

# Yardmaster Pup™ Magnet Controller

# 4292P

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### Instructions:

Lifting magnets operate more efficiently with greater life and safety to equipment when controlled by Hubbell Type 4292P Magnet Controllers. Magnets are cleanly discharged permitting prompt return for another lift because of exclusive patented features.

A mechanically rugged high thermal capacity varistor assembly permanently connected around the magnet always provides a positive, safe discharge path for the stored magnetic energy. The use of a non-linear silicon carbide material in this varistor permits the fastest possible discharge of the magnetic energy at peak voltages not exceeding 700 volts.

Inductive voltages from the magnet discharge cannot be returned to the line, permitting rectifier power supplies to be safely used without requiring special protective load resistors or other by-pass circuitry.

Refer to the standard schematic diagram. 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 Discharge Varistor - "DVA" and the Blocking Rectifier - "RECT/MOV".

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 - "D1". This rectifier assures that correct polarity connections have been made to the controller. No operation is possible without proper polarity being supplied.

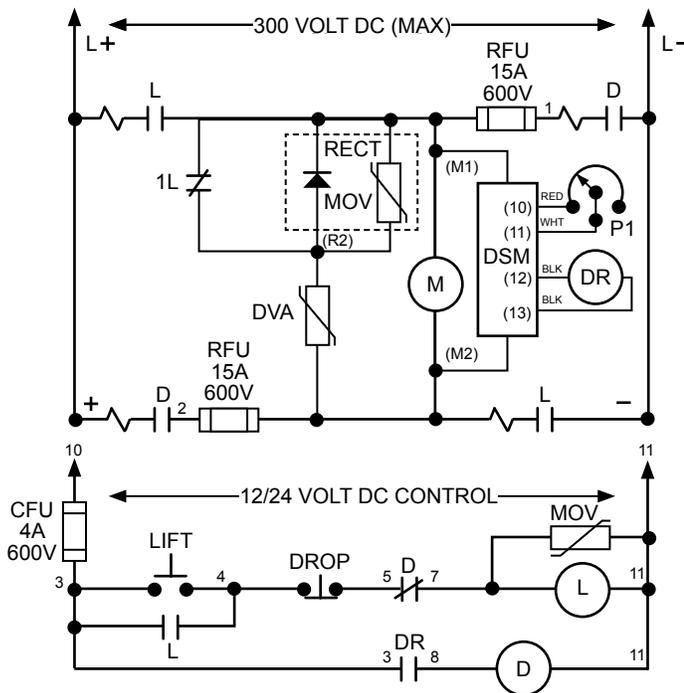


Figure 1

- DVA..... Discharge Varistor Assembly
- MOV..... Control Suppressor
- CFU..... Control Fuse
- RFU..... Drop Fuse
- RECT./MOV..... Rectifier / MOV Assembly
- P1..... Potentiometer Assembly
- DR..... Drop Relay
- DSM..... Discharge Sensor Module
- D..... Drop Contactor
- L..... Lift Contactor

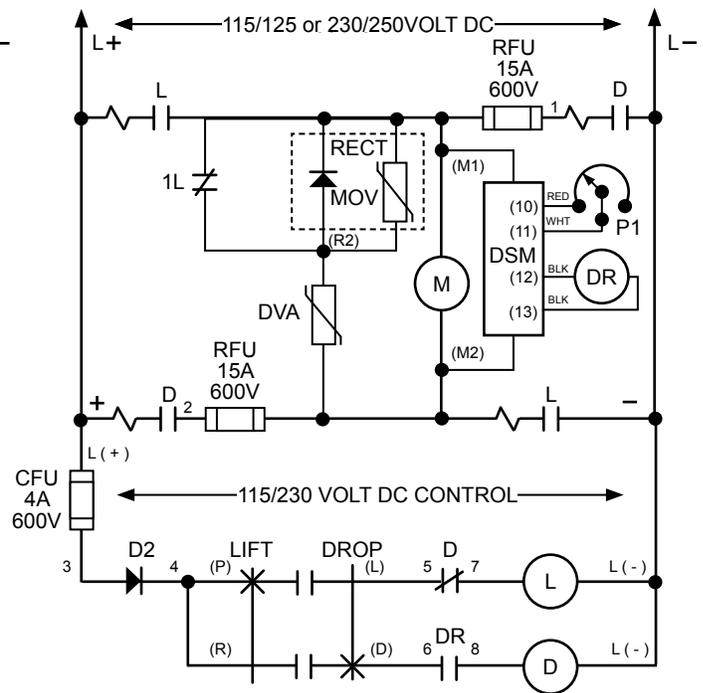


Figure 1

- D2..... Diode
- DVA..... Discharge Varistor Assembly
- MOV..... Control Suppressor
- CFU..... Control Fuse
- RFU..... Drop Fuse
- RECT./MOV..... Rectifier / MOV Assembly
- P1..... Potentiometer Assembly
- DR..... Drop Relay
- DSM..... Discharge Sensor Module
- D..... Drop Contactor
- L..... Lift Contactor



## Installation and Maintenance

Hubbell Type 4292 Magnet Controllers should be installed in accordance with accepted practice for installation of industrial control equipment.

### Caution:

User should check all nuts, bolts and screws in the magnet control cabinet prior to putting the controller into operation as the nuts, bolts and screws may have become loose in transportation.

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

The Yardmaster Pups are available with 230VDC, 115VDC, 12VDC or 24VDC control circuits. Insure that the proper control voltage is applied.

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 operations:

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.

Two electrically and mechanically interlocked sets of contactors, "Lift" and "Drop". serve to apply DC power for energization and reverse current cleaning respectively in two separate actions without time overlap.

The permanently connected magnet discharge path around the magnet absorbs and dissipates the stored magnet energy when the "LIFT" contactor interrupts the power supply.

During the stored energy dissipation cycle, the reverse voltage appearing across the magnet and the discharge varistor assembly signals the Discharge Sensor Module "DSM" that a discharge cycle has begun. When the discharge voltage falls to 300 to 350 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 in the discharge path. After a preset period, controlled by the Drop Time adjustment potentiometer, P1, the "DSM" de-energizes the DROP RELAY. This action causes the drop contactor to open and end the reverse current cycle.

Another feature of Hubbell Magnet Controllers is that full supply voltage is utilized to force the buildup of reverse current, improving the overall speed.

### Note:

Reverse current adjustment should always be made with the lightest material handled. Start with P1 at "0" and cycle the controller. Turn the adjustment knob clockwise and repeat cycling until the magnet drops the material cleanly. The adjusting potentiometer is mounted beside the "DSM".



## TROUBLESHOOTING

The following covers a general list of possible troubles that may be encountered, with the causes and suggested actions given respectively.

SYMPTOM	POSSIBLE CAUSE	DIAGNOSIS / ACTION
“Lift” contactor does not pick up.	Polarity not observed at the time of controller installation.	Reverse the supply power connections to the controller.
	Lift contactor coil circuit open.	Check continuity of Lift contactor coils. Check master switch contacts.
	CFU or Diode D1 open.	Replace CFU or D1.
Magnet does not clean properly.	Reverse current cycle time is too short. Drop contactor does not remain closed long enough to clean magnet.	Increase the Drop Time potentiometer setting (clockwise rotation).
	Reverse current cycle time is too long. Drop contactor remains closed too long and allows excessive current to build-up.	Decrease the Drop Time potentiometer setting (clockwise rotation).
	Drop contactor operates but no reverse current flows.	Replace RFU fuses.
	4292P DVA varistor circuit is open.	Check DVA. If the fins are warped or ohm value is under 50k ohms, varistor may be defective. Replace DVA varistor.
“Drop” contactor does not operate	Drop contactor coil circuit open.	Check continuity of Drop contactor coils. Check master switch contacts.
	Reversed M2-M1 connections to DSM.	Check DSM wiring and correct if necessary.
	Fault drop relay.	Replace drop relay.
	Faulty DSM.	Replace DSM.
“Drop” contactor operates but does not drop.	Faulty drop time adjustment potentiometer or open potentiometer circuit.	Repair or replace potentiometer assembly or wiring.
	Faulty DSM.	Replace DSM.
No adjustment of the reverse current cycle.	Faulty drop time adjustment potentiometer.	Replace potentiometer assembly.
	Faulty DSM.	Replace DSM.
Magnet discharge device overheats.	Too many magnet discharges per minute.	Avoid frequent cycling or use controller with greater capacity.
	Blocking rectifier is shorted. Full line voltage applied to magnet discharge device during lift cycle.	Replace blocking rectifier assembly.



## 4292P Renewal Parts

Device	Description	Service Pub.	Part Number
L	50 Amp Contactor	RPC 59323-1	*
	230 VDC Control		HC59322104
	125 VDC Control		HC59322102
	24 VDC Control		HC59322108
	12 VDC Control		HC59322116
	Aux. Contact Kit		HC68011003
D	25 Amp Contactor	RPC 59323-1	*
	230 VDC Control		HC59322103
	125 VDC Control		HC59322101
	24 VDC Control		HC59322107
	12 VDC Control		HC59322115
	Arc Shield	Item 19	HC42856001
	Contact Kit		HC59672003
	Coil (230/250V)	Item 10	HC68014001
	Coil (24V)	Item 10	HC68014004
	Coil (12V)	Item 10	HC68014007
	Coil (115V)	Item 10	HC68014002
Rect.	Rect./Mov. Assy	-	HC71386005
DVA	Discharge Varistor	-	HC03009021
DR	Drop Relay	-	HC31658038
D2	Control Diode	-	HC47288066
P1	Potentiometer Assy.	-	HC48686001
DSM	Discharge Sensor Module	-	HC48684001
MOV	Suppressor	-	HC82946002
RFU	Reverse Current Fuse, 15 Amp	-	FU2701
CFU	115/230VDC Control Fuse, 4 Amp	-	FU2700
	24VDC Control Fuse, 4 Amp	-	FU2700
	12VDC Control Fuse, 4 Amp	-	FU2700

\* The Contactor nameplate identifies the complete contactor which varies because of control voltage.

### Contactor Maintenance

For proper maintenance of the "Lift" and "Drop" contactors refer to the following Hubbell Contactor Service Publication

Contactor Size	Contactor Series	Publication Number
2 (Lift and Drop)	59322	RPC59323-1



Hubbell Industrial Controls, Inc.  
 a subsidiary of Hubbell Incorporated  
 4301 Cheyenne Drive, Archdale, NC 27263  
 Phone (336) 434-2800 | Fax (336) 434-2801  
[www.hubbell-icd.com](http://www.hubbell-icd.com)  
[sales@hubbell-icd.com](mailto:sales@hubbell-icd.com)