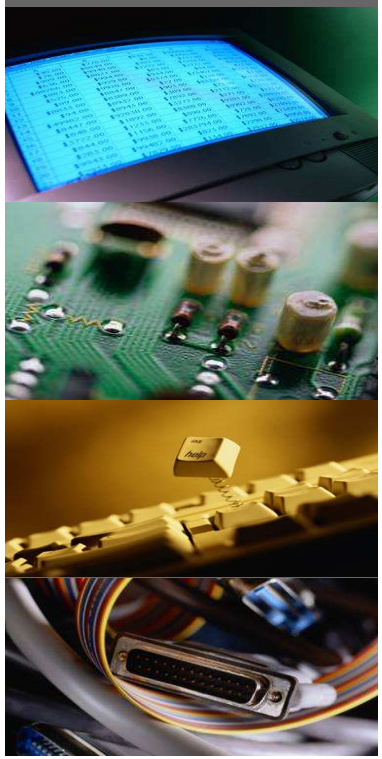
Guide Book for L7S Series Speed Mode



21.Feb, 2014

SI team/Wonkee Son

LS Mecapion

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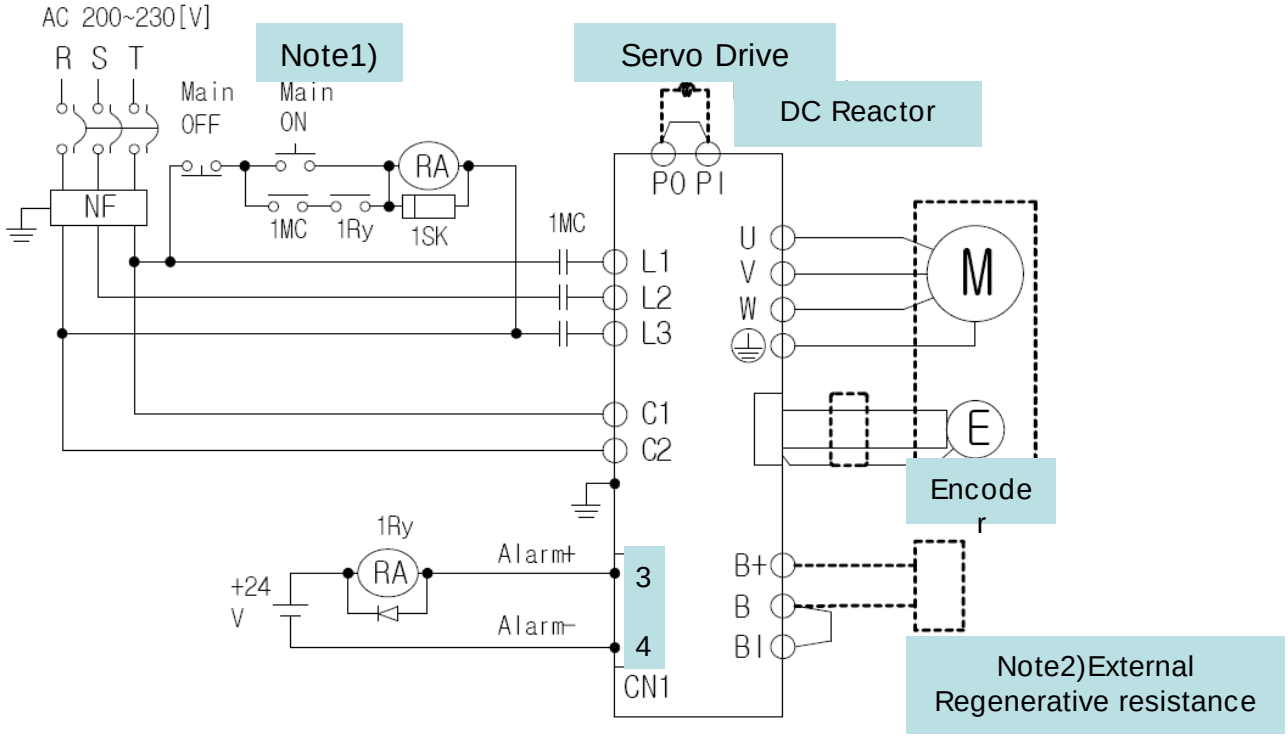
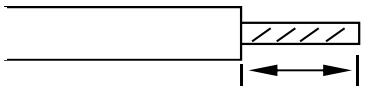


Note1) It takes approximately one to two seconds to output an alarm signal after turning on the main power(3Phase AC220V). Accordingly, press and hold the main power ON switch for at least two seconds.

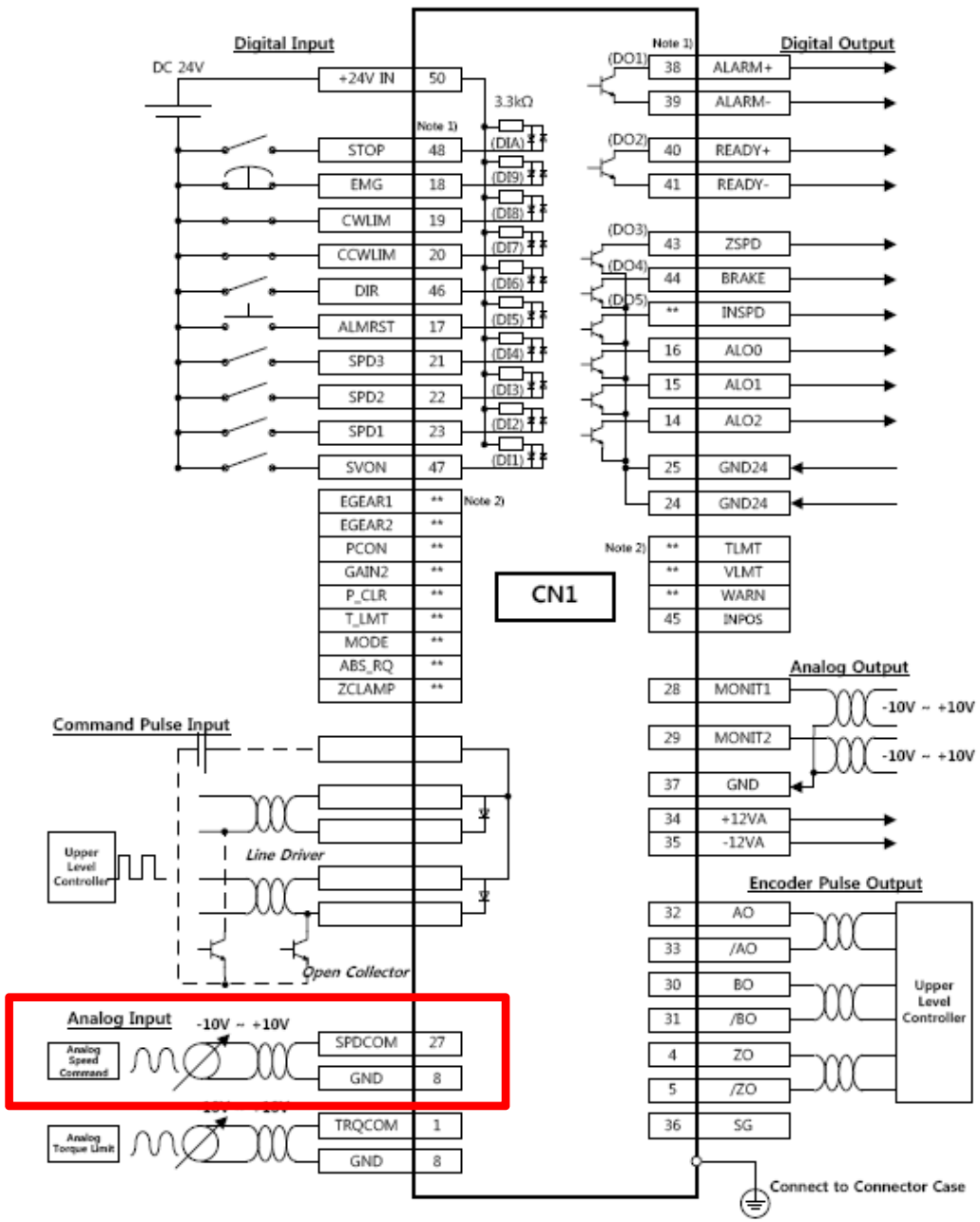
Note2) Check the B and BI short-circuit terminals and the L7NA001B-L7NA004B (50 W, 100 Ω), L7NA008B ~ L7NA010B (100 W, 40 Ω), and L7NA020B ~ L7NA035B (150 W, 13 Ω) regenerative resistors before use. If the regenerative capacity is high because of frequent acceleration and deceleration, open the short-circuit pins (B , BI) and connect an external regenerative resistor to B and B+

주3) Remove approximately 7-10 ㎜ of the sheathing from the cables for the main circuit power and attach crimp terminals. (Maker : SEOIL)

100[W]~400[W] : UA-F1510, 800[W] ~400[W]: UA-F2010, 2[kW] ~3.5[kW]: UA-F4010



Wiring Diagram



▶ Set as below ordering

1. Wiring on CN1
   - Analogue speed command : CN1, No.27(SPDCOM), No.8(GND) Wiring
2. Basic parameters setting
   - Motor ID->Encoder type->Encoder pulse numbers->Operation mode
3. Motor operation test as increase gradually Analogue speed command voltage
4. Check speed command(rpm) and speed feedback(rpm)
5. When ordering 0V, if motor is rotated, adjust not to rotate motor as using speed offset function
6. Accel/Decel time setting when necessary
7. Use Zero clamp function to reduce offset of command from upper controller
8. Adjust Drive according to load condition

(Notice)

▶ In the case of wrong parameter set, Motor will rotate in high speed or vibrate. And, it causes burning of Motor

Motor ID [P0-00]

1. then motor constant can be automatically set
2. ID is displayed on Motor Label

Encoder Type [P0-01]

No.	Types	Signal Mode	Signal types	Remark
0	Incremental Parallel	A Phase Lead 15Lines	A,B,Z,U,V,W	
1	SingleTurn Absolute Serial	Biss Serial	Serial Type	
3	MultiTurn Absolute Serial	Biss Serial	Serial Type	

Encoder Pulse [P0-02]

1. Set Encoder Pulse Number
2. Encoder Pulse Number is displayed on Motor Label

(Notice) Serial type : Set the number of bits per turn from Encoder
Incremental type : Set the number of Encoder pulse

(Note) Set Pulse Logic Parameter in Servo-off

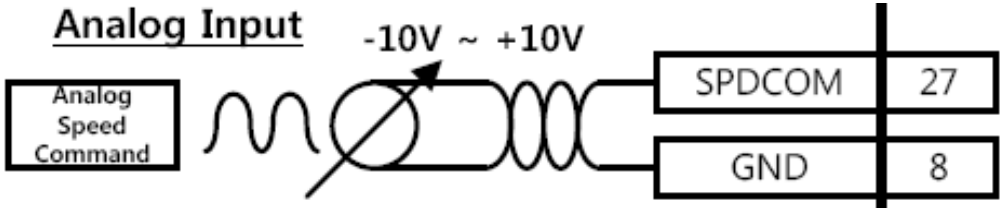
Operation Mode [P0-03]	"1" (Speed Mode) Set

Operation mode	Operation mode
0	Torque control operation
1	Speed control operation
2	Position control operation
3	MODE contacts ON : Speed control operation MODE contacts OFF : Position control operation
4	MODE contacts ON : Speed control operation MODE contacts OFF : Torque control operation
5	MODE contacts ON : Position control operation MODE contacts OFF : Torque control operation

(Note) Set Pulse Logic Parameter in Servo-off

Speed command

Analogue speed command input signal : I/O pin no.27, no8

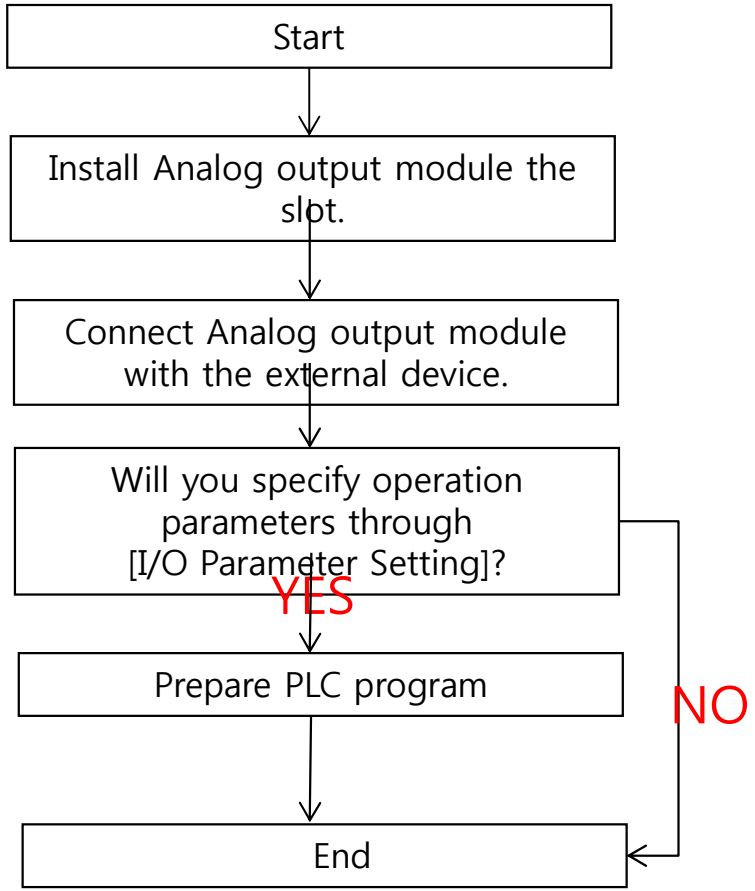


Analog speed scale setting [P2-17] : Sets speed scale when the analog speed command is 10 [V].
The maximum value is the maximum motor speed

If input value is 2000, when 10V, motor is rotated at 2000rpm

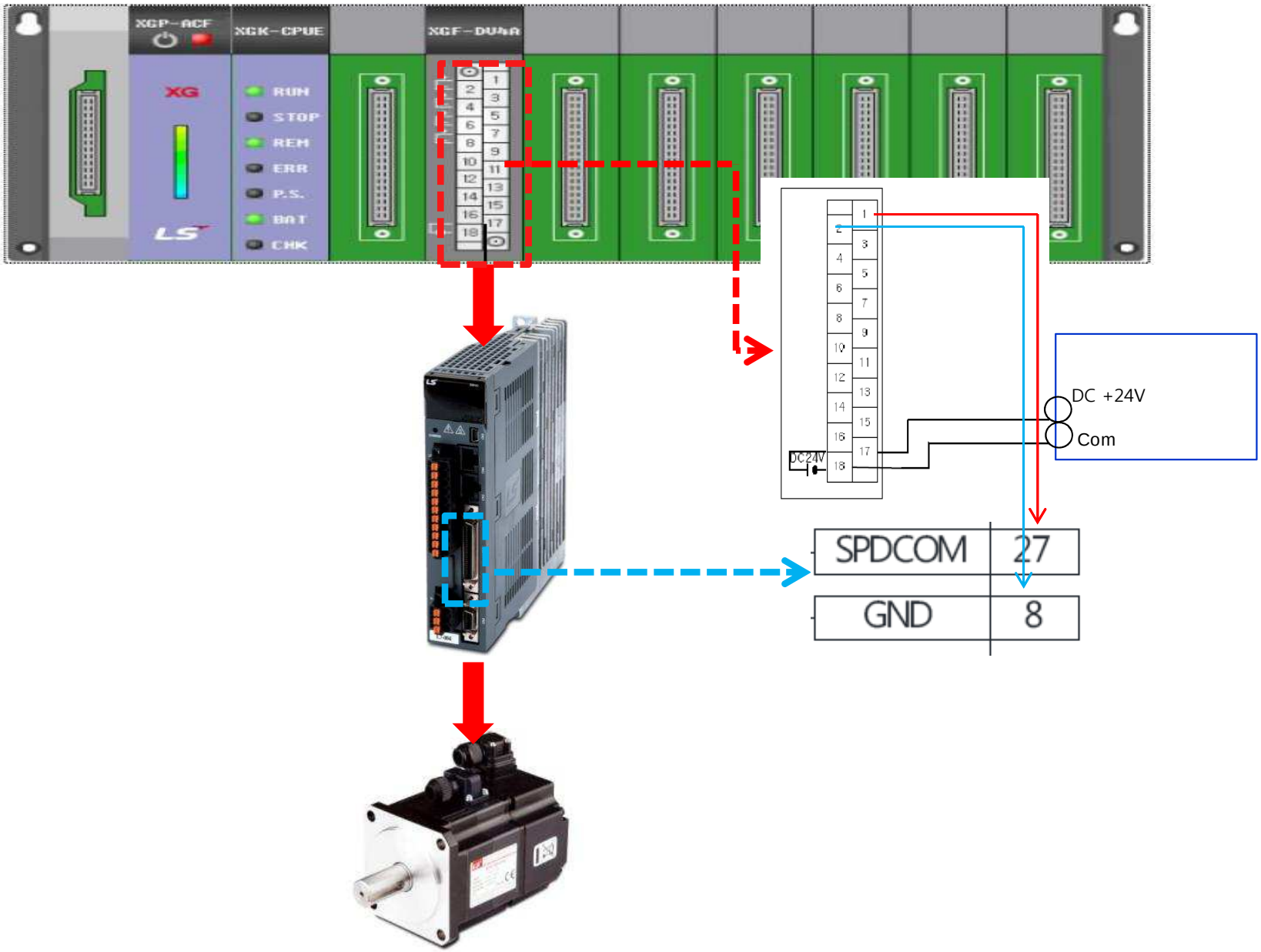
Speed command with Analog output module (1/5)

- Procedures for the operation with Analog output module (XGF-DV4A/DV8A)



Speed command with Analog output module (2/5)

Connection diagram for XGF-DV4A with L7S Dirve



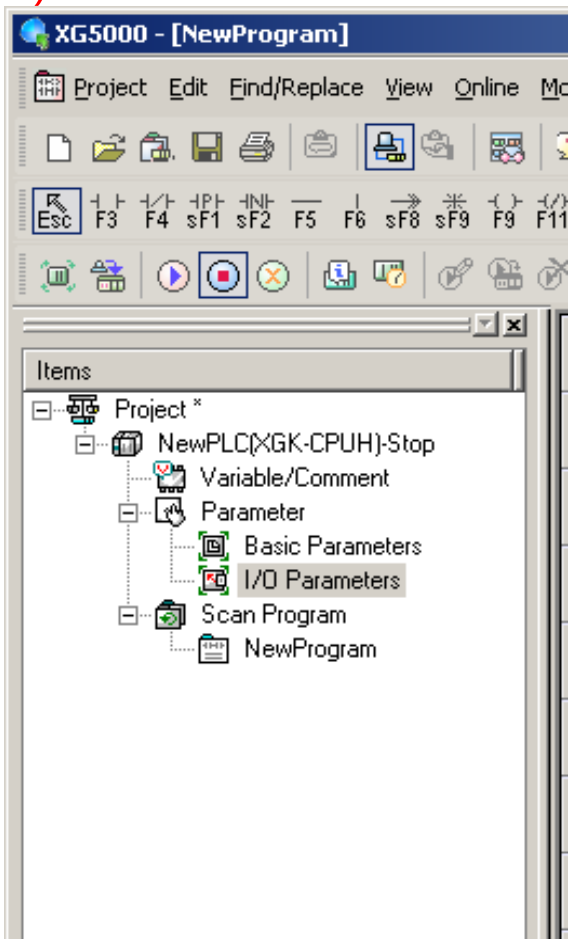
Setting screen of parameters

To set I/O parameters

1) After selecting I/O parameters in the left menu of XG-5000, Double click the I/O parameters

2) Click the arrow button on the screen above to display the screen where an applicable module can be selected. Search for the applicable module to select.

1)



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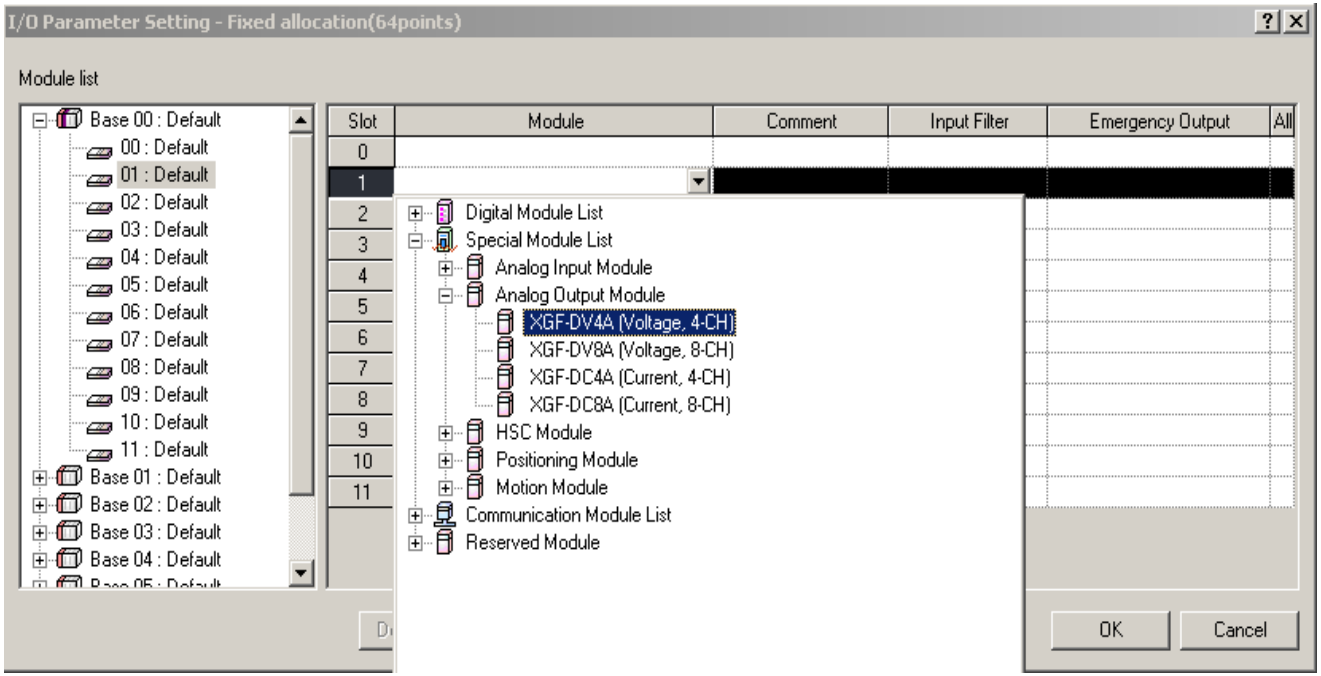
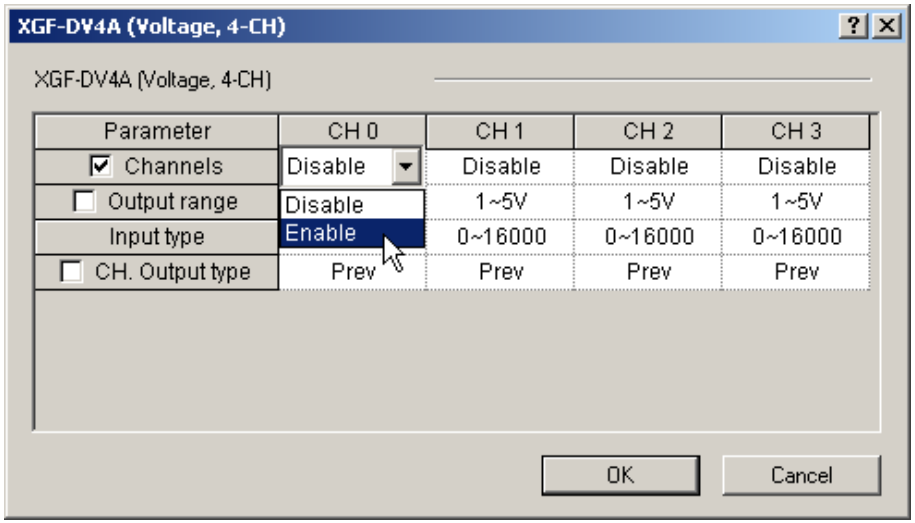


Speed command with Analog output module (4/5)

I/O Parameters settings

Set Channels, Output range, input type, Channel. Output type like 3)~6) as below

3)



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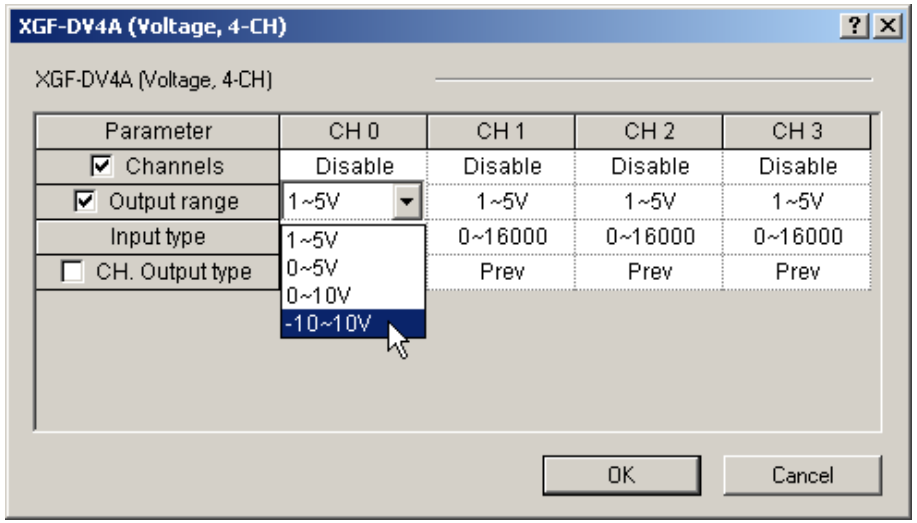

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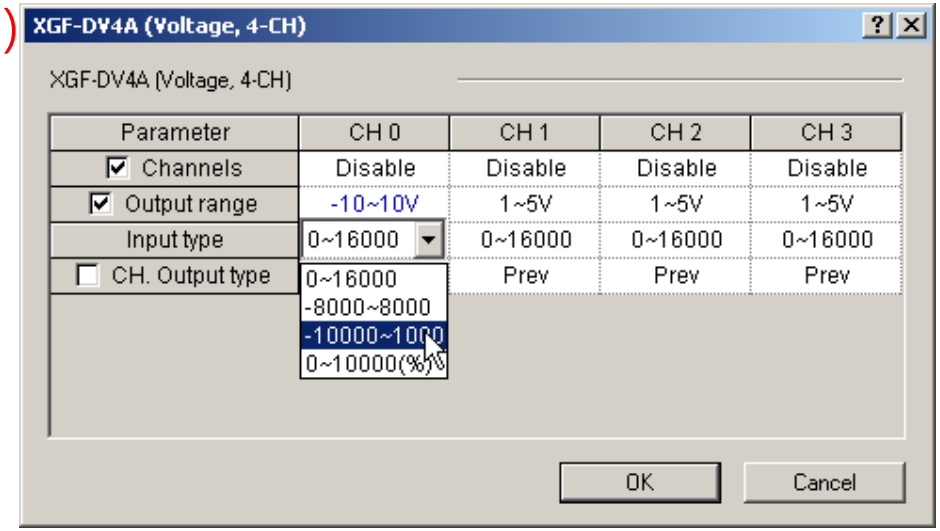
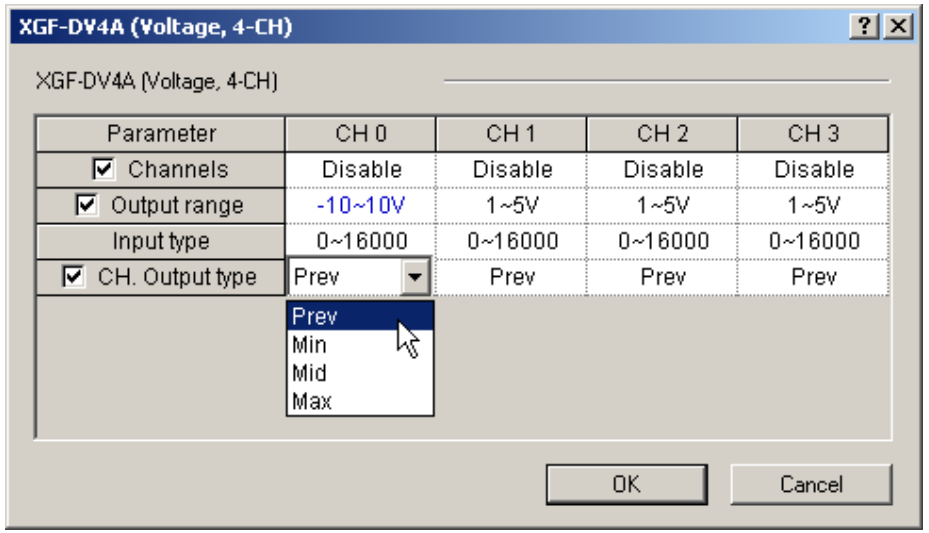
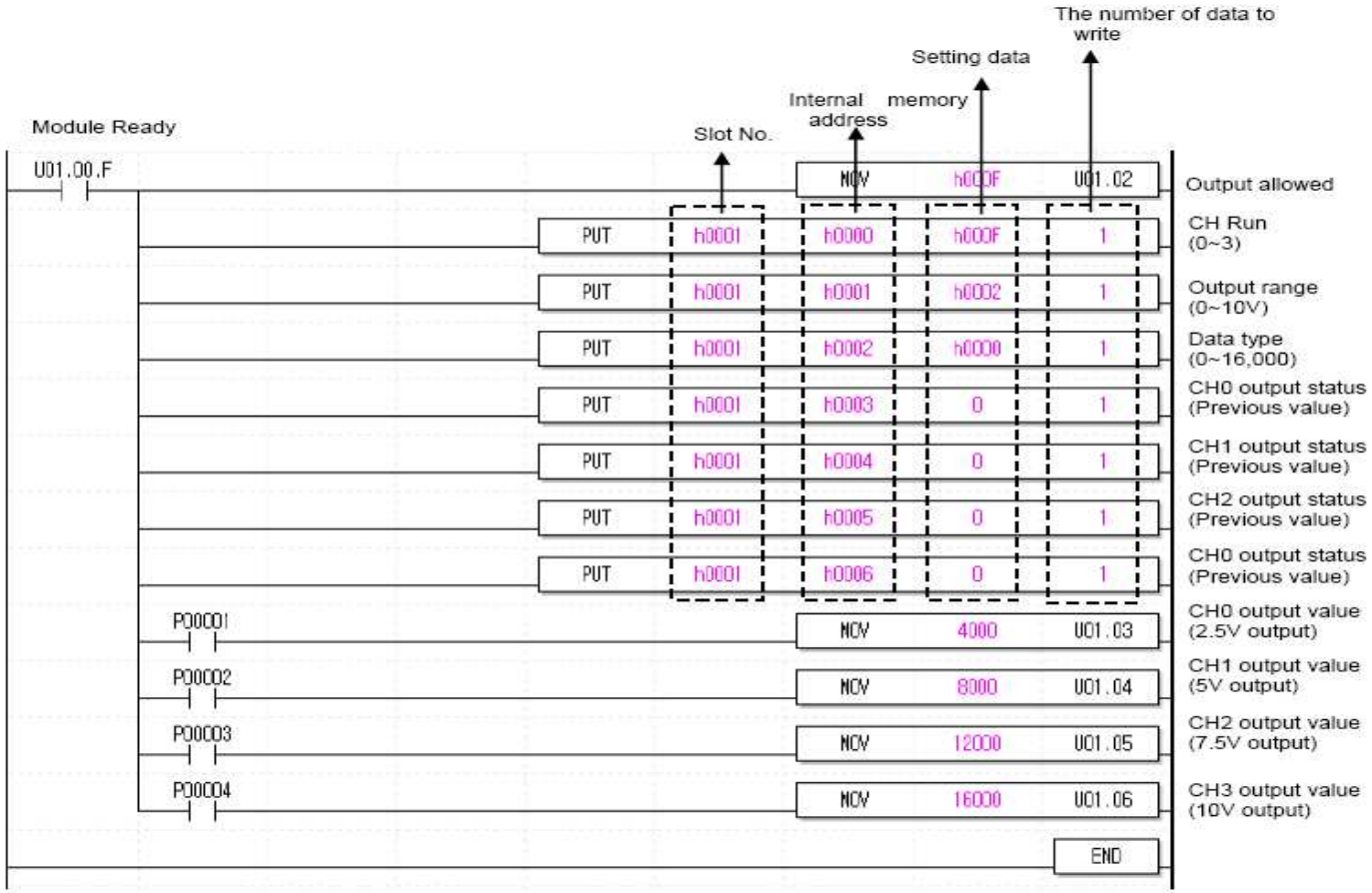


6)



▶ Example of PLC program(XGK)

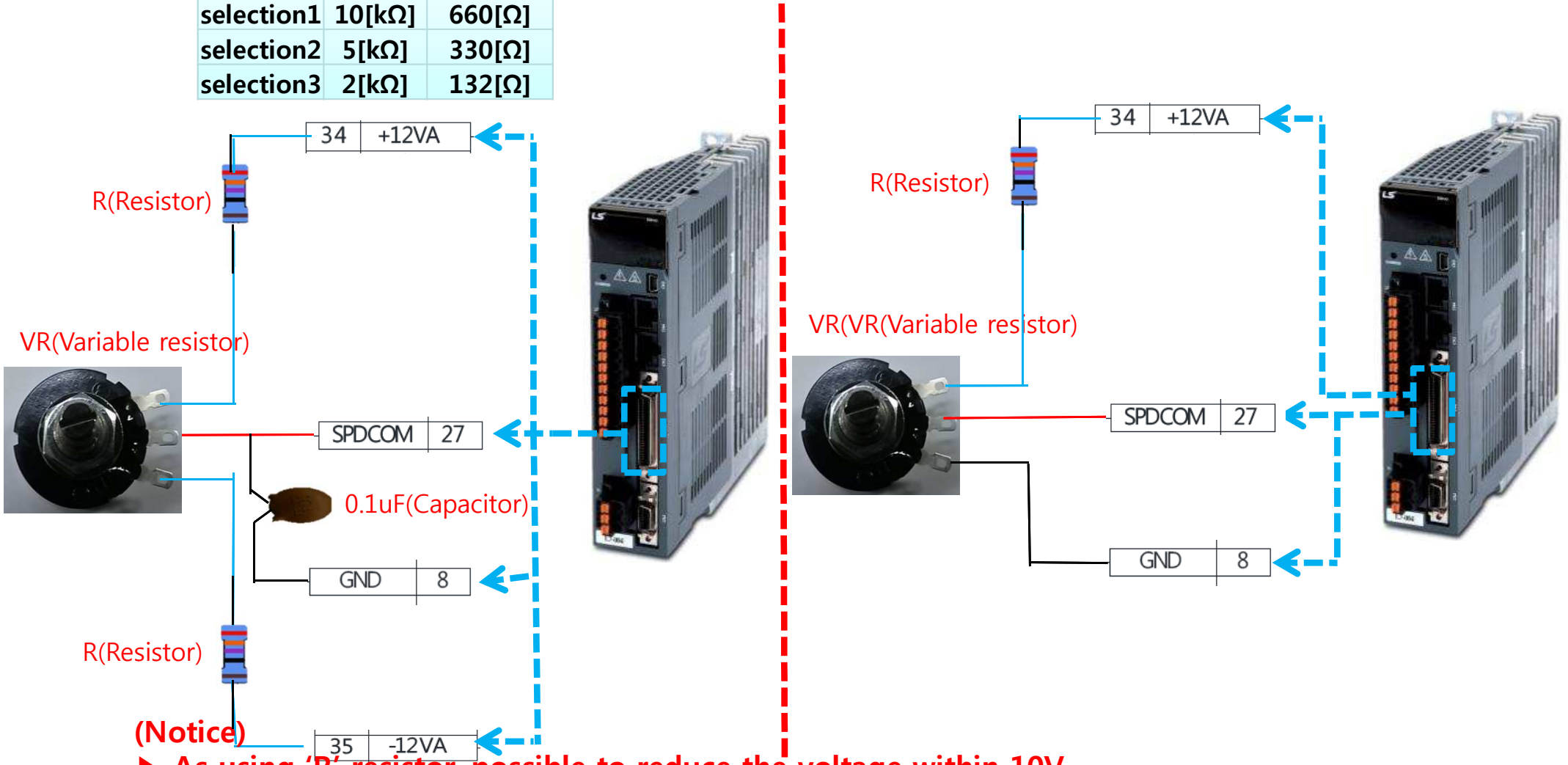
1. CH Run, Output range, Data type and output status are saved in internal address.
2. If P0001 is On, 2.5V will be output, If P0002 is On, 5.0V will be output. If P0003 is On, 7.5V will be output
   If P0004 is On, 10.0V will be output



Analog speed command by using variable resistor

▶ **Analog input adjustment by using variable resistor with using power supplied by the drive**

Division	VR	R
selection1	10[kΩ]	660[Ω]
selection2	5[kΩ]	330[Ω]
selection3	2[kΩ]	132[Ω]



(Notice)

▶ **As using 'R' resistor, possible to reduce the voltage within 10V.**

▶ **In the case of one side polarity only like right picture, Motor is rotated one direction only**

▶ Analog speed scale[P2-17] :

Set the analog speed command of 10 [V] in the unit of [RPM].

The maximum value is the maximum motor speed. If input value is 2000, when 10V, motor is rotated at 2000rpm

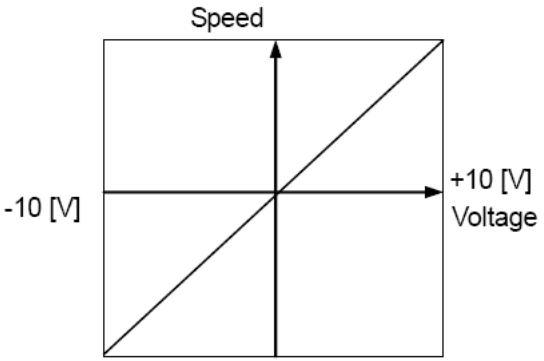
▶ Analog speed offset [P2-18]:

There are cases where a certain level of voltage remains on the analog signal access circuit, even at the 0 speed command. In this case, you can compensate it by setting the voltage as offset. The unit is [㎷].

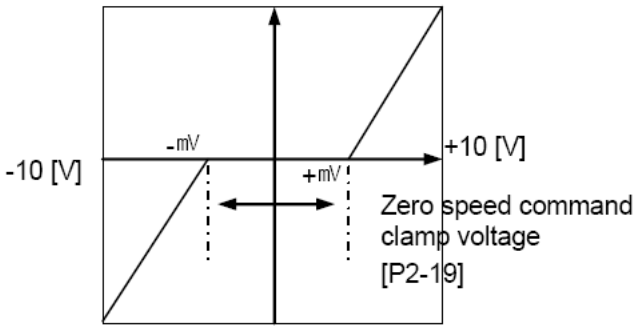
▶ Zero speed clamp voltage [P2-19]:

The voltage command under the zero speed clamp level[P2-19] is ignored

When speed command over the level inputs, motor is rotated by command value



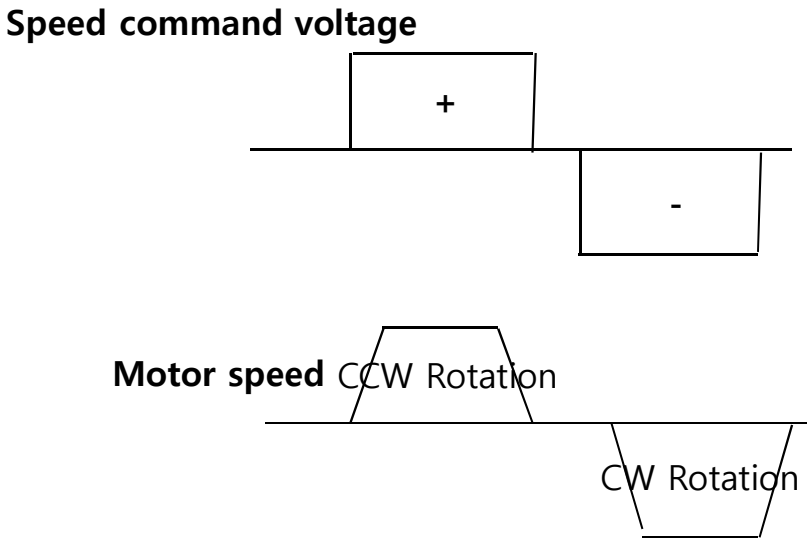
Zero speed command clamp voltage"
[P2-19] = 0



Zero speed command clamp voltage
[P2-19] = Not 0 [mV]

▶ Input of direction change :

In speed mode, motor direction is changed by polarity of voltage



If Input contact DIR(No.46) is On, Motor direction is changed as speed command is reversed

STOP & Soft Accel/Decel operation

▶ STOP input :

After Servo-On, If speed command voltage is input after Servo-On, Motor is rotated

Input contact STOP(No.48) is on, Motor will be stopped.

▶ Soft operation setting :

As setting Accel/Decel and S-curve operation, possible for softer operation to reduce shock that can occur when Accel/Decel

▶ Acceleration/Deceleration Time :

Acceleration Time[P3-08]: Set the time required for the motor to reach the rated motor speed from zero speed in [ms] units

Deceleration TimeP3-09]: Sets the time required for the motor to stop after running at the rated

▶ S-Curve operation[P3-11]

You can set acceleration/deceleration operation as an S-curve pattern for smooth acceleration/deceleration.

0: Trapezoidal -> Set acceleration/deceleration time [P3-08] and [P3-09].

1: Sinusoidal -> Set acceleration/deceleration time [P3-08] and [P3-09] + S-curve time [P3-10].

(Notice)

▶ Without Acceleration/Deceleration setting, S-curve operation is not available. To use S-Curve operation, set Acceleration/Deceleration in advance.

▶ Before setting acceleration/deceleration time, if operation time is 20S, total operation time is => 20Second+Acceleration/Deceleration Time[P3-08],[P3-09]+S-Curve time[P3-10]

Servo lock setting :

1) Servo-Lock : In speed mode, even if the speed command input is 0, the position of servo is not locked. If Servo-Lock function is set(P0-17), the position of servo is locked

If Servo-Lock function is used, it controls the position of the time that speed command input is 0

2) Servo lock setting[P0-17]:

DIGIT2 of Parameter [P0-17] -> "0" : Not use

"1" : Use

▶ Digital speed command(P3-00~P3-06) :

It is operated by drive internal speed as using input signals SPD1(No.23), SPD2(No.22), SPD3(No.21) not using external analog input voltage.

SPD1	SPD2	SPD3	Speed control
OFF	OFF	OFF	Analog speed command
ON	OFF	OFF	Digital speed command1
OFF	ON	OFF	Digital speed command2
ON	ON	OFF	Digital speed command3
OFF	OFF	ON	Digital speed command4
ON	OFF	ON	Digital speed command5
OFF	ON	ON	Digital speed command6
ON	ON	ON	Digital speed command7

Set the gain as below ordering

1. Inertia : [P1-00]

- Using Auto tuning : [Cn-05]
- Manual Set : [P1-00]

2. Speed Proportional Gain : [P1-06]

- Increase step by step (Increase 50 per step)
- If noise or vibration occurs, decrease 50 per step from current value

3. Speed Integral Time Constant : [P1-08]

- Increase step by step (Increase 1 per step)
- After monitoring OverShoot and Steady-state error, if Oversh0oot occurs, increase 10per step.

Note) If overshoot occurs when Integral gain increase, using for P/PI Converstion Mode

4. Speed feedback filter : [P1-11]

- Using for reducing Vibration and Noise
- Increase step by step (Increase 1 per step) till no vibration

Revision History

Number	Date issued	Revised content	Version Number	Notes
1	14.Feb,2014	Revise Input pin number for using variable resistor	V1.1	