Overview

The modulating electronic interface device, BA/EA2, provides simplified field wiring and trouble shooting of a "Belimo®" style actuator with voltage feedback.

The BA/EA2 plugs into the 4-point power backplane, BA/BP4, or the 8-point power backplane, BA/BP8. A green LED on the BA/EA2 lights whenever power is present.

Easily reached on the edge of the board facing you are the display, display pushbutton switch and actuator connector. The four actuator wires and the controllers output signal terminate on the connector. The BA/EA2 provides power for the actuator from the backplane.

You do not need to gain physical access to the actuator to determine if the actuator is in the correct position. The display normally shows the actuator position based on the actuators feedback signal. An easy push of the display pushbutton switch shows the position that the controller is requesting. Troubleshooting is an easy comparison of the two. If they don't match you have a problem; either a damper is stuck or the actuator slipped on the damper drive shaft. See the examples in the **Operation** section of this document.

Mounting

The BA/EA2 plugs into either a BA/BP4 or BA/BP8 board as shown in figure 1.

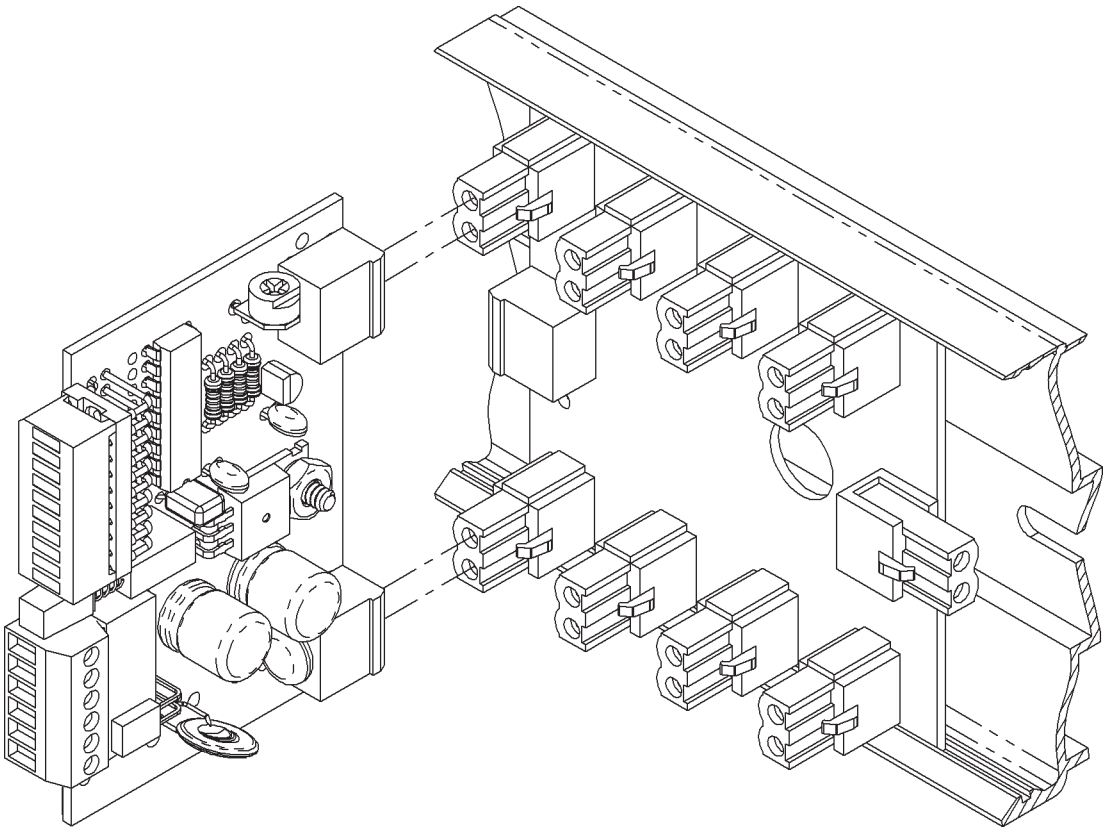

Figure 1: BA/EA2 plugging into a BA/BP4 board

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Termination

Connect to J3 as shown in the table below.

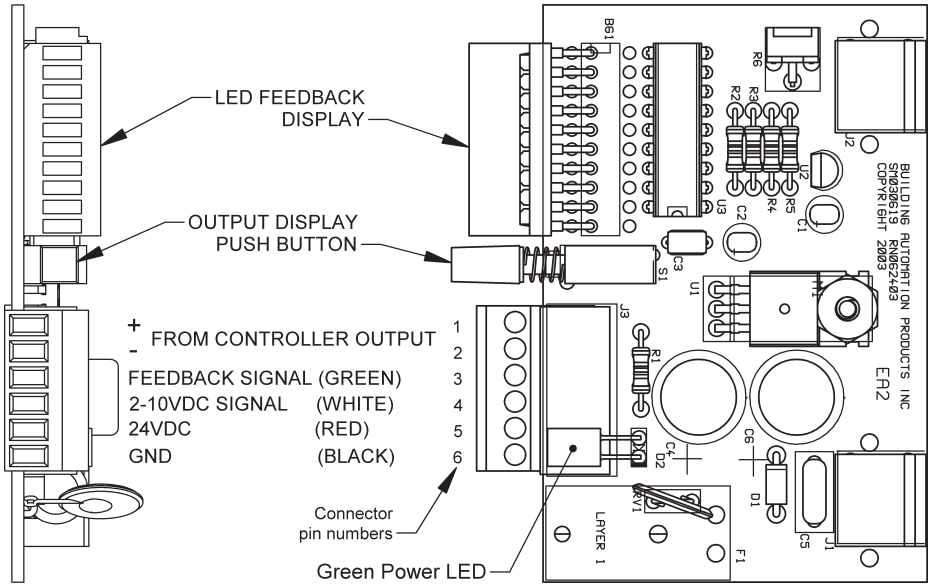

Figure 2: BA/EA2 component identifier

Table 1: BA/EA2 Connection List		
Pin on J3	Wire Connection	Belimo® wire color
1	To controller 2-10Volt output	White
2	To controller ground	Black
3	To position feedback pin on actuator	Green
4	To control signal input on actuator	White
5	To 24VDC input pin on actuator	Red
6	To ground pin on actuator	Black

Note: The male connectors that plug into the jacks on the board use a rising block screw terminal to hold the wires. If the block is in a partially up position the wire may be inserted under the block and the wire will not be held when the screw is tightened. To avoid improper wiring, turn the male connector screws counterclockwise until the block is below the wire opening before inserting the wire. Lightly tug on each wire after tightening to verify proper termination.

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Operation

The ten segments on BG1 light up as a bar graph indicating actuator position feedback and commanded position. They are set for a 2-10VDC control voltage range. Segment turn-on voltages are shown in Table 2.

Table 2: BG1 Segment Turn-on Voltages

Number of segments on	Percent Actuator Travel	Segment turn on voltage
1	10%	2.69±0.05 VDC
2	20%	3.46±0.1 VDC
3	30%	4.23±0.1 VDC
4	40%	5.00±0.15 VDC
5	50%	5.76±0.15 VDC
6	60%	6.53±0.15 VDC
7	70%	7.30±0.2 VDC
8	80%	8.07±0.2 VDC
9	90%	8.84±0.2 VDC
10	100%	9.61±0.25 VDC

When the switch is in it's normal mode the bar graph displays the actuator's feedback signal, when the switch is pressed it shows the controllers output command signal. Troubleshooting is comparing the two signals to see if they match.

Figure 4: Actuator Feedback Signal

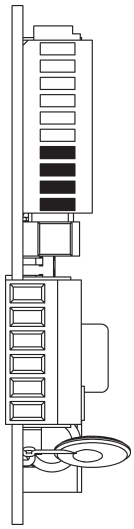

Figure 5: Display Button Pushed

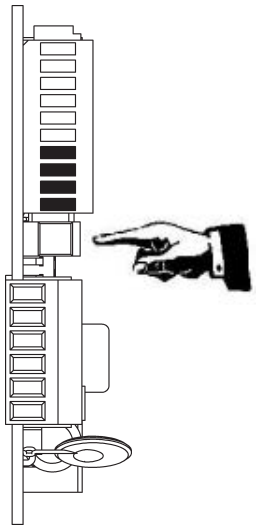

Figure 4 shows the lower four LEDs in the BA/EA2 display lit indicating that the actuator is reporting it is at 40% position.

In Figure 5 the Output Display Push Button is pushed in showing the commanded signal from the controller. The Command signal is at 40%, there is no problem.

Figure 6: Actuator Feedback Signal

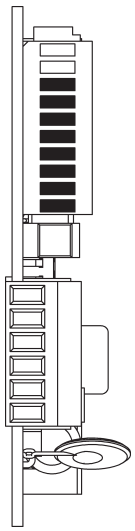

Figure 7: Display Button Pushed

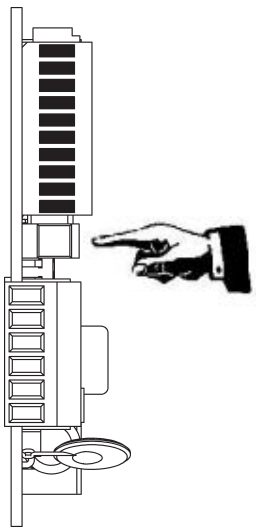

Figure 6 shows the lower eight LEDs in the BA/EA2 display lit indicating that the actuator is reporting it is at 80% position.

In Figure 5 the Output Display Push Button is pushed in showing the commanded signal from the controller. The Command signal is at 100%; there is a problem.

The actuator is mechanically stuck at 80%. Examine the actuator to determine the problem.

Operation - continued

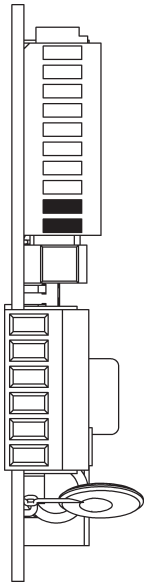

Figure 8: Actuator Feedback Signal

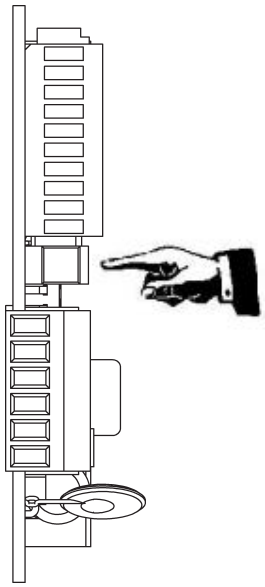

Figure 9: Display Button Pushed

Figure 8 shows the lower two LEDs in the BA/EA2 display lit indicating that the actuator is reporting it is at 20% position.

In Figure 5 the Output Display Push Button is pushed in showing the commanded signal from the controller. The Command signal is at zero; there is a problem.

The actuator is mechanically stuck at 20%. Examine the actuator to determine the problem.

Troubleshooting

Possible Problems:	**Possible Solutions:**
Power LED D2 does not light	Check to see that the BA/EA2 is firmly inserted into the backplane Check to see if the power cable is firmly inserted into the backplane. Check to see if the PS17 is working correctly Check to see if the power to the PS17 is turned on
No segments are lit with S1 in normal position	Check to see if the actuator is in the 2V position
No segments are lit with S1 pushed (in output check position)	Check to see if the controller is putting out 0V
The lit segments do not match when S1 is pushed	Actuator may be moving, wait and recheck Check to see if the actuator is mechanically obstructed

Specifications

Power Voltage	26 to 35 VDC or 20 to 26 VAC
Power Current	50mA maximum plus actuator (1.7VA max plus actuator)