

# CTC-33 Effortless Controller Instruction Manual

Document No. DEE-00274C-EN

Ver. 1.21 2003 / 04 / 17



***Dyadic Systems Co.,Ltd.***

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## 1. Features of CTC-33 Effortless Control

The basic operation of the CTC-33 Effortless Controller is very easy. It allows the operators to enter and edit both position data and its sequence by just following the panel instructions. This makes you to escape from the confusion of a complicated ladder programming and debugging. As a result, the lead-time of your system development will shorten drastically.

Input Sgals					Output Sgals				
Fin	Name	Description	Terminal Block	Wire Color	Fin	Name	Description	Terminal Block	Wire Color
20	IN0	Condition Input 0	B10	Black	8	OUT0	General purpose output 0	B4	Gray
19	IN1	Condition Input 1	A10	White	7	OUT1	General purpose output 1	A4	Purple
18	IN2	Condition Input 2	B9	Gray	6	OUT2	General purpose output 2	B3	Blue
17	IN3	Condition Input 3	A9	Purple	5	OUT3	General purpose output 3	A3	Green
16	IN4	Condition Input 4	B8	Blue	4	OUT4	General purpose output 4	B2	Yellow
15	IN5	Condition Input 5	A8	Green	3	OUT5	General purpose output 5	A2	Orange
14	SQSTR	Start Sequence Step	B7	Yellow	2	SQFIN	Error of Sequence Cycle	B1	Red
13	SQSTR	Forced Stop Sequence	A7	Orange	1	*ALM	Alarm State Indicator	A1	Brown
12	ICOM	Input Common (connect +24V)	B6	Red	10	OCOM	Output common (connect to 0V)	B5	Black

### 1.1. Summary of operation

#### Teach position data ( the left side )

**POSITION TEACH** (Red LED) / **SEQUENCE TEACH** (White LED)

First time after powering ON, POSITION TEACH is selected

**AXIS SELECT** Select the axis number to teach.

**HOMING** Press until **HOMED** has turned ON

**POSITION SELECT** Select the position to be taught.

**DATA ENTRY MODE** Select the item to teach.

**JOG/HANDLE** To teach the actual position by moving the actuator.

**E Position teach** 00001.000 mm

**POS. DATA INPUT** To input the position into the memory

**E Position edit** 00001.000 mm

**SPEED DATA INPUT** To input the speed into the memory.

**E Speed Input** 0100.0 mm/sec

**PUSH FORCE DATA IN** To input the Push Force data for Push Positioning, if you select the Push Positioning mode.

**PUSH POSITIONING** / **NORMAL POSITIONING** Please decide which mode is to be used, Normal Positioning or Push Positioning.

**WRITE** Please press **WRITE** key after the set of Positioning data to save into Mechatronics Cylinder.

#### Edit sequence ( the right side )

To run the sequence, press **RUN/TEACH** key or Make turn ON the SQSTR input.

**RUN** is turning ON, if sequence is running

**POSITION TEACH** (White LED) / **SEQUENCE TEACH** (Red LED)

Select **SEQUENCE TEACH** mode

Select the sequence step to edit.

**NEXT STEP**

**S00** Axes to move #0 #1 #2 #\_ #

Select the point to be executed in this step.

**POSITION SELECT**

Select the item to edit.

**AXES TO EXECUTE** To input the axis identifiers of axes to be executed positioning.

Use ← → to move cursor

**S00** Axes to move #0 #1 #2 #\_ #

**IN.COND.TO PROGRESS** To input the condition of input signals for the sequence progression.

ON  
 OFF  
X Don't care

**S00** In condition 0 1 2 3 4 X

**DELAY TIMER** To input the time for waiting in this step.

**S00** Delay timer 001.00 sec

**DATA TO OUTPUT** To input the data into Output signals in this step.

If the step should be the end of sequence, please select the End Step. In other case, please select the Cont. Step

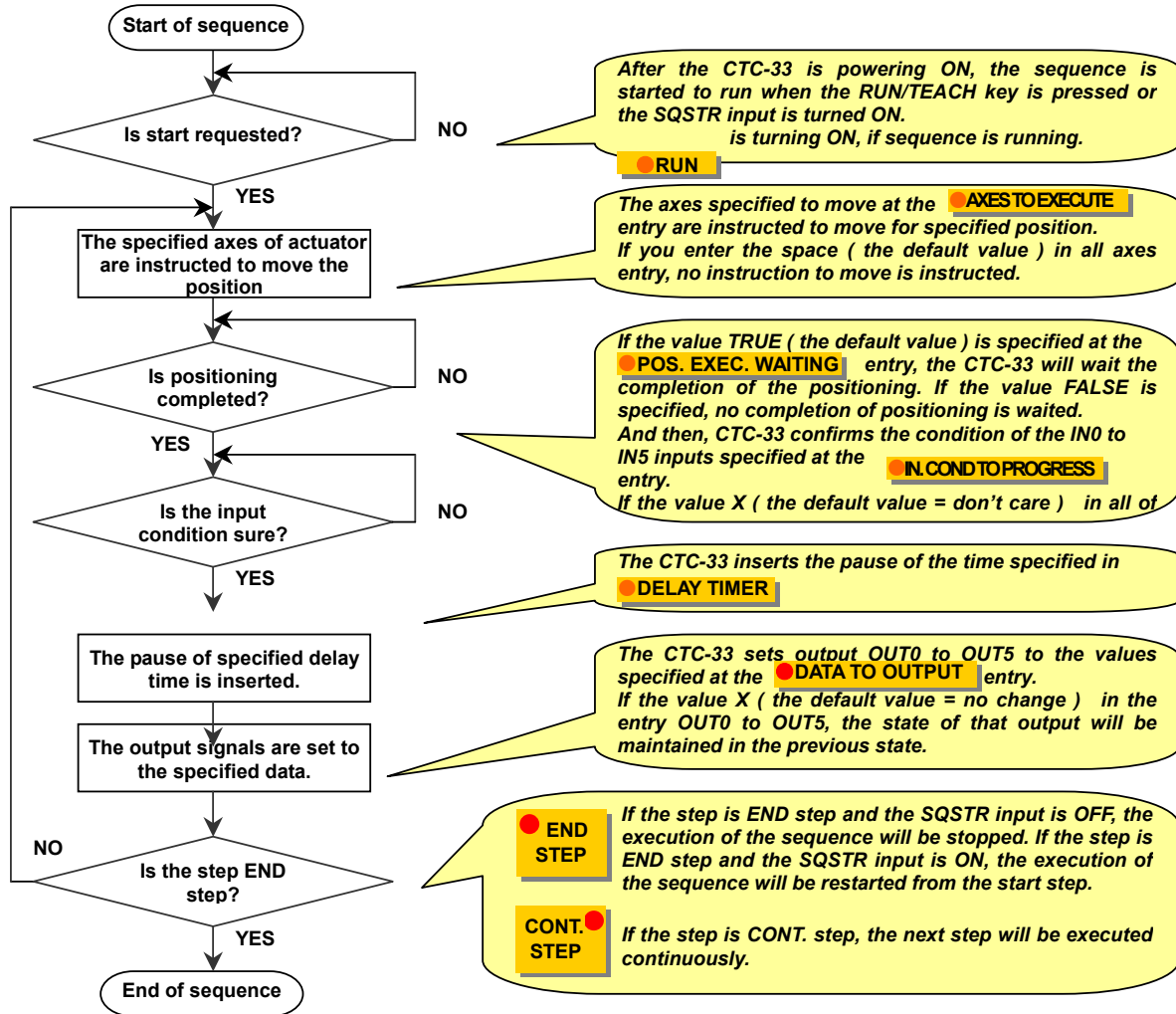
**END STEP** / **CONT. STEP**

Please press **WRITE** key after the set of Sequence data to save into CTC-33 Effortless Controller.

**WRITE**

## 1.2. The procedure of a sequence step execution in the CTC-33

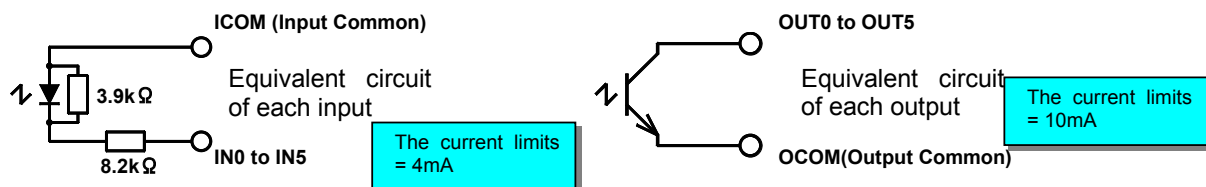
The each of sequence steps in the CTC-33 is executed as shown below.



## 1.3. The signals definition and pin assignment of external I/O connector

Input Signals					Output Signals				
Pin	Name	Description	Terminal Block	Wire Color	Pin	Name	Description	Terminal Block	Wire Color
20	IN0	Condition Input0	B10	Black	8	OUT0	Genegral purpose output0	B4	Gray
19	IN1	Condition Input1	A10	White	7	OUT1	Genegral purpose output1	A4	Purple
18	IN2	Condition Input2	B9	Gray	6	OU12	Genegral purpose output2	B3	Blue
17	IN3	Condition Input3	A9	Purple	5	OUT3	Genegral purpose output3	A3	Green
16	IN4	Condition Input4	B8	Blue	4	OUT4	Genegral purpose output4	B2	Yellow
15	IN5	Condition Input5	A8	Green	3	OUT5	Genegral purpose output5	A2	Orange
14	SQSTR	Start Sequence Step	B7	Yellow	2	SQFIN	End of Sequence Cycle	B1	Red
13	SQSTP	Forced Stop Sequence	A7	Orange	1	*ALM	Alarm State Indicator	A1	Brown
12	ICOM	Input Common (connect +24V)	B6	Red	10	OCOM	Output common (connect to 0V)	B5	Black

Signals of external I/O connector (Maker: Hirose Type: HIF38A-20PA2.54DS)

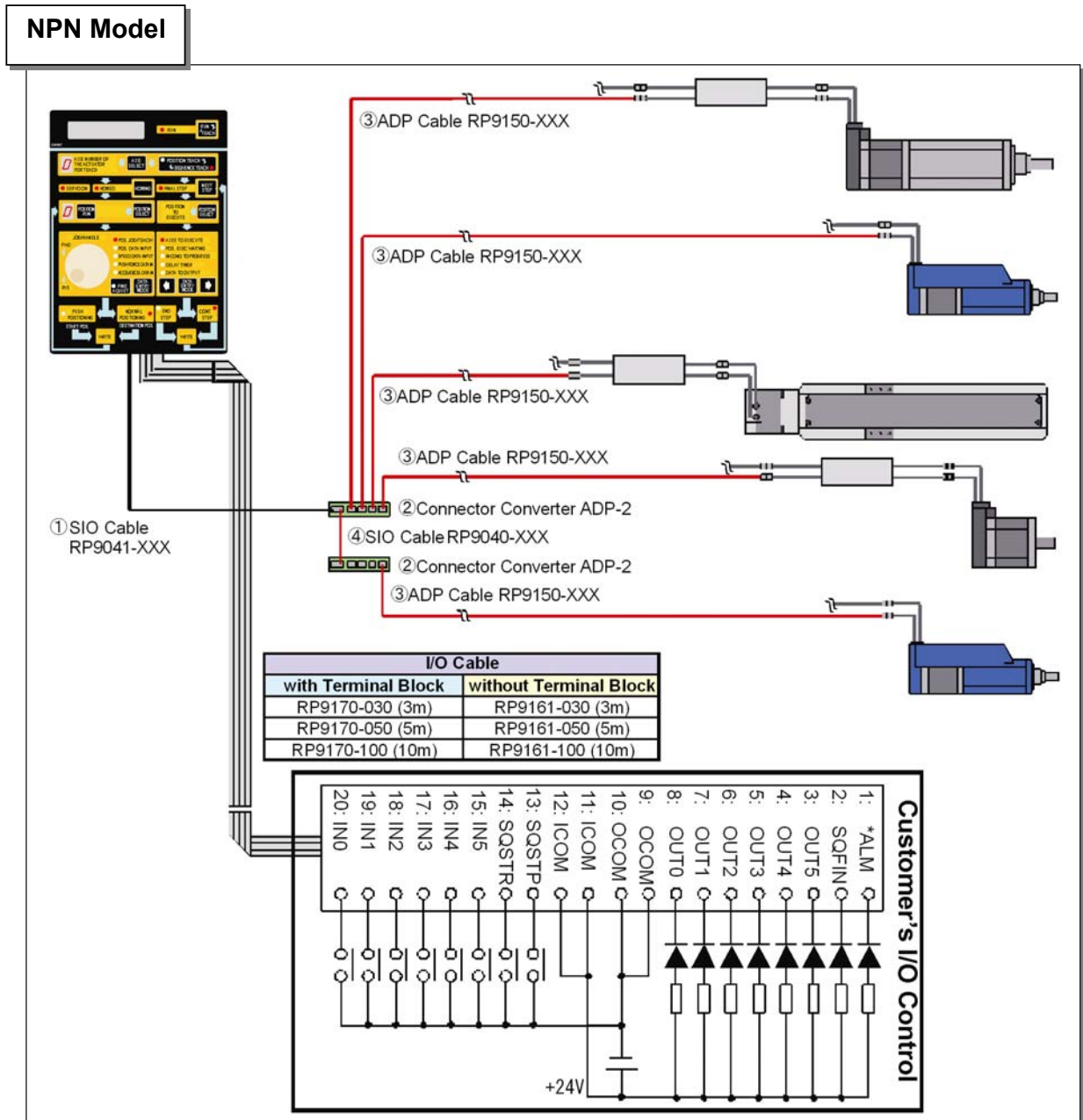




To execute the sequence, please press **RUN** key or turned ON the Sequence Start ( SQSTR ) Input. The sequence is started from Step No.00, and then step-by-step execution to next steps is continued until the END step is encountered. If the step to execute is reached to the FINAL step (usually Step No.41) until END Step is encountered, the FINAL step is treated as the END step. If the execution of the END step is complete, the Sequence Complete ( SQFIN ) output is turned ON and if the SQSTR input is OFF at that time, the execution of the sequence will be stopped. If the SQSTR input is ON at that time, the execution of the sequence will be restarted from the start step. This means that the sequence cycle is automatically repeatable. If you turned ON the Sequence Stop ( SQSTP ) input, the execution of all of the actuators' positioning and the sequence will be stop immediately. Because the priority of the SQSTP input is higher than it of the SQSTR Input, the SQSTP input force to stop the sequence execution even if the SQSTR Input is maintained ON for cyclic execution. The Alarm ( \*ALM ) output is ON when the CTC-33 is normal. The \*ALM is OFF when the CTC-33 or the actuators connected to the CTC-33 is in an alarm state.

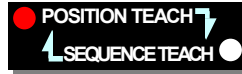
#### 1.4. The connection between the CTC-33 and the actuators

The cable kit for multi axes connection is available as shown below. If you use only one axis of the actuator, you can connect it to the CTC-33 with the ADP cable attached to the CTC-33. The I/O cable can be used to connect between external I/O connector and the external equipments as shown below.



## 2. The operation of sequence teach


To enter the sequence teach mode, press



key.

### 2.1. To specify the axes to be executed positioning **AXES TO EXECUTE**

S00 Axes to move  
#\_# # # # #

The axis numbers of the axes to be executed positioning in this step are indicate in the LCD panel. Please select the axis number that you want to make it to be executed with the JOG Shuttle. If you want select several axes, you can move cursor position to next axis selection with  key.

S00 Axes to move  
#0 #1 #\_ # #

For example, if you want the axis number #0 and the axis number #1 to be executed, you should make it as shown left. You can specify up to 5 axes in a step. If you want to execute no positioning in this step, you should enter the space ( the default value ) to all of axis numbers.



And then, you should select the position number to be executed in this step by the POSITION SELECT key in the right side. When no axis is selected, the position number has no effect.

### 2.2. To specify waiting the completion of the positioning **POS. EXEC. WAITING**

DATA ENTRY MODE

key is used to enter the LCD panel to specify waiting the completion of the positioning.

If you want to wait the completion of the positioning, you should enter 1(TRUE) to this item. If you don't want to wait the completion of the positioning, you should enter 0(FALSE) to this item. The default value of this item is 1. When no axis is selected, the confirmation of input condition is executed immediately.


S00 Move waiting  
1(TRUE)

### 2.3. The condition of input signals for the sequence progression **IN. COND TO PROGRESS**

DATA ENTRY MODE

key is used to enter the LCD panel to specify the condition of input signals for the sequence progression. The number in the lower line indicates the input number, 0 as IN0 to 5 as IN5.

S00 In condition  
0X 1X 2X 3X 4X →

→ mark of right end indicates it can scroll to right by  key.

S00 In condition  
0■ 1□ 2X 3X 4X →

To specify the condition, you should select the mark with the JOG shuttle. Each mark has the means that X as "Don't Care", ■ as "ON" and □ as "OFF".

Each condition is related logical AND, so shown above setting means the condition "IN0 is ON and IN1 is OFF" is needed to progress.

### 2.4. To input the time for waiting **DELAY TIMER**

DATA ENTRY MODE

key is used to enter the LCD panel to input the time for waiting in this step.

When the positioning had been completed and the input condition had been confirmed, CTC-33 inserts the pause of specified time in this step. The delay time is specified in second unit, and the value 0 means no pause will be inserted.


S00 Delay timer  
001.00 sec

### 2.5. To input the data into output signals

DATA ENTRY MODE

key is used to enter the LCD panel to specify the data into output signals in the end of this step. The number in the lower line indicates the output number, 0 as OUT0 to 5 as OUT5.

S00 In condition  
0X 1X 2X 3X 4X →

→ mark of right end indicates it can scroll to right by  key.

S00 In condition  
0■ 1□ 2X 3X 4X →

To specify the data, you should select the mark with the JOG shuttle. Each mark has the means that X as "Not Change", ■ as "ON" and □ as "OFF".

## 2.6. CONT. step and END step



If the step is END step and the SQSTR input is OFF, the execution of the sequence will be stopped. If the step is END step and the SQSTR input is ON, the execution of the sequence will be restarted from the start step.



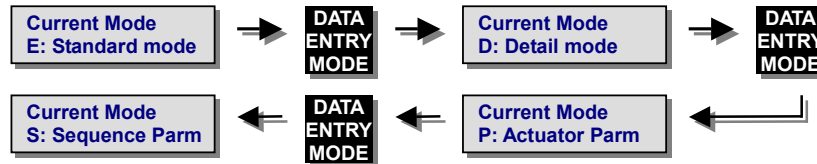
If the step is CONT. step, the next step will be executed continuously. In the default, all of steps are CONT. step.

Please press key after the set of Sequence data to save into CTC-33 Effortless Controller.

Please press key to edit the next step.

## 3. The extended function of the sequence control

To activate the extended function, you should use keys in the left side of the panel.

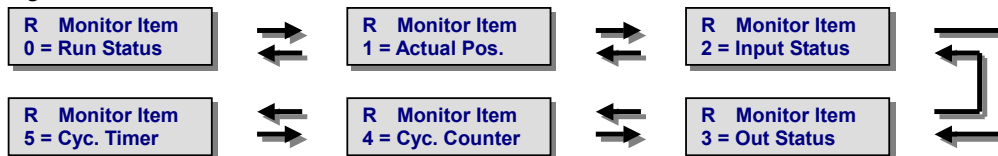


After the powering ON of the CTC-33, the mode selection screen is in the LCD panel as shown above.

Then, please press key 3 times to indicate "Sequence Parm", and press key to enter the Sequence Parameter Mode.

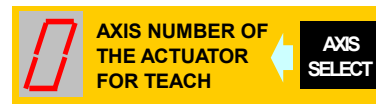
### 3.1. To select the monitoring item when the sequence is executing

When the sequence is executing, the selected items can be monitoring in the LCD panel. If you enter the "Sequence Parm" mode, you get the monitoring item selection screen as shown below. These monitoring items can be selected with the JOG Handle.



0 = Run Status      The internal status of the sequence execution.

1 = Actual Pos.      The actual position of the actuator that selected by the AXIS SELECT key in the left side.



2 = Input Status      The current condition of Input signals (IN0~IN5).

3 = Output Status      The current data of output signals (OUT0~OUT5).

4 = Cyc. Counter      The counter to be incremented each cycle.

5 = Cyc. Timer      The rest of time to the cycle timeout limit

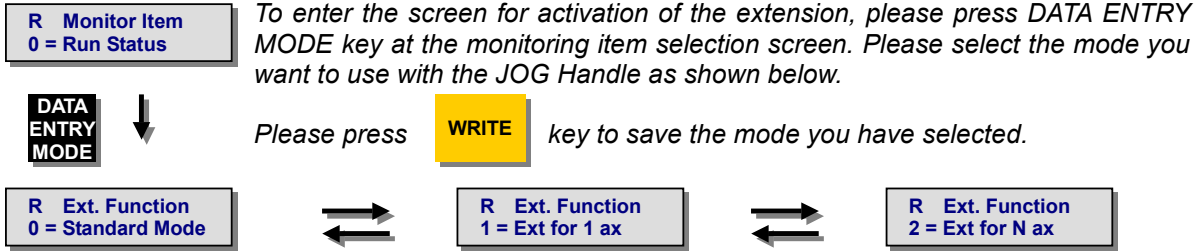
The cycle counter is reset to 0 when CTC-33 is powering ON, and it's incremented by 1 at the end of in every sequence execution cycles. So the value of the cycle counter is always same as the total number of sequence cycles after powering ON.

If the function of cycle timeout supervision is activated, the monitoring item of "5 = Cyc. Timer" is selectable. The cycle timer is reset to 0 at the start of every sequence execution cycles. If the function of cycle timeout supervision is deactivated( the default ), the monitoring item of "5 = Cyc. Timer" can't be selectable.

Please press key to save your selection into the memory of the CTC-33.

### 3.2. The extended function about the actuator

The extensions about the actuators' function can be activated with CTC-33. The parameters about these extensions are saved into the memory of the CTC-33. If you activate these extensions about the actuators, the available steps to be used for sequence control are 31 steps ( from Step00 to Step30 ). There are 2 modes about these extensions, the Single Axis Mode and the Multi Axes Mode. You can activate these extensions with the procedure as shown below. No extension is activated in the default.



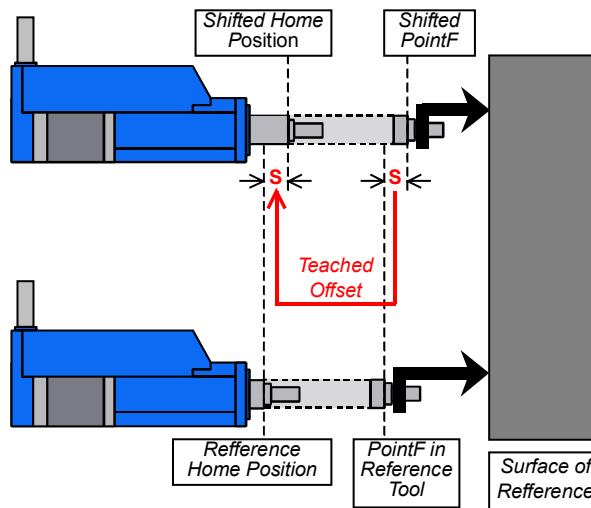
The functionality of the Single Axis Mode and Multi Axes Mode are indicated below.

Functionality	Single Axis Mode	Multi Axes Mode
<b>Offset for Home Position</b>	It's available only in the axis that have lowest axis number of the systems	It's available in all axes of the systems
<b>Offset for Displayed Position</b>	It's available only in the axis that have lowest axis number in the systems	It's available in all axes of the systems
<b>Individually settable ZONE signal output range for each Position</b>	It's available only in the axis that has lowest axis number in the systems. It's settable individually for each point from Position0 to PositionF	It's available only in the axis that has lowest axis number in the systems. It's settable individually for each point from Position0 to Position7. In other Point, a common ZONE signal region is available.

#### 3.2.1. Offset for Home Position

Normally, the home position of the Mechatronics Cylinder is a fixed position depends on the forward end or the reverse end, and each saved Position is fixed in a position on this coordinate system. If you activate the extended functionality, you can shift all of the actual position of the saved Position with using Offset for Home Position extension. For example, this means that you can avoid re-teaching of the Position when the tool length is changed.

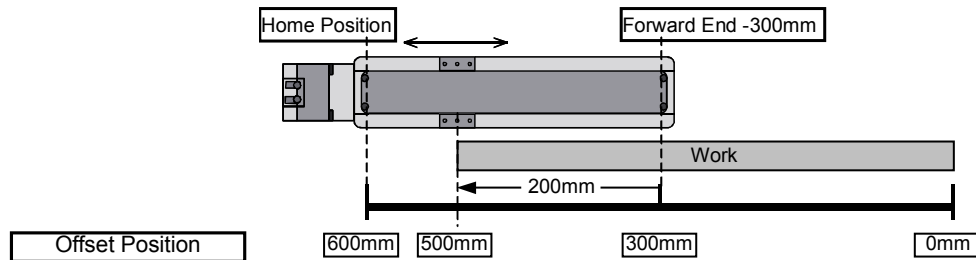
The offset value can be taught as the deference to actual position from the PositionF ( the point of reference ) immediately as shown below.





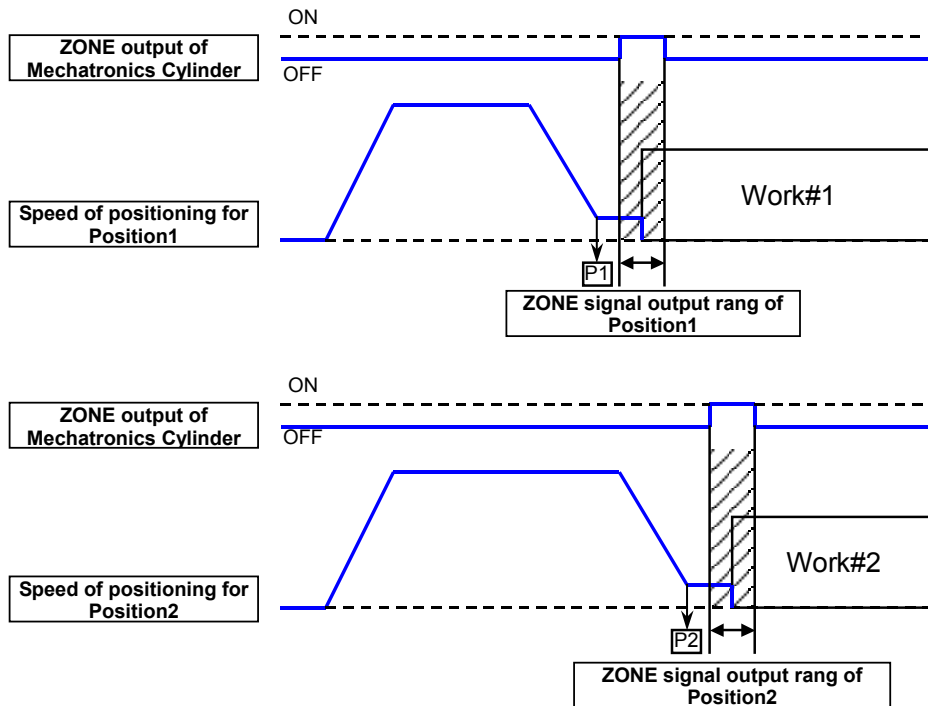
### 3.2.2. Offset for Displayed Position

Normally, the position displayed at the CTC-33 is a distance from the Home Position fixed within the stroke of the mechatronics cylinder. If you activate the extended functionality, you can shift the displayed position at the CTC-33 with using "Offset for Displayed Position" extension. For example, if you set the value 600mm as the Offset for Displayed Position, the value 590mm is displayed at the actual position -10mm, the value 500mm is displayed at the actual position -100mm. This means that you can be displayed the position at the coordinate system that region is exceed the stroke of your mechatronics cylinder.

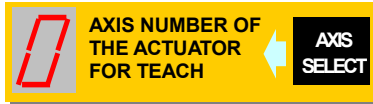


### 3.2.2. Individually settable ZONE signal output range for each Position

If you activate the extended functionality, you can set the ZONE signal output range individually for each Position with using "Individually settable ZONE signal output range for each Position" extension. You can make the mechatronics cylinder to check the stopped position is regular or not, even if the target works have many kind of length.



#### 4. Detail of Positioning Programming Operations



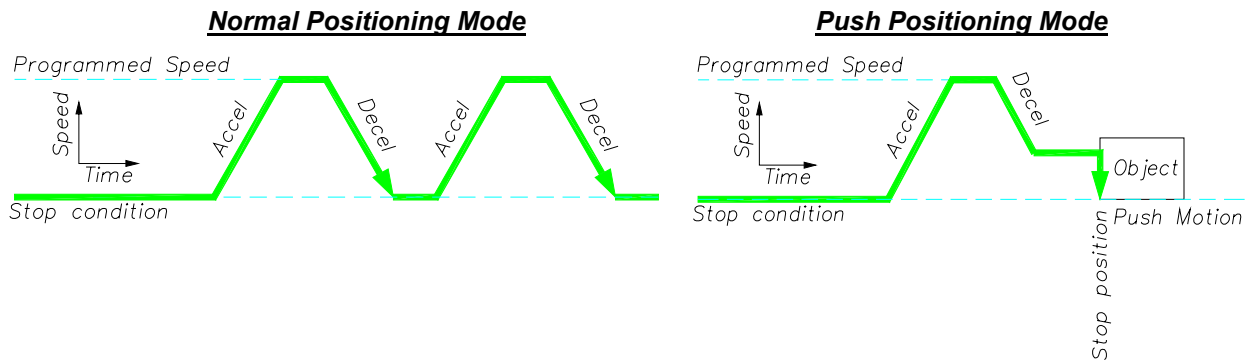
The functionality of Positioning Programming of CTC-33 is same as CTA-23 Teaching Pendant. There is additional feature of the axis number select capability for the multi axes system in CTC-33. If you change the axis number to be selected, the CTC-33 returns the equivalent state when it's powering ON.

##### 4.1. Standard Positioning Programming Operations

This chapter will explain the basic Positioning Programming Operation. This mode has the following set items:

1. Position Teach-Manual
2. Position data entry
3. Speed data entry
4. Push force data entry (in case of Push mode only)
5. Acceleration data entry








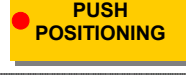
As explained in the summary, this Mechatronics Cylinder has 2 basic motions, "Positioning Mode" and "Push Mode". "Positioning Mode" moves the cylinder rod to the programmed position and stops. "Push mode" starts the push motion from the programmed position, which is in front of the object. Please decide which mode is to be used before the Teach programming.



The set data item will be selected by **DATA ENTRY MODE** key. LED at the desired data set item will be ON, as this key is pressed continuously. The position of lighted LED will move down, so that the set item will change.

Panel	Functions	Descriptions
<ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul>	Position Jog/Teach	To teach the actual position by moving the rod of our Mechatronics Cylinder.
	Position Data Input	To input the position into the memory of Mech. Cylinder. The Mech. Cylinder doesn't move.
	Speed Data Input	To input the speed into the memory of Mech. Cylinder.
	Push Force Data Input	To input the Push Force data into the Mech. Cylinder.
	Accel/Decel Data Input	To input the Acceleration/Deceleration into the memory of Mech. Cylinder.

### 4.1.1. Common Operation

No.	Panel	Operations
1		First connect Teaching Box to the Mechatronics Cylinder via ADP cable, and then turn the power ON.
2	 ⇒ 	Approx. 3 seconds after the power is turned ON, or after ADP cable is connected, <b>Servo ON LED</b> will be turned ON.
3	 ⇒ 	When turning the power on for the FIRST TIME, please keep pressing <b>Homing Key</b> until <b>Homing Complete LED</b> turns ON. If this key is released before the light turns on, press (Homing Key) again to continue the Homing process. If the power is ON condition and the unit is (Homed), <b>Homed LED</b> will be ON together with the LED ON <b>Servo ON LED</b> too, after the connecting the Teaching Box.
4		Please press <b>Position Select Key</b> to select position No. (16 positions can be programmed, 0 ~ F). Keep pressing it to change the position numbers.
5		Please select "Positioning Mode" or "Push Mode".
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>Normal Positioning Mode</b></p>  </div> <div style="text-align: center;"> <p><b>Push Positioning Mode</b></p>  </div> </div>	
6-1		Please select setting item by pressing <b>Teach Select Key</b> .
	<p><b>Normal Positioning Mode</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Position Jog/Teach)</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Position Data Entry)</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Speed Data Entry)</p> </div> </div> <div style="margin-top: 10px; text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Accel/decel Data Entry)</p> </div> <div style="font-size: 2em;">←</div> </div>	
Or 6-2		
	<p><b>Push Positioning Mode</b></p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Position Jog/Teach)</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Position Data Entry)</p> </div> <div style="font-size: 2em;">⇒</div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Speed Data Entry)</p> </div> </div> <div style="margin-top: 10px; text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Accel/decel Data Entry)</p> </div> <div style="font-size: 2em;">←</div> <div style="border: 1px solid black; padding: 5px; width: 20%;"> <ul style="list-style-type: none"> <li>● POS. JOG/TEACH</li> <li>● POS. DATA INPUT</li> <li>● SPEED DATA INPUT</li> <li>● PUSH FORCE DATA IN</li> <li>● ACCEL/DECEL DATA IN</li> </ul> <p style="text-align: center; color: red;">(Push Force Data Entry)</p> </div> <div style="font-size: 2em;">←</div> </div>	

#### 4.1.2. Position Teach-Jog

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>E Position Teach</b>                      -00010.000mm                 </div> <div style="background-color: yellow; padding: 5px;">                     ● POS. JOG/TEACH                      ● POS. DATA INPUT                      ● SPEED DATA INPUT                      ● PUSH FORCE DATA IN                      ● ACCEL/DECEL DATA IN                 </div>	1	By turning the manual handle of Teaching Box, the rod of Mechatronics Cylinder will jog. Please move it to the desired position. The display shows the distance from the Home position. Fine tuning the position can be done using the same manual handle after pressing <b>Fine Adjust Key</b> . The increment will be the smallest positioning unit.
	2	After the manual positioning, please press <b>Write Key</b> to save the position data into the memory of Mechatronics Cylinder.
	3	To set other data of the selected position Number, please select the desired item by pressing <b>Teach Select Key</b> .
	4	In case of the data entry/edit for other position Number, please select desired position Number by pressing <b>Position Select Key</b> .

#### 4.1.3. Position Data Input

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>E Position Edit</b>                      -00010.000 mm                 </div> <div style="background-color: yellow; padding: 5px;">                     ● POS. JOG/TEACH                      ● POS. DATA INPUT                      ● SPEED DATA INPUT                      ● PUSH FORCE DATA IN                      ● ACCEL/DECEL DATA IN                 </div>	1	By turning the jog handle in the Teaching Box, please set the desired position data of the Mechatronics Cylinder on the display. (The rod of the Mechatronics Cylinder doesn't move.) The displayed data is a distance from the home position. Using the manual handle after pressing the <b>Fine Tuning Key</b> the Mechatronics Cylinder can be set by the smallest resolution.
	2	Please press <b>Write Key</b> after the position set to write the position data into the memory of the Mechatronics Cylinder.
	3	In case of setting other data of this selected position Numbers, please select the desired item by pressing <b>Teach Select Key</b> .
	4	4. In case of the data entry/edit for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

#### 4.1.4. Speed Data Input

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>E Speed Input</b>                      400.0 mm/sec                 </div> <div style="background-color: yellow; padding: 5px;">                     ● POS. JOG/TEACH                      ● POS. DATA INPUT                      ● SPEED DATA INPUT                      ● PUSH FORCE DATA IN                      ● ACCEL/DECEL DATA IN                 </div>	1	By turning the jog handle in the Teaching Box, please set the desired positioning speed data of the Mechatronics Cylinder on the display. Using the manual handle after pressing <b>Fine Tuning Key</b> , the speed of Mechatronics Cylinder can be set by the smallest resolution.
	2	Please press <b>Write Key</b> after the speed set to write the speed data into the memory of the Mechatronics Cylinder.
	3	In case of setting other data of this selected position Numbers, please select the desired item by pressing <b>Teach Select Key</b> .
	4	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>Position Select Key</b> .

#### 4.1.5. Push Data Input (Valid only when Push Positioning Mode is selected)

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <b>E Push Force</b>                      100 %                 </div> <div style="background-color: yellow; padding: 5px;">                     ● POS. JOG/TEACH                      ● POS. DATA INPUT                      ● SPEED DATA INPUT                      ● PUSH FORCE DATA IN                      ● ACCEL/DECEL DATA IN                 </div>	1	By turning manual handle (Jog Handle), please set the Push Force of Mechatronics Cylinder in the LCD display. 100% is the maximum Force. (Max. Thrust at Push Positioning) In this operation, the Fine Adjusting Key is not valid.
	2	Please press <b>Write</b> key after the set of Force to save into Mechatronics Cylinder.
	3	In case of setting other data of this selected position Numbers, please select the desired item by pressing <b>Teach Select Key</b> .
	4	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>Position Select Key</b> .

#### 4.1.6. Acceleration Data Input

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p>E Accel/Decel 0.500 G</p> </div> <div style="background-color: yellow; border: 1px solid black; padding: 5px;"> <p>● POS. JOG/TEACH ● POS. DATA INPUT ● SPEED DATA ● PUSH FORCE DATA IN ● ACCEL/DECEL DATA IN</p> </div>	1	By turning manual handle (Jog Handle), please set the Acceleration of Mechatronics Cylinder in the LCD display. By the turning the manual handle (Jog Handle) after pressing the <b>Fine Adjust Key</b> the Mechatronics Cylinder can be set by the smallest resolution. <b>Fine Adjust</b> is not valid.
	2	Please press <b>Write</b> key after the set of Acceleration to save into Mechatronics Cylinder.
	3	In case of setting other data of this selected position Numbers, please select the desired item by pressing <b>Teach Select Key</b> .
	4	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>Position Select Key</b> .

#### 4.2. Advance Positioning Programming Operations

There are 2 Advanced modes beside Standard Positioning Programming Mode.

Therefore there are 2 Advanced Operating Modes in the Mechatronics Cylinder as follows:

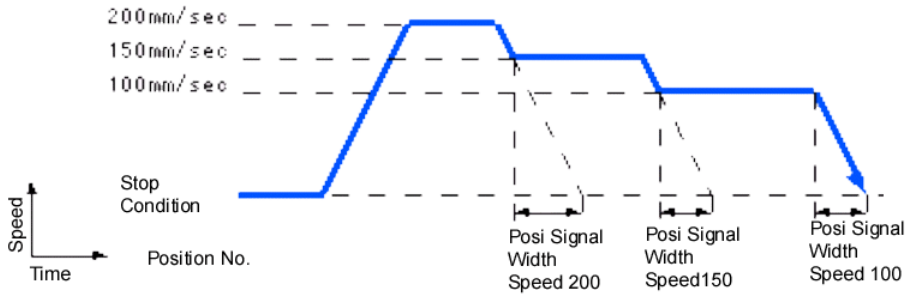
D: Detail Mode

P: Cylinder Parameter Mode

##### 4.2.1. Detail Mode

##### 4.2.1.1. Functions of Detail Mode


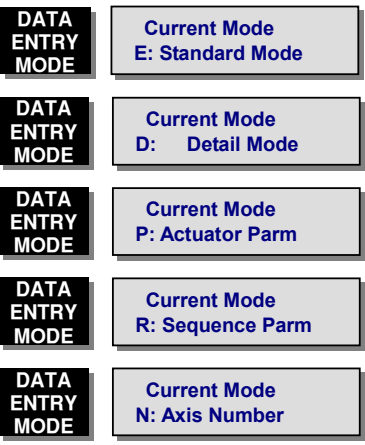


Function No.	Functions Description
D-1	<p><b>Ultimate Acceleration Set</b></p> <p>To set of Ultimate Acceleration ON for the application (load) Deceleration is according to the program.</p>
D-2	<p><b>Incremental Movement</b></p> <p>To set the distance to repeat the incremental movement from the current position</p>


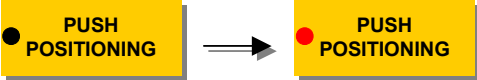
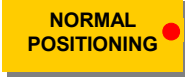

<p><b>D-3</b></p>	<p align="center"><b>Positioned (Position Completion) signal Width Set</b></p> <p>To set the Position Completion Signal Width, which is the distance between current position and the destination position in pulse. Its default is 4 pulses. Application of this width set may be to change multiple speeds during one movement without stop. (This application requires to program longer Positioned Output Signal Width to (PFIN) and to make next movement as soon as the previous positioned output.</p> 
<p><b>D-4</b></p>	<p align="center"><b>Servo Gain Set</b></p> <p>To set the Gain Volume of the desired positioning. Its default is 6 and the maximum data is 15. There is no need to change this data, but the positioning time may be reduced if the Gain is set to larger volume (the high Speed Positioning Application)</p>

**4.2.1.2. Operation of Detail Mode**

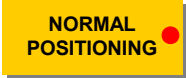


**4.2.1.2.1. Common Operation (Refer 3.1 Common Operation)**

Programming of Standard mode and Advanced Modes are different start Menu, therefore please make decision which mode to be programmed before the start of programming.



No.	Panel	Operations
1		<p>First connect Teaching Box to the Mechatronics Cylinder via ADP cable, and then turn the power ON.</p>
2		<p>Please press <b>DATA ENTRY MODE</b> key once within 3 seconds</p> <p>The display changes to Current Mode, “D: Detail Mode”. Please press <b>WRITE</b> key to confirm it.</p>
3		<p>After the confirmation of Detail Mode, <b>Servo ON LED</b> will be turned ON.</p>
4		<p>When turning the power on for the FIRST TIME, please keep pressing <b>Homing Key</b> until <b>Homing Complete LED</b> turns ON. If this key is released before the light turns on, press (Homing Key) again to continue the Homing process. If the power is ON condition and the unit is (Homed), <b>Homed LED</b> will be ON together with the LED ON <b>Servo ON LED</b> too, after the connecting the Teaching Box.</p>

5		Please press <b>POSITION SELECT</b> Key to select position No. (16 positions can be programmed, 0 ~ F). Keep pressing it to change the position numbers.
5		Please select "Positioning Mode" or "Push Mode".
	<p style="text-align: center;"><b>Normal Positioning Mode</b></p> 	<p style="text-align: center;"><b>Push Positioning Mode</b></p> 
6-1	<p style="text-align: center;"><b>Normal Positioning Mode</b></p> 	Please select setting item by pressing <b>DATA ENTRY MODE</b> Key.
Or 6-2	<p style="text-align: center;"><b>Push Positioning Mode</b></p> 	
7	Position Teach-Jog (Refer 4.1.2. Position Teach-Jog)	
8	Position Data Input (Refer 4.1.3. Position Data Input)	
9	Speed Data Input (Refer 4.1.4. Speed Data Input)	
10	Push Data Input (Refer 4.1.5. Push Data Input)	
11	Acceleration Data Input (Refer 4.1.6. Acceleration Data Input)	



#### 4.2.1.2.2. Ultimate Acceleration Valid

Panel	No.	Operations
 <p>or</p>  	1	Turn the Jog handle forward direction, and then the display shows 1 (TRUE). This means that the positioning movement will be by ultimate acceleration according to the load even though the acceleration is programmed at programming of above 12. This programmed Accel/Decel of above 12 will be then just Deceleration.
	2	By turning Jog handle reverse direction, then the display shows 0 (FALSE) and the programmed Accel/Decel of above 12 will be both Acceleration and Deceleration.
	3	Please press <b>WRITE</b> key after the set of Ultimate Acceleration Valid to save into Mechatronics Cylinder.
	4	In case of setting other data of this selected position Number, please select the desired item by pressing <b>TEACH SELECT Key</b> .
	5	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>POSITION SELECT</b> key.

#### 4.2.1.2.3. Incremental Movement Set

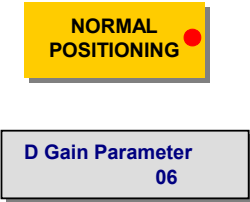
Panel	No.	Operations
 	1	Turn the Jog handle forward direction, and then the display shows 1(TRUE). This means that the positioning movement will be by incremental movement with the relative position instruction.
	2	By turning Jog handle reverse direction, then the display shows 0 (False) and the positioning will be regular mode, which is position to the programmed position.
	3	If this is set to 1 (TRUE), the Mechatronics Cylinder will move incrementally by the set distance. By operating this same positioning step, same distance movement will be repeated for any times within the stroke limit range.
	4	Please press <b>WRITE</b> key after the set of Incremental Movement to save into Mechatronics Cylinder.
	5	In case of setting other data of this selected position Number, please select the desired item by pressing <b>DATA ENTRY MODE</b> key.
	6	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>POSITION SELECT</b> key.

#### 4.2.1.2.4. Positioned (Positioning Completion) Output Signal Width

Panel	No.	Operations
 	1	Turn the Jog handle forward direction or reverse direction, so that the Positioned Output Distance Width can be adjusted.
	2	This Positioned Output Distance is the distance (relating to pulses) from the position of Mechatronics Cylinder to the destination position to output positioned signal. If this width (distance) is long, the positioned signal will be output even though the Mechatronics Cylinder is still moving so that the Mechatronics Cylinder can receive next motion order before its stop.
	3	Fine tuning the signal width can be done using the same manual handle after pressing <b>FINE ADJUST</b> key.
	4	Please press <b>WRITE</b> key after the set of Positioned Signal Width to save into Mechatronics Cylinder.
	5	In case of setting other data of this selected position Number, please select the desired item by pressing <b>DATA ENTRY MODE</b> Key.
	6	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>POSITION SELECT</b> key.




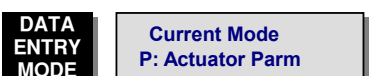




#### 4.2.1.2.5. Servo Gain Set

Panel	No.	Operations
	1	Turn the Jog handle forward direction or reverse direction, so that the Positioning Motion Gain can be adjusted.
	2	This Gain Set is set to 6 normally; it can be set 15 maximum. This set shouldn't be changed, but in case the application need some try-and-error, this can be set. One example is High Speed Application. This Gain increase may help the positioning Speed. (Depending on the case)
	3	<b>FINE ADJUST</b> key is not valid for this operation.
	4	Please press <b>WRITE</b> key after the set of Servo Gain to save into Mechatronics Cylinder.
	5	In case of setting other data of this selected position Number, please select the desired item by pressing <b>DATA ENTRY MODE</b> Key.
	6	In case of the data entry/edit for other position Numbers, please select desired position Number by pressing <b>POSITION SELECT</b> key.

#### 4.3. Actuator Parameter Mode

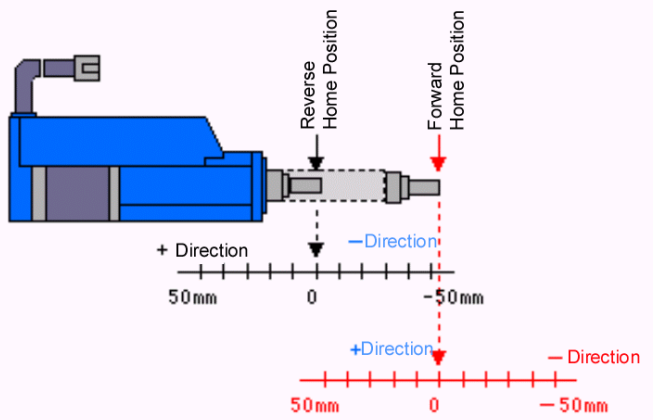
Actuator Parameter Mode is to set the Parameters effecting all the operation of Mechatronics Cylinder. If the Extended Function of Sequence Parameter is activated, all items of Actuator Parameters are available. If the Extended Function of Sequence Parameter is disabled, only the Basic Function Parameters are available.

No.	Panel	Operations
1		First connect Teaching Box to the Mechatronics Cylinder via ADP cable, and then turn the power ON.
2	    	<p>Please press <b>DATA ENTRY MODE</b> key once within 3 seconds</p> <p>Please press <b>DATA ENTRY MODE</b> key once more.</p> <p>The display changes to Current Mode, "P: Actuator Parm". Please press <b>WRITE</b> key to confirm it.</p>

### 4.3.1. Home Direction Set ( Basic Function )

**P Home Forward**  
0(FALSE)

To set the Home Direction forward direction or reverse direction, turn the Jog handle forward direction, then the display shows 1(TRUE). This means that the Home position will be forward end. Turn the Jog handle reverse direction, and then the display shows 0(FALSE). This means that the Home position will be returned end. In case of the Home direction forward, the ordinate will be + (plus). In case of the Home direction reverse, the ordinate will be - (minus). (see fig. below)



### 4.3.2. Stroke Limit End Set ( Basic Function )

**P Stroke Limit**  
00050.000mm

To set stroke Limit corresponding to the Home direction set. By using this function, one stroke Cylinder can simulate other stroke Cylinder.

### 4.3.3. Home Position Offset Teaching ( Extended Function )

**P Home OffsetTCH**  
00010.000mm

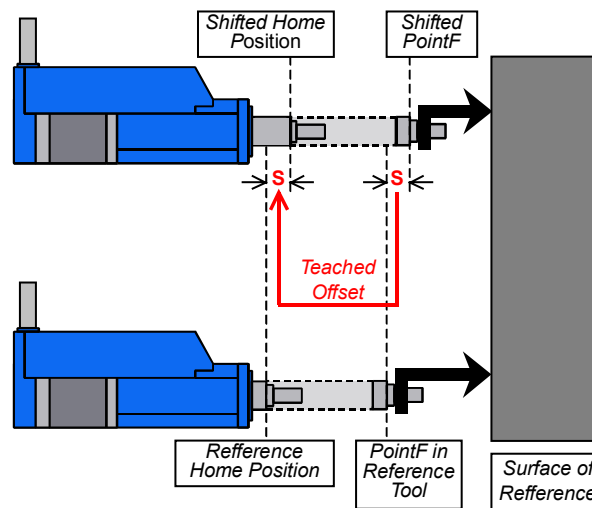
Normally, the home position of the Mechatronics Cylinder is a fixed position depends on the forward end or the reverse end, and each saved Position is fixed in a position on this coordinate system. If you activate the extended functionality, you can shift all of the actual position of the saved Position with using Offset for Home Position extension. For example, this means that you can avoid re-teaching of the Position when the


- POS. JOG/TEACH
- POS. DATA INPUT
- SPEED DATA INPUT
- PUSH FORCE DATA IN
- ACCEL/DECEL DATA IN


tool length is changed. At the first time you entry the screen of the "Home OffsetTCH", The "POS. JOG/TEACH" is selected as shown left. **POSITION**

In this state, you can instruct positioning to PositionF with pressing **RUN** and you can move the cylinder shaft to any position with the JOG Handle.



The offset value can be taught as the deference to actual position from the PositionF ( the point of reference ) immediately as shown below. You should have previously taught the PositionF as the reference position in the reference tool if you want to use this method.



Fine tuning the position can be done using the same manual handle after pressing  key.


Please press  key to save the mode you have selected.


#### 4.3.4. Home Position Offset Input ( Extended Function )

 At the screen of the “Home OffsetTCH”, you can Manual Data Input mode of Home Position Offset Input by pressing 

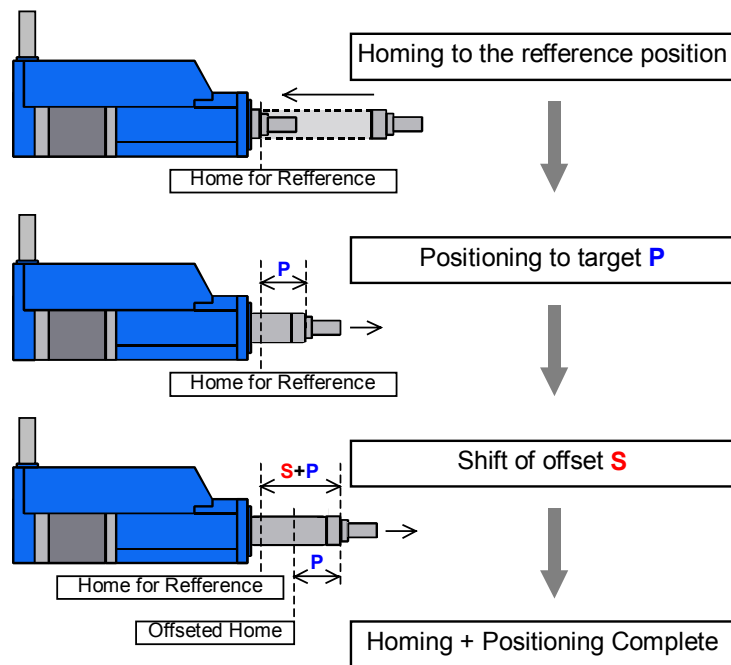
- POS. JOG/TEACH
- POS. DATA INPUT
- SPEED DATA INPUT
- PUSH FORCE DATA IN
- ACCEL/DECEL DATA IN

The “POS. DATA/INPUT” is selected as shown left, you can input the offset data without moving of the cylinder shaft.



Fine tuning the position can be done using the same manual handle after pressing  key.

Please press  key to save the mode you have selected.


If you activate the Home Position Offset extension, the Mechatronics Cylinder behaves the Homing action before the positioning when it is first positioning after it's powering ON.




#### 4.3.5. Offset for Displayed Position ( Extended Function )

 At the screen of the “Home OffsetMDI”, you can enter the input mode of Offset for Displayed Position by pressing 

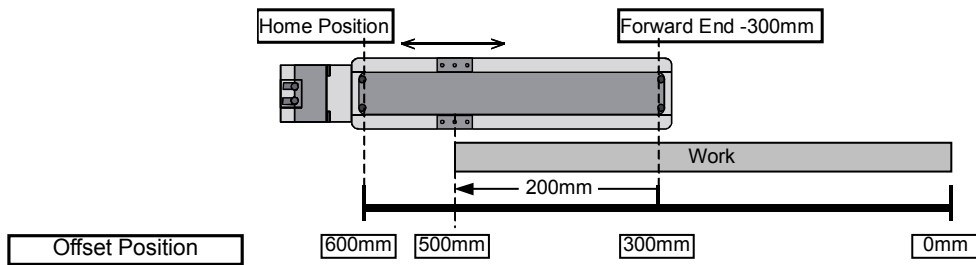
You can input the offset data with the JOG Handle.

Fine tuning the position can be done using the same manual handle after pressing  key.

Please press  key to save the mode you have selected.

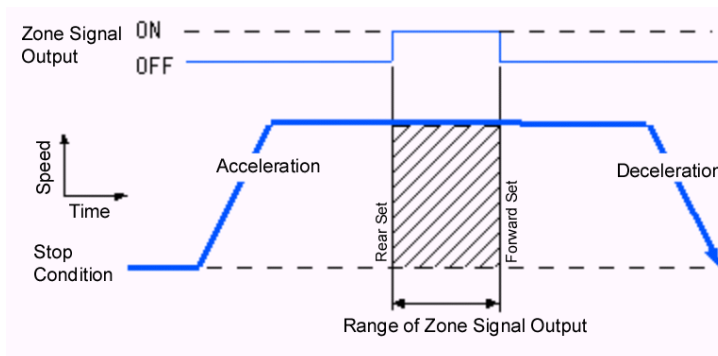
The position displayed at the CTC-33 is a distance from the Home Position fixed within the stroke of the mechatronics cylinder. If you activate the extended functionality, you can shift the displayed position at the CTC-33 with using “Offset for Displayed Position” extension.

For example, if you set the value 600mm as the Offset for Displayed Position, the value 590mm is displayed at the actual position -10mm, the value 500mm is displayed at the actual position -100mm. This means that you can be displayed the position at the coordinate system that region is exceed the stroke of your mechatronics cylinder.

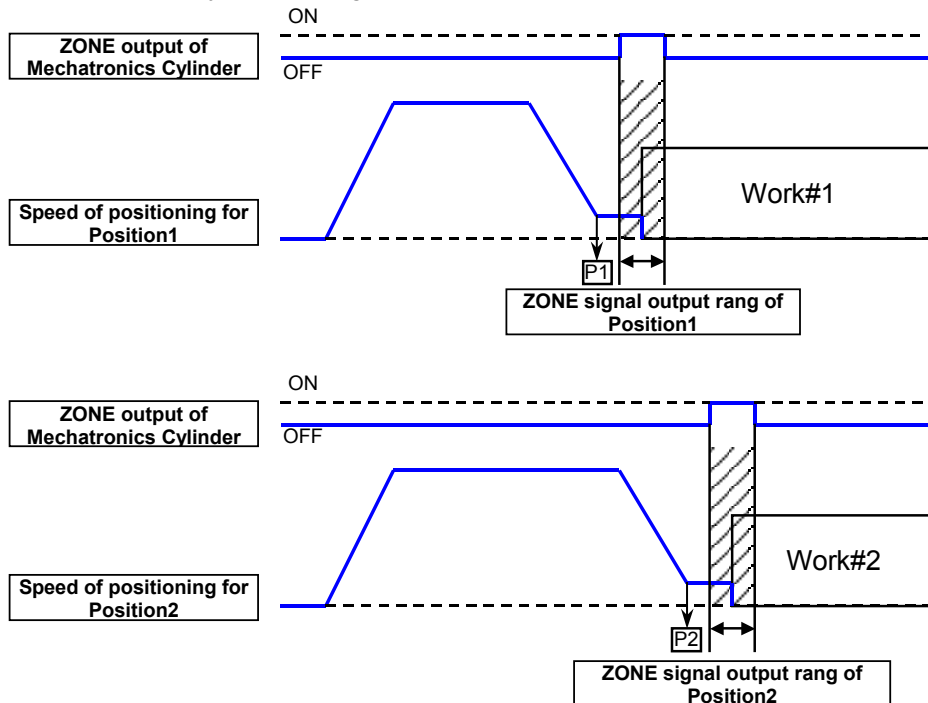


#### 4.3.6. Individually settable ZONE signal output range for each Position

The Mechatronics Cylinder has the function to output the ZONE signal indicate if the shaft of the cylinder is in the specified region or not.




If you activate the extended functionality, you can set the ZONE signal output range individually for each Position with using "Individually settable ZONE signal output range for each Position" extension. You can make the mechatronics cylinder to check the stopped position is regular or not, even if the target works have many kind of length.




#### 4.3.6.1. Individually settable ZONE signal output - Rear Position ( Extended Function )

P0 ZONE Reverse  
00010.000mm

The left term of the above line is the position number bind to this rear ZONE setting. "P0" means Position0, "P1" means Position1 and "PF" means PositionF. The value is settable with using the JOG Handle.


Fine tuning the position can be done using the same manual handle after pressing  key.


Please press  key to save the mode you have selected.

#### 4.3.6.2. Individually settable ZONE signal output - Forward Position ( Extended Function )

P0 ZONE Forward  
00010.000mm

The left term of the above line is the position number bind to this forward ZONE setting. "P0" means Position0, "P1" means Position1 and "PF" means PositionF. The value is settable with using the JOG Handle.

Fine tuning the position can be done using the same manual handle after pressing  key.


Please press  key to save the mode you have selected.

#### 4.3.6.3. Common ZONE signal output - Rear Position ( Basic Function )

P ZONE Reverse  
00010.000mm

If the left term of the above line is "P", the ZONE setting is common to all or the several positions. The value is settable with using the JOG Handle.


Fine tuning the position can be done using the same manual handle after pressing  key.


Please press  key to save the mode you have selected.

#### 4.3.6.4. Common ZONE signal output - Forward Position ( Basic Function )

P ZONE Forward  
00010.000mm

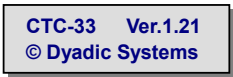


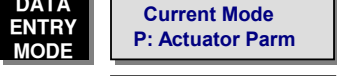
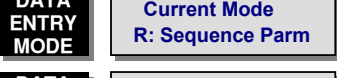
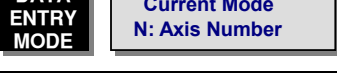





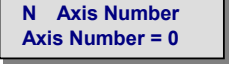

If the left term of the above line is "P", the ZONE setting is common to all or the several positions. The value is settable with using the JOG Handle.

Fine tuning the position can be done using the same manual handle after pressing  key.

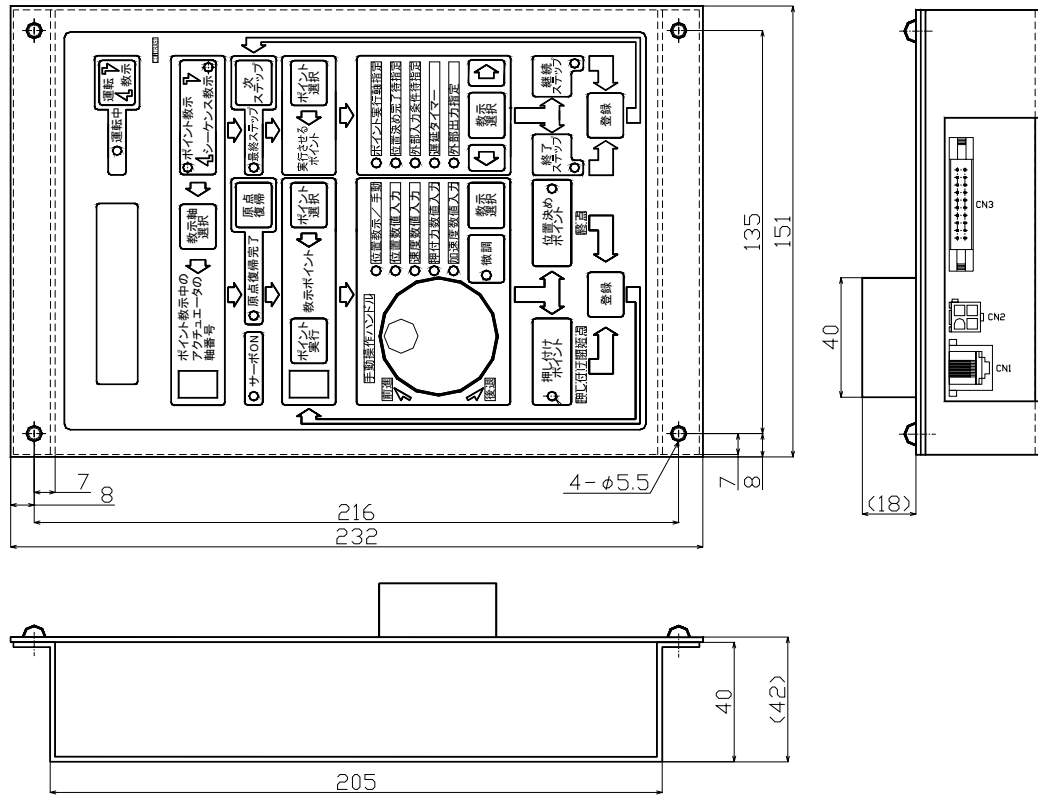
Please press  key to save the mode you have selected.

### 5. To change the axis number of the actuator

The Axis Number Mode is to change the axis number of the Mechatronics Cylinder for the multi axes system. To avoid the conflict of communication, only one axis must be connected to the CTC-33 when its axis number is change.

No.	Panel	Operations
1		First connect Teaching Box to the Mechatronics Cylinder via ADP cable, and then turn the power ON.
2	    	Please press  key once within 3 seconds  Please press  key once more.  Please press  key once more.  Please press  key once more.  The display changes to Current Mode, "P: Axis Number". Please press  key to confirm it.
3		Please select the new axis number for the actuator with using the JOG Handle and press  key to save it.

## 6. Dimension Drawing





66-3 Kanaiwa Honmachi,  
Kanazawa, Ishikawa  
920-0336 Japan  
TEL 076-267-9103 FAX 076-267-9104

Please feel free to contact us for further assistance and/or any questions.  
Please note that the specifications may be changed without notice.