

B171
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B175

INSTRUCTIONS

KELMAN TYPE 15RA2-B6

OIL CIRCUIT BREAKER

WITH

SOLENOID OPERATING MECHANISM STYLE L-1403

FOR ARIZONA PUBLIC SERVICE CO.

<u>CONTRACT</u>	<u>KELMAN SO</u>	<u>OCB SER NO</u>	<u>DATE</u>
23642	29798	28698-99	12-28-53

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FOR BUSHING TYPE CT KELMAN TYPE XE600 AND XE1200

6/7/54

KELMAN ELECTRIC & MFG. CO.
LOS ANGELES, CALIFORNIA

S-30311

KELMAN TYPE 15RA2-B, 600 AMPERE OIL CIRCUIT BREAKER

GENERAL INFORMATION

Voltage Rating	15,000 Volts
Maximum Continuous Current	600 Amperes
Rated Interrupting Capacity	250,000 KVA
Maximum Interrupting Rating at Rated Voltage	10,000 Amperes
Maximum Interrupting Rating	25,000 Amperes
Momentary Current Rating	40,000 Amperes
4 Second Current Rating	25,000 Amperes
Number of Poles	3
Number of Breaks per Pole	2
Gallons of Oil per breaker	130
Net Weight of Oil	975 Pounds
Net Weight of Breaker without Oil	2,600 Pounds
Solenoid Closing Current (125V.DC)	15 Amperes
Solenoid Closing Current (48V.DC)	26 Amperes
Tripping Current (125V.DC)	6 Amperes
Tripping Current (48V.DC)	14 Amperes

BUSHINGS - Kelman, D-3488

CLOSING COIL - Kelman Type CL-117H (230V.AC rectifier oper.)
CL-117A (125V.DC)
CL-117D (48V.DC)

OPENING COIL - Kelman Type CL-111B (125V.DC)
CL-111C (48V.DC)

INSTALLATION OF BREAKER

The breaker has been completely assembled and tested at the factory, however, it is important that the following instructions are followed when installing the breaker in its permanent location:

1. All breakers are shipped in the closed position with the toggle of the operating mechanism wired closed. Remove wire and trip breaker by means of the hand trip. Guard against accidental electrical or hand tripping of the breaker while making the following adjustments.

2. LEVELING OF BREAKER

Lower tank and plumb MOVING CONTACT RODS shown on drawing "Cross Section of Breaker". Shim under base of breaker as required.

3. ALIGNMENT OF CONTACTS

Refer to drawing "Cross Section of Breaker".

Close breaker slowly by means of the hand closing device. Observe the alignment of the STATIONARY CONTACTS entering the DETHERMALIZER ASSEMBLY. If any misalignment is present, adjustment can be made by loosening the bolts on the SUPPORT FOR CONTACT and shifting the STATIONARY CONTACT to the desired position.

4. CONTACT ADJUSTMENT

Refer to drawing "Cross Section of Breaker".

- a. When breaker is in the closed position, the dimension from the top of the MOVING CONTACT NUT to the bottom of the MOVING CONTACT must agree with the dimension shown on the drawing. Screw nuts up or down as required.
- b. The dimension from the bottom of the STATIONARY CONTACT LOCKNUT to the top of the DETHERMALIZER ASSEMBLY must agree with the dimension shown on the drawing. If adjustment is required, loosen locknut on MOVING CONTACT ROD ADJUSTING STUD and turn adjusting stud in desired direction.
- c. The dimension from the bottom of the DETHERMALIZER SUPPORT to the bottom of the MOVING CONTACT must agree with the dimension shown on the drawing. This dimension may be obtained by loosening the STATIONARY CONTACT LOCKNUT and turning the STATIONARY CONTACT to the left or right as required.

5. TRAVEL ADJUSTMENT

Refer to drawing "Cross Section of Breaker".
The total travel of the DETHERMALIZER ASSEMBLY should agree with the dimension shown on the drawing.

- a. To check travel, mark the MOVING CONTACT ROD at the bottom of the MOVING CONTACT ROD GUIDE when the breaker is in the closed position.
- b. Open breaker and measure distance between the mark and the bottom of MOVING CONTACT ROD GUIDE.
- c. If the travel is not correct, adjust upper STOP NUTS up or down on ROD FOR KICKOUT SPRING in the solenoid mechanism.

6. TRIAL SETTING OF KICKOUT SPRING

Set KICKOUT SPRING, shown on drawing "Assembly of Solenoid" to compress about $3/8$ ". This is a trial setting only.

7. Check operating mechanism according to adjustments found in another section of this bulletin.
8. With minimum operating voltage for solenoid mechanism close the breaker.
9. Operate breaker several times, then recheck settings.
10. Replace tank and fill with oil.
11. Adjust KICKOUT SPRING, shown on "Assembly of Solenoid", so that the breaker will close positively at minimum operating voltage. Use maximum spring compression consistent with this requirement.

OIL

The breaker should be filled with a reliable oil suitable for oil circuit breakers such as Avon Transformer Oil or Shell Diala AX. Samples of oil should be drawn from the bottoms of the tanks at regular intervals to ascertain if there is foreign matter present. After several heavy short circuits it may be necessary to filter the oil.

SPARE PARTS

When ordering parts always give the serial numbers of the breaker and operating mechanism as well as the part number.

CONNECTIONS

A wiring diagram for the current transformers and control circuits is shipped with each breaker inside the mechanism housing.

STORAGE

It is important to bear in mind at all times that moisture is detrimental to the Dethermalizers (arc quenchers). In the event a breaker is purchased for stock or is not placed in service within one month (allow only 10 days during damp weather) proper precaution must be taken to prevent the absorption of moisture. Dethermalizers already installed in the breakers are best protected if the tanks are filled with clean, moisture free transformer oil in sufficient depth to cover the Dethermalizers. Spare Dethermalizers ordered for stock are always shipped in waterproof bags containing silica gel as the drying agent. It is suggested that when received, the bags be inspected for damage during shipment. If a bag has been punctured, the following steps should be taken:

1. Remove the Dethermalizer and dry thoroughly at temperatures not to exceed 158° F.
2. Dry and repair the bag.
3. Replace the Dethermalizer in the bag and add new silica gel.
4. Reseal the bag by pressing the edges together with a hot iron.

Occasional inspection of stored Dethermalizers is also suggested to be sure of proper preservation while in stock.

LUBRICATION

No lubrication is required.

ADJUSTMENTS FOR SOLENOID OPERATING MECHANISM

These adjustments should be made after the breaker contacts have been correctly adjusted.

Refer to drawing "Assembly of Solenoid".

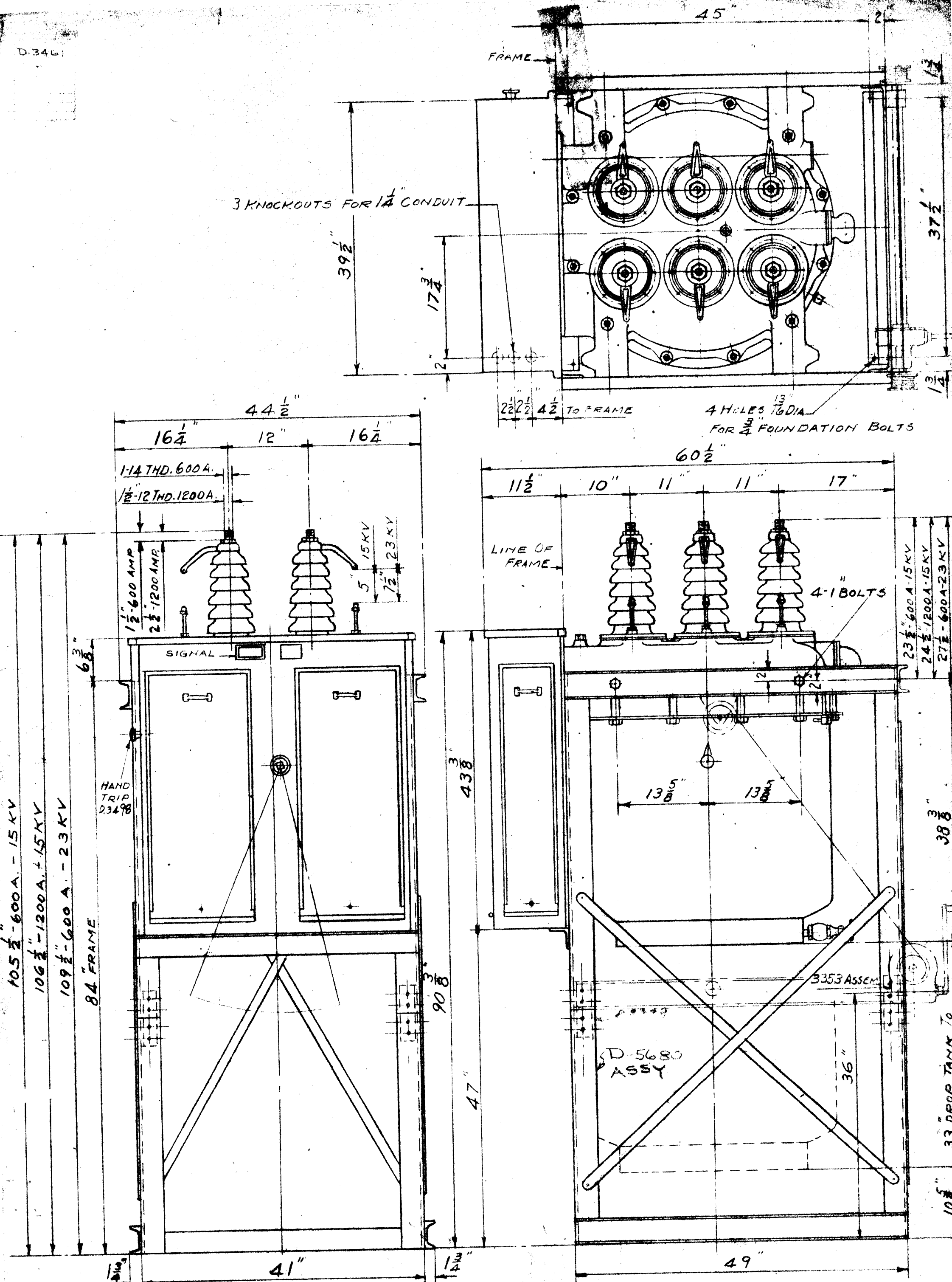
1. Close the breaker manually and check operation of AUXILIARY SWITCHES. The OVERTRAVEL SPRINGS should be adjusted so that positive operation is obtained upon opening or closing. Positive operation is indicated by a snapping action after the auxiliary switch contacts have touched.
2. If the operating mechanism fails to latch, that is, if one or both LATCHES fail to seat completely under the LOWER TOGGLE PIN, follow adjustments 3 and 4.
3. If the LATCHES do not seat at the same time, loosen the locknuts on the ECCENTRIC PINS FOR LATCH and rotate these PINS until the LATCHES are even. Tighten locknuts.
4. The overtravel between the LOWER TOGGLE PIN and the LATCHES should be $1/32$ inch when the SOLENOID PLUNGER is raised as high as possible by means of the hand closing device. Adjustment is made with the mechanism in the open position by loosening the CLAMP SCREW FOR YOKE and turning the SOLENOID PLUNGER by means of a spanner wrench inserted in the bottom of the SOLENOID PLUNGER. Tighten CLAMP SCREW FOR YOKE after $1/32$ inch overtravel has been obtained.
5. The TRIP COIL ASSEMBLY should be located so that there is about $1/8$ inch gap between the KICKOUT BAR of the TRIP COIL ASSEMBLY and the TRIP PIN FOR TOGGLE.
6. Trip the breaker and observe the retarding action of the OPENING DASHPOT. The breaker should open fast and come to rest without a bounce or a delay. If the breaker tends to bounce, increase the dashpot effect by unscrewing the DASHPOT ROD from the ROD END a turn or two at a time until smoothest action is obtained. If the OPENING DASHPOT checks too soon and there is a delay before the breaker is fully open, screw the DASHPOT ROD into the ROD END a few turns.
7. The thermostat in the mechanism housing should normally be set at 70°F .

FLUID FOR DASHPOTS

All Kelman dashpots and fluid timing devices use Dow Corning Silicone Fluid, Type DC 200, Viscosity Grade:10 centistokes.

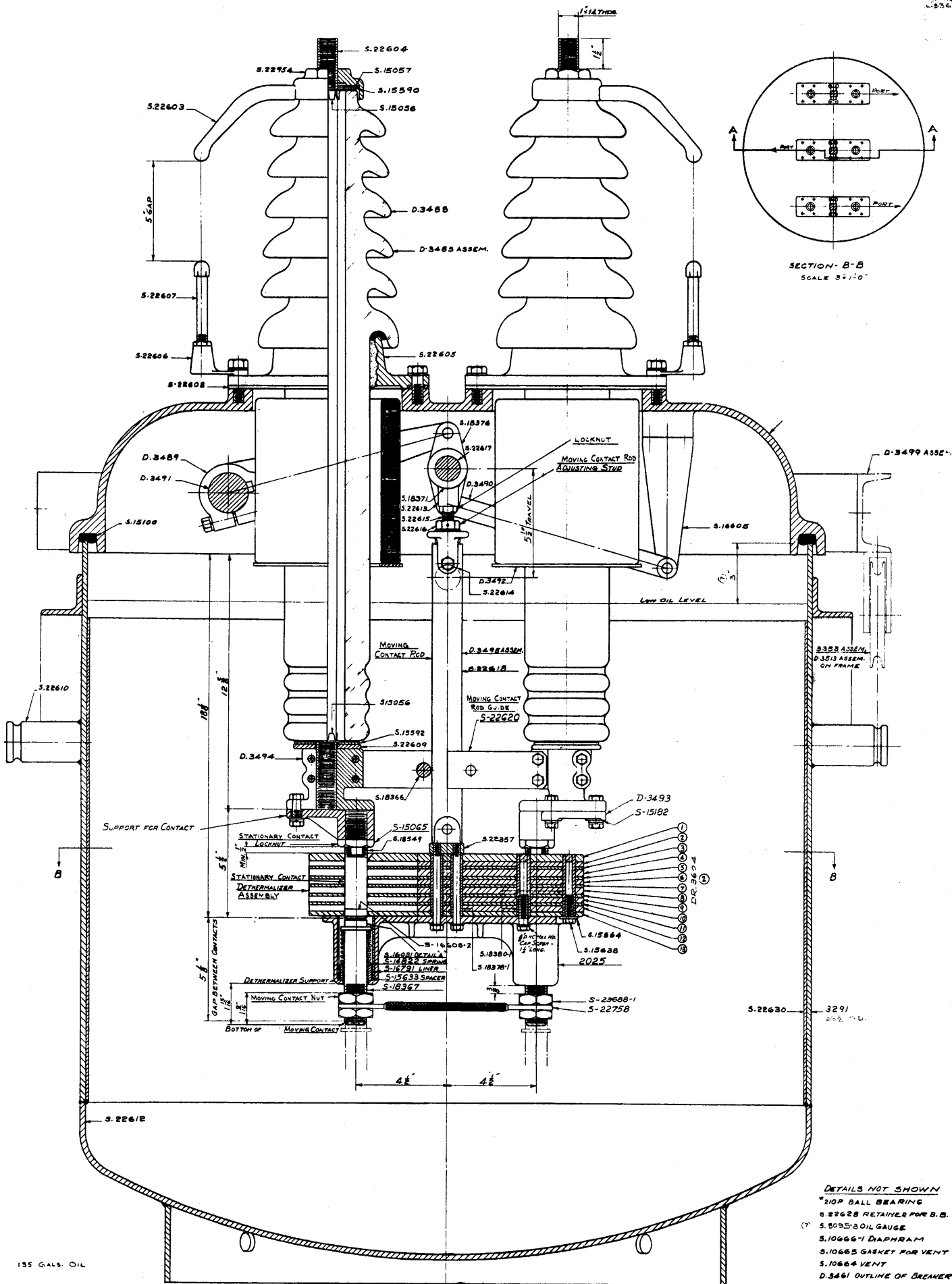
LUBRICATION

No lubrication is required.



D-3499 FRAME ASSY FULL
HEIGHT
D-5680 FRAME ASSY

ML-001 FRAME
ML-43 1/2" x 50 1/2"
1ST. S.O 27328 No D-5681
NAME OUTLINE OF BREAKER
FOR TYPE 15RA2 B 600A/1200A & 23RA2A 600A



3. REMEDY PART NAMES FOR INSTRUCTIONS 7-17-52
 4. ADD: SERIES OF PUMPS FOR INSTRUCTIONS 8-8-52
 5. 3. ADD: 8.8055-3 WAS 8.22611
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SECTION AA

15RA2-B 600 AMR 15KV

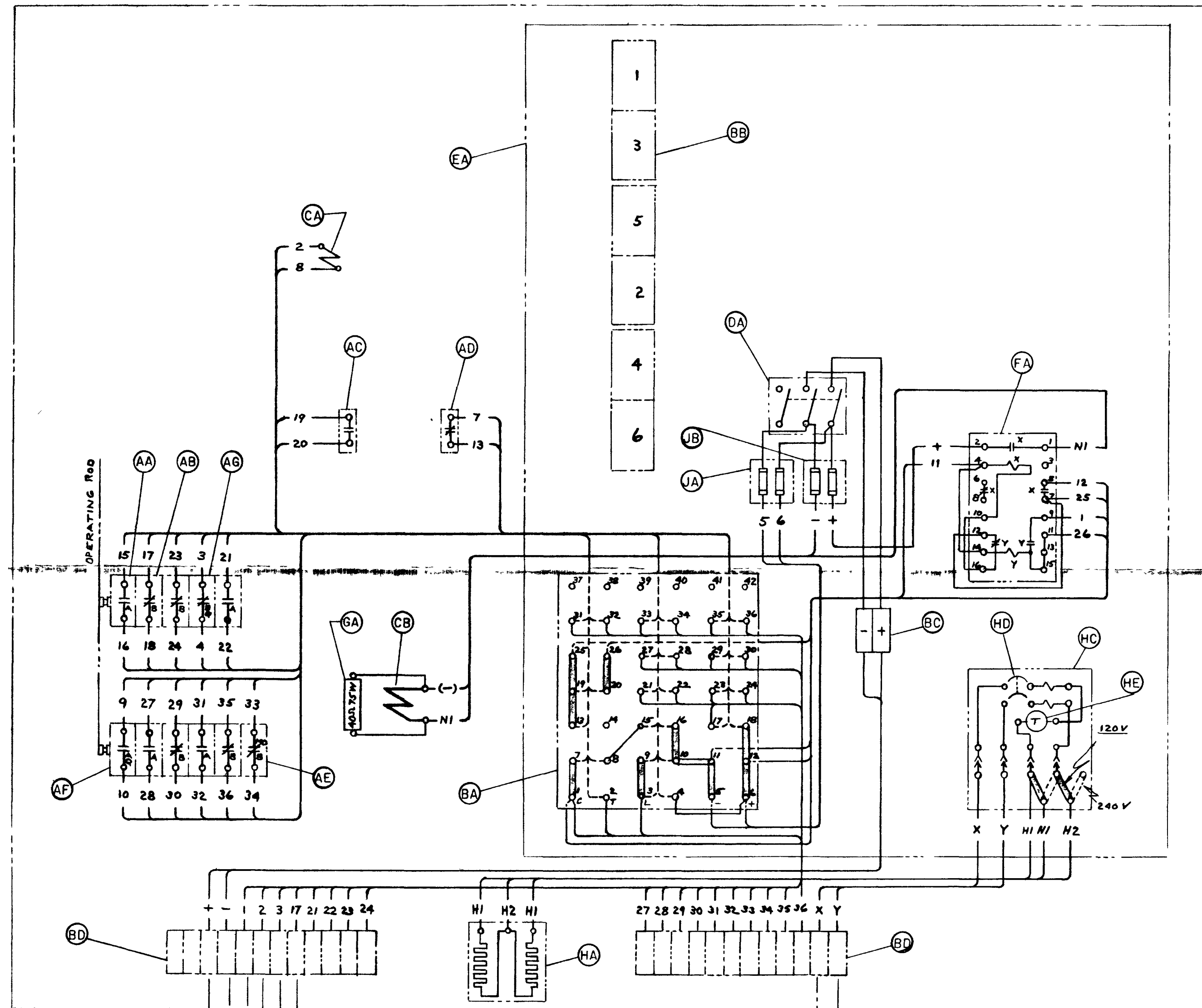
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USE PHOTO PRINT

M.L. 101 MATERIAL LIST TANK LIFTER

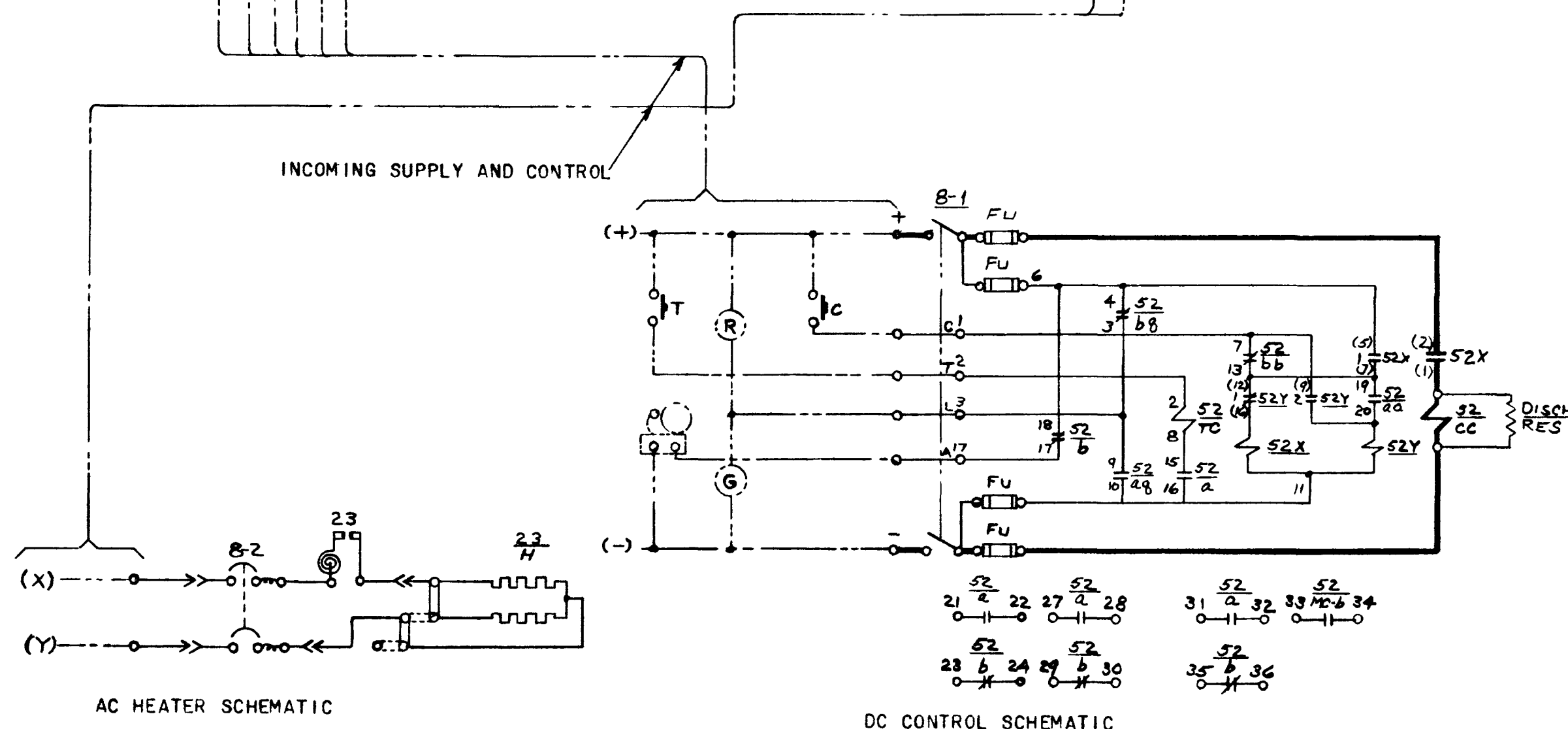
SCALE 6"=1'-0"

REV. 0.00.00	REV. 0.00.00
NAME ASSEMBLY OF BREAKER	FOR 15RA2-B 600 AMR 15KV
DATE 08-28-52	TRIAL
NAME	KELMAN ELECTRIC & MFG. CO.
LOS ANGELES, CAL.	



ITEM	DESCRIPTION
AA	AUXILIARY SWITCH "A" CLOSED WHEN OCB IS CLOSED
AB	AUXILIARY SWITCH "B" CLOSED WHEN OCB IS OPEN
AC	AUXILIARY SWITCH "AA" CLOSED WHEN OPERATING MECHANISM IS IN ENERGIZED POSITION
AD	AUXILIARY SWITCH "BB" CLOSED WHEN OPERATING MECHANISM IS IN DE-ENERGIZED POSITION
AE	AUXILIARY SWITCH MC-"B" CLOSSES MOMENTARILY AS OCB OPENS
AF	AUXILIARY SWITCH "AQ" OPENS AS OCB BEGINS TO OPEN
AG	AUXILIARY SWITCH "BQ" OPENS AS OCB BEGINS TO CLOSE
BA	TERMINAL BOARD, CONTROL
BB	TERMINAL BLOCK, TRANSFORMER (AS SPECIFIED)
BC	TERMINAL BLOCK - INCOMING DC SUPPLY
BD	TERMINAL BLOCK - INCOMING CONTROL
CA	COIL, TRIP
CB	COIL, CLOSING
DA	KNIFE SWITCH 3 PST
EA	PANEL
FA	RELAY, CLOSING
GA	RESISTOR, DISCHARGE
HA	SPACE HEATER - SEE W-1986 15KV THRU 69KV (FOR 250,000 KVA THRU 1,500,000 KVA OCB)
HC	SPACE HEATER, CONTROL BOX
HD	SPACE HEATER, CONTROL SWITCH
HE	SPACE HEATER, CONTROL THERMOSTAT
JA	FUSES, CONTROL
JB	FUSES, CLOSING COIL

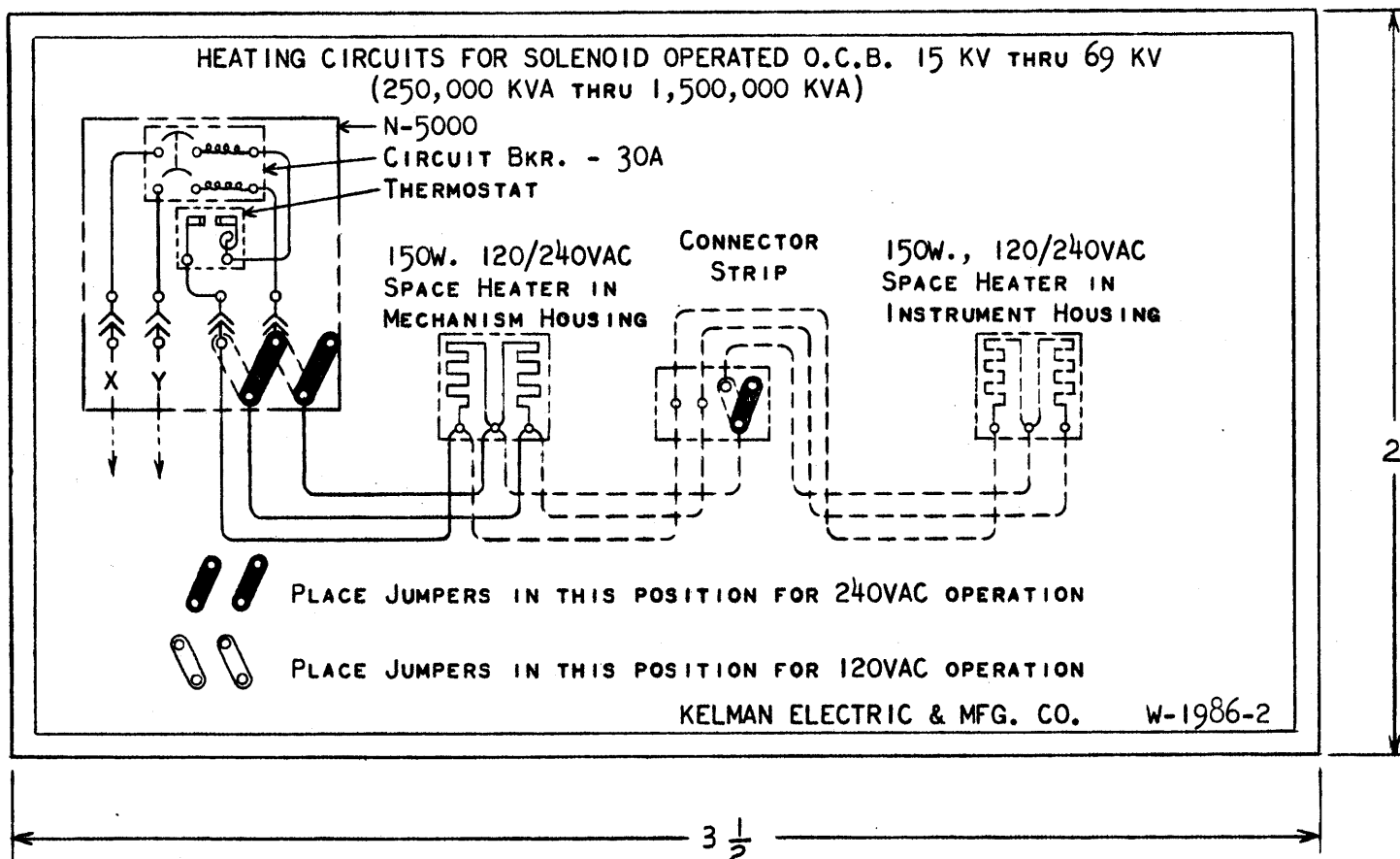
DEVICE NUMBERS AND FUNCTIONS	
8-1	DC CONTROL SWITCH
8-2	AC HEATER CONTROL SWITCH (CIRCUIT BREAKER)
23	THERMOSTAT
52	CIRCUIT BREAKER
"A"	AUXILIARY SWITCH "A" CLOSED WHEN OCB IS CLOSED
"AA"	AUXILIARY SWITCH "AA" CLOSED WHEN OPERATING MECHANISM IS IN ENERGIZED POSITION
"AQ"	AUXILIARY SWITCH "AQ" OPENS AS OCB BEGINS TO OPEN
"B"	AUXILIARY SWITCH "B" CLOSED WHEN OCB IS OPEN
"BB"	AUXILIARY SWITCH "BB" CLOSED WHEN OPERATING MECHANISM IS IN DE-ENERGIZED POSITION
"BQ"	AUXILIARY SWITCH "BQ" OPENS AS OCB BEGINS TO CLOSE
MC"B"	AUXILIARY SWITCH MC"B" CLOSSES MOMENTARILY AS OCB OPENS
A	ALARM
C	CLOSE
CC	CLOSING COIL
H	SPACE HEATER
G	GREEN INDICATING LAMP
R	RED INDICATING LAMP
T	TRIP
TC	TRIP COIL
X	AUXILIARY RELAY
Y	AUXILIARY RELAY
FU	FUSE



INCOMING SUPPLY AND CONTROL CONNECTIONS MADE IN BACK OF BA

REVISES	REFERENCE	1ST. S. O.	PAT. No.
1 INSTRUMENTS RELOCATED ON DRAWING	WN-2201	29798	WN-2213-1
TITLE			
CONTROL WIRING DIAGRAM			
DATE			
2-10-54 BY R CHECKED			
SCALE			
APPROVED			
KELMAN ELECTRIC & MFG. CO.			
LOS ANGELES, CAL.			

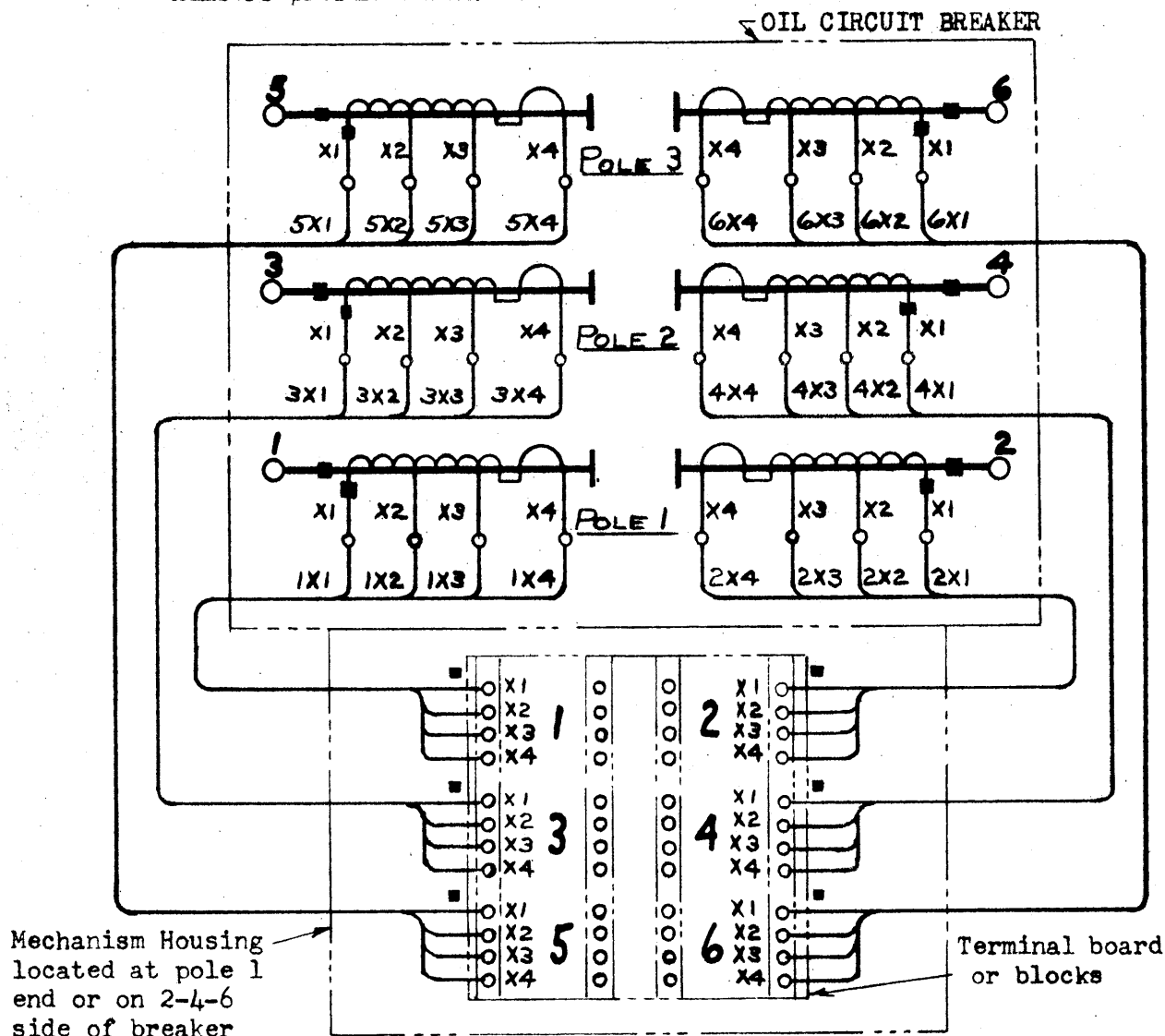
W-2213-1



REVISIONS		REFERENCE	1st. S. O.		No.	W-1986-2
-2	REVISED DIAGRAM, ADDED CONNECTOR		TITLE			
	STRIP. RETRACED.	2-19-54	HEATING CIRCUITS -			
			SOLENOID OPERATED BREAKERS			
			MAT.		PAT No.	
			DATE 2-19-54		BY RF	CHECKED R
			SCALE DOUBLE		APPROVED	
			KELMAN ELECTRIC & MFG. CO.			
			LOS ANGELES. CAL.			

W-1986-2

Note: All CT's with taps shown below have style numbers prefixed with "X"



Marked Ratio	Turn Ratio	Secondary Taps	Marked Ratio	Turn Ratio	Secondary Taps
200/5	40/1	X1-X2	100/5	20/1	X1-X2
400/5	80/1	X3-X4	200/5	40/1	X3-X4
600/5	120/1	X2-X3	300/5	60/1	X2-X3
800/5	160/1	X1-X3	400/5	80/1	X1-X3
1200/5	240/1	X1-X4	600/5	120/1	X1-X4

REVISIONS	REFERENCE	1st. S. O.	No. W-1869
		TITLE	
		CURRENT TRANSFORMER CONNECTIONS	
		1200/5; 600/5; NEMA Pub. 46-116; Rev. 5-49	
		MAT.	PAT No.
		DATE 3-1-54 BY R	CHECKED <i>[Signature]</i>
		SCALE	APPROVED
		KELMAN ELECTRIC & MFG. CO.	
		LOS ANGELES, CAL.	

W-1869

INSTRUCTIONS

KELMAN TYPE 15RA2-B6

OIL CIRCUIT BREAKER

with

SOLENOID OPERATING MECHANISM STYLE L-1403

for Arizona Public Service Co.

<u>CONTRACT</u>	<u>KELMAN SO</u>	<u>OCB SER NO</u>	<u>DATE</u>
23642	29798	<u>28696-99</u>	12-28-53

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4. Mechanism Adjustments S-28673 Pt. I
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6. Cross Section of Breaker L-527
7. Assembly of 2 HS Solenoid Mechanism L-1403
8. Assembly of Instrument Panel 4800-Q
9. Control Wiring Diagram WN-2213
10. Heating Circuit W-1986
11. Current Transformer Connections W-1805
for Bushing Type C.T. Kelman type XE-600

2/8/54

KELMAN ELECTRIC & MFG. CO.
Los Angeles, California

S-30080

KELMAN TYPE 15RA2-B, 600 AMPERE OIL CIRCUIT BREAKER

GENERAL INFORMATION

Voltage Rating	15,000 Volts
Maximum Continuous Current	600 Amperes
Rated Interrupting Capacity	250,000 KVA
Maximum Interrupting Rating at Rated Voltage	10,000 Amperes
Maximum Interrupting Rating	25,000 Amperes
Momentary Current Rating	40,000 Amperes
4 Second Current Rating	25,000 Amperes
Number of Poles	3
Number of Breaks per Pole	2
Gallons of Oil per breaker	130
Net Weight of Oil	975 Pounds
Net Weight of Breaker without Oil	2,600 Pounds
Solenoid Closing Current (125V.DC)	15 Amperes
Solenoid Closing Current (48V.DC)	26 Amperes
Tripping Current (125V.DC)	6 Amperes
Tripping Current (48V.DC)	14 Amperes

BUSHINGS - Kelman, D-3488

CLOSING COIL - Kelman Type CL-117H (230V.AC rectifier oper.)
CL-117A (125V.DC)
CL-117D (48V.DC)

OPENING COIL - Kelman Type CL-111B (125V.DC)
CL-111C (48V.DC)

INSTALLATION OF BREAKER

The breaker has been completely assembled and tested at the factory, however, it is important that the following instructions are followed when installing the breaker in its permanent location:

1. All breakers are shipped in the closed position with the toggle of the operating mechanism wired closed. Remove wire and trip breaker by means of the hand trip. Guard against accidental electrical or hand tripping of the breaker while making the following adjustments.

2. LEVELING OF BREAKER

Lower tank and plumb MOVING CONTACT RODS shown on drawing "Cross Section of Breaker". Shim under base of breaker as required.

3. ALIGNMENT OF CONTACTS

Refer to drawing "Cross Section of Breaker".

Close breaker slowly by means of the hand closing device. Observe the alignment of the STATIONARY CONTACTS entering the DETHERMALIZER ASSEMBLY. If any misalignment is present, adjustment can be made by loosening the bolts on the SUPPORT FOR CONTACT and shifting the STATIONARY CONTACT to the desired position.

4. CONTACT ADJUSTMENT

Refer to drawing "Cross Section of Breaker".

- a. When breaker is in the closed position, the dimension from the top of the MOVING CONTACT NUT to the bottom of the MOVING CONTACT must agree with the dimension shown on the drawing. Screw nuts up or down as required.
- b. The dimension from the bottom of the STATIONARY CONTACT LOCKNUT to the top of the DETHERMALIZER ASSEMBLY must agree with the dimension shown on the drawing. If adjustment is required, loosen locknut on MOVING CONTACT ROD ADJUSTING STUD and turn adjusting stud in desired direction.
- c. The dimension from the bottom of the DETHERMALIZER SUPPORT to the bottom of the MOVING CONTACT must agree with the dimension shown on the drawing. This dimension may be obtained by loosening the STATIONARY CONTACT LOCKNUT and turning the STATIONARY CONTACT to the left or right as required.

5. TRAVEL ADJUSTMENT

Refer to drawing "Cross Section of Breaker".
The total travel of the DETHERMALIZER ASSEMBLY should agree with the dimension shown on the drawing.

- a. To check travel, mark the MOVING CONTACT ROD at the bottom of the MOVING CONTACT ROD GUIDE when the breaker is in the closed position.
- b. Open breaker and measure distance between the mark and the bottom of MOVING CONTACT ROD GUIDE.
- c. If the travel is not correct, adjust upper STOP NUTS up or down on ROD FOR KICKOUT SPRING in the solenoid mechanism.

6. TRIAL SETTING OF KICKOUT SPRING

Set KICKOUT SPRING, shown on drawing "Assembly of Solenoid" to compress about $3/8$ ". This is a trial setting only.

7. Check operating mechanism according to adjustments found in another section of this bulletin.
8. With minimum operating voltage for solenoid mechanism close the breaker.
9. Operate breaker several times, then recheck settings.
10. Replace tank and fill with oil.
11. Adjust KICKOUT SPRING, shown on "Assembly of Solenoid", so that the breaker will close positively at minimum operating voltage. Use maximum spring compression consistent with this requirement.

OIL

The breaker should be filled with a reliable oil suitable for oil circuit breakers such as Avon Transformer Oil or Shell Diala AX. Samples of oil should be drawn from the bottoms of the tanks at regular intervals to ascertain if there is foreign matter present. After several heavy short circuits it may be necessary to filter the oil.

SPARE PARTS

When ordering parts always give the serial numbers of the breaker and operating mechanism as well as the part number.

CONNECTIONS

A wiring diagram for the current transformers and control circuits is shipped with each breaker inside the mechanism housing.

STORAGE

It is important to bear in mind at all times that moisture is detrimental to the Dethermalizers (arc quenchers). In the event a breaker is purchased for stock or is not placed in service within one month (allow only 10 days during damp weather) proper precaution must be taken to prevent the absorption of moisture. Dethermalizers already installed in the breakers are best protected if the tanks are filled with clean, moisture free transformer oil in sufficient depth to cover the Dethermalizers. Spare Dethermalizers ordered for stock are always shipped in waterproof bags containing silica gel as the drying agent. It is suggested that when received, the bags be inspected for damage during shipment. If a bag has been punctured, the following steps should be taken:

1. Remove the Dethermalizer and dry thoroughly at temperatures not to exceed 158° F.
2. Dry and repair the bag.
3. Replace the Dethermalizer in the bag and add new silica gel.
4. Reseal the bag by pressing the edges together with a hot iron.

Occasional inspection of stored Dethermalizers is also suggested to be sure of proper preservation while in stock.

LUBRICATION

No lubrication is required.

ADJUSTMENTS FOR SOLENOID OPERATING MECHANISM

These adjustments should be made after the breaker contacts have been correctly adjusted.

Refer to drawing "Assembly of Solenoid".

1. Close the breaker manually and check operation of AUXILIARY SWITCHES. The OVERTRAVEL SPRINGS should be adjusted so that positive operation is obtained upon opening or closing. Positive operation is indicated by a snapping action after the auxiliary switch contacts have touched.
2. If the operating mechanism fails to latch, that is, if one or both LATCHES fail to seat completely under the LOWER TOGGLE PIN, follow adjustments 3 and 4.
3. If the LATCHES do not seat at the same time, loosen the locknuts on the ECCENTRIC PINS FOR LATCH and rotate these PINS until the LATCHES are even. Tighten locknuts.
4. The overtravel between the LOWER TOGGLE PIN and the LATCHES should be $1/32$ inch when the SOLENOID PLUNGER is raised as high as possible by means of the hand closing device. Adjustment is made with the mechanism in the open position by loosening the CLAMP SCREW FOR YOKE and turning the SOLENOID PLUNGER by means of a spanner wrench inserted in the bottom of the SOLENOID PLUNGER. Tighten CLAMP SCREW FOR YOKE after $1/32$ inch overtravel has been obtained.
5. The TRIP COIL ASSEMBLY should be located so that there is about $1/8$ inch gap between the KICKOUT BAR of the TRIP COIL ASSEMBLY and the TRIP PIN FOR TOGGLE.
6. Trip the breaker and observe the retarding action of the OPENING DASHPOT. The breaker should open fast and come to rest without a bounce or a delay. If the breaker tends to bounce, increase the dashpot effect by unscrewing the DASHPOT ROD from the ROD END a turn or two at a time until smoothest action is obtained. If the OPENING DASHPOT checks too soon and there is a delay before the breaker is fully open, screw the DASHPOT ROD into the ROD END a few turns.
7. The thermostat in the mechanism housing should normally be set at 70°F .

FLUID FOR DASHPOTS

All Kelman dashpots and fluid timing devices use Dow Corning Silicone Fluid, Type DC 200, Viscosity Grade:10 centistokes.

LUBRICATION

No lubrication is required.



USE ROTO PRINT

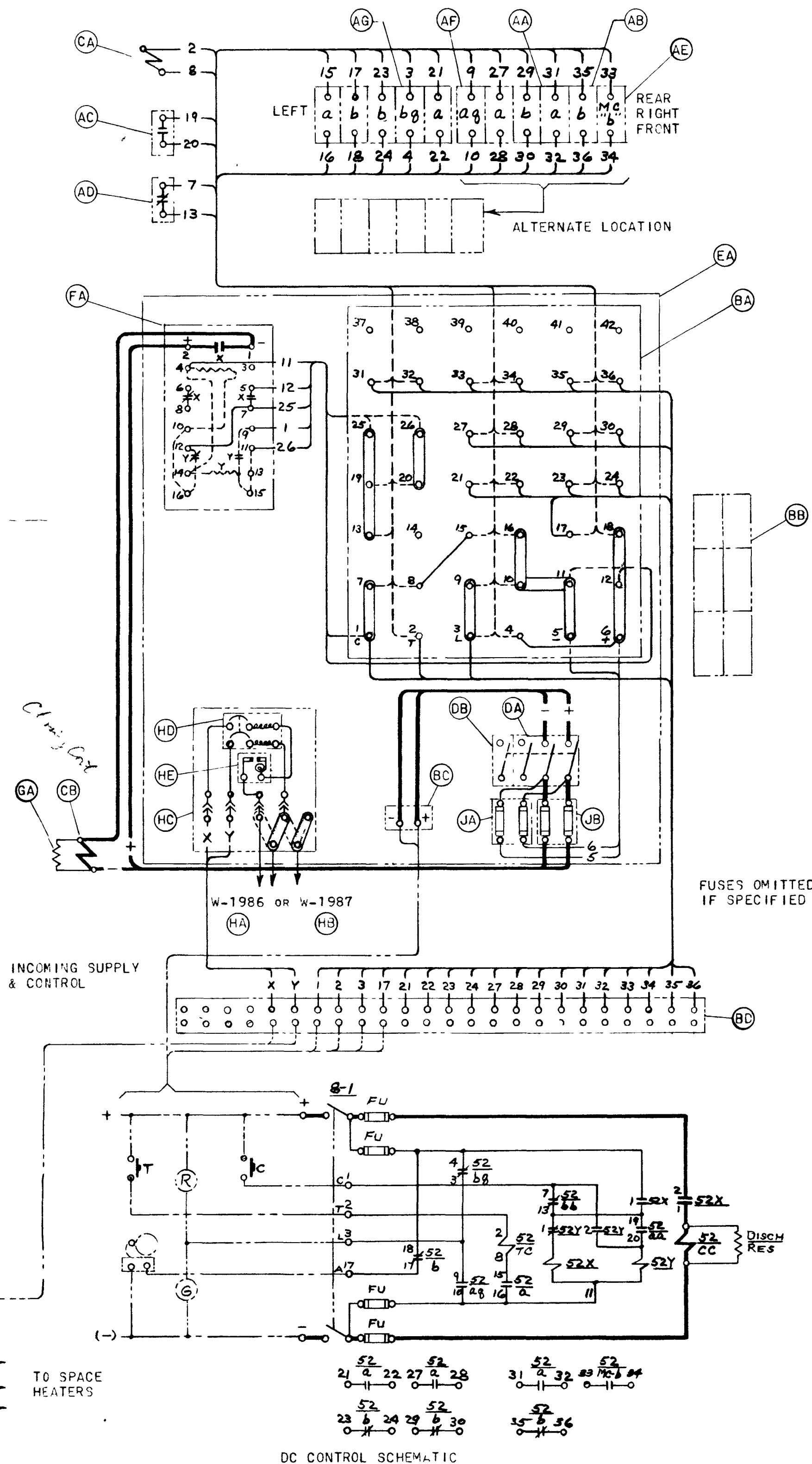
1:52

② CONTACT NUT 5-18690 SUPERSEDED BY 5-28690-1; LOCK WASHER 5-23782-2 REMAINED; ADDED 5 TO 5-18697.
③ ADDED 1/2" MC HXK HX CAP SCREW NOTE 8 EXTENDED 8-18380 AIRFLOW TO COVER OUTSIDE STUDS. 1-15-67. *Smyle*
12-10-66 *Smyle*

L-527-9

SCALE 6" = 1'-0"

USE ROTO PRINT



ITEM	DESCRIPTION
AA	AUXILIARY SWITCH "A" CLOSED WHEN OCB IS CLOSED
AB	AUXILIARY SWITCH "B" CLOSED WHEN OCB IS OPEN
AC	AUXILIARY SWITCH "AA" CLOSED WHEN OPERATING MECHANISM IS IN ENERGIZED POSITION
AD	AUXILIARY SWITCH "BB" CLOSED WHEN OPERATING MECHANISM IS IN DE-ENERGIZED POSITION
AE	AUXILIARY SWITCH MC-"B" CLOSED MOMENTARILY AS OCB OPENS
AF	AUXILIARY SWITCH "AQ" OPENS AS OCB BEGINS TO OPEN
AG	AUXILIARY SWITCH "BQ" OPENS AS OCB BEGINS TO CLOSE
BA	TERMINAL BOARD, CONTROL
BB	TERMINAL BOARD, TRANSFORMER (AS SPECIFIED)
BC	TERMINAL BLOCK - INCOMING DC SUPPLY
BD	TERMINAL BLOCK - INCOMING CONTROL
CA	COIL, TRIP
CB	COIL, CLOSING
DA	KNIFE SWITCH 3 PST
DB	KNIFE SWITCH 4 PST (SPECIAL)
EA	PANEL
FA	RELAY, CLOSING
GA	RESISTOR, DISCHARGE
HA	SPACE HEATER - SEE W-1986 15KV THRU 69KV (FOR 250,000 KVA THRU 1,500,000 KVA OCB)
HB	SPACE HEATER - SEE W-1987 69KV THRU 115KV (FOR 2,500,000 KVA AND HIGHER OCB)
HC	SPACE HEATER, CONTROL BOX
HD	SPACE HEATER, CONTROL SWITCH
HE	SPACE HEATER, CONTROL THERMOSTAT
JA	FUSES, CONTROL
JB	FUSES, CLOSING COIL

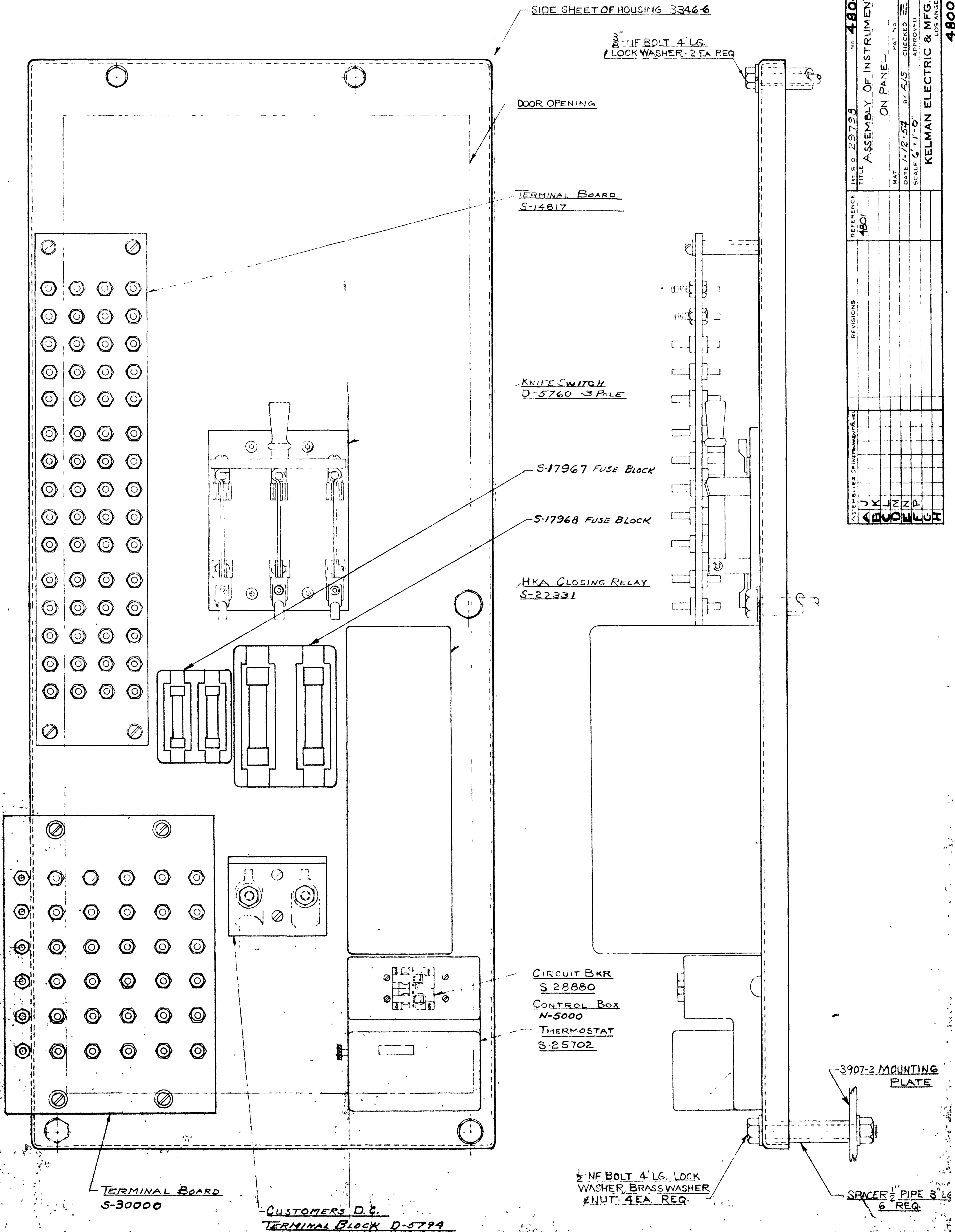
WN-2213

DEVICE NUMBERS AND FUNCTIONS	
8-1	DC CONTROL SWITCH
8-2	AC HEATER CONTROL SWITCH (CIRCUIT BREAKER)
23	THERMOSTAT
52	CIRCUIT BREAKER
"A"	AUXILIARY SWITCH "A" CLOSED WHEN OCB IS CLOSED
"AA"	AUXILIARY SWITCH "AA" CLOSED WHEN OPERATING MECHANISM IS IN ENERGIZED POSITION
"AQ"	AUXILIARY SWITCH "AQ" OPENS AS OCB BEGINS TO OPEN
"B"	AUXILIARY SWITCH "B" CLOSED WHEN OCB IS OPEN
"BB"	AUXILIARY SWITCH "BB" CLOSED WHEN OPERATING MECHANISM IS IN DE-ENERGIZED POSITION
"BQ"	AUXILIARY SWITCH "BQ" OPENS AS OCB BEGINS TO CLOSE
MC"B"	AUXILIARY SWITCH MC"B" CLOSED MOMENTARILY AS OCB OPENS
A	ALARM
C	CLOSE
CC	CLOSING COIL
G	GREEN INDICATING LAMP
R	RED INDICATING LAMP
T	TRIP
TC	TRIP COIL
X	AUXILIARY RELAY
Y	AUXILIARY RELAY
FU	FUSE

INCOMING SUPPLY AND CONTROL _____

CONNECTIONS MADE IN BACK OF TERMINAL BOARD _____

IF NOT OTHERWISE SPECIFIED			TITLE		
SCALE	TOLERANCES	SURFACES	CONTROL WIRING DIAGRAM		
DRAWN	CHECKED	APPROVED	KELMAN ELECTRIC & MFG. CO.		
DATE	DATE	DATE	LOS ANGELES, CAL.		
2-10-54	2-10-54	2-10-54	NO WN-2213		



4800-Q	29738	ASSEMBLY OF INSTRUMENTS	ON PANEL	4800-Q
REFERENCE	4801	REVISIONS	DATE 1-12-54	BY AJS
ASSEMBLY OF INSTRUMENTS			SCALE 6" = 1'-0"	CHECKED E
				APPROVED
				KELMAN ELECTRIC & MFG. CO.
				LOS ANGELES CAL.

3 KNOCKOUTS FOR 1 1/4" CONDUIT

FRAME

45"

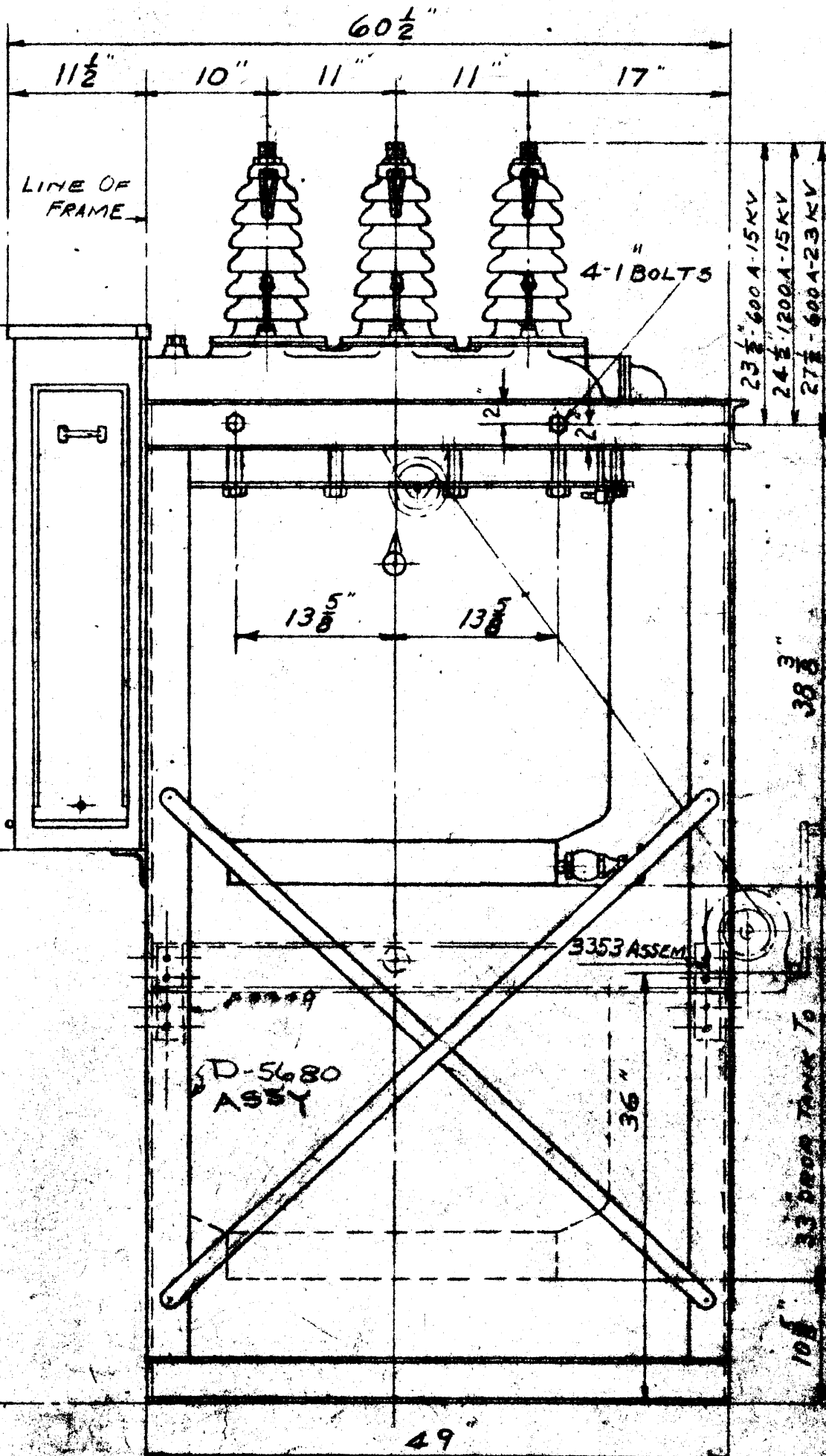
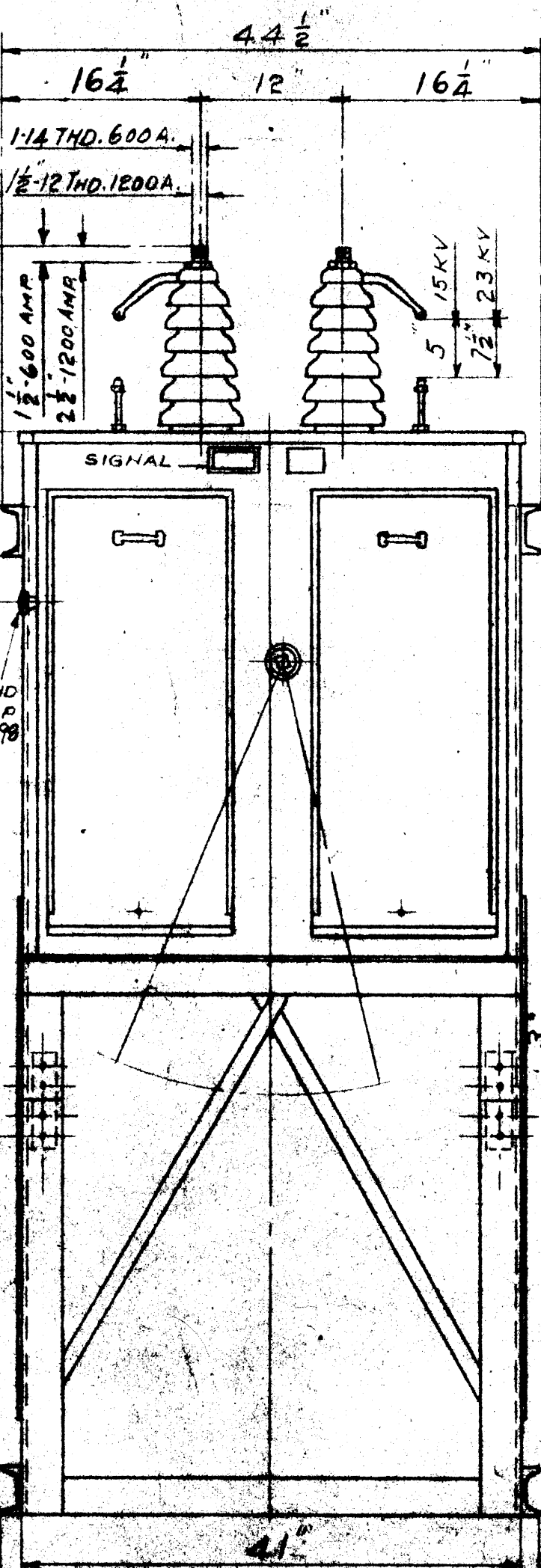
13

37 1/2"

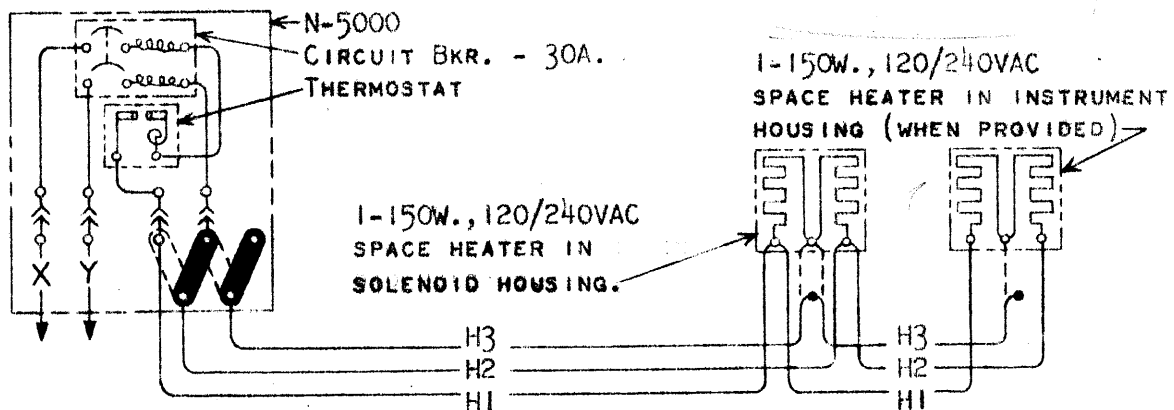
1 3/4"

2 1/2" 2 1/2" 4 1/2" TO FRAME

4 HOLES 1 3/8" DIA
FOR 3/4" FOUNDATION BOLTS



HEATING CIRCUITS FOR SOLENOID OPERATED O.C.B. 15 KV THRU 69 KV
(250,000 KVA THRU 1,500,000 KVA)



PLACE JUMPERS IN THIS POSITION AND DISCONNECT H3 WIRES
FROM CENTER TAP OF EACH HEATER FOR 240VAC OPERATION.

PLACE JUMPERS IN THIS POSITION AND CONNECT H3 WIRES
TO CENTER TAP OF EACH HEATER FOR 120VAC OPERATION.

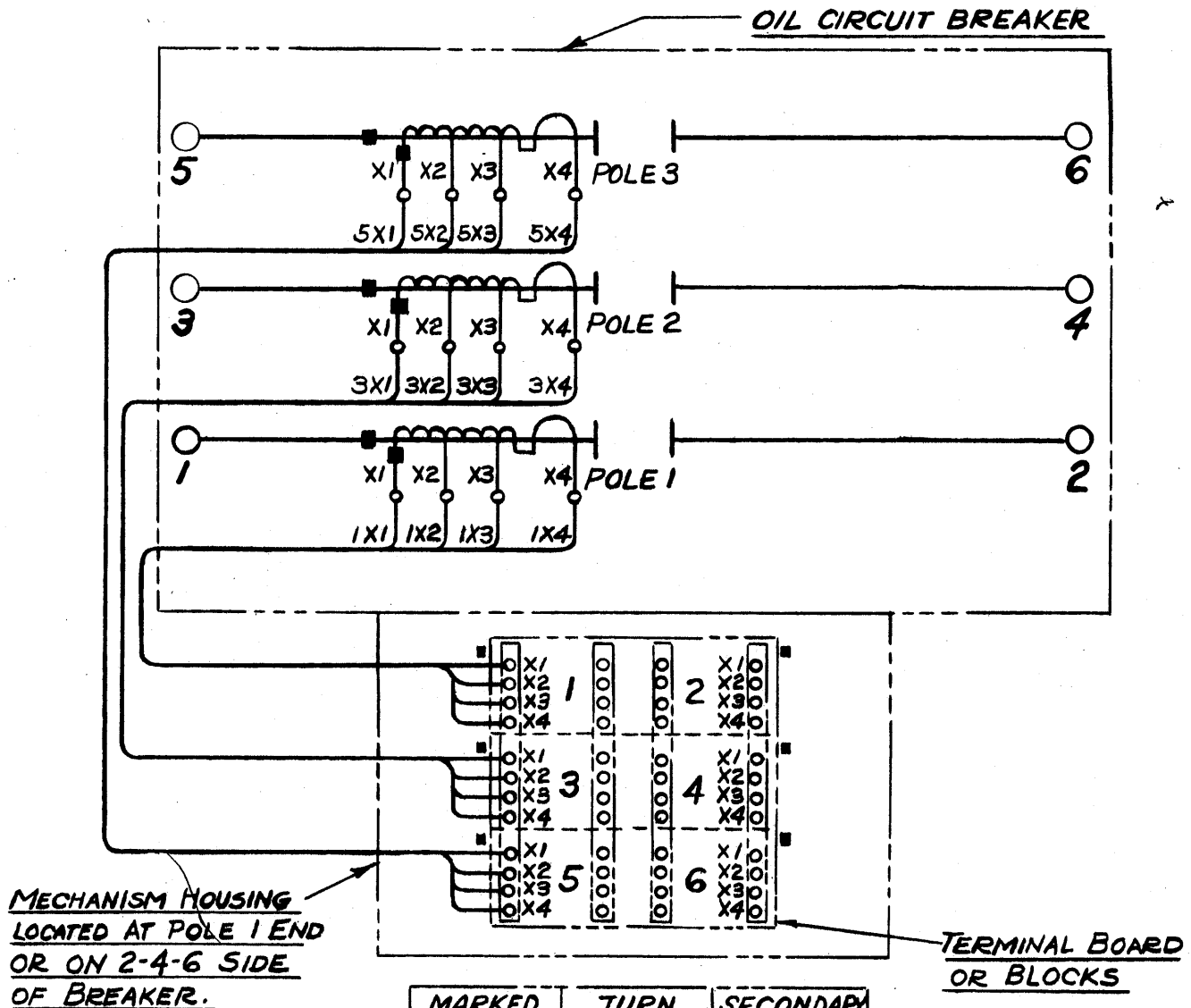
KELMAN ELECTRIC & MFG. CO. W-1986-1

NOTE TO DRAWING: ANY REVISIONS SHOULD BE MADE TO N-5000 ALSO.

REVISIONS		REFERENCE	1st. S. O.	No.	W-1986-1
-1	REVISED CONNECTIONS & INSTRUCTIONS 1-21-54		TITLE HEATING CIRCUITS		
			SOLENOID OPERATED BREAKERS		
			MAT. _____	PAT No.	
			DATE 1-20-54 BY RF	CHECKED	<i>[Signature]</i>
			SCALE DOUBLE	APPROVED	<i>[Signature]</i>
			KELMAN ELECTRIC & MFG. CO.		
			LOS ANGELES, CAL.		

W-1986-1

Note: All CT's with taps shown below have style numbers prefixed with "X"



MARKED RATIO	TURN RATIO	SECONDARY TAPS
100/5	20/1	X1-X2
200/5	40/1	X3-X4
300/5	60/1	X2-X3
400/5	80/1	X1-X3
600/5	120/1	X1-X4

REVISIONS	REFERENCE	1st. S. O.	No. W-1805
		TITLE	CURRENT TRANSFORMER CONNECTIONS
			(600-5) NEMA Pub.46-116 Rev.5-49
		MAT.	PAT NO.
		DATE 1-15-52 BY JW	CHECKED <i>[Signature]</i>
		SCALE	APPROVED <i>[Signature]</i>
		KELMAN ELECTRIC & MFG. CO.	
		LOS ANGELES, CAL.	

W-1805

23816

February 23, 1954

C
O
P
Y

Mr. E. W. Hutloff
Arizona Public Service Company
Post Office Box 2591
Phoenix, Arizona

Dear Mr. Hutloff:

SUBJECT: Your Order No. 23642
15 KV Kelman Oil Circuit Breakers

This will confirm our verbal information this morning wherein I advised you that your 15 KV Kelman oil circuit breakers now on order will be assigned serial numbers 28,696, -7, -8, and -9. The first two serial numbers will have the 600/5 current transformers in the 1-3-5 bushing positions, and the next two serial numbers will have the 600/5 current transformers in the 2-4-6 bushing positions. The 1200/5 current transformers will be located in the alternate bushings.

As I advised you by phone, the four 15 KV breakers were ready for shipment the first of this week, but it will be necessary to delay shipment for two weeks in order to construct and install the 1200/5 bushing current transformers. We trust that this delivery will meet with your approval.

Very truly yours,

W. H. EDDY ELECTRIC PRODUCTS, INC.

WHE:rs

W. H. Eddy

cc: Paul Rist
cc: Purchasing Dept.