

-10-3

ADDENDUM TO S225-3 DATED JUNE 1978

The following supersedes all information applying to the motor and capacitor, and troubleshooting of those parts.

Tap changers on regulators produced after Aug. 31, 1981 employ motor TAB133187 (see Addendum Fig. 1). These tap changers will be identified with one of the following model numbers stamped in the upper righthand corner of the drive frame:

<u>Model Number</u>	<u>Typical Use</u>
859E	Simplified Regulator
859F	" "
859G	" "
859H	" "
928C	Conventional Regulators (95 BIL)
170B	" " (150 BIL)

All employ many common parts and show a strong physical resemblance.

MOTOR

The motor is a permanent split capacitor type suitable for operation in both directions of rotation at 120 vac, single-phase at 50/60 Hz. All components are compatible with hot transformer oil and the windings are oil-cooled. The motor will carry locked rotor current for 750 hours. An integral braking mechanism controls motor coast.

CAPACITOR

The capacitor is a 370 vac, 7.5 MFD rating with sealed case construction. The impregnant is a non-toxic, non-PCB fluid.

TROUBLESHOOTING AND SERVICING

General - The following troubleshooting and servicing functions are done with the regulator partially untanked as outlined in S225-10-1. Experience has shown that common causes of internal problems are the motor, capacitor, broken wires, or loose connections.

Check all wire connections between the junction box terminal board, tap changer terminal board and tap changer.

Examine the tap changer and drive mechanism to be sure that the motor operation is not mechanically blocked by a damaged part.

Motor - If the mechanism is not blocked, check the motor on direct power. For models 170B and 928C, apply power by connecting a 120 vac source with the ground lead on the "G" terminal of the tap changer board (see Addendum Fig. 2). The hot lead should be placed on TCB4 for Raise operation (CCW) or TCB5 for Lower operation (CW).

continued.....

For models 859E thru H apply power by disconnecting the push on at V2 (see Addendum Fig. 3) and placing the hot lead of the 120 vac source on V2. The ground lead should be placed on the TCB10 for Raise Operation (CCW) or TCB9 for Lower operation.

If the motor operates the tap changer the problem is not within the mechanism.

Capacitor - If the motor will not operate, disconnect all leads from the capacitor and check continuity between the terminals. The meter should show initial continuity and then drop to zero. A steady reading or no initial reading indicates the capacitor is defective. If the capacitor is satisfactory, the motor is defective.

Replacing Motor - It is recommended that the tap changer be removed to eliminate the possibility of loose parts dropping into the winding. See Page 6 of S225-3 for instructions on removal.

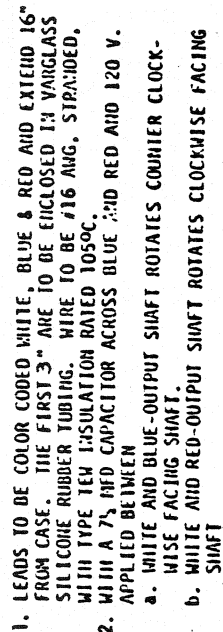
1. Cut the tie wraps securing the paper tube containing the red and blue motor to capacitor leads and disconnect those leads from the capacitor.
2. Remove the frame ground bolt located on the left side of the top plate and disconnect only the white motor lead. Cut off the terminal and pull the lead free of the insulating tube passing thru the top plate.
3. Remove the indicator gear, bearing and drive shaft assembly from Models 120B and 928C.
4. Remove the four top plate securing bolts and slide the plate over to the right, being careful not to damage the holding switch. Lay the plate off to the right.
5. Locate master link in the chain, and if accessible, remove it and take the chain off the sprockets. If the link cannot be removed, it will be necessary to remove the motor sprocket and indicator gear (where employed) from the motor shaft. Use a 3/32 or 1/8 diameter punch to drive out the pins holding these parts.
6. Remove the two bolts securing the motor to the mounting shelf.
7. The motor is now completely free and can be removed by sliding the gear and sprocket from the motor shaft and removing the chain.

The replacement motor package is furnished with all terminals, a new insulating tube and tie wraps. The sprocket will be in place and aligned for the holding switch. The indicator drive

gear will be in place for models 170B and 928C.

8. Insert the motor red and blue leads through the insulating tube and attach a push-on terminal to each one.
9. Position the motor on the mounting shelf with the sprocket in line with the sprocket cam and replace and tighten the mounting bolts.
10. Replace the chain making sure all drive cams are aligned as shown in Addendum Fig. 4. The illustrated condition exists at each off neutral position of the main contacts except the reversing switch will be closed. The engagement pin head should be in front of the middle flange on the spool. A slight rotation of the crank arm may be necessary to produce this condition. The master link should be positioned to allow easy installation with the retainer ring on the motor side of the chain.
11. Replace the top plate being careful not to damage the holding switch. Tighten the bolts finger tight and check the alignment of the holding switch and motor. See Addendum Figs. 5A and 5B for desired condition.
12. Replace indicator gear, bearing and drive shaft assembly as shown in Addendum Fig. 5A.
13. Place the white motor lead through the insulating tube at the right side of the plate. Attach the ring tongue terminal and place under the frame ground bolt with all other ground leads. Tighten all top plate bolts completely.
14. Apply 120 vac as previously instructed and run the tap changer to each mechanical stop to check the holding switch operation. Return tap changer contacts to neutral as shown in Addendum Fig. 4.
15. Use tie wraps to secure the motor and capacitor leads to the drive frame.

The tap changer is now ready for replacement on the regulators.



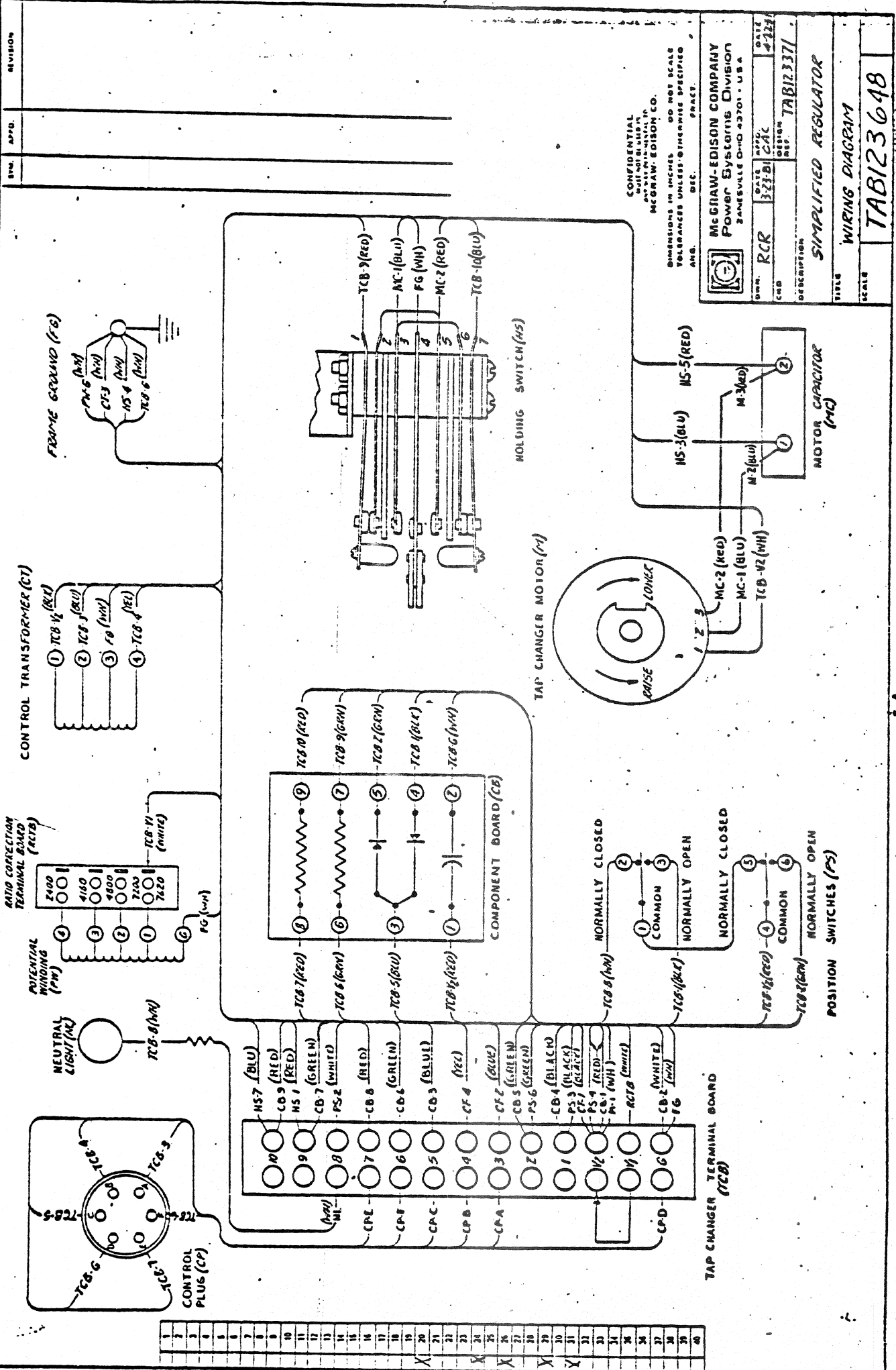
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DIMENSIONS IN INCHES DO NOT SCALE
VOL. 10, NO. 1, 1968

McGRATH-CONSON COMPANY
Power Systems Division
JANUARY 1, 1980 • U.S.A.

INVENTOR	JES	DATE	10-15-57
BY	Yeo	APPROVED	Yeo
TITLE	MOTOR FOR SPRING DRIVE		
DESCRIPTION	TAP CHANGING		
SCALE	MOTOR		
FILE	TAB 133157		

5. SIMILAR TO 2. 10. 20. 30. 40. 50. 60. 70. 80. 90. 100. 110. 120. 130. 140. 150. 160. 170. 180. 190. 200. 210. 220. 230. 240. 250. 260. 270. 280. 290. 300. 310. 320. 330. 340. 350. 360. 370. 380. 390. 400. 410. 420. 430. 440. 450. 460. 470. 480. 490. 500. 510. 520. 530. 540. 550. 560. 570. 580. 590. 600. 610. 620. 630. 640. 650. 660. 670. 680. 690. 700. 710. 720. 730. 740. 750. 760. 770. 780. 790. 800. 810. 820. 830. 840. 850. 860. 870. 880. 890. 900. 910. 920. 930. 940. 950. 960. 970. 980. 990. 1000.

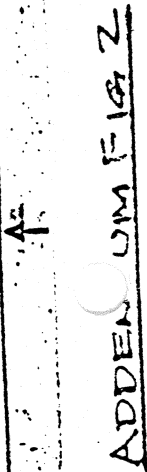


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MCGRAW-EDISON COMPANY Power Systems Division ZANESVILLE OHIO 43701 U.S.A.	
DATE 3-23-61	APPD. CAC
DATE 4-22-61	DESIGN TAB123371
DESCRIPTION SIMPLIFIED REGULATOR	
TITLE WIRING DIAGRAM	
SCALE TAB123648	

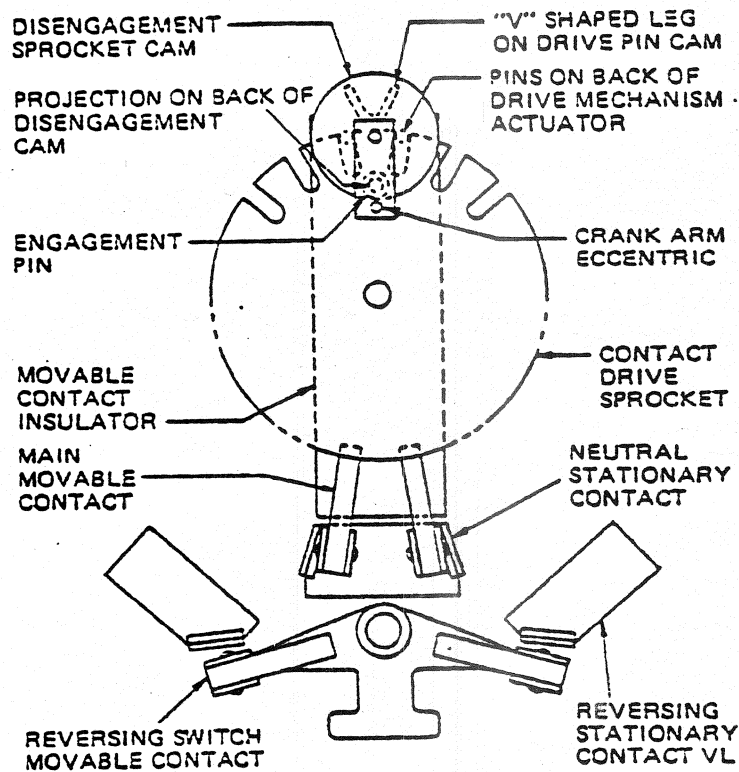
STANDARD DRAWING 371

DEVELOP FIG 3



STANDARD DRAWING

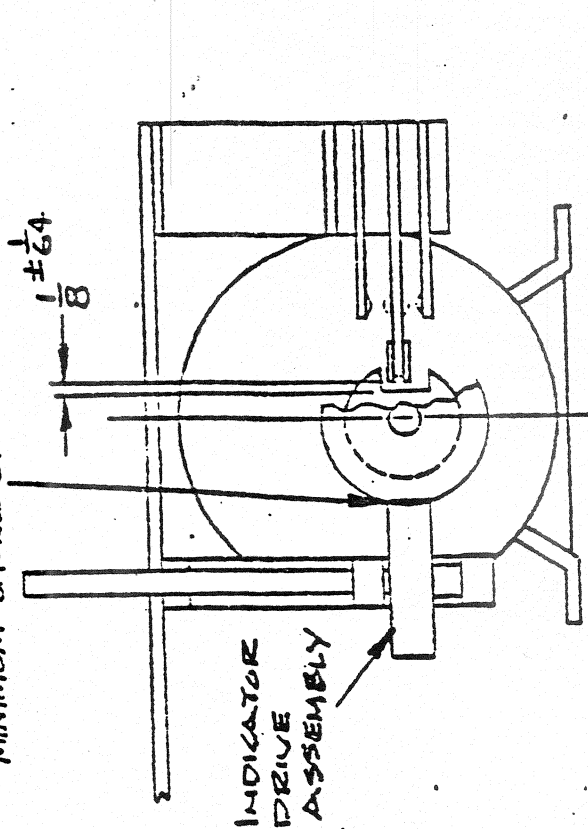
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The relationship of parts defining the neutral position are as follows: The main movable contacts must be on the neutral stationary contact at the bottom center of the tap changer. The reversing switch movable contacts must be open and not making contact with either reversing stationary contact. The crank arm eccentric must be on the vertical centerline at the bottom with both springs equally extended. The projection on the back of the disengagement sprocket cam must be on the vertical centerline at the bottom. The engagement pin in the drive pin cam must be on the vertical centerline at the bottom and fully engaged in the bottom hole in the drive mechanism actuator. The vee-shaped legs on the engagement pin cam must be at the top. The pins on the back of the drive mechanism actuator should be on the horizontal centerline and resting in the contact drive sprocket slots on both sides of the sprocket arm. The sprocket arm should be on the vertical centerline at the top and engaged in the slot on the movable contact insulator. The motor holding switch should be open.

ADDENDUM FIG. 4

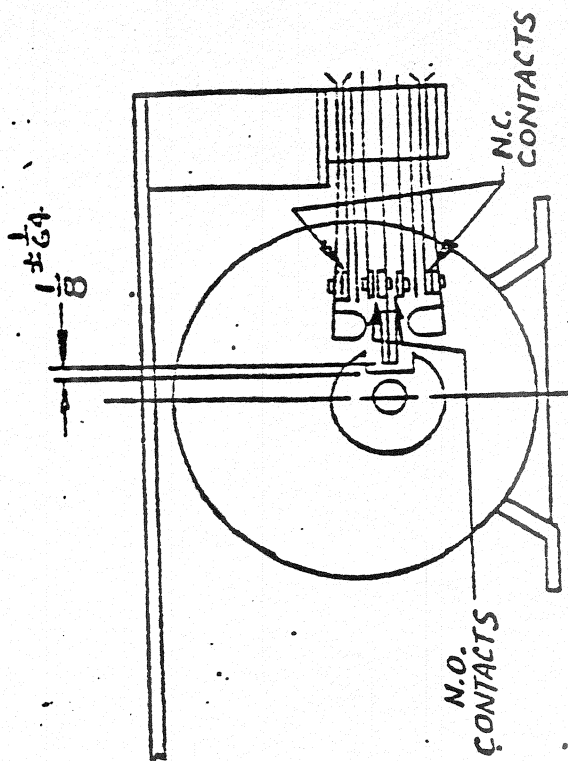
MAKE TIGHT FIT TO KEEP
MINIMUM BACKLASH



TYPICAL CONTACT GAP = .1" THE
HOLDING SWITCH MUST CLOSE IN 40°
MAX. MOTOR ROTATION & REMAIN OPEN
WITH MECHANISM AT MECHANICAL STOP

A

FOR MODELS 170B# 928C



TYPICAL N.O. CONTACT GAP = .1" N.O.
CONTACTS MUST CLOSE IN 40° MOTOR
ROTATION. N.C. CONTACTS MUST OPEN
WITHIN 10° OF N.O. CONTACT CLOSE.
N.O. CONTACTS MUST REMAIN OPEN
WITH MECHANISM AT MECHANICAL
STOP.

B

FOR MODELS 859E THRU F

APPENDUM FIG 5