DINGS
Precision Motion Specialist

VER 1.0

# Hardware Manual

## DS-BVS-FETC/FCAO



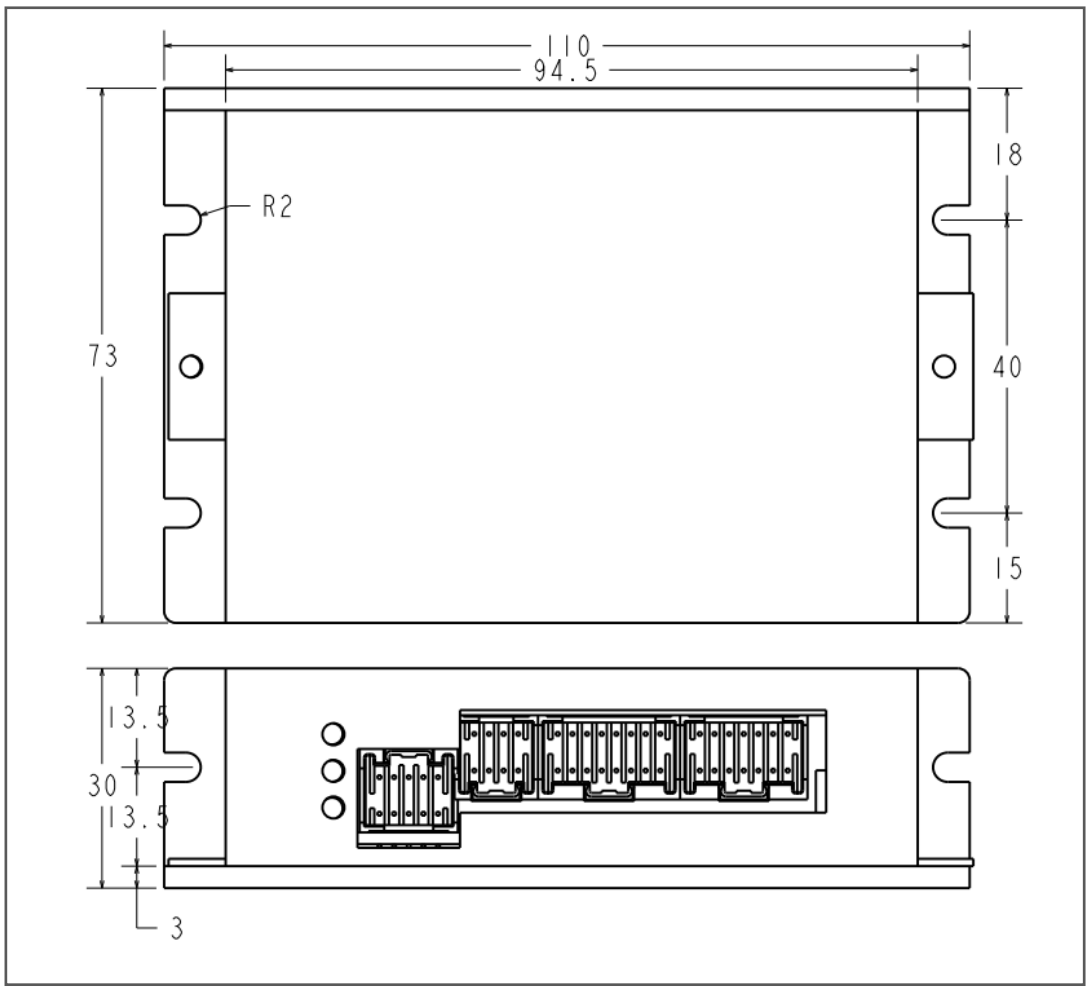
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# 1. Technical Information

## 1.1 Mechanical Data




| Item | Unit | Description |
|---|---|---|
| SIZE (L x W x H) | mm | 110 x 73 x 31 |
| Fastener | M3 | |

## 1.2 Electrical Data

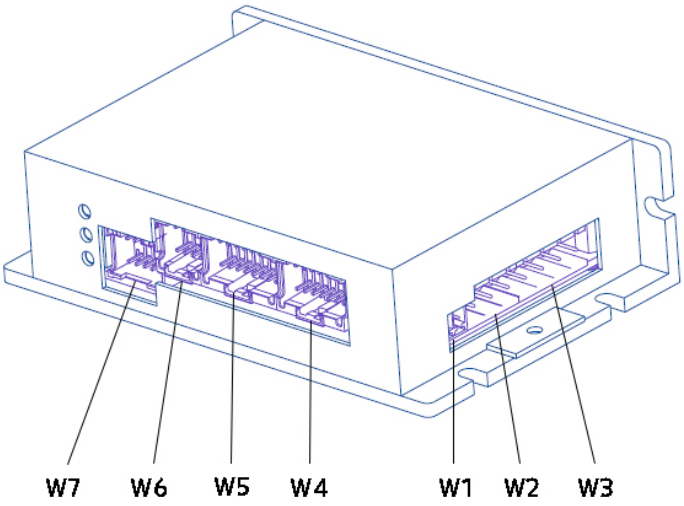
| DS-BVS-FETC/FCAO | | | |
|---|---|---|---|
| Basic | Motors | DC/BLDC/PMSM/VCM | |
| | Communication | USB + CANopen or EtherCAT(CoE, FoE) | |
| | GUI | DINGS' Servo Studio | |
| | Position Sensor | Incremental Encoder<br>Shared/Separated Hall Sensor<br>Analog Hall Sensor<br>Sin/Cos Encoder<br>SSI/Biss-C/Tamagawa Serial Encoder | |
| Inputs & Outputs | Analog Input | Quantity | 1 |
| | | Voltage Range | Analog ±10 VDC differential |
| | | Input Resolution | 14 bit |
| | Digital Input | Quantity | 6 (with STO) |
| | | Signal | Configurable. Opto-isolated |
| | | Voltage | 24V |
| | Digital Output | Quantity | 2 |
| | | Signal | Configurable. Opto-isolated. Open collector |
| | | Voltage | 24V |
| | | Max. Output Current | 50mA |
| Motor Feedback | General | Supply Voltage | 5VDC |
| | Incremental Encoder | Signal | A-quad-B with or without index, shared digital hall sensor, RS422, Differential |
| | | A-quad-B Max Input Frequency | 10MHz (before quadrature) |
| | Digital Hall Sensor | Signal | Differential-ended |
| | | Type | Separated and shared hall sensor |
| | Analog Hall Sensor | Signal | 0~5V, Single-ended |
| | | Sampling Frequency | 24KHz |
| | Sin/Cos Encoder | Signal | -0.7~+0.7V at 2.5V |
| | | Sampling Frequency | 24KHz |
| | Serial Encoder | Type | SSI, Biss-C, Tamagawa |
| | | Bite rate | 0.5Mbps, 1Mbps, 2Mbps, 2.5Mbps, 5Mbps |

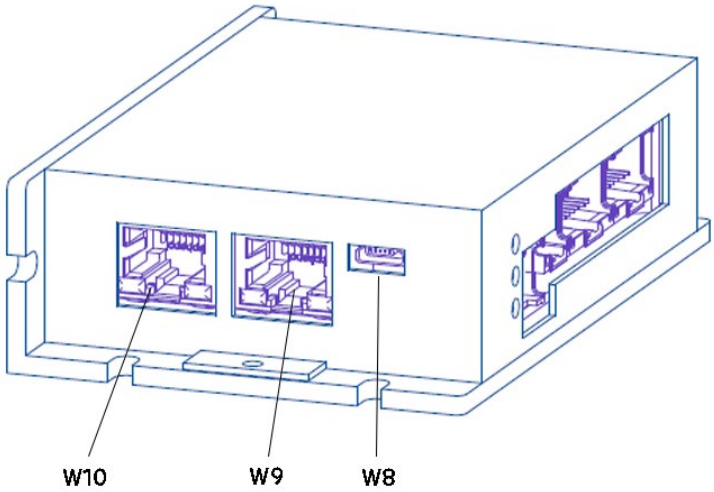
# 2. Wiring

## 2.1 Tools

| Tool | Manufacturer | Part Number |
|---|---|---|
| Hand crimp Tool | MOLEX | 63811-6300 |

## 2.2 Connections




**W1 → Regenerative resistance**

**W2 → Main Power**

**W3 → Motor Power**

**W4 → Analog Encoder**

**W5 → Digital Encoder**

**W6 → Serial Encoder**

**W7 → GPIO**

**W8 → USB**

**W9 → EtherCAT Output**

**W10 → EtherCAT Input**

## 2.3 Regenerative Resistance

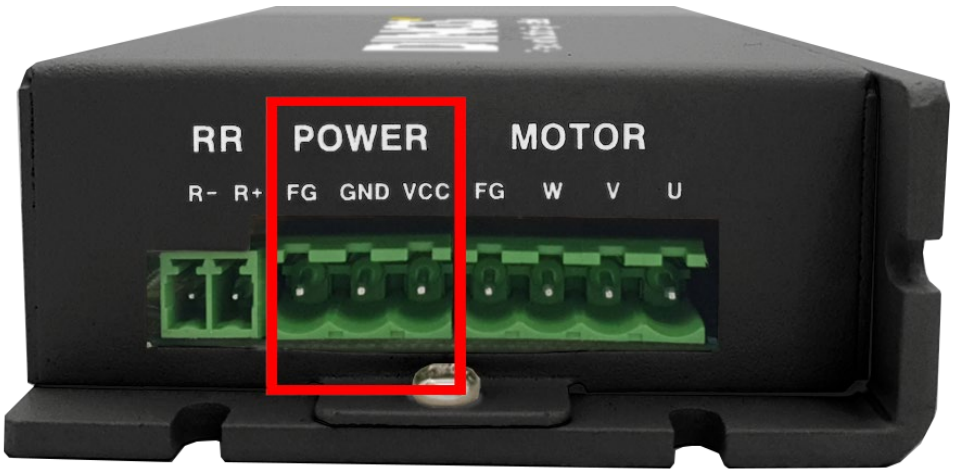





EC350V-2P

| ECH350R-02P | J904 |
|---|---|
| **Pin** | **Input Power** |
| 1 | R+ |
| 2 | R- |

## 2.4 Main Power






5ESDV 03P

| 5EHDR-03P | | J1 |
|---|---|---|
| **Pin** | **Signal** | **Input Power** |
| 1 | VCC | 12V ~ 48V DC |
| 2 | GND | GND |
| 3 | FG | FG |

## 2.5 UVW

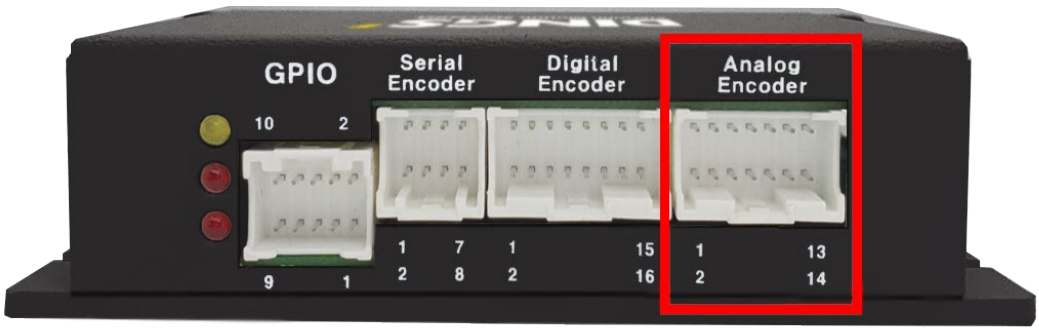





5ESDV 04P

| 5EHDR-04P | J101 |
|---|---|
| **Pin** | **Signal** |
| 1 | U |
| 2 | V |
| 3 | W |
| 4 | FG |

## 2.6 Analog Encoder




Molex_51353-1400

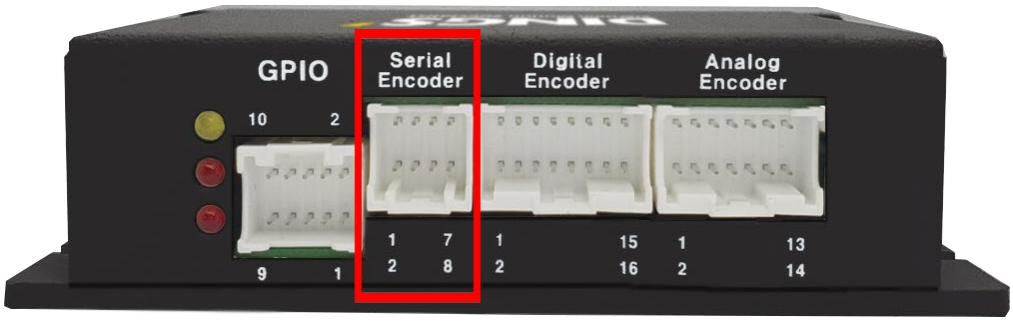


Molex 561349000



| MOLEX 55959-1430 | J901 |
|---|---|
| Pin | Signal |
| 1 | SIN+ |
| 2 | SIN- |
| 3 | COS+ |
| 4 | COS- |
| 5 | REF+ |
| 6 | REF- |
| 7 | 5V |
| 8 | GND |
| 9 | FG |
| 10 | AHALL_U |
| 11 | AHALL_V |
| 12 | AHALL_W |
| 13 | AIN+ |
| 14 | AIN- |

## 2.7 Biss Encoder




Molex_51353-0800

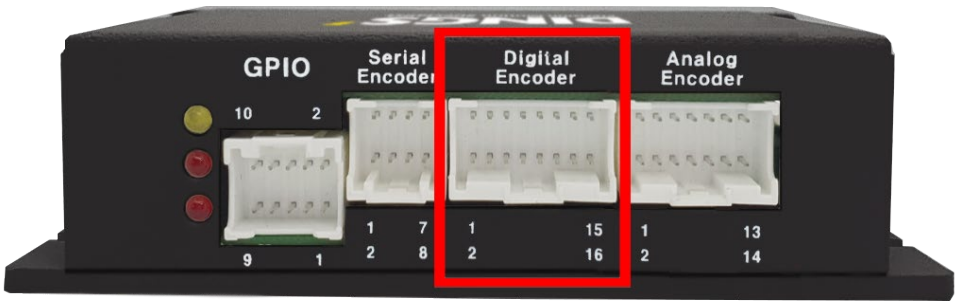


Molex 561349000



| MOLEX 55959-0830 | J801 |
|---|---|
| **Pin** | **Signal** |
| 1 | BISS_DATA+ (SLO+) |
| 2 | BISS_DATA- (SLO-) |
| 3 | BISS_CLK+ (MA+) |
| 4 | BISS_CLK- (MA-) |
| 5 | RS485_RTX+ |
| 6 | RS485_RTX- |
| 7 | 5V |
| 8 | GND |

## 2.8 Digital Encoder




Molex_51353-1600

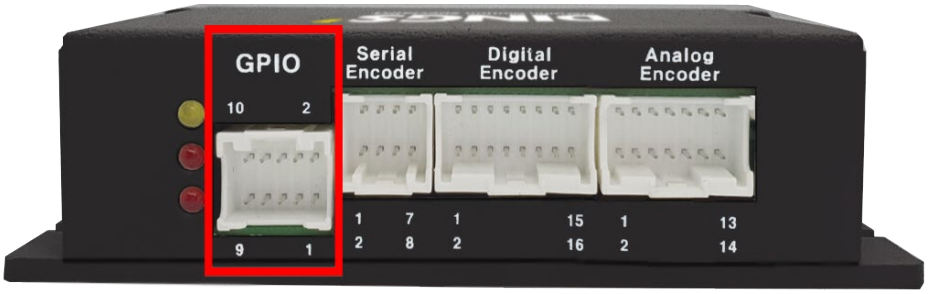


Molex 561349000



| Molex 55959-1630 | J701 |
|---|---|
| **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 | HALL U- |
| 11 | HALL V+ |
| 12 | HALL V- |
| 13 | HALL W+ |
| 14 | HALL W- |
| 15 | FG |
| 16 | GND |

## 2.9 GPIO



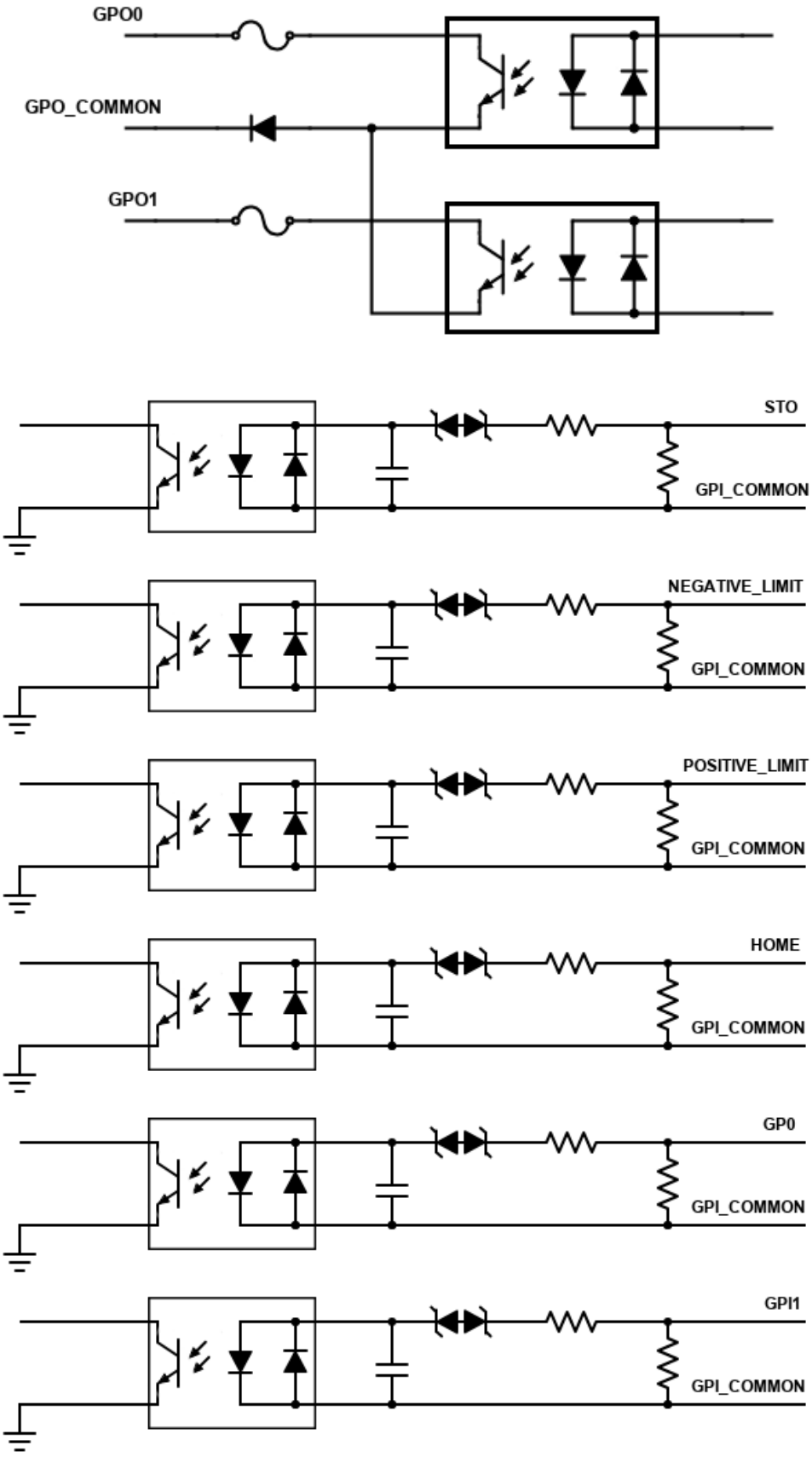

Molex_51353-1000



Molex 561349000

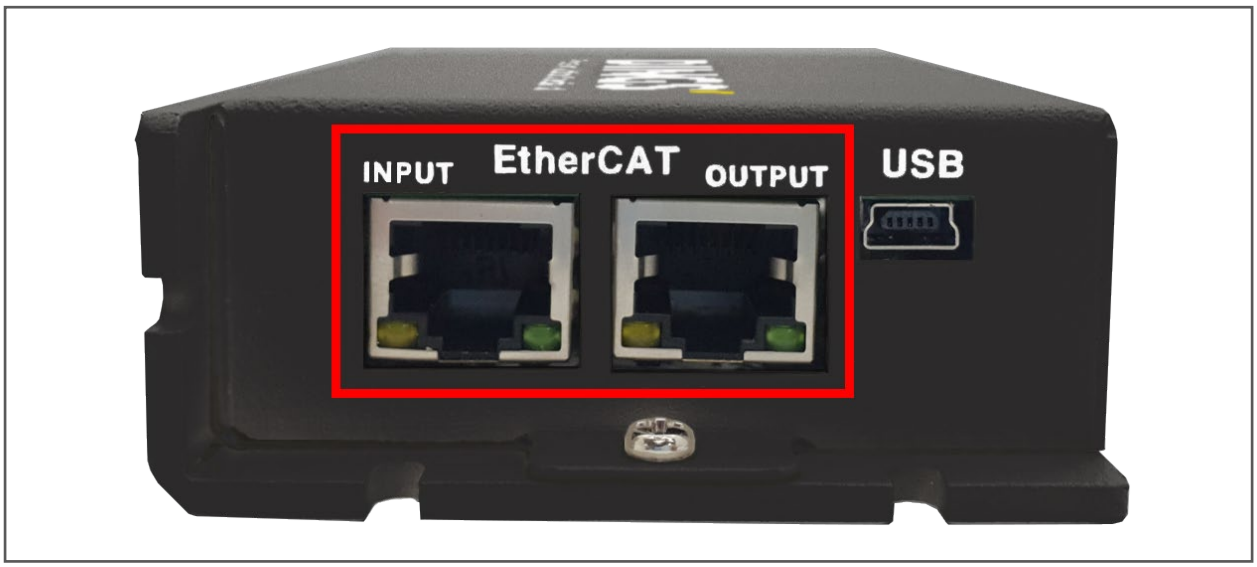


| Molex 55959-1030 | J301 |
|---|---|
| **Pin** | **Signal** |
| 1 | STO |
| 2 | NEGATIVE_LIMIT |
| 3 | POSITIVE_LIMIT |
| 4 | HOME |
| 5 | GPI 0 |
| 6 | GPI 1 |
| 7 | GPI_COMMON |
| 8 | GPO 0 |
| 9 | GPO 1 |
| 10 | GPO_COMMON |



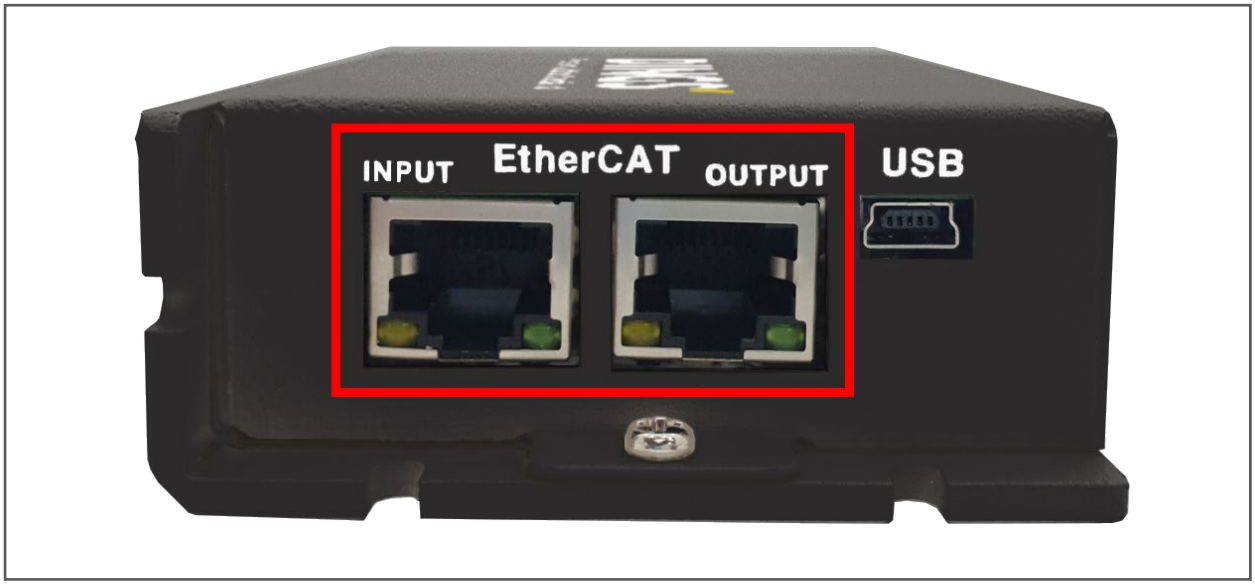

[GPIO Circuit]

## 2.10 EtherCAT



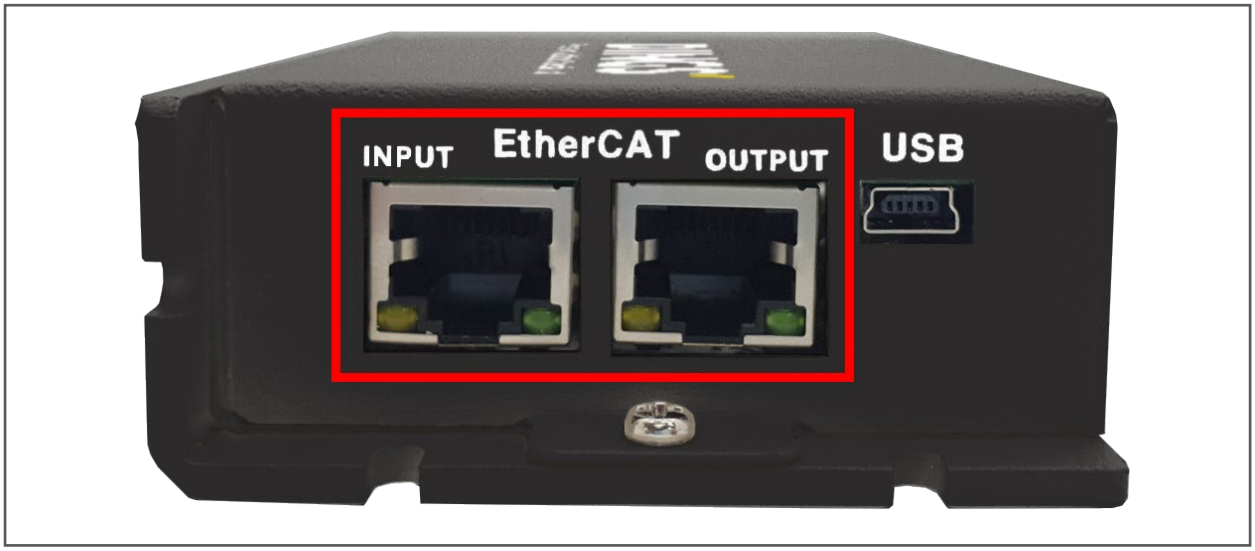

| 8pin RJ45 | |
|---|---|
| **Pin** | **Signal** |
| 1 | EtherCAT Tx+ |
| 2 | EtherCAT Tx- |
| 3 | EtherCAT Rx+ |
| 4 | NC |
| 5 | NCs |
| 6 | EtherCAT RX- |
| 7 | NC |
| 8 | NC |

## 2.11 CAN



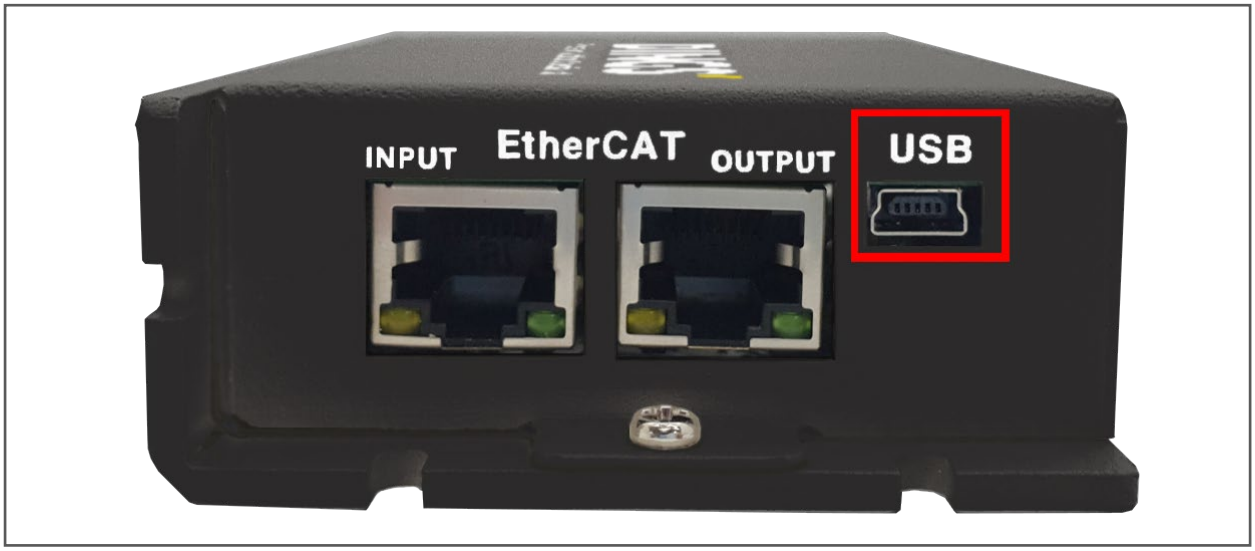

| 8pin RJ45 | |
|---|---|
| **Pin** | **Signal** |
| 1 | HIGH |
| 2 | LOW |
| 3 | GND |
| 4 | NC |
| 5 | NC |
| 6 | NC |
| 7 | GND |
| 8 | NC |

## 2.12 RS-485




| 8pin RJ45 | |
|---|---|
| **Pin** | **Signal** |
| 1 | RTD+ |
| 2 | NC |
| 3 | GND |
| 4 | RTD- |
| 5 | NC |
| 6 | NC |
| 7 | NC |
| 8 | NC |

## 2.13 USB




| USB-Mini Type B (Keystone Model : 937) | |
|---|---|
| **Pin** | **Signal** |
| 1 | VBUS |
| 2 | DM |
| 3 | DP |
| 4 | ID |
| 5 | GND |
| 6 | SHIELD |

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