PowerFlex 750 Series: 20-750-IF4XOF4-SC Setup

Question

Is there a setup guide for the 20-750-IF4XOF4-SC card (4-Channels In/4 Channels Out Module)?

Environment

- 20F PowerFlex 753
- 20G PowerFlex 755
- 20G PowerFlex 755T

Answer

The 20-750-IF4XOF4-SC 4-Channels In/4 Channels Out Module is a card manufactured by Spectrum Controls.

It will work with either the PowerFlex 753, PowerFlex 755 or PowerFlex 755T products. The card is designed to accept 0-20 mA, 4-20 mA, 0-5 V, 0-10 V or +/-10V inputs and outputs.

The user manual for the card is put out by Spectrum Controls and can be found on the link below:

[Spectrum Controls: PowerFlex 4-Channels In/4 Channel Outs](#) Spectrum Controls User's Manual Publication 0300320-01.


Install the card

The Spectrum card can be installed in slots 4, 5, or 6. Option cards cannot be installed or removed with the drive powered. Install the card in one of the supported slots and secure it using the thumb screws at the top and bottom of the option card with a T15 Hex screwdriver.
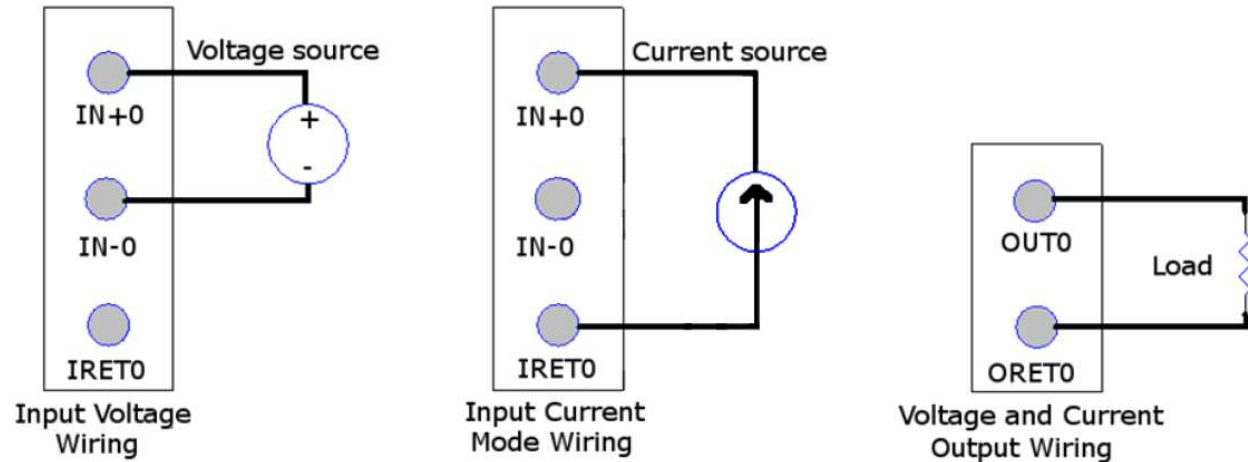
Wiring the card

The terminal blocks are removable and are clamp style. Wires should be shielded, twisted pair. The shield should be kept as short as possible and connected to the drive chassis. Strip the wire and push into the appropriate hole while pressing the orange tab next to the hole.
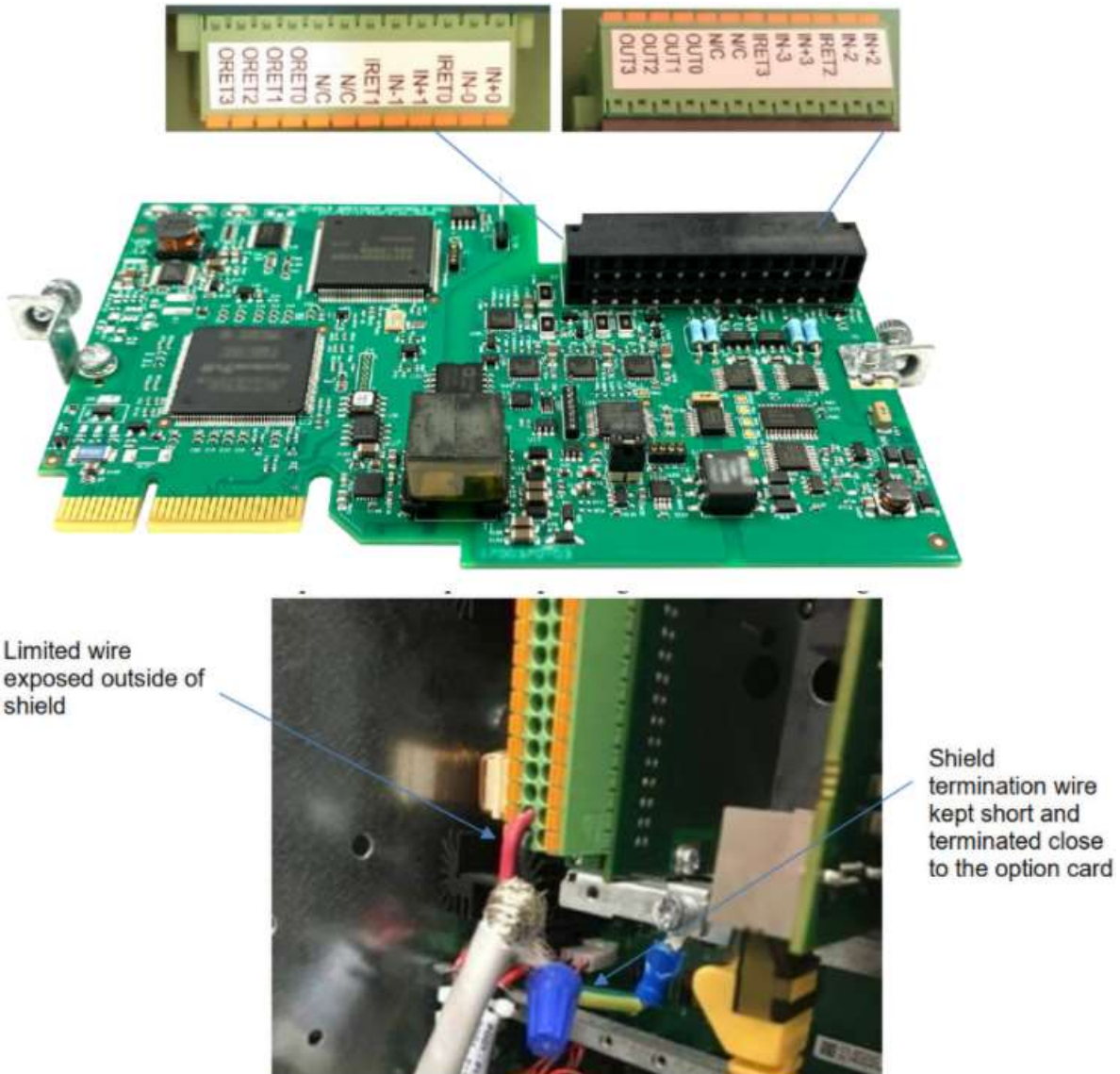
A given input on the card can be wired for any one of the following:

- Current 0-20 mA, or 4-20 mA
- Voltage 0-5 V, +/-10 V or 0-10 V

Examples are given below:

Input Voltage Wiring   Input Current Mode Wiring   Voltage and Current Output Wiring

<u>Note</u> 1: If wiring multiple wires to a single terminal block, the clamp style terminal block can be challenging with these connections. It is highly recommended to solder these wires together before trying to land multiple wires at the same terminal.

Configure the Card

The card has two types of parameters. They are "Host" and "Device". Host parameters reside on the main control board. Device Parameters reside on the card itself. If the card is moved from one drive to another, the device parameters will stay as configured, the host parameters will reset to default.

Parameter configuration can be done via the HIM or Connected Components Workbench (CCW) V10 or higher. Configure the Device Parameters first.

Input Channels

Setup the Device **Parameters 5, 8, 11, 14 [Inx Cfg Bits]** (where X is **the input** number 1-4) per the table below:

Name	Setting	Ignored							OC Action 1	OC Action 0	Range 2	Range 1	Range 0	Filter 2	Filter 1	Filter 0	Disable
Bit Names:		15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Disable	Enable	Default															0
	Disabled																1
Filter	17 Hz	Default												0	0	0	
	4 Hz													0	0	1	
	60 Hz													0	1	0	
	120 Hz													0	1	1	
	240 Hz													1	0	0	
	470 Hz													1	0	1	
Range	0-20 mA	Default									0	0	0				
	4-20 mA										0	0	1				
	0-5 V										0	1	0				
	0-10 V										0	1	1				
	±10 V										1	0	0				
OC Action	Upscale	Default							0	0							
	Downscale								0	1							
	Zero								1	0							
	Disabled*	(voltage range only)							1	1							
Ignored	N/A	X	X	X	X	X	X	X									

- **Disable** - Set to 1 to disable the channel
- **Filter** - Set the filtering frequency of the input
- **Range** - Set the input range/type of the channel
- **OC Action** - Set the action for when an open circuit (OC) is detected

It is recommended to optimize performance that unused channels be set to disable (set bit '0' to a '1').

Output Channels

Parameters 6, 9, 12, 15 [Inx Low Eng] (where X is **the output** number 1-4) - Set to low end of the analog input (0mA, 4mA, 0V)

Parameters 7, 10, 13, 16 [Inx High Eng] (where X is **the output** number 1-4) - Set to high end of the analog input (20mA, 10V)

Setup the Device **Parameters 17, 23, 29, 35 [Outx Cfg Bits]** (where X is **the output** number 1-4) per the table below:

Name	Setting	15 (Ignored)	14	13	12	11	10	9 FaultMode	8 AlmLatchEn	7 HiClmpAlm 1	6 HiClmpAlm 0	5 LowClmpAlm 1	4 LowClmpAlm 0	3 Range 2	2 Range 1	1 Range 0	0 Disable
Disable	Enable	Default															0
	Disable																1
Range	0-20 mA	Default												0	0	0	
	4-20 mA													0	0	1	
	0-5 V													0	1	0	
	0-10 V													0	1	1	
	±10 V													1	0	0	
Low Clamp & Alarm	Range	Default										0	0				
	Limit											0	1				
	User											1	0				
High Clamp & Alarm	Range	Default								0	0						
	Limit									0	1						
	User									1	0						
Alarm Latch EN	Disable	Default							0								
	Enable								1								
Fault Mode	Hold	Default						0									
	User							1									
Ignored	N/A	X	X	X	X	X	X										

- **Disable** - Set to 1 to disable the channel.
- **Range** - Set the input range/type of the channel.
- **Low Clamp & Alarm** - Clamp channel output and Set Output Under Range Alarm status bit when the channel output is less or equal to the user-defined option and clamp value.
  - o 0 = (default) Low Range value. User-defined Low Clamp value is ignored.
  - o 1 = Low Limit value. User-defined Low Clamp value is ignored.
  - o 2 = User-defined Low Clamp value. The value will be clipped to high or low limit

- **High Clamp & Alarm** - Clamp channel output and Set Output Over Range Alarm status bit when the channel output is greater or equal to the user-defined option and clamp value.
  - o 0 = (default) High Range value. User-defined High Clamp value is ignored.
  - o 1 = High Limit value. User-defined High Clamp value is ignored.
  - o 2 = User-defined High Clamp value. The value will be clipped to high or low limit.
- **Alarm Latch EN** - Set to 1 to disable the Alarm Latch Enable. When this bit is set, the Over Range, Under Range, and Load Error Alarm bits in the Output Status will remain set even when the Alarm condition is cleared. The Unlatch Alarm bits for this channel in the Output Table must be set to clear the alarms.
- **Fault Mode** - This setting determines the output value when a fault condition is detected. Changes to the commanded output value will have no effect until the condition is cleared. If the condition is cleared, the output resumes using the value in the channels Data Link.
  - o 0 = Hold (default). The output is held at its last value.
  - o 1 = User. The output is set to the Offline Val parameter.

It is recommended to optimize performance that unused channels be set to disable (set bit '0' to a '1').

Parameters 18, 24, 30, 36 [Outx Low Eng] (where X is **the output** number 1-4) **-** Set to low end of the analog input (0mA, 4mA, 0V)

Parameters 19, 25, 31, 37 [Outx High Eng] (where X is **the output** number 1-4) **-** Set to high end of the analog input (20mA, 10V)

Parameters 20, 26, 32, 38 [Outx Low Clamp] (where X is **the output** number 1-4) **-** User-defined low clamp and alarm value. This parameter is valid only when Low Clam**p** & Alarm set to User. Value is in Engineering Units.

Parameters 21, 27, 33, 39 [Outx HighClamp] (where X is **the output** number 1-4) - User defined high clamp and alarm value. This parameter is valid only when High Clam**p** & Alarm set to User. Value is in Engineering Units.

Parameters 22, 28, 34, 40 [Outx Fault Val] (where X is **the output** number 1-4) - User-defined output when Fault Mode set to User.

The data from the input/output of the option card can be viewed in the Diagnostic Items for the Spectrum Card.

Port	#	Name	Value	Units	Internal Value	Default	Min	Max
6	7	In0 Analog	4.032		4.032	0.000	-34028...	340282...
6	8	In1 Analog	0.000		0.000	0.000	-34028...	340282...
6	9	In2 Analog	5.011		5.011	0.000	-34028...	340282...
6	10	In3 Analog	0.000		0.000	0.000	-34028...	340282...
6	11	Out0 Cmd	0.000		0.000	0.000	-34028...	340282...
6	12	Out1 Cmd	4.000		4.000	0.000	-34028...	340282...
6	13	Out2 Cmd	0.000		0.000	0.000	-34028...	340282...
6	14	Out3 Cmd	0.000		0.000	0.000	-34028...	340282...
6	15	Input Status	00000000 000000...		0	00000000 0000000...		
6	16	Output Status	00000001 000000...		16843008	00000000 0000000...		
6	17	Module Status	00000000 000000...		736	00000000 0000000...		

Next configure the **Host Parameters 1-11 [DL From Net X]** (where X is a number 1-11).

Input Data Connection:

Each DL is a datalink. DL1 is Channel 0, DL2 is Channel 1 and so on. The term "From Net" is sometimes misunderstood. The "From Net" parameters are actually mapping from the card to where ever you point to. Configure the 'HOST' parameters 'DL From Net' as the table below. Set the datalink parameters in the Spectrum card to the PF750 or PF755T setting based on your drive.

Function	20-750-IF4XOF4-SC DL From Net	PF750 Setting	PF755T Setting	Port 0 Parameter Name
Ch 0 Data	Port x Parameter 01 [DL From Net 01]	Port 0 Parameter 1800	Port 0 Parameter 800	UserData Real 00
Ch 1 Data	Port x Parameter 02 [DL From Net 02]	Port 0 Parameter 1801	Port 0 Parameter 801	UserData Real 01
Ch 2 Data	Port x Parameter 03 [DL From Net 03]	Port 0 Parameter 1802	Port 0 Parameter 802	UserData Real 02
Ch 3 Data	Port x Parameter 04 [DL From Net 04]	Port 0 Parameter 1803	Port 0 Parameter 803	UserData Real 03
Ch 4 Data	Port x Parameter 05 [DL From Net 05]	Port 0 Parameter 1804	Port 0 Parameter 804	UserData Real 04
Ch 5 Data	Port x Parameter 06 [DL From Net 06]	Port 0 Parameter 1805	Port 0 Parameter 805	UserData Real 05
Ch 6 Data	Port x Parameter 07 [DL From Net 07]	Port 0 Parameter 1806	Port 0 Parameter 806	UserData Real 06
Ch 7 Data	Port x Parameter 08 [DL From Net 08]	Port 0 Parameter 1807	Port 0 Parameter 807	UserData Real 07
Input Status	Port x Parameter 09 [DL From Net 09]	Port 0 Parameter 1700	Port 0 Parameter 700	UserData Int 00
Output Status	Port x Parameter 10 [DL From Net 10]	Port 0 Parameter 1701	Port 0 Parameter 701	UserData Int 01
Mod Status	Port x Parameter 11 [DL From Net 11]	Port 0 Parameter 1702	Port 0 Parameter 702	UserData Int 02

Output Data Connection:

During normal execution, the five DLs To Net for the option card are linked to Drive Parameters as shown in the table below. The data types for the Drive parameters should be as shown. Set the datalink parameters in the Spectrum card to the PF750 or PF755T setting based on your drive.

Function	20-750-IF4XOF4-SC DL To Net	PF750 Setting	PF755T Setting	Port 0 Parameter Name
Out0 Data	Port x Parameter 17 [DL To Net 01]	Port 0 Parameter 1808	Port 0 Parameter 808	UserData Real 08
Out1 Data	Port x Parameter 18 [DL To Net 02]	Port 0 Parameter 1809	Port 0 Parameter 809	UserData Real 09
Out2 Data	Port x Parameter 19 [DL To Net 03]	Port 0 Parameter 1810	Port 0 Parameter 810	UserData Real 10
Out3 Data	Port x Parameter 20 [DL To Net 04]	Port 0 Parameter 1811	Port 0 Parameter 811	UserData Real 11
UnlatchBits	Port x Parameter 21 [DL To Net 05]	Port 0 Parameter 1703	Port 0 Parameter 703	UserData Int 03

If the datalinks are successfully set up, the above data will appear in Port 0 UserData Int/Real xx.

Port	#	Name	Value	Units	Internal Value
0	1800	UserData Real 00	4.0310		4.0310
0	1801	UserData Real 01	0.0000		0.0000
0	1802	UserData Real 02	5.0107		5.0107
0	1803	UserData Real 03	0.0000		0.0000
0	1804	UserData Real 04	0.0000		0.0000
0	1805	UserData Real 05	4.0000		4.0000

NOTE: For setup help with a **20-750sc-8U**, please reference QA38326 - PowerFlex 750 Series: 20-750sc-8U Setup.