posco
포스코DX

PosDrive NX Series

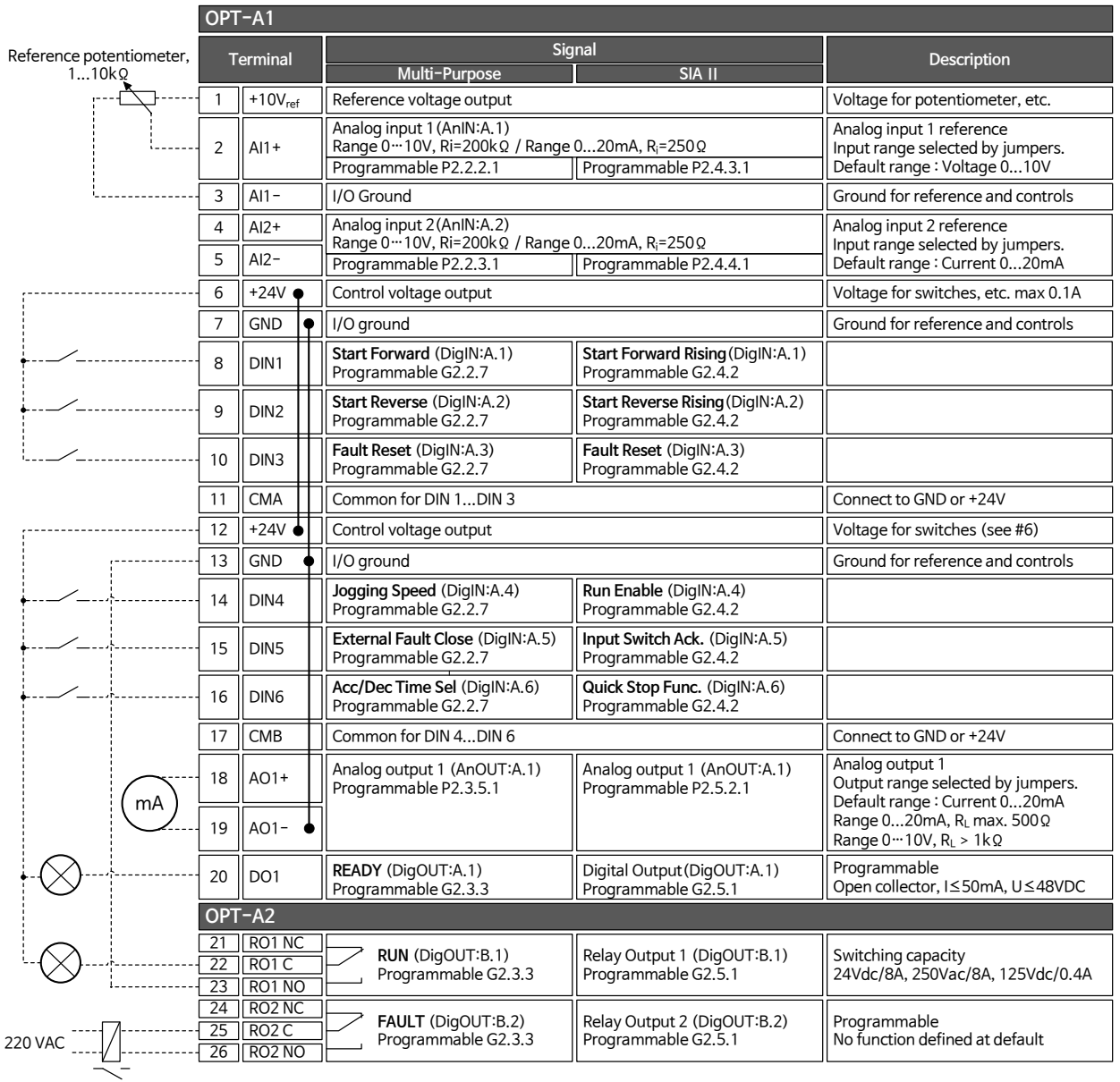
PosDrive Option Board 사용자 매뉴얼

작성 : '23.03.16

〈목 차〉

1. Standard I/O Board (OPT-A1, OPT-A2)

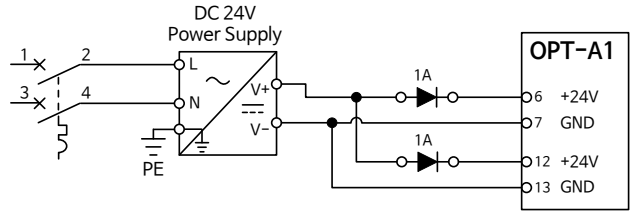
■ Terminal Description



Terminal		Signal: Multi-Purpose	Signal: SIA II	Description
OPT-A1				
1	+10V$_{ref}$	Reference voltage output		Voltage for potentiometer, etc.
2	AI1+	Analog input 1 (AnIN:A.1) Range 0…10V, Ri=200kΩ / Range 0...20mA, R_i=250Ω Programmable P2.2.2.1	Programmable P2.4.3.1	Analog input 1 reference Input range selected by jumpers. Default range : Voltage 0...10V
3	AI1-	I/O Ground		Ground for reference and controls
4	AI2+	Analog input 2 (AnIN:A.2) Range 0…10V, Ri=200kΩ / Range 0...20mA, R_i=250Ω		Analog input 2 reference Input range selected by jumpers. Default range : Current 0...20mA
5	AI2-	Programmable P2.2.3.1	Programmable P2.4.4.1	
6	+24V	Control voltage output		Voltage for switches, etc. max 0.1A
7	GND	I/O ground		Ground for reference and controls
8	DIN1	**Start Forward** (DigIN:A.1) Programmable G2.2.7	**Start Forward Rising** (DigIN:A.1) Programmable G2.4.2	
9	DIN2	**Start Reverse** (DigIN:A.2) Programmable G2.2.7	**Start Reverse Rising** (DigIN:A.2) Programmable G2.4.2	
10	DIN3	**Fault Reset** (DigIN:A.3) Programmable G2.2.7	**Fault Reset** (DigIN:A.3) Programmable G2.4.2	
11	CMA	Common for DIN 1...DIN 3		Connect to GND or +24V
12	+24V	Control voltage output		Voltage for switches (see #6)
13	GND	I/O ground		Ground for reference and controls
14	DIN4	**Jogging Speed** (DigIN:A.4) Programmable G2.2.7	**Run Enable** (DigIN:A.4) Programmable G2.4.2	
15	DIN5	**External Fault Close** (DigIN:A.5) Programmable G2.2.7	**Input Switch Ack.** (DigIN:A.5) Programmable G2.4.2	
16	DIN6	**Acc/Dec Time Sel** (DigIN:A.6) Programmable G2.2.7	**Quick Stop Func.** (DigIN:A.6) Programmable G2.4.2	
17	CMB	Common for DIN 4...DIN 6		Connect to GND or +24V
18	AO1+	Analog output 1 (AnOUT:A.1) Programmable P2.3.5.1	Analog output 1 (AnOUT:A.1) Programmable P2.5.2.1	Analog output 1 Output range selected by jumpers. Default range : Current 0...20mA Range 0...20mA, R_L max. 500Ω Range 0…10V, R_L > 1kΩ
19	AO1-			
20	DO1	**READY** (DigOUT:A.1) Programmable G2.3.3	Digital Output (DigOUT:A.1) Programmable G2.5.1	Programmable Open collector, I≤50mA, U≤48VDC
OPT-A2				
21	RO1 NC	**RUN** (DigOUT:B.1) Programmable G2.3.3	Relay Output 1 (DigOUT:B.1) Programmable G2.5.1	Switching capacity 24Vdc/8A, 250Vac/8A, 125Vdc/0.4A
22	RO1 C			
23	RO1 NO			
24	RO2 NC	**FAULT** (DigOUT:B.2) Programmable G2.3.3	Relay Output 2 (DigOUT:B.2) Programmable G2.5.1	Programmable No function defined at default
25	RO2 C			
26	RO2 NO			

■ Control Power (DC 24V) 별도 공급 방법

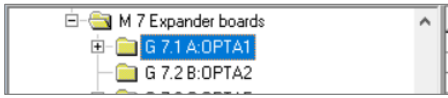
1. Main 전원이 Drive에 인가되면 DC Charge에 의해 자체 Control Power가 만들어 진다.
2. 또한 Main 전원 투입 前 Parameter 설정 작업 등을 고려하여 별도의 Control Power를 공급할 수 있다. (Diode 추가 설치 필요)



■ Digital Input 값 Keypad에서 Monitoring

Application	Index	Name	ID
Multi-Purpose	V1.13	DIN1, DIN2, DIN3	15
	V1.14	DIN4, DIN5, DIN6	16
SIA II	V1.19	DIN1, DIN2, DIN3	15
	V1.20	DIN4, DIN5, DIN6	16

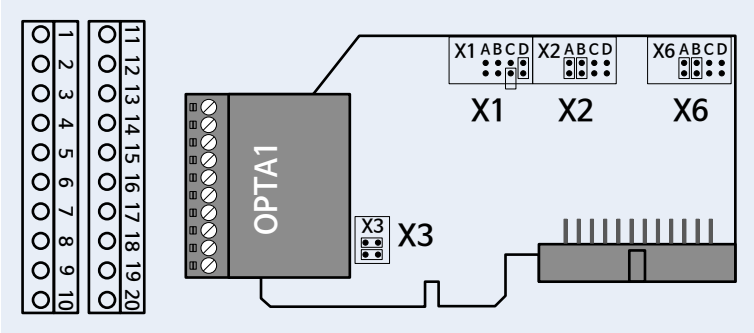
2. OPT-A1 Board (Standard I/O Board)



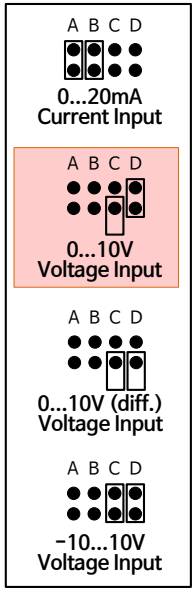
Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.1.1.1	AI1 mode	3 / 0...10V	3 / 0...10V		1	5	
P 7.1.1.2	AI2 mode	1 / 0...20mA	1 / 0...20mA		1	5	
P 7.1.1.3	AO1 mode	1 / 0...20mA	1 / 0...20mA		1	4	

장착가능 Slot	A

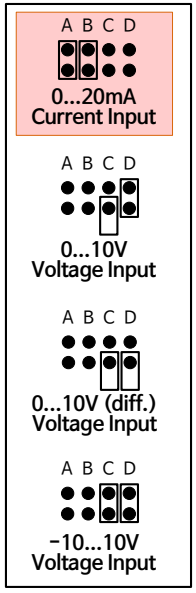
■ Terminal & Jumper 설정



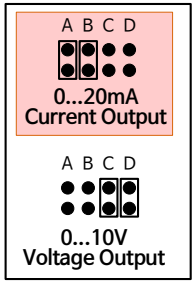
X1 : AI1 mode



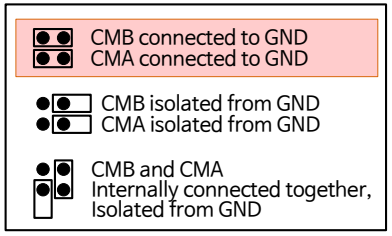
X2 : AI2 mode



X6 : AO1 mode



X3 : CMA and CMB grounding



= Factory default

■ Parameter 설정

※ 사용되는 Analog Input/Output 사양을 확인한 후,
Jumper(X1, X2, X6) 및 해당 Parameter를 일치되도록 설정 해야 한다.

Index	Parameter	Min	Max	Default	Note
P7.1.1.1	AI1 mode	1	5	3	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V 5 = -10...+10V
P7.1.1.2	AI2 mode	1	5	1	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V 5 = -10...+10V
P7.1.1.3	AO1 mode	1	4	1	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V

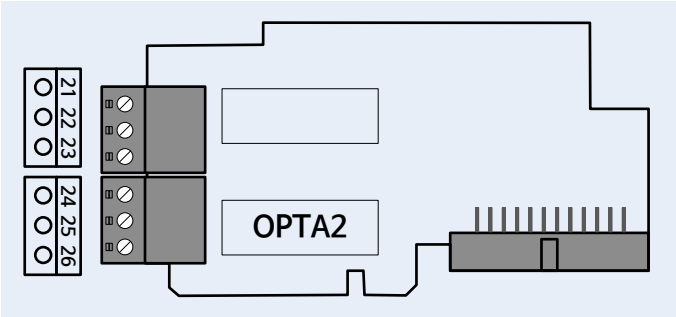
■ AI1, AI2, AO1 값 Keypad에서 Monitoring

구분	Application	Index	Name	Note	ID
AI1	Multi-Purpose	V1.11	Analog Input 1	V/mA	13
		V1.21.16		0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	59
	SIA II	V1.11			13
AI2	Multi-Purpose	V1.12	Analog Input 2	V/mA	14
		V1.21.17		0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	60
	SIA II	V1.12			14
AO1	Multi-Purpose	V1.15	Analog Out 1	0%(0mA/0V)~100%(20mA/10V)	26
	SIA II	V1.15			26

3. OPT-A2 Board (Standard I/O Board)

※ 2 x **Relay Out** (NO/NC)

장착가능 Slot	B

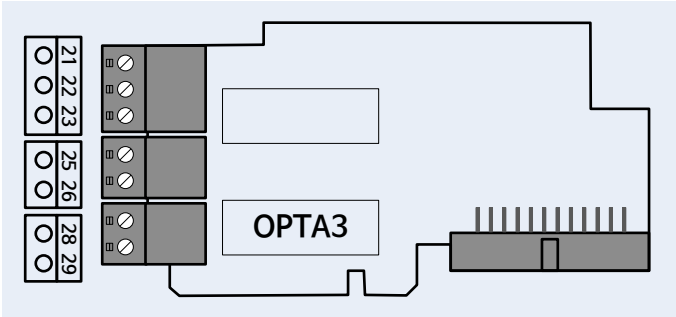


Terminal		Parameter reference Keypad	Technical information
21 22 23	RO1/NC RO1/COM RO1/NO	DigOUT:B.1	**Relay output 1** (NO/NC) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
24 25 26	RO2/NC RO2/COM RO2/NO	DigOUT:B.2	**Relay output 2** (NO/NC) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA

4. OPT-A3 Board

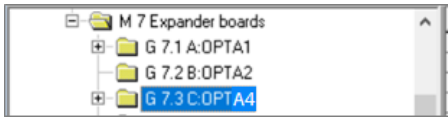
※ 1 x **Relay Out** (NO/NC)
1 x **Relay Out** (NO)
1 x **Thermistor** (R_{trip} = 4kΩ PTC)

장착가능 Slot	B



Terminal		Parameter reference Keypad	Technical information
21 22 23	RO1/NC RO1/COM RO1/NO	DigOUT:B.1	**Relay output 1** (NO/NC) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
25 26	RO2/COM RO2/NO	DigOUT:B.2	**Relay output 2** (NO) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
28 29	TI1+ TI1-	DigIN:B.1	Thermistor input; R_{trip} = 4kΩ (PTC) * 센서 미연결시 단락 필요

5. OPT-A4 Board (TTL Type Incremental Encoder Sensing Board)

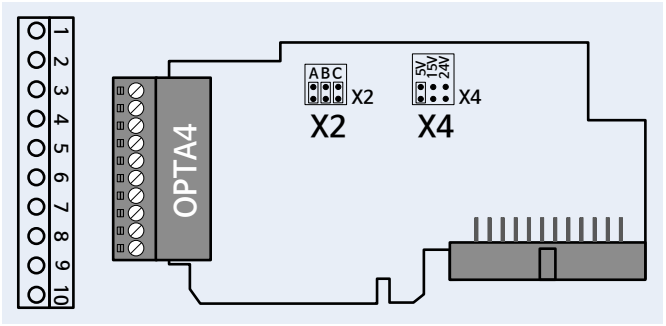


Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.3.1.1	Pulse revolution	1024	1024		0	65535	
P 7.3.1.2	Invert direction	0 / No	0 / No		0	1	
P 7.3.1.3	Reading rate	1 / 1 ms	1 / 1 ms		0	4	
P 7.3.1.4	Encoder type	1 / A,B=Speed	1 / A,B=Speed		1	3	

장착가능 Slot	C

- 사용되는 Encoder 사양과 동일하게 Jumper 위치 설정 및 Parameter를 설정한다.

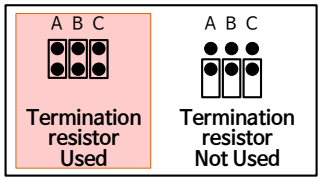
■ Terminal & Jumper 설정



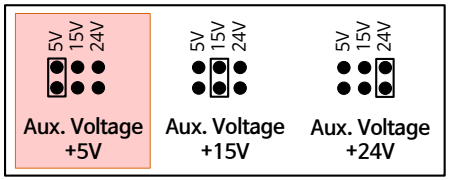
Terminal		Description
1	DIC1A+	Pulse input A
2	DIC1A-	
3	DIC2B+	Pulse input B
4	DIC2B-	
5	DIC3Z+	Pulse input Z
6	DIC3Z-	
7	ENC1Q	Reserved
8	DIC4	Reserved
9	GND	Ground for control
10	+5V/+15V/ +24V	Control voltage output to PLG Output voltage selectable with jumper X4

※ Max. input frequency ≤ 150kHz
Max. load per encoder input I_{low} = I_{high} ≒ 25mA
Termination Resistor R=135Ω

X2 : Termination Resistor



X4 : Auxiliary Voltage level



= Factory default

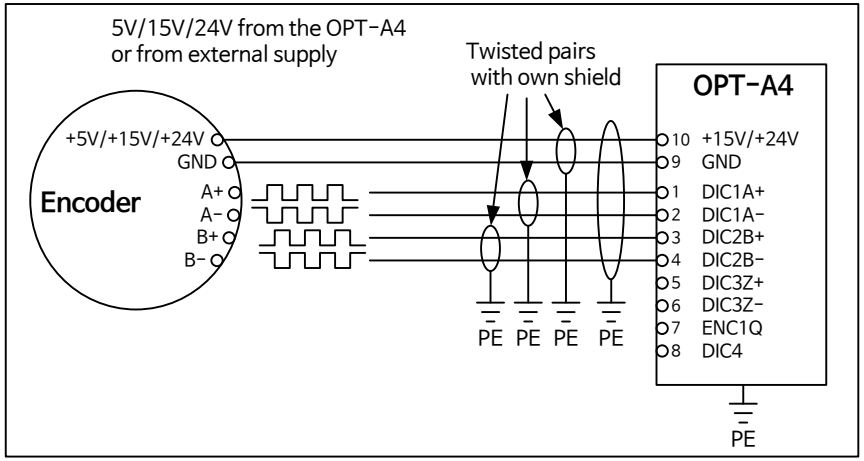
■ Parameter 설정

Parameter		Note
P7.3.1.1	Pulse revolution	Encoder의 pulse revolution
P7.3.1.2	Invert direction	Direction change 0 / No, 1 / Yes
P7.3.1.3	Reading rate	Speed actual value 계산 시간 0 / No, 1 / 1ms, 2 / 5ms, 3 / 10ms, 4 / 50ms **(Closed loop control에서는 1 / 1ms 사용)**
P7.3.1.4	Encoder type	1 / A,B=speed, 2 / A=REF,B=Dir, 3 / A=FORW,B=REV **(Closed loop control에서는 1 / A,B=speed 사용)**

■ 센싱된 Encoder 값 Keypad에서 Monitoring

Application	Index	Name	Note	ID No.
Multi-Purpose	V1.21.5	Encoder 1 freq	[Hz]	1124
	V1.21.6	Shaft Rounds	회전수	1170
	V1.21.7	Shaft Angle	Rotor 회전 각도 [Dec]	1169
SIA II	V1.24.5	Shaft Frequency	[Hz], 필터링 값	96
	V1.24.6	Encoder 1 freq	[Hz]	1164
	V1.25.20	Shaft Rounds	회전수	1170
	V1.25.21	Shaft Angle	Rotor 회전 각도 [Dec]	1169
	V1.28.9	Speed Measured	[rpm]	1124

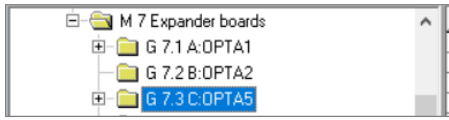
■ Encoder Connection



NOTE :

1) Shield의 순환전류 방지를 위해 접지는 AC 드라이브에서만 연결
2) Encoder에서 Shield 분리
3) Cable은 이중 차폐 케이블을 사용 권장

6. OPT-A5 Board (HTL Type Incremental Encoder Sensing Board)

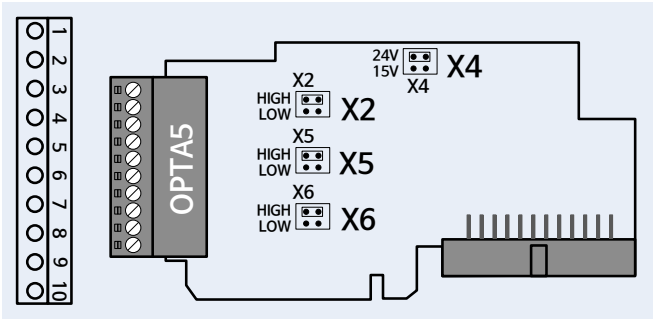


Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.3.1.1	Pulse revolution	1024	1024		0	65535	
P 7.3.1.2	Invert direction	0 / No	0 / No		0	1	
P 7.3.1.3	Reading rate	1 / 1 ms	1 / 1 ms		0	4	
P 7.3.1.4	Encoder type	1 / A,B=Speed	1 / A,B=Speed		1	3	

장착가능 Slot	C

- 사용되는 Encoder 사양과 동일하게 Jumper 위치 설정 및 Parameter를 설정한다.

■ Terminal & Jumper 설정



X4 : Aux. voltage level

24V ●● 15V ● ●	24V ● ● 15V ●●
Aux. voltage : +24V	**Aux. voltage : +15V**

= Factory default

X2, X5, X6 : PLG voltage level

HIGH ●● LOW ● ●	HIGH ● ● LOW ●●

HIGH : 신호레벨이 8V 보다 크면 펄스로 인식
LOW : 신호레벨이 2.3V 보다 크면 펄스로 인식

Terminal		Description
1	DIC1A+	Pulse input A (differential) : 10~24V
2	DIC1A-	
3	DIC2B+	Pulse input B (differential) : 10~24V
4	DIC2B-	
5	DIC3Z+	Pulse input Z (differential) : 10~24V
6	DIC3Z-	
7	ENC1Q	Reserved
8	DIC4	Reserved
9	GND	Ground for control
10	+15V/+24V	Control voltage output to PLG Output voltage selectable with jumper X4

※ Max. input frequency ≤ 150kHz

■ Parameter 설정

Parameter		Note
P7.3.1.1	Pulse revolution	Encoder의 pulse revolution
P7.3.1.2	Invert direction	Direction change 0 / No, 1 / Yes
P7.3.1.3	Reading rate	Speed actual value 계산 시간 0 / No, 1 / 1ms, 2 / 5ms, 3 / 10ms, 4 / 50ms **(Closed loop control에서는 1 / 1ms 사용)**
P7.3.1.4	Encoder type	1 / A,B=speed, 2 / A=REF,B=Dir, 3 / A=FORW,B=REV **(Closed loop control에서는 1 / A,B=speed 사용)**

■ 센싱된 Encoder 값 Keypad에서 Monitoring

Application	Index	Name	Note	ID No.
Multi-Purpose	V1.21.5	Encoder 1 freq	[Hz]	1124
	V1.21.6	Shaft Rounds	회전수	1170
	V1.21.7	Shaft Angle	Rotor 회전 각도 [Dec]	1169
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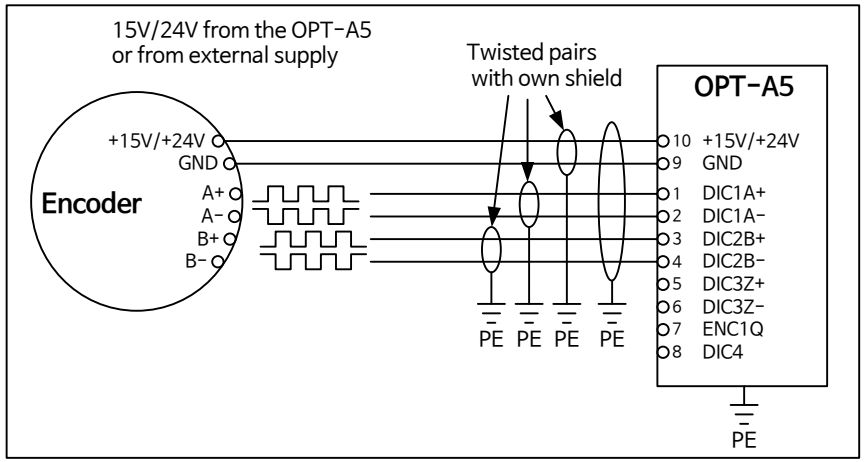
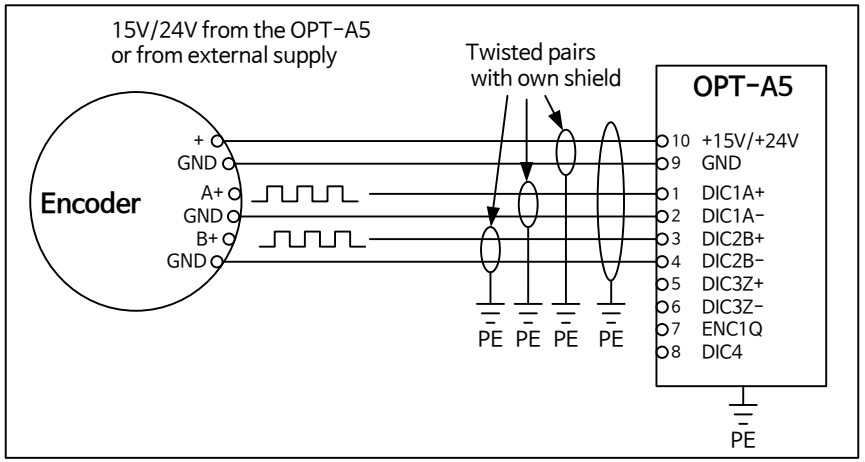
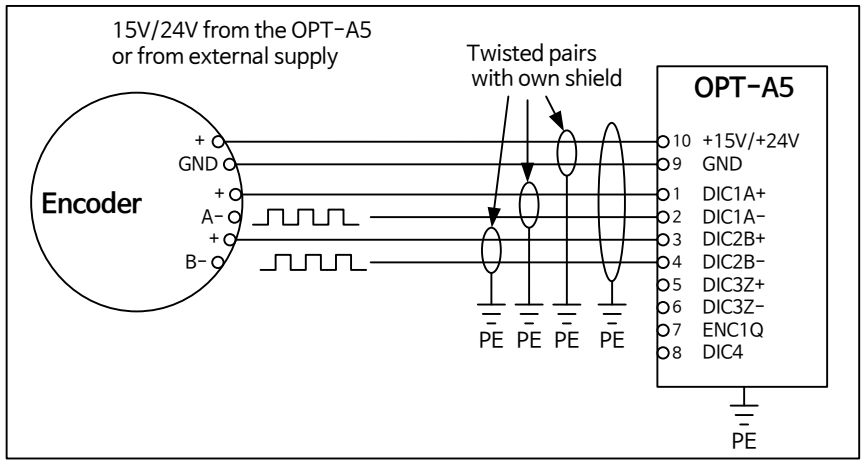
	V1.25.20	Shaft Rounds	회전수	1170
	V1.25.21	Shaft Angle	Rotor 회전 각도 [Dec]	1169
	V1.28.9	Speed Measured	[rpm]	1124

■ Encoder Connection



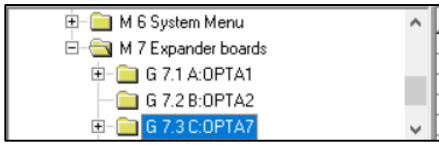




NOTE :

1) Shield의 순환전류 방지를 위해 접지는 AC 드라이브에서만 연결
2) Encoder에서 Shield 분리
3) Cable은 이중 차폐 케이블을 사용 권장

7. OPT-A7 Board (Double Encoder Sensing Board)

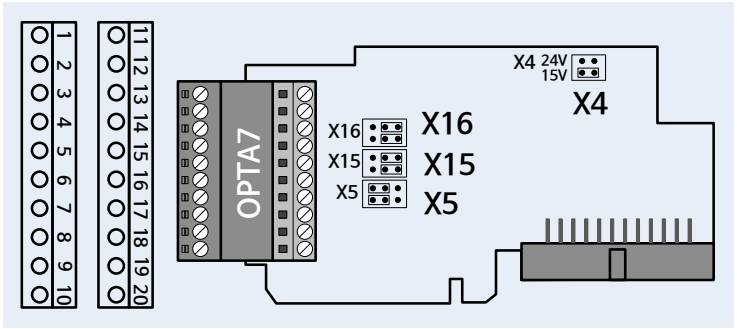


Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.3.1.1	Enc 1 Pulse/Rev	1024	1024		0	65535	
P 7.3.1.2	Invert Enc 1 dir	0 / No	0 / No		0	1	
P 7.3.1.3	Reading rate	1 / 1 ms	1 / 1 ms		0	4	
P 7.3.1.4	Enc 2 Pulse/Rev	1024	1024		0	65535	
P 7.3.1.5	Encoder 2 type	1 / A,B=Speed	1 / A,B=Speed		1	3	

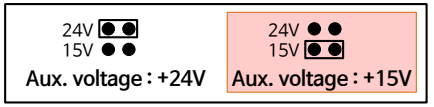
장착가능 Slot	C

- 사용되는 Encoder 사양과 동일하게 Jumper 위치 설정 및 Parameter를 설정한다.

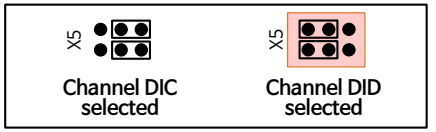
■ Terminal & Jumper 설정



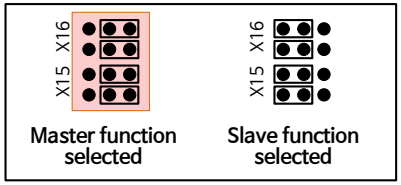
X4 : Aux. voltage level



X5 : Repeater Signal로 사용할 Channel 선택



X15, X16 : Master/Slave function 선택



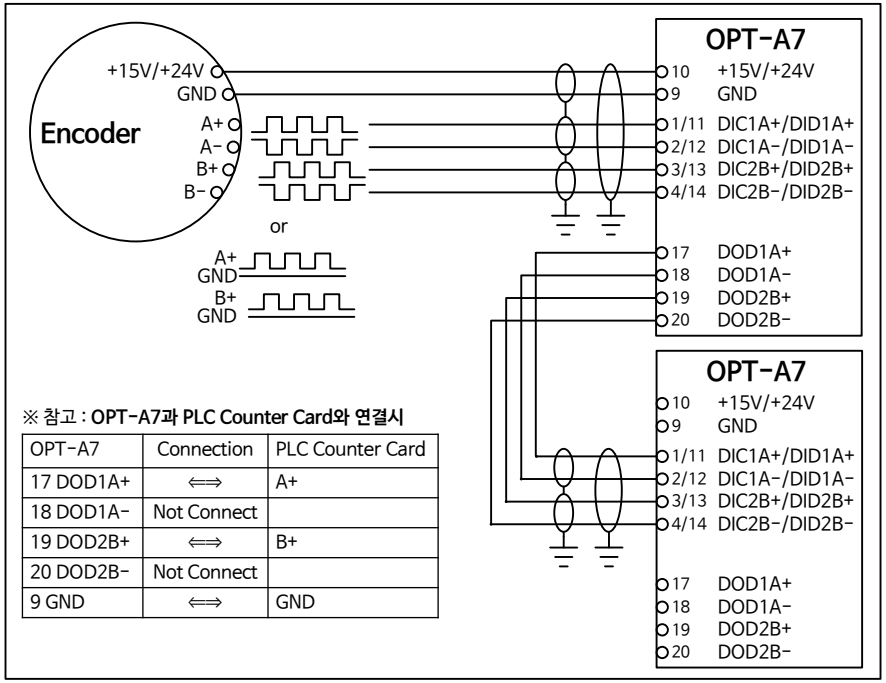
= Factory default

Terminal		Description
1	DIC1A+	Pulse input A (differential) : 10~24V
2	DIC1A-	
3	DIC2B+	Pulse input B (differential) : 10~24V
4	DIC2B-	
5	DIC3Z+	Pulse input Z (differential) : 10~24V
6	DIC3Z-	
7	ENC1Q	
8	ENC2Q	
9	GND	Ground for control
10	+15V/+24V	Control voltage output to PLG Output voltage selectable with Jump. X4

Terminal		Description
11	DID1A+	Pulse input A (differential) : 10~24V
12	DID1A-	
13	DID2B+	Pulse input B (differential) : 10~24V
14	DID2B-	
15	DID3Z+	Pulse input Z (differential) : 10~24V
16	DID3Z-	
17	DOD1A+	Pulse output A (differential) : +24V
18	DOD1A-	
19	DOD2B+	Pulse output B (differential) : +24V
20	DOD2B-	

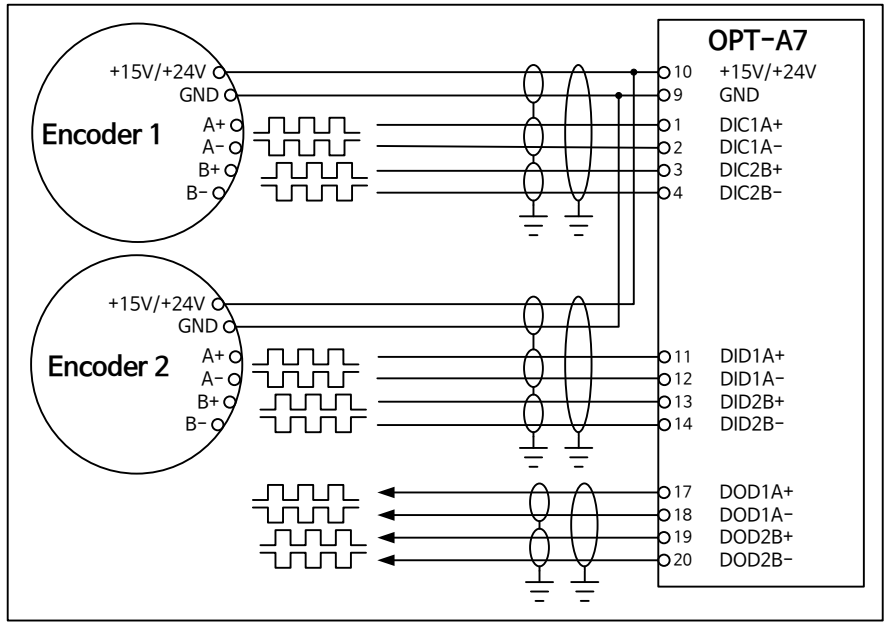
※ Max. input frequency ≤ 150kHz

■ Encoder Connection



※ 참고 : **OPT-A7과 PLC Counter Card와 연결시**

OPT-A7	Connection	PLC Counter Card
17 DOD1A+	⟺	A+
18 DOD1A-	Not Connect	
19 DOD2B+	⟺	B+
20 DOD2B-	Not Connect	
9 GND	⟺	GND



NOTE : 1) Shield의 순환전류 방지를 위해 접지는 AC 드라이브에서만 연결 2) Encoder에서 Shield 분리 3) Cable은 이중 차폐 케이블을 사용 권장

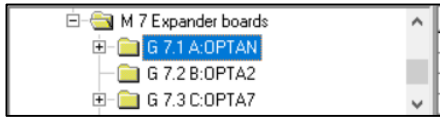
■ Parameter 설정

Parameter		Note
P7.3.1.1	Encoder 1 Pulse/rev.	Encoder 1의 pulse revolution
P7.3.1.2	Invert Encoder 1 dir	Direction change 0 / No, 1 / Yes
P7.3.1.3	Reading rate	Speed actual value 계산 시간 0 / No, 1 / 1ms, 2 / 5ms, 3 / 10ms, 4 / 50ms **(Closed loop control에서는 1 / 1ms 사용)**
P7.3.1.4	Encoder 2 Pulse/rev.	Encoder 2의 pulse revolution
P7.3.1.4	Encoder 2 type	1 / A,B=speed, 2 / A=REF,B=Dir, 3 / A=FORW,B=REV **(Closed loop control에서는 1 / A,B=speed 사용)**

■ 센싱된 Encoder 값 Keypad에서 Monitoring

Application	Index	Name	Note	ID No.
Multi-Purpose	V1.21.5	Encoder 1 freq	[Hz]	1124
	V1.21.6	Shaft Rounds	회전수	1170
	V1.21.7	Shaft Angle	Rotor 회전 각도 [Dec]	1169
	V1.21.11	Encoder 2 freq	[Hz]	53
SIA II	V1.24.5	Shaft Frequency	[Hz], 필터링 값	96
	V1.24.6	Encoder 1 freq	[Hz]	1164
	V1.25.20	Shaft Rounds	회전수	1170
	V1.25.21	Shaft Angle	Rotor 회전 각도 [Dec]	1169
	V1.28.9	Speed Measured	[rpm]	1124

8. OPT-AN Board (Standard I/O Board)

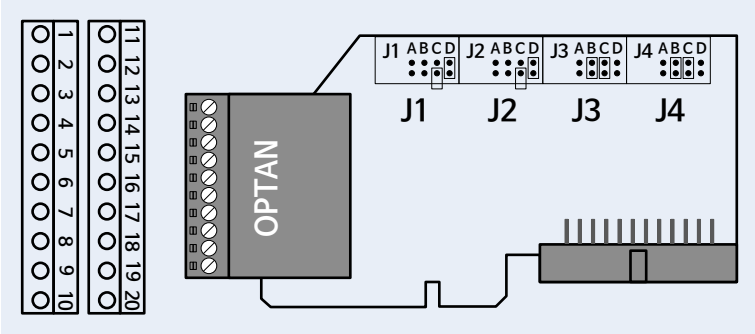


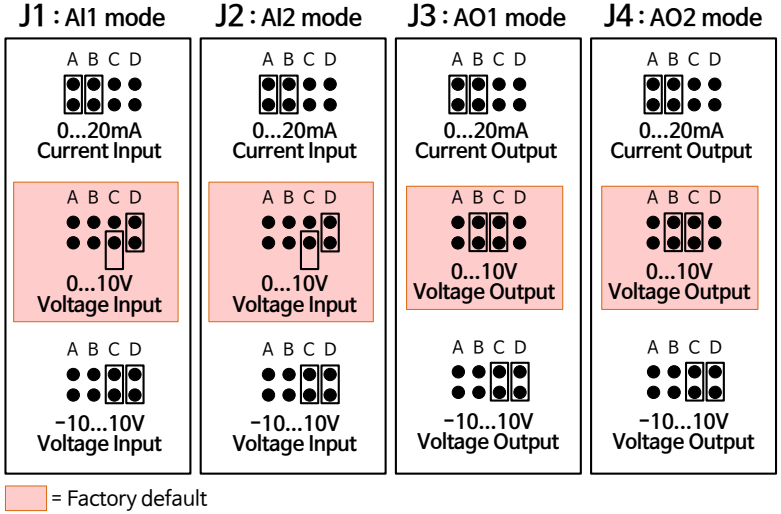
Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.1.1.1	AI1 mode	3 / 0...10V	3 / 0...10V		1	5	
P 7.1.1.2	AI2 mode	3 / 0...10V	3 / 0...10V		1	5	
P 7.1.1.3	AO1 mode	3 / 0...10V	3 / 0...10V		1	5	
P 7.1.1.4	AOA2 mode	3 / 0...10V	3 / 0...10V		1	5	

장착가능 Slot	A

※ 6 Digital Input + 2 Analog Input + **2 Analog Output(-10V...+10V 지원)**

■ Terminal & Jumper 설정





■ Parameter 설정

※ 사용되는 Analog Input/Output 사양을 확인한 후,
Jumper(X1, X2, X6) 및 해당 Parameter를 일치되도록 설정 해야 한다.

Index	Parameter	Min	Max	Default	Note
P7.1.1.1	AI1 mode	1	5	3	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V 5 = -10...+10V
P7.1.1.2	AI2 mode	1	5	3	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V 5 = -10...+10V
P7.1.1.3	AO1 mode	1	5	3	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V **5 = -10...+10V**
P7.1.1.4	**AO2 mode**	1	5	3	1 = 0...20mA 2 = 4...20mA 3 = 0...10V 4 = 2...10V **5 = -10...+10V**

■ AI1, AI2, AO1, AO2 값 Keypad에서 Monitoring

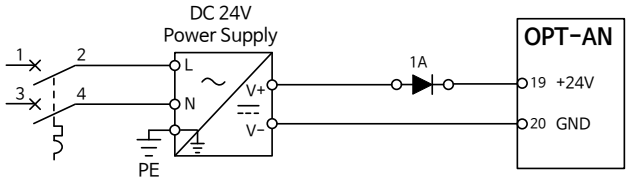
구분	Application	Index	Name	Note	ID
AI1	Multi-Purpose	V1.11	Analog Input 1	V/mA	13
		V1.21.16		0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	59
	SIA II	V1.11			13
AI2	Multi-Purpose	V1.12	Analog Input 2	V/mA	14
		V1.21.17		0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	60
	SIA II	V1.12			14
AO1	Multi-Purpose	V1.15	Analog Out 1	0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	26
	SIA II	V1.15			26
AO2	Multi-Purpose	V1.21.20	Analog Out 2	0%(0mA/0V)~100%(20mA/10V) -100%(-10V)~100%(10V)	31
	SIA II	V1.16			31

■ Terminal Description

Terminal		Parameter reference	Technical Information
1	AI1-	AnIN:A.1	AI1 : J1에 의해 V or mA 선택 (Default : 0...+10V, R_i=200kΩ) AI2 : J2에 의해 V or mA 선택 (Default : 0...+10V, R_i=200kΩ) -10V...+10V : for Joy-stick control 0...20mA (R_i=200Ω) Differential Input if not connected to ground : Allows ±20V differential mode voltage to GND
2	AI1+		
3	AI2-	AnIN:A.2	
4	AI2+		
5	-10V_POT_REF		-10V reference voltage 10mA
6	GND POT COM		Common for POT
7	+10V_POT_REF		+10V reference voltage 10mA
8	AO1+	AnOUT:A.1	AO1 : J3에 의해 V or mA 선택 (Default : 0...+10V, R_L>1kΩ) AO2 : J4에 의해 V or mA 선택 (Default : 0...+10V, R_L>1kΩ) Current : 0(4)...20mA, R_L max 500Ω Voltage : 0...+10V, R_L>1kΩ or -10...+10V, R_L>1kΩ Resolution : 0.1% (10 bits) Accuracy ±2%
9	GND AO COM		
10	AO2+	AnOUT:A.2	
11	DIN1	DigIN:A.1	Digital input 1 (Common DI COM) ; R_i= min. 5kΩ
12	DIN2	DigIN:A.2	Digital input 2 (Common DI COM) ; R_i= min. 5kΩ
13	DIN3	DigIN:A.3	Digital input 3 (Common DI COM) ; R_i= min. 5kΩ
14	DIN4	DigIN:A.4	Digital input 4 (Common DI COM) ; R_i= min. 5kΩ
15	DIN5	DigIN:A.5	Digital input 5 (Common DI COM) ; R_i= min. 5kΩ
16	DIN6	DigIN:A.6	Digital input 6 (Common DI COM) ; R_i= min. 5kΩ
17	DI COM		DI COM isolated from GND
18	DI COM		DI COM isolated from GND
19	24V out (bi-directional)		24V auxiliary voltage output. Short-circuit protected ±15%, maximum current 150mA +24Vdc external supply may be connected
20	GND 24V COM		Ground for reference and controls

■ Control Power(DC 24V) 별도 공급 방법

1. Main 전원이 Drive에 인가되면 DC Charge에 의해 자체 Control Power가 만들어 진다.
2. 또한 Main 전원 투입 前 Parameter 설정 작업 등을 고려하여 별도의 Control Power를 공급할 수 있다. (Diode 추가 설치 필요)



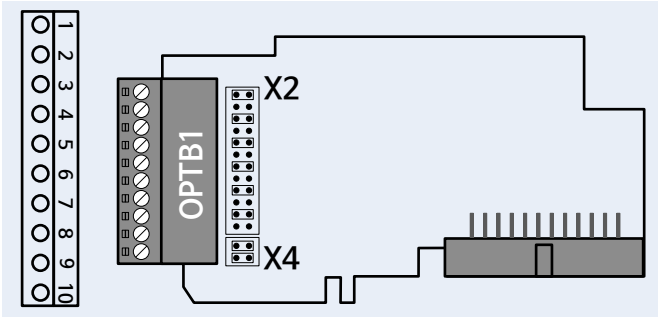
■ Digital Input 값 Keypad에서 Monitoring

Application	Index	Name	ID
Multi-Purpose	V1.13	DIN1, DIN2, DIN3	15
	V1.14	DIN4, DIN5, DIN6	16
SIA II	V1.19	DIN1, DIN2, DIN3	15
	V1.20	DIN4, DIN5, DIN6	16

9. OPT-B1 Board (Selectable Digital I/O Board)

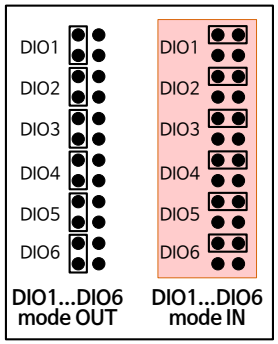
※ Selectable 6 x Digital In/Out

장착가능 Slot	B, C, D, E

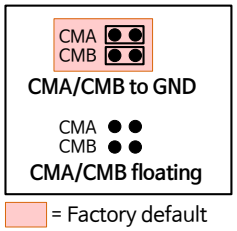


Terminal		Parameter reference	Technical Information
1	DIO1	DigIN:X.1/DigOUT:X.1	**Digital Input** : 24V, R_i>5kΩ **Digital Output** : Open collector, 50mA/48V
2	DIO2	DigIN:X.2/DigOUT:X.2	
3	DIO3	DigIN:X.3/DigOUT:X.3	
4	CMA		Common for DIO1...DIO3
5	DIO4	DigIN:X.4/DigOUT:X.4	**Digital Input** : 24V, R_i>5kΩ **Digital Output** : Open collector, 50mA/48V
6	DIO5	DigIN:X.5/DigOUT:X.5	
7	DIO6	DigIN:X.6/DigOUT:X.6	
8	CMB		Common for DIO4...DIO6
9	GND		I/O ground
10	+24V		Control voltage output max. current 150mA, Short-circuit protected

X2 : DIO mode



X4 : CMA and CMB to GND

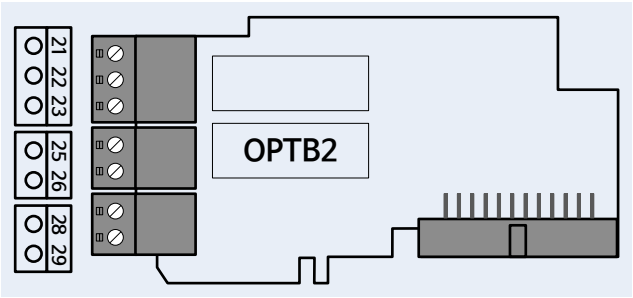


= Factory default

10. OPT-B2 Board

※ 1 x **Relay Out** (NO/NC)
1 x **Relay Out** (NO)
1 x **Thermistor** (R_{trip} = 4kΩ PTC)

장착가능 Slot	B, C, D, E

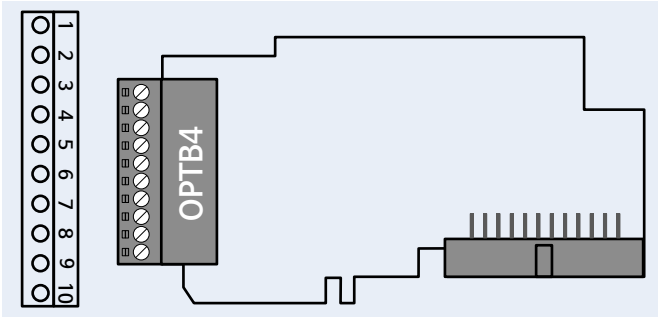


Terminal		Parameter reference	Technical information
21 22 23	RO1/NC RO1/COM RO1/NO	DigOUT:X.1	**Relay output 1** (NO/NC) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
25 26	RO2/COM RO2/NO	DigOUT:X.2	**Relay output 2** (NO) Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
28 29	TI1+ TI1-	DigIN:X.1	Thermistor input; R_{trip} = 4kΩ (PTC)

11. OPT-B4 Board

※ 1 x AI(0(4)...20mA)
2 x AO(0(4)...20mA)

장착가능 Slot	B, C, D, E

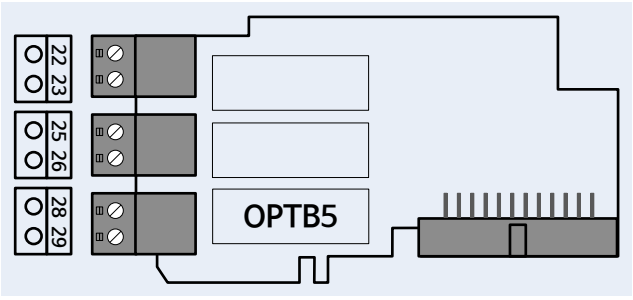


Terminal		Parameter reference	Technical Information
1	AI1+	AnIN:X.1	0(4)...20mA (R_i=200Ω)
2	AI1-		
3	AO1+	AnOUT:X.1	0(4)...20mA, R_L max 500Ω
4	AO1-		
5	AO2+	AnOUT:X.2	
6	AO2-		
7	GND		
8	GND		
9	GND		
10	+24V		

12. OPT-B5 Board

※ 3 x Relay Out (NO)

장착가능 Slot	B, C, D, E

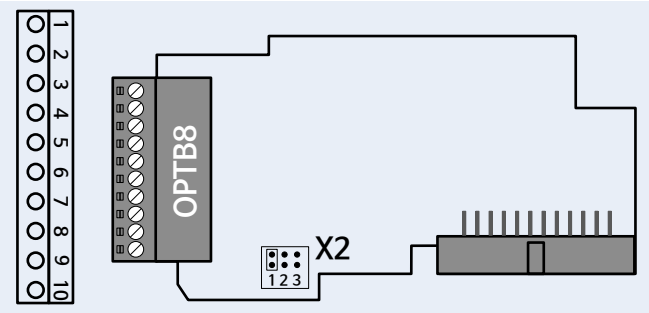


Terminal		Parameter reference	Technical information
22	RO1/COM	DigOUT:X.1	Switching capacity : 24VDC/8A, 250VAC/8A, 125VDC/0.4A Min. switching load 5V/10mA
23	RO1/NO		
25	RO2/COM	DigOUT:X.2	
26	RO2/NO		
28	RO3/COM	DigOUT:X.3	
29	RO3/NO		

13. OPT-B8 Board

※ 3 x Pt-100

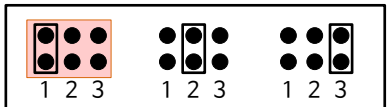
장착가능 Slot	B, C, D, E



■ Terminal

Terminal		Parameter reference	Technical Information
1	R1+	AnIN:X.1	PT100 Input, -30...200℃ One sensor Sensor current 10mA
2	Rm1		
3	R1-		
4	R2+	AnIN:X.2	
5	Rm2		
6	R2-		
7	R3+	AnIN:X.3	PT100 Input, -30...200℃ 1~3 sensor (X2) Accuracy ≤ 1℃ Sensor current 10mA
8	Rm3		
9	R3-		
10	NC		

X2 : 3'rd Input의 Sensor 갯수



= Factory default

〈PT100 accuracy for OPTB8〉

Cable length(m)	3-wire	2-wire	Accuracy(℃)
300	x		-20 < x < 8
150	x		-13 < x < 3
50	x		-8 < x < 2
50		x	-10 < x < 10

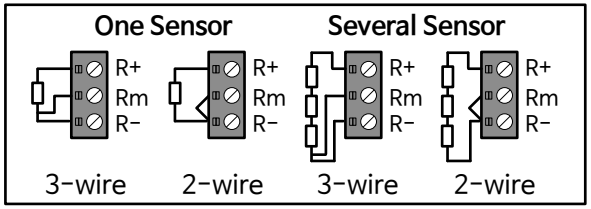
■ Parameter 설정(Sensing Enable)

Parameter		Note
for Multi-purpose		0 = Not Used 1 = Input 1 2 = Input 1 & 2 3 = Input 1 & 2 & 3 4 = Input 2 & 3 5 = Input 3
P2.7.24	TBoard1 Numbers	
P2.7.37	TBoard2 Numbers	
for SIA2		
P2.12.2.1	PT100 Numbers	
P2.12.2.5	PT100 2 Numbers	

■ 센싱 값 Monitoring

Application	Index	Name	ID No.
Multi-purpose	V1.21.8	Sensor 1 Temp	50
	V1.21.9	Sensor 2 Temp	51
	V1.21.10	Sensor 3 Temp	52
	V1.21.25	Sensor 4 Temp	69
	V1.21.26	Sensor 5 Temp	70
	V1.21.27	Sensor 6 Temp	71
SIA2	V1.24.8	MeasTemp 1	50
	V1.24.9	MeasTemp 2	51
	V1.24.10	MeasTemp 3	52
	V1.24.11	MeasTemp 4	69
	V1.24.12	MeasTemp 5	70
	V1.24.13	MeasTemp 6	71

Connection of PT100 sensors



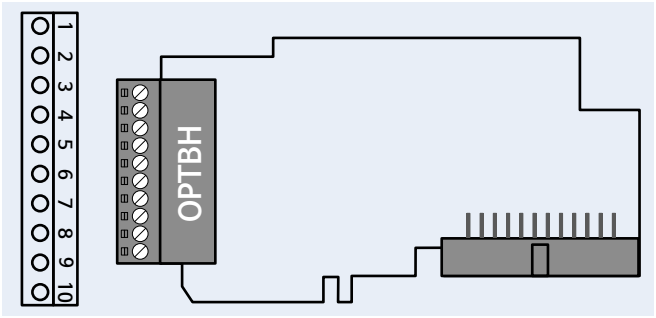
■ 참조 : PT-100 온도/저항 Table

온도[℃]	저항값[Ω]
-30	≤ 88.22
-20	92.16
-10	96.09
0	100.00
10	103.90
20	107.79
30	111.67
40	115.54
50	119.40
60	123.24
70	127.08
80	130.90
90	134.71
100	138.51
110	142.29
120	146.07
130	149.83
140	153.58
150	157.33
160	161.05
170	164.77
180	168.48
190	172.17
200	≥ 175.86

14. OPT-BH Board

※ 3 x Temperature measurement

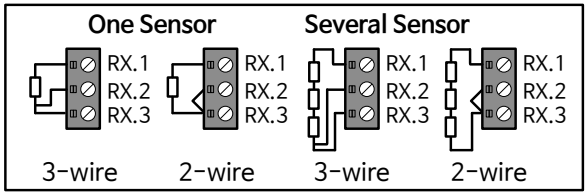
장착가능 Slot	B, C, D, E



■ Terminal

Terminal		Parameter reference	Technical Information
1	R1.1	AnIN:X.1	Temp. sensor Input 1 -50...200℃
2	R1.2		
3	R1.3		
4	R2.1	AnIN:X.2	Temp. sensor Input 2 -50...200℃
5	R2.2		
6	R2.3		
7	R3.1	AnIN:X.3	Temp. sensor Input 2 -50...200℃
8	R3.2		
9	R3.3		
10	NC		

Connection of Temperature sensors



※ Supported sensors

PT100, PT1000, Ni1000, KTY84-130, KTY84-150, KTY84-131

〈 PT100 accuracy for OPTBH〉

Cable length(m)	3-wire	2-wire	Accuracy(℃)
≤300	x		-1 < x < 3
50		x	-1 < x < 14

〈 PT1000, KTY84, Ni1000 accuracy for OPTBH〉

Cable length(m)	3-wire	2-wire	Accuracy(℃)
≤300	x		-1 < x < 1
150		x	-1 < x < 5
50		x	-1 < x < 3

■ Parameter 설정

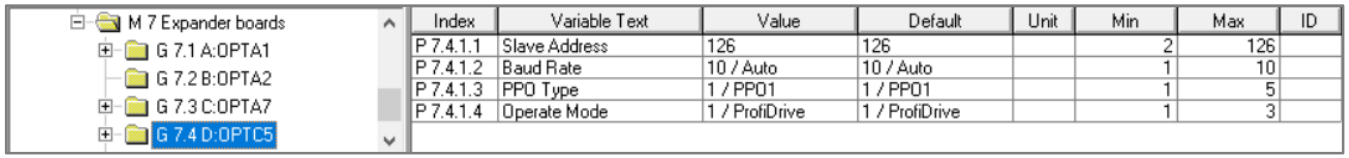
Index	Parameter	Default	Description
P7.x.1.1	Sensor 1 type	0	0 = No Sensor 1 = PT100 2 = PT1000 3 = Ni1000 4 = KTY84 5 = 2 x PT100 6 = 3 x PT100
P7.x.1.2	Sensor 2 type	0	
P7.x.1.3	Sensor 3 type	0	

Parameter		Note
for Multi-purpose		0 = Not Used 1 = Input 1 2 = Input 1 & 2 3 = Input 1 & 2 & 3 4 = Input 2 & 3 5 = Input 3
P2.7.24	TBoard1 Numbers	
P2.7.37	TBoard2 Numbers	
for SIA2		
P2.12.2.1	PT100 Numbers	
P2.12.2.5	PT100 2 Numbers	

■ 센싱 값 Monitoring

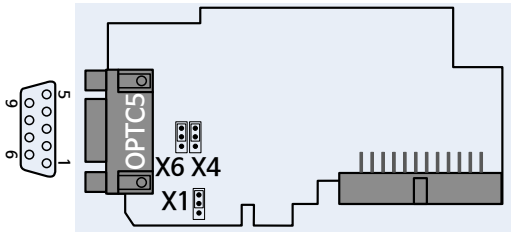
Application	Index	Name	ID No.
Multi-purpose	V1.21.8	Sensor 1 Temp	50
	V1.21.9	Sensor 2 Temp	51
	V1.21.10	Sensor 3 Temp	52
	V1.21.25	Sensor 4 Temp	69
	V1.21.26	Sensor 5 Temp	70
	V1.21.27	Sensor 6 Temp	71
SIA2	V1.24.8	MeasTemp 1	50
	V1.24.9	MeasTemp 2	51
	V1.24.10	MeasTemp 3	52
	V1.24.11	MeasTemp 4	69
	V1.24.12	MeasTemp 5	70
	V1.24.13	MeasTemp 6	71

15. OPT-C5 Board (PROFIBUS DP)

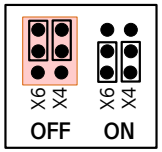


Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.4.1.1	Slave Address	126	126		2	126	
P 7.4.1.2	Baud Rate	10 / Auto	10 / Auto		1	10	
P 7.4.1.3	PPO Type	1 / PPO1	1 / PPO1		1	5	
P 7.4.1.4	Operate Mode	1 / ProfiDrive	1 / ProfiDrive		1	3	

장착가능 Slot	D, E

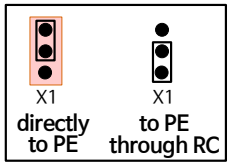


X4, X6 : Bus termination



= Factory default

X1 : Cable shield connection



6GK1500-0FC10
(SIEMENS)

〈 추천 Connector 〉

■ PPO Types

Parameter Field			Process Data Field									
ID	IND	VALUE	CW	REF	PD1	PD2	PD3	PD4	PD5	PD6	PD7	PD8
			SW	ACT	PD1	PD2	PD3	PD4	PD5	PD6	PD7	PD8
PPO 1												
PPO 2												
PPO 3												
PPO 4												
PPO 5												

■ Technical Data

Profibus DP connections	Interface	9-pin DSUB connector (female)
	Data transfer method	RS-485, half-duplex
	Transfer cable	Shielded twisted pair (1 pair and shield)
	Electrical isolation	500 VDC
Communications	Profibus DP	As described in document "Profibus Profile for variable speed drives, Profidrive"
	PPO types	1, 2, 3, 4, 5
	Baud rate	9.6 kbaud to 12 Mbaud
	Addresses	2 to 126
Environment	Ambient operating temp.	-10℃...55℃
	Storing temp.	-40℃...70℃
	Humidity	<95%, no condensation allowed
	Altitude	Max. 1000m
	Vibration	0.5 G at 9...200 Hz
Safety		Fulfills EN50178 standard

■ Line length for different transmission speeds

Parameter	Impedance	Capacity	Resistance	Wire gauge	Conductor area
Line A	135...165 Ω (3 to 20 Mhz)	< 30 pF/m	< 110 Ω/km	> 0.64 mm	> 0.34 mm²
Line B	100...130 Ω (f > 100 kHz)	< 60 pF/m	-	> 0.53 mm	> 0.24 mm²

Baud rate (kbit/s)	9.6	19.2	93.75	187.5	500	1500	3000-12000
Length Line A (m)	1200	1200	1200	1000	400	200	100
Length Line B (m)	1200	1200	1200	600	200	-	-

■ Parameter 설정

Index	Parameter	Default	Description
P7.x.1.1	Slave Address	126	Station Address (**2~125**)
P7.x.1.2	Baud Rate	10/Auto	1/9.6k, 2/19.2k, 3/93.75k, 4/187.5k, 5/500k 6/1.5M, 7/3M, 8/6M, 9/12M, **10/Auto**
P7.x.1.3	PPO Type	1/PPO1	1/PPO1, 2/PPO2, 3/PPO3, 4/PPO4, **5/PPO5**
P7.x.1.4	Operate Mode	1/ProfiDrive	1/ProfiDrive, **2/ByPass**, 3/Echo

① for **Multi-purpose Application**

- PLC에 Drive용 GSD파일(OPTC5 board Profibus DP용 GSD 파일)을 설치한다. (VAC29500.GSD)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 Vancon NX ⇒ Profibus ⇒ DP Module ⇒ **Vacon PPO 5** 를 선택한다.
- **Station Address(2~125)**을 설정한다.
- **Connector Termination** 처리 (PLC측과 Last Drive측)
- Drive에서 위 PLC 설정에 맞도록 아래 Parameter를 설정한다.
  . G2.9 Fieldbus를 설정한다. (Fieldbus 통신 Board를 D Slot에 장착한 경우)
  P2.9.35 State Machine = 1/ProfiDrive
  P2.9.36 FB Mode SlotD = 0/Normal P2.9.37 FB Mode SlotE = 4/Not Control
  . OPT-C5 Board 동작 Mode를 설정한다.
  P7.4.1.1 Slave Address = PLC Station Address와 동일하게 설정
  P7.4.1.2 Baud Rate = 10 / Auto P7.4.1.3 PPO Type = 5 / PPO5
  P7.4.1.4 Operate Mode = 2 / ByPass

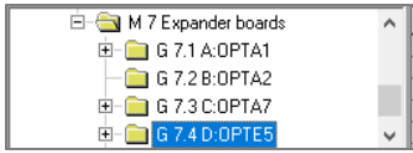
	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	-	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FBGeneralStatusWord**	**FBGeneralStatusWord**
	W1		FB Actual Speed	FB Actual Speed
	W2~W9		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Warning Word (ID1174)	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x10)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

② for **SIA2 Application**

- PLC에 Drive용 GSD파일(OPTC5 board Profibus DP용 GSD 파일)을 설치한다. (VAC29500.GSD)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 Vancon NX ⇒ Profibus ⇒ DP Module ⇒ **Vacon PPO 5** 를 선택한다.
- **Station Address(2~125)**을 설정한다.
- **Connector Termination** 처리 (PLC측과 Last Drive측)
- Drive에서 위 PLC 설정에 맞도록 아래 Parameter를 설정한다.
  . G2.13 Fieldbus를 설정한다. (Fieldbus 통신 Board를 D Slot에 장착한 경우)
  P2.13.33 GSW ID = 65 P2.13.34 ControlSlotSel = 5 / Slot D
  P2.13.35 State Machine = 2 / ProfiDrive P2.13.37 FB Monitoring = 0 / No
  . OPT-C5 Board 동작 Mode를 설정한다.
  P7.4.1.1 Slave Address = PLC Station Address와 동일하게 설정
  P7.4.1.2 Baud Rate = 10 / Auto P7.4.1.3 PPO Type = 5 / PPO5
  P7.4.1.4 Operate Mode = 2 / ByPass

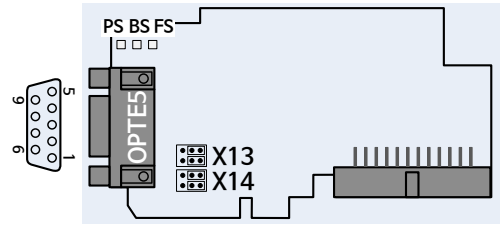
	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	**Aux Control Word (ID1161)**	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FB Status Word**	**FB Status Word**
	W1		FB Actual Speed	FB Actual Speed
	W2~W9		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Warning Word (ID1174)	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x1)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

16. OPT-E5 Board (PROFIBUS DP)

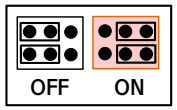


Index	Variable Text	Value	Default	Unit	Min	Max	ID
P 7.4.1.1	Slave Address	126	126		2	126	
P 7.4.1.2	Operate Mode	1 / ProfiDrive	1 / ProfiDrive		1	3	
P 7.4.1.3	Compatib. Mode	1 / Normal	1 / Normal		1	3	
P 7.4.1.4	IM data offset	0 / IM Offset 1	0 / IM Offset 1		0	1	
M 7.4.2.1	Profibus Status	0.0			0.0	5000.9	

장착가능 Slot	D, E

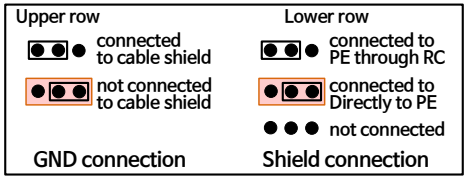


X13 : Bus termination



= Factory default

X14 (upper) : GND connection
X14 (lower) : Cable shield connection



6GK1500-0FC10
(SIEMENS)

〈 추천 Connector 〉

■ PPO Types

Parameter Field			Process Data Field									
ID	IND	VALUE	CW	REF	PD1	PD2	PD3	PD4	PD5	PD6	PD7	PD8
			SW	ACT	PD1	PD2	PD3	PD4	PD5	PD6	PD7	PD8

PPO 1
PPO 2
PPO 3
PPO 4
PPO 5

■ Technical Data

Profibus DP connections	Interface	9-pin DSUB connector(female)
	Data transfer method	RS-485, half-duplex
	Transfer cable	Shielded twisted pair(1 pair and shield)
	Electrical isolation	500 VDC
Communications	Drive profile	PROFIdrive
	Standard Telegrams	1, 20
	Vendor Telegrams	100, 101, 138, 139
	Standard (Safety) Telegrams	30, 31
	Vendor (Safety) Telegrams	58000
	PPO types	1, 2, 3, 4, 5
	Baud rate	9.6 kBd to 12 MBd, **Auto detect is always on**
	Addresses	2 to 126
Environment	Ambient operating temp.	-10℃...50℃
	Storing temp.	-40℃...60℃
	Humidity	<95%, no condensation allowed
	Altitude	Max. 1000m
	Vibration	0.5 G at 9...200 Hz
Safety		Fulfills EN50178 standard

■ Line length for different transmission speeds

Parameter	Impedance	Capacity	Resistance	Wire gauge	Conductor area
Line A	135...165Ω (3 to 20 Mhz)	< 30 pF/m	< 110 Ω/km	> 0.64 mm	> 0.34 mm²
Line B	100...130Ω (f >100 kHz)	< 60 pF/m	-	> 0.53 mm	> 0.24 mm²

Baud rate (kbit/s)	9.6	19.2	93.75	187.5	500	1500	3000-12000
Length Line A(m)	1200	1200	1200	1000	400	200	100
Length Line B(m)	1200	1200	1200	600	200	-	-

■ Parameter 설정

Index	Parameter	Default	Description
P7.x.1.1	Slave Address	126	Station Address (**2~125**)
P7.x.1.2	Operate Mode	1/ProfiDrive	1/ProfiDrive, **2/ByPass**, 3/Echo
P7.x.1.3	Compatible Mode	1/Normal	**1/Normal**, 2/C3/C5 mode 3/PPO_PROFIdrive
P7.x.1.4	IM data offset	0/IM Offset 1	**0/IM Offset 1**, 1/IM Offset 0

① for **Multi-purpose Application**

- PLC에 Drive용 GSD파일(OPTE5 board Profibus DP용 GSD 파일)을 설치한다. (VAC30CCF_DPV0.GSD)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 **Vacon PROFIBUS DP Slave OPTEx DP ⇒ PPO 5 (4PKW+10PZD)** 를 선택한다.
- **Station Address(2~125)**을 설정한다.
- **DP mode = DP-V0, Operate mode = Local 로 설정한다.**
- **Connector Termination** 처리 (PLC측과 Last Drive측)
- Drive에서 위 PLC 설정에 맞도록 아래 Parameter를 설정한다.
  . G2.9 Fieldbus를 설정한다. (Fieldbus 통신 Board를 D Slot에 장착한 경우)
  P2.9.35 State Machine = 1/ProfiDrive
  P2.9.36 FB Mode SlotD = 0/Normal P2.9.37 FB Mode SlotE = 4/Not Control
  . OPT-E5 Board 동작 Mode를 설정한다.
  P7.4.1.1 Slave Address = PLC Station Address와 동일하게 설정
  P7.4.1.2 Operate Mode = 2/ByPass
  P7.4.1.3 Compatib. Mode = 1/Normal (VAC29500.GSD 사용시 "2/C3/C5 mode")
  P7.4.1.4 IM data offset = 0/IM Offset 1

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	-	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FBGeneralStatusWord**	**FBGeneralStatusWord**
	W1		FB Actual Speed	FB Actual Speed
	W2~W9		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Warning Word (ID1174)	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x10)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

② for **SIA2 Application**

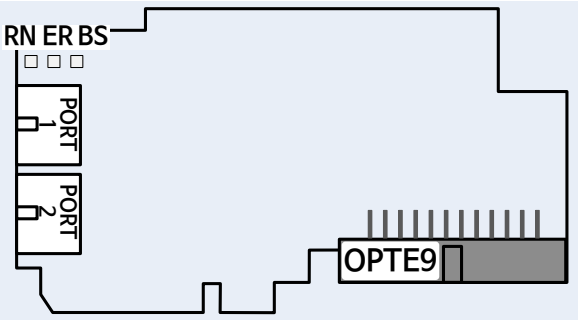
- PLC에 Drive용 GSD파일(OPTE5 board Profibus DP용 GSD 파일)을 설치한다. (VAC30CCF_DPV0.GSD)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 **Vacon PROFIBUS DP Slave OPTEx DP ⇒ PPO 5 (4PKW+10PZD)** 를 선택한다.
- **Station Address(2~125)**을 설정한다.
- **DP mode = DP-V0, Operate mode = Local 로 설정한다.**
- **Connector Termination** 처리 (PLC측과 Last Drive측)
- Drive에서 위 PLC 설정에 맞도록 아래 Parameter를 설정한다.
  . G2.13 Fieldbus를 설정한다. (Fieldbus 통신 Board를 D Slot에 장착한 경우)
  P2.13.33 GSW ID = 65 P2.13.34 ControlSlotSel = 5/Slot D
  P2.13.35 State Machine = 2/ProfiDrive P2.13.37 FB Monitoring = 0/No
  . OPT-E5 Board 동작 Mode를 설정한다.
  P7.4.1.1 Slave Address = PLC Station Address와 동일하게 설정
  P7.4.1.2 Operate Mode = 2/ByPass
  P7.4.1.3 Compatib. Mode = 1/Normal (VAC29500.GSD 사용시 "2/C3/C5 mode")
  P7.4.1.4 IM data offset = 0/IM Offset 1

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	**Aux Control Word (ID1161)**	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FB Status Word**	**FB Status Word**
	W1		FB Actual Speed	FB Actual Speed
	W2~W9		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Warning Word (ID1174)	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x1)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

17. OPT-E9 Board (Dual Port Ethernet)

※ 한개의 MAC 및 IP address만 가지므로, 네트워크에서 단일장치로 표시

장착가능 Slot	D, E



Index	Variable Text	Value	Default	Unit
P 7.5.1.1	Comm. Protocol	2 / ProfiNet	1 / Modbus	
P 7.5.1.2	Comm. Time-out	10	10	s
S 7.5.1.3	Show to Appl. As	0 / Default	/	
P 7.5.1.4.1	IP Mode	1 / Static IP	2 / DHCP	
P 7.5.1.4.2	IP Part 1	192	192	
P 7.5.1.4.3	IP Part 2	168	168	
P 7.5.1.4.4	IP Part 3	1	0	
P 7.5.1.4.5	IP Part 4	21	10	
P 7.5.1.4.6	Subnet mask P1	255	255	
P 7.5.1.4.7	Subnet mask P2	255	255	
P 7.5.1.4.8	Subnet mask P3	255	0	
P 7.5.1.4.9	Subnet mask P4	0	0	
P 7.5.1.4.10	Default GW P1	192	192	
P 7.5.1.4.11	Default GW P2	168	168	
P 7.5.1.4.12	Default GW P3	1	0	
P 7.5.1.4.13	Default GW P4	1	1	
P 7.5.1.4.14	Speed/Duplex	1 / Autoneg.	1 / Autoneg.	
P 7.5.1.4.15	IP Port Filter		0	
P 7.5.1.4.16	Drive PC Tool	? /	1 /	
P 7.5.1.4.17	SW Link Failure	? /	0 /	
P 7.5.1.5.1	EIP Output inst.	2 / 21	2 / 21	
P 7.5.1.5.2	EIP Input inst.	2 / 71	2 / 71	
P 7.5.1.5.3	EIP ProdCodeOffs	0	0	
P 7.5.1.6.1	ModbusUnitIdent	255	255	
P 7.5.1.7.1	NOS Device ID	0	0	
P 7.5.1.8.1	SNTP Mode	1 / Disabled	1 / Disabled	
P 7.5.1.8.2	Server 1 IP P1	0	0	
P 7.5.1.8.3	Server 1 IP P2	0	0	
P 7.5.1.8.4	Server 1 IP P3	0	0	
P 7.5.1.8.5	Server 1 IP P4	0	0	
P 7.5.1.8.6	Server 2 IP P1	0	0	
P 7.5.1.8.7	Server 2 IP P2	0	0	
P 7.5.1.8.8	Server 2 IP P3	0	0	
P 7.5.1.8.9	Server 2 IP P4	0	0	
P 7.5.1.8.10	Time Interval	200	200	
P 7.5.1.8.11	Time Offset H	0	0	
P 7.5.1.8.12	Time Offset M	0	0	
P 7.5.1.8.13	SNTP Port	123	123	

■ Technical Data

Technical item or function		Technical data
General	Board name	OPT-E9
Ethernet connections	Interface	Two RJ-45 connectors
	Transfer cable	STP CAT5e
Communications	Speed	10 / 100 Mb
	Duplex	half / full
	Default IP-address	By default the board is in DHCP mode
Protocol	Modbus TCP, Modbus UDP, Profinet I/O, EtherNet/IP	
Environment	Ambient operating temp.	-10°C...50° C
	Storing temperature	-40°C...70° C
	Humidity	<95%, no condensation allowed
	Altitude	Maximum 1000 m
	Vibration	0.5 G at 9...200 Hz
Safety	Fulfills EN 50178 standard	

■ LED Indication

RN = Network Status **ER** = I/O connection **BS** = Module Status

LED combination			Description
RN	ER	BS	No Power. All LED Off
RN	ER	BS	Firmware 손상 또는 software missing
RN	ER	BS	Board is failure and not operation
RN	ER	BS	Board is operation
RN	ER	BS	Protocol is Ready for communication
RN	ER	BS	Protocol is communication
RN	ER	BS	Protocol communication fault
RN	ER	BS	Protocol is communication with active fault
RN	ER	BS	Duplicate IP address detected
RN	ER	BS	PROFINET only! In node flashing test
RN	ER	BS	H/W failure or non-recoverable fault situation

RN LED blinking On BS LED steady On

Index	Parameter	Default	Description
P7.x.1.1	Comm. Protocol	1	Active protocol 선택 (0/None, 1/Modbus, 2/Profinet I/O, 3/EtherNet/IP)
P7.x.1.2	Comm. Time-out	10	Communication timeout 시간 설정
P7.x.1.3	Show to Appl.As	0	OPT-Cx Emulation mode 선택 (only for OPT-EA Board) (0/Default, 17225/OPTCI, 17232/OPTCP, 17233/OPTCQ)
G7.x.1.4 IP Settings			
P7.x.1.4.1	IP Mode	2	IP Address Mode 설정 (1/Static IP, 2/DHCP, 3/DCP)
P7.x.1.4.2	IP Part 1	192	IP Address 설정 (0...255)
P7.x.1.4.3	IP Part 2	168	
P7.x.1.4.4	IP Part 3	0	
P7.x.1.4.5	IP Part 4	10	
P7.x.1.4.6	Subnet mask P1	255	Subnet mask 설정(0...255)
P7.x.1.4.7	Subnet mask P2	255	
P7.x.1.4.8	Subnet mask P3	0	
P7.x.1.4.9	Subnet mask P4	0	
P7.x.1.4.10	Default GW P1	192	Default Gateway 설정(0...255)
P7.x.1.4.11	Default GW P2	168	
P7.x.1.4.12	Default GW P3	0	
P7.x.1.4.13	Default GW P4	1	
P7.x.1.4.14	Speed/Duplex	1	Ethernet link speed/duplex 선택 (1/Autoneg. 2/10M HD, 3/10M FD, 4/100M HD, 5/100M FD)
P7.x.1.4.15	IP Port Filter	0	IP Port Filter. (Bit 마스크 선택)
P7.x.1.4.16	Drive PC Tool	1	NCDrive사용시 "1" 설정
P7.x.1.4.17	SW Link Failure	0	

Index	Parameter	Default	Description
G7.x.1.5 EtherNet/IP			
P7.x.1.5.1	EIP Output inst.	2	EtherNet/IP Output assembly instance.
P7.x.1.5.2	EIP Input inst.	2	EtherNet/IP Input assembly instance.
P7.x.1.5.3	EIP ProdCodeOffs	0	EtherNet/IP Product Code Offset
G7.x.1.6 Modbus			
P7.x.1.6.1	ModbusUnitIdent	255	Modbus Unit Identifier. Used only with Modbus UDP
G7.x.1.7 Profinet			
P7.x.1.7.1	NOS Device ID	0	Name of Station device identification number
G7.x.1.8 SNTP			
P7.x.1.8.1	SNTP Mode	1	SNTP Mode (0/disable, 2/Poll, 3/Listen only 4/Poll fault, 5/Listen only fault)
P7.x.1.8.2	Server 1 IP P1	0	SNTP Server 1 IP address
P7.x.1.8.3	Server 1 IP P2	0	
P7.x.1.8.4	Server 1 IP P3	0	
P7.x.1.8.5	Server 1 IP P4	0	
P7.x.1.8.6	Server 2 IP P1	0	SNTP Server 2 IP address
P7.x.1.8.7	Server 2 IP P2	0	
P7.x.1.8.8	Server 2 IP P3	0	
P7.x.1.8.9	Server 2 IP P4	0	
P7.x.1.8.10	Time Interval	200	Time interval in seconds for time information polling and receiving
P7.x.1.8.11	Time Offset H	0	Time offset Hours(-13...15)
P7.x.1.8.12	Time Offset M	0	Time offset Minutes(-59...59)
P7.x.1.8.13	SNTP Port	123	SNTP server of client port depending on SNTP mode

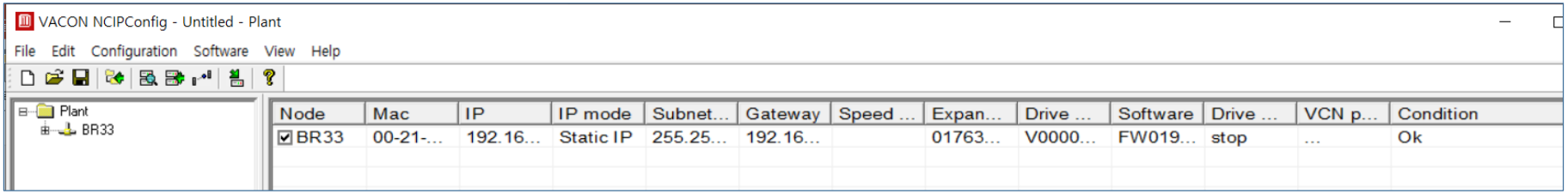
※ 상세 내용은 OPT-E9 Board 매뉴얼 참조

■ Drive Node Name 설정 방법

※ 다수의 Drive가 하나의 네트워크에 연결된 경우 IP Address에 의해 구분하기 불편 → Drive Node Name을 설정/사용하는 경우 Drive 구분이 편리

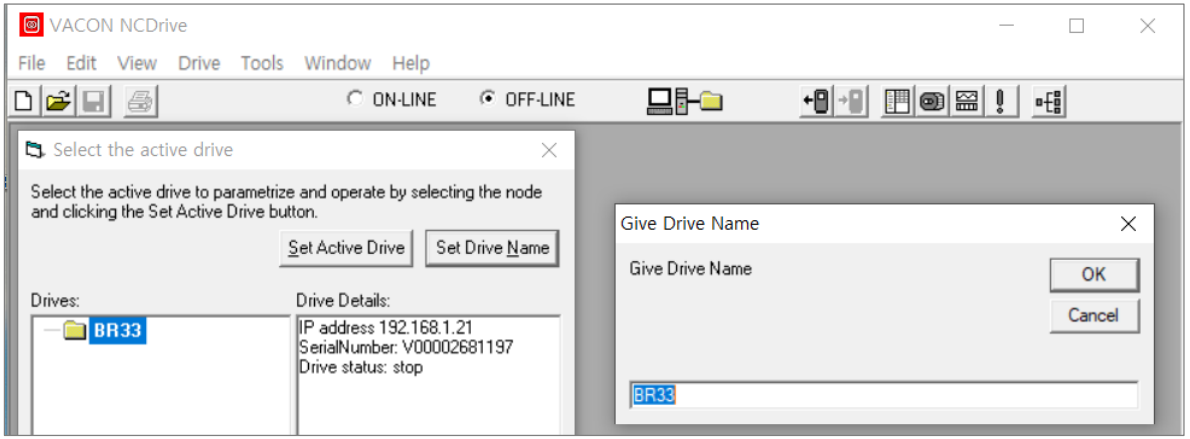
1. NCIPConfig을 이용한 방법

① VACON® NCIPConfig 실행
② Select *Configuration ⇒Scan* 선택 후, 좌측 tree 구조에 연결된 device가 표시될 때 까지 기다린다.
③ 해당 Device를 선택한 후, Node Name 입력, Protocol 설정, IP 설정, IP mode 설정
④ 해당 Device를 선택 ☑ 한 후, *Configuration ⇒Configure* 선택 : 올바르게 Configuration이 완성되면 "Condition=Ok"로 표시된다.
⑤ 해당 Device에 대한 Ping Test : 해당 Device를 선택 ☑ 한 후, *Configuration ⇒Ping Targets* 선택 (Ping Test결과 정상이면 "Condition=Pong"로 표시)



2. NCDrive를 이용한 방법

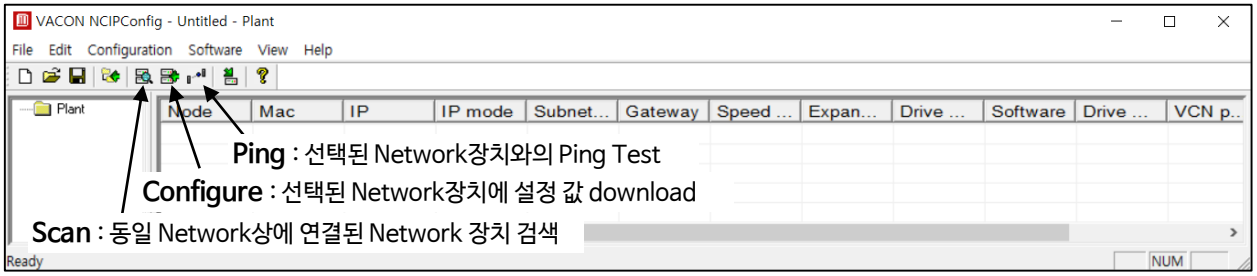
① Keypad 또는 Serial Cable을 사용하여 "G7.x.1 OPTE9 Parameters"에서 Protocol 설정, IP 설정, IP Mode 설정
② VACON® NCDrive 실행
③ NCDrive 실행 후 *Tools ⇒Options ⇒Communication ⇒Connect using=Ethernet*로 설정 후 Drive Select 선택
④ 해당 Device를 선택(IP address 확인) 후, "*Set Drive Name*" 버튼 선택하여 Drive Node Name 입력



■ Profinet 사용시 Sation Name 설정 방법

※ Profinet의 경우 Fieldbus 통신을 위해서 **Station Name**을 반드시 정의해 주어야 한다.

1. NCIPConfig을 이용한 Station Name 설정



① Scan에 의해 동일한 Network상에 연결된 Network을 검색한다.

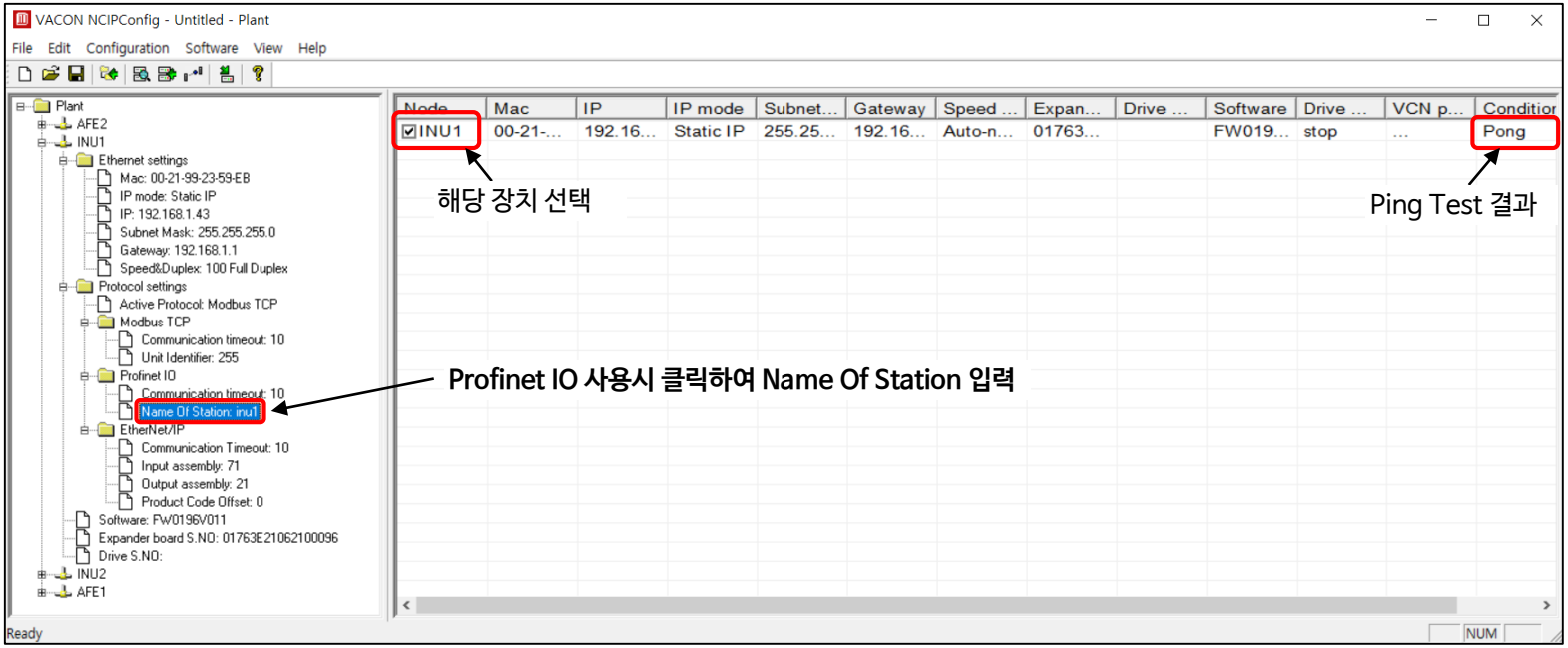
② Node명, IP, IP mode, Subnet Mask, Gateway, Speed & Duplex를 설정한다.(참고 : 이 설정은 NCDrive에서도 변경 가능함)

③ Protocol settings을 설정한다.(참고 : Profinet IO의 Name Of Station을 제외한 나머지 설정은 NCDrive에서도 변경 가능함)

- **Profinet IO를 사용하는 경우 Name Of Station을 PLC에서 설정한 값과 동일하게 설정**한다.

④ 해당 장치를 선택 ☑한 후, Configure버튼을 눌러 설정을 Download한다.

⑤ 해당 장치를 선택 ☑한 후, Ping 버튼을 눌러 통신 상태가 정상인지 확인한다. 정상인 경우 Condition인 Pong으로 표시된다.



■ OPT-E9 Board를 사용한 Fieldbus 통신 Interface (Application : Multi-Purpose)

① Profinet I/O

- PLC에 Drive용 GSDML파일(OPTE9 board Profinet I/O용 GSDML파일)을 설치한다.
  (GSDML-V2.34-VACON-OPTE9-20200403.xml)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 Profinet IO Module ⇒ Bypass ⇒ Vendor 4 + 8 PD 를 선택한다.
- Profinet IO Cycle time : 4ms이상, Profinet Comm. Cycle time : 10ms이상
- **Station Name**을 설정한다.
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.9 Fieldbus를 설정한다. (Fieldbus 통신 Board를 E Slot에 장착한 경우)
  P2.9.35 State Machine = 2 / ProfiDrive
  P2.9.36 FB Mode Slot D = 4/Not Control P2.9.37 FB Mode Slot E = 0/Normal
  . P7.5.1.1 Comm. Protocol = 2 / Profinet

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word (ID1160)
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	-	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FBGeneralStatus Word**	**FBGeneralStatus Word**
	W1		FB Actual Speed	FB Actual Speed
	W2~W8		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	**Control Word feedback (ID1160)**	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, x10)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

② Modbus TCP

- PLC에서 Modbus TCP Slave를 설치한다.
  . Access type : Read/Write Multiple Registers (Function Code 23) 또는
  Read : Function Code 03 / Write : Function Code 16
  . **Slave Unit-ID : 1** (1~247 또는 255)
  . READ Register Offset = 2101, READ Register Length = 10
  WRITE Register Offset = 2000, Write Register Length = 10
  . Cycle time : 10ms 이상 . Read Register - **Error handling : Set to Zero**
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.9 Fieldbus를 설정한다. (Fieldbus 통신 Board를 E Slot에 장착한 경우)
  P2.9.35 FB State Machine = 2 / ProfiDrive,
  P2.9.36 FB Mode Slot D = 4/Not Control
  P2.9.37 FB Mode Slot E = 0/Normal
  . P7.5.1.1 Comm. Protocol = 1 / Modbus **P7.5.1.6.1 ModbusUnitIdent = 1**

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		Out : Address 42001	FB Control Word (ID1160)
	W1		Out : Address 42002	사용불가
	W2		Out : Address 42003	FB Speed Reference
	W3~W9		Out : Address 42004~42010	FB Data IN 1~7 Sel.
	사용 예)		Process Data	
	W3	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W4	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W5	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W6	PD 4 IN	-	
	W7	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W8	PD 6 IN	-	
	W9	PD 7 IN	-	
Drive⇒PLC (Status Word)	W0		In : Address 42102	**FBGeneralStatus Word**
	W1		In : Address 42103	FB Actual Speed
	W2~W9		In : Address 42104~42111	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	**Control Word feedback (ID1160)**	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, x10)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

■ OPT-E9 Board를 사용한 Fieldbus 통신 Interface (Application : SIA II)

① Profinet I/O

- PLC에 Drive용 GSDML파일(OPTE9 board Profinet I/O용 GSDML파일)을 설치한다.
  (GSDML-V2.34-VACON-OPTE9-20200403.xml)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 Profinet IO Module ⇒ Bypass ⇒ Vendor 4 + 8 PD 를 선택한다.
- Profinet IO Cycle time : 4ms이상, Profinet Comm. Cycle time : 10ms이상
- **Station Name**을 설정한다.
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.13 Fieldbus를 설정한다.
  P2.13.33 GSW ID = 65, P2.13.34 ControlSlotSel = 5 / Slot E
  P2.13.35 State Machine = 2 / ProfiDrive, P2.13.37 FB Monitoring = 0 / No
  . P7.x.1.1 Comm. Protocol = 2 / Profinet

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		FB Control Word	FB Control Word (ID1160)
	W1		FB Speed Reference	FB Speed Reference
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W3	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W4	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W5	PD 4 IN	-	
	W6	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W7	PD 6 IN	-	
	W8	PD 7 IN	**Aux Control Word (ID1161)**	
	W9	PD 8 IN	-	
Drive⇒PLC (Status Word)	W0		**FB Status Word**	**FB Status Word**
	W1		FB Actual Speed	FB Actual Speed
	W2~W8		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	**Warning Word (ID1174)**	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x1)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

② Modbus TCP

- PLC에서 Modbus TCP Slave를 설치한다.
  . Access type : Read/Write Multiple Registers (Function Code 23)
  Read : Function Code 03 / Write : Function Code 16
  . **Slave Unit-ID : 1** (1~247 또는 255)
  . READ Register Offset = 2101, READ Register Length = 10
  WRITE Register Offset = 2000, Write Register Length = 10
  . Cycle time : 10ms 이상 . Read Register - **Error handling : Set to Zero**
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.13 Fieldbus를 설정한다.
  P2.13.33 GSW ID = 65, P2.13.34 ControlSlotSel = 5 / Slot E
  P2.13.35 State Machine = 2 / ProfiDrive, P2.13.37 FB Monitoring = 0 / No
  . P7.x.1.1 Comm. Protocol = 1 / Modbus
  P7.x.1.6.1 ModbusUnitIdent = 1

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		Out : Address 42001	FB Control Word (ID1160)
	W1		Out : Address 42002	사용불가
	W2		Out : Address 42003	FB Speed Reference
	W3~W9		Out : Address 42004~42010	FB Data IN 1~7 Sel.
	사용 예)		Process Data	
	W3	PD 1 IN	FB Torq Reference [%] (ID1140, Scale x10)	
	W4	PD 2 IN	Positive Torque Limit [%] (ID646, Scale x10)	
	W5	PD 3 IN	Negative Torque Limit [%] (ID645, Scale x10)	
	W6	PD 4 IN	-	
	W7	PD 5 IN	Load Drooping [%] (ID620, Scale x100)	
	W8	PD 6 IN	-	
	W9	PD 7 IN	**Aux Control Word (ID1161)**	
Drive⇒PLC (Status Word)	W0		In : Address 42102	**FB Status Word**
	W1		In : Address 42103	FB Actual Speed
	W2~W9		In : Address 42104~42111	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	**Warning Word (ID1174)**	
	W3	PD 2 OUT	Application Status Word (ID43)	
	W4	PD 3 OUT	FB Motor Current [A] (ID45, Scale x10)	
	W5	PD 4 OUT	Motor Torque [%] (ID4, Scale x10)	
	W6	PD 5 OUT	Shaft Rounds (ID1170, Scale x1)	
	W7	PD 6 OUT	Shaft Angle [deg] **(ID1169, Scale x1)**	
	W8	PD 7 OUT	Fault Word 1 (ID1172)	
	W9	PD 8 OUT	Fault Word 2 (ID1173)	

■ OPT-E9 Board를 사용한 Fieldbus 통신 Interface (Application : AFE Ⅰ)

① Profinet I/O

- PLC에 Drive용 GSDML파일(OPTE9 board Profinet I/O용 GSDML파일)을 설치한다.
  (GSDML-V2.34-VACON-OPTE9-20200403.xml)
  이 파일은 www.danfoss.com 에서 다운로드하여 사용한다.
- PLC에서 Profinet IO Module ⇒ Bypass ⇒ Vendor 4 + 8 PD 를 선택한다.
- Station Name을 설정한다.
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.7 Fieldbus를 설정한다.
  P2.7.17 ControlSlotSel.= 5 (Slot E)
  . P7.x.1.1 Comm. Protocol = 2/Profinet

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		Control Word	Main Control Word
	W1		DC Volt. Reference	FB DC Volt. Ref
	W2~W9		Process Data 1~8 Out	FB Data IN 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 IN	0	
	W3	PD 2 IN	Aux Control Word (ID1161)	
	W4	PD 3 IN	0	
	W5	PD 4 IN	0	
	W6	PD 5 IN	0	
	W7	PD 6 IN	0	
	W8	PD 7 IN	0	
	W9	PD 8 IN	0	
Drive⇒PLC (Status Word)	W0		Status Word	Main Status Word
	W1		DC Volt. Actual	DC Voltage
	W2~W9		Process Data 1~8 In	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Total Current (ID1104)	※ 단위 및 Scale 은 Monitoring Value 참조
	W3	PD 2 OUT	Warning Word 1 (ID1174)	
	W4	PD 3 OUT	Fault Word 1 (ID1172)	
	W5	PD 4 OUT	Fault Word 2 (ID1173)	
	W6	PD 5 OUT	DIN Status 1 (ID56)	
	W7	PD 6 OUT	DIN Status 2 (ID57)	
	W8	PD 7 OUT	Active Power (ID1151)	
	W9	PD 8 OUT	Supply Voltage (ID1107)	

② Modbus TCP

- PLC에서 Modbus TCP Slave를 설치한다.
  . Access type : Read/Write Multiple Registers (Function Code 23)
  Read : Function Code 03 / Write : Function Code 16
  . **Slave Unit-ID : 1** (1~247 또는 255)
  . READ Register Offset = 2101, READ Register Length = 10
  . WRITE Register Offset = 2000, Write Register Length = 10
  . Cycle time : 10ms 이상 . Read Register - **Error handling : Set to Zero**
- Drive에서 위 PLC 설정에 맞도록 설정한다.
  . G2.7 Fieldbus를 설정한다.
  P2.7.17 ControlSlotSel.= 5 (Slot E)
  . P7.x.1.1 Comm. Protocol = 1/Modbus **P7.x.1.6.1 ModbusUnitIdent = 1**

	Word		PLC	Drive
PLC⇒Drive (Control Word)	W0		Out : Address 42001	Main Control Word
	W1		Out : Address 42002	사용불가
	W2		Out : Address 42003	FB DC Volt. Ref
	W3~W9		Out : Address 42004~42010	FB Data IN 1~7 Sel.
	사용 예)		Process Data	
	W3	PD 1 IN	0	
	W4	PD 2 IN	Aux Control Word (ID1161)	
	W5	PD 3 IN	0	
	W6	PD 4 IN	0	
	W7	PD 5 IN	0	
	W8	PD 6 IN	0	
	W9	PD 7 IN	0	
Drive⇒PLC (Status Word)	W0		In : Address 42102	Main Status Word
	W1		In : Address 42103	DC Voltage
	W2~W9		In : Address 42104~42111	FB Data Out 1~8 Sel.
	사용 예)		Process Data	
	W2	PD 1 OUT	Total Current (ID1104)	※ 단위 및 Scale 은 Monitoring Value 참조
	W3	PD 2 OUT	Warning Word 1 (ID1174)	
	W4	PD 3 OUT	Fault Word 1 (ID1172)	
	W5	PD 4 OUT	Fault Word 2 (ID1173)	
	W6	PD 5 OUT	DIN Status 1 (ID56)	
	W7	PD 6 OUT	DIN Status 2 (ID57)	
	W8	PD 7 OUT	Active Power (ID1151)	
	W9	PD 8 OUT	Supply Voltage (ID1107)	

End of Documents