



CLASS 6815 (Formerly Class 1315) TYPE R-22 & RF-22 REDUCED VOLTAGE MAGNET CONTROLLERS

Series A, 230 Volts DC

FOR HIGH SPEED CHARGE & DISCHARGE OF SQUARE D 80"-100" MAGNETS
EQUIPPED WITH PARTIAL VOLTAGE COILS

Designed for the following magnet type numbers:

8SW, 8DSW, SM840D, SM840DC, SM840EDC, 87DSH, 87DSHC, 100DSH.

Not for use with magnets equipped with full voltage coils.

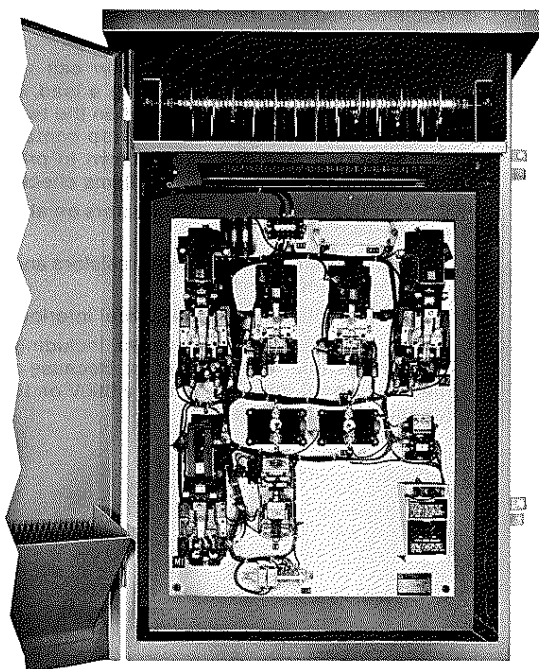
"COLD" RATINGS:

(with internal temperature of magnet coil at 68°-77°F)

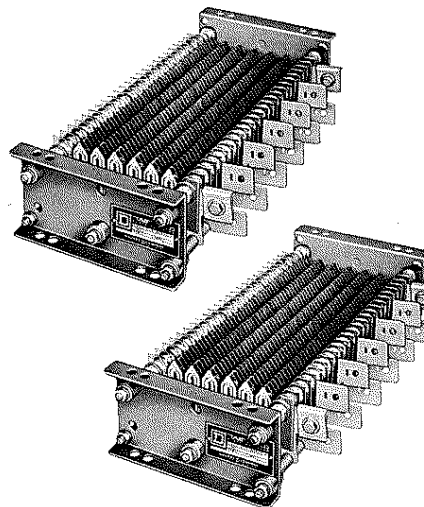
MAX. CURRENT AT LINE VOLTAGE (At Full Voltage or "Forcing")..... 280 AMPS

MAX. CURRENT AT REDUCED VOLTAGE (At Partial Voltage or "Cutback")..... 150 AMPS

MIN. MAGNET COIL RESISTANCE: 0.85 OHMS



Class 6815 Type R-22 Controller



Separate Tab-Weld Resistors
for Customer Mounting

Installation:

- Unpack controller carefully. Verify receipt of correct device by checking main nameplate on panel, and nameplates on the two separate Class 6715 Type TW120D Tab-Weld resistors furnished with the controller.
- Thoroughly inspect equipment for any transit damage. Tighten any electrical connections that might have loosened during shipment.
- When controller is to be lifted, be sure to use the lifting lugs on each side of controller. *Do not lift by cabinet top.*
- Bolt controller securely into desired position. Mount both separate Tab-Weld resistors so as to prevent accidental contact by personnel, allow free air circulation, and have protection from weather.
- Wire all external power and control circuits in accordance with wiring diagram on inside of door. Be certain that wiring is completed to both separate Tab-Weld resistors.
- Before applying power or connecting magnet, manually operate contactors to check for free movement without binding, and *make sure all arc chutes are pivoted to their fully down position.*

Supersedes SB 6815-18 Dated Sept., 1980

OCTOBER, 1982

Printed in U.S.A.

AJR

SQUARE D COMPANY

P.O. Box 472
Milwaukee, Wis. 53201
(414) 332-2000

Minor Rev. 11/84

Page 1



WARNING: *Electrical Shock Hazard when enclosure door is open. Contactor arcing is normal for control operation and this arcing may result in emission of hot particles. To avoid injury from emission of hot particles, service personnel should wear safety glasses and stand back and to the side when operating control with enclosure door open.*

Preliminary Start-Up: *(With Magnet Disconnected)*

- A. Place pilot device in "DROP" position. Apply voltage to controller. Check voltage, it should be between 230-250V for best performance.
- B. Check polarity with a voltmeter. **NOTE:** *Controller will NOT operate if polarity is reversed.*
- C. With voltage applied to the controller, *but with no magnet connected*, follow the Sequence of Operation at the bottom of page 7 (for Type R-22 controllers) or page 9 (for Type RF-22 controllers with fanning). **NOTE:** *With no magnet connected, DR, 1D, and 2D will not operate.*

Start-Up: *(With Magnet Connected)*

- A. Remove power from the controller.
- B. Make certain all arc chutes are pivoted to their fully down position.
- C. Connect the magnet.
- D. Apply power to the controller.
- E. Again follow the Sequence of Operation. Note that when "DROP" is initiated, DR, 1D, and 2D should close for approximately 2 to 4 seconds.

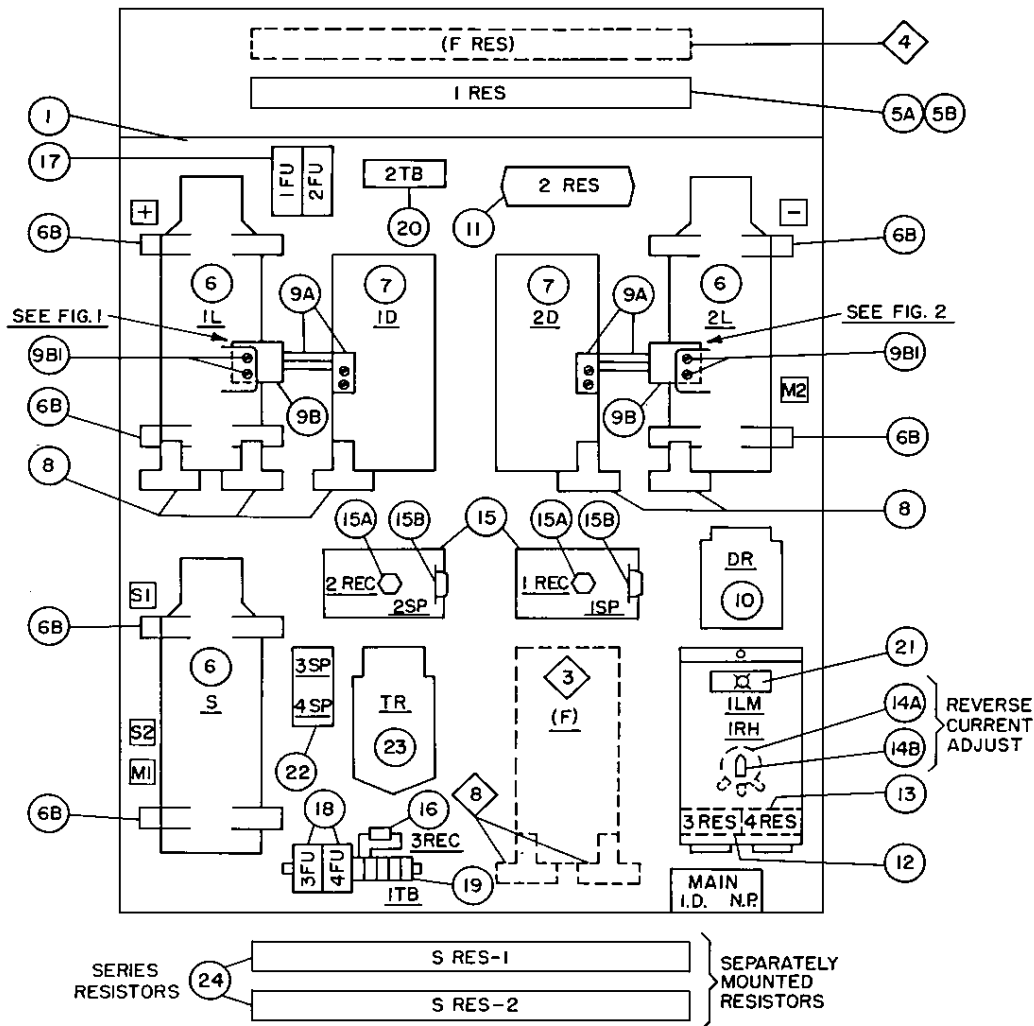
Adjustment For Clean Drop: To adjust the controller for a clean drop without "repicking", a reverse current rheostat and monitor light are provided. To obtain the best setting for a given magnet, start with the knob set near MIN, then make lifts and drops at successively higher settings until the light blinks at the end of the drop cycle (see "Monitor Light Operation" nameplate), or until a clean drop is obtained. Do not set higher than necessary to get a clean drop on all types of loads being handled. Rheostat should be reset if magnet is changed.

Preventive Maintenance and Troubleshooting:

- A. *Contact Tips* should be inspected on a regular basis for wear and excessive pitting, before a malfunction occurs. *Tips should be replaced in sets.* Each set is available in a kit (see Items 3A, 6A, 7A on page 4). It is recommended that these kits be kept on hand.
- B. *Periodic Inspection During Operation* can reveal abnormal conditions. While dropping a load, if excessive or unequal arcing occurs when the two Lift contactors open, or when the two Drop contactors open, the system should be shut down to prevent further damage, and the following items checked:
 1. Contact tips and "pigtail" connectors on all contactors.
 2. Electrical continuity of all fuses, resistors and the reverse current rheostat.
 3. Electrical continuity of all electrical interlocks.
 4. Shorts and grounds in the system, including the generator, cable, reel and magnet. Because ohmmeters may not detect grounds, a 500V or 1000V Megger should be used.



TYPE R-22 & RF-22 MAGNET CONTROLLERS
PARTS LOCATION DIAGRAM



◇ INDICATES COMPONENTS FURNISHED ONLY ON TYPE RF-22 CONTROLLERS.

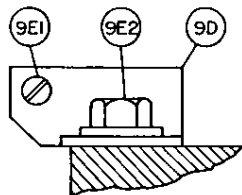


FIGURE 1

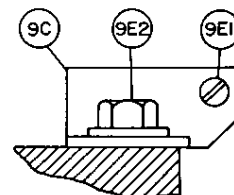


FIGURE 2



TYPE R-22 & RF-22 MAGNET CONTROLLERS PARTS INFORMATION

SYMBOL on Wiring Diagram	ITEM NO. From Pg. 3	DESCRIPTION <i>NOTE: Indented items listed directly under a device are component parts of that device</i>	TOTAL QTY. in Controller	ORDER PARTS BY NUMBERS SHOWN BELOW (Part Number or Class & Type Number)	
				For Type R-22	For Type RF-22
	1	Assembled Control Panel (Does not include Items 2, 3, 3A, 4, 5A, 5B, or 24.	1	Class 6815 Type RP-22	Class 6815 Type RFP-22
	2	Enclosure only, with door	1	50912-001-51	50912-020-51
	2A	Door only	1	50912-017-52	50912-021-52
F	3	Fanning Contactor, complete except for electrical interlock (Item 8)	(1)	(none)	Class 7004, Type MXEO-1 with 240V coil
	3A	Replacement Contact Tips for Item 3 (two sets)	(1)	—	Class 9998 Type MX-1 Kit
FRES	4	Fanning Resistor, complete with 2 end terminals	(1)	(none)	Class 6715 Type TW62D
1RES	5A	Discharge Resistor, with 2 end terminals only	1	Class 6715 Type TW32D	
	5B	Additional terminals	2	Class 6715 Type T-3	
1L,2L,S	6	Lift Contactors & Shorting Contactor, complete except for lugs (It. 6B) and electrical & mechanical interlock eqpt. (Items 8 thru 9E2).	3	<ul style="list-style-type: none"> • Class 7004 Type MFMO-1 For 1L & 2L, specify 120V coil. For S, specify 240V coil. (See Service Bul. 7004-67 for contactor components) 	
	6A	Replacement Contact Tips for Item 6.	2	Class 9998 Type MF-1 Kit Each Kit has 2 movable tips, 2 stationary tips & hardware.	
1L,2L,S	6B	Set of Power Terminal Lugs	2	Class 9999 Type ML-1 Kit (Contains 4-clamshell lugs)	
1D,2D	7	Drop Contactors, complete except for electrical & mechanical interlock eqpt. (Items 8 thru 9E2).	2	Class 7004 Type MXCO-1 with 120V coil (See Service Bul. 7004-61 for contactor components)	
	7A	Replacement Contact Tips for two Drop Contactors	1	Class 9998 Type MX-1 Kit (contains 2 movable tips, 2 stationary tips & hardware)	
1L,2L, 1D,2D, F	8	Electrical Interlocks (For Items 3, 6, and 7) (Qty. shown for std. controllers)	—	Class 9999 Type MX-11 Kit (Each kit contains 1-N.O. & 1-N.C. interlock) One kit each req'd for 2L, 1D, 2D. Two kits req'd for 1L and F.	
1L-1D 2D-2L	9A	Mechanical Interlocks, complete except for Items 9B thru 9E2.	2	Class 9999 Type MM-1 Kit NOTE: See instructions on Page 2 of Service Bul. 7004-61.	
	9B	Special Interlock Operators for mtg. on 1L & 2L contactors	2	50911-011-01 Use in place of one std. operator from each kit (9A).	
	9B1	Spl. Mtg. Screws for Item 9B (Pan-Head SA No. 8-32x3/4)	4	21911-14240 Use in place of 2 shorter pan-hd screws from each kit (9A).	
	9C	Special Interlock Support (left) for mtg. on 2L contactor	1	50911-012-02	
	9D	Special Interlock Support (right) for mtg. on 1L contactor	1	50911-012-01	
	9E1	Pan-Head Screws, SA 1/4-20x1/2; for Items 9C & 9D	2	21916-20160	
	9E2	Hex-Head Cap Screws, 1/4-20x3/4, for Items 9C & 9D	2	21401-20240 Use in place of one longer cap screw from each kit (9A).	
DR	10	Drop Relay	1	Class 7001 Type DO22-S5 with 48V DC coil (See Service Bul. 209-AS for relay components)	

(CONTINUED ON PAGE 5)



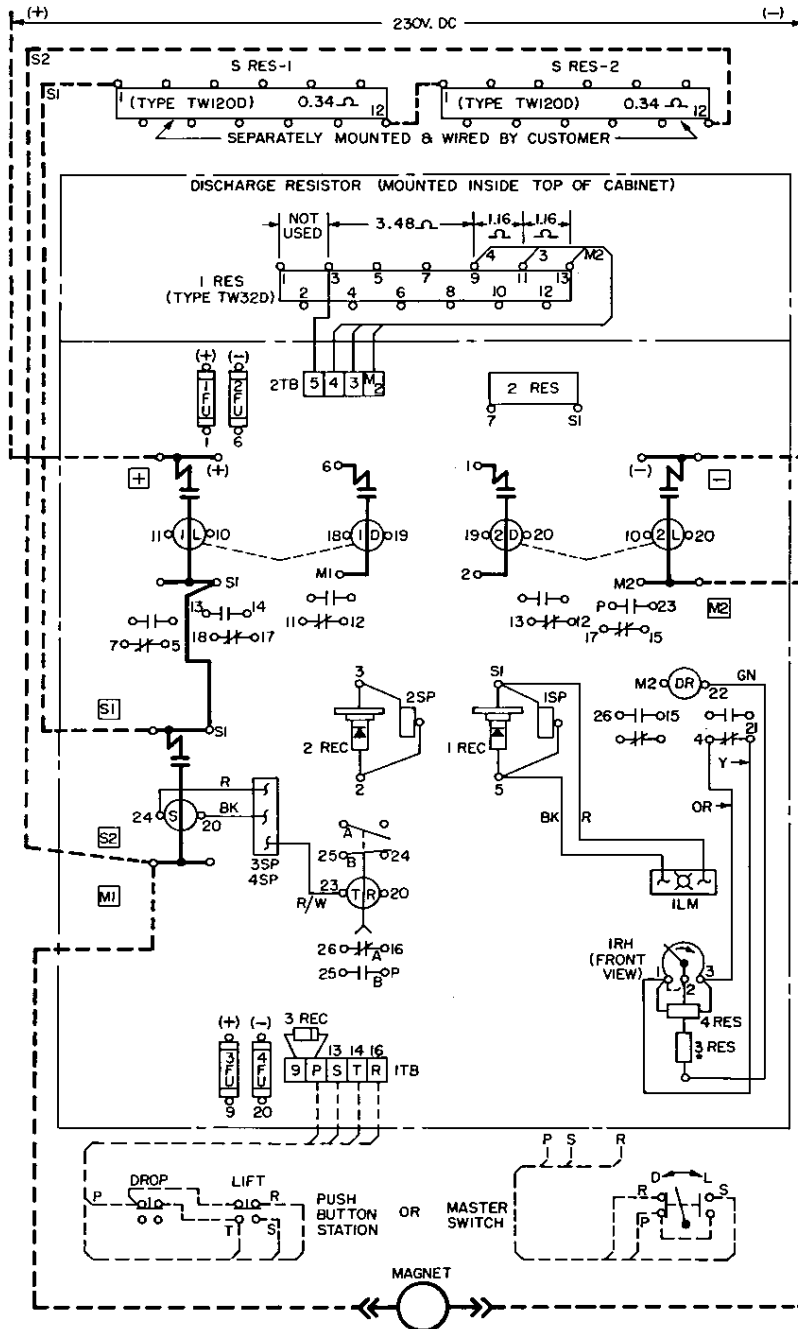
**TYPE R-22 & RF-22 MAGNET CONTROLLERS
PARTS INFORMATION (continued)**

SYMBOL on Wiring Diagram	ITEM NO. From Pg. 3	DESCRIPTION <i>NOTE: Indented items listed directly under a device are component parts of that device</i>	TOTAL QTY. In Controller	ORDER PARTS BY NUMBERS SHOWN BELOW (Part Number or Class & Type Number)
2RES	11	Reset Resistor, 16 ohm, 2.9 amp	1	Class 6703 Type PX1-16
3RES	12	Control Resistor, 39 ohm, 2 watt (requires two No. 22-16 AWG lugs)	1	26108-03920
4RES	13	Control Resistor, 1200 ohm, 5 watt (requires two No. 22-16 AWG lugs)	1	26101-13612
1RH	14A	Rheostat, 1000 ohm, 50 watt (Reverse Current Adjustment)	1	26198-34310
	14B	Pointer Knob (for Item 14A)	1	29203-04002
1REC,1SP 2REC,2SP	15	Heat Sink Assembly, complete, (Includes 1-Item 15A diode, 1-Item 15B surge suppressor, and 1-heat sink)	2	50912-010-50
1REC, 2REC	15A	Diodes (for power circuit)	2	27906-34100 Note: Apply heat sink compound (Dow-Corning No. 340 or equal) to replacement diode before mounting it, then torque its mounting nut to 100-120 lb.-in.
1SP,2SP	15B	Surge Suppressors	2	27920-94200
3REC	16	Diode (for control circuit)	1	27906-11602
1FU,2FU	17	Fuses (for power circuit)	2	25413-00350 (Bussmann FRN-30 or equal)
3FU,4FU	18	Fuses (for control circuit)	2	25419-10121 (Bussmann KTK-6 or equal)
1TB	19	Control Terminals (qty. shown for std. R & RF controllers)	5-7	Class 9080 Type GP-3
2TB	20	Terminal Block for Discharge Resistor	1	For Type R-22: Class 9080 Type CA-4 For Type RF-22: Class 9080 Type CA-5
1LM	21	Monitor Light Module	1	50910-017-51
3SP,4SP	22	Coil Suppressor Module	1	50912-011-51
TR	23	Cutback Timer	1	Class 9050 Type CO-2E with 230V DC coil Note: Set for 7 seconds (on-delay). (See Service Bul. 297-AS for timer components)
SRES-1, SRES-2	24	Series Resistors (separately mounted), each complete with 2 end terminals	2	Class 6715 Type TW120D



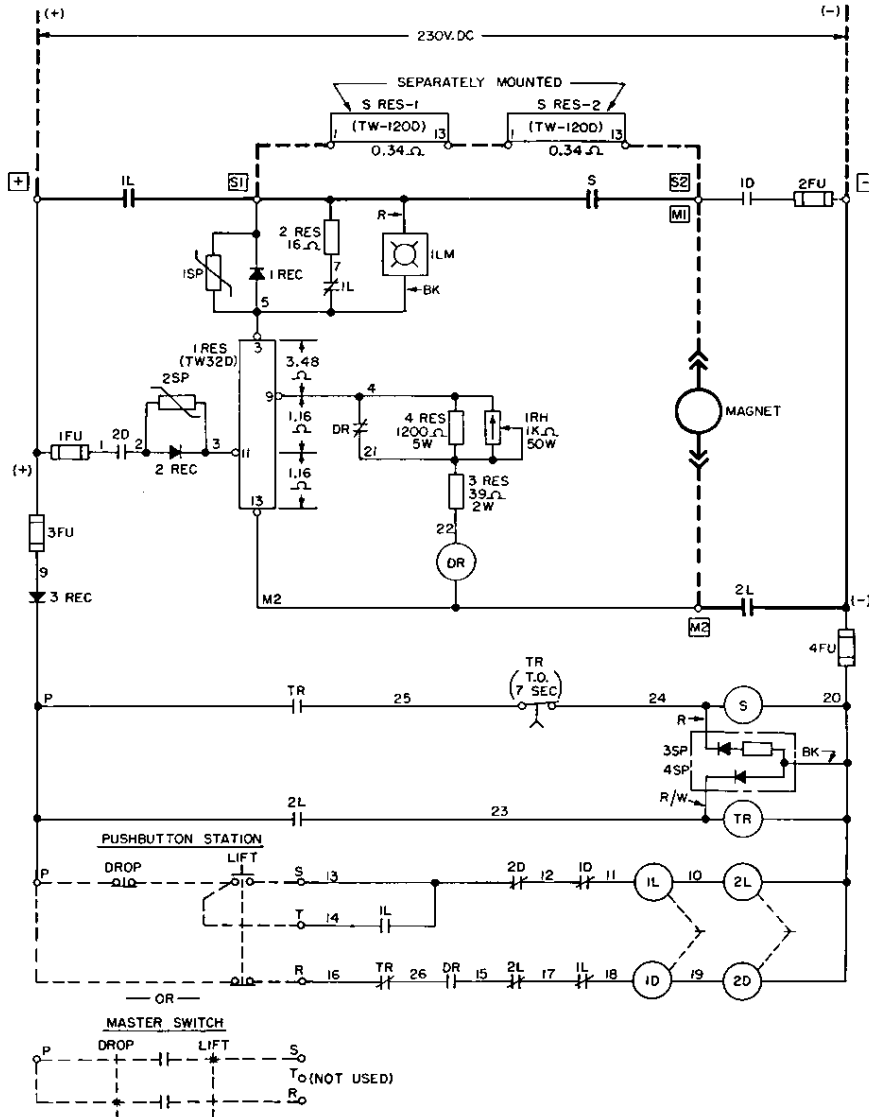
STANDARD TYPE R-22 MAGNET CONTROLLERS
CONNECTION DIAGRAM (See Page 7 for Elementary Diagram)

NOTE: CONTROLLER WILL ONLY OPERATE WHEN USING INDICATED POLARITY.





**STANDARD TYPE R-22 MAGNET CONTROLLERS
ELEMENTARY DIAGRAM (See Page 6 for Connection Diagram)
NOTE: CONTROLLER WILL ONLY OPERATE WHEN USING INDICATED POLARITY.**



SEQUENCE OF OPERATION

Placing the master switch in the LIFT position (or pressing the LIFT pushbutton) picks up contactors 1L and 2L, timer TR, and contactor S, applying line voltage to the magnet. In approximately 7 seconds TR times out, dropping out S and inserting resistors SRES-1 and SRES-2 in series with the magnet, thus reducing magnet voltage to its holding (cutback) design level.

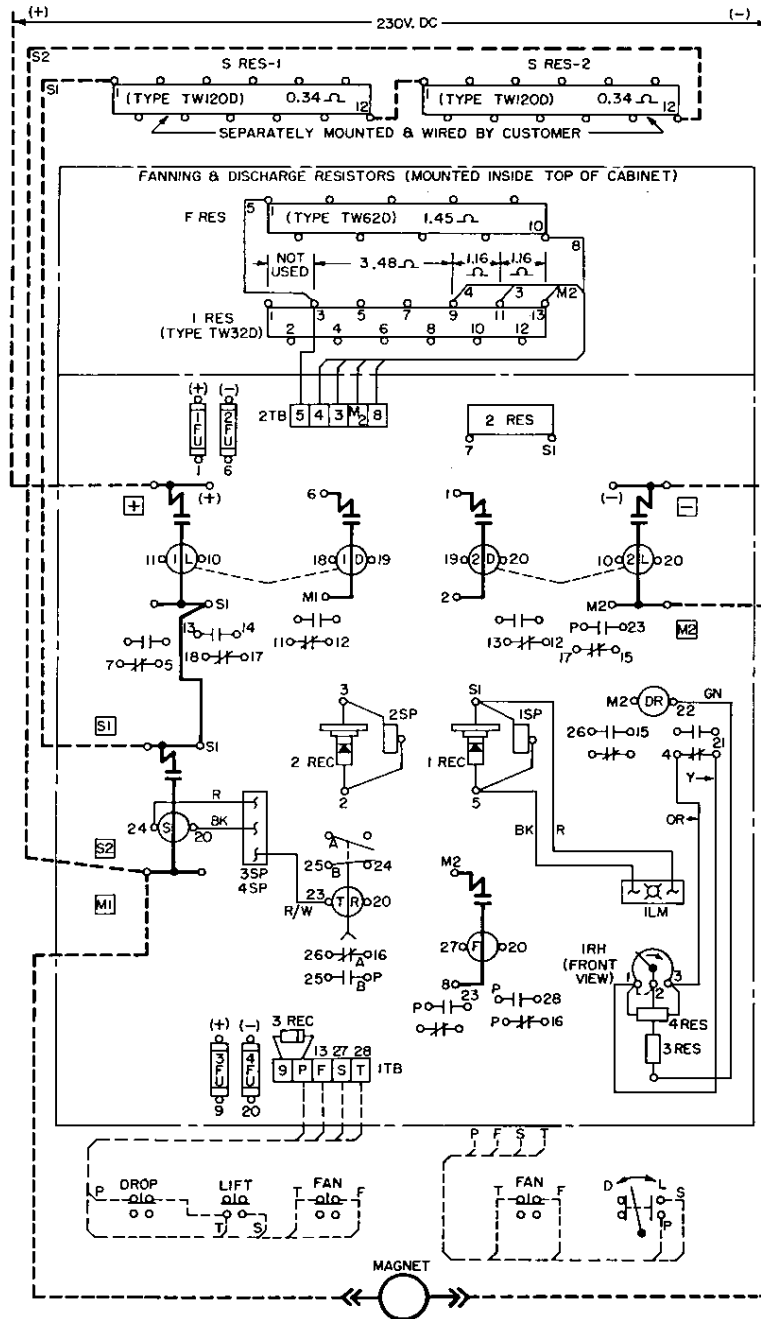
Moving the master switch from LIFT to DROP (or pressing the DROP button) drops out 1L, 2L and TR, discon-

necting the magnet from the line. Magnet discharge current through discharge resistor 1RES immediately picks up relay DR, which picks up contactors 1D and 2D. As magnet discharge current reaches zero and magnet voltage decays below line voltage, reverse current begins to flow from (+), 3, M2, M1, to (-). This reduces the voltage drop between 4 and M2 that holds in DR. Thus, when reverse current builds up to a certain value (dependent upon the setting of rheostat 1RH), DR, 1D, and 2D drop out, ending the cycle.



TYPE RF-22 MAGNET CONTROLLERS WITH FANNING CONNECTION DIAGRAM (See Page 9 for Elementary Diagram)

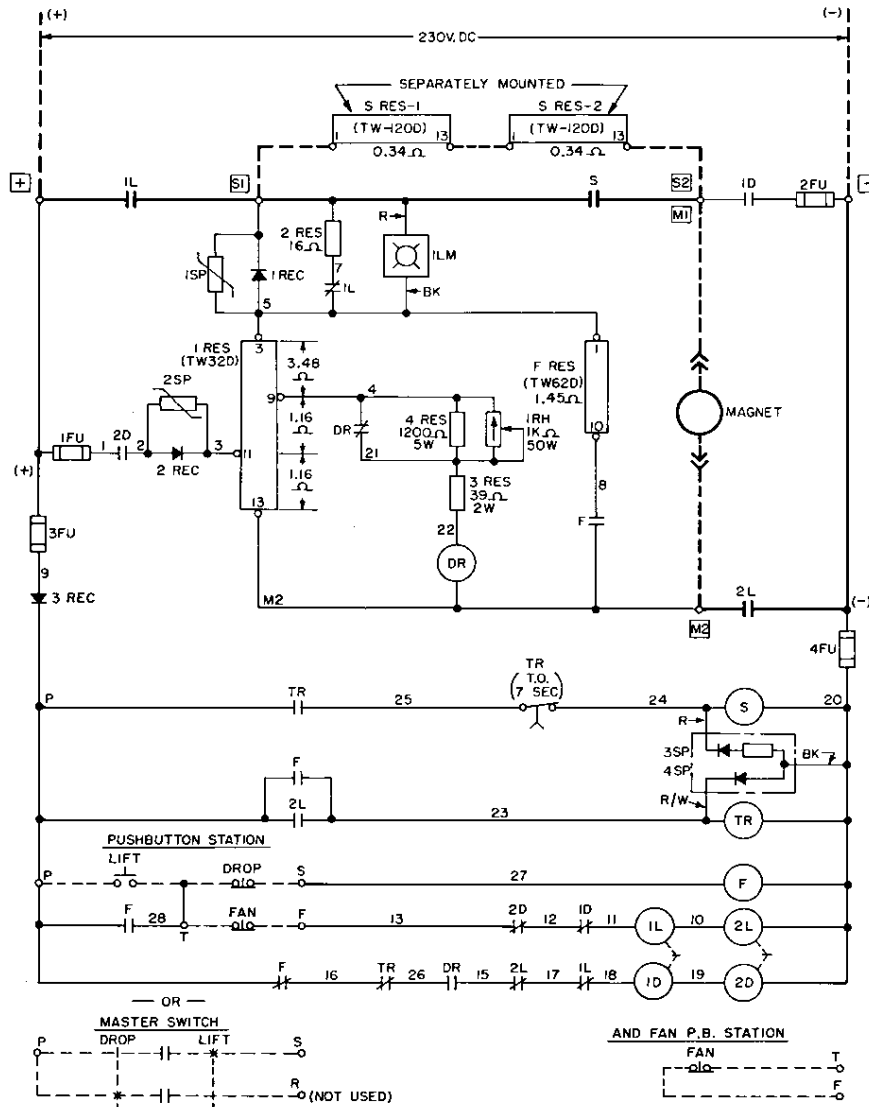
NOTE: CONTROLLER WILL ONLY OPERATE WHEN USING INDICATED POLARITY.





TYPE RF-22 MAGNET CONTROLLERS WITH FANNING ELEMENTARY DIAGRAM (See Page 8 for Connection Diagram)

NOTE: CONTROLLER WILL ONLY OPERATE WHEN USING INDICATED POLARITY.



SEQUENCE OF OPERATION

Placing the master switch in the LIFT position (or pressing the LIFT pushbutton) picks up contactors F, 1L and 2L, timer TR, and contactor S, applying line voltage to the magnet. In approximately 7 seconds TR times out, dropping out S and inserting resistors SRES-1 and SRES-2 in series with the magnet, thus reducing magnet voltage to its holding (cutback) design level.

While in LIFT, pressing the FAN pushbutton drops out 1L and 2L as long as the button is held depressed, causing the magnet to discharge slowly. Releasing the FAN button picks up 1L and 2L to retain the load remaining on the magnet.

Moving the master switch from LIFT to DROP (or pressing the DROP button) drops out F, 1L, 2L and TR, disconnecting the magnet from the line. Magnet discharge current through discharge resistor 1RES immediately picks up relay DR, which picks up contactors 1D and 2D. As magnet discharge current reaches zero and magnet voltage decays below line voltage, reverse current begins to flow from (+), 3, M2, M1, to (-). This reduces the voltage drop between 4 and M2 that holds in DR. Thus, when reverse current builds up to a certain value (dependent upon the setting of rheostat 1RH), DR, 1D, and 2D drop out, ending the cycle.

Supersedes SB 6815-18 Dated Sept., 1980

OCTOBER, 1982

SQUARE D COMPANY

P.O. Box 472
Milwaukee, Wis. 53201
(414) 332-2000

Page 9

**CLASS 6815 (Formerly Class 1315) TYPE R-22 & RF-22
FORM E44****REDUCED VOLTAGE MAGNET CONTROLLERS**

Series A, 230 Volts DC

FOR HIGH SPEED CHARGE & DISCHARGE OF SQUARE D 100-DSH MAGNETS
EQUIPPED WITH PARTIAL VOLTAGE COILS

This Supplement applies only to Form E44 Controllers and is for use in conjunction with Service Bulletin 6815-18.

Form E44 Controllers use Type TW150D instead of TW120D for the two separately mounted Class 6715 Tab-Weld series resistors SRES-1 and SRES-2. The ohmic value of each resistor is 0.23 ohms instead of 0.34 ohms.

This change is applicable to all references to TW120D resistors in Service Bulletin 6815-18, as follows:

- Page 1, bottom-left, under "Installation", paragraph A.
- Page 5, Item 24, in right-hand Class & Type number column.
- Pages 6, 7, 8, 9, at top of diagram.

No other changes are applicable to the Form E44 Controllers.