

SERVO DRIVER(FDA7000 Series)
STANDARD PROTOCOL (Ver 1.00)

Contents

1. INTRODUCTION
2. MODBUS PROTOCOL FRAME OUTLINE
3. FUNCTION FIELD
4. DATA FIELD
5. CRC CHECK
6. FUNCTION EXAM.
7. EXCEPTION RESPONSE
8. I/O STATUS
9. OPR REGISTER
10. FDA7000 Address Map
11. Appendix

1. INTRODUCTION

FDA7000

PROTOCOL

1.1 FDA7000

- FDA7000 Operator
- RS232C, RS485
- Protocol MODBUS
- RS232C D/L, PC/L, RS485
- MODBUS PLC, Touch Screen 가

1.2



1.2.1 RS232C

- 9600bps
- Digital Loader P-DORI Station 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

- 1. Frame

통신 속도	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' 가 , RS-485 '1 ~ 31'

2.1.3 Function Field

- Field 1 byte
- Master() Slave() data 가 code (Function Code)
- Code '03, 06, 16'

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	내 용
70	h46	JOG KEY 기능 수행
73	h49	알람 내용 지우기
74	h50	알람 내용 요청

- 6.Function Exam.

4. Data Field

Data Field

4.1 Data Field

- Register() Address, , data , Function Code

4.2 Register Data

- Register data 4bytes
- Register Data type Integer , Float

4.2.1 Integer data

- 가 Register ‘ 0 ~ 65535 ‘ data , 가 Register ‘-32768 ~ 32767’

data

- 4bytes 2bytes Don't care . data 2bytes

- ‘ 50000 (dec) ‘ data

Reg. Value	Reg. Value	Reg. Value	Reg. Value
HI-H	HI-L	LO-H	LO-L
h00	h00	hC3	h50

4.2.2 Float data

- ‘ -99999.9 ~ +99999.9 ‘ data

- Float data format IEEE754

S	E	M
31 30	23	22
		0

S : bit (1 bit)

E : bit (8 bit)

M : 가 bit (23 bit)

$$\text{Data} = (-1)^S \times 1.M \times 2^{(E-127)}$$

- 1) 1234.5 data

Reg. Value	Reg. Value	Reg. Value	Reg. Value
HI-H	HI-L	LO-H	LO-L
h44	h9A	h50	h00

S : 0

E : 10001001 = 137

M : 0011010 01010000 00000000 = 1/8 + 1/16 + 1/64 + 1/512 + 1/2048 = 0.205566406

Data = (-1)⁰ x 1.205566406 x 2⁽¹³⁷⁻¹²⁷⁾ = 1234.5

- 2) -1234.5 data

Reg. Value	Reg. Value	Reg. Value	Reg. Value
HI-H	HI-L	LO-H	LO-L
C4	9A	50	00

S : 1

E : 10001001 = 137

M : 0011010 01010000 00000000 = 1/8 + 1/16 + 1/64 + 1/512 + 1/2048 = 0.205566406

Data = (-1)¹ x 1.205566406 x 2⁽¹³⁷⁻¹²⁷⁾ = -1234.5

4.3 Register data

- Register Integer , Float , data type

- (http://higenmotor.co.kr) ‘ Data (Float <--> HEX) ’ 가

5. CRC Check

CRC Check Field

5.1 Error Check Field

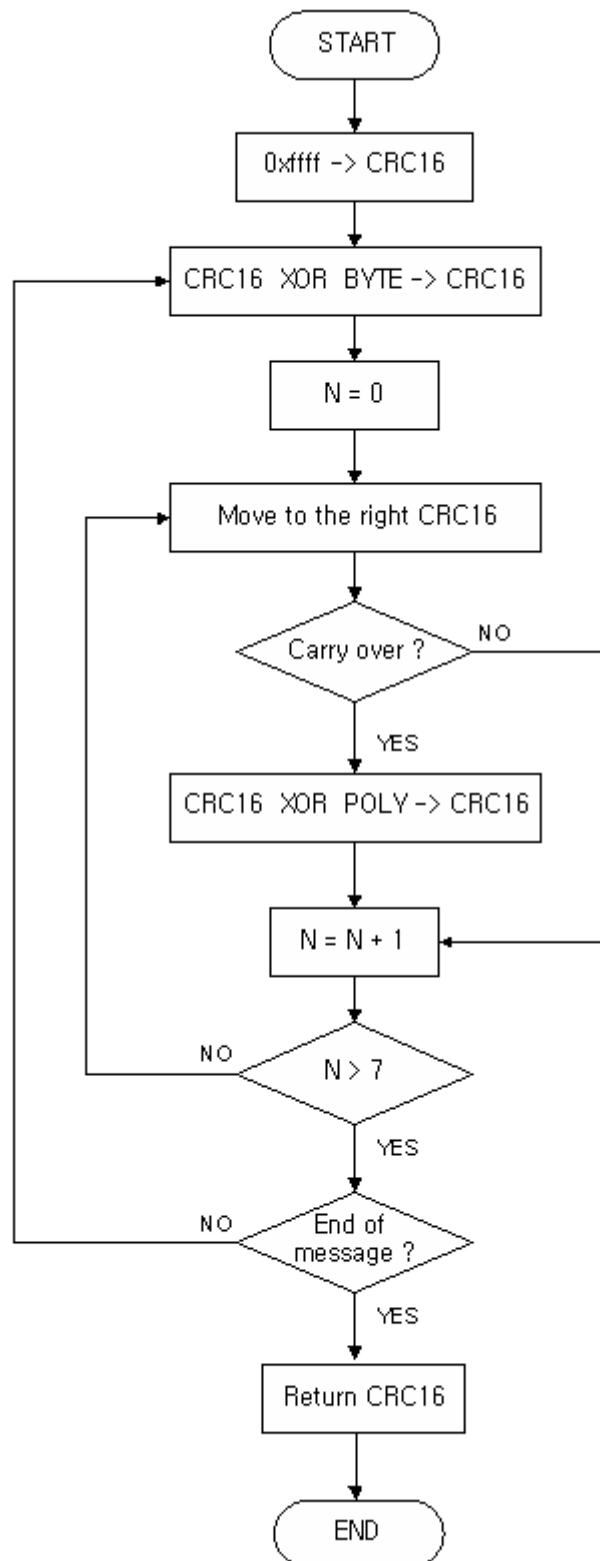
- Field 2 bytes
- 1 byte + 1 byte
- CRC Check Method CRC-16($X^{16} + X^{15} + X^2 + 1$)

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 가 '0' , 3)
carry 가 '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
가 , 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 (0x02에 대한 CRC16 값)

0x813E 0x02 CRC16 . hex CRC16
 CRC16 . Data CRC16
 . Register CMD CRC



CRC16 (Delphi)

가 . Table

Modicon Modbus Protocol Reference

Guide

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	hB5	hE4

Response

Address	Function	Byte Count	Register value HLH(108)	Register value HLL(108)	Register value LO_H(108)	Register value LO_L(108)
h02	h03	h08	h00	h00	h02	H2B

Register value HLH(109)	Register value HLL(109)	Register value LO_H(109)	Register Value LO_L(109)	CRC LO	CRC HI
h00	h00	h00	h00	hBF	h77

2) Register 108 :+1234.5(dec), 109 : -1234.5(dec)가 . (Float 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	hB5	hE4

Response

Address	Function	Byte Count	Register value HLH(108)	Register value HLL(108)	Register value LO_H(108)	Register value LO_L(108)
h02	h03	h08	h44	h9A	h50	h00

Register value	Register value	Register value	Register value	CRC LO	CRC HI
HL_H(109)	HL_L(109)	LO_H(109)	LO_L(109)		
hC4	h9A	h50	h00	h88	h16

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

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

Request

Address	Function	Starting Address	Starting Address	Register Value	Register Value	Register Value	Register Value	CRC LO	CRC HI
		HI.	LO.	HL_H.	HL_L.	LO_H.	LO_L.		
h02	h06	h00	h01	h00	h00	h00	h03	hDA	h13

Response

Address	Function	Starting Address	Starting Address	Register Value	Register Value	Register Value	Register Value	CRC LO	CRC HI
		HI.	LO.	HL_H.	HL_L.	LO_H.	LO_L.		
h02	h06	h00	h01	h00	h00	h00	h03	hDA	h13

- Function Code ‘ 06 ‘ Request Frame . (Setting)

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

- Slave Device(ID : 2) Register 2 2 register ‘ 10 ‘, ‘ 258 ‘ setting .

Request

Address	Function	Starting Address	Starting Address	Quantity of Registers	Quantity of Registers	Byte Count
		HI.	LO.	HI.	LO.	
h02	h10	h00	h01	h00	h02	h08

Register Value	Register Value	Register Value	Register Value	Register Value	Register Value	Register Value	Register Value	CRC LO	CRC HI
HL_H.	HL_L.	LO_H.	LO_L.	HL_H.	HL_L.	LO_H.	LO_L.		
h00	h00	h00	h0A	h00	h00	h01	h02	hF0	hF7

Response

Address	Function	Starting Address HI.	Starting Address LO.	Quantity of Registers HI.	Quantity of Registers LO.	Error Check LO.	Error Check HI.
h02	h10	h00	h01	h00	h02	h10	h3B

6.4 SP Function Code

6.4.1 JOG SP Function Code

메뉴명(변수명)	ID	F_C	Start_H	Start_L	Reg_H_h	Reg_H_l	Reg_L_h	Reg_L_l	CRC_H	CRC_L
JOG ON	02	46	08	98	00	00	00	01	07	42
JOG OFF	02	46	08	99	00	00	00	02	7A	83
역회전 연속	02	46	08	9A	00	00	00	03	FF	43
정회전 연속	02	46	08	9B	00	00	00	04	83	41
정지	02	46	08	9C	00	00	00	05	F7	41

(data hex .)

⇒ Master JOG CMD Request Echo(CMD return)

6.4.2 Alarm SP Function Code

메뉴명(변수명)	ID	F_C	Start_H	Start_L	Reg_H_h	Reg_H_l	Reg_L_h	Reg_L_l	CRC_H	CRC_L
현재 알람 요청	02	50	08	34	00	00	00	01	E0	9B
현재 알람 지우기	02	49	08	35	00	00	00	02	15	9B
알람 이력 요청	02	50	08	36	00	00	00	03	18	9A
알람 이력 지우기	02	49	08	37	00	00	00	04	EC	59

(data hex .)

⇒ / Request echo
 ⇒ / table

Response

ID	F_C	Byte count	ALARM 1				CRC_L	CRC_H
			Reg_val_1	Reg_val_2	Reg_val_3	Reg_val_4		
h02	h50	h04	h00	h00	h00	h01	h04	h90

Response

ID	F_C	Byte count	ALARM 1				ALARM2 ~ ALARM10	CRC_L	CRC_H
			Reg_val_1	Reg_val_2	Reg_val_3	Reg_val_4			
h02	h50	h28	h00	h00	h00	h03	4 byte x 9개		

(Reg_val_4)

알람 내용	Reg_val_4	표준형
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 가 .
- , 2 Start Address 가 Register .

7. Exception Response

Exception Response

7.1 Master Device Slave Device

- 1)
- 2) 가 Master , Slave
 ⇒ (Master Device) Time-out
- 3) Master , data (parity, CRC, LRC)가 Slave
 ⇒ (Master Device) Time-out
- 4) frame CMD , Slave
 Code 가
 ⇒ 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	내 용
h01	Illegal Function	Slave에서 지원하지 않는 Function Code 요청시 발생.
h02	Illegal Data Address	Slave에서 정의 되지 않은 Address의 register값 요청시 발생
h03	Illegal Data Value	Slave의 정의된 register에 유효하지 않은 data를 저장하라는 요청시 발생.
h04	Slave Device Failure	
h05	ACK	지속적인 지령 요청(long CMD)에 대한 response는 시간이 오래 걸린다. 이 경우 Master측에서 timeout error로 인식할 수 있으므로, 응답을 준비중이라고 알리기 위한 Code임. -> 정의된 long CMD의 개수는 없으므로, Master의 timeout error 기준 시간에 맞추어야 함.
h06	Slave Device Busy	지속적인 요청 지령(long CMD)을 받고 그에 대한 응답을 수행하는 도중에 Master에서 재요청 cmd가 전송 될 경우 발생.
h07	NAK	요청 Function Code "13","14"에 대해 수행 할 수 없는 경우 발생.
h08	Servo ON Notice	Servo ON시 변경할 수 없는 파라메타의 값을 변경하고자 할 경우 발생.

8. I/O Status

- I/O (: StE-17) .
- I/O Status Frame Data Field 4byte , 16bit
- Input , 16bit Output .
- 가 Register .

8.1

- Slave Device(ID : 2) I/O 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
h02	h03	h00	h1A	h00	h01	A5	FE

Response

Address	Function	Byte Count	INPUT 정보		OUTPUT 정보		CRC LO	CRC HI
			Register value	Register value	Register value	Register value		
			HI_H(108)	HI_L(108)	LO_H(108)	LO_L(108)		
h02	h03	h04	h02	h43	h00	H2B	79	40

⇒ INPUT Data(16bit) : 0x0243

⇒ OUTPUT Data(16bit) : 0x002B

8.2

8.2.1 16 bit (Input)

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	0	1	1
------------	---	---	---	---	---	---	---	---	---	---	---	---	---

1 : (GND24)

0 :

신호명칭	표시상태	동작내용
ALMRST	0	알람리셋 해제 기능 사용 안함
STOP	0	모터 정지 사용 안함
ESTOP	1	비상 정지 사용 안함
TLIM	0	아날로그 토크 제한 사용 안함
CWLIM	0	CW 방향 회전 불가능
CCWLIM	1	CCW 방향 회전 가능
PI/P	0	PI 제어로 동작함
DIR	0	지령 방향 회전
SPD3	0	내부 지령 속도 1 사용
SPD2	0	
SPD1	1	
SVONEN	1	서보 모터 구동 명령 중

8.2.2 16 bit (Output)

F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Don't care							A_CODE1	A_CODE0	ALARM	TRQOUT	RDY	ZSPD	INSPD	BRAKE	A_CODE2

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

1 :

0 :

신호명칭	표시상태	동작내용
A_CODE2	0	No Alarm Code, 정상 상태 임
A_CODE1	0	
A_CODE0	0	
ALARM	1	No Alarm, 정상 상태 임
TRQOUT	0	토크 제한 중이 아님
RDY	1	No Alarm, Power Good, 서보 Ready 상태임
ZSPD	0	모터 정지 상태가 아님
INSPD/INPOS	1	지령 속도 또는 지령 위치 도달 상태임
BRK	1	모터 Brake 해제 신호 출력 상태임

9. OPR Register

- CN1 Register
- I/O OPR CMD P01-17 '1' 가
- Frame 32bit , 16 bit Don't care
- 16 bit bit Table
- 가 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	0
Don't care				ALARM/CLR	STOP/START	ESTOP	TLIM	CWLIM	CCWLIM	P/PI	DIR	SPD3	SDP2	SPD1	SVONEN
Don't Care				1	1	0	1	0	0	1	1	1	1	0	1

⇒ , I/O OPR CMD 0x0D3D 가

Request

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HLH.	Register Value HLL.	Register Value LO_H.	Register Value LO_L.	CRC Lo.	CRC Hi.
h02	h06	h07	hD0	h00	h00	h0D	h3D	hA2	hF6

Response : Request echo .

Address	Function	Starting Address HI.	Starting Address LO.	Register Value HLH.	Register Value HLL.	Register Value LO_H.	Register Value LO_L.	CRC Lo.	CRC Hi.
h02	h06	h07	hD0	h00	h00	h0D	h3D	hA2	hF6

9.2 OPR CMD

- I/O OPR CMD CN1 .
- I/O CN1 .
- P1-17 'Serial I/O' '0' -> '1' .
- 가 .

10. FDA7000 Address Map

10.1

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

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

40201	0x00C8	*	P02-01	INT	Control Mode	R/W	1	0	5	-
40202	0x00C9		P02-02	Float	Mode Change Time	R/W	500.0	100	10000	ms
40203	0x00CA		P02-03	Float	CCW TRQ LMT	R/W	300.0	0	300	%
40204	0x00CB		P02-04	Float	CW TRQ LMT	R/W	-300.0	-300	0	%
40205	0x00CC		P02-05	Float	CCW Speed Limit	R/W	3000.0	0	6000	rpm
40206	0x00CD		P02-06	Float	CW Speed Limit	R/W	-3000.0	-6000	0	rpm
40207	0x00CE		P02-07	Float	Brake Speed	R/W	50.0	0	9999.9	rpm
40208	0x00CF		P02-08	Float	Brake Time	R/W	50.0	0	10000	ms
40209	0x00D0		P02-09	INT	DB Mode	R/W	2	0	3	-
40210	0x00D1		P02-10	INT	Notch Filter1	R/W	0	0	2	-
40211	0x00D2		P02-11	Float	NF Frequency1	R/W	300.0	50	2000	Hz
40212	0x00D3		P02-12	Float	NF Bandwidth1	R/W	95.0	10	99.9	%
40213	0x00D4		P02-13	INT	Notch Filter2	R/W	0	0	1	-
40214	0x00D5		P02-14	Float	NF Frequency2	R/W	500.0	50	2000	Hz
40215	0x00D6		P02-15	Float	NF Bandwidth2	R/W	95.0	10	99.9	%
40216	0x00D7		P02-16	Float	TRQ Filter TC	R/W	1.3	0	1000	ms
40217	0x00D8		P02-17	INT	Auto Tuning	R/W	0	0	1	-
40218	0x00D9		P02-18	INT	System Response	R/W	7	1	19	-
40219	0x00DA		P02-19	Float	Inertia Ratio	R/W	2.0	1	50	-
40220	0x00DB		P02-20	Float	Gain ADJ Speed1	R/W	800.0	100	5000	rpm
40221	0x00DC		P02-21	Float	Gain ADJ Speed2	R/W	100.0	10	500	rpm
40222	0x00DD		P02-22	Float	Gain ADJ TRQ1	R/W	150.0	50	300	%
40223	0x00DE		P02-23	Float	Gain ADJ TRQ2	R/W	50.0	0	300	%
40224	0x00DF		P02-24	Float	Contact Gain TC	R/W	100.0	0	10000	ms
40225	0x00E0		P02-25	INT	Temporary Stop	R/W	0(off)	0	1	-
40226	0x00E1		P02-26	INT	Emergency Stop	R/W	0(off)	0	1	-
40227	0x00E2		P02-27	INT	Direction Select	R/W	0(off)	0	1	-
40228	0x00E3		P02-28	INT	Ripple COMPEN	R/W	0(off)	0	1	-
40229	0x00E4	*	P02-29	INT	Parameter INIT	R/W	0(off)	0	1	-

40301	0x012C	*	P03-01	INT	Speed Gain Mode	R/W	1	1	5	-
40302	0x012D		P03-02	Float	PI-IP Control %	R/W	100.0	0	100	%
40303	0x012E		P03-03	Float	Friction COMPEN	R/W	0.0	0	100	%
40304	0x012F		P03-04	Float	Load COMPEN	R/W	0.0	0	100	%
40305	0x0130		P03-05	Float	SC Loop Gain1	R/W	30.0	0	1000	Hz
40306	0x0131		P03-06	Float	SC TC1	R/W	30.0	0	10000	ms
40307	0x0132		P03-07	Float	SC Loop Gain2	R/W	35.0	0	1000	Hz
40308	0x0133		P03-08	Float	SC TC2	R/W	25.0	0	10000	ms
40309	0x0134		P03-09	Float	Analog CMD TC	R/W	0.0	0	2000	ms
40310	0x0135		P03-10	Float	ACCEL Time	R/W	0.0	0	90000	ms
40311	0x0136		P03-11	Float	DECEL Time	R/W	0.0	0	90000	ms
40312	0x0137	*	P03-12	Float	S-Mode TC	R/W	0.0	0	9000	ms
40313	0x0138		P03-13	Float	In Speed Range	R/W	10.0	0	9999.9	rpm

40314	0x0139		P03-14	Float	Zero Speed Range	R/W	10.0	0	9999.9	rpm
40315	0x013A	*	P03-15	Float	Analog +10[V] RPM	R/W	1500.0	0	9999.9	rpm
40316	0x013B	*	P03-16	Float	Analog -10[V] RPM	R/W	-1500.0	-9999.9	0	rpm
40317	0x013C		P03-17	INT	Auto Offset	R/W	0(off)	0	1	-
40318	0x013D		P03-18	Float	Manual Offset	R/W	0.0	-1000	1000	mV
40319	0x013E	*	P03-19	INT	Override ENB	R/W	0(off)	0	1	-
40320	0x013F		P03-20	INT	Clamp Mode	R/W	0	0	2	-
40321	0x0140		P03-21	Float	Clamp Voltage	R/W	0.0	-1000	1000	mV
40322	0x0141	*	P03-22	Float	F/Back TC	R/W	0.0	0	2000	ms
40323	0x0142		P03-23	Float	Zero SPD VIB REJ	R/W	0.1	0	1000	rpm
40324	0x0143	*	P03-24	INT	Feedforward TRQ	R/W	0	0	2	-

40401	0x0190		P04-01	Float	Spded1	R/W	10.0	-9999.9	9999.9	rpm
40402	0x0191		P04-02	Float	Speed2	R/W	100.0	-9999.9	9999.9	rpm
40403	0x0192		P04-03	Float	Speed3	R/W	200.0	-9999.9	9999.9	rpm
40404	0x0193		P04-04	Float	Speed4	R/W	500.0	-9999.9	9999.9	rpm
40405	0x0194		P04-05	Float	Speed5	R/W	1000.0	-9999.9	9999.9	rpm
40406	0x0195		P04-06	Float	Speed6	R/W	2000.0	-9999.9	9999.9	rpm
40407	0x0196		P04-07	Float	Speed7	R/W	3000.0	-9999.9	9999.9	rpm
40408	0x0197		P04-08	Float	Torque1	R/W	0.0	-300	300	%
40409	0x0198		P04-09	Float	Torque2	R/W	2.0	-300	300	%
40410	0x0199		P04-10	Float	Torque3	R/W	20.0	-300	300	%
40411	0x019A		P04-11	Float	Torque4	R/W	50.0	-300	300	%
40412	0x019B		P04-12	Float	Torque5	R/W	75.0	-300	300	%
40413	0x019C		P04-13	Float	Torque6	R/W	100.0	-300	300	%
40414	0x019D		P04-14	Float	Torque7	R/W	120.0	-300	300	%

40501	0x01F4	*	P05-01	INT	POS Gain Mode	R/W	1	1	5	-
40502	0x01F5	*	P05-02	INT	POS Pulse Type	R/W	1	0	5	-
40503	0x01F6		P05-03	INT	Speed Mode	R/W	0(off)	0	1	-
40504	0x01F7		P05-04	Float	Feedforward	R/W	0.0	0	100	%
40505	0x01F8		P05-05	Float	PC P Gain1	R/W	30.0	0	500	Hz
40506	0x01F9		P05-06	Float	PC P Gain2	R/W	35.0	0	500	Hz
40507	0x01FA		P05-07	INT	PI-P Pulse ERR	R/W	0	0	99999	pulse
40508	0x01FB		P05-08	INT	IN Position	R/W	100	0	99999	pulse
40509	0x01FC		P05-09	INT	Follow ERR	R/W	30000	0	99999	pulse
40510	0x01FD		P05-10	Float	POS CMD TC	R/W	0.0	0	2000	ms
40511	0x01FE		P05-11	Float	FF TC	R/W	0.0	0	2000	ms
40512	0x01FF	*	P05-12	INT	ELCTR Gear NUM1	R/W	1	1	99999	-
40513	0x0200	*	P05-13	INT	ELCTR Gear DEN1	R/W	1	1	99999	-
40514	0x0201	*	P05-14	INT	ELCTR Gear NUM2	R/W	1	1	99999	-

40515	0x0202	*	P05-15	INT	ELCTR Gear DEN2	R/W	2	1	99999	-
40516	0x0203	*	P05-16	INT	ELCTR Gear NUM3	R/W	1	1	99999	-
40517	0x0204	*	P05-17	INT	ELCTR Gear DEN3	R/W	4	1	99999	-
40518	0x0205	*	P05-18	INT	ELCTR Gear NUM4	R/W	1	1	99999	-
40519	0x0206	*	P05-19	INT	ELCTR Gear DEN4	R/W	8	1	99999	-
40520	0x0207		P05-20	Float	Bias SPD COMPEN	R/W	0.0	-1000	1000	rpm
40521	0x0208		P05-21	INT	Bias Pulse Band	R/W	10	0	500	pulse
40522	0x0209		P05-22	INT	Backlash Pulse	R/W	0	0	99999	pulse

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

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

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

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

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

◆ Operating Address

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

◆ Alarm Address

Address		메뉴	Data Type	메뉴명(변수명)	속성	초기치	Min	Max	단위
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		메뉴	Data Type	메뉴명(변수명)	속성	초기치	Min	Max	단위
42201	0x0898	-	-	JOG ON	W	-	-	-	-
42202	0x0899	-	-	JOG OFF	W	-	-	-	-
42203	0x089A	-	-	역회전(CW)	W	-	-	-	-
42204	0x089B	-	-	정회전(CCW)	W	-	-	-	-
42205	0x089C	-	-	정지(Stop)	W	-	-	-	-

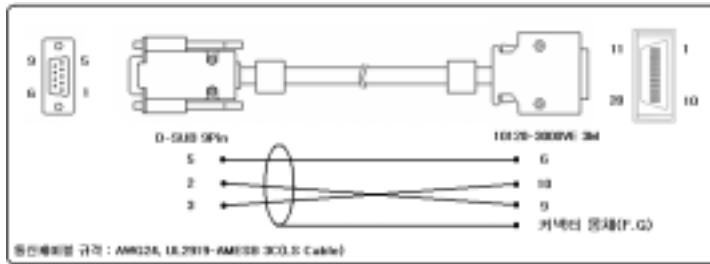
PARAMETER

FDA7000

11. APPENDIX

11.1 Appendix A : Serial Communication Cable

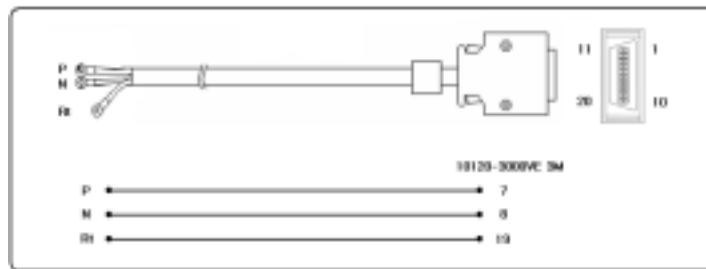
11.1.1 RS232C Channel



[PC Serial Port]

[Servo DRV_CN3 CON.]

11.1.2 RS485 Channel

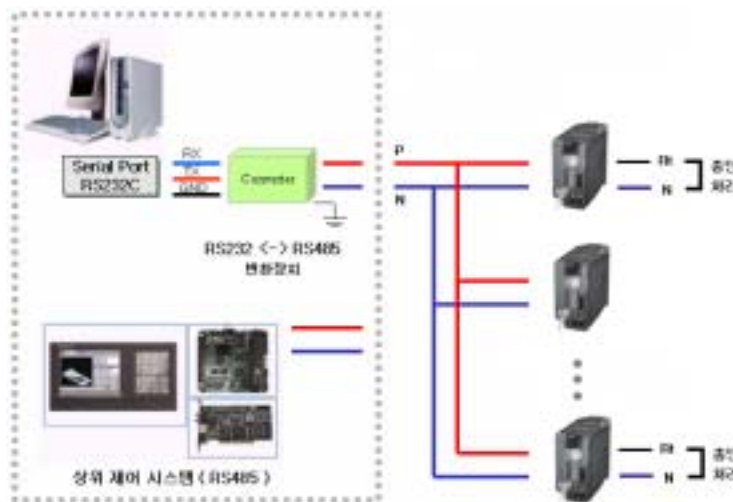


[Upper System]

[Servo DRV_CN3 CON.]

- 1) Rt N Short()
- 2) (120)
- 3) 가 Rt

- RS485 Network



- MEMO -