SNAP TEX Cables and Breakout Boards

Features

- Extend the terminals on your SNAP I/O modules for easier, cleaner wiring to field devices.
- Six-foot (1.8 meter) wiring cables plug into tops of I/O modules for quick replacement.
- Breakout boards offer options such as fusing, power to loads, and mechanical relays.
- Specialty cables integrate older G4 digital I/O with SNAP PAC I/O.

SNAP TEX Family

Description

SNAP TEX cables and breakout boards are part of the SNAP TEX family of wiring and mounting accessories. These parts save time and expense during installation, maintenance, and debugging by reducing the time and effort required to wire field devices to SNAP I/O modules.

Choose the cables and breakout boards for your modules based on the table that starts on .

Specifications, dimensions, and wiring diagrams begin on .

SNAP TEX Cables

SNAP TEX cables provide convenient connections from I/O modules to field wiring. Most cables are designed to connect to breakout boards; some cables have flying leads for direct connection to field devices.

SNAP TEX Breakout Boards

SNAP TEX breakout boards move terminals away from the crowded rack area for easier installation and maintenance. Some breakout boards, such as the SNAP-AIMA-HDB, work only with specific modules; others are designed to be used with several types of modules. See tables starting on .

Part Numbers (continued)

Part	Description
Breakout Boards	
SNAP-TEX-32	32-point breakout board for SNAP I/O modules
SNAP-TEX-FB16-H	16-point breakout board for SNAP I/O modules, with fuses, fuse-blown indicators, & bussed power (120–240 V)
SNAP-TEX-FB16-L	16-point breakout board for SNAP I/O modules, with fuses, fuse-blown indicators, & bussed power (12–24 V)
SNAP-TEX-MR10-4	Mechanical relay breakout board for a 4-channel SNAP digital output module
SNAP-TEX-MR10-16	Mechanical relay breakout board for one high-density or four 4-channel SNAP digital output modules.
SNAP-TEX-MR10-16C	Mechanical relay breakout board for one high-density or four 4-channel SNAP digital output modules. Header connector connects two boards to one high-density digital module. Optional jumper straps.
SNAP-IDC-HDB SNAP-IDC-HDB-FM*	Fused breakout board for SNAP 32-point digital input modules
SNAP-ODC-HDB SNAP-ODC-HDB-FM*	Fused breakout board for SNAP 32-point digital output modules
SNAP-AIMA-HDB SNAP-AIMA-HDB-FM*	Breakout boards for SNAP-AIMA-32 and SNAP-AIMA-32-FM analog input modules
SNAP-AIV-HDB SNAP-AIV-HDB-FM*	Breakout boards for SNAP-AIV-32 and SNAP-AIV-32-FM analog modules

* Factory Mutual approved

Part Numbers

Part	Description
Cables	
SNAP-TEX-CBO6	6 ft. (1.8 m), 8-wire cable for SNAP I/O modules. Odd terminals commoned
SNAP-TEX-CBE6	6 ft. (1.8 m), 8-wire cable for SNAP I/O modules. Even terminals commoned
SNAP-TEX-CBS6	6 ft. (1.8 m), 8-wire cable for SNAP I/O modules. Straight-through; no common terminals.
SNAP-HD-ACF6	6 ft. (1.8 m) wiring harness assembly for SNAP 16-point digital modules
SNAP-HD-BF6	6 ft. (1.8 m) wiring harness for 32-channel modules and breakout boards
SNAP-HD-CBF6	6 ft. (1.8 m) wiring harness with flying leads for most 32-point modules
SNAP-HD-G4F6	6 ft. (1.8 m) header cable for SNAP-ODC-32-SNK and SNAP-IDC-32 digital modules and G4PB16H and G4PB16HC mounting racks. Also for SNAP-ODC-32-SRC when connecting to a SNAP-MR10-16C breakout board.
SNAP-HD-G4F6N	6 ft. (1.8 m) header cable for SNAP-IDC-32N digital modules and G4PB16H and G4PB16HC mounting racks

Module, Breakout Board, and Cable Compatibility Charts

Look in the left column for the module you have. Choose the breakout board in the right columns. Compatible cables are shown in the table cells in the center.

4-Channel Digital Modules

Module	Breakout Board		
	SNAP-TEX-32	**SNAP-TEX-FB16-H** **SNAP-TEX-FB16-L**	**SNAP-TEX-MR10-4** **SNAP-TEX-MR10-16** **SNAP-TEX-MR10-16C**
Digital input modules—4-channel			
SNAP-IAC5 SNAP-IAC5A SNAP-IAC5AFM SNAP-IAC5FM SNAP-IAC5MA SNAP-IDC5 SNAP-IDC5-FAST-A SNAP-IDC5-HT SNAP-IDC5-SW SNAP-IDC5-SW-NC SNAP-IDC5D SNAP-IDC5DFM SNAP-IDC5FAST SNAP-IDC5FM SNAP-IDC5G SNAP-IDC5MA SNAP-IDC5Q	SNAP-TEX-CBE6 SNAP-TEX-CBO6 SNAP-TEX-CBS6	SNAP-TEX-CBO6 SNAP-TEX-CBS6	Not used for inputs
Digital output modules—4-channel			
SNAP-ODC5-I SNAP-ODC5-IFM SNAP-ODC5A-I SNAP-ODC5A-IFM	SNAP-TEX-CBS6 SNAP-TEX-CBO6 SNAP-TEX-CBE6	SNAP-TEX-CBS6 SNAP-TEX-CBO6	SNAP-TEX-CBO6
SNAP-OAC5-I SNAP-OAC5-IFM SNAP-OAC5MA SNAP-ODC5MA	SNAP-TEX-CBS6 SNAP-TEX-CBO6 SNAP-TEX-CBE6	SNAP-TEX-CBS6 SNAP-TEX-CBO6	Not used
SNAP-ODC5SRC	SNAP-TEX-CBS6 SNAP-TEX-CBO6	SNAP-TEX-CBS6 SNAP-TEX-CBO6	SNAP-TEX-CBO6 SNAP-TEX-CBS6
SNAP-OAC5 SNAP-OAC5FM SNAP-ODC5ASNK SNAP-ODC5R SNAP-ODC5R5 SNAP-ODC5R5FM SNAP-ODC5RFM SNAP-ODC5SNK SNAP-ODC5SNKFM SNAP-ODC5SRCFM	SNAP-TEX-CBS6 SNAP-TEX-CBO6	SNAP-TEX-CBS6 SNAP-TEX-CBO6	Not used
SNAP-OMR6-A SNAP-OMR6-C			

SNAP TEX Cables and Breakout Boards

Module, Breakout Board, and Cable Compatibility Charts (continued)

Look in the left column for the module you have. Choose the breakout board in the right columns. Compatible cables are shown in the table cells in the center.

1-, 2-, and 4-Channel Analog Modules

Module		SNAP-TEX-32	SNAP-TEX-FB16-H SNAP-TEX-FB16-L	SNAP-TEX-MR10-4 SNAP-TEX-MR10-16 SNAP-TEX-MR10-16C
Breakout Board				
Analog input modules (not thermocouples)				
SNAP-AIMV2-4 SNAP-AIV-4 SNAP-AIR40K-4	SNAP-AIMA-4 SNAP-AIMV-4	SNAP-TEX-CBS6 SNAP-TEX-CBE6	Not used for analog modules	
SNAP-AIMA SNAP-AIV-72 SNAP-AIVRMS SNAP-AIV SNAP-AIARMS SNAP-AICTD SNAP-AIRATE SNAP-AIRATE-HFi SNAP-AIRTD SNAP-AIRTD-10 SNAP-AIRTD-1K	SNAP-AICTD-4 SNAP-AIMA-i SNAP-AIMA2-i SNAP-AIMA-iH SNAP-AIV-i SNAP-AIV2-i SNAP-AIARMS-i SNAP-AIARMS-i-FM SNAP-AIVRMS-i SNAP-AIVRMS-i-FM SNAP-AIPM SNAP-AIPM-3V	SNAP-TEX-CBS6	Not used for analog modules	
SNAP-AILC SNAP-AILC-2 SNAP-pH/ORP SNAP-AIMA-iSRC SNAP-AIMA-iSRC-FM SNAP-AIPM-3*	SNAP-AITM-i ** SNAP-AITM2-i ** SNAP-AITM-4i ** SNAP-AITM ** SNAP-AITM-2 **	No cable available	Not used for analog modules	
Analog output modules				
SNAP-AOA-23 SNAP-AOA-28 SNAP-AOA-3 SNAP-AOV-25	SNAP-AOV-27 SNAP-AOV-5 SNAP-AOA-23-iH SNAP-AOA-23-iSRC SNAP-AOA-23-iSRC-FM	SNAP-TEX-CBS6	Not used for analog modules	
SNAP-AOD-29	SNAP-AOD-29-HFi	SNAP-TEX-CBS6	Not used for analog modules	

* Not recommended for use with breakout boards due to CT safety concerns.
** Do not use breakout boards with thermocouples.

SNAP TEX Cables and Breakout Boards

SNAP TEX Cables and Breakout Boards

High-Density Digital Modules

Module	Breakout Board					Without a breakout board
	SNAP-TEX-32	SNAP-TEX-FB16-H SNAP-TEX-FB16-L	SNAP-TEX-MR10-4 SNAP-TEX-MR10-16 SNAP-TEX-MR10-16C	SNAP-IDC-HDB SNAP-IDC-HDB-FM	SNAP-ODC-HDB SNAP-ODC-HDB-FM	
SNAP-IAC-16 SNAP-IAC-A-16 SNAP-IAC-K-16 SNAP-IDC-16 SNAP-IDC-HT-16	SNAP-HD-ACF6 (2 modules/board)	SNAP-HD-ACF6				SNAP-HD-ACF6
SNAP-IDC-32 SNAP-IDC-32-FM SNAP-IDC-32N SNAP-IDC-32D SNAP-IDC-32DN	SNAP-HD-CBF6	SNAP-HD-CBF6 (2 boards/module)		SNAP-HD-BF6		SNAP-HD-CBF6
SNAP-ODC-32-SNK SNAP-ODC-32-SNK-FM	SNAP-HD-CBF6	SNAP-HD-CBF6 (2 boards/module)	Do not use		SNAP-HD-BF6	SNAP-HD-CBF6
SNAP-ODC-32-SRC SNAP-ODC-32-SRC-FM			SNAP-HD-CBF6 SNAP-HD-G4F6 (MR10-16C only)			

Analog Modules with More Than 4 Points

Module	Breakout Board							Without a breakout board
	SNAP-TEX-32	SNAP-TEX-FB16-H SNAP-TEX-FB16-L	SNAP-TEX-MR10-4 SNAP-TEX-MR10-16 SNAP-TEX-MR10-16C	SNAP-IDC-HDB SNAP-IDC-HDB-FM	SNAP-ODC-HDB SNAP-ODC-HDB-FM	SNAP-AIMA-HDB SNAP-AIMA-HDB-FM	SNAP-AIV-HDB SNAP-AIV-HDB-FM	
SNAP-AITM-8 SNAP-AITM-8-FM SNAP-AIV-8 SNAP-AIMA-8 SNAP-AICTD-8	Can be used; no cable currently available	Not used with analog modules						
SNAP-AIV-32 SNAP-AIV-32-FM	SNAP-HD-CBF6	Not used with analog modules					SNAP-HD-BF6	SNAP-HD-CBF6
SNAP-AIMA-32 SNAP-AIMA-32-FM	Not recommended				SNAP-HD-BF6			Not recommended

SNAP TEX Cables and Breakout Boards

SNAP-TEX-CBO6, SNAP-TEX-CBE6, SNAP-TEX-CBS6 Cables

These three cables provide neat, protected wiring from the top of the module to the breakout board. Each cable snaps into the top of one module and terminates at the breakout board with 18-gauge, color-coded flying leads, already stripped and ready for wiring. The leads attach easily to the breakout board with spring connectors.

SNAP-TEX-CBO6—Odd-numbered terminals are commoned.

SNAP-TEX-CBE6—Even-numbered terminals are commoned.

SNAP-TEX-CBS6—No common terminals; wiring is straight through.

This photo shows the contrast between a regularly wired SNAP PAC rack (at upper left) and one using SNAP-TEX-CBE6, -CBO6, and -CBS6 cables (at lower right).

The cables protect top-of-module connections and wires, and make it easier to follow wiring to field devices.
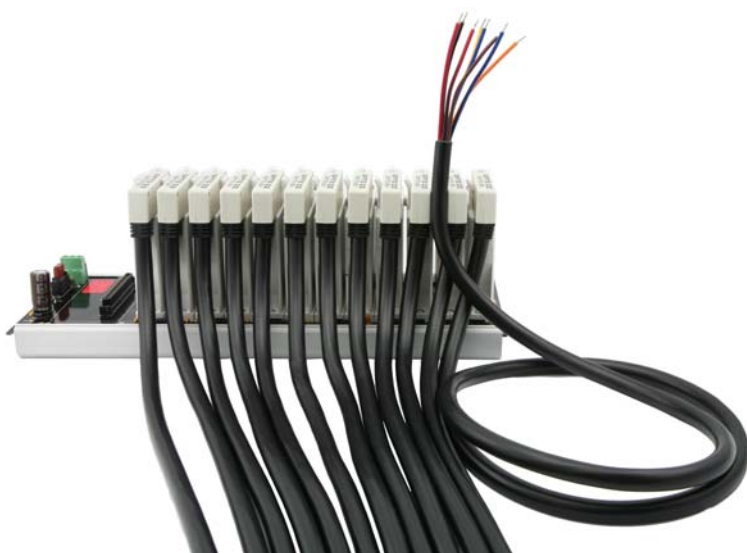
Cables terminate in color-coded flying leads, already stripped and ready for wiring.

Installation, maintenance, and troubleshooting are faster and simpler using the SNAP TEX cables.

OPTO 22

SNAP TEX Cables and Breakout Boards

SNAP-TEX-CBO6, SNAP-TEX-CBE6, SNAP-TEX-CBS6 Cables (continued)

Cable Specifications

Feature	SNAP-TEX-CBO6	SNAP-TEX-CBE6	SNAP-TEX-CBS6
Cable length	6 feet (1.8 meters)	6 feet (1.8 meters)	6 feet (1.8 meters)
Connector	8 pins, 0.2 in. (5.08 mm) center-to-center	8 pins, 0.2 in. (5.08 mm) center-to-center	8 pins, 0.2 in. (5.08 mm) center-to-center
Wires	8 pre-stripped, color-coded, 18 gauge	8 pre-stripped, color-coded, 18 gauge	8 pre-stripped, color-coded, 18 gauge
Bussing	Odd-numbered pins connected	Even-numbered pins connected*	No connected
Agency Approvals	CE, RoHS, DFARS	CE, RoHS, DFARS	CE, RoHS, DFARS
Warranty	30 months	30 months	30 months

*Do NOT USE the CBE6 with a SNAP-TEX-FB16-H or -L breakout board. The FB16s have odd-numbered pins connected.

Wire Colors

Point	Pin	Color wire
0	1	black
	2	red
1	3	blue
	4	orange

Point	Pin	Color wire
2	5	yellow
	6	brown
3	7	red/black
	8	blue/black

Compatible SNAP I/O Modules

See table starting on for detailed module, cable, and breakout board compatibility.

Modules	SNAP-TEX-CBO6	SNAP-TEX-CBE6	SNAP-TEX-CBS6
Use with	SNAP 4-channel digital input and output modules	SNAP 4-channel digital input modules Isolated and -MA digital output modules 4-channel analog modules, except SNAP-AICTD-4 SNAP-AOD-29	SNAP 4-channel digital input and output modules Most 1-, 2-, and 4-channel analog modules
DO NOT use with	Thermocouples Analog modules Modules with more than 4 points	Fused digital output modules Thermocouples Analog modules not listed above Modules with more than 4 points	Thermocouples Modules with more than 4 points SNAP-AITM family, SNAP-pH/ORP, SNAP-AILC family, SNAP-AIMA-iSRC

SNAP TEX Cables and Breakout Boards

SNAP-HD-ACF6, SNAP-HD-CBF6, and SNAP-HD-BF6 Cables

The SNAP-HD-ACF6, SNAP-HD-CBF6, and SNAP-HD-BF6 cables connect 16- and 32-channel modules to field wiring or breakout boards. Each cable is 6 ft. (1.8 m) long.

The **SNAP-HD-ACF6** and the **SNAP-HD-CBF6** have connectors at one end that attach to the top of a module and flying leads at the other end for field wiring. The ACF6 is for 16-channel modules and the CBF6 is for 32-channel modules.

The **SNAP-HD-BF6** has connectors at both ends, one for a 32-channel module and the other for a suitable breakout rack.

SNAP-HD-CBF6

SNAP-HD-BF6

Cable Specifications

See table starting on for detailed module, cable, and breakout board compatibility.

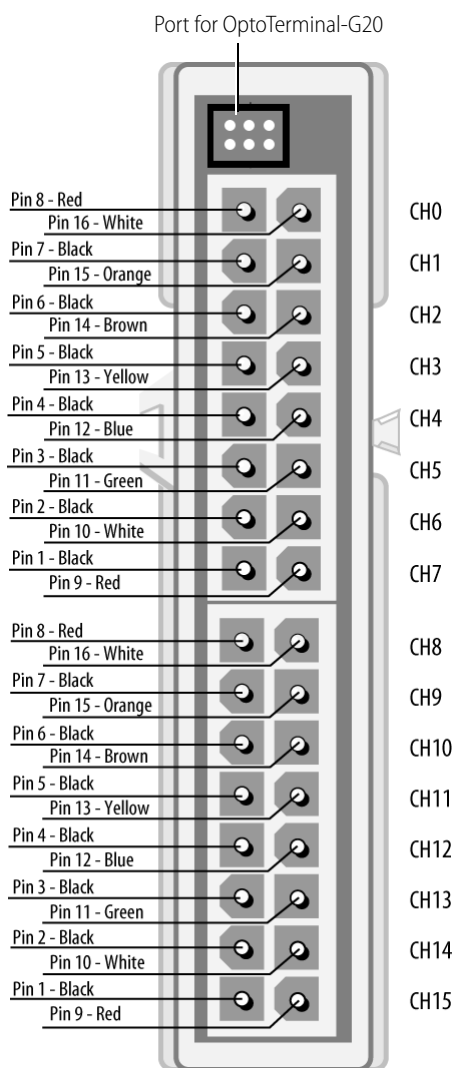| Feature	SNAP-HD-ACF6	SNAP-HD-CBF6	SNAP-HD-BF6
Cable length	6 feet (1.8 meters)	6 feet (1.8 meters)	6 feet (1.8 meters)
Connectors	Two-connector assembly at module end, each with 16 pins; flying leads at other end	One 40-pin connector at module end; flying leads at other end	One connector at module end; one connector at breakout board end
Wires	Pre-stripped, color-coded, 22-gauge wires	Pre-stripped, color-coded, 24-gauge wires	24 gauge wires
Use with	Modules: SNAP-IAC-16 SNAP-IAC-A-16 SNAP-IAC-K-16 SNAP-IDC-16 SNAP-IDC-HT-16	Modules: SNAP-IDC-32 SNAP-IDC-32-FM SNAP-IDC-32N SNAP-IDC-32D SNAP-IDC-32DN SNAP-ODC-32-SNK SNAP-ODC-32-SNK-FM SNAP-ODC-32-SRC SNAP-ODC-32-SRC-FM SNAP-AIV-32 SNAP-AIV-32-FM	Modules to breakout boards (regular and -FM versions): SNAP-IDC-32 to SNAP-IDC-HDB SNAP-IDC-32N to SNAP-IDC-HDB SNAP-IDC-32D to SNAP-IDC-HDB SNAP-IDC-32DN to SNAP-IDC-HDB SNAP-ODC-32-SNK to SNAP-ODC-HDB SNAP-ODC-32-SRC to SNAP-ODC-HDB SNAP-AIV-32 to SNAP-AIV-HDB SNAP-AIMA-32 to SNAP-AIMA-HDB
Agency Approvals	CE, RoHS, DFARS	CE, RoHS, DFARS	CE, RoHS, DFARS
Warranty	30 months	30 months	30 months

SNAP TEX Cables and Breakout Boards

SNAP-HD-ACF6, SNAP-HD-CBF6, and SNAP-HD-BF6 Cables (continued)

Wiring—From SNAP-HD-ACF6 Cable to SNAP 16-Point Digital Module

The following diagram shows16-channel module connector wiring for the SNAP-HD-ACF6 wiring harness. Applies to the following modules (top view of module):

SNAP-IDC-16	SNAP-IAC-16
SNAP-IDC-HT-16	SNAP-IAC-A-16
	SNAP-IAC-K-16

Port for OptoTerminal-G20

Pin 8 - Red / Pin 16 - White	CH0
Pin 7 - Black / Pin 15 - Orange	CH1
Pin 6 - Black / Pin 14 - Brown	CH2
Pin 5 - Black / Pin 13 - Yellow	CH3
Pin 4 - Black / Pin 12 - Blue	CH4
Pin 3 - Black / Pin 11 - Green	CH5
Pin 2 - Black / Pin 10 - White	CH6
Pin 1 - Black / Pin 9 - Red	CH7
Pin 8 - Red / Pin 16 - White	CH8
Pin 7 - Black / Pin 15 - Orange	CH9
Pin 6 - Black / Pin 14 - Brown	CH10
Pin 5 - Black / Pin 13 - Yellow	CH11
Pin 4 - Black / Pin 12 - Blue	CH12
Pin 3 - Black / Pin 11 - Green	CH13
Pin 2 - Black / Pin 10 - White	CH14
Pin 1 - Black / Pin 9 - Red	CH15

SNAP TEX Cables and Breakout Boards

SNAP-HD-ACF6, SNAP-HD-CBF6, and SNAP-HD-BF6 Cables (continued)

Wiring—SNAP-HD-CBF6 Cable

The following table shows 32-channel module connector wiring for the SNAP-HD-CBF6 wiring harness. Wires from the wiring harness are grouped into four sets. Each set contains color-coded wires.

Set A		
Wires		**Point**
A0	Gray	0
A1	Blue	1
A2	Yellow	2
A3	Red	3
A4	White	4
A5	Violet	5
A6	Green	6
A7	Orange	7
ACOM	Blk/Brn	com

Set B		
Wires		**Point**
B0	Gray	8
B1	Blue	9
B2	Yellow	10
B3	Red	11
B4	White	12
B5	Violet	13
B6	Green	14
B7	Orange	15
BCOM	Blk/Brn	com

Set C		
Wires		**Point**
C0	Gray	16
C1	Blue	17
C2	Yellow	18
C3	Red	19
C4	White	20
C5	Violet	21
C6	Green	22
C7	Orange	23
CCOM	Blk/Brn	com

Set D		
Wires		**Point**
D0	Gray	24
D1	Blue	25
D2	Yellow	26
D3	Red	27
D4	White	28
D5	Violet	29
D6	Green	30
D7	Orange	31
DCOM	Blk/Brn	com

The four sets relate to point numbers on the module as shown below.

Harness Wire Color	Pin Number	Signal		Signal	Pin Number	Harness Wire Color
Gray	40	A0		A4	39	White
Blue	38	A1		A5	37	Violet
Yellow	36	A2		A6	35	Green
Red	34	A3		A7	33	Orange
Black	32	ACOM		ACOM	31	Brown
Gray	30	B0		B4	29	White
Blue	28	B1		B5	27	Violet
Yellow	26	B2		B6	25	Green
Red	24	B3		B7	23	Orange
Black	22	BCOM		BCOM	21	Brown
Gray	20	C0		C4	19	White
Blue	18	C1		C5	17	Violet
Yellow	16	C2		C6	15	Green
Red	14	C3		C7	13	Orange
Black	12	CCOM		CCOM	11	Brown
Gray	10	D0		D4	9	White
Blue	8	D1		D5	7	Violet
Yellow	6	D2		D6	5	Green
Red	4	D3		D7	3	Orange
Black	2	DCOM		DCOM	1	Brown

Connector wiring for SNAP-ODC-32-SNK, SNAP-ODC-32-SRC, SNAP-IDC-32, -FM versions, SNAP-IDC-32N, and SNAP-IDC-32DN (top view of module)

SNAP-HD-G4F6 and SNAP-HD-G4F6N Cables

The SNAP-HD-G4F6 and SNAP-HD-G4F6N cables are used to connect a SNAP high-density digital (HDD) module to G4 mounting racks in order to integrate older G4 (or even G1) digital output systems with modern PAC Project software and SNAP PAC Ethernet-based controllers.

For outputs, this connection makes available the G4 output's up to 3-amp switching and sensing capability, which can provide twelve times the 0.25 amp capability of the high-density digital modules themselves. (For details of individual G4 module capabilities, see Opto 22 form #727, the *G4 Digital I/O Data Book*.)

The header cable connects two 16-channel mounting racks to one 32-channel digital module. The cable can also be used to connect G1 mounting racks with header connectors to these modules. See the table below for module and rack compatibility.

The SNAP-HD-G4F6 cable can also be used to connect two SNAP-TEX-MR10-16C breakout boards to one 32-channel digital module. See .

For more information on HDD modules, see form #1556, the *SNAP High-Density Digital Module Data Sheet*.

SNAP-HD-G4F6 header cable

SNAP-ODC-32-SNK module

SNAP mounting rack

G4PB16H mounting racks

In this photo, the **SNAP-HD-G4F6** header cable connects a single SNAP-ODC-32-SNK digital output module on a SNAP PAC mounting rack to two G4PB16H mounting racks.

NOTE: Do not use this cable with a SNAP-ODC-32-SRC module when connecting to G4 mounting racks.
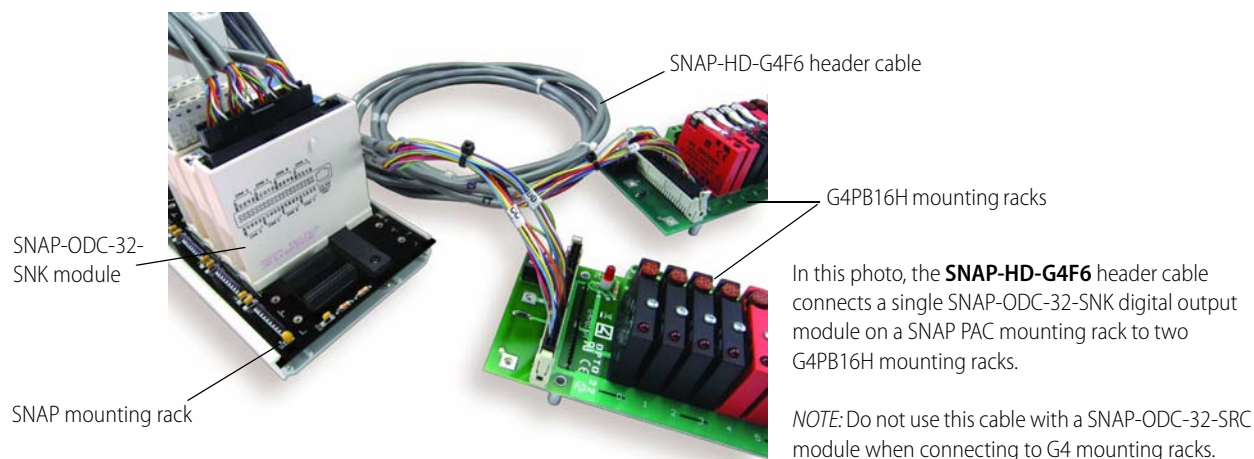
SNAP-HD-G4F6 and SNAP-HD-G4F6N Cables—Compatible Modules and Racks

Cable	Modules	Racks		Integrated I/O	
SNAP-HD-G4F6	SNAP-ODC-32-SNK SNAP-ODC-32-SNK-FM	G4PB16H G4PB16HC	PB16H PB16HC	G4PB16L	PB16L
SNAP-HD-G4F6N	SNAP-IDC-32N* SNAP-IDC-32DN*	G4PB16H G4PB16HC	PB16H PB16HC	–	

* For 15 volt or 24 volt G1 or G4 modules, use the SNAP-IDC-32N. For 5 volt modules, use the SNAP-IDC-32DN.

NOTE: While not designed for this use, it is possible to connect the SNAP-IDC-32 module with G4 15 or 24 V inputs using a SNAP-HD-G4F6 cable. However, the SNAP-IDC-32 uses positive-true logic and therefore returns the inverse of the typical negative-true logic. For example, if the SNAP-IDC-32 is controlled by a PAC Control strategy, an "OFF" state from it actually indicates that the associated G4 module is turned ON.

SNAP-HD-G4F6 cable

Pin 1
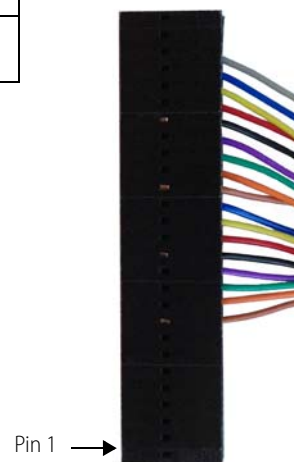
SNAP TEX Cables and Breakout Boards

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L Breakout Boards

The **SNAP-TEX-32** is a simple breakout board with straight-through wiring. Designed primarily for 2- and 4-channel analog inputs/outputs and for 4-channel digital inputs, the breakout board is used with SNAP-TEX cables.

The SNAP-TEX-32 can also be used with 8-, 16-, or 32-channel SNAP analog modules (not thermocouples). See the table beginning on page 2 for recommended cable and board combinations for your modules.

The **SNAP-TEX-FB16-H** and **SNAP-TEX-FB16-L** breakout boards provide a fuse and a fuse-blown indicator for each of their 16 channels. In addition, they provide power to loads: the SNAP-TEX-F16-H provides 120–240 volts, and the SNAP-TEX-F16-L provides 12–24 volts. Simply attach the power source to a single spot in the middle of the rack, and power goes out to solenoids or switches, depending on the module

you're using. These breakout boards are used primarily for digital inputs and outputs.

CAUTION: Odd pins on the SNAP-TEX-FB16-H and SNAP-TEX-FB16-L breakout boards are commoned. Use *only* straight-through or odd cables with these boards.
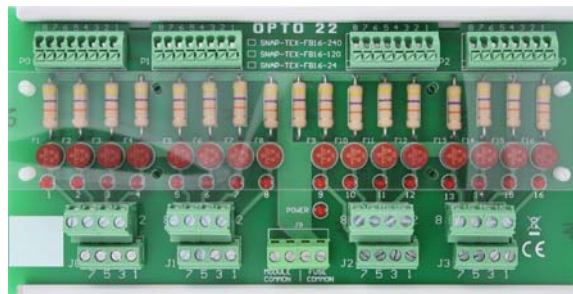
SNAP-TEX-FB16-H

Specifications

See the table beginning on page 2 for recommended cable and board combinations.

Feature	SNAP-TEX-32	SNAP-TEX-FB16-H	SNAP-TEX-FB16-L
Use with I/O modules	2- or 4-channel analog inputs/outputs; 4-channel digital inputs/outputs *	4-channel digital inputs and outputs 16- and 32-ch digital inputs/outputs	4-channel digital inputs and outputs 16- and 32-ch digital inputs/outputs
Use with cables	SNAP-TEX-CBE6 (even pins connected), SNAP-TEX-CBO6 (odd pins connected), or SNAP-TEX-CBS6 (no connections), depending on module.	**4-ch modules:** SNAP-TEX-CBO6 (odd pins connected)** or SNAP-TEX-CBS6 (straight-through), depending on module. **16-ch modules:** SNAP-HD-ACF6 **32-ch modules:** SNAP-HD-CBF6	**4-ch modules:** SNAP-TEX-CBO6 (odd pins connected)** or SNAP-TEX-CBS6 (straight-through), depending on module. **16-ch modules:** SNAP-HD-ACF6 **32-ch modules:** SNAP-HD-CBF6
Connectors	32 spring connectors; accommodates eight 4-channel modules	16 spring connectors; accommodates four 4-channel modules	16 spring connectors; accommodates four 4-channel modules
Fusing	none	1 A, 250 V, fast-acting fuse for each I/O point (16 total). Replace with Opto 22 PN FUSE01G4	1 A, 250 V, fast-acting fuse for each I/O point (16 total). Replace with Opto 22 PN FUSE01G4
Indicators	none	1 LED per fuse (16 LEDs total)	1 LED per fuse (16 LEDs total)
Bussed power	none	120–240 V	12–24 V
Agency Approvals	CE, RoHS, DFARS	CE, RoHS, DFARS	CE, RoHS, DFARS
Warranty	30 months	30 months	30 months

* Can also be used with 8-, 16-, or 32-channel digital and analog inputs (not thermocouples).
** **IMPORTANT:** Do NOT USE the FB16 breakout boards with a SNAP-TEX-CBE6 cable. The board has odd pins connected; the cable has even pins connected.

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L (continued)

Dimensions—SNAP-TEX-32 Breakout Board

Dimensions are shown in inches (with centimeters in parentheses).
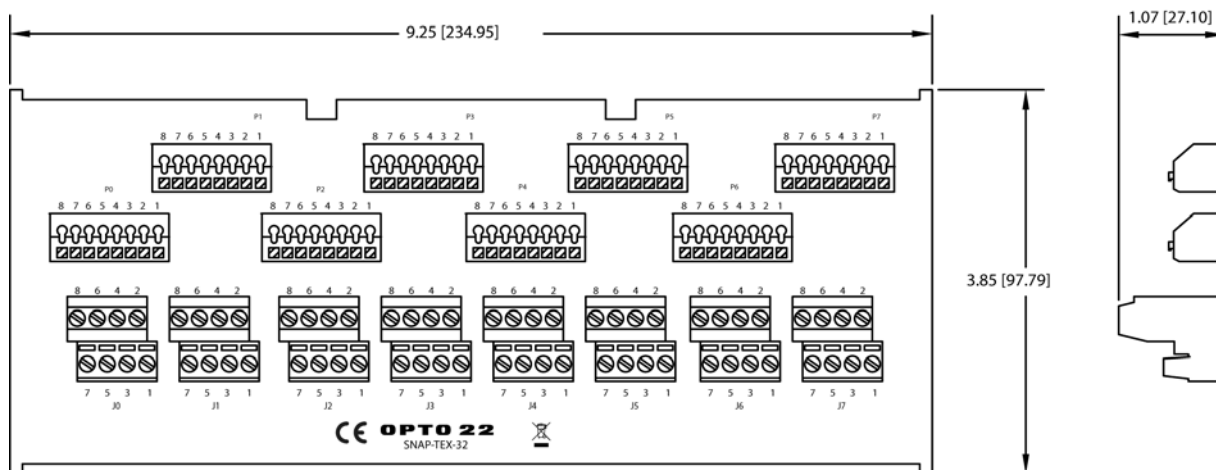
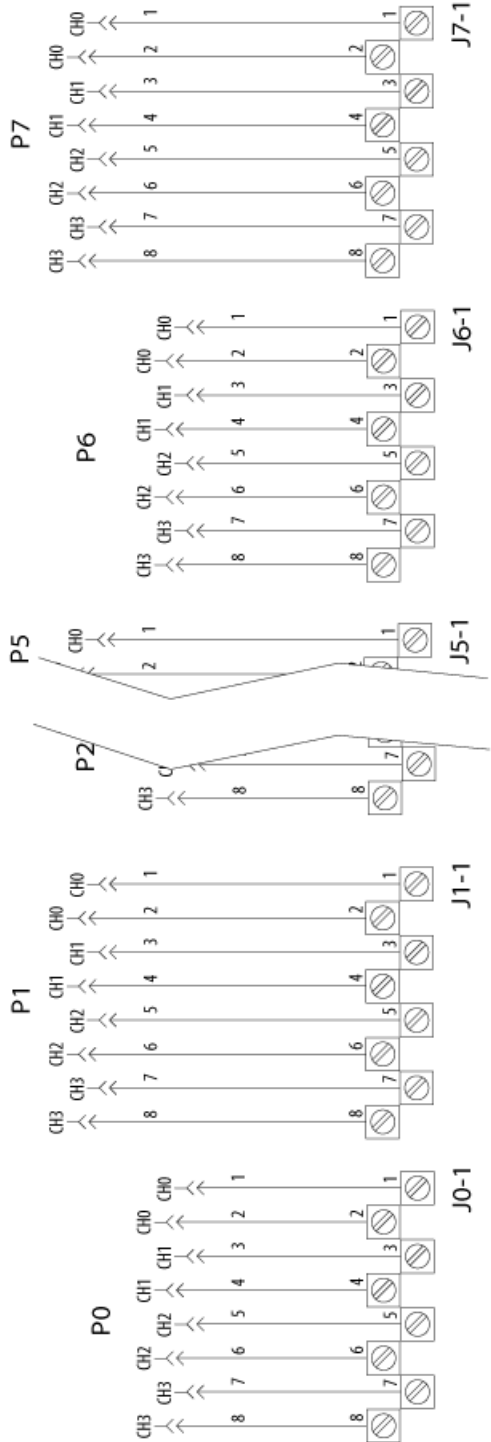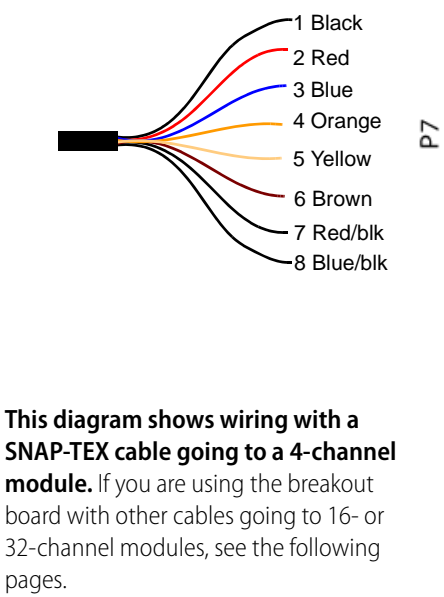### Dimensions—SNAP-TEX-FB16-H and SNAP-TEX-FB16-L Breakout Boards

Dimensions are shown in inches (with centimeters in parentheses).
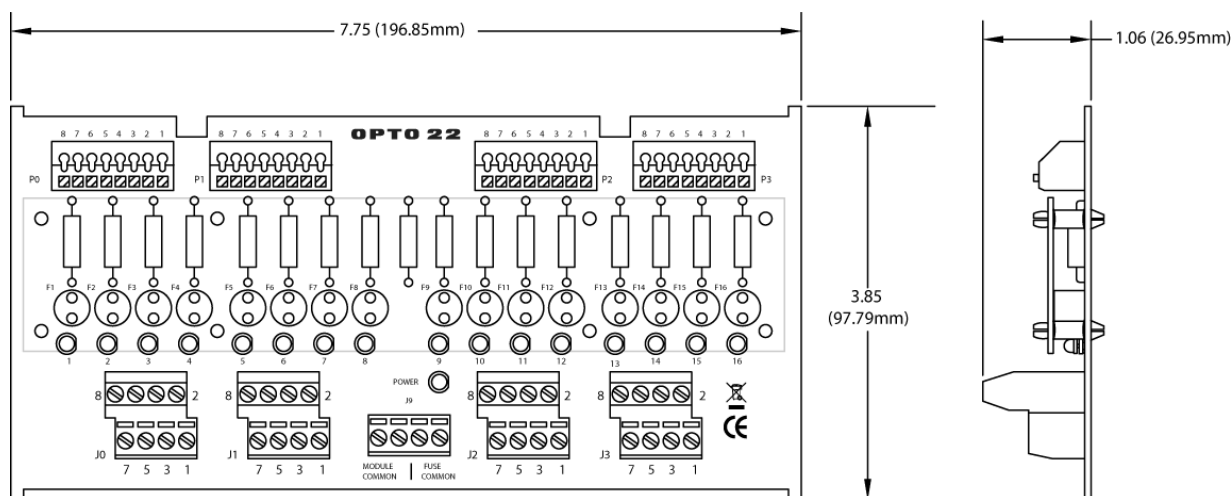
SNAP TEX Cables and Breakout Boards

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L (continued)
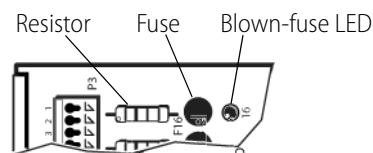
Wiring—SNAP-TEX-32 Breakout Board to 4-channel Module

1 Black
2 Red
3 Blue
4 Orange
5 Yellow
6 Brown
7 Red/blk
8 Blue/blk

This diagram shows wiring with a SNAP-TEX cable going to a 4-channel module. If you are using the breakout board with other cables going to 16- or 32-channel modules, see the following pages.

For use with SNAP 0AC5, 0AC5-i, 0DC-i, 0DC5, IAC(s) and IDC(s)
For use with all 2, 4, 16, 32 CH SNAP analog except thermocouples

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L (continued)

Wiring—SNAP-TEX-FB16-H and SNAP-TEX-FB16-L Breakout Boards

This diagram shows wiring with SNAP-CBO6 or SNAP-CBS6 cables coming from 4-channel modules. If you are using the breakout board with a SNAP-HD-CBF6 cable coming from 32-channel modules, see .

CAUTION: Do NOT use the SNAP-TEX-CBE6 (even pins commoned) cable with this board. The board has odd pins commoned.
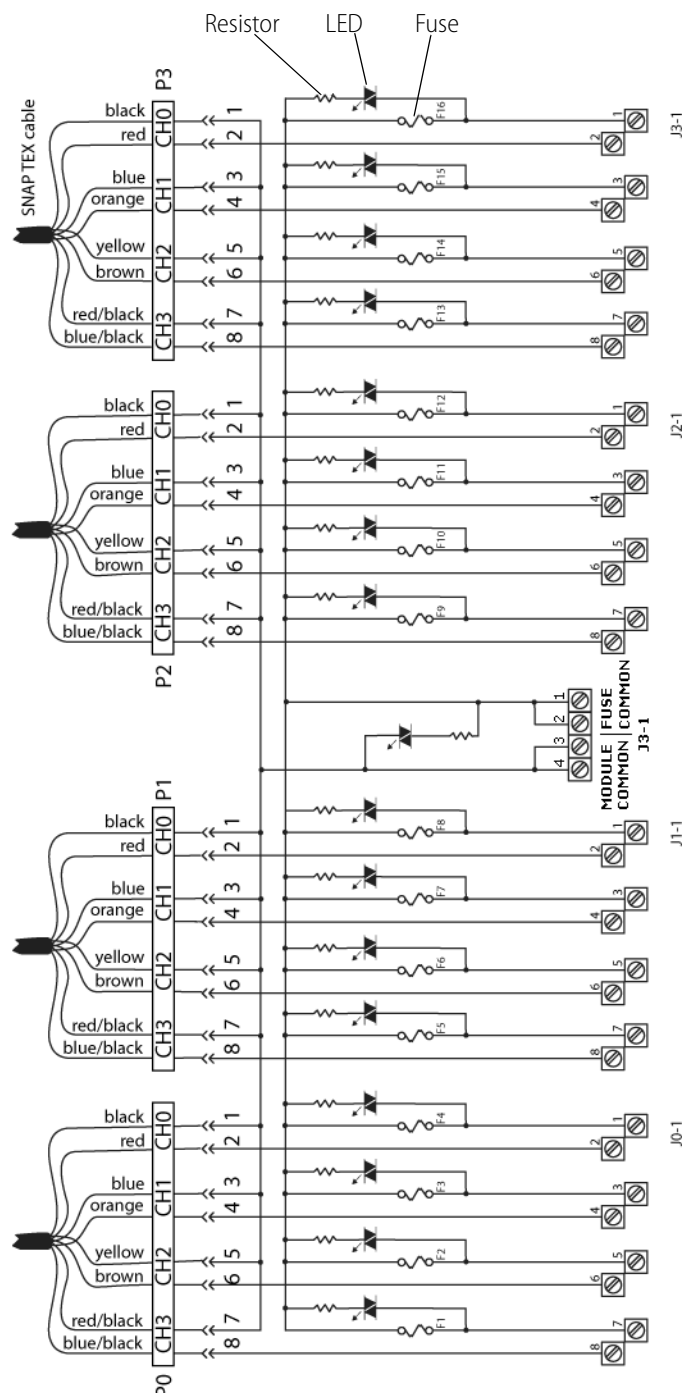
SNAP TEX Cables and Breakout Boards

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L (continued)

Wiring—SNAP-TEX-FB16-L Breakout Board with SNAP-HD-CBF6 Cable

This diagram shows wiring with a SNAP-HD-CBF6 cable coming from a 32-channel module (SNAP-ODC-32-SRC or SNAP-ODC-32-SNK). Each module requires two boards.

If you are using the board with 4-channel modules, see the previous page.
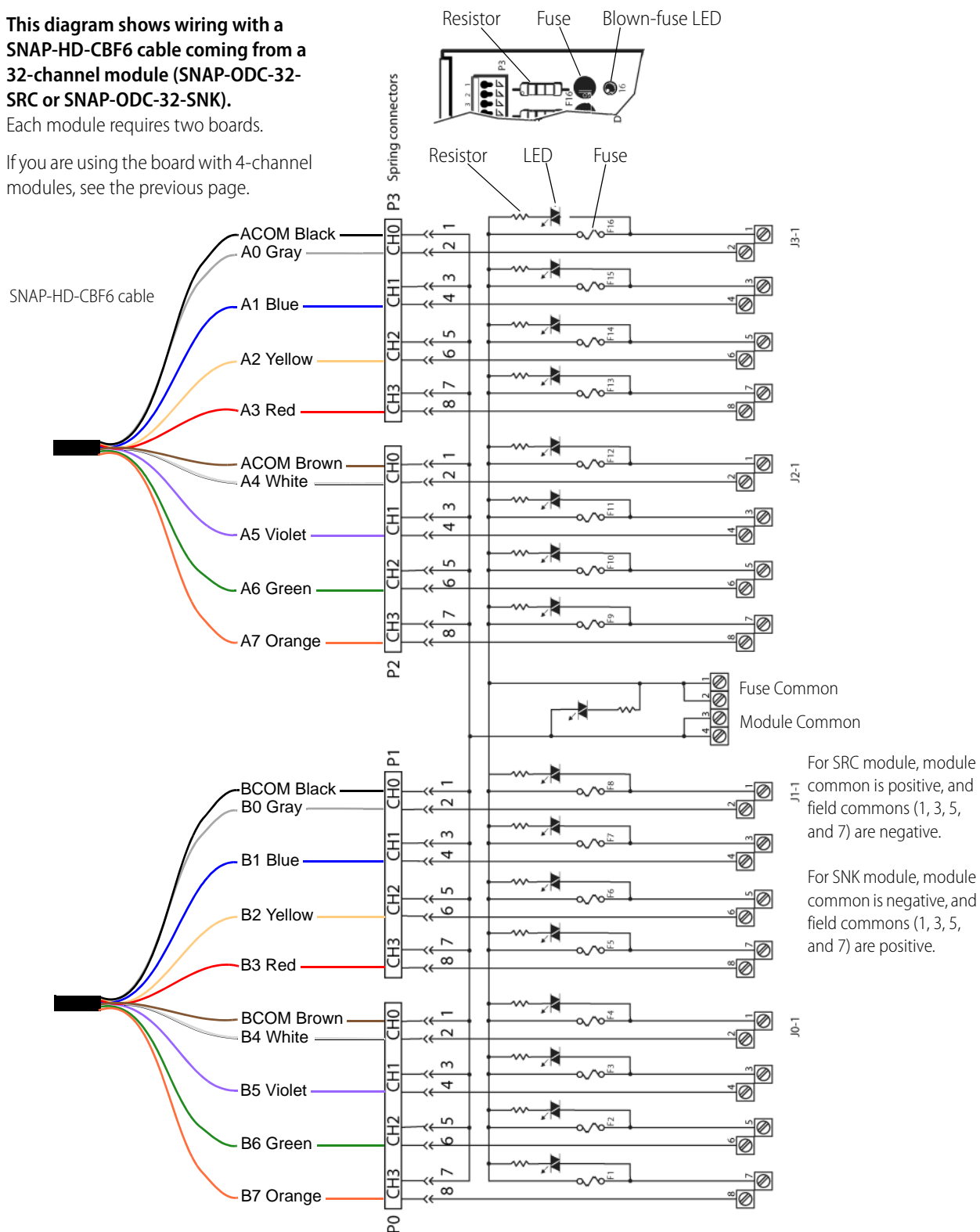
For SRC module, module common is positive, and field commons (1, 3, 5, and 7) are negative.

For SNK module, module common is negative, and field commons (1, 3, 5, and 7) are positive.

SNAP-TEX-32, SNAP-TEX-FB16-H, SNAP-TEX-FB16-L (continued)

Wiring—SNAP-TEX-FB16-L Breakout Board with SNAP-HD-ACF6 Cable

This diagram shows wiring with a SNAP-HD-ACF6 cable coming from a 16-channel module (SNAP-IDC-16, SNAP-IDC-HT-16, SNAP-IAC-16, SNAP-IAC-A-16, and SNAP-IAC-K-16 high-density digital modules).
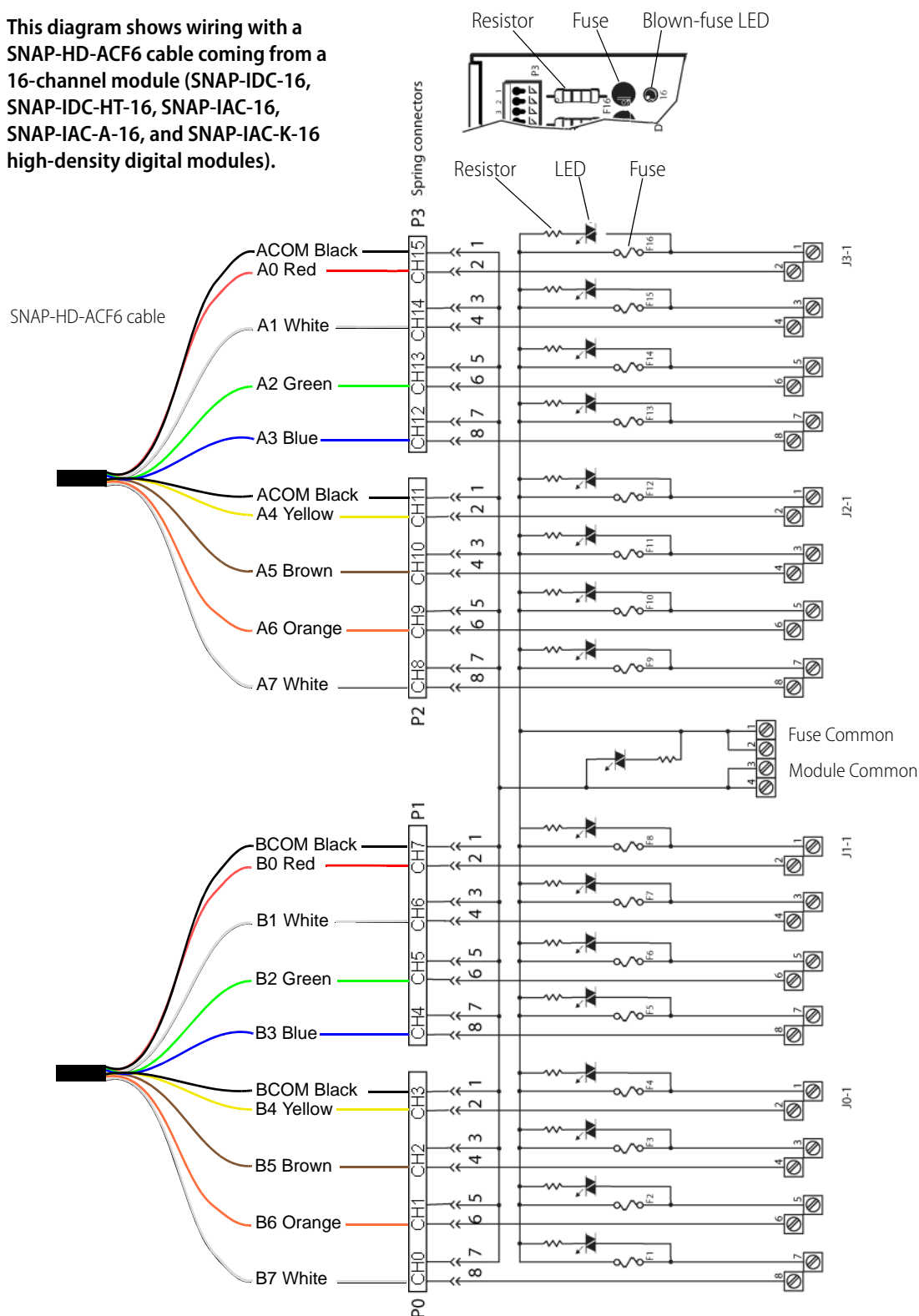
SNAP TEX Cables and Breakout Boards

SNAP-TEX-MR10-4 and SNAP-TEX-MR10-16 Breakout Boards
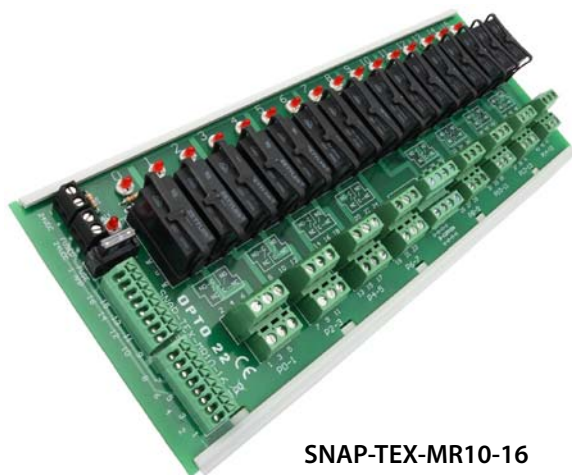
SNAP-TEX-MR10-16

The **SNAP-TEX-MR10-4** and **SNAP-TEX-MR10-16** breakout boards, designed for high-current switching, feature mechanical relays that can switch up to 10 A per channel. (Standard SNAP output modules can switch up to 0.75 A; SNAP-OMR6 output modules can switch up to 6 A.)

These breakout boards include on/off indicators for each channel, and each channel can be wired for normally closed or normally open. The boards require 24 VDC power.

A replacement relay is available, part number SNAP-MR10.

Also see "SNAP-TEX-MR10-16C Breakout Board" on page 21.

Specifications

See the tables beginning on page 2 for compatible modules and cables.

Feature	SNAP-TEX-MR10-4	SNAP-TEX-MR10-16
Use with I/O modules	SNAP-ODC5-i, SNAP-ODC5A-i, SNAP-ODC5SRC, SNAP-ODC-32-SRC	SNAP-ODC5-i, SNAP-ODC5A-i, SNAP-ODC5SRC, SNAP-ODC-32-SRC
Use with cables	SNAP-TEX-CBO6 (odd pins bussed),SNAP-TEX-CBS6 (no bussing), or SNAP-HD-CBF6, depending on module.	SNAP-TEX-CBO6 (odd pins bussed),SNAP-TEX-CBS6 (no bussing), or SNAP-HD-CBF6, depending on module.
Relay contacts	SPDT (1 Form C) Typical life expectancy (Electrical): 1×10^5	SPDT (1 Form C) Typical life expectancy (Electrical): 1×10^5
Switching capacity	10 A @ 240 VAC	10 A @ 240 VAC
Switch On time	7 ms nominal	7 ms nominal
Switch Off time	3 ms nominal	3 ms nominal
Fusing	24 V fuse for board. Opto 22 p/n SNAP-FUSE1AC	24 V fuse for board. Opto 22 p/n SNAP-FUSE1AC
Indicators	4 On/Off status indicators (one for each channel) 1 fuse-blown indicator	16 On/Off status indicators (one for each channel) 1 fuse-blown indicator
Power requirements (all positions On)	24 VDC @ 75 mA	24 VDC @ 300 mA
Agency Approvals	CE, RoHS, DFARS	CE, RoHS, DFARS
Warranty	30 months from date of manufacture	30 months from date of manufacture

SNAP TEX Cables and Breakout Boards *(left margin)*

OPTO 22 *(left margin)*

SNAP-TEX-MR10-4 and SNAP-TEX-MR10-16 Breakout Boards (continued)

Dimensional Drawing—SNAP-TEX-MR10-16 Breakout Board

Dimensions are shown in inches (with centimeters in parentheses).
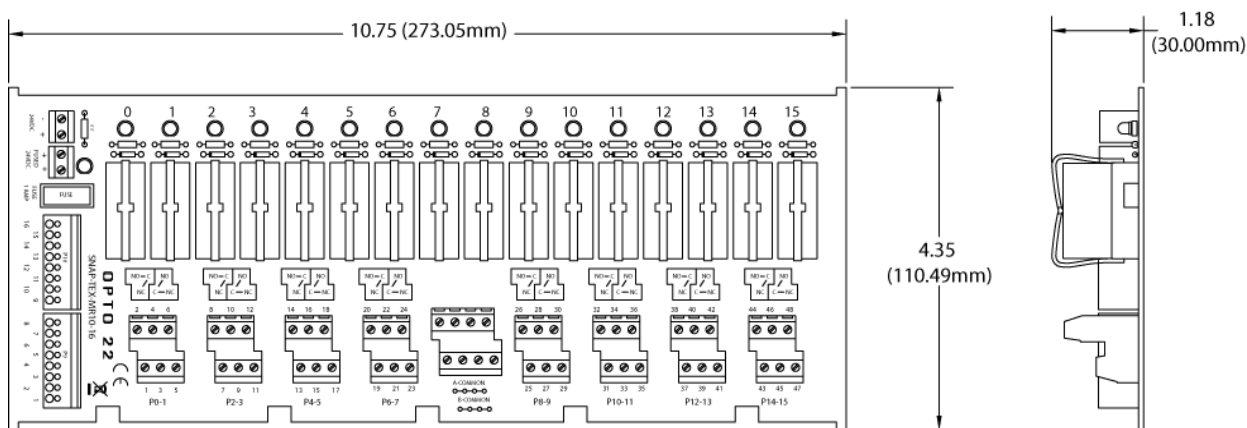
Dimensional Drawing—SNAP-TEX-MR10-4 Breakout Board

Dimensions are shown in inches (with centimeters in parentheses).
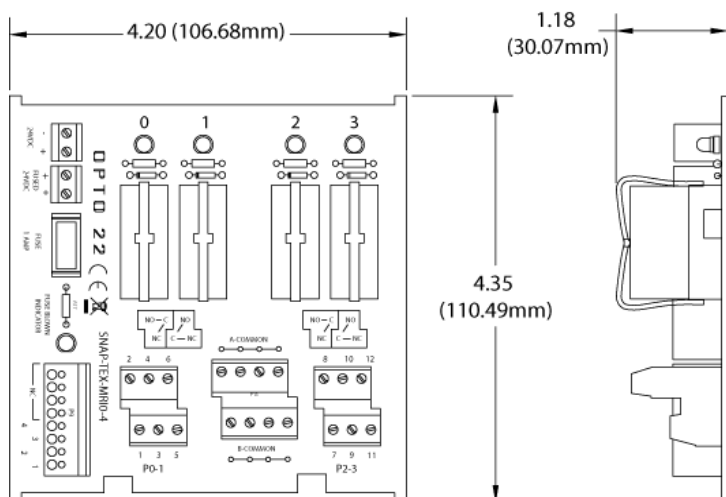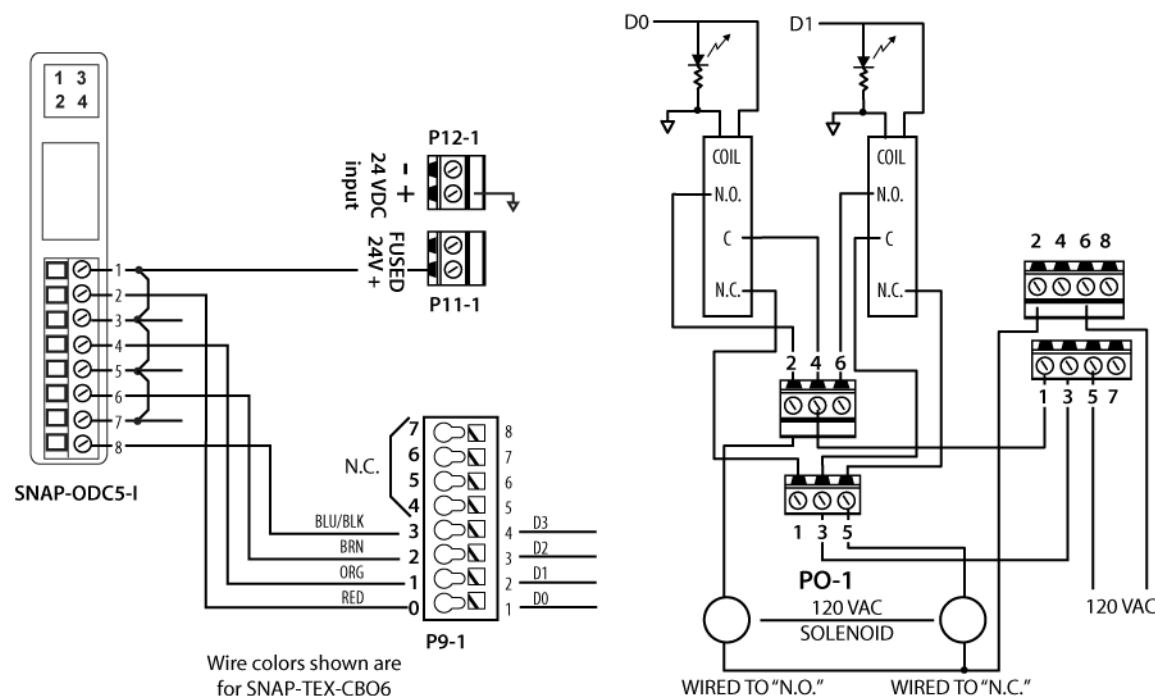
SNAP TEX Cables and Breakout Boards

SNAP-TEX-MR10-4 and SNAP-TEX-MR10-16 Breakout Boards (continued)

Wiring Diagram—SNAP-TEX-MR10-4 or SNAP-TEX-MR10-16 Breakout Board to 4-channel Module

The example below shows wiring from the first two points of a SNAP-ODC5-i output module to a SNAP-TEX-MR10-4 board. Wire colors shown are for a SNAP-TEX-CBO6 cable.

Wiring 4-point modules to a SNAP-TEX-MR10-16 board, which has 16 channels rather than four, is similar. If you are using the SNAP-TEX-MR10-16 board with a 32-channel module, however, see the wiring diagram on .

This board can also be used with other modules and cables; see the compatibility tables starting on .

SNAP-TEX-MR10-4 and SNAP-TEX-MR10-16 Breakout Boards (continued)

Wiring Diagram—SNAP-TEX-MR10-16 Breakout Board to 32-channel Module

The example below shows wiring from a SNAP-ODC-32-SRC output module to a SNAP-TEX-MR10-16 board, using a SNAP-HD-CBF6 cable. You will need two boards for each module and cable.

This board can also be used with other modules and cables; see the compatibility tables starting on .

24VDC – +

Black
Brown
Black
Brown

16 Orange
15 Green
14 Violet
13 White
12 Red
11 Yellow
10 Blue
9 Gray

8 Orange
7 Green
6 Violet
5 White
4 Red
3 Yellow
2 Blue
1 Gray

SNAP-TEX-MR10-16 breakout board

Two breakout boards are required for the 32 points on the module.

SNAP-HD-CBF6 cable going to SNAP-ODC-32-SRC module

Wire the other I/O points to a second breakout board
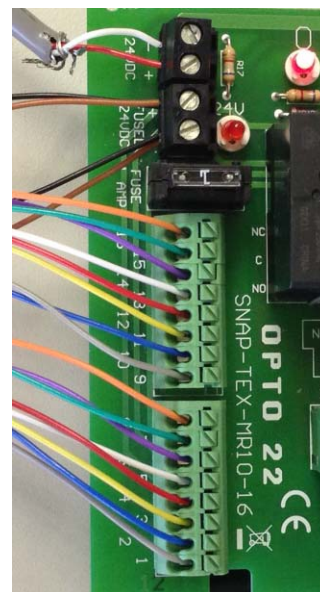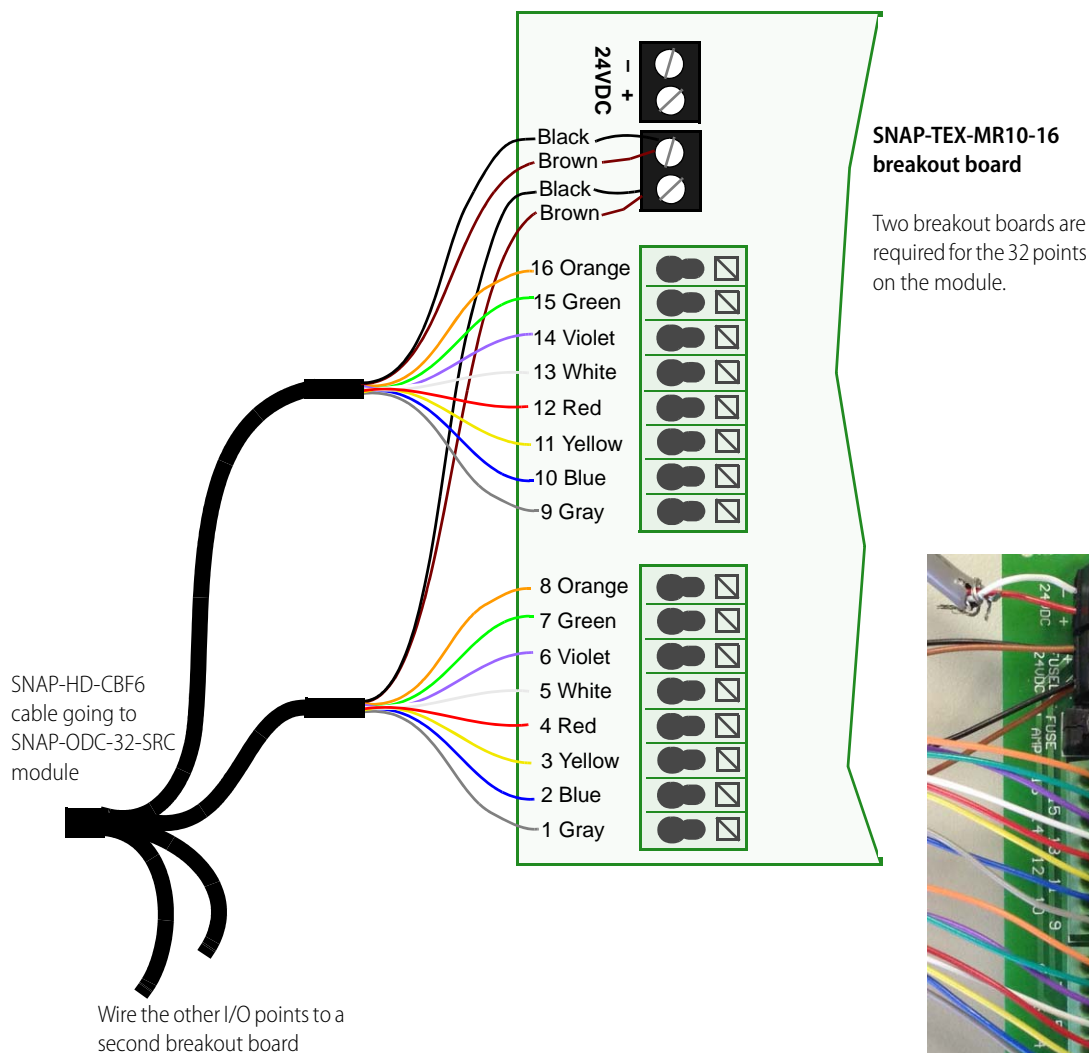
SNAP TEX Cables and Breakout Boards

SNAP-TEX-MR10-16C Breakout Board

SNAP-TEX-MR10-16C

Pin 1 for header connector

Spring connectors for standard, 4-channel ODC modules

Header connector for high-density SNAP-ODC-32-SRC module

Mechanical relays

Field connectors
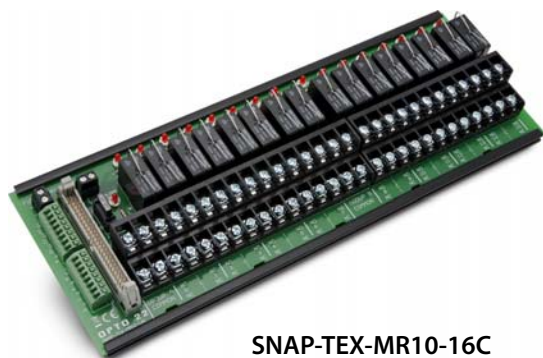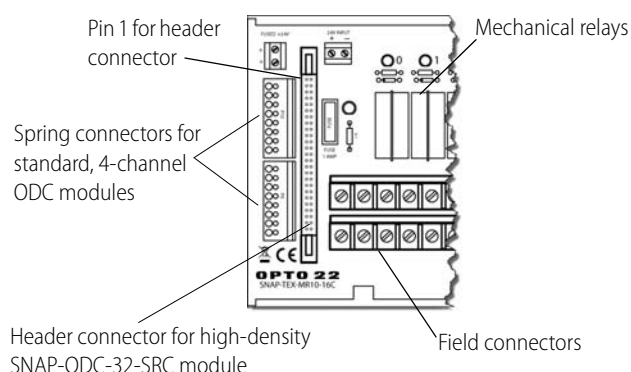
The **SNAP-TEX-MR10-16C** breakout board, designed for high-voltage/high-current switching, features mechanical relays that can switch up to 10 A per channel. (Standard SNAP output modules can switch up to 0.75 A; SNAP-OMR6 output modules can switch up to 6 A.)

This breakout board includes on/off indicators for each channel, and each channel can be wired for normally closed or normally open. The boards require 24 VDC power.

This board allows you to connect digital output modules in two ways:

- Connect 4 standard four-channel ODC modules using the two *spring connectors* and the appropriate cable for the modules. See page 22.
- Connect one SNAP-ODC-32-SRC high-density module to the *header connectors* on two MR10-16C breakout boards. Requires a SNAP-HD-G4F6 cable (see page 10).

Bussed commons in 2-channel groups provide easier wiring of loads. Bussing straps (STRAP2Q and STRAP4Q) can be used for quick common power connections between relay groups. See page 23.

A replacement relay is available, part number SNAP-MR10.

Also see "SNAP-TEX-MR10-4 and SNAP-TEX-MR10-16 Breakout Boards" on page 17.

Specifications

Also see the tables beginning on page 2 for compatible modules and cables.

Feature	SNAP-TEX-MR10-16C
Use with I/O modules	SNAP-ODC5-i, SNAP-ODC5A-i, SNAP-ODC5SRC, SNAP-ODC-32-SRC
Use with cables	• For one high-density SNAP-ODC-32-SRC module, use a SNAP-HD-G4F6 cable to connect two breakout boards to one SNAP-ODC-32-SRC module. • For four standard modules, use SNAP-TEX-CBO6 (odd pins bussed), SNAP-TEX-CBS6 (no bussing), or SNAP-HD-CBF6, depending on module.
Use with jumper straps	STRAP2Q, STRAP4Q
Relay contacts	SPDT (1 Form C) Typical life expectancy (Electrical): 1×10^{5}
Switching capacity	10 A @ 250 VAC
Switch On time	7 ms nominal
Switch Off time	3 ms nominal
Fusing	24 V fuse for board. Opto 22 p/n SNAP-FUSE1AC
Indicators	16 On/Off status indicators (one for each channel) 1 fuse-blown indicator
Power requirements (all positions On)	24 VDC @ 300 mA
Agency Approvals	CE, RoHS, DFARS
Warranty	30 months from date of manufacture

SNAP-TEX-MR10-16C Breakout Board (continued)

Dimensional Drawing—SNAP-TEX-MR10-16C Breakout Board
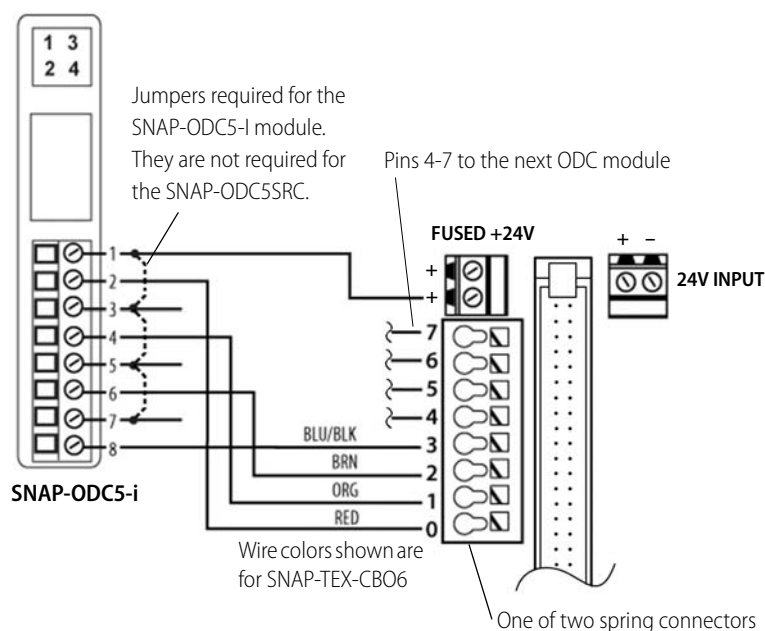
Dimensions are shown in inches (with centimeters in parentheses).
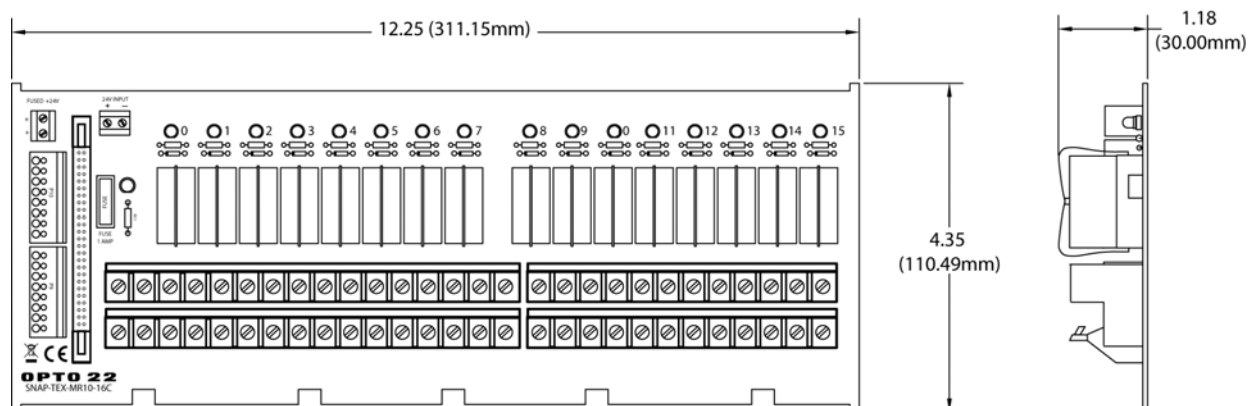
Wiring Diagram—Connecting Four-Channel ODC Modules to SNAP-TEX-MR10-16C

The example below shows wiring a SNAP-ODC5-i output module to a SNAP-TEX-MR10-16C board. Two four-channel ODC modules can be wired to each of the two spring connectors. Wire colors shown are for a SNAP-TEX-CBO6 cable.

SNAP TEX Cables and Breakout Boards

SNAP-TEX-MR10-16C Breakout Board (continued)

Wiring Diagram—SNAP-TEX-MR10-16C Relay Group

The diagram below shows relays 0 and 1 in a relay group.

NO | NO
0 C 1
NC | NC
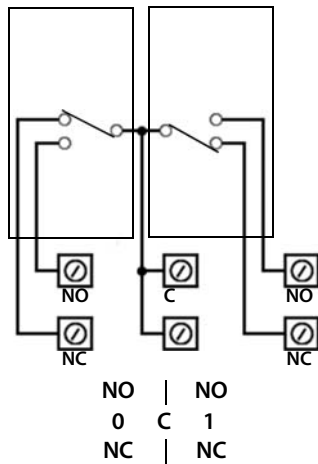
Terminals 0 and 1

Jumper Straps—SNAP-TEX-MR10-16C Breakout Board

This diagram shows an example using jumper straps, Opto 22 part numbers STRAP2Q and STRAP4Q.
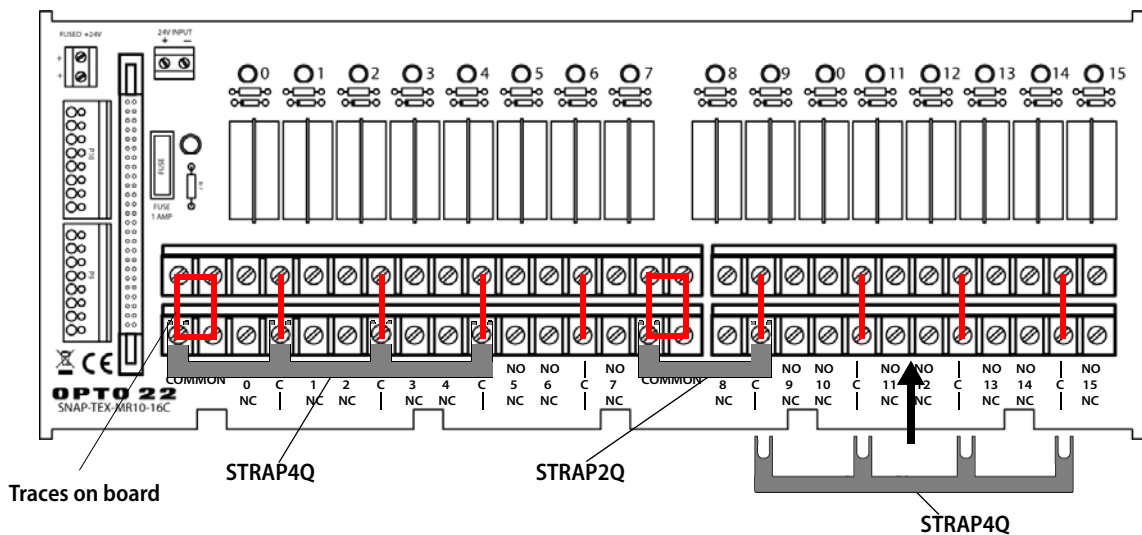
Traces on board

STRAP4Q

STRAP2Q

STRAP4Q

SNAP-IDC-HDB and SNAP-ODC-HDB Breakout Boards

SNAP-IDC-HDB, SNAP-IDC-HDB-FM, SNAP-ODC-HDB, and SNAP-ODC-HDB-FM breakout boards provide LED indicators and easily accessible fused connectors for points on 32-channel digital input or output modules.

See Opto 22 form 1547, the *High-Density Module User's Guide*, for SNAP-IDC-HDB and SNAP-ODC-HDB breakout rack wiring and jumper settings.

Specifications

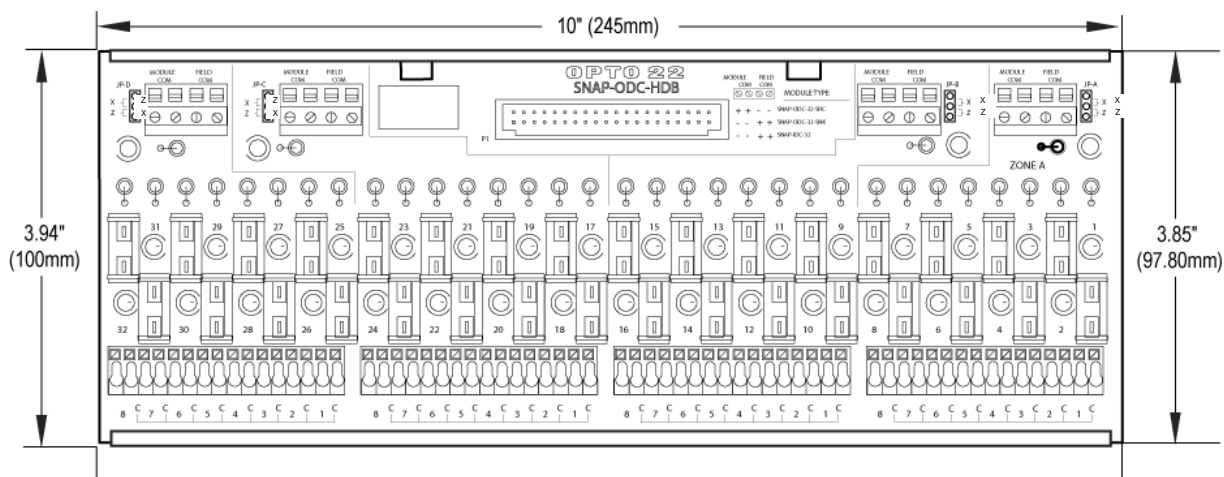| SNAP-IDC-HDB and SNAP-IDC-HDB-FM Breakout Racks for High-Density Digital Input Modules	
Used with	SNAP-IDC-32, SNAP-IDC-32-FM, SNAP-IDC-32N, and SNAP-IDC-32DN
Connectors	40-pin header connects to 32-channel input module using SNAP-HD-BF6 header cable. 32 signal input connectors; each signal connector has a corresponding common connector. For each zone of 8 signal inputs, 1 connection for either module common or field common.
Indicators	1 LED for each signal input (32 signal LEDs total) 1 power status LED for each zone of 8 signal inputs (4 power LEDs total)
Fusing	1 A fuses; 2 fuses for each zone of 8 signal inputs (8 fuses total) Replace with Pudenz 1 A automobile mini-fuse or equivalent.
Jumpers	For each zone of 8 signal inputs, 1 jumper controls whether module common or field common is used.
Voltage	32 VDC maximum, 12-24 VDC nominal
Agency Approvals	SNAP-IDC-HDB: UL, CE, RoHS, DFARS SNAP-IDC-HDB-FM: FM, CE, RoHS, DFARS
Warranty	30 months from date of manufacture
SNAP-ODC-HDB and SNAP-ODC-HDB-FM Breakout Racks for High-Density Digital Output Modules	
Used with	SNAP-ODC-32-SRC, SNAP-ODC-32-SRC-FM, SNAP-ODC-32-SNK, and SNAP-ODC-32-SNK-FM
Connectors	40-pin header; connects to 32-channel sourcing or sinking module using SNAP-HD-BF6 header cable. 32 signal output connectors; each signal connector has a corresponding common connector. For each zone of 8 signal outputs, 1 connection for either module common or field common.
Indicators	1 LED for each signal output (32 signal LEDs total) 1 power status LED for each zone of 8 signal outputs (4 power LEDs total)
Fusing	1 A fuses; 1 fuse for each signal output (32 signal fuses total) Replace with Pudenz 1 A automobile mini-fuse or equivalent.
Jumpers	For each zone of 8 signal inputs, 1 jumper controls whether module common or field common is used.
Voltage	32 VDC maximum, 12-24 VDC nominal
Agency Approvals	SNAP-ODC-HDB: UL, CE, RoHS, DFARS SNAP-ODC-HDB-FM: FM, CE, RoHS, DFARS
Warranty	30 months from date of manufacture

SNAP TEX Cables and Breakout Boards

SNAP-IDC-HDB and SNAP-ODC-HDB Breakout Boards (continued)
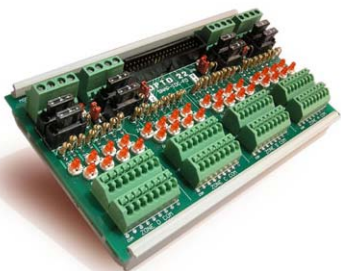
Dimensional Drawings

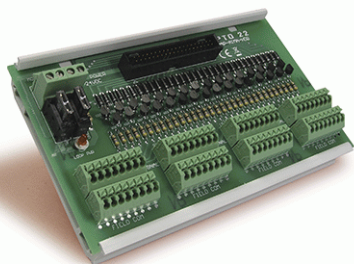**SNAP-IDC-HDB and SNAP-IDC-HDB-FM breakout racks**

SNAP-ODC-HDB and SNAP-ODC-HDB-FM breakout racks

For wiring diagrams and jumper settings, see Opto 22 form 1547, the *SNAP High-Density Digital Module User's Guide.*

PAGE

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SNAP-AIMA-HDB and SNAP-AIV-HDB Breakout Boards

SNAP-AIMA-HDB breakout board

SNAP-AIMA-HDB, SNAP-AIMA-HDB-FM, SNAP-AIV-HDB, and **SNAP-AIV-HDB-FM** breakout boards are primarily designed for use with SNAP-AIMA-32, SNAP-AIMA-32-FM, SNAP-AIV-32, and SNAP-AIV-32-FM analog input modules, respectively. Each of these modules provides 32 input points. The breakout boards provide easy accessibility for wiring points to field devices. Use the SNAP-HD-BF6 cable for wiring connections between the module and the breakout board.

Note for the SNAP-AIMA-32 or SNAP-AIMA-32-FM: if you are using one of these modules with loop power (2-wire) devices, connect to the SNAP-AIMA-HDB or SNAP-AIMA-HDB-FM rack as shown on . If you are using the SNAP-AIMA-32 (or -FM) with self-powered devices (4-wire), do not use the SNAP-AIMA-HDB (or -FM) boards, which have a current limiter. Instead, wire to the SNAP-AIV-HDB or SNAP-AIV-HDB-FM as shown on (negative common or (positive common).

CAUTION: We strongly recommend that you use a breakout board with the SNAP-AIMA-32 (or -FM) module. Without the board , miswiring of any point on the module can cause severe out-of-warranty damage. The breakout board protects the module from many wiring errors.

Working with Module Values

AIMA modules used with a SNAP-AIV-HDB board read normally. However, values on AIMA modules used with a SNAP-AIMA-HDB board are read as *negative values*. For example, a value of 10 mA on the module will be read as -10 mA. (Note: If no readings appear, try reversing field connections on the board.)

Because these readings are negative values, they can be confusing to work with. This section shows you how to easily change them to positive values or scale them to the positive

readings you need. This section applies only with the SNAP-AIMA-HDB board.

Changing Negative to Positive Values

(SNAP-AIMA-HDB board only) To read positive values, when you configure points on the module, choose the scalable option and enter the corresponding positive values, like this:

This may seem odd, but it works. Don't be confused by the "Lower" and "Upper" labels for the values. Positive values sent to the module will be shown as the correct positive values within your PAC Control strategy.

Scaling Values

Similarly, if you need to scale values for your application, enter the positive values you need. The module's range is 4 to 20 mA. If you want 4 to represent 0 mA and 20 to represent 130 mA, for example, enter those values as shown below:
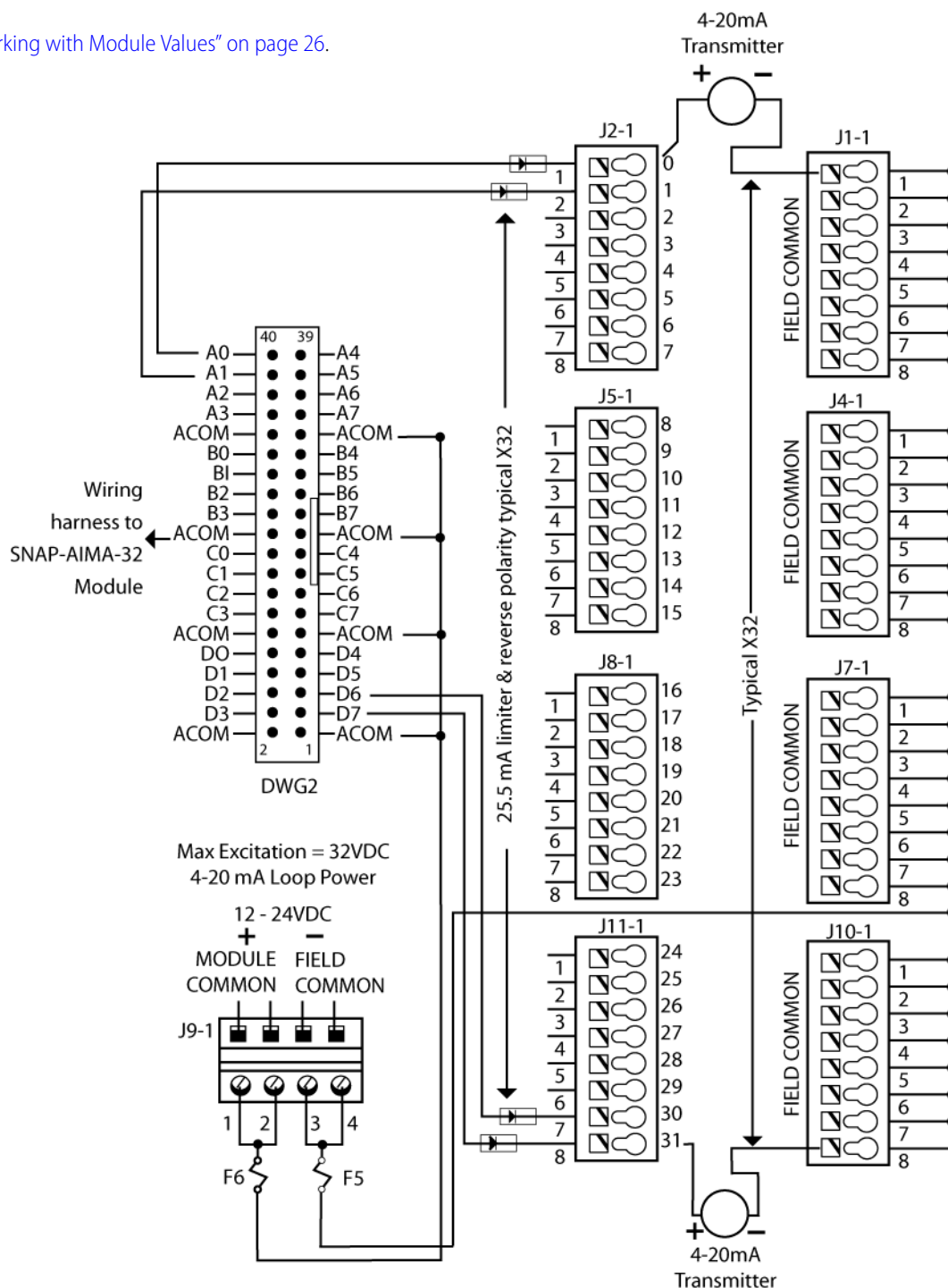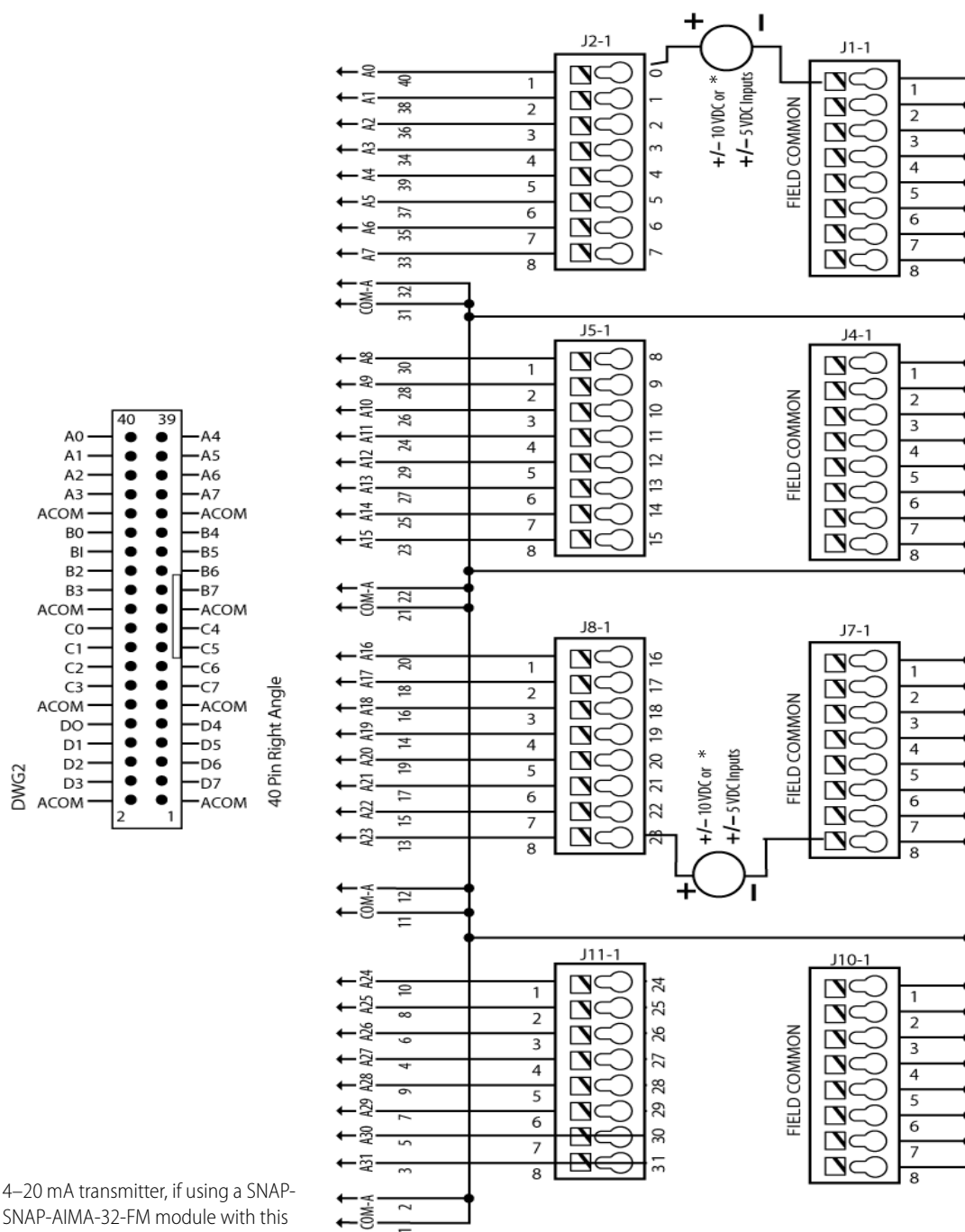
SNAP TEX Cables and Breakout Boards

SNAP-AIMA-HDB Breakout Boards

Wiring diagram: SNAP-AIMA-HDB or SNAP-AIMA-HDB-FM board to SNAP-AIMA-32 or SNAP-AIMA-32-FM module

This diagram cannot be used with self-sourcing transmitters. Use this diagram only with loop power (2-wire) negative common devices . For self-powered (4-wire) devices, use a SNAP-AIV-HDB board and wiring diagram on (negative common devices) or (positive common devices).

See .

SNAP-AIV-HDB Breakout Boards

Wiring diagram: SNAP-AIV-HDB or SNAP-AIV-HDB-FM board to SNAP-AIV-32 or SNAP-AIV-32-FM module

NOTE: Also use this diagram to wire the SNAP-AIV-HDB breakout rack to a **SNAP-AIMA-32** or SNAP-AIMA-32-FM module, when the module connects to self-powered (4-wire) devices that share a negative common connection. (For positive common devices, use the diagram on .) See the module's data sheet for more information.
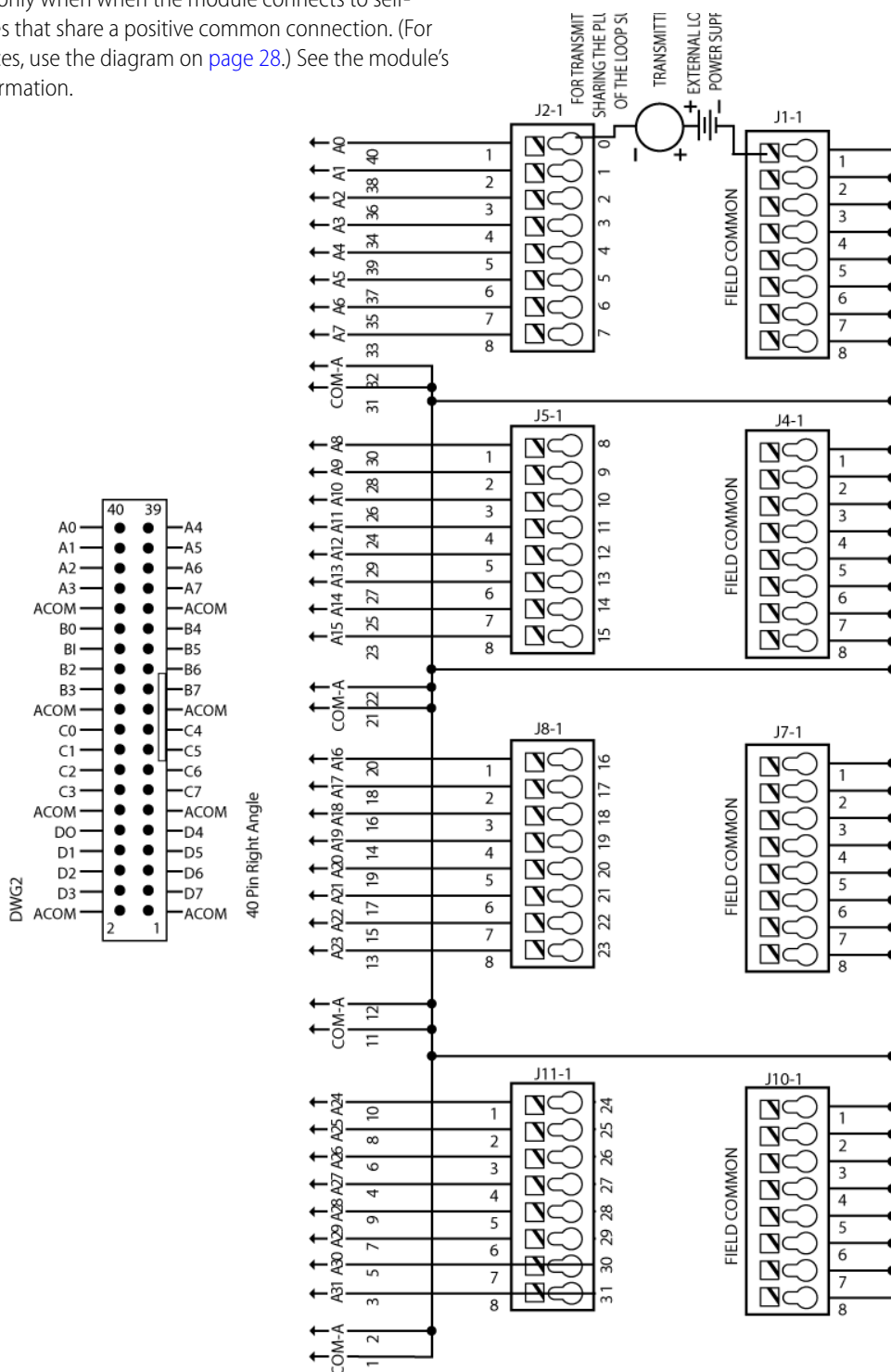

* Or 4-wire, 4–20 mA transmitter, if using a SNAP-AIMA-32 or SNAP-AIMA-32-FM module with this rack

SNAP TEX Cables and Breakout Boards

SNAP-AIV-HDB Breakout Boards (continued)

### Wiring diagram: SNAP-AIV-HDB or SNAP-AIV-HDB-FM board to SNAP-AIMA-32 or SNAP-AIMA-32-FM module

NOTE: Use this diagram only when when the module connects to self-powered (4-wire) devices that share a positive common connection. (For negative common devices, use the diagram on .) See the module's data sheet for more information.

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SNAP-AIMA-HDB and SNAP-AIV-HDB Breakout Boards (continued)

Dimensional Drawing—SNAP-AIMA-HDB and SNAP-AIMA-HDB-FM Breakout Boards
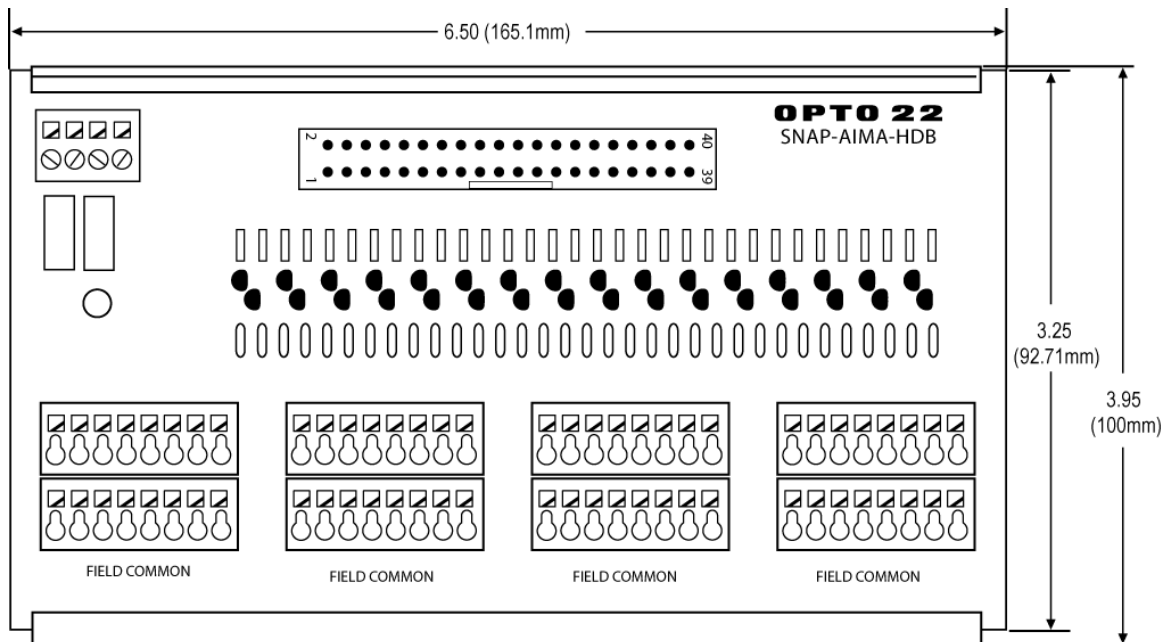
Dimensional Drawing—SNAP-AIV-HDB and SNAP-AIV-HDB-FM Breakout Boards
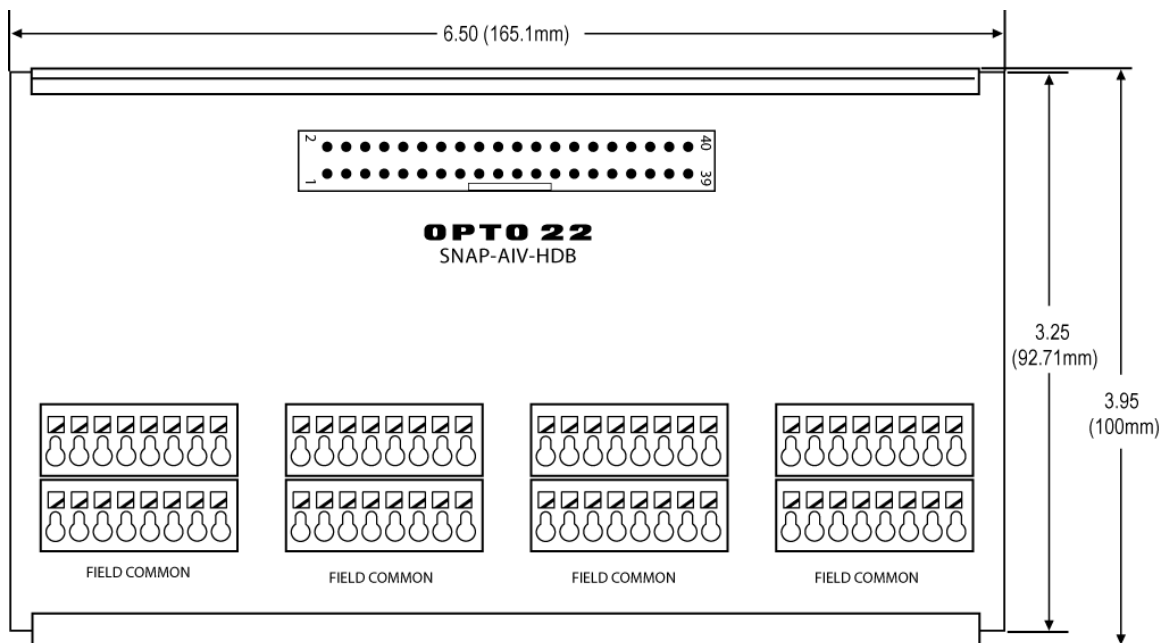
More About Opto 22

Products

Opto 22 develops and manufactures reliable, flexible, easy-to-use hardware and software products for industrial automation, energy management, remote monitoring, and data acquisition applications.

groov

groov puts your system on your mobile device. With zero programming, you can build mobile operator interfaces to monitor and control systems from Allen-Bradley, Siemens, Schneider Electric, Modicon, and many more. Web-based *groov* puts mobile-ready gadgets at your fingertips. Tag them from your existing tag database, and they automatically scale for use on any device with a modern web browser. See groov.com for more information and your free trial.

SNAP PAC System

Designed to simplify the typically complex process of selecting and applying an automation system, the SNAP PAC System consists of four integrated components:

- SNAP PAC controllers
- PAC Project™ Software Suite
- SNAP PAC brains
- SNAP I/O™

SNAP PAC Controllers

Programmable automation controllers (PACs) are multifunctional, modular controllers based on open standards.

Opto 22 has been manufacturing PACs for over two decades. The standalone SNAP PAC S-series, the rack-mounted SNAP PAC R-series, and the software-based SoftPAC™ all handle a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

SNAP PACs are based on open Ethernet and Internet Protocol (IP) standards, so you can build or extend a system easily, without the expense and limitations of proprietary networks and protocols. Wired+Wireless™ models are also available.

PAC Project Software Suite

Opto 22's PAC Project Software Suite provides full-featured, cost-effective control programming, HMI (human machine interface) development and runtime, OPC server, and database connectivity software for your SNAP PAC System.

Control programming includes both easy-to-learn flowcharts and optional scripting. Commands are in plain English; variables and I/O point names are fully descriptive.

PAC Project Basic offers control and HMI tools and is free for download on our website, www.opto22.com. PAC Project

Professional, available for separate purchase, adds one SoftPAC, OptoOPCServer, OptoDataLink, options for controller redundancy or segmented networking, and support for legacy Opto 22 serial *mistic*™ I/O units.

SNAP PAC Brains

While SNAP PAC controllers provide central control and data distribution, SNAP PAC brains provide distributed intelligence for I/O processing and communications. Brains offer analog, digital, and serial functions, including thermocouple linearization; PID loop control; and optional high-speed digital counting (up to 20 kHz), quadrature counting, TPO, and pulse generation and measurement.

SNAP I/O

I/O provides the local connection to sensors and equipment. Opto 22 SNAP I/O offers 1 to 32 points of reliable I/O per module, depending on the type of module and your needs. Analog, digital, and serial modules are all mixed on the same mounting rack and controlled by the same processor (SNAP PAC brain or rack-mounted controller).

Quality

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California. Because we test each product twice before it leaves our factory, rather than only testing a sample of each batch, we can guarantee most solid-state relays and optically isolated I/O modules for life.

Free Product Support

Opto 22's California-based Product Support Group offers free, comprehensive technical support for Opto 22 products. Our staff of support engineers represents decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Additional support is always available on our website: how-to videos, OptoKnowledgeBase, self-training guide, troubleshooting and user's guides, and OptoForums.

In addition, hands-on training is available for free at our Temecula, California headquarters, and you can register online.

Purchasing Opto 22 Products

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at 800-321-6786 or 951-695-3000, or visit our website at www.opto22.com.