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.

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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.

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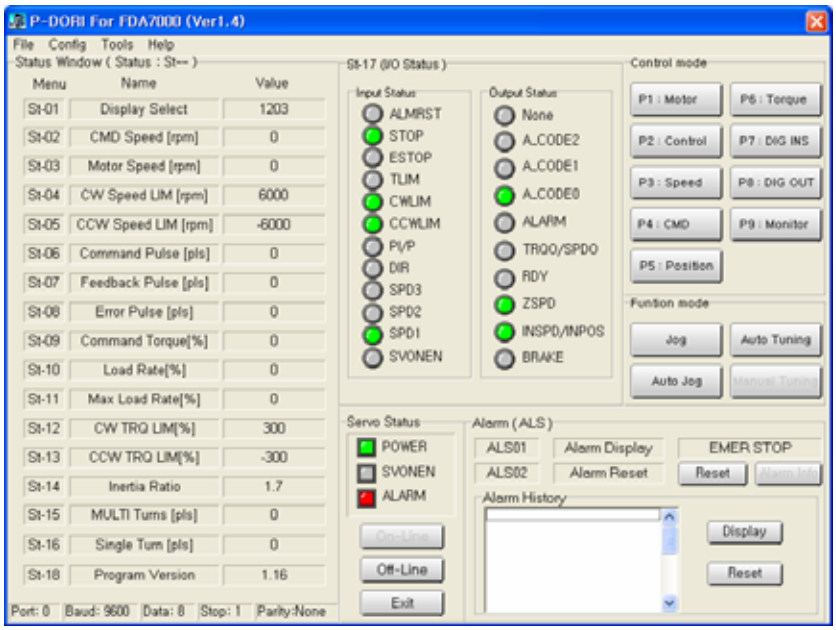
2. How to Use

2.1 P-DORI Window

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



Picture1. Main Window

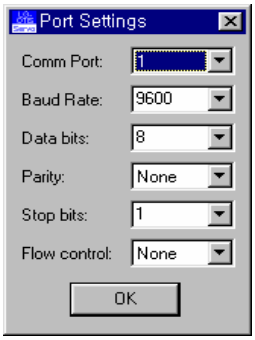
Use the P-DORI through following steps.

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.

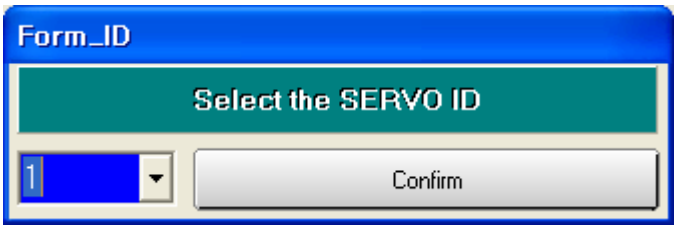


Picture2. Port Setting Window

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.



Picture3. Selecting Servo ID

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

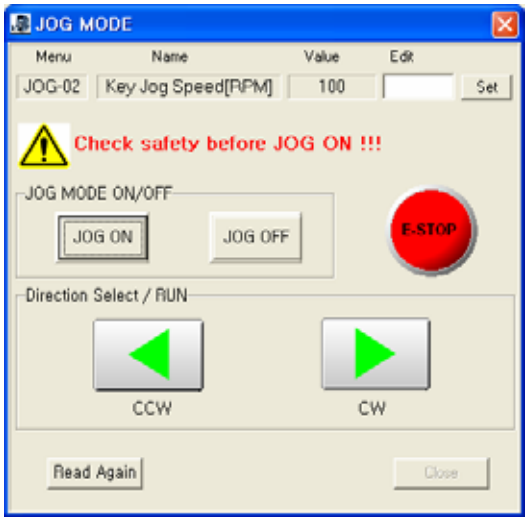
Click the P1~P9 Buttons to edit the parameters. When the each button is clicked, present parameters in the servo driver are displayed in ‘**Value’** Box. To change the parameter value, write the new value in ‘EDIT’ box and click the ‘**SET’** Button. If the new value is written properly, the new value 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.



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

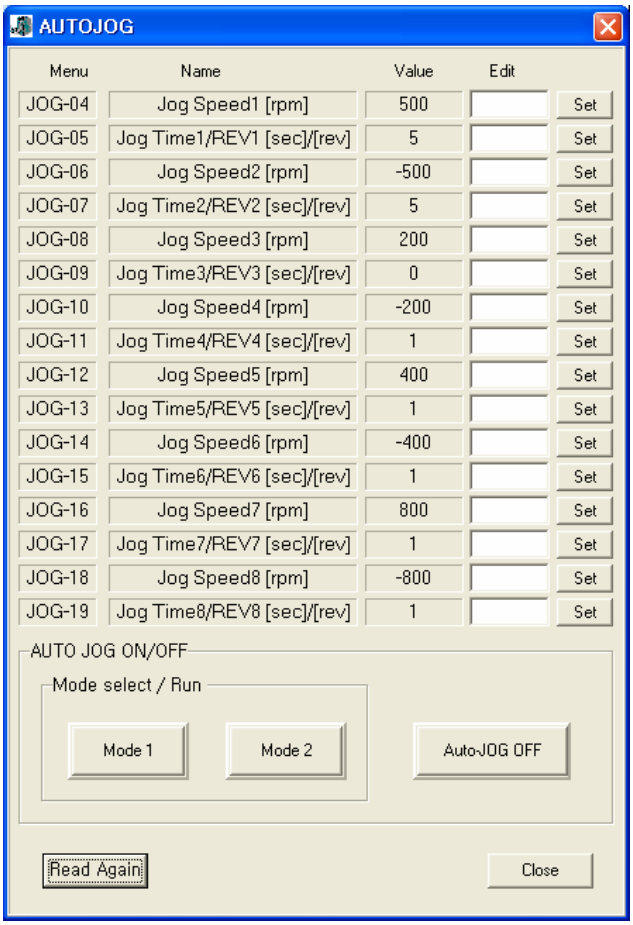
2.1.4.2 Auto JOG Mode

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

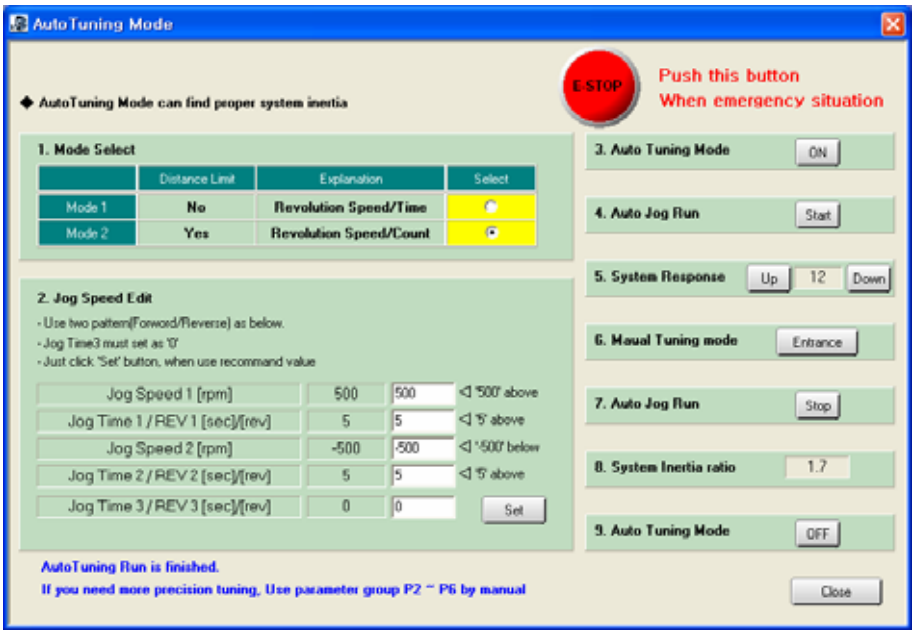
Auto-JOG window have two kind of Auto-JOG mode

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



Picture5. Auto-Jog Window

2.1.4.3 Auto Tuning Mode



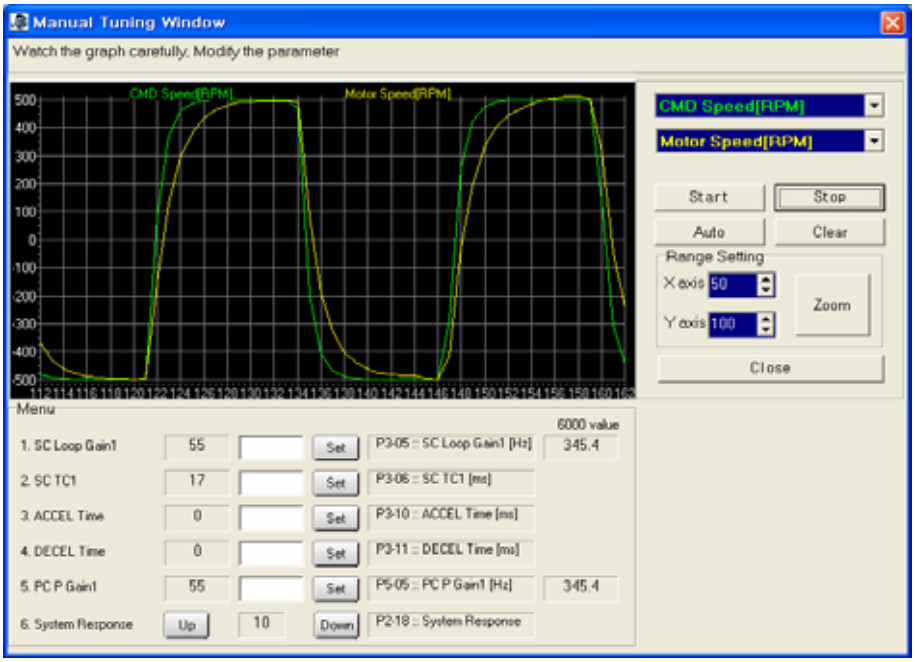
Picture6. Auto Tuning mode

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



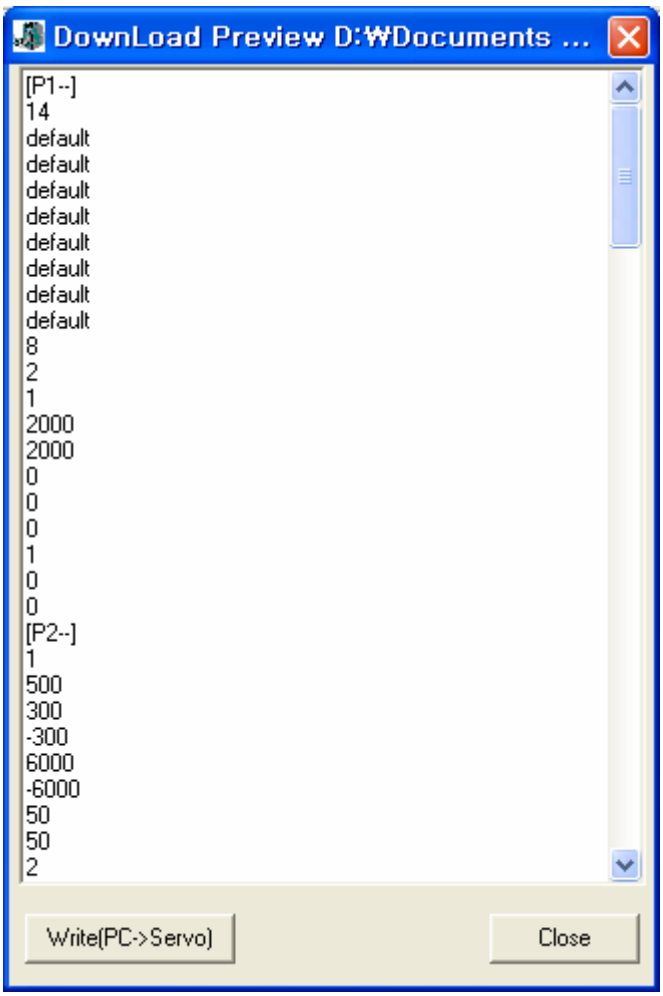
Picture7. Manual Tuning Window

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.

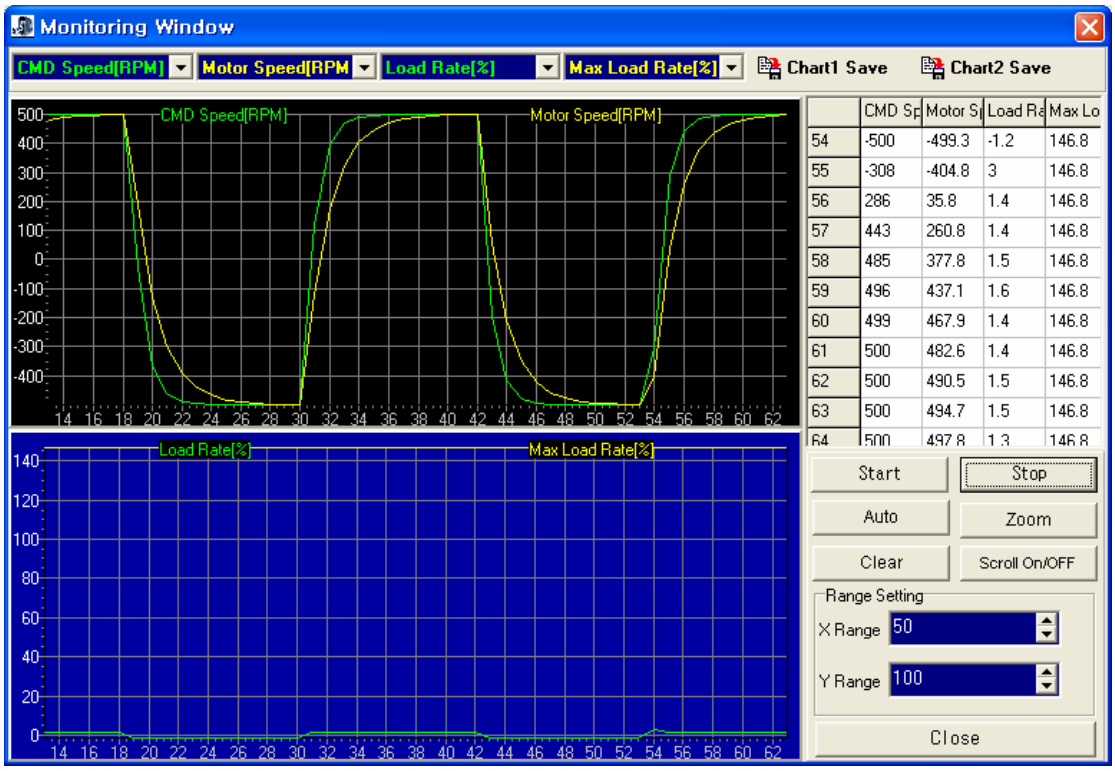


Picture8. Down Load Window

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

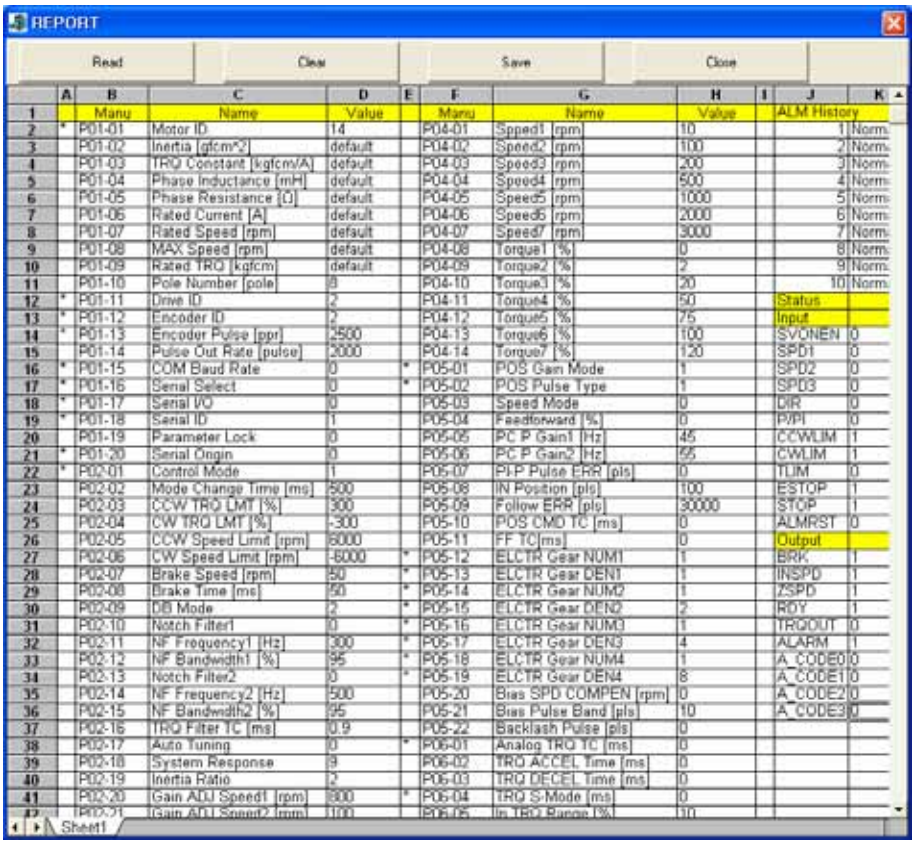
See the real-time chart using following method.

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.



	A	B	C	D	E	F	G	H	I	J	K
1		Manu	Name	Value		Manu	Name	Value		ALM History	
2	*	P01-01	Motor ID	14		P04-01	Spped1 [rpm]	10		1	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	Norm
5		P01-04	Phase Inductance [mH]	default		P04-04	Speed4 [rpm]	500		4	Norm
6		P01-05	Phase Resistance [Ω]	default		P04-05	Speed5 [rpm]	1000		5	Norm
7		P01-06	Rated Current [A]	default		P04-06	Speed6 [rpm]	2000		6	Norm
8		P01-07	Rated Speed [rpm]	default		P04-07	Speed7 [rpm]	3000		7	Norm
9		P01-08	MAX Speed [rpm]	default		P04-08	Torque1 [%]	0		8	Norm
10		P01-09	Rated TRQ [kgfcm]	default		P04-09	Torque2 [%]	2		9	Norm
11		P01-10	Pole Number [pole]	8		P04-10	Torque3 [%]	20		10	Norm
12	*	P01-11	Drive ID	2		P04-11	Torque4 [%]	50		Status	
13	*	P01-12	Encoder ID	2		P04-12	Torque5 [%]	75		Input	
14	*	P01-13	Encoder Pulse [ppr]	2500		P04-13	Torque6 [%]	100		SVONEN	0
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		SPD2	0
17	*	P01-16	Serial Select	0	*	P05-02	POS Pulse Type	1		SPD3	0
18	*	P01-17	Serial I/O	0		P05-03	Speed Mode	0		DIR	0
19	*	P01-18	Serial ID	1		P05-04	Feedforward [%]	0		P/PI	0
20		P01-19	Parameter Lock	0		P05-05	PC P Gain1 [Hz]	45		CCWLIM	1
21	*	P01-20	Serial Origin	0		P05-06	PC P Gain2 [Hz]	65		CWLIM	1
22	*	P02-01	Control Mode	1		P05-07	PI-P Pulse ERR [pls]	0		TLIM	0
23		P02-02	Mode Change Time [ms]	500		P05-08	IN Position [pls]	100		ESTOP	1
24		P02-03	CCW TRQ LMT [%]	300		P05-09	Follow ERR [pls]	30000		STOP	1
25		P02-04	CW TRQ LMT [%]	-300		P05-10	POS CMD TC [ms]	0		ALMRST	0
26		P02-05	CCW Speed Limit [rpm]	6000		P05-11	FF TC[ms]	0		Output	
27		P02-06	CW Speed Limit [rpm]	-6000	*	P05-12	ELCTR Gear NUM1	1		BRK	1
28		P02-07	Brake Speed [rpm]	50	*	P05-13	ELCTR Gear DEN1	1		INSPD	1
29		P02-08	Brake Time [ms]	50	*	P05-14	ELCTR Gear NUM2	1		ZSPD	1
30		P02-09	DB Mode	2	*	P05-15	ELCTR Gear DEN2	2		RDY	1
31		P02-10	Notch Filter1	0	*	P05-16	ELCTR Gear NUM3	1		TRQOUT	0
32		P02-11	NF Frequency1 [Hz]	300	*	P05-17	ELCTR Gear DEN3	4		ALARM	1
33		P02-12	NF Bandwidth1 [%]	95	*	P05-18	ELCTR Gear NUM4	1		A_CODE0	0
34		P02-13	Notch Filter2	0	*	P05-19	ELCTR Gear DEN4	8		A_CODE1	0
35		P02-14	NF Frequency2 [Hz]	500		P05-20	Bias SPD COMPEN [rpm]	0		A_CODE2	0
36		P02-15	NF Bandwidth2 [%]	95		P05-21	Bias Pulse Band [pls]	10		A_CODE3	0
37		P02-16	TRQ Filter TC [ms]	0.9		P05-22	Backlash Pulse [pls]	0			
38		P02-17	Auto Tuning	0	*	P06-01	Analog TRQ TC [ms]	0			
39		P02-18	System Response	9		P06-02	TRQ ACCEL Time [ms]	0			
40		P02-19	Inertia Ratio	2		P06-03	TRQ DECEL Time [ms]	0			
41		P02-20	Gain ADJ Speed1 [rpm]	300	*	P06-04	TRQ S-Mode [ms]	0			
42		P02-21	Gain ADJ Speed2 [rpm]	1000		P06-05	In TRQ Range [%]	10			

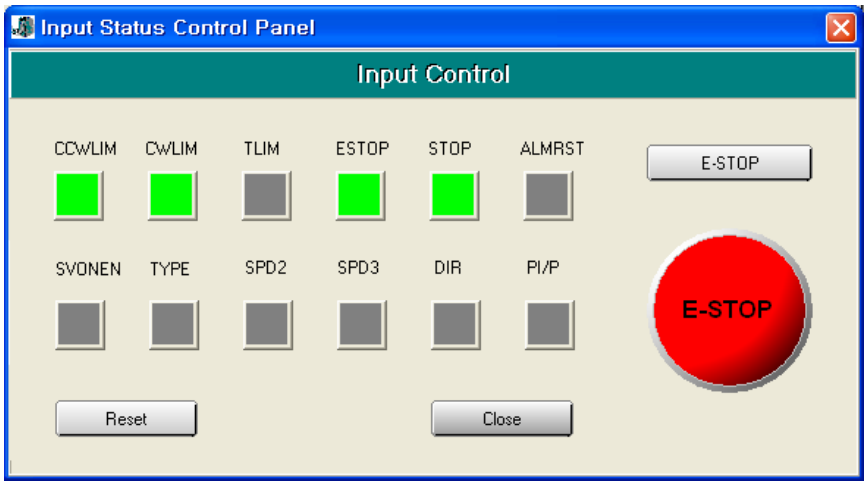
Picture10. Report window

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’ → ‘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 ’.



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’

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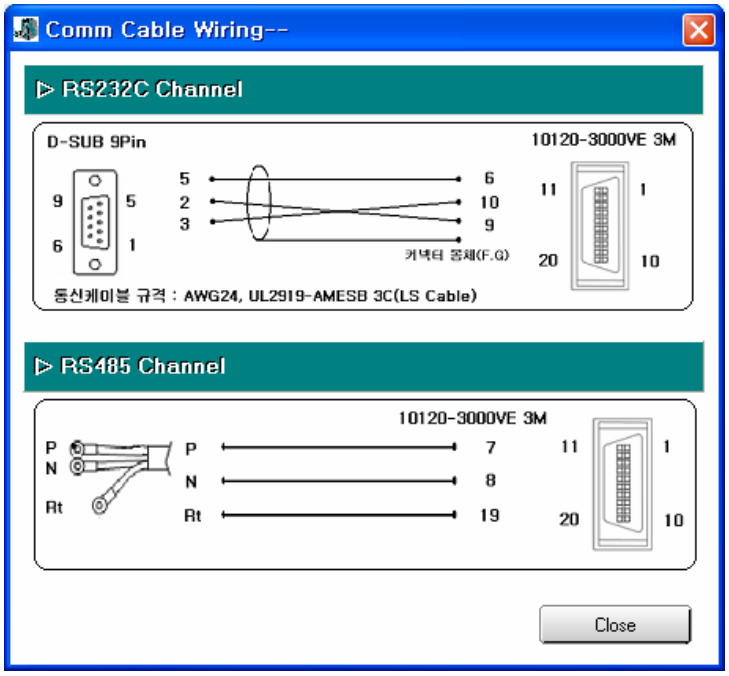
2.1.9 Communication Cable Wiring

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



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*

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.

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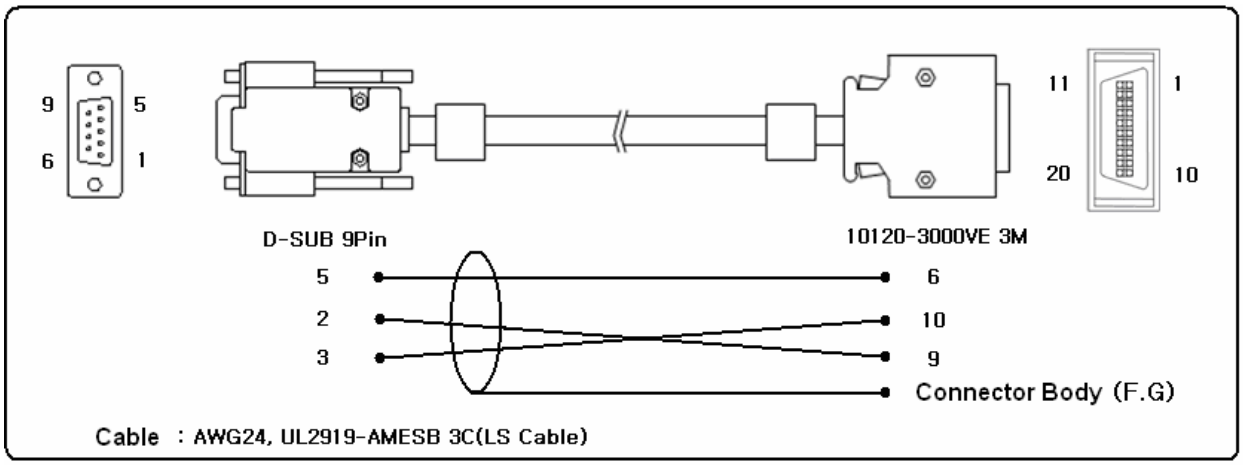
4. Communication cable

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