

C4

DRIVE STARTUP MANUAL



MAGNETEK DSD 412 DRIVE
DC MOTOR INSTALLATION

 SMARTRISE

CONTROLLER GROUNDING REQUIREMENTS

NOTE – For the controller to function properly it is very important to provide proper building ground connections to the controller.

Examples of a proper building-to-controller ground connection is to attach the ground cable to:

- The street side of the incoming water main.
- To a grounding rod that has been driven into the pit flooring.

The controller has a common ground bus terminal connection.



- All grounds need to land at this common point including building, motor, transformer, and filter grounds. This prevents ground loops, and will limit the impedance between the grounds and noise will be channeled back to building ground.

Providing a proper ground is mandatory and will improve the performance of the controller.



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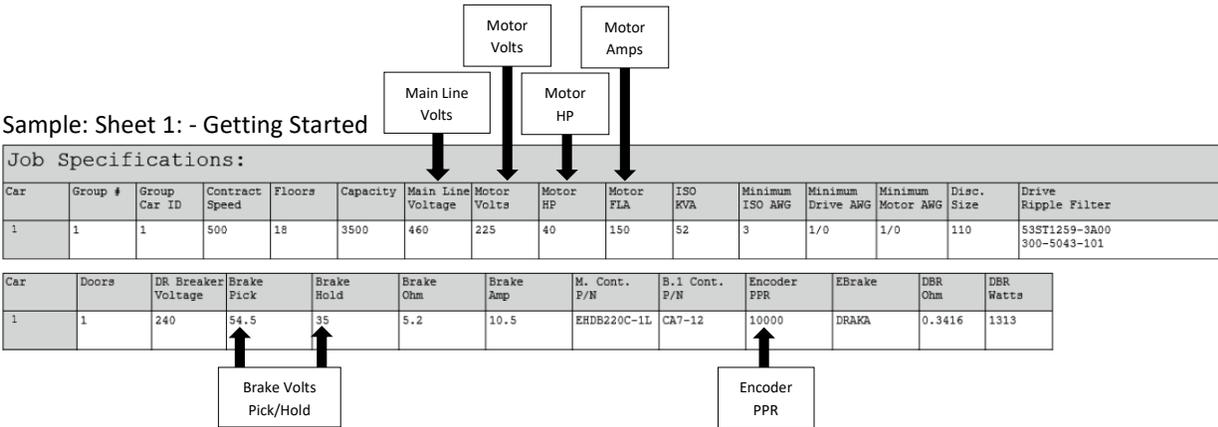


MAGNETEK DSD 412 DRIVE

EQUIPMENT/SETTINGS VERIFICATION

Verify that the Job Specification parameter table on the drawings “Sheet 1: Getting Started” matches the actual equipment.

Below is a sample table showing the important values that will affect operation.



WIRING

(Check off box when complete)

**** Refer to the Appendix for the following connections ****

Power – (Sheet 3: Machine Room connections)

- Connect main line power to terminal block L1/L2/L3.
- Connect the ground wire to the yellow/green terminal block next to L1-L3.

Brake – (Sheet 5: Brakes)

- Connect the main brake wiring to terminals K1 / K2 and the secondary brake wiring (if equipped) to terminals J1 / J2 located on the terminal block next to the M contactor.

Motor / Encoder – (Sheet 4: Drive and Motor)

- Connect motor leads to the M contactor at T1/T2/T3.
- Connect the encoder cable to the TB1 encoder terminal block located under the lower cover. The following table contains wiring references for common encoders.

Encoder	Drive	Imperial 35'	Imperial 50' / 75'	Accucoder	Wachendorff	IH740 / IH950	Industrial
PWR	IP	Red	White	Brown	Brown	Brown	Brown
COM	IG	Black	Black	Blue	White	White	White
A	A+	White	Purple	White	Green	Green	Green
/A	A-	White/Black	Gray	Green	Red	Pink	Pink
B	B+	Blue	Green	Yellow	Yellow	Yellow	Yellow
/B	B-	Red/Black	Blue	Gray	Black	Blue	Blue
Z	-	Orange	-	Pink	Gray	Gray	Gray
/Z	-	Green	-	Red	Violet	Red	Red
CLK+	CK	-	-	-	-	-	-
CLK-	\overline{CK}	-	-	-	-	-	-
DAT+	DT	-	-	-	-	-	-
DAT-	\overline{DT}	-	-	-	-	-	-
SHIELD	FE	Shield	Shield	Shield	Shield	Shield	Shield

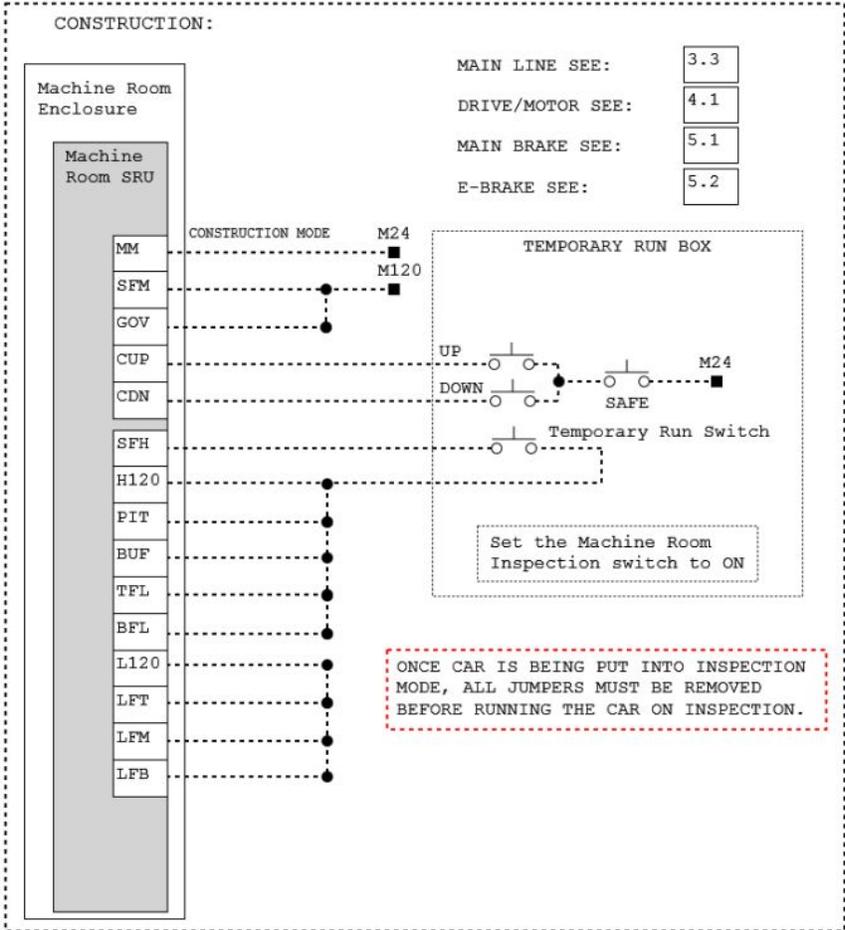


CONSTRUCTION

(Sheet 1: Construction)

The following instructions are from the job drawings: "Sheet 1 – Construction". Refer to the job's specific drawings for connections.

Construction Box from Sheet 1 – (Sample)



CONSTRUCTION CONNECTIONS

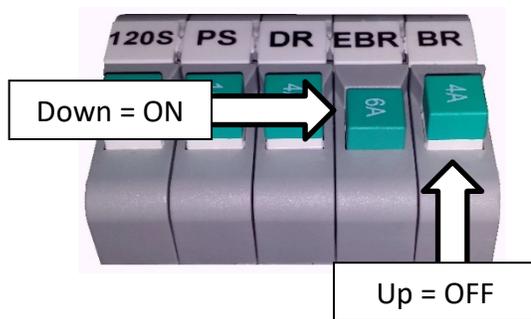
- All Safety inputs are functional during construction mode on the “C4” product. When these devices are installed they should be connected per sheet 2 of the prints, even if still on construction mode. The following will assume that none of these devices have been installed prior to beginning on construction mode.
- Connect a jumper from L120 to terminals LFT, LFM, LFB. Do the same for LRT, LRM, and LRB if you have rear doors.
- Connect a jumper from H120 to PIT, BUF, BFL, TFL, and SFH.
- Connect M120 through your machine room run/stop switch and connect it to SFM. A closed switch will indicate run; an open switch will indicate stop. If no run/stop switch is being used just connect M120 to SFM.
- Connect your run bug. Wire the up button to input CUP and the down to input CDN. If no run bug is being used, leave the inputs unwired.
- Connect a jumper from 24VDC to MM.
- Verify the car door bypass and Hoistway bypass switches are in the off position.
- Place the inspection switch to “Inspection”.



POWERING UP

(Check off box when complete)

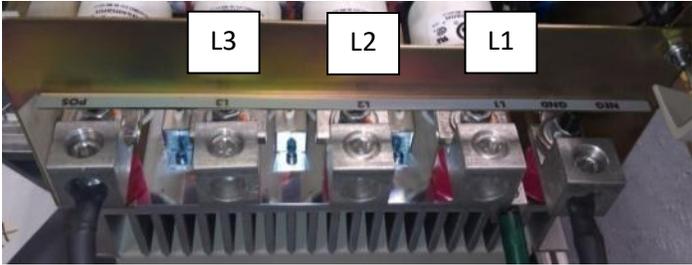
- Apply external power by closing the main disconnect.
- Close all the pushbutton breakers.
- Verify that the LCD on the Smartrise board and the Magnetek Drive come on.



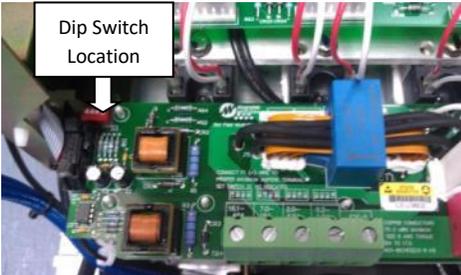
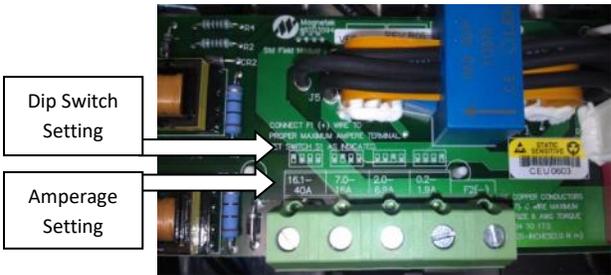
MAGNETEK DSD412 SETUP

Refer to the recommended connections shown in the connection diagrams. Attach a voltmeter across the 115vac source for the control power supply at A4TB3-1 & A4TB3-7.

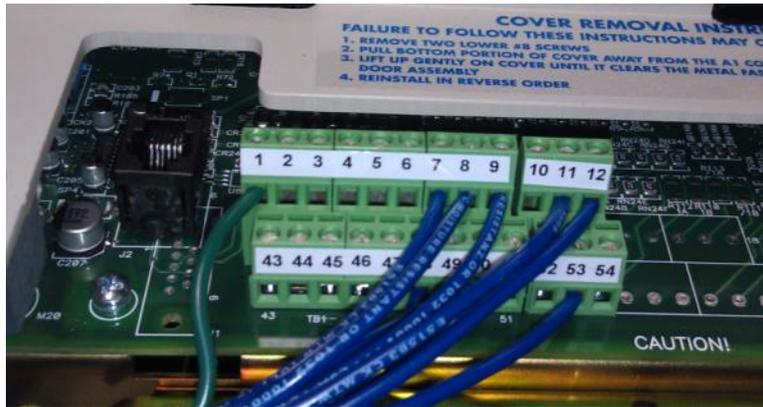
- 1. Attach L1, L2 & L3 to the corresponding terminals on the drive.



- 2. Connect the armature wiring to the terminal block according to the amperage rating listed on the motor. Make sure to set the dipswitch to the value that matches the amperage rating.



3. If you haven't already done this, connect the encoder to TB1 using the color codes provided by the manufacturer or the reference tables in the manual.
4. Apply the control and three-phase power and verify that the control power is between 103vac and 126vac. Then press the RESET push button on the front of the power cube, and observe the drive power-up sequence as described below.



DRIVE POWER-UP SEQUENCE

The power up sequence can be observed by monitoring the Standard Control/Display Unit (SCDU) on the front of the power cube.

1. First, all of the segments on the digital LED display and all of the LEDs will come on for about 1 second.
2. Next, the LEDs and display should turn off. The drive will perform internal checks. The SCDU will display 'tEst' while a self-test is being performed.
3. If the drive passes the self-test, then the SCDU will display 'P-UP'.
4. READY LED will light.

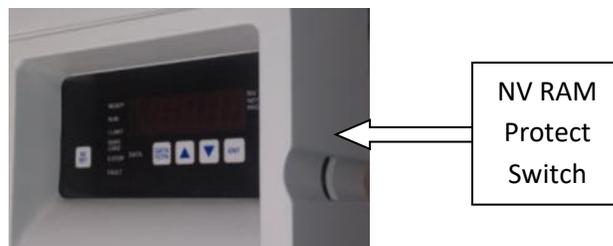
ABNORMAL DISPLAY CONDITIONS

Displays other than those mentioned above may occur. The following is a list of abnormal display conditions that may occur, and the actions necessary to correct the situation:

1. If no digits or LEDs light up, then check for proper voltage between the 115vac control power lines, or for blown 115vac control power fuses, or for a defective Control Voltage Power Supply in the power cube.



2. If horizontal segment(s) of the SCDU display are lit, then one or more phases of the three-phase power are missing. Measure and verify three phase power input at the drive terminals. Check the three-phase power fuses.
3. If the FAULT LED lights, and a fault code appears on the SCDU, then refer to the Fault/Error Codes List to see what caused the fault and to find the correct solution. A fault code is the letter 'F' followed by a number representing the fault.
4. If the SCDU displays 'Prot', then the initial checks found that the protected non-volatile RAM (NVRAM) has not been initialized. Move the NV RAM PROTECTION switch to "OFF" in order to allow the microprocessor to initialize the NVRAM with preprogrammed default values. Notice that the NV RAM UNPROTECTED LED is now lit to indicate the NV RAM PROTECTION switch position. Next, press the RESET push button. The drive will go through its power up sequence again; however, this time it will initialize the unprotected NVRAM and load in factory supplied default parameter values.



FAN CHECK

1. On drives with a blower motor (power bridge fan), verify that the fans are working.

VERIFY PARAMETERS

When the READY LED on the SCDU is lit, all the selectable parameter data should be checked and/or verified to the proper values as follows:

1. VERIFY OR CHANGE EACH PARAMETER VALUE for the particular application and motor involved.
2. STORE PARAMETERS, Function # 994, so that power can be removed and reapplied without losing the entered parameters.
3. Set the NV RAM PROTECT switch to the protect position (UN PROT NV RAM light is off) to ensure that set up data cannot be corrupted.
4. Operate drive, using external control signal inputs shown on the Interconnection Diagram.

Verify the following parameters in the Magnetek DSD412 are set correctly. The job specific values are listed on “*Sheet: 04 – Drive and Motor*”.

Parameter	Description	Recommended Value	Additional Information
2	Use Self Tune Logic	On	This parameter cannot be set to ON until performing the self-tune.
3	Rated Armature Current	Motor Name Plate	
7	Rated Armature Voltage	Motor Name Plate	
9	Nominal AC Voltage	Drive Supply Voltage	This is the voltage coming into the drive. Not necessarily the line voltage if a step-up or step-down transformer is being used.
10	Encoder PPR	Per Encoder	
11	Motor RPM	Motor Name Plate	
17	Rated Car Speed	Per Job Specification	
49	Weak Field Current	Motor Name Plate	If this value is greater than the Rated Field Current, then the field will never weaken.
50	Rated Field Current	Motor Name Plate	The drive must be configured for the correct field current range. See page 28 in the Magnetek manual for dip switch settings.
52	Rated Field Voltage	Motor Name Plate	
53	Standby Field Current	25%	



MAGNETEK DSD412 DRIVE SELF TUNE PROCEDURE

1. Place a jumper from 120 on the DIN rail to SAFE.
2. Put the NVRAM Protected Switch in the 'Not Protected' position.
3. Perform PCU DIAGNOSTICS Function 998 to verify armature and field circuitry.
4. Perform SELF-TUNE PARAMETER TEST Function # 997. The drive should display PASS after a few seconds. Set Parameter #2 to 'ON'.
5. Remove the jumper and perform Function #994 to permanently save the changed values.
6. Verify the Smartrise Machine Room board LCD is not showing an active fault as indicated by a flashing Red LED, and it displays "**Construction Mode**".
7. Close the Run Bug Stop Switch.
8. Command the Car to move.
9. Ensure the brake is picking/holding after a valid run command is given. Also, ensure the brake is dropping once the command is removed.
10. Verify the timing and operation of the brake to ensure to motor is not running through the brake prior to it picking.
 - a. If the brake is inoperative check the following:
 - b. Check for DC voltage between points K1 and K2 on the Machine Room DIN Rail.
 - c. Verify this voltage is also at the Brake Coil when commanded to pick.
 - d. Ensure this voltage corresponds to the voltage the Brake Coil is rated for.
 - e. If problems persist contact Smartrise for assistance.
11. The encoder feedback may be out of phase upon first power up. This may cause the motor to run faster than commanded and/or give drive fault 408/98. If this occurs remove line power and swap the encoder A and A- wires.
12. Reapply Line power and command the car to move. The car should now move at the programmed Inspection Speed.
13. If the Motor is running in a reverse direction from what is commanded swap the field (+) and (-) wires. It may be necessary to swap the encoder A and A-wires after changing the field wires.



SHUDDERING AT HIGH SPEED

1. Motor voltage vs. transformer secondary input voltage – Recommendation is that the transformer secondary voltage be at a minimum equal to rated armature Vdc. For best results that account for sagging utility, etc, $V_{ac} = 1.05 \times V_{dc}$ is a better number to use.
2. Make sure that the motor weak field current is adjusted so that with full load up at rated speed yields the rated Vdc used above.
3. Rope resonance – Use the high speed / low speed bandwidth adjustments (#39 & 40). Reduce the setting of High speed bandwidth to maybe 50% of that for low speed. Set the gain change speed (#105) at 25-50% of rating. Elevator speeds of 350-500 with 2:1 roping can be problematic. Using the notch filter may help (#190, 191).
4. Make sure there is no slop/backlash in the encoder coupling and that the encoder is not wobbling or vibrating.
5. Keep Tach Rate Gain (#107) at zero.
6. Verify the correct motor & encoder data and performed diagnostics (#998) and self tune (#997) and used the values for self tune (#4, 6, 51). [Recommend copying them from (#613, 614, 615) to Manual settings and then specifying to use them (#2)].
7. Reduce motor armature response (#8) to 250 r/sec.
8. Make sure there is a ground bonding wire from motor frame to drive chassis.
9. Make sure the encoder is electrically insulated from the motor shaft and frame.
10. If using a friction wheel encoder, make sure both surfaces are perfectly round.



OPERATION

(Check off box when complete)

Run the car and verify the following:

No Faults

- Make sure the car is moving without triggering a fault either on the Smartrise SRU or the drive. If the SRU board displays a “Drive Fault” on the SRU, look at the drive to see what the fault is.
 - Go to “**Troubleshooting – Drive Fault / Encoder Flt**” for corrective actions.

Proper Direction

- Make sure the car is moving in the same direction as the control switch on the Run Bug.
 - Go to “**Troubleshooting – Wrong Direction**” for corrective actions.

At Speed

- Make sure that the car is moving at the proper inspection speed (approx. 50 FPM).
 - Go to “**Troubleshooting – Car Moving Too Slow or Rough**” for corrective actions.

Under Control

- Make sure that the car is moving under full control. The car should stop when commanded from the Run Bug. Verify that the car runs with no faults for 10 seconds or more.
 - Go to “**Troubleshooting – Brake Not Lifting**” for corrective actions.



TROUBLESHOOTING

DRIVE FAULT / ENCODER FLT

1. The most common fault at startup with a Magnetek drive is the Encoder fault. Perform the following checks to correct this fault:
 - a. Check for a solid *shield-to-ground* connection at the motor and drive.
 - b. Check for correct colored encoder wires to the terminals.
 - c. Swap A+ / A- on terminal TB1.

BRAKE NOT LIFTING

1. If the brake is not picking make sure that it is wired according to “Sheet 5 – Brake & Hydro Options” and verify that the EB terminal is jumped to the terminal listed on “Sheet 01 – Getting Started”. If it has the proper voltage check the following:
 - a. During a run command, check for DC voltage between points K1 / K2 and J1 / J2 (if 2nd brake installed). Verify the voltages are also at the Brake Coil(s) when commanded to pick.
 - b. Verify that the voltages match the Brake Coil voltages shown on “Sheet 1: Getting Started” table.

WRONG DIRECTION

1. If the car is moving in the wrong direction:
 - a. On the Smartrise controller board make sure that IO CUP comes on when commanding the **UP** direction and IO CDN comes on when commanding the **DOWN** direction.

CAR MOVING TOO SLOW OR ROUGH

1. Swap the encoder wires A+ and A- on drive TB1.
2. Verify the brakes are lifting fully.



APPENDIX

Terminal Locations

