

V2

DRIVE STARTUP MANUAL

HPV900-PM

VERSION 2.0



SMARTRISE

Document History

Date	Version	Summary of Changes
October 23,2018	1.0	Initial Submittal
December 17, 2019	2.0	Changed cover page New document format Reworked display screen shots to display as viewed Expanded on step by step procedures Replaced Construction section to include wiring to the CXN board

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HPV900-S2 PM Drive

The HPV900-S2 drive is a permanent magnet AC drive.



Figure 1: HPV900-S2 PM Drive

Equipment/Settings Verification

Set and verify the equipment matches the job specific parameters for proper operation. See V2 Controller sheet 01 Getting Started Parameter Table for more information.

Job Specifications:																
Car	Group #	Group Car ID	Contract Speed	Floors	Capacity	Main Line Voltage	Motor Voltage	Motor HP	Motor FLA	Motor Poles	Motor RPM	Motor Freq	Drive AMP	Motor AMP	Disc. Size	Drive
1	1	1	300	17	2500	208	208	25	67	6	1144	60	2	2	110	HPV900-2075-2E1-01

Car	Doors	DR Voltage	Brake Pick	Brake Hold	Brake Ohm	Brake Amp	M. Cont. P/W	S.1 Cont. P/W	Encoder PPR	EBrake	DR Ohm	DR Watts
1	1	240	230	180	190	1.2	CAT-97	CAT-12	1024	HW GRIPPER	5	4000

Motor Volts	Motor Amps	Motor RPM	Main Line Volts	Motor HP	Motor Poles	Motor Frequency
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Brake Volts Pick/Hold	Encoder PPR
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Figure 2: Example of Parameter Table

Magnetek Parameter Location Reference

Adjust A0

- **Drive A1**
 - Encoder Pulses (Encoder PPR – 1024/2048)
- **Power Convert – A4**
 - Input L-L Volts
- **Motor – A5**
 - Rated Mtr Power (Kw)
 - Rated Mtr Volts (VAC)
 - Rated Exit Freq (60Hz)
 - Rated Motor Curr (FLA – Amps)
 - Motor Poles
 - Rated Mtr Speed (RPM)

Configure C0

- User Switches – C1
 - Motor Rotation
 - Forward/Reverse
 - Encoder Connect
 - Forward/Reverse

Grounding Requirements

NOTE: A proper and effective building ground connection is required for the safe and successful operation of the controller.

Examples of a proper building-to-controller ground is as follows:

1. Attach the ground wire to the street side of a water main.
2. Attach the ground wire to a grounding rod in the pit.

The controller has a common ground bus terminal connection.



Figure 3: Ground Bus Terminal

- The building, motor, transformer, and filter(s) must all share a common ground. This removes ground loops, limits impedance, and routes noise into the ground.

Wiring

A checklist must be completed during the drive wiring process. See Appendix for terminal location.

Power

Perform the following to connect power. See *V2 Controller sheet 03 Machine Room* for job specific information.

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

Brake

Perform the following to connect the brakes. See *V2 Controller* sheet *05 Brakes* for job specific information.

- Connect the main brake wiring to terminal K1/K2 and the secondary brake wiring (if equipped) to terminals J1/J2 located on the terminal block next to the M Contactor.
- Jump EB to the terminal on Construction Box and connect either the rope gripper or sheave brake to EBR (if installed). See *V2 Controller* sheet *01 Getting Started* for more information.

Motor / Encoder

Perform the following to connect the drive to the motor and encoder cable. See *V2 Controller* sheet *04 Motor and Drive Connections* for job specific information.

- Connect motor leads to the M contactor at T1/T2/T3.
- Connect the encoder cable to the drive terminal block TB1. See Figure 12.

The table below lists the Wiring References for Common Encoders. Record the encoder wire color code for future release.

Table 1: Wiring References for Common Encoders

Encoder	Endat Termination		Black Heidenhain	Ziehl	Green Encoder Cable	Torin Encoder Cable	On-Site Color
/A	A-	TB2-1	Yellow and Black	Red and Blue	Yellow	Brown	
A	A+	TB2-2	Green and Black	Gray and Pink	Green	Green	
/B	B-	TB2-3	Red and Black	Red	Red	Yellow	
B	B+	TB2-4	Blue and Black	Blue	Blue	Blue	
/DATA	DAT-	TB2-5	Pink	Brown	Pink	Silver	
DATA	DAT+	TB2-6	Gray	White	Gray	Gray	
/CLOCK	CLK-	TB2-7	Yellow	Black	Violet	White	
CLOCK	CLK+	TB2-8	Violet	Violet	Black	Violet	
0V com	COM	TB2-9	Green and White	Pink	White	Black/Red and White	
+5V	+5V	TB2-10	Green and Brown	Gray	Brown	Red and Pink	

Encoder	Endat Termination		Black Heidenhain	Ziehl	Green Encoder Cable	Torin Encoder Cable	On-Site Color
	SEN-	TB2-11					
0V Sense (If Present)	SEN-	TB2-11	White	Yellow			
+5V Sense (If Present)	SEN+	TB2-12	Blue	Green			
Cable Shield	Shield	TB2-13	Encoder Cable Shield	Encoder Cable Shield	Encoder Cable Shield	Red	
EnDat Board Ground (Magnetek GRN factory wire tied to ground stud)	Shield	TB2-13					

Construction

Perform the following to wire the Construction box. See *V2 Controller sheet 01 Getting Started* for job specific information.

1. Install jumpers between M24 and Input/Output (IO) as per print.
2. Using an external run box?
 - a. If using an external run box, go to step 3.
 - b. If not using an external run box, go to step 5.
3. Remove factory wires on inputs 521 and 522.
4. Install the Run Bug UP/DOWN switch to IOs 521 and 522.
5. Install the Run Bug UP/DOWN TIME switch to M24.
6. Install the Temporary Run switch between 120 and SFIN on the CXN board and 120 to THL, MHL, and BHL on the CXN board.
7. Are there two sheave brakes and no rope gripper?
 - a. If there are two sheave brakes and no rope gripper, go to step 8.
 - b. If there is a rope gripper or a single sheave brake, the process ends.
8. Install a jumper between EB and SOUT.

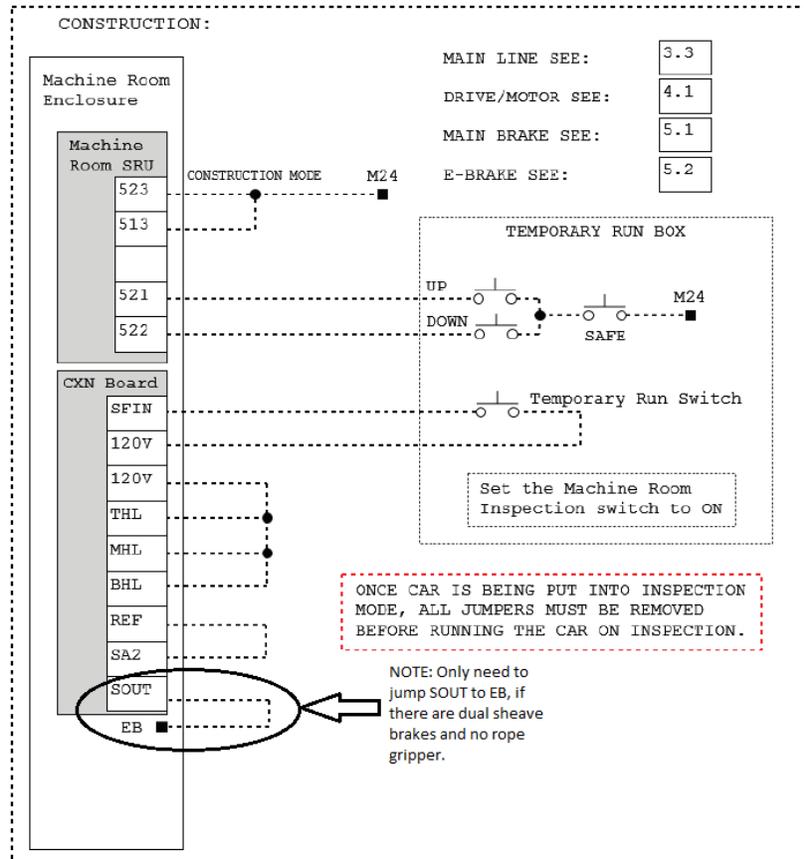


Figure 4: Example of Construction Wiring

Powering Up

Perform the following to power up the drive.

1. Apply external power by closing the main disconnect.
2. Close the two-pole breaker and all pushbutton breakers.

- Verify the LCD on the Smartrise board and the drive powers up.

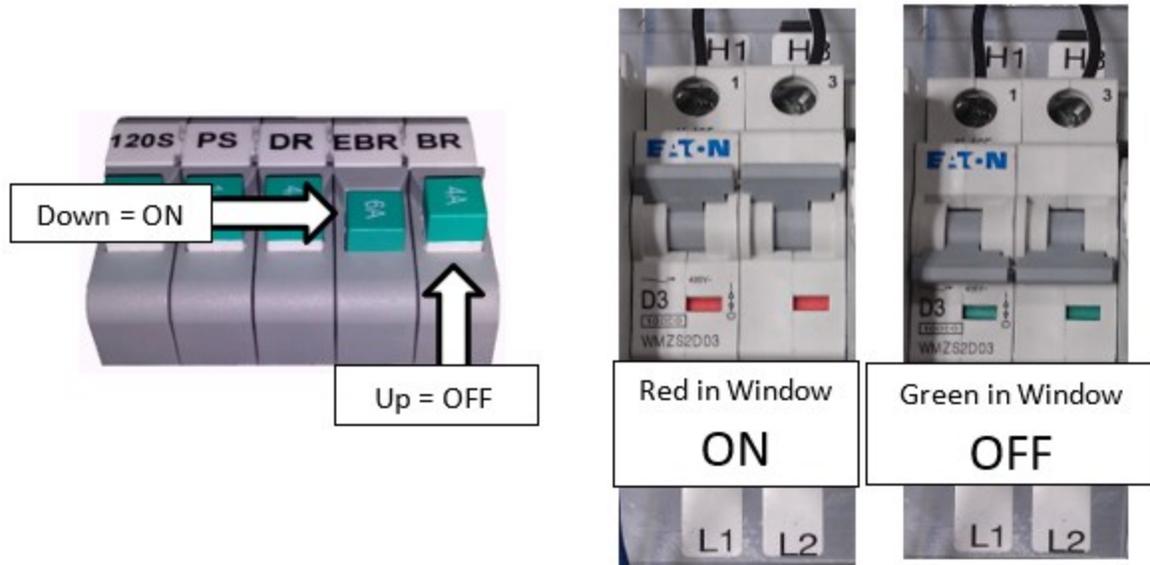


Figure 5: Breakers

Final Setup

Perform the following to set the Bypass Term Limit.

NOTE: The selected menu within the menu options is shown with a *.

- Toggle the Inspection/Normal switch to Inspection.
- On the Smartrise Machine Room board, press the left arrow (ESC) button several times to get to the MAIN SCREEN.
- Press the right button to access the Main Menu.
- From the MAIN MENU, scroll and select Setup.



Figure 6: MAIN MENU – Setup

- From the SETUP menu, scroll and select Misc.



Figure 7: SETUP Menu – Misc

- From the MISC menu, scroll and select Bypass Term Limits.

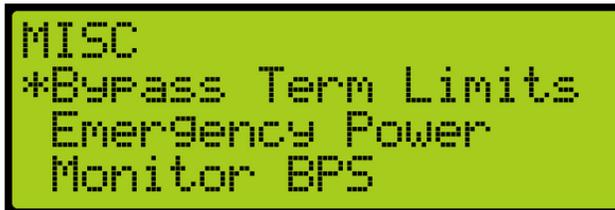


Figure 8: MISC Menu – Bypass Term Limits

- From the BYPASS TERM LIMITS menu, set the bypass term limits from NO to YES.



Figure 9: Bypass Term Limits Menu – NO

- Scroll and change NO to YES.



Figure 10: Bypass Term Limits Menu – YES

- Scroll right and press Enter to save.
- Press the left button several times to get to the MAIN SCREEN.
- Verify the LCD displays Construction Mode on the MAIN SCREEN.

12. Does the drive show a Setup Fault One on the display?
 - a. If the drive shows a Setup Fault One, go to Setup Fault One.
 - b. If the drive does not show a Setup Fault One, the process ends.

Auto Tuning

The auto tune function must be performed for a PM motor to properly operate. The two functions are Encoder Alignment and Motor Alignment. Complete the checklist during the verification process.

NOTE: During the alignment process, the Smartrise SRU board may display several faults. These are normal and won't affect the alignment procedure.

Motor Alignment

Perform the following to align the motor.

1. Use the Left|Right arrow buttons to select the AUTOTUNE SEL U12 menu.
2. Use the Up|Down arrow buttons to change AUTOTUNE SELECT to YES but **DON'T PRESS THE ENTER BUTTON.**
3. Press and hold the M contactor button.
4. Press the Enter button on the drive to start the alignment.

Encoder Alignment (Non-Rotational)

Perform the following to align the encoder.

1. On the drive – In the ROTOR ALIGN U10 menu change the following parameters:
 - Set the alignment method to either HF INJECT or AUTO ALIGN and press Enter. See Table 4 HF INJECT Note to verify if the HF INJECT method can be used.
 - Change alignment from disabled to enable.
 - Select BEGIN ALIGNMENT to Yes but **DON'T PRESS THE ENTER BUTTON.**
2. Press and hold the M contactor button.
3. Press the Enter Button on the drive to start the alignment.

NOTE: If the drive displays the error message "CAN NOT CHANGE AT THIS TIME", verify U10 ROTOR ALIGN – ALIGNMENT is set to Enable. If there are other faults during this process, see *Magnetek HPV900* for diagnostic information.

The table below lists the Parameters for BASICS U9.

Table 2: Parameters for BASICS U9

Parameter	Description	Choices
Drive Mode	Drive Operation	Open Loop Closed Loop PM

The table below lists the Parameters for AUTOTUNE SEL U12.

Table 3: Parameters for AUTOTUNE SEL U12

Parameter	Description	Choices
Autotune Select	Allows autotune to run	Disable On Run Yes

The table below lists the Parameters for ROTOR ALIGN U10.

Table 4: Parameters for ROTOR ALIGN U10

Parameter	Description	Choices
Alignment	Allows alignment to be performed	Enable Disable
Begin Alignment	Determines when to perform alignment	Yes On Run No
Alignment Method	How alignment will be performed	Open Loop Auto Align HF INJECT *

***NOTE:** HF INJECT only works if the drive version is A4810-xxxx15.xx or above. Navigate to U6 DRIVE INFO and check the drive version. If the drive is not version 15 or above, then use AUTO ALIGN.

The table below lists the Parameters for DRIVE INFO U6.

Table 5: Parameters for DRIVE INFO U6

Parameter	Description	Choices
Drive Version	Shows the software version of the drive software	A4810-xxxx <u>15</u> .xx

Operation

Run the car and complete the checklist during the verification process.

No Faults

Make sure the car is moving without triggering a fault either on the Smartrise SRU board or the drive. If the SRU board displays a drive fault, look at the drive to see what the fault is. See Drive Fault/Encoder Fault for troubleshooting drive fault.

Proper Direction

Make sure the car is moving in the same direction as the control switch on the Run Bug. See Wrong Direction for troubleshooting proper direction faults.

At Speed

Make sure the car is moving at the proper inspection speed (approximately 50 fpm). See Car Moving to Slow or Rough for troubleshooting at speed faults.

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. See Brake Not Lifting for troubleshooting under control faults.

Troubleshooting

The following sections list troubleshooting procedures.

Drive Fault/Encoder Fault

The most common fault at drive startup is the Encoder fault.

Perform the following checks to correct this fault:

- Check for a solid shield-to-ground connection at the motor and drive.
- Check for correct colored encoder wires to the terminals.
- Verify the C1-Encoder Select is set to endat.
 - If any encoder wiring has been changed, the Encoder Alignment must be run again. See Encoder Alignment.

Brake Not Lifting

If the brake is not picking, make sure that the brake is wired according to *V2 Controller sheet 05 Brake Connection* and verify that the EB terminal is jumpered to the terminal. See *V2 Controller sheet 01 Getting Started* for more information.

If the brake has the proper voltage check the following:

- During a run command, check the DC voltage between points K1/K2 and J1/J2 if secondary brake is installed. Verify the voltages are also at the brake coil(s) when commanded to pick.
- Verify that the actual brake voltage matches the brake coil voltage shown on the *V2 Controller sheet 01 Getting Started Parameter table*.

Wrong Direction

If the car is moving in the wrong direction check the following:

- On the Smartrise controller board make sure that IO 521 comes on when commanding the UP direction and IO 522 comes on when commanding the DOWN direction.
- Change the direction of the motor in the drive by going to C1-Motor Rotation and toggling between FORWARD/REVERSE.
- Swap two of the motor leads (T1 with T2).
 - After swapping the motor wires, it may be necessary to change C1 – Motor Rotation again.

Car Moving to Slow or Rough

If the car is moving to slow or rough perform the following:

- Verify the brakes are lifting fully.

Setup Fault One

This fault is caused when the HPV900 is programmed with motor data (A5) that conflicts with the drive software.

1. Unplug the CAT5 cable from the drive port on the the Machine Room board. This will restore access to the HPV LCD screen.
2. Navigate to A5 – Motor Parameters – Motor Poles and verify that you have the correct number of poles listed.
3. Navigate to A5 – Motor Parameters – Rated Motor Speed and lower the RPM by 15-20 rpms and save.
4. Plug the CAT5 cable into the drive port on the Machine Room board.

Appendix

The figures below show the Main Line and : EnDat terminal locations.

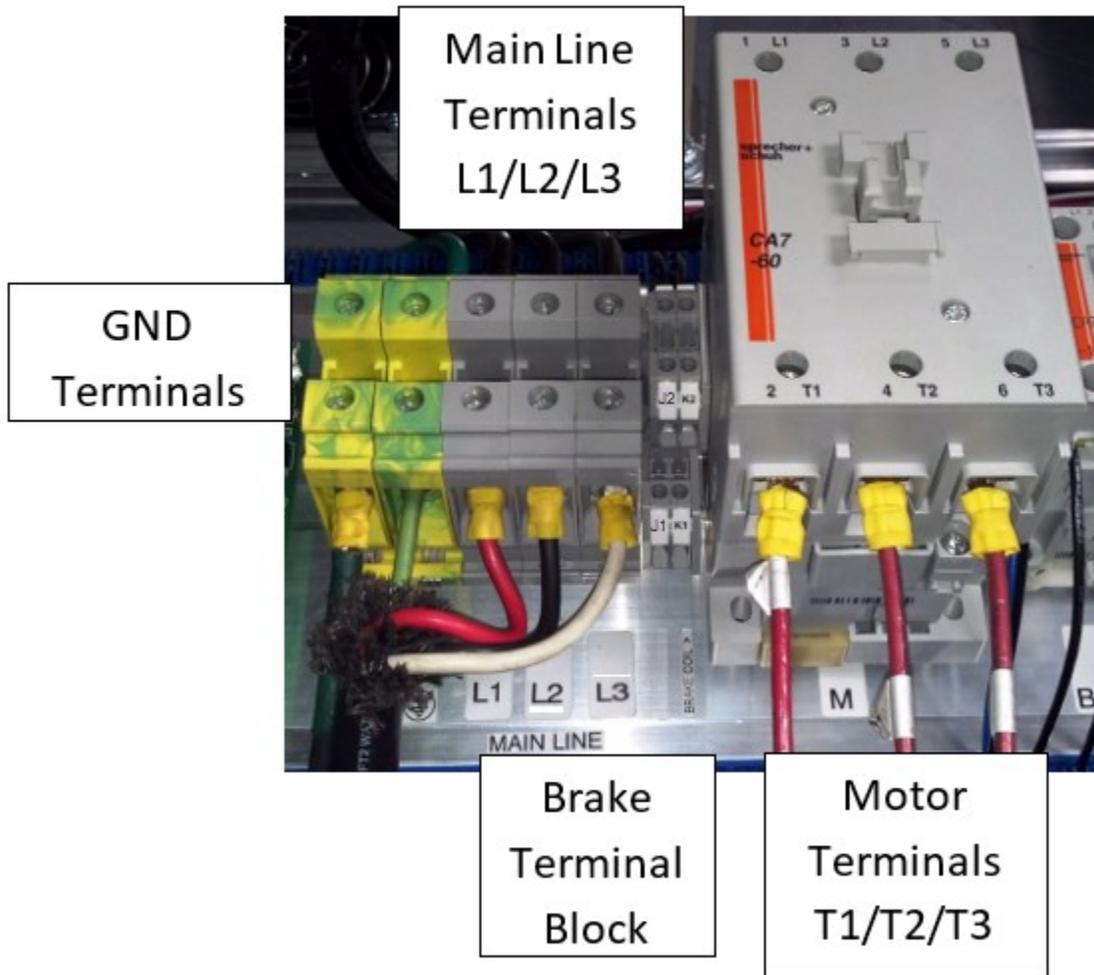


Figure 11: Main Line Terminal Locations

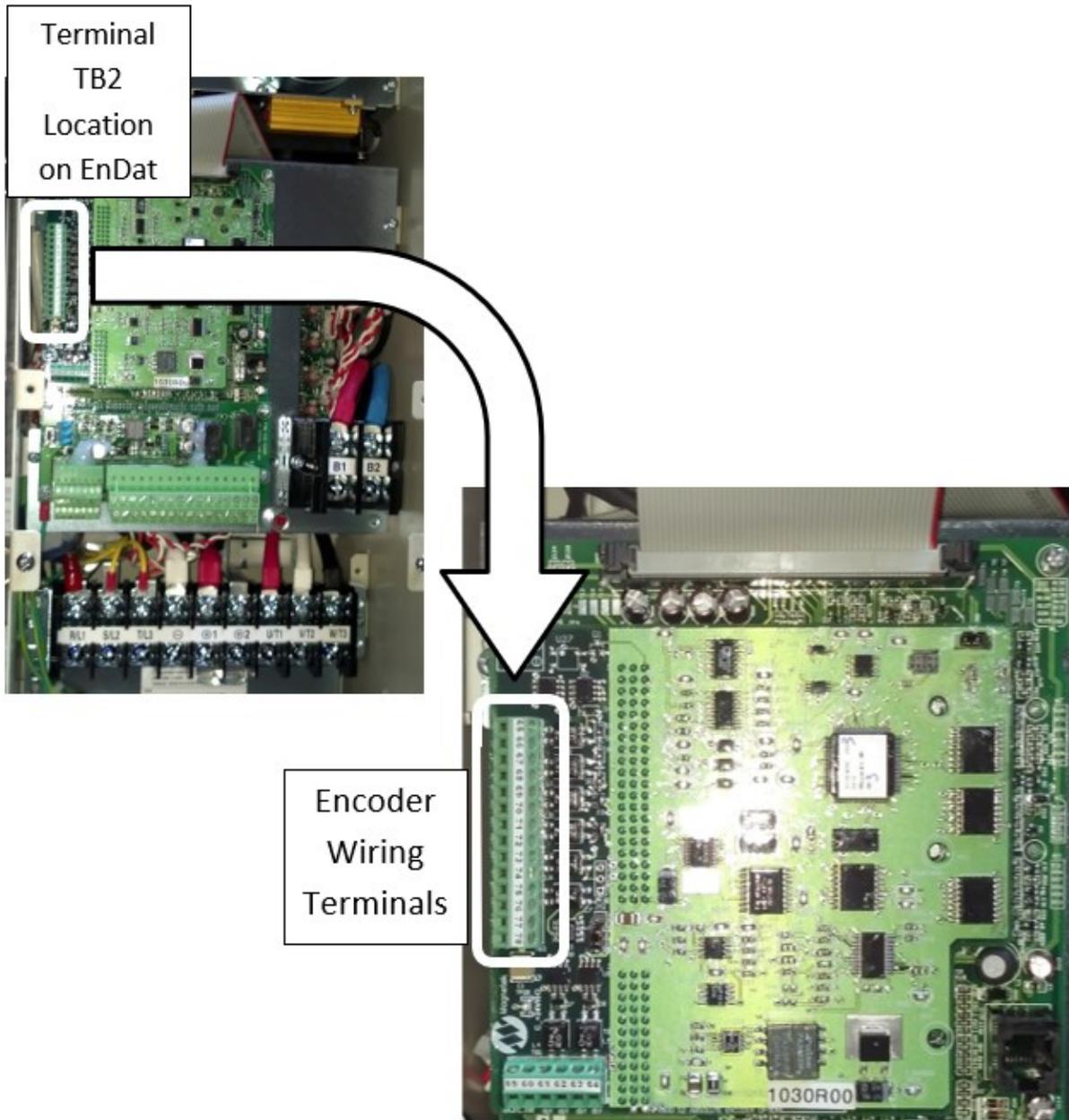


Figure 12: EnDat Terminal Location