With ALL Power OFF
A. Connect up the drive
Hook your drive up according to the following diagrams. Ensure power and control wiring are routed in separate conduit/cable trays and wiring meets applicable national and local electrical codes.

Power Wiring Diagram

Control Wiring Diagram

Control Terminals

Contact Descriptions (All are maintained-type)

CSO (Coast Stop Override): Must be closed prior to all other control signals for proper sequencing. When opened, the drive immediately stops generating armature current and the contactor drops out. Motor coasts to stop.

ENA (Enable): Electronic inhibit for all modes of operation. When closed, the drive may generate current. If open, no armature current will generated. May be jumpered to Terminal 35 in most applications.

JOG: When closed, the drive’s contactor comes in and the motor will run at the Jog Speed 1 setting (Default 5% speed). When opened, the drive ramps to zero and contactor opens after a delay (Default = 2 secs).

STRT (Start): When closed, the drive’s contactor comes in and the motor will run at potentiometer speed setting. When opened, the drive ramps to zero and contactor opens after a delay (Default = 2 secs).

As programmed from the factory, after removal of the control input, the motor field current will be present until the field quench delay is completed (Default = 10 secs).

Power Terminals

Optional Feedback Devices

A. Get the supply and motor nameplate data

<table>
<thead>
<tr>
<th>Description</th>
<th>Typical</th>
<th>Actual</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage (V)</td>
<td>460</td>
<td>500</td>
<td>VAC</td>
</tr>
<tr>
<td>Armature Volts (V)</td>
<td>500</td>
<td>600</td>
<td>VDC</td>
</tr>
<tr>
<td>Armature Current (IA)</td>
<td>55</td>
<td>50</td>
<td>ADC</td>
</tr>
<tr>
<td>Base Speed (BS)</td>
<td>1750</td>
<td>1000</td>
<td>RPM</td>
</tr>
<tr>
<td>Maximum Speed (MS)</td>
<td>2300</td>
<td>1000</td>
<td>RPM</td>
</tr>
<tr>
<td>Field Volts (VP)</td>
<td>6</td>
<td>5</td>
<td>VDC</td>
</tr>
<tr>
<td>Field Current @ BS (IFP)</td>
<td>1.35</td>
<td>1.0</td>
<td>ADC</td>
</tr>
<tr>
<td>Field Current @ MS (IFM)</td>
<td>0.8</td>
<td>0.5</td>
<td>ADC</td>
</tr>
</tbody>
</table>

Feedback Device

DC Tachometer

Naviagting through the menus

Legend of abbreviations used for keystrokes:

LR.U.B = Press the specified button EXACTLY once.
8xU = Press the Up button 8 times.
U/D = Use the Up button to increase the value, use the Down button to decrease the value.

Final Power OFF Checks
Recheck all your wiring, especially the drive’s chassis ground. Also, use your multimeter to check the L1, L2, L3, F+, F-, A+, and A- Terminals for short circuits to ground. All readings should be greater than 1 MΩ. Correct any low resistances prior to applying power.

It is essential to perform all of the following steps in their entirety and in the proper sequence! If in doubt, call 1-888-667-7333 (International 410-604-3400).

Power ON Checks
1. Apply Control Power and Calibrate
2. Calibrate the Drive to the Motor

At power up, the Diagnostic Summary Screens are displayed. By pressing the Left key at least 5 times, you will return to these screens from any menu level.

When at the top level, the display toggles between the Diagnostic Summaries about every 5 seconds.

Use the up and down keys to change the values.

Now, to move to the rated field current:

Apply 100-240 VAC control power to T53 (Line) and T52 (Neutral).

DC Tachometer Calibration

For a tachometer, initially calibrate the drive for the expected DC voltage at base speed.

TVb = (BS 1000) x TV

Feedback calibration

If you do not have a DC tachometer or encoder, skip this section and go to Step 3.
**Bardac drives**

**basicPL/X Quick Start**

This Quick Start is a supplement to the standard product manuals intended for use as a guide to get your PL/X Drive up and running as a basic speed controller in a safe and efficient manner. For all other applications, refer to the PL/X Product and Applications Manuals.

**With ALL Power OFF**

A. Connect up the drive

Hook your drive up according to the following diagrams. Ensure power and control wiring are routed in separate conduit/cable trays and wiring meets applicable national and local electrical codes.

**Power Terminals**

With ALL Power OFF

A. Ensure

With ALL Power OFF

A. With ALL Power OFF

Only qualified personnel who thoroughly understand the operation of the machine on which the PL/X is installed and who are familiar with electrical wiring and safety standards should attempt to commission this equipment.

**Control Wiring Diagram**

**Optional Feedback Devices**

**DC Tachometer**

**Encoder**

**A. Get the supply and motor nameplate data**

**Description** | **Typical** | **Actual** | **Units**
--- | --- | --- | ---
Supply Voltage (V) | 200 | 500 | VDC
Armature Volts (V) | 500 | 600 | VDC
Armature Current (IA) | 35 | 80 | ADC
Base Speed (BS) | 1750 | 1750 | RPM
Maximum Speed (MS) | 2300 | 2300 | RPM
Field Volts (VF) | 1.35 | 1.35 | ADC
Field Current @ BS (IFB) | 0.8 | 0.8 | ADC
Field Current @ MS (IFm) | 1.35 | 1.35 | ADC
Feedback Device | 50 | 50 | V/
Encoder (PPR) | 500 | 500 | PPR
Supply Voltage (V) | 5 – 24 | 5 – 24 | VDC

**Navigating through the menus**

The green keys are used to setup the drive. In this Quick Start, the required key sequences are displayed to the left of each parameter to be modified. When executed correctly, the display on the drive should match the one shown.

**Legend of abbreviations used for keystrokes**

- **L,R,U,D** = Press the specified button EXACTLY once.
- **8xU** = Press the Up button 8 times.
- **U/D** = Use the Up button to increase the value, use the Down button to decrease the value.

**Final Power OFF Checks**

Recheck all your wiring, especially the drive’s chassis ground. Also, use your multimeter to check the L1, L2, L3, F+, F-, A+, and A- Terminals for short circuits to ground. All readings should be greater than 1 MΩ. Correct any low resistances prior to applying power.

It is essential to perform all of the following steps in their entirety and in the proper sequence! If in doubt, call 1-888-667-7333 (International 410-604-3400).

**Power ON Checks**

1. Apply Control Power and Calibrate

**Apply 100-240 VAC control power to T53 (Line) and T52 (Neutral).**

2. Calibrate the Drive to the Motor

At power up, the Diagnostic Summary Screens are displayed. By pressing the Left key at least 5 times, you will return you to these screens from any menu level.

**5xL**

When at the top level, the display toggles between the Diagnostic Summaries about every 5 seconds. Press the keys in the sequence below to set the rated armature current from the nameplate data you recorded.

**R,R,U,R,R - U/D**

Use the up and down keys to change the values. Now, to move to the rated field current:

**L,D,R - U/D**

Repeat these steps for the following:

- **L,D,R - U/D**
- **L,D,R - U/D**
- **L,D,R - U/D**

Also check the following to ensure they have not been modified from the factory default settings:

- **L,D,R - U/D**
- **L,D,R - U/D**
- **L,D,R - U/D**

Although the drive regulates field current by default, set the field voltage clamp as a percentage of AC supply volts.

**FV %** = **(FV + VL) x 100**


**Feedback calibration**

If you do not have a DC tachometer or encoder, skip this section and go to Step 3.

**DC Tachometer Calibration**

For a tachometer, initially calibrate the drive for the expected DC voltage at base speed.

TVb = (BS – 1000) x TV

**Contact Descriptions**

CSO (Coast Stop Override): Must be closed prior to all other control signals for proper sequencing. When opened, the drive immediately stops generating armature current and the contactor drops out. Motor coasts to stop.

ENA (Enable): Electronic inhibit for all modes of operation. When closed, the drive may generate current. If open, no armature current will generated. May be jumped to Terminal 35 in most applications.

JOG: When closed, the drive’s contactor comes in and the motor will run at the Jog Speed 1 setting (Default 5% speed). When opened, the drive ramps to zero and contactor opens after a delay (Default = 2 secs).

STRT (Start): When closed, the drive’s contactor comes in and the motor will run at potentiometer speed setting. When opened, the drive ramps to zero and contactor opens after a delay (Default = 2 secs).

As programmed from the factory, after removal of the control input, the motor field current will be present until the field quench delay is completed (Default = 10 secs).

See Product Manual for fuse specifications.
5. Cycle see R,D,R,4xD,R,D,D,R

The actual Control Input (CIP) terminal status.

1,0,R - U/D

Then 4xL

Encoder Calibration

Ensure quadrature is enabled and enter the PPR.

L,R,0,R,4xD,R,0,R - U/D

Then 4xL

PPR

1024

1. Encoder SET UP KEY TO CONTINUE

2. PARAMETER SAVE 2 (SAVES DATA)

3. PARAMETER SAVE FINISHED

2. Save Parameters

To save your work thus far, from the Diagnostic Screens:

R,U,R

To

U

When done

Then 2xL

4. Check Control Terminals

The next few checks are to ensure the drive controller is sequenced properly prior to applying three phase power.

The value under the letters TRUSC in the display indicate the actual Control Input (CIP) terminal status.

R,U,R,4x0,R,0,R,0,R

141100 12333333 CIP 10101010

Leaving the CSO contact of your control wiring open (a 0 under the C), close the other control contacts. Check to see if the digit under the appropriate letter changes as you cycle the contact. Generally, 1 = ON while 0 = OFF (for the thermostat, 0 = OK while 1 = Motor Overtemp).

Once satisfied with the operation of the TR,R, and S control inputs, leave R,J, and S OFF and check the C control input for proper operation.

5. Apply Main Three Phase Power

Prior to running the motor, the current loop of the drive must be tuned to the motor and cabling (PIN’s 93,94,& 95).

a) Ensure the drive is in a normal stop condition. The CIP’s should match TRUSC below:

Still from Step 4

Then 4xL

b) Enable the autotune mode.

R,U,6x0,R,7x0,R - U

Then 4xL

(2)AUTOTUNE ENABLE

c) Start the drive by energizing the Start Input (T33).

R,U,4x0,R,0,R,0,R

Then 4xL

The contactor will close and an autotune will be performed (takes 10 - 60 seconds). When complete, the drive’s contactor will open. Turn off the Start Input (T33).

Now, SAVE PARAMETERS as described in Step 3.

7. Motor Rotational Checks

Ideally, you would like to perform these running checks with the motor disconnected from the gear box and the machine.

As an additional precaution, restrict the available current to the drive by reducing the Current Limit to just enough current to turn the motor (usually 8 to 10%).

R,U,R,0,R,0,R - D

CURRENT LIMIT(1)

5.00 %

Check operation of the speed potentiometer by monitoring the Ramp Input. Leave the reference at zero after checking for proper operation.

L,1,R,5x0,R

100 VDC

Then 4xL

Start the drive by energizing the Start Input (T33). Check the field voltage at the F+ and F-. When the motor is cold, you will measure somewhat less than the rated field voltage (approximately 240 VDC for a 300 VDC rated field).

Confirm the field current matches the IFB nameplate data.

R,U,R,0,R,0,R,0,R

Then 4xL

Increase the potentiometer setting until the motor is turning slowly. Check motor rotation. If backwards, stop, turn off ALL power to the drive, and swap the field leads (F+ F-). Recheck after changes.

Now, slowly bring the motor up to full speed while checking the voltage on the A+ and A- terminals.

R,U,R,3x0,R

200.0 VDC MON

300.0 VDC MON

If you have neither a tachometer nor encoder, skip to Step 9. If using a tachometer or encoder, check to ensure the speed reference is positive (+).

3xU

Then, check the sign of the feedback, as follows:

Tachometer Feedback

6x0

Then 4xL

If positive (+), skip to Step 8. If negative (-), stop, power off the drive, then swap the tachometer leads on T25 and T26 and recheck.

Encoder Feedback

2xU

Then 4xL

If positive (+), skip to Step 8. If negative (-), stop the drive and invert the encoder sign and recheck.

R,U,R,8x0,R,3x0,R - D

10xENCODER SIGN INVERT

5xL

8. Switching Feedback Type

Now, stop the drive and select the appropriate feedback.

Tachometer Feedback

R,U,R,7x0,R - U

TACH OUTPUT FOR TYPE ANALOG TACHO

Then 4xL

Encoder Feedback

R,U,R,7x0,R - 2xU

TACH OUTPUT FOR TYPE ENCODER

Then 4xL

Again, start the drive and ensure maximum speed can be obtained and the armature voltage does not exceed the nameplate VA.

9. Increase the Current Limit to Rated Value

At this point, the Current Limit may be returned to 150%.

R,U,R,0,R,0,R - D

HOLDFIELD(1)

150.00 %

Then 4xL

Now, SAVE PARAMETERS as described in Step 3.

10. Adjusting the Speed Calibration at Base Speed

Gradually, increase your potentiometer to the maximum position and then adjust the final speed of the motor.

Depending on the final feedback type, different parameters (PIN’s 16, 17, & 6) are used for speed calibration.

Do NOT exceed the base speed (BS) value while adjusting these parameters. These calibration parameters may be adjusted while the drive is running.

Armature Voltage

R,U,R,5x0,R - U

1 PHARM VOLT PIN

1.0000

Then 4xL

Increase this value to reduce the armature voltage. If this parameter does not provide enough adjustment, stop and readjust PIN 18 - Rated Arm Volts from Step 2.

Tachometer Feedback

R,U,R,4x0,R - U

Then 4xL

Increase this value to reduce the motor speed. If this parameter does not provide enough adjustment, stop and readjust PIN 8 - Analog Tacho Volts from Step 2.

Encoder Feedback

R,U,R,4x0,R - D - U/D

Depending on type

Then 4xL

Encoder Feedback

R,U,R,4x0,R - D - U/D

Depending on type

Then 4xL

Congratulations, you have successfully commissioned your Bardac PLX Digital DC Drive.

If you have any questions or do not understand a portion of this Quick Start Manual, please contact us:

Bardac Corporation
40 Log Canoe Circle
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International: 410-604-3400
FAX: 410-604-3500
Website: www.bardac.com
Email: info@bardac.com
**Caution:**
TVb must not exceed 200 VDC.

**Encoder Calibration**
Ensure quadrature is enabled and enter the PPR.

**Save Parameters**
To save your work thus far, from the Diagnostic Screens:

**Check Control Terminals**
The next few checks are to ensure the drive contactor is sequenced properly prior to applying three phase power. The value under the letters TRJSC in the display indicate the actual Control Input (CIP) terminal status.

**Apply Main Three Phase Power**
Prior to running the motor, the current loop of the drive must be tuned to the motor and cabling (PIN’s 93,94,95 & 96).

- **Autotune the PL/X**
- **Armature Voltage**

**Armature Voltage**
3sU
Then, check the sign of the feedback, as follows:

**Tachometer Feedback**
6xB
If positive (+), skip to Step 8. If negative (-), stop the power off the drive, then swap the tachometer leads on T25 and T26 and recheck.

**Encoder Feedback**
2xU
If positive (+), skip to Step 8. If negative (-), stop the drive and invert the encoder sign and recheck.

**Autotune the PL/X**
Autotune the PL/X as described in Step 9.

- **Armature Voltage**
- **Armature Voltage**

Increase this value to reduce the armature voltage. If this parameter does not provide enough adjustment, stop and readjust PIN 18 - Rated Arm Volts from Step 2.

**Tachometer Feedback**
R,R,0,4x0,R - U

Increase this value to reduce the motor speed. If this parameter does not provide enough adjustment, stop and readjust PIN 8 - Analog Tacho Volts from Step 2.

**Encoder Feedback**
R,R,4x0,R - U/D

Change this value to achieve the desired motor speed.

**Setting Up Field Weakening**
When using either tachometer or encoder feedback, field weakening may be enabled for a motor which supports an extended speed range.

- **Field Weakening**
- **Field Weakening**

**Congratulations**
If you have any questions or do not understand a portion of this Quick Start Manual, please contact us:

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