

How to Connect and Test a Proportional Model

This Application Note details how to connect and test an EMCO proportional model to verify operation. This Application Note applies to these EMCO products:

- A Series
- AG Series
- DX Series
- E Series
- F Series
- FS Series
- G Series
- GP Series
- L Series
- Q Series

Safety Warning

High voltage power supplies present a serious risk of personal injury if not used in accordance with design and/or use specifications, if used in applications on products for which they are not intended or designed, or if they are used by untrained or unqualified personnel.

For more information, please refer to the EMCO Safety Warning and Disclaimer located at:

<http://www.emcohighvoltage.com/pdfs/Safety-Warning-Concern-HV-3460B.pdf>

General Information

- EMCO proportional models are typically isolated.
- The **output** voltage is load dependent – they are **not** load regulated.
- The **Full Load** vs. **No Load** variation depends on the selected EMCO converter.

See the product series Data Sheets for more information.

Necessary Equipment / Parts

- **Input supply (V_{in}) Low voltage DC power supply to power the EMCO Unit:** Refer to EMCO data sheets to determine input voltage and input current specifications. Select a low voltage DC power supply that matches the required input voltage and meets or exceeds the input current requirements.
- **High voltage rated resistor:** Select a high voltage rated resistor sized for a Full Load output. (Max rated output voltage / Max rated output current = Full Load Resistor R_{FL})
- **High voltage rated oscilloscope probe or high voltage rated resistor divider:** Use a high voltage rated oscilloscope probe or resistor divider to measure the actual high voltage output. See EMCO accessory model V1G for a resistor divider: <http://www.emcohighvoltage.com/pdfs/v1gseries.pdf>.

How to Test

Full Load Test – For a basic operational test, provide 100% input voltage using a resistive load sized for the maximum rated current to produce the specified max output voltage. Measure this output with a high voltage rated scope probe or a simple voltage divider.

No Load Test – To test the unit under Light or No Load conditions, use a variable DC input supply. To test under Light Load conditions, slowly increase the low voltage DC supply to the EMCO unit. When the DC input is $>0.7\text{VDC}$, there should be a high voltage output on the EMCO unit. Continue to increase the input voltage until the unit reaches its maximum rated output voltage. Under this condition, the input will be LESS than the maximum. See Figure 1.

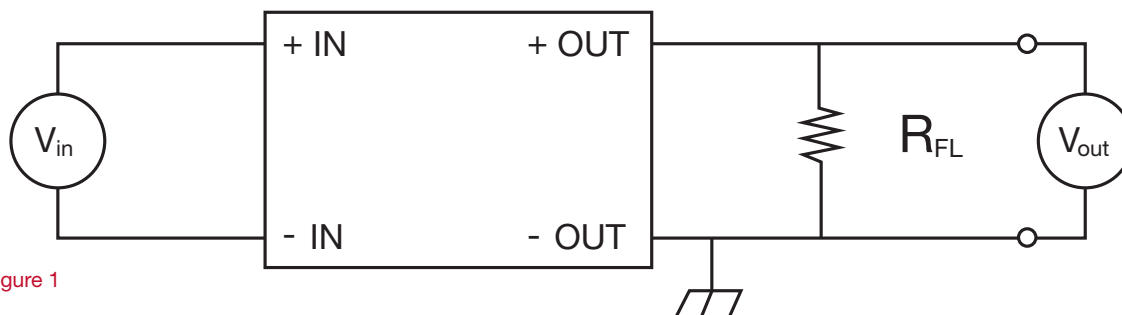


Figure 1

Example:

EMCO Model F20 - <http://www.emcohighvoltage.com/pdfs/fseries.pdf>

- Input supply: +12VDC, at least 1.5A
- Full Load Resistor calculation: $2000\text{V} / 5\text{mA} = 400\text{Kohm}$ [rated for at least 2KV]
- Measurement device: high voltage scope probe

Results

The Full Load test will produce the maximum rated output voltage (V_{out}) 2KV for the model F20. The oscilloscope will show the DC value at 2KV.

For the No Load test, remove the Full Load resistor. Then slowly increase the input supply until the max output voltage of 2KV is reached. In this case, the input voltage is +9.6VDC when the output voltage (V_{out}) is 2KV with No Load.

Online Tutorials

Please see our tutorial on How to Connect and Test a Proportional Model:

<http://www.emcohighvoltage.com/emco-high-voltage-tutorials.php>

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