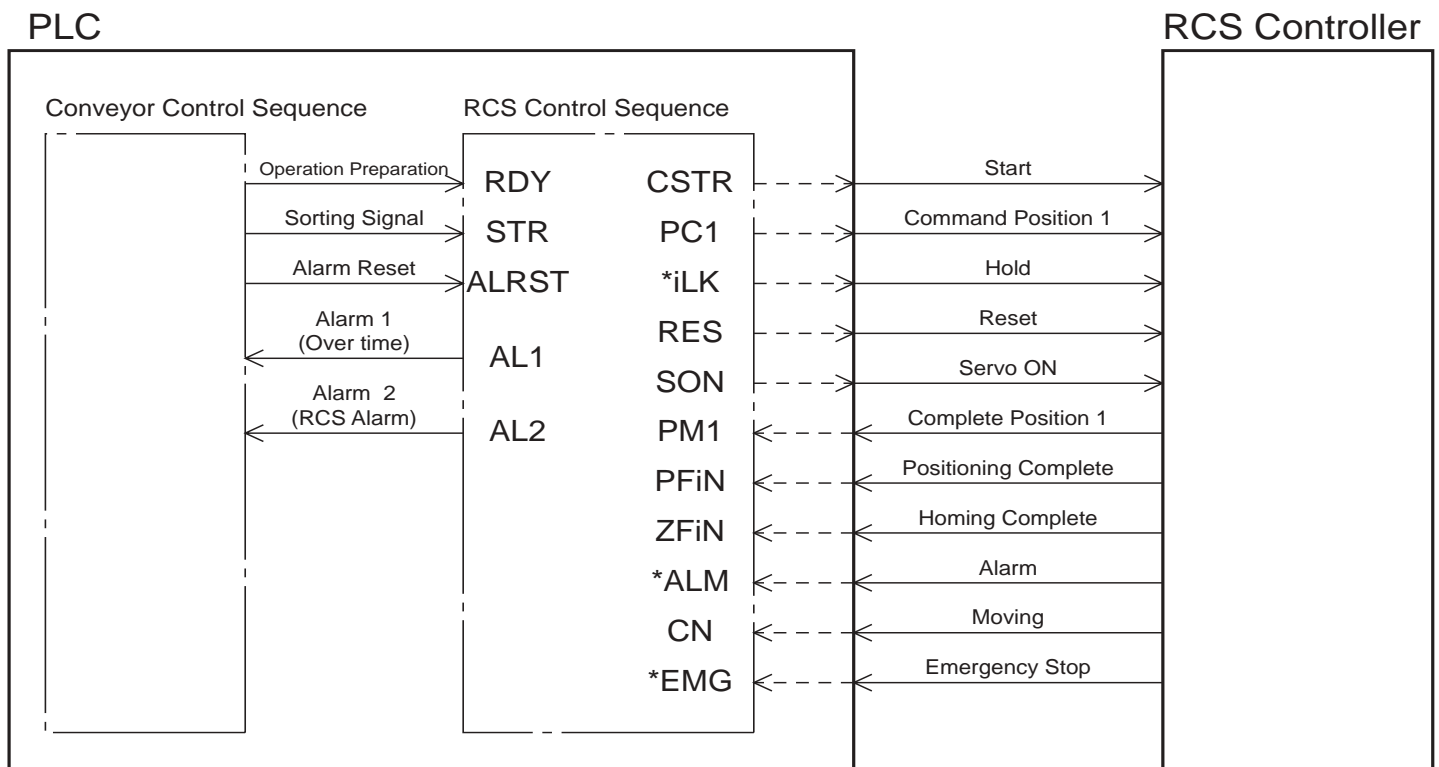
\* Position 0 and 1 refer to No. 0 and 1 of the position data which is located within the controller.

For further details, please refer to the section, "PC Display Screen," located on the next page.

### Note:

1. The Hold Signal (normally ON) stops the Robo Cylinder's movement due to the hold of the conveyor. To stop the actuator, turn OFF the Hold Signal. To continue movement in progress, turn the Hold Signal back ON. To cancel the movement in progress, turn the Hold Signal back ON. To cancel the movement in progress, toggle the Reset Signal ON before turning back ON the Hold Signal.
2. The Operation Ready Signal and Sorting Signal from the Conveyor Control Signal will turn OFF once the RCS control sequence recognizes these Signals.
3. If the RCS is in alarm or emergency stop, the Conveyor Controller will not give a System Ready or Move Signal to any device on the controller.
4. After the alarm source is corrected, reset the alarm circuit on the Operation Panel.
5. This control is specifically for the Robo Cylinder controller.

## I/O Signal



## Robo Cylinder Setting:

The operation for the Robo Cylinder is extremely simple. To move, all Robo Cylinder requires is to teach a position to an assigned number.

### There are two method to teach positions:

1. Numeric input (coordinate value)
2. Input the coordinate value of the desired position by manually moving the slider or by machine operation (JOG function).

Use either the PC Software or Teach Pendant to input the position data into the controller. The PC Software and Teach Pendant share the same content for teaching the basic columns (refer to the “PC Display Screen diagram shown at the bottom of the page).

### Positioning between two points (in case of direct numeric input (coordinate value)):

Set Position 0 at the motor side end (coordinate value 0) and Position 1 at the non-motor end (coordinate value 400), and execute a movement reciprocating between the two points.

1. Input the value “0” into the Position for No. 0.
2. Speed, the column next to Position of the PC display screen, will be the speed to move to Position 0, so input your desired speed. Here, we input 800mm/sec. In the Speed Column, next to the Position Column in the PC display screen, input the desired speed at which to move to Position 0. For this case, enter 800mm/sec.
3. Input the value “400” into the Speed Column for Position No. 1.
4. Input the value “800” into the Speed column for Position No.1.

The above steps completes position data input.

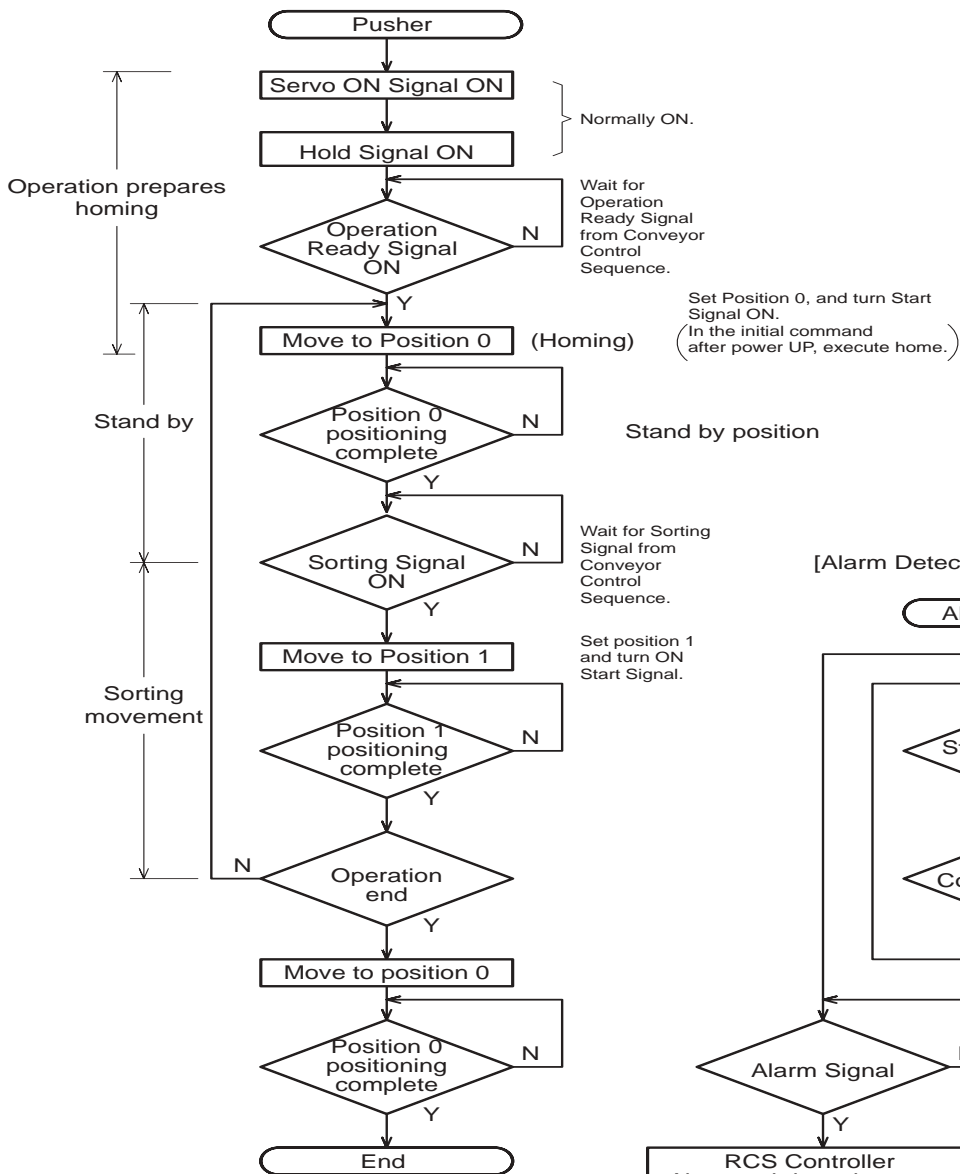
The other columns are required for other functions. Input is not necessary for this application.

Below is the Point Edit Screen located within the controller.

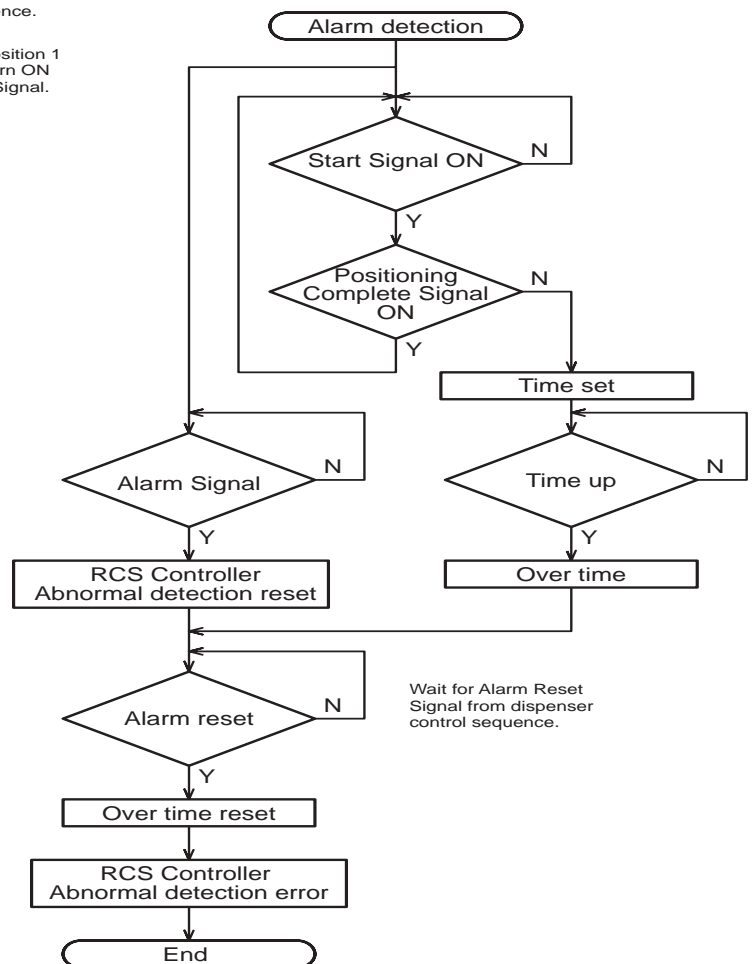


# Movement Flow Chart (for reference)

[Slide Flow Chart]

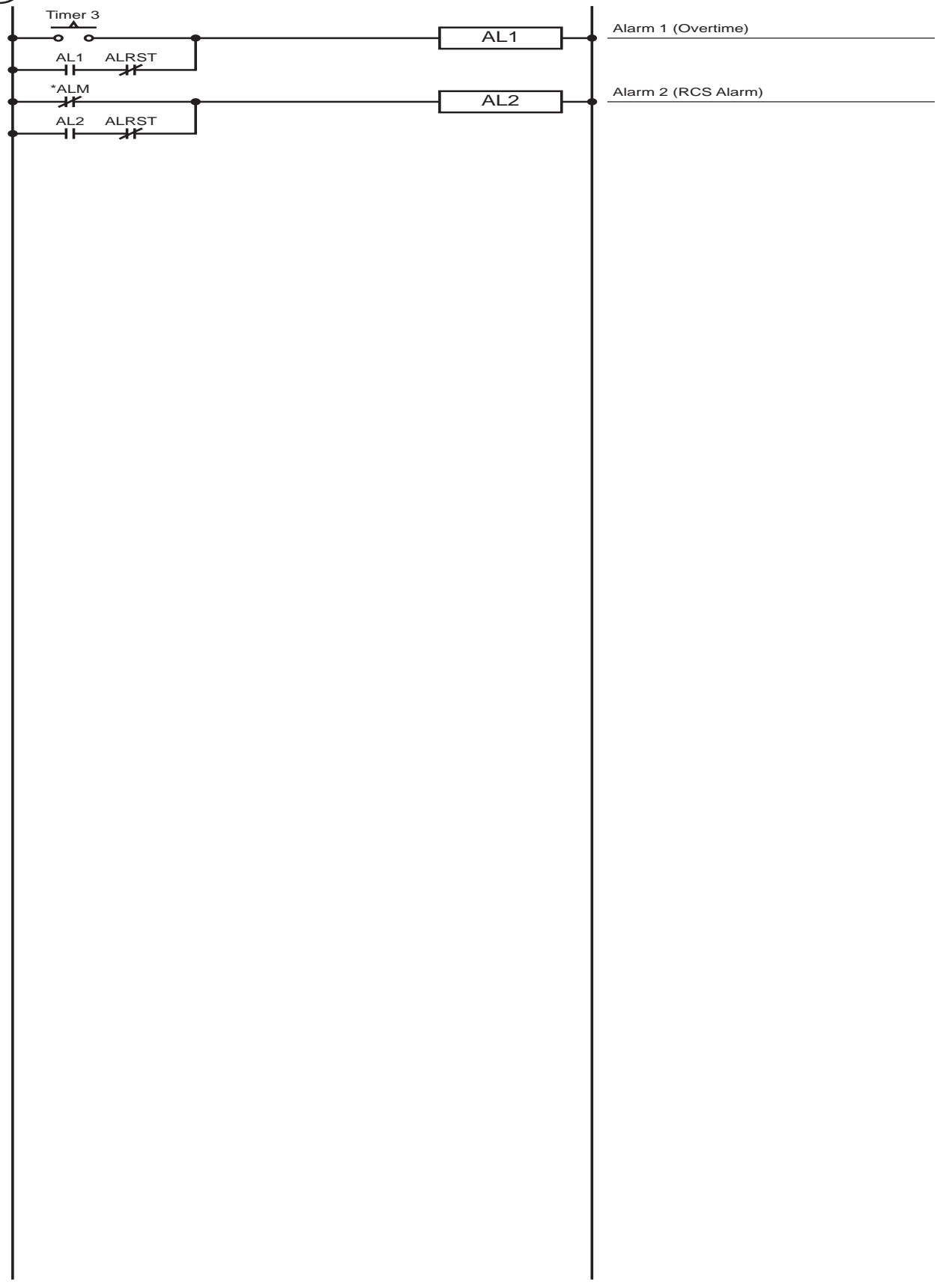


## [Alarm Detection Flow Chart]





**Reference**



## Application Example 2:

**Device Function:** To insert liquid into multiple types of containers that requires speed change

**Movement:** Liquid Dispensing

### Speed Change Function:

#### **Characteristics:**

In the midst of moving to a desired position (assumed as P1), the Robo Cylinder allows the user to send a signal to change to another position (assumed as P2). The Robo Cylinder cancels the move to P1 and then continues onto P2 from the point where the signal was received.

Using the above function with P1 speed set to 100, P2 speed to 200, and designated position set the same for the both points, speed will increase from 100 to 200 without stopping.

#### Existing Specifications:

When a major distance is set between the dispensing nozzle and the surface of the liquid in the container, the liquid will bubble. In order to prevent the bubbles, the dispensing nozzle must rise at the same rate as the liquid in the container. The rate of the liquid rising increases when the cross section of the container becomes smaller.

#### **Existing Problems:**

Cam component adjustment is required for the dispensing nozzle to match the speed changes of the rising liquid in the container slowing down cycle time.

#### **Content Changes:**

By using the Robo Cylinder Rod Type, the speed setting for the nozzle is easily executed even with multiple types of containers.

#### **Applicable Robo Cylinder:**

RCS-RA 55 High Speed Rod Slim Type with 250 stroke (model type: RCS-RA55I-60-GN-H-250-B)

Speed	Maximum 800mm/sec (Minimum speed possible 1mm/sec)
Payload	Horizontal: Maximum 12kg (*in case with guide) Vertical: Maximum 2kg
Stroke	50~300mm (50mm increments)

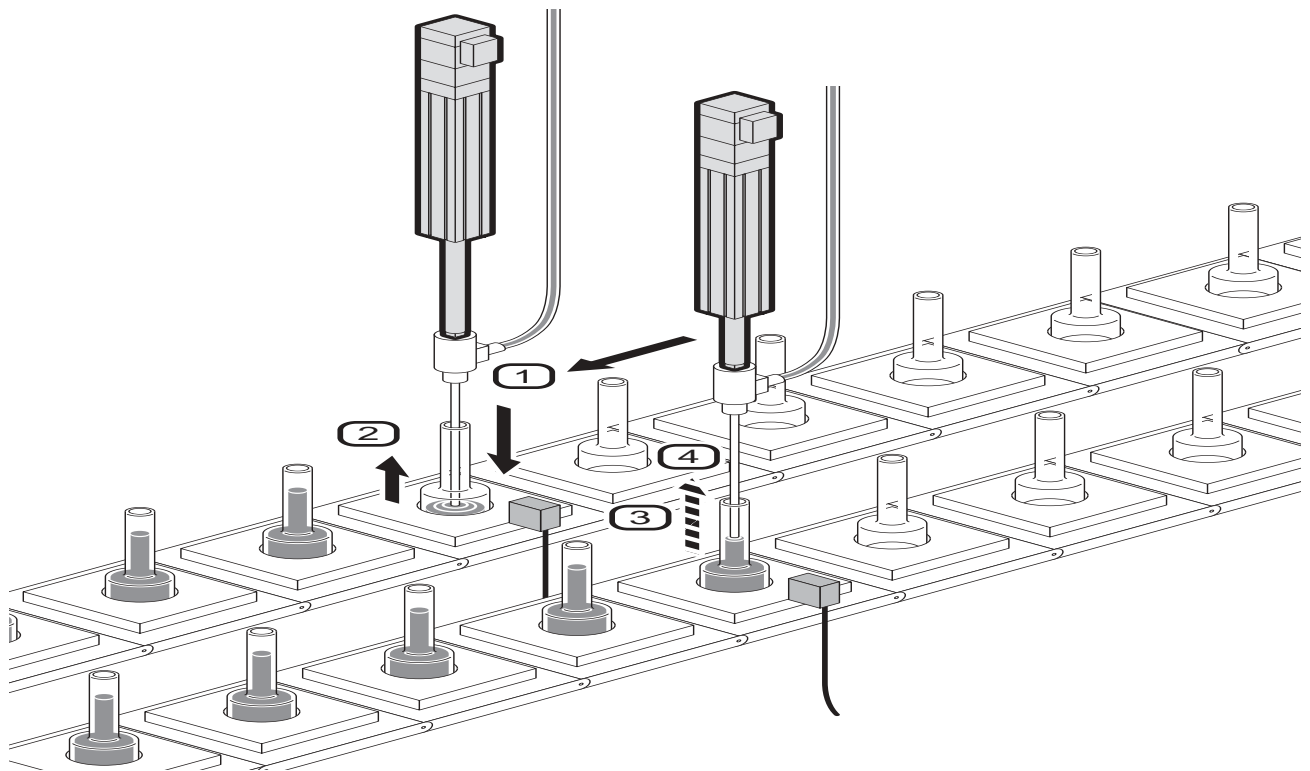
RCS-RA55  
Rod Slim High Speed Type  
Specifications Range

#### Benefits:

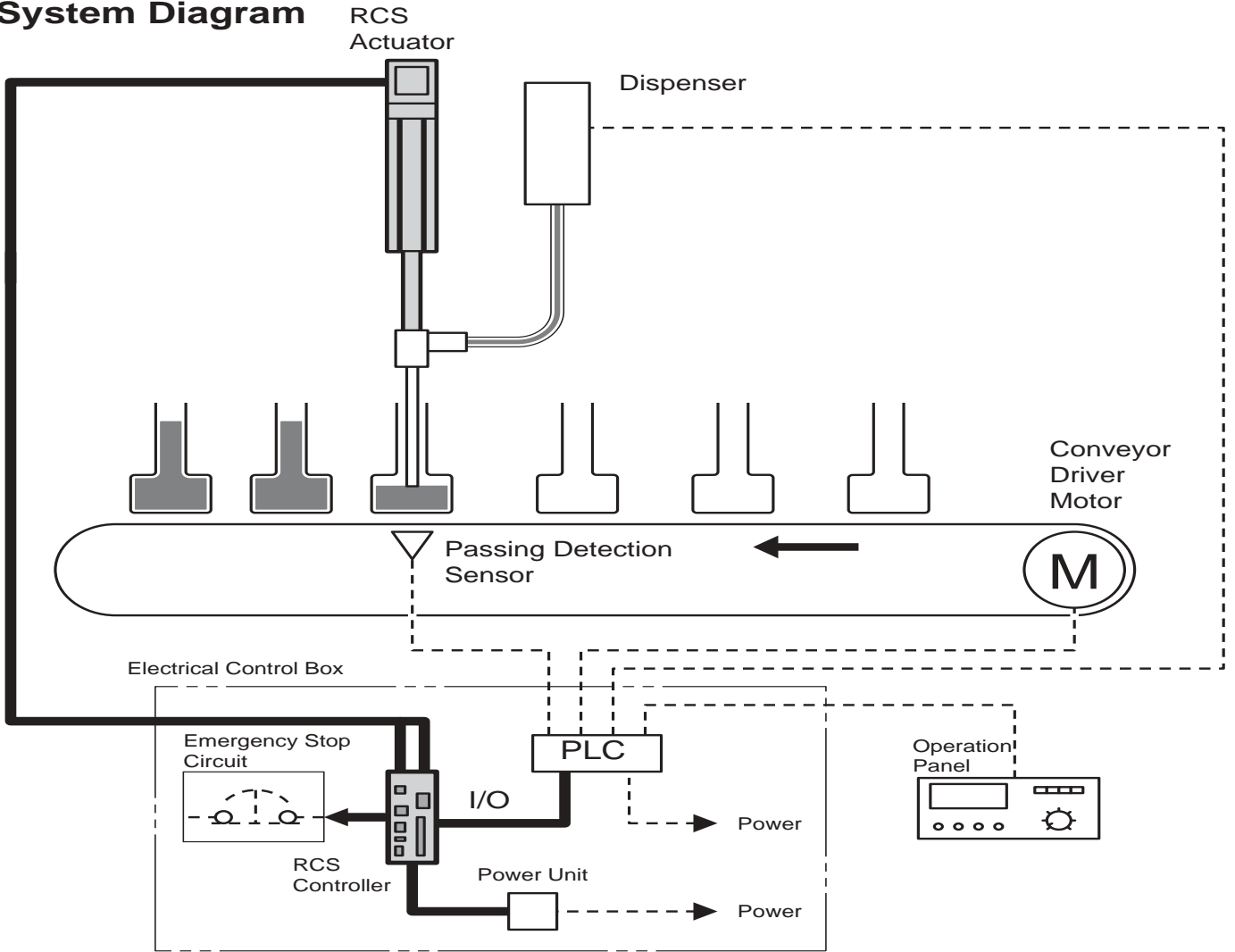
1. Speed can be adjusted in 1mm/sec increments making efficient speed adjustment.
2. Nozzle speed is easier to set when no adjustment of hardware is required.

**Movement Flow**

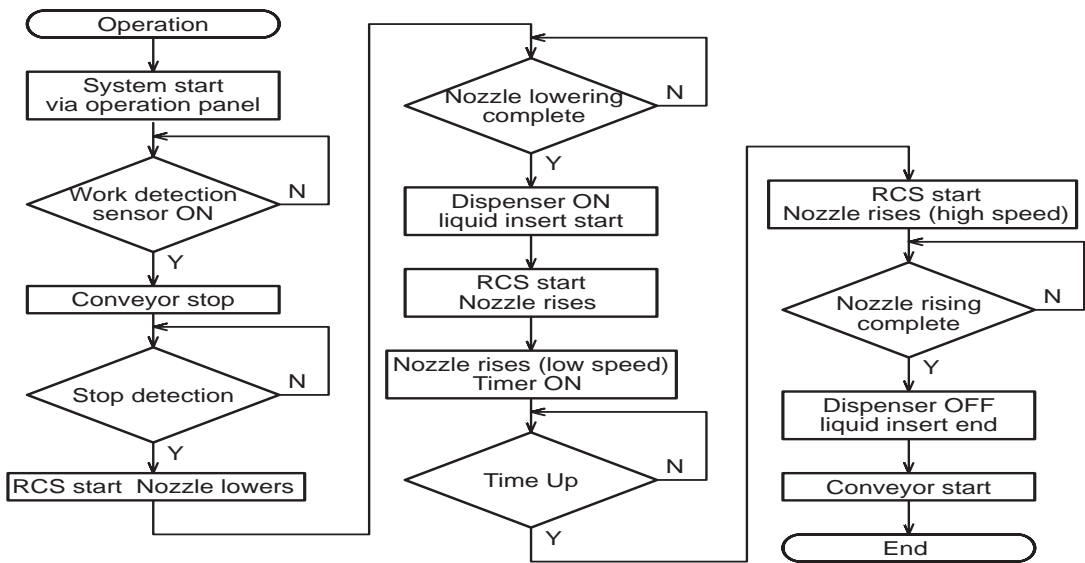
1. When the container flows on the conveyor and stops underneath the insert nozzle, the rod lowers to the liquid insert start point.
2. The rod (dispensing nozzle) rises at the same constant speed as the liquid in the container.
3. The speed of the rod (dispensing nozzle) will increase at the position where the container's cross-section becomes smaller.
4. After dispensing the liquid, the rod (dispensing nozzle) will move up to the stand-by position.



# System Diagram



[General Operation Flow Chart]



## Control Specifications:

- 1) Under normal circumstances, Servo ON Signal and Hold Signal are turned ON.
- 2) When Robo Cylinder receives Operation Ready Signal from the Conveyor Control Sequence move to Position 0\* (stand-by position).
- 3) Move to Position 1\* (liquid dispense start position) when the container is positioned by the conveyor underneath the nozzle signaling the insert start command from the dispenser control sequence.
- 4) From the Positioning Signal of Position 1, the dispenser control sequence starts the liquid flow as the Robo Cylinder moves to Position 2\*.
- 5) Upon move start to Position 2\*, after 3 seconds (at the position where the cross section of the container becomes smaller), change the move position to Position 3\*.
- 6) Upon completing the move to Position 3\*, move to Position 0.
- 7) Repeat above steps, 3) ~ 6).
- 8) The alarm will turn ON if the Robo Cylinder takes over 5 seconds to return from Position 3\* to Position 0.
- 9) When the Alarm Output (normally ON) turns OFF, the alarm LED will turn ON.

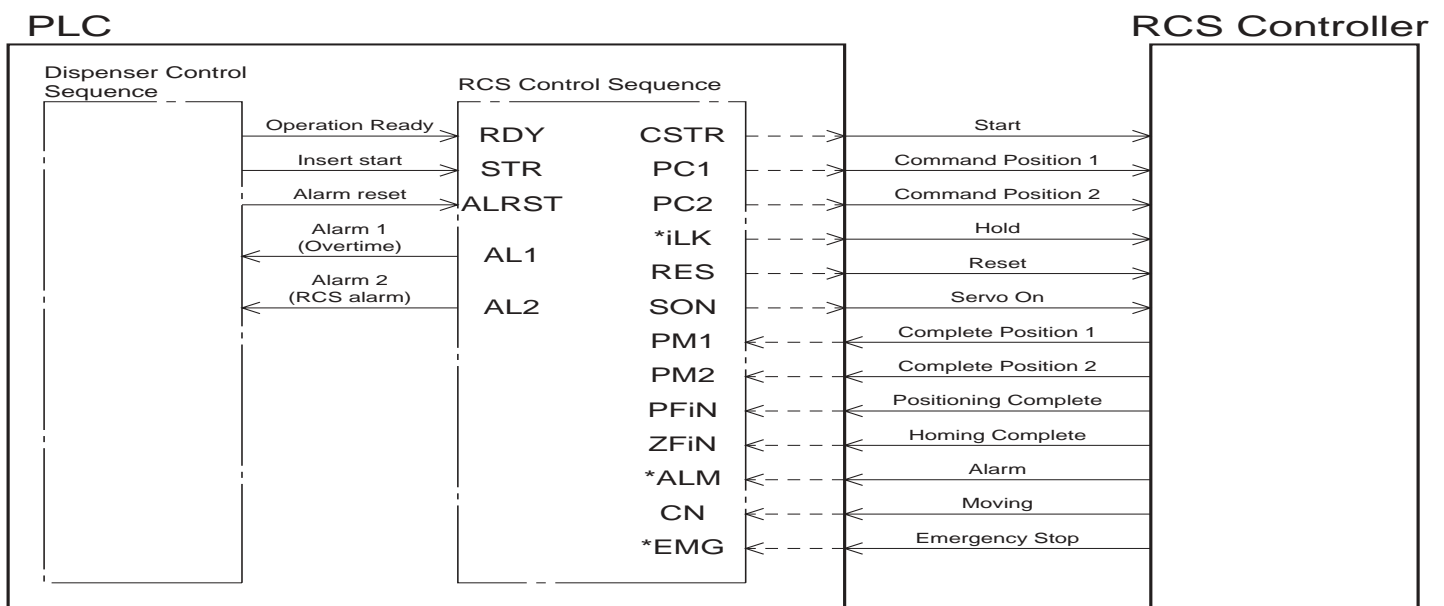
\* Position 0 through 3 refer to No. 0 through 3 of the position data located within the controller.

For further details, please refer to the section, "PC Display Screen," located on the next page.

Note:

1. The Hold Signal (normally ON) stops the Robo Cylinder's movement due to a clog in the liquid dispenser. To stop the actuator, turn OFF the Hold Signal. To continue movement in progress, turn the Hold Signal back ON. To cancel the movement in progress, turn the Reset Signal ON before turning back ON the Hold Signal.
2. The Operation Ready Signal and Insert Nozzle Start Signal from the Dispenser Control Sequence turn OFF after confirming the RCS RCS Controller recognized the Signals.
3. If the RCS is in alarm or emergency stop, the Dispenser Controller will not give a System Ready or Move Signal to any device on the controller.
4. After the alarm source is corrected, reset the alarm circuit on the Operation Panel.
5. This program is specifically for the Robo Cylinder Controller.

## I/O Signal Terminal Diagram



## Robo Cylinder Setting:

To change the speed without stopping during movement, send a separate position command. For instance, Position A is set to 300mm/sec, a move command is sent to Position B, which is ahead of Position A. Position B is set to 500mm/sec. Speed will increase from 300 to 500.

### Speed Changes:

When the speed is a direct numeric input, teach the position coordinate value by using the JOG function.

Position 0 is the stand-by station.

Position 1 is the liquid dispensing start point.

Position 2 is the passing point.

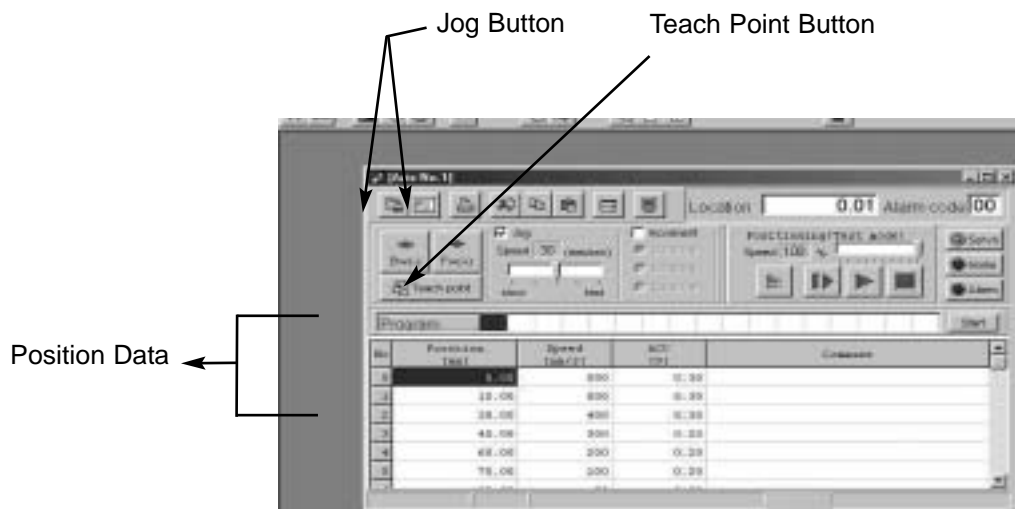
Position 3 is the liquid dispensing end point.

1. After selecting No. 0, use the JOG (forward - backward) button to adjust the suitable position for the stand-by point. Once the position is determined, push the Teach Point button to incorporate the current coordinate value into No. 0 Position.
2. Directly input 500 into the Speed of No. 0.
3. Similar to step 1 after selecting No. 1, move the actuator with the JOG function and teach the Liquid Dispensing Start Point.
4. Directly input 500 into Speed of No. 1.
5. Apply the above step 1 to the Position of No. 2.
6. Directly input 300 into the Speed of No. 2.
7. Apply the above step 1 to the Position of No. 3.
8. Directly input 500 into the Speed of No. 3.

From the above steps, position data input is completed.

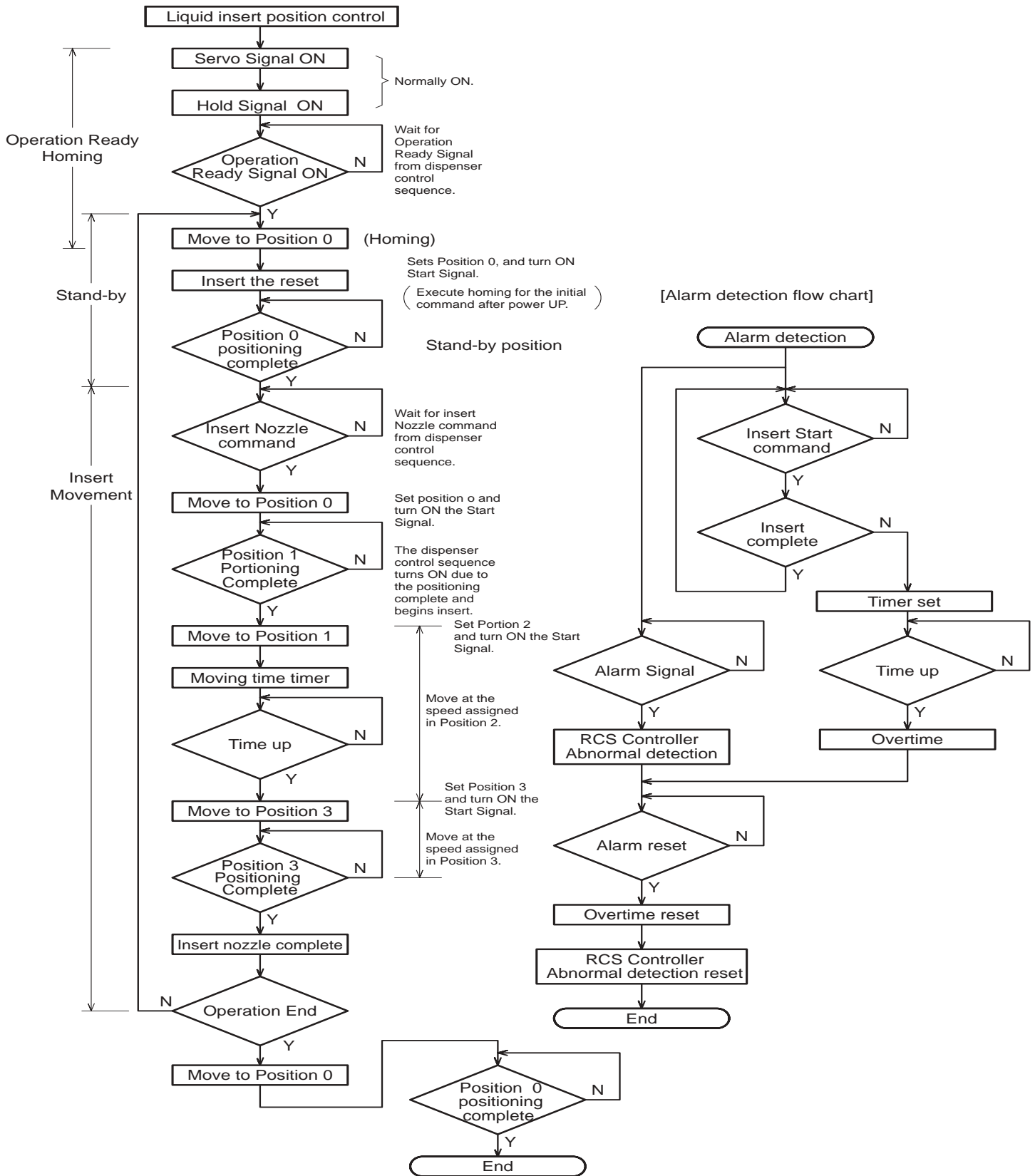
### - PC Display Screen:

Below is the Point Edit Screen which located within the controller.



# Movement Flow Chart (for reference)

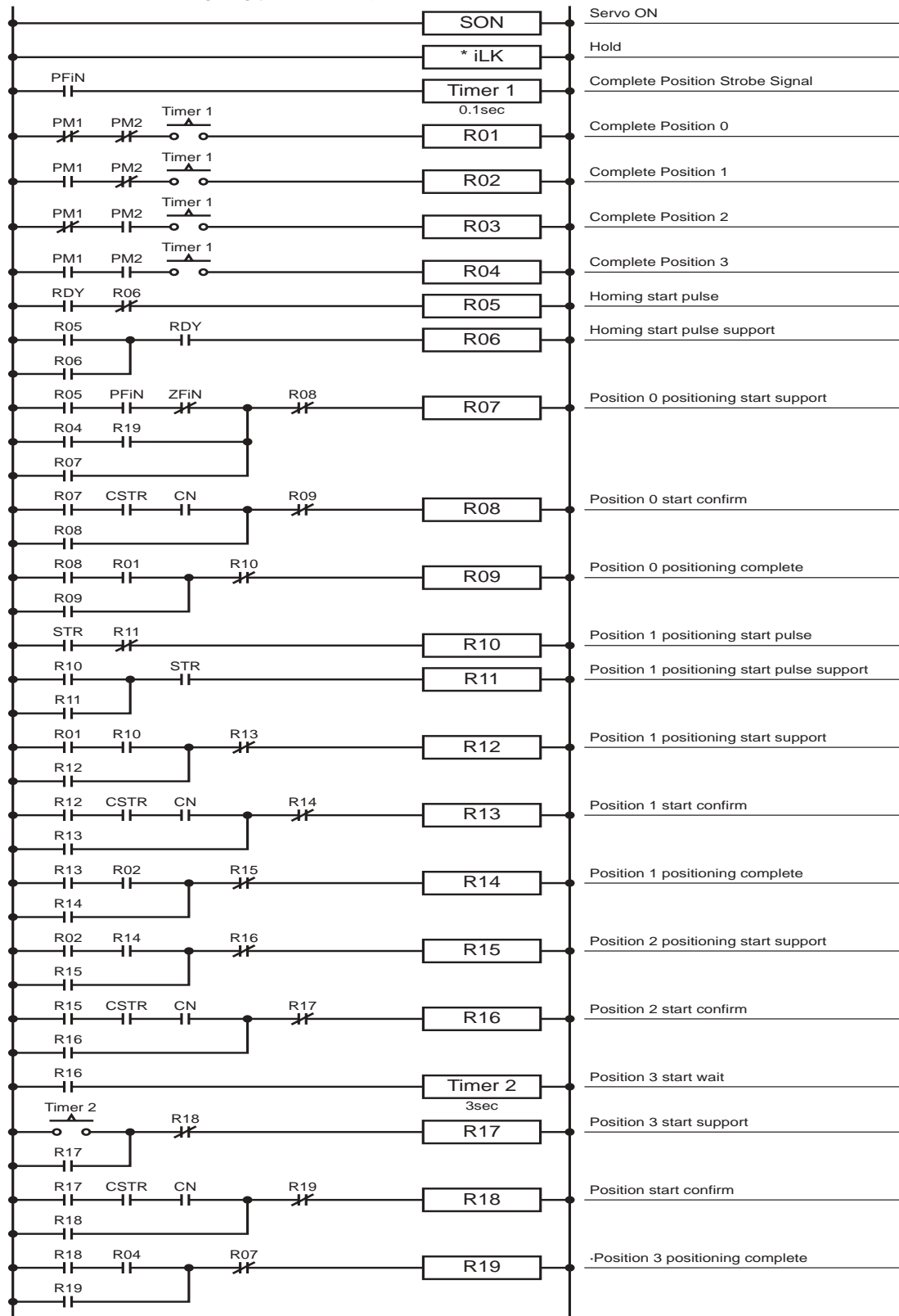
[Liquid Dispensing Position Control]



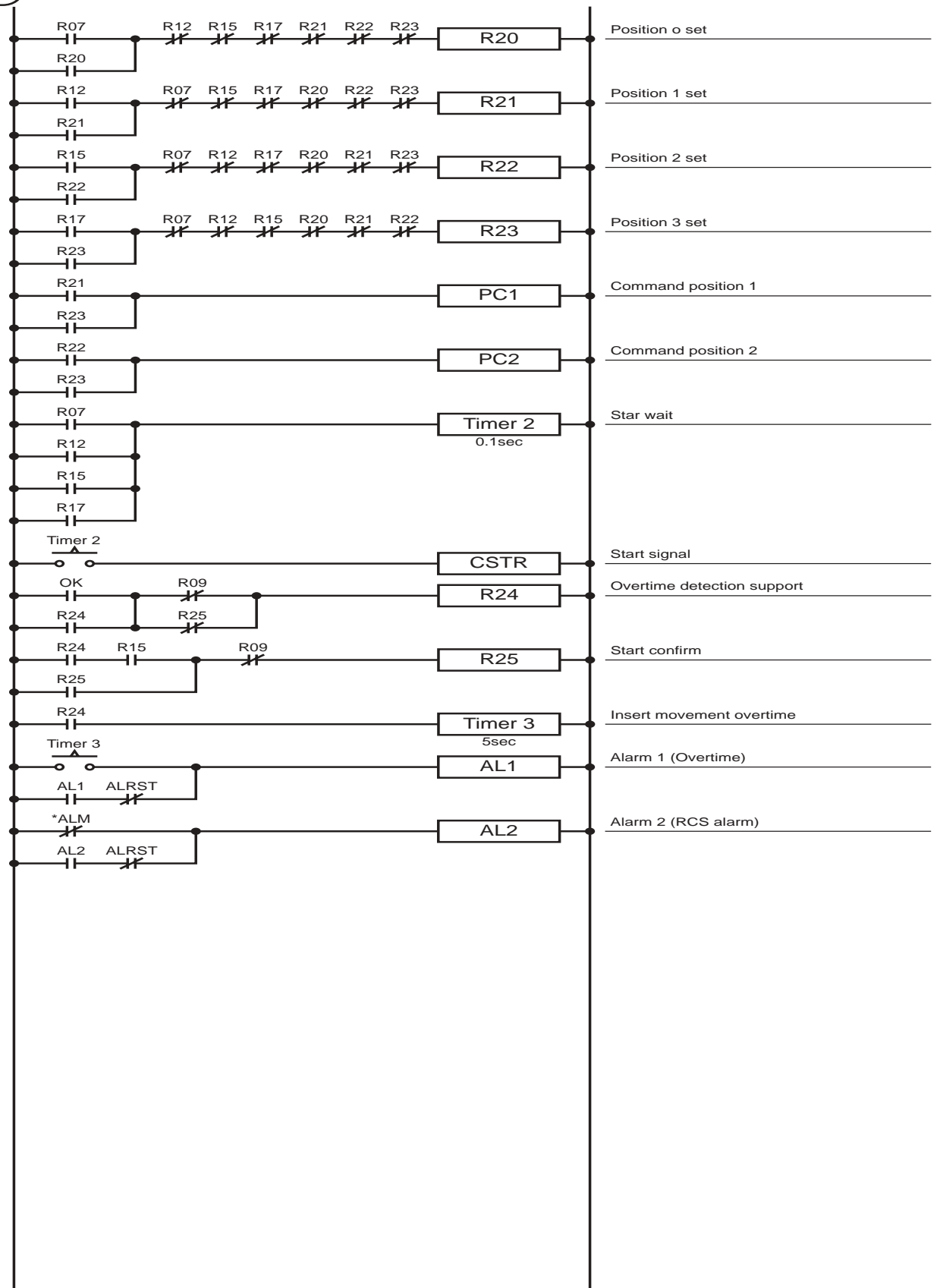
## - PLC Ladder Diagram

**Reference**

The following is a basic circuit to control the Robo Cylinder. Therefore, it does not connect with the circuit that controls the entire machine. In addition, this circuit was not designed for a particular PLC manufacturer and instead, describes a Robo Cylinder controller circuit from a general circuit. When designing your circuit, please remember the aforementioned.



Reference



### Application Example 3:

**Device Function:** Wire feeder to roll on drum

**Movement:** Position the wire material that is being drum rolled

#### Multiple Positions (Pitch) Function:

##### Characteristics:

The incremental move function of the Robo Cylinder is a relative movement. The numeric value in the position data\* is incremented from the current position.

The procedure for the incremental movement is the same as a normal movement. By assigning the position data\* number and toggle the start signal input, the Robo Cylinder moves to the coordinate value. However, with the increment setting, the actuator increment [+] or [-] for only the amount in the position data.

\* Position data is the position data that is input into the controller. For details, please refer to the "PC Display Screen" located on Page 21 of this manual.

#### Existing Specifications:

##### Existing Problems:

In cases where accuracy is not required, the current synchronized machine increased cost and production time; therefore, an easier and more affordable device is needed.

##### Machine Changes:

Mount the wire on the Robo Cylinder Slider Type and move only in the needed area.

##### Appropriate Robo Cylinder:

RCS-SA5 Slider High Speed Type 300 stroke (model type: RCS-SA51-20-H-300)

RCS-SA5  
Slider High Speed Type  
Specifications Range

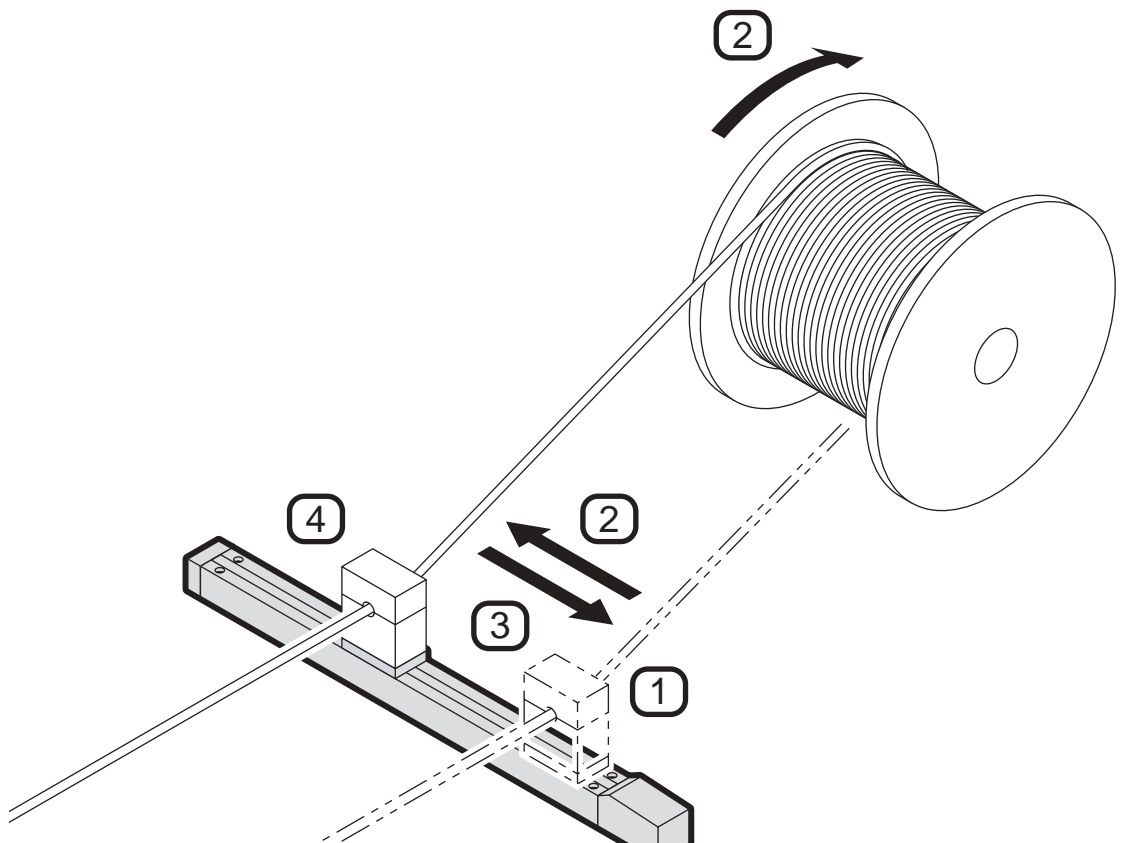
Speed	Maximum 800mm/sec (minimum setting of 1mm/sec)
Payload	Horizontal: Maximum 4kg (*in case with guide) Vertical: Maximum 1kg
Stroke	50~300mm (50mm increments)

#### Benefits:

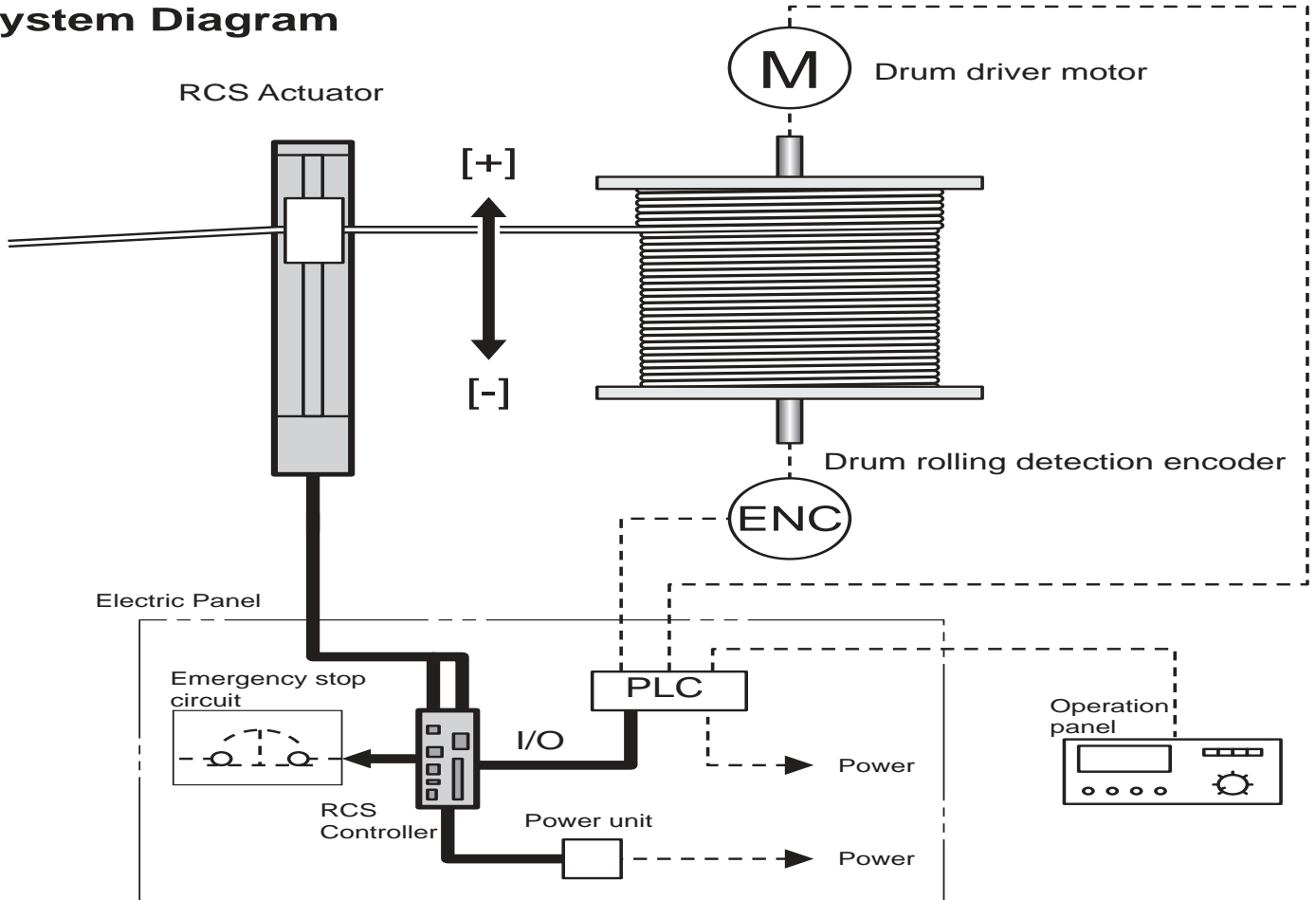
1. Utilizing the Robo Cylinder's pitch function, the price of rolling machine was reduced.
2. Programming of the machine became less complicated because the only a signal to the controller is required.
3. Machine change to different size of drums or wire thickness is now smoother. Only the increment amount needs to be changed in the Robo Cylinder controller.

**Movement Flow**

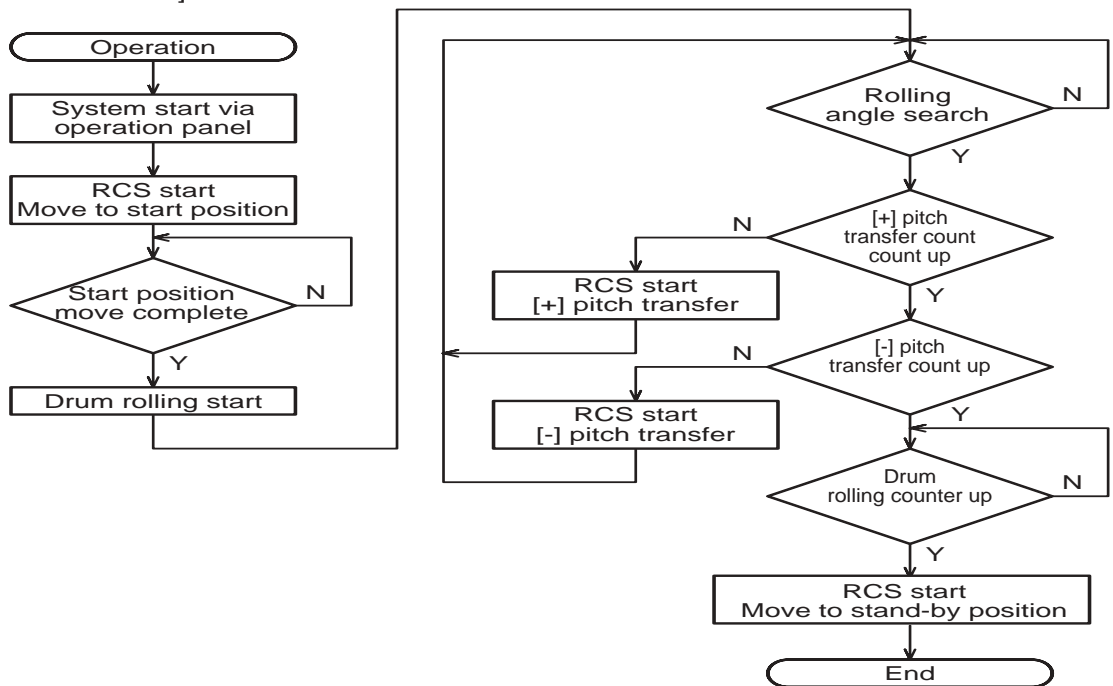
1. By toggling the operation ready switch, the slider will move to the start position.
2. By toggling the start switch, the drum begins rolling the wire and the actuator constantly increments 10mm.
3. When the wire reaches the edge of the drum, the actuator increments at the same rate in the opposite direction.
4. Once the wire is completely wound, the Robo Cylinder stops.



# System Diagram



[General Operation Flow Chart]



## Control Specifications:

- 1) Under normal circumstances, Servo ON Signal and Hold Signal are turned ON.
- 2) When the Robo Cylinder controller receives Operation Ready Signal from the Drum Rolling Controller, move to position 0\*.
- 3) When Robo Cylinder controller receives start position command from the Drum Rolling Controller, move to Position 1.
- 4) The incremental Signal from the Drum Rolling Controller pulses 1 time per roll at the same rotating angle.
5. When the first row of wire is complete on then roll, from the control sequence, the reverse pitch transfer command outputs.
6. Repeat steps 4) and 5) for the amount set into the Control Sequence. After receiving Roll Complete Signal, move to Position 0 and wait for new drum.
7. The time out alarm will turn ON if the increment move does not complete in 1 second or if the move to Position 0\* does not complete within 5 seconds after roll complete signal.g
8. The alarm LED indicator will turn ON when the Alarm Signal (normally ON) is turned OFF from the Robo Cylinder.

\* Positions 0~3 refer to the No.0~3 of the position data located within the controller.

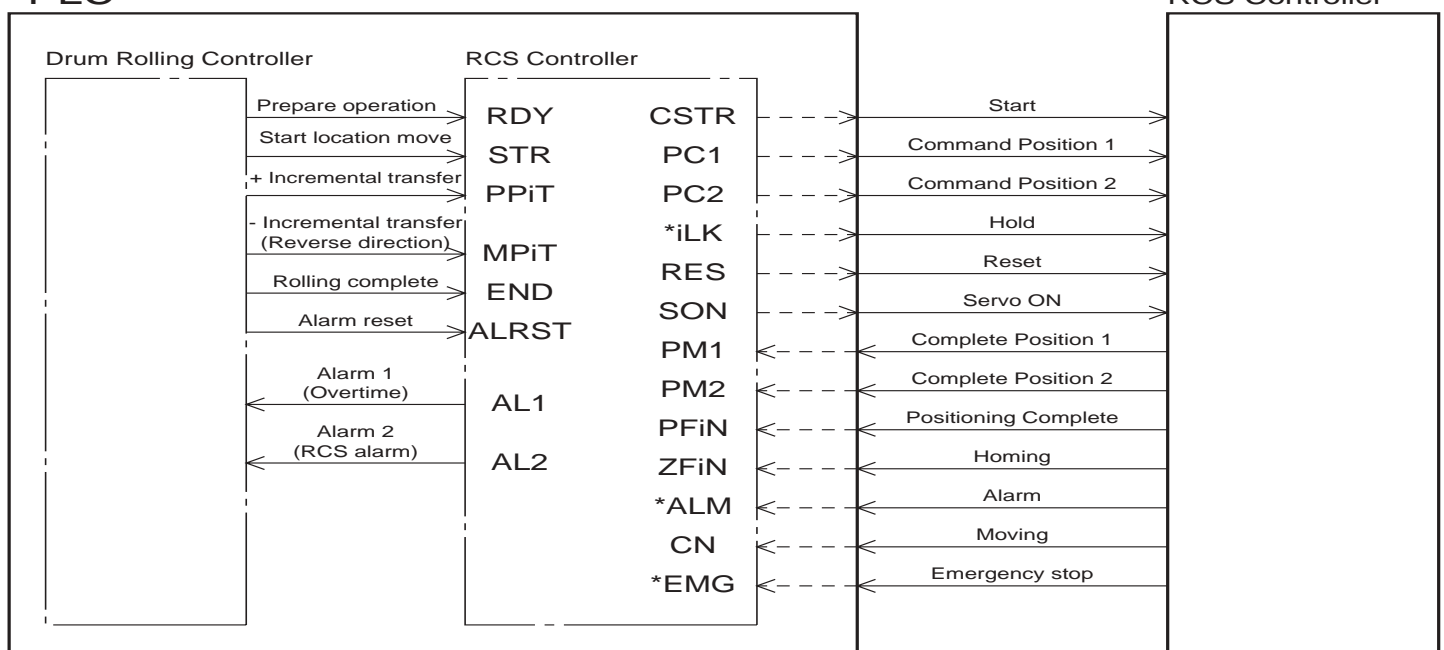
(For details, please refer to the section, "PC Display Screen" located on the next page of this manual.

### Note:

1. The Hold Signal (normally ON) will turn OFF when the drum stops. In order to continue with the move simply turn the Hold Signal ON again. To cancel the move in progress, toggle the Reset Signal before turning ON the Hold Signal.
2. The start position transfer command, Rolling Complete Signal and the Operation Ready Signal from the Drum Rolling Controller turn OFF when either the Increment Pulse Signal or RCS control recognizes the signal.
3. If the RCS is in alarm or emergency stop, the Drum Roll Controller will not give a System Ready or Move Signal to any device on the controller.
4. After the alarm source is corrected, reset the alarm circuit on the Operation Panel.
5. The Drum Roll Controller checks for the Operation Ready Signal and the Start Move Signal. The RCS Controller does not perform the check.
6. This program is specifically for the Robo Cylinder Controller.

## - I/O Signal Terminal Diagram

### PLC



## Robo Cylinder Setting:

The Incremental move function of the Robo Cylinder is a relative movement. The numeric value in the position data\* is incremented from the current position. The procedure for the incremental movement is the same as a normal movement. By assigning the position data\* number and toggle the start signal input, the Robo Cylinder moves to the coordinate value. However, with the increment setting, the actuator increments [+] or [-] for only the amount in the position data.

### Incremental Move Method (with direct numeric input of move amount):

Position 0 is the stand-by point.

Position 1 is the start point (coordinate value 0).

Position 2 is the increment amount in the positive direction (move amount 10).

Position 3 is the incremental amount in the negative direction (move amount -10).

- 1) Input 0 into the position of No. 0.
- 2) Input 500 into the speed of No.0.
- 3) Input 100 into the position of No.1
- 4) Input 400 into the speed of No.1.
- 5) Input 10 into the position of No.2.
- 6) Input 300 into the speed of No.2.
- 7) Input 1 into the incremental assign of No.2.
- 8) Input 1 into the incremental assign of No.3.
- 9) Input -10 into the position of No.3.
- 10) Input 300 into the speed of No.3.

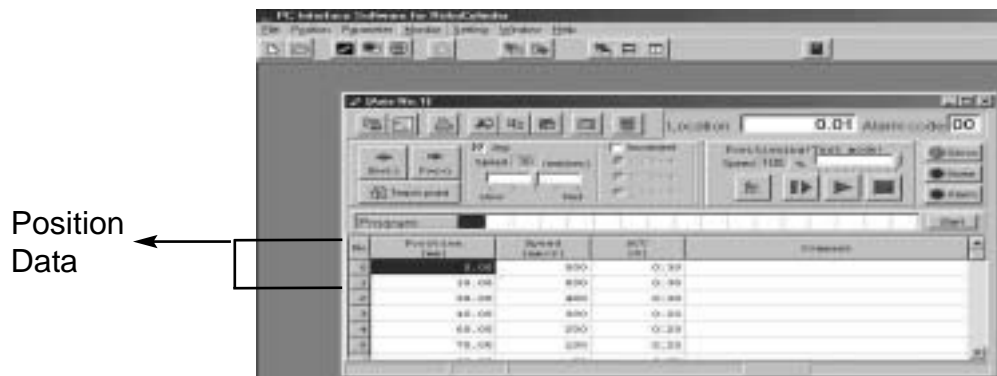
\* To input a negative numeric value to a position, first input 1 into the incremental assign.

The above steps complete position data input.

When in normal positioning mode (move distance from home), the incremental column value is 0, and to increment move (distance from current position), the incremental column value is 1. In the above scenario, if you select to move to Position 1, the actuator move 100mm away from home, or if you select Position 2, the actuator moves 10mm in the positive [+] direction from the current position (Position 3 move 10mm in the negative [-] direction).

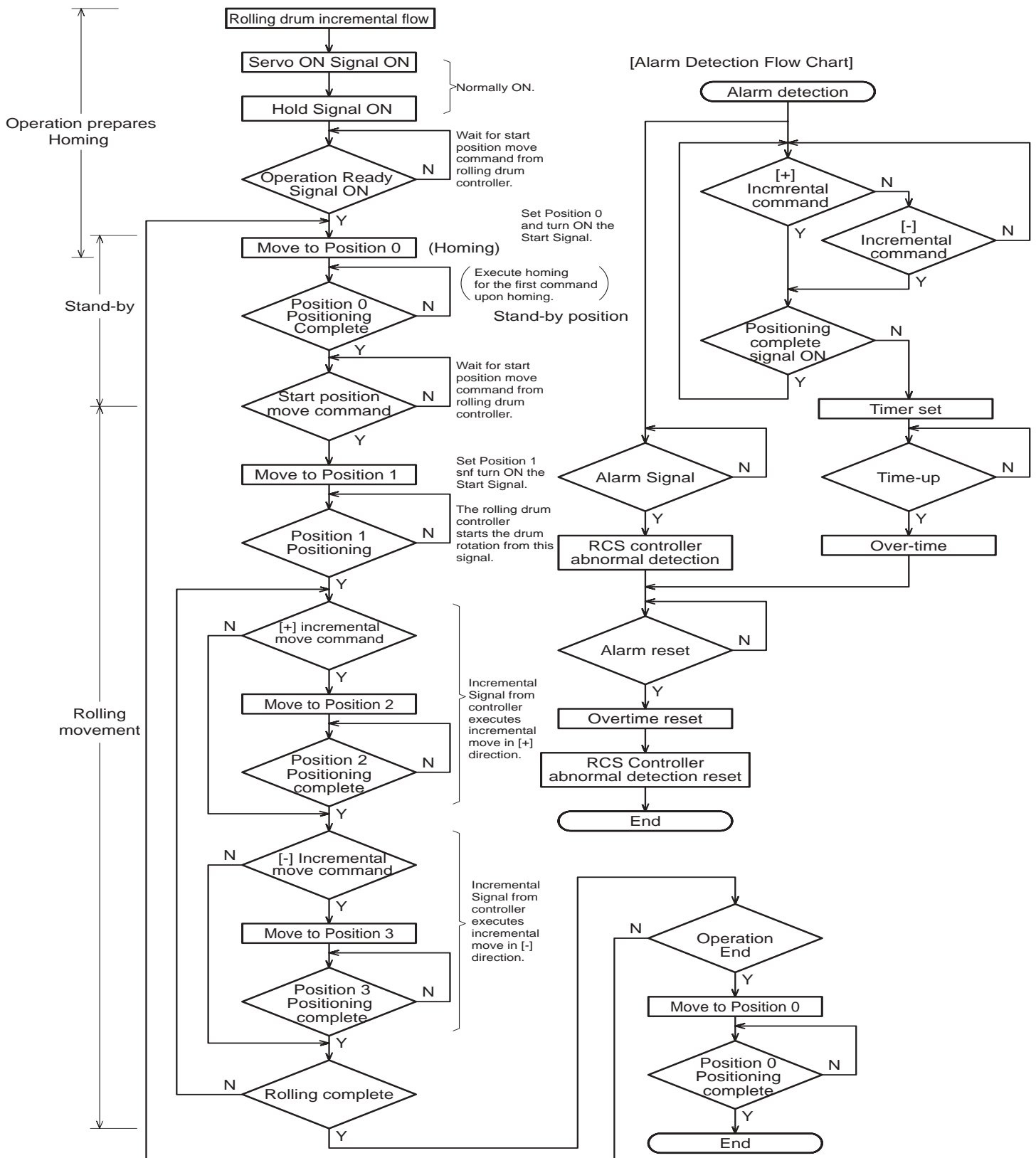
### -PC Display Screen:

The following screen shows the Point Data Edit Screen seen through the PC software.



# Movement Flow (For reference)

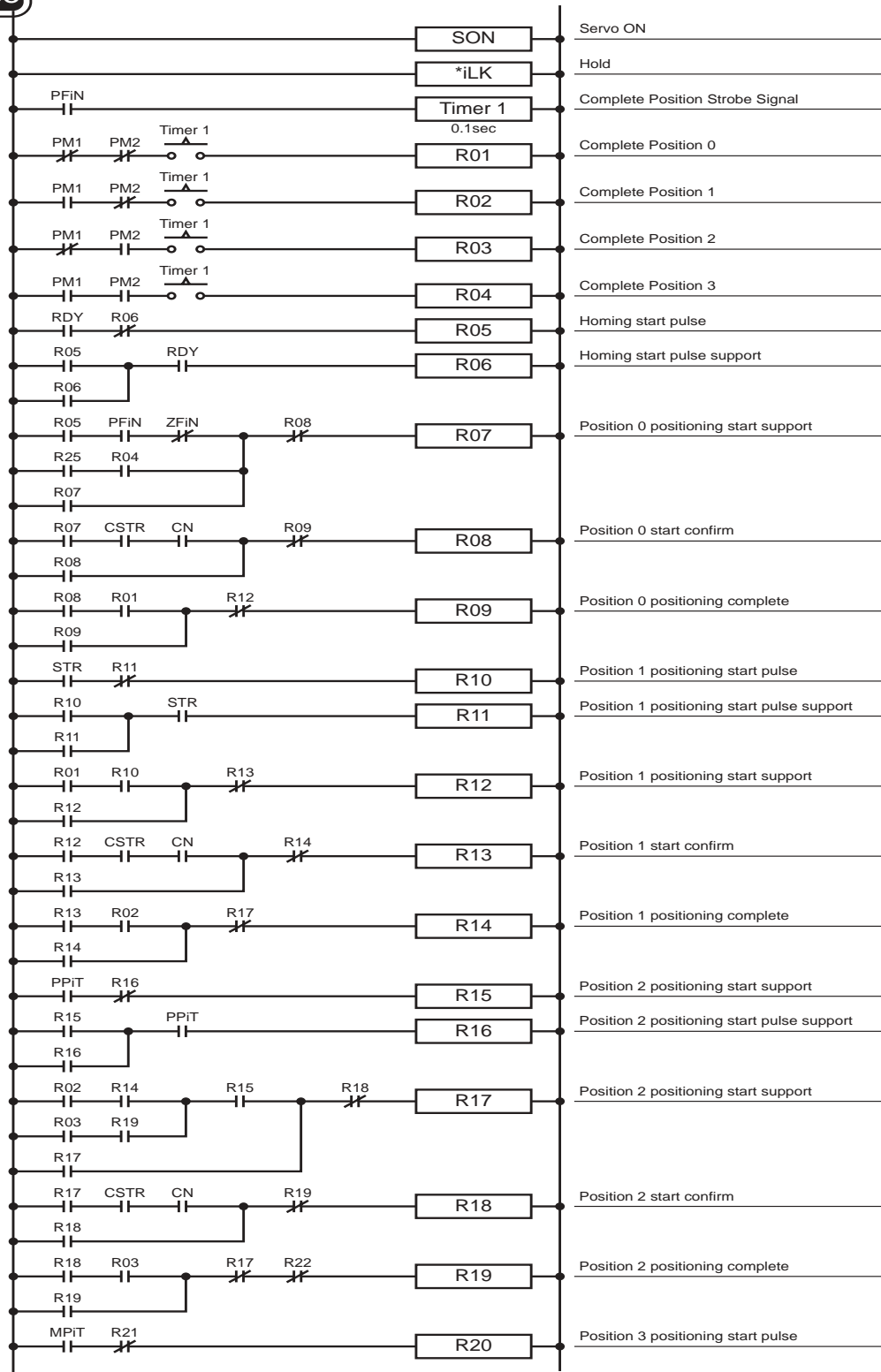
[Rolling Drum Incremental Flow Chart]



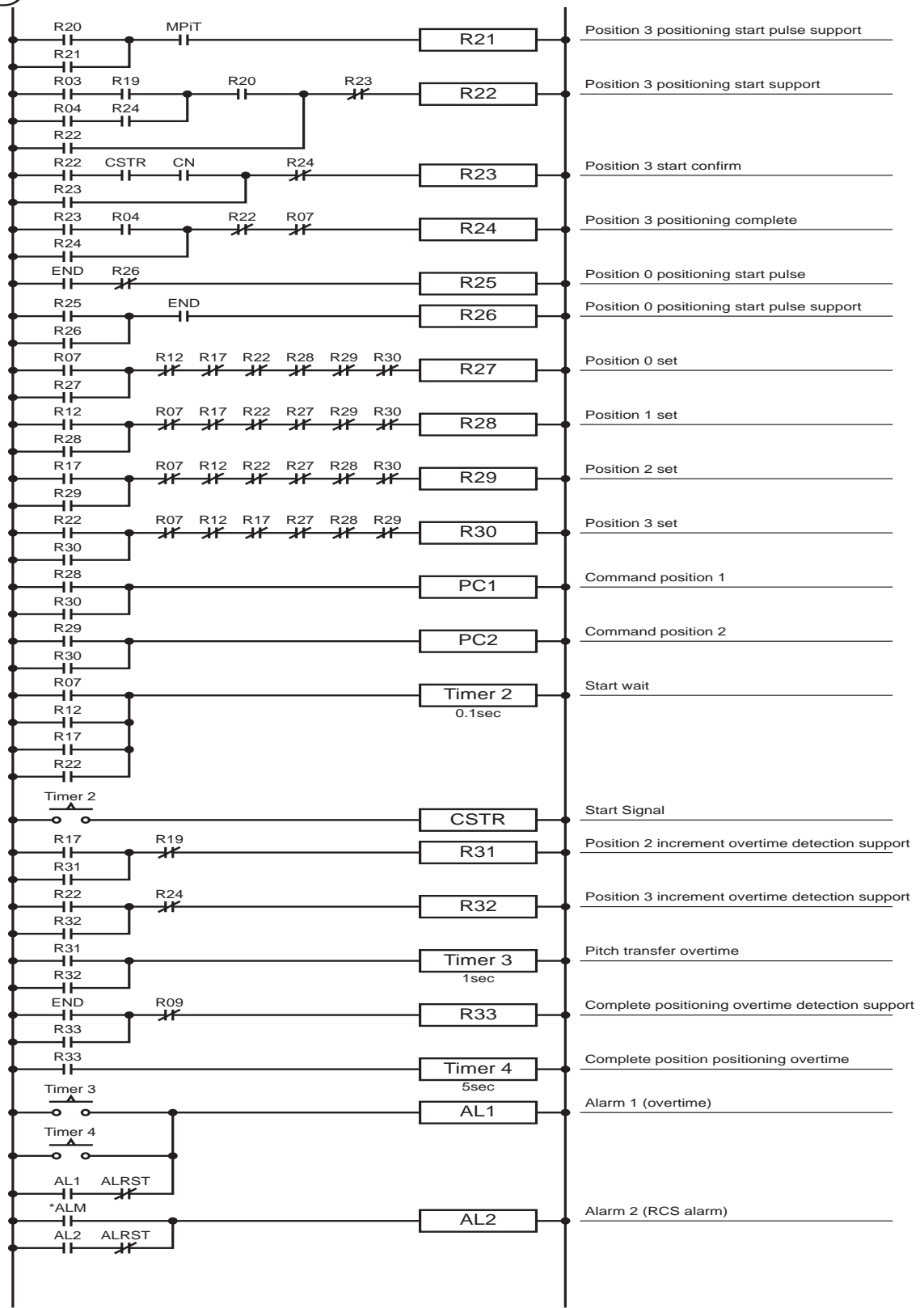
# PLC Ladder Diagram

The following is a basic circuit to control the Robo Cylinder. Therefore, it does not connect with the circuit that controls the entire machine. In addition, this circuit was not designed for a particular PLC manufacturer and instead, describes a Robo Cylinder controller circuit from a general standpoint. When designing your circuit, please remember the aforementioned.

Reference



Reference



## Application Example 4:

**Device Function:** Stacking boxes traveling on a conveyor  
**Movement:** Move down at a constant increment stacking a constant number of boxes

### Multiple Positions (Increment) Function:

#### **Characteristics:**

The Incremental move function of the Robo Cylinder is a relative movement. The numeric value in the position data\* is incremented from the current position.

The procedure for the incremental movement is the same as a normal movement. By assigning the position data\* number and toggle the start signal input, the Robo Cylinder moves to the coordinate value. However, with the increment setting the actuator increments [+] or [-] for only the amount in the position data.

#### **Existing Specifications:**

The robot receives the box traveling on the conveyor and stacks them up until the set amount is reached then transfers the stacked boxes to the next machine.

#### **Existing Problems:**

Increasing the line is not possible to decrease the cycle time.

#### **Machine Changes:**

Use the increment function of the Robo Cylinder and lower the items in a constant amount in the middle of the conveyor. Then stack the items one after another until the set amount is reached and send them to the next station.

#### **Appropriate Robo Cylinder:**

RCS-RA55 Low Speed Rod Type 300 stroke (model number: RCS-RA55I-100-GN-L-300B)

RCS-RA55  
 Low Speed Rod Type  
 Specifications Range

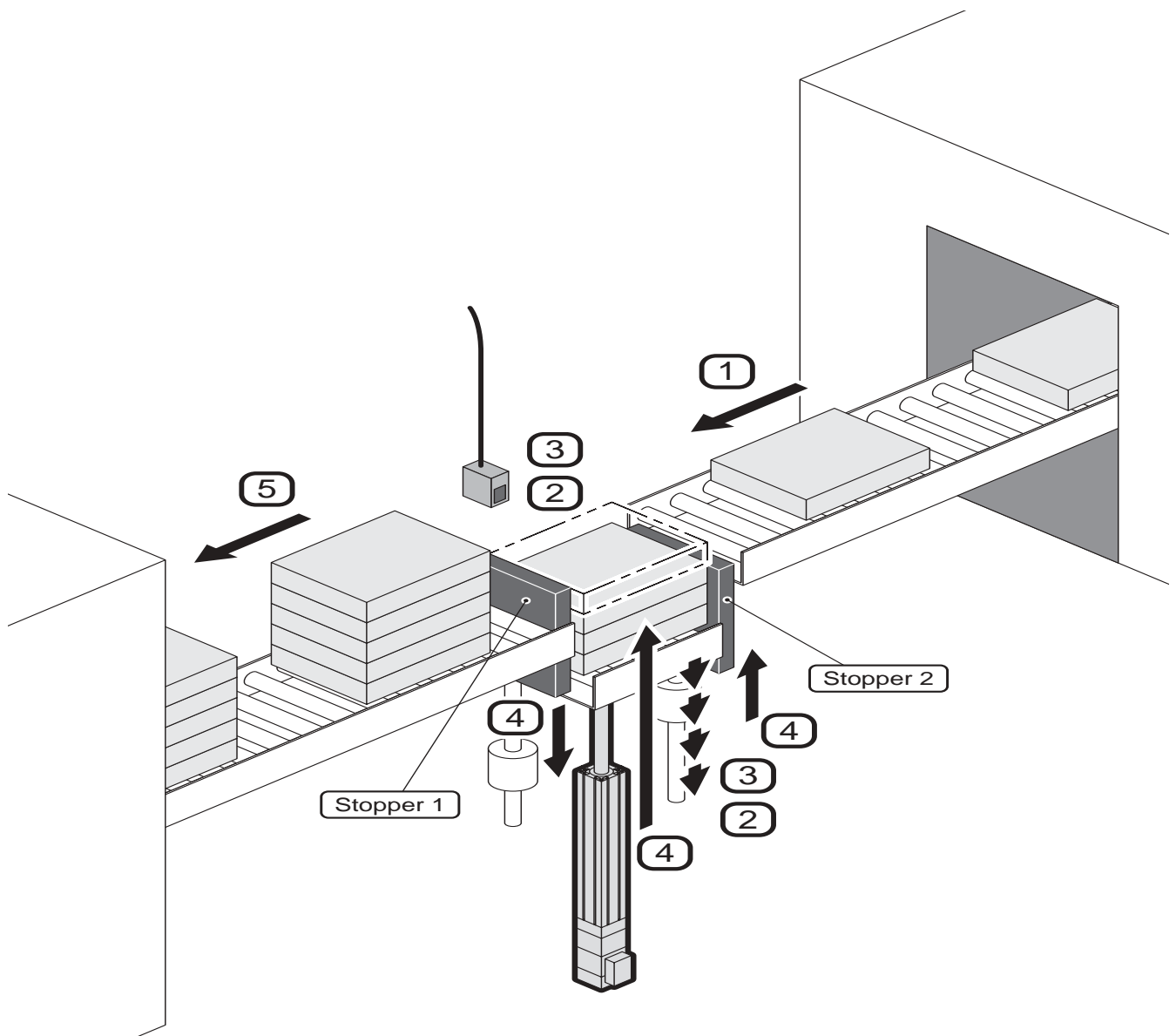
Speed	Maximum 200mm/sec (minimum setting is 1mm/sec)
Payload	Horizontal: Maximum 60kg (*in case with guide) Vertical: Maximum 18kg
Stroke	50~300mm (50mm increments)

#### **Benefits:**

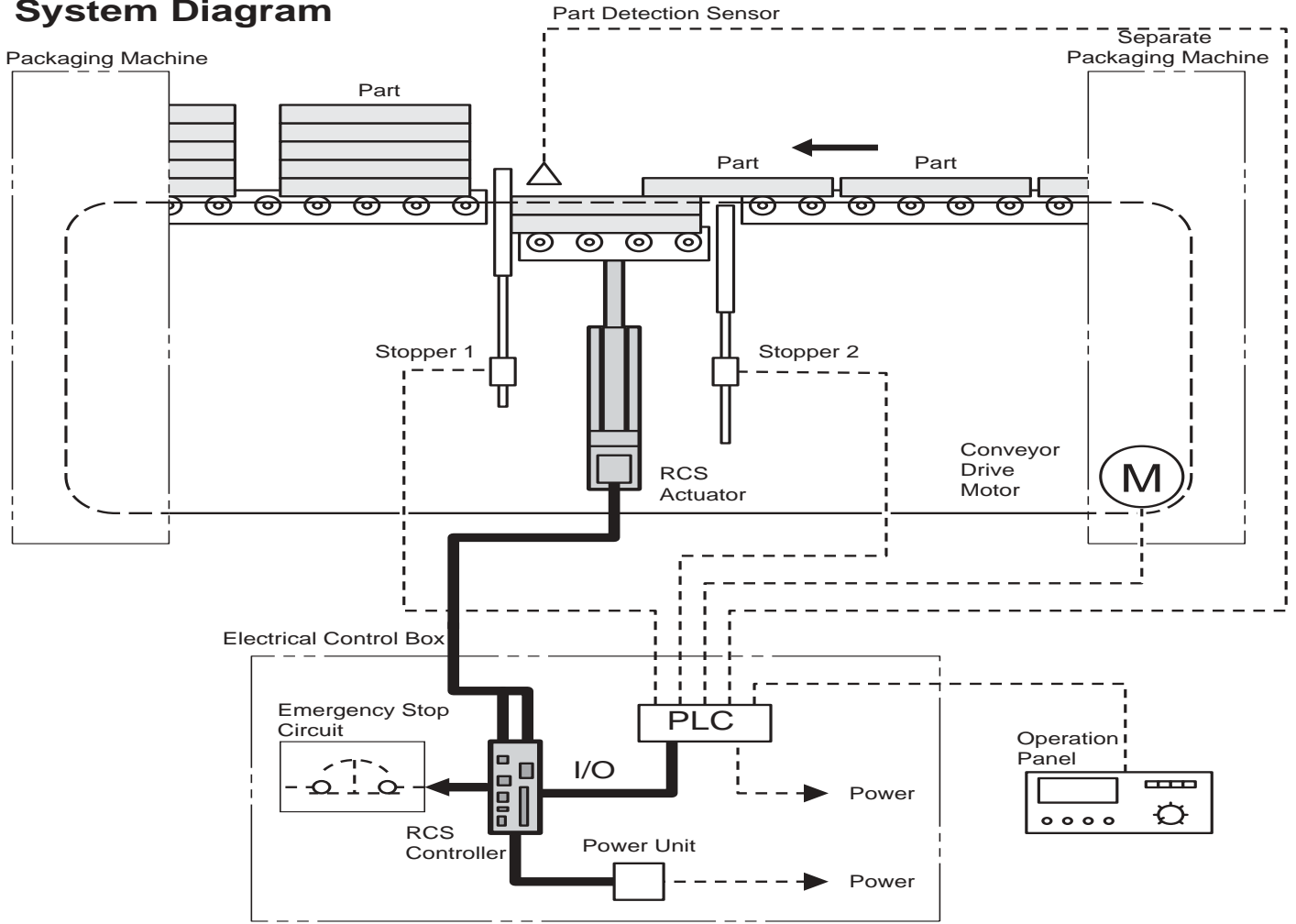
1. Cycle time dramatically reduced.
2. The increment amount is adjustable to allow for multiple box sizes.
3. In comparison to an articulate robot system, cost is reduced.

### Movement Flow

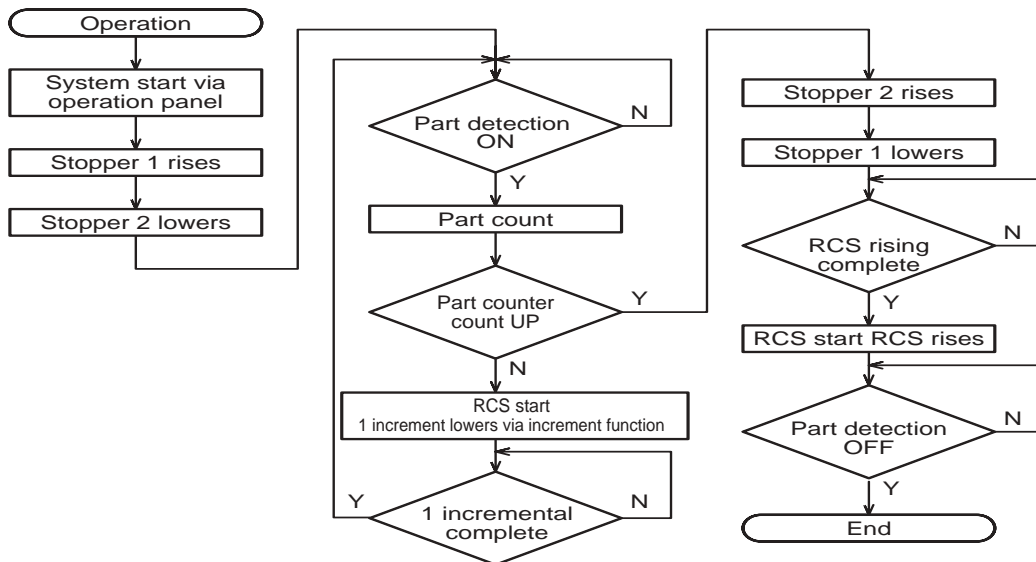
1. The boxed item travels on the conveyor.
2. After the box hits Stopper 1, the Robo Cylinder lowers the thickness of one box.
3. The next box traveling on the conveyor stacks on top of the previous box. Once the box hits Stopper 1, the actuator lowers the thickness of one box again.
4. Repeat above moves until the assigned number of boxes has been stacked. Then Stopper 2 rises and Stopper 1 lowers. The Robo Cylinder rises after the stoppers are done moving.
5. Once the Robo Cylinder rises parallel with the conveyor, the stacked boxes transfer to the next packaging machine.



# System Diagram



[General Operation Flow Chart]



## - Control Specifications:

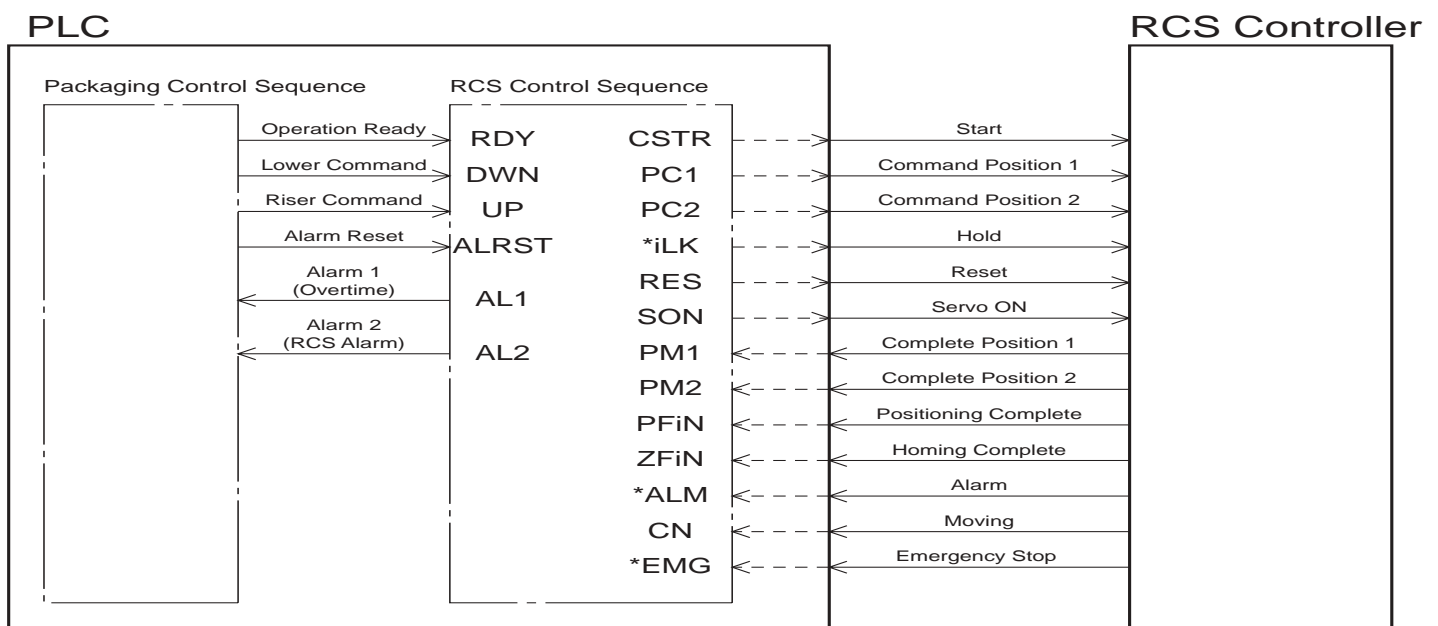
- 1) Under normal circumstances, Servo ON Signal and Hold Signal are turned ON.
- 2) After receiving Operation Ready Signal from the Packaging Controller, move to Position 0\*.
- 3) Upon Position 0\*, move complete, move the Robo Cylinder to Position 1 (stand-by position).
- 4) After Positioning Complete Signal of Position 1, the Packaging Controller raises Stopper 1 and lowers Stopper 2.
- 5) When the part hits the stopper on the conveyor, the Packaging Controller counts the part.
- 6) Next, move to Position 2\* after receiving Lower Command (increment=height of box).
- 7) Repeat steps, 5 and 6 until the value on the counter matches the preset amount.
- 8) Once the counter matches the preset amount, the Packaging Controller raises Stopper 2 and lowers Stopper 1.
- 9) Then, when given the Rise Command, the Robo Cylinder moves to Position 1 (stand-by position).
- 10) When the Robo Cylinder completes the move to Position 1, the rollers on the conveyor rotate sending the part to the next packaging machine,
- 11) After the Part Detection Sensor turns OFF, Stopper 1 rises up, and Stopper 2 lowers.
- 12) Repeat steps 5 through 11.
- 13) If the Increment movement does not complete within 2 seconds, the alarm output will turn OFF.
- 14) The alarm LED indicator will turn ON if the Alarm Output is turned OFF by the Robo Cylinder.

\* Positions 0~2 refer to No. 0~2 in the position data stored in the controller. (For details, please refer to the section, "PC Display Screen" which is located on the next page of this manual.)

### Note:

1. To stop the Robo Cylinder in the event of a part clog, turn OFF the Hold Signal (normally ON). turn OFF the Hold Signal (normally ON). To continue the move in progress, run the Hold Signal ON. To cancel the move in progress, toggle the Reset Signal ON before turning ON the Hold Signal.
2. The Operation Ready Signal, Rise command, and Lower command from the Packaging Controller turn OFF when the Pulse Signal or RCS controller recognizes the signals.
3. If the RCS is in alarm or emergency stop, the Conveyor Controller will not give a System Ready or Move Signal to any device on the controller.
4. After the alarm source is corrected, reset the alarm circuit on the Operation Panel.
5. This control is specifically for the Robo Cylinder.

## I/O Signal Terminal Diagram



## Robo Cylinder Setting:

### Increment Function (Direct numeric input of coordinate value):

When a layer of box is 50 and is stacked up in 5 layers:

Position 0 is home (coordinate value of 0).

Position 1 is the stand-by position (coordinate value of 300).

Position 2 is the increment amount in the negative direction (move amount -50).

- 1) Input 0 into the position of No. 0.
- 2) Input 100 into the speed of No.0.
- 3) Input 300 into the position of No.1.
- 4) Input 200 into the speed of No.1.
- 5) Input 1 into incremental column of No.2.
- 6) Input -50 into the position of No.2.
- 7) Input 100 into the speed of Position No.2.

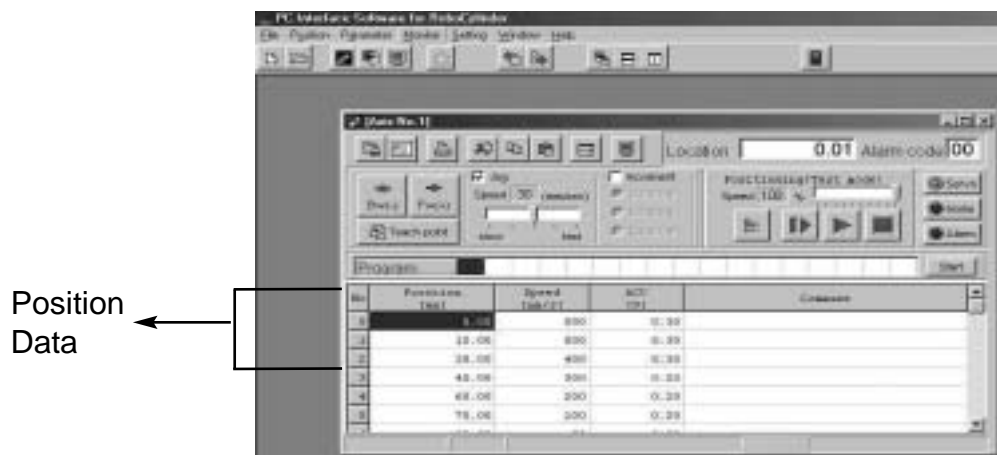
To input a negative numeric value into the position, first input 1 into the incremental column.

Position data is now complete.

For normal positioning (coordinate value from home), the Incremental Flag column is 0. The value 1 in the Incremental Flag is for Increment Function. When Position 1 is selected, the rod moves 300mm away from home. If Position 2 is selected, the rod will move 50mm back from the current location.

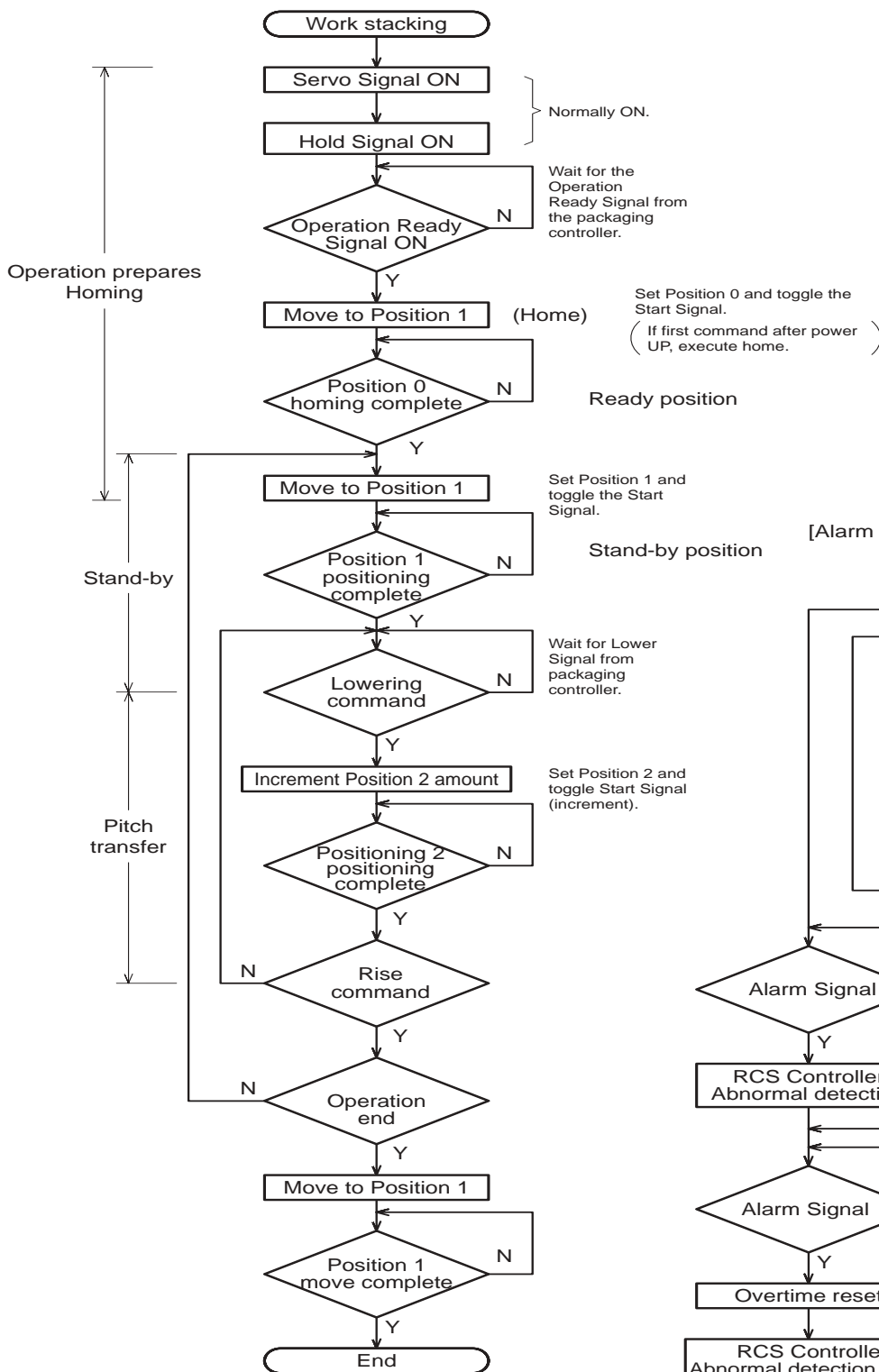
## PC Display Screen

The following screen is the Point Data Edit Screen located within the controller.

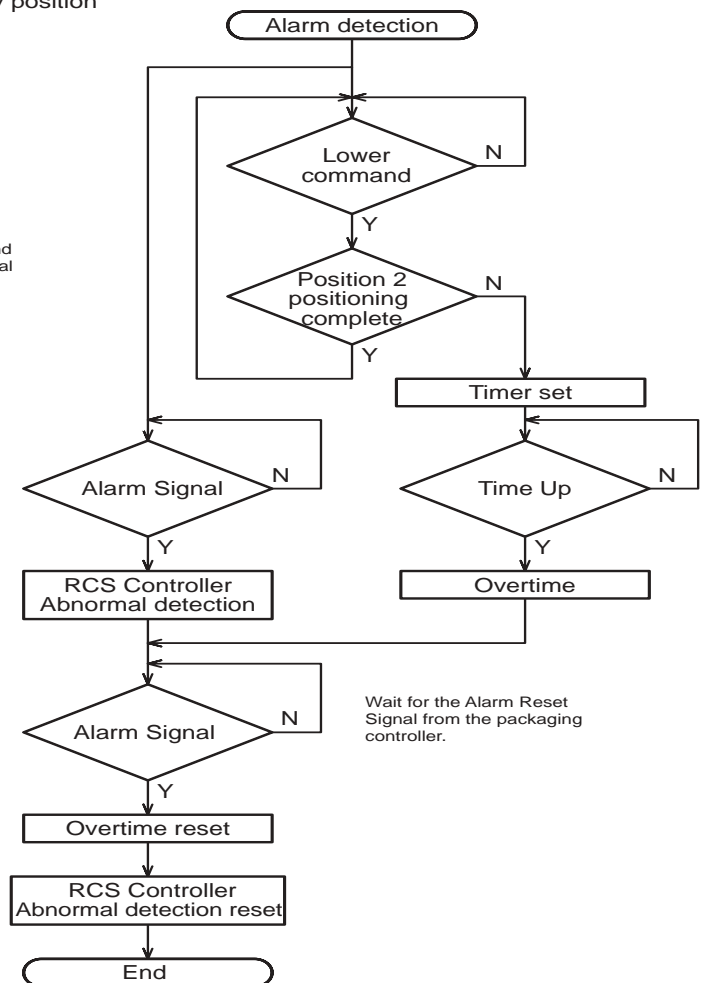


# Movement Flow Chart (For reference)

[Work Stacking Flow Chart]



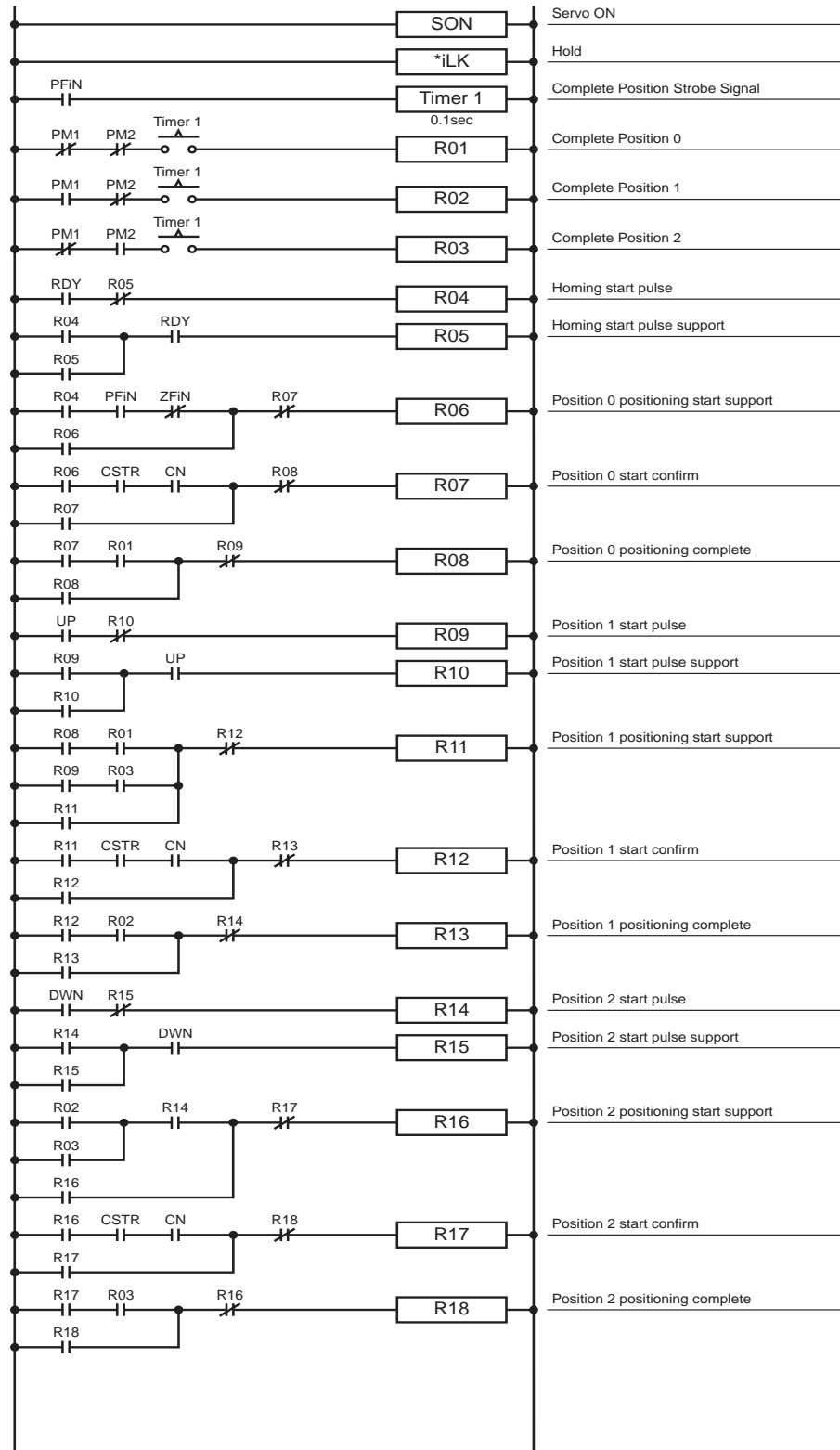
## [Alarm Detection Flow Chart]



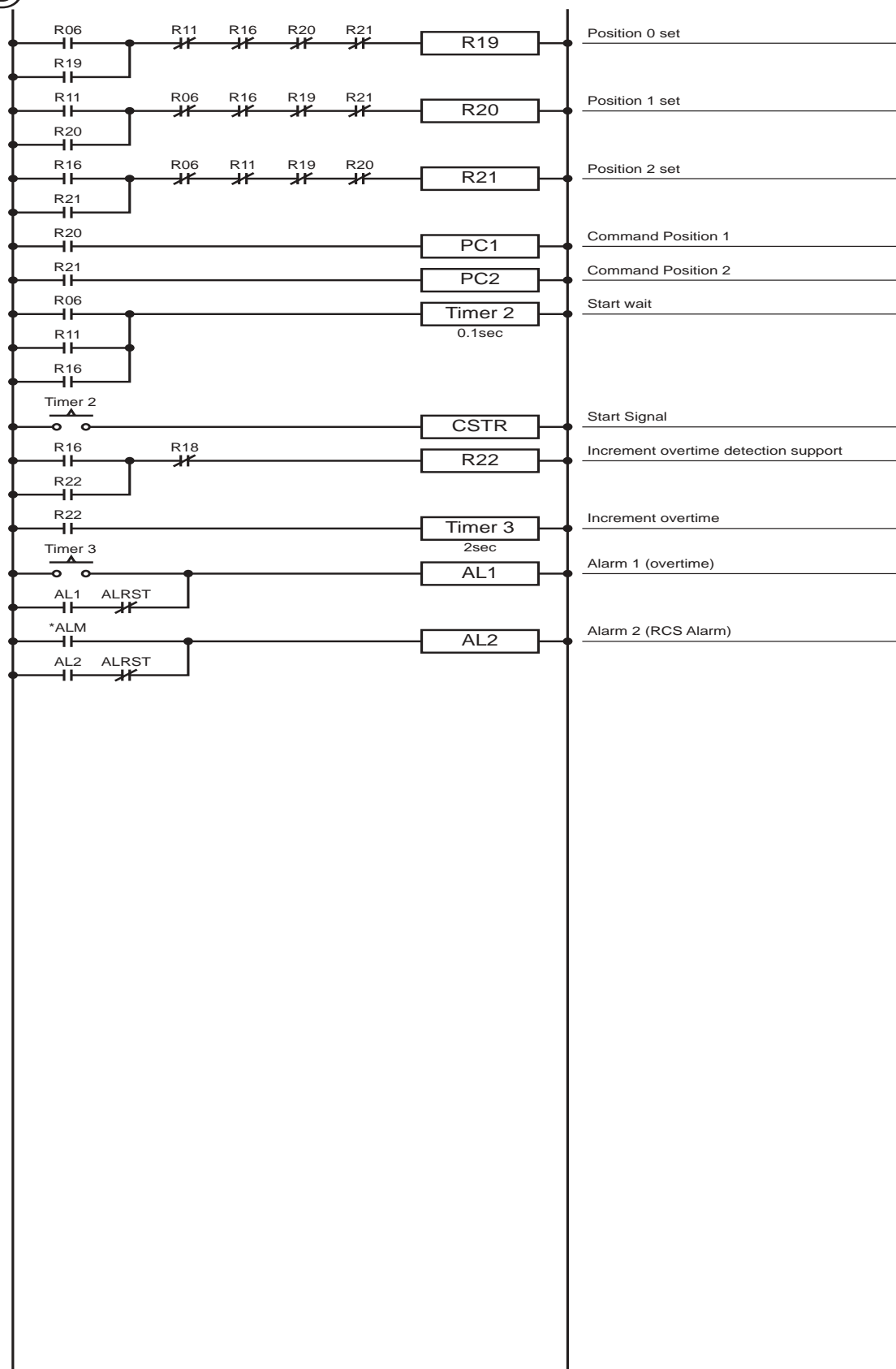
# PLC Ladder Diagram

Reference

The following is a basic circuit to control the Robo Cylinder. Therefore, it does not connect with the circuit that controls the entire machine. In addition, this circuit was not designed for a particular PLC manufacturer and, instead, describes a Robo Cylinder controller circuit from a general standpoint. When designing your circuit, please remember the aforementioned.



Reference



## Application Example 5:

**Device Function:** Press-fit a lid onto a plastic container

**Movement:** Press-fit a lid onto a plastic container

### Push Function:

Characteristics:

Although the Robo Cylinder is an electrical cylinder with an AC servo motor, pushing can be maintained similar to an air cylinder.

### Existing Specifications:

The push functions ideal for press-fit and clamp applications because push power percentage can be controlled.

### Existing Problems:

The supplied air pressure to the air cylinder fluctuates. When the air pressure is raised to increase the speed of the rod, too much power is supplied causing damage to the product.

### Modification Suggestion:

Used an air cylinder to press-fit a lid.

### Appropriate Robo Cylinder:

RCP-RSA Rod High Speed Type 100 stroke (model type: RCP-RSAI-H-100-B)

RCP-RSA  
Rod High Speed Type  
Specifications Range

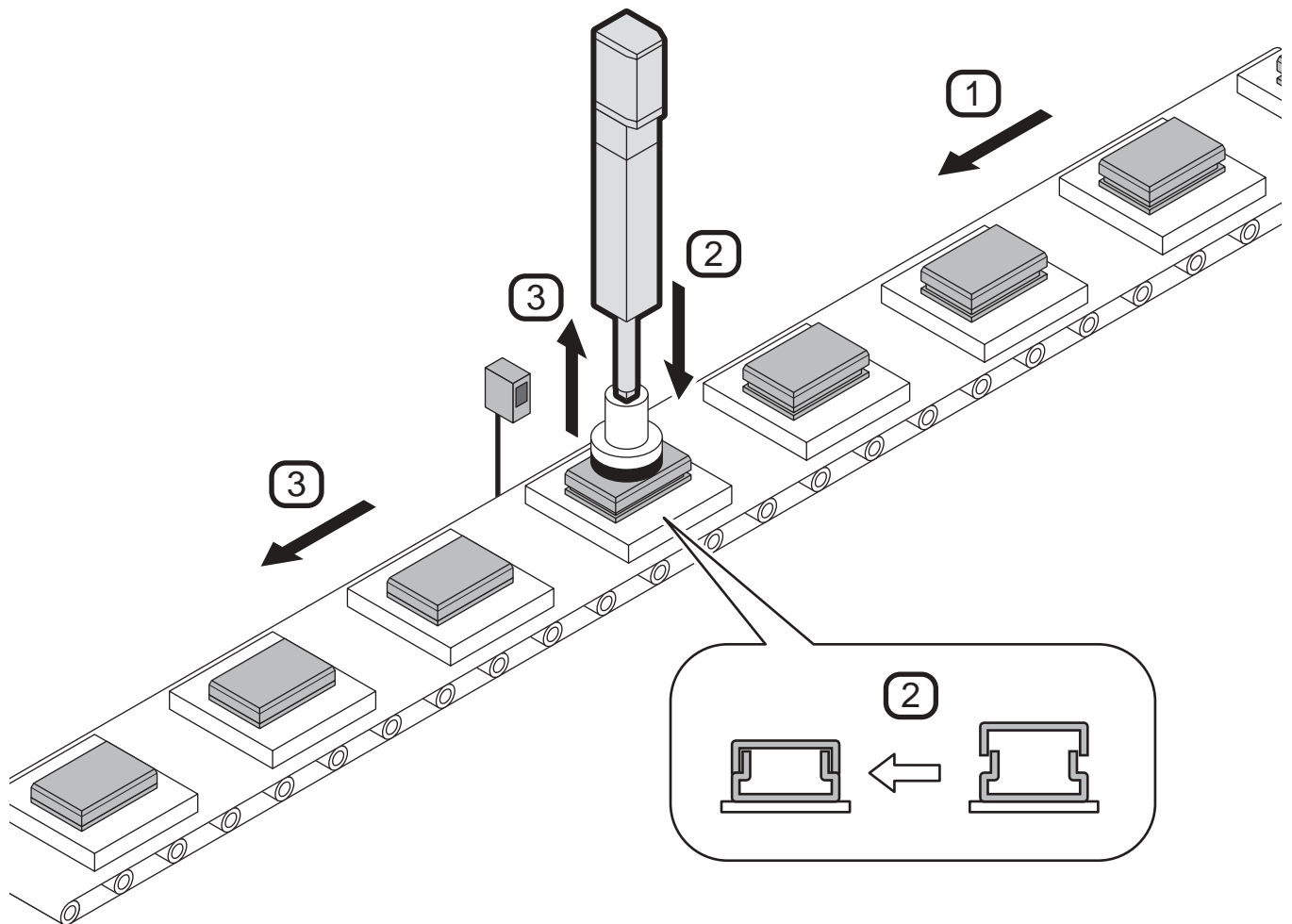
Speed	Maximum 458mm/sec (1mm/sec minimum input speed) (Note: In case the stroke is 300mm, the maximum speed is 350mm/sec.)
Payload	Horizontal: Maximum 25kg Vertical: Maximum 4.5kg
Stroke	50~300mm (50mm increments)

### Benefits:

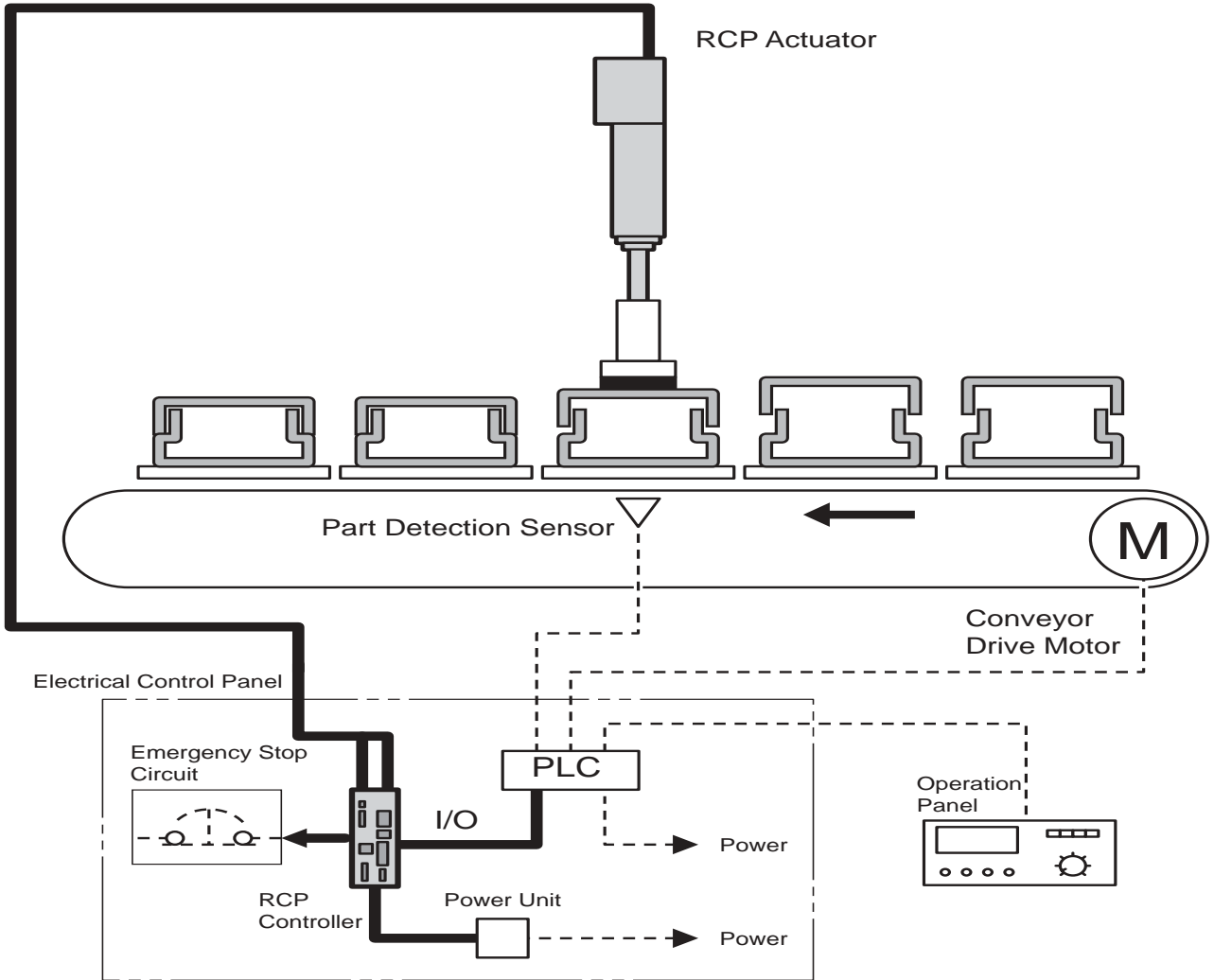
1. Adjustable push power reduces part damage.
2. Cycle time is reduced by moving faster until right before the push point.

**Movement Flow**

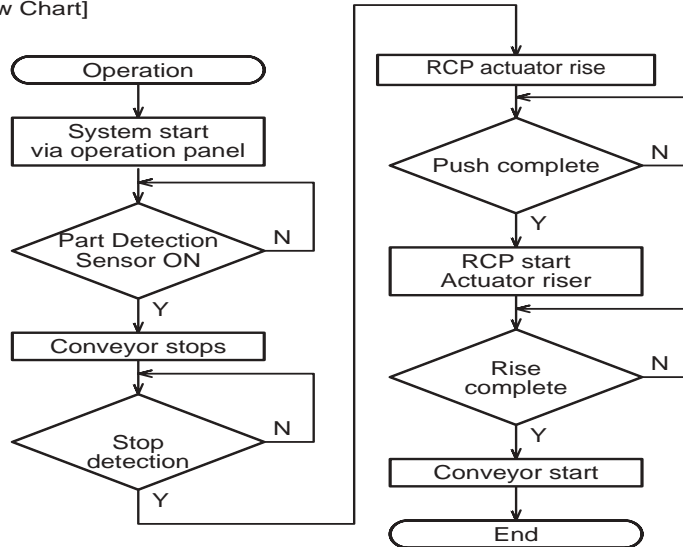
1. A box with its lid placed by the previous station flows on the conveyor.
2. When the Part Detection Sensor sees the part, the Robo Cylinder lowers and presses the lid into position.
3. Once the press-fit is complete, the box moves to the next station, and the Robo Cylinder rises to stand-by position.



### System Diagram



[Rough Operation Flow Chart]



## Control Specifications:

- 1) Under normal circumstances, Hold Signal is turned ON.
- 2) Move to Position 0\* upon receiving Operation Ready Signal from the Conveyor Controller.
- 3) When the part on the conveyor reaches the point right underneath the Robo Cylinder, the Conveyor Controller stops the conveyor and send the Press-fit command to lower the Robo Cylinder to Position 1.
- 4) After receiving the Positioning Complete Signal from Position 1, the Robo Cylinder returns to Position 1.
- 5) Repeat steps, 3 through 4.
- 6) If the Increment move does not complete within 2 seconds, the Alarm will turn OFF.
- 14) The Alarm LED Indicator will turn ON when the Alarm Signal Output is turned OFF from the Robo Cylinder.

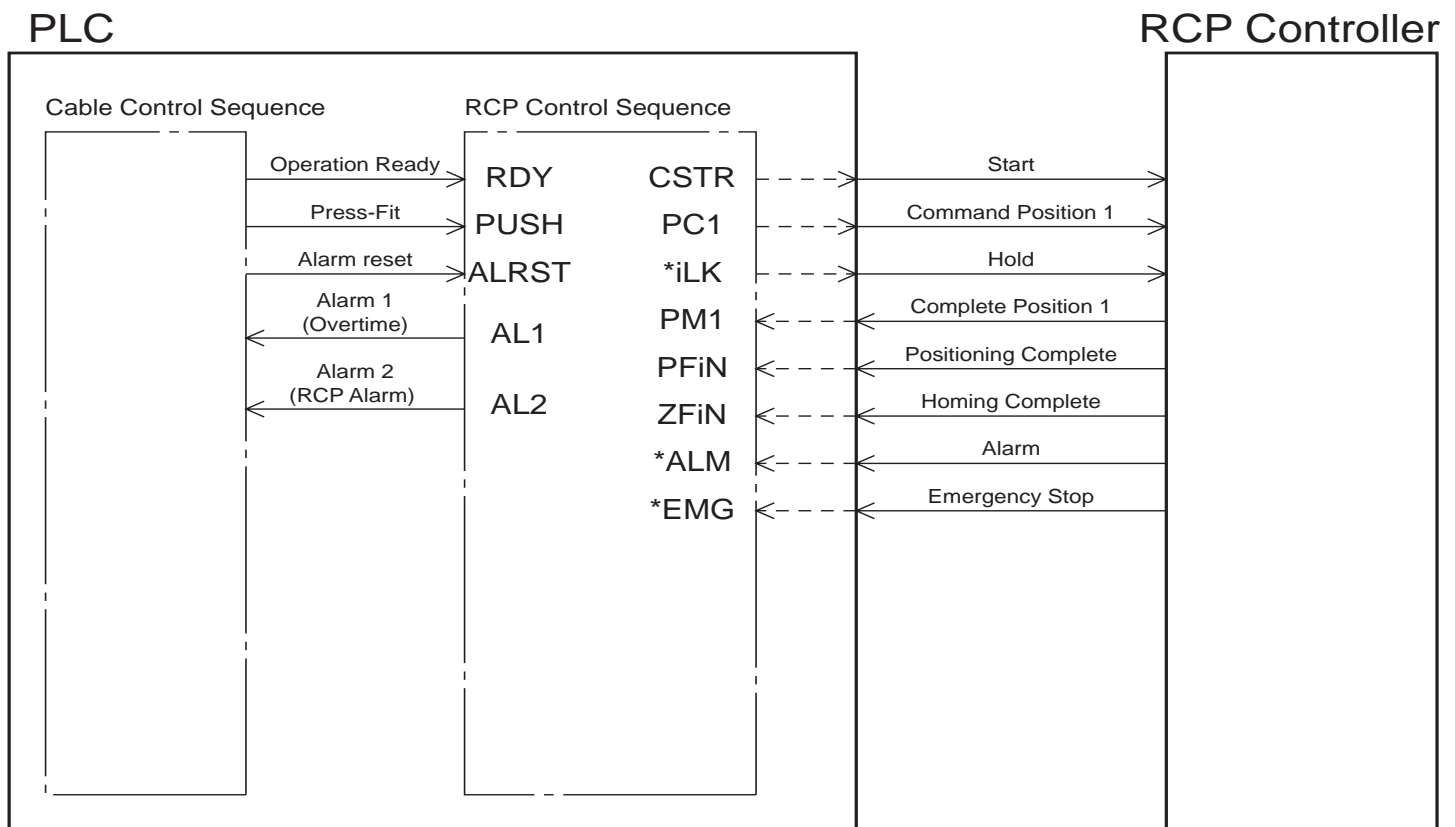
\* Positions 0 and 1 refer to the No.0 and 1 of the position data located within the controller.

(For details, please refer to the section, "PC Display Screen" located on the next page of this manual.

Note:

1. The Hold Signal (normally ON) stops the Robo Cylinder's movement due to the hold of the conveyor. To stop the actuator, turn OFF the Hold Signal. To continue movement in progress, turn the Hold Signal back ON. To cancel the movement in progress, toggle the Reset Signal ON before turning back ON the Hold Signal.
2. The Operation Ready Signal and Press-Fit Move Signal from the Conveyor Controller will turn OFF once the RCP controller recognizes these Signals.
3. If the RCS is in alarm or emergency stop, the Conveyor Controller will not give a System Ready or Move Signal to any device on the controller.
4. After the alarm source is corrected, reset the alarm circuit on the Operation Panel.
5. This program is specifically for the Robo Cylinder Controller.

## I/O Signal Terminal Diagram



## Robo Cylinder Setting:

### Pitch Method (In case of direct numeric input (coordinate value)):

Position 0 is home (coordinate value of 0).

Position 1 is push start position (coordinate value of 300).

Push power of Position 1 is set as 20% (approximately 2kgf).

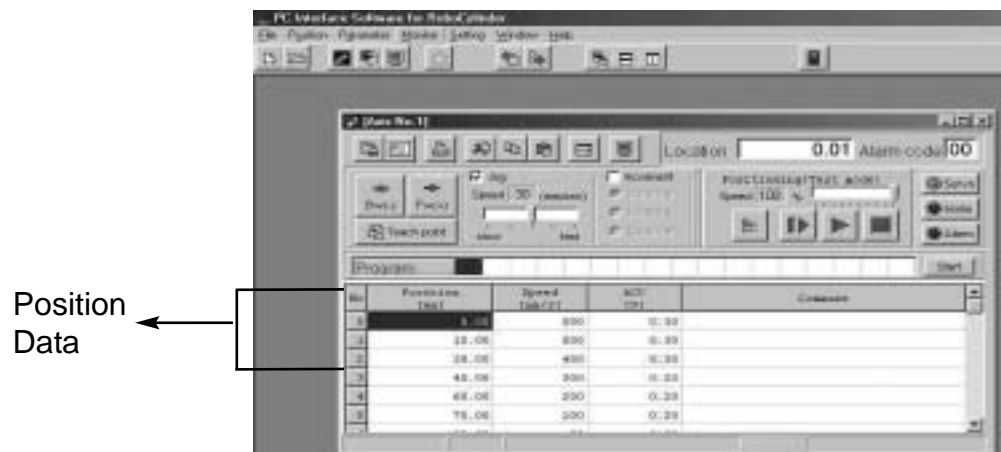
- 1) Input 0 into the position of No. 0.
- 2) Input 458 into the speed of No.0.
- 3) Input 50 into the position of No.1
- 4) Input 458 into the speed of Position 1.
- 5) Input 20 into the push of No.1.
- 6) Input 30 into the positioning width of No.1.

Position data input is completed.

If numeric data is input into the Push Percentage Column and a Positioning width is specified, the actuator will move to the specified location at the designated speed and begin to push at a fixed lower speed to the specified distance at the push percentage. With the above specifications, the Robo Cylinder moves 50mm away from home at 458mm/sec, and from there, the Robo Cylinder pushes at a slow fixed speed within the 30mm range. Once it hits the part, the Push function turns ON the Positioning Complete Signal and continues pushing until reaching 2kgf.

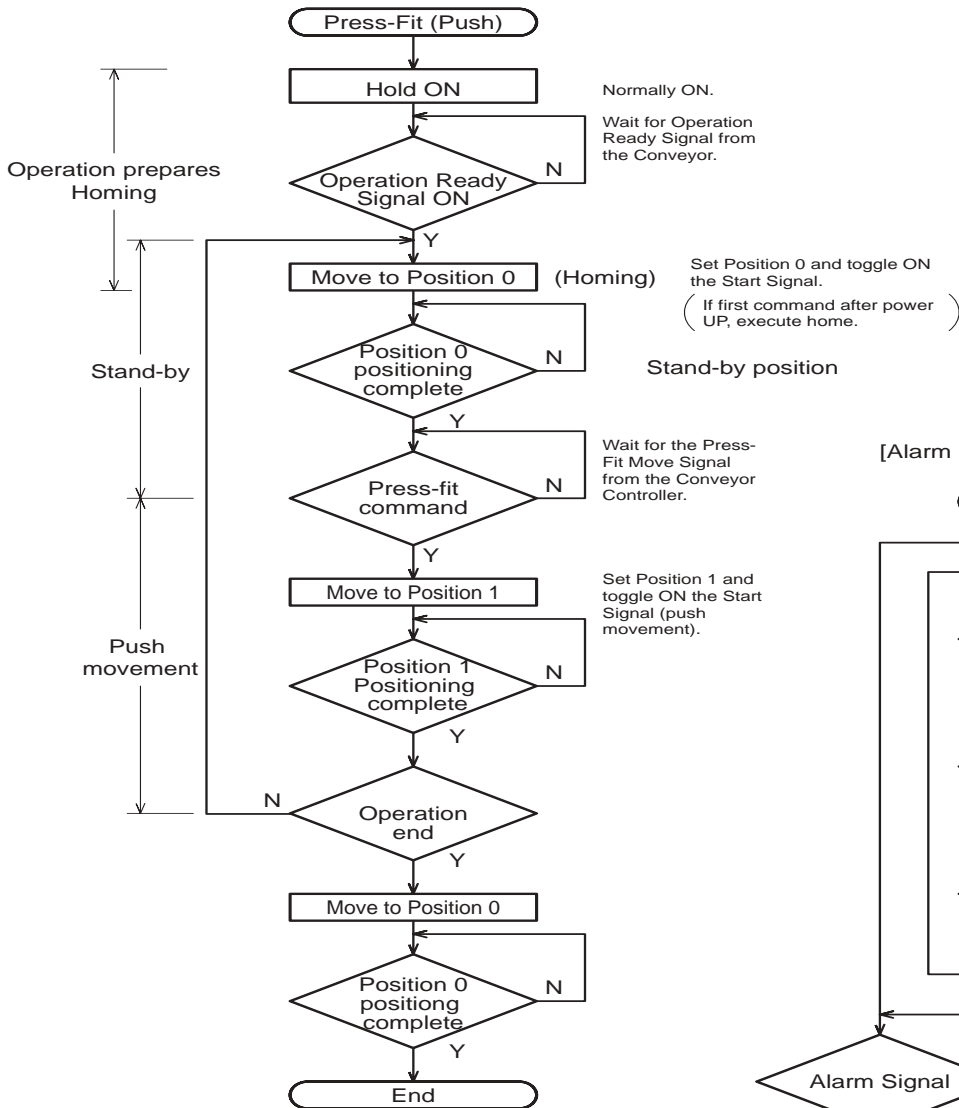
### PC Display Screen:

The below screen is the Point Data Edit Screen that is located within the controller.

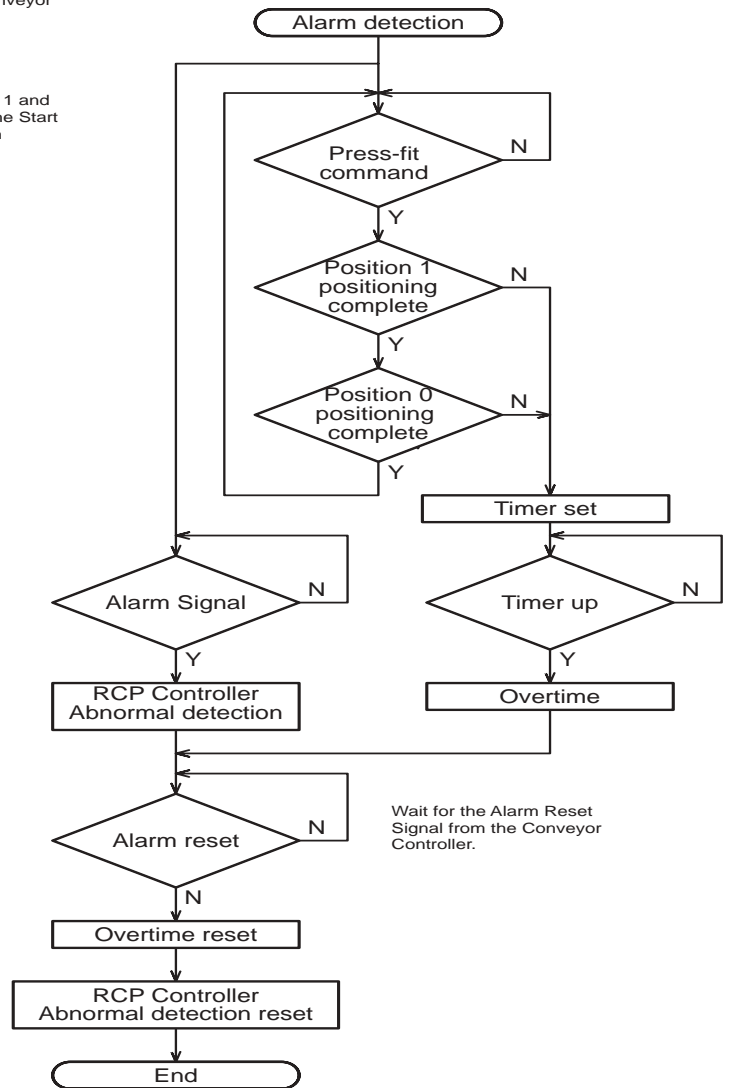


# Movement Flow Chart (Reference)

[Press-Fit (Push) Flow Chart]



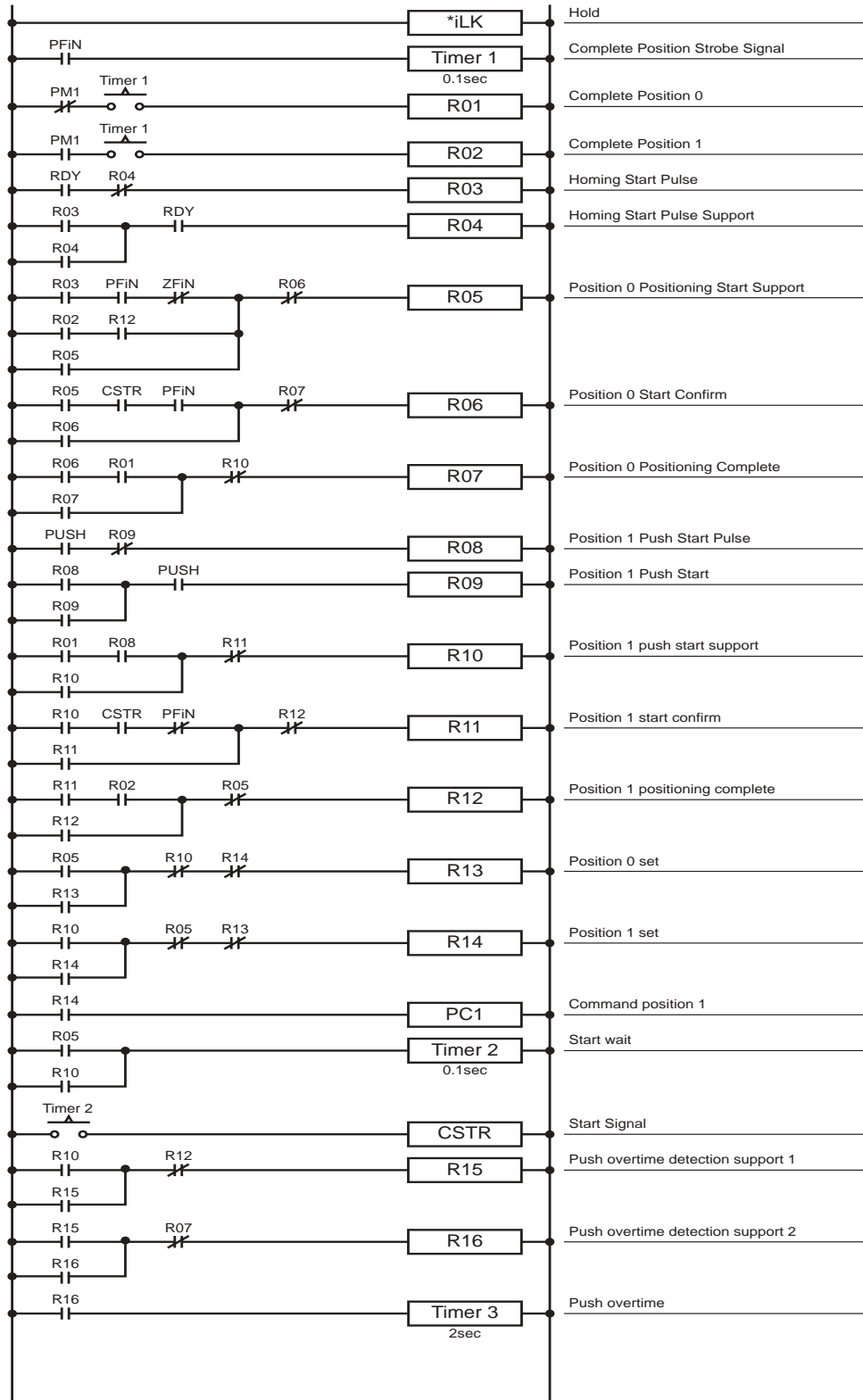
## [Alarm Detection Flow Chart]



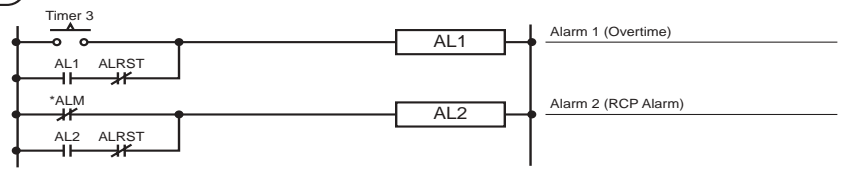
## - PLC Ladder Diagram

The following is a basic circuit to control the Robo Cylinder. Therefore, it does not connect with the circuit that controls the entire machine. In addition, this circuit was not designed for a particular PLC manufacturer and, instead, describes a Robo Cylinder controller circuit from a general standpoint. When designing your circuit, please remember the aforementioned.

### Reference



**Reference**



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