# Digital AC Servo Drive ACS606

## 1. Introduction

Leadshine's fully digital AC servo drive ACS606 is developed with 32-bit DSP based on advanced control algorithm. Since its input commands are PUL/DIR signals, the users can upgrade stepping drives to the ACS606 without changing control systems. The ACS606 can offer high precision, high speed and high reliability performance, and widely used in inkjet printers, engraving machines, and etc. A built-in controller can be used for testing and tuning. PC based and handheld configuration & tuning tools can meet different tuning environments or requirements. The ACS606 can drive both DC brushless and AC servo motors.But it is more suitable for the DC brushless servo motors. Compare to ACS806, ACS606 has less I/O thus has smaller size and higher cost-effective.

## 2. Features

l  Input: 18 - 60VDC,

l  Peak Current: 15A , Continuous Current: 6 A (Max), 10 - 200 W

l  FOC-SVPWM technologies

l  PC based and handheld configuration tools

l  Electronic gear rate from 1/255 to 255

l  Self-test function with trapezoidal velocity profile

l  Support PUL/DIR and CW/CCW control signals

l  Opto-isolated, support single-ended and differential inputs

l  Following error lock range adjustable

l  Over-voltage, over-current, encoder failure protections

l  10 latest failures self-record function

l  Small size, surface-mount technology

## 3. Applications

Suitable for large and medium automation machines and equipments, such as inkjet printers, engraving machines, electronics manufacturing equipments, special NC machines, pick and place devices, packing devices, and so on. Particularly adapt to the applications require high speed, high precision, and low motor noise.

## 4. Specifications

### Electrical Specifications ($T_j = 25℃/77℉$)

| Parameters | ACS606 | | | |
|---|---|---|---|---|
| | Min. | Typical | Max. | Unit |
| Peak output current | 0 | - | 15 | A |
| Continue output current | 0 | - | 6 | A |
| Supply voltage | +18 | - | +60 | VDC |
| Logic signal current | 7 | 10 | 16 | mA |
| Pulse input frequency | 0 | - | 200 | kHz |
| Isolation resistance | 500 | | | MΩ |
| Current provided to encoder | - | - | 100 | mA |

### Performance Specifications (with BLM Series Motors)

l  Position following error : +/-1 count

l  Velocity accuracy: +/-2rpm

l  Maximum acceleration speed (No Load) : 80 rpm/ms$^2$

l  Maximum speed : 3000 rpm

l  Allowable low speed reaches1 rpm

l  Positioning accuracy :+/-1 count

l  Suitable for 18 - 60 VDC AC/DC servo motors

## Mechanical Specifications (unit: mm[inch])
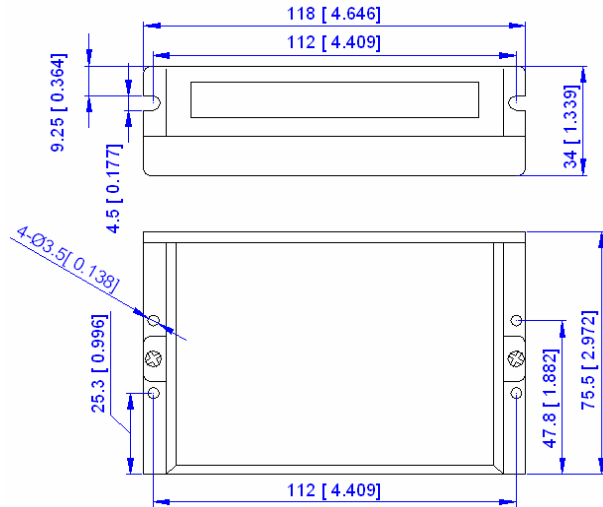


Figure 1: Mechanical specifications

## Operating Environment and Parameters

| Cooling | Natural cooling or Forced cooling | |
|---|---|---|
| Operating Environment | Environment | Avoid dust, oil fog and corrosive gases |
| | Ambient Temperature | 0℃－50℃ (32℉－122℉) |
| | Humidity | 40%RH－90%RH |
| | Vibration | 5.9m/s$^2$Max |
| Storage Temperature | -20℃－65℃ (-4℉－149℉) | |
| Weight | Approx. 280g (9.87oz) | |

## 5. Connector Configuration

## General Information

| Feedback Signal Connector | | | |
|---|---|---|---|
| Pin | Signal | Description | I/O |
| 1 | EA+ | Encoder channel A+ input | I |
| 2 | EB+ | Encoder channel B+ input | I |
| 3 | EGD | Signal ground | GND |
| 4 | HW | Hall sensor W input | I |
| 5 | HU | Hall sensor U input | I |
| 6 | FG | Ground terminal for shielded | GND |
| 7 | EZ+ | Reserve | I |
| 8 | EZ- | Reserve | I |
| 9 | HV | Hall sensor V input | I |
| 10 | NC | Not Connected | - |
| 11 | EA- | Encoder channel A- input | I |
| 12 | EB- | Encoder channel B- input | I |
| 13 | VCC | +5V @ 100 mA max. | O |
| 14 | NC | Not Connected | - |
| 15 | NC | Not Connected | - |
| Control Signal Connector | | | |
| Pin | Signal | Description | I/O |
| 1 | PUL+ | Pulse signal input + | I |
| 2 | PUL- | Pulse signal input - | I |
| 3 | DIR+ | Direction signal input + | I |
| 4 | DIR- | Direction signal input - | I |
| 5 | ENA+ | Enable signal input + | I |
| 6 | ENA- | Enable signal input - | I |

| RS232 Communication Connector | | | |
|---|---|---|---|
| Pin | Signal | Description | I/O |
| 1 | NC | Not connected | - |
| 2 | +5V | +5V power only for STU. | O |
| 3 | TxD | RS232 transmit. | O |
| 4 | GND | Ground. | GND |
| 5 | RxD | RS232 receive. | I |
| 6 | NC | Not connected | - |
| High Voltage Connector | | | |
| Pin | Signal | Description | I/O |
| 1 | U | Motor phase U | O |
| 2 | V | Motor phase V | O |
| 3 | W | Motor phase W | O |
| 4 | +Vdc | DC power Input (18-60VDC) | I |
| 5 | GND | Power Ground. | GND |

**More about I/O Signals**

| Signal | Description |
|---|---|
| PUL+/PUL- | Pulse input signal. In single pulse (pulse/direction) mode, this input represents pulse signal, each rising or falling edge active (software configurable); 4-5V when PUL-HIGH, 0-0.5V when PUL-LOW. In double pulse mode (pulse/pulse) , this input represents clockwise (CW) pulse，active at both high level and low level . For reliable response, pulse width should be longer than 0.85μs. Series connect resistors for current-limiting when +12V or +24V used. The same as DIR and ENA signals. |
| DIR+/DIR- | Directions input signal. In single-pulse mode, this signal has low/high voltage levels, representing two directions of motor rotation; in double-pulse mode (software configurable), this signal is counter-clock (CCW) pulse，active at both high level and low level. For reliable motion response, DIR signal should be ahead of PUL signal by 5μs at least. 4-5V when DIR-HIGH, 0-0.5V when DIR-LOW. |
| ENA+/ENA- | Enable input signal. This signal used for enabling/disabling the drive. High level for enabling the drive and low level for disabling the drive. Usually left **UNCONNECTED** (ENABLED). |

## 6. RS232 Interface Connection
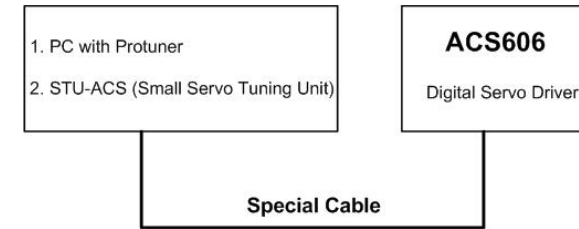


Figure 2: RS232 interface connection

## 7. Typical Connections

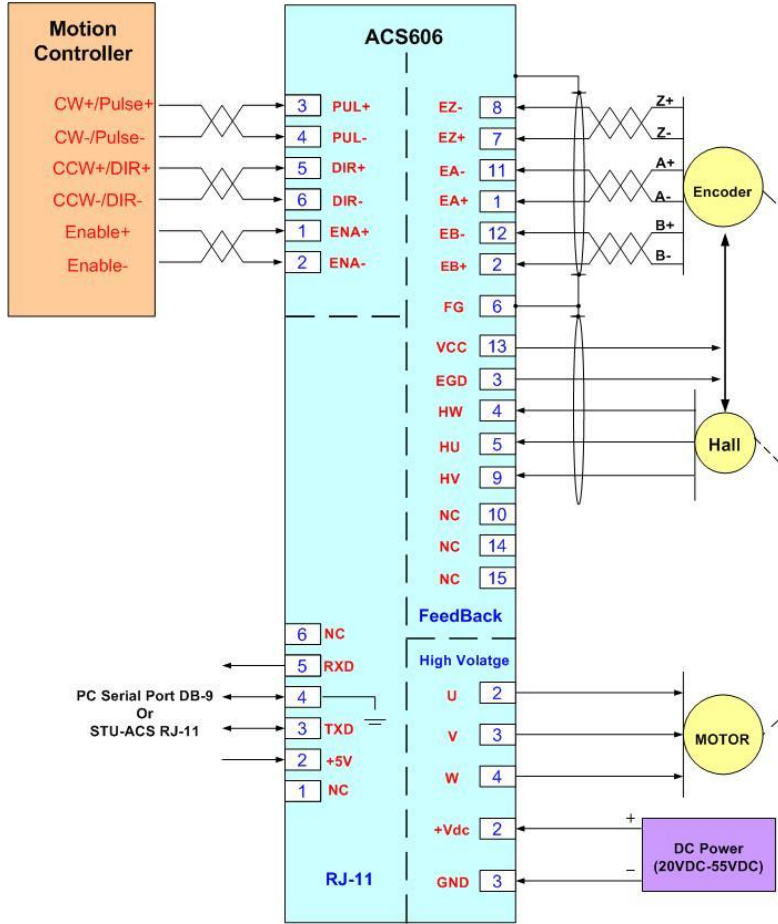A typical connection of the ACS606 is shown as Figure 3.

Figure 3: Typical connection of the ACS606

## 8. Accessories

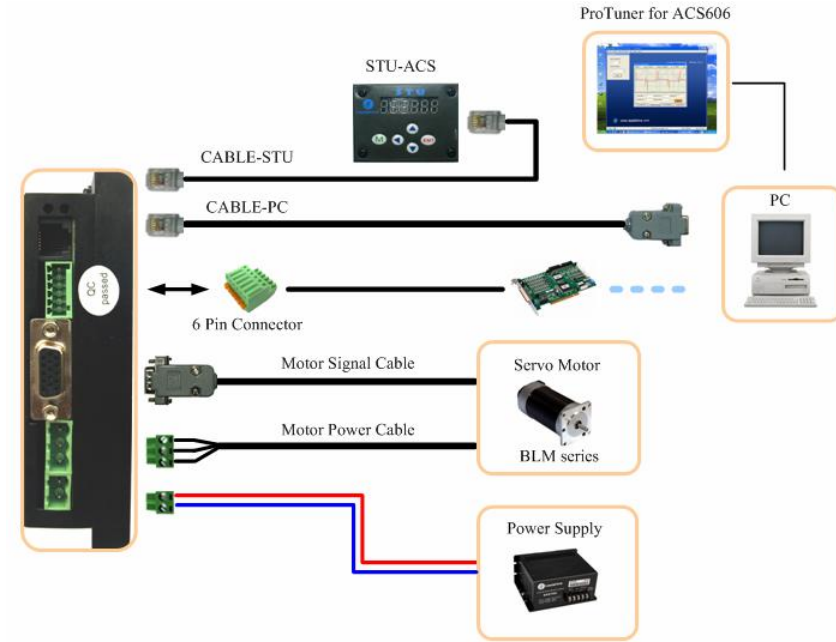### ACS606 Accessories and Connections
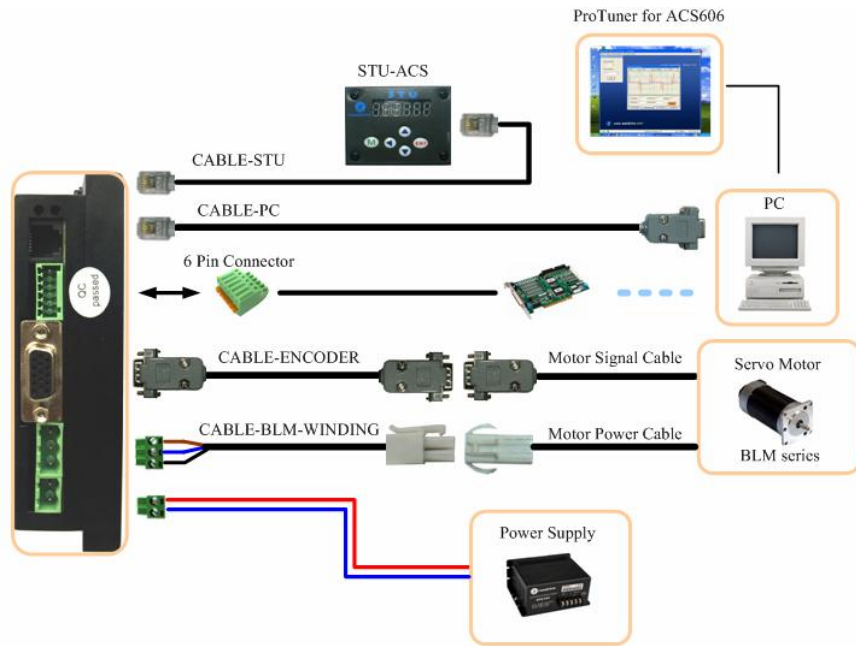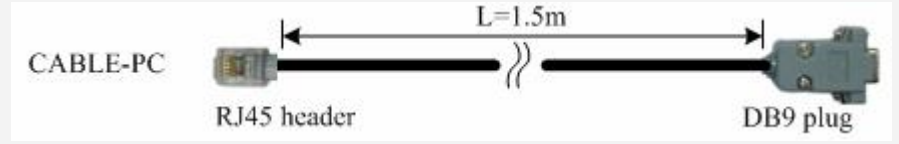


Figure 4: ACS806 accessories and connections

Figure 5: ACS606 accessories and connections with extended cable

## More Information about ACS606 Accessories

| ProTuner | |
|---|---|
| **Description** | PC-based configuration & tuning software. |
| **Order** | Standard Accessory, user can download from Leadshine website for free. |
| |  |

| CABLE-PC | |
|---|---|
| **Description** | Special RS232 cable designed to setup communication between the drive and PC-based configuration & tuning software **ProTuner.** |
| **Order** | Standard Accessory, one is enough for a user to configure and tune multiple drives. |
| |  |

| STU-ACS | |
|---|---|
| **Description** | Handheld configuration & tuning unit. |
| **Order** | Optional Accessory, one is enough to configure and tune multiple drives. |
| |  |

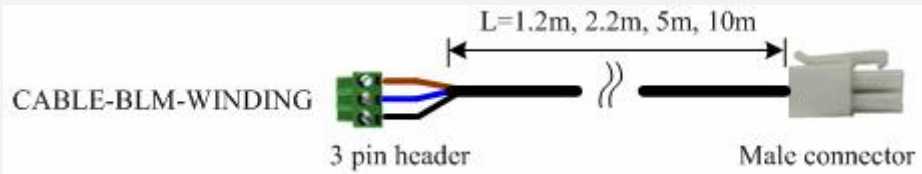| CABLE-STU | |
|---|---|
| **Description** | Special RS232 cable designed to setup communication between drive and Handheld configuration & tuning unit **STU-ACS.** |
| **Order** | One **STU-ACS** needs at least one. |
| |  |
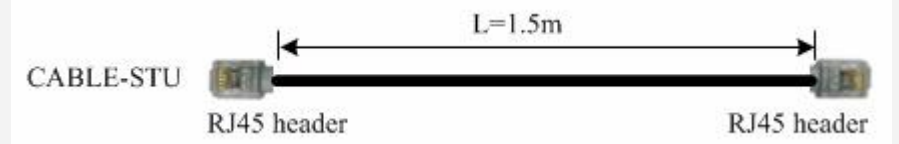
## 6 pin Control signal Connector

| | |
|---|---|
| **Description** | Self-locked connector for control signals include PUL+, PUL-, DIR+ and DIR-, ENA+，ENA-. |
| **Order** | Standard Accessory, shipped with the drive for free. |
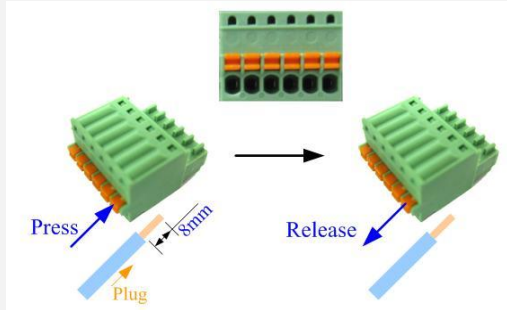


## CABLE-BLM-WIND

| | |
|---|---|
| **Description** | Extended cable for power leads between the drive and Leadshine BLM series DC brushless servo motor. |
| **Order** | Optional Accessory, Leadshine provides 1.2m, 2.2m, 5m, 10m cable for user selection. Users can select the proper length according to their needs. |



| | Pin | Color | Signal | Description |
|---|---|---|---|---|
| **Wires** | 1 | Red | U | Motor phase U |
| | 2 | Blue | V | Motor phase V |
| | 3 | Black | W | Motor phase W |

## CABLE-ENCODER

| | |
|---|---|
| **Description** | Extended cable for the feedback wires between the drive and servo motor. |
| **Order** | Optional Accessory, Leadshine provides 1.2m, 2.2m, 5m, 10m cable for user selection. Users can select the proper length according to their needs. |