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## 1 . Teaching Pendant (Model CTA-23) Summary

The **Teaching Pendant (CTA-23)** is a handy type of data entry operation tool for the Mechatronics Cylinder of Dyadic Systems.

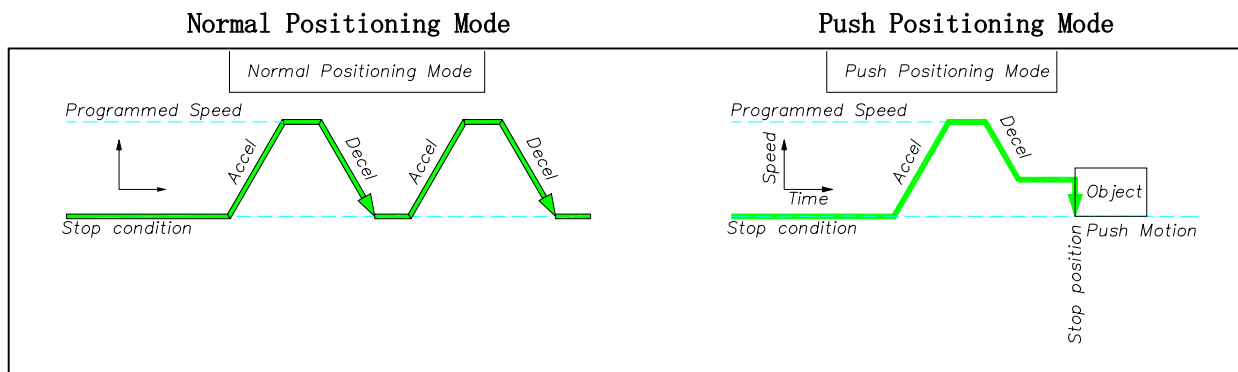
### 1.1. Features

The basic operation of the CTA-23 Teaching Pendant is very easy. It allows the operator to enter and edit data by just following the panel instructions.

The cable between the Teaching Pendant and the Mechatronics Cylinder can be connected or removed while the Mechatronics Cylinder has power.

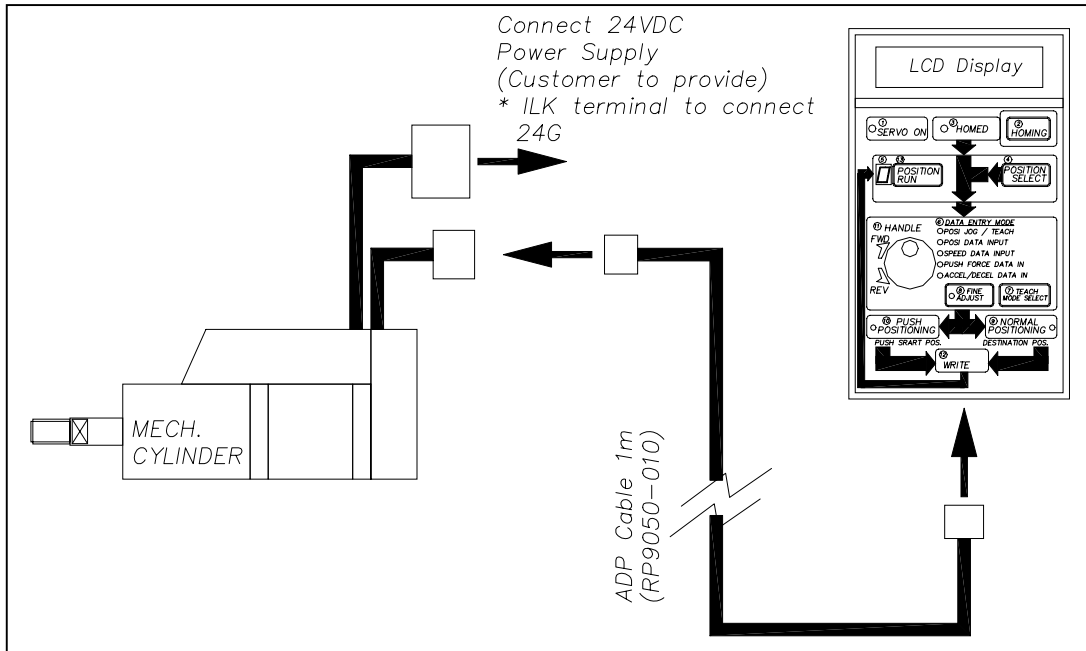
### 1.2. Operation mode

There are 2 main operation modes of this Mechatronics Cylinder: **“Positioning Mode”** and **“Push Mode”**. **“Positioning Mode”** moves and stops the Mechatronics Cylinder at the programmed position. **“Push Mode”** moves the Mechatronics Cylinder to the programmed position (called the “Approach Point”) at whatever speed and acceleration the user selects. Then it continues its motion at constant speed to push the object with set force.



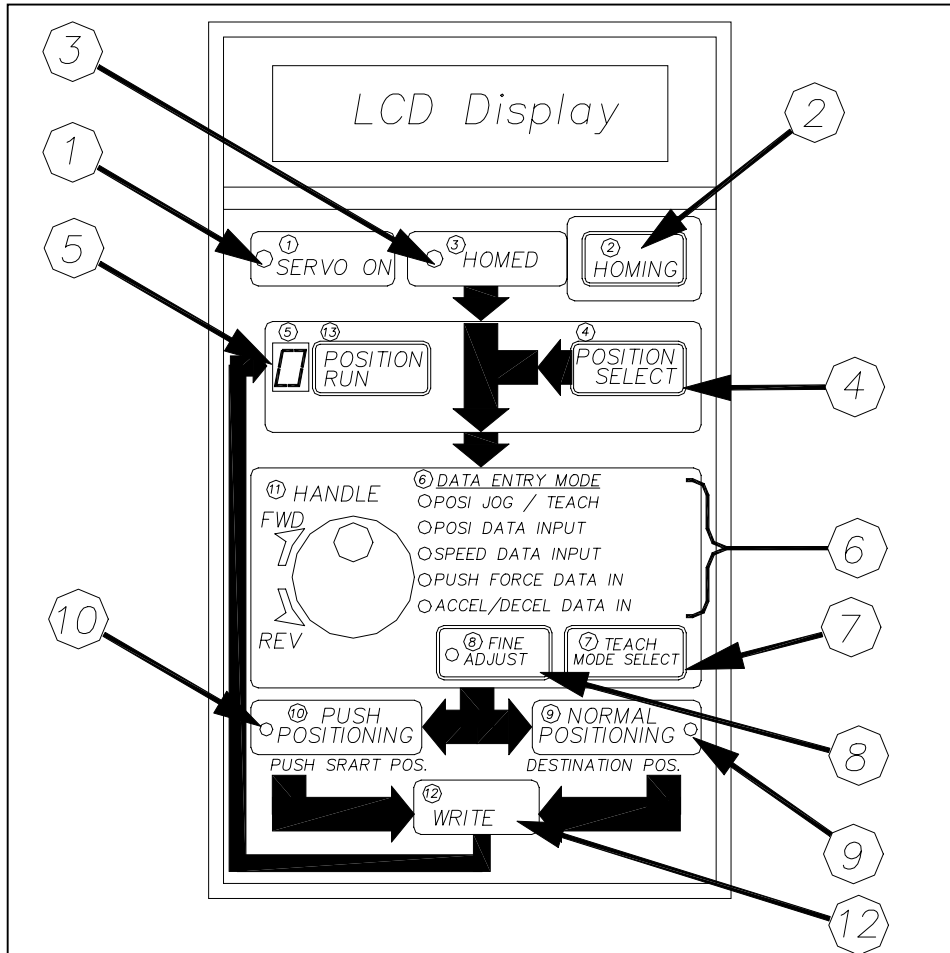
### 1.3. Connections

Use the ADP cable (supplied with Teach Pendant) to connect the Mechatronics Cylinder with the CTA-23. The power to CTA-23 comes from the Mechatronics Cylinder. The cable can be connected when the power of the Mechatronics Cylinder is either ON or OFF.



## 2. Functions and titles of Operation Panel Key and LED

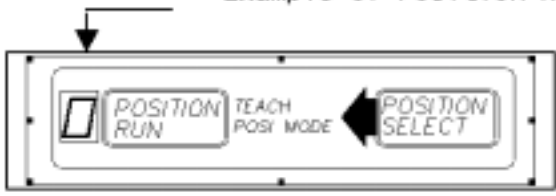
### 2.1. Teaching Pendant Panel



### 2.2. Operation of Teaching Pendant

The following diagram shows the functions and titles of Operation panel keys and LED. In this manual terms in brackets refer to the key to be used.

Action	Function and LED	Display Menu
Homing	<p><b>Homing</b> ( <b>Homing Key</b> )</p> <p>Press and hold the (Homing Key) until the “Homed” LED (#3) turns ON. If the key is released before the LED turns on, you can continue by just pressing the key again. The Homing Completion LED will be ON until the System is turned OFF.</p>	<p><input type="checkbox"/> Homed</p> <p>→ <input checked="" type="checkbox"/> Homed</p>
Position Select	<p><b>To select Position Number</b> ( <b>Position Select Key</b> )</p> <p>The position number can be increased by pressing the position Number Select Key the appropriate number of times - from 0 to F. Continuing to press this key will increase the position number continuously.</p>	

	<p style="text-align: center;">Example of Position Number 0</p> 											
<p>Position Run</p>	<p>To run the displayed position number.                  ( <span style="border: 1px solid black; padding: 2px;">Position Run Key</span> )                  Ensure that the Mechatronics Cylinder has room to move, then press the "Position Run Key".</p>											
<p>Data Review</p>	<p>Indicate the current setting item by Indicator LED                  (⑤)                  To set the item to be reviewed, press <span style="border: 1px solid black; padding: 2px;">Data Entry Mode Key</span> .                  The data can be changed by the turning the handle.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <ul style="list-style-type: none"> <li><input type="radio"/> Position Teach-Jog</li> <li><input type="radio"/> Position Data Input</li> <li><input type="radio"/> Speed Data Input</li> <li><input type="radio"/> Push Force Data Input</li> <li><input type="radio"/> Accel Data Input</li> </ul> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Manual Position Teach</td> <td>To teach the actual position by moving the rod of the Mechatronics Cylinder.</td> </tr> <tr> <td>Position Data Input</td> <td>To input the position into the memory of Mech. Cylinder. The Mech. Cylinder doesn't move.</td> </tr> <tr> <td>Speed Data Input</td> <td>To input the speed into the memory of Mech. Cylinder.</td> </tr> <tr> <td>Push Force Data Input</td> <td>To input the Push Force data into the Mech. Cylinder.</td> </tr> <tr> <td>Accel/Decel Data Input</td> <td>To input the Acceleration/Deceleration into the memory of Mech. Cylinder.</td> </tr> </table>	Manual Position Teach	To teach the actual position by moving the rod of the 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.	
Manual Position Teach	To teach the actual position by moving the rod of the Mechatronics Cylinder.											
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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.											
<p>Teach Select</p>	<p>Select Positioning data to edit ( <span style="border: 1px solid black; padding: 2px;">Data Entry Mode Key</span> )                  Each depression of this key will change the selected data as follows:</p>	<div style="border: 1px solid black; padding: 10px; display: inline-block;">                     Normal ●                      Positioning                 </div>										

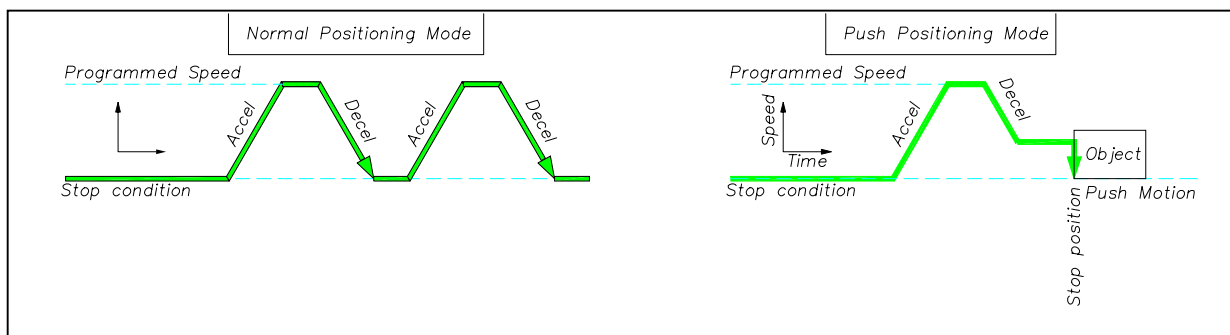
	<p style="text-align: center;"><b>In case of Normal Positioning Mode (9)</b></p>	
	<p style="text-align: center;"><b>In case of Push Positioning (10)</b></p>	
<p>○ Fine Adjust</p>	<p><b>Fine tuning the data (Fine Tuning)</b></p> <p>Press the (Fine Tuning) key to turn on the LED. Press it again to return to normal adjustment sensitivity.</p>	<p>○ Fine Adjust</p>
<p>Normal ○ Positioning</p>	<p><b>To select Positioning Mode Edit (Positioning Mode Key)</b></p> <p>By pressing to select, the LED will be turned ON.</p>	
<p>Push ○ Positioning</p>	<p><b>Push Mode Edit (Push Mode Key)</b></p> <p>Press the (Push Mode Key) to select. The LED will turn ON.</p>	
<p>Write</p>	<p><i>Write all the data selected into the memory of Mechatronics Cylinder. (Write Key)</i></p>	

### 3. Operation Method: Standard Operation Mode LCD Display

This chapter will explain the basic operation of the Teaching Box.  
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

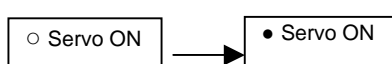
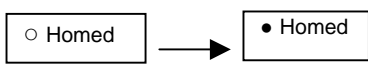
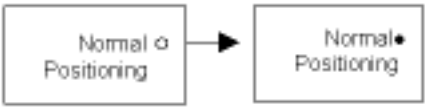
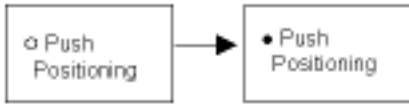
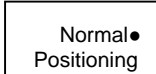
As explained in the summary, this Mechatronics Cylinder has 2 basic motions, "Positioning Mode" and "Push Mode". "Positioning Mode" moves the cylinder rod to the programmed position and stops, "Push mode" starts the push motion from the programmed position which is in front of the object. Please decide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

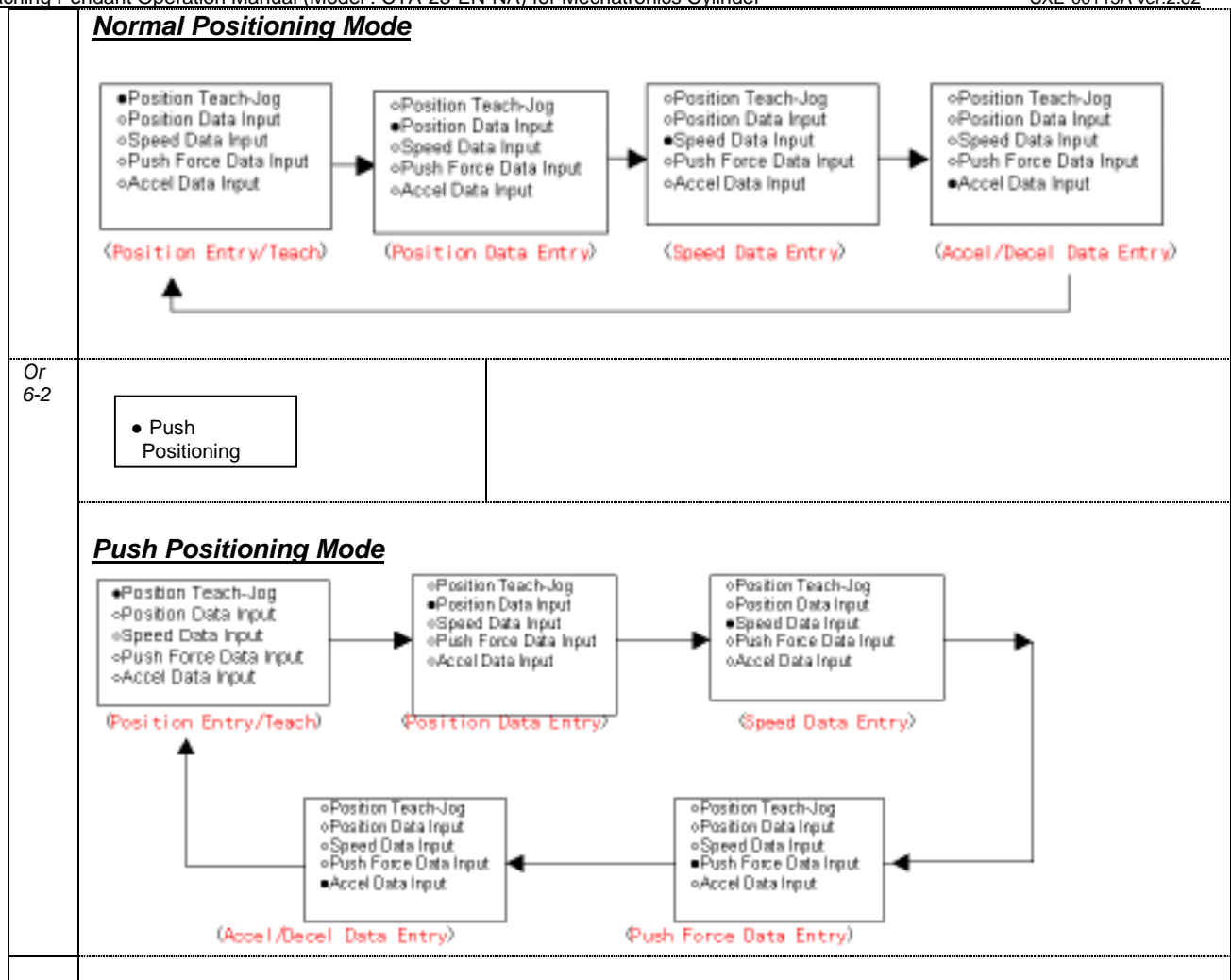


The set data item will be selected by **Data Entry Mode Key** . LED at the desired data set item will be ON. As this key is pressed repeatedly the position of lighted LED will move down, so that the set item will change.

<b>Panel</b>	<b>Functions</b>	<b>Descriptions</b>
<div style="border: 1px solid black; padding: 5px;">           ○Position Teach-Jog            ○Position Data Input            ○Speed Data Input            ○Push Force Data Input            ○Accel Data Input         </div>	<i>Manual Position Teach</i>	<i>To teach the actual position by moving the rod of the Mechatronics Cylinder.</i>
	<i>Position Data Input</i>	<i>To input the position into the memory of Mech. Cylinder. The Mech. Cylinder doesn't move.</i>
	<i>Speed Data Input</i>	<i>To input the speed into the memory of Mech. Cylinder.</i>
	<i>Push Force Data Input</i>	<i>To input the Push Force data into the Mech. Cylinder.</i>
	<i>Accel/Decel Data Input</i>	<i>To input the Acceleration/Deceleration into the memory of Mech. Cylinder.</i>

### 3.1. Common Operation

<b>No.</b>	<b>Panel</b>	<b>Operations</b>
1		First connect Teaching Box to the Mechatronics Cylinder via ADP cable, 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.
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 to be set by pressing <b>Data Entry Mode Key</b> .



### 3.2. Position Teach-Jog

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">                     E Position Teach Jog 00000.000 mm                 </div> <div style="border: 1px solid black; padding: 5px;">                     ●Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input                 </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>Data Entry Mode Key</b> .
	4	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

### 3.3. Position Data Input

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">           E Position Edit -00021.500 mm         </div> <div style="border: 1px solid black; padding: 5px;"> <input type="radio"/> Position Teach-Jog  <input checked="" type="radio"/> Position Data Input  <input type="radio"/> Speed Data Input  <input type="radio"/> Push Force Data Input  <input type="radio"/> Accel Data Input         </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 Adjust 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	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

### 3.4. Speed Data Input

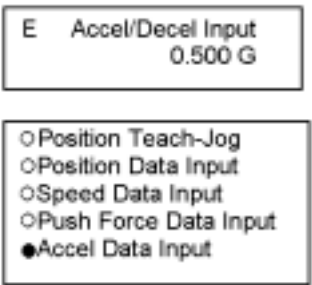
Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">           E Speed Input 1500.0 mm/sec         </div> <div style="border: 1px solid black; padding: 5px;"> <input type="radio"/> Position Teach-Jog  <input type="radio"/> Position Data Input  <input checked="" type="radio"/> Speed Data Input  <input type="radio"/> Push Force Data Input  <input type="radio"/> Accel Data Input         </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 data entry knob after pressing <b>Fine Adjust Key</b> , the speed of Mechatronics Cylinder can be set by the smallest resolution.
	2	Please press <b>Write Key</b> after the speed is set to write the speed data into the memory of the Mechatronics Cylinder.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

### 3.5. Push Data Input

**(Valid only when Push Positioning Mode is selected)**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">           E Push Force Input 20%         </div> <div style="border: 1px solid black; padding: 5px;"> <input type="radio"/> Position Teach-Jog  <input type="radio"/> Position Data Input  <input type="radio"/> Speed Data Input  <input checked="" type="radio"/> Push Force Data Input  <input type="radio"/> Accel Data Input         </div>	1	By turning manual handle (Jog Handle), please set the Push Force of Mechatronics Cylinder in the LCD display. The maximum force that can be run in Push Mode is ~65% rated axial load to ensure the motor can maintain speed and control of the load. In this operation, the Fine Adjusting Key <b>Fine Adjust</b> is not valid.
	2	Please press <b>Write</b> key after setting Force to save the data into the Mechatronics Cylinder.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

### 3.6. Acceleration Data Input

Panel	No.	Operations
	1	By turning manual handle (Jog Handle), please set the Acceleration of Mechatronics Cylinder in the LCD display. By turning the manual knob (Jog Handle) after pressing the <b>Fine Adjust Key</b> the Mechatronics Cylinder can be set by the smallest resolution.
	2	Please press <b>Write</b> key after the set of Acceleration to save into Mechatronics Cylinder.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b> .

### 4. Advanced Operations

There are 2 Advanced modes beside Standard Positioning Programming Operation. Therefore there are 3 Modes in Advanced Mechatronics Cylinder are as follows:

**S: Standard Mode (Default when Teach Pendant is powered up)**

- S-1. Position Jog Programming
- S-2. Position Data Programming
- S-3. Speed Data Programming
- S-4. Push Force Data Programming (Valid for Push Mode ONLY)
- S-5. Acceleration Data Programming

**D: Detail Mode**

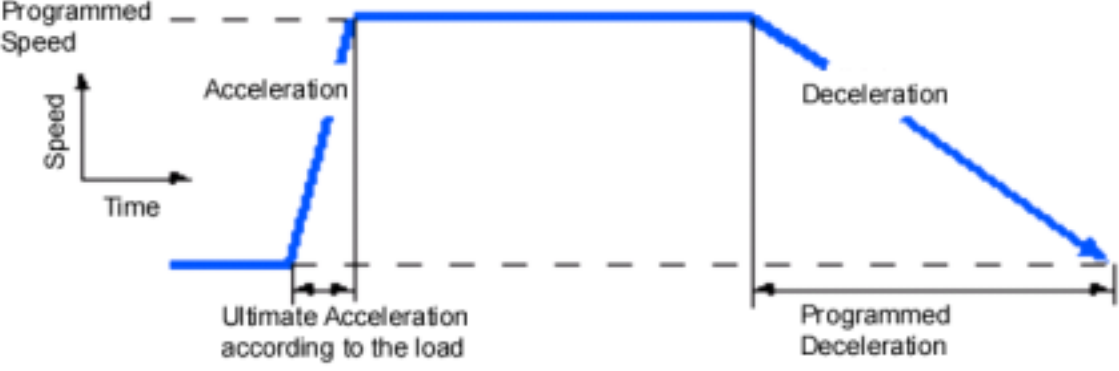
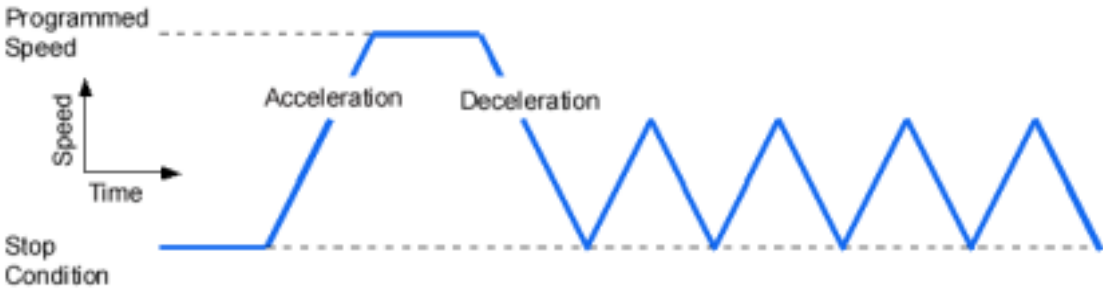
- All of the standard positioning programming
- D-1. Maximum Acceleration Mode
- D-2. Incremental Positioning Mode
- D-3. Positioned (Positioning Completion) Output Signal Width Setting
- D-4. Servo Gain Setting

**P: Parameter Mode**

- P-1. Homing Direction Setting
- P-2. Stroke Limit End Setting
- P-3. Zone Signal Output Rear Limit Setting
- P-4. Zone Signal Output Forward Limit Setting

## 4.1. Detail Mode

### 4.1.1. Functions of Detail Mode

Function No.	Function Description
D-1	<p><b>Maximum Acceleration Mode</b></p> <p>Uses Maximum Acceleration for the position, Deceleration is according to the “Acceleration” parameter.</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><b>Positioned (Position Completion) Signal Width Set</b></p> <p>To set the Position Completion Signal Width, which is the distance between the current position and the destination position at which the “Position Finished” output is energized. An application of this feature may be to change speeds during one movement without stopping. (The next movement would be initiated as soon as the PFIN output comes on, before the current movement stops).</p>
<p><b>D-4</b></p>	<p><b>Servo Gain Set</b></p> <p>To set the Gain Value of the selected position. Its default is 6 and the maximum data is 15. There is generally no need to change this data, but positioning time may be reduced if the Gain is tuned specifically to the load.</p>

#### 4.1.2. Operation of Detail Mode

##### 4.1.2.1. Common Operation (Refer 3.1 Common Operation)

To program the Mechatronics Cylinder in Detail mode the user must enter this mode immediately on power-up.

No.	Panel	Operations
1		First connect Teaching Box to the Mechatronics Cylinder via ADP cable, then turn the power ON.
2	<p>CTA-22d Ver. 2.62 (c) Dyadic Systems</p> <p>→ Current Mode S: Standard</p> <p>→ Current Mode D: Detail</p>	<p>Please press <b>Data Entry Mode</b> 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>○ Servo ON → ● Servo ON</p>	After the confirmation of Detail Mode, the <b>Servo ON LED</b> will be turned ON.
4	<p>○ Homed → ● Homed</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

		<p>Key) again to continue the Homing process.</p> <p>If the power is ON condition and the unit is (Homed), <b>Homed LED</b> will be ON together with the <b>Servo ON LED</b>.</p>
5		<p>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.</p>
5		<p>Please select "Positioning Mode" or "Push Mode".</p>
		<p><b>Normal Positioning Mode</b> <span style="float: right;"><b>Push Positioning Mode</b></span></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">                 Normal ○ Positioning             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">                 Normal ● Positioning             </div> <div style="margin-left: 100px;"> <div style="border: 1px solid black; padding: 5px; text-align: center;">                     ○ Push Positioning                 </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; text-align: center;">                     ● Push Positioning                 </div> </div> </div>
6-1		<p>Please select item to be reviewed or modified by pressing <b>Data Entry Mode Key</b>.</p>
		<p><b>Normal Positioning Mode</b></p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ●Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ●Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ○Position Data Input ●Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ●Accel Data Input             </div> </div> <p style="text-align: center; color: red; font-size: 0.8em;"> <span>(Position Entry/Teach)</span>      <span>(Position Data Entry)</span>      <span>(Speed Data Entry)</span>      <span>(Accel/Decel Data Entry)</span> </p> <p style="text-align: center; color: red; font-size: 0.8em;"> <span>←</span> (Return arrow from Accel/Decel Data Entry to Position Entry/Teach)         </p>
Or 6-2		<p>● Push Positioning</p>
		<p><b>Push Positioning Mode</b></p> <div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ●Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ●Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ○Position Data Input ●Speed Data Input ○Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ○Position Data Input ○Speed Data Input ●Push Force Data Input ○Accel Data Input             </div> <div style="font-size: 2em;">→</div> <div style="border: 1px solid black; padding: 5px; width: 20%;">                 ○Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ●Accel Data Input             </div> </div> <p style="text-align: center; color: red; font-size: 0.8em;"> <span>(Position Entry/Teach)</span>      <span>(Position Data Entry)</span>      <span>(Speed Data Entry)</span> </p> <p style="text-align: center; color: red; font-size: 0.8em;"> <span>(Accel/Decel Data Entry)</span>      <span>(Push Force Data Entry)</span> </p> <p style="text-align: center; color: red; font-size: 0.8em;"> <span>←</span> (Return arrows from Speed Data Entry and Push Force Data Entry to Position Entry/Teach)         </p>
7		<p>Position Teach-Jog (Refer to 3.2. Position Teach-Jog)</p>

8	Position Data Input (Refer to 3.3. Position Data Input)
9	Speed Data Input (Refer to 3.4. Speed Data Input)
10	Push Data Input (Refer to 3.5. Push Data Input)
11	Acceleration Data Input (Refer to 3.6. Acceleration Data Input)

#### 4.1.2.2. Maximum Acceleration

Panel	No.	Operations
<p>or</p> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">           Normal● Positioning         </div> <div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">           ● Push Positioning         </div> <div style="border: 1px solid black; padding: 5px; display: inline-block;">           D Ultimate Accele 0 (FALSE)         </div>	1	Turn the Jog handle forward (CW) direction, then the display shows 1 (TRUE). This means that the positioning movement will be by maximum acceleration according to the load. This programmed Accel/Decel (row 11 above) will then be just Deceleration.
	2	By turning Jog handle reverse (CCW) direction, then the display shows 0 (False) and the programmed Accel/Decel of row 11 above will be both Acceleration and Deceleration.
	3	Please press the <b>WRITE</b> key after changing the status of Maximum Acceleration to save into the Mechatronics Cylinder.
	4	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b>
	5	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b>

#### 4.1.2.3. Incremental Movement Set

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; display: inline-block; margin-bottom: 10px;">           Normal● Positioning         </div> <div style="border: 1px solid black; padding: 5px; display: inline-block;">           D Incremental Posi 0 (FALSE)         </div>	1	Turn the Jog handle forward (CW) direction, then the display shows 1(TRUE). This means that the positioning movement will be by Incremental movement.
	2	By turning Jog handle reverse (CCW) direction, the display shows 0 (False) and the positioning will be regular mode, in which the axis moves to a set position along its stroke.
	3	If this is set to 1 (TRUE), the Mechatronics Cylinder will move incrementally by the set distance. By operating this same positioning step, the same distance movement will be repeated until the axis reaches its stroke limit range. Velocity and Acceleration can still be modified for each motion.
	4	Please press the <b>WRITE</b> key after selecting Incremental Movement to save into the Mechatronics Cylinder.
	5	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b>
	6	To enter or edit data for other position Numbers, please select the desired position Number by pressing <b>Position Select Key</b>

**4.1.2.4. Positioned (At Position) Output Signal Width**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> Normal● Positioning </div> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> D            At Position               00000.030 mm </div>	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 from the destination position at which the Mechatronics Cylinder will output the “Position Finished” signal. If this width (distance) is long, the “PFIN” signal will be output even though the Mechatronics Cylinder is still moving so that the Mechatronics Cylinder can receive another motion command before it stops. This value can be set independently for each of the positions in the axis.
	3	Fine tuning the signal width can be done using the same manual handle after pressing <span style="border: 1px solid black; padding: 2px;">FINE ADJUST</span> key.
	4	Please press the <span style="border: 1px solid black; padding: 2px;">WRITE</span> key after the setting the Positioned Signal Width to save into Mechatronics Cylinder.
	5	To set other data for this selected position Number, please select the desired item by pressing <span style="border: 1px solid black; padding: 2px;">Data Entry Mode Key</span>
	6	To enter or edit data for other position Numbers, please select the desired position Number by pressing <span style="border: 1px solid black; padding: 2px;">Position Select Key</span>

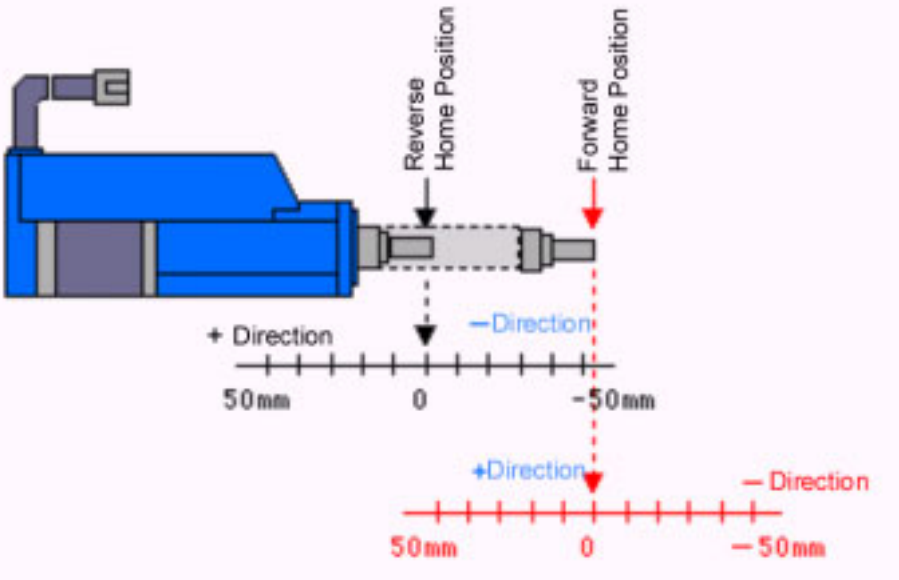
**4.1.2.5. Servo Gain Set**

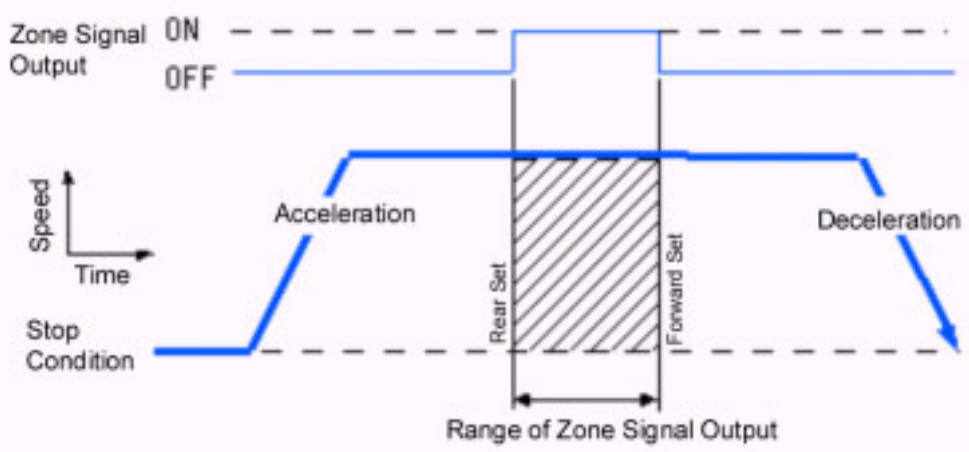
Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;"> Normal● Positioning </div> <div style="border: 1px solid black; padding: 5px; width: fit-content;"> D            Gain Parameter               006 </div>	1	Turn the Jog handle forward or reverse, so that the Position Motion Gain can be adjusted.
	2	This Servo Gain is set to 6 normally; it can be set to 15 maximum. This setting shouldn't need to be changed, but in special cases motion may become smoother with trial and error gain adjustments. See the TBVST PCTOOL User manual for information on creating traces of axis motion.
	3	<span style="border: 1px solid black; padding: 2px;">FINE ADJUST</span> key is not valid for this operation.
	4	Please press the <span style="border: 1px solid black; padding: 2px;">WRITE</span> key after changing Servo Gain to save into Mechatronics Cylinder.
	5	To set other data for this selected position Number, please select the desired item by pressing <span style="border: 1px solid black; padding: 2px;">Data Entry Mode Key</span>
	6	To enter or edit data for other position Numbers, please select the desired position Number by pressing <span style="border: 1px solid black; padding: 2px;">Position Select Key</span>

## 4.2. Parameter Mode

Parameter Mode is used to set the Parameters that control the operation of the Mechatronics Cylinder. The Mechatronics Cylinder has standard parameters set already which will be appropriate for most operations. Users should make changes in the Parameter Mode very carefully, and do so at their own risk.

### 4.2.1. Functions of Parameter Mode

Function No.	Functions Description
P-1	<p><b>Home Direction Set</b></p> <p>To set the Home Direction (fully extended or retracted). When the home direction is set to full extension, all length co-ordinates along the stroke of the axis will be + (plus). When the home direction is set to full retraction, all length co-ordinates along the stroke of the axis will be - (negative). (see fig. below)</p> 
P-2	<p><b>Stroke Limit End Set</b></p> <p>This function can be used to set a stroke Limit corresponding to the Home direction. By using this function, a Cylinder of one stroke can simulate a Cylinder of a shorter stroke.</p>

<p><b>P-3</b></p>	<p><b>Zone Signal Output Set – Rear Position</b></p> <p>To set the rear position of Zone Signal output range. This function is used with P-4. In case of Cylinder extending, the Zone signal will be turned ON at this Rear Position. In case of Cylinder retracting, the Zone signal will be turned OFF at this Rear Position.</p> 
<p><b>P-4</b></p>	<p><b>Zone Signal Output Set – Forward Position</b></p> <p>To set the forward position of Zone Signal output range. This function is used with P-3. In case of Cylinder extending, the Zone signal will be turned OFF at this Forward Position. In case of Cylinder retracting, the Zone signal will be turned ON at this Forward Position.</p>

#### 4.2.2. Operation of Detail Mode

##### 4.2.2.1. Common Operation (Refer 3.1 Common Operation)

Please follow the procedure below:

No.	Panel	Operations
1		Connect the Teach Pendant to the Mechatronics Cylinder via ADP cable and turn the power ON.
2	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin-bottom: 10px;">CTA-22d Ver. 2.62 (c) Dyadic Systems</div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <span style="font-size: 2em; margin-right: 10px;">→</span> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">Current Mode S: Standard</div> </div> <div style="display: flex; align-items: center;"> <span style="font-size: 2em; margin-right: 10px;">→</span> <div style="border: 1px solid black; padding: 5px; margin-left: 10px;">Current Mode P: Parameter</div> </div>	<p>Please press <span style="border: 1px solid red; padding: 2px;">DATA ENTRY MODE</span> once within 3 seconds</p> <p>Please press <span style="border: 1px solid red; padding: 2px;">DATA ENTRY MODE</span> twice</p> <p>The display changes to Current Mode, “P: Parameter Mode”. Please press <span style="border: 1px solid red; padding: 2px;">WRITE</span> key to confirm it.</p>
3		After selecting Parameter Mode, the “Home Direction Set” menu will be displayed.

**4.2.2.2. Home Direction Set**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">           P Home FWD Direction 0 (FALSE)         </div> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>● Position Teach-Jog</li> <li>○ Position Data Input</li> <li>○ Speed Data Input</li> <li>○ Push Force Data Input</li> <li>○ Accel Data Input</li> </ul> </div>	1	Turn the Jog handle forward (CW direction), then the display shows 1(TRUE). This means that the Home position will be full extension.
	2	Turn the Jog handle backward (CCW direction), then the display shows 0(FALSE). This means that the Home position will be full retraction.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	Please press the <b>WRITE</b> key after making changes to save into Mechatronics Cylinder.
	5	After pressing the "WRITE" key, the display goes back to the original menu when the power is turned ON. Please press <b>DATA ENTRY MODE</b> key and select next mode, Standard, Detail or Parameter.

**4.2.2.3. Stroke Limit Set**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">           P Stroke Limit -00050.500 mm         </div> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>● Position Teach-Jog</li> <li>○ Position Data Input</li> <li>○ Speed Data Input</li> <li>○ Push Force Data Input</li> <li>○ Accel Data Input</li> </ul> </div>	1	Turn the Jog handle forward direction or backward, so that the Stroke Limit can be adjusted.
	2	Fine tuning the Stroke Limit can be done using the same manual Jog handle after pressing the <b>FINE ADJUST</b> key.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>Data Entry Mode Key</b> .
	4	Please press the <b>WRITE</b> key after making changes to save into Mechatronics Cylinder.
	5	After pressing the "WRITE" key, the display goes back to the original menu when the power is turned ON. Please press <b>DATA ENTRY MODE</b> key and select next mode, Standard, Detail or Parameter..

**4.2.2.4. Zone Signal Output Set – Rear Position**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">           P Zone Rear Limit End -00000.000 mm         </div> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>● Position Teach-Jog</li> <li>○ Position Data Input</li> <li>○ Speed Data Input</li> <li>○ Push Force Data Input</li> <li>○ Accel Data Input</li> </ul> </div>	1	Turn the Jog handle forward or backward, so that the rear position of Zone Signal Output can be adjusted.
	2	Fine tuning the rear position can be done using the same manual Jog handle after pressing <b>FINE ADJUST</b> key.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>DATA ENTRY MODE KEY</b> .
	4	Please press the <b>WRITE</b> key after making changes to save into Mechatronics Cylinder.
	5	After pressing the "WRITE" key, the display goes back to the original menu when the power is turned ON. Please press the <b>DATA ENTRY MODE KEY</b> and select next mode, Standard, Detail or Parameter.

**4.2.2.5. Zone Signal Output Set – Forward Position**

Panel	No.	Operations
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">           P Zone Frond Limit End -00000.000 mm         </div> <div style="border: 1px solid black; padding: 5px;">           ●Position Teach-Jog ○Position Data Input ○Speed Data Input ○Push Force Data Input ○Accel Data Input         </div>	1	Turn the Jog handle forward or backward, so that the forward position of Zone Signal Output can be adjusted.
	2	Fine tuning the forward position can be done using the same manual Jog handle after pressing <b>FINE ADJUST</b> key.
	3	To set other data for this selected position Number, please select the desired item by pressing <b>DATA ENTRY MODE KEY</b> .
	4	Please press the <b>WRITE</b> key after making changes to save into Mechatronics Cylinder.
	5	After pressing the “WRITE” key, the display goes back to the original menu when the power is turned ON. Please press the <b>DATA ENTRY MODE KEY</b> and select next mode, Standard, Detail or Parameter.

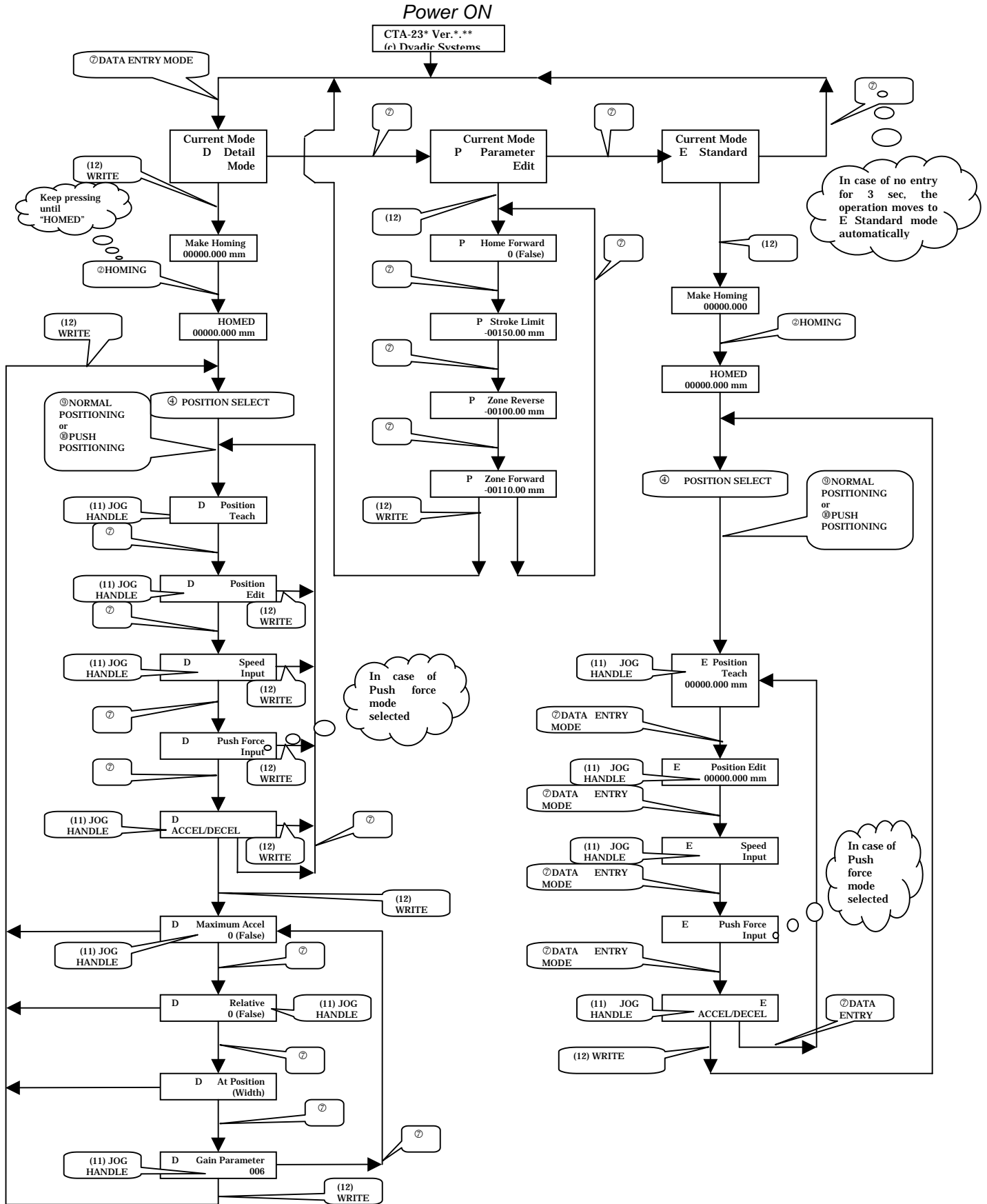
**5. Demo Program**

The Teach Pendant has a Demonstration function which can move the Cylinder by preset demo program or customer’s program. The operation procedure is as follows:

**Procedure of Demo**

No.	Panel	Operations
1		Connect the Teach Pendant (CTA-22) with the Mechatronics Cylinder via ADP cable, then turn the power ON. The Teach Pendant can be connected with the Mechatronics Cylinder when the power is already ON.
2	<div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px 5px;">○ Servo ON</div> <div style="font-size: 20px;">→</div> <div style="border: 1px solid black; padding: 2px 5px;">● Servo ON</div> </div> <div style="display: flex; align-items: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px 5px;">○ Homed</div> <div style="font-size: 20px;">⇒</div> <div style="border: 1px solid black; padding: 2px 5px;">● Homed</div> </div>	Approx. 4 to 5 seconds after the power is turned ON, or after ADP cable is connected, the <b>Servo ON LED</b> will be turned ON and LCD Display of Teaching Box will show “Make Homing” with Teach Position [0] flashing.
3		In case of the power ON first time, please keep pressing <b>Homing Key</b> until <b>Homing Complete LED</b> light turns ON. If it is stopped before the light turns on, you can press the Homing Key again to continue the Homing process.
4		To write the Demo Program into the Mechatronics Cylinder, hold down the <b>Normal Positioning Key</b> (#9) and press the <b>Position Select Key</b> (#4). This will over-write any settings currently in the Cylinder.
5		Please press <b>Position Select Key</b> once, so that No.1 position is selected. Press <b>Position Select Key</b> one more time, then No.2 position is selected. If <b>Position Select Key</b> is pressed N times, No.N position is selected.
6		After selecting the position (procedure 5), hold down the <b>Normal Positioning Key</b> (#9) and press the <b>Homing Key</b> (#2). The Mechatronics Cylinder will now begin running a loop of repeated motion from position 0 to position N.
7		By pressing the <b>Normal Positioning Key</b> , the demo movement will be stopped.

### 6. TEACH PENDANT (CTA-23) Operation Flow Chart



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