

# CM-700 Technical Information

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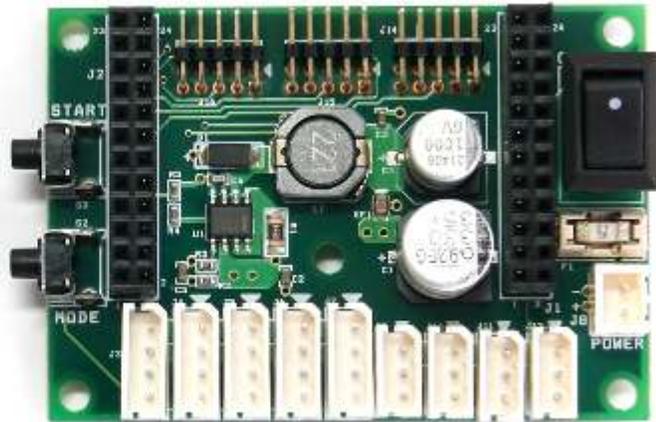
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## Part Photo

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**CM-700**

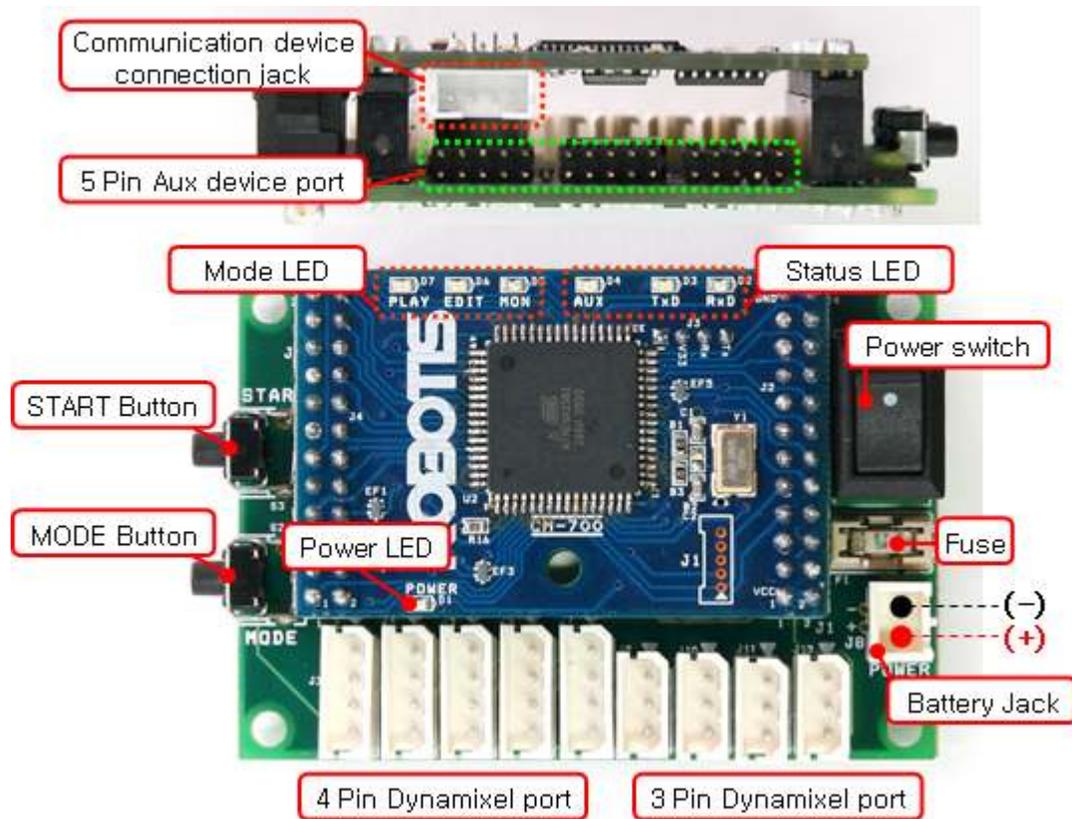


**CM-700 SUB Board**

- **CM-700** is a control module type controller with a CPU, TTL / RS485 communication circuit and ZIG-110 connector. You cannot control dynamixels or other peripheral devices alone with the CM-700. You will need a SUB board.
- **CM-700 SUB Board** is composed of a power department, connector department, switch, and an additional circuit for 5 pin peripheral devices.
- You may refer to the connector pin layout to make your own SUB board.

## Name of Each Part

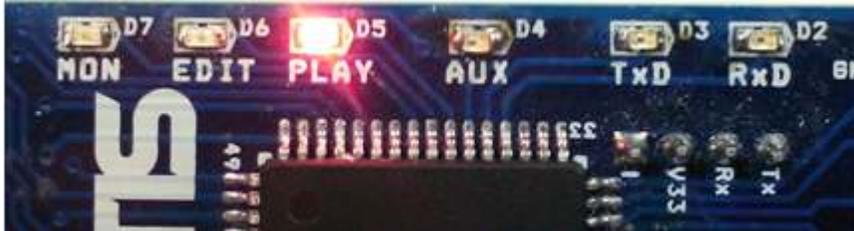
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[The name of each part : CM-700]

- **PC Link (Serial Cable) & Communication Device Connection Port : LN-101** is used to connect the CM-700 and PC. It is used to download task code or communicate with PC. Also, it can be used for wireless communication module such as [ZIG-110](#) and IR Receiver etc., or communication with other external board.
- **Battery Socket** : Socket for connecting the battery.
- **Power LED** : ON and OFF LED for the power.
- **Power Switch** : Used to turn the robot ON / OFF.
- **MODE Button** : Used to change the operation mode of CM-700. Please read below for more information.
- **START Button** : Used to START selected mode. Please read below for more information.
- **3-Pin Cable Connector** : Used to connect Dynamixels using 3 pin cable(TTL Communication) in a daisy chain method.
- **4-Pin Cable Connector** : Used to connect Dynamixels using 4 pin cable (RS-485 Communication) in a daisy chain method.

- **Peripheral Devices Connection Port** : Used to connect peripheral devices such as [DMS](#), [Touch Sensor](#), and [IR Sensor](#) etc.
- **Mode Display LED** : LED to display current operation mode of CM-510; Detailed descriptions are provided as below.



#### [ MON ]

- It displays Dynamixel Management Mode is in progress.
- It is used to set or test the operations of CM-700 and Dynamixel using RoboPlus Manager.
- It is automatically executed when [RoboPlus Manager](#) and CM-700 are connected.

#### [ EDIT ]

- It displays the motion edit mode is in progress.
- It is used when the motions are edited with RoboPlus Motion.
- It is automatically executed when [RoboPlus Motion](#) and CM-700 are connected.

#### [ PLAY ]

- It displays the task edit mode is in progress.
- It is used after downloading the written code to CM-700 with [RoboPlus Task](#).
- The Start button must be pressed directly by the user to execute When PLAY LED flickers.
- **Status Display LED** : The LED represents the current status of CM-510. Detailed discriptions are provided as below.
  - **TxD** : Turned on while CM-700 is transmitting the data to the outside.
  - **RxD** : Turned on while CM-510 is receiving the data from the outside.
  - **AUX** : Assigned LED to be used by the user in the program. It can be turned on or off using task code.

## Power Supply

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The CM-700 which consists of a micro-controller, is divided into a power department, various connectors, and SUB board. Depending on the connection of each board, the working voltage range may change so please refer to the below information to make your own battery.

#### CM-700 + User's Custom SUB Board

Because the CM-700 does not have a regulator, the power supply from the user's custom SUB board to the CM-700 must be 5V.

- **CM-700 Working Voltage** : 4.5 ~ 5.5 V

#### CM-700 + CM-700 SUB Board

When connecting and using the CM-700 and ROBOTIS's SUB board only, below is the allowed power range for the SUB board.

- **CM-700 + SUB Working Voltage** : 7 ~ 35 V

#### CM-700 + CM-700 SUB Board + Dynamixels

Our SUB board has a comprehensive working voltage range to use all released dynamixel line-ups. Thus, the working voltage for the SUB board is restricted depending on the dynamixel you are using.

Dynamixel In Use	Min. Voltage	Max. Voltage	Li-Po Conversion	Ni-MH Conversion
AX-12+	7	12	2 ~ 3 cells	6 ~ 10 cells
DX-117	12	16	3 ~ 4 cells	10 ~ 13 cells
RX-10	10	12	3 cells	8 ~ 10 cells
RX-28	12	16	3 ~ 4 cells	10 ~ 13 cells
RX-64	12	18	3 ~ 5 cells	10 ~ 15 cells
EX-106+	12	18.5	3 ~ 5 cells	10 ~ 15 cells

When using 2 or more different types of dynamixels together, the voltage range must be where all of the dynamixels can work.

Thus, the minimum voltage should be the dynamixel's highest voltage spec and the maximum voltage should be the lowest voltage to suit the working range.

For example, when using the AX-12+ and RX-64 together, AX-12+ is 7 ~ 12 V, and RX-64 is ~ 18 V. Thus the working voltage would be 12V, meaning Li-Po conversion would be 3 cells and Ni-MH would be converted in 10 cells.

Connect the battery into the CM-700's battery socket, and then set the power switch to supply power. Once the power is supplied, the POWER LED will turn on, and one of the MODE LED will start blinking.



## How to Operate

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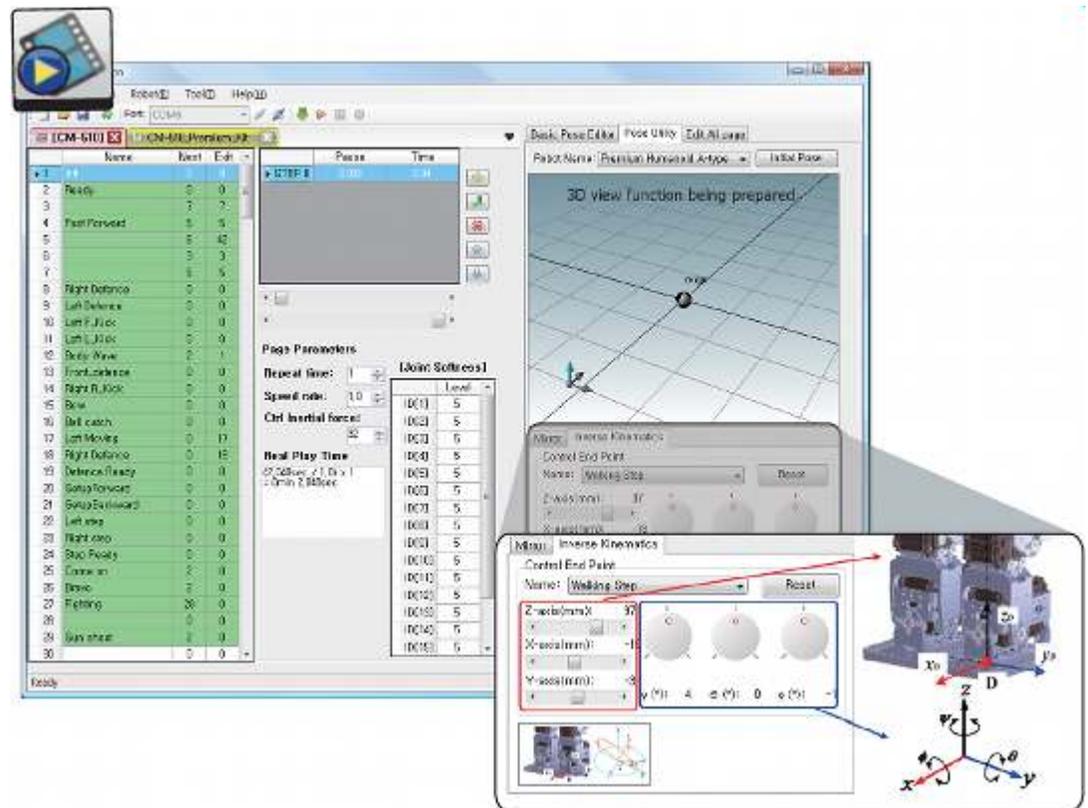
- **[Turning the power on]** : The power is turned on by moving the switch from **OFF** to **ON**.
    - If the power is not turned on in spite of moving the switch to ON, the batteries may have been discharged.  
Please refer to [Charging](#) to recharge, or connect the power using SMPS.
  - **[ Start ]** : Move to **PLAY** using **Mode Button** to operate robots. Press **START Button** to execute when the LED on **PLAY flickers**.
    - If START button is pressed, the LED on **PLAY** is not supposed to be **flickering** any more; that is the normal status of the execution.
  - **[ End ]** : If you want to stop the executed operations, press **MODE Button** to get back to waiting mode status, or turn **OFF the power using Power Switch**.
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# Usage

## RoboPlus

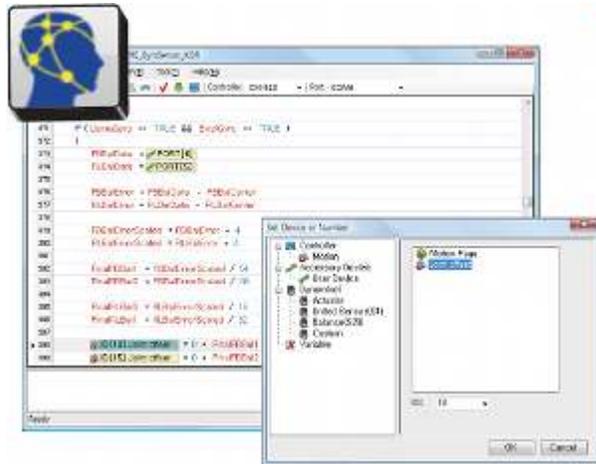
- It is used to control Dynamixel and the peripherals, and it can connect Dynamixel(AX-12+, AX-S1, AX-S20, DX-Series, RX-Series EX-Series... etc.) and various parts of OLLO(Geared Motor, Touch Sensor, LED Module, IR Sensor etc.).
- Specific motions can be edited and saved through [RoboPlus Motion](#). The saved motion (mtn file) can be always executed by [RoboPlus Task](#), and also the motions of each part can be controlled by writing the task codes for control.

### □ RoboPlus Motion



### □ RoboPlus Task

### □ RoboPlus Manager



## Connecting Wireless Communication Module

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- ZIG-110 wireless communication module can be connected to CM-700.



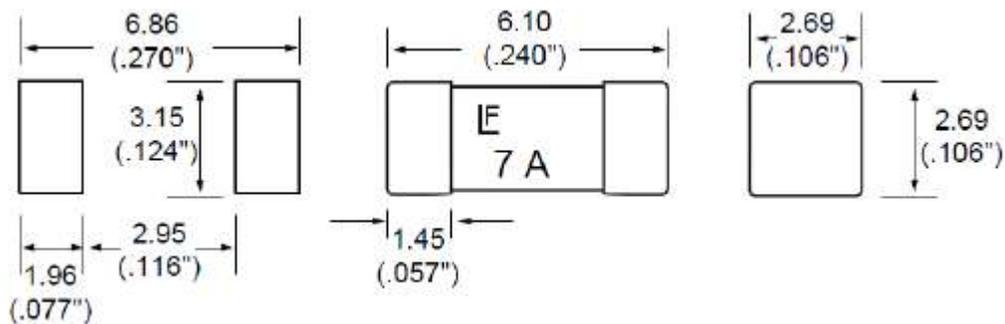
## Replacing the Fuse

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There is a fuse to prevent from damaging the circuit due to over current.

If the CM-700 does not turn on, there is a high chance your fuse is blown. Replace the fuse right away.

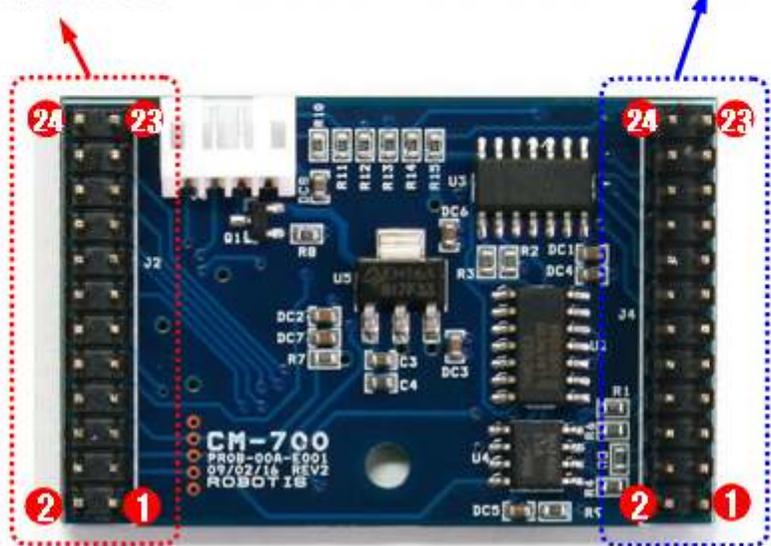
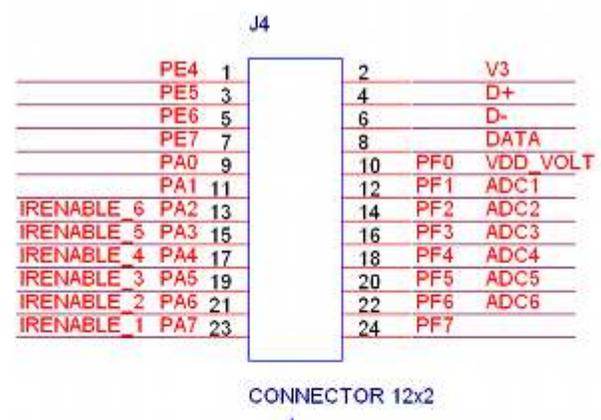
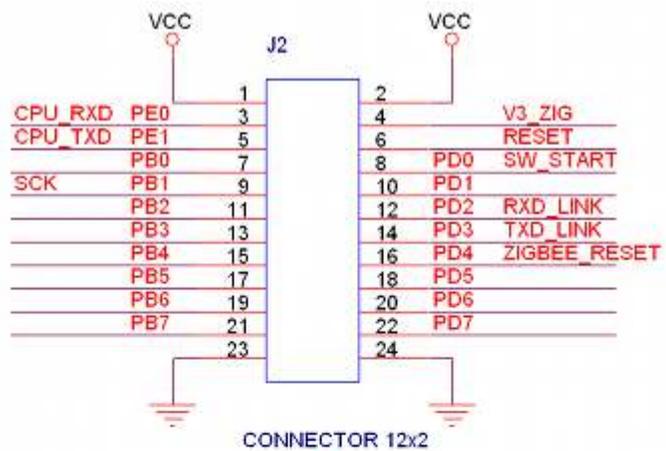
- The fuse size of CM-700 is as below, and you may use a product with a capacity between 125V / 5A ~ 10A. (It is the same as CM-510)



## Sub-Board Connector Information

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The pin layout of the connector which connects CM-700 and SUB board is as below.

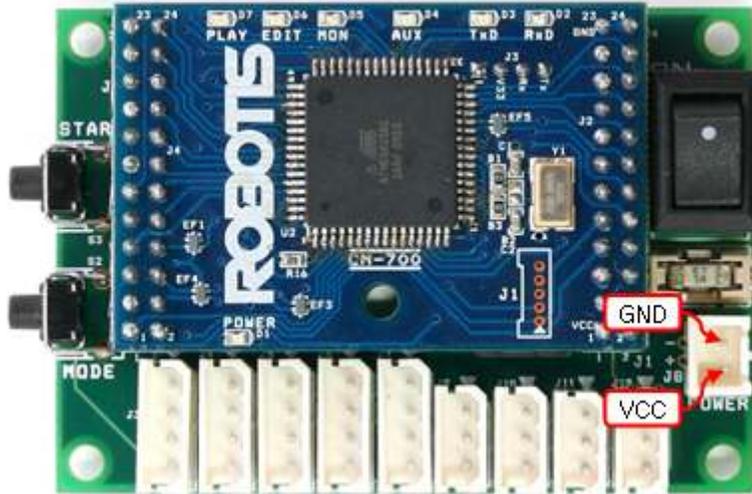


## Pin Information to Build User Application Device

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### Power

The pin composition of CM-700 power is as below.

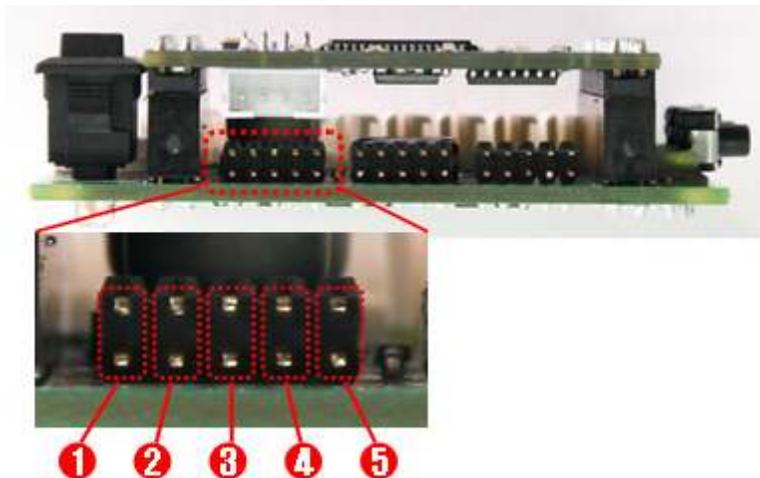


### External 5-Pin Port

Users can create a sensor to control and connect to the 5 pin peripheral device connection port.

However, composing the wrong circuits may damage your controller's circuit, so please learn more about circuit before doing so.

Below is the 5 pin layout information for a peripheral device.



1. OUT : 5V Output Possible (Maximum Allowed Current 0.9A)
2. VCC (5V)
3. ADC : The analog signals from the sensor made by the user can be read.
4. GND
5. NC : Not Used

## Communication Device Connection Port

The functions of pins on the communication device connection port are as follows.

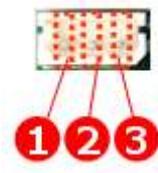


1. RXD : Receive Signal Terminal
2. TXD : Transmit Signal Terminal
3. VCC : Supply Voltage ( 2.7~3.6V )
4. GND : Ground Level (0v)

## 3-Pin Connector Port

The functions of pins on the 3-pin connector port are as follows. Pleaser refer to [AX-Series Pin Assignment](#) for more information.

Please be careful not to change the direction considering the angular part.



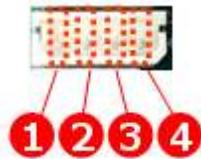
1. GND : Ground Level (0v)
2. VDD : Supply Voltage (It is equal to the voltage of battery)
3. DATA : Data Transmission Pin

## 4-Pin Connector Port

The functions of pins on the 4-pin connector port are as follows. Pleaser refer to [RX-Series Pin Assignment](#) for more information.

(It is compatible with 4-pin of DX and EX Series.)

Please be careful not to change the direction considering the angular part.



1. DATA- : Data Transmission Pin
2. DATA+ : Data Transmission Pin
3. VDD : Supply Voltage (It is equal to the voltage of battery)
4. GND : Ground Level (0v)

## H/W Specification

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- Weight : 37.3g
- Controller : ATmega2561
- Working Voltage
  - Allowed Range : 7V ~ 35V
  - Recommended Voltage : Please refer to the above "Power Supply."
- Consumed Current
  - When IDLE : 40mA
  - Exterior I/O Maximum Current : 0.9A
  - Overall Maximum Current : 10A (Fuse)
- Working Temperature : -5℃~70℃
- Internal I/O Device

- Button : 2 sets (Reset 1, Start 1)
- Temperature Sensor : 1
- Voltage Sensor : 1
  
- External I/O Device
  - OLLO Peripheral-Device Compatible 5 pin I/O Port : 6
  - 3-Pin Connector for Dynamixel using TTL Communication : 4
  - 4-Pin Connector for Dynamixel using RS-485 Communication : 5