

<i>Issue Date</i>	<i>Org. Code</i>
3-3-92	W/OS032

NATIONAL WEATHER SERVICE

Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-8	02	2.0

PART 2

SURFACE EQUIPMENT (EHB-8)

2. Equipment Maintenance Notes. Maintenance notes serve to establish day-to-day procedures regarding maintenance activities carried out by electronics technicians, and to augment technical material presented in equipment manuals. They function as a communications device to assist technicians in following the correct procedures established in calibrating and maintaining electronic and electromechanical systems. Maintenance notes provide information generally not found in other sources and are basically the means by which technicians are kept informed of changes relating to specific equipment and systems for which they have maintenance responsibility. They are issued only by the NWS Office of Systems Operations Engineering Division, the sole authorized organization for establishing maintenance policy, and are distributed to all electronics technicians and on a selective basis to other predesignated organizational units having a requirement for the information.

Revisions to existing material are made to enhance maintenance effectiveness and to update obsolete technical information. Input for maintenance notes is derived from operational experience obtained through various reporting channels, suggestions from field technicians who are maintaining a particular class of instruments, and through the experience of highly technical specialists and engineers engaged in managing the maintenance program at the regional and NWS Headquarters level. In essence, maintenance notes are developed from numerous inputs throughout the organization and constitute an important supplement to other technical documents.

Notes are issued by equipment types for ease of reference, and are consecutively numbered by date of issue. The area electronics supervisor will periodically check that each electronics technician has available all current notes. Missing material should be requested through the regional headquarters from the National Logistics Supply Center (NLSC).

<i>Issue Date</i>	<i>Org. Code</i>
3-3-92	W/OS032

NATIONAL WEATHER SERVICE
Engineering Handbook

<i>Program</i>	<i>Part</i>	<i>Section</i>
EHB-8	02	2.1

MAINTENANCE NOTE INDEX - CLOUD MEASURING EQUIPMENT

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
31	April 5, 1973	Timer Assembly for Crouse-Hinds Ceiling Light Projector
34	July 25, 1974	Binders for EHB-8, Surface Equipment
44	August 8, 1979	Gifft Recorder Pinch Roller Cleaning
45	March 17, 1980	Addendum to Gifft RBC Recorder Manual
48	February 18, 1981	Replacement of Defective Gifft Recorder Ribbon Cable

Items 1 through 30, 32-33, 35-43, 46-47 and 49 have been deleted.

CLOUD HEIGHT MAINTENANCE NOTES
(For Electronics Technicians)

31. Timer Assembly for Crouse-Hinds Ceiling Light Projector

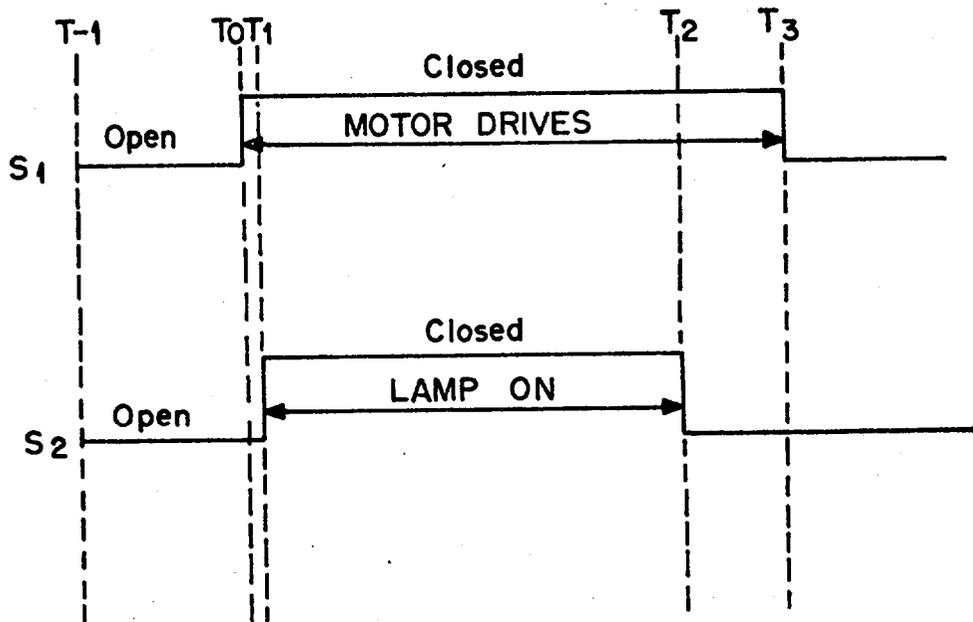
The timer assembly used in the K103 Ceiling Light Projector and included in the Ceiling Light Projector Modification No. 28 is no longer available, A new timer assembly has been obtained and is stocked at the CLSC, Kansas City, Mo. The new timer is different from the previous one in that it has two microswitches and a solid state relay. The relay is used in place of the 15-ohm resistor. The mounting holes for the timer are the same as previous making it directly interchangeable with the older type assembly. The timer assembly should be ordered from the CLSC only as required for replacement of a defective unit that is presently in use. The timer assembly, timer, relay, and microswitches are stocked at the CLSC for replacement components.

Two copies of a revised schematic, an assembly drawing, and a timing cycle are provided. One copy of each should be inserted in the Ceiling Light Type DCE-16 Manual, No. A242B, and one copy of each should remain with this maintenance note.

The following items are stocked at the CLSC:

<u>Weather Service Stock Number</u>	<u>Description</u>	<u>Fedeml Stock Number</u>
K103-2A	Timer Assembly, complete Crouse-Hinds No. ML4997	Not yet assigned
K103-2A-1	Timer, Cramer Model 472	Not yet assigned
K103-2A-2	Switch, Sensitive, Micro Switch, No. V3L-1233-08	Not yet assigned
K103-2A-3	Relay, Solid State, Crydom Model A1210	Not yet assigned

ATTACHMENT 1



T_{-1} Time before delay timer power is interrupted.

T_0 Delay timer power is momentarily interrupted and the timing sequence begins. Motor starts driving.

T_1 Time when S_2 closes and allows the lamp to come on.

T_2 Time when S_2 opens, removing power from lamp.

T_3 Time when S_1 opens, removing power from timing motor and ending timing cycle.

Note: Time period between T_0 and T_1 is only displacement of cam and is considered to be negligible.

Time period between $T_1 - T_2$ and $T_0 - T_3$ is controlled by setting of dial on top of delay timer.

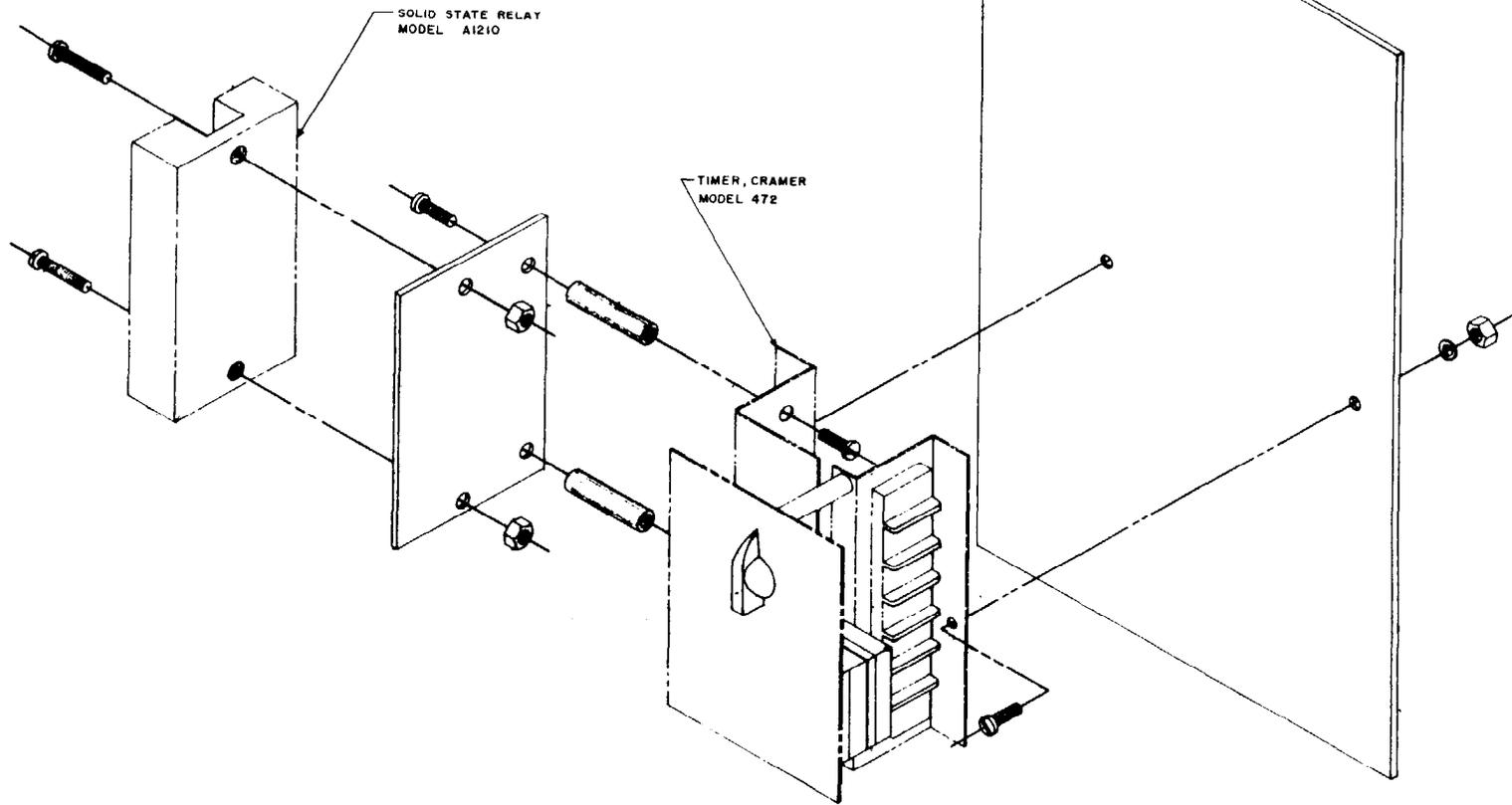


FIG. 1 , CEILING LIGHT TIMER ASSEMBLY

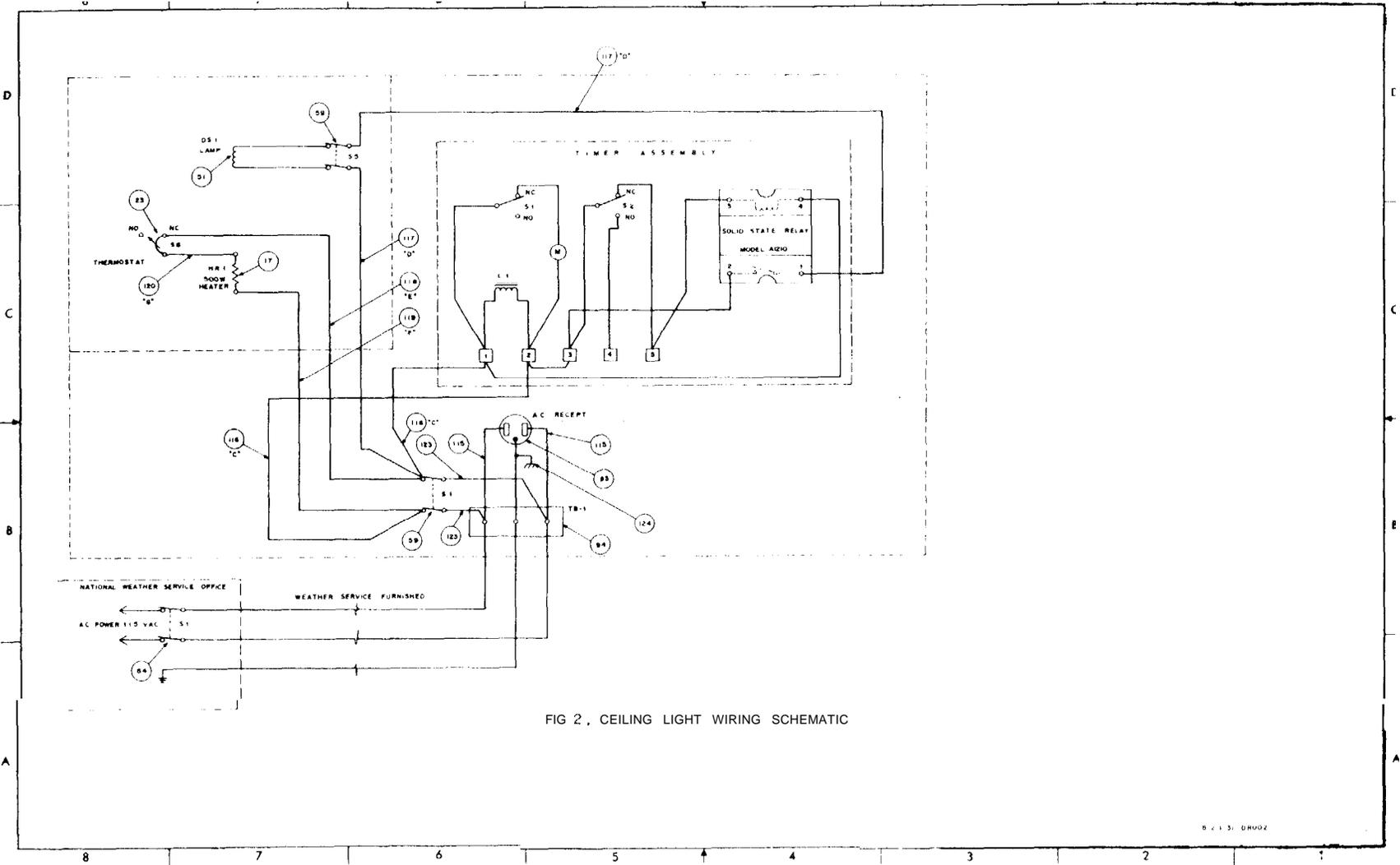


FIG 2 , CEILING LIGHT WIRING SCHEMATIC



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

Date: July 25, 1974

Reply to
Attn of: W514

Subject: Transmittal Memorandum for Engineering Handbook No. 8, Issuance 74-3

To: All Regional Headquarters, Area Electronic Supervisors, and Electronics Technicians

1. Material Transmitted:

Engineering Handbook No. 8 - Surface Equipment, Section 2.1; Cloud Height Maintenance Note No. 34, Binders for EHB-8, Surface Equipment.

2. Summary:

Maintenance Note No. 34 informs ELTEC's about the distribution and use of binders for EHB-8.

3. Effect on Other instructions:

None.


J. M. St. Clair
Acting Chief, Engineering Division

EHB-8
Issuance 74-3

CLOUD HEIGHT MAINTENANCE NOTES
(For Electronics Technicians)

34. Binders for EHB-8, Surface Equipment.

A set of three Binders for EHB-8 is being distributed to each ELTEC. The set consists of three volumes labelled as Volume 1, 2, and 3.

Each volume should contain one set of separation tabs labelled for Manuals, Maintenance Notes, Modifications, and Maintenance Schedules.

It is suggested that Volume 1 be used for Cloud Height Equipment, Volume 2 for Wind and Radiation Equipment, and Volume 3 for Hygrothermometer and Agmet Equipment.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

August 28, 1979

OAW5141 - JM

TO: All NWS Regional Headquarters, Area Electronics Supervisors,
and Electronics Technicians (EHB-8 Distribution)

FROM: OA/W51 - J. M. St. Clair *J. M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 8,
Issuance 79-10

1. Material Transmitted:

Engineering Handbook No. 8, Surface Equipment, Section 2.1; Cloud Height Maintenance Note No. 44, Cleaning of Gifft Recorder Pinch Roller.

2. Summary:

Maintenance Note No. 44 informs the Electronics Technicians on the frequency and method of cleaning the Gifft Recorder Pinch Roller.

3. Effect on Other Instructions:

None.

EHB-8
Issuance 79-10



CLOUD HEIGHT MAINTENANCE NOTE

(For Electronics Technicians)

44. Cleaning of Pinch Roller on Gifft Recorder.

The metallic paper used in the Gifft recorder tends to flake. This leaves a deposit of aluminum oxide on the pinch roller, and in time the build-up of aluminum oxide causes a poor ground connection. This may be noticed on the paper as a missing, partially missing, or variable dark and light trace. To avoid this problem, the pinch roller should be cleaned with a dry soft wire brush every time the paper roll is changed, or when improper marking occurs.

A soft wire brush, for this purpose, made of brass or aluminum bristles can be purchased at a local shoe or hardware store.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

March 17, 1980

OAW5141 - JM

TO: All NWS Regional Headquarters, Area Electronics Supervisors,
and Electronics Technicians (EHB-8 Distribution)

FROM: OAW51 - J.M. St. Clair *J.M. St. Clair*

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 8,
Issuance 80-2

1. Material Transmitted:

Engineering Handbook No. 8, Surface Equipment, Section 2.1;
Cloud Height Maintenance Note No. 45: Addendum to RBC Giff
Recorder Manual 8-119.

2. Summary:

This addendum is the latest update to RBC Giff Recorder Manuals.
It includes Sections 6-6 through 6-19.

3. Effect on Other Instructions:

None.

EHB-8
Issuance 80-2



Engineering Division
W514

CLOUD HEIGHT MAINTENANCE NOTES
(For Electronics Technicians)

45. Addendum to Giffit RBC Recorder Manual.

The latest Giffit RBC Recorder Manual 8-119 incorporates the enclosed paragraphs 6-6 through 6-19. Add the enclosures, as required, to the RBC Manual you have.

Paragraph 6-6 refers to a CTB Test Box. These will be issued to Area Electronics Supervisors upon receipt of a NOAA Form 37-4 addressed to CLSC. Since supplies are limited, they will be issued on a first come first served basis.

Paragraph 6-15 refers to modifications that will be issued after the Engineering Division has ascertained their validity. Do not send any boards or parts to the manufacturer. Standard Logistics, Maintenance, and Modification practices will be observed.

Attachment: Enclosure for Manual 8-119

6-5 LUBRICATION

The only areas needing lubrication attention are as follows: Approximately every 2000 hours of recording operation (standby not counted), loosen the rear securing screw, slide the chassis forward approximately 4 inches, and apply one drop of BARDAHL, Mac's 8800 oil booster, or equivalent to the worm and worm-gear junction. Do not use ordinary motor oil or 3-in-1 type general purpose lubricants, as these do not have the necessary film strength to prevent seizure and excess wear. Wipe the scanner shaft at the front top of the recorder and apply one drop of light oil in the crack between the scanner shaft and the linear bearings of the TRA assembly. Wipe excessive oil buildup with a clean cloth.

6-6 TIME CLOCK CHECKOUT

Most of the overlay features and correct counting of the time clock can be checked as follows: With the recorder scanning normally as triggered by a ceilometer or the CTB test box, set the time switches to 2359 and push the time set pushbuttons. Within 1 minute the number 0000 should begin to be displayed. Set to 1926 and push buttons. Within 4 minutes 1930 should start to come up. Set to 1645 and push buttons. Within 5 minutes 1650 should start to come up. This test checks all bits in the counters, character generation of all numerals, and proper framing and truncation.

6-7 SCANNER DRIVE BELT TENSION ADJUSTMENT (FIG. 7-3-37).

1. Check that the socket screws in the scanner shaft support blocks (Fig. 7-3-24) are tightly securing the scanner track shaft (Fig. 7-3-65).
2. Loosen the two socket screws in the scanner idler slide block (Fig. 7-3-21).
3. Push the slide block to the left with a force of approximately 3 pounds and tighten the socket screws, keeping the upper surface of the slide block flat with the upper surface of the shaft support block.

6-8 TRA ASSEMBLY REPLACEMENT (FIG. 7-3-PC10).

1. Remove Stylus.
2. Pull the TRA connector out of the connector at the right side (Fig. 7-3-J9). Pull straight out and carefully so as not to crimp or damage the flat conductor cable.
3. Thread the flat cable out of the slots in the cable guide bracket (Fig. 7-3-26). Again take care. Leave the flat cable ending straight out to the left.
4. Loosen the scanner idler slide block (Fig. 7-3-21) and lift the scanner belt (Fig. 7-3-17) off the belt pulleys.

6-8 (Continued)

5. Loosen the screws in the scanner shaft support blocks (Fig. 7-3-24). While holding the TRA assembly to the right, slide the scanner track shaft (Fig. 7-3-65) to the left approximately 2/3 of the way.
6. Remove the TRA using the following technique:
While holding the flat cable and following with the left hand, with the right hand push the TRA to the rear, then slightly counter-clockwise, lift the forward portion up and out.
7. To replace the TRA, reverse the above procedures. Always take care not to snag or damage the flat cable.
8. Adjust the scanner belt tension (Par. 6-7), and check that the new TRA moves freely end to end.

6-9 PAPER ADVANCE WORM GEAR REPLACEMENT (FIG. 7-4-87).

1. Loosen the scanner idler slide block (Fig. 7-3-2)]. See Par. 6-7.
2. Push the slide block and the TRA assembly (Fig. 7-3-PC10) to the right side.
3. Set the recorder on its right side.
4. Observe the two holes in the chassis which were previously hidden under the idler slide block. These are used to gain access to the worm gear and the chain sprocket.
5. Pull the paper feed motor (Fig. 7-4-M2) away from the worm gear just far enough to enable turning the metal platen by hand freely.
6. Turn the metal platen until the worm gear set screw lines up with its set screw access hole.
7. Loosen the worm gear and remove by pulling straight off the shaft.
8. To replace the worm gear, reverse the above procedure.
9. Place the worm gear on the shaft so that as it engages the worm, its set screw is lined up with the proper access hole.
10. The worm gear must be centered carefully on its natural position with respect to the worm by jockeying it up and down slightly as it is tightened.
11. Lubricate. See Par. 6-5.

6-10 PAPER ADVANCE WORM REPLACEMENT (FIG. 7-4-86).

1. Remove the paper advance worm gear (7-4-87). See Par. 6-9.
2. Loosen and remove the worm.
3. The replacement worm should be of the newer style which has a brass collar which improves the set screw security.
4. The replaced worm is positioned with the set screw end towards the motor with approximately 1/4 inch gap.
5. Lubricate. See Par. 6-5.

6-11 PAPER DRIVE CHAIN (7-4-16) AND SPROCKET (FIG.7-4-55, 56)
REPLACEMENT.

1. Remove the paper advance worm gear (Fig. 7-4-87).
See Par. 6-g.
2. Remove the paper advance worm (Fig. 7-4-86).
3. Turn the metal platen until the larger sprocket
(Fig. 7-4-56) set screw lines up with its access hole,
and loosen this sprocket.
4. Loosen the smaller chain sprocket (Fig. 7-4-55).
5. Pull the paper drive idler cone assembly (Fig. 7-2-41)
down and out of this sprocket. Leave the assembly
intact with the cone, shaft, and spacer collar.
6. While holding the chain on the larger sprocket, remove
this sprocket from the metal platen shaft.
To replace, reverse the above procedure.
7. Assemble the chain around the smaller sprocket and
position it over the paper drive idler cone bearings.
The chain should now be around both sprockets in normal
fashion.
9. Push the idler cone assembly back into the smaller
sprocket and tighten the smaller sprocket.
10. Tighten the larger sprocket at a height where the set
screw is normally centered on its access hole.

6-12. RUBBER PLATEN REPLACEMENT (FIG. 7-3-54).

1. Place the recorder on its right side, front forward.
2. Loosen the screw holding the left bearing end stop
(Fig. 7-4-15). Push the end stop plate to the rear,
uncovering the left end bearing of the rubber platen.
3. Lift the rubber platen up, and jockey the lower end
out of the pocket hole. Lift platen out.
4. To replace the rubber platen, reverse the above
procedures.
5. When tightening the left bearing end stop, it should
be vertical and parallel with the front panel.
6. Check that there is some end play and that the rubber
platen moves around freely in the bearing pockets.

6-13 METAL PLATEN REPLACEMENT (FIG. 7-3-52).

1. Remove the paper advance worm gear (Fig. 7-4-87)
and the worm (Fig. 7-4-86). See Par. 6-9 and 6-10.
2. Remove the paper advance chain and sprockets.
See Par. 6-11.
3. Remove the rubber platen. See Par. 6-12.
4. Remove the bearing capture screw and washers on the
inside surface of the paper compartment located near
the right hand end of the platens.
5. Move the left bearing end stop (Fig. 7-4-9) towards the
front, uncovering the metal platen bearing.

6-13 (continued)

6. Lift the metal platen up, popping the left end bearing out of its pocket.
7. Slide the left end bearing off the shaft.
8. Angle the metal platen out through the paper compartment.
9. To replace, reverse the above procedures. The replacement metal platen should be of the stainless steel type, which has a letter "S" stamped on one end. Swap the screw captured ball bearing if necessary.
10. Remember to install the bearing capture screw and washers.
11. Replace the rubber platen. See Par. 6-12.
12. Replace the paper advance chain and sprockets. See Par. 6-11.
13. Replace the paper advance worm and worm gear. See Par. 6-10 and 6-9.

6-14 FLAT CONDUCTOR CABLE REPLACEMENT (FIG. 5-18-H1).

After several false starts, a flat conductor cable has been designed which seems to adequately resist fatigue cracking after long periods of flexing during the TRA scanning motion. This cable is identified by its red color. Replace if necessary as follows:

1. When handling the red cable, take extreme care not to crease it. Furthermore, the stripped fingers are extremely fragile and brittle, so do not bend them in the least!
2. Remove the TRA assembly. See Par. 6-8.
3. Remove the cable clamps at each end of the cable and clean the solder points on the connector and the TRA board.
4. Note that the red cable has a natural curl perpendicular to its length. This curl must be oriented properly in the following steps. "Curl up" will refer to the edges tending to curl up with respect to the center, and "curl down" the opposite.
5. Reassemble the cable clamps loosely on the top side of the TRA board and the conductor side of the terminating connector.
6. Pass the red cable under the clamps with the "curl down" at the TRA assembly, and the "curl up" at the terminating connector. Tighten lightly with the cable straight and centered on the conducting fingers.
7. Wiggle the cable to an angle accurately perpendicular to the entry edges of the board and connector with the aid of something with a square corner. Tighten the clamps and solder the fingers down.
9. Check the job for shorts and clean up as necessary.
10. Reinstall the TRA assembly. See Par. 6-8.

6-15 RECENT VALUE CHANGES & IMPROVEMENTS.

Some sites have experienced power fail type loss of the overprint data when no obvious power fail has occurred. This situation has been significantly improved in the new recorders by substitution of a higher value energy storage capacitor in the +5 regulator input. Giffit P/N 131 should be substituted for C2 (Fig. 7-3-C2). This capacitor is approximately 1 inch taller than C1 (Fig. 7-3-C1), whereas the previous capacitor is the same height. Examining the relative height is necessary and sufficient to tell which capacitor is installed. If the capacitor is to be replaced, be sure to observe the correct polarity (BK-R, GY-BR, BK-GR wires on the positive terminal, 2 BK wires on the negative terminal.)

Some sites have experienced a sawtooth jitter effect on the recordings due to 60 Hz noise on the projector keying leads. To correct this situation in the newer recorders, capacitors C1 and C2 on the PSU board have been changed from .01 mfd to .1 mfd (P/N 188.)

Another source of irregular scanning has been found to be the floating gate inputs to the overtravel inputs of the SWP board at pins 13 and 14. This has been corrected in the newer recorders by addition of pullup resistors R4 and R5 on the SWP board. If this change is desired it is recommended that the board be returned to the manufacturer.

6-16 PLASTIC SCANNER SPROCKET REPLACEMENT (FIG. 7-3-57).

6-17 PAPER GEAR PRESSURE ADJUSTMENT (FIG. 7-4-86, 87).

6-18 IDLER CONE COIL SPRING REPLACEMENT (FIG. 7-2-75, 76).

6-19 SCANNER DRIVE BELT REPLACEMENT (FIG. 7-3-17).



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

February 18, 1981

OA/W5141 - BLM

TO: All NWS Regional Headquarters, Area Electronics Supervisors,
and Electronics Technicians (EHB-8 Distribution)

FROM: *J.M. St. Clair*
OA/W51 - J.M. St. Clair

SUBJECT: Transmittal Memorandum for Engineering Handbook No. 8,
Issuance 81- 1

1. Material Transmitted:

Engineering Handbook No. 8, Surface Equipment, Section 2.1; Cloud Height
Maintenance Note No. 48: Repair and Reordering Procedure for Giff
Recorder Ribbon Cable.

2. Summary:

When the Ribbon Cable becomes defective, the entire Traveling Circuit
Board Assembly is to be replaced.

3. Effect on Other Instructions:

None.

EHB-8
Issuance 81-1



Engineering Division
OA/W514

CLOUD HEIGHT MAINTENANCE NOTE
(For Electronics Technicians)

48. Replacement of Defective Giffit Recorder Ribbon Cable.

PROCEDURE:

Ribbon Cables are not stocked at CLSC as a separate item.

When a Ribbon Cable is defective it will be necessary to replace the entire Traveling Circuit Board Assembly.

Use Weather Service Stock Number K211-A4PC10 when ordering the Traveling Circuit Board Assembly, Giffit P/N 1938. This assembly consists of the Traveling Circuit Board, Ribbon Cable, PC Connector and Spare Belt. The National Stock Number is: 6660-01-034-7170.

Return the defective assembly to NRC, attention: George Barrios.

Issue Date 3-3-92	Org. Code W/OS032
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NATIONAL WEATHER SERVICE

Engineering Handbook

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MAINTENANCE NOTE INDEX - WIND EQUIPMENT

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
1	June 1, 1962	Summary of Wind Equipment Instruction
2	June 1, 1962	F420 Wind System Loading
3	November 7, 1962	Condensed Instruction for Conversion of Direct Reading Wind Speed Equipment from M. P. H. to KNOT Indication
5	August 24, 1966	Illustrated Conversion of Direct Reading Wind Speed Meters from Miles-Per-Hour (MPH) to KNOTS & KNOTS Doubling Indicators
6	May 3, 1967	F420 Transmitters
10	August 12, 1971	Replacement Rectifier for F420C-7-2
11	November 1, 1971	Consolidation of Supplementary Instructions for Wind Equipment
13	January 6, 1972	Adjustment of the Battery Charger, Sears & Roebuck Model No. 608.71970
14	April 27, 1972	Modified F420C-2-1 Wind Direction Transmitter and F420C-2-2 Wind Vane
15	June 19, 1972	DC Power Supply for Battery Replacement
16	November 28, 1972	F611 Solid State Wind Retransmitter
17	March 8, 1973	Fuse Replacement in the F611 Retransmitter
19	January 28, 1974	F611A Printed Circuit Board - Lightning Arrester

Items 4, 7-9, 12 and 18 have been deleted.

Issue Date	Org. Code
3-3-92	W/OS032

NATIONAL WEATHER SERVICE

Engineering Handbook

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MAINTENANCE NOTE INDEX - WIND EQUIPMENT

<u>Number</u>	<u>Date of Issue</u>	<u>Title</u>
20	February 5, 1975	Topographic/Magnetic Orientation of Wind Direction Transmitter
21	February 10, 1975	Use of Constant Voltage Transformer with F611 Wind Retransmitter
22	February 10, 1975	Correction of F611 Wind Retransmitter Instruction Manual
23	February 27, 1975	F611 Retransmitter Chassis Ground
24	February 24, 1977	Toroid Resistor Check F420 Wind Direction Transmitter
25	March 17, 1977	Circuit Change DARDC Wind Direction Card
28	September 20, 1978	Revision for F611 Solid State Wind Retransmitter Manual No. 8-213
30	March 7, 1979	Optional Method of Calibration Wind Speed Meter
31	July 30, 1980	F425 Speed/Gust Card 1A13W
32	September 23, 1980	Weather Service Form H-17, Wind Calibration Data Sheet
	November 10, 1980	Errata Sheet Note 32
33	December 1, 1981	Installation of Acopian Power Supply in the F611 Wind Retransmitter

Items 26, 27 and 29 have been deleted.

Date Changed for Maintenance Notes 20, 21 and 22

UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU
WASHINGTON

June 1, 1962

IN REPLY, PLEASE ADDRESS
CHIEF, U. S. WEATHER BUREAU
WASHINGTON 25, D. C.
AND REFER TO

Instrumental Engineering Division

WIND SYSTEM MAINTENANCE NOTES
(For Electronic Technicians)

1. Summary of Wind Equipment Instructions

Future maintenance and modification instructions covering wind systems will be issued separately as the result of discontinuing Service Letters and Engineering Notes. The following equipment will be covered by Wind System instructions:

- a. F420 Series and Associated Recorders and Retransmitters
- b. Contacting Type Anemometer
- c. Contacting Type Wind Direction Transmitter
- d. Operational Recorders
- e. Triple Registers

The new pulsed light, digital readout wind system will be Included when the system becomes available.

The following instructions should be available to all ELTEC's. If they are not available in the ELTEC or station files, copies should be requested.

1. Instructions for Conversion of Direct-Reading Wind Speed Equipment from MPH to Knot indication, dated October 4, 1954.
NOTE: This is now out of print. The information will be condensed and reissued as a maintenance note.
2. Instruction Manual for Installation, Calibration, and Maintenance of F420 Series Wind Equipment (Stock Catalog Nos. F420, F420A, F420B, F420C), dated August, 1958. (Covered by transmittal memo No. 1, dated November 14, 1958, Subject: Instruction Manual for Wind Equipment.)
3. Maintenance and Service Instruction for Wind Systems Retransmitters, (F420 Series), dated March, 1958.
4. Installation and Operation of Magnetic Amplifier Type Wind Speed and Direction Retransmitters for use with F420 Series Wind Equipment, dated January, 1960. (Covered by transmittal memo No. 2, dated January, 1960.)
5. Instruction Book for Indicator Wind Set, USWB No. F420D (See memorandum to all ELTEC's, dated June 22, 1960.)

2.

6. Memorandum to all RAO's, dated November 5, 1959, Subject: F420 Wind Equipment, copy to ELTEC's.
7. Memorandum to all Weather Bureau and FAA Observing Stations, dated February 19, 1960, Subject: Wind Variations with Height.
8. Memorandum to First Order Stations and ELTEC'e, dated April 20, 1960, Subject: Wind Instrument Support Safety Precautions.
9. Retransmitter, Wind Speed and Direction Magnetic Amplifier, Weather Bureau Catalog No. F607 schematic, dated October 21, 1960. (Covered by transmittal memo No. 3, Wind Equipment Manual Issuance.)
10. Memorandum to all ELTEC's, dated December 11, 1961, Subject: Magnetic Amplifiers.
11. MAL No. 16-62, dated March 20, 1962, Subject: Weekly Checks of Magnetic Amplifier-Type Wind Retransmitters.
12. Schematic diagram of Brown Amplifier used in F420 Wind Retransmitters.
NOTE: This diagram is a reproduction for use by ELTEC's who do not have a copy of Minneapolis - Honeywell Service Manual No. 15019M (Manual No. 15019M should be requested only by those ELTEC's servicing Brown Solar Radiation Recorders.)

2. F420 Wind System Loading

The maximum allowable D and E lead current for F420 series equipment is 250 milliamperes for F420, F420A and F420B transmitters, and 400 milliamperes for F420C and F420D transmitters. The number of indicators that can be driven by a single wind direction transmitter is affected by lead resistances, line voltage values and regulation, and particularly by the amount of friction in the bearings of the direction meters. These are generally evaluated in terms of the worst possible combination of the above conditions that may be encountered.

The following tables indicate the number of wind direction indicators vs lead resistances, which can be driven by a single F420B, F420C, or F420D transmitter. These tables are based on meters of maximum acceptable bearing friction and an acceptable meter lag of up to 3° in the indicated wind direction. The first table is for systems having equal resistances in each of leads A, B, C, D and E, and the second for systems having a remote power supply with essentially zero resistance in leads D and E, but with equal resistance in leads A, B, and C. Note that where the line voltage can be maintained constant at 120 volts, greater lead lengths are possible.

Total Indicator Load for F420B, F420C, and F420D Wind Direction Transmitters with an allowable meter lag of 3°

*For systems having equal resistances in leads **A, B, C, D, and E** (station power supply.)

No. Panels	Lead resistance (line voltage 105 to 125 V)	Lead resistance (line voltage 120 volts)
1	20 ohms	34 ohms
2	11	22.5
3	7.5	17
4	6	13.5
5	5	11.5
6	4.5	10
7	4	9.5

⊙For systems having equal resistances in leads A, B, C, and essentially zero resistance in leads D and E (remote power supply):

No. Panels	Lead resistance (line voltage 105 to 125 V)	Lead resistance (line voltage 120 volts)
1	60 ohms	100 ohms
2	32	60
3	19	39
4	11	27.5
5	7	21
6	5	17.5
7	4.5	15.5

*Standard Installation

†Non-Standard Installation

The line resistance between the transmitters and the indicators was simulated in the laboratory by the use of calibrated decade boxes. No resistance was inserted between the wind direction indicators in making these tests. Therefore, the laboratory layout did not exactly represent field installations where there may be several hundred feet between the various indicators or groups of indicators.

The lead resistances shown above should be determined by measuring the resistance of leads A, B, and C from the transmitter to the most distant indicator. The resistance must be below the values indicated above to remain within the 3° lag.

NOTE: The 3° lag referred to above does not mean that the wind direction system is correct to within 3°. The indications of the wind direction Systems may, under the specifications, be within 5°, and depending on the direction of rotation, the instrument errors may either be accumulative or tend to cancel each other.

4.

As stated in the instructions for Installation and Operation of Magnetic Amplifier Retransmitters, nine speed and direction meters can be driven by a single magnetic amplifier type retransmitter.

As indicated in the Maintenance and Service Instructions for Wind Systems Retransmitters (F420 Series), not more than five indicators should be connected to the Electronic type retransmitters.

The information contained in this maintenance note supersedes similar information contained in Paragraph 2.5.4 on pages 10 and 11 of the Instruction Manual for Wind Equipment. The above paragraphs should be marked as superseded by Maintenance Note No. 2.

UNITED STATES DEPARTMENT OF COMMERCE
WEATHER BUREAU
WASHINGTON

November 7, 1962

Instrumental Engineering Division

WIND SYSTEM MAINTENANCE NOTES
(For Electronic Technicians)

3. Condensed Instructions for Conversion of Direct-Reading Wind Speed Equipment from MPH to Knot Indication.

At the time the Weather Bureau began reporting wind speeds in knots, conversion kits were sent to the field to modify all F420, F420A, F420B, and F430-series direct-reading wind equipment: The F420 and F430-series have since been replaced, and in several Regions the F420A-series have been phased out.

Those indicators which have been repaired at Joliet, Illinois, have had the external modifications removed and installed internally in the indicators. These units can easily be identified by the word "KNOTS" stamped on the meter case.

The original modification to convert the wind-speed indicator from MPH to KNOTS involved the installation of a suitable resistor in parallel with the wind-speed indicator. This, however, reduced the apparent resistance of the indicator and it was necessary to add another resistor in series to maintain a constant resistive load on the wind-speed transmitter.

Three different combinations of resistors were required to convert the 500-ohm and 1500-ohm Indicators and the 3000-ohm gust recorders. These resistors were furnished in kit form mounted upon an insulator strip or within a box, depending upon the type of equipment to be converted. The modification could be performed on part of the speed indicators in the system without affecting the MPH indication of the other indicators or recorders in the system.

ELTEC's will occasionally encounter units of the F420A and F420B-series in the field, that still have the external modifications. These units fall into three groups, each of which require a particular method of installation of the conversion resistors.

GROUP 1. All 1500-ohm indicators in the master and repeater panels of the F420A and F420B-series are included in this group. The Indicators are identified by the two terminals on the rear of the case, and as manufactured by either the Hickok Electrical Instrument Co., or the Electric Speed Indicator co. The resistors used in making the conversion were mounted upon an insulator strip which was marked with the numeral 15. The resistors used for this kit were 9900-ohms (shunt) and 197-ohms (series). The conversion is shown pictorially in Figure 1 and the schematic in Figure 1a.

2.

GROUP 2. All 500-ohm indicators in the master and repeater panels of the F420A and F420B-series are included in this group. The indicators are identified by the four terminals on the rear of the case, and as manufactured by the Hickok Electrical Company or by the Electric Speed Indicator Company. The resistors used in making the conversion were mounted the same as those in Group 1 with the exception of having the numeral 5 stamped on the insulator strip. The resistors used in this kit were 3300-ohms (shunt) and 66-ohms (series) connected between the + and 500-ohm taps. The wiring is shown in schematic diagram Figure 1b, and pictorially in Figure 2.

GROUP 3. The 3000-ohm gust recorders, used with the F420-series wind equipment, are included in this group. The gust recorders were manufactured by the Esterline-Angus Company, and the General Electric Corporation. The resistors used in making this conversion were mounted in a small box chassis with an exterior four-circuit terminal strip. In addition to the numerals designating the terminals, the numeral 3000 was used to identify the box. The resistors used in making this conversion were a 19800-ohm (shunt) and a 395-ohm (series). The kits were mounted and wired as shown in Figures 3 and 4.

Recent wind-speed indicators used by the Weather Bureau and Federal Aviation Agency are of two types. The first type, used by the Weather Bureau in the F420C and F420D systems, incorporate within the meter case the series and shunt resistors for obtaining knot indications. The basic meter movement as compensated by these two resistors, has a full scale current of 3.071 milliamperes, with an input resistance of 500-ohms. In addition, two other resistors have been added to the basic meter movement, and connected to two external terminals so that when connected and controlled by a single-pole, double-throw switch, the indication may be either in knots full scale or in knots double scale. The internal circuitry is shown in Figure 5.

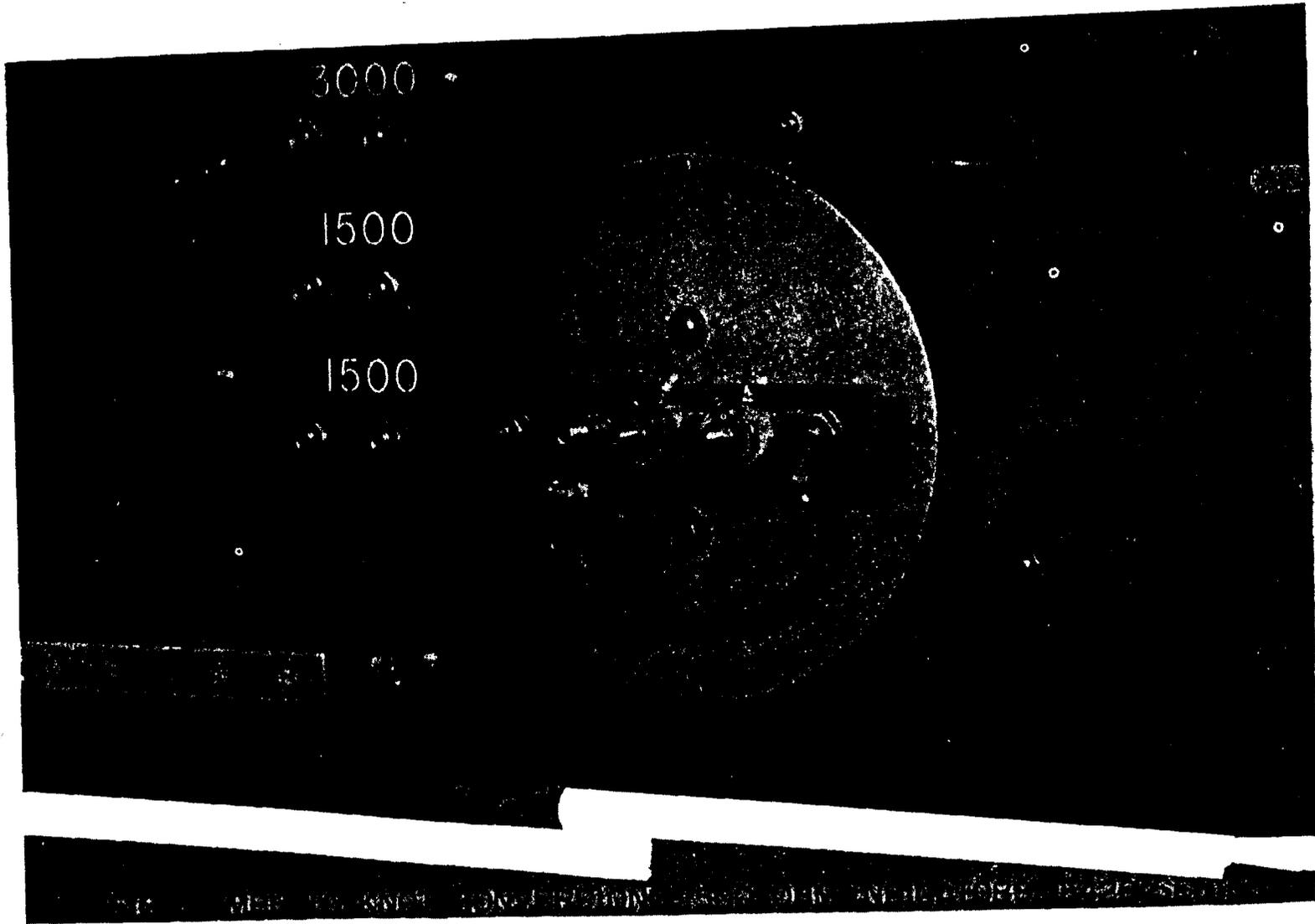
The wind-speed indicators used by the Federal Aviation Agency are basically the same as those used by the Weather Bureau, except that the basic indicating meter movement is adjusted to 500-ohms with a full scale current of 2-2/3 milliamperes. Appropriate series and shunt resistors have been incorporated in the meter and connected to the external terminals, so that upon connecting a suitable single-pole, double-throw switch, indications may be had in either miles per hour, or in knots, depending upon the switch position. The circuitry for this meter is shown in Figure 6.

Changes in the switch position of either type of meter (WB or FAA) will not cause any change in the input resistance of the indicating meter.

The Federal Aviation Agency has issued instructions to discontinue the use of the "Knots to MPH" switch connected to the wind-speed meters located in their facilities. This has in a number of cases resulted in this switch being removed from the circuit. In installations where the meters also have a resistor network, changing the original meter (MPH) to read Knots, the removal of this switch may alter the circuit resistance and produce erroneous readings.

ELTEC's should be careful when servicing wind systems where both Federal Aviation Agency and the Weather Bureau utilize the same wind-speed transmitter to check during the system calibration that all wind-speed meters are within prescribed calibration standards and that the meter indications are in Knots.

The above instructions supersedes the "Instructions For Conversion of Direct-Reading Wind-Speed Equipment From MPH to Knot Indication", dated October 4, 1954.



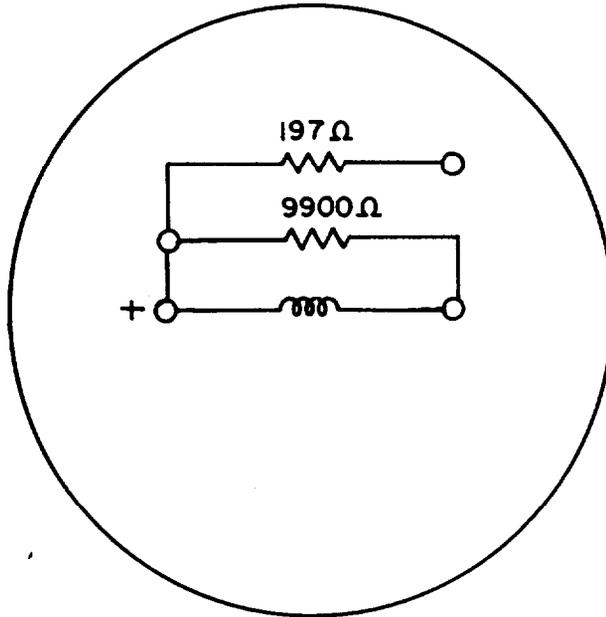


FIG. 1a
MPH to Knots Conversion
1500 Ohm Indicators, F420 Series

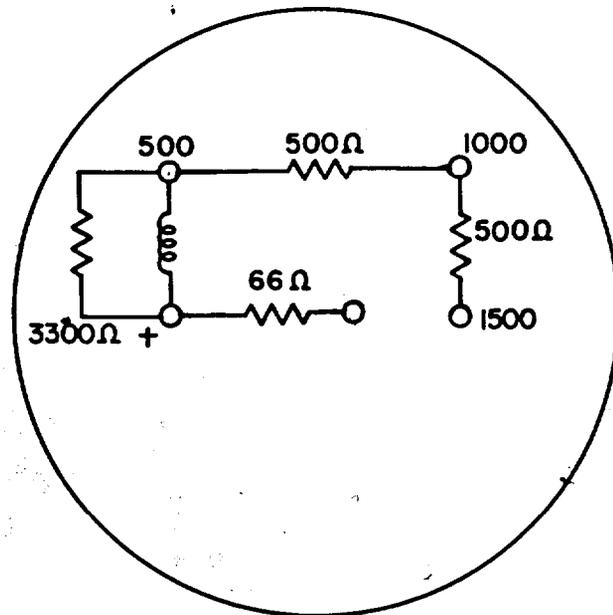


FIG. 1b.
MPH to Knots Conversion
Multiple Terminal Type Indicators
F420 Series

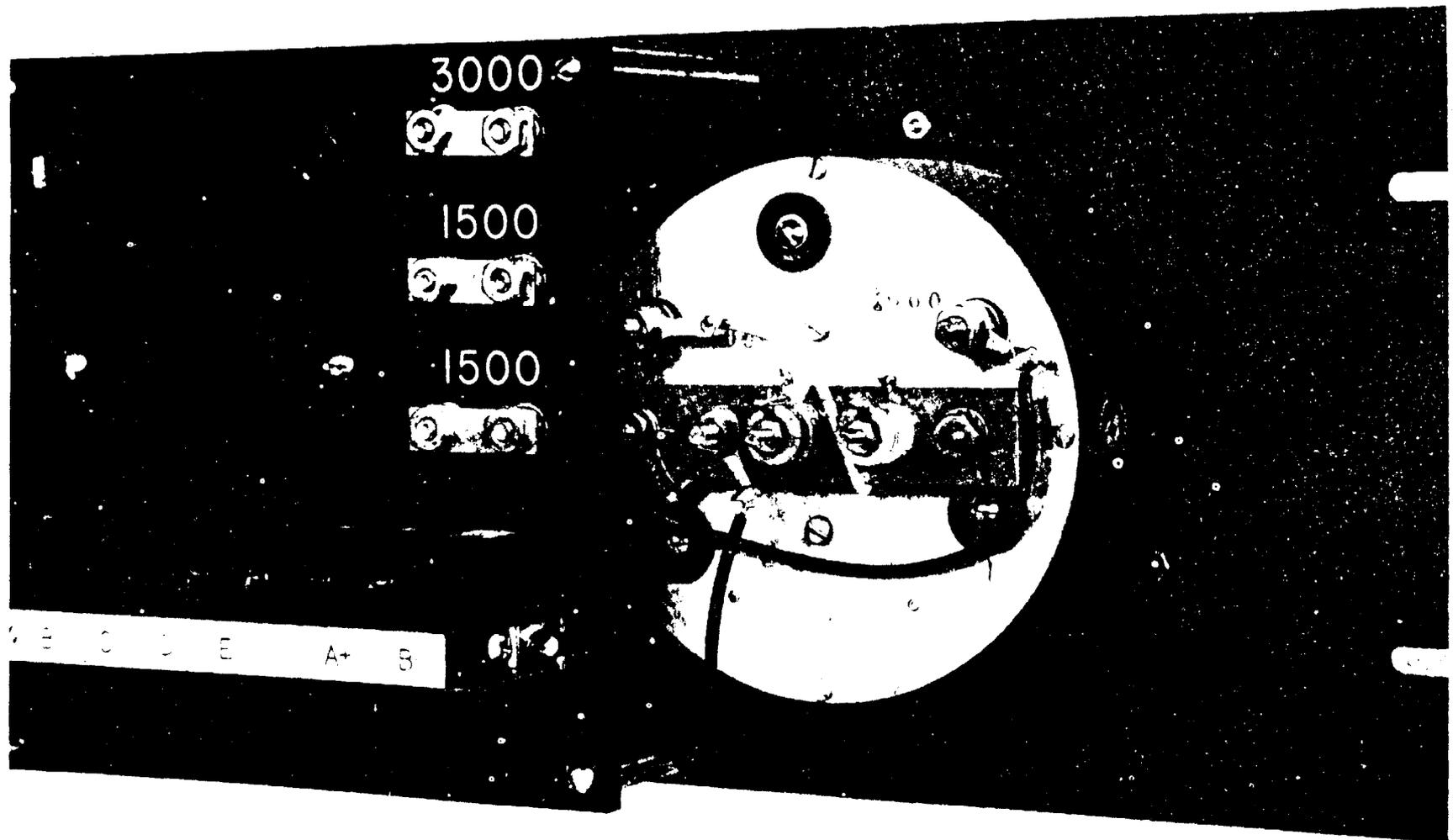
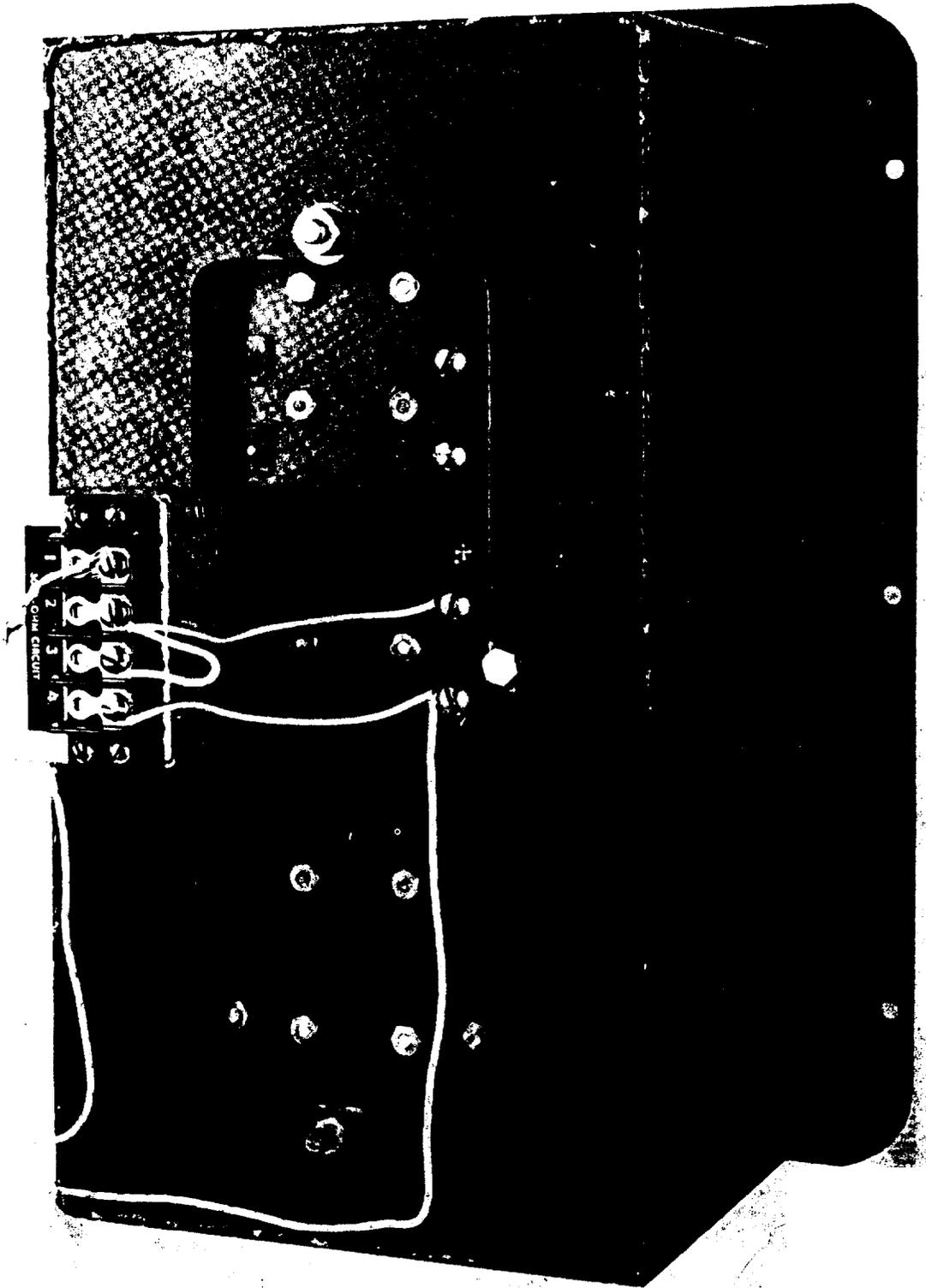


FIG. 2. MPH TO KNOT CONVERSION - MULTIPLE TERMINAL TYPE INDICATORS, F420 SERIES.



**FIG. 3. MPH TO KNOT CONVERSION.
GUST RECORDER, G-E TYPE.**

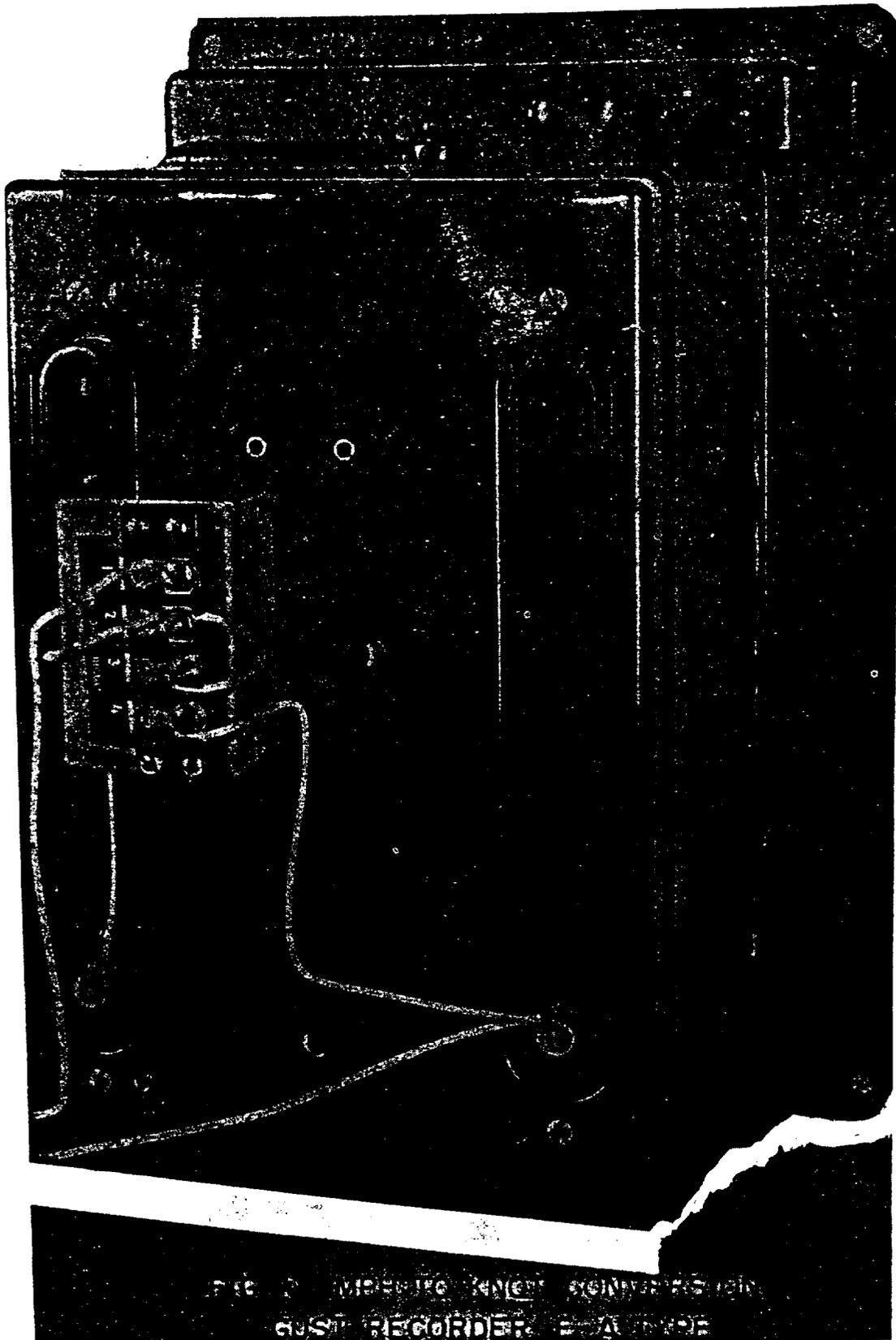
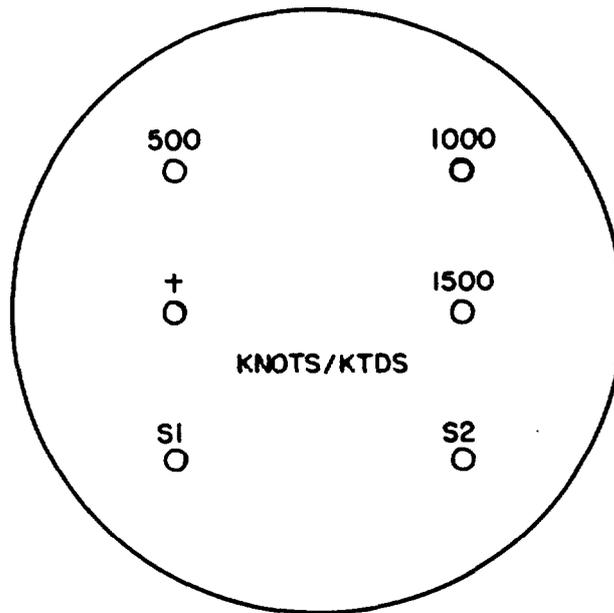
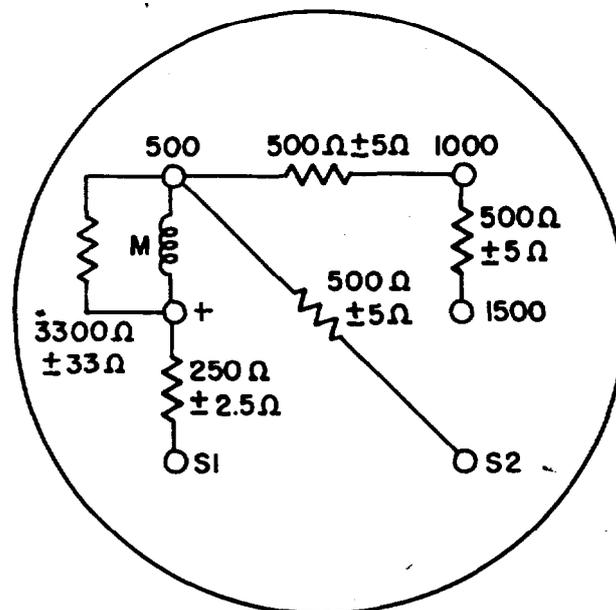


FIG 4 MPH TO KNOT CONVERSION
GUST RECORDER F-A TYPE



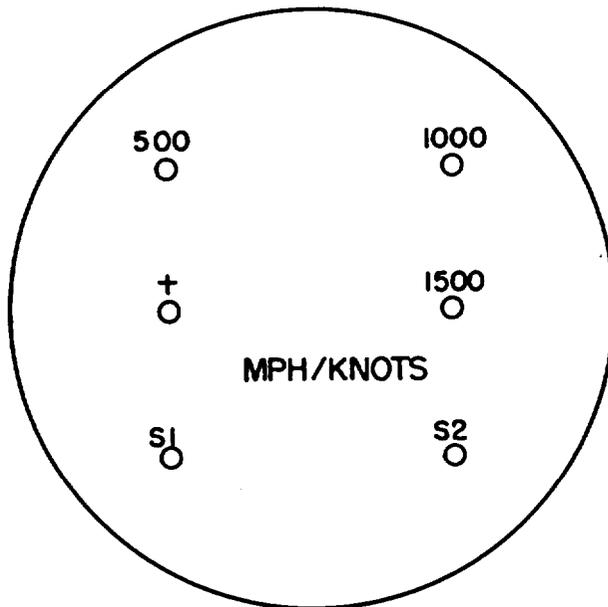
TERMINAL MARKINGS



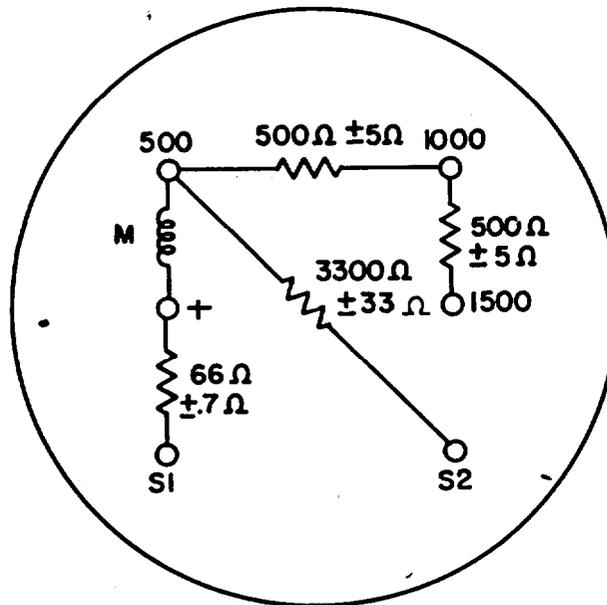
INTERNAL CIRCUITRY

FIG. 5

Weather Bureau Knot Doubling -
F420C and F420D Series



TERMINAL MARKINGS



INTERNAL CIRCUITRY

FIG. 6

FAA MPH to Knots —
F420 Series

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
WEATHER BUREAU
SILVER SPRING, MD. 20910

ENGINEERING DIVISION

August 24, 1966

IN REPLY REFER TO:

W514

WIND SPEED SYSTEM MAINTENANCE NOTES
(For Electronic Technicians)

5. Illustrated Conversion Of Direct Reading Wind Speed Meters From Miles Per Hour (MPH) To Knots And Knots Doubling Indication

A variety of different type wind speed meters are available for use with the F420 wind system of which Eltecs should be familiar. Some of the wind speed indicators have the same outward appearance, but the internal resistance network is arranged to provide either MPH, knots or knots doubling scale readout on the indicator. The meters may be connected in different patterns to provide the correct resistive load to the wind speed transmitter. The attached figures (Fig. 1-7) illustrate the possible variation that might be encountered in the field.

Early model Federal Aviation Agency wind speed meters (identified by round mounting flange and dial lighting) have an input resistance of 500, 1000, or 1500 ohms and full scale current of 2.666 milliamperes (100 mph). This model has appropriate series and shunt resistors supplied and connected to the proper terminals, so that upon connection of a suitable single-pole double-throw switch, indication will be in either MPH or knots, controllable by the switch position. Later models have the same 500, 1000, or 1500 ohm meter movement and are converted for full scale current of 3.071 milliamperes (100 knots). These meters have the same resistive network as the six-terminal Weather Bureau meters which provide knots and knots doubling indication. When repair is currently required on the early model FAA type meters, they are being converted to correspond to the same specifications as the later FAA model and Weather Bureau meters (knots and knots doubling indicators). The later model FAA meter is identified by the square mounting flange whereas the WB models are round. All FAA meters have dial lighting which is required for tower and IFR room installations (see Figure 7).

The O-75 miles-per-hour meter, first used with the Weather Bureau F420 wind system, have an input resistance of 1500 ohms and full scale current of 2 milliamperes.

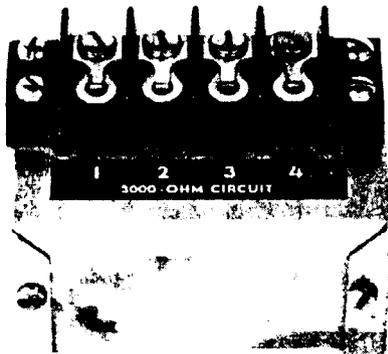
Weather Bureau meters presently have an input resistance of 500, 1000, or 1500 ohms and a full scale current of 3.071 milliamperes (100 knots). The series and shunt resistors are so connected to the basic meter movement and external terminals, that upon connection of a single-pole double-throw switch, indication will be in either knots full scale or knots double scale, controlled by the position of the switch.

It has been found that individual meter range doubling is preferable to having the entire system "doubled" with a switch on the Master Panel. The switch used for range doubling should be of the momentary type, so that it will automatically return to the O-100 range.

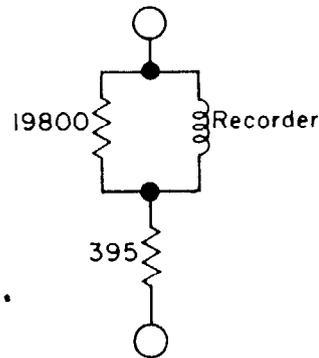
Reference should be made to Wind System Maintenance Note No. 3, dated November 7, 1962, figure 1 through 6, to see actual applications of these conversion kits. It should be noted that the internal circuitry drawing of Maintenance Note No. 3, Figure No. 5, is in error and should be changed to show a 66-OHM resistor connected from the positive terminal in series with the meter and the 3300-OHM resistor.


H. R. McBirney, Chief

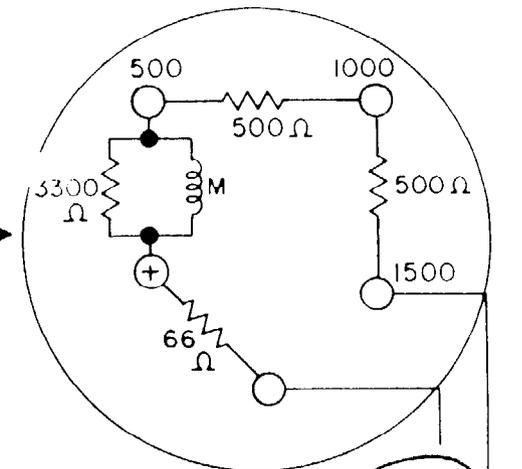
Attachments



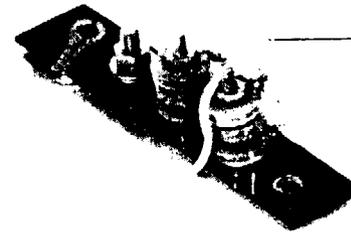
F420 SERIES GUST RECORDER
MPH TO KNOTS, 3000 OHMS



F420 SERIES INDICATOR
MPH TO KNOTS CONVERSION,
FOUR TERMINAL, 500 OHM



These units were used with the F420 wind speed indicators as a means of converting the indicators from miles per hour to knots. The resistors used in making this conversion were mounted on an insulated strip and marked on one end with the numeral 5 or 15, and on the other, a "P", for positive terminal. Most of these resistors have now been installed within the wind speed meters and are no longer visible. However, on the older gust recorders, the mini-box with the resistor network is still in use.



F420 SERIES INDICATOR
MPH TO KNOTS CONN.
TWO TERMINAL, 1500 OHM

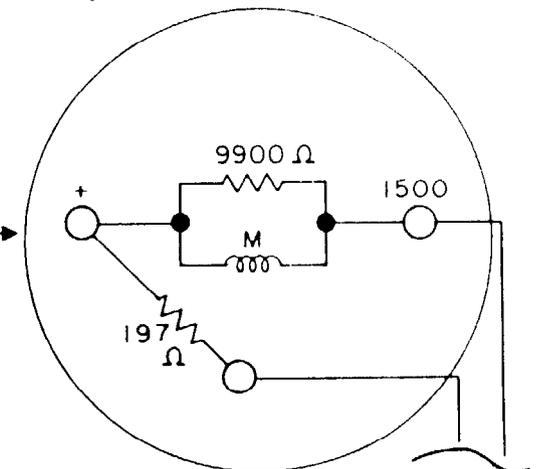


Figure 1 - F420 WIND SPEED MAINTENANCE NOTE NO. 5

An example of the hookup of the resistor strip on the back of a 0-75 MPH, 1500 OHM, 2MA fullscale, wind speed meter. The resistor strips were mounted across the terminals with one end marked with the numeral 15, and the other with a "P", for positive terminal. This converts the meter from MPH to knots.

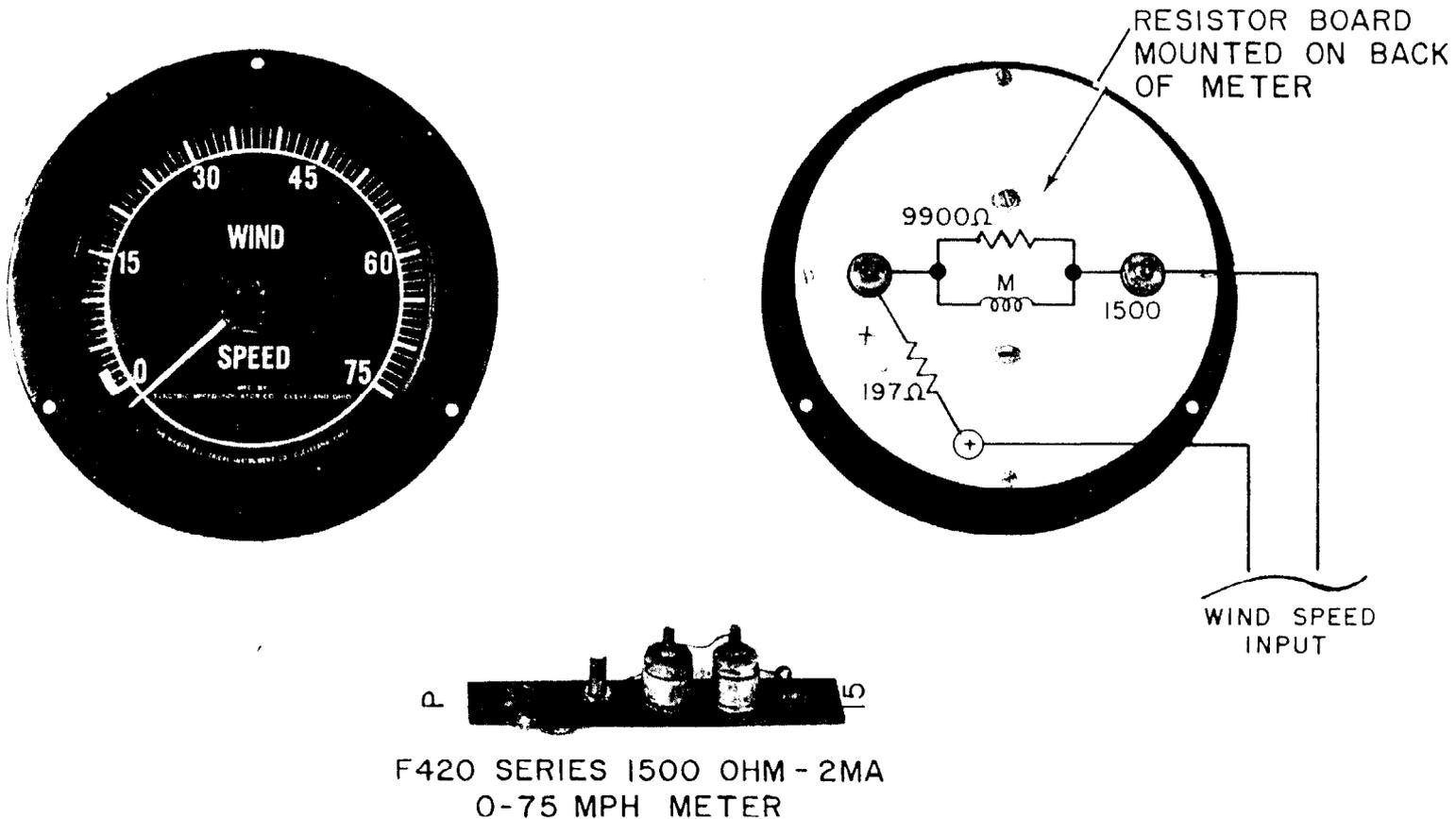
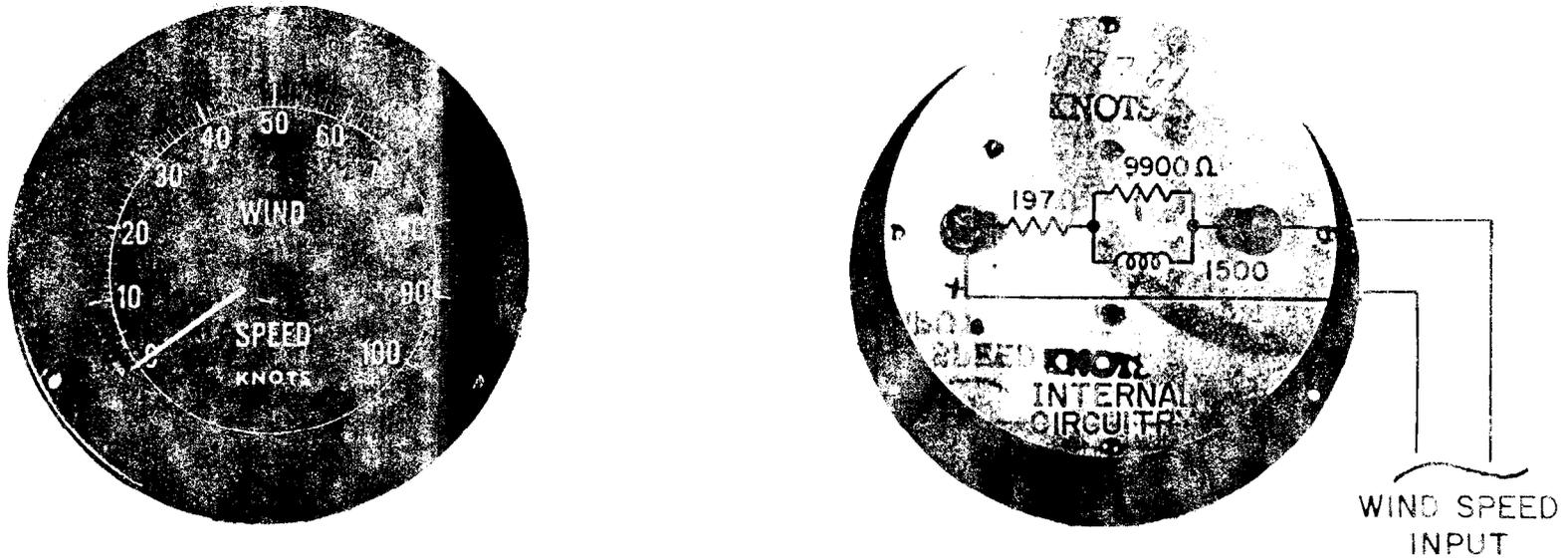


Figure 2 - F420 WIND MAINTENANCE NOTE NO. 5

THIS MODEL HAS THE REQUIRED RESISTORS
INSIDE THE CASE TO CONVERT FROM MPH
TO KNOTS.

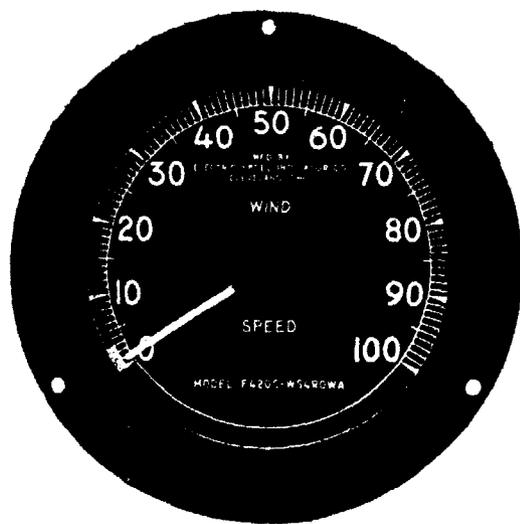
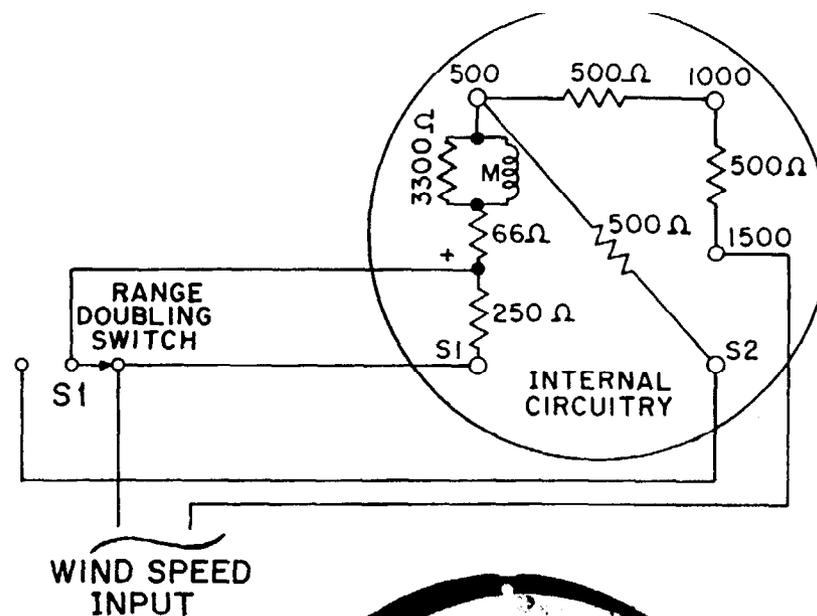


F420 SERIES SPEED INDICATOR
TWO TERMINAL 1500 OHM METER
MPH TO KNOTS

Figure 3 - F420 WIND MAINTENANCE NOTE NO. 5

For detailed diagram of Range Doubling Circuit see Figure 31 in the F420 series Wind Instruction Manual. If equipment does not have range doubling capabilities, the positive lead connects to the "+" terminal for knot readout.

Range Doubling Switch "S1" Is Shown In 0-100 Knots Position.



F420 SERIES SPEED INDICATOR
SIX TERMINAL 500 OHM
KNOTS & KNOTS DOUBLING

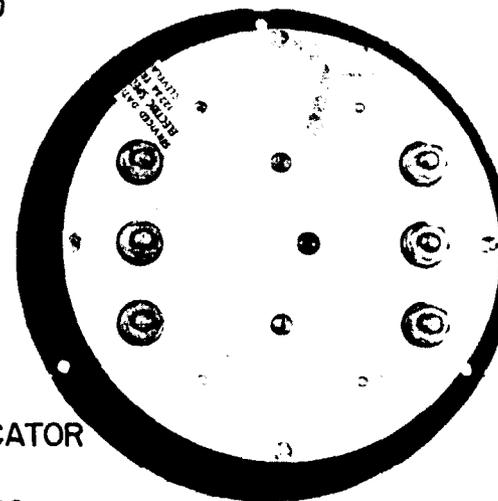
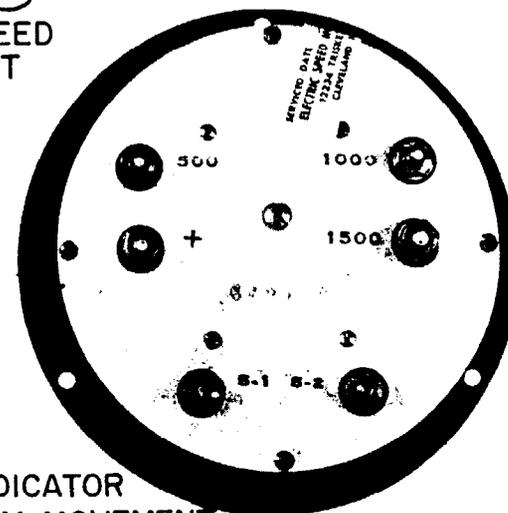
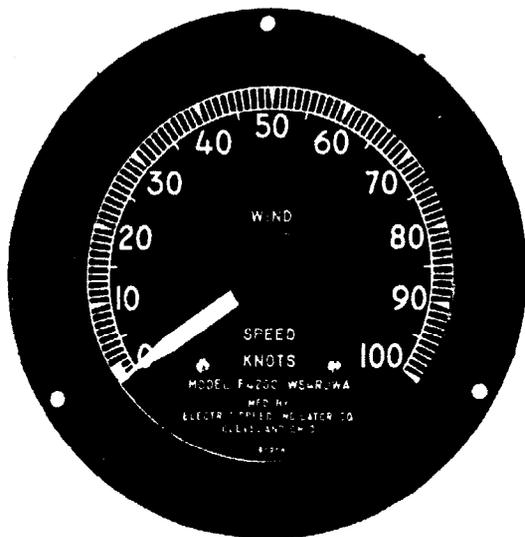
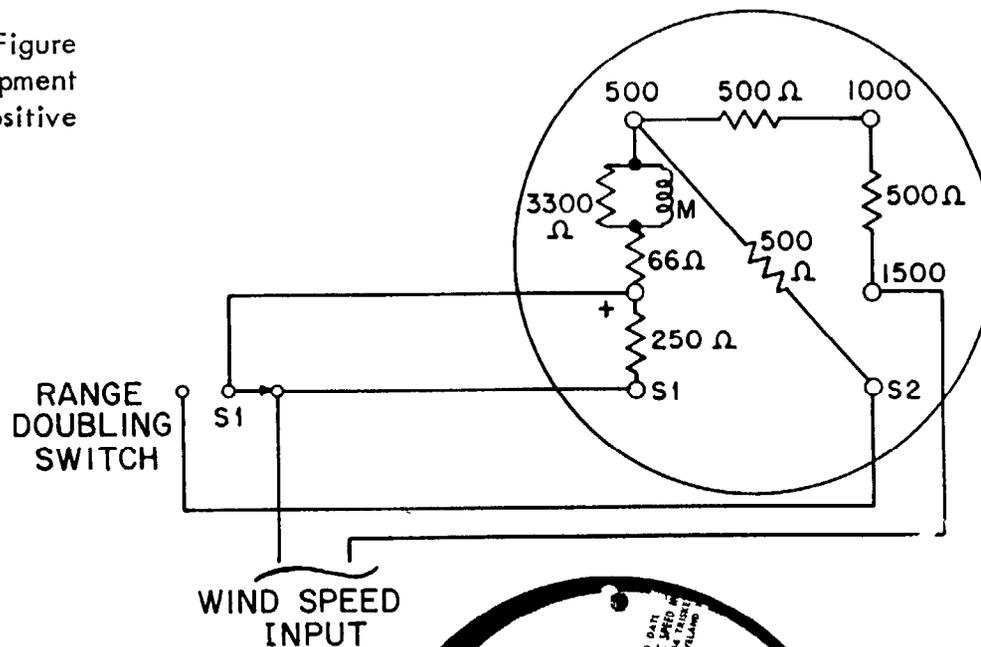


Figure 4 - F420 WIND MAINTENANCE NOTE NO. 5

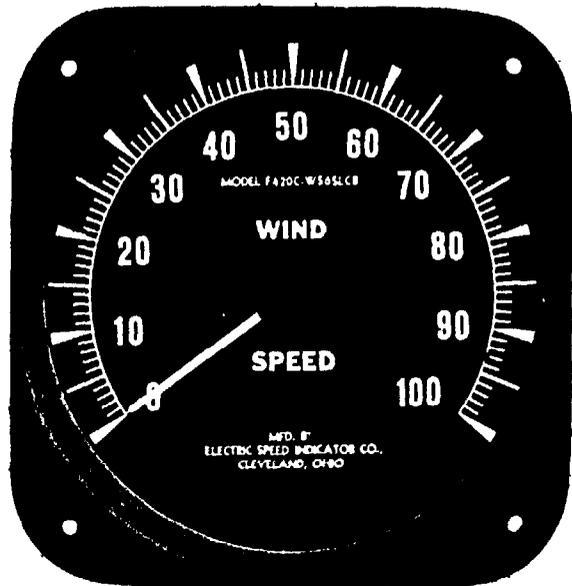
For detailed diagram of Range Doubling Circuit see Figure 31 in F420 series Wind Instruction Manual. If equipment does not have range doubling capabilities, the positive lead connects to the "+" terminal for knot readout.

Range Doubling Switch "S1" Is Shown In 0-100 Knots Position.



F420 SERIES SPEED INDICATOR
SIX TERMINAL 500 OHM MOVEMENT
KNOTS & KNOTS DOUBLING

Figure 6 - F420 WIND MAINTENANCE NOTE NO. 5



F420 Wind Speed Indicator FAA type, 6 terminal. Early model (bottom right) indicates MPH or Knots. Later model (bottom left) indicates Knots or Knots Double Scale depending on position of S1.

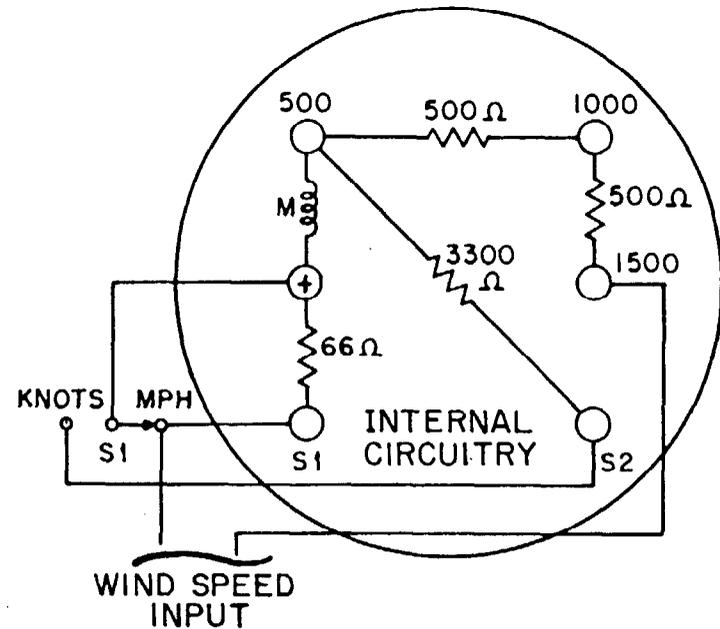
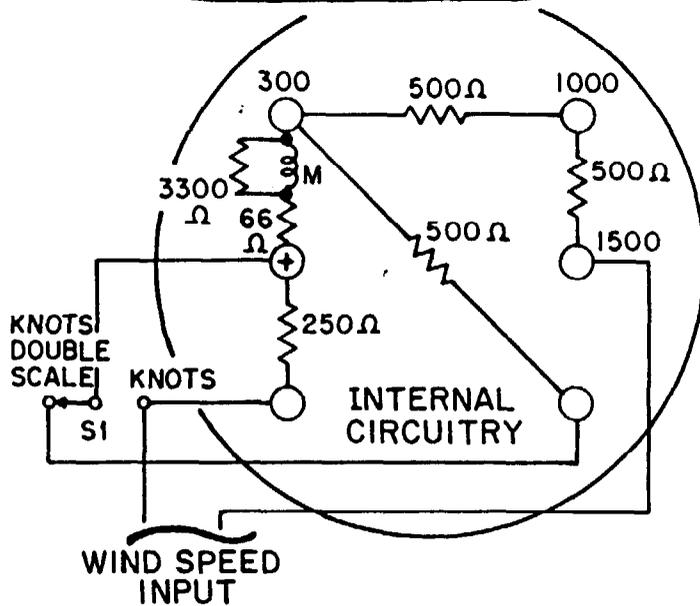
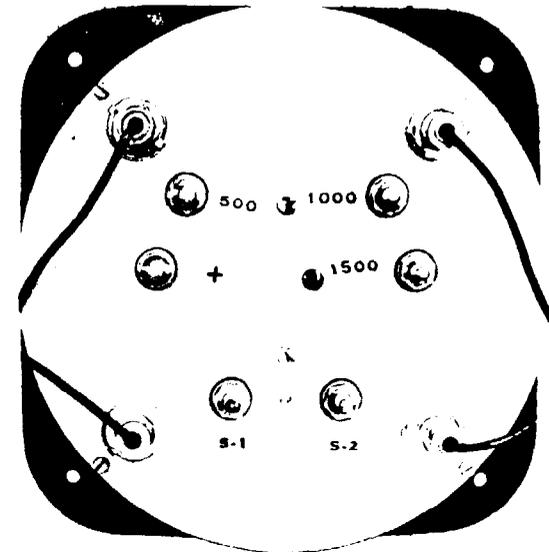


Figure 7-F420 WIND MAINTENANCE NOTE NO. 5

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
WEATHER BUREAU
SILVER SPRING, MD. 20910

May 3, 1967

IN REPLY REFER TO

Engineering Division

W514

WIND MAINTENANCE NOTES
(For Electronic Technicians)

6. F420 Transmitters

It has been called to our attention that, in a number of cases, F420B wind speed and wind direction transmitters have been returned to Reconditioning Center at Joliet with the notation "wrong transmitter".

All of the older type F420B Transmitters are electrically and physically interchangeable with their respective F420C transmitters.

Repaired F420B and F420C transmitters are stocked together as the same item at the CLSC, Kansas City, and either should be utilized as replacement for a F420C unit.


J. A. Cunningham, Chief
Engineering Division

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
Silver Spring, Md. 20910

Engineering Division

W514

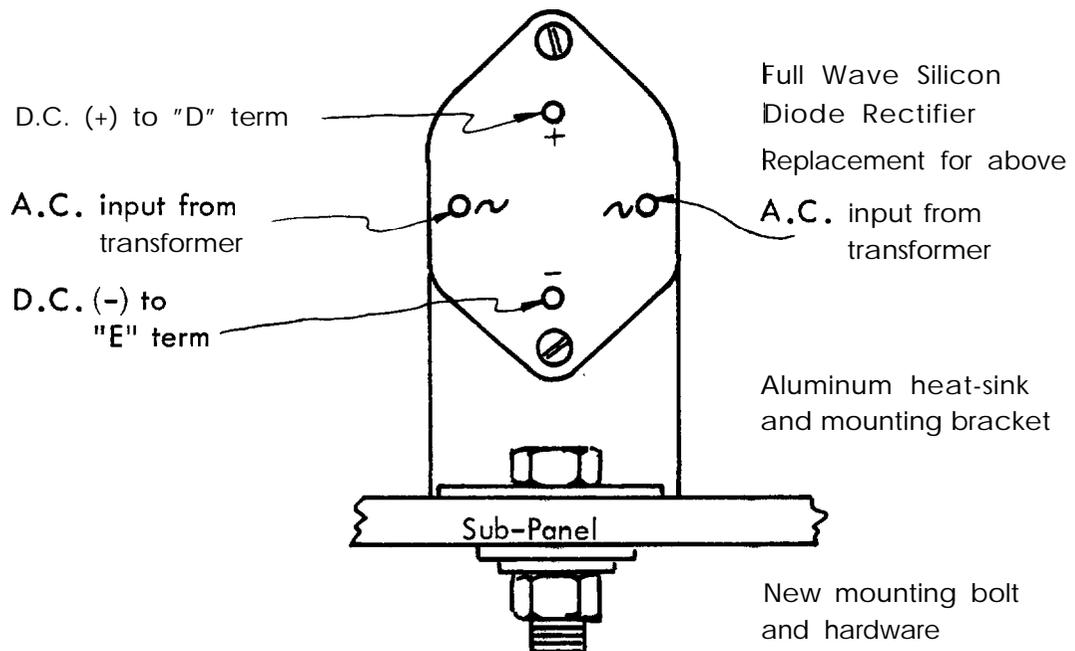
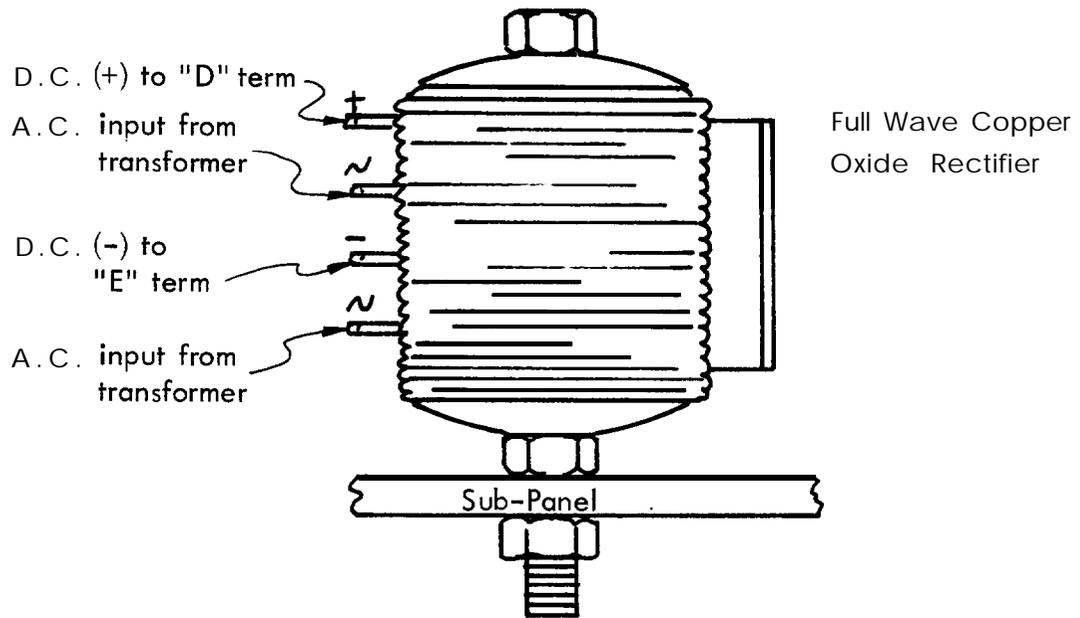
WIND EQUIPMENT MAINTENANCE NOTE
(For Electronics Technicians)

10. Replacement Rectifier for F420C-7-2.

The full wave copper oxide rectifier, Weather Service Stock Number F420C-7-2, FSN 6130-572-2617, is no longer available. It has been replaced with a full wave silicon diode rectifier that is complete with mounting hardware and instructions. The Weather Service Stock Number will remain the same, although a new FSN will be assigned.

The replacement procedure and drawing is attached to this maintenance note and should be retained for future reference.

Attachment: 1



REPLACEMENT PROCEDURE: Remove the sub-panel by removing four screws

secured to the mounting standoffs. Cut the four wires close to the solder connections at existing rectifier and remove the rectifier, Using new mounting hardware, install the new silicon rectifier, orienting aluminum mounting plate at a right angle to the transformer and with the lugs of the rectifier pointing towards the terminals on the sub-panel. Re-solder the wires to the rectifier in accordance with above diagram.

Remount the sub-panel.

8-2.2-10-DR001
6-18-71