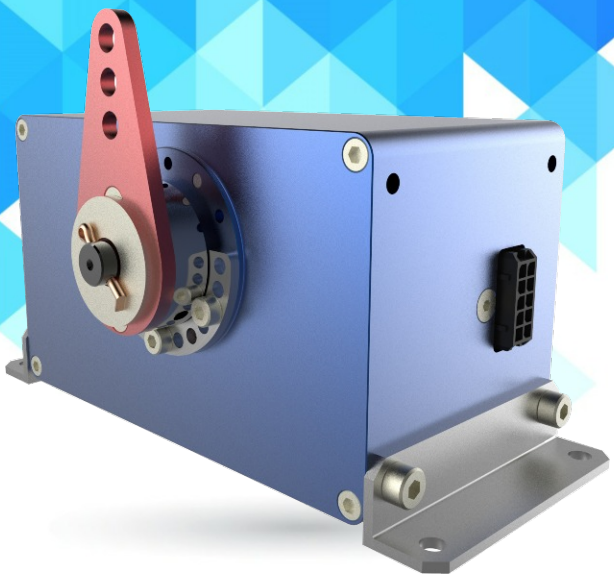
FLYBOX®



Digital Servomotor FX75

Revision#1.2, 6/12/2016
For firmware version 1.35

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SECTIONS

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Thank you for purchasing a Flybox® product. We hope it fully satisfy you and makes your flights pleasant and secure.
Developing FX75, our intent was to create a compact and lightweight digital servomotor, easy to install and use.

SYMBOLS USED IN THE MANUAL

NOTE: Used to highlight important informations.

CAUTION: Used to warn the user and indicate a potentially hazardous situation or improper use of the product.

WARNING: Used to indicate a dangerous situation that can cause personal injury or death if the instruction is disregarded.

NOTE: Keep this manual in the aircraft.
This document must accompany the instrument in the event of change of ownership.

NOTE: This device is intended for installation onto non type certified aircraft only, because it has no aviation certifications. Refer to your local aviation authorities to check if this device may be installed in your aircraft.

CAUTION: Read entirely this manual before installing the instrument in your aircraft, and follow the installation and operating instructions described here.

CAUTION: The pilot must understand the operation of this instrument prior to flight, and must not allow anyone to use it without knowing the operation. Don't use this instrument in flight until you are sure of the correct operating of the same.

CAUTION: When the installation is finished you must do a test, prior to flight, switching on all the possible source of electric noise and checking the properly operation of this instrument.

CAUTION: The software of this instrument can be subject to change, update, addition or removal of functions, so also the operating mode of the instrument can be subject to change. Always refer to the installation and operating manual updated with the software version used in your instrument. To obtain updated manuals, please visit www.flyboxavionics.it.

CAUTION: Using this instrument over the maximum allowable ranges can cause malfunction or wrong indications.

WARNING: Responsibility for installation lies entirely with the installer. Responsibility for operations lies entirely with the operator. Responsibility for any calibration, settings or any other customization lies with the person performing these operations.

WARNING: The user is not authorized to use this product without first make the registration.
The use of this product requires registration to take advantage of warranty, for eventual important safety communications or hardware and software updates.
In case of change of ownership consign this manual to the new owner of the product, that must make a new registration.

TO REGISTER FOLLOW THIS LINK:
http://www.flyboxavionics.it/en/servofx.html

IMPORTANT: **If you do not agree with the notices above do not install this instrument in your aircraft, but return the product for a refund.**

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SECTION 1

1.1 SERVO OVERVIEW

The Flybox FX75 digital servo incorporates important safety features:

It has a reliable disengaging system: situations like severe turbolence or something other kind of anomaly will not be a problem, because the pilot can take in any case the immediate control of the plane.

When the autopilot isn't engaged, the internal gears are completely disconnected, then at difference as some servomotors the pilot will not feel no residual torque at the command stick, giving a confortable flight.
In case of mechanical failure, the gear train is engineered to be reversible: the pilot can overtop the power of the brushless motor, it provides to the servomotor a further safety level.

The output torque is electronically adjustable, and in case of forced action from the pilot on the command stick, the disengage will be without the breaking of a shear pin (unlike other servomotors on the market that use that mechanical safety system that after the break, needs a remediation action to work again).

A software function disengage the autopilot if the pilot override the servo for more than 1 seconds.

WARNING: improper installation of servos can lead to loss of control of the aircraft, resulting in damage to the aircraft itself and injury or death of the occupants.
BE SURE TO CAREFULLY FOLLOW THE INSTALLATION INSTRUCTIONS, AND CONSULT A QUALIFIED INSTALLER.

SECTION 2

2.1 KIT CONTENTS

Flybox cod.	QTY	Description
701061	1	FX75 SERVO
701101	2	M5 ROD END BEARING
701102	4	3mm SPACER, ø5mm
701103	2	MOUNTING BRACKET
701104	1	ALUMINIUM TUBE 30cm LENGTH
701105	2	M5 THREADED END FOR ALUMINIUM TUBE
701106	2	5X10mm PLAIN WASHER
701107	2	5X15mm PLAIN WASHER
701108	2	ALUMINIUM RIVET
701109	2	HEX. HEAD SCREW M5X30mm
701110	2	M5 NUT
701111	2	M5 SELF LOCKING NUT
701112	1	10P MICROFIT RECEPTACLE
701113	10	CRIMP FEMALE CONTACT
701114	4	M4X10mm STAINLESS STEEL SCREW
701115	4	M4X8 PLASTIC NYLON SCREW
701116	3	M3x6mm LOW HEAD SOCKET CAP SCREWS
701117	1	LIMITING BRACKET

The kit provided by Flybox includes hardware to mount a servo and connect it to the aircraft controls using push-pull mounting.

2.2 MECHANICAL INSTALLATION

For the installation of the servo refer to the following drawings (FIG.1, FIG.2, FIG.3).

Choose a location that allow the servo arm and associate linkage to move freely through the entire range of travel.
Use the screws and mounting brackets provided with the kit.

The mounting brackets can be installed in two different modes, depending if you need clearance downwards for the lever (see FIG.2 and FIG.3, mode2) or if you don't need clearance (see FIG.2 and FIG.3, mode1).

FIG.1 - Servo dimensions
Dimensions in millimeters

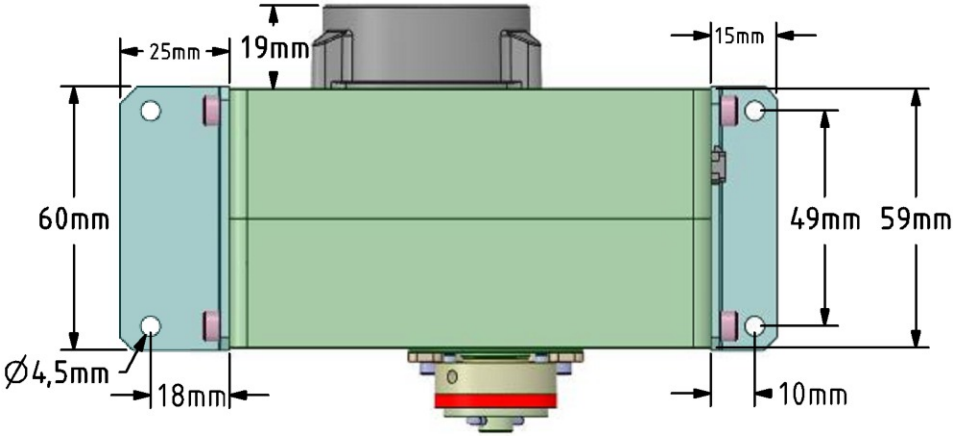


FIG.2 - Servo dimensions
Dimensions in millimeters

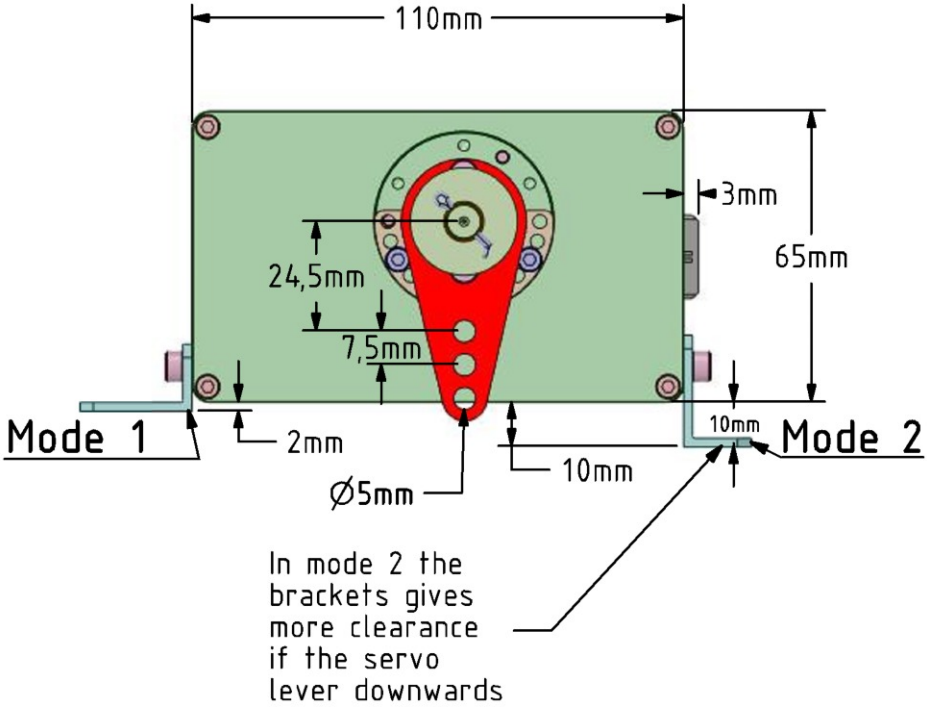
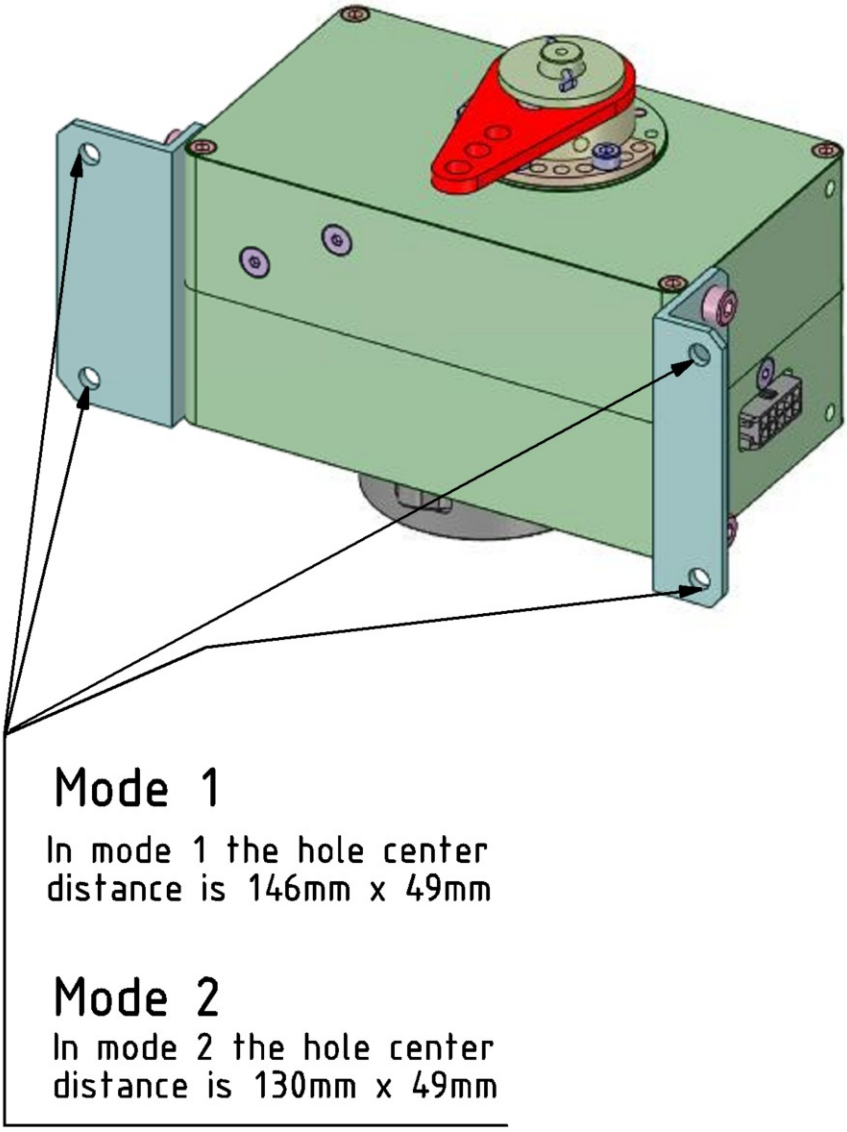


FIG.3 - Mounting holes distance
Dimensions in millimeters



CAUTION: to install the mounting brackets, use only the four M4x10mm screws supplied in the kit.

CAUTION: Once installed the servo, use the four plastic nylon screws to plug the unused fixing holes of the servo. In a new servo, the four plastic screws are pre-screwed on the holes on the upper side of the servo, but if you use a different mechanical installation you can remove it from this holes; after installation remember to place the plastic screws that you have removed on the unused fixing holes.

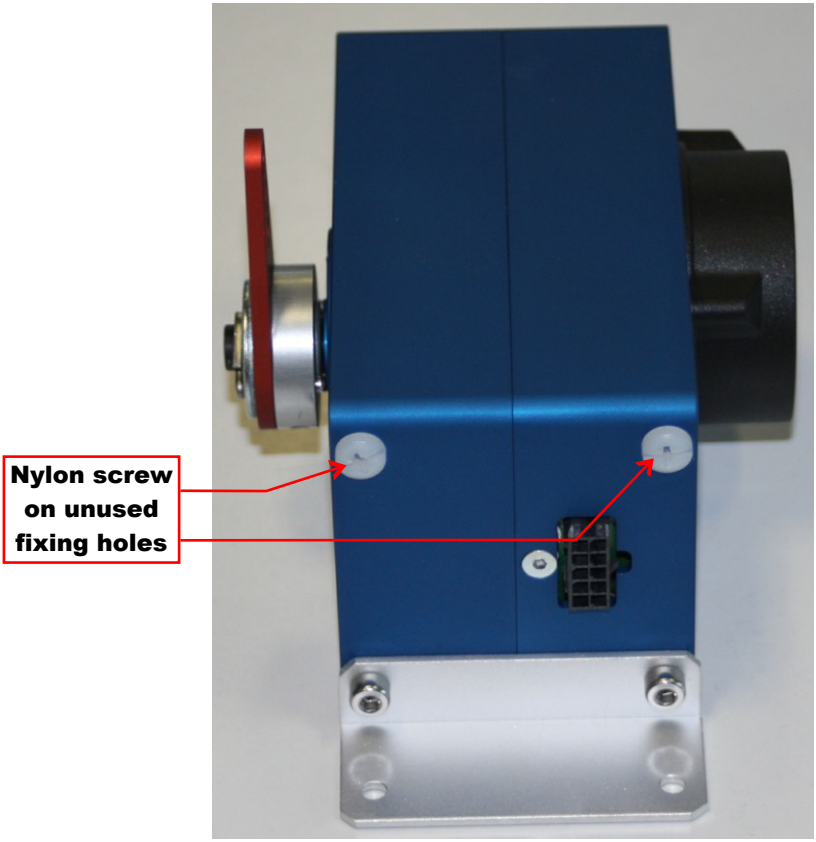


FIG.4 - Use of the plastic nylon screws

2.3 PUSH ROD INSTALLATION

WARNING: The push rod must be connected to the servo arm using the supplied hardware, taking care to perform the correct mounting as indicated in the picture below:

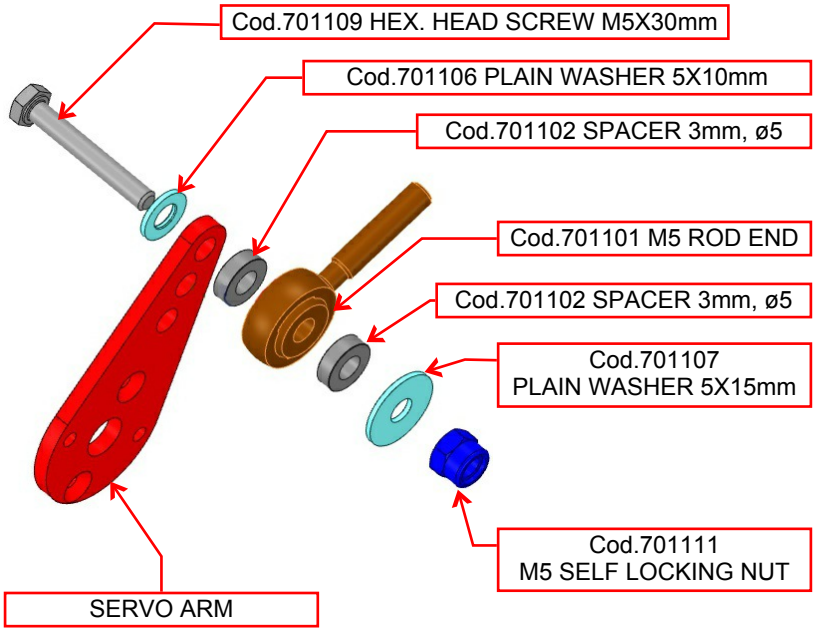


FIG.5 - Servo arm and push rod linkage

2.4 LIMITING BRACKET INSTALLATION

The limiting bracket is designed to mechanically limit the travel of the servo arm and so is an extra method of security. When correctly installed, the limiting bracket mechanically limit the servo arm travel to ~144°.

- Mount the limiting bracket so that the servo arm travel stay centered on the limiting bracket.

- Mount the servo and pushrod so that the control surface is in neutral position when the servo arm is in mid position. Check that in normal conditions the servo arm travel, during full range of motion of the control stick, should never come in contact with the limiting bracket.

The multiple holes in the limiting bracket and in the servo housing allow for 24 different positions (every 15°), so you can choose the orientation that fit to your type of installation.
See Fig.6 on the next page for installation examples.

WARNING: When installing the servo, make sure that under any flight condition it can never happen an over-center condition (an over-center condition happens when the servo arm go over-center relative to the connected push rod).
An over-center condition could result in serious injury or death.

CAUTION: To install the limiting bracket, use only the three M3x6mm low head socket cap screws supplied in the kit and use a threadlocker.

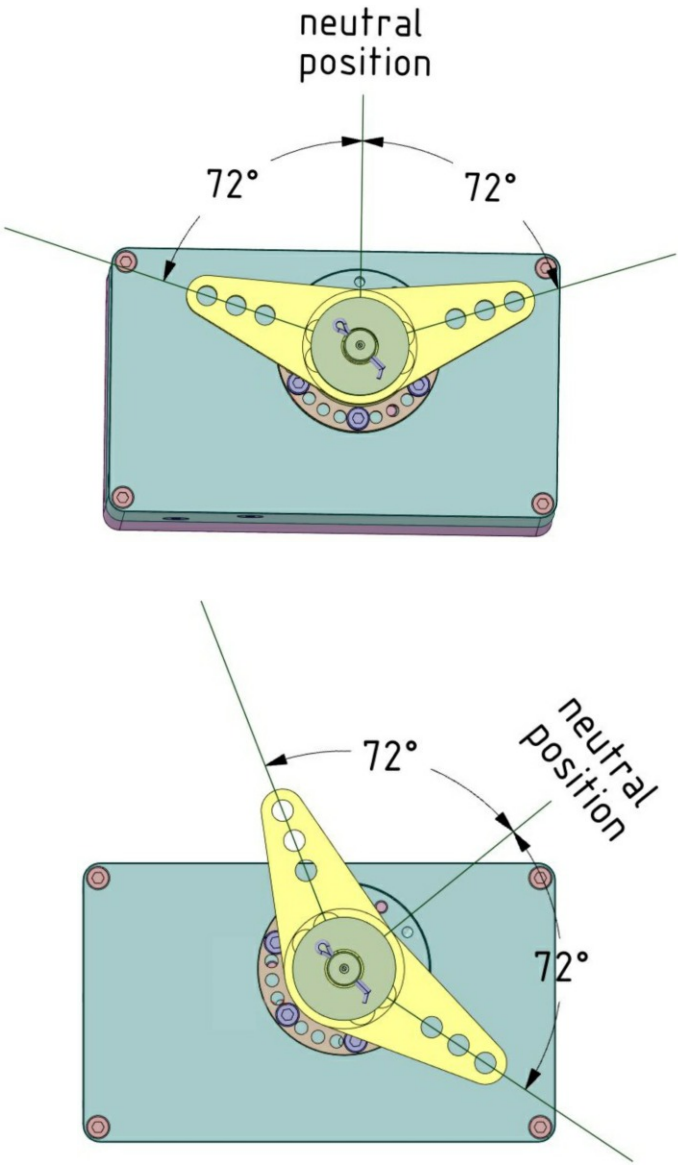
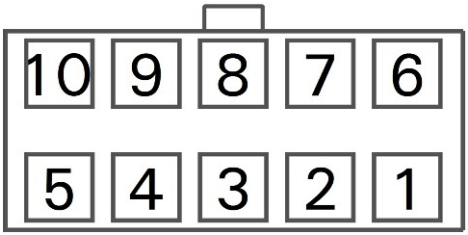


FIG.6 - Installation examples

SECTION 3

3.1 ELECTRICAL INSTALLATION

The electrical connections are made using the provided 10 poles Microfit receptacle connector, supplied with the crimp pin contacts.



SERVO CONNECTOR CN1
10 pin microfit connector, view from wiring side

Pin#	Descriprion
1	+12V power supply
2	Not used
3	Not used
4	CAN bus communication line: CAN-L signal
5	CAN bus termination
6	GND power supply
7	Not used
8	Not used
9	CAN bus communication line: CAN-H signal
10	CAN bus termination

NOTE: The CAN bus termination (pin#5 connected with pin#10) must be done only on the last servo of the CAN bus line. If you install only one servo, the CAN line must be terminated on that servo.

NOTE: Insert a pilot-accessible circuit breaker to the power lead (4A for one servo installation, 7.5A for two servos installation).

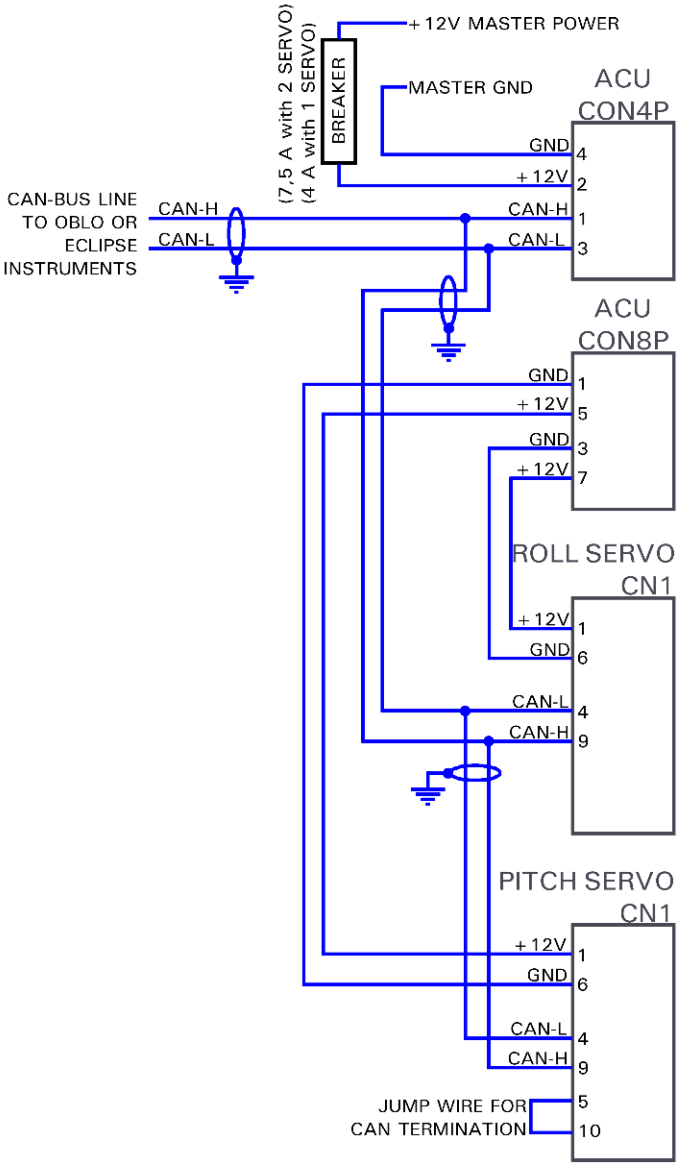
Use aeronautic cable for the wirings.

Take care to properly insulate any exposed wire, to avoid short circuit between any of the wires.

CAUTION: Voltage peaks that exceeds the operating limits on the supply line can damage the device.

NOTE: The wiring diagram on the next page is referred to a generic installation of two servos. For the complete wiring diagram to the main instrument plese refer to the installation manual of the instrument to which the servo will be connected (Oblò-A/P, Eclipse or Eclipse-912is instruments).

FIG.7 - Wiring diagram



SECTION 4

4.1 TECHNICAL SPECIFICATIONS

- **Anodized aluminium case.**
- **Dimensions (servo body):** 110 x 59 x h65 mm
- **Weight**: 750 g.
- **Operational temperature range**: -20 ~ +70°C.
- **Supply voltage**: 11 ~ 16 V=.
- **Max current draw:** 3 A.
- **Max torque**: 7.5 Nm - Electronically adjustable.

WARRANTY:

This product is warranted to be free from defects for a period of 12 months from the user invoice date.

The warranty only cover the manufacture's defects; shall not apply to product that has been improper installed, misused or incorrect maintenance, repaired or altered by non-qualified person.

Date	Revision	Description
03/2016	1.0	First release
03/2016	1.1	Updated chap.2.3 - 2.4

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