MotiFlex e100
Digital I/O Option
OPT-MF-005

Installation manual
MN1950 01/10
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For a period of two (2) years from the date of original purchase, Baldor will repair or replace without charge controls and accessories that our examination proves to be defective in material or workmanship. This warranty is valid if the unit has not been tampered with by unauthorized persons, misused, abused, or improperly installed and has been used in accordance with the instructions and/or ratings supplied. This warranty is in lieu of any other warranty or guarantee expressed or implied. Baldor shall not be held responsible for any expense (including installation and removal), inconvenience, or consequential damage, including injury to any person or property caused by items of our manufacture or sale. (Some countries and U.S. states do not allow exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply.) In any event, Baldor’s total liability, under all circumstances, shall not exceed the full purchase price of the control. Claims for purchase price refunds, repairs, or replacements must be referred to Baldor with all pertinent data as to the defect, the date purchased, the task performed by the control, and the problem encountered. No liability is assumed for expendable items such as fuses. Goods may be returned only with written notification including a Baldor Return Authorization Number and any return shipments must be prepaid.

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Product Notice

Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment. This equipment may be connected to other machines that have rotating parts or parts that are controlled by this equipment. Improper use can cause serious or fatal injury.

Safety Notice

Intended use: Drives incorporating the Digital I/O option are intended for use in stationary ground based applications in industrial power installations according to the standards EN60204 and VDE0160. They are designed for machine applications that require variable speed controlled three-phase brushless AC motors. These drives are not intended for use in applications such as:

- Home appliances
- Medical instrumentation
- Mobile vehicles
- Ships
- Airplanes.

Unless otherwise specified, the drive is intended for installation in a suitable enclosure. The enclosure must protect the drive from exposure to excessive or corrosive moisture, dust and dirt or abnormal ambient temperatures. The installation, connection and control of drives is a skilled operation, disassembly or repair must not be attempted. In the event that a drive fails to operate correctly, contact the place of purchase for return instructions.

Precautions

- Do not touch any circuit board, power device or electrical connection before you first ensure that no high voltage is present at this equipment or other equipment to which it is connected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt to start-up, program or troubleshoot this equipment.

- MEDICAL DEVICE / PACEMAKER DANGER: Magnetic and electromagnetic fields in the vicinity of current carrying conductors and industrial motors can result in a serious health hazard to persons with cardiac pacemakers, internal cardiac defibrillators, neurostimulators, metal implants, cochlear implants, hearing aids, and other medical devices. To avoid risk, stay away from the area surrounding a motor and its current carrying conductors.

- Electrical components can be damaged by static electricity. Use ESD (electrostatic discharge) procedures when handling this device.

- To prevent equipment damage, be certain that input and output signals are powered and referenced correctly.

- To ensure reliable performance of this equipment, be certain that all signals are shielded correctly.
2.1 Digital I/O option features

The Digital I/O option is available as a customer-fitted option for the MotiFlex e100 range of drives. The option adds a number of features to the drive:

- Six opto-isolated digital inputs.
- Four opto-isolated digital outputs.

The option card may be inserted in either of the expansion slots, located on the top and bottom panel of the drive.

2.1.1 Installation

Before touching the option card, be sure to discharge static electricity from your body and clothing by touching a grounded metal surface. Alternatively, wear an earth strap while handling the card.

1. Choose carefully which of the option slots (top or bottom) to use. The choice will often depend on the best route for the wiring that will lead to the option card.

2. Pull off the drive’s top or bottom front panel cover (as appropriate). Remove the option slot cover’s retaining screw.

3. Insert a screwdriver under the edge of the option slot cover and gently lever out the cover.
4. Confirm that the correct option card is being installed. The description is printed on the leading edge of the card, furthest from the mounting bracket.

Insert the option card with the main component side facing towards the center of the drive. The edges of the option card should locate behind retaining brackets inside the drive.

5. Push down the option card until it clicks into place. The option card’s external connector plate should finish approximately level with the 8 posts along the edge of the option slot.

6. Insert the retaining screw and tighten. If the screw will not locate in the threaded socket on the option card, then check the position of the option card.

The screw must be fitted since it provides mechanical support and an electrical chassis connection for the option card.

7. Push on the drive’s top or bottom front panel cover until it clicks into place.
3.1 Introduction

All external connections to the Digital I/O option card are made using the 24-pin connector. The required Weidmüller Minimate B2L 3.5/24 mating connector is supplied.

The digital inputs and outputs are described in the following sections.

3.1.1 Slot selection and input / output numbering

The MotiFlex e100 implements a system of I/O 'banks', with each bank allowing up to 32 inputs and outputs. The I/O available as standard on the MotiFlex e100 always resides in bank 0. The I/O available on option cards resides in bank 1 if the card is inserted in slot 1, or bank 2 if the card is inserted in slot 2.

The numbering of bank 1 (slot 1) inputs and outputs always starts at 32, since 0-31 are reserved by bank 0 (even though only DIN0-DIN2 and DOUT0-DOUT1 are used by a standard MotiFlex e100).

The numbering of bank 2 (slot 2) inputs and outputs always starts at 64, since 0-31 are taken by bank 0, and 32-63 are taken by bank 1.

This numbering system is summarized in the following table, and in Figures 3-1 and 3-2.

<table>
<thead>
<tr>
<th>Bank/Slot</th>
<th>Digital inputs</th>
<th>Digital outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Standard drive, connector X3</td>
<td>DIN0</td>
<td>DOUT0</td>
</tr>
<tr>
<td></td>
<td>DIN1</td>
<td>DOUT1</td>
</tr>
<tr>
<td></td>
<td>DIN2</td>
<td></td>
</tr>
<tr>
<td>1 Option card, top slot</td>
<td>DIN32</td>
<td>DOUT32</td>
</tr>
<tr>
<td></td>
<td>DIN33</td>
<td>DOUT33</td>
</tr>
<tr>
<td></td>
<td>DIN34</td>
<td>DOUT34</td>
</tr>
<tr>
<td></td>
<td>DIN35</td>
<td>DOUT35</td>
</tr>
<tr>
<td></td>
<td>DIN36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN37</td>
<td></td>
</tr>
<tr>
<td>2 Option card, bottom slot</td>
<td>DIN64</td>
<td>DOUT64</td>
</tr>
<tr>
<td></td>
<td>DIN65</td>
<td>DOUT65</td>
</tr>
<tr>
<td></td>
<td>DIN66</td>
<td>DOUT66</td>
</tr>
<tr>
<td></td>
<td>DIN67</td>
<td>DOUT67</td>
</tr>
<tr>
<td></td>
<td>DIN68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DIN69</td>
<td></td>
</tr>
</tbody>
</table>

The same numbering system is used when referring to the I/O using the Mint INX and OUTX keywords; for example DOUT32 is referred to as OUTX(32). See the Mint help file for details.
Figure 3-1: 24-pin connector assignment - slot 1 (top) numbering

Figure 3-2: 24-pin connector assignment - slot 2 (bottom) numbering
3.1.2 Digital inputs
- Six independent digital inputs.
- Input voltage range: 12-30 VDC (input current not to exceed 50 mA).
- Sampling frequency: 1 kHz.

Each digital input is buffered by a TLP280 opto-isolator, allowing the input signal to be connected with either polarity.

![Figure 3-3: DIN32/64 digital input circuit](image)

When the MotiFlex e100 is connected to Mint WorkBench, the digital inputs can be configured using the Digital I/O tool. Alternatively, Mint keywords including `RESETINPUT`, `ERRORINPUT` and `STOPINPUT` can be used in the command window. The state of these specially configured digital inputs can then be viewed using the Mint WorkBench Spy window’s Axis tab. The state of all digital inputs can also be viewed using the Spy window’s I/O tab. See the Mint help file for details.

![Figure 3-4: Digital input - typical connection from a Baldor NextMove e100](image)
3.1.3 Digital outputs

- Four independent digital outputs.
- User supply: 28 VDC maximum.
- Output current: 150 mA maximum.
- Update frequency: 1 kHz.

The optically isolated outputs are designed to source current from the user supply as shown in Figure 3-5. The TLP127 has a maximum power dissipation of 150 mW at 25 °C. The maximum saturated voltage across the outputs when active is 1.0 VDC, so it can be used as a TTL compatible output. The output includes a self-resetting fuse that operates at approximately 200 mA. The fuse may take up to 20 seconds to reset after the load has been removed. If the output is used to directly drive a relay, a suitably rated diode must be fitted across the relay coil, observing the correct polarity. This is to protect the output from the back-EMF generated by the relay coil when it is de-energized. The sense of the output can be configured in Mint WorkBench, and its state is displayed in the Spy window.

![Digital I/O Option Card](image)

When the MotiFlex e100 is connected to Mint WorkBench, the active level of an output can be configured using the Digital I/O tool. Alternatively, the Mint keyword `OUTPUTACTIVELEVEL` can be used in the command window. An output may also be configured for special purpose functions such as a motor brake output or global error output. The state of these specially configured digital outputs can then be viewed using the Mint WorkBench Spy window’s Axis tab. The state of all digital outputs can also be viewed using the Spy window’s I/O tab. See the Mint help file for details.
3.1.4 Power consumption

The maximum overall power consumption of the Digital I/O option card is 0.85 W. See the main MotiFlex e100 installation manual (MN1943) for further details about the option slots’ power supply and derating information.
If you have any suggestions for improvements to this manual, please let us know. Write your comments in the space provided below, remove this page from the manual and mail it to:

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