

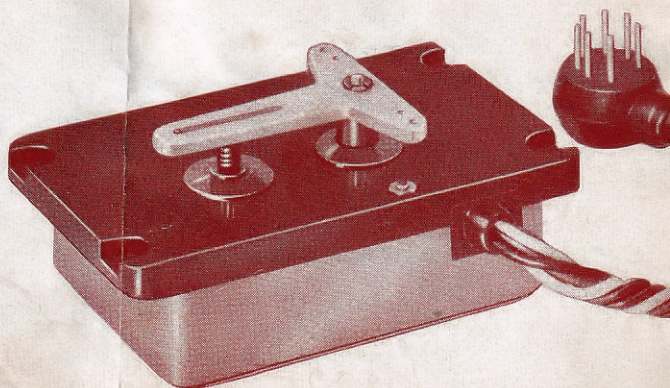
UCE

Graupner

UNIMATIC

Single channel
actuator for
rudder and engine
throttle operation

Indent No. 3753



UNIMATIC

is a single-channel rudder servo, powered by an electric motor and self-neutralizing electrically.

It is suitable for model aeroplanes and ships and can be used alternatively for operating either a control surface (2 possible signal rhythms) or for actuating the engine throttle. Furthermore the UNIMATIC, with the steering disc No. 1 installed, can be wired to a cascaded unit for additional functions. This feature practically converts single-channel R/C sets into multi channel equipment, for it then permits not only left – neutral – right rudder displacement, but, for example, the selection of full power or idle for the engine throttle as well, if equipped with a second cascaded unit.

The test data printed on page 8 clearly indicate that UNIMATIC not only provides the smooth operation of the rudder required for an equally smooth operation of the model, but that these rudder movements can be actuated in as rapid a sequence as the circumstances may dictate, these presuppositions being a must for complete mastery of the model.

The structure

The components of the UNIMATIC consist of injection moulded plastics, frame and lid are made of high-impact Polystyrol, the cogwheel material is self-lubricating Durethan. The steering lever in turn is made of Hostalen, a tough material which is capable of standing the hard battering of a crash. The contacts are of the self-cleaning variety, thus eliminating the danger of contamination by foreign particles or burning.

Durability tests have shown the steering disc wear to be a mere 15 % after no less than 125,000 switching operations.

The servo is structurally very robust and can stand all stresses caused by, and encountered in, normal operation.

UNIMATIC is quite unaffected by vibrations; its steering lever is securely arrested in all positions.

The function

As a rudder servo UNIMATIC is operated by using two different signal rhythms; A and B

A. Equipped with steering disc No. 1, the standard equipment of the unit, the function is:

- 1. Press button 1 x = always left rudder throw**
(or right rudder throw, respectively, if steering lines are crossed or the steering pushrod is attached to the opposite side of the lever arm) for the duration of the signal. Lever arm returns to neutral automatically.
- 2. Press button 2 x = always right rudder throw**
(or left rudder, respectively, as explained above) by blipping a quick first signal (approx. 0,1 seconds) and pressing the button for the second signal as long as right rudder is required. After releasing the button lever arm will return to neutral position.

3. **3rd. short signal:** operation of cascaded servo. Same signals as under A. 2, followed by a quickly blipped 3rd. signal. This third short signal actuates the cascaded gear (for example UNIMATIC with steering disc No. 3 or SERVO-relay as engine throttle actuator), which holds the endposition in question till the next short signal arrives; the operating sequence, for example, then is:

full power – idle – full power etc.

This signal rythm simultaneously operates the control surface (rudder) too, but since this displacement does not last more than a fraction of a second it is not noticeable in flight or in the behaviour of a model ship.

Getting the knack of the proper signal rythm requires some practice and training.

- B. **With steering disc No. 2** the device serves as a rudder servo with the following steering sequence: neutral – left – neutral – right etc., with the rudder throw held as long as the button is pressed. The unit neutralizes automatically on release of the button.

UNIMATIC, equipped with steering disc No. 2, can be used as **engine throttle actuator**, provided a **separate channel** is used for its operation.

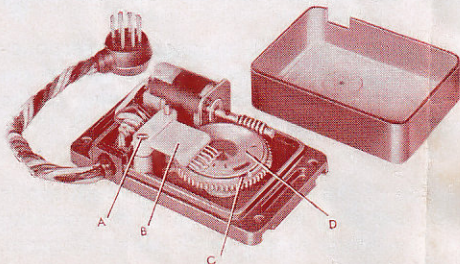
Check page 4 for details of steering lever adjustment.

UNIMATIC as cascaded engine throttle actuator

- C. With steering disc No. 3 the UNIMATIC is used as a cascaded unit (check A3) to operate the engine throttle. The control sequence then is:
full power – idle – full power etc.

If used as engine throttle actuator the steering lever must be arranged in such a manner that it occupies one of the endpositions, not the neutral one, in the signal off condition (check instructions below).

Replacing the steering discs (see illustration)



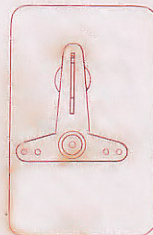
Remove the lid after unscrewing the nut at the bottom of the lid. After removing screw A the contact set B can be lifted approx. $\frac{1}{4} - \frac{3}{8}$ ". Attention: do NOT bend the contacts! Using one of the two small recesses C the steering disc E can be lifted with a small screw driver and removed from its support.

Then insert steering disc No. 2 or 3 (as required), re-attach the contact set, slip on the lid and secure with the nut.

Clean the disc once in a while to ensure positive contacts.

How to find neutral position when using UNIMATIC with steering disc No. 1 or 2 as rudder servo

After replacing steering discs the steering lever will generally be found not to occupy the exact neutral position. In this case the drive crank which engages the slot of the steering lever must be rotated to the right, until the steering lever is in the correct, dead-neutral position (see illustration). Be sure not to press down the drive crank, while adjusting neutral position, as it might otherwise jam at the panel.



How to adjust steering lever position of UNIMATIC equipped with steering disc No. 2 or 3, engine throttle actuator version

After wiring the unit turn the drive crank to the right until the steering lever is in the end position, i.e. the position of maximum throw (see illustration). In this manner the steering lever, in following signals, will move to either extreme left or right position and hold same until the next signal makes it move again.

The total stroke of $2 \times \frac{3}{16} = \frac{3}{8}$ " can thus be utilized for actuating the engine throttle.



Wiring

UNIMATIC comes supplied with a 7-pin plug, which features the following colour code:

1 : brown	— 2/2,4 volts	5 : green	break contact
2 : white	+ 2/2,4 volts	6 : red	make contact
3 : blue	(additional contact for cascaded unit)	7 : black	central contact, relay (additional contact for cascaded unit)
4 : unoccupied			

Installation of the special coupling, indent No. 3671, will cut down the wiring work to a minimum.

The UNIMATIC plug sports a central keying peg, which engages a corresponding recess of the coupling. Since this recess is provided on one side of the special coupling only the possibility of erroneously inserting the plug of the receiver into this part of the coupling is positively eliminated.

Single channel operation

Insert the UNIMATIC plug into the side of the special coupling which sports the recess, insert the ULTRATON receiver plug into the side of the coupling without recess. For proper wiring of the power supply check wiring diagram. In this set-up UNIMATIC operates as rudder servo.

If a second, cascaded unit is to be installed for operation of the engine throttle, the leads designated 3, 5 and 7 in the wiring diagrams must be soldered to the coupling; follow instructions given on page 7 for this step.

3-channel operation

For operation with the 3-channel receiver POLYTON 3 the **black** receiver plug (channel 1) must be attached to the coupling.

UNIMATIC (equipped with steering disc No. 3) is generally operated as engine throttle actuator via 1 channel, using the control sequence full power – idle – full power etc.

Of course with 3-channel operation (with 2 channels normally used for operation of the rudder via BELLAMATIC) the first channel can be made to operate 2 UNIMATICs; for example in the following manner:

1st UNIMATIC with steering disc No. 1 for elevator control (press 1 x = dive, press 2 x = climb)

2nd UNIMATIC with steering disc No. 3 for engine throttle operation, triggered by 3rd short pulse (function sequence: full power – idle – full power etc.).

For a start you will be well advised, however, to be content with the operation of the rudder via 2 channels and the engine throttle using the 3rd channel (see corresponding instructions in prospectus 3 K).

Installation

UNIMATIC is completely unaffected by changes of position. If it cannot be installed in the normal manner, i.e. horizontally, as, for instance, in narrow fuselages, it may be mounted at the flanks or same. Preferably fasten it with 4 screws on a suitable plywood panel.

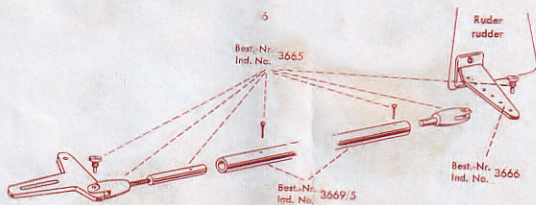
Rudder linkage

The following standardized components are available for proper rudder servo – rudder linkage:

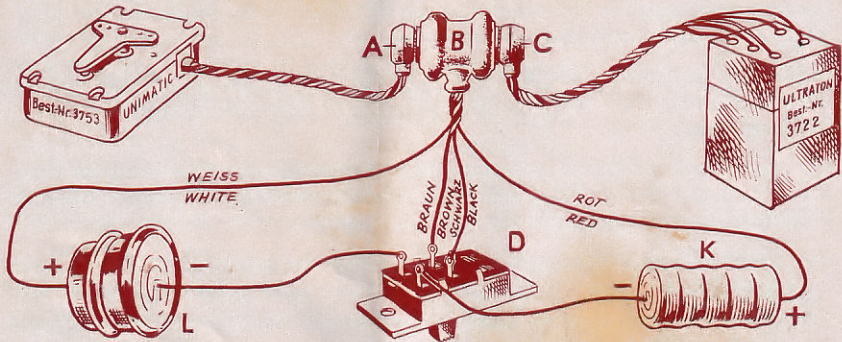
- adjustable forked coupling, indent No. 3665
- pushrod $1\frac{3}{64}$ / $1/8$ " Ø, 2" long, indent No. 3669/5
- control horn, indent No. 3666

These parts do not only ensure a fail-safe linkage, but permit precision dead-neutral rudder position adjustments, too.

Cables, if preferred to push rods, may be alternatively installed, of course.

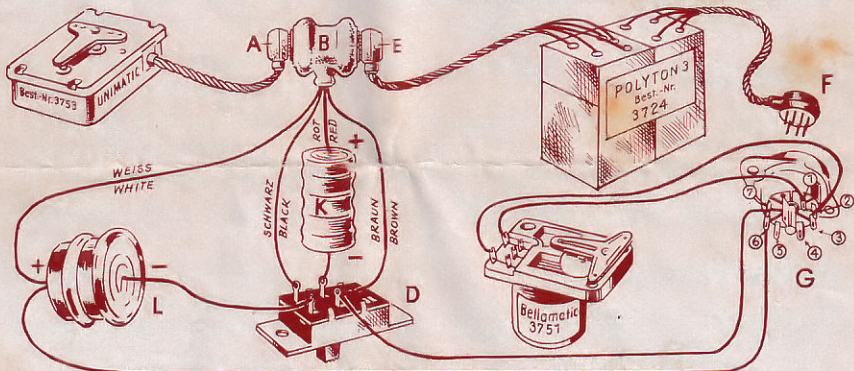


Wiring diagram ULTRATON - UNIMATIC

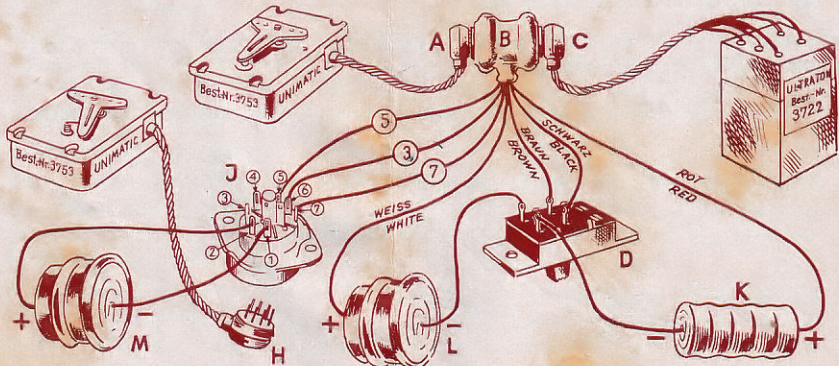


Wiring diagram POLYTON 3 - UNIMATIC - BELLAMATIC

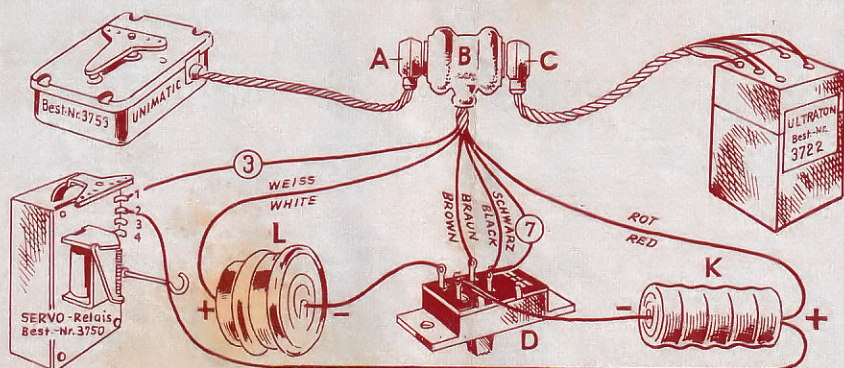
Optionally a second UNIMATIC may be cascaded by following the wiring diagramm ULTRATON - UNIMATIC - UNIMATIC.



Wiring diagram ULTRATON - UNIMATIC - UNIMATIC



Wiring diagram UTRATON – UNIMATIC – SERVO-relay



Legend

- A plug of UNIMATIC
- B special coupling, indent No. 3677
- C plug of ULTRATON
- D double pole slide switch, indent No. 3639
- E **black** plug of POLYTON 3
- F **red** plug of POLYTON 3
- G plug socket, indent No. 1531, for **red** plug of POLYTON 3 (for BELLAMATIC)
- H plug of cascaded UNIMATIC
- J plug socket, indent No. 1531, for cascaded UNIMATIC
- K 6 volts power supply for receiver, or receiver plus SERVO-relay respectively. Either 1 x 6 volts DEAC 225 DK, indent No. 3645, or – for operation less SERVO-relay – 2 x 3 = 6 volts PERTRIX-PERVOX, indent No. 3668
- L 2–2,4 volts power supply for either UNIMATIC, or UNIMATIC **plus** BELLAMATIC respectively. Either 1 x RULAG RL 4, indent No. 3634, or RZ 2, indent No. 3635, or 2 x 1,2 = 2,4 volts DEAC DKZ, indent No. 3654, or 500 DKZ, indent No. 3655
- M 2–2,4 volts power supply for second, cascaded UNIMATIC. Either 1 x RULAG RL 4, indent No. 3634, or 2 x 1,2 = 2,4 volts DEAC 225 DKZ, indent No. 3654.

Important notice:

The leads designated with (3), (5) and (7) in the wiring diagrams ULTRATON-UNIMATIC-UNIMATIC and ULTRATON-UNIMATIC-SERVO-Relais must be soldered to contacts 3, 5 and 7 at that side of the special coupling, where the UNIMATIC is plugged in, after removal of the cap of the coupling (This is the side with the recess).

Recommended power supplies and operating times

	Indent No.	Type	Number requ'd	Voltage volts	Operating time, hours
A	3654	DEAC 225 DKZ 1,2 volts each	2	2,4	3—4
B	3655	DEAC 500 DKZ 1,2 volts each	2	2,4	7—8
C	3634	RULAG RL4, .35 Ah	1	2	3—4
D	3635	RULAG RZ2, .7 Ah	1	2	6—7

Note: These operating times were found using fresh power supplies with 3 seconds intervals between signals.

UNIMATIC draws current only while moving between neutral and end positions; there is no current drain in the end positions, no matter how long they are occupied.

Technical data:

Dimensions: $2^{59}/64 \times 1^{25}/32 \times 1^{17}/64$ "

Weight: approx. 2 ozs.

Stroke: (outboard holes) $2 \times 1^{13}/64$ "

Operating voltage: 2—2,4 volts

Reduction ratio: 60 : 1

Rudder force: 2,77 oz. in.

Test

The values indicated in the compilation below were found by evaluating the results of 100,000 switching operations on 2,4 volts operating voltage ($2 \times$ DEAC 225 DKZ), using an off-the-shelf UNIMATIC. A full revolution of the drive crank (360°) required .45 second.

Using a 2 volts operating voltage (RULAG) slows down the values by a factor of 1,5. The rudder force in turn decreases by a factor of 1,5.

Symbols used in the compilation: $>$ = more than . . . , $<$ = less than . . .

Signal-length-table

	Steering disc No.	Rudder throw	Duration of 1st signal, sec.	Inter-val, sec.	Duration of 2nd signal, sec.	Inter-val, sec.	Duration of 3rd signal, sec.
A	1	left	desired duration of rudder throw				
B	1	right	$> .07$.12	desired duration of rudder throw		
C	1	left—left	desired duration of rudder throw	$> .3$	desired duration of rudder throw		
D	1	right—right	desired duration of rudder throw	$> .07$	$> .12$.12	desired duration of rudder throw
E	1	3rd. blipped signal for cascaded unit	$> .07$.12	$> .12$	$< .03$	$> .12$
F	2	left—left or right—right	desired duration of rudder throw	$> .07$	$> .12$	$> .12$	desired duration of rudder throw