Ezi-SERVO® Plus-R

Closed Loop Stepping System
with Network based Motion Controller

Ezi-SERVO® Plus-R MINI

Closed Loop Stepping System

User Manual

Communication Function_Ver6

(Rev.08.05.11)

FASTECH

- Table of Contents -

1. Communication Protocols

1－1. Communication Functions

Ezi-SERVO Plus-R can control up to 16 axes by multidrop link at RS-485(two-wire).

Caution	Pay attention that when Windows goes into standby or power-save mode, serial communication is basically disconnected. When the system is recovered from standby mode, it should be connected again with serial communication. This is also applicable to the library provided.

1－1－1. Communication Specifications

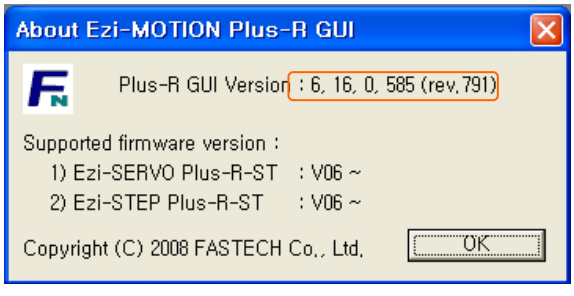
Specification	RS-485
Communication Type	Asynchronous
	Half-duplex
Baud Rate [bps]	19200, 38400, 57600, 115200, 230400,460800,921600
Data Type	8bit Binary
Parity	No
Stop Bit	1bit
CRC Check	Yes
Max Cabling Length (Converter ↔ Drive)	30 m
Min Cable length between drive	More than 60 cm
Number of Connected Axes	16 axes (No. 0~F)

1－1－2. RS-485 Communication Protocol(Ver6)

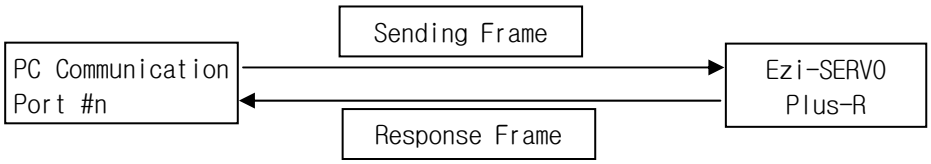
Thers are 2 kinds of program version for SERVO Plus-R. This manual support for Version 6 level.

Type	Firmware version	compatability	User Program(GUI) version
1	Level 6 (V06.0x.0xx.xx)	<->	Level 6 (6.xx.x.xxx)
2	Level 8 (V08.xx.0xx.xx)	<->	Level 8 (8.xx.x.xxx)

After connect the User Program(GUI),
Version number can be check in
'About Plus-R GUI…' menu in 'Help' menu.



1) Overview of communication FRAME



2) Basic structure of Frame

Header	*Frame Data*	Tail
0xAA 0xCC	4~252 bytes	0xAA 0xEE

① 0xAA : Delimited byte
② 0xAA 0xCC : Displays that the Frame locates in header.
③ 0xAA 0xEE : Displays that the Frame locates in tail.
④ If any of the Frame data is '0xAA', '0xAA' should be added right after it. (byte stuffing)
⑤ If any data following '0xAA' is not '0xAA', '0xCC' or '0xEE', it displays that an error has occurred.

Detailed *Frame Data* is configured as follows:

Slave ID	Frame type	Data	CRC	
1 byte	1 byte	0~248 bytes.	2 bytes	
			Low byte	High byte

① Slave ID : Dive module number (0~15) connected to the PC communication port.
② Frame type : To designate command type of relevant frames. For the command type, refer to 「Frame Type and Data Configuration」 section.
③ Data : Data structure and length is set according to Frame type. For more information, refer to 「Frame Type and Data Configuration」 section.
④ CRC : To check that an error occurs during communication, '0xA001' of a polynomial factor in CRC16(Cyclic Redundancy Check) is used. Or 'X16+X15+X2+1' of a polynomial factor in CRC-16-IBM(Cyclic Redundancy Check) is used. CRC calculation is performed for all items (Slave ID, Frame type, Data) prior to CRC item.

1-1-3. CRC Calculation Example

The following program source is included in a file (file name : CRC_Checksum.c) provided with the product.

1) '0xA001' of CRC16

```
const unsigned short TABLE_CRCVALUE[] =
{
0X0000, 0XC0C1, 0XC181, 0X0140, 0XC301, 0X03C0, 0X0280, 0XC241,
0XC601, 0X06C0, 0X0780, 0XC741, 0X0500, 0XC5C1, 0XC481, 0X0440,
0XCC01, 0X0CC0, 0X0D80, 0XCD41, 0X0F00, 0XCFC1, 0XCE81, 0X0E40,
0X0A00, 0XCAC1, 0XCB81, 0X0B40, 0XC901, 0X09C0, 0X0880, 0XC841,
0XD801, 0X18C0, 0X1980, 0XD941, 0X1B00, 0XDBC1, 0XDA81, 0X1A40,
0X1E00, 0XDEC1, 0XDF81, 0X1F40, 0XDD01, 0X1DC0, 0X1C80, 0XDC41,
0X1400, 0XD4C1, 0XD581, 0X1540, 0XD701, 0X17C0, 0X1680, 0XD641,
0XD201, 0X12C0, 0X1380, 0XD341, 0X1100, 0XD1C1, 0XD081, 0X1040,
0XF001, 0X30C0, 0X3180, 0XF141, 0X3300, 0XF3C1, 0XF281, 0X3240,
0X3600, 0XF6C1, 0XF781, 0X3740, 0XF501, 0X35C0, 0X3480, 0XF441,
0X3C00, 0XFCC1, 0XFD81, 0X3D40, 0XFF01, 0X3FC0, 0X3E80, 0XFE41,
0XFA01, 0X3AC0, 0X3B80, 0XFB41, 0X3900, 0XF9C1, 0XF881, 0X3840,
0X2800, 0XE8C1, 0XE981, 0X2940, 0XEB01, 0X2BC0, 0X2A80, 0XEA41,
```

```
  0XEE01, 0X2EC0, 0X2F80, 0XEF41, 0X2D00, 0XEDC1, 0XEC81, 0X2C40,
  0XE401, 0X24C0, 0X2580, 0XE541, 0X2700, 0XE7C1, 0XE681, 0X2640,
  0X2200, 0XE2C1, 0XE381, 0X2340, 0XE101, 0X21C0, 0X2080, 0XE041,
  0XA001, 0X60C0, 0X6180, 0XA141, 0X6300, 0XA3C1, 0XA281, 0X6240,
  0X6600, 0XA6C1, 0XA781, 0X6740, 0XA501, 0X65C0, 0X6480, 0XA441,
  0X6C00, 0XACC1, 0XAD81, 0X6D40, 0XAF01, 0X6FC0, 0X6E80, 0XAE41,
  0XAA01, 0X6AC0, 0X6B80, 0XAB41, 0X6900, 0XA9C1, 0XA881, 0X6840,
  0X7800, 0XB8C1, 0XB981, 0X7940, 0XBB01, 0X7BC0, 0X7A80, 0XBA41,
  0XBE01, 0X7EC0, 0X7F80, 0XBF41, 0X7D00, 0XBDC1, 0XBC81, 0X7C40,
  0XB401, 0X74C0, 0X7580, 0XB541, 0X7700, 0XB7C1, 0XB681, 0X7640,
  0X7200, 0XB2C1, 0XB381, 0X7340, 0XB101, 0X71C0, 0X7080, 0XB041,
  0X5000, 0X90C1, 0X9181, 0X5140, 0X9301, 0X53C0, 0X5280, 0X9241,
  0X9601, 0X56C0, 0X5780, 0X9741, 0X5500, 0X95C1, 0X9481, 0X5440,
  0X9C01, 0X5CC0, 0X5D80, 0X9D41, 0X5F00, 0X9FC1, 0X9E81, 0X5E40,
  0X5A00, 0X9AC1, 0X9B81, 0X5B40, 0X9901, 0X59C0, 0X5880, 0X9841,
  0X8801, 0X48C0, 0X4980, 0X8941, 0X4B00, 0X8BC1, 0X8A81, 0X4A40,
  0X4E00, 0X8EC1, 0X8F81, 0X4F40, 0X8D01, 0X4DC0, 0X4C80, 0X8C41,
  0X4400, 0X84C1, 0X8581, 0X4540, 0X8701, 0X47C0, 0X4680, 0X8641,
  0X8201, 0X42C0, 0X4380, 0X8341, 0X4100, 0X81C1, 0X8081, 0X4040
 };

 unsigned short CalcCRC(unsigned char* pDataBuffer, unsigned long usDataLen)
{
        unsigned char nTemp;
        unsigned short wCRCWord = 0xFFFF;

        while (usDataLen--)
        {
                nTemp = wCRCWord ^ *(pDataBuffer++);
                wCRCWord >>= 8;
                wCRCWord ^= TABLE_CRCVALUE[nTemp];
        }
        return wCRCWord;
}
```

2) 'X16+X15+X2+1' of CRC-16-IBM

```
unsigned short CalcCRCbyAlgorithm(unsigned char* pDataBuffer, unsigned long usDataLen)
{
        // Use the Modbus algorithm as detailed in the Watlow comms guide
        const unsigned short POLYNOMIAL = 0xA001;
        unsigned short wCrc;
        int iByte, iBit;

        /* Initialize CRC */
        wCrc = 0xffff;

        for (iByte = 0; iByte < usDataLen; iByte++)
        {
           /* Exclusive-OR the byte with the CRC */
           wCrc ^= *(pDataBuffer + iByte);
```

```
        /* Loop through all 8 data bits */

        for (iBit = 0; iBit <= 7; iBit++)
        {
           /* If the LSB is 1, shift the CRC and XOR the polynomial mask with the CRC */

          // Note - the bit test is performed before the rotation, so can't move the << here
              if (wCrc & 0x0001)
              {
                        wCrc >>= 1;
                        wCrc ^= POLYNOMIAL;
              }
              else
              {
                        // Just rotate it
                        wCrc >>= 1;
              }
        }
      }
      return wCrc;
}
```

1－1－4. Response Frame Structure and Communication Error(Ver6)

When any command is sent, the basic structure of Frame at the response side is same. However, there is a difference in case of *Frame Data,* which 'communication status' is added as shown below.

Slave ID	Frame Type	Data		CRC	
1 byte	1 byte	1 byte	0~247 bytes	2 bytes	
		Communication status	Response data	Low byte	High byte

① Slave ID : Same to sending Frame.
(When this is not same to sending data, it should be recognized as the error status.)
② Frame type : Same to sending Frame.
(When this is not same to sending data, it should be recognized as the error status.)
③ Data : When simple executive instructions are sent, this data cannot be read. However, in case of response, 1 byte is added to display the communication status (error / normal).

The code by bytes means the **'Communication status'** as follows.

Hexa Code	Decimal Code	Description
0x00	0	Communication is normal.
0x80	128	Frame Type Error : Responded Frame type cannot be recognized.
0x81	129	Data error, ROM data read/write error : Data value responded is without the given range.
0x82	130	Received Frame Error : Frame data received is out of this specification.
0x85	133	Running Command Failure : The user has tried to execute new running commands in wrong condition as follows. 1) currently motor is running 2) currently motor is stopping 3) currently Servo is OFF status 4) try to Z-pulse Origin without encoder
0x86	134	RESET Failure : The user has tried to execute new running commands in wrong condition as follows. 1) While the servo is ON 2) Already RESET in ON by external input signal
0x87	135	Servo ON Failure ① : While an alarm occurs, the user has tried to execute Servo ON command.
0x88	136	Servo ON Failure ② : While Emergency Stop occurs, the user has tried to execute Servo ON command.
0x89	137	Servo ON Failure ③ : 'ServoON' signal is assigned to input pin already. Servo ON/OFF Can execute by external input signal only.
0xAA	170	CRC Error : Frame data received is out of CRC format. In this case, DLL Library of sending side automatically try to send 1 more time.

Caution	**1)** If 'Header' and 'Slave ID' values in the sending Frame are abnormal, there is no response from the drive. **2)** If the communication status is displayed to '130', the size of response data is '0' byte.

1－2. Structure of Frame type(Ver6)

1－2－1. Frame type and Data Configuration

(1) The following table displays the content and configuration of data by Frame type.

<table>
<tr><th>Frame Type</th><th>Library Name</th><th>Contents</th></tr>
<tr><td>0x01
(1)</td><td>FAS_
GetSlaveInfo</td><td>Connected slave type and program version information are required.

Sending : 0 byte
Response : 1~248 bytes

<table>
<tr><td>1 byte</td><td>1 bytes</td><td>0~246 bytes</td></tr>
<tr><td>Communication status</td><td>Slave type</td><td>ACII string with NULL byte (strlen() + 1 byes)</td></tr>
</table>

♦ Slave type : 1 : Ezi-SERVO Plus-R ST 20 : Ezi-STEP Plus-R ST
50 : Ezi- SERVO Plus-R MINI</td></tr>
<tr><td>0x05
(5)</td><td>FAS_
GetMotorInfo</td><td>Connected motor type and maker information are required.

Sending : 0 byte
Response : 1~248 bytes

<table>
<tr><td>1 byte</td><td>1 bytes</td><td>0~246 bytes</td></tr>
<tr><td>Communication status</td><td>Motor type (1~255)</td><td>ACII string with NULL byte (strlen() + 1 byes)</td></tr>
</table>

♦ Motor type : refer to 「1-1-7.Information of Motors」</td></tr>
<tr><td>0x10
(16)</td><td>FAS_
SaveAllParameters</td><td>Current setting parameters & assign of IO signals are saved in the ROM of the drive. Even though the drive is powered off, saving these must be possible.
Values set at ‘FAS_SetParameter’ & ‘FAS_SetIOAssignMap’ are saved together.

Sending : 0 byte
Response : 1 byte
<table>
<tr><td>1 byte</td></tr>
<tr><td>Communication status</td></tr>
</table></td></tr>
<tr><td>0x11
(17)</td><td>FAS_
GetRomParameter</td><td>Specific parameter values in the ROM are read.

Sending : 1 byte
<table>
<tr><td>1 byte</td></tr>
<tr><td>Parameter number (0~31)</td></tr>
</table>

Response : 5 bytes
<table>
<tr><td>1 byte</td><td>4 bytes</td></tr>
<tr><td>Communication status</td><td>Parameter value</td></tr>
</table>

Refer to 「1-2-2.Parameter List」</td></tr>
</table>

<table>
<tr><td>0x12
(18)</td><td>FAS_
SetParameter</td><td>Specific parameter values are saved to the RAM.

Sending : 5 bytes
<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Parameter number (0~31)</td><td>Parameter value</td></tr></table>
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table>
Refer to 「1-2-2.Parameter List」</td></tr>
<tr><td>0x13
(19)</td><td>FAS_
GetParameter</td><td>Specific parameter values in the RAM are read

Sending : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Parameter number (0~31)</td></tr></table>
Response : 5 bytes
<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Parameter value</td></tr></table>
Refer to 「1-2-2.Parameter List」</td></tr>
<tr><td>0x20
(32)</td><td>FAS_
SetIOOutput</td><td>Output signal level of the control output port is set.

Sending : 8 bytes
<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>I/O set mask value</td><td>I/O clear mask value</td></tr></table>
When specific bit of the set mask is ‘1’, the relevant output port signal is set to [ON].
When specific bit of the clear mask is ‘1’, the relevant output port signal is set to [OFF].
For more information, refer to 「1-2-3.Bit setup of Output Pin」.

Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x21
(33)</td><td>FAS_
SetIOInput</td><td>Input signal level of the control input port is set.

Sending : 8 bytes
<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>I/O set mask value</td><td>I/O clear mask value</td></tr></table>
When specific bit of the set mask is ‘1’, the relevant input port signal is set to [ON].
When specific bit of the clear mask is ‘1’, the relevant input port signal is set to [OFF].
For more information, refer to 「1-2-4. Bit setup of Input Pin」.

Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x22
(34)</td><td>FAS_
GetIOInput</td><td>Current input signal status of the control input port is read.

Sending : 0 byte
Response : 5 byte<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Input status value</td></tr></table>
Relevant bit by each input signal, refer to 「1-2-4. Bit setup of Input Pin」.</td></tr>
<tr><td>0x23
(35)</td><td>FAS_
GetIOOutput</td><td>Current output signal status of the control output port is read.

Sending : 0 byte
Response : 5 byte<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Output status value</td></tr></table>
Relevant bit by each output signal, refer to 「1-2-3.Bit setup of Output Pin」.</td></tr>
<tr><td>0x24
(36)</td><td>FAS_
SetIOAssignMap</td><td>To assign control I/O signals to the pin of CN1 port and set the signal level. By running 'FAS_SaveAllParameters', you can save the setting value to the ROM.

Sending : 6 bytes<table><tr><td>1 byte</td><td>4 bytes</td><td>1 byte</td></tr><tr><td>I/O number</td><td>I/O pin masking data</td><td>Setting level</td></tr></table>
♦ I/O number: '0~11' corresponds to 'Limit+, Limit-, Org, IN1,…, IN9' respectively, and '12~22' corresponds to 'COMP, OUT1,…, OUT9' respectively.
♦ I/O pin masking data: Refer to 「1-2-4. Bit setup of Input Pin」.
♦ Level Setting: 0:Active Low, 1:Active High

Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x25
(37)</td><td>FAS_
GetIOAssignMap</td><td>Pin setting status of CN1 port is read from RAM area.

Sending : 1 byte<table><tr><td>1 byte</td></tr><tr><td>I/O number</td></tr></table>
♦ I/O number: '0~11' corresponds to 'Limit+, Limit-, Org, IN1, …, IN9' respectively, and '12~22' corresponds to 'COMP, OUT1, …, OUT9' respectively.

Response : 6 bytes<table><tr><td>1 byte</td><td>4 bytes</td><td>1 byte</td></tr><tr><td>Communication status</td><td>IO pin masking status</td><td>Level status</td></tr></table>
For more information, refer to '0x24' Frame type.</td></tr>
</table>

<table>
<tr><td>0x26
(38)</td><td>FAS_
IOAssignMapReadROM</td><td>Pin setting status of CN1 port is loaded to RAM from ROM area.

Sending : 0 byte

Response : 2 bytes
<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(0 : complete, values except 0: error)</td></tr></table></td></tr>
<tr><td>0x27
(39)</td><td>FAS_
TriggerOutput_RunA</td><td>Start/Stop command for ‘Compare Out’ signal

Sending : 18 bytes
<table><tr><td>1 byte</td><td>4 bytes</td><td>4 byte</td></tr><tr><td>Output start/stop
(1:start 0:stop)</td><td>Pulse start position
[pulse]</td><td>Pulse period
[pulse]</td></tr></table><table><tr><td>4 byte</td><td>1 bytes</td><td>4 byte</td></tr><tr><td>Pulse width
[msec]</td><td>Output pin number
(fix to 0)</td><td>spare</td></tr></table>
Response : 2 byte
<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(0 : complete, values except 0: error)</td></tr></table></td></tr>
<tr><td>0x28
(40)</td><td>FAS_
TriggerOutput_Status</td><td>Command to check if the trigger output pulse is working or not.

Sending : 0 byte
Response : 2 byte
<table><tr><td>1 byte</td><td>1 bytes</td></tr><tr><td>Communication status</td><td>Status (1:output ON, 0 :output OFF)</td></tr></table></td></tr>
<tr><td>0x2A
(42)</td><td>FAS_
ServoEnable</td><td>Servo ON/OFF status is set.

Sending : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>0:OFF, 1:ON</td></tr></table>
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x2B
(43)</td><td>FAS_
ServoAlarmReset</td><td>Servo alarm status is reset.

Sending : 0 byte
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x2E
(46)</td><td>FAS_
ServoAlarmtype</td><td>To request the Alarm type
Sending: 0 byte
Response: 2 byte
<table><tr><td>1 byte</td><td>1 bytes</td></tr><tr><td>Communication status</td><td>Alarm type (1~)</td></tr></table>
♦ Alarm type: No alarm (0) OverCurrent(1) OverSpeed(2)
StepOut(3) OverLoad(4) OverTemperature(5)
BackEMF(6) MotorConnect(7) EncoderConnect(8)
MotorPower(9) Inposition(10) SystemHalt(11)
ROMdevice(12) OverInputVoltage(14)
Position Overflow(15)</td></tr>
<tr><td>0x31
(49)</td><td>FAS_
MoveStop</td><td>To request to stop running the motor

Sending : 0 byte
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x32
(50)</td><td>FAS_
EmergencyStop</td><td>To request the running motor to stop emergently

Sending : 0 byte
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x33
(51)</td><td>FAS_
MoveOriginSingleAxis</td><td>To request the motor to return to the origin at the current setting parameter condition

Sending : 0 byte
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x34
(52)</td><td>FAS_
MoveSingleAxisAbsPos</td><td>To request the motor to move its position as much as the absolute value[pulse]

Sending : 8 bytes
<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Absolute position value</td><td>Running speed [pps]</td></tr></table>
Response : 1 byte
<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x35
(53)</td><td>FAS_
MoveSingleAxisIncPos</td><td>To request the motor to move its position as much as the incremental value[pulse]
Sending : 8 bytes<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Incremental position value</td><td>Running speed [pps]</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x36
(54)</td><td>FAS_
MoveToLimit</td><td>To request the motor to start limit motion at the current setting parameter condition
Sending : 5 bytes<table><tr><td>4 bytes</td><td>1 byte</td></tr><tr><td>Running speed [pps]</td><td>Running direction (0: -Limit 1: +Limit)</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x37
(55)</td><td>FAS_
MoveVelocity</td><td>To request the motor to start jog motion at the current setting parameter condition
Sending : 5 bytes<table><tr><td>4 bytes</td><td>1 byte</td></tr><tr><td>Running speed [pps]</td><td>Running direction (0: -Jog 1: +Jog)</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x38
(56)</td><td>FAS_
PositionAbsOverride</td><td>To request the motor to change the target absolute position value[pulse] while it is in running.
Sending : 4 bytes<table><tr><td>4 bytes</td></tr><tr><td>Changed command position value [pulse]</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x39
(57)</td><td>FAS_
PositionIncOverride</td><td>To request the motor to change the target incremental position value[pulse] while it is in running.
Sending : 4 bytes<table><tr><td>4 bytes</td></tr><tr><td>Changed command position value [pulse]</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x3A
(58)</td><td>FAS_
VelocityOverride</td><td>To request the motor to change the running speed value[pps] while it is in running.
Sending : 4 bytes<table><tr><td>4 bytes</td></tr><tr><td>Changed running speed [pps]</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x3B
(59)</td><td>FAS_
AllMoveStop</td><td>To request stop for all motor that connected in same port.

Sending : 0 byte
(Slave number must be ‘99’)
Response : no response</td></tr>
<tr><td>0x3C
(60)</td><td>FAS_
AllEmergencyStop</td><td>To request emergency stop for all motor that connected in same port.

Sending : 0 byte
(Slave number must be ‘99’)
Response : no response</td></tr>
<tr><td>0x3D
(61)</td><td>FAS_All
MoveOriginSingleAxis</td><td>To request return to the origin at the current setting parameter condition for all motors that connected in same port.

Sending : 0 byte
(Slave number must be ‘99’)
Response : no response</td></tr>
<tr><td>0x3E
(62)</td><td>FAS_All
SingleAxisAbsPos</td><td>To request move its position as much as the absolute value[pulse] for all motors that connected in same port.

Sending : 8 bytes (Slave number must be ‘99’)<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Absolute position value</td><td>Running speed [pps]</td></tr></table>
Response : no response</td></tr>
<tr><td>0x3F
(63)</td><td>FAS_All
SingleAxisIncPos</td><td>To request move its position as much as the incremental value[pulse] for all motors that connected in same port.

Sending : 8 bytes (Slave number must be ‘99’)<table><tr><td>4 bytes</td><td>4 bytes</td></tr><tr><td>incremental position value</td><td>Running speed [pps]</td></tr></table>
Response : no response</td></tr>
<tr><td></td><td>FAS_MoveLinearAbsPos</td><td>To request Linear Interpolation move its position as much as the absolute value[pulse] for more than 2 motors that connected in same port.
Refer to 「2. Library for PC program」.</td></tr>
<tr><td></td><td>FAS_MoveLinearIncPos</td><td>To request Linear Interpolation move its position as much as the incremental value[pulse] for more than 2 motors that connected in same port.
Refer to 「2. Library for PC program」.</td></tr>
</table>

<table>
<tr><td>0x40
(64)</td><td>FAS_
GetAxisStatus</td><td>To request the Flag value of displaying the running status

Sending : 0 byte
Response : 5 bytes

<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Status flag value</td></tr></table>
For bit related to each Flag, refer to 「1-2-5. Bit setup of Status Flag」 .</td></tr>
<tr><td>0x41
(65)</td><td>FAS_
GetIOAxisStatus</td><td>To request the I/O status and the running Flag status.
(Frame type 0x22, 0x23, and 0x40 are packed.)

Sending : 0 byte
Response : 13 bytes

<table><tr><td>1 byte</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Input status value</td><td>Output status value</td><td>Status flag value</td></tr></table></td></tr>
<tr><td>0x42
(66)</td><td>FAS_
GetMotionStatus</td><td>To request the current running progress status and its PT number
(Frame type 0x51, 0x53, 0x54, and 0x55 are packed.)

Sending : 0 byte
Response : 21 bytes

<table><tr><td>1 byte</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Command position value</td><td>Actual Position value</td><td>Position Difference value</td><td>Running speed value</td><td>Current running PT number</td></tr></table></td></tr>
<tr><td>0x43
(67)</td><td>FAS_
GetAllStatus</td><td>To request all data including the current running status
(Frame type 0x41, and 0x42 are packed.)

Sending : 0 byte
Response : 33 bytes
<table><tr><td>1 byte</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Input status value</td><td>Output status value</td><td>Status flag value</td></tr></table>
<table><tr><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td><td>4 bytes</td></tr><tr><td>Command position value</td><td>Actual position value</td><td>Position Difference value</td><td>Running speed value</td><td>Current running PT number</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x50
(80)</td><td>FAS_
SetCommandPos</td><td>Ezi-SERVO Plus-R is the closed loop control drive and so the command position value is continuously controlled while the motor is in running. The user sets it to the command position value before it starts to operate and then can check how the command position value is changed.

Sending : 4 bytes<table><tr><td>4 bytes</td></tr><tr><td>Command position setting count value</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x51
(81)</td><td>FAS_
GetCommandPos</td><td>To request the command position value[pulse] being tracked.

Sending : 0 byte
Response : 5 bytes<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Command position value</td></tr></table></td></tr>
<tr><td>0x52
(82)</td><td>FAS_
SetActualPos</td><td>Ezi-SERVO Plus-R is the closed loop control drive and so the actual position value is continuously controlled while the motor is in running. The user sets it to the actual position value before it starts to operate and then can check how the actual position value is changed.

Sending : 4 bytes<table><tr><td>4 bytes</td></tr><tr><td>Actual position count value</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x53
(83)</td><td>FAS_
GetActualPos</td><td>To request the current actual position value[pulse].

Sending : 0 byte
Response : 5 bytes<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Actual position value</td></tr></table></td></tr>
<tr><td>0x54
(84)</td><td>FAS_
GetPosError</td><td>To request the difference[pulse] between the command position value and the actual position value.

Sending : 0 byte
Response : 5 bytes<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Position difference value</td></tr></table>By this value, the user can check the current running status (how much inposition is tracked).</td></tr>
</table>

<table>
<tr><td>0x55
(85)</td><td>FAS_
GetActualVel</td><td>To request the current running speed value [pps]

Sending : 0 byte
Response : 5 bytes<table><tr><td>1 byte</td><td>4 bytes</td></tr><tr><td>Communication status</td><td>Speed value</td></tr></table></td></tr>
<tr><td>0x56
(86)</td><td>FAS_
ClearPosition</td><td>Ezi-SERVO Plus-R is the closed loop control drive and so the command position value is continuously controlled while the motor is in running. The user sets the command position and actual position value to ‘0’ before it starts to operate and then can check how the command position value is changed.

Sending : 0 byte
Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x60
(96)</td><td>FAS_
PosTableReadItem</td><td>To read PT values in the RAM of the drive.

Sending : 2 bytes<table><tr><td>2 bytes</td></tr><tr><td>Readable PT number (0~255)</td></tr></table>Response : 65 bytes<table><tr><td>1 byte</td><td>64 bytes</td></tr><tr><td>Communication status</td><td>Relevant PT values</td></tr></table>For items by each PT, refer to 「1-2-6. Position Table Item」.</td></tr>
<tr><td>0x61
(97)</td><td>FAS_
PosTableWriteItem</td><td>To save PT values to the RAM of the drive.

Sending : 66 bytes<table><tr><td>2 bytes</td><td>64 bytes</td></tr><tr><td>PT number (0~255)</td><td>Relevant PT value</td></tr></table>For items by each PT, refer to 「1-2-6. Position Table Item」.
Response : 2 bytes<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(values except 0 : complete, 0: error)</td></tr></table></td></tr>
<tr><td>0x62
(98)</td><td>FAS_
PosTableReadROM</td><td>To read all PT values (256 ea) in the ROM of the drive

Sending : 0 byte
Response : 2 bytes<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(0 : complete, values except 0: error)</td></tr></table></td></tr>
</table>

<table>
<tr><td>0x63
(99)</td><td>FAS_
PosTableWriteROM</td><td>To save all PT value(256 ea) to the ROM of the drive.

Sending : 0 byte
Response : 2 bytes<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(0 : complete, values except 0: error)</td></tr></table></td></tr>
<tr><td>0x64
(100)</td><td>FAS_
PosTableRunItem</td><td>To start the position table operation from the designated PT number

Sending : 2 bytes<table><tr><td>2 bytes</td></tr><tr><td>PT Number (0~255)</td></tr></table>Response : 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
<tr><td>0x6A
(106)</td><td>FAS_
PosTableReadOneItem</td><td>To read one of PT values in the RAM of the drive.
Sending: 4 byte<table><tr><td>2 byte</td><td>2 byte</td></tr><tr><td>PT Number (0~255)</td><td>Offset value(0~40)</td></tr></table>Refer to 「1-2-6. Position Table Item」 for Offset value
Response: 5 byte<table><tr><td>1 byte</td><td>4 byte</td></tr><tr><td>Communication status</td><td>Relevant one of PT value</td></tr></table></td></tr>
<tr><td>0x6B
(107)</td><td>FAS_
PosTableWriteOneItem</td><td>To save one of PT values to the RAM of the drive.
Sending: 8 byte<table><tr><td>2 byte</td><td>2 byte</td><td>4 byte</td></tr><tr><td>PT Number (0~255)</td><td>Offset value (0~40)</td><td>Relevant one of PT value</td></tr></table>Refer to 「1-2-6. Position Table Item」 for Offset value
Response: 2 byte<table><tr><td>1 byte</td><td>1 byte</td></tr><tr><td>Communication status</td><td>Command performing status
(values except 0 : complete, 0: error)</td></tr></table></td></tr>
<tr><td>0x78
(120)</td><td>FAS_
MovePush</td><td>To request push motion(maintain specified motor torque) command
Sending: 26 bytes<table><tr><td>4 byte</td><td>4 bytes</td><td>4 byte</td><td>2 bytes</td><td>2 bytes</td></tr><tr><td>Normal
Start speed</td><td>Normal
Move speed</td><td>Normal
Position</td><td>Accel
time</td><td>Decel
time</td></tr></table><table><tr><td>2 byte</td><td>4 bytes</td><td>4 byte</td></tr><tr><td>Push torque
ratio</td><td>Push
Move speed</td><td>Push
Position</td></tr></table>Refer to 「User Manual Test 10-6. Push Motion」 .

Response: 1 byte<table><tr><td>1 byte</td></tr><tr><td>Communication status</td></tr></table></td></tr>
</table>

<table>
<tr>
<td>0x79
(121)</td>
<td>FAS_
GetPushStatus</td>
<td>To request thecurrent push motion status.

Sending: 0 byte
Response: 2 byte

<table>
<tr><th>1 byte</th><th>1 bytes</th></tr>
<tr><td>Communication status</td><td>Push motion status
(0: normal Servo ON
1: push motioning but the work is not detected
2: work detected and torque is maintained)</td></tr>
</table>
</td>
</tr>
</table>

* Frame Type ‘0x65’ ~ ‘0x69’, ‘0x90’ ~ ‘0x92’ are allotted for internal use.
* PT Number : 0~255 for **Ezi-SERVO-PR**
0~63 for **Ezi-SERVO-PR-MI**

1－2－2. Parameter Lists

No.	Name	Unit	Lower Limit	Upper Limit	Default
0	Pulse per Revolution		0	9	9
1	Axis Max Speed	[pps]	1	500,000	500,000
2	Axis Start Speed	[pps]	1	35,000	1
3	Axis Acc Time	[msec]	1	9,999	100
4	Axis Dec Time	[msec]	1	9999	100
5	Speed Override	[%]	1	500	100
6	Jog Speed	[pps]	1	500,000	5,000
7	Jog Start Speed	[pps]	1	35,000	1
8	Jog Acc Dec Time	[msec]	1	9,999	100
9	Servo Alarm Logic		0	1	0
10	Servo On Logic		0	1	0
11	Servo Alarm Reset Logic		0	1	0
12	S/W Limit Plus Value	[pulse]	-134,217,727	+134,217,727	+134,217,727
13	S/W Limit Minus Value	[pulse]	-134,217,727	+134,217,727	-134,217,727
14	S/W Limit Stop Method		0	1	1
15	H/W Limit Stop Method		0	1	1
16	Limit Sensor Logic		0	1	0
17	Org Speed	[pps]	1	500,000	5,000
18	Org Search Speed	[pps]	1	500,000	1,000
19	Org Acc Dec Time	[msec]	1	9,999	50
20	Org Method		0	2	0
21	Org Dir		0	1	0
22	Org Offset	[pulse]	-134,217,727	+134,217,727	0
23	Org Position Set	[pulse]	-134,217,727	+134,217,727	0
24	Org Sensor Logic		0	1	0
25	Position Loop Gain		0	15	4
26	Inpos Value		0	15	0
27	Pos Tracking Limit	[pulse]	1	+134,217,727	5,000
28	Motion Dir		0	1	0
29	Limit Sensor Dir		0	1	0
30	Org Torque Ratio	[%]	10	100	50
31	Pos. Error Overflow Limit	[pulse]	1	+134,217,727	5,000

1-2-3. Bit setup of Output pin

This displays the detailed description for 0x20 Frame type.
This command is applicable only to 9 signals of 'User Output 0' ~ ' User Output 8' out of 24 signal types in the control output port. The rest (15 output signals) of them cannot be operated by the user's disposal. When any relevant situation occurs while the drive operates, they are displayed. The following table shows bit mask values by each signal.

Signal Name	Relevant Bit Position	Signal Name	Relevant Bit Position	Signal Name	Relevant Bit Position
Compare Out	0x00000001	Origin Search OK	0x00000100	User Output 1	0x00010000
Inposition	0x00000002	ServoReady	0x00000200	User Output 2	0x00020000
Alarm	0x00000004	reserved	0x00000400	User Output 3	0x00040000
Moving	0x00000008	reserved	0x00000800	User Output 4	0x00080000
Acc/Dec	0x00000010	PT Output 0	0x00001000	User Output 5	0x00100000
ACK	0x00000020	PT Output 1	0x00002000	User Output 6	0x00200000
END	0x00000040	PT Output 2	0x00004000	User Output 7	0x00400000
AlarmBlink	0x00000080	User Output 0	0x00008000	User Output 8	0x00800000

【Example 1】 Sending data to turn ON the User Output 5 port.

4 bytes (I/O set mask value)	4 bytes (I/O clear mask value)
0x00100000	0x00000000

【Example 2】 Sending data to turn OFF the User Output 5 port

4 bytes (I/O set mask value)	4 bytes (I/O clear mask value)
0x00000000	0x00100000

1-2-4. Bit setup of Input pin

This displays the detailed description for 0x21 Frame type.
This command is applicable to 32 signals in the control input port. The user can use signals for test as if they are inputted without actual input signal. The following table shows bit mask values by each signal.

Signal Name	Relevant Bit Position	Signal Name	Relevant Bit Position	Signal Name	Relevant Bit Position	Signal Name	Relevant Bit Position
Limit+	0x00000001	PT A4	0x00000100	AlarmReset	0x00010000	JPT input 2	0x01000000
Limit-	0x00000002	PT A5	0x00000200	ServoON	0x00020000	JPT Start	0x02000000
Origin	0x00000004	PT A6	0x00000400	Pause	0x00040000	User Input 0	0x04000000
Clear Position	0x00000008	PT A7	0x00000800	Org Search	0x00080000	User Input 1	0x08000000
PT A0	0x00000010	PT Start	0x00001000	Teaching	0x00100000	User Input 2	0x10000000
PT A1	0x00000020	Stop	0x00002000	E-stop	0x00200000	User Input 3	0x20000000
PT A2	0x00000040	Jog+	0x00004000	JPT input 0	0x00400000	User Input 4	0x40000000
PT A3	0x00000080	Jog-	0x00008000	JPT input 1	0x00800000	User Input 5	0x80000000

【Example 1】 Sending data to turn ON the Pause port

4 bytes (I/O set mask value)	4 bytes (I/O clear mask value)
0x00040000	0x00000000

【Example 2】 Sending data to turn OFF the Pause port

4 bytes (I/O set mask value)	4 bytes (I/O clear mask value)
0x00000000	0x00040000

1-2-5. Bit setup of Status Flag

Refer to 'motion_define.h' of include files.

It can be applied under the Firmware version of 06.03.043.8

Name of Flag Define	Contents	Relevant Bit Position
FFLAG_ERRORALL	One or more error occurs.	0X00000001
FFLAG_HWPOSILMT	'+' direction limit sensor turns ON.	0X00000002
FFLAG_HWNEGALMT	'-' direction limit sensor turns ON.	0X00000004
FFLAG_SWPOGILMT	'+' direction program limit is exceeded.	0X00000008
FFLAG_SWNEGALMT	'-' direction program limit is exceeded.	0X00000010
reserved		0X00000020
FFLAG_POSCNTOVER	Position error is higher than 'Pos Tracking Limit' value during position command run.	0X00000040
FFLAG_ERRSERVOALARM	One or more error of Servo alarm(8 ea) occurs.	0X00000080
FFLAG_ERROVERCURRENT	The motor driving device is under over-current.	0X00000100
FFLAG_ERROVERSPEED	The motor speed exceeded 3000[rpm].	0X00000200
FFLAG_ERRSPEED	The motor is not tracked normally by pulse input.	0X00000400
FFLAG_ERROVERLOAD	Load exceeding the max torque of the motor is loaded more than 5 seconds.	0X00000800
FFLAG_ERROVERHEAT	The internal temperature of the drive exceeds 55° C.	0X00001000
FFLAG_ERRREVPWR	A counter electromotive force of the motor exceeds 70V	0X00002000
FFLAG_ERRMOTORPOWER	The motor is not connected to drive correctly.	0X00004000
FFLAG_ERRINPOSITION	After operation is finished, a position error occurs for more than 3 seconds.	0X00008000
FFLAG_EMGSTOP	The motor is under emergency stop.	0X00010000
FFLAG_SLOWSTOP	The motor is under general stop.	0X00020000
FFLAG_ORIGINRETURNING	The motor is returning to the origin.	0X00040000
FFLAG_INPOSITION	Inposition has been finished.	0X00080000
FFLAG_SERVOON	The motor is under Servo ON.	0X00100000
FFLAG_ALARMRESET	AlarmReset has run.	0X00200000
FFLAG_PTSTOPED	Position Table operation has been finished.	0X00400000
FFLAG_ORIGINSENSOR	The origin sensor is ON.	0X00800000
FFLAG_ZPULSE	The motor operates to z-pulse type of origin return operations.	0X01000000
FFLAG_ORIGINRETOK	Origin return operation has been finished.	0X02000000
FFLAG_MOTIONDIR	To display the motor operating direction (+: Off, -: On)	0X04000000
FFLAG_MOTIONING	The motor is running.	0X08000000
FFLAG_MOTIONPAUSE	The motor in running is stopped by Pause command.	0X10000000
FFLAG_MOTIONACCEL	The motor is operating to the acceleration section.	0X20000000
FFLAG_MOTIONDECEL	The motor is operating to the deceleration section.	0X40000000
FFLAG_MOTIONCONST	The motor is operating to the normal speed, not acceleration / deceleration sections.	0X80000000

Next bit assignments can be applied over the Firmware version of 06.03.043.10

Name of Flag Define	Contents	Relevant Bit Position
FFLAG_ERRORALL	One or more error occurs.	0X00000001
FFLAG_HWPOSILMT	'+' direction limit sensor turns ON.	0X00000002
FFLAG_HWNEGALMT	'-' direction limit sensor turns ON.	0X00000004
FFLAG_SWPOGILMT	'+' direction program limit is exceeded.	0X00000008
FFLAG_SWNEGALMT	'-' direction program limit is exceeded.	0X00000010
Reserved1		0X00000020
Reserved2		0X00000040
FFLAG_ERRPOSOVERFLOW	Position error is higher than 'Pos Error Overflow Limit' parameter after position command	0X00000080
FFLAG_ERROVERCURRENT	The motor driving device is under over-current.	0X00000100
FFLAG_ERROVERSPEED	The motor speed exceeded 3000[rpm].	0X00000200
FFLAG_ERRPOSTRACKING	Position error is higher than 'Pos Tracking Limit' parameter during position command run.	0X00000400
FFLAG_ERROVERLOAD	Load exceeding the max torque of the motor is loaded more than 5 seconds.	0X00000800
FFLAG_ERROVERHEAT	The internal temperature of the drive exceeds 55° C.	0X00001000
FFLAG_ERRBACKEMF	A counter electromotive force of the motor exceeds 70V.	0X00002000
FFLAG_ERRMOTORPOWER	The power supplied to the motor is less than low limited value.	0X00004000
FFLAG_ERRINPOSITION	After operation is finished, a position error occurs for more than 3 seconds.	0X00008000
FFLAG_EMGSTOP	The motor is under emergency stop.	0X00010000
FFLAG_SLOWSTOP	The motor is under general stop.	0X00020000
FFLAG_ORIGINRETURNING	The motor is returning to the origin.	0X00040000
FFLAG_INPOSITION	Inposition has been finished.	0X00080000
FFLAG_SERVOON	The motor is under Servo ON.	0X00100000
FFLAG_ALARMRESET	AlarmReset has run.	0X00200000
FFLAG_PTSTOPED	Position Table operation has been finished.	0X00400000
FFLAG_ORIGINSENSOR	The origin sensor is ON.	0X00800000
FFLAG_ZPULSE	The motor operates to z-pulse type of origin return operations.	0X01000000
FFLAG_ORIGINRETOK	Origin return operation has been finished.	0X02000000
FFLAG_MOTIONDIR	To display the motor operating direction (+: Off, -: On)	0X04000000
FFLAG_MOTIONING	The motor is running.	0X08000000
FFLAG_MOTIONPAUSE	The motor in running is stopped by Pause command.	0X10000000
FFLAG_MOTIONACCEL	The motor is operating to the acceleration section.	0X20000000
FFLAG_MOTIONDECEL	The motor is operating to the deceleration section.	0X40000000
FFLAG_MOTIONCONST	The motor is operating to the normal speed, not acceleration / deceleration sections.	0X80000000

1-2-6. Position Table Item

Refer to 'motion_define.h' of include files.

Name	Name of Structure Parameter	Number of Bytes	Offset value	Unit	Low Limit	Upper Limit
Position	lPosition	4 (signed)	0	[pulse]	-134217728	+134217728
Low Speed	dwStartSpd	4 (unsigned)	4	[pps]	0	500000
High Speed	dwMoveSpd	4 (unsigned)	8	[pps]	0	500000
Accel. Time	wAccelRate	2 (unsigned)	12	[msec]	1	9999
Decel. Time	wDecelRate	2 (unsigned)	14	[msec]	1	9999
Command	wCommand	2 (unsigned)	16		0	10
Wait time	wWaitTime	2 (unsigned)	18	[msec]	0	600000
Continuous Action	wContinuous	2 (unsigned)	20		0	1
Jump Table No.	wBranch	2 (unsigned)	22		0 10000	255 10255
Jump PT 0	wCond_branch0	2 (unsigned)	24		0 10000	255 10255
Jump PT 1	wCond_branch1	2 (unsigned)	26		0 10000	255 10255
Jump PT 2	wCond_branch2	2 (unsigned)	28		0 10000	255 10255
Loop Count	wLoopCount	2 (unsigned)	30		0	100
Loop Jump Table No.	wBranchAfterLoop	2 (unsigned)	32		0 10000	255 10255
PT set	wPTSet	2 (unsigned)	34		0	15
Loop Counter Clear	wLoopCountCLR	2 (unsigned)	36		0	255
Check Inposition	bCheckInpos	2 (unsigned)	38		0	1
Compare Position	lTriggerPos	4 (signed)	40	[pulse]	-134217728	+134217728
Compare Width	wTriggerOnTime	2 (unsigned)	44	[msec]	1	9999
Push Ratio	wPushRatio	2 (unsigned)	46	[%]	10	100
Push Speed	dwPushSpeed	4 (unsigned)	48	[pps]	0	50000
Push Position	lPushPosition	4 (signed)	52	[pulse]	-134217728	+134217728
Blank		8 (unsigned)	56	0x00		

For the setting method by each item, refer to other manual 「User Manual_Position Table」.

1-2-7. Information of Motors

Firstly the number and 2~3 characters are display the motor size and length.

【Example 1】 56XL : Motor Flange size is 56mm and Extra long size

Second area is display the motor maker information like below.

Display	Maker
blank	JapanServo
SD	Sanyo Denki
POR	Portescap
NPM	NPM
FUL	Fulling

1－3. Program Method

There are 2 method of programming for Ezi-SERVO Plus-R.

The first is normally used method that using Visual C++ language under window system of PC. Library that serviced together with Ezi-SERVO Plus-R have to be used. Refer to 「2. Library for PC Program」

The second method can be accomplished by sending command characters directly to Ezi-SERVO Plus-R. The user have to prepare low level protocol programming like 'Protocol Test' program. This method is normally used for PLC system.
For excise the protocol programming, 'ProtocolTest_PlusR.exe' GUI program is serviced together.
Refer to 「 3. Protocol for PLC Program」.

2. Library for PC Program(Ver6)

2－1. Library Configuration

To use this library, C++ header file(*.h) and library file(*.lib or *.dll) are required. These files are included in "WWFASTECHWWEziMOTION PlusRWWincludeWW The following contents should be included in a source file for development.

#include "WWFASTECHWW EziMOTION PlusR WWincludeWWFAS_EziMotionPlusR.h"
#include "WWFASTECHWW EziMOTION PlusR WWincludeWWCOMM_Define.h"
#include "WWFASTECHWW EziMOTION PlusR WWincludeWWMOTION_DEFINE.h"
#include "WWFASTECHWW EziMOTION PlusR WWincludeWWReturnCodes_Define.h"

Also, library files are as follows:
"WWFASTECHWW EziMOTION PlusR WWincludeWWEziMotionPlusR.lib"
"WWFASTECHWW EziMOTION PlusR WWincludeWWEziMotionPlusR.dll"

A sample program source of using library is included in a "WWFASTECHWWEziMOTION PlusR WWExamplesWW" folder.

(1) The following table describes values returned when each library(DLL) function is used. The user can check the values returned at the library(DLL) function. In case of low-level programming, this service not provided.

Item	Definition	Returned Value	Description
Normal	FMM_OK	0	The function has normally performed the command.
Input Error	FMM_NOT_OPEN	1	Wrong port number is inputted.
	FMM_INVALID_PORT_NUM	2	The port that is not connected.
	FMM_INVALID_SLAVE_NUM	3	Wrong slave number is inputted.
Operation Error	FMM_POSTABLE_ERROR	9	An error occurs while the motor accesses to the position table.
Connection Error	FMC_DISCONNECTED	5	The relevant drive is disconnected.
	FMC_TIMEOUT_ERROR	6	Response delay(100 msec) occurs.
	FMC_CRCFAILED_ERROR	7	Checksum error occurs.
	FMC_RECVPACKET_ERROR	8	Protocol level error occurs in packet that comes from Drive.

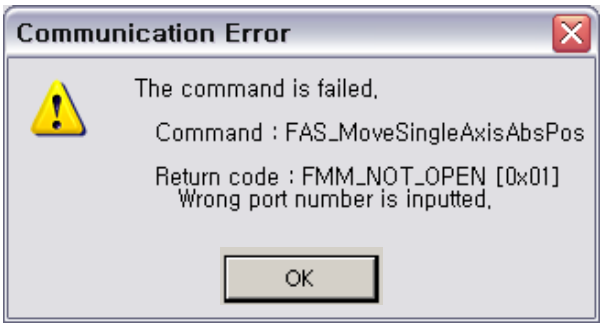
(2) The following table shows return values included commonly in all libraries. The user can check the result (communication status, running status) judged by the drive. When the user develops programs by using protocols without libraries(DLL), they are available as well.

Item	Description	Returned Value	Description
Normal	FMP_OK	0	Communication has been normally performed.
Input Error	FMP_FRAMETYPEERROR	128	The drive cannot recognize the command.
	FMP_DATAERROR	129	Input data is out of the range.
Operation Error	FMP_ RUNFAIL	133	The motor is already running or not prepared for running.
	FMP_RESETFAIL	134	The user cannot execute AlarmReset command while the servo is ON.
	FMP_SERVOONFAIL1	135	An alarm has occurred.
	FMP_SERVOONFAIL2	136	The motor is under Emergency Stop.
	FMP_SERVOONFAIL3	137	'ServoON' signal is already assigned to input pin.
Connection Error	FMP_PACKETERROR	130	Protocol level error occurs in packet that Drive's received.
	FMP_PACKETCRCERROR	170	CRC value is not correct in packet that Drive's received.

2-2. Communication Status Window

Above communication status is divide by 3 groups.

(1) Communication Error



FMM_NOT_OPEN,

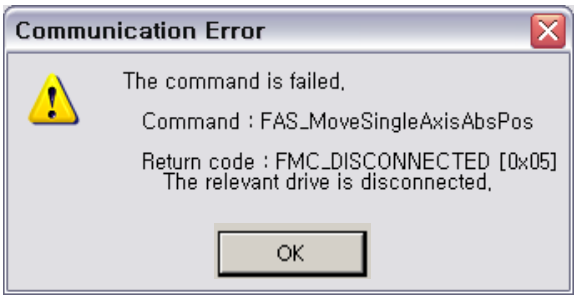
COM Port is not connected.

FMM_INVALID_PORT_NUM,

COM Port number is not exist. Checking the 'Device Manager' window in Window OS.

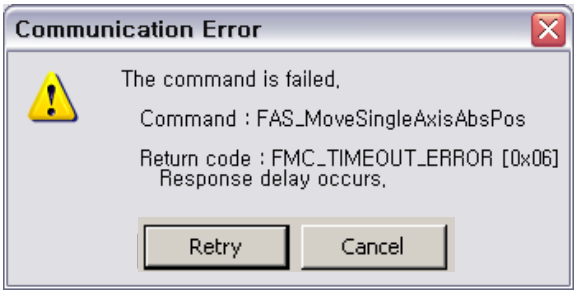
FMM_INVALID_SLAVE_NUM,

Slave number is not exist. Checking the ID value of the drive.



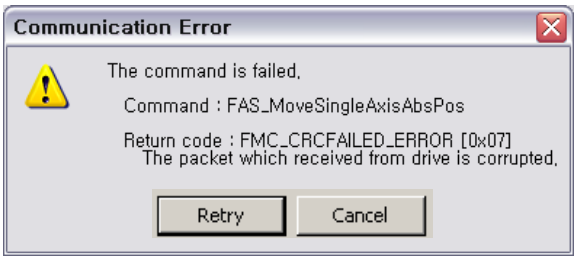
FMC_DISCONNECTED = 5,

COM Port is disconnect during communication. Checking the communication cable Or Power of the drive.



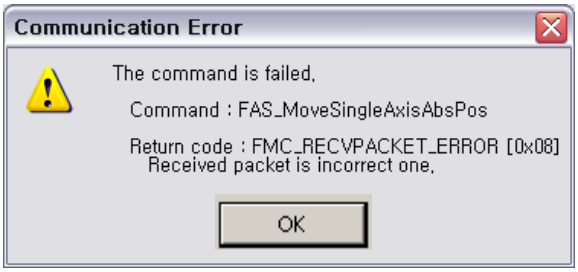
FMC_TIMEOUT_ERROR,

There is no response from the drive.



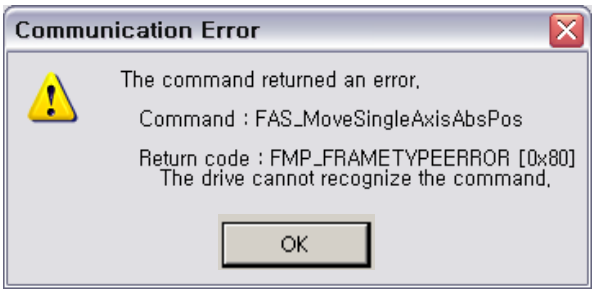
FMC_CRCFAILED_ERROR,

CRC value of communication packet from the drive is not correct. Checking the Possibility of noise on communication cable.



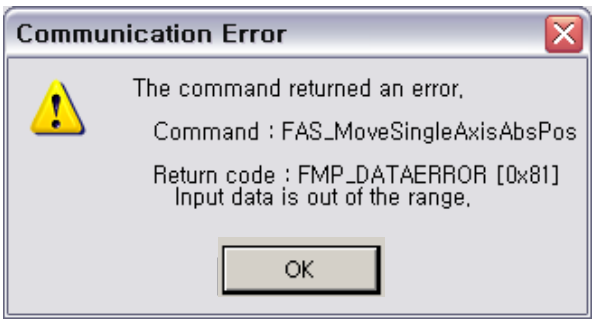
FMC_RECVPACKET_ERROR,

The length of received packet is not correct. Checking the possibility of noise on communication cable.



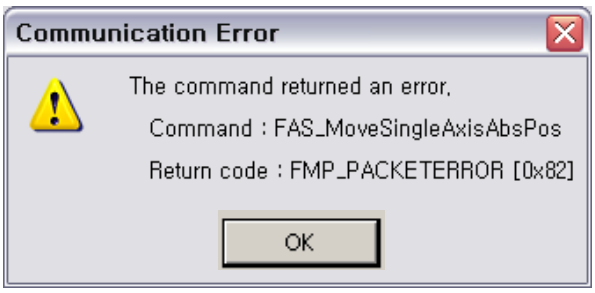
FMP_FRAMETYPEERROR = 0x80,

Drive do not recognize the command or wrong command is sended.
Checking the command value that you want to send to the drive.



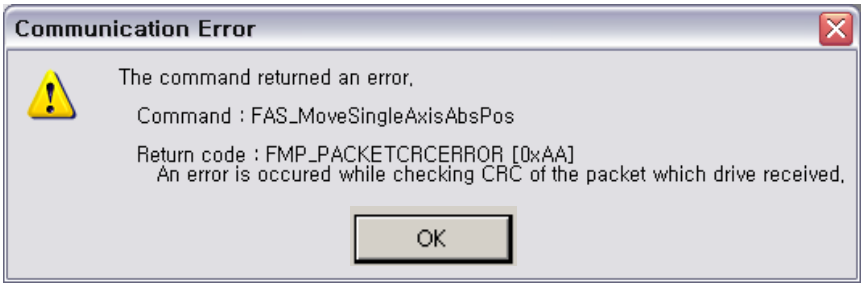
FMP_DATAERROR,

The value of the sended data is out of the proper range for drive.
Checking the value that you want to send to the drive.



FMP_PACKETERROR,

The length of received packet on drive is not correct. Checking the possibility of noise on communication cable.



FMP_PACKETCRCERROR = 0xAA,

The CRC value on drive is not correct. Checking the possibility of noise on communication cable.

(2) Wrong Command

FMP_RUNFAIL = 0x85,

Fail on motion command : The motor can not run on next status.

-. The motor is already running

-. The motor is under stop command

-. Servo OFF status

-. Try to Z-pulse Origin without external encoder (only for Ezi-STEP)

FMP_RESETFAIL,

Fail on reset command : The motor can not reset on next status.

-. Servo ON status

-. Already 'Reset' status by external input signal.

FMP_SERVOONFAIL1,

Wrong 'Servo ON' command during Alarm happens.

FMP_SERVOONFAIL2,

Wrong 'Servo ON' command during E-Stop happens.

FMP_SERVOONFAIL3,

'Servo ON' Signal is assigned by external input pin. In this case Servo ON command by DLL library is not working.

(3) Command Execution Error

FMM_POSTABLE_ERROR,

The execution of DLL library for 'Position Table' is failed.

2－3. Drive Link Function

Function Name	Description
FAS_Connect	The drive tries to connect communication with the drive module: When it is successfully connected, TRUE will return. Otherwise, FALSE will return.
FAS_Close	The drive tries to disconnect communication with the drive module.
FAS_GetSlaveInfo	The drive reads drive type and program version: Drive type and version information will return.
FAS_GetMotorInfo	The drive reads motor type and maker: Motor type and maker information will return.
FAS_IsSlaveExist	The drive checks whether there is the relevant drive: When it exists, TRUE will return. Otherwise, FALSE will return.

FAS_Connect

FAS_Connect is the function of connecting Ezi-SERVO Plus-R.

Syntax

```
BOOL FAS_Connect(
    BYTE nPortNo,
    DWORD dwBaud
);
```

Parameters

nPortNo
Select a serial port to be connected.

dwBaud
Input the Baudrate of the serial port.

Return Value

When it is successfully connected, TRUE will returns. Otherwise, FALSE will return.

Remarks

Example

```
#include "FAS_EziMOTIONPlusR.h"

void funcInit()
{
        BYTE nPortNo = 1;  // COMM Port Number
        DWORD dwBaudrate = 115200;  // Baudrate. (Be variable by setting)
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        char lpBuff[256];
        int nBuffSize = 256;
        BYTE nType;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, dwBaudrate) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        if (FAS_IsSlaveExist(nPortNo, iSlaveNo) == FALSE)
        {
                // There is no relevant slave number.
                // Check the slave number of Ezi-SERVO Plus-R.
                return;
        }

        nRtn = FAS_GetSlaveInfo(nPortNo, iSlaveNo, &nType, lpBuff, nBuffSize);
        if (nRtn != FMM_OK)
        {
                // Command has not been performed properly.
                // Refer to ReturnCodes_Define.h.
        }

        printf("Port : %d (Slave %d) ₩n", nPortNo, iSlaveNo);
        printf("₩tType : %d ₩n", nType);
        printf("₩tVersion : %d ₩n", lpBuff);
```

```
        // Disconnect.
        FAS_Close(nPortNo);
    }
```

See Also

FAS_Close

FAS_Close

To disconnect the serial port being used

Syntax

```
void FAS_Close(
    BYTE nPortNo
);
```

Parameters

nPortNo

Port number to disconnect

Remarks

Example

Refer to 'FAS_Connect' library.

See Also

FAS_Connect

FAS_GetSlaveInfo

To get the version information string of the relevant drive

Syntax

```
int FAS_GetSlaveInfo(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE pType,
    LPSTR lpBuff,
    int nBuffSize
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

pType
Relevant drive type number

lpBuff
Buffer pointer to get version information string

nBuffSize
lpBuff memory allocation size

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_Connect' library.

See Also

FAS_GetMotorInfo

To get the motor information string of the relevant drive

Syntax

```
int FAS_GetMotorInfo(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE pType,
    LPSTR lpBuff,
    int nBuffSize
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

pType
Relevant motor type number

lpBuff
Buffer pointer to get version information string

nBuffSize
lpBuff memory allocation size

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_Connect' library.

See Also

FAS_IsSlaveExist

To check that the drive is connected

Syntax

```
BOOL FAS_IsSlaveExist(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

Return Value

TRUE : The drive is connected.
FALSE : The drive is disconnected.

Remarks

This function is provided from the library only and it is inapplicable to the protocol program mode.

Example

Refer to 'FAS_Connect' library.

See Also

FAS_Connect

2－4. Parameter Control Function

Function Name	Description
FAS_SaveAllParameters	Current parameters are saved to the ROM: Even after the drive is powered OFF, parameters related to operating speed, acceleration/deceleration time, and origin return need to be preserved.
FAS_SetParameter	The designated parameter is saved to the RAM: Specific parameter is saved.
FAS_GetParameter	The designated parameter is read from the RAM: Specific parameter is read.
FAS_GetROMParameter	The designated parameter is read from the ROM: Specific parameter is read from the ROM.

FAS_SaveAllParameters

All parameters edited up to now & assign status of In/Out signals are saved in the ROM area.

Syntax

```
Int FAS_SaveAllParameters(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Parameter values set to 'FAS_SetIOAssignMap' library as well as current parameter values are saved to the ROM.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcModifyParameter()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        long lParamVal;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Check Axis Start Speed Parameter.
        nRtn = FAS_GetParameter(nPortNo, iSlaveNo, SERVO_AXISSTARTSPEED, &lParamVal);
        if (nRtn != FMM_OK)
        {
                // Command has not been performed properly.
                // Refer to ReturnCodes_Define.h.
                _ASSERT(FALSE);
        }
        else
        {
                // Parameter value saved in Ezi-SERVO Plus-R.
                printf("Parameter [before] : Start Speed = %d ₩n", lParamVal);
        }
```

```
        // Change Axis Start Speed parameter as 200 then read it again.
        nRtn = FAS_SetParameter(nPortNo, iSlaveNo, SERVO_AXISSTARTSPEED, 200);
        _ASSERT(nRtn == FMM_OK);    // You have to check if the command didn't execute
correctly.

        nRtn = FAS_GetParameter(nPortNo, iSlaveNo, SERVO_AXISSTARTSPEED, &lParamVal);
        _ASSERT(nRtn == FMM_OK);
        printf("Parameter [after] : Start Speed = %d ₩n", lParamVal);


        // Check the value saved in the ROM.
        nRtn = FAS_GetROMParameter(nPortNo, iSlaveNo, SERVO_AXISSTARTSPEED, &lParamVal);
        _ASSERT(nRtn == FMM_OK);    // You have to check if the command didn't execute
correctly.
        printf("Parameter [ROM] : Start Speed = %d ₩n", lParamVal);


        // Edit the parameter value then save it in the ROM.
        nRtn = FAS_SetParameter(nPortNo, iSlaveNo, SERVO_AXISSTARTSPEED, 100);
        _ASSERT(nRtn == FMM_OK);    // You have to check if the command didn't execute
correctly.

        nRtn = FAS_SaveAllParameters(nPortNo, iSlaveNo);
        _ASSERT(nRtn == FMM_OK);

        // Disconnect.
        FAS_Close(nPortNo);
}
```

See Also

FAS_GetRomParameter

FAS_SetParameter

Edit the relevant parameter value and then save it to the RAM.

Syntax

```
int FAS_SetParameter(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE iParamNo,
    long lParamValue
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

iParamNo
Parameter number to be edited

lParamValue
Parameter value to be edited

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : There is no parameter of designated iParamNo.

Remarks

The function operates only for one parameter designated.
Parameters in the drive are saved to 2 memory areas. That is, when power is off, the ROM saves parameters permanently. When power is on, parameters in the ROM are copied to the DSP RAM and used. When the user changes parameters, it changes not parameters in the ROM but parameter in the RAM. This function is to set the parameter number designated from the RAM to the relevant value.

Example

Refer to 'FAS_SaveAllParameter' library.

See Also

FAS_GetParameter

FAS_GetParamater

To call specific parameter values of the drive

Syntax

```
int FAS_GetParameter(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE iParamNo,
    long* lParamValue
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

iParamNo
Parameter number to be imported

lParamValue
Parameter values

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : There is no parameter of designated iParamNo.

Remarks

The function operates only for one parameter designated.
Parameters in the drive are saved to 2 memory areas. That is, when power is off, the ROM saves parameters permanently. When power is on, parameters in the ROM are copied to the DSP RAM and used. When the user changes parameters, it changes not parameters in the ROM but parameter in the RAM. This function reads the parameter number designated to the RAM.

Example

Refer to 'FAS_SaveAllParameter' library.

See Also

FAS_SetParameter

FAS_GetROMParameter

To call parameters saved in the ROM

Syntax

```
int FAS_GetROMParameter(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE iParamNo,
    long* lRomParam
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

iParamNo
Parameter number to be imported

lRomParam
Parameter values saved in the ROM

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : There is no parameter of designated iParamNo.

Remarks

To call parameter values saved in the ROM
Even though this function runs, the value in the RAM is not changed. For this, run FAS_SetParameter.

Example

Refer to 'FAS_SaveAllParameter' library.

See Also

FAS_SaveAllParameters

2－5. Servo Control Function

Function Name	Description
FAS_ServoEnable	The Servo of the drive designated turns ON/OFF.
FAS_ServoAlarmReset	The drive which an alarm occurs is released: Troubleshoot the alarm cause and use this function.

FAS_ServoEnable

To turn ON/OFF the drive servo

Syntax

```
int FAS_ServoEnable(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BOOL bOnOff
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant

bOnOff
Enable or Disable.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

The given time is required until Servo ON flag in the axis status turns on after enable.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcAxisStatus()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        EZISERVO_AXISSTATUS AxisStatus;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        nRtn = FAS_GetAxisStatus(nPortNo, iSlaveNo, &(AxisStatus.dwValue));
        _ASSERT(nRtn == FMM_OK);

        // If SERVO_ON flag turns off, the servo turns on..
        if (AxisStatus.FFLAG_SERVOON == 0)
        {
                nRtn = FAS_ServoEnable(nPortNo, iSlaveNo, TRUE);
                _ASSERT(nRtn == FMM_OK);
        }

        // If there is an alarm, AlarmReset runs.
        if    (AxisStatus.FFLAG_ERRORALL    ||    AxisStatus.FFLAG_ERROVERCURRENT    ||
AxisStatus.FFLAG_ERROVERLOAD)
        {
                nRtn = FAS_ServoAlarmReset(nPortNo, iSlaveNo);
                _ASSERT(nRtn == FMM_OK);
```

```
        }

        // Disconnect.
        FAS_Close(nPortNo);
    }
```

See Also

FAS_ServoAlarmReset

FAS_ServoAlarmReset

To send AlarmReset command

Syntax

```
int FAS_ServoAlarmReset(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Before sending this command, troubleshoot the alarm cause.
For alarm cause, refer to 'User Manual_Text'.

Example

Refer to 'FAS_ServoEnable' library

See Also

FAS_ServoEnable

2－6. Control I/O Function

Function Name	Description
FAS_SetIOInput	To set the input signal level of the control input port : Input signal is set to [ON] or [OFF].
FAS_GetIOInput	To read the current input signal status of the control input port : The signal status returns by bit for each input signal.
FAS_SetIOOutput	To set the output signal level of the control output port : Output signal is set to [ON] or [OFF].
FAS_GetIOOutput	To read the current output signal status of the control output port : The signal status returns by bit for each output signal.
FAS_GetIOAssignMap	To read the pin setting status of the CN1 port : The setting status for each 9 variable signals returns by bit to the Input and Output port.
FAS_SetIOAssignMap	To assign the control I/O signal to CN1 port pin and also set the signal level : Setting for each 9 variable signals is assigned to the Input and Output port.
FAS_IOAssignMapReadROM	To load the pin setting status of CN1 port from ROM area to RAM area.

FAS_SetIOInput

To set I/O input. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_SetIOInput(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD dwIOSetMask,
    DWORD dwIOCLRMask
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
dwIOSetMask
Input bitmask value to be set
dwIOCLRMask
Input bitmask value to be cleared

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Be careful that dwIOSetMask bit and dwIOCLRMask bit are not duplicated.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcIO()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        DWORD dwInput, dwOutput;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Check I/O input.
        nRtn = FAS_GetIOInput(nPortNo, iSlaveNo, &dwInput);
        _ASSERT(nRtn == FMM_OK);
        if (dwInput & SERVO_IN_BITMASK_LIMITP)
        {
                // Limit + input is ON.
        }
```

```
        if (dwInput & SERVO_IN_BITMASK_USERIN0)
        {
                // User Input 0 is ON.
        }

        // Turning ON 'Clear Position' and 'User Input 1' inputs and turning off 'Jog +' input.
        nRtn = FAS_SetIOInput(nPortNo, iSlaveNo, SERVO_IN_BITMASK_CLEARPOSITION |
SERVO_IN_BITMASK_USERIN1, SERVO_IN_BITMASK_PJOG);
        _ASSERT(nRtn == FMM_OK);

        // Check I/O output.
        nRtn = FAS_GetIOOutput(nPortNo, iSlaveNo, &dwOutput);
        _ASSERT(nRtn == FMM_OK);
        if (dwOutput & SERVO_OUT_BITMASK_USEROUT0)
        {
                // User Output 0 is ON.
        }

        // Turn off User Output 1 and 2 signals.
        nRtn = FAS_SetIOOutput(nPortNo, iSlaveNo, 0, SERVO_OUT_BITMASK_USEROUT1 |
SERVO_OUT_BITMASK_USEROUT2);
        _ASSERT(nRtn == FMM_OK);

        // Disconnect.
        FAS_Close(nPortNo);
}
```

See Also

FAS_GetIOInput

FAS_GetIOInput

To read I/O input values. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_GetIOInput(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD* dwIOInput
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

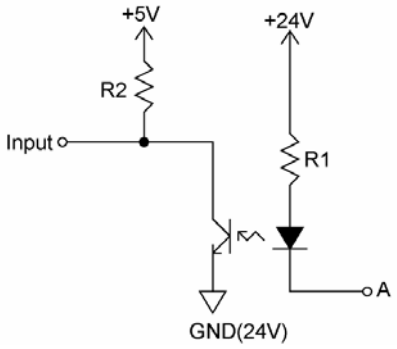
dwIOInput
Parameter pointer which input values will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

There are 12 input pins in EziSERVO PlusR. The user can select and use 9 input pins of them. This function can read the input port status by 32bit. All of them are insulated by a photocoupler. (Refer to the figure.)



When Port A is supplied 24V from an external input port, the input is recognized to 5V(High).

Example

Refer to 'FAS_SetIOInput' library.

See Also

FAS_SetIOInput

FAS_SetIOOutput

To read I/O output values. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_SetIOOutput(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD dwIOSetMask,
    DWORD dwIOCLRMask
);
```

Parameters

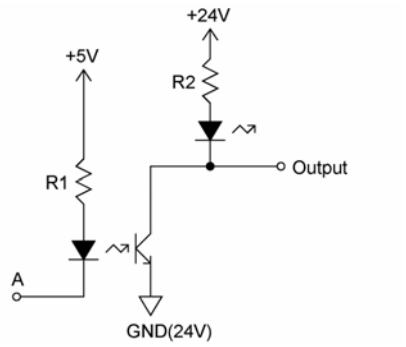
nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
dwIOSetMask
Output bitmask value to be set
dwIOCLRMask
Output bitmask value be cleared

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

There are 10 input pins in EziSERVO PlusR. The user can select and use 9 output pins of them.



When output data is '1', Port A becomes 0V. When it is '0', Port A becomes +5V.

Be careful that dwIOSetMask bit and dwIOCLRMask bit are not duplicated.

Example

Refer to FAS_SetIOInput.

See Also

FAS_GetIOOutput

FAS_GetIOOutput

To read I/O output values. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_GetIOOutput(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD* dwIOOutput
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

dwIOInput
Parameter pointer which the output value will be saved.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_SetIOInput' library

See Also

FAS_SetIOOutput

FAS_GetIOAssignMap

To read I/O Assign Map. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_GetIOAssignMap(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE iIOPinNo,
    BYTE* nIOLogic,
    BYTE* bLevel
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

iIOPinNo
I/O pin number to be read

nIOLogic
Parameter pointer which the logic value assigned to a relevant pin will be saved

bLevel
Parameter pointer which the active level of relevant logic will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

For nIOLogic, refer to 'Motion_define.h'.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcIOAssign()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        BYTE iPinNo;
        DWORD dwLogicMask;
        BYTE bLevel;
        BYTE i;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Check assigned information of input pin.
        for (i=0; i</*Input Pin Count*/12; i++)
        {
```

```
                    nRtn = FAS_GetIOAssignMap(nPortNo, iSlaveNo, i, &dwLogicMask, &bLevel);
                    _ASSERT(nRtn == FMM_OK);

                    if (dwLogicMask != IN_LOGIC_NONE)
                            printf("Input Pin %d : Logic Mask 0x%08X (%s)Wn", i, dwLogicMask,
((bLevel == LEVEL_LOW_ACTIVE) ? "Low Active" : "High Active"));
                    else
                            printf("Input Pin %d : Not assignedWn", i);
            }

            // Assign SERVOON Logic (Low Active) to input pin 3.
            iPinNo = 3;         // 0 ~ 11 value is available (Caution : 0 ~ 2 is fixed.)
            nRtn = FAS_SetIOAssignMap(nPortNo, iSlaveNo, iPinNo, SERVO_IN_BITMASK_SERVOON,
LEVEL_LOW_ACTIVE);
            _ASSERT(nRtn == FMM_OK);

            // Check assign information of output pin.
            for (i=0; i<10/*Output Pin Count*/; i++)
            {
                    nRtn = FAS_GetIOAssignMap(nPortNo, iSlaveNo, 12/*Input Pin Count*/ + i,
&dwLogicMask, &bLevel);
                    _ASSERT(nRtn == FMM_OK);

                    if (dwLogicMask != OUT_LOGIC_NONE)
                            printf("Output Pin %d : Logic Mask 0x%08X (%s)Wn", i, dwLogicMask,
((bLevel == LEVEL_LOW_ACTIVE) ? "Low Active" : "High Active"));
                    else
                            printf("Output Pin %d : Not assignedWn", i);
            }

            // Assign ALARM Logic (High Active) to output pin 9.
            iPinNo = 9;         // 0 ~ 9 value is available (Caution : 0 is fixed to COMPOUT.)
            nRtn = FAS_SetIOAssignMap(nPortNo, iSlaveNo, 12/*Input Pin Count*/ + iPinNo,
SERVO_OUT_BITMASK_ALARM, LEVEL_HIGH_ACTIVE);
            _ASSERT(nRtn == FMM_OK);

            // Disconnect.
            FAS_Close(nPortNo);
    }
```

See Also

FAS_SetIOAssignMap

FAS_SetIOAssignMap

To set I/O Assign Map. For more information, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_SetIOAssignMap(
    BYTE nPortNo,
    BYTE iSlaveNo,
    BYTE iIOPinNo,
    BYTE nLogicNo,
    BYTE bLevel
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

iIOPinNo
I/O Pin number to be read

nIOLogic
Logic value to be assigned to the relevant pin

bLevel
Active Level value of the relevant logic

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : Designated iIOPinNo or nIOLogic value is out of range.

Remarks

To save current setting values to the memory, 'FAS_SaveAllParameters' library should be run.

Example

Refer to 'FAS_GSetIOAssignMap' library

See Also

FAS_GetIOAssignMap

FAS_IOAssignMapReadROM

To load the status of CN1 assignment being saved in ROM area

Syntax

```
int FAS_PosTableReadROM(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

See Also

FAS_ GetIOAssignMap

2－7. Position Control Function

Function Name	Description
FAS_SetCommandPos	To set the command position value
FAS_SetActualPos	To set the current position to the actual position value
FAS_GetCommandPos	To read the current command position value
FAS_GetActualPos	To read the actual command position value
FAS_GetPosError	To read the difference between the actual position value and the command position value
FAS_GetActualVel	To read the actual running speed value while the motor is moving
FAS_ClearPosition	To set the command position and actual position value to ‘0’

FAS_SetCommandPos

To set the command position value to the motor

Syntax

```
int FAS_SetCommandPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lCmdPos
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
lCmdPos
Commnad position value to be set.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

The user sets the position command (pulse output counter) value.
This function is generally used when the user sets the current position to coordinates that he wants.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcClearPosition()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Initialize Command Position and Actual Position values to 0.
        nRtn = FAS_SetCommandPos(nPortNo, iSlaveNo, 0);
        _ASSERT(nRtn == FMM_OK);
        nRtn = FAS_SetActualPos(nPortNo, iSlaveNo, 0);
        _ASSERT(nRtn == FMM_OK);

        // Disconnect.
        FAS_Close(nPortNo);
}
```

See Also

FAS_SetActualPos

FAS_SetActualPos

To set the actual position value to the motor

Syntax

```
int FAS_SetActualPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lActPos
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lActPos
Actual position value to be set.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

The user sets the encoder feedback counter value to the value that he wants.

Example

Refer to 'FAS_GetActualPos' library.

See Also

FAS_SetCommandPos

FAS_GetCommandPos

To read the command position of the current motor

Syntax

```
int FAS_GetCommandPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long* lCmdPos
);
```

Parameters

nPortNo
Port number of relevant drive

iSlaveNo
Slave number of relevant drive

lCmdPos
Parameter pointer that command position value will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

To read the position command (pulse output counter) value.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcDisplayStatus()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        long lValue;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Check position information of Ezi-SERVO Plus-R.
        nRtn = FAS_GetCommandPos(nPortNo, iSlaveNo, &lValue);
        _ASSERT(nRtn == FMM_OK);
        printf("CMDPOS : %d ₩n", lValue);
        nRtn = FAS_GetActualPos(nPortNo, iSlaveNo, &lValue);
        _ASSERT(nRtn == FMM_OK);
        printf("ACTPOS : %d ₩n", lValue);
        nRtn = FAS_GetPosError(nPortNo, iSlaveNo, &lValue);
        _ASSERT(nRtn == FMM_OK);
        printf("POSERR : %d ₩n", lValue);
        nRtn = FAS_GetActualVel(nPortNo, iSlaveNo, &lValue);
        _ASSERT(nRtn == FMM_OK);
```

```
            printf("ACTVEL : %d ₩n", lValue);

            // Disconnect.
            FAS_Close(nPortNo);
    }
```

See Also

FAS_GetActualPos

FAS_GetActualPos

To read the actual position value of the motor

Syntax

```
int FAS_GetActualPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long* lActPos
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lActPos
Parameter pointer which the actual position value will be saved.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

When the user decides the motor position and checks its actual position, this function is generally used.

Example

Refer to 'FAS_GetCOmmandPosition' library.

See Also

FAS_GetCommandPos

FAS_GetPosError

To read the position error of the motor

Syntax

```
int FAS_GetPosError(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long* lPosErr
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lPosErr
Parameter pointer which the position error value will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_GetCOmmandPosition' library.

See Also

FAS_GetCommandPos,
FAS_GetActualPos

FAS_GetActualVel

To read the actual velocity of the motor

Syntax

```
int FAS_GetActualVel(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long* lActVel
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lActVel
Parameter pointer which the actual velocity value will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_GetCOmmandPosition' library.

See Also

FAS_ClearPosition

To set the command position value and actual value to '0'

Syntax

```
int FAS_SetCommandPos(
    BYTE nPortNo,
    BYTE iSlaveNo
    );
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

The user sets the position command (pulse output counter) value.
This function is generally used when the user sets the current position to initial values.

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcClearPosition()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Initialize Command Position and Actual Position values to 0.
        nRtn = FAS_ClearPosition(nPortNo, iSlaveNo);
        _ASSERT(nRtn == FMM_OK);

        // Disconnect.
        FAS_Close(nPortNo);
}
```

See Also

FAS_SetActualPos

2－8. Drive Status Control Function

Function Name	Description
FAS_GetIOAxisStatus	To read control I/O status, running status Flag value : The current input status value, the output setting status value, and the running status Flag value will return.
FAS_GetMotionStatus	To read the current running progress status and its PT number : The command position value, the actual position value, the speed value will return.
FAS_GetAllStatus	To read all status including the current I/O status at one time : This function is to combine 'FAS_GetIOAxisStatus' function and 'FAS_GetMotionStatus' function.
FAS_GetAxisStatus	To read the running status Flag value of the relevant drive

FAS_GetIOAxisStatus

To read I/O Input and Output values of the relevant drive, and the motor Axis Status

Syntax

```
int FAS_GetIOAxisStatus(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD* dwInStatus,
    DWORD* dwOutStatus,
    DWORD* dwAxisStatus
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
dwInStatus
Parameter pointer which the I/O input value will be saved.
dwOutStatus
Parameter pointer which the I/O output value will be saved.
dwAxisStatus
Parameter pointer which the axis status value of the relevant motor will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_GetMotionStatus

To read the motion status of current motor at one time

Syntax

```
int FAS_GetMotionStatus(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long* lCmdPos,
    long* lActPos,
    long* lPosErr,
    long* lActVel,
    WORD* wPosItemNo
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lCmdPos
Parameter pointer which the command position value will be saved

lActPos
Parameter pointer which the actual position value will be saved.

lPosErr
Parameter pointer which the position error value will be saved

lActVel
Parameter pointer which the actual velocity value will be saved

wPosItemNo
Parameter pointer which current running item number in the Position Table will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_GetAllStatus

To read I/O Input and Output values of the relevant drive, the motor Axis Status, the motor motion status

Syntax

```
int FAS_GetAllStatus(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD* dwInStatus,
    DWORD* dwOutStatus,
    DWORD* dwAxisStatus,
    long* lCmdPos,
    long* lActPos,
    long* lPosErr,
    long* lActVel,
    WORD* wPosItemNo
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
dwInStatus
Parameter pointer which the I/O input value will be saved.
dwOutStatus
Parameter pointer which the I/O output value will be saved.
dwAxisStatus
Parameter pointer which the axix status value of the relevant motor will be saved
lCmdPos
Parameter pointer which the command position value will be saved
lActPos
Parameter pointer which the actual position value will be saved
lPosErr
Parameter pointer which the position error value will be saved
lActVel
Parameter pointer which the actual velocity value will be saved
wPosItemNo
Parameter pointer which current running item number in the Position Table will be saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_GetAxisStatus
FAS_GetMotionStatus

FAS_GetAxisStatus

To read the motor Axis Status value. For status Flag, refer to '1-2. Structure of Frame Type'.

Syntax

```
int FAS_GetAxisStatus(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD* dwAxisStatus
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

dwAxisStatus
Parameter pointer which the axis status value of the relevant motor

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

2－9. Running Control Function

Function Name	Description
FAS_MoveStop	The motor in running is decelerate and stopped.
FAS_EmergencyStop	The motor in running stops directly without deceleration
FAS_MoveOriginSingleAxis	The motor starts the origin return.
FAS_MoveSingleAxisAbsPos	The motor moves as much as the given absolute position value.
FAS_MoveSingleAxisIncPos	The motor moves as much as the given incremental position value.
FAS_MoveToLimit	The motor moves up to the position that the limit sensor is detected.
FAS_MoveVelocity	The motor moves to the given velocity and direction: This function is available to Jog motion.
FAS_PositionAbsOverride	While the motor is running, the target absolute position value [pulse] is changed.
FAS_PositionIncOverride	While the motor is running, the target incremental position value [pulse] is changed.
FAS_VelocityOverride	While the motor is running, the running velocity value [pulse] is changed.
FAS_AllMoveStop	All motors that connected in same port are decelerate and stopped.
FAS_AllEmergencyStop	All motors that connected in same port are directly stop without deceleration.
FAS_AllMoveOriginSingleAxis	All motors that connected in same port are starts the origin return.
FAS_AllMoveSingleAxisAbsPos	All motors that connected in same port moves as much as the given absolute position value.
FAS_AllMoveSingleAxisIncPos	All motors that connected in same port moves as much as the given incremental position value.
FAS_MoveLinearAbsPos	More than 2 motors that connected in same port Linear Interpolation moves as much as the given absolute position value.
FAS_MoveLinearIncPos	More than 2 motors that connected in same port Linear Interpolation moves as much as the given incremental position value.

FAS_MoveStop

To stop the motor

Syntax

```
int FAS_MoveStop(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_EmergencyStop

To stop the motor without deceleration

Syntax

```
int FAS_EmergencyStop(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

This function does not include deceleration phase. So, the user must be careful so that the machine cannot be impacted.

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_MoveOriginSingleAxis

To search the origin of system. For more information, refer to 'User Manual_Text 9.3 Origin Return'.

Syntax

```
int FAS_MoveOriginSingleAxis(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_MoveSingleAxisAbsPos

To move the motor to the absolute coordinate

Syntax

```
int FAS_MoveSingleAxisAbsPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lAbsPos,
    DWORD lVelocity,
    );
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
lAbsPos
Absolute coordinate of position to move
lVelocity
Velocity when the motor moves

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

```
#include "FAS_ EziMOTIONPlusR.h"

void funcMove()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        DWORD dwAxisStatus, dwInput;
        EZISERVO_AXISSTATUS stAxisStatus;
        long lAbsPos, lIncPos, lVelocity;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Check error and Servo ON status.
        nRtn = FAS_GetAxisStatus(nPortNo, iSlaveNo, &dwAxisStatus);
        _ASSERT(nRtn == FMM_OK);
        stAxisStatus.dwValue = dwAxisStatus;

        //if (dwAxisStatus & 0x00000001)
        if (stAxisStatus.FFLAG_ERRORALL)
```

```
                FAS_ServoAlarmReset(nPortNo, iSlaveNo);
        //if ((dwAxisStatus & 0x00100000) == 0x00)
        if (stAxisStatus.FFLAG_SERVOON == 0)
                FAS_ServoEnable(nPortNo, iSlaveNo, TRUE);

        // Check input status.
        nRtn = FAS_GetIOInput(nPortNo, iSlaveNo, &dwInput);
        _ASSERT(nRtn == FMM_OK);

        if (dwInput & (SERVO_IN_LOGIC_STOP | SERVO_IN_LOGIC_PAUSE | SERVO_IN_LOGIC_ESTOP))
                FAS_SetIOInput(nPortNo,     iSlaveNo,     0,     SERVO_IN_LOGIC_STOP     |
SERVO_IN_LOGIC_PAUSE | SERVO_IN_LOGIC_ESTOP);

        // Increase the motor to 15000 pulse.
        lIncPos = 15000;
        lVelocity = 30000;
        nRtn = FAS_MoveSingleAxisIncPos(nPortNo, iSlaveNo, lIncPos, lVelocity);
        _ASSERT(nRtn == FMM_OK);

        // Stand by until motion command is completely finished.
        do
        {
                Sleep(1);

                nRtn = FAS_GetAxisStatus(nPortNo, iSlaveNo, &dwAxisStatus);
                _ASSERT(nRtn == FMM_OK);
                stAxisStatus.dwValue = dwAxisStatus;
        }
        while (stAxisStatus.FFLAG_MOTIONING);

        // Move the motor to '0'.
        lAbsPos = 0;
        lVelocity = 20000;
        nRtn = FAS_MoveSingleAxisAbsPos(nPortNo, iSlaveNo, lAbsPos, lVelocity);
        _ASSERT(nRtn == FMM_OK);

        // Stand by until motion command is completely finished
        do
        {
                Sleep(1);

                nRtn = FAS_GetAxisStatus(nPortNo, iSlaveNo, &dwAxisStatus);
                _ASSERT(nRtn == FMM_OK);
                stAxisStatus.dwValue = dwAxisStatus;
        }
        while (stAxisStatus.FFLAG_MOTIONING);

        // Disconnect.
        FAS_Close(nPortNo);
}
```

See Also

FAS_MoveSingleAxisIncPos

To move the motor to the incremental coordinate value

Syntax

```
int FAS_MoveSingleAxisIncPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lIncPos,
    DWORD lVelocity
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lIncPos
Incremental coordinate of position to move

lVelocity
Velocity when the motor moves

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_MoveToLimit

To give the motor a command to search the limit sensor

Syntax

```
int FAS_MoveToLimit(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD lVelocity,
    int iLimitDir,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lVelocity
Velocioty when the motor moves

iLimitDir
Limit direction which the motor moves (0: -Limit, 1: +Limit)

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_MoveVelocity

To move the motor to the relevant direction and velocity. This function is also available for Jog motion.

Syntax

```
int FAS_MoveVelocity(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD lVelocity,
    int iVelDir
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
lVelocity
Velocity when the motor moves
iVelDir
Direction which the motor moves (0: -Jog, 1: +Jog)

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_PositionAbsOverride

To change the absolute position value set while the motor moves to the absolute position

Syntax

```
int FAS_PositionAbsOverride(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lOverridePos
);
```

Parameters

nPortNo

Port number of relevant drive.

iSlaveNo

Slave number of relevant drive.

lOverridePos

Absolute coordinate position value to be changed

Return Value

FMM_OK : Command has been normally performed.

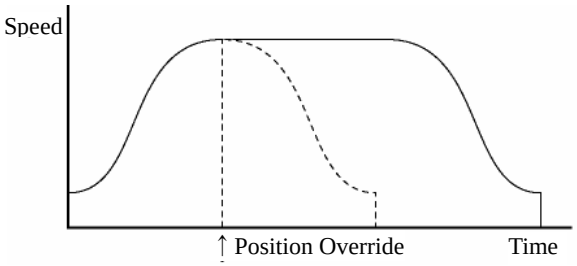
FMM_NOT_OPEN : The drive has not been connected yet.

FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.

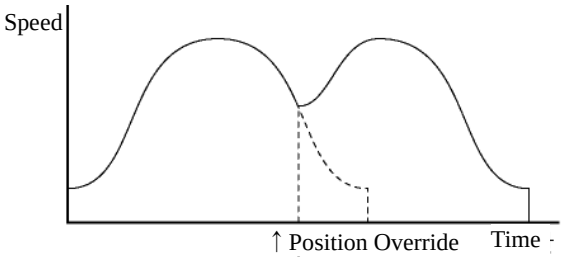
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

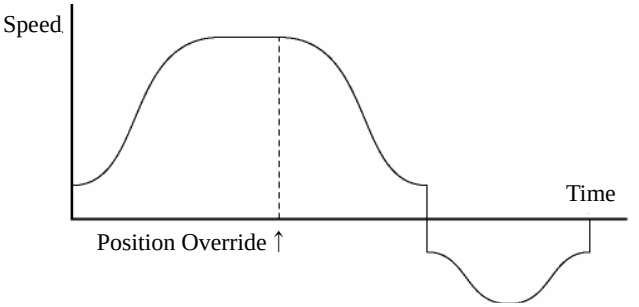
1) If the target position is set to the farther coordinate than the original target position while the motor moves to the accelerated or uniform velocity, the motor moves to the velocity pattern until then and stops the target position.



2) If the target position is changed while the motor is decelerated, it is again accelerated up to the uniform velocity and then stops to the target position.



3) If the changed target position is set to the closer coordinate than the original target position, the motor once stops to the position before change and then performs acceleration and deceleration to stop the changed target position.



Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_PositionIncOverride

FAS_PositionIncOverride

To change the incremental position value set while the motor moves to the incremental position

Syntax

```
int FAS_PositionIncOverride(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lOverridePos
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

lOverridePos
Incremental coordinate position value to be changed

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Refer to 'FAS_PositionAbsOverride' library.

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_PositionAbsOverride

FAS_VelocityOverride

To change the velocity set while the motor moves

Syntax

```
int FAS_VelocityOverride(
    BYTE nPortNo,
    BYTE iSlaveNo,
    DWORD lVelocity
);
```

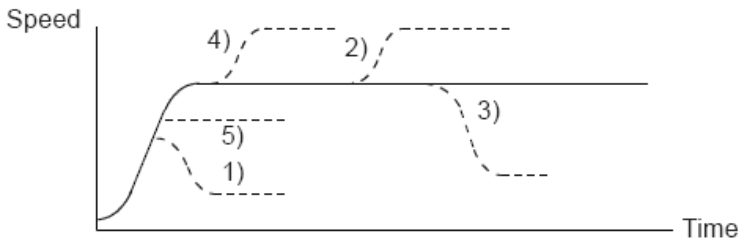
Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
lVelocity
Velocity to be changed in [pps]

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks



1) In case of ((change speed) < (speed before change)), the motor reaches the change speed through acceleration/deceleration using a new velocity pattern.
5) In case of ((change speed) ≥ (speed before change)), the motor reaches the change speed through acceleration/deceleration without any new velocity pattern.
4) The motor reaches the ‘speed before change’ without a change of the velocity pattern and then it reaches the ‘change speed’ by a new velocity pattern.
2),3) After acceleration/deceleration is finished, the motor reaches the change speed corresponding to the velocity pattern of the ‘change speed’.

Example

Refer to ‘FAS_MoveSingleAxisAbsPos’ library.

See Also

FAS_AllMoveStop

To stop the motor that connected in same port.

Syntax

```
int FAS_AllMoveStop(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive. (must be '99')

Return Value

No response

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_AllEmergencyStop

To stop the motor that connected in same port without deceleration

Syntax

```
int FAS_AllEmergencyStop(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive. (must be '99')

Return Value

No response

Remarks

This function does not include deceleration phase. So, the user must be careful so that the machine cannot be impacted.

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_AllMoveOriginSingleAxis

To search the origin of system for all motor that is connected in same port. For more information, refer to 'User Manual_Text 9.3 Origin Return'.

Syntax

```
int FAS_AllMoveOriginSingleAxis(
    BYTE nPortNo,
    BYTE iSlaveNo,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive. (must be '99')

Return Value

No response

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_AllMoveSingleAxisAbsPos

To move the motor that connected in same port to the absolute coordinate

Syntax

```
int FAS_AllMoveSingleAxisAbsPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lAbsPos,
    DWORD lVelocity,
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive. (must be '99')

lAbsPos
Absolute coordinate of position to move

lVelocity
Velocity when the motor moves

Return Value

No response

Remarks

Example

See Also

FAS_AllMoveSingleAxisIncPos

To move the motor that connected in same port to the incremental coordinate value

Syntax

```
int FAS_AllMoveSingleAxisIncPos(
    BYTE nPortNo,
    BYTE iSlaveNo,
    long lIncPos,
    DWORD lVelocity
    );
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive. (must be '99')

lIncPos
Incremental coordinate of position to move

lVelocity
Velocity when the motor moves

Return Value

No response

Remarks

Example

Refer to 'FAS_MoveSingleAxisAbsPos' library.

See Also

FAS_MoveLinearAbsPos / FAS_MoveLinearIncPos

To move(Linear Interpolation) more than 2 motors that connected in same port to the absolute /increnental coordinate.

Syntax

```
int FAS_MoveLinearAbsPos(
    BYTE nPortNo,
    BYTE nNoOfSlaves,
    BYTE *iSlaveNo,
    long *lAbsPos,
    DWORD lFeedrate,
    WORD wAccelTime
    );
```

Parameters

nPortNo
Port number of relevant drive.

nNoOfSlaves
Slave numbers for Linear motioning.

iSlaveNo
Array of Slave numbers.

lAbsPos
Array of position value for each slave. (in case of incremental : Distance)

lFeedrate
Speed value for motioning.

wAccelTime
Acceleration & deceleration time value.

Return Value

FMM_OK : Command has been successfully performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

When this function is used, the 'Start speed' value must be designated to '1'.

2－10. Position Table Control Function

Function Name	Description
FAS_PosTableReadItem	To read items of RAM area in the specific all items of position table
FAS_PosTableWriteItem	To save specific all items of position table items to RAM area
FAS_PosTableWriteROM	To save all of position table values to ROM area : Total 256 PT values are saved.
FAS_PosTableReadROM	To read position table values in ROM area : Total 256 PT values are read.
FAS_PosTableRunItem	The motor starts to run from the designated position table in sequence.
FAS_PosTableReadOneItem	To read items of RAM area in the specific one item of position table
FAS_PosTableWriteOneItem	To save specific one item of position table items to RAM area

FAS_PosTableReadItem

To read a specific item in the position table

Syntax

```
int FAS_PosTableReadItem(
    BYTE nPortNo,
    BYTE iSlaveNo,
    WORD wItemNo,
    LPITEM_NODE lpItem
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
wItemNo
Item number to be read
lpItem
Item structure pointer which item value is saved

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Example

```
#include "FAS_EziMOTIONPlusR.h"

void funcPosTable()
{
        BYTE nPortNo = 1;  // COMM Port Number
        BYTE iSlaveNo = 0; // Slave No (0 ~ 15)
        WORD wItemNo;
        ITEM_NODE nodeItem;
        int nRtn;

        // Try to connect
        if (FAS_Connect(nPortNo, 115200) == FALSE)
        {
                // Connection failed.
                // The port is not connected or the baudrate may be wrong.
                return;
        }

        // Read No.20 Position table value and edit the position value.
        wItemNo = 20;
        nRtn = FAS_PosTableReadItem(nPortNo, iSlaveNo, wItemNo, &nodeItem);
        _ASSERT(nRtn == FMM_OK);

        nodeItem.lPosition = 260000;          // Change the position value to 260000.
        nodeItem.wBranch = 23;                // Set next command to 23.
```

```
        nodeItem.wContinuous = 1;            // Next command should be connected without
    deceleration.

        nRtn = FAS_PosTableWriteItem(nPortNo, iSlaveNo, wItemNo, &nodeItem);
        _ASSERT(nRtn == FMM_OK);

        // Call the value in the ROM regardless of edited position table data.
        nRtn = FAS_PosTableReadROM(nPortNo, iSlaveNo);
        _ASSERT(nRtn == FMM_OK);

        // Save edited position table data in the ROM.
        nRtn = FAS_PosTableWriteROM(nPortNo, iSlaveNo);
        _ASSERT(nRtn == FMM_OK);

        // Disconnect.
        FAS_Close(nPortNo);
    }
```

See Also

FAS_PosTableWriteItem

FAS_PosTableWriteItem

To edit specific items in the position table

Syntax

```
int FAS_PoslableWriteItem(
    BYTE nPortNo,
    BYTE iSlaveNo,
    WORD wItemNo,
    LPITEM_NODE lpItem
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

wItemNo
Item number to be edited

lpItem
Item structure pointer to be edited

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMC_POSTABLE_ERROR : An error occurs while position table is being written.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Position Table data is saved to RAM / ROM area. This function acts to save data to RAM area. When power is off, data is deleted.

Example

See Also

FAS_PosTableReadItem

FAS_PosTableWriteROM

To save all current position table items to ROM area

Syntax

```
int FAS_PosTableWriteROM(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMC_POSTABLE_ERROR : An error occurs while position table is being saved.

Remarks

Position table data is saved to RAM / ROM area. This function acts to save data to ROM area. Even though power is off, data is preserved.

Example

See Also

FAS_PosTableReadROM

FAS_PosTableReadROM

To read position table items being saved in ROM area

Syntax

```
int FAS_PosTableReadROM(
    BYTE nPortNo,
    BYTE iSlaveNo
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMC_POSTABLE_ERROR : An error occurs while position table is being read.

Remarks

Example

See Also

FAS_PosTableWriteROM

FAS_PosTableRunItem

To perform command from a specific item in the position table

Syntax

```
int FAS_PosTableRunItem(
    BYTE nPortNo,
    BYTE iSlaveNo,
    WORD wItemNo
);
```

Parameters

nPortNo
Port number of relevant drive.

iSlaveNo
Slave number of relevant drive.

wItemNo
Item number to start motion

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Example

See Also

FAS_GetAllStatus
FAS_MoveStop
FAS_EmergencyStop

FAS_PosTableReadOneItem

To read a one item in the specific position table

Syntax

```
int FAS_PosTableReadOneItem(
BYTE nPortNo,
BYTE iSlaveNo,
WORD wItemNo,
WORD wOffset,
long* lPosItemVal

);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
wItemNo
Item number to be read
wOffset
offset value which will be read in PT items. (Refer to '1-2-6. Position Table Item')

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Example

See Also

FAS_PosTableWriteOneItem

FAS_PosTableWriteOneItem

To edit one item in the specific position table

Syntax

```
int FAS_PoslableWriteOneItem(
BYTE nPortNo,
BYTE iSlaveNo,
WORD wItemNo,
WORD wOffset,
long lPosItemVal

);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
wItemNo
Item number to be edited
wOffset
offset value which will be save in PT items. (Refer to '1-2-6. Position Table Item')

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMC_POSTABLE_ERROR : An error occurs while position table is being written.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Example

See Also

FAS_PosTableReadOneItem

2－11. Other Control Function

Function Name	Description
FAS_TriggerOutput_RunA	To Start/Stop command for ‘Compare Out’ signal
FAS_TriggerOutput_Status	To check if the trigger output pulse is working or not.
FAS_MovePush	To request push motion(maintain specified motor torque) command
FAS_GetPushStatus	To request thecurrent push motion status

FAS_TriggerOutput_RunA

To start/stop the digital output signal(Compare Out pin) when reaching the specific Taregt position.

Syntax

```
int FAS_TriggerOutput_RunA(
BYTE nPortNo,
BYTE iSlaveNo,
BOOL bStartTrigger,
long lStartPos,
DWORD dwPeriod,
DWORD dwPulseTime,

);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
bStartTrigger
Output start/stop command (1:start, 0:stop)
long lStartPos
Output start position [pulse]
DWORD dwPeriod
Period of output signal [pulse]
DWORD dwPulseTime
Width of output signal [msec]

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.
FMM_INVALID_PARAMETER_NUM : wItemNo is out of range.

Remarks

Example

See Also

FAS_TriggerOutput_Status

FAS_TriggerOutput_Status

To check if the trigger output is working or not.

Syntax

```
int FAS_TrggerOutput_Status(
BYTE nPortNo,
BYTE iSlaveNo,
BYTE* bTriggerStatus

);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
bTriggerStatus
Current status of signal output.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

See Also

FAS_ TriggerOutput_RunA

FAS_MovePush

To request push motion(maintain specified motor torque) command

Syntax

```
int FAS_MovePush(
BYTE nPortNo,
BYTE iSlaveNo,
DWORD dwStartSpd,
DWORD dwMoveSpd,
long lPosition,
WORD wAccel,  WORD wDecel,
WORD wPushRate,
DWORD dwPushSpd,
long lEndPosition
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
DWORD dwStartSpd
start speed of position command.
DWORD dwMoveSpd
move speed of position command.
long lPosition
absolute target position of position command.
WORD wAccel
Accel time of position command.
WORD wDecel
Deceleration time of position command.
WORD wPushRate
Torque ratio of Push motion.
DWORD dwPushSpd
Moce speed of Push motion.
long lEndPosition
absolute target position of push motion.

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

See Also

FAS_GetPushStatus

FAS_GetPushStatus

To request thecurrent push motion status

Syntax

```
int FAS_MovePush(
BYTE nPortNo,
BYTE iSlaveNo,
BYTE* nPushStatus
);
```

Parameters

nPortNo
Port number of relevant drive.
iSlaveNo
Slave number of relevant drive.
BYTE nPushStatus*
Status value of push motion. (refer to '1-2-1. FrameType and Data Configuration')

Return Value

FMM_OK : Command has been normally performed.
FMM_NOT_OPEN : The drive has not been connected yet.
FMM_INVALID_PORT_NUM : There is no nPort in the connected ports.
FMM_INVALID_SLAVE_NUM : There is no drive of iSlaveNo in the relevant port.

Remarks

Example

See Also

FAS_Move Push

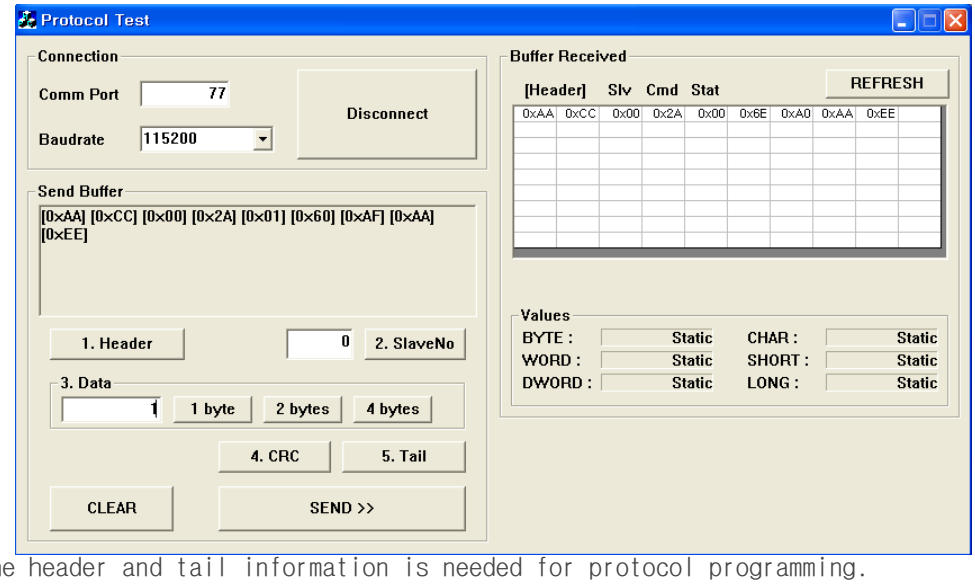
3. Protocol for PLC Program

Next window is open when you click 

icon in User Program(GUI) installed folder.

Next test procedure will help you to understand the protocol programming.

(1)Servo ON/OFF command



The header and tail information is needed for protocol programming.
Additionally Frame Data (Slave ID, Frame type, Data and CRC) is also needed in every protocol with header and tail.

1)Insert 'Comm Port' number and click 'Connect' button.

2)Header : Click 'Header' and you can see '[0XAA][0xCC]' on 'Send Buffer' window.

3)Slave ID : Insert your slave number(above example is '0') and click 'SlaveNo'.

4)Frame type : Insert 'Frame type'.
You can find next table information in '1-2-1. Frame Type and Data Configuration' on UserManual(EziSERVO PlusR)_Communication Function.

Frame type	DLL Library name	Data
42 (0x2A)	FAS_ServoEnable	Setting the Servo ON/OFF status. Sending : 1 byte 1 byte 0:OFF, 1:ON

Insert '42' in ⓫ area and click '1 byte' because the size of Frame Type is 1 byte.

5)Data : To make Servo ON status, the data is '1'. Insert '1' in ⓬ area and click '1 byte'.

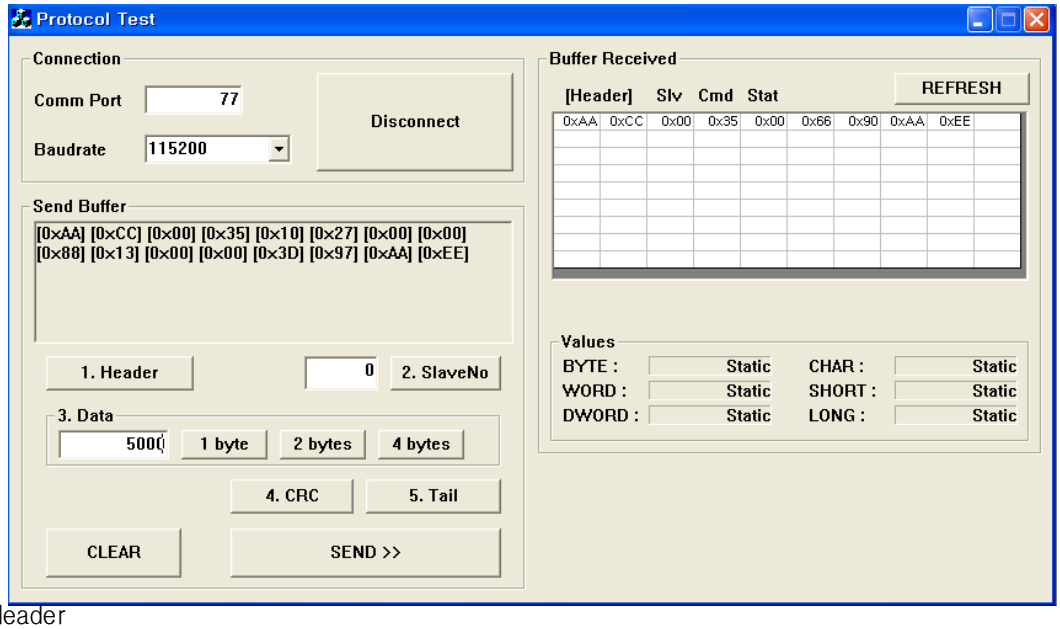
6)CRC : Click 'CRC' and the calculated result value(2 bytes) is displayed on 'Send Buffer' window.

7)Tail : click 'Tail' and you can see '[0XAA][0xEE]' on 'Send Buffer' window.

8)Finally click 'Send' button to send command characters to Ezi-SERVO Plus-R.
You can check the motor torque and LED flash for Servo ON status.

9)After sending command you can check the answering informations from Ezi-SERVO Plus-R on 'Buffer Received' window.

(2)Motion command



1) Header
2) Slave No.
3) Frame type : insert '53' in 1 byte size for 'Incremental Move' command.
4) Data(Position value) : insert '10000' and click '4byte'.
5) Data(Running speed) : insert '5000' and click '4 byte'.
6) CRC
7) Tail
8) Send : After sending command you can check the motor rotation and if click 'Send' more the motor will rotate one more time.

(3)PLC Programming

In 'Protocol test GUI' automatically calculate the 'Byte stuffing' and 'CRC' data. For protocol programming in PLC, you have to add the function of 'Byte stuffing' and 'CRC' calculation.

For 'Byte stuffing' refer to '1-1-2. RS-485 Communication Protocol' and for 'CRC' refer to '1-1-3. CRC Calculation Example' on UserManual(EziSERVO PlusR)_Communication Function.

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● Please note that the specifications are subject to change without notice due to product improvements.