SERVO DRIVER(FDA7000 Series)

Std_MODBUS PROTOCOL (Ver 1.0)

Contents

1. INTRODUCTION

FDA7000 **PROTOCOL** .

1.1 FDA7000

- FDA7000 Operator .

- RS232C, RS485 .

- Protocol MODBUS .

- RS232C D/L, PC/L , RS485
.

- MODBUS PLC, Touch Screen .

1.2

1.2.1 RS232C

- 9600bps .

- Digital Loader P-DORI Setup .

1.2.2 RS485

- 9600, 19200, 38400, 57600bps .

- P-DORI Station Setup .

- (OPR CMD) .

2. MODBUS PROTOCOL FRAME OUTLINE

MODBUS   **Field**   .

2.1   RTU(Remote Terminal Unit) Frame : Hex Data

START(logical)	ADDRESS FIELD	FUNCTION FIELD	DATA FIELD	CRC CHECK
3.5 Character Times	1 byte	1 byte	n x 1 byte	2 bytes

2.1.1   Start

-         **Frame**   .

-         9600bps   1bit   0.104msec   ,   (3.5character times,
  1 Character = 10 bits) Start time   3.64msec(Min)   .

    RS485   **Frame**   .

           Frame   .

          1.   Frame

	Start Time
9600 bps	3.64ms
19200 bps	1.82ms
38400 bps	0.91ms
57600 bps	0.46ms

- **Start time**   **frame**   ,   **frame**   .

-    Field   10bits   .

2.1.2   Address Field

-   Field   1 byte   .

-   RS485   Slave Device(   )   ID   .

-   '1 ~ 247'   , RS-485   ' 1 ~ 31'   .

2.1.3   Function Field

-   Field   1 byte   .

-   Master(   )   Slave(   )   data   code
      . (Function Code   .)

-       Code   '03, 06, 16'   .

2.1.4   Data Field

-    Function Code   Field   2 bytes   .

-    Register Address, Data, Byte-count   .

2.1.5   CRC Check

-    Field   2 bytes   . (CRC Check   )

2.1.6   Field

-    **Start bit : 1 bit**
-    **Data bit : 8 bits** (4bit   hex   2   )
-    **Parity bit :** 1 bit(even, odd), **no bit(no parity)**
-    **Stop bit : 1 bit**, 2 bits
-    Data   LSB bit -> MSB bit   .

2.2   Mode

-              RTU Mode   ASCII Mode   .
-                  (baud rate, parity mode, port)   Slave device   Mode
           .

-          Modbus Network   Device   Mode   .
-            ,   data   RTU Mode   .

2.3 OTIS   Mode

-              **Data**   **RTU Mode**   .

3. Function Field

Function Field   Code   .

3.1   ' 03 ' : Read Holding Register(0x03)

-                        Slave Device   Code   .

-   .

-    Register   (40001 ~ 4xxxx)   ,   Data Address   " 0000 ~

   xxxx-1 "   .

3.2   ' 06 ' : Write Single Register(0x06)

-                        Slave Device   Setting   Code   .

-   Setting   .

3.3   ' 16 ' : Write Multiple Register(0x10)

-                        Slave Device   Setting   Code   .

-                      (Address   )   Setting   .

3.4   SP Function Code

-                        Code   ,

   Function Code   .

-               Code   .

Code	HEX	
70	h46	JOG KEY
73	h49	
74	h50	

-                        6.Function Exam.   .

4. Data Field

Data Field .

4.1 Data Field

- Register( ) Address, , data , Function Code

.

4.2 Register Data

▪ Register data 2bytes .
▪ Register Data type Integer , Float , .

4.2.1 Integer data

- Register ' 0 ~ 65535 ' data , Register '-32768 ~ 32767'
data .
- ' 50000 (dec) ' data .

Reg. Value	Reg. Value
LO-H	LO-L
hC3	h50

5. CRC Check

CRC Check Field 				.

5.1   Error Check Field

- Field 		2 bytes 			.
- 				1 byte + 	1 byte 		.
- CRC Check Method 	CRC-16(X^16 + X^15 + X^2 + 1) 		.

5.2   CRC

1) 16bit register(0xFFFF) CRC Register(			) 			.

2) CRC Register 		data(Start, Parity, Stop bit 			8 bit) 	XOR

	CRC Register 			.

3) CRC Register 			1 bit Shift 		.

4) Shift 	carry 	'0' 	, 3) 			.

	carry 	'1' 	, CRC Register 	0xA001(POLY : polynomial value) 	XOR

	CRC Register 		3) 		.

5) 3) 	4) 			8 			.

6) 8 			data 	CRC Register 			.

7) 1) ~ 6) 		1byte 			CRC 	, 				frame 	N byte

			, 1) ~ 6) 		N-2 	(-2 : Error CHK Field) 			.

5.3 Block Diagram
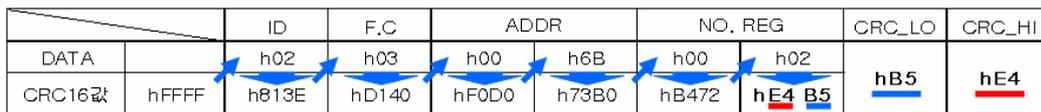
- CRC   Block Diagram   .
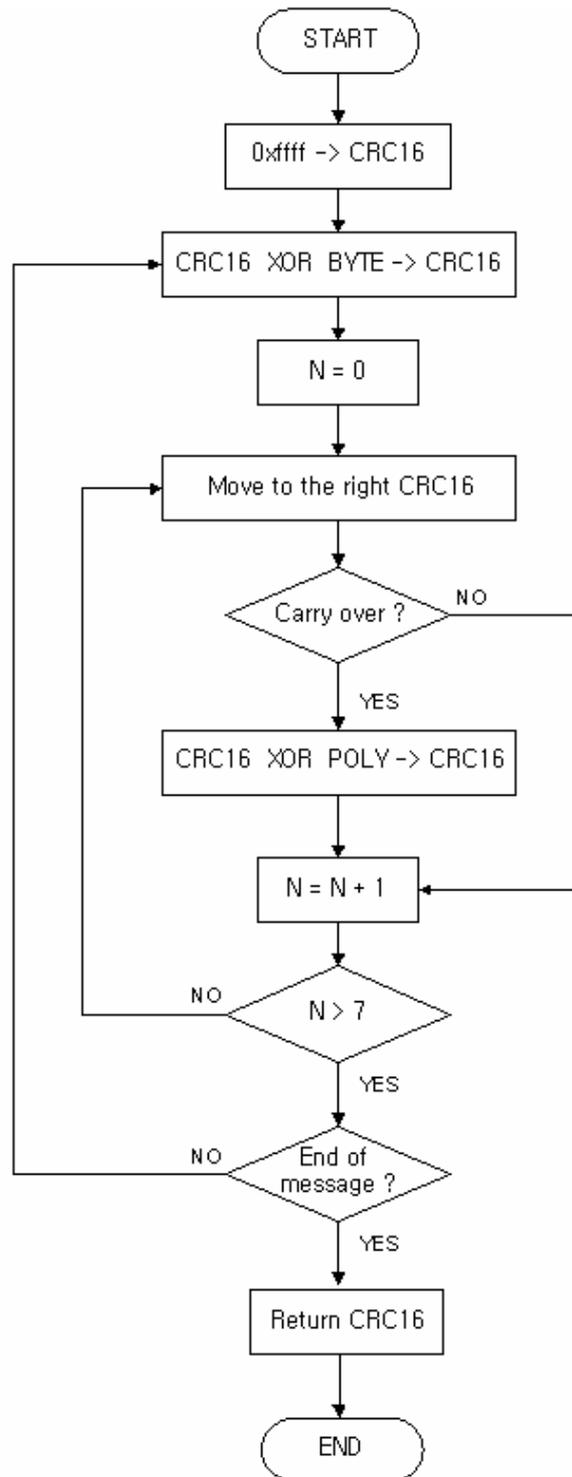
5.4 CRC Check

- 0x02   CRC16   . (POLY : 0xA001)

CRC16	11111111	11111111	
DATA	00000000	00000010	XOR

CRC16	11111111	11111101	
Shift - 1	01111111	11111110	1 : carry
POLY	10100000	00000001	XOR

CRC16	11011111	11111111	
Shift - 2	01101111	11111111	1 : carry
POLY	10100000	00000001	XOR

CRC16	11001111	11111110	
Shift - 3	01100111	11111111	0
Shift - 4	00110011	11111111	1 : carry
POLY	10100000	00000001	XOR

CRC16	10010011	11111110	
Shift - 5	01001001	11111111	0
Shift - 6	00100100	11111111	1 : carry
POLY	10100000	00000001	XOR

CRC16	10000100	11111110	
Shift - 7	01000010	01111111	0
Shift - 8	00100001	00111111	1 : carry
POLY	10100000	00000001	XOR

CRC16	10000001	00111110	=> 0x813E (0x02 CRC16)

0x813E   0x02   CRC16   .   hex   CRC16

CRC16   .   Data   CRC16

.   Register   CMD   CRC

.

		ID	F.C	ADDR		NO. REG		CRC_LO	CRC_HI
DATA		h02	h03	h00	h6B	h00	h02	hB5	hE4
CRC16값	hFFFF	h813E	hD140	hF0D0	h73B0	hB472	hE4 B5		

CRC16   (Delphi   )

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Table   Modicon Modbus Protocol Reference Guide

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6. Function Exam.

Function Code   .

6.1   ' 03 ' : Read Holding Register(0x03)

- Slave Device(ID : 2)   Register 108 ~ 109   .

  1) Register 108 : 555(dec), 109 : 0(dec)   . (Integer Type)

Request

Address	Function	Starting Address HI.	Starting Address LO.	No. of Registers HI.	No. of Registers LO.	CRC LO	CRC HI
h02	h03	h00	h6B	h00	h02		

Response

Address	Function	Byte Count	Register value HI(108)	Register value LO(108)	Register value HI(109)	Register Value LO(109)	CRC LO	CRC HI
h02	h03	h04	h02	H2B	h00	h00		

6.2   ' 06 ' : Write Single Register(0x06)

- Slave Device(ID : 2)   Register 2(Addr : 0001)   ' 3 '   setting   .

  Request

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HI.	Register Value LO.	CRC LO	CRC HI
h02	h06	h00	h01	H00	h03		

  Response

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HI.	Register Value LO	CRC LO	CRC HI
h02	h06	h00	h01	H00	h03		

- Function Code ' 06 '   Request   Frame   . (Set ting   )

6.3 ' 16 ' : Write Multiple Register(0x10)

6.4 SP Function Code

6.4.1 JOG 　　　 SP Function Code

(　)	ID	F_C	Start_H	Start_L	Reg_H	Reg_L	CRC_H	CRC_L
JOG ON	02	46	08	98	00	01		
JOG OFF	02	46	08	99	00	02		
	02	46	08	9A	00	03		
	02	46	08	9B	00	04		
	02	46	08	9C	00	05		

(　 data 　 hex 　.)

⇨ Master 　 JOG CMD 　　　　 Request Echo(　 CMD 　　 return)
.

6.4.2 Alarm 　　 SP Function Code

(　)	ID	F_C	Start_H	Start_L	Reg_H	Reg_L	CRC_H	CRC_L
	02	50	08	34	00	01		
	02	49	08	35	00	02		
	02	50	08	36	00	03		
	02	49	08	37	00	04		

(　 data 　 hex 　.)

⇨ 　　　　 / 　　　　　　　　　　　 Request echo 　　.
⇨ 　　　　 / 　　　　　　　　　　　 table 　　　.

Response

ID	F_C	Byte count	ALARM 1		CRC_L	CRC_H
			Reg _val_1	Reg _val_4		
h02	h50	h02	h00	h01		

Response

ID	F_C	Byte count	ALARM 1		ALARM2 ~ ALARM10	CRC_L	CRC_H
			Reg _val_1	Reg _val_2			
h02	h50	h20	h00	h03	2 byte x 9		

(Reg_val_4   )

	Reg_val_4	
AL-00	h00	NORMAL / E-STOP
AL-01	h01	OVER CURNT
AL-02	h02	OVER VOLT
AL-03	h03	OVER LOAD
AL-04	h04	POWER FAIL
AL-05	h05	LINE FAIL
AL-06	h06	OVER SPEED
AL-07	h07	FOLLOW ERR
AL-08	h08	OUTPUT NC
AL-09	h09	PPR ERROR
AL-10	h0A	ABS DATA
AL-11	h0B	ABS BATT
AL-12	h0C	ABS MDER
AL-13	h0D	ERASE FAIL
AL-14	h0E	WRITE FAIL
AL-15	h0F	PARA INIT

6.5 Data

- **Motor Parameter (P1-02 ~ P1-06, P1-09)**   **Masking**

  (' 1 '   )   **.**   **.**

- Parameter   data   ,   Parameter   data

  ' F '   .

)   Parameter : P1-01 ~ P1-20,   Parameter : P1-01 ~ P1-21   .

  ⇨   Exception Error   , P1-01 ~ P1-20   data

  , P1-21(Parameter)   'FFFFFFFF'   .

- Parameter   Register Address   data   Exception Rule

  Exception Code   .

- , 2   Start Address   Register   .

7. Exception Response

Exception Response 						.

## 7.1	**Master Device** **Slave Device** 							.

1)

2) 						Master 						, 					Slave

⇨ 							(Master Device) 				Time-out
.

3) Master 					, 	data 		(parity, CRC, LRC 	) 			Slave

⇨ 							(Master Device) 				Time-out
.

4) 						**frame** **CMD** 				**, Slave**
Code

⇨ 		Function code, Register Address 						Slave
Exception Response 			. Exception Response
Exception Code 				.

## 7.2	**Exception Response**

- 						2 Field(Function Field + Exception Code Field)
.

- Function Field (Code = Function Code + h80)
⇨ Modbus Protocol 					Function Code 		128(h 80) 		.
bit 		' 00000001 ~ 01111111 ' 		, 			bit 	' 0 ' 		.
⇨ Exception Response 			bit 	' 1 ' 	set 			129 (h81)
.
⇨ Exception Response 	Function Field 	data 	' 		Function Code + h80 '
.

- Data Field
⇨ 				Data 		, 					, Exception Response
Exception Code 			.

7.3

-             Address   Register   .

Request

Address	Function	Starting Address HI.	Starting Address LO.	Quantity of Outputs HI.	Quantity of Outputs LO.	CRC LO	CRC HI
h02	h01	h04	hA1	h00	h01	hAD	h2B

Response

Address	Function	Exception Code	CRC LO	CRC HI
h02	h81 (h01 + h80)	h02	h31	h91

7.4　Exception Code

Code	Name	
h01	Illegal Function	Slave Function Code .
h02	Illegal Data Address	Slave Address register
h03	Illegal Data Value	Slave register data .
h04	Slave Device Failure	
h05	ACK	(long CMD) response . Master timeout error , Code . - > long CMD , Master timeout error .
h06	Slave Device Busy	(long CMD) Master cmd .
h07	NAK	Function Code "13","14" .
h08	Servo ON Notice	Servo ON .

8. INPUT Status

- INPUT   (: StE-17)   .

-   Register   .

8.1

- Slave Device(ID : 2)   INPUT Status(Register Addr : 0x001A)   .

Request (   )

Address	Function	Starting Address HI.	Starting Address LO.	No. of Registers HI.	No. of Registers LO.	CRC LO	CRC HI
hO2	hO3	hOO	h1A	hOO	hO1	A5	FE

Response

Address	Function	Byte Count	INPUT		CRC LO	CRC HI
			Register value HI_H(108	Register value HI_L(108)		
hO2	hO3	hO2	hO2	h43		

⇨   INPUT Data(16bit) : 0x0243

8.2

8.2.1   Input bit

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Don't care				ALARM/ CLR	STOP/ START	ESTOP	TLIM	CWLIM	CCWLIM	P/PI	DIR	SPD3	SDP2	SPD1	SVONEN

Don't care	0	0	1	0	0	1	0	0	0	0	1	1

1 :   (GND24   )

0 :

ALMRST	O	
STOP	O	
ESTOP	1	
TLIM	O	
CWLIM	O	CW
CCWLIM	1	CCW
PI/P	O	PI
DIR	O	
SPD3	O	
SPD2	O	1
SPD1	1	
SVONEN	1	

9. OPR Register

- CN1   Register   .
- I/O OPR CMD   P01-17   '1'   .
-       bit   Table   .
-                       **Register   .**

9.1   I/O OPR CMD

9.1.1

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Don't care				ALARM/ CLR	STOP/ START	ESTOP	TLIM	CWLIM	CCWLIM	P/PI	DIR	SPD3	SDP2	SPD1	SVONEN

1 :

0 :   (GND24   )

9.1.2　I/O OPR CMD

- I/O OPR CMD Register Address　42001(0x07D0)　　,

  ' CWLIM, CCWLIM, ESTOP, SPD1 : ON '　　　　　　　　. (Slave ID : 2)

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	O
Don't care				ALARM /CLR	STOP/ START	ESTOP	TLIM	CWLIM	CCWLIM	P/PI	DIR	SPD3	SDP2	SPD1	SVONEN
Don't Care				1	1	O	1	O	O	1	1	1	1	O	1

⇨ 　, I/O OPR CMD　0x0D3D　　　.

Request

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HI.	Register Value LO.	CRC Lo.	CRC Hi.
hO2	hO6	hO7	hDO	hOD	h3D		

Response　: Request echo　.

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HI.	Register Value LO.	CRC Lo.	CRC Hi.
hO2	hO6	hO7	hDO	hOD	h3D	hA2	hF6

9.2 OPR CMD

- I/O OPR CMD　CN1　　　　　　　　　　　　　　　　　　.
- I/O　　　　　CN1

　　　　　　P1-17　 'Serial I/O'　 '0' -> '1'　　　　　　　　　　.

- 　　　　　　　　　　　　　　　　　　　　　　　　.

10. FDA7000 Address Map

10.1

Address				( )			Min	Max	Min	Max	Data Type		
40011	0x000A		StE-01	Display Select	R		1203	100	1330	100	1330	INT		-
40012	0x000B		StE-02	Command Speed	R		0.0	-9999.9	9999.9	-3276.8	3276.7	Float	#	rpm
40013	0x000C		StE-03	Motor Speed	R		0.0	-9999.9	9999.9	-3276.8	3276.7	Float	#	rpm
40014	0x000D		StE-04	CCW Speed Limit	R		3000.0	0	9999.9	0	3276.7	Float	#	rpm
40015	0x000E		StE-05	CW Speed Limit	R		-3000.0	-9999.9	0	-3276.8	0	Float	#	rpm
40016	0x000F		StE-06	Command Pulse	R		0	-99999	99999	-32767	32768	INT	#	pulse
40017	0x0010		StE-07	Feedback Pulse	R		0	-99999	99999	-32767	32768	INT	#	pulse
40018	0x0011		StE-08	Error Pulse	R		0	-99999	99999	-32767	32768	INT	#	pulse
40019	0x0012		StE-09	Command Torque	R		0.0	-300	300	-300	300	Float		%
40020	0x0013		StE-10	Load Rate	R		0.0	-300	300	-300	300	Float		%
40021	0x0014		StE-11	Max Load Rate	R		0.0	-300	300	-300	300	Float		%
40022	0x0015		StE-12	CCW TRQ LMT	R		275.4	0	300	0	300	Float		%
40023	0x0016		StE-13	CW TRQ LMT	R		-275.4	-300	0	-300	0	Float		%
40024	0x0017		StE-14	Inertia Ratio	R		2.0	0	50	0	50	Float		-
40025	0x0018		StE-15	MULTI Turns	R		0	0	99999	0	65535	INT	#	pulse
40026	0x0019		StE-16	Single Turn	R		0	0	131072	0	65535	INT	#	pulse
40027	0x001A		StE-17	Input Status	R		-	0	99999	0	65535	BIT		-
40028	0x001B		StE-18	PROG Version	R		1.00	0	99.99	0	99.99	Float		-

P1--

Address				( )			Min	Max	Min	Max	Data Type		
40101	0x0064	*	P01-01	Motor ID	R/W		21	0	99	0	99	INT		-
40102	0x0065		P01-02	Inertia	-		-	0.01	999.99	0.01	999.99	Float		gfcm^2
40103	0x0066		P01-03	TRQ Constant	-		-	0.1	999.99	0.1	999.99	Float		kgfcm/A
40104	0x0067		P01-04	Phase Inductance	-		-	0.001	99.999	0.001	99.999	Float		mH
40105	0x0068		P01-05	Phase Resistance	-		-	0.001	99.999	0.001	99.999	Float		
40106	0x0069		P01-06	Rated Current	-		-	0.01	999.99	0.01	999.99	Float		A(rms)
40107	0x006A		P01-07	Rated Speed	-		-	0	9999	0	6553.5	Float		rpm
40108	0x006B		P01-08	MAX Speed	-		-	0	9999	0	6553.5	Float		rpm
40109	0x006C		P01-09	Rated TRQ	-		-	0	9999	0	6553.5	Float		kgfcm
40110	0x006D		P01-10	Pole Number	-		-	2	98	2	98	INT		pole
40111	0x006E	*	P01-11	Drive ID	R/W		10	0	10	0	10	INT		-
40112	0x006F	*	P01-12	Encoder ID	R/W		1(A)	0	9	0	9	INT		-
40113	0x0070	*	P01-13	Encoder Pulse	R/W		2000	1	32768	1	32768	INT		ppr
40114	0x0071		P01-14	Pulse Out Rate	R/W		2000	1	131072	1	65535	INT	#	pulse
40115	0x0072	*	P01-15	COM Baud Rate	R/W		0	0	3	0	3	INT		-
40116	0x0073	*	P01-16	Serial Select	R/W		0	0	2	0	2	INT		-
40117	0x0074	*	P01-17	Serial I/O	R/W		0	0	2	0	2	INT		-
40118	0x0075	*	P01-18	Serial ID	R/W		1	0	31	0	31	INT		-
40119	0x0076		P01-19	Parameter Lock	R/W		0(off)	0	1	0	1	INT		-
40120	0x0077	*	P01-20	Serial Origin	R/W		0(off)	0	1	0	1	INT		-

Address			( )			Min	Max	Min	Max	Data Type		
40201	0x00C8	*	P02-01	Control Mode	R/W	1	0	5	0	5	INT		-
40202	0x00C9		P02-02	Mode Change Time	R/W	500.0	100	10000	100	6553.5	Float		ms
40203	0x00CA		P02-03	CCW TRQ LMT	R/W	300.0	0	300	0	300	Float		%
40204	0x00CB		P02-04	CW TRQ LMT	R/W	-300.0	-300	0	-300	0	Float		%
40205	0x00CC		P02-05	CCW Speed Limit	R/W	3000.0	0	6000	0	3276.8	Float	#	rpm
40206	0x00CD		P02-06	CW Speed Limit	R/W	-3000.0	-6000	0	-3276.7	0	Float	#	rpm
40207	0x00CE		P02-07	Brake Speed	R/W	50.0	0	9999.9	0	6553.5	Float		rpm
40208	0x00CF		P02-08	Brake Time	R/W	50.0	0	10000	0	6553.5	Float		ms
40209	0x00D0		P02-09	DB Mode	R/W	2	0	3	0	3	INT		-
40210	0x00D1		P02-10	Notch Filter1	R/W	0	0	2	0	2	INT		-
40211	0x00D2		P02-11	NF Frequency1	R/W	300.0	50	2000	50	2000	Float		Hz
40212	0x00D3		P02-12	NF Bandwidth1	R/W	95.0	10	99.9	10	99.9	Float		%
40213	0x00D4		P02-13	Notch Filter2	R/W	0	0	1	0	1	INT		-
40214	0x00D5		P02-14	NF Frequency2	R/W	500.0	50	2000	50	2000	Float		Hz
40215	0x00D6		P02-15	NF Bandwidth2	R/W	95.0	10	99.9	10	99.9	Float		%
40216	0x00D7		P02-16	TRQ Filter TC	R/W	1.3	0	1000	0	1000	Float		ms
40217	0x00D8		P02-17	Auto Tuning	R/W	0	0	1	0	1	INT		-
40218	0x00D9		P02-18	System Response	R/W	7	1	19	1	19	INT		-
40219	0x00DA		P02-19	Inertia Ratio	R/W	2.0	1	50	1	50	Float		-
40220	0x00DB		P02-20	Gain ADJ Speed1	R/W	0.0	100	5000	100	5000	Float		rpm
40221	0x00DC		P02-21	Gain ADJ Speed2	R/W	100.0	10	500	10	500	Float		rpm
40222	0x00DD		P02-22	Gain ADJ TRQ1	R/W	150.0	50	300	50	300	Float		%
40223	0x00DE		P02-23	Gain ADJ TRQ2	R/W	50.0	0	300	0	300	Float		%
40224	0x00DF		P02-24	Contact Gain TC	R/W	100.0	0	10000	0	6553.5	Float		ms
40225	0x00E0		P02-25	Temporary Stop	R/W	0(off)	0	1	0	1	INT		-
40226	0x00E1		P02-26	Emergency Stop	R/W	0(off)	0	1	0	1	INT		-
40227	0x00E2		P02-27	Direction select	R/W	0(off)	0	1	0	1	INT		-
40228	0x00E3		P02-28	Ripple COMPEN	R/W	0(off)	0	1	0	1	INT		-
40229	0x00E4	*	P02-29	Parameter INIT	R/W	0(off)	0	1	0	1	INT		-
40230	0x00E5		P02-30	ServoOff_dly_time	R/W	0	0	1000	0	1000	Float		ms
40231	0x00E6		P02-31	CW Limit	R/W	ON/OFF	OFF	1	0	1	INT		-
40232	0x00E7		P02-32	CCW Limit	R/W	ON/OFF	OFF	1	0	1	INT		-
40233	0x00E8		P02-33	Servo ON/OFF	R/W	ON/OFF	OFF	1	0	1	INT		-

Address				( )			Min	Max	Min	Max	Data Type		
40301	0x012C	*	P03-01	Speed Gain Mode	R/W	1	1	5	1	5	INT		-
40302	0x012D		P03-02	PI-IP Control %	R/W	100.0	0	100	0	100	Float		%
40303	0x012E		P03-03	Friction COMPEN	R/W	0.0	0	100	0	100	Float		%
40304	0x012F		P03-04	Load COMPEN	R/W	0.0	0	100	0	100	Float		%
40305	0x0130		P03-05	SC Loop Gain1	R/W	30.0	0	1000	0	1000	Float		Hz
40306	0x0131		P03-06	SC TC1	R/W	30.0	0	10000	0	6553.5	Float		ms
40307	0x0132		P03-07	SC Loop Gain2	R/W	35.0	0	1000	0	1000	Float		Hz
40308	0x0133		P03-08	SC TC2	R/W	25.0	0	10000	0	6553.5	Float		ms
40309	0x0134		P03-09	Analog CMD TC	R/W	0.0	0	2000	0	2000	Float		ms
40310	0x0135		P03-10	ACCEL Time	R/W	0.0	0	90000	0	6553.5	Float		ms
40311	0x0136		P03-11	DECEL Time	R/W	0.0	0	90000	0	6553.5	Float		ms
40312	0x0137	*	P03-12	S-Mode TC	R/W	0.0	0	9000	0	6553.5	Float		ms
40313	0x0138		P03-13	In Speed Range	R/W	10.0	0	9999.9	0	6553.5	Float		rpm
40314	0x0139		P03-14	Zero Speed Range	R/W	10.0	0	9999.9	0	6553.5	Float		rpm
40315	0x013A	*	P03-15	Analog +10[V] RPM	R/W	1500.0	0	9999.9	0	3276.7	Float		rpm
40316	0x013B	*	P03-16	Analog -10[V] RPM	R/W	-1500.0	-9999.9	0	-3276.8	0	Float		rpm
40317	0x013C		P03-17	Auto Offset	R/W	0(off)	0	1	0	1	INT		-
40318	0x013D		P03-18	Manual Offset	R/W	0.0	-1000	1000	-1000	1000	Float		mV
40319	0x013E	*	P03-19	Override ENB	R/W	0(off)	0	1	0	1	INT		-
40320	0x013F		P03-20	Clamp Mode	R/W	0	0	2	0	2	INT		-
40321	0x0140		P03-21	Clamp Voltage	R/W	0.0	-1000	1000	-1000	1000	Float		mV
40322	0x0141	*	P03-22	F/Back TC	R/W	0.0	0	2000	0	2000	Float		ms
40323	0x0142		P03-23	Zero SPD VIB REJ	R/W	0.1	0	1000	0	1000	Float		rpm
40324	0x0143	*	P03-24	Feedforward TRQ	R/W	0	0	2	0	2	INT		-

Address			( )			Min	Max	Min	Max	Data Type		
40401	0x0190		P04-01	Spped1	R/W	10.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40402	0x0191		P04-02	Speed2	R/W	100.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40403	0x0192		P04-03	Speed3	R/W	200.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40404	0x0193		P04-04	Speed4	R/W	500.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40405	0x0194		P04-05	Speed5	R/W	1000.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40406	0x0195		P04-06	Speed6	R/W	2000.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40407	0x0196		P04-07	Speed7	R/W	3000.0	-9999.9	9999.9	-3276.8	3276.7	Float		rpm
40408	0x0197		P04-08	Torque1	R/W	0.0	-300	300	-300	300	Float		%
40409	0x0198		P04-09	Torque2	R/W	2.0	-300	300	-300	300	Float		%
40410	0x0199		P04-10	Torque3	R/W	20.0	-300	300	-300	300	Float		%
40411	0x019A		P04-11	Torque4	R/W	50.0	-300	300	-300	300	Float		%
40412	0x019B		P04-12	Torque5	R/W	75.0	-300	300	-300	300	Float		%
40413	0x019C		P04-13	Torque6	R/W	100.0	-300	300	-300	300	Float		%
40414	0x019D		P04-14	Torque7	R/W	120.0	-300	300	-300	300	Float		%

P5--

Address			( )			Min	Max	Min	Max	Data Type		
40501	0x01F4	*	P05-01	POS Gain Mode	R/W	1	1	5	1	5	INT		-
40502	0x01F5	*	P05-02	POS Pulse Type	R/W	1	0	5	0	5	INT		-
40503	0x01F6		P05-03	Speed Mode	R/W	0(off)	0	1	0	1	INT		-
40504	0x01F7		P05-04	Feedforward	R/W	0.0	0	100	0	100	Float		%
40505	0x01F8		P05-05	PC P Gain1	R/W	30.0	0	500	0	500	Float		Hz
40506	0x01F9		P05-06	PC P Gain2	R/W	35.0	0	500	0	500	Float		Hz
40507	0x01FA		P05-07	PI-P Pulse ERR	R/W	0	0	99999	0	65535	INT		pulse
40508	0x01FB		P05-08	IN Position	R/W	100	0	99999	0	65535	INT		pulse
40509	0x01FC		P05-09	Follow ERR	R/W	30000	0	99999	0	65535	INT		pulse
40510	0x01FD		P05-10	POS CMD TC	R/W	0.0	0	2000	0	2000	Float		ms
40511	0x01FE		P05-11	FF TC	R/W	0.0	0	2000	0	2000	Float		ms
40512	0x01FF	*	P05-12	ELCTR Gear NUM1	R/W	1	1	99999	1	65535	INT		-
40513	0x0200	*	P05-13	ELCTR Gear DEN1	R/W	1	1	99999	1	65535	INT		-
40514	0x0201	*	P05-14	ELCTR Gear NUM2	R/W	1	1	99999	1	65535	INT		-
40515	0x0202	*	P05-15	ELCTR Gear DEN2	R/W	2	1	99999	1	65535	INT		-
40516	0x0203	*	P05-16	ELCTR Gear NUM3	R/W	1	1	99999	1	65535	INT		-
40517	0x0204	*	P05-17	ELCTR Gear DEN3	R/W	4	1	99999	1	65535	INT		-
40518	0x0205	*	P05-18	ELCTR Gear NUM4	R/W	1	1	99999	1	65535	INT		-
40519	0x0206	*	P05-19	ELCTR Gear DEN4	R/W	8	1	99999	1	65535	INT		-
40520	0x0207		P05-20	Bias SPD COMPEN	R/W	0.0	-1000	1000	-1000	1000	Float		rpm
40521	0x0208		P05-21	Bias Pulse Band	R/W	10	0	500	0	500	INT		pulse
40522	0x0209		P05-22	Backlash Pulse	R/W	0	0	99999	0	65535	INT		pulse

Address				( )			Min	Max	Min	Max	Data Type		
40601	0x0258	*	P06-01	Analog TRQ TC	R/W	0.0	0	2000	0	2000	Float		ms
40602	0x0259		P06-02	TRQ ACCEL Time	R/W	0.0	0	9000	0	6553.5	Float		ms
40603	0x025A		P06-03	TRQ DECEL Time	R/W	0.0	0	9000	0	6553.5	Float		ms
40604	0x025B	*	P06-04	TRQ S-Mode	R/W	0.0	0	2000	0	2000	Float		ms
40605	0x025C		P06-05	In TRQ Range	R/W	10.0	0	100	0	100	Float		%
40606	0x025D		P06-06	Stop TRQ Range	R/W	10.0	0	100	0	100	Float		%
40607	0x025E		P06-07	10[V] TRQ	R/W	100.0	0	300	0	300	Float		%
40608	0x025F		P06-08	Auto Offset	R/W	0(off)	0	1	0	1	INT		-
40609	0x0260		P06-09	Manual Offset	R/W	0.0	-1000	1000	-1000	1000	Float		mV

P7--

Address				( )			Min	Max	Min	Max	Data Type		
40701	0x02BC	*	P07-01	CN1-18	R/W	1	0	30	0	30	INT		-
40702	0x02BD	*	P07-02	CN1-43	R/W	9	0	20	0	20	INT		-
40703	0x02BE	*	P07-03	CN1-17	R/W	10	0	20	0	20	INT		-
40704	0x02BF	*	P07-04	CN1-42	R/W	11	0	20	0	20	INT		-
40705	0x02C0	*	P07-05	CN1-16	R/W	3	0	20	0	20	INT		-
40706	0x02C1	*	P07-06	CN1-41	R/W	4	0	20	0	20	INT		-
40707	0x02C2	*	P07-07	CN1-15	R/W	13	0	20	0	20	INT		-
40708	0x02C3	*	P07-08	CN1-40	R/W	14	0	20	0	20	INT		-
40709	0x02C4	*	P07-09	CN1-14	R/W	12	0	20	0	20	INT		-
40710	0x02C5	*	P07-10	CN1-39	R/W	16	0	20	0	20	INT		-
40711	0x02C6	*	P07-11	CN1-13	R/W	15	0	20	0	20	INT		-
40712	0x02C7	*	P07-12	CN1-38	R/W	19	0	20	0	20	INT		-

P8--

Address				( )			Min	Max	Min	Max	Data Type		
40801	0x0320	*	P08-01	CN1-23	R/W	0	0	30	0	30	INT		-
40802	0x0321	*	P08-02	CN1-48	R/W	3	0	18	0	18	INT		-
40803	0x0322	*	P08-03	CN1-22	R/W	6	0	18	0	18	INT		-
40804	0x0323	*	P08-04	CN1-47	R/W	5	0	18	0	18	INT		-
40805	0x0324	*	P08-05	CN1-21	R/W	7	0	18	0	18	INT		-
40806	0x0325	*	P08-06	CN1-46	R/W	9	0	18	0	18	INT		-
40807	0x0326	*	P08-07	CN1-20	R/W	14	0	18	0	18	INT		-
40808	0x0327	*	P08-08	CN1-45	R/W	15	0	18	0	18	INT		-
40809	0x0328	*	P08-09	CN1-19	R/W	16	0	18	0	18	INT		-
40810	0x0329	*	P08-10	CN1-44	R/W	17	0	18	0	18	INT		-

Address			( )			Min	Max	Min	Max	Data Type	
40901	0x0384	P09-01	Monitor1	R/W	0	0	5	0	5	INT	-
40902	0x0385	P09-02	Monitor2	R/W	0(off)	0	1	0	1	INT	-
40903	0x0386	P09-03	Monitor ABS1	R/W	1.0	0.1	2000	0.1	2000	Float	-
40904	0x0387	P09-04	Monitor ABS2	R/W	0.0	-1000	1000	-1000	1000	Float	mV
40905	0x0388	P09-05	Monitor Scale1	R/W	1	0	5	0	5	INT	-
40906	0x0389	P09-06	Monitor Scale2	R/W	0(off)	0	1	0	1	INT	-
40907	0x038A	P09-07	Monitor Offset1	R/W	1.0	0.1	2000	0.1	2000	Float	-
40908	0x038B	P09-08	Monitor Offset2	R/W	0.0	-1000	1000	-1000	1000	Float	mV

JOG

Address			( )			Min	Max	Min	Max	Data Type	
41001	0x03E8	P10-01	Key Jog Mode	R/W	0(off)	0	1	0	1	INT	-
41002	0x03E9	P10-02	Key Jog Speed	R/W	100.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41003	0x03EA	P10-03	Auto Jog Mode	R/W	0	0	2	0	2	INT	-
41004	0x03EB	P10-04	Jog Speed1	R/W	100.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41005	0x03EC	P10-05	Jog Time1/REV1	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41006	0x03ED	P10-06	Jog Speed2	R/W	-100.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41007	0x03EE	P10-07	Jog Time2/REV2	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41008	0x03EF	P10-08	Jog Speed3	R/W	200.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41009	0x03F0	P10-09	Jog Time3/REV3	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41010	0x03F1	P10-10	Jog Speed4	R/W	-200.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41011	0x03F2	P10-11	Jog Time4/REV4	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41012	0x03F3	P10-12	Jog Speed5	R/W	400.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41013	0x03F4	P10-13	Jog Time5/REV5	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41014	0x03F5	P10-14	Jog Speed6	R/W	-400.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41015	0x03F6	P10-15	Jog Time6/REV6	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41016	0x03F7	P10-16	Jog Speed7	R/W	800.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41017	0x03F8	P10-17	Jog Time7/REV7	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]
41018	0x03F9	P10-18	Jog Speed8	R/W	-800.0	-9999.9	9999.9	-3276.8	3276.7	Float	rpm
41019	0x03FA	P10-19	Jog Time8/REV8	R/W	1.0	0	5000	0	5000	Float	[sec]/[rev]

Address			( )			Min	Max	Min	Max	Data Type	
42001	0x07D0	-	I/O DGT CMD	W	0x0d3f	-	-	-	-	-	-
42002	0x07D1	-	SPD DGT CMD	W	0	-	-	-	-	Float	-
42003	0x07D2	-	TRQ DGT CMD	W	0	-	-	-	-	Float	-
42004	0x07D3	-	POS DGT CMD	W	0	-	-	-	-	-	-

Alarm Address

Address			( )			Min	Max	Min	Max	Data Type	
42101	0x0834	-	Current Alarm	R	-	-	-	-	-	-	-
42102	0x0835	-	Alarm Reset	W	-	-	-	-	-	-	-
42103	0x0836	-	Alarm History	R	-	-	-	-	-	-	-
42104	0x0837	-	Alarm History Reset	W	-	-	-	-	-	-	-

Jog Key Address

Address			( )			Min	Max	Min	Max	Data Type	
42201	0x0898	-	JOG ON	W	-	-	-	-	-	-	-
42202	0x0899	-	JOG OFF	W	-	-	-	-	-	-	-
42203	0x089A	-	(CW)	W	-	-	-	-	-	-	-
42204	0x089B	-	(CCW)	W	-	-	-	-	-	-	-
42205	0x089C	-	(Stop)	W	-	-	-	-	-	-	-

PARAMETER **FDA7000** .

11.   APPENDIX

11.1 Appendix A : Serial Communication Cable

11.1.1 RS232C Channel

D-SUB 9Pin   10120-3000VE 3M

5 ——————— 6
2 ——————— 10
3 ——————— 9
                          커넥터 몸체(F.G)

통신케이블 규격 : AWG24, UL2919-AMESB 3C(LS Cable)
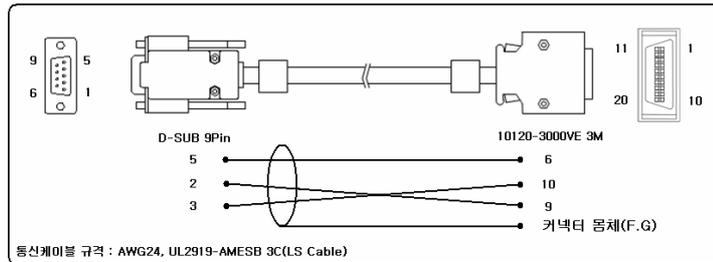
[PC Serial Port]   [Servo DRV _CN3 CON.]

11.1.2 RS485 Channel

10120-3000VE 3M

P ——————— 7
N ——————— 8
Rt ——————— 19
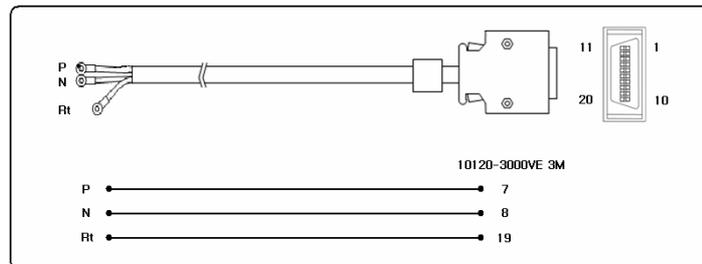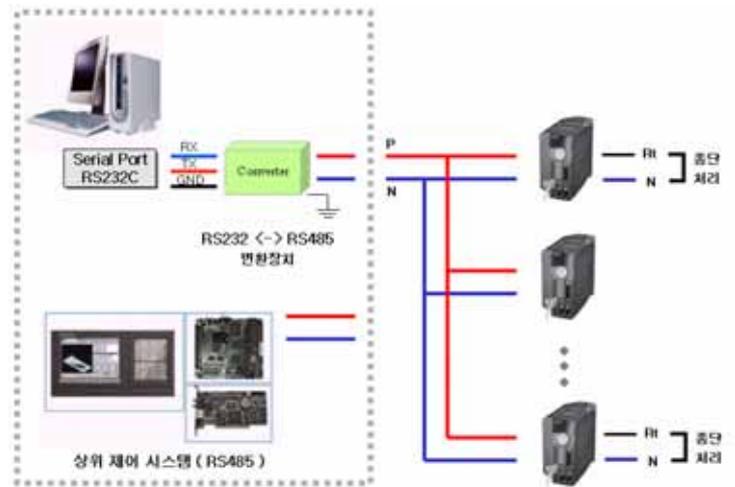
[Upper System]   [Servo DRV _CN3 CON.]

1)   Rt   N   Short(   )   .

2)   (120   )   .

3)   Rt

.   .

-   RS485   Network

- MEMO -