



*Intelligent Flap Controller  
with positioning set-points*

**Model: IFC-10**



**Flap positioning and control system  
for DC motor actuators up to 10 amps**

**Pilot and Co-pilot control**

**Vfe protection**

**Programmable positions and manual mode**

Intelligent Flap Controller (IFC) is an electronic controller designed specifically to operate DC motor actuators including the Van's Aircraft series of Flap Actuators used in RV type homebuilt aircraft. IFC connects to the standard up-off-(down) switches commonly used to control flap operation and directly drives a Van's flap actuator. IFC allows for Pilot and Co-pilot flap switches and resolves the possible conflicts if the switches are operated in opposite directions. IFC requires NO flap position sensor and is fully compatible with *Safety-Trim* servo controllers.

IFC provides flap positioning presets that are easily set without having to adjust a position sensor. Additionally, IFC includes a manual mode of operation to raise or lower the flaps in proportion to the time the flap switch is held closed.

IFC receives switch inputs from Pilot and Co-pilot flap switches such as those found on the Infinity Stick Grips. These switches provide a momentary closure for Flaps Down and a maintained closure for Flaps UP. The switch closures are referenced to a common ground. Based on the switch inputs, IFC directly drives the flap actuator. IFC resolves any conflicts between the Pilot and Co-pilot switches as well as any switches left in the maintained UP position.

Flap positions such as 0,10,20,40 degrees are selected by simply pressing the flaps down switch for a momentary action of less than 1 second. If flap positions other than those preset in the controller are desired the switch may be held for longer than 1 second, giving manual control of flap position. When the switch is released the flaps stop at their current position.

Additionally, when used with an ASW-1 airspeed switch IFC provides Vfe protection by preventing flap deployment above a preset air speed. However, IFC will not limit the flaps from being retracted regardless of airspeed. The ASW-1 airspeed switch may be shared with a *Safety-Trim* servo controller for system integration.

The Van's flap actuators have no internally electrical limit switches and will run continuously if not controlled. IFC prevents the flap actuator from running endlessly when a flap switch is left in the UP position. After a 15 second timeout, the flap actuator is shut off. Simply move a flap switch to the off or down position to reset the operation of the flap actuator.

IFC is to be used with DC Flap Actuator motors rated for operation at 12-24 volts DC and up to 10 amps continuous, 15 amps peak. No other uses are permitted. The Flap Actuator must be mechanically or electrically limited for travel length as the IFC unit does not set the minimum and maximum travel lengths for the flap actuator. The Van's flap actuator satisfies this requirement.

IFC is not TSO'd and must only be used in aircraft certified in the Experimental category.

Flap input switches for DOWN actuation must be of the momentary closure type. Flap input switches for UP actuation may be either momentary or maintained type.

Compatible wiring harness model number: IFC-10-Harn

IFC must be installed using the current aircraft standards and practices. Refer to AC 43.13-2A/1B. The installer/builder is solely responsible for determining the suitability of the installation and use of this product.

### **Installation instructions:**

- 1) Connect the wiring harness as shown in the wiring diagram.

NOTE: Double power, ground and motor wires are ONLY required when the flap actuator requires more than 7.5 amps continuous current. When using the standard Van's aircraft flap actuator double wires are NOT required.

- 2) WHITE #20 gauge wire to + Aircraft Power via a 7.5 amp fuse or circuit breaker.  
(if using double WHITE #20 connect via a 10 amp fuse or c.b. )

BLACK #20 gauge wire(s) to – Aircraft ground.  
(as shown on the wiring diagram)

- 3) Flap switch wires: DO NOT mix the pilot and copilot switch wires

PILOT:       Blue #22   Flaps UP  
              Violet #22   Flaps DOWN

Co-pilot       Orange #22   Flaps UP  
              Yellow #22   Flaps DOWN

- 4) Common (center) terminal of the Pilot and Co-pilot flap switches and to the Airspeed switch (ASW-1) to ground of pin 7 or 15

Alternately aircraft chassis ground may be used instead of the connection to pin 7,15 for the flap switches and airspeed switch.

- 5) Flap Actuator motor:

Red #20 to Flap Motor +  
Green #20 to Flap Motor -

NOTE: This polarity must be used to drive the flap actuator in the UP direction.

**DO NOT LET THE FLAP ACTUATOR WIRES TOUCH EACH OTHER OR GROUND!**

6) White/Black#22 to the ASW-1 Airspeed Switch. Connect the other terminal of the airspeed switch to pin 7, 15 or common switch ground. If Vfe protection is not going to be utilized, pin 8 must be capped off and not connected to any other wires.

If utilizing a Safety-Trim controller, pin 8 of both the IFC and the Safety-Trim controller may be connected together and to a common ASW-1 Airspeed Switch. The preset airspeed switch setting will enable flap deployment protection in the IFC as well as the trim speed transition point for the Safety-Trim controller.

7) Mount the IFC Control box inside the aircraft using the mounting tabs on the enclosure. The control box can be mounted in any orientation. Do not mount the control box in the firewall forward area or in an area likely to get wet.

Ensure access to the position set-up trim-pots on the side of the unit is available.

8) Provide power to the flap control system and verify the flap switches drive the flap actuator in the correct direction. Check the Pilot and the Co-pilot Flap Switches separately. UP flap activation should drive the flap actuator continuously for about 15 seconds. Down flap activation will drive the flap actuator for about 4 seconds (factory calibration value) if the switch is pressed for a quick tap (less than 1 second long). If the Down switch is held for more than 1 second the flap actuator should drive as long as the switch is held.

9) FULL MANUAL MODE: Note: The IFC-10 may be used in a full manual mode without presets, operating just as our IFC-1 legacy product did. In this mode the flaps are deployed for whatever duration the down flap switch is held closed. Full manual mode may be accessed by connecting PIN 2 to ground.

## **FLAP POSITION SET-UP:**

The IFC-10 system uses time intervals to drive the flaps to a particular position. The time interval is set by the trim pots located on the side of the controller. The flap positions for the pilot and co-pilot are independently set with their own trim-pot. Turning the trim-pot clockwise increases the run time of the flap motor for each preset position selection. Each press of the down flap switch will drive the flap motor for the preset run time selected on the trim pot.

The IFC-10 unit is set to a 4 second run time at the factory. This value may be adjusted from 1-10 seconds. Each time the flap down switch is activated for a short press the system will drive the flap motor for this preset time.

The total flap travel and flap motor speed of your particular installation will determine how many preset flap positions are obtained for a particular preset time interval.

Examples:

A Van's RV-10 flap system takes about 12 seconds to travel from full up to full down. With a 4 second time interval each tap of the flap down switch will deliver about 1/3 of the total flap travel. If you want more flap positions, decrease the time interval.

A Van's RV-8 flap system takes about 8 seconds to travel from full up to full down, a 4 second time interval would provide for effectively 3 flap positions: UP  $\frac{1}{2}$ , and Full Down. If an intermediate position was desired the time interval would be reduced to about  $2\frac{3}{4}$  seconds. Providing for flaps; UP, 1/3, 2/3, Full Down.

During the set-up process it is recommended to connect a battery charger to the aircraft battery to ensure the battery voltage remains close to the normal running voltage obtained when the aircraft alternator is running (eg. Approx. 14 volts for a 12 volt aircraft system)

If adjustments are made to the preset run time, ensure both the pilot and copilot set points are adjusted and checked.

## PRODUCT OPERATION:

- 1) Setting either the Pilot or Co-pilot flap switches to the UP position will drive the flap actuator to the up position. If either of the flap switches are left in the UP position the flap actuator will be driven for 15 seconds and then shut off.
  
- 2) Pressing either of the Pilot or Co-pilot flap switches to the DOWN position will drive the flap actuator to the down position. A quick tap of the switch will drive the flap actuator to the next down position set point. A quick tap is a press of less than 1 second. If a down switch is held for more than one second the system goes into manual mode and the actuator will drive flaps down as long as the switch is held. When the switch is released, the flap motor will stop.
  
- 3) After the flaps are set to their full up position it is recommended to return the flap switches to the center off position.

### Conflict resolution:

If either or both flap switches are left in the UP position, and after the 15 second time-out period, the Flaps may be put DOWN by moving either of the flap switches to the Down position. This may be done even if one of the flap switches is left in the up position. The flaps may be retracted at any time, (without delay) by placing a flap switch in the up position.

### Vfe protection:

When the IFC is used with an airspeed switch (model ASW-1) the flaps cannot be deployed above the airspeed switch set point. The ASW-1 airspeed switch is supplied calibrated to a set point of 100 knots. The flaps can always be retracted regardless of the airspeed set point. IF the Vfe protection feature is not used, Pin 8 must be capped off and remain un-used.

If a different airspeed set point is required, a small adjustment screw is available on the ASW-1. Turning the screw clock-wise will lower the set point. **However, you must ensure the flaps can be deployed at an appropriate airspeed by applying pitot pressure to the system and verifying the airspeed for the set point. DO NOT ADJUST THE ASW-1 UNLESS YOU DOUBLE CHECK THE PROPER AIRSPEED SET POINT. FAILURE TO DO SO COULD PREVENT FLAP DEPLOYMENT IN FLIGHT !!!**

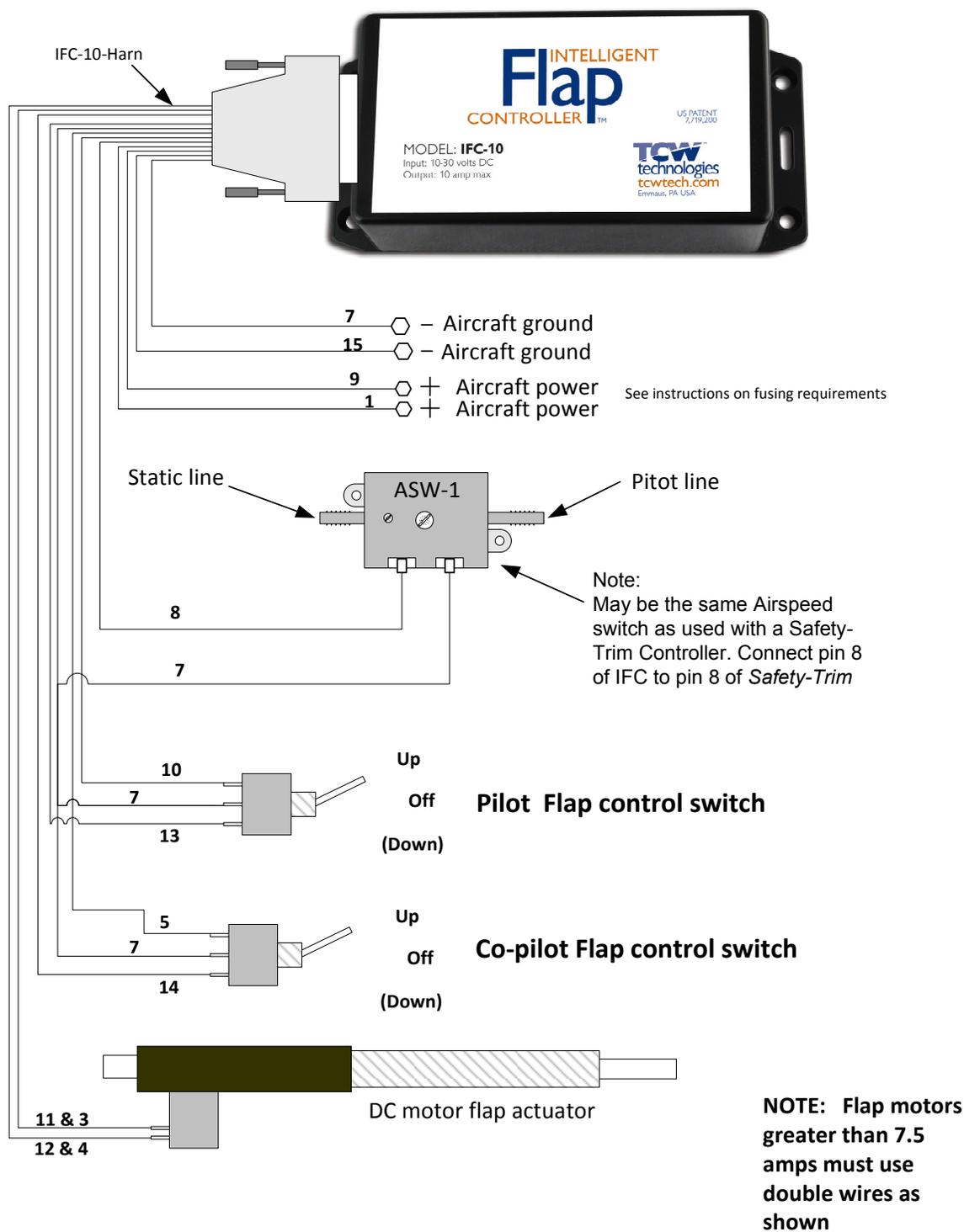
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# Wiring Diagram Model IFC-10



## IFC-10 wiring harness detail

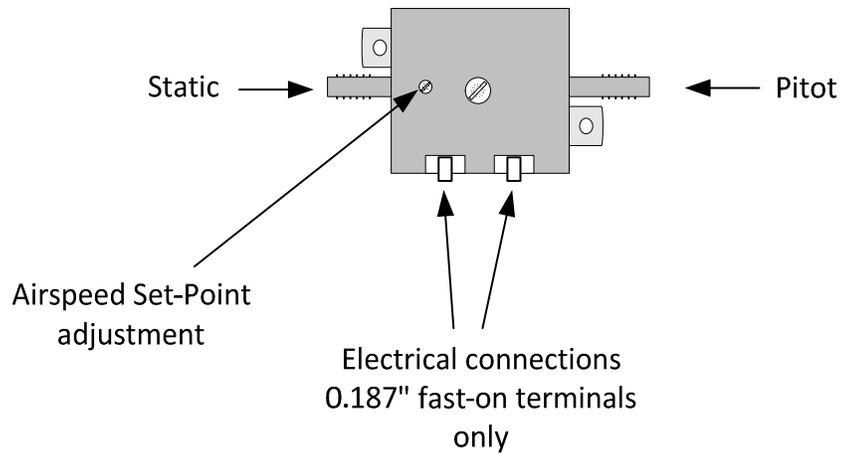
15 pin D-sub connector			
Pin #	Function	Wire color	Size
1	Power +	White	#20
2	Manual mode only		
3	FLAP motor +	Red	#20
4	FLAP motor -	Green	#20
5	CO-PILOT DOWN switch terminal	Yellow	#22
6			
7	Ground -	Black	#20
8	2 speed switch	White/black	#22
9	Power +	White	#20
10	PILOT Down switch terminal	Violet	#22
11	FLAP motor +	Red	#20
12	FLAP motor -	Green	#20
13	PILOT UP switch terminal	Blue	#22
14	CO-PILOT UP switch terminal	Orange	#22
15	Ground -	Black	#20

**NOTES:**

- 1. All switches share a common ground and may use aircraft chassis ground or pin 7 or 15.**
- 2. Confirm airspeed set point operation via a testing of the pitot system.**
- 3. Cap off any unused wires.**
- 4. Verify each switch provides proper operation of the flap motor.**
- 5. Connect pin 2 to ground to access full manual only mode.**

## Airspeed Switch Details

Models:  
ASW-1, ASW-2



**NOTE: Airspeed set-point is adjusted by turning small screw:**

**To increase airspeed set-point: turn counter-clockwise,  
To decrease airspeed set-point: turn clockwise,**

**½ turn = approx 25 knots**

Maximum switch voltage = 30 volts DC

Maximum switch current = 20 milliamps

TCW Technologies, LLC.

During the first 24 months from the date of purchase and subject to the conditions hereinafter set forth, TCW Technologies, LLC. (TCW) will repair or replace to the original user or consumer any portion of your new Flap Controller product which proves defective due to defective materials or workmanship of TCW. Contact TCW Technologies for warranty service. TCW shall have and possess the sole right and option to determine whether to repair or replace defective equipment, parts or components. Damage due to equipment, environment or conditions beyond the control of TCW Technologies are NOT COVERED BY THIS WARRANTY.

LABOR, COSTS: TCW shall IN NO EVENT be responsible or liable for the cost of field labor or other charges incurred by any customer in removing and/or reaffixing any TCW product, part or component thereof.

THIS WARRANTY WILL NOT APPLY: (a) to defects or malfunctions resulting from failure to properly install, operate or maintain the unit in accordance with printed instructions provided; (b) to failures resulting from abuse, accident, or negligence; (c) to normal maintenance services and the parts used in connection with such service; (d) to units which are not installed in accordance good trade practices; or (e) to unit used for purposes other than for what it was designed and manufactured.

RETURN OR REPLACED COMPONENTS: any item to be replaced under this Warranty must be returned to TCW Technologies in Emmaus, PA, or such place as TCW may designate, freight prepaid.

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Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state. In the absence of other suitable proof of this installation date, the effective date of this Warranty will be based upon the date of manufacture plus one year. Direct All Notices To: Warranty and Product Service Department, TCW Technologies LLC., 2955 Main Road East. Emmaus, PA 18049