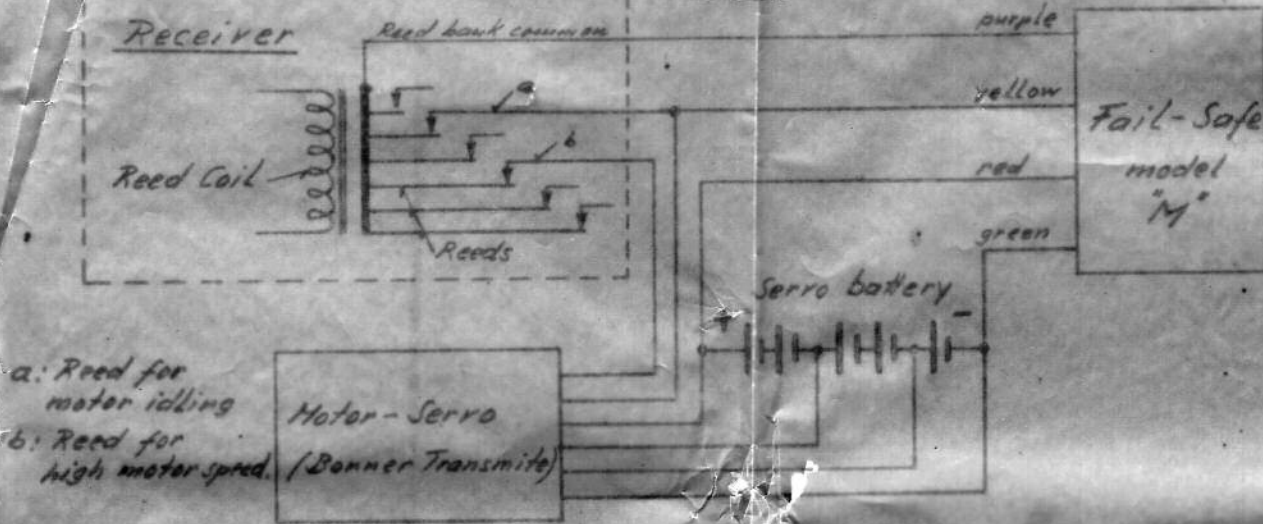


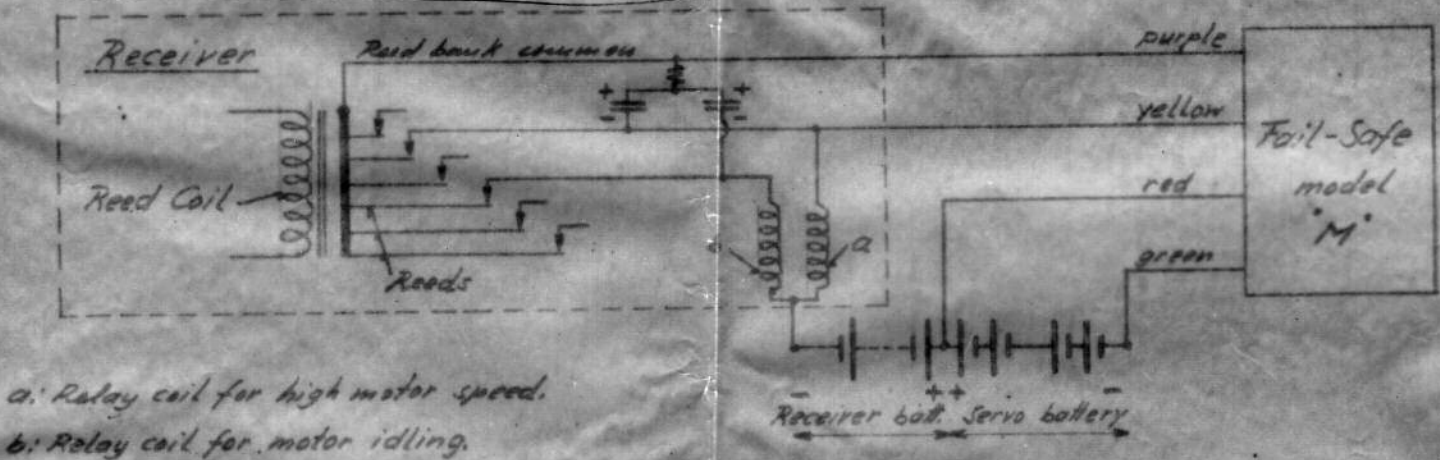
Model "M"

# ① Multichannel relayless



Model "M"

# ② Multichannel with relays (Reed bank common on +)



- Wiring:
- I) Disconnect existing wire between reed bank common and receiver batt. +.
  - II) Connect only purple wire of Fail-Safe to reed bank common.
  - III) Connect receiver battery + to servo battery +.
  - IV) Connect red, green and yellow wire of Fail-Safe as shown.

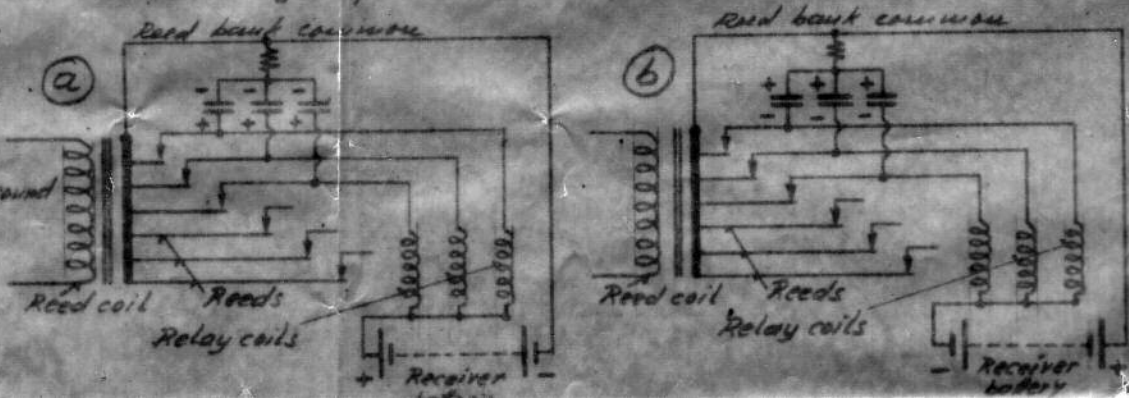
convert or use Fail-Safe with reversed polarity

# ③ Multichannel with relays (Reed bank common on -)

Convert existing wiring of reed bank output ③ to ⑥ by:

- I) Turning reed capacitors around
- II) Exchanging + and - wire of reed bank output on receiver battery.

Then proceed as described under ②

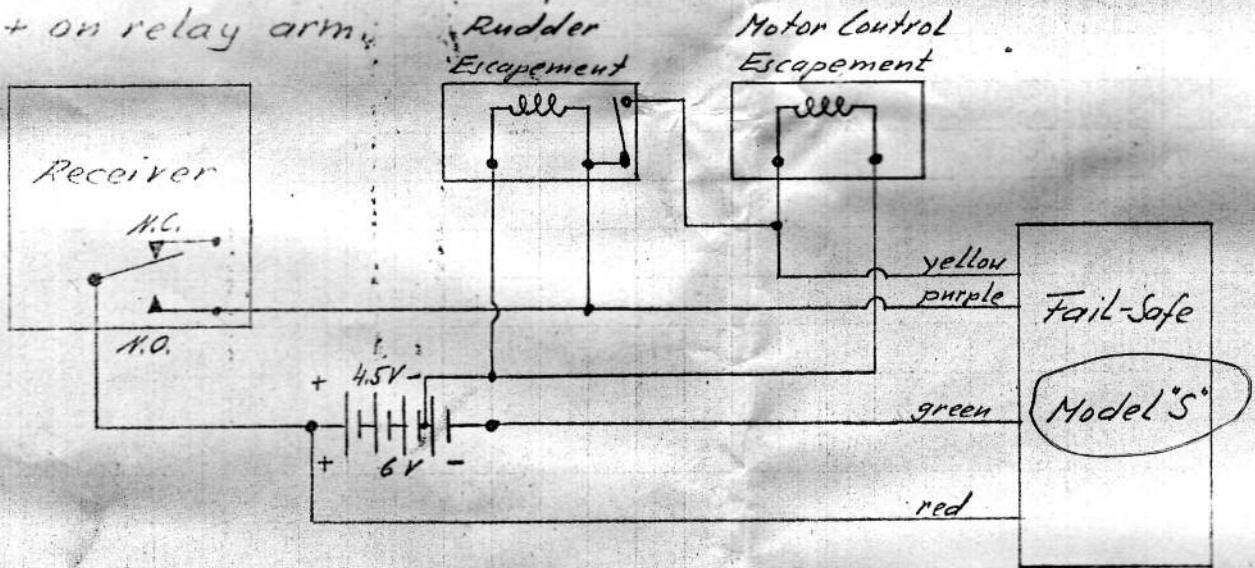


# FAIL-SAFE HOOKUP

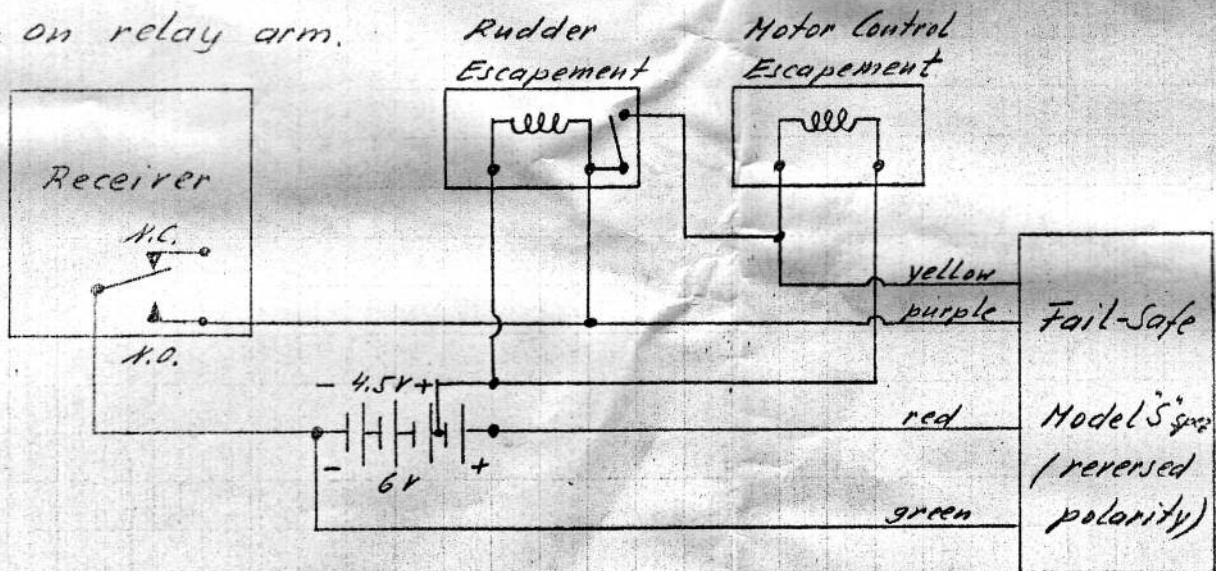
## Single Channel

(Rudder Escapement with 3rd Position for Motor Control)

① + on relay arm.



② - on relay arm.

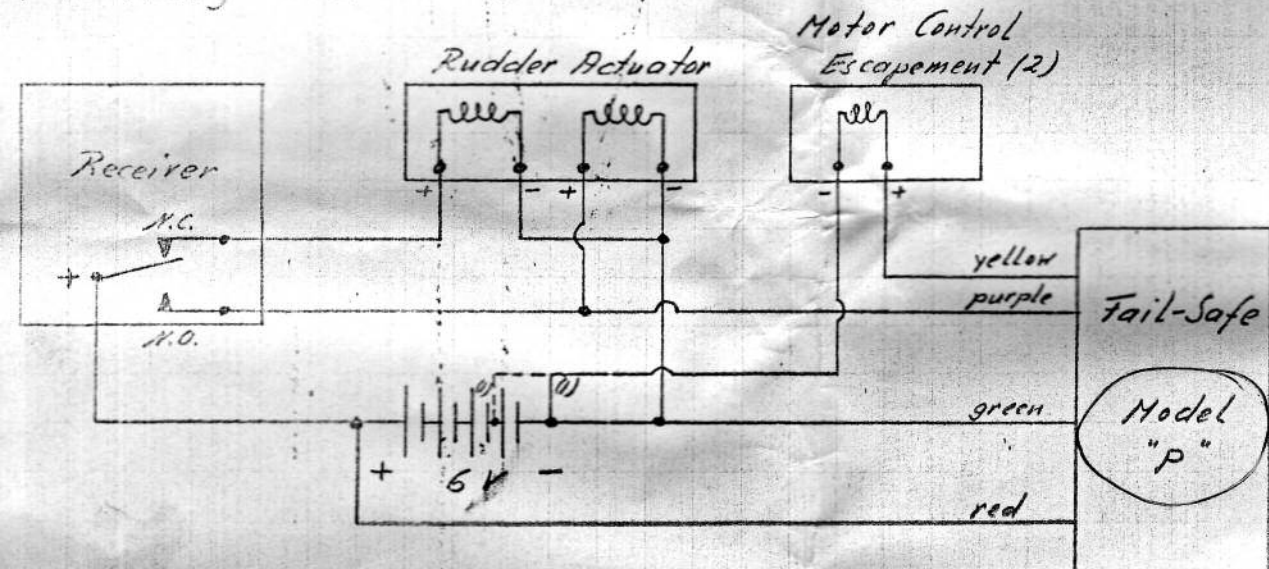




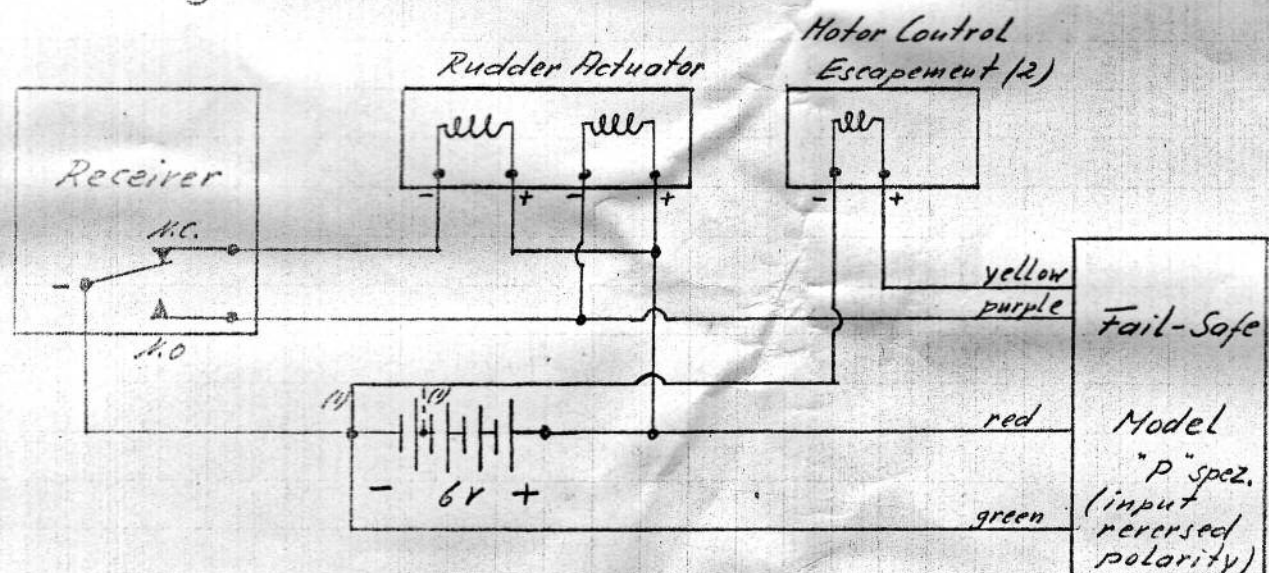
# FAIL-SAFE HOOKUP

Single Channel Pulse  
(with South Western Magnetic Actuator)

① + on relay arm.



② - on relay arm



(1) Escapement can be connected to 6 or 4.5 Volts.

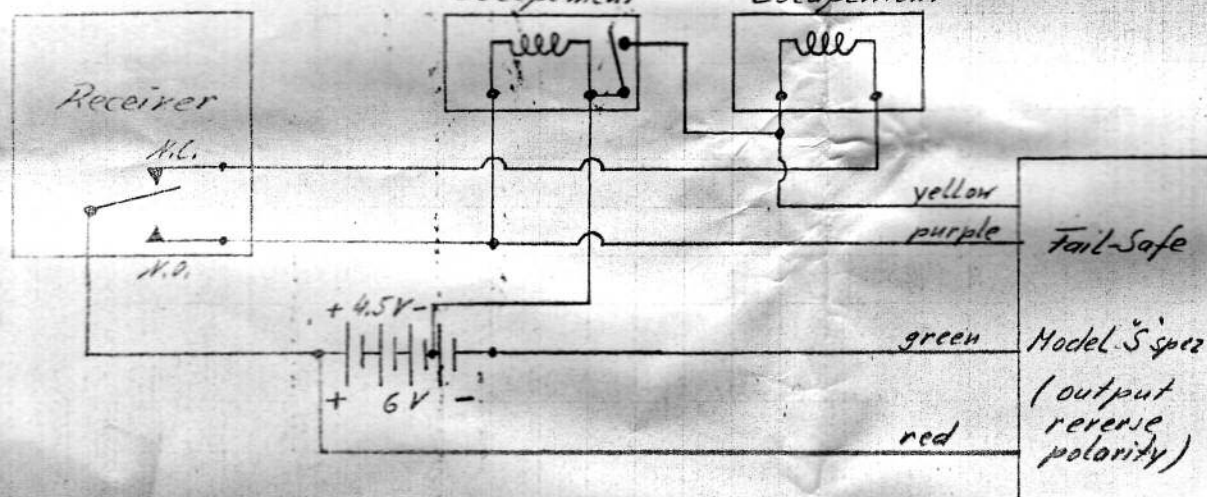
(2) Provide for all positions and one neutral "motor idling".

# FAIL-SAFE HOOKUP

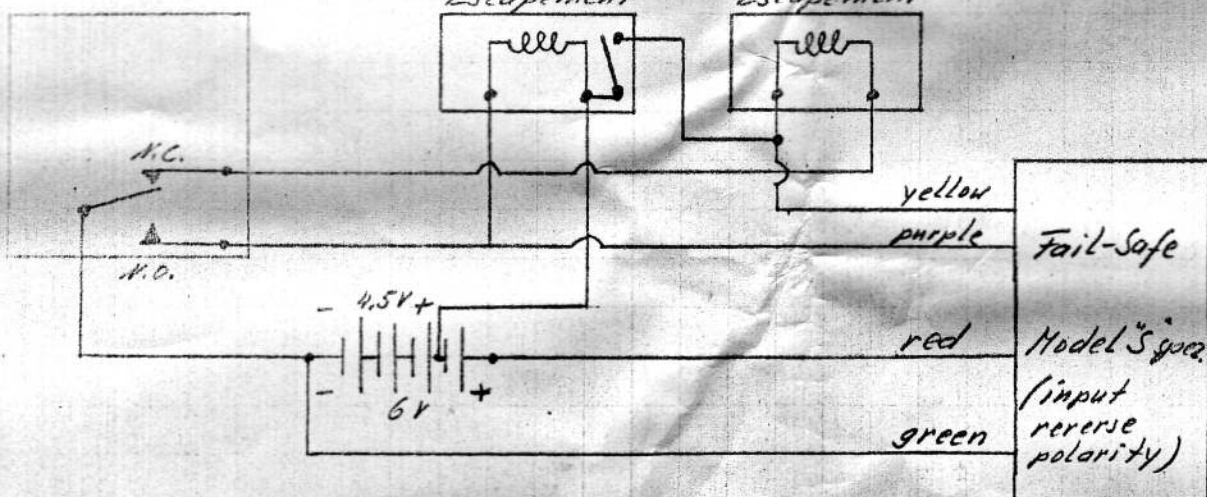
## Single Channel

(Rudder Escapement with quick blip motor control)

① on relay arm,

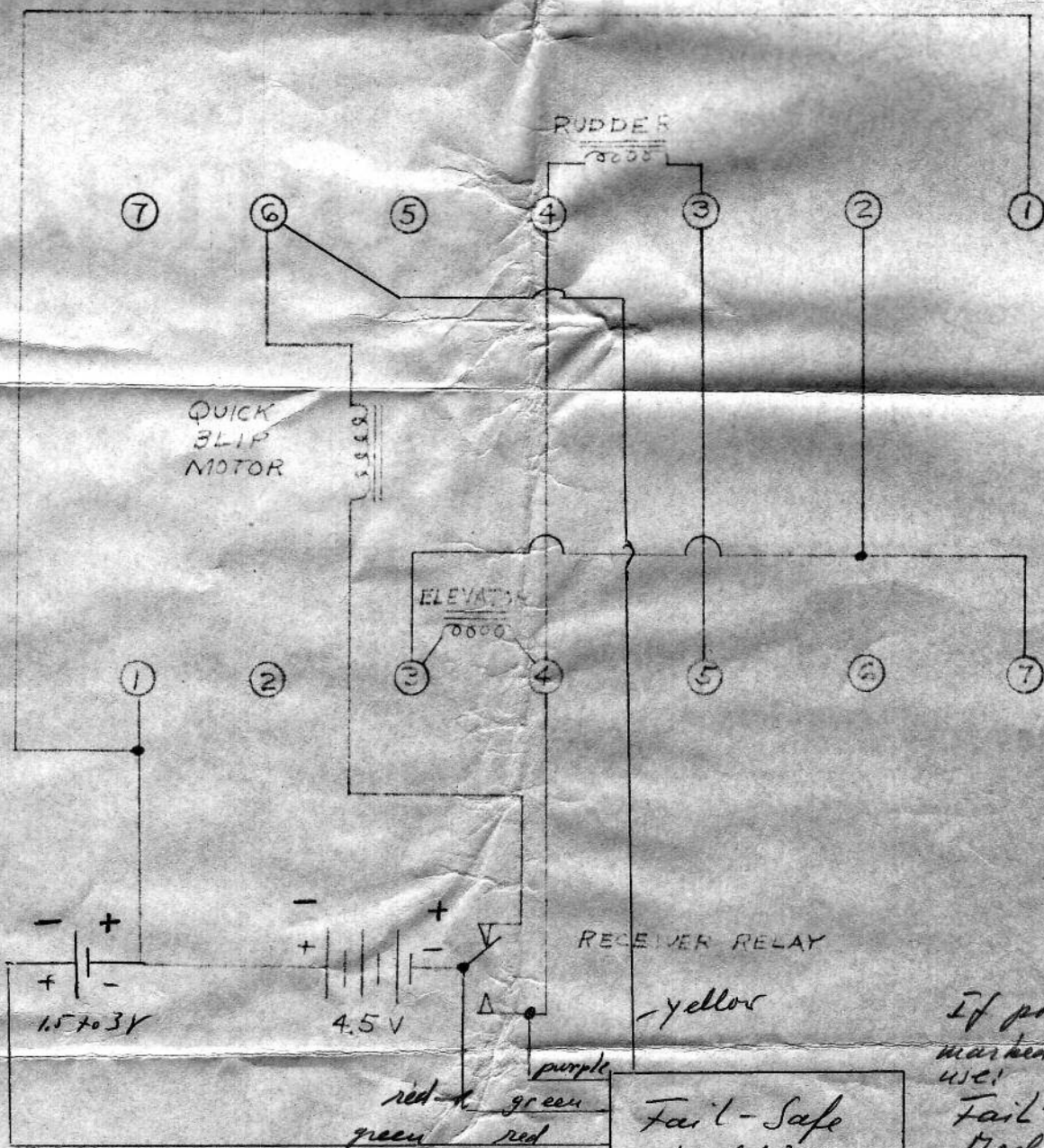


② on relay arm,





BONNER CASCADING VARICOMPS



# KEYING

1. HOLD ———— RIGHT
2. RELEASE - HOLD — LEFT
3. RELEASE - HOLD — UP
4. RELEASE - HOLD - DOWN
- RELEASE - NEUTRAL

QUICK BLIP - MOTOR ESCAPEMENT

If polarity as  
marked with pencil.  
use!

Fail-Safe  
Model 5  
(output reversal  
polarity)

**FLY-TRONICS****ENGINEERING****FAIL-SAFE**

OUR NEW ADDRESS: 3010 BROOK DRIVE, MUNCIE, IND. :: PHONE 288-2164 :: AREA CODE 317

*A New Automatic Electronic Control Device for Safer R/C Flying*

You know how it feels when your valuable R/C plane gets out of control, flies away and the plane with all your work and money invested in it may be lost. FAIL-SAFE, the automatic control device designed and built by experienced modelers can eliminate this worry. A simple connection of FAIL-SAFE to your plane controls will assure you that this cannot happen.

Just what does FAIL-SAFE do? It switches your throttle servo or escapement automatically to "motor idling" if for a chosen time no controls are executed.

Who can use FAIL-SAFE? Everyone with a multi channel or single channel R/C equipment, relay-less or with relays where a voltage between 5 and 9 volts is available. Suitable for 3 volt receivers if two small pencil cells are added. Used with single channel pulse, FAIL-SAFE gives in addition to its safety purpose, motor speed control.

FAIL-SAFE is available in 3 models:

FAIL-SAFE Model M:	For operation with multi channel receivers, relay-less or with relays	\$17.50
FAIL-SAFE Model S:	For operation with single channel receivers, relay-less or with relays	\$17.50
FAIL-SAFE Model P:	For operation with single channel receivers with attached pulser	\$17.50

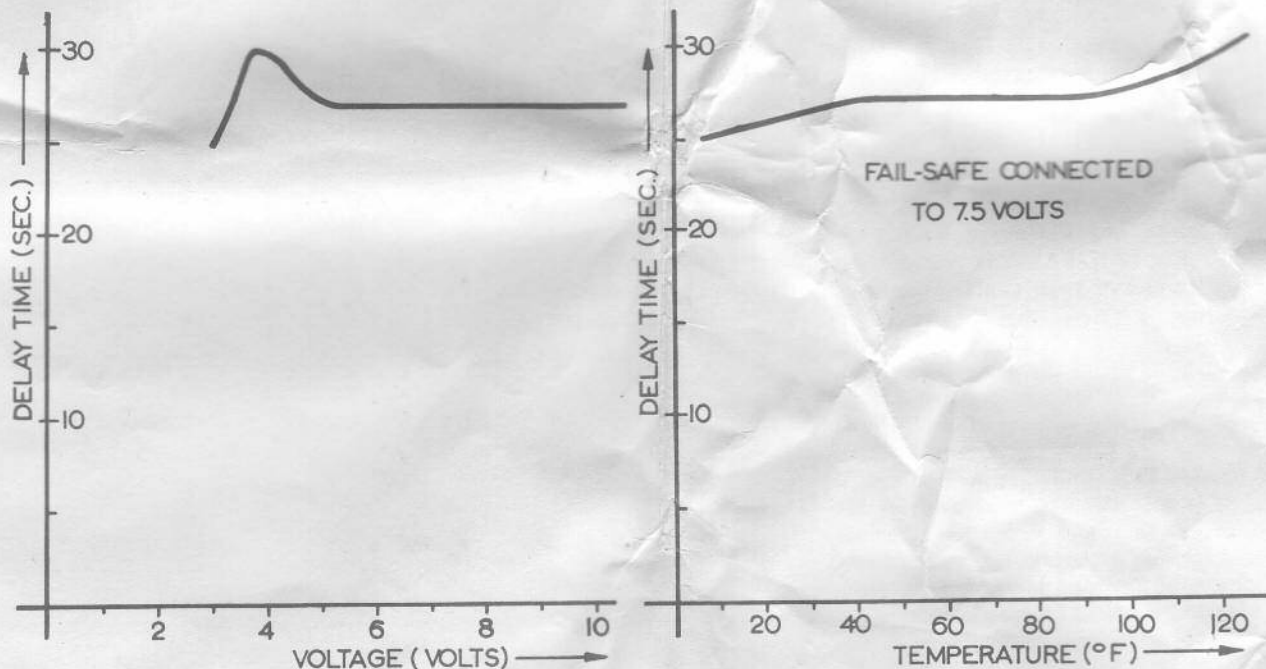
The components for each FAIL-SAFE are selected and assembled with great care. Each FAIL-SAFE is tested thoroughly to assure your complete satisfaction.

For model M and S the delay time is factory adjusted to 27 sec., for model P to 1 sec. Two timing resistors for 18 and 39 sec. delay are delivered with each model of FAIL-SAFE. Delivered with model M and S is also the necessary resistor for conversion to model P. Model M comes wired for low power output, model S and P are wired for high power output. Each FAIL-SAFE model can easily be changed to the opposite form of output or to any of the other FAIL-SAFE models.



### Specifications

- LIGHT WEIGHT - Only 3/4 oz. including case and cover.
- SMALL SIZE - 1-3/4" long x 1-1/8" wide x 11/16" high.
- VOLTAGE - FAIL-SAFE operates at any voltage from 5 to 9 volts.
- CURRENT DRAIN - Only 3 ma. at 6.25 volts.
- LOAD - Up to 600 ma. can be switched, short time load.
- TIMING - Factory adjusted for 27 sec. delay time. FAIL-SAFE can easily be changed to any desired delay time up to 45 sec.
- VERSATILITY - Each FAIL-SAFE model can be converted to any of the other FAIL-SAFE models.
- OUTPUT - Can be adjusted for low power output as required for multi channel or for high power output as required for single channel operation.
- WELL COMPENSATED - The delay time of FAIL-SAFE is relatively independent of temperature and voltage within the range as shown by the curves below.
- Printed circuit, four transistors, top quality components.
- Vibration and shock resistant.
- Case and cover made from .020" aluminum, gold anodised.
- Short circuiting of servo impossible. FAIL-SAFE switches off at once should a signal come through again.
- Simple to install. Only four wires to connect.
- Special feature for single channel pulse: FAIL-SAFE can be used for motor speed control in addition to its safety purpose.





### Installation Instructions

Type of Receiver Remarks	FAIL-SAFE model to be used	Power Output Required	Wiring Layout	Remarks
Multi channel relayless	M	low		See note (1).
Multi channel with relays. Variation 1.	M	low		Receiver battery plus wire and servo battery plus wire connected together.
Multi channel with relays. Variation 2.	M	high		See conversion instruction regarding black wire. Connect red wire to that N.O. contact of throttle relay which has plus polarity.
Single channel with relay	S	high		Use throttle actuator with low current drain. (max. 400 ma.) (2)
Single channel relayless	S	high		Use throttle actuator with low current drain. (max. 400 ma.) (2)
Single channel pulse	S or P	high		If additional motor speed control desired use model P. (2)

(1) Reed bank common. Open existing connection between this wire and battery, then connect FAIL-SAFE as shown.

(2) If an escapement is used, provide for all positions, except neutrals, "motor idling".

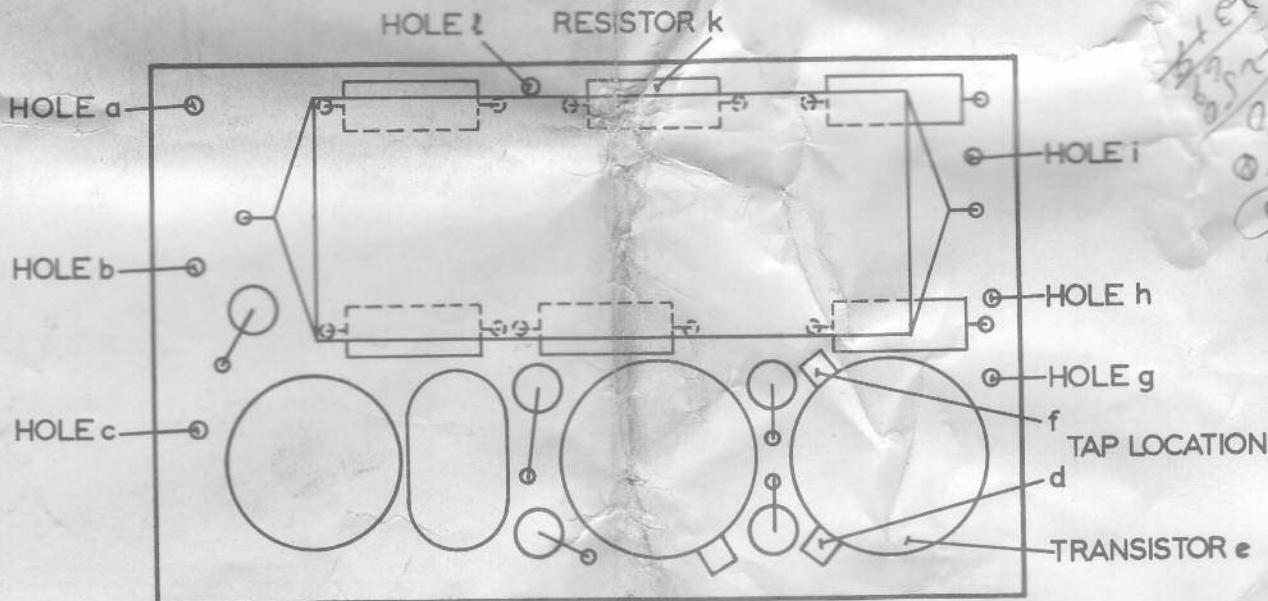


## Conversion Instructions

### General instructions for any conversion:

Remove cover. Unscrew printed circuit board, lift it up and pull wires a few inches through the grommet in order to get access to the board. Use a soldering pencil of 25 to 40 watts and rosin core solder. (Use only as much heat as necessary to let the solder flow. Be careful, too much heat will damage the printed circuit board.) After the conversion level soldering spots with a file. Remove all solder chips with a brush. Moisten a cloth slightly with dope thinner to remove the soldering flux from the board. Assemble FAIL-SAFE. Do not forget to put the fiber glass insulation between board and case bottom.

Conversion	What to do
Change in delay time	Unsolder resistor "k" while pulling it out. Push leads of new timing resistor into the same holes and solder leads carefully to printed circuit. Value of timing resistor is proportional to delay time. (27 kohms = 27 sec., or 18 kohms = 18 sec. delay time.)
Low power output to high power output	Unsolder yellow jump wire at hole "a". Push same end of wire through hole "c" and solder wire carefully to printed circuit.
High power output to low power output	Unsolder yellow jump wire at hole "c". Push same end of wire through hole "a" and solder wire carefully to printed circuit.
For multi channel with relays Variation 2.	Unsolder and remove red jump wire between holes "g" and "h". Cut a black hook up wire to a length of 12 inches. Push prepared wire through hole "h" and solder it carefully to printed circuit. Pull black wire through grommet and connect it as shown under "Installation".
FAIL-SAFE model M to model S	Unsolder and remove red jump wire between holes "g" and "h". Carefully and with as little heat as possible unsolder transistor "e" while pulling it out. Make holes free from solder. Turn transistor so that tap is located as shown with "d". Push transistor leads through holes and solder leads quickly but carefully to printed circuit.
FAIL-SAFE model S to model M	Push a prepared insulated red hook up wire through holes "g" and "h" and solder wire to printed circuit. Carefully and with as little heat as possible unsolder transistor "e" while pulling it out. Make holes free from solder. Turn transistor so that tap is located as shown with "f". Push transistor leads through holes and solder wires quickly but carefully to printed circuit.
For single channel pulse with additional motor control	Push uninsulated lead of supplied 3.3 kohm resistor (orange - orange - red - silver) through hole "i" until resistor touches the board, then solder lead to printed circuit. Push insulated (spaghetti) lead through hole "l" and solder it carefully to printed circuit. Remarks: Doing so the delay time of FAIL-SAFE is reduced to 1 sec. If now the pulser is turned off for a moment during operation, FAIL-SAFE responds at once and the throttle actuator is moved. Adjust rudder close to neutral position for pulser off. In order to maintain the safety purpose of FAIL-SAFE all positions, except neutrals, of a throttle escapement should cause "motor idling".
FAIL-SAFE model P to model S or M.	Unsolder and remove resistor between holes "i" and "l". You have now model S. If model M is required, convert further as per instructions above.



TOP VIEW OF FAIL-SAFE