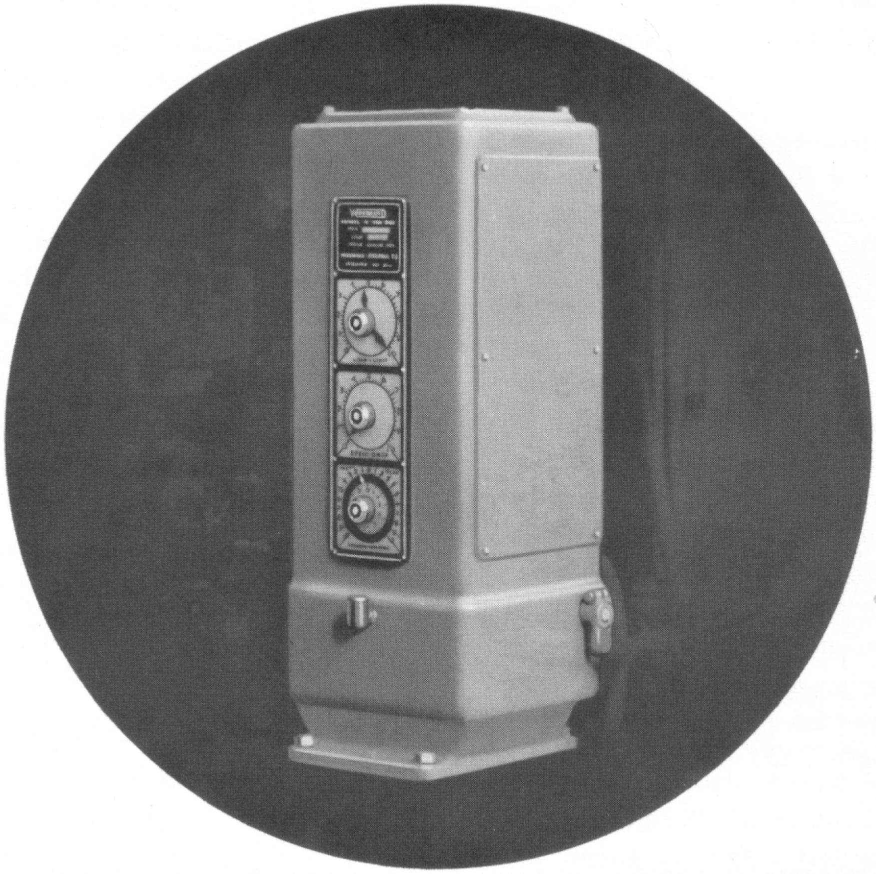
02002 A

WOODWARD

TYPE IC GOVERNORS

BULLETIN 02002 A



WOODWARD GOVERNOR CO.

ROCKFORD, ILLINOIS

SECTION I

INSTRUCTIONS TO POWER PLANT OPERATORS

Your Woodward Governor is a precision instrument, but there is nothing mysterious about it. You don't have to be an engineer or a scientist to operate it and get the finest possible governing.

The illustration on the front cover shows the location of all the controls mentioned below. All of them may be adjusted while the engine is running.

STARTING ENGINE: With the knob on the top dial (LOAD-LIMIT) turn the red hand to a point just a little higher than where the black hand usually runs when the engine is idling (probably somewhere between 1½ and 4 on the dial). This prevents the engine from getting too much fuel and accelerating too rapidly. Start the engine.

When the engine is sufficiently warmed up, turn the red hand way over to 10. If for any reason you want to keep this engine from taking full load, set the red hand at a lower point. The black hand (which shows the fuel control position) can never go beyond the red hand.

If the engine carries any load other than an A.C. generator, the governor is now ready for load, so apply it when ready. You can adjust the speed of the engine by turning the synchronizer knob on the governor, or by operating the synchronizing switch on the switchboard. This switch controls a small electric motor inside the governor which turns the synchronizer knob. If your engine drives an A.C. generator, set the speed droop at about 5 and then synchronize in the usual way. After the unit is on the line, load can be picked up by turning the synchronizer toward FAST or dropped off by turning it toward SLOW.

THE FOLLOWING INSTRUCTIONS APPLY ONLY TO A.C. GENERATING PLANTS WHICH ARE OPERATING ALONE. THEY DO NOT APPLY IF YOUR PLANT IS TIED IN WITH OTHER PLANTS.

In order to maintain 60 cycle frequency most easily, adjust your governors as follows. These instructions should be followed unless the manufacturer of your engine has given you other instructions.

All but one of the governors on the line at one time should have speed droop. If you have any engines which do not have a Woodward Governor, they probably have from 3% to 5% speed droop. Therefore:

(a). Set the speed droop dials of all governors (except one) at about 3 on the dial if you have all Woodward Governors.

(b). If you have some engines that do not have Woodward Governors, set all (except one) of the speed droop dials at 5 or higher.

Set one governor on zero speed droop or as far to the left as the pointer will go. THIS ENGINE WILL NOW TAKE ALL OF THE LOAD CHANGES WITHIN THE LIMIT OF ITS CAPACITY, and when you have learned how to adjust it closely enough, it will hold the normal frequency to very close limits. You will have to adjust it only once a day or less to keep your electric clock correct within a few seconds a day. Turning the inner dial on the synchronizer one small division will make your electric clock change about 8 seconds a day.

You should watch your load on the watt meters or on the governor load indicators, and when you find that the engine whose governor has zero speed droop is almost to full load, PICK UP MORE LOAD ON THE OTHER ENGINES. If you find that it has almost no load, TAKE SOME LOAD OFF THE OTHER ENGINES. After you have run this way a while, you will learn what times during the day you will have to do this.

You adjust your speed or frequency (cycles) by means of synchronizer adjustment on the engine with zero speed droop, and you adjust load by changing speed (synchronizer) setting on the other engines.

THE FOLLOWING INSTRUCTIONS APPLY IF YOUR PLANT IS TIED IN WITH OTHER PLANTS.

Set the speed droop dial at about 5.

Start engine and synchronize as above.

If the engine tries to take too great a share of the load changes, set the speed droop higher. If it does not take its share, set it lower.

Pick up load in the usual manner by adjusting the synchronizer knob.

It may be that if your system is not too large and you have one unit that is large enough to take care of any load changes that may occur, you can set its governor on zero speed droop so it will do all the regulating for the system, just as though it were a single plant. The best way to find out if you can this is to try

it, first making sure that the load limit is set so that the engine cannot be overloaded.

STOPPING ENGINE: Take the load off the engine by turning the synchronizer knob toward SLOW.

After the unit has been taken off the line, shut it down in the usual way.

THE FOLLOWING INSTRUCTIONS APPLY IF YOUR ENGINE IS NOT DRIVING AN A.C. GENERATOR.

If your engine is driving a D.C. generator, pump, or anything but an alternating current generator, set the speed droop at zero on all engines. In direct current service, it is occasionally desirable to run with a little speed droop to aid in load division, particularly in cases where generator compounding is not identical.

TAKING CARE OF YOUR GOVERNOR

It will not take much care to keep your Woodward Governor running properly for many years.

OIL: Keep the governor oil level high enough so it can be seen in the filler cup. Your regular engine oil will be all right although SAE 20 to 30 is usually best. The oil should be acid-free and should not sludge or retain air. IT MUST BE CLEAN AND NEW. Wash your pail or oil can thoroughly with gasoline before you use it for governor oil.

The dashpot (inside the governor) must be kept full of Woodward dashpot oil up to the level of the filler cup. This should be checked every six months, say on February 1st and again on August 1st.

The connecting joints of levers, links, pins, etc. should be lubricated once a week with oil from the governor sump. This may be done by using a small new paint brush, which can be hung inside the governor where it will always be available and will be kept clean. If the governor is not provided with a ballhead oiler as shown on Page 9, write to us for information and price of this service kit.

MAINTENANCE AND REPAIRS

OIL LEAKAGE: When it becomes necessary to add oil frequently to maintain proper level, the oil seal 88-1 on the drive shaft should be replaced as follows: Remove governor from the engine, remove drive gear and key and the four cap screws. Slip the sleeve 16-1 and bearing retainer 55-6 off the shaft. Press or knock out the old seal 88-1 and press in a new one; be certain the sealing lip will be upward when assembled. Slip the sleeve into the seal, using shim stock in the form of a cone to prevent damaging the sealing edge of the seal. If the shim and sleeve are turned, while inserting, the edge of the shim stock will not cut the seal. Inspect the drive bearing 203FF at this time.

REGISTER OF BLACK HAND (LOAD INDICATOR): If the load indicator goes below zero when the load limit (red hand) is turned all the way to the left, to shut down the engine, it may be reset as follows:

Unlock the nut and remove screw 36-12 in gear segment 32-4. The screw will usually be worn and it should be repointed by grinding it to a rounded end. Replace the screw and nut, adjusting it to obtain register of the pointer with the zero mark.

PARTS SUBJECT TO WEAR: The following parts should be inspected twice yearly and replaced if necessary, in order to maintain best performance: Ballhead assembly parts consisting of 200FF bearings, 22-4 ballarm pins, 90-3 ballarm blocks, 22-3 ballarm block pins, 14-1 bushing, 14-2 bushing, 68-11 bearing, 5205FF bearing, and 6-4 speeder rod.

The 200FF ballarm bearings must be perfectly free running. Any roughness or stickiness will cause poor operation and if bad enough will make it impossible to hold speed.

Twist the ballhead assembly around a few degrees to check the action of the spring drive laminations 98-2 and pin 22-52. Replace them if no spring action is felt or if it feels "rough".

The 90K pivot pins will wear if lubrication is neglected. Inspect them and replace if they are grooved.

EXCHANGE PLAN: When your governor becomes several years old and may require considerable repair and readjustment, write us for details of our exchange plan. Be sure to give us the serial number stamped on the nameplate.

ORDERING OF PARTS OR REQUESTING INFORMATION: When ordering any parts or requesting any information concerning your governor, be sure that you furnish us with the serial number of the governor.

SECTION II
INSTRUCTIONS TO ENGINE ERECTORS

You will not find it difficult to install and adjust a Woodward type IC Governor. If the governor was fitted on the engine at your factory, you will only have two simple things to do. If they are not done, the governor will not work properly, and your engine will not perform as well as other engines whose governors are correctly adjusted.

1. PUT IN OIL.

(a). Take off the side cover and fill the governor base with engine oil, so that the oil level shows in the filler cup on the front. This level should be maintained in service.

Use CLEAN, NEW ENGINE OIL. The pail or can used to carry oil to the governor should be thoroughly washed with gasoline before it is used.

(b). It is a good idea to roll the engine over slowly a few revolutions to fill the governor cylinder with oil. This is not necessary, but it will make the first start of the engine much smoother.

2. ADJUST THE COMPENSATION.

This is not as difficult as it sounds, and it is VERY IMPORTANT.

The adjustments made at your factory may not be satisfactory when the engine is installed in the field. You should go through the procedure indicated here, even though the governor appears to work all right. The fact that a governor does not hunt does not necessarily mean that it is correctly adjusted.

(a) First, check to see that the dashpot is full of oil up to the level of the filler cup. Nothing but Woodward dashpot oil should be used. Open the needle valve one turn and move the small plunger up and down two or three complete strokes. (This should be done before the engine is started.)

(b) Set the slider (pc. 28K) in about the center of the compensating crank.

(c) Close the needle valve by screwing it all the way in, then open it about ½ turn.

(d) Start the engine.

(e) If the governor hunts, close the needle valve slowly until the hunting stops, or until it is only about ⅛ turn open.

(f) If this does not stop the hunting, move the slider ⅛" farther out on the crank and open the needle valve again until it is ½ turn open.

(g) Close the needle valve slowly until the hunting stops or until it is only ⅛ turn open.

(h) Repeat this until the hunting stops.

(i) When the correct opening of the needle valve has been determined, lock it in place with the lock nut.

(j) If the hunting does not stop with the slider all the way out and the needle valve ⅛ turn open, it is a good idea to check over the linkage from the governor to the fuel pumps (or other fuel metering device). The linkage should be entirely free from lost motion and binding.

(k) On some engines with very little flywheel effect, the above adjustments may not be sufficient to stop hunting. If this is the case, stop the engine, remove the screw 90K, and move the rod end 93K to the outer hole in lever 7-2.

(l) Now start all over again with the slider in the center of the crank as shown and the needle valve open ½ turn, and repeat the above adjustments.

(m) It is not desirable to have the slider any farther out or the needle valve closed any farther than necessary, because this will tend to make the governor sluggish. If the needle valve is closed too far it will be almost impossible to divide load properly.

OPERATION: If you want to know how to operate the governor, read section I, "Instructions for Power Plant Operators."

SECTION III

DESCRIPTION OF GOVERNOR AND ITS METHOD OF OPERATION

SCHEMATIC OPERATION

Movements of the operating parts of the governor are actually proportional to the amount of speed change, but have been greatly exaggerated in the drawings to make them more visible.

Assume, for the purpose of explanation, that the prime mover is rotating at normal speed as shown on the speed indicator and carrying approximately half load as shown by the black hand. Assume, also, that the governor adjustments are all properly set and that speed droop is zero.

LOAD REDUCTION

Cut No. 1. The flyballs are in their normal position for normal speed and no speed droop. The load limit is set at about 9/10 load, as shown by the red hand. The pilot valve is central. The power piston is stationary. The larger or actuating compensating plunger is approximately central. The small or receiving compensating plunger is central.

Cut No. 2. A certain amount of load is thrown off the unit. The speed instantly starts to increase. As the speed increases, the flyballs move out, the speeder rod is forced down against the upward thrust of the speeder spring, pivot points "H", "I", "B" and "A" are forced down, the pilot valve plunger is forced down from its central position against the upward thrust of the pilot valve spring, and pressure oil is admitted from P-1 through the lower holes in the pilot valve bushing into port W-1 and on into the power cylinder where it starts moving the power piston to the right, which is the direction to reduce the flow of energy medium to the prime mover. Oil laying on the opposite side of the power piston is forced out through port Y-1, through the upper holes in the pilot valve bushing and into the discharge area D-1 and from there back into the sump tank.

Cut No. 3. As the power piston moves to the right, pivots "G", "M" and "L" are raised and the larger or actuating compensating plunger is raised. Since the compensating dashpot is filled with oil, the upward movement of the compensating actuating plunger sucks the smaller or receiving compensating plunger downward against the upward force of the tension-compression compensating spring, which attempts to keep the receiving plunger central at all times. The downward movement of the compensating receiving plunger pulls pivot "J" downward and as pivot "H" is temporarily stationary due to the fact that the flyballs are still in their outward position, it acs as a fulcrum, causing the downward movements of pivot "J" to raise pivots "I", "B" and "A" and consequently the pilot valve plunger. These various parts do not make a single, definite and complete move but make short moves in sequence and the action is continued until the pilot valve plunger is raised to its central position, thus stopping the flow of pressure oil from P-1 to port W-1 and thus stopping the motion of the power piston.

If the compensating adjustments have been properly made, the pilot valve plunger will be centered and the movement of the power piston will be stopped at a position corresponding to a flow of energy medium just sufficient to accommodate the reduced load on the unit. All that is necessary now is to hold the power piston stationary until the speed returns to normal or until a subsequent speed change occurs.

The upward movement of the actuating compensating plunger created a vacuum in the lower half of the compensating dashpot case, which caused the receiving plunger to be drawn downward. At the same time, oil from the upper part of the case began to flow through the compensating needle valve into the lower part of the case to break up the vacuum and allow the compensating spring to return the receiving plunger to its central position. The needle valve is small and consequently had little effect while the actuating plunger was in motion. Now, however, the movement of the actuating plunger has stopped and, therefore, the flow through the needle valve will allow the compensating spring to bring the receiving plunger back to normal at any pre-determined rate according to the setting of the needle valve. If the needle valve has been properly set, the receiving plunger will return to its central position in exact unison with the return of the prime mover speed to normal and consequently the return of the flyballs to their normal central position. Such being the case, pivot "J" will move upward in exact ratio to the upward movement of pivot "H" caused by the return of the flyballs to center. Pivot "I" will, therefore, remain stationary, the pilot valve plunger will not be disturbed, and the power piston will remain stationary.

Cut No. 4. The cycle has been completed, the speed is normal, the load is as shown by the black hand, the flyballs are central, the receiving compensating plunger is central, and the power piston is stationary. The only permanent changes that have resulted are the position of the black hand, which shows the new loading of the unit; the position of the power piston; and the position of the compensating actuating plunger.

LOAD INCREASE

The action when load is added to the unit is just the reverse. The speed starts to drop, the flyballs move in, pivots "H", "I", "B" and "A" are raised, the pilot valve plunger is raised, pressure oil is admitted from P-1 to Y-1, and the power piston moves to the left to increase the flow of energy medium. As the power piston moves

to the left pivots "G", "M" and "L" are lowered, the compensating actuating plunger is forced downward, the compensating receiving plunger is forced upward, raising pivot "J" and lowering pivots "I", "B" and "A" until the pilot valve plunger centers, stops the flow of pressure oil into port Y-1 and stops the movement of the power piston at the exact position corresponding to the increased load on the unit. As the energy medium flow is corrected, the speed of the unit returns to normal. In unison with the return of the speed to normal and consequently the return of the flyballs to their central position, the compensating receiving plunger, due to the flow of oil through the compensating needle valve and the centering action of the compensating spring, returns to its central position. The pilot valve plunger is not disturbed and the power piston remains stationary awaiting another change in speed resulting from a change in load.

THE LOAD LIMIT

The purpose of the load limit is to prevent the unit from taking on more load than that for which the red hand is set by mechanically preventing the pilot valve plunger from rising above center when a loading corresponding to the setting of the red hand has been reached. It also provides a means of shutting the unit down by merely turning the red hand to zero.

Action: Referring to the cuts, as the power piston moves to increase the flow of the energy medium, the compensating crankshaft is revolved clockwise and the load limit eccentric lowers the left end of the load limit lever, the right end being held stationary. The pivot "K" is forced downward as is the load limit rod. The finger on the lower end of the load limit rod is forced downward, and as the power piston reaches a position corresponding to the setting of the red hand, the finger contacts the top of the pilot valve plunger and prevents it from rising above center. The energy medium flow cannot, therefore, be further increased.

To reduce the load limit or to shut the unit down completely, revolve the red hand counter clockwise. The right end of the load limit lever will be forced downward, the load limit rod and the finger will be forced down and will force the pilot valve plunger below center. Pressure oil from P-1 will be admitted to port W-1, the power piston will move to the right, pivots "G" and "M" will be raised, the compensating crankshaft will be revolved counter clockwise, and the load limit eccentric will raise the left end of the load limit lever and thus raise pivot "K", the load limit rod and the pilot valve plunger so that the pilot valve plunger will center and stop the action just as the power piston reaches a position corresponding to the setting of the red hand.

SPEED DROOP

The purpose of speed droop is to cause all units operating in parallel to take their proportionate share of the total load.

Action: As shown in the cuts, pivot "P" is on exact center and consequently does not produce a drooping of the unit speed as the unit takes on load. In other words, the speed of the unit will remain the same regardless of the amount of load on the unit (within the capacity of the unit). But, revolve the speed droop knob clockwise and pivot "P" will be drawn toward the front of the governor and consequently away from exact center. The farther away from exact center it is drawn, the greater will be the droop in the speed.

With pivot "P" off center, assume that the power piston moves to the left to increase energy medium flow. The compensating crankshaft will be revolved clockwise and will move the upper end of the speed droop lever to the left. Pivot "P" will be raised, pivot "E" will be raised, pivots "D" and "C" will be lowered, pivot "A" will be lowered in respect to pivot "B", the pilot valve will be centered and the power piston stopped before it reaches a position corresponding to the original speed. In other words, the speed of the unit will not be returned to the speed at which it was operating but to a slightly lower speed of a percentage corresponding to the distance pivot "P" is off center.

If the power piston moves in the direction to decrease energy medium flow, the speed will rise a percentage corresponding to the distance pivot "P" is off center.

THE SYNCHRONIZER

The purpose of the synchronizer or speed adjusting mechanism is to permit varying the unit speed for synchronizing when the unit is being paralleled with other units. If the unit is operating in parallel on a system many times the capacity of the individual unit, an adjustment of the speed setting will result in a change of the system speed, but the change in speed may be so infinitesimal as to be unreadable on ordinary switchboard instruments. Practically, therefore, a change in the synchronizer setting merely changes the loading of the unit due to the small amount of influence the capacity of the unit has on the total capacity of the system.

Action: Revolve the synchronizer knob counter clockwise. Pivot "O" will be pulled toward the front of the governor, pivot "C" will be raised—permanently raising the left end of the lower floating lever. This will raise pivot "A" with respect to pivot "B". Pressure oil will be admitted from P-1 to port Y-1, the power piston will move to the left to increase energy medium flow, the unit speed will increase until the flyballs have changed their normal central position sufficiently to recenter the pilot valve plunger. The flyballs will then be slightly farther apart and this will be their normal central position until the synchronizer is again reset.

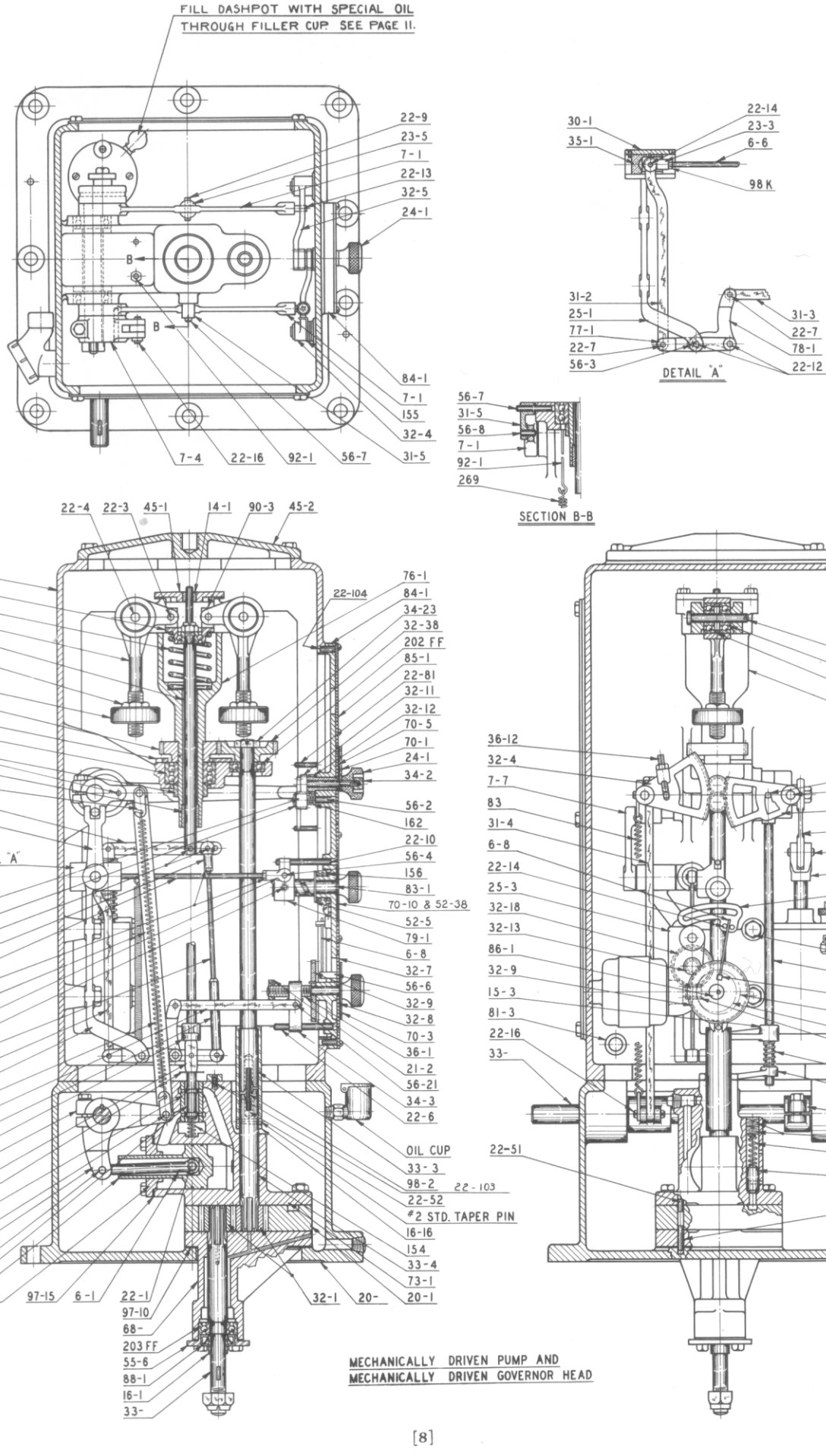
Revolving the synchronizer knob clockwise will cause a reversal of operation and the unit speed will be lowered.

WOODWARD TYPE IC GOVERNORS

— PARTS LIST —

Part No.	Description
4-1	Cylinder Head
5-1	Power Piston
6-1	Connecting Rod
6-4	Speeder Rod
6-5	Limit Stop Rod
6-6	Speed Droop Adjusting Rod
6-7	Floating Lever Connecting Rod
6-8	Reducing Gear Stop Rod
7-1	Load Indicator Lever (2)
7-2	Upper Floating Lever
7-3	Lower Floating Lever
7-4	Upper Compensating Lever
7-5	Compensating Lever
7-6	Power Lever
7-7	Speed Droop Lever
9-1	Compensating Crank
11-1	Large Bonnet
11-2	Small Bonnet
12-1	Large Plunger
12-4	Pilot Valve Plunger
12-12	Small Plunger
12-17	Relief Valve Plunger
13-1	Control Column
14-1	Bushing (4)
14-2	Bushing (4)
14-3	Terminal Shaft Bushing (2)
14-6	Pilot Valve Bushing
14-77	Synchronizer Gear Bushing
15-2	Ball Arm
15-3	Limit Stop Arm
16-1	Spacer Sleeve
16-2	Crankshaft Bearing Spacer Sleeve
16-16	Spring Drive Sleeve
20-1	Pump Case
20-	Power Case
21-2	Synchronizer Stop Collar
21-11	Collar
22-1	Piston Pin
22-3	Ball Arm Block Pin
22-4	Ball Arm Pin
22-6	Guide Pin
22-7	Pin (3)
22-8	Pin
22-9	Pin
22-10	Guide Pin
22-12	Pin (2)
22-13	Pin (2)
22-14	Pin (2)
22-15	Connecting Rod Pin
22-16	Pin (2)
22-51	Dowel Pin (2)
22-52	Spacer Pin
22-80	Dowel Pin (2)
22-81	Segment Stop Pin (2)
23-1	Rod End
23-2	Rod End
23-3	Rod End
23-4	Rod End
23-5	Rod End
24-1	Knob (3)
25-1	Speed Droop Bracket
25-4	Guide Bracket
25-25	Motor Bracket
27-3	Compensating Dashpot
30-1	Speed Droop Fulcrum
31-1	Dashpot Connecting Link
31-2	Connecting Link
31-3	Synchronizer Link
31-4	Compensating Connecting Link
31-5	Load Indicator Pivot Link
31-6	Spring Link (2)
32-1	Pump Gear (2)
32-4	Load Indicator Segment
32-5	Load Limit Segment
32-6	Load Limit Pinion
32-7	Internal Gear
32-8	Synchronizer Reducing Gear
32-11	Load Limit Pinion
32-12	Load Indicator Pinion
32-38	Gear
32-39	Gear
32-105	Synchronizer Gear
32-106	Synchronizer Gear
33-	Drive Shaft
33-	Terminal Shaft
33-3	Upper Drive Shaft
33-4	Lower Drive Shaft
34-1	Lock Nut
34-2	Knob Lock Nut (3)
34-3	Synchronizer Nut
34-22	Lock Nut
34-23	Shear Nut
35-1	Speed Droop Slide
36-1	Synchronizer Screw
36-2	Connecting Link Screw
36-3	Dashpot Screw (2)
36-12	Load Indicator Adjusting Screw
36-26	Bypass Screw
45-1	Governor Head Cover
45-2	Top Cover
45-4	Side Cover
48-	Flyball (2)
50-1	Guide Key
52-2	Oil Shield Washer
52-5	Speed Droop Friction Washer
52-6	Compensating Crankshaft Washer
52-8	Load Limit Friction Washer
52-35	Spring Washer (2)
52-38	Washer
54-1	Power Case Plug
54-34	Adjusting Plug (2)
55-6	Bearing Retainer
56-2	Load Limit Stud
56-3	Pivot Stud
56-4	Adjusting Rod Stud
56-5	Segment Pivot Stud (2)
56-6	Stop Rod Stud
56-7	Pivot Link Stud
56-8	Load Indicator Pivot Stud
56-9	Upper Compensating Lever Stud
56-21	Stud
68-	Drive Bearing
68-11	Speeder Rod Bearing
70-1	Load Limit Pointer
70-3	Synchronizer Vernier Pointer
70-5	Disc Pointer (Load Indicator)
70-10	Disc Pointer (Speed Droop)
73-1	Controlet
75-1	Limit Stop Rod Guide
76-1	Governor Head
76-2	Pilot Valve Head
77-1	Walking Beam
78-1	Bell Crank
79-1	Speed Droop Adjuster
80-1	Clamp Plate
81-1	Connecting Rod Sheath
81-3	Electrical Conduit
83-1	Speed Droop Adjusting Worm
84-1	Control Panel
85-1	Control Dial
86-1	Synchronizer Eccentric
86-2	Load Indicator Eccentric
88-1	Oil Seal (2)
90-3	Ball Arm Block (2)
91-1	Binding Post (3)
92-1	Spring Anchor
93-1	Spacer Ring (2)
97-10	Gasket
97-15	Cylinder Head Gasket
98-2	Spring Lamination (8)
135-1	Synchronizing Motor
28K	Compensating Slide Block
90K	Pivot Pin (4)
93K	Rod End
98K	Nut (3)
57	Relief Valve Spring
83	Tension Spring
151	Limit Stop Rod Spring
154	Pilot Valve Spring
155	Torsion Spring
156	Speed Droop Friction Spring
158	Speeder Spring
162	Load Limit Friction Spring
269	Tension Spring
298	Dashpot Spring
38	Ball Bearing (2)
200	Ball Bearing (4)
202	Ball Bearing
203	Ball Bearing (3)
5205	Ball Bearing

WOODWARD TYPE IC GOVERNORS
SECTIONAL VIEWS AND PART NUMBERS



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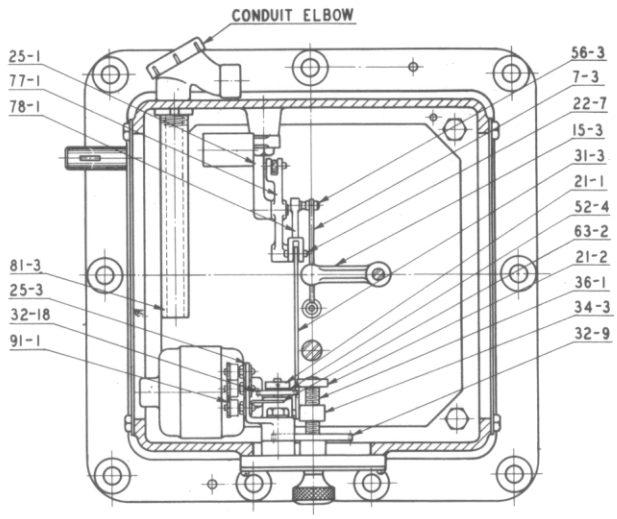
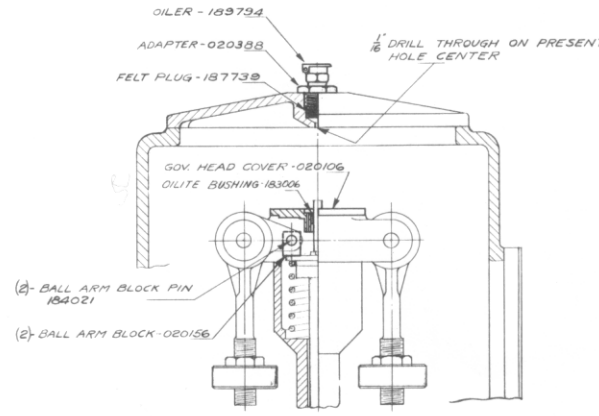
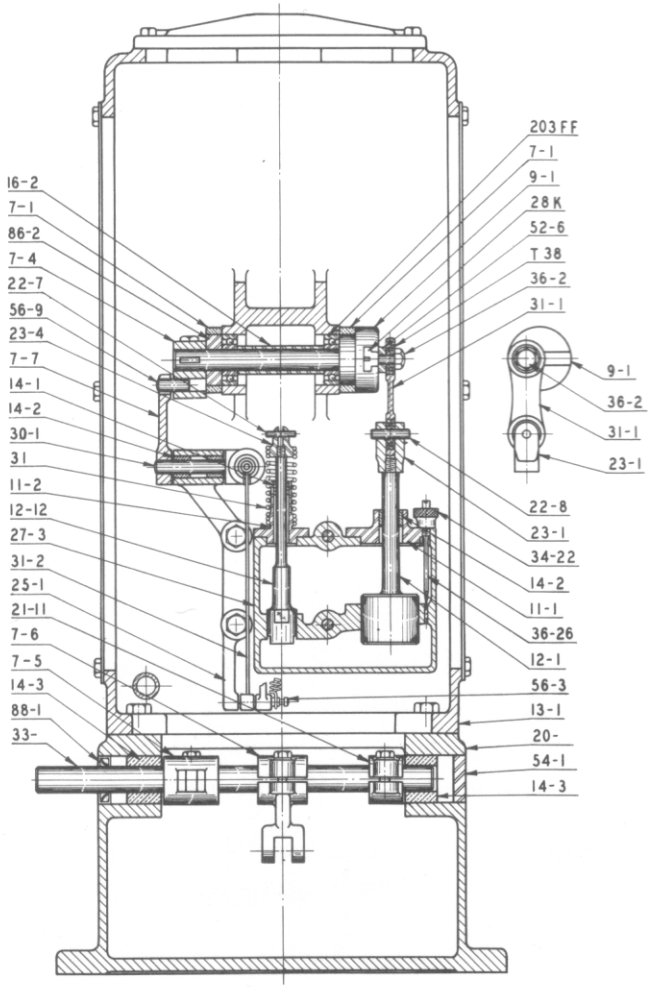


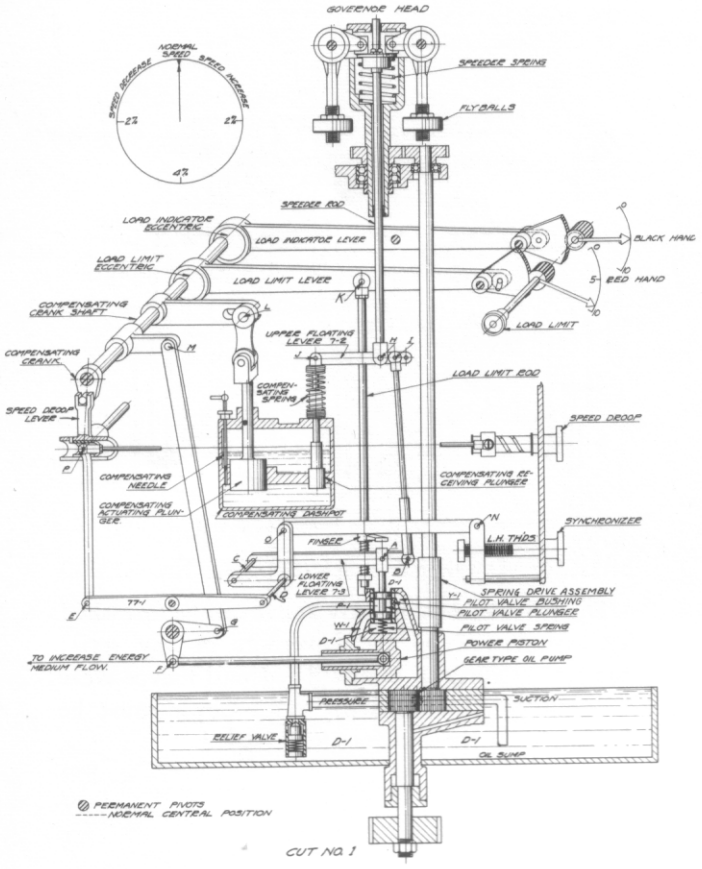


BALLHEAD OILER SERVICE KIT No. 175130

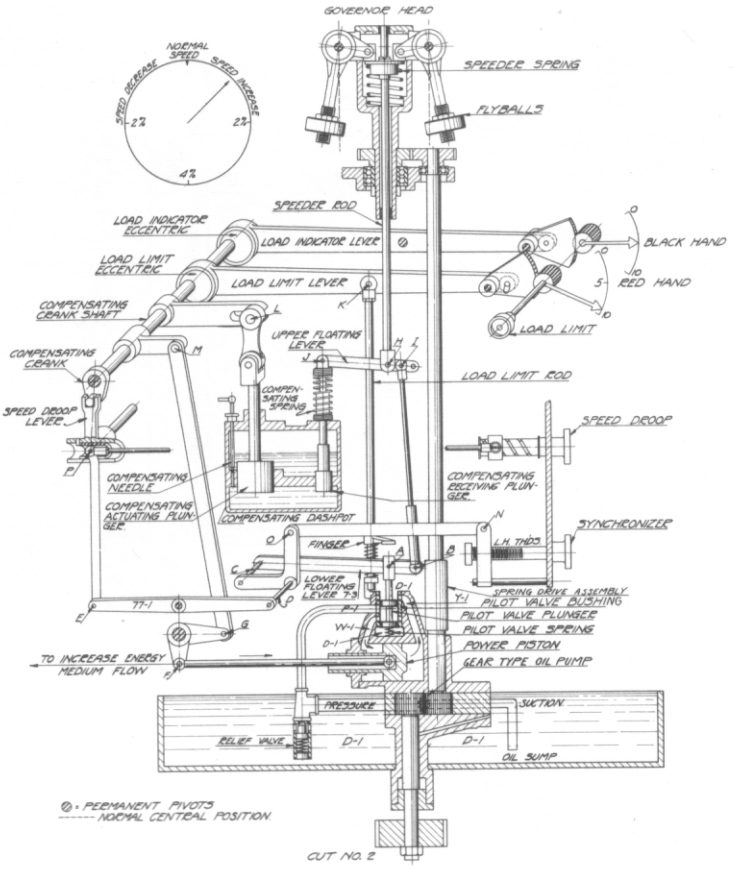
The parts shown directly above can be furnished for installation on IC Governors of any serial number. Oiling of the ballhead will reduce wear and improve performance. 45-2 Cover must be drilled when these parts are installed.



SCHEMATIC OPERATION VIEWS



CUT NO. 1



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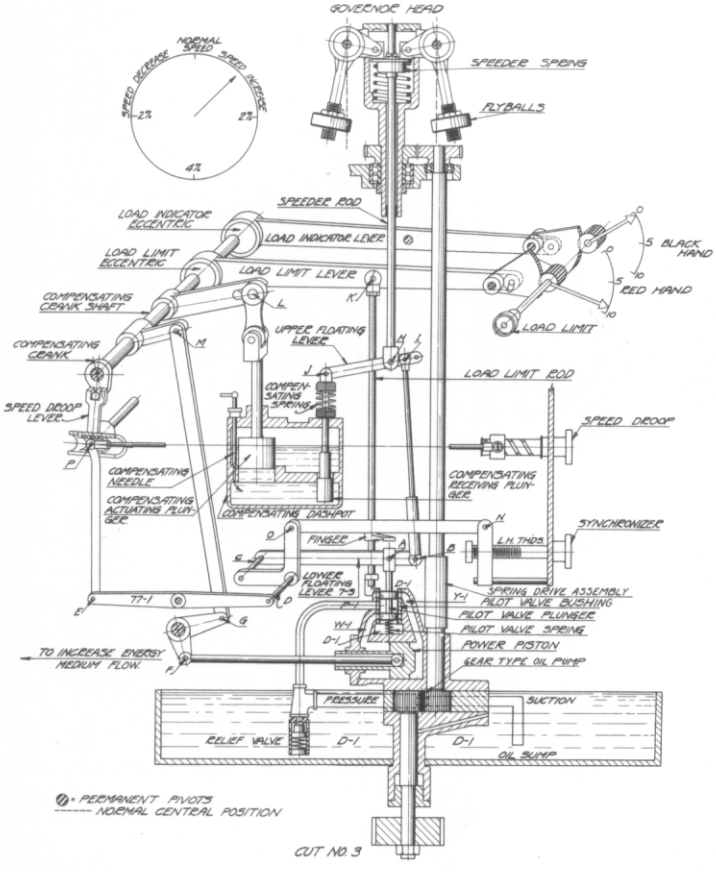
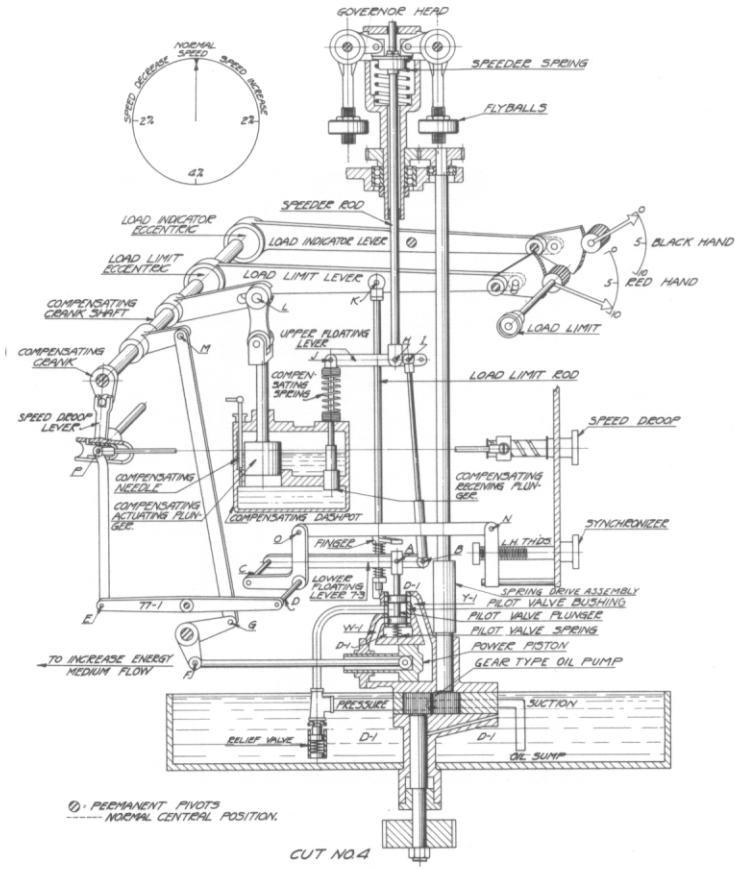


CUT NO. 3



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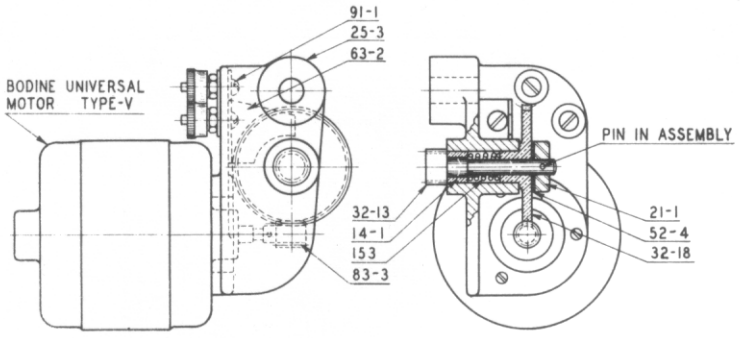
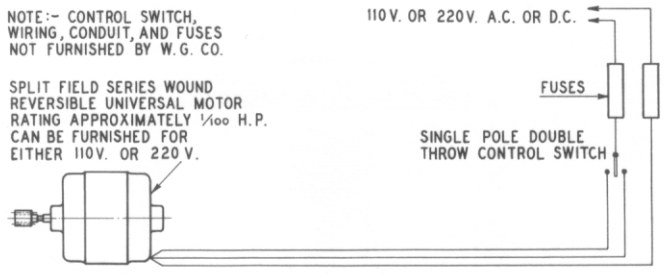
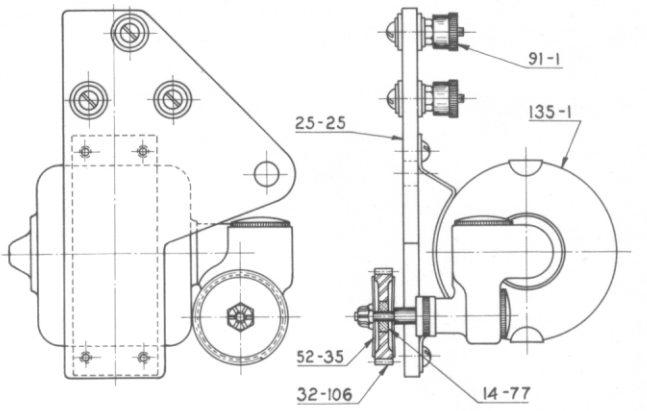


SYNCHRONIZING MOTOR BRACKET ASSEMBLY

THIS ASSEMBLY USED ON GOVERNORS TO AND INCLUDING SERIAL NO. 8367

WIRING DIAGRAM FOR SYNCHRONIZING MOTOR





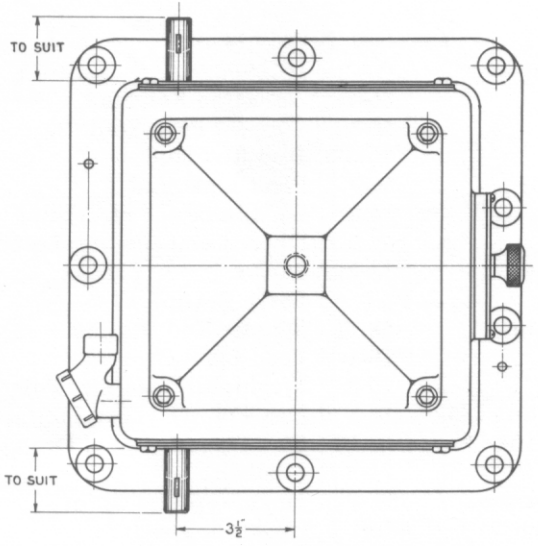
SYNCHRONIZING MOTOR BRACKET ASSEMBLY

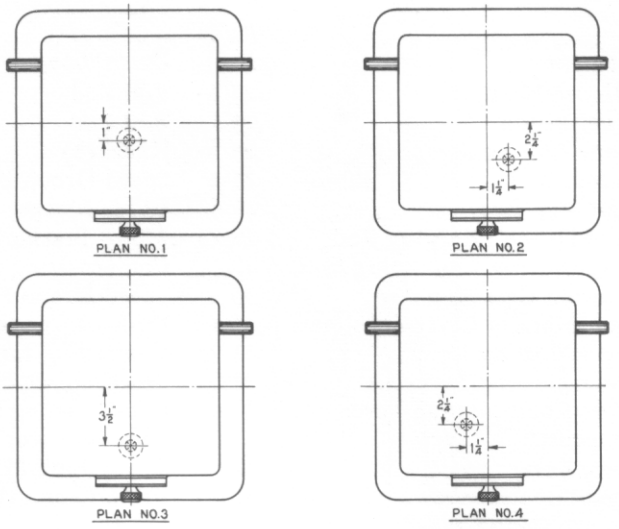
This assembly used on governors beginning with Serial No. 8368. When used on governors preceding this serial number, the following parts are also required:

1 — No. 020186 Speeder Screw Assembly.

1 — No. 186265 Spacer Washer.

WOODWARD TYPE IC GOVERNORS
ADAPTATION DATA





DESIGNATION OF GOVERNOR DRIVE SHAFT POSITIONS.
DRIVE SHAFT MAY ROTATE CLOCKWISE OR COUNTER-CLOCKWISE IN ANY PLAN