**AIVE Smart feeder**

**Install manual**

**AIVE2.0**          **AIVE3.0**

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Your comments help us to prepare the future documentation. Please send your comments to: houns9@aim-fa.com

# Table of Contents

AIVE user guide

# 1. INTRODUCTION

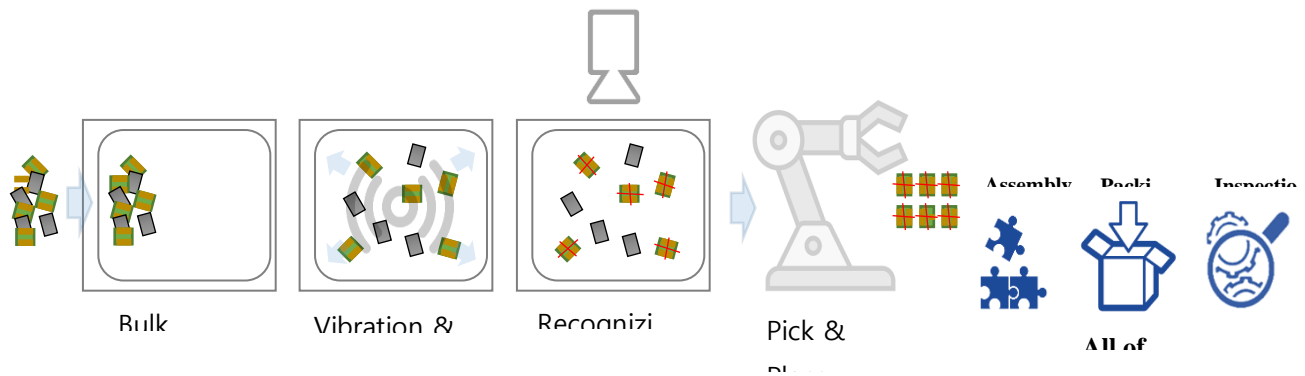## 1.1 Basic system configuration of Using AIVE and ROBOT



*Figure 1-1. Basic system configuration of using AIVE® and ROBOT*

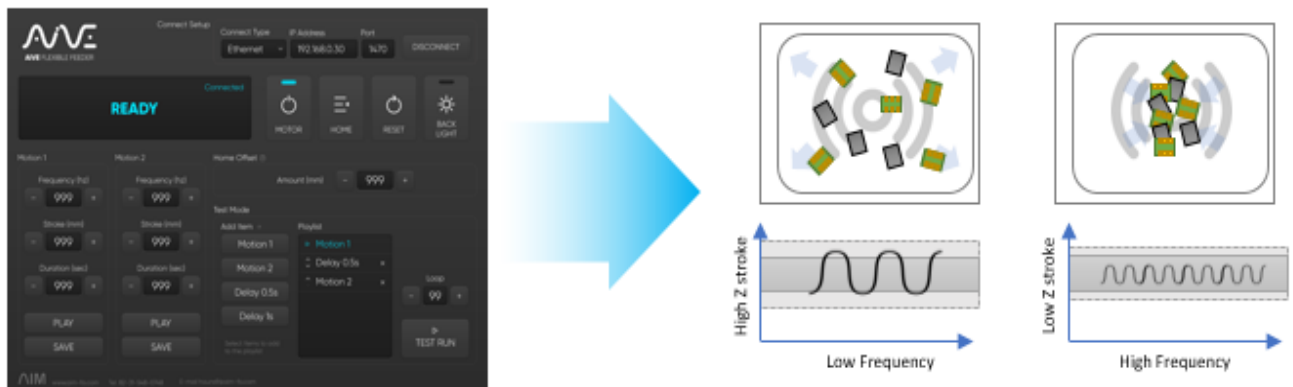## 1.2. Main features of AIVE



Figure   1-2.   Main  features  of  AIVE

## 1.3 What to do in an emergency situation

Press any E-stop button (A red push-button on a yellow background/ field) on any robot being used with the feeder, power-down the feeder, and then follow the internal procedures of your company or organization for an emergency situation. If a fire occurs, use $CO_2$ to extinguish the fire.

## 1.4 Introduction to AIVE

The AIVE® feeder is a vibratory feeder, capable of feeding a wide range of loose parts for handling by an industrial robot system with vision. The parts may have various shapes and be made of different materials.

For lubricated, fragile, and/or delicate parts, please contact AIM's technical office.

AIVE® feeders are not suitable for handling liquid products or fine grit.
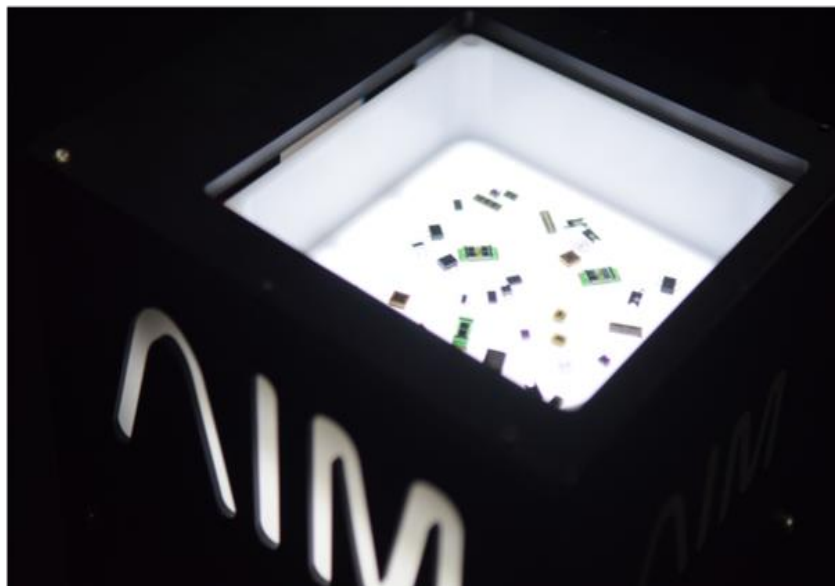


The AIVE® feeder consists of a square plastic box and various board devices on top of the vibration generator. An optional backlight to illuminate the parts is available.

Most of the AIVE® feeder components are enclosed inside the feeder body. A vibration feeder is exposed at the top of the device, the user-supplied camera is mounted above the feeder,

The plastic top of AIVE® is available in different materials and thicknesses, depending

on the kind of parts being fed, as well as the color required for the product.
This is the appearance of the AIVE® feeder. Because the vibrating platform is translucent, the camera can identify the silhouette of the plastic part.

The top of the feeder's frame is a steel frame, surrounding the vibrating platform. It is designed to contain the parts, which can be shaken or spread out by centrifugal force.

## Robotic Flexible parts feeding system



Camera (5Mp, 10Mp)

Top Light (Optional)

Robot

Bulk hopper

Flexible feeder AIVE
Backlight (Optional)

### 1-5 the inspection sheet of AIVE

## Inspection sheet

Serial No :     AIVE-120-000   (AIVE-specification-YY/MM/DD)
Product   :           AIVE
Model name:           AIVE-0000 (the serial number per AIVE)
The date of issue:      20220303-1 the confirmation of the person in charge/the first product of the date of settlement day

The date of test    : YYYY/ MM/DD          signature
Inspector              : OOO                 signature
The final confirmer: OOO                    signature
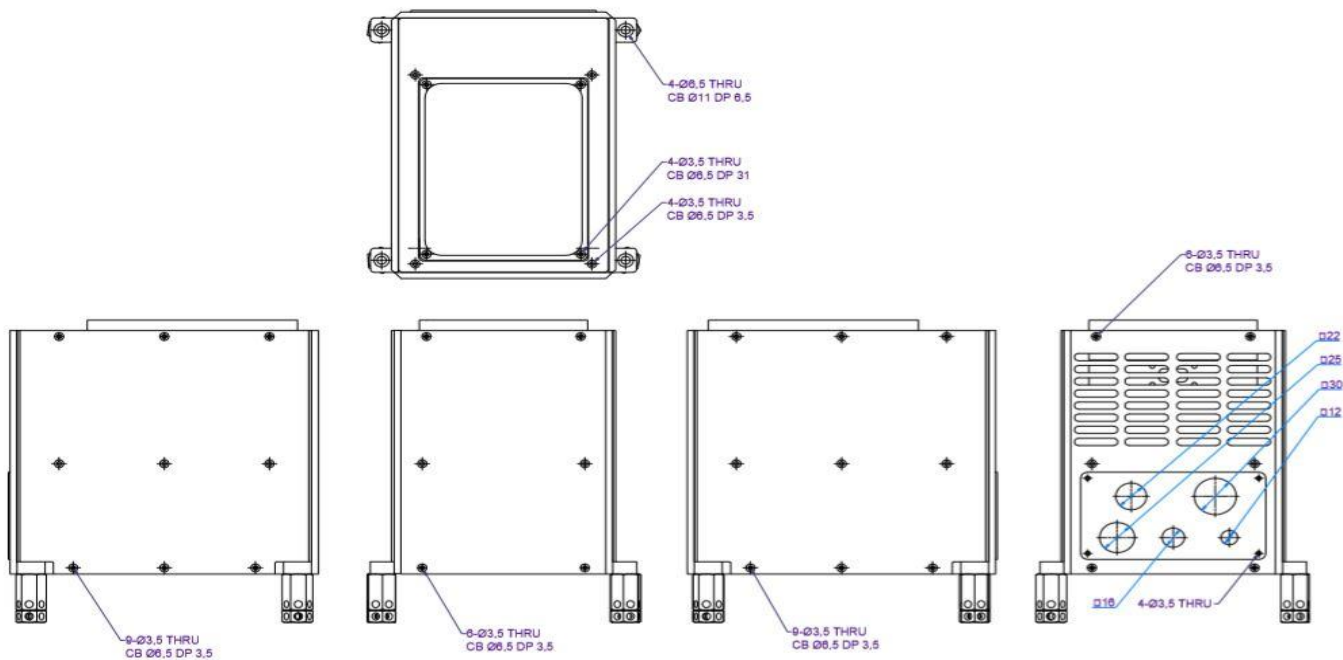
## The test category and result

### 1) Electric test

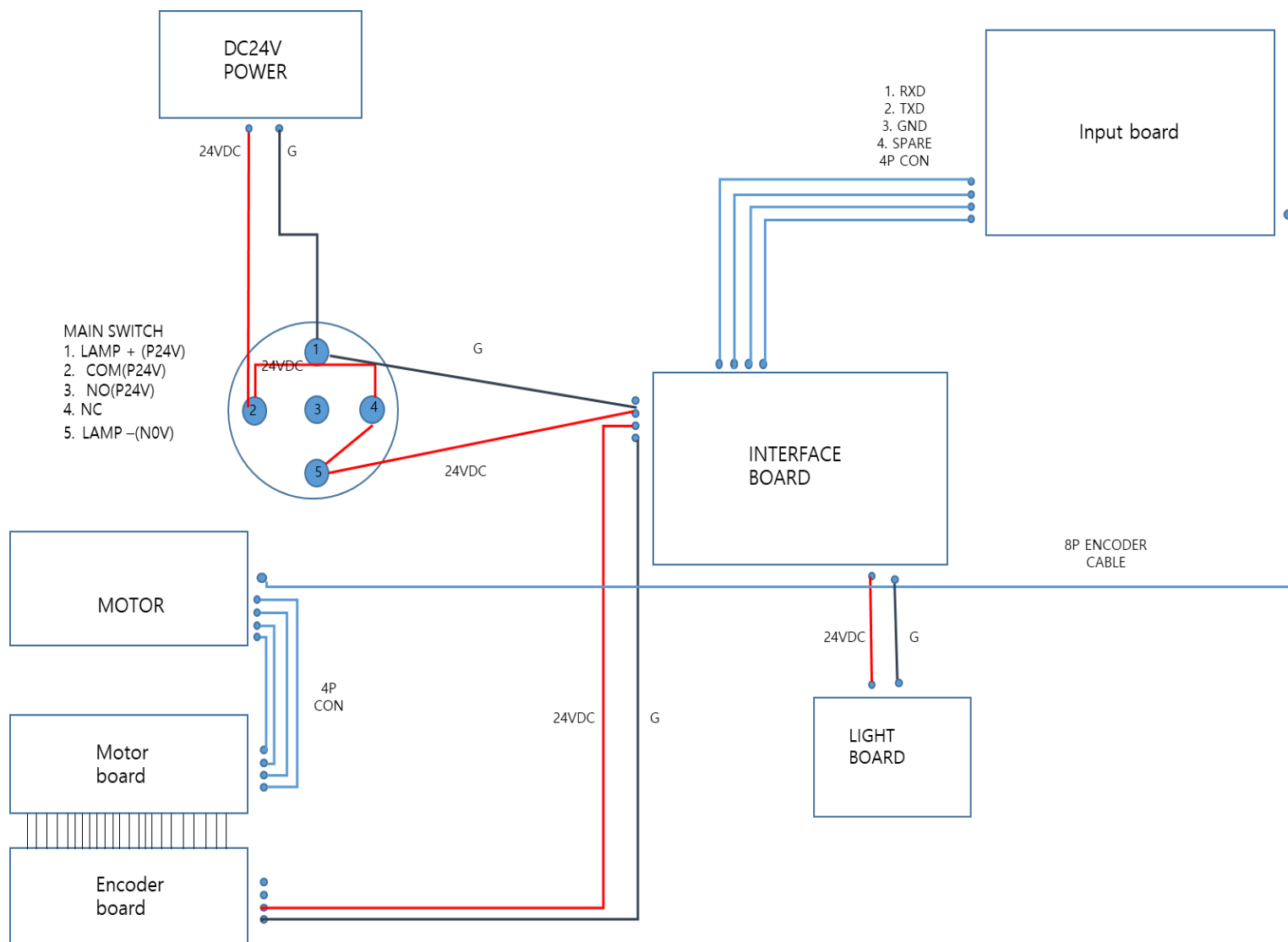| Item name | The content of test | SPECIFICATION | The result |
|---|---|---|---|
| power | Normality ON/OFF | 1time 100times ON/OFF per 5seconds?? | |
| | The inner BOARD normality ON | | |
| ETHERNET | The basic motion by ETHERNET | Activate 2H through MELSEC Q PLC | |
| I/O | The basic motion using I/O and PLC | Activate2Hthrough MELSEC Q PLC | |
| USB | The activation using USB | Activate 2H through 3MM, 20HZ | |
| MOTOR | Motions of spreading and gathering using AIVE program | After setting up 3MM, 20HZ, 4H After setting up0.2MM, 80HZ, 4H | |
| BACK LIGHT | The motion of BACK LIGHT ON/OFF by EHTERNET | Checking the contrast spreads equally on all the side of feeding through vision program, WiZER (Deviation within +-10) | |

## 2) The physical switch/LAMP test

| Item name | The content of test | SPECIFICATION | The test result |
|---|---|---|---|
| SERVE ON | LAMP lightning by pushing SERVE ON | Repeat 10 times | |
| HOME | Home movement by pushing Home button | Repeat 10 times | |
| FUNC #1 | activate after setting up 3MM 20HZ, | Repeat 10 times | |
| FUNC #2 | Activate after setting up 0.2MM 80HZ | Repeat 10 times | |
| Fault Release | Pushing SERVE ON button after pulling out the power motor cable | Repeat 5 times | |
| Manual ON | While not pushing this button, activate other manual buttons | Repeat 5 times | |
| Back Light | Checking the normality of Back light on/off | Repeat 5 times | |

## 3) The exterior check operation

| The list of test | The reference value | The test result |
|---|---|---|
| The appearance | No scratch/breakage | |
| The hole work | Tightening is positive | |
| | No omission of hole | |
| The parts | No omission. | |

## 1-6 the wiring information of AIVE

DC24V POWER

1. RXD
2. TXD
3. GND
4. SPARE
4P CON

Input board

24VDC    G

MAIN SWITCH
1. LAMP + (P24V)
2. COM(P24V)
3. NO(P24V)
4. NC
5. LAMP –(N0V)

24VDC

G

24VDC

INTERFACE BOARD

8P ENCODER CABLE

MOTOR

24VDC    G

LIGHT BOARD

4P CON

Motor board

24VDC    G

Encoder board

The wiring information

# 2. COMPONENTS

## 2-1 All the contents of AIVE



The customer would be given AIVE as the photo above
width: **340** X length: **300** X height: **360**    (the dimension of AIVE box)

**There are an** AIVE, input cable, output cable, power cable, USB, leveler in the box (as photos below), **please make sure if there are things missed**





**AIVE** appearance

**Input, output cable** are same, we provide two cables

**Power cable**



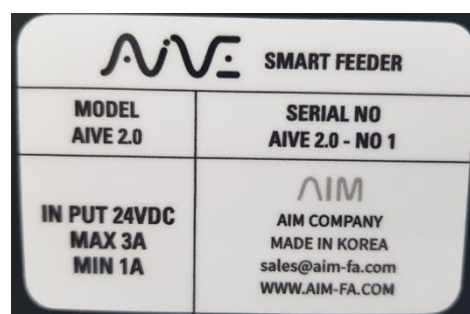**Levelers** (we provide four levelers)



**USB** (It includes manuals and program)



This is the photo the AIVE box open
The weight of AIVE, box, Styrofoam, all the
components included is **8kg**



This is the photo which
the first Styrofoam is taken out



(It's attached to AIVE)
Model name: AIVE 2.0
Serial number AIVE 2.0 no1
Input: 24vdc (Max 3A, Min 1A)

Each feeder is made up of the following parts.
- Frame
- Control port
- Vibrator
- PICK-UP ZONE
    - Size varies according to specification
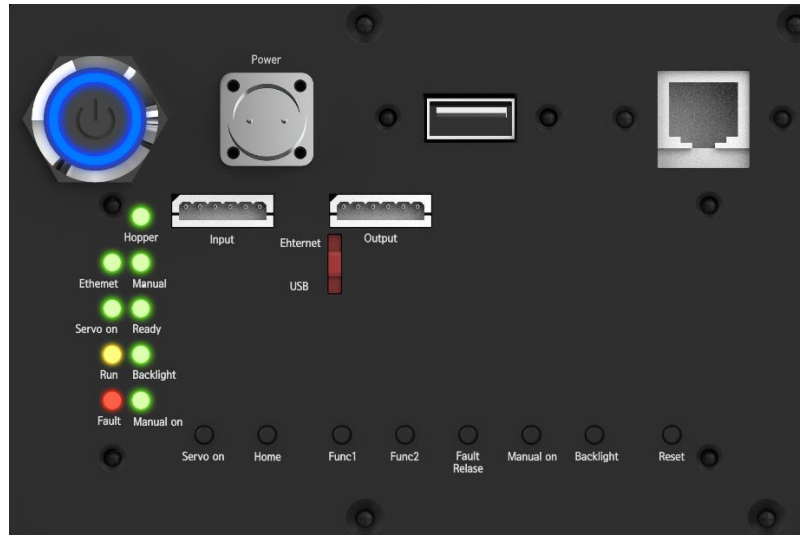- BACK LIGHT(optional)

## 2.2 Assembled frame status



Figure 2-1. AIVE appearance

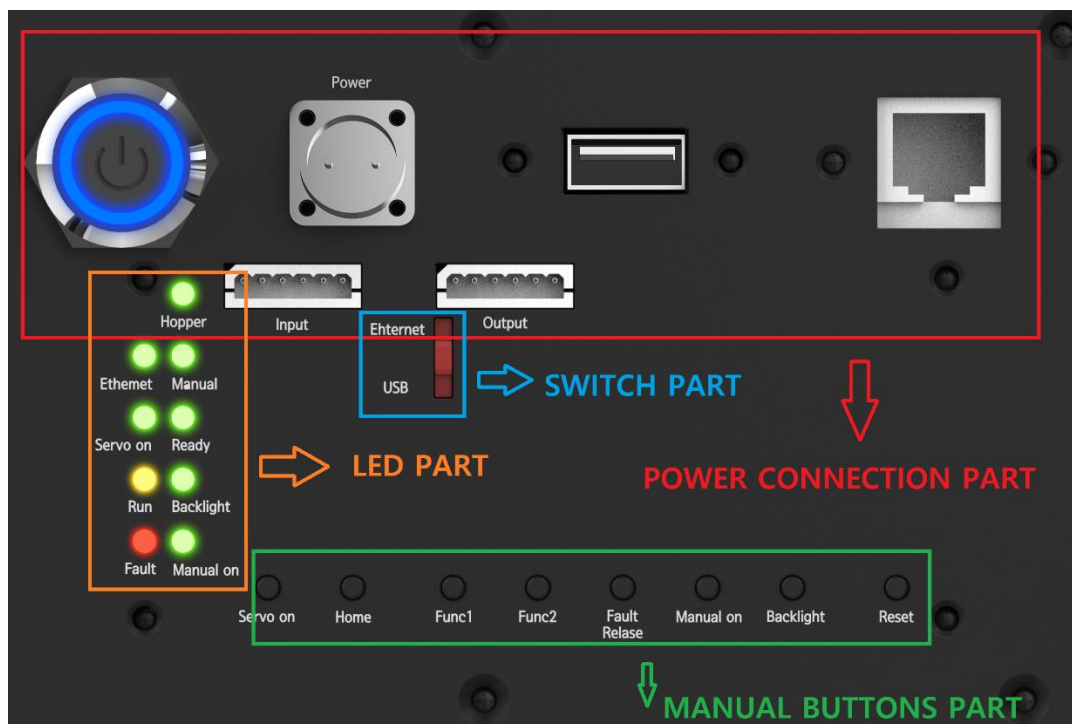The AIVE feeder is made of thick steel plate to protect the inside from unnecessary external impact.

## 2.3 Control port

There are communication ports and power ports in the control port, tested and provided by us.



The control port includes MAIN POWER SWITCH, LAN PORT, FUSE BOX, USB PORT, and I/O POWER CABLE PORT.
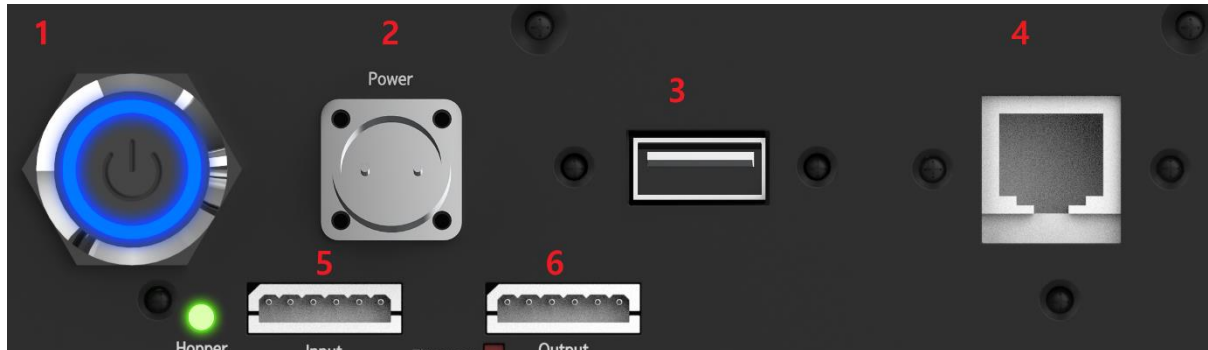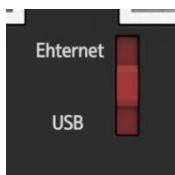
## The AIVE control port manual



**The form and section of AIVE control port**

# The section of power connection



1.  Power button : you can turn on/off AIVE through this button

2.  Power connect : you can provide power through this port

3.  USB port          4.Ethernet port



As next to this photo, you can decide the way of communication through this switch and connect the right port.(USB port or Ethernet port)

5,6 : Input, Output

| | 1 | A1 |
|---|---|---|
| | 2 | A2 |
| *Input* | 3 | A3 |
| | 4 | STROBE |
| | 5 | SPARE |
| | 6 | GND |
| | 1 | FAULT |
| | 2 | READY |
| *Output* | 3 | BUSY |
| | 4 | HOPPER |
| | 5 | SPARE |
| | 6 | GND |
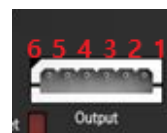




The set-up of input, output is as shown above

## The section of manual buttons



*You can activate the all manual buttons by pushing **Manual on** button

1. Serve on: When you push this button, the motor is powered on and ready to operate
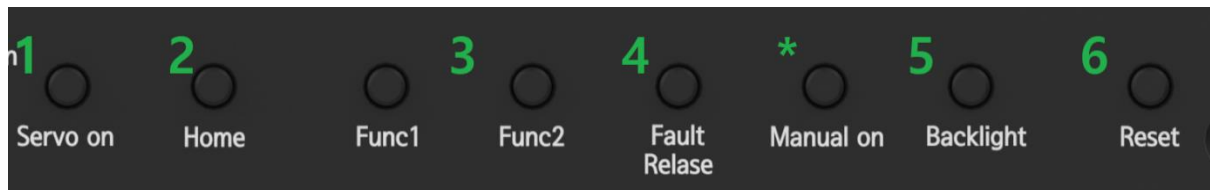
2. Home: When you push this button, the basket top of the AIVE where you put parts is fixed
Then AIVE is ready to operate

3. Func#1, Func#2: the roles of Func#1, Func#2 are gathering or spread the parts on the basket. The parts are gathered with high frequency of vibration or spread with low frequency of vibration. Users can set-up functions of Func#1, Func#2 as users want

4. Fault release: the red LED button turns on in case the feedback of Serve on or Home or connect doesn't come and in the case motor doesn't operate. You can turn off the red LED button by pushing Fault release button after solving these problems.

5. Back light: the white light comes in the basket of AIVE as photo below when you push this button.



6. Reset: All the memories users set in the control port reset when you push this button.

# The section of LED lights
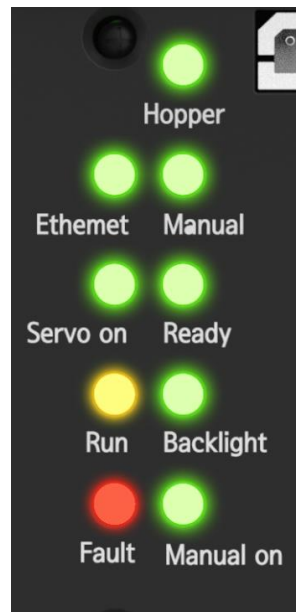


Every single LED light comes in the case the operation which is same with

LED's name performs

- ·○Hopper LED is turned on if hopper operates

- ·○Ethernet LED is turned on if the Ethernet port is connected

- ·○Serve on LED is turned on if the Serve on button's pushed

- ·○Ready LED is turned on if Home button's pushed

- ·○Run LED is turned on if Func#1, Func#2 is operating

- ·○Back light LED is turned on if Back light button's pushed

- ·○Fault LED is turned on if the feedback of Serve on or Home, connect

  doesn't come or the motor doesn't work. You can turn of this light by

  pushing Fault release button after solving the problem

- ·○Manual on LED is turned on if Manual on button's pushed.

## 2.4 Basket design



- 120mm x 150mm
- Parts size
  5mm ~ 40mm
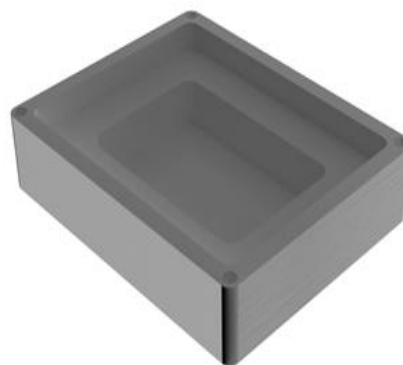
- 80mm x 50mm
- Parts size
  0.5mm ~ 5mm

## 2.5 Shape
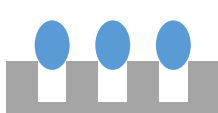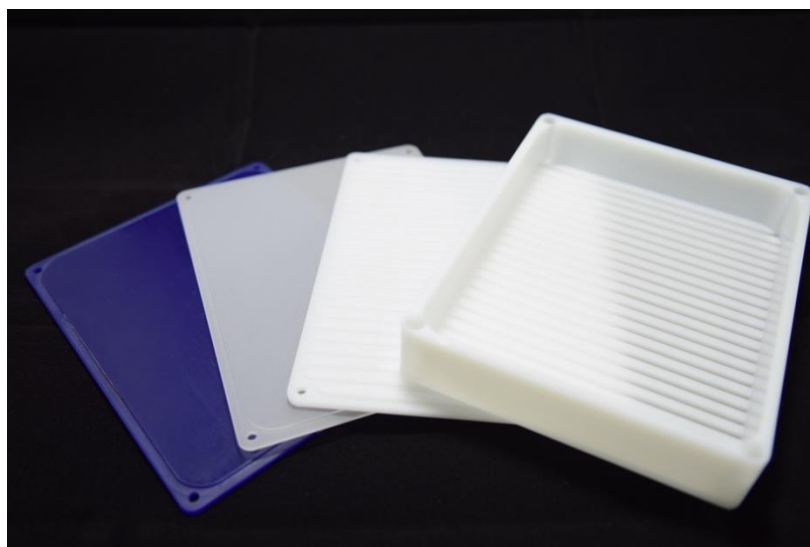




Cylindrical                    Thin parts

# 3. INSTALLATION

## 3.1 Installation

1. Position the feeder, checking that it is level and stable
2. Place 190 x 174mm (Width x Height, mm) tabs
3. Use M6 50mm bolt, and bolt it down to the floor.
4. Place the level gauge, and adjust the height using the parts on the following photo.



5. Align it with the robot as possible

## 3.2 DC

### Power supply

The 24 VDC power supply is user-supplied.

> **NOTE:** *You must provide your own power supply.* Make sure the power cables and power supply conform to the specifications in the following table.

## DC power specification

⚠️ **CAUTION**: make sure you select a 24 VDC power supply that meets the specifications in the preceding table. Using an underrated supply can cause system problems and prevent your equipment from operating correctly. See the following table for recommended power supplies.

Power Supply        PNP TYPE
CABLE Korea MISUMI        **PRC05P-P-A-12-2**
Customer-Supplied Power Supply        24 VDC (-10 % + 5 %) 1 A

## Connector assembly

1. Use the supplied connector to attach the user-supplied 24 VDC power supply to the feeder.

2. If necessary, you can purchase the product in accordance with the above specification from MISUMI in Korea.

# 4. OPERATION/ How to Use AIVE Program

## 4.1 How to use AIVE program



*Figure 4-1. AIVE program*

## AIVE program operation manual

1. You can choose the way of connect here (Ethernet or USB).
2. This is the IP address of AIVE
3. This is the AIVE port number.
4. You can turn on/off the AIVE's motor here
5. You can fix the basket top of the AIVE here then AIVE is ready to operate
6. You can reset all the memories in the AIVE here
7. You can turn on/off the backlight of AIVE here
8,9. You can save and play and also set up the motion of AIVE such as frequency, stroke, duration(sec) here

● AIVE default IP : 192.168.0.30, PORT : 1470

## 4.2 Digital Input and Output example

PLC example



Figure 4-2.   PLC configuration
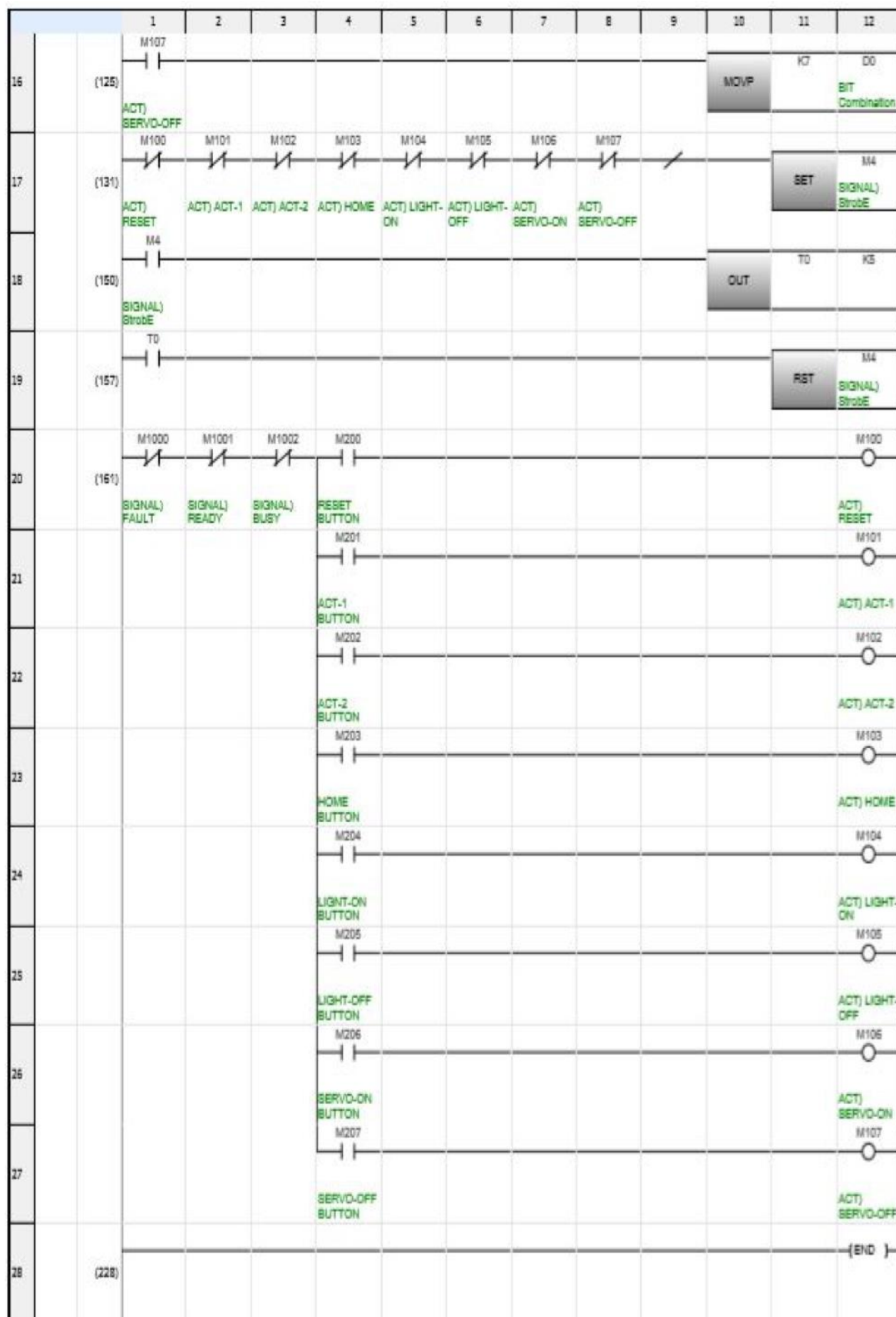
Figure 4-2. PLC configuration

## 4.3 TCP/IP (ex. Delta robot, Epson Robot)

**Vibration Platform communication Protocol**

Modified date: 2018.12.20

> Rates: 9600, Data: 8, Parity: None, Stop: 0
> ASCII Value

| Command | STX | Mode | DATA | ETX | Description |
|---|---|---|---|---|---|
| On | < | C | 1 | > | Actuator On |
| Off | < | C | 2 | > | Actuator Off |
| HOME | < | C | 3 | > | Actuator Home Position |
| Motion SAVE1 | < | C | 4 | > | Save Action 1 |
| Motion SAVE2 | < | C | 5 | > | Save Action 2 |
| Reset | < | C | 6 | > | Equipment Reset |
| Travel distance | < | P1 | NNN | > | Travel Distance : NN.N mm |
| Sine Waveform Cycle + operating time | < | P2 | NN,NN | > | Waveform Cycle : NN Hz, Time: 0~9.9sec |
| Home Offset Settings | < | P3 | NN | > | Home Offset : NN mm |
| Lamp On | < | L | 1 | > | Back LED On |
| Lamp Off | < | L | 0 | > | Back LED Off |

Figure 4-3. Sample system

> Rates: 9600, Data: 8, Parity: None, Stop: 0
> ASCII Value

## 4.3.1 Delta robot Example

```
function aive()      // ex Delta Robot    .
        aive=SocketClass("192.168.1.30",1470)      // Enter current IP address
        aive:Send("<C6>")                          // Equipment Reset
        DELAY(0.05)                                 // Delay time

        aive:Send("<C1>")                           // AIVE Power ON
        DELAY(0.05)                                 // Delay time

        aive:Send("<C3>")                           // AIVE Home Location
        print("aive_on")                            // Output to monitor AIVE ON
        DELAY(4)                                    // Delay time

        aive:Send("<P1020>")               // AIVE Vibration travel distance
                                                        2MM SETTING
        print("2.0mm")
                            // Output to monitor AIVE Vibration travel distance 2MM
        DELAY(1)

        aive:Send("<P220,03>")                     // AIVE operation 0.3sec
                                                      operation with 20HZ
        print("20HZ,0.3sec")
        DELAY(2)                                   // Delay time
End
```

## 4.3.2 EPSON Robot Example

```
Function AIVE                              //ex Epson Robot Preset IP
        CloseNet #208                      // Initialize Preset Ports
        OpenNet #208 As Client             // Port reopened
        WaitNet #208                       // Waiting for port reply

        Print #208, "<C1>" 'on             // Transfer Ready command for
                                             AIVE operation to Port 208
 Input #208, data$                         // Wait for Receive data at Port 208
 Print #208, "<C3>" 'home                  // Transfer Move to HOME position
                                             command to port 208
        Input #208, data$                  // Wait for Receive data at Port 208
        Wait 0.05

        Print #208, "<P1025>" //'Travel distance
                    // Transfer the AIVE setting distance to 2.5 MM to port 208
        Input #208, data$                  // Wait for Receive data at Port 208
        Wait 0.05

        Print #208, "<P220,10>" //'start
            // Transfer vibrate 0.1sec in operation with 20Hz command to port 208
        Print "20Hz 1sec"
                        // Output to monitor Vibrate 1 sec in operation with 20Hz
        Wait 1.1                                           // Delay time

        CloseNet #208                                 // Initialize port
```

## 4.4 programming via digital I/O (ex. Melsoft GX work3 plc)

| INPUT description | | | | | |
|---|---|---|---|---|---|
| A5 | Strobe | Input 24V | | | Function |
| SPARE | A4 | A3 | A2 | A1 | |
| 0 | 1 | 0 | 0 | 0 | Reset |
| 0 | 1 | 0 | 0 | 1 | Action 1 |
| 0 | 1 | 0 | 1 | 0 | Action 2 |
| 0 | 1 | 0 | 1 | 1 | Home |
| 0 | 1 | 1 | 0 | 0 | Light On |
| 0 | 1 | 1 | 0 | 1 | Light Off |
| 0 | 1 | 1 | 1 | 0 | SERVO ON |
| 0 | 1 | 1 | 1 | 1 | SEREVO OFF |
| 0 | 0 | x | x | x | - |

| Out Description | | | |
|---|---|---|---|
| PORT | Function | Active | |
| 1 | Fault | Low | 24 V → 0V |
| 2 | Ready | Low | 24 V → 0V |
| 3 | Busy | Low | 24 V → 0V |
| 4 | Hopper | Low | 24V |

## 4.2 Digital Input and Output example
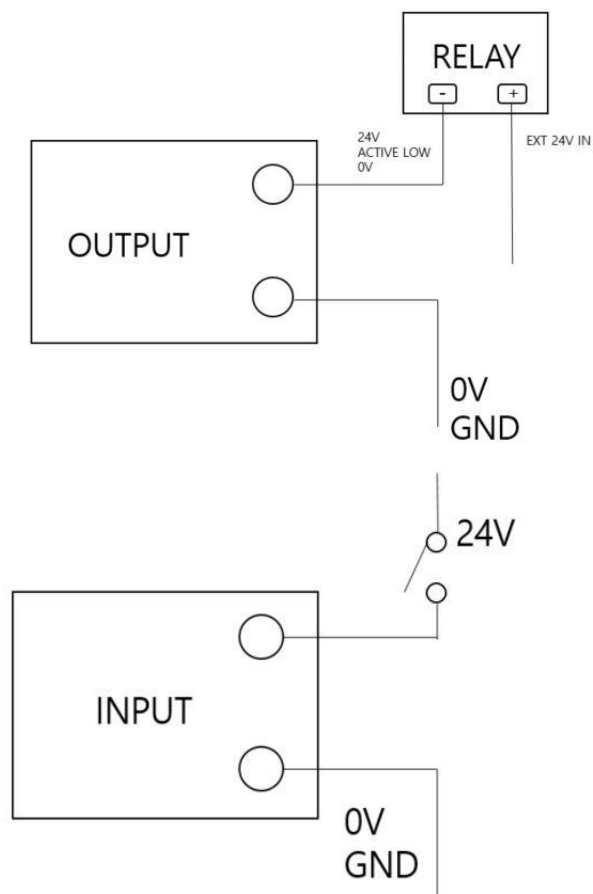


| Connector | Cable number | Usage | Classification |
|---|---|---|---|
| A | 1 | *Minus Power* | *Power* |
| B | 2 | *PLUS Power* | |
| C | 3 | *A1* | *INPUT* |
| D | 4 | *A2* | |
| E | 5 | *A3* | |
| F | 6 | *STROBE* | |
| G | 7 | *GND* | |
| H | 8 | *FAULT* | *Ouptut* |
| J | 9 | *READY* | |
| K | 10 | *BUSY* | |
| L | 11 | *GND* | |
| M | 12 | *SPARE* | *SPARE* |

**Figure 4-2. I/O Wiring Practice**

## 4.5 I/P Settings

Proceed with the ezManager program
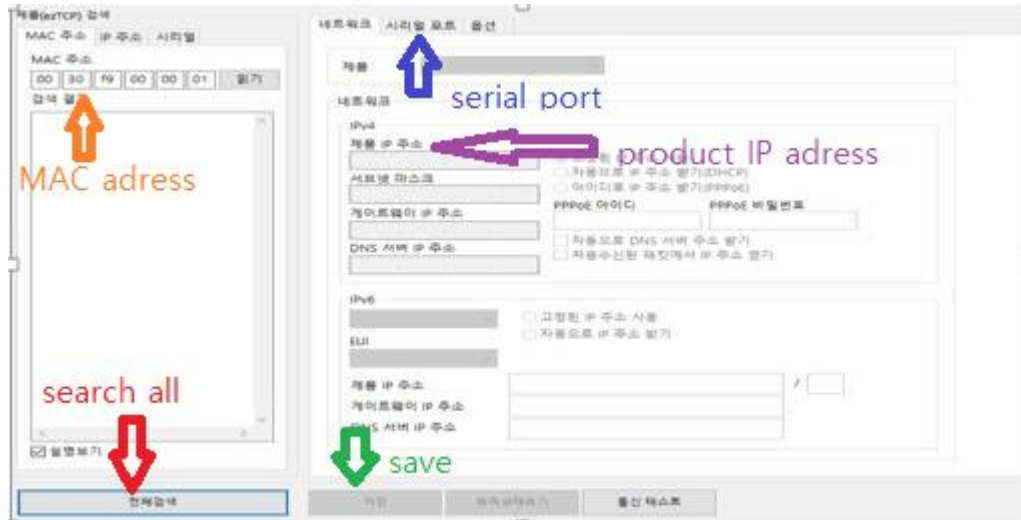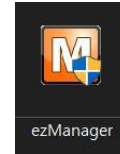This program is included in the USB file we provide


Figure 4-5. EZMANAGER Setting

1. Connect the LAN cable to the AIVE and power it on.
2. Change the MAC address as the screenshot below.



3. Click 'Search All' to display the searched AIVE.
4. The IP address of the current AIVE is displayed on the product IP address of the network item.
5. Enter the IP address you want to change in the product IP address.
6. Press the Save button at the bottom.
7. Search again and confirm that the IP address has been changed.

Figure 4-5. EZMANAGER setting 2

11. The above picture is the screenshot when the AIVE is searched.
12. Set the serial port items as shown above.

- AIVE default IP : 192.168.0.30, PORT: 1470
- The appropriate set-up of serial port
  #1: RS-932, #2: 9600, #3: TCP server, #4: 1, #5: 0D 00 00 00
  The initial set-up would be same with set-up above, but if it's different with any reason, you have to change into the initial set-up

AIVE user guide