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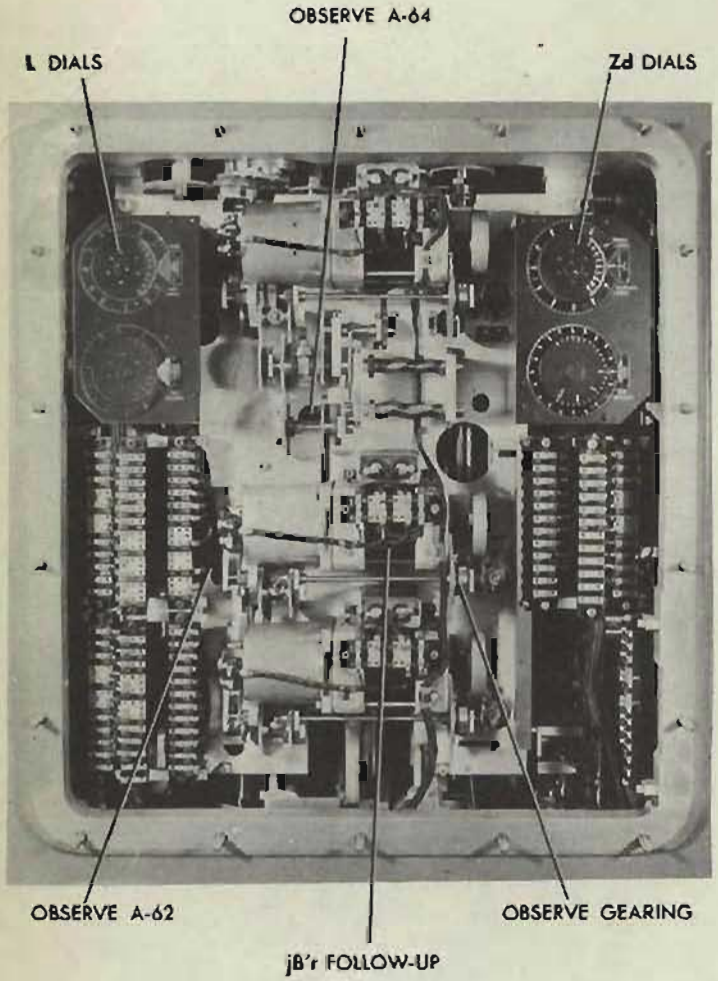
DECK TILT CHECK TEST

Preliminary setup

1 Turn the power switch ON.
2 Turn the control switch to SEMI-AUTO.



Check the synchronization of the jB′r Follow-up

1 Set *L* and *Zd* at 2000′.
2 Set *B′r* at 0°00′, on the stable element dials.

The *Br* ring dials should read 0°00′. If *Br* does not read 0°00′, check the *jB′r* follow-up and the connecting shaft lines.

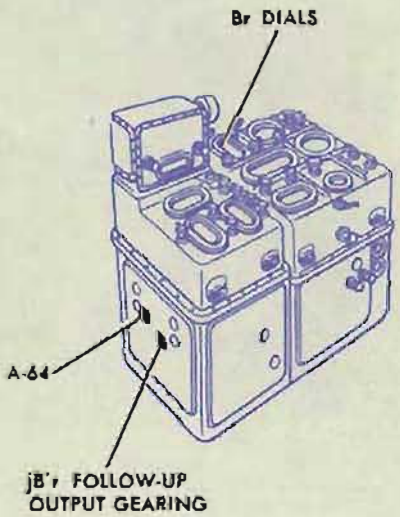
Check the Deck Tilt Component Solver

1 Set *B′r* at 45°.
2 Observe clamp A-64 while turning *L* from 500′ to 3500′.

If movement of A-64 is observed, the vector gear of the deck tilt component solver is incorrectly positioned.

1 Set *L* at 2000′.
2 Observe A-64 while turning *B′r* from 0° to 180°.

If movement of A-64 is observed, the *L* cam of the deck tilt component solver is incorrectly positioned.



Check the Zd (L−L cos 2B′r) Multiplier

1 Check that *L* is at 2000′.
2 Set *B′r* at 0°.
3 Observe the *jB′r* follow-up output gearing for motion while turning *Zd* from 500′ to 3500′.

If motion is observed, the input rack of the *Zd* ($L - L \cos 2B'r$) multiplier is incorrectly positioned.

1 Set *Zd* at 2000′.
2 Set *B′r* at 90°.
3 Observe the *jB′r* follow-up output gearing while turning *L* from 500′ to 3500′.

If there is motion at the *j′Br* follow-up output gearing, observe A-62, and again turn *L* from 500′ to 3500′.

If there is motion of A-62, the input rack of the *L* (*L* sin *2B′r*) multiplier is incorrectly positioned.

If A-62 is stationary, but there is motion at the *jB′r* follow-up output gearing, the lead screw of the *Zd* (*L* –*L* cos *2B′r*) multiplier is incorrectly positioned.

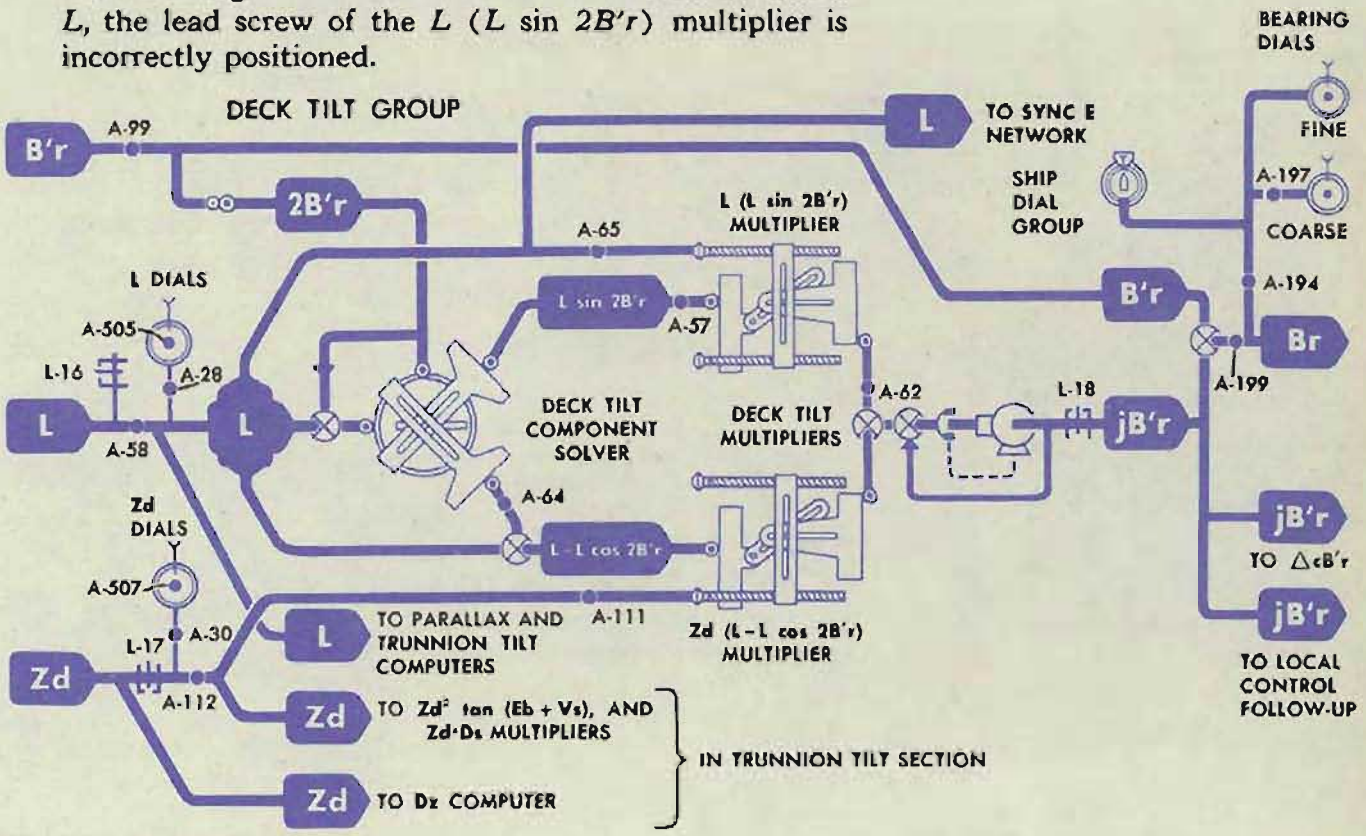
Check the L (L sin 2B′r) Multiplier

1 Set *Zd* at 2000′.
2 Set *B′r* at 0°.
3 Turn *L* from 500′ to 3500′ and observe the *jB′r* follow-up.

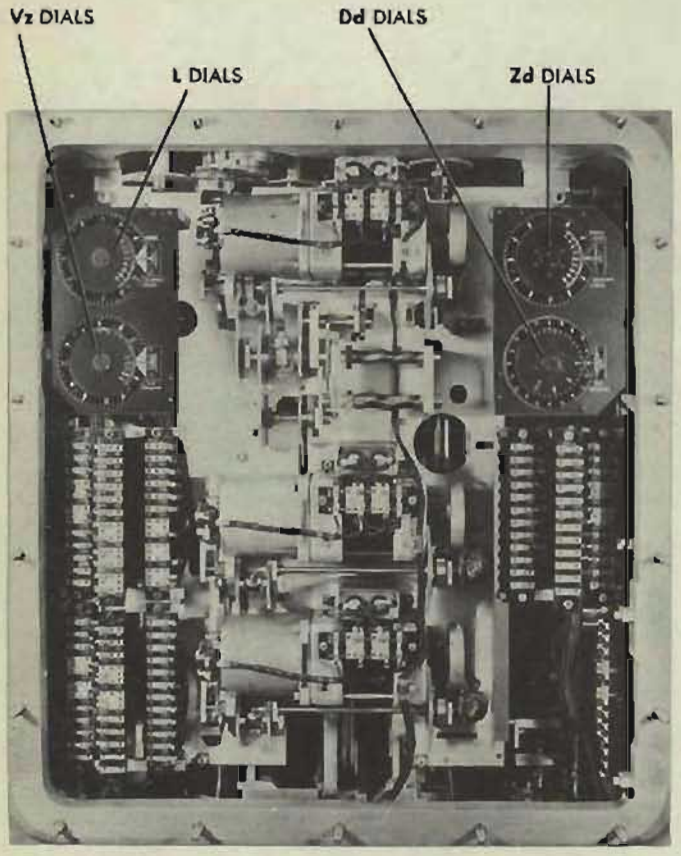
If there is motion of the *jB′r* follow-up output gearing, the *L* sin *2B′r* input rack of the *L* (*L* sin *2B′r*) multiplier is incorrectly positioned.

1 Set *Zd* at 2000′.
2 Set *B′r* at 45°.
3 Turn *L* to 3200′.
4 The *Br* ring dials should read 46°21′. Record the error.
5 Turn *L* to 800′.
6 The *Br* ring dials should read 46°21′. Record the error.

If the *Br* ring dials do not read 46°21′ for both values of *L*, the lead screw of the *L* (*L* sin *2B′r*) multiplier is incorrectly positioned.

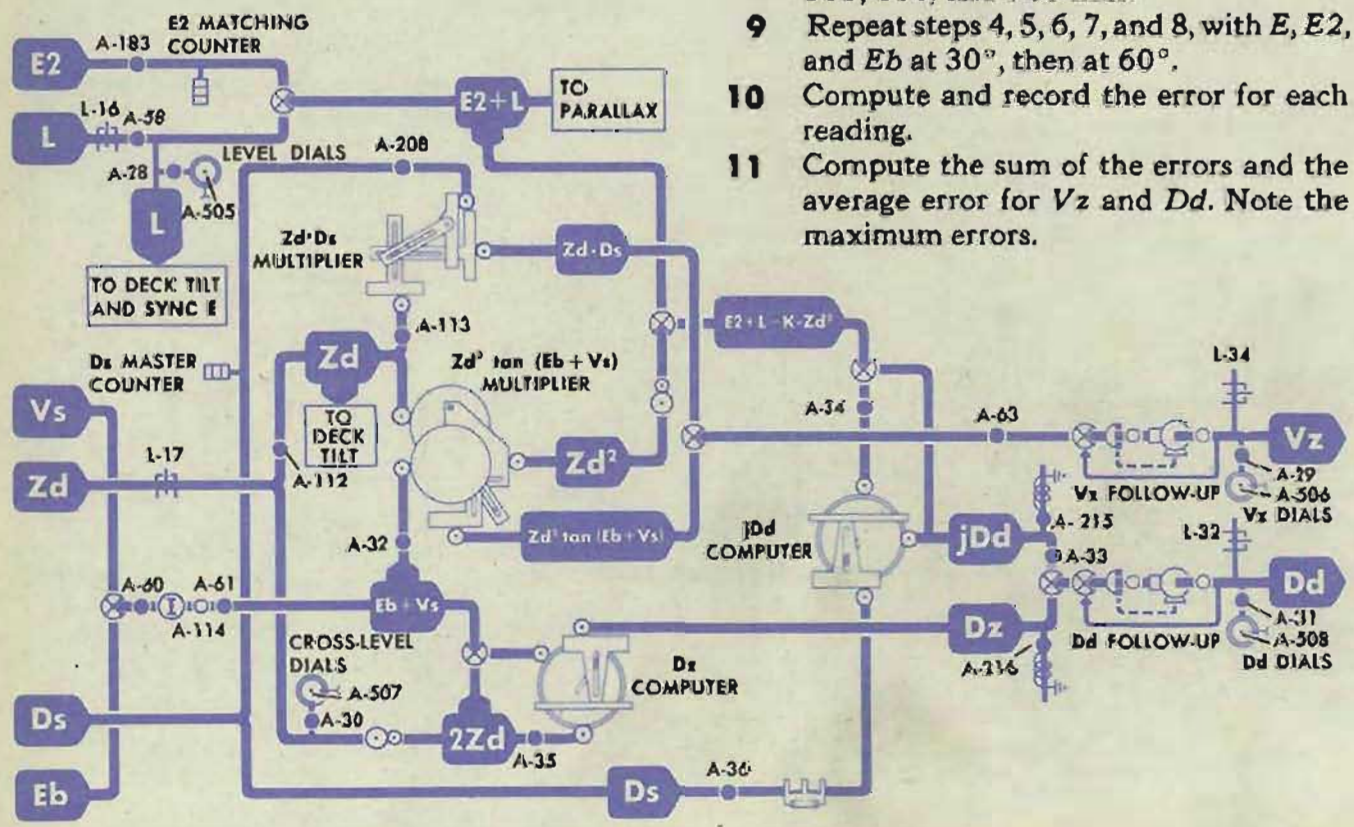


TRUNNION TILT CHECK TEST



Making the test

1. Set *L* and *Vs at* 2000′.
2. Match *E* and *E2* as follows:
   Remove power leads C1 and CC from the *Vl* + *Pe* follow-up. Set *Vl* + *Pe* at 0 and wedge the follow-up output gearing. Set *I.V.* at 2550 f.s. *E2* will then remain equal to *E* for all settings of *E*.
3. Set *E* at 0° with sync *E* handcrank at CENTER. (*E2* will also be zero.) Match the sync *E* dials at the fixed index with the sync *E* handcrank OUT. (*Eb* will then equal *E* since *L* equals 2000′.)
4. Set *Ds* at 300 mils.
5. Set *Zd* at 3200′ in an increasing direction.
   Read and record the values of *Vz* and *Dd*.
6. Set *Zd* at 3200′ in a decreasing direction.
   Read and record the values of *Vz* and *Dd*.
7. Continue the test in the same manner, setting *Zd* at 2600′, 2000′, 1400′ and 800′.
8. Repeat steps 5, 6, and 7, with *Ds* at 400, 500, 600, and 700 mils.
9. Repeat steps 4, 5, 6, 7, and 8, with *E*, *E2*, and *Eb* at 30°, then at 60°.
10. Compute and record the error for each reading.
11. Compute the sum of the errors and the average error for *Vz* and *Dd*. Note the maximum errors.



The necessary record forms for the Trunnion Tilt Test are provided in NAVORD Form 1229. Samples of these sheets are shown below.

TROUBLE ANALYSIS TESTS — TRUNNION TILT CORRECTOR TEST

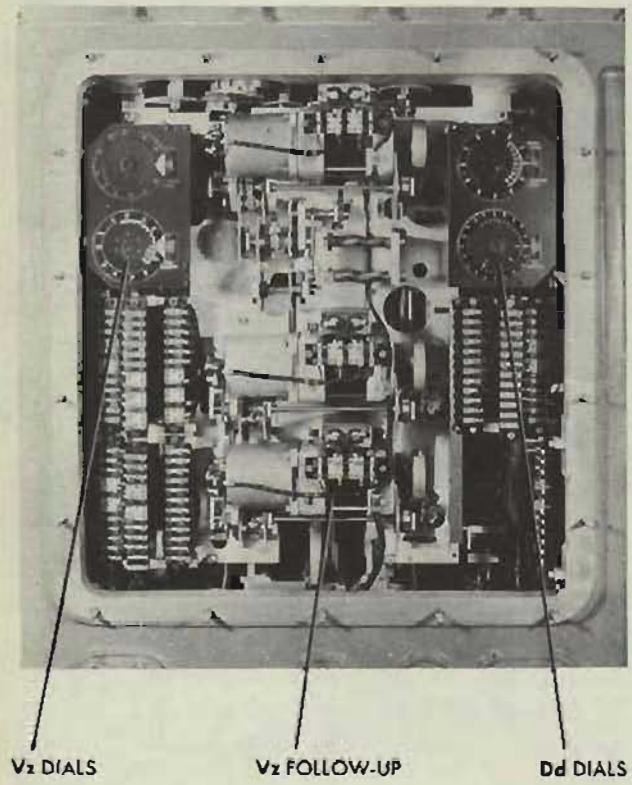
READ Vz

Zd		3200			2600			2000			1400			800		
Ds	Zd	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR
E AND E2 AT 0°																
300	INC	-276			-138			0			+138			+276		
	DEC															
400	INC	-138			-69			0			+69			+138		
	DEC															
500	INC	0			0			0			0			0		
	DEC															
600	INC	+138			+69			0			-69			-138		
	DEC															
700	INC	+276			+138			0			-138			-276		
	DEC															
E AND E2 AT 30°																
300	INC	-171			-112			0			+164			+381		
	DEC															

TROUBLE ANALYSIS TESTS — TRUNNION TILT CORRECTOR TEST

READ Dd

Zd		3200			2600			2000			1400			800		
Ds	Zd	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR	CALC	READ	ERR
E AND E2 AT 0°																
300	INC	-11°			-11°			-11°			-11°			-11°		
	DEC	32'			32'			32'			32'			32'		
400	INC	-5°			-5°			-5°			-5°			-5°		
	DEC	44'			44'			44'			44'			44'		
500	INC	0°			0°			0°			0°			0°		
	DEC	00'			00'			00'			00'			00'		
600	INC	+5°			+5°			+5°			+5°			+5°		
	DEC	44'			44'			44'			44'			44'		
700	INC	+11°			+11°			+11°			+11°			+11°		
	DEC	32'			32'			32'			32'			32'		
E AND E2 AT 30°																
300	INC	-1°			-7°			-13°			-18°			-23°		
	DEC	03'			04'			21'			55'			19'		



Locating errors

If the errors in both *Dd* and *Vz* are excessive, *Vz* should be checked first.

NOTE:
See page 222 for instructions on setting *E2* and *Eb*.

Checking Vz

Check the Vz Follow-up

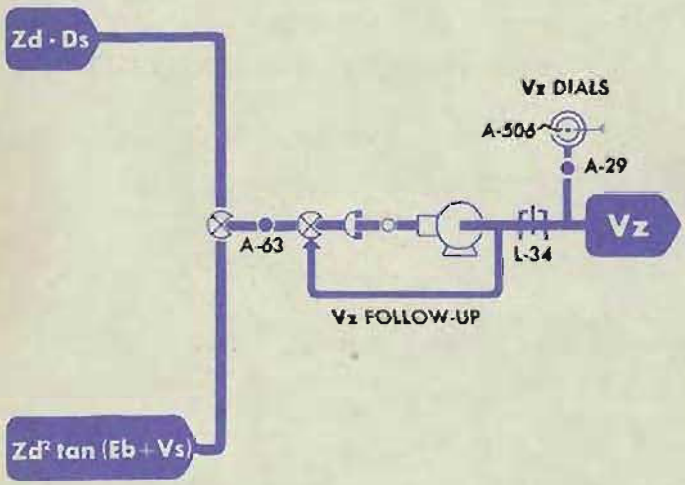
1 Set *Ds* at 500 mils.
2 Set *L*, *Zd*, and *Vs* at 2000′.
3 Set *Eb* at 0°.

The *Vz* dial should read 00′.
If the *Vz* dial does not read 00′, check the *Vz* follow-up and A-63.

Check the Zd rack of the Zd · Ds Multiplier

1 Set *Zd* at 2000′.
2 Set *Ds* at 100 mils.
3 Turn *Ds* from 100 mils to 900 mils.

There should be no movement of the *Vz* dial while *Ds* is run from 100 to 900 mils. If the *Vz* dial moves, the *Zd* input rack is incorrectly positioned.



Check the Ds rack of the Zd · Ds Multiplier

1 Check A-114 and A-61 for tightness.
Check the cut-out points of the *Eb* + *Vs* intermittent drive (A-60).
Set *Eb* at 0.
Set *Vs* at 1500′.
2 Set *Ds* at 500 mils.
3 Turn *Zd* from 800′ to 3200′ and observe the *Vz* dials for motion.

If there is any motion of the *Vz* dials the *Ds* rack of the *Zd*·*Ds* multiplier is incorrectly positioned.

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Check the Zd^2 tan (Eb + Vs) Multiplier

1 Set *Ds* at 500 mils.
2 Set *Vs* at 2000′.
3 Set *L* at 2000′.
4 Set *Eb* at 60°.
5 Set *Zd* at 800′.

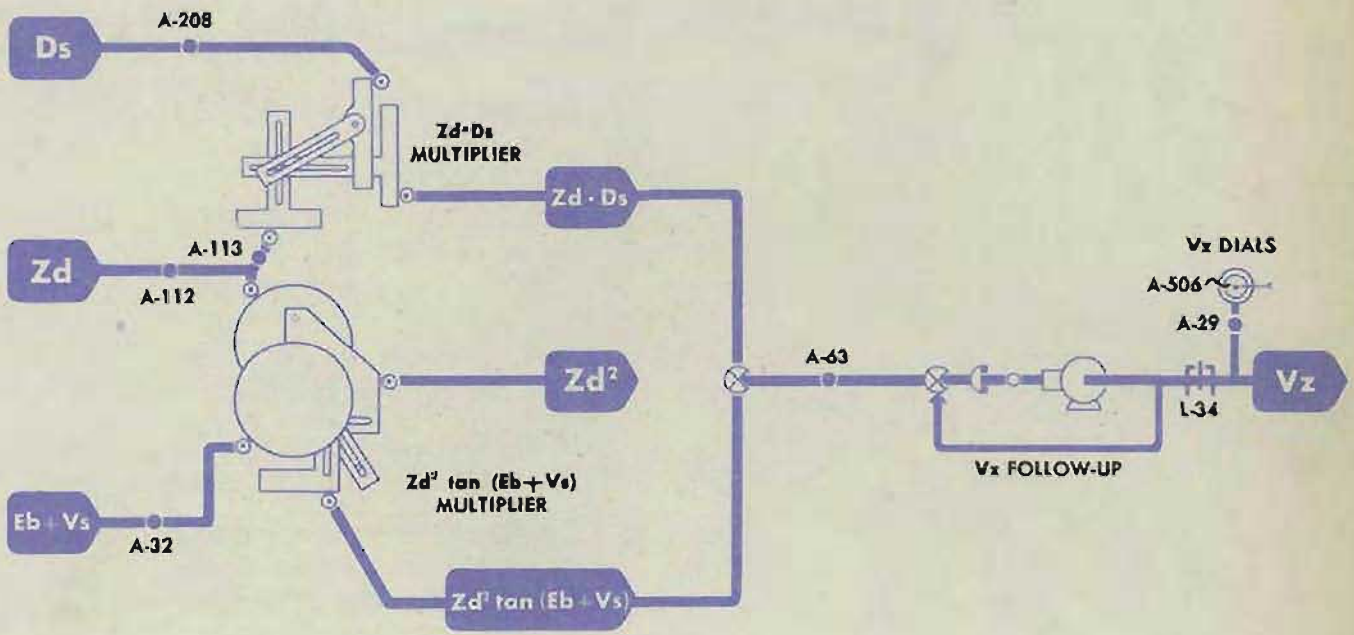
The *Vz* dial should read +316′. Record the reading.

6 Turn *Zd* from 800′ to 3200′.

The *Vz* dial should again read +316′. Record the reading.

If the *Vz* dial readings are not equal, the square cam of the Zd^2 tan (*Eb* + *Vs*) multiplier is incorrectly positioned.

If the *Vz* dial readings are equal, but greater or less than +316′, the *Eb* + *Vs* cam of the Zd^2 tan (*Eb* + *Vs*) multiplier is incorrectly positioned.



Checking Dd

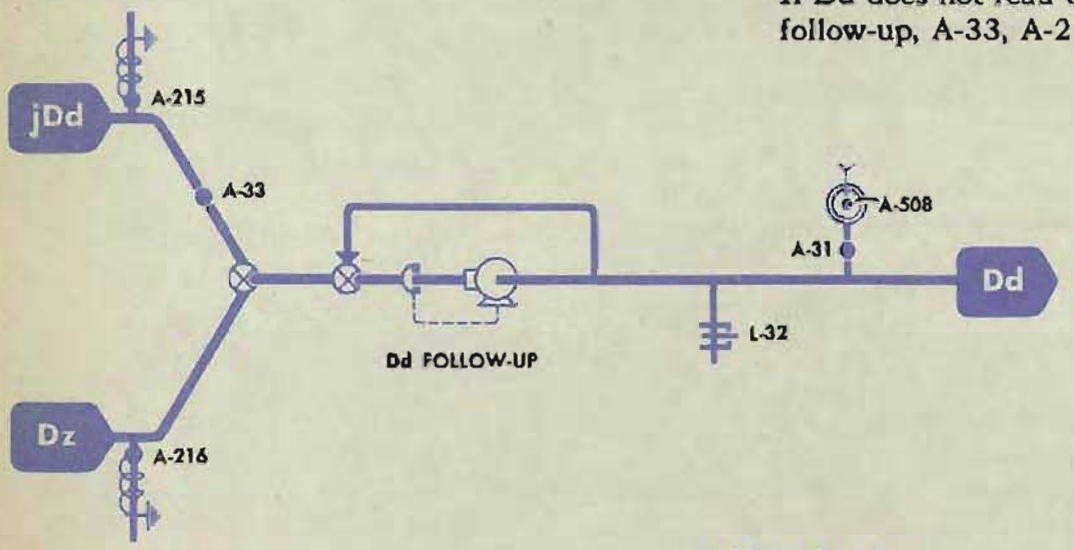
Check the Dd Follow-up

1 Set *Ds* at 500 mils.
2 Set *Zd*, *L*, and *Vs* at 2000′.
3 Set *E2* at 0°.
4 Set *Eb* at 0°.

NOTE:
See page 222 for instructions on setting *E2* and *Eb*.

The *Dd* dials should read 0°00′.

If *Dd* does not read 0°00′, check the *Dd* follow-up, A-33, A-215 and A-216.



Check the jDd Computer Rack and the Dz Computer Vector Gear

1 Set *Ds* at 500 mils.
2 Set *Zd*, *L*, and *Vs* at 2000′.
3 Set *Eb* and *E2* at 0°.
4 The *Dd* dials should read 0.
5 Put the sync *E* handcrank at CENTER and increase *E* from 0° to 60°.
The *Dd* dials should not move.

If the *Dd* dials move, the *Ds* rack of the *jDd* computer is incorrectly positioned.

6 Pull the sync *E* handcrank OUT and re-match the sync *E* dials at the fixed index.
The *Dd* dials should not move.

If the *Dd* dials move, the vector gear of the *Dz* computer is incorrectly positioned.

Check the cam of the Dz Computer

1 Set *Ds* at 500 mils.
2 Set *E2* at 0°.
3 Set *L* and *Vs* at 2000′.
4 Set *Eb* at 60°.
5 Check that *E2* has remained at 0°.
6 Set *Zd* at 800′.
The *Dd* dial should read −30°34′. Compute the error.
7 Set *Zd* at 3200′.
The *Dd* dial should read +30°34′. Compute the error.

Compare the two errors. They should be of like sign and equal magnitude. For example: Readings of −30°31′ and +30°37′ would be satisfactory (error equals +3′ in each case).

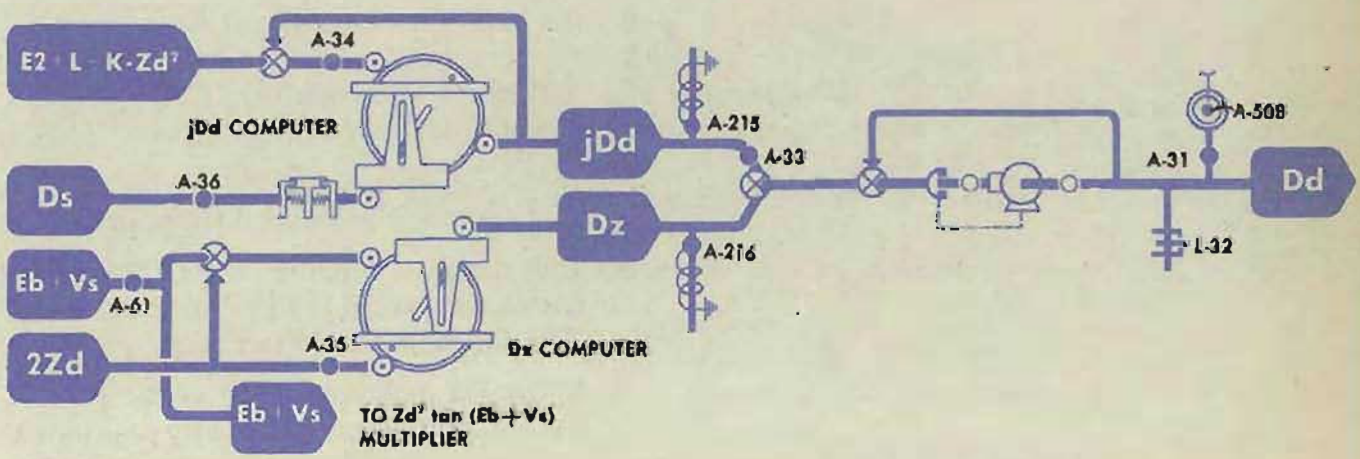
If the errors are unequal or of unlike sign, the *Eb* + *Vs* cam of the *Dz* computer is incorrectly positioned.

Check the cam of the jDd Computer

1 Check that *L* and *Vs* are at 2000′.
2 Set *Zd* at 2000′.
3 Set *E2* at 60°.
4 Set *Eb* at 0°.
5 Check that *E2* still equals 60°.
6 Set *Ds* at 300 mils.
The *Dd* dial should read −23°35′. Compute the error.
7 Set *Ds* at 700 mils.
The *Dd* dial should read +23°35′. Compute the error.

Compare the two errors. They should be of like sign and equal magnitude. For example: Readings of −23°32′ and +23°38′ would be satisfactory (error equals +3′ in each case).

If the errors are unequal or of unlike sign, the *E2* + *L* − *K*·*Zd*² cam of the *jDd* computer is incorrectly positioned.



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SUMMARY of UNIT CHECK TESTS

Deflection prediction multiplier

A-102 All inputs at zero. *Vf* + *Pe* at 100 (010 on counter).
Range below 500.
Ds should read 500.
A-131 Run range above 18,000.
Ds should not change.
A-133 Adjust range to set *Tf*/*R2* at 0.00225. Set *Sh* at 300.
Set *A* at 90. *Ds* should read 885.
Set *A* at 270. *Ds* should read 115.

Elevation prediction multiplier

A-103 *A*, *Br*, and *Bws* at 90. All other inputs at zero.
Vf + *Pe* at 0. Range below 500.
Vs should read 2000.
A-134 Run range above 18,000.
Vs should not change.
A-79 Adjust range to set *Tf*/*R2* at 0.00215.
Set *dH* at +100. *Vs* should read 2418.6.
Set *dH* at −100. *Vs* should read 1581.4.

Range prediction multiplier

A-104 *A*, *Br*, and *Bws* at 90. All other inputs at zero.
Adjust range to set *Tf* at 5.00 (050 on counter).
Adjust *E* to set *E2* about 79.
R2 should equal *cR*.
A-135 Run range to slightly under 18,000.
R2 should follow, equalling *cR* at all values.
A-81 Wedge *Tf* at 40.00. Set *cR* at 10,000, *E* at 0, and *Sh* at 300.
Set *A* at 0. *R2* should read 3244.
Set *A* at 180. *R2* should read 16756.

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Dead time prediction multiplier

Ser. Nos. 780 and lower

A-203 *Tg* and *dR* at zero.
R3 should equal *R2*.
A-132 *dR* at zero. Run *Tg* to 6.
R3 should not change.
A-188 *Tg* at zero. Run *dR* ±450.
R3 should equal *R2*.

Dead time prediction multiplier

Ser. Nos. 781 and higher

A-203 All inputs at zero. Set *F* to equal *Tf*.
R3 should equal *R2*.
A-132 Run *F* between limits.
R3 should not change.
A-188 *F* equal to *Tf*. Run *dR* from −450 to +450.
R3 should equal *R2*.

Complementary error corrector

A-110 All inputs at zero. *Vs* handcrank OUT.
Turn *E* until *E2* equals 80.00.
Changing *Ds* to either 100 or 900 should reduce *E2* to the same reading.
A-107 Changing *Ds* to either 100 or 900 should reduce *E2* to 67.25.

Range rate corrector

A-108, A-109 All inputs at zero. Insert setting rod.

Horizontal wind component solver

A-157 *Sw* at zero. Mark *Ywgr* follow-up. Change wind direction.
Ywgr should not change.
A-105 *Bws* at 90. *Ds* at 500. All other inputs at zero. Run *Sw* to 60.
Ywgr should not change.

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Elevation wind component solver

A-100 *Br* and *Bws* at 90. *Ds* at 500. All other inputs at zero.
Range near 17,000.
Change *E* to run *E2* near 80.
R2 should not change.

A-106 Set *E2* at 78.947. Run *Ywgr* between limits.
R2 should not change.

Train parallax

A-52 *Dd*, *B'gr*, *E2*, and *L* at zero. *R2* at maximum.
Ph dial should read zero.

A-243 Set *E2* at 70°. Run *R2* to minimum.
Ph should not change.

A-49 *Dd*, *B'gr*, *L*, and *E2* at zero. *R2* at maximum. Change *E2* from 0 to 90.
Ph should not change.

A-156 *Dd*, *E2*, and *L* at zero. *B'gr* at 90. *R2* at 1560.
Ph should read RIGHT 3°40'.

A-3 *Dd*, *L* at zero. *B'gr* at 90. *E2* at 60. *R2* at 1560.
Ph should read RIGHT 7°20'.

Relative motion group

A-524 *dR* limits ±450.

A-163 *So*, *Sh*, *dH*, and *E* at zero. *Br* and *A* at 90.
dR should read zero.

A-192 *Sh* at 0. Change *A* through 360°.
dR should not change.

A-127 *So* at 0. Change *Br* through 360°.
dR should not change.

A-532 *A* at 90. Change *Sh* from 0 to 400.
dR should not change.

A-194 *Br* at 90. Change *So* from 0 to 45.
dR should not change.

A-123 *E* at 0. Change *dH* from −250 to +150.
dR should not change.

A-125, A-126 *So*, *Sh*, and *dH* at zero. Change *E* from 0 to 85.
dR should not change.

A-128 *E* at 60, *Br* at 90, *A* at 0, *Sh* at 400, *So* and *dH* at 0.
dR should read −200.

A-126 *E* at 30. *A*, *Br*, *Sh*, and *So* at zero. *dH* at −240.
dR should be −120.

Deck tilt section

A-62 *L*, *Zd*, and *B'r* at zero.
Br should read zero.

A-99 *B'r* at 45. Change *L* from 500 to 3500.
A-64 should not move.

A-28 *L* at zero. Change *B'r* through 360°.
A-64 should not move.

A-64 *B'r* and *L* at zero. Change *Zd* from 500 to 3500.
jB'r should not change.

A-57 *B'r* at zero. Change *L* from 500 to 3500.
A-62 should not move.

A-111 *Zd* at zero. *B'r* at 90. Change *L* from 500 to 3500.
jB'r should not change.

A-65 *Zd* at zero. *B'r* at 45. Set *L* first at 800 and then at 3200.
Br should read 46°21′ in both cases.

Trunnion tilt section

A-63 *Ds*, *Eb*, *L*, *Zd*, *Vs* at zero.
Vz should read zero.

A-113 *Zd* at zero. Change *Ds* from 100 to 900.
Vz should not change.

A-208 *Ds*, *Eb*, *Vs* at zero. Change *Zd* from 800 to 3200.
Vz should not change.

A-112 *Ds*, *L*, and *Vs* at zero. *Eb* at 60. Set *Zd* first at 800 and then at 3200.
Vz should read same value on plus side in both cases.

A-32 *Ds*, *L*, and *Vs* at zero. *Eb* at 60. Set *Zd* first at 800 and then at 3200.
Vz should read +316 in both cases.

A-33 *Ds*, *L*, *Zd*, *Vs*, *Eb*, *E2* at zero.
Dd should read zero.

A-35 *L*, *Zd*, and *Vs* at zero. Change *Eb* from 0 to 60.
A-216 gearing should not move.

A-36 *Ds*, *L*, *Zd*, *Vs* at zero. Change *E2* from 0 to 80.
A-215 gearing should not move.

A-34 *L*, *Zd*, and *Vs* at zero. *E2* at 60.
Set *Ds* at 700. *Dd* should read +23°35′.
Set *Ds* at 300. *Dd* should read −23°35′.

A-61 *Ds*, *Vs*, and *L* at zero. *Eb* at 60.
Set *Zd* at 3200. *Dd* should read +30°34′.
Set *Zd* at 800. *Dd* should read −30°34′.

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Part four

READJUSTMENT PROCEDURE

Introduction

This section serves as a reference for all adjustment points in the Computer Mk 1, Mods 0-4, 6-10, 12, and 13, and the Star Shell Computer Mk 1, Mods 0, 1, and 2.

The introductory chapter on *Covers* gives information about the construction and securing devices of the covers and cover windows, together with precautions to be observed when removing, handling, and replacing these parts.

All adjustment points and assembly clamps are listed in numerical order for ready reference. The location, method of checking, and adjustment procedure are given for each adjustment. In most cases, the check and adjustment procedure depend upon other parts of the instrument being operative and in correct adjustment.

The necessity for readjustment is made evident only through trouble analysis. The chapters which deal with analysis of test errors and unit check tests contain a carefully worked-out procedure for locating adjustment trouble. Also, the chapters on removal and replacement of mechanisms contain lists of adjustments to be remade or checked. In all of these cases the adjustment numbers are listed in a definite sequence which, when followed, will expedite the job. In order to avoid possible damage to the mechanism, it is advisable for all maintenance personnel, no matter how well experienced, to follow this sequence carefully.

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The partial schematic diagram which accompanies each adjustment is intended to show the units and other adjustments which would be affected. If any extensive readjustment is necessary, however, reference should be made to the complete schematic diagram in order to gain an over-all picture of the job.

It is not advisable to use the readjustment procedure as a reference if an instrument must be completely readjusted, that is, if it was dismantled and reassembled with all adjustment clamps left loose. In such a case, refer to *Factory Adjustment Procedure*, page 815.

The readjustment procedure gives an individual check for each numbered adjustment. In the check, the necessary computer setup and procedure are given for determining the accuracy of the adjustment. If the results of the check are unsatisfactory, the readjustment should then be made, using the *same setup*.

In some cases, locational directions are given with respect to the right, left, front, or rear of the instrument. These should not be confused with the *apparent* right, left, front, or rear of any part of the instrument as viewed through an access opening. The directions used for reference are explained in the chapter on *Covers*.

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In making most of the adjustments, it is helpful to make the clamp slip-tight. When a clamp is slip-tightened properly, the adjustment can be slipped with light pressure, but it is tight enough to hold while the check is made. In this way, critical adjustments can be made a little at a time, gradually approaching the correct position. Then, since the clamp is slip-tight, a slight additional turn of the clamping screw will make the clamp fully tight without disturbing the adjustment.

Usually, when an adjustment is slip-tight, the related parts are brought into position by turning the gearing. A gear-pusher may be used for this purpose. Such a tool should be made of *soft metal,* such as aluminum, and should have a wedge-shaped end which can be applied to the base of a gear tooth in order to turn the gear. *Never touch gear teeth with hard metal such as a screw-driver blade.*

When making setups of various quantities, it is often desirable to wedge shaft lines in position temporarily. This may be done by inserting a wedge between the side of a gear and a fixed hanger or plate. The wedges may be of material such as linen bakelite. It is advisable to have a supply of wedges on hand for use during checks and readjustments. Avoid the use of bits of wood or metal, as they may leave chips in the instrument or damage finished surfaces. When using a wedge, make sure that the parts being wedged are substantial. *Never wedge differentials or counters.* The wedge should be inserted with light pressure only, never hammered in place. If the proper location for wedging is selected, light pressure will create enough friction to hold the line.

In making some adjustments, a dial indicator is used to measure motion of parts. Any suitable indicator which reads to 0.001 inch may be used. It should be clamped in place so as to read true motion of the part being observed. For example, in the adjustment of A-126, an indicator is used to measure motion of the *dH* sin *E* rack. If the type of indicator having a pivoted contact arm is used, the arm should be set perpendicular to the direction of motion of the rack. If the plunger type of indicator is used, the plunger should be parallel to the direction of motion of the rack.

When an adjustment calls for setting a synchro motor or generator on electrical zero, a standard motor (test synchro) should be used. Refer to page 183 for instructions on connecting a standard motor to the instrument wiring. If it is connected to a synchro motor, the standard motor may be used to hold the electrical zero position of the synchro while the adjustment is made. If it is connected to a synchro generator, the standard motor will indicate the position of the generator rotor, which may then be manually positioned at electrical zero by turning and wedging the gearing.

In the special case of the star shell differential generators, two standard motors may be used to set electrical zero. The stator leads of one standard motor are connected to the *stator* leads of the differential generator. This motor should be held on electrical zero. The stator leads of the other standard motor are connected to the *rotor* leads of the differential generator. This second motor will then indicate the position of the generator rotor, which may be manually positioned at electrical zero by turning and wedging the gearing. When two standard motors are used in this way, it is important that both be energized from the same source, with proper regard to polarity of the rotor leads.

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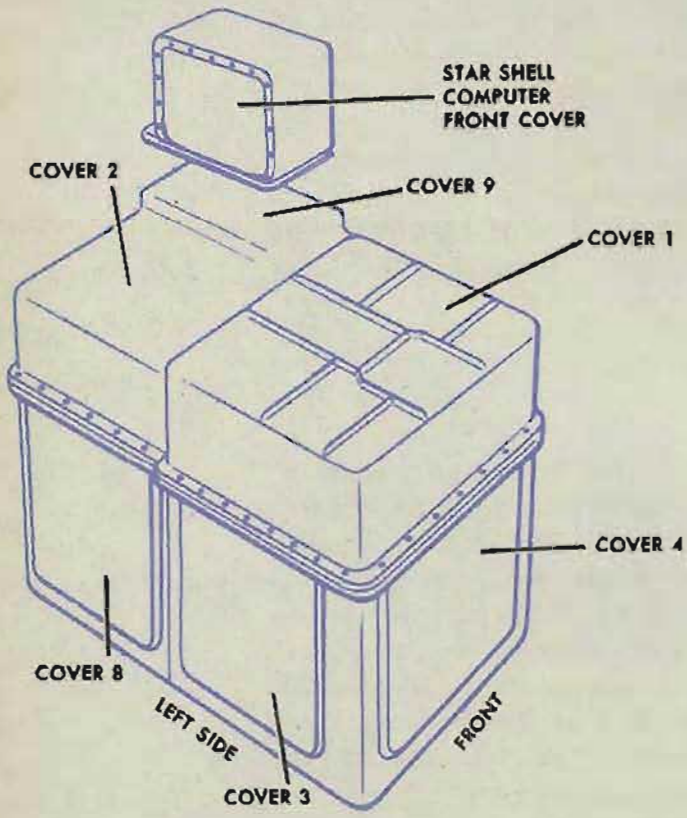
THE COMPUTER COVERS

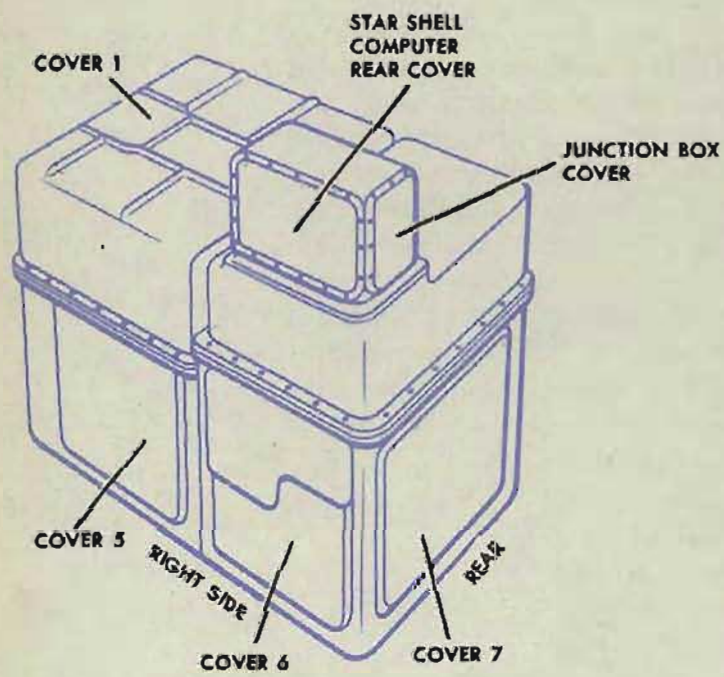


Location

The Computer Mark 1 has nine covers located as shown in the sketches.

On later instruments, cover 1 has a small cover on the right side for access to the time motor regulator.

Cover 9 is used only when a star shell computer is not supplied.



The Star Shell Computer Mark 1 has three covers: one in front, one in rear, and one over the junction box.

Note that the Computer Mark 1 and the star shell computer do not face in the same direction. The FRONT of the star shell computer faces in the direction of the LEFT side of the Computer Mark 1. Thus, the front cover of the star shell computer faces the left side of the computer, the rear cover faces the right side of the computer, and the junction box cover faces the rear of the computer.

When repairs or adjustments are to be made inside the computer, some or all of the covers must be removed, but no cover should be kept off the computer unless work is actually in progress under that particular cover.

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THE COVER FITTINGS

Studs and nuts are used to hold the covers in place except in special construction where socket head screws are used. The studs are threaded at each end and have an unthreaded section in the middle. They are permanently screwed into the computer frame and protrude through the holes in the covers.

Cap nuts (usually called acorn nuts) are screwed on the studs to secure the covers in place.

A cover washer and a lock washer are always used between the cover and each acorn nut.

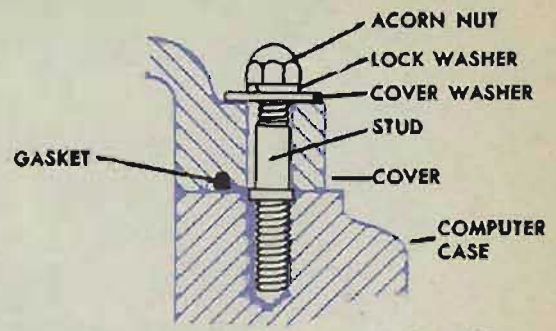
Elongated acorn nuts are used for accessibility instead of regular acorn nuts on the four studs that secure cover 1 in the narrow space between the front and the rear sections of the computer.

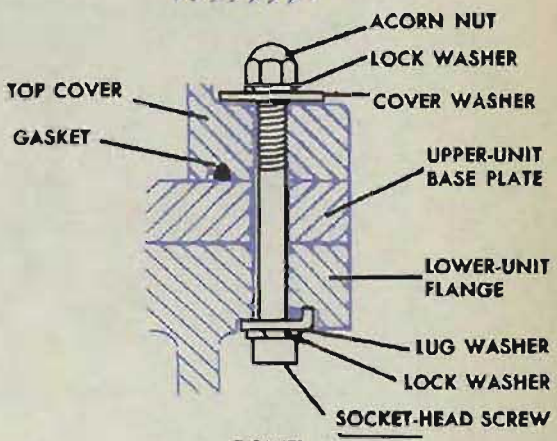
Socket-head screws are used where the sides of the top cover must be secured to a flange of the lower unit. The socket-head screw goes through holes in the lower-unit flange, the upper-unit base plate, and the top-cover flange. A lug washer and a lock washer are used between the head of the screw and the flange, and a cover washer and lock washer are used between the acorn nut and the cover.

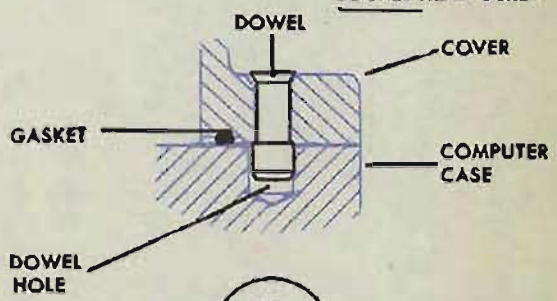
Dowels are used to position the covers that have handcranks on them: Covers 1, 2, and 3 on the Computer Mark 1, and the front cover of the star shell computer. A dowel is riveted to a cover and projects from it. The dowels fit snugly into holes in the computer case, thus positioning the covers accurately.

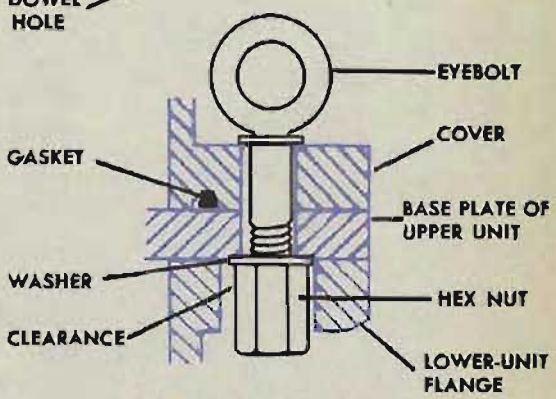
Eyebolts are provided to lift the upper units of the computer off the lower units. There are four of these eyebolts on cover 1 and four on cover 2. They go through the cover and the base plate of the upper unit, and must be removed before removing covers 1 and 2.

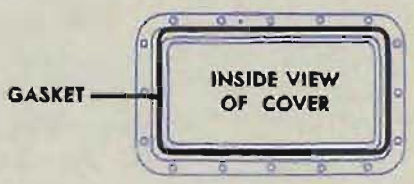
A gasket made of rubber or neoprene is cemented into a small groove within a larger groove around the inside edge of each cover. The gasket protrudes about 1/8 inch from the larger groove. When the cover is tightened, the gasket is compressed and expands laterally into the larger groove. Sometimes the gaskets stick to the computer case. Graphite applied to the computer case will help prevent the gasket from sticking.

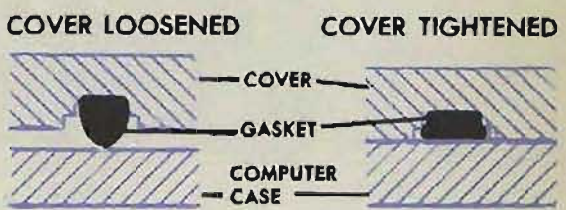












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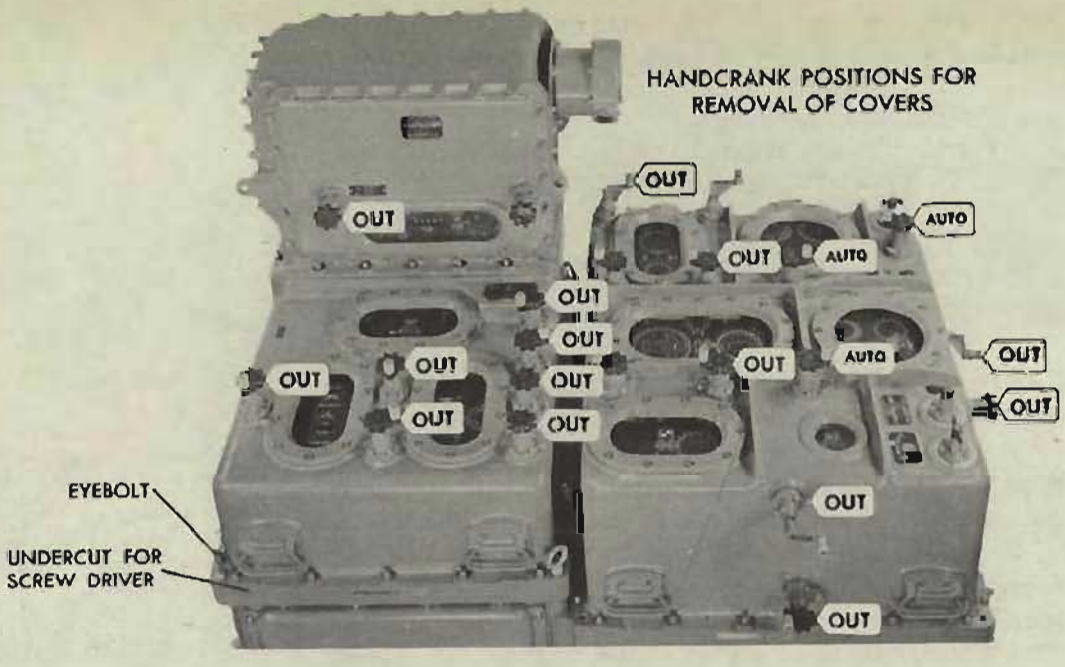
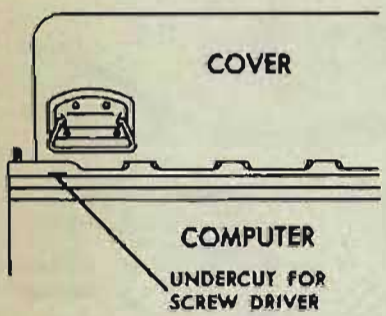


Removing a cover



Lock all handcranks on the cover at their OUT or AUTO positions. The handcranks come off with the cover.

Remove all the cap nuts and washers around the cover.

Before removing covers 1 and 2, turn the power switch OFF and take out the eyebolts at the corners.

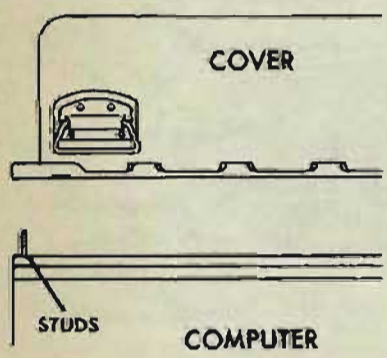
Put a screw driver into each undercut along the edge of the cover near the corners. Pry the cover loose gradually. Use the lifting handles on covers 1 and 2. Keep the cover straight while removing it. Be sure to clear all mechanisms before moving the cover sideways.

The threads on the studs are sharp and may cause damage to body or clothing. It is advisable to replace the acorn nuts on the studs before working inside the computer.

In order to remove cover 2 when the star shell computer is mounted on it, the star shell computer must be removed.

CAUTION: Cover 1 is heavy and cumbersome. To avoid possible damage to the mechanisms under this cover, four men should handle it during removal.

Replacing a cover

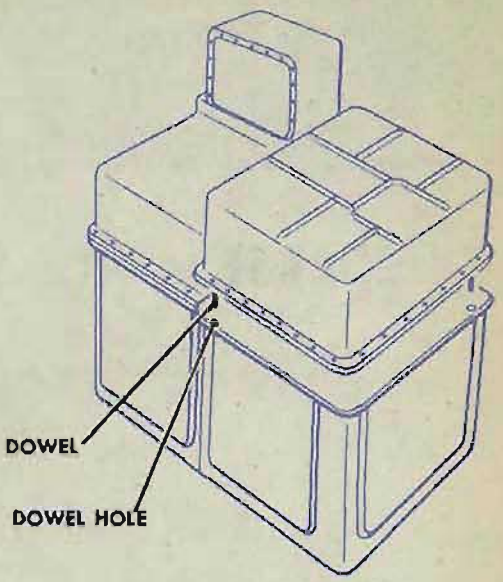


As soon as work is finished inside a unit of the computer, replace the cover of that unit to prevent dirt from getting inside. Before replacing a cover, inspect the cover gasket for damage. If there are breaks in the gasket, take it out, clean the contacting surfaces, and cement a new one in its place. In replacing a cover with handcranks on it, make sure that all the handcranks are locked in their OUT or AUTO positions. Position the cover so that it goes on straight. If there are dowels in the cover, lubricate the dowels with grease and line up the cover so that the dowels slide easily into the holes in the case. Don't try to force the dowels into the holes.

Don't let the covers rest on the stud ends. This may strip the threads of the studs and damage the stud holes. The aluminum chips from the cover may then get into the computer.

When the cover is on, finger-tighten all the cap nuts. Then tighten each nut slightly with a socket wrench. Go around the cover, tightening the nuts evenly until all the nuts are taken up securely. Tightening each nut fully as soon as it is put on a stud may warp the cover.

CAUTION: Some of the handcrank gears are meshed in the OUT position. Make sure these gears are in mesh as the cover is being seated. Check the mesh by turning the handcranks.



BEFORE SEATING COVER:

1. CLEAN OFF THE CONTACTING SURFACES
2. LUBRICATE THE DOWELS WITH GREASE

The windows in the covers

The glass in the windows of the covers may have to be replaced occasionally because of discoloration or breakage.

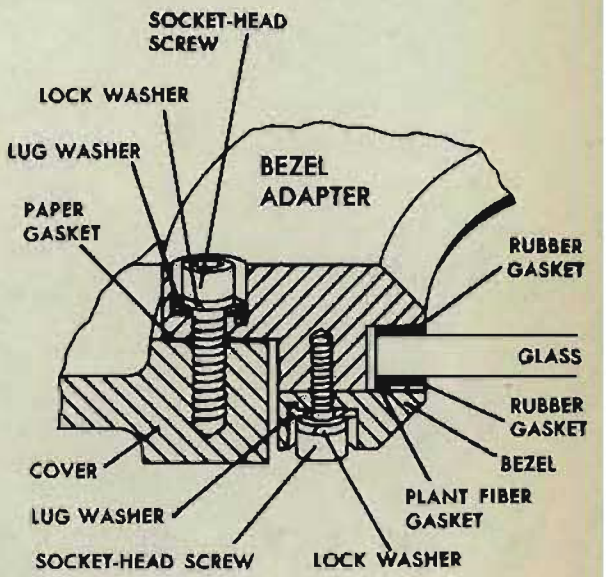
There are two types of windows: those that can be removed from the outside of the cover, and those that can be removed only from the inside of the cover.

Windows attached to outside of a cover

The windows that can be removed from the outside are held between two frames: a bezel on the underside and a bezel adapter on the top. The arrangement of the watertight window gaskets is important. There is a rubber gasket between the bezel adapter and the glass, and a rubber gasket plus a fiber gasket between the glass and the bezel. Socket-head screws hold the assembly together.

The window assembly is attached to the computer cover with socket-head screws which go through the rim of the bezel adapter and are threaded into the computer cover.

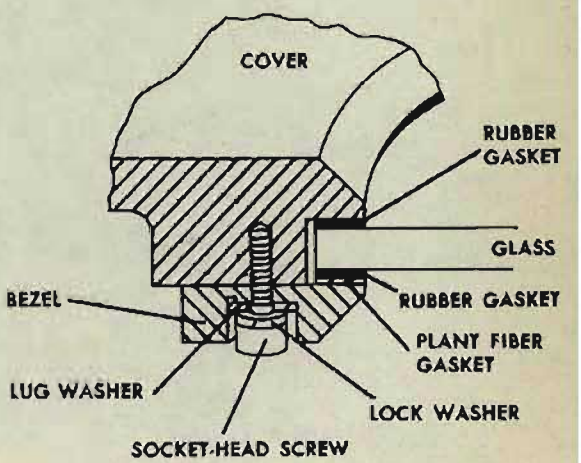
To remove the glass window without removing the cover, it is necessary first to remove the entire assembly from the cover in order to get at the bezel screws on the underside of the assembly.



Windows attached to inside of a cover

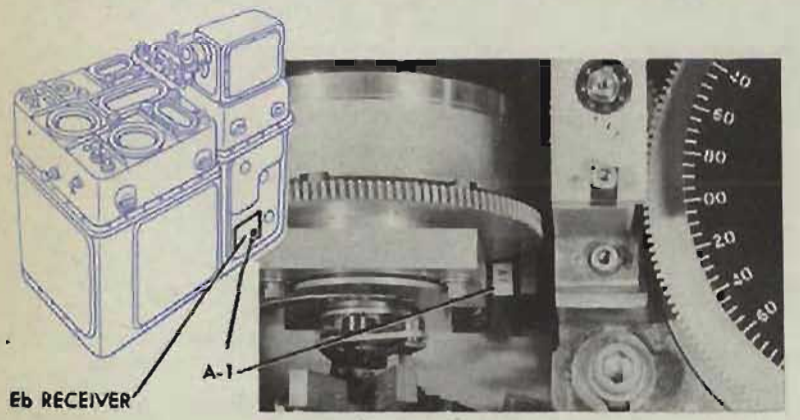
When a window is attached to the *inside* of a cover, the glass can be removed only after the cover in which it is located has been removed from the computer. A bezel usually holds the glass window against the inside of the cover and is secured in place by socket-head screws.

An examination of each type of window assembly will show the order in which to remove the parts and put them together again.

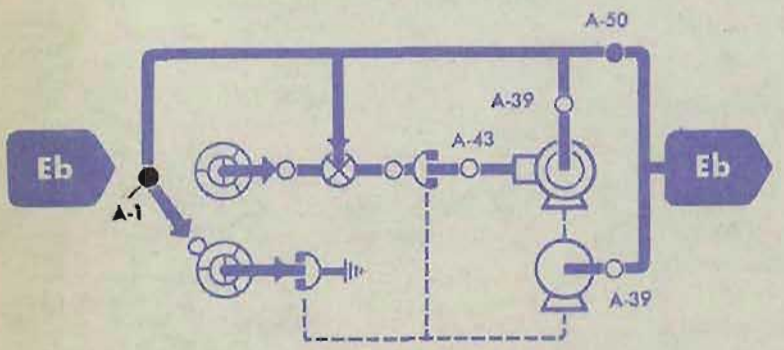


CLAMPS

A-1 COARSE to FINE SYNCHRO—Eb RECEIVER



DIRECTOR ELEVATION RECEIVER



Location

A-1 is under cover 6, on the horizontal worm behind the coarse *Eb* synchro.

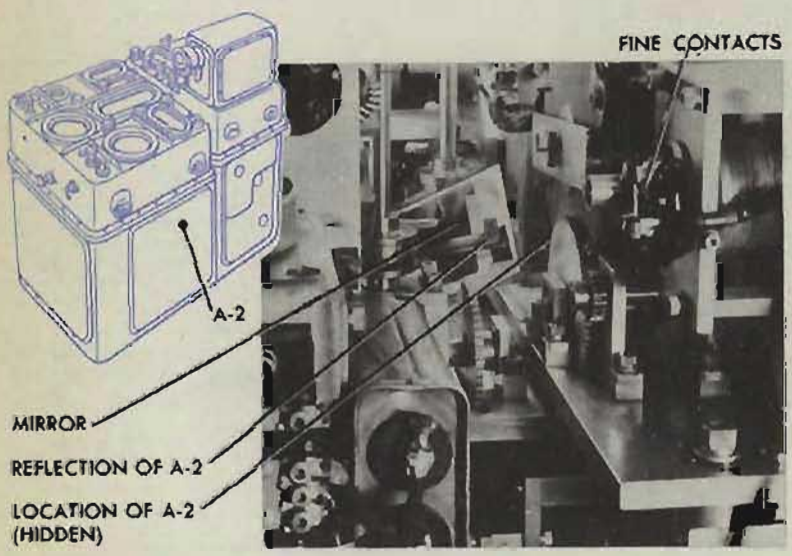
Check

Turn the power ON.
Transmit *Eb* from the director.
Allow the follow-up to synchronize.
The coarse center contact arm on the receiver should be centered between the scissor contacts.

Adjustment

If the contact arm is not centered between the scissor contacts, turn the power OFF, loosen A-1, and turn the worm until the contact is centered. Tighten A-1 and recheck.
Readjust A-50.

A-2 COARSE to FINE SYNCHRO—Co RECEIVER



Location

A-2 is under cover 5, on the horizontal worm which meshes with the gear of the coarse *Co* synchro.

The clamp is 3 inches to the rear of the lower right end of the hanger on which a resistor is mounted, and 1/2 inch above the receiver mounting plate. It is visible only with a mirror and a pencil light.

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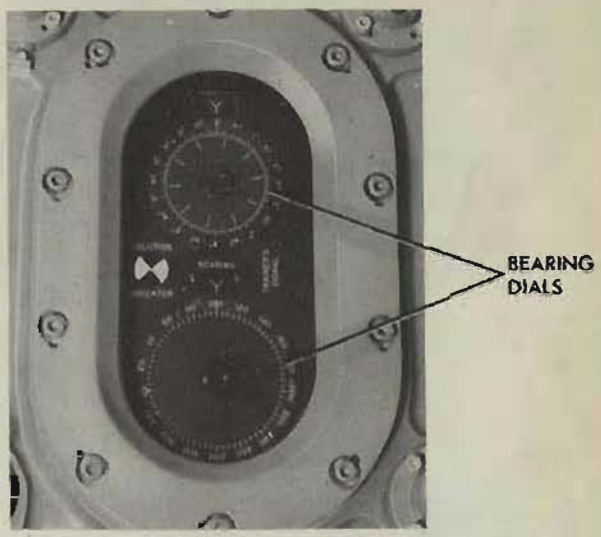
Check

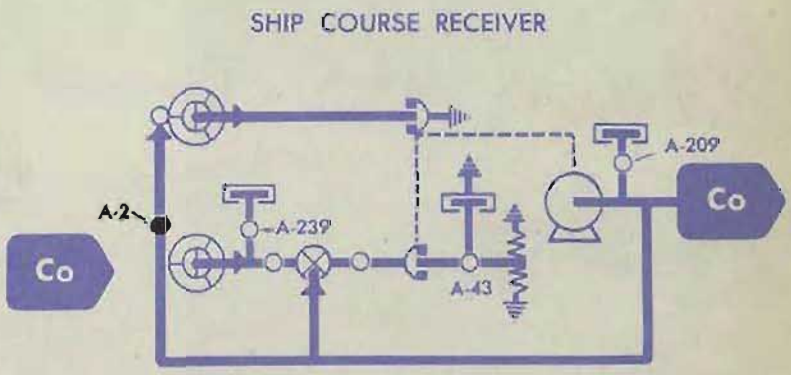
Turn the power ON.
Transmit *Co* from the gyro compass to the computer.
Put the *Co* handcrank in the OUT position.
Allow the follow-up to synchronize.
Turn the control switch to LOCAL.

The coarse contact arm should be centered between the scissor contacts on the receiver. Since it is difficult to observe the scissor contacts, check them by pushing the fine contact arm to each limit and observing, on the *Br* dials, the amount the follow-up drives each way from the centralized point.



Adjustment

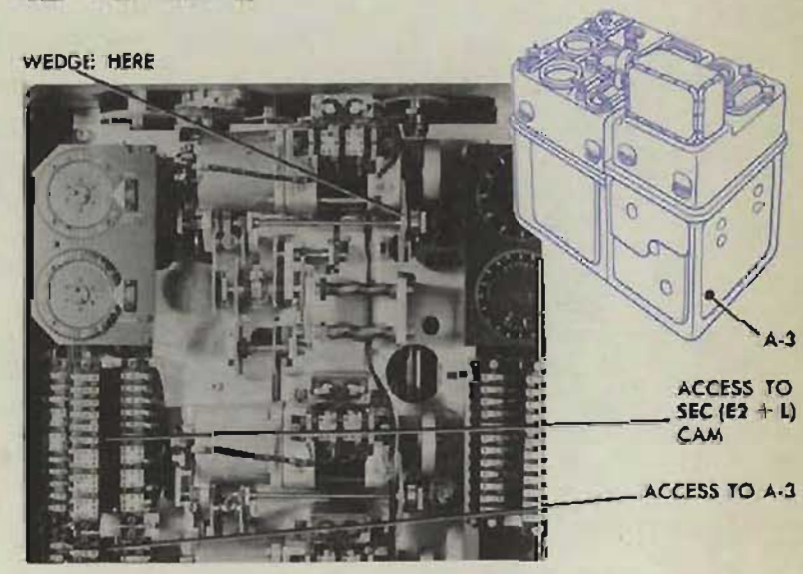
If the follow-up does not drive about the same amount in each direction, approximately 3° on the *Br* dials, loosen A-2. Reach A-2 by inserting a short screw driver between the housing of the differential and the post mounting the scissor arm contacts. Turn the worm until the coarse contact arm is centered. The centered position can be determined only by the trial and error method.
Tighten A-2.
Readjust A-179.



A-3 Ph COMPUTER to E2 + L LINE

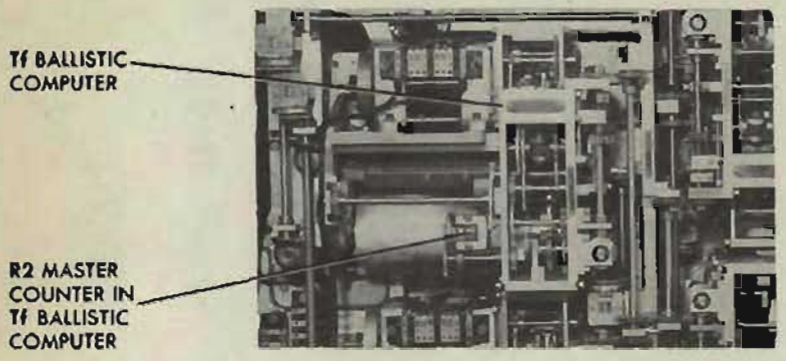
Location

A-3 is under cover 7, below the *Ph* computer. It may be seen by looking down at an angle past the lower end of the coarse *E'g* indicating transmitter.



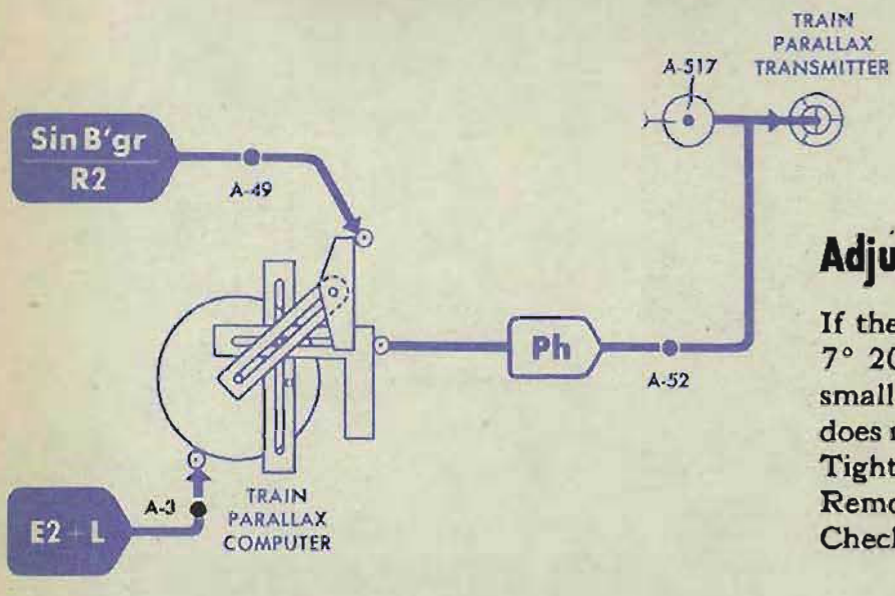
Check

Turn the power OFF.
Set *Dd* at 0° and wedge the line.
Set *B'r* and *B'gr* at 90°.



Set the *R2* master counter at 1560 yards and wedge the line.
Set *E2* at 60°.
Set *L* at 2000′ on the computer dials.
The *Ph* dial should read RIGHT 7° 20′.

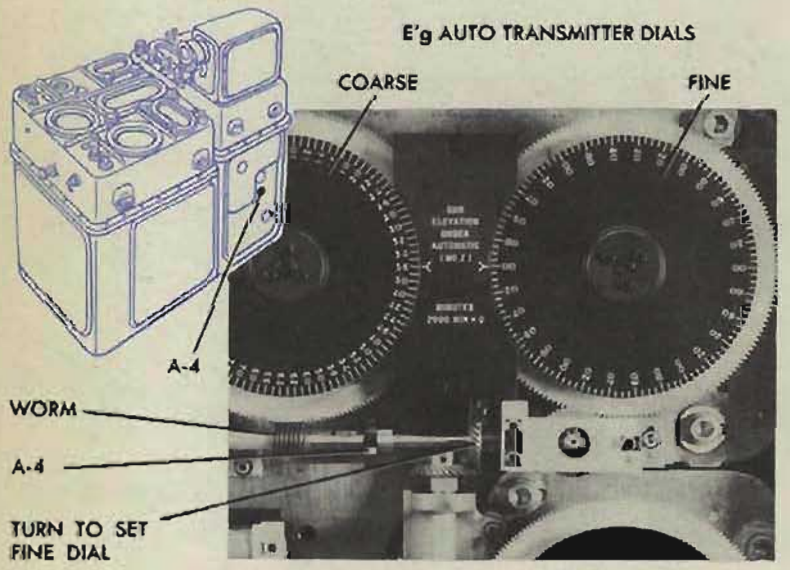
All Mods 0, and some early Mods 1 and 2, have *Ph* dials graduated in minutes. All others have *Ph* dials graduated in degrees and minutes.



Adjustment

If the *Ph* dial does not read RIGHT 7° 20′ make A-3 slip-tight. Turn the small gear under A-3 until the dial does read 7° 20′.
Tighten A-3 and recheck.
Remove wedges.
Check A-52.

A-4 COARSE to FINE SYNCHRO— E'g AUTO TRANSMITTER



Location

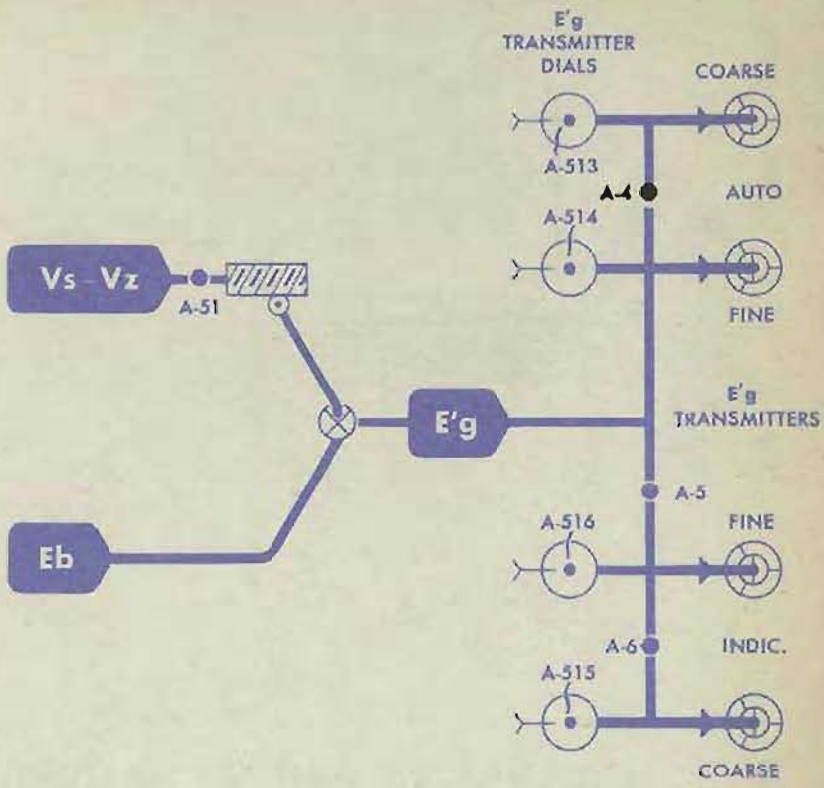
A-4 is under cover 6, on the worm beneath the *E'g* coarse auto transmitter dial.

Check

When the coarse dial reads 20, the fine dial should read 00.
Check A-513 and A-514 before readjusting A-4.

Adjustment

If the dials do not agree, turn the input shaft of the coarse auto transmitter until the coarse dial reads 20. Loosen A-4. Hold the worm to keep the coarse dial at 20 and turn the shaft until the fine dial reads 00. Tighten A-4 and recheck.



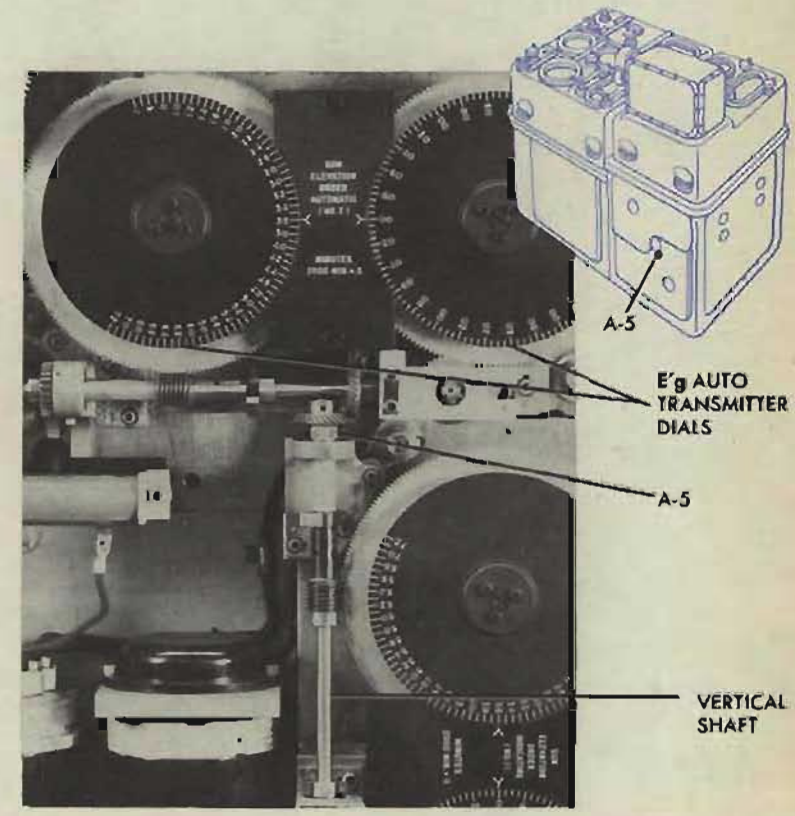
Note

There are six different graduations marked 00 on the fine dial. Check that the electrical zero graduation lines up with the 20 graduation on the coarse dial (A-514).
Check A-51 and A-5.

A-5 E'g INDICATING to E'g AUTO TRANSMITTER

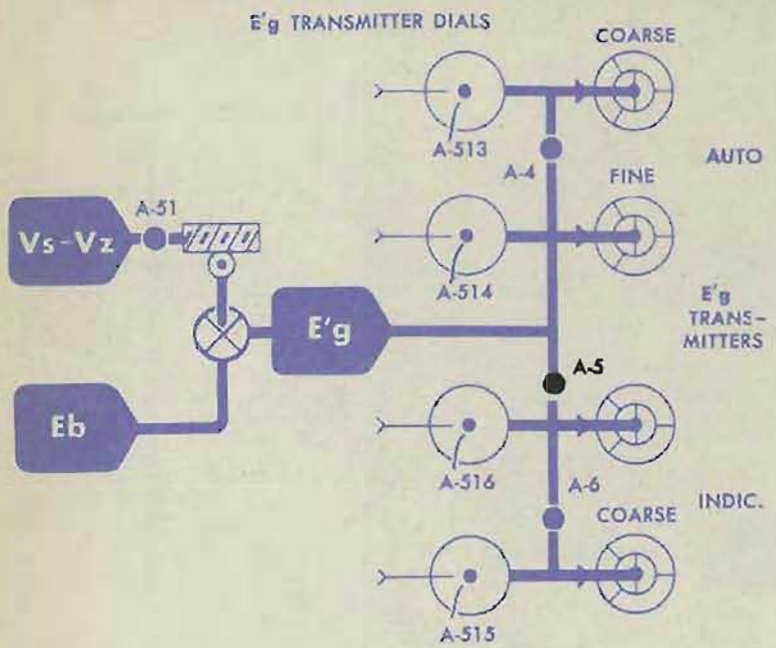
Location

A-5 is under cover 6, on the bevel gear below the *E'g* auto transmitter dials.



Check

The *E'g* indicating transmitter dials should read the same value as the *E'g* auto transmitter dials.



Adjustment

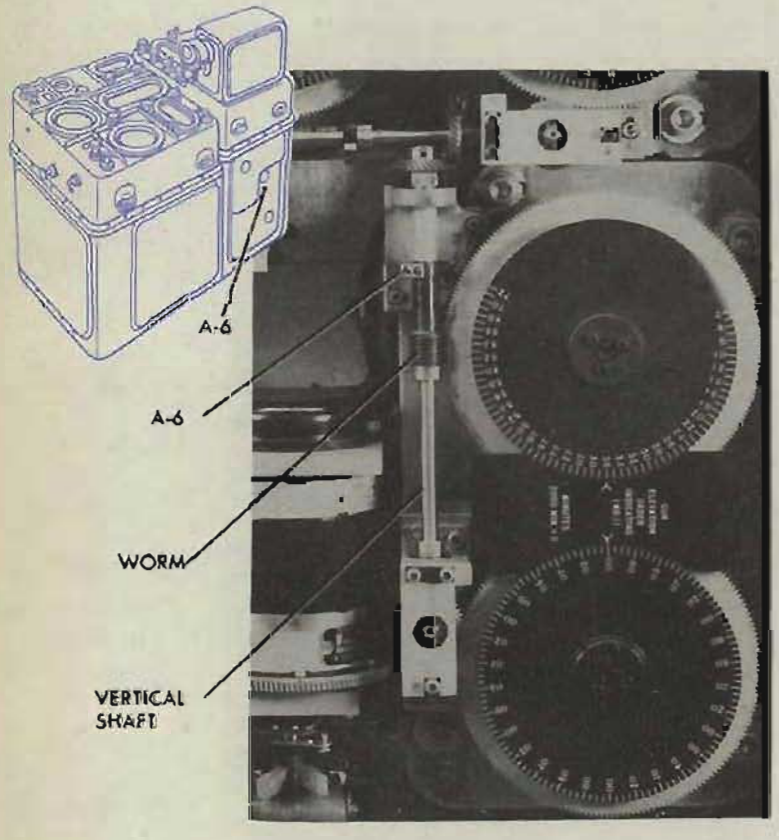
If the dial readings do not agree, loosen clamp A-5.

Turn the vertical shaft below the clamp until the indicating transmitter dials read the same value as the auto transmitter dials.

Tighten A-5 and recheck.

Check A-51 and A-6.

A-6 COARSE to FINE SYNCHRO— E'g INDICATING TRANSMITTER



Location

A-6 is under cover 6, on the worm to the coarse *E'g* indicating transmitter.

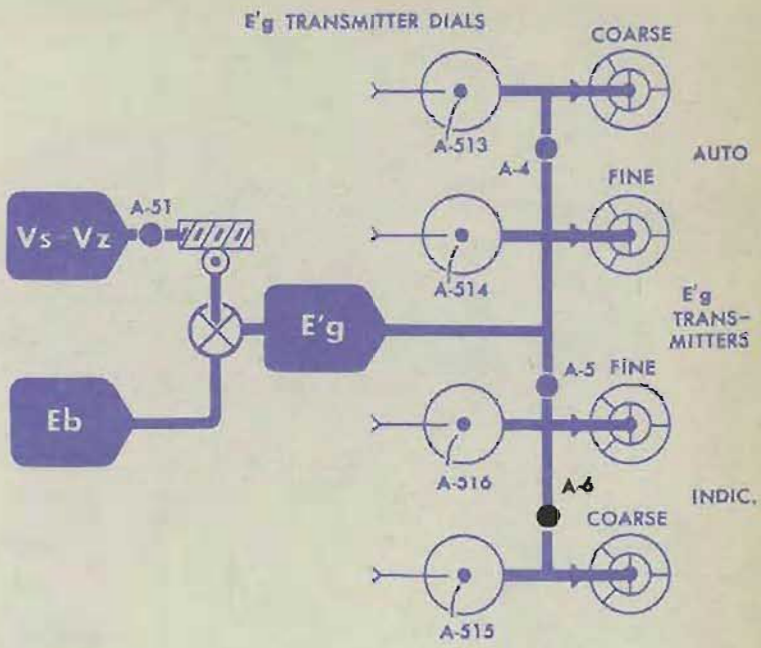
Check

When the coarse dial reads 20, the fine dial should read 00.
Check A-515 and A-516 before readjusting A-6.

Adjustment

If the dials do not agree, turn the input shaft of the coarse indicating transmitter until the coarse dial reads 20. Loosen A-6. Hold the worm to keep the coarse dial at 20, and turn the shaft until the fine dial reads 00.

Tighten A-6 and recheck.

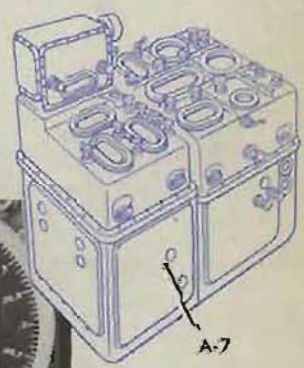


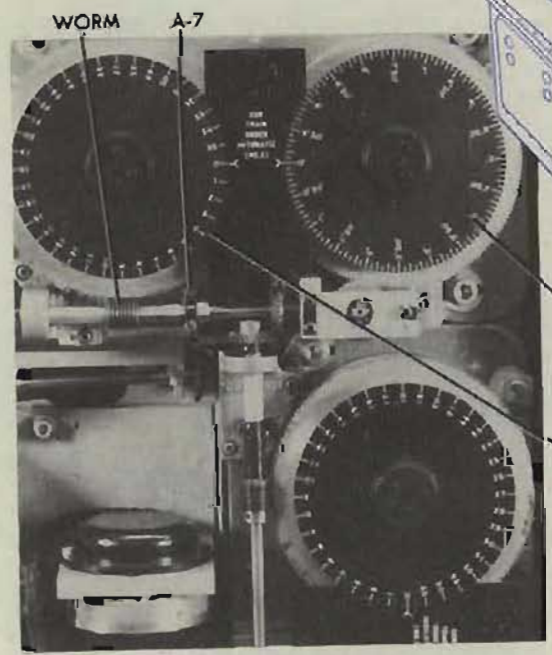
Note

There are six different graduations marked 00 on the fine dial. Check that the electrical zero graduation lines up with the 20 graduation on the coarse dial (A-516).

Check A-5 and A-51.

A-7 COARSE to FINE SYNCHRO— B'gr AUTO TRANSMITTER





Location

A-7 is on the worm beneath the coarse *B'gr* auto transmitter dial.

Check

When the coarse dial reads 0°, the fine dial should also read 0°.

Check A-509 and A-510 before readjusting A-7.

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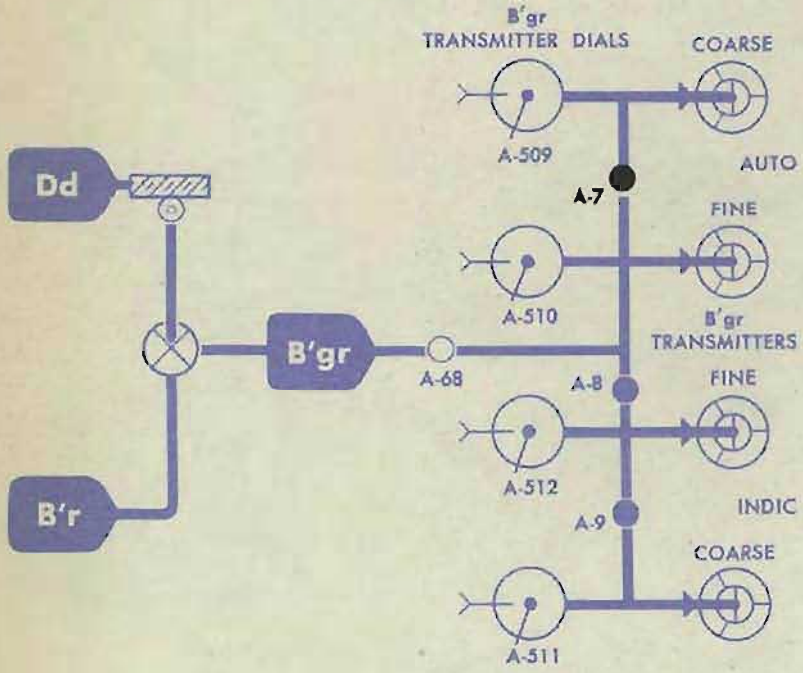


Adjustment

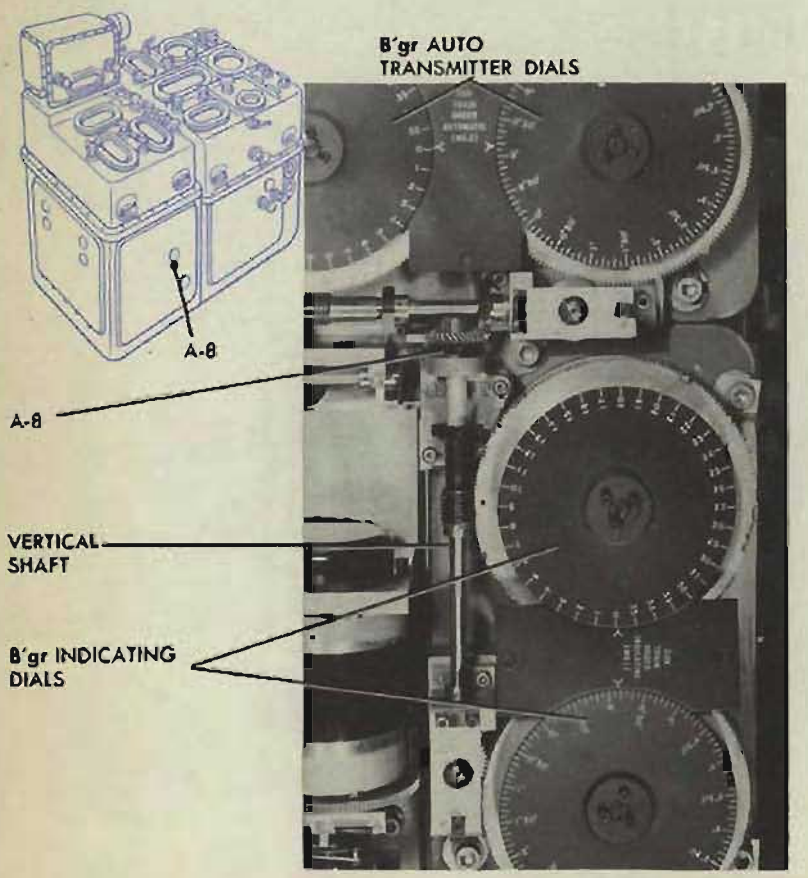
Set the coarse *B'gr* auto dial at 0°.

Loosen A-7.

Hold the worm and turn the shaft until the fine dial reads 0°. Tighten A-7 and recheck.

Check A-68.

A-8 B'gr INDICATING to B'gr AUTO TRANSMITTER



Location

A-8 is under cover 8.

Check

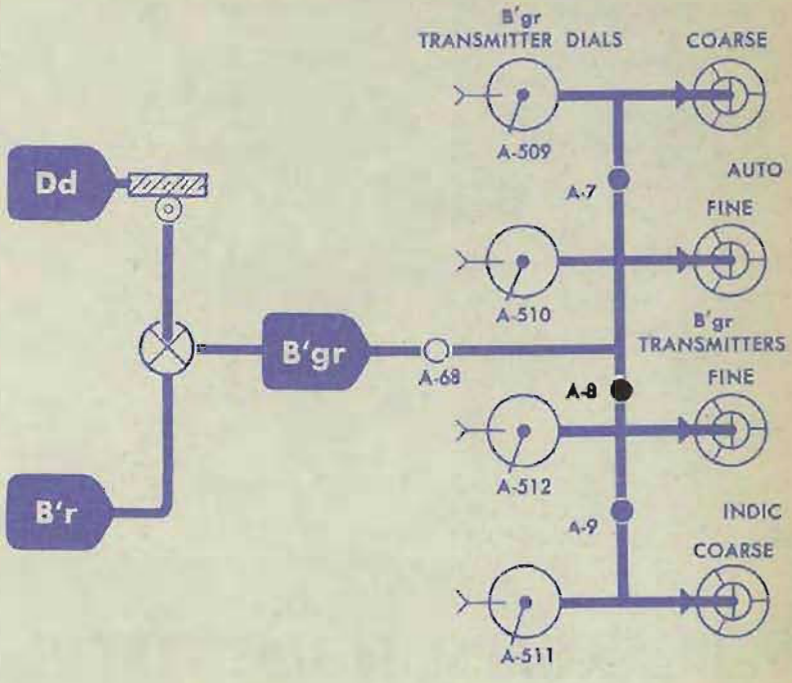
The *B'gr* auto and indicating transmitter dial readings should agree.

Adjustment

If the dial readings do not agree, loosen A-8 and turn the shaft below the clamp until the *B'gr* indicating dials read the same value as the *B'gr* auto dials.

Tighten A-8 and recheck.

Check A-68.



A-9 COARSE to FINE SYNCHRO — B'gr INDICATING TRANSMITTER

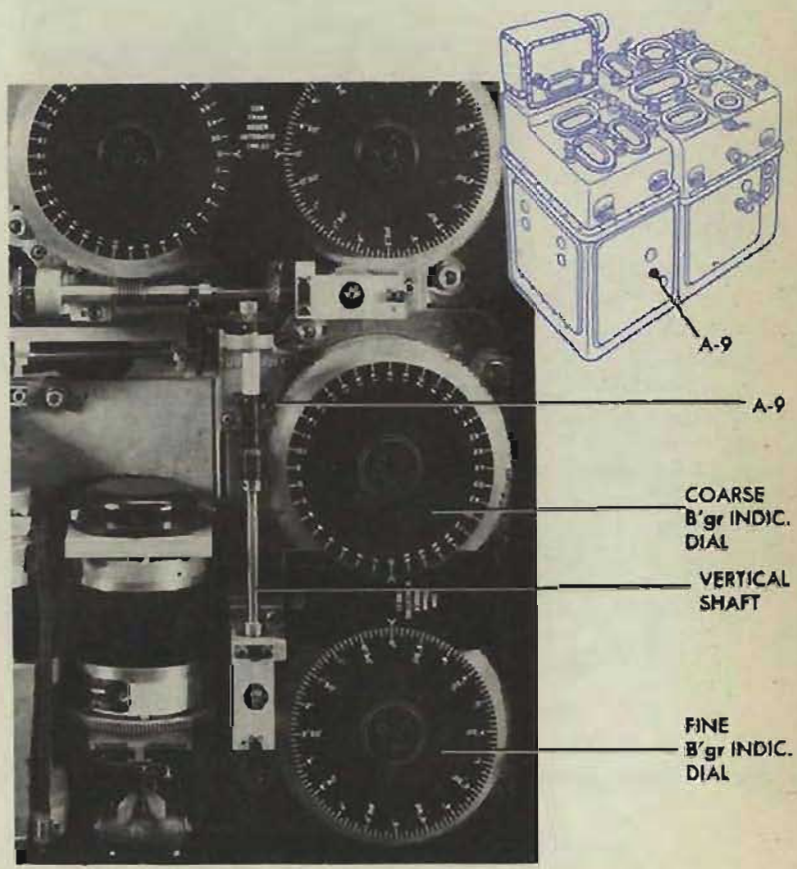
Location

A-9 is under cover 8, on the worm to the coarse *B'gr* indicating transmitter.

Check

When the coarse dial reads 0°, the fine dial should read 0°.

Check A-511 and A-512 before readjusting A-9.



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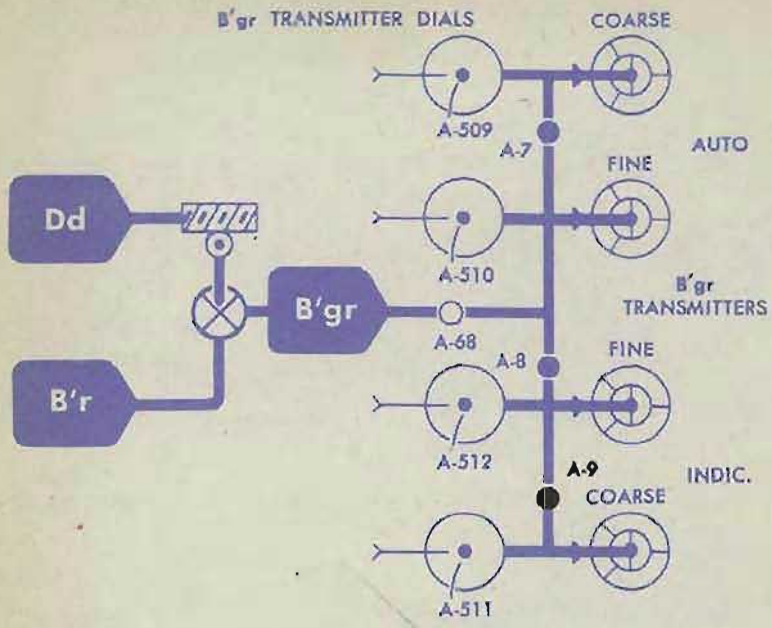


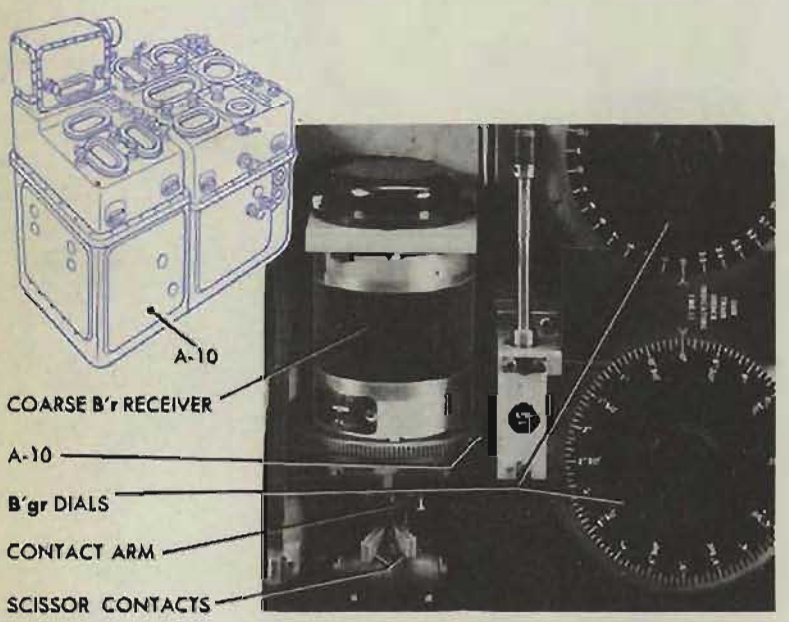
Adjustment

Set the coarse *B'gr* indicating dial at 0°. Loosen A-9. Hold the worm and turn the vertical shaft until the fine dial reads 0°.

Tighten A-9 and recheck.

Check A-8.

A-10 COARSE to FINE SYNCHRO—B'r RECEIVER



Location

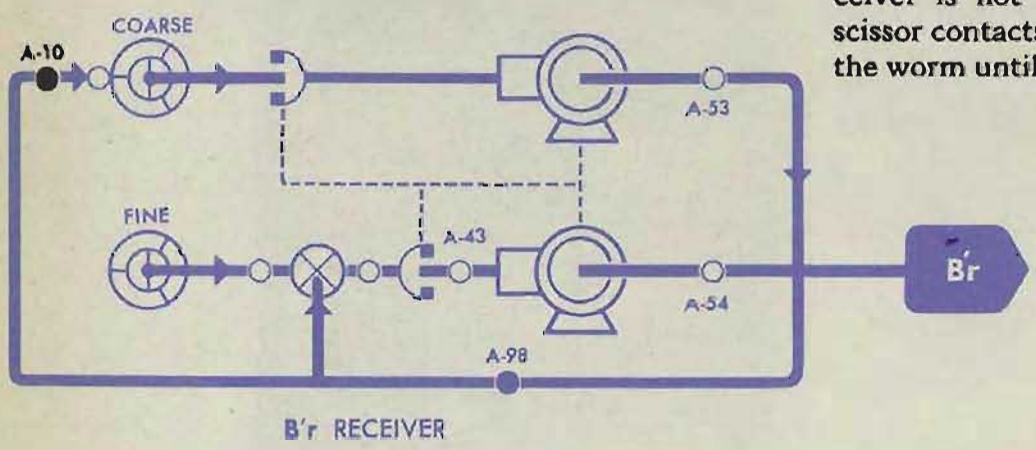
A-10 is under cover 8, on the worm behind the coarse *B'r* receiver.

Check

Turn the power ON.
Turn the control switch to SEMI-AUTO.
Transmit *B'r* from the director, and allow the follow-up to synchronize.
The coarse center contact on the receiver should be centered between the scissor contacts.

Adjustment

If the contact arm on the coarse receiver is not centered between the scissor contacts, loosen A-10 and turn the worm until the arm is centered.



To check the setting, push the fine contact arm to each limit and observe the displacement of the *B'gr* dials. If the contact is centered, the displacement will be equal.

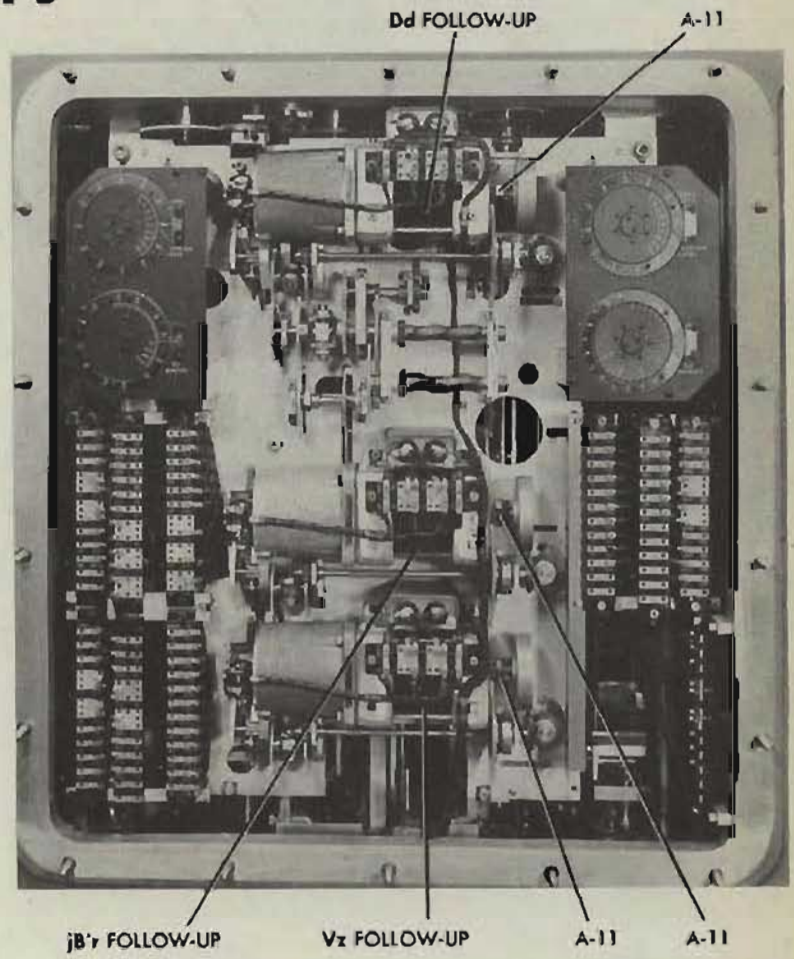
Tighten A-10 and recheck.

Check A-98.

A-11 ASSEMBLY CLAMPS

Location

Three assembly clamps numbered A-11 are located under cover 7. One is located on each of the three servo motor output shafts: *Dd*, *jB'r*, and *Vz*.



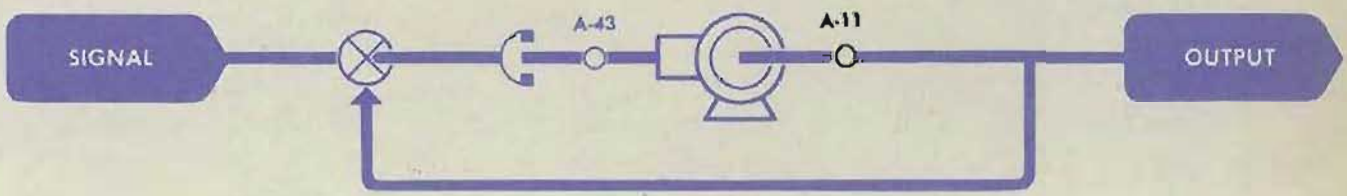
Check

If an A-11 clamp is loose, the servo may run away; that is, it may drive without limitation.

It will not drive the associated gear train because of slippage of the gear on which A-11 is mounted.

Adjustment

Tighten A-11.



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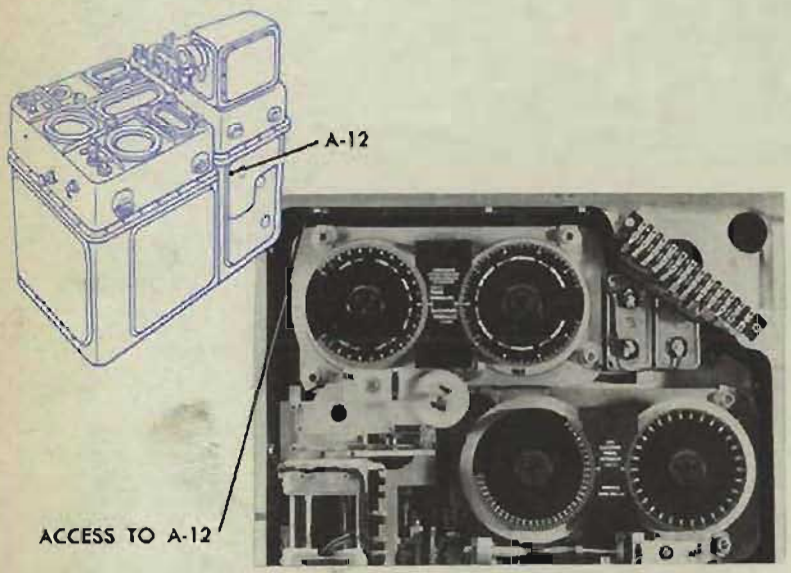
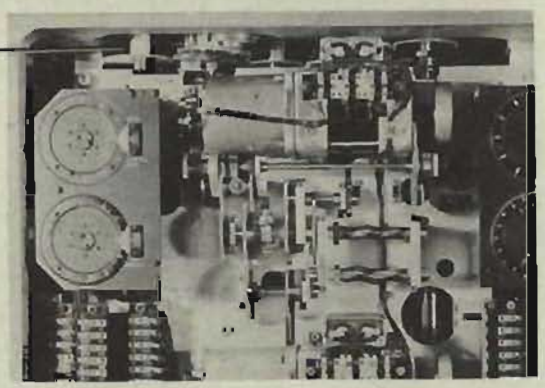
A-12 FRICTION BRAKES to SYNC E HANDCRANK





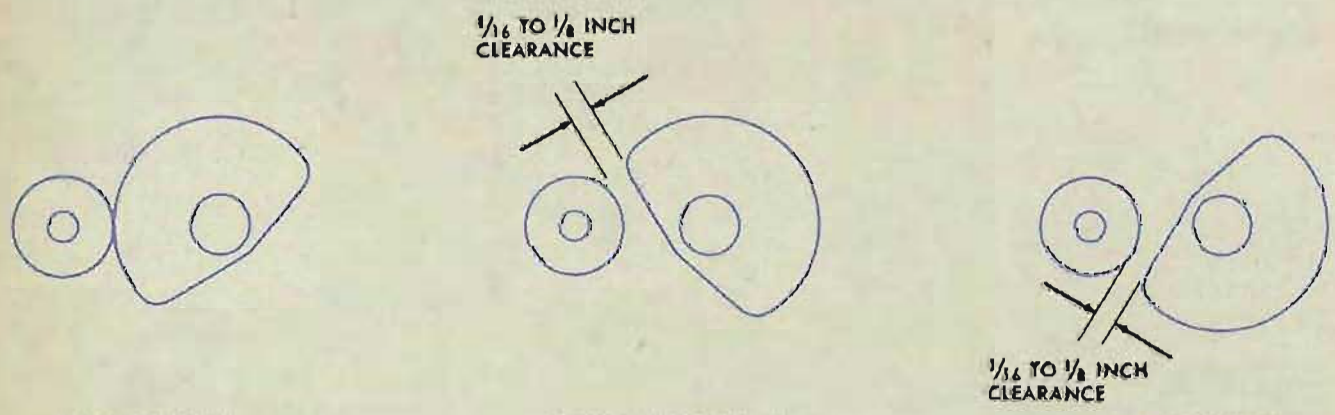
Location

A-12 is under cover 6, about 12 inches in, and is reached through an access at the upper front of the *Ph* transmitter. The brakes and cam shaft can be seen by removing cover 7 and looking into the computer directly above the *L* dials.

Check

Put the sync *E* handcrank IN and compare the position of the rear cam, nearest the back of the instrument, with the corresponding sketch of the cam, shown below. Do the same with the sync *E* handcrank in the CENTER, then in the OUT position.

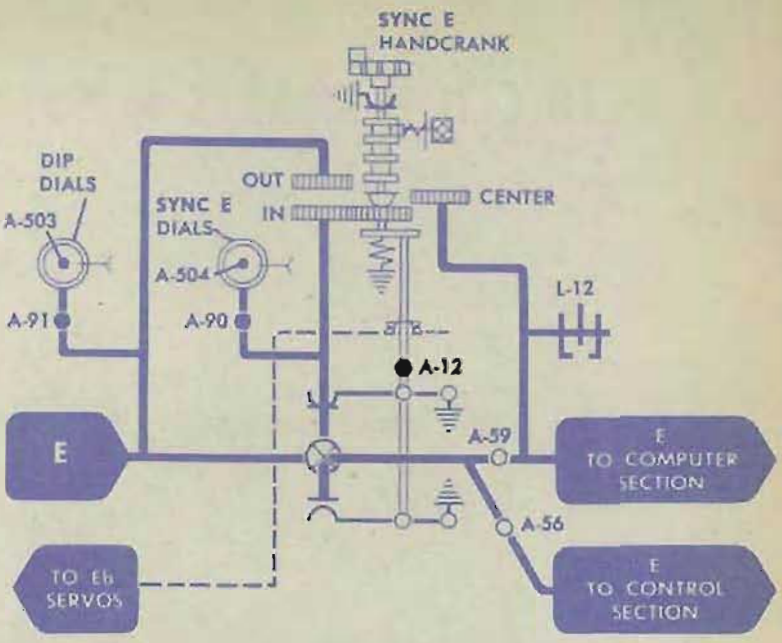
With the sync *E* handcrank IN, the rear friction brake should be released and the front friction brake applied. With the handcrank in the CENTER and OUT positions, the rear brake should be applied, and the front brake released.



RELATIVE POSITIONS OF REAR ROLLER AND CAM

Adjustment

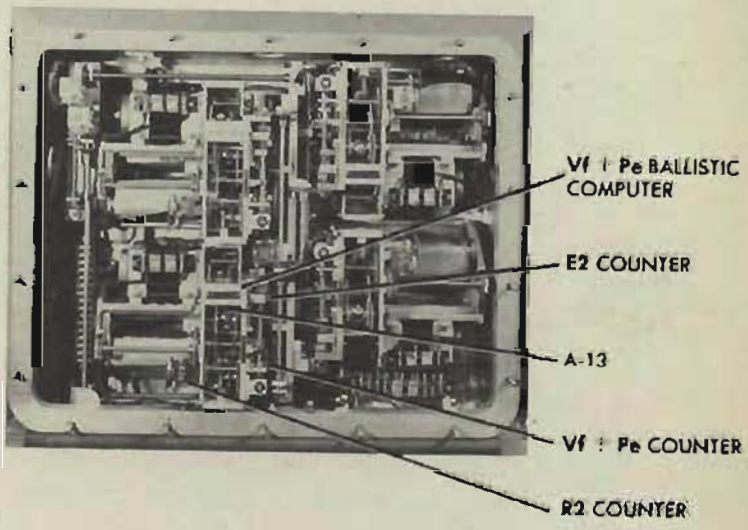
If the cams are adjusted incorrectly so that the brakes are applied and released improperly, put the sync *E* handcrank in the CENTER position. Make A-12 slip-tight. Using a gear pusher made of soft material such as aluminum, turn the bevel gear below A-12 until the rear cam is in the proper position shown in the sketch. Tighten A-12 and check the positions of the cam against the sketches when the sync *E* handcrank is at the IN and the OUT positions.



A-13 SYNCHRONIZING THE Vf + Pe FOLLOW-UP

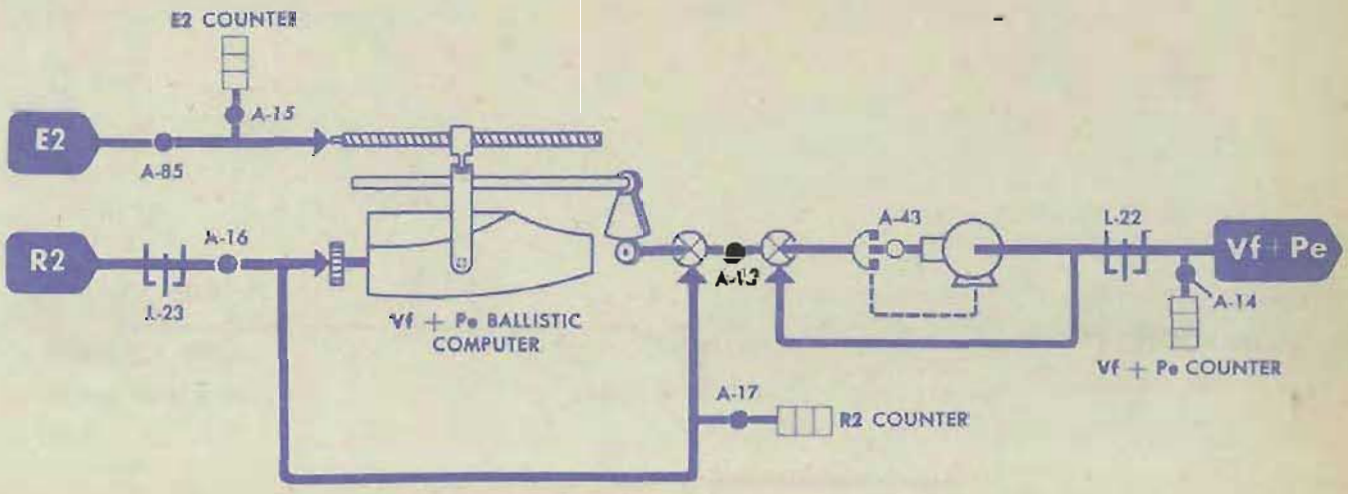
Location

A-13 is under cover 4, in the *Vf + Pe* ballistic computer.



Check

Refer to the N.I.O. final test sheet for the particular unit being checked.
Turn the power ON.
Set *E2* and *R2* at values given on the N.I.O. final test sheet.
Read the *Vf + Pe* unit counter and note any variation from the corresponding values recorded on the test sheet.
If the *Vf + Pe* value is *consistently less* or *consistently greater* than the recorded value, A-13 is in error and should be readjusted.



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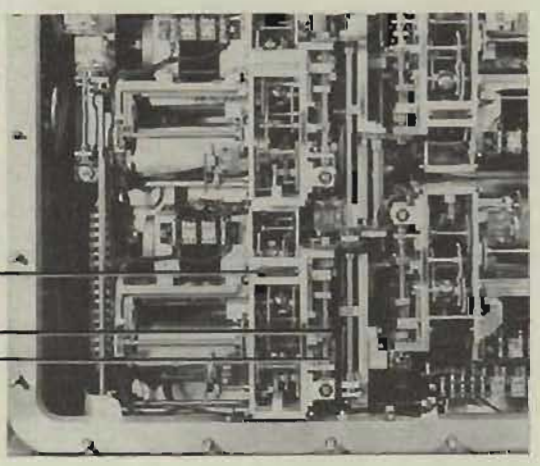
Adjustment

Loosen A-13. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *Vf* + *Pe*. Tighten A-13.

Refer to the N.I.O. final test sheets and run the complete test of the *Vf* + *Pe* ballistic computer.

If necessary, A-13 may be readjusted slightly to improve the readings.

A-14 Vf + Pe COUNTER to L-22



Location

A-14 and L-22 are under cover 4, in the *Vf* + *Pe* ballistic computer.

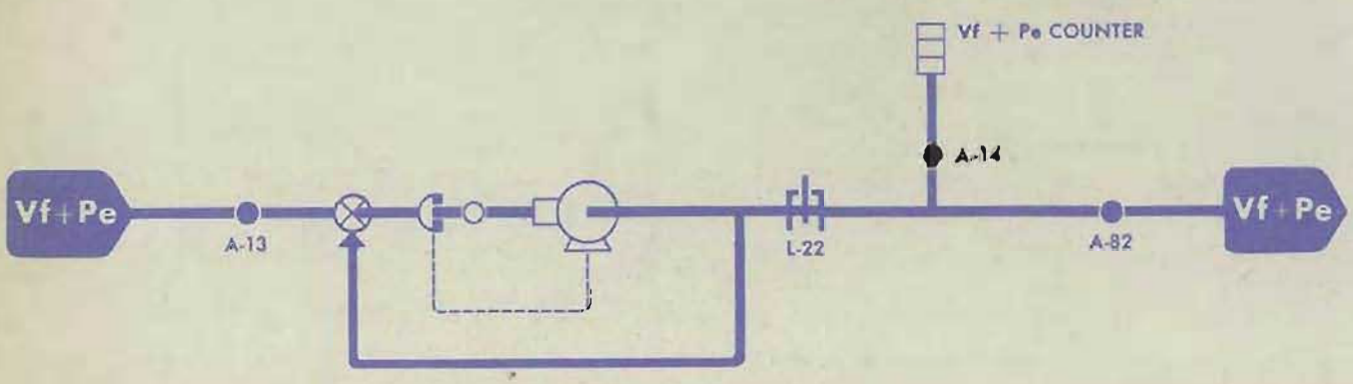
Check

Turn the power OFF.
Turn the *Vf* + *Pe* ballistic computer output gearing from limit to limit.

The *Vf* + *Pe* counter should read 0′ at the lower limit, and 2500′ at the upper limit. (On Mods 8 and 12, the limits are 0′ and 1800′.)

Adjustment

Loosen A-14.
Slip the counter to the correct reading.
Tighten A-14 and recheck.
Check A-13 and A-82.



A-15 E2 COUNTER to Vf + Pe BALLISTIC COMPUTER

Location

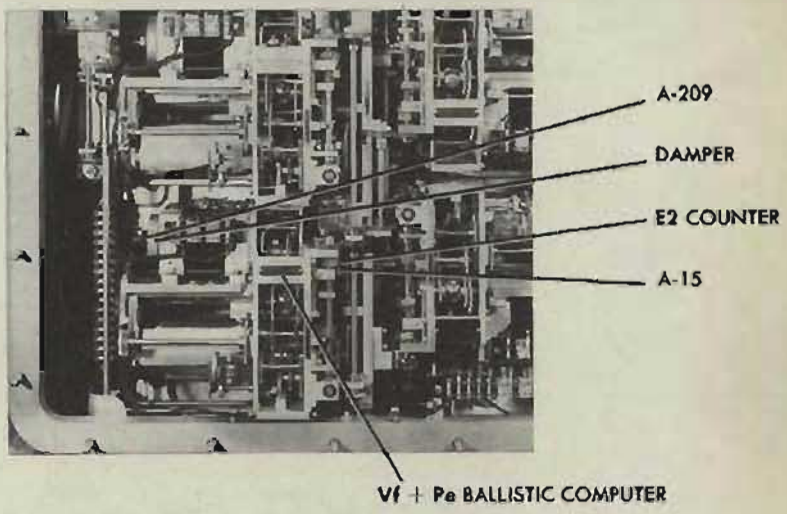
A-15 is under cover 4, in the *Vf + Pe* ballistic computer.

Check

Turn the power OFF.
Set *E2* and *R2* at the values listed on the setting rod legend plate.

Loosen A-209 on the *Vf + Pe* follow-up damper. Push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, follower arm, and cam. If it is necessary to change the *E2* input to insert the setting rod, A-15 is upset and should be readjusted.



Adjustment

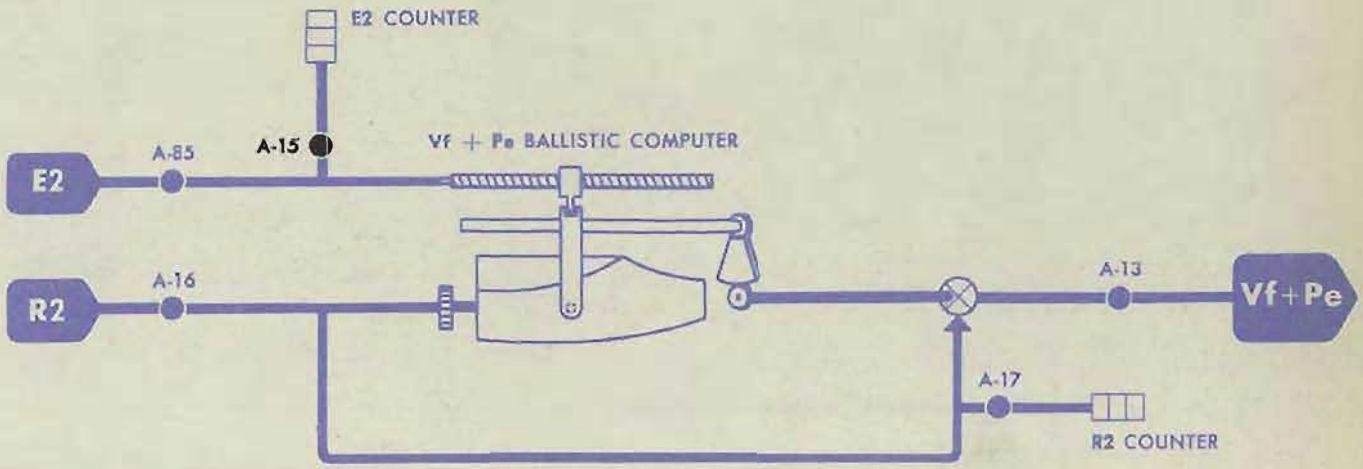
With the setting rod inserted, loosen A-15. Turn the *E2* counter until it reads the value specified on the legend plate. Tighten A-15 and recheck.

Remove the setting rod.

Replace the damper on the follow-up and tighten A-209.

Check that *E2* can be varied from 0° to 90°.

Check A-13 and A-85.



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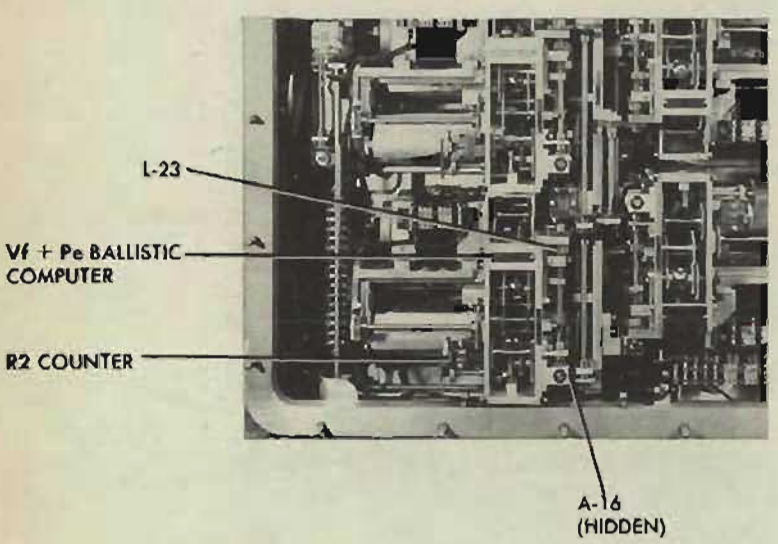
A-16 R2 COUNTER to L-23



Location

A-16 and L-23 are under cover 4, in the *Vf* + *Pe* ballistic computer.

Check

Turn the power OFF.
Loosen A-75.
Turn the *R2* input to the *Vf* + *Pe* ballistic computer from limit to limit.
The *R2* counter should read 300 yards at the lower limit and 18,200 yards at the upper limit on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.

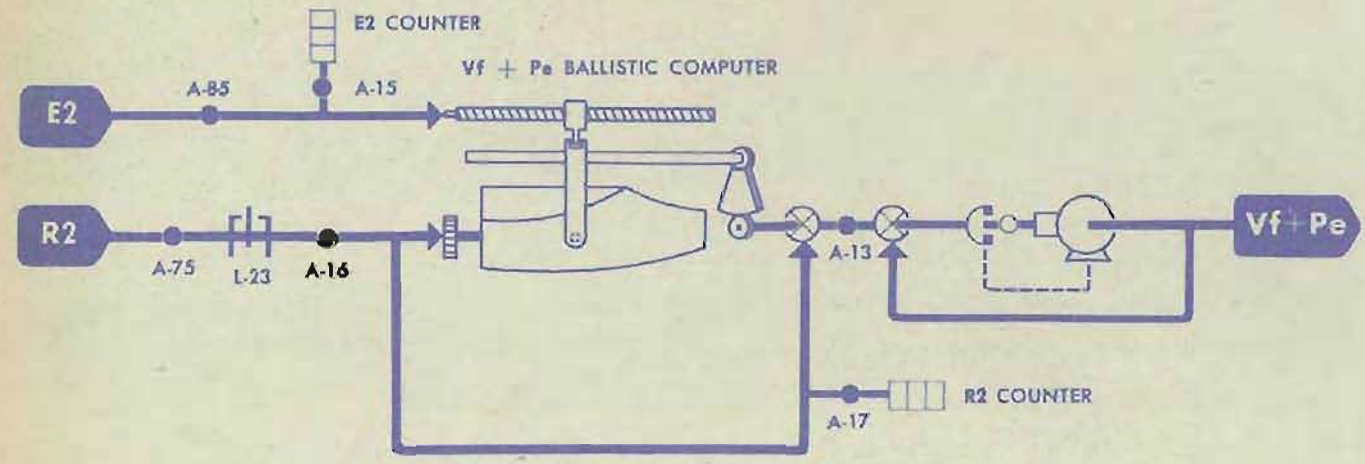
Adjustment

If the *R2* counter does not read the proper values, loosen A-16.

Turn the *R2* counter gearing until the limits are correct. Tighten A-16 and recheck.

Readjust A-75.

Check A-13.



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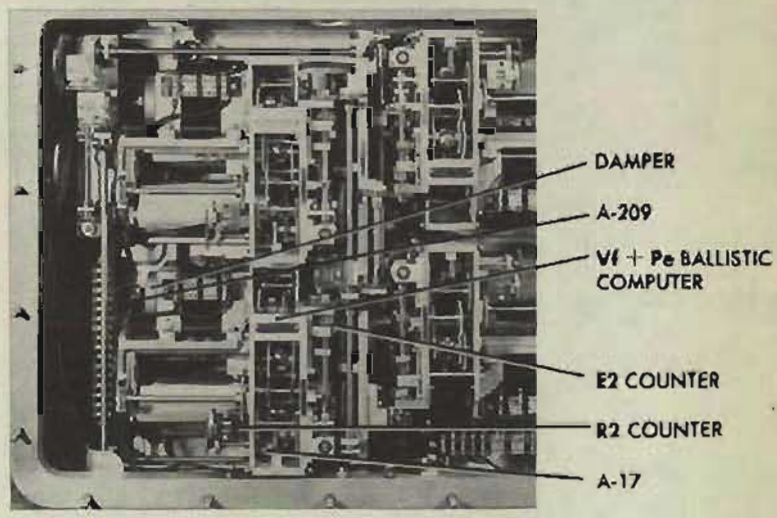
A-17 R2 COUNTER to Vf + Pe BALLISTIC COMPUTER

Location

A-17 is under cover 4, in the *Vf* + *Pe* ballistic computer.



Check

Turn the power OFF.
Set *E2* and *R2* at the values listed on the legend plate.

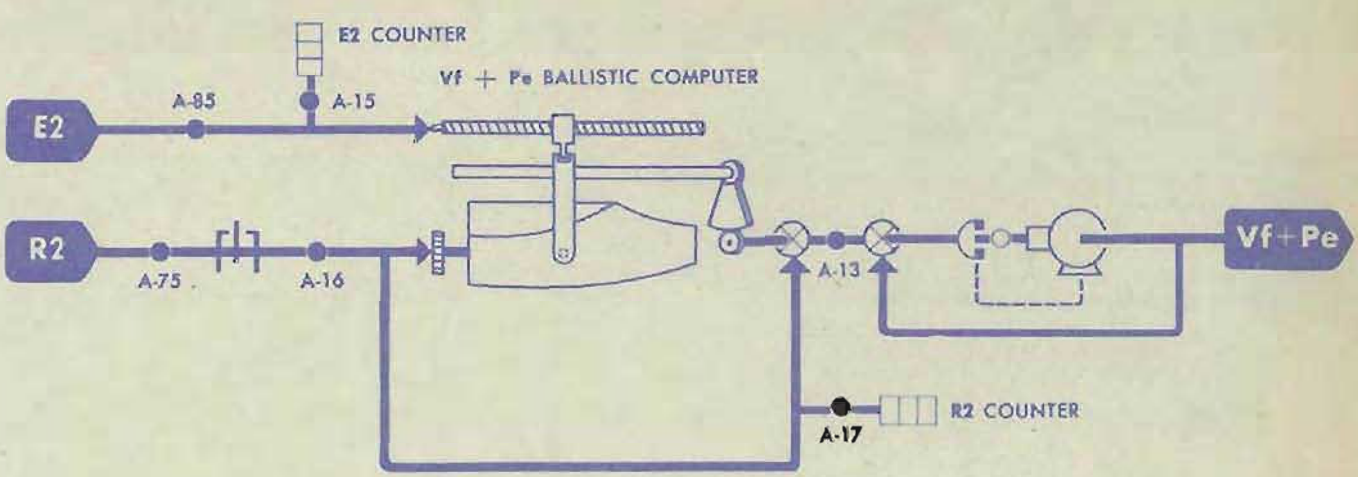
Loosen A-209 on the *Vf* + *Pe* follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, follower arm, and cam. If it is necessary to change the *R2* input to insert the setting rod, A-17 is upset and should be readjusted.

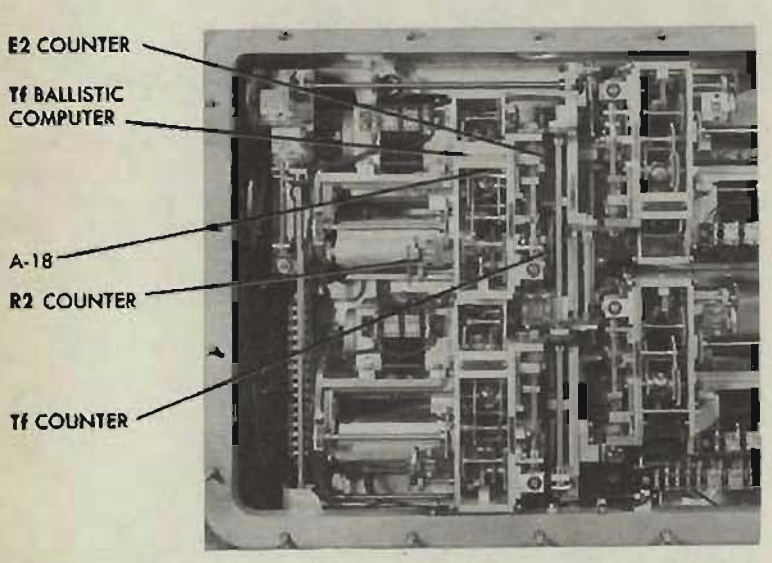
Adjustment

With the setting rod inserted, loosen A-17. Turn the *R2* counter gearing until the counter reads the value specified on the legend plate.

Tighten A-17 and recheck.
Remove the setting rod.
Replace the damper on the follow-up and tighten A-209.
Check A-16, A-75, and A-13.



A-18 SYNCHRONIZING THE Tf FOLLOW-UP



Location

A-18 is under cover 4, in the *Tf* ballistic computer.

Check

Refer to the N.I.O. final test sheet for the particular unit being checked.

Turn the power ON.

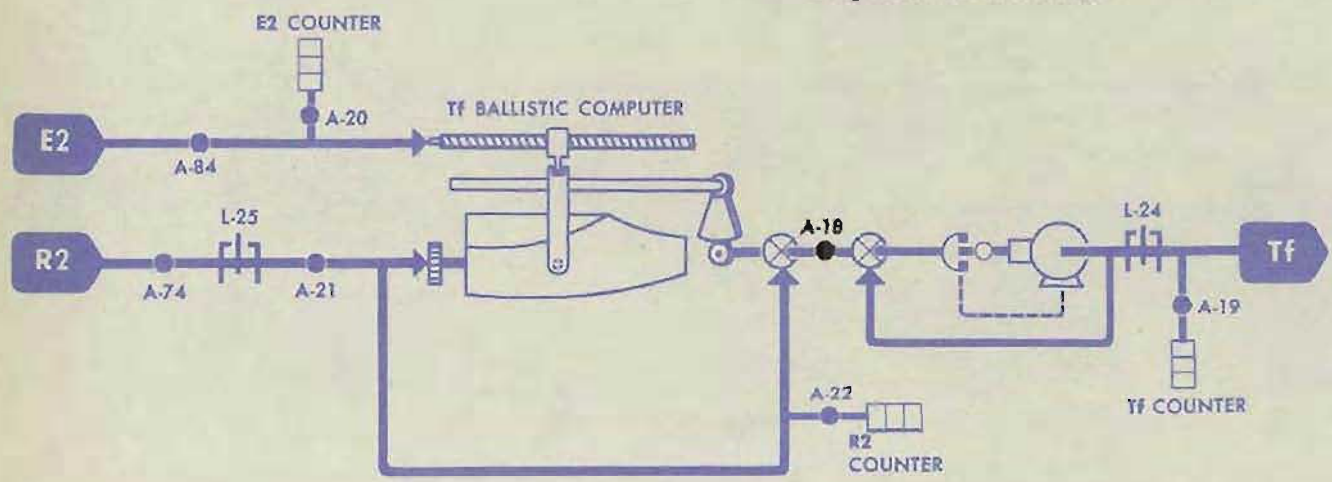
Set *E2* and *R2* at the values given on the N.I.O. final test sheet.

Read the *Tf* unit counter and note any variation from the corresponding values recorded on the test sheet. If the *Tf* value is *consistently less* or *consistently greater* than the recorded value, A-18 is in error and should be readjusted.

Adjustment

Loosen A-18. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *Tf*. Tighten A-18.

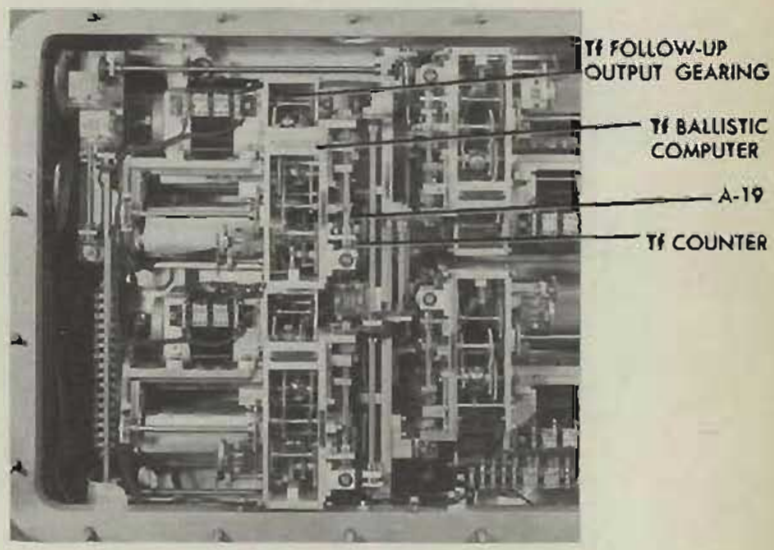
Refer to the N.I.O. acceptance test sheets and run the complete test of the *Tf* ballistic computer. If necessary, A-18 may be readjusted slightly to improve the readings.



A-19 Tf COUNTER to L-24

Location

A-19 and L-24 are under cover 4, in the *Tf* ballistic computer.



Check

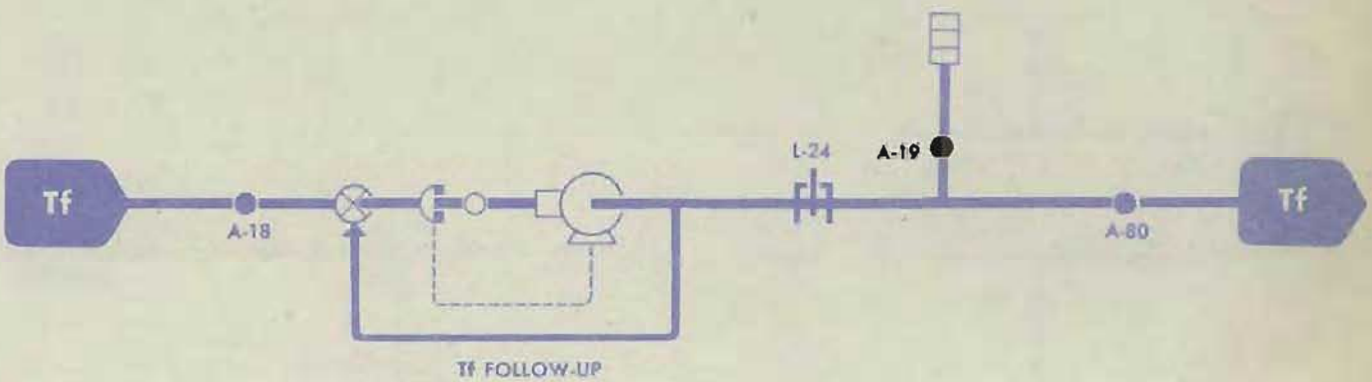
Turn the power OFF.

Turn the *Tf* ballistic computer output gearing from limit to limit.

The *Tf* counter should read 0.60 second at the lower limit and 60.60 seconds at the upper limit, on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1.80 and 61.80 seconds. On Mods 8 and 12, the limits are 0.60 to 50.6 seconds.

Adjustment

Loosen A-19. Slip the counter to the correct reading. Tighten A-19 and recheck. Check A-18 and A-80.



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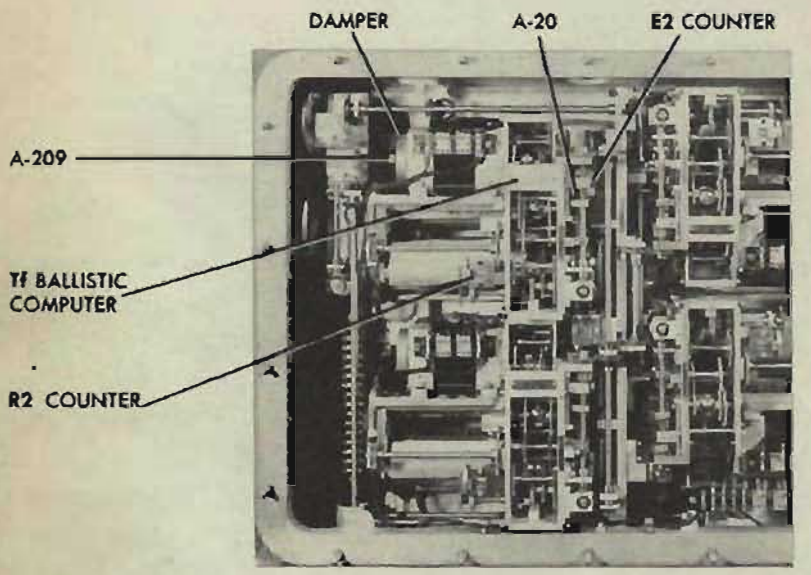
A-20 E2 COUNTER to Tf BALLISTIC COMPUTER



Location

A-20 is under cover 4, in the *Tf* ballistic computer.

Check

Turn the power OFF.
Set *E2* and *R2* at the values listed on the legend plate. Loosen A-209 on the *Tf* follow-up damper, and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the *E2* input to insert the rod, A-20 is upset and should be readjusted.

Adjustment

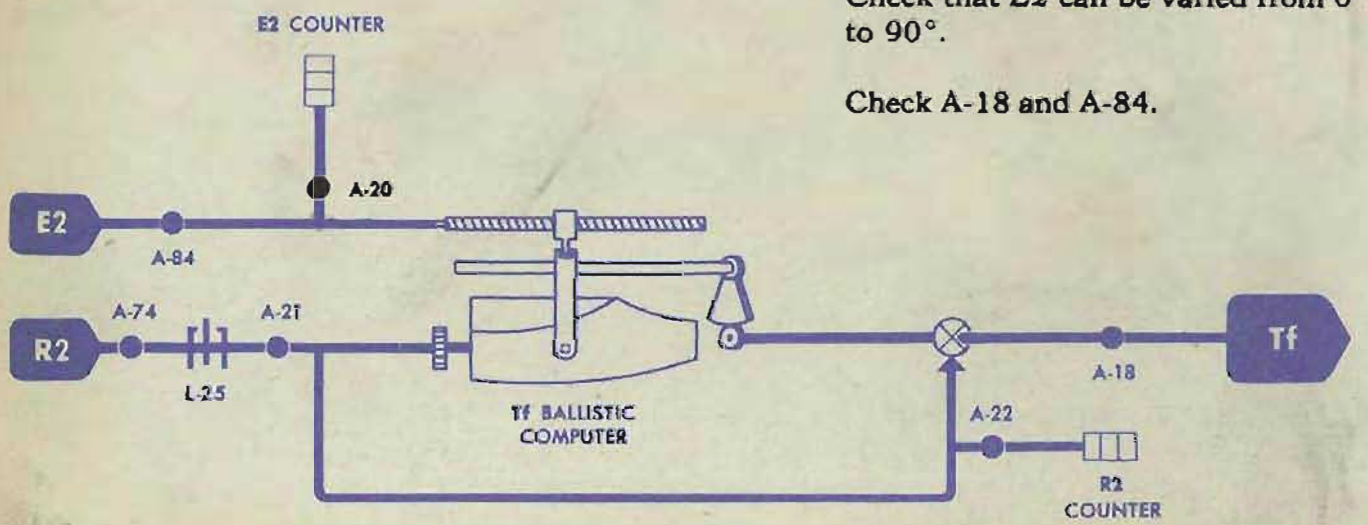
With the setting rod inserted, loosen A-20. Turn the *E2* counter until it reads the value specified on the legend plate. Tighten A-20 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft, and tighten A-209.

Check that *E2* can be varied from 0° to 90°.

Check A-18 and A-84.



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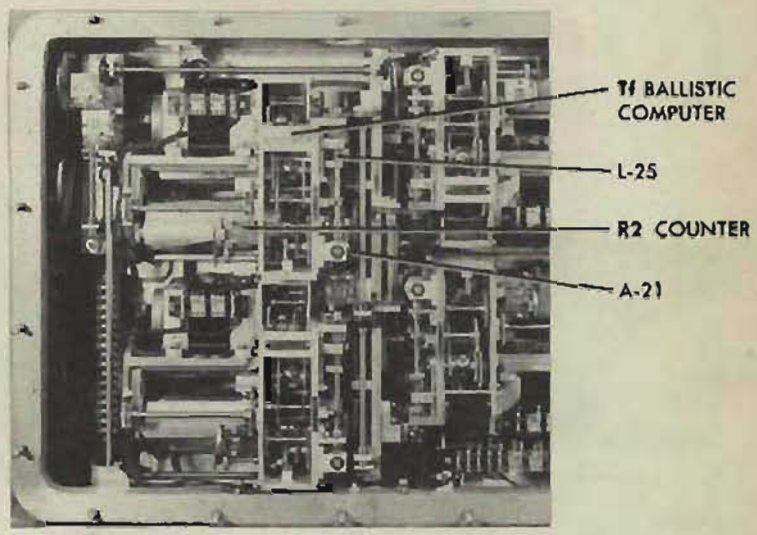
A-21 R2 COUNTER to L-25

Location

A-21 and L-25 are under cover 4, in the *Tf* ballistic computer.



Check

Turn the power OFF.
Loosen A-74, and readjust later.
Turn the *R2* input to the *Tf* ballistic computer from limit to limit.
The *R2* counter should read 300 yards at the lower limit and 18,200 yards at the upper limit, on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.

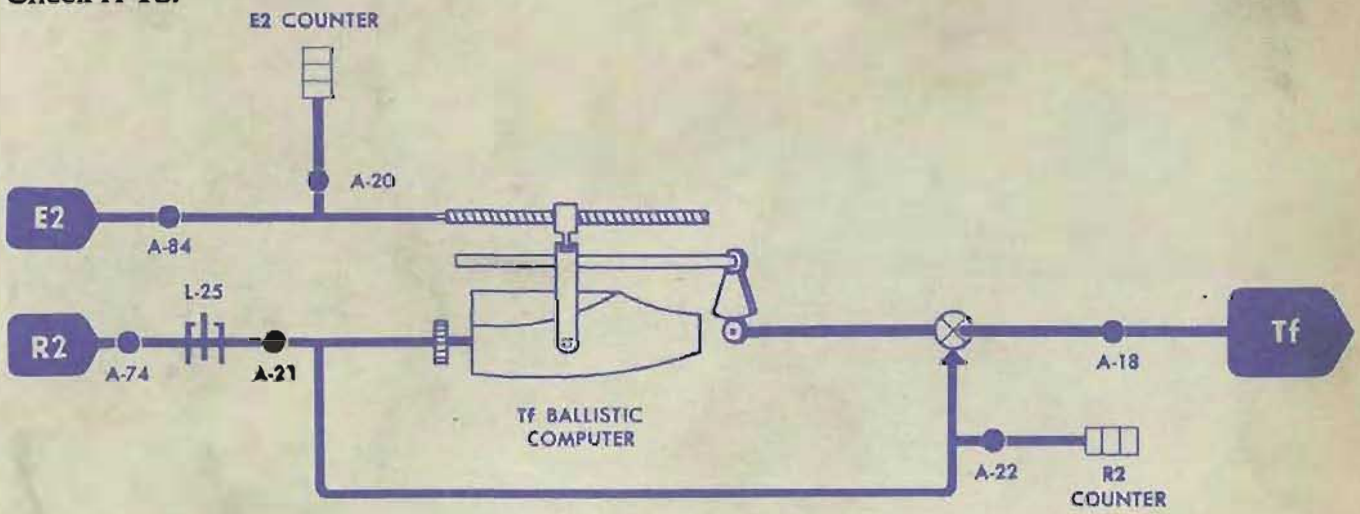
Adjustment

If the *R2* counter does not read the proper value, loosen A-21.

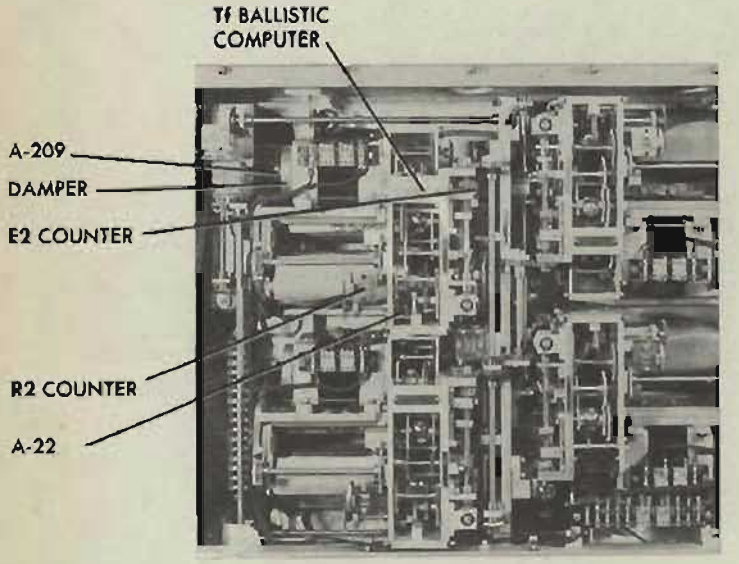
Turn the *R2* counter gearing until the limits are correct. Tighten A-21 and recheck.

Readjust A-74.

Check A-18.



A-22 R2 COUNTER to Tf BALLISTIC COMPUTER



Location

A-22 is under cover 4, in the *Tf* ballistic computer.

Check

Turn the power OFF.

Set *E2* and *R2* at the values listed on the legend plate.

Loosen A-209 on the *Tf* follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the *R2* input to insert the rod, A-22 is upset, and should be readjusted.

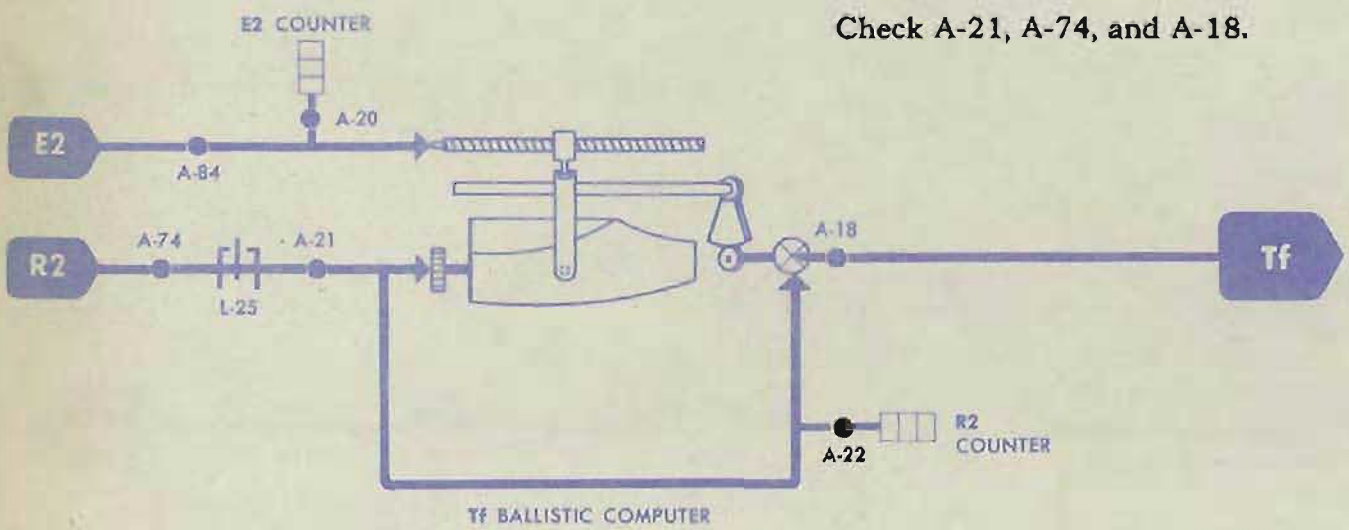
Adjustment

With the setting rod inserted, loosen A-22. Turn the *R2* counter until it reads the value specified on the legend plate. Tighten A-22 and recheck.

Remove the setting rod.

Replace the damper on the follow-up, and tighten A-209.

Check A-21, A-74, and A-18.



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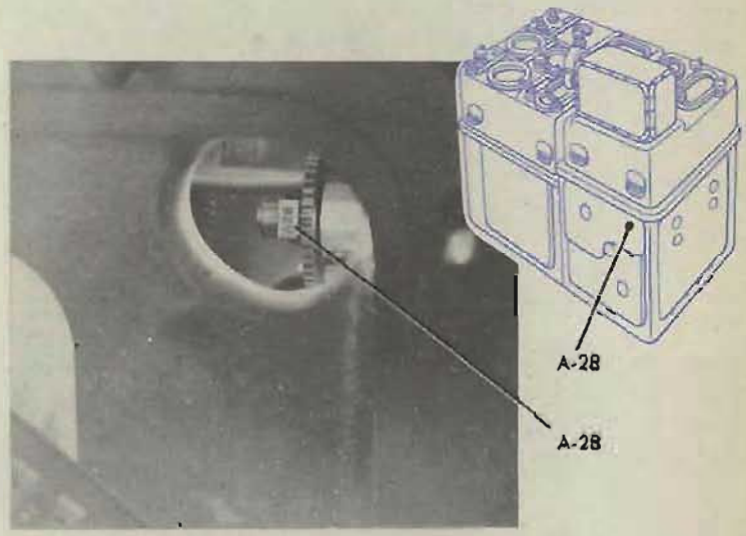
A-28 DECK TILT COMPONENT SOLVER to L DIALS

Location

A-28 is under cover 6 directly behind the *L* dials.



Check

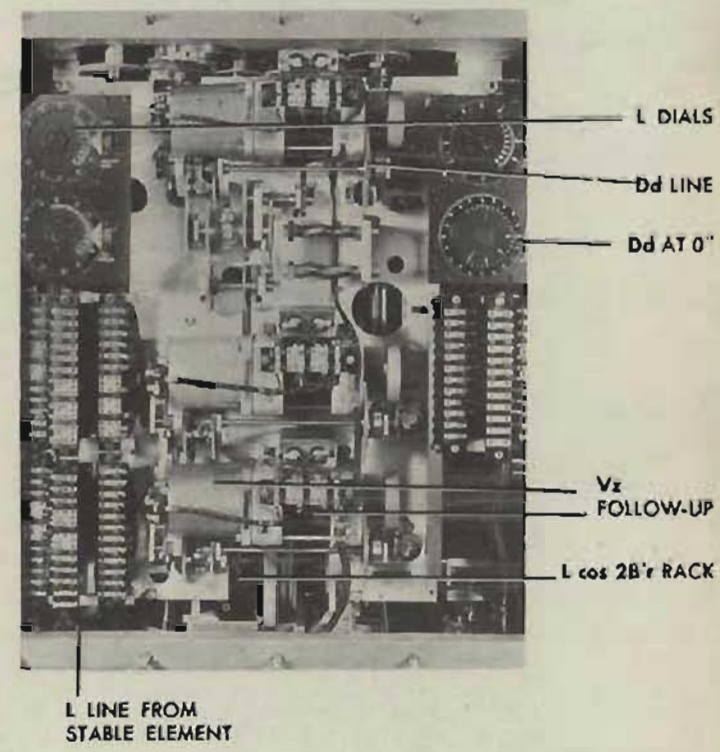
Remove leads 1B and 1BB from the *Dd* follow-up. Turn the follow-up output gearing to set *Dd* at 0°, and wedge the line.

Turn the power ON. Turn the control switch to LOCAL.

Set *L* at 2000′.

Use the generated bearing crank in the OUT position to set *B′r* at 0°, as read on the *B′gr* dial.

Set up a dial indicator to measure motion of the *L* cos *2B′r* rack of the deck tilt component solver. This rack, which moves vertically, is accessible under cover 7, below the *Vz* follow-up, about four inches in.



Observe the indicator while turning *B′r* from 0° to 180°. The indicator reading should not change during the rotation of the vector gear. In most cases, however, it is inadvisable to readjust A-28 unless the total indicator movement exceeds 0.002 inch.

Adjustment

Make A-28 slip tight.
Set *B′r* at 45° and note the reading of the dial indicator.
Turn *B′r* from 45° to 0°. Then turn the *L* shaft line until the indicator has its original reading. Hold the *L* shaft line and bring the computer *L* dials to 2000′ by turning the square mounting plate behind the dials. Tighten A-28 and recheck.
Turn the the power OFF.

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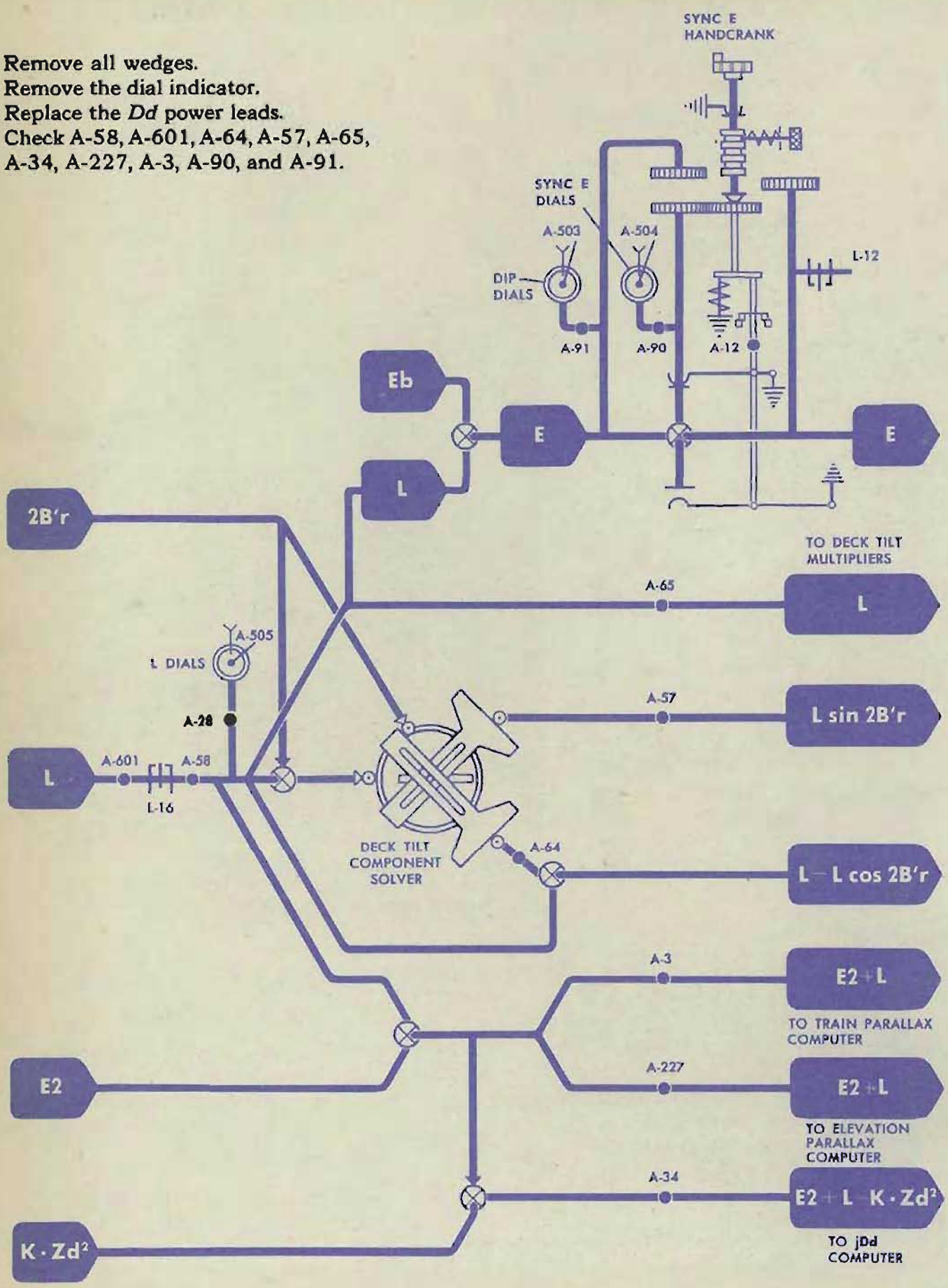
Remove all wedges.
Remove the dial indicator.
Replace the *Dd* power leads.
Check A-58, A-601, A-64, A-57, A-65, A-34, A-227, A-3, A-90, and A-91.



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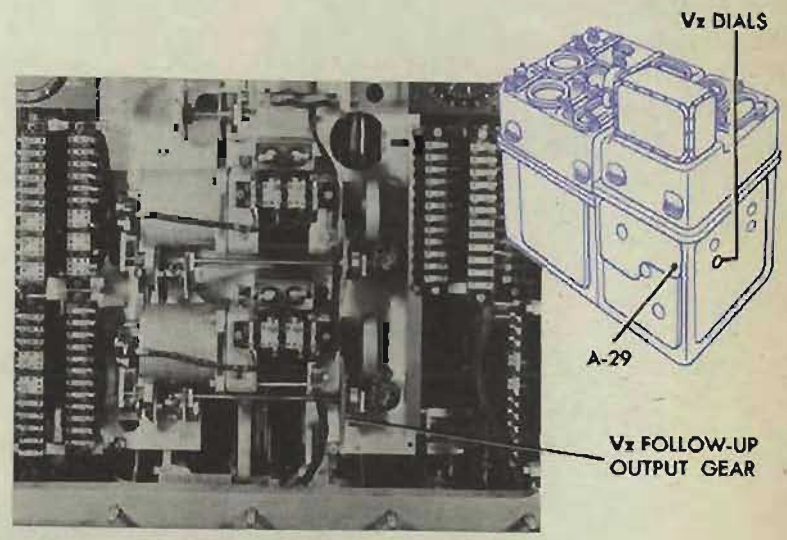
A-29 Vz DIALS to L-34

Location

A-29 is under cover 6, on the shaft to the *Vz* dials. It is reached through an access hole in the upper right corner. L-34 can be seen under cover 7, near the output of the *Vz* follow-up. It is mounted in a vertical position with the upper limit of *Vz*, +1860′, at the top, and the lower limit of *Vz*, −2940′, at the bottom.

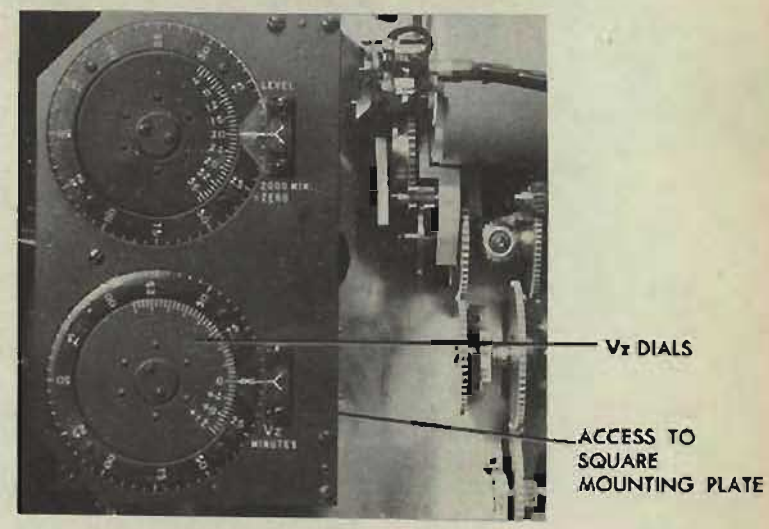


Check

Turn the power OFF.

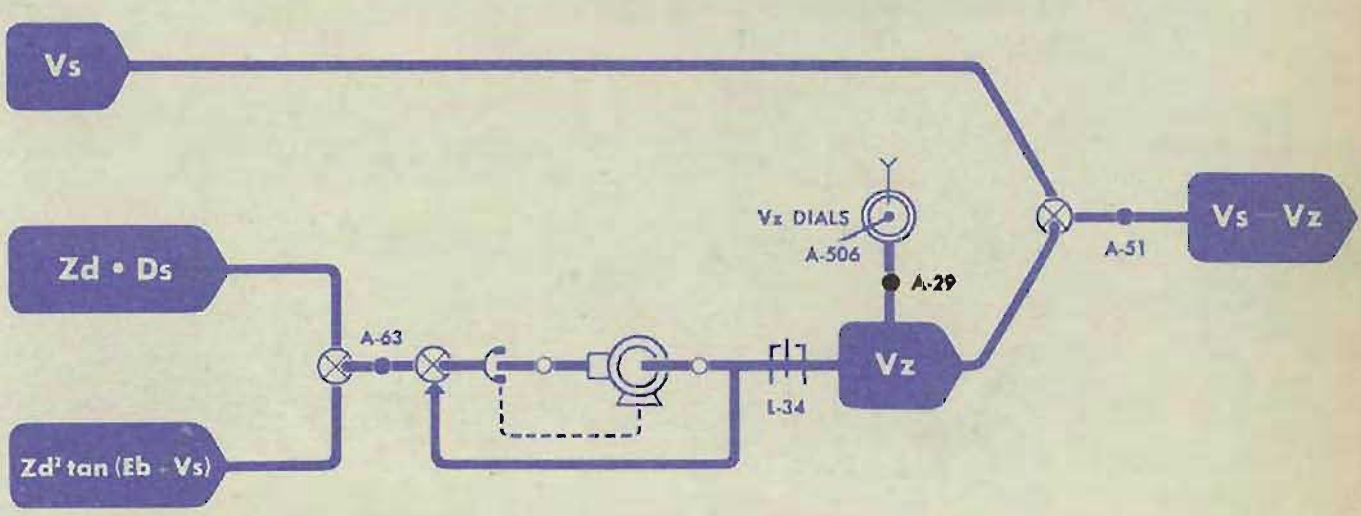
Turn the *Vz* follow-up output gearing until the lower limit of L-34 is reached.
The *Vz* dials should read −2940′.

Turn the follow-up output gearing until the upper limit of L-34 is reached.
The *Vz* dials should read +1860′.

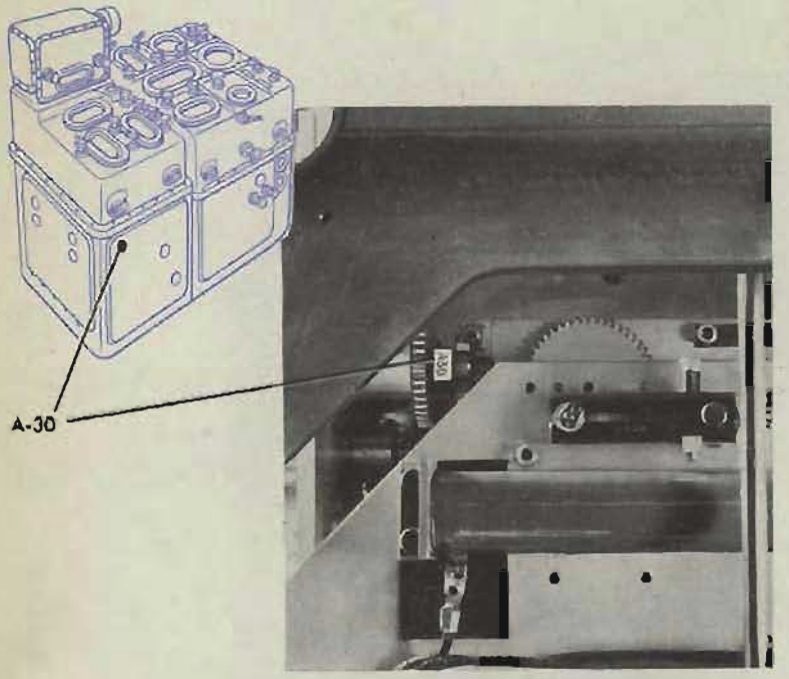


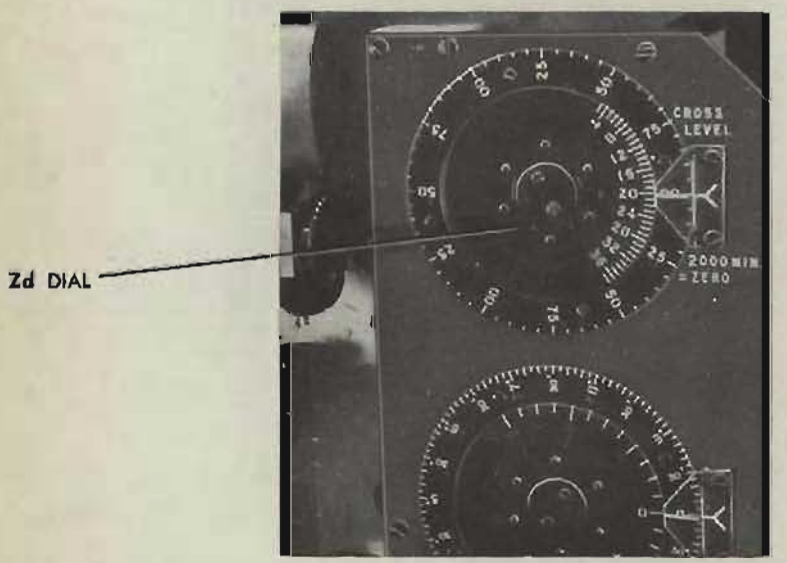
Adjustment

If the limits are not correct, make A-29 slip-tight. Hold the stop at one limit and slip the dials to the proper reading by turning the square mounting plate behind the dials. Tighten A-29 and recheck at the other limit. Check A-63 and A-51.



A-30 Zd DIALS to L-17





Location

A-30 is under cover 8, directly behind the *Zd* dials.

L-17 is located under cover 7, on the rear deck plate about 12 inches in. The upper limit is toward the left of the computer.

Check

Loosen A-603.

Turn the *Zd* shaft line to run L-17 from one limit to the other.

The *Zd* dials should read 480′ at the lower limit and 3520′ at the upper limit.

IMPORTANT

If either limit cannot be reached, it is possible that A-112, A-35, A-113, or A-111 is in error.

Determine which clamp is in error and loosen it.

Adjustment

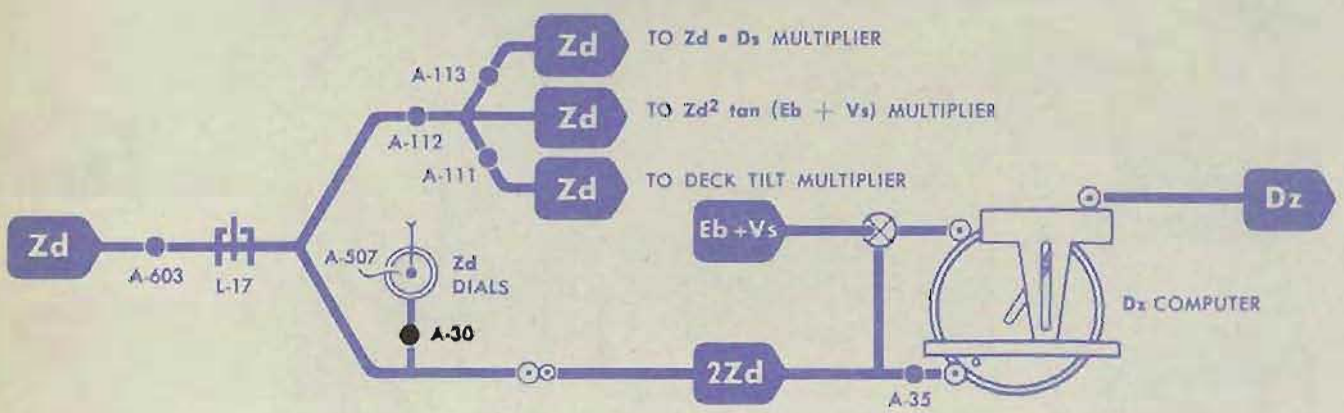
If the *Zd* dials do not show their proper values at the stop limits, make A-30 slip-tight.

Set the *Zd* dials at their proper reading by holding the *Zd* input against the stop and turning the square mounting plate behind the *Zd* dials.

Tighten A-30 and recheck by running *Zd* to the other limit.

Readjust A-603 and any other clamps loosened.

Check A-112, A-35, A-113 and A-111.



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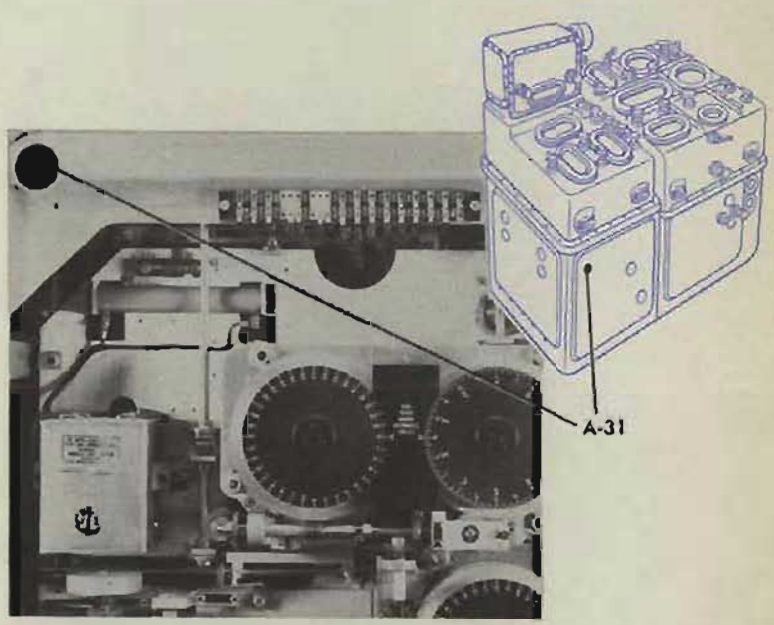
A-31 Dd DIALS to L-32

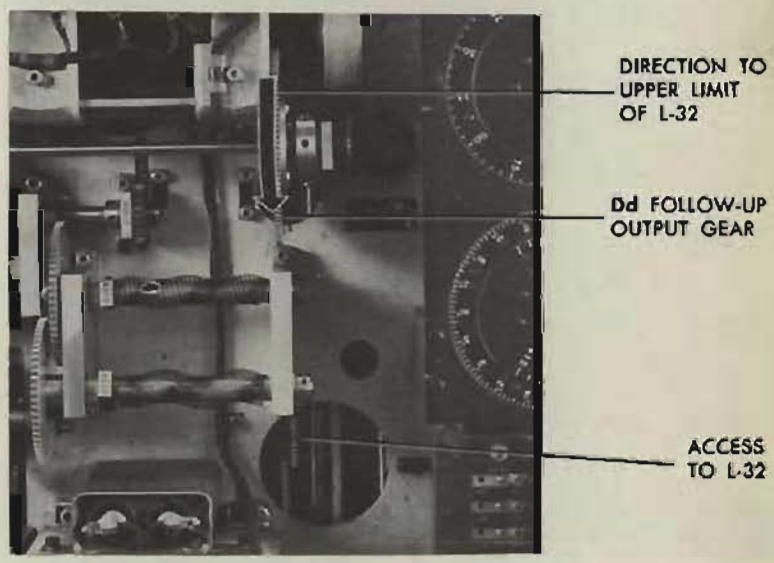
Location

A-31 is under cover 8, on the *Dd* dial group shaft behind the *Dd* dials.
L-32 can be seen through a 2-inch hole above the damper of the *jB'r* follow-up motor. The upper limit is toward the left of the computer.



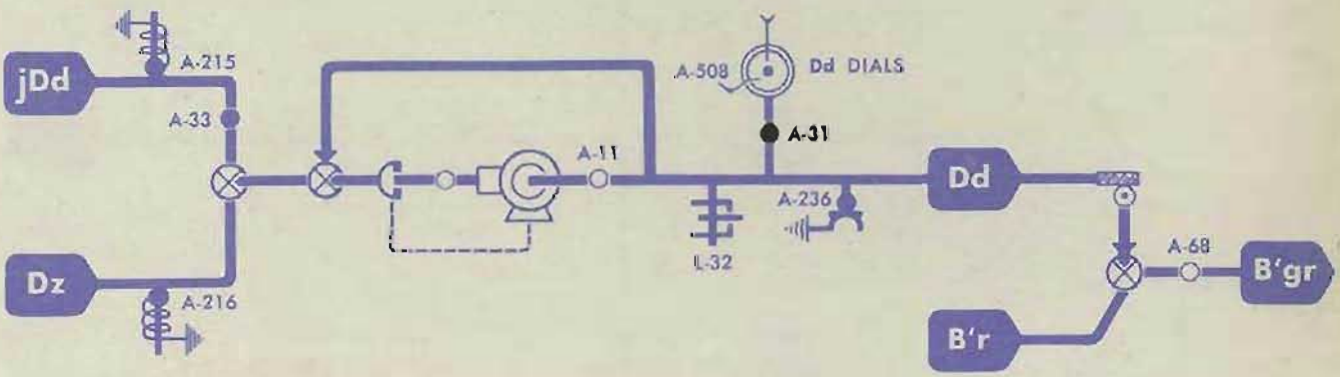
Check

Turn the power OFF.
Turn the *Dd* follow-up output gear until the upper limit of L-32 is reached. The *Dd* dials should read +120°.
Turn the gear in the opposite direction to reach the lower limit of L-32. The *Dd* dials should read −120°.

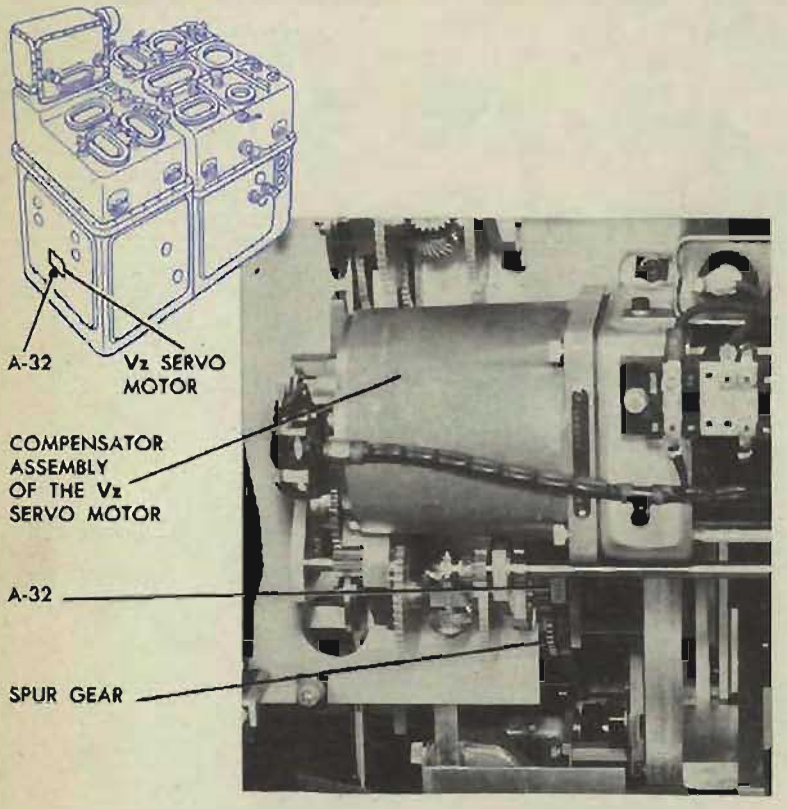


Adjustment

If the *Dd* dials do not read the correct values, hold the stop against one limit, loosen A-31, and set the dials at the proper value.
Tighten A-31 and recheck by turning the *Dd* follow-up output gear until the other limit is reached.
Split any overtravel.
Check A-68 and A-33.



A-32 Zd^2 tan (Eb+Vs) MULTIPLIER to Eb+Vs LINE



Note

A-112, A-113, A-208, and A-63 should be checked before readjusting A-32.

Location

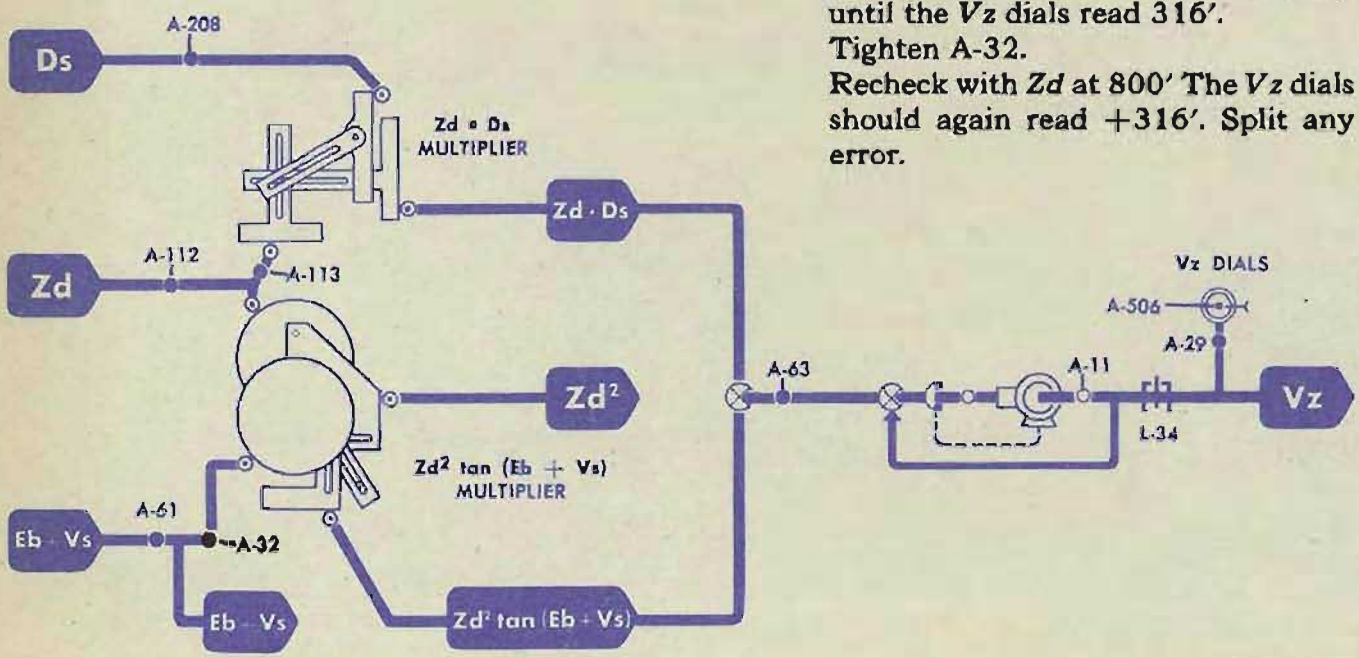
A-32 is under cover 7, below the compensator assembly on the *Vz* servo motor.

Check

Turn the power ON to energize the *Vz* follow-up.
Set *L* at 2000′.
Set *E* at 60° with the sync *E* handcrank at CENTER; then pull the handcrank OUT and match the sync *E* dials at the fixed index.
Set *Vs* at 2000′.
Set *Ds* at 500 mils.
Set *Zd* at 3200′.
The *Vz* dials should read +316′.

Adjustment

If the *Vz* dials do not read +316′, make A-32 slip-tight.
Turn the spur gear next to the clamp until the *Vz* dials read 316′.
Tighten A-32.
Recheck with *Zd* at 800′ The *Vz* dials should again read +316′. Split any error.



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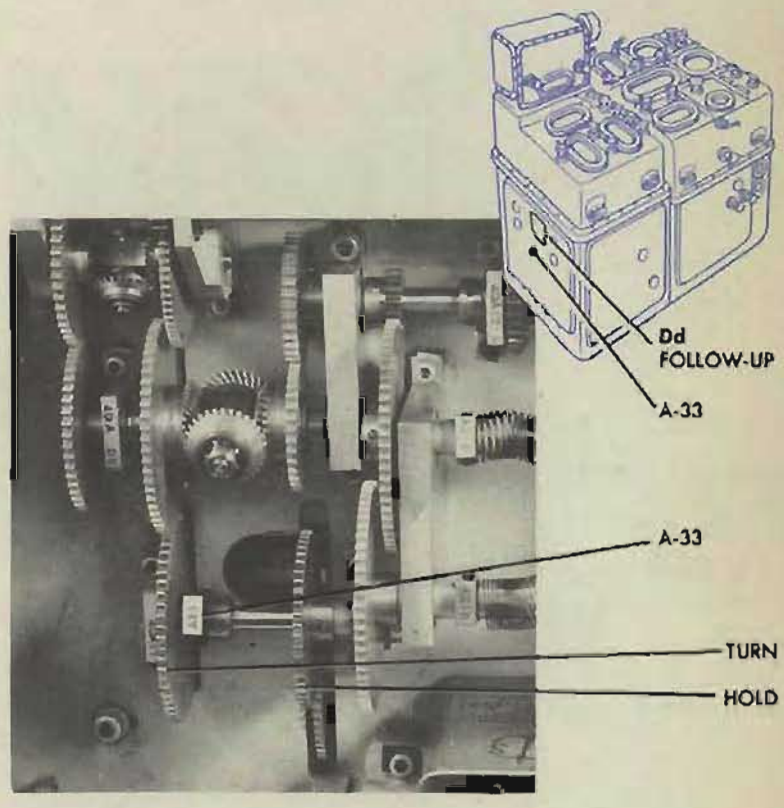
A-33 SYNCHRONIZING THE Dd FOLLOW-UP

Note

A-31 should be checked before readjusting A-33.

Location

A-33 is under cover 7, below the compensator assembly on the *Dd* follow-up.

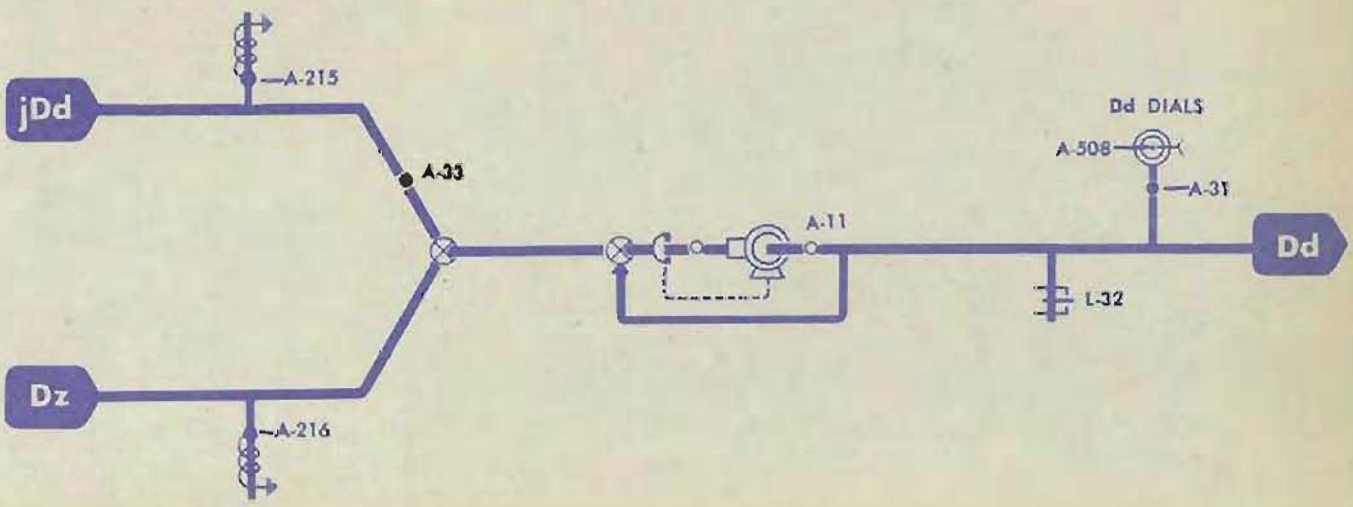


Check

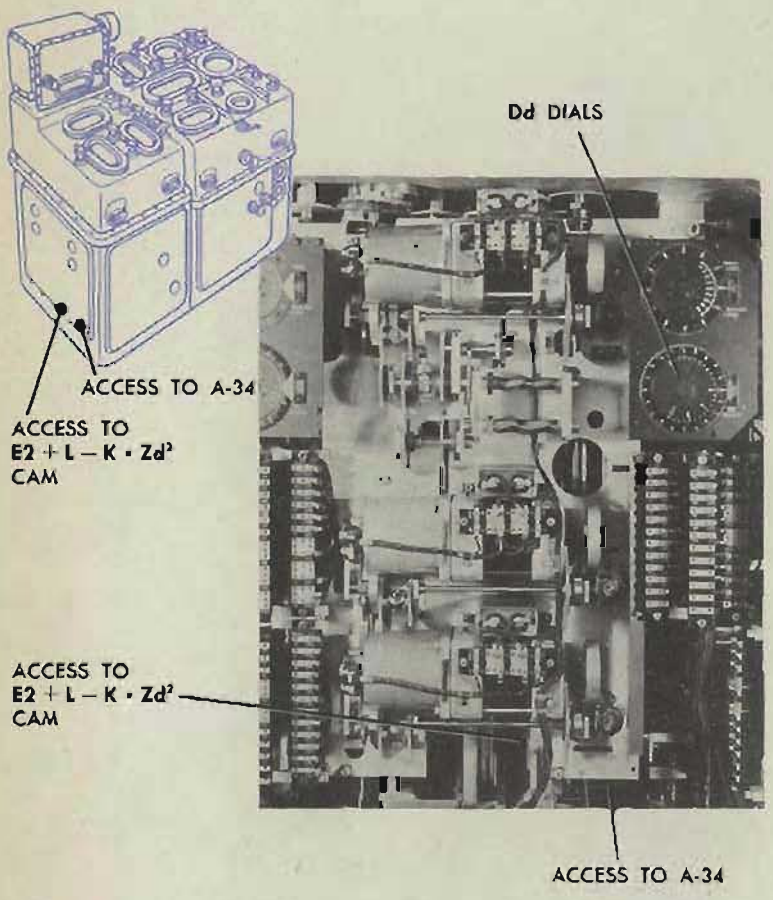
Turn the power ON to energize the *Dd* follow-up.
Set *Ds* at 500 mils.
Set *Vs* at 2000′.
Set *L* at 2000′.
Set *Zd* at 2000′.
Set *E2* at 0°.
Set *Eb* at 0°.
The *Dd* dials should read 0°.

Adjustment

If the *Dd* dials do not read 0°, make A-33 slip-tight.
Turn the spur gear next to A-33 until the *Dd* dials read 0°.
Tighten A-33 and recheck.



A-34 jDd COMPUTER to E2+L-K·Zd² LINE



Location

A-34 is under cover 7. It is reached through an access at the lower right.

Check

Turn the power ON to energize the *Dd* follow-up motor.
Set *L* at 2000′.
Set *Zd* at 2000′.
Set *Ds* at 750 mils.
Set *E2* at 60°.
The *Dd* dials should read +30°00′.

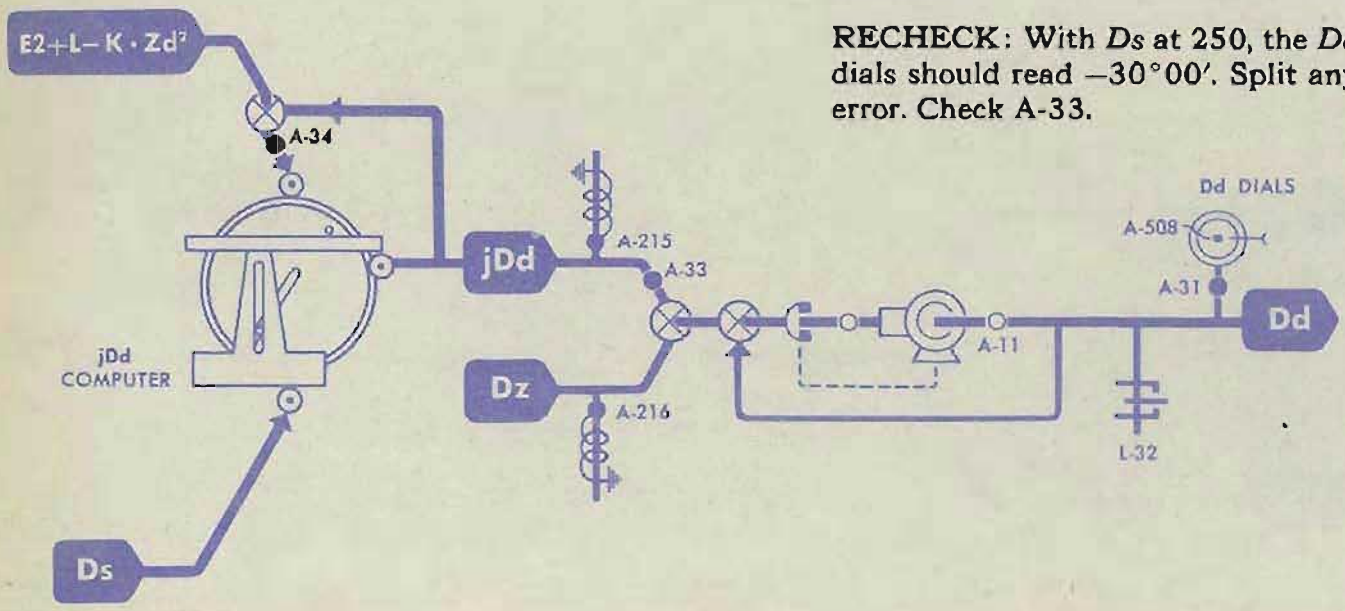
Adjustment

If the *Dd* dials do not read +30°00′, make A-34 slip-tight.

Turn the *E2+L−K·Zd²* cam until the *Dd* dials read +30°00′.

Tighten A-34 and recheck.

RECHECK: With *Ds* at 250, the *Dd* dials should read −30°00′. Split any error. Check A-33.



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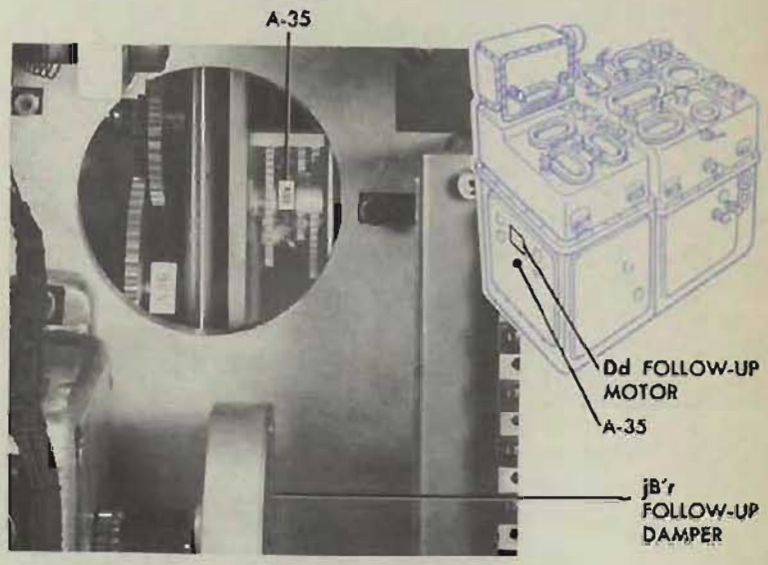
A-35 Dz COMPUTER to Zd DIALS

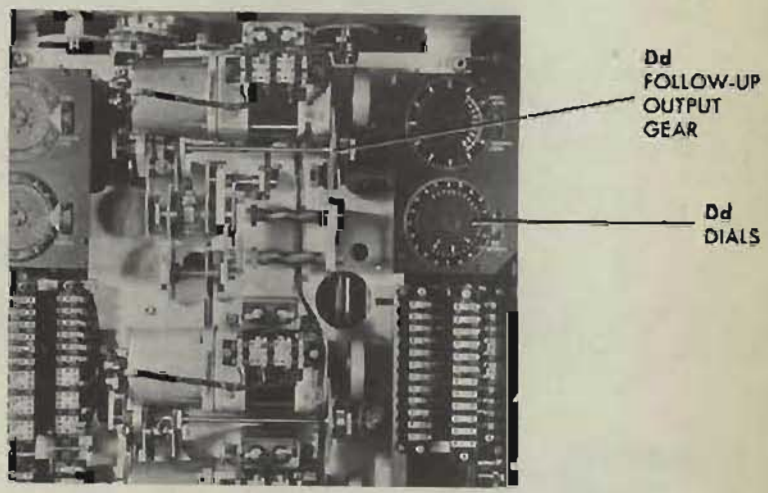
Location

A-35 is under cover 7. It can be reached through a hole above the damper on the *jB'r* follow-up.



Check

Turn the power ON.
Set *Ds* at 500 mils.
Set *Vs* at 2000′.
Set *L* at 2000′.
Set *Zd* at 2000′.
Turn the *Eb* line, using the sync *E* handcrank in the OUT position.
Full travel of the *Eb* line should cause no movement of the output rack of the *Dz* computer.
Mark the *Dd* follow-up output gear for use as an indicator to check for any motion of the *Dz* output rack.



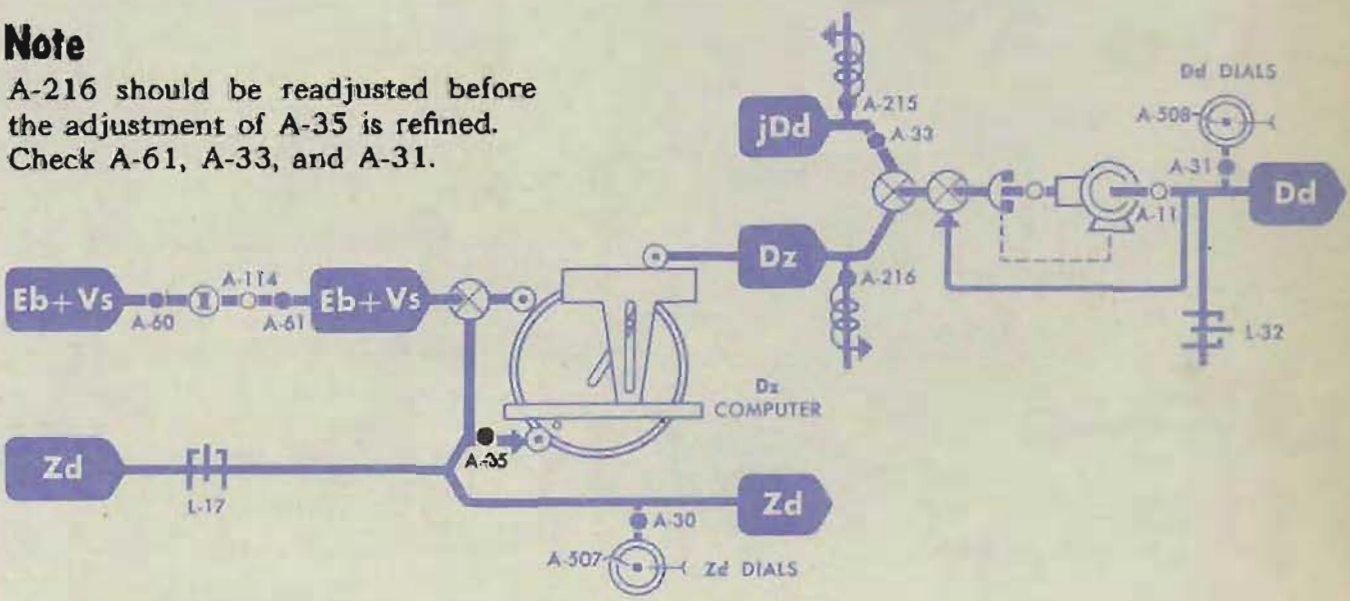
Adjustment

If there is any motion of the *Dd* follow-up output gearing, slip-tighten A-35. Adjust the slot in the vector gear to a horizontal or zero position by turning the vector gear with a gear pusher. At the zero position there will be no movement of the *Dd* follow-up output gearing for full travel of the *Eb* line.

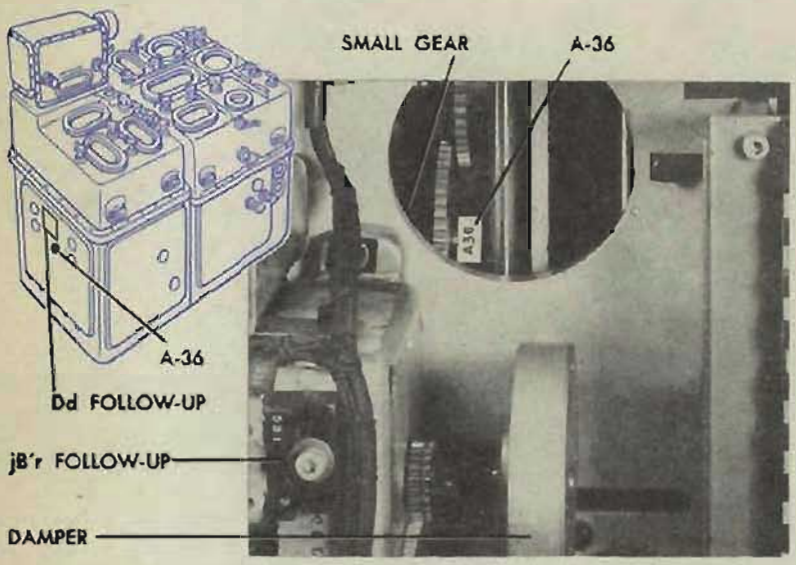
WARNING: After each adjustment of the vector gear, check that *Zd* has not moved off 2000′.

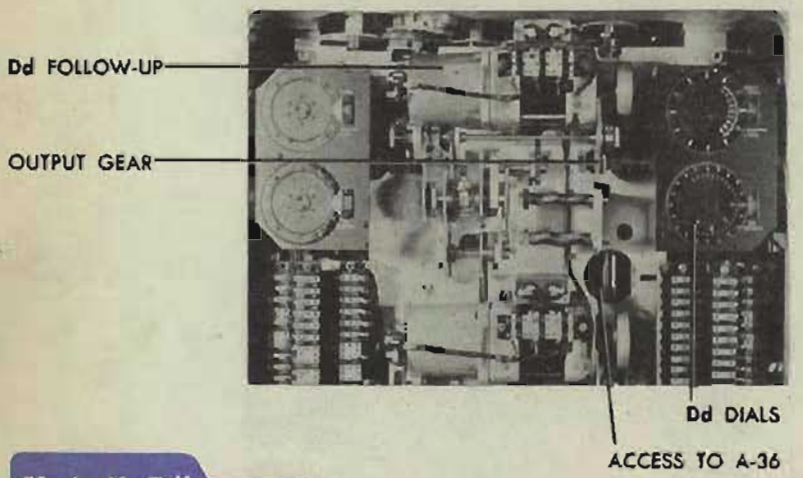
Note

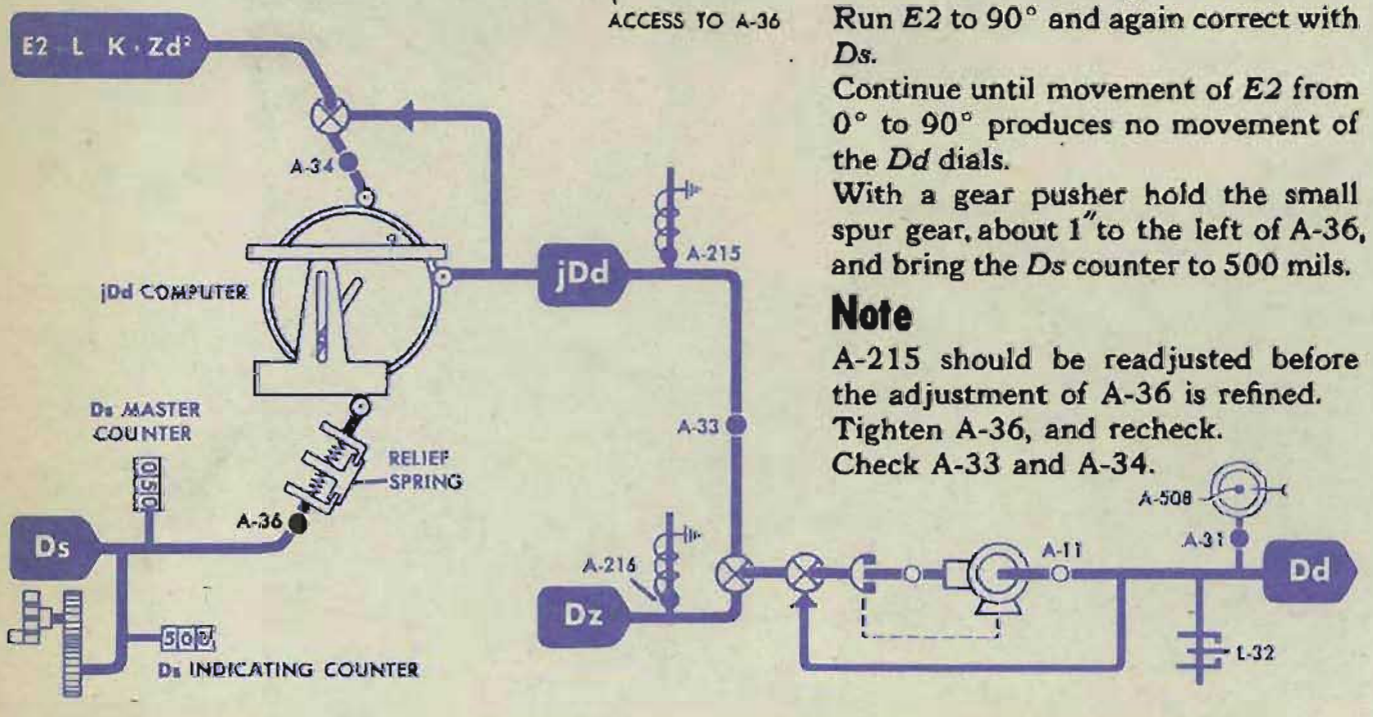
A-216 should be readjusted before the adjustment of A-35 is refined. Check A-61, A-33, and A-31.



A-36 jDd COMPUTER to Ds COUNTER







Location

A-36 is under cover 7. It is reached through a hole above the damper of the *jB'r* follow-up motor.

Check

Turn the power ON.
Set *Ds* at 500 mils.
Set *L* at 2000′.
Set *Zd* at 2000′.
The *Ds* input rack should be at a position where full travel of *E2* will cause no motion of the *jDd* output gear.
Any motion of the *jDd* output gear is indicated by movement of the *Dd* follow-up output gearing.

Adjustment

The *jDd* computer is unusual in that the vector gear is the output. If there is any movement of the *Dd* follow-up output gearing, make A-36 slip-tight.
Adjust the input rack to the zero position as follows:
Set *E2* at 0°.
Note the reading of the *Dd* dials.
Run *E2* to 90°.
Turn the *Ds* handcrank to bring the *Dd* dials back to the same value noted when *E2* was at zero.
Run *E2* back to zero.
Note the new reading of the *Dd* dials.
Run *E2* to 90° and again correct with *Ds*.
Continue until movement of *E2* from 0° to 90° produces no movement of the *Dd* dials.
With a gear pusher hold the small spur gear, about 1″ to the left of A-36, and bring the *Ds* counter to 500 mils.

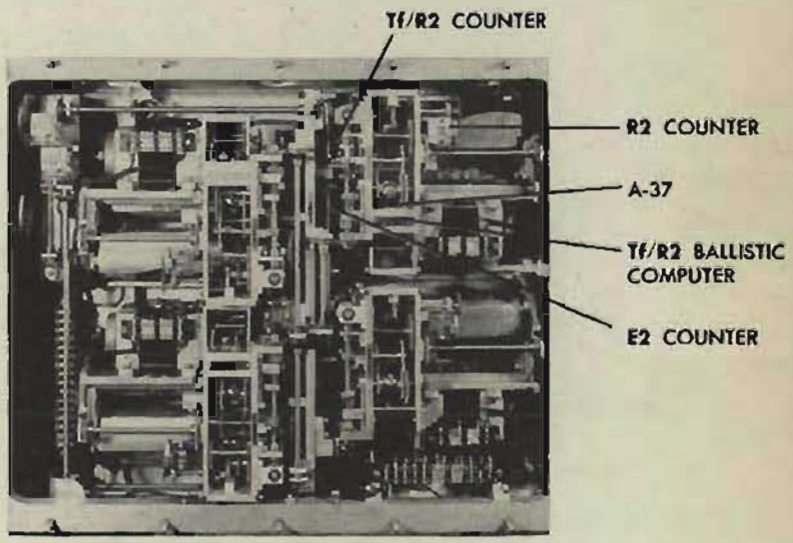
Note

A-215 should be readjusted before the adjustment of A-36 is refined.
Tighten A-36, and recheck.
Check A-33 and A-34.

A-37 SYNCHRONIZING THE Tf/R2 FOLLOW-UP

Location

A-37 is under cover 4, in the *Tf/R2* ballistic computer.



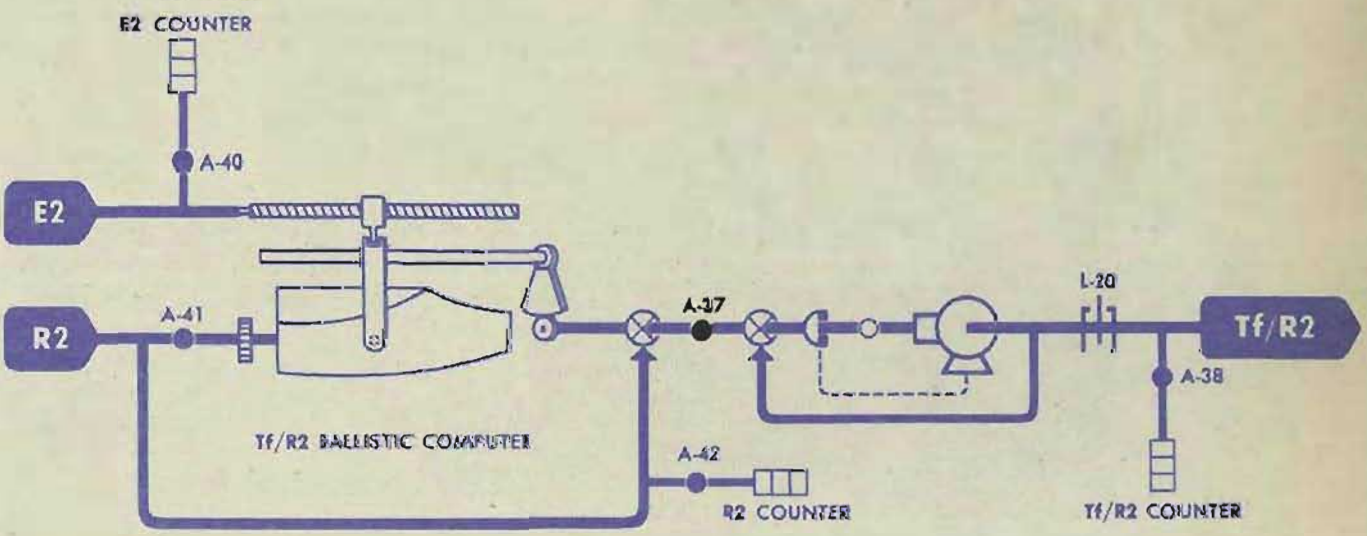
Check

Refer to the N.I.O. final test sheet for the particular unit being checked.
Turn the power ON.

Set *E2* and *R2* (*R2m* on Ser. Nos. 811 and higher) at the values given on the N.I.O. final test sheet.
Read the *Tf/R2* unit counter and note any variation from the corresponding values recorded on the test sheet.
If the *Tf/R2* value is consistently less or consistently greater than the recorded value, A-37 is in error and should be readjusted.

Adjustment

Loosen A-37. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *Tf/R2*. Tighten A-37. Refer to the N.I.O. final test sheets and run the complete test of the *Tf/R2* ballistic computer. If necessary, A-37 may be readjusted slightly to improve the readings.



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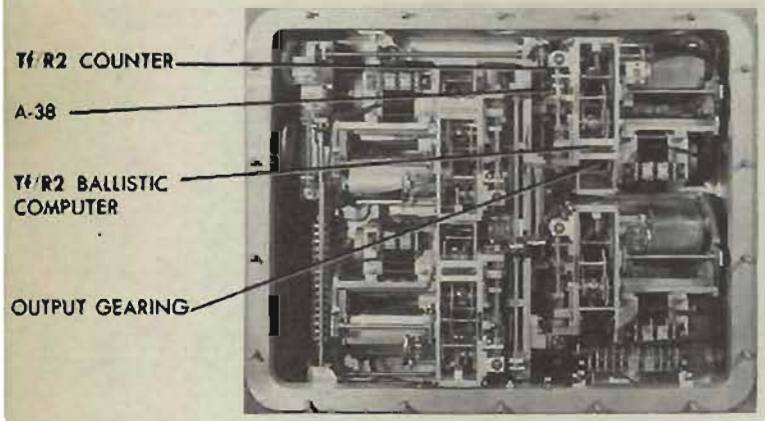
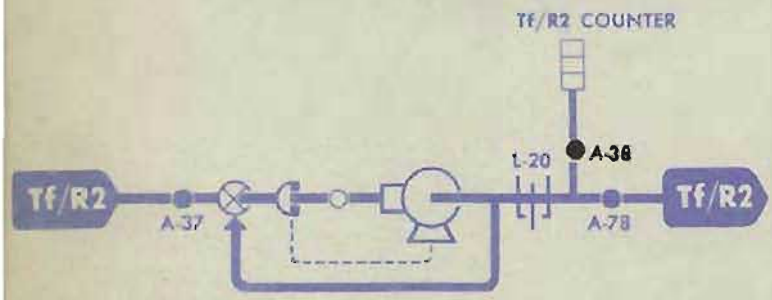
A-38 Tf/R2 COUNTER to L-20





Location

A-38 and L-20 are under cover 4, in the *Tf/R2* ballistic computer.

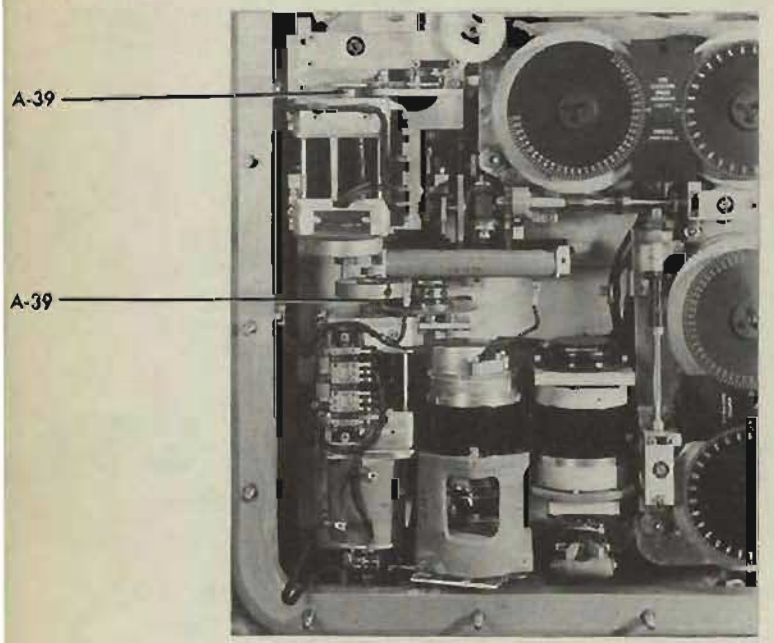
Check

Turn the power OFF.
Turn the *Tf/R2* ballistic computer output gearing from limit to limit.
The *Tf/R2* counter should read 0.00122 at the lower limit and 0.00336 at the upper limit.
On Mods 8 and 12 the limits are 0.001184 to 0.002674.

Adjustment

Loosen A-38. Hold the *Tf/R2* line against the stop and slip the counter to the correct reading.
Tighten A-38 and recheck.
Check A-37 and A-78.

A-39 ASSEMBLY CLAMPS



Location

A-39 is under cover 6. There are two clamps numbered A-39, one on each servo motor output shaft of the two *Eb* follow-ups.

Check

If either A-39 is loose, the servo on which it is located may drive without producing any output motion in the computer.

Adjustment

Tighten A-39.

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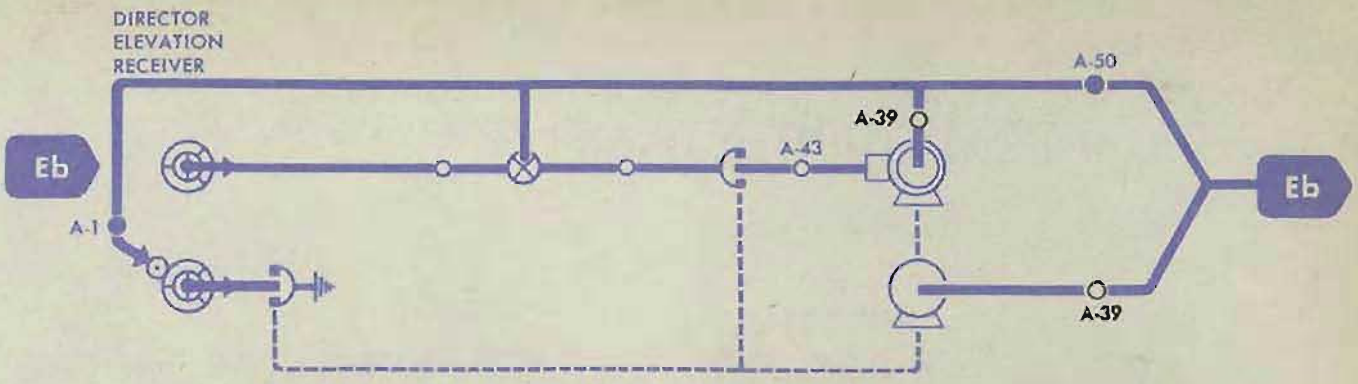


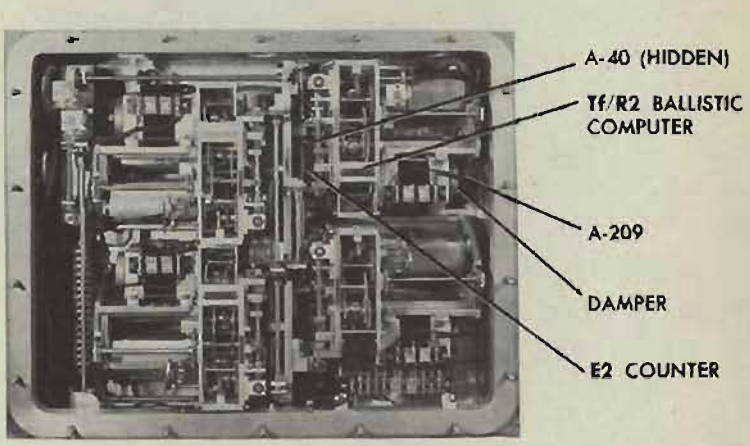
A-40 E2 COUNTER to Tf/R2 BALLISTIC COMPUTER

Location

A-40 is under cover 4, in the *Tf/R2* ballistic computer.

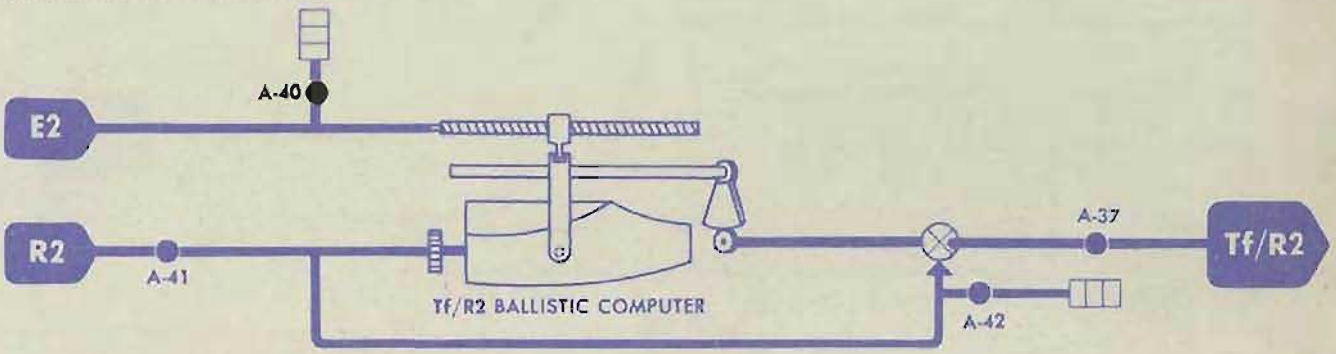
Check

Turn the power OFF.
Set *E2* and *R2* (*R2m* on Ser. Nos. 811 and higher) at the values listed on the legend plate.
Loosen A-209 on the *Tf/R2* follow-up damper, and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the *E2* input to insert the rod, A-40 is upset and should be readjusted.

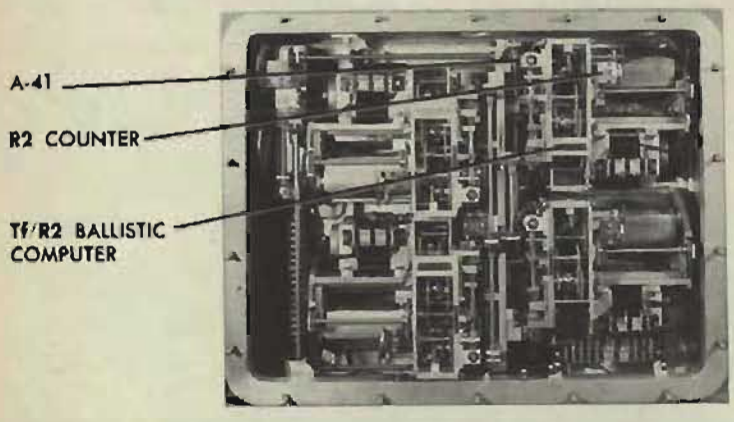


Adjustment

With the setting rod inserted, loosen A-40.
Turn the *E2* counter until it reads the value specified on the legend plate.
Tighten A-40 and recheck.
Remove the setting rod.
Replace the damper on the follow-up shaft and tighten A-209.
Check that *E2* can be varied from 0° to 90°.
Check A-37 and A-41.



A-41 R2 (or R2m) COUNTER to L-21



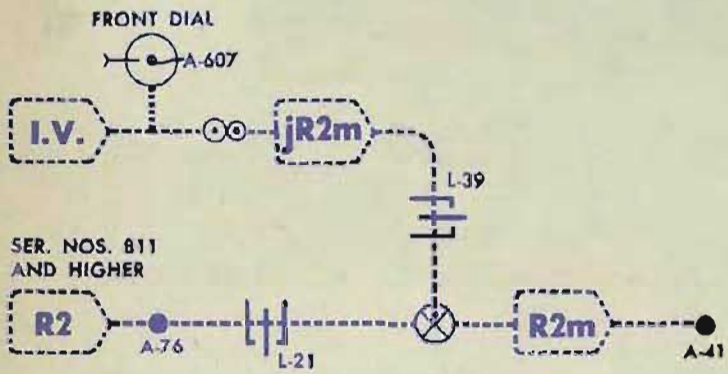
Location

A-41 and L-21 are under cover 4, in the *Tf/R2* ballistic computer.

Check

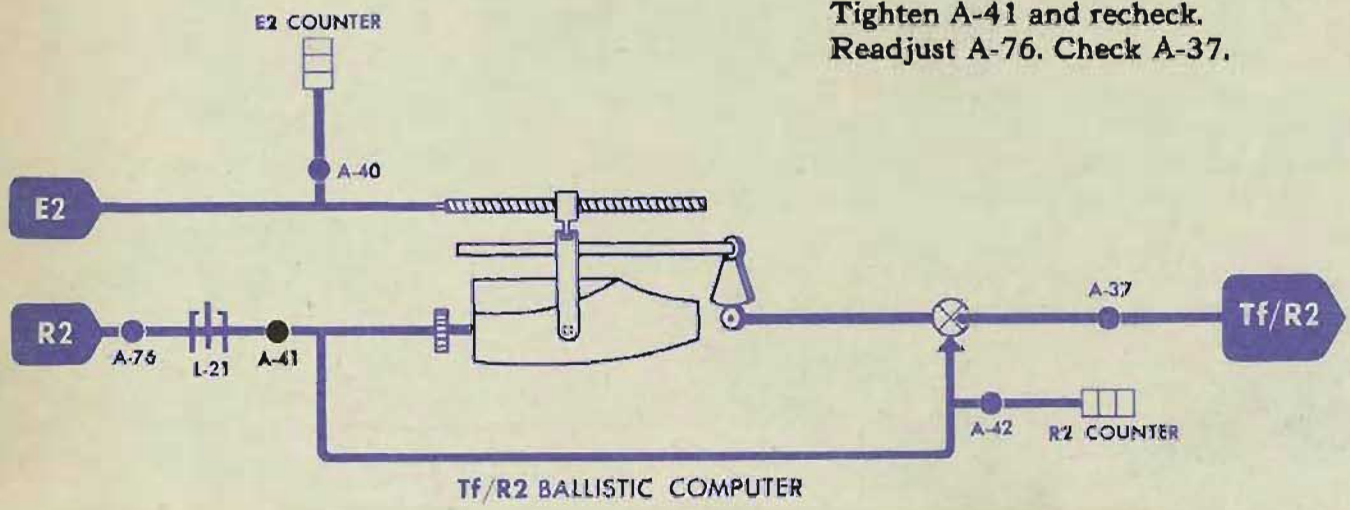
NOTE: In computers with Ser. Nos. 811 and higher, *R2m* is used.

Turn the power OFF.
Set front *I.V.* at 2550 f.s. (Ser. Nos. 811 and higher).
Loosen A-76.
Turn the *R2* (or *R2m*) input to the *Tf/R2* ballistic computer from limit to limit.
The *R2* or *R2m* counter should read 300 yards at the lower limit, and 18,200 yards at the upper limit on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.



Adjustment

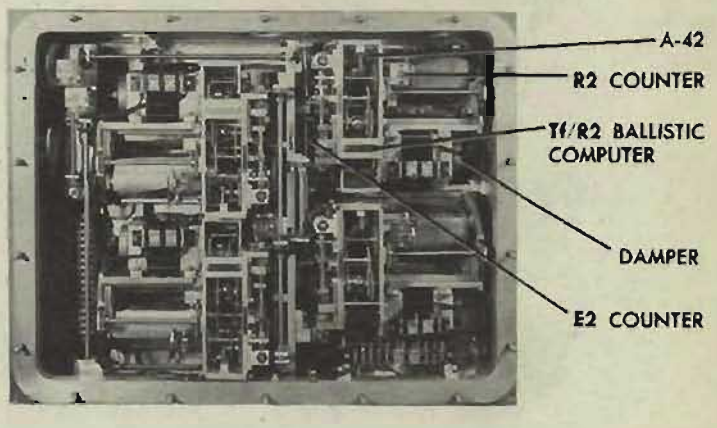
If the *R2* (*or R2m*) counter does not read the proper values, loosen A-41. Hold the line against the stop and turn the counter to the correct value. Tighten A-41 and recheck.
Readjust A-76. Check A-37.



A-42 R2 (or R2m) COUNTER to Tf/R2 BALLISTIC COMPUTER

Location

A-42 is under cover 4, in the *Tf/R2* ballistic computer.



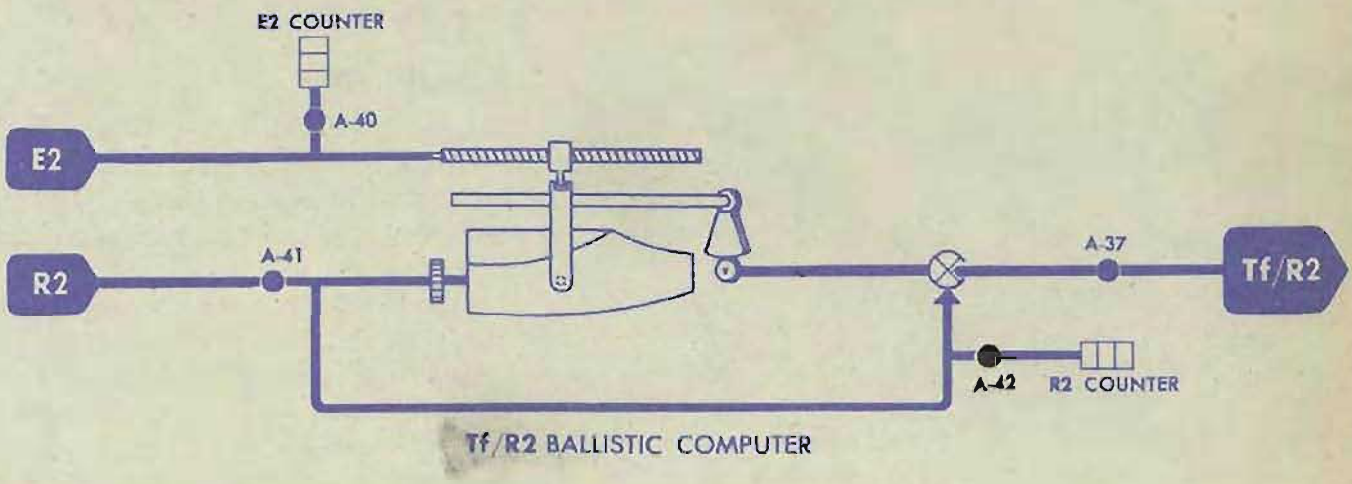
Check

NOTE: In computers with Ser. Nos. 811 and higher, *R2m* is used.

Turn the power OFF.
Set *E2* and *R2* (or *R2m*) at the values listed on the legend plate.
Loosen A-209 on the *Tf/R2* follow-up damper and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm and the cam.
If it is necessary to change *R2* (or *R2m*) to insert the rod, A-42 is upset and should be readjusted.

Adjustment

With the setting rod inserted, loosen A-42.
Turn the *R2* (or *R2m*) counter until it reads the value specified on the legend plate.
Tighten A-42 and recheck. Remove the setting rod. Replace the damper on the follow-up, and tighten A-209. Check A-41, A-37 and A-76.



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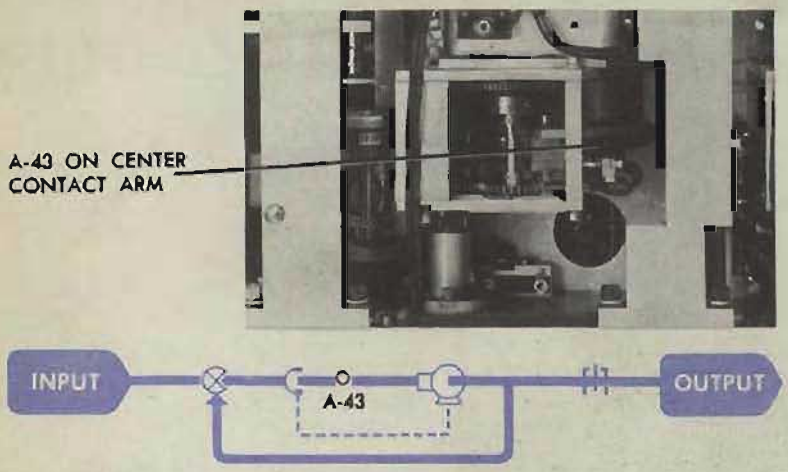
A-43 ASSEMBLY CLAMPS



Location

There is a small assembly clamp numbered A-43 on the center contact arm of each follow-up.

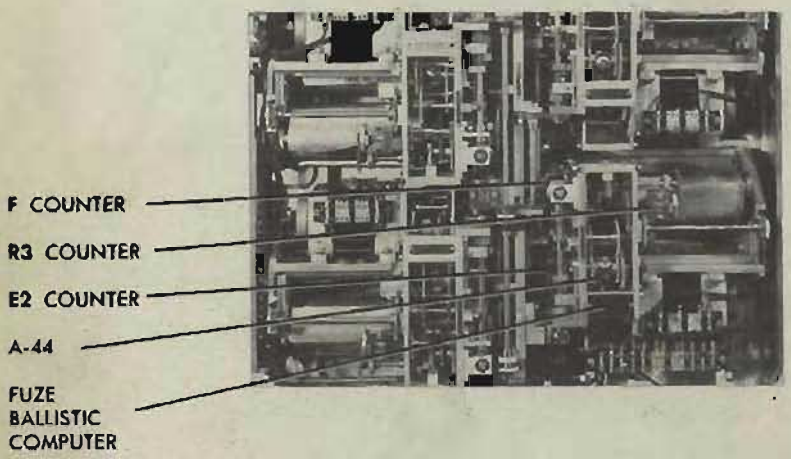
Check

If an A-43 clamp is loose, the follow-up on which it is located may oscillate. See *The Follow-up* in OP 1140A.

Adjustment

Tighten A-43.

A-44 SYNCHRONIZING THE F FOLLOW-UP



Location

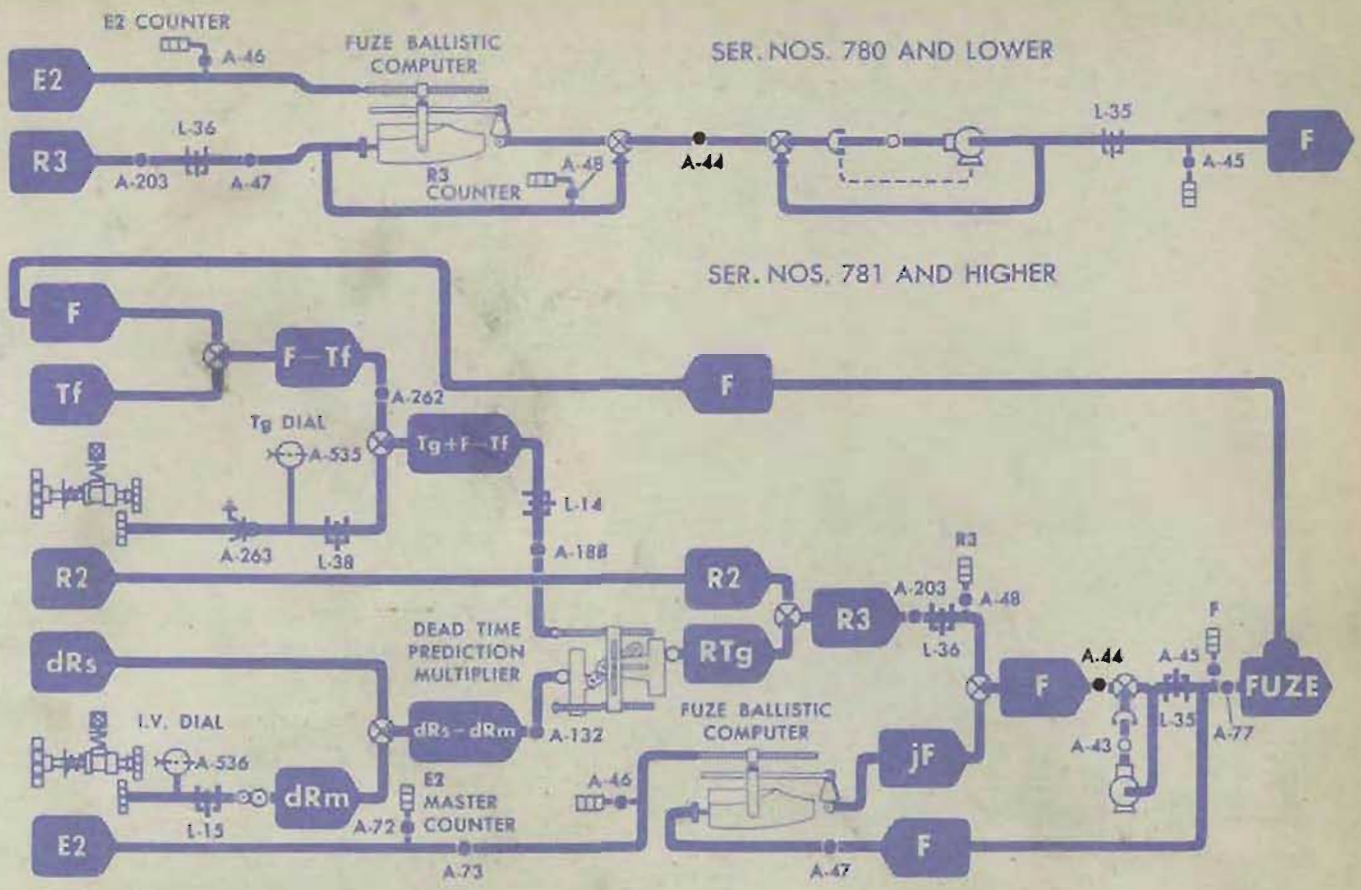
A-44 is under cover 4, in the fuze ballistic computer.

Check

Refer to the N.I.O. final test sheet for the particular unit being checked.
Put the *F* handcrank in the OUT position. Turn the power ON.
Set *E2* and *R3* at the values given on the N.I.O. final test sheet.
Read the *F* unit counter and note any variation from the corresponding values recorded on the test sheet.
On Ser. Nos. 780 and lower, if the *F* value is consistently greater, or consistently less than the recorded value, A-44 is in error and should be readjusted.
On Ser. Nos. 781 and higher, if the error in *F* becomes progressively greater as *R3* is increased, A-44 is in error and should be readjusted.

Adjustment

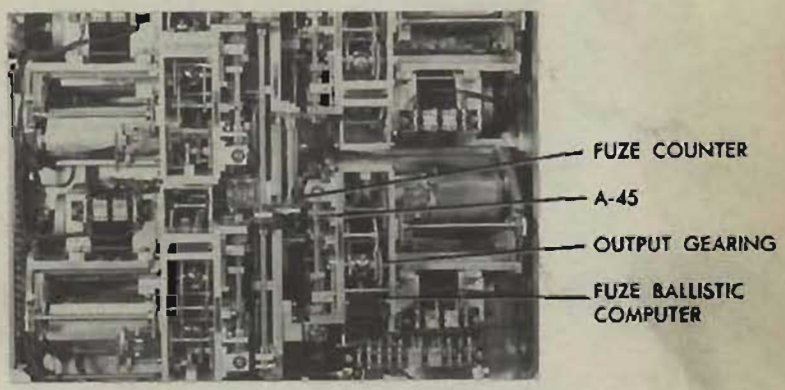
Loosen A-44. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *F*. (On Ser. Nos. 781 and higher, make the adjustment while *R3* is set at a high value.) Tighten A-44 and recheck.
Refer to the N.I.O. acceptance test sheets and run the complete test of the fuze ballistic computer. A-44 may be readjusted slightly to improve the readings.



A-45 F COUNTER to L-35

Location

A-45 and L-35 are under cover 4, in the fuze ballistic computer.



Check

Turn the power OFF.

Turn the fuze ballistic computer output gearing from limit to limit.

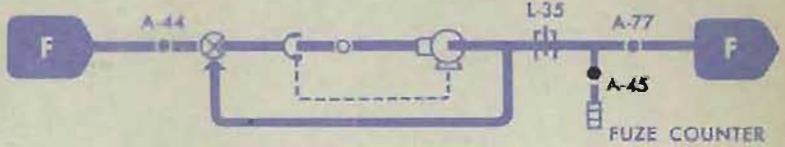
The fuze counter should read 0.60 second at the lower limit, and 55.00 seconds at the upper limit on Mods 3, 10, 4, "Univ" 7, and 13. On Mods 0, 2, 1, and 9, the limits are 0.60 and 45.05 seconds. On Mods 6 and "Old" 7, the limits are 0.60 and 45.00 seconds. On Mods 8 and 12, the limits are 0.60 and 49.00 seconds.

Adjustment

If the *F* counter does not read the proper values, loosen A-45. Slip the counter to the correct reading. Tighten A-45 and recheck.

Check A-44 and A-77.

On Ser. Nos. 781 and higher, also check A-47.



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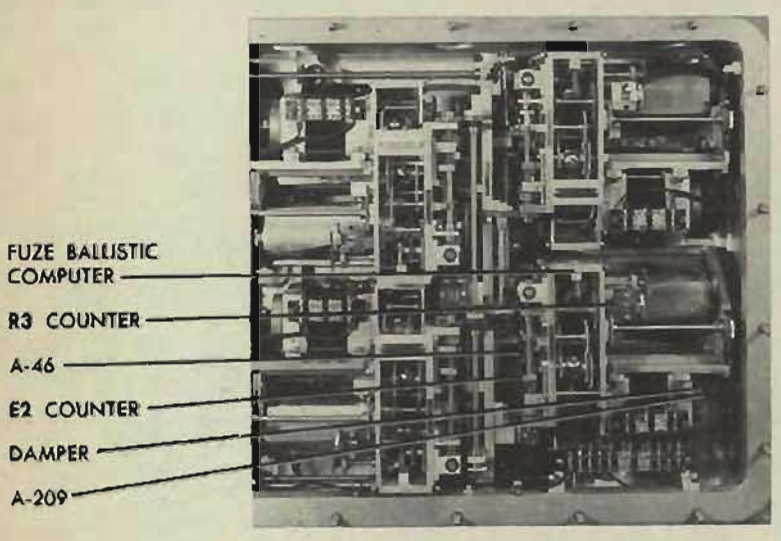
A-46 E2 COUNTER to F BALLISTIC COMPUTER



Location

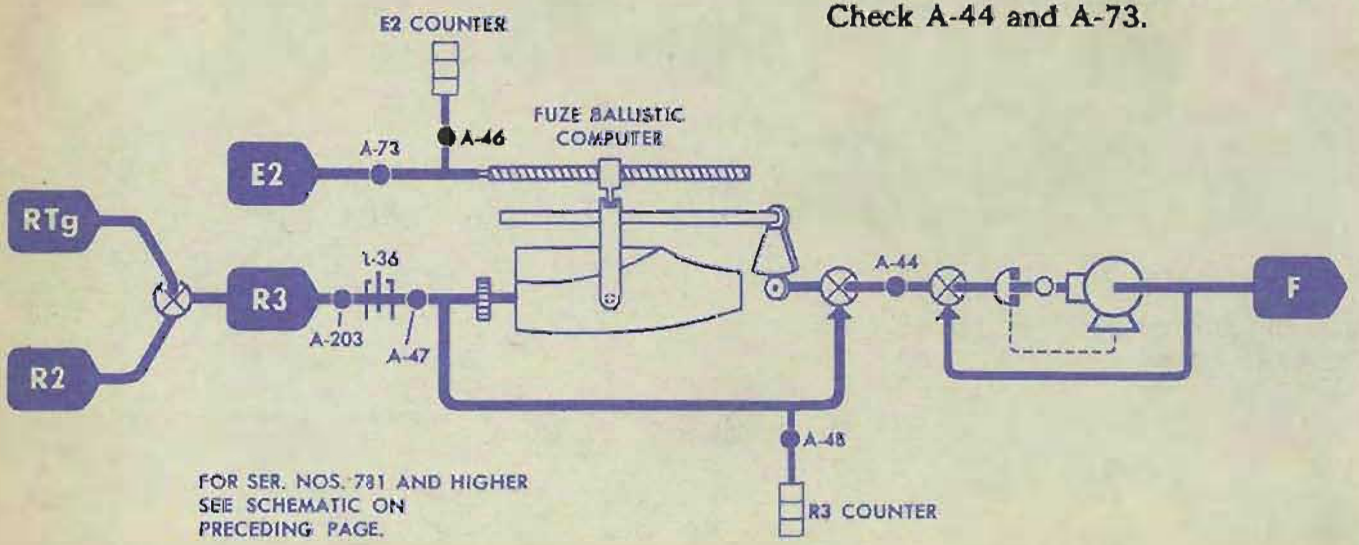
A-46 is under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.
Set *E2* and *R3* (*F* on Ser. Nos. 781 and higher) at the values listed on the legend plate.
Loosen A-209 on the fuze follow-up damper and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam.
If it is necessary to change the *E2* input, A-46 is upset and should be re-adjusted.

Adjustment

With the setting rod inserted, loosen A-46. Turn the *E2* counter until it reads the value specified on the legend plate.
Tighten A-46 and recheck.
Remove the setting rod.
Replace the damper on the follow-up shaft and tighten A-209.
Check that *E2* can be moved from 0° to 90°.
Check A-44 and A-73.



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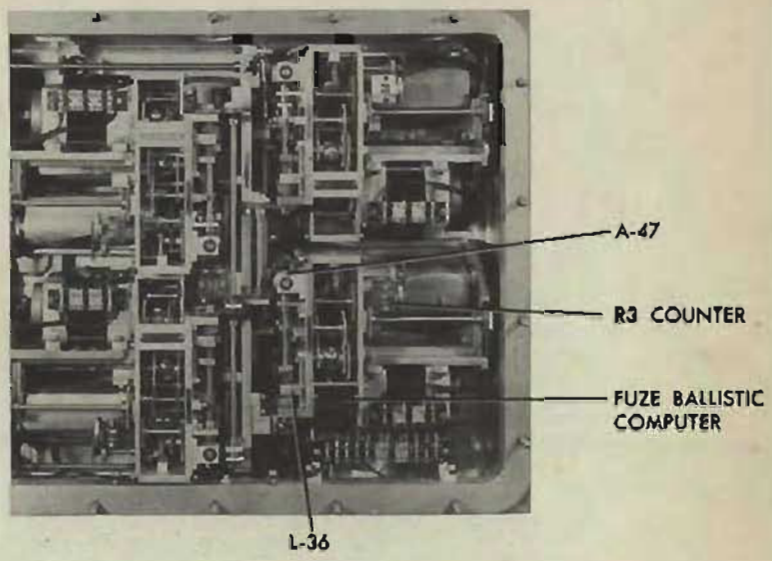
A-47 R3 COUNTER to L-36
SER. NOS. 780 and LOWER

Location

A-47 and L-36 are under cover 4, in the fuze ballistic computer.

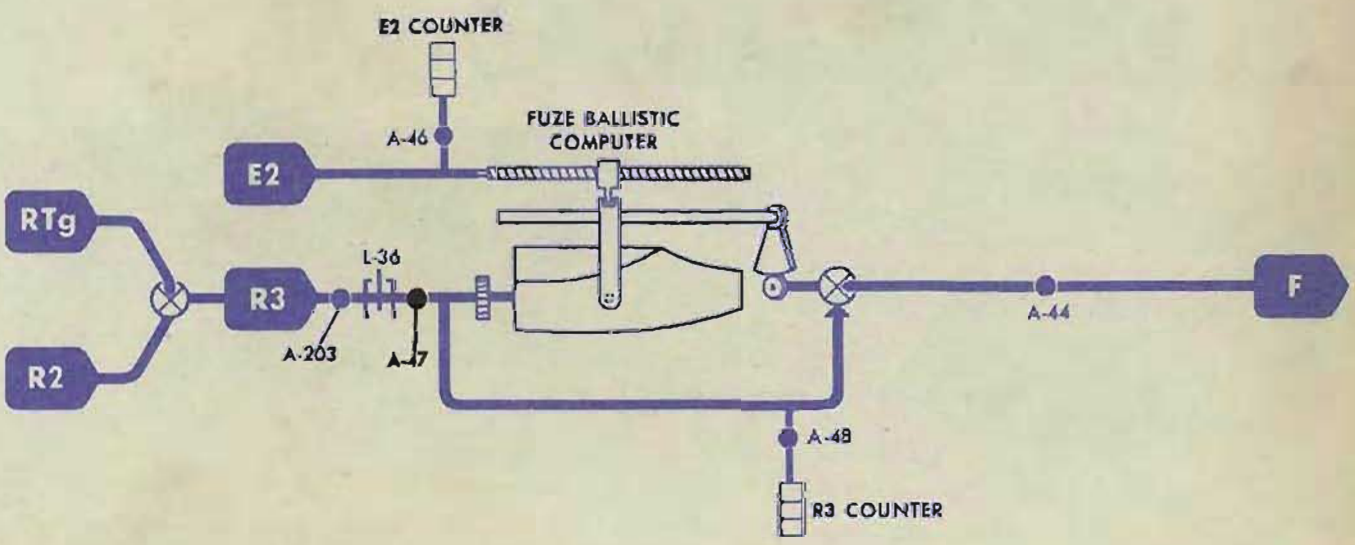


Check

Turn the power OFF.
Loosen A-203.
Turn the *R3* input to the fuze ballistic computer from limit to limit.
The *R3* counter should read −1250 yards at the low limit, and 19,750 yards at the high limit on Mods 3, 4, 6, 7, 10, and 13 below Ser. Nos. 781. On Mods 0, 1, 2, and 9, the limits are −250 and 19,750 yards.

Adjustment

If the *R3* counter does not read the proper values, loosen A-47. Hold the line against one limit and turn the *R3* counter gearing until the counter reads the proper value. Tighten A-47 and recheck.
Readjust A-203.
Check A-44.



A-47 F COUNTER to F BALLISTIC CAM
SER. NOS. 781 and HIGHER

Location

A-47 is under cover 4, in the fuze ballistic computer.

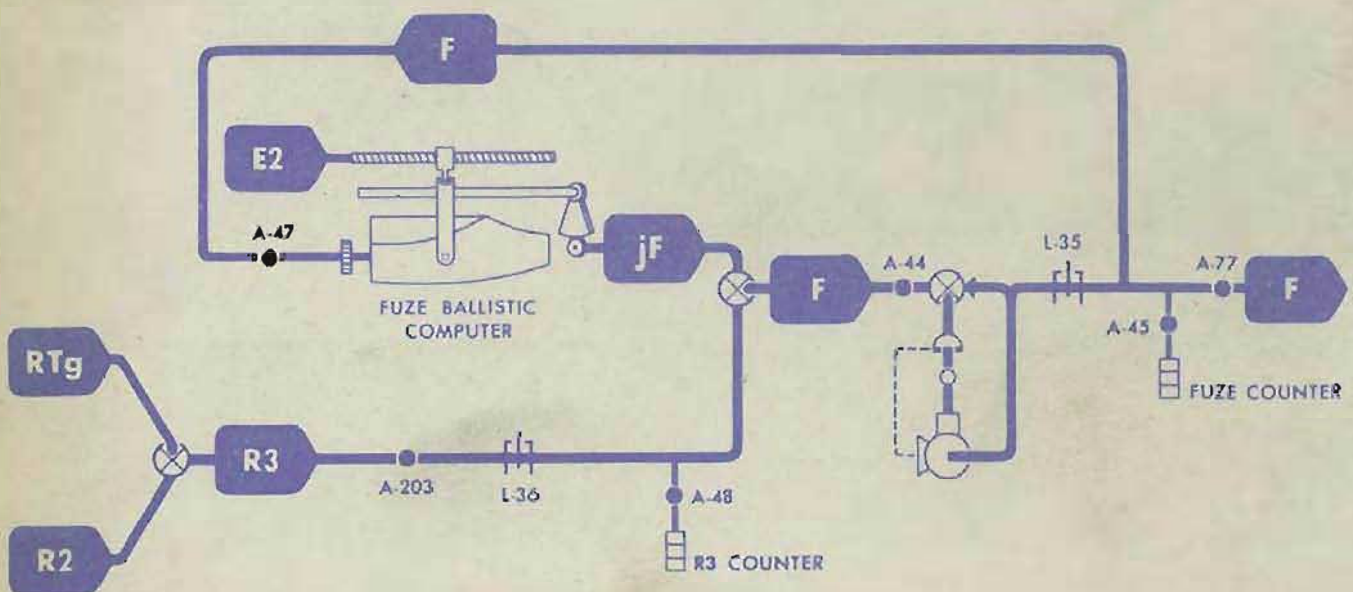
E2 - 9005
F 3999

Check

Turn the power OFF.
Set *E2* and *F* at the values listed on the legend plate.
Loosen A-209 on the fuze follow-up damper, and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam.
If it is necessary to change the *F* input to insert the rod, A-47 is upset and should be readjusted.

Adjustment

With the setting rod inserted, loosen A-47. Turn the *F* line until the counter reads the value specified on the legend plate.
Tighten A-47 and recheck.
Remove the setting rod.
Replace the damper on the follow-up shaft and tighten A-209.
Check A-44.



A-48 R3 COUNTER to L-36
SER. NOS. 781 and HIGHER

Location

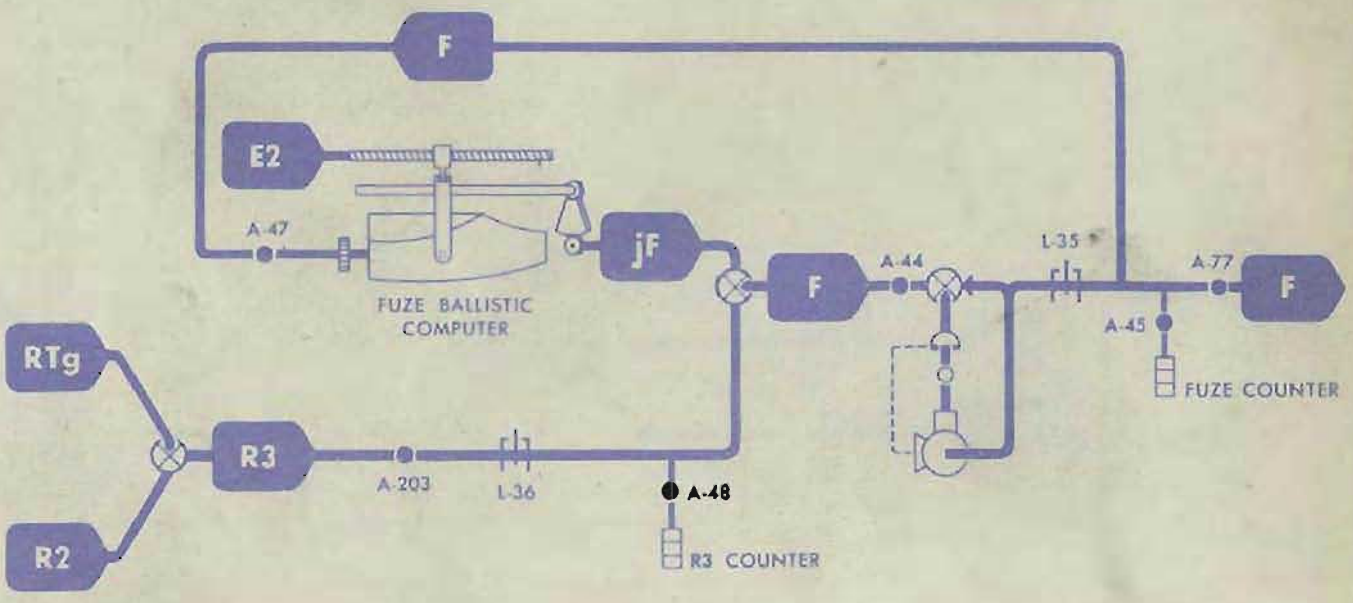
A-48 and L-36 are under cover 4, in the fuze ballistic computer.

Check

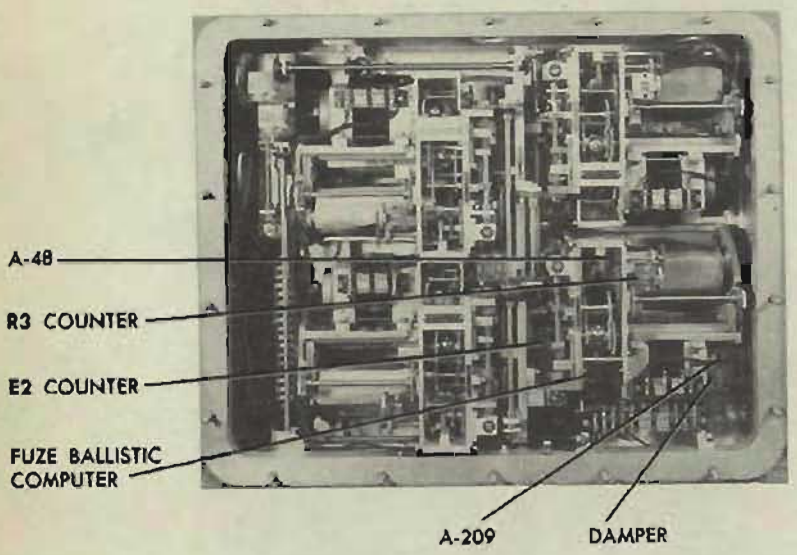
Turn the power OFF.
Loosen A-203.
Turn the *R3* input to the lower limit.
The *R3* counter should read −13,150 yards (86850) in Mod 13, or −13,350 yards (86650) in Mods 8 and 12.
Check at the higher limit. In Mod 13 the higher limit is +31,650 yards. In Mods 8 and 12, the higher limit is +33,850 yards.

Adjustment

If the *R3* counter does not read the proper values, loosen A-48.
Hold the line against the stop and turn the *R3* counter gearing until the counter reads the correct value.
Tighten A-48 and recheck.
Readjust A-203.
Check A-44.



A-48 R3 COUNTER to F BALLISTIC COMPUTER
SER. NOS. 780 and LOWER



Location

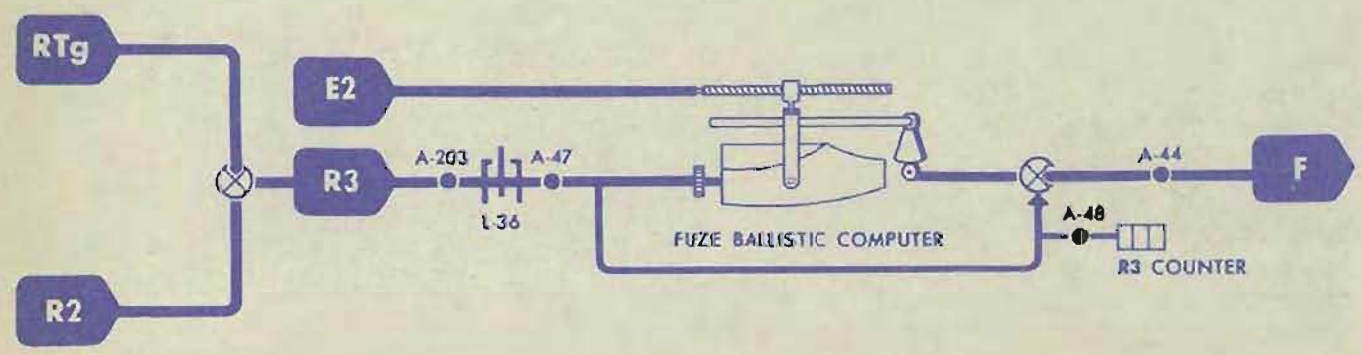
A-48 is under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.
Set *E2* and *R3* at the values listed on the legend plate.
Loosen A-209 on the fuze follow-up damper, and push the damper to the end of the shaft.
Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam.
If it is necessary to change the *R3* input to insert the rod, A-48 is upset and should be readjusted.

Adjustment

With the setting rod inserted, loosen A-48. Turn the *R3* counter gearing until the counter reads the value specified on the legend plate. Tighten A-48 and recheck.
Remove the setting rod.
Replace the damper on the follow-up shaft and tighten A-209.
Check A-47, A-44, and A-203.



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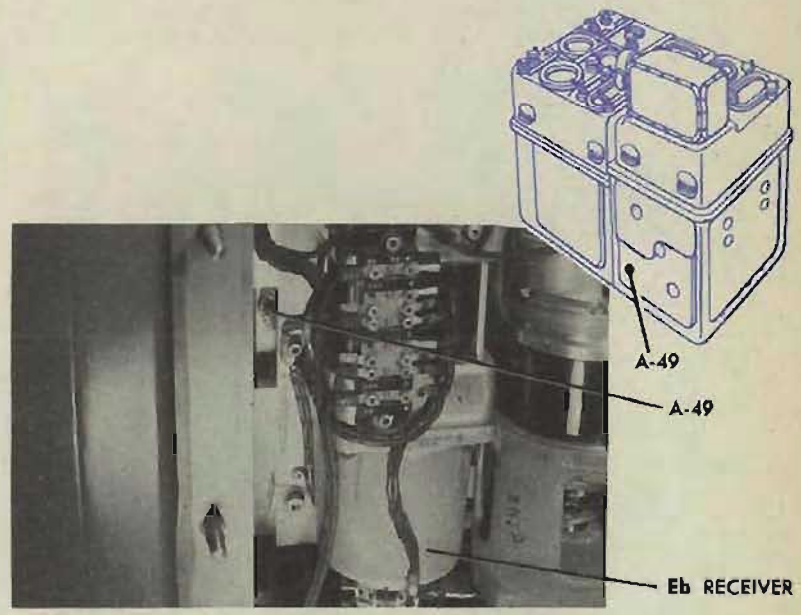
A-49 Ph COMPUTER to PARALLAX COMPONENT SOLVER

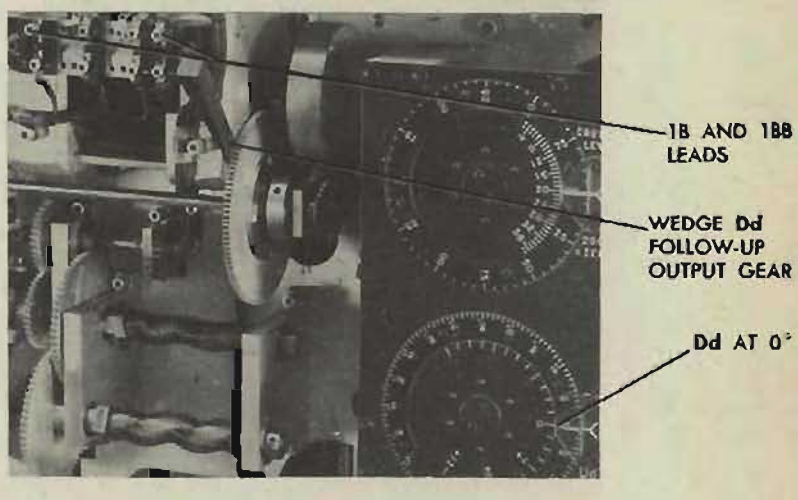
Location

A-49 is under cover 6, at the left of the *Eb* receiver servo motor terminal block.



Check

Remove power leads 1B and 1BB on the *Dd* follow-up.
Turn the power ON.
Set *Dd* at 0° and wedge the gearing.
Turn the control switch to LOCAL.
Set *B'gr* at 0°, using the generated bearing crank.
Set *R2* at a high value.
Set *L* at 2000'.
Turn *E2* from 0° to 90°.
There should be no movement of the *Ph* dials.

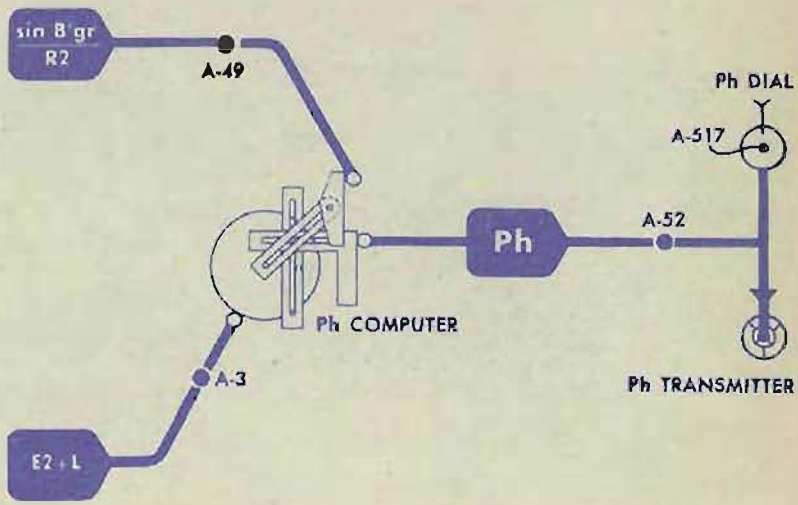


Adjustment

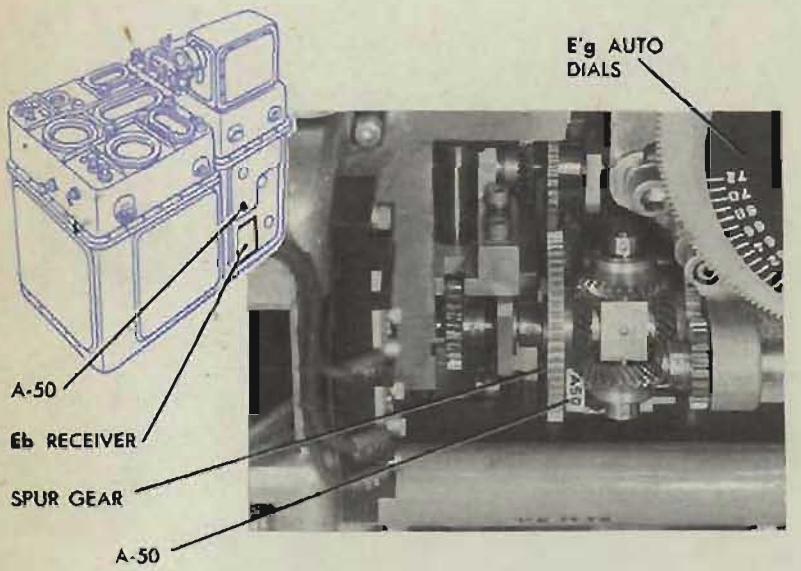
If there is movement of the *Ph* dials, make A-49 slip-tight.

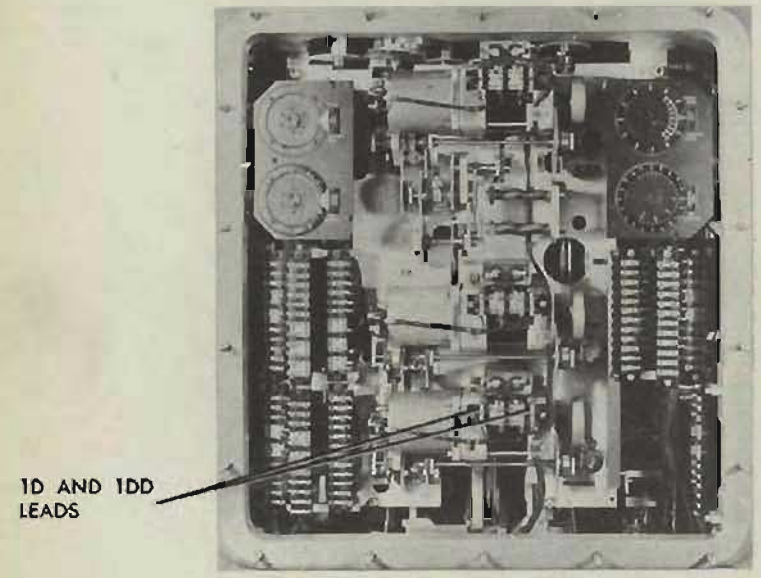
CAUTION: When A-49 is loosened, the input rack of the *Ph* computer may drop, causing damage to the unit. Make this clamp slip-tight, *while holding the input rack.*

Set *E2* at 0° and read the *Ph* dial.
Run *E2* to 75°.
Turn the small spur gear which is 1½ inches to the left of A-49, until the *Ph* dial reads the original value.
Run *E2* to 0° and take a new reading of *Ph*.
Again run *E2* to 75° and correct as before.
Continue the adjustment until there is no motion of *Ph* for full travel of *E2*.
Tighten A-49.
Remove the wedge and replace the power leads on the *Dd* follow-up.
Check A-52 and A-3.



A-50 E'g DIALS to Eb RECEIVER





Location

A-50 is under cover 6, above the *Eb* receiver.

Check

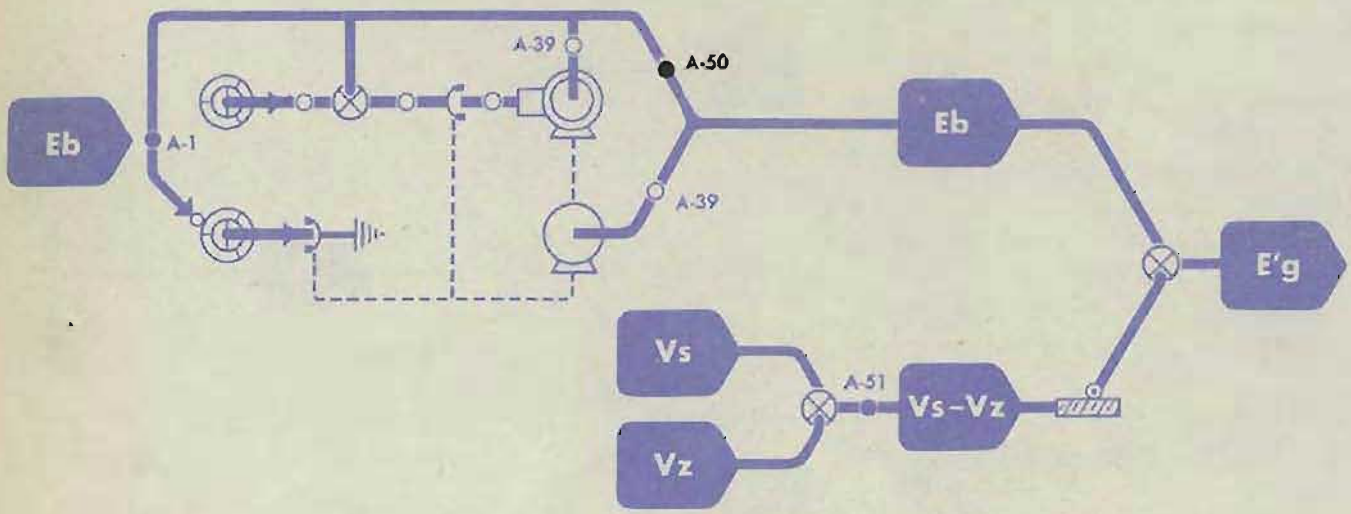
Remove power leads 1D and 1DD from the *Vz* follow-up.
Set *Vz* at 0 and wedge the line.
Turn the power ON.
Set *Vs* at 2000'.
Put the sync *E* handcrank at CENTER.
Transmit *Eb* from the director.
The value read on the *E'g* dials should agree with the *Eb* value transmitted from the director.
Check A-51 before readjusting A-50.

Adjustment

If the *E'g* dials do not read the correct value, slip-tighten A-50. Turn the spur gear next to the clamp until the *E'g* dials read the proper value.

Tighten A-50 and recheck.

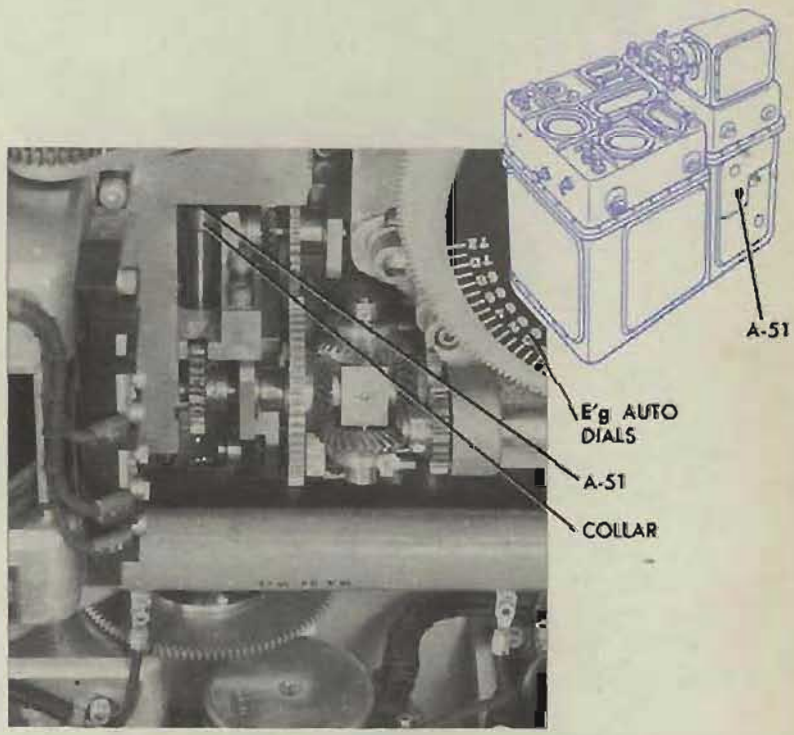
Remove the wedge.



A-51 E'g DIALS to Vs – Vz LINE

Location

A-51 is under cover 6.



Check

Turn the power OFF.
Set *L* at 2000'.
Set *Vs* at 2000'.
Set *E* at 0° with the sync *E* handcrank at CENTER and match the sync *E* dials at the fixed index with the handcrank OUT.
Set *Vz* at 0 by turning the output gearing on the *Vz* servo motor.
The *E'g* dials should read 2000'.

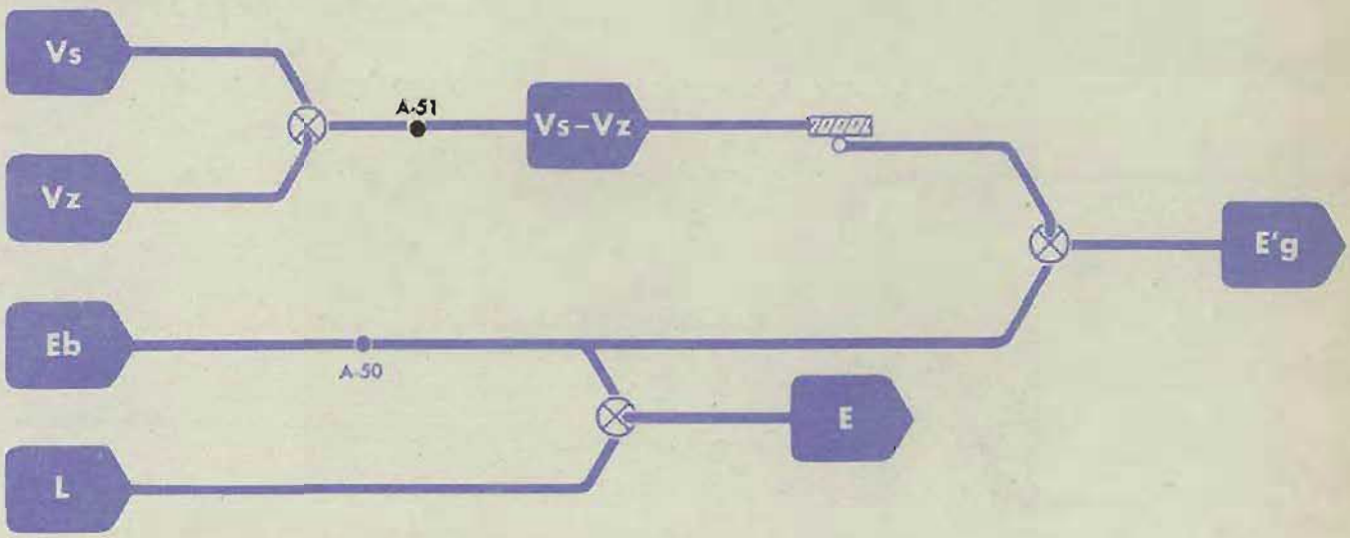
Adjustment

If the *E'g* dials do not read 2000', loosen A-51. Set the *Vz* dials at 0, and wedge the *Vz* line. Turn the collar on the shaft below the clamp until the *E'g* dials read 2000'.

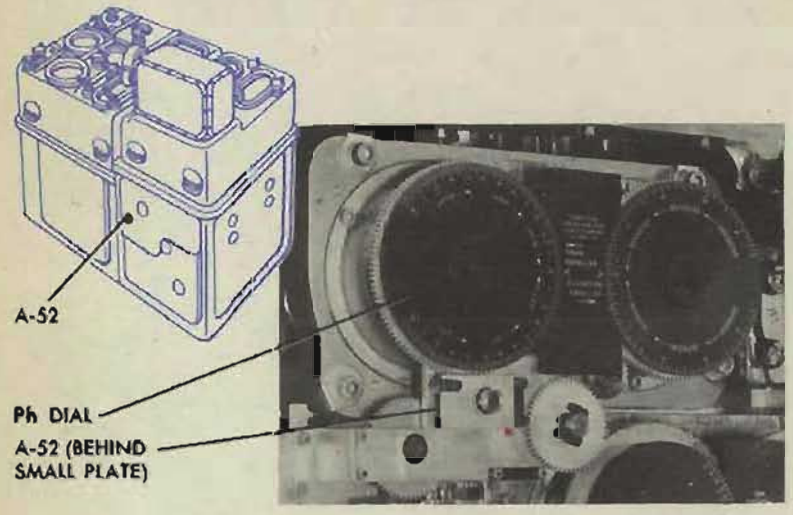
Tighten A-51 and recheck.

Readjust A-50.

Remove the wedges.



A-52 Ph DIAL to Ph COMPUTER

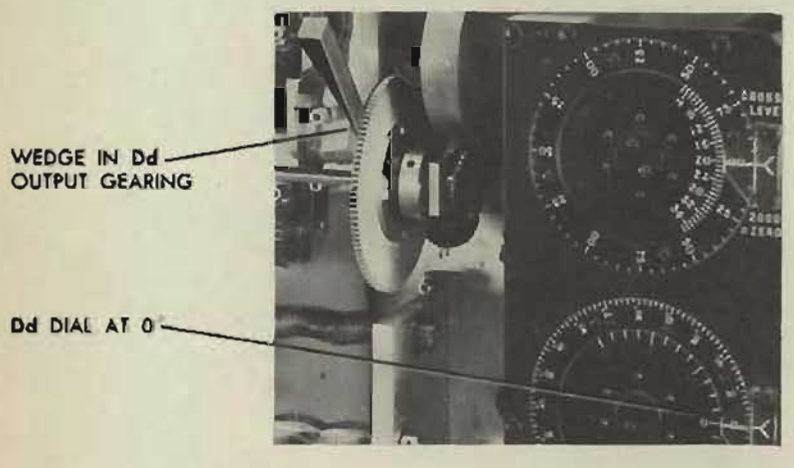


Location

A-52 is under cover 6, behind the small plate below the *Ph* dial.

Check

Turn the power OFF.
Set *Dd* at 0° and wedge the line.
Set *B'gr* at 0°.
The *Ph* dial should read 0°.

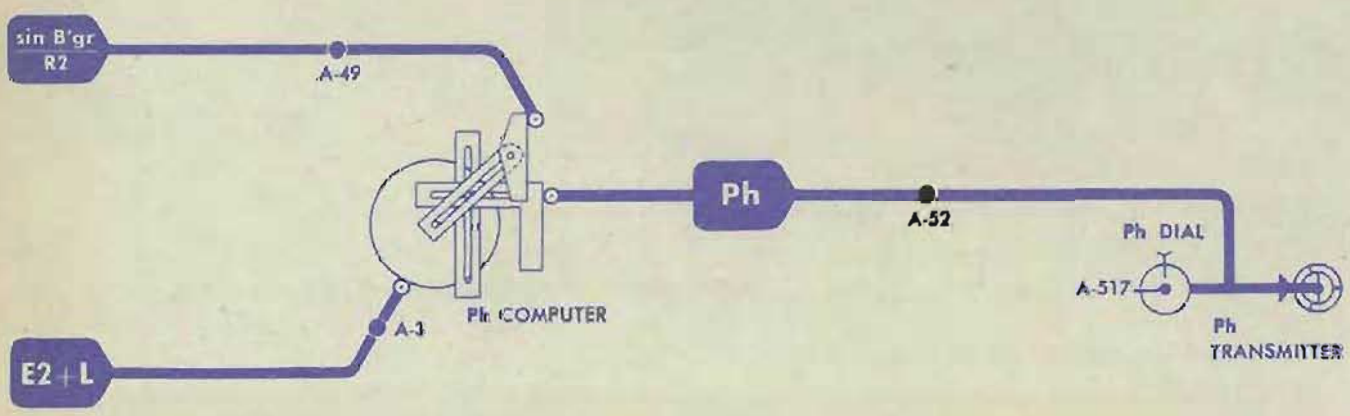


Adjustment

If the *Ph* dial does not read 0°, check A-517. Make A-52 slip-tight. Slipping through A-52, turn the large gear on the rotor of the *Ph* transmitter until the dial is at its proper reading.

Tighten A-52 and recheck.

Remove the wedge.



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A-53 ASSEMBLY CLAMP

Location

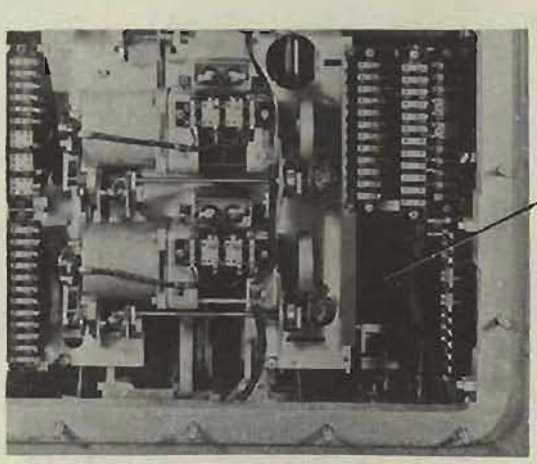
A-53 is under cover 7, on the servo output shaft of the *B'r* local control follow-up.

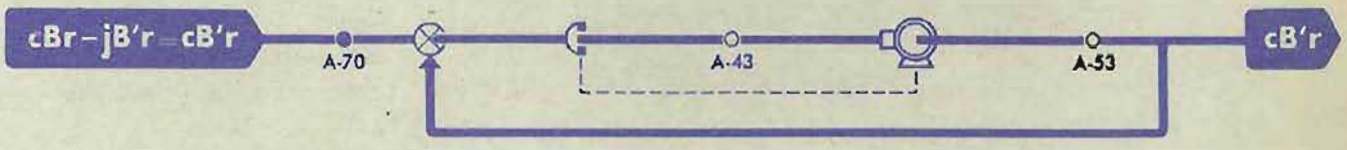
Check

If A-53 is loose, the energized *B'r* local control servo may run without driving the *cB'r* line.

Adjustment

Tighten A-53.





A-54 ASSEMBLY CLAMP

Location

A-54 is under cover 8, on the servo output shaft of the *B'r* receiver.

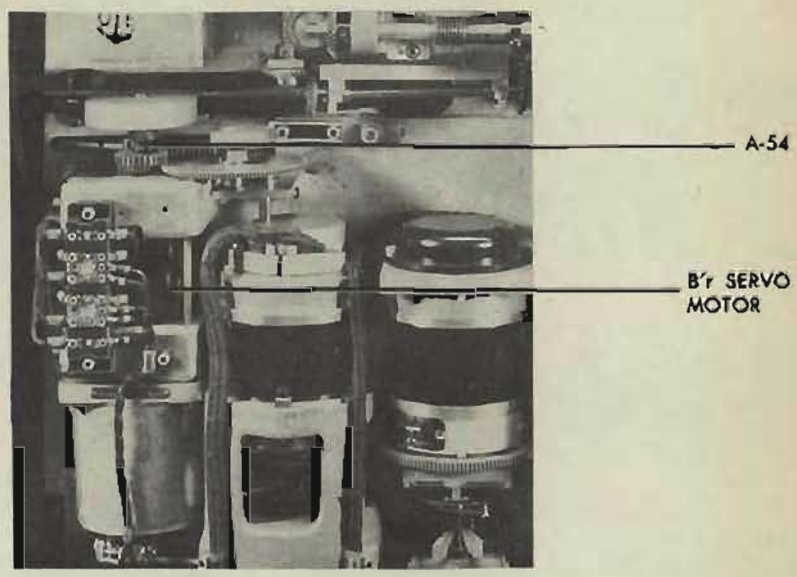
Check

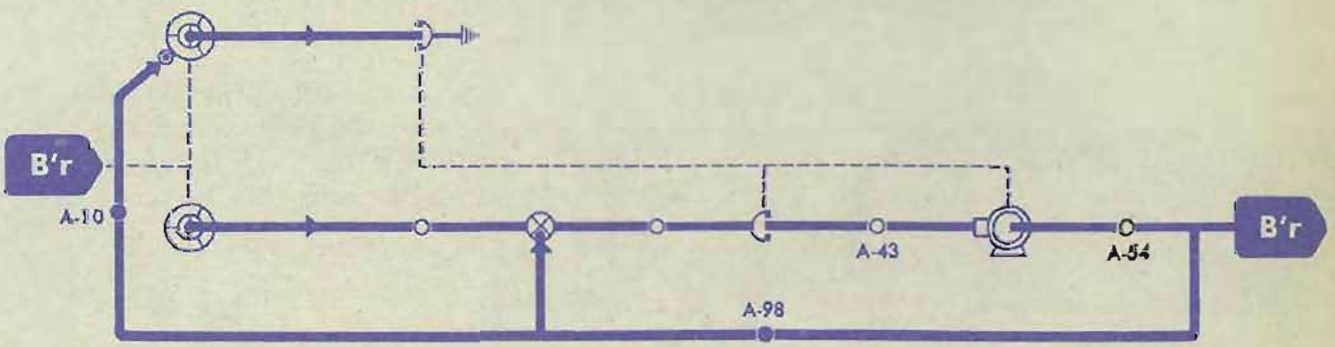
If A-54 is loose, the *B'r* receiver servo may run without driving the *B'r* line.

Adjustment

Make sure that the servo output cluster gear is in mesh. Then tighten A-54. Make sure A-209 on the magnetic damper above A-54 is also tight.

Check A-98.





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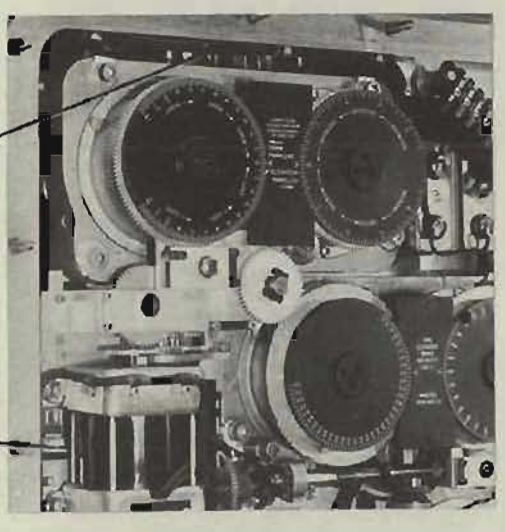
A-55 Vs INDICATING to Vs MASTER COUNTER

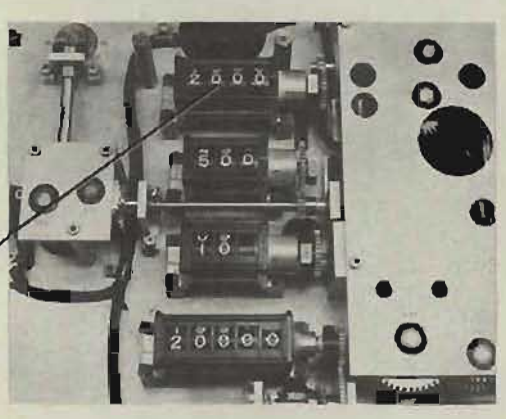


Location

A-55 is under cover 6, directly in front of the *Vs* intermittent drive. It is reached by inserting a long screw driver through the access over the *Ph* transmitter.

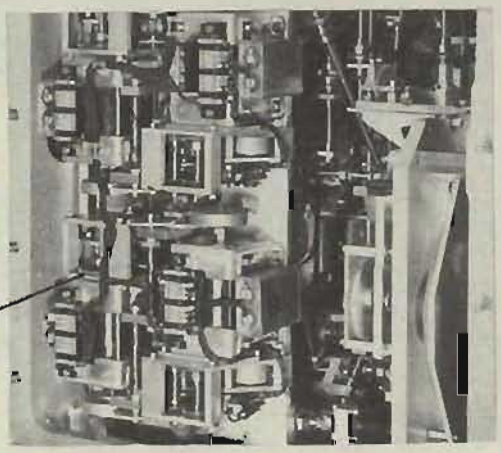
The *Vs* indicating counter is under cover 2, beside the *Vs* handcrank.

The *Vs* master counter is under cover 6, behind the *Eb* servo motor.



Check

Both *Vs* counters should agree.



Adjustment

If the *Vs* counters do not agree, make A-55 slip-tight.

Turn the power ON. Hold the *Vs* setting with the *Vs* handcrank in the IN position. Turn the *V* follow-up output gearing to bring the *Vs* master counter to the same reading.

Tighten A-55 and recheck. Check A-184, A-95.

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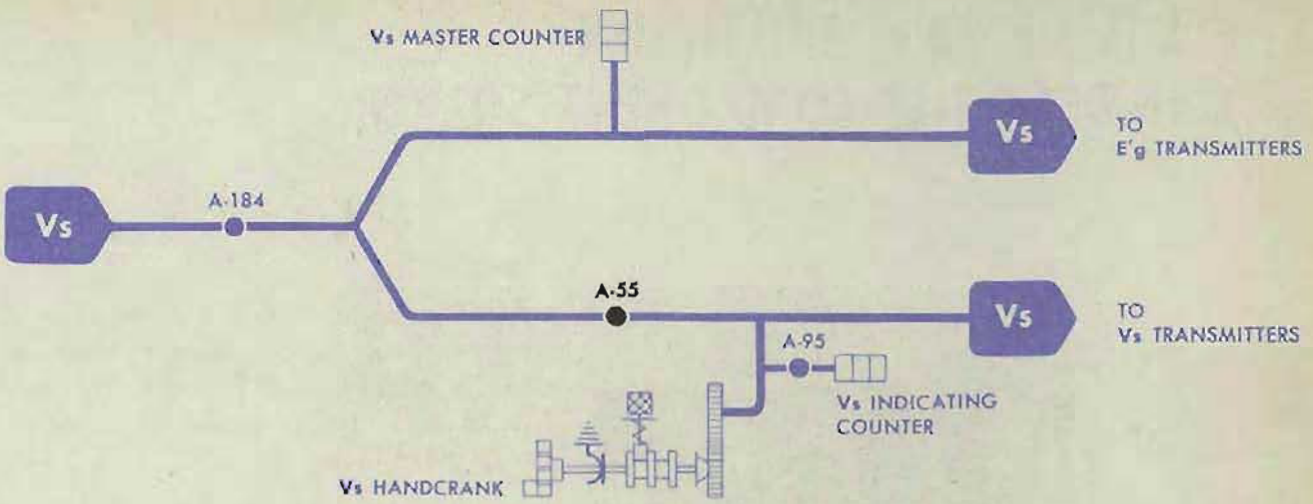
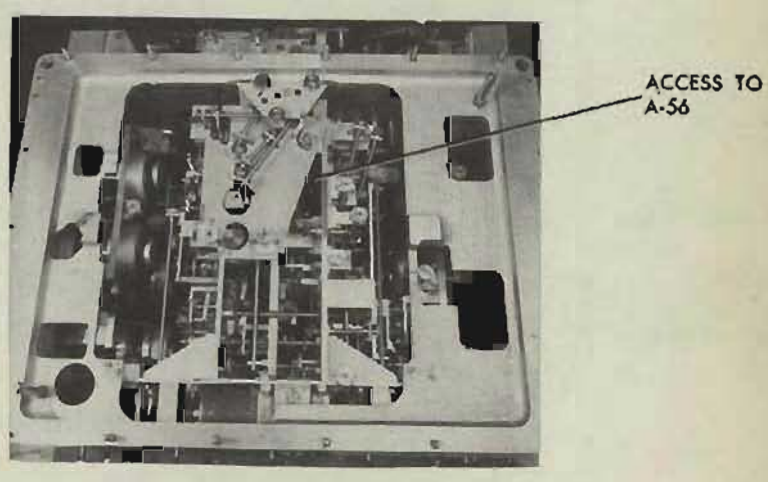


A-56 ASSEMBLY CLAMP

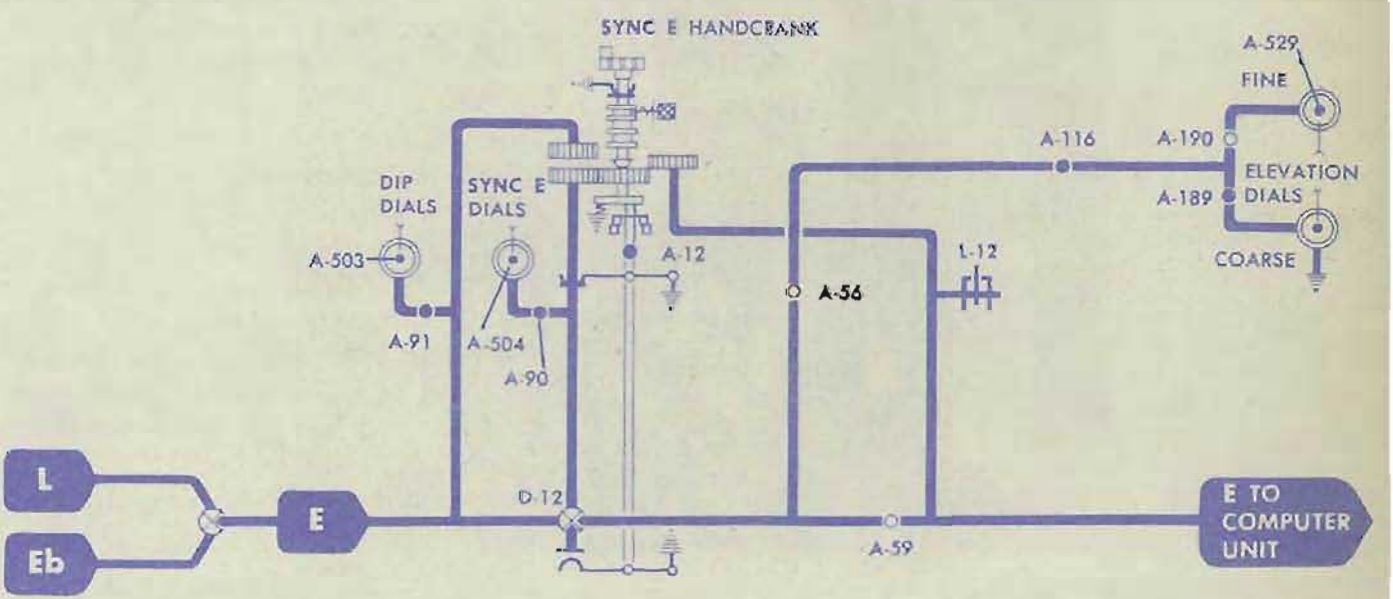
Location

A-56 is on the *E* line at D-12 in the corrector unit. It can be reached only when the indicator unit is removed from the corrector unit. On computers with Ser. Nos. 290 and lower, A-56 is the common type of adjustment clamp. On computers with Ser. Nos. 291 and higher, it is a square clamp which closes firmly against a flat on the shaft



Check

A-56 is checked and readjusted in the same way as A-59.



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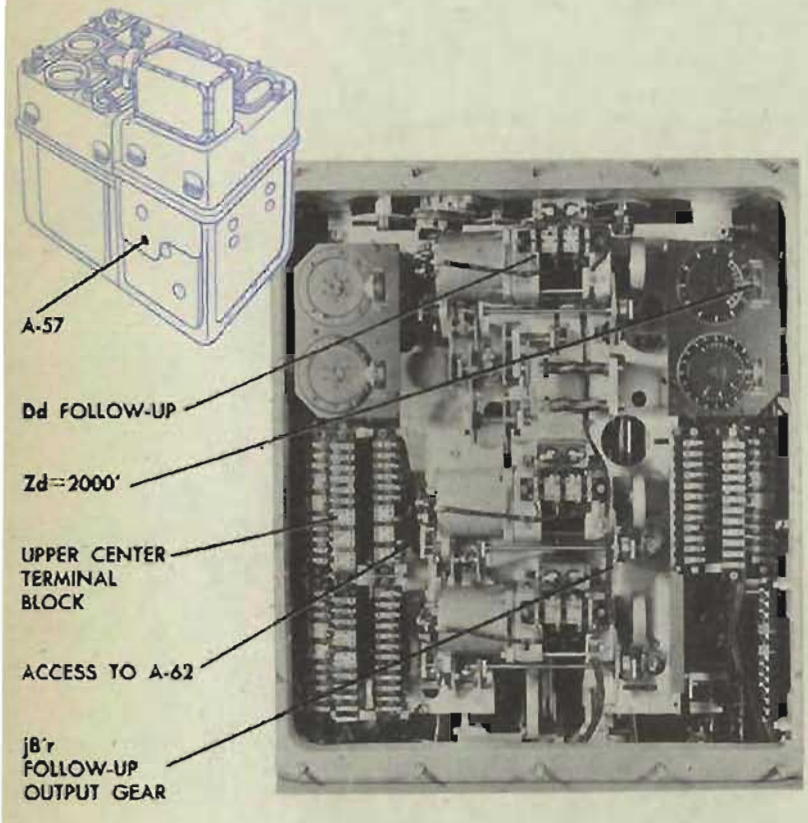
A-57 L (L sin 2B′r) MULTIPLIER to DECK TILT COMPONENT SOLVER

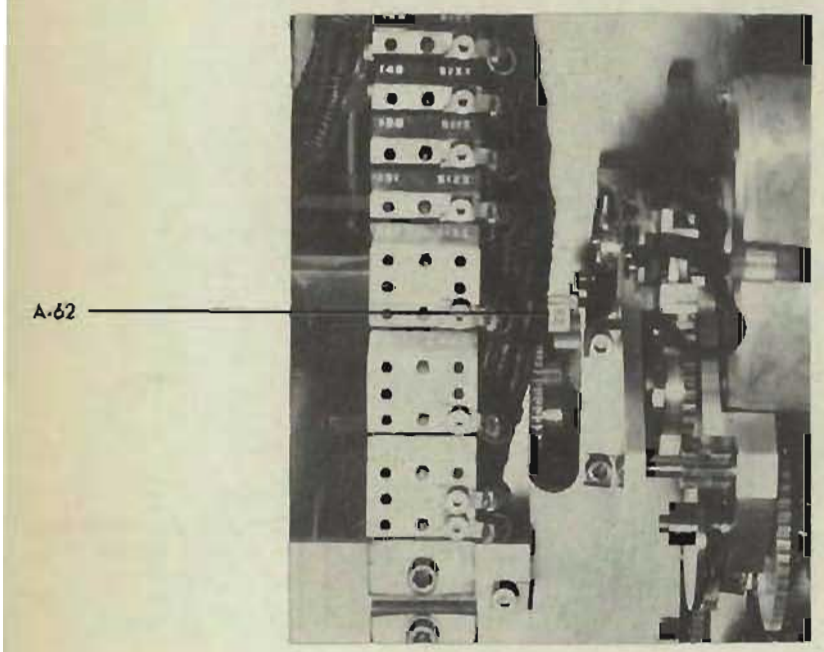


Location

A-57 is under cover 7. To reach it, remove the upper center terminal block near the *jB′r* follow-up contacts. A-57 is 20 inches in from the terminal block.

Check

Set *Dd* at 0°.
Remove leads 1B and 1BB from the *Dd* follow-up and wedge the output gearing.
Turn the power ON.
Turn the control switch to LOCAL.
Set *Zd* at 2000′.
Set *B′gr* at 0°, using the generated bearing crank.
Turn *L* from 800′ to 3200′.
There should be no motion of the *L*(*L* sin *2B′r*) output rack for the full travel of *L*.
Observe A-62 for motion of the output rack. If A-62 moves, A-57 is in error and should be readjusted.



Adjustment

With *L* at 2000′, mark the *jB′r* follow-up output gear for use as an indicator. Turn *L* to 3200′. Make A-57 slip-tight.
WARNING: If A-57 is loosened too much, the input slide of the multiplier will fall.
With a gear pusher, turn the spur gear next to A-57 until the *jB′r* follow-up gear is at the original mark.
Turn *L* to 800′ and continue the adjustment until there is no motion of the follow-up gear for full travel of *L*.
Tighten A-57 and recheck.
Remove the wedge and replace the leads on the *Dd* follow-up.

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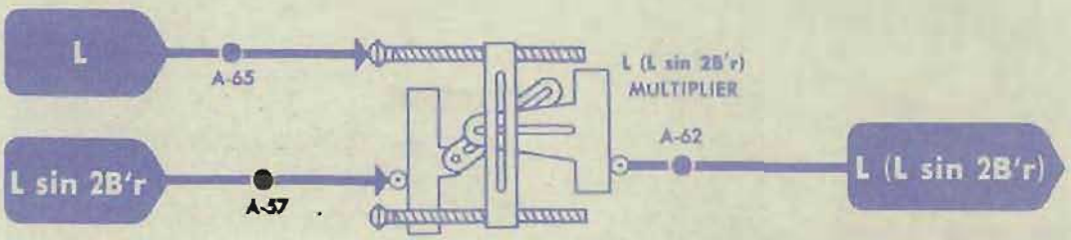
REMINDER

Replace the terminal block at the left of the *jB'r* follow-up.
Check A-62.

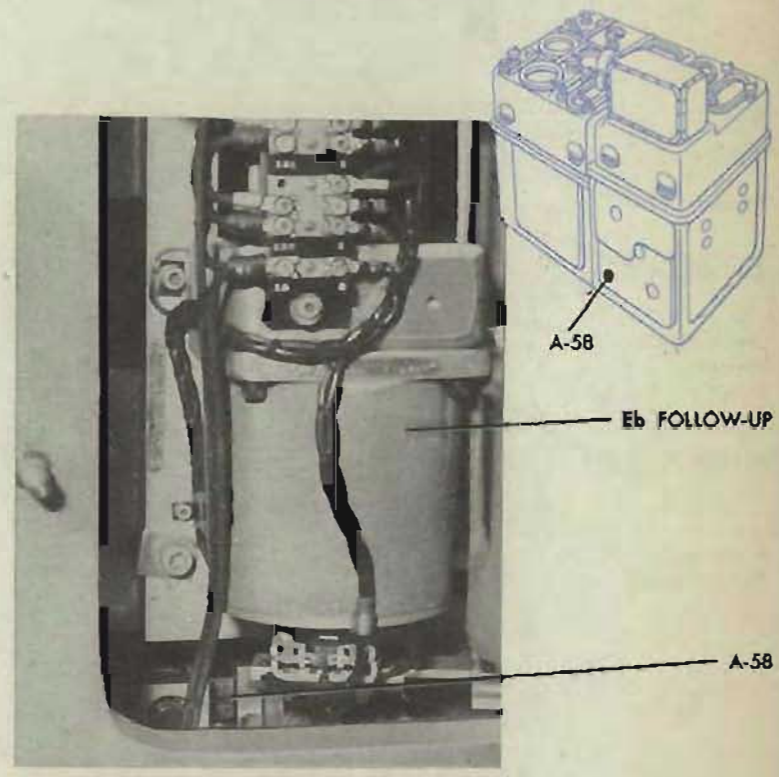


A-58 L DIALS to L-16

Location

A-58 is under cover 6, below the lower *Eb* follow-up.

L-16 is under cover 7, in front of the *L* stub shaft to the stable element. The upper limit is at the rear.

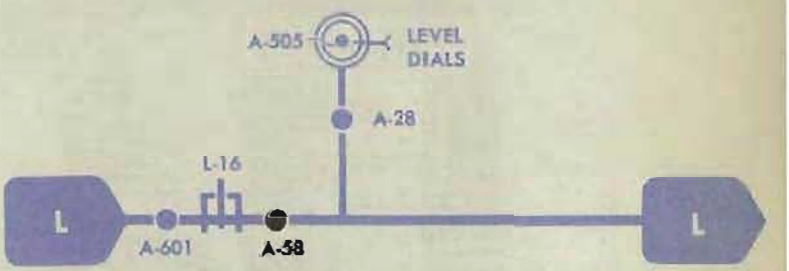


Check

Put the sync *E* handcrank at CENTER.
Loosen A-601.
Turn the *L* line to check the readings of the computer *L* dials at the limits of L-16.
The *L* dials should read 480' at the lower limit and 3520' at the upper limit.

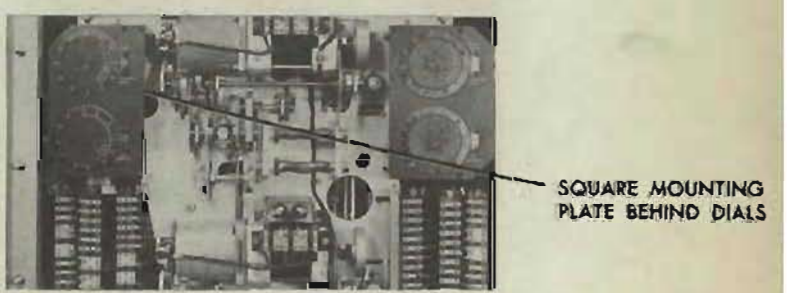
CAUTION

In case either limit cannot be reached, check A-28, and readjust if necessary. Check A-64, A-65, A-57, A-34, A-227 and A-3.
Determine which adjustment is in error. Loosen it and readjust later.



Adjustment

If the readings of the dials are incorrect, make A-58 slip-tight.
Hold the *L* shaft line against either limit and set the *L* dials at their proper value by turning the square mounting plate behind the *L* dials.
Tighten A-58 and recheck the readjustment at the other limit.
Split any error.
Readjust A-601.



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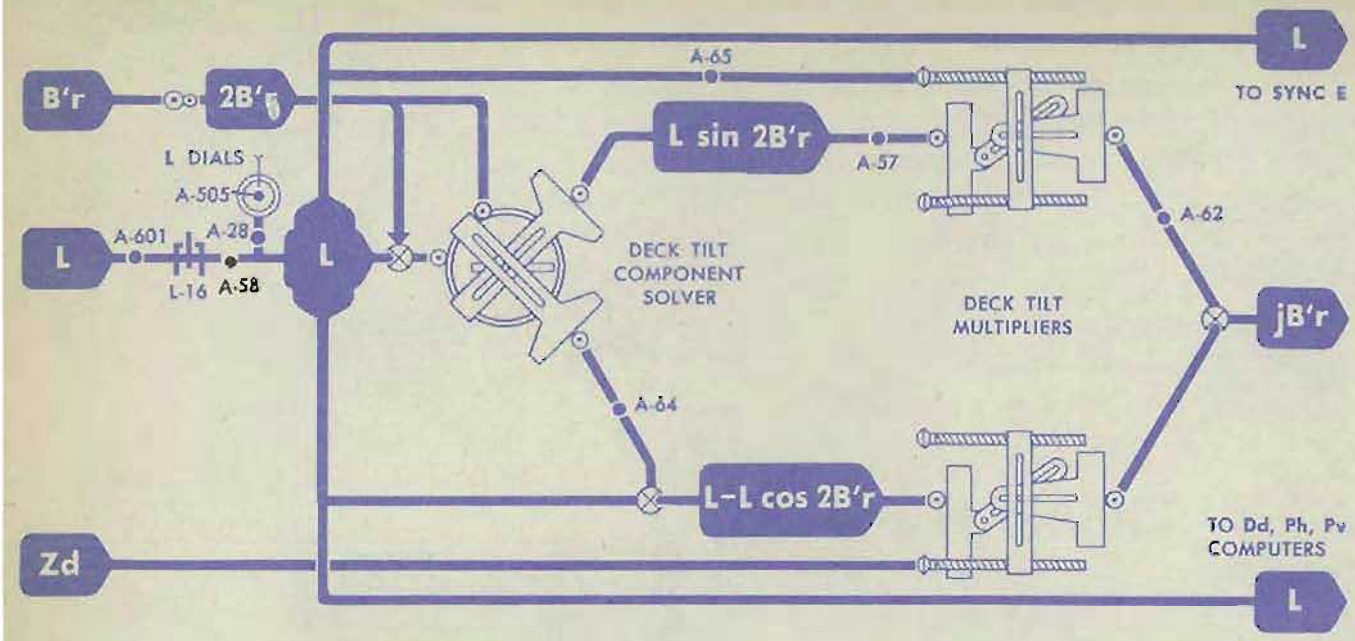
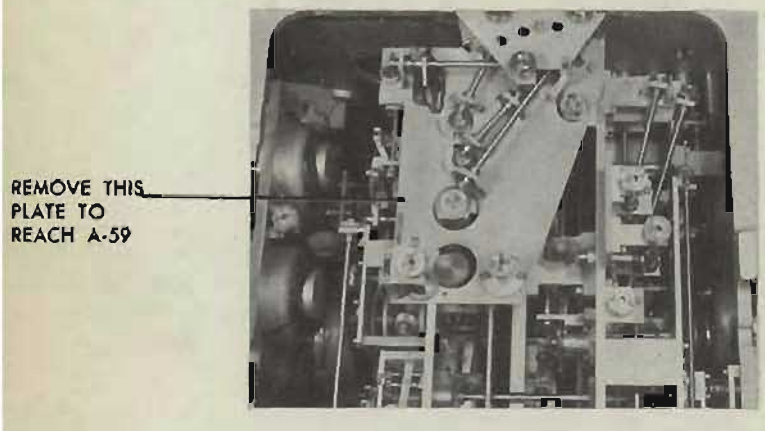


A-59 ASSEMBLY CLAMP



Location

A-59 is on D-12 in the *E* line in the corrector unit. It can be reached only after removal of the indicator unit and the top plate of the corrector unit. On computers with Ser. Nos. 290 and lower, A-59 is the common type of adjustment clamp. On computers with Ser. Nos. 291 and higher, it is a square clamp which closes firmly against a flat on the shaft.

Check

Put the sync *E* handcrank in the CENTER position.

Check that the limits of *E* are correct:

$-5°$ to $+85°$ on Ser. Nos. 389 and lower.

$-25°$ to $+85°$ on Ser. Nos. 390 and higher.

If the limits of *E* are incorrect, check A-116 for looseness. If A-116 is tight and shows no signs of slippage, either A-56 or A-59, or both, may have slipped.

NOTE: On computers with Ser. Nos. 291 and higher, A-56 and A-59 cannot slip when properly assembled.

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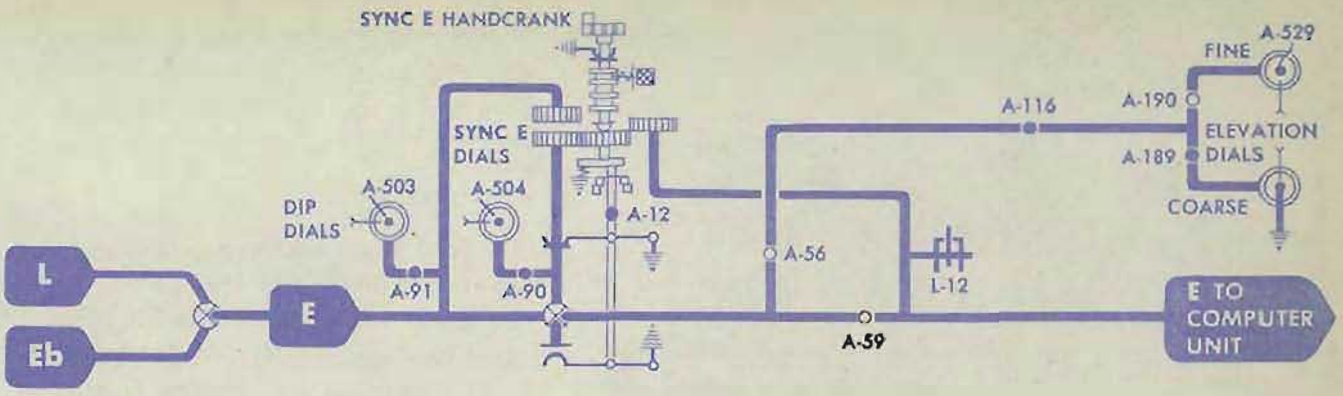


Adjustment

Tighten A-59 and A-56.

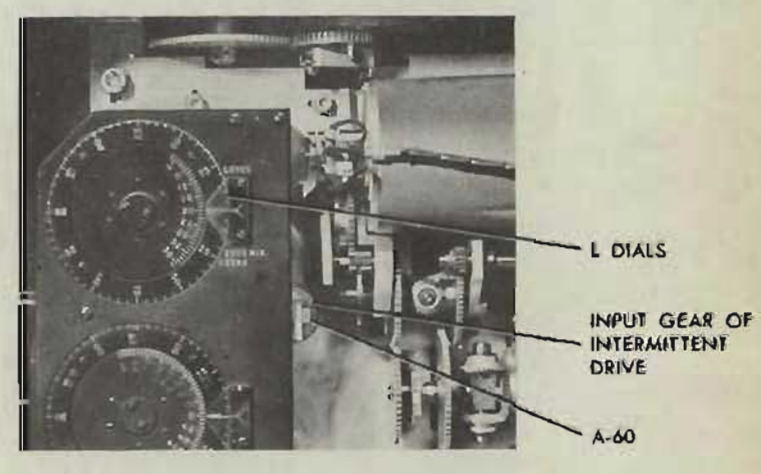
Reinstall the top plate and the indicator unit.

Readjust by *Factory Adjustment Procedure*, page 815.

A-60 Eb+Vs INTERMITTENT DRIVE to Eb+Vs LINE

Location

A-60 is under cover 7, on the input gear of the *Eb* + *Vs* intermittent drive. It can be seen through the access hole next to the *L* dial mask.



Check

Set *E* at 80° with the sync *E* handcrank at CENTER. Match the sync *E* dials at the index, with the handcrank OUT.

Set *L* at 2000′.

Increase *Vs* while observing the output gear of the intermittent drive. It should stop turning when the *Vs* counter reads 2360′.

NOTE: Check that *E* and sync *E* remain as set.

Adjustment

If the intermittent drive output gear does not stop turning when *Vs* reads 2360′, make A-60 slip-tight.

Turn *Vs* in an increasing direction to the point where the output gear stops turning. This is the upper cut-out point of the intermittent drive.

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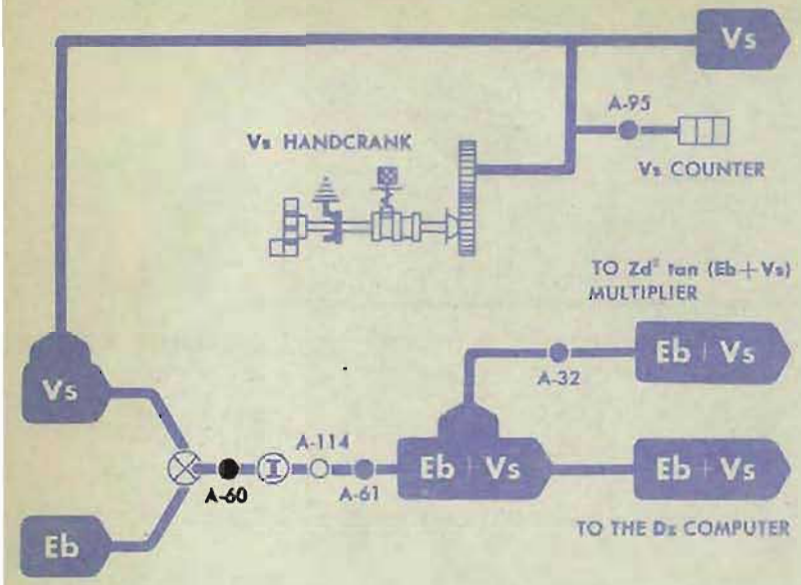


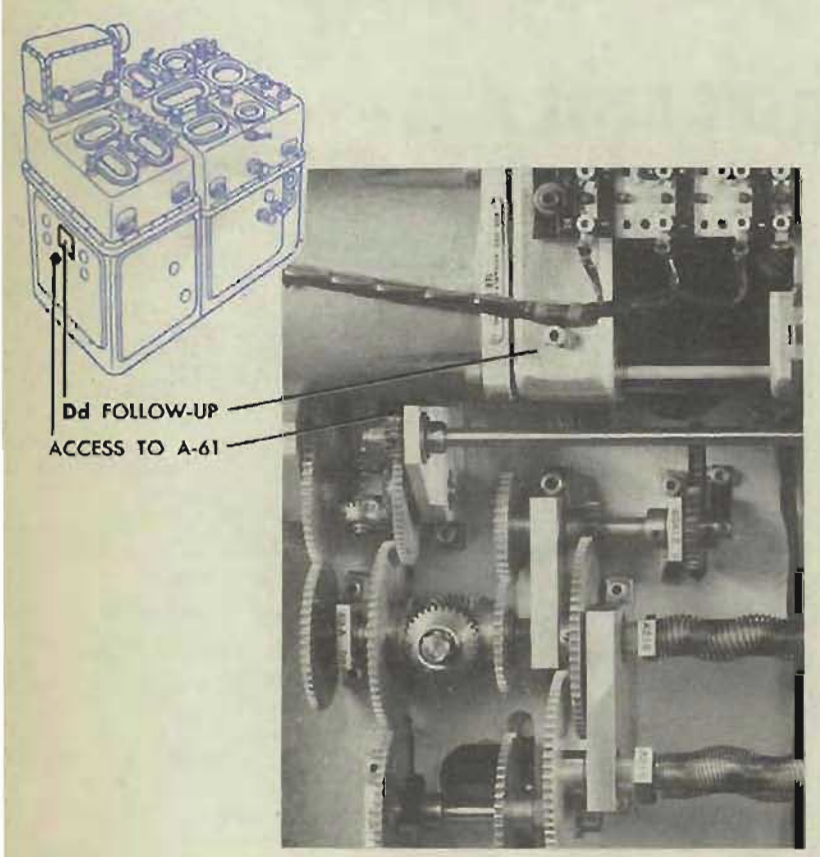
Use a gear pusher to hold the spider disk on the intermittent drive. Set the *Vs* counter to 2360′ with the *Vs* handcrank.

Tighten A-60.

Check at the lower cut-out point. Set *E* at 0°. Match the sync *E* dials at the fixed index. Decrease *Vs*.
The intermittent drive should cut out when the *Vs* counter reads 1640′.

Check A-61 and A-32.

A-61 Dz COMPUTER to Eb + Vs LINE



Location

A-61 is under cover 7. It may be reached through the hole below the compensator assembly of the *Dd* follow-up.

Check

Turn the power ON.
Set *L* at 2000′.
Set *E* at 60° with the sync *E* handcrank at CENTER.
Match the sync *E* dials at the fixed index, with the handcrank OUT.
Set *Ds* at 500 mils.
Set *Vs* at 2000′.
Set *Zd* at 3200′.
The *Dd* dials should read +30°34′.

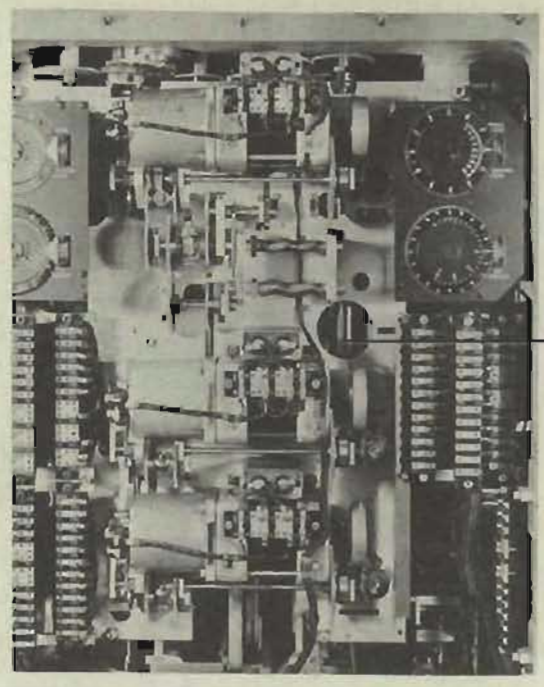
Adjustment

If the *Dd* dials do not read +30°34′, check A-35 and A-36 and readjust them if necessary.

Make A-61 slip-tight.

Turn the *Eb* + *Vs* cam until the *Da* dials read the proper value.

The *Eb* + *Vs* cam is next to the mounting plate of the *Dz* computer. It can be reached by a gear pusher inserted through the hole above the *jB'r* follow-up.



IMPORTANT

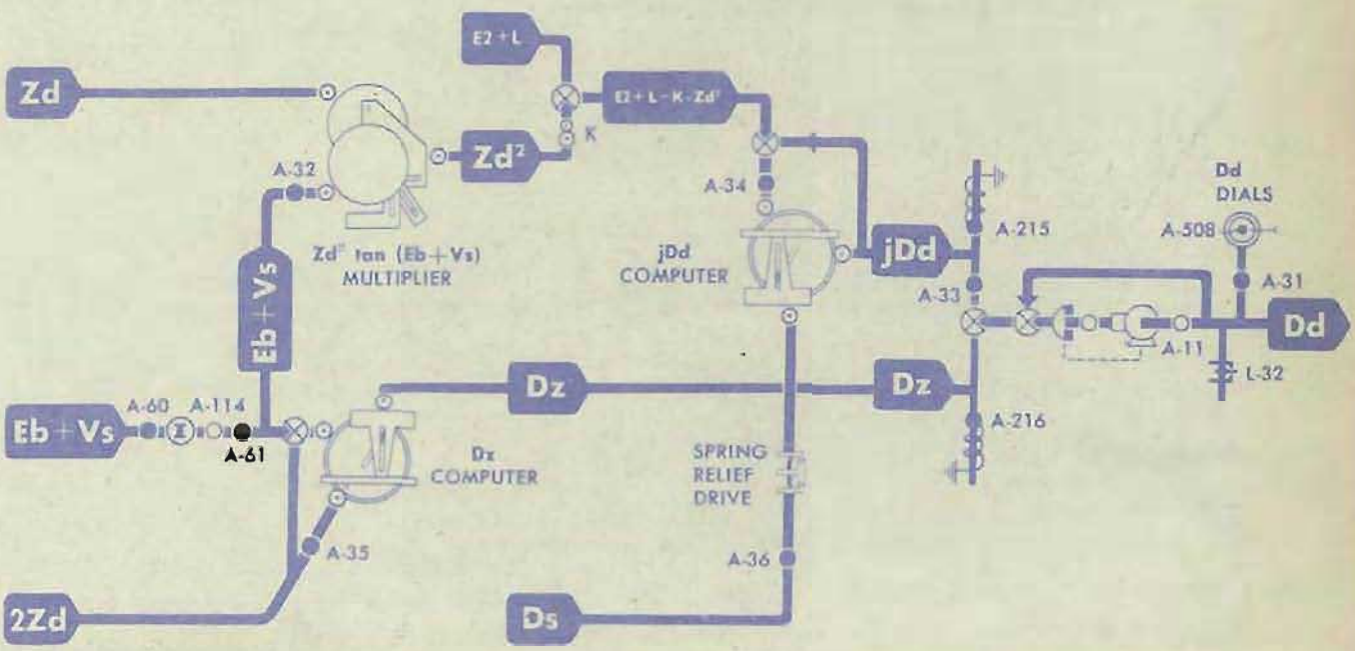
If any interference is felt while adjusting A-61, loosen A-32.

Tighten A-61.

Recheck

Decrease *Zd* to 800'.
The *Dd* dials should read −30°34'.
Split the error.

Check A-114 and A-32.



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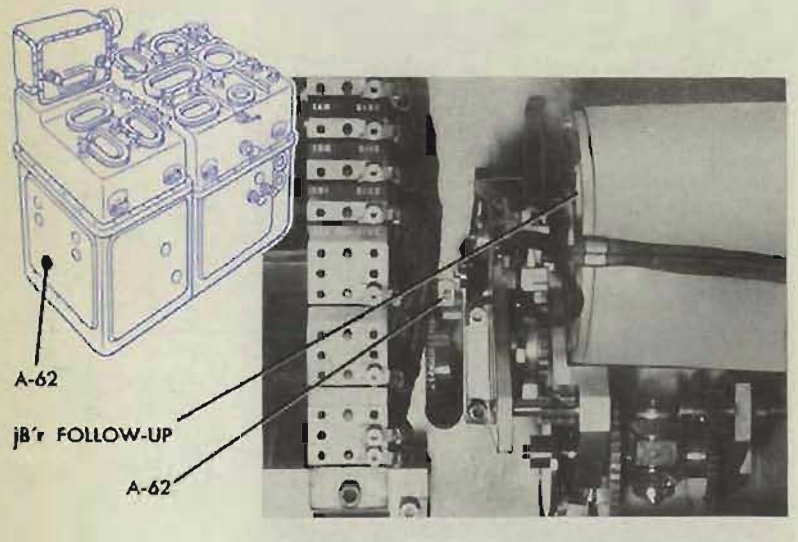
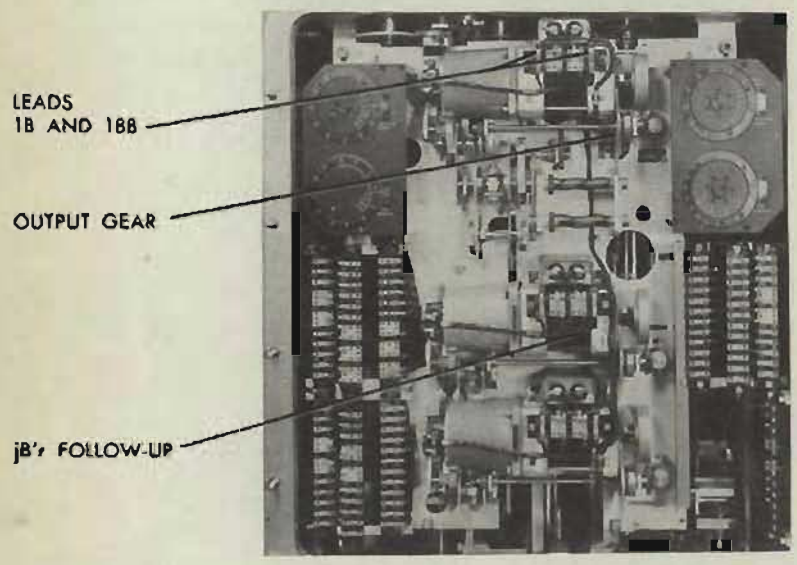
A-62 SYNCHRONIZING THE jB′r FOLLOW-UP





Location

A-62 is under cover 7. It is reached through a hole next to the contacts of the *jB′r* follow-up.

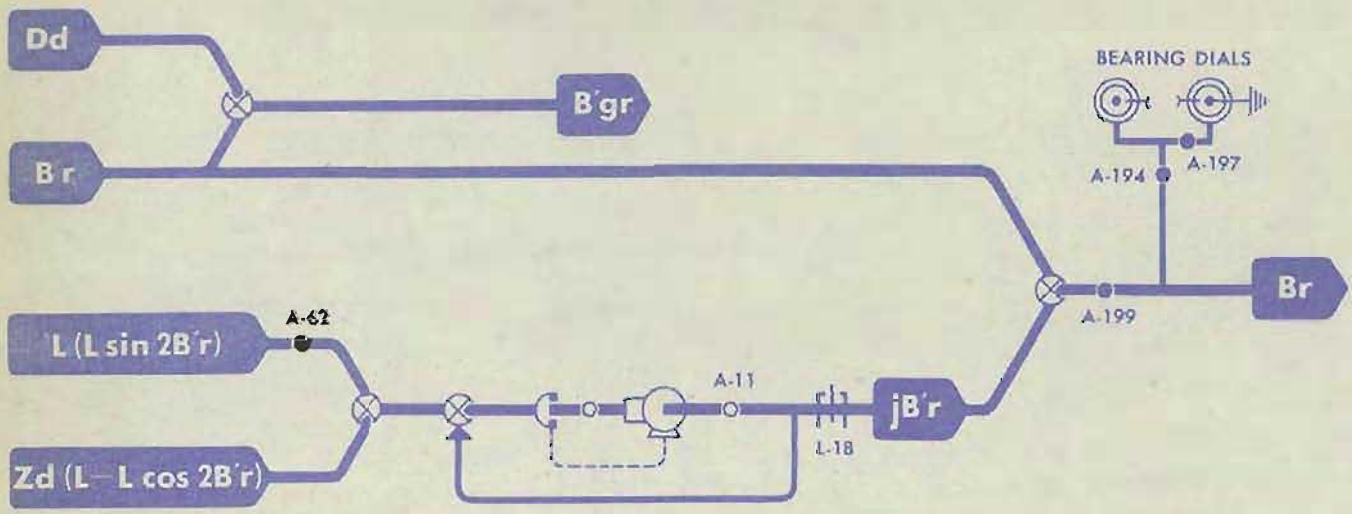
Check

At the switchboard, turn the *B′r* receiver switch OFF.
Set *Dd* at 0°.
Remove leads 1B and 1BB from the *Dd* follow-up, and wedge the output gearing.
Turn the power ON.
Set *L* and *Zd* at 2000′.
Set *B′gr* at 0°, and wedge the line.
The *Br* dials should read 0°.

Adjustment

If the *Br* dials do not read 0°, check A-199. Make A-62 slip-tight. Use a gear pusher to turn the spur gear at the rear of A-62 until the *jB′r* follow-up drives the *Br* dials to 0°.
Tighten A-62, and recheck.

Remove all wedges and replace the *Dd* power leads.



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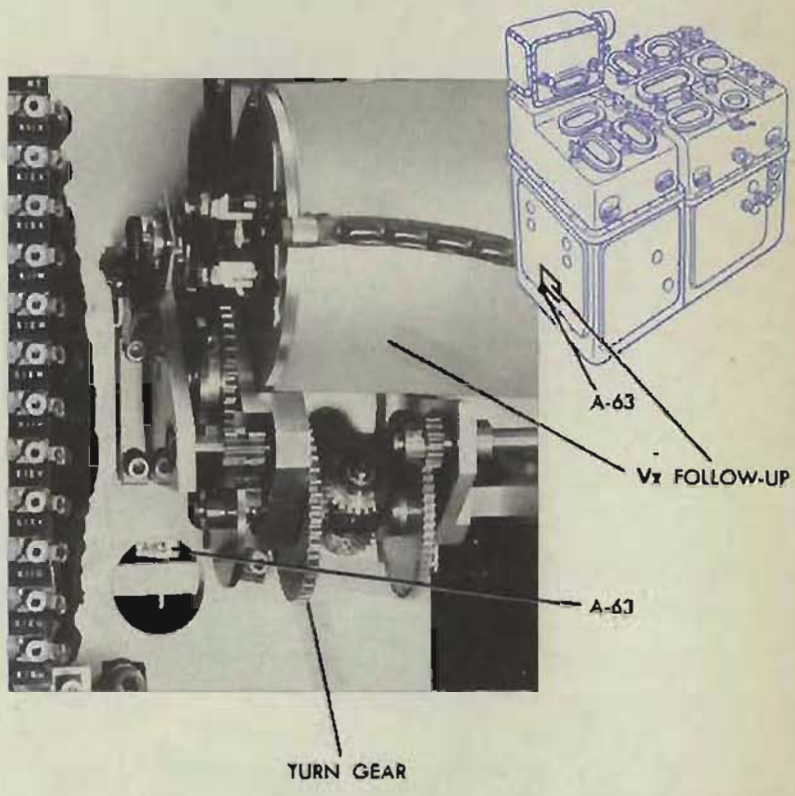
A-63 SYNCHRONIZING THE Vz FOLLOW-UP

Location

A-63 is under cover 7. It is reached through the small hole below the *Vz* follow-up.



Check

Turn the power ON.

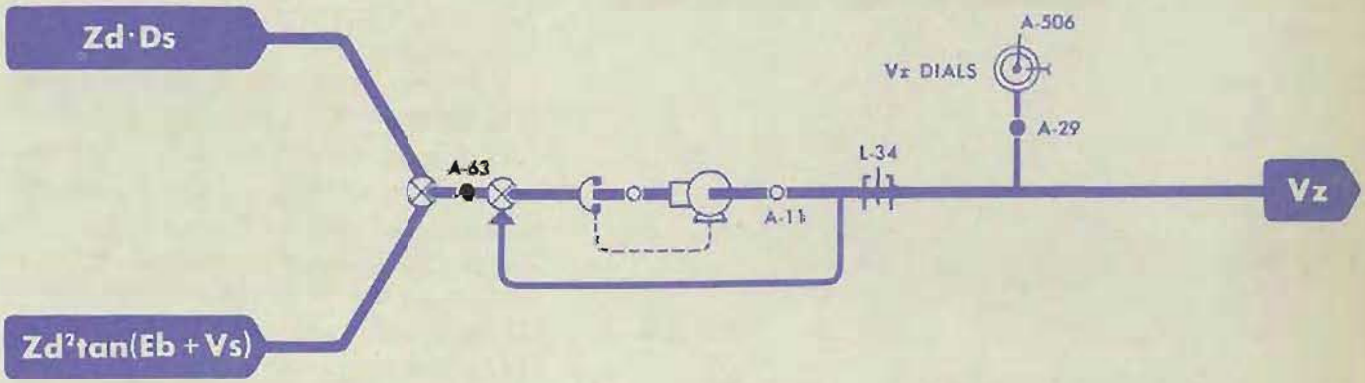
Set *L* at 2000′.
Set *E* at 0° with the sync *E* handcrank at CENTER and match the sync *E* dials at the index with the handcrank OUT.
Set *Zd* at 2000′.
Set *Ds* at 500 mils.
Set *Vs* at 2000′.
The *Vz* dials should read 0′.

Adjustment

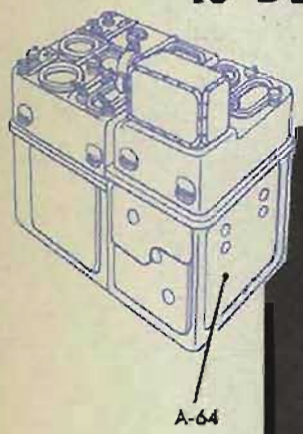
If the *Vz* dials do not read 0′, make A-63 slip-tight.

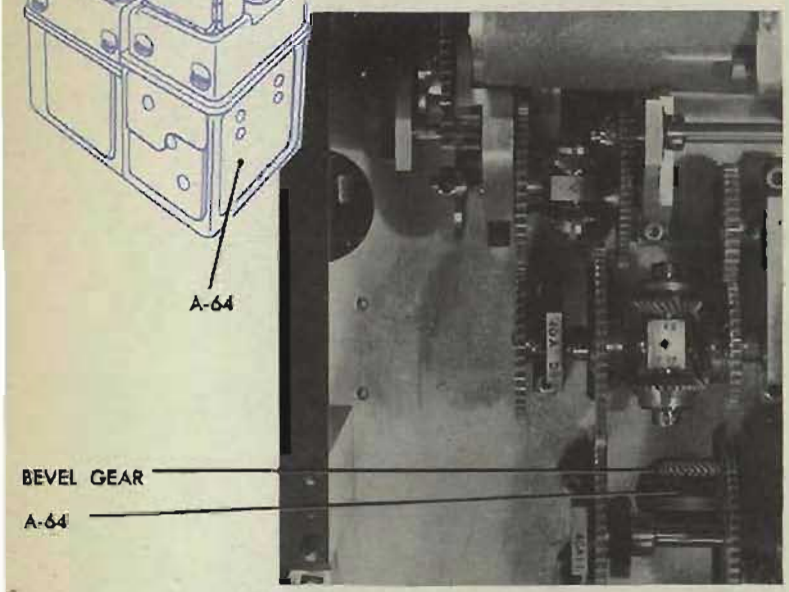
Turn the left side gear of the differential, below the *Vz* compensator assembly, until the *Vz* dials read 0′.

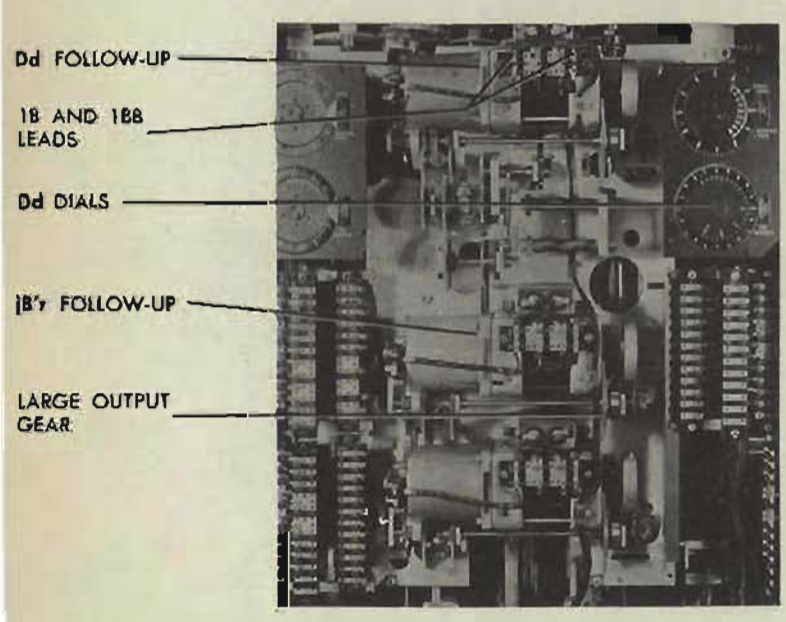
Tighten A-63 and recheck.



A-64 Zd (L − L cos 2B′r) MULTIPLIER to DECK TILT COMPONENT SOLVER







Location

A-64 is under cover 7. It is visible through the hole above the *jB′r* follow-up motor.

Check

Set *Dd* at 0°.
Disconnect leads 1B and 1BB from the *Dd* follow-up. Wedge the output gearing.
Turn the power ON.
Turn the control switch to LOCAL.
Set the computer *L* dials at 2000′.
Use the generated bearing crank to set *B′gr* at 45°.
Turn *Zd* from 800′ to 3200′. The *L* − *L* cos *2B′r* slide should be at its zero position, the position at which there is no movement of the output slide when *Zd* is turned from 800′ to 3200′.

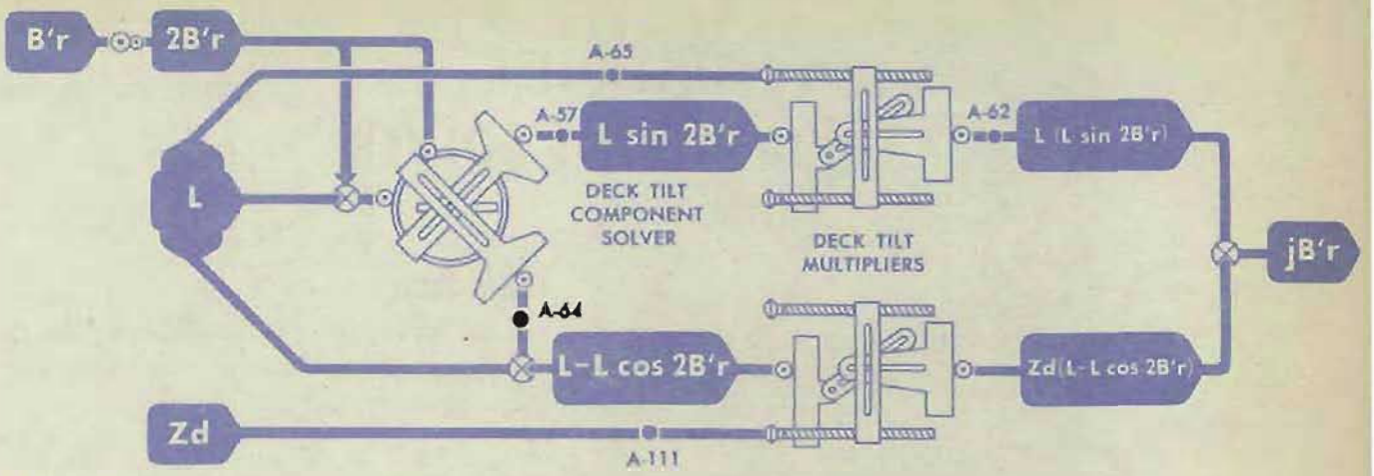
Observe the large output gear on the *jB′r* follow-up to note any movement of the output slide.

Adjustment

If there is movement during the full travel of *Zd*, make A-64 slip-tight.

WARNING: If A-64 is completely loosened, the input slide will fall.

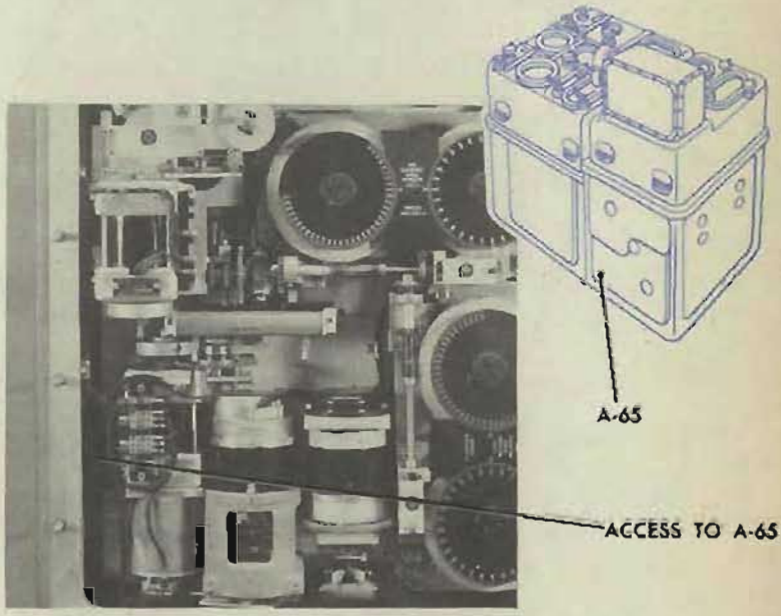
Set *Zd* at 2000′ and mark the *jB′r* follow-up output gear.
Turn *Zd* to 3200′.
Use a gear pusher to turn the bevel gear above A-64 until the follow-up output gear has returned to its original mark. Tighten A-64 and recheck by turning *Zd* from 800′ to 3200′.
There should be no motion of the *jB′r* follow-up.
Remove all wedges and replace the *Dd* follow-up power leads.
Check A-62.



A-65 L (L sin 2B′r) MULTIPLIER to L DIALS

Location

A-65 is a large clamp under cover 6, 8 inches from the bottom and 10 inches in, directly behind the *Eb* follow-up.

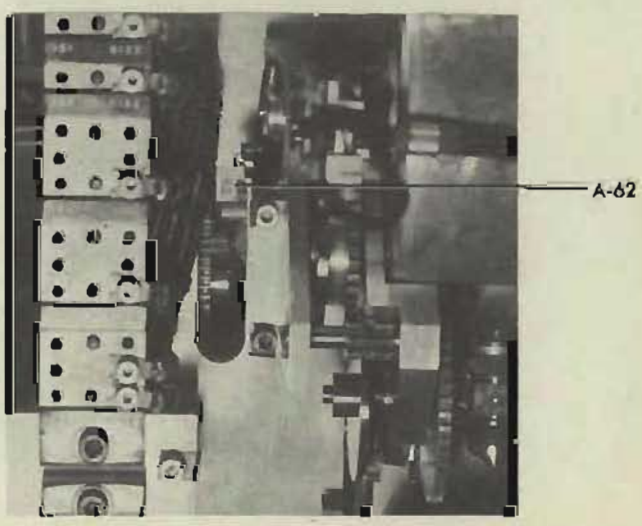


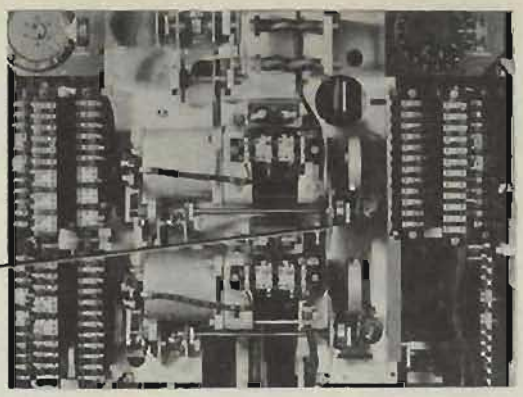
Check

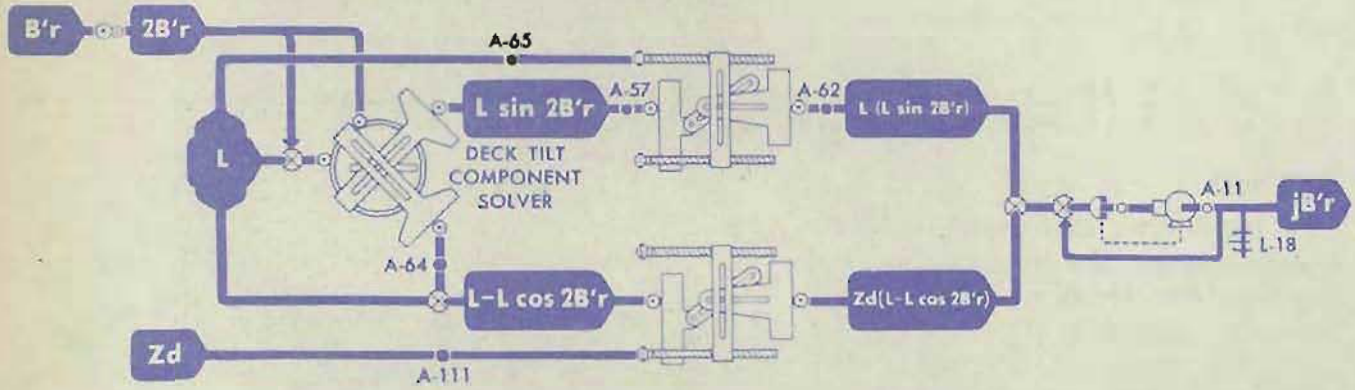
A-57 must be loosened before A-65 can be checked.
Set *L* at 2000′.
Make A-57 slip-tight. See readjustment of A-57.
Use a long gear-pusher to move the *L* sin *2B′r* input rack from limit to limit. Push the gear just behind the A-57 gear.
There should be no motion of the *jB′r* follow-up for full travel of the *L* sin *2B′r* input rack.

Adjustment

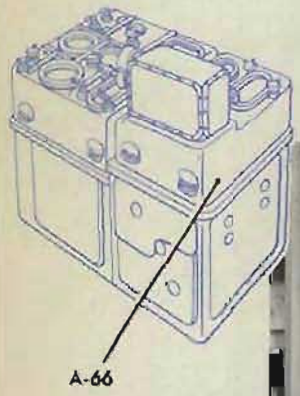
If there is movement of the *jB′r* follow-up, A-65 is in error.
Move the *L* sin *2B′r* input rack to one limit.
Mark the *jB′r* follow-up output friction gear for use as an indicator.
Move the *L* sin *2B′r* input rack to the other limit.
Loosen A-65 and turn the gear next to it to correct halfway.
Make new indicating marks. Continue adjusting until there is no motion of the *jB′r* follow-up for full travel of the *L* sin *2B′r* input rack.
Tighten A-65 and recheck.
Readjust A-57.
Check A-62.

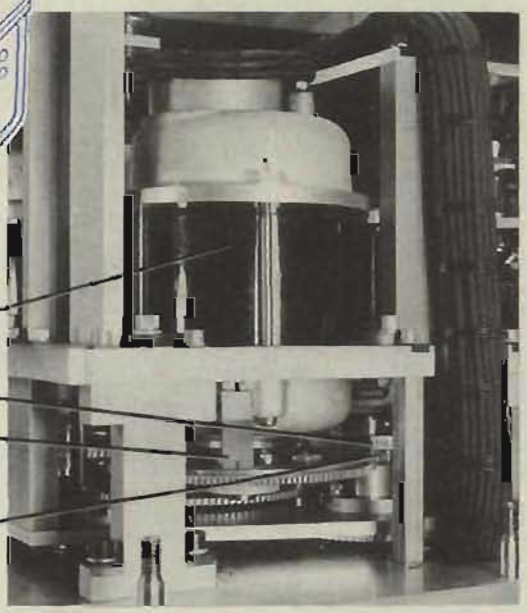






A-66 Ds SINGLE-SPEED TRANSMITTER to Ds COUNTER





Location

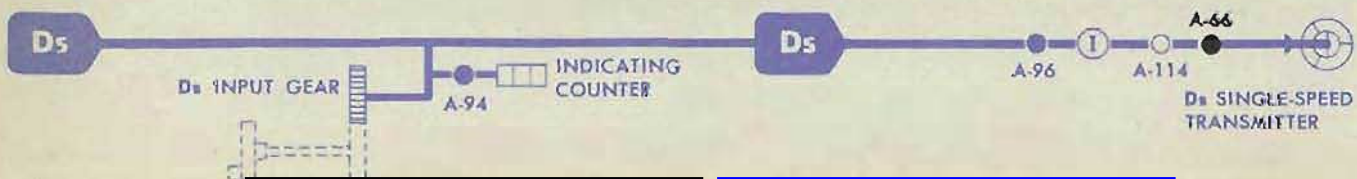
A-66 is under cover 2. A-66 is omitted on Mods 1, 3, 4, 8, and 12.

Check

Set the *Ds* counter at 500 mils.
The *Ds* transmitter should be on electrical zero. When the transmitter is on electrical zero, the scribe mark on the rotor gear should match the fixed index.

Adjustment

If the transmitter is not on electrical zero, make A-66 slip-tight.
Hold *Ds* at 500.
Turn the gear below A-66 until the scribe mark matches the fixed index.
Tighten A-66, and recheck.
Check A-114, A-94, and A-96.



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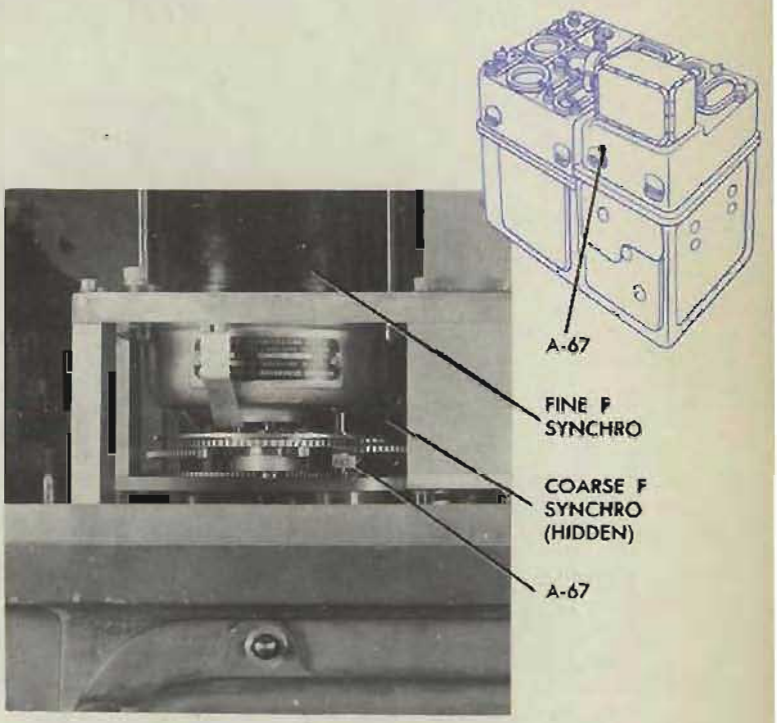
A-67 COARSE to FINE SYNCHRO— F TRANSMITTER

Location

A-67 is under cover 2, at the right front



Check

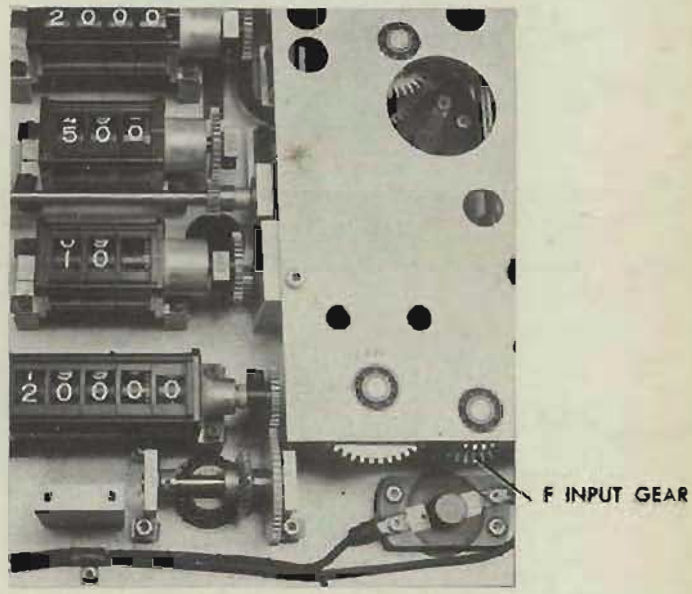
Set the coarse *F* synchro on electrical zero by turning the *F* input gear. This should also position the fine *F* synchro on electrical zero. When the coarse and fine synchros are on electrical zero, the scribe marks on their rotor gears should be matched with the fixed index marks.

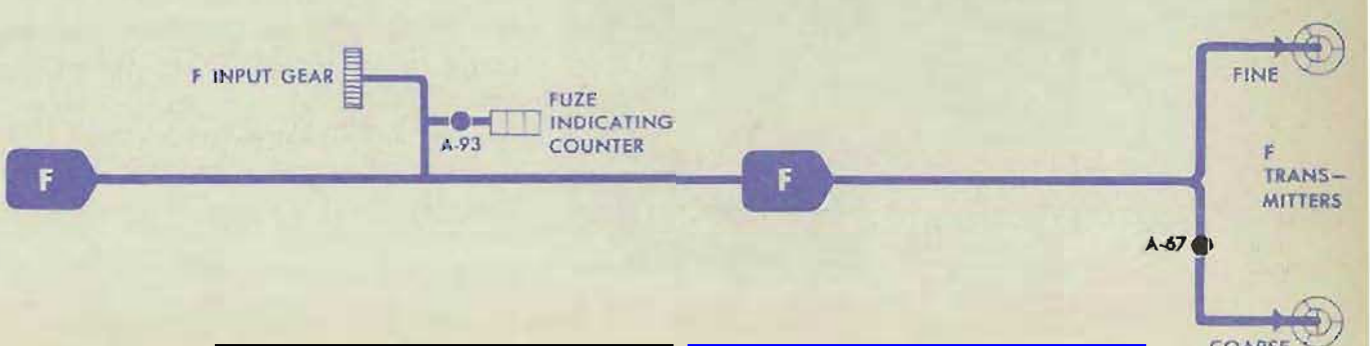
Adjustment

If the rotor of the fine *F* synchro is not on electrical zero, make A-67 slip-tight.

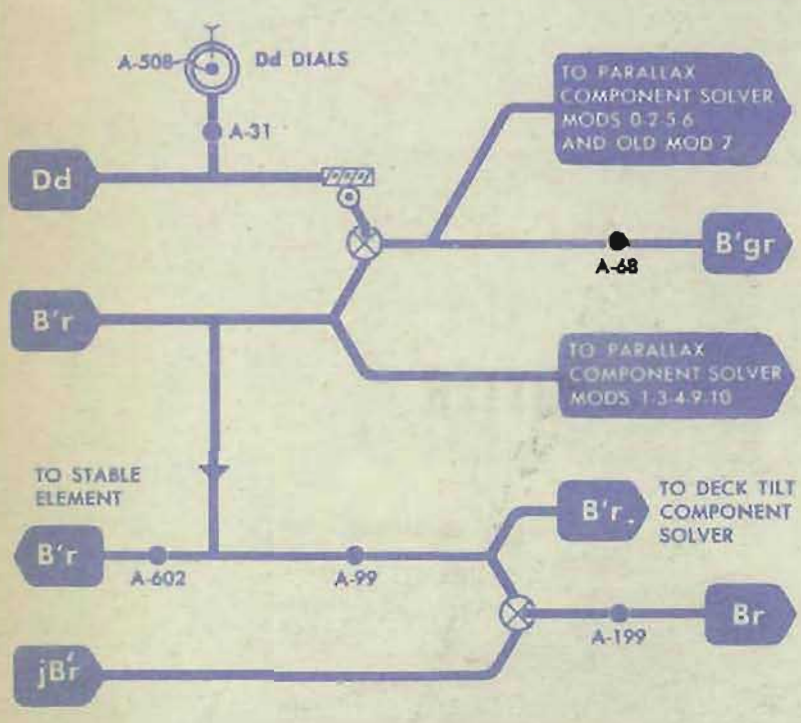
Hold the large gear on the coarse *F* synchro rotor shaft. This will keep the coarse synchro on electrical zero.

Turn the *F* input gear until the rotor of the fine synchro is at electrical zero. Check that the scribe mark on the rotor gear of the coarse synchro still matches its fixed index.
Tighten A-67, and recheck.
Check A-93.





A-68 B'gr DIALS to PARALLAX COMPONENT SOLVER (SER. NOS. 215 and LOWER)



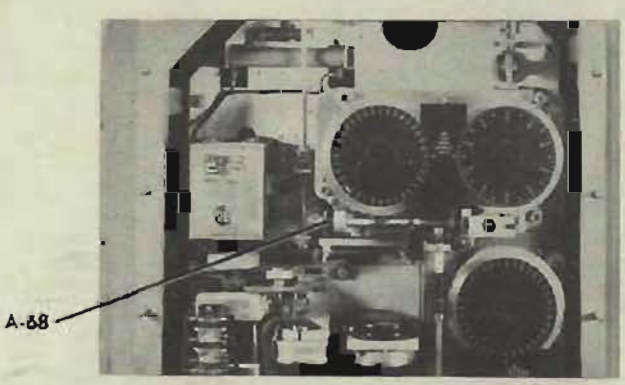
Location

A-68 is under cover 8, on the *B'gr* transmitter gearing.

Check

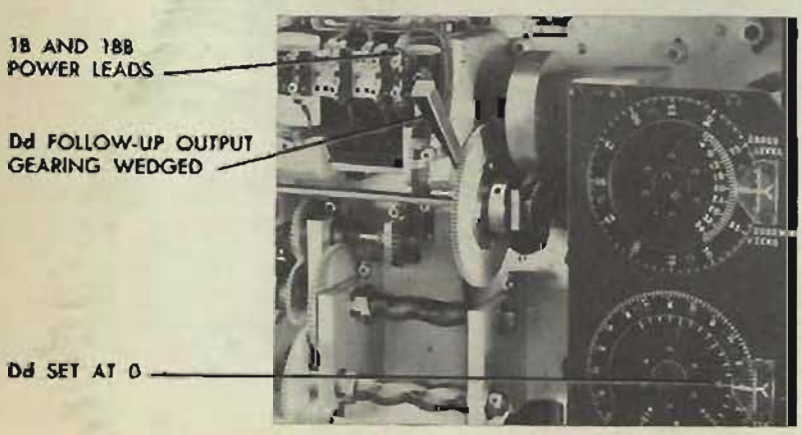
On instruments with Ser. Nos. 215 and lower, A-68 is used to adjust the *B'gr* dials to the parallax component solver. The check and readjustment for A-68 is the same as that given for A-243 on later instruments. Refer to the readjustment of A-243. After readjusting A-68, check A-99.

A-68 ASSEMBLY CLAMP (SER. NOS. 216 and HIGHER)



Check

On instruments with Ser. Nos. 216 and higher, check A-243 and A-99. If one checks correctly, but the other does not, correct the one in error. If both are out of adjustment by an equal amount on the *B'gr* dials, A-68 is upset and should be readjusted.



Adjustment

Disconnect leads 1B and 1BB from the *Dd* servo. Wedge the output gearing when the *Dd* dials read 0. Turn the power ON. Turn the control switch to LOCAL. Use the generated bearing crank to set *B'r* at 0°, on the stable element dials.

Loosen A-68. Turn the worm below the *B'gr* transmitter dials to bring the *B'gr* dials to 0°. Split the lost motion and tighten A-68.

Recheck A-243 and A-99.

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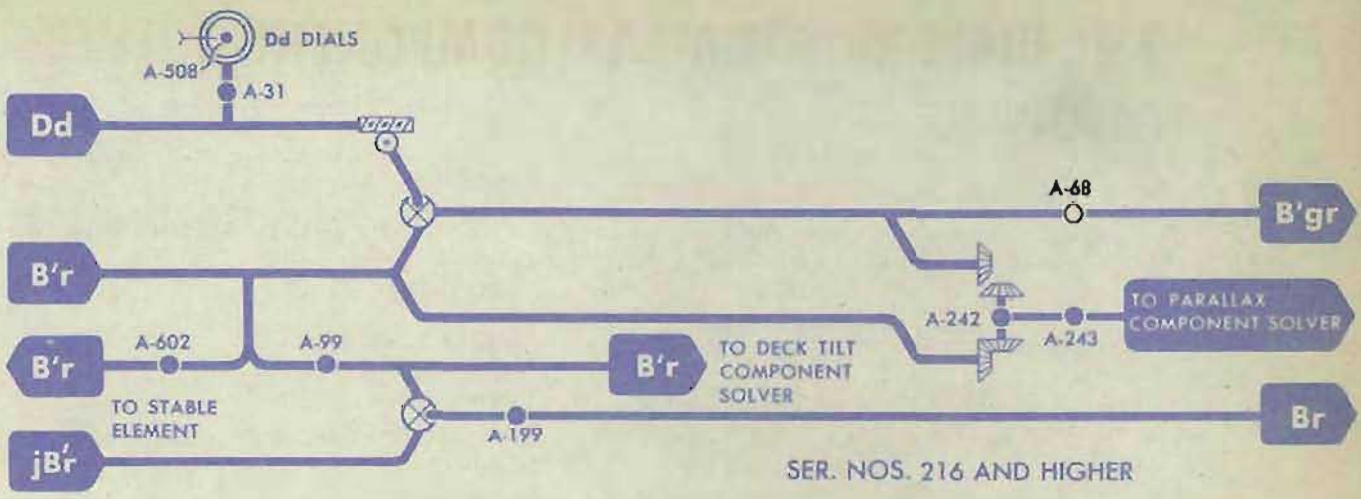
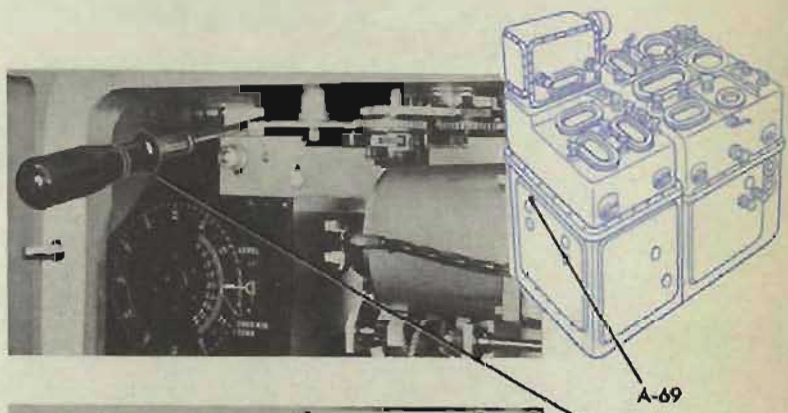


A-69 Vs SINGLE-SPEED TRANSMITTER to Vs COUNTER

Location

A-69 is under cover 7, behind the plate, near the top of the section. It is on the stub shaft below a large spur gear.

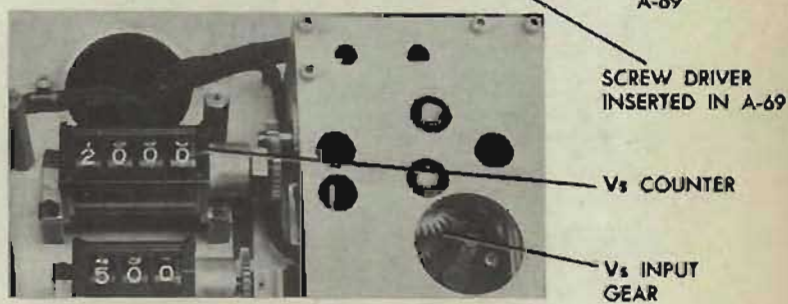
A-69 is omitted on Mods 1, 3, 4, 8, and 12.



Check

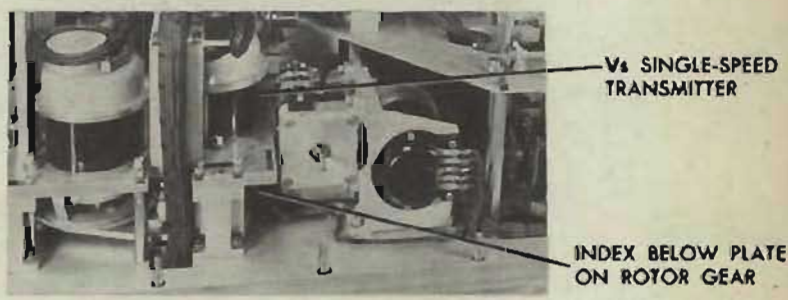
Remove cover 2.
Set the *Vs* counter at 2000′ by turning the *Vs* input gear.

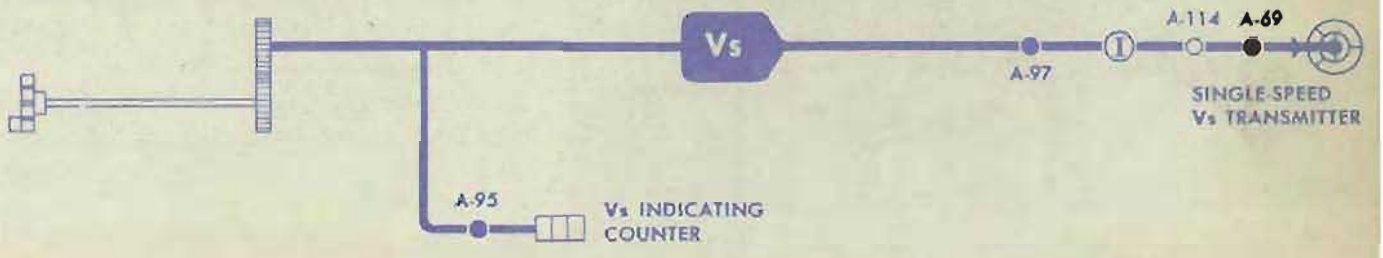
The rotor of the *Vs* single-speed transmitter synchro should be at electrical zero. When the synchro is at electrical zero, the scribe mark on the rotor gear should match the fixed index.



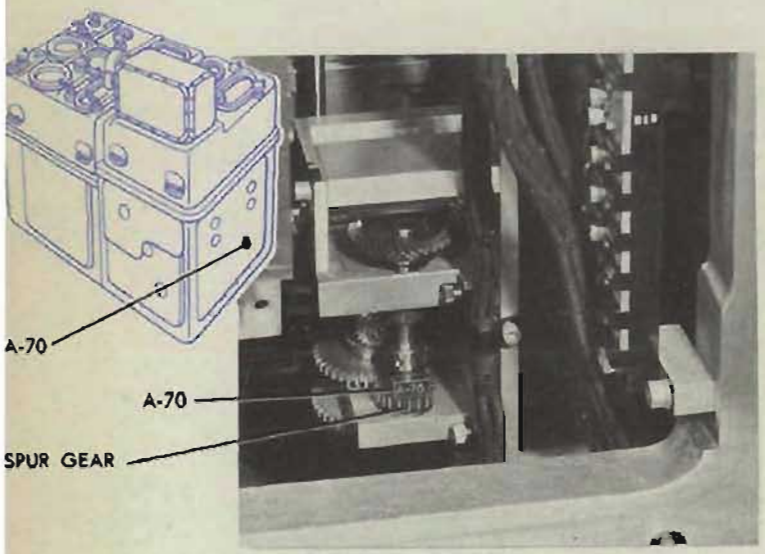
Adjustment

If the synchro is not on electrical zero, make A-69 slip-tight. Hold *Vs* at 2000′. Turn the large gear on the rotor of the synchro until the scribe mark matches the fixed index.
Tighten A-69 and recheck.





A-70 SYNCHRONIZING THE B′r LOCAL CONTROL FOLLOW-UP



Location

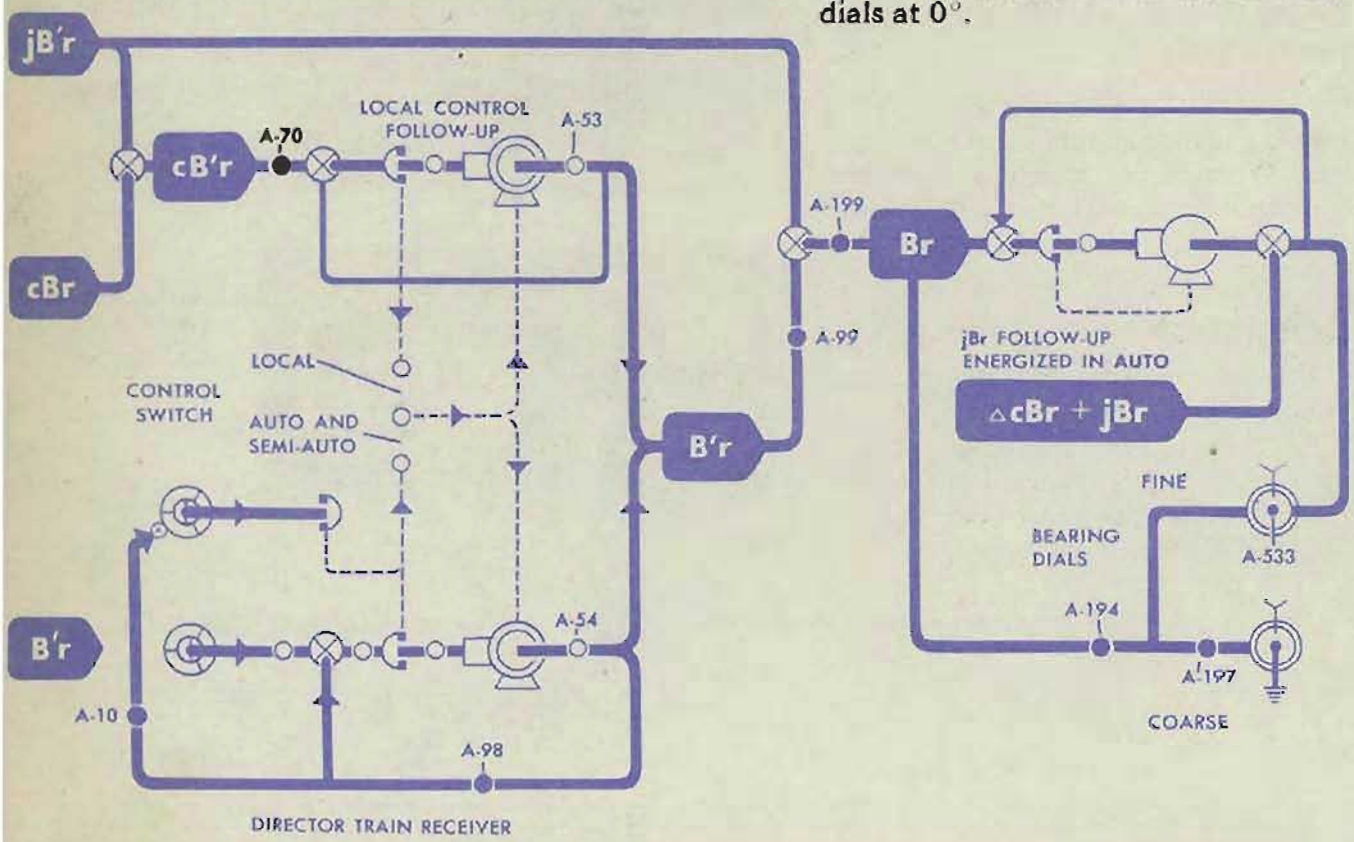
A-70 is under cover 7, in line with the *Zd* input shaft.

Check

Turn the power ON.
Turn the control switch to LOCAL to energize the *B′r* local control follow-up.
At the switchboard, turn the director train receiver switch OFF.
Turn the control switch to AUTO.
There should be no motion of the inner bearing dial.
If the inner bearing dial moves when the control switch is turned from LOCAL to AUTO, the *B′r* local control follow-up is not properly adjusted.

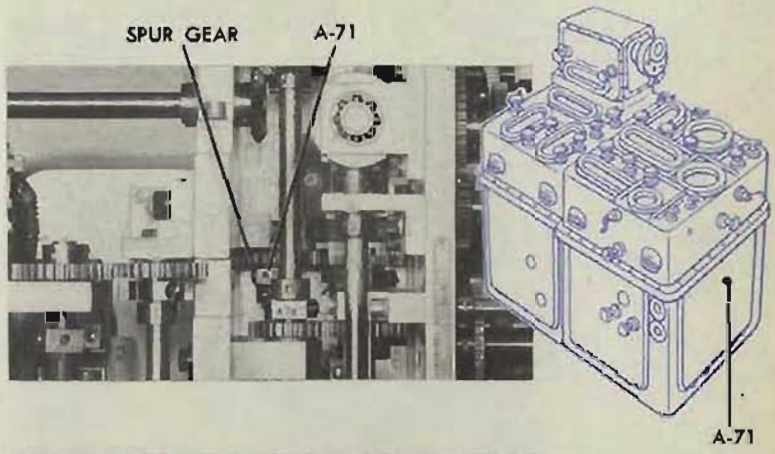
Adjustment

Make A-70 slip-tight.
Turn the control switch to LOCAL.
Turn the generated bearing crank in its OUT position to set the *Br* ring dials at 0°.



Turn the control switch to AUTO. After the inner dial stops, turn the control switch back to LOCAL. Turn the spur gear below A-70 to put the ring dials back to 0°. Tighten A-70. Check by turning the control switch back and forth between AUTO and LOCAL, making sure that *B'r* is cut off at the fire control switchboard. Check A-533.

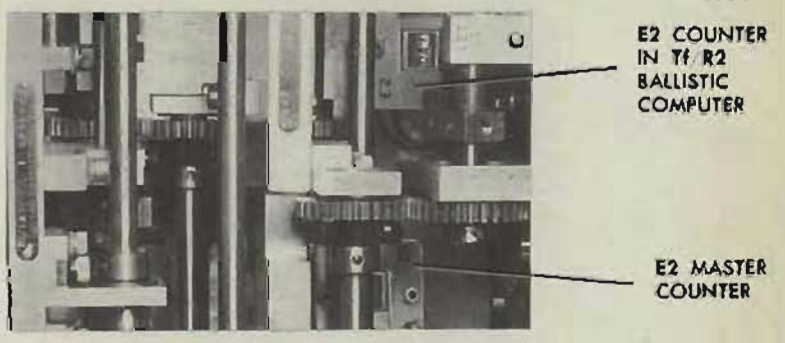
A-71 Tf/R2 BALLISTIC COMPUTER to E2 MASTER COUNTER



Location

A-71 is under cover 4.

The *E2* master counter is directly below the *E2* counter in the *Tf/R2* ballistic computer.

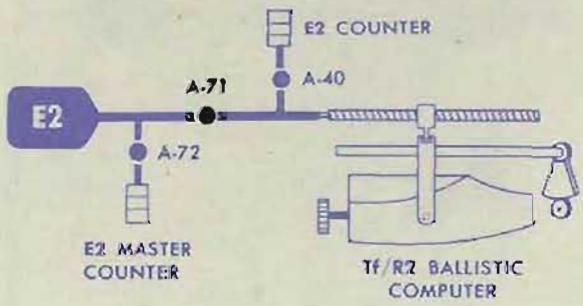


Check

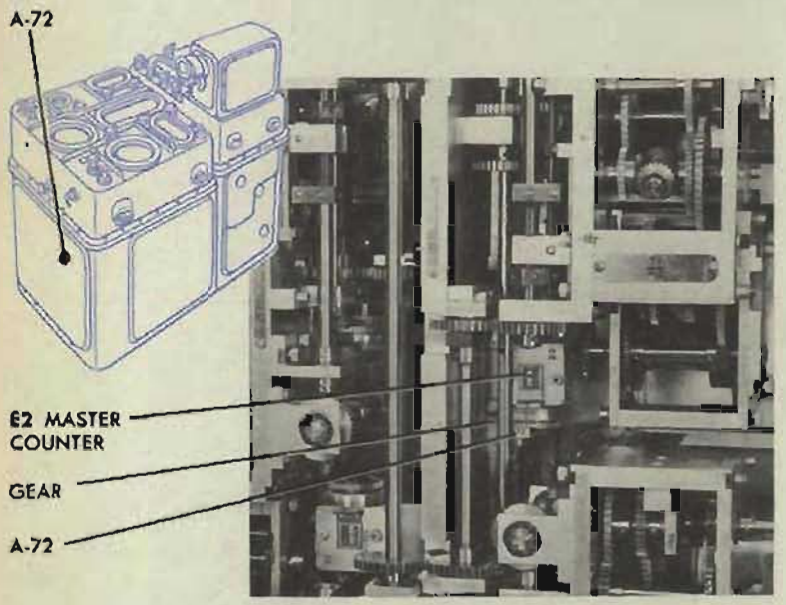
Both *E2* counters should agree.

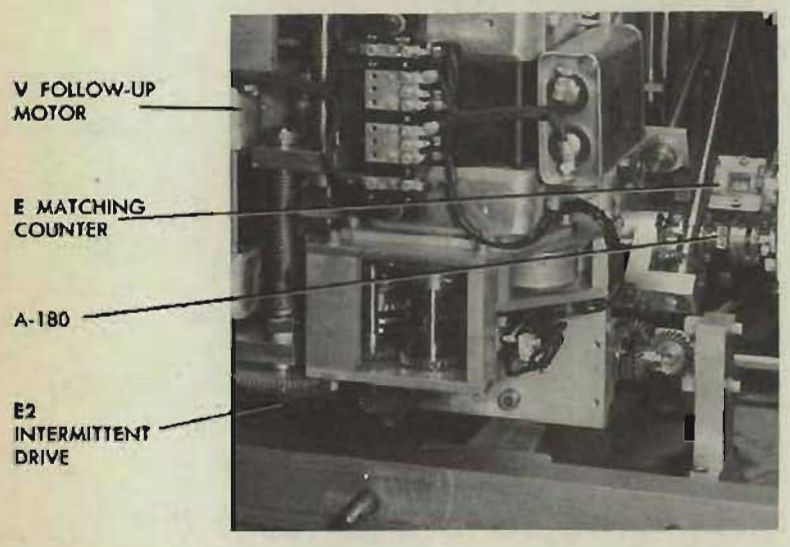
Adjustment

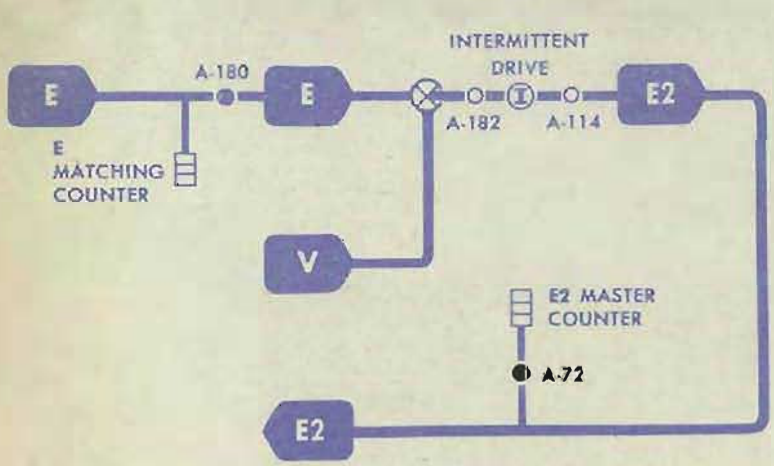
If the counters do not agree, make A-71 slip-tight. Hold the master counter, and turn the spur gear above A-71 to make the counter in the ballistic computer agree.
Tighten A-71 and recheck.



A-72 E2 MASTER COUNTER to E2 INTERMITTENT DRIVE







Location

A-72 is under cover 4, at the upper left of the fuze ballistic computer, below the *E2* master counter.

The *E2* intermittent drive is under cover 5, behind the lower front corner of the *V* follow-up mounting plate.

Check

Set *Vs* at 2000′.
Use the sync *E* handcrank in its CENTER position to decrease *E* until the *E2* master counter stops turning. When the master counter stops turning, the *E2* intermittent drive has reached its low cut-out point.
The *E2* counter reading should be 0°.

Adjustment

If the *E2* counter reading at the lower cut-out point is not 0°, loosen A-72. Use a gear pusher to turn the gear above the clamp, until the counter reads 0°.
Tighten A-72.

Recheck

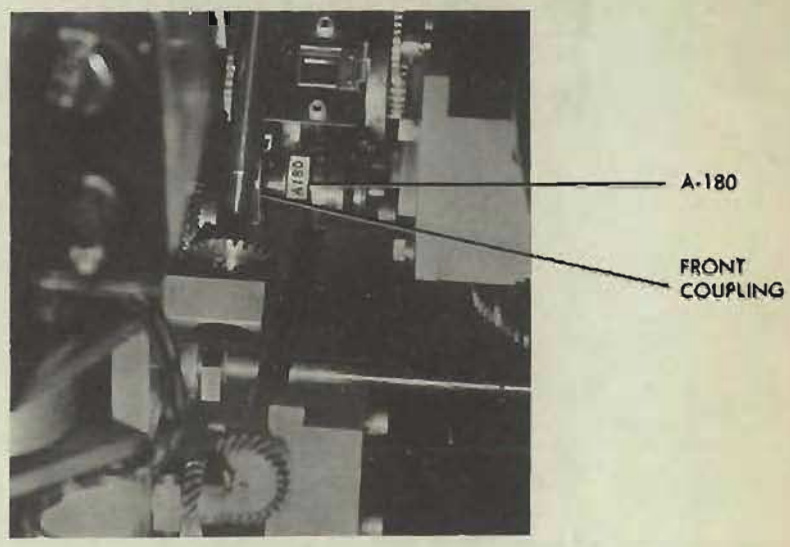
Increase *E* and *Vs* until the *E2* counter stops turning. This is the high cut-out point of the intermittent drive. The *E2* counter should read 90°.

IMPORTANT

1 If the limit stops on the *E* and *V* lines operate before the low cut-out point of the intermittent drive is reached, loosen A-180. Hold the coupling at the front of the clamp and increase *E* to 85°.

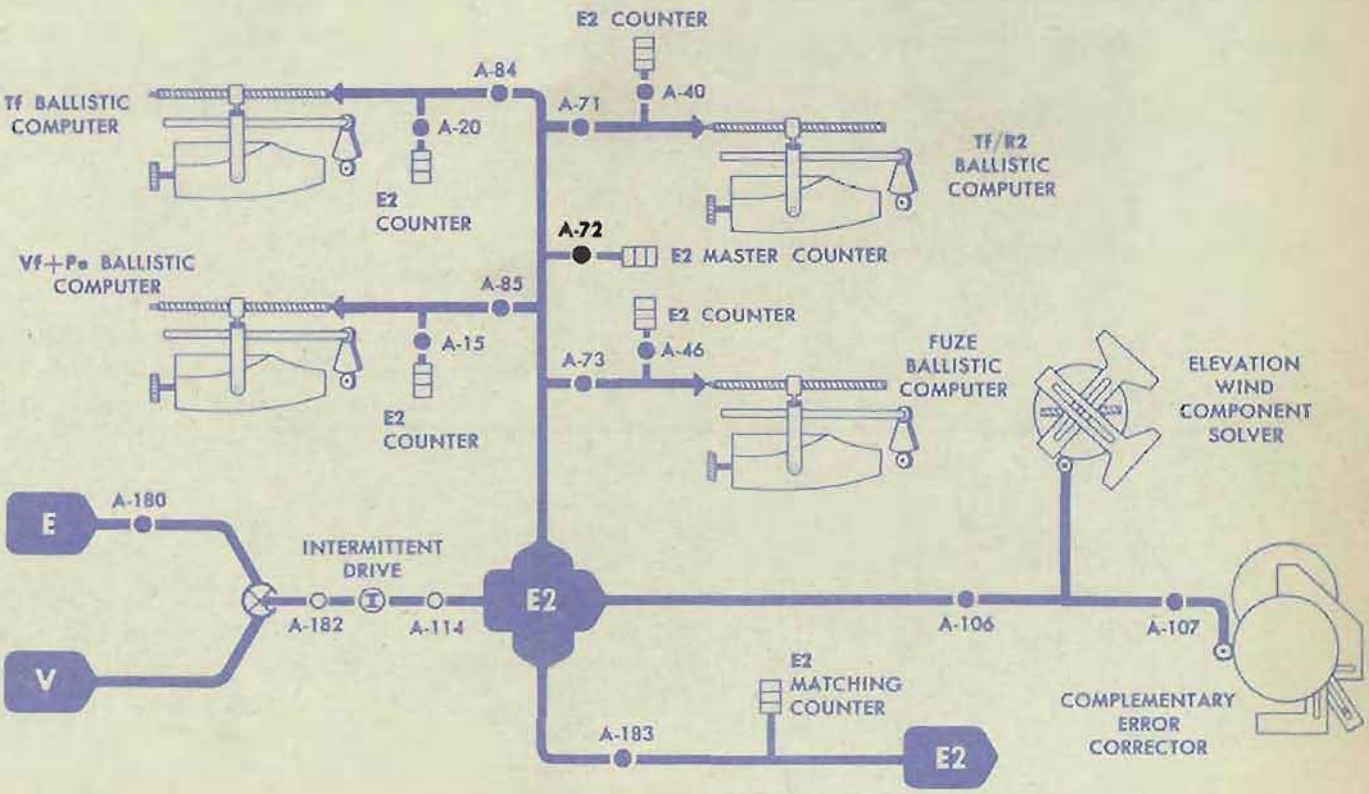
Tighten A-180 and decrease *E* until the intermittent drive reaches its low cut-out point. If the cut-out point still cannot be reached, this procedure may have to be repeated several times.

A-180 is located under cover 5, on the coupling immediately below the *E* matching counter.

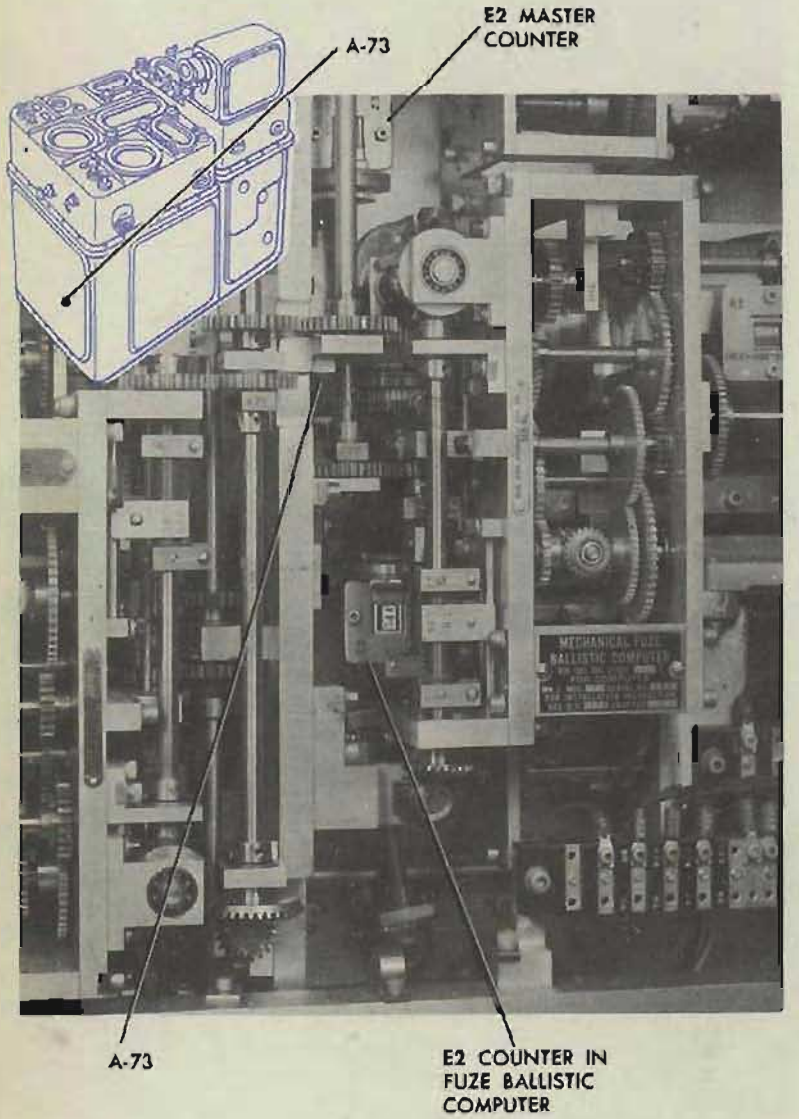


2 If interference on the *E2* line keeps the intermittent drive from reaching either limit, check A-85, A-73, A-71, and A-84 (the *E2* lead screw inputs of the four ballistic computers). Check A-107 (the *E2* cam of the complementary error corrector). Check A-106 (the vector gear of the elevation wind component solver). Check A-183 (the *E2* line to the parallax and trunnion tilt sections). Determine which clamp is causing the restriction and loosen it.

Readjust A-180 and any other clamps that were loosened. Check A-182, A-114, A-71, A-73, A-84, A-85, A-106, A-107, and A-183.



A-73 F BALLISTIC COMPUTER to E2 MASTER COUNTER



Location

A-73 is under cover 4, between the *Vl* + *Pe* and the fuze ballistic computers, behind clamp A-77.

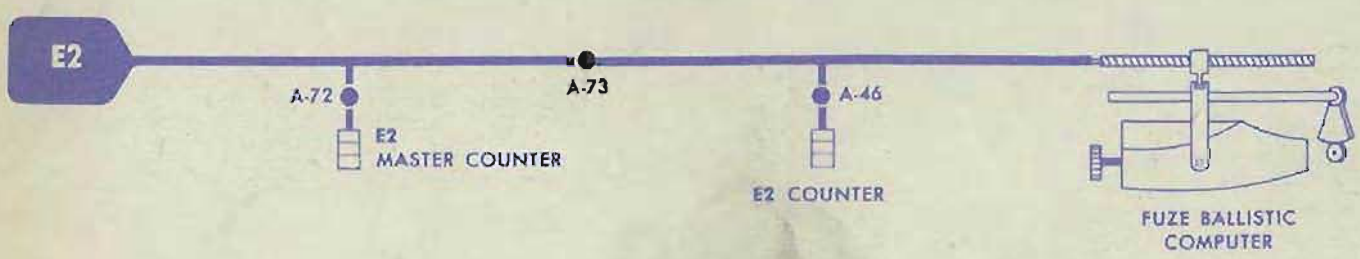
Check

The *E2* counter in the fuze ballistic computer should agree with the *E2* master counter.

Adjustment

If the counters do not agree, loosen A-73. Turn the spur gear below the clamp until the *E2* counter in the fuze ballistic computer agrees with the *E2* master counter.

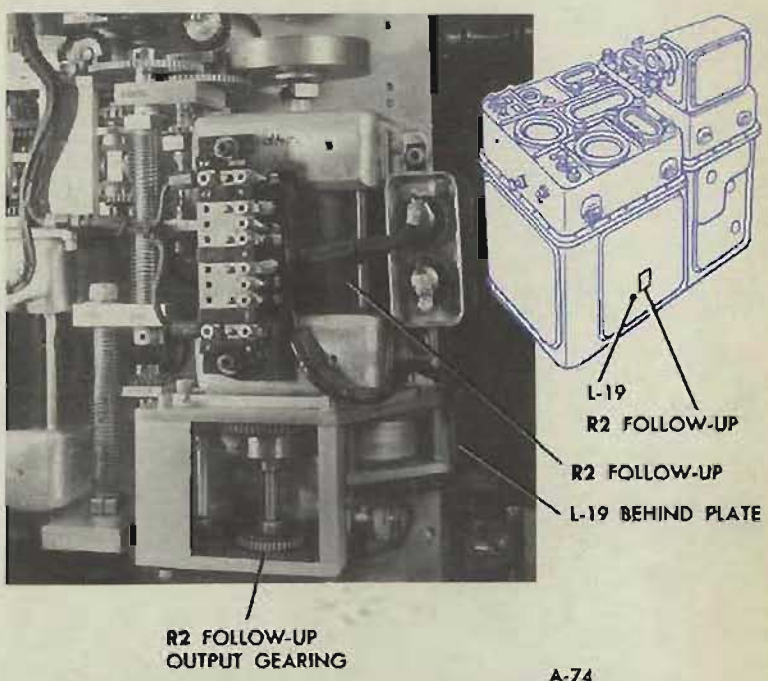
Tighten A-73 and recheck.



A-74 R2 MASTER COUNTER to L-19

Location

A-74 is under cover 4, above and to the right of the *T1* ballistic computer. L-19 is under cover 5, behind the *R2* follow-up mounting plate. It is in a horizontal position with its lower limit toward the front.

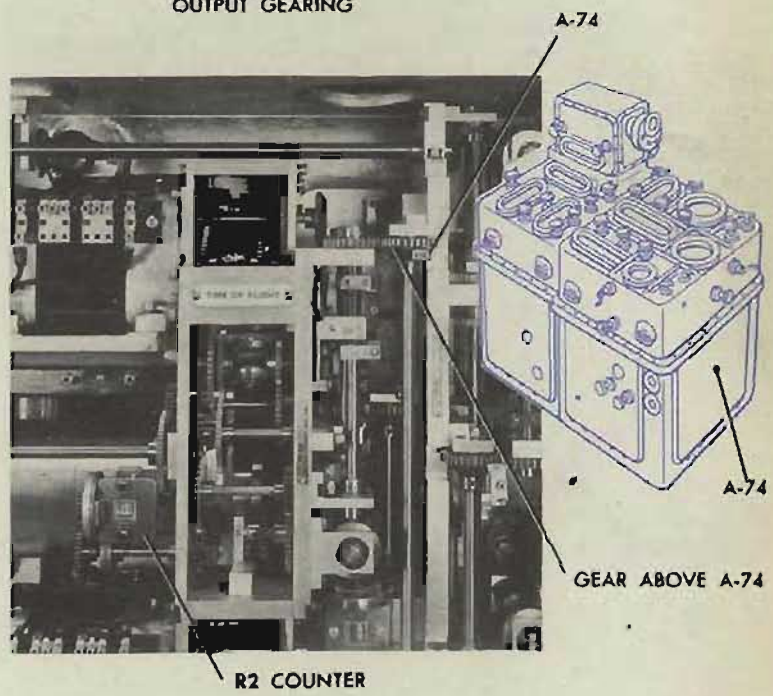


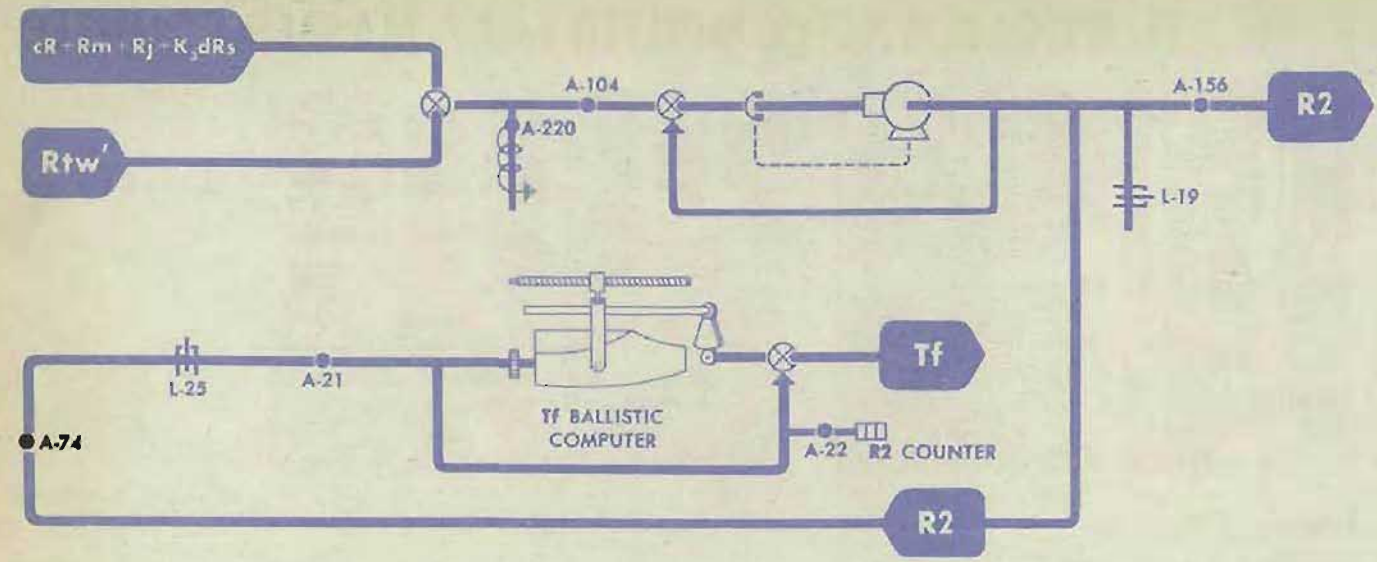
Check

Turn the power OFF.
Turn the *R2* follow-up output gearing to run *R2* to the upper limit.
The *R2* master counter should read 18,000 yards (180) on Mods 0 through 7, 9, 10, and 13.
On Mods 8 and 12, the upper limit of *R2* is 20,000 yards (200).
Turn the gearing to run *R2* to the lower limit. The *R2* master counter should read 500 yards (005) on Mods 3-7, 8, 10, 12, and 13.
On Mods 0, 1, 2, and 9, the lower limit is 1500 yards (015).

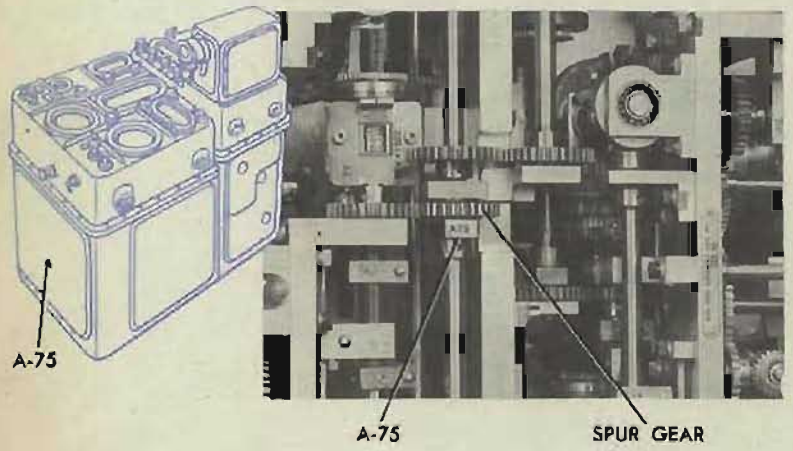
Adjustment

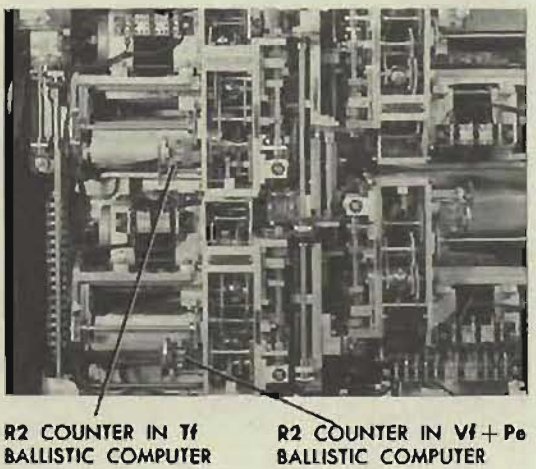
If the *R2* master counter does not read correctly, loosen A-74. Hold the shaft below A-74 to keep the line against the stop. Turn the gear above A-74 until the *R2* master counter reads correctly. Tighten A-74. Recheck the limits.
Readjust any clamps that were loosened. Check A-75, A-76, A-203, A-156, A-92, and A-104.

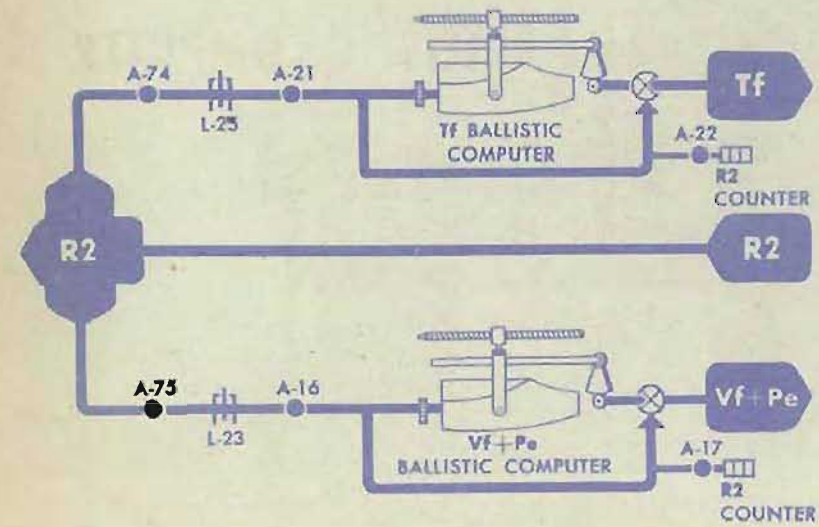




A-75 Vf + Pe BALLISTIC COMPUTER to R2 MASTER COUNTER







Location

A-75 is under cover 4, to the right of the *Vf + Pe* ballistic computer.

Check

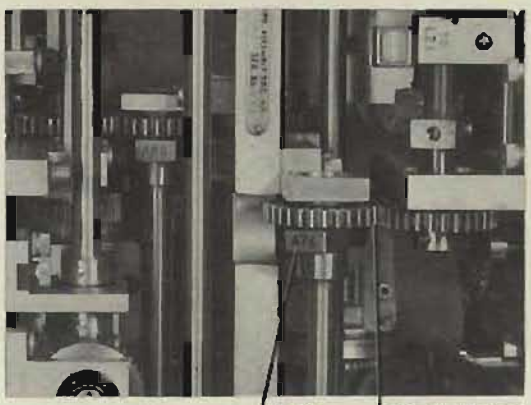
The *R2* counters in the *Tf* and *Vf + Pe* computers should agree.

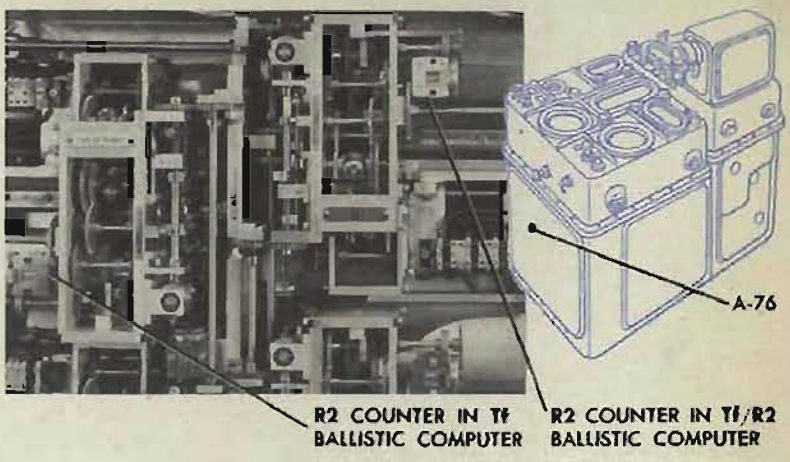
Adjustment

If the counters do not agree, make A-75 slip-tight. Turn the spur gear above the clamp until the counters agree.

Tighten A-75 and recheck.

A-76 Tf/R2 BALLISTIC COMPUTER to R2 MASTER COUNTER





Location

A-76 is under cover 4, to the left of the *Tf/R2* ballistic computer.

Check

On Ser. Nos. 810 and lower, the *R2* counter in the *Tf/R2* ballistic computer should agree with the *R2* master counter in the *Tf* ballistic computer unless an offset has been purposely introduced per Bureau of Ordnance Information Bulletin 4-44.

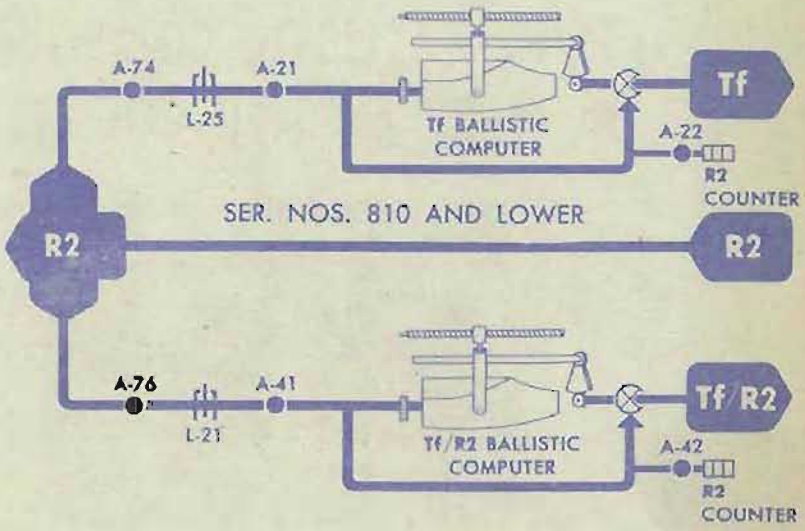
On Ser. Nos. 811 and higher, set front *I.V.* at 2550 f.s. Then the *R2m* counter in the *Tf/R2* ballistic computer should agree with the *R2* master counter.

Adjustment

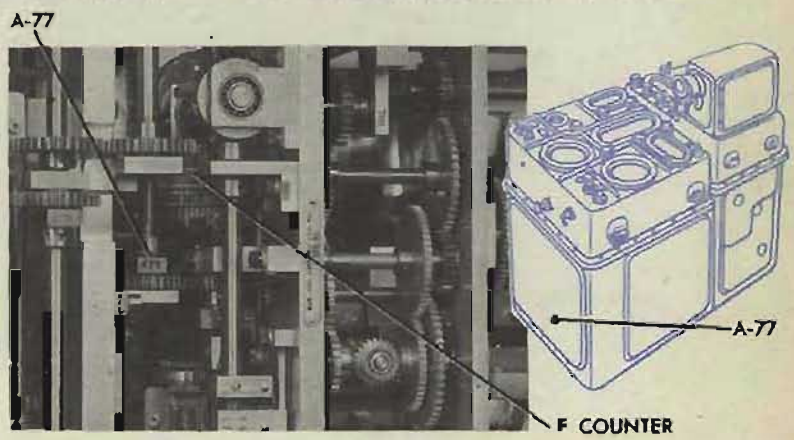
If the counters do not agree, make A-76 slip-tight.

Turn the spur gear above the clamp until the counters agree.

Tighten A-76 and recheck.



A-77 F INDICATING COUNTER to F BALLISTIC COMPUTER



Location

A-77 is under cover 4, on the left side of the fuze ballistic computer. The *F* counter is in the *F* ballistic computer. The *F* indicating counter is under cover 2.

Check

Both *F* counters should agree.

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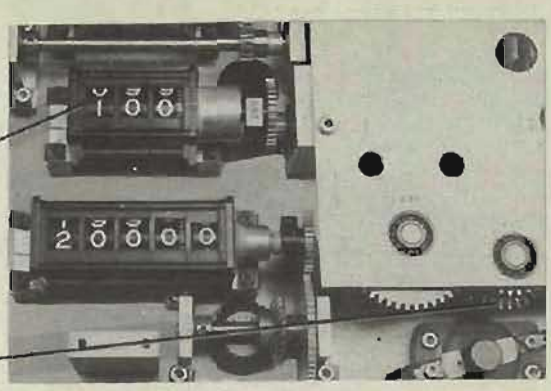
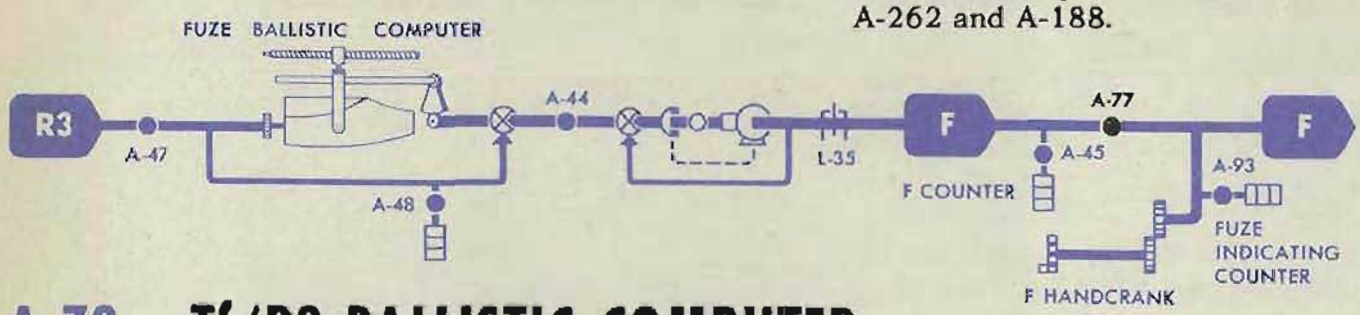


Adjustment

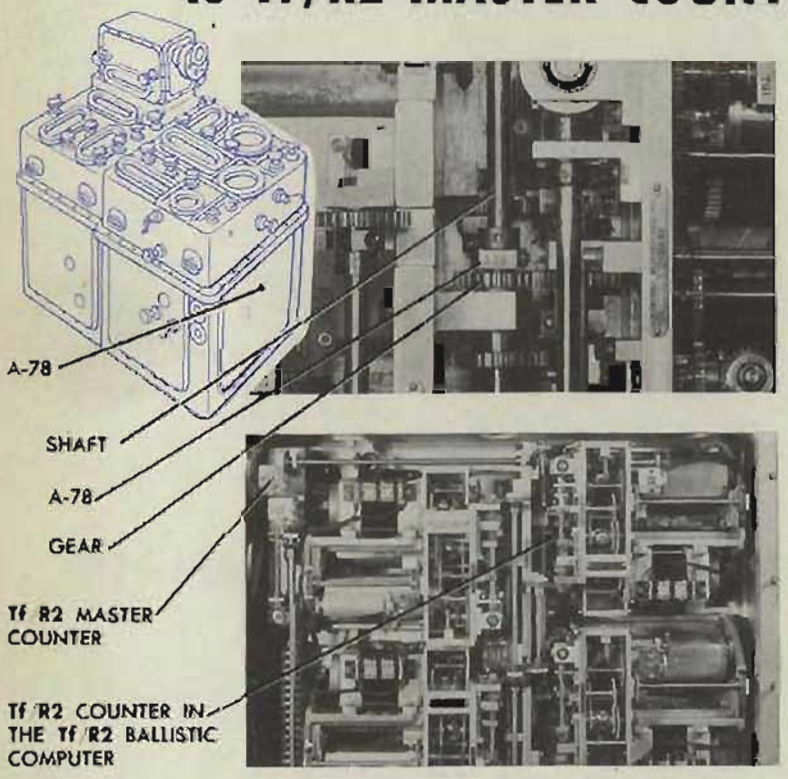
If the counters do not agree, check A-93. Make A-77 slip-tight.

Use the *F* handcrank to bring the *F* indicating counter to the same reading as the fuze ballistic computer counter.

Tighten A-77 and recheck.
On Ser. Nos. 781 and higher, check A-262 and A-188.



A-78 Tf/R2 BALLISTIC COMPUTER to Tf/R2 MASTER COUNTER



Location

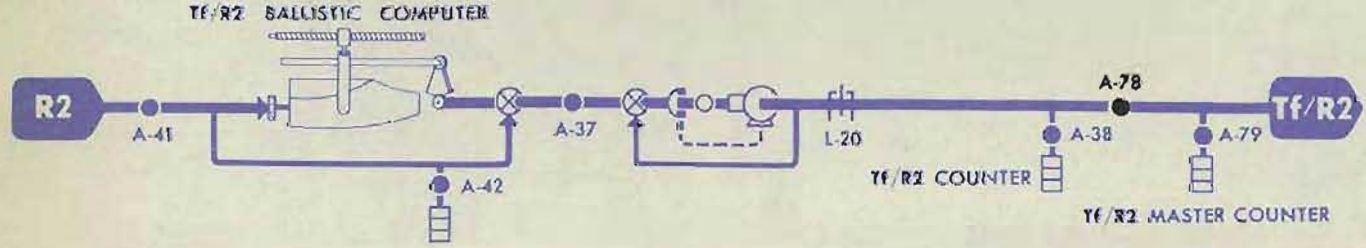
A-78 is under cover 4.
Both *Tf/R2* counters are under cover 4.

Check

Both *Tf/R2* counters should agree.

Adjustment

If the counters do not agree, make A-78 slip-tight.
Hold the spur gear below A-78 and turn the shaft until the *Tf/R2* master counter matches the ballistic counter.
Tighten A-78 and recheck.



A-79 Tf/R2 MASTER COUNTER to ELEVATION PREDICTION MULTIPLIER

Location

A-79 is under cover 4, below the gear on the drum of the *Tf/R2* master counter.

IMPORTANT

Before this counter can be set at the check value, A-78 and A-133 must be loosened.

Check

Set the *Tf/R2* counter at 0.00115 by turning the shaft line to the counter. The lead screw of the elevation prediction multiplier should now be in a position where full travel of the $RdE - K_1WrE$ input rack will cause no movement of the *Vtw'* output rack.

Turn the power ON.

Pull the *Vs* handcrank OUT.

Loosen A-134 and turn the spur gear next to the clamp to run the $RdE - K_1WrE$ rack from limit to limit. Motion of the *V* follow-up output gearing indicates movement of the *Vtw'* output rack.

Adjustment

If the *V* follow-up output gearing moves, make A-79 slip-tight. Gently turn the shaft below A-79 until the multiplier lead screw is at its lower limit. Hold the shaft against the lower limit and slip the *Tf/R2* counter to 0.001095.

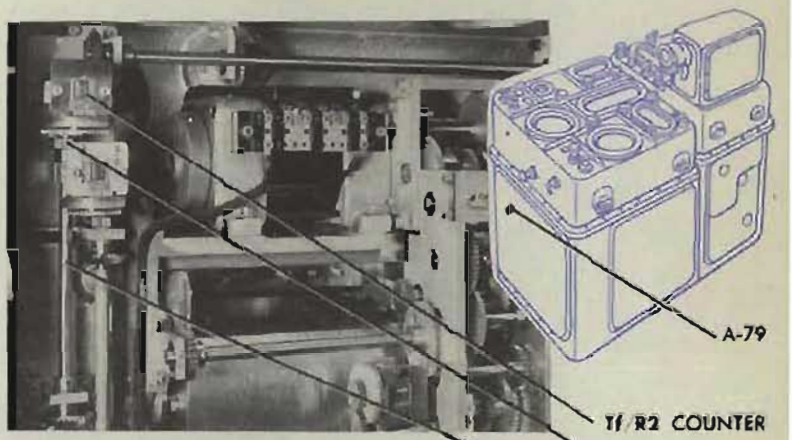
Turn the shaft until the *Tf/R2* counter again reads 0.00115.

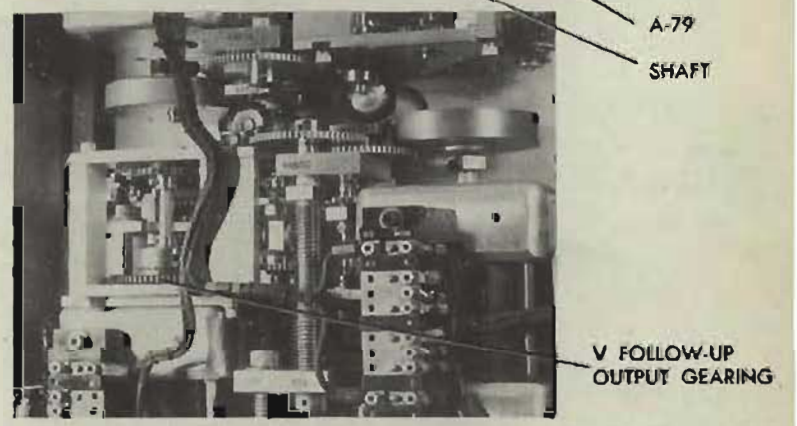
Repeat the check.

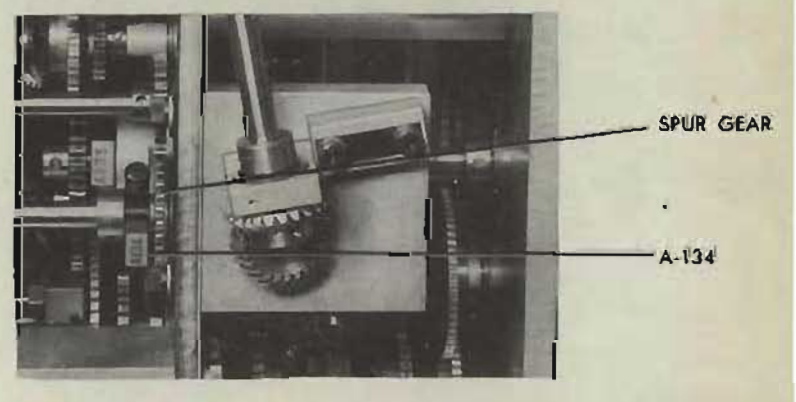
If the adjustment is still off, correct slightly by turning the shaft below A-79 until the *Tf/R2* input screw is at its zero position. This is the position at which full travel of the $RdE - K_1WrE$ input rack produces no movement of the *V* follow-up output gearing. Hold the *Tf/R2* input shaft and reset the counter at 0.00115.

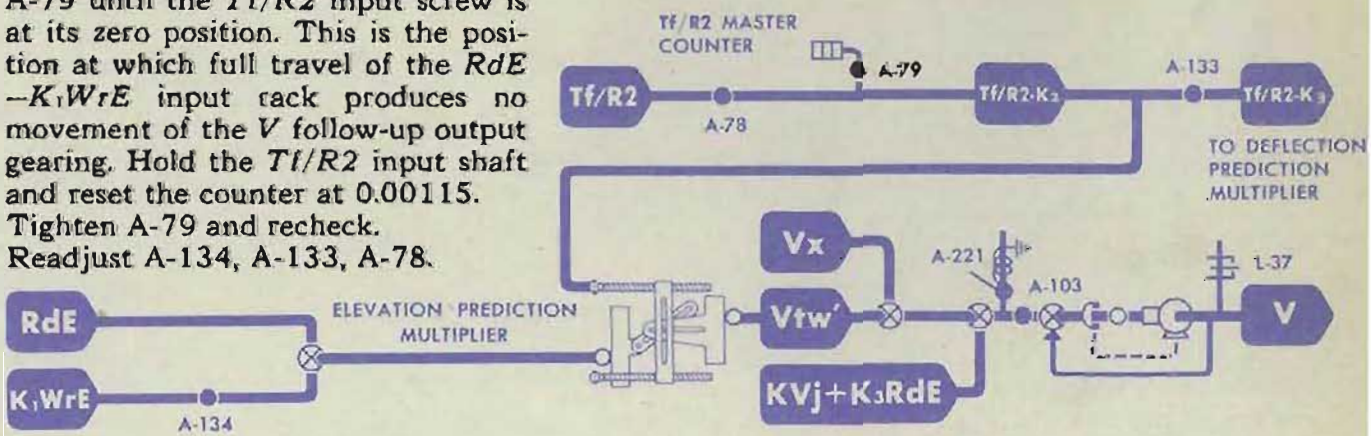
Tighten A-79 and recheck.

Readjust A-134, A-133, A-78.









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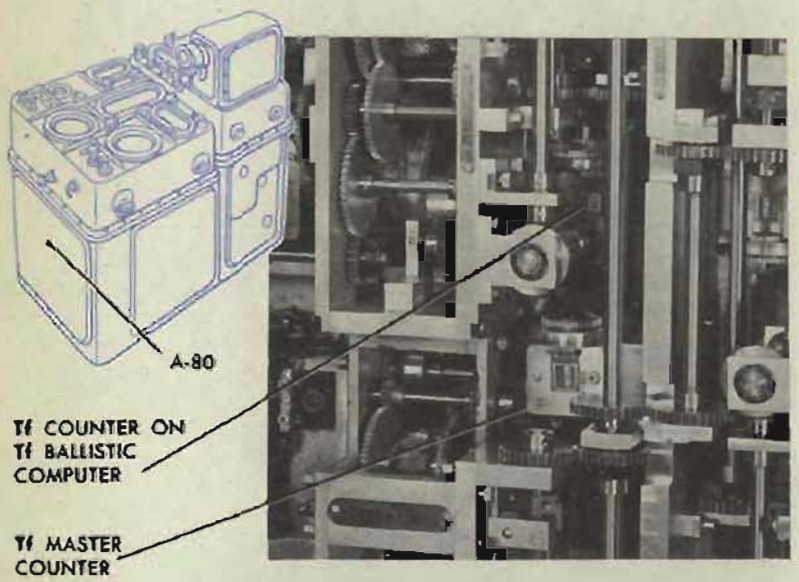
A-80 Tf BALLISTIC COMPUTER to Tf MASTER COUNTER

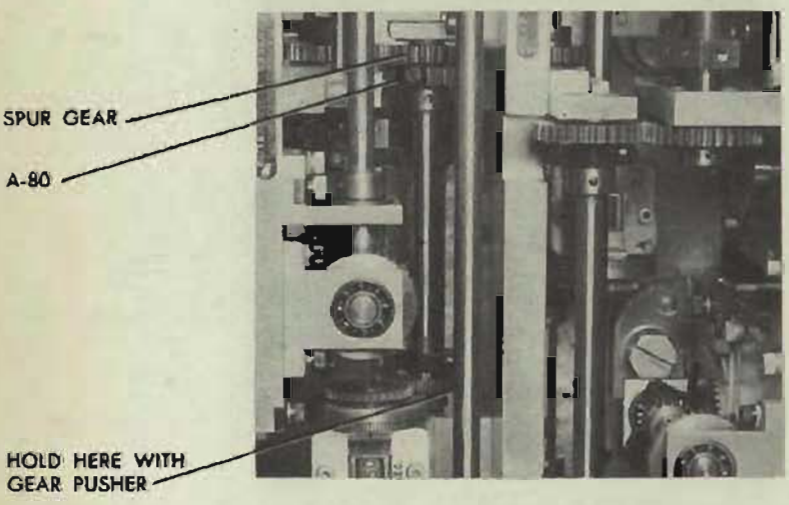


Location

A-80 is under cover 4, to the right of the *Tf* ballistic computer.

Check

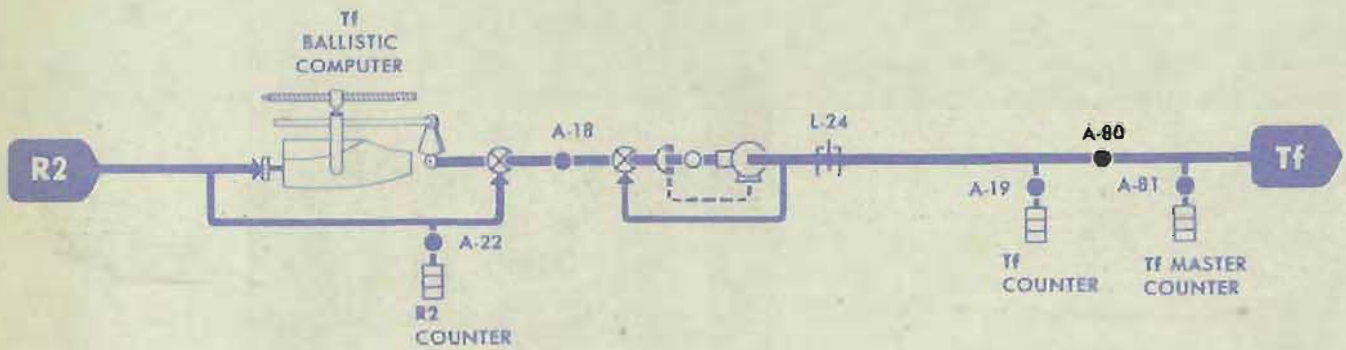
The *Tf* master counter and the *Tf* ballistic counter should agree.



Adjustment

If the counters do not agree, make A-80 slip-tight. Turn the spur gear above the clamp until the *Tf* counter in the ballistic computer agrees with the *Tf* master counter.

Tighten A-80 and recheck.



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A-81 Tf MASTER COUNTER to RANGE PREDICTION MULTIPLIER

Location

A-81 is under cover 4, at the lower right of the *Tf* ballistic computer, above the *Tf* counter.

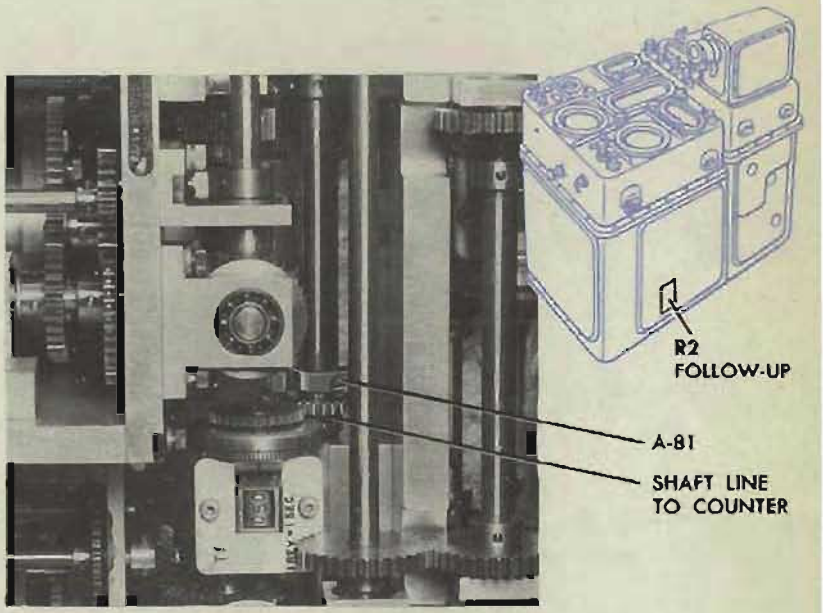
Check

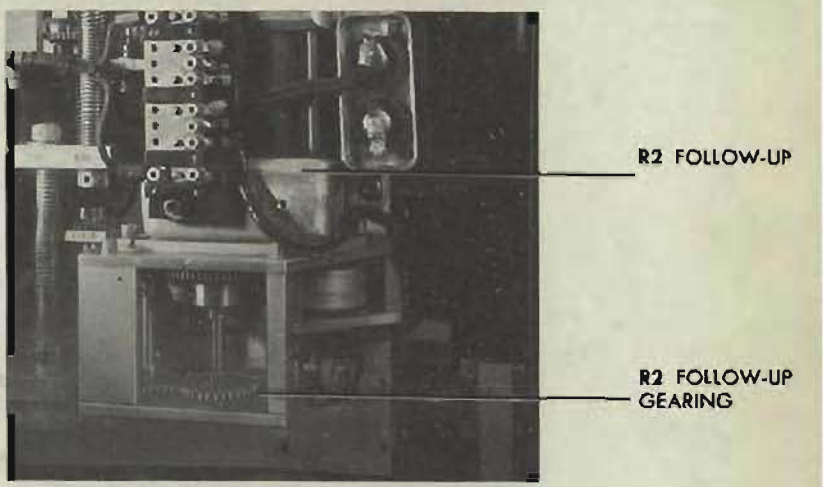
Remove leads A and AA from the *Tf* follow-up.
Turn the power ON.
Set the *Tf* counter at 5 seconds (050) by turning the shaft line leading to the counter. On Mods 8 and 12, set *Tf* at 8 seconds (080).
Wedge the line.
The lead screw input of the range prediction multiplier should now be positioned so that movement of the $K\ (dRs + K_1WrR)$ input rack causes no movement of the *Rtw'* output rack.
To move the input rack, A-135 must be loosened and readjusted later.
The *R2* follow-up gearing indicates *Rtw'* output.
Make indicating marks on the *R2* follow-up output gearing.
Turn the small gear behind A-135 to move the input rack from limit to limit.
The indicating marks should remain matched.

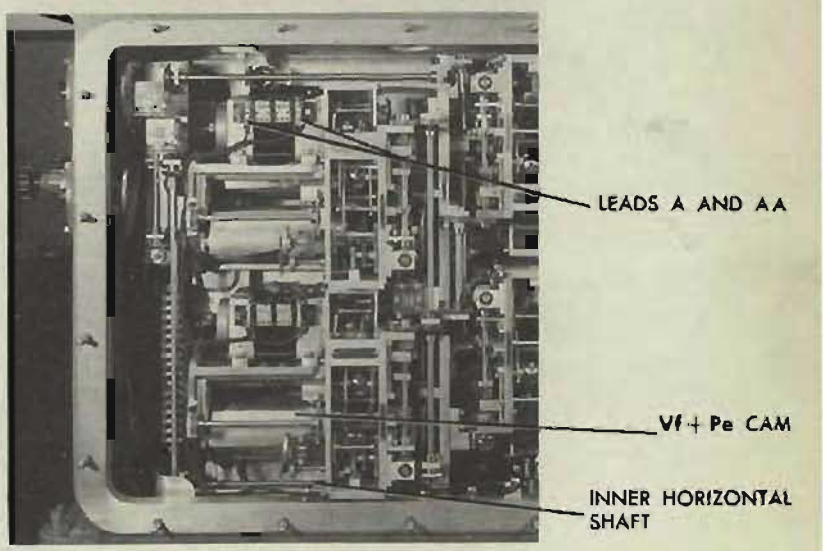
Adjustment

If there is motion of the *R2* follow-up output gearing, the lead screw input can be set approximately as follows:

Loosen A-80.
Remove the wedge. Use the inner horizontal shaft below the *Vf + Pe* ballistic cam to turn *Tf* gently in a decreasing direction until the lead screw reaches its lower limit. Set the *Tf* counter at 99.05. On Mods 8 and 12, set *Tf* at 99.21. Make A-81 slip-tight. Turn the shaft to turn the lead screw in an increasing direction until the *Tf* counter reads 5 seconds (050), or 8 seconds (080) on Mods 8 and 12.







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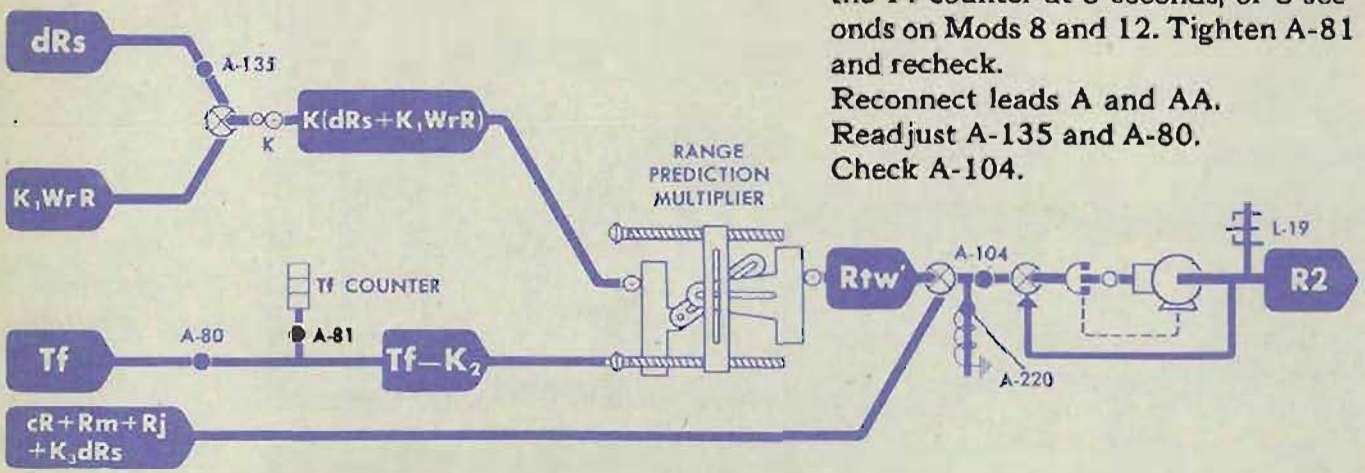
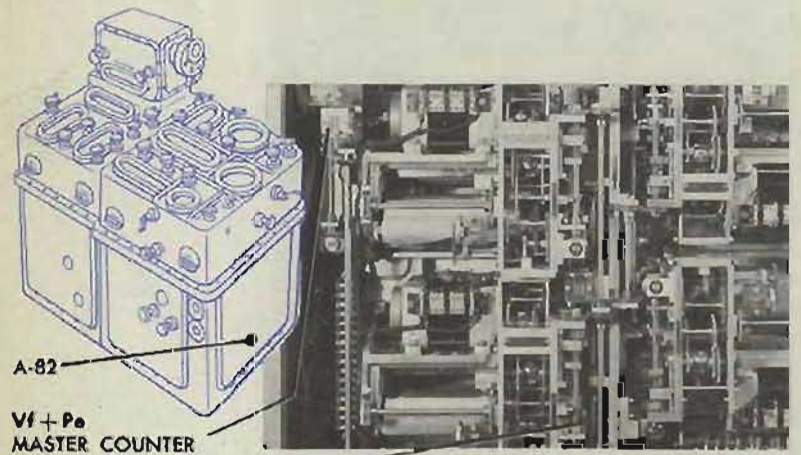
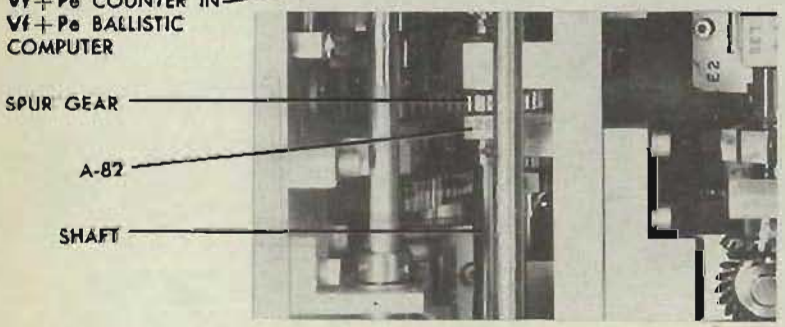
To refine the adjustment, move the input rack from limit to limit by turning the gear behind A-135. Note any output on the *R2* follow-up output gearing. Turn the *Tf* gearing to correct for *one half* this output. When the multiplier lead screw is at the zero position where full travel of the input rack produces no output, hold the shaft going to the lead screw and reset the *Tf* counter at 5 seconds, or 8 seconds on Mods 8 and 12. Tighten A-81 and recheck.
Reconnect leads A and AA.
Readjust A-135 and A-80.
Check A-104.



A-82 Vf + Pe BALLISTIC COMPUTER to Vf + Pe MASTER COUNTER





Location

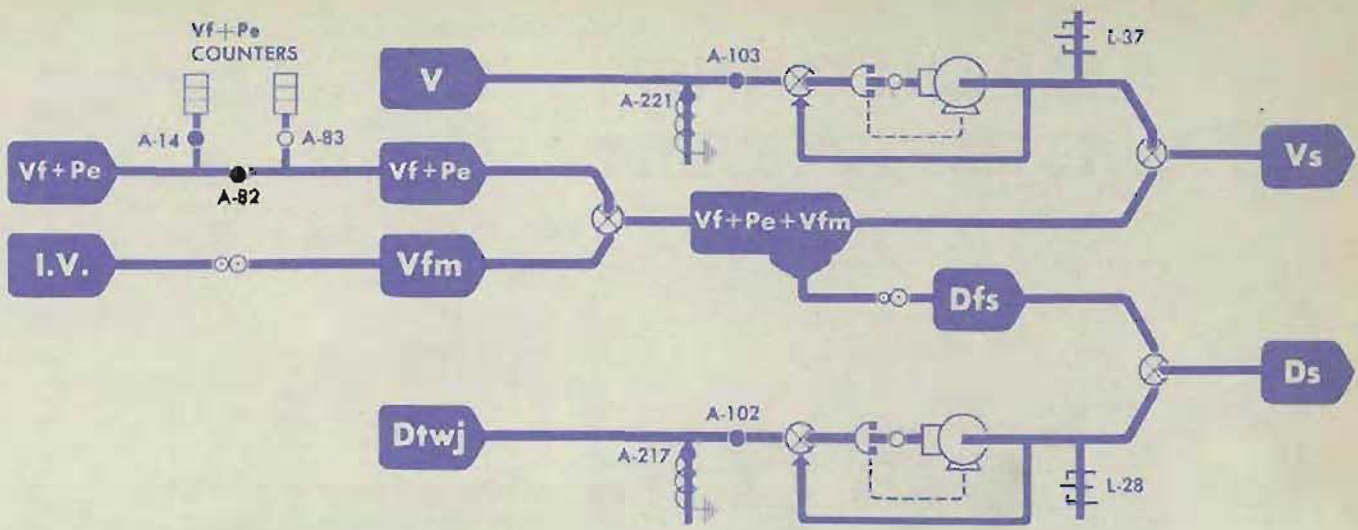
A-82 is under cover 4, to the right of the *Vf + Pe* ballistic computer.
Both *Vf + Pe* counters are under cover 4.

Check

The *Vf + Pe* counters should agree.

Adjustment

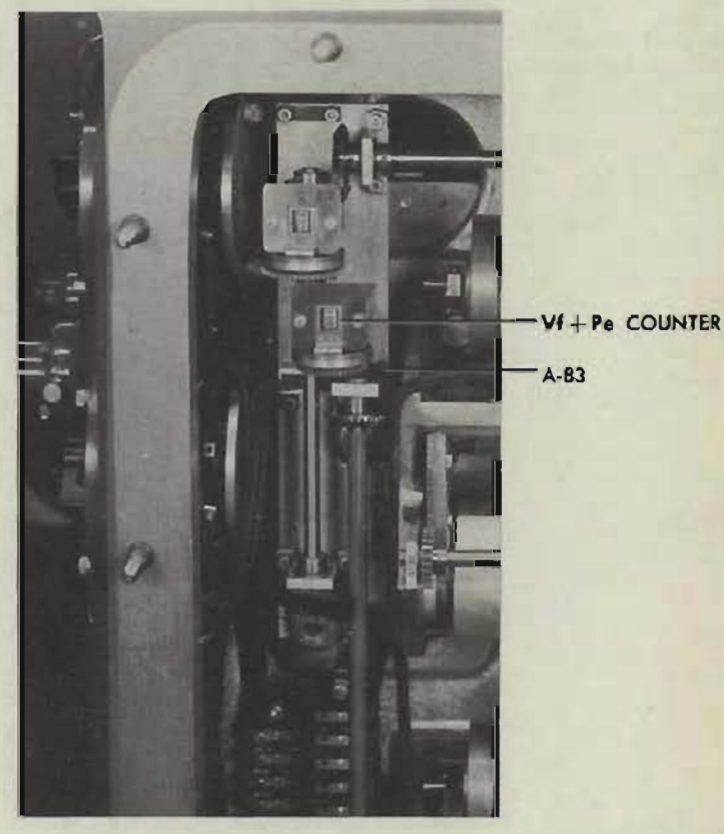
If the counters do not agree, make A-82 slip-tight.
Hold the spur gear above the clamp and match the *Vf + Pe* master counter to the *Vf + Pe* ballistic computer counter by turning the shaft below A-82.
Tighten A-82 and recheck.
Check A-83, A-102, and A-103.



A-83 ASSEMBLY CLAMP

Location

A-83 is under cover 4, below the *Vf + Pe* counter.

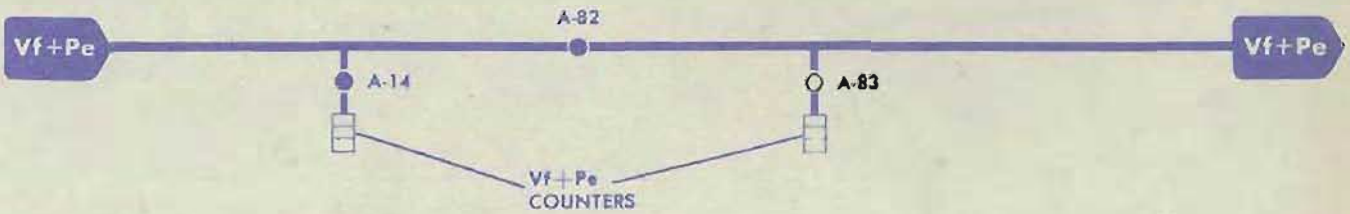


Check

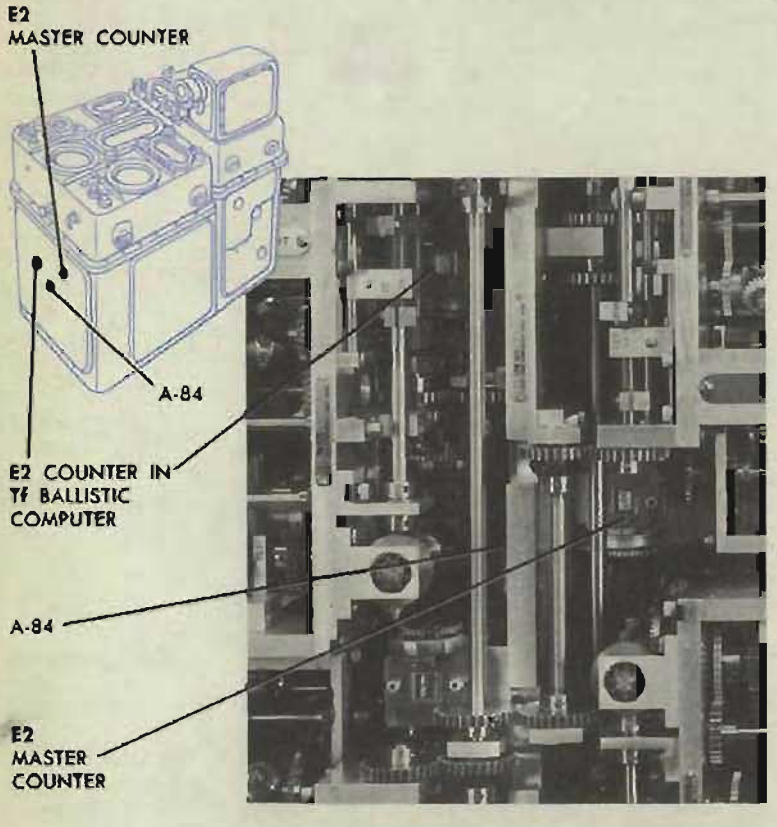
A-83 should be tight.

Adjustment

If A-83 is loose, tighten it.
Check A-82.



A-84 Tf BALLISTIC COMPUTER to E2 MASTER COUNTER



Location

A-84 is under cover 4, to the right of the *Tf* ballistic computer.

The *Tf* ballistic computer *E2* counter is located to the right of the *Tf* ballistic cam.

The *E2* master counter is under cover 4, in the center of the ballistic section above A-72.

Check

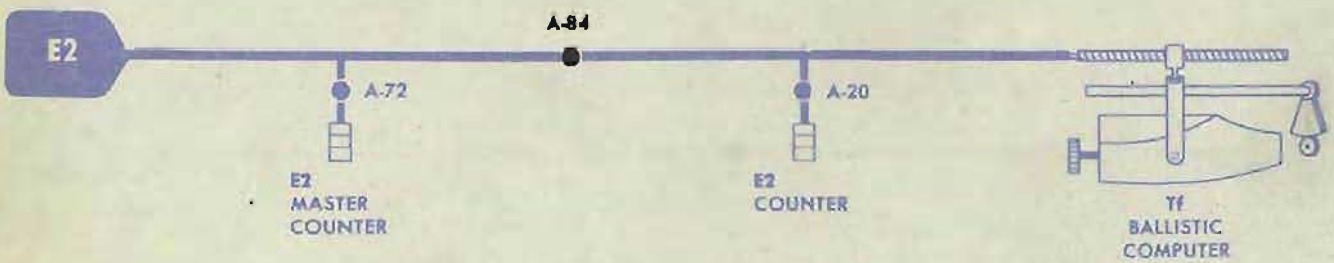
Both *E2* counters should agree.

Adjustment

If the counters do not agree, turn the power OFF. Make A-84 slip-tight.

Use a gear pusher to turn the spur gear above clamp A-84 until the *E2* counter in the *Tf* ballistic computer agrees with the *E2* master counter.

Tighten A-84 and recheck.



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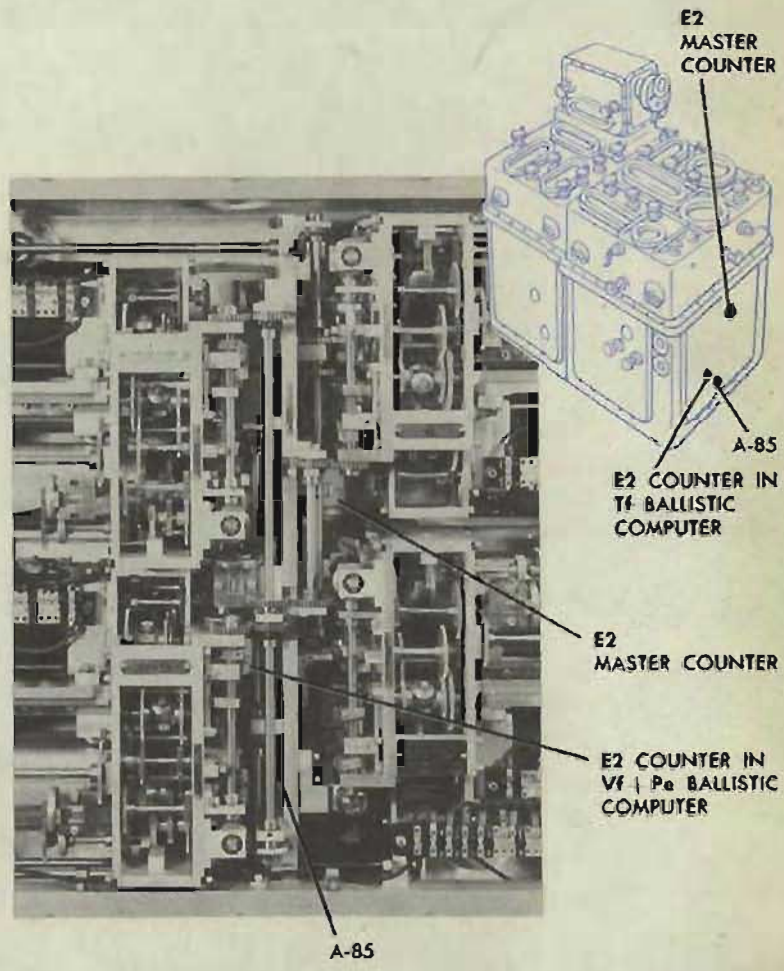
A-85 Vf + Pe BALLISTIC COMPUTER to E2 MASTER COUNTER

Location

A-85 is under cover 4, to the right of the *Vf + Pe* computer.

The *Vf + Pe* ballistic computer *E2* counter is above A-85.

The *E2* master counter is under cover 4, in the center of the ballistic section above A-72.



Check

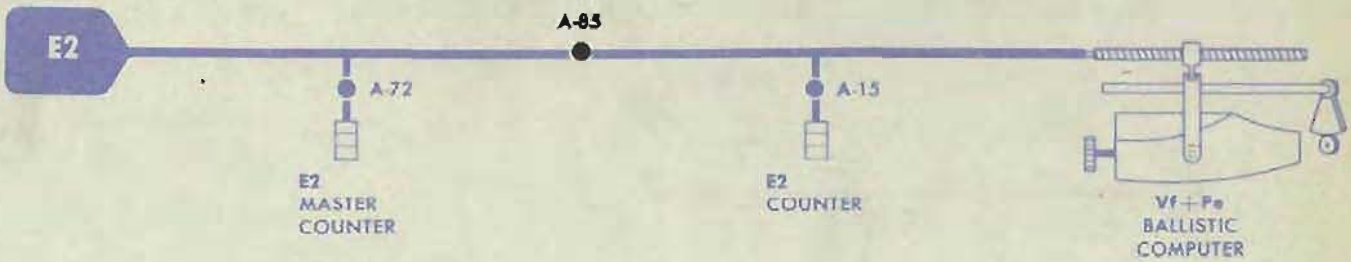
The *E2* counters should agree.

Adjustment

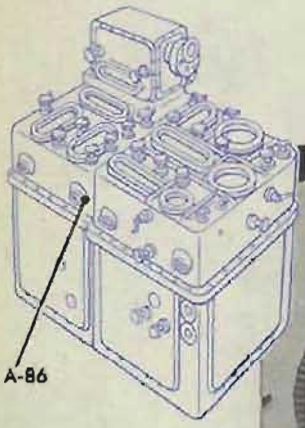
If the counters do not agree, make A-85 slip-tight.

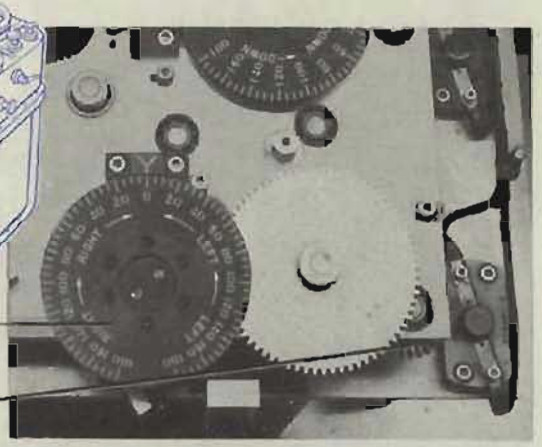
Turn the spur gear above the clamp, until the counters agree.

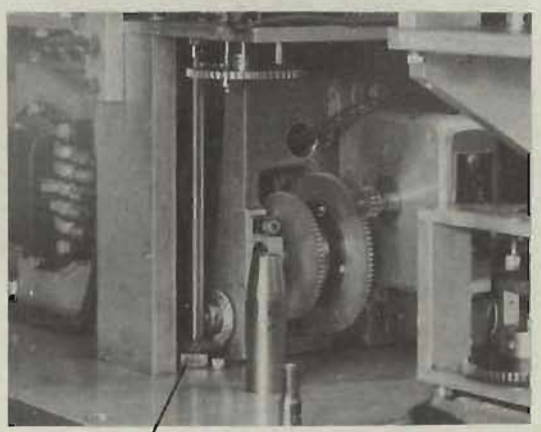
Tighten A-85 and recheck.



A-86 Dj DIAL to Dj RECEIVER







Location

A-86 is under cover 2.

Check

Turn the power ON.

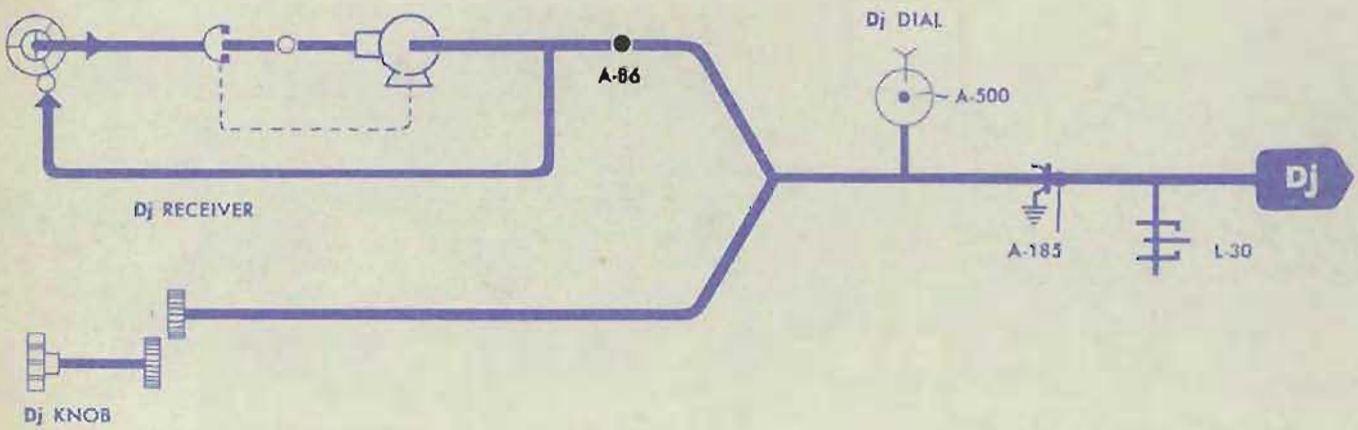
Pull the *Dj* knob OUT.
From the director, transmit 0 deflection spot.
The *Dj* follow-up will synchronize at its central position.
The *Dj* dial should read 0 mils.

Adjustment

If the *Dj* dial does not read 0, make A-86 slip-tight. Bring the *Dj* dial to 0 by turning the *Dj* input gear.

Tighten A-86, and recheck.

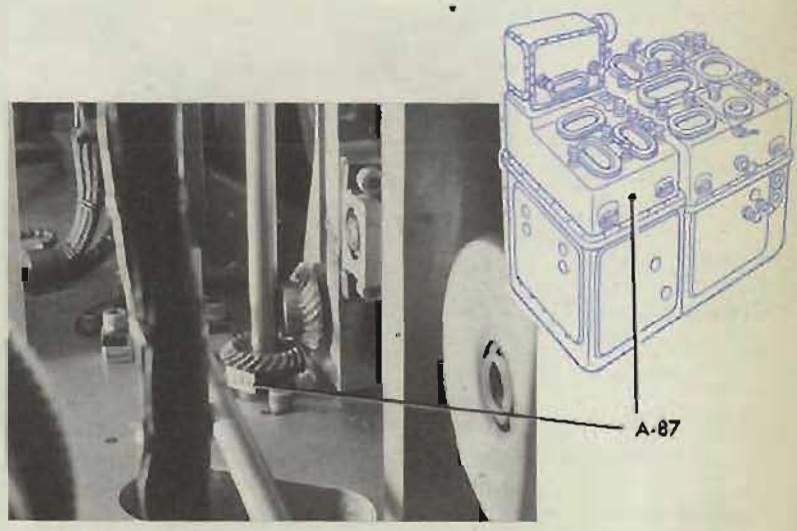
Check A-500.



A-87 Vj DIAL to Vj RECEIVER

Location

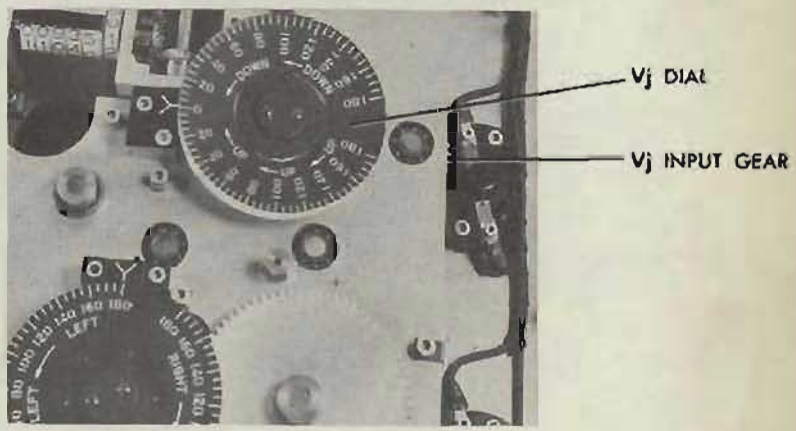
A-87 is under cover 2, near the main plate of the rear top section. It can be reached only from the rear.



Check

Turn the power ON.

Pull the *Vj* knob OUT.
From the director, transmit 0 elevation spot.
The *Vj* dial should read 0 mils.

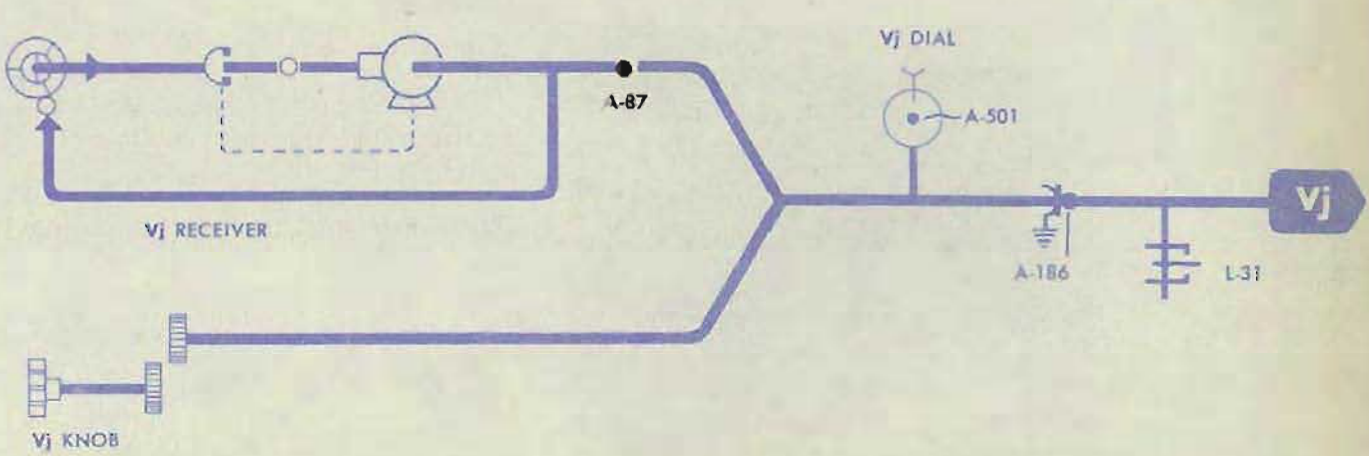


Adjustment

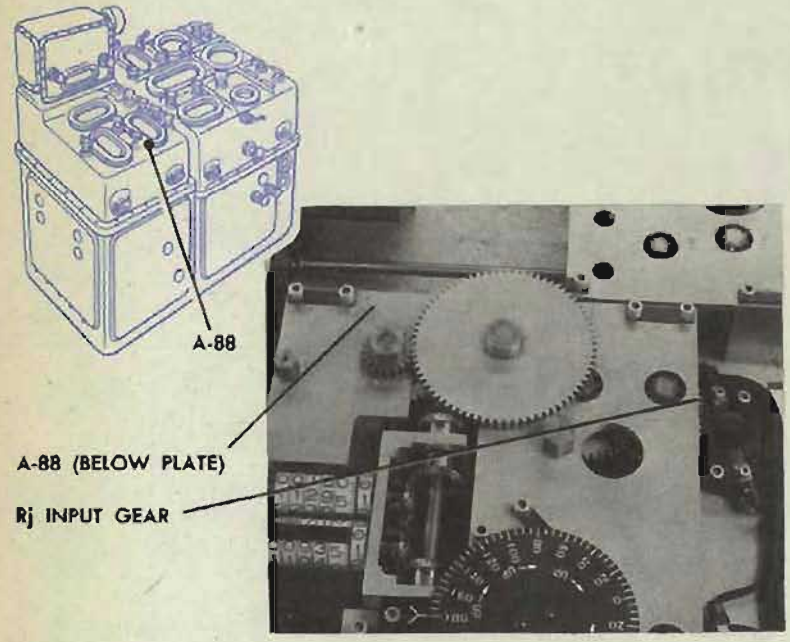
If the *Vj* dial does not read 0 mils, loosen A-87.
Bring the dial to 0 mils by turning the *Vj* input gear.

Tighten A-87 and recheck.

Check A-501.



A-88 Rj COUNTERS to Rj RECEIVER



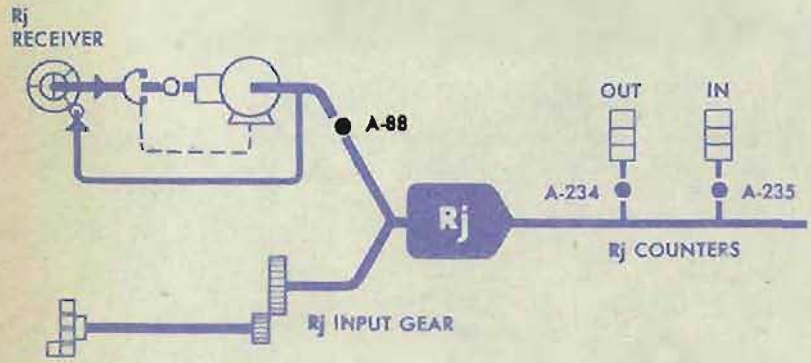
Location

A-88 is under cover 2, under the mounting plate to the right of the *Rj* counter, near the deck plate. It is reached from the left side of the instrument.

Check

Turn the power ON.

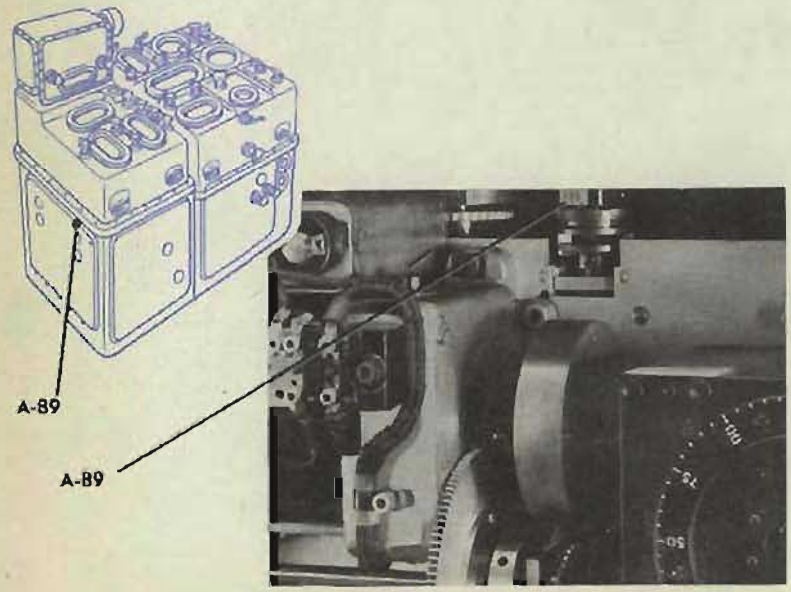
Pull the *Rj* handcrank OUT.
Transmit *Rj* from the director.
The computer *Rj* counters should agree with the director *Rj* dials.



Adjustment

If the *Rj* counters do not agree with the director *Rj* dials, make A-88 slip-tight. Make the counters agree with the director dials by turning the *Rj* input gear.
Tighten A-88 and recheck.
Check A-234, A-235.

A-89 Ds INDICATING to Ds MASTER COUNTER



Location

A-89 is under cover 7.

The *Ds* indicating counter is at the top of the indicating unit, next to the *Ds* handcrank.

The *Ds* master counter is under cover 8.

Check

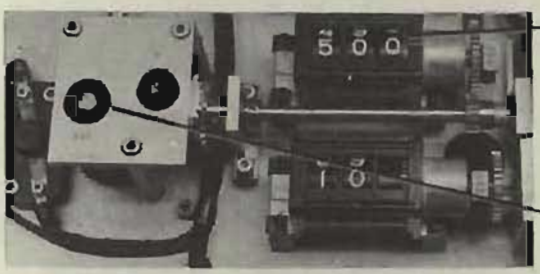
Both *Ds* counters should agree.

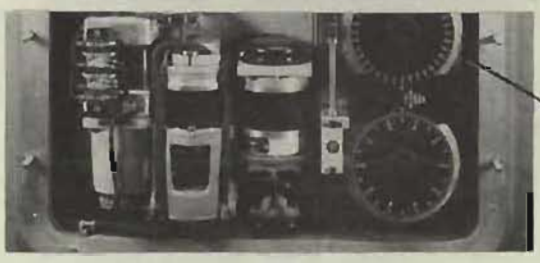
Adjustment

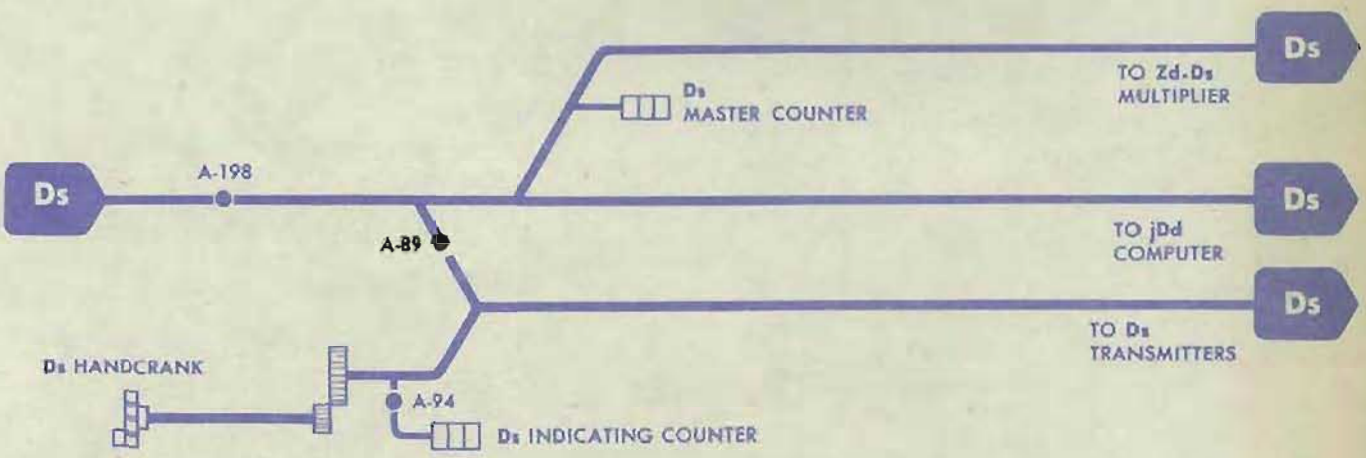
If the *Ds* counters do not agree, make A-89 slip-tight.
Turn the power OFF.
Wedge the output gearing of the *Dtwj* and *Vl* + *Pe* follow-ups.
Bring the *Ds* indicating counter to the same reading as the *Ds* master counter by turning the *Ds* input gear.
Tighten A-89 and recheck.

Remove the wedges from the *Dtwj* and *Vl* + *Pe* follow-up output gearing.

Check A-198 and A-94.





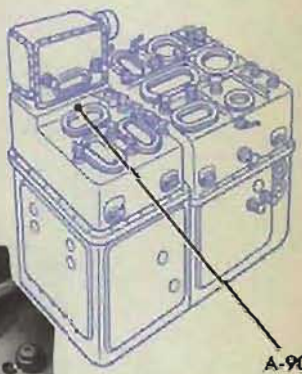


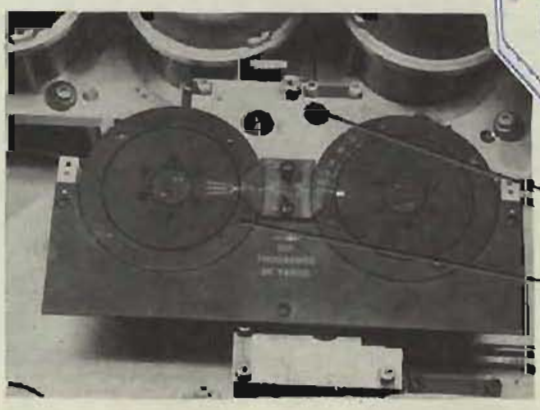
A-90 SYNC E DIALS to L-11

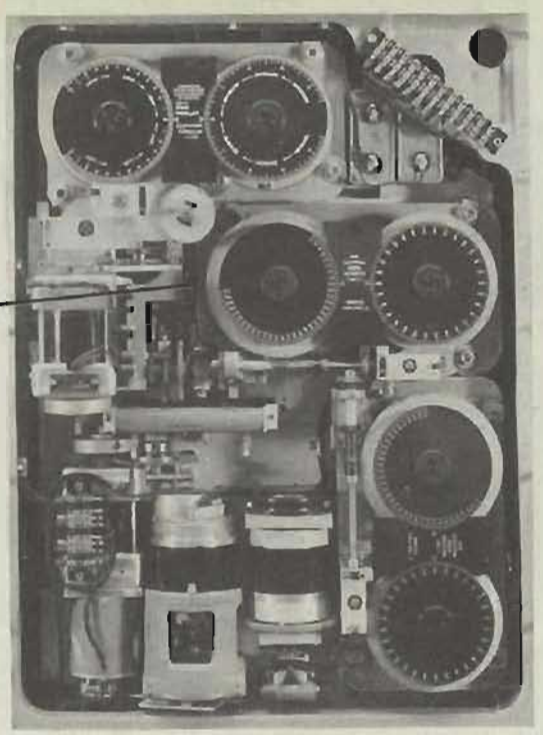
Location

A-90 is under cover 2, below the right half of the sync *E* dial mask. It can be reached through the small access hole, after the dial mask is removed.

L-11 is under cover 6, near the deck tilt multipliers.
The shaft is horizontal, and the lower limit is toward the left.







Check

Lower limit

Set *L* at 800′.
Set *E* at −5° with the sync *E* handcrank in the CENTER position. Then turn the handcrank counterclockwise in the OUT position until the limit of L-11 is reached.
The sync *E* dials should be matched at the fixed index.

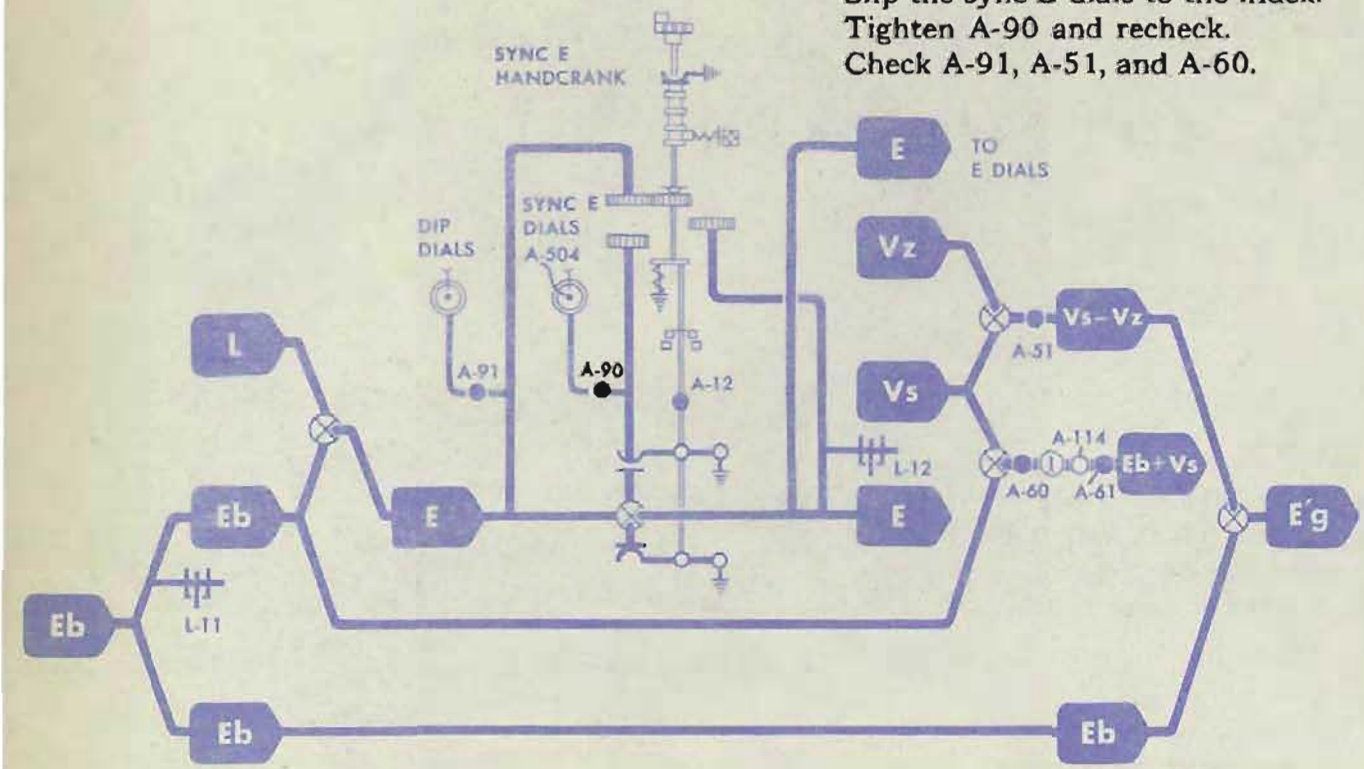
Upper limit

Set *L* at 3500′.
Set *E* at 85° with the sync *E* handcrank in the CENTER position. Then turn the handcrank clockwise in the OUT position until the limit of L-11 is reached. The sync *E* dials should be matched at the fixed index.

NOTE:
There may be a slight overtravel at each limit.

Adjustment

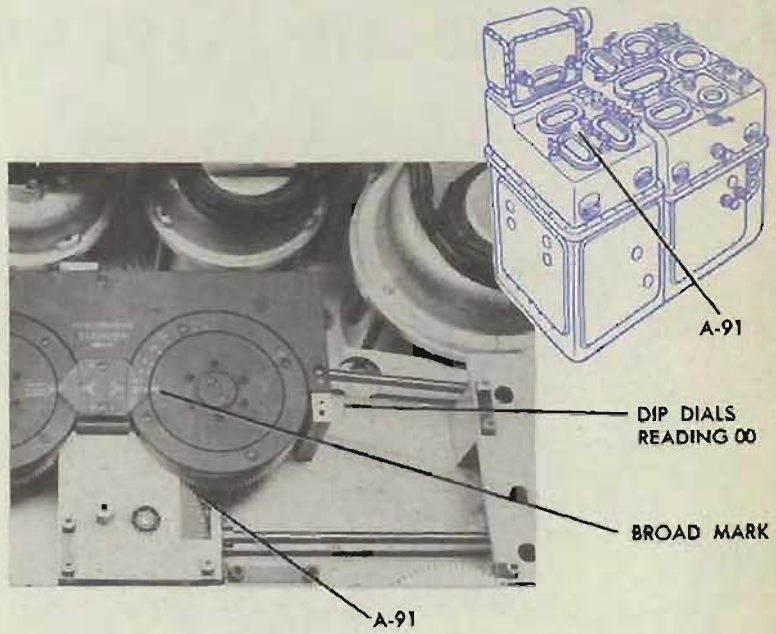
If the sync *E* dials do not match at the fixed index, at either limit of L-11, loosen A-90.
Slip the sync *E* dials to the index.
Tighten A-90 and recheck.
Check A-91, A-51, and A-60.



A-91 DIP DIALS to SYNC E LINE

Location

A-91 is under cover 2, below the left half of the sync *E* dial mask.



Check

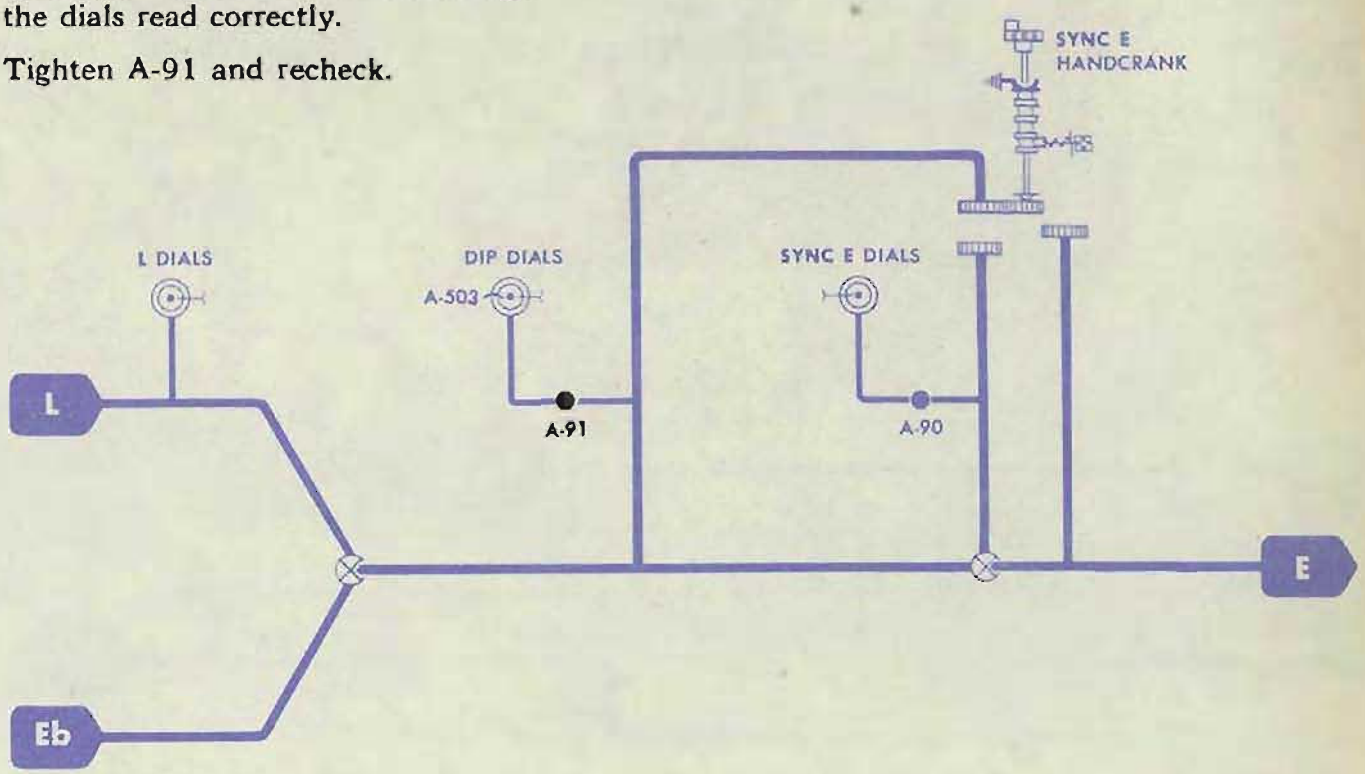
Set *L* at 2000′ on the computer *L* dials.
Set *E* at 0°, with the sync *E* handcrank at CENTER.
Match the sync *E* dials at the fixed index, with the sync *E* handcrank OUT.
The dip dials should now be positioned with the infinity mark and the counterclockwise edge of the broad index mark at the fixed index.

Adjustment

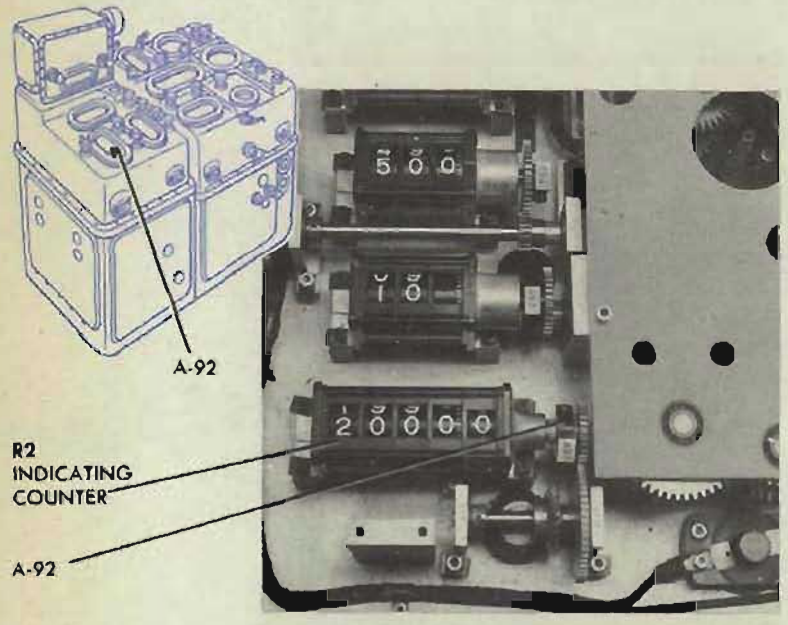
If the dip dials are not correctly positioned, slip-tighten A-91.

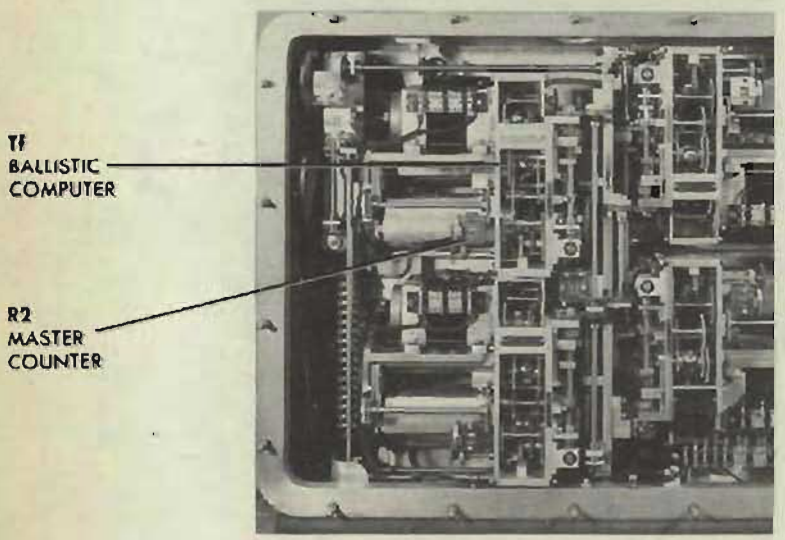
Use a gear pusher to turn the vertical bevel gear at the rear of A-91 until the dials read correctly.

Tighten A-91 and recheck.



A-92 R2 INDICATING to R2 MASTER COUNTER





Location

A-92 is on the *R2* indicating counter shaft. The *R2* master counter is under cover 4, in the *Tf* ballistic computer.

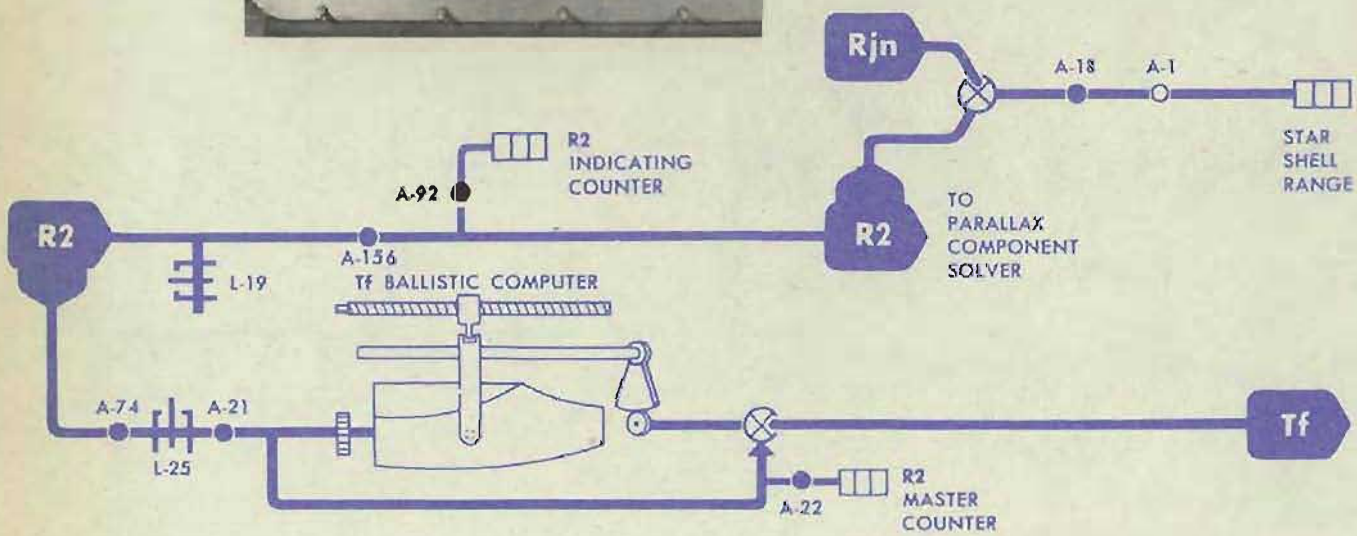
Check

The *R2* counter readings should agree.

Adjustment

If the *R2* indicating counter does not agree with the *R2* master counter, loosen A-92.
Turn the *R2* indicating counter until it agrees with the *R2* counter in the ballistic section.

Tighten A-92 and recheck.
Check A-18 in the star shell computer.



A-93 F INDICATING COUNTER to F TRANSMITTER

Location

A-93 is under cover 2 on the *F* counter shaft.

Check

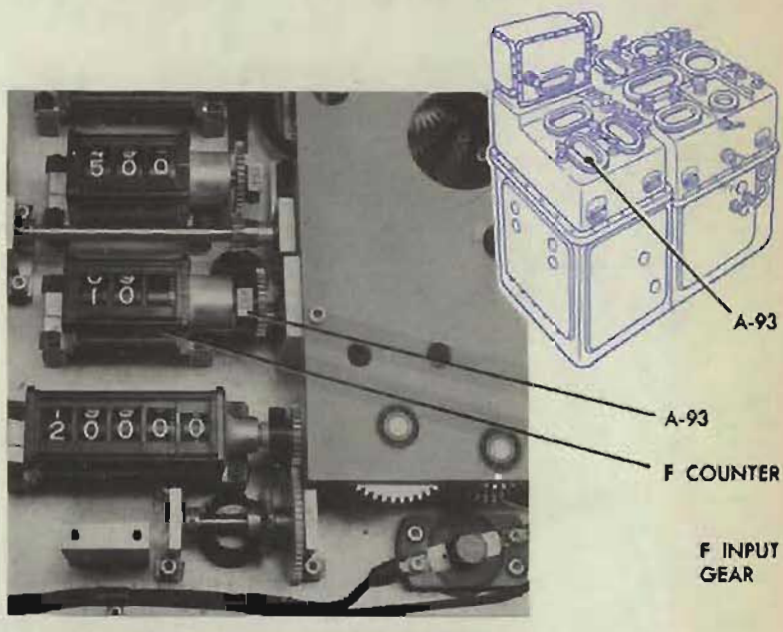
Set the *F* counter at 10 seconds. Use the *F* input gear.
The *F* transmitter should be on electrical zero.
Both synchros are on electrical zero when the scribe marks on the rotor gears match the fixed indexes.

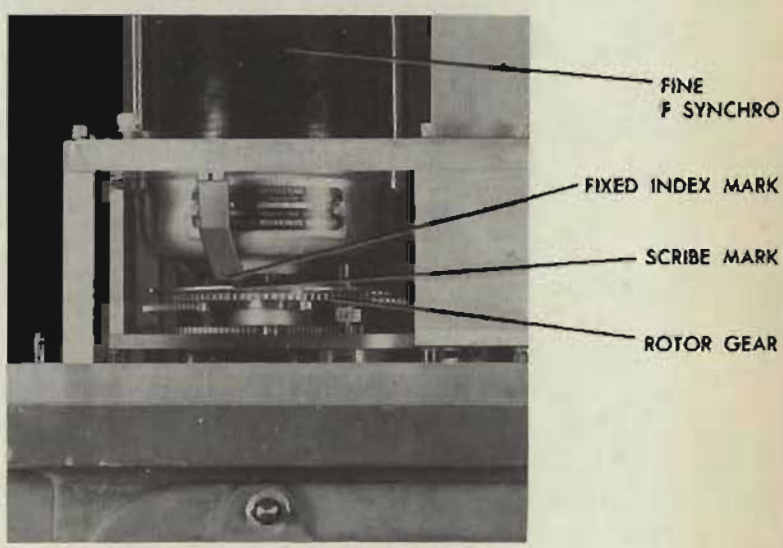
Adjustment

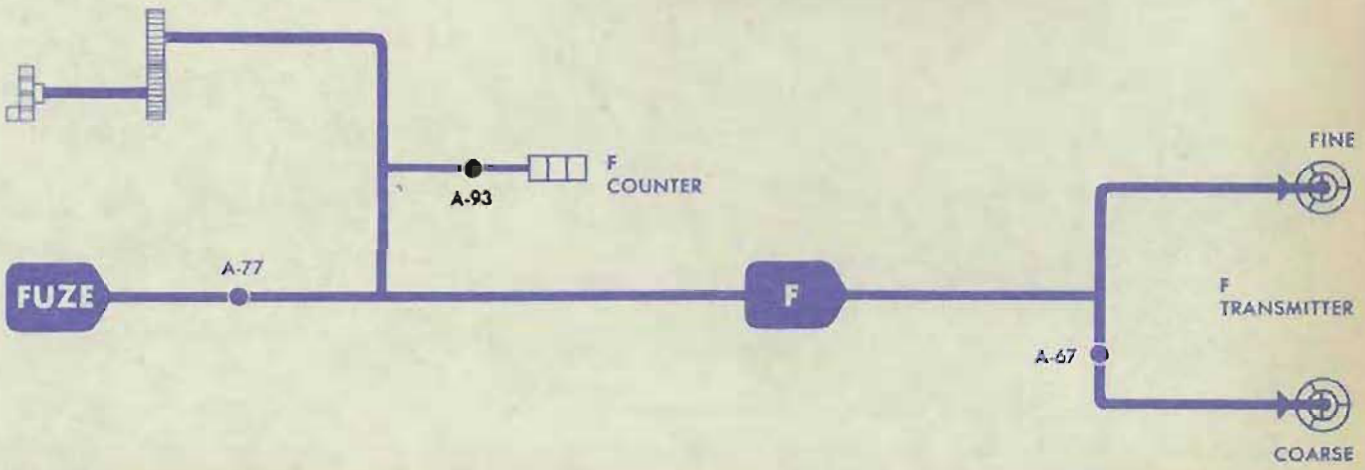
If the transmitter is not on electrical zero, make A-93 slip-tight.

Hold the *F* counter at 10 seconds.
Turn the *F* input gear until the transmitter is on electrical zero.

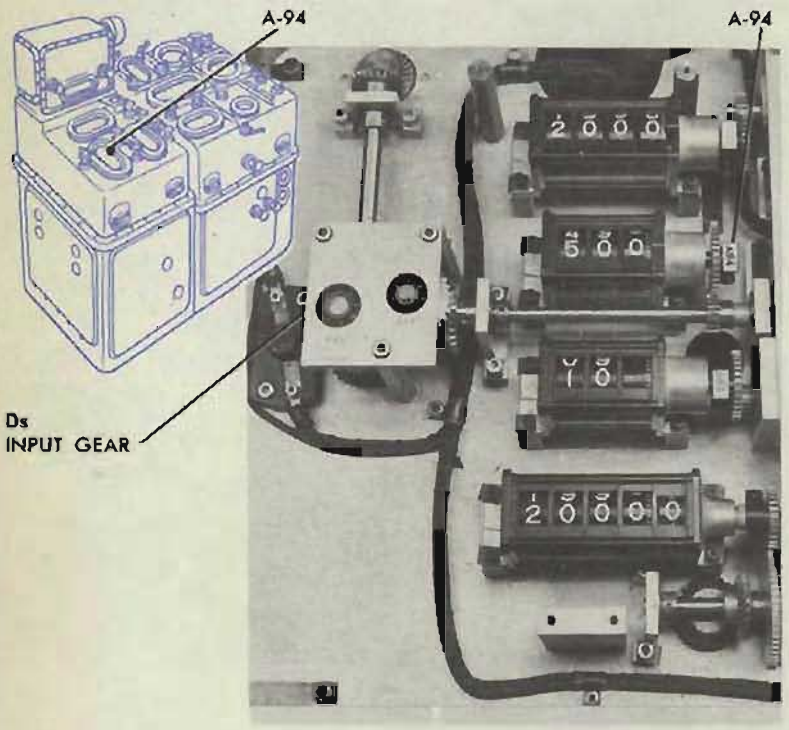
Tighten A-93 and recheck.
Readjust A-77 and check A-67.







A-94 Ds INDICATING COUNTER to Ds DOUBLE-SPEED TRANSMITTER



Location

A-94 is under cover 2, on the *Ds* indicating counter shaft.

Check

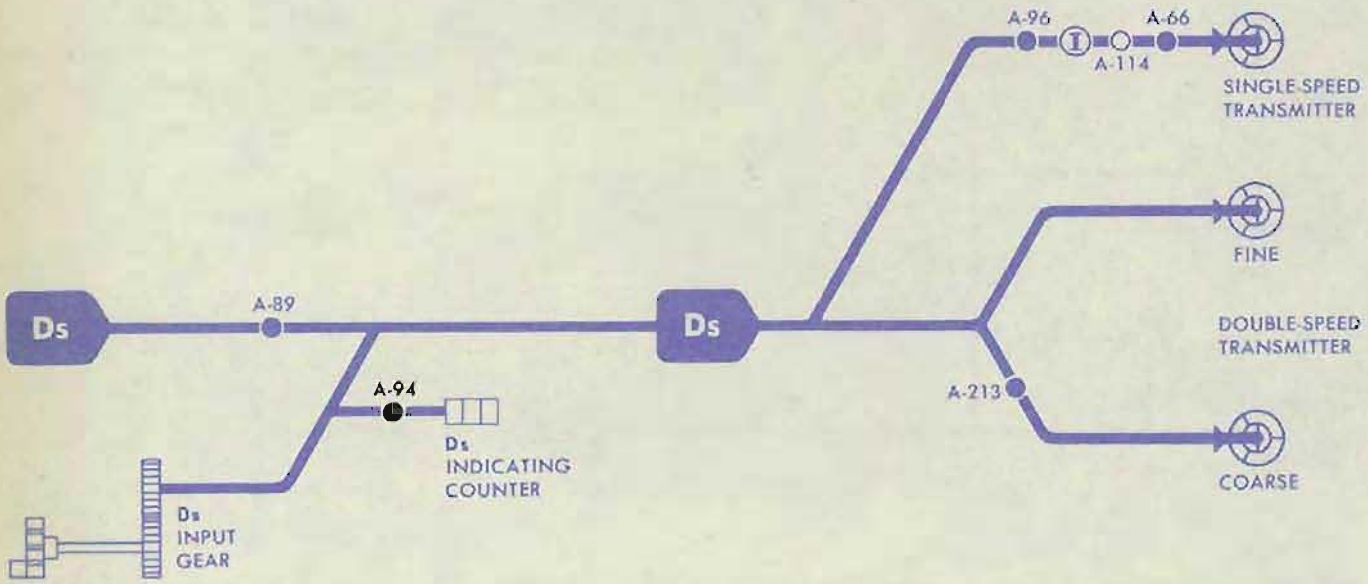
On Mods 0, 2, and 6, A-94 is an assembly clamp. Check that it is tight.

On other mods, proceed as follows: Set the *Ds* counter at 500 mils. The *Ds* double-speed transmitter should be on electrical zero. Both synchros are on electrical zero when the scribe marks on the rotors match the fixed indexes.

Adjustment

If both synchros are not on electrical zero, make A-94 slip-tight. Hold the counter at 500 mils and bring the synchros to electrical zero by turning the *Ds* input gear.

Tighten A-94 and recheck.
Readjust A-89 and check A-96.



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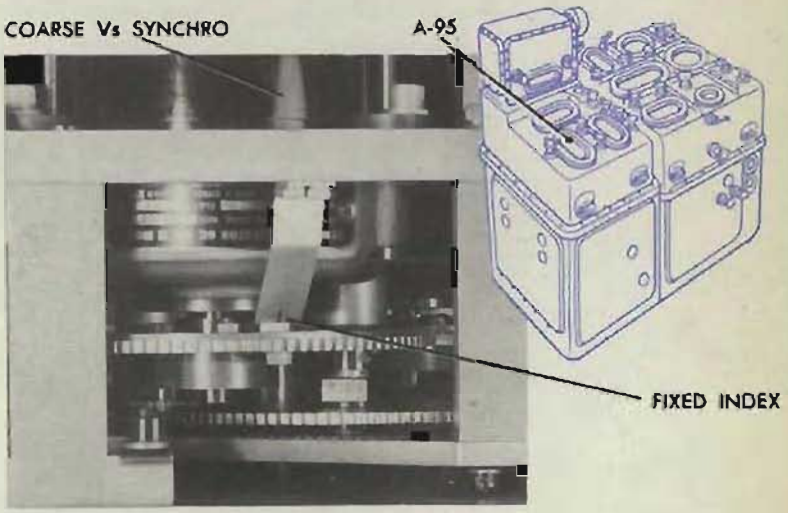
A-95 Vs INDICATING COUNTER to Vs DOUBLE-SPEED TRANSMITTER

Location

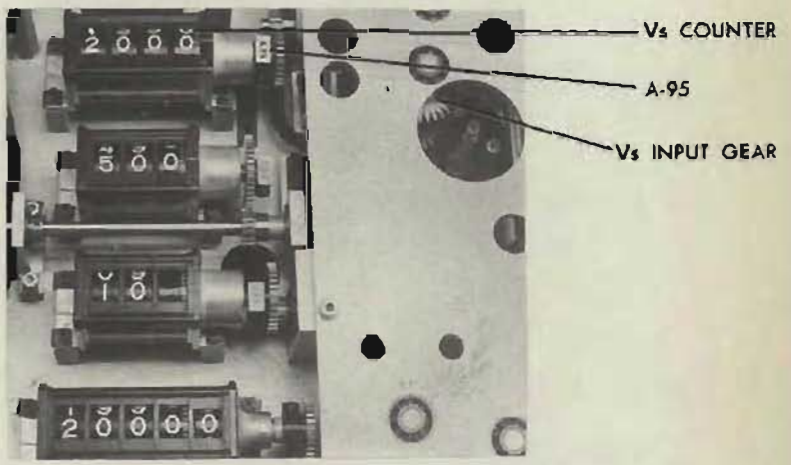
A-95 is under cover 2, on the *Vs* counter shaft.



Check

On Mods 0, 2, and 6, A-95 is an assembly clamp. Check that it is tight.

On other mods, proceed as follows: Set the *Vs* counter at 2000′. Use the *Vs* input gear. The *Vs* double-speed transmitter should now be on electrical zero. Both synchros are on electrical zero when the scribe marks on the rotors match the fixed indexes.



Adjustment

If both synchros are not on electrical zero, make A-95 slip-tight. Hold the counter at 2000′ and bring the synchros to electrical zero by turning the *Vs* input gear.

Tighten A-95 and recheck.
Readjust A-55 and check A-97.