AC SERVO SYSTEM

P-DORI for FDA7000 USER MANUAL(Ver1.4)

Otis Elevator Korea

< CAUTION >

- 1. Insertion and Removal of communication cable should be done with the power off in both the servo drive and PC. If not, it may result in damage to both the servo driver's CN3 connector and PC's serial port.
- 2. Don't connect the body of 15pin connector and 9pin connector. It can cause problem because of noise. (Refer to Chapter 4.)

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1. Installing P-DORI Station

1.1 Introduction of P-DORI Station

P-DORI Station is a software tool for setup of OTIS FDA7000 servo drivers. P-DORI is designed to communicate with FDA7000 servo drive through RS-232 or RS-485 port. P-DORI Station provides an easy graphical user interface for setup, monitoring and testing FDA7000 servo system..

1.2 Program Setup

1.2.1 Installing from Internet

- 1. Download the 'P-DORI 7000(Ver1.4).zip' from OTIS Motor Website (http://www.higenmotor.com/eng/info).
- 2. Extract the zip file to hard disk(e.g., D:\).
- 3. Type D:\Setup.exe or double-click the D:\Setup.exe file.

If the P-DORI Station is installed correctly, it creates the new directory (C:\Program Files\OTIS\ P-DORI_FDA7000) and the new icon 'P-DORI Station' in your desktop. Double-click the 'P-DORI Station_FDA7000' icon to start the P-DORI Station.

2. How to Use

2.1 P-DORI Window

When the P-DORI button is clicked, the P-DORI Window appears

🔊 P-DC	RI For FDA7000 (Ver1.	4)				X
File Co	nfig Tools Help					
-Status W	Indow (Status : St)		St-17 (VO Status)		Control mode	
Menu	Name	Value	Input Status	Oulput Status	P1 : Motor	P6 : Torque
SI-01	Display Select	1203	ALMRST	None		
St-02	CMD Speed [rpm]	0	STOP	ALCODE2	P2 : Control	P7 : DIG INS
St-03	Motor Speed [rpm]	0	ESTOP	ALCODE1		
St-04	CW Speed LIM [rpm]	6000	CWLIM	ALCODE0	P3 : Speed	P8 : DIG OUT
St-05	CCW Speed LIM [rpm]	-6000	CCWLIM	ALARM	P4 : CMD	P9 : Monitor
S1-06	Command Pulse [pls]	0	Q PVP	TRQO/SPDO	DE - Dazitas	
St-07	Feedback Pulse [pls]	0	SPD3	O RDY	PSTPOSIDON	
St-08	Error Pulse [pls]	0	SPD2	C ZSPD	Funtion mode	
St-09	Command Torque[%]	0	SPD1	INSPD/INPOS	Jog	Auto Tuning
St-10	Load Rate[%]	0	O SVONEN	O BRAKE	AutoJon	Manual Tuning
SI-11	Max Load Rate[%]	0				
St-12	CW TRQ LIM[%]	300	Servo Status	Alarm (ALS)		
St-13	CCW TRQ LIM[%]	-300	POWER	ALS01 Alarm Dir	splay EM	ERSTOP
St-14	Inertia Ratio	1.7	ALARM	ALS02 Alarm R	eset Reset	Alarm Into
SI-15	MULTI Turns [pls]	0		Polaministory		
St-16	Single Turn [pls]	0	On-Line			isplay
St-18	Program Version	1.16	Off-Line			Reset
Port: 0	Baud: 9600 Data: 8 Stop	1 Parity:None	Exit		<u>×</u>	

Picture1. Main Window



2.1.1 Serial cable connection & Serial port setting

Prepare the serial cable to connect the PC (Personal Computer) and the servo driver. (Refer to **Chapter 4** for the serial cable).

Connect the servo driver and PC with the serial cable. Any serial comport is available. After proper connecting of serial cable, start P-DORI. Click the '**Config**' Menu to set the serial port. Default port is COM0. Choose the proper comport and click the '**OK**' Button.

🚔 Port Settings 🛛 🗙							
Comm Port:	1	•					
Baud Rate:	9600	•					
Data bits:	8	•					
Parity:	None	•					
Stop bits:	1	•					
Flow control:	None	•					
ОК							

Picture2. Port Setting Window

To use 'Auto port setting function', select COM0. In this case, when the 'ON-LINE' button is clicked, the available port list is displayed..

2.1.2 Select the Servo Drive ID

'Select the each servo drive's ID. Refer the picture 4.





If the communication works properly, state values and I/O status of the servo driver are displayed in the window. If not, the error message ' **Please, check Comport Connection**' appears. In this case, check the RS-232C connection.

2.1.3 Parameters Setting

Click the P1~P9 Buttons to edit the parameters. When the each button is clicked, present parameters in the servo driver are displayed in '**Value**' Box. To change the parameter value, write the new value in 'EDIT' box and click the '**SET**' Button. If the new value is written properly, the new value will be displayed in '**Value**' box. If not, click the '**Read Again**' Button and try again. Check the limitation of the values before editing the parameters. If abnormal value is written, errors will occur. Refer to the **Operation Manual of FDA 7000 servo driver**.

2.1.4 Function mode

There are four function modes. Jog, Auto Jog, Auto Tuning and Manual Tuning Mode. In Jog and Auto-Jog mode, the motor can be test-run with the only servo driver loader without wiring CN1

2.1.4.1 JOG Mode

In Jog mode window, click the 'JOG ON' button to stand-by the servo system.

📓 JOG M	IODE			
Menu	Name	Value	Edit	
JOG-02	Key Jog Speed[F	(PM] 100		Set
	heck safety before DE ON/OFF IG ON JC	ore JOG ON	III E-STOP	
Direction	Select / RUN			
	ccw		cw	
Read	Again		Clos	9

Picture4. JOG Mode window

To change the motor speed, edit the Jog Command Speed and click the 'SET' button. After setting the Jog Command Speed, click the one of the direction buttons, the motor will be running while you click-on the mouse and stop when click-off. Click the 'JOG OFF' button to return the servo function to normal

Caution!

Without clicking the 'JOG OFF' button, the servo system keeps the JOG operation mode ON after clicking the 'JOG ON' button

2.1.4.2 Auto JOG Mode

Auto-Jog mode provides eight speed patterns and eight periods of time.

After editing the Speed and Time values, click the 'Mode1' or 'Mode2' button to operate with eight speed and eight patterns. Please, click the 'Auto-JOG OFF' button before returning the servo function to normal or exiting from Auto-JOG window. Without clicking the 'Auto-JOG OFF' button, the servo system keeps the Auto-Jog operation mode. In case of exiting from Auto-JOG window without clicking the 'A-JOG OFF' button, reopen the Auto-Jog window and click the 'Auto-JOG OFF' button

Auto-JOG window have two kind of Auto-JOG mode

When there is no wonder running limit, use the Mode1. if not, use the Mode2

🕼 АЛТОЈОС 🛛 🔀								
Menu	Name	Value	Edit					
JOG-04	Jog Speed1 [rpm]	500		Set				
JOG-05	Jog Time1/REV1 [sec]/[rev]	5		Set				
JOG-06	Jog Speed2 [rpm]	-500		Set				
JOG-07	Jog Time2/REV2 [sec]/[rev]	5		Set				
JOG-08	Jog Speed3 [rpm]	200		Set				
JOG-09	Jog Time3/REV3 [sec]/[rev]	0		Set				
JOG-10	Jog Speed4 [rpm]	-200		Set				
JOG-11	Jog Time4/REV4 [sec]/[rev]	1		Set				
JOG-12	Jog Speed5 [rpm]	400		Set				
JOG-13	Jog Time5/REV5 [sec]/[rev]	1		Set				
JOG-14	Jog Speed6 [rpm]	-400		Set				
JOG-15	Jog Time6/REV6 [sec]/[rev]	1		Set				
JOG-16	Jog Speed7 [rpm]	800		Set				
J0G-17	Jog Time7/REV7 [sec]/[rev]	1		Set				
JOG-18	Jog Speed8 [rpm]	-800		Set				
JOG-19	Jog Time8/REV8 [sec]/[rev]	1		Set				
-AUTO JO	G ON/OFF							
-Mode	select / Run	1						
	al la al							
Mode 1 Mode 2 Auto-JOG OFF								
(Prood 7			Class					
Liead Again								

Picture5. Auto-Jog Window

2.1.4.3 Auto Tuning Mode

AutoTuning Mode						×
AutoTuning Mode can find proper	system	inertia			E STOP Push this butt When emerged	ion ncy situation
1. Mode Select					3. Auto Tuning Mode	ON
Distance Limit		Explanation		Select		
Mode 1 No	Reve	olution Speed	l/Time	•	4. Auto Jog Run	Start
Mode 2 Yes	Revo	lution Speed	/Count	•		
2. Jog Speed Edit					5. System Response Up	12 Down
Use two pattern(Forword/Reverse) as be Jog Time3 must set as '0' Just click 'Set' button, when use recomm	kow. and vak	ue			6. Maual Tuning mode	Entrance
Jog Speed 1 (rpm)		500	500	1 500° above	7. Auto Joo Bup	firm 1
Jog Time 1 / REV 1 [sec]/[re	4	5	5	⊲ 5 above	r. rate eg man	3000
Jog Speed 2 [rpm]		-500	-500	<1.200 below		- 13
Jog Time 2 / REV 2 [sec]/[re	4	5	5	⊲ 5 above	8. System Inertia ratio	1.7
Jog Time 3 / REV 3 [sec]/[re	4	0	0	Set		
					9. Auto Tuning Mode	OFF
AutoTuning Run is finished. If you need more precision tuning,	Use p	arameter grou	ap P2 ~ I	°6 by manual		Close

Picture6. Auto Tuning mode

Auto Tuning mode is made for find proper inertia adapted system.

In case of emergency situation, Stop the Auto Tuning operation by clicking the 'E-STOP' button or No.7 Auto-Jog mode 'Stop' button.

2.1.4.4 Manual Tuning mode

Manual Tuning mode provides precision tuning method



Picture7. Manual Tuning Window

2.1.5 Parameter Read and Write

P-DORI provides the download function. This function is useful to apply the same parameters to several servo drivers. Download the parameters using following method.

- Edit & Write the parameters.
- Click the Tool/Read menu to save the parameters to a file.

The parameter save file has '*.lpa' form.

- Set another drive to download the parameters.
- Click the Tools/Write to load the parameter save file.
- Click the Write button to start downloading the parameters.

After downloading, click Read button to check the values of the parameters.

DownLoad Preview D:\Docum	ents	×
[P1]		~
14		
default		
2		
1		
2000		
2000		
0		
0		
1		
ó		
0		
[P2]		
1		
200		
-300		
6000		
-6000		
50		
50		
14		
	~	1
Write(PC->Servo)	Close	

Picture8. Down Load Window

2.1.6 Monitor Window

Monitoring window provides real-time chart for the status of servo driver.

Click the 'Tools/Monitor' to use the Monitoring function.



Picture9. Monitor window

See the real-time chart using following method.

- 1. Choose the status which you want to display. Sampling Rate is 40ms/S. However, The sampling rate is concerned with PC's performance.
- 2. Click the 'Start' button to get the sampling data from servo driver.
- 3. Click the 'Auto' button to set the Y-axis range as auto-scale. Or, edit the value of Range Setting, and then click the 'Zoom' button to change the x-y axis range.
- 4. Click the 'Stop' button to pause the charts. Click the 'Chart Save' Icons to save the chart as BMP files.
- 5. Click the 'Clear' button to initialize the chart.
- 6. Click the 'Exit' button to close the Monitoring window.

2.1.7 Report Window

Report window provides the report sheet to view all of the parameters in one page. Click the Tools/Report Menu to use the Report function.

) HE	PORT									
Read Clear		64	Save			Close				
-	AB	c	D	E	E.	6	H	1	J	K
1	Man	and Construction Name	Value	1	Manu	Name	Value		ALM Histo	ey
2	* P01-01	Motor ID	14		P04-01	Sppedi [rpm]	10			Norm
3	P01-02	Inertia [gfcm ²]	default		P04-02	Speed2 [rpm]	100		2	Norm
4	P01-03	TRQ Constant [kgfcm/A	default		P04-03	Speed3 [rpm]	200		3	Nom
5	P01-04	Phase Inductance [mH]	default		P04-04	Speed4 [rpm]	500		4	Norn
6	P01-05	Phase Resistance (O)	default		P04-05	Speed5 [rpm]	1000		5	Norn
7	P01-06	Rated Current [A]	default		P04-06	Speed5 rpm	2000		6	Norr
8	P01-07	Rated Speed [rpm]	default		P04-07	Speed7 rpm	3000		7	Norn
9	P01-08	MAX Speed [rpm]	default		P04-08	Torque1 [%]	0		8	Norn
10	P01-09	Rated TRQ [kgfcm]	default		P04-09	Torque2 [%]	2		9	Norn
11	P01-10	Pole Number [pole]	18		P04-10	Torque3 %	20		10	Norn
12	* P01-11	Drive ID	12		P04-11	Torque4 [%]	50		Status	1
13	* P01-12	Encoder ID	2		P04-12	Torque5 %	75		Input	-
14	* P01-13	Encoder Pulse [ppr]	2500	-	P04-13	Torque6 [%]	100		SVONEN	Ŭ.
15	P01-14	[Pulse Out Rate [pulse]	2000	-	P04-14	Torque7 [%]	120		SPD1	0
16	 P01-15 	COM Baud Rate	0		P05-01	POS Gain Mode	1		ISPD2	10
17	* P01-16	Senal Select	10	1	P05-02	POS Pulse Type	1	17	ISPD3	tō—
18	* P01-17	Serial VO	10	+	P05-03	Speed Mode	0	+	DIR	10
19	* P01-18	Secial ID	1	+	P05-04	Feedforward [%]	0	17	P/PI	0
20	P01-19	Parameter Lock	10	+	P05-05	PC P Gain1 [Hz]	45	17	COM M	1
21	* P01-20	Serial Ongin	0	+	P05-06	PC P Gain2 Hz	105	+	CWLIM	li -
22	* P02.01	Control Mode	1	+	P05-07	PLP Pulse FPP Ints	0	+-	TUM	tó –
21	E02.02	Mode Change Time Ime	1 400	+	P05.08	IN Position Inis]	100	++	ESTOP	H -
24	D02.03	COW TRO I MT 1941	1986	+	1205.09	Foliow EDD Intel	30000	+*	STOP	11 –
35	1002.04	CW TRO LMT 18.1	300	+	P05.10	IPOS CMD TC Imsl	0	++	ALMPST	tó-
20	002.05	10050 Sugad Light Light	12000	+	1005.11	IFE TOlenal	0	+++	Duted	×
20	02:05	COV Speed Limit Imm	16000	+	1005.12	IFI CTD Cost MUNI	1	++	EOU.	-
20	P02-00	Basha Snord Immel	1-0000	+	005.12	ELCTR Gear NOMI	1	+-	INCON.	
20	P02-07	Brake Speed (pm)	100		P05-13	ELCTR Gest MUM2	1	+	7500	11-
20	1695.20	Ing Made	100		19958.12	ELCTR Gear None	-	+	12340	1
30	P02-09	DB Mode	16		PUS-15	ELCTR Gear DENZ	2	+	TOOOLT	10 - H
31	P02-10	Noton Printers	1000	-	PU5-16	ELCTR Gear NUNG	1	+-	IRGUUI	<u>10</u>
32	P02/11	NF Frequency1 [Hz]	300	-	P05-17	ELCIR Gear DENS	4	++	ALARM	<u>-</u>
33	P02-12	her Bandwidth i [%]	95	-	PU5-18	ELCTR Gear NOM4	1	+	A CODED	<u>K</u>
34	P02-13	Noten Piner2	1000	-	PUS-19	Discontraction of the second second	8	+	A CODET	<u>u</u>
33	1902-14	[HF Frequency2 [H2]	500	+	1105-20	IDIAS SPD COMPEN [rpm]	0	1	A CODE2	<u>u</u>
36	1402-15	NF Bandwidth2 [%]	202	-	PUD-21	Bias Pulse Band [pls]	10	+	A_CODE3	<u>N</u>
31	PU2-16	THO Filter TC [ms]	0.9	-	P05-22	Backlash Pulse pis	0	-		-
38	P02-17	Auto Tuning	10	1.	P06-01	Analog TRO TC [ms]	0		-	
39	P02-18	System Response	19		P06-02	TRO ACCEL Time [ms]	0		-	
40	P02-19	Inertia Ratio	2	-	P06-03	TRQ DECEL Time [ms]	0	1	-	1
41	P02\20	[Gain ADJ Speed1 [rpm]	1800		P06-04	TRQ S-Mode [ms]	0			
13	I IP00.01	IGain ADJ Sneet2 (mm)	1100		IP06.05	In TRO Range 1%	110			

Picture10. Report window

Make report sheet using following method.

- 1. Click the 'Read' button to read all parameters from servo driver.
- 2. Click the 'Save' button to save the parameters as a file. The Report file has '*.vts' form and it can be read with MS-Excel.
- 3. Click the 'Clear' button to initialize the sheet..
- 4. Click the 'Close' button to close the Report window

2.1.8 Input Contact Status window.

Click the 'Tool' \rightarrow 'Input Control' in menu, and the 'Input Status Control Panel' window appears. To use this function, Serial I/O (P1-17) value should be set to '1'.

	Input Sta	tus Cont	rol Panel	J			×
				Inpu	t Contr	ol	
	CCWLIM SVONEN	CWLIM	TLIM SPD2	ESTOP SPD3	STOP DIR	ALMRST	E-STOP
I	N	.c.				1050	

Picture11. Input Control Window

Function of each input contact button is same as that of each input contact signal. Refer the Operation Manual Chapter 3 for the input contact signal.

The function of 'E-STOP' button is the same as that of 'Servo Off'

2.1.9 Communication Cable Wiring

Click the 'COMM Cable Wiring' in Help menu, and the window as below will appears

🥼 Comm Cable Wiring	
▷ RS232C Channel	
D-SUB 9Pin 9 0 5 5 4 6 10 6 0 1 3 9 9 1 9 9 1 10 9 9 1 10 9 9 1 10 9 9 1 10 9 9 1 10 9 9 1 10 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10	10120-3000VE 3M 11 1 20 10
P 0 P 7 N 0 Rt N 8 Rt 0 Rt 19	3M 11 20 10
	Close

Picture12. Cable Wiring Window

3. Troubleshooting

3.1 In case of Communication Problems.

- 1. Confirm that the servo drive power has been turned on.
- 2. Check the serial cable connection.
- 3. Check the serial port setting.

3.2 In case of Downloading Error

- 1. Don't click any button until finishing downloading.
- 2. Check the values of the parameters whether it go out of its limitation.

3.3 In case of Reading / Writing Parameter Error

- 1. Check the serial cable and port.
- 2. Restart the P-DORI Station program.

Contact with technical supports when you can not find out the solution.

Caution

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Insertion and Removal of communication cable should be done with the power off in both the servo drive and PC. If not, it may result in damage to both the servo driver's CN3 connector and PC's serial port.

4. Communication cable



4.1 For RS232C Channel

Caution

Connect the shield line of the cable to body of only 3M connector(side of Driver). Don't connect with the body of D-SUB 9Pin connector. (Affix the other Shield line with a clamp).

4.2 For RS485 Channel

