



industrial controls division

INSTRUCTIONS

4295

Publication No. 112
October 1984
Repl.: September 1980

EUCLIDTM AUTOMATIC DISCHARGE MAGNET CONTROLLER INSTRUCTION MANUAL

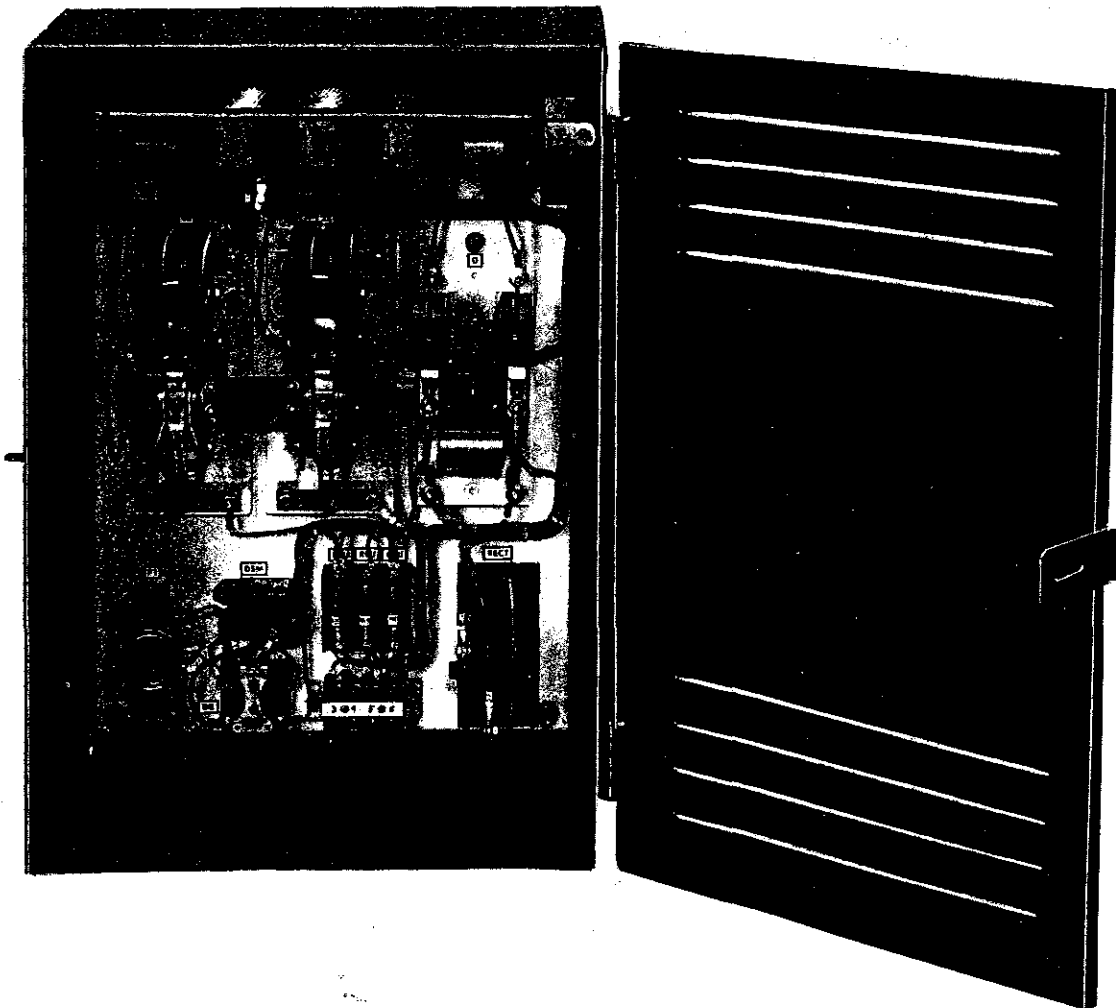


TABLE OF CONTENTS

	Page
Description of Operation.....	3
Schematic Diagram, Fig. 1 — Lifting Magnet Control - Automatic Discharge.....	3
Voltage and Current Values at Magnet, Fig. 2	4
Schematic Diagram, Fig. 3 — Lift Cycle	4
Schematic Diagram, Fig. 4 — Primary Discharge Cycle	5
Schematic Diagram, Fig. 5 — Reverse Current Cycle	5
Schematic Diagram, Fig. 6 — Secondary Discharge Cycle	6
Installation and Maintenance	6
Troubleshooting	7
Part Numbers for Renewal Parts	8
	9
DSM (Discharge Sensor Module).....	10

Description of Operation

Lifting magnets operate more efficiently with greater life and safety to equipment when controlled by the Euclid Type 4295 Magnet Controllers. Magnets are cleanly discharged, permitting prompt return for another lift because of exclusive features.

A mechanically rugged high thermal capacity resistor assembly, permanently connected around the magnet, always provides a positive discharge path for the stored magnetic energy.

Inductive voltages from the magnet discharge cannot possibly be returned to the line, permitting rectifier power

supplies to be safely used without requiring special protective load resistors or other by-pass circuitry.

Figure 1 covers the complete schematic of the basic controller. The Lift and Drop Contactors designated "L", and "D" respectively, provide a reversing circuit to the magnet. The discharge circuit is composed of the permanently connected resistor RES1 and the blocking rectifier D1.

Throwing the master switch handle to the Lift Position closes the master switch contact in the lift contactor coil circuit, thereby energizing the Lift contactors. The control circuit power is supplied through CFU and Rectifier D2. This rectifier assures that correct polarity connections have been made to the controller. No operation is

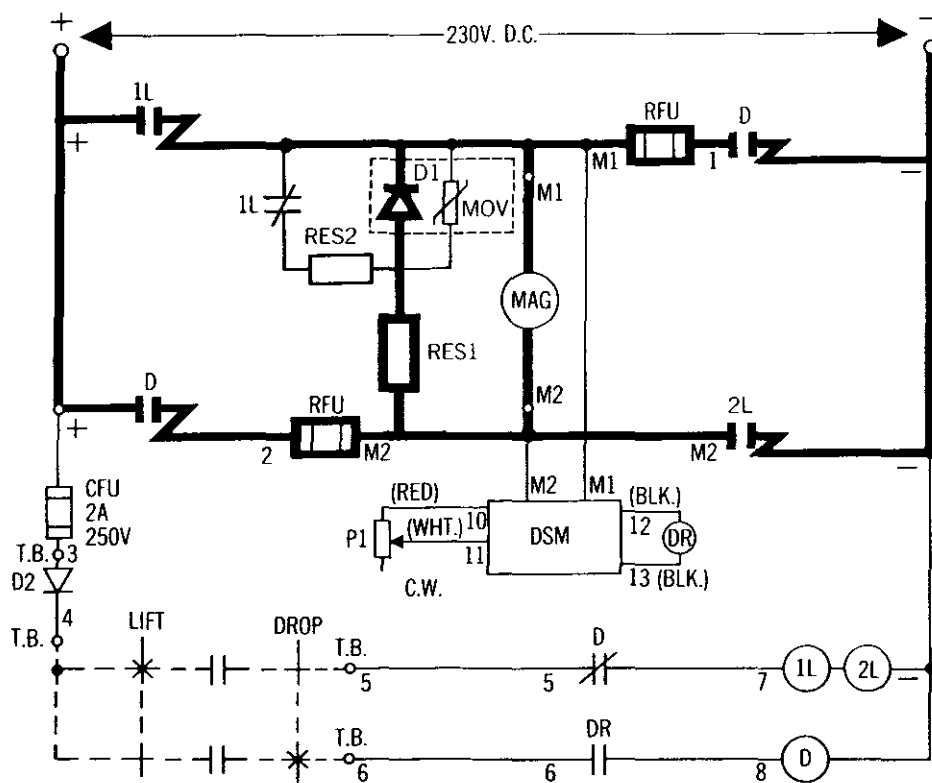
possible without proper polarity being supplied.

A small resistor Res 2 is connected in series with a normally closed auxiliary contact "1L" on the Lift contactor. This series combination is connected in parallel with the discharge path blocking rectifier "D1". The purpose of this resistance is two-fold:

1. This resistance forces the primary magnet discharge current to flow through the blocking rectifier "D1" and not through the auxiliary "1L" contact, and
2. This resistance dissipates some of the remaining secondary discharge energy from the reverse current drop cycle.

TYPE 4295 LIFTING MAGNET CONTROL - AUTOMATIC DISCHARGE CONSTANT VOLTAGE TYPE (230V. D.C.) SCHEMATIC DIAGRAM

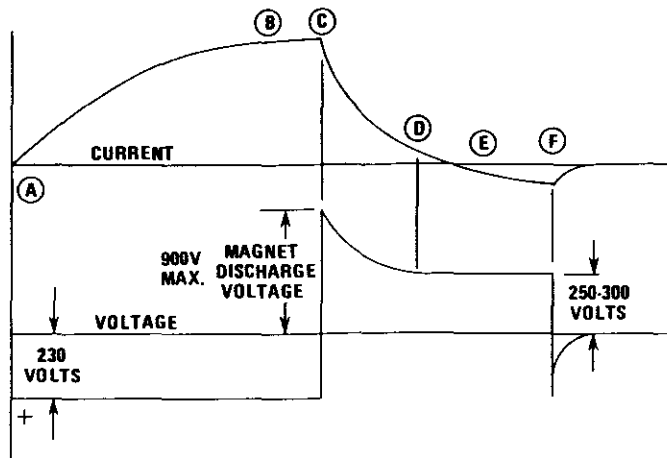
FIG. 1



SYMBOL	FUNCTION	SYMBOL	FUNCTION
DR	DROP RELAY	MOV	SURGE SUPPRESSOR
P1	POTENTIOMETER ASSEMBLY	RES1	DISCHARGE RESISTOR
CFU	CONTROL FUSE	RES2	FORCING RESISTOR (IF USED)
RFU	DROP FUSES	DSM	DISCHARGE SENSOR MODULE
D2	DIODE	D	DROP CONTACTOR
D1	RECTIFIER, MAGNET DISCHARGE PATH	1L, 2L	LIFT CONTACTOR

VOLTAGE AND CURRENT VALUES AT MAGNET

FIG. 2

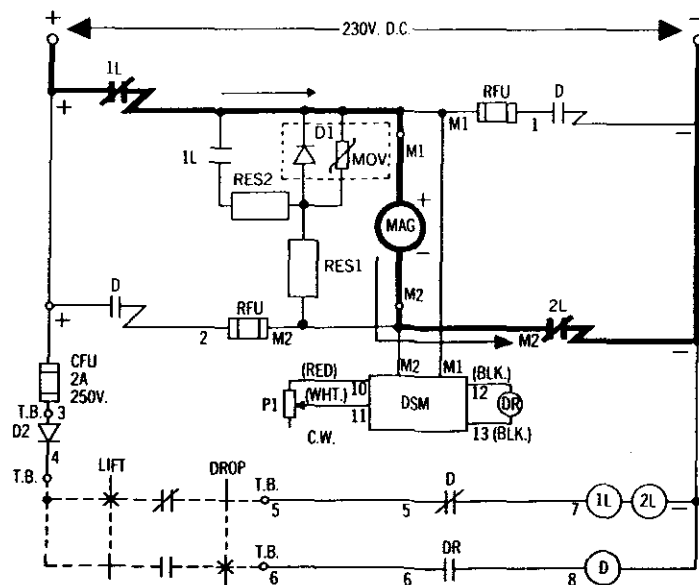


- A) Master Switch moved to "LIFT" position (see Lift Cycle Fig. 3)
- B) Magnet Fully Energized.
- C) Master Switch moved to "DROP" position (see Discharge Cycle Fig. 4).
- D) Drop contactor closes (see reverse current cycle Fig. 5).
- E) Fixed time reverse current period.
- F) Drop Contactor opens after fixed time period. (see secondary discharge cycle Fig. 6).

The following gives sequential operating steps of the basic functions of this control with reference to the appropriate schematic figure.

230V. D-C SCHEMATIC DIAGRAM LIFT CYCLE

FIG. 3

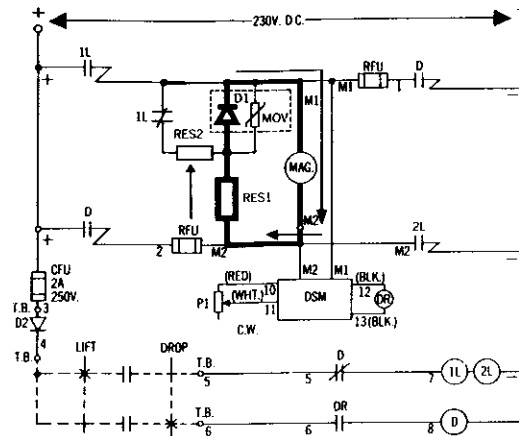


LIFT CYCLE

1. The master switch handle moves to the lift position and closes the master switch Lift contact.
2. The lift contactor is energized through D2 and CFU.
3. The lift contactor closes and the main lift contacts "L" energize the magnet.

230V. D-C SCHEMATIC DIAGRAM PRIMARY DISCHARGE CYCLE

FIG. 4

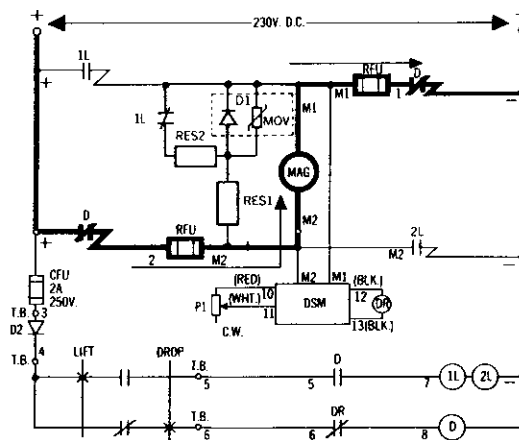


DISCHARGE CYCLE

1. The master switch handle is moved to the central position (Dribble) or to the drop position. The master switch Lift contact opens.
2. The lift contactor is deenergized.
3. The lift contactor main contacts "L" open and disconnect the magnet from the 230V supply.
4. The magnet voltage reverses and the remaining magnet current now flows through the permanently connected primary discharge path.

230V. D-C SCHEMATIC DIAGRAM REVERSE CURRENT CYCLE

FIG. 5

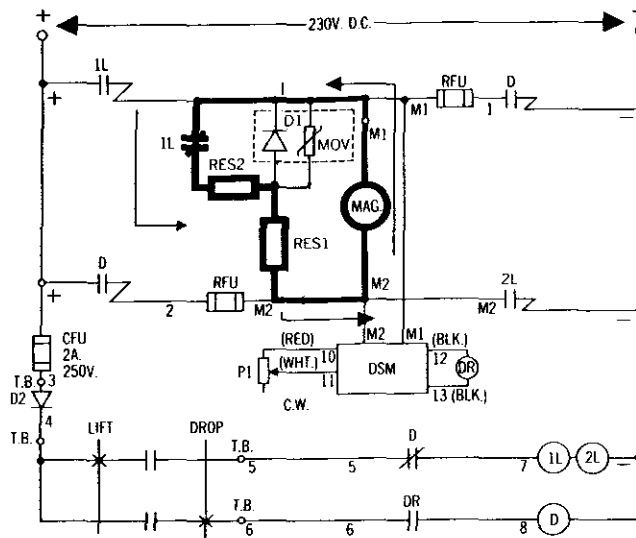


REVERSE CURRENT CYCLE

1. The reverse magnet voltage resulting from the discharge cycle, Fig. 4, signals the "DSM" that the discharge cycle has begun.
2. When the reverse magnet voltage falls to 250-300 volts, the "DSM" energizes the "Drop Relay", "DR".
3. The "Drop Relay" energizes the drop contactor if the master switch drop contact is closed.
4. When the main drop, "D", contacts close, the reverse magnet current begins to flow. (This is done to force the residual magnetism to zero).
5. As the "DSM" energizes the "Drop Relay", it also begins the fixed time reverse current period. The drop time adjustment potentiometer P1 determines the length of this period.
6. At the end of this fixed time period, the "DSM" deenergizes the "Drop Relay" which causes the Drop contactor to open. This terminates the reverse current cleaning cycle.

230V. D-C SCHEMATIC DIAGRAM SECONDARY DISCHARGE CYCLE

FIG. 6



SECONDARY DISCHARGE CYCLE

1. When the drop contactor opens and interrupts the reverse magnet current, the magnet voltage reverses once again.
2. The remaining reverse magnet current flows through the secondary discharge path; the normally closed auxiliary contact "1L" and the discharge resistor RES-1.

Installation and Maintenance

Hubbell Type 4295 Magnet Controllers should be installed in accordance with accepted practices for installation of industrial control equipment.

Polarity of the incoming line connections **MUST BE** observed; otherwise, these controllers will not function.

An understanding of the principle of operation will help in analyzing trouble and in keeping this controller operating at maximum efficiency.

Basically, this controller serves the three functions necessary for magnet operation:

1. Energize the magnet for movement of load.
2. Dissipate the stored energy of the magnet to release the load.
3. Apply reverse current through the magnet to remove the residual magnetism effect.

Two electrically and mechanically interlocked sets of contactors "LIFT" and "DROP" serve to apply the D-C power for energization and reverse

current cleaning respectively in two separate actions without time overlap.

The permanently connected resistor discharge path around the magnet absorbs and dissipates the stored magnet energy when the Lift contactor interrupts the supply power. The maximum voltage peak is limited to about 900 volts by the high thermal capacity resistor assembly.

During the time of the stored energy dissipation, the reverse voltage appearing across the magnet and the discharge resistor assembly signals the discharge sensor module "DSM" that a discharge cycle has begun. When the discharge voltage falls to 250 to 300 volts, the "DSM" module closes a pilot drop relay which energizes the "DROP" contactor.

The fixed time reverse current cycle begins with the closing of the "DROP RELAY" after practically all of the stored magnet energy is dissipated by the discharge resistor assembly. The "DSM" module also controls the length of the reverse current cycle. After a preset period, controlled by the Drop Time adjustment potentiometer,

the DSM deenergizes the drop relay. This action causes the drop contactor to open and end the reverse current cycle.

A unique feature of the Euclid Magnet Control is that the full supply voltage is utilized to force the buildup of reverse current through the magnet. This feature guarantees a short reverse current cycle thus contributing to the overall controller speed.

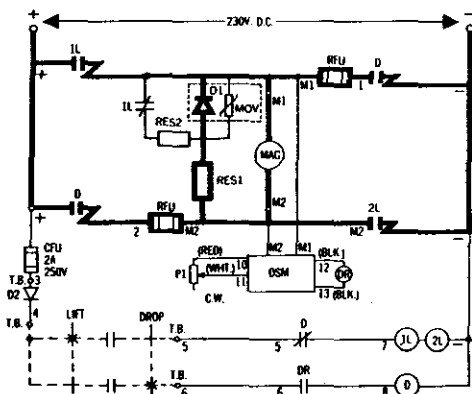
NOTE: Reverse current adjustment should always be made with the lightest material handled and starting with the least current. Turn the adjustment knob clockwise until the magnet drops the material cleanly. The adjusting potentiometer is mounted along side of the "DSM".

Since the discharge of the magnet is a separate function from the reverse current magnet cleaning action, it is easy to obtain close control of partial load drops or to "DRIBBLE" a load if desired. A portion of the load can be dropped merely by moving the master switch handle midway between the lift and drop positions to open the "LIFT" contactor without "SETTING UP" the automatic drop cycle.

Trouble Shooting

SYMPTOM	POSSIBLE CAUSE	DIAGNOSIS/CORRECTIVE ACTION
1. "LIFT" contactor does not pickup	Polarity not observed at time of controller installation. Lift contactor coil circuit open. CFU or Diode D2 open.	Reverse the supply power connections to the controller. Check continuity of lift contactor coils. Check master switch contacts. Replace CFU or D2.
2. Magnet does not clean properly.	Reverse current cycle time is too short. Drop contactor does not remain closed long enough to clean magnet. Reverse current cycle time is too long. Drop contactor remains closed too long and allows excessive reverse current build-up. Drop contactor operates but no reverse current flow.	Increase the Drop Time adjustment potentiometer setting (Clockwise rotation). Decrease the Drop Time adjustment potentiometer setting (counter-clockwise rotation). Replace RFU fuses.
3. "DROP" contactor does not operate.	Drop contactor coil circuit open. Reversed M2-M1 connections to the "DSM". Faulty drop relay. Faulty "DSM"	Check continuity of Drop Contactor coil. Check master switch contacts. Check "DSM" wiring and correct if necessary. Replace drop relay. Replace "DSM".
4. "DROP" contactor operates but does not drop out. Reverse current fuses are blown.	Faulty drop time adjustment potentiometer or open potentiometer circuit. Faulty "DSM".	Repair or replace potentiometer assembly or wiring. Replace "DSM".
5. No adjustment of the reverse current cycle time.	Faulty drop time adjustment potentiometer. Faulty "DSM".	Replace potentiometer assembly. Replace "DSM".
6. Discharge Resistor ASSEMBLY overheats.	Too many magnet discharges per minute. Blocking rectifier D1 is shorted. Full line voltage applied to resistor assembly during lift cycle.	Avoid frequent cycling or use controller with increased capacity. Replace blocking rectifier D1.

CONSULT FACTORY IF FURTHER RECOMMENDATIONS ARE DESIRED.



SYMBOL	FUNCTION	SYMBOL	FUNCTION
DR	DROP RELAY	MOV	SURGE SUPPRESSOR
P1	POTENTIOMETER ASSEMBLY	RES1	DISCHARGE RESISTOR
CFU	CONTROL FUSE	RES2	FORCING RESISTOR (IF USED)
RFU	DROP FUSES	DSM	DISCHARGE SENSOR MODULE
D2	DIODE	D	DROP CONTACTOR
D1	RECTIFIER, MAGNET DISCHARGE PATH	1L, 2L	LIFT CONTACTOR

AUTOMATIC DISCHARGE

PART NUMBERS FOR RENEWAL PARTS

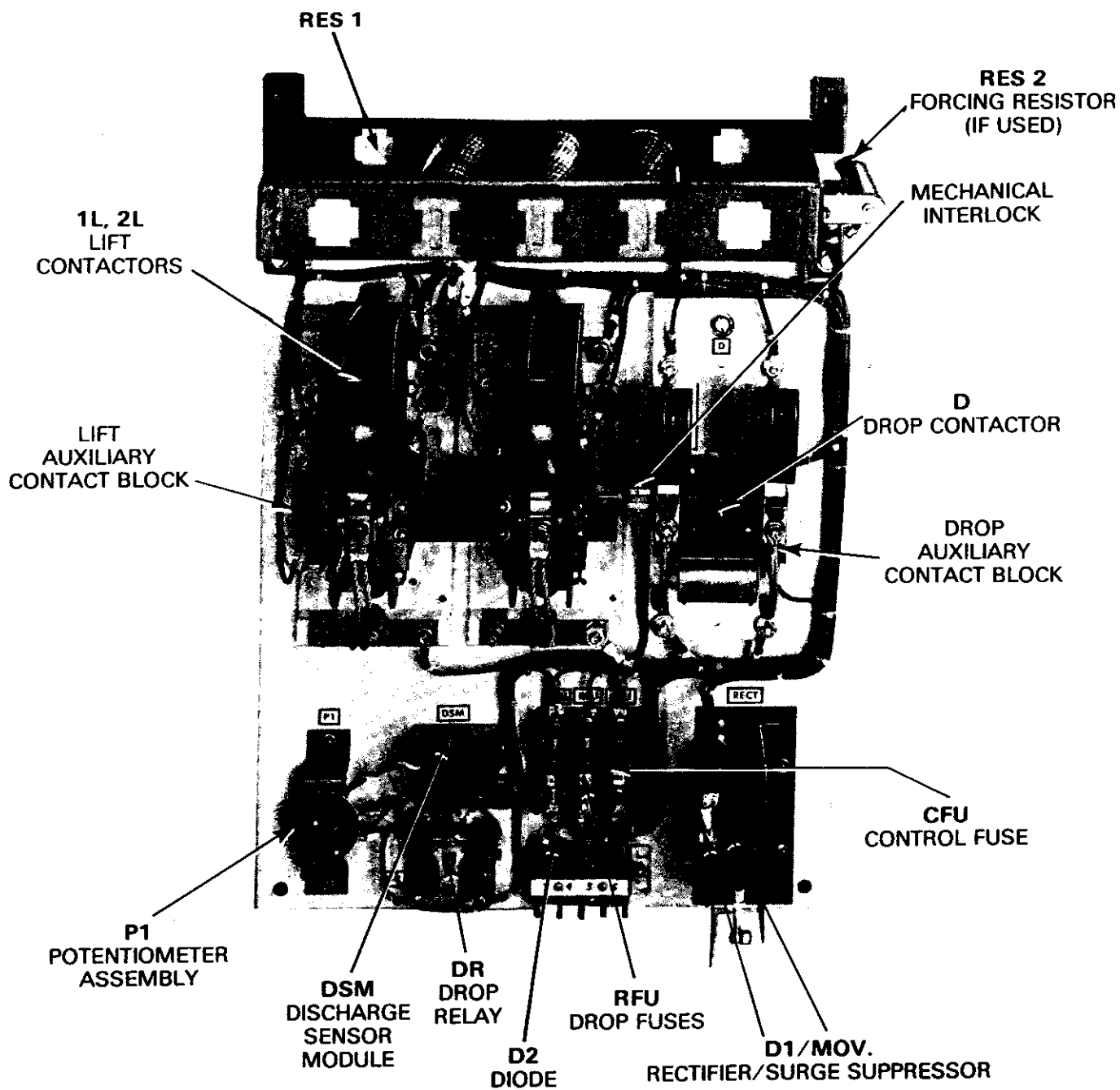
PRODUCT COMPONENT DESCRIPTION	MAXIMUM COLD MAGNET CURRENT				
	25 AMP.	50 AMP.	85 AMP.	130 AMP.	175 AMP.
MAGNET CONTROLLER SIZE	1	2	3	3	4
RES 1** DISCHARGE RESISTOR ASSEMBLY	69451-855	69451-856	69451-857	69451-858	69451-859
D1/MOV. ASSEMBLY RECTIFIER/SURGE SUPPRESSOR	71386-005	71386-005	71386-006	71386-007	71386-007
RFU DROP FUSES	57361-282 5A, 250V.	57361-085 10A, 250V.	57361-006 20A, 250V.	57361-010 25A, 250V.	57361-010 25A, 250V.
D2 DIODE	57355-001	57355-001	57355-001	57355-001	57355-001
DSM DISCHARGE SENSOR MODULE	48684-001	48684-001	48684-001	48684-001	48684-001
DR DROP RELAY	31658-038	31658-038	31658-038	31658-038	31658-038
P1 POTENTIOMETER ASSEMBLY	48686-001	48686-001	48686-001	48686-001	48686-001
D DROP CONTACTOR	5210-59312-507	5210-59322-503	5210-59322-503	5210-59322-503	5210-59322-503
CFU CONTROL FUSE	57361-071 2A, 250V.	57361-071 2A, 250V.	57361-071 2A, 250V.	57361-071 2A, 250V.	57361-071 2A, 250V.
2L LIFT CONTACTOR	5210-59322-503 (L)	5210-59322-504 (L)	5210-59335-011	5210-59335-011	5210-59345-011
1L LIFT CONTACTOR	—	—	5210-59335-011	5210-59335-011	5210-59345-011
AUXILIARY CONTACT BLOCK N.O. & N.C.	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"
RES 2 FORCING RESISTOR	—	—	57419-035	57419-035	57419-035
MECHANICAL INTERLOCK	68015-002	68015-002	71904-001	71904-001	71904-001
*SPARE PARTS KIT	59401-001	59401-009	59401-003	59401-003	59401-004

*RECOMMENDED PARTS FOR MAINTENANCE

**SEE CHART ON PAGE 9 FOR RESISTOR COILS USED

RES 1 — DISCHARGE RESISTOR ASSEMBLY

DISCH. RES. ASSEM. P/N	69451-855	69451-856	69451-857	69451-858	69451-859
RES. COILS USED	1 - Size 3	2 - Size 3	3 - Size 3	3 - Size 3	5 - Size 3
RES. COILS RATING - Each	2A, 40Ω	5.5A, 11.5Ω	11A, 3.76Ω	15A, 2.14Ω	24A, .945Ω
RES. COILS Part No.	69423-004	69323-001	69323-005	69323-009	69323-014

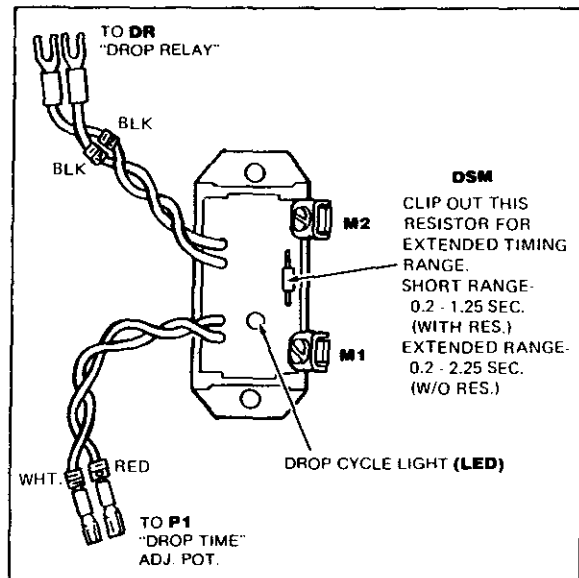
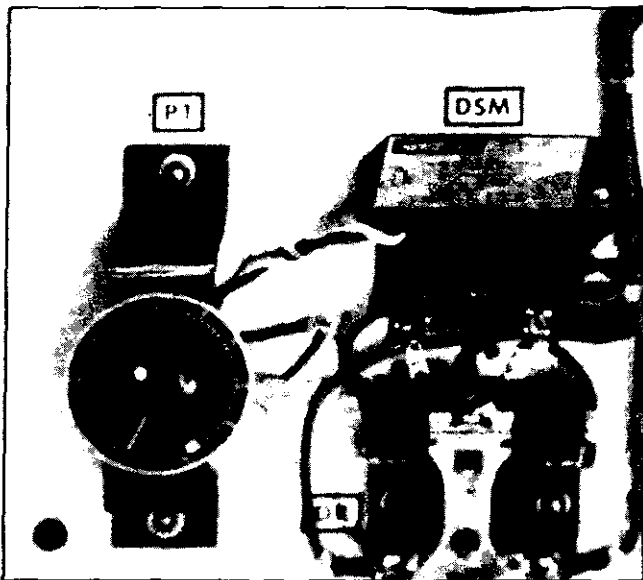


AUTOMATIC DISCHARGE ONLY DSM DISCHARGE SENSOR MODULE

The DSM, Discharge Sensor Module, is a potted electronic assembly which operates a pilot relay. This module monitors the primary discharge voltage of a lifting magnet and controls the drop contactor during the drop cycle. The DSM contains a voltage sensing section and an adjustable timing section. The voltage sensing section causes the drop contactor to engage when the discharge voltage falls to about 250V. The adjustable timing section controls the length of time that the drop contactor is engaged. This

adjustment allows the magnet controller to be set to clean the magnet.

Small magnets, generally size 1 through the low end of size 3 controllers, will require the short range timing. This range is available by leaving the exposed resistor on top of the DSM assembly intact. Larger magnets, mid range size 3 through size 4, will require the extended range timing. This range is selected by "Clipping Out" the exposed resistor.



TROUBLESHOOTING

The operation of the DSM can be verified by watching the magnet controller operation:

1. When the lift circuit opens, the magnet begins discharging through the primary discharge path. As the magnet energy is expended, the discharge voltage falls.
2. When the discharge voltage falls to 250-300V, the DSM causes the drop relay to operate. At the same time, the drop cycle LED on the DSM lights.
3. When the drop relay closes, the drop contactor picks up and begins the controller's reverse current cycle.
4. After the pre-set drop time has expired, the DSM de-energizes the drop relay. The drop cycle LED on the DSM goes out.
5. The drop time potentiometer, P1, is used to adjust the drop time to suit the particular magnet and load.



hubbell industrial controls, inc.

Instructions

4295

Publication No. 112A
May 1988

PART NUMBERS FOR RENEWAL PARTS

PRODUCT COMPONENT DESCRIPTION	MAXIMUM COLD MAGNET CURRENT				
	25 AMP.	50 AMP.	85 AMP.	130 AMP.	175 AMP.
MAGNET CONTROLLER SIZE	1	2	3	3	4
RES 1** DISCHARGE RESISTOR ASSEMBLY	69451-855	69451-856	69451-857	69451-858	69451-859
D1/MOV ASSEMBLY RECTIFIER/SURGE SUPPRESSOR	71386-005	71386-005	71386-006	71386-007	71386-007
RFU DROP FUSES	57361-282 5A, 250V.	57361-085 10A, 250V.	57361-006 20A, 250V	57361-010 25A, 250V.	57361-010 25A, 250V.
D2 DIODE	57355-001	57355-001	57355-001	57355-001	57355-001
DSM DISCHARGE SENSOR MODULE	48684-001	48684-001	48684-001	48684-001	48684-001
DR DROP RELAY	31658-038	31658-038	31658-038	31658-038	31658-038
P1 POTENTIOMETER ASSEMBLY	48686-001	48686-001	48686-001	48686-001	48686-001
D DROP CONTACTOR	5210-59112-002	5210-59122-002	5210-59122-002	5210-59122-002	5210-59122-002
CFU CONTROL FUSE	57361-071 2A, 250V.	57361-071 2A, 250V.	57361-071 2A, 250V	57361-071 2A, 250V.	57361-071 2A, 250V.
2L LIFT CONTACTOR	5210-59122-002 (L)	5210-59122-001 (L)	5210-59430-010	5210-59430-010	5210-59440-010
1L LIFT CONTACTOR	—	—	5210-59430-010	5210-59430-010	5210-59440-010
AUXILIARY CONTACT BLOCK N.O. & N.C.	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"	67976-001 "D" & "L"
RES 2 FORCING RESISTOR	—	—	47419-001	57419-035	57419-035
MECHANICAL INTERLOCK	68015-002	68015-002	71904-001	71904-001	71904-001
*SPARE PARTS KIT	59401-401	59401-409	59401-403	59401-403	59401-404

*RECOMMENDED PARTS FOR MAINTENANCE

**SEE CHART ON BACK FOR RESISTOR COILS USED

SPARE PARTS KIT

Used With Magnet Controller Part Number	Spare Parts Kit Part Number	Spare Parts Kit Includes:
4295-91813-002	59401-001 ▲ 59401-401 ●	1 — Set of Contacts, Springs and Coil for "Lift" Contactor.
4295-91814-002	59401-009 ▲ 59401-409 ●	1 — Set of Contacts, Springs and Coil* for "Drop" Contactor.
4295-91815-002	59401-003 ▲	1 — Polarity Sensing Rectifier
4295-91816-002	59401-403 ●	1 — Auxiliary Contact Assembly for "Drop" or "Lift" Contactor.
4295-91817-002	59401-004 ▲ 59401-404 ●	1 — Discharge Sensor Module (DSM). 1 — Drop Relay (DR)
4296-91827-002	59401-010 ▲ 59401-410 ●	1 — Set of Contacts, Springs and Coil for "Lift" Contactor.
4296-91828-002	59401-011 ▲ 59401-411 ●	1 — Set of Contacts, Springs and Coil* for "Drop" Contactor.
4296-91829-002	59401-012 ▲	1 — Polarity Sensing Rectifier.
4296-91830-002	59401-412 ●	1 — Auxiliary Contact Assembly for "Drop" or "Lift" Contactor.

- ▲ Use with Controllers supplied before May 1988
● Use with Controllers supplied after May 1988

*Except size 1 and 2 controllers. Kit includes (1)
coil for both lift and drop contactors.

DISCHARGE RESISTOR ASSEMBLY P/N	RESISTOR COILS USED	COIL RATING		RESISTOR COIL PART NUMBER
		AMPS	OHMS	
69451-855	1-SIZE 3	2.0	40.0	69423-004
69451-856	2-SIZE 3	5.5	11.5	69323-001
69451-857	3-SIZE 3	11.0	3.76	69323-005
69451-858	3-SIZE 3	15.0	2.14	69323-009
69451-859	5-SIZE 3	24.0	.945	69323-014



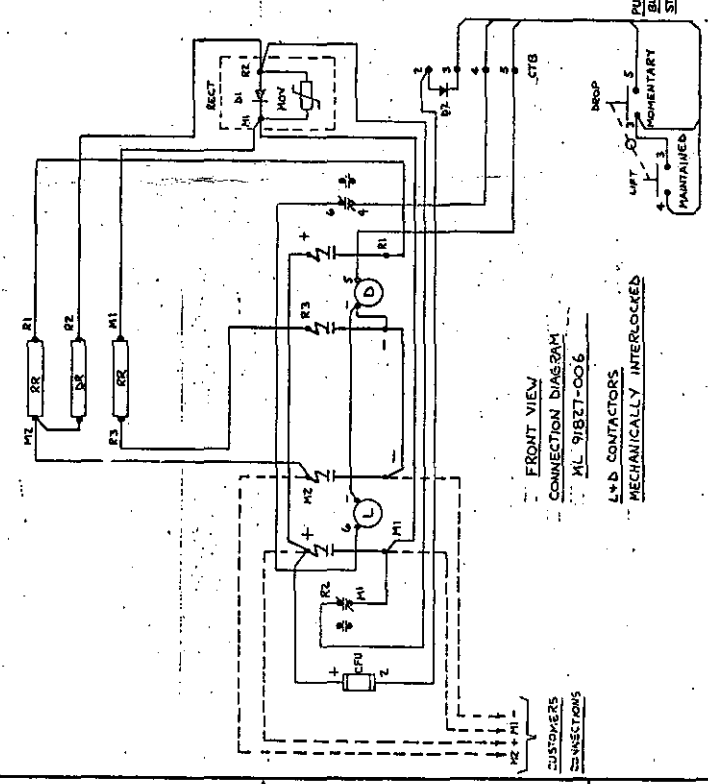
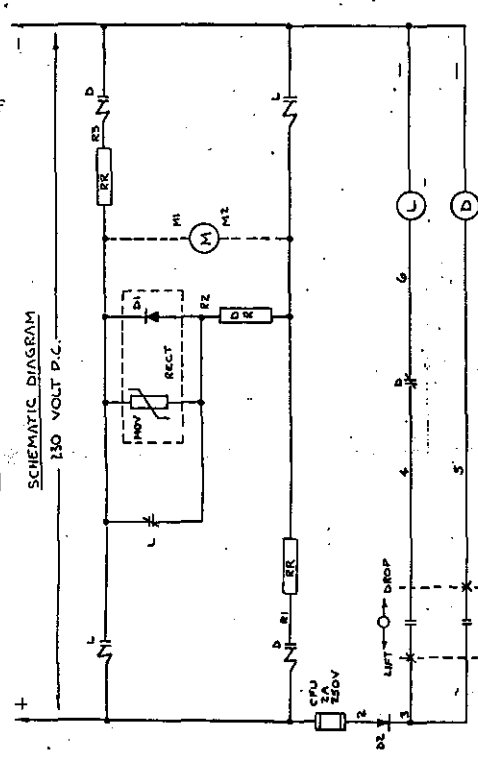
Hubbell Industrial Controls, Inc.
a subsidiary of HUBBELL INCORPORATED
50 Edwards Street, Madison, Ohio 44057
Telephone (216) 428-1161 • FAX 216-428-7635

C-7644-6-003

MAY 08 '89

NEWA I CABINET OUTLINE A-71920

SCHEMATIC DIAGRAM

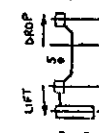
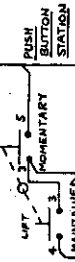


FRONT VIEW

CONNECTION DIAGRAM

ML 91827-006

L&D CONTACTORS
MECHANICALLY INTERLOCKED



SPRING RETURN FROM DROP TO OFF
BULL TOOL TYPE M-918 LIFT-OFF-DROP

SYMBOL	FUNCTION	DESCRIPTION
1	LIFT CONTACTOR	90 AMP, D.C. 2 POLE
2	DISCHARGE RESISTOR	10-000
3	CONTROL TERMINAL BLOCK	CONTROL TERMINAL BLOCK
4	DISCHARGE RESISTOR	10-000
5	DISCHARGE RESISTOR	10-000
6	DISCHARGE RESISTOR	10-000
7	DISCHARGE RESISTOR	10-000
8	DISCHARGE RESISTOR	10-000
9	DISCHARGE RESISTOR	10-000
10	DISCHARGE RESISTOR	10-000
11	DISCHARGE RESISTOR	10-000
12	DISCHARGE RESISTOR	10-000
13	DISCHARGE RESISTOR	10-000
14	DISCHARGE RESISTOR	10-000
15	DISCHARGE RESISTOR	10-000
16	DISCHARGE RESISTOR	10-000
17	DISCHARGE RESISTOR	10-000
18	DISCHARGE RESISTOR	10-000
19	DISCHARGE RESISTOR	10-000
20	DISCHARGE RESISTOR	10-000
21	DISCHARGE RESISTOR	10-000
22	DISCHARGE RESISTOR	10-000
23	DISCHARGE RESISTOR	10-000
24	DISCHARGE RESISTOR	10-000
25	DISCHARGE RESISTOR	10-000
26	DISCHARGE RESISTOR	10-000
27	DISCHARGE RESISTOR	10-000
28	DISCHARGE RESISTOR	10-000
29	DISCHARGE RESISTOR	10-000
30	DISCHARGE RESISTOR	10-000
31	DISCHARGE RESISTOR	10-000
32	DISCHARGE RESISTOR	10-000
33	DISCHARGE RESISTOR	10-000
34	DISCHARGE RESISTOR	10-000
35	DISCHARGE RESISTOR	10-000
36	DISCHARGE RESISTOR	10-000
37	DISCHARGE RESISTOR	10-000
38	DISCHARGE RESISTOR	10-000
39	DISCHARGE RESISTOR	10-000
40	DISCHARGE RESISTOR	10-000
41	DISCHARGE RESISTOR	10-000
42	DISCHARGE RESISTOR	10-000
43	DISCHARGE RESISTOR	10-000
44	DISCHARGE RESISTOR	10-000
45	DISCHARGE RESISTOR	10-000
46	DISCHARGE RESISTOR	10-000
47	DISCHARGE RESISTOR	10-000
48	DISCHARGE RESISTOR	10-000
49	DISCHARGE RESISTOR	10-000
50	DISCHARGE RESISTOR	10-000
51	DISCHARGE RESISTOR	10-000
52	DISCHARGE RESISTOR	10-000
53	DISCHARGE RESISTOR	10-000
54	DISCHARGE RESISTOR	10-000
55	DISCHARGE RESISTOR	10-000
56	DISCHARGE RESISTOR	10-000
57	DISCHARGE RESISTOR	10-000
58	DISCHARGE RESISTOR	10-000
59	DISCHARGE RESISTOR	10-000
60	DISCHARGE RESISTOR	10-000
61	DISCHARGE RESISTOR	10-000
62	DISCHARGE RESISTOR	10-000
63	DISCHARGE RESISTOR	10-000
64	DISCHARGE RESISTOR	10-000
65	DISCHARGE RESISTOR	10-000
66	DISCHARGE RESISTOR	10-000
67	DISCHARGE RESISTOR	10-000
68	DISCHARGE RESISTOR	10-000
69	DISCHARGE RESISTOR	10-000
70	DISCHARGE RESISTOR	10-000
71	DISCHARGE RESISTOR	10-000
72	DISCHARGE RESISTOR	10-000
73	DISCHARGE RESISTOR	10-000
74	DISCHARGE RESISTOR	10-000
75	DISCHARGE RESISTOR	10-000
76	DISCHARGE RESISTOR	10-000
77	DISCHARGE RESISTOR	10-000
78	DISCHARGE RESISTOR	10-000
79	DISCHARGE RESISTOR	10-000
80	DISCHARGE RESISTOR	10-000
81	DISCHARGE RESISTOR	10-000
82	DISCHARGE RESISTOR	10-000
83	DISCHARGE RESISTOR	10-000
84	DISCHARGE RESISTOR	10-000
85	DISCHARGE RESISTOR	10-000
86	DISCHARGE RESISTOR	10-000
87	DISCHARGE RESISTOR	10-000
88	DISCHARGE RESISTOR	10-000
89	DISCHARGE RESISTOR	10-000
90	DISCHARGE RESISTOR	10-000
91	DISCHARGE RESISTOR	10-000
92	DISCHARGE RESISTOR	10-000
93	DISCHARGE RESISTOR	10-000
94	DISCHARGE RESISTOR	10-000
95	DISCHARGE RESISTOR	10-000
96	DISCHARGE RESISTOR	10-000
97	DISCHARGE RESISTOR	10-000
98	DISCHARGE RESISTOR	10-000
99	DISCHARGE RESISTOR	10-000
100	DISCHARGE RESISTOR	10-000

REV.	DATE	BY	DESCRIPTION
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			

DRG. NO. C-76446003