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# Digital Output Modules for Compact FieldPoint and FieldPoint

NEW

NI [c]FP-DO-400, NI [c]FP-DO-401,  
NI [c]FP-DO-403, NI [c]FP-DO-410

- 8 or 16 digital outputs
  - 5 VDC
  - 12 VDC
  - 24 VDC
- Fused outputs for short circuit protection (DO-410)
- 2,300 V<sub>rms</sub> bank isolation for transient overvoltage protection
- Hot swappable with autoconfiguration
- -40 to 70 °C operating range



Module	Output Channels	Output Ranges	Output Current Rating (see Specifications for More Details)	Compatibility Examples	Electronically Fused Outputs	All Channel Update Rate
[c]FP-DO-400	8	10 to 30 VDC, sourcing	2 A	12 and 24 VDC	–	20 kHz
[c]FP-DO-401	16	10 to 30 VDC, sourcing	2 A	12 and 24 VDC	–	20 kHz
[c]FP-DO-403	16	5 to 30 VDC, sinking	2 A	5, 12, and 24 VDC	–	20 kHz
[c]FP-DO-410	8	5 to 30 VDC, sourcing	1 A	5, 12, and 24 VDC	✓	20 kHz

## Overview

The National Instruments [c]FP-DO-4xx devices are versatile digital output modules for Compact FieldPoint and FieldPoint that can be used to control digital signals ranging from 5 to 30 volts. These modules are commonly used to control indicator lights, external relays, and CMOS and TTL devices. All the modules include onboard diagnostics to ensure trouble-free installation and maintenance.

## Digital Output Modules

The DO-4xx modules provide built-in module-to-module isolation to protect your FieldPoint system and controller or communication interface from high voltage levels. All the digital output modules use a common ground plane for the digital output channels.

The DO-400 and DO-401 modules are sourcing digital output modules capable of providing up to 2 A per channel, with a maximum power limit across the entire module as explained in the specifications section.

The DO-403 modules are sinking digital output modules capable of providing up to 2 A per channel, with a maximum power limit across the entire module as explained in the specifications section.

The DO-410 modules are sourcing digital output modules capable of providing up to 1 A per channel. They also feature an electronic fuse that will prevent damage to the module due to short circuits or other overcurrent situations. The fuses automatically reset when the output returns to a normal state. An LED indicates an overcurrent fault.

All the channels on the DO-4xx modules feature LEDs that indicate the output state of each channel. The modules all feature an all channel update rate of 20 kHz. Overall data throughput depends on software loop speeds and network speeds.

## Isolation

The DO-4xx modules feature optical bank isolation with 2,300 V<sub>rms</sub> of breakdown isolation. These Compact FieldPoint and FieldPoint modules do not have channel-to-channel isolation.

# Digital Output Modules for Compact FieldPoint and FieldPoint

## Field I/O Connections

The Compact FieldPoint and FieldPoint modules include a built-in power distribution bus that provides multiple power connections on the module. A field-wired power supply connected to the voltage (V) and common (C) terminals is internally connected to a power distribution bus that provides additional breakout terminals for voltage supply ( $V_{SUP}$ ) and common (COM). These terminals provide a convenient way to distribute power to field devices that require external power.

The DO-400 and DO-410 each have:

- 8 digital output terminals ( $V_{OUT}$ )
- 16 common terminals (COM)
- 8 power connections to power field devices ( $V_{SUP}$ )

The DO-401 and DO-403 each have:

- 16 digital output terminals ( $V_{OUT}$ )
- 8 common terminals (COM)
- 8 power connections to power field devices ( $V_{SUP}$ )

## Ordering Information

### Compact FieldPoint

NI cFP-DO-400 .....	777318-400
NI cFP-DO-401 .....	777318-401
NI cFP-DO-403 .....	777318-403
NI cFP-DO-410 .....	777318-410

### Recommended Compact FieldPoint System Products

NI cFP-2020 .....	777317-2020
NI cFP-BP-4 .....	778617-04
NI cFP-CB-1 .....	778618-01
NI PS-4 Power Supply .....	778805-90
NI Developer Suite Professional Control Edition .....	777906-03

### FieldPoint

NI FP-DO-400 .....	777518-400
NI FP-DO-401 .....	777518-401
NI FP-DO-403 .....	777518-403
NI FP-DO-410 .....	777518-410

### Recommended FieldPoint System Products

NI FP-1601 .....	777792-01
NI FP-TB-1 .....	777519-01
NI PS-4 Power Supply .....	778586-90
NI Developer Suite Standard Control Edition .....	777905-03

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Visit [ni.com/info](http://ni.com/info) and enter *cfpdo400*, *cfpdo401*, *cfpdo403*, *cfpdo410*, *fpdo400*, *fpdo401*, *fpdo403*, and/or *fpdo410*.

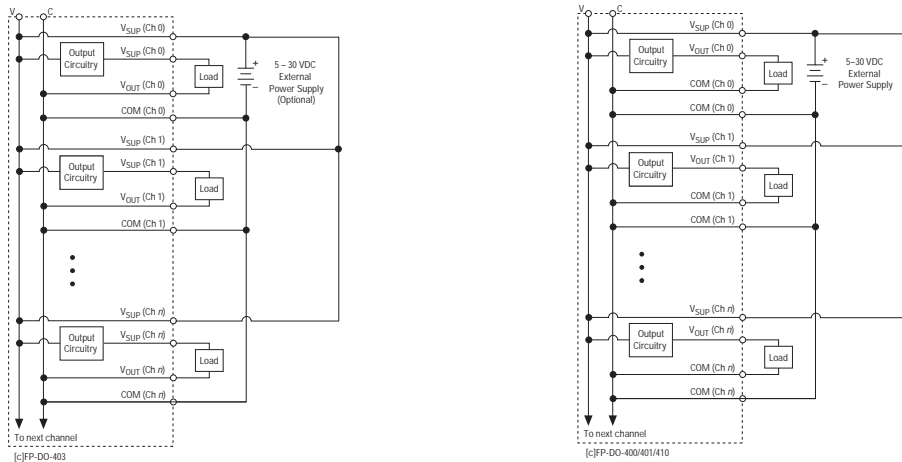


Figure 1. Wiring Schematics for DO Modules

# Digital Output Modules for Compact FieldPoint and FieldPoint

## Specifications

Typical for -40 to 70 °C unless otherwise noted.

### Digital Output Channels

Number of output channels	
[c]FP-DO-400, [c]FP-DO-410	8
[c]FP-DO-401, [c]FP-DO-403	16
Voltage range	5-30 VDC
Output impedance at 10-30 V	0.3 Ω
	(0.3 V drop at 1 A)
[c]FP-DO-403	0.12 Ω
Output impedance at 5 to 10 V	2 Ω
Maximum output current per channel at 10 to 30 V range	
[c]FP-DO-400, [c]FP-DO-403	2.0 A
[c]FP-DO-401	1.5 A
[c]FP-DO-410	1 A
Maximum output current on all channels	
[c]FP-DO-400	8 A <sup>2</sup>
[c]FP-DO-401	8 A <sup>2</sup>
FP-DO-403	16 A <sup>2</sup>
cFP-DO-403	16 A <sup>2</sup> at -40 to 60 °C
	12 A <sup>2</sup> at 60 to 70 °C
[c]FP-DO-410	8 A
Maximum output current at 5 to 10 V range	
Per channel	0.67 A
All channels, [c]FP-DO-400*	1.35 A <sup>2</sup>
All channels, [c]FP-DO-401*	1.2 A <sup>2</sup>
Output delay time	
Turn ON	20 μs
Turn OFF	50 μs
Protection	
All modules	Flyback diode to COM for inductive loads
FP-DO-410	Electronic fuses for overcurrent protection
Leakage, overcurrent condition	
(FP-DO-410 only)	1 mA
Power-on state	Off, until set to power-on state stored in local network module

\*The sum of the squares of the output currents on every channel must be less than or equal to this value.

### Power Requirements

Power from network module	
[c]FP-DO-400	300 mW
[c]FP-DO-401 and FP-DO-403	600 mW
[c]FP-DO-410	400 mW

### Isolation Voltage

Channel-to-channel isolation	No isolation between channels
Transient overvoltage	2,300 V <sub>rms</sub>

### Physical Characteristics

LED indicators	
POWER (green)	Power on and self-test passed
READY (green)	Module configured and ready
<0...15> or <0...7> (green)	On/off state of each channel
<0...7> (red) (FP-DO-410 only)	Overcurrent condition
Dimensions (including terminal base)	10.7 by 10.9 by 9.1 cm (4.2 by 4.3 by 3.6 in.)
Weight	136 g (4.8 oz)

### Environment

Operating temperature	-40 to 70 °C
Storage temperature	-55 to 85 °C
Relative humidity	10% to 90%, noncondensing

### Shock and Vibration

These specifications apply only to Compact FieldPoint. NI recommends Compact FieldPoint if your application is subject to shock and vibration.

Operating vibration, random	
(IEC 60068-2-64)	10 to 500 Hz, 5 g <sub>rms</sub>

Operating vibration, sinusoidal	
(IEC 60068-2-6)	10 to 500 Hz, 5 g

Operating shock	
(IEC 60068-2-27)	50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations

### Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 3121-1, UL 61010C-1
- CAN/CSA C22.2 No. 1010.1

For UL, hazardous location, and other safety certifications, refer to the product label or to [ni.com](http://ni.com)

### Electromagnetic Compatibility

CE, C-Tick, and FCC Part 15 (Class A) Compliant

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	EN 61326:1997 + A2:2001, Table 1

For EMC compliance, operate this device with shielded cabling.

### CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE Marking, as follows:

Low-Voltage Directive (safety)	73/23/EEC
Electromagnetic Compatibility	

Directive (EMC)..... 89/336/EEC

Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit [ni.com/hardref.nsf/](http://ni.com/hardref.nsf/) and search by model number or product line.



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