

Intelligent Flap Controller

Model: IFC-1

Intelligent Flap Controller (IFC) is an electronic controller designed specifically to operate a 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 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.

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 the flap switch(es) are left in the UP position. After a 12 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.

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.

IFC contains no mechanical relays, is reverse polarity protected and overload protected.

IFC is to be used with DC Flap Actuator motors rated for operation at 12-24 volts DC and up to 2 amps continuous, 5 amps peak. No other uses are permitted. 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-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.
- 2) Connect the White #20 gauge wire to + Aircraft Power via a 5 amp fuse or circuit breaker.
Connect the Black #20 gauge wire to – Aircraft ground.
(as shown on the wiring diagram)
- 3) Connect the flap switch wires to the corresponding wires as shown in the wiring diagram. Each switch (up, down) is a simple momentary closure to ground.
The Pilot side flap UP switch is connected to pin 13, blue.
DO NOT CONNECT THIS WIRE TO ANY OTHER SWITCHES.

The Co-pilot side flap UP switch is connected to pin 14, orange.
DO NOT CONNECT THIS WIRE TO ANY OTHER SWITCHES.
- 4) Connect the Pilot and Co-pilot flap DOWN switches together and to pin 10, yellow.
- 5) Connect the common terminal of the Pilot and Co-pilot flap switches together and to pin 7, black. Pin 7 is a common ground terminal used for all switches including the airspeed switch (ASW-1)

- 6) Connect the Flap Actuator to Pins 11, red and Pin 12, green.
Pin 11 is the + terminal, Pin 12 is the – terminal.
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!

- 7) Connect pin 8, white/black to the ASW-1 Airspeed Switch. Connect the other terminal of the airspeed switch to pin 7, the 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.

- 8) 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.

- 9) 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 12 seconds. Down flap activation will drive the flap actuator for as long as a flap switch is held in the down position.

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 12 seconds and then shut off.

- 2) Setting either of the Pilot or Co-pilot flap switches to the DOWN position will drive the flap actuator to the down position. The flap actuator will be driven down as long as either switch is held in the down position. The down switches must be momentary type closure switches.

- 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 12 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!**

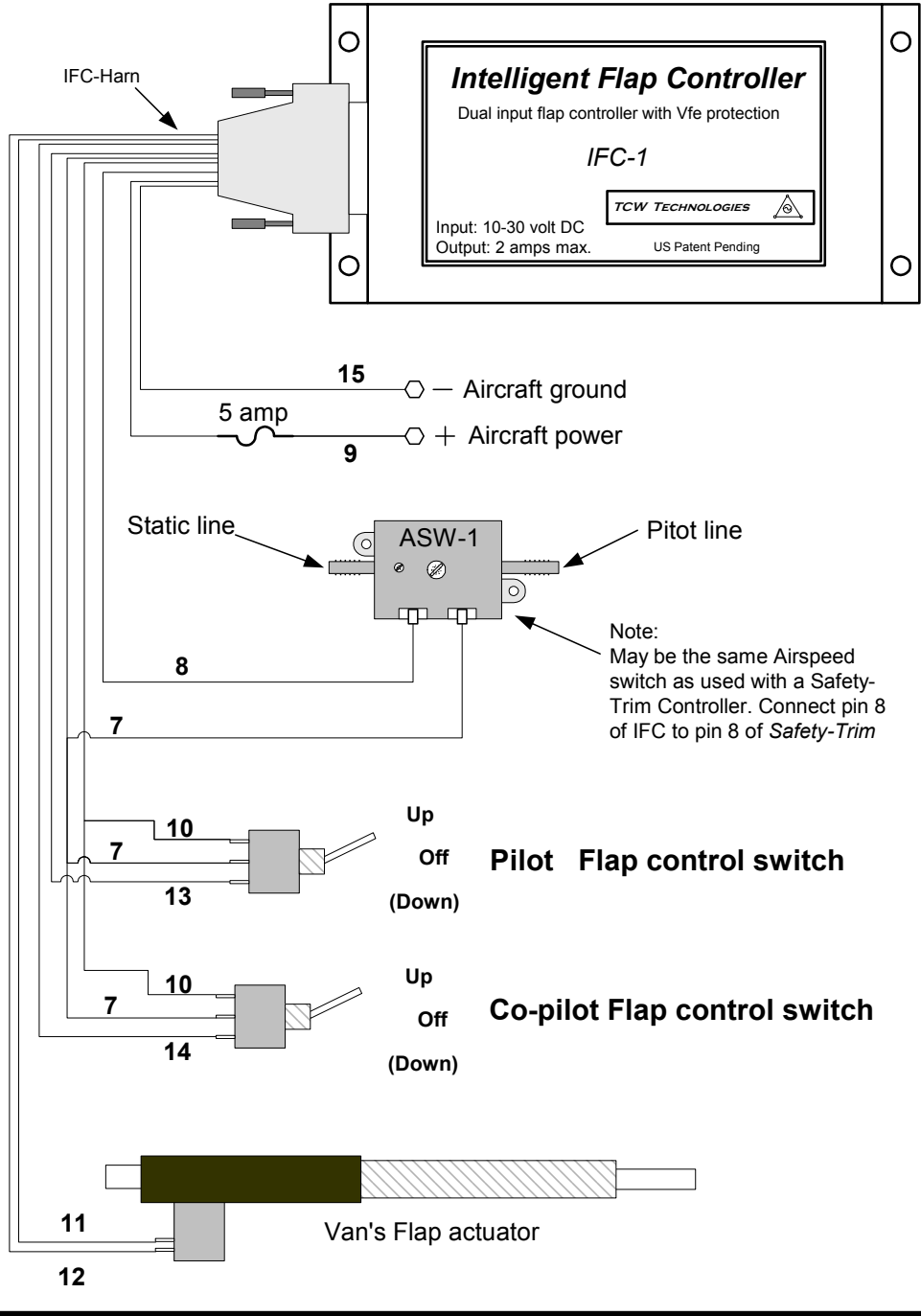
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Wiring Diagram Model IFC-1



Intelligent Flap Controller

Wiring harness chart

Model: IFC-1

15 pin D-sub connector			
Pin #	Function	Wire	Size
1			
2			
3			
4			
5			
6			
7	Switch center terminal (grd)	Black	22 gauge
8	Vfe speed switch	White w/black	22 gauge
9	Power +	White	20 gauge
10	All Flap switches DOWN	Yellow	22 gauge
11	Flap motor power +	Red	22 gauge
12	Flap motor power -	Green	22 gauge
13	Pilot Flap Switch UP	Blue	22 gauge
14	Co-pilot Flap Switch UP	Orange	22 gauge
15	Ground -	Black	20 gauge

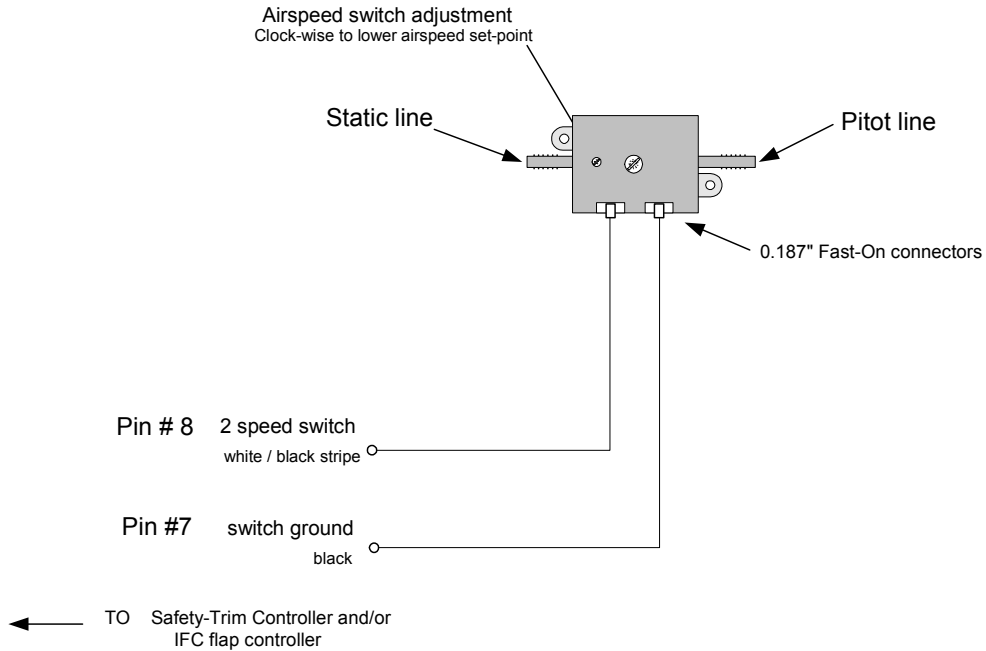
NOTES:

- 1) All switches share a common ground , Pin7.
A separate chasis ground may be used instead of pin 7 in retrofit applications
- 2) Any unused wires must be capped off
- 3) Verify proper flap actuation with each flap switch
- 4) Verify Airspeed Switch setting by testing the pitot system.

Application Note #5

ASW-1

Airspeed Switch for 2 speed selection of *Safety-Trim* and *Vfe* protection with *IFC*



Note: Pin #7 is a common switch ground for all trim switches and the airspeed switch. An airframe ground may be used as an alternative

Note: Adjustment ranges is about from 55 knots to 140 knots. Factory calibrated to 100 knots.

Rev 2, March 25, 2008
Safety-Trim/ IFC
Airspeed Switch wiring detail

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.

PRODUCT IMPROVEMENTS: TCW reserves the right to change or improve its products or any portions thereof without being obligated to provide such a change or improvement for units sold and /or shipped prior to such change or improvement.

WARRANTY EXCLUSIONS: as to any specific TCW product, after the expiration of the time period of the warranty applicable thereto as set forth above. THERE WILL BE NO WARRANTIES, INCLUDING ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. No warranties or representations at any time made by any representative of TCW shall vary or expand the provisions hereof.

LIABILITY LIMITATION: IN NO EVENT SHALL TCW OR ITS AFFILIATES BE LIABLE OR RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES RESULTING FROM OR RELATED IN ANY MANNER TO ANY TCW PRODUCT OR PARTS THEREOF. THE SUITABILITY OF USE OF THE SAFETY-TRIM or INTELLIGENT FLAP CONTROLLER PRODUCT IS TO BE DETERMINED BY THE AIRCRAFT HOMEBUILDER.

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, 4906 Raymond Ct. Emmaus, PA 18049