PRODUCT GUIDE

FT Flexitest™ Family

FT-1, FT-1F, FT-1X, FT-14, FT-14D, FT-19R, FT-19RX, FT-19RS, FT-22RS, test plugs, and accessories

With more than 50 years of experience, ABB is the test switch manufacturer with the largest installed base in North America. ABB introduced the FT switch and continues to be the leader in innovation. ABB now incorporates the FT-14 Digital Flexitest™ test switch, and FT cover shields to make testing safer, faster, and easier. In addition, now we offer a reverse current shorting pole option for special applications.

Table of contents

Table of contents

FT Flexitest™ family
Features and application

With more than 50 years of experience, ABB is the test switch manufacturer with the largest installed base in North America. ABB's Flexitest test switch's perfected design offers the highest quality, leaving nothing to chance. ABB Flexitest is the original FT - there is no equivalent.

1.1 Features

- Clear covers that allow for easier visual check on switch status
- Colored switch handles to simply identify circuits
- Rear extended switches for easier, faster access to wiring points
- 14-pole and 19" wide rack mounted test switches (FT-14 and FT-19R) to save space and installation time
- Patented 3-D white numbering on the rear of the test switch which allows for easier identification of poles
- Comprehensive family of test plugs including SafePlug™ – individual current test plug with open CT protection
- Online configurator to create and easily order your own, customized switch - spine.abb.com/ftswitch
- FT-1 and FT-14 meet Ingress Protection IP41 for protection against dripping water from the front with shallow clear and black covers installed. FT-1 and FT-14 meet Ingress Protection IP2X for finger safety at the product rear
- FT-1 and FT-14 are RoHS compliant

1.2 Application

ABB Flexitest™ switches, types FT-1 (10 pole, rear connected), FT-1F (10 pole, front connected), FT-1X (10 pole, extended terminals, rear connected), FT-14 (14 pole, rear connected), and associated Test Plugs, provide a safe, simple, fast and reliable method to isolate, test, and service installed equipment without disturbing the power system.

FT-14D is a new test switch solution for digital switchgear using current and voltage sensors. The FT-14D switch ties to cutting-edge digital strategies by allowing customers to integrate current and voltage sensors within digital switchgear and Relion® protective relays.

FT-19R, FT-19RX, FT-19RS, and FT-22RS Flexitest switch assemblies for rack and switchboard mounting also permit convenient isolation of switchboard relays, meters, and instruments allowing quick and easy multi-circuit testing by any conventional test method. These assemblies utilize FT-1 and/or FT-14 switches, depending on customer requirements.

The most complete family of test switches

2.1. FT-1 Standard 10 pole, rear connected test switch.

2.2. FT-1F Surface mount switch allows the user to make the same connections as with FT-1 but on the front of the switch.

2.3. FT-1X Extended length test switch brings the rear terminal connections to the same depth as most panel mounted protective relays and equipment for easier and faster access to wiring points. Length extension of 8 inches or 10 inches depth is available.

2.4. FT-14 Provides the same features and reliability as FT-1 but with a maximum of 14 individual poles. Although supplying 40 percent more capacity than the FT-1, the FT-14 only requires 18 percent more space.

2.5. FT-19R and FT-19RX assemblies accommodate up to three FT-1 switches mounted on a 19” wide, and two-rack unit (2RU), three-rack unit (3RU), or four-rack unit (4RU) high panel suitable for rack or switchboard mounting. These assemblies can be ordered with a full-length clear cover (standard), or optional full-length black, individual black or clear covers.

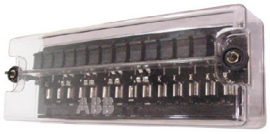
FT-19RX extends the rear terminals of the FT-1 switches to the same depth as most 19” rack mounted equipment thereby providing improved access to the rear terminals. FT-19RX two-rack unit assemblies (2RU) allow the user to mount protective relays or other equipment in the racks directly above and below the FT-19RX, optimizing the space in the rack and reducing the amount of wire required.

FT-1

FT-1F

FT-1X

FT-14



FT-19R 2RU with full length clear cover

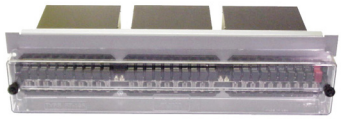
FT Flex
fam

xitest™ nily

—
FT-19 3RU lockable version

—
FT-19R 3RU with special customer labels

—
FT-19RX 3RU with full length clear cover



—
FT-19RS

—
FT-22RS

2.6 FT-19RS assemblies consist of up to two FT-1 switches, two FT-14 switches, or the combination of one FT-1 and one FT-14 switch mounted on a 19” wide, and two-rack unit (2RU), three-rack unit (3RU), or four-rack unit (4RU) high panel suitable for rack or switchboard mounting. Any combination of FT-1 or FT-14 switches styles may be selected with individual black or clear covers. Non-ABB equipment is not included with the assembly (see FT-19RS picture).

2.7 FT-22RS assemblies consists of up to three FT-1 or two FT-14 switches mounted on a 22” wide, two-rack unit (2RU), three-rack unit (3RU), or four-rack unit (4RU) high mounting panel suitable for rack or switchboard mounting. Any combination of FT-1 or FT-14 switches styles may be selected with individual black or clear covers.

Mounting panels for these assemblies can be of steel or aluminum. Steel panels are commonly available in ANSI 61 gray, ANSI 70 gray, and RAL7035 gray, beige, light sandalwood, thunder blue, black, and white; although panel color or finish, as well as panel height, can be customized to meet the user’s necessities. The three rack unit (3RU) assembly also allows switches to be positioned off-center, in either low or high upper mounting positions in the rack panel, allowing room for special label requirements.

FT-14D Digital Test Switch

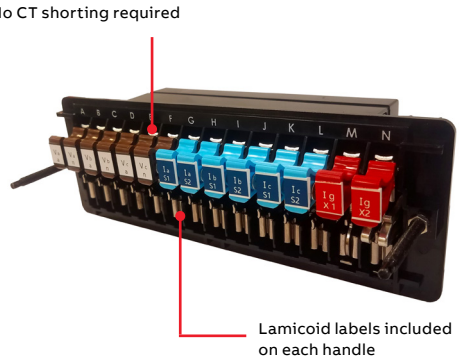
Revolutionary technology to make testing safer, faster, and easier

Figure a. Front view FT-14D based upon the FT-14 interface

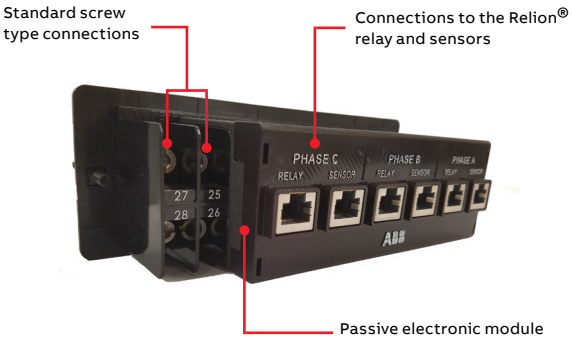
Figure b. Rear view FT-14D adds electronic module on the back with RJ45 connectors

Figure c. FT-14D test harness and FT-14D separate source test plug

a.



b.



c.

2.8 FT-14D is used for testing, commissioning, and metering of relays, and current and voltage sensors used in digital switchgear.

FT-14D incorporates a passive electronic module on the rear with RJ45 connection to the Relion® relays with low-energy voltage and current sensor inputs. The FT-14D maintains the same front interface as the standard FT-14 Flexitest™ switch. The FT-14D meets ANSI/ IEEE Standard C37.90, UL and is ESD proven. See page 23 for style number information.

Testing

For testing purposes, use the FT-14D in conjunction with two accessories: the FT-14 separate source test plug and the FT-14D test harness (figure C).

First, connect the FT-14D test harness RJ45 connectors to an interface adapter that is plugged into the protection relay test equipment. Then, insert the banana plugs into the FT-14 separate source test plug. Last, insert the FT-14 separate source test plug into the FT-14D by placing the switch blades in open position. This procedure disconnects the low-energy current and voltage sensors from the relay, and allows testing to be performed with the relay test equipment.

Caution

All relays and test equipment must be properly grounded.

Warning

Connections to all equipment should be made using standard and safe connection practices. Due to the low-energy sensing during system operation, it is important not to touch the open or closed FT-14D switchjaw terminals since relay misoperation can occur. Therefore, during testing and maintenance, it is also recommended the relay trip circuit be disconnected first as a precaution.

3. Advantages

3. Advantages
Flexitest switches provide a safe, reliable, and cost-effective means to wire the output, input, and power relays, meters, and other associated equipment to external devices for in-service testing.

3.1 Safe and convenient
All measurements and tests can be performed at the front of the switchboard, without taking any devices out of service, and without the need to access wiring at the rear of the devices.

Flexitest switches and test plugs have all the features necessary for applications involving the safe measurement and isolation of individual currents, voltages, and digital I/O signals to facilitate testing of substation instrumentation and protection devices.

The make-before-break current shorting feature allows test personnel to quickly and safely isolate equipment from current transformer (CT) circuits.

Voltage measurements can also be made directly on Flexitest switches, without disturbing existing connections. There is a test clip located on the top of each pole that allows connection with standard spring clip test leads.

3.2 Fast and reliable
When test plugs are used, any number of circuits may be tested in rapid succession. One plug properly connected can test all instruments or meters of a particular type.

3.3 Maximum flexibility
Test switches can be assembled in a variety of different arrangements and colors, to match customer requirements. To build new or view existing Flexitest switches and FT-19R panels, please visit our interactive FT-1 Configurator website at **spine.abb.com/ftswitch** (see page 20).

3.4 Security
With the cover in place, a meter seal can be placed through either of the cover studs of any Flexitest switch to prevent unauthorized access to the switch. As an additional feature, a clear cover is available that can also be installed with the switchblades in the fully open or closed positions. In addition, a barrier has been incorporated into the cover to prevent knife switches from being left partially open. Optional padlocking provisions are available for most covers allowing access to authorized personnel only.

3.5 Quality
With over 50 years of field proven applications, ABB is the test switch manufacturer with the highest quality and largest installed base in North America. ABB's Flexitest test switches have been an industry standard for years.

3.6 Technical and application engineering support
Available 24/7 at +1 800 222 1946 or
+1 954 752 6700, option 1.

4. Specifications

4.1 Certifications

All Flexitest switches meet or exceed all requirements of ANSI/IEEE Standard C37.90. Class 1E switches meet IEEE C37.98, C37.105, 323-1983 and 344-1987 Standards.

UL and CUL file number E103204, and Class 1E certification are available for most test switches. Contact your ABB representative for more details.

FT-1 and FT-14 meet Ingress Protection IP41 for the front of the product with shallow clear and black covers installed. FT-1 and FT-14 meet Ingress Protection IP2X for the rear.

FT-1 and FT-14 are RoHS compliant.

4.2 Ratings

All Flexitest switches are rated at 600 Volts AC or DC and 30 Amps.

4.3 Mounting

The FT-1, FT-14, and FT-1X switches are designed for semi-flush mounting on the front of switchboard panels, facilitating inspection and accessibility. The FT-1F is designed for surface mounting and can also be mounted on a unistrut with the use of a unistrut adapter plate. Refer to figures 08 to 11 on page 41-44 for the specific outline and drilling plan information of each switch.

The FT-19R, FT-19RX, and FT-19RS are designed for mounting on 19-inch rack structures or conventional panels. The FT-22RS are designed for mounting on 22-inch rack structures. Outline, drilling plan, and switch dimensions are shown on page 45-51.

Approximate shipping weight and dimensions

Device	Net lbs (kg)	Shipping lbs (kg)	Shipping container L x W x H in (mm)
FT-1 and FT-1F	1.75 (0.79)	3 (1.4)	4 (100) x 7 (177) x 5 (126)
FT-1X	2.7 (1.25)	3.75 (1.7)	4 (100) x 12 (300) x 7 (177)
FT-14	2.5 (1.5)	3.25 (1.5)	4 (100) x 9 (225) x 5 (126)
FT-14D	2.4 (1.09)	2.7 (1.23)	4 (100) x 9 (225) x 6 (153)
FT-19R	7.0 (3.18)	12 (6)	10 (254) x 21 (534) x 10 (254)
FT-19RX	9.0 (4.08)	17 (8)	10 (254) x 21 (534) x 16 (407)
FT-19RS	7.0 (3.18)	12 (6)	10 (254) x 21 (534) x 10 (254)
FT-22RS	7.0 (3.18)	12 (6)	10 (254) x 24 (610) x 10 (254)
Separate source test plug (10 position)	1.5 (0.68)	3 (1.4)	10 (253) x 7 (177) x 5 (126)
In-service series test plug (10 position)	1.5 (0.68)	3 (1.4)	10 (253) x 7 (177) x 5 (126) For up to 4 pieces
Individual current circuit test plug	0.1 (0.045)	1 (0.45)	10 (253) x 7 (177) x 5 (126) For up to 30 pieces

—
Figure 01. FT switch terminal numbering, rear view.

Figure 01a. FT switch terminal lettering, front view

—
01

—
01.a

4.4 Construction
The base of all Flexitest switches is made of a high grade molded thermoplastic which provides a tough, insulated enclosure. Barriers are molded into the base (front and rear) to separate the switch units from one another. The barriers provide insulation between poles, and also ample wiring space between terminals. The terminals of the FT-1X are extended either 8 or 10 inches beyond the switch blades located on the front of the switch. The front of the switch is marked with a white raised 3-D lettering, which allows easier identification of poles. The back of the terminals is marked with a white raised 3-D numbering, which allows easier identification of poles and helps prevent inadvertent upside down installation.

4.5 Cover
All Flexitest switch covers provide a tough insulated enclosure for the switch and are made from a durable thermoplastic material. Covers are fastened to the switches with thumbnuts on each end that can be loosened and tightened by hand, or with a 1/4” nut driver. This is the same size nut driver used on the hex head terminal screws of all Flexitest switches. All covers have the provision to accept meter seals.

All switches may be purchased with a black opaque cover or a deep clear cover. The deep clear cover offers the user the unique option of intentionally leaving switch handles in the open position with the cover in place, maintaining the provision for a meter seal. This allows the user to service electrical equipment while still complying with OSHA tag and lockout procedures.

Lockable covers (in black or clear) are also available upon request.

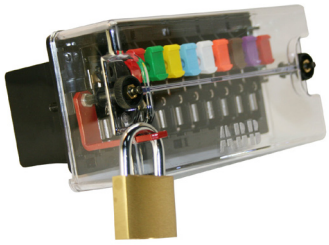
Any cover can be ordered separately to retrofit any existing switch, maintaining the same ease of use and accessibility. See ordering information on page 34.

—
Ft test switch cover selection samples
a. Shadow black
b. Deep clear
c. Lockable

—
a.

—
b.

—
c.



4.6 Poles

FT-1, FT-1F, and FT-1X switches are available in combinations of 1 to a maximum of 10 individual poles or switch units. FT-14 switches are available in combinations of 1 to a maximum of 14 poles or switch units. Each pole is identified by a letter (A to J or A to N) visible along the top of the base from left to right (front view).

Individual pole designations are used to identify each pole according to its type or function. In order to develop a complete switch arrangement, pole designations should be listed sequentially from left to right to account for every pole position on the switch. Unused poles are identified by the letter X.

Each individual pole is of a knife blade type. There are two different types of poles, potential and current.

For quick, easy, user friendly configuration of flexitest switches, please visit **spine.abb.com/ftswitch**.

4.6.1 Potential poles

Potential poles (P) are configured as single, non-shorting knife blades for use in potential, trip, or control circuits. P designates a potential, trip, or control circuit with a black handle. Potential poles with other color handles are available by replacing the “P” with the appropriate designation per chart on page 15.

Each potential pole can also be described with two characters (P1 to P9). P indicates potential and the second character is a numeric color code for the switch handle.

4.6.2 Current poles

Current poles are typically configured in sets of two (C-C), for use with current circuits, and consist of a current test jack, a shorting spring, a shorting blade, and a non-shorting blade (see Figure 2). The positions of the short circuit springs are always visible from the front of the switch.

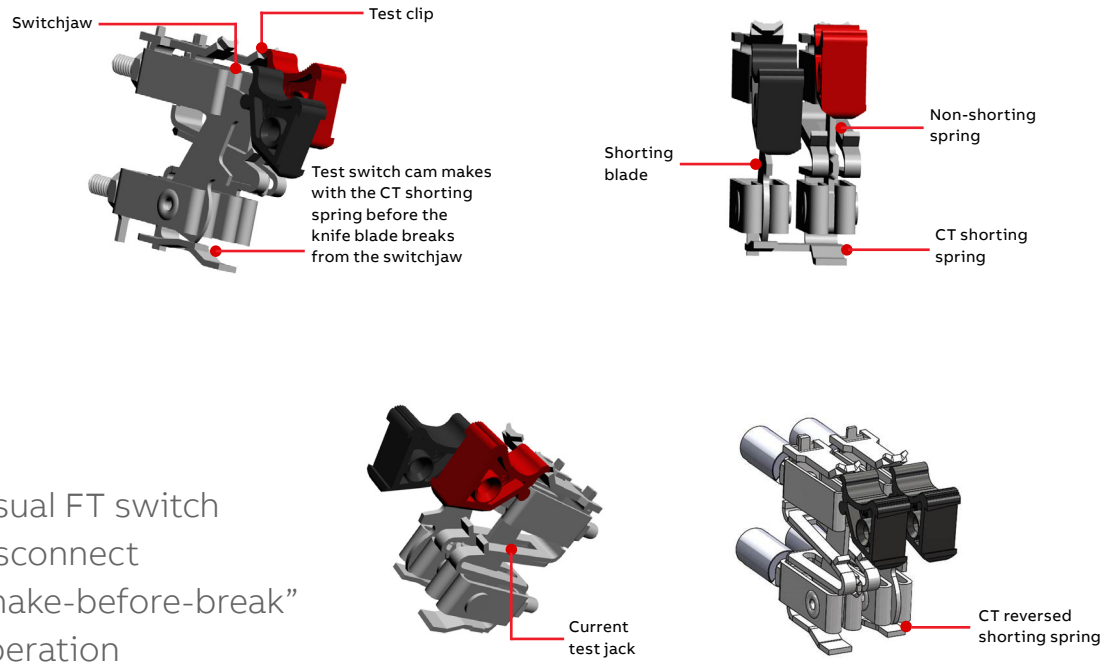
C designates a single current circuit, non-shorting pole, with a current test jack and a black handle. Current poles with other color handles are available by replacing the “C” with the appropriate designation per chart on page 15.

Each current pole can also be described with two characters (C1 to C9). C indicates current and the second character is a numeric color code for the switch handle.

Current poles typically span more than one pole position. Pole designations C-C, C-C-C, C-C-C-C and C-C-C-C-C indicate current shorting poles (make-before-break) with black handles. Note that any color handle may be selected for any pole position by using the appropriate pole designation, ex: 5-R or C-9-7 (alternately C5-C2 or C1-C9-C7).

—
Figure 02. Blade assembly of 2 position current poles

—
02



Visual FT switch disconnect “make-before-break” operation

Visit **spine.abb.com/ftswitch** to build any complete FT switch arrangement, select options, view schematic details and get style number information.

Pole type	Potential pole designation		Handle color	Description & schematic symbols	
Potential	P	P1	Black	Potential, non-shorting blade	
	T	P2	Red		
	H	P3	Brown		
	V	P4	Purple		
	G	P5	Green		
	Y	P6	Yellow		
	Z	P7	Blue		
	W	P8	White		
	O	P9	Orange		
	L	L1	Black ††	Potential, shorting blade	
Current	C	C1	Black	Current, non-shorting, with test jack and blade	
	R	C2	Red		
	3	C3	Brown		
	4	C4	Purple		
	5	C5	Green		
	6	C6	Yellow		
	7	C7	Blue		
	8	C8	White		
	9	C9	Orange		
	D	D0	N/A	Current test jack, no switch blade	
Current shorting†	C-C	C1-C1	Black ††	Current shorting (make-before-break), with test jack and blade	
	C+C	C1+C1		Reversed current shorting (make-before-break), with test jack and blade in reverse configuration	
	C-A	C1-A1		Current shorting (make-before-break), with standard blade, no current test jack	
	C-B	C1-B1		Current shorting (make-before-break), with stud only, no current jack, no switch blade	
	C-D	C1-D1		Current shorting (make-before-break), with current test jack, no switch blade	
	C-E	C1-E1		Current shorting (make-before-break), with shorting blade, no current test jack	
	C-S	C1-S1		Current shorting (make-before-break), with fixed shorting strap	
Miscella-neous	S	S0	None	Fixed shorting strap	
	J	J0	None	Current jaw, no blade	
	N	N0	None	Terminal stud in blade location, no jaw	
	U	U0	None	Stud and test clip in jaw location, no blade	
	X	X0	None	Empty pole position	

Schematic legend

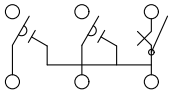
Non-shorting blade

Shorting blade

Current test jack

Shorting spring

C-C-C



† = Current shorting poles are also available spanning up to 5 positions (ex: C-C-C-C-C or alternately C1-C1-C1-C1-C1)

†† = Every color handle is available by substituting appropriate pole color designation in desired location

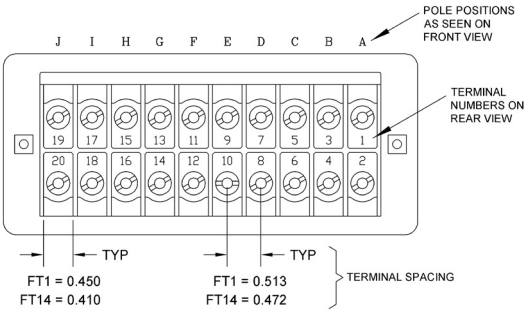
—
Figure 03. Switch handles with interlocking bar

Figure 04. FT switch terminals, rear view (FT-1 shown)

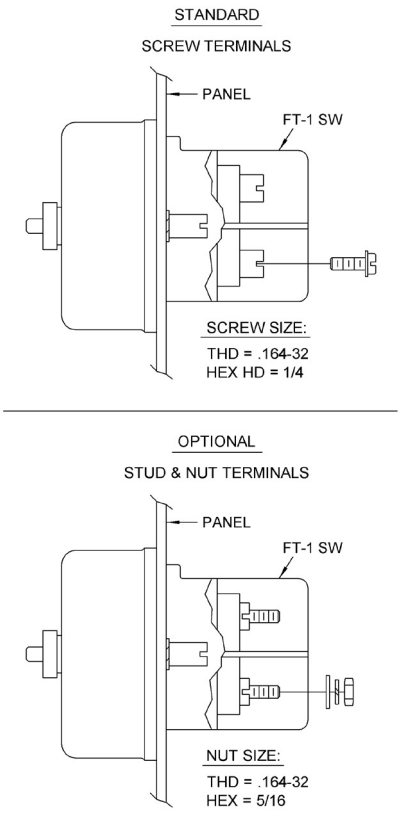
Figure 05. FT switch terminals, rear view (FT-1 shown)

—
03

—
04



—
05



The reversed current shorting pole option positions the current transformer (CT) shorting spring, individual current jack and associated knife blades in reverse. The pole designations for this configuration is available only in sets of 2 and is described with 2 characters (C+C). The “+” sign is the indication for the reversal. Current shorting is performed with the right hand blade versus the traditional left hand blade. Current monitoring is accessed with and individual current test jack in the left hand position.

4.7 Switch handles

Switch handles are made of a molded thermoplastic material. They are typically black for potential and current circuits, red for trip circuits. In addition to black and red, switch handles are also available in various other colors (brown, purple, green, yellow, blue, white, and orange) for simple circuit identification. Each handle has a dovetail indentation that can hold a circuit identification label. To create and print custom labels, please use the template found on our website **new.abb.com/substation-automation** under Distribution Automation subheading test switch and accessories downloads.

Knife blade switches can be operated independently, or ganged together with a horizontal interlocking tie bar to suit testing needs. A hole runs through the middle of each switch handle to allow insertion of interlocking bars that can mechanically tie 2, 3, 4, 5, 6, 8, 10, or 14 adjacent switch handles together. Interlocking bars can be screwed into either side of the handle and can be easily removed if necessary. Interlocking bars are ordered as a separate line item and installed by the customer ; see “Test plug & accessories – ordering information” on page 33.

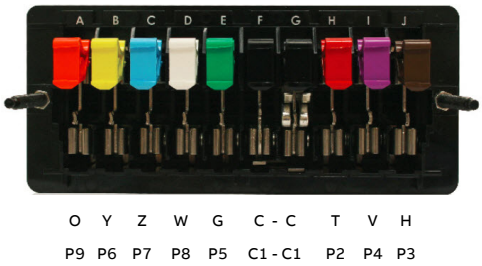
4.8 Terminal connections

Connection terminals are located at the rear of the switch (except on the front connected FT-1F). Most Flexitest switch terminals are marked with a white raised 3-D numbering, which allows easier identification of poles along the rear of the switch (1 to 20 on FT-1 and 1 to 28 on FT-14), as shown on Figure 01, page 13). Each pair of numbered terminals is associated with a matching pole designated by a letter on the front of the switch.

All required terminal hardware is supplied with every Flexitest switch (see Figure 05). Screw terminals are provided standard with all Flexitest switches. Connections are made with a hex washer head screw - #8 thread size (0.164-32), 1/4” hex head.

—
Figure 06. FT switch arrangement, front view (FT-1 shown)

—
06



Stud and nut terminals are an optional feature. Connections are made with two washers and a nut. A special (5/16”) nut driver can be purchased from ABB to connect to stud terminals, see “Test plug & accessories - ordering information” on page 33.

Warning

Connections to ALL equipment should be made using standard and safe connection practices. Recommended maximum torque values for all FT switch terminals is 16 in-lbs. Exceeding this torque may result in damage to terminal threads. On extended versions of the FT switch (ex. FT-1X), exceeding maximum torque values may lead to loosening of internal hardware. Even number terminals (bottom row) of Flexitest switches should be connected to voltage transformers and current transformers, while odd number terminals (top row) should be connected to equipment that is to be isolated, such as meters and relays. Max Lug size = Yellow 10-12 AWG. Ring terminal. Recommended lug size for PT’s is 12 AWG and 10 AWG for CT’s.

4.9 Switch arrangement

Pole positions are identified from left to right on the front view of the switch by the letters “A” through “J” or “A” through “N”. Individual pole designations are used to identify each pole according to its type or function. In order to develop a complete switch arrangement, pole designations should be listed sequentially from left to right to account for every pole position on the switch. Unused poles are identified by the letter X.

Warning

All switch arrangements should be checked for adequate current transformer shorting when applied to current transformer circuits.

5. Test plugs

—
Figure 07. Safe plug with open CT protection

—
a. In-service series test plug
b. Individual current circuit test plug
c. Separate source test plug
d. Individual current circuit test plug inserted in Flexitest relay case
e. Separate source test plug
f. FT test kit

—
07

5. Test plugs
Test plugs used in conjunction with Flexitest switches enable easy measurement, calibration, verification and maintenance of relays, meters and instruments.

5.1 In-service series test plug
The “In-service” series test plug with a maximum of 10 positions is designed to match the pole configurations of specific styles of FT Flexitest devices (either FT-1, FT-1F, FT-1X switches or FT case relays).

This test plug is typically used to connect devices measuring the currents and voltages being applied to the switchboard relays, meters and instruments without interrupting or short-circuiting the circuit. Only current test switches with a current test jack must be opened before inserting the series test plug. Connections to the test plug must be made before inserting the test plug into a Flexitest switch or relay.

Not every switch or relay pole configuration is suitable to accept an in-service series test plug. For available styles, see table 1, FT-1 switch selection guide 1VAC397062-SG. You may also refer to your ABB representative or ABB FT-1 configurator at **spine.abb.com/ftswitch**.

Warning
When using an in-service series test plug for current measurements, connections from the test plug to the measuring instruments must be made before inserting the test plug in place.

5.2 Individual current circuit test plug
This plug consists of two conducting strips separated by an insulating strip. The ammeter is connected to these strips by terminal screws and leads carried out through holes in the back of the insulated handle. (See figures b and d on page 18-19).

The standard test plug inserts into the current test jack with the red part of the handle facing up allowing the alignment nipple and tab to guide the connector into the test jack.

5.3 SafePlug with open CT protection
The Safeplug is an individual current circuit test plug with open current transformer (CT) protection provides a safe, simple, fast, and reliable method to test and service installed equipment while reducing risks due to operator error, incorrect equipment settings, or deviation from correct test

—
a.

—
b.

—
c.

procedures. Its design prevents shock hazards, outages, and erroneous meter readings all associated with open CTs.

If a CT opens during operation, the test plug shorts the CT to protect the operator, typically within 100 microseconds or less (6/1000th of a cycle). At the same time a red LED provides visual indication of the fault.

Warning
When using an in-service series test plug for current measurements, connections from the test plug to the measuring instruments must be made before inserting the test plug in place.

5.4 Separate source test plug
The 10 position and the 14 position separate source test plugs isolate the external connections from the relay or equipment under test. The test plug accepts all common size banana plugs, ring wire connectors, spade lugs and has a through hole for meter probe or wire connections.

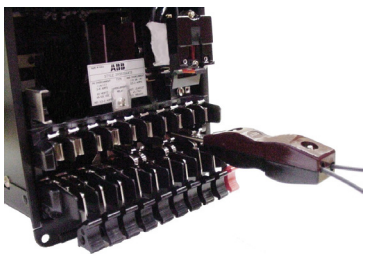
This test plug provides quick circuit testing by fitting into the stationary contact jaws of any Flexitest type FT case or switch. The L-shaped test blades assure quick, accurate alignment between the test plug and the stationary contact jaws. The blades connect the relay inputs and outputs to a set of binding banana posts on the top of the test plug. An insulated barrier along the bottom of the blades isolates the relay circuits from external connections. Test circuits can then be connected to these binding posts, which are staggered for easy accessibility.

Before inserting the separate source test plug into service, all switchblades must be placed in the full open position. In a Flexitest type FT case, the plug is inserted in the bottom switch jaw with the binding posts up and in the top test switch jaw with the binding posts down.

Warning
In order to prevent relay misoperation, do not insert or remove test plug while the test set leads are attached. Provision is made only on current poles with shorting springs to automatically short-circuit current transformer circuits when the knife switches are opened prior to inserting the test plug.

5.5 Flexitest test kit
The ABB Flexitest test kit comes with a convenient carrying case to hold your hand held meter, test plugs, patch cords, test clips, and test probes in neat order. Flexitest test kits can be ordered with your selected quantities of test plugs, safety patch cords, test clips, and test probes. Patch cords are highly durable and flexible. Contact your local ABB representative for a quotation. For more information see “Test Plugs & Accessories -Ordering Information” on pages 33-35.

d.



e.

f.

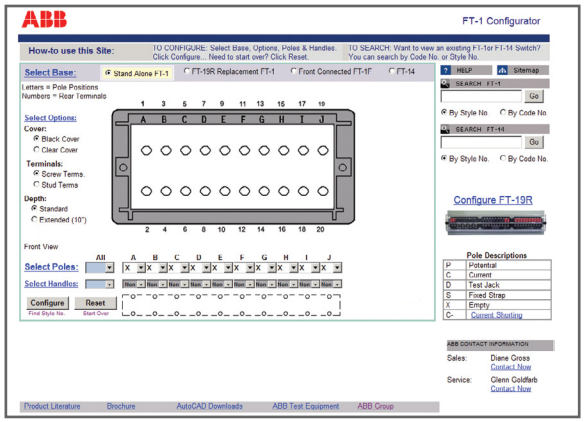
6. FT Flexitest switches ordering information

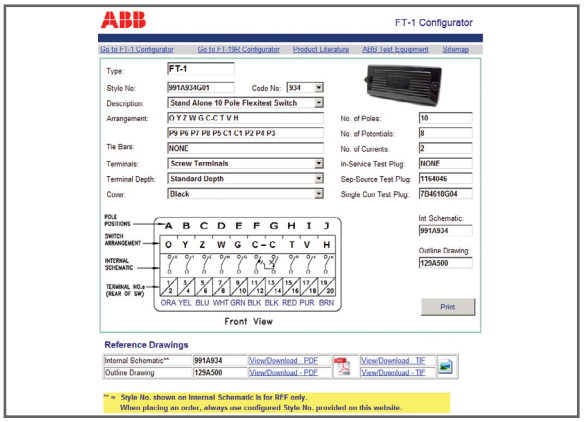
FT-1 configurator
ABB has a web based tool to help build any complete FT switch arrangement, select options, view schematic details and get style number information. We strongly recommend the use of the web based tool for quick, easy, and user-friendly configuration of Flexitest switches.

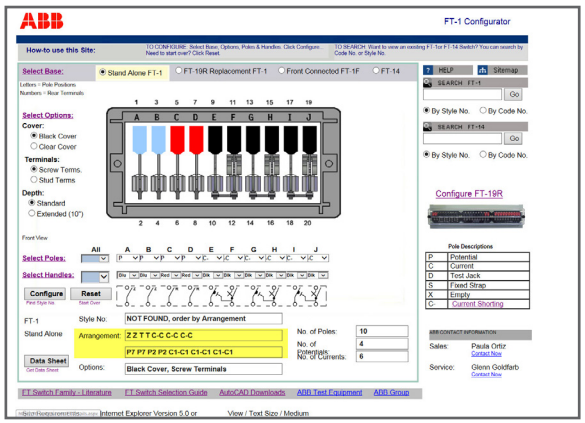
The following products can be easily configured:
- FT-1 (10 Pole)
- Front connected FT-1F
- Extended terminals FT-1X
- Replacement switches for FT-19R
- FT-14 (14 Pole)
- FT-19R switch panel assemblies
- FT-19RX switch panel assemblies

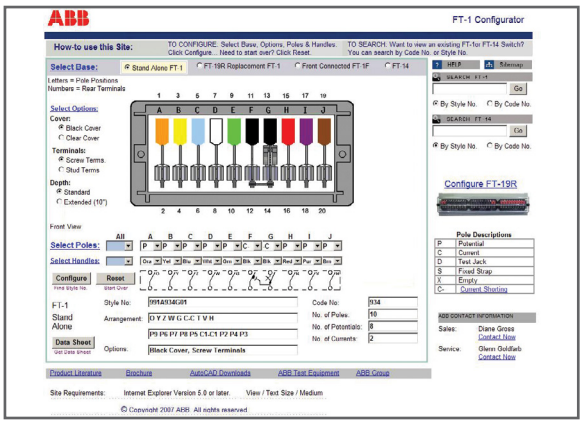
Please visit ABB's FT-1 configurator website at spine.abb.com/ftswitch.

—
Screenshots from the FT1switch.com - when style numbers are not available, order by arrangement









FT-1
10 pole - Flexitest switch

Style numbers are assigned by the factory.

Choose from available options by adding style prefix as shown.

Individual covers for FT-1 to be used on FT-19R application should be ordered as a separate item. See ordering information table on page 34.

Example styler number

1 2 9 A 5 0 1 G 0 1

Style prefix

None	= Black cover, screw terminals
S	= Black cover, stud & nut terminals
K	= Black cover shield, screw terminals
KS	= Black cover shield, stud and nut terminals
C	= Clear deep cover, screw terminals
CS	= Clear deep cover, stud and nut terminals
M	= Clear shallow cover, screw terminals
MS	= Clear shallow cover, stud and nut terminals
G	= Clear cover shield, screw terminals
GS	= Clear cover shield, stud and nut terminals
L	= Lockable black cover, screw terminals
LS	= Lockable black cover, stud and nut
LC	= Lockable clear deep cover, screw terminals
LCS	= Lockable clear deep cover, stud and nut
LM	= Lockable clear shallow cover, screw terminals
LMS	= Lockable clear shallow cover, stud and nut
R	= FT-19R application, screw terminals
RS	= FT-19R application, stud and nut terminals

FT-1X
10 pole - extended terminals rear connected

Style numbers same as FT-1.

Choose from available options by adding style prefix as shown.

Individual covers for FT-1 to be used on FT-19R application should be ordered as a separate item. See ordering information table on page 28.

Example styler number

1 2 9 A 5 0 1 G 0 1

Style prefix

Same as FT-1

Extended length

X10 = 10.25 inches

X08 = 8.25 inches

FT-1F
10 pole - front connected

Style numbers are assigned by the factory.

Choose from available options by adding style prefix as shown.

Example styler number

1 2 9 A 5 0 1 G 0 1

Style prefix

F = Black cover, screw terminals
FS = Black cover, stud & nut terminals
KF = Black cover shield, screw terminals
KSF = Black cover shield, stud & nut terminals

CF = Clear deep cover, screw terminals
CSF = Clear deep cover, stud and nut terminals
MF = Clear shallow cover, screw terminals
MSF = Clear shallow cover, stud and nut terminals
GF = Clear cover shield, screw terminals
GSF = Clear cover shield, stud and nut terminals

LF = Lockable black cover, screw terminals
LSF = Lockable black cover, stud and nut
LCF = Lockable clear deep cover, screw terminals
LCSF = Lockable clear deep cover, stud and nut
LMF = Lockable clear deep cover, screw terminals
LMSF = Lockable clear deep cover, stud and nut

FT-14
14 pole - Flexitest switch

FT4 A 14 T 14 C N 4001

Base type:
FT4 = FT14

Depth
A= Standard depth (rear connected)

No. of poles:
01-14 = Total number of poles used

Terminals:
T = Standard screw terminals
S = Stud and nut terminals

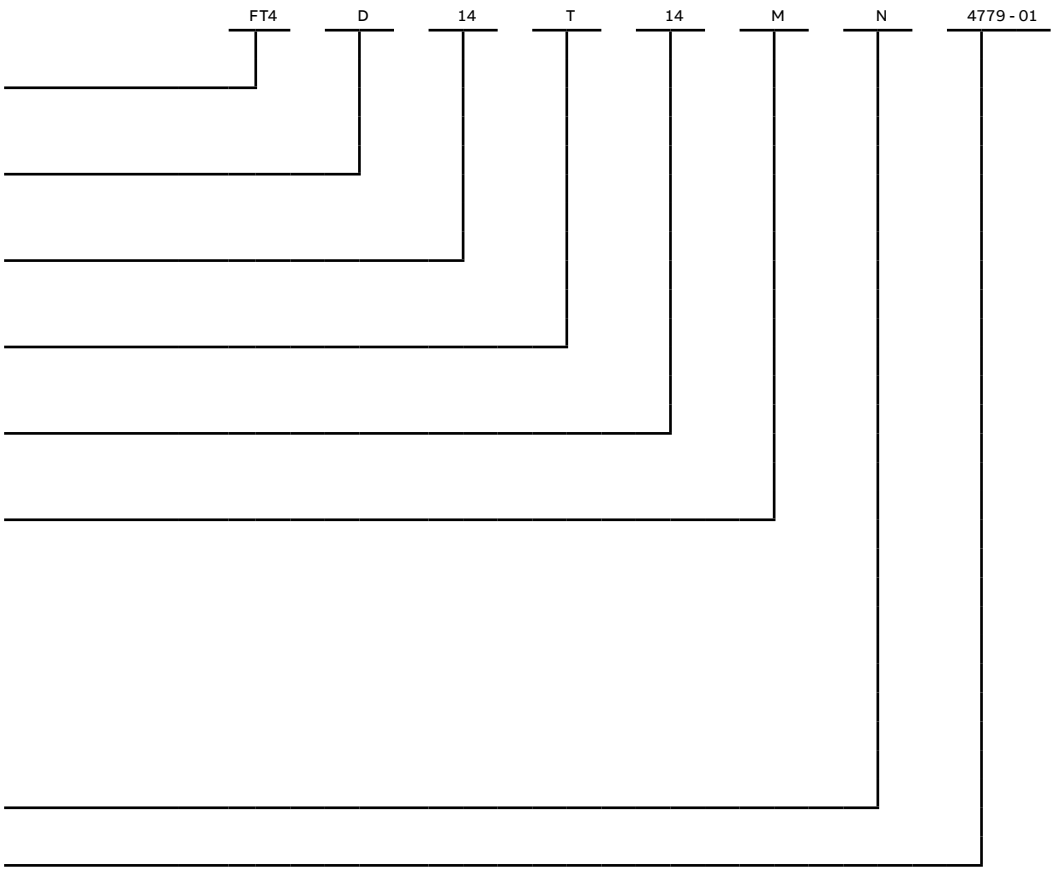
No. of potentials:
00-14 = Total number of potential poles

Cover
C = Clear cover
B = Black cover
G = Clear cover shield
K = Black cover shield
M = Clear, shallow cover
L = Lockable clear cover
R = Lockable black cover
W = Lockable clear, shallow cover

N = None

Code no.:
4001-4999 = Unique code number assigned by the factory

FT-14D
14 pole Flexitest switch



Base type:
FT4 = FT14

Depth
D= Standard depth (rear connected)

No. of poles:
14 = Total number of poles used

Terminals:
T = Standard screw terminals

No. of potentials:
12-14 = Total number of potential poles

Cover
C = Clear cover
B = Black cover
G = Clear cover shield
K = Black cover shield
M = Clear, shallow cover
L = Lockable clear cover
R = Lockable black cover
W = Lockable clear, shallow cover

N = None

Code no.:
4779 - 01 = All potential blades, with lamicoid G01

4780 - 02 = 12 potential blades, 2 currents (Pos. 13&14), with lamicoid G02

FT-14D and cover options	Standard style numbers
Clear shallow cover with potential terminals 13,14	FT4D14T14MN4779-01
Black cover with potential terminals 13, 14	FT4D14T14BN4779-01
Clear shallow cover with current terminals 13, 14	FT4D14T12MN4780-02
Black cover with current terminals 13, 14	FT4D14T12BN4780-02

FT-14D test harness	Style no.
Quantity 3 (kit for 3 phase testing)	95A1159G01
Quantity 1	95A1159H01

6.1 FT-1, FT-1F and FT-1X switches are available in any combination of 1 to 10 poles. Each different configuration of poles is assigned a unique part number or style number by the factory. See ordering information chart for FT-1, FT-1X, and FT-1F on pages 21-22.

The standard FT-1 style number defines a unique pole configuration with black cover and screw terminals ex: 129A501G01. Adding a prefix and/or suffix to the standard style number allows the selection of options for FT-1 as well as the ability to create complete FT-1F and FT-1X style numbers.

Customers may also place an order by providing a complete switch arrangement definition as well as the selected options. ex: P X P C-C C-C C-C P (P1 X0 P1 C1-C1 C1-C1 C1-C1 P1), clear cover, screw terminals. For configurations -A or -E, the double character should be used.

6.1.1 Terminal connections
An optional FT-1 switch with stud and nut termination can be supplied at no additional charge. Style number prefix “S” is used for this option, ex: S129A501G01. For optional clear cover with stud and nut terminals use style number prefix “CS”, ex: CS129A501G01. See pages 21-22 for more ordering details.

6.1.2 Cover
An optional clear cover will be supplied instead of the black cover by using style number prefix “C,” ex: C129A501G01.

6.1.3 Depth
An FT-1X extended switch with black cover will be supplied by using suffix “X08” for 8 inches and “X10” for 10 inches, ex: 129A501G014X08 or 129A501G01X10.

An FT-1X extended switch with clear cover will be supplied by using prefix “C” and suffix “X10”, ex: C129A501G014X10

6.1.4 Front connected
Adding a prefix “F” to the standard style number is used for a front connected FT-1F switch, which allows the user to make the connections on the front of the switch.

6.2 FT-14 switch is available in any combination up to 14 poles. Each different style number is based on a smart part number system. See ordering information chart on page 22.

6.2.1 Terminal connections
A standard FT-14 switch with screw termination will be supplied when using the normal style number. An optional FT-14 switch with stud and nut termination can be supplied at no additional charge provided when the seventh character on the smart part number is changed from “T” to “S.”

6.2.2 Cover
A standard FT-14 switch with clear cover will be supplied when using the normal style number. An optional FT-14 switch with black cover can be supplied at no additional charge provided the tenth character in the above styles is changed from “C” to “B”. An optional FT-14 switch with lockable clear or black cover can be supplied at no additional charge provided the tenth character changed from “C” to either “M” (clear shallow), “L” (lockable clear), “R” (lockable black), or “W” (lockable clear shallow).

6.3 FT-19 and FT-22 test switch assemblies.
The FT-19R and FT-19RX assemblies accommodate up to three FT-1 switches. The FT-19RS and FT-22RS assemblies accommodate up to two FT-1 switches, two FT-14 switches, or the combination of one FT-1 and one FT-14 switch.

Each different style number is based on a smart part number system. See page 26-28 for more ordering details.

6.3.1 Terminal connections
The Flexitest switches for FT-19R, FT-19RX, FT-19RS, and FT-22RS assemblies can be ordered with standard (#8) screw or optional stud & nut terminals. The type of terminal connection is represented by the second character of the style number.

6.3.2 Panel height
The 19" as well as 22" wide mounting panel can be ordered in different rack unit (RU) heights: 2RU, 3RU or 4RU. The 3RU assembly is available with switch positions centered, mounted high or mounted low. The 4RU is available with switches mounted low or high.

6.3.3 Panel color & material
Panels are available in the following colors and materials: brushed finish aluminum; beige (textured surface) - steel; light sandlewood (RAL1019) - steel; thunder blue (textured) - steel; beige (RAL7032 smooth surface) - steel; ANSI 61 gray - steel; ANSI 70 gray - steel; RAL7035 gray - steel; black (smooth surface) - steel; and white (corvel30-1112 high gloss) - steel.

For visual representation of the panel colors, please visit **spine.abb.com/ftswitch**.

6.3.4 Flexitest switch code numbers (positions A, B, and C)
Each FT-1 switch is identified by a unique three-digit code number. FT-14 switches are identified by a unique four digit code number. These "code numbers" are required for each of the positions in the assembly (positions A, B, and C).

To obtain the FT-1 or FT-14 switch style number and the three or four digit code number refer to the ABB FT-1 configurator at spine.abb.com/ftswitch or FT switch selection guide (document 1VAC397062-SG). A cover plate will be provided for unused FT-1 or FT-14 switch positions (A, B, or C) by using code number "000" or "0000" respectively.

If a particular arrangement is not listed, contact the ABB Coral Springs factory.

6.3.5 Switch replacement
To add an FT-1 switch in an unused position or to replace a switch in an FT-19R assembly, the required FT-1 switch style(s) will need to be provided. These numbers differ from the individual FT-1 style numbers by including the prefix "R" to represent screw terminals (e.g., R129A501G01) or the prefix "RS" to represent stud type terminals (e.g., RS129A501G01). For FT-19RX assemblies provide the required FT-1 switch style with an "R" or "RS" prefix plus the X08 or X10 length suffix (e.g., R129A501G01X10).

It is not necessary to add "R" prefix to the standard style number of FT-1 or FT-14 switches to be used as replacement on FT-19RS assemblies.

6.3.6 Cover
For FT-19R assemblies, the cover field should be left BLANK to order the unit with the standard full length clear cover. Optional full length black (A) or clear (N), full length shallow clear (M), individual black (B), individual deep clear (C), individual shallow clear (H), lockable full length clear (L) or black (R), lockable full length shallow clear (W), cover can be requested by indicating the assigned letter on the cover field on the smart part number.

The cover field is always required on FT-19RX, FT-19RS and FT-22RS part numbers.

6.3.7 Additional features
When ordering the "Flat panel" version, please note this is meant for applications where flush panel or cabinet mounting is required.

FT-19R
Flexitest switch assembly

Typical catalog number

F	R	2	B	Pos A 014	Pos B 014	Pos C 014		

Terminal connections

Screw type (standard)	R
Stud and nut type (optional)	S

Panel height

Two rack units	2
Three rack units (switches centered)	3
Three rack units (switches low)	X
Three rack units (switches high)	Y
Four rack units (switches low)	4
Four rack units (switches high)	Z

Color and material

Brushed finish aluminum	A
Beige (textured surface) steel	B
Light sandlewood (RAL1019) steel	D
Thunder blue (textured) steel	E
Beige (RAL7302 smooth surface) steel	F
Gray (ANSI 61 smooth surface) steel	G
Gray (ANSI 70 smooth surface) steel	H
Gray (RAL7035 smooth surface) steel	J
Black (smooth surface) steel	K
White (corvel 30-1112 high gloss) steel	W

FT-1 switch code numbers

Position A
Position B
Position C

000 = no switch (cover plate provided over switch cutout)
3-digit FT-1 code number

Cover

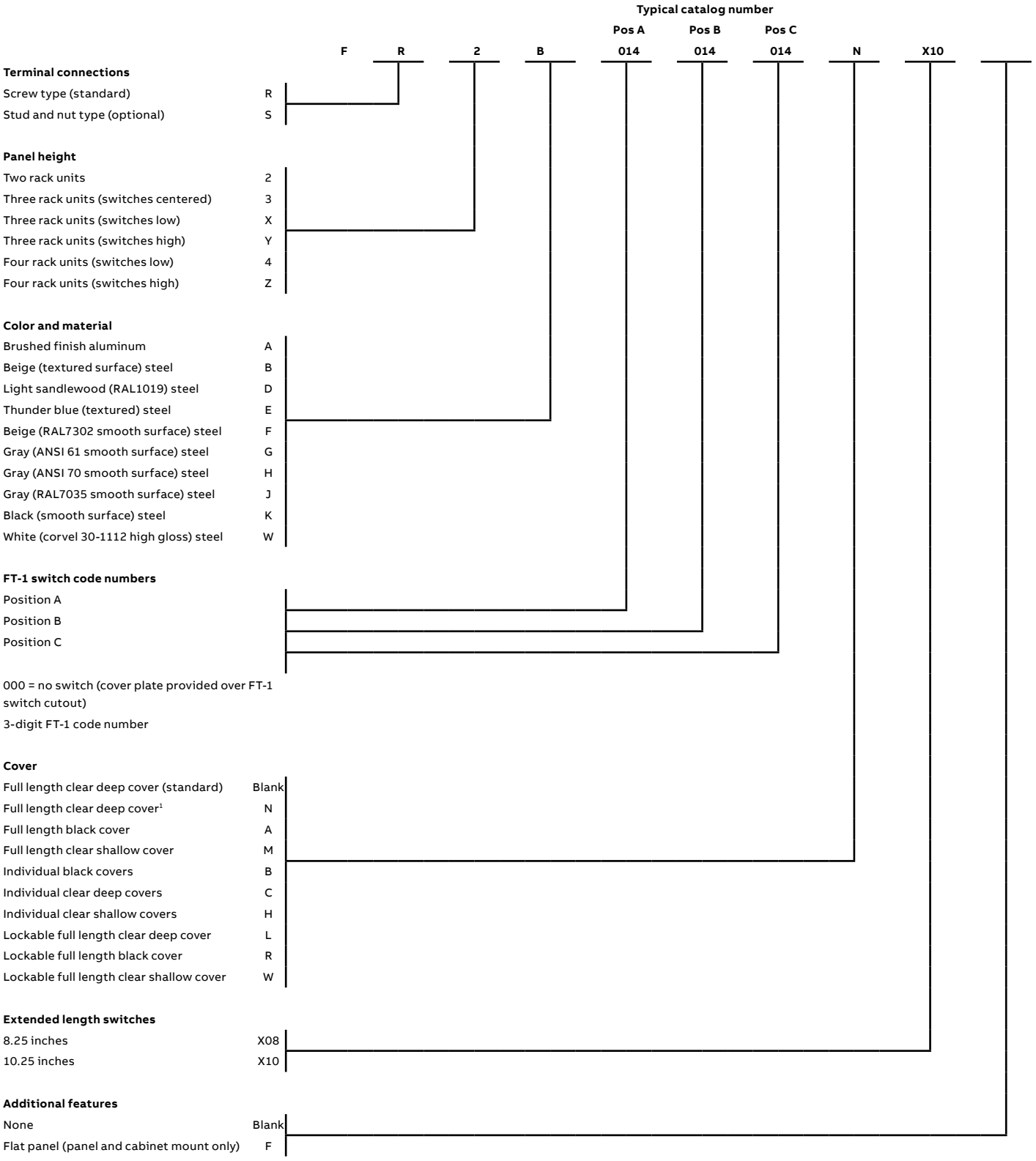
Full length clear deep cover (standard)	Blank
Full length clear deep cover[1]	N
Full length black cover	A
Full length clear shallow cover	M
Individual black covers	B
Individual clear deep covers	C
Individual clear shallow covers	H
Lockable full length clear deep cover	L
Lockable full length black cover	R
Lockable full length clear shallow cover	W

Additional features

None	Blank
Flat panel (panel and cabinet mount only)	F

[1] The cover option "N" only applies when additional features are required.
For special configurations, please contact the factory.

FT-19RX
Flexitest switch assembly



For special configurations, please contact the factory.

FT-19RS and FT-22RS
Flexitest switch assembly

Typical catalog number

Pos A		Pos B		Pos C		
S	R	2	B	014 -	N -	4025	B	

Assembly type
- 19 inch mounting panel — S
- 22 inch mounting panel — V

Terminal connections
- Screw type (standard) — R
- Stud and nut type (optional) — S

Panel height
- Two rack units — 2
- Three rack units (switches centered) — 3
- Three rack units (switches low) — X
- Three rack units (switches high) — Y
- Four rack units (switches low) — 4
- Four rack units (switches high) — Z

Color and material
- Brushed finish aluminum — A
- Beige (textured surface) steel — B
- Light sandlewood (RAL1019) steel — D
- Thunder blue (textured) steel — E
- Beige (RAL7302 smooth surface) steel — F
- Gray (ANSI 61 smooth surface) steel — G
- Gray (ANSI 70 smooth surface) steel — H
- Gray (RAL7035 smooth surface) steel — J
- Black (smooth surface) steel — K
- White (corvel 30-1112 high gloss) steel — W

Positions A, B, C

001-999, A01-Z99 = 3-digit FT-1 switch code number

4001-4999 = 4-digit FT-14 switch code number

S01-S99 = special equipment code (see table 1, page 24)

N = unused panel position

000 = no switch (cover plate provided over FT-1 switch cutout)

4000 = no switch (cover plate provided over FT-14 switch cutout)

Cover
- Individual clear deep covers — C
- Individual black covers (standard) — B
- Lockable individual clear deep cover — L
- Lockable individual black cover — R
- Individual clear shallow cover — M
- Lockable individual clear shallow cover — W

Additional features
- None — Blank
- 8.25 inches extended terminals (FT-1 only) — W
- 10.25 inches extended terminals (FT-1 only) — X
- Flat panel — F
- 8.25 inches extended terminals (FT-1 only), flat panel — M
- 10.25 inches extended terminals (FT-1 only), lat panel — A

For special configurations, please contact the factory.

Possible combinations of FT-1 and FT-14 switches on FT-19RS and FT-22RS assemblies when space for special equipment is not required. Consult the ABB factory for custom configurations.

Fig.	Pos. A	Pos. B	Pos. C
1	FT1	N	FT1
2	FT14	N	FT14
3	FT14	N	FT1
4	FT1	N	FT1
5	FT1	N	N

Figure 1

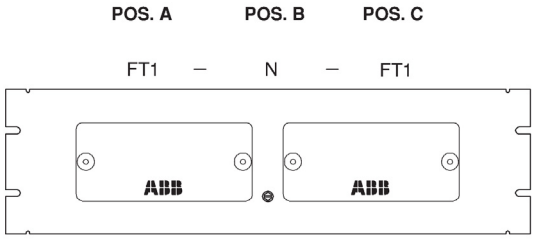


Figure 2

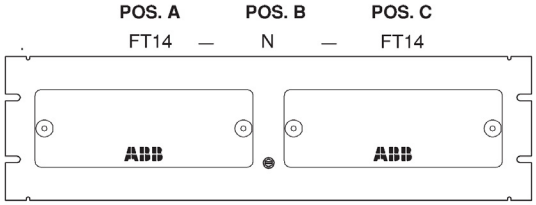


Figure 3

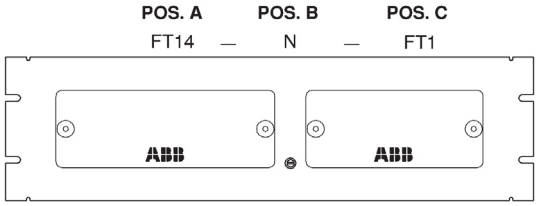


Figure 4

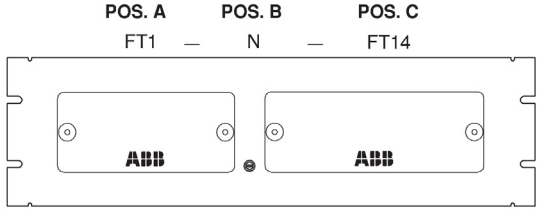
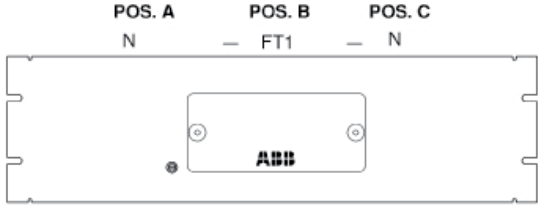


Figure 5



Possible combinations of FT-1 and FT-14 switches on FT-19RS and FT-22RS assemblies when space for special equipment is not required. Consult the ABB factory for custom configurations.

Fig.	Pos. A	Pos. B	Pos. C
6	FT1	FT1	SXX
7	FT1	SXX	FT1
8	SXX	FT1	FT1
9	FT1	N	SXX

Figure 6

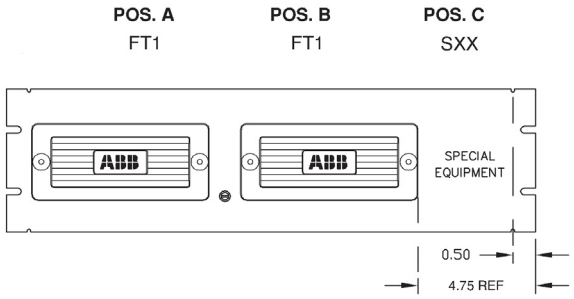


Figure 7

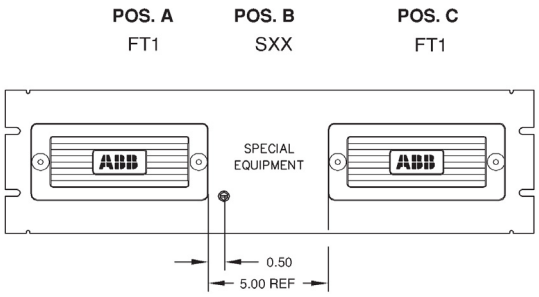


Figure 8

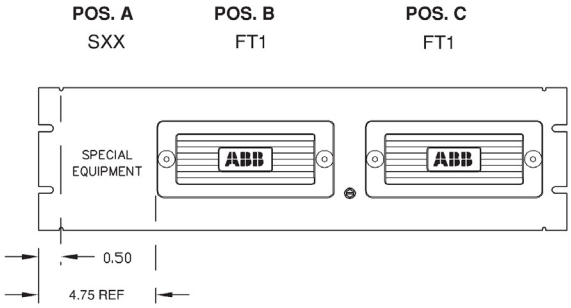


Figure 9

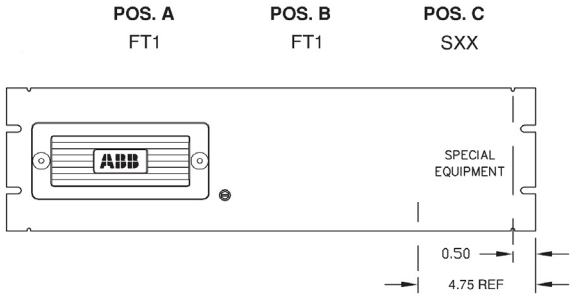


Table 1. Available special equipment codes

Code	Detail drawing	Manufacturer	Description
S01	PNL-DRL-S01	-	Toggle switch
S02	PNL-DRL-S02	Electroswitch	Series 24 lock-out relay
S03	PNL-DRL-S03	GE	GE type SBM control switch
S04	PNL-DRL-S04	GE	GE type SB-1 switch
S24	PNL-DRL-S24	Electroswitch	Series 24 control transfer switch

Note: Special equipment not included with assembly.

Most popular FT switches

Table 1 - FT -1 switch selection guide

Poles	Potential	Current	A	B	C	D	E	F	G	H	I	J	Style number	Code	Options	In-service test plug
10	10	0	P	P	P	P	P	P	P	P	P	P	129A501G01	001	Black cover, screw terminals	129A062G10
10	10	0	T	T	T	T	T	T	T	T	T	T	129A539G01	036	Black cover, screw terminals	129A062G10
10	10	0	P	T	T	T	T	T	T	T	T	T	9688A17G01	584	Black cover, screw terminals	129A062G10
10	10	0	P	P	P	P	P	P	P	P	T	T	1586C42G23	212	Black cover, screw terminals	129A062G10
10	10	0	P	P	P	P	T	T	T	P	P	P	9676A14G01	452	Black cover, screw terminals	129A062G10
10	10	0	T	T	P	P	P	P	P	P	P	P	1586C42G45	262	Black cover, screw terminals	129A062G10
10	4	6	P	P	P	C - C		C - C		C - C		P	129A514G01	014	Black cover, screw terminals	292B319G23
10	4	6	P	C - C		P	C - C		P	C - C		P	129A528G01	026	Black cover, screw terminals	NONE
10	4	6	C - C		C - C		C - C		P	P	P	P	774B430G20	171	Black cover, screw terminals	NONE
10	4	6	T	T	T	T	C - C		C - C		C - C		498A010G01	065	Black cover, screw terminals	NONE
10	4	6	P	P	P	P	C - C		C - C		C - C		670B197G18	119	Black cover, screw terminals	NONE
10	4	6	T	T	T	C - C		C - C		C - C		T	714B325G32	137	Black cover, screw terminals	292B319G23
10	4	6	C - C		C - C		C - C		T	T	T	T	774B430G24	183	Black cover, screw terminals	NONE
10	3	7	P	P	C	C - C		C - C		C - C		P	129A535G01	033	Black cover, screw terminals	292B319G22
10	2	8	P	C - C		C - C		C - C		C - C		P	129A518G01	018	Black cover, screw terminals	292B319G22
10	2	8	C - C		C - C		C - C		C - C		P	P	837A407G01	083	Black cover, screw terminals	NONE
10	2	8	C - C		C - C		C - C		C - C		T	T	774B430G22	173	Black cover, screw terminals	NONE
10	0	10	C - C		C - C		C - C		C - C		C - C		498A020G01	073	Black cover, screw terminals	NONE
8	0	8	,	C - C		C - C		C - C		C - C		,	129A517G01	017	Black cover, screw terminals	292B319G22
8	0	8	X	R - R		R - R		R - R		R - R		**X**	9660A84G01	266	Black cover, screw terminals	292B319G22
6	0	6	,	,	,	C - C		C - C		C - C		,	129A516G01	016	Black cover, screw terminals	292B319G23

Table 2 - FT -14 switch selection guide

Poles	Potential	Current	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Style number	Code	Options
14	14	0	P	P	P	P	P	P	P	P	P	P	P	P	P	P	FT4A14T14CN4001	4001	Clear cover, screw terminals
14	14	0	T	T	T	T	T	T	T	T	T	T	T	T	T	T	FT4A14T14CN4018	4018	Clear cover, screw terminals
14	6	8	P	P	P	P	P	P	C - C		C - C		C - C		C - C		FT4A14T06CN4046	4046	Clear cover, screw terminals
14	6	8	P	P	P	C - C		C - C		C - C		C - C	P	P	P		FT4A14T06CN4044	4044	Clear cover, screw terminals
14	6	8	C - C		C - C		C - C		C - C		P	P	P	P	P	P	FT4A14T06CN4068	4068	Clear cover, screw terminals
14	6	8	C - C		C - C		C - C		C - C		P	P	P	P	T	T	FT4A14T06CN4035	4035	Clear cover, screw terminals
14	6	8	T	T	T	T	C - C		C - C		C - C		C - C		T	T	FT4A14T06CN4052	4052	Clear cover, screw terminals
14	4	10	P	P	P	P	C - C		C - C		C - C		C - C		C - C		FT4A14S04BN4151	4151	Black cover, stud terminals
14	2	12	C - C		C - C		C - C		P	P	C - C		C - C		C - C		FT4A14S02BN4177	4177	Black cover, stud terminals
14	0	14	C - C		C - C		C - C		C - C		C - C		C - C		C - C		FT4A14T00CN4063	4063	Clear cover, screw terminals
12	4	8	T	P	Z	W	,	R - R		C - C		7 - 7	,	8 - 8			FT4A12T04CN4163	4163	Clear cover, screw terminals
11	3	8	P	P	P	,	C - C		C - C		C - C	,	C - C	,			FT4A11S03BN4127	4127	Black cover, stud terminals

The above are the most popular FT configurations. For more styles please visit spine.abb.com/ftswitch

—

Table 3 - FT -19R switch assemblies

Style number	Position A	Position B	Position C	Options
FR3G001001001	001	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G171001001	171	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR2G001001001	001	001	001	2RU, steel, ANSI 61 gray, screw terminals
FR3H014001001	014	001	001	3RU (centered), steel, ANSI 70 gray, screw terminals
FR3H001001001	001	001	001	3RU (centered), steel, ANSI 70 gray, screw terminals
FR3G073001001	073	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FRXG001001001	001	001	001	3RU (low), steel, ANSI 61 gray, screw terminals
FR3G014001001	014	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G001001262	001	001	262	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G183001262	183	001	262	3RU (centered), steel, ANSI 61 gray, screw terminals
FR4G001001001	001	001	001	4RU, steel, ANSI 61 gray, screw terminals
FR3G073212036	073	212	036	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G183001001	183	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR4G171001001	171	001	001	4RU, steel, ANSI 61 gray, screw terminals
FR3G083001001	083	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G083452000	083	452	000	3RU (centered), steel, ANSI 61 gray, screw terminals
FR2G014001001	014	001	001	2RU, steel, ANSI 61 gray, screw terminals
FR3G036036036	036	036	036	3RU (centered), steel, ANSI 61 gray, screw terminals
FR2G026001001	026	001	001	2RU, steel, ANSI 61 gray, screw terminals
FR3G026001026	026	001	026	3RU (centered), steel, ANSI 61 gray, screw terminals
FR3G171171001	171	171	001	3RU (centered), steel, ANSI 61 gray, screw terminals
FR2G001001000	001	001	000	2RU, steel, ANSI 61 gray, screw terminals
FR2G001000000	001	000	000	2RU, steel, ANSI 61 gray, screw terminals
FR3H014014014	014	014	014	3RU (centered), steel, ANSI 70 gray, screw terminals
FR3G026001001	026	001	001	3RU (centered), steel, ANSI 61 gray, screw terminals

—

Table 3 - FT -19RS switch assemblies

Style number	Position A	Position B	Position C	Options
SR2J183-N-183B	183	N	183	19 Inch mounting panel, screw terminals, 2RU, RAL7035 gray, steel
SR2J4037-N-4001CF	4037	N	4001	19 Inch mounting panel, screw terminals, 2RU, RAL7035 gray, steel
SR2JN-001-1NB	N	001	N	19 Inch mounting panel, screw terminals, 2RU, RAL7035 gray, steel
SR3A014-N-001CF	014	N	001	19 Inch mounting panel, screw terminals, 3RU (centered), brushed finish aluminum, individual clear covers, flat panel
SR3A036-S02-000C	036	S02	000	19 Inch mounting panel, screw terminals, 3RU (centered), brushed finish aluminum, individual clear covers, special equipment
SR3G001-N-000C	001	N	000	19 Inch mounting panel, screw terminals, 3RU (centered), ANSI 61 gray, individual clear covers
SR2JN-001-NB	N	001	N	19 Inch mounting panel, screw terminals, 2RU, RAL7035 gray, steel, standard individual black covers
SR2K014-N-001B	014	N	001	19 Inch mounting panel, screw terminals, 2RU, black smooth surface, steel, standard individual black covers
SR3G001-N-001B	001	N	001	19 Inch mounting panel, screw terminals, 2RU, ANSI 61 smooth surface, steel, standard individual black covers

The above are the most popular FT configurations. For more styles please visit **spine.abb.com/ftswitch**

7. Test plug and accessories - ordering information

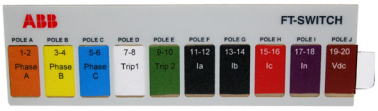
Test plugs	Description	Style number
	In-service series test plug (order to match Flexitest FT-1 switch arrangement or FT relay case)	Reference **spine.abb.com/ftswitch** data sheet
	Standard individual current circuit test plug - leads not included	7B4618G04
	Standard individual current circuit test plug - 6’ length leads with retractable banana jacks, 13 AWG	7B4618G05
	SafePlug - Individual current circuit test plug with open CT protection - leads not included	1VAC391001P001
	SafePlug - Individual current circuit test plug with open CT protection - 6’ length leads with retractable banana jacks, 13 AWG Rated 600V, CatII, 20 A	1VAC391001P002
	Separate source test plug (10 position)	1164046
	Separate source test plug (14 position)	1355D32G04

FT test kit (Includes ABB bag)	Items in test kit 9688A68G18	Rated voltage	Rated current
	1 red 6’ safety patch cord with retractable sleeve banana plug on both ends	600 VDC	32A
	1 black 6’ safety patch cord with retractable sleeve banana plug on both ends	600 VDC	32A
	1 red 10’ UTP cable with RJ-45 male connector on both ends	600V	30A
	1 red safety plug-on test probe	1000V	10A
	1 black safety plug-on test probe	1000V	10A
	1 red safety plug-on alligator test clip	1000V	10A
	1 black safety plug-on alligator test clip	1000V	10A
	FT separate source test plug - 1164046	600V	30A
	FT individual series test plug - 7B4618G04	600V	30A

FT test kit (Includes ABB bag)	Items in test kit 9688A68G24	Rated voltage	Rated current
	1 red 6’ safety patch cord with retractable sleeve banana plug on both ends	600 VDC	32A
	1 black 6’ safety patch cord with retractable sleeve banana plug on both ends	600 VDC	32A
	1 red 10’ UTP cable with RJ-45 male connector on both ends	600V	30A
	1 red safety plug-on test probe	1000V	10A
	1 black safety plug-on test probe	1000V	10A
	1 red safety plug-on alligator test clip	1000V	10A
	1 black safety plug-on alligator test clip	1000V	10A
	FT separate source test plug - 1164046	600V	30A
	FT individual current circuit test plug with open CT protection - 1VAC391001P001	600V	20A

Covers		FT-1	FT-14	FT-19R
	Standard individual shallow cover w/ thumb nuts - BLACK	128A973G01	128A973G05	9683A78G06
	Standard individual shallow cover w/ thumb nuts - CLEAR	9669A64G01	9669A64G03	9683A78G07
	Standard individual deep cover w/ thumb nuts - CLEAR	9676A32G01	9676A32G02	9683A78G01
	Full length shallow cover w/ thumb nuts - BLACK	Not applicable	Not applicable	9676A28G06
	Full length deep cover w/ thumb nuts - CLEAR	Not applicable	Not applicable	9676A28G01
	Lockable shallow cover w/ thumb nuts & bracket- BLACK	9669A49G01	9669A49G07	Not applicable
	Lockable shallow cover w/ thumb nuts & bracket- CLEAR	9669A49G05	9669A49G06	Not applicable
	Lockable deep cover w/ thumb nuts & bracket - CLEAR	9669A49G02	9669A49G04	Not applicable
	Full length shallow cover w/ thumb nuts - CLEAR	Not applicable	Not applicable	9676A28G09
	Lockable full length shallow cover w/ thumb nuts & bracket - CLEAR	Not applicable	Not applicable	9669A52G04
	Lockable full length shallow cover w/ thumb nuts & bracket - BLACK	Not applicable	Not applicable	9669A52G03
	Lockable full length deep cover w/ thumb nuts & bracket - CLEAR	Not applicable	Not applicable	9669A52G01

Interlocking bars		FT-1	FT-14
	2 positions	1270547	9669A19G02
	3 positions	1164048	9669A19G03
	4 positions	02C9834G03	9669A19G04
	5 positions	02C9834G04	9669A19G05
	6 positions	02C9834G06	9669A19G06
	7 positions	Not Applicable	9669A19G07
	8 positions	02C9834G07	9669A19G08
	10 positions	02C9834G05	9669A19G10
	14 positions	Not applicable	9669A19G14

Miscellaneous		Style number
	FT-1 & FT-14 nut driver for stud & nut terminals	877A821G02
	Unistrut adapter plate for railmount of FT-1F	9666A15H01
	Label holder Sleeve (gloss polycarbonate) for FT-1 SW *To create and print custom labels, please use the template in the downloads section at this link.	1506B81H01
	Banana thumbnut knobs for FT-14 separate source and FT-1 in-service series test plugs. Test plug knobs replace all older design knobs. The knobs have a 10-32 threaded brass insert that accommodates all types of test set leads and lugs	9683A91G02

8. FT switch covers

Covers	Description	Style number
	FT-1 standard individual shallow cover with thumb nuts - BLACK	128A973G01
	FT-1 standard individual shallow cover with thumb nuts - CLEAR	9669A64G01
	FT-1 standard individual deep cover with thumb nuts - CLEAR	9676A32G01
	FT-14 standard individual shallow cover with thumb nuts - BLACK	128A973G05
	FT-14 standard individual shallow cover with thumb nuts - CLEAR	9669A64G03
	FT-14 standard individual deep cover with thumb nuts - CLEAR	9676A32G02

Covers	Description	Style number
	FT-19R individual standard individual shallow cover with thumb nuts and cover studs - BLACK	9683A78G06
	FT-19R individual standard individual shallow cover with thumb nuts and cover studs - CLEAR	9683A78G07
	FT-19R individual standard individual deep cover with thumb nuts and cover studs - CLEAR	9683A78G01
	FT-19R full length shallow cover with thumb nuts - BLACK	9676A28G06
	FT-19R full length shallow cover with thumb nuts - CLEAR	9676A28G09
	FT-19R full length deep cover with thumb nuts - CLEAR	9676A28G01

FT cover shield

Covers	Description	Style number
	FT-1 cover shield individual shallow cover with thumbnuts - BLACK	128A973G09
	FT-1 cover shield individual shallow cover with thumbnuts - CLEAR	9669A64G05
	FT-14 cover shield individual shallow cover with thumbnuts - BLACK	128A973G10
	FT-14 cover shield individual shallow cover with thumbnuts - CLEAR	9669A64G06

—
Figure a. FT-14 shallow clear cover shield hanging from external tabs on a test switch

Figure b. FT-14 shallow clear cover shield inserted into the test switch by using the internal bosses

Figure c. FT-1 shallow black cover shield hanging from external tabs with separate source test plug inserted into the test switch

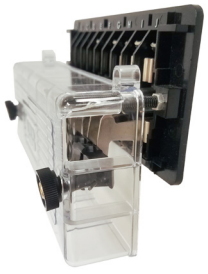
Cover shield installation
The cover shield is easy to install and remove while being a safeguard for "hot" blades. The ABB separate source test plug can be inserted into the FT switch while keeping hot blades isolated, providing safety during necessary testing. Loose covers can easily be secured with the user having no place to put them.

The cover shield is available in clear and black shallow thermoplastic material and can replace existing covers for both FT-1 (10 pole) and FT-14 (14 pole) switches.

Install the cover shield by holding each end and evenly insert the external tabs onto the existing cover mounting posts. The separate source test plug can now be inserted into the FT switch for safe testing. Internal bosses can be used to hold the cover in place over the knife blades but does not allow for testing. The cover shield can easily be removed in the same manner.

—
a.

—
b.



—
c.

9. Warranty

All ABB Flexitest switches and assemblies are backed by a 12-year warranty. The quality of ABB products comes from years of experience and rigorous quality testing programs.

Figure 08. FT-1 and FT-1X switch outline and drilling plan

08 Outline

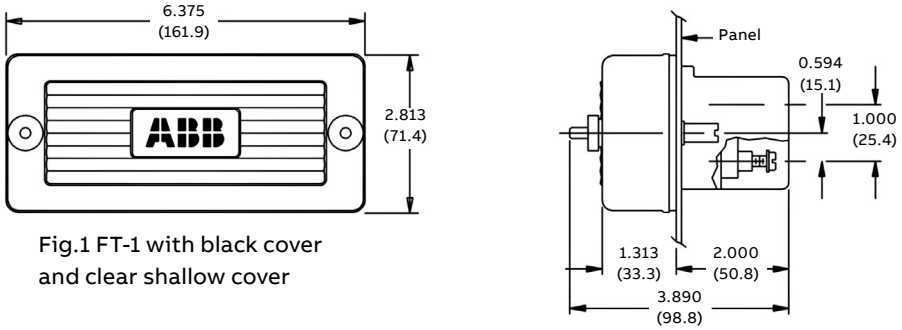


Fig.1 FT-1 with black cover and clear shallow cover

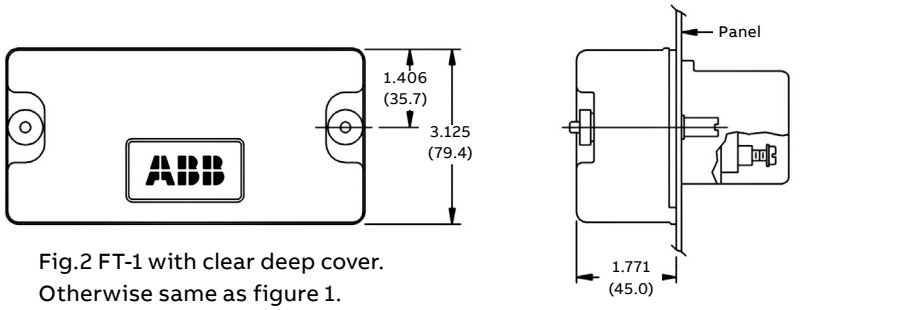
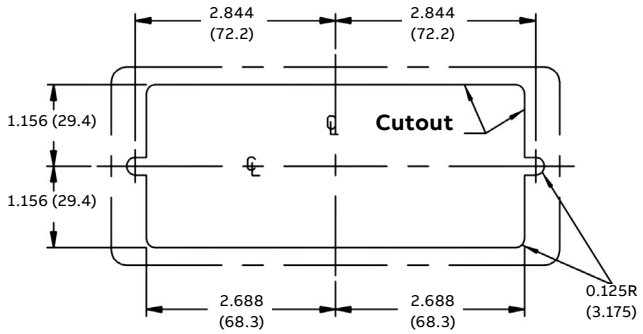
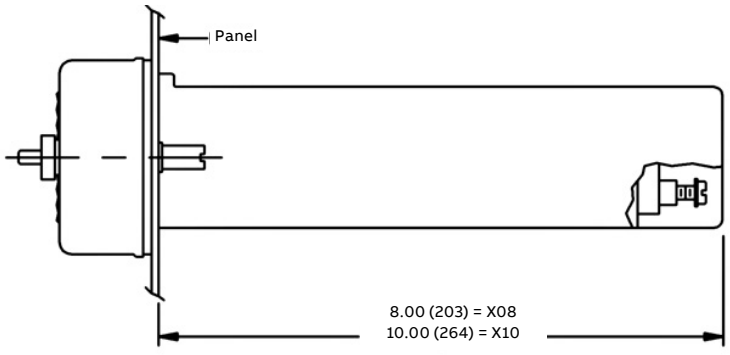


Fig.2 FT-1 with clear deep cover. Otherwise same as figure 1.

Drilling plan



FT-1X



Otherwise same as figure 1.

Dimensions inches (mm)

—
Figure 09. FT-1F switch outline and drilling plan

—
09

Outline

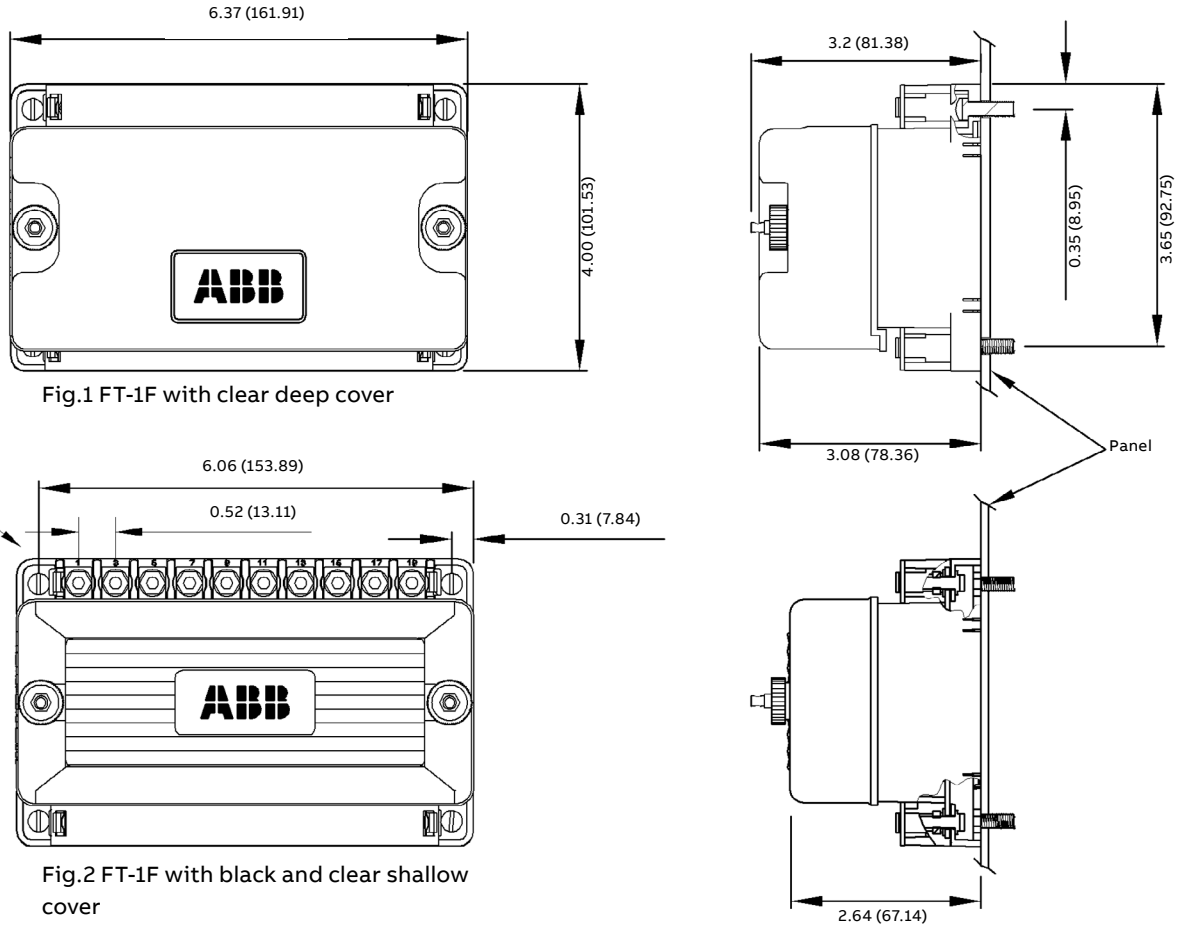
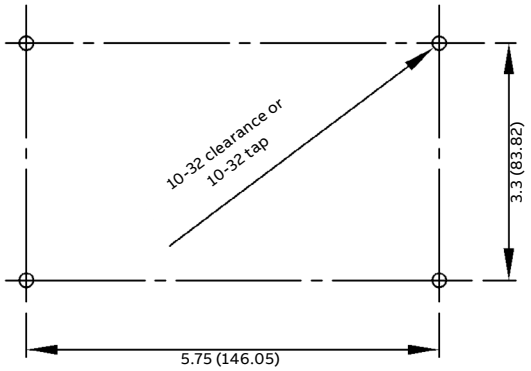


Fig.1 FT-1F with clear deep cover

Fig.2 FT-1F with black and clear shallow cover

Drilling plan



Dimensions inches (mm)

—
Figure 10. FT-14 switch outline and drilling plan

—
10

Outline

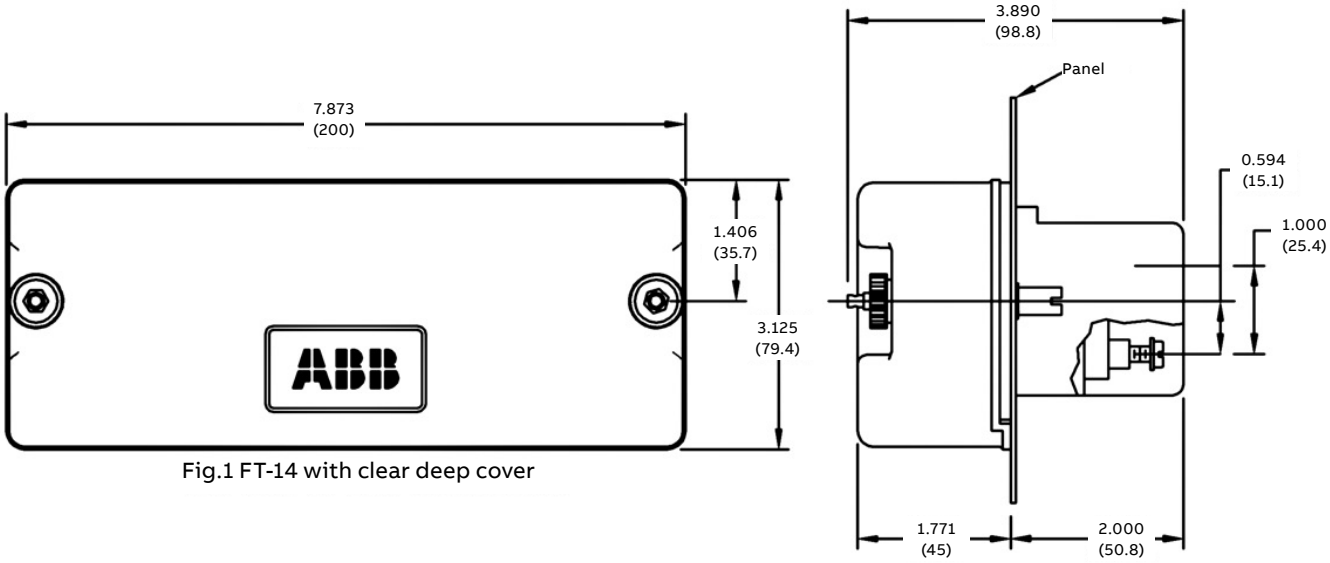
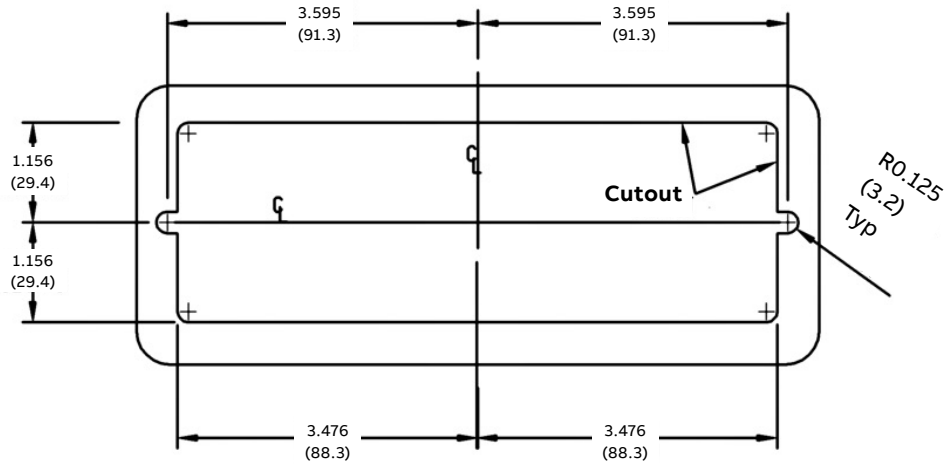


Fig.1 FT-14 with clear deep cover

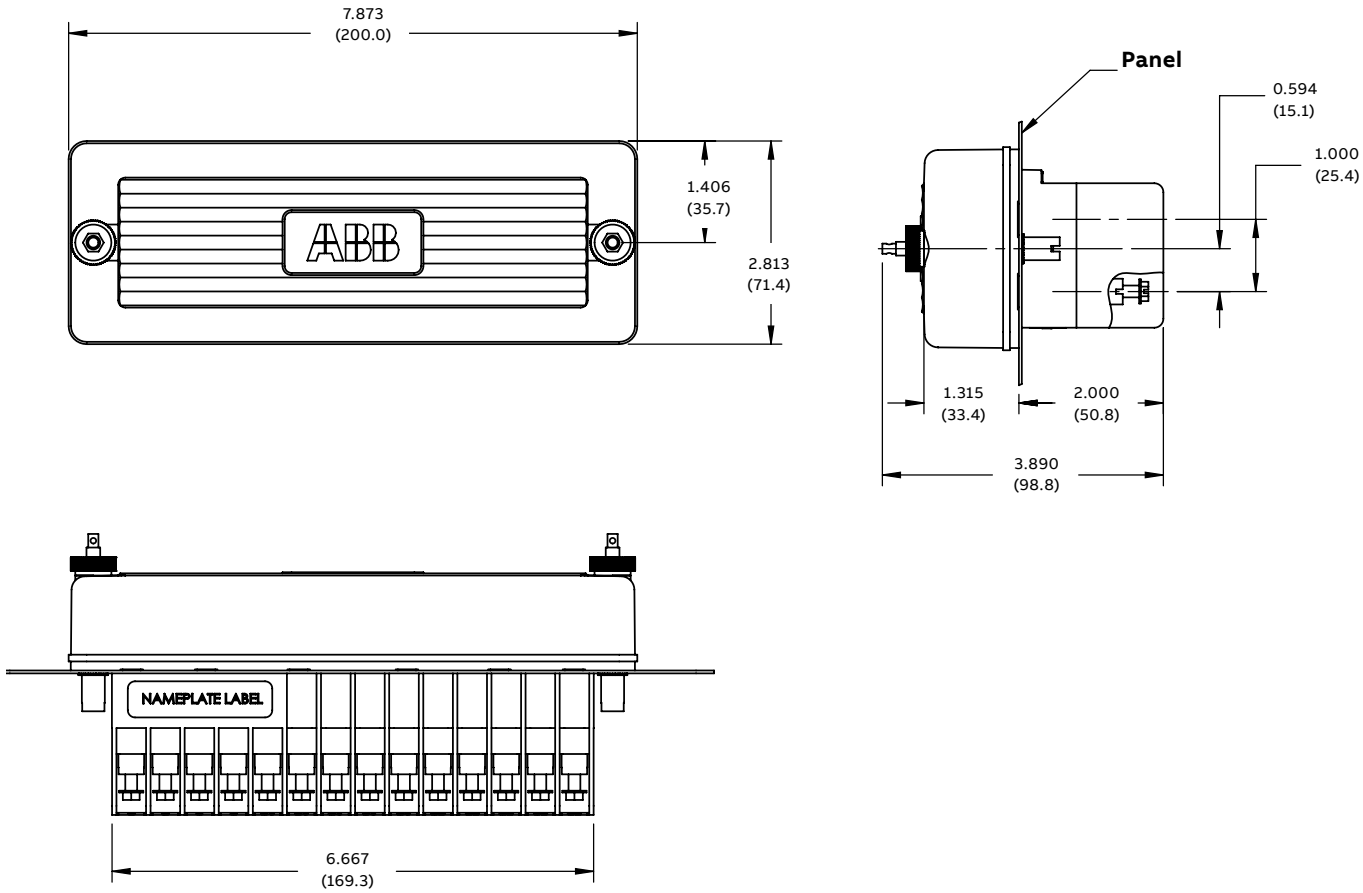
Drilling plan



Dimensions inches (mm)

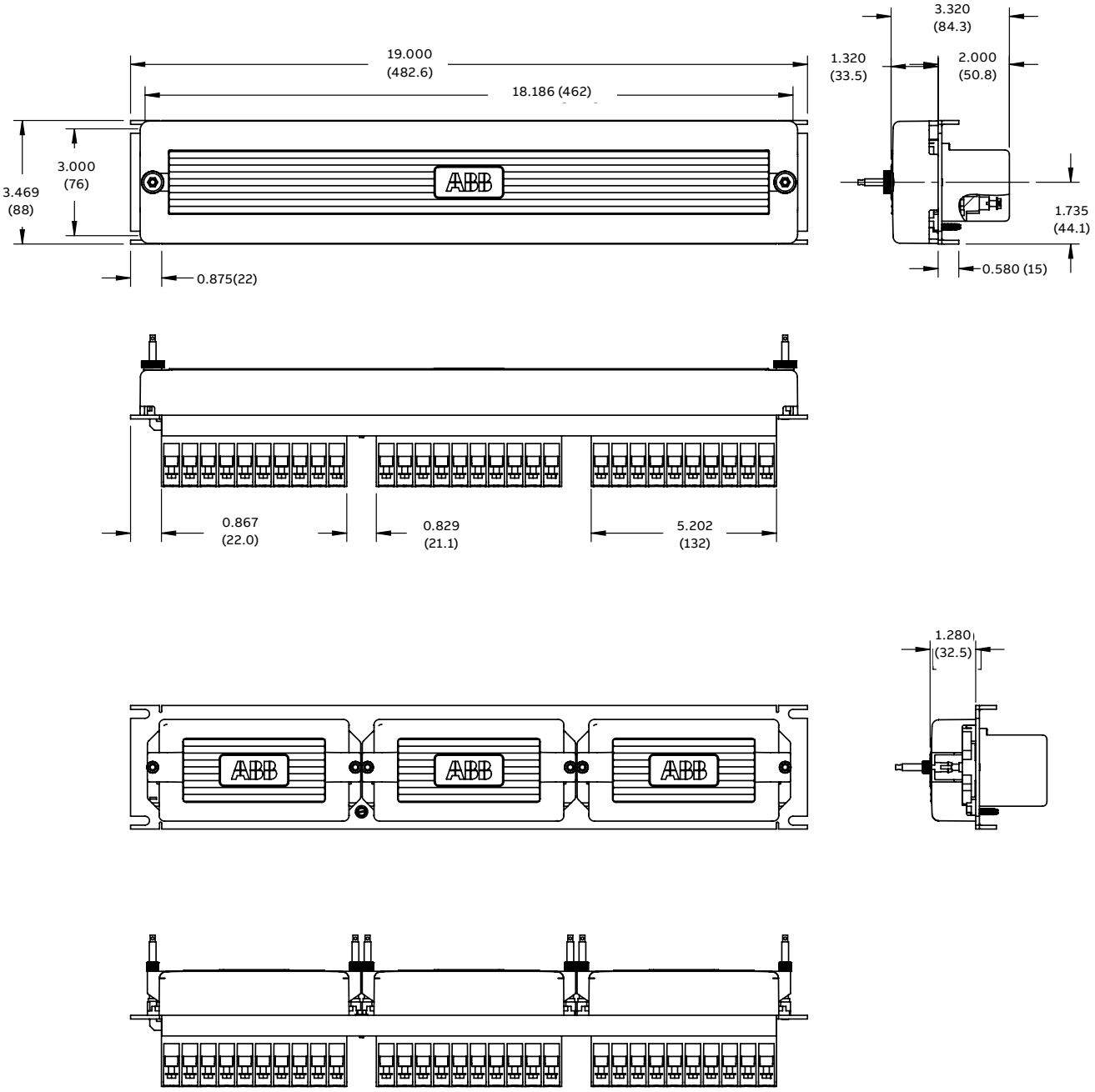
—
Figure 11. FT-14
shallow cover

—
11



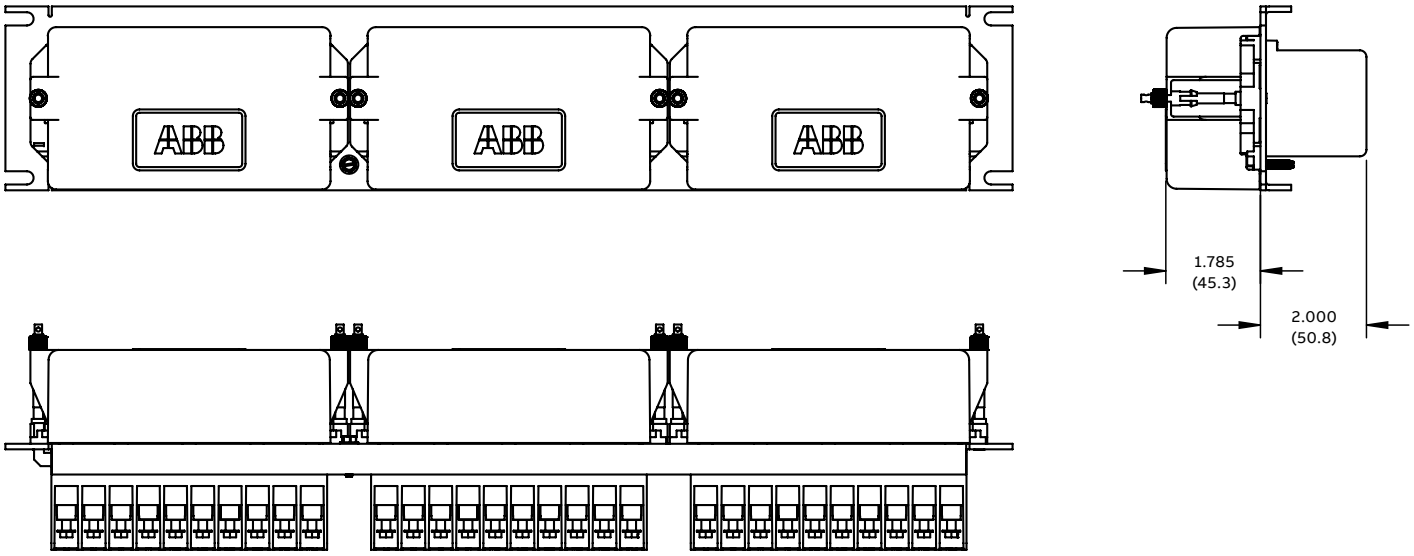
—
Figure 12. FT-19R

—
12



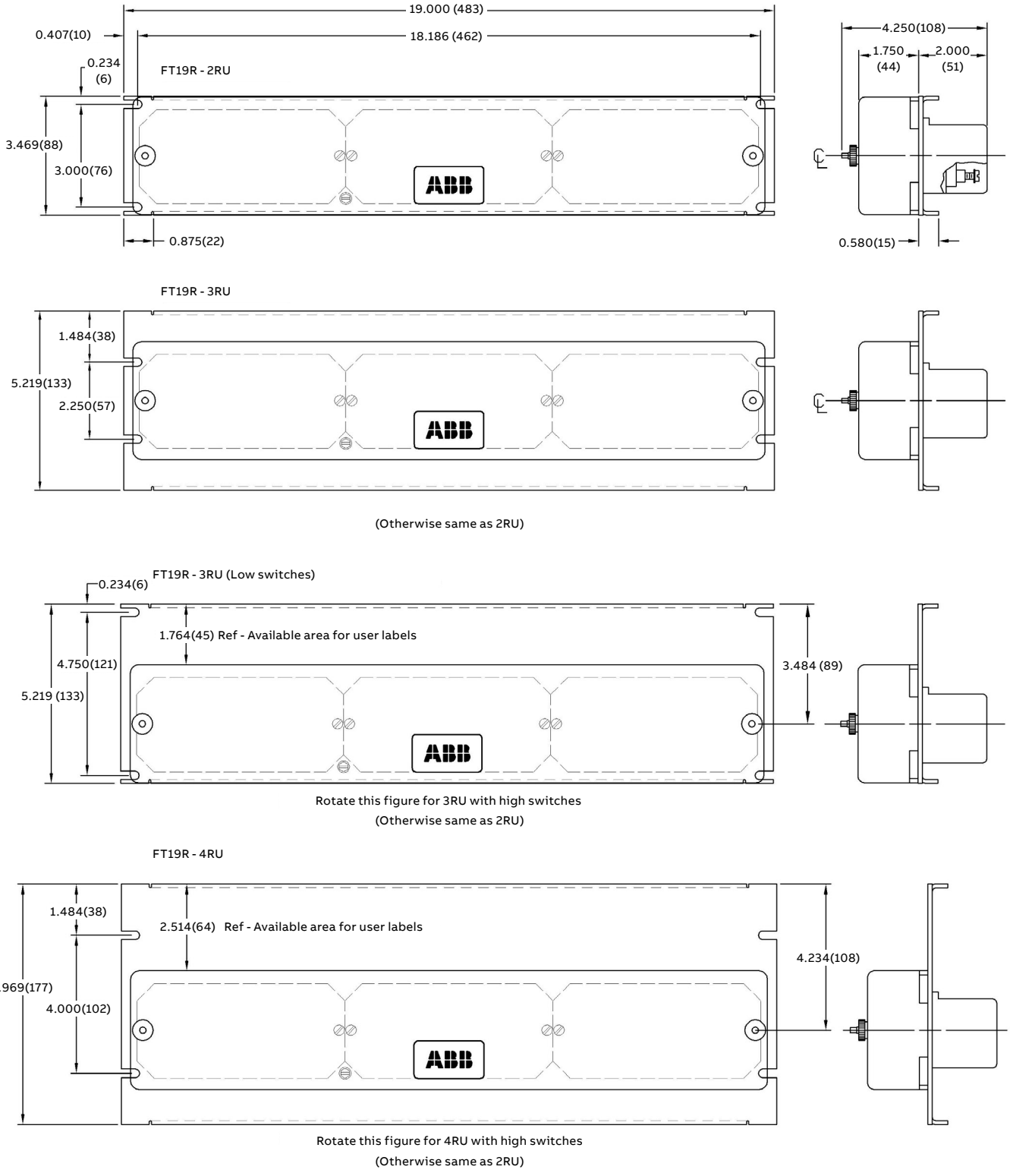
—
Figure 13. FT-19R
(continued)

—
13



—
Figure 14. FT-19R dimensions and layout for rack mounting

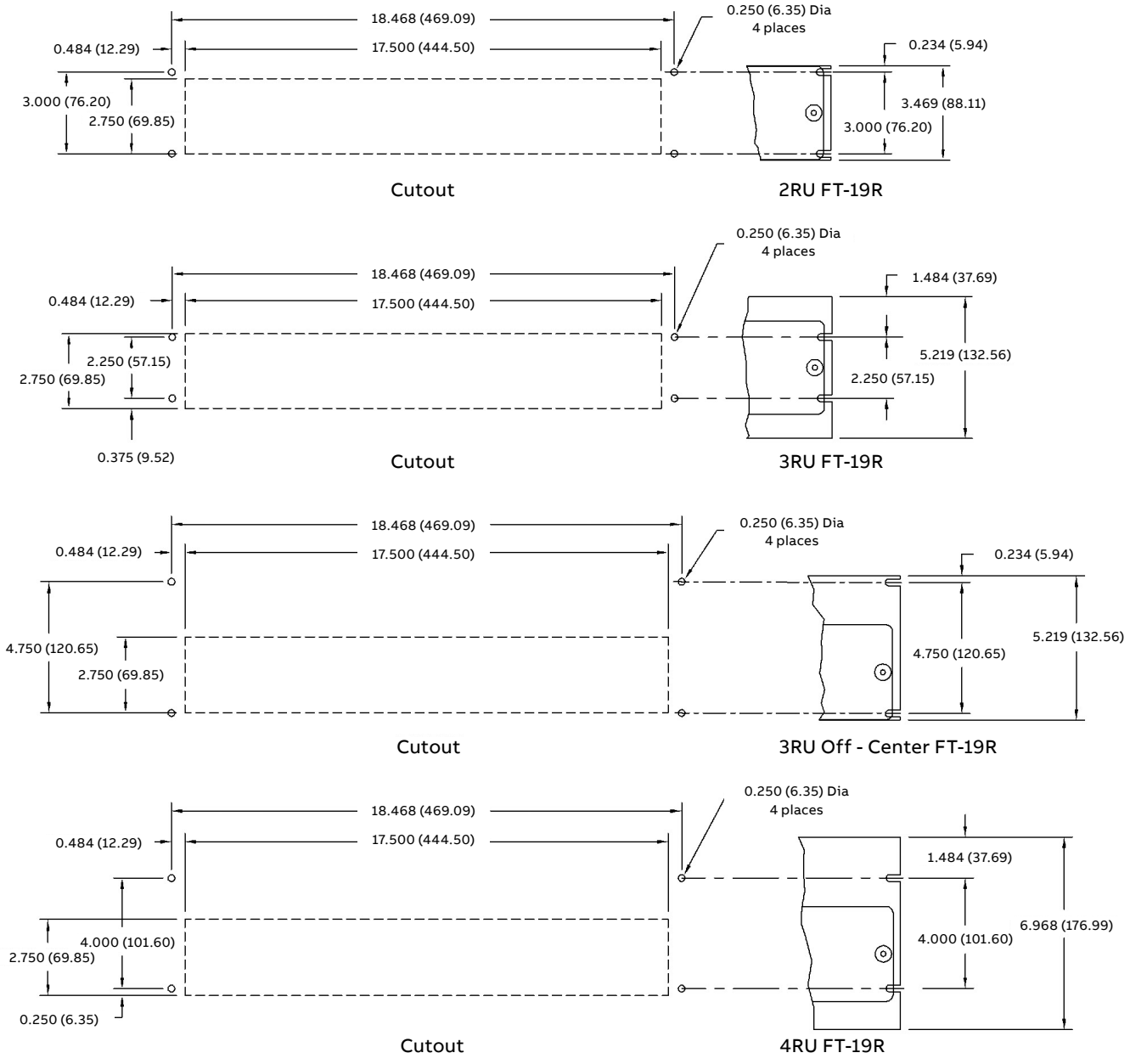
—
14



Dimensions inches (mm)

—
Figure 15. Outline and drilling plan for FT-19R with flat panels (no rolled edges), rack or flush mounting for panels or cabinets

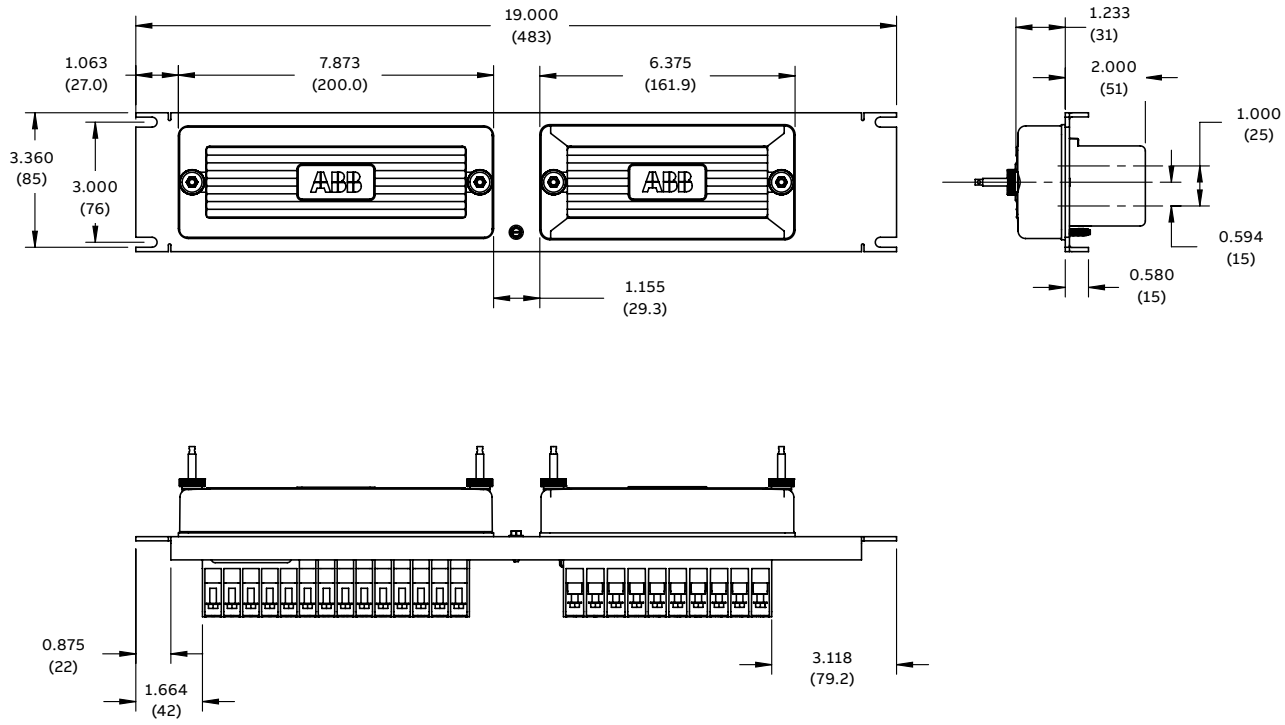
—
15



Ref.:
Dimensions inches (mm)
All figures show front view FT19R panels and cutouts

Figure 16. FT-19RS

16



Dimensions inches (mm)

—
Figure 17. FT-22RS dimensions and layout for rack mounting

—
17

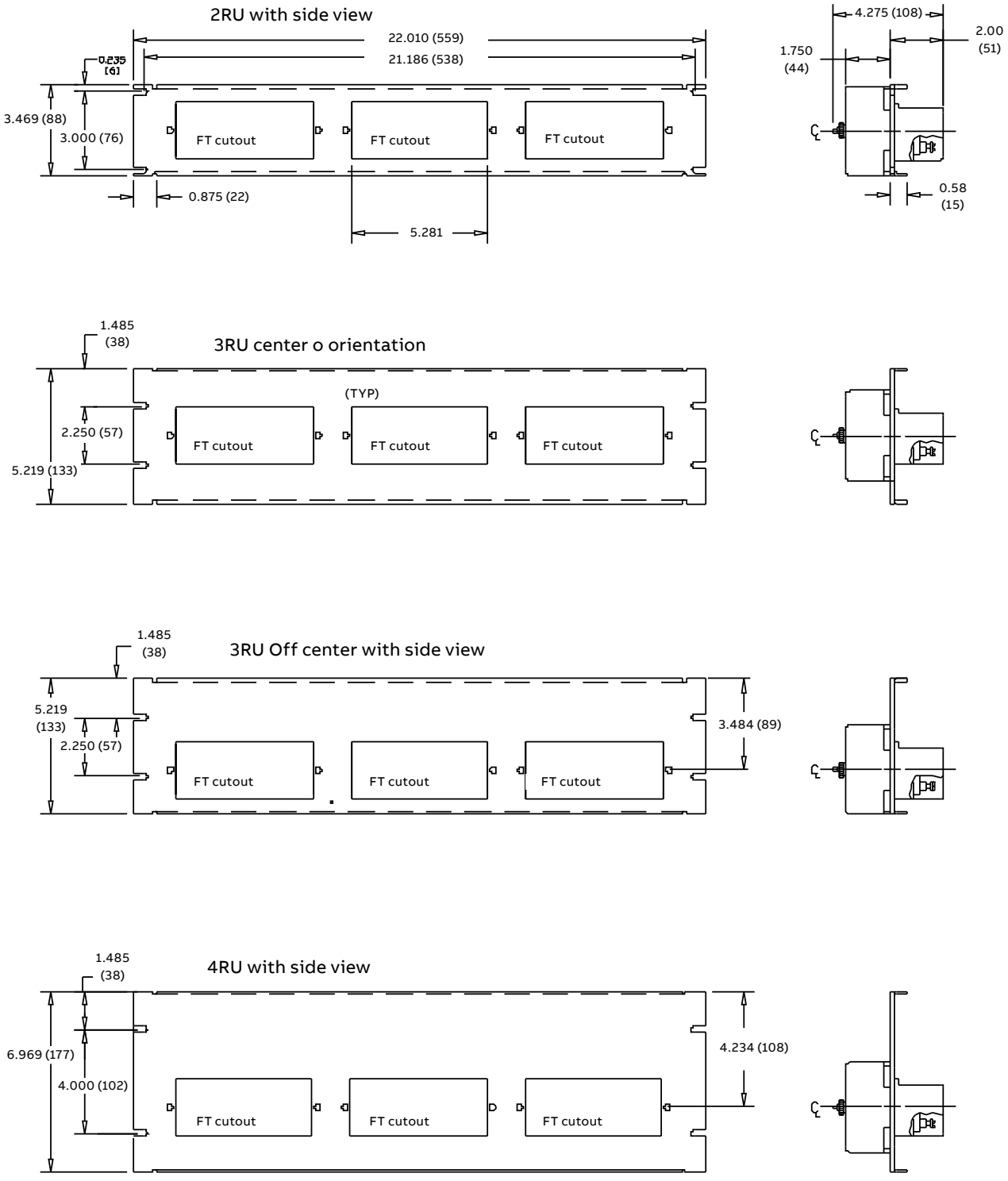
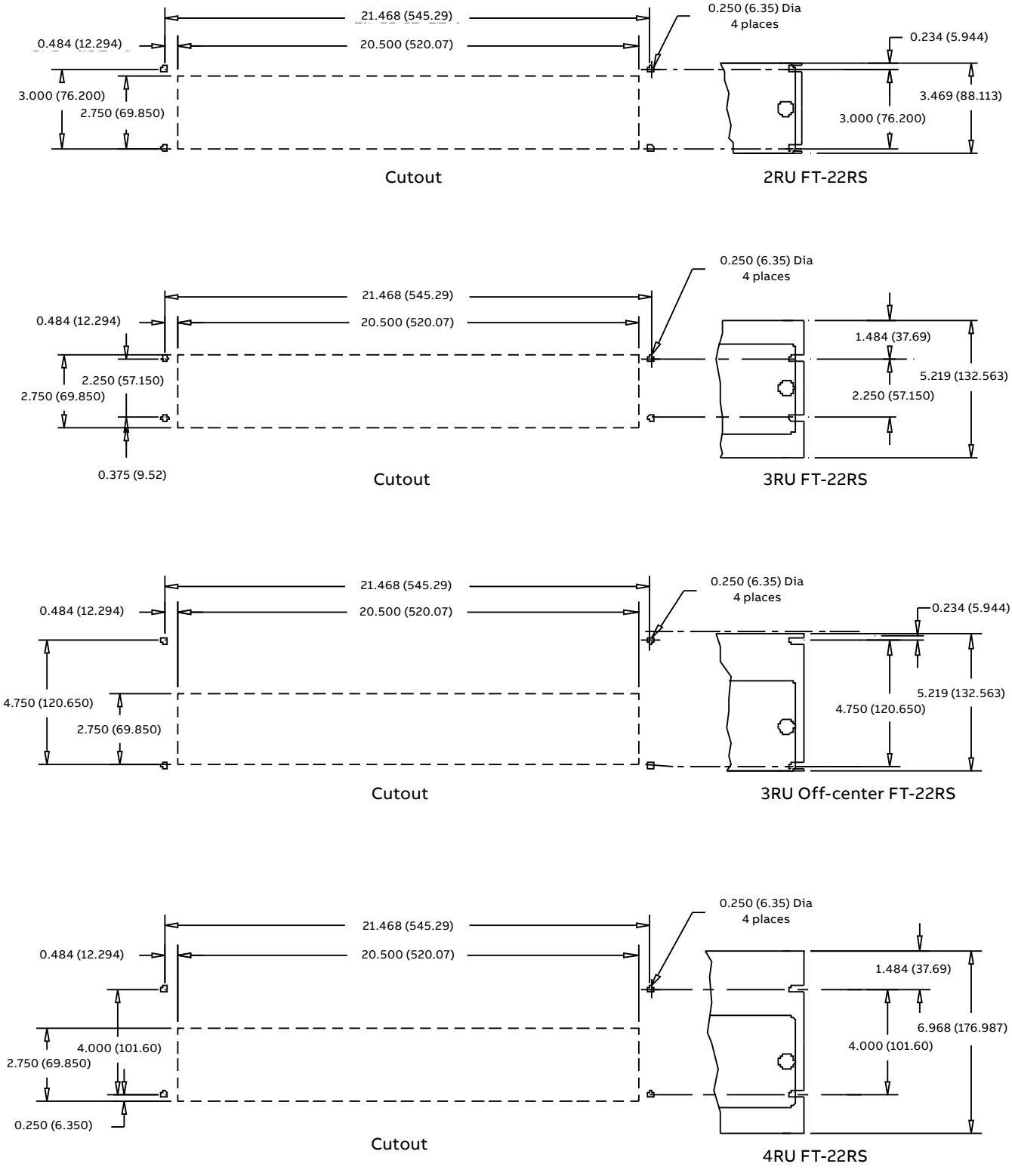


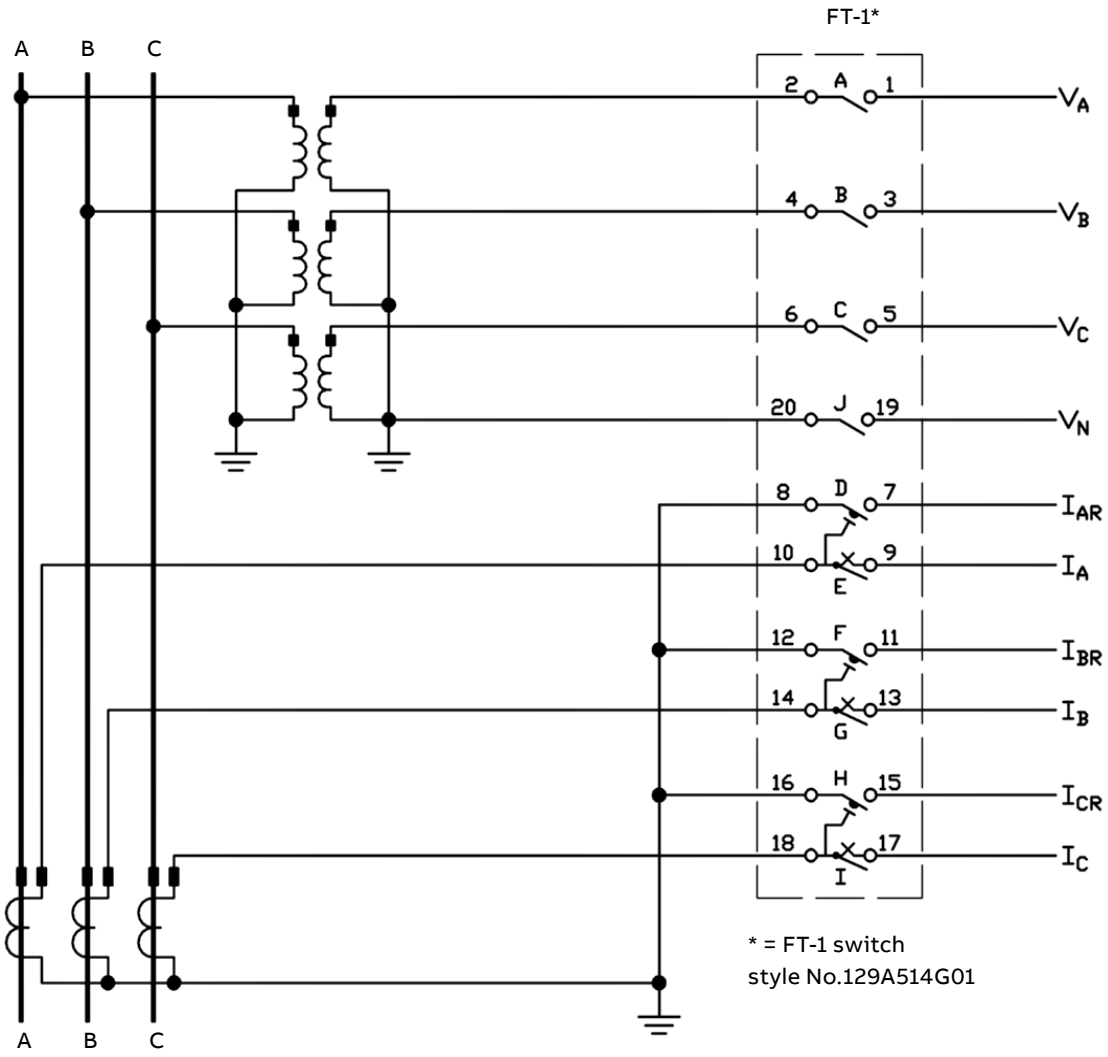
Figure 18. Outline and drilling plan for FT-22RS with flat panels (no rolled edges), rack or flush mounting for panels or cabinets

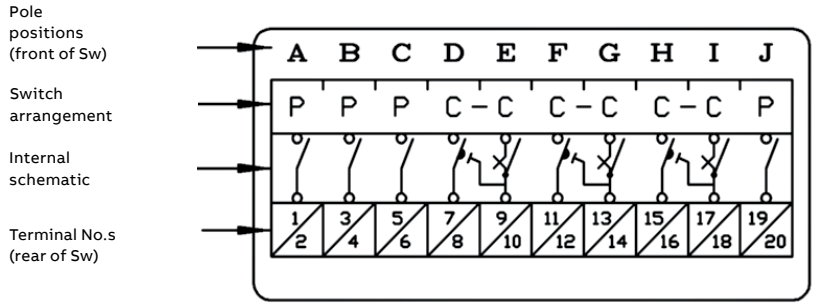
18



—
Figure 19. Typical FT-1 switch connection schematic

—
19

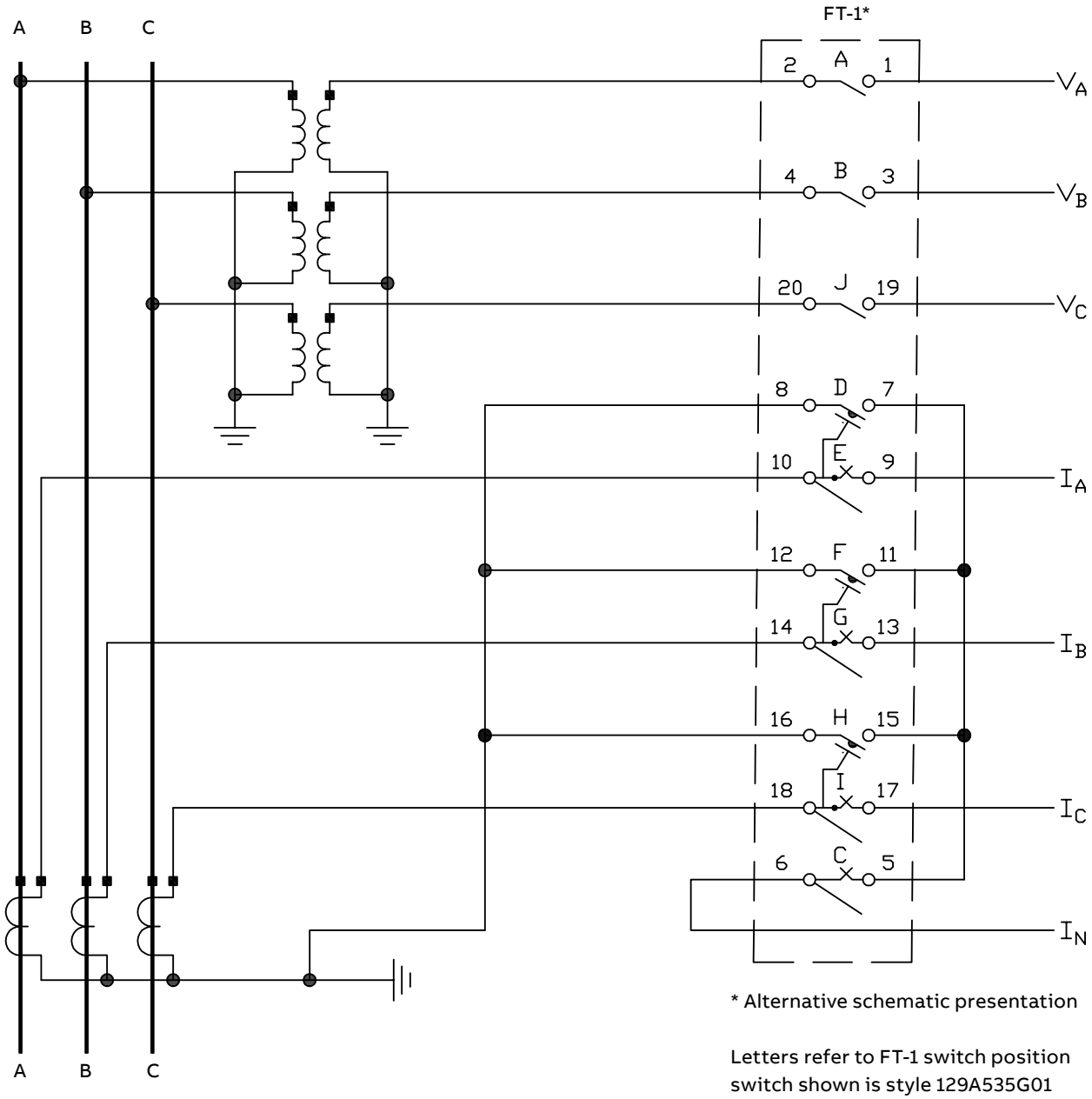




FT-1 style No.129A514G01
(switch layout)

—
Figure 20. FT-1 switch connection schematic

—
20



* Alternative schematic presentation

Letters refer to FT-1 switch position switch shown is style 129A535G01 (10 poles)

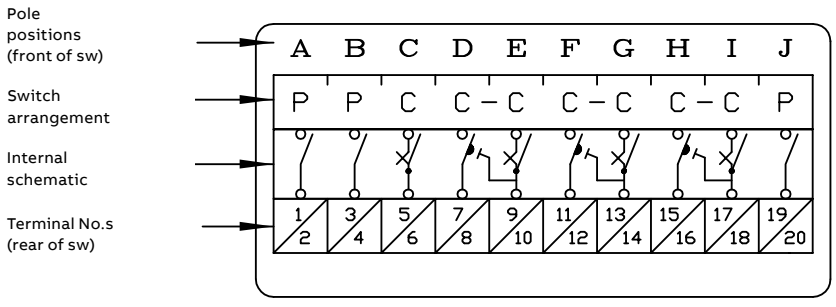
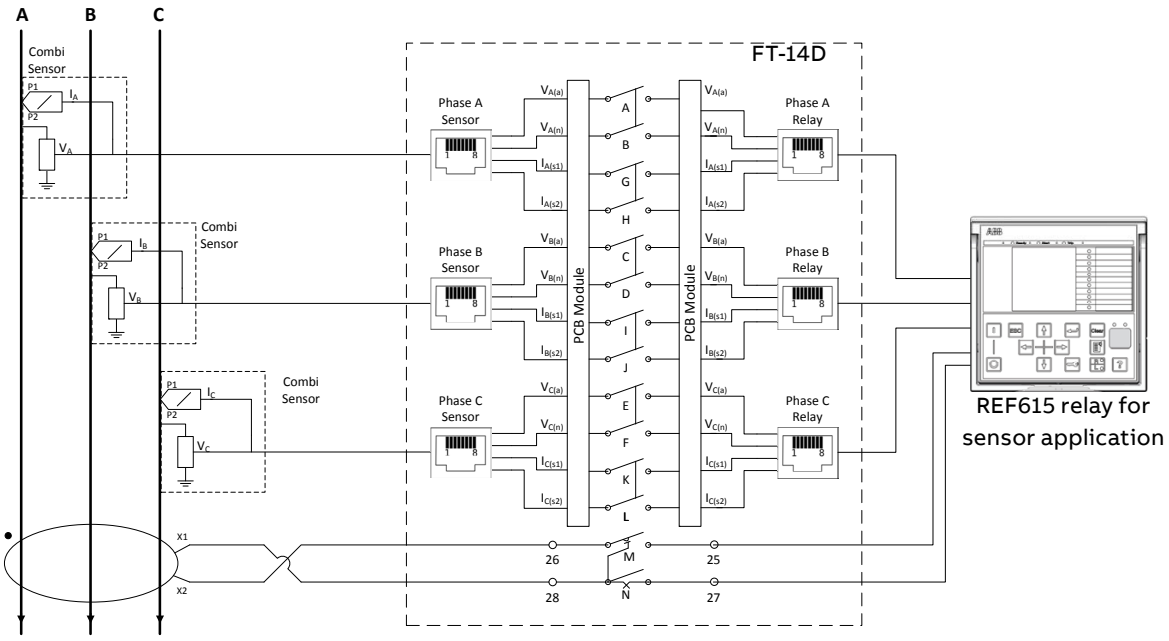


Figure 21. FT-14D with combi sensor and REF615 sensor relay with optional ground CT

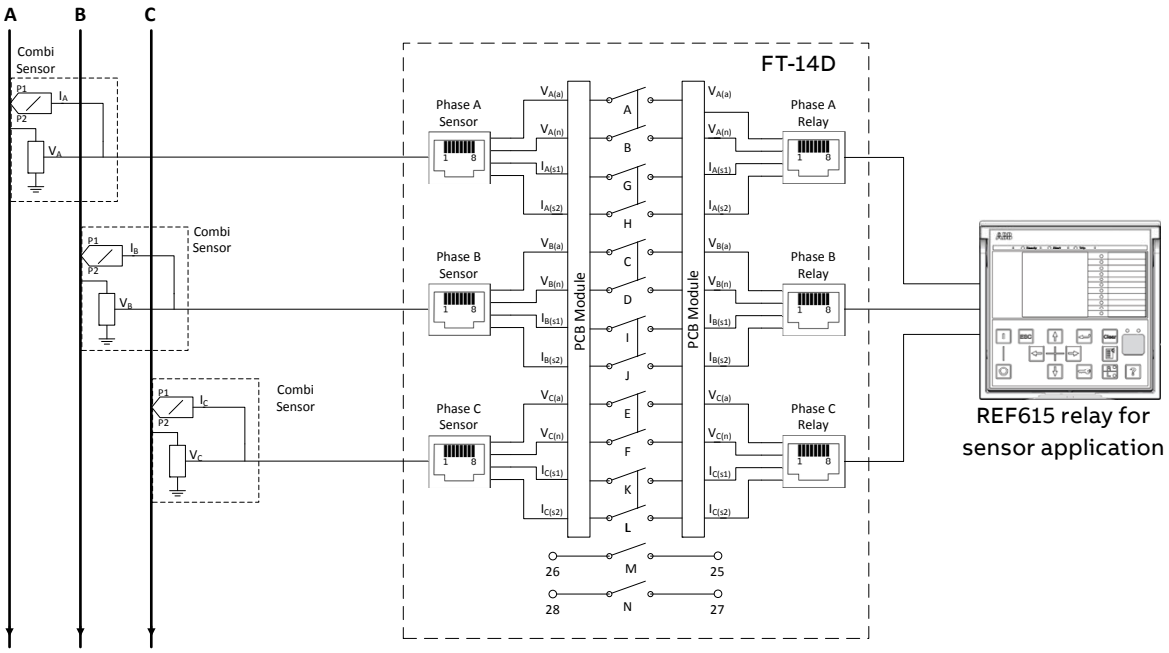
Figure 22. FT-14D with combi sensors and REF615 sensor relay with optional potential poles

21



General concept FT-14D with combi sensors, external ground CT and REF615 sensor relay

22

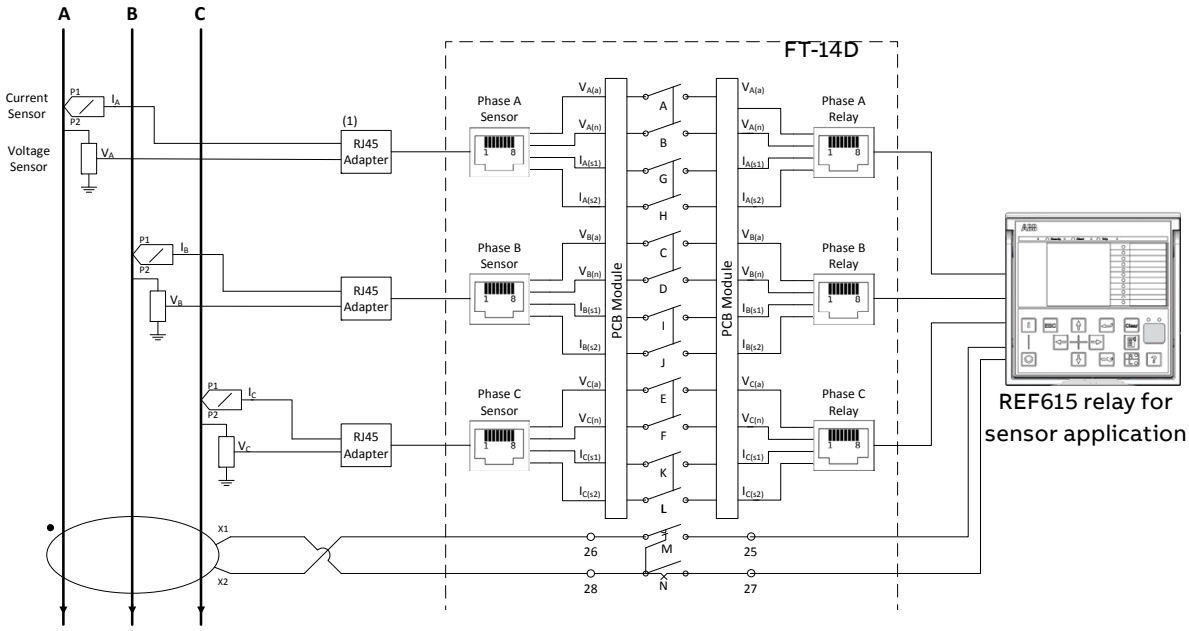


General concept FT-14D switch with combi sensors and REF615 sensor relay

Figure 23. FT-14D with current and voltage sensors and REF615 sensor relay

Figure 24. FT-14D switch with current and voltage sensors and REF615 sensor relay

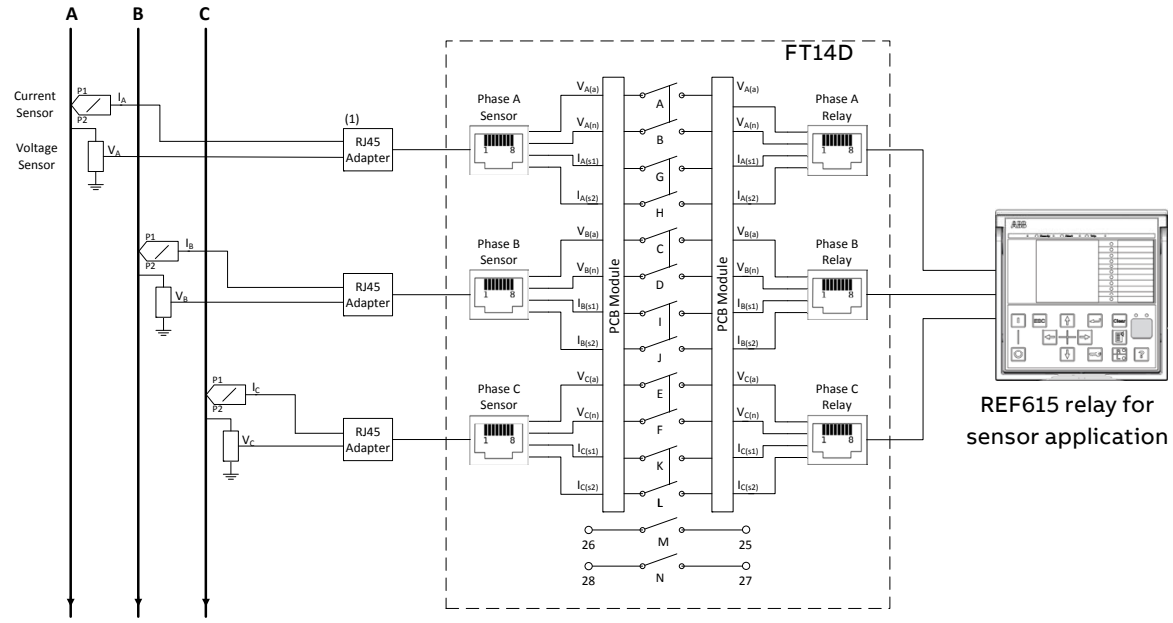
23



General concept FT-14D with separate current and voltage sensors, external ground CT and and REF615 sensor relay

(1) If separate current and voltage sensors are used in application, use optional RJ45 adapter to merge the signals from current and voltage sensors. The RJ45 adapter is not required if only current sensor is used.

24



General concept FT-14D with current and voltage sensors and REF615 sensor relay

(1) If separate current and voltage sensors are used in application, use optional RJ45 adapter to merge the signals from current and voltage sensors. The RJ45 adapter is not required if only current sensor is used.

ABB Inc.
4300 Coral Ridge Drive
Coral Springs, FL 33065
Phone: +1 954 752 6700

abb.com/mediumvoltage
abb.com/substationautomation

1VAC394641-PG REV F SEPTEMBER 2018