

FLYBOX

INNOVATIVE AVIONICS



EFC57 PLUS

Flap Controller
Installation and User Manual

**Installation and User Manual, Safety
Instructions and Warning Booklet**

**This product is not TSO'd and cannot be installed
into traditional FAA Part 23 and similarly Type-
Certificate Aircraft**

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Revision#1.1, 07/2025
For firmware version 1.4.01

This booklet is suitable for printing in A5 format.

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DISCLAIMER

Thank you for purchasing a Flybox® **EFC57 PLUS** instrument.

Our intention in developing the **EFC57 PLUS** was to create a product that is light and compact, powerful and easy to use.

The owner has the option of keeping the instrument software up-to-date by downloading the latest revision available on www.flyboxavionics.it and installing it via a USB pen drive.

We are confident that our products will be satisfactory and make your flying experience enjoyable.

Symbols used in the User Manual



NOTE: Used to highlight important information.



CAUTION: Used to warn the user, it indicates 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.

**FAILURE TO DO SO MAY RESULT IN SERIOUS
INJURY OR DEATH.**



WARNING: These instructions must be read and respected by installers, and retained for ready reference. The installer must read, understand (or be explained) and heed all instructions and warnings supplied with this product and with those products intended for use in association with it. Always keep a copy of the Installation and User Manual, Safety Instructions and Warning Booklet on the aircraft. In case of change of ownership, the Installation and User Manual, Safety Instructions and Warning Booklet must be delivered together with all of the other papers.



WARNING: Read the Installation and User Manual, Safety Instructions and Warning Booklet before installing the device in the aircraft and follow the procedure described therein.



WARNING: This device is intended to be installed on NON-TYPE CERTIFIED AIRCRAFT ONLY, as it does NOT require any air operator's certificate. Refer to your national aviation authorities to check if this device can be installed on your aircraft.



WARNING: It is the owner's responsibility to test this device before operating the aircraft and to make sure nobody is using it unless properly instructed and authorized to do so.



WARNING: Once the installation process is completed, it is extremely important to test the device before taking off to make sure it works properly. Therefore, we strongly suggest to double check all of the electronic instruments available on the aircraft and to turn them on to verify they function correctly.



WARNING: This device is operated through a software which from time to time can be updated and/or subject to change. Please, always refer to the Installation and User Manual, Safety Instructions and Warning Booklet for the last updated version of the software available on www.flyboxavionics.it



WARNING: It is the responsibility of the installer to properly install the device on the aircraft. In case of calibration, or any technical or functional customization of the device, the responsibility lies with the individual who carried out such operation.



WARNING: If this product is not used correctly, or it is subjected to additions or alterations, the effectiveness of this device may be considerably reduced.



WARNING: Alterations, additions, or repairs not performed by the instrument manufacturer or by a person or organization authorized by the manufacturer shall negate any warranty.



WARNING: The unit isn't waterproof. Serious damage could occur if the unit is exposed to water or spray jets.



WARNING: EFC57 PLUS must be turned off in case of start with booster. Open the corresponding breaker before starting. Warranty shall not apply for damage to the instrument for this reason.



NOTE: The consumer decides of his own free will if the purchased product is suitable and safe for his need. If the consumer does not agree with the notices contained in this Installation and user Manual, Safety Instructions and Warning Booklet, do not install this instrument in his aircraft.



NOTE: Flybox Avionics reserves the right to change or improve its products as well as terms, conditions, and notices under which their products are offered without prior notice.



NOTE: The Installation and User Manual, Safety Instructions and Warning Booklet will be updated annually if needed.

All changes or updates will be published on our website www.flyboxavionics.com in the "support" section.



NOTE: Check the website www.flyboxavionics.it periodically for software and manual updates.



NOTE: For some products, registration may be required to receive important news or information on available firmware updates or to receive security information.

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1.0 System Overview

CONSTRUCTION FEATURES

The **EFC57 PLUS** front panel is built from solid aluminum alloy, CNC milled and powder coated to last a long time over the years always showing a new appearance. The other parts of the housing are made of corrosion-protected aluminium.

ELECTRONICS

The **EFC57 PLUS** use a powerful 32 bit microcontroller to ensure reliability and accuracy over time. Thanks to its feature, it can interface with all types of actuators.

ERGONOMICS

- Bright bicolour LEDs, to differentiate normal operation in green and alarm signals in orange.
- Switch for flap movement with a flat pad for comfortable grip
- Switch for operating mode with safety lock to prevent accidental changes

EASY SOFTWARE UPDATE

The user can download any new firmware, when available from Flybox website, connect a USB pen drive to the instrument and freely update it with the last features.

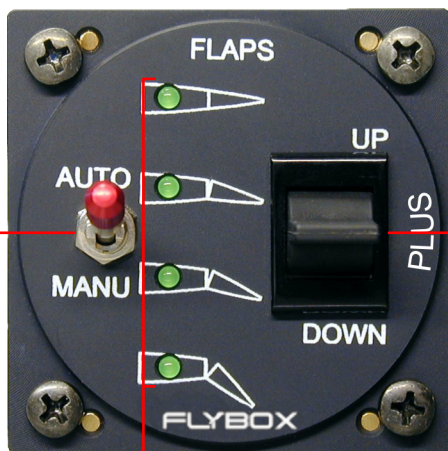
ABOUT SAFETY

EFC57 PLUS has been designed with safety in mind. Thanks to the processor's calculation speed and hardware protections, the user is quickly alerted in the event of faults.

Furthermore, the “Manual” mode allows direct control of the flaps, bypassing the electronics, for complete safety in any eventuality.

2.0 Panel Indicators & Commands

Operating
Mode Switch
(A/M Switch)



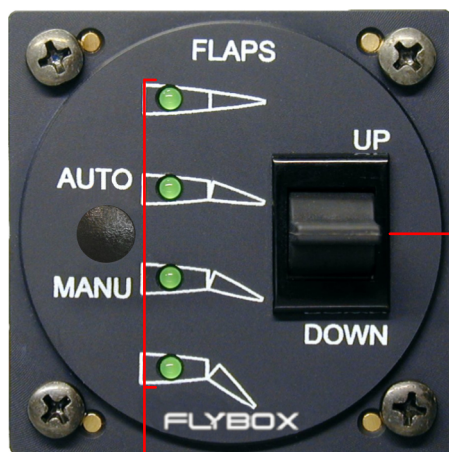
Bicolour LEDs

Flap
Movement
Switch
(U/D Switch)



CAUTION: The Auto/Manual switch has a safety lock to avoid accidental operation: it must first pulled on the outside and then moved to the desired position. Operating this switch without pulling the red knob will cause it to break.

2.1 EFC REP Panel Indicators & Commands



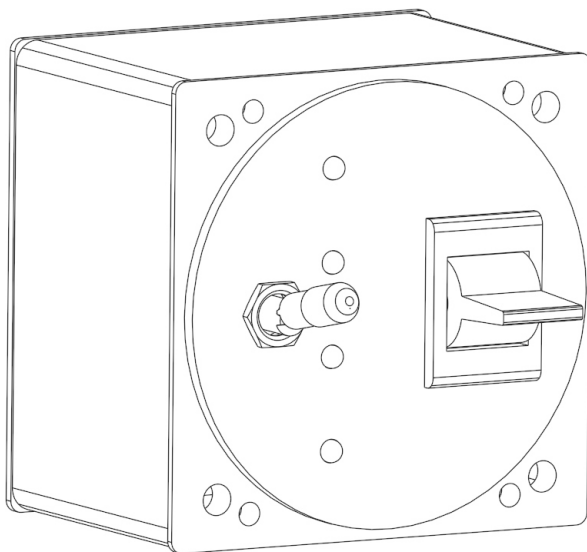
Bicolour LEDs

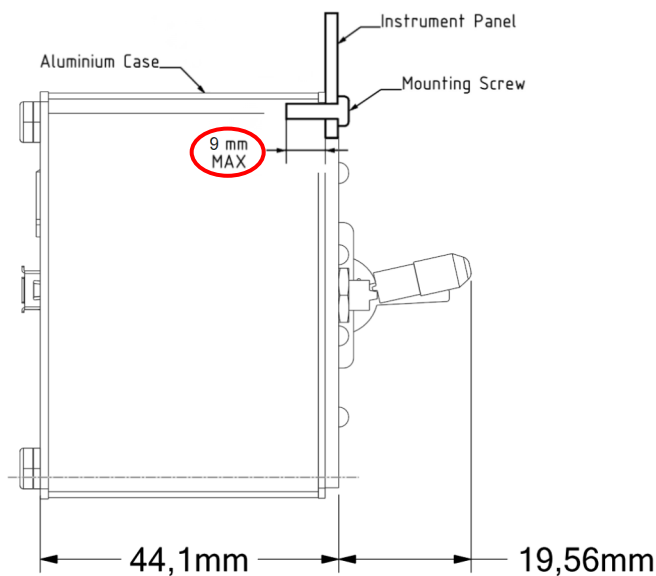
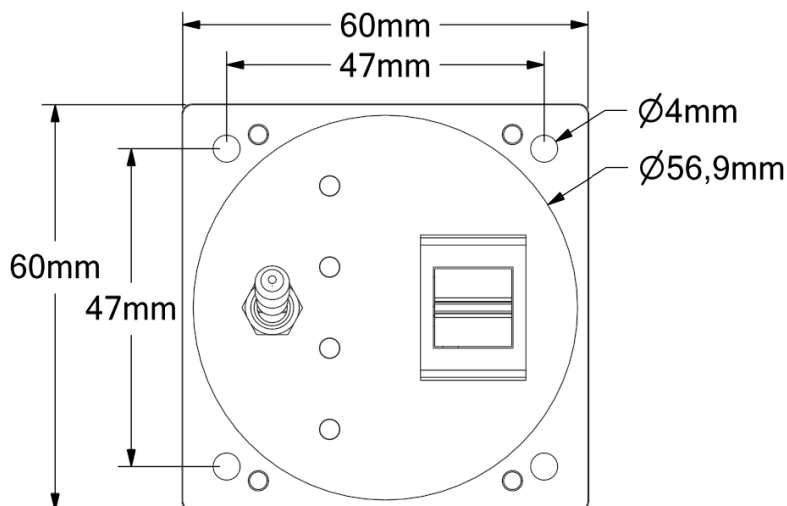
Flap
Movement
Switch
(U/D Switch)

3.0 EFC57 PLUS Mechanical Installation

It's recommended to choose a position that permits optimal display visibility. The instrument is supplied with four M4X10mm screws to install it to the panel, if you use other screws consider that **the maximum thread length inside the instrument body is 9mm.**

Screws longer than 10mm will damage the instrument and void the warranty.





3.0.1 Panel Cut-Out

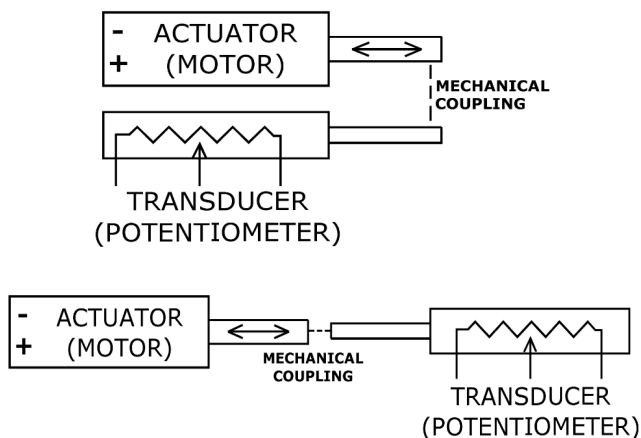
The **EFC57 PLUS** instrument fits in a standard 2 1/4" (57mm) panel cutout.



NOTE: For an installation without interference, consider making a hole of at least 57.5mm diameter.

3.1 Transducer Mechanical Installation (not required for actuators with integrated transducer)

The installation consists of the mechanical coupling between the flap actuator (motor) and the transducer (potentiometer) that allows the EFC57 PLUS to know the actual flaps position.



Examples of mechanical installations actuator-transducer



NOTE: The transducer stroke must be at least 10mm longer than the actuator stroke.



NOTE: The electrical resistance of the transducer must be between 1 and 10 Kohm.



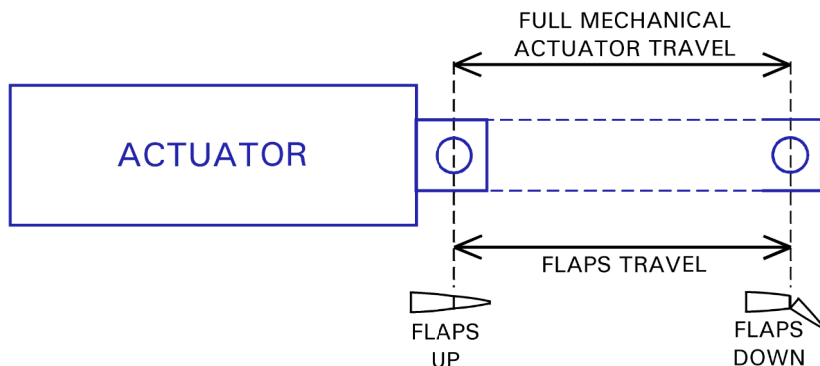
NOTE: The transducer must be centred on the actuator stroke so that it is not possible to go outside the limits, which would damage the position transducer.

3.2 Actuator Mechanical Installation

To avoid mechanical and electrical damage, the actuator stroke must coincide exactly with the flaps stroke: with the actuator fully retracted (limit switch reached) the flaps must be fully retracted (or fully extracted for inverse mechanical coupling); with the actuator fully extracted the flaps must be fully extracted (or fully retracted for inverse mechanical coupling).

Adjust the actuator stroke if it does not coincide with the flaps stroke, e.g. by using a suitable arm/lever length.

If the above condition is not satisfied the actuator is not protected against overtravel during flap extension and retraction, therefore a pilot driving the flaps manually (e.g. using the EFC57 PLUS "Manual" mode) can cause mechanical damage if he does not stop exactly when the flaps have reached the up and down positions.



For a correct installation the actuator stroke exactly matches the flaps stroke



NOTE: If the actuator does not have any internal limit switches, they must be installed externally.



NOTE: The electrical resistance of the transducer must be between 1 and 10 Kohm.



NOTE: Choose an actuator model that uses the maximum electrical resistance range. For example, if you choose an actuator with a 10 Kohm transducer, make sure that the stroke you are going to use provides a variation of at least half of the transducer's resistance, i.e. 5 Kohm.

4.0 Electrical Installation

POWER SPECIFICATIONS

EFC57 PLUS is capable of operating at either 14 or 28 VDC. On the following table are listed the power requirements for EFC57 PLUS; the specified current draw is measured with the EFC57 PLUS disconnected from the actuator and transducer.

Power Supply	EFC57 PLUS
14 V	70 mA 0.98 W
28 V	60 mA 1.68 W



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

General wiring hints:

- It is recommended that EFC57 PLUS be installed prior to constructing the wiring harnesses and cables.
- Use aeronautic cable for the wiring.
- Take care to properly insulate any exposed wire to avoid short circuits between them.
- All cable routing should be kept as short and as direct as possible.

- Check that there is ample space for the cabling and mating connectors.
- Avoid sharp bends in cabling.
- Avoid routing near aircraft control cables.
- Avoid routing cables near heat sources, RF sources, EMI interference sources, power sources or near power for fluorescent lighting.

The installer shall supply and fabricate all of the cables, unless a pre-wired cable has been ordered.

If no pre-wired cable has been ordered, the required connectors and associated crimp contacts can be obtained by ordering the optional EFC57 PLUS connector kit.

Contacts for the connectors must be crimped onto the individual wire of the wiring harness.



CAUTION: To avoid damage to the EFC57 PLUS, take precautions to prevent Electro-Static Discharge (ESD) when handling connectors and associated wiring. ESD damage can be prevented by touching an object that is on the same electrical potential as the EFC57 PLUS before handling them.



CAUTION: Check wiring connections for errors before connecting any wiring harnesses. Incorrect wiring could cause internal component damage.

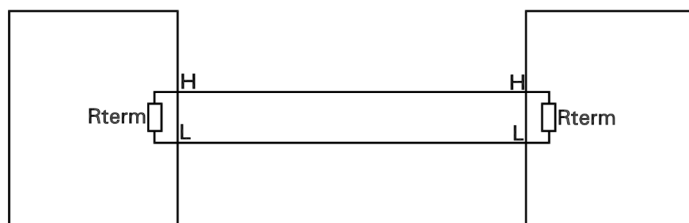
CAN-BUS INFORMATIONS

EFC57 PLUS has CAN bus (Controller Area Network) interfaces.

It is used exclusively to communicate with an optional EFC Repeater unit.

The basic electrical architecture of a CAN bus consists of a single twisted or shielded wire pair with a device connected at each end. Each end must be terminated with a 120 ohm resistor, that in the case of EFC57 PLUS is integrated inside the instruments so that the installer should simply connect together two pin on the connector to perform the required terminations.

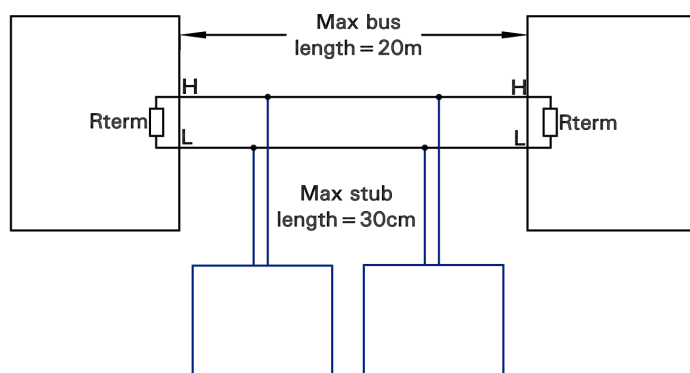
The maximum length from end to end of the CAN bus is 20 meters.



Basic CAN bus architecture

Other devices can be connected to the bus through short stub (also called “node”) connections. This device must not be terminated with the resistor and the maximum length should not exceed 30cm.

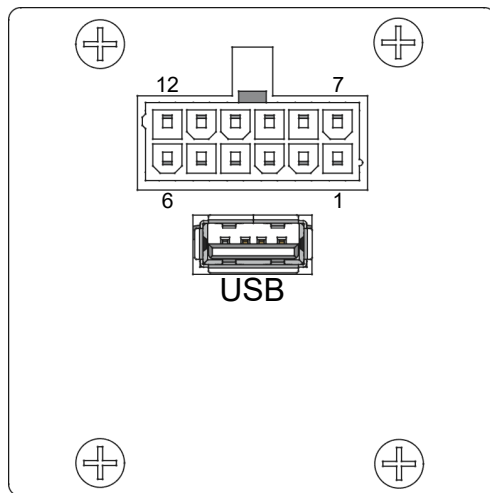
One stub or node must serve to connect only one device; multiple devices must be connected to the bus in a daisy-chain configuration as in this examples picture:



CAN bus node connections

The wiring for the CAN bus connections can be twisted pair or shielded twisted-pair. We recommend the use of shielded wires for better performance, connecting the shield to the ground of both devices on the terminated ends of the bus. It's important also that all the devices connected to a CAN bus share the same power ground reference. This means that the power ground of the various devices must be connected to a single ground point (do not use aircraft structure as a power ground).

4.1 EFC57 PLUS Electrical Installation



Rear view

The required connectors and terminals are supplied with the optional EFC57 PLUS connector kit:

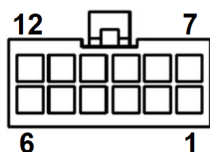
Molex P/N 39012125 (12 pole housing)

Molex P/N 39000038 (female crimp terminal)

The terminals can be crimped with:

- Molex tool P/N 638190901

4.1.1 12-Pole Connector



12 pin Molex Mini-Fit Receptacle
P/N 39012125. View from wires
insertion side.

PIN #	Type	Description	Note
1	Out	+5V for position transducer	Max 500 mA (Protected)
2	/	Not Used / Reserved	
3	I/O	CAN bus L	
4	/	CAN bus termination	Connect to pin 10 to terminate CAN bus
5	Out	Motor output (-)	Max 7 A (Protected)
6	In	GND Main supply	
7	In	Position transducer signal input	
8	Out	GND for position transducer	
9	I/O	CAN bus H	
10	/	CAN bus termination	Connect to pin 4 to terminate CAN bus
11	Out	Motor output (+)	Max 7 A (Protected)
12	In	+Positive Main supply	Max 10-30 VDC

Signals explanation

● Position transducer (PIN#1-7-8):

Connect these pins to the position transducer to enable the EFC57 PLUS to know the actual position of the actuator. It's suggested to use shielded cable, AWG24 is enough.

If for ease of mounting or other reasons the two transducer ends (PIN#1-8) are reversed, the EFC57 PLUS can recognize this on its own during positions setting (chap.5.1), so this will not affect the normal operation of the instrument.

● CAN BUS (PIN#3-4-9-10):

This CAN bus is used exclusively for communication with an optional EFC Repeater unit; use shielded or twisted wire pair, AWG24 is enough. Max length of this bus is 20 meters.

The CAN bus termination (jump wire pin#4 with pin#10) is required.

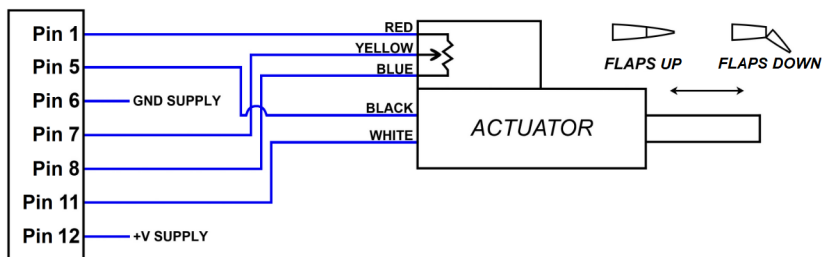
● Motor output (PIN#5-11):

Connect these pins to the actuator motor so that it is possible for the instrument to have control over the movement of the flaps. AWG18 wire is recommended. After installation is complete, perform motor wirings check (chap.4.2).

● Power supply (PIN#6-12):

The EFC57 PLUS is capable of operating at either 14 or 28 VDC, AWG18 wire is preferred. It's recommended to insert a circuit breaker on the positive wire that supply EFC57 PLUS, choosing a correct amperage depending on the actuator installed.

Wiring Connections (for Flybox[®] actuator cod.10500)

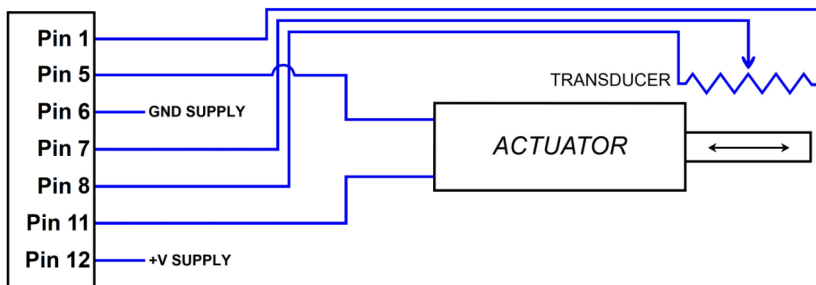


Wiring diagram for Flybox[®] actuator cod.105000



NOTE: In the case of reverse mechanical installation (rod in-flaps down/rod out-flaps up) it is necessary to exchange the red wire with blue and the white with black.

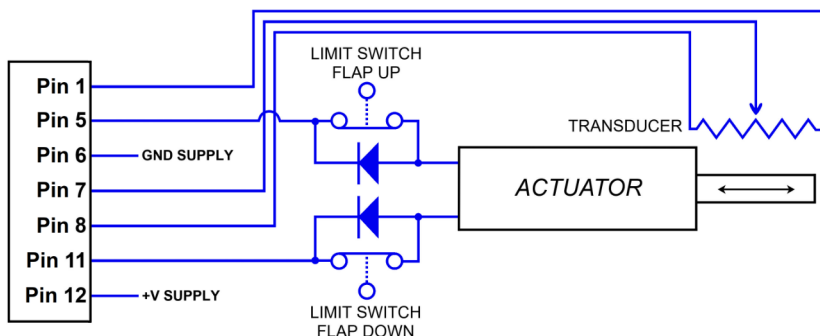
Wiring Connections (for actuators with internal limit switches)



Wiring diagram for actuators with internal limit switches

Wiring Connections (for actuators with no internal limit switches)

If the actuator used does not have internal limit switches, these must be installed externally and the wiring diagram below must be followed.



Wiring diagram for actuators with no internal limit switches



NOTE: The UP and DOWN limit switches must be normally closed.



NOTE: Diodes max current must be at least 3 Ampere (e.g. 1N5402, available from us or from RS components with cod.774-3338).

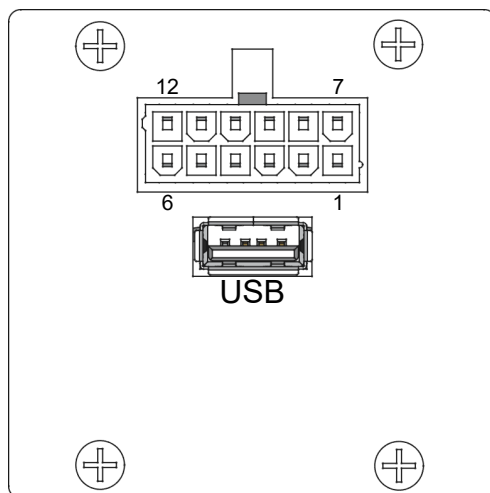


NOTE: Pay attention to the mechanical and electrical installation of the UP and DOWN limit switches, because an incorrect connection may prevent the EFC57 PLUS from switching off the actuator before the mechanical stop, with the risk of damaging the actuator itself.

4.2 Motor Wiring Check

After all wiring has been completed, set the A/M switch to the Manual position and check the movement of the flaps with the U/D switch: press to the "DOWN" position and check that the flaps go down, press to the "UP" position and check that the flaps go up. If the directions are reversed, swap the wire of the motor (pin#5 and pin#11 of the EFC57 PLUS connector).

4.3 EFC REP Electrical Installation



Rear view

The required connectors and terminals are supplied with the optional EFC REP connector kit:

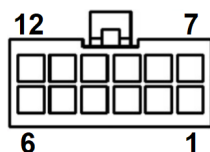
Molex P/N 39012125 (12 pole housing)

Molex P/N 39000038 (female crimp terminal)

The terminals can be crimped with:

- Molex tool P/N 638190901

4.3.1 12-Pole Connector



12 pin Molex Mini-Fit Receptacle
P/N 39012125. View from wires
insertion side.

PIN #	Type	Description	Note
1	/	Not Used / Reserved	
2	/	Not Used / Reserved	
3	I/O	CAN bus L	
4	/	CAN bus termination	Connect to pin 10 to terminate CAN bus
5	/	Not Used / Reserved	
6	In	GND Main supply	
7	/	Not Used / Reserved	
8	/	Not Used / Reserved	
9	I/O	CAN bus H	
10	/	CAN bus termination	Connect to pin 4 to terminate CAN bus
11	/	Not Used / Reserved	
12	In	+Positive Main supply	Max 10-30 VDC

Signals explanation

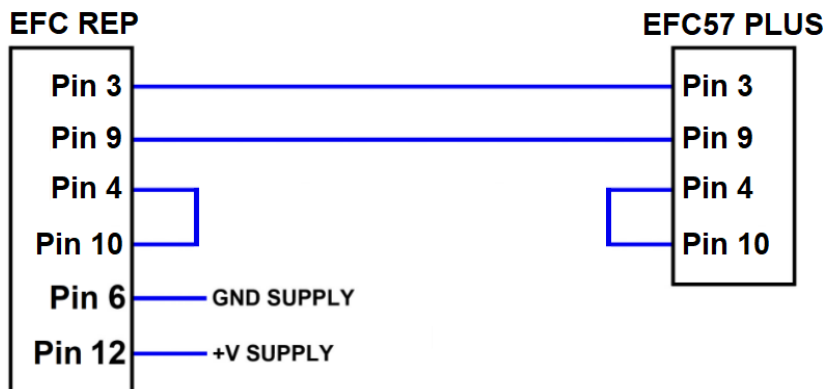
- **CAN BUS (PIN#3-4-9-10):**

This CAN bus is used exclusively for communication with the EFC57 PLUS Main unit; use shielded or twisted wire pair, AWG24 is enough. Max length of this bus is 20 m. The CAN bus termination (jump wire pin#4 with pin#10) is required.

- **Power supply (PIN#6-12):**

The EFC REP is capable of operating at either 14 or 28 VDC, AWG24 is enough.

Wiring Connections



5.0 Instrument Use

The instrument can work in two modes: Automatic or Manual.

For normal operations use the “Automatic” mode; the “Manual” mode must only be used in case of emergency or failure of the EFC57 PLUS.

5.1 Positions Setting

Before using the device for the first time it is necessary to set the four positions that the EFC57 PLUS stores and uses in “Automatic” mode. Follow this procedure to perform the setting:

1. Put the EFC57 PLUS in “Manual” mode and move the flaps until the limit switches are not activated.
2. With the device powered off, turn the A/M switch to the “Automatic” position, then press and hold the U/D switch to the “UP” position.
3. Power on the EFC57 PLUS, keeping U/D switch to the “UP” position, and wait 10 seconds until LED1 and LED4 are lit steadily.
4. Release the U/D switch. LED1 and LED4 start flashing, indicating that the device is in programming mode.
5. Perform this sequence using the U/D switch:
 - 2 click in the “UP” position
 - 2 click in the “DOWN” position
 - 1 click in the “UP” position

if the sequence is correct the EFC57 PLUS enters positions programming mode and LED2/LED3 flash briefly.

6. Now LED1 flashes, indicating that you can adjust the flaps to the desired position (using the U/D switch). To store the position, briefly move the A/M switch to “Manual” and then back to “Automatic”.
7. At this point, LED2 flashes and it will be possible to adjust and store the second position in the same way explained in the previous step (U/D switch to adjust and A/M switch to store the position). Repeat the step for the third and fourth position. The EFC57 PLUS will automatically exit the programming mode and become operative when the last position has been correctly stored.



MANDATORY: Once the position setting procedure is finished, check on the ground that the flaps reach all positions correctly.

Positions remain stored even in the absence of power supply.



NOTE: If the EFC57 PLUS is powered on for the first time without entering programming mode, the four LEDs will flash orange simultaneously.



NOTE: If for some reason the two transducer ends (PIN#1-8) are reversed, the EFC57 PLUS can recognize this on its own during positions setting, so this will not affect the normal operation of the instrument.

5.2 Use in Automatic Mode

In “Automatic” mode it is possible to move the flaps choosing one of four stored positions; the maximum actuator stroke is defined by the two UP and DOWN limit switches.

The LEDs show the status of the flaps:

LED on: indicates the current flaps position

LED flashing: indicates the position the flaps are reaching

-EXAMPLE OF USE-

The flaps are in the first position (LED1 on, all other LEDs off):

to move the flaps in the third position, press the U/D switch to the “DOWN” position twice; the flaps start moving and LED3 flashes, indicating the position that the flaps are reaching.

When the flaps reach the second position LED1 turns off while LED2 turns on; when they reach the third position LED2 turn off and LED3 turns on. The flaps have reached the selected position and the EFC57 PLUS returns to steady state, waiting for another command.

Pressing the U/D switch in the “UP” position for more than 1 second automatically moves the flaps to the first position (regardless of the current position).

5.3 Use in Manual Mode

In “Manual” mode the flaps position is not fixed between the four programmed positions, but the movement is continuous; however, it is recommended to use “Manual” mode just in case of an electronic failure of the device, as this mode bypasses the internal electronic circuits and connects the motor directly to the U/D switch.

To control the flaps, simply use the U/D switch: press and hold in one position (“UP” or “DOWN”) and release when the motor have reached the desired position.

5.4 Repeater Use

The EFC REP only works when the main EFC57 PLUS is set to “Automatic” mode.

When the main EFC57 PLUS is set to "Automatic" mode it is possible to use the EFC REP to manage the flaps position exactly as described in chap.5.2 .



NOTE: It is not possible to use the EFC REP either in "Manual" mode or to program the positions.



NOTE: EFC REP needs the main EFC57 PLUS unit to function; it cannot be used alone.

5.5 Firmware Update

If you want to update the instrument to a newer firmware version, please visit our website and check if it is available:

<https://www.flyboxavionics.it/software-updates.html>

Once requested, you will receive by e-mail the link to download the .zip containing the latest firmware.

Instructions for firmware updating:

1. Decompress the downloaded .zip folder and copy all the files ".fwi" in the root of a USB pen drive.
2. Plug the pen drive into the back of the connector or the extension cable, if you purchased the kit.
3. Power on the instrument. Loading will start automatically indicating the operation in progress by the scrolling of the LEDs in green and orange.
4. Wait for the completion of the operation indicated by the 4 LEDs flashing green.
5. Power off and remove the pen drive.

USB pen drive requirements:

- USB 2.0
- Max storage capacity 8GB
- Fat32 formatted



NOTE: If you purchased our USB pen drive cod.604011 or kit cod.604012, you already have a suitable pen drive for the purpose.

6.0 Troubleshooting and error code

- All four LEDs flashing orange: no positions setting has been made (see chap.5.1)
- LED1 and LED2 flashing orange: the EFC57 PLUS is attempting to move the motor but there is no feedback from the transducer: this may be incorrect connections on the motor wiring or on the transducer wiring.
To exit this condition the device must be turned off and the cause of the fault removed.
- LED2 and LED4 flashing orange: the EFC57 PLUS has detected an overcurrent condition for more than 5 seconds. Check that the actuator is operating correctly.
- LED1 and LED4 flashing orange: the EFC57 PLUS has detected a short circuit condition. Check the actuator motor wiring for short circuits.
- LED1 and LED3 flash orange alternately with LED2 and LED4 (on EFC REP only): the repeater unit is not receiving signal from the master unit. Check the goodness of the CAN bus connection between the two instruments.

If you should have any other problems, please do not hesitate to contact our team through the support service <http://www.flyboxavionics.it/request-support.html>

Technical specifications

EFC57 PLUS

- 4 Bright bicolour LEDs for operation and alarm signals
- Standard mounting 2-1/4" 57mm
- Powder painted aluminium case
- Dimensions: 60 x 60 x 44.1 mm (body)
- Weight: 125 g
- Supply voltage: 10 ~ 30 V=
- Power supply: 0.98 ~ 1.68 W (without actuator)
- Max continuous current output: 7 A
- Max peak output current protection: 7 ~ 10 A for 5 sec
- Operating temperature range: -20 ~ +70°C
- Humidity: 90% max (without condensation)
- 1 CAN bus communication interface
- USB port: for USB 2.0

One Year Warranty:

Product support and warranty information can be found at www.flyboxavionics.it.

Flybox® warrants the registered Product to be free from defects in materials and workmanship for 12 months from date of delivery. The inactivity of the Products determined by periods of repair does not involve the extension of the warranty period. This warranty covers only defects in material and workmanship found in the products under normal use and service when the product has been properly installed, maintained and registered. This warranty does not cover failures due to abuse, misuse, accident, improper maintenance, failures to follow improper instructions or due to unauthorized alterations or repairs or use with equipments with which the Products is not intended to be used. Flybox®, after verification of the complaint and confirmation that the defect is covered by warranty, at its sole discretion, will either replace or repair the Products at no costs for the customer. Alterations, additions, or repairs not performed by the manufacturer shall negate any warranty. This warranty doesn't cover cosmetic or incidental damages. Shipping costs, taxes, custom fee, any other duties and any costs incurred while removing, reinstalling or troubleshooting the Products, shall be at customer's charge.

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Date	Rev.	Description
May 2025	1.0	First release
July 2025	1.1	General revision

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Important

Do not send your instrument for repair until you have filled out the request form on the support page at www.flyboxavionics.it. After filling out the form you will receive an authorization email with the RMA number.

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EFC57 PLUS - Installation Manual,
Safety Instructions and Warning Booklet