

WELCON

Servo Drive

Hardware Manual



WER-D048/20-FS04F7_V03



2024-04-11



Precautions

- Please read this manual carefully before installing and commissioning.
- WELCON SYSTEMS assumes no responsibility whatsoever for any loss or damage arising out of use for any purpose.

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Product Name for welcon Drive

WE2S-D024 / 01-FS0057-E

Product Type

- WE** WELCON Standard
- ** User Code (only for customized order)

Drive Shape

- R** Rectangle Type Board
- C** Circle Type Board
- M** Miniature Board
- 2S** 2-Axis Slot Type (Backboard necessary)
- 2A** 2-Axis Stand-Alone Type

Power

- D** DC
- A** AC

Voltage

- 024** 12~24V
- 048** 12~48V
- 310** 12~310V

Continuous Current

- P3** 0.3A rms
- P5** 0.5A rms
- 01** 1A rms
- 03** 3A rms
- 10** 10A rms
- 25** 25A rms

Feedback Sensor (Hexadecimal)

Bit0	Incremental Encoder	Bit4	Sin/Cos Encoder	Bit8	Potentiometer
Bit1	Dual Incremental Encoder	Bit5	BISS/SSI Interface Encoder	Bit9	SPI
Bit2	Separated Digital Hall Sensor	Bit6	Analog Hall Sensor	Bit10	EnDat
Bit3	Shared Digital Hall Sensor	Bit7	Tamagawa/Panasonic Encoder	Bit11	PWM

Ex) 0057= 0000 0000 0101 0111
 Incremental(Bit0) + Dual Incremental (Bit1) + Separated Digital Hall (Bit2) + Sin/Cos (Bit4) + Analog Hall (Bit6)

Communication

- E** EtherCAT
- C** CAN
- R** RS-485



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Question : www.welconsystems.com

1. Safety Information

- Safety accidents and damage to the product may occur, so be sure to read the safety instructions before use and use it correctly.

Warnings

- 전원이 켜진 상태에서 서보 드라이브 주 전원을 연결/분리하지 마십시오.
Do not connect/disconnect the main power of the servo drive while the power is on.
- 전원이 켜진 상태에서 서보 드라이브 엔코더 케이블 및 I/O를 연결/분리하지 마십시오.
모터 및 서보 드라이브의 고장 원인이 될 수 있습니다.
Do not connect/disconnect the servo drive encoder cable and I/O while the power is on. Motor and servo drive may be damaged.
- 전원 케이블은 모터가 움직이지 않을 때도 고전압을 전달할 수 있습니다.
The power cable can carry high voltage even when the motor is not moving.
- 서보 드라이브의 메인 전원은 드라이브 사양에 맞춰 정확히 입력되어야 합니다.
드라이브 파손 및 고장의 원인이 될 수 있습니다.
The main power of the servo drive must be accurately input according to the drive specifications. It may cause damage to the drive
- 서보 드라이브 U, V, W 출력 단자에 전원을 직접 접속하지 마십시오.
Do not connect power directly to the servo drive U, V, W output terminals.
- 서보 드라이브 전원을 차단한 후 캐패시터가 완전히 방전된 후 전원을 분리해 주십시오.
After turning off the servo drive power, disconnect the power after the capacitor is completely discharged.

Cautions

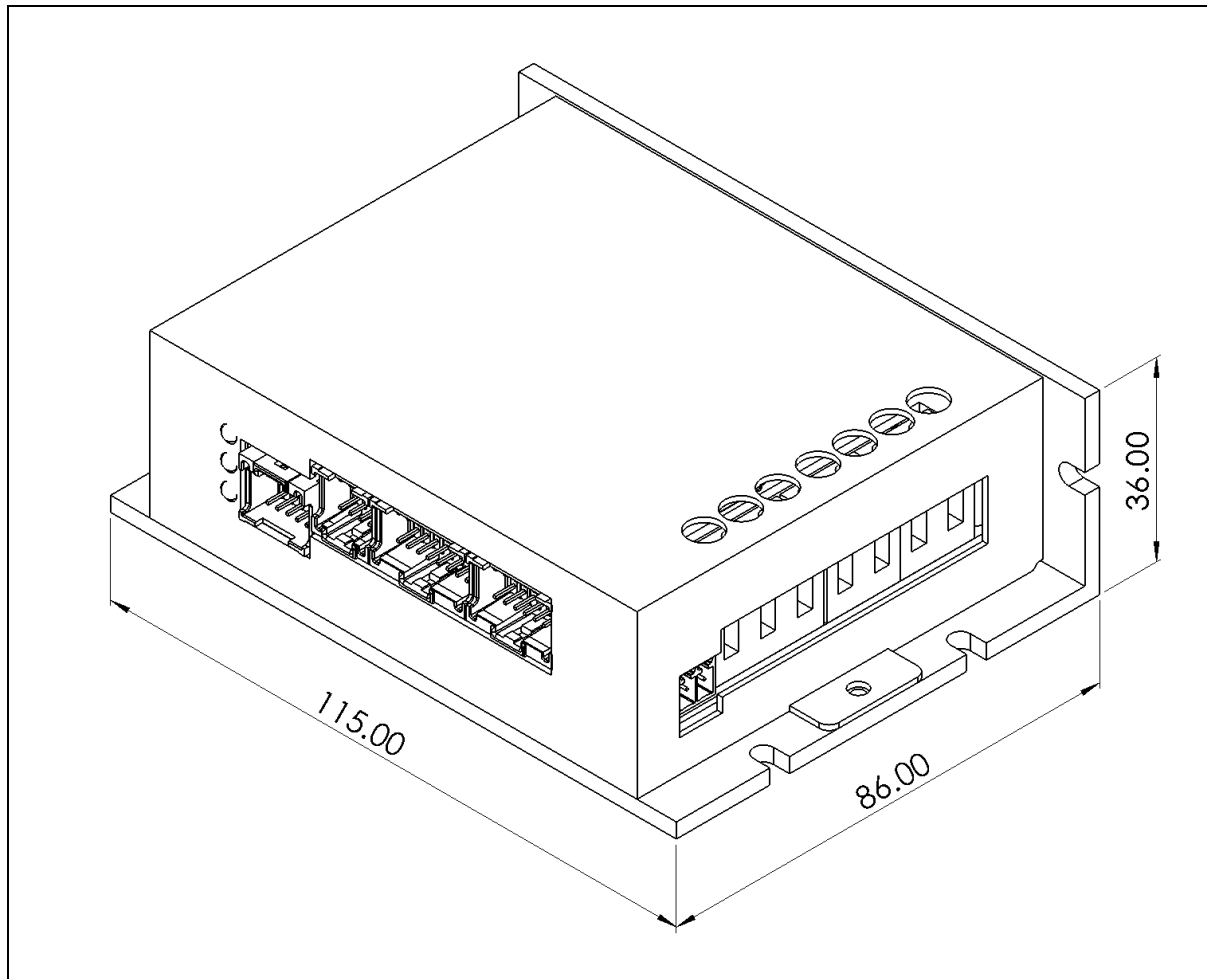
- U, V, W 케이블과 Encoder 케이블은 반드시 분리하여 배선해 주십시오.
Be sure to separate U, V, W cables and encoder cables before wiring.
- 전원 차단 후 U, V, W 케이블과 Encoder 케이블 배선작업을 진행하십시오.
After turning off the power, proceed with wiring the U, V, W cables and encoder cables.
- 떨어뜨리거나 강한 충격을 가하지 마십시오.
Do not drop it or subject it to strong impact.
- 가연성 물질, 물 근처는 설치를 하지 말아주십시오.
Do not install near flammable substances or water.
- 서보 드라이브 내부에 피복이나 구리선 등이 들어가지 않도록 해 주십시오.
Make sure that no sheath or copper wire gets inside the servo drive.
- Encoder 케이블은 실드 케이블 사용을 권장합니다.
It is recommended to use shielded cables for encoder cables.
- EtherCAT 케이블은 CAT.6 이상의 케이블 사용을 권장합니다.
For EtherCAT cables, it is recommended to use CAT.6 cables.
- 초기 전원 투입 전 모터의 U, V, W 및 Encoder 케이블 등을 확인하여 주십시오.
Check the U, V, W and encoder cables of the motor before turning on the power.
- 노이즈 방지를 위해 Encoder 케이블 및 U, V, W 및 전원 FG 접속을 권장합니다.
It is recommended to connect the encoder cable and U, V, W and power FG to prevent noise.
- 케이블 연결 및 연결 해제 시 커넥터가 기판에서 분리되지 않도록 주의하여 주십시오.
Be careful not to separate the connector from the board when connecting or disconnecting the cable.

Use environment

환경	조건
Operating Temperature	0 °C to 50 °C
Maximum Humidity	90[%] RH
Operating Place	A place free of iron, flammable gas, dust, etc.

2. Technical Information

2.1. Mechanical Data



Item	Unit	Description
Weight	g	437
SIZE (L x W x H)	mm	115 * 86 * 36
Fastener	M3	

[*For details, please refer to the 3D Modelling on the homepage.](#)

2.2. Electrical Data

WER-D048/20-FS04F7		
Ratings		20
Continuous Output Current A[rms]		20
Peak Output Current A[rms]		40
Basic Specifications		
Feature	Specification	
Motors	DC/BLDC/PMSM/VCM	Rotary servo motors, Linear servo motors
Current(Torque) Control	Control Periodic	24KHz
	Control Loop	PI + Feed-forward
Velocity & Position Control	Control Periodic	2KHz
	Control Loop	Cascade P/PI + Feed-forward
	Filters	First order low pass filter, Four notch filters, First order adaptive windowing filters
Reference Command	Current/Velocity/Position	USB, CAN(CANopen), EtherCAT(CoE,FoE), RS-485
Auto Tuning	Method	Automatic self-configuration and optimization of motor phasing, wires, current loop, velocity control loop.
GUI	User Interface	WELSS(WelconServoStudio), Setting, Drive, Motor, Feedback, I/O, Motion
Input Voltage	12~48VDC	
Protective Functions	Under- and over-voltage, Over-current, Over-load(with I ² T), Drive over-temperature	
Environment	Ambient temperature: Operation 0~50°C, Storage 0~70°C Humidity: 10~90%, Vibration: 1.0g	
Compliance Standard	CE	
Communication*		
Feature	Specification	
USB	Baud rate: up to 3Mbps, Maximum cable length: 3m	
CAN*	Bit rate: 125kbps ~ 1Mbps	
EtherCAT*	100Mbps Communication cycle time: up to 500μs(CSV, CSP mode), up to 250μs(CST mode)	
RS-485*	Baud rate: 9200bps ~ 3Mbps	

I/O		
Feature	Specification	
Analog Input	Quantity	1
	Voltage Range	Analog ± 10 VDC differential
	Input Resolution	14 bit
Digital Input	Quantity	6
	Signal	Configurable. Opto-isolated
	Voltage	24V
Digital Output	Quantity	2
	Signal	Configurable. Opto-isolated.
	Voltage	24V
	Max. Output Current	40mA
Brake	Use one of digital outputs (40mA)	
Motor Feedback*		
General	Supply Voltage	5VDC
Incremental Encoder	Signal	CH1 : A-quadr-B with or without index, RS422, Differential CH2 : A-quadr-B with or without index, Single-ended
	A-quadr-B Max Input Frequency	10MHz (before quadrature)
Digital Hall Sensor	Signal	Single-ended
	Type	Separated hall sensor
Analog Hall Sensor*	Signal	0~5V, Single-ended
	Sampling Frequency	24KHz
Sin/Cos Encoder*	Signal	-0.7~+0.7V at 2.5V, Differential
	Sampling Frequency	24KHz
Serial Encoder	Type	SSI, BiSS-C, Tamagawa, Panasonic, EnDat2.2
	Bite rate	0.5Mbps, 1Mbps, 2Mbps, 2.5Mbps, 5Mbps

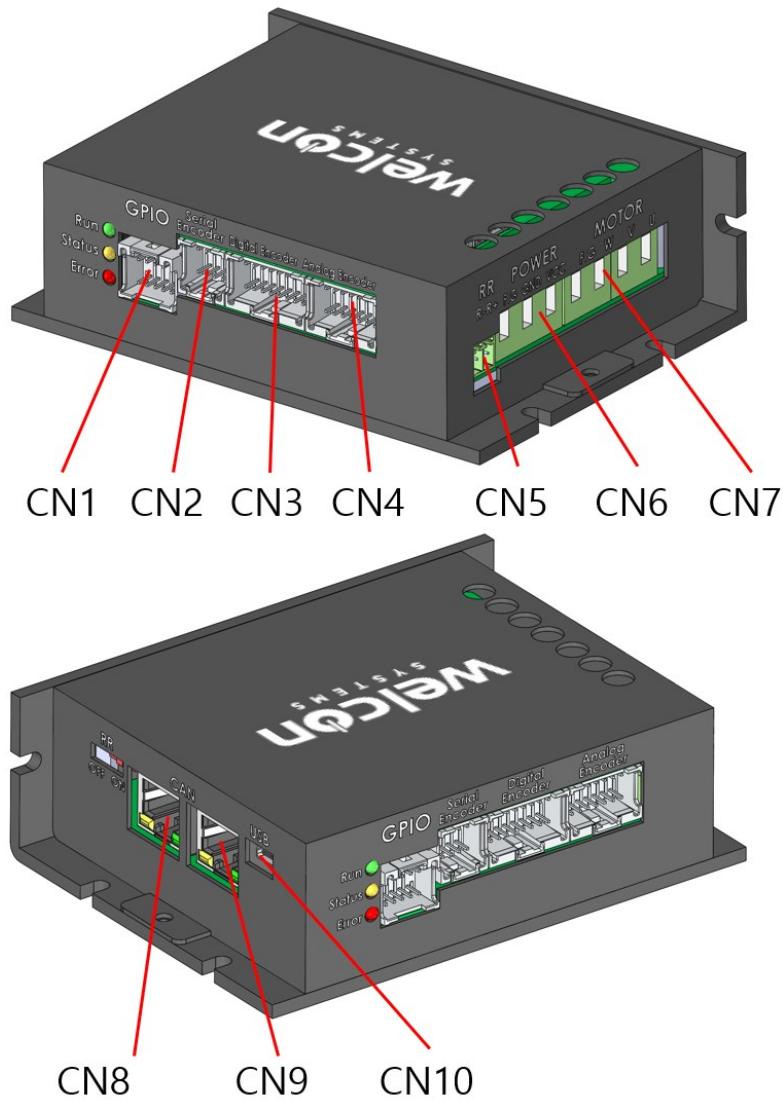
* Optional (Refer to product code)

3. Wiring

3.1. Tools

Tool	Manufacturer	Part Number
Hand crimp Tool	MOLEX	63811-6300

3.2. Connections



Connector	Function	Connector	Function
CN1	GPIO	CN6	Main Power
CN2	Serial Encoder	CN7	Motor UVW
CN3	Digital Encoder	CN8	CAN / RS-485 / EtherCAT IN
CN4	Analog Encoder	CN9	CAN / RS-485 / EtherCAT OUT
CN5	Regenerative resistance	CN10	USB

3.3. Regenerative resistance

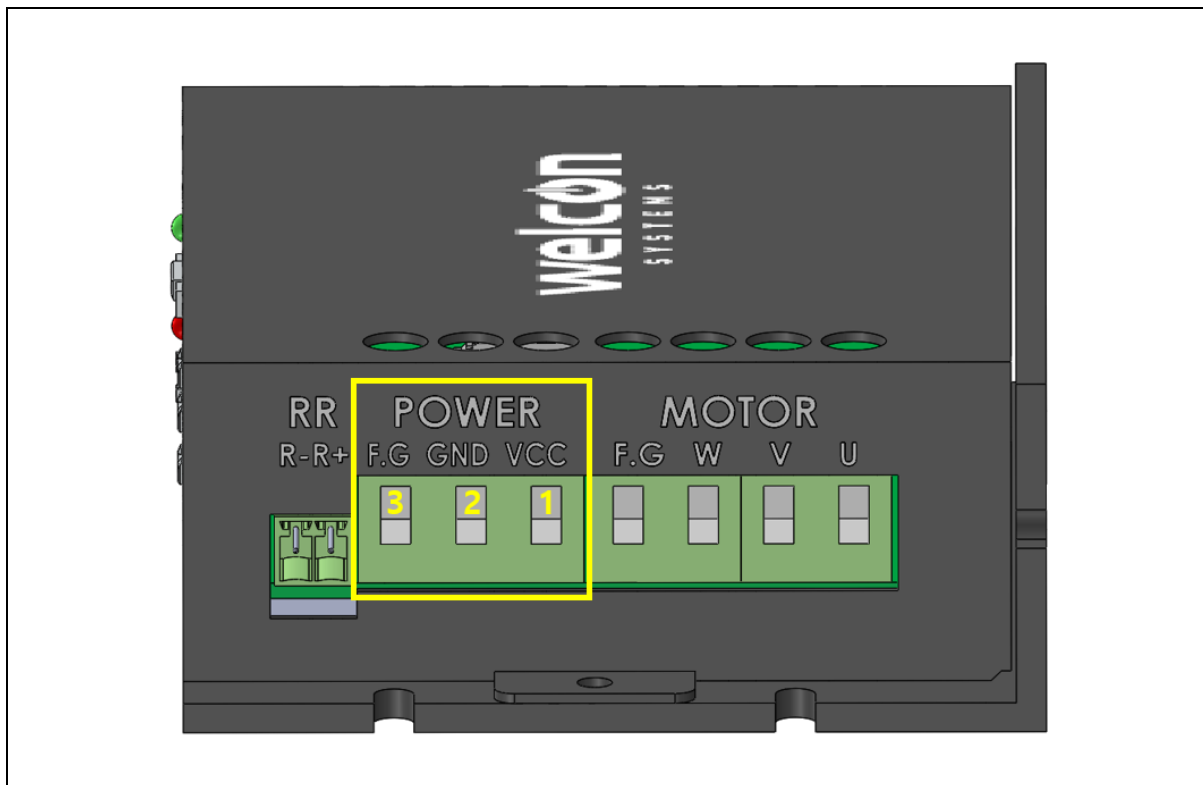
Dinkle_EC350V-2P

Dinkle_ECH350R-02P		J702
Pin	Input Power	
1	R+	
2	R-	



- Be sure to connect the regenerative resistor after changing the regen clamp cut-off voltage value(Object Index : 0x5013) using WELSS UI.
- On systems with large inertia, do not make large speed changes all at once.

3.4. Main Power

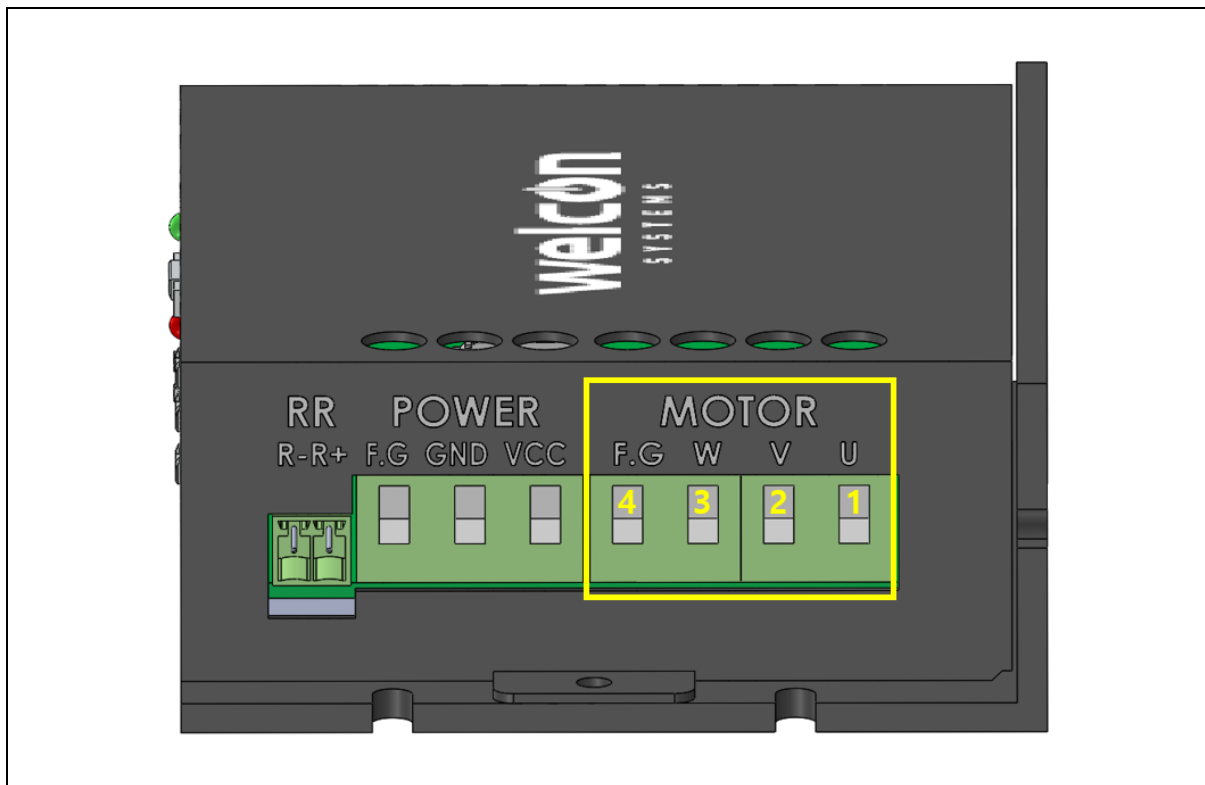


Dinkle_EHK750V-03P		J701
Pin	Signal	Input Power
1	VCC	12~48VDC
2	GND	GND
3	FG	FG



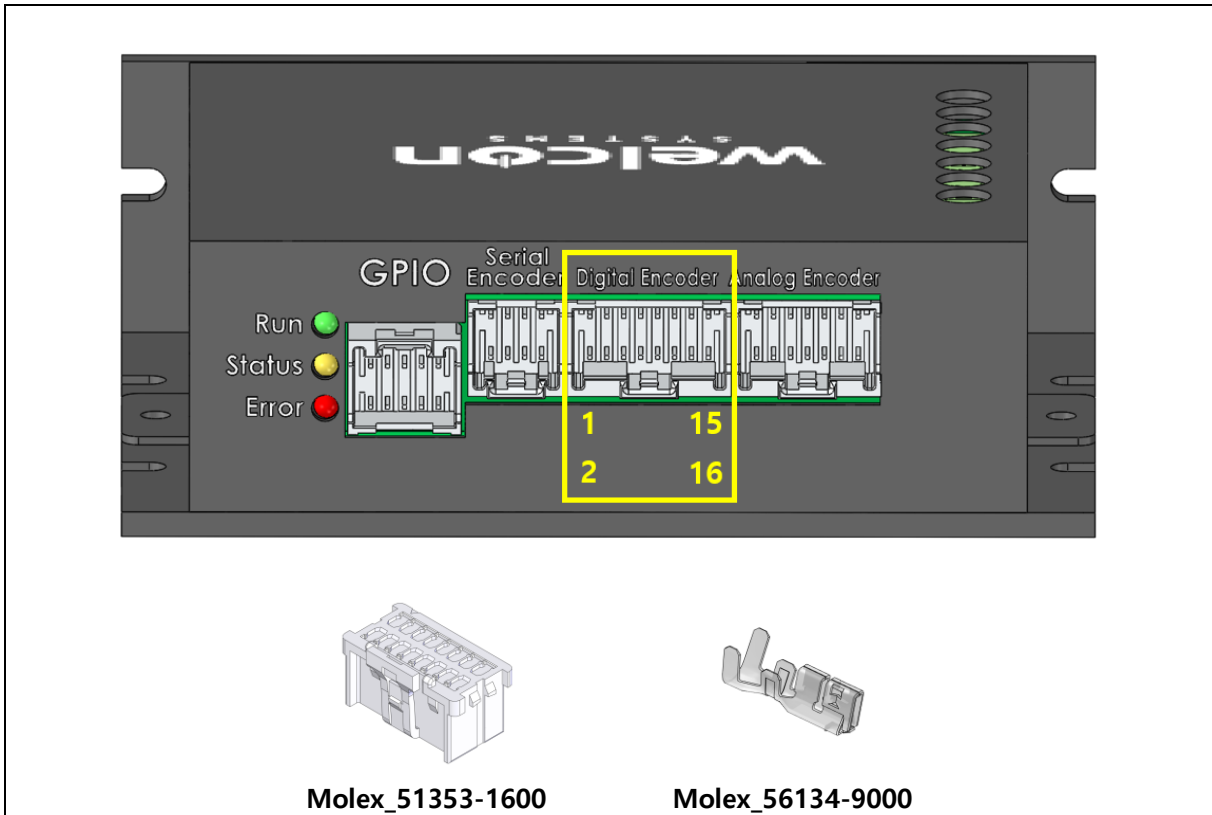
- Do not connect/disconnect the servo drive while the power is on.
- Before applying power, make sure that the DC supply is within the specified range.
- make sure the proper plus and minus connections are in order.

3.5. Motor UVW



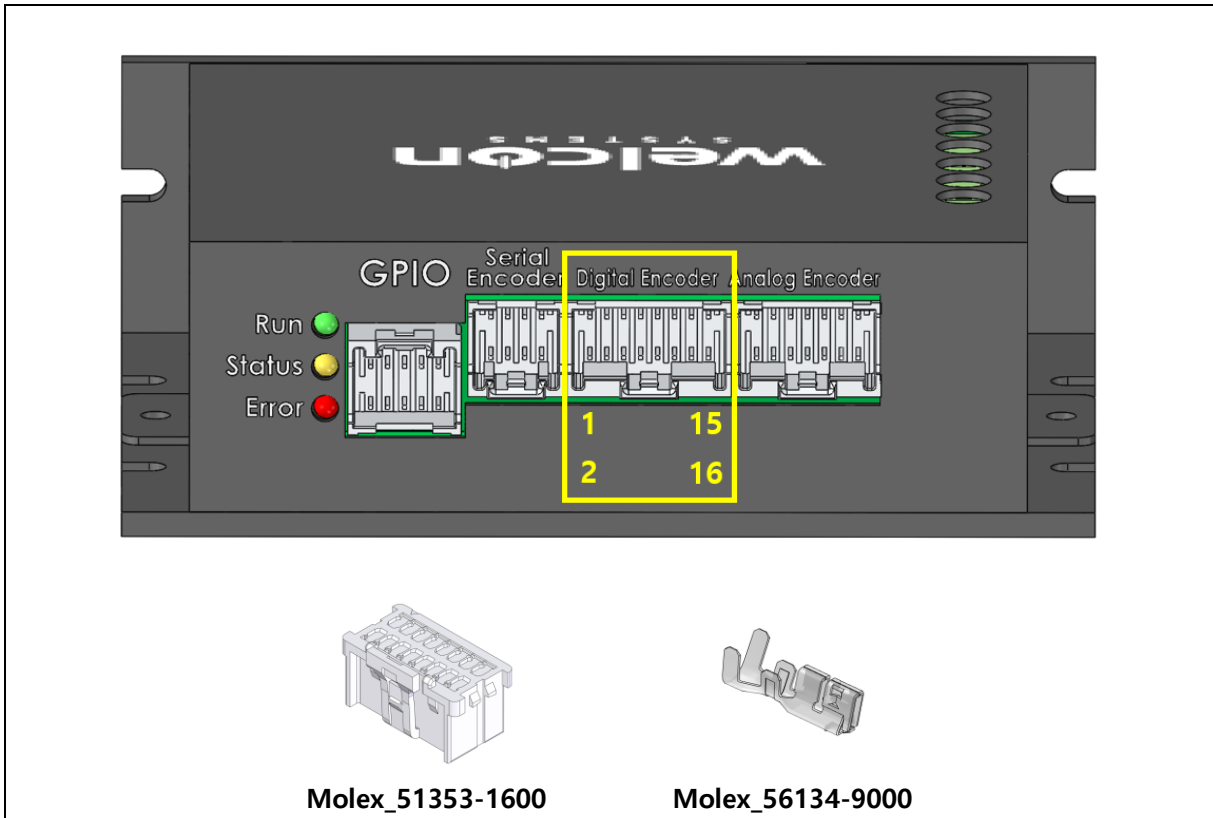
Dinkle_EHK750V-04P		J801
Pin	Signal	
1	U (VCM or DC Motor : +)	
2	V (VCM or DC Motor : -)	
3	W	
4	FG	

3.6. Digital Encoder (Port A)



Molex_55959-1630		J501
Pin	Signal	
1	5V	
2	GND	
3	Encoder A+	
4	Encoder A-	
5	Encoder B+	
6	Encoder B-	
7	Encoder I+	
8	Encoder I-	
9	Hall U	
10	Not used	
11	Hall V	
12	Not used	
13	Hall W	
14	Not used	
15	FG	
16	GND	

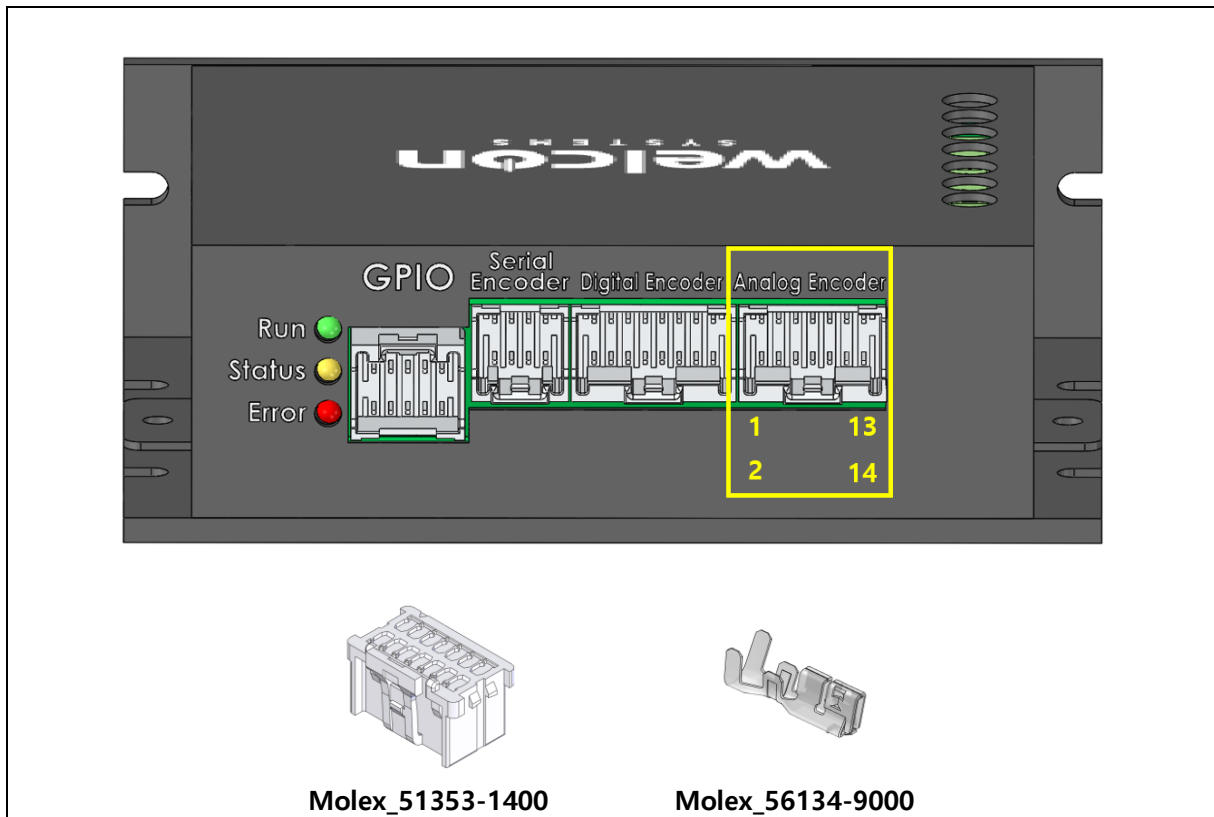
3.7. Digital Encoder (Port B)



Molex_55959-1630		J501
Pin	Signal	
1	5V	
2	GND	
3	Not Used	
4	Not Used	
5	Not Used	
6	Not Used	
7	Not Used	
8	Not Used	
9	Hall U	
10	Encoder A	
11	Hall V	
12	Encoder B	
13	Hall W	
14	Encoder I	
15	FG	
16	GND	

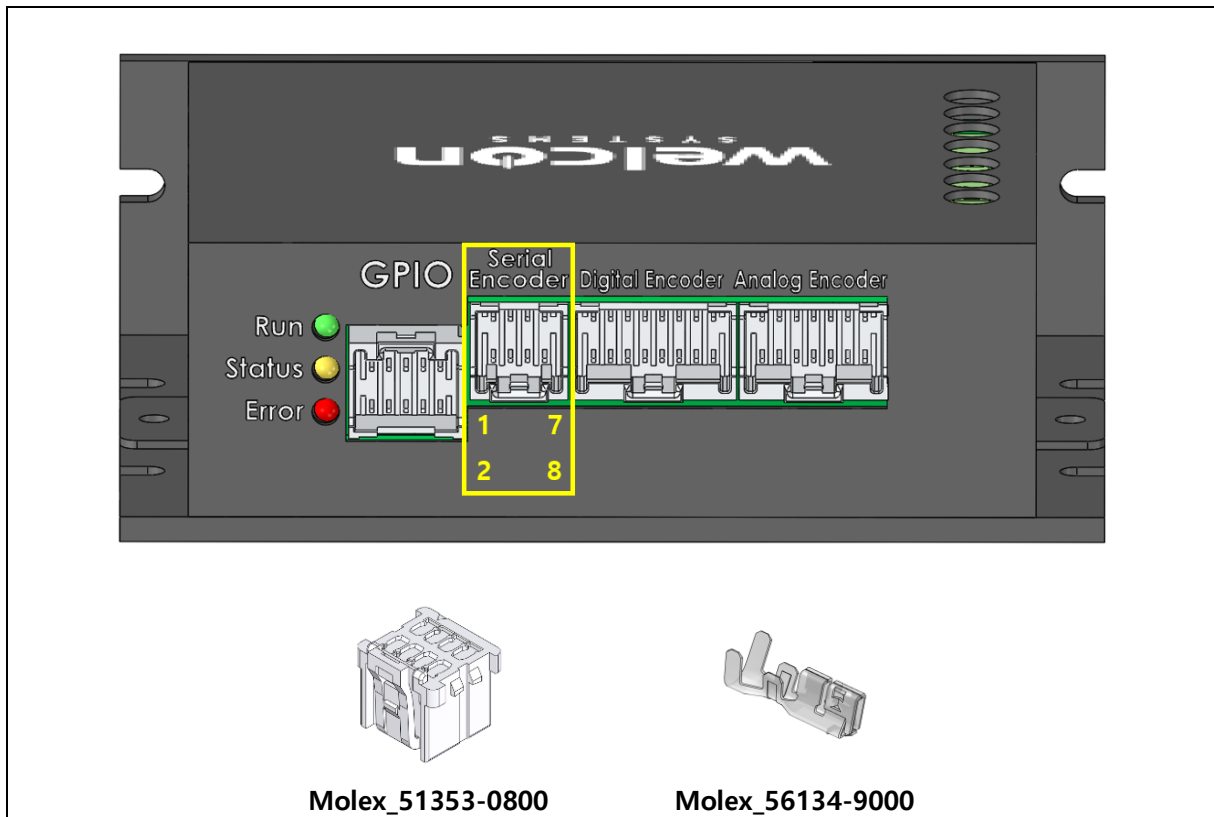
* When using Dual Feedback, only Hall Sensor A can be selected in WELSS UI.

3.8. Analog Encoder



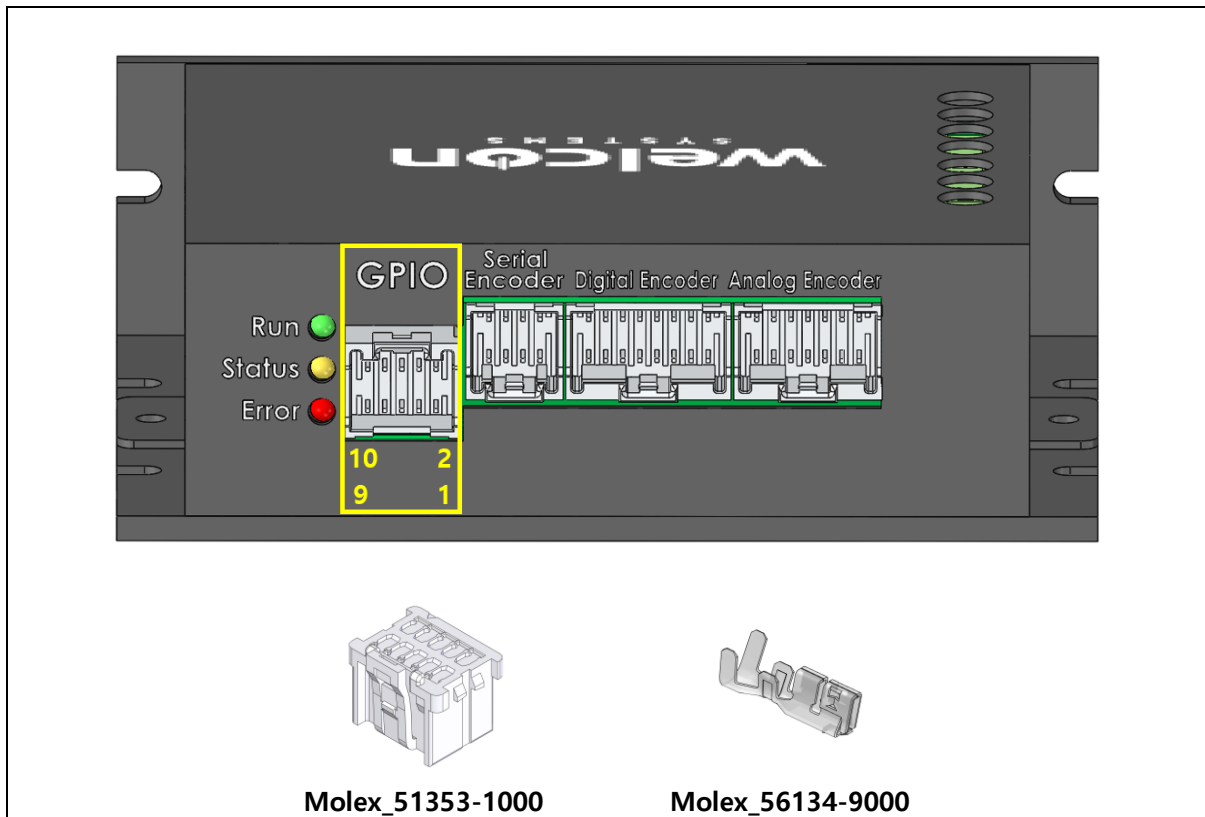
Molex_55959-1430		J701
Pin	Signal	
1	SIN+	
2	SIN-	
3	COS+	
4	COS-	
5	REF+	
6	REF-	
7	5V	
8	GND	
9	FG	
10	Analog Hall U	
11	Analog Hall V	
12	Analog Hall W	
13	Analog Input+	
14	Analog Input-	

3.9. Serial Encoder

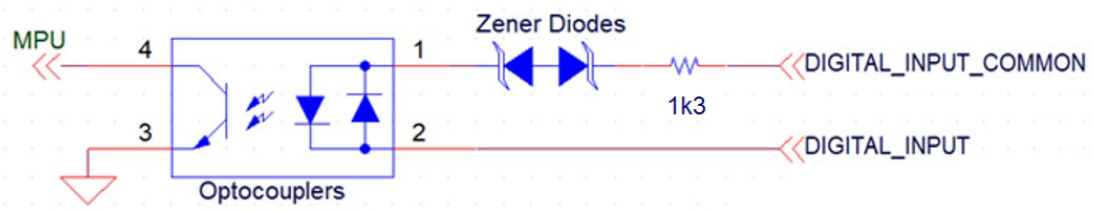


Molex_55959-0830		J601
Pin	Signal	
1	BISS_DATA+ / RS485_RTX+	
2	BISS_DATA- / RS485_RTX-	
3	BISS_CLK+	
4	BISS_CLK-	
5	Not Used	
6	Not Used	
7	5V	
8	GND	

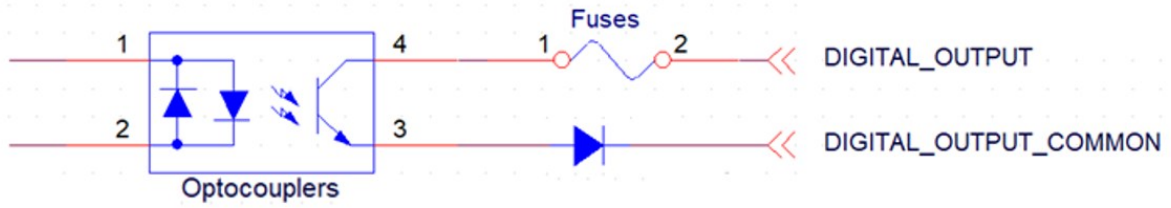
3.10. GPIO



Molex_55959-1030		J901
Pin	Signal	
1	GPI 0	
2	GPI 1	
3	GPI 2	
4	GPI 3	
5	GPI 4	
6	GPI 5	
7	GPI_COMMON	
8	GPO 0	
9	GPO 1	
10	GPO_COMMON	

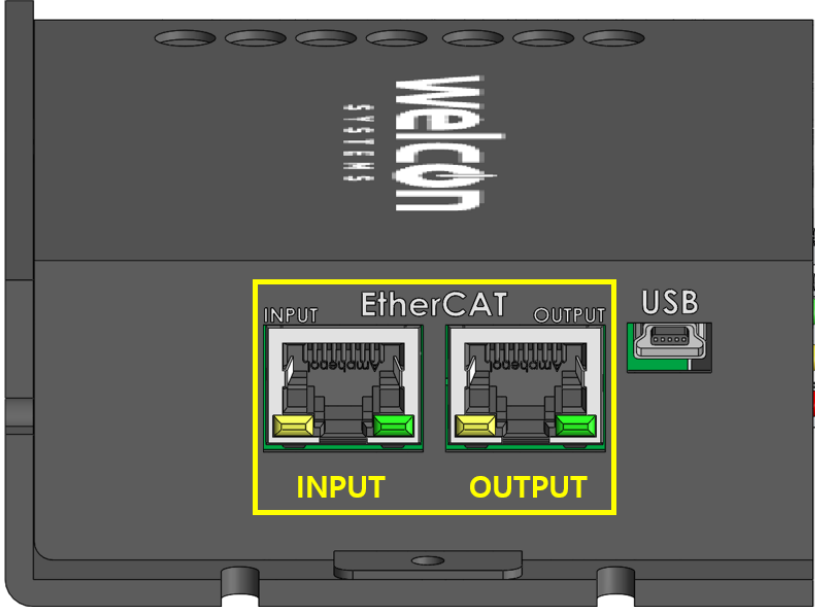


<Digital Input Circuit>

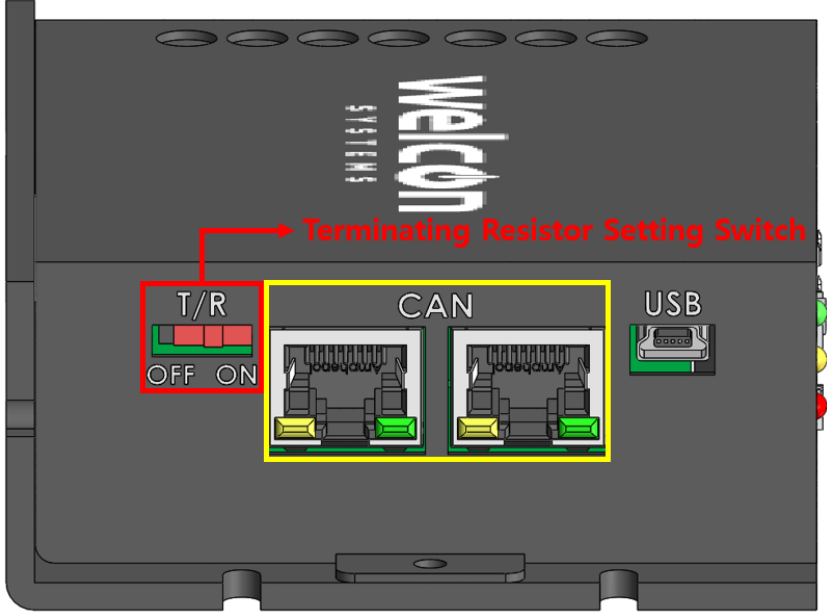


<Digital Output Circuit>

3.11. EtherCAT

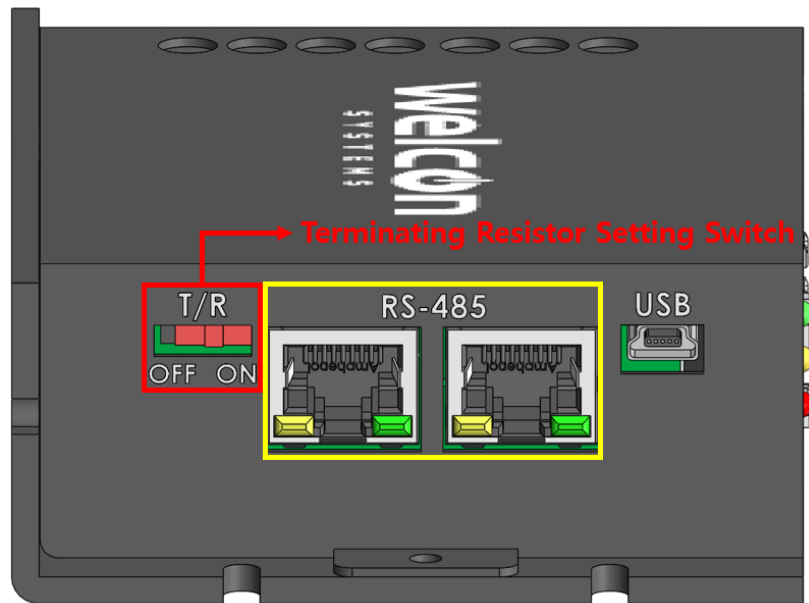
Fieldbus Type	Product Number
EtherCAT	WER-D048/20-FS04F7-E
	
Meritec_N3J11-017-02	J801, J802
Pin	Signal
1	EtherCAT Tx+
2	EtherCAT Tx-
3	EtherCAT Rx+
4	NC
5	NC
6	EtherCAT RX-
7	NC
8	NC

3.12. CAN

Fieldbus Type	Product Number	
CAN	WER-D048/20-FS04F7-C	
		
Meritec_N3J11-017-02	J801, J802	
Pin	Signal	
1	HIGH	
2	LOW	
3	GND	
4	NC	
5	NC	
6	NC	
7	NC	
8	NC	

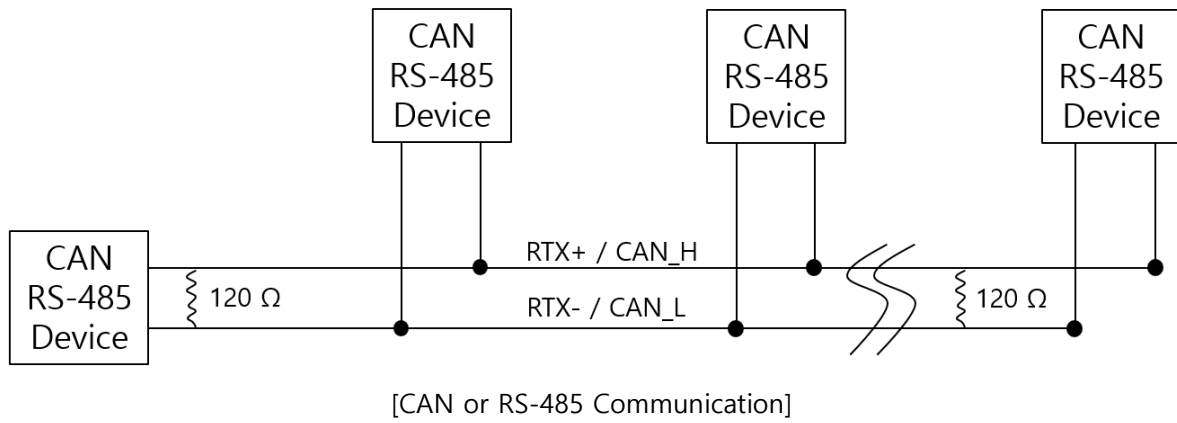
3.13. RS-485

Fieldbus Type	Product Number
RS-485	WER-D048/20-FS04F7-R

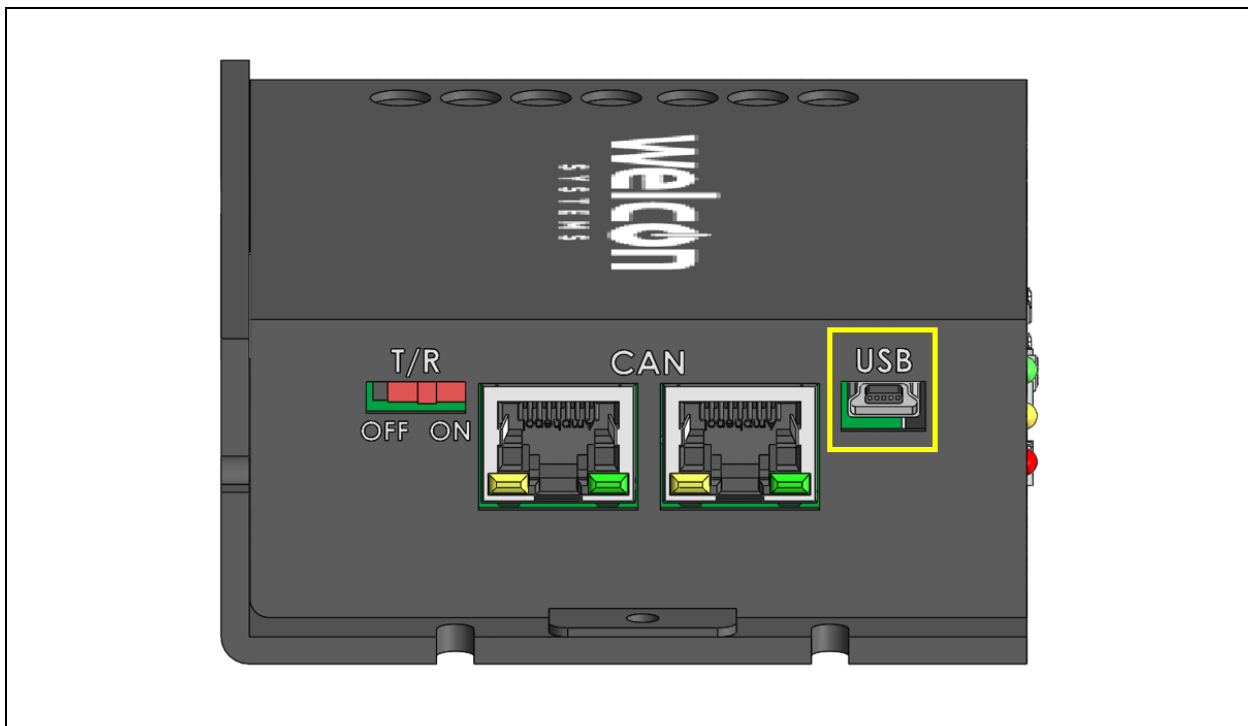


Meritec_N3J11-017-02		J801, J802
Pin	Signal	
1	RTX+	
2	NC	
3	GND	
4	RTX-	
5	NC	
6	NC	
7	NC	
8	NC	

- 종단 저항 설정 스위치를 이용하여 CAN or RS-485 신호선의 양 끝단에 종단 저항 연결
- Connect the terminating resistor to both ends of the CAN or RS 485 signal line using the terminating resistor setting switch.



3.14. USB



USB-Mini Type B (Keystone Model:934)		J101
Pin	Signal	
1	VBUS	
2	DM	
3	DP	
4	ID	
5	GND	
6	SHIELD	



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