BALDOR®
MOTORS AND DRIVES

Input / Output
Expansion Board
For Digital Soft–Start

Catalog No. EB0389A00

Installation and Operating Manual

5/01 **MN851**

Table of Contents

Section 1
General Information

Introduction

Baldor Digital Soft–Start represents the latest technology in microprocessor based motor starting and control. In addition to the user programmable parameters available in every soft–start, additional features can be added by installing this expansion board. The I/O expansion board offers the following additional capabilities:

- Two programmable relay outputs, K3 and K4 (with normally open and normally closed contacts).
- Two programmable analog outputs, AN1 and AN2 (0–10V @10mA maximum).
- One 12VDC Voltage source for use with the 0–21V or 4–20mA inputs.

Limited Warranty

For a period of two (2) years from the date of original purchase, BALDOR will repair or replace without charge controls and accessories which 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 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.

Safety Notice

This equipment contains voltages that may be as great as 1000 volts! Electrical shock can cause serious or fatal injury. 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 driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.

PRECAUTIONS

⚠ **WARNING: Do not touch any circuit board, power device or electrical connection before you first ensure that power has been disconnected and there is no high voltage present from this equipment or other equipment to which it is connected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.**

⚠ **WARNING: Be sure that you are completely familiar with the safe operation of 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. Only qualified personnel should attempt the start-up procedure or troubleshoot this equipment.**

⚠ **WARNING: Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury.**

⚠ **WARNING: Do not remove cover for at least five (5) minutes after AC power is disconnected to allow capacitors to discharge. Dangerous voltages are present inside the equipment. Electrical shock can cause serious or fatal injury.**

⚠ **WARNING: Improper operation of control may cause violent motion of the motor shaft and driven equipment. Be certain that unexpected motor shaft movement will not cause injury to personnel or damage to equipment. Peak torque of several times the rated motor torque can occur during control failure.**

⚠ **WARNING: Motor circuit may have high voltage present whenever AC power is applied, even when motor is not rotating. Electrical shock can cause serious or fatal injury.**

Section 2
Expansion Board Description

Introduction

Catalog No. EB0389A00

Features:

- Two programmable relay outputs, K3 and K4 (with normally open and normally closed contacts). The two output relays convert low level DC voltage outputs to Dry Contact Relay Outputs. See Table 2-1.
- Two programmable analog outputs, AN1 and AN2 (0–10V @10mA maximum). These Analog Outputs are available for remote process measurement and display. See Table 2-2.
- One 12VDC Voltage source for use with the 0–21V or 4–20mA inputs.

Table 2-1 Relay Output Specifications

Number of Relays		2- Form A (N.O.) and Form B (N.C.)
Contact Rating	AC DC	3 A_{RMS} at 230VAC Maximum AC11 (non-inductive)
Operating Time		5 milliseconds
Release Time		4 milliseconds
Connector		Screw Terminals

Terminal tightening torque is 7 lb-in (0.8 Nm) maximum.

K3

Terminal	Function	
31	K3 Common	A Bit = 1 on the parameter/bit selected by P61 makes Relay K3 ACTIVE (positive logic) or INACTIVE (negative logic). Factory setting, P9, Bit 0: Alarm
32	K3, Normally Closed	
34	K3, Normally Open	

K4

Terminal	Function	
41	K4 Common	A Bit = 1 on the parameter/bit selected by P63 makes Relay K4 ACTIVE(positive logic) or INACTIVE (negative logic). Factory setting P9, Bit 1: Overload Integrating
42	K4, Normally Closed	
43	K4, Normally Open	

Table 2-2 Analog Output Specifications

Number of Outputs	2
Maximum Source Current/Load	0-10VDC @ 10mA
Resolution (DAC)	8 Bit
Connector	Screw Terminals

Terminal tightening torque is 7 lb-in (0.8 Nm) maximum.

Table 2-3 Voltage Source Specifications

Number of Outputs	1
Maximum Source Current/Load	12VDC @ 100mA
Connector	Screw Terminals

Terminal tightening torque is 7 lb-in (0.8 Nm) maximum.

Section 3
Installation

Board Installation

This section describes the Expansion Board installation procedure.

⚠ **Caution: Before you proceed, be sure to read and become familiar with the safety precautions at the beginning of this manual. Do not proceed if you are unsure of the safety precautions described. If you have any questions, contact BALDOR before you proceed.**

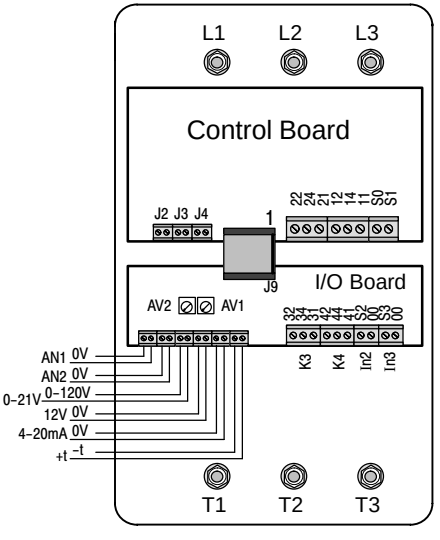
1. Remove the expansion board from the shipping container.
2. Remove all packing material from the board.

⚠ **Caution: Be sure all packing materials are removed from the board. Conductive foam may be present on the connectors to prevent static build up during shipping. This can prevent proper circuit operation.**

Procedure:

1. Be sure motor operation is terminated and secured.
2. Remove all power sources from the soft–start.
3. Wait at least 5 minutes for internal capacitors to discharge.
4. Remove the cover.
5. Place the I/O board in position next to the control board as shown in Figure 3-1.
6. Securely mount the expansion board to the sheet metal mounting plate using the hardware provided.
7. Install the ribbon cable between the control and I/O boards.
8. Make connections to the terminal strips of the I/O board as required for your installation. Refer to Section 4 and Figure 3-1.
9. When complete, install the cover.
10. Restore all power sources to the control.
11. Restore soft–start operation.

Figure 3-1 Single Expansion Board Installation



Terminal tightening torque is 7 lb-in (0.8 Nm) maximum.

Section 4
Hardware Setup

The information in this section describes all of the inputs and outputs for the I/O board. Use this information to make connections at the terminal strips of the I/O Board. These terminals is shown in Figure 4-1.

Relay Outputs

Each relay has form A Normally Open(N.O.) and form B Normally Closed(N.C.) as defined in Table 4-1.

Table 4-1 Relay Output Descriptions

Relay	Pin	Description	Function
K3	31	K3 Common	K3 is activated by the parameter selected by P61.
	32	Normally Closed	
	34	Normally Open	
K4	41	K4 Common	K4 is activated by the parameter selected by P63.
	42	Normally Closed	
	44	Normally Open	

K3 is activated by the parameter selected by P61. The factory setting is parameter P9, Bit0 (Alarm). With this setting, when P9 Bit0=1 the K3 coil is energized.

K4 is activated by the parameter selected by P63. The factory setting is parameter P9, Bit1 (Overload Integrating). With this setting, when P9 Bit1=1 the K4 coil is energized.

Programmable Inputs

Two programmable inputs are provided on the I/O board. These inputs are described in Table 4-2. The operation of each input is the same as Control Input 1 (S0, S1) of the control board.

Table 4-2 Programmable Input Descriptions

Pin	Description	Function
00	Common	Input 2 sets or clears the parameter mapped by P67.
S2	Input 2	
00	Common	Input 3 sets or clears the parameter mapped by P69.
S3	Input 3	

Analog Outputs

Two programmable analog outputs are available on the I/O board. These outputs are described in Table 4-3.

Table 4-3 Analog Output Descriptions

DAC Out	Pin	Description	Function
DAC1	0V	Analog Common	AN1 is scaled at 0–10V and represents the parameter mapped by P49.
	AN1	Analog Output 1	
DAC2	0V	Analog Common	AN2 is scaled at 0–10V and represents the parameter mapped by P50.
	AN2	Analog Output 2	

AN1 is scaled at 0–10V and represents the parameter mapped by parameter P49. 10V represents the maximum value of that parameter. The maximum current demand is 10mA.

AN2 is scaled at 0–10V and represents the parameter mapped by parameter P50. 10V represents the maximum value of that parameter. The maximum current demand is 10mA.

Analog Input (0–21VDC or 0–120VDC)

One analog input is available on the I/O board and is described in Table 4-4. **Only one input may be used.**

Table 4-4 Analog Input Description

DC In	Function
0–120V	A DC voltage source can be applied to either input (but not both) and the common goes to the 0V pin of the 12V input. A value representing the voltage level at the input is sent to the parameter mapped by P47.
0–21V	

12VDC Output

A voltage source of 12VDC is available to power input circuits for the 4–20mA or 0–21V inputs. Maximum current is 100mA. Also, the 0V terminal is used as the common for the 21V and 120V inputs.

4–20mA Input

One DC current input is available on the I/O board and is described in Table 4-5. Input impedance is 100 ohms.

Table 4-5 Current Input Description

Pin	Description	Function
0V	Common	A current input is available. A value representing the current level at the input is sent to the parameter mapped by P45.
4–20mA	Current input	

Thermistor Input

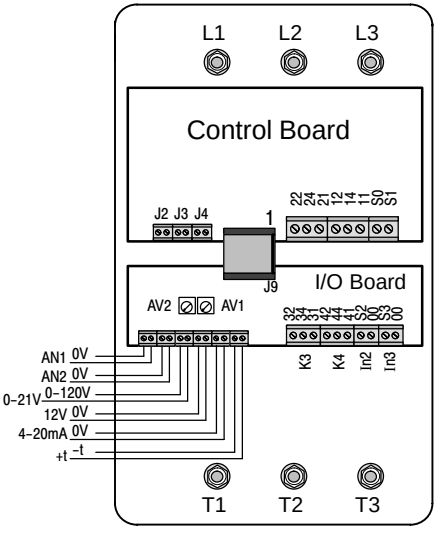
One input for a standard PTC motor thermistor (BS4999 or IEC 34–11) is available on the I/O board and is described in Table 4-6. If not used, a jumper (shorting link) must be installed across these terminals.

Table 4-6 Thermistor Input Description

Pin	Description	Function
–t	Common	If the PTC motor thermistor opens, the soft–start will trip.
+t	Thermistor input	

Note: If a thermistor is not used, a jumper (shorting link) must be installed across these terminals.

Figure 4-1 Adjustment Location



Terminal tightening torque is 7 lb-in (0.8 Nm) maximum.

Adjustments

The I/O board has two adjustable trim potentiometers.
AV1 is to adjust the voltage level at the Analog DC input.
AV2 is to adjust the 4–20mA current input level.

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