MX-106R, MX-106T

NOTE : Compliance has been replaced with PID Gains.

NOTE : Although the MX-106T (TTL) and MX-106R (RS-485) differ in communications protocols both have the same features and perform equally. (TTL uses 3-pin connectors while RS-485 uses 4)

NOTE : In order to use Protocol 2.0, please update the firmware to V39 or above. (Update firmware using R+ Manager 2.0)

WARNING : For MX-106(2.0) Protocol, please refer to the MX-106(2.0) Control Table as they are different.

1. Specifications

Item	Specifications
MCU	ARM CORTEX-M3 (72 [MHz], 32Bit)
Position Sensor	Contactless absolute encoder (12Bit, 360 [°]) Maker : ams(www.ams.com), Part No : AS5045
Motor	Coreless(Maxon)
Baud Rate	8,000 [bps] ~ 4.5 [Mbps]
Control Algorithm	PID control
Resolution	4096 [pulse/rev]
Backlash	20 [arcmin] (0.33 [°])

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Item	Specifications
Operating Mode	Joint Mode (0 ~ 360 [°]) Wheel Mode (Endless Turn)
Weight	165 [g]
Dimensions (W x H x D)	40.2 x 65.1 x 46 [mm]
Gear Ratio	225 : 1
Stall Torque	8.0 [Nm] (at 11.1 [V], 4.8 [A]) 8.4 [Nm] (at 12[V], 5.2 [A]) 10.0 [Nm] (at 14.8 [V], 6.3 [A])
No Load Speed	41 [rev/min] (at 11.1 [V]) 45 [rev/min] (at 12 [V]) 55 [rev/min] (at 14.8 [V])
Radial Load	[1] 40 [N] (10 [mm] away from the horn)
Axial Load	[1] 20 [N]
Operating Temperature	-5 ~ +80 [°C]
Input Voltage	10.0 ~ 14.8 [V] (**Recommended : 12.0 [V]**)
Command Signal	Digital Packet
Protocol Type	TTL Half Duplex Asynchronous Serial Communication with 8bit, 1stop, No Parity RS485 Asynchronous Serial Communication with 8bit, 1stop, No Parity
Physcial Connection	RS485 / TTL Multidrop Bus
ID	254 ID (0 ~ 253)
Feedback	Position, Temperature, Load, Input Voltage, etc
Material	Full Metal Gear Engineering Plastic(Front, Middle, Back) [1] Metal(Front)
Standby Current	100 [mA]

[1] Applies to alumium housing products(MX-28AR/AT, MX-64AR/AT, MX-106R/T).

DANGER

(May cause serious injury or death)

- Never place items containing water, flammables, and solvents near product.
- Never place fingers, arms, toes, and other body parts near product during operation.
- Cut power off if product emits strange odors or smoke.
- Keep product out of reach of children.
- Check the power polarity before wiring.

CAUTION

(May cause injury or damage to product)

- Do not operate the product at a temperature exceeding -5 ~ +80 [°C] range.
- Do not insert sharp blades nor pins during product operation.

ATTENTION

(May cause injury or damage to product)

- Do not disassemble or modify product.
- Do not drop or apply strong shock to product.

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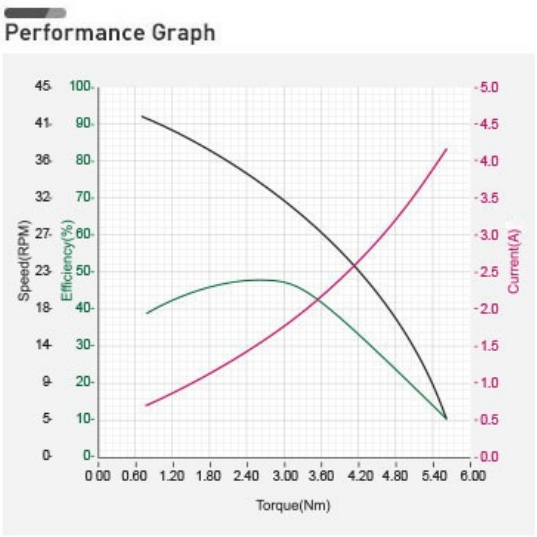
1. 1. Performance Graph



NOTE : The Max Torque and the Stall Torque of Performance Graph are different in measurement methods. Stall torque is a measured value of the momentary torque that it can reach. This is generally how RC servos are measured. The Performance graph is also called as N-T curves, which is measured with the gradually increasing load. The actual motor operation environment is closer to the performance graph, not stall torque method. For this reason, the performance graph is broadly used in the industrial field. Generally, Max Torque of the Performance Graph is less than the Stall Torque.

CAUTION : When supplying power

- It is recommended using ROBOTIS controller or SMPS2DYNAMIXEL.
- Do not connect or disconnect DYNAMIXEL when power is being supplied.

2. Control Table

The Control Table is a structure of data implemented in the device. Users can read a specific Data to get status of the device with Read Instruction Packets, and modify Data as well to control the device with WRITE Instruction Packets.

2. 1. Control Table, Data, Address

The Control Table is a structure that consists of multiple Data fields to store status or to control the device. Users can check current status of the device by reading a specific Data from the Control Table with Read Instruction Packets. WRITE Instruction Packets enable users to control the device by changing specific Data in the Control Table. The Address is a unique value when accessing a specific Data in the Control Table with Instruction Packets. In order to read or write data, users must designate a specific Address in the Instruction Packet. Please refer to Protocol 1.0 for more details about Instruction Packets.

NOTE : Two's complement is applied for the negative value. For more information, please refer to Two's complement from Wikipedia.

2. 1. 1. Area (EEPROM, RAM)

The Control Table is divided into 2 Areas. Data in the RAM Area is reset to initial values when the power is reset(Volatile). On the other hand, data in the EEPROM Area is maintained even when the device is powered off(Non-Volatile).

Data in the EEPROM Area can only be written to if Torque Enable(24) is cleared to '0'(Off).