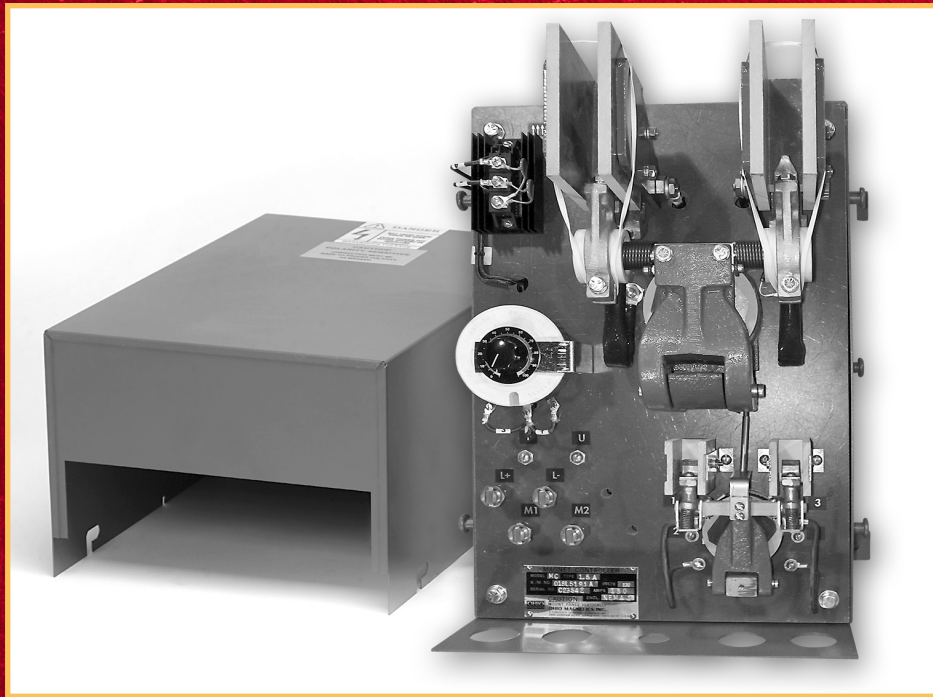


OHIO MODEL MC-1.5A & MC-2.0A AUTO/MANUAL DROP MAGNET CONTROLLER



INSTALLATION, MAINTENANCE, AND PARTS BULLETIN

OPERATING RANGE
70-130 A-dc (MC-1.5A)
& 100-150 A-dc (MC-2.0A), respectively.
(COLD MAGNET CURRENT)

DESCRIPTION

The MC-1.5A and 2.0A Controllers are heavy duty magnet controllers used for magnets whose cold current ranges from 70-130A-dc and 100-150A-dc. Cold current references the current flowing through the magnet when the magnet temperature is 25°C throughout.

AUTOMATIC DROP

A reverse current adjustment provides for a fast, clean drop of the magnet over a complete range of magnetic material with one movement of the master switch or push button.

MANUAL DROP

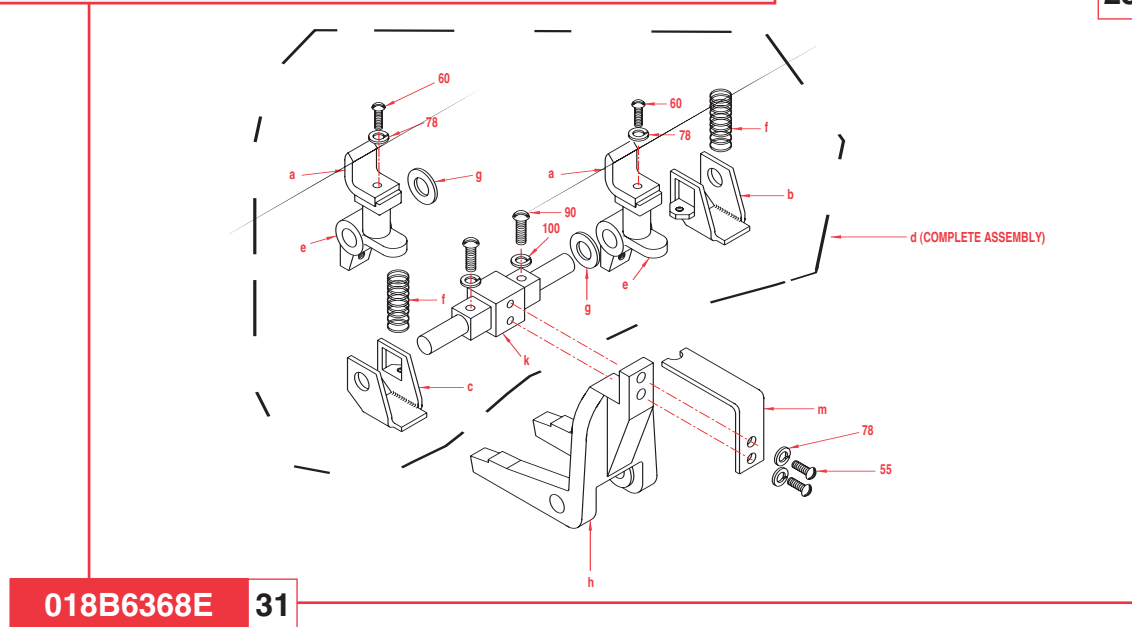
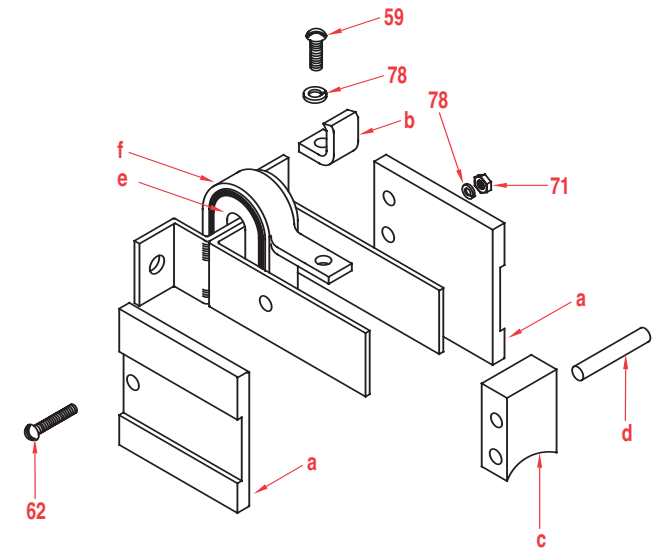
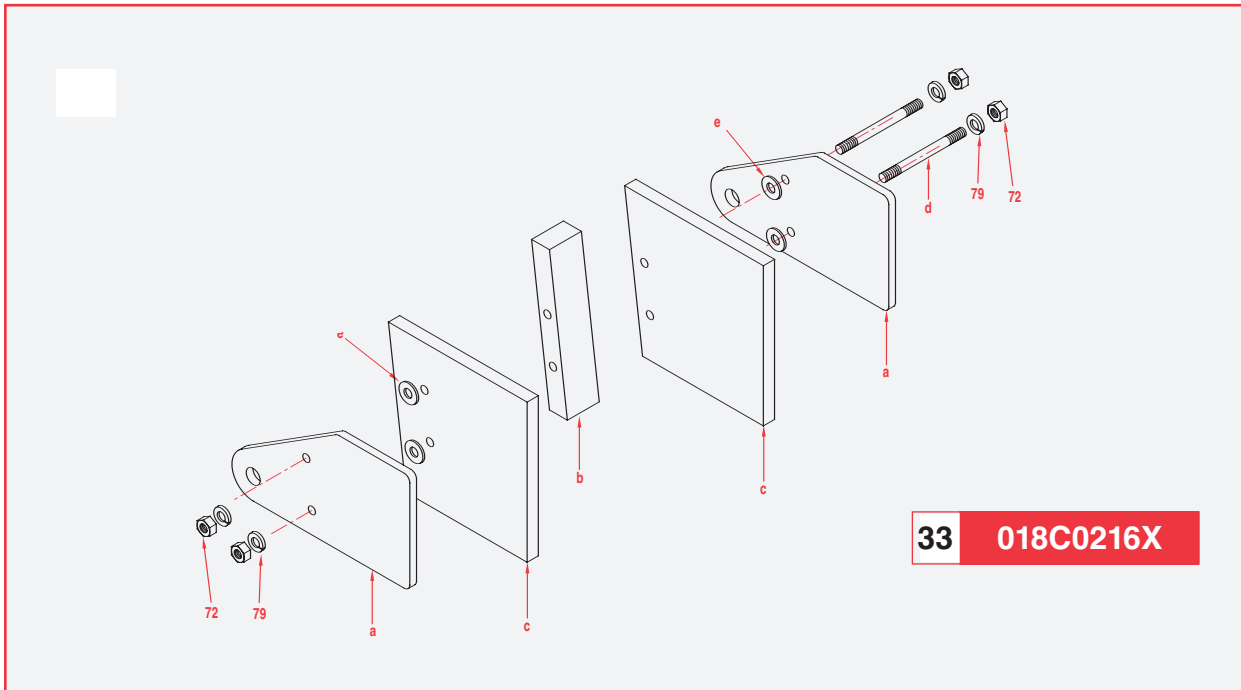
Allows for partial dropping of the load by controlling the amount of reverse current to the magnet. A drop position on the master switch or a push button that is spring returned to off, gives the operator complete control of the drop cycle.

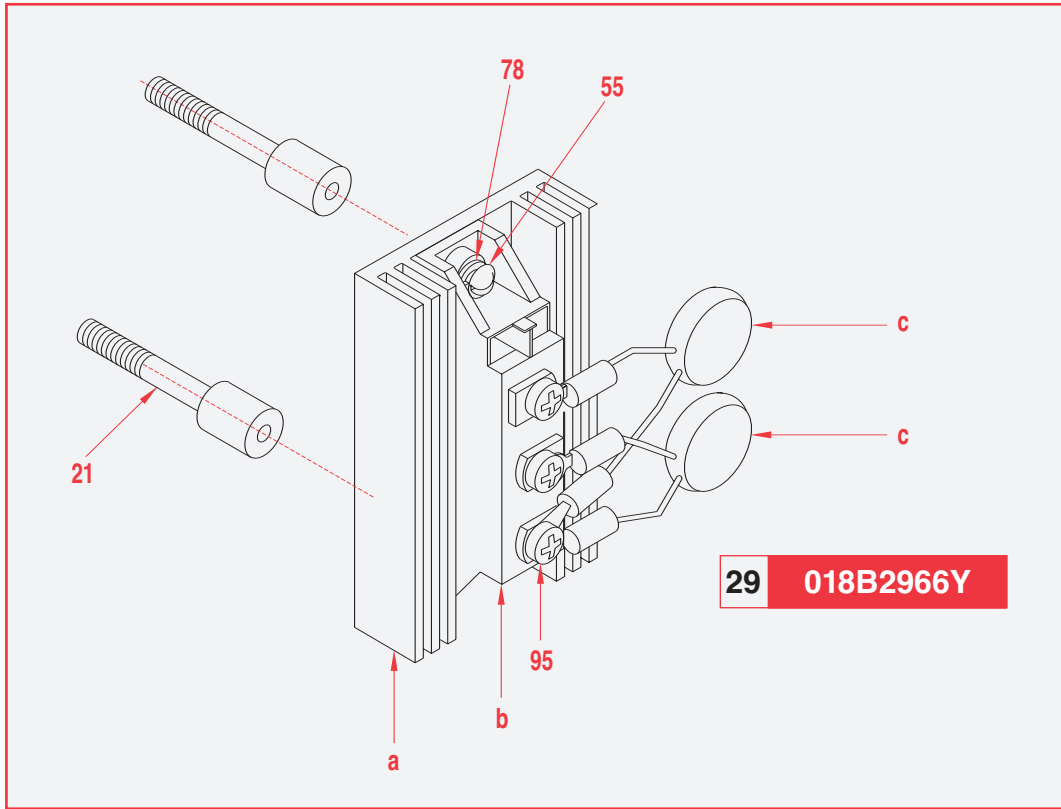
INSTALLATION PROCEDURES

- Mount the controller to a solid surface with the mounting bars provided.
- The controller must be mounted vertically with the "TOP" up to operate properly.
- Mount the controller away from sources of heat and direct exhaust of engines.
- Allow enough room around the controller for air circulation.
- Route electrical wires through bottom of the enclosure and connect securely to the terminals.
- Controller is polarity sensitive. The positive line must be connected to L+ and the negative to L- to ensure proper operation.
- All electrical circuits must be free from grounds and shorts.
- Remove shipping material from the arc shields before operating the controller.
- Adjust the reverse current control rheostat to provide enough reverse current to cleanly drop the magnet load.

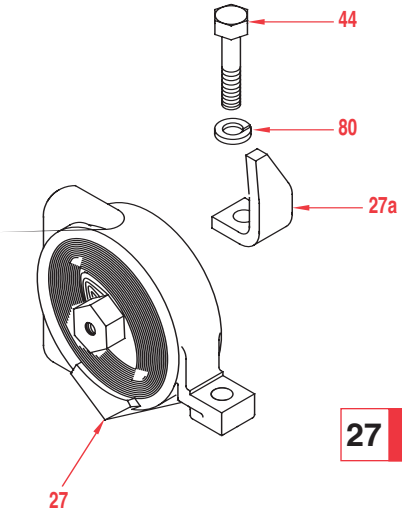
Procedure Start with the dial set at low range. Pick up and drop a load of the material to be handled. If the material does not completely fall off the magnet, increase the adjustment and try another load. If the material drops off and then some jumps back up to the magnet before it can fall free, reduce the adjustment and try another load. When all the material falls cleanly from the magnet, the controller is properly set.

MC-1.5A & MC-2.0A SUBASSEMBLIES

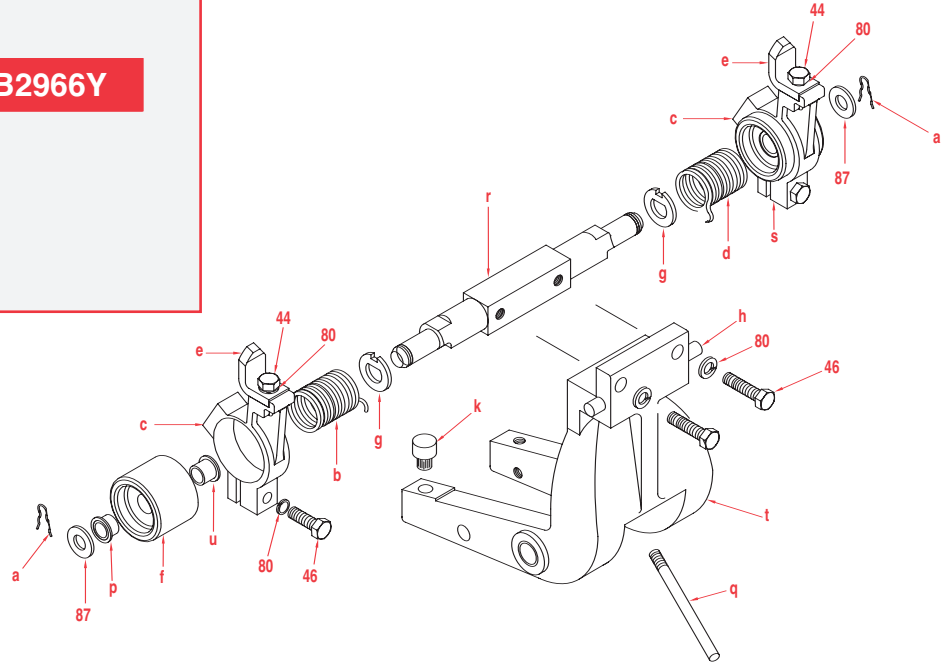




29 018B2966Y



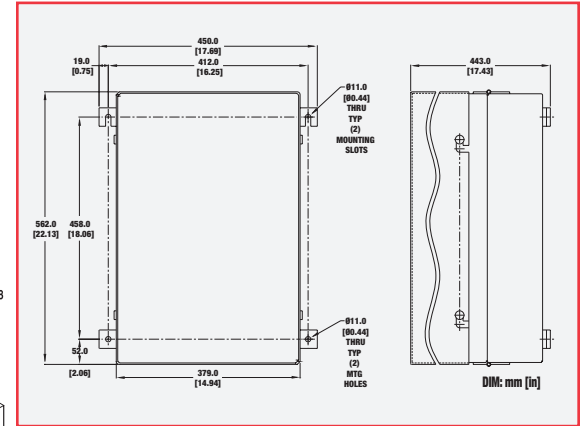
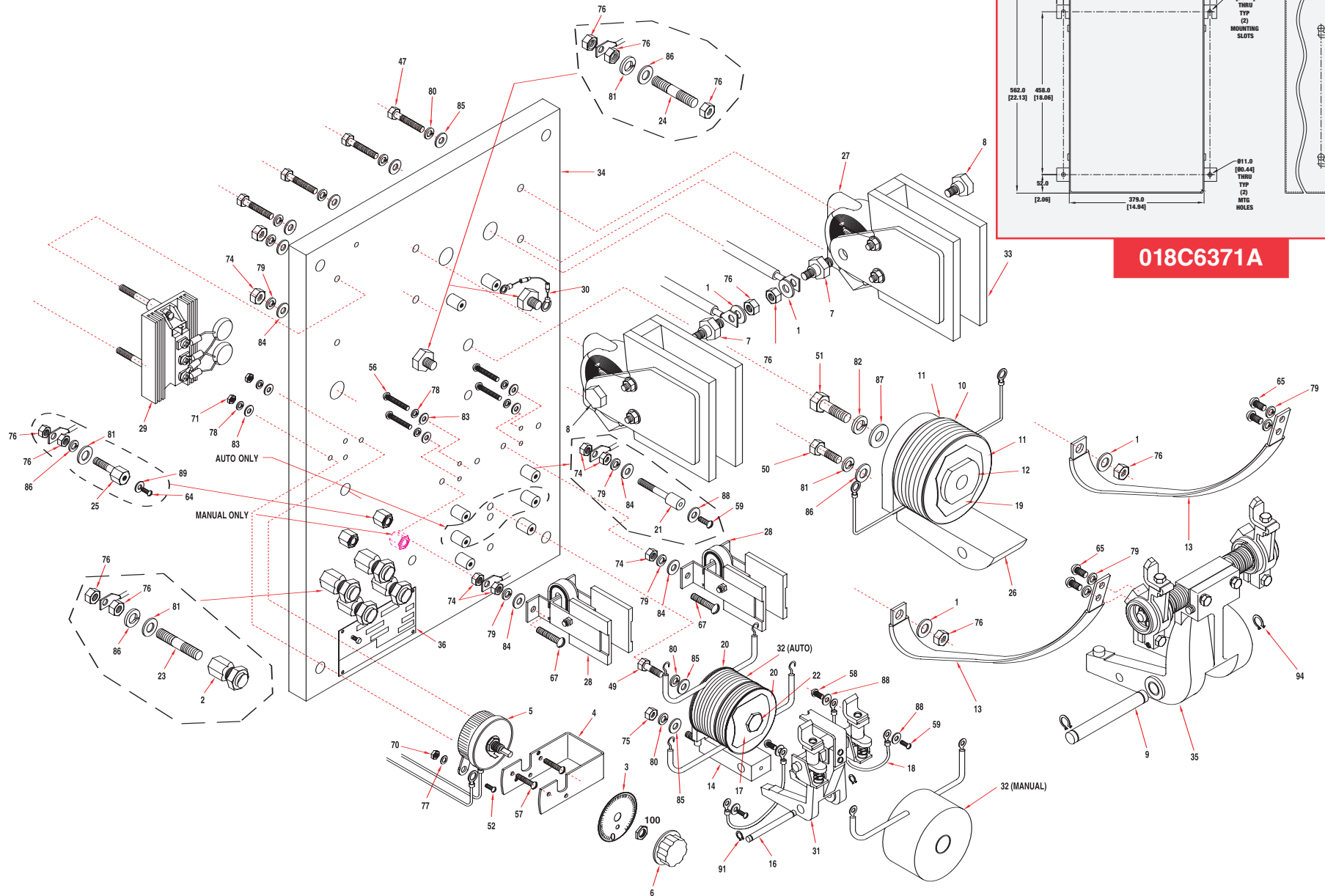
27 018B0217A



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OHIO MODEL MC-1.5A & MC-2.0A AUTO/MANUAL DROP MAGNET CONTROLLER

MC-1.5A & MC-2.0A CONTROLLER EXPLODED ASSEMBLY VIEW



018C6371A

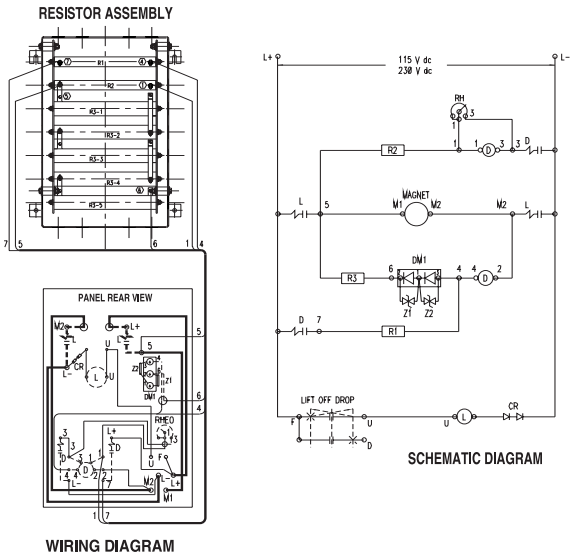
MC-1.5A & MC-2.0A HARDWARE PART LIST

ITEM	PART NUMBER	REQ A230	REQ M230	REQ 0-230	REQ A115	REQ M115	REQ 0-115	DESCRIPTION	ITEM	PART NUMBER	REQ A230	REQ M230	REQ 0-230	REQ A115	REQ M115	REQ 0-115	DESCRIPTION	ITEM	PART NUMBER	REQ A230	REQ M230	REQ 0-230	REQ A115	REQ M115	REQ 0-115	DESCRIPTION	
1	A-900118-21	4	4	4	4	4	4	FLATWASHER: 3/8	31b	018A2604A	1	1	1	1	1	1	CONTACT BRACKET	52	A-900416-05	3	3	3	3	3	3	SCR PAN HEAD: M4 x 0.7 x 10 mm	STEEL
2	A-900215-02	4	4	4	4	4	4	CABLE CONNECTOR: #2 - #8	31c	018A2605A	1	1	1	1	1	1	CONTACT BRACKET	55	A-900023-07	4	4	4	4	4	4	SCR RH SLOTTED: 10-32 x 0.88 UNF	STEEL
3	A-900228-01	1	1	1	1	1	1	RHEOSTAT DIAL	31d	018B5074B	2	2	2	2	2	2	CONTACT SHAFT ASSEMBLY	56	A-900023-09	4	4	4	4	4	4	SCR RH SLOTTED: 10-32 x 1.25 UNF	STEEL
4	A-900229-02	1	1	1	1	1	1	RHEOSTAT MOUNTING KIT	31e	018A2614X	2	2	2	2	2	2	CONTACT ARM ASSEMBLY	57	A-900023-11	2	2	2	2	2	2	SCR RH SLOTTED: 10-32 x 1.75 UNF	STEEL
5	A-900232-04	1	1	1	1	1	1	RHEOSTAT: 0.5 Ω; 150 W	31f	018A2625X	2	2	2	2	2	2	CONTACT SPRING	58	A-900023-13	2	2	2	2	2	2	SCR RH SLOTTED: 10-32 x 0.31 UNF	BRASS
6	A-900233-02	1	1	1	1	1	1	RHEOSTAT KNOB	31g	018A2631X	2	2	2	2	2	2	SPACER WASHER	59	A-900023-14	8	6	8	8	6	8	SCR RH SLOTTED: 10-32 x 0.38 UNF	BRASS
7	018A0123X	2	2	2	2	2	2	BLOWOUT BOLT WITH STUD	31h	018B2596C	1	1	1	1	1	1	REVERSE SWITCH ARM: MACHINED	60	A-900023-15	2	2	2	2	2	2	SCR RH SLOTTED: 10-32 x 0.50 UNF	BRASS
8	018A0124X	2	2	2	2	2	2	BLOWOUT BOLT	31k	018B2618D	1	1	1	1	1	1	REVERSE ARM SHAFT	62	A-900023-25	2	2	2	2	2	2	SCR RH SLOTTED: 10-32 x 1.75 UNF	BRASS
9	018A0140C	1	1	1	1	1	1	ARM PIN: φ12.5 mm	31m	018B5645B	1	1	1	1	1	1	INTERLOCK ARM	64	A-900025-16	2	3	2	2	3	2	SCR RH SLOTTED: 1/4-20 x 0.38 UNC	BRASS
10	018A0151F	1	1	1	1	1	1	MAIN COIL: 230 V	32	018B6156A	1	1	1	1	1	1	REVERSE SWITCH COIL: AUTOMATIC	65	A-900025-17	4	4	4	4	4	4	SCR RH SLOTTED: 1/4-20 x 0.50 UNC	BRASS
10	018A0151D	1	1	1	1	1	1	MAIN COIL: 115 V	32	018A1508J	1	1	1	1	1	1	REVERSE SWITCH COIL: MANUAL 230 V	67	A-900025-22	4	4	4	4	4	4	SCR RH SLOTTED: 1/4-20 x 1.75 UNC	BRASS
11	018A0152X	3	3	3	3	3	3	INSULATING WASHER	32	018A1508C	1	1	1	1	1	1	REVERSE SWITCH COIL: MANUAL 115 V	70	A-900106-38	3	3	3	3	3	3	NUT HEX: M4 x 0.7	STEEL
12	018A0154A	1	1	1	1	1	1	CORE ASSEMBLY	33	018C0216X	2	2	2	2	2	2	ARC SHIELD ASSEMBLY: MAIN	71	A-900106-03	4	2	4	4	2	4	NUT HEX: #10-32 UNF	STEEL
13	018A0317D	2	2	2	2	2	2	SHUNT ASSEMBLY	33a	018A0120X	4	4	4	4	4	4	BLOWOUT EAR	72	A-900106-05	4	4	4	4	4	4	NUT HEX: 1/4-20 UNC	STEEL
14	018A1442A	1	1	1	1	1	1	REVERSE FRAME ASSEMBLY	33b	018A0126X	2	2	2	2	2	2	SPACER WASHER	74	A-900108-11	21	17	21	21	17	21	NUT HEX JAM: 1/4-20 NC	BRASS
16	018A2641A	1	1	1	1	1	1	ARM PIN	33c	018A0130X	4	4	4	4	4	4	BLOWOUT SHIELD	75	A-900108-12	1	1	1	1	1	1	NUT HEX JAM: 5/16-18 NC	BRASS
17	018A2637X	1	1	1	1	1	1	SPRING WASHER	33d	018A0139X	4	4	4	4	4	4	STUD: φ3.13 in 80 mm	76	A-900112-07	22	24	22	22	24	22	NUT HEX JAM: 3/8-16 NC	BRASS
18	018A2720A	2	2	2	2	2	2	SHUNT ASSEMBLY	33e	018A1362X	16	16	16	16	16	16	WASHER	77	A-900116-11	3	3	3	3	3	3	LOCKWASHER INTERNAL TOOTH: M4	STEEL
19	018A2866X	1	1	1	1	1	1	CLAMP WASHER	34	018C5184X	1	1	1	1	1	1	PANEL	78	A-900115-03	15	14	15	15	14	15	LOCKWASHER SPLIT: #10	STEEL
20	018A2977X	3	3	3	3	3	3	SEPERATOR WASHER	35	018D3090C	1	1	1	1	1	1	ARM ASSEMBLY	79	A-900115-05	23	21	23	23	21	23	LOCKWASER SPLIT: 1/4	STEEL
21	018A3010X	10	8	10	10	8	10	TERMINAL STUD	35a	A-900221-05	2	2	2	2	2	2	HAIR PIN CLIP: φ0.38 in 10 mm	80	A-900115-06	14	14	14	14	14	14	LOCKWASHER SPLIT: 5/16	STEEL
22	018A2673A	1	1	1	1	1	1	REVERSE SWITCH CORE	35b	018A0104X	1	1	1	1	1	1	SPRING : LEFT	81	A-900115-07	9	10	9	9	10	9	LOCKWASHER SPLIT: 3/8	STEEL
22	018A3000X	1	1	1	1	1	1	REVERSE SWITCH CORE	35c	018A0118X	2	2	2	2	2	2	CONTACT ARM: MACHINED	82	A-900115-09	1	1	1	1	1	1	LOCKWASHER SPLIT: 1/2	STEEL
23	018A3878A	4	4	4	4	4	4	TERMINAL STUD: 2.5 in 65 mm	35d	018A0121X	1	1	1	1	1	1	SPRING: RIGHT	83	A-900118-03	4	4	4	4	4	4	FLATWASHER: #10	STEEL
24	018A3878X	2	2	2	2	2	2	TERMINAL STUD: 2.75 in 70 mm	35e	018A0125X	2	2	2	2	2	2	CONTACT TIP	84	A-900118-05	19	17	19	19	17	19	FLATWASHER: 1/4	STEEL
25	018A3882X	2	3	2	2	3	2	TERMINAL STUD	35f	018A0128A	2	2	2	2	2	2	ARM INSULATION	85	A-900118-06	6	6	6	6	6	6	FLATWASHER: 5/16	STEEL
26	018B0116A	1	1	1	1	1	1	MAIN FRAME	35g	018A0129X	2	2	2	2	2	2	STOP WASHER	86	A-900118-07	9	10	9	9	10	9	FLATWASHER: 3/8	STEEL
27	018B0217A	2	2	2	2	2	2	BLOWOUT COIL ASSEMBLY: MAIN	35h	018A0135X	2	2	2	2	2	2	SPRING PIN	87	A-900118-09	3	3	3	3	3	3	FLATWASHER: 1/2	STEEL
27a	018A0125X	2	2	2	2	2	2	CONTACT TIP	35k	018A0138X	1	1	1	1	1	1	STOP	88	A-900118-18	12	10	12	12	10	12	FLATWASER: #10	BRASS
28	018B1478X	2	2	2	2	2	2	BLOWOUT COIL ASSEMBLY: DROP	35p	A-900298-02	2	2	2	2	2	2	BEARING: SELF LUBRICATIONG	89	A-900118-26	2	3	2	2	3	2	FLATWASHER: 1/4	BRASS
28a	018A0803X	4	4	4	4	4	4	ARC SHIELD SIDE	35q	018A5645A	1	1	1	1	1	1	THREADED ROD	90	A-900021-23	2	2	2	2	2	2	SCR RH SLOTTED: #8-32 x 0.75 UNF	BRASS
28b	018A1443X	2	2	2	2	2	2	CONTACT TIP	35r	018B0131X	1	1	1	1	1	1	ARM SHAFT	91	A-900219-06	2	2	2	2	2	2	EXTERNAL RETAINER RING: SHAFT 3/8	STEEL
28c	018A1503X	2	2	2	2	2	2	ARC SHIELD SPACER	35s	018B0219A	2	2	2	2	2	2	CONTACT ARM ASSEMBLY	94	A-900219-09	2	2	2	2	2	2	EXTERNAL RETAINER RING: SHAFT 1/2	STEEL
28d	018A1523X	2	2	2	2	2	2	DOWEL	35t	018C2992A	1	1	1	1	1	1	MAIN ARM MACHINED	95	A-900413-08	3	3	3	3	3	3	SCREW ASSEMBLY: M5 x 0.8 x 16 mm	STEEL
28e	018A2695X	2	2	2	2	2	2	BLOWOUT COIL SUBASSEMBLY	35u	A-900298-03	2	2	2	2	2	2	BEARING: SELF LUBRICATIONG	100	A-900115-28	2	2	2	2	2	2	LOCKWASER SPLIT: M4	
28f	018A2726X	2	2	2	2	2	2	CONTACT SUPPORT	36	100A013B1	1	1	1	1	1	1	NAME PLATE										
29	018B2966Y	1	1	1	1	1	1	DIODE/HEATSINK ASSEMBLY	44	A-900007-02	4	4	4	4	4	4	SCR HEX HEAD: 5/16-18 x 0.75 UNC	STEEL	105B009E01	1	1	1	1	1	1	MAIN PANEL WIRE KIT	AUTOMATIC
29a	A-900565-17	1	1	1	1	1	1	HEAT SINK: DRILLED	46	A-900007-05	4	4	4	4	4	4	SCR HEX HEAD: 5/16-18 x 1.25 UNC	STEEL	105B009E02	1	1	1	1	1	1	MAIN PANEL WIRE KIT	MANUAL
29b	A-900550-26	1	1	1	1	1	1	DIODE MODULE	47	A-900007-06	4	4	4	4	4	4	SCR HEX HEAD: 5/16-18 x 1.5 UNC	STEEL	105B009E03	1	1	1	1	1	1	MAIN PANEL WIRE KIT	VARIABLE
29c	018A2966Q	2	2	2	2	2	2	MOV SUPPRESSOR ASSEMBLY	49	A-900007-08	1	1	1	1	1	1	SCR HEX HEAD: 5/16-18 x 2.0 UNC	STEEL	105B012A01	1	1	1	1	1	1	RESISTOR TO PANEL WIRE KIT	N-01/IP-23
30	018A2966Z	1	1	1	1	1	1	CONTROL DIODE ASSEMBLY	50	A-900008-08	1	1	1	1	1	1	SCR HEX HEAD: 3/8-16 x 1.75 UNC	STEEL	105B012A02	1	1	1	1	1	1	RESISTOR TO PANEL WIRE KIT	N12/IP-65
31	018B6368E	1	1	1	1	1	1	REVERSE SWITCH ARM ASSEMBLY	51	A-900010-09	1	1	1	1	1	1	SCR HEX HEAD: 1/2-13 x 2.5 UNC	STEEL									
31a	018A1443X	2	2	2	2	2	2	CONTACT TIP																			

MC-1.5A & MC-2.0A WIRING DIAGRAMS

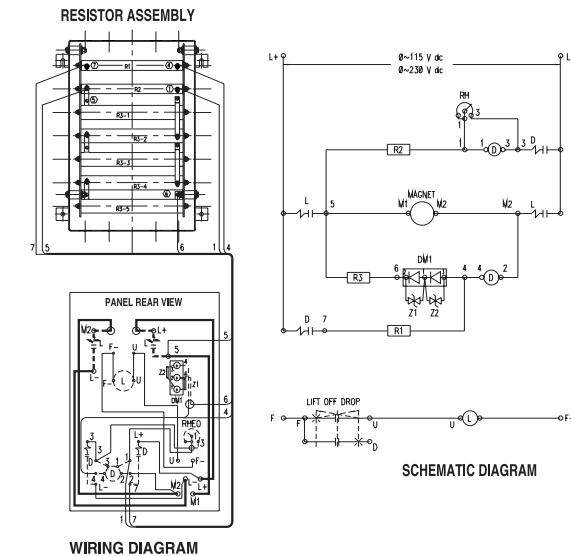
MC-1.5A & MC-2.0A AUTOMATIC CONTROLLER

WIRE DIAGRAM P/N: 018B6171X (230 V-dc) • 018B6171C (115 V-dc)



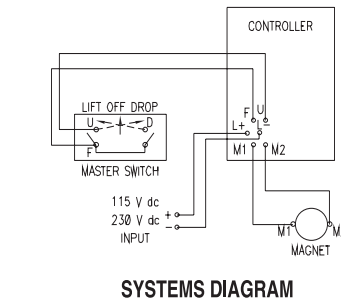
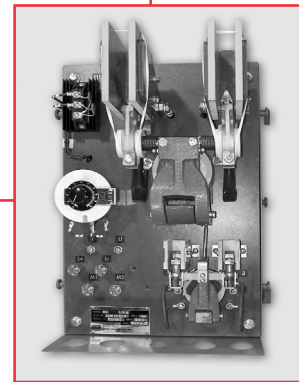
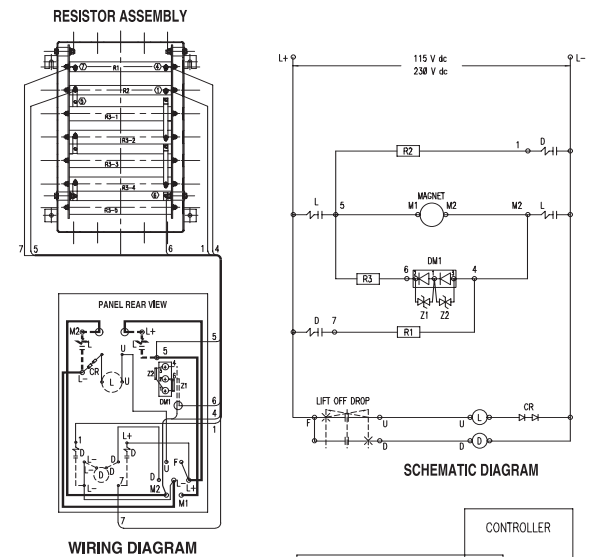
MC-1.5A & MC-2.0A AUTOMATIC CONTROLLER (Variable Voltage)

WIRE DIAGRAM P/N: 018B6171B (0~230 V-dc) • 018B6171E (0~115 V-dc)

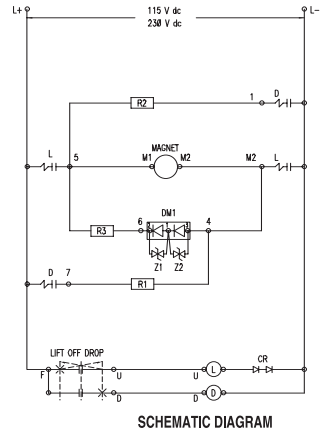


MC-1.5A & MC-2.0A MANUAL CONTROLLER

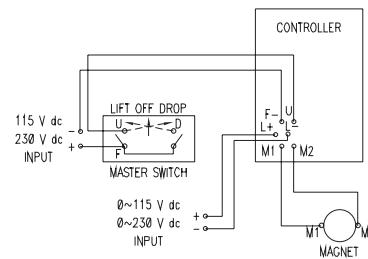
WIRE DIAGRAM P/N: 018B6171A (230 V-dc) • 018B6171D (115 V-dc)



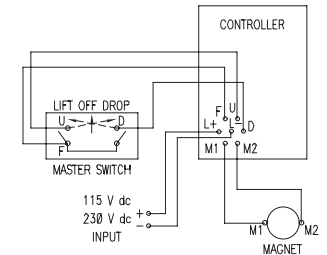
SYSTEMS DIAGRAM



SYSTEMS DIAGRAM



SYSTEMS DIAGRAM



SYSTEMS DIAGRAM

TABLE OF EQUIPMENT

SYMBOL	DESCRIPTION	FUNCTION
D	REVERSE CONTACT	DROP
L	MAIN CONTACT	LIFT
RH	0.5 Ω RHEOSTAT	DROP CONTROL
R1-R2	2.4 Ω RESISTOR	DROP RESISTOR (MC-2.0A-115V)
R1-R2	4.8 Ω RESISTOR	DROP RESISTOR (MC-2.0A-230V)
R3	12.8 Ω (2.56 Ω x 5) RESISTOR	DISCHARGE RESISTOR (MC-2.0A)
R1-R2	2.75 Ω RESISTOR	DROP RESISTOR (MC-1.5A-115V)
R1-R2	5.5 Ω RESISTOR	DROP RESISTOR (MC-1.5A-230V)
R3	15.0 Ω (3.0 Ω x 5) RESISTOR	DISCHARGE RESISTOR (MC-1.5A)
DM1	DIODE MODULE	BLOCKING DIODE
Z1-Z2	MOV SUPPRESSOR	DIODE PROTECTION
CR	CONTROL DIODE	ANTI-REVERSE PROTECTION

STEP BY STEP CONTROLLER OPERATION

AUTOMATIC CONTROLLER

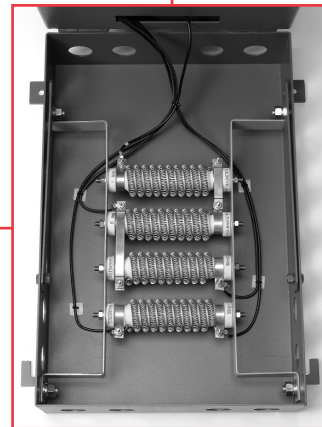
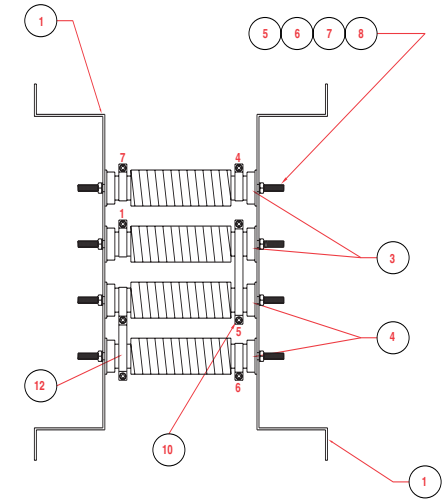
1. When a lift signal is given by closing the contacts between terminals “F” and “U”, the “L” coil is energized.
2. This closes the “L” contacts which supplies full power to the magnet.
3. When a drop signal is given the “F” to “U” contact is broken and the “L” coil is de-energized.
4. This opens the “L” contacts and at the same time a discharge circuit is set up through “2” – “4” winding of the “D” coil, DM1, and resistors “R4” and “R3”, energizing the “D” coil.
5. This causes the energy in the magnet to be dissipated through the “R3” & “R4” resistors, and the “D” contacts to close.
6. Reverse voltage is then applied to the magnet through the “R1” and “R2” resistors.
7. When the proper amount of reverse current to the magnet, (as adjusted by the rheostat), is measured by the “4,” “2” winding of the “D” coil, it cancels the affect of the “1,” “3” winding of the “D” coil and the “D” contacts open.
8. This stops the flow of reverse current through the magnet.

MANUAL CONTROLLER

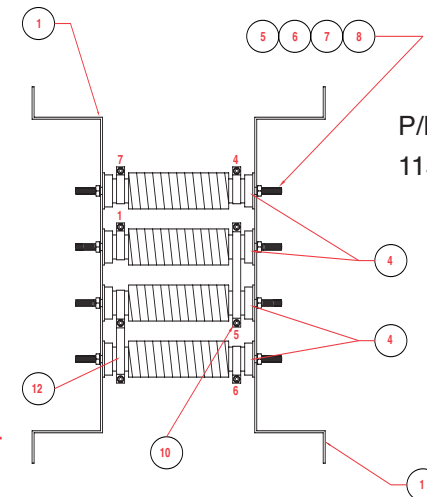
1. When a lift signal is given by closing the contacts between terminals “F” and “U”, the “L” coil is energized.
2. This closes the “L” contacts which supplies full power to the magnet.
3. When a drop signal is given the “F” to “U” contact is broken and the “L” coil is de-energized.
4. This opens the “L” contacts and at the same time a discharge circuit is set up through “2” – “4” winding of the “D” coil, DM1, and resistors “R4” and “R3”, energizing the “D” coil.
5. Energy in the magnet is dissipated through the “R3” & “R4” resistors.
6. Moving the master switch to the drop position or pushing the drop button, closes the contact between terminals “F” and “D”, energizing the “D” coil.
7. This closes the “D” contacts and provides reverse voltage to the magnet, through resistors “R1” and “R2”.
8. To stop the build up of reverse current, release the master switch control and it will return to the off position, or release the drop push button.
9. This breaks the contact between the “F” and “D” terminals, de-energizes the “D” coil, (opening the “D” contacts), and stops the flow of reverse current through the magnet.

MC-1A RESISTOR ASSEMBLY CONTROLLER

P/N: 018A1541S
230 V-dc WITH DIODE



NO.	QTY	PART NUMBER	DESCRIPTION
1	2	018B8101R	MOUNTING BRACKET
3	2	018B1554G	RESISTOR: 12 Ω
4	2	018B1554A	RESISTOR: 8 Ω
4	4	018B1554A	RESISTOR: 8 Ω
5	4	1900A064003	THR D ROD: M8 x 1.25 x 225mm
6	8	018A1500X	WASHER
7	8	A-900115-31	LOCKWASHER: M8
8	8	A-900106-41	HEX NUT: M8 x 1.25
10	1	018A8114A	BUS BAR
11	1	018A8114B	BUS BAR



P/N: 018A1541T
115 V-dc WITH DIODE

MAINTENANCE AND TROUBLE SHOOTING

Check all contact tips for excess wear or burning. Replace if needed.

Check arc shields for burnt areas. Replace any that are badly burned.

Check for burned or damaged insulation on shunts or wires. Replace if found.

Check for carbon tracking on the base panel and insulating parts. If found, remove by filing or scraping. If carbon can not be removed, replace the part.

Check gap ($\frac{3}{4}$ " (20 mm) opening) between main contacts (#27a and #35e). Adjust by loosening screw (#46) on part (#35c) and turning the assembly.

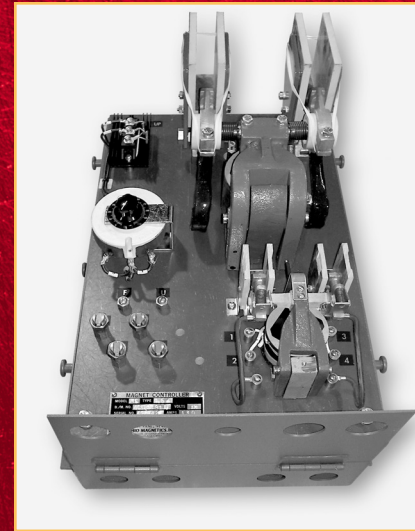
All pin connections should move easily, and contact springs should provide force when contacts are closed. If springs do not provide contact force, replace them.

Check Power Diode Integrity (DM1) with a standard Digital Volt Meter (DVM), set to the diode check function. (See owner's manual for details.) Disconnect leads to the diode and remove suppressors MOV (Z1 and Z2) to isolate from the circuit. Place the red lead of meter on Terminal 1 of diode (number is stamped next to terminal) and the black lead on Terminal 2. Meter should read <1.0. Reverse leads and meter should read 1.(00). Repeat for Terminals 3 (red) and 1 (black). If the diode reads bad, replace. Reconnect wires and MOVs (Z1 and Z2).

NOTE: Z1 and Z2 are MOV suppressors to help limit voltage spikes applied to DM1 and causing damage.



OHIO MAGNETICS—PERFORMANCE ENGINEERED



EMERGENCY SPARE PARTS KITS AND/OR KITS

Automatic — #ESP-018MS190A1 (MC-2.0A)
#ESP-018MS190A1 (MC-1.5A)

- Contains the parts most likely to fail due to a system problem or a high voltage spike. It is recommended that one of these kits be kept on hand to avoid unnecessary down time.



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