ATTENTION: Only qualified personnel familiar with DC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

ATTENTION: To avoid an electric shock hazard, ensure that all power to the drive has been removed before performing the following.

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference A-B publication 8000-4.5.2, “Guarding Against Electrostatic Damage” or any other applicable ESD protection handbook.

What This Kit Includes

- I/O Expansion circuit board
- Two stand-offs
- Two spring washers
- Two flat washers
- Two screws with captive lock washers

What This Option Provides

The I/O Expansion Card is a drive mounted board that provides these additional I/O signals.

- Four (4) Digital Inputs
- Four (4) Digital Outputs
- Two (2) Analog Outputs

Tools That You Need

- Phillips® screwdriver
- Nut driver or wrench for hex stand-offs
- Flathead screwdriver

Phillips® is a registered trademark of Phillips Screw Company.
What You Need to Do

To install the I/O Expansion board:

☐ Step 1: Remove power from the drive
☐ Step 2: Open the drive
☐ Step 3: Install the I/O Expansion board
☐ Step 4: Wire the I/O Expansion board
☐ Step 5: Document the change

Step 1: Removing Power from the Drive

ATTENTION: Remove power before making or breaking cable connections. When you remove or insert a cable connector with power applied, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system’s field devices, causing unintended machine motion
- causing an explosion in a hazardous environment

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

1. Remove and lock-out all incoming power to the drive.
Step 2: Opening the Drive

1. Disconnect the DPI cable from the HIM (if present).

2. Remove the bottom front cover from the drive:
   
a. On frame A drives, remove the screws that secure the bottom front cover to the drive, then slide the cover down and off the drive chassis.

   ![Frame A diagram]
   
   Disconnect DPI cable
   
   Tightening torque:
   
   1.5 N-m (13.3 lb.-in.)

   ![Frame B & C diagram]
   
   Disconnect DPI cable.
   
   Tightening torque:
   
   1.5 N-m (13.3 lb.-in.)

   b. On frame B and C drives, loosen, but do not remove, the screws that secure the bottom front cover to the drive, then slide the cover down and off the drive chassis.
3. Remove the top front cover from the drive:

a. For frame A drives, press in on the sides at the bottom edge of the cover and at the same time pull the cover toward you to pull it partially off the drive chassis. Next, at the top of the drive, pull the cover forward, away from the drive, until the pins fit in the keyhole in the top of the cover; then carefully lift the cover off of the drive chassis.

Important: The HIM assembly is connected via a cable to the Control board and therefore will not pull free from the drive until disconnected. See page 5 for instructions.
b. On frame B and C drives, loosen, but do not remove, the screws that secure the top front cover to the drive, then slide the cover up and off the drive chassis.

**Important:** The HIM assembly is connected via a cable to the Control board and therefore will not pull free from the drive until disconnected. See page 5 for instructions.

Frames B & C (Frame B shown)

Tightening torque:
1.5 N-m (13.3 lb.-in.)

4. Disconnect the HIM Communication cable from the connector on the upper right corner of the Control board and set the cover aside.

All Frames (Frame A shown)
Step 3: Installing the I/O Expansion Board

1. Remove the screw in the lower left corner of the Control circuit board.

2. Place the two (2) flat washers and two (2) spring washers between the stand-offs and the Control board and install and tighten the stand-offs on the Control board.

Important: Do not over tighten the stand-offs or circuit board damage may occur.
3. Carefully insert the connector pins on the back of the I/O Expansion
board into connector XBB on the Control board and push the board
down until it makes contact with the stand-offs.

**Important:** Push the board straight down so that the pins on the I/O
Expansion board do not bend or break.

4. Secure the I/O Expansion board to the stand-offs on the Control board
using the two screws provided.

**Important:** Do not over tighten the screws or circuit board damage may
occur.
Step 4: Wiring the I/O Expansion Board

Table 1  Recommended Signal Wire Size

<table>
<thead>
<tr>
<th>Wire Type and Size</th>
<th>Tightening Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible (mm²)</td>
<td>multi-core (mm²)</td>
</tr>
<tr>
<td>0.14 - 1.5</td>
<td>0.14 - 1.5</td>
</tr>
</tbody>
</table>

A 75 x 2.5 x 0.4 mm (3.0 x 0.1 x 0.02 in.) flathead screwdriver is recommended for connecting wire to the terminal block inputs. Strip the ends of the cables to a length of 6.5 mm (0.26 in.).

**Important:** To improve the noise immunity it is recommended that you connect the common of the outputs (terminals 2, 4, 5 and 15 of the I/O Expansion board) with the ground (terminal 10 or 20) on the standard I/O terminal blocks on the Control board. If this is not possible, these terminals must be grounded by means of a 0.1 μF/250V capacitor.

**Figure 1  I/O Expansion Board Terminal Block 1 Designations**

<table>
<thead>
<tr>
<th>No.</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Analog Output 3 (+)</td>
<td>±10V, 5mA maximum</td>
</tr>
<tr>
<td>2</td>
<td>Analog Output 3 (–)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Analog Output 4 (+)</td>
<td>±10V, 5mA maximum</td>
</tr>
<tr>
<td>4</td>
<td>Analog Output 4 (–)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Digital Output Common</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Digital Output 5 (+)</td>
<td>Max volt. +30V, max cur. 50mA</td>
</tr>
<tr>
<td>7</td>
<td>Digital Output 6 (+)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Digital Output 7 (+)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Digital Output 8 (+)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>+24VDC</td>
<td>Drive supplied power for Digital Outputs. Max volt. +30V, max. cur. 80mA</td>
</tr>
</tbody>
</table>

**Figure 2  I/O Expansion Board Terminal Block 2 Designations**

<table>
<thead>
<tr>
<th>No.</th>
<th>Signal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Digital Input 9</td>
<td>Max volt. +30V, max cur. 15V/3.2mA, 24V/5mA, and 30V/6.4mA.</td>
</tr>
<tr>
<td>12</td>
<td>Digital Input 10</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Digital Input 11</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Digital Input 12</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Digital Input Common</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3  I/O Expansion Board Wiring Diagram

Figure 4  I/O Wire Routing

Route I/O wiring between bottom front cover and power terminal cover/shield.

(Frame A shown)
Step 5: Documenting the Change

1. Record the installation of the Analog and Digital I/O Expansion circuit board and date of installation on the Field Installed Option label on the side of the drive (as shown below).

2. Replace the drive covers in the reverse order of removal as described in Step 2: Opening the Drive on page 3.

3. Install DPI cable (if present).

Related Documentation


<table>
<thead>
<tr>
<th>For . . .</th>
<th>Read this document</th>
<th>Publication Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>In depth information regarding the operation of PowerFlex Digital DC drives</td>
<td>User Manual - PowerFlex Digital DC Drives</td>
<td>20P-UM001...</td>
</tr>
</tbody>
</table>