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C-16-010-010 / MN-CCC

EO 20-85BA-3

ROYAL CANADIAN AIR FORCE

RESCINDED

REPAIR AND OVERHAUL INSTRUCTIONS

FUEL GAUGE SYSTEMS

(LIQUIDOMETER)

REVISION NOTICE

LATEST REVISED PAGES SUPERSEDE THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic publication.
Destroy superseded pages.

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

1 AUG 54

Revised 12 Mar 63

LIST OF RCAF REVISIONS

DATE	PAGE NO	DATE	PAGE NO
17 Oct 55	64		
17 Oct 55	120		
21 Jun 56	78		
12 Mar 63	96		

RESCINDED

X-XX-XXX-XXX/XX-XXX

RECORD OF CHANGES/REGISTRE DES MODIFICATIFS

Identification of Ch Identification de Mod		Date Entered Date enregistrée	Signature
Ch. No. N° de Mod.	Date Date		

Figure 2-3 Record of Changes, Bilingual P4
Figure 2-3 Registre des modificatifs, format bilingue P4

RESCINDED

X-XX-XXX-XXX/XX-XXX

RECORD OF CHANGES/REGISTRE DES MODIFICATIFS

Identification of Ch Identification de Mod		Date Entered Date enregistrée	Signature
Ch. No. N° de Mod.	Date Date		
Basic	54-8-1	[redacted]	
Revision	63 03 12		

Figure 2-3 Record of Changes, Bilingual P4
Figure 2-3 Registre des modificatifs, format bilingue P4

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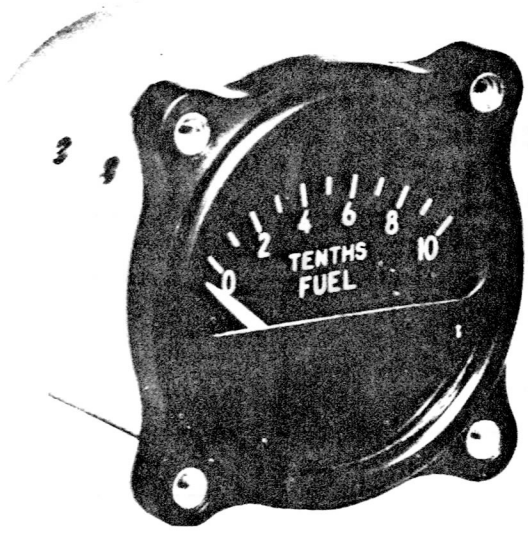


Figure 1—EA-35 and 343 Indicators

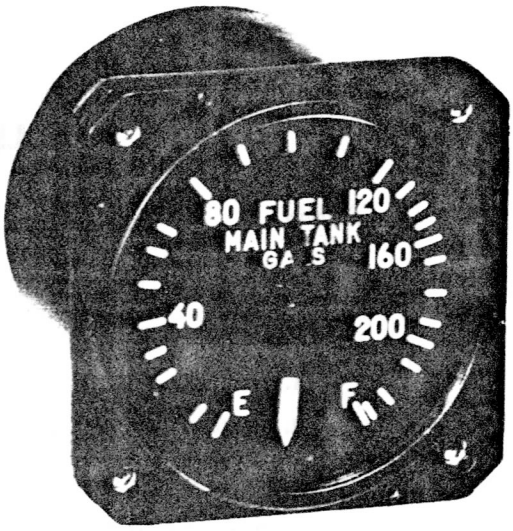


Figure 2—EA-100 Indicator

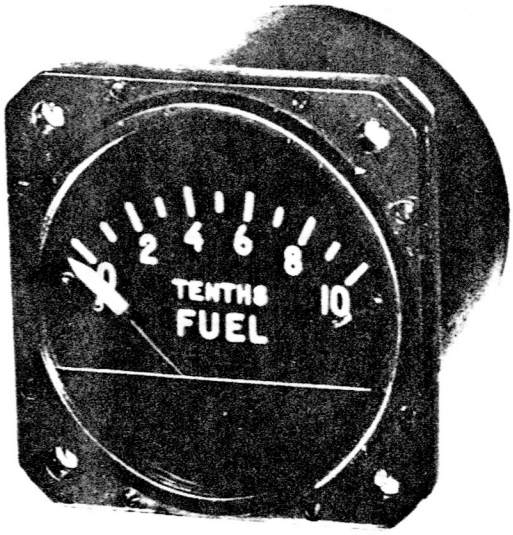


Figure 3—EA-102 Indicator

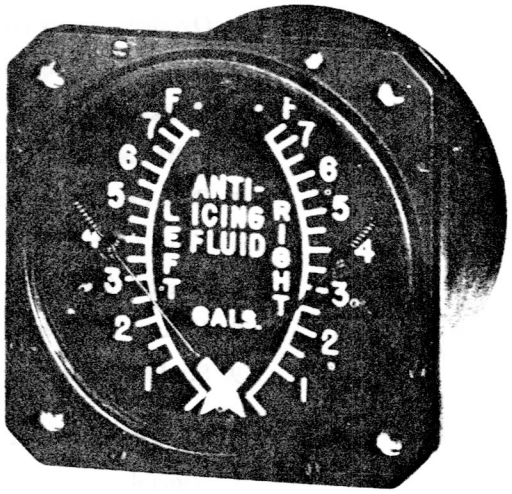


Figure 4—EA-108 Indicator

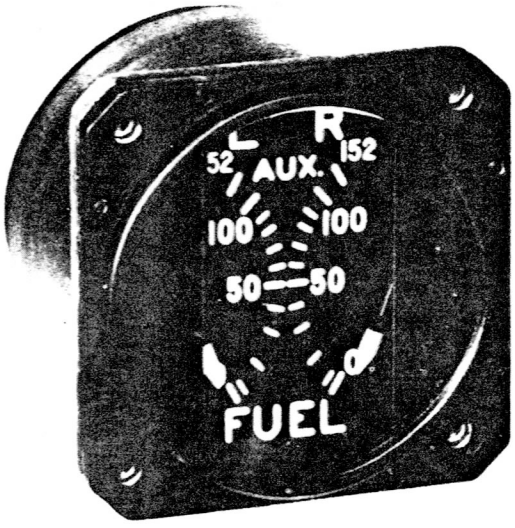


Figure 5—EA-148 Indicator

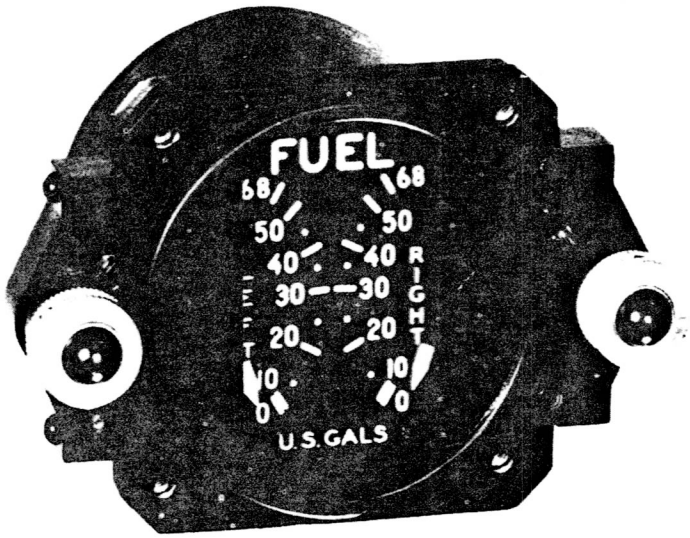


Figure 6—EA-148W Indicator

RESCINDED

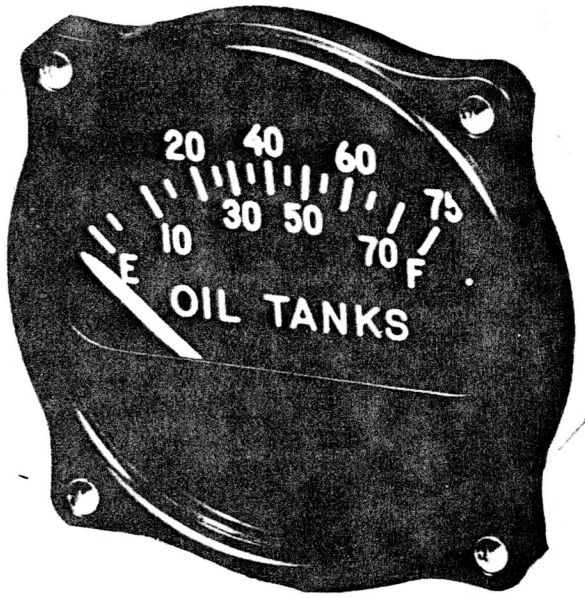


Figure 7—EA-36 Indicator

Figure 8—EA-101A Indicator

Figure 9—EA-101 Indicator

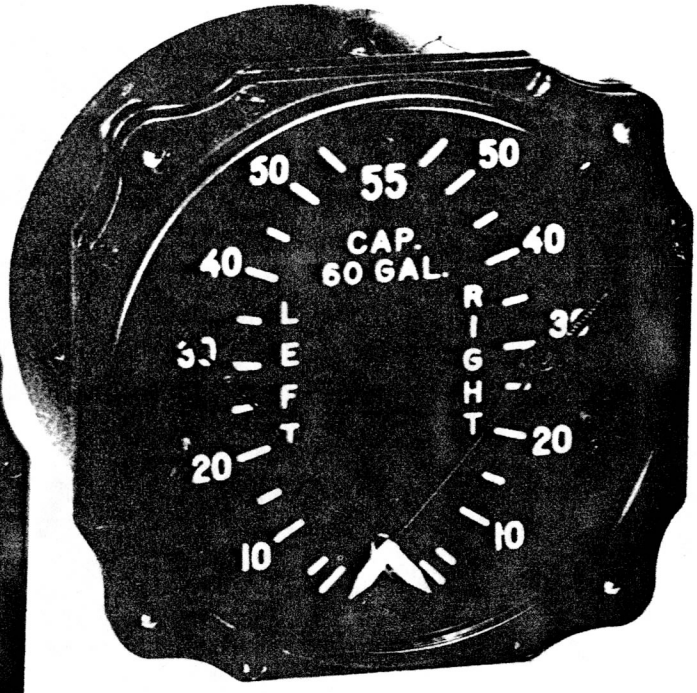


Figure 10—EA-104 Indicator

Note

EA-104A Indicator similar to EA-104 except a light has been added to upper R. H. corner as in Figure 8.

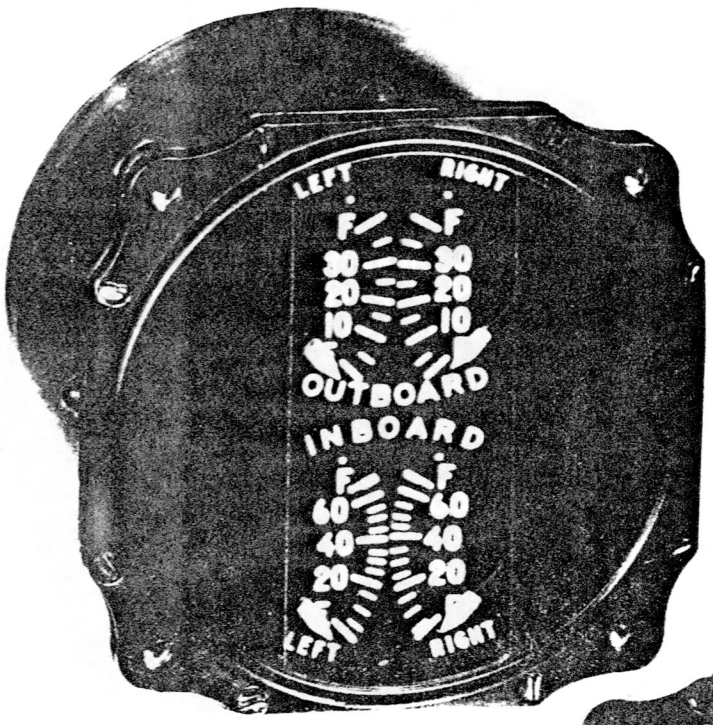


Figure 11—EA-109 Indicator

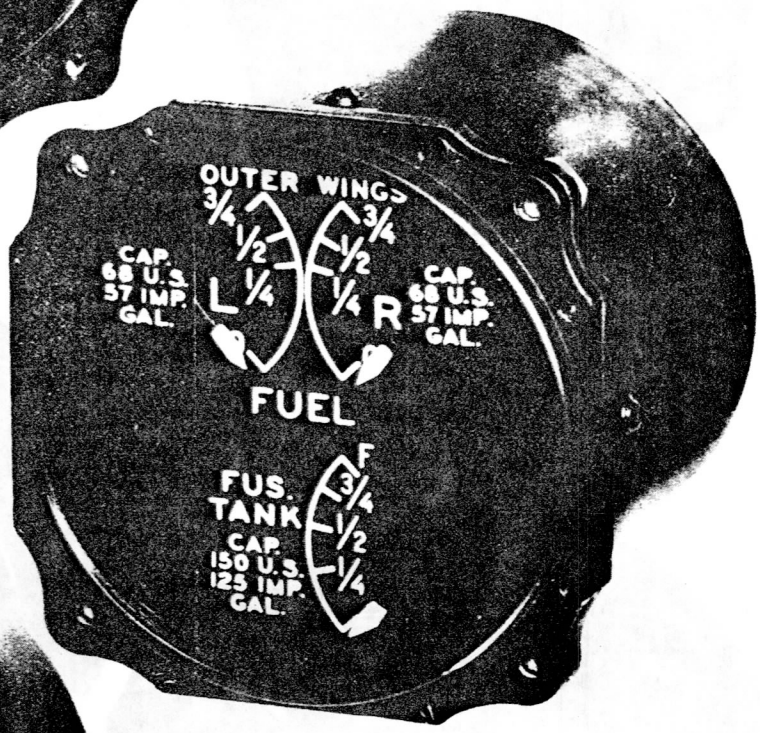


Figure 12—EA-111 Indicator

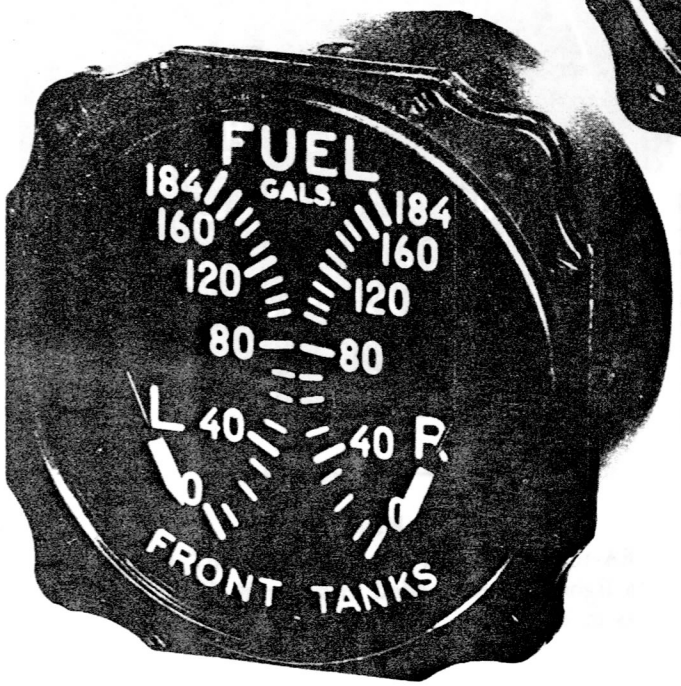


Figure 13—EA-124 Indicator

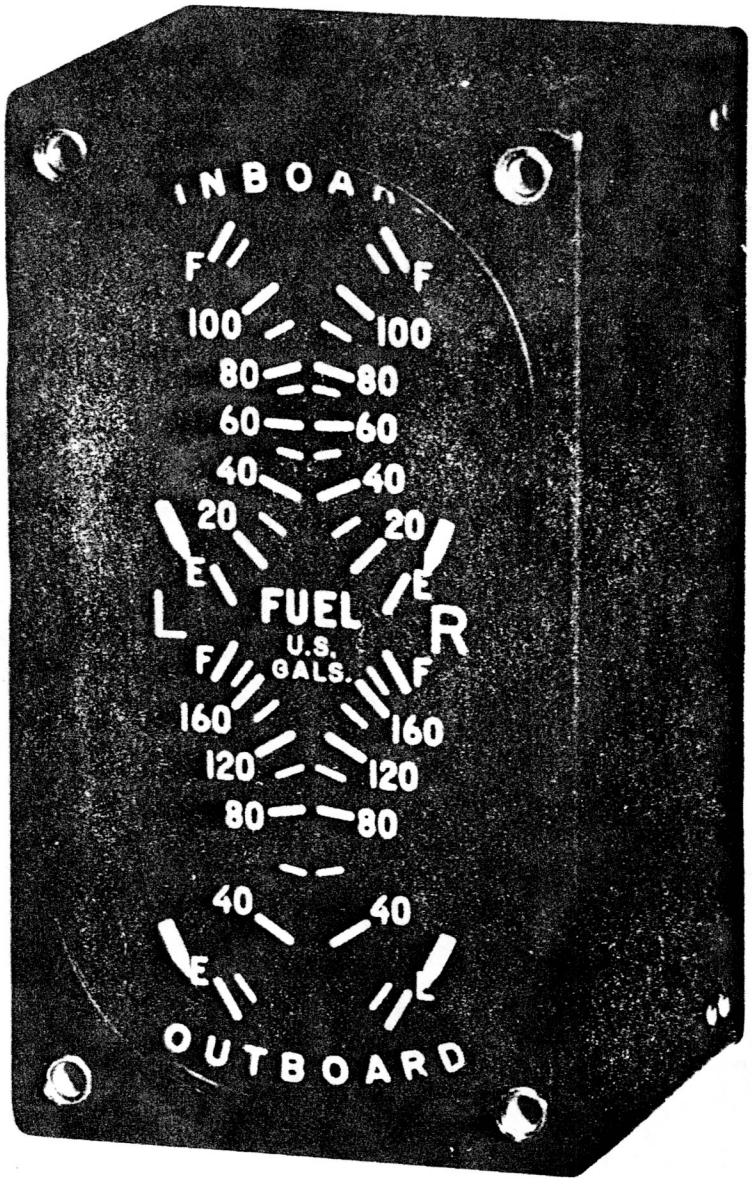


Figure 14—EA-134 Indicator

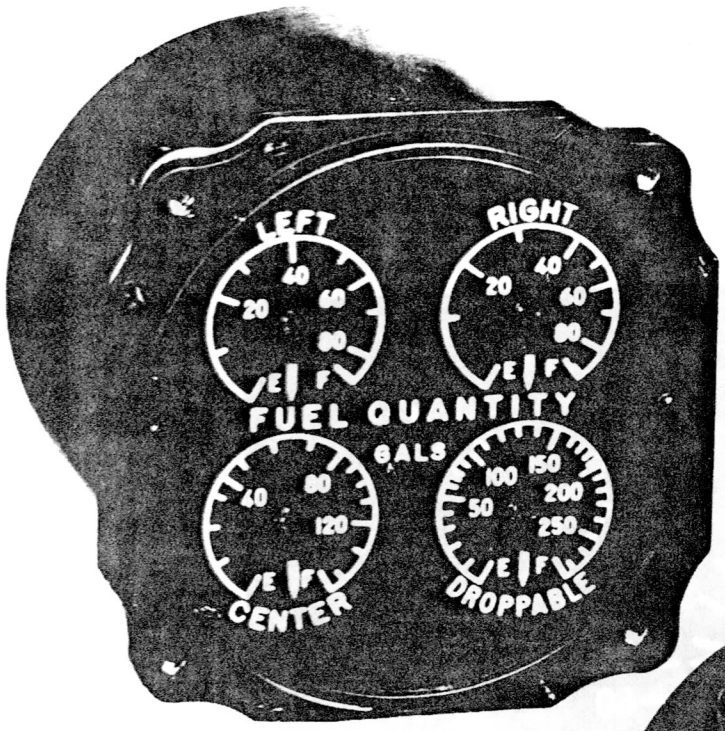


Figure 15—EA-140 Indicator

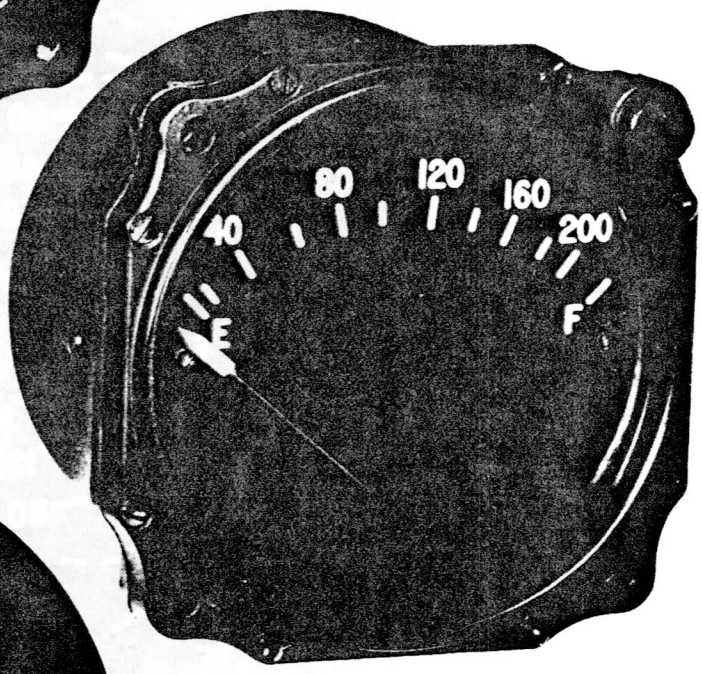


Figure 16—EA-143A Indicator

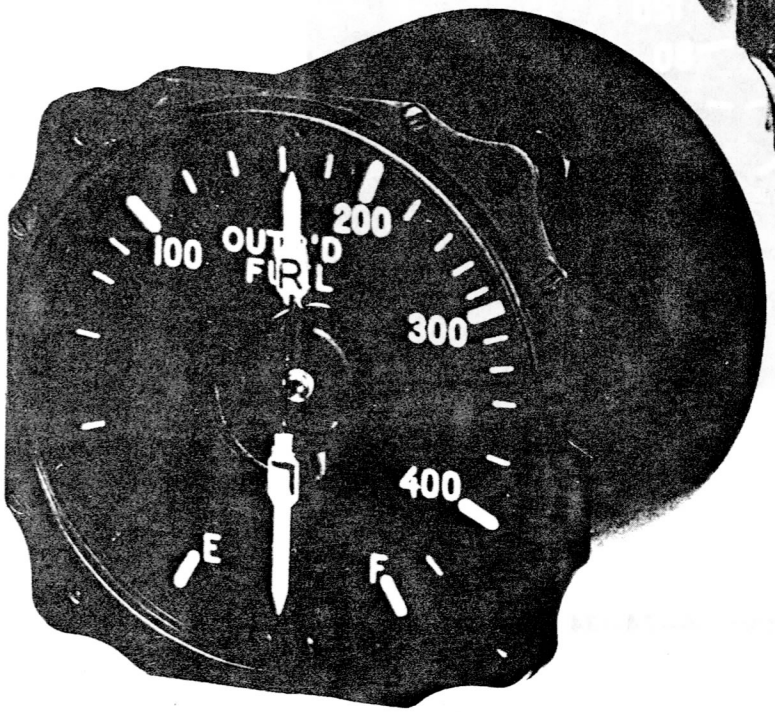


Figure 17—EA-150 Indicator

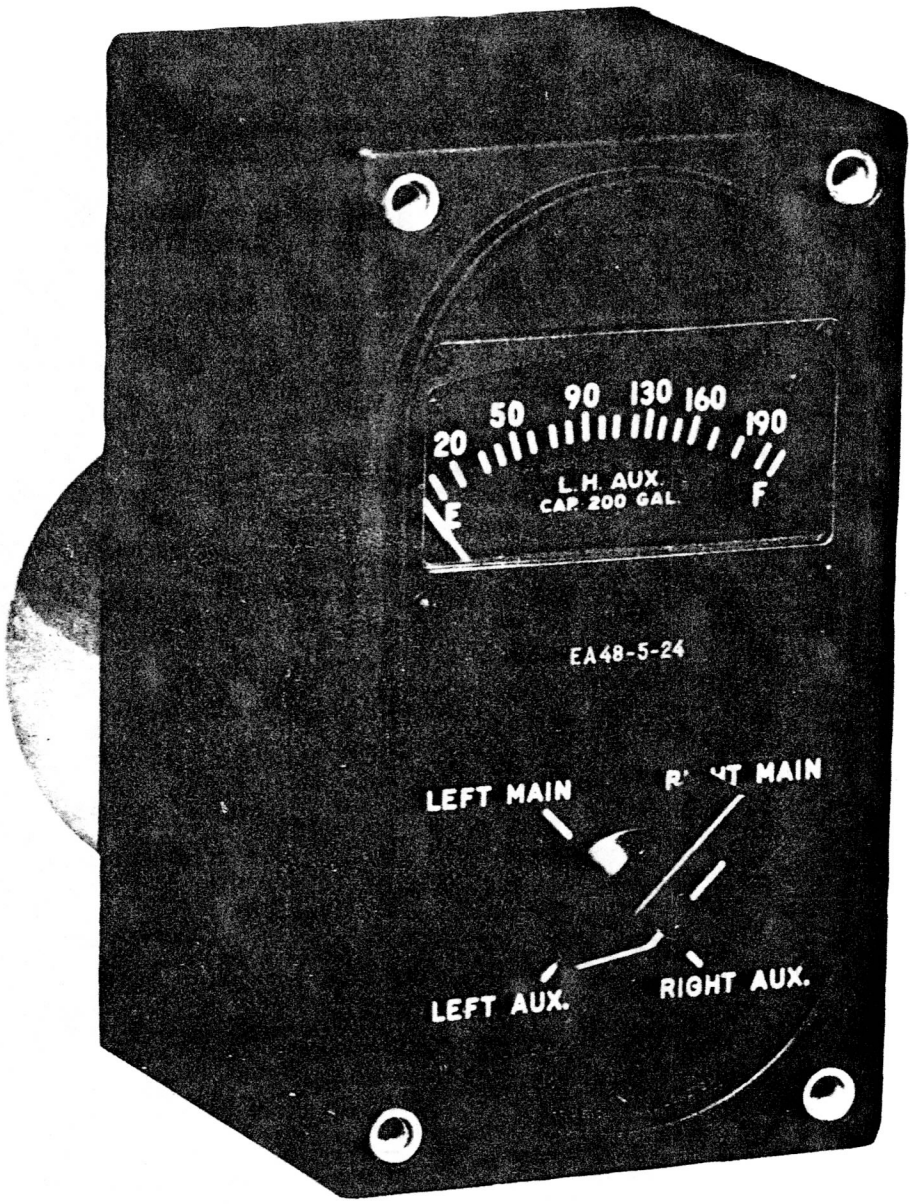


Figure 18—EA-48 Dial Change Indicator

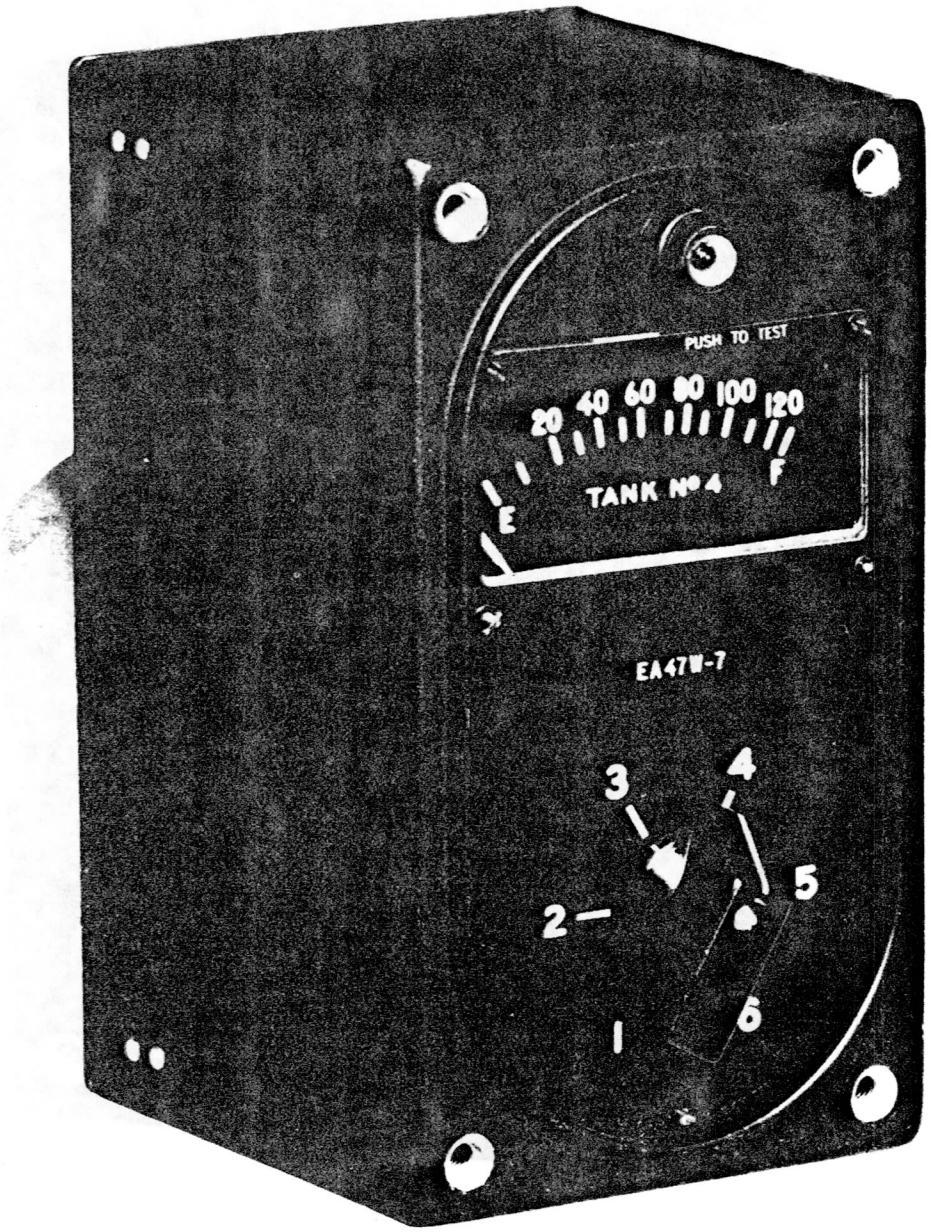


Figure 19—EA-47W Dial Change Indicator

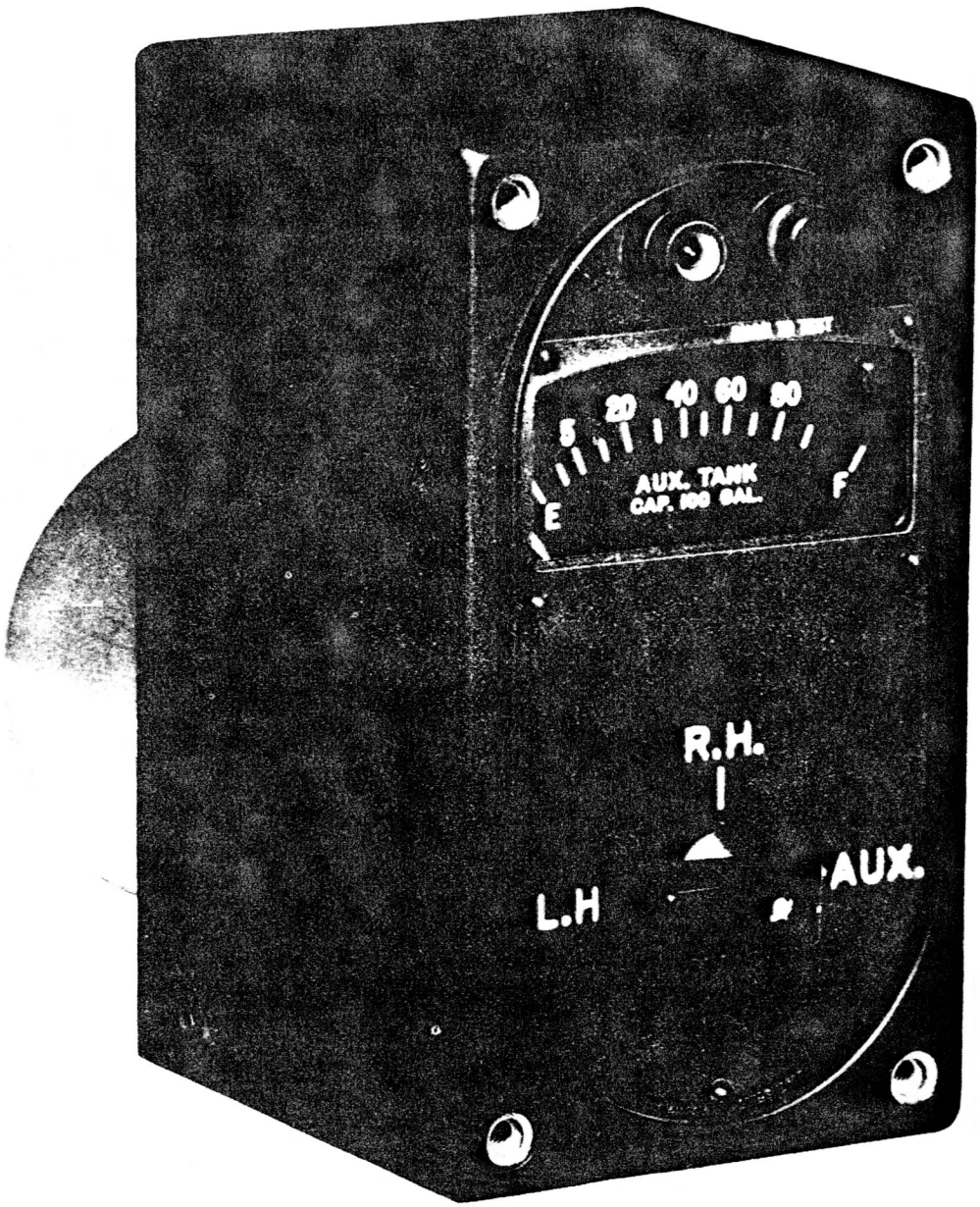


Figure 20—EA-48AW Dial Change Indicator

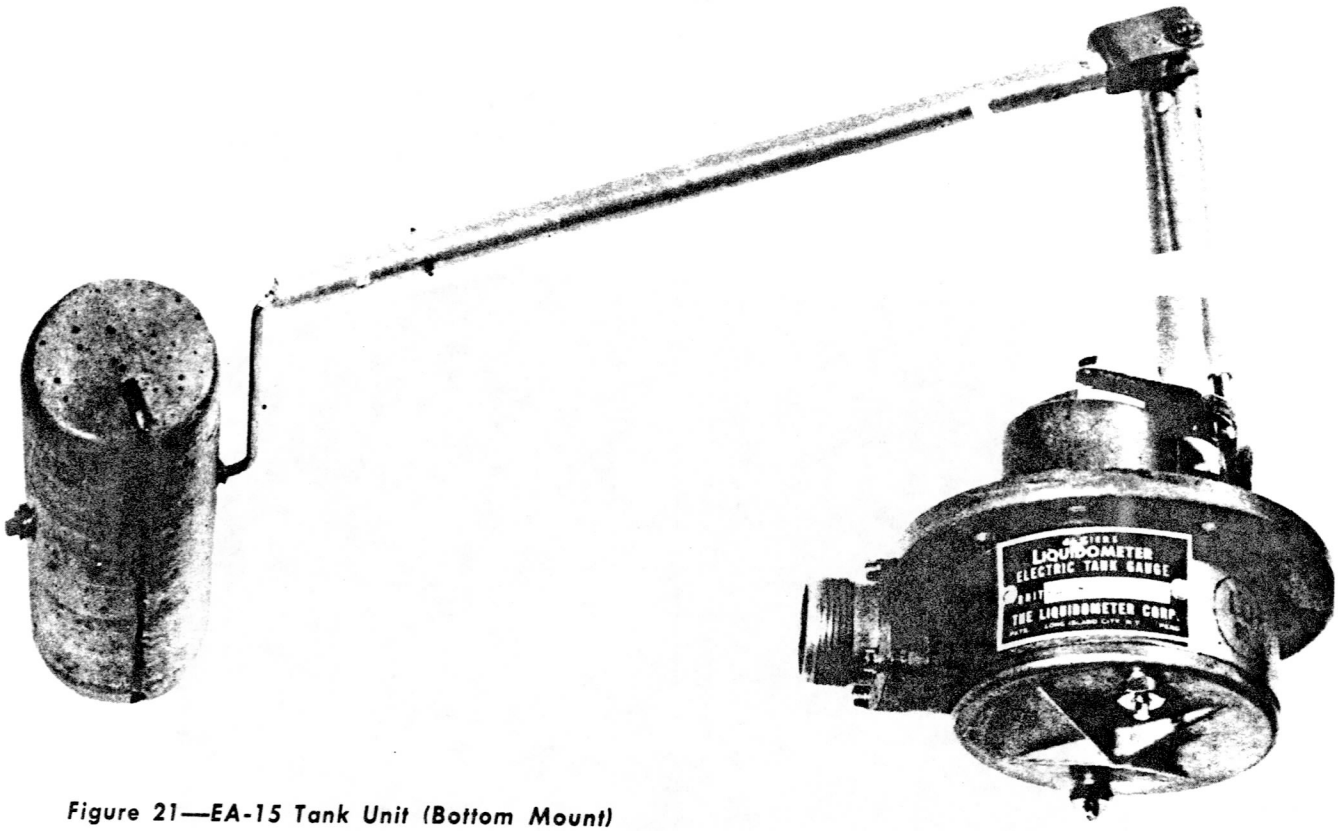


Figure 21—EA-15 Tank Unit (Bottom Mount)

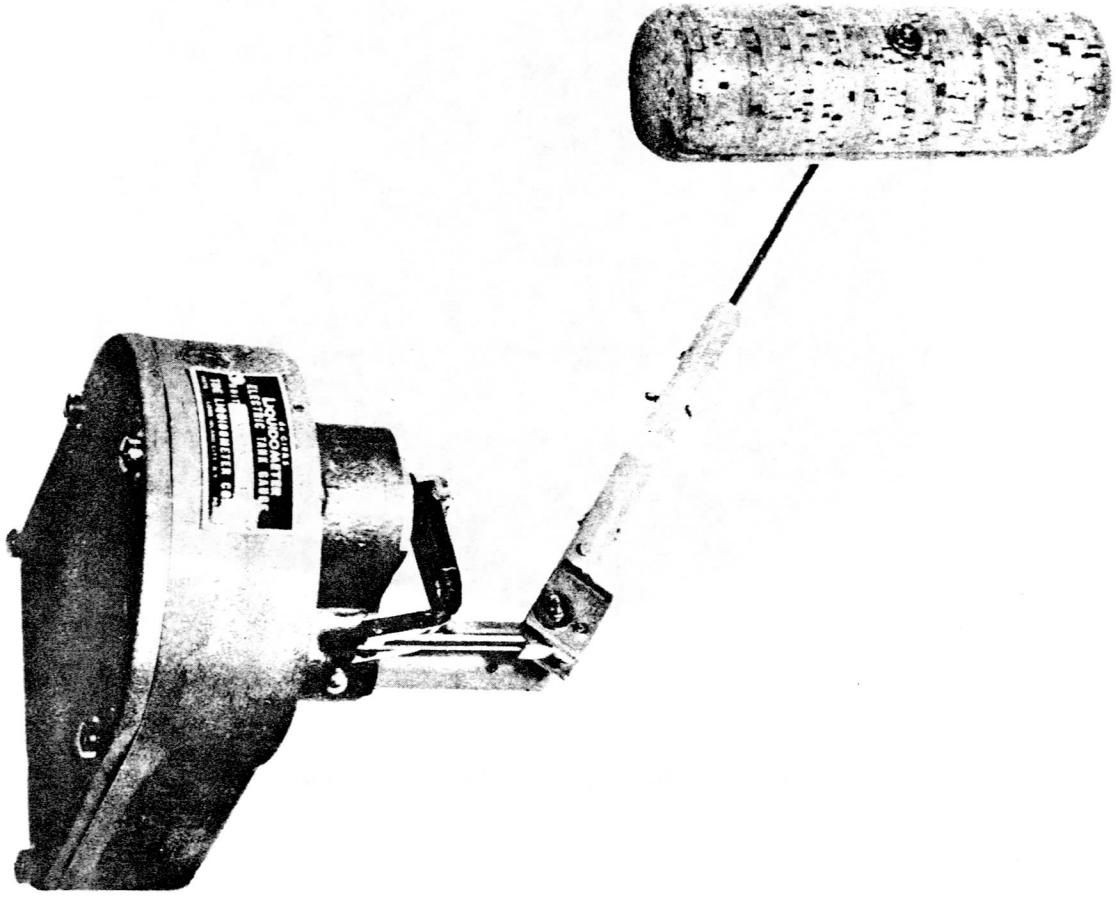


Figure 22—EA-16 Tank Unit (Side Mount)

x

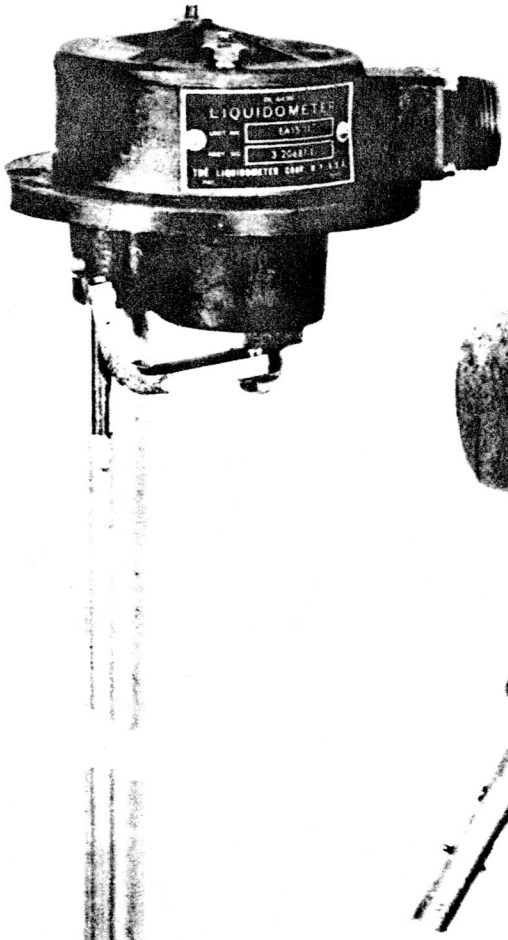


Figure 23—EA-15 Tank Unit (Top Mount)

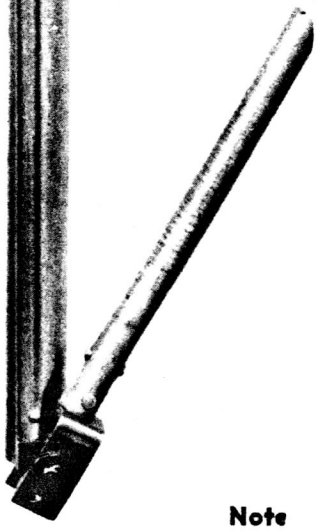
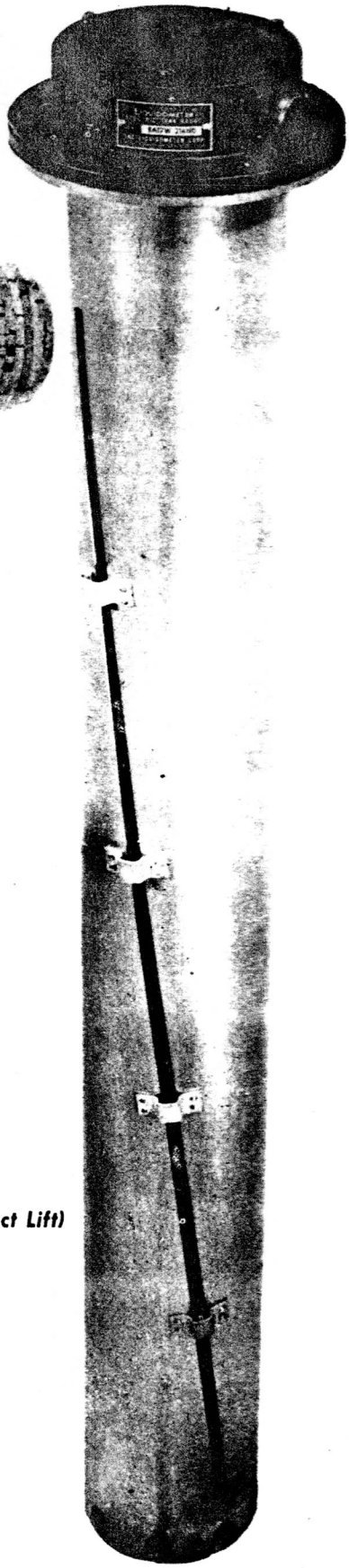


Figure 24—EA-17 Tank Unit (Direct Lift)

Note

This Tank Unit is typical of all EA-15 and EA-65 Tank Units except for float which will vary.



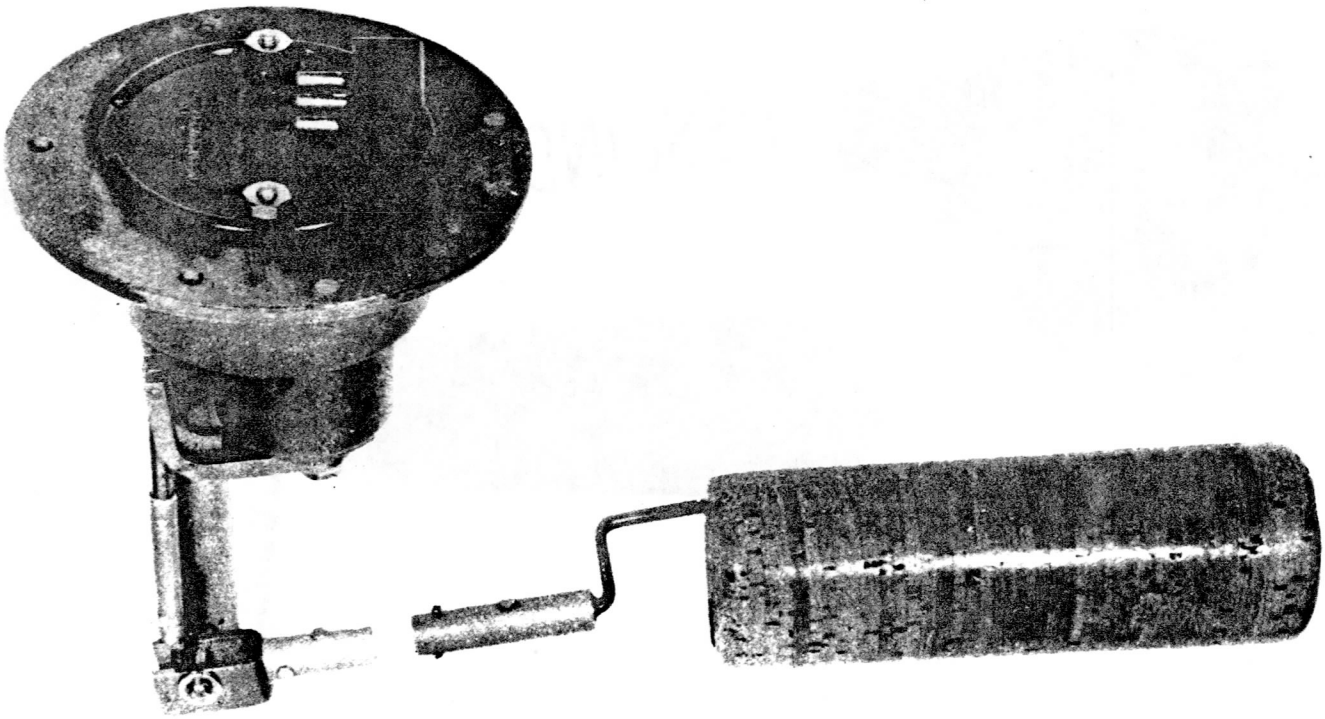


Figure 25—EA-177 Tank Unit (Top Mount)

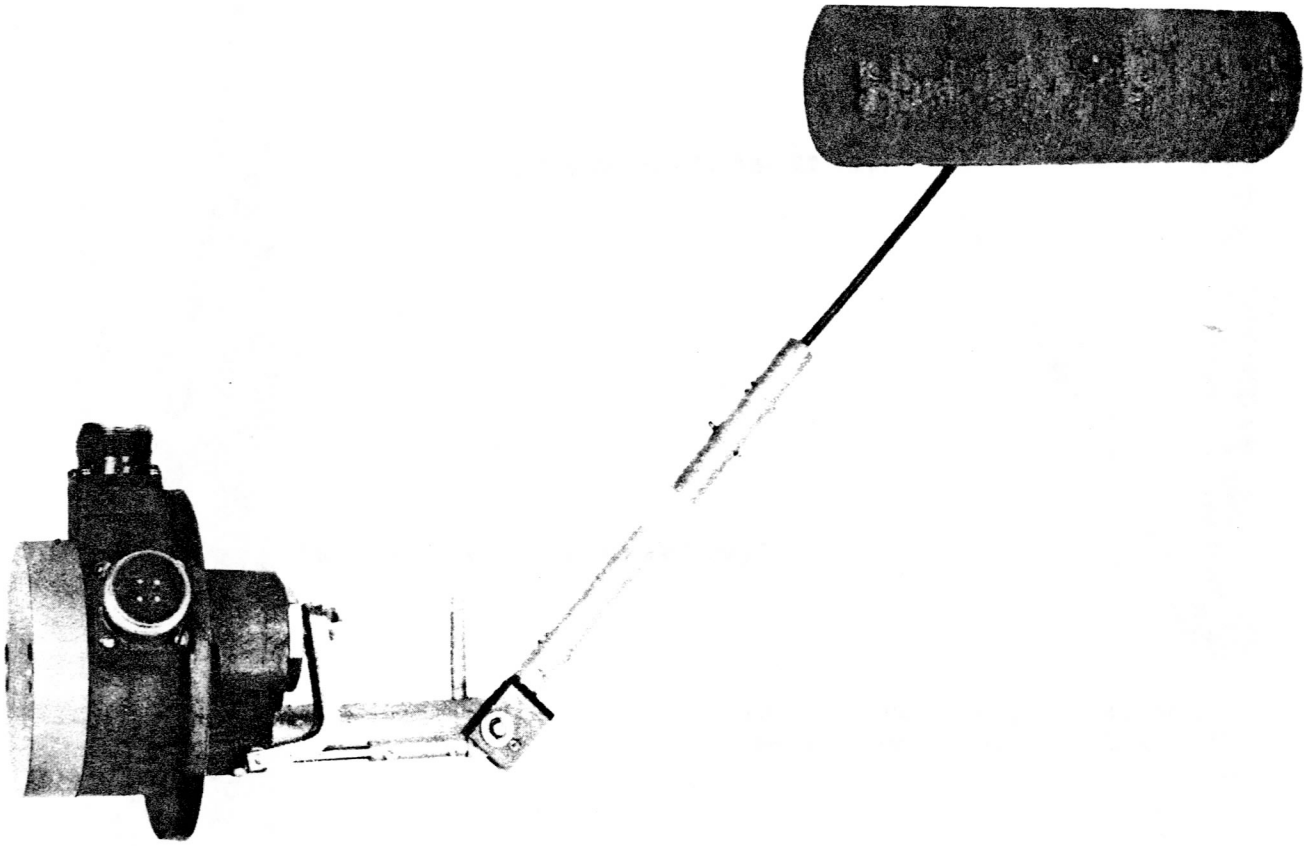


Figure 26—EA-65AWC Tank Unit (Side Mount)

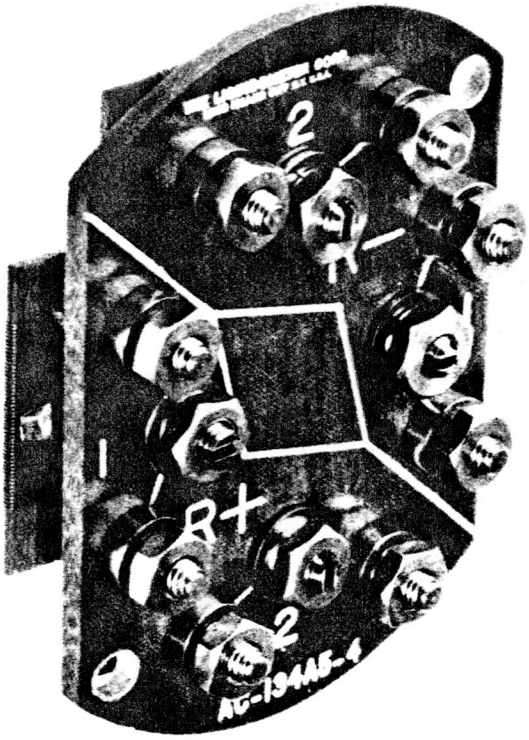


Figure 27—AC-134A5-4 Stroke Adjustment Panel

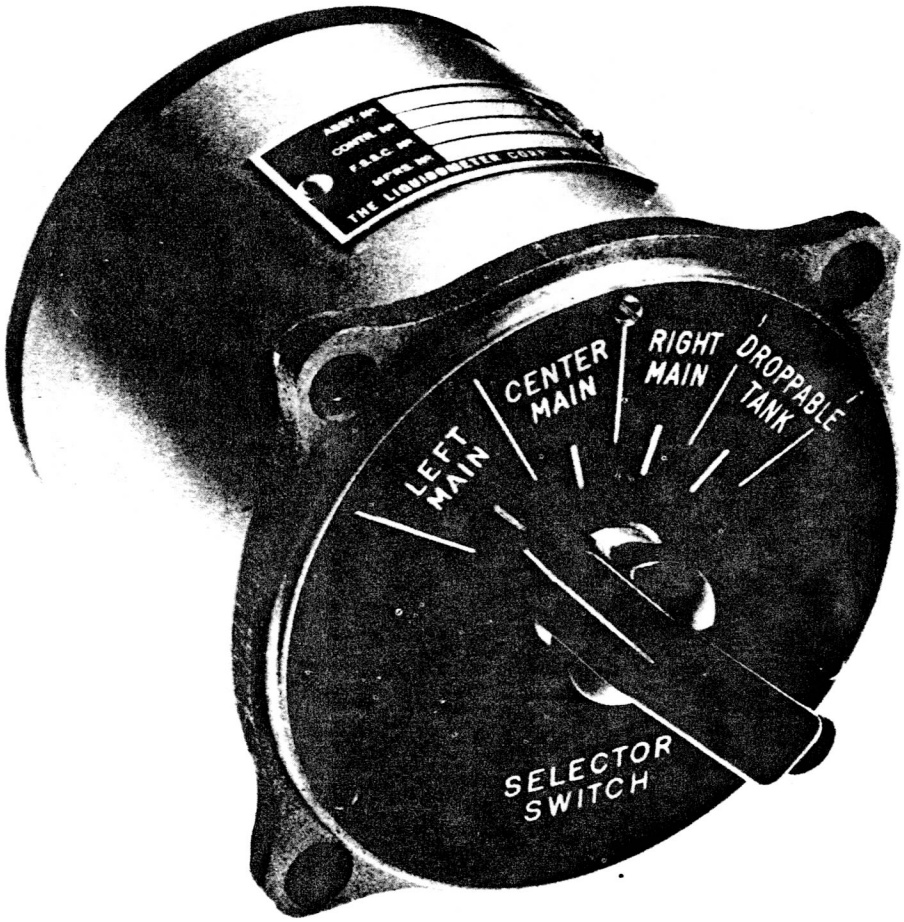


Figure 28—EA-29-141 Selector Switch

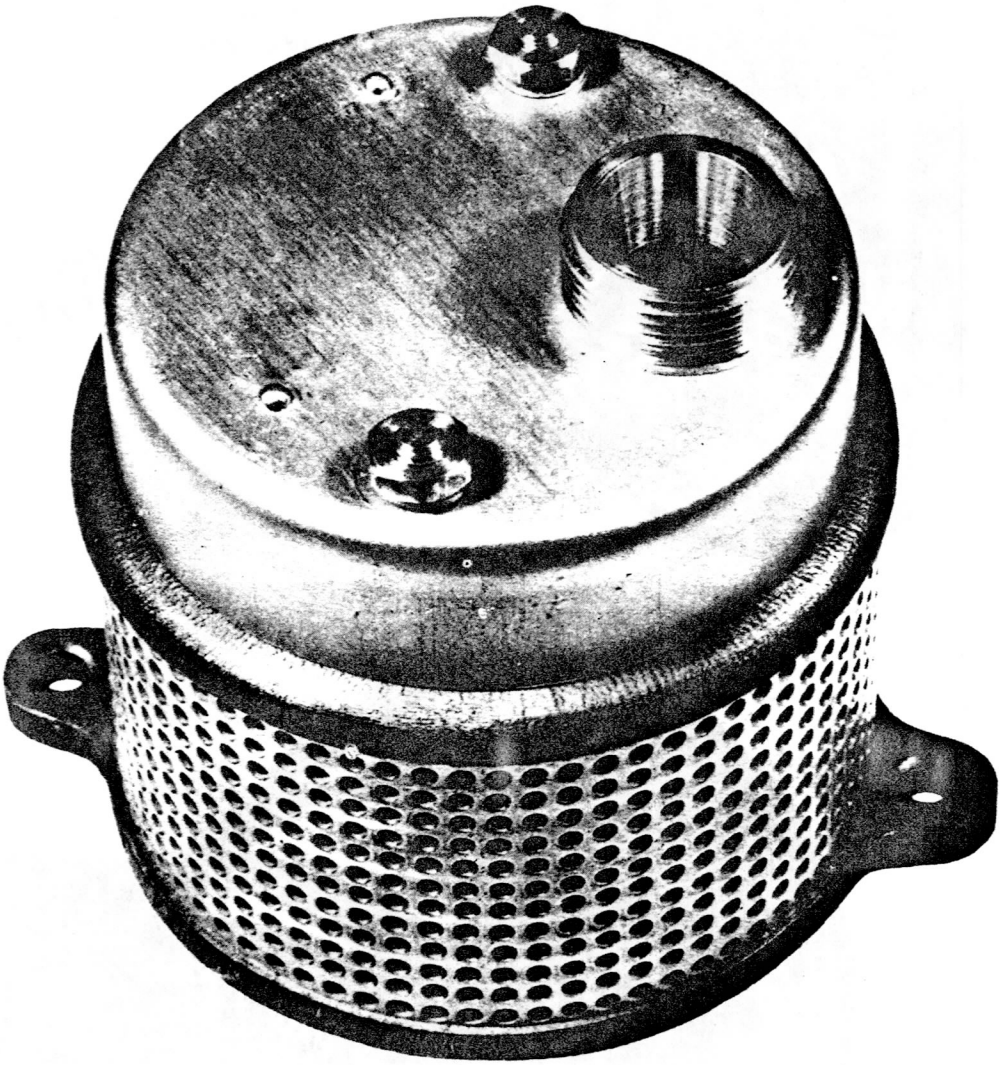


Figure 29—EA-40B-2 Voltage Compensator

TABLE 1. DESIGNATIONS

THIS TABLE GIVES THE COMPARABLE DESIGNATION OF THE UNITS EMBODIED IN THE AIRPLANE.

Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
AT-11	SNB-1		52	EA-35-1139-1	132	EA-1611-189630-2	202
				EA-102-10	136	EA-1611-189726-2	202
				EA-343-1	160	EA-1612-189630-1	202
						EA-1612-189726-1	202
						EA-1612A-18R-9715	202
P-39D		Aircobra I or Caribou		EF-108-5	148	EA-15A-14-685-002L	183
				EA-108-11	146	EA-15A-14-685-002R	183
				EA-108-11C	148		
P-39D-1		Aircobra IA	76	EA-108-16	148	EA-15A-14-685-002L	183
						EA-15A-14-685-002R	183
P-39K				EA-108-19 or	148	EA-15A-14-685-002L	183
P-39L				EA-108-26	148	EA-15A-14-685-002R	183
P-39M							
P-39E			77	EA-108-13	146	EA-15A-23-685-001-1 (2)	183
P-39K			81	EA-108-19	148	EA-15AW-14-685-002L	184
P-39L						EA-15AW-14-685-002R	184
P-39M							
P-59A			84	EA-108W-31	149	EA-15AW-27-685-001-1 (2)	188
P-59A-1			83	EA-108W-17	149	EA-15AW-27-685-001-1 (2)	188
XP-59B			56	EA-100-7	133	EA-84AW-29-685-001-1	191
XP-63			104	EA-148W-3	155	EA-15W-24-685-002-1	188
						EA-15W-24-685-002-2	188
B-17F		Fortress II	110	EA-47-2C	166	EA-15-10 (2)	187
						EA-15-11 (2)	187
						EA-15-12 (2)	187
				EA-47W-2	169	EA-15W-3-14659 (2)	189
				EA-47W-2V	169	EA-15W-3-14659-1 (2)	189
				EA-47W-2C	169	EA-15W-3-14659-2 (2)	189
B-29			120	EA-48-16	173	EA-15-3-14867-1 (2)	187
						EA-15-3-14867-2 (2)	187
			121	EA-48-17T	173	EA-228A-15-16635-1 (2)	195
						EA-228A-15-16635-2 (2)	194
						EA-228A-15-16635-3 (2)	195
						EA-228X-15-16635-4L	195
						EA-228X-15-16635-4R	194
						For ships 1-164 inc.	

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Army	Navy	British	External Wiring Fig. No.	Indicator	Indicator Internal Wiring Fig. No.	Tank Unit	Navy Stock Number	Tank Unit Internal Wiring Fig. No.
B-29						EA-228A-15-16635-1 (2)		195
						EA-228A-15-16635-2 (2)		194
			121	EA-48-17T	173	EA-228A-15-16635-3 (2)		195
						EA-228A-15-16635-5 (2)		195
						For ships 165 & up.		
C-93	RB-1		99	EA-140-6	158	EA-65B-1-85-087 (2)		186
						EA-65B-1-85-088 (2)		186
AT-17	JRC-1	Crane I	72	EA-104-8	139	EA-15AW-53067 (2)		189
AT-17	JRC-1	Crane I	71	EA-104-5	140	EA-15AW-53067 (2)		189
C-87C			105	EA-150-16	156	EA-65-144 (2)		186
	PB2Y-2		89	EA-109-4	152	EA-15A-28-0-2003 (4)		187
	PB2Y-2		51	EA-36-1139	132	EA-1611A-29-0-1004 (2)		51
	PBY-2		49	EA-31-1236-1 With Voltage Compensator EA-40B-2	139	EA-1611A-28-0-2003 (2)		49
	PBY-5		48	EA-31-1236-1 With Voltage Compensator EA-40B-2	139	EA-1611A-28-0-2003 (2)		48
B-24D	PB4Y-1	Liberator BIII and GRV	73	EA-104-16	140	EA-191A-743 (2)		187
B-24D B-24H B-24K			92	EA-124-15	142	EA-85A-32R4282 (2)		201
AT-9			68	EA-101-AT-9	161	EA-65W-AT-9		191
C-76			88	EA-124-4	142	EA-15A-27-421-1039 (2)		187
XP-40K-2			58	EA-100-9	133	EA-67W-SK8230		191
C-46			94	EA-124-24 or EA-124AN-24	143	EA-15-14 (2) or EA-15-312 (2)		180 180
				EA-124-25 or EA-124AN-25	143	EA-15-15 (2)		180
				EA-124-26 or EA-124AN-26	143	EA-15-16 (2)		180
A-20A	BD-1		113	EA-48AW-1	174	EA-15AW-4062359 (2)		189
				EA-48AW-2 (Superseded by EA-48AW-6)	173	EA-15AW-4062365 (2)		189
					174			
A-20A	BD-1		75	EA-104A-6	138	EA-15W-4144825		189
						EA-15W-4144825-1		189

Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
A-20A	BD-1		100	EA-143A-4	145	EA-15W-4144825	189
						EA-15W-4144825-1	189
A-20B	BD-2		108	EA-46W-1	164	EA-18W-4099790	189
						EA-18W-4099790-1	189
						EA-15W-4139873	189
A-20B	BD-2		55	EA-100-5	133	EA-65-2140327	190
				EA-100-6	133	EA-65-2140325	190
A-20C	BD-1		117	EA-47AW-4	170	EA-15AW-4062359 (2)	189
		Boston III		EA-47W-4	169	EA-15AW-4062365 (2)	189
		Boston IIIA				EA-15W-4147504-1	189
A-20C	BD-1	Boston III	118	EA-47AW-5	170	EA-15AW-4062359 (2)	189
		Boston IIIA				EA-15AW-4062365 (2)	189
						EA-15W-4147504-1 or	189
						EA-15W-4162778	189
						EA-15AW-4163064	189
A-20C	BD-1	Boston III	114	EA-47W-6	169	EA-15AW-4062359 (2)	189
		Boston IIIA				EA-15AW-4062365 (2)	189
						EA-15W-4147504-1	189
						EA-15AW-4163064	189
A-20G			115	EA-47W-7	169	EA-15AW-4062359 (2)	189
						EA-15AW-4062365 (2)	189
						EA-15W-4147504-1	189
						EA-15W-4162778	189
A-20H			116	EA-47W-8	169	EA-15AW-4062359 (2)	189
						EA-15AW-4062365 (2)	189
						EA-15W-4147504-1	189
						EA-15W-4162778	189
C-47	R4D-1	Dakota I	119	EA-48-5	171	EA-15-4113228-2	187
				EA-48-5-24	172	EA-15-4113228-3	187
						EA-15-4113228-4	187
						EA-15-4113228-5	187
C-53	R4D-3	Dakota II	122	EA-48-12	171	EA-15-4136535-2	187
				EA-48-12-24	172	EA-15-4136535-3	187
				EA-48-13	171	EA-15-4136535-4	187
				EA-48-15	171	EA-15-4136535-5	187
C-54			63	EA-101-24 (2)	133	EA-88A-4175744-4 (2)	197
				EA-101-25 (2)	133	EA-89A-4171346-8 (2)	197
						EA-88A-4171346-2 (2)	197
						EA-89A-4175744-2 (2)	197
C-54A	R5D-1		66	EA-102-13 or	134	EA-15-5132925	203
				EA-102-1 or	134		
				EA-102-1F	134		
				EA-108-6 or	147	EA-15-5105650	187
				EA-108-6F	147		

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Army	Navy	British	External Wiring Fig. No.	Indicator	Indicator Internal Wiring Fig. No.	Tank Unit	Tank Unit Internal Wiring Fig. No.
C-54A	R5D-1		65	EA-101-18(2) or	133	EA-89A-4171346-8(2)	198
				EA-101AN-18(2)	162-E	EA-88A-4171346-6(2)	198
				EA-101-19A(2)	133	EA-89A-4171346-4(2)	198
						EA-88A-4171346-2(2)	198
			64	EA-101-19(2)	133	EA-89A-4171346-4(2)	198
						EA-88A-4171346-2(2)	198
				EA-101-27(2)	133	EA-208A-4178896-6	196
						EA-208A-4178896-7	196
						EA-207A-4178896-4(2)	196
						EA-206A-4178896-2(2)	196
				EA-150-12	156	EA-88A-4171346-6(2)	198
						EA-89A-4171346-8(2)	198
C54D			130-N	EA-150-24	156	EA-88P-500(2)	198
						EA-89P-502(2)	198
C-54D & up				EA-101-27A(2)	133	EA-206 A-4178896-2(2)	196
				EA-101AN-27A(2)	162-E	EA-207A-4178896-4(2)	196
				EA-101-19A(2)	133	EA-208A-4178896-6(2)	196
				EA-101AN-19A(2)	162-E	EA-208A-4178896-7(2)	196
			130-W	EA-150-12A	156	EA-88A-4171346-2(2)	198
				EA-150AN-12A	162-D	EA-89A-4171346-4(2)	198
				EA-150-24	156	EA-88A-4171346-6(2)	198
				EA-150AN-24	162-D	EA-89A-4171346-8(2)	198
						EA-88P-500(2)	198
						EA-89P-502(2)	198
C-54				EA-101AN-27A(2)	162-E	EA-206A-4178896-2(2)	196
				EA-101-27A(2)	133	EA-207A-4178896-4(2)	196
			130-V	EA-101AN-19A(2)	162-E	EA-208A-4178896-6	196
				EA-101-19A(2)	133	EA-208A-4178896-7	196
				EA-150AN-12A	162-D	EA-88A-4171346-2(2)	198
				EA-150-12A	156	EA-89A-4171346-4(2)	198
						EA-88A-4171346-6(2)	198
						EA-89A-4171346-8(2)	198
C-54				EA-102-28	134	EA-15A-215	187
				EA-102-40	134		
			130-Y	EA-102-52	134		
				EA-102AN-40	162-J		
				EA-102AN-52	162-J		
C-54			130-X	EA-303AN-1	162-K	EA-524A-309	192
				EA-303AN-3	162-K	EA-529BC-310	204-J
						EA-533-311	193
P-70		Boston I or II or Havoc I or II	288	EA-49AW-7	178	EA-15AW-4062359(2)	189
						EA-15AW-4062365(2)	189
						EA-15W-4147504-2	189

Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
XA-42				EA-124-12	141	EA-15-4310272	202
						EA-15-4310272-1	202
			93	EA-124-13	141	EA-216-4310269-2 (2)	200
						EA-217-4310269-4 (2)	200
				EA-124-14	141	EA-15-4310270	202
						EA-15-4310270-1	202
XAT-13			85	EA-109-1	151	EA-85-766121L	187
XAT-14				(Superseded by		EA-85-766121R	187
AT-21				EA-109-12)	152	EA-85-766125L	187
						EA-85-766125R	187
XA-39			67	EA-101-29	133	EA-84-39-68106	186
XP-75			57	EA-100-8	133	EA-65AW-8940758	191
	TBF-1		59	EA-101-1	133	EA-65-141 (3)	186
	TBM-1			(Superseded by		EA-6612-141	186
				EA-140-4)		With Selector Switch EA-29-141	
	TBF-1		98	EA-140-4	158	EA-65-141 (3)	186
						EA-6612-141	186
B-37		Ventura GR III		EA-101-2	133	EA-178-110020	182
				EA-101-3	133	EA-178-110022	182
				EA-101-4	133	EA-178-110019	182
			60			EA-178-110021	182
						EA-65B-15509	190
						EA-65B-15508	190
				EA-104-9	140	EA-177-114477	185
						EA-177-114478	185
P-38			82	EA-108-839F	157	EA-15A-228151-2	187
				EA-108-839R	157	EA-15A-228151-3	187
						EA-15-228150 (2)	187
B-26			111	EA-47W-1	167	EA-15AW-F-263661 (2)	189
						EA-15AW-F-263662 (2)	189
						EA-17W-R-102970F	189
B-26			129	EA-49W-1	179	EA-15AW-F-263661 (2)	189
						EA-15AW-F-263662 (2)	189
						EA-17W-R-102970F (2)	189
B-26A				EA-47W-1-24	168	EA-15AW-F-263661 (2)	189
B-26B						EA-15AW-F-263662 (2)	189
B-26B1						EA-17W-R-102970F (2)	189
			112				
B-26C				EA-47-1-24	165	EA-15A-F-263661 (2) or EA-191A-F-263661 (2)	187
						EA-15A-F-263662 (2)	187
						EA-17-R-102970 (2)	187

Army	Navy	British	External Wiring Fig. No.	Indicator
B-26F B-26G			109	EA-47-10
	PBM-1 (Fuel system)		130	EA-55A-438
	PBM-1 (Oil system)		50	EA-36-438
	PBM-3	Mariner	106	EA-41A-1
	PBM-3	Mariner	107	EA-41A-2
	PBM-3	Mariner	53	EA-36-141
	PBN-1 (Fuel)		78	EA-101-311188-1L EA-101-311188-1R EA-101-311188-2
B-25			126	EA-49AW-2
B-25A B-25B		Mitchell I	127	EA-49AW-3
B-25C B-25D	PBJ-1	Mitchell II	125	EA-49-4
B-25C B-25D	PBJ-1	Mitchell II	91	EA-124-10 EA-124-11
B-25C B-25D	PBJ-1	Mitchell II	101	EA-148-1
F-61			124	EA-48W-18
F-61A			97	EA-134-1
YP-61			123	EA-48W-14
C-64A	R5C-1		102	EA-148-2
P-47D			96	EA-124-29 or EA-124-40

Indicator Internal Wiring Fig. No.	Tank Unit	Tank Unit Internal Wiring Fig. No.
165	EA-15A-F-263662 (2)	187
	EA-17-R-102970 (2)	187
	EA-191A-F-263661 (2)	187
130	EA-15-C-169539 (2)	130
	EA-17-F-170829 (4)	130
132	EA-15-C-169581 (2)	50
163	EA-15AWC-162B5784A (2)	197
	EA-15AW-162B5748 (2)	189
	EA-191W-162B5785 (3)	189
163	EA-15AWC-162B5784A (2)	197
	EA-15AW-162B5748 (2)	189
	EA-191W-1-162B5785-C (3)	189
132	EA-15A-162B5835 (2)	187
133	EA-84A-47979-1	186
133	EA-84A-47979-2	186
133	EA-65A-28-0-3039-31 (2)	186
177	EA-15AW-62-00168-2 (2)	189
	EA-15AW-62-00168-3 (2)	189
177	EA-15AW-62A-00346-2 (2)	189
	EA-15AW-62A-00346-3 (2)	189
176	EA-15A-82-00128-2 (2)	187
	EA-15A-82-00128-3 (2)	187
142	EA-15A-8-00128-2 (2)	187
142	EA-15A-82-00128-3 (2)	187
154	EA-15B-82-00353	187
	EA-15B-82-00353-1	187
175	EA-15W-214189-3 (2)	189
	EA-17W-213190 (2)	189
150	EA-15-217870-3 (2)	187
	EA-17-217869 (2)	187
175	EA-15BW-208132-1	189
	EA-15BW-208132-2	189
	EA-17BW-208133 (2)	189
154	EA-15-P-5047	187
	EA-15-P-5048	187
142	EA-85-P47	187
	EA-85W-943	188

Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
P-72			95	EA-124-30	142	EA-85W-XP72(2)	184
B-34	PV-1	Ventura BII	79	EA-101A-5	137	EA-65A-15504	186
	PV-3	BIIA, BIV		EA-101A-6	137	EA-65A-15505	186
				EA-101A-7	137	EA-65A-15506	186
						EA-65A-15507	186
						EA-65B-15508	190
						EA-65B-15509	190
		Ventura		EA-101A-14	137	EA-65A-15504	186
			80	EA-101A-15	137	EA-65A-15505	186
				EA-101A-16	137	EA-65A-15506	186
						EA-65A-15507	186
						EA-65B-15508	190
						EA-65B-15509	190
				EA-101-8	133	EA-65A-15504	186
	PV-1		61	EA-101-9	133	EA-65A-15505	186
				EA-101-10	133	EA-65A-15506	186
				EA-104-9	140	EA-65A-15507	186
						EA-65B-15508	190
						EA-65B-15509	190
						EA-177-114477	185
						EA-177-114478	185
	PV-1			EA-101-8	133	EA-65AWC-15504	201
				EA-101-9	133	EA-65AWC-15505	201
			62	EA-101-10	133	EA-65A-15506	186
				EA-104-9	140	EA-65A-15507	186
						EA-65B-15508	190
						EA-65B-15509	190
						EA-177-114477	185
						EA-177-114478	185
	PV-2			EA-109-3	152	EA-15WC-120090	197
						EA-15-120088	187
						EA-15-120089	187
						EA-15WC-120091	197
			86	EA-124-8	142	EA-202A-120557	199
						EA-202A-121404	199
						EA-203A-120558	199
						EA-203A-129585	199
	PV-2		130AC	EA-109-3	152	EA-15-120088	187
						EA-15-120089	187
						EA-15WC-120090	197
						EA-15WC-120091	197
				EA-124-32	142	EA-226-1L	192
						EA-226-1R	192
						EA-227-2L	193
						EA-227-2R	193
			103	EA-148-5	154	EA-85AW-120782	189
						EA-85AW-129713	189

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Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
YR4A, YR4B R-4B		Helicopter	69	EA-102-8	135	EA-15-VS-36862	187
XR-6, R-6			70	EA-102-11	135	EA-15AW-VS-06-45-1005	189
	F4U-1	Corsair I	54	EA-100-2AB	133	EA-67-VS-13350AB	186
						*EA-92W-VS-33330R	204
	TBY-2		90	EA-124-9 With Stroke Adjustment Panel AC-134A5-4	144	EA-220-VS2-304612L	192
						EA-220-VS2-304612R	192
						EA-221A-VS2-304007L	192
						EA-221A-VS2-304007R	192
						EA-222A-VS2-304307 (2)	193
A-31C A-35A		Vengeance II	87	EA-111-1 or EA-111-12	159	EA-15-88-64820 or	181
					159	EA-15-88-64820A	181
						EA-15-88-64821 (2) or	181
						EA-15-88-64821A (2)	181
BT-13			74	EA-143A-1M EA-104A-3	153	EA-15A-63-78071	187
					162	EA-15A-63-78071-1	187
P47N			130-K	EA-125AN2	162-G	EA-15X-4	203
						EA-84X-1L	204-A
						EA-84X-1R	186
R6A		Helicopter	130-G	EA-102-19	135	EA-15AW-444	188
R6A		Helicopter	130H	EA-102-27	135	EA-15AW-213	188
XP-80			130-L	EA-100-17	133	EA-65W-203 or	204-E
						EA-65W-207	204-E
						EA-565W-269	204-E
						Replaces EA-65W-207	204-E
P-63			130-S	EA-148W-7, EA-148W-14 or EA-148W-18 with AC134A5-3 stroke adj. panel (2)	162-F	EA-224-2	192
					162-F	EA-224-3	192
						EA-225W-1	204-F
					162-F	EA-225W-2	204-F
TBY-2			130-P	EA-124-53 AC134A5-4 stroke adj. panel	144	EA-220VS2-304612L	192
						EA-220VS2-304612R	192
						EA-221VS2-304721L	192
						EA-221VS2-304721R	192
						EA-222VS2-304821L	193
						EA-222VS2-304821R	193
B-32			130-R	EA-155-13 (2) replaces EA-155-9	156	EA-190A33G2045 (2)	186
					156	EA-190A33G2046 (2)	186
	FR-1		130-Q	EA-124-51	156	EA-85C203	204-G
						EA-85-204	187

* This Tank Unit is used only as a Warning Unit for the Water Injection System.

Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
	F4U-4 F4U-5 PG-2		130-E	EA-100-16 or EA-100AN-48	133 162-H	EA-67W-VS-43103	191
	PBM-5 for ships 1126 and up		130-A	EA-41-A-4	163	EA-15AWC-162B5784A(2) EA-15-AW-162B5748(2) EA-191W-1-162B5785F EA-191W-1-162B5785C EA-191W-162FK5727A	197 189 189 189 189
	PBM-5		130AD	EA-41A-5	163	EA-15AW-162B5748(2) EA-15AWC-162B5784A(2) EA-191W-1-162B5785F EA-191W-162FK5727A	189 197 204-D 204-D
				EA-101AN-67	162-E	EA-190W-354	204-D
	PBM-5A		130-AB	EA-41A-6	163	EA-15AWC-162B5784A(2) EA-15AW-162B5748(2) EA-591W-483 EA-591W-484	197 189 189 189
				EA-101AN-78	162-E	EA-590W-485	191
	JRM-1		130-B	EA-100-10(2) EA-100-11(2) EA-100-12(2) EA-100-13(2)	133 133 133 133	EA-65AWC-170A-K-5409(2) EA-190W-170A-K-5416(2) EA-190W-170A-K-5417(2) EA-190W-170A-K-5418(2) EA-190W-170A-K-5419(2) EA-190W-170A-K-5420(2) EA-190W-170A-K-5421(2)	204-H 204-D 204-D 204-D 204-D 204-D 204-D
	JRM-1		130-M	EA-140-5	158	EA-290-170A-K-5501(4)	186
C74			130-U	EA-150AN-17 EA-150AN-18	162-D 162-D		186
C74			130-C	EA-143AN-8	162-B	EA-15-4174039	187
C74			130-T	EA-150AN-7 EA-150AN-8 EA-150AN-9	162-D 162-D 162-D	EA-565A-264(2) EA-565A-263(2) EA-565-A-265(2)	186 186 186
YR-6A		Helicopter	130-J	EA-148AN-19	162-A	EA-15W-249 EA-15W-250	204-B 204-B
Bell Mod. 47		Helicopter	130AE	EA-148AN-23 EA-148AN-23-24	162-M 162-M	EA-15-341 EA-15A-342 EA-15A-494	187 187 187
B-24			130-I	EA-124-31	162-C	EA-15X-1 EA-15X-2	180 204-C
	XBT2D		130-D	EA-101AN-44 or EA-101AN-44A	162-E	EA-565-201A	186

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Army	*Navy*	*British*	*External Wiring Fig. No.*	*Indicator*	*Indicator Internal Wiring Fig. No.*	*Tank Unit*	*Tank Unit Internal Wiring Fig. No.*
	F6F C54		130-O	EA-102-29	135	EA-15WC-216 or EA-515WC-216A	130-O 130-O
	B, D, E		130-F	EA-102-16 or EA-102AN-16	134 162-J	EA-15B-4238874 EA-515-217	187 187
	XP4M-1		130-AA	EA-124AN-52	162-L	EA-565AW-259	204-E
	XP4M-1		130-Z	EA-155AN-14	162-D	EA-565C-245	204-K
F-84			130-AF	EA-124AN-65 EA-124AN-89 EA-124AN-94 EA-124AN-102 EA-129AN-104	162-L 162-L 162-L 162-L 162-L	EA-85W-323 EA-85BWC-326 EA-85BW-587	188 204-L 188
C-82			130-AG	EA-124AN-39 EA-124AN-82 EA-124AN-39	162-L 162-L 162-L	EA-85A-306(2) EA-85A-430(2) EA-85A-476(2)	187 187 187

SECTION I
INTRODUCTION

1. This handbook is issued as the basic instruction for the equipment involved.

2. The Electrically Operated Fuel Level Gages covered in this Handbook provide the pilot with visual indication of the exact quantity of fuel and oil available at all times.

3. This Handbook contains Installation, Operation, and Overhaul Instructions for the newer types of Electrically operated Fuel Level Gages, shown in Table I. These gages are manufactured by the Liquidometer Corporation, Long Island City, New York.

4. For the purpose of easily identifying the various units comprising a complete gage system, a wiring diagram is made to suit each different model airplane. This diagram is allotted a number which identifies the entire gage system. This number consists of the model number of the airplane where such is furnished by the airplane builder, preceded by "E". Where model number is not furnished by airplane builder, the Liquidometer Corporation provides a suitable identification number to follow the symbol "E". Each unit is marked on the diagram with a unit number, which number also appears on the name plate attached to each unit.

a. The unit number for indicators shown in this Handbook will start with the designation EA-35, EA-100, etc., and be followed by a number allotted by the Liquidometer Corporation to suitably identify the indicator with respect to dial graduations, numerals, nomenclature, etc.

b. Drawings for dial change indicator and selector switch combination units are supplied with unit numbers allotted in accordance with the specific number of dials and selector switch positions required, such as EA-47, EA-48, etc. Additional numbers are added in each case for the purpose of identification with respect to dial graduations, numerals, etc.

c. Tank Units are supplied with unit numbers starting with EA-15, EA-15A, EA-15B, EA-1612A, etc., followed by the customer's tank drawing number, if available, otherwise a number supplied by the Liquidometer Corporation.

SECTION II
DESCRIPTION

1. GENERAL.

a. The Liquidometer electric tank gage for aircraft complies with Specification No. MIL-G-5672.

b. Liquidometer Electric Type Aircraft Tank Gages are used to indicate the quantity of fuel, oil, alcohol, and other liquids contained in tanks.

c. INDICATORS.

(1) LIQUIDOMETER. – Various Ratiometer type indicators are available. For instance, there are single, double and multiple scale indicators. Tank gauging requirements vary with respect to the type of indicators; i.e., some indicators are furnished with a single pointer arranged to move over the face of either a 65-degree, 120-degree, or 300-degree calibrated scale, while other indicators are furnished with a number of calibrated scales, (with a pointer for each scale) mounted in a single indicator housing, each one independently connected to a particular tank. Each electric mechanism in the indicator is independently shielded so that all the mechanisms within the close confines of the indicator case function independently without electrical interference between them. A sectional view of each type indicator is not provided, since the general construction of each type is satisfactorily illustrated by Figure 31.

(2) WESTON.—The indicators and mechanism assemblies described herein are of the ratiometer type and are supplied as component parts of Liquidometer Fuel Level Gauges. The indicators, part numbers 110026, 111645, and 113665, are self-contained units calibrated in terms of fuel quantities and are connected to the tank units by electrical cables. Mechanisms, part numbers 100442 and 111482, are assembled in Dial Change Indicators which permit indication of fuel levels in several tanks with a single indicator. A sectional view of each type indicator covered by these instructions is not provided, since the general construction of each type is satisfactorily illustrated by Figure 32.

TABLE 2

WESTON—LIQUIDOMETER INDICATORS

WESTON			*Liquidometer*
Model	*Type*	*Part No.*	*Part Number*
9969	4	100442	EA-47008
9969	6	111482	EA-47008
727	6	110026	EA-35
727	54	111645	EA-343
728	11	113665	EA-36

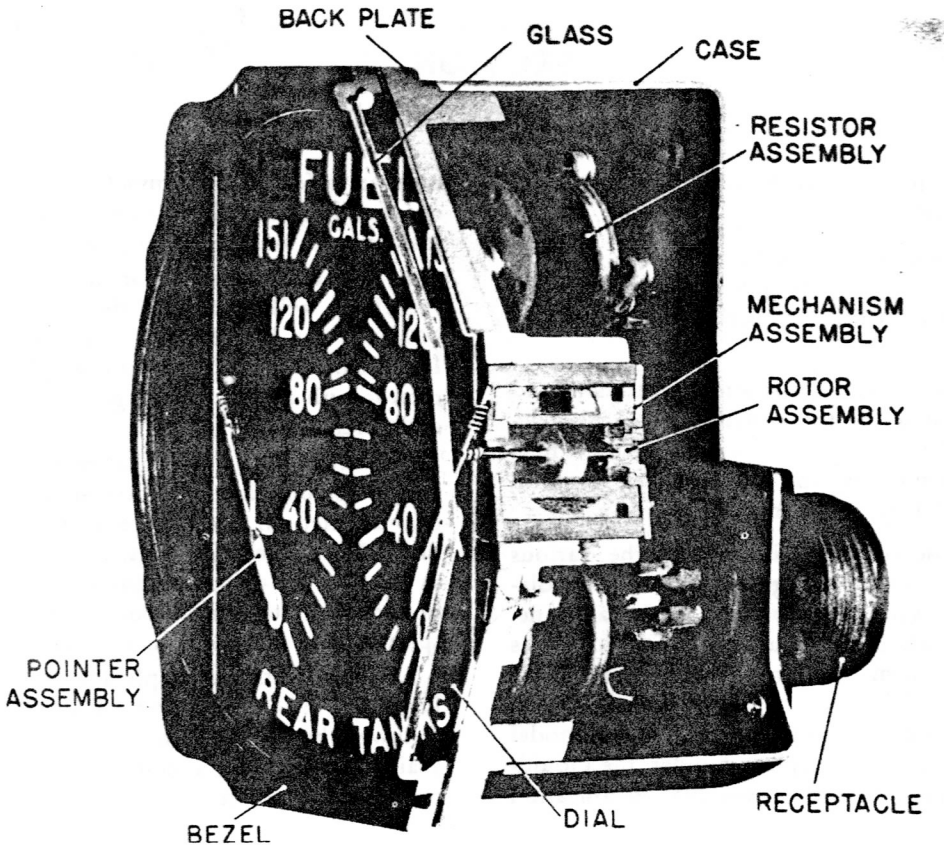
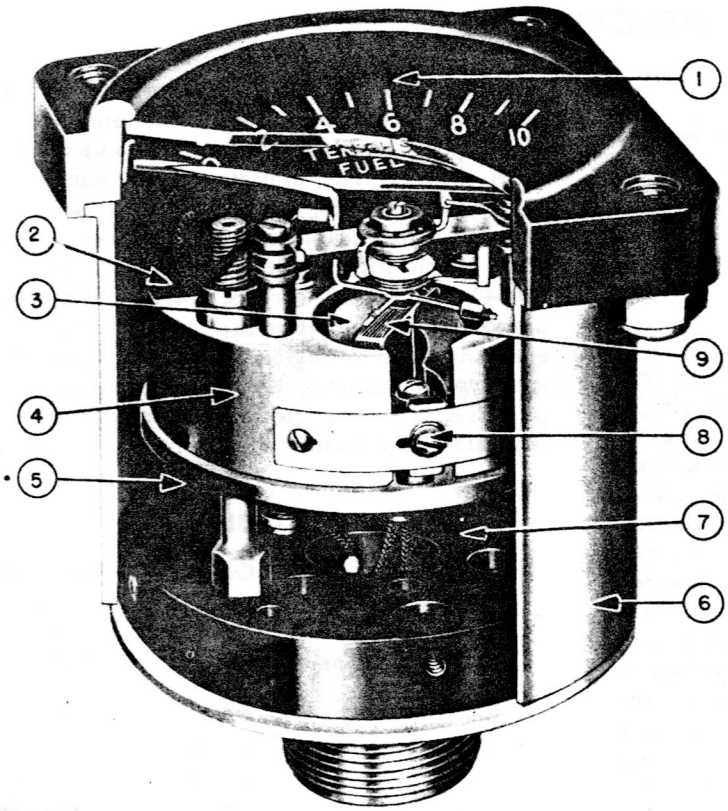


Figure 31—Cutaway View of Liquidometer Indicator



1. Glass
2. Magnet
3. Core
4. Scale Plate
5. Resistance Spool
6. Case
7. Base
8. Scale Corrector
9. Moving Element

Figure 32—Cutaway View of Weston Indicator

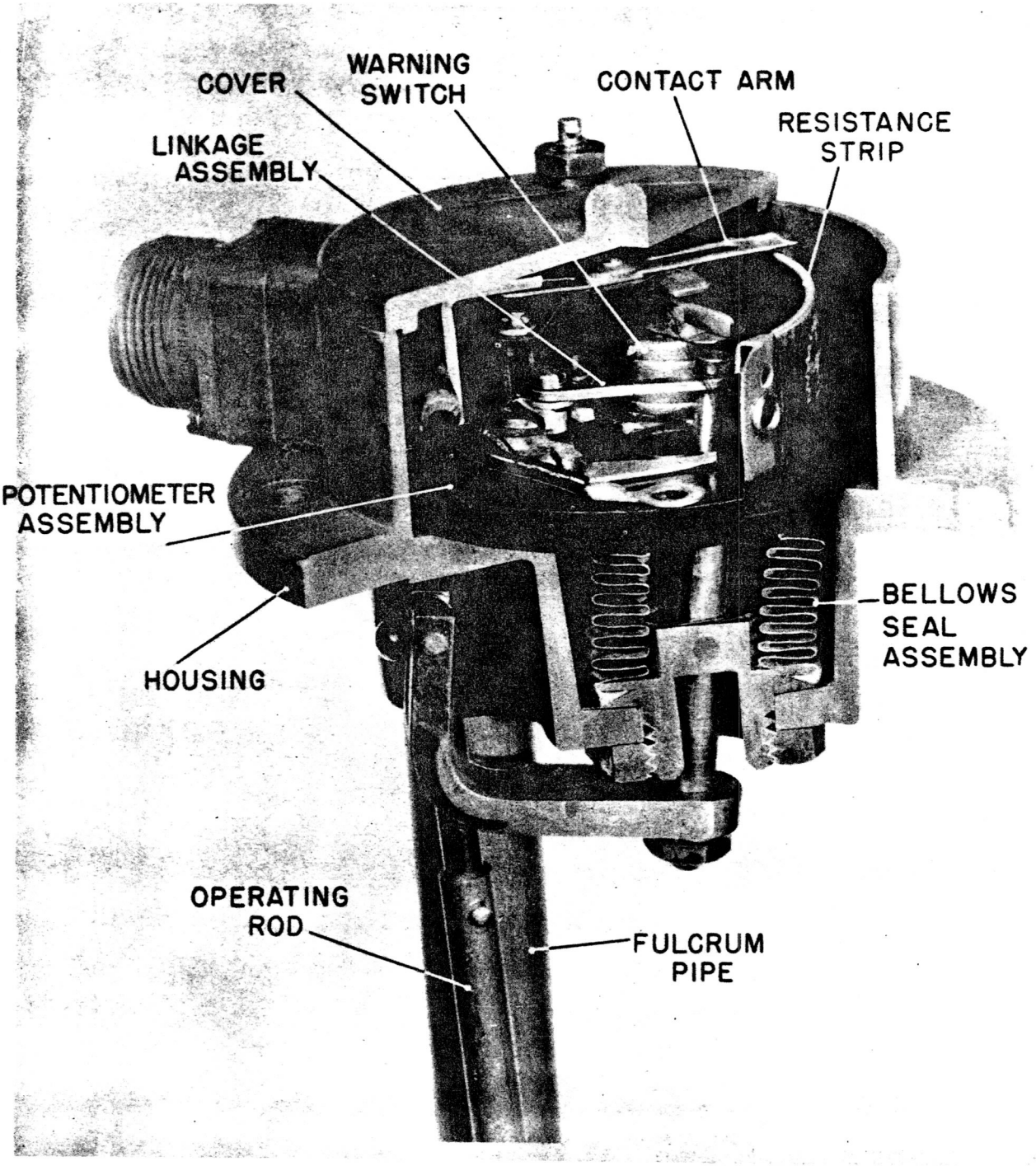


Figure 33—Cutaway View of Leverage Type Tank Unit

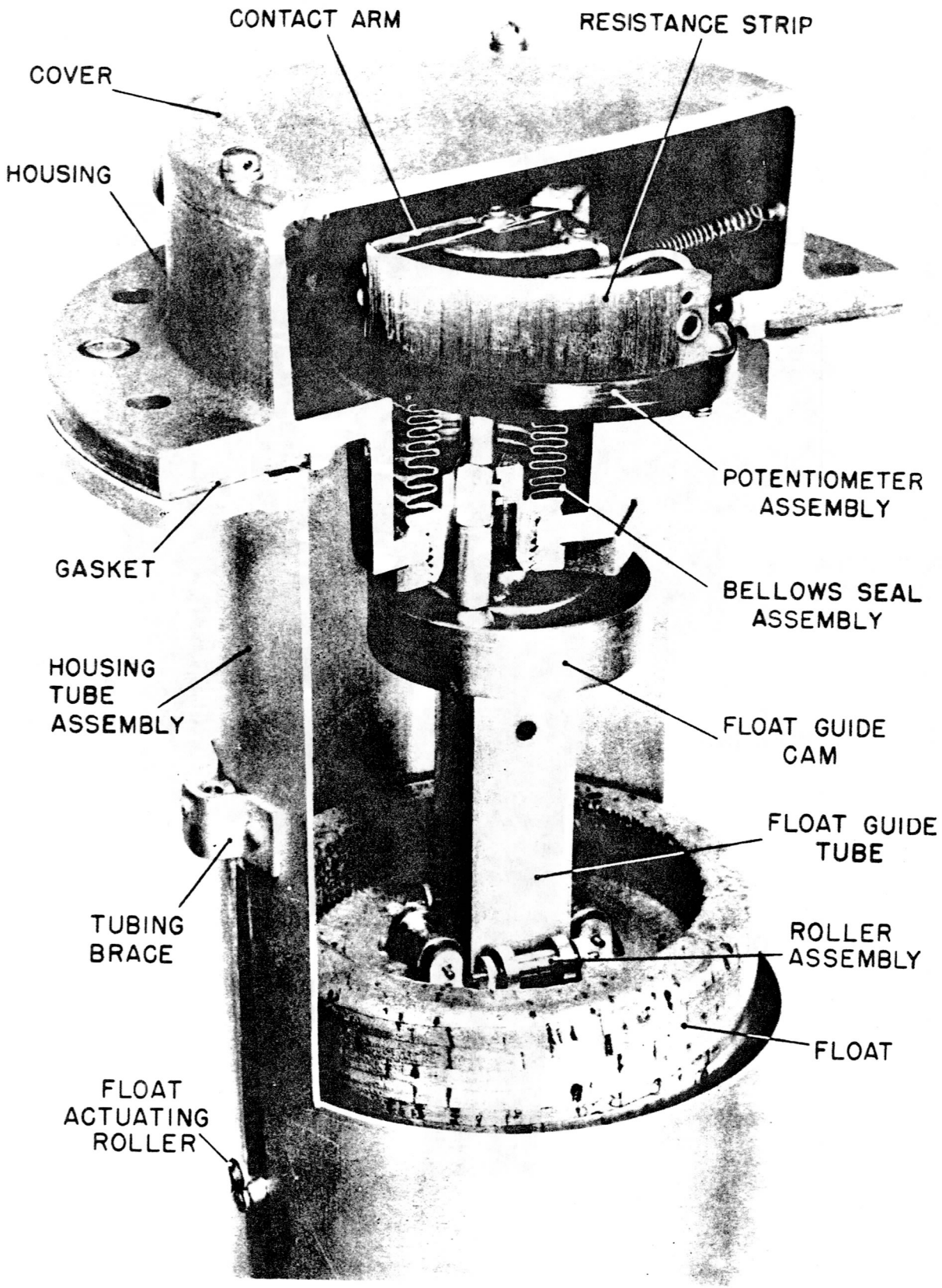


Figure 34—Cutaway View of Direct Lift Tank Unit

d. TANK UNITS.

(1) A tank transmitter unit is installed on each tank. (Tank Units vary depending on the shape of the tank, internal obstructions, etc. They may be installed on top, side, bottom, or any other position on tank that will provide the most practicable installation arrangement.) Each tank unit contains a resistance strip and a movable contact arm, the position of which is varied by the motion of a float in the tank. This position is transmitted electrically to an indicator graduated in gallons or other form of measurement. Fuel leakage from the tank is prevented by a metal bellows at the point where the float movement is carried through to the resistance strip unit.

(2) The tank units are made in two forms; namely, a leverage type float unit and a direct lift float type. In both types, a direct mechanical linkage (no gears are used) is employed to carry the movement of the float directly to the electrical portion of the unit. This direct linkage movement is obtained by using a rocking motion of a metal bellows. This metal bellows acts as a seal between the fuel tank contents and the electrical parts of the unit. The bearings are slotted to wipe away any deposit left in them due to contact with the fuel or fuel vapors.

(3) The float arm is rigidly constructed and of definite length and form. The movement between the float arm and the electric transmitting element is by simple direct linkage. Where pivoted floats are used they are properly counterweighted to insure a horizontal position when freely suspended.

(4) All tank units are so constructed that the pointer travel over the face of the calibrated scale can be easily adjusted to indicate "EMPTY" and "FULL" when the float touches bottom and top of tank, without removing tank unit. This adjustment is made part of the tank unit so that a true indication at "EMPTY" and "FULL" can be made to overcome discrepancies in tank dimensions.

(5) On planes requiring a low liquid level warning signal, a small sealed switch is secured to the same molded part that supports the resistance strip in the tank unit housing. A simple adjustable metal arm operates the switch which in turn operates a warning light. A sectional view of each type tank unit is not provided, since the general construction of each type is satisfactorily illustrated in Figure 33.

e. SELECTOR SWITCH.—The Selector Switch is used where there is not sufficient space on the instrument panel for more than one indicator and where a single indicator containing two or more mechanisms is not desirable because of the short scale.

f. VOLTAGE COMPENSATOR.—Maintains an output voltage substantially constant, by means of a bridge circuit in which two lamps are connected to unbalance the bridge in direct proportion to the change in line voltage. The voltage compensator is necessary with EA-31 indicators only.

g. STROKE ADJUSTMENT UNIT.—Contains adjustable resistor assemblies, which are used to set the resistance between R + and C at the empty position and between R — and C at the full position. Used with EA-124-9 Indicator.

2. DETAILED.

a. SINGLE POINTER INDICATORS.

(1) Figure 35 shows the electrical arrangement of a single scale 90-degree type or 120-degree type Indicator and Tank Unit. The contact shoe in the tank unit is caused to move over the resistance strip through a lever attached to a bellows seal by the movement of a float in the tank. The Indicator consists of a pointer attached to a magnetic iron rotor mounted in association with two electro-magnets. These magnets are connected to the tank unit by wiring and the system is grounded. The current distribution is varied at the tank unit through the movement of contact shoe over resistance strip and the current thus distributed excites the two electro-magnets which in turn move the magnetic iron rotor to which the pointer is attached. A magnetic force serves to bring the pointer off the empty end of the scale when the current is off. The voltage limiting resistor protects the system from overload should any of the tank unit leads be short circuited.

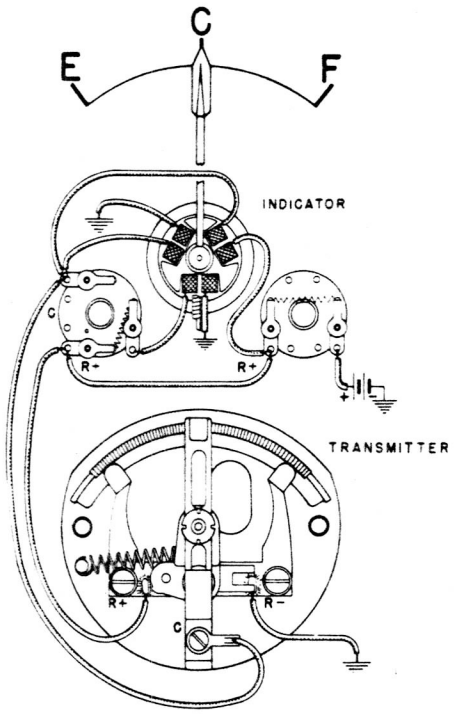


Figure 35—Schematic Wiring Diagram of Indicator and Tank Unit

(2) It will be noted that the leads R − and R + contact the resistance strip at each end through an adjustable shoe. This adjustment varies the effective resistance value of the strip and affords a convenient means for adjusting the pointer position at either end of the dial scale in conformity with the position of the float at the top and bottom of the tank.

(3) The single 300-degree scale Indicator shown in Figure 35 has a ratio type mechanism having a magnetic rotor moving in a field produced by stationary coils. The rotor carries the pointer. The variable resistance in the tank controls the current flowing through the stationary coils. These coils in turn produce a magnetic field which controls the rotor.

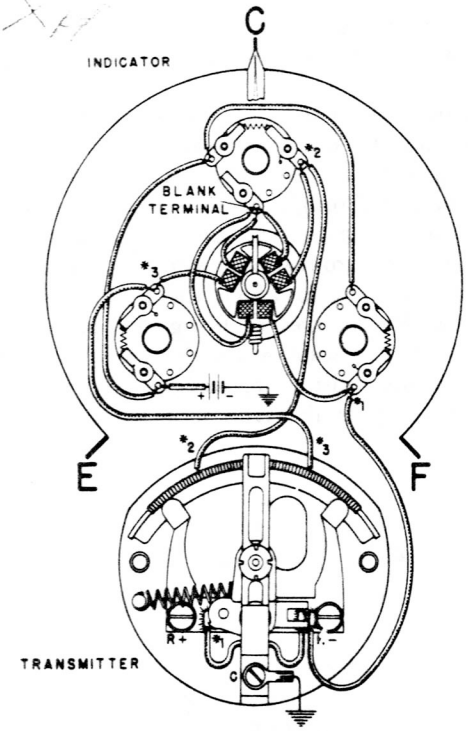


Figure 36—Schematic Wiring Diagram of a 300-Degree Scale Indicator and Tank Unit

b. DUAL-POINTER INDICATORS.—The double 120-degree scale Indicator has two ratio-type mechanisms, each having a magnetic rotor moving in a field produced by stationary coils. The rotor carries the pointer. The variable resistance in the tank controls the current flowing through the stationary coils. These coils in turn produce a magnetic field, which controls the rotor.

c. CROSS-POINTER INDICATOR.—The Cross-Pointer Indicator is similar to the Double-Pointer except that it has a cross-pointer scale arrangement as the name signifies.

Note

The Weston Electrical Instrument Co. makes the following indicators for the Liquidometer Corp. These indicators are therefor described in the following text by the use of Weston Part Numbers. Wherever part numbers are indicated throughout the text, refer to Table 2 when the Weston Model and Type or Liquidometer Number is desired.

d. PART NUMBERS 110026, 111645, and 113665. *(See Figure 32.)*

(1) The ratiometer indicators above are similar in construction and electrical circuit. Part numbers 110026 and 111645 have a 2.5-inch diameter face and part number 113665 has a 3.25-inch diameter face. Other differences are described below.

(2) CASE.

(a) PART NUMBER 110026 and 113665.—The case (6) of part number 110026 and 113665 is a cylindrical bakelite fabrication completely covering the sides of the instrument. The case front is fitted with a scale glass and a movement masking plate which obscures undesirable portions of the mechanism from view. The four corners of the case contain inserts and elastic stop nuts for mounting the indicator to a panel. A special sulfidefree rubber gasket between the bakelite case and base prevents water from entering the mechanism.

(b) PART NUMBER 111645.—The integral case and shield of this instrument consists of an armco iron case (6) assembled to a moulded bakelite front by means of eight self-tapping screws. The iron case provides a means of magnetically shielding the instrument in order to minimize the effect of the indicator on the ship's compass. A flat gasket between the case and front and a rubber gasket between the case and base prevents the entrance of water into the mechanism.

(3) BASE.—The base (7) is a moulded bakelite fabrication of which the receptacle contact pins are an integral part. The base is the principal structure upon which are mounted the mechanism assembly, the case, and the shield.

(4) SHIELD.—All three indicators described herein are magnetically shielded to prevent the stray fields of the instrument from effecting the readings of the pilot's compass. Essentially the shield consists of an iron can which covers the sides and rear of the instrument. The shield of part number 110026 slips over the bakelite case and is secured thereto by six screws through the side of the shield. The case and shield are fastened to the base by four screws. Except for the larger diameter the shield of part number 113665 is similar to that of part number 110026. The shield of part number 111645 forms the case, the bakelite inner case being omitted, and is slipped over the mechanism from the front to be secured to the base by four screws.

(5) SCALE.—The scale plate (4) is made of armco iron and, besides providing a foundation for the scale

numerals and captions, provides additional magnetic shielding. The face of the scale of part number 110026 and 111645 is divided into 10 divisions, each division representing 1/10 of a tank of fuel. The caption on the scale is "TENTHS FUEL." The scale plate of part number 113665 is furnished with a blank dull black finish. The scale plate is securely mounted to the mechanism by two screws.

(6) MAGNETIC SYSTEM.—An alnico magnet (2) having a high coercive force provides the necessary flux density to the pole pieces (4), located at the ends of the magnet horns. The center of the cylindrical core (3) is bored out to accommodate the center leg of the moving coil. The position of the core is adjustable so that it may be located eccentrically with respect to the center line of the pole piece bore. This feature is essential to the electrical adjustment of the mechanism. Mechanism, part number 111482, is equipped with a magnetic scale corrector (8) assembled on the face of the pole piece and a truncated type core. These design features provide greater ease of adjustment and calibration of the indicator. The mechanism of part number 111645 is the only one furnished with a magnetic scale corrector.

(7) MOVING ELEMENT (9). PART NUMBER 110026 and 113665.

(a) MOVING COIL.—The moving coil assembly consists of two coils, each wound with approximately 205 turns of 0.00225-inch diameter enameled copper wire, cemented together and surmounted by two pivot bases which provide a means of assembling the springs, pointer, pivots, etc., to the moving coil assembly.

(b) SPRINGS.—The position assumed by the pointer during operation should be the resultant of the forces of the two moving coil windings and no control spring, as is necessary in conventional electrical instruments, should be present. However, it is necessary to conduct current from the bridges to the coils so actual springs must be used. Futhermore, in the event of battery power failure, it is desirable that the pointer move off-scale rather than assume a random on-scale position. For these reasons, the springs have a definite restoring torque. The outer top and outer bottom springs each have a torque of 2.5 milligram centimeters per 100 degree deflection and the inner top and inner bottom springs each have a torque of 0.6 milligrams centimeters per 100 degree deflection. The tails of the springs purposely extend beyond the abutment to which the spring is soldered to provide a means of holding the spring during soldering operations, after which the spring tails may be trimmed. Bushings on the pivot bases insulate the springs from each other and a spring guard prevents entanglement of the springs if the instrument is severely jarred.

(c) POINTER.—A lance type pointer is secured to the top pivot base of the moving coil. The tubular portion of the pointer is painted with white enamel while the top surface of the lance tip is coated with fluorescent material.

The moving element is mechanically balanced about its center of rotation by adjustable balance weights which are threaded on the balance cross, an integral part of the pointer.

(d) PIVOTS.—The moving element is pivoted in the jeweled bearings of the top and bottom bridge by highly polished cylindrical steel pivots, having a 0.015-inch diameter shank and a radius of 0.003-inch at the tip. The pivots are force-fitted into the pivot bases.

(e) PART NUMBER 111645.—The moving element is the same as that for part number 111482, in that it has three control springs (two top and one bottom). The moving coil leads, which were separately brought out to the inner top and outer bottom springs are connected together within the moving coil and this common lead is connected to the bottom spring. The outer top and bottom springs each have a torque of 2.5 while the inner top spring has a torque of 1.2.

(8) RESISTANCE SPOOLS.—The resistance spools (5) mounted on the movement plate are wire wound resistors which form part of the electrical network which permits the application of the ratio type mechanism to fuel level measurements. The adjustment of the various resistance spools is explained in section IV, paragraph 4.*d.*(7).

(9) CONNECTORS.—Connection is made to the indicators in the manner listed below.

(a) Part number 110026—three pin Weston standard receptacle.

(b) Part number 111645—four pin AN receptacle AND10066-14s-2P.

(c) Part number 113665—three pin AN receptacle AND10066-14s-1P.

d. DIAL CHANGE INDICATOR.

(1) This type indicator has the following designations:

EA-41	5 dials	7 tanks
EA-46	3 dials	3 tanks
EA-47	6 dials	6 tanks
EA-48	4 dials	4 tanks
EA-49	5 dials	5 tanks
EA-55	6 dials	6 tanks

When a warning light is used, a "W" follows the above designations. When indirect lighting is used, the designation is followed by the letter "A". If both indirect light and warning light are used, the numeral is followed by the letters "AW".

(2) This unit is ideally adaptable for airplanes where there are a number of tanks of different capacity. In this unit a separate dial is provided for

each tank. The Selector Switch and Indicator elements are so combined that when the Selector Switch Knob is turned to a certain tank position, the dial calibrated for that tank automatically comes into view.

(3) Figure 37 shows the mechanical arrangement of the Dial Change Indicator and Selector Switch Combination Unit. It will be noted that the knob is connected to a shaft which extends through the Selector Switch. Attached to the shaft is a worm gear which in turn is attached to a shaft that supports a spur gear that meshes with a larger spur gear. Attached to this large spur gear is a sprocket which engages pins that are attached to a cam This cam is attached to a dial drum which is free to rotate on a bearing. This cam rides on a rotor. Consequently, it will be seen that when the knob is turned, the contacts in the Selector Switch are shifted and at the same time the gear connection to the shaft causes the cam to turn and push the dial drum away from the rotor and simultaneously dial drum turns to a new index position.

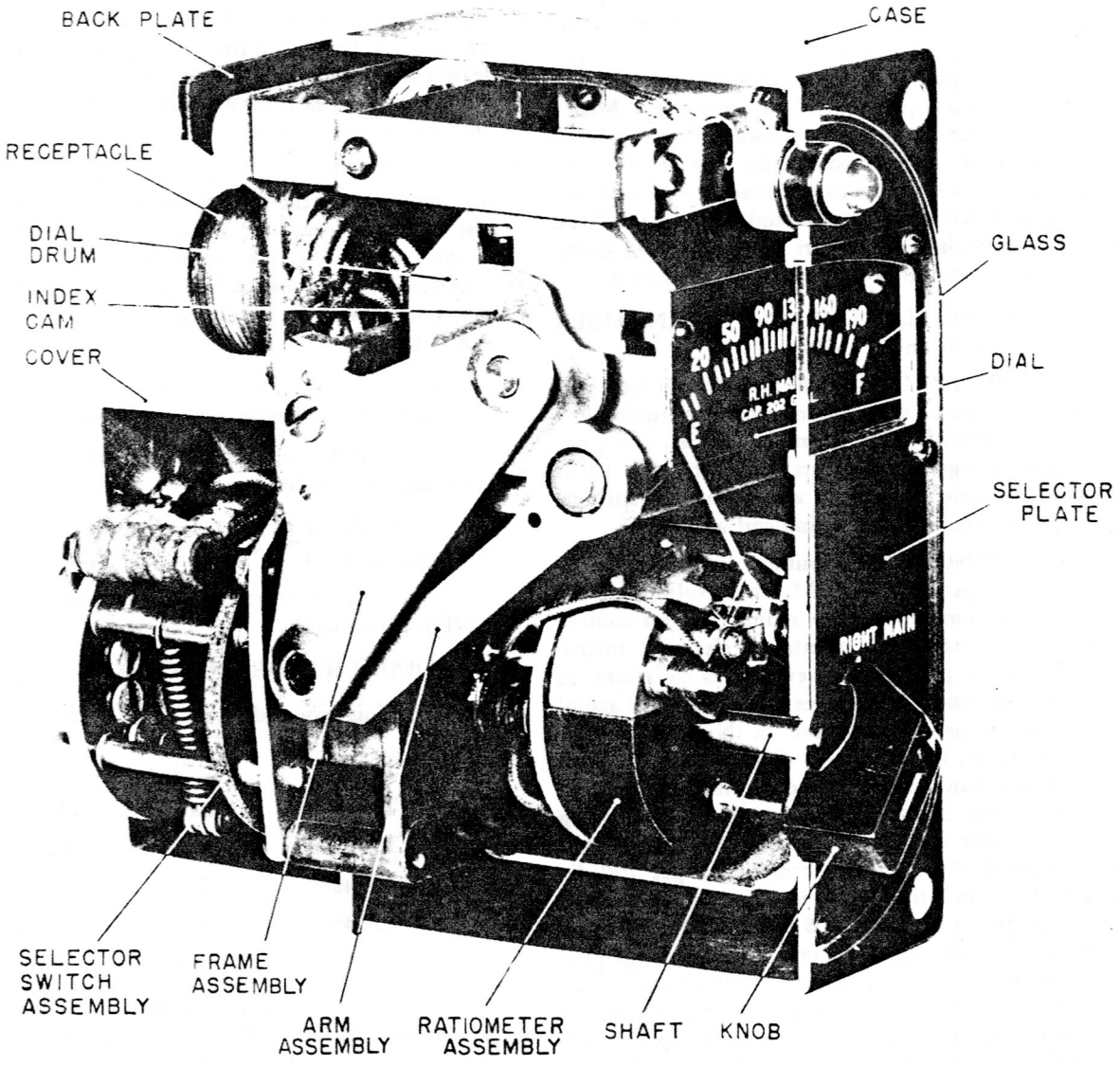


Figure 37—Cutaway View of Dial Change Indicator

Note

The Dial Change Indicator has a ratiometer that is a Weston Part. This part is described as follows:

(4) Part Number 100442 and 111482. (See Table 2 for Weston Model No. and Liquidometer Part No.)

(a) Ratiometer mechanisms, part numbers 100442 and 111482 are identical in construction except in details of the moving element.

the shield cover permits the pointer to operate throughout the necessary arc of the scale. The mechanism, shield and cover are designed to permit the passage of the range-changing shaft through the assembly when the mechanism is installed.

(c) BASE. *(See Figure 32.)*—The mechanism proper is supported by a bakelite base (7) in which a 1/4-inch hole for the range-changing shaft and the three smaller holes for the external leads are provided.

(d) MAGNETIC SYSTEM.—An alnico magnet

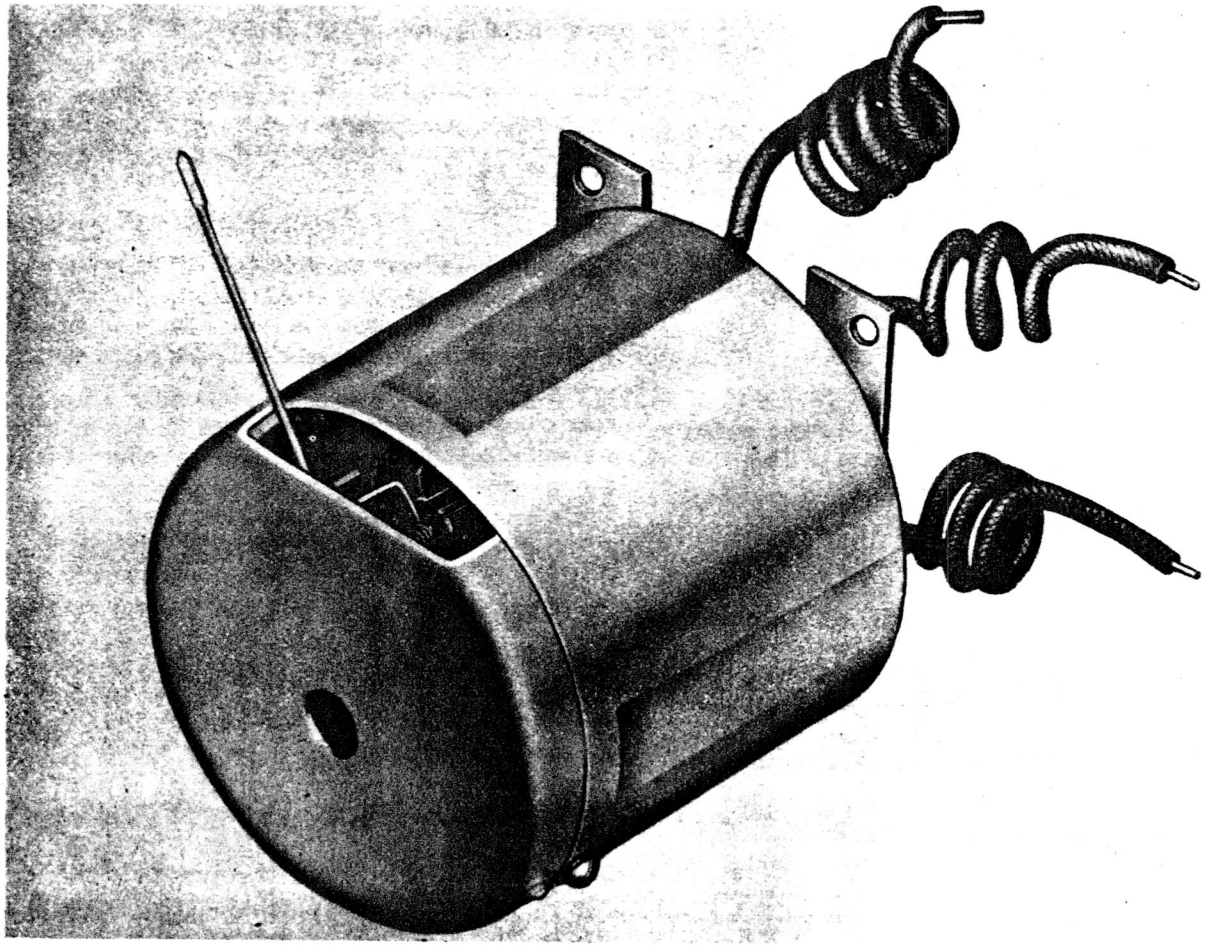


Figure 38—Ratiometer Weston Models 9969 Types 4 and 6

Note

Part Number 100442 which has four control springs is discontinued and is replaced as a unit by part number 111482. Part number 100442 appears in this data because there are some units still in service and, therefore, must be included. Differences therein are described below.

(b) SHIELD. *(See Figure 38.)*—A cylindrical iron shield and two brackets for mounting the complete mechanism in the dial change indicator are secured to the bakelite base of the mechanism by four screws. A shield cover held to the shield barrel by two screws completes the encasement of the mechanism. An opening in

(2) having a high coercive force provides the necessary flux density to the pole pieces (4), located at the ends of the magnet horns. The center of the cylindrical core (3) is bored out to accommodate the center leg of the moving coil. The position of the core is adjustable so that it may be located eccentrically with respect to the center line of the pole piece bore. This feature is essential to the electrical adjustment of the mechanism. Mechanism, part number 111482, is equipped with a magnetic scale corrector (8) assembbled on the face of the pole piece and truncated type core. These design features provide greater ease of adjustment and calibration of the indicator.

(e) MOVING ELEMENT, PART NUMBER 100442.

1. MOVING COIL.—The moving coil assembly consists of two coils, each wound with approximately 205 turns of 0.00225-inch diameter enameled copper wire, cemented together and surmounted by two pivot bases which provide a means of assembling the springs, pointer, pivots, etc., to the moving coil assembly.

2. SPRINGS.—The position assumed by the pointer during operation should be the resultant of the forces of the two moving coil windings and no control spring, as is necessary in conventional electrical instruments, should be present. However, it is necessary to conduct current from the bridges to the coils so actual springs must be used. Furthermore, in the event of battery power failure, it is desirable that the pointer move off-scale rather than assume a random on-scale position. For these reasons, the springs have a definite restoring torque. The outer top and outer bottom springs each have a torque of 2.5 milligram centimeters per 100 degree deflection and the inner top and inner bottom springs each have a torque of 0.6 milligram centimeters per 100 degree deflection. The tails of the springs purposely extend beyond the abutment to which the spring is soldered to provide a means of holding the spring during soldering operations, after which the spring tails may be trimmed. Bushings on the pivot bases insulate the springs from each other and a spring guard prevents entanglement of the springs if the instrument is severely jarred.

3. POINTER.—A lance type pointer is secured to the top pivot base of the moving coil. The tubular portion of the pointer is painted with white enamel while the top surface of the lance tip is coated with fluorescent material.

The moving element is mechanically balanced about its center of rotation by adjustable balance weights which are threaded on the balance cross, an integral part of the pointer.

4. PIVOTS.—The moving element is pivoted in the jeweled bearings of the top and bottom bridge by highly polished cylindrical steel pivots, having a 0.015-inch diameter shank and a radius of 0.003-inch at the tip. The pivots are force-fitted into the pivot bases.

(f) MOVING ELEMENT PART NUMBER 111482.

1. The moving element (9) of the part number 111482 is identical with that of part number 100442 except that it has but three control springs (two top and one bottom) while the moving element of part number 100442 has four control springs (two top and two bottom). The moving coil leads, which were separately brought out to the inner top and outer bottom springs are connected together within the moving coil and this common lead is connected to the bottom spring. The outer top and bottom springs each have a torque of 2.5 while the inner top spring has a torque of 1.2.

(g) RESISTANCE SPOOLS. – The resistance spools (5) mounted on the movement plate are wire wound resistors which form part of the electrical network which permits the application of the ratio type mechanism to fuel level measurements. The adjustment of the various resistance spools is explained in section IV, paragraph 4.*d.*(7).

(h) CONNECTORS.—Connection is made to the mechanisms by means of three flexible leads, one red, one yellow and one black.

e. TANK UNITS.

(1) All Tank Units of the leverage type bear the prefix EA-15, EA-16, EA-18, EA-65 or EA-85. The EA-16 unit has an overhanging housing using box-connector fittings while the others have circular housings, using plug-in connectors except the EA-18 which has a special cable, using terminal lugs. The EA-15 and EA-85 tank units are identical except that the EA-85 flange diameter is larger than the EA-15. The EA-65 and EA-84 Tank Units are used in conjunction with 300-degree scale indicators while the other tank units are used in conjunction with 90- or 120-degree scale indicators. The numbers mentioned above designate the type of unit while the additional numbers used in each case identify it in respect to size, mounting, warning signals, etc.

(2) Figure 33 shows the mechanical action of a tank unit arranged for mounting on the top of a tank. As previously stated, tank units may be installed top, bottom and side or any other position that provides the most suitable installation arrangement. The leverage type tank unit has the housing attached to tank flange. The float rides the liquid surface and moves float arm which is pivoted at the end of the fulcrum pipe. This fulcrum pipe is attached to the housing. The push rod is pivoted to the float arm with the opposite end pivoted to a short arm. The latter is attached to a pivoted rocker arm. The rocker arm is slotted to metal bellows head and the lower end of the bellows is sealed to pivoted supporting head. The bellows head is drawn in place to form a seal at the bottom of the housing by a locating nut. Thus, it can be seen, that liquid, vapor or air from the tank cannot pass through the bellows.

(3) Due to the mechanical linkage, a movement of the float will cause a rocking movement of the lever passing through the bellows. Figure 39 illustrates position of lever when the float is at the tank bottom position. A link (2) connection is used to connect the upper end of rocker arm (1) and variable resistance shoe support (2) which is free to move around the shaft supporting the wiper contact arm.

(4) Referring to Figure 40, slotted arm (2) in linkage is fixed to wiper contact arm support which also is free to move around the shaft. By adjusting the distance between link bearing and shaft, the amount of travel of wiper contact arm (3) can be set so that the contact shoe on wiper arm will move over the resistance strip (1) the required amount when the float is moved to touch top and bottom of the tank. The slotted eccentrics in the adjustment arms (4) are provided to control

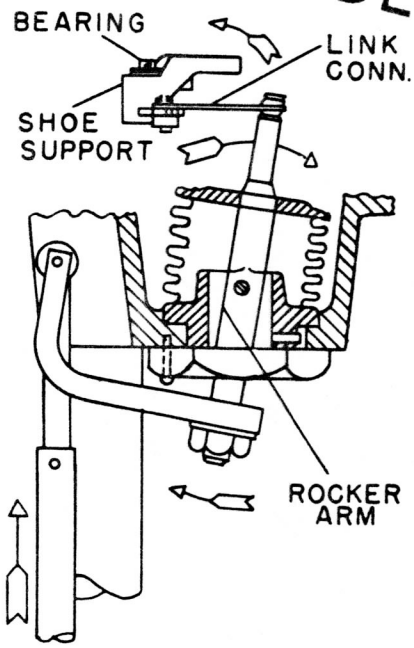


Figure 39—Linkage Connections in Housing

the position of the electrical take-off shoes. Since means must be provided for moving the float from bottom to top of tank so that the indicator pointer travel may be adjusted to conform with the float travel, all "leverage type" tank units are supplied with an eye in the float arm so that a string loop can be passed through (see Figure 33). In some instances, however, the use of a stroke setting string is not practicable and a wire form or some other device may be used through a separate opening in the tank in order that the float may be lifted up and down during the stroke setting operation.

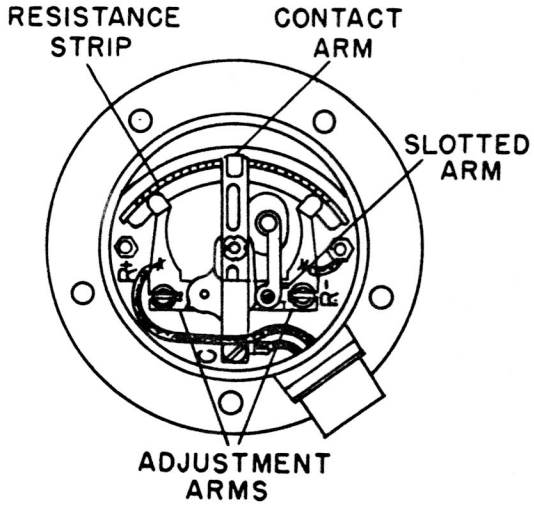


Figure 40—Stroke Adjustment of Tank Unit

(5) In addition to the leverage type float unit, there is also a "direct lifting type". This type is used where there is not sufficient clearance in the tank for the float arm travel of the "leverage type". The direct lifting type utilizes a float that rises vertically but which provides the same sealing method and electrical operation as the leverage type. This tank unit bears designations such as EA-17 and EA-67. It consists essentially of a long tube with a circular housing at one end and a locating socket at the other. A large float having a thick roller running in a spiral guide slot in the tube, transmits a rotating motion to a movable contact arm in the housing by means of a central shaft, which is actuated by rollers attached to the float. A resistance strip is used in conjunction with the movable contact arm. This unit has provisions for adjusting stroke and end position. A metal bellows mounted on the housing in a similar manner to the "leverage type", prevents fuel leakage.

f. SELECTOR SWITCHES. *(See Figure 41.)*—They are of the conventional type approved aircraft switches, containing a sufficient number of banks to accommodate the circuit used. They are used when there is insufficient space on the instrument panel for more than one indicator and the use of a single indicator containing two or more mechanisms is not desirable because of the short scale. They are also used in conjunction with a single indicator to indicate the quantity of fuel or oil in two or more tanks. When the index knob on the Selector Switch is turned to the desired tank unit which is inscribed on the tank plate of the Selector Switch the quantity of the fuel can then be read from the calibrated dial of the indicator. Selector Switches are generally supplied by the aircraft manufacturer.

g. STROKE ADJUSTMENT UNIT. *(See Figure 42.)*—Used to set the stroke of a tank unit that does not have the adjustments incorporated in it. The Stroke Adjustment Unit corrects the variations which may exist in a tank when the tank unit is being installed and adjusted. The resistor assemblies, contained in the Stroke Adjustment Unit, set the resistance between R + and "C" at the empty position and between R– and "C" at the full position.

h. VOLTAGE COMPENSATOR. *(See Figure 43.)*—Consists essentially of two resistance spools and two Tungsten filament lamps mounted in a perforated light weight metal case. The spools are mounted directly to the base while the lamps are suspended on shock absorbing metal strips, with a sponge rubber pad for damping small oscillations. These strips are designed to provide a simple rugged lamp mounting with a high degree of shock absorption as well as low thermal conduction to the case. The lamps have standard automobile type six candle power, 12-16 volt bulbs mounted on miniature type bases. They are suitably aged and paired to provide for constancy of adjustments and easy replacements. The Compensator is adjusted to supply an output of 4.1 plus or minus 0.05 volts into a 100 ohm load when the input is between 11 and 15 volts.

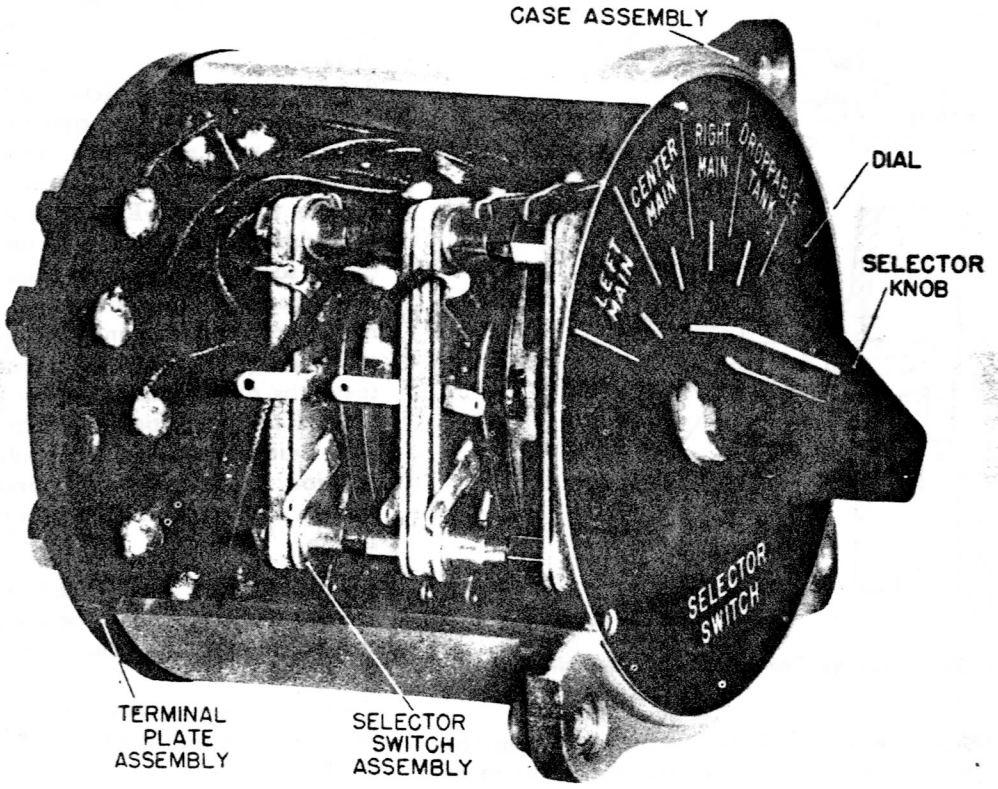


Figure 41—Cutaway View of Selector Switch

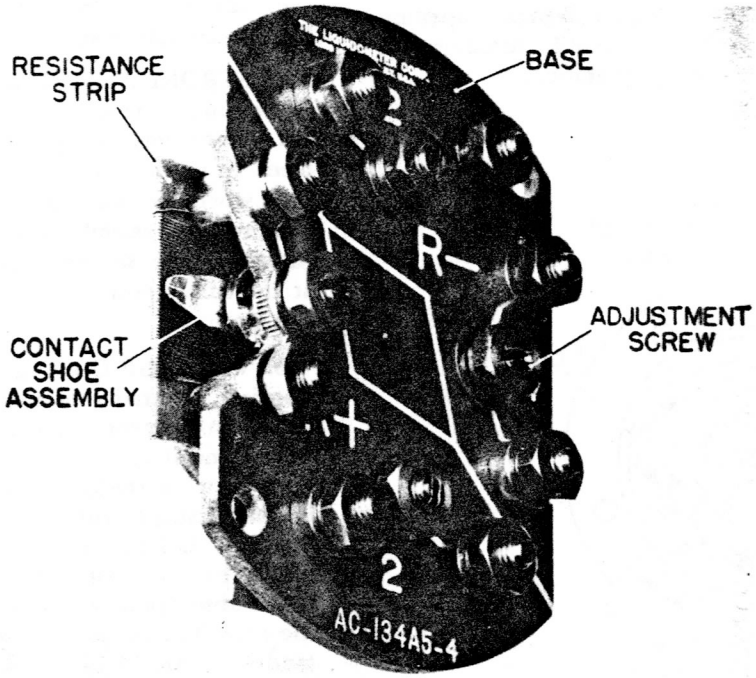


Figure 42—Cutaway View of Stroke Adjustment Unit

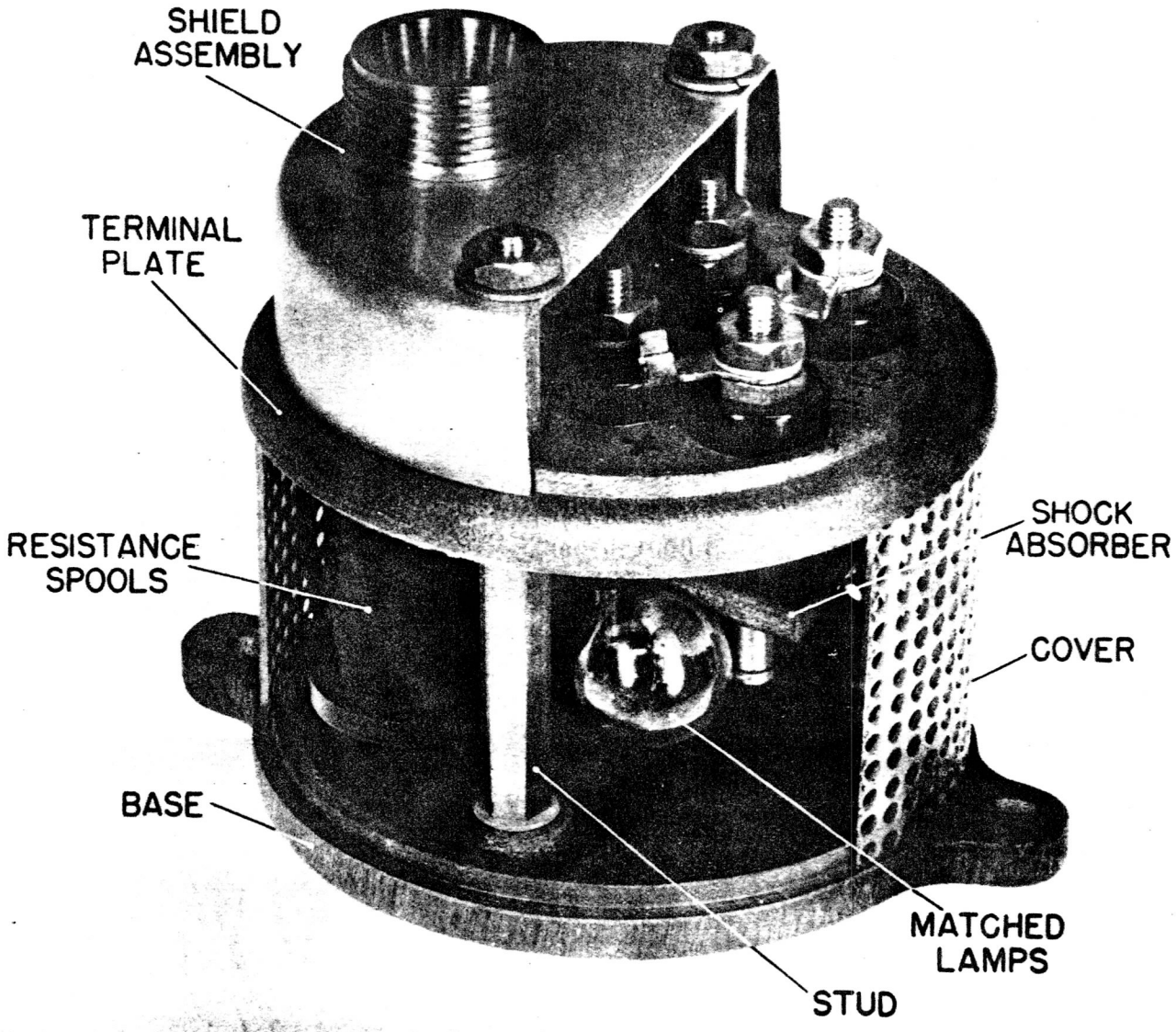


Figure 43—Cutaway View of Voltage Compensator

SECTION III
OPERATION

1. PRINCIPLES OF OPERATION.

a. GENERAL.—Fuel level indicator installations consist essentially of an indicator calibrated in terms of fuel level, and a tank unit consisting of a float operated variable rheostat, the two units being connected by electrical cables. Motion of the float with changes in fuel quantity operates the movable arm of the variable resistor. The earliest application of this system required a milliameter operated by a series rheostat. This installation depended on a controlled supply voltage such as the output of a voltage compensator. Improvements in design of this equipment have resulted in the use of the ratiometer type mechanism, eliminating the necessity for voltage compensation.

b. INDICATOR.

(1) In order to describe clearly the operation of the gauge, see Figure 44, whereon is schematically drawn, a complete circuit of both the tank unit and indicator. Coils E 1, E 2 and E 3 are shown equi-distant surrounding M, which represents the iron rotor and whereupon is mounted pointer P. The lower section shows a resistance strip and the adjustable contacts R+ and R−, through which the current is supplied to the resistance strip. C represents the contact wiper arm which moves across the strip. K is a limiting resistor. K 1 is a scale control resistor. The battery may be 12 or 24 volts, which in turn decides the value of limiting resistor K.

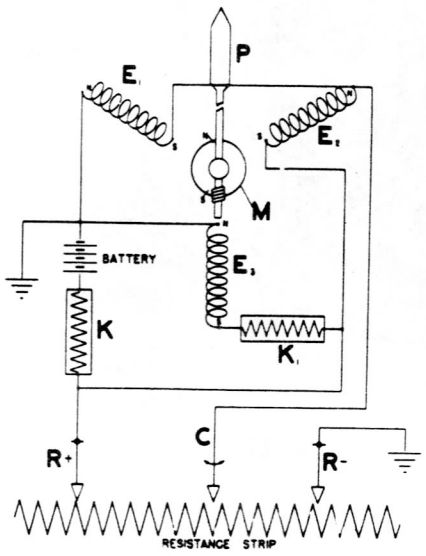


Figure 44—Circuit Diagram for Indicator and Tank Unit

(2) In operation, the voltage is essentially constant across the resistance strip and through Coil E 3, which is the scale control coil. Contact wiper arm C is moved across the resistance strip from R+ to R− or vice versa, changing the voltage in coils E 1 and E 2. When contact wiper arm C is in the electrical center of the resistance strip, the voltage through E 1 and E 2 is the same. These coils produce a flux path of equal strength, having like polarities equally attracting the section of the rotor of unlike polarity, which then causes a resultant force, causing the indicator pointer to come to rest at mid-scale. As the contact wiper arm C is moved closer to R−, coil E 1 has a higher voltage than coil E2 as noted in the diagram, the return circuit of E 2 being connected through scale control resistor K 1. This unblance causes the pointer to come to rest at the lower end of the dial, which is then the new resultant force. Coil E 1 and E 2, attracting the pole on Rotor M, cause the opposite result to be obtained as contact wiper arm C is moved across resistance strip to R−. Coil E 3 maintains a constant flux path, which, attracting the opposite pole of Rotor M, controls the length of travel of the pointer.

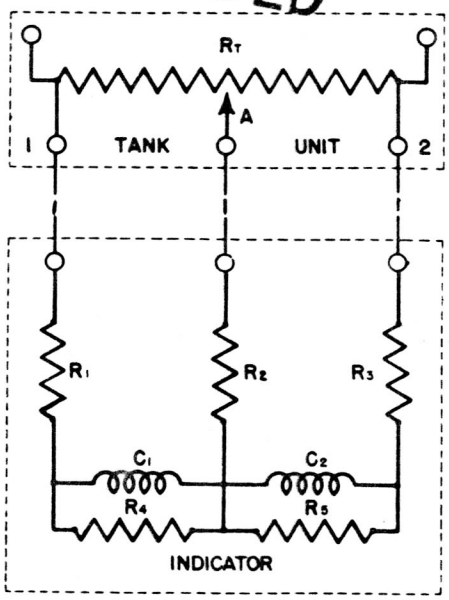
(3) As described, the indicator remains at its last position when the circuit is disconnected. To avoid this, an additional permanent magnet (not shown), is placed beneath Rotor M, having its polarities in line with the AN OFF scale position (unless otherwise required for customer's application) which, when the circuit is broken, causes the poles in Rotor M to align themselves with the opposite poles in the return magnet, thereby causing the pointer to fall below the "Empty" position. This means of magnetic return eliminates the use of sensitive hairsprings.

c. DIAL CHANGE INDICATOR.

(1) The Dial Change Indicator is used where there are a number of tanks to be calibrated. The indicator is connected to the tank unit electrically. When the quantity of fuel in a tank is needed, the index knob of the indicator is turned which moves the contacts in the Selector Switch and also controls the mechanism so that the desired dial comes into view. The pointer then shows the quantity of fuel in the tank by coming to rest at a mark on the dial. These operations may be repeated for the contents of the tanks shown on index plate.

Note

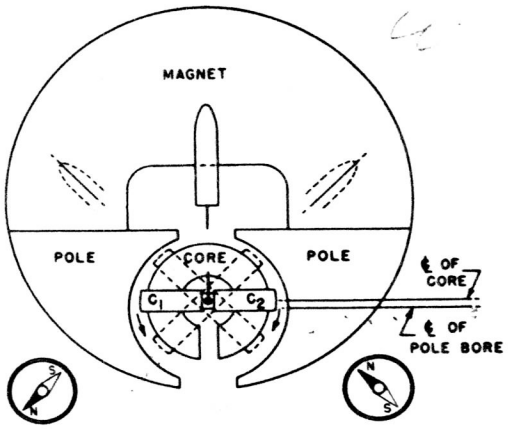
The following data applies to the Weston Ratiometer which is used in the Dial Change Indicator and also in a few other indicators. See Table 2, Section II.



R1, R2, R3 - RESISTANCE SPOOL (SINGLE WINDING)
R4, R5 - RESISTANCE SPOOL (DOUBLE WINDING)
C1, C2 - MOVING COIL WINDINGS
RT - TANK UNIT RESISTOR
SEE TABLE 4 FOR RESISTANCES OF SPOOLS.

Figure 45—Schematic Wiring Diagram

d. RATIOMETER. – Figure 45 illustrates the ratiometer circuit employed in the measurement of fuel tank levels. The tank unit is mounted in the fuel tank, the rheostat arm "A" being operated by a system of linkages connecting the tank float to the rheostat. A potentiometer type rheostat is required in order to vary the current in the indicator moving coils proportionately. Figure 46 shows the mechanical arrangement of the moving coils and magnetic system by which a ratio type indication is obtained. The moving coils C_1 and C_2 are cemented together and pivoted at the center line of a bored out core piece as shown; thus, as the pointer moves, the outside edges of the coils move oppositely in their respective air gaps. In addition, the core is set eccentrically with respect to the pole piece bore so that the air gaps at the bottom are larger than at the top, providing an increasing magnetic flux density from bottom to top. As the force exerted by each moving coil is proportional to the product of current and flux density, the same coil currents will produce greater and greater torque as the coils move from bottom to top. If the current in each coil is in the proper direction to move each downward, the coil carrying the larger current will move downward forcing the other coil upward until the current-flux product, and consequently the torque of each is equal, at which point the coils will come to rest. Variation of both currents proportionately, as would result from changes in supply voltage, will not affect this ratio or change the indication. In the circuit of Figure 45, R_t is the variable potentiometer operated by the float in the fuel tank. When movable arm "A" is exactly midway between connection 1 and 2, equal currents flow through coil C_1 and C_2 and the pointer assumes a center scale indication. As the rheostat arm "A" moves toward connection 2, the current through C_1 increases and the pointer approaches an end scale indication. Similarly as arm "A" approaches connection, the pointer approaches the opposite end scale deflection. These extreme and center readings are calibrated to indicate an "empty", "full", or "half full" fuel tank. Intermediate graduations indicate fractional quantities between "empty" and "full". Detailed electrical adjustment for all types is given in paragraph 4.*d.*(7), section IV.



DOTTED LINES INDICATE END SCALE COIL POSITIONS.
ARROWS INDICATE DIRECTION OF FORCE EXERTED BY EACH COIL.
CORE ECCENTRIC RELATIVE TO POLE PIECE BORE, PRODUCING UNEQUAL FLUX DISTRIBUTION IN CORE-POLE GAPS.

Figure 46—Ratiometer Mechanism

e. TANK UNIT.

(1) Each tank unit contains a resistance strip and a movable contact arm, the position of which is varied by the motion of a float in the tank. This position is transmitted electrically to an indicator. Fuel leakage from the tank is prevented by a metal bellows at the point where the float movement is carried through to the resistance strip unit. The contact shoe in the tank unit housing is caused to move over the resistance strip through suitable leverage by the movement of a float in the tank.

(2) Due to the mechanical linkage a movement of the float will cause a rocking movement of lever (1). Figure 39 illustrates the position of lever (1) when the float is at the tank bottom position. A link connection (2) is used to connect the upper end of rocker arm (1) and variable resistance shoe support (3) which is free to move around bearing (4). It will be noted that the leads R – and R + contact resistance strip (1) at each

end through an adjustable shoe. (See Figure 40.) This adjustment varies the effective resistance value of strip (1) and affords a convenient means for adjusting the pointer position at either end of the dial scale in conformity with the position of the float at the top and bottom of the tank.

(3) In addition to the "leverage type float unit" shown in Figure 33 a "direct lift type" is also available. This type is used where there is not sufficient clearance in the tank for the float arm travel of the "leverage type". The "direct lifting type" utilizes a float that rises vertically, but which provides the same sealing method and electrical operation as the "leverage type".

(4) A sealed low level warning switch which is connected to a lamp is sometimes used to indicate a predetermined low liquid level. Figure 47 shows the electrical arrangement used where low level warning signal switches are employed. The movement of arm "C" opens and closes the contact in the warning switch. An adjustment is provided so that the switch action can be set to give the warning at the desired liquid level.

f. SELECTOR SWITCH.—The operation of the Selector Switch is simple. By turning the index knob to the desired tank unit inscribed upon the index plate the quantity of fuel can be seen on the dial of the indicator. When the index knob is turned contact is made by the brushes, attached to the shaft, with the contacts that are wired to the resistance strip in the tank unit and also to the mechanism of the indicator.

g. VOLTAGE COMPENSATOR.—When the voltage compensator is wired according to the wiring diagram the operation becomes automatic because of the resistance spools and matched lamps that control the output of the voltage, thereby supply a substantially constant voltage supply.

h. STROKE ADJUSTMENT UNIT.—The Stroke Adjustment Unit is automatic in its operation once it has been set to bring the stroke within the Empty, Center and Full positions of the tank. The setting of the stroke is made by adjusting the slotted screws which vary the resistance in the resistor assemblies, thereby making the stroke of the tank unit long or short so that the pointer of the indicator gives a true reading of all the graduations on the dial.

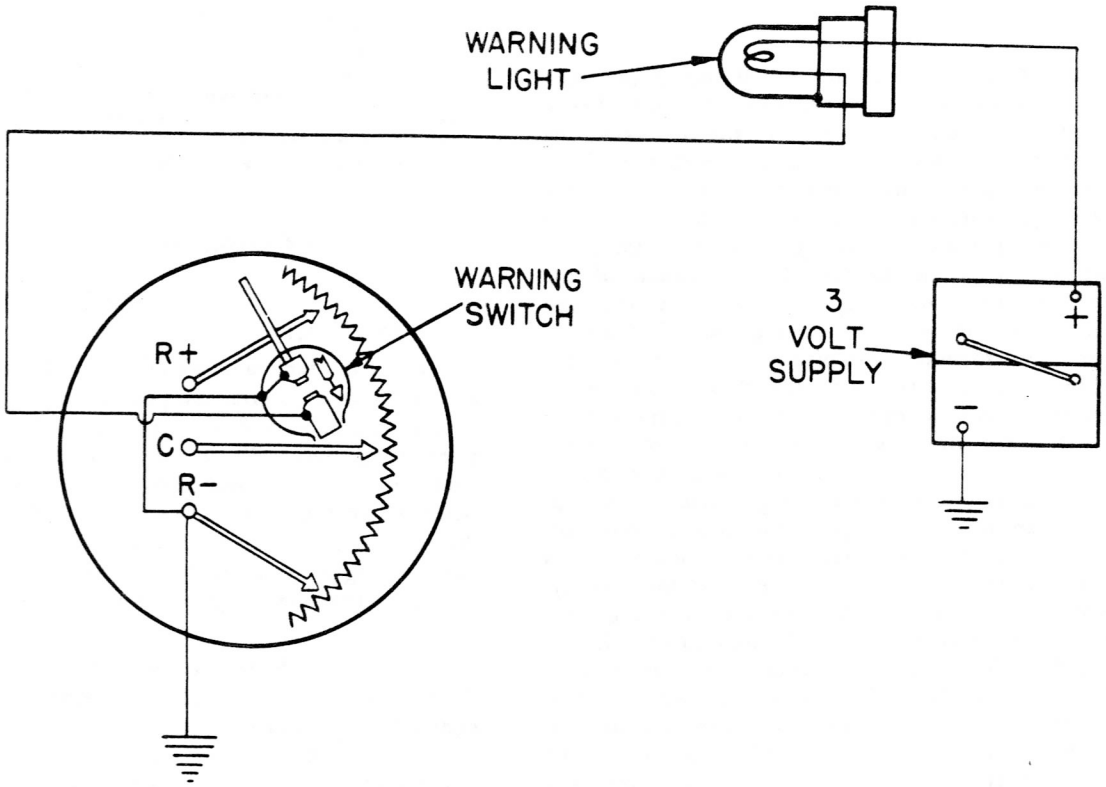


Figure 47—Wiring Digram of Warning Switch

RESCINDED

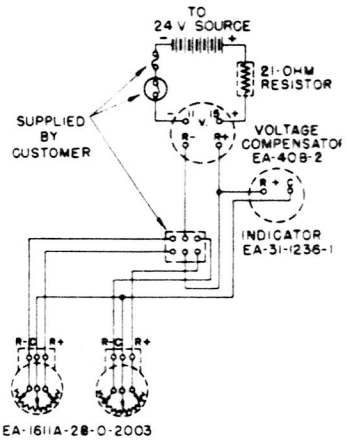


Figure 48—External Wiring Diagram for Consolidated Model PBY-5

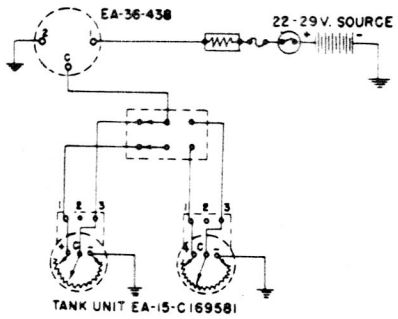


Figure 50—External Wiring Diagram for Martin Model PBM-1

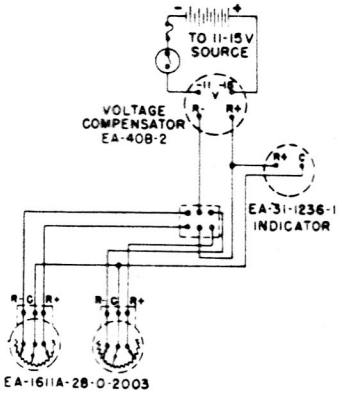


Figure 49—External Wiring Diagram for Consolidated Model PBY-2

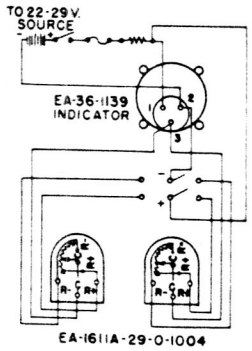


Figure 51—External Wiring Diagram for Consolidated Model PB-2Y-2

Note

The above wiring diagrams have the internal wiring shown for the indicators and tank units.

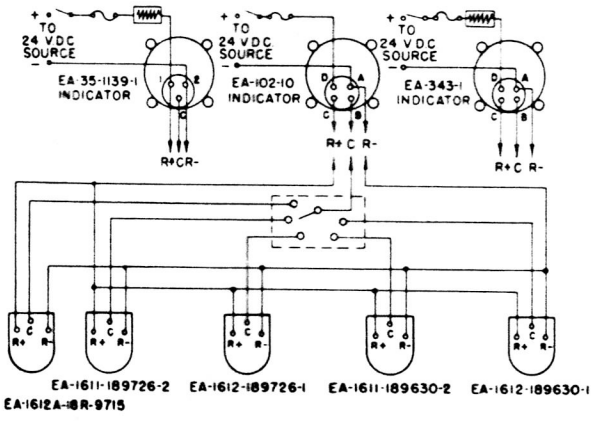


Figure 52—External Wiring Diagram for Beech Model AT-11

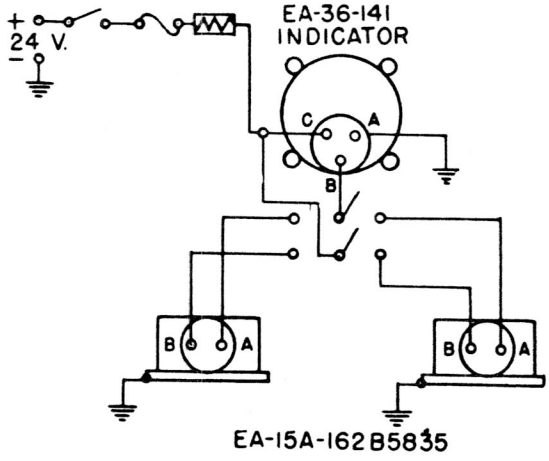


Figure 53—External Wiring Diagram for Martin Model PBM3

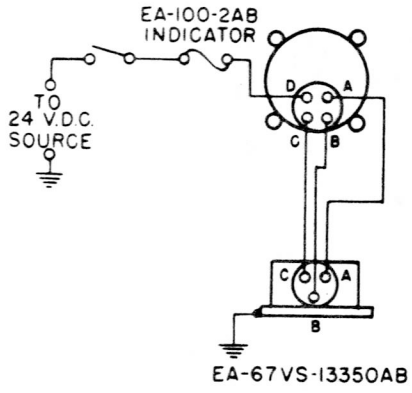


Figure 54—External Wiring Diagram for Vought Sikorsky Model F4U-1

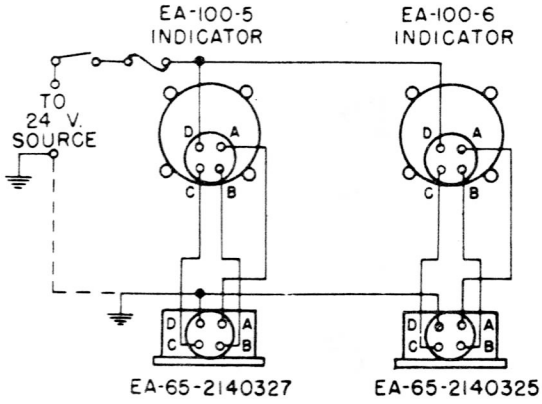


Figure 55—External Wiring Diagram for Douglas Model A20B

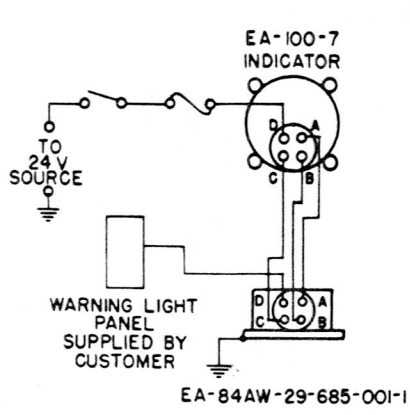


Figure 56—External Wiring Diagram for Bell Model XP-59B

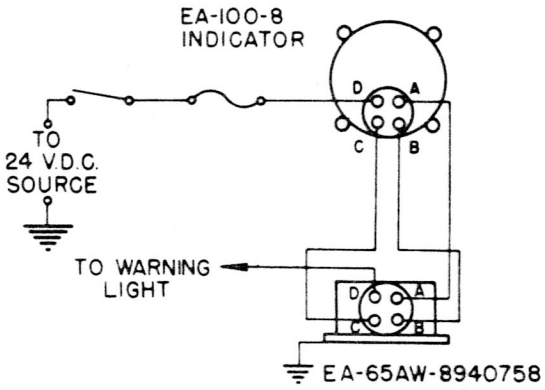


Figure 57—External Wiring Diagram for General Motors Model XP-75

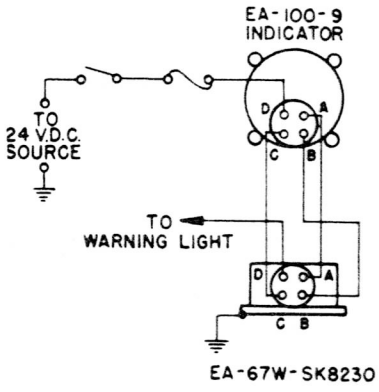


Figure 58—External Wiring Diagram for Curtiss Model XP-40Q-2

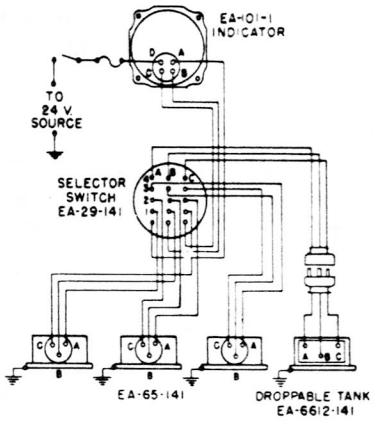


Figure 59—External Wiring Diagram for Grumman Model TBF-1 and TBM-1

RESCINDED

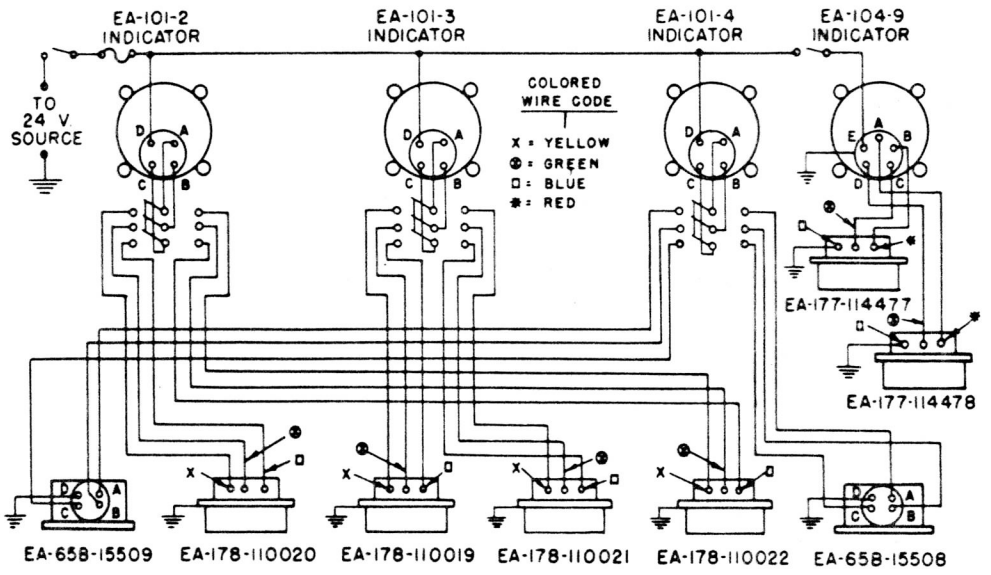


Figure 60—External Wiring Diagram for Lockheed Model B-37

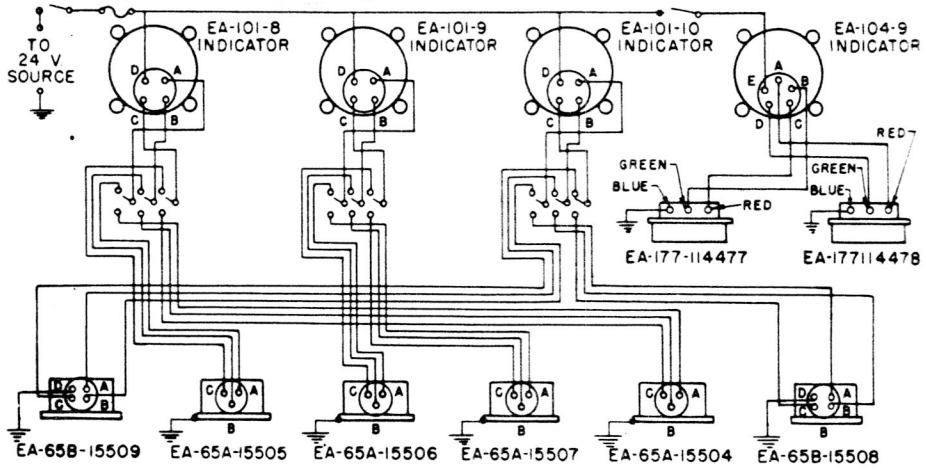


Figure 61—External Wiring Diagram for Vega Model PV-1

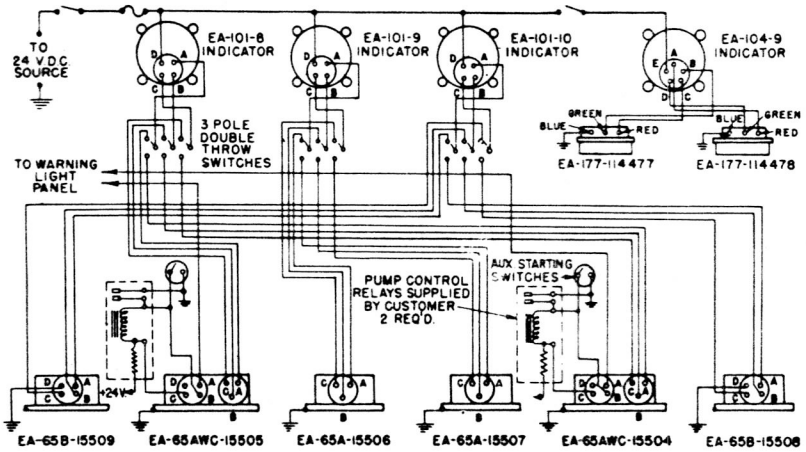


Figure 62—External Wiring Diagram for Vega Model PV-1

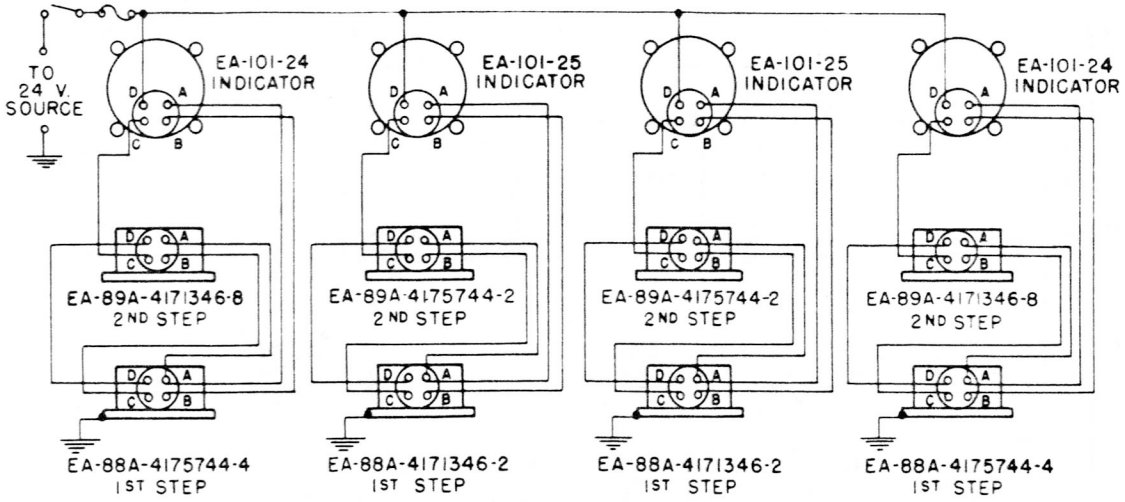


Figure 63—External Wiring Diagram for Douglas Model C54

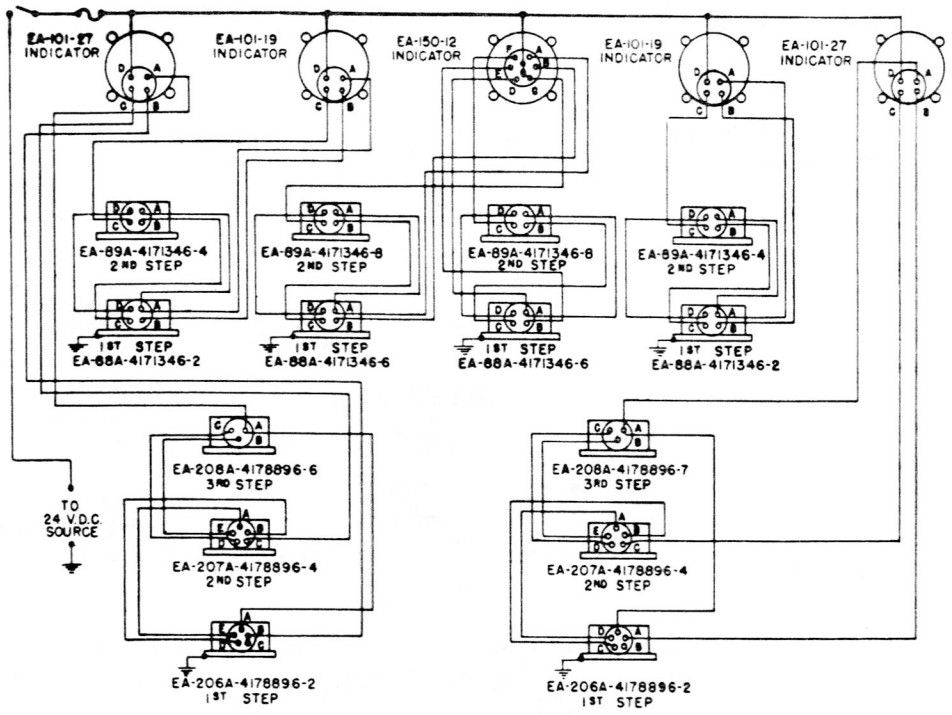


Figure 64—External Wiring Diagram for Douglas Model C54A

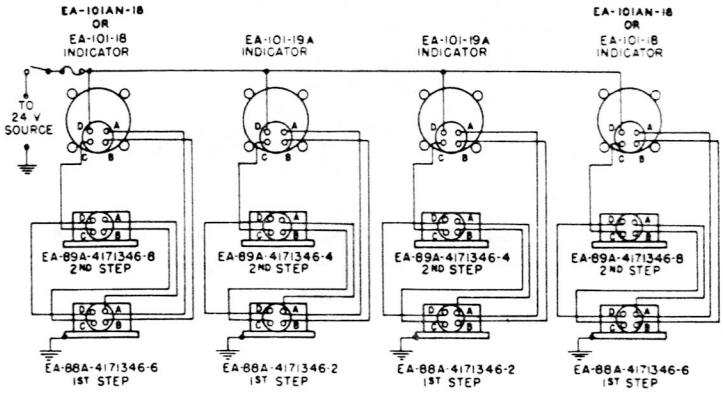


Figure 65—External Wiring Diagram for Douglas Model C54A

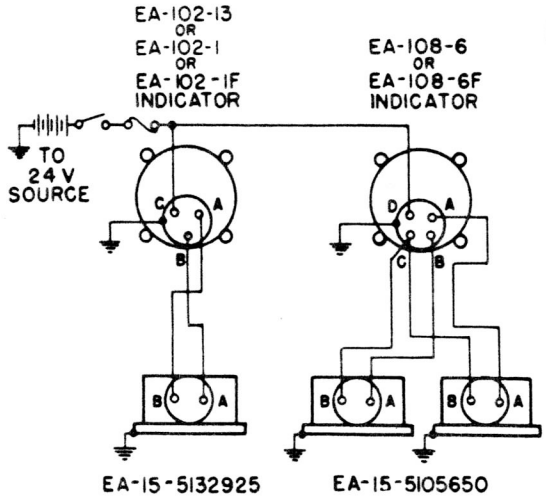


Figure 66—External Wiring Diagram for Douglas Model C54A

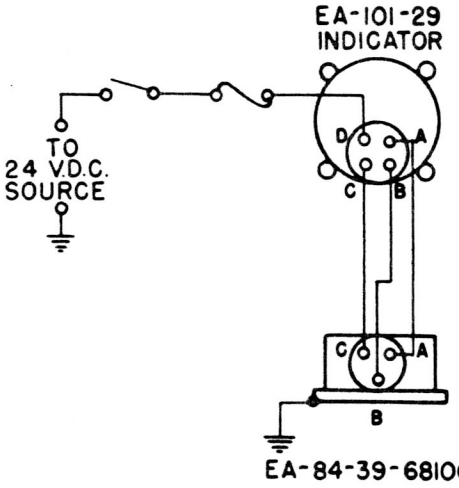


Figure 67—External Wiring Diagram for Fleet Wings Model XA-39

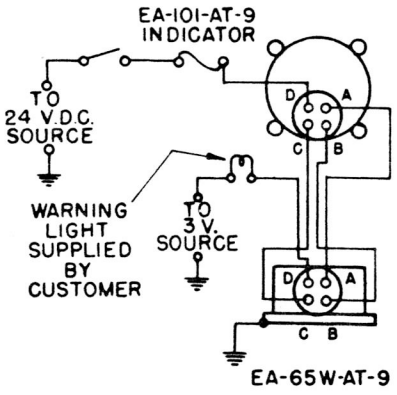


Figure 68—External Wiring Diagram for Curtiss Model AT-9

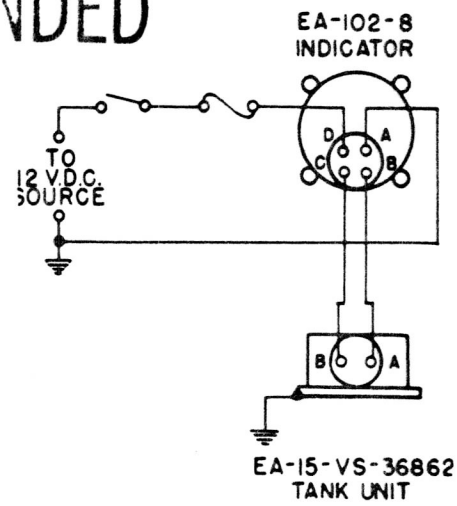


Figure 69—External Wiring Diagram for Vought-Sikorsky Models YR4A, 4B and R-4B

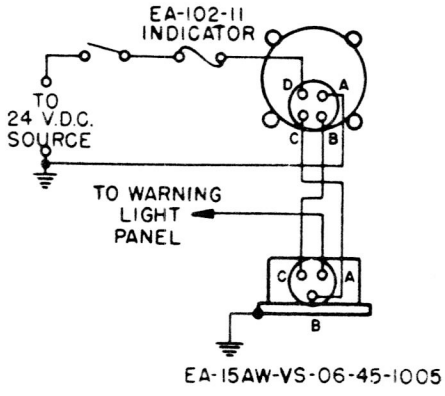


Figure 70—External Wiring Diagram for Vought-Sikorsky Models XR-6 and R-6

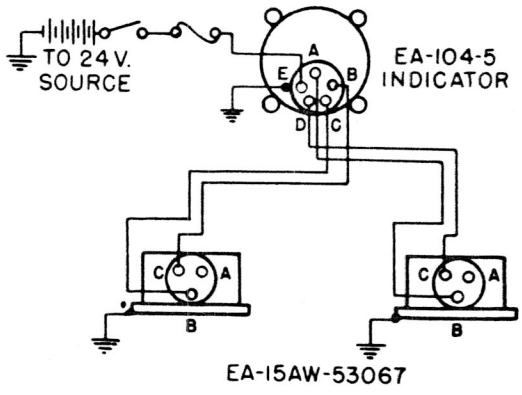


Figure 71—External Wiring Diagram for Cessna Model AT-17

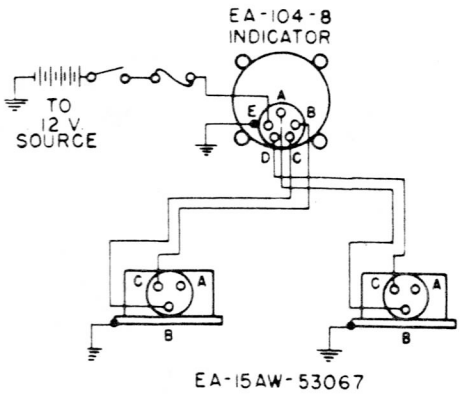


Figure 72—External Wiring Diagram for Cessna Model AT-17

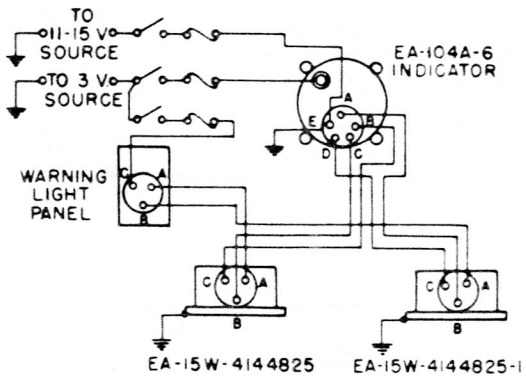


Figure 75—External Wiring Diagram for Douglas Model A-20A

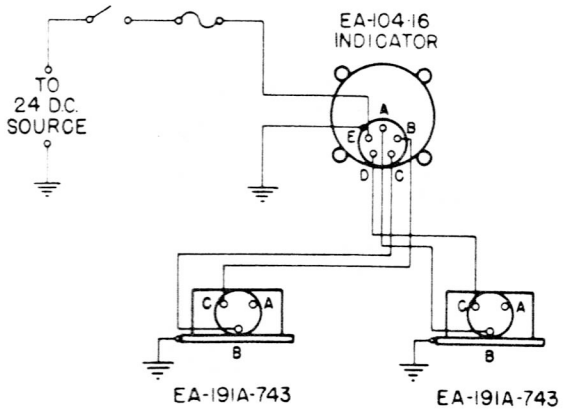


Figure 73—External Wiring Diagram for Consolidated Vultee Model B-24D

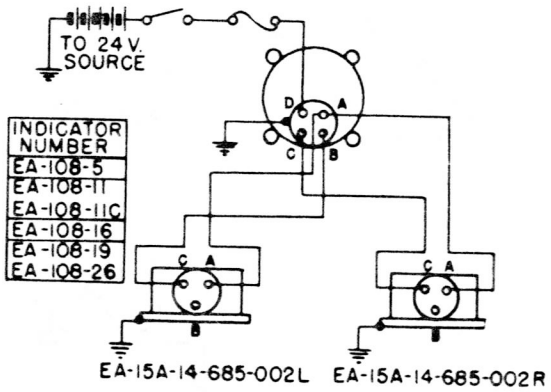


Figure 76—External Wiring Diagram for Bell Models P-39D, D1, K, L and M

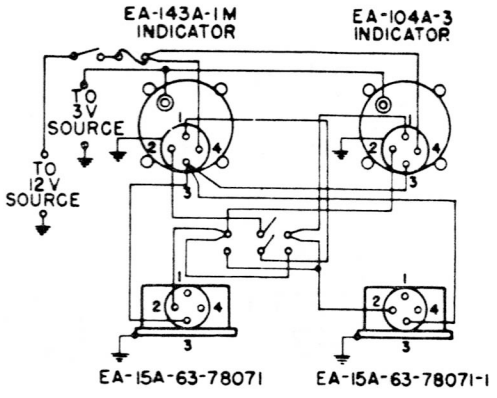


Figure 74—External Wiring Diagram for Vultee Model BT-13

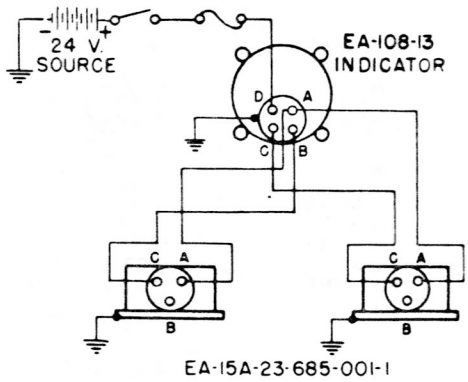


Figure 77—External Wiring Diagram for Bell Model P-39E

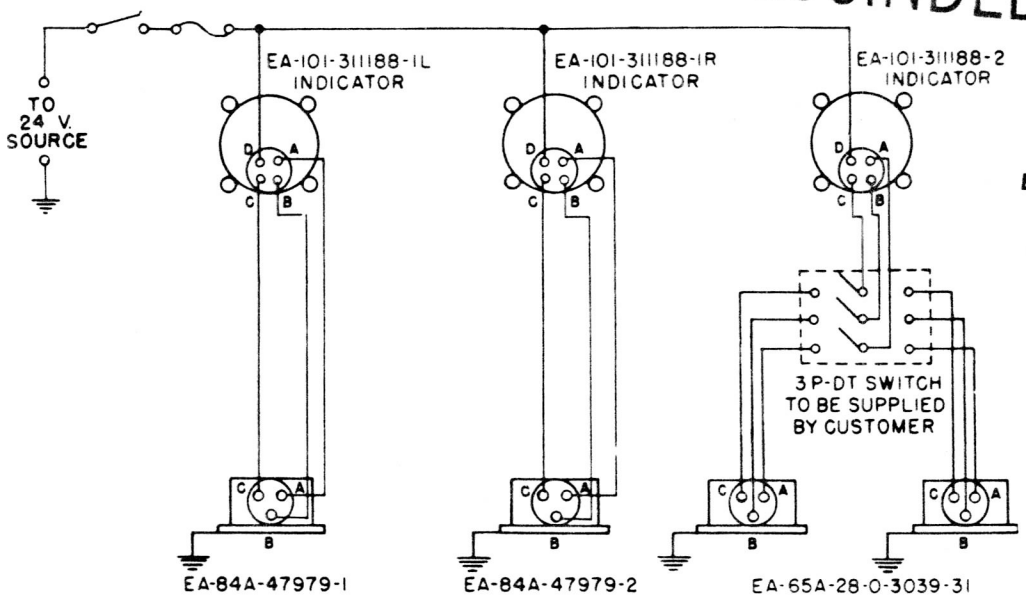


Figure 78— External Wiring Diagram for Naval Aircraft Factory Model PBN-1

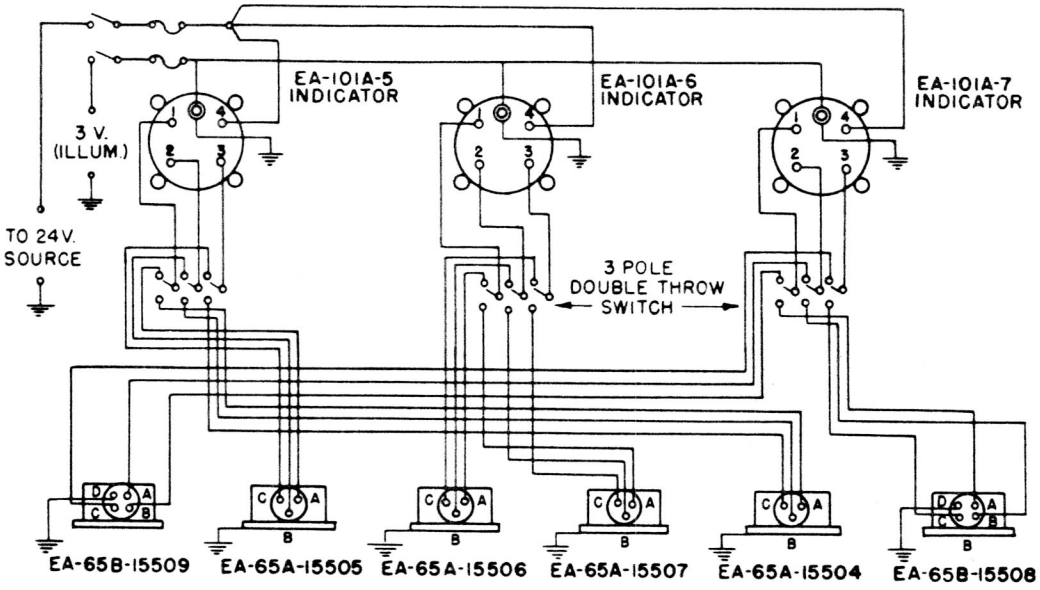


Figure 79— External Wiring Diagram for Vega Model B-34

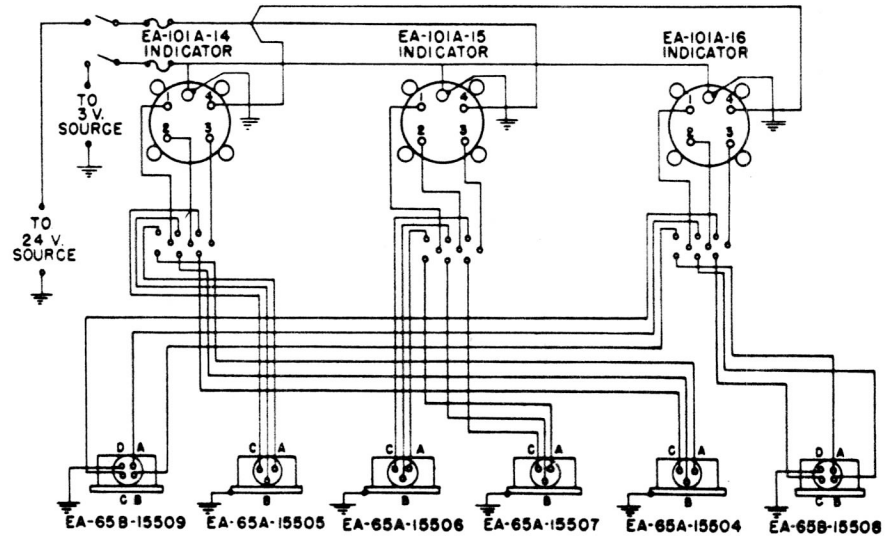


Figure 80— External Wiring Diagram for Vega Model LV-37

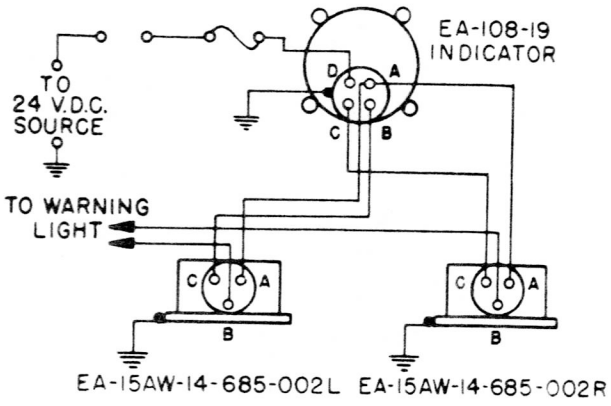


Figure 81—External Wiring Diagram for Bell Models P-39K, L and M

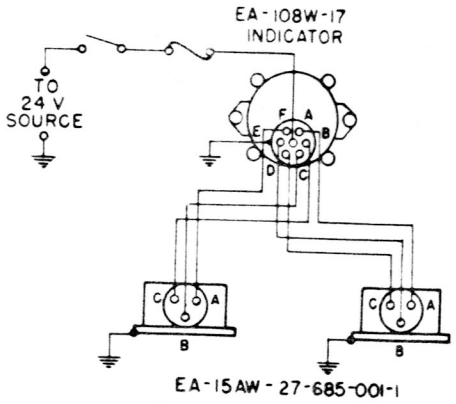


Figure 83—External Wiring Diagram for Bell Model P-59A-1

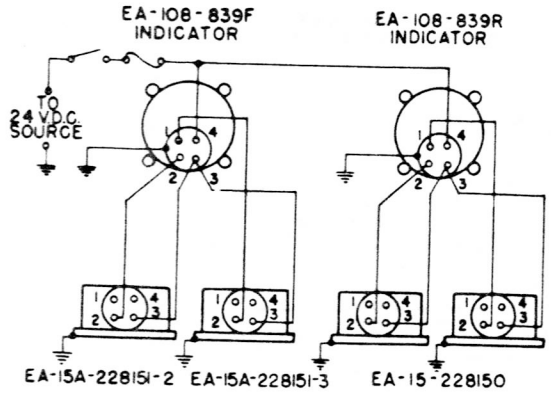


Figure 82—External Wiring Diagram for Lockheed Model P-38

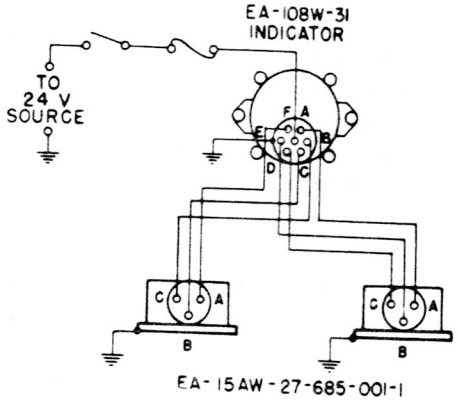


Figure 84—External Wiring Diagram for Bell Model P-59A

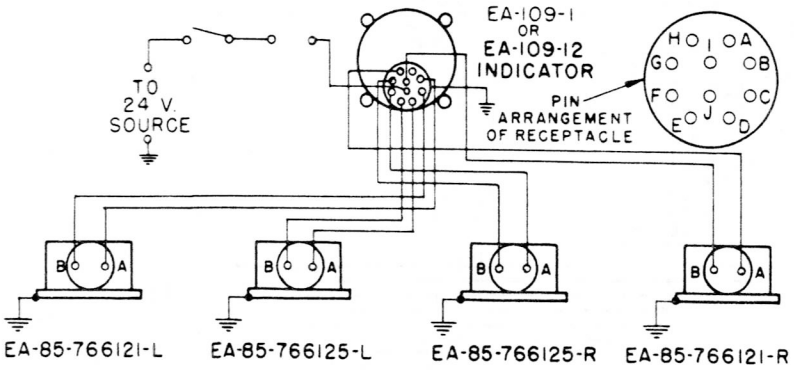


Figure 85—External Wiring Diagram for Fairchild Models XAT-13, 14 and AT-21

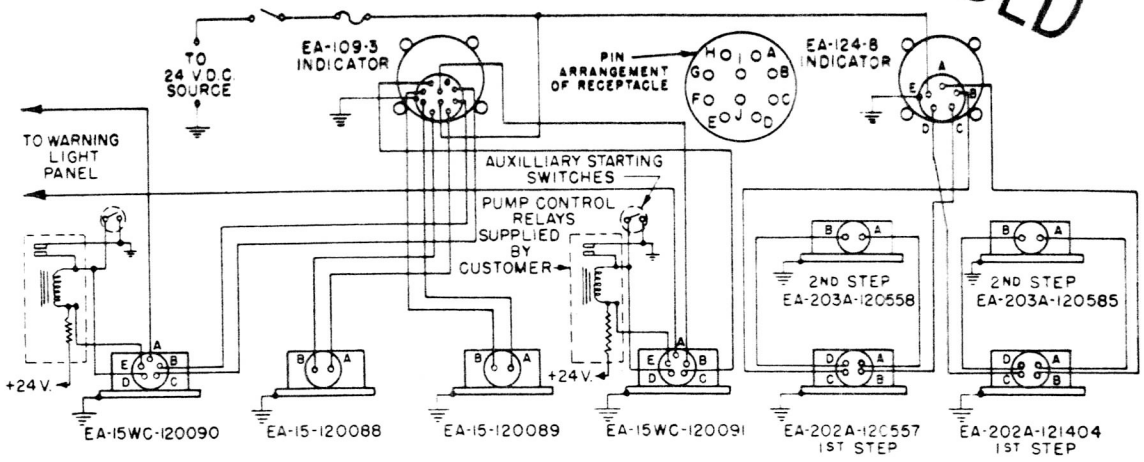


Figure 86—External Wiring Diagram for Vega Model PV-2

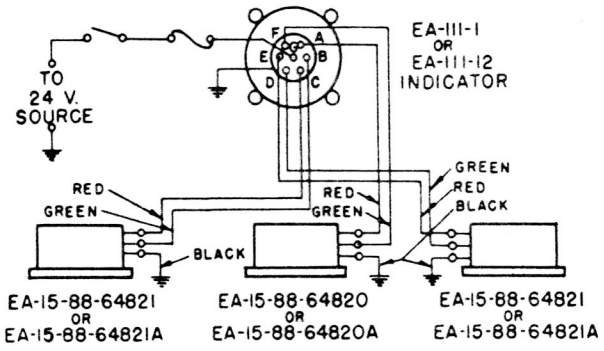


Figure 87—External Wiring Diagram for Vultee Model A-31C and A-35A

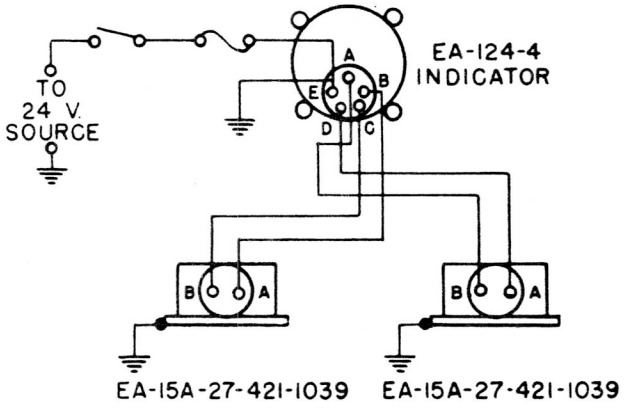


Figure 88—External Wiring Diagram for Curtiss Model C-76

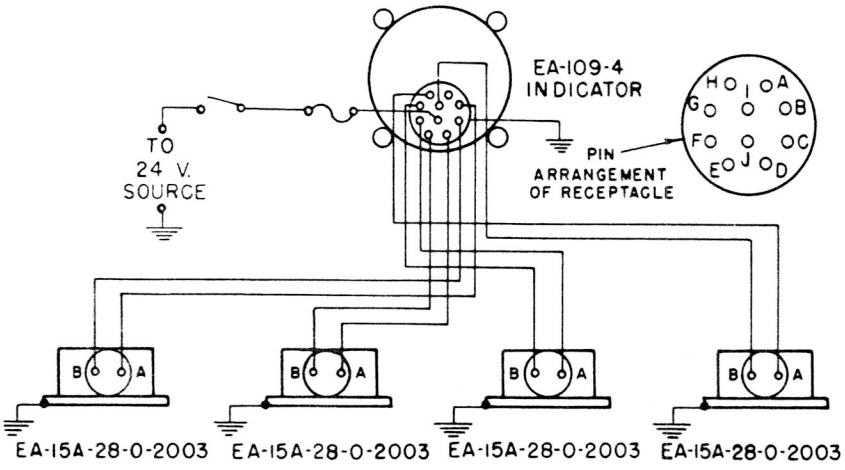


Figure 89—External Wiring Diagram for Consolidated Model PB2Y-2

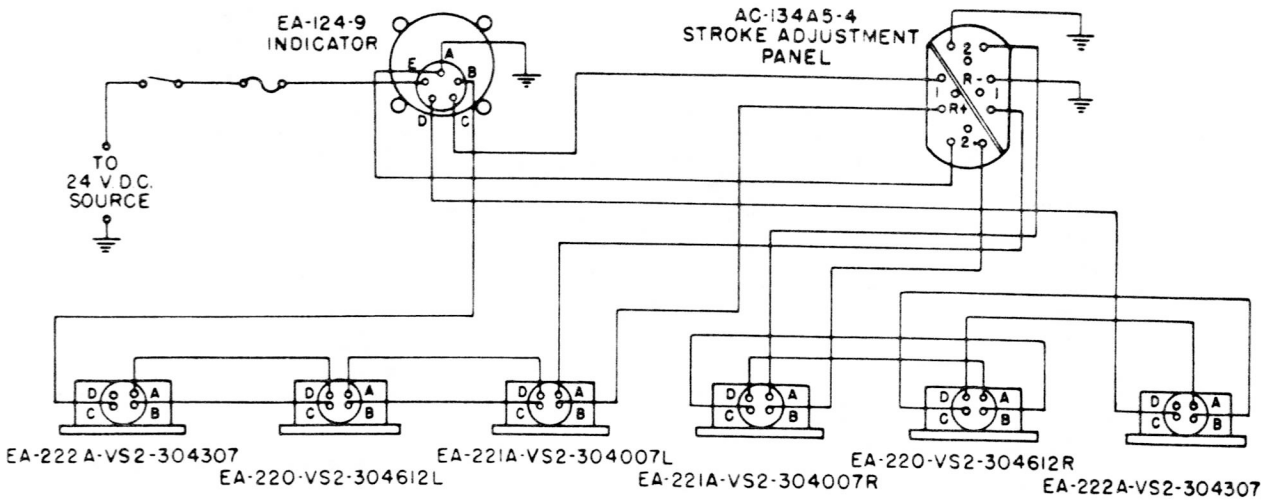


Figure 90—External Wiring Diagram for Vought-Sikorsky Model TBU-1

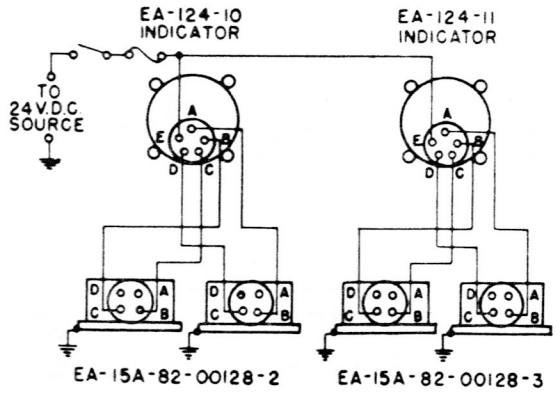


Figure 91—External Wiring Diagram for North American Models B-25C and D

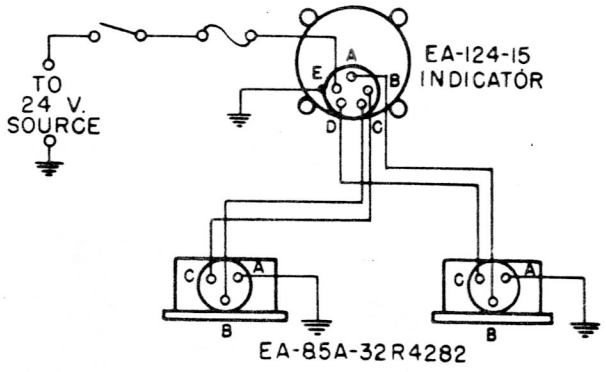


Figure 92—External Wiring Diagram for Consolidated-Vultee Models B-24D, H and K

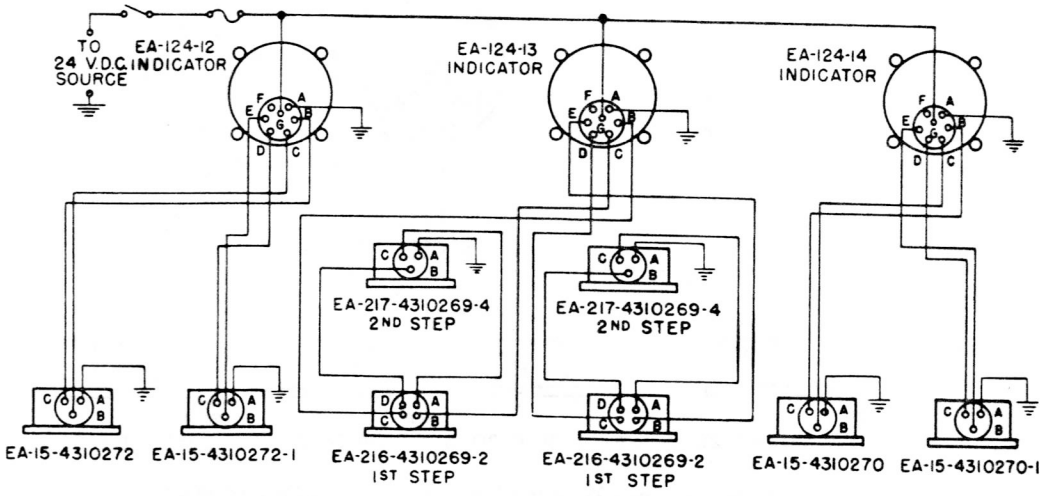


Figure 93—External Wiring Diagram for Douglas Model XA-42

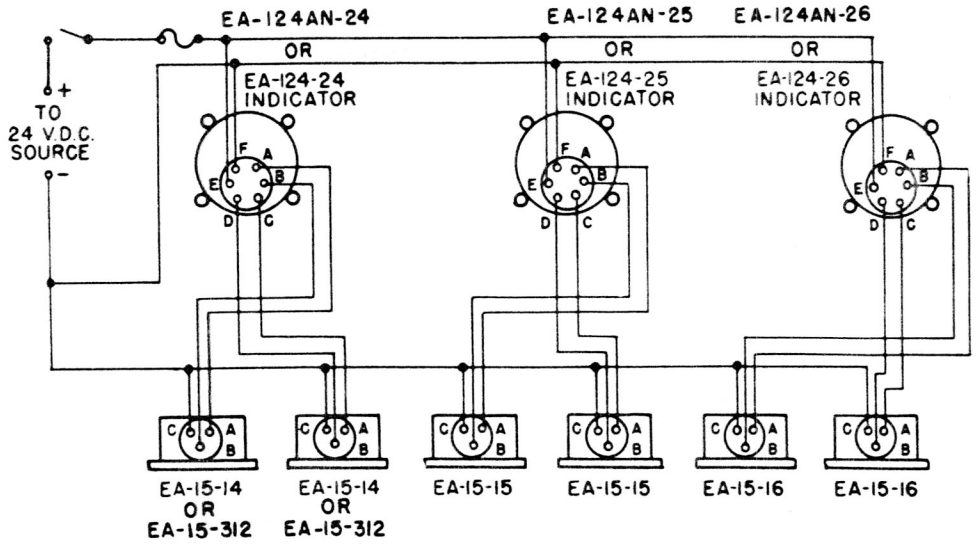


Figure 94—External Wiring Diagram for Curtiss Model C-46

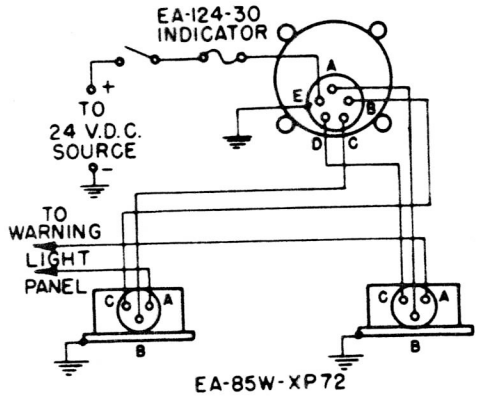


Figure 95—External Wiring Diagram for Republic Model P-72

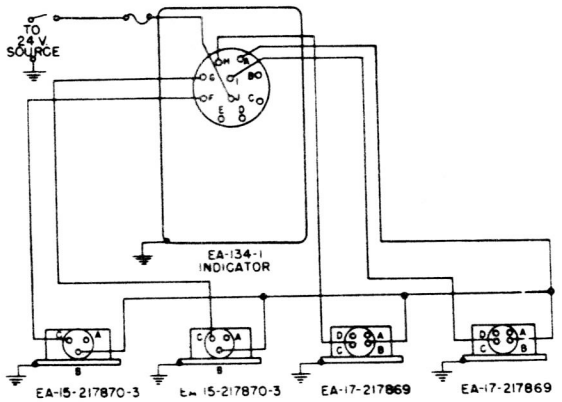


Figure 97—External Wiring Diagram for Northrop Model P61A

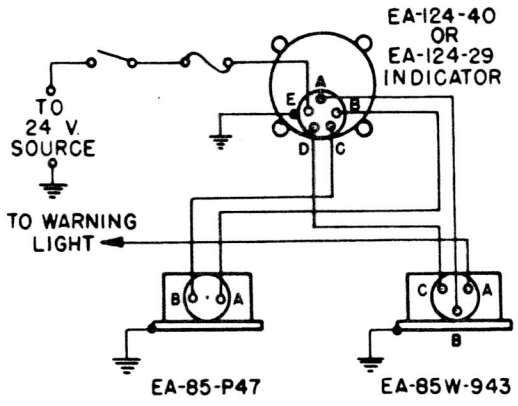


Figure 96—External Wiring Diagram for Republic Model P-47D

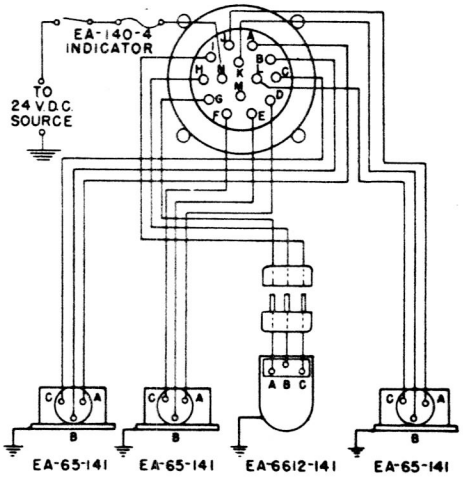


Figure 98—External Wiring Diagram for Grumman Model TBF-1

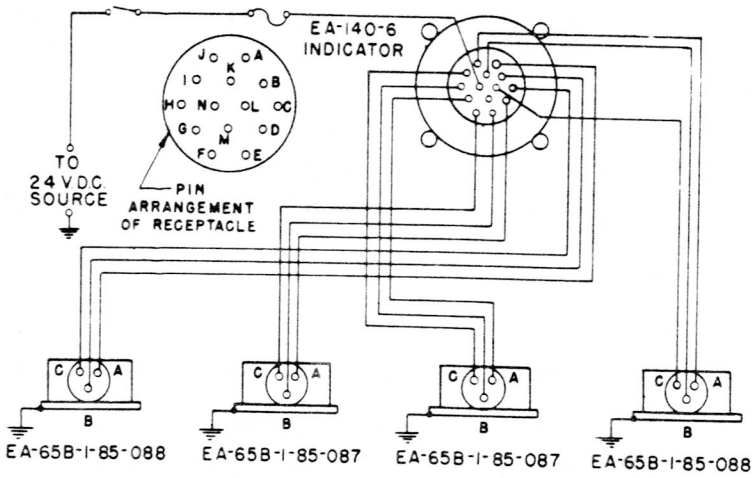


Figure 99—External Wiring Diagram for Budd Model C-93

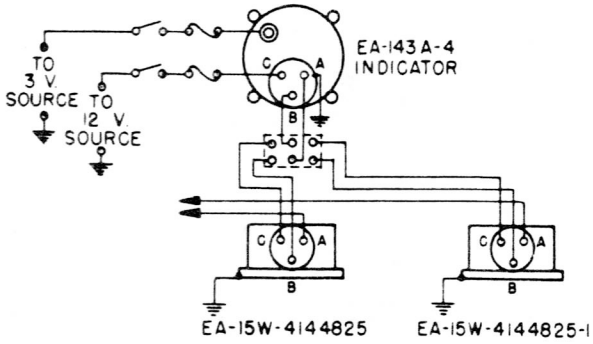


Figure 100—External Wiring Diagram for Douglas Model A-20A

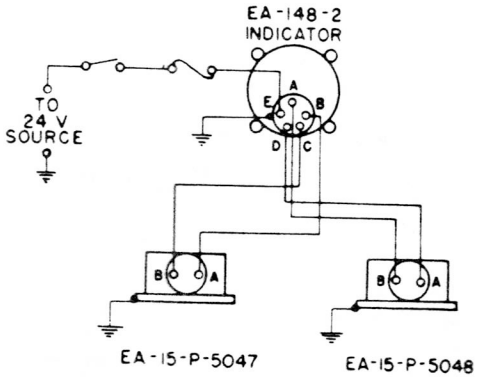


Figure 102—External Wiring Diagram for Noorduyn Model C-64A

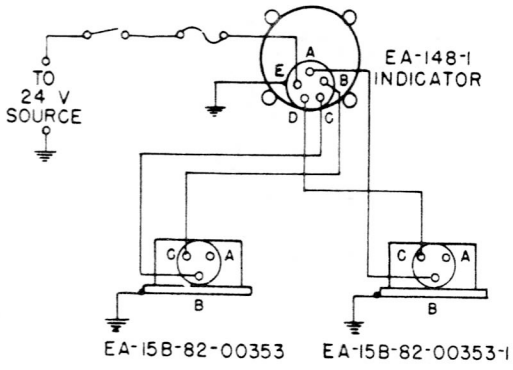


Figure 101—External Wiring Diagram for North American Model B-25C and D

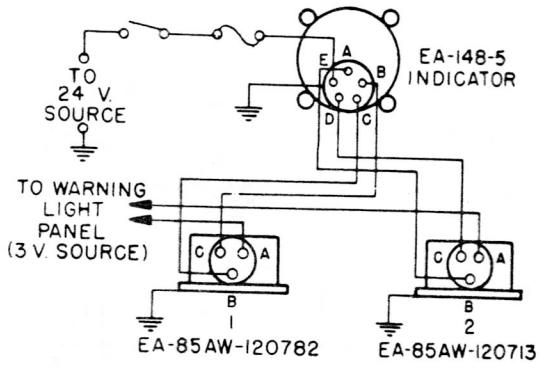


Figure 103—External Wiring Diagram for Vega Model PV-2

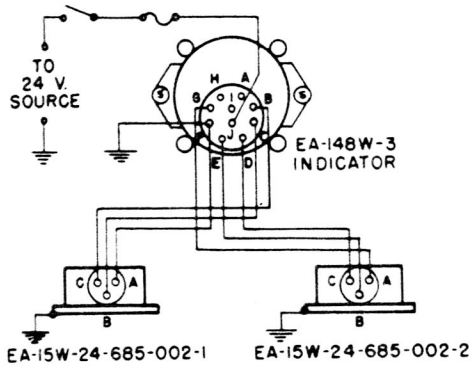


Figure 104—External Wiring Diagram for Bell Model XP-63

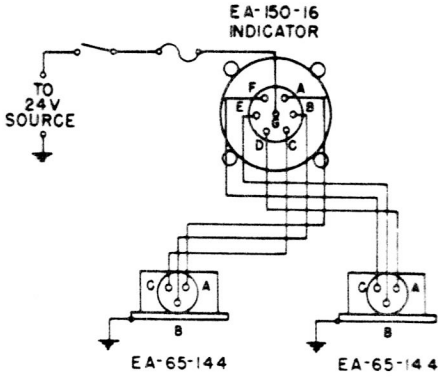


Figure 105—External Wiring Diagram for Consolidated Model C-87C

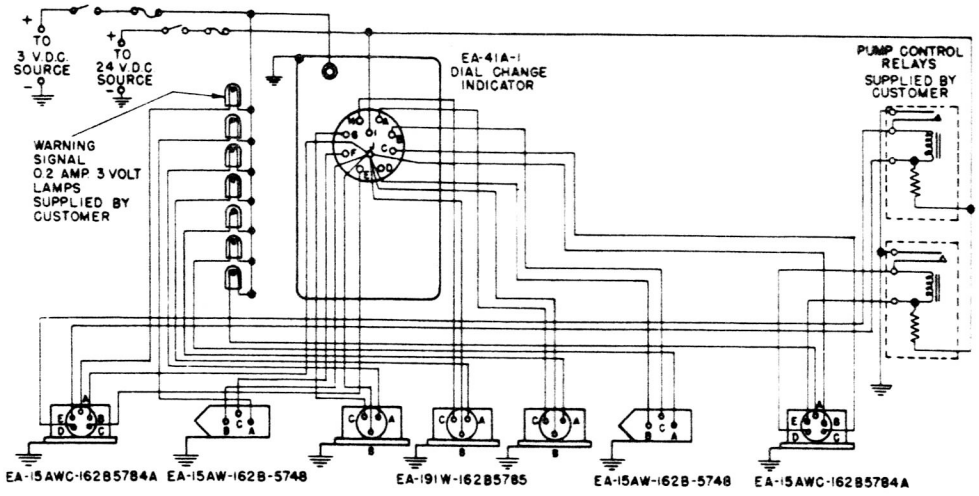


Figure 106—External Wiring Diagram for Martin Model PBM-3

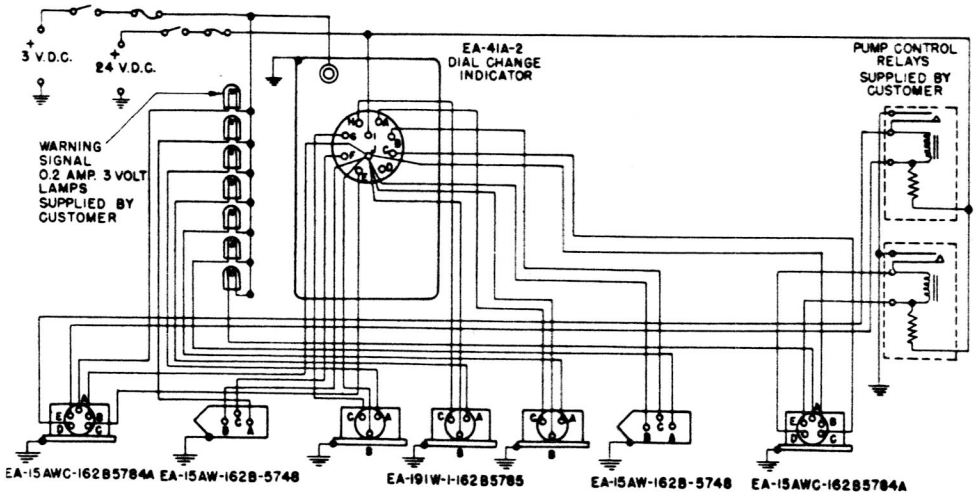


Figure 107—External Wiring Diagram for Martin Model PBM-3

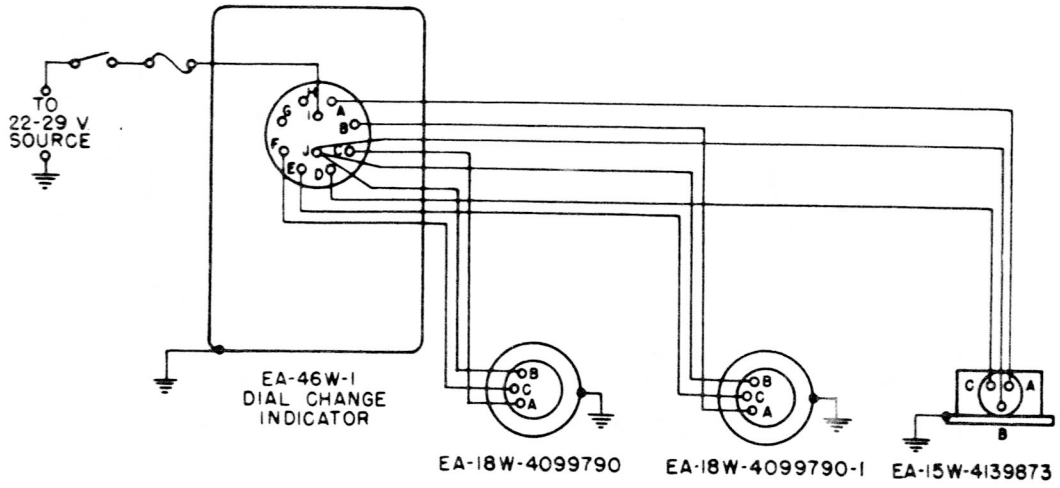


Figure 108—External Wiring Diagram for Douglas Model A-20B

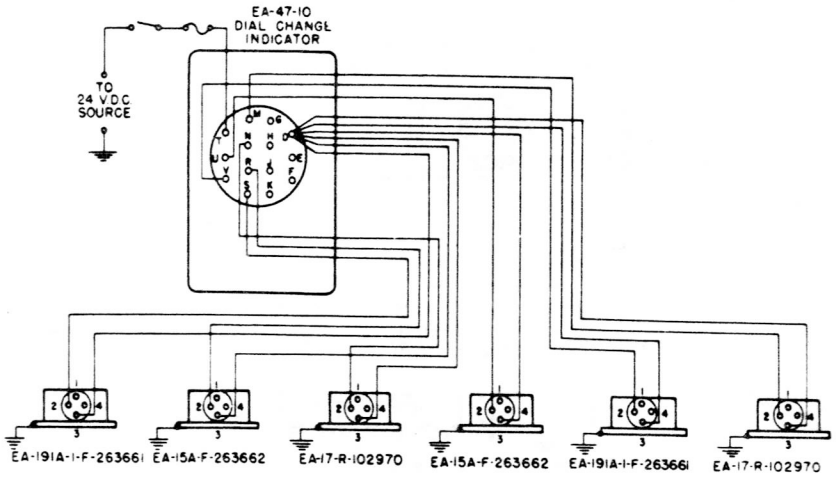
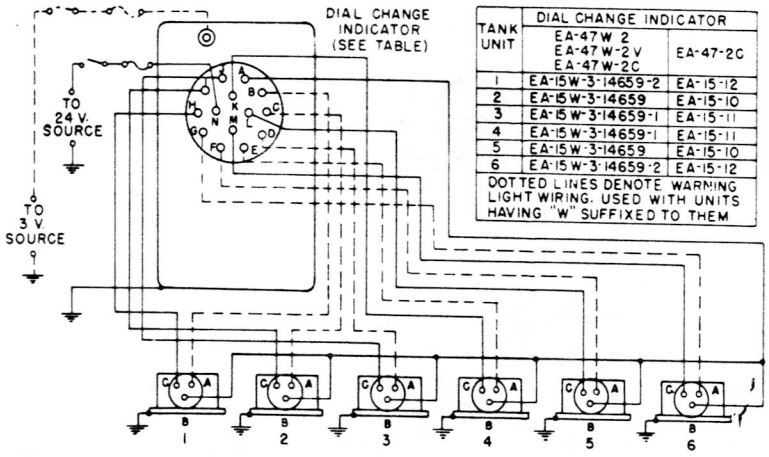


Figure 109—External Wiring Diagram for Douglas Models B-26F and B-26G



TANK UNIT	DIAL CHANGE INDICATOR	
	EA-47W 2 EA-47W-2V EA-47W-2C	EA-47-2C
1	EA-15W-3-14659-2	EA-15-12
2	EA-15W-3-14659	EA-15-10
3	EA-15W-3-14659-1	EA-15-11
4	EA-15W-3-14659-1	EA-15-11
5	EA-15W-3-14659	EA-15-10
6	EA-15W-3-14659-2	EA-15-12

DOTTED LINES DENOTE WARNING LIGHT WIRING. USED WITH UNITS HAVING "W" SUFFIXED TO THEM

Figure 110—External Wiring Diagram for Boeing Model B-17F

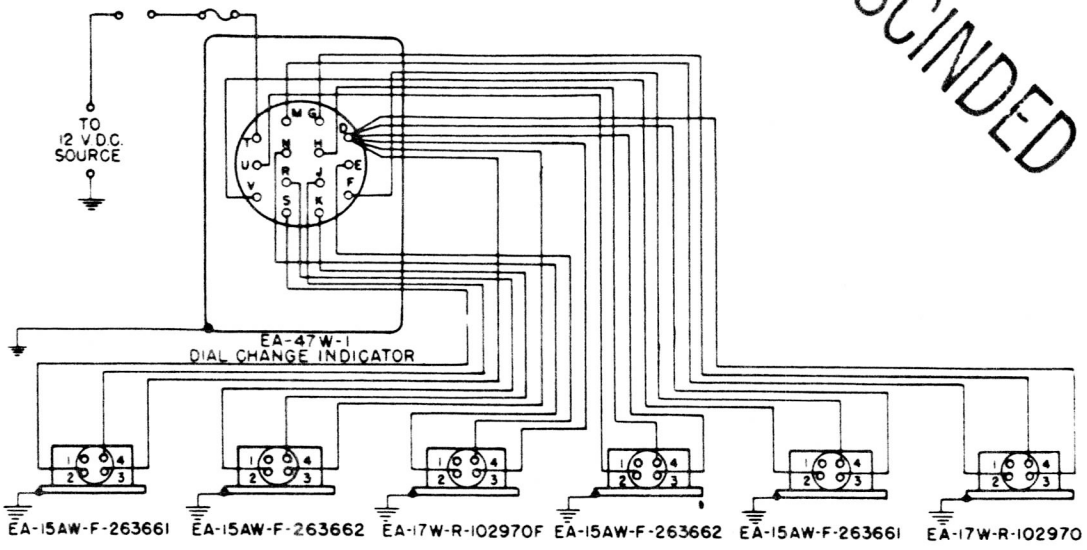


Figure 111—External Wiring Diagram for Martin Model B-26

UNITS 1 & 2	UNITS 3 & 4	UNITS 5 & 6	DIAL CHANGE
EA-15A-F-263661 OR EA-19IA-F-263661	EA-15A-F-263662	EA-17-R-102970	EA-47-1-24
EA-15AW-F-263661	EA-15AW-F-263662	EA-17W-R-102970F	EA-47W-1-24

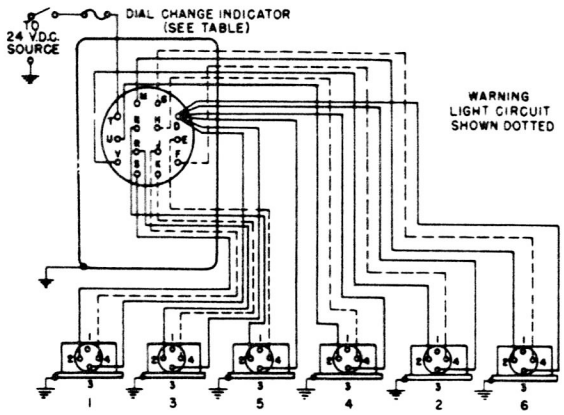


Figure 112—External Wiring Diagram for Martin Models B-26A, B, B1 and C

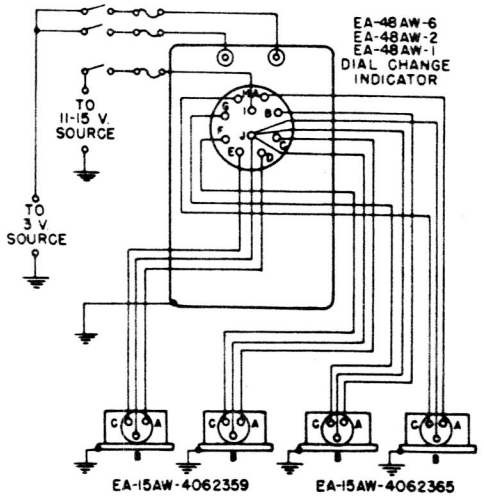


Figure 113—External Wiring Diagram for Douglas Model A-20A

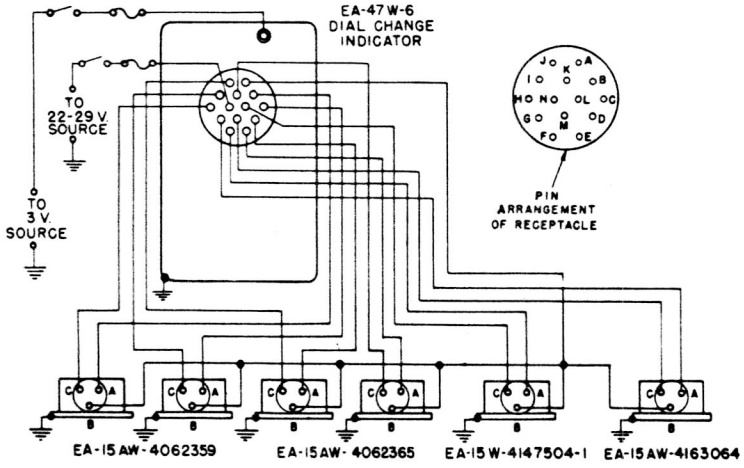


Figure 114—External Wiring Diagram for Douglas Model A-20C

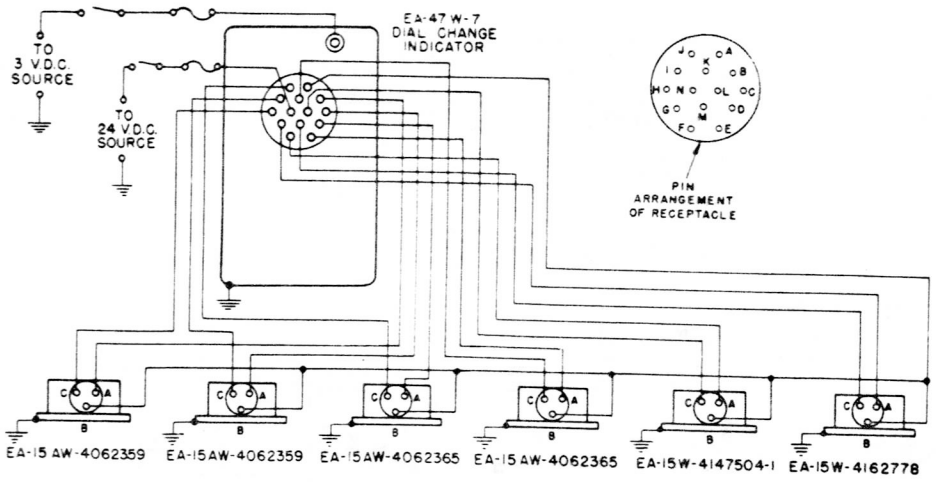


Figure 115—External Wiring Diagram for Douglas Model A-20G

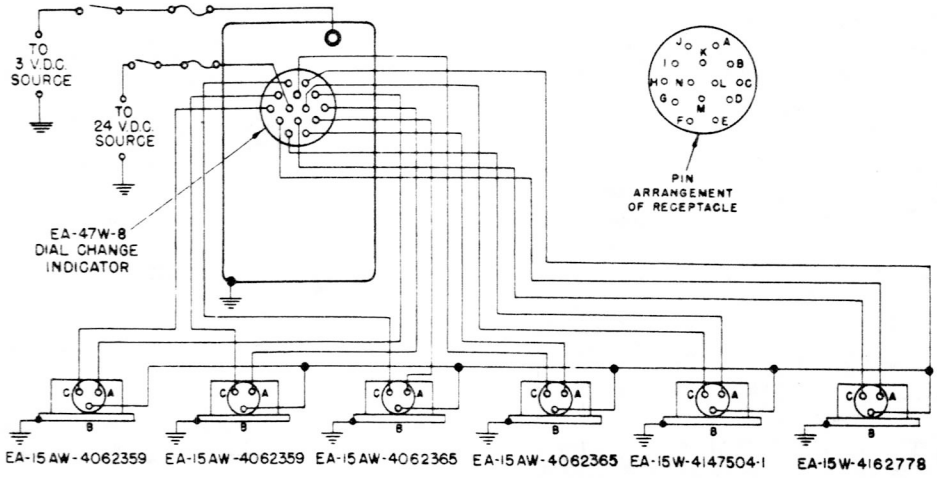


Figure 116—External Wiring Diagram for Douglas Model A-20H

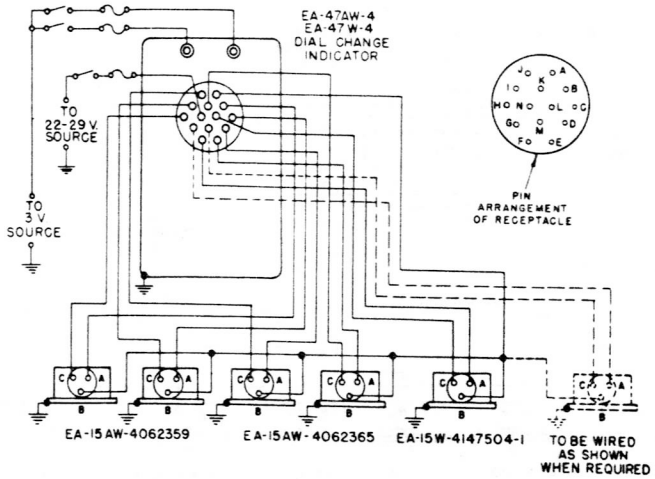


Figure 117—External Wiring Diagram for Douglas Model A-20C

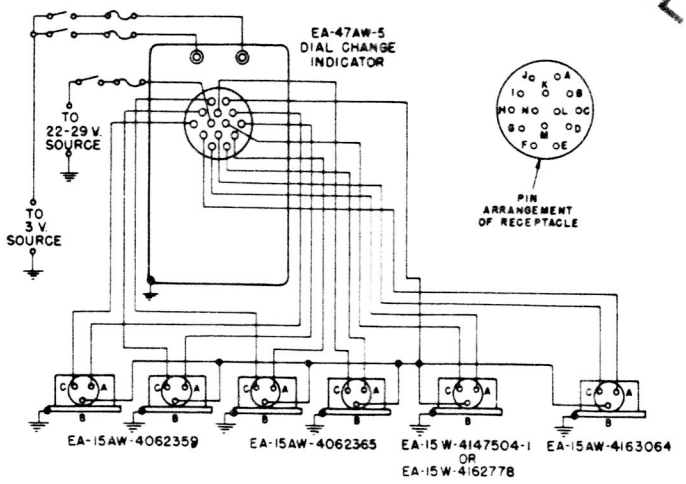


Figure 118—External Wiring Diagram for Douglas Model A-20C

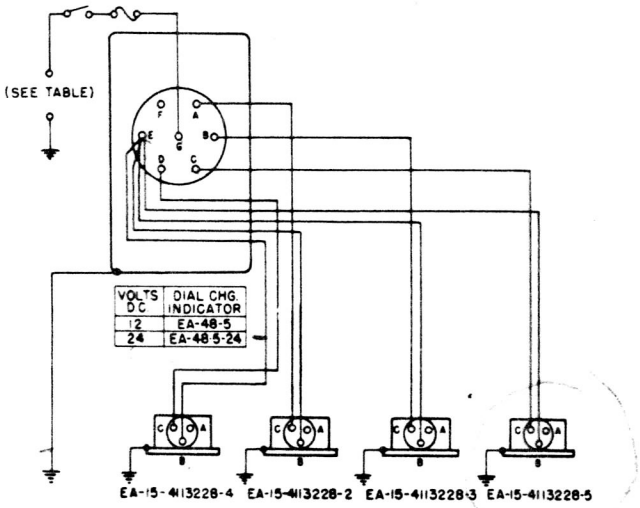


Figure 119—External Wiring Diagram for Douglas Model C-47

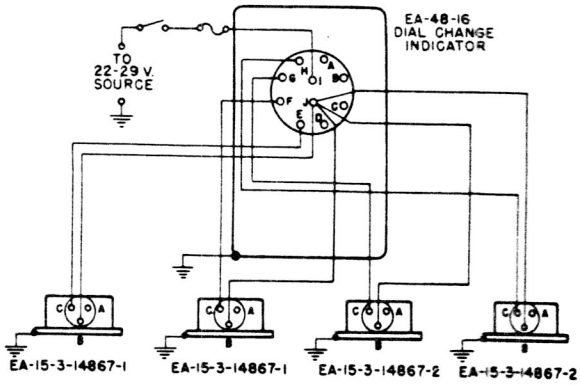


Figure 120—External Wiring Diagram for Boeing Model B-29

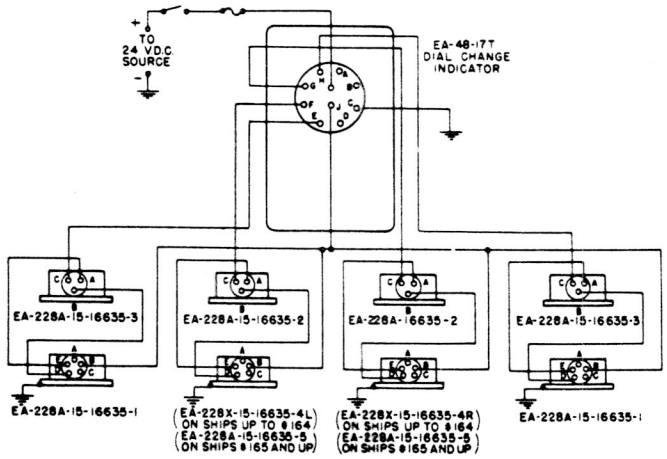
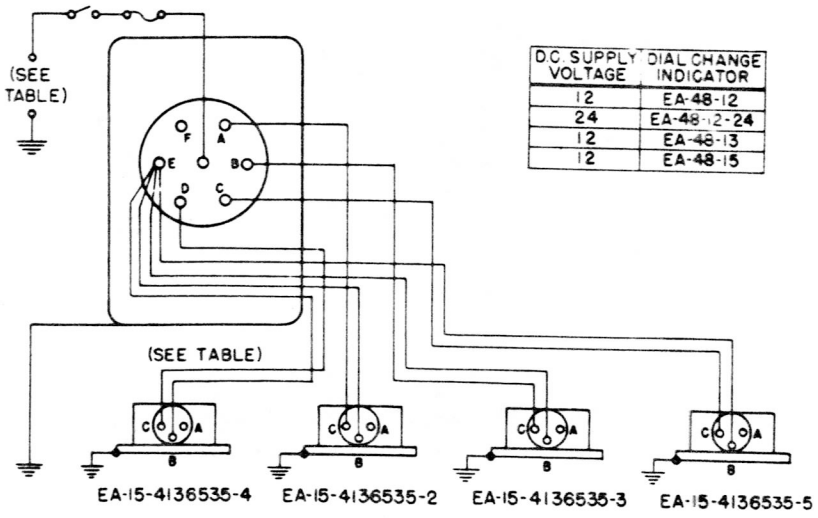


Figure 121—External Wiring Diagram for Boeing Model B-29



D.C. SUPPLY VOLTAGE	DIAL CHANGE INDICATOR
12	EA-48-12
24	EA-48-12-24
12	EA-48-13
12	EA-48-15

Figure 122—External Wiring Diagram for Douglas Model C-53

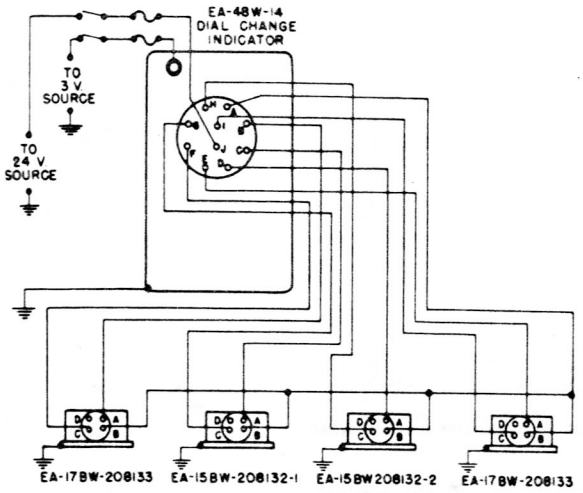


Figure 123—External Wiring Diagram for Northrop Model YP-61

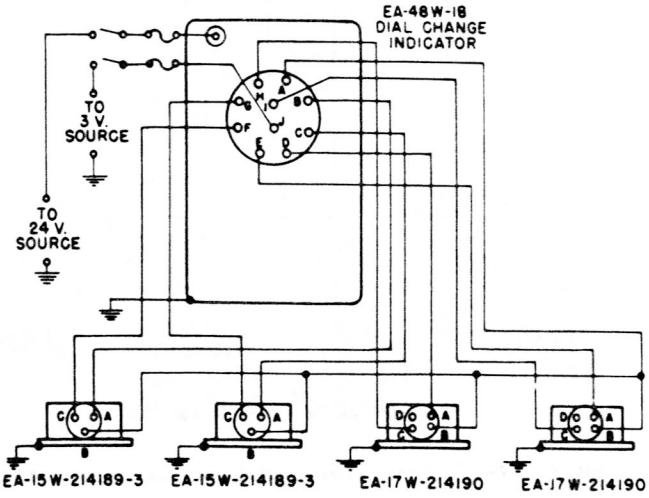


Figure 124—External Wiring Diagram for Northrop Model P-61

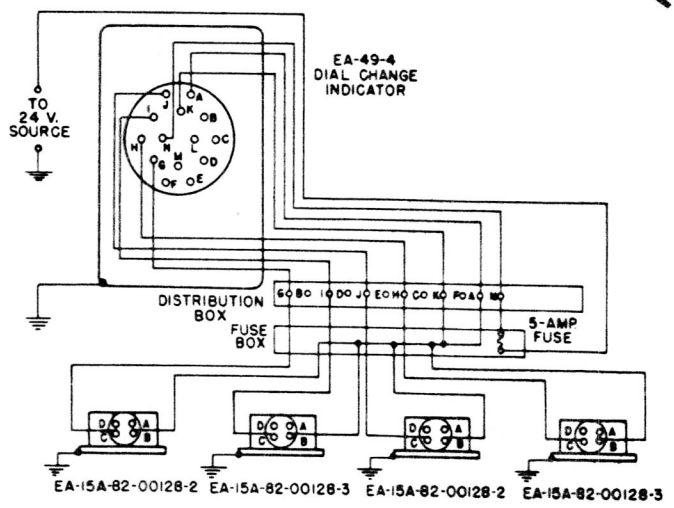


Figure 125—External Wiring Diagram for North American Models B-25C

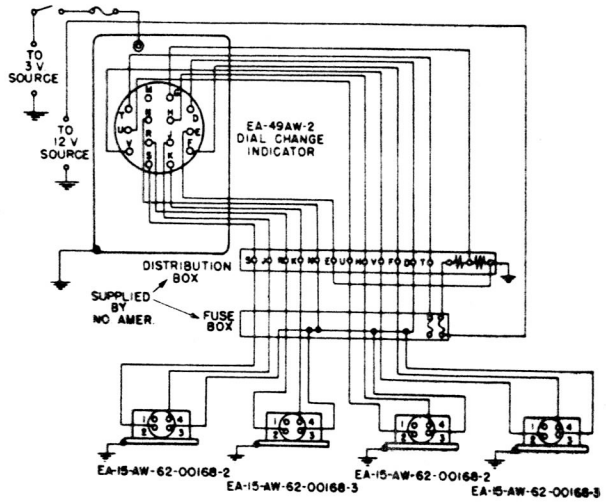


Figure 126—Extenal Wiring Diagram for North American Model B-25

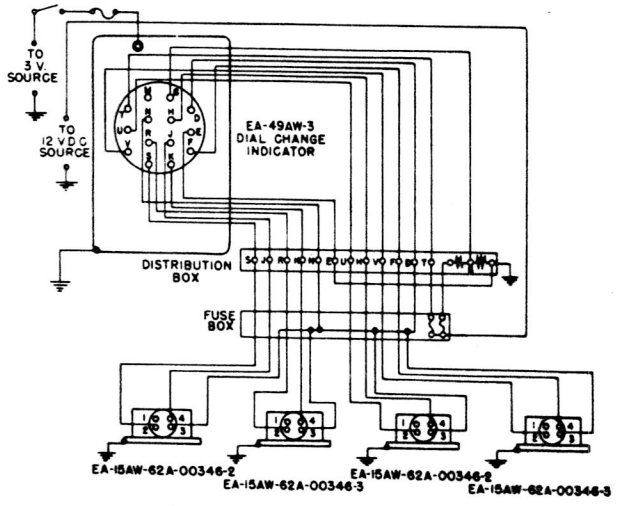


Figure 127—External Wiring Diagram for North American Models B-25A and B

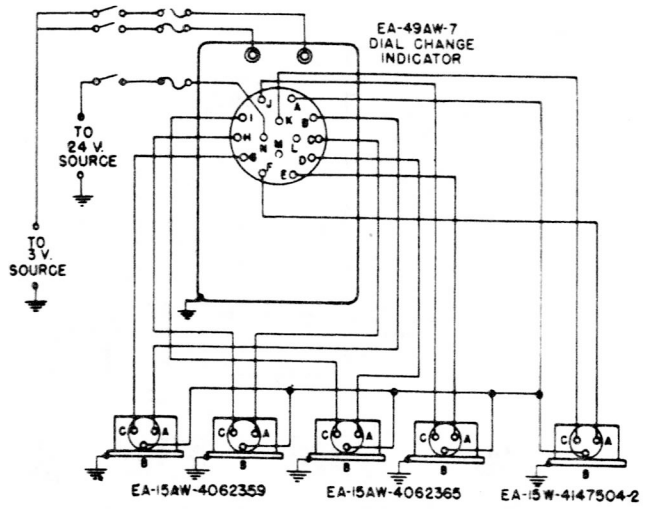


Figure 128—External Wiring Diagram for Douglas Model P-70

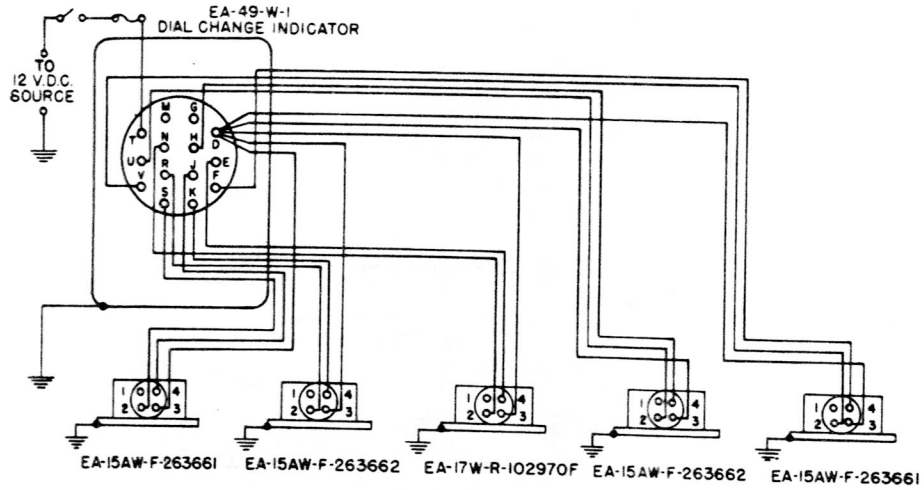


Figure 129—External Wiring Diagram for Martin Model B-26

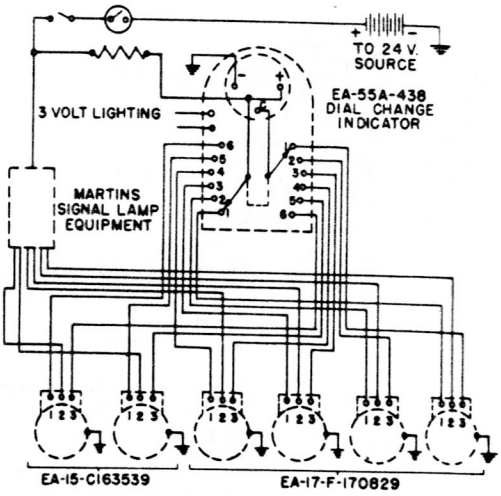


Figure 130—External Wiring Diagram for Martin Model PBM-1

Note

The Internal Wiring Diagram for the Indicator appears upon this drawing.

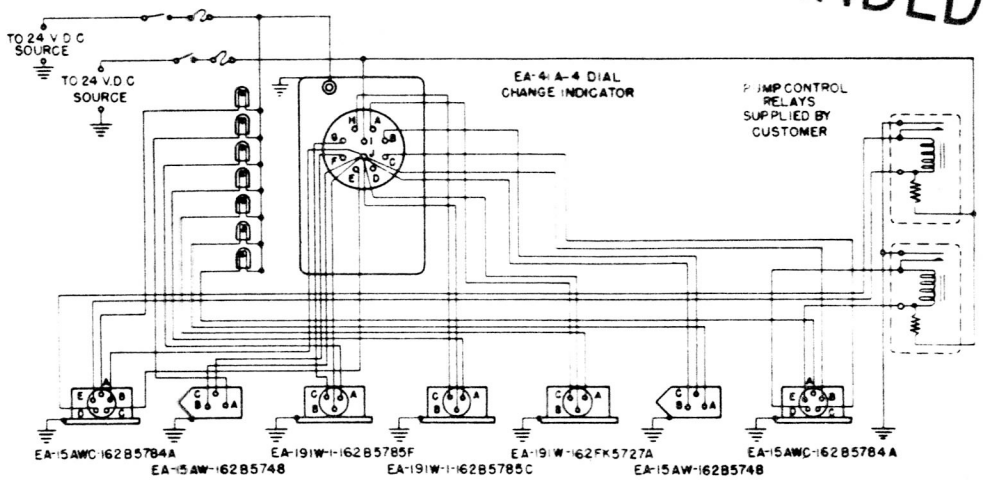


Figure 130-A—External Wiring Diagram for Martin Model PBM-5

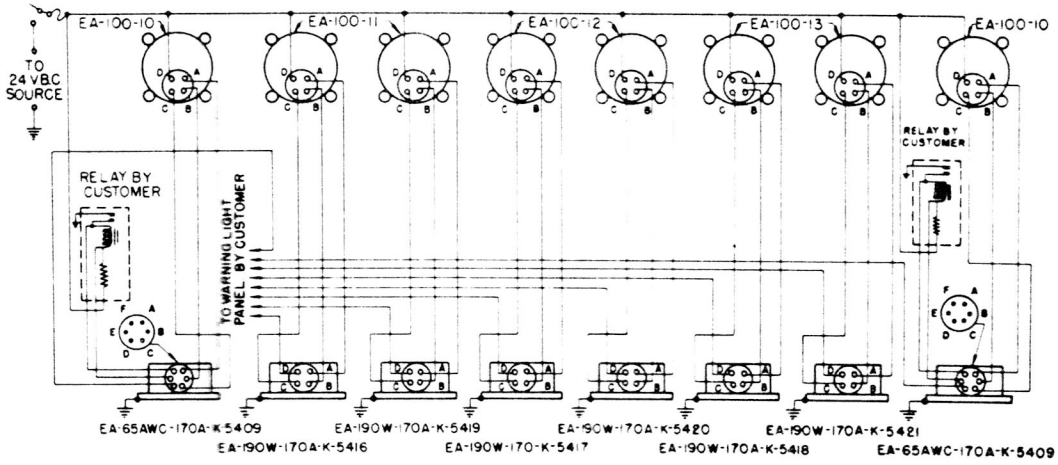


Figure 130-B—External Wiring Diagram for Martin Model JRM-1

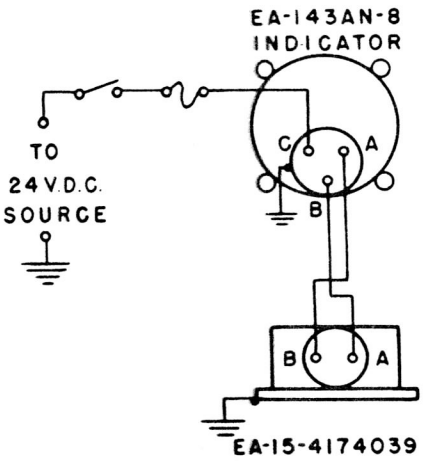


Figure 130-C—External Wiring Diagram for Douglas Model C-74

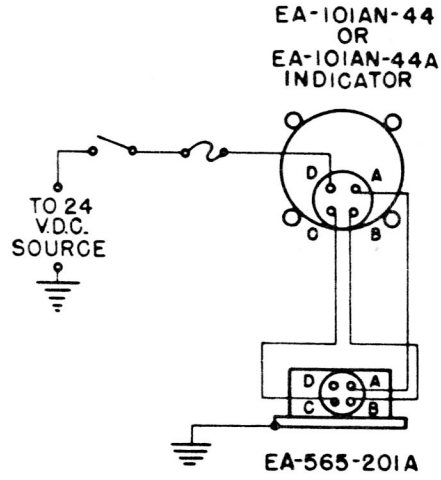


Figure 130-D—External Wiring Diagram for Douglas Model XBT2D

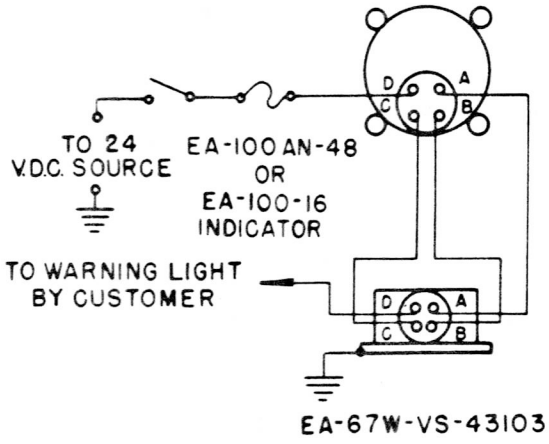


Figure 130-E—External Wiring Diagram for Chance Vought Models FU-4 and FG-2

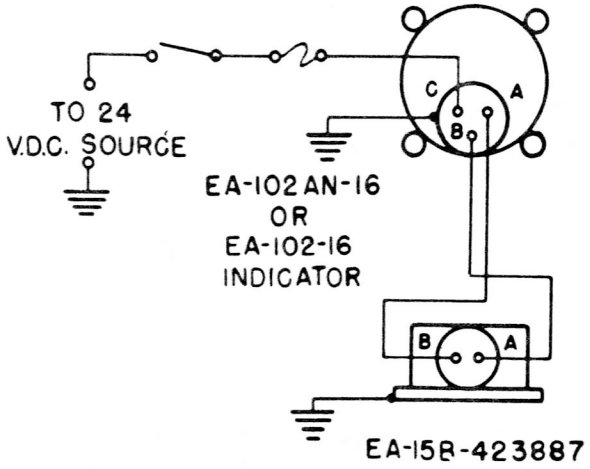


Figure 130-F—External Wiring Diagram for Douglas Models C-54B, D and E

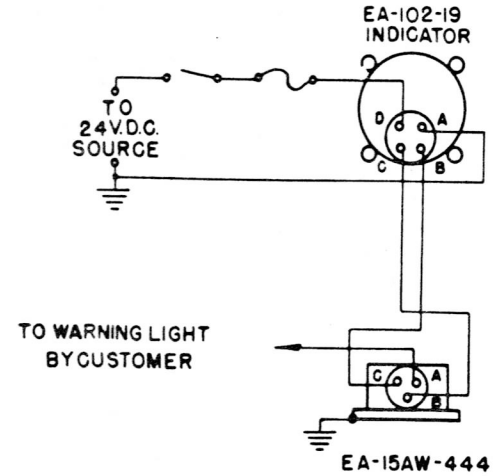


Figure 130-G—External Wiring Diagram for Nash-Kelvinator Model R6A

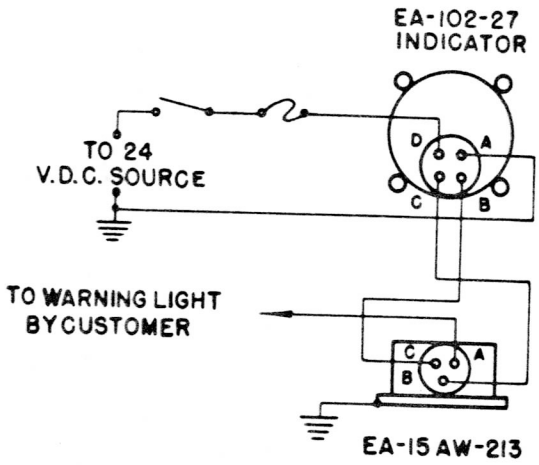


Figure 130-H—External Wiring Diagram for Nash-Kelvinator Model R6A

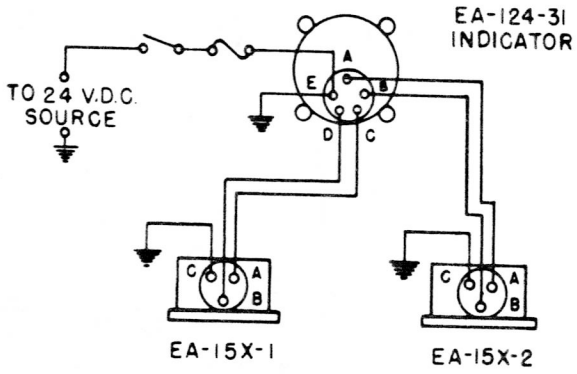


Figure 130-I—External Wiring Diagram for Consolidated Model B-24

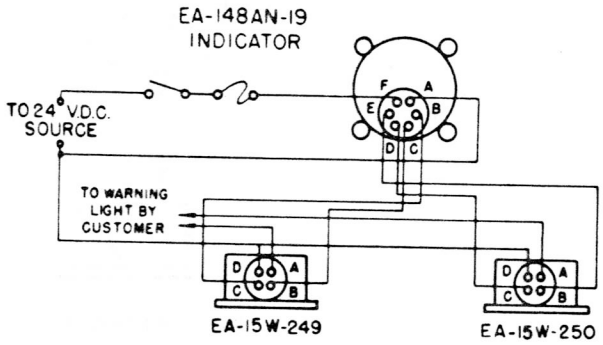


Figure 130-J—External Wiring Diagram for Sikorsky Model YR6A

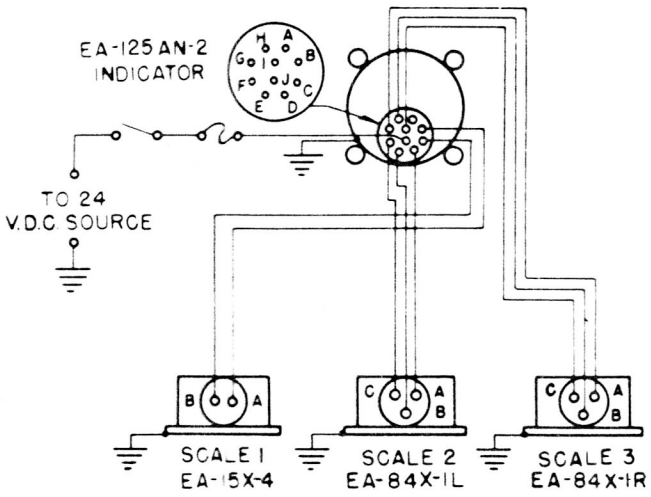


Figure 130-K—External Wiring Diagram for Republic Model P47N

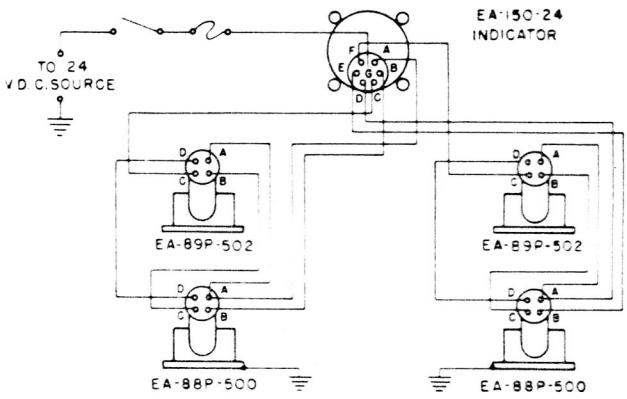


Figure 130-N—External Wiring Diagram for Douglas Model C-54D

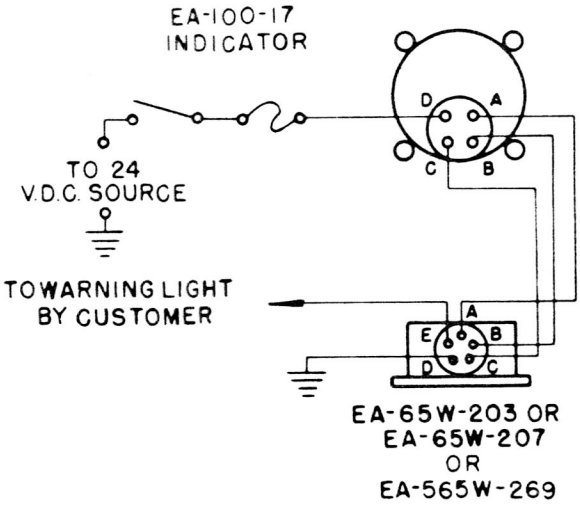


Figure 130-L—External Wiring Diagram for Lockheed Model XP-80

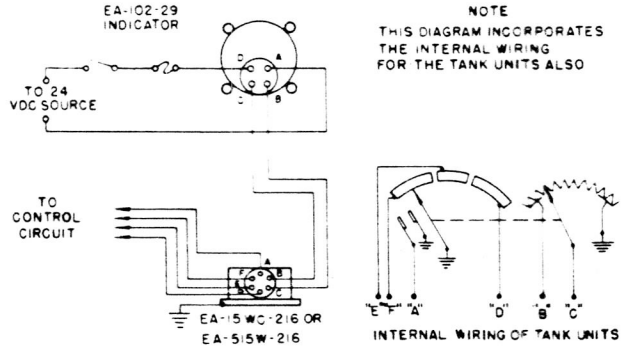


Figure 130-O—External Wiring Diagram for Grumman Model F-6

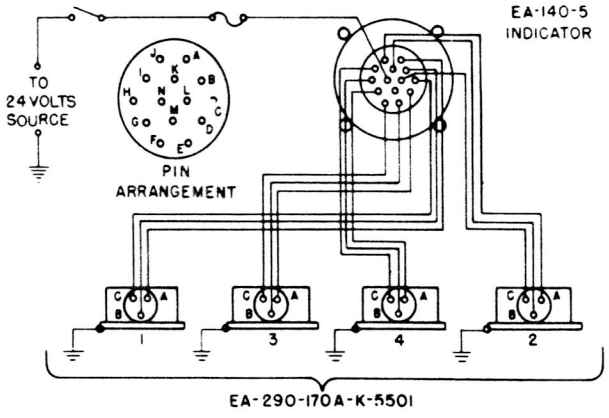


Figure 130-M—External Wiring Diagram for Martin Model JRM-1

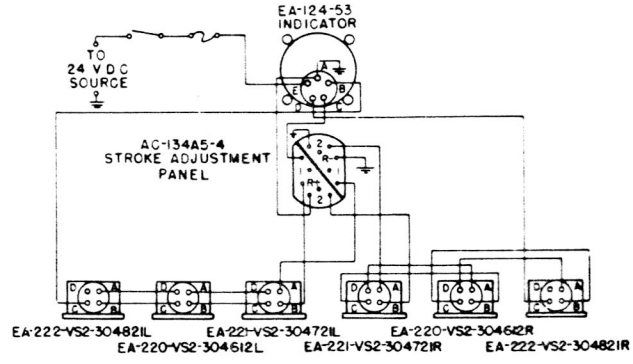


Figure 130-P—External Wiring Diagram for Consolidated Vultee Model TBY-2

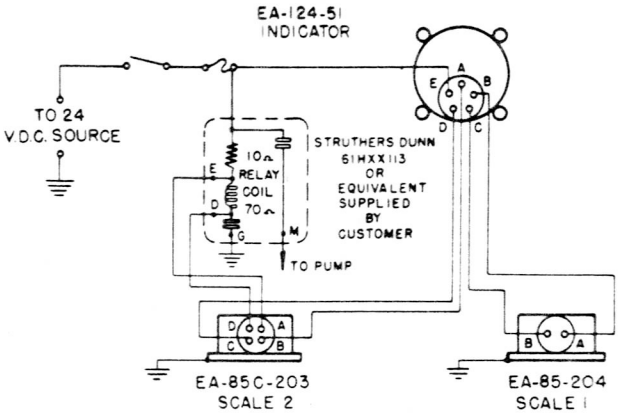


Figure 130-Q—External Wiring Diagram for Ryan Model FR-1

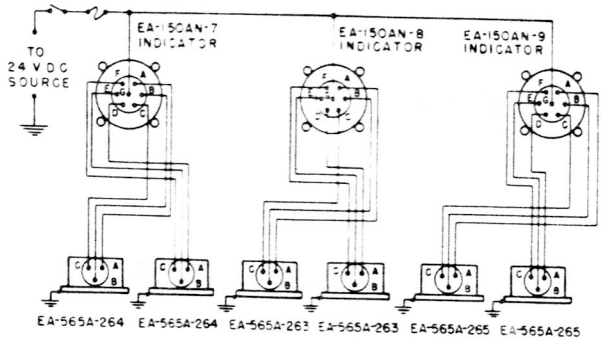


Figure 130-T—External Wiring Diagram for Douglas Model C-74

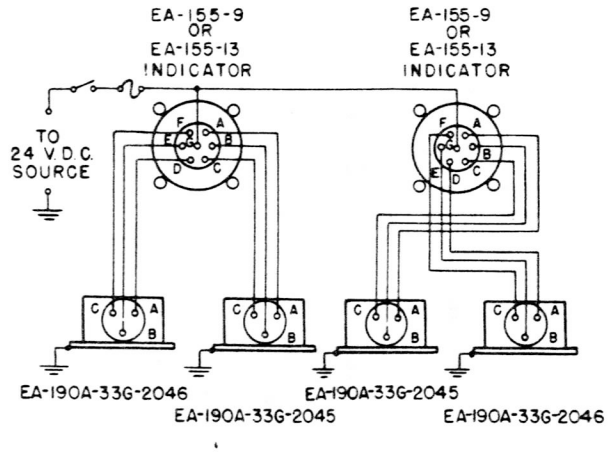


Figure 130-R—External Wiring Diagram for Consolidated Vultee Model B-32

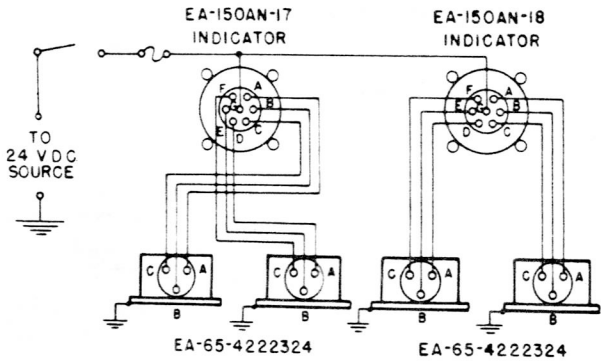


Figure 130-U—External Wiring Diagram for Douglas Model C-74

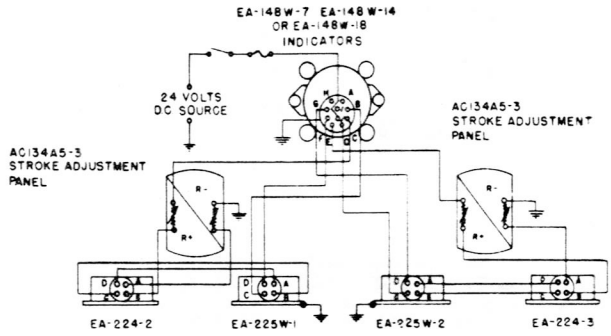


Figure 130-S—External Wiring Diagram for Bell Model P-63

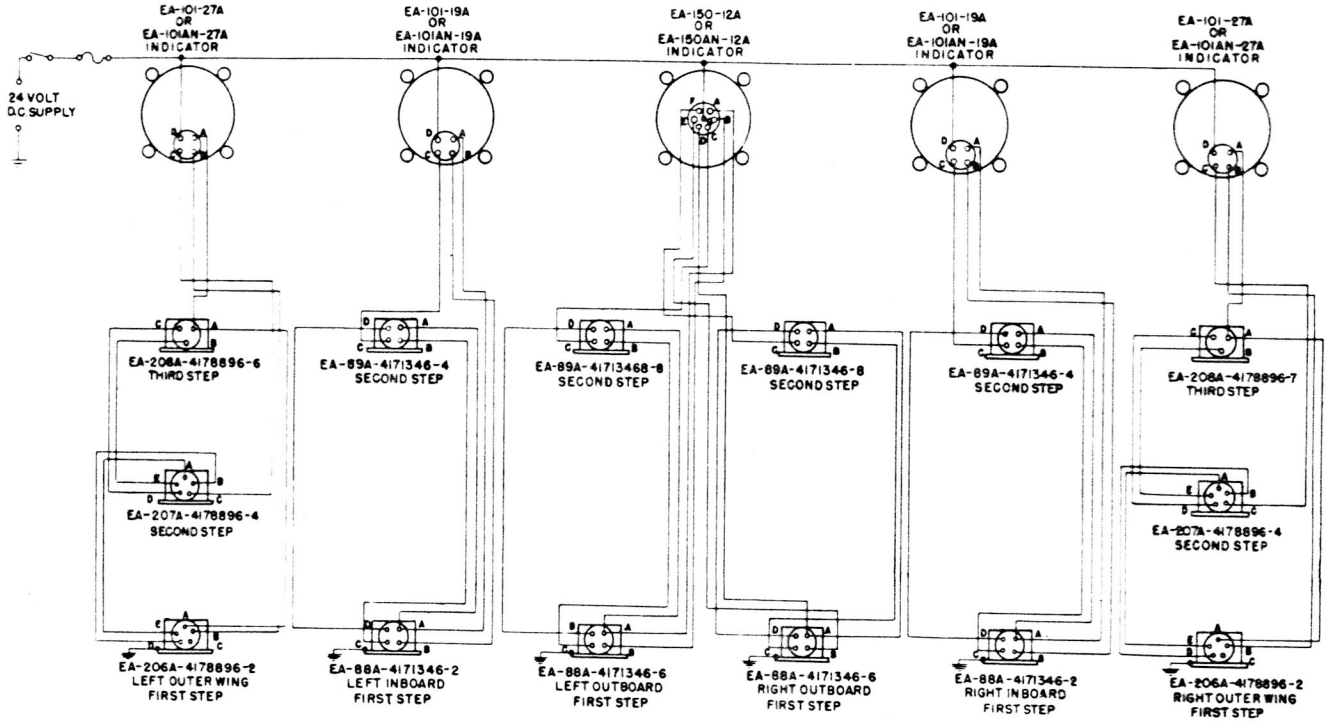


Figure 130-V—External Wiring Diagram for Douglas Model C-54 Series

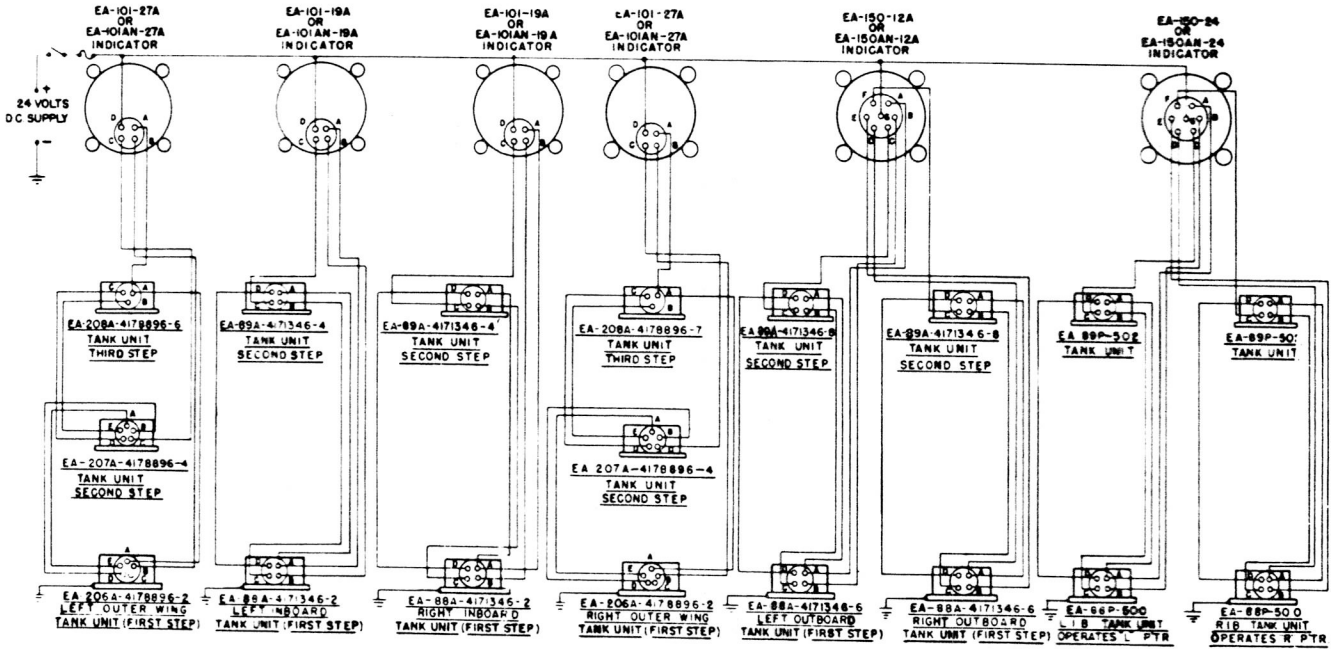


Figure 130-W—External Wiring Diagram for Douglas Model C-54D and Up

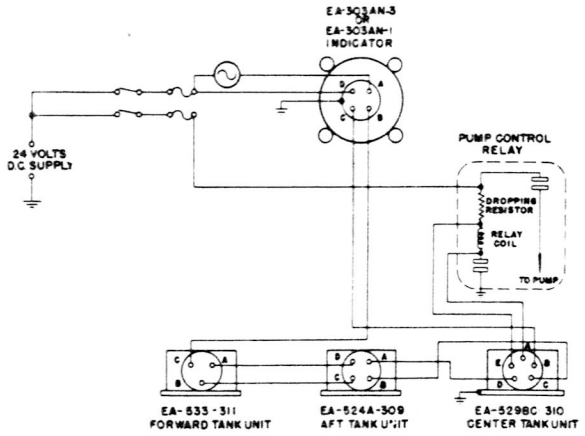


Figure 130-X—External Wiring Diagram for Douglas Model C-54 Series

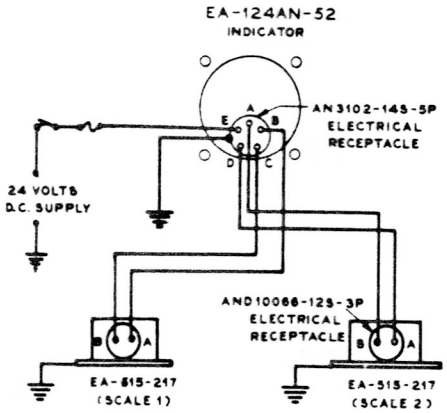


Figure 130-AA—External Wiring Diagram for Douglas Model XP4M-1

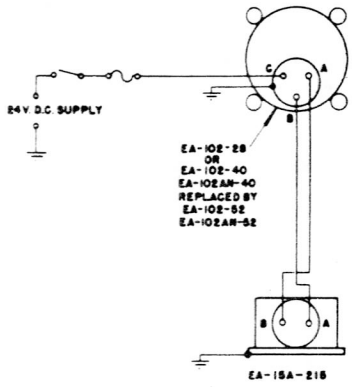


Figure 130-Y—External Wiring Diagram for Douglas Model C-54 Series

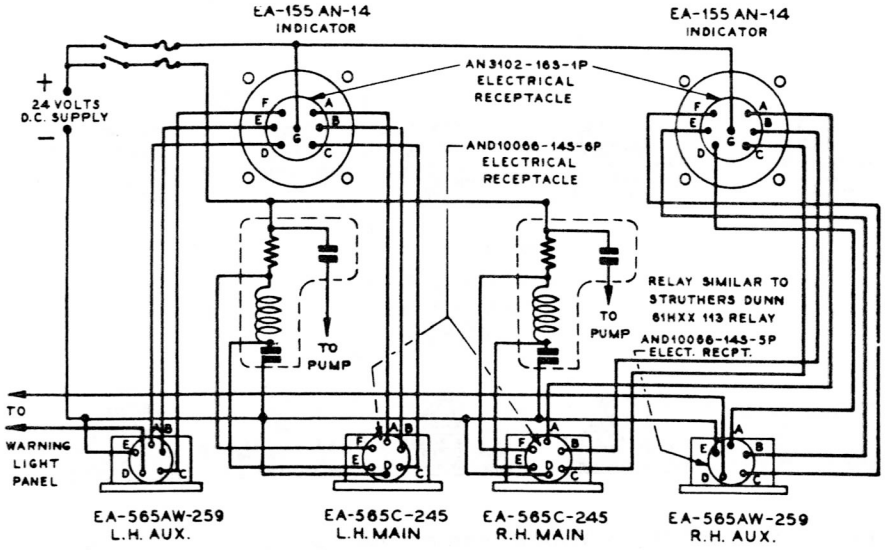


Figure 130-Z—External Wiring Diagram for Douglas Model XP4M-1

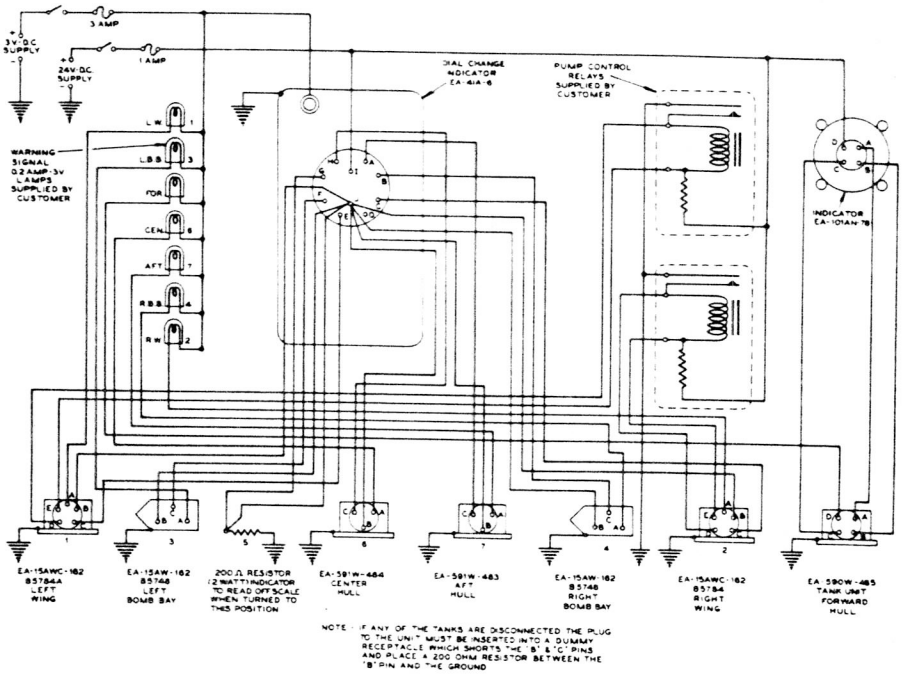


Figure 130AB—External Wiring Diagram for Martin Model PBM-5A

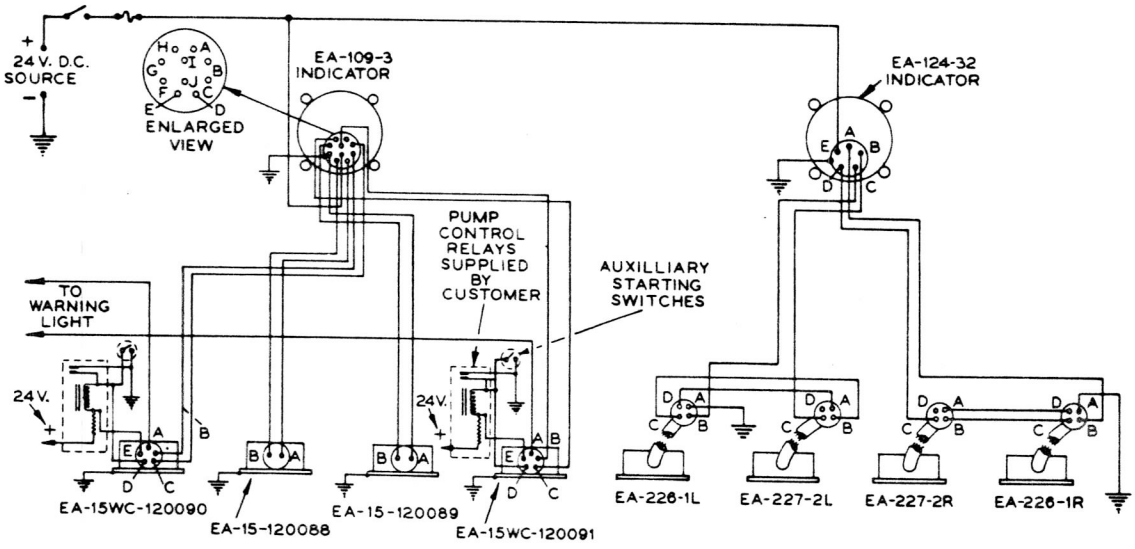


Figure 130AC—External Wiring Diagram for VEGA Model PV-2

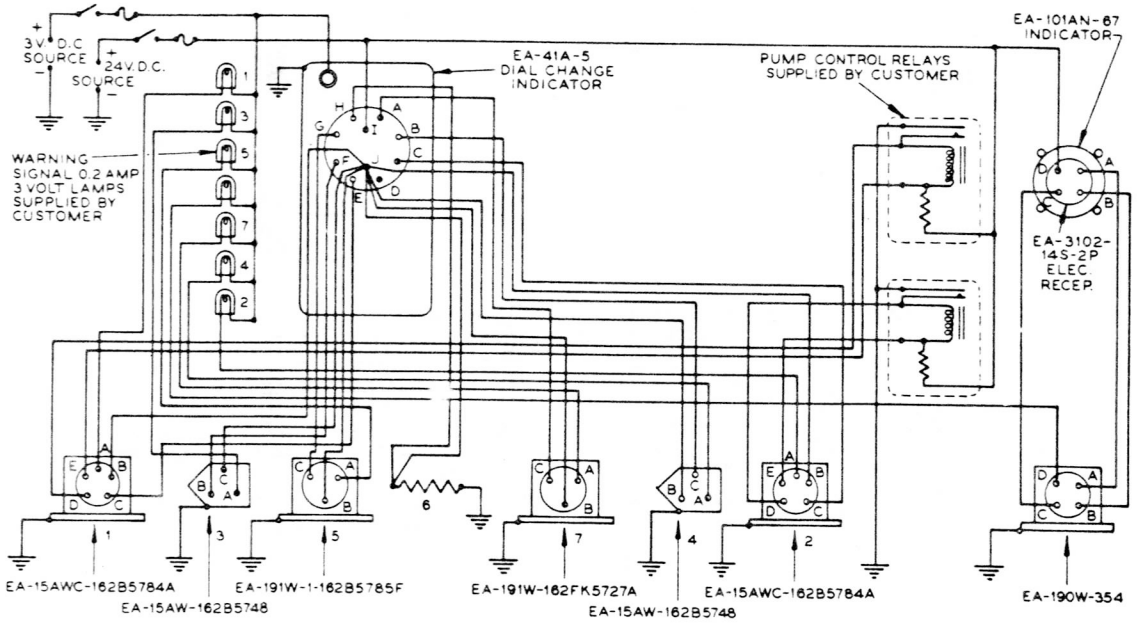
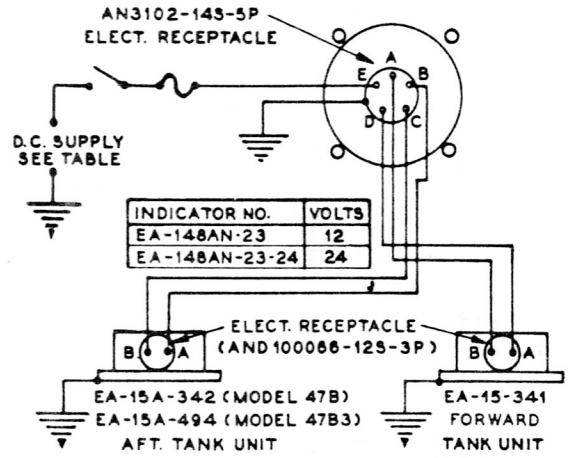
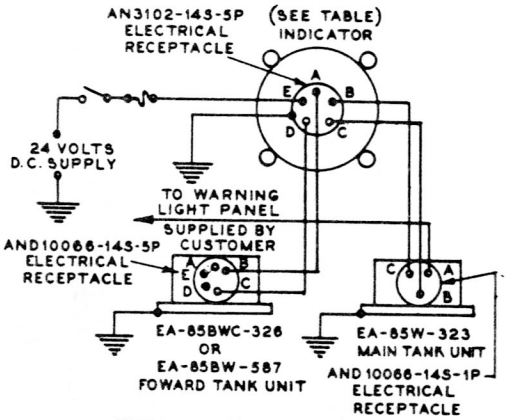


Figure 130AD—External Wiring Diagram for Martin Model PBM-5



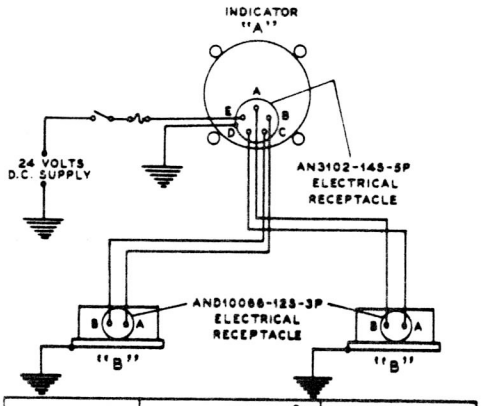
INDICATOR NO.	VOLTS
EA-148AN-23	12
EA-148AN-23-24	24

Figure 130AE—External Wiring Diagram for Bell Model 47 Helicopter



INDICATOR	SHIP
EA-124AN-65	YP3
EA-124AN-89	YP1 & UP
EA-124AN-94	SPECIAL FOR SHIPS 52,53 & 55
EA-124AN-102	F-84
EA-124AN-104	F-84

Figure 130AF—External Wiring Diagram for Republic Model F-84



INDICATOR "A"	TANK UNIT "B" 2 REQD.	USED ON
EA-124AN-39	EA-85A-306	C-82 SHIPS 10001 THRU 10077 10108 AND 10137
EA-124AN-39	EA-85A-476	C-82 SHIPS 10138 AND UP
EA-124AN-82	EA-85A-430	C-82 SHIPS 10178 THRU 10107

Figure 130AG—External Wiring Diagram for Fairchild Model C-82

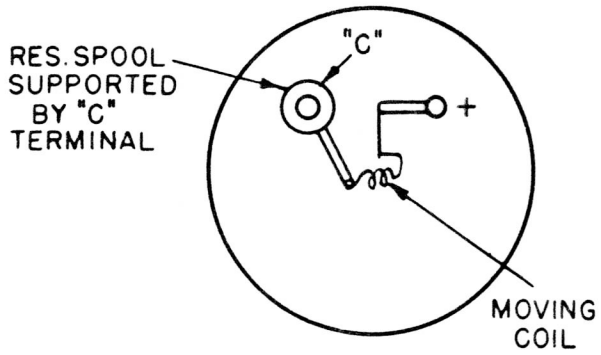


Figure 131—Internal Wiring Diagram for EA-31 Indicator

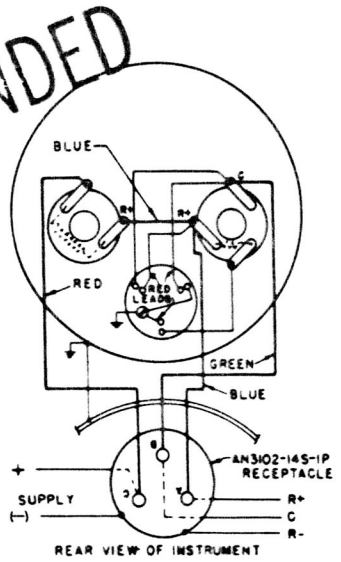


Figure 134—Internal Wiring Diagram for EA-102 Indicators (Grounded System)

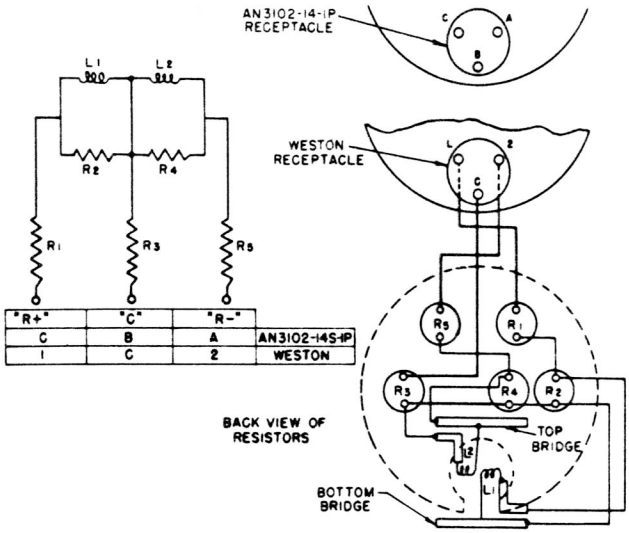


Figure 132—Internal Wiring Diagram for EA-35 and EA-36 Indicators

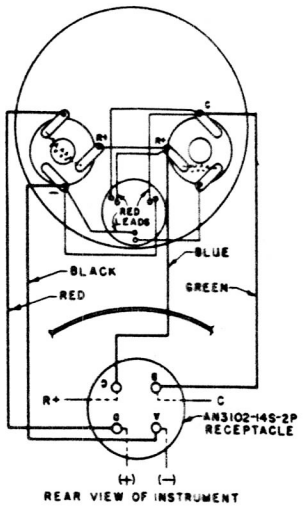


Figure 135—Internal Wiring Diagram for EA-102 Indicators (Ungrounded System)

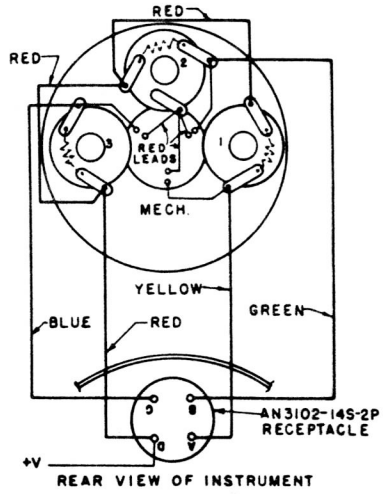


Figure 133—Internal Wiring Diagram for EA-100 and EA-101 Indicators

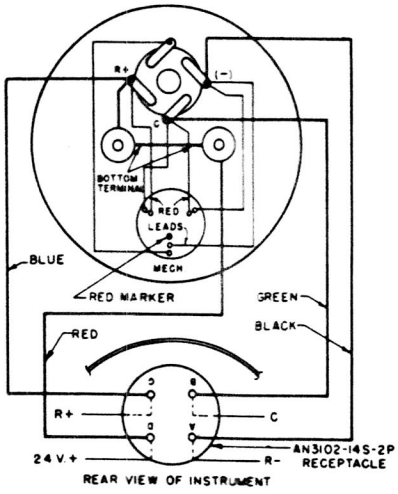


Figure 136—Internal Wiring Diagram for EA-102-10 Indicator (Special)

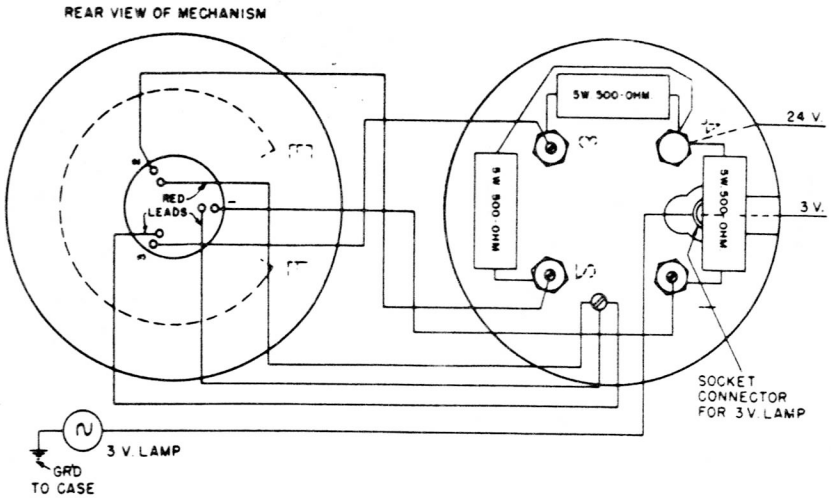


Figure 137—Internal Wiring Diagram for EA-101A-5, -6, -7, -14, -15 and -16 Indicators

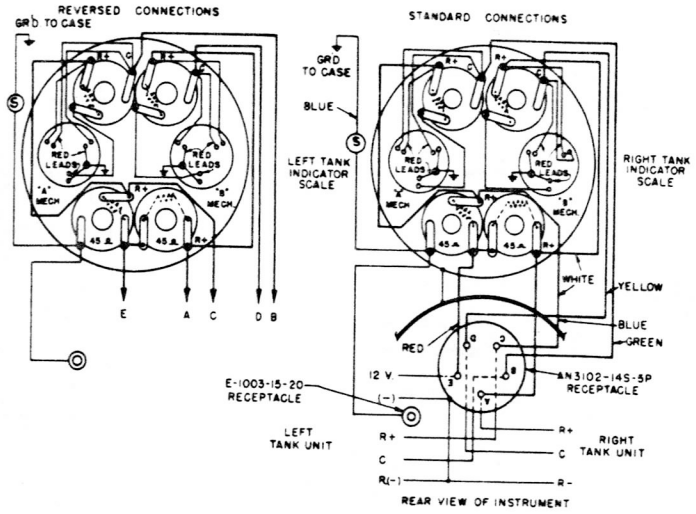


Figure 138—Internal Wiring Diagram for EA-104A-6 Indicator

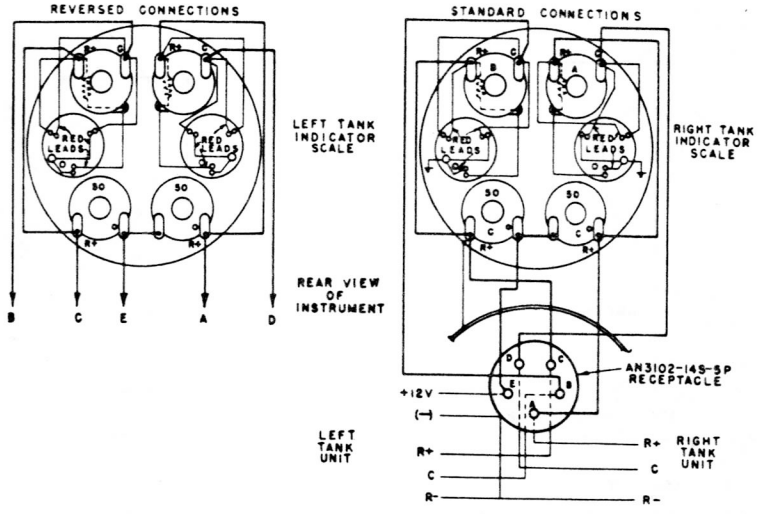


Figure 139—Internal Wiring Diagram for EA-104-8 Indicator

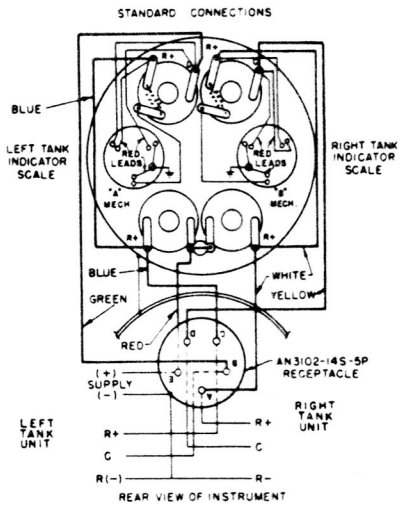


Figure 140—Internal Wiring Diagram for EA-104-5, and -9 Indicators

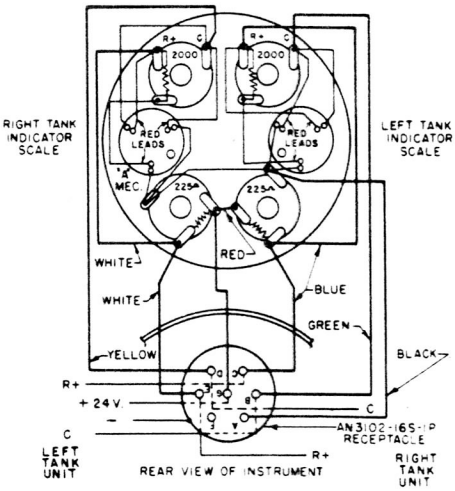


Figure 141—Internal Wiring Diagram for EA-124-12, -13 and -14 Indicators

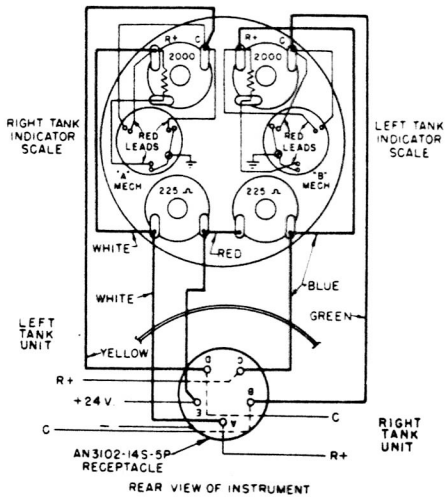


Figure 142—Internal Wiring Diagram for EA-124-4, -8, -10, -11, -15, -29 and -30 Indicators

RESCINDED

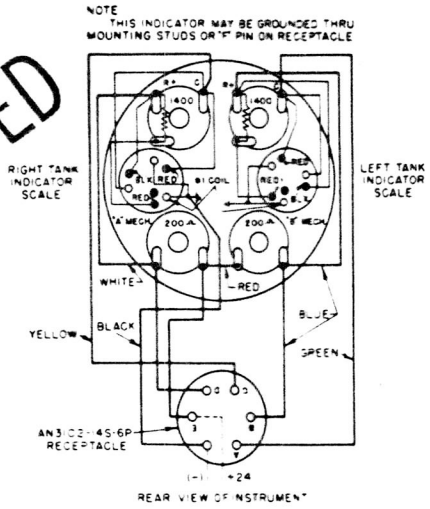


Figure 143—Internal Wiring Diagram for EA-124-24, -25 and -26 Indicators

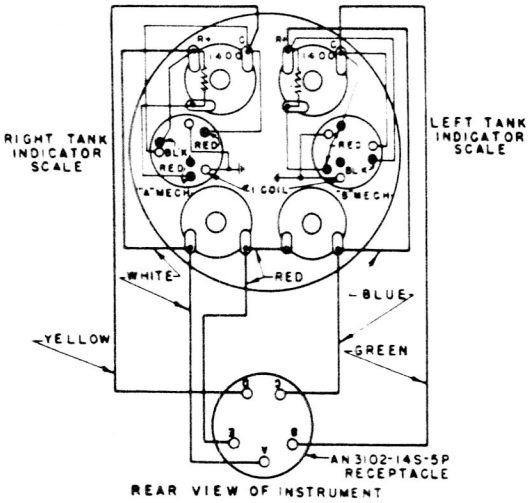


Figure 144—Internal Wiring Diagram for EA-124-9 Indicator

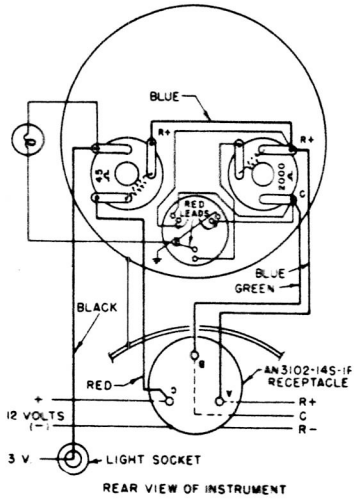


Figure 145—Internal Wiring Diagram for EA-143A-4 Indicator

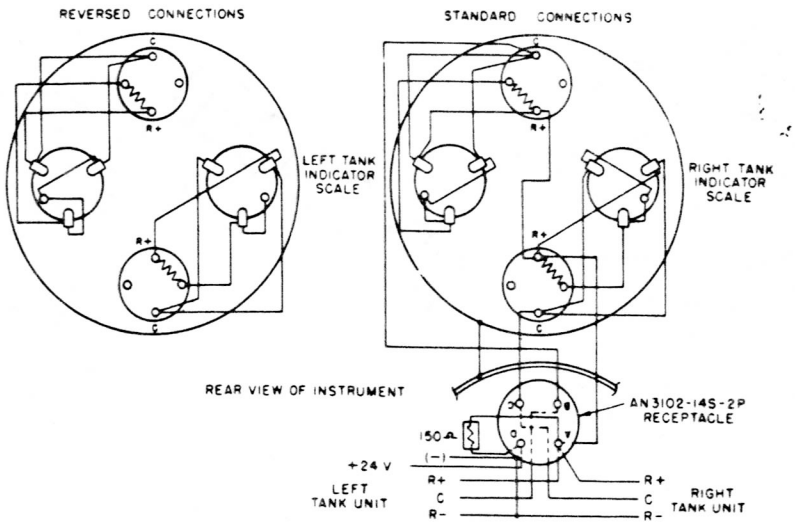


Figure 146—Internal Wiring Diagram for EA-108-11 and -13 Indicators

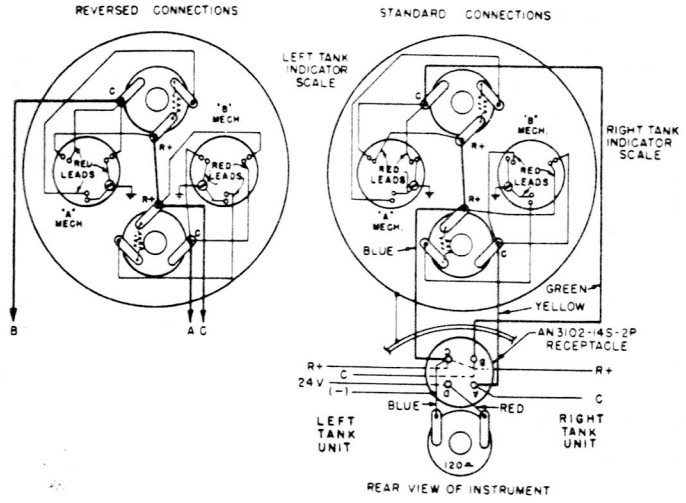


Figure 147—Internal Wiring Diagram for EA-108-6 and -6F Indicators

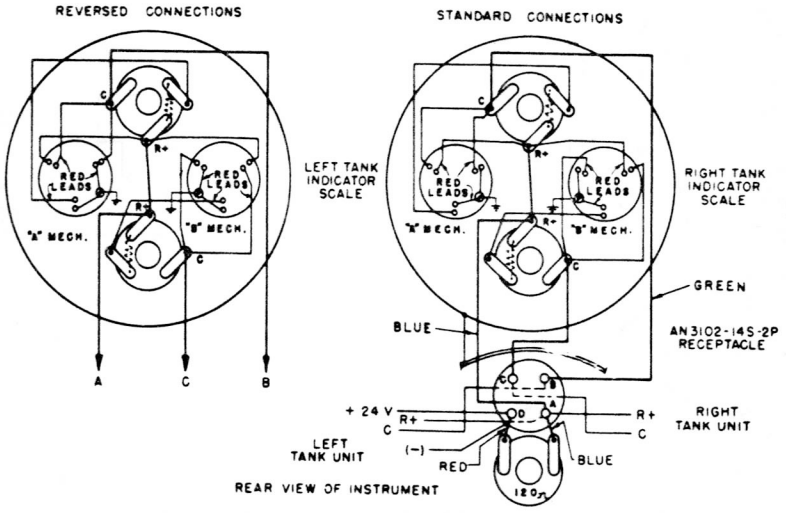


Figure 148—Internal Wiring Diagram for EA-108-5, -11C, -16, -19 and -26 Indicators

RESCINDED

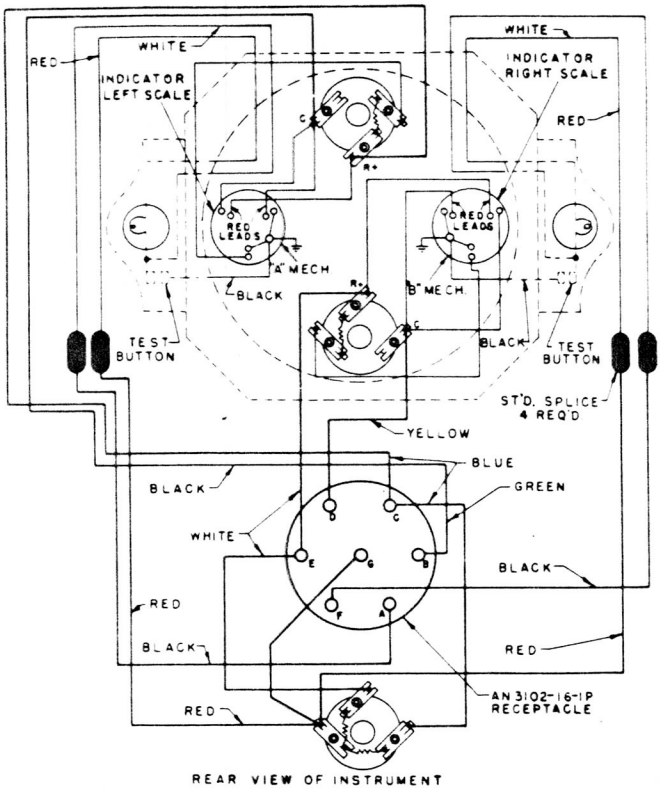


Figure 149—Internal Wiring Diagram for EA-108W-17 and -31 Indicators

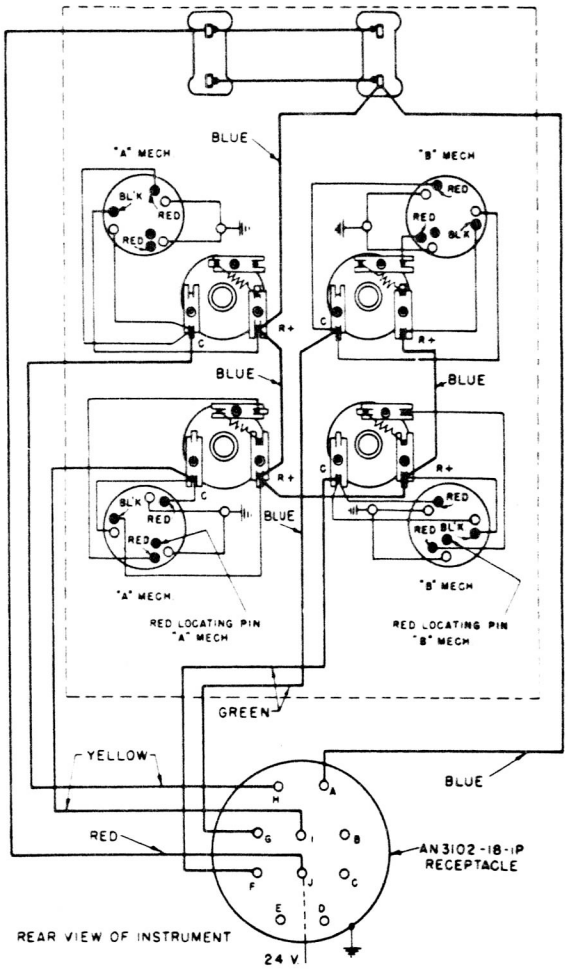


Figure 150—Internal Wiring Diagram for EA-134-1 Indicator

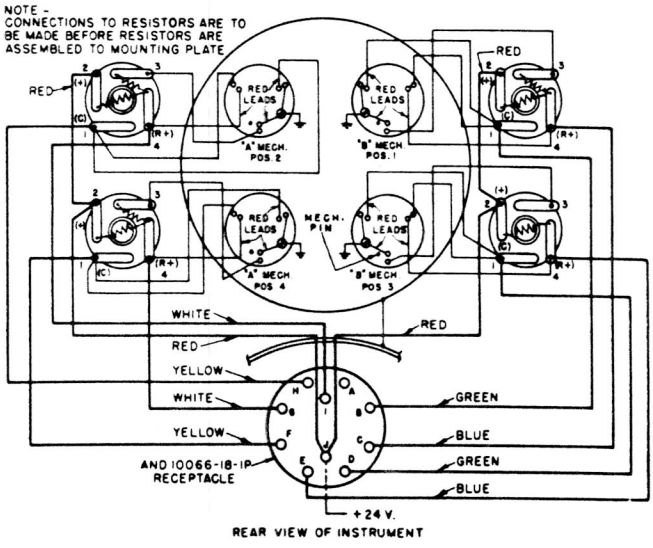


Figure 151—Internal Wiring Diagram for EA-109-1 Indicator

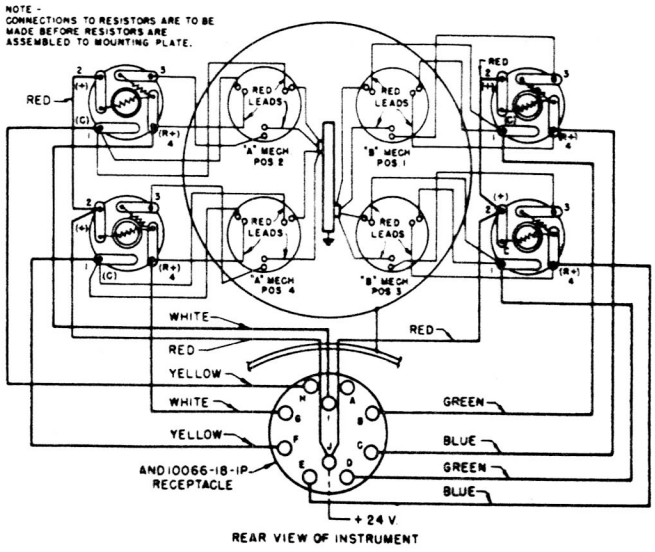


Figure 152—Internal Wiring Diagram for EA-109-3, -4 and -12 Indicators

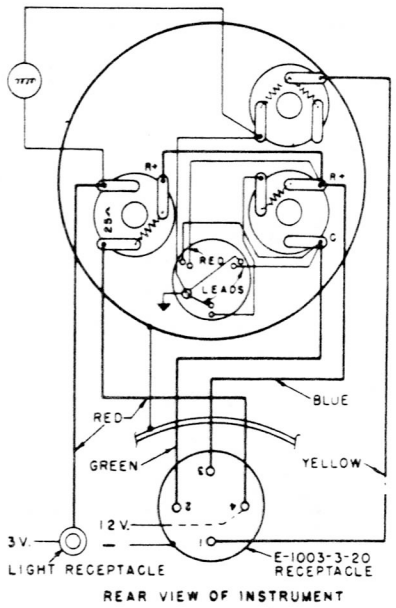


Figure 153—Internal Wiring Diagram for EA-143A-1M Indicator

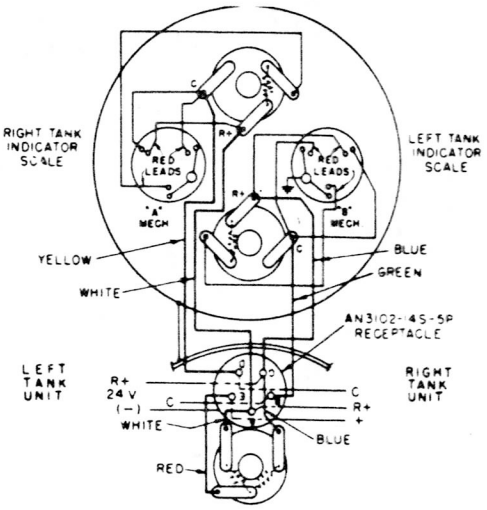


Figure 154—Internal Wiring Diagram for EA-148-1, -2 and -5 Indicators

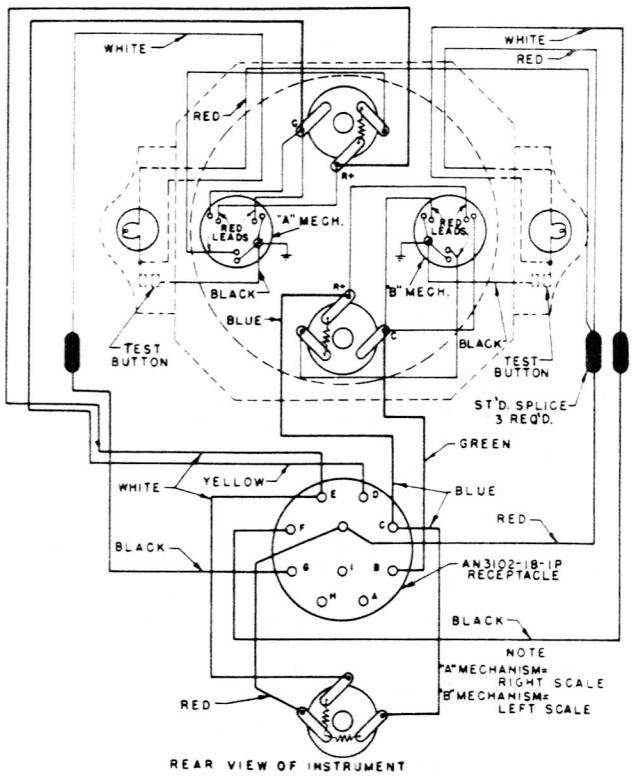


Figure 155—Internal Wiring Diagram for EA-148W-3 Indicator

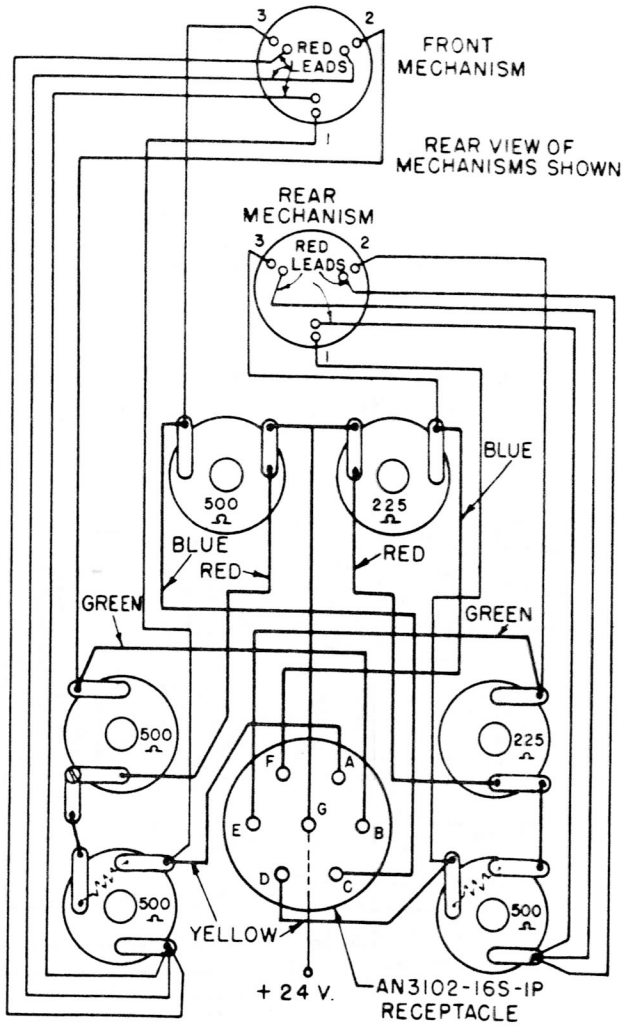


Figure 156—Internal Wiring Diagram for EA-150-12 and -16 Indicators

RESCINDED

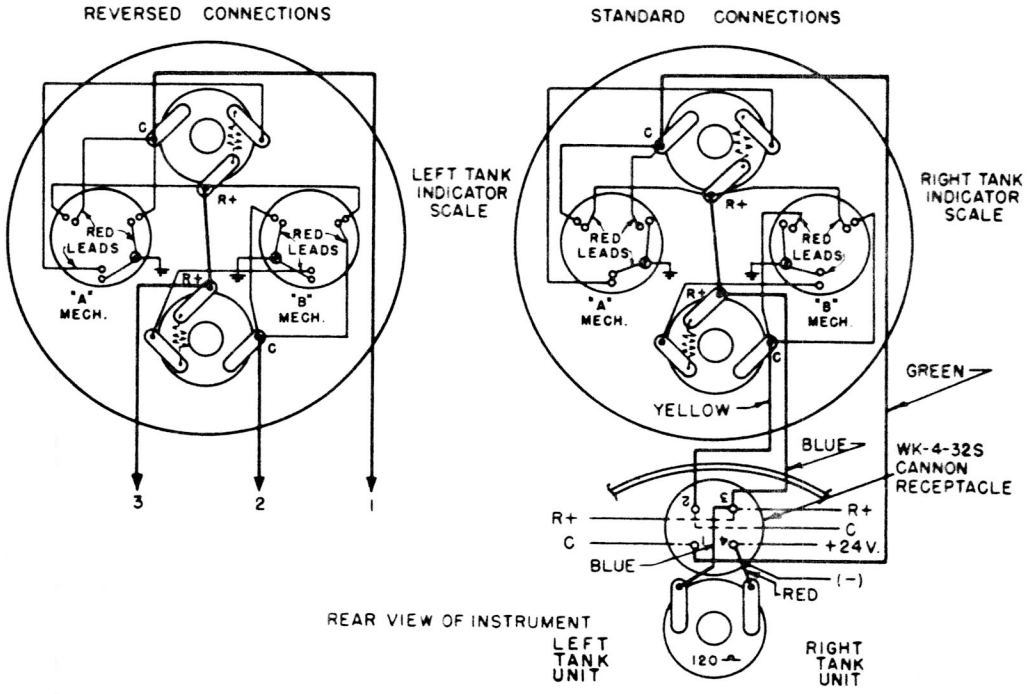


Figure 157—Internal Wiring Diagram for EA-108-839F and R Indicators

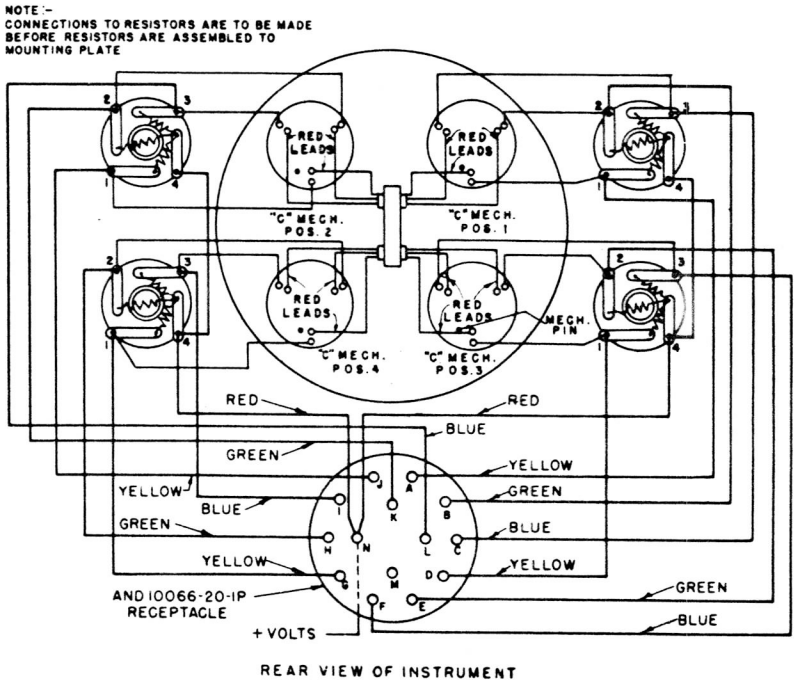


Figure 158—Internal Wiring Diagram for EA-140-4 and -6 Indicators

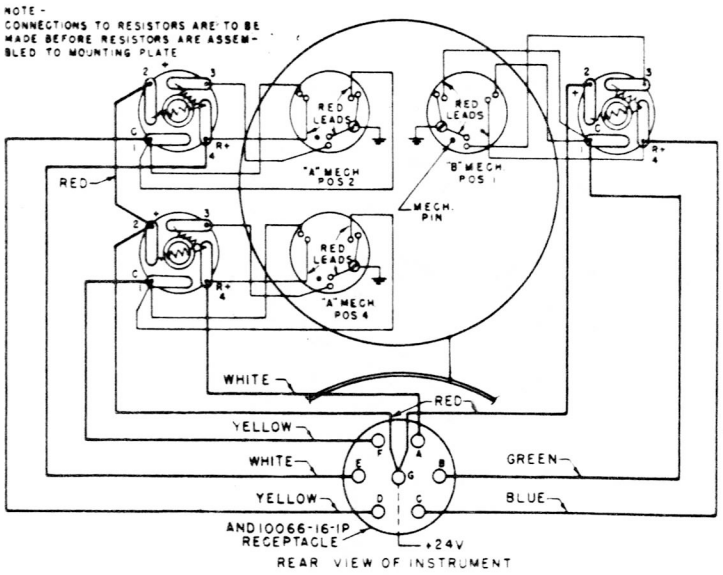


Figure 159—Internal Wiring Diagram for EA-111-1 and -12 Indicators

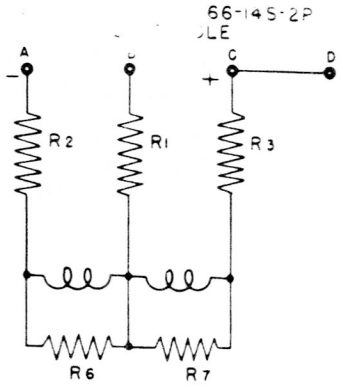


Figure 160—Internal Wiring Diagram for EA-343-1 Indicator

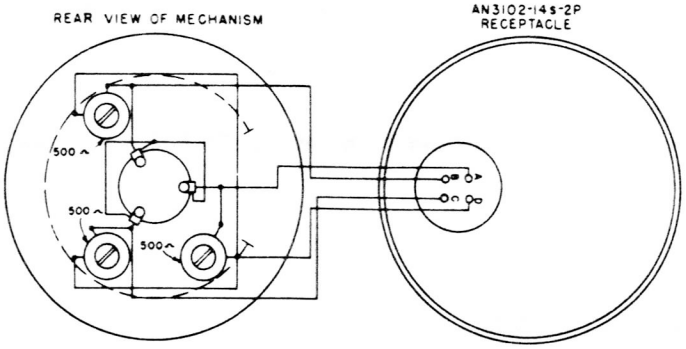
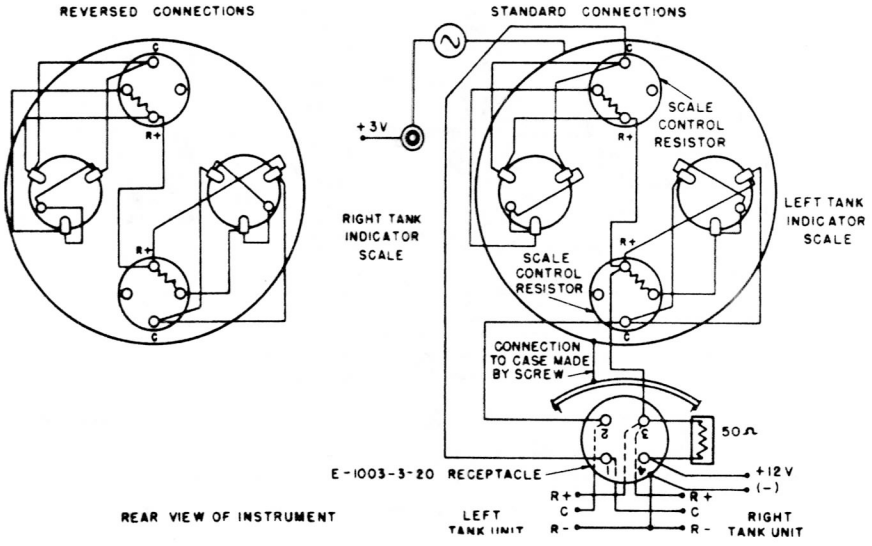


Figure 161—Internal Wiring Diagram for EA-101-AT-9

Figure 162—Internal Wiring Diagram for EA-104A-3 Indicator



RESCINDED

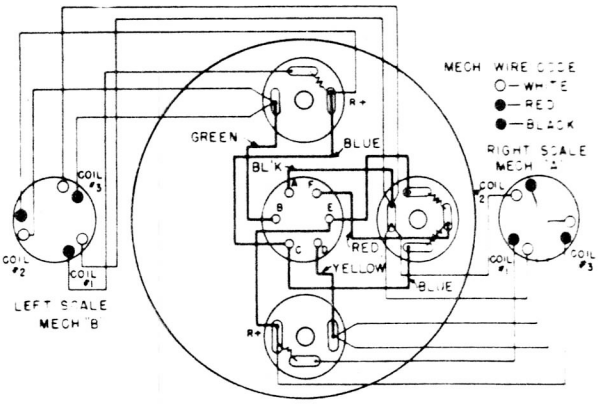


Figure 162-A—Internal Wiring Diagram for EA-148AN-19 Indicator

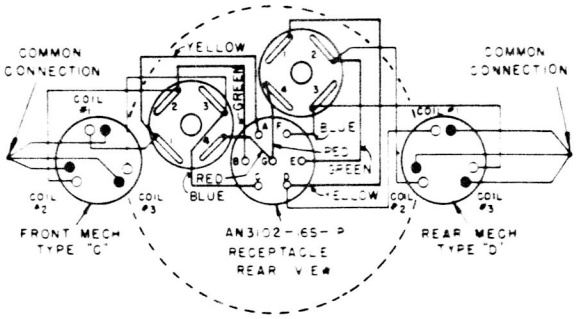


Figure 162-D—Internal Wiring Diagram for EA-150AN Indicators

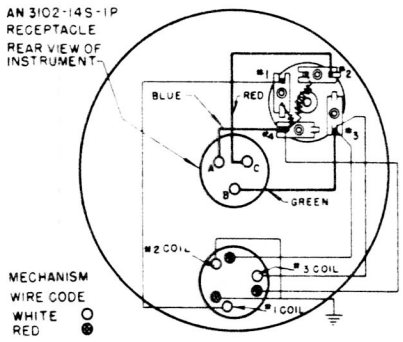


Figure 162-B—Internal Wiring Diagram for EA-143AN-8 Indicator

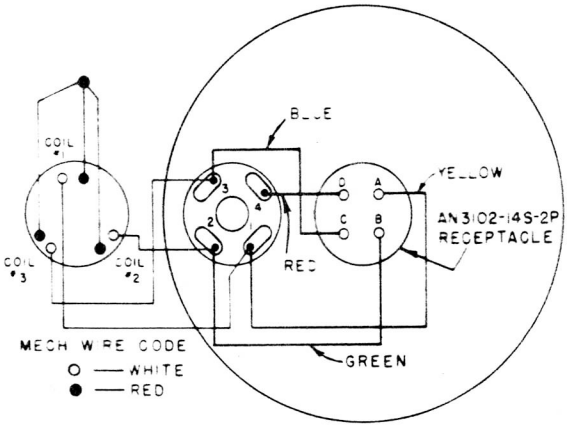


Figure 162-E—Internal Wiring Diagram for EA-101AN-44 Indicator

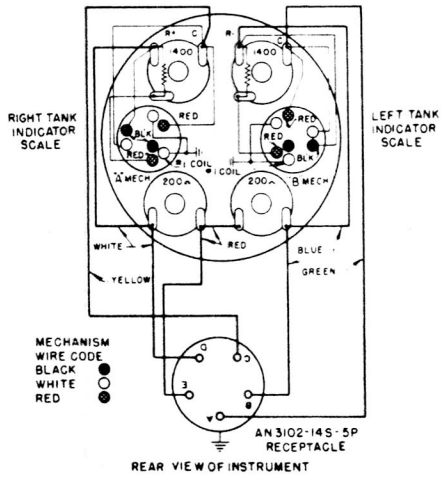


Figure 162-C—Internal Wiring Diagram for EA-124-31 Indicator

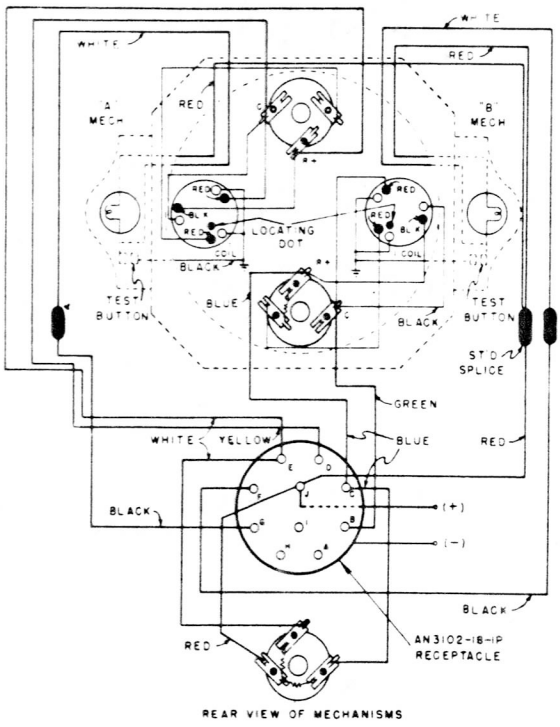


Figure 162-F—Internal Wiring Diagram for EA-148W Indicators

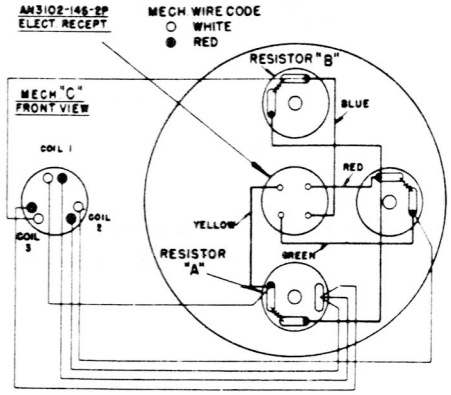


Figure 162-H—Internal Wiring Diagram for EA-100AN Indicator

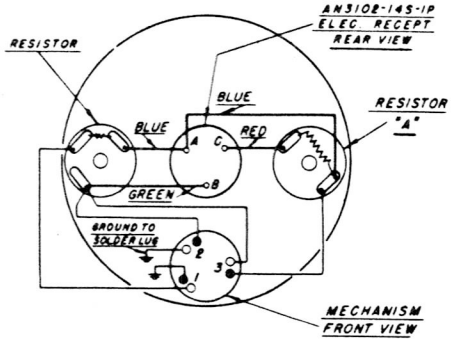


Figure 162-J—Internal Wiring Diagram for EA-102AN Indicator

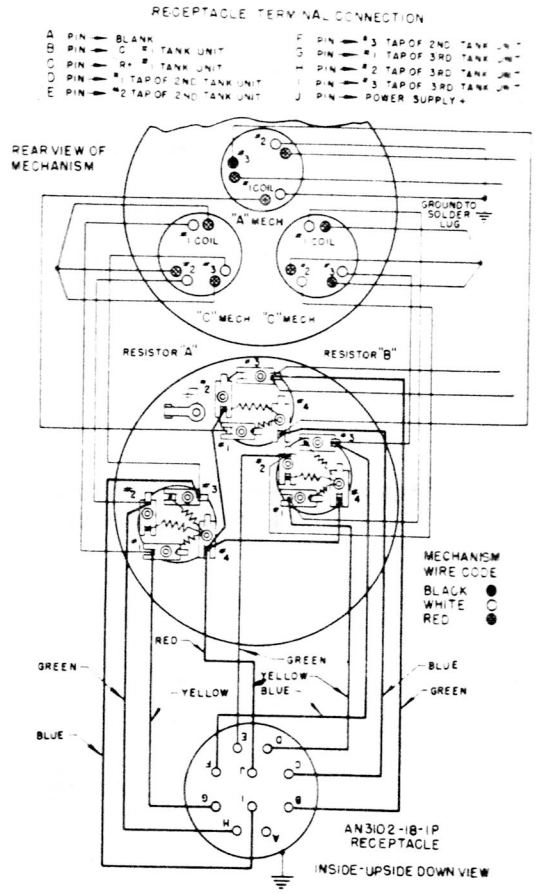


Figure 162-G—Internal Wiring Diagram for EA-125AN-2 Indicator

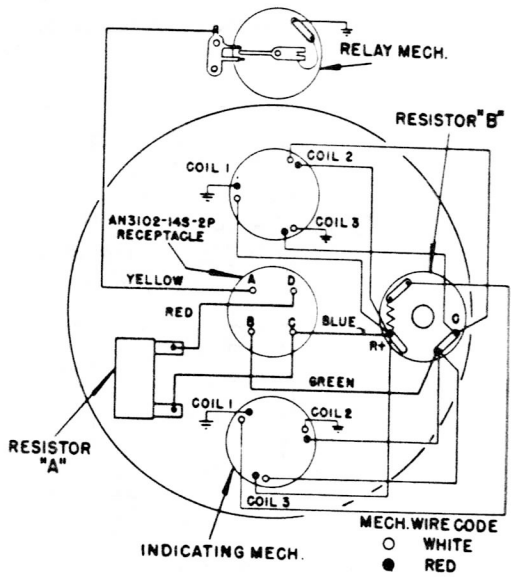


Figure 162-K—Internal Wiring Diagram for EA-303AN Indicator

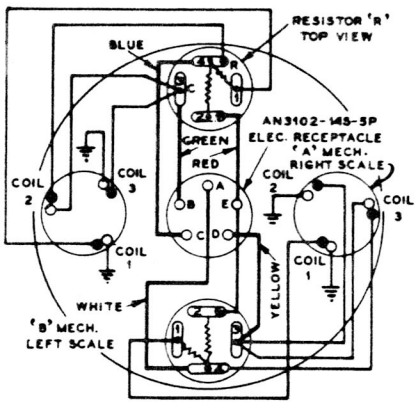


Figure 162-L—Internal Wiring Diagram for EA-124AN-52 Indicator

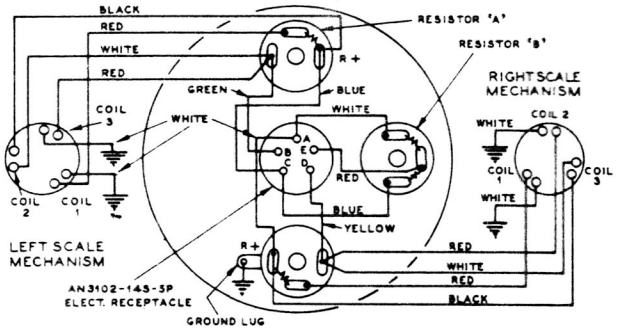


Figure 162-M—Internal Wiring Diagram for EA-148AN Indicator

RESCINDED

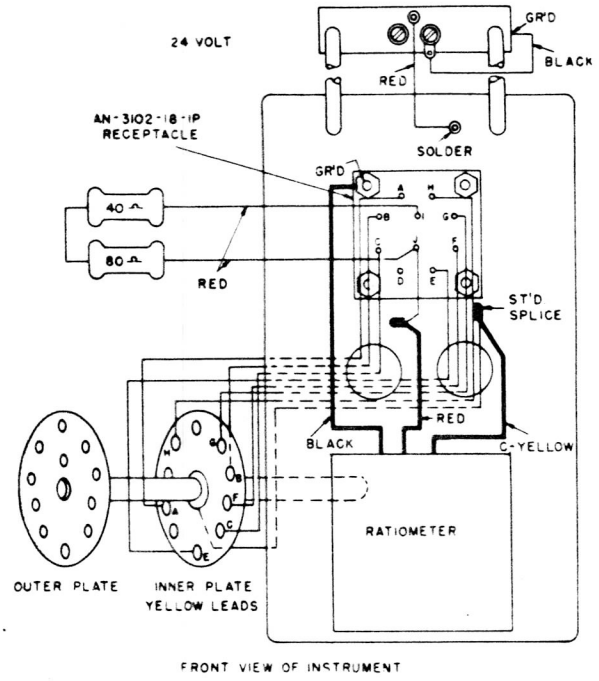


Figure 163—Internal Wiring Diagram for EA-41A-1 and -2 Dial Change Indicators

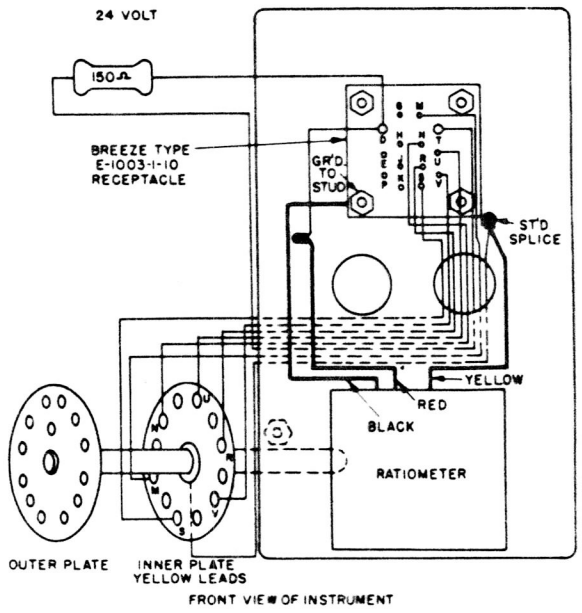


Figure 165—Internal Wiring Diagram for EA-47-1-24 and -10 Dial Change Indicators

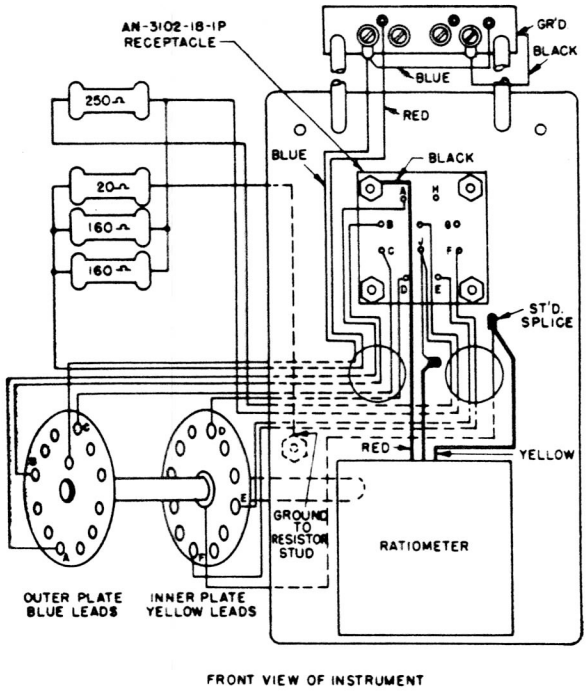


Figure 164—Internal Wiring Diagram for EA-46W-1 Dial Change Indicator

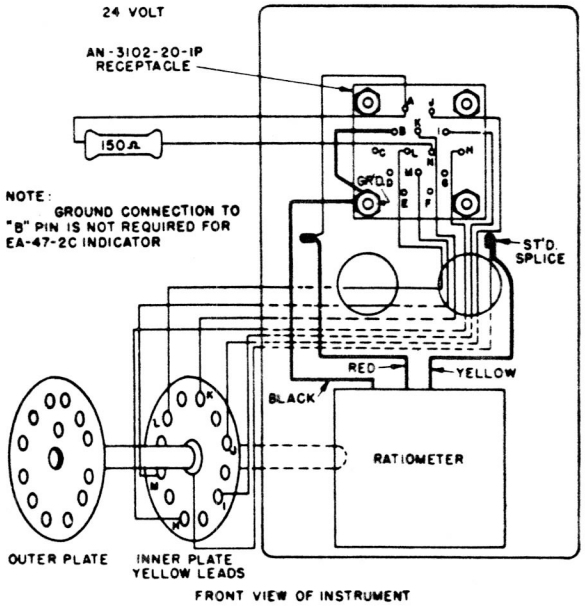


Figure 166—Internal Wiring Diagram for EA-47-2C Dial Change Indicator

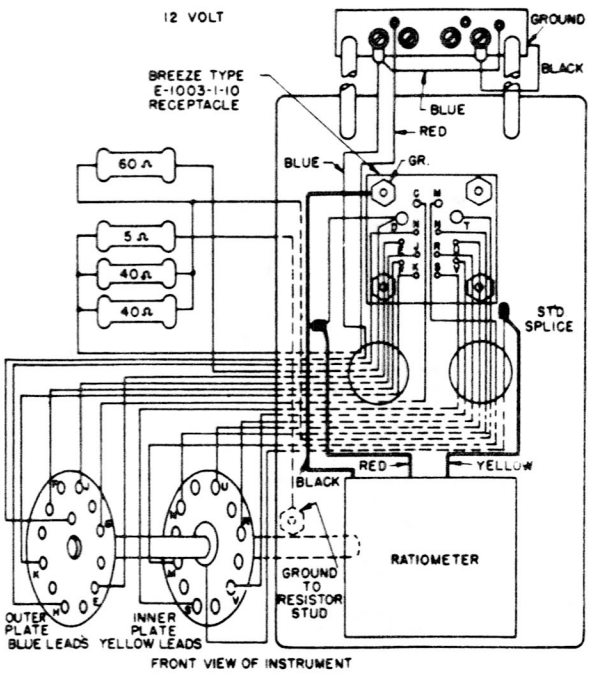


Figure 167—Internal Wiring Diagram for EA-47W-1 Dial Change Indicator

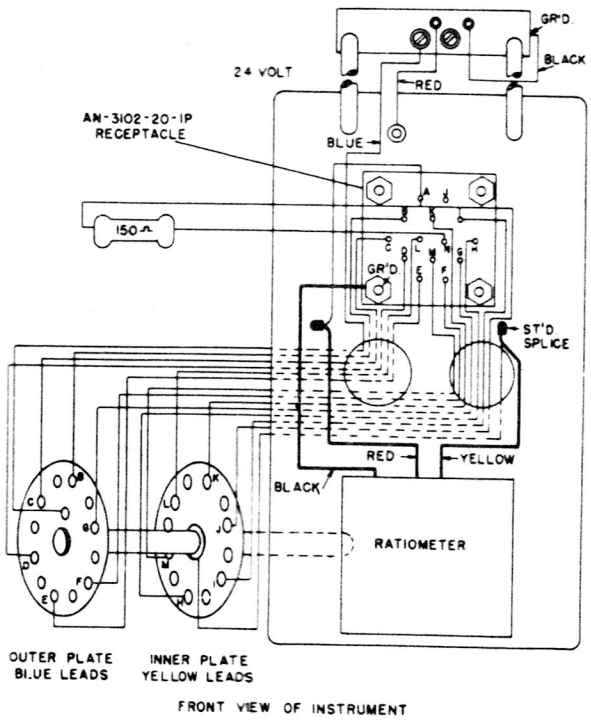


Figure 169—Internal Wiring Diagram for EA-47W-2, -4, -6, -7-2V, -2C and -8 Dial Change Indicator

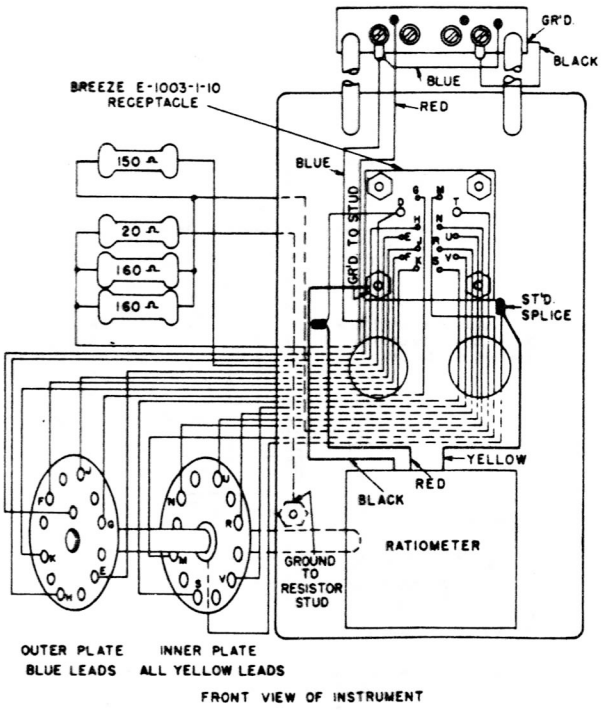


Figure 168—Internal Wiring Diagram for EA-47W-1-24 Dial Change Indicator

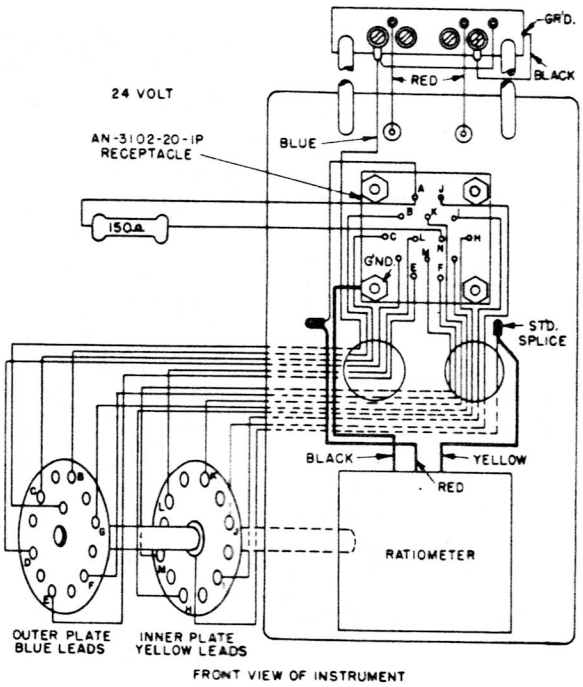


Figure 170—Internal Wiring Diagram for EA-47AW-4 and -5 Dial Change Indicator

RESCINDED

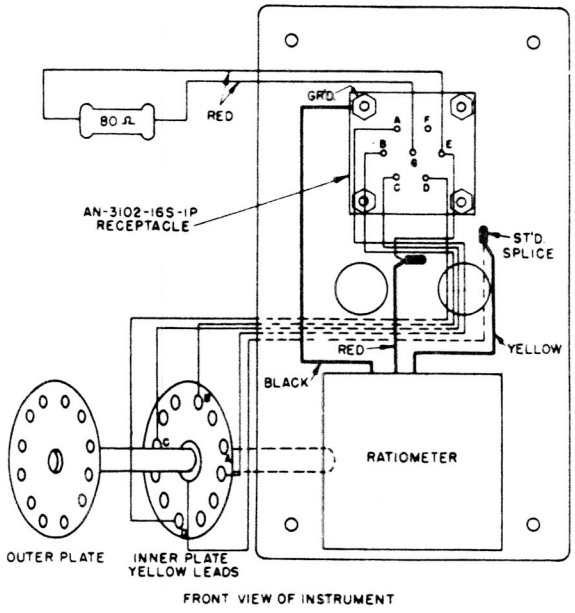


Figure 171—Internal Wiring Diagram for EA-48-5, -12, -13 and -15 Dial Change Indicator

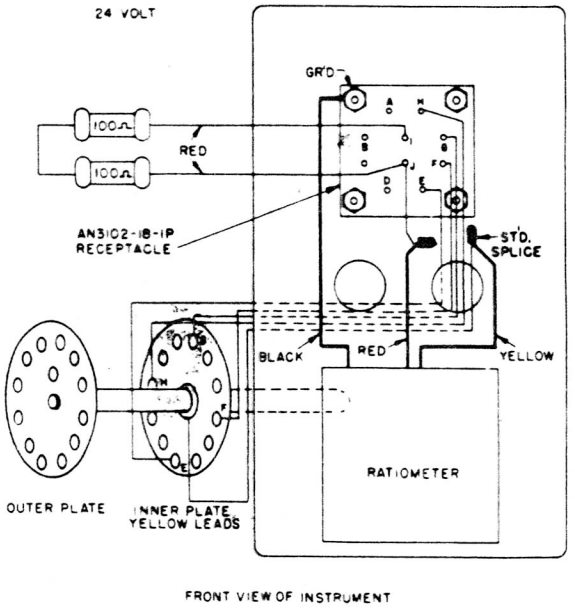


Figure 173—Internal Wiring Diagram for EA-48-16 and 17T Dial Change Indicator

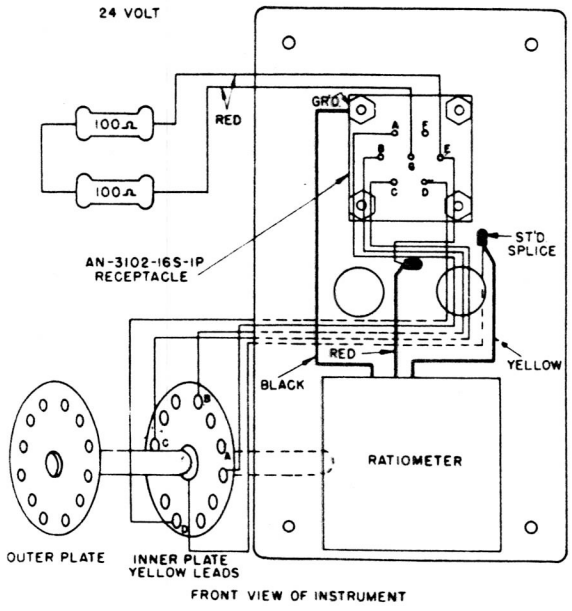


Figure 172—Internal Wiring Diagram for EA-48-5-24 and -12-24 Dial Change Indicator

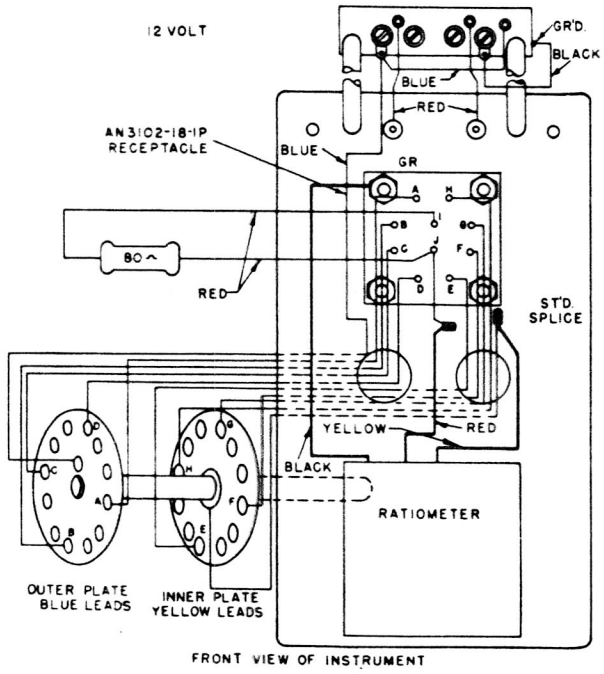


Figure 174—Internal Wiring Diagram for EA-48AW-1 -2 and -6 Dial Change Indicator

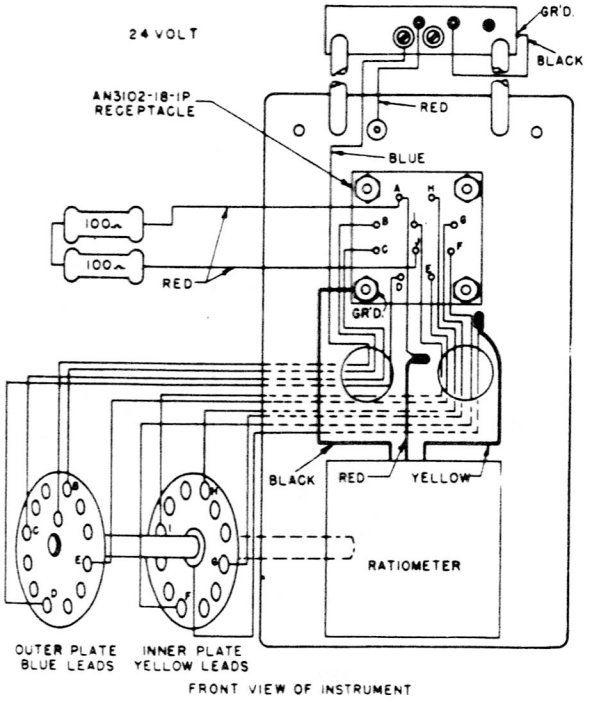


Figure 175—Internal Wiring Diagram for EA-48W-14 and -18 Dial Change Indicators

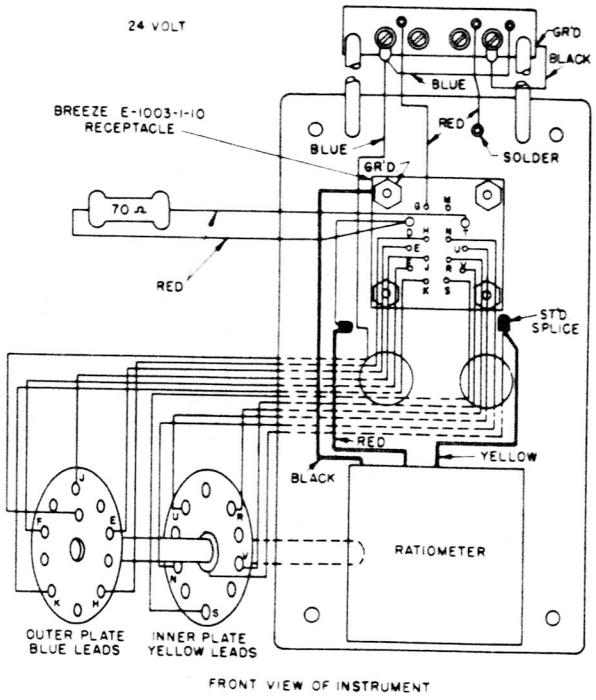


Figure 177—Internal Wiring Diagram for EA-49AW-2 and -3 Dial Change Indicators

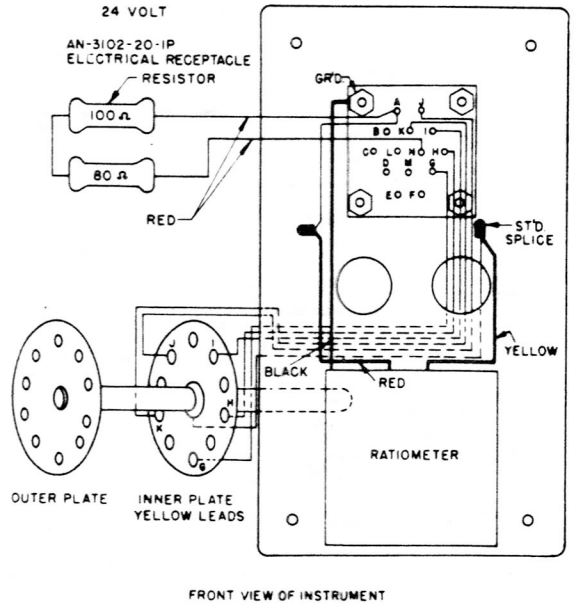


Figure 176—Internal Wiring Diagram for EA-49-4 Dial Change Indicator

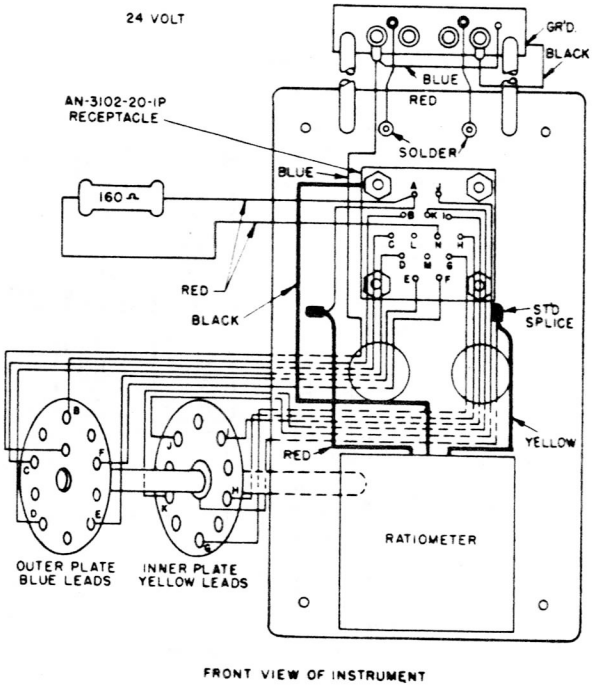


Figure 178—Internal Wiring Diagram for EA-49AW-7 Dial Change Indicator

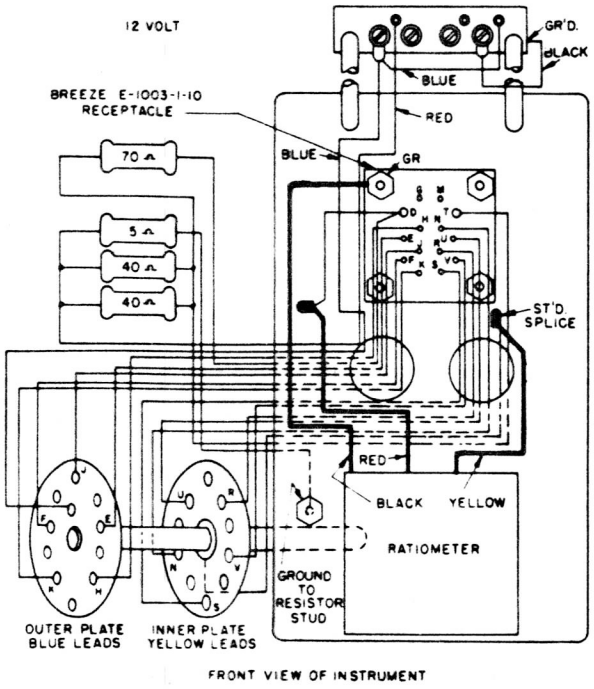


Figure 179—Internal Wiring Diagram for EA-49W-1 Dial Change Indicator

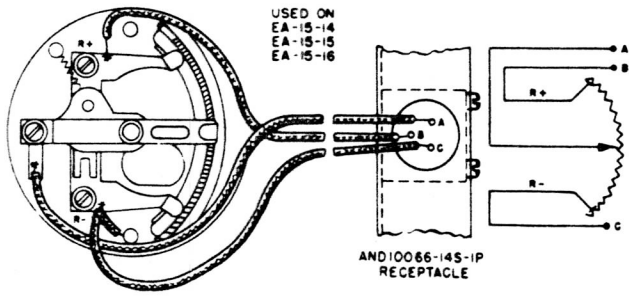


Figure 180—Internal Wiring Diagram for EA-15 Tank Unit

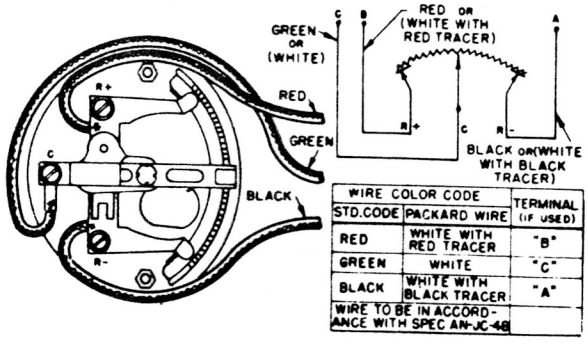


Figure 181—Internal Wiring Diagram for EA-15 Tank Unit (Special)

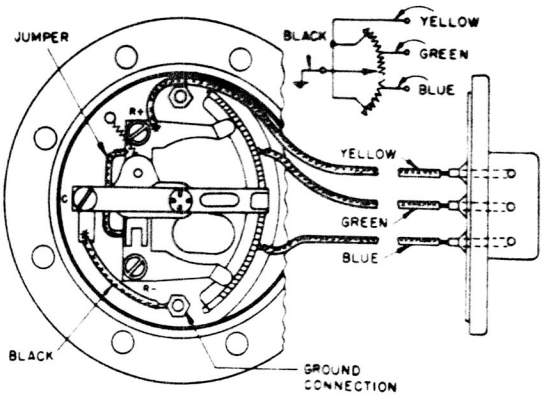


Figure 182—Internal Wiring Diagram for EA-178 Tank Unit (Grounded System)

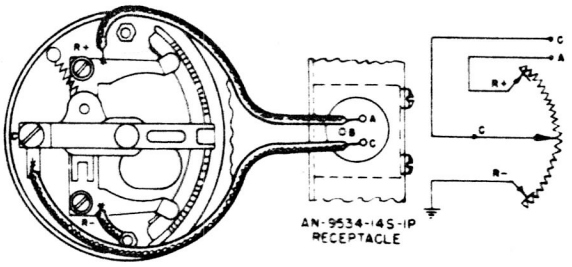


Figure 183—Internal Wiring Diagram for EA-15, 15A and 15B Tank Units (Grounded System)

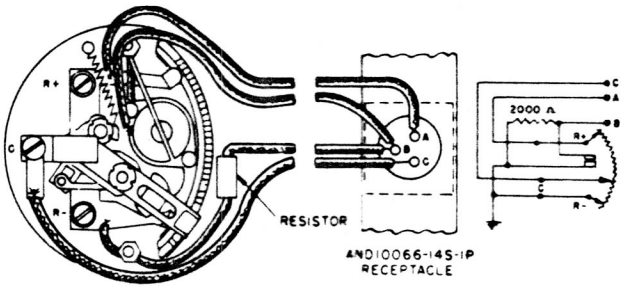


Figure 184 Internal Wiring Diagram for EA-15AW Tank Unit (With Warning Switch)

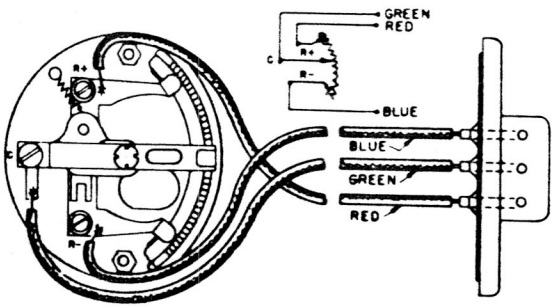


Figure 185—Internal Wiring Diagram for EA-176 and EA-177 Tank Units (Ungrounded System)

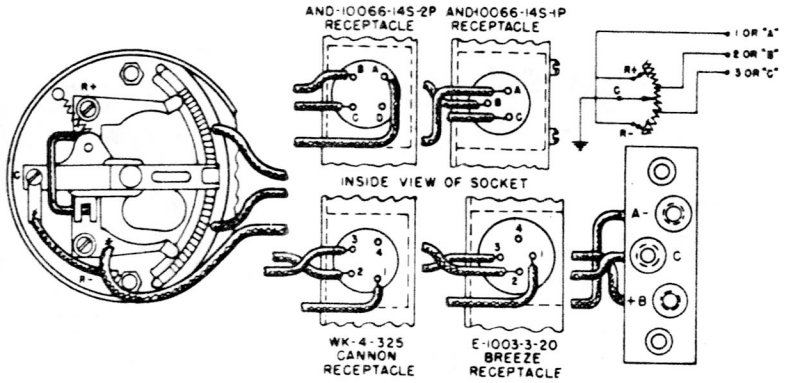
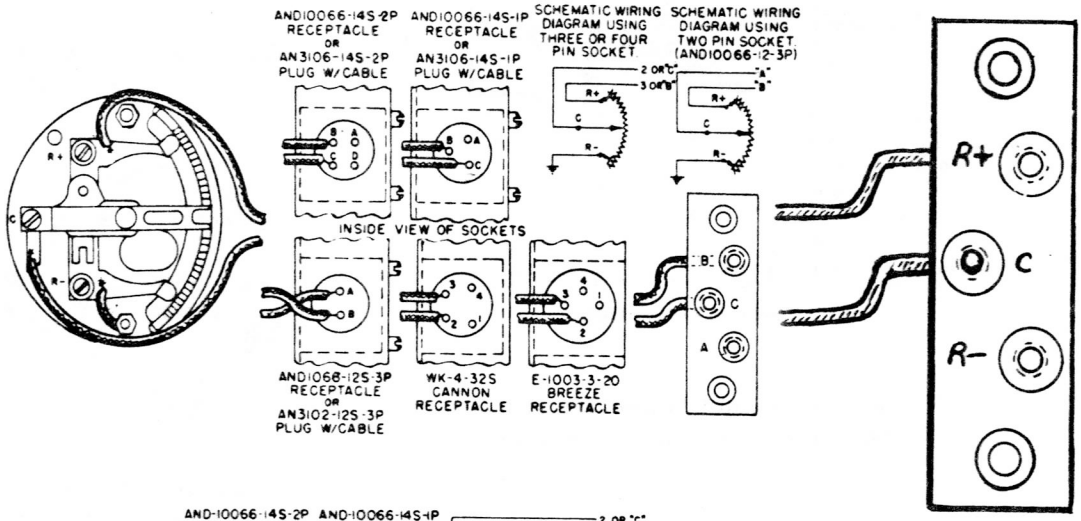


Figure 186—Internal Wiring Diagram for EA-65, -65A, -65B, -66, -67, -84 and -84A Tank Units Grounded System

Figure 187—Internal Wiring Diagram for EA-15, -15A, -15B, -16, -16A, -17, -85, -85A and 191A Tank Units



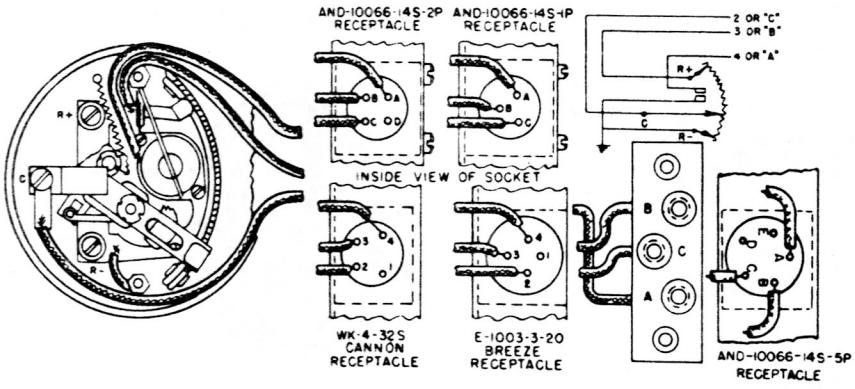
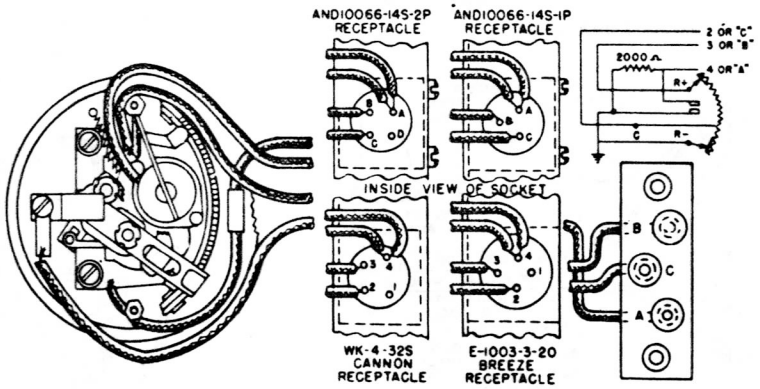


Figure 188—Internal Wiring Diagram for EA-15W, -15AW, -15BW, 16W, -16AW, -16BW, -17W, -17BW, -18W, -18AW, -18BW, -85W, -85AW, 85BW, 77W, 97W Tank Units With Warning Switch

Figure 189—Internal Wiring Diagram for EA-15W, -15AW, -15BW, -17W, -17BW, -18W, -77W, -85W and 85AW Tank Units With Warning Switch



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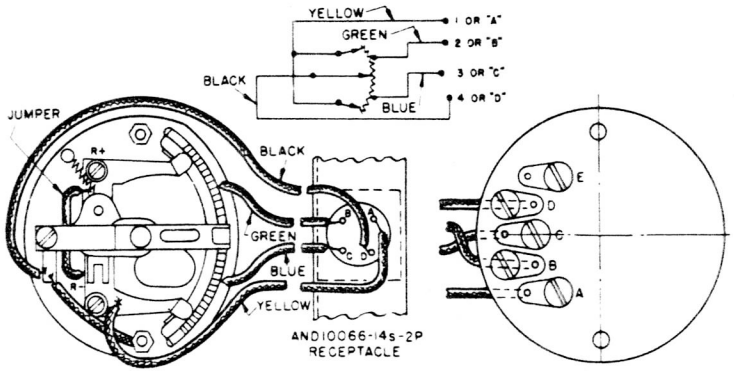
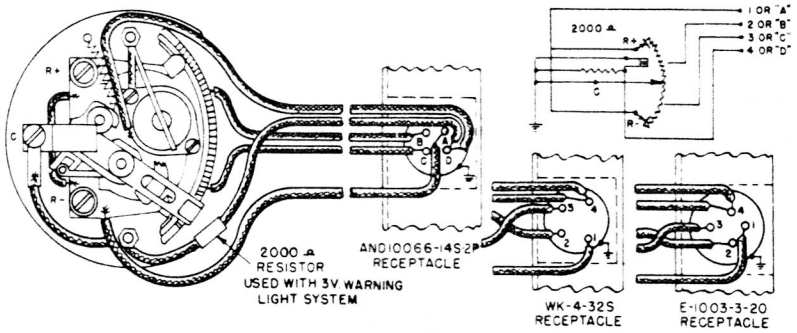


Figure 190—Internal Wiring Diagram for EA-65, -65A, -65B and -185 Tank Units (Ungrounded System)

Figure 191—Internal Wiring Diagram for EA-65W, -65AW, -65BW, -67W, -78W, -84W, -84AW and -84BW Tank Units With Warning Switch (Grounded System)



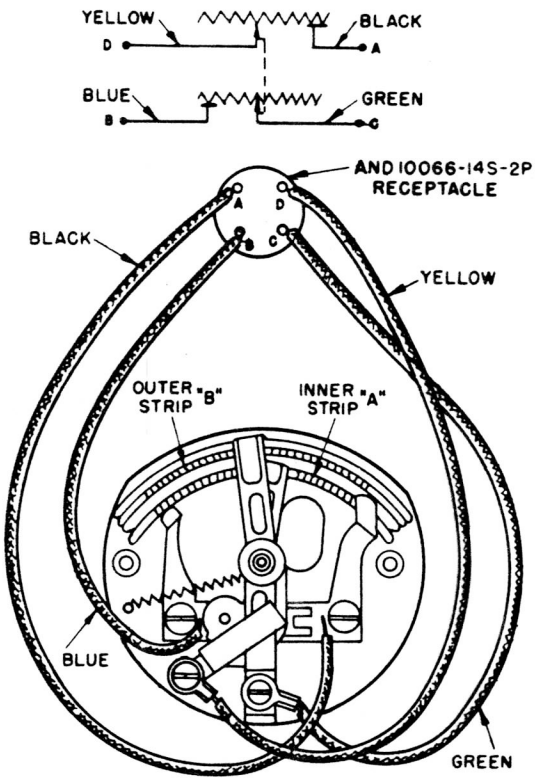


Figure 192—Internal Wiring Diagram for EA-220 and EA-221A Tank Units

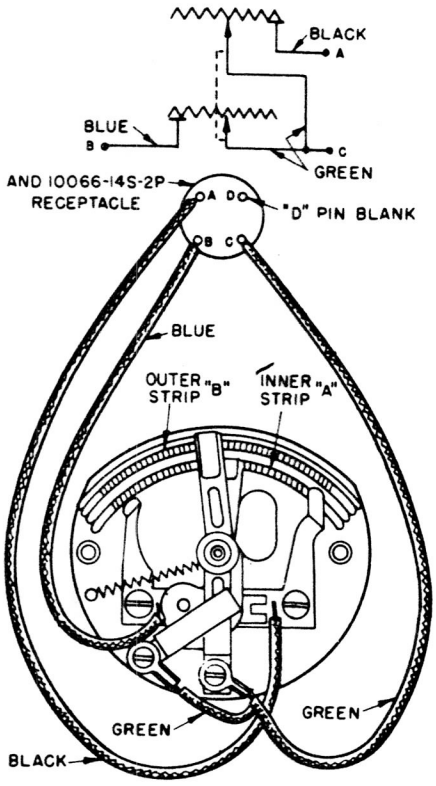


Figure 193—Internal Wiring Diagram for EA-222A Tank Unit

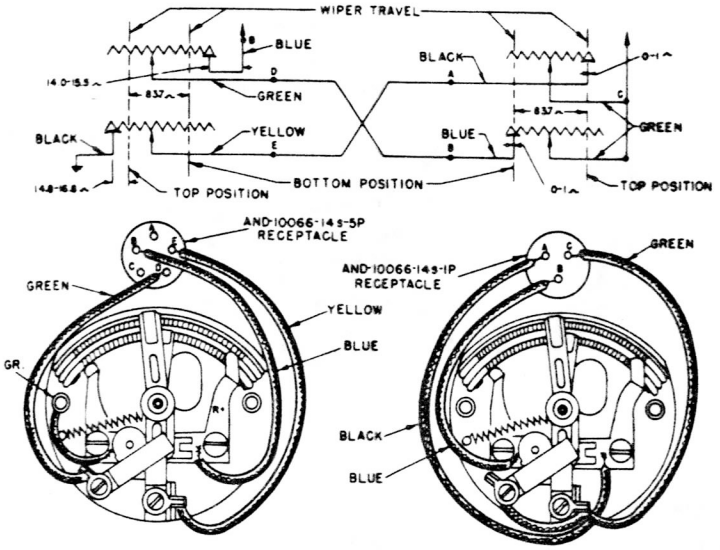


Figure 194— Internal Wiring Diagram for EA-228 Tank Units

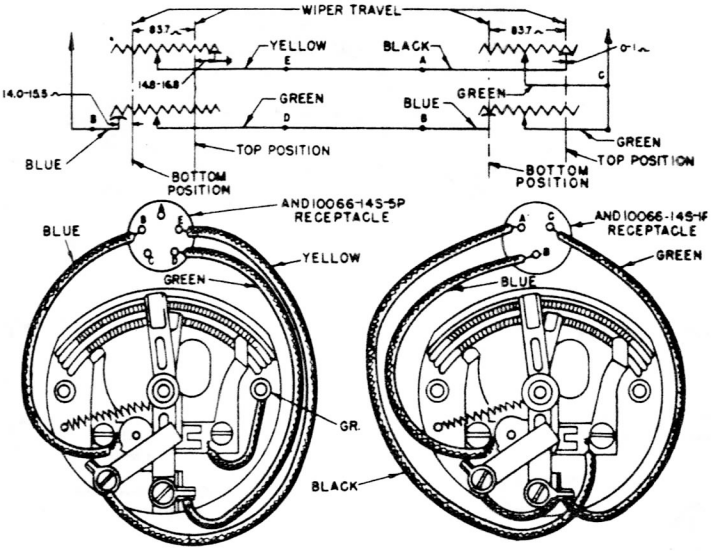


Figure 195— Internal Wiring Diagram for EA-228 Tank Unit

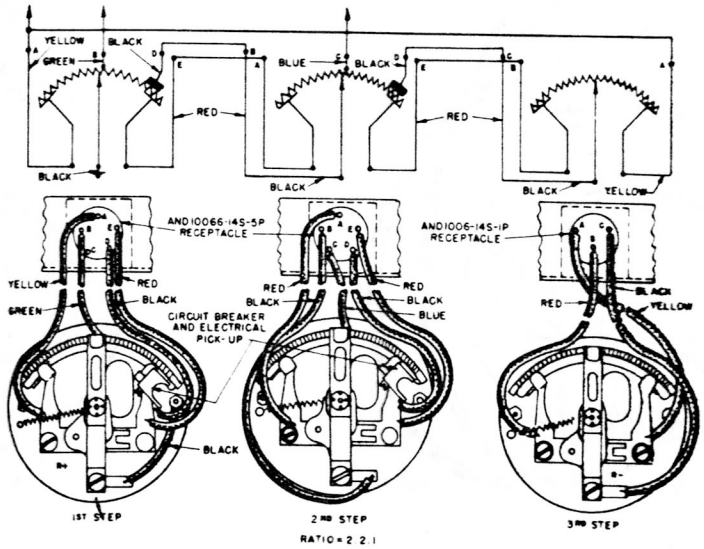


Figure 196— Internal Wiring Diagram for EA-206A, -207A, and 208A Tank Units

RESCINDED

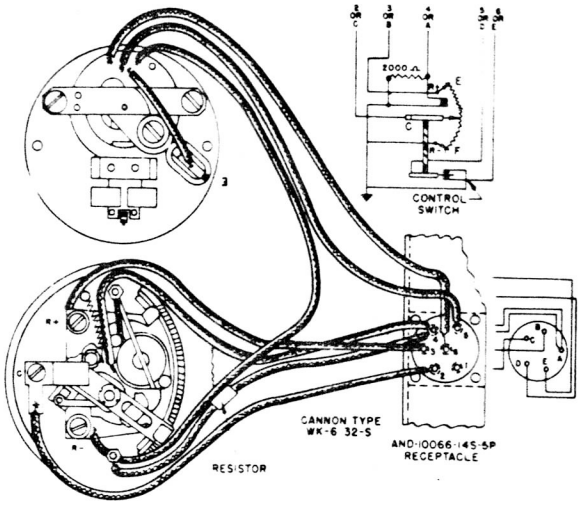


Figure 197—Internal Wiring Diagram for EA-15WC and AWC Tank Units

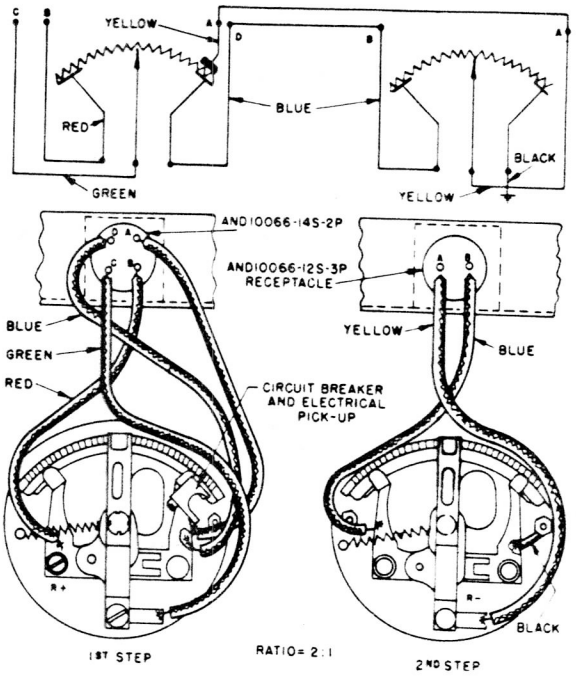


Figure 199—Internal Wiring Diagram for EA-202, -202A, -202B, -203, -203A and -203B Tank Units (Grounded System)

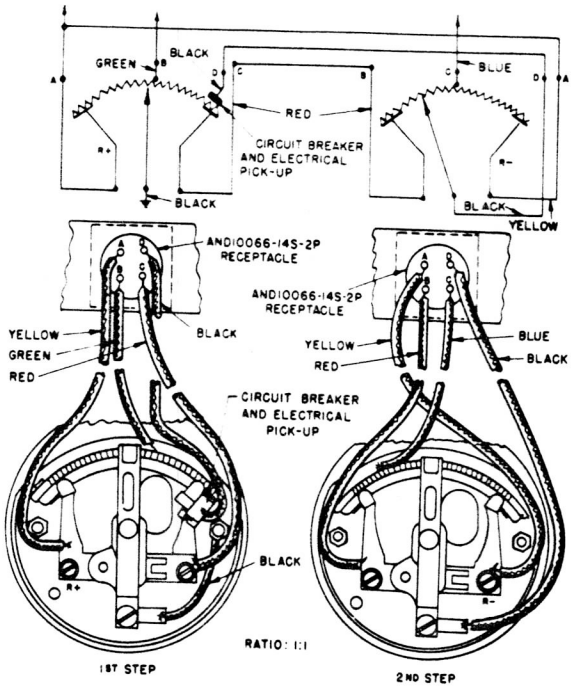


Figure 198—Internal Wiring Diagram for EA-88, -88A, -88B, -89, -89A and -89B Tank Units

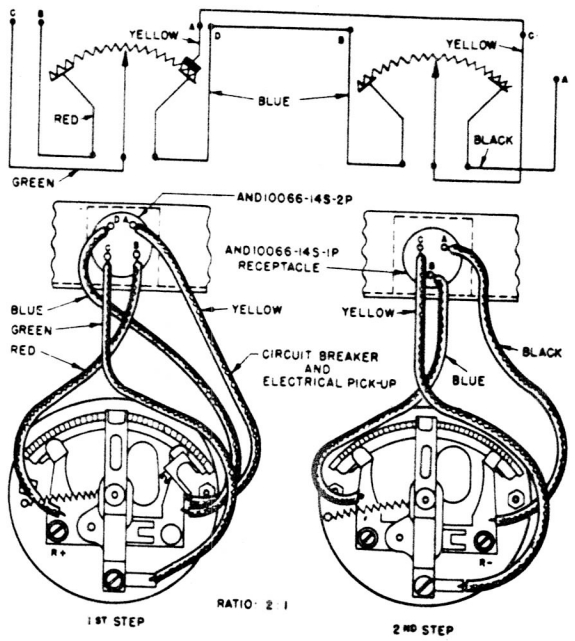


Figure 200—Internal Wiring Diagram for EA-216, -216A, -216B, -217, -217A, -217B Tank Units (Ungrounded System)

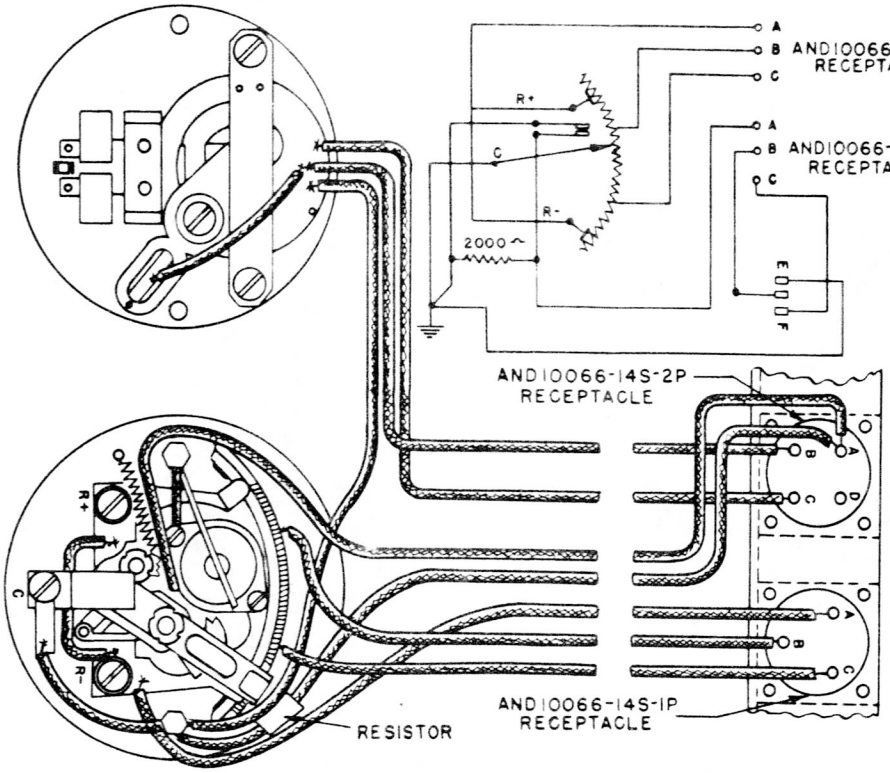


Figure 201—Internal Wiring Diagram for EA-65WC, -65AWC and -65BWC With Warning Switch

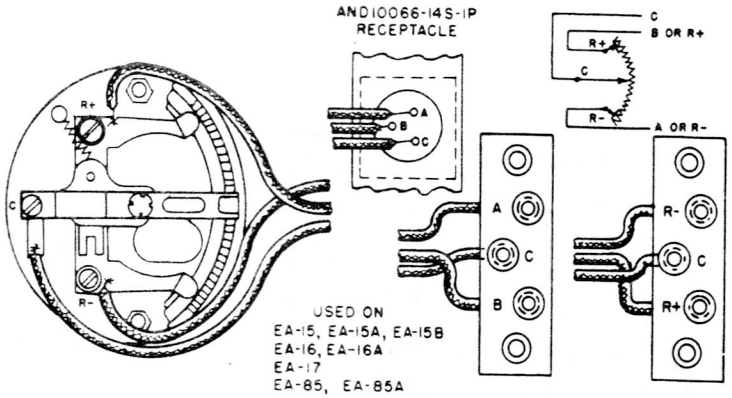


Figure 202—Internal Wiring Diagram for EA-15, -15A, -15B, -16, -16A, -17, -85 and -85A Tank Units (Ungrounded System)

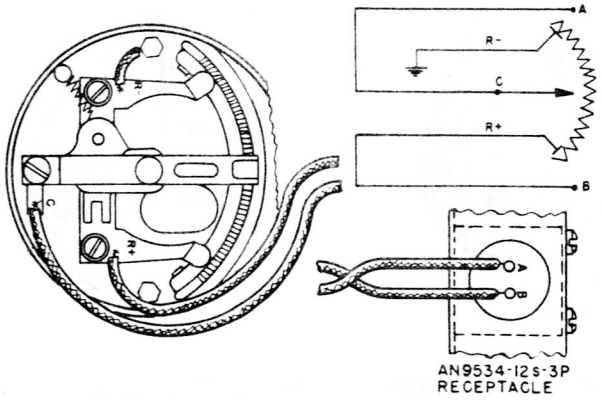


Figure 203—Internal Wiring Diagram for EA-15, -15A and -15B Tank Unit (Special Reversed Pivot)

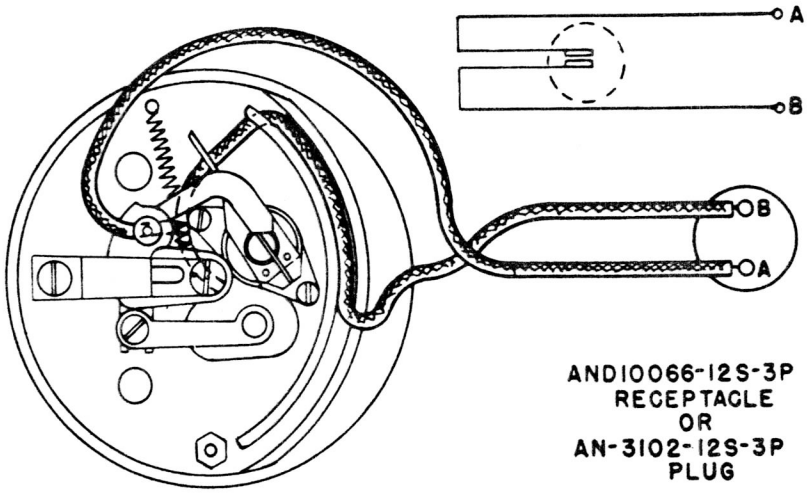


Figure 204—Internal Wiring Diagram for EA-92W Tank Unit

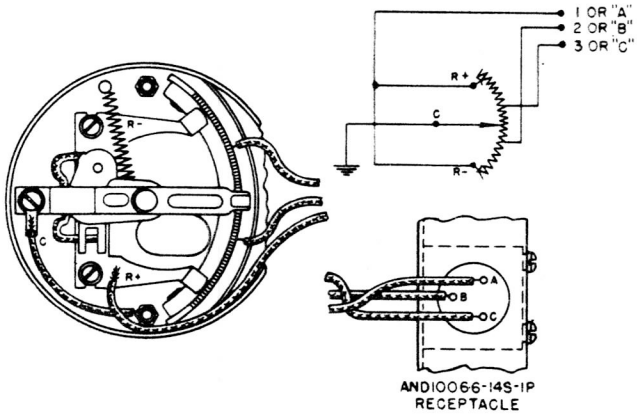


Figure 204A—Internal Wiring Diagram for EA-84X-1L Tank Unit

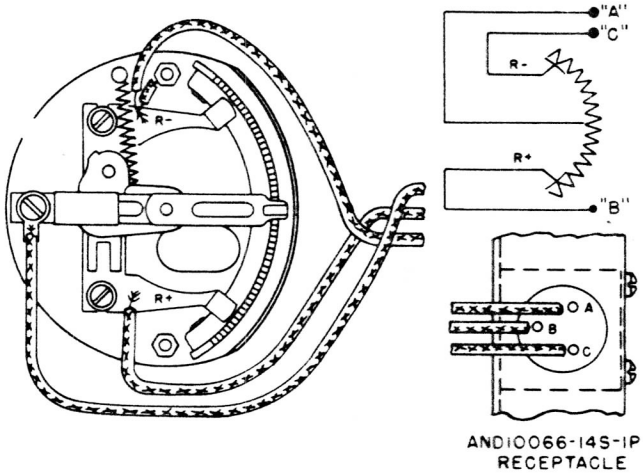


Figure 204-C—Internal Wiring Diagram for EA-15X-2 Tank Unit

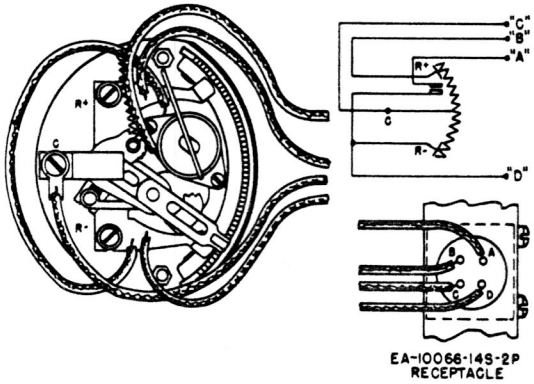


Figure 204-B—Internal Wiring Diagram for EA-15W-249 and -250 Tank Units

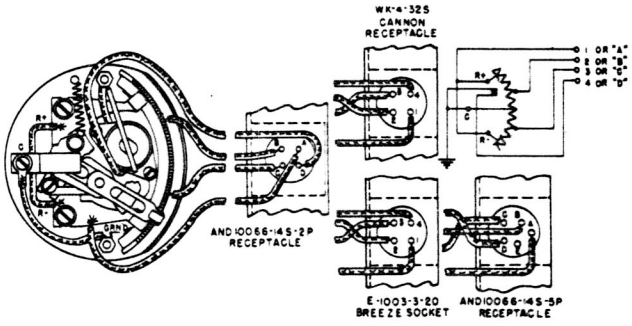


Figure 204-D—Internal Wiring Diagram for EA-190W Tank Units

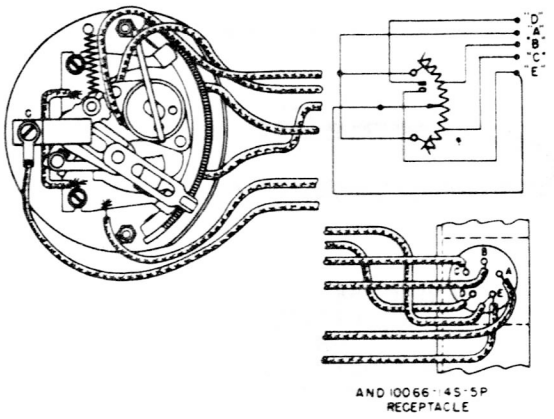


Figure 204-E—Internal Wiring Diagram for EA-65W-203 and -207 Tank Units

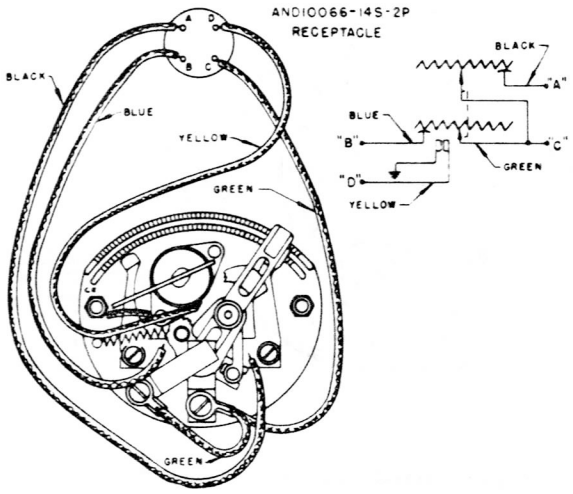


Figure 204-F—Internal Wiring Diagram for EA-225W-1 and -2 Tank Units

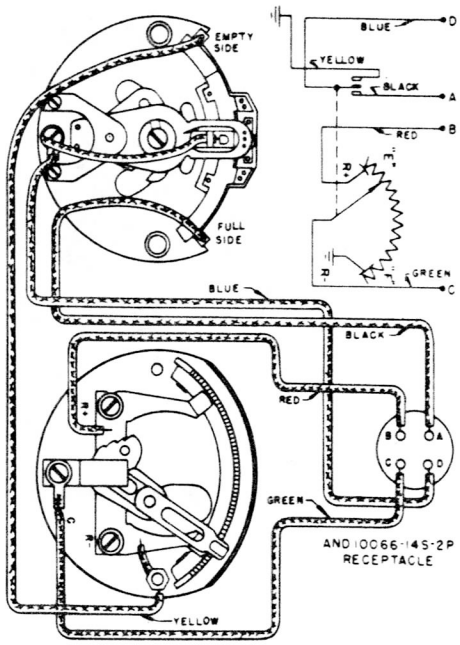


Figure 204-G—Internal Wiring Diagram for EA-85C-203 Tank Unit

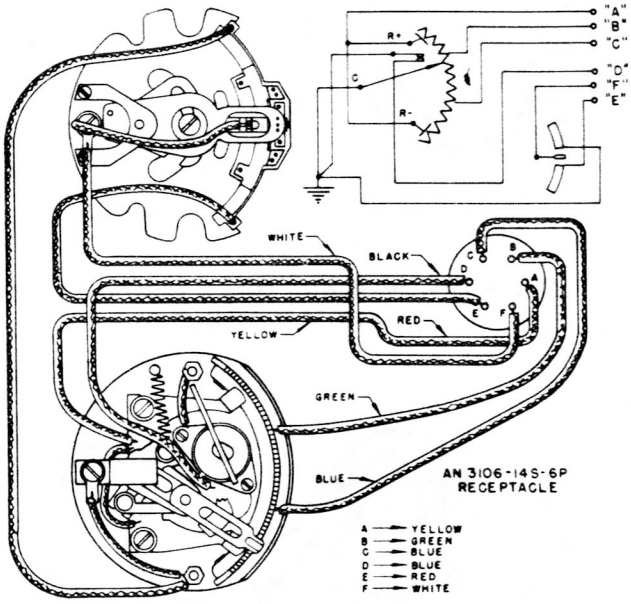


Figure 204-H—Internal Wiring Diagram for EA-65AWC-170A-K-5409 Tank Unit

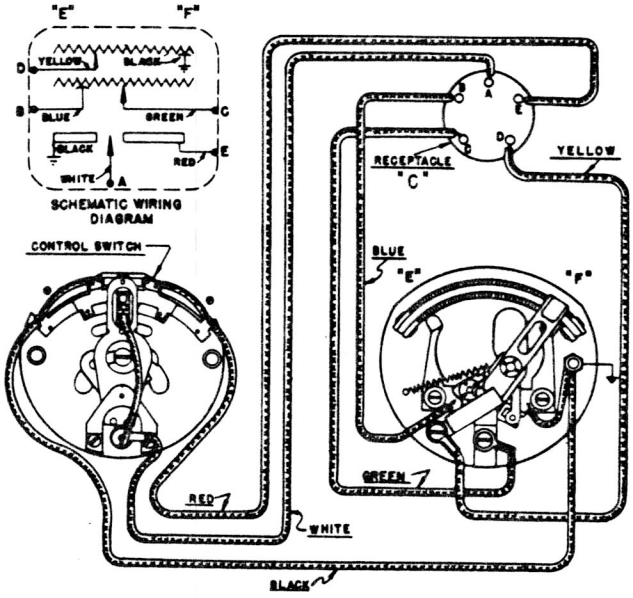


Figure 204-J—Internal Wiring Diagram for EA-529BC Tank Unit

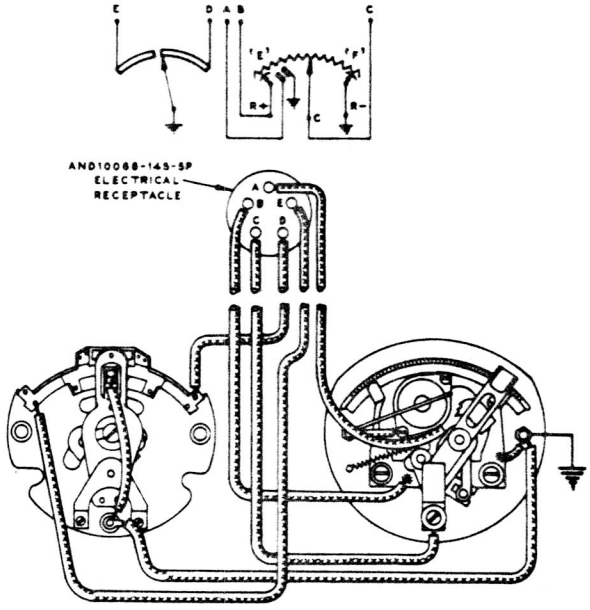


Figure 204-L—Internal Wiring Diagram for EA-85BWC-326 Tank Unit

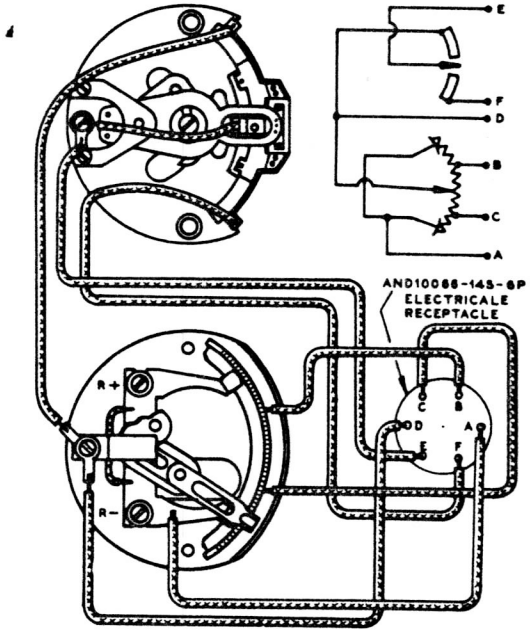


Figure 204-K—Internal Wiring Diagram for EA-565C-245 Tank Unit

SECTION IV
DISASSEMBLY, INSPECTION, REPAIR, AND REASSEMBLY

Successful instrument repair requires an ability to handle delicate parts, a knowledge of fundamentals of electrical phenomena, and a thorough knowledge of ordinary mechanical repairs such as soldering, etc. Cleanliness of surroundings and proper lighting are essential for efficient repair of instruments. Metallic particles, iron filings, etc., should be removed from the immediate vicinity of the repair table and every effort must be made to keep the instrument parts from becoming contaminated. Friction encountered in the instrument mechanism will depend largely upon how closely the principles of cleanliness have been adhered to. Proper lighting plays an important part in this work and the light source must be considered as one of the most important tools. Whenever possible the forearms should rest on the repair table and the wrist should be firmly supported during hand motions especially when the moving element is the object being handled.

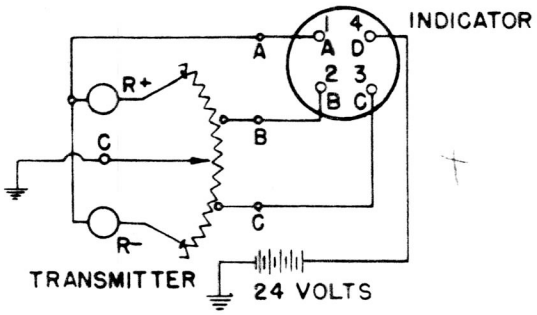
1. OVERHAUL TOOLS REQUIRED

a. LIQUIDOMETER TOOLS.

Part No.	*Nomenclature*	*Application*
T-1	Fixture—Dial Change Indicator Figure 239A	Holding Dial Change Indicator while making repairs.
T-2	Fixture—Tank Unit Housing Figure 251A	Holding Tank Unit Housing while tightening sylphon nut.
T-3	Tool—Staking Figure 250A	Staking of Float to hold float in place.
T-4	Driver—Return Magnet Screw Figure 226	Adjusting Return Magnets.
T-5	Driver—Lock Nut Screw Figure 227	Tightening Nut—Locking front jewel to case.
T-6	Tester—Sylphon Figure 251B	Testing Bellows Seal for leaks.

b. WESTON TOOLS.—The following is a list of special tools and equipment necessary for overhauling the indicators covered herein. The column headed "Used With" means that the tools having a letter in this column are not complete in themselves. For example, insert ST18494 which has an "A" in the "Used With" column is used in handle ST19513 also marked "A" in the column.

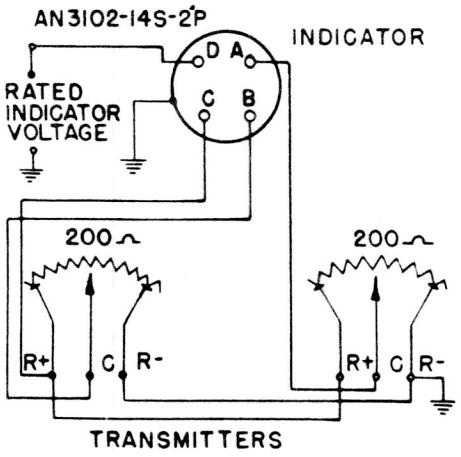
Part No.	*Nomenclature*	*Used With*	*Application*
ST-18494	Wrench, Socket Insert	A	Removing pivot base nut.
ST-18951	Wrench, Insert .160 inch Hex.	B	Mounting magnet to movement plate.
ST-19314	Handle, Wrench	B	
ST-19513	Handle, Socket Wrench	A	Removing pivot base nut.
ST-19645	Inserter, Pivot	C	Inserting Pivots.
ST-19646	Handle, Pivot Inserter	C	Inserting Pivots.
ST-30055	Screwdriver, Straddle		Mounting pole pieces and base.
ST-34031	Wrench, Spring Balance		Adjusting balance weights.
ST-34997	Wrench, Spring Balance		Adjusting balance weights.
ST-36367	Wrench, Spring Balance		Adjusting balance weights.
ST-38096	Wrench, Balance .072 inch Hex.		Adjusting balance weights.
ST-54533	Pliers, Pivot Extracting		Removing pivots.
ST-55316	Fixture, Laboratory (figure 240)		Supporting mechanism.
ST-57390	Fixture, Mechanism Assembly (figure 241)		Moving Element repair.
FAD42D270	Decade Resistance Box		Indicator adjustment.



POINTER INDICATION	POTENTIOMETER RESISTANCE IN OHMS C TO A
EMPTY	76.5 ±2% (C BETWEEN A & B
FULL	76.5 ±2% (C BETWEEN A & C
CENTER	250. ±2%

NOTE :- THE ABOVE VALUES ARE WITH THE TWO ENDS OF THE TANK UNIT CONNECTED TOGETHER. THESE POINTS SHOULD BE DETERMINED WITH POTENTIOMETER UNIT OUT OF CIRCUIT.

FOR EA-100, EA-101 AND EA-101A INDICATORS

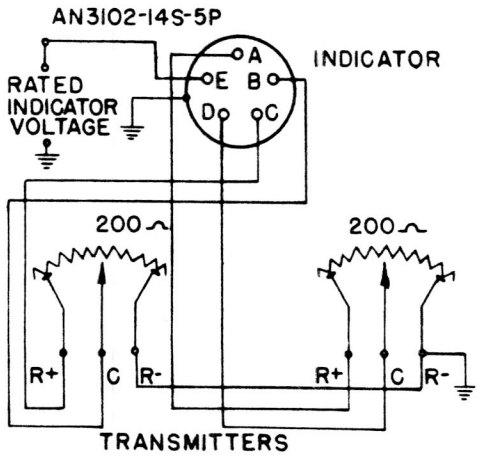


POTENTIO-METER POSITION	POTENTIOMETER RESISTANCE C TO R+	C TO R-
EMPTY	16.8	184.2
CENTER	100.5	100.5
FULL	184.2	16.8

CONNECTIONS SHOWN ARE STANDARD. ALTERNATE CONNECTIONS APPLYING TO SPECIAL INDICATORS ARE AS FOLLOWS.

TANK UNIT TRANSMITTER TERMINALS	INSTRUMENT RECEPTACLE AN3102-14S-2P (SPECIAL) FOR P-39	WK-4-32S (SPECIAL) FOR YP-38	WK-4-32S E-1003-3-20
R+	A	3	3
C LEFT TANK	B	1	2
C RIGHT TANK	C	2	1
R-	GROUND.	GROUND	GROUND
POWER SUPPLY	D	4	4

FOR EA-108 AND EA-108A INDICATORS



POTENTIO-METER POSITION	POTENTIOMETER RESISTANCE C TO R+	C TO R-
EMPTY	16.8	184.2
CENTER	100.5	100.5
FULL	184.2	16.8

CONNECTIONS SHOWN ARE STANDARD. ALTERNATE CONNECTIONS APPLYING TO SEPARATE INDICATORS ARE AS FOLLOWS.

TANK UNIT TRANSMITTER TERMINALS	INSTRUMENT RECEPTACLE AN3102-16S-1P (UNGROUNDED SYSTEMS)	E-1003-7-10
R+ LEFT TANK	C	3
R+ RIGHT TANK	E	1
C LEFT TANK	B	2
C RIGHT TANK	D	4
R-	A	GROUNDED
POWER SUPPLY	G	5

FOR EA-104, EA-124 AND EA-148 INDICATORS

Figure 205—Electrical Inspection

2. INDICATORS (LIQUIDOMETER).

Note

Due to the nature of the instruments, disassembly, cleaning, inspection, testing and repair and reassembly are all covered in this section as follows, since all operations are performed more or less simultaneously.

a. INSPECTION.—Make sure all connections are clean and tight.

(1) FRICTION TEST. — The friction of the instrument when measured at any point on the scale and after tapping should not exceed three degrees at zero, or four degrees at any other point on 90 and 120 degree scale indicators, and three degrees at zero and five degrees at any other point on 300 degree scale indicators. The friction can be determined by bringing the pointer slowly to any indication on the dial, and tapping the instrument lightly.

(2) OPEN OR SHORTED COILS.—If the instrument fails to operate properly, due to open or shorted coils inside the mechanism, then it becomes necessary to replace mechanism. (See paragraph 2.*b.*(3), this section.)

(3) SCALE CALIBRATION — THE "EMPTY", "CENTER", and "FULL" positions should be determined from the table given in figure 205. At the start, adjustment screws on tank unit should be set at neutral, but may be adjusted to bring pointer to proper calibration points. Pointer indications should agree with calibration points on tank unit within plus or minus 2 percent after adjustments.

b. REPAIR FOR ALL INDICATORS EXCEPT AN TYPE *(See figure 206)*

(1) TO REPLACE GLASS.

(a) Remove eight bezel screws.

(b) For indicators without indirect lighting: remove bezel, take out snap ring and glass.

(c) For indicators with indirect lighting: remove bezel, take out translucent ring, glass and gasket.

(d) Reassemble in reverse order, using a new glass. Replace gasket, if necessary.

CAUTION

Care should be taken not to damage pointer or pointers.

(2) TO REPLACE DIAL.

(a) REMOVE BEZEL.

1. Remove eight bezel screws.

2. For indicators without indirect lighting: remove bezel, take out snap ring and glass.

3. For indicators with indirect lighting: remove bezel, take out translucent ring, glass and gasket.

(b) Remove dial screws and dial.

Note

Dials can be removed from all indicators without disturbing the pointers, except the EA-104 and EA-108 Indicators. For these indicators, dismount pointers before removing dial.

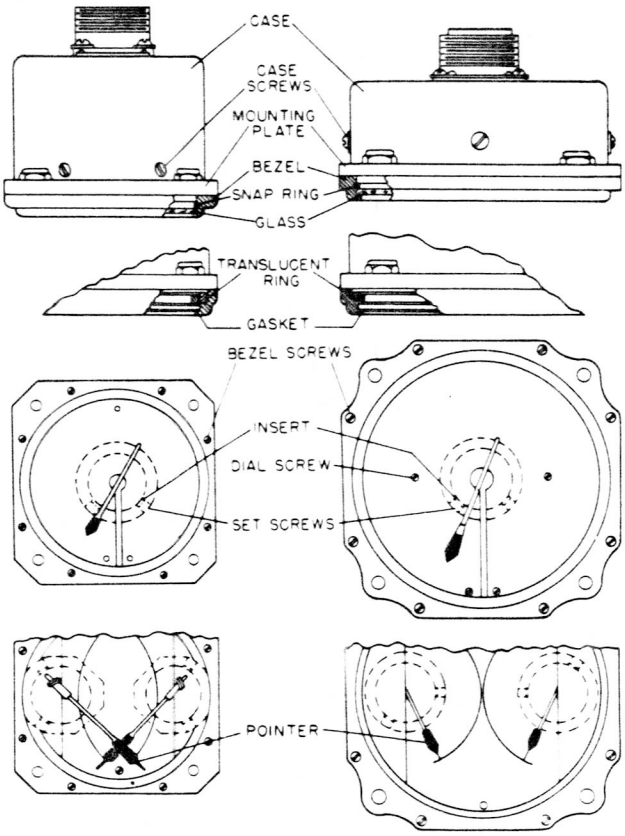


Figure 206—Disassembling of Indicators

(c) Reassemble in reverse order, using new dial.

Note

For EA-104 and EA-108 indicators, pointers must be reassembled after replacing dial as indicated in paragraph 2.*b.*(5), this section.

(3) TO DISMOUNT MECHANISM FROM INSTRUMENT.

(a) Remove screws from side of case.

(b) Carefully separate case assembly from mounting plate assembly.

CAUTION

Care should be taken not to strain connection wires, which connect the two units, as a broken wire will result.

(c) Inspect inside of instrument, noting position of mechanism in relation to mounting plate. Also, note the terminal positions of all leads coming from the socket. At reassembly, these leads must be again connected in their original positions.

(d) Disconnect all leads coming from mechanism.

(e) Remove bezel.

1. Remove eight bezel screws.

2. For indicators without indirect lighting: remove bezel, take out snap ring and glass.

3. For indicators with indirect lighting: remove bezel, take out translucent ring, glass and gasket.

CAUTION

Care should be taken not to damage pointer, as a wrong reading will result due to a twisted pointer.

(f) Carefully remove pointer.

(g) Remove setscrews and inserts. Mechanism can now be lifted out of the adapter.

Note

For indicators without mechanism adapters, dismount dial and remove three screws holding mechanism to mounting plate.

(4) TO MOUNT A REPLACEMENT MECHANISM.

(a) Insert mechanism in adapter so that the coil next to the locating pin at rear of mechanism is approximately at the bottom. Place an insert in each hole in the adapter, then tighten setscrews to temporarily hold mechanism in position.

Note

It is necessary to place one insert before each setscrew so as to prevent the screw from raising a burr on the mechanism case, which would prevent further movement of the mechanism within the adapter.

(b) Temporarily mount glass and bezel to mounting plate. This will protect the shaft of the rotor, during wiring operations, and at the same time eliminate possibility of dust entering the mechanism.

(c) Wire mechanism according to internal wiring diagram, using the internal wiring diagram for the particular indicator being repaired. Make sure all connections are clean and tight.

(d) Mount case on mounting plate, using screws provided for same.

(e) Remove glass and bezel as temporarily assembled.

(f) The indicator is now ready to have its pointer or pointers assembled.

(5) ASSEMBLY OF POINTER TO INSTRUMENT.

(a) Connect indicator to circuit using diagram applicable to the indicator. (Refer to electrical inspection diagrams, figure 205.)

(b) With the transmitter at "EMPTY" set the pointer to the approximate corresponding position on the dial. The pointer is to be set only once, and when assembled it is not to be removed. Apply a small quantity of quick-drying, clear lacquer to the hole of the pointer hub to cement the hub and the rotor shaft together.

Note

Care should be taken to see that the lacquer does not flow down between the jewel and the rotor shaft.

(c) If the pointer indicates correctly over the "EMPTY" and "FULL" positions of the dial for the corresponding positions of the transmitter, and the pointer clearance of the dial is between .030 of an inch and 0.45 of an inch, no further adjustments are required. The setscews should be tightened to hold the mechanism firmly in position.

(d) If pointer indicates correctly, but clearance of the dial is incorrect, loosen setscrews and move mechanism in or out as required, to obtain proper spacing. Setscrews should then be tightened to hold mechanism firmly in place.

(e) If the pointer indications are shifted either to one side or the other, loosen setscrews and turn mechanism about its axis until the pointer indications correspond to the transmitter settings at "EMPTY" and "FULL". If a slight unbalance is noted, this unbalance should be divided equally at both ends of the scale.

Note

For indicators where the mechanisms are mounted with three screws through the front of the mounting plate, the adjustments (paragraphs 2.*b*.(5)*(b)* to *(e)* cannot be made as outlined in those paragraphs but must be considered when mounting the pointer. In this case, the pointer must be set at "EMPTY" and checked at "FULL". If a slight unbalance is noticed, then this unbalance must be divided at both ends of the scale. Thus, if the pointer reads exactly "ZERO" at "EMPTY" but it reads 2 degrees over at "FULL", then the pointer must be relocated so that it reads 1 degree below "EMPTY" and 1 degree above "FULL". A few trials may be necessary to locate pointer in the proper position. At this time it is also necessary to see that the pointer has the proper distance above the dial. Having located the pointer as indicated above, apply a small quantity of quick-drying, clear lacquer to the hole of the pointer hub to cement the hub and rotor shaft together.

(f) Check operation of the magnetic return. When power is turned off, pointer should swing off scale from any position on the dial. If the magnetic return does not swing off scale, make sure that the pointer is free and that the mechanism has been correctly wired. If the instrument still fails to operate, due to magnetic return, mechanism should be replaced.

(g) Check for free operation of the pointer over the whole scale by operating pointer of the indicator slowly back and forth a few times.

(h) To adjust pointer balance, place the indicator in a horizontal position and adjust the transmitter

so that the pointer reads "ZERO". Pick up the indicator so that the dial is in a vertical position, and rotate the complete indicator until the pointer is horizontal. Note any change in indication. Rotate indicator 180 degrees (dial still vertical) and again note any change in indication. Balance pointer by adding or subtracting weight on the tail of the pointer until balance in the three positions mentioned is within 1 degree. Balance at any other position should be within 2 degrees. It should be noticed at this time that the side balance of the rotor has been taken into consideration during the charging of the rotor. Rotors are charged so that the heavy side of the rotor always lines up with the axis of the pointer. With a normal straight pointer, no trouble should be encountered with side balance.

CAUTION

The "EMPTY" and "FULL" calibration points on the finished dials are not in all cases symmetrical about the vertical center line of the dial. However, when the indicator itself is to be tested, the end points shall be checked in accordance with the scales shown in Figure 341. If the "EMPTY" and "FULL" marks on the finished dial do not coincide with these points, then adjustments to these marks are to be made in the tank unit. For example, the "FULL" mark on a 300-degree dial may be 5 degrees short of the 300-degree mark. When testing the indicator with a standard transmitter the pointer travel should be from 0 to 300-degrees. When the indicator is installed, the tank unit is then to be adjusted so that the pointer travels from "0" to "F".

c. REPAIR FOR AN TYPE INDICTORS

(See figure 206-A)

(1) TO REPLACE GLASS.

(a) Remove three case screws.

(b) Disengage snap ring from case assembly, and remove glass.

(c) Reassemble in reverse order, using a new glass, and applying new putty.

CAUTION

Care should be taken not to damage pointer or pointers.

(2) TO REPLACE DIAL

(a) Remove case assembly by removing three case screws.

(b) Remove dial screws, dial shield (if present) and dial.

Note

Dials can be removed from all indicators without disturbing pointers, except the EA-100AN, EA-101AN and EA-125AN indicators. For these indicators dismount pointers before removing dial.

(c) Reassemble in reverse order, using new dial.

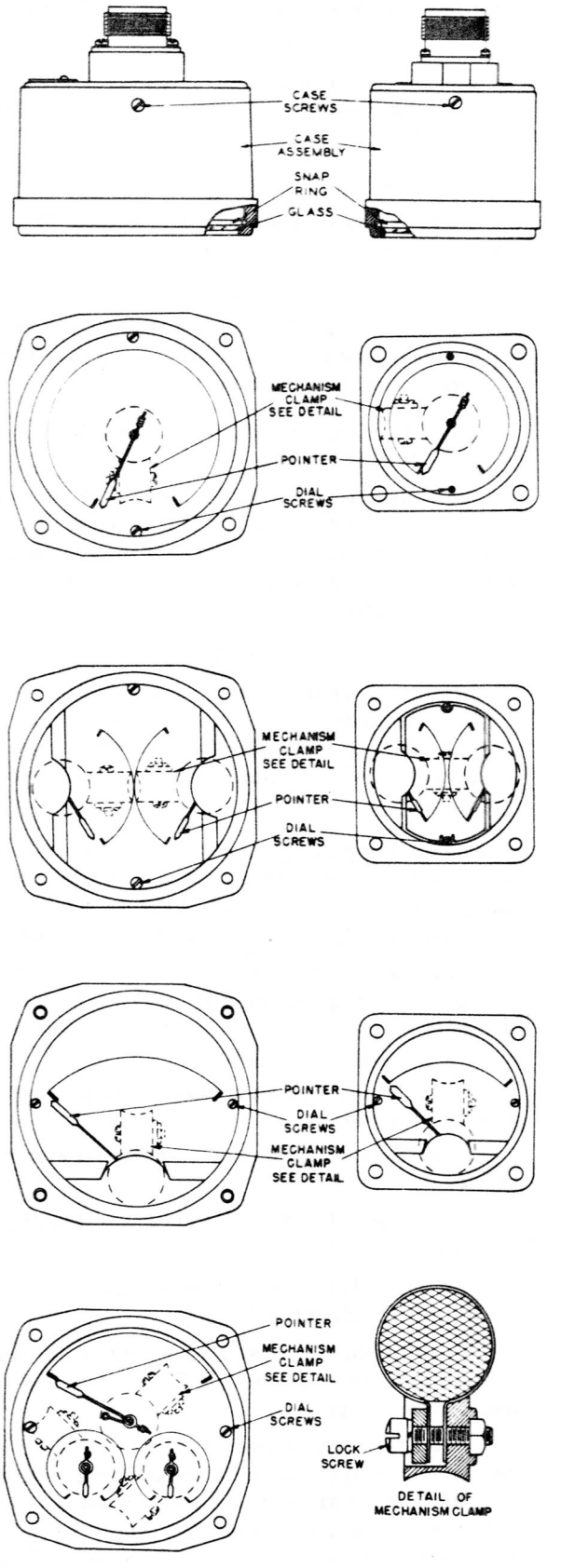


Figure 206-A—Disassembling of AN Type Indicators

Note

For EA-100AN, EA-101AN and EA-125AN indicators, pointers must be reassembled after replacing dial as indicated in paragraph 2.*b.*(5) this section.

(3) TO DISMOUNT MECHANISM FROM INSTRUMENT.

(a) Remove case assembly by removing three case screws.

(b) Inspect inside of instrument, noting position of mechanism in relation to its mounting plate. Also note the terminal positions of all leads coming from the mechanism, or use internal wiring diagram. At reassembly, these leads must be again connected in their original positions.

(c) Disconnect all leads coming from mechanism.

(d) Carefully remove pointer.

(e) Loosen lock screw (see figure 206-A). This will loosen strap clamping mechanism in place. Mechanism can now be withdrawn from clamp.

Note

All mechanisms are mounted in the same manner and the above instructions will apply to all indicators.

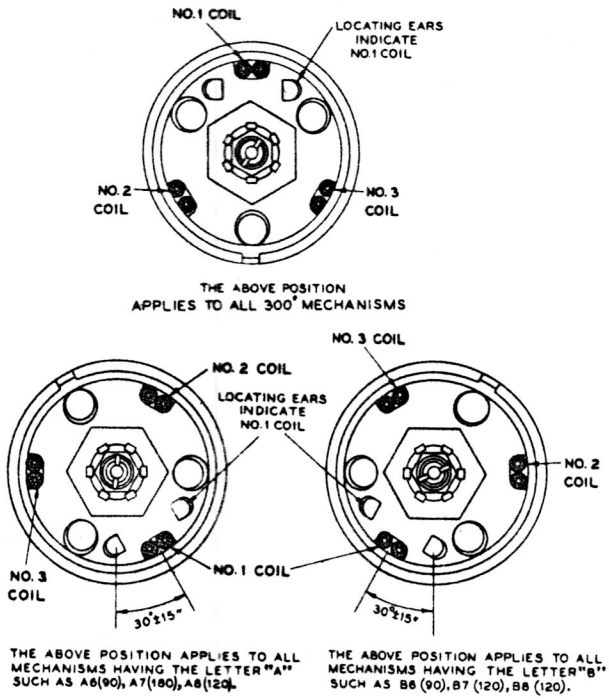


Figure 206-B—Methods of Mounting Mechanisms for AN Type Indicators

(4) TO MOUNT A REPLACEMENT MECHANISM.

(a) Insert mechanism in adaptor, taking care that the coils are mounted as shown in figure 206-B. Mechanism will operate more efficiently when mounted as shown by this illustration.

(b) Wire mechanism according to internal wiring diagram for the particular indicator being repaired. Make sure all connections are clean and tight.

(c) The indicator is now ready to have its pointer or pointers reassembled.

(5) ASSEMLY OF POINTER TO INSTRUMENT.

(a) Connect indicator according to circuit diagram applicable to the indicator (refer to electrical inspection diagrams figures 205, 336, 337, 338, 339, 340).

(b) With the transmitter at "EMPTY" set the pointer to the approximate corresponding position on the dial. The pointer is to be set only once, and when assembled is not to be removed. Apply a small quantity of quick drying, clear lacquer to the hole of the pointer hub to cement the hub and the rotor shaft together.

Note

Care should be taken to see that the lacquer does not flow down between the jewel and the rotor shaft.

(c) If the pointer indicates correctly over the "EMPTY" and "FULL" positions of the dial for the corresponding positions of the transmitter, and the pointer clearance of the dial is between .030 and .045 of an inch, no further adjustments are required. The lock screw should be tightened to hold the mechanism firmly in place.

(d) If the pointer indicates correctly, but clearance over the dial is incorrect, loosen lock screw and move mechanism in or out as required, to obtain the proper spacing. The lock screw should then be tightened to hold mechanism firmly in place.

(e) If the pointer indications are shifted either to one side or the other, loosen lock screw and turn mechanism about its axis until pointer indications correspond to the transmitter settings at "EMPTY" and "FULL". If a slight unbalance is noted, this unbalance should be divided equally at both ends of the scale.

(f) Check operation of magnetic return. When the power is turned off, the pointer should swing off scale from any position of the dial. If the magnetic return does not swing the pointer off scale, make sure that the pointer is free and that the mechanism has been correctly wired. If the instrument still fails to operate due to magnetic return, the mechanism should be replaced.

(g) Check for free operation of the pointer over the whole scale by operating the pointer of the indicator slowly back and forth a few times.

(h) Adjust pointer balance. See paragraph 2.*b.*(5)*(h)*.

3. MECHANISMS.

The mechanism is a ratiometer having a magnetic rotor moving in a field produced by three stationary coils. The transmitter (located in the tank) controls the current flowing through these coils, and the resulting magnetic field in turn positions the rotor. The rotor, and the pointer carried by it, are the only moving parts of the ratiometer. No hairsprings are used. A return magnet controls the pointer when the power is turned off.

These instructions apply to the following mechanisms:

EA-10210A5 (90°)	90° Clockwise scale.
EA-10210A5-1 (90°)	Same as EA-10210A5 except with three front mounting holes for interchangeability with EA-10210A4 mechanism.
EA-10210B5 (90°)	90° Counter-clockwise scale.
EA-10210B5-1 (90°)	Same as EA-10210B5 except with three front mounting holes for interchangeability with EA-10210B-4 mechanism.
EA10210A5 (120°)	120° Clockwise scale.
EA-10210B5 (120°)	120° Counter-clockwise scale.
EA-10210C2	300° Scale, return down, "V" jewel construction. Interchangeable as a unit with EA-10210C3.
EA-10210C2-1	Same as EA-10210C2 except with three front mounting screws for interchangeability with EA-10210C1 and EA-10210C3-1 mechanisms.
EA-10210C2-2	Same as EA-10210C2 except with longer leads for EA-150 and EA-155 Indicators. Interchangeable as a unit with EA-10210C3-2.
EA-10210C3	300° scale, return down, ring jewel construction. Interchangeable as a unit with EA-10210C2.
EA-10210C3-1	Same as EA-10210C3 except with three front mounting screws for interchangeability with EA-10210C1 and EA-10210C3-1 mechanisms.
EA-10210C3-2	Same as EA-10210C3 except with longer leads for EA-150 and EA-155 Indicators. Interchangeable as a unit with EA-10210C2-2.
EA-10210D2	300° scale, return up, "V" jewel construction. Interchangeable as a unit with EA-10210D3.
EA-10210D3	300° scale, return up, ring jewel construction. Interchangeable as a unit with EA-10210D2.
EA-10210A6 (90°)	90° Clockwise scale interchangeable with EA-10210A5 (90°).
EA-10210B6 (90°)	90° Counter-clockwise scale interchangeable with EA-10210B5 (90°).
EA-10210A7 (120°)	Standard 120° Clockwise mechanism with essentially uniform scale.
EA-10210B7 (120°)	Standard 120° Counter-clockwise mechanism with essentially uniform scale.
EA-10210A8 (120°)	120° Clockwise mechanism with non-uniform scale. Interchangeable with EA-10210A5 (120°) mechanism.
EA-10210B8 (120°)	120° Clockwise mechanism with non-uniform scale. Interchangeable with EA-10210B5 (120°) mechanism.
EA-10210C6 (300°)	300° Scale, return down. Interchangeable with EA-10210C3 mechanism.
EA-10210D6 (300°)	300° Scale, return up. Interchangeable with EA-10210D3 mechanism.

The following resistance values in ohms apply to the following mechanisms:

Mechanism	*Coil 1*	*Coil 2*	*Coil 3*
EA-10210A6 (90°)	285-315	285-315	285-315
EA-10210A7 (120°)	285-315	285-315	120-140
EA-10210A8 (120°)	285-315	285-315	285-315
EA-10210B6 (90°)	285-315	285-315	285-315
EA-10210B7 (120°)	285-315	120-140	285-315
EA-10210B8 (120°)	285-315	285-315	285-315
EA-10210C6 (300°)	285-315	285-315	285-315
EA-10210D6 (300°)	285-315	285-315	285-315

For the sake of simplicity, mechanisms will hereinafter be referred to by their type number without the prefix EA-10210, such as A5(90) C2, etc. References made to the basic mechanisms will also apply to the corresponding variations listed above. For example, reference made to C2 mechanism will also apply to C2-1 and C2-2.

a. DISASSEMBLY, INSPECTION, REPAIR AND REASSEMBLY.

(1) DISASSEMBLY.—If it is found necessary to disassemble the mechanism for any reason, such as open or shorted coils, dirty or warn bearings, etc., the following procedure should be followed:

(a) Remove three screws from rear of mechanism. Loosen cement on scale adjusting screws with a few drops of thinner, then remove screws.

(b) Remove backplate assembly, rotor, and coil form assembly from case assembly. (See figure 207.) Care should be taken that the rotor and the return magnet do not come in contact with each other, or any other iron parts.

(2) COILS.—If coils are found to be open or shorted, proceed as follows:

(a) Cut away cord wound around leads, and remove coil at fault.

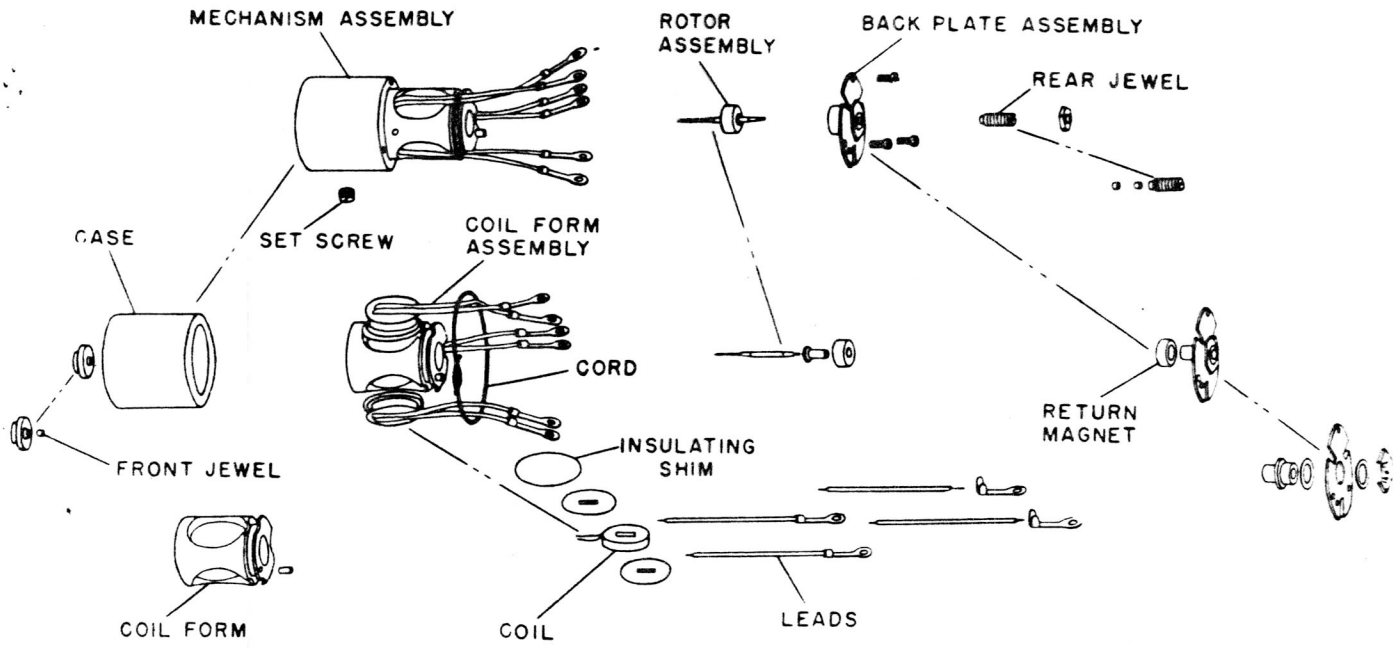


Figure 207—Exploded View of Mechanism

(b) Inspect groove in coil form to make sure that it is smooth and clean. When new coil is mounted, it is important that it will lie flat at the bottom of the groove.

(c) In order to obtain best results, the three coils for Type C2, C3, D2 and D3 mechanisms should be selected to be within 5 ohms of each other, in a range from 250 to 325 ohms. For Type A5 and B5 mechanisms, the two deflecting coils should be within 5 ohms of each other, in a range from 250 to 325 ohms. The scale control coil, mounted closest to the locating pin of the coil form, may vary from 250 to 350 ohms.

(d) To replace new coil, cement bottom of groove and coil; place an insulating shim in the slot and insert coil. Coil should be flat against bottom of groove.

(e) Wind cord around three coils, and tie securely.

(f) Test for shorts or breakdown between coil form and each coil lead.

(3) ROTOR.—If the rotor is found defective either mechanically or magnetically, proceed as follows:

(a) Inspect rotor to see that the shaft is straight and that the rotor body is firmly assembled to the shaft. Rotor body position in relation to shaft should be as indicated in figure 208.

(b) Inspect bearing surfaces of shaft. If severely worn or pitted, complete rotor should be replaced. If merely dirty, clean and polish. In case of rotors with "V" pivots, the radius of the pivot is to be between 0.0025 and 0.0035 inches.

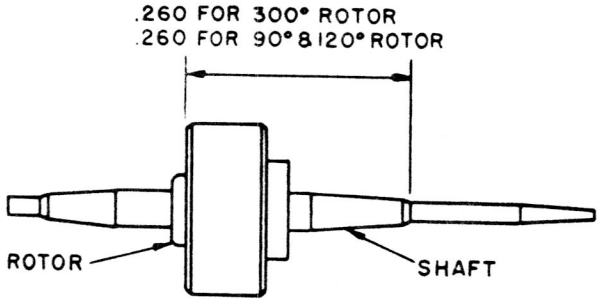


Figure 208—Rotor Assembly

(c) If the rotor is to be magnetized, demagnetize before recharging.

For A5 and B5 mechanisms, use pole pieces shown in figure 209. For C2, C3, D2 and D3 mechanisms, use pole pieces shown in figure 210. It is important that after charging, the rotors be kept clean and away from any iron parts or disturbing magnetic fields.

(4) RETURN MAGNET.

(a) If the return magnet is to be replaced, the complete backplate assembly should be replaced.

(b) If the return magnet is to be magnetized, demagnetize before recharging. Use pole pieces shown in figure 211. Adjustment of the return magnet is to be made after assembly. See section on Tests.

(5) JEWELS.—If jewels are to be replaced, proceed as follows:

(a) Remove rear jewel from backplate assembly. Cement around jewel screw should be loosened with a few drops of thinner before attempting to remove jewel.

PIECES FOR CHARGING ROTORS & RETURN MAGNETS

NOTE:-
THICKNESS OF ALL POLE PIECES 3/16. BACKSIDE OF POLE PIECES MADE TO FIT CHARGING UNIT.
ALL POLE PIECES ARE SYMMETRICAL.

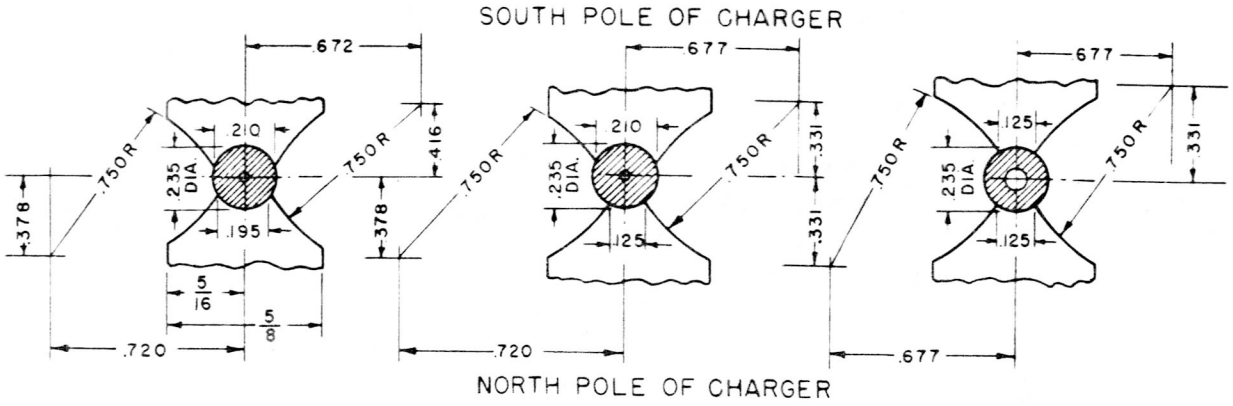


Figure 209—For A5 and B5 Mechanisms

Figure 210—For C2, C3, D2 and D3 Mechanisms

Figure 211—For All Return Magnets

(b) Inspect jewel under a microscope for dirt, roughness or cracks. If dirty, clean and reassemble.

If cracks or surface roughness are evident, replace with new jewel.

(c) Remove front jewel from case assembly. See figure 212 and repeat process. In reassambling, the front jewel is to be set to the dimension shown in figure 212.

(6) CLEANING AND POLISHING.—It is important, in order to insure proper operation of the mechanism, that all parts be thoroughly cleaned before assembly. Bearing surfaces on the rotor shafts should be carefully polished with powdered rouge, Grade One. Jewels and rotors are to be washed, preferably in trichlorethylene. Each part should be cleaned with pith or balsawood to remove any film left in washing. If necessary, the parts should be carefully blown over with clean, dry air or equivalent.

(7) REASSEMBLY.—After parts have been serviced as indicated above, they are to be reassembled as follows:

(a) Insert coil form into case assembly.

For Type A5 and B5 mechanisms, the deflecting coils are located under the two holes in the mechanism case for the adjusting screws. Do not insert adjusting screws in holes until mechanism is being tested.

For Type C2, C3, D2 and D3 mechanisms, the coil closest to the pin is to be assembled under the hole on the side of the mechanism case.

(b) Carefully insert rotor so that the shaft comes through the front jewel.

(c) Assemble backplate, making sure that the rear jewel is sufficiently backed off so as not to crack the jewels.

(d) Adjust end play clearance between rotor shaft and jewel to .003 to .004 inch.

(e) The mechanism is now ready for test.

Mech. Type	*Scale*	*Test Circuit*	*Standard Trans.*	*Scale Adjustments and Standard Scale*	*Scale Tolerance*	*Charging Pole Pieces*	
						Rotor	*Return Magnet*
A5 (90°)	90° Clockwise	Fig. 213	Fig. 219	Fig. 221	± 1.8°	Fig. 209	Fig. 211
A5 (120°)	120° Clockwise	Fig. 214	Fig. 219	Fig. 222	± 2.4°	Fig. 209	Fig. 211
B5 (90°)	90° Counterclockwise	Fig. 215	Fig. 219	Fig. 223	± 1.8°	Fig. 209	Fig. 211
B5 (120°)	120° Counterclockwise	Fig. 216	Fig. 219	Fig. 224	± 2.4°	Fig. 209	Fig. 211
C2 and C3	300° Return-down	Fig. 217	Fig. 220	Fig. 225	± 6°	Fig. 210	Fig. 211
D2 and D3	300° Return-up	Fig. 218	Fig. 220	Fig. 225	± 6°	Fig. 210	Fig. 211

TABLE 3

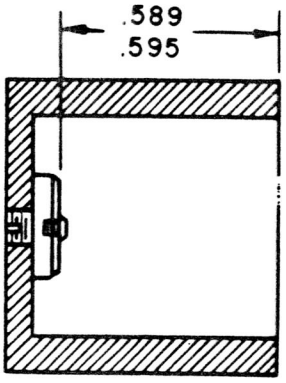


Figure 212—Mechanism Case Assembly

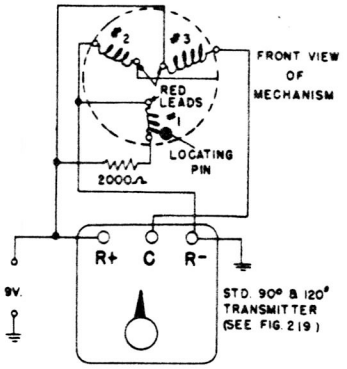


Figure 213—Test Circuit—Type A5 (90° Mech.)

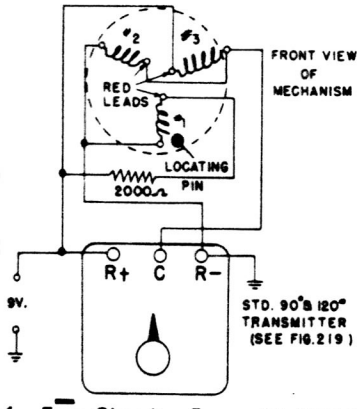


Figure 214—Test Circuit—Type A5 (120° Mech.)

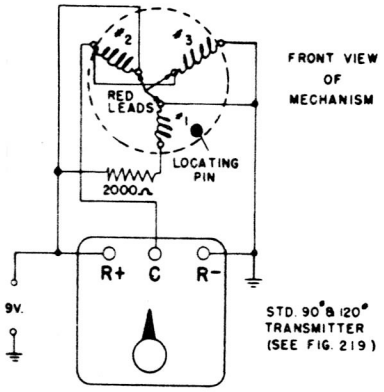


Figure 215—Test Circuit—Type B5 (90° Mech.)

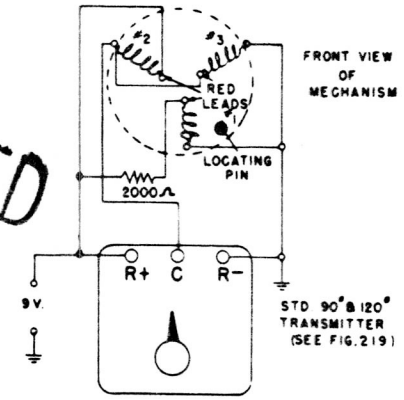


Figure 216—Test Circuit—Type B5 (120° Mechs.)

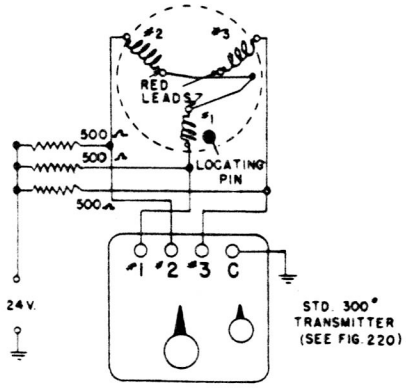


Figure 217—Test Circuit—Type C2 and C3 Mechs.

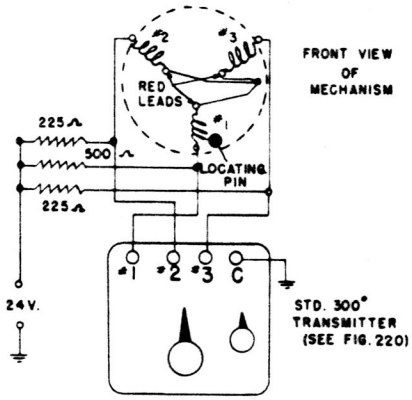


Figure 218—Test Circuits—Type D2 and D3 Mechs.

b. SCALE CHARACTERISTICS.

(1) TYPE A5 AND B5 MECHANISM.

(a) Connect mechanism in normal circuit. See Table 3.

(b) Set standard transmitter at "Empty". Mount pointer carefully to corresponding position on test dial.

(c) Adjust return magnet at rear of mechanism so that with the power off, the pointer will come to rest approximately 40° below "Empty".

(d) With the current on, check "Empty" and "Full". Should the pointer travel be greater or less than the required 90° or 120°, divide the difference equally at both ends of the scale by turning mechanism in its holder, then turn the return magnet one way or the other, as required, until scale is within ± 1° of these angles. After this adjustment, the power-off position of the pointer must again be checked. Set standard transmitter at "Full" and turn power off. The pointer must swing off scale from the "Empty" side of the dial and come to rest not less than 10° below "Empty".

(e) Set the standard transmitter at "Center". If the pointer indication is not within ½° of the true center of the scale, insert a steel scale adjusting screw in the proper hole of the shell, and screw in as far as necessary to bring the scale within ½° of the true center. See Table 3 for reference to scale adjustments and figures 221 to 224 inclusive for correct mechanism.

(f) Check the ¼ and ¾ mark. The pointer should indicate within the limits of the standard scale. See Table 3 for reference to standard scale.

(g) Place a brass screw in each hole of the mechanism case where a steel screw has not been used and seal all screws with lacquer or equivalent.

(2) TYPE C2, C3, D2 AND D3 MECHANISM.

(a) Connect mechanism in normal circuit. (See Table 3.)

(b) Set the standard transmitter at "Empty". Mount pointer carefully to corresponding position on test dial.

(c) Adjust return magnet at rear of mechanism so that with the power off, the pointer will indicate off-scale, approximately half way between "Empty" and "Full".

(d) With current on, check "Empty" and "Full". Should the pointer travel be greater or less than the required 300°, divide the difference equally at both ends of the scale by turning the mechanism in the holder, then adjust "End Scale Adjustment" on standard transmitter until scale comes within ± ½° of the end points.

(e) Operate mechanism through all points on the Standard Transmitter, and note pointer indication. If mechanism indicates correctly within tolerance, no further adjustments are necessary. If the pointer indication falls outside tolerance at one or more points, make the adjustments indicated on figure 225.

(f) If a steel screw has not been used, place a brass screw in the empty hole on the side of the shell, and seal with lacquer or equivalent.

c. FRICTION.—Friction is to be measured with a variable transmitter. (See paragraph 3.*d.*(5), this section.) The friction for any mechanism shall not exceed the tolerances specified.

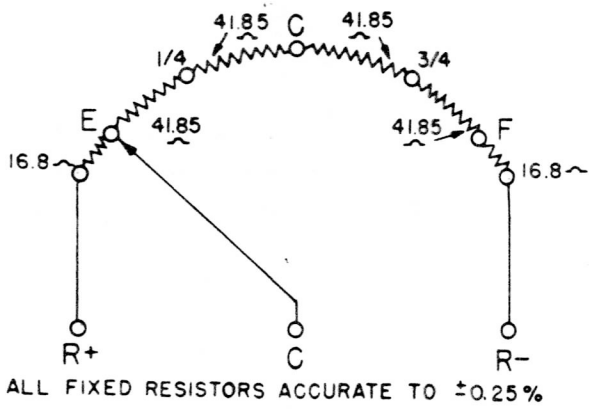
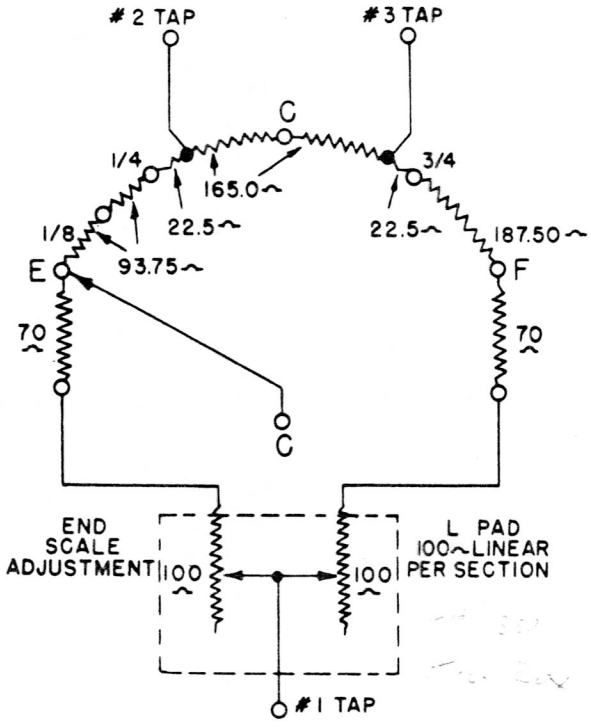


Figure 219—90° and 120° Standard A5 and B5 Mechanism



6 11/1350 Test Box

Figure 220—300° Standard Transmitter C2, C3, D2 and D3 Mechanism

SCALE ADJUSTMENTS OF 90° & 120° MECHANISMS(FRONT VIEW)

SCALE TOLERANCES 2% OF FULL SCALE

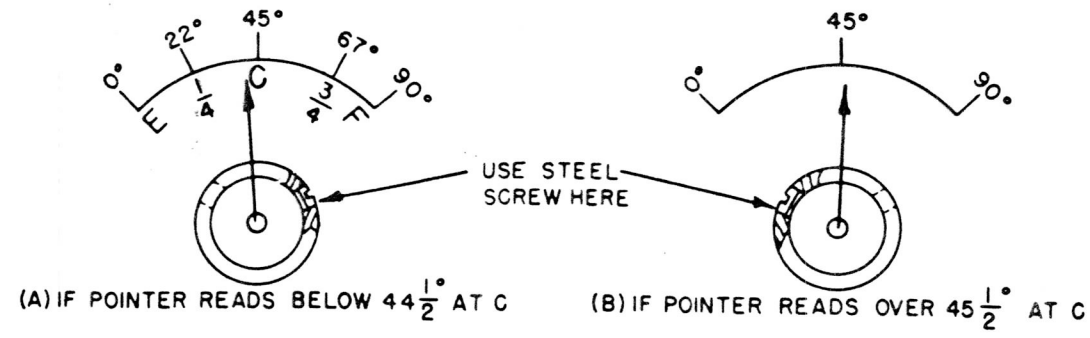


Figure 221—Type A5 Mechanism 90 Scale

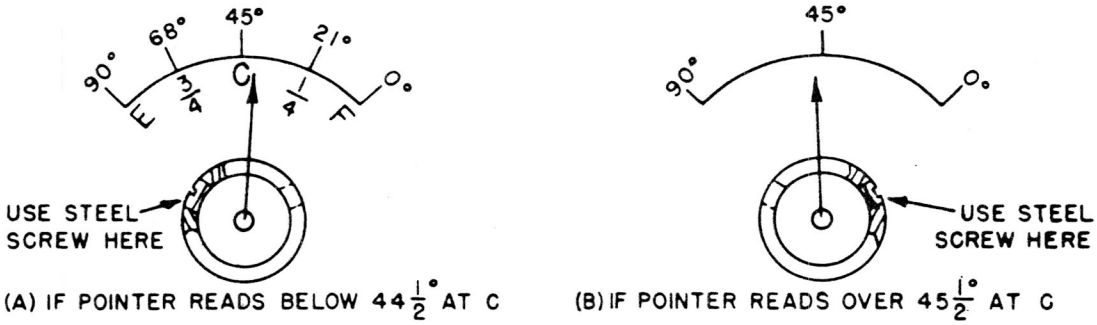


Figure 222—Type A5 Mechanism 120 Scale

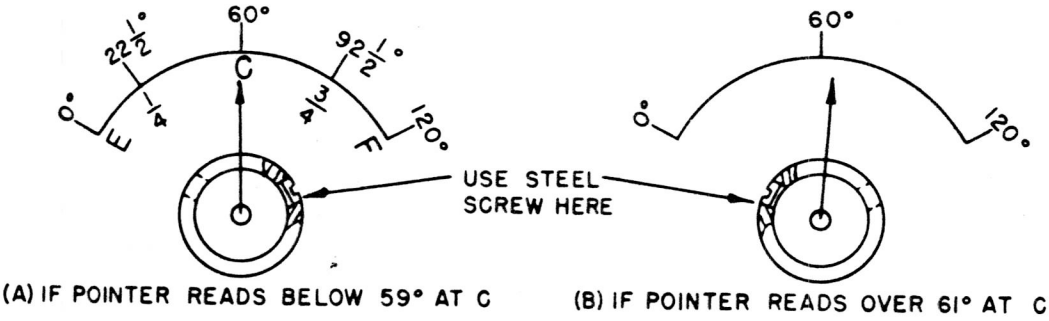


Figure 223—Type A5 Mechanism 120° Scale

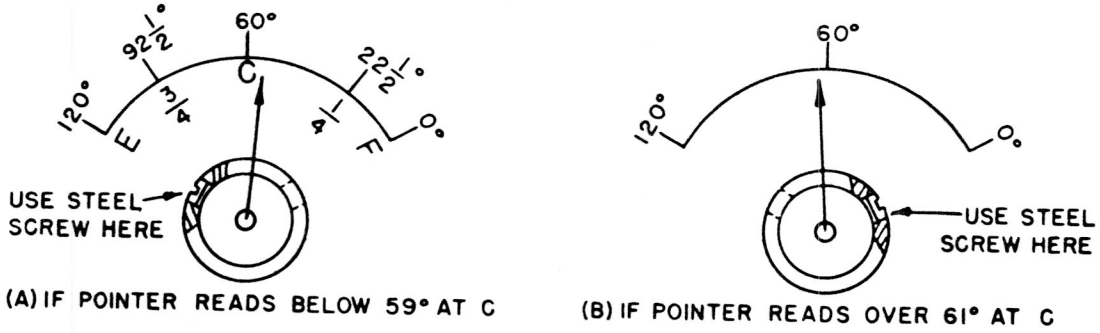


Figure 224—Type B5 Mechanism 120° Scale

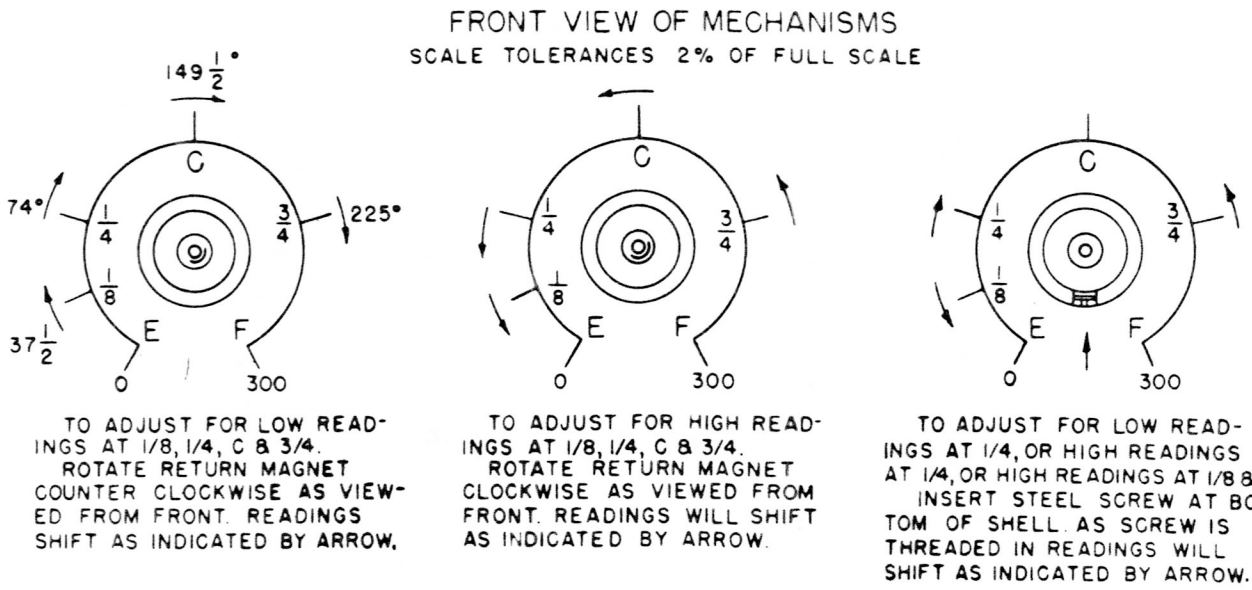


Figure 225—Scale Adjustments of 300° Mechanisms

d. SPECIAL EQUIPMENT.—The following special equipment is required for overhauling of the mechanism.

(1) RETURN MAGNET SCREW DRIVER.—The screw-driver is to be used for adjusting return magnets. (See figure 226.)

(2) LOCKNUT SCREW DRIVER FOR FRONT JEWEL.—This screw-driver is to be used for tightening the nut, locking the front jewel to the case. (See figure 227.)

(3) TEST DIALS.—Test dials for each type of mechanism are to be calibrated in mechanical degrees. Either a completely calibrated scale, or merely the point and tolerances corresponding to the positions of the standard transmitter may be used.

(4) STANDARD TRANSMITTER. — Standard transmitters are used for testing the scale characteristics of the mechanism. These transmitters are made with fixed resistors to reproduce accurately the various calibrating points. Standard Transmitter for 90° and 120° mechanism is shown in figure 219.

Standard Transmitter for 300° mechanism is shown in figure 220.

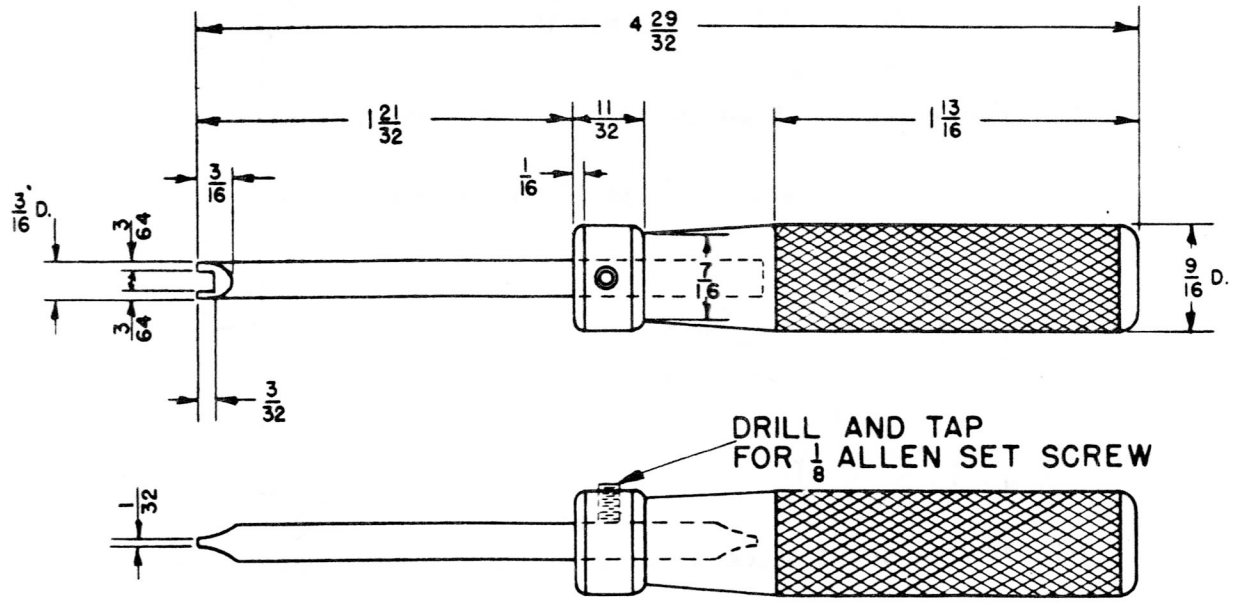


Figure 226—Return Magnet Screw Driver

(5) VARIABLE TRANSMITTER. — Variable transmitters are used for testing for friction of the mechanism at any part of the scale.

For 90° and 120° mechanisms, any standard 200 ohm potentiometer or a tank unit transmitter may be used.

For 300° mechanism, any standard 1000 ohm potentiometer, tapped to divide the resistance strip into three equal parts as shown in figure 228 may be used. These variable transmitters are used in circuit in place of the standard transmitters shown in the test circuits of figures 213 to 218 inclusive.

(6) CHARGING POLE PIECES.—Rotors and return magnets can be charged on any instrument charger being able to provide a minimum of 10,000 ampere turns per inch length of magnet. Details of the pole pieces are shown in figures 209, 210 and 211. These pole pieces are to be made to fit the charging fixture.

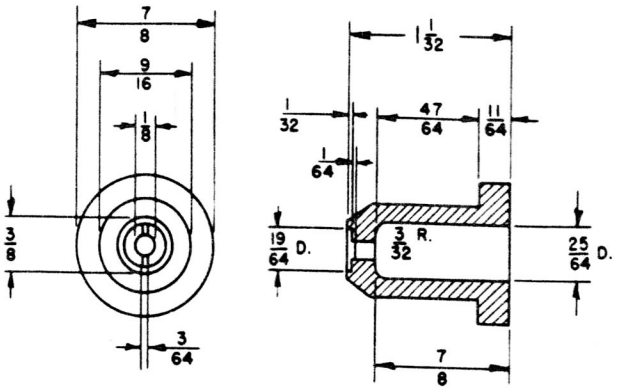


Figure 227—Locknut Screw Driver for Front Jewel

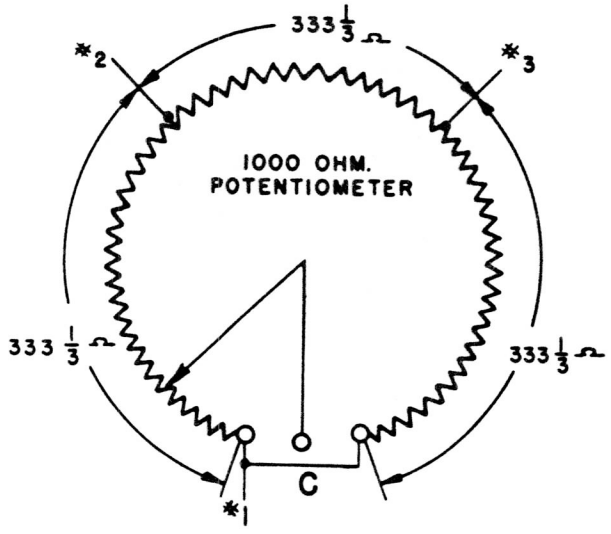


Figure 228—Variable Transmitter 300° Mechanism

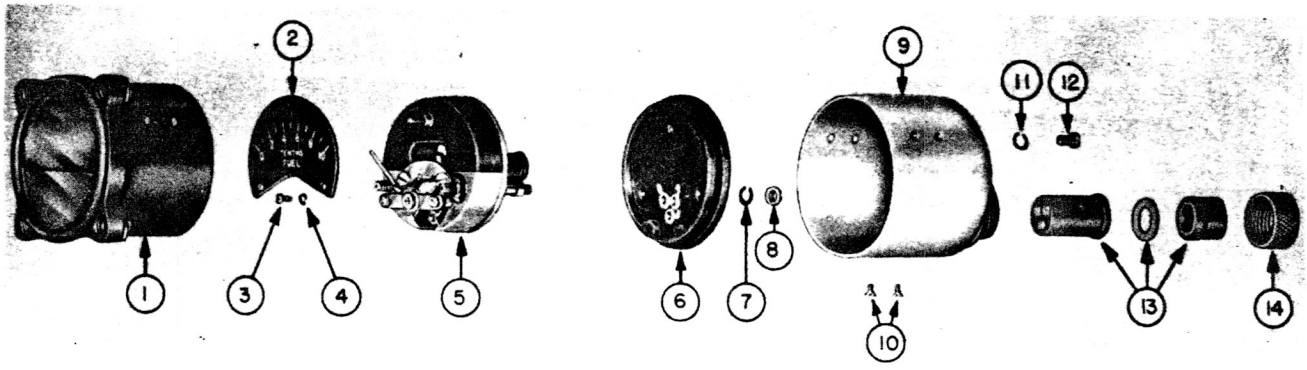


Figure 229—Case, Shield, Scale, and Base Removal—Model 727 Type 6, (Part No. 110026) Liquidometer EA-35

1. Case—Bakelite
2. Plate—Scale
3. Screw—Scale
4. Washer—Lock
5. Assembly—Mechanism
6. Base—Bakelite
7. Washer—Lock
8. Nut
9. Shield—Magnetic
10. Screw
11. Washer—Lock
12. Screw
13. Assembly—Plug
14. Nut—Locking

4. INDICATOR (WESTON).

a. PART NUMBERS 110026 AND 113665.

(1) CASE REMOVAL. *(See figure 229 or 230.)*

(a) Remove six shield to case screws (10).

(b) Withdraw the bakelite case (1) from the metal shield (9).

(2) SHIELD REMOVAL. *(See figure 229 or 230.)*

(a) Unscrew the knurled lock nut (14) from the shield (9) and remove the plug assembly (13). Part No. 110026 only.

(b) Remove the four shield to base screws (12) and four lock washers (11) on Part No. 110026 or receptacle housing grounding screw (17) and three shield to base screws (12) on Part No. 113665.

(c) Grasp the mechanism by the scale plate and carefully remove the magnetic shield (9).

(3) SCALE PLATE REMOVAL. *(See figure 229 or 230.)*

(a) Remove the two scale screws (3) and the two lock washers (4).

(b) Remove the scale plate (2).

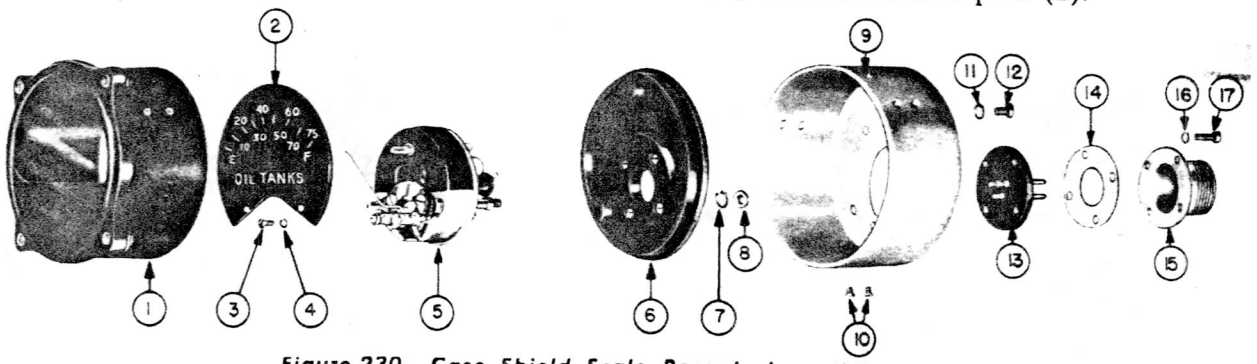


Figure 230—Case, Shield, Scale, Receptacle, and Base Removal—Model 728, Type 11 (Part No. 113665) Liquidometer EA-36

1. Case—Bakelite
2. Plate—Scale
3. Screw—Scale
4. Washer—Lock
5. Assembly—Mechanism
6. Base—Bakelite
7. Washer—Lock
8. Nut
9. Shield—Magnetic
10. Screw
11. Washer—Lock
12. Screw
13. Receptacle
14. Gasket
15. Housing—Receptacle
16. Washer—Lock
17. Screw

(4) RECEPTACLE HOUSING, RECEPTACLE, AND BASE REMOVAL. (PART NO. 113665.) *(See figure 230.)*

(a) Remove the three remaining screws (17) and lock-washers (16) which hold the receptacle (13) and housing (15) to the bakelite base.

(b) Lift the housing off over the receptacle.

(c) Withdraw the receptacle (13) and gasket (14) to the extent of the flexible leads.

(d) Remove three slotted nuts (8) and three lock washers (7).

(e) Remove the bakelite base (6) from the mechanism support studs and unsolder the leads at the resistance spool terminals. Identify the leads to facilitate reassembly.

(5) BASE REMOVAL (PART NUMBER 110026.) *(See figure 229.)*

(a) Remove three slotted nuts (8) and three lock washers (7) from the rear of the base (6) and remove the base from the mechanism supports.

(b) Unsolder the flexible leads from the three contact pins in the base and identify them to assure proper reassembly.

Note

Do not unsolder the flexible leads from the spools unless they are frayed or broken or unless the spools require replacement.

(6) TOP BRIDGE REMOVAL.—The removal of the bridge parts of part number 110026 and 113665 is identical with that of part number 100442 except that "LEFT SIDE" and "RIGHT SIDE" parts are interchanged. (See paragraph 5.*c.*(3), this section.

(7) MAGNET, CORE, AND MOVING ELEMENT REMOVAL.—Identical with paragraph 5.*c.*(4), this section.

(8) BOTTOM BRIDGE REMOVAL. — Identical with paragraph 5.*c.*(5)*(a)*, this section, except that "LEFT SIDE" and "RIGHT SIDE" parts are interchanged.

(9) RESISTANCE SPOOL REMOVAL.—Repair of the mechanism does not usually require the removal of the resistance spools or pole pieces and these parts should remain intact. However, should it be necessary to replace spools, unsolder the leads and remove the mounting screws.

(10) MOVING ELEMENT DISASSEMBLY. — Disassembly operations are identical with those required for Part No. 100442 as described in paragraph 5.*c.*(7), this section.

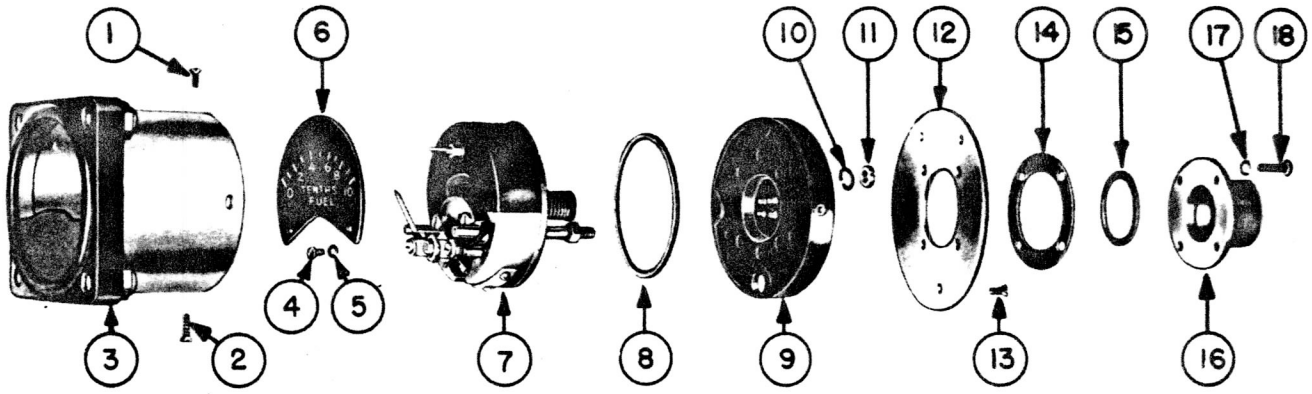


Figure 231—Case, Scale, Receptacle Housing, Shield, and Base Removal—Model 727, Type 54, (Part No. 111645) Liquidometer EA-343

1. Screw—Case to base
2. Screw—Case to base
3. Case
4. Screw—Scale
5. Washer—Lock
6. Plate—Scale
7. Mechanism
8. Gasket—Rubber
9. Base—Bakelite
10. Washer—Lock
11. Nut
12. Shield—Rear
13. Screw—Shield to base
14. Gasket—Cork
15. Gasket—Paper
16. Housing—Receptacle
17. Washer—Lock
18. Screw—Housing to base

b. PART NUMBER 111645.

(1) CASE REMOVAL. *(See figure 231.)*

(a) Remove the three case to base screws (1) and one case to base screw (2).

(b) Remove case (3).

CAUTION

Allow inside top of case barrel to slide on the top edge of the scale plate to avoid damage to the moving element.

(2) SCALE PLATE REMOVAL. *(See figure 231.)*

(a) Remove two scale screws (4) and two lock washers (5).

(b) Remove scale plate (6).

(3) RECEPTACLE HOUSING REMOVAL. *(See figure 231.)*

(a) Remove the four receptacle housing to base screws (18) and four lock washers (17).

(b) Remove the receptacle housing (16).

(c) Remove the paper gasket (15) and cork gasket (14).

(4) REAR SHIELD REMOVAL. *(See figure 231.)*

(a) Remove one rear shield to base screw (13).

(b) Remove the rear shield (12) and the rubber gasket (8).

(5) BASE REMOVAL. *(See figure 231.)*

(a) Remove the three slotted nuts (11) and the three lock washers (10) from the rear of the base (9).

(b) Lift the base off the supports and unsolder the red, yellow, and black leads from their respective spools.

(6) TOP BRIDGE REMOVAL. *(See figure 232.)*

(a) Unsolder the inner top spring, the outer top spring, and the bottom spring from their respective abutments.

(b) Remove the outer bridge mounting parts in the order listed below.

Left Side	*Right Side*
Screw (13)	Screw (13)
Washer—Lock (12)	Washer—Lock (12)
Washer (11)	Washer (11)
Washer—Insulating (9)	Washer—Insulating (10)
Spring—Cushion (8)	Spring—Cushion (8)
Terminal (7)	

Bridge (6)

(c) Remove the inner bridge mounting parts in the order listed below. Note that these parts are on opposite bridge supports from figure 232.

Left Side	*Right Side*
Bushing (5)	Bushing (5)
Washer (3)	Terminal—Spring abutment (4)
	Bushing (2)

(7) MAGNET, CORE, AND MOVING ELEMENT REMOVAL.—Identical with paragraph 2.*b.*(4), this section.

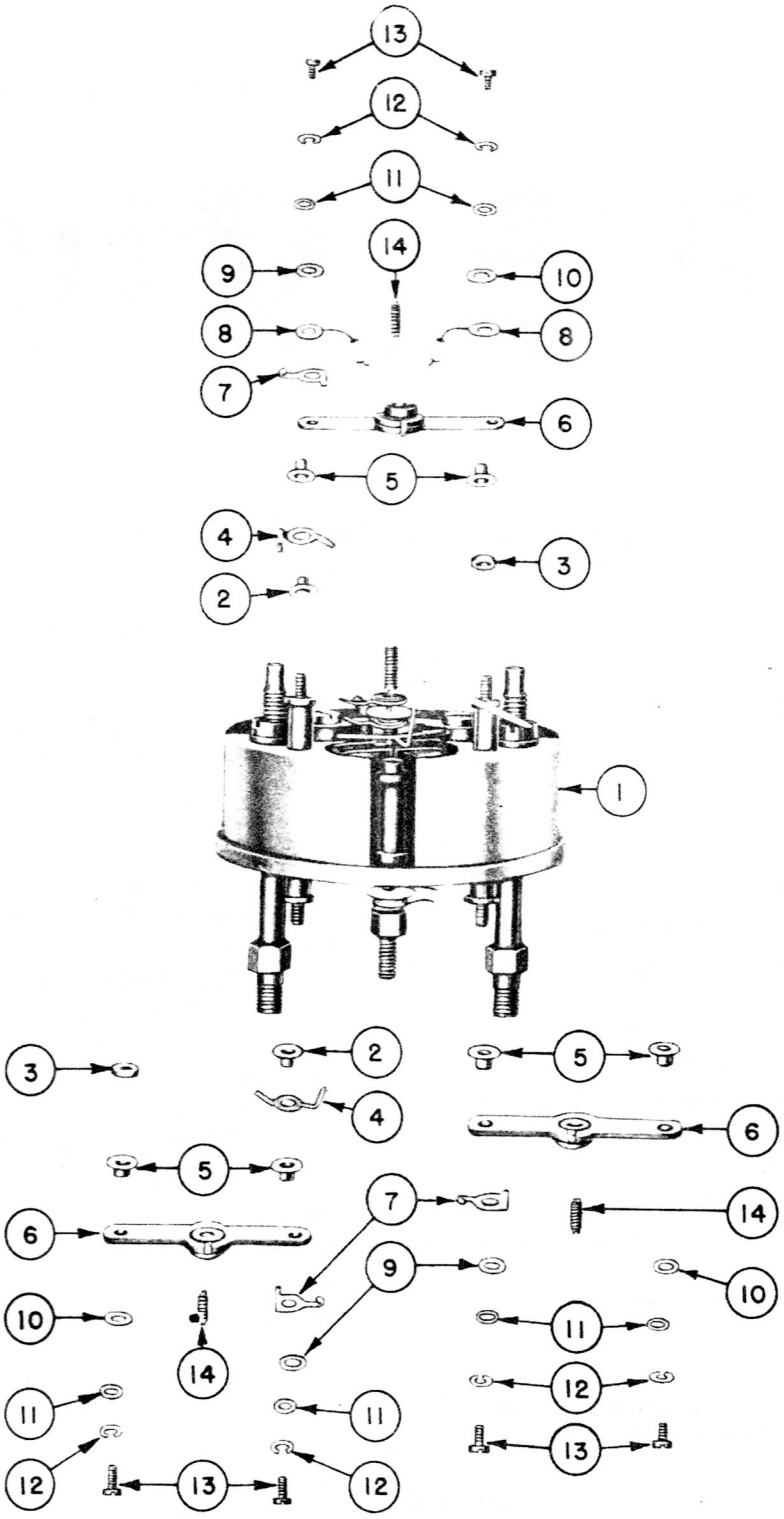


Figure 232—Top and Bottom Bridge Removal

1. Pole Piece
2. Bushing—Short
3. Washer
4. Terminal—Spring abutment
5. Bushing—Long
6. Bridge
7. Terminal
8. Spring—Cushion
9. Washer
10. Washer
11. Washer
12. Washer—Lock
13. Screw
14. Screw—Jewel

(8) BOTTOM BRIDGE REMOVAL. — Identical with the operations indicated for Part No. 111482 in paragraph 5*c.*(5)*(b)*, this section.

(9) RESISTANCE SPOOL REMOVAL. — Repair of the mechanism does not usually require the removal of the resistance spools or pole pieces and these parts should remain intact. However, should it be necessary to replace spools, unsolder the leads and remove the mounting screws.

(10) MOVING ELEMENT DISASSEMBLY. — Disassembly operations are identical with those required for part number 111482 as described in paragraph 5.*c.*(8), this section.

c. CLEANING, INSPECTION, TESTING, REPAIR, AND INDICATOR TROUBLES, AND REMEDIES.

(1) SCALE GLASS (PART NUMBER 110026 and 113665).—The case glass, if cracked, may be forced out by placing the case, base down, in an arbor press and applying pressure to a metal disk, slightly smaller than the case opening, placed over the glass. A glass badly shattered should be knocked out and the bezel distorted by gripping the rim with a pair of pliers. Once distorted, the bezel may be easily pushed out. Before replacing the glass, all old sealing compound must be removed. New sealing compound should be applied to the rim of the case front and a new glass inserted. A new bezel, where necessary, should be forced firmly against the paper spacer and glass.

(2) SCALE GLASS (PART NUMBER 111645).—When scale glasses are broken, remove the four elastic stop nuts and eight self-tapping screws from the case front. Reassemble a new case front (supplied with glass mounted), stop nuts, and self-tapping screws, making sure the thin wax impregnated gasket is in the proper position between the case flange and bakelite front.

(3) SCALE PLATE.—The upper surface of the scale plate should be free of all fuzz which might interfere with pointer action. Fuzz may be singed off by passing the face of the scale plate quickly through a clean flame.

(4) MAGNETIC AIR GAPS.—The magnet air gaps should be perfectly clean and free of all magnetic particles. Any particles may be lifted out with a thin steel needle.

(5) JEWELS.—Clean the jewels by twirling a pointed piece of matchwood in the cup of the jewel. Inspect each jewel under a microscope for punctures or surface pits. A sharp needle moved around in the jewel cup will usually detect such fractures. Discard rough jewels.

(6) MOVING ELEMENT.

(a) MOVING COIL.—Inspect the coil under a microscope for loose or broken wires and for fuzz adhering to the coil. To avoid a most troublesome form of friction, singe off all fuzz by passing the coil quickly through a clean flame. The resistance of each winding of the moving coil should be 70 ohms ± 10 ohms and they should match each other within 2 ohms.

(b) SPRINGS.—The movement springs should be flat spirals with convolutions evenly spaced. The convolutions should not be deformed and should not touch any part of the moving coil, bridge, or spring guard. Minor distortions may be adjusted with a pair of tweezers.

(c) PIVOTS.—Ordinarily, pivots require only cleaning by pushing the points into a piece of pithwood or soft cork. Inspect the pivots under a microscope for damaged tips. Replace a pivot that is worn or mushroomed. To remove a damaged pivot, hold the moving coil firmly and grip the pivot shank in the jaws of pivot extractor ST54533 or in the collect of a jeweler's lathe. Turn the moving coil and pivot in opposite directions while exerting a steady pull. Care should be exercised not to exert too much pressure as a broken pivot will result. If new pivots are stored in oil, they must be cleaned by rubbing them between porous paper before insertion. Do not touch pivots unnecessarily as perspiration may tend to rust pivots later in the assembled instrument. To replace a pivot, bring the pivot punch ST-19645, with handle ST-19646, near the pointed end of the pivot and push this end into the punch. Support the moving coil under the pivot base, using the moving coil support fixture as shown in column 4 in the table of figure 241, and force the pivot into the pivot base being careful not to apply too much pressure as the coil frame may become distorted.

Note

A high polish at the point does not indicate pivot wear. The high polish reduces friction and acts as a rust preventive. Do not oil pivots.

(7) INDICATOR TROUBLES AND REMEDIES.

Trouble	*Probable Cause*	*Remedy*
FRICTION.	Damaged pivots.	Replace pivots.
	Damaged jewels.	Replace jewels.
	Fuzz on moving coil or scale plate.	Remove fuzz.
	Foreign particle in air gap.	Remove particle.
	Moving coil touching.	Readjust jewels for proper coil clearance or, if necessary, shift core and recheck electrical adjustments.

Trouble	*Probable Cause*	*Remedy*
	Distorted spring.	Repair or replace spring.
	Jewels too tight.	Readjust jewels to proper clearance per paragraph 4.*c.*, this section.
POINTER SLAMS RIGHT OR LEFT.	Incorrect wiring.	Check wiring diagram. (See figure 45.)
	Open spool R_1 or R_2.	Readjust spool. (See figure 236, and table 4, this section.)
	Open winding in moving coil.	Replace moving coil.
	Short circuited section in spool R_4-R_5.	Replace spool or repair short circuit. (See figure 236 and table 4, this section.)
	Leads short circuited at receptacle pins.	Resolder leads and clear short circuit.
	Break in + or— lead.	Repair lead.
STEADY CENTER SCALE READING.	Break in lead to spool R_3.	Repair lead. (See figure 236.)
	Spool R_3 open circuited.	Replace spool. (See figure 236 and table 4, this section.)
OFF CALIBRATION AT CENTER OR END SCALE.	Off adjustment.	Readjust. (See paragraph 4. *d.*(7), this section.)
	Core not anchored firmly.	Readjust and tighten core and core bracket screws.

d. REASSEMBLY.—Reassembly of the indicators is exactly the reverse of the disassembly procedure. The following instructions cover precautions to be observed and additional operations required.

(1) SPOOLS.—Before reassembly, measure the resistance of each spool. One lead from each singly wound spool or two leads from each double wound spool must be removed before measuring the resistance of the spool. Each resistance should be in accordance with the values listed in table 4, this section.

TABLE 4 SPOOL RESISTANCES

Indicator Part No.	*Symbol (Figure 236)*	*Spool Part No.*	*Resistance Ohms*	*Quant. Per Mech.*	*Tolerance Ohms*
+ 100442	R_1, R_2	106341	*140	2	+ 21 — 0
	R_4, R_5	111489	30	1	2 windings within 1% of each other
	R_3	103775	120	1	+ .6 — .6
111482	R_1, R_2	109722 or 111488	90.4 115	2 2	+ .5 — .5 + 17 — 0
	R_4, R_5	111489	30	1	2 windings within 1% of each other
	R_3	111488	115	1	+ 17 — 0
+ 110026	R_1, R_2	106341	*140	2	+ 21 — 0
	R_4, R_5	111489	30	1	2 windings within 1% of each other
	R_3	103775	120	1	+ .6 — .6
111645	R_1, R_2, R_3	109722	90.4	3	+ .5 — .5
	R_4, R_5	111489	30	1	2 windings within 1% of each other
+ 113665	R_1, R_2	106341	*140	2	+ 21 — 0
	R_4, R_5	111489	30	1	2 windings within 1% of each other
	R_3	103775	120	1	+ .6 — .6

* Adjusted during repair, all other spools preadjusted.

+ The dual winding 30 ohm spool, Part No. 111489, replaces the two separate 30 ohm spools, Part No. 92732, assembled in earlier fabrications of this type. If one spool 92732 becomes defective, remove the second spool 92732 and replace the pair with one dual spool 111489.

(2) MOVING ELEMENT.—The resistance of the moving coils should measure 70 ohms ± 10 ohms and should match each other within 2 ohms. Moving coils failing to meet the above requirements should be replaced. Special care must be taken when reassembling the moving element in the pole pieces in order to avoid damage to the moving element and springs.

(3) JEWEL ADJUSTMENT.—After the moving element has been remounted in the pole pieces, the clearance between the coils and the ends of the core should be equalized by adjustment of the jewel screws. The final jewel adjustment is made by gradually turning the top jewel screw in the clockwise direction until the slightest binding is noticed, indicating zero jewel clear.

(4) MECHANICAL BALANCE. — The moving element must be well balanced about the axis of rotation in order that the calibration will check in the various instrument operating positions as may occur in service. Adjustable balance weights are provided on the pointer tail and side arms for balancing purposes. Since the ratiometer mechanisms have springs of low torque and the pointer assumes an off-scale position on open circuit, it is necessary to apply voltage to the mechanisms during balancing operations. A general procedure for balancing each of the mechanisms follows.

(a) Connect the instrument or mechanism in the pertinent circuit as shown in figure 237. Set decade box 1 and 2 to 100.5 ohms. Apply a 4-volt source of supply and the pointer should assume an on-scale indication. With the instrument scale plate horizontal, place a small pencil dot on the scale plate directly beneath the tip of the pointer.

(b) Carefully raise the instrument from the horizontal to the vertical position so that the pointer is horizontal, and points to the left. Using the proper balance wrench, adjust the threaded tail weight in or out until the pointer coincides with the pencil mark on the scale plate.

(c) Carefully raise the instrument to a vertical position so that the pointer is vertical and adjust the side arm weights until the pointer reading coincides with the pencil mark on the scale plate. Repeat horizontal and vertical balancing operations until perfect balance is obtained.

Note

Part Number 100442 and 111482 are mechanisms not equipped with a regular scale plate. For balancing and electrical adjustment purposes a temporary scale may be made using the full size diagram of figure 233 as a template. Mount the temporary scale plate on the regular mounting studs, and proceed with the balancing operations using the technique described above.

(5) CHARGING MAGNET. *(See figure 46.)* — Charge the magnet to as near saturation as possible using a direction of charge which will provide a magnet polarity as shown by the compass needles in figure 46.

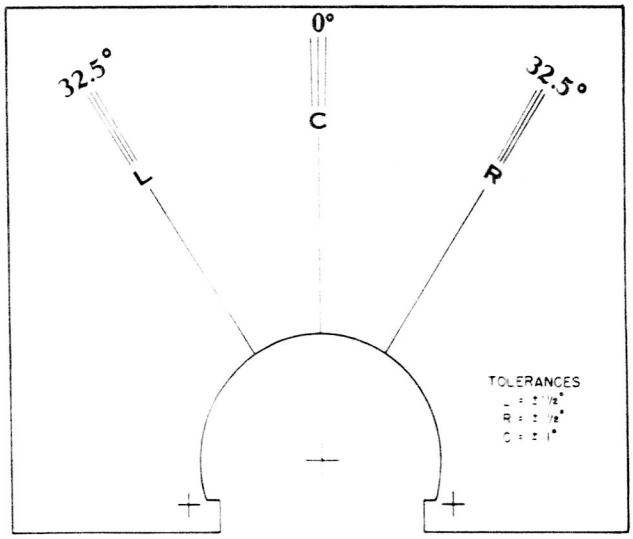


Figure 233—Temporary Scale Plate—Template

(6) SCALE AND SPOOL ADJUSTMENTS. *(See figures 234 and 235.)*

(a) GENERAL.—The adjustment of the instrument to a given scale is made by shifting the core and magnetic scale corrector and by readjusting certain spools. Spool adjustment is only necessary when mechanical adjustment (shifting of core and Magnetic scale corrector) is not sufficient. The diagrams shown in figures 234 and 235 apply to all of the mechanisms and indicators discussed herein.

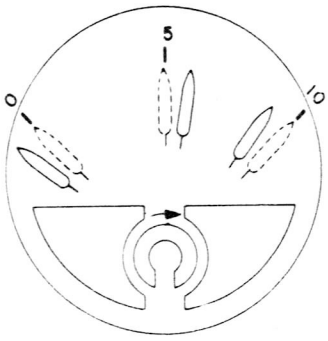
(b) SCALE SPREAD CONTROL.—Shifting the core up or down will have the effect of contracting or expanding the pointer sweep as desired. This effect may also be obtained by changing the resistance of spools R_1 and R_2. Moving the core down will lengthen the sweep of the pointer. Increasing the resistance of the series spools will have the same effect. Moving the core up or decreasing the resistance of the series spools will have the opposite effect. Moving the core up or down or adjusting the series spool will not effect the pointer indication at mid-scale.

Note

There is a limit to the allowable vertical motion of the core as reasonable clearance must be maintained between core and moving coil. The pointer must swing without friction over the entire scale arc.

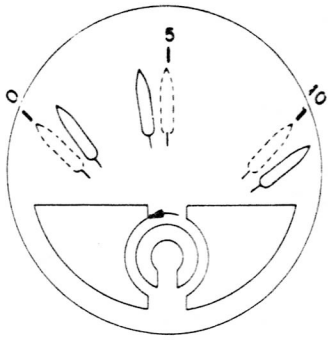
(c) SCALE DISTRIBUTION CONTROL.—The scale distribution or calibration may be changed by slight rotation of the core about the core stud screw. Rotating the core in a clockwise direction will shift the pointer position at center scale to the left. The pointer position at the left end and right end scale marks will shift to the right. See figure 234 for effect of opposite rotation.

(d) SCALE LOCATION CONTROL.—A uniform change in position of the pointer at all scale points, equivalent to a shifting of the entire scale to one side or the other, is obtained by shifting the magnetic scale corrector. Shifting the scale corrector to the right has the effect of shifting the calibration to the right and shifting the corrector to the left has the opposite effect.



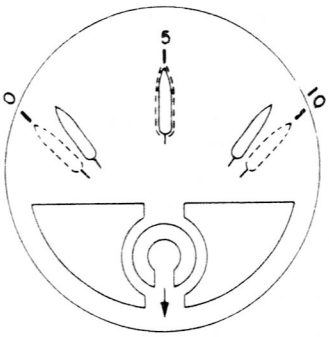
CONDITION
LOW ON 0 POINT
HIGH ON 5 POINT
LOW ON 10 POINT

ADJUSTMENT:
ROTATE CORE CLOCKWISE



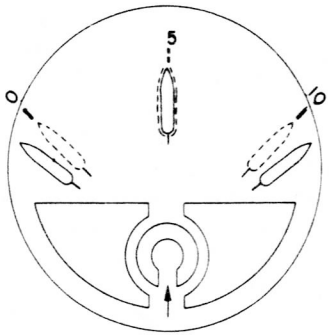
CONDITION
HIGH ON 0 POINT
LOW ON 5 POINT
HIGH ON 10 POINT

ADJUSTMENT:
ROTATE CORE COUNTER-CLOCKWISE



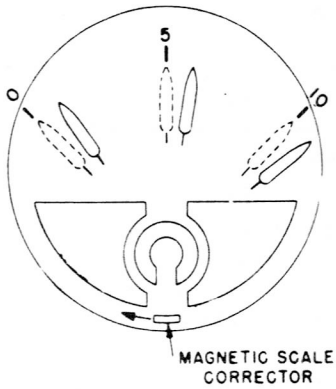
CONDITION
HIGH ON 0 POINT
CHECKS ON 5 POINT
LOW ON 10 POINT

ADJUSTMENT:
PREFERRED:—MOVE CORE DOWNWARD OR
ALTERNATE:—INCREASE RESISTANCE OF SPOOLS R_1 AND R_2 (FIGURE 4)



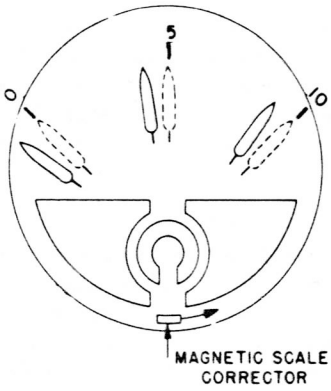
CONDITION
LOW ON 0 POINT
CHECKS ON 5 POINT
HIGH ON 10 POINT

ADJUSTMENT:
PREFERRED:—MOVE CORE UPWARD OR
ALTERNATE:—DECREASE RESISTANCE OF SPOOLS R_1 AND R_2 (FIGURE 4)



CONDITION
HIGH ON 0 POINT
HIGH ON 5 POINT
HIGH ON 10 POINT

ADJUSTMENT:
SHIFT MAGNETIC SCALE CORRECTOR TO LEFT

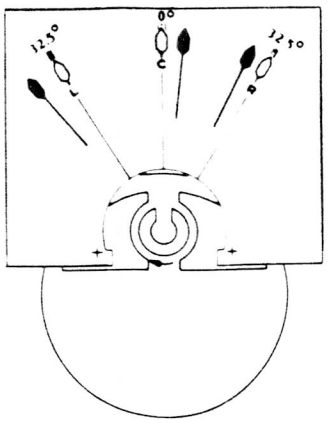


CONDITION
LOW ON 0 POINT
LOW ON 5 POINT
LOW ON 10 POINT

ADJUSTMENT:
SHIFT MAGNETIC SCALE CORRECTOR TO RIGHT

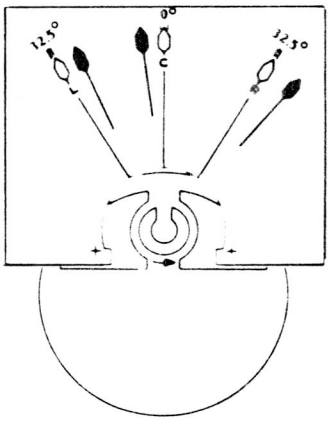
FULL LINES INDICATE POINTER POSITION BEFORE ADJUSTMENT.
DOTTED LINES INDICATE POINTER POSITION AFTER ADJUSTMENT.

Figure 234—Fundamental Calibration Adjustments For Model 727 Types 6 and 54 (Part Nos. 110026 and 111645) Model 728 Type 11 (Part No. 113665)



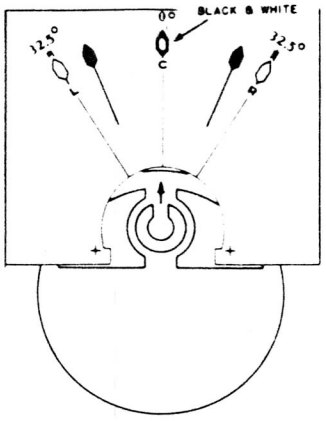
CONDITION
LOW ON L
HIGH ON C
LOW ON R

ADJUSTMENT:
ROTATE CORE CLOCKWISE



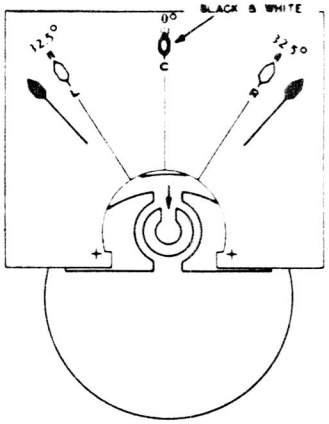
CONDITION
HIGH ON L
LOW ON C
HIGH ON R

ADJUSTMENT:
ROTATE CORE COUNTER-CLOCKWISE



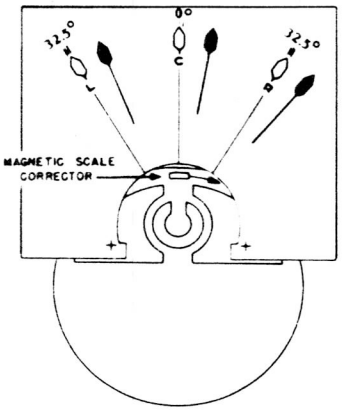
CONDITION
HIGH ON L
CHECKS ON C
LOW ON R

ADJUSTMENT:
PREFERRED: MOVE CORE UPWARD OR
ALTERNATE:- INCREASE RESISTANCE OF SPOOLS R_1 AND R_2 (FIGURE 4)



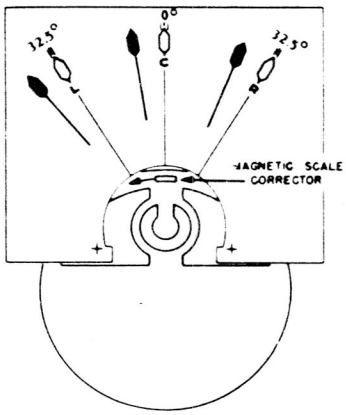
CONDITION
LOW ON L
CHECKS ON C
HIGH ON R

ADJUSTMENT:
PREFERRED: MOVE CORE DOWNWARD OR
ALTERNATE:- DECREASE RESISTANCE OF SPOOLS R_1 AND R_2 (FIGURE 4)



CONDITION
HIGH ON L
HIGH ON C
HIGH ON R

ADJUSTMENT:
SHIFT MAGNETIC SCALE CORRECTOR TO RIGHT



CONDITION
LOW ON L
LOW ON C
LOW ON R

ADJUSTMENT:
SHIFT MAGNETIC SCALE CORRECTOR TO LEFT

INDICATES POINTER POSITION BEFORE ADJUSTMENT
INDICATES POINTER POSITION AFTER ADJUSTMENT.
FOR ADJUSTMENT OF
MODEL 9969 TYPES 4 AND 6 (PART NOS. 100442 AND 111482)

Figure 235—Fundamental Calibration Adjustments For Model 9969 Types 4 and 6 (Part Nos. 100442 and 111482)

(7) ADJUSTMENT PROCEDURE.

(a) GENERAL.

1. The adjustment necessary is dependent upon the extent of the repairs made. Readjustment will be necessary if the moving element, the position of the core, or the resistance of the spools has been changed. Replacement spools should have resistance values as listed in Table 4, this section.

2. Before adjustments are made, rotate the movable spring abutments located on the top and bottom bridges so that the pointer will move off scale at the "empty" end with no voltage applied to the instrument.

3. It is recommended that the two core bracket screws (6) and the core-stud screw (8), figure 244, be partially tightened and the core pried into position with a non-magnetic prying tool, the three screws, then being tightened after adjustment.

Note

The core bracket screws and core stud screw must be firmly tightened after adjustment. This may slightly alter the adjustment. Practice will indicate proper tension to leave on core screws during adjustment and the deviation in adjustment to allow for the tightening of same.

4. Increasing familiarity with the ratiometer mechanism and its circuit will awaken in the repair man an understanding of the fact that results in adjustment similar to those described may be obtained by varying the resistance of other circuit elements. One should keep in mind that wide adjustments of these may badly upset the operation of the instrument while minor adjustments will do no harm from the operating standpoint and can be very helpful in saving time. In manufacturing, it has been found desirable to reduce the number of adjustments to a minimum, concentrating only on core and magnetic scale corrector positions and the adjustment of the spools in the specific instructions below. It is impractical to describe the effect of the numerous other possible adjustments and these must be left to the more experienced operator to study after the fundamental procedure has been mastered.

(b) PART NUMBERS 100442, 110026, and 113665.

1. Mount and connect the moving coil shunt spool R_4-R_5 and spool R_3 as shown in the pertinent pictorial diagram of figure 236.

2. Charge the magnet if this has not already been done. See paragraph 4.*d.*(5), this section.

3. Substitute a decade resistance box, set at approximately 110 ohms, for spools R_1 and R_2.

4. Partially tighten the core bracket screws (6) and core stud screw (8) and pry the core downward (away from magnet) while keeping it centered laterally. (See figure 244.)

5. Connect the mechanism and the two additional decade resistance boxes (No. 1 and No. 2) as

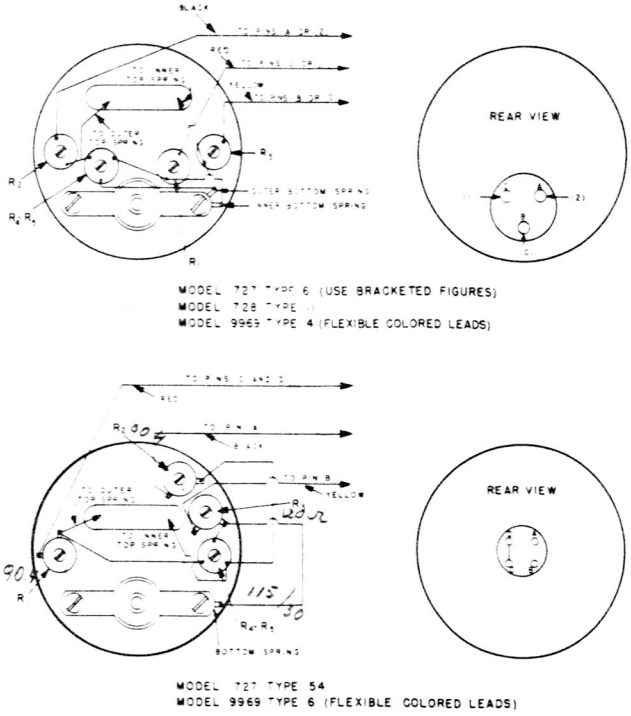


Figure 236—Pictorial Wiring Diagram

shown in the applicable diagram of figure 237. Mount the temporary scale made according to figure 233 for part number 100442 or the regular scale for part number 110026 and 113665. Set decade boxes No. 1 and No. 2 to 100.5 ohms and apply 4.1 volts d.c. with the polarity shown in figure 237. The pointer should indicate approximately center scale.

Note

The temporary scale has three lines at each adjusting point, marked "L", "C", and "R". The scale lines are 32½ degrees from the center line. The short lines either side of the major lines indicate the plus-minus tolerance for adjustment. Thus if the pointer indication falls within the area between the tolerance lines, the mechanism is considered satisfactorily adjusted.

6. Set decade box No. 1 to 16.8 ohms and decade box No. 2 to 184.2 ohms. The pointer should indicate "Empty" or "0" at the left end scale. Note the reading carefully.

7. Set decade box No. 1 to 184.2 ohms and box No. 2 to 16.8 ohms. The pointer should indicate "Full" or "10" at the right end scale.

8. Alternately adjust the vertical position of the core and the resistance of the decade boxes substituted for spools R_1 and R_2 until exact end scale indications are obtained. Note paragraph 4.*d.*(6)*(b)*, this section. Do not allow R_1 or R_2 to exceed 140 ohms, the maximum resistance of the stock replacement spools.

9. Set decade resistance box No. 1 and No. 2 to 100.5 ohms. The pointer should indicate mid-scale (5 tenths or "half full"). Any error in reading may be corrected as directed in paragraph 4.*d*.(6)*(c)*, this section.

Note

Alternately set the decade boxes No. 1 and No. 2 for the end scale and center scale indications and carefully pry core and adjust spools R_1 and R_2 until optimum calibration is attained.

10. By means of a Wheatstone bridge, adjust spools R_1 and R_2 to the values of the decade resistance boxes substituted therefor and wire the spools in the mechanism.

(c) PART NUMBERS 111482 and 111645.

1. All spools for these mechanisms are pre-adjusted in stock to the resistance values given in Table 4, this section. Calibration adjustment is made by shifting the core and magnetic scale corrector as explained in paragraph 4.*d*(6)*(a),(b),(c),(d)*, this section. See figure 234 for pictorial adjustment procedure. In all cases, large scale adjustments should be made by shifting the core, only minor adjustments being made by shifting the magnetic scale corrector.

2. If the core in the magnetic air gap has been removed or if the magnetic circuit has been disturbed, it will be necessary to charge the magnet. See paragraph 4.*d*.(5), this section.

3. Partially tighten the core bracket screws and core stud screw and pry the core downward (away from magnet) while keeping it centered laterally.

4. Connect the mechanism and the two decade resistance boxes (No. 1 and No. 2) as shown in the applicable diagram of figure 237. Mount a temporary scale made according to figure 233 for part number 111482 or the regular scale for part number 111645. Set each decade box to 100.5 ohms and apply 4.1 volts d.c. with the polarity shown in figure 237. The pointer should indicate approximately center scale.

5. Set decade box No. 1 to 16.8 ohms and decade box No. 2 to 184.2 ohms. The pointer should indicate "empty" or "0" at the left end scale. Note the reading carefully.

6. Set decade box No. 1 to 184.2 ohms and box No. 2 to 16.8 ohms. The pointer should indicate "full" or "10" at the right end scale.

7. Alternately adjust the vertical position of the core and shift the magnetic scale corrector until exact end scale indications are obtained. Note paragraph 4.*d*.(6)*(b)* and *(d)*, this section.

Note

If end scale calibration adjustment can not be satisfactorily obtained by shifting core and scale corrector, the resistance of spool R_1 or R_2 must be changed. Table 4, this section, lists the alternate spools for this purpose.

8. Set decade resistance box No. 1 and No. 2 to 100.5 ohms. The pointer should indicate mid-scale (5 tenths or "half full"). Any error in readings may be corrected as directed in paragraph 4.*d*.(6)*(c)*, this section.

Note

Alternately set the decade boxes No. 1 and No. 2 for the end-scale and center-scale indications and carefully pry core and adjust magnetic scale corrector until optimum calibration is attained.

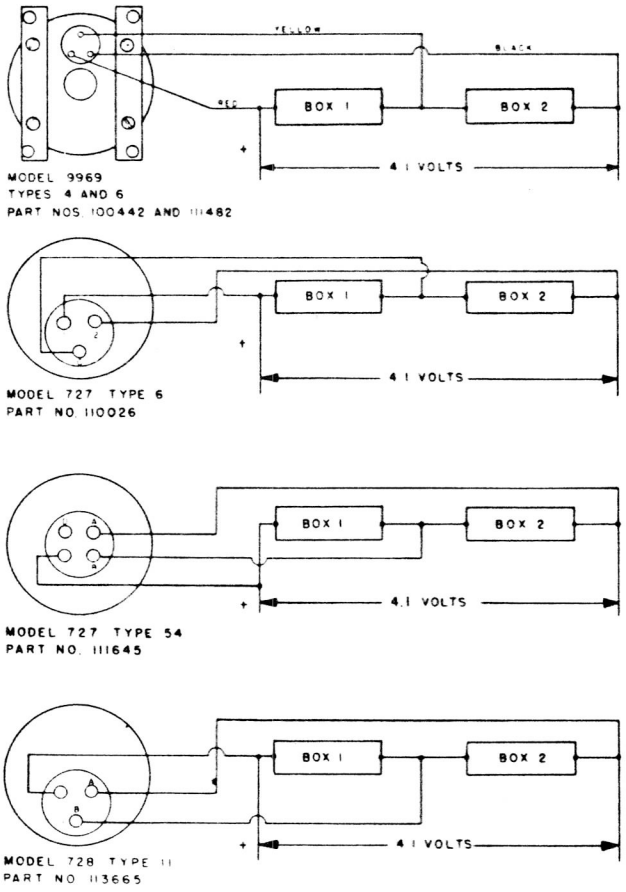


Figure 237—Calibration Adjustment Connections

(8) FINAL INSPECTION.

(a) Remove any magnetic particles which may cling in the air gap and, in general, clean the mechanism.

(b) Clean the inside of the scale glass with a soft cloth and remove all lint before mounting the case.

(c) Mount the case and receptacle parts.

(d) Connect the instrument or mechanism in the applicable circuit of figure 237 and check the end point and center indications per paragraph 4.*d*(7)*(b)*6.7. and 9.

(e) The instrument is ready for installation or stock.

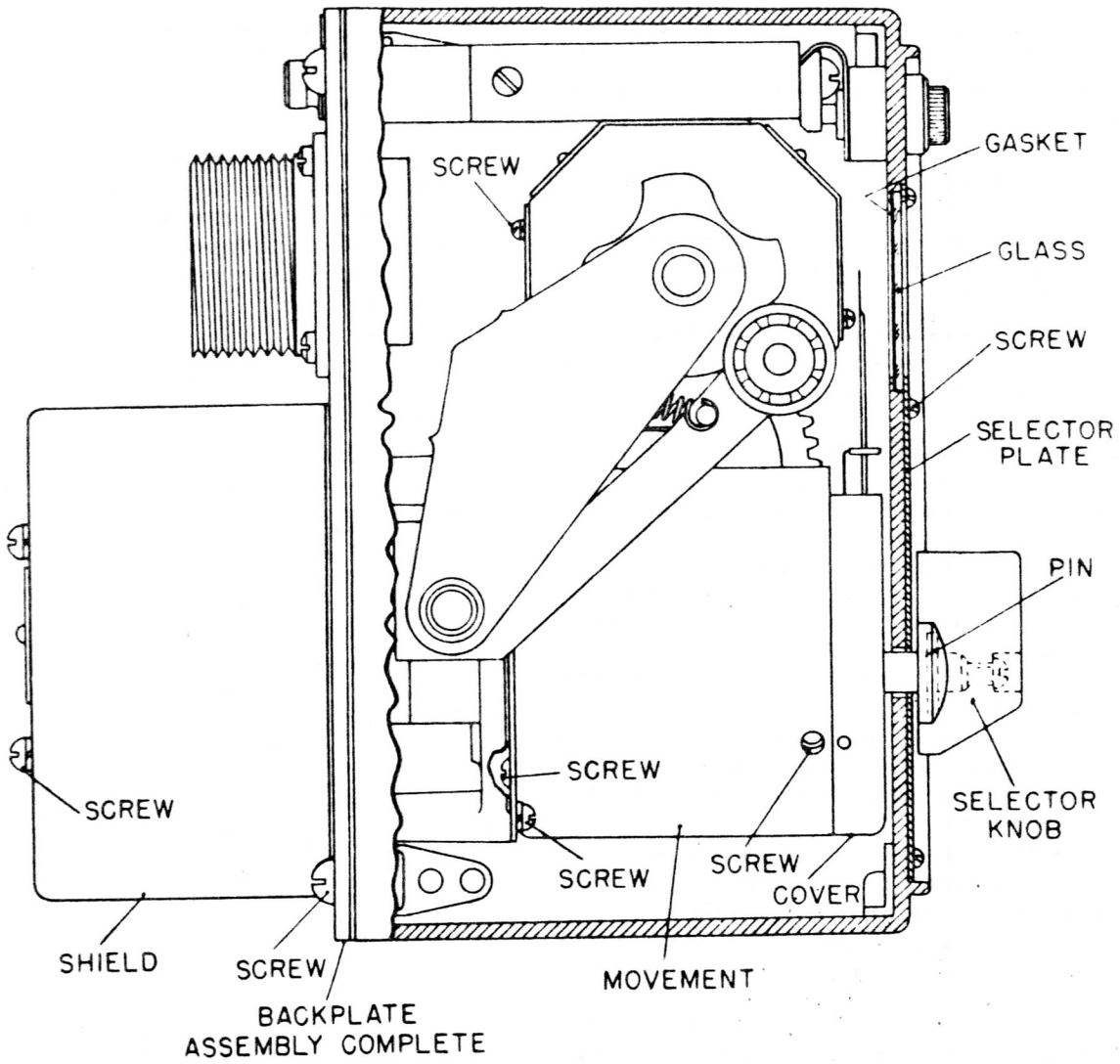


Figure 238 - Dial Change Indicator (Sectional View)

5. DIAL CHANGE INDICATORS.

a. INSPECTION (See figure 238).

(1) ELECTRICAL.

(a) Remove selector knob and pin.

(b) Remove shield by taking out three screws. Dismantle switch by removal of rivet. Clean contact plate, end of springs and contact cup using fine emery paper. Polish using crocus cloth 000 grade. Re-rivet assembly using a new rivet.

(c) Make sure all connections are clean and tight.

(d) Connect as shown in figure 239. Adjust the potentiometer unit to the value shown in table. The pointer should indicate EMPTY, FULL, or CENTER scale within 2%. If indication is outside this limit, replace movement.

(2) MECHANICAL. - Examine all bearings; if appreciably worn, replace them. If, however, they are in good order, they should be carefully cleaned.

b. REPAIR.

(1) REMOVAL OF RATIOMETER.

(a) Remove selector knob and pin.

(b) Remove complete backplate assembly by taking out four screws. With backplate removed place unit in fixture (see figure 239A) which will hold unit steady while repairs are made.

POINTER INDICATION	POTENTIOMETER UNIT RESISTANCE—OHMS C TO +	C TO −
EMPTY	16.8	184.2
FULL	184.2	16.8
CENTER	100.5	100.5

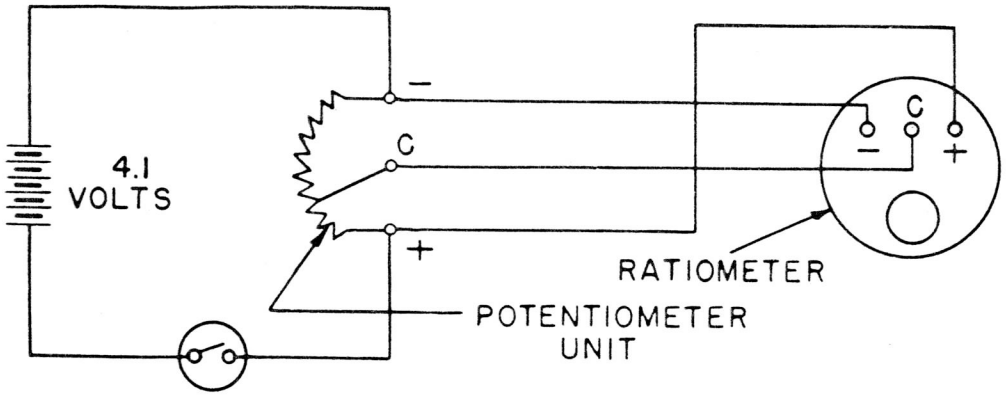


Figure 239—Electrical Connection Diagram

(c) Remove shielded ratiometer assembly by taking out four screws.

(d) Remove cover by taking out two screws.

(e) Remove ratiometer by taking out four screws.

CAUTION

Great care should be taken not to damage pointer as a wrong reading will result due to a twisted pointer.

(f) Reassemble in reverse order using new ratiometer.

(g) Care should be taken not to let magnet touch shield case.

(2) REPLACEMENT OF GLASS.

(a) Remove selector knob and pin.

(b) Remove selector plate by taking out five screws.

(c) Place new glass in recessed opening using new gasket.

(3) REPLACEMENT OF DIAL.

(a) Remove selector knob and pin.

(b) Remove complete backplate assembly by taking out four screws.

(c) Remove old dial by taking out four screws.

(d) Attach new dial using same screws. Make sure dial fits correctly.

(e) Apply a coating of insignia red enamel, Spec. 1-GP-59 to color 1-GP-12A No. 9-2 to these screws. This prevents screws working loose in service.

Note

Never attempt to attach dial from front of instrument through window, as this will result in a damaged pointer and dial.

CAUTION

The "EMPTY" and "FULL" calibration marks on the finished dials, are not in all cases located 32½ degrees from the true vertical center of the dial. In all cases, however, ratiometers shall be tested so that "EMPTY" indicates 32½ degrees to the left of the vertical center line: "CENTER" indicates on the vertical center line: and "FULL" indicates 32½ degrees to the right of the vertical center line. Adjustments to the "EMPTY" and "FULL" marks on the finished dials are to be made on the tank units as indicated in section III.

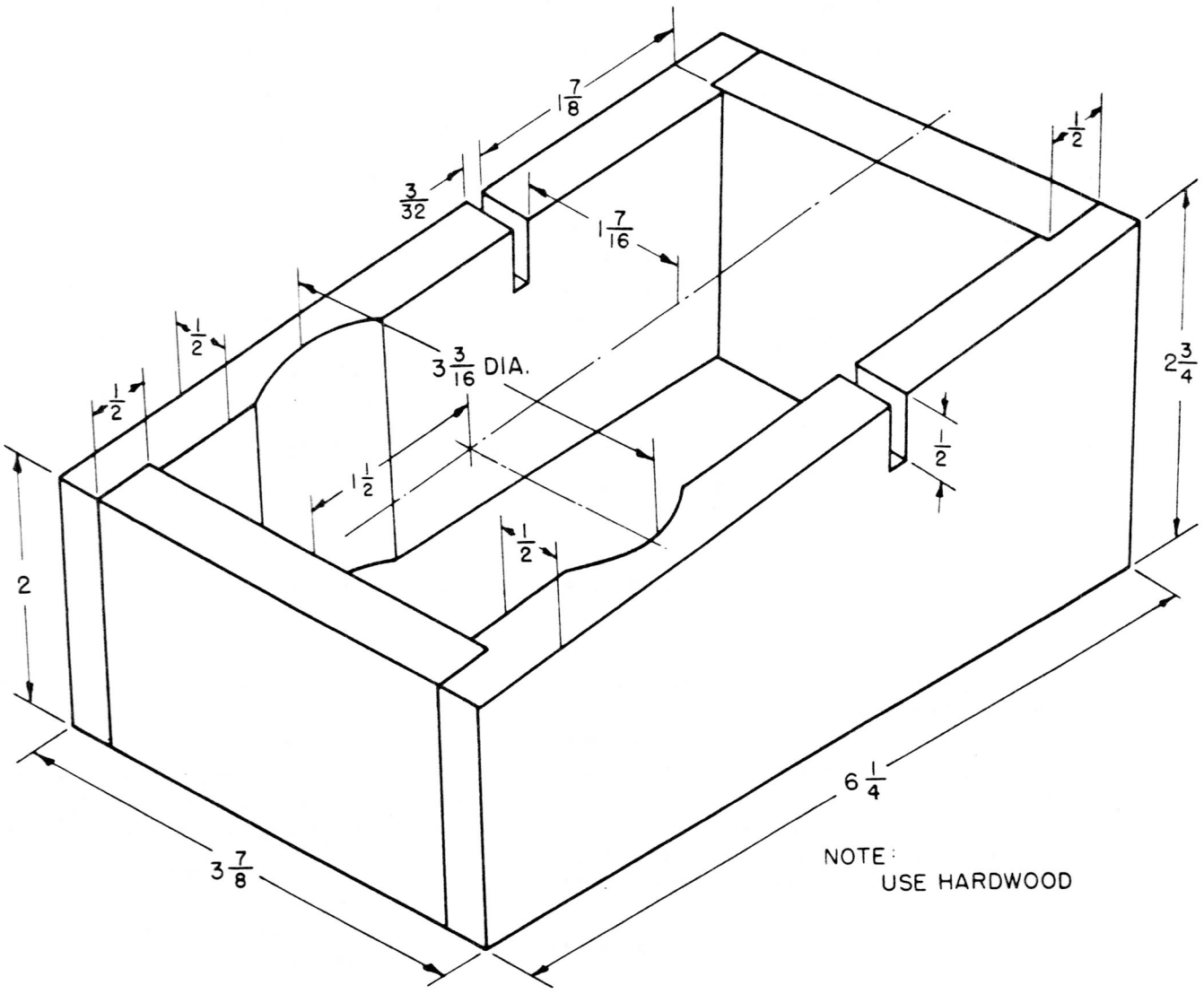


Figure 239A—Fixture T-1 for Holding Dial Change Indicator

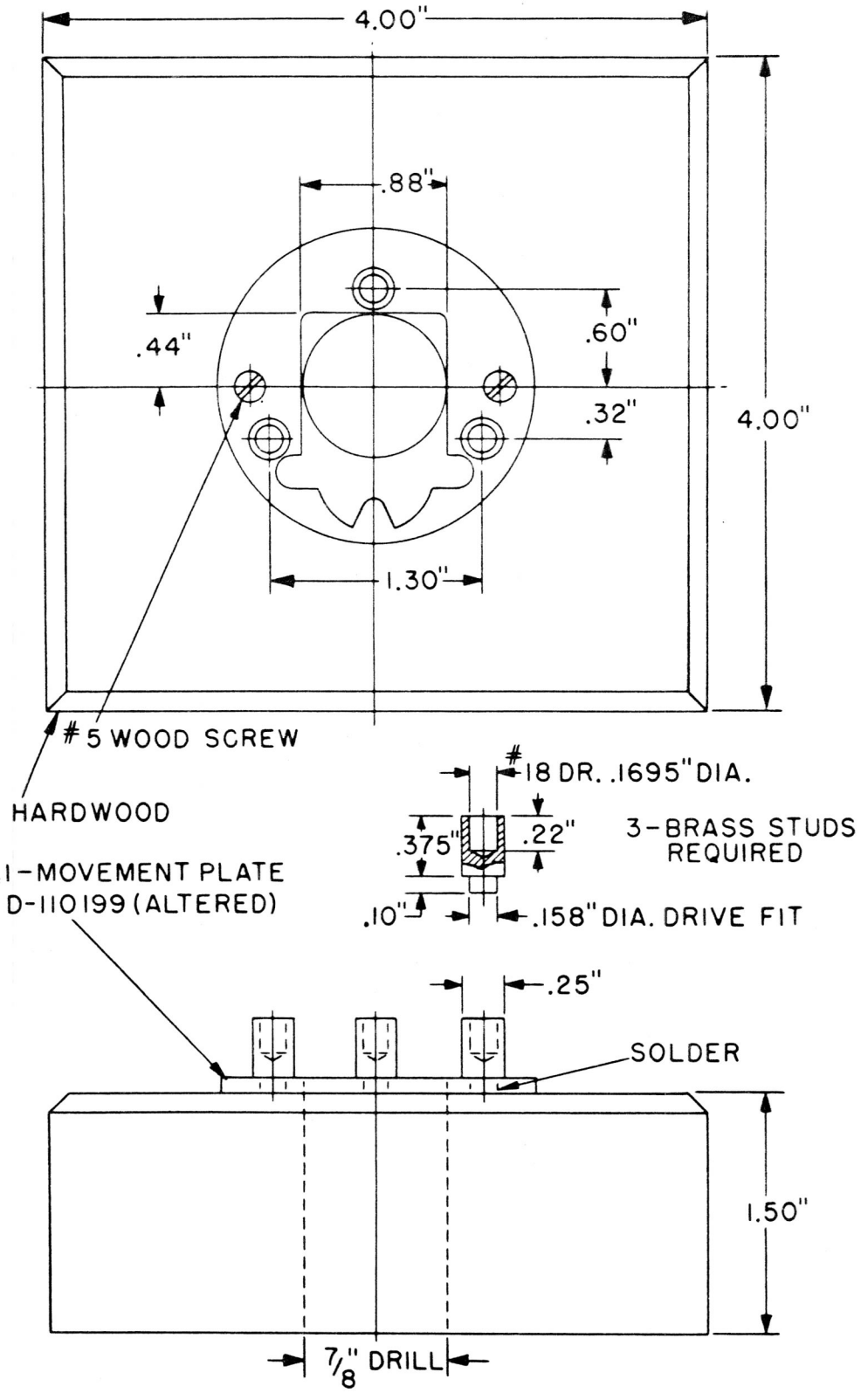
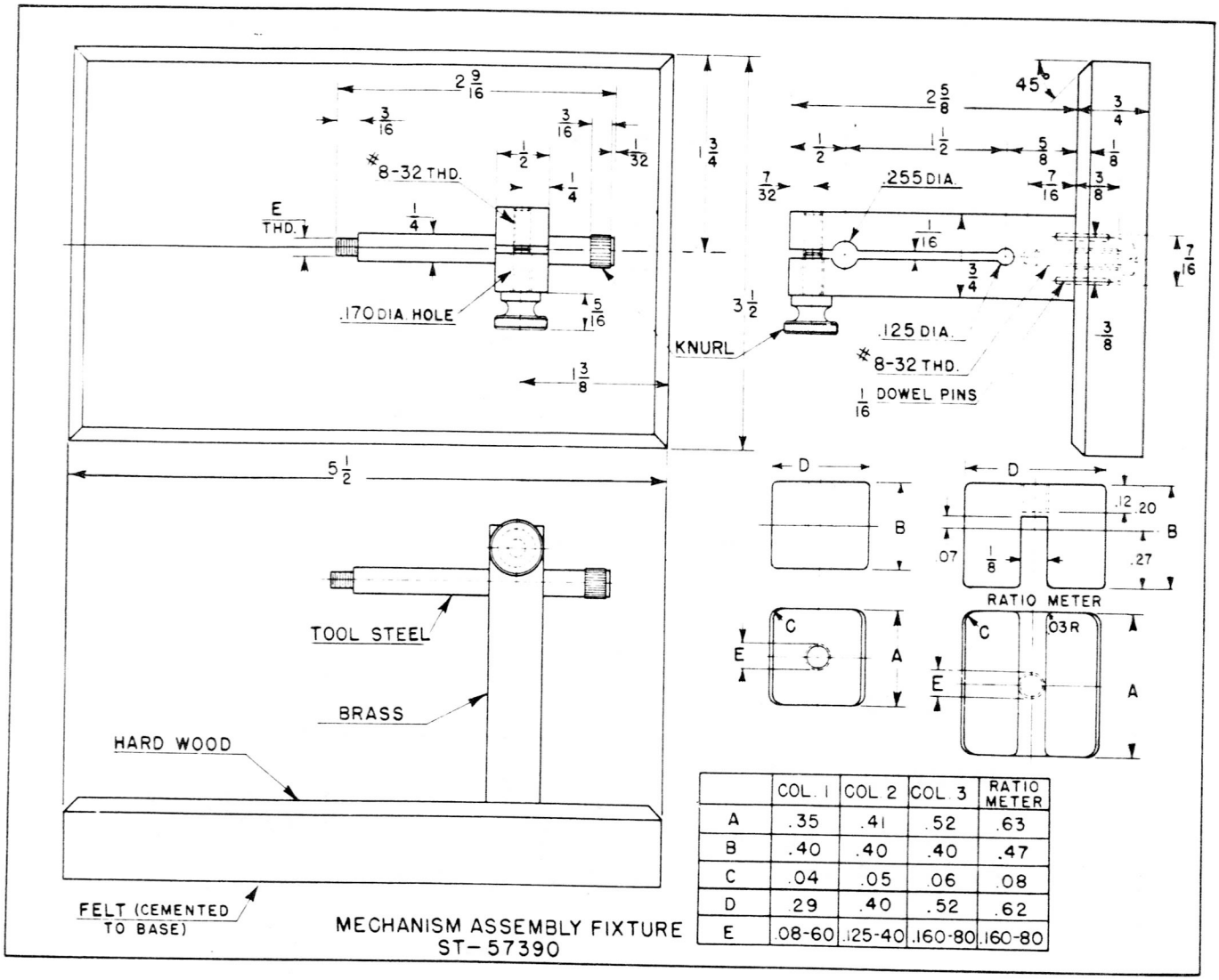


Figure 240—Laboratory Fixture (Part No. ST-55316)



MECHANISM ASSEMBLY FIXTURE
ST-57390

	COL. 1	COL 2	COL 3	RATIO METER
A	.35	.41	.52	.63
B	.40	.40	.40	.47
C	.04	.05	.06	.08
D	.29	.40	.52	.62
E	.08-60	.125-40	.160-80	.160-80

Figure 241—Mechanism Assembly Fixture (Part No. ST-57390)

RESCINDED

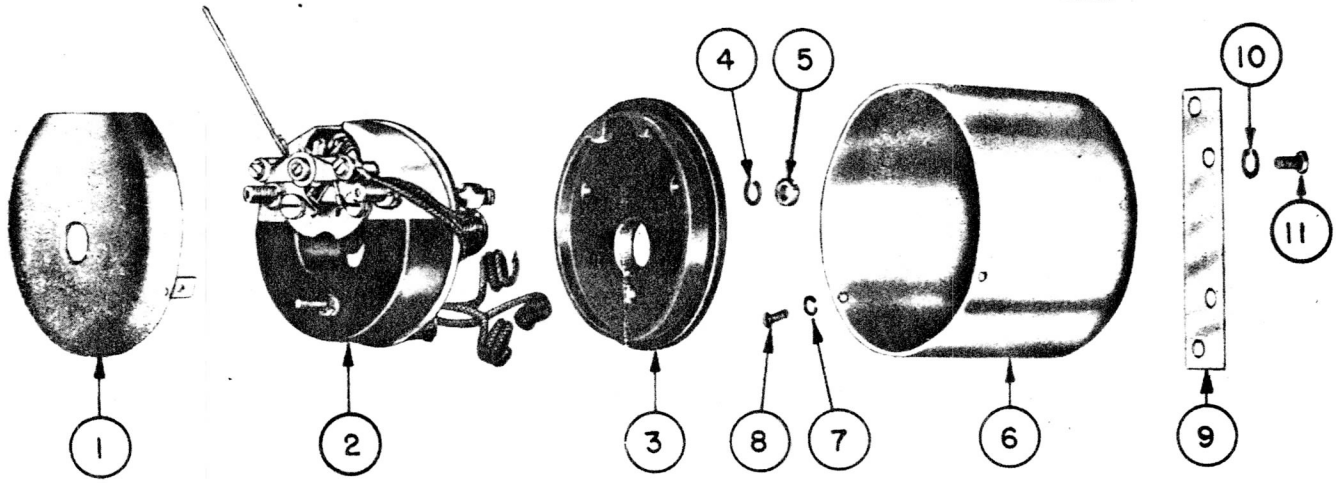


Figure 242—Shield and Base Removal Model 9969 Types 4 and 6 (Part Nos. 100442 and 111482)

1. Cover—Shield
2. Mechanism
3. Base—Bakelite
4. Washer—Lock
5. Nut
6. Shield
7. Washer—Lock
8. Screw—Shield cover
9. Bracket—Mounting
10. Washer—Lock
11. Screw

c. RATIOMETER (WESTON).

(1) DISASSEMBLY.

(a) Fixture ST55316 is designed to hold the completed instrument as well as the partially dismounted mechanism as shown in figure 246. This fixture can be made from movement plate part number 110199 and should prove invaluable to the operator.

Note

Before proceeding with the disassembly, ascertain the model, type, and part number of the mechanism involved and refer to the pertinent paragraph below.

(b) MODEL 9969 TYPES 4 AND 6. (PART NUMBERS 100442 AND 111482.)

1. SHIELD AND SHIELD COVER REMOVAL. *(See figure 242).*

a. Remove the two shield cover screws (8) and lock washers (7).

b. Remove the four shield to base screws (11), four lock washers (10), and two mounting brackets (9).

2. BASE REMOVAL. *(See figure 242.)*

a. Remove the three slotted nuts (5) and the three lock washers (4) from the rear of the base (3).

b. Remove base (3) by sliding it off over the three flexible leads.

3. TOP BRIDGE REMOVAL. *(See figure 232).*

a. Unsolder the flexible leads from the two top bridge terminals (4) and (7).

b. Unsolder the outer terminations of the top springs from their respective abutments.

c. Remove the outer bridge mounting parts in the order listed. The designations "right" and "left" referred to below are determined with the pole piece horns facing the operator.

Left Side	*Right Side*
Screw (13)	Screw (13)
Washer—Lock (12)	Washer—Lock (12)
Washer (11)	Washer (11)
Washer (9)	Washer (10)
Spring—Cushion (8)	Spring—Cushion (8)
Terminal (7)	

Bridge (6)

Screw jewel (14)

Note

The constituent bridge mounting parts of the mechanisms of Model 9969 Type 4 and Model 9969 Type 6 are identical, but the parts are located on opposite bridge supports.

d. Remove the inner bridge mounting parts in the order listed below:

Left Side	*Right Side*
Bushing (5)	Bushing (5)
Terminal — spring abutment (4)	Washer (3)
Bushing (2)	

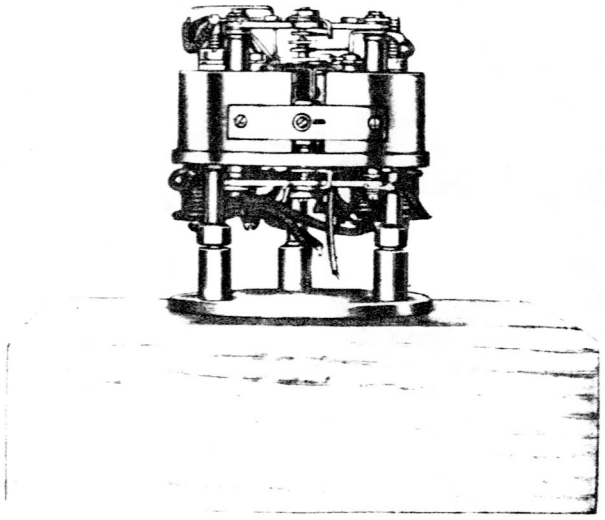


Figure 243—Application of Fixture ST-55316

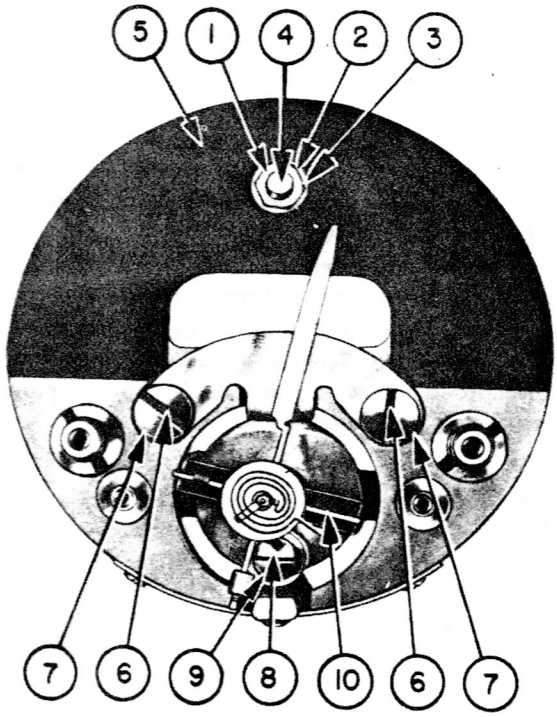


Figure 244—Magnet, Core, and Moving Element Removal.

1. Nut
2. Washer—Lock
3. Washer
4. Stud—Magnet
5. Magnet
6. Screw
7. Washer—Lock
8. Screw
9. Washer—Lock
10. Element—Moving

4. MAGNET, CORE, AND MOVING ELEMENT REMOVAL. *(See figure 244.)*

a. Unsolder outer termination of bottom spring or springs from bottom bridge abutments.

b. Remove nut (1), lock washer (2), washer (3), and magnet stud (4).

c. Pry magnet (5) from pole piece assembly and slide magnet out.

d. Remove screws (6) and lock washers (7).

e. Remove screw (8) and lock washer (9).

f. Tilt mechanism toward the magnet end of the pole piece and lift core bracket assembly and moving element (10) from the pole piece structure. Be careful. Avoid damage to the moving element during this operation.

5. BOTTOM BRIDGE REMOVAL. *(See figure 232).*—Remove the bottom bridge mounting parts in the order listed below:

a. PART NUMBER 100442.

Left Side	*Right Side*
Screw (13)	Screw (13)
Washer—Lock (12)	Washer—Lock (12)
Washer (11)	Washer (11)
Washer—Insulating (10)	Washer—Insulating (9)
	Terminal (7)
Bridge—Bottom (6)	
Screw jewel (14)	
Bushing (5)	Bushing (5)
Washer (3)	Terminal — Spring abutment (4)
	Bushing (2)

b. PART NUMBER 111482.

Left Side	*Right Side*
Screw (13)	Screw (13)
Washer—Lock (12)	Washer—Lock (12)
Washer (11)	Washer (11)
Washer—Insulating (9)	Washer—Insulating (10)
Terminal (7)	
Bridge—Bottom (6)	
Bushing (5)	Bushing (5)

6. RESISTANCE SPOOL REMOVAL. — Repair of the mechanism does not usually require the removal of the resistance spools or pole pieces and these parts should remain intact. However, should it be necessary to replace spools, unsolder the leads and remove the mounting screws.

7. MOVING ELEMENT DISASSEMBLY.—PART NUMBER 100442. *(See figure 245.)*

a. Unsolder the leads from the moving coil to the inner top and inner bottom spring terminals (7).

b. Remove the nut (2) from the upper pivot base.

c. Remove the parts (3) through (11) from the upper pivot base in the order shown on figure 245. The movement springs are delicate. Always handle them by grasping the inner spring terminal with a pair of pointed tweezers. The balance weights (9) and (10) should not be removed from the pointer (11) unless they are loose or damaged.

d. Invert the moving element and remove nut (2) from the bottom pivot base.

e. Remove the parts (3) through (8) from the lower pivot base in the order shown on figure 12, observing the precautions indicated in paragraph 5.*c.* (7)*(c)*, this section.

f. The pivots (1) are forced into the pivot base and may be extracted by grasping the pivot shank in pivot pulling pliers ST54533 and turning the coil from side to side while pulling.

D

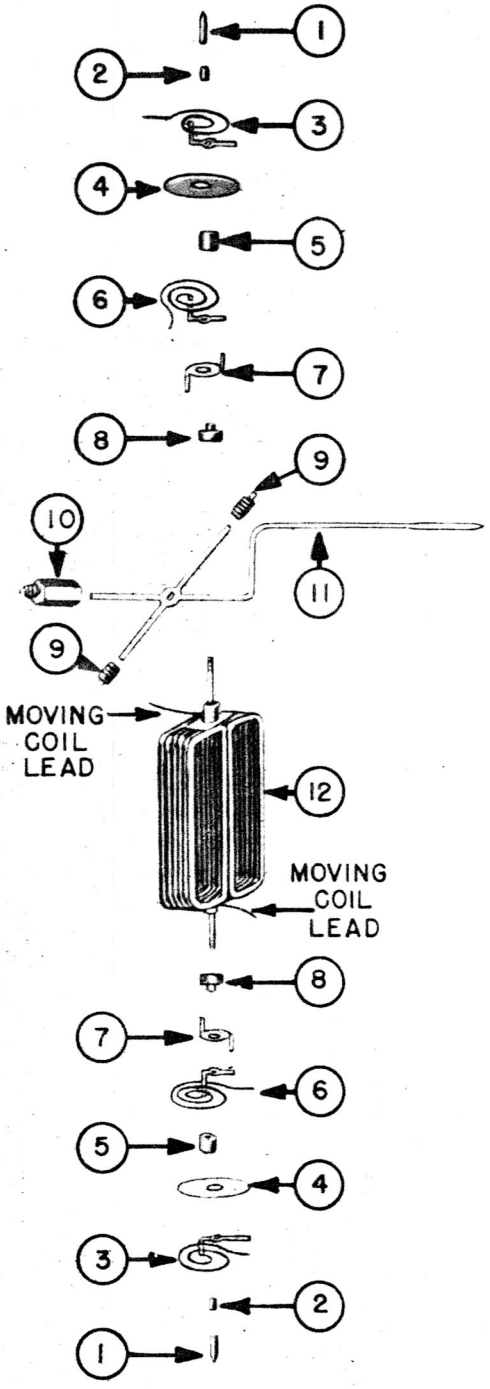


Figure 245—Moving Element Disassembly—Part No. 100442

1. Pivot
2. Nut
3. Spring
4. Guard—Spring
5. Bushing
6. Spring
7. Terminal
8. Bushing
9. Weight—Balance side arm
10. Weight—Balance tail
11. Pointer
12. Coil—Moving

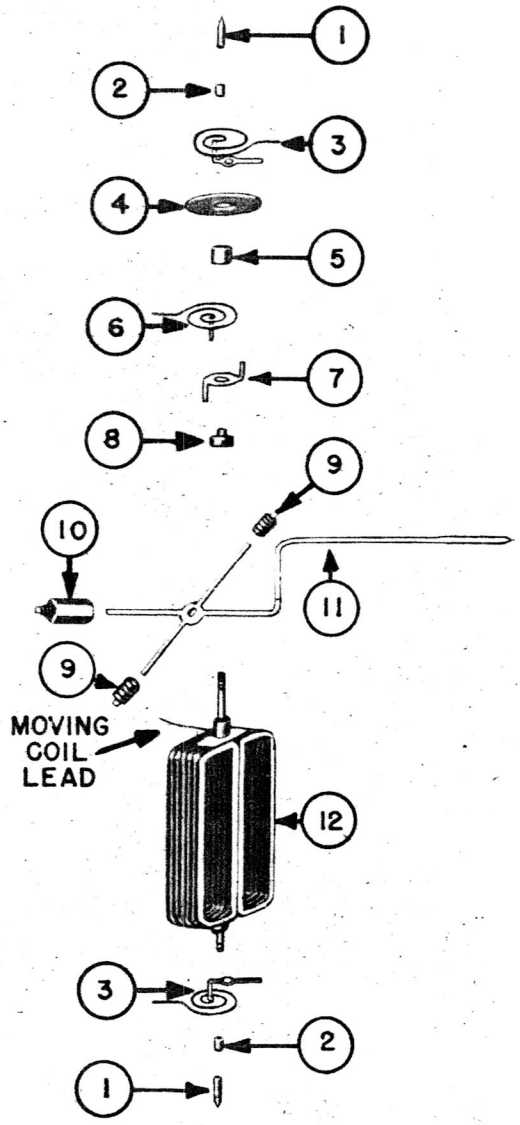


Figure 246—Moving Element Disassembly—Part No. 111482.

1. Pivot
2. Nut
3. Spring
4. Guard—Spring
5. Bushing
6. Spring
7. Terminal
8. Bushing
9. Weight—Balance side arm
10. Weight—Balance tail
11. Pointer
12. Coil—Moving

8. MOVING ELEMENT DISASSEMBLY—PART NUMBER 111482. *(See figure 246.)*

a. Unsolder the moving coil lead from the inner spring terminal (7) of the top pivot base.

b. Remove the nut (2) from the upper pivot base.

c. Remove the parts (3) through (11) from the upper pivot base in the order shown on figure 246, observing the precautions given in paragraph 5.*c.*(7)*(c)*, this section.

d. Invert the moving element and remove nut (2) and spring (3) from the bottom pivot base.

e. The pivots (1) are forced into the pivot base and may be extracted by grasping the pivot shank in pivot pulling pliers ST54533 and turning the coil from side to side while pulling.

D *d.* ELECTRICAL TESTS.

(1) RATIO DETERMINATION.

(a) Shift the tails of the top and bottom abutments as far to the right as is possible. When the instrument is held in the vertical position the pointer should drift to the left end of the scale. It may be necessary to tap the instrument in order to overcome the initial pivot friction.

(b) Connect the instrument as per diagram No. 1 of Figure 247, and set resistance boxes RA and RB to 920 ohms each.

(c) Apply 10 volts dc and vary RA until the pointer indicates the left end scale mark. Note the value of resistance and then vary RA until the pointer indicates the right end scale mark. Again note the resistance.

(d) The over-all ratio can then be determined by dividing the original value of RA plus moving coil resistance by the small value of RA plus moving coil resistance. The over-all ratio of the mechanism should be three to four plus or minus 2 percent. If the ratio is lower than this value, loosen the two core bracket screws and the one core to base screw and shift the core a slight amount up (towards the magnet). Tighten screws and recheck the ratio. A little experience will be necessary in order to minimize the amount of re-adjustments necessary to attain the proper over-all ratio.

(2) ELECTRICAL AND RESISTANCE READJUSTMENTS.

(a) Check the connections of all spools and terminals according to diagram No. 2, figure 247.

(b) Connect the instrument as per diagram No. 2 and with position RX and RY set to 100.5 ohms and with 4.1 volts applied to the circuit, the pointer should deflect to the center of the scale plus or minus 3½ degrees.

(c) Change box RX to 16.8 ohms and RY to 184.2 ohms and the pointer should deflect to the left end of the scale.

(d) Change RX to 184.2 ohms and RY to 16.8 ohms and the pointer should deflect to the right end of the scale.

(e) If the pointer has not indicated correctly at the left, center, and right marks, it will then be necessary to replace the spools marked R_1, R_2, and R_3 with variable resistance boxes and repeat the above operations.

(f) By the proper manipulation of these three resistance boxes the proper end scale and center scale marks can be obtained. After this has been accomplished note the resistance of the boxes and readjust those spools to the new values in the instrument.

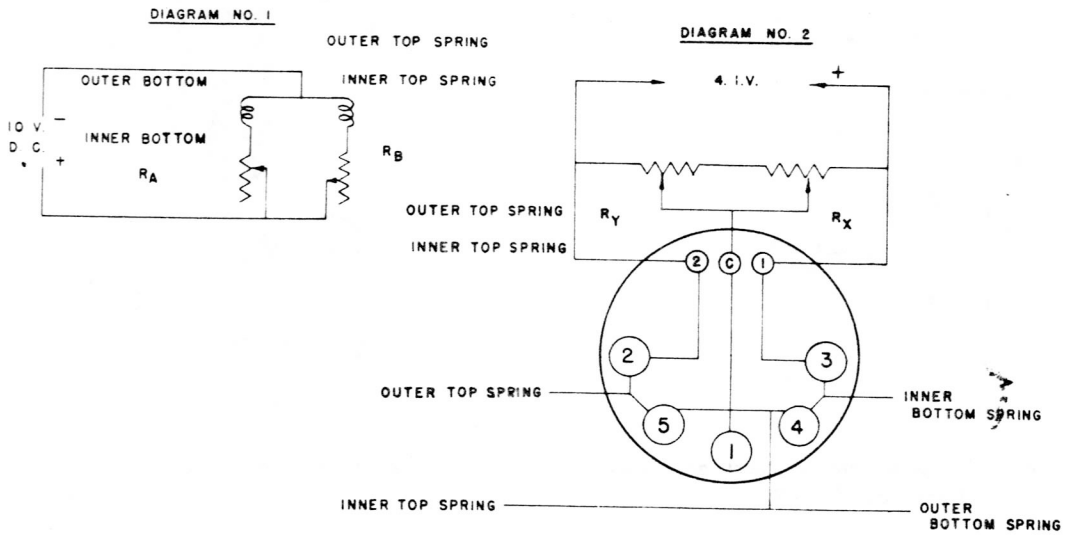


Figure 247—Internal Wiring Inspection

6. TANKS UNITS.

The following applies to all tank units except where noted, then the particular tank unit will be specified.

Note

When dismantling and reassembling tank units, care should be taken not to damage the resistance winding or the metal bellows.

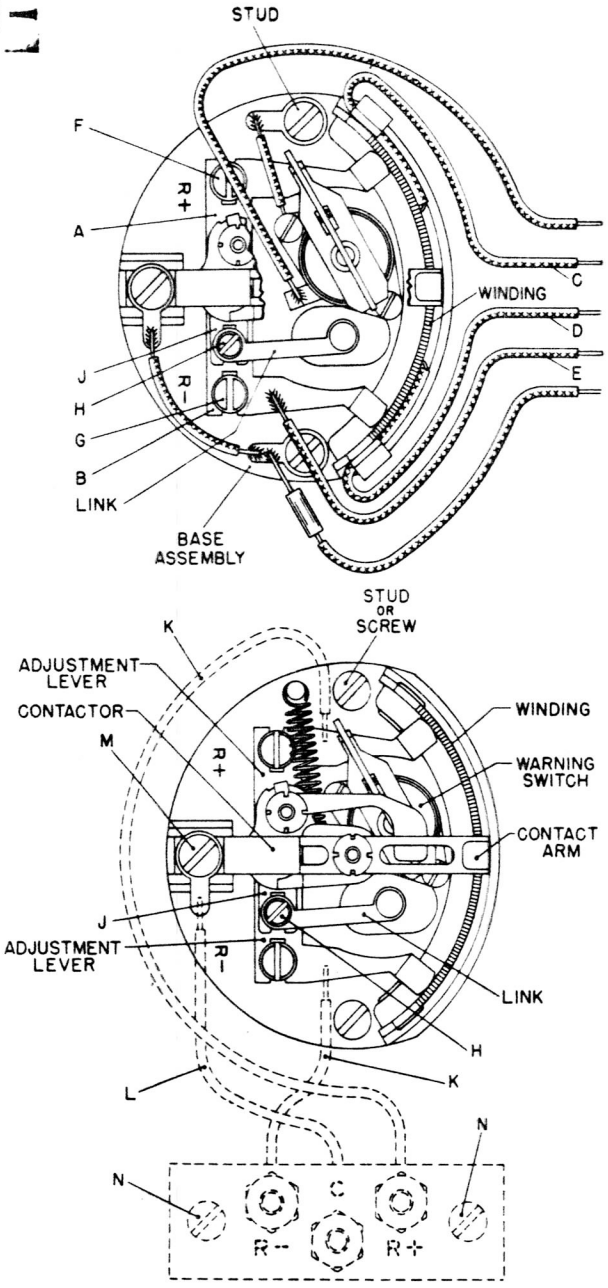


Figure 248—Potentiometer Assemblies

a. INSPECTION. *(See figure 248.)*

(1) Make sure all electrical connections are clean and tight.

(2) Examine all bearings; if appreciably worn, replace them. If, however, they are in good condition, they should be carefully cleaned.

(3) Make sure there is a good clean contact between contact arm and resistance winding. This contact should be adjusted to a wiper arm tension of 56 grams (2 ounces) ±25 grams (.8 ounces). Gage Assembly 0-150 gram scale, Western Electric Model 70-J may be used for making this adjustment.

(3A) Make sure there is a good clean contact between the adjustment levers and resistance winding and between the contactor and contact arm.

(4) Check warning signal switch. If defective, replace it.

(5) FOR INSPECTION OF EA-65 TANK UNIT.

(a) Disconnect tank unit from circuit by removing plug connection.

(b) Check resistance of center portion of resistance winding with a Wheatstone bridge or a good ohmmeter. To test this winding, the circuit between adjustment lever (A) and the winding must be broken by inserting between them a thin piece of insulating paper. The center portion of the winding then is determined by measuring the resistance across the (C) and (D) terminals. This resistance should not be less than 250 ohms. Should the measured resistance vary from the stated tolerances, replace with new base assembly.

(c) With the same setting, measure resistance across terminals (E and C). This resistance must be plus or minus 10 ohms of the center section, but not less than 250 ohms. Should the measured resistance vary from the stated tolerances turn adjustment screw (F) until resistance comes within specified limits.

(d) To check the third section of the winding, remove insulating paper and place same between adjustment lever (B) and winding. Measure resistance between terminals (C and D). The resistance must be plus or minus 10 ohms of the center section, but not less than 250 ohms. Should the measured resistance vary from the stated tolerances, turn adjustment screw (G) until resistance comes within specified limits.

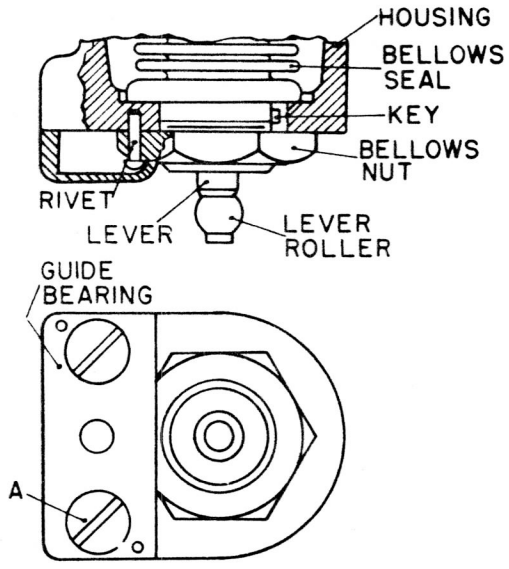


Figure 249—Direct Lift Housing Sectional View

CAUTION

Make sure that insulating pieces used to break circuit at adjustment levers are removed before connecting tank unit to the indicator.

(6) FOR INSPECTION OF EA-17 OR EA-67 TANK UNIT.

(a) Make sure the roller moves freely on actuating pin assembly in float.

(b) Make sure the lever roller moves freely on lever (See figure 249.)

b. REPAIR.

(1) BINDING AT FLOAT ARM BEARING. *(See figure 250.)*

(a) Remove float arm and operating rod by taking out locking pin at bearing and unsoldering and removing small nut beneath housing.

(b) Remove operating rod and bearing pin by filing one end and driving out.

(c) Clear both bearing holes.

(d) If bearing shows appreciable wear, replace it.

(e) Reassemble, using new bearing pin. Use staking tool (see figure 250A) for holding float on float fork.

Note

Both bearing and bearing pin should be polished with crocus cloth 000 grade.

(2) DEFECTIVE METAL FLOAT. — The float should be thoroughly dried before soldering, and care should be taken that additional leaks are not caused by soldering operation.

D—

IMPORTANT

Prior to soldering, to remove any fuel which might be inside the float, the float should be immersed in boiling water for approximately 5 minutes after all traces of bubbles have ceased to emerge from the crack.

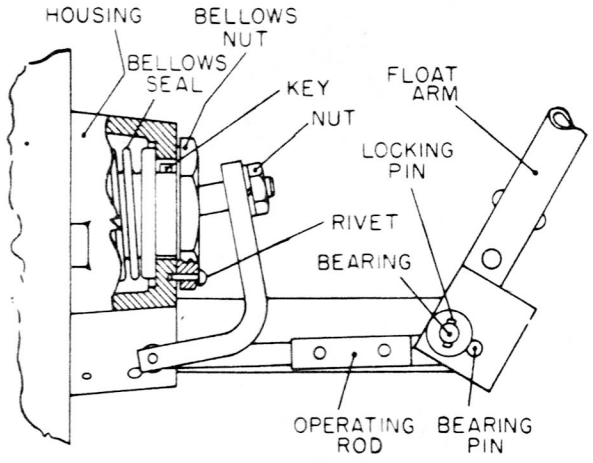
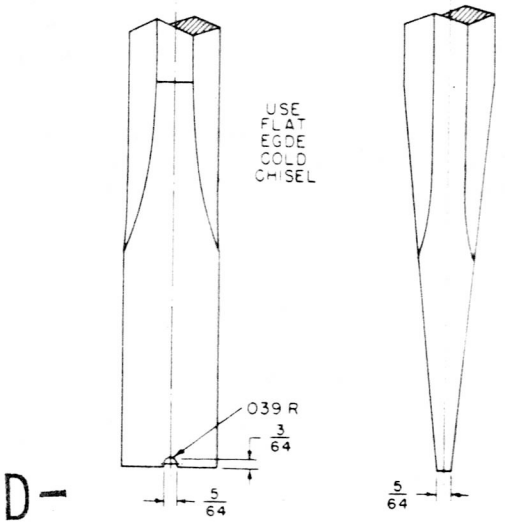


Figure 250—Housing and Fulcrum Pipe Assembly



D—

Figure 250A—Staking Tool for Float Fork Arm

(3) REPLACING POTENTIOMETER ASSEMBLY. *(See figure 248.)*

(a) FOR TANK UNITS EA-15, EA-16, EA-17, EA-65, EA-67, OR EA-85.

1. Remove old potentiometer assembly by taking out two studs or screws, loosening screw (H), and removing it together with link from slotted arm (J).

2. Remove leads.

a. FOR TANK UNIT EA-15, EA-16, EA-17, EA-67 OR EA-85.—Unsolder two leads (K) at potentiometer assembly and remove remaining lead (L) by taking out screw.

b. FOR TANK UNIT EA-85. — Unsolder all leads from connector.

3. Assemble new potentiometer assembly using same screws, etc., and solder leads in the original positions.

(b) FOR TANK UNIT EA-18. *(See figure 251.)*

1. Remove two nuts (A), two washers, cover, and gasket.

2. Disconnect three leads (B) from terminal plate by taking out three screws.

3. Remove two nuts (C) and lift terminal plate from two studs and bend back, using the wires (D) as hinges.

Note

In handling this assembly, care should be taken not to damage resistance winding.

4. Remove old potentiometer and terminal assembly by taking out two studs. Loosen screw (H) (figure 248), and remove it together with link from slotted arm (5).

5. Reassemble in reverse order using replacement potentiometer and terminal assembly.

(4) REPLACING BELLOWS SEAL ASSEMBLY. *(See figures 248, 249 and 250.)*—If bellows is damaged, replace complete bellows seal assembly.

(a) If tank unit EA-15, EA-16, EA-18, EA-65, or EA-85 is being repaired:

1. Disconnect operating rod by unsoldering and removing small nut directly beneath housing.

2. If tank unit EA-17 or EA-67 is being repaired, remove guide bearing by taking out two studs (A). (See figure 249.)

3. File off head of rivet, and drill out remainder of rivet with No. 53-(.059) drill to a depth of 1/4 inch from top of bellows nut. (See figure 250.)

4. Remove bellows nut and lift out complete bellows seal assembly.

5. Clean gasket surface on housing.

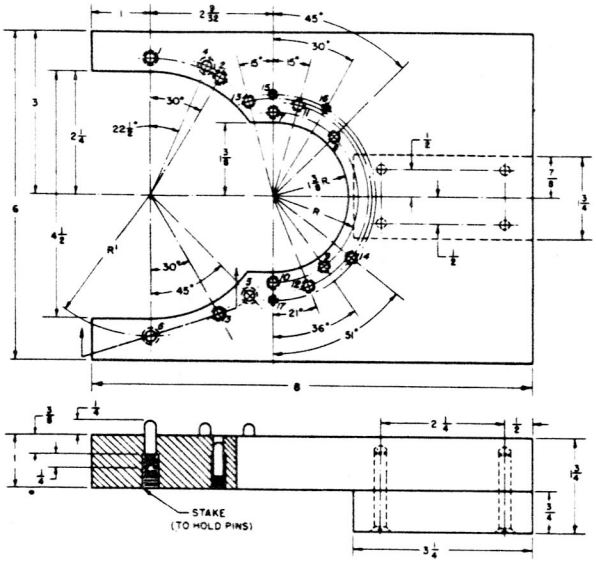
D— *6.* Put bakelite varnish on gasket surface.

7. Insert replacement bellows seal assembly so that key enters slot in housing and secure with new bellows nut.

8. When nut is in place, using drill No. 53 (.059) drill a new hole 1/8 of an inch deep into housing and drive in new rivet.

9. Reassemble remainder in reverse order. Using fixture (see figure 251A) for holding housing while tightening sylphon nut.

(5) TESTING BELLOWS SEAL *(See figure 251B.)*



UNIT	PIN NUMBER			PIN DIA	RAD R	RAD R	TAP
EA-1430	4	5	6	3/16	—	2 3/16	3/8 X 16
EA-1511	7	—	9	3/16	1 9/16	—	1/4 X 20
EA-1511A	7	8	10	3/16	1 9/16	—	1/4 X 20
EA-1730	4	5	6	3/16	—	2 3/16	3/8 X 16
EA-1811	1	2	3	9/32	—	2 1/2	1/4 X 20
EA-8511	7	—	9	3/16	1 3/4	—	1/4 X 20
EA-17611	15	16	17	1/8	1 7/8	—	10X24
EA-17811	13	14	—	3/32	1 13/16	—	1/4 X 20

Figure 251A—Fixture T-2 for Holding Tank Unit Housing While Tightening Sylphon Nut

D— *(a)* The transmitter to be tested, less float, float-arm, cover, linkage assembly and potentiometer, is placed in the fixture as shown by the dotted lines. The clamping fixture is placed on top of transmitter and the clamping lever is swung around to engage the slot in the locking fixture.

D— *(b)* Pour kerosene into top of housing until bellows seal is covered. Air pressure of 40 lbs. per square inch is then applied through air inlet to the inside of fixture. Watch surface of kerosene in housing for air bubbles which indicate a leak.

(c) If a new bellows seal must be installed proceed as outlined in paragraph (4).

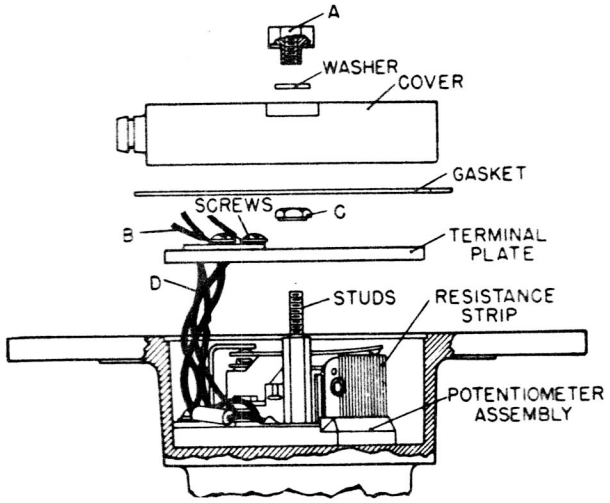
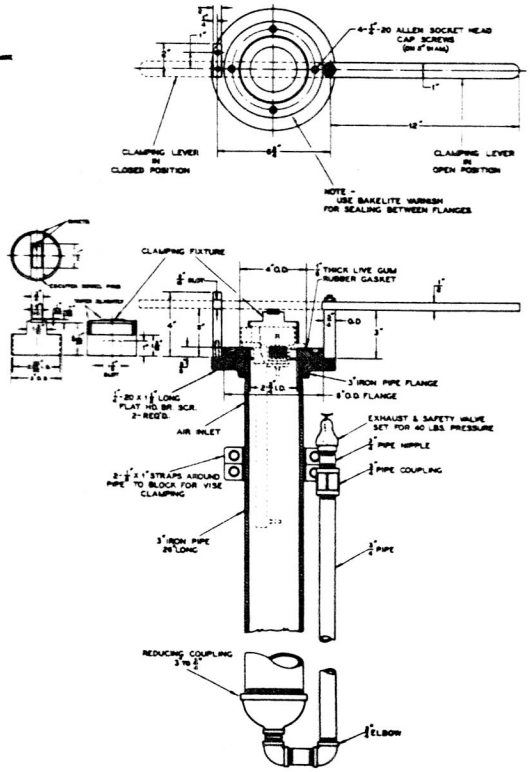


Figure 251—Potentiometer Removal from EA-18 Tank Unit Housing

D—



D— ***Figure 251B—Fixture T-6 Testing Bellows Seal***

(5) REMOVAL OF POTENTIOMETER ASSEMBLY.

(a) If tank unit EA-15, EA-17, EA-67, or EA-85 is being repaired (figure 248), remove potentiometer assembly by taking out two studs, loosening screw (H) and removing it together with link from slotted arm (J) Unsolder two leads (K) at potentiometer assembly and remove remaining lead (L) by taking out screw (M).

(b) If tank unit EA-65 is being repaired, unsolder all leads from connector and remove potentiometer assembly by taking out two studs, loosening screw (H) and removing it together with link from slotted arm (J).

(c) If tank unit EA-16 is being repaired, remove potentiometer assembly by taking out the two studs or screws, and two screws (N), removing link from slotted arm (J) after first loosening screw (H).

(d) If tank unit EA-18 is being repaired. (See figure 251.)

1. Remove two nuts (A), two washers, cover and gasket.

2. Disconnect three leads (B) from terminal plate by taking out three screws.

3. Remove two nuts (C) and lift terminal plate from two studs and bend back, using the wires (D) as hinges.

Note

In handling this assembly, care should be taken not to damage resistance winding.

4. Remove old potentiometer and terminal assembly by taking out two studs. Loosen screw (H) (figure 248) and remove it together with link from slotted arm (J).

5. Reassemble in reverse order using replacement potentiometer and terminal assembly.

7. SELECTOR SWITCH.

CAUTION

Care should be taken in handling the parts of this unit.

a. DISASSEMBLY. *(See figure 252.)*

(1) Loosen rear terminal plate by taking out two screws (A).

(2) Remove screw (B) in index knob.

(3) Remove index knob (C) and pin (D).

(4) Remove nut (E).

(5) Remove rear terminal plate (F) and rotary switch (G) as a unit.

(6) Dial can also be removed by taking out the three screws (H).

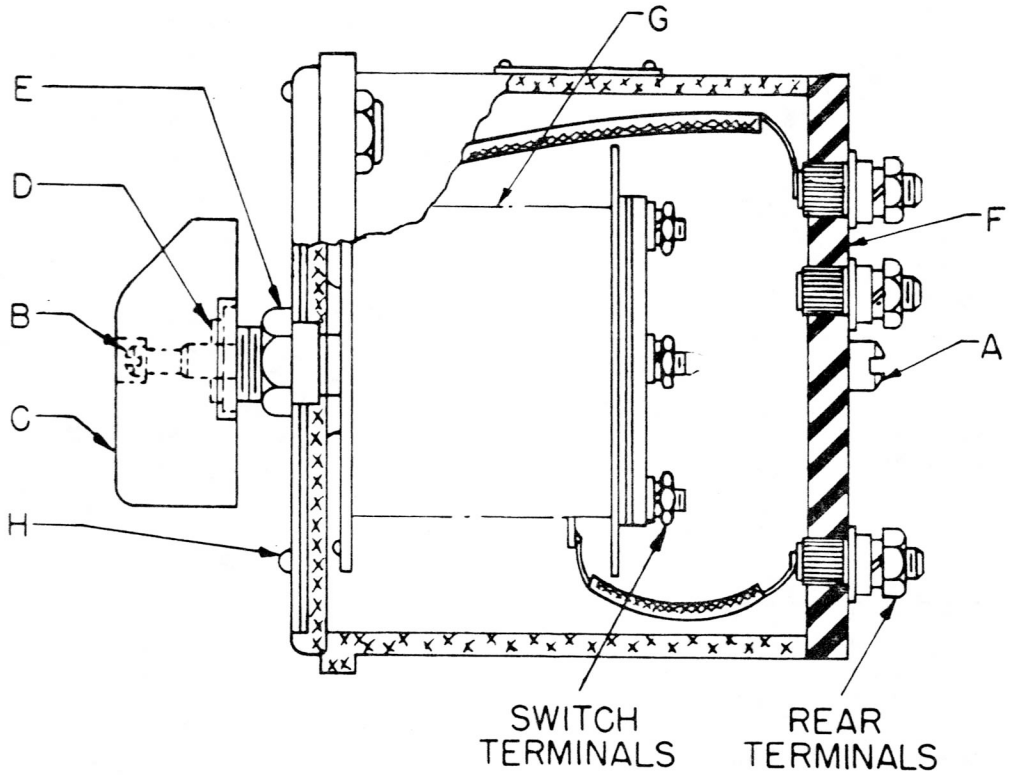


Figure 252—Selector Switch Sectional View

b. CLEANING, INSPECTION, TESTING AND REPAIR.

(1) Make sure all connections are clean and tight.

(2) Check soldered connections from switch terminals to rear terminals. Repair if any are broken or loose.

(3) Make certain there is sufficient tension between contact arms and buttons. Clean out all dirt, chips or oil that may be between contact arms and contact buttons.

(4) Be sure detent balls are clean and move freely.

c. REASSEMBLY.

(1) Reassemble Selector Switch in reverse order to disassembly.

8. VOLTAGE COMPENSATOR.

The data for this unit will be supplied at a later date as a revision to this manual.

9. STROKE ADJUSTMENT UNIT.

CAUTION

Care should be taken not to damage the resistance windings.

a. DISASSEMBLY. *(See figure 253.)*

(1) Remove resistor assembly by taking off nuts (A) lock washers and spacers.

(2) Drive out studs (B) simultaneously, making sure that edge of hole in panel is not damaged.

(3) Remove contact shoe assembly by taking off nut (C) and lock washer and plain washer.

b. CLEANING, INSPECTION, TESTING AND REPAIR.

(1) Check resistor assemblies for damaged windings. Replace if necessary.

(2) Check contact shoe assembly to make certain shoe has sufficient tension. Replace assembly if damaged.

(3) Clean out all dirt, grit, etc., so that a bright clean contact is made at all times.

c. REASSEMBLY.

(1) Reassemble this unit after all repairs are made in reverse order to the disassembly procedure.

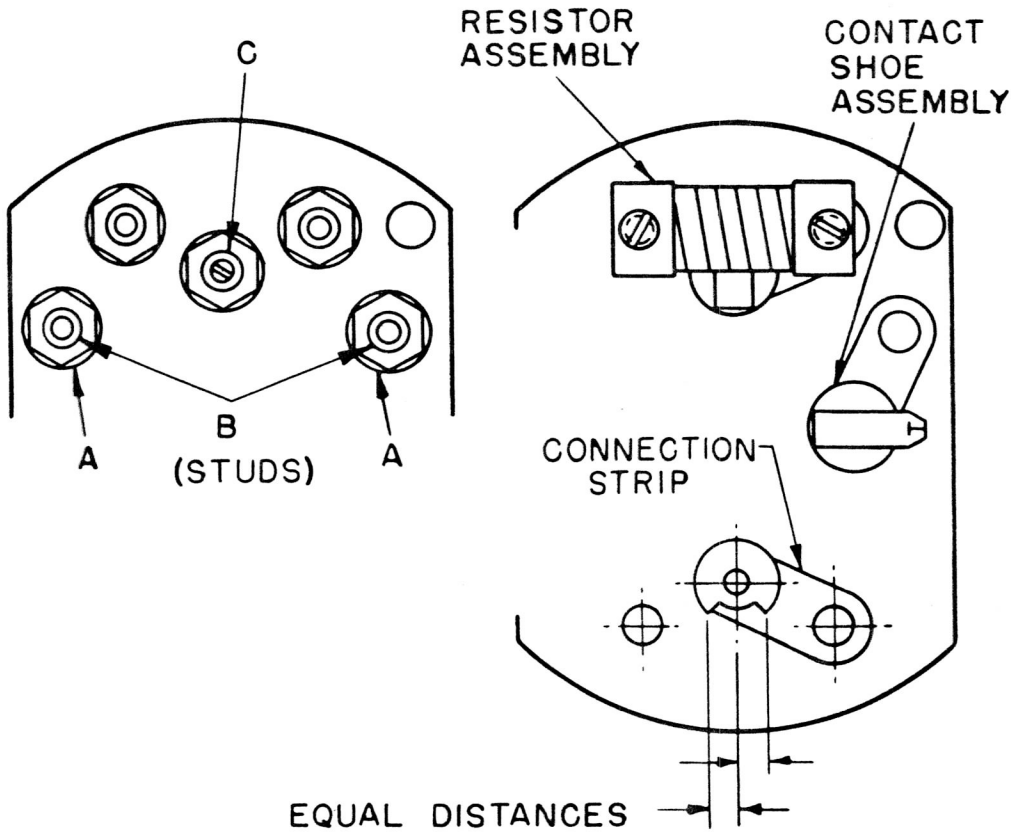
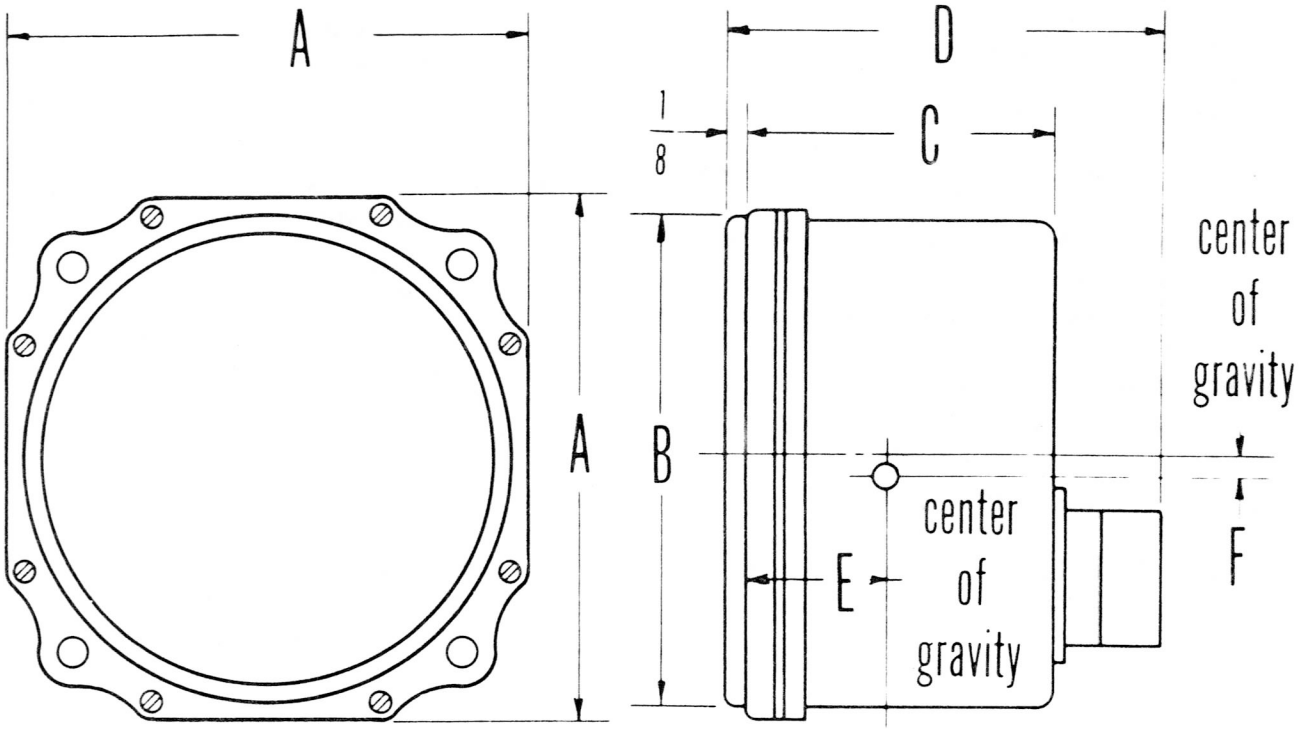


Figure 253—Stroke Adjustment Unit



Indicator	*A*	*B*	*C* Max.	*D* Max.	*E* Center of Gravity Approx.	*F* Center of Gravity Approx.
EA-100	2 3/8	2 1/4	1 7/8	2 5/8	7/8	0
EA-101	3 1/4	3 1/8	1 7/8	2 5/8	5/8	0
EA-102	2 3/8	2 1/4	1 7/8	2 5/8	5/8	1/4
EA-104	3 1/4	3 1/8	1 7/8	2 5/8	5/8	1/8
EA-108	2 3/8	2 1/4	1 7/8	2 5/8	3/4	1/8
EA-109	3 1/4	3 1/8	2 7/8	3 7/8	1	1/8
EA-111	3 1/4	3 1/8	2 7/8	3 7/8	1	1/8
EA-124	3 1/4	3 1/8	1 7/8	2 5/8	5/8	1/8
EA-140	3 1/4	3 1/8	2 7/8	3 7/8	1 3/8	0
EA-143	3 1/4	3 1/8	1 7/8	2 5/8	5/8	1/4
EA-148	2 3/8	2 1/4	1 7/8	2 5/8	3/4	1/8
EA-150	3 1/4	3 1/8	2 7/8	3 7/8	1 3/8	1/4

Figure 254—General Dimensions of Liquidometer Indicators

TABLE 5

LIQUIDOMETER INDICATORS CROSS REFERENCED WITH TABLE 1

Indicator	Manufacturer	Model Airplane	Ext. Wiring Fig. No.	Int. Wiring Fig. No.	Receptacle Number	Size	Series	Scales Degrees	Scales Number	Voltage	Approx. Weight
EA-100-2AB	V. SIKORSKY	F4U-1	54	133	AN3102-14S-2P	1⅞"	"C"	300	1	24V.	0.45
EA-100-5	DOUGLAS	A20B	55	133	AN3102-14S-2P	1⅞"	"C"	300	1	24V.	0.45
EA-100-6	DOUGLAS	A20B	55	133	AN3102-14S-2P	1⅞"	"C"	300	1	24V.	0.45
EA-100-7	BELL	XP-59B	56	133	AN3102-14S-2P	1⅞"	"C"	300	1	24V.	0.45
EA-100-8	GENERAL MOTORS	XP-75	57	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-9	CURTISS	XP-40Q-2	58	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V. GR.	0.45
EA-100-10	MARTIN	JRM-1	130-B	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-11	MARTIN	JRM-1	130-B	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-12	MARTIN	JRM-1	130-B	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-13	MARTIN	JRM-1	130-B	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-16	CHANCE VOUGHT	F4U-4, 5 & FG-2	130-E	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100-17	LOCKHEED	XP-80	130-L	133	AN3102-14S-2P	1⅞"	"D"	300	1	24V.	0.45
EA-100AN-48	CHANCE VOUGHT	F4U-4, F4U-5, FG-2	130-E	162-H	AN3102-14S-2P	1⅞"	"A"	300	1	24V.	0.45
EA-101-1	GRUMMAN	TBF-1	59	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-2	LOCKHEED	B37	60	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-3	LOCKHEED	B37	60	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-4	LOCKHEED	B37	60	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-8	VEGA	PV-1	61	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-9	VEGA	PV-1	61	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-10	VEGA	PV-1	61	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-18	DOUGLAS	C-54A	65	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-19	DOUGLAS	C-54A	64 & 65	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-19A	DOUGLAS	C-54	130-V & W	133	AN3102-14S-2P	2¼"	"D"	300	1	24V.	0.60
EA-101-24	DOUGLAS	C-54	63	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-25	DOUGLAS	C-54	63	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-27	DOUGLAS	C-54A	64	133	AN3102-14S-2P	2¼"	"D"	300	1	24V.	0.60
EA-101-27A	DOUGLAS	C-54	130-V & W	133	AN3102-14S-2P	2¼"	"D"	300	1	24V.	0.60
EA-101-29	FLEET WINGS	XA-39	67	133	AN3102-14S-2P	2¼"	"D"	300	1	24V.	0.60
EA-101-311188-1L	N. A. F.	PBN-1	78	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-311188-1R	N. A. F.	PBN-1	78	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-3111-88-2	N. A. F.	PBN-1	78	133	AN3102-14S-2P	2¼"	"C"	300	1	24V.	0.60
EA-101-AT9	CURTISS	AT-9	68	161	AN3102-14S-2P	2¼"	"C"	300	1	24V.	1.00
EA-101A-5	VEGA	B34	79	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101-A-6	VEGA	B34	79	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101A-7	VEGA	B34	79	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101A-14	VEGA	LV-37	80	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101A-15	VEGA	LV-37	80	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101A-16	VEGA	LV-37	80	137	FOUR STUDS	2¼"	"C"	300	1	24V. & 3V.	0.60
EA-101AN-18	DOUGLAS	C-54A	65	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-19A	DOUGLAS	C-54	130-V & W	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-27A	DOUGLAS	C-54	130-V & W	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-44	DOUGLAS	XBT2D	130-D	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-44A	DOUGLAS	XBT2D	130-D	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-67	MARTIN	PBM-5	130-AD	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-101AN-78	MARTIN	PBM-5A	130-AB	162-E	AN3102-14S-2P	2¾"	"A"	300	1	24V.	0.75
EA-102-1	DOUGLAS	C-54A	66	134	AN3102-14S-1P	1⅞"	"C"	90	1	24V.	0.45
EA-102-1F	DOUGLAS	C-54A	66	134	AN3102-14S-2P	1⅞"	"C"	90	1	24V.	0.45
EA-102-8	V. SIKORSKY	YR4A, YR4B, R4B	69	135	AN3102-14S-1P	1⅞"	"C"	90	1	24V.	0.45

TABLE 5 (Contd)

Indicator	Manufacturer	Airplane Model	Ext. Wiring Fig. No.	Int. Wiring Fig. No.	Receptacle Number	Size	Series	Scales		Voltage	Appox. Weight	Navy Stock Number
								De-grees	Num-ber			
EA-102-10	BEECH	AT-11	#52	#136	AN3102-14S-2P	1⅞"	"C"	90	1	24V. UNGR.	0.45	
EA-102-11	V. SIKORSKY	XR6, R-6	#70	#135	AN3102-14S-2P	1⅞"	"C"	90	1	24V.	0.45	
EA-102-13	DOUGLAS	C-54A	#66	#134	AN3102-14S-1P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-16	DOUGLAS	C-54B, D & E	#130-F	#134	AN3102-14S-1P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-19	NASH-KELVIN-ATOR	R6A	#130-G	#135	AN3102-14S-2P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-27	NASH-KELVIN-ATOR	R6A	#130-H	#135	AN3102-14S-2P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-28	DOUGLAS	C-54 Series	#130-Y	#134	AN3102-14S-1P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-29	GRUMMAN Modified by Namu	F-6	#130-O	#135	AN3102-14S-2P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-40	DOUGLAS	C-54	#130-Y	#134	AN3102-14S-1P	1⅞"	"D"	90	1	24V.	0.45	
EA-102-52	DOUGLAS	C-54	#130-Y	#134	AN3102-14S-1P	1⅞"	"D"	90	1	24V.	0.45	
EA-102AN-16	DOUGLAS	C-54	#130-F	#162-J	AN3102-14S-1P	1⅞"	"A"	90	1	24V.	0.45	
EA-102AN-40	DOUGLAS	C-54	#130-F	#162-J	AN3102-14S-1P	1⅞"	"A"	90	1	24V.	0.45	
EA-102AN-52	DOUGLAS	C-54	#130-F	#162-J	AN3102-14S-1P	1⅞"	"A"	90	1	24V.	0.45	
EA-104-5	CESSNA	AT-17	#71	#140	AN3102-14S-5P	2¾"	"C"	90	2	24V.	0.70	
EA-104-8	CESSNA	AT-17	#72	#139	AN3102-14S-5P	2¾"	"C"	90	2	12V.	0.70	
EA-104-9	LOCKHEED	B-37	#60, 61 & 62	#140	AN3102-14S-5P	2¾"	"C"	90	2	24V.	0.70	
EA-104-16	CONSOLIDATED VULTEE	B24D	#73	#140	AN3102-14S-5P	2¾"	"D"	90	2	24V.	0.70	
EA-104A-3	VULTEE	BT-13	#74	#162	BR-E-1003-3-20	2¾"	"A"	90	2	12V.	0.70	
EA-104A-6	DOUGLAS	A-20A	#75	#138	AN3102-14S-5P	2¾"	"C"	90	2	12V. & 3V.	0.50	
EA-108-5	BELL	P39D	#76	#148	AN3102-14S-2P	1⅞"	"B"	90	2	24V.	0.50	
EA-108-6	DOUGLAS	C54A	#66	#147	AN3102-14S-2P	1⅞"	"B"	90	2	24V.	0.50	
EA-108-6F	DOUGLAS	C54A	#66	#147	AN3102-14S-2P	1⅞"	"C"	90	2	24V.	0.50	
EA-108-11	BELL	P39D	#76	#146	AN3102-14S-2P	1⅞"	"B"	90	2	24V.	0.50	
EA-108-11C	BELL	P39D	#76	#148	AN3102-14S-2P	1⅞"	"C"	90	2	24V.	0.50	
EA-108-13	BELL	P39E	#77	#146	AN3102-14S-2P	1⅞"	"B"	90	2	24V.	0.50	
EA-108-16	BELL	P39D-1	#76	#148	AN3102-14S-2P	1⅞"	"C"	90	2	24V.	0.50	
EA-108-19	BELL	P39, K, L, M	#76 & 81	#148	AN3102-14S-2P	1⅞"	"C"	90	2	24V.	0.50	
EA-108-26	BELL	P39, K, L, M	#76	#148	AN3102-14S-2P	1⅞"	"C"	90	2	24V.	0.50	
EA-108-839R	LOCKHEED	P38	#82	#157	WK-4-32S	1⅞"	"C"	90	2	24V.	0.50	
EA-108-839F	LOCKHEED	P38	#82	#157	WK-4-32S	1⅞"	"C"	90	2	24V.	0.50	
EA-108W-17	BELL	P-59A	#83	#149	AN3102-16S-1P	1⅞"	"D"	90	2	24V.	0.50	
EA-108W-31	BELL	P-59A	#84	#149	AN3102-16S-1P	1⅞"	"D"	90	2	24V.	0.50	
EA-109-1	FAIRCHILD	XAT-13, 14 & AT-21	#85	#151	AND-10066-18-1P	2¾"	"C"	90	2	24V.	0.95	
EA-109-3	VEGA	PV2	#86	#152	AND-10066-18-1P	2¾"	"D"	90	4	24V.	0.95	
EA-109-4	CONSOLIDATED	PBY	#89	#152	AND-10066-18-1P	2¾"	"D"	90	4	24V.	0.95	
EA-109-12	FAIRCHILD	AT-21	#85	#152	AND-10066-18-1P	2¾"	"D"	90	4	24V.	0.95	
EA-111-1	VULTEE	A-35A	#87	#159	AND-10066-16S-1P	2¾"	"C"	90	3	24V.	0.90	
EA-111-12	VULTEE	A-31C	#87	#159	AND-10066-16S-1P	2¾"	"C"	90	3	24V.	0.90	
EA-124-4	CURTISS	C76	#88	#142	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	
EA-124-8	VEGA	PV2	#86	#142	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	
EA-124-9	V. SIKORSKY	TBU-1	#90	#144	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70	
EA-124-10	N. AMERICAN	B25C	#91	#142	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	
EA-124-11	N. AMERICAN	B25D	#91	#142	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	
EA-124-12	DOUGLAS	#740	#93	#141	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	
EA-124-13	DOUGLAS	#740	#93	#141	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70	

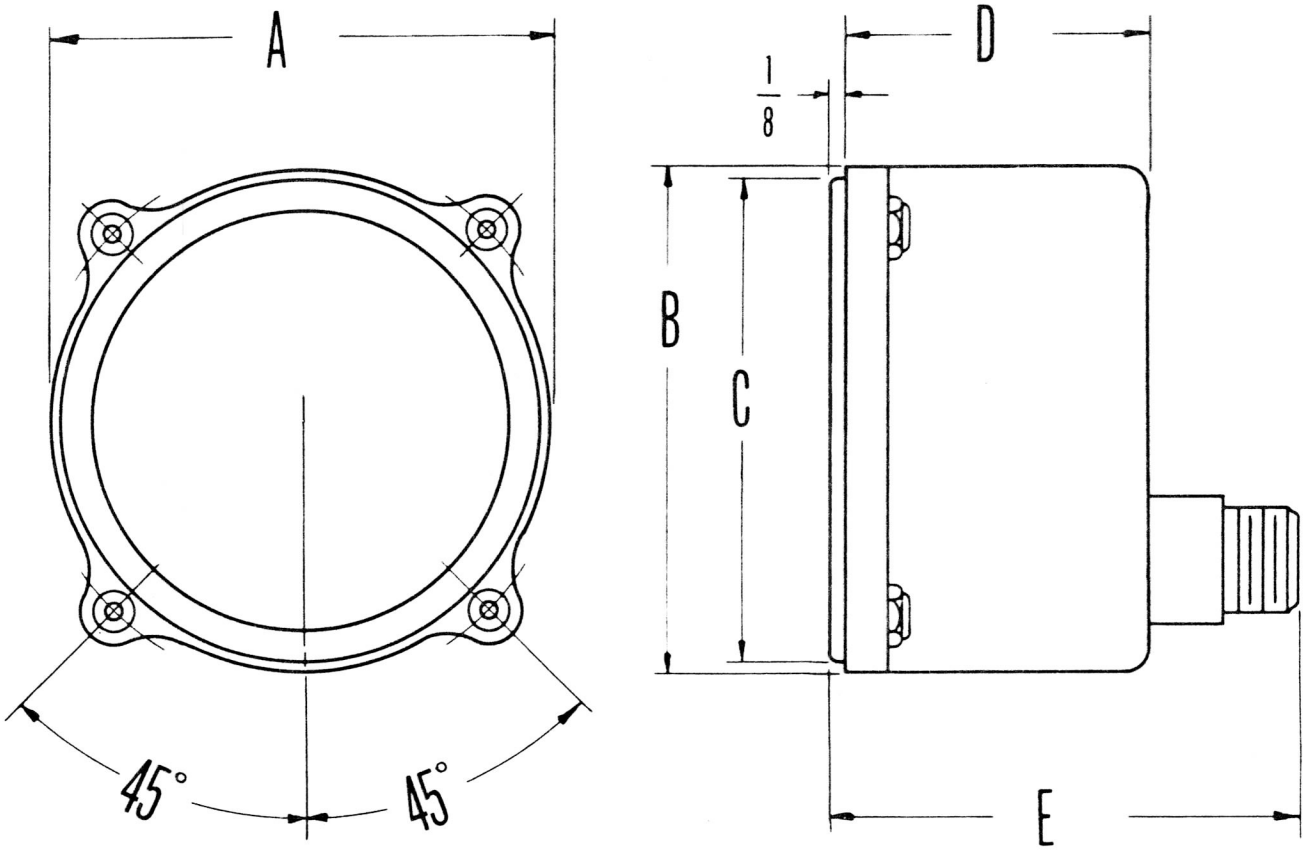
TABLE 5 (Contd)

Indicator	Manufacturer	Model Airplane	Ext. Wiring Fig. No.	Int. Wiring Fig. No.	Receptacle Number	Size	Series	Scales Degrees	Scales Number	Voltage	Approx. Weight
EA-124-14	DOUGLAS	#740	93	141	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70
EA-124-15	CONSOL. VULTEE	B-24D, H & K	92	142	AN3102-14S-5P	2¾"	"C"	120	2	24V. UNGR.	0.70
EA-124-24	CURTISS	C46	94	143	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124-25	CURTISS	C46	94	143	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124-26	CURTISS	C46	94	143	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124-29	REPUBLIC	P47D-25 & UP	96	142	AN3102-14S-5P	2¾"	"C"	120	2	24V. GR.	0.70
EA-124-30	REPUBLIC	XP-72	95	142	AN3102-14S-5P	2¾"	"C"	120	2	24V.	0.70
EA-124-31	CONSOLIDATED	B24	130-I	162-C	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124-32	VEGA	PV-2	130-AC	142	AN3102-14S-5P	2¾"	"E"	120	2	24V.	0.70
EA-124-40	REPUBLIC	P47N	—	142	AN3102-14S-5P	2¾"	"E"	120	2	24V.	0.70
EA-124-51	RYAN	FR1	130-Q	144	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124-53	CONSOL. VULTEE	TBY-2	130-P	144	AN3102-14S-5P	2¾"	"D"	120	2	24V.	0.70
EA-124AN-39	FAIRCHILD	C-82	130-AG	162-L	AN3102-14S-5P	2¾"	"A"	120	2	24V.	0.80
EA-124AN-52	MARTIN	XP4M-1	130-AA	162-L	AN3102-14S-5P	2¾"	"A"	120	2	24V.	0.80
EA-124AN-65	REPUBLIC	F-84	130-AF	162-L	AN3102-14S-5P	2¾"	"A"	120	2	24V.	0.80
EA-124AN-82	FAIRCHILD	C-82	130-AG	162-L	AN3102-14S-5P	2¾"	"A"	120	2	24V.	0.80
EA-124AN-89	REPUBLIC	F-84	130-AF	162-L	AN3102-14S-5P	2¾"	"B"	120	2	24V.	0.80
EA-124AN-94	REPUBLIC	F-84	130-AF	162-L	AN3102-14S-5P	2¾"	"B"	120	2	24V.	0.80
EA-124AN-102	REPUBLIC	F-84	130-AF	162-L	AN3102-14S-5P	2¾"	"B"	120	2	24V.	0.80
EA-124AN-104	REPUBLIC	F-84	130-AF	162-L	AN3102-14S-5P	2¾"	"B"	120	2	24V.	0.80
EA-125AN-2	REPUBLIC	P47N	130-K	162-G	AN3102-18-1P	2¾"	"A"	1-120 2-300	3	24V.	1.20
EA-134-1	NORTHROP	P61A	97	150	AN3102-18-1P	2⅝" x 5⅛"	none	120	4	24V.	1.75
EA-140-4	GRUMMAN	TBF-1	98	158	AND10066-20-1P	2¾"	"D"	300	4	24V.	1.00
EA-140-5	MARTIN	JRM-1	130-M	158	AND10066-20-1P	2¾"	"D"	300	4	24V.	1.23
EA-140-6	BUDD	C-93	99	158	AND10066-20-1P	2¾"	"D"	300	4	24V.	1.00
EA-143A-1M	VULTEE	BT-13	74	153	E-1003-3-20	2¾"	"C"	90	1	12V.	0.60
EA-143A-4	DOUGLAS	A-20A	100	145	AN3102-14S-1P	2¾"	"C"	90	1	12V.	0.60
EA-143AN-8	DOUGLAS	C74	130-C	162-B	AN3102-14S-1P	2¾"	"A"	90	1	24V.	0.70
EA-148-1	N. AMERICAN	B25C & D	101	154	AN3102-14S-5P	1⅞"	"C"	120	2	24V.	0.50
EA-148-2	NOORDUYN	C64A	102	154	AN3102-14S-5P	1⅞"	"C"	120	2	24V.	0.50
EA-148-5	VEGA	PV2	103	154	AN3102-14S-5P	1⅞"	"C"	120	2	24V.	0.50
EA-148AN-19	SIKORSKY	YR6A	130-J	162-A	AND10066-14S-6P	1⅞"	"A"	120	2	24V.	0.60
EA-148AN-23	BELL	47	130-AE	162-M	AN3102-14S-5P	1⅞"	"A"	120	2	12V.	0.60
EA-148AN-23-24	BELL	47	130-AE	162-M	AN3102-14S-5P	1⅞"	"A"	120	2	24V.	0.60
EA-148W-3	BELL	XP63	104	155	AN3102-18-1P	1⅞"	"C"	120	2	24V.	0.50
EA-148W-7	BELL	P63	130-S	162-F	AN3102-18-1P	1⅞"	"D"	120	2	24V.	0.50
EA-148W-14	BELL	P63	130-S	162-F	AN3102-18-1P	1⅞"	"E"	120	2	24V.	0.50
EA-148W-18	BELL	P63	130-S	162-F	AN3102-18-1P	1⅞"	"E"	120	2	24V.	0.50
EA-150-12	DOUGLAS	C54A	64	156	AND10066-16S-1P	2¾"	"D"	300	2	24V.	0.75
EA-150-12A	DOUGLAS	C-54	130-V & W	156	AND10066-16S-1P	2¾"	"D"	300	1	24V.	0.75
EA-150-16	CONSOLIDATED	C-87C	105	156	AND10066-16S-1P	2¾"	"D"	300	2	24V.	0.75
EA-150-24	DOUGLAS	C54D	130-N	156	AND10066-16S-1P	2¾"	"D"	300	1	24V.	0.75
EA-150AN-7	DOUGLAS	C74	130-T	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-150AN-8	DOUGLAS	C74	130-T	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-150AN-9	DOUGLAS	C74	130-T	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-150AN-12A	DOUGLAS	C-54	130-V & W	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-150AN-17	DOUGLAS	C74	130-U	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-150AN-18	DOUGLAS	C74	130-U	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95

TABLE 5 (Contd)

Indicator	*Manufacturer*	*Model Airplane*	*Ext. Wiring Fig. No.*	*Int. Wiring Fig. No.*	*Receptacle Number*	*Size*	*Series*	*Scales* *De-grees*	*Scales* *Num-ber*	*Voltage*	*Approx. Weight*
EA-150AN-24	DOUGLAS	C-54	130-W	162-D	AN3102-16S-1P	2¾"	"A"	300	1	24V.	0.95
EA-155-9	CONSOL. VULTEE	B32	130-R	156	AND10066-16S-1P	2¾"	"D"	300	2	24V.	0.75
EA-155-13	CONSOL. VULTEE	B32	130-R	156	AND10066-16S-1P	2¾"	"D"	300	2	24V.	0.75
EA-155AN-14	MARTIN	XP4M-1	130-X	162-K	AN3102-16S-1P	2¾"	"A"	120	2	24V.	0.95
EA-303AN-1	DOUGLAS	C-54	130-Z	162-D	AN3102-14S-2P	2¾"	"A"	90	1	24V.	0.95
EA-303AN-3	DOUGLAS	C-54	130-X	162-K	AN3102-14S-2P	2¾"	"A"	90	1	24V.	0.95

Note: See Figure 254 for general dimensions of the indicators listed in this table except EA-134-1 indicator which uses the same case as the dial change indicator. See Figure 256.



Unit Number	*A*	*B*	*C*	*D*	*E*	*Approx. Weight*	*Remarks*
EA-31	3-1/2	3-1/4	3-1/8	1-5/8	3-5/16	1.27 lbs.	See Table 2 for Weston Model, Type and Part Numbers.
EA-35	2-5/8	2-13/32	2-1/4	2-1/4	3-1/4	0.95 lbs.	
EA-36	3-1/2	3-1/4	3-1/8	2-5/16	3-5/16	1.38 lbs.	
EA-343	2-3/8	2-3/8	2-1/4	2-3/8	3-1/4	0.95 lbs.	

NOTE

These indicators cross-referenced with Table 1.

Figure 255—General Dimensions of Weston Indicators

TABLE 6

LIQUIDOMETER DIAL CHANGE INDICATORS CROSS REFERENCED WITH TABLE 1

Dial Change Indicator	*Manufacturer*	*Airplane Model*	*External Wiring Fig. No.*	*Internal Wiring Fig. No.*	*Receptacle Number*	*Number of Dials*	*Voltage*
EA-41A-1	MARTIN	PBM3	106	163	AN3102-18-1P	5	24V. & 3V.
EA-41A-2	MARTIN	PBM3	107	163	AN3102-18-1P	5	24V. & 3V.
EA-41A-4	MARTIN	PBM5	130A	163	AN3102-18-1P	5	24V. & 3V.
EA-41A-5	MARTIN	PBM5	130AD	163	AN3102-18-1P	5	24V. & 3V.
EA-41A-6	MARTIN	PBM5A	130AB	163	AN3102-18-1P	5	24V. & 3V.
EA-46W-1	MARTIN	A-20B	108	164	AN3102-18-1P	3	24V.
EA-47-1-24	DOUGLAS	B-26	112	165	E-1003-1-10	6	24V.
EA-47-2C	BOEING	B-17	110	166	AN3102-20-1P	6	24V.
EA-47-10	MARTIN	B-26 F & G	109	165	E-1003-1-10	6	24V.
EA-47W-1	MARTIN	B-26	111	167	E-1003-1-10	6	12V.
EA-47W-1-24	MARTIN	B-26	112	168	E-1003-1-10	6	24V.
EA-47W-2	BOEING	B-17	110	169	AN3102-20-1P	6	24V. & 3V.
EA-47W-2C	BOEING	B-17	110	169	AN3102-20-1P	6	24V. & 3V.
EA-47W-2V	BOEING	B-17	110	169	AN3102-20-1P	6	24V. & 3V.
EA-47AW-4	DOUGLAS	A-20C	117	169	AN3102-20-1P	6	24V. & 3V.
EA-47W-6	DOUGLAS	A-20C	114	169	AN3102-20-1P	6	24V. & 3V.
EA-47W-7	DOUGLAS	A-20G	115	169	AN3102-20-1P	6	24V. & 3V.
EA-47W-8	DOUGLAS	A-20H	116	169	AN3102-20-1P	6	24V. & 3V.
EA-47AW-4	DOUGLAS	A-20C	117	170	AN3102-20-1P	6	24V.
EA-47AW-5	DOUGLAS	A-20C	118	170	AN3102-20-1P	6	24V. & 3V.
EA-48-5	DOUGLAS	C-47	119	171	AN3102-16S-1P	4	12V.
EA-48-5-24	DOUGLAS	C-47	119	172	AN3102-16S-1P	4	24V.
EA-48-12	DOUGLAS	C-53	122	171	AN3102-16S-1P	4	12V.
EA-48-12-24	DOUGLAS	C-53	122	172	AN3102-16S-1P	4	24V.
EA-48-13	DOUGLAS	C-53	122	171	AN3102-16S-1P	4	12V.
EA-48-15	DOUGLAS	C-53	122	171	AN3102-16S-1P	4	12V.
EA-48-16	BOEING	B-29	120	173	AN3102-18-1P	4	24V.
EA-48-17T	BOEING	B-29	121	173	AN3102-18-1P	4	24V.
EA-48W-14	NORTHROP	YP-61	123	175	AN3102-18-1P	4	24V. & 3V.
EA-48W-18	NORTHROP	P-61	124	175	AN3102-18-1P	4	24V. & 3V.
EA-48AW-1	DOUGLAS	A-20A	113	174	AN3102-18-1P	4	12V. & 3V.
EA-48AW-2	DOUGLAS	A-20A	113	174	AN3102-18-1P	4	12V. & 3V.
EA-48AW-6	DOUGLAS	A-20A	113	174	AN3102-18-1P	4	12V. & 3V.
EA-49-4	N. AMERICAN	B-25C	125	176	AN3102-20-1P	5	24V.
EA-49W-1	MARTIN	B-26	129	179	E-1003-1-10	5	12V.
EA-49AW-2	N. AMERICAN	B-25	126	177	E-1003-1-10	5	12V. & 3V.
EA-49AW-3	N. AMERICAN	B-25A & B	127	177	E-1003-1-10	5	12V. & 3V.
EA-49AW-7	DOUGLAS	P70	128	178	AN3102-20-1P	5	24V. & 3V.
EA-55A-438	MARTIN	PBM-1	130	130	NONE (STUDS)	6	12V.

APPROXIMATE WEIGHT OF DIAL CHANGE INDICATORS = 3.2 LBS.

SEE FIGURE 124 FOR GENERAL DIMENSIONS

RESCINDED

TABLE 7

LIQUIDOMETER INDICATORS CROSS REFERENCED WITH TABLE 1

Unit Number	Gen. Dim. Fig. No.	Airplane Manufacturer	No. of Units Per Ship	Tank Location	Location in Tank	Length in Inches of: Float Arm	Length in Inches of: Fulcrum Pipe	Type of Float	Connector Receptacle	Receptacle Position	External Wiring Fig No.	Internal Wiring Fig. No.	No. and Size Holes in Housing	Approx. Weight Lb.	Approx. Weight Oz.	Depth of Tank: Top	Depth of Tank: Neutral	Depth of Tank: Bottom
EA-15-10	272	BOEING	2	1 & 4 Tanks	Top	17-1/4	14-15/32	Hinged-Cork	AND-10066-14S-1P	#3	110	187	5 #2(.221)	1	6	14-5/64	0	14-5/64
EA-15-11	272	BOEING	2	2 & 3 Tanks	Top	18-31/32	15-3/4	Hinged-Cork	AND-10066-14S-1P	#3	110	187	5 #2(.221)	1	6	15-25/64	0	15-25/64
EA-15-12	272	BOEING	2	L. & R. Feeder	Top	13-25/32	11-23/32	Hinged-Cork	AND-10066-14S-1P	#3	110	187	5 #2(.221)	1	4	11-29/64	0	11-29/64
EA-15-14	261	CURTISS-WRIGHT	2	Left & Right	Top	12	11	Rigid-Cork	AND-10066-14S-1P	#13	94	180	5 #2(.221)	1	4	10-11/16	0	11-1/4
EA-15-15	277	CURTISS-WRIGHT	2	Left & Right	Top	11-1/2	10-3/4	Hinged-Cork	AND-10066-14S-1P	#13	94	180	5 #2(.221)	1	6	10-27/32	0	10-27/32
EA-15-16	261	CURTISS-WRIGHT	2	Left & Right	Top	13	7-1/4	Rigid-Cork	AN-9534-14S-1P	#13	94	180	5 #2(.221)	1	2	7-3/4	0	7-3/4
EA-15-312	295-A	CURTISS-WRIGHT	2	Left & Right	Top	11-1/16	11	Rigid-Cork	AND-10066-14S-1P	#13	94	180	5 #2(.221)	1	6	11-1/64	0	10-45/64
EA-15-3-14867-1	268	BOEING	2	1 & 2 Tanks	Top	24-1/2	22-1/2	Rigid-Metal	AN-9534-14S-1P	#3	120	187	5 #2(.221)	1	10	18	0	18
EA-15-3-14867-2	268	BOEING	2	3 & 4 Tanks	Top	24-1/2	22-1/2	Rigid-Metal	AN-9534-14S-1P	#3	120	187	5 #2(.221)	1	10	18	0	18
EA-15-341	261	BELL	1	Forward Tank	Top	9-7/8	5-1/8	Rigid-Cork	AND-10066-12S-3P	#1	130AE	187	5 #2(.221)	1	2	4-27/32	0	4-27/32
EA-15-88-64820	294	VULTEE	1	Fuselage Inner Wing	Top	11-3/4	5-7/16	Hinged-Cork	EA-6533	#3	87	181	5 #2(.221)	1	4	6-5/16	0	8-3/32
EA-15-88-64820A	289	VULTEE	1	Fuselage Inner Wing	Top	11-3/4	5-7/16	Hinged-Cork	EA-6550	#3	87	181	5 #2(.221)	1	4	6-5/16	0	8-3/32
EA-15-88-64821	294	VULTEE	2	L. & R. Wing	Top	11-3/4	4-7/8	Hinged-Cork	EA-6533	#3	87	181	5 #2(.221)	1	4	5-21/32	0	7-9/32
EA-15-88-64821A	289	VULTEE	2	L. & R. Wing	Top	11-3/4	4-7/8	Hinged-Cork	EA-6550	#3	87	181	5 #2(.221)	1	4	5-21/32	0	7-9/32
EA-15-120088	274	VEGA	1	Left Rear	Top	13-9/16	11-7/16	Hinged-Cork	AND-10066-12S-3P	#2	86	187	5 #2(.221)	1	6	12-41/64	0	8-17/64
EA-15-120089	275	VEGA	1	Right Rear	Top	13-9/16	11-7/16	Hinged-Cork	AND-10066-12S-3P	#1	86	187	5 #2(.221)	1	6	12-41/64	0	8-17/64
EA-15-217870-3	267	NORTHROP	2			13	5-13/32	Hinged-Metal	AND-10066-14S-1P	#3	97	187	5 #2(.221)	1	2	5-21/64	0	10-3/8
EA-15-228150	272	LOCKHEED	2	Left & Right	Top	9-3/16	8-9/16	Hinged-Cork	WK-4-32S	#3	82	187	5 #2(.221)	1	2	6-9/32	0	6-17/32
EA-15-4113228-2	278	DOUGLAS	1	Left Main	Top	15-1/8	10	Hinged-Cork	AND-10066-14S-1P	#8	119	187	8 #2(.221)	1	4	10-3/16	0	10-3/16
EA-15-4113228-3	278	DOUGLAS	1	Right Main	Top	15-1/8	10	Hinged-Cork	AND-10066-14S-1P	#7	119	187	8 #2(.221)	1	4	10-3/16	0	10-3/16
EA-15-4113228-4	278	DOUGLAS	1	Left Auxiliary	Top	11-13/16	9-15/32	Hinged-Cork	AND-10066-14S-1P	#8	119	187	8 #2(.221)	1	4	9-15/64	0	9-15/64
EA-15-4113228-5	278	DOUGLAS	1	Right Auxiliary	Top	11-13/16	9-15/32	Hinged-Cork	AND-10066-14S-1P	#7	119	187	8 #2(.221)	1	4	9-15/64	0	9-15/64
EA-15-4136535-2	281	DOUGLAS	1	Left Main	Top	14-1/2	10-1/2	Hinged-Cork	AND-10066-14S-1P	#17	122	187	5 #2(.221)	1	4	10-3/32	0	10-43/64
EA-15-4136535-3	281	DOUGLAS	1	Right Main	Top	14-1/2	10-1/2	Hinged-Cork	AND-10066-14S-1P	#19	122	187	5 #2(.221)	1	4	10-3/32	0	10-43/64
EA-15-4136535-4	281	DOUGLAS	1	Left Auxiliary	Top	12-1/2	9-3/4	Hinged-Cork	AND-10066-14S-1P	#17	122	187	5 #2(.221)	1	2	8-37/64	0	9-13/32
EA-15-4136535-5	281	DOUGLAS	1	Right Auxiliary	Top	12-1/2	9-3/4	Hinged-Cork	AND-10066-14S-1P	#19	122	187	5 #2(.221)	1	2	8-37/64	0	9-13/32
EA-15-4174039	267	DOUGLAS	1	Alcohol	Top	12	9-31/32	Hinged-Metal	AND-10066-12S-3P	#3	130-C	187	5 #2(.221)	1	2	7-19/32	0	9-39/64
EA-15-4310270	271	DOUGLAS	1		Top	15-1/4	14-5/8	Rigid-Metal	AND-10066-14S-1P	#1	93	202	5 #2(.221)	1	4	12-3/4	0	13-21/32
EA-15-4310270-1	271	DOUGLAS	1	Right Tank	Top	15-1/4	14-5/8	Rigid-Metal	AND-10066-14S-1P	#2	93	202	5 #2(.221)	1	4	12-3/4	0	13-21/32
EA-15-4310272	271	DOUGLAS	1		Top	19-13/16	17-1/2	Rigid-Metal	AND-10066-14S-1P	#1	93	202	5 #2(.221)	1	6	16-3/4	0	18-5/16
EA-15-4310272-1	271	DOUGLAS	1		Top	19-13/16	17-1/2	Rigid-Metal	AND-10066-14S-1P	#2	93	202	5 #2(.221)	1	6	16-3/4	0	18-5/16
EA-15-5105650	293	DOUGLAS	2	Left & Right	Top	6-5/8	10-1/4	Hinged-Metal	AND-10066-14S-1P	#3	66	187	5 #2(.221)	1	4	5-9/16	0	5-9/16
EA-15-5132925	290	DOUGLAS	1	Fuselage Nose	Top	9	4-13/32	Hinged-Metal	AND-10066-12S-3P	#1	66	203	5 #9(.196)	1	4	3-31/32	0	5-41/64
EA-15-C-169539	262	MARTIN	2		Top	17-1/16	13-13/16	Hinged-Cork	E-1003-3-20	#3	130	130	5 "F"(.257)	1	6	12-19/32	0	15-37/64
EA-15-C-169581	262	MARTIN	2		Top	13-5/16	11-5/8	Hinged-Cork	E-1003-3-20	#3	50	50	5 "F"(.257)	1	6	11-1/4	0	12-3/32
EA-15-P-5047	294	NOORDUYN	1	Front Belly	Top	13-1/2	8	Hinged-Cork	AND-10066-12S-3P	#2	102	187	5 #2(.221)	1	4	8-7/32	0	5-31/64
EA-15-P-5048	294	NOORDUYN	1	Read Belly	Top	12	8	Hinged-Cork	AND-10066-12S-3P	#2	102	187	5 #2(.221)	1	4	10-19/32	0	5-11/64
EA-15-VS-36862	276	VOUGHT SIKORSKY	1		Top	11-5/32	7-13/16	Hinged-Cork	AND-10066-12S-3P	#1	69	187	5 #10(.193)	1	4	7-17/64	0	8-13/32
EA-15A-14-685-002L	319	BELL	1	Left	Side	10-5/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	76	183	5 #2(.221)	1	2	7-3/64	0	4-5/64
EA-15A-14-685-002R	319	BELL	1	Right	Side	10-5/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	76	183	5 #2(.221)	1	2	7-3/64	0	4-5/64
EA-15A-23-685-001-1	296	BELL	2	Right & Left	Side	8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	77	183	5 #2(.221)	1	2	7-17/64	0	5-51/64
EA-15A-27-421-1039	324	CURTISS-WRIGHT	2		Side	18-5/16	5-3/16	Rigid-Cork	AND-10066-12S-3P	#3	88	187	5 #2(.221)	1	6	9-19/32	0	12-5/32
EA-15A-28-0-2003	318	CONSOLIDATED	4		Side	20-1/2	2-1/2	Hinged-Metal	AND-10066-12S-3P	#2	89	187	5 #2(.221)	1	6	18-27/32	0	17-13/16
EA-15A-63-78071	320	VULTEE	1	Left	Side	8	2-1/2	Hinged-Metal	35A4269	#3	74	187	5 #2(.221)	1	2	5-9/64	0	7-1/4
EA-15A-63-78071-1	320	VULTEE	1	Right	Side	8	2-1/2	Hinged-Metal	35A4269	#3	74	187	5 #2(.221)	1	2	5-9/64	0	7-1/4
EA-15A-82-00128-2	312	NORTH AMERICAN	2	Left & Right Front	Side	13-13/16	4-21/32	Hinged-Cork	AND-10066-14S-2P	#3	91 & 125	187	5 #2(.221)	1	2	8-21/64	0	12-1/16
EA-15A-82-00128-3	312	NORTH AMERICAN	2	Left & Right Rear	Side	15	4-21/32	Hinged-Cork	AND-10066-14S-2P	#3	91 & 125	187	5 #2(.221)	1	5	6-3/64	0	13-3/16
EA-15A-162B5835	301	MARTIN	2	Left & Right	Side	18	2-1/2	Rigid-Cork	AND-10066-12S-3P	#3	53	187	5 "F"(2.57)	1	5	18	0	2-1/2
EA-15A-215	298-A	DOUGLAS	1	Anti-Icer	Side	7-3/4	3	Rigid-Metal	AND-10066-12S-3P	#2	130-Y	187	5 #2(.221)	1	0	3-21/32	0	2-45/64
EA-15A-228151-2	312	LOCKHEED	1	Right	Side	8-1/4	2-1/2	Hinged-Cork	WK-4-32S	#1	82	187	5 #2(.221)	1	2	8-1/64	0	7-25/32
EA-15A-228151-3	312	LOCKHEED	1	Left	Side	8-1/4	2-1/2	Hinged-Cork	WK-4-32S	#2	82	187	5 #2(.221)	1	2	8-1/64	0	7-25/32
EA-15A-342	324	BELL	1	Aft. Tank	Side	10-1/2	2-1/2	Rigid-Cork	AND-10066-12S-3P	#2	130AE	187	5 #2(.221)	1	2	8-39/64	0	8-39/64
EA-15A-494	324	BELL	1	Aft. Tank	Side	10-1/2	2-1/2	Rigid-Cork	AND-10066-12S-3P	#3	130AE	187	5 #2(.221)	1	2	8-39/64	0	8-39/64
EA-15A-F-263661	308	MARTIN	2	1 & 2 Inboard	Side	11-3/8	3	Hinged-Metal	35A4267	#1	112	187	5 #2(.221)	1	4	10-31/32	0	9-1/16
EA-15A-F-263662	308	MARTIN	2	3 & 4 Outboard	Side	7-7/8	4	Hinged-Metal	E-1003-3-20	#1	109 & 112	187	5 #2(.221)	1	4	8	0	6-25/32
EA-15AW-213	312	SIKORSKY	1	Fuselage	Side	15	7-3/4	Hinged-Cork	AND-10066-14S-1P	#2	130-H	188	5 #2(.221)	1	2	11-15/16	0	11-25/64
EA-15AW-444	312	SIKORSKY	1	Fuselage	Side	14	7-3/4	Hinged-Cork	AND-10066-14S-1P	#2	130-G	188	5 #2(.221)	1	2	12-3/4	0	11-9/32
EA-15AW-14-685-002L	319	BELL	1	Left	Side	10-5/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	81	184	5 #2(.221)	1	4	7-3/64	0	4-5/64
EA-15AW-14-685-002R	319	BELL	1	Right	Side	10-5/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	81	184	5 #2(.221)	1	4	7-3/64	0	4-5/64
EA-15AW-27-685-001-1	299	BELL	2	Left & Right	Side	8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	83 & 84	188	5 #2(.221)	1	2	7-3/8	0	5-7/8
EA-15AW-62-00168-2	312	NORTH AMERICAN	2	1 & 4 Main	Side	15-1/2	14-15/16	Hinged-Cork	E-1003-3-20	#3	126	189	5 #2(.221)	1	6	10-25/32	0	11-1/2
EA-15AW-62-00168-3	312	NORTH AMERICAN	2	2 & 3 Auxiliary	Side	15-1/2	14-15/16	Hinged-Cork	E-1003-3-20	#3	126	189	5 #2(.221)	1	6	8-5/8	0	12-5/8

TABLE 7 (Contd)

Unit Number	Gen. Disp. Fig. No.	Airplane Manufacturer	No. of Units Per Ship	Tank Location	Location in Tank	Length in Inches of: Float Arm	Length in Inches of: Fulcrum Pipe	Type of Float	Connector Receptacle	Receptacle Position	External Wiring Fig No.	Internal Wiring Fig. No.	No. and Size Holes in Housing	Approx. Weight Lb.	Approx. Weight Oz.	Depth of Tank: Top	Depth of Tank: Neutral	Depth of Tank: Bottom
EA-15AW-42A-[illegible]	296	NORTH AMERICAN	2	1 & 4 Main	Side	13-13/16	14-15/16	Hinged-Cork	E-1003-3-20	#3	127	189	5 #2(.221)	1	6	9-43/64	0	11
EA-15AW-42A-[illegible]	296	NORTH AMERICAN	2	2 & 3 Auxiliary	Side	13-13/16	14-15/16	Hinged-Cork	E-1003-3-20	#3	127	189	5 #2(.221)	1	6	8	0	12-7/32
EA-15AW-[illegible]	298	MARTIN	2	L. & Right Bomb Bay	Side	24	2-1/2	Hinged-Cork	None	None	106-107-130AD	189	5 "F"(.257)	1	4	20-13/16	0	19-3/16
EA-15AW-[illegible]	312	CESSNA	2	Left & Right	Side	6-1/4	3	Hinged-Cork	AND-10066-14S-1P	#1	71 & 72	189	5 #2(.221)	1	2	6	0	6
EA-15AW-[illegible]	321	DOUGLAS	2	L. & R. Outboard	Side	10-1/4	2-1/2	Rigid-Metal	AND-10066-14S-1P	#6	113-114-115-116-117-118-128	189	8 #4(.209)	1	4	7-25/32	0	8-15/32
EA-15AW-[illegible]	321	DOUGLAS	2	L. & R. Inboard	Side	13-3/4	2-1/2	Rigid-Metal	AND-10066-14S-1P	#6	113-114-115-116-117-118-128	189	8 #4(.209)	1	4	10-1/	0	11-9/64
EA-15AW-[illegible]	313	DOUGLAS	1	Ferry Tank #6	Side	15-5/8	4-1/8	Rigid-Cork	AND-10066-14S-1P	#1	114-118	189	5 #2(.221)	1	5	5-55/64	0	9-1/8
EA-15AW-F-[illegible]	308	MARTIN	2	1 & 2 Inboard	Side	11-3/8	3	Hinged-Metal	35A4269	#1	111-112-129	189	5 #2(.221)	1	4	10-31/32	0	9-21/64
EA-15AW-F-[illegible]	310	MARTIN	2	3 & 4 Outboard	Side	7-7/8	4	Hinged-Metal	E-1003-2-20	#1	111-112-129	189	5 #2(.221)	1	2	8	0	6-25/32
EA-15AW-VS-[illegible]	303	VOUGHT SIKORSKY	1		Side	14	7-3/4	Hinged-Cork	AND-10066-14S-1P	#2	70	189	5 #10(.193)	1	4	13	0	10-25/32
EA-15AWC-[illegible]	304	MARTIN	2	Left & Right Wing	Side	18	5	Hinged-Cork	AND-10066-14S-5P	#3	106-107-130AD	197	5 "F"(.257)	1	6	12-59/64	0	14-7/8
EA-15B-[illegible]	331-A	DOUGLAS	1	Anti-Icer	Bottom	11-1/8	10-5/8	Rigid-Cork	AND-10066-12S-3P	#10	130-F	187	8 #2(.221)	1	6	8-33/64	0	8-33/64
EA-15B-82-[illegible]	327	NORTH AMERICAN	1	Left Auxiliary	Bottom	10-1/2	7-29/32	Hinged-Cork	AND-10066-14S-1P	#3	101	187	5 #2(.221)	1	4	8-35/64	0	6-13/16
EA-15B-82-[illegible]	327	NORTH AMERICAN	1	Right Auxiliary	Bottom	10-1/2	7-29/32	Hinged-Cork	AND-10066-14S-1P	#3	101	187	5 #2(.221)	1	4	8-35/64	0	6-13/16
EA-15BW-[illegible]	328	NORTHROP	1	Left Inboard	Bottom	12-1/4	5-25/64	Hinged-Metal	AND-10066-14S-2P	#1	123	189	5 #2(.221)	1	4	11-1/32	0	5-1/16
EA-15BW-[illegible]	328	NORTHROP	1	Right Inboard	Bottom	12-1/4	5-25/64	Hinged-Metal	AND-10066-14S-2P	#2	123	189	5 #2(.221)	1	4	11-1/32	0	5-1/16
EA-15W-249	281	SIKORSKY	1	Left Hand	Top	10-3/8	6-3/4	Hinged-Cork	AND-10066-14S-2P	#2	130-J	204-B	5 #2(.221)	1	1	6-3/8	0	6-3/8
EA-15W-250	281	SIKORSKY	1	Right Hand	Top	10-3/8	6-3/4	Hinged-Cork	AND-10066-14S-2P	#1	130-J	204-B	5 #2(.221)	1	1	6-3/8	0	6-3/8
EA-15W-3-14659	272	BOEING	2	1 & 4 Tanks	Top	17-1/4	14-15/32	Hinged-Cork	AND-10066-14S-1P	#3	110	189	5 #2(.221)	1	6	14-5/64	0	14-5/64
EA-15W-3-14659-1	272	BOEING	2	2 & 3 Tanks	Top	18-31/32	15-3/4	Hinged-Cork	AND-10066-14S-1P	#3	110	189	5 #2(.221)	1	6	15-25/64	0	15-25/64
EA-15W-3-14659-2	272	BOEING	2	Left & Right Feeder	Top	13-25/32	11-23/32	Hinged-Cork	AND-10066-14S-1P	#3	110	189	5 #2(.221)	1	4	11-29/64	0	11-29/64
EA-15W-24-685-003-1	279	BELL	1		Top	9	4-5/8	Hinged-Cork	AND-10066-14S-1P	#1	104	188	5 #2(.221)	1	2	4-13/16	0	4-25/32
EA-15W-24-685-003-2	279	BELL	1		Top	9	4-5/8	Hinged-Cork	AND-10066-14S-1P	#2	104	188	5 #2(.221)	1	2	4-13/16	0	4-25/32
EA-15W-214189-3	267	NORTHROP	2	1 & 2 Tanks	Top	13	5-13/32	Hinged-Metal	AND-10066-14S-1P	#3	124	189	5 #2(.221)	1	4	5-5/16	0	10-3/8
EA-15W-4139073	272	DOUGLAS	1	Auxiliary	Top	22-1/8	14-11/16	Hinged-Cork	AND-10066-14S-1P	#1	108	189	5 #2(.221)	1	7	14-1/8	0	14-1/8
EA-15W-4144825	257	DOUGLAS	1	Left	Top	12-3/4	10-3/4	Rigid-Cork	AND-10066-14S-1P	#8	75 & 100	189	8 #2(.221)	1	4	9-27/32	0	14-15/16
EA-15W-4144825-1	257	DOUGLAS	1	Right	Top	12-3/4	10-3/4	Rigid-Cork	AND-10066-14S-1P	#7	75 & 100	189	8 #2(.221)	1	4	9-27/32	0	14-15/16
EA-15W-4147504-1	280	DOUGLAS	1	Bomb Bay	Top	20-7/16	18-1/2	Rigid-Cork	AND-10066-14S-1P	#13	114-115-116-117-118	189	8 #2(.221)	1	6	17-27/32	0	18-1/8
EA-15W-4147504-2	280	DOUGLAS	1	#5 Ferry	Top	24-1/2	21	Rig -Cork	AND-10066-14S-1P	#8	128	189	8 #2(.221)	1	7	20-5/16	0	20-11/64
EA-15W-4162778	269	DOUGLAS	1	Fuselage	Top	15-3/8	12-3/8	Rig -Cork	AND-10066-14S-1P	#2	115-116-118	189	8 #2(.221)	1	4	13-3/4	0	13-3/4
EA-15WC-216	295-B	GRUMMAN modified by Namu	1		Top	16-5/8	13-1/16	Hi d-Cork	AND-10066-14S-6P	#5	130-O	130-O	5 #2(.221)	1	7	11-9/32	0	13-5/32
EA-15WC-120090	285	VEGA	1	Left Front	Top	13	8-1/8	Hi d-Cork	AND-10066-14S-5P	#2	86-130AC	197	5 #2(.221)	1	4	10-31/32	0	11-21/32
EA-15WC-120091	284	VEGA	1	Right Front	Top	13	8-1/8	Hi d-Cork	AND-10066-14S-5P	#1	86-130AC	197	5 #2(.221)	1	4	10-31/32	0	11-21/32
EA-15X-1	326-A	CONSOLIDATED	1	L. H. Auxiliary Wing	Side	12-11/32	5	Hi d-Cork	AND-10066-14S-1P	#27	130-I	180	5 #2(.221)	1	3	11-9/16	0	7-25/32
EA-15X-2	326-B	CONSOLIDATED	1	R. H. Auxiliary Wing	Side	12-11/32	5	Hi d-Cork	AND-10066-14S-1P	#26	130-I	204-C	5 #2(.221)	1	3	11-9/16	0	7-25/32
EA-15X-4	326-E	REPUBLIC	1	Oil Tank	Side	13	5	Rig d-Metal	AND10066-12S-3P	#1	130-K	203	5 #2(.221)	1	3	7-37/64	0	11-21/32
EA-17-217869	334	NORTHROP	2	R. Inboard, R. Outboard	Top	None	None	Cork	AND-10066-14S-2P	None	97	187	8-9/32	5	4	Measurable Fuel		29-3/4
EA-17-F-170829	332	MARTIN	4		Top	None	None	Cork	E-1003-3-20	None	130	130	8-17/64			Measurable Fuel		33-3/8
EA-17-R-102970	333	MARTIN	2	5 & 6 Bomb Bay	Top	None	None	Cork	E-1003-3-20	None	109-112	187	8-9/32	6	8	Measurable Fuel		39-3/8
EA-17BW-208133	335	NORTHROP	2	L. & R. Outboard	Top	None	None	Cork	AND-10066-14S-2P	None	123	189	8-9/32	6		Measurable Fuel		31-1/8
EA-17W-214190	334	NORTHROP	2	3 & 4 Tanks	Bottom	None	None	Cork	AND-10066-14S-2P	None	124	189	8-9/32	5	4	Measurable Fuel		28-3/4
EA-17W-R-102970F	333	MARTIN	2	5 & 6 Bomb Bay	Top	None	None	Cork	E-1003-3-20	None	111-112-129	189	8-9/32	6	8	Measurable Fuel		39-3/8
EA-18W-4099790	292	DOUGLAS	1	Left Tank	Top	20-1/2	6-5/16	Hinged-Cork	None	None	108	189	12 #10(.193)	1	5	10-3/16	0	10-1/32
EA-18W-4099790-1	292	DOUGLAS	1	Right Tank	Top	20-1/2	6-5/16	Hinged-Cork	None	None	108	189	12 #10(.193)	1	5	10-3/16	0	10-1/32
EA-65-141	281	GRUMMAN	3	Left, Center & Right	Top	16-7/8	7-3/8	Hinged-Cork	AND-10066-14S-1P	#3	59-98	186	5 #2(.221)	1	4	5-15/64	0	14-17/32
EA-65-144	263	CONSOLIDATED	2	Left & Right	Top	25-3/8	18-9/16	Rigid-Cork	AND-10066-14S-1P	#3	105	186	10 #10(.193)	1	8	16-45/64	0	17-1/32
EA-65-2140325	281	DOUGLAS	1	Bomb Bay	Top	34	22-1/4	Hinged-Cork	AND-10066-14S-2P	#2	55	190	5 #2(.221)	1	12	22-1/32	0	22-1/32
EA-65-2140327	294	DOUGLAS	1	Belly Tank	Top	13-9/16	12-3/8	Hinged-Cork	AND-10066-14S-2P	#3	55	190	5 #2(.221)	1	6	12-5/8	0	12-5/8
EA-65A-28-0-3039-31	318	N. A. F.	2		Side	20-1/2	2-1/2	Hinged-Metal	AND-10066-14S-1P	#3	78	186	5 #2(.221)	1	6	18-45/64	0	17-43/64
EA-65A-15504	307	VEGA	1	Right Front Center	Side	13-1/2	3-3/8	Hinged-Cork	AND-10066-14S-1P	#3	61-79-80	186	5 #2(.221)	1	4	11-7/32	0	11-7/32
EA-65A-15505	307	VEGA	1	Left Front Center	Side	13-1/2	3-3/8	Hinged-Cork	AND-10066-14S-1P	#3	61-79-80	186	5 #2(.221)	1	4	11-7/32	0	11-7/32
EA-65A-15506	307	VEGA	1	Left Rear Center	Side	13	3-15/16	Hinged-Cork	AND-10066-14S-1P	#3	61-62-79-80	186	5 #2(.221)	1	4	10-27/32	0	10-27/32
EA-65A-15507	307	VEGA	1	Right Rear Center	Side	13	3-15/16	Hinged-Cork	AND-10066-14S-1P	#3	61-62-79-80	186	5 #2(.221)	1	4	10-53/64	0	10-53/64
EA-65AW-8940758	318	GENERAL MOTORS	1		Side	31	2-1/2	A ged-Metal	AND-10066-14S-2P	#2	57	191	5 #2(.221)	1	6	22	0	22
EA-65AWC-15504	317	VEGA	1	Right Front	Side	13-1/2	3-3/8	H ged-Cork	AND-10066-14S-2P	Special	62	201	5 #2(.221)	1	6	11-7/32	0	11-7/32
EA-65AWC-15505	317	VEGA	1	Left Front	Side	13-1/2	3-3/8	Hinged-Cork	AND-10066-14S-2P	Special	62	201	5 #2(.221)	1	6	11-7/32	0	11-7/32
EA-65AWC-170A-K-5409	326-F	MARTIN	2	R. & L. Wing	Side	33-1/8	11-3/4	Hinged-Cork	AND-10066-14S-6P	#3	130-B	204-H	5 "G"(.261)	1	11	20-11/32	0	14-11/32
EA-65B-1-85-087	330	BUDD	2	Nacelle	Bottom	18-1/2	16-3/8	Hinged-Cork	AND-10066-14S-1P	#3	99	186	5-9/32	1	6	16-3/	0	15-23/32

RESCINDED

TABLE 7 (Contd)

Unit Number	Gen. Dim. Fig. No.	Airplane Manufacturer	No. of Units Per Ship	Tank Location	Location in Tank	Length in Inches of: Float Arm	Length in Inches of: Fulcrum Pipe	Type of Float	Connector Receptacle	Receptacle Position	External Wiring Fig No.	Internal Wiring Fig. No.	No. and Size Holes in Housing	Approx. Weight Lb.	Approx. Weight Oz.	Depth of Tank: Top	Depth of Tank: Neutral	Depth of Tank: Bottom
EA-65B-1-85-088	330	BUDD	2	Wing	Bottom	10-1/4	9-11/32	Hinged-Cork	AND-10066-14S-1P	#3	99	186	5-9/32	1	4	9-9/32	0	9-1/2
EA-65B-15508	329	VEGA	1	Right Outer Wing	Bottom	11	7-1/32	Hinged-Cork	AND-10066-14S-2P	#3	60-61-62-79-80	190	5 #2(.221)	1	4	8-21/32	0	8-21/32
EA-65B-15509	329	VEGA	1	Left Outer Wing	Bottom	11	7-1/32	Hinged-Cork	AND-10066-14S-2P	#3	60-61-62-79-80	190	5 #2(.221)	1	4	8-21/32	0	8-21/32
EA-65W-AT-9	267	CURTISS WRIGHT	1		Top	9-21/64	7-51/64	Hinged-Metal	AND-10066-14S-2P	#3	68	191	5 #2(.221)	1	2	7-15/32	0	7-15/32
EA-65W-203	281	LOCKHEED	1	Fuselage	Top	22-3/8	14	Hinged-Cork	AND-10066-14S-5P	#1	130-L	204-E	5 #2(.221)	1	8	18-5/16	0	19-27/32
EA-65W-207	281	LOCKHEED	1	Fuselage	Top	22-3/8	15-9/16	Hinged-Cork	AND-10066-14S-5P	#1	130-L	204-E	5 #2(.221)	1	8	18-5/16	0	19-27/32
EA-67-VS-13350AB	334	VOUGHT SIKORSKY	1		Top	None	None	Cork	AND-10066-14S-1P	None	54	186	8-9/32	6	14	Measurable Fuel		47-15/16
EA-67W-SK-8230	334	CURTISS	1		Top	None	None	Cork	AND-10066-14S-2P	None	58	191	8-9/32	6		Measurable Fuel		29-3/4
EA-67W-VS-43103	334	CHANCE VOUGHT	1	Fuselage	Top	None	None	Cork	AND-10066-14S-2P	None	130-E	204-D	8-9/32	7		Measurable Fuel		47-15/16
EA-84-39-68106	278	FLEET WINGS	1		Top	20-5/16	17-11/16	Hinged-Cork	AND-10066-14S-1P	#16	67	186	8-9/32	1	6	17-13/64	0	14-47/64
EA-84A-47979-1	305	N. A. F.	1	Left Tank	Side	21	8	Hinged-Cork	AND-10066-14S-1P	#2	78	186	5 #10(.193)	1	6	15-23/32	0	11-3/8
EA-84A-47979-2	305	N. A. F.	1	Right Tank	Side	21	8	Hinged-Cork	AND-10066-14S-1P	#1	78	186	5 #10(.193)	1	6	15-23/32	0	11-3/8
EA-84AW-29-685-001-1	314	BELL	1		Side	25-1/2	6-1/2	Rigid-Cork	AND-10066-14S-2P	#3	56	191	5 #2(.221)	1	8	20-3/32	0	19-17/32
EA-84X-1L	326-C	REPUBLIC	1	Left Wing	Side	15-3/8	5-1/2	Hinged-Cork	AND-10066-14S-1P	#2	130-K	204-A	5 #10(.193)	1	2	11-1/16	0	2-3/16
EA-84X-1R	326-D	REPUBLIC	1	Right Wing	Side	15-3/8	5-1/2	Hinged-Cork	AND-10066-14S-1P	#6	130-K	186	5 #10(.193)	1	2	11-1/16	0	2-3/16
EA-85-204	295-D	RYAN	1	Scale 1	Top	14-1/16	8	Hinged-Cork	AND-10066-12S-3P	#1	130-Q	187	5 #2(.221)	1	1	7-7/8	0	5-7/32
EA-85-766121L	286	FAIRCHILD	1	Left Main	Top	10-1/4	4-1/4	Hinged-Cork	AND-10066-12S-3P	#1	85	187	5-9/32	1	4	6	0	6
EA-85-76612-R	286	FAIRCHILD	1	Right Main	Top	10-1/4	4-1/4	Hinged-Cork	AND-10066-12S-3P	#2	85	187	5-9/32	1	4	6	0	6
EA-85-766125L	286	FAIRCHILD	1	Left Auxiliary	Top	10-1/8	5-5/8	Hinged-Cork	AND-10066-12S-3P	#1	85	187	5-9/32	1	4	7-15/32	0	7-15/32
EA-85-766125R	286	FAIRCHILD	1	Right Auxiliary	Top	10-1/8	5-5/8	Hinged-Cork	AND-10066-12S-3P	#2	85	187	5-9/32	1	4	7-15/32	0	7-15/32
EA-85A-306	326-K	FAIRCHILD	2	Oil Tank	Side	16-5/8	2-1/2	Rigid-Metal	AND-10066-12S-3P	#3	130-AG	187	5 #"H"(.266)	1	3	10	0	11-1/2
EA-85A-32R-4282	323	CONSOL. VULTEE	2		Side	9-7/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#1	92	202	5 #2(.221)	1	2	9-27/64	0	9-7/64
EA-85A-430	326-K	FAIRCHILD	2	Oil Tank	Side	16-1/4	2-1/2	Rigid-Metal	AND-10066-12S-3P	#3	130-AG	187	5 #"F"(.257)	1	3	8-1/2	0	11-7/8
EA-85A-476	326-K	FAIRCHILD	2	Oil Tank	Side	16	2-1/2	Regid-Metal	AND-10066-12S-3P	#2	130-AG	187	5 #"F"(.257)	1	3	11-3/8	0	9-57/64
EA-85AW-120713	325	VEGA	1	Right Tank	Side	11	2-1/2	Hinged-Metal	AND-10066-14S-1P	#11	103	189	8 "F"(.257)	1	4	8-9/32	0	10-27/32
EA-85AW-120782	325	VEGA	1	Left Tank	Side	11	2-1/2	Hinged-Metal	AND-10066-14S-1P	#16	103	189	8 "F"(.257)	1	4	8-9/32	0	10-27/32
EA-85BW-587	331-C	REPUBLIC	1	Forward	Bottom	15-7/8	12-9/16	Rigid-Cork	AND-10066-14S-5P	#7	130-AF	188	8-9/32	1	5	11.937	0	12.187
EA-85BWC-326	331-C	REPUBLIC	1	Forward	Bottom	15-7/8	12-9/16	Rigid-Cork	AND-10066-14S-5P	#7	130-AF	204-L	8-9/32	1	5	11.937	0	12.187
EA-85C203	295-D	RYAN	1	Scale 2	Top	12-9/16	8	Hinged-Cork	AND-10066-14S-2P	#1	130-Q	204-G	5 #2(.221)	1	1	6-33/64	0	10-23/32
EA-85-P47	264	REPUBLIC	1		Top	24	10-3/4	Rigid-Cork	AND-10066-12S-3P	#3	96	187	5-17/64	1	4	10-11/32	0	9-7/32
EA-85W-323	295-X	REPUBLIC	1	Main	Top	13-9/16	7-3/4	Rigid-Cork	AND-10066-14S-1P	#2	130-AF	188	5-9/32	1	1	6.3125	0	9.71875
EA-85W-943	287	REPUBLIC	2		Top	31	5	Rigid-Cork	AND-10066-14S-1P	#15	96	188	8-9/32	1	4	28-9/16	0	17-7/8
EA-85W-XP72	266	REPUBLIC	2		Top	19	15-1/2	Rigid-Cork	AND-10066-14S-1P	#16	95	184	8-9/32	1	7	14-23/32	0	15-1/8
EA-88A-4171346-2	326	DOUGLAS	2	L. & R. Inboard	Side	12-7/8	3-3/8	Rigid-Cork	AND-10066-14S-2P	2	63-64-65	198	8 #4(.209)	1	2	10-5/32	0	10-7/16
EA-88A-4171346-6	326	DOUGLAS	2	L. & R. Outboard	Side	15	3-3/8	Rigid-Cork	AND-10066-14S-2P	#2	64-65	198	8 #4(.209)	1	4	6-5/8	0	13-1/32
EA-88A-4175744-4	326	DOUGLAS	2	L. & R. Outboard	Side	15	3-3/8	Rigid-Cork	AND-10066-14S-2P	#2	63	198	8 #4(.209)	1	4	13-13/32	0	4-3/8
EA-88P-500	295-E	DOUGLAS	2	L. & R. Inboard	Top	15	22-9/16	Rigid-Cork	AN3101-14S-2P	#1	130-N	198	5 #2(.221)	1	12	8-3/8	0	8-3/8
EA-89A-4171346-4	326	DOUGLAS	2	L. & R. Inboard	Side	15	3-3/8	Rigid-Cork	AND-10066-14S-2P	#2	64-65	198	8 #4(.209)	1	6	7-61/64	0	12-11/32
EA-89A-4171346-8	326	DOUGLAS	2	L. & R. Outboard	Side	12-7/8	3-3/8	Rigid-Cork	AND-10066-14S-2P	#2	63-64-65	198	8 #4(.209)	1	2	9-3/4	0	9-3/4
EA-89A-4175744-2	326	DOUGLAS	2		Side	15	3-3/8	Rigid-Cork	AND-10066-14S-2P	#2	63	198	8 #4(.209)	1	4	13-13/32	0	4-1/2
EA-89P-502	295-F	DOUGLAS	2	L. & R. Inboard	Top	14-3/8	11-15/16	Rigid-Cork	AN3101-14S-2P	#2	130-N	198	5 #2(.221)	1	10	11-1/8	0	9-31/32
EA-92W-VS-33330R	260	VOUGHT SIKORSKY	1		Top	4-1/2	2-9/16	Hinged-Metal	AN3108-12S-3P	None	54	204	5 #10(.193)	1		2-3/4		
EA-177-114477	291	LOCKHEED & VEGA	1	Left Cabin	Top	22-7/8	18-1/2	Rigid-Cork	None	None	60-61-62	185	5 #9(.196)	1	6	19	0	19
EA-177-114478	288	LOCKHEED & VEGA	1	Right Cabin	Top	10-1/2	5	Hinged-Cork	None	None	60-61-62	185	5 #9(.196)	1	4	5-15/32	0	9-25/32
EA-178-110019	295	LOCKHEED	1	Left Rear Center	Top	13-9/16	10-3/4	Hinged-Cork	None	None	60	182	5 #9(.196)	1	5	12-5/8	0	8-1/4
EA-178-110020	295	LOCKHEED	1	Left Front Center	Top	13	7-7/16	Hinged-Cork	None	None	60	182	5 #9(.196)	1	4	10-53/64	0	10-53/64
EA-178-110021	295	LOCKHEED	1	Right Rear Center	Top	13-9/16	10-3/4	Hinged-Cork	None	None	60	182	5 #9(.196)	1	5	12-5/8	0	8-1/4
EA-178-110022	295	LOCKHEED	1	Right Front Center	Top	13-3/4	7-7/16	Hinged-Cork	None	None	60	182	5 #9(.196)	1	4	11-13/32	0	11-13/32
EA-190A33G2045	326-G	CONSOL. VULTEE	2	Inboard	Side	34-5/8	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	130-R	186	9-13/64	1	3	19-13/32	0	19-25/32
EA-190A33G2046	326-G	CONSOL. VULTEE	2	Outboard	Side	16	2-1/2	Hinged-Cork	AND-10066-14S-1P	#3	130-R	186	9-13/64	1	1	15-5/16	0	14-5/8
EA-190W-170-A-K-5416	295-M	MARTIN	1	Left Forward Hull	Top	42-1/2	27-3/32	Rigid-Cork	AND-10066-14S-2P	#5	130-B	204-D	5 "G"(.261)	1	4	28-7/8	0	29-21/32
EA-190W-170-A-K-5417	295-M	MARTIN	1	Left Center Hull	Top	39-3/4	27-3/32	Rigid-Cork	AND-10066-14S-2P	#5	130-B	204-D	5 "G"(.261)	1	4	26-25/32	0	31-7/8
EA-190W-170-A-K-5418	295-M	MARTIN	1	Left Aft Hull	Top	41-1/4	27-3/32	Rigid-Cork	AND-10066-14S-2P	#5	130-B	204-D	5 "G"(.261)	1	4	29	0	24-5/8
EA-190W-170-A-K-5419	295-M	MARTIN	1	Right Fuel	Top	42-1/2	27-3/32	Rigid-Cork	AND-10066-14S-2P	#4	130-B	204-D	5 "G"(.261)	1	4	28-7/8	0	29-21/32
EA-190W-170-A-K-5420	295-M	MARTIN	1	Right Fuel	Top	39-3/4	27-3/32	Rigid-Cork	AND-10066-14S-2P	#4	130-B	204-D	5 "G"(.261)	1	4	26-25/32	0	31-7/8
EA-190W-170-A-K-5421	295-M	MARTIN	1	Right Fuel	Top	41-1/4	27-3/32	Rigid-Cork	AND-10066-14S-2P	#4	130-B	204-D	5 "G"(.261)	1	4	29	0	24-5/8
EA-190W-354	295-W	MARTIN	1	Center Hull	Top	21-3/4	19	Hinged-Cork	AND-10066-14S-2P	#3	130-AD	204-D	5 "F"(.257)	1	8	17-5/16	0	16-11/16
EA-191A-743	302	CONSOL. VULTEE	2		Side	29	12-5/8	Hinged-Cork	AND-10066-14S-1P	#1	73	187	5 #2(.221)	1	6	18	0	18
EA-191A-1-F-263661	300	MARTIN	2	1 & 2 Tanks	Side	11-3/8	3	Hinged-Metal	35A-4269	#1	109	187	5 #2(.221)	1	4	10-31/32	0	9-21/64
EA-191A-F-263661	300	MARTIN	2	Inboard	Side	11-3/8	3	Hinged-Metal	35A-4269	#1	112	187	5 #2(.221)	1	2	10-31/32	0	9-21/64
EA-191W-1-162B5785	265	MARTIN	3	Front, Rear, Center Hull	Top	21-3/4	19	Hinged-Cork	AND-10066-14S-1P	#3	107	189	5 "F"(.257)	1	8	15-7/16	0	15-7/16
EA-191W-162B5785	265	MARTIN	3	Front, Rear, Center Hull	Top	21-3/4	19	Hinged-Cork	AND-10066-14S-1P	#3	106	189	5 "F"(.257)	1	8	15-7/16	0	15-7/16
EA-191W-1-162B5285F	295-W	MARTIN	1	Forward Hull	Top	21-3/4	19	Hinged-Cork	AND-10066-14S-2P	#3	130-AD	189	5 "F"(.257)	1	8	—	—	—
EA-191W-162FK-5727A	295-G	MARTIN	1	Aft Hull	Top	30-3/16	24-1/2	Hinged-Cork	AND-10066-14S-1P	#3	130-A	189	5 "F"(.257)	1	2	22-13/32	0	22-17/32

TABLE 7 (Contd)

Unit Number	Gen. Dim. Fig. No.	Airplane Manufacturer	No. of Units Per Ship	Tank Location	Location in Tank	Length in Inches of: Float Arm	Length in Inches of: Fulcrum Pipe	Type of Float	Connector Receptacle	Receptacle Position	External Wiring Fig No.	Internal Wiring Fig. No.	No. and Size Holes in Housing	Approx. Weight Lb.	Approx. Weight Oz.	Depth of Tank: Top	Depth of Tank: Neutral	Depth of Tank: Bottom
EA-202A-120557	297	VEGA	1	Left Outer Wing	Side	18-15/16	3	Hinged-Cork	AND-10066-14S-2P	#15	86	199	8 #18(.170)	1	4	11-29/64	0	7-63/64
EA-202A-121404	297	VEGA	1	Right Outer Wing	Side	18-15/16	3	Hinged-Cork	AND-10066-14S-2P	#16	86	199	8 #18(.170)	1	4	11-29/64	0	7-63/64
EA-203A-120558	315	VEGA	1		Side	7-7/8	2-1/2	Hinged-Cork	AND-10066-12S-3P	#16	86	199	8 #18(.170)	1	2	6-13/16	0	6-25/32
EA-203A-120585	315	VEGA	1		Side	7-7/8	2-1/2	Hinged-Cork	AND-10066-12S-3P	#15	86	199	8 #18(.170)	1	2	6-13/16	0	6-25/32
EA-206A-4178896-2	309	DOUGLAS	2	R. & L. Outer Wing	Side	12-1/2	4-3/16	Rigid-Cork	AND-10066-14S-5P	#2	64	196	8 #4(.209)	1	2	8-1/4	0	9-7/8
EA-207A-4178896-4	309	DOUGLAS	2	R. & L. Outer Wing	Side	10-1/16	4-3/16	Rigid-Cork	AND-10066-14S-5P	#2	64	196	8 #4(.209)	1	2	7-7/32	0	7-1/2
EA-208A-4178896-6	311	DOUGLAS	1	Left Outer Wing	Side	8-3/4	4-3/16	Rigid-Cork	AND-10066-14S-1P	#2	64	196	8 #4(.209)	1	2	5-19/32	0	4-1/8
EA-208A-4178896-7	311	DOUGLAS	1	Right Outer Wing	Side	8-3/4	4-3/16	Rigid-Cork	AND-10066-14S-1P	#2	64	196	8 #4(.209)	1	2	5-19/32	0	4-1/8
EA-216-4310269-2	285	DOUGLAS	2	L. & R. Inboard	Top	8-3/4	8-7/16	Hinged-Cork	AND-10066-14S-2P	#3	93	200	5 #2(.221)	1	2	7-5/16	0	6-13/16
EA-217-4310269-4	285	DOUGLAS	2		Top	8-3/4	7-15/16	Hinged-Cork	AND-10066-12S-3P	#3	93	200	5 #2(.221)	1	4	7-5/16	0	5-1/2
EA-220-VS2-304612L	273	VOUGHT SIKORSKY	1	Left Interbeam	Top	7-1/2	6-3/4	Hinged-Cork	AND-10066-14S-2P	#3	90	192	5 #2(.221)	1	5	4-3/8	0	6-13/16
EA-220-VS2-304612R	273	VOUGHT SIKORSKY	1	Right Interbeam	Top	7-1/2	6-3/4	Hinged-Cork	AND-10066-14S-2P	#3	90	192	5 #2(.221)	1	5	4-3/8	0	6-13/16
EA-221A-VS2-304007L	316	VOUGHT SIKORSKY	1	Left Inboard	Side	10-3/4	3	Hinged-Cork	AND-10066-14S-2P	#3	90	192	5 #2(.221)	1	5	4-3/8	0	9-31/64
EA-221A-VS2-304007R	316	VOUGHT SIKORSKY	1	Right Inboard	Side	10-3/4	3	Hinged-Cork	AND-10066-14S-2P	#3	90	192	5 #2(.221)	1	5	4-3/8	0	9-31/64
EA-221VS2-304721L	295-H	CONSOL. VULTEE	1	Left Inboard	Top	10-55/64	6-3/64	Hinged-Cork	AND-10066-14S-2P	#8	130-P	192	5 #2(.221)	1	8	4-55/64	0	9-43/64
EA-221VS2-304721R	295-H	CONSOL. VULTEE	1	Right Inboard	Top	10-55/64	6-3/64	Hinged-Cork	AND-10066-14S-2P	#7	130-P	192	5 #2(.221)	1	8	4-55/64	0	9-43/64
EA-222A-VS2-304307	322	VOUGHT SIKORSKY	2	L. & R. Outboard	Side	9-7/64	3	Hinged-Cork	AND-10066-14S-2P	#3	90	193	5 #2(.221)	1	5	6-31/64	0	5-55/64
EA-222VS2-304821L	295-I	CONSOL. VULTEE	1	Left Inboard	Top	10-55/64	6-3/64	Hinged-Cork	AND-10066-14S-2P	#8	130-P	193	5 #2(.221)	1	8	4-55/64	0	7-25/32
EA-222VS2-304821R	295-I	CONSOL. VULTEE	1	Right Outboard	Top	10-55/64	6-3/64	Hinged-Cork	AND-10066-14S-2P	#7	130-P	193	5 #2(.221)	1	8	4-55/64	0	7-25/32
EA-224-2	295-J	BELL	1	Left Outboard	Top	9	2-1/2	Hinged-Cork	AND-10066-14S-2P	#1	130-S	192	5 #2(.221)	1	1	3-13/16	0	3-11/16
EA-224-3	295-J	BELL	1	Right Outboard	Top	9	2-1/2	Hinged-Cork	AND-10066-14S-2P	#2	130-S	192	5 #2(.221)	1	1	3-13/16	0	3-11/16
EA-225W-1	295-K	BELL	1	Left Inboard	Top	9	4-5/8	Hinged-Cork	AND-10066-14S-2P	#1	130-S	204-F	5 #2(.221)	1	1	4-13/16	0	4-25/32
EA-225W-2	295-K	BELL	1	Right Inboard	Top	9	4-5/8	Hinged-Cork	AND-10066-14S-2P	#2	130-S	204-F	5 #2(.221)	1	1	4-13/16	0	4-25/32
EA-226-1L	295-U	VEGA	1	Left Outboard	Top	8-1/8	4-21/32	Hinged-Cork	AN3106-14S-2P	#1	130-AC	192	5 #2(.221)	1	2	—	—	—
EA-226-1R	295-U	VEGA	1	Right Outboard	Top	8-1/8	4-21/32	Hinged-Cork	AN3106-14S-2P	#2	130-AC	192	5 #2(.221)	1	2	—	—	—
EA-227-2L	295-V	VEGA	1	Left Inboard	Top	11-1/2	5-3/4	Hinged-Cork	AN3106-14S-2P	#1	130-AC	193	5 #2(.221)	1	8	—	—	—
EA-227-2R	295-V	VEGA	1	Right Inboard	Top	11-1/2	5-3/4	Hinged-Cork	AN3106-14S-2P	#2	130-AC	193	5 #2(.221)	1	8	—	—	—
EA-228A-15-16635-1	310	BOEING	2	L. & R. Outboard	Side	27	16-5/16	Hinged-Cork	AND-10066-14S-5P	#3	121	195	5 #2(.221)	1	12	11-27/64	0	13-9/16
EA-228A-15-16635-2	310	BOEING	2	L. & R. Inboard	Side	26-1/2	16-5/16	Hinged-Cork	AND-10066-14S-1P	#3	121	194	5 #2(.221)	1	12	8-1/16	0	14-17/32
EA-228A-15-16635-3	310	BOEING	2	L. & R. Outboard	Side	19-5/16	13-13/16	Hinged-Cork	AND-10066-14S-1P	#3	121	195	5 #2(.221)	1	8	4-9/16	0	9-15/16
EA-228A-15-16635-5	310	BOEING	2	L. & R. Inboard	Side	32-1/2	16-5/16	Hinged-Cork	AND-10066-14S-5P	#3	121	195	5 #2(.221)	1	12	17-1/8	0	15-3/4
EA-228X-15-16635-4L	331	BOEING	1	Left Inboard	Side	37	None	Hinged-Cork	AND-10066-14S-5P	#3	121	195	5 #2(.221)	1	8	14-7/8	0	17-3/32
EA-228X-15-16635-4R	331	BOEING	1	Right Inboard	Side	37	None	Hinged-Cork	AND-10066-14S-5P	#3	121	194	5 #2(.221)	1	8	14-7/8	0	17-3/32
EA-290-170A-K-5501	295-L	MARTIN	4	Nacelle (Oil)	Top	22	22-15/32	Rigid-Cork	AND-10066-14S-1P	#1	130-M	186	5 "G"(.261)	1	8	17-5/16	0	19-3/8
EA-515-217	295-R	MARTIN	2	Oil Tank	Top	20-1/2	13-1/16	Rigid-Metal	AND-10066-12S-3P	#2	130-AA	187	5 #F(.257)	1	9	13-1/2	0	19-1/2
EA-515WC-216	295-N	GRUMMAN modified by Namu	1	Fuselage	Top	15-7/8	13-1/16	Hinged-Cork	AND-10066-14S-6P	#20	130-O	130-O	5 #2(.221)	1	8	12-5/16	0	12-11/16
EA-524A-309	298-B	NORTH AMERICAN	1	Aft. Tank	Side	7-5/8	2-1/2	Hinged-Cork	AND-10066-14S-2P	#3	130-X	192	9 #2(.221)	1	4	15-27/32	0	14-7/32
EA-529BC-310	331-B	NORTH AMERICAN	1	Center Tank	Bottom	6-3/8	10-5/16	Hinged-Cork	AND-10066-14S-5P	#3	130-X	204-J	9 #2(.221)	1	4	13-7/16	0	13-7/16
EA-533-311	295-Q	NORTH AMERICAN	1	Forward Tank	Top	9-5/8	15-1/16	Hinged-Cork	AND-10066-14S-1P	#13	130-X	193	9 #2(.221)	1	10	16-1/2	0	16-3/8
EA-565-201A	295-O	DOUGLAS	1	Fuselage	Top	32-3/4	25-7/8	Rigid-Cork	AND-10066-14S-2P	#1	130-D	186	5 #2(.221)	1	12	24-17/32	0	31-31/32
EA-565A-263	326-H	DOUGLAS	2	Outboard	Side	24-7/8	12-1/16	Rigid-Cork	AND-10066-14S-1P	#6	130-T	186	8 #2(.221)	1	9	15-31/32	0	17-15/32
EA-565A-264	326-H	DOUGLAS	2	Inboard	Side	28-13/16	14-13/16	Rigid-Cork	AND-10066-14S-1P	#6	130-T	186	8 #2(.221)	1	10	20-1/2	0	22
EA-565A-265	326-H	DOUGLAS	2	Auxiliary	Side	34-1/4	18-13/16	Rigid-Cork	AND-10066-14S-1P	#6	130-T	186	8 #2(.221)	1	12	24-9/16	0	26-3/64
EA-565AW-259	326-J	MARTIN	2	L. & R. Auxiliary	Side	11-9/16	2-1/2	Hinged-Cork	AND-10066-14S-5P	#2	130-Z	204-E	5 #F(.257)	1	5	7-33/64	0	7-23/32
EA-565W-269	295-P	LOCKHEED	1	Fuselage	Top	22	15-9/16	Hinged-Cork	AND-10066-14S-5P	#1	130-L	204-E	5 #2(.221)	1	7	18-5/16	0	19-27/32
EA-590W-485	295-T	MARTIN	1	Forward Hull	Top	21	19	Hinged-Cork	AND-10066-14S-2P	#3	130-AB	191	5 #F(.257)	1	11	17-5/16	0	16-11/16
EA-591W-483	295-T	MARTIN	1	Aft Hull	Top	22-1/2	19-13/16	Hinged-Cork	AND-10066-14S-1P	#3	130-AB	189	5 #F(.257)	1	11	19-5/16	0	12-5/8
EA-591W-484	295-T	MARTIN	1	Center Hull	Top	29-7/16	24	Hinged-Cork	AND-10066-14S-1P	#3	130-AB	189	5 #F(.257)	1	11	22-13/32	0	22-33/64
EA-565C-245	295-S	MARTIN	2	L. & R. Main	Top	25-3/8	14	Hinged-Cork	AND-10066-14S-6P	#3	130-Z	204-K	5 #F(.257)	1	9	15-31/32	0	12-7/8
EA-1611-189630-2	258	BEECH	1		Top	13	6-3/4	Rigid-Metal	None	None		187	5 #9(.196)	1	12	7-23/64	0	11-25/32
EA-1611-189726-2	282	BEECH	1		Top	12-1/2	2-1/2	Hinged-Metal	None	None		187	5 #9(.196)	1	12	3-59/64	0	7-21/32
EA-1611A-28-0-2003	306	CONSOLIDATED	2		Side	20-1/2	3	Hinged-Metal	None	None	48 & 49	48 & 49	5 #2(.221)	1	14	18-43/64	0	17-13/16
EA-1611A-29-0-1004	306	CONSOLIDATED	2		Side	20-1/2	3	Hinged-Metal	None	None	51	51	5 #2(.221)	1	14	18-43/64	0	17-13/16
EA-1612-189630-1	258	BEECH	1		Top	13	6-3/4	Rigid-Metal	None	None		187	5 #9(.196)	2		7-23/32	0	11-25/32
EA-1612-189726-1	282	BEECH	1		Top	12-1/2	2-1/2	Hinged-Metal	None	None		187	5 #9(.196)	2		3-57/64	0	6-43/64
EA-6612-141	209	GRUMMAN	1	Droppable	Top	15-1/4	10-1/4	Hinged-Cork	None	#1	59-98	186	5 #2(.221)	2	2	9-15/16	0	10-7/8
EA-1612A-18R-9715	298-C	BEECH	1	Baggage Comp.	Side	10-9/32	2-1/2	Hinged-Metal	None	None	52	202	5 #9(.196)	2	0	7-7/32	0	5-3/8

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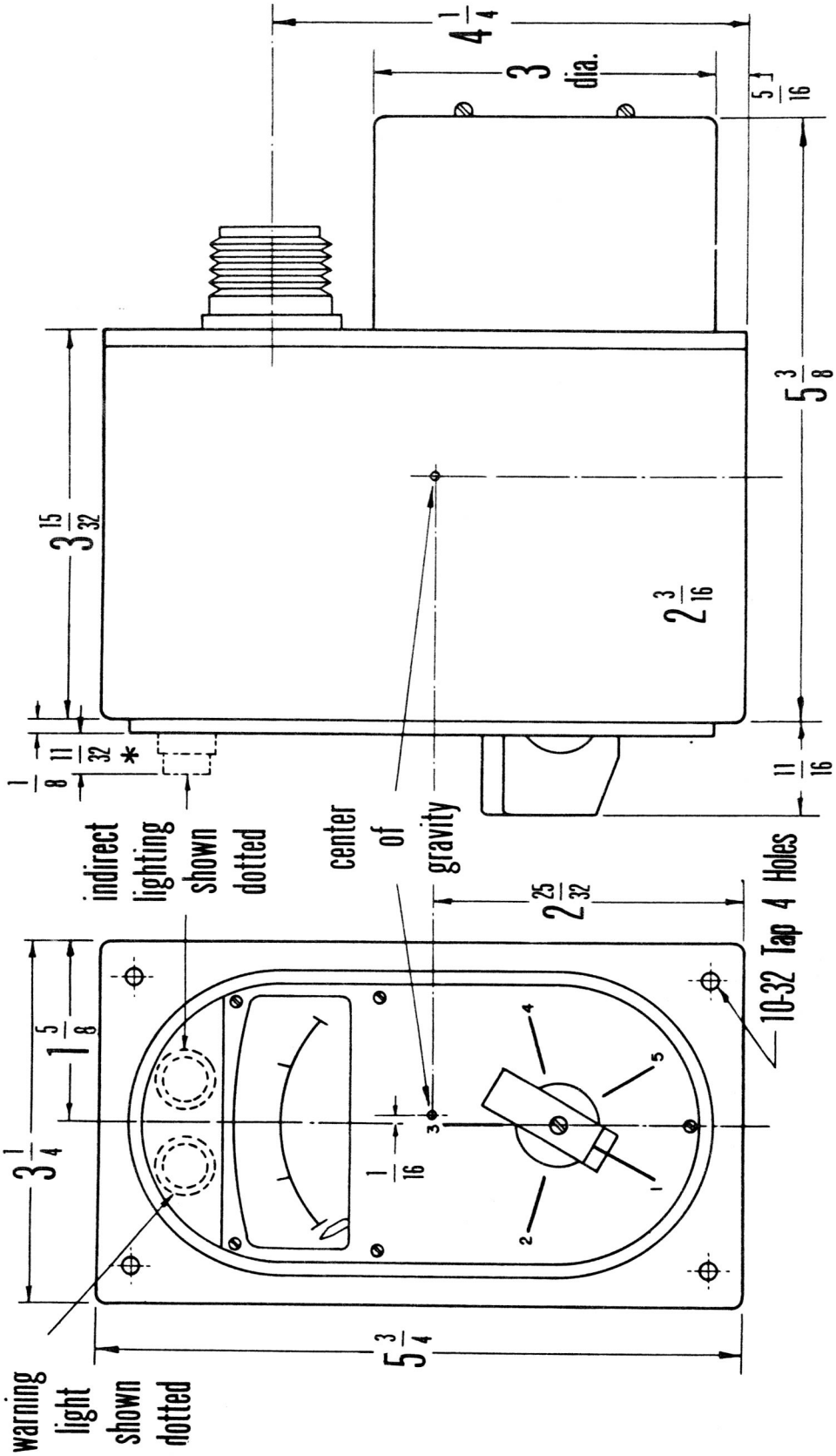
RESCINDED



All Dial Change Indicators will have the same dimensions as shown with the exception of those with the suffix A, W or AW. They will have the additional dimension shown by an (*)asterisk.

Figure 256—General Dimensions of Dial Change Indicators.

GENERAL DIMENSIONS of TANK UNITS

Note

Part Numbers of Tank Units are only specified opposite figure number, when only one or two units are shown by one drawing. When more than two units are shown by a drawing a table is given on the drawing specifying the tank units covered by that drawing.

THE FOLLOWING ARE DRAWINGS OF TOP MOUNT TANK UNITS

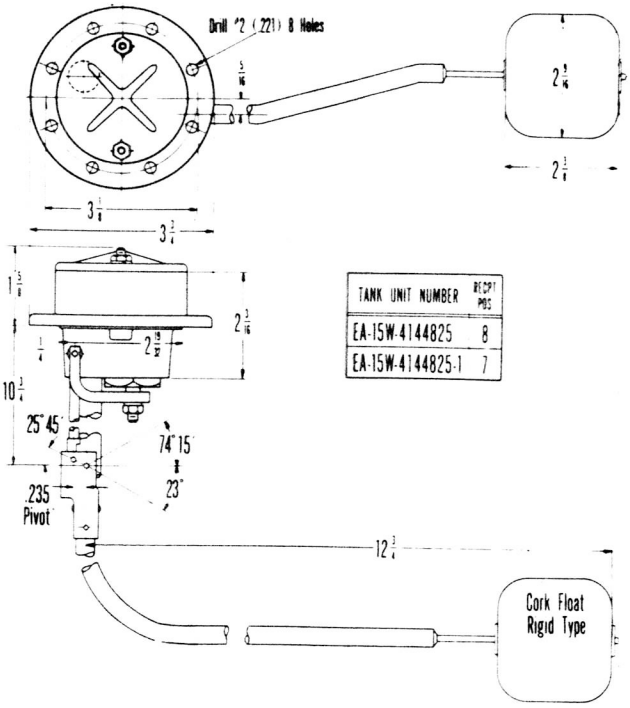


Figure 257—EA-15W Tank Units

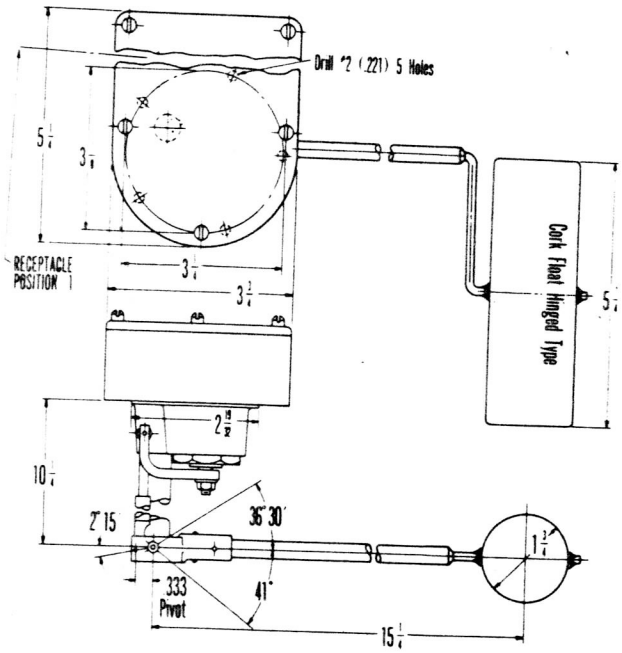


Figure 259—EA-6612-141 Tank Unit

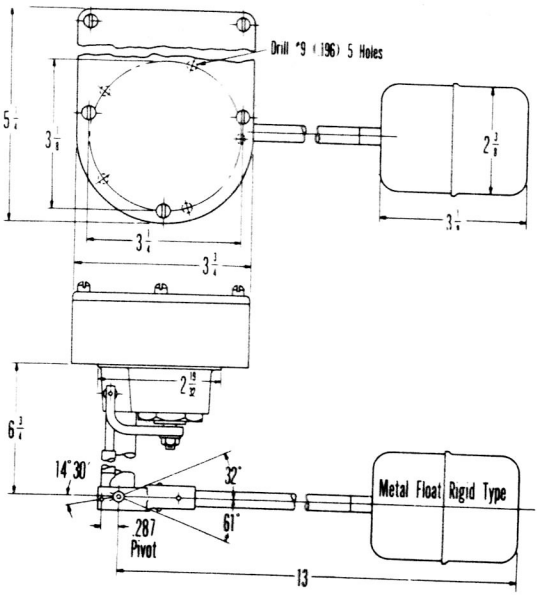


Figure 258—EA-1611-189630-2 and EA-1612-189630-1 Tank Units

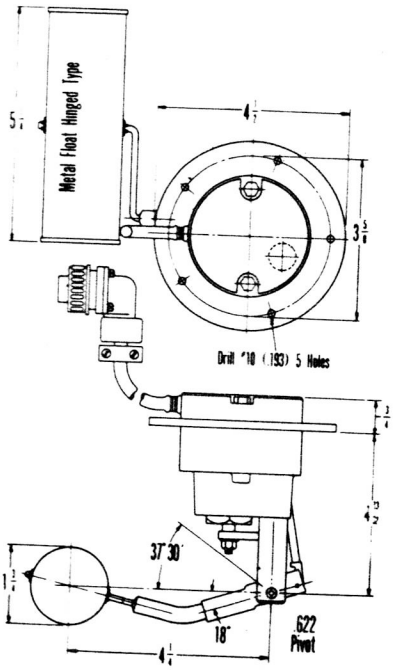
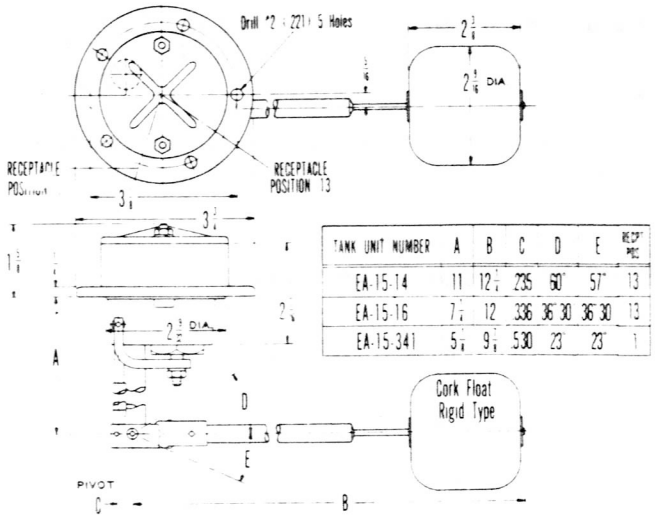
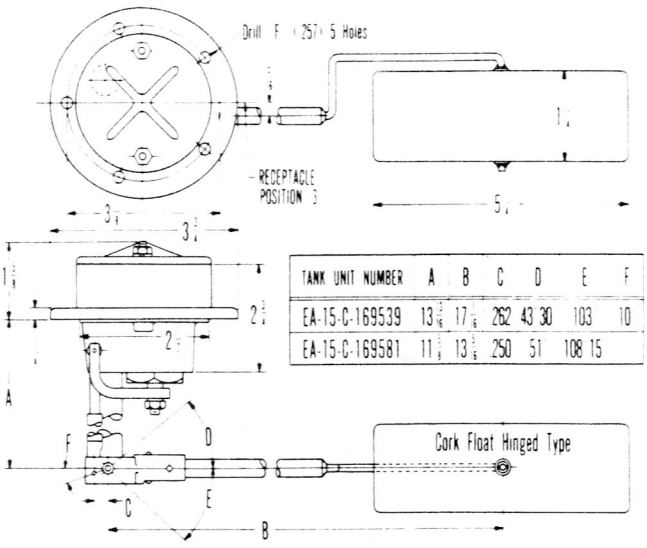


Figure 260—EA-92W-VS-3333OR Tank Unit



TANK UNIT NUMBER	A	B	C	D	E	RECEPT. POS.
EA-15-14	11	12 7/8	.235	60°	57°	13
EA-15-16	7 7/8	12	.336	36°30'	36°30'	13
EA-15-341	5 7/8	9 3/8	.530	23°	23°	1

Figure 261—EA-15 Tank Units



TANK UNIT NUMBER	A	B	C	D	E	F
EA-15-C-169539	13 3/16	17 5/16	.262	43°30'	103	10
EA-15-C-169581	11 3/16	13 5/16	.250	51	108	15

Figure 262—EA-15 Tank Units

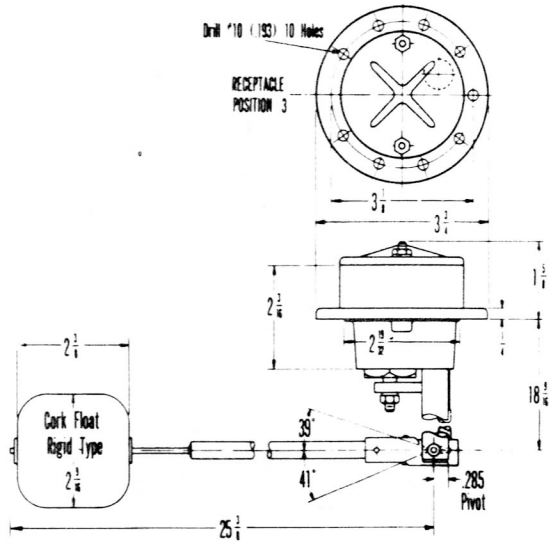


Figure 263—EA-65-144 Tank Unit

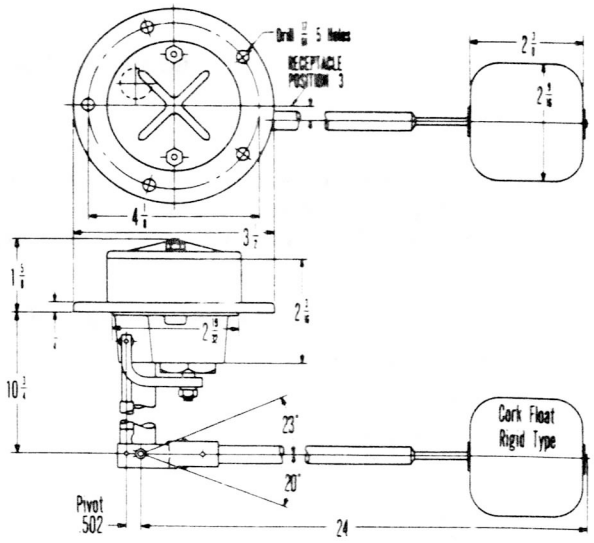


Figure 264—EA-85P47 Tank Unit

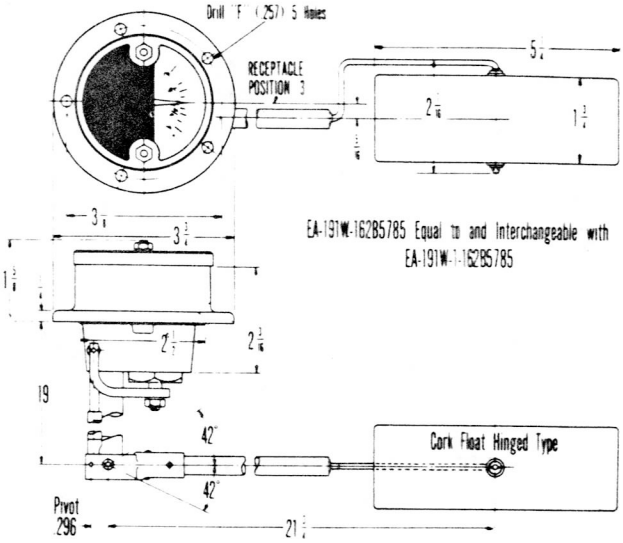


Figure 265—EA-191W-162B5785
EA-191W-1-162B5785 Tank Units

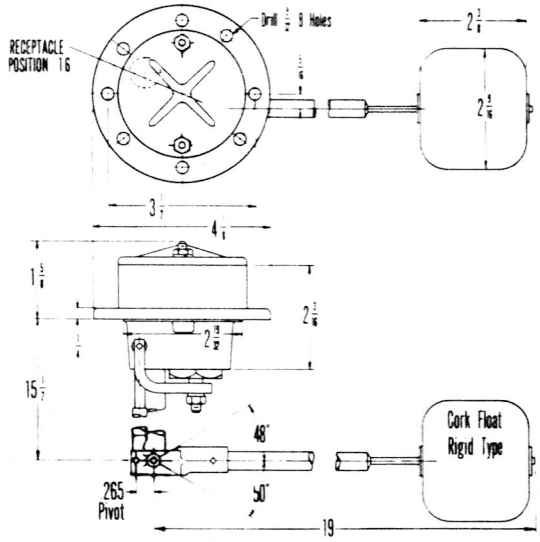
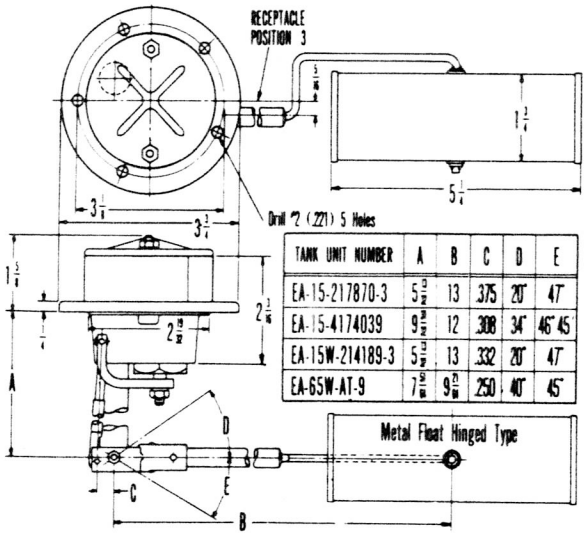
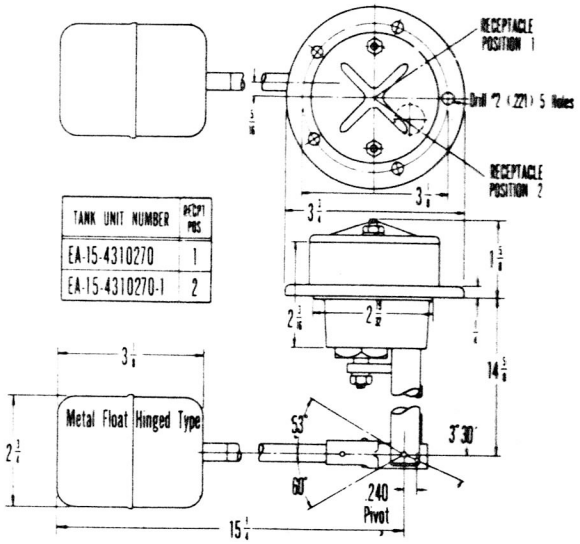


Figure 266—EA-85W-XP72 Tank Unit



TANK UNIT NUMBER	A	B	C	D	E
EA-15-217870-3	5 3/32	13	.375	20°	47°
EA-15-4174039	9 3/32	12	.308	34°	46° 45'
EA-15W-214189-3	5 3/32	13	.332	20°	47°
EA-65W-AT-9	7 9/16	9 21/64	.250	40°	45°

Figure 267—EA-15-15W and 65W Tank Units



TANK UNIT NUMBER	RECPT POS
EA-15-4310270	1
EA-15-4310270-1	2

Figure 270—EA-15 Tank Units

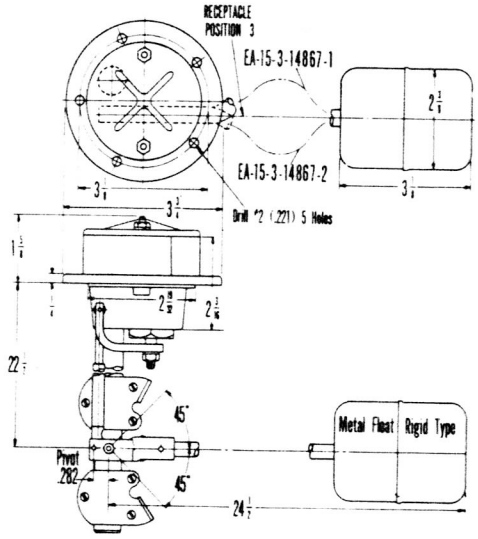


Figure 268—EA-15-3-14867-1, EA-15-3-14867-2 Tank Units

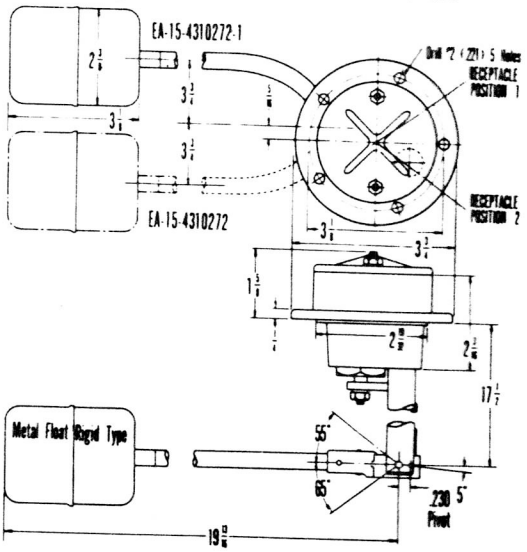


Figure 271—EA-15-4310272, EA-15-4310272-1 Tank Units

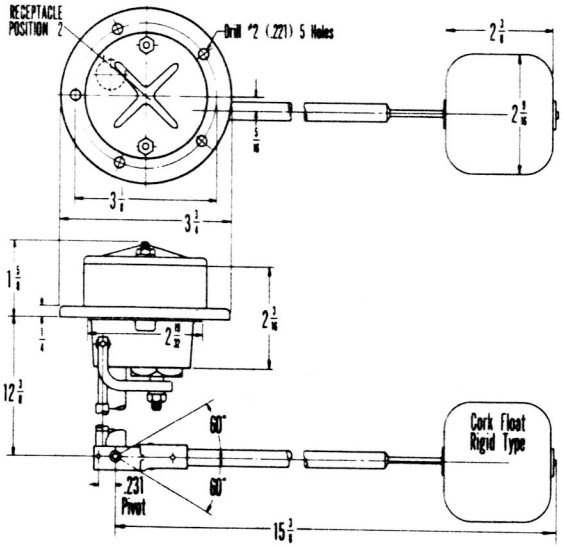
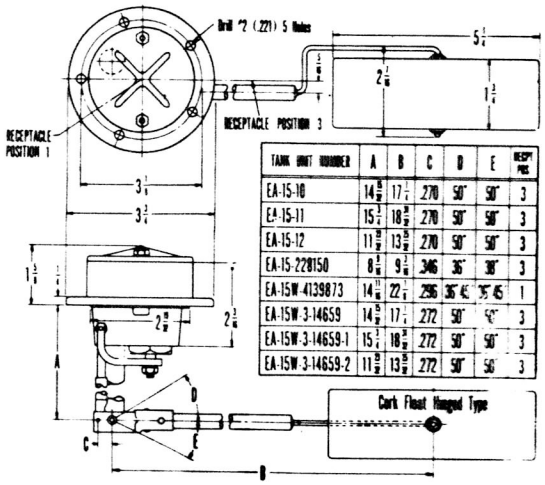


Figure 269—EA-15W-4162778 Tank Unit



TANK UNIT NUMBER	A	B	C	D	E	RECPT POS
EA-15-10	14 9/32	17 1/4	.270	50°	50°	3
EA-15-11	15 1/4	18 9/32	.270	50°	50°	3
EA-15-12	11 9/32	13 5/32	.270	50°	50°	3
EA-15-228150	8 3/16	9 3/16	.346	35°	35°	3
EA-15W-4139873	14 11/16	22 1/4	.295	35° 45'	35° 45'	1
EA-15W-3-14659	14 5/32	17 1/4	.272	50°	50°	3
EA-15W-3-14659-1	15 1/4	18 9/32	.272	50°	50°	3
EA-15W-3-14659-2	11 9/32	13 5/32	.272	50°	50°	3

Figure 272-EA-15 and 15W Tank Units

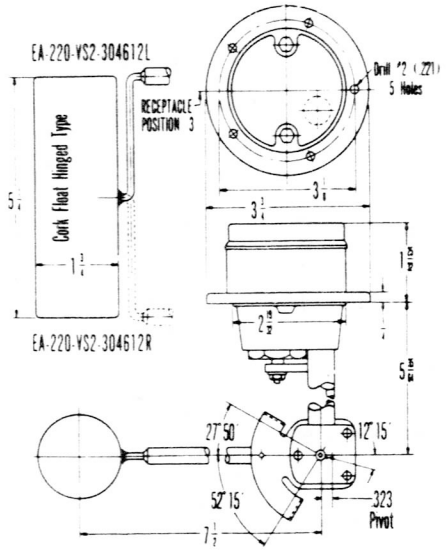


Figure 273—EA-220-VS2-304612L, EA-220-VS2-304612R Tank Units

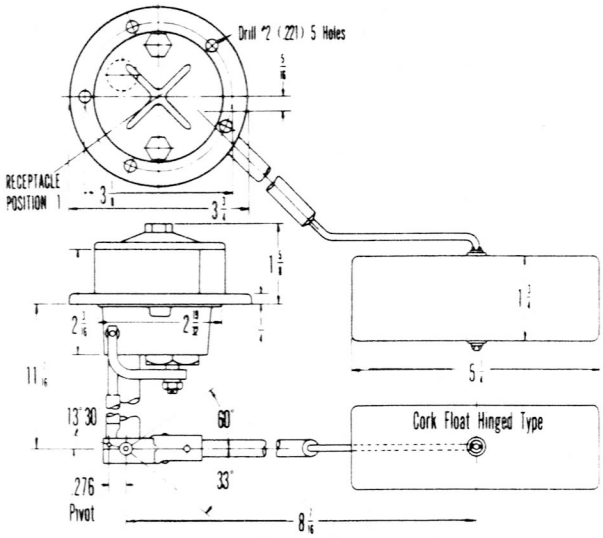


Figure 274—EA-15-120088 Tank Unit

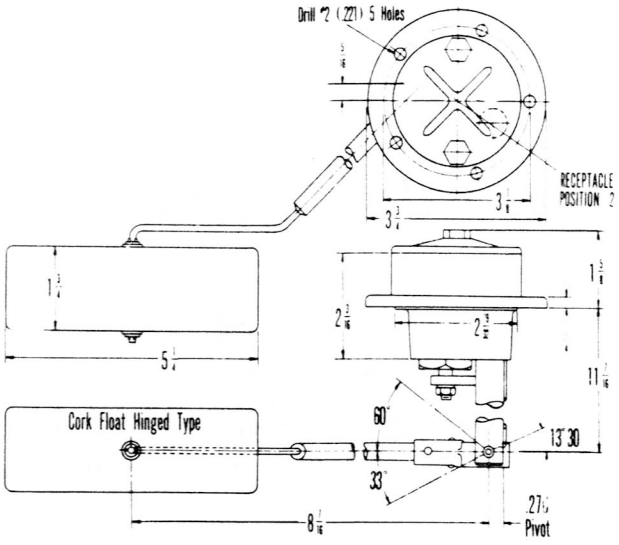


Figure 275—EA-15-120089 Tank Unit

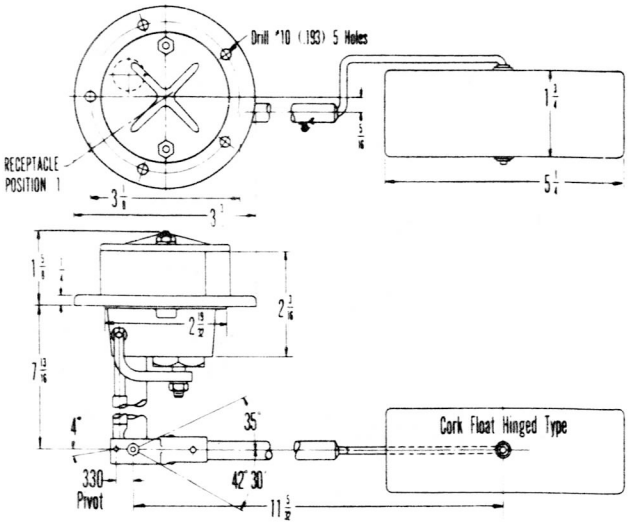


Figure 276—EA-15-VS-36862 Tank Unit

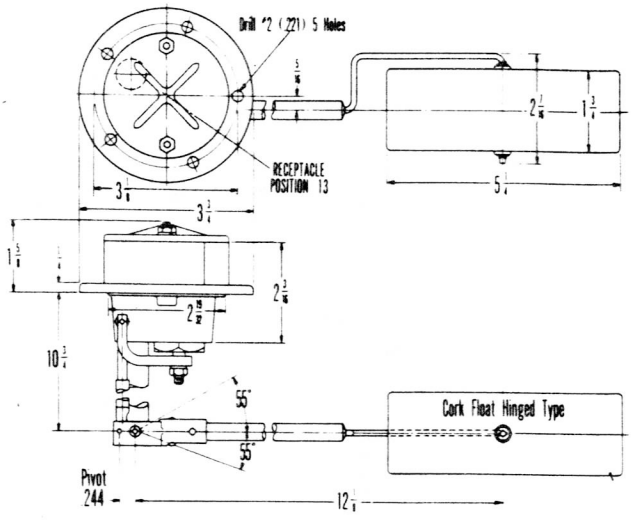
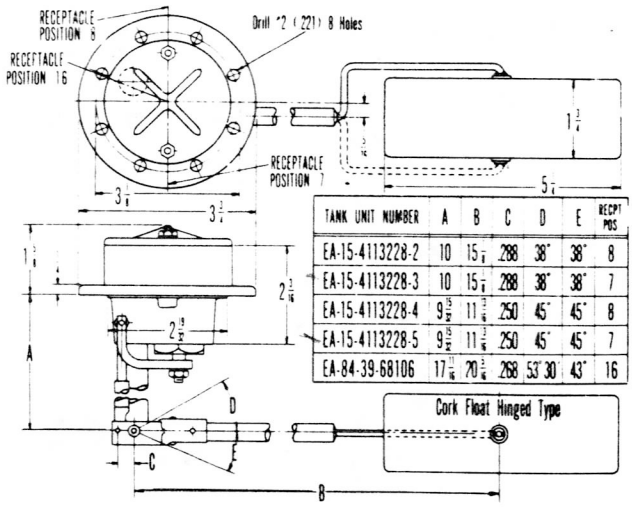
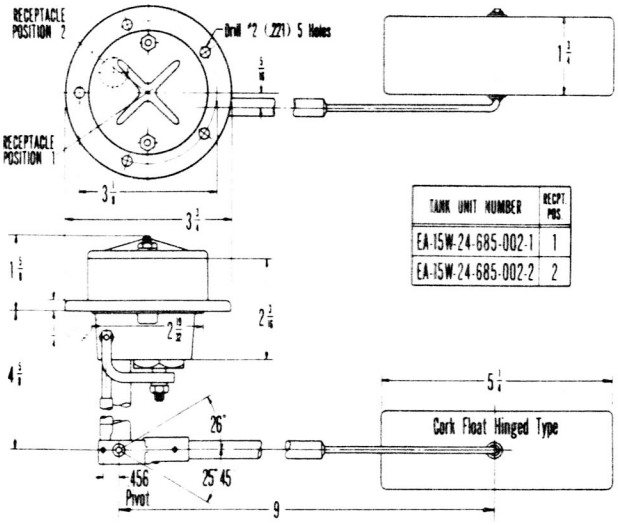


Figure 277—EA-15-15 Tank Unit



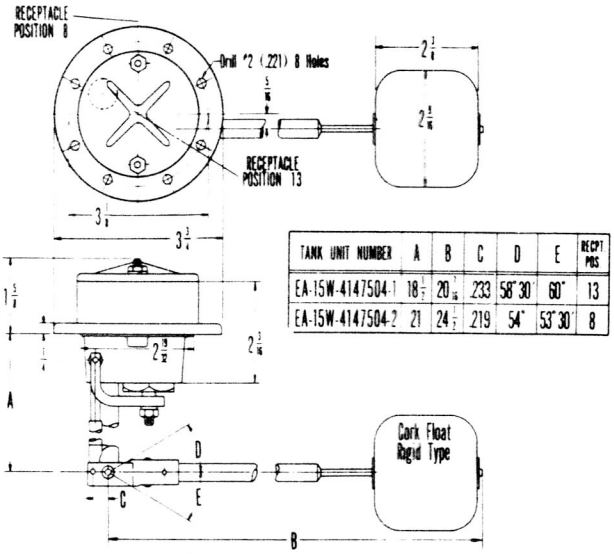
TANK UNIT NUMBER	A	B	C	D	E	RECPT POS
EA-15-4113228-2	10	15½	.288	38°	38°	8
EA-15-4113228-3	10	15½	.288	38°	38°	7
EA-15-4113228-4	9 15/32	11 3/16	.250	45°	45°	8
EA-15-4113228-5	9 15/32	11 3/16	.250	45°	45°	7
EA-84-39-68106	17 7/16	20 3/16	.268	53° 30'	43°	16

Figure 278—EA-15 and 84 Tank Units



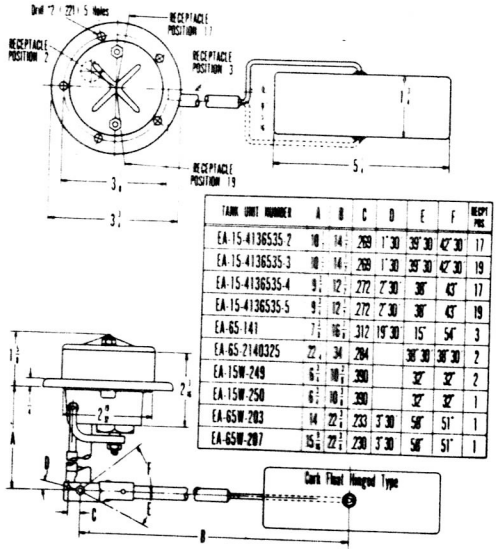
TANK UNIT NUMBER	RECPT POS
EA-15W-24-685-002-1	1
EA-15W-24-685-002-2	2

Figure 279—EA-15W Tank Units



TANK UNIT NUMBER	A	B	C	D	E	RECPT POS
EA-15W-4147504-1	18 7/8	20 1/16	.233	58°30'	60°	13
EA-15W-4147504-2	21	24 7/8	.219	54°	53°30'	8

Figure 280—EA-15W Tank Units



TANK UNIT NUMBER	A	B	C	D	E	F	RECPT POS
EA-15-4136535-2	10	14 1/2	269	1°30	39°30	47°30	17
EA-15-4136535-3	10	14 1/2	269	1°30	39°30	47°30	19
EA-15-4136535-4	9 1/2	12 1/2	272	2°30	38°	45°	17
EA-15-4136535-5	9 1/2	12 1/2	272	2°30	38°	45°	19
EA-65-141	7 1/2	16 1/2	312	19°30	15°	54°	3
EA-65-2140325	22 1/2	34	284		36°30	36°30	2
EA-15W-249	6 1/2	10 3/4	280		32°	32°	2
EA-15W-250	6 1/2	10 3/4	280		32°	32°	1
EA-65W-203	14	22 3/4	233	3°30	56°	51°	1
EA-65W-207	15 5/16	22 3/4	230	3°30	56°	51°	1

Figure 281—EA-15 and 65 Tank Units

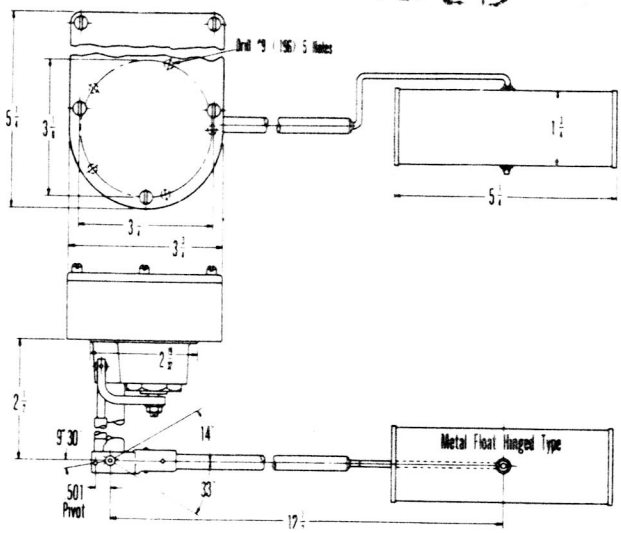


Figure 282—EA-1611-189726-2, EA-1612-189726-1 Tank Units

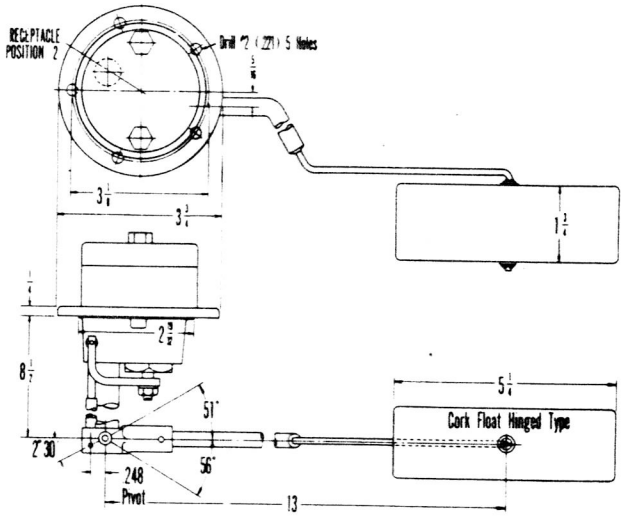


Figure 283—EA-15WC-120090 Tank Unit

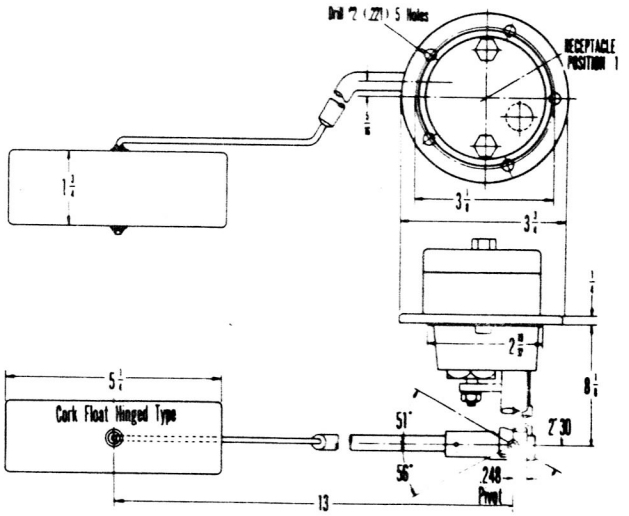
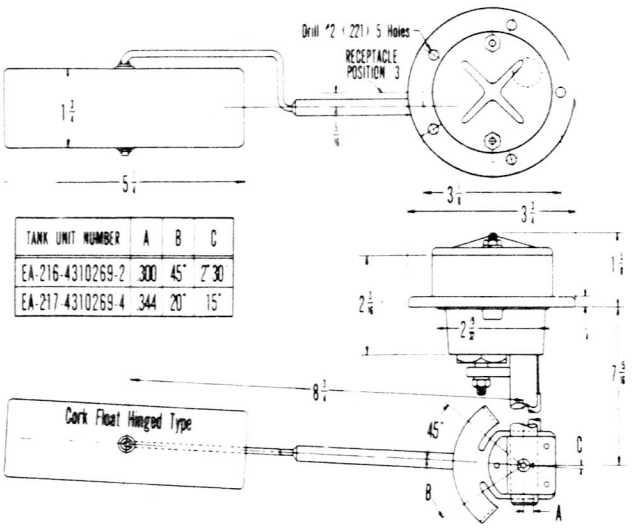


Figure 284—EA-15WC-120091 Tank Unit



TANK UNIT NUMBER	A	B	C
EA-216-4310269-2	300	45°	7°30
EA-217-4310269-4	344	20°	15°

Figure 285—EA-216-217 Tank Units

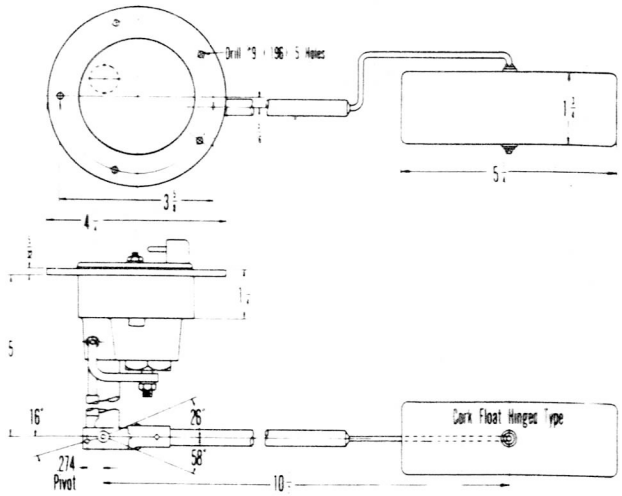
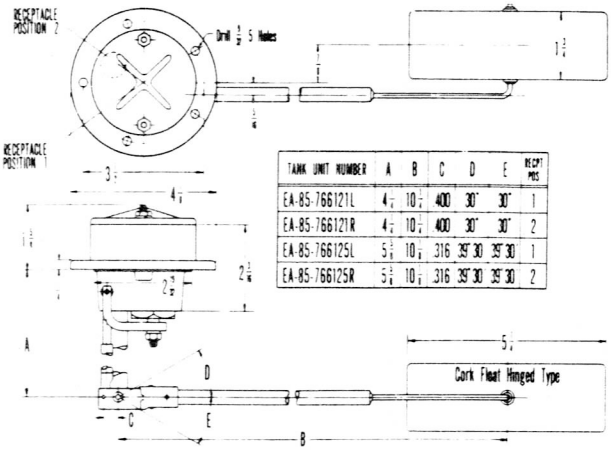
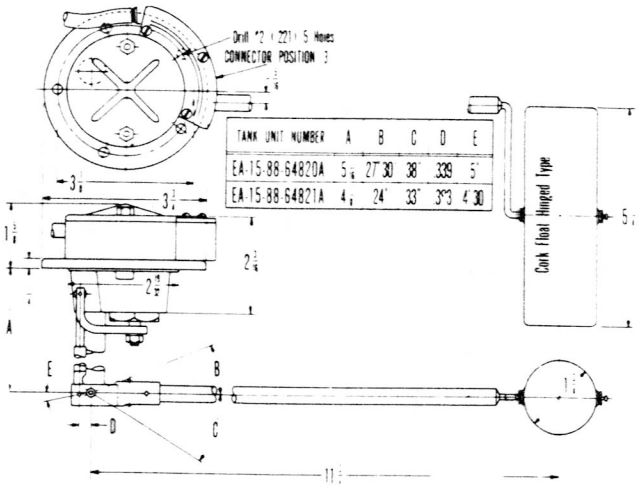


Figure 288—EA-177-114478 Tank Unit



TANK UNIT NUMBER	A	B	C	D	E	RECPT POS
EA-85-766121L	4 1/2	10 1/2	400	30°	30°	1
EA-85-766121R	4 1/2	10 1/2	400	30°	30°	2
EA-85-766125L	5 1/2	10 1/2	316	35°30	35°30	1
EA-85-766125R	5 1/2	10 1/2	316	35°30	35°30	2

Figure 286—EA-85 Tank Units



TANK UNIT NUMBER	A	B	C	D	E
EA-15-88-64820A	5 1/2	27°30	38°	339	5°
EA-15-88-64821A	4 1/2	24°	33°	3°3	4°30

Figure 289—EA-15 Tank Units

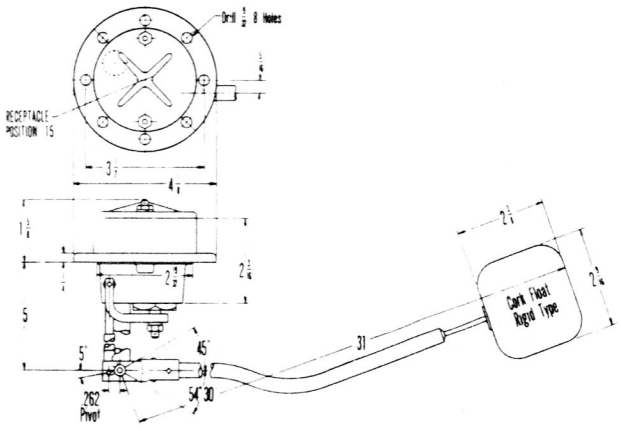


Figure 287—EA-85W-943 Tank Unit

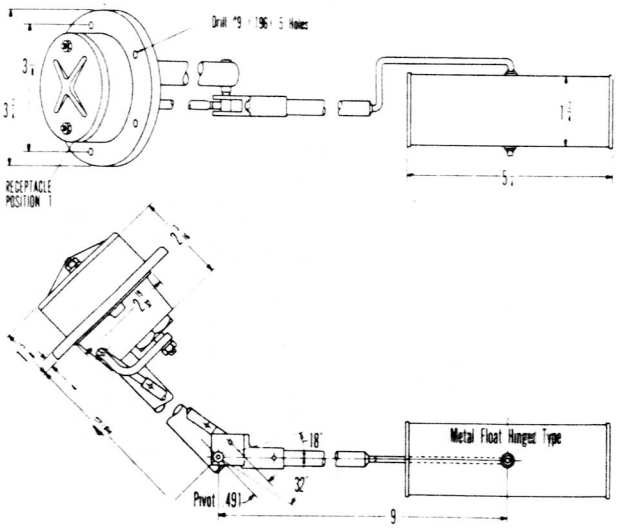


Figure 290—EA-15-5132925 Tank Unit

RESCINDED

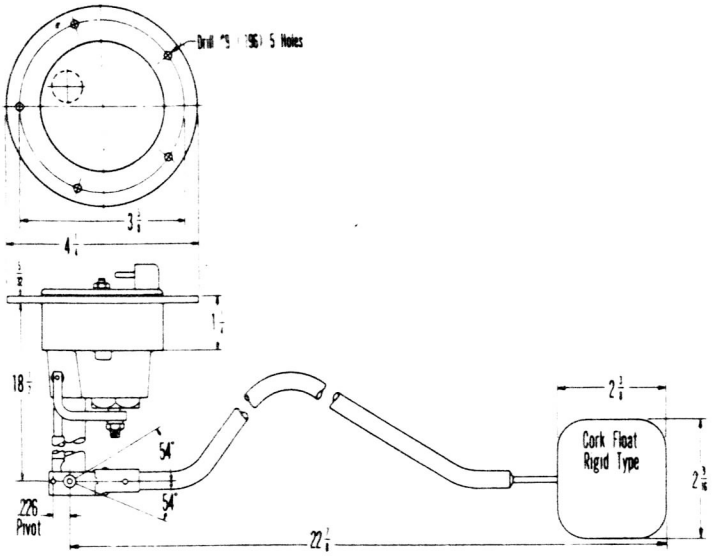


Figure 291—EA-177-114477 Tank Unit

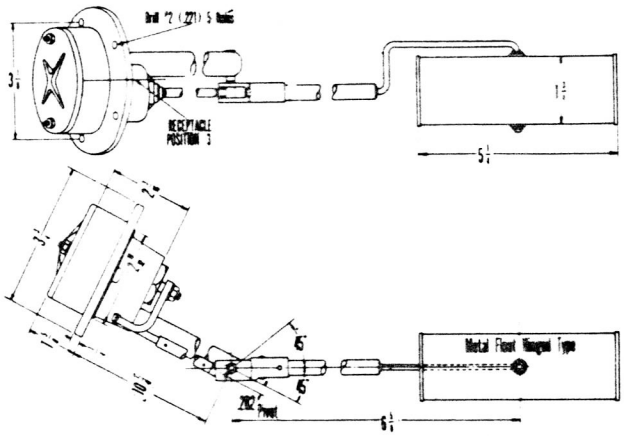


Figure 293—EA-15-5105650 Tank Unit

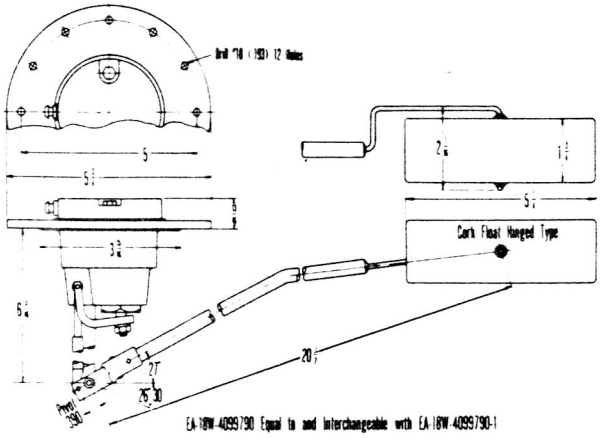
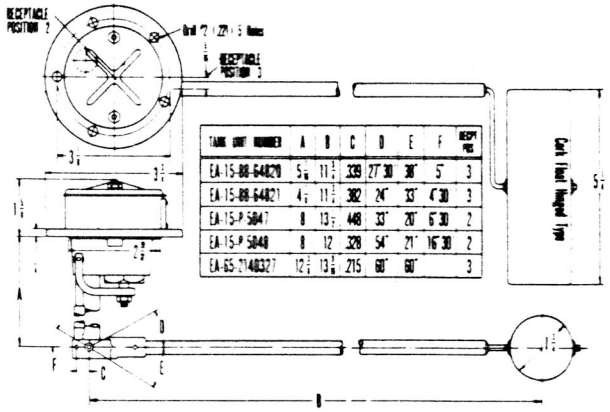
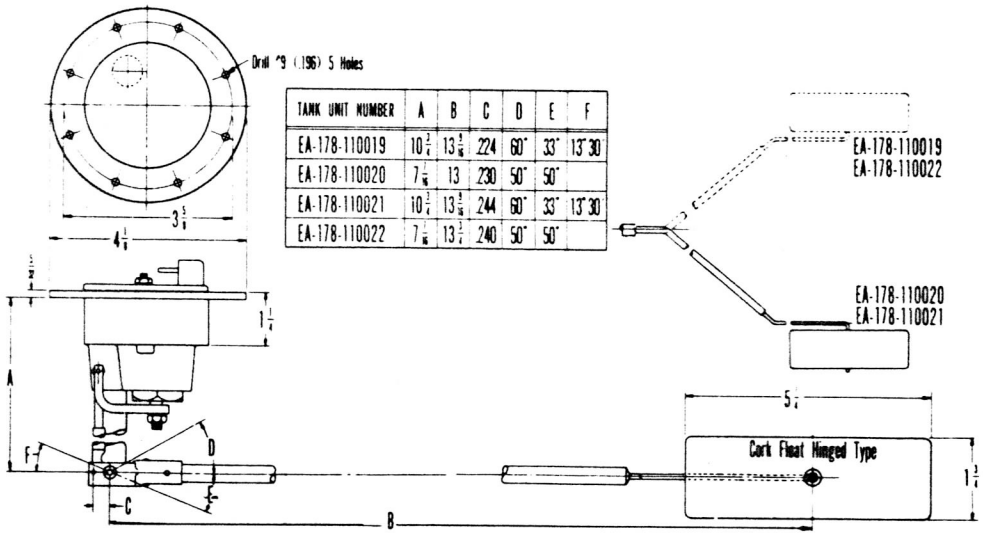


Figure 292—EA-18W-4099790, EA-18W-4099790-1 Tank Units



TANK UNIT NUMBER	A	B	C	D	E	F	RECEPT POS
EA-15-88-64820	5 1/8	11 1/2	.339	27°30'	38°	5°	3
EA-15-88-64821	4 1/8	11 1/2	.382	24°	33°	4°30'	3
EA-15-P-5847	8	13 1/2	.448	33°	20°	6°30'	2
EA-15-P-5848	8	12	.328	54°	21°	16°30'	2
EA-65-7148327	12 1/2	13 5/8	.215	68°	68°		3

Figure 294—EA-15 and 65 Tank Units



TANK UNIT NUMBER	A	B	C	D	E	F
EA-178-110019	10 1/2	13 5/16	.224	60°	33°	13°30'
EA-178-110020	7 1/16	13	.230	50°	50°	
EA-178-110021	10 1/2	13 5/16	.244	60°	33°	13°30'
EA-178-110022	7 1/16	13 1/2	.240	50°	50°	

Figure 295—EA-178 Tank Units

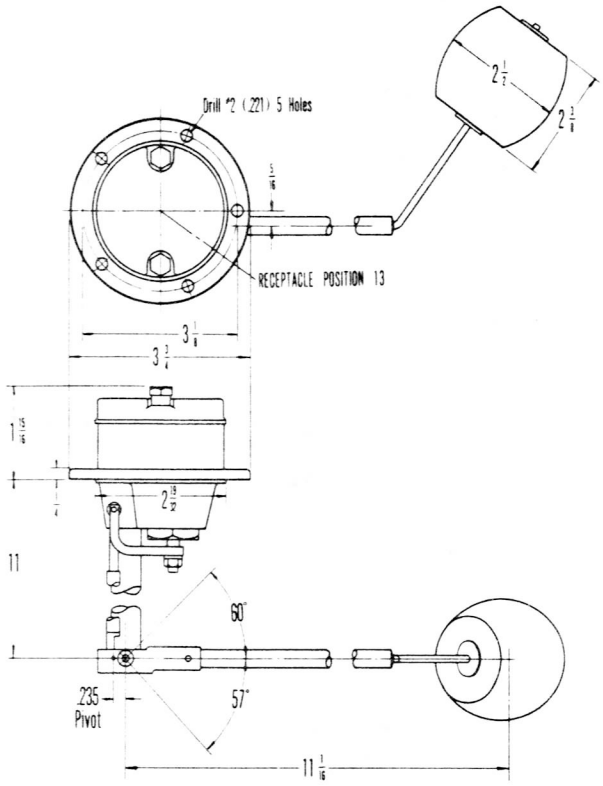


Figure 295-A—EA-15-312 Tank Unit

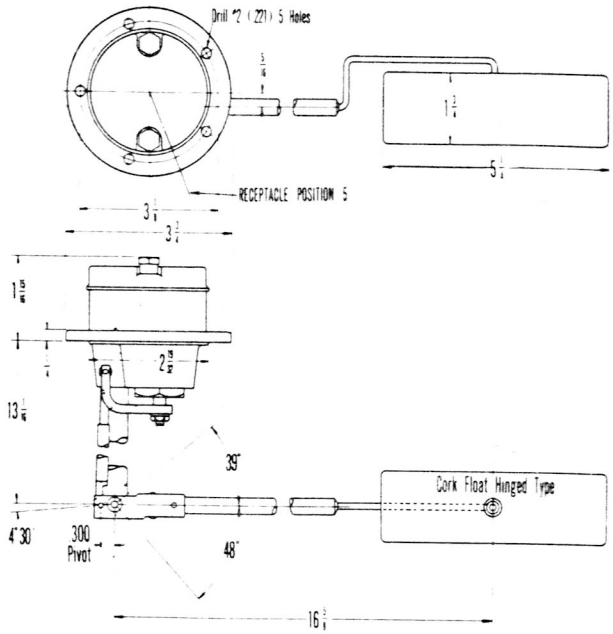


Figure 295-B—EA-15WC-216 Tank Unit

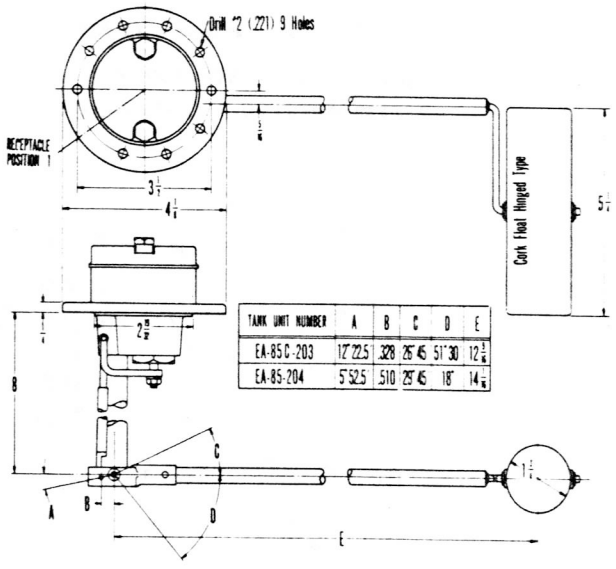


Figure 295-D—EA-85 and 85C Tank Units

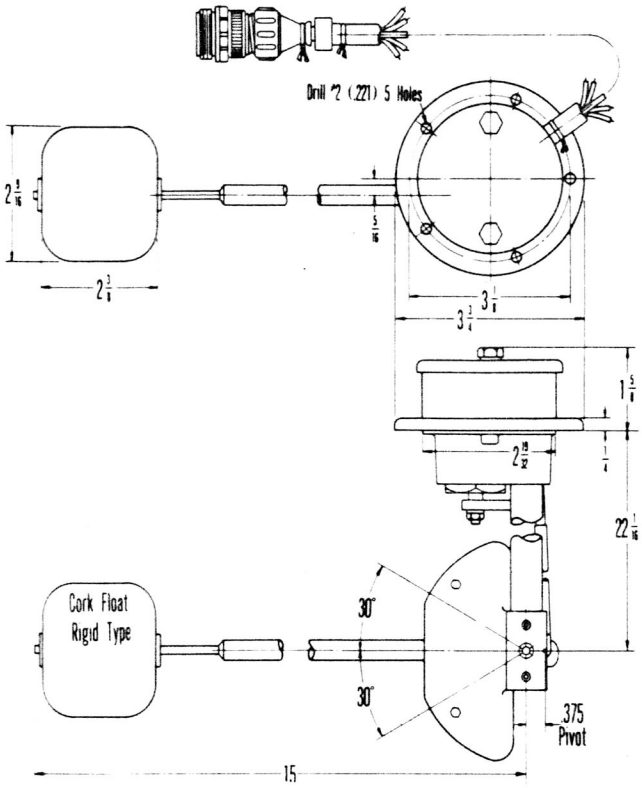


Figure 295-E—EA-88P-500 Tank Unit

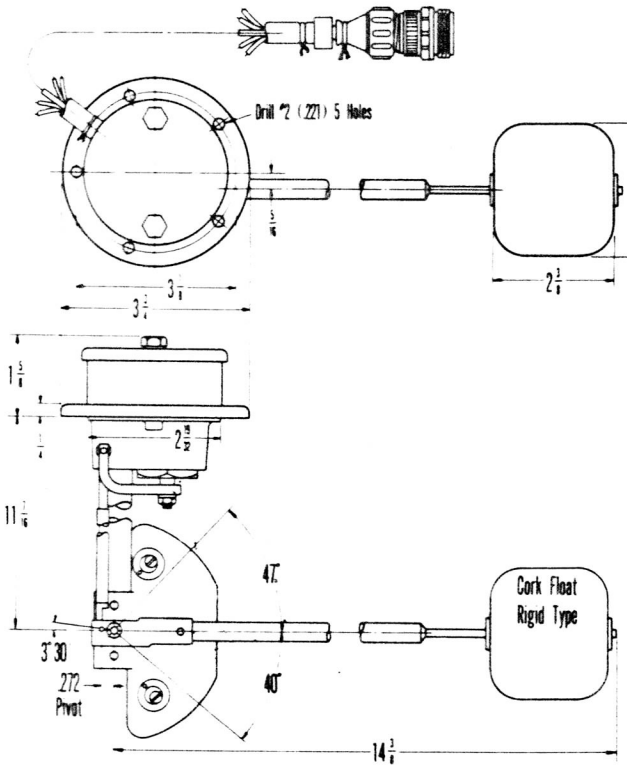


Figure 295-F—EA-89P-502 Tank Unit

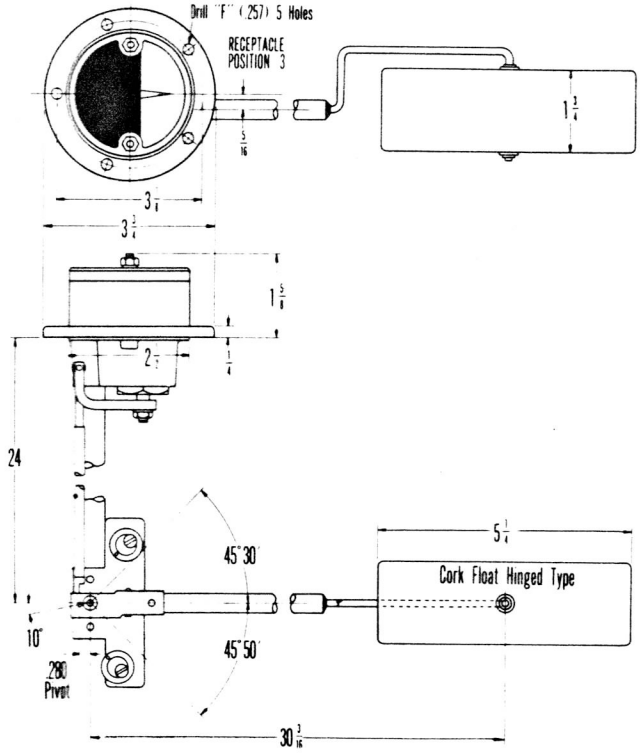


Figure 295-G—EA-191W-162FK5727A Tank Unit

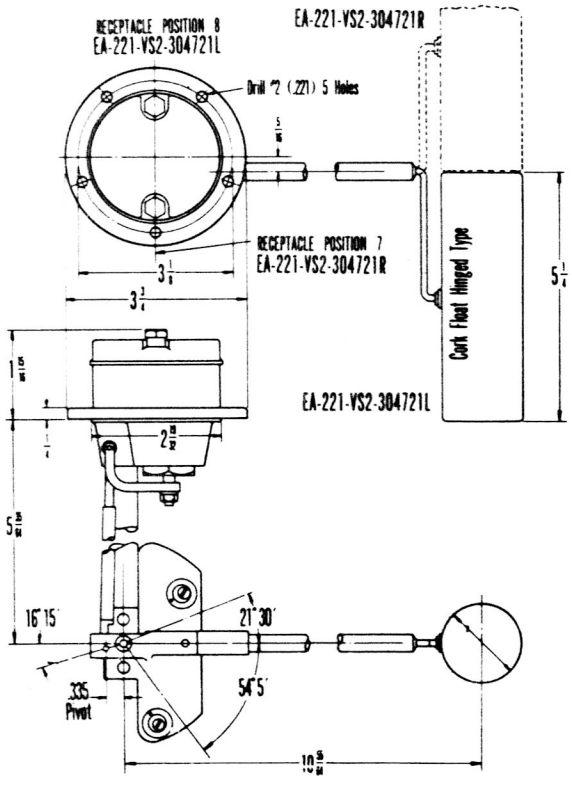


Figure 295-H—EA-211-US2-304721L and R Tank Units

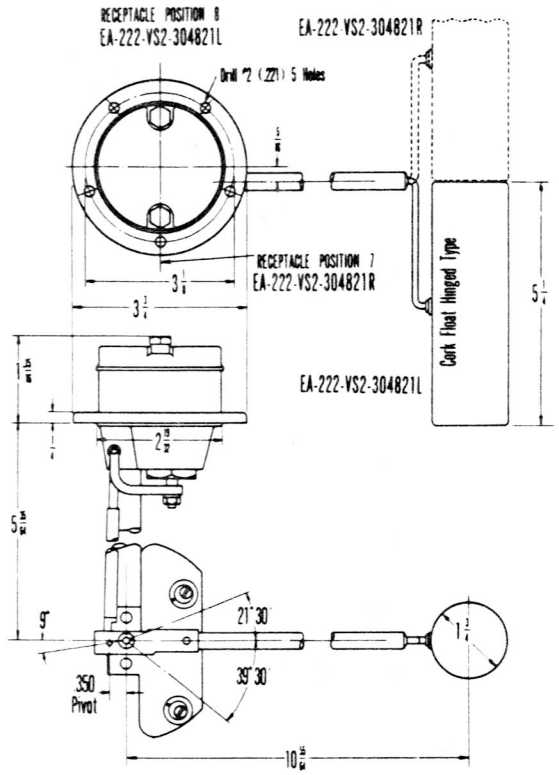


Figure 295-I—EA-222-VS2-304821L and R Tank Units

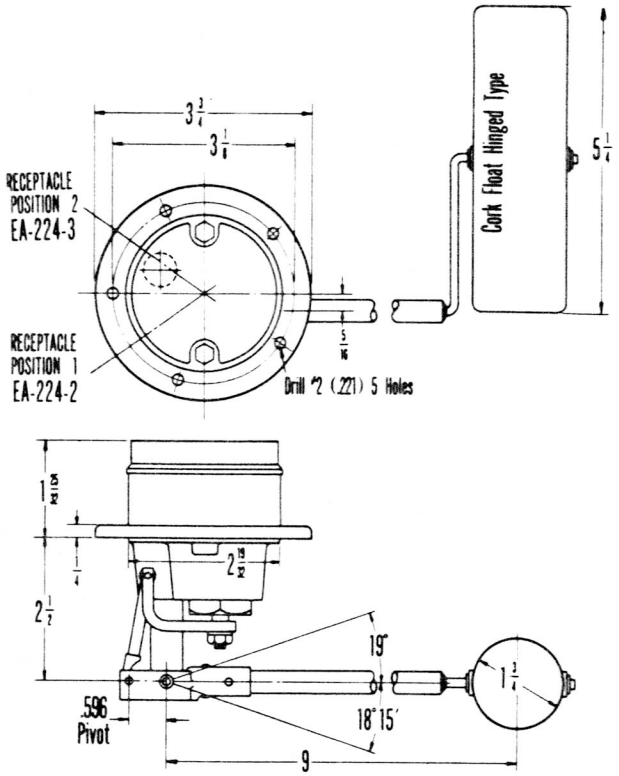


Figure 295-J—EA-224-2 and -3 Tank Units

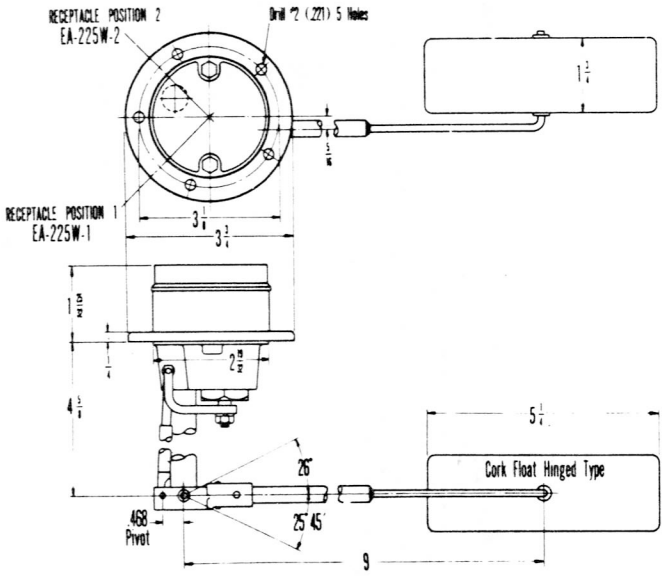


Figure 295-K—EA-225W-1 and -2 Tank Units

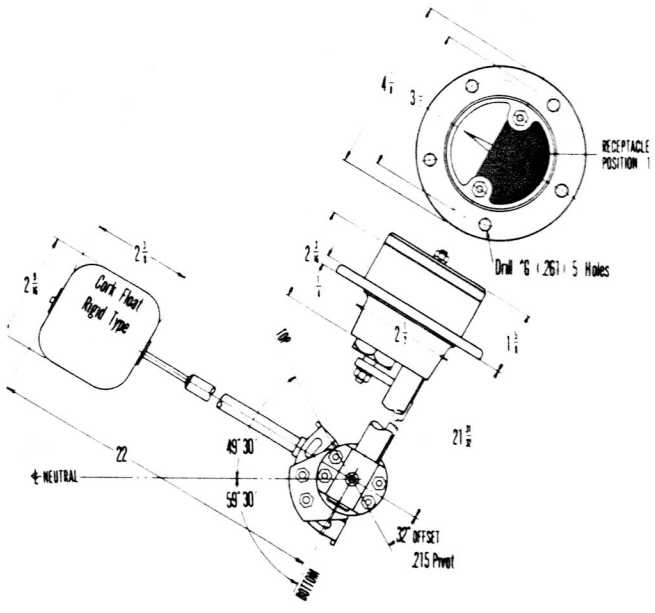
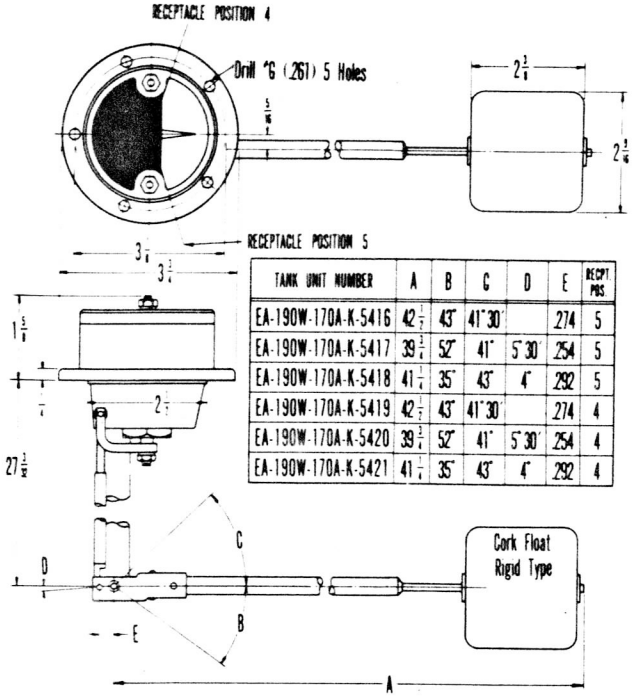


Figure 295-L—EA-290-170A-K-5501 Tank Unit



TANK UNIT NUMBER	A	B	C	D	E	RECPT POS
EA-190W-170A-K-5416	42 1/2	43°	41°30'		274	5
EA-190W-170A-K-5417	39 3/4	52°	41°	5°30'	254	5
EA-190W-170A-K-5418	41 1/4	35°	43°	4°	292	5
EA-190W-170A-K-5419	42 1/2	43°	41°30'		274	4
EA-190W-170A-K-5420	39 3/4	52°	41°	5°30'	254	4
EA-190W-170A-K-5421	41 1/4	35°	43°	4°	292	4

Figure 295-M—EA-190W Tank Units

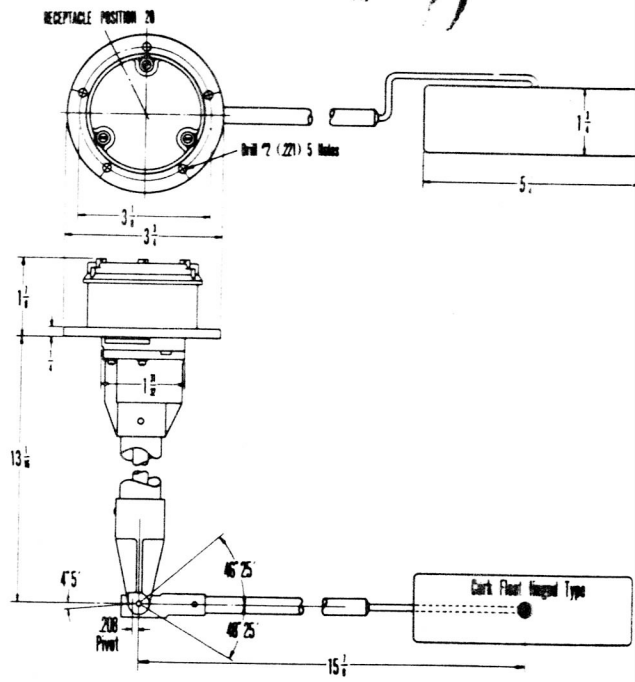


Figure 295-N—EA-515WC-216 Tank Unit

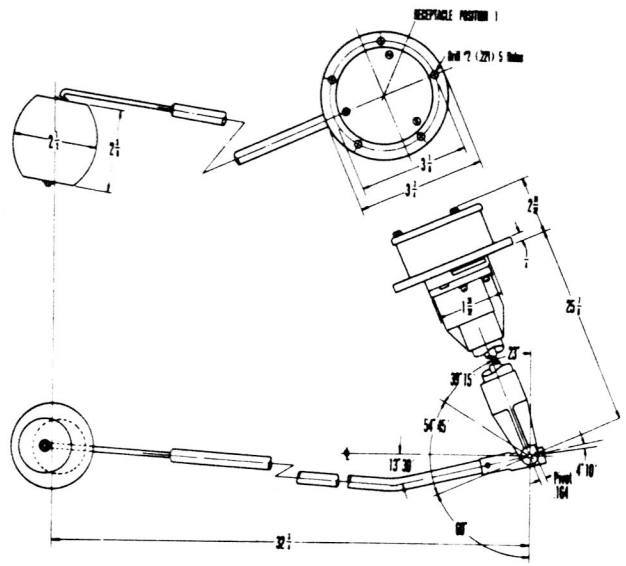


Figure 295-O—EA-565-201A Tank Unit

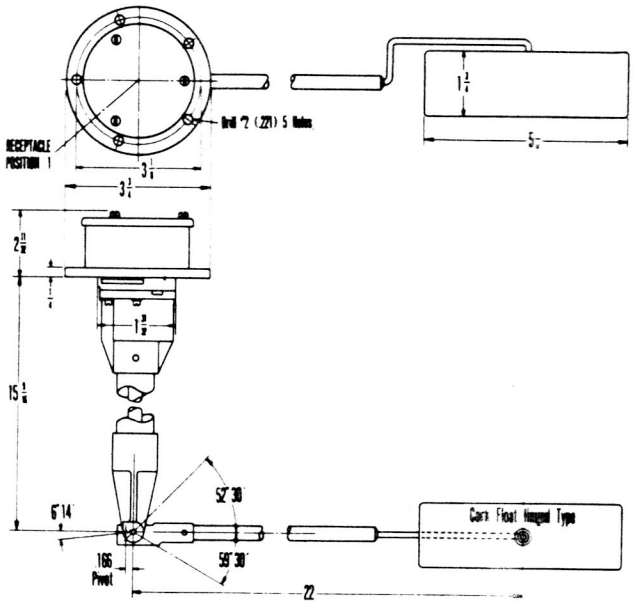


Figure 295-P—EA-565W-269 Tank Unit

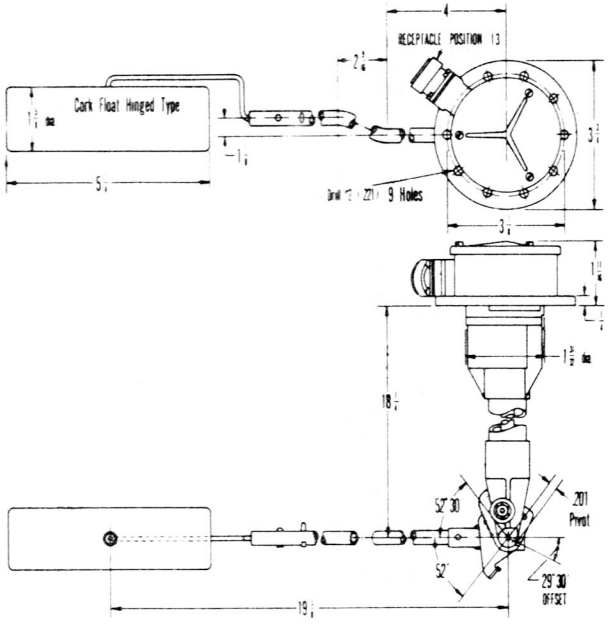


Figure 295-Q—EA-533-311 Tank Unit

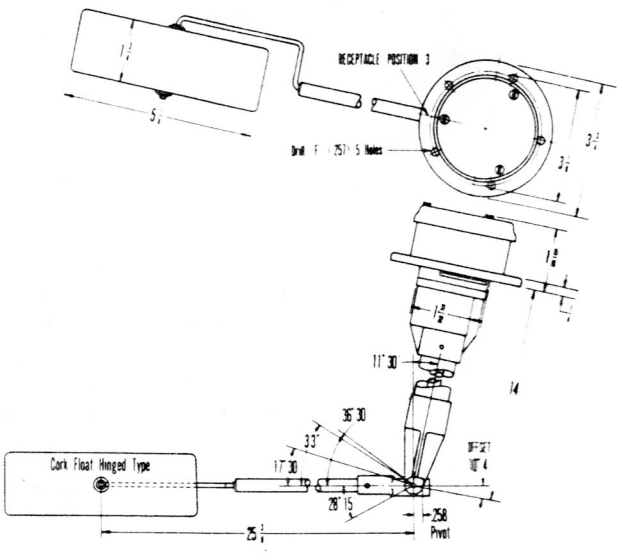


Figure 295-S—EA-565C-245 Tank Unit

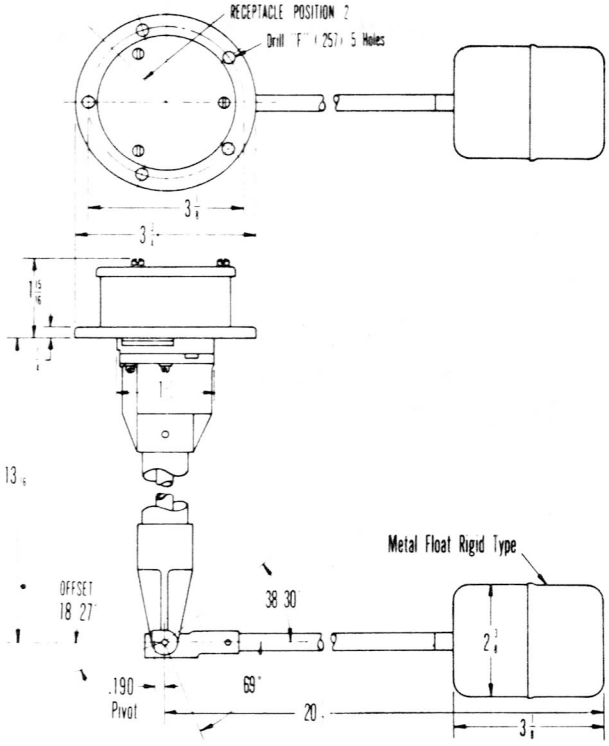
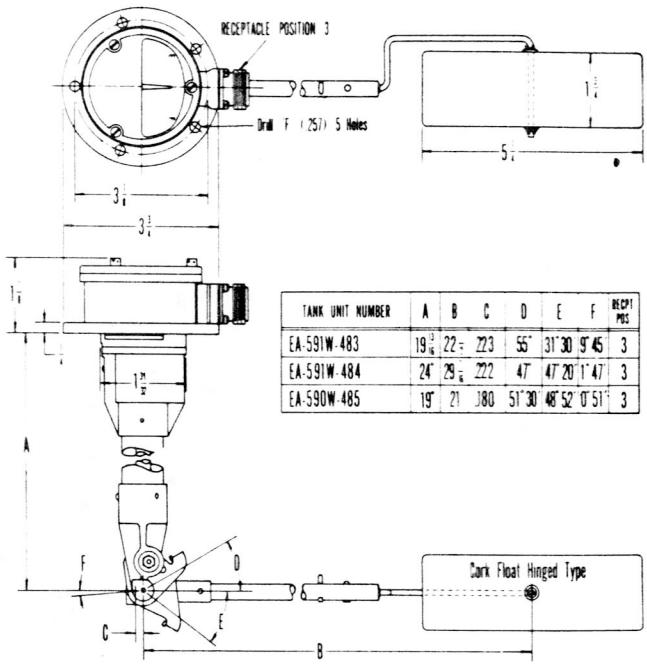


Figure 295-R—EA-515-217 Tank Unit



TANK UNIT NUMBER	A	B	C	D	E	F	RECPT POS
EA-591W-483	19 3/16	22	.223	55°	31° 30'	9° 45'	3
EA-591W-484	24"	29 1/16	.222	47°	47° 20'	1° 47'	3
EA-590W-485	19"	21	.180	51° 30'	48° 52' 0"	51°	3

Figure 295-T—EA-591W-483,-484 and EA-590W-485 Tank Units

RESCINDED

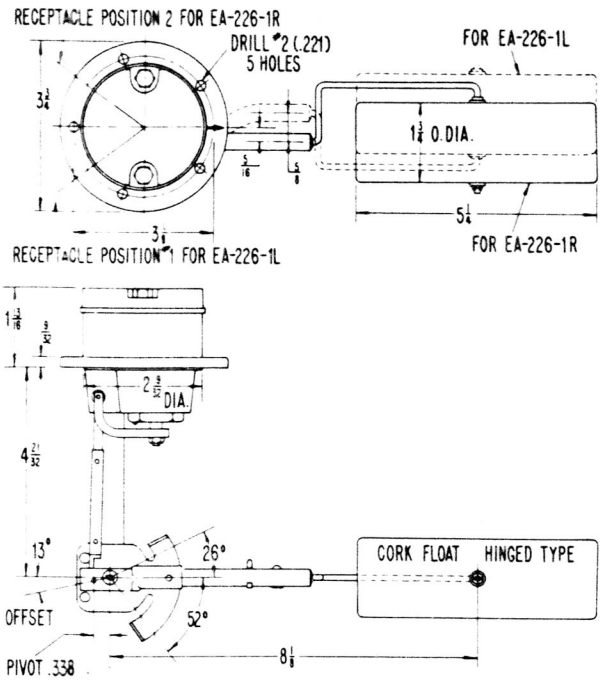
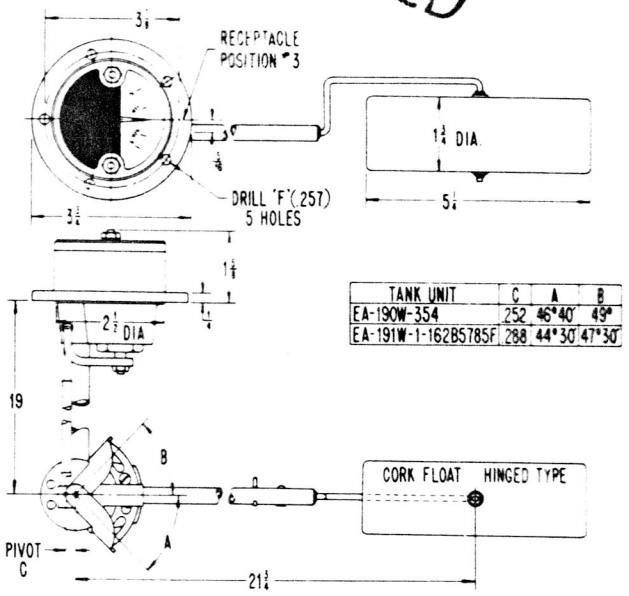


Figure 295-U-EA-226-1L and 1R Tank Units



TANK UNIT	C	A	B
EA-190W-354	.252	46°40'	43°
EA-191W-1-162B5785F	.288	44°30'	47°30'

Figure 295-W—EA-190W-354 and EA-191W-1-162B578SF Tank Units

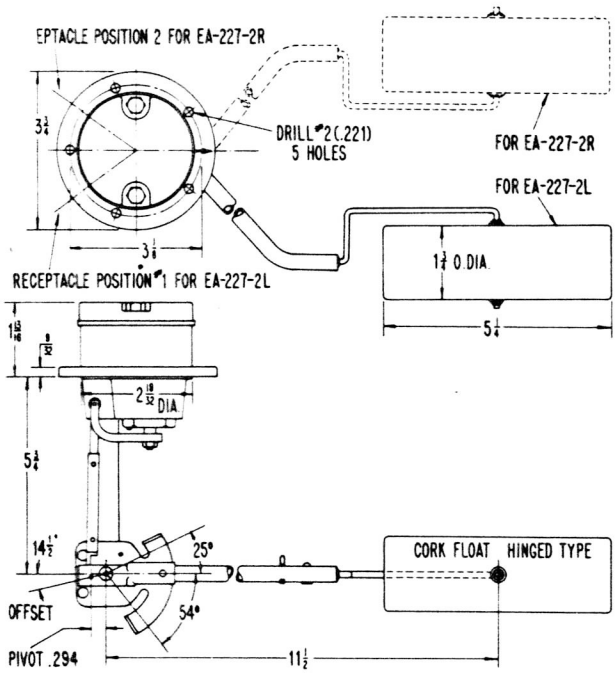


Figure 295-V—EA-277-2L and-2-R Tank Units

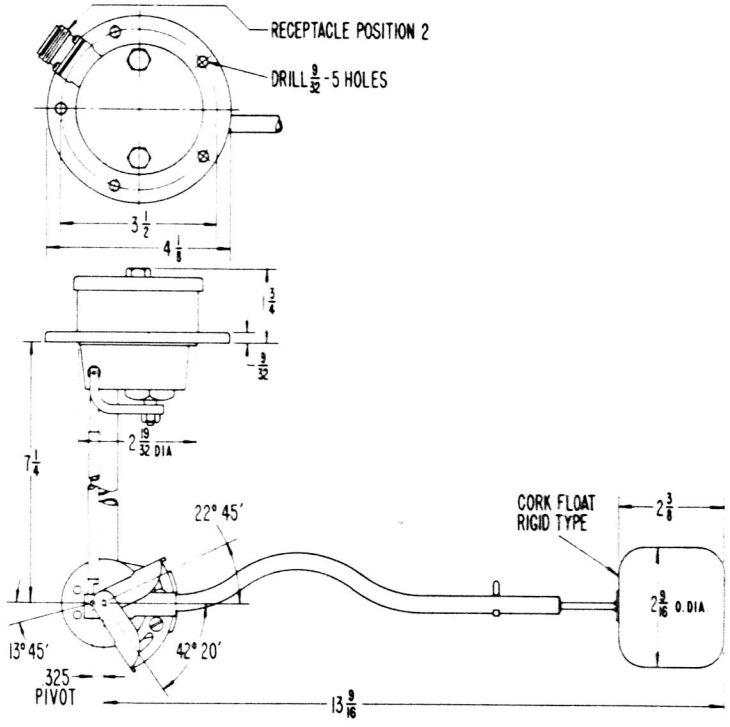


Figure 295-X—EA-85W-323 Tank Unit

THE FOLLOWING ARE DRAWINGS OF SIDE MOUNT TANK UNITS

TANK UNIT NUMBER	A	B	C	D	E	F
EA-15A-23-685-001-1	$2\frac{1}{2}$	8	.248	53°	38°	1°30'
EA-15AW-62A-00346-2	$14\frac{15}{16}$	$13\frac{13}{16}$	.303	39°30'	47°5'	4°
EA-15AW-62A-00346-3	$14\frac{15}{16}$	$13\frac{13}{16}$	.305	31°	55°15'	12°

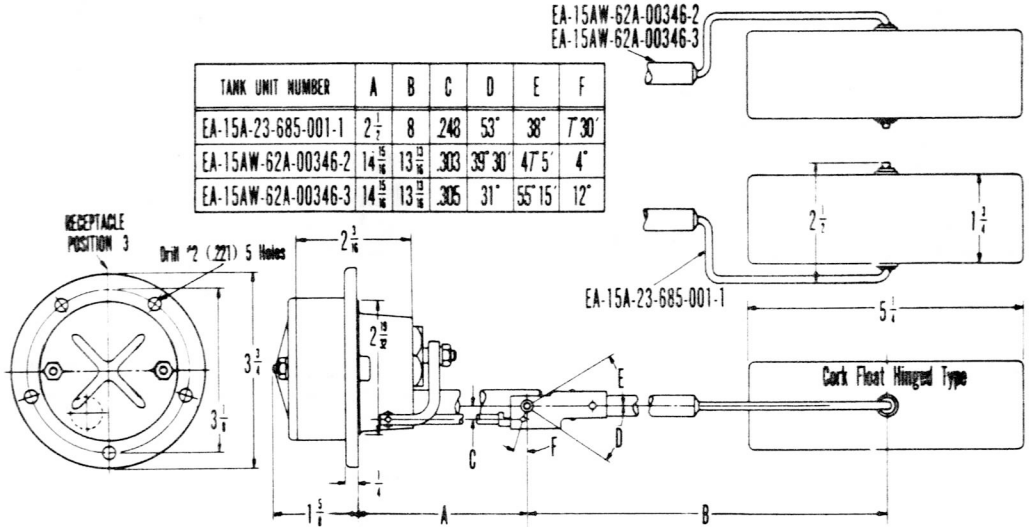


Figure 296—EA-15A and EA-15AW Tank Units

TANK UNIT NUMBER	RECPT. POS.
EA-202A-120557	15
EA-202A-121404	16

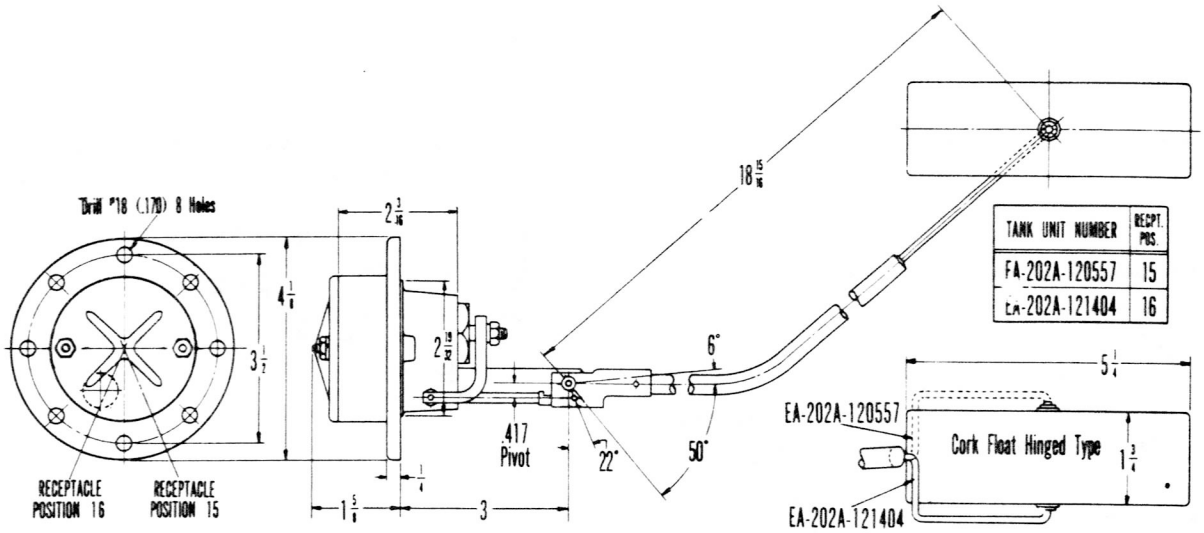


Figure 297—EA-202A Tank Units

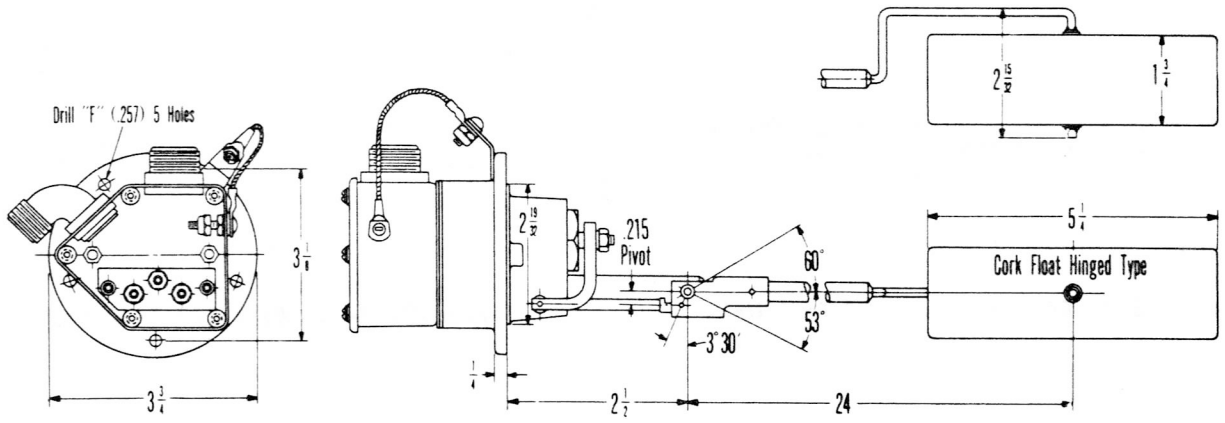


Figure 298—EA-15AW-162B5748 Tank Unit

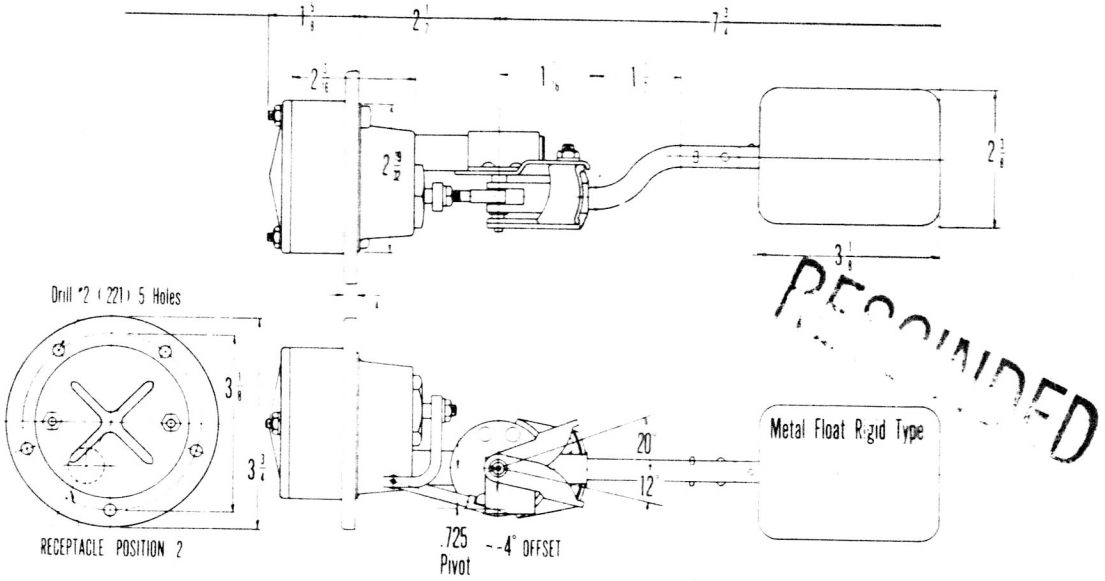


Figure 298-A—EA-15A-215 Tank Unit

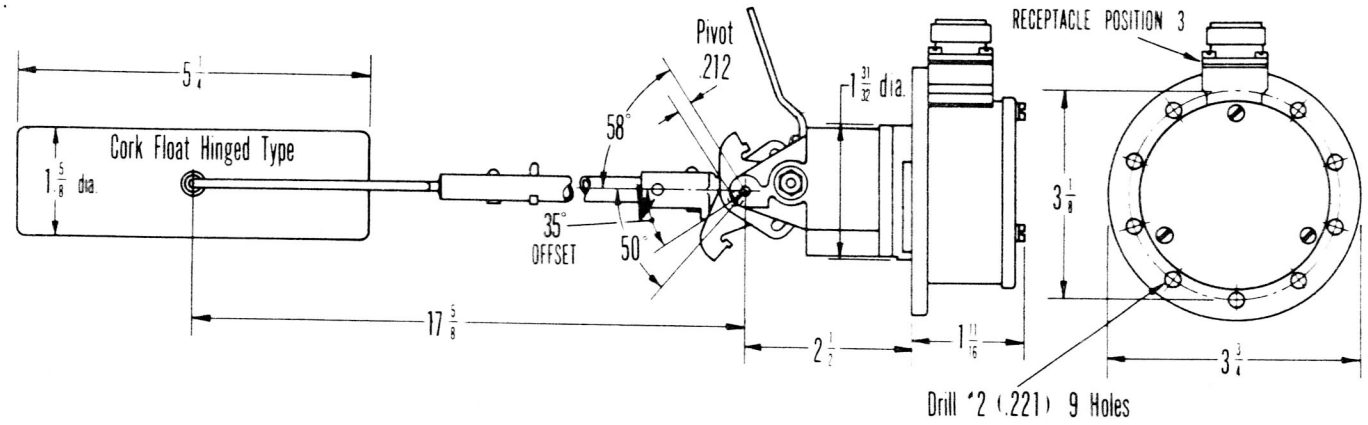


Figure 298-B—EA-524A-309 Tank Unit

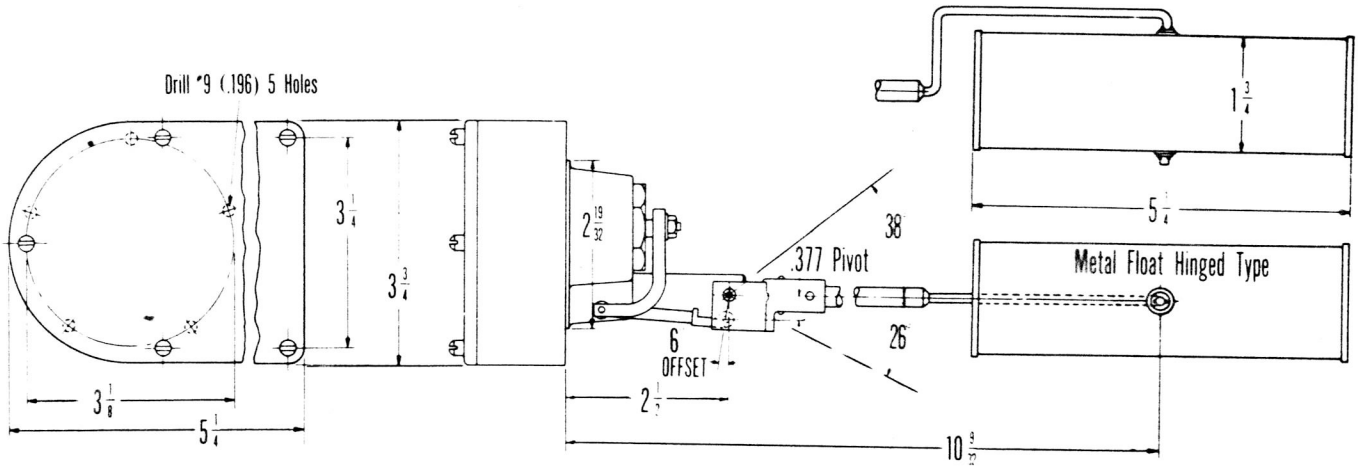


Figure 298-C—EA-1612A-18R-9715 Tank Unit

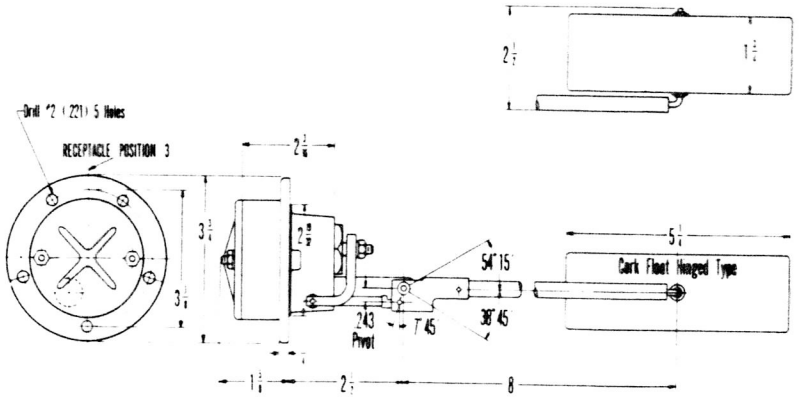


Figure 299—EA-15AW-27-685-001-1 Tank Unit

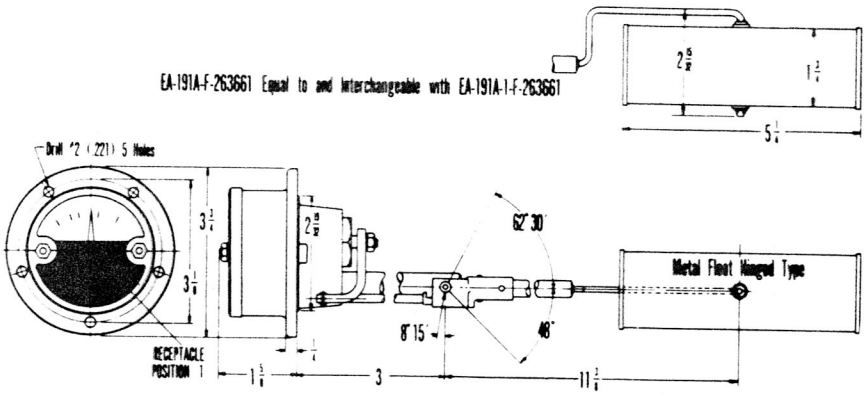


Figure 300—EA-191A-F-263661 and EA-191A-1-F-263661 Tank Units

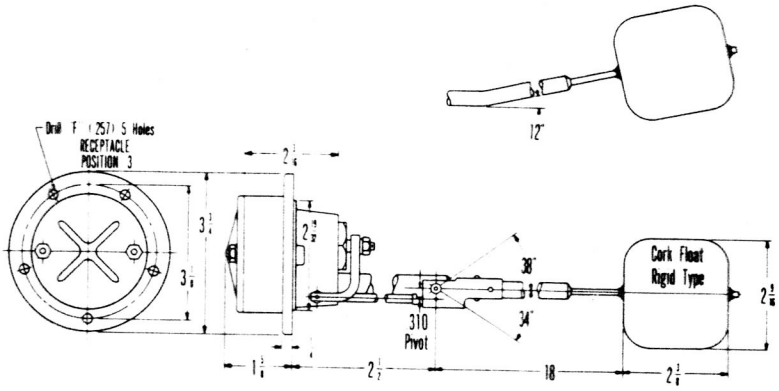


Figure 301—EA-15A-162B5835 Tank Unit

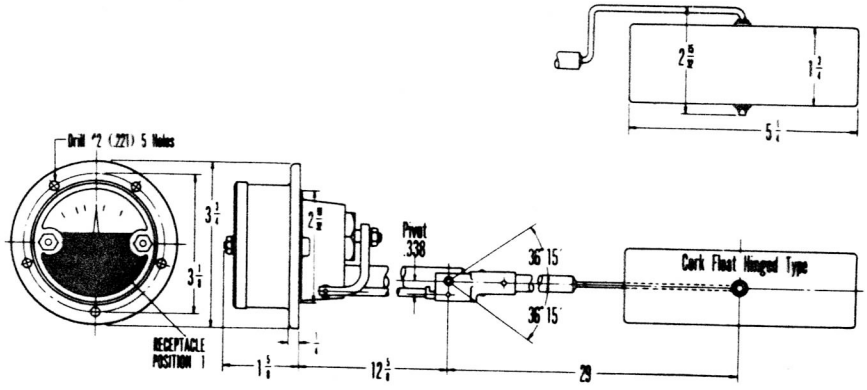


Figure 302—EA-191A-743 Tank Unit

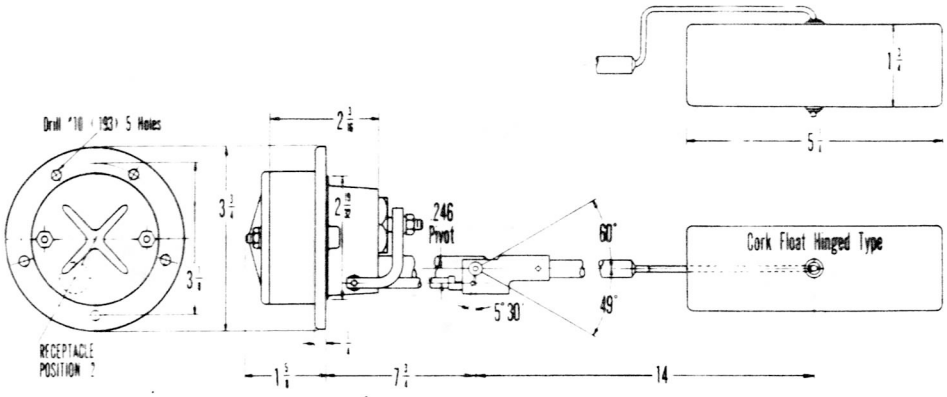


Figure 303—EA-15AW-VS-06-45-1005 Tank Unit

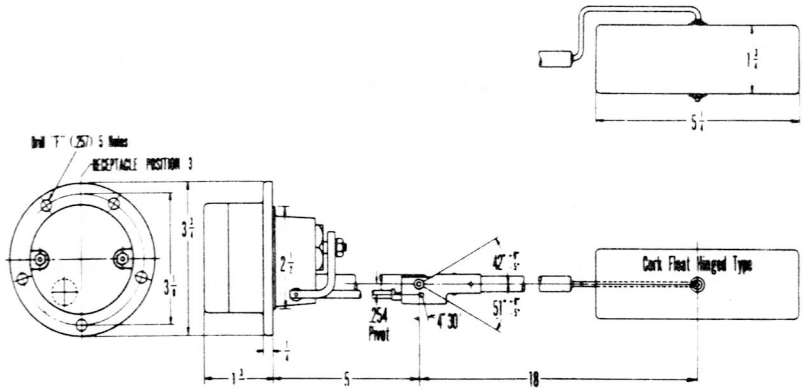


Figure 304—EA-15AWC-162B5784A Tank Unit

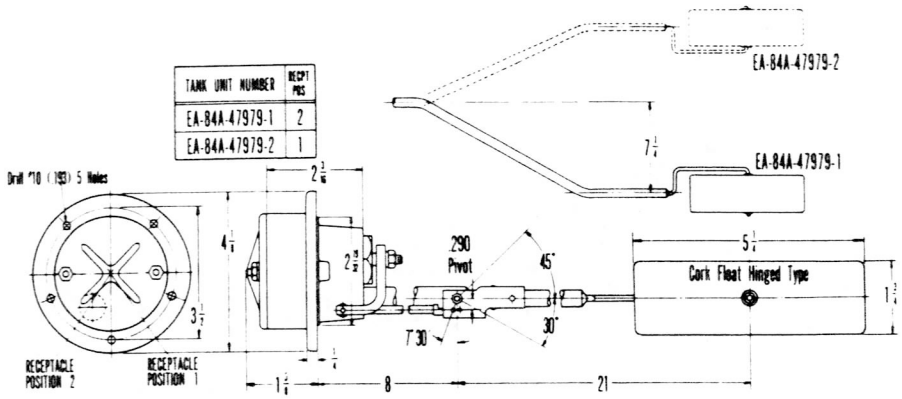


Figure 305—EA-84A Tank Units

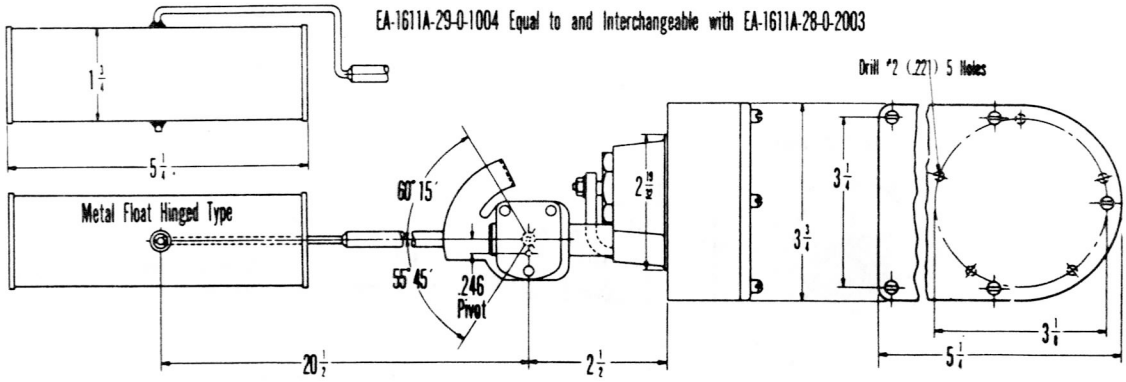


Figure 306—EA-1611A-29-0-1004 and EA-1611A-28-0-2003 Tank Units

TANK UNIT NUMBER	A	B
EA-65A-15504	$3\frac{1}{4}$	$13\frac{1}{2}$
EA-65A-15505	$3\frac{1}{4}$	$13\frac{1}{2}$
EA-65A-15506	$3\frac{5}{16}$	13
EA-65A-15507	$3\frac{5}{16}$	13

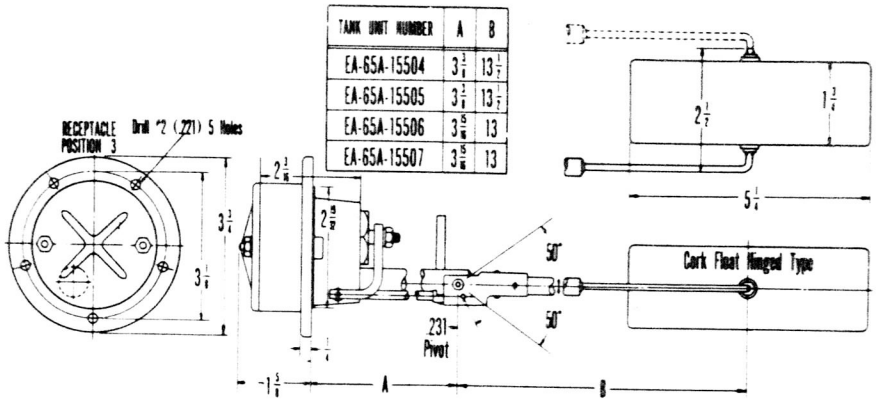


Figure 307—EA-65A Tank Units

TANK UNIT NUMBER	A	B	C	D	E	F
EA-15AW-F-263661	3	$11\frac{3}{8}$	246	8°	62°30	46°
EA-15A-F-263661	3	$11\frac{3}{8}$	246	8°15	62°30	46°
EA-15A-F-263662	4	$7\frac{1}{2}$	240	8°	65°	48°30

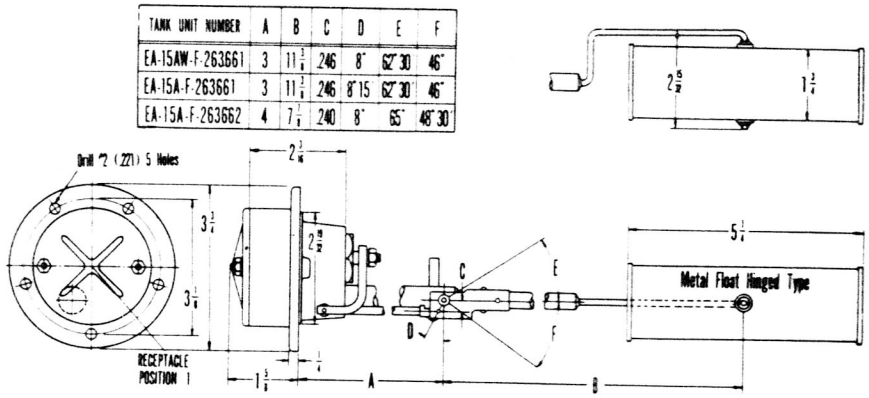


Figure 308—EA-15A and EA-15AW Tank Units

TANK UNIT NUMBER	A	B	C	D	E
EA-206A-4178896-2	$12\frac{1}{2}$	.251	38°15	50°30	4°
EA-207A-4178896-4	$10\frac{5}{16}$	.326	40°15	42°30	

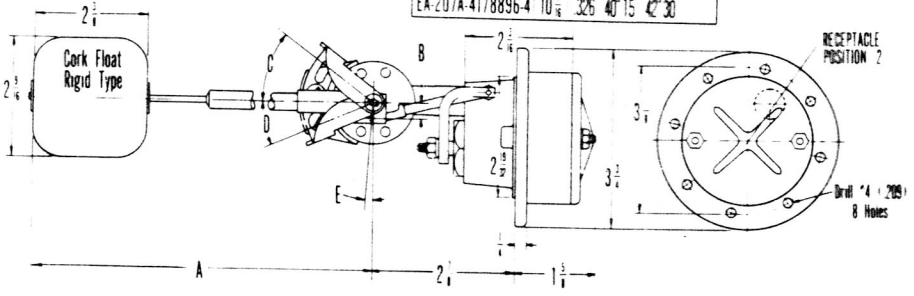


Figure 309—EA-206A and EA-207A Tank Units

TANK UNIT NUMBER	A	B	C	D	E	F
EA-228A-15-16635-1	15	27	.440	23°	28°	2°30
EA-228A-15-16635-2	15	$26\frac{1}{2}$	.477	15°30	31°	7°30
EA-228A-15-16635-3	$12\frac{1}{2}$	$19\frac{5}{16}$	.566	11°	28°	8°30
EA-228A-15-16635-5	15	$32\frac{1}{2}$	.394	30°	27°25	

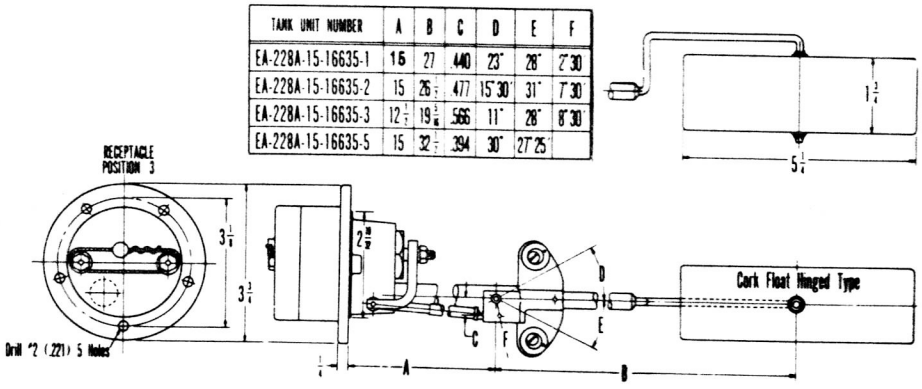


Figure 310—EA-228A Tank Units

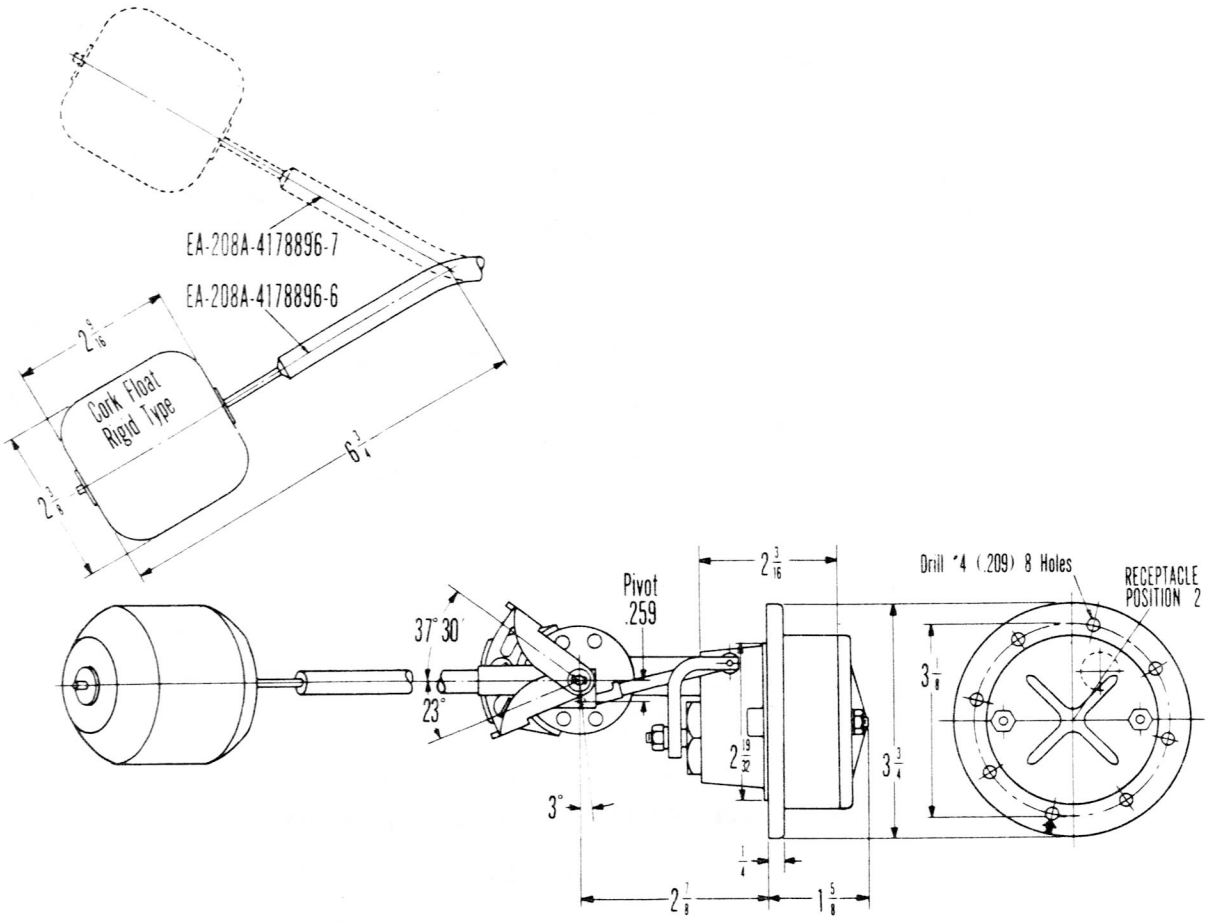


Figure 311—EA-208A-4178896-6 and EA-208A-4178896-7 Tank Units

TANK UNIT NUMBER	A	B	C	D	E	F	RECPT. POS.
EA-15A-82-00128-2	$4\frac{21}{32}$	$13\frac{13}{16}$	.302	32° 40'	54° 5'	11°	3
EA-15A-82-00128-3	$4\frac{21}{32}$	15	.336	20° 15'	55° 20'	18°	3
EA-15A-228151-2	$2\frac{1}{7}$	$8\frac{1}{4}$	.244	60°	57°		1
EA-15A-228151-3	$2\frac{1}{7}$	$8\frac{1}{4}$	.244	60°	57°		2
EA-15AW-53067	3	$6\frac{1}{4}$	.248	55°	55°		1
EA-15AW-62-00168-2	$14\frac{15}{16}$	$15\frac{1}{7}$	.267	39° 45'	43° 15'		3
EA-15AW-62-00168-3	$14\frac{15}{16}$	$15\frac{1}{7}$	.277	30°	49° 25'	9° 40'	3
EA-15AW-213	$7\frac{3}{4}$	15	.288	47° 30'	44° 30'	1° 30'	2
EA-15AW-444	$7\frac{3}{4}$	14	.250	58°	48°	5°	2

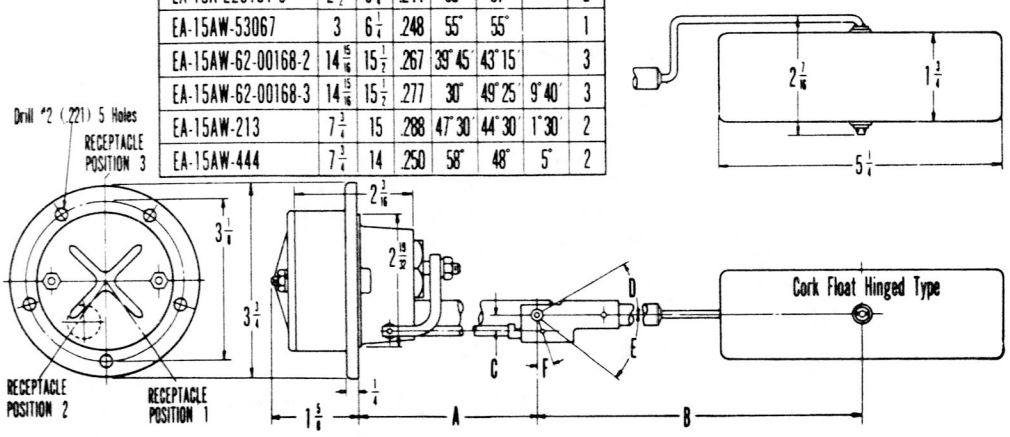


Figure 312—EA-15A and 15AW Tank Units

RESCINDED

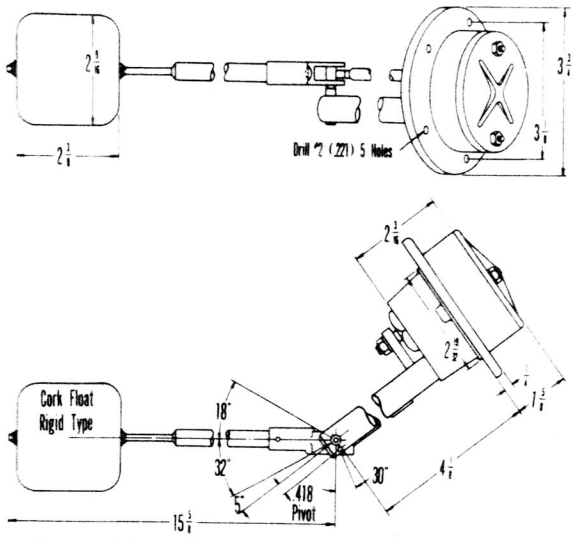


Figure 313—EA-15AW-4163064 Tank Unit

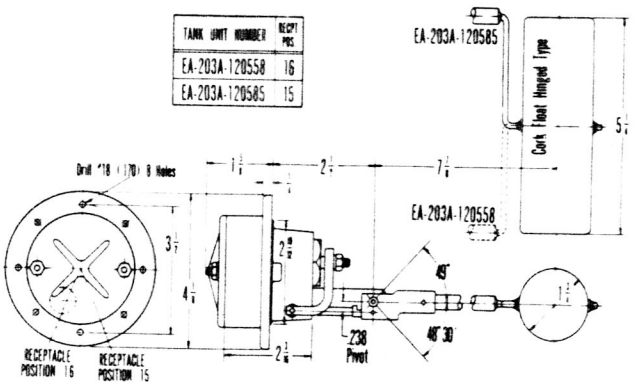


Figure 315—EA-203A Tank Units

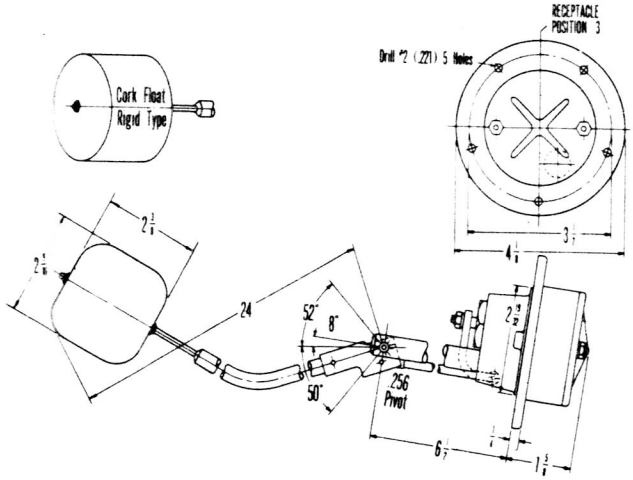


Figure 314—EA-84AW-29-685-001-1 Tank Unit

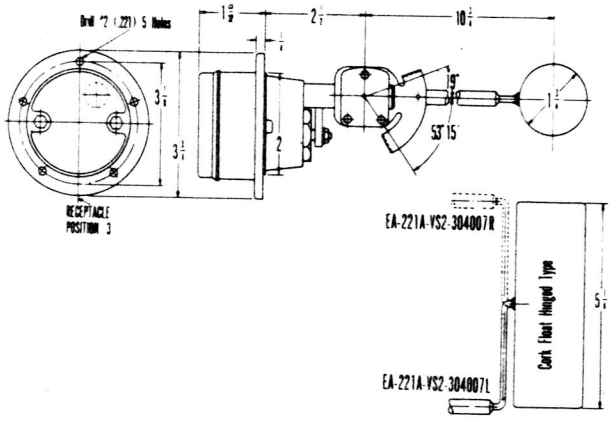


Figure 316—EA-221A-VS2-304007 R and L Tank Units

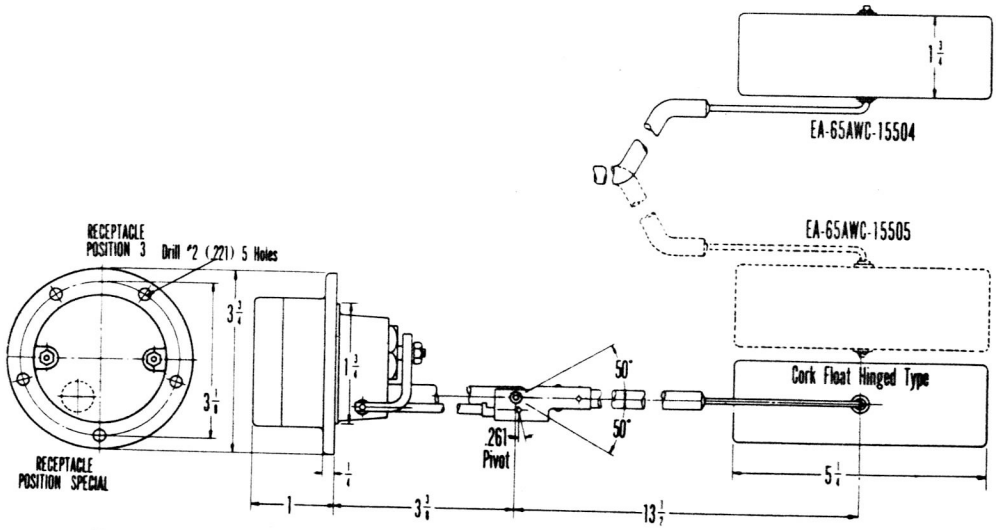


Figure 317—EA-65AWC-15504 and EA-65AWC-15505 Tank Units

TANK UNIT NUMBER	A	B	C	D	E	F	RECPT. POS.
EA-15AW-F-263662	4	7 1/8	240	65°	48° 30'	8°	1
EA-65A-28-0-3039-31	2 1/2	20 1/2	215	60° 30'	55°	2° 45'	3
EA-65AW-8940758	2 1/2	31	274	43°	43°		2
EA-15A-28-0-2003	2 1/2	20 1/2	236	60° 15'	55° 45'	2° 15'	2

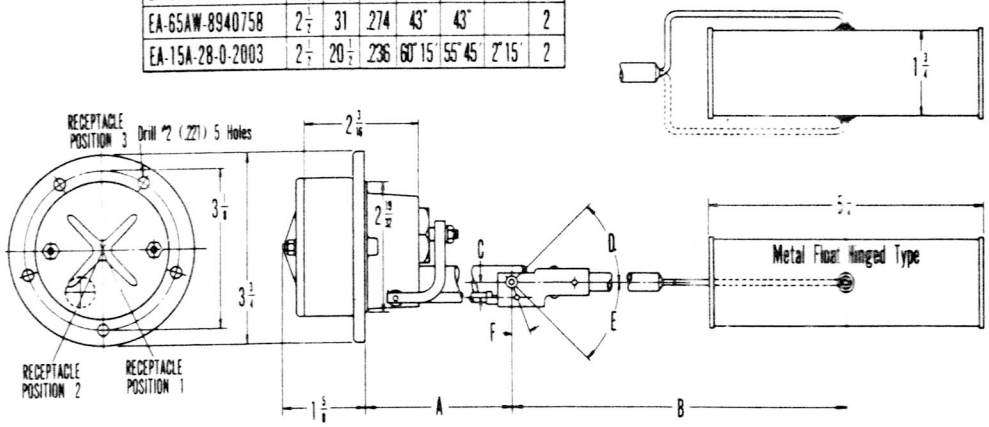


Figure 318—EA-15A, EA-15AW, EA-65A and EA-65AW Tank Units

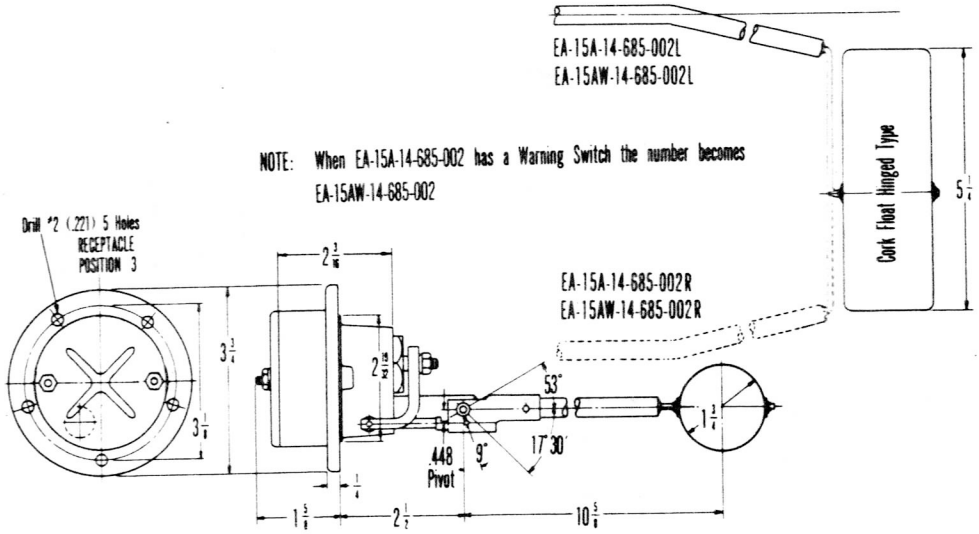


Figure 319—EA-15A and EA-15 AW Tank Units

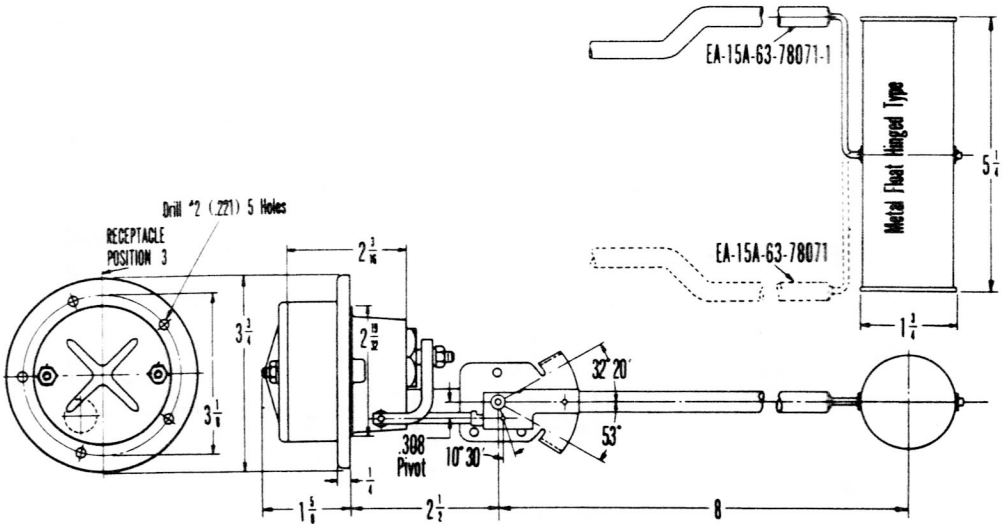


Figure 320—EA-15A-63-78071 and EA-15A-63-78071-1 Tank Units

TANK UNIT NUMBER	A	B	C	D	E
EA-15AW-4062359	$2\frac{1}{2}$	$10\frac{1}{4}$	.268	44°	50°
EA-15AW-4062365	$2\frac{1}{2}$	$13\frac{3}{4}$	.268	44°	50

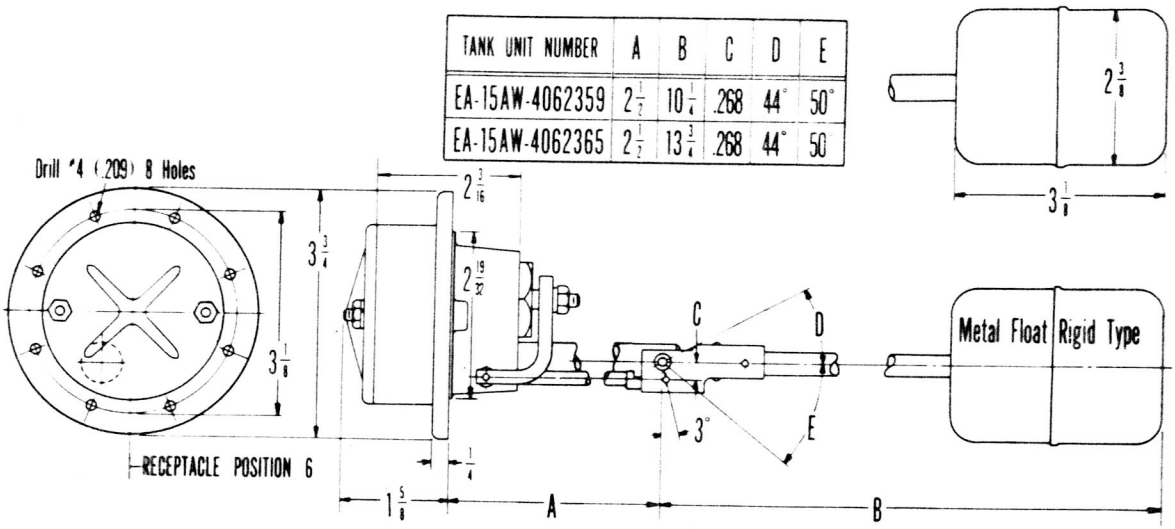


Figure 321—EA-15AW Tank Units

RESCINDED

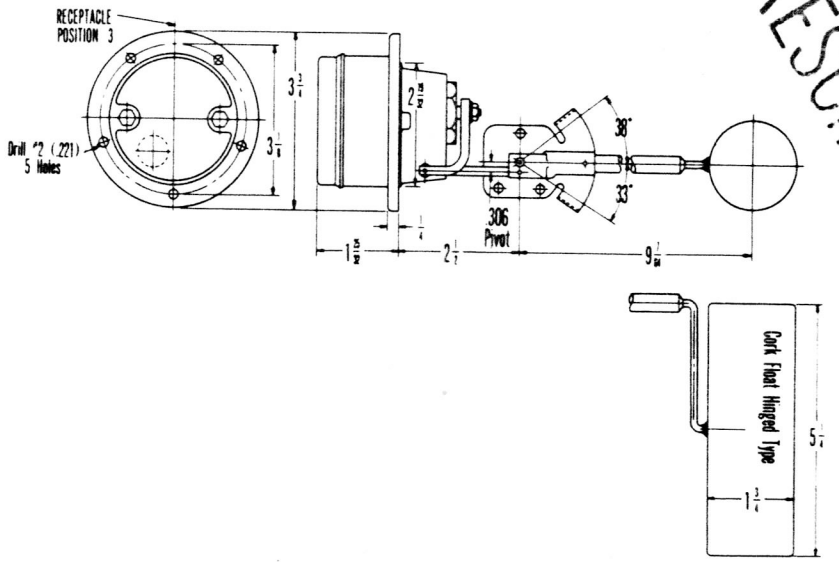


Figure 322—EA-222A-VS2-304307 Tank Unit

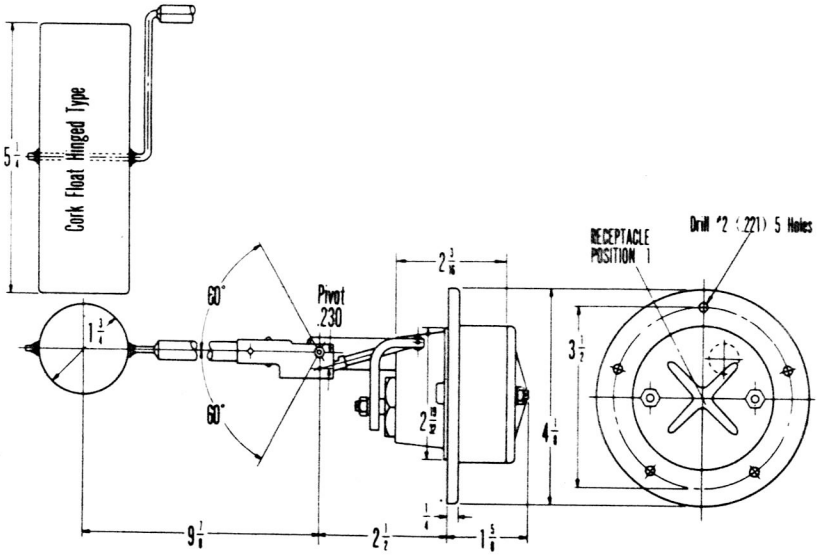


Figure 323—EA-85A-32R-4282 Tank Unit

TANK UNIT NUMBER	A	B	C	D	E	F	RECP' POS
EA-15A-27-421-1039	5 1/16	18 5/16	5°	28°30	38°30	.362	3
EA-15A-342	2 1/2	10 1/2	—	50°	50°	.270	2
EA-15A-494	2 1/2	10 1/2	—	50°	50°	.270	3

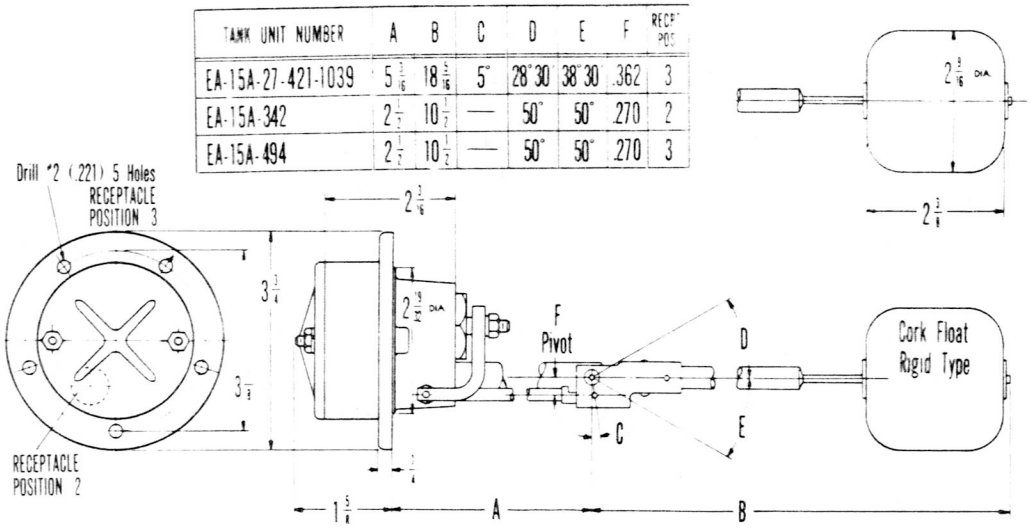


Figure 324—EA-15A-27-421-1039 Tank Unit

TANK UNIT NUMBER	A	B	C	D	E	F	RECP' POS
EA-85AW-120713	2 1/2	11	.248	42°20	42°50	11°20	11
EA-85AW-120782	2 1/2	11	.248	65°	65°30	11°20	16

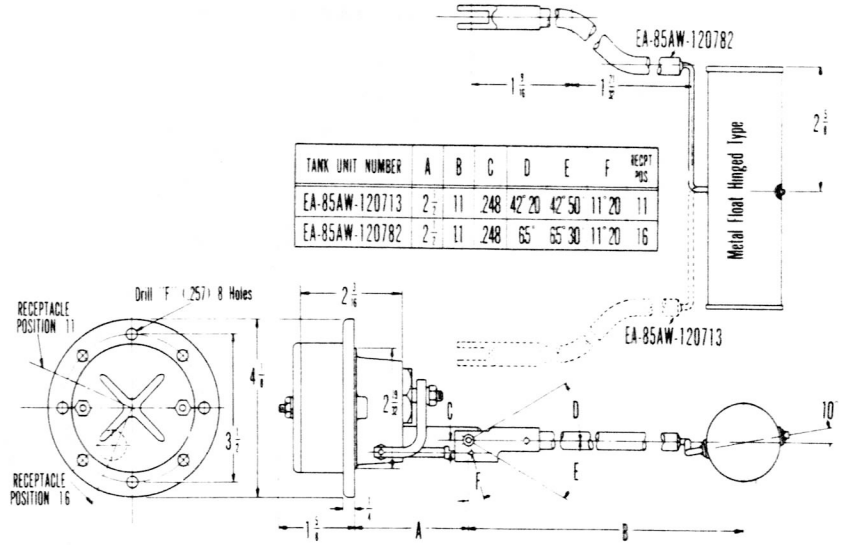


Figure 325—EA-85AW Tank Units

TANK UNIT NUMBER	A	B	C	D	E
EA-88A-4171346-2	12 1/8	.248	49°30	47°15	
EA-88A-4175744-4	15	.342	60°	12°30	23°45
EA-88A-4171346-6	15	.294	19°	57°30	17°30
EA-89A-4175744-2	15	.342	60°	13°	23°30
EA-89A-4171346-4	15	.292	29°	48°	12°
EA-89A-4171346-8	12 1/8	.265	47°49	39°15	

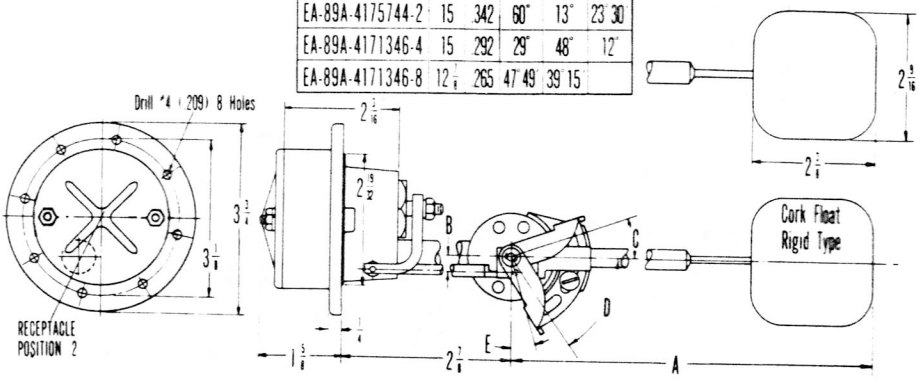


Figure 326—EA-88A and EA-89A Tank Units

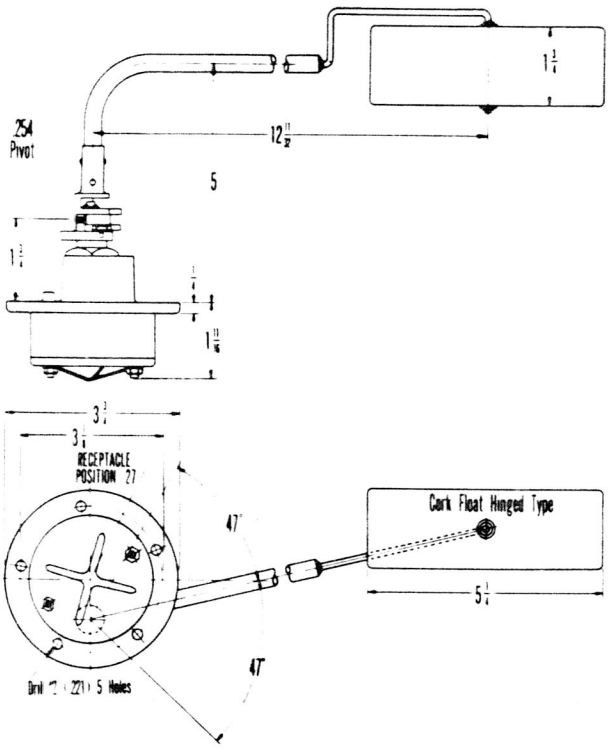


Figure 326-A—EA-15X-1 Tank Unit

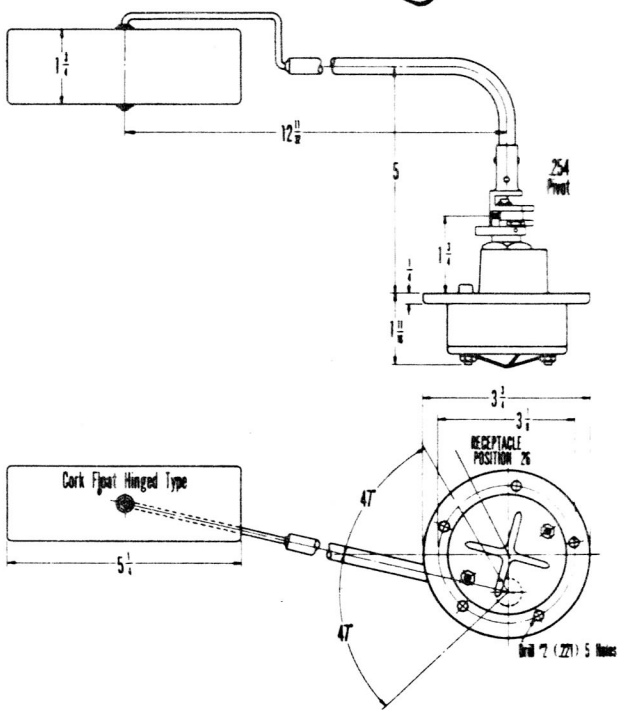


Figure 326-B—EA-15X-2 Tank Unit

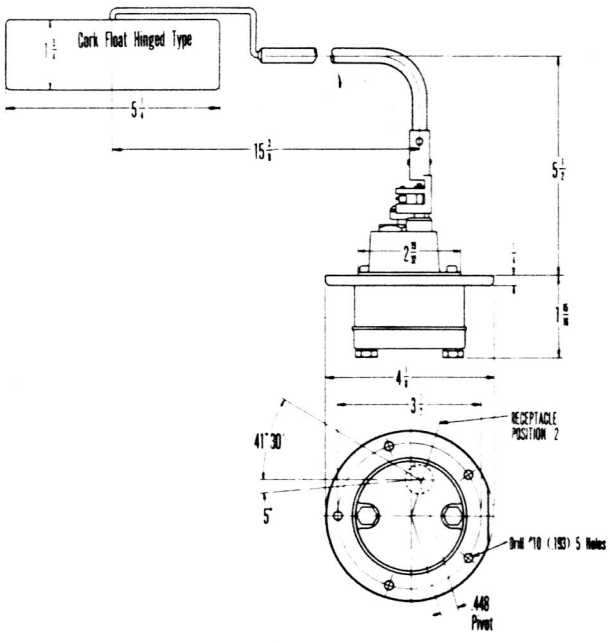


Figure 326-C—EA-84X-1L Tank Unit

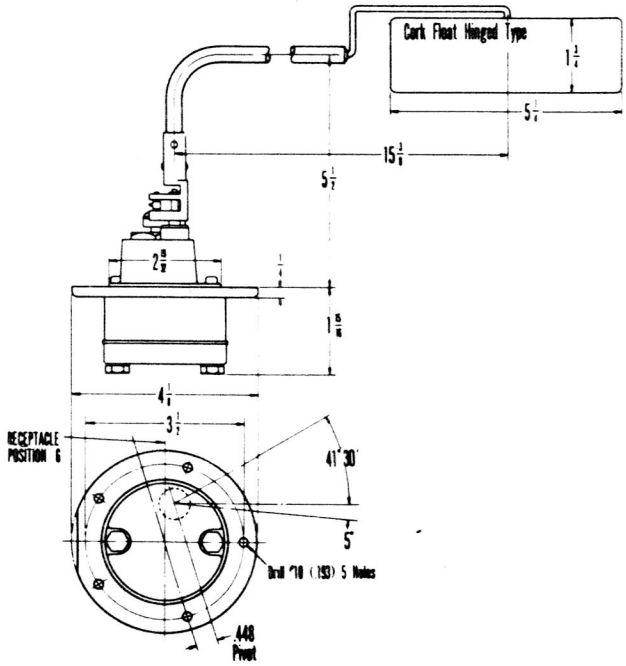


Figure 326-D—EA-84X-1R Tank Unit

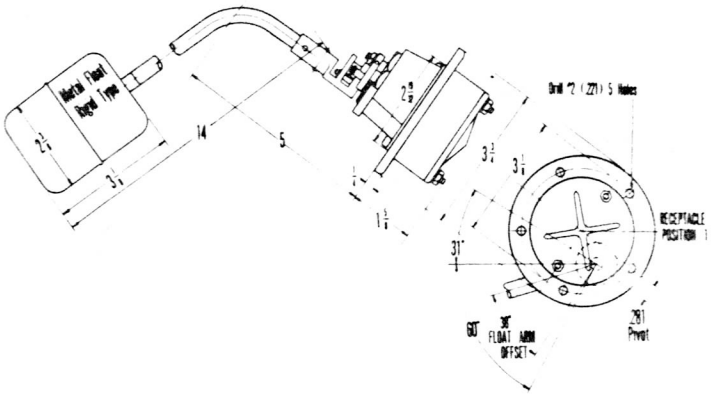


Figure 326-E—EA-15X-4 Tank Unit

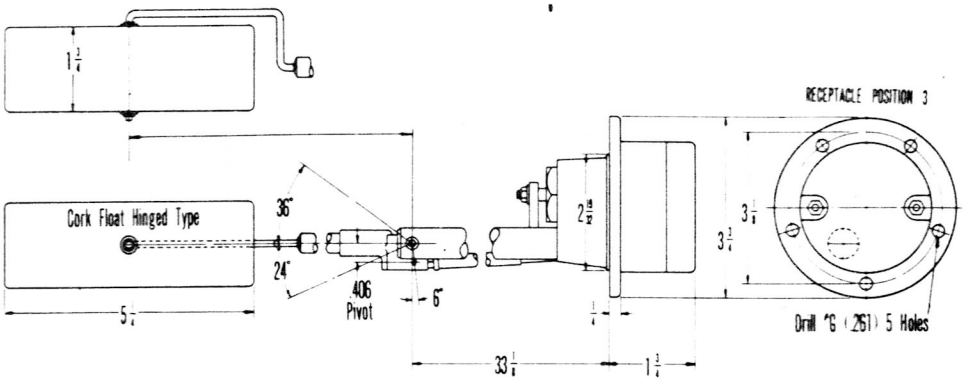
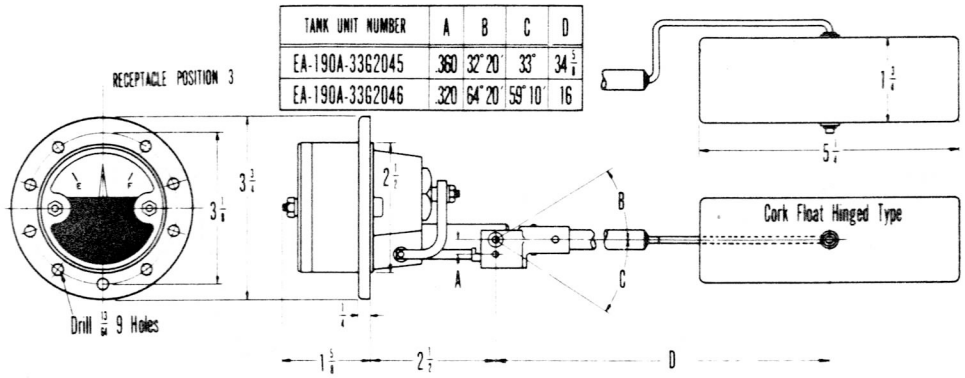
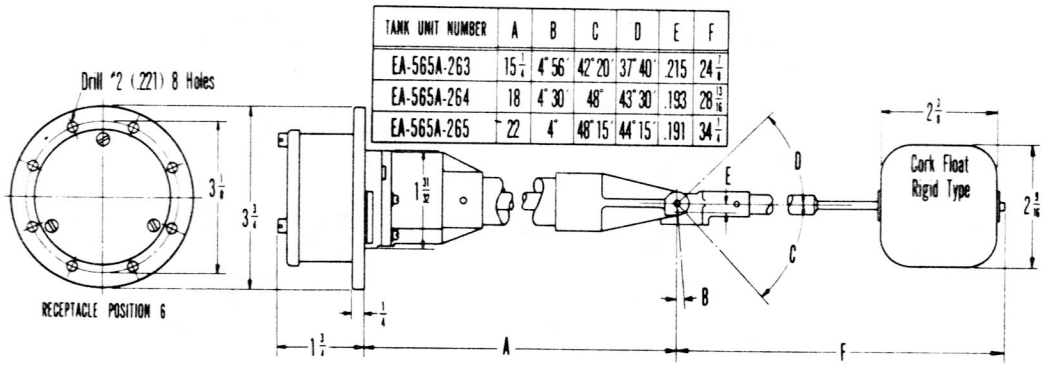


Figure 326-F—EA-65AWC-170A-K-5409 Tank Unit



TANK UNIT NUMBER	A	B	C	D
EA-190A-33G2045	.360	32°20'	33°	34 3/8
EA-190A-33G2046	.320	64°20'	59°10'	16

Figure 326-G—EA-190A-33G-2045 and 2046 Tank Units



TANK UNIT NUMBER	A	B	C	D	E	F
EA-565A-263	15 1/4	4°56'	42°20'	37°40'	.215	24 1/8
EA-565A-264	18	4°30'	48°	43°30'	.193	28 13/16
EA-565A-265	22	4°	48°15'	44°15'	.191	34 1/4

Figure 326-H—EA-565A-263, -264 and -265 Tank Units

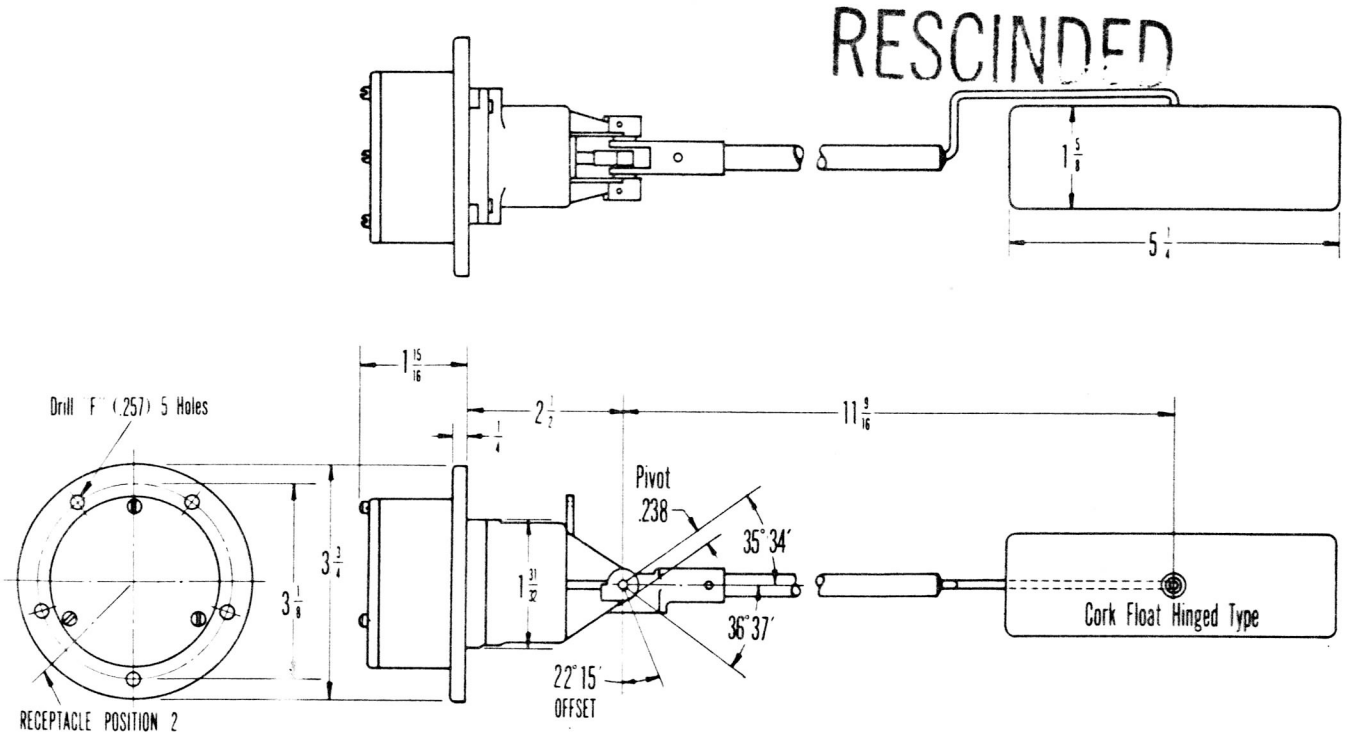


Figure 326-J—EA-565AW-259 Tank Unit

TANK UNIT NUMBER	A	B	C	D	E	F	RECPT. POS.
EA-85A-306	2 1/2	16 5/8	.332	32°	38° 20		3
EA-85A-430	2 1/2	16 1/4	.332	26° 42'	41°		3
EA-85A-476	2 1/2	16	.350	39° 30'	33°	3° 30'	2

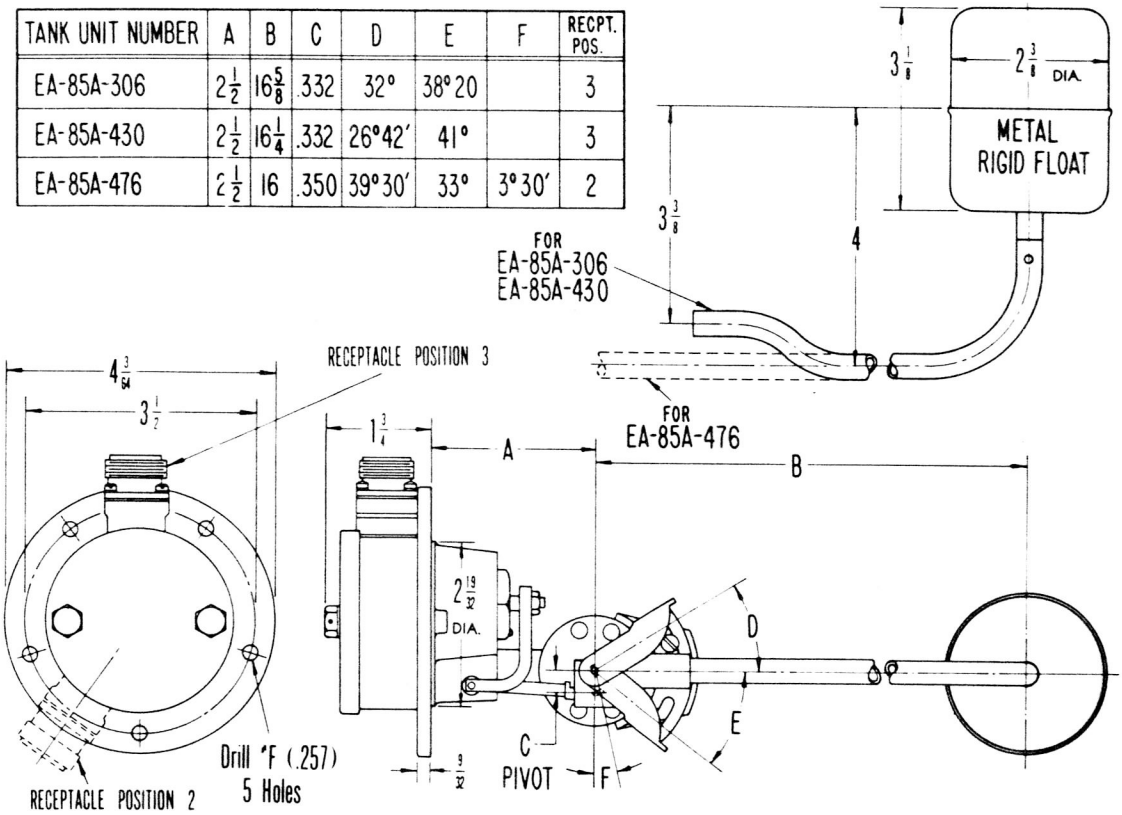


Figure 326-K—EA-85A-306, -430 and -476 Tank Units

THE FOLLOWING ARE DRAWINGS OF BOTTOM MOUNT TANK UNITS

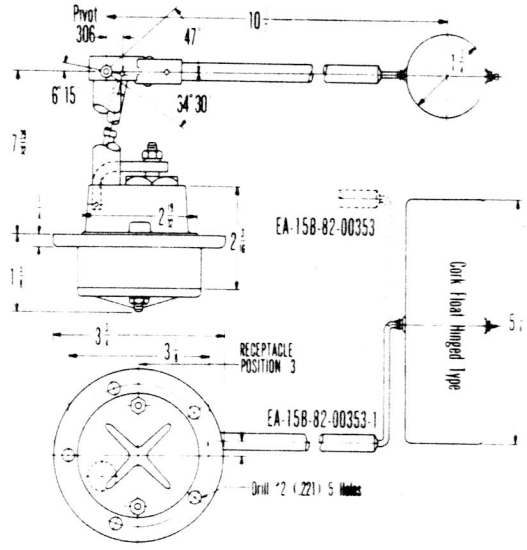


Figure 327—EA-15B-82-00353 and -1 Tank Units

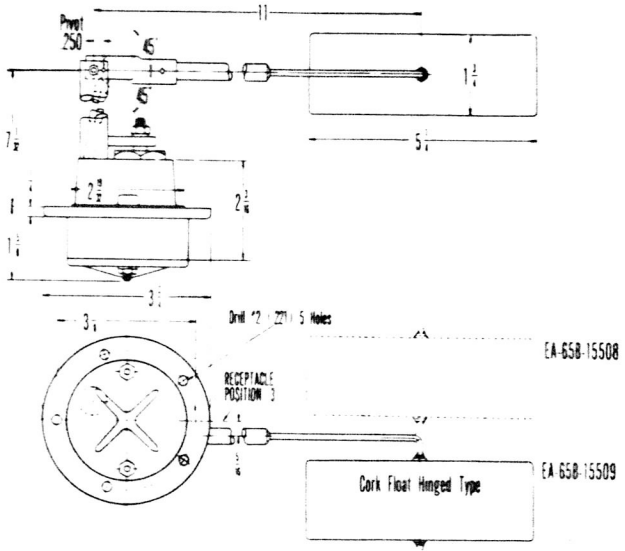


Figure 329—EA-65B-15508 and 15509 Tank Units

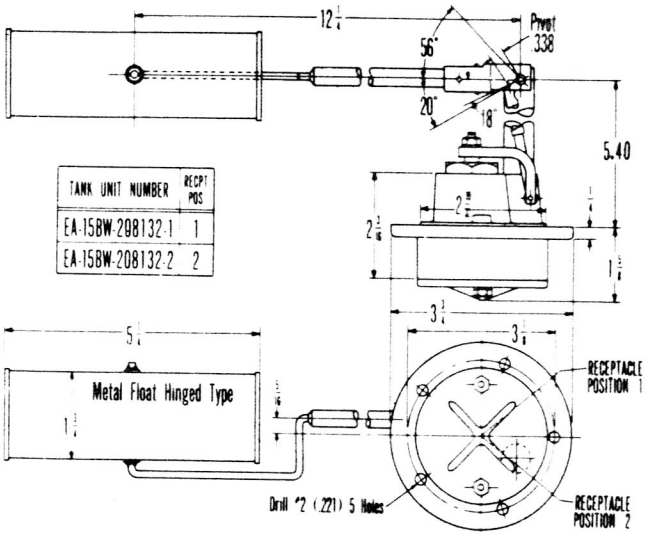


Figure 328—EA-15BW Tank Units

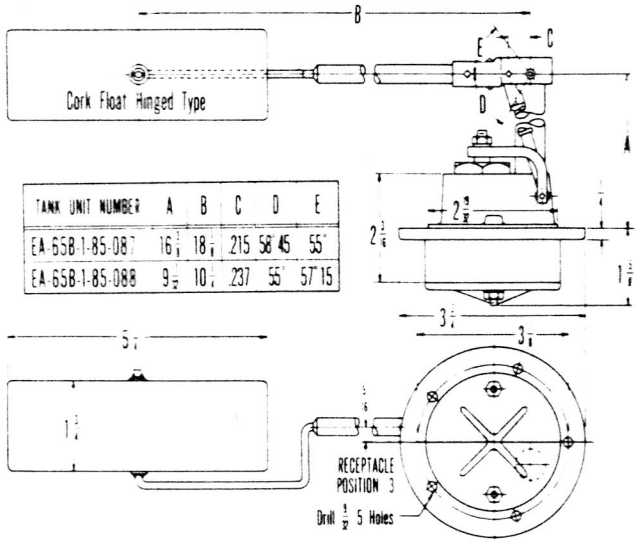


Figure 330—EA-65B Tank Units

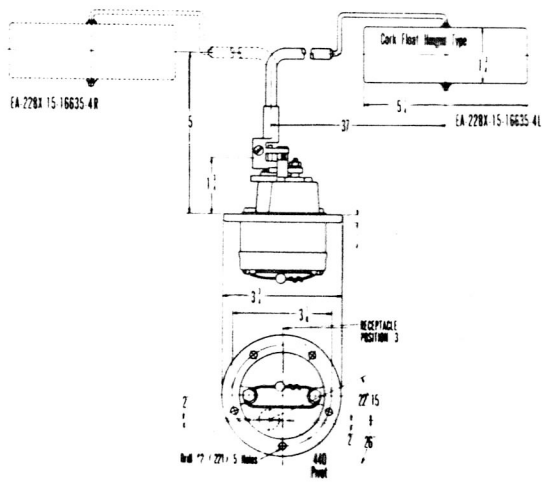


Figure 331—EA-228X-15-16635-4R and EA-228X-15-16635-4L Tank Units

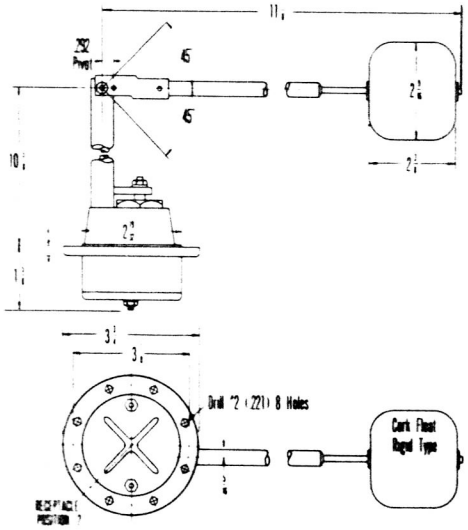


Figure 331-A-EA-15B-4238874 Tank Unit

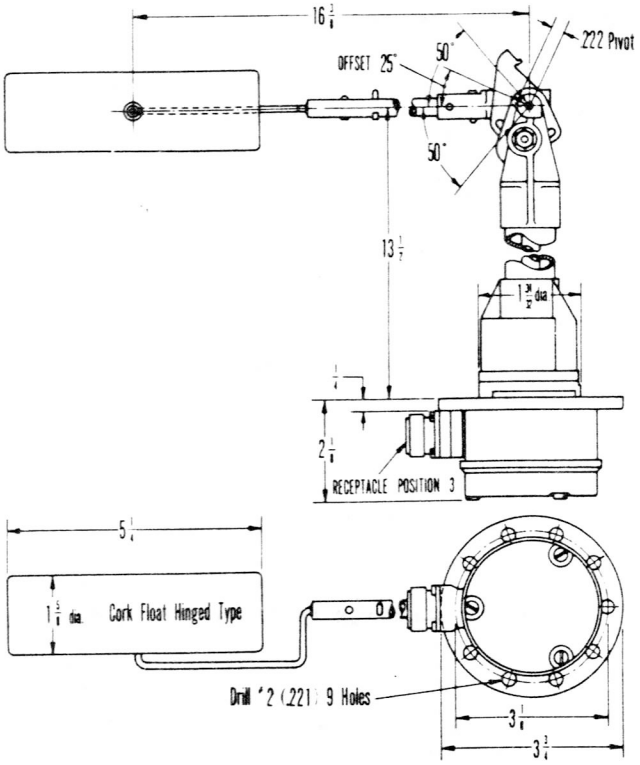


Figure 331-B—EA-529BC-310 Tank Unit

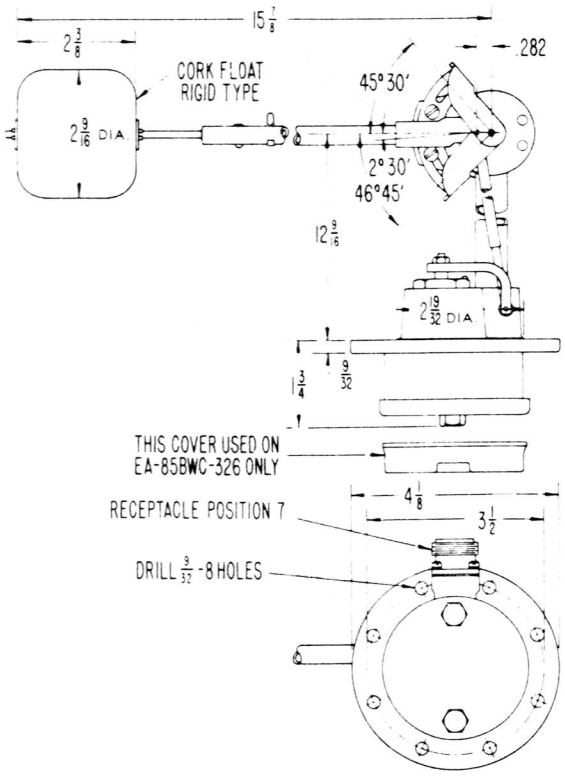


Figure 331-C-EA-85BW-587 and EA-85BWC-326 Tank Units

THE FOLLOWING ARE DRAWINGS OF DIRECT LIFT TOP AND BOTTOM MOUNT TANK UNITS

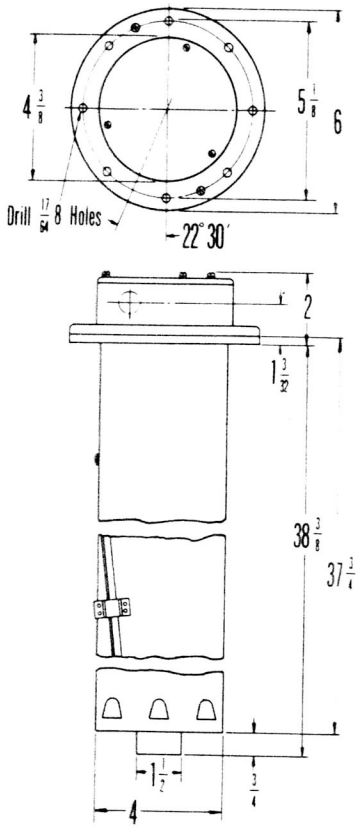
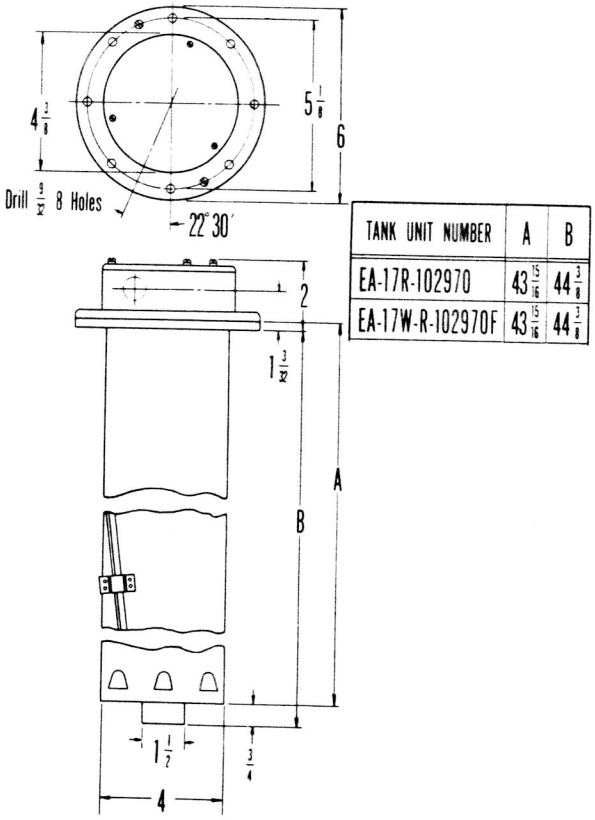
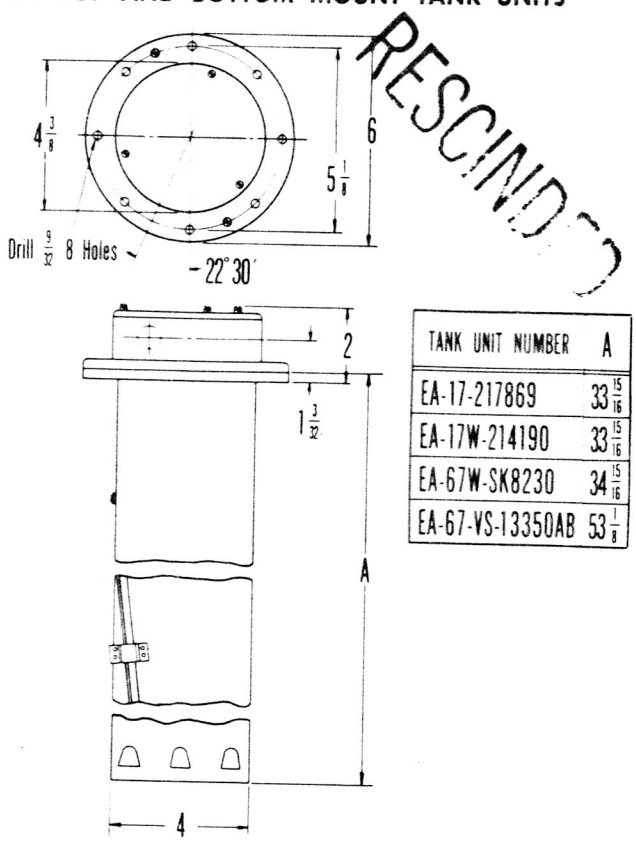


Figure 332—EA-17-F170829 Tank Unit



TANK UNIT NUMBER	A	B
EA-17R-102970	43 15/16	44 3/8
EA-17W-R-102970F	43 15/16	44 3/8

Figure 333—EA-17R and EA-17W Tank Units



TANK UNIT NUMBER	A
EA-17-217869	33 15/16
EA-17W-214190	33 15/16
EA-67W-SK8230	34 15/16
EA-67-VS-13350AB	53 1/8

Figure 334—EA-17, 17W, 67 and 67W Tank Units

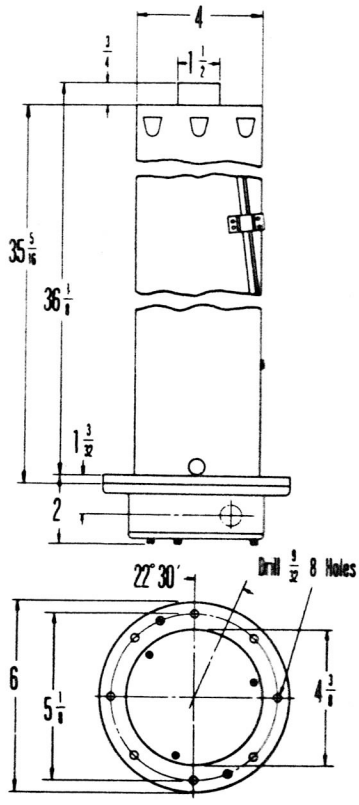


Figure 335—EA-17BW-208133 Tank Unit

RESCINDED

SECTION V
TEST PROCEDURE

1. GENERAL.

a. The following procedure covers the testing of Indicators and Dial Change Indicators for scale error, friction, power off return, warning light and correct internal wiring.

b. The instruments shall be tested in normal operating position and shall be lightly tapped before taking a test reading.

c. The instruments shall be tested with an applied voltage of either 14±0.25 volts or 28.5±1 volt depending on the design operating voltage.

2. INDICATORS.

a. TEST METHOD.

(1) SCALE ERROR.

(a) Connect instrument to circuit as indicated on the Electrical Inspection Diagram. Consult Table 8 for figure number of diagram applicable to the indicator involved.

TABLE 8

Indicator	*Figure No.*	*Indicator*	*Figure No.*
EA-100	336	EA-111	338
EA-100A	336	EA-124	339
EA-101	336	EA-134	339
EA-102	337	EA-140	336
EA-104	337	EA-143	337
EA-104A	337	EA-143A	337
EA-108	338	EA-148W	340
EA-108A	338	EA-150	336
EA-109	340		

For multiple pointer indicators with separate R +, mechanisms may be connected and tested one at a time. The procedure will be the same in each case. For FA-104 or EA-108 Indicators with common R +, the instrument must be wired completely so as to have both scales operating. Also refer to External Wiring Diagram.

Note

Common R + connections are used only in certain types of EA-104 and EA-108 Indicators. This denotes that the positive side of the transmitters (R + side) are connected together eliminating one wire. These indicators are recognizable by a four-pin receptacle instead of five.

Separate R + connections are used for all 90-degree and 120-degree indicators, except certain types of EA-104 and EA-108 indicators. This denotes that the positive side of the transmitters (R + side) are electrically separated, making each section independent of the others.

(b) Test scale at Empty, Center and Full.

CAUTION

The "Empty" and "Full" calibration points on the finished dials are not in all cases symmetrical about the center line of the scale. However, when the indicator itself is to be tested, the end points shall be checked in accordance with the following 90-degree, 120-degree or 300-degree scale as shown in Figure 341. If the "Empty" and "Full" marks on the finished dial do not coincide with the points, then adjustment to these marks are to be made in the corresponding tank unit at the time of installation.

For example, the "Full" mark on a 120-degree dial may be 5 degrees short of the 120 degree mark. When testing the indicator with a standard transmitter, the pointer travel should be from 0 to 120 degrees. When the indicator is installed the tank unit is then to be adjusted so that the pointer travels from 0 to "F" or 5 degrees short of 120 degrees.

(2) FRICTION.—The friction shall be determined by bringing the pointer slowly to some point on the dial and noting the difference in indication before and after tapping. This test may be performed at any point on the scale.

(3) POWER OFF RETURN.—To test the effect of the zero return magnets set the transmitter for 90- and 120-degree indicators at "Full" and for 300-degree indicators approximately 10-degrees off the center position. With the pointer in this position, turn power off and note behavior of the pointer. The pointer must swing off scale and come to rest outside of the scale.

b. PERFORMANCE.

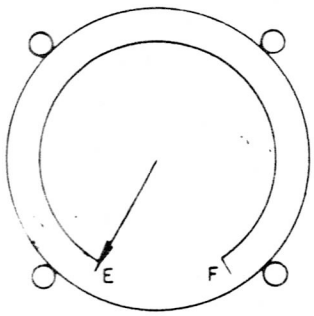
(1) SCALE ERROR.—The scale error at "Empty", "Center" and "Full" shall not exceed 2 percent of full scale or as follows:

90-degree Indicators ± 1.8°
120-degree Indicators ± 2.4°
300-degree Indicators ± 6.0°

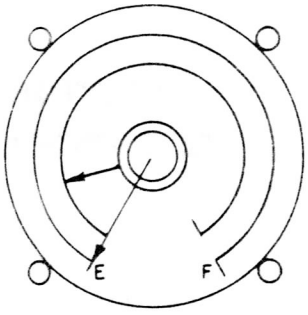
(2) FRICTION.—The friction error shall not exceed the values given in the table.

TABLE 9
ALLOWABLE FRICTION ERROR

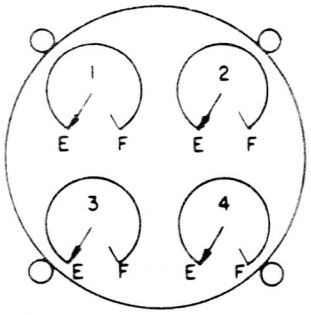
Indicator	*Maximum Friction in Mech. Degrees at Empty*	*Maximum Friction in Mech. Degrees at any other point on scale*
90°	3°	4°
120°	3°	4°
300°	3°	5°



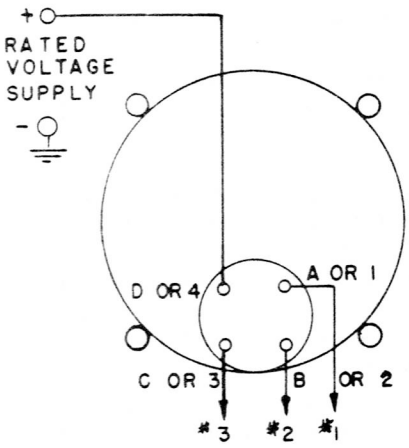
EA-100 & 100AN
EA-101 & 101 AN
EA-101A
INDICATORS

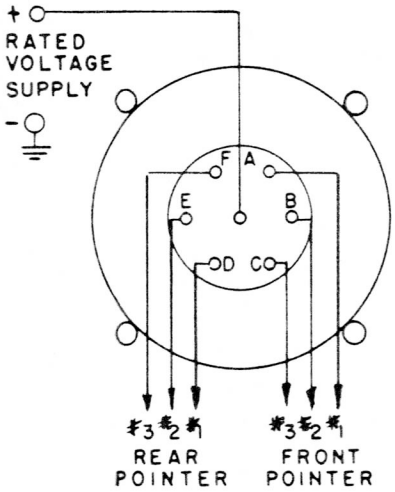


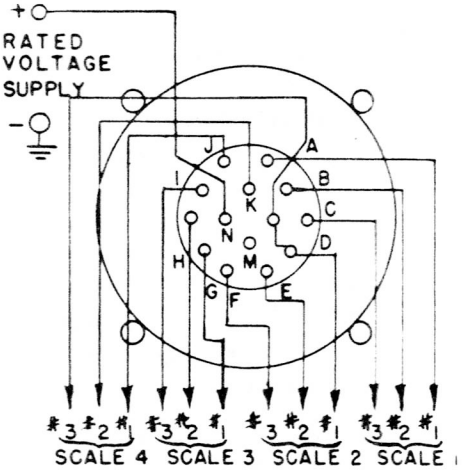
EA-150 & 150AN
EA-155AN
INDICATORS



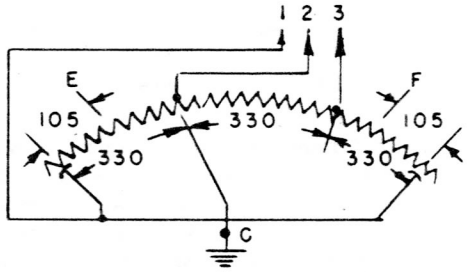
EA-140
INDICATOR



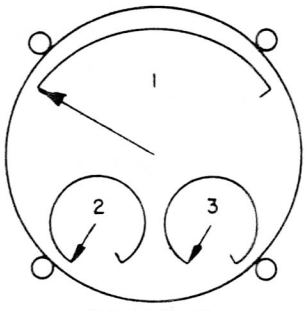




NOTE:
EACH SCALE ON ANY INDICATOR MAY BE TESTED INDIVIDUALLY CONNECT REQUIRED SCALE TO TRANSMITTER AS SHOWN ABOVE.
IF IT IS DESIRED TO OPERATE MORE THAN ONE SCALE SIMULTANEOUSLY, ADDITIONAL TRANSMITTERS MUST BE PROVIDED.



TANK UNIT TRANSMITTER
STANDARD TEST UNIT



EA-125AN
INDICATOR

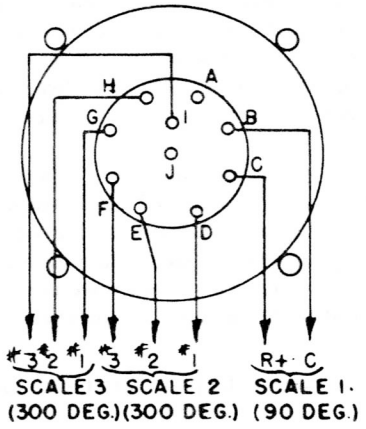


Figure 336—Electrical Inspection Wiring Diagram

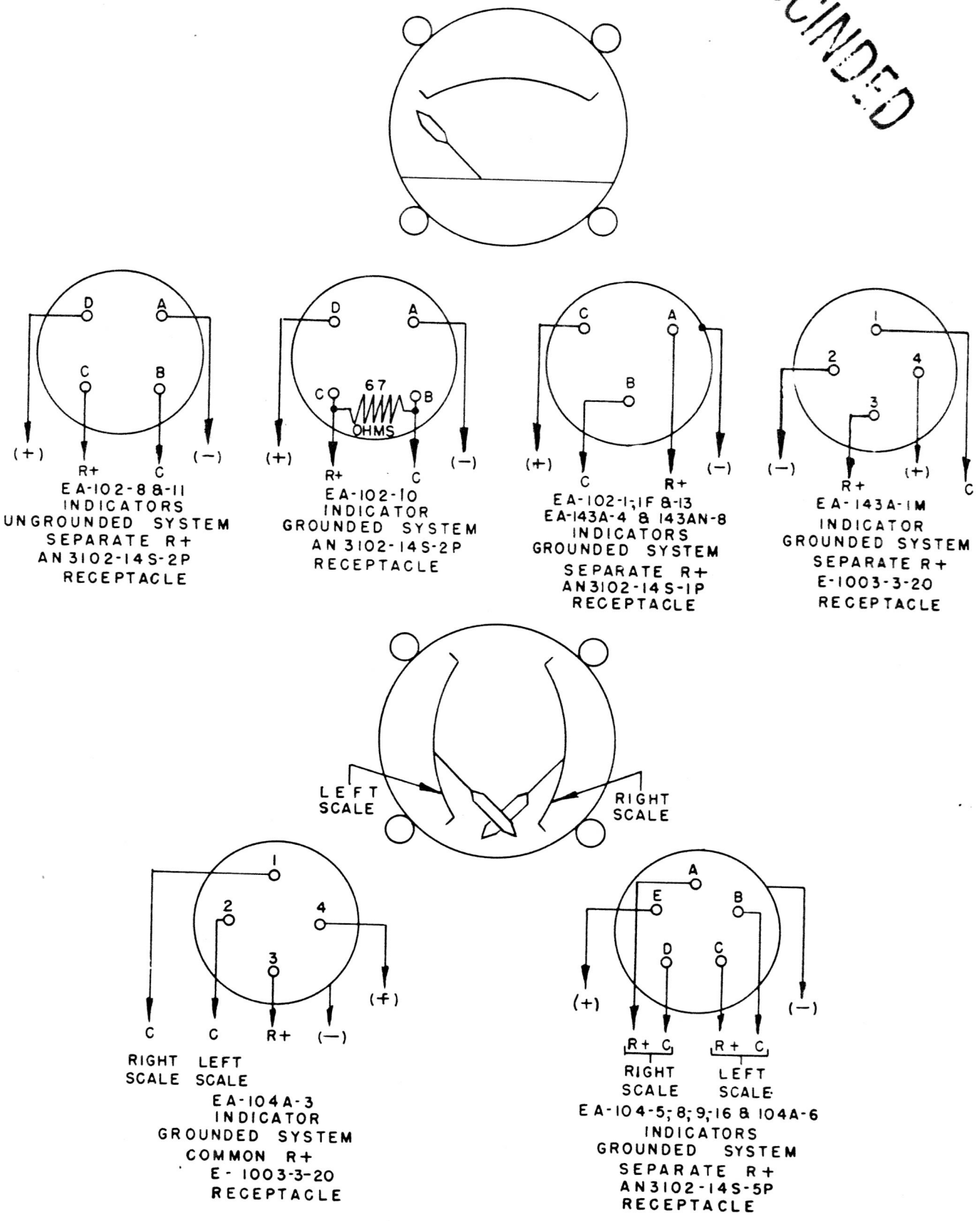


Figure 337—Electrical Inspection Wiring Diagram

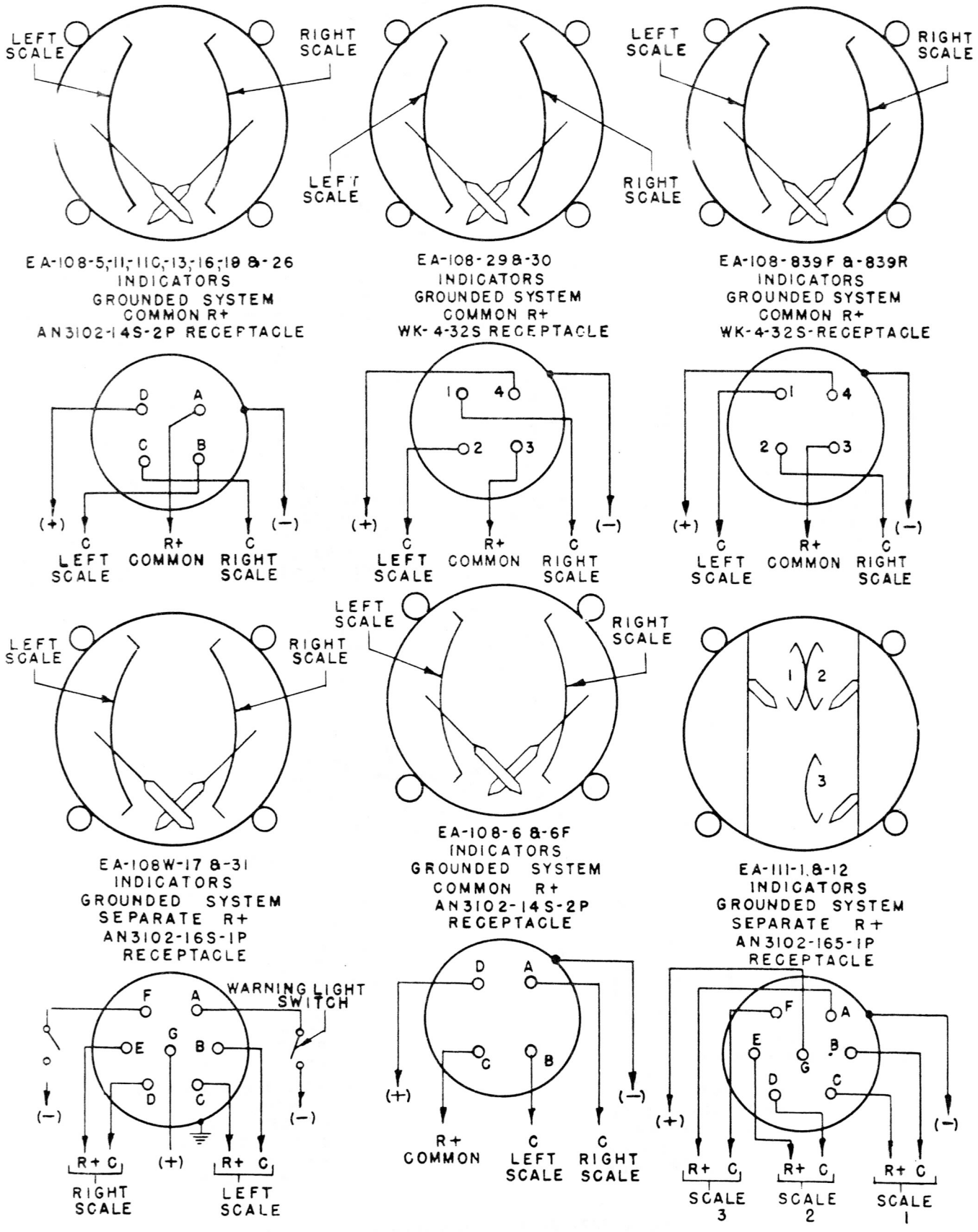
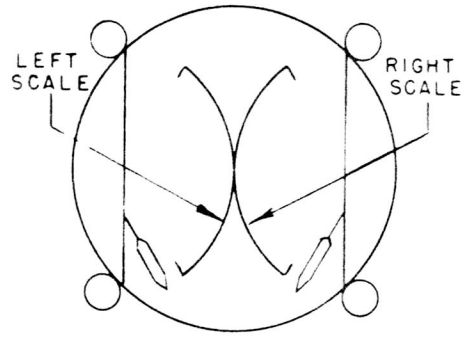
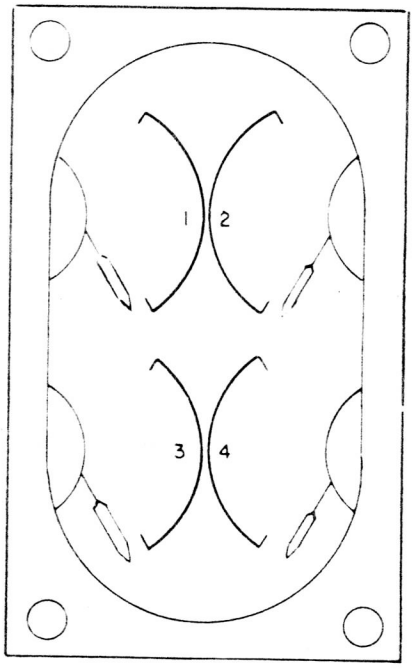
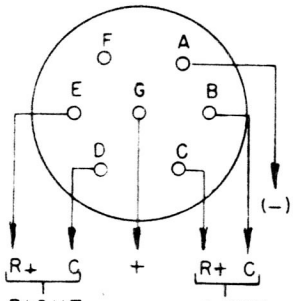


Figure 338—Electrical Inspection Wiring Diagram

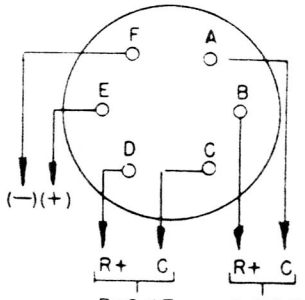
RESCINDED



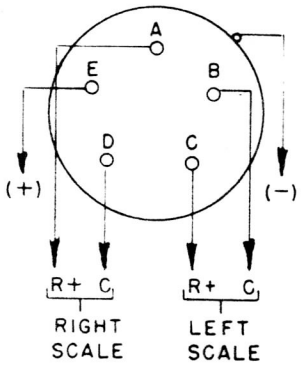




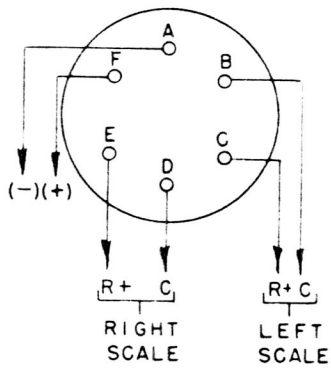
EA-124-12;13 8-14
INDICATORS
UNGROUNDED SYSTEM
SEPARATE R+
AN3102-16S-1P
RECEPTACLE



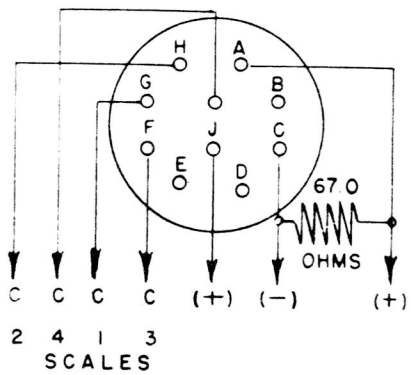
EA-124-24;25 8-26
INDICATORS
UNGROUNDED SYSTEM
SEPARATE R+
AN3102-14S-6P
RECEPTACLE



EA-124-4;8;10;11;15;29 8-30
EA-148-1;2 8-5
INDICATORS
GROUNDED SYSTEM
SEPARATE R+
AN3102-14S-5P
RECEPTACLE

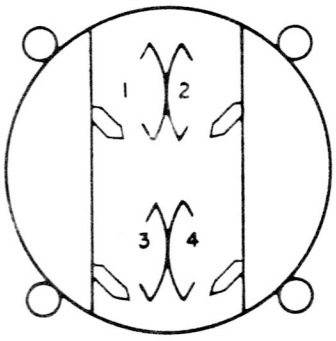


EA-148AN-19
INDICATOR
UNGROUNDED SYSTEM
SEPARATE R+
AN3102-14S-6P
RECEPTACLE

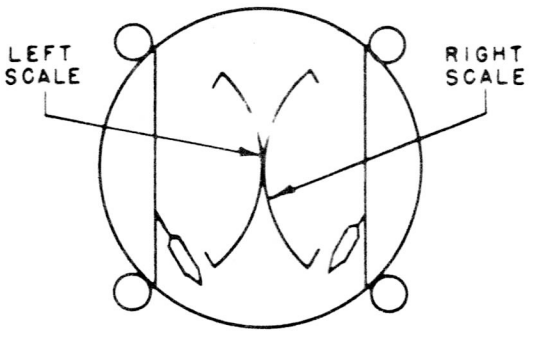


EA-134-1
INDICATOR
GROUNDED SYSTEM
COMMON R+
AN3102-18-1P
RECEPTACLE

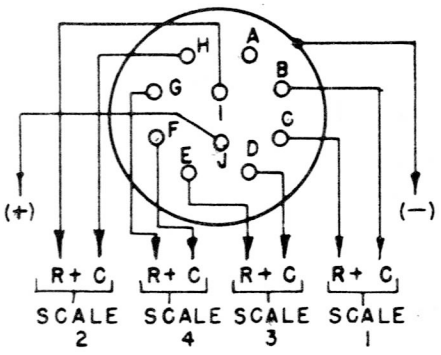
Figure 339—Electrical Inspection Wiring Diagram

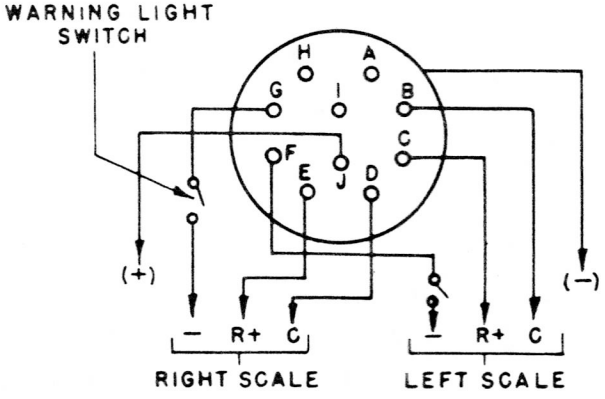


EA-109-1; 3; 48-12
INDICATORS
GROUNDED SYSTEM
SEPARATE R+
AN3102-18-1P
RECEPTACLE



EA-148W-3
INDICATOR
GROUNDED SYSTEM
SEPARATE R+
AN3102-18-1P
RECEPTACLE





THE FOLLOWING NOTES AND CHART APPLY TO FIGURES 337,-338,-339 & 340

NOTES:-

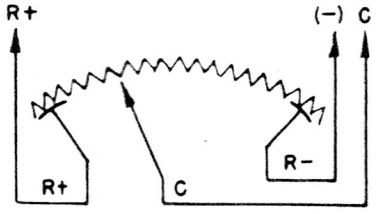
EACH SCALE ON ANY INDICATOR NOTED AS "SEPARATE R+" MAY BE TESTED INDIVIDUALLY. CONNECT REQUIRED SCALE TO TRANSMITTERS AS SHOWN ABOVE. IF IT IS DESIRED TO OPERATE MORE THAN ONE SCALE SIMULTANEOUSLY ADDITIONAL TRANSMITTERS MUST BE PROVIDED.

EA-104 & EA-108 INDICATORS WITH "COMMON R+" TWO TRANSMITTERS OR THE EQUIVALENT MUST BE CONNECTED WHEN TESTING.

NORMAL VOLTAGE ACROSS TRANSMITTER BETWEEN R+ AND R- IS 10.8 VOLTS WITH TRANSMITTER AT EMPTY.

(+) DENOTES INDICATOR VOLTAGE AS SPECIFIED ON NAMEPLATE.

TANK UNIT TRANSMITTER
OR
STANDARD TEST UNIT



CALIBRATION DATA

POTENTIOMETER POSITION	POTENTIOMETER RESISTANCE	
	C TO R+	C TO R-
EMPTY	16.8	184.2
CENTER	100.5	100.5
FULL	184.2	16.8

Figure 340—Electrical Inspection Wiring Diagram

RESCINDED

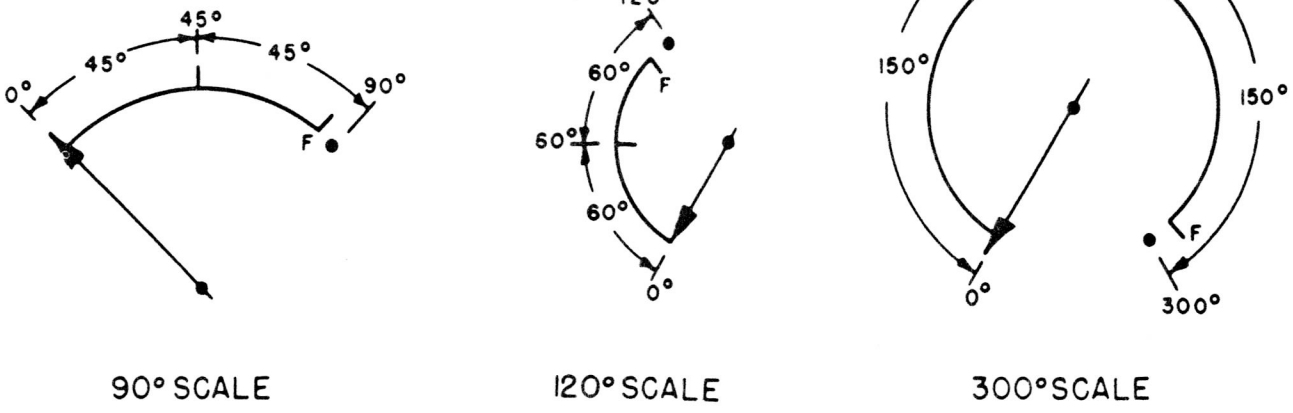


Figure 341—Calibration Scales

3. DIAL CHANGE INDICATORS.

a. TEST METHOD.

(1) SCALE ERROR.

(a) Connect indicator in test circuit as indicated in table 10. Refer to electrical inspection diagram, figure 342, for typical example. The standard transmitter is the same as that shown in figure 340. In all cases use dial change position 1 for scale error test.

EXAMPLE—To test EA-46W-1 Dial Change Indicator (see figure 342).

1. Connect 100 ohm resistor across "R+" and "R—" terminals of standard transmitter.

2. Connect 28.5 volt power supply to "I" pin of Dial Change Indicator.

3. Connect "R+" of standard transmitter to "J" pin of Dial Change Indicator.

4. Turn selector switch of Dial Change Indicator to "L.H." position.

5. Connect "C" terminal of standard transmitter to "F" pin of Dial Change Indicator.

6. Ground "R—" of standard transmitter and receptacle shell of Dial Change Indicator. Since dial change is equipped with a warning light, connect "C" pin to ground through a switch.

(b) Test scale at Empty, Center and Full.

CAUTION

The standard length of the scale for Dial Change Indicators is 65 degrees, 32.5 degrees on each side of the vertical center line. However, the "Empty", and "Full" calibration points of the finished dials do not in all cases coincide with the standard scale length. For example, the "Full" calibration mark of a finished dial may be located more or less than 32.5 degrees to the right of the vertical center line. In testing for the scale error of the instrument, the standard points shall be used as follows:

Empty	32.5 degrees to left of vertical center line.
Center	On vertical center line.
Full	32.5 degrees to right of vertical center line.

(2) FRICTION.—The friction shall be determined by bringing the pointer slowly to some point on the dial and noting the difference in indication before and after tapping. This test may be performed at any point on the scale.

(3) POWER OFF RETURN.—Set the standard transmitter at "Full" position and turn power off. Note for proper return of pointer to a position below the empty calibration mark of the dial.

(4) WARNING LIGHTS.

(a) If it is only required to know whether the warning light bulb is operating, connect power supply to appropriate pin on Dial Change Indicator as indicated on table 10 and ground instrument.

EXAMPLE: To test EA-46W-1 Dial Change Indicator:

1. Connect 28.5 volts power supply to "I" pin of Dial Change Indicator.

2. Ground receptacle shell of Dial Change Indicator.

(b) Press "Push to Test" button and note if lamp glows.

(5) INTERNAL WIRING.

(a) If it is required to check the internal wiring of the Dial Change Indicator for different positions of the selector switch connect indicator in test circuit as indicated in table 10, for position 1. Refer to electrical inspection diagram, figure 342, for typical example. Test for general proper operation of the indicator. If Dial Change Indicator is equipped with warning light, operate ground switch on and off and note if bulb glows.

(b) Set Dial Change selector switch to position 2 and connect "C" terminal of standard transmitter and warning light switch (if applicable) to the appropriate pins of the Dial Change Indicator as indicated in table 10. Refer to electrical inspection diagram, figure 342, for typical example. Test for general proper operation of pointer and warning light.

(c) Switch to all other positions on the indicator as indicated in table 10 and repeat test as above.

EXAMPLE: To test EA-46W-1 Dial Change (see figure 342).

1. Connect indicator in circuit as outlined in section *a.*(1)*(a)*. Operate the standard transmitter to see that the pointer moves properly across the dial in the proper direction. Operate ground switch, and note that warning light glows.

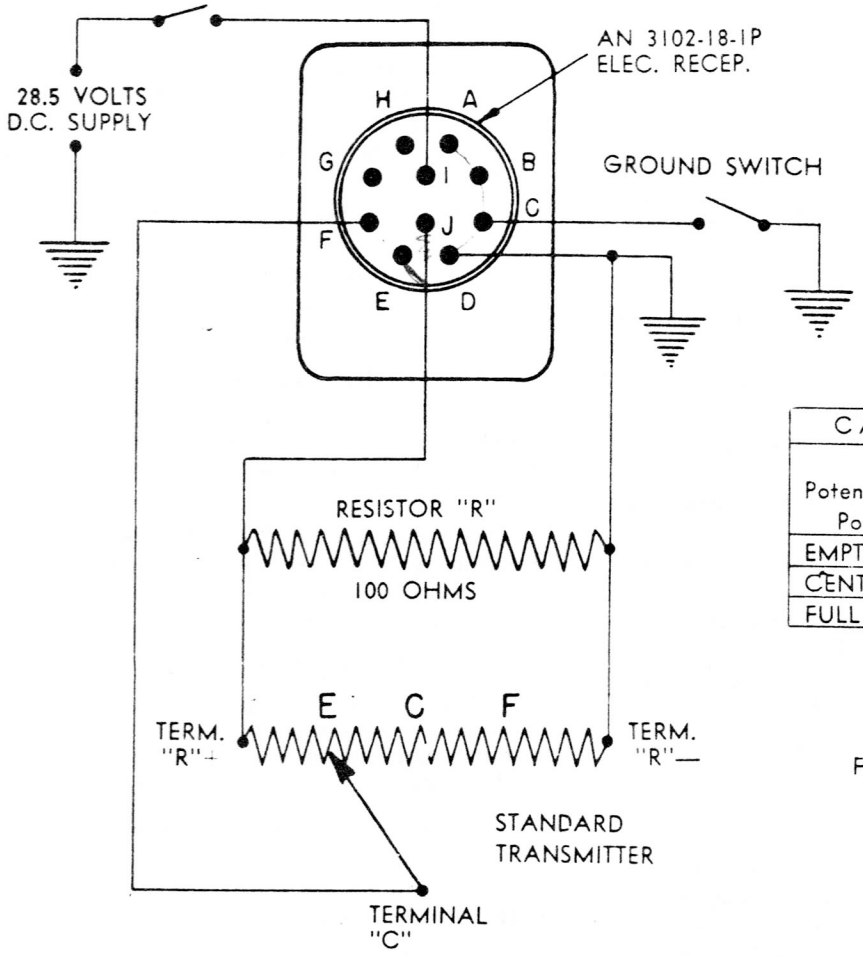
2. Switch Dial Change Indicator to "R.H." (position 2). Disconnect "C" terminal of standard transmitter from "F" pin (position 1) to "E" pin (position 2). Disconnect ground switch from "C" pin (position 1) to "B" pin (position 2). Repeat tests as in *(c)1.*

3. Switch Dial Change Indicator to "AUX" (position 3). Disconnect "C" terminal of standard transmitter from "E" pin (position 2) to "D" pin (position 3). Disconnect ground switch from "B" pin (position 2) and connect to "A" pin (position 3). Repeat tests as in *(c)1.*

b. PERFORMANCE.

(1) SCALE ERROR.—The scale error at "Empty", "Center" and "Full" shall not exceed 2 percent of full scale or ±1.3 degrees.

(2) FRICTION.—The friction error shall not exceed 2 degrees at Empty or 3 degrees at any other point on the scale.



CALIBRATION DATA		
Potentiometer Position	Potentiometer Resistance	
	C to R ·	C to R—
EMPTY	16.8	184.2
CENTER	100.5	100.5
FULL	184.2	16.8

FOR FURTHER REFERENCE SEE FIGURE 340

Figure 342—Typical Electrical Inspection Diagram

TABLE 10

RESCINDED

Dial Change Indicator	Positions	Receptacle	Resistors "R"	Connect to (+) Term.	Connect to R+ Term.	POSITION No. 1			POSITION No. 2			POSITION No. 3			POSITION No. 4			POSITION No. 5			POSITION No. 6			POSITION No. 7		
						Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch	Index Plate Position	Connect to "C" Term.	Connect to Warning Light Switch
EA-41A-1	7	AN3102-18-1P	35 ohms	I	J	Left Wing	E	None	Right Wing	C	None	L. Bomb Bay	F	None	R. Bomb Bay	B	None	Fwd. Hull	G	None	Center Hull	H	None	Rear Hull	A	None
EA-41A-2	7	AN3102-18-1P	35 ohms	I	J	Left Wing	E	None	Right Wing	C	None	L. Bomb Bay	F	None	R. Bomb Bay	B	None	Fwd. Hull	G	None	Center Hull	H	None	Rear Hull	A	None
EA-46W-1	3	AN3102-18-1P	100 ohms	I	J	L. H.	F	C	R. H.	E	B	Aux.	D	A	——	–	——	——	–	——	——	–	——	——	–	——
EA-47-1-24	6	E-1003-1-10	40 ohms	T	D	1	S	None	2	V	None	3	R	None	4	U	None	5	N	None	6	M	None	——	–	——
EA-47-2C	6	AN3102-20-1P	40 ohms	N	A	L. H. Feeder	H	None	1	I	None	2	J	None	3	K	None	4	L	None	R. H. Feeder	M	None	——	–	——
EA-47-10	6	E-1003-1-10	40 ohms	T	D	1	S	None	2	V	None	3	R	None	4	U	None	5	N	None	6	M	None	——	–	——
EA-47W-1	6	E-1003-1-10	40 ohms	T	D	1	S	J	2	V	F	3	R	K	4	U	H	5	N	E	6	M	G	——	–	——
EA-47W-1-24	6	E-1003-1-10	40 ohms	T	D	1	S	J	2	V	F	3	R	K	4	U	H	5	N	E	6	M	G	——	–	——
EA-47W-2	6	AN3102-20-1P	40 ohms	N	A	L. H. Feeder	H	B	1	I	C	2	J	D	3	K	E	4	L	F	R. H. Feeder	M	G	——	–	——
EA-47W-2C	6	AN3102-20-1P	40 ohms	N	A	L. H. Feeder	H	B	1	I	C	2	J	D	3	K	E	4	L	F	R. H. Feeder	M	G	——	–	——
EA-47W-2V	6	AN3102-20-1P	40 ohms	N	A	L. H. Feeder	H	B	1	I	C	2	J	D	3	K	E	4	L	F	R. H. Feeder	M	G	——	–	——
EA-47W-4	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-47W-6	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-47W-7	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-47W-8 not used	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-47AW-4	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-47AW-5	6	AN3102-20-1P	40 ohms	N	A	1	H	B	2	I	C	3	J	D	4	K	E	5	L	F	6	M	G	——	–	——
EA-48-5	4	AN3102-16S-1P	67 ohms	G	E	Left Aux.	D	None	Left Main	A	None	Right Main	B	None	Right Aux.	C	None	——	–	——	——	–	——	——	–	——
EA-48-5-24	4	AN3102-16S-1P	67 ohms	G	E	Left Aux.	D	None	Left Main	A	None	Right Main	B	None	Right Aux.	C	None	——	–	——	——	–	——	——	–	——
EA-48-12	4	AN3102-16S-1P	67 ohms	G	E	Left Aux.	D	None	Left Main	A	None	Right Main	B	None	Right Aux.	C	None	——	–	——	——	–	——	——	–	——
EA-48-12-24	4	AN3102-16S-1P	67 ohms	G	E	Left Aux.	D	None	Left Main	A	None	Right Main	B	None	Right Aux.	C	None	——	–	——	——	–	——	——	–	——
EA-48-13	4	AN3102-16S-1P	67 ohms	G	E	Aux. Esq.	D	None	Principal Esq.	A	None	Principal Dir.	B	None	Aux. Dir.	C	None	——	–	——	——	–	——	——	–	——
EA-48-15	4	AN3102-16S-1P	67 ohms	G	E	1	D	None	2	A	None	3	B	None	4	C	None	——	–	——	——	–	——	——	–	——
EA-48-16	4	AN3102-18-1P	67 ohms	I	J	3	G	None	4	H	None	1	E	None	2	F	None	——	–	——	——	–	——	——	–	——
EA-48-17T	4	AN3102-18-1P	67 ohms	I	J	3	G	None	4	H	None	1	E	None	2	F	None	——	–	——	——	–	——	——	–	——
EA-48W-14	4	AN3102-18-1P	67 ohms	J	A	Left Outbd.	F	B	Left. Inbd.	G	C	Rt. Inboard	H	D	Rt. Outbd.	I	E	——	–	——	——	–	——	——	–	——
EA-48W-18	4	AN3102-18-1P	67 ohms	J	A	Left Outbd.	F	B	Left. Inbd.	G	C	Rt. Inboard	H	D	Rt. Outbd.	I	E	——	–	——	——	–	——	——	–	——
EA-48AW-1	4	AN3102-18-1P	67 ohms	I	J	1	E	D	2	F	C	3	G	B	4	H	A	——	–	——	——	–	——	——	–	——
EA-48AW-2	4	AN3102-18-1P	67 ohms	I	J	1	E	D	2	F	C	3	G	B	4	H	A	——	–	——	——	–	——	——	–	——
EA-48AW-6	4	AN3102-18-1P	67 ohms	I	J	1	E	D	2	F	C	3	G	B	4	H	A	——	–	——	——	–	——	——	–	——
EA-49-4	4	AN3102-20-1P	67 ohms	N	A	L. H. Front	G	None	R. H. Rear	H	None	L. H. Rear	I	None	R. H. Front	J	None	——	–	——	——	–	——	——	–	——
EA-49W-1	5	E-1003-1-10	50 ohms	T	D	1	S	J	2	V	F	3	R	K	4	U	H	5	N	E	——	–	——	——	–	——
EA-49AW-2	4	E-1003-1-10	67 ohms	T	D	L. H. Main	S	J	R. H. Aux.	V	F	L. H. Aux.	R	K	R. H. Main	U	H	——	–	——	——	–	——	——	–	——
EA-49AW-3	4	E-1003-1-10	67 ohms	T	D	L. H. Front	S	J	R. H. Rear	V	F	L. H. Rear	R	K	R. H. Front	U	H	——	–	——	——	–	——	——	–	——
EA-49AW-7	5	AN3102-20-1P	50 ohms	N	A	1	G	B	2	H	C	3	I	D	4	J	E	5	K	F	——	–	——	——	–	——