

Characteristics:

General description:

This Termination Board (TB) provides direct connection between the I/O Card of the system and D5000 / D6000 Series modules.
The Intrinsically Safe protection and signal isolation between Safe and Hazardous Area, is provided by D5000 Series Associated Apparatus. The 24 Vdc Power Supply of the TB is connected to two plug-in terminal blocks, for a redundant power supply.
The power supply for modules is given by TB power bus.

Termination Board general characteristics:

| Number of positions | Features |
|---------------------|--|
| 8 | 1) Power Supply voltage redundancy; 2) HART multiplexing; 3) Abnormal supply voltage signaling; 4) Cumulative module fault signaling. |

Supported Invensys FBM200 I/O Cards:

| I/O Card Type | I/O Card Model | Number of channels per I/O Card | Number of I/O Cards per board | Number of channels per board | Supported GM Modules* |
|---------------|---------------------------------------|---------------------------------|-------------------------------|------------------------------|---|
| Analog In | FBM201 FBM214 FBM214b FBM216 | 8 | 1 | 8 | D5011S, D5014S D5072S, D6011S, D6014S, D6072S |
| | | | 2 | 16 | D5011D, D5014D, D5072D, D6011D, D6014D, D6072D |
| Analog Out | FBM215 FBM218 FBM237 | 8 | 1 | 8 | D5020S, D6020S |
| | | | 2 | 16 | D5020D, D6020D |
| Analog In/Out | FBM244 | 8 | 1 | 8 | D5011S, D5014S, D5072S, D6011S, D6014S, D6072S, D5020S, D6020S |
| | | | 2 | 16 | D5011D, D5014D, D5072D, D6011D, D6014D, D6072D, D5020D, D6020D |

* Do not mix D5000 Intrinsically Safe barriers with D5000 Relay modules or D6000 Isolators on same termination board.

Features:

- FBM200 AI/AO cards board interfaces
- 8 positions Terminal Board for up to 16 channels.
- Lower cables installation and maintenance costs.
- Power supplies fault monitoring.
- Spare fuse provided.
- Mounting hardware provided for:
 - Wall mounting, M4 thread screw;
 - Wall mounting, M4 self tapping screw;
 - Single Din Rail mounting kit.

Ordering Information:

Model: TB-D5008-INV-002

Technical Data:

Supply:

24 Vdc nom (20 to 30 Vdc) reverse polarity protected, double terminal blocks for redundant power supply, with OR diodes to mix supply voltages.
Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm².
2 LEDs indication: green color, one for supply 1 and one for supply 2.
Protection fuse: 2 A time lag (spare fuse provided on Termination Board).

Fault detection:

1) Preventive - abnormal supply voltage: supply 1 or supply 2 is < 18 Vdc (Under Voltage, UV) or > 30 Vdc (Over Voltage, OV).
2) Critical - abnormal supply voltages or cumulative fault: both supplies are in under (< 18 Vdc) or over (> 30 Vdc) voltage condition OR cumulative fault indication (about presence of short or open field circuit for any DO channel).
LED fault signaling (for both case 1 and 2): 2 red LEDs (UV and OV of supply 1); 2 red LEDs (UV and OV of supply 2); a cumulative fault red LED.
Relay fault signaling (one for each case 1 or 2): a voltage free NE SPDT - 1 Form C relay contacts (de-energized in fault condition), with the following characteristics:
Contact material: AgCdO.
Contact rating: 2 A 36 Vac 72 VA, 2 A 48 Vdc 80 W (resistive load).
Mechanical / Electrical life: 30 * 10⁶ / 1 * 10⁵ operation, typical.
Coil status LED indication: yellow color, turn on when coil is energized.
Connection: by polarized plug-in disconnect screw terminal blocks to accommodate terminations up to 2.5 mm².

FBM200 I/O card interface:

Connection: two SUB D25 poles male connector (requires female mating connector).

HART Multiplexing:

Connection: 34 poles male connector (requires female mating connector).

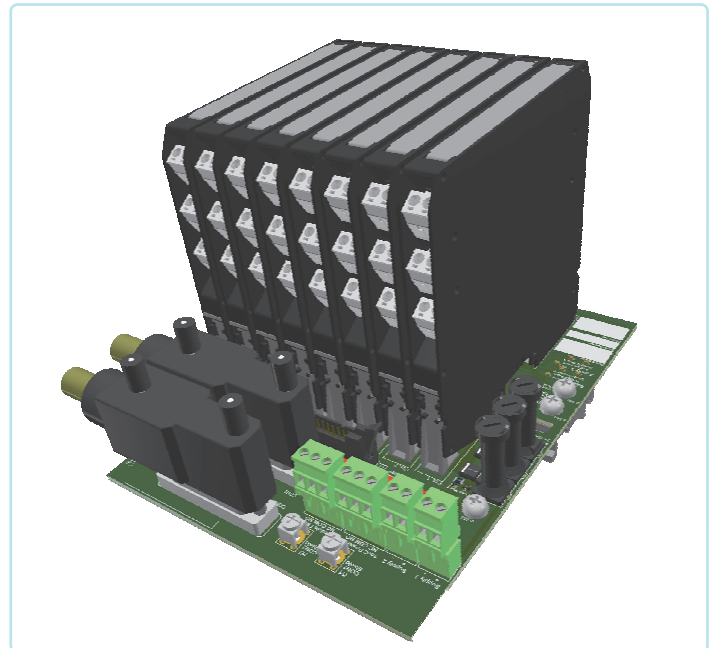
Environmental conditions:

Operating: temperature limits – 40 to + 70 °C,
relative humidity max 90 % non condensing, up to 35 °C.
Storage: temperature limits – 45 to + 80 °C.

Mounting:

Hardware included for mounting on wall and single DIN rail.
Weight: about 200 g (excluding modules and mounting options).
Location: Safe Area / Ordinary locations.
Dimensions: Width 165 mm, Depth 185 mm, Height 125 mm.

Image:



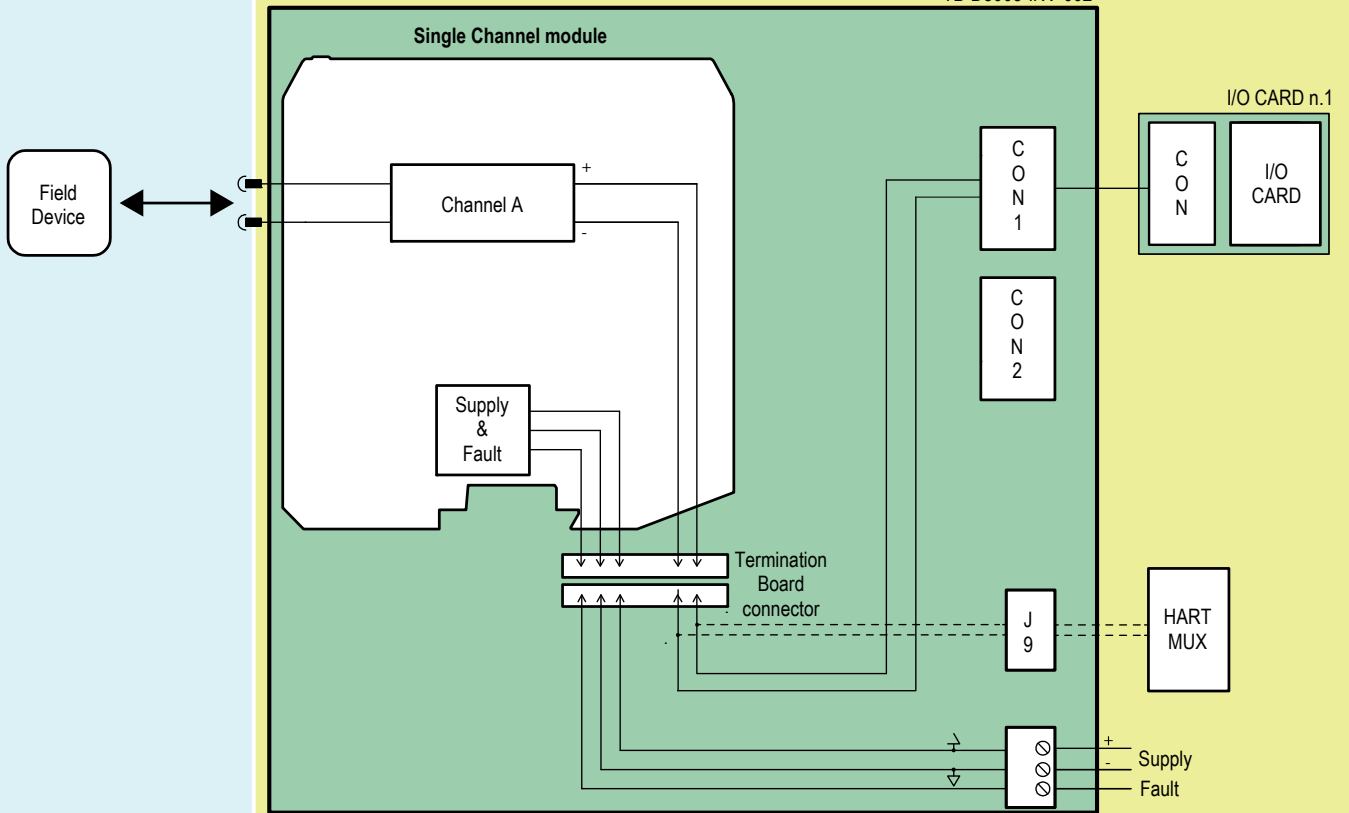
Loop Diagram

FIELD

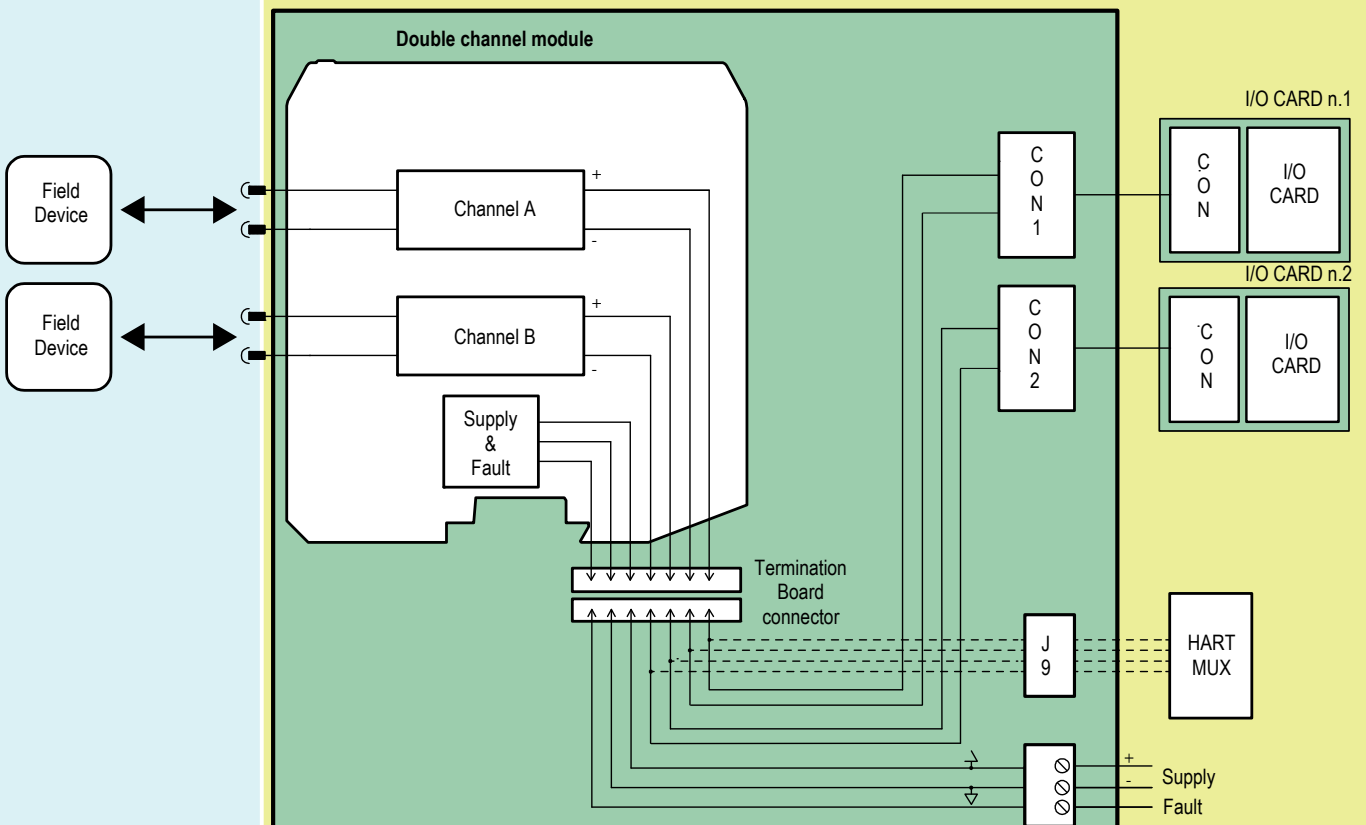
SAFE AREA

Note: Do not mix D5000 Intrinsically Safe barriers with D5000 relay modules or D6000 isolators on same termination board

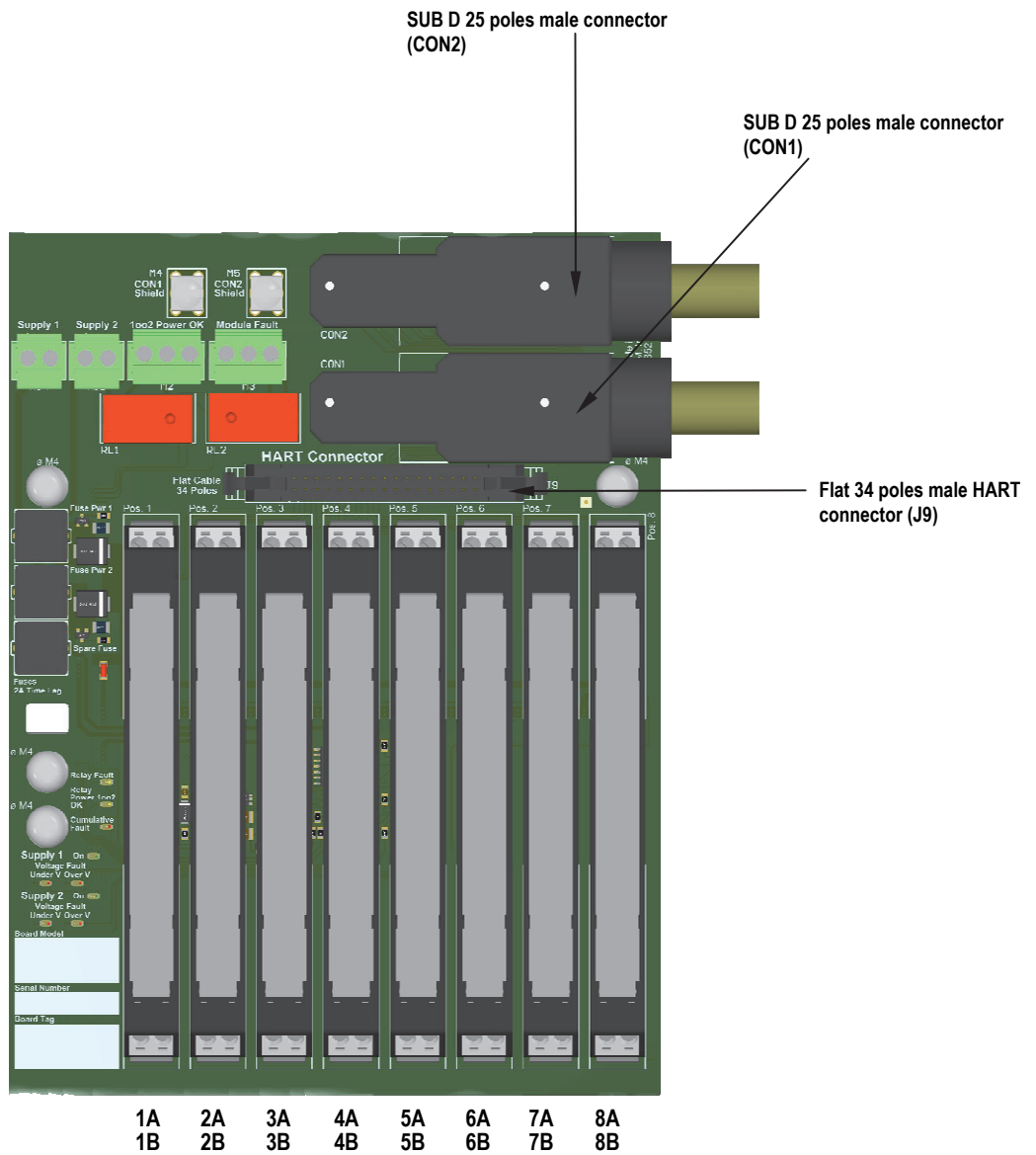
TB-D5008-INV-002



TB-D5008-INV-002



Termination Board Description:

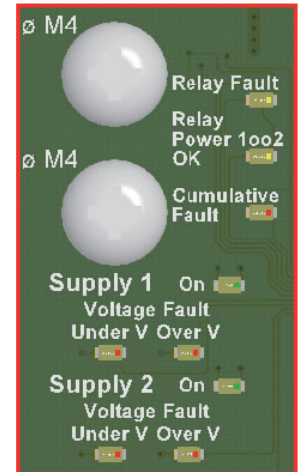


Termination Board Fault Logic:

LED Signaling:

Meaning of LEDs on termination boards:

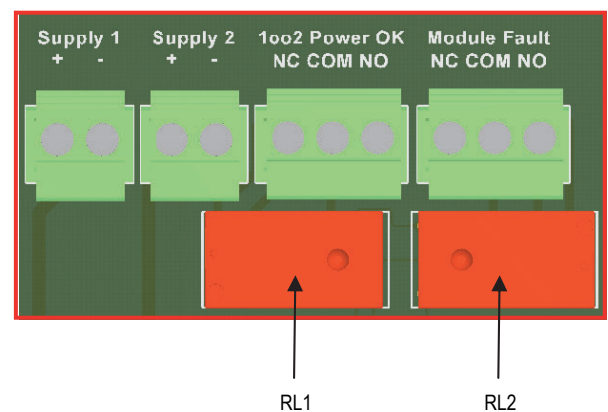
| TAG | LED COLOR | MEANING |
|---------------------|-----------|---|
| Supply 1 On | GREEN | The LED is on when the Supply 1 is present, regardless of its voltage |
| Supply 1 Under V | RED | The LED is on when the Supply 1 is under-voltage (<18 V) |
| Supply 1 Over V | RED | The LED is on when the Supply 1 is over-voltage (>30 V) |
| Supply 2 On | GREEN | The LED is on when the Supply 2 is present, regardless of its voltage |
| Supply 2 Under V | RED | The LED is on when the Supply 2 is under-voltage (<18 V) |
| Supply 2 Over V | RED | The LED is on when the Supply 2 is over-voltage (>30 V) |
| Cumulative Fault | RED | The LED is on when at least one module/barrier reported a fault |
| Relay Power 1oo2 OK | YELLOW | The LED is on when both supply voltages are within the regular range (>18 V and <30 V) |
| Relay Fault | YELLOW | The LED is on when the following two conditions hold: 1. at least one voltage supply is within the regular range (>18 V and <30 V) 2. no module/barrier fault is reported |



Relay Activation Conditions:

The two relays are activated according to the following rules:

| TAG | ACTIVATION |
|---------------------|--|
| 1oo2 Power OK (RL1) | The relay is energized when both supply voltages are within the regular range (>18 V and <30 V), i.e. when "Relay 1oo2 Power OK" yellow LED is on. |
| Module Fault (RL2) | The relay is energized when the following two conditions hold: 1. at least one voltage supply is within the regular range (>18 V and <30 V) 2. no module/barrier fault is reported Therefore, the relay is energized when the "Fault" yellow LED is on. |



All I/O Cards but FBM244

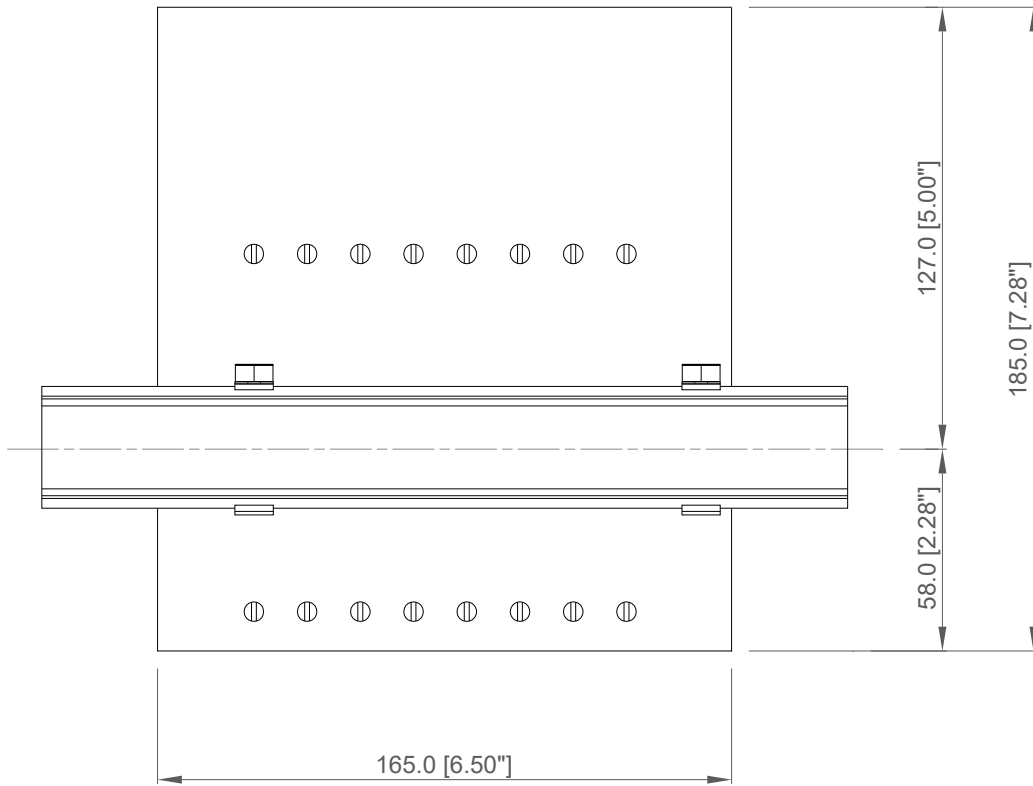
| MODULE POSITION | MODULE CHANNEL NUMBER | INTERFACE CARD(S) CHANNEL NUMBER | MODULE CHANNEL POSITIVE(+) CONNECTION | MODULE CHANNEL NEGATIVE(-) CONNECTION | HART MULTIPLEXING CONNECTOR POSITIVE(+) PIN NUMBER | HART MULTIPLEXING CONNECTOR NEGATIVE(-) PIN NUMBER | NOTE |
|-----------------|-----------------------|----------------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 1 | 1A | 1 on I/O card n.1 | 12(CON1) | 13(CON1) | 1 (J9) | 2 (J9) | CON1, CON2: <ul style="list-style-type: none"> • Poles 2, 5, 8, 11, 16, 19, 22 and 25 are not connected. • Pole 1 is connected to screen J9: <ul style="list-style-type: none"> • The poles 33, 34 are not connected because not used |
| | 1B | 1 on I/O card n.2 | 12(CON2) | 13(CON2) | 17 (J9) | 18 (J9) | |
| 2 | 2A | 2 on I/O card n.1 | 23(CON1) | 24(CON1) | 3 (J9) | 4 (J9) | |
| | 2B | 2 on I/O card n.2 | 23(CON2) | 24(CON2) | 19 (J9) | 20 (J9) | |
| 3 | 3A | 3 on I/O card n.1 | 9(CON1) | 10(CON1) | 5 (J9) | 6 (J9) | |
| | 3B | 3 on I/O card n.2 | 9(CON2) | 10(CON2) | 21 (J9) | 22 (J9) | |
| 4 | 4A | 4 on I/O card n.1 | 20(CON1) | 21(CON1) | 7 (J9) | 8 (J9) | |
| | 4B | 4 on I/O card n.2 | 20(CON2) | 21(CON2) | 23 (J9) | 24 (J9) | |
| 5 | 5A | 5 on I/O card n.1 | 6(CON1) | 7(CON1) | 9 (J9) | 10 (J9) | |
| | 5B | 5 on I/O card n.2 | 6(CON2) | 7(CON2) | 25 (J9) | 26 (J9) | |
| 6 | 6A | 6 on I/O card n.1 | 17(CON1) | 18(CON1) | 11 (J9) | 12 (J9) | |
| | 6B | 6 on I/O card n.2 | 17(CON2) | 18(CON2) | 27 (J9) | 28 (J9) | |
| 7 | 7A | 7 on I/O card n.1 | 3(CON1) | 4(CON1) | 13 (J9) | 14 (J9) | |
| | 7B | 7 on I/O card n.2 | 3(CON2) | 4(CON2) | 29 (J9) | 30 (J9) | |
| 8 | 8A | 8 on I/O card n.1 | 14(CON1) | 15(CON1) | 15 (J9) | 16 (J9) | |
| | 8B | 8 on I/O card n.2 | 14(CON2) | 15(CON2) | 31 (J9) | 32 (J9) | |

I/O Card FBM244

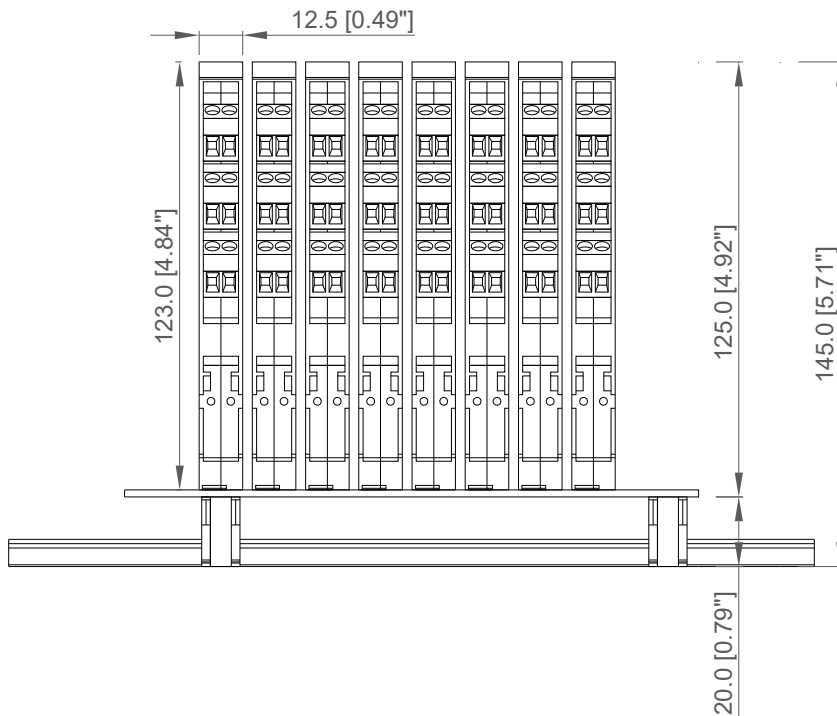
| MODULE POSITION | MODULE CHANNEL NUMBER | INTERFACE CARD(S) CHANNEL NUMBER | MODULE CHANNEL POSITIVE(+) CONNECTION | MODULE CHANNEL NEGATIVE(-) CONNECTION | HART MULTIPLEXING CONNECTOR POSITIVE(+) PIN NUMBER | HART MULTIPLEXING CONNECTOR NEGATIVE(-) PIN NUMBER | NOTE |
|-----------------|-----------------------|----------------------------------|---------------------------------------|---------------------------------------|--|--|---|
| 1 | 1A | 5 on I/O card n.1 | 12(CON1) | 13(CON1) | 1 (J9) | 2 (J9) | CON1, CON2: <ul style="list-style-type: none"> • Poles 2, 5, 8, 11, 16, 19, 22 and 25 are not connected. • Pole 1 is connected to screen • Interface card channels 1 to 4 are AI 5 to 8 are AO J9: <ul style="list-style-type: none"> • The poles 33, 34 are not connected because not used |
| | 1B | 5 on I/O card n.2 | 12(CON2) | 13(CON2) | 17 (J9) | 18 (J9) | |
| 2 | 2A | 6 on I/O card n.1 | 23(CON1) | 24(CON1) | 3 (J9) | 4 (J9) | |
| | 2B | 6 on I/O card n.2 | 23(CON2) | 24(CON2) | 19 (J9) | 20 (J9) | |
| 3 | 3A | 7 on I/O card n.1 | 9(CON1) | 10(CON1) | 5 (J9) | 6 (J9) | |
| | 3B | 7 on I/O card n.2 | 9(CON2) | 10(CON2) | 21 (J9) | 22 (J9) | |
| 4 | 4A | 8 on I/O card n.1 | 20(CON1) | 21(CON1) | 7 (J9) | 8 (J9) | |
| | 4B | 8 on I/O card n.2 | 20(CON2) | 21(CON2) | 23 (J9) | 24 (J9) | |
| 5 | 5A | 1 on I/O card n.1 | 6(CON1) | 7(CON1) | 9 (J9) | 10 (J9) | |
| | 5B | 1 on I/O card n.2 | 6(CON2) | 7(CON2) | 25 (J9) | 26 (J9) | |
| 6 | 6A | 2 on I/O card n.1 | 17(CON1) | 18(CON1) | 11 (J9) | 12 (J9) | |
| | 6B | 2 on I/O card n.2 | 17(CON2) | 18(CON2) | 27 (J9) | 28 (J9) | |
| 7 | 7A | 3 on I/O card n.1 | 3(CON1) | 4(CON1) | 13 (J9) | 14 (J9) | |
| | 7B | 3 on I/O card n.2 | 3(CON2) | 4(CON2) | 29 (J9) | 30 (J9) | |
| 8 | 8A | 4 on I/O card n.1 | 14(CON1) | 15(CON1) | 15 (J9) | 16 (J9) | |
| | 8B | 4 on I/O card n.2 | 14(CON2) | 15(CON2) | 31 (J9) | 32 (J9) | |

Termination Board Single DIN Rail mounting and overall dimensions:

Bottom view

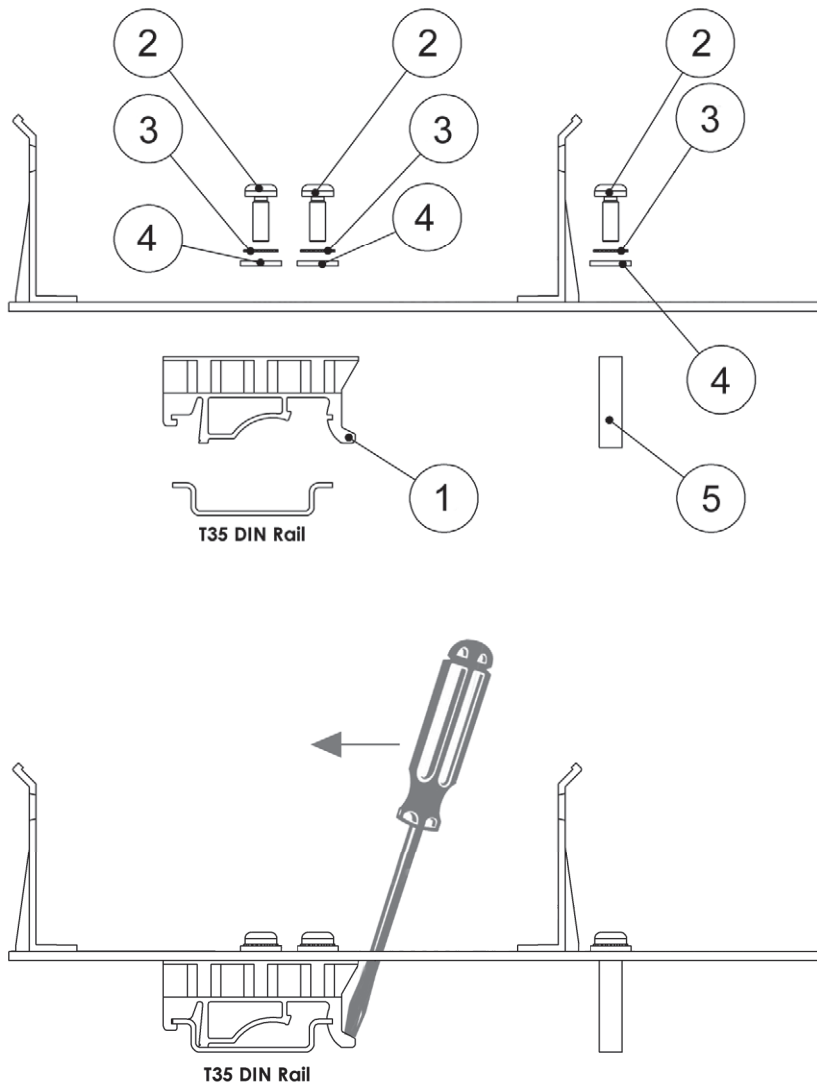


Side view



All dimensions are expressed in millimeters [inches]

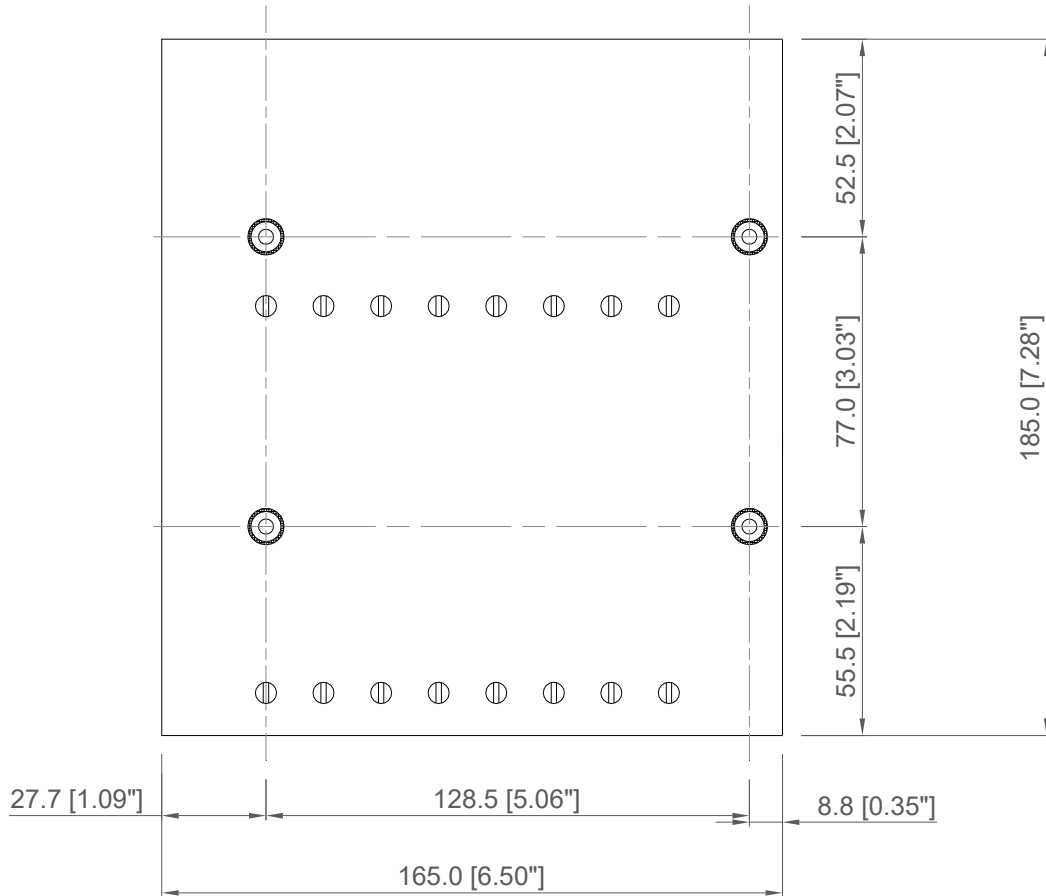
Mounting features kit TB-OPT-001



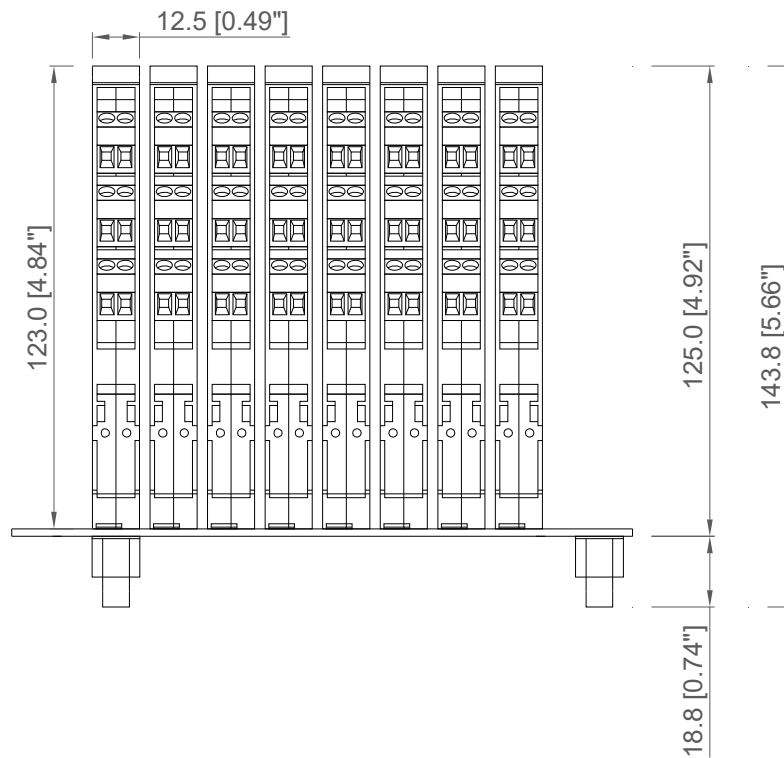
| Ref. Nr | Q.ty | Description | Material |
|---------|------|-------------------------------|-----------------|
| 1 | 2 | T35 Din Rail Adapter | PA |
| 2 | 6 | 3.5 x 9.5 Self tapping screw | Stainless Steel |
| 3 | 6 | M3 External Tooth lock Washer | Stainless Steel |
| 4 | 6 | M3 Washer | Stainless Steel |
| 5 | 2 | 6 c 20 Spacer | PA |

Wall mounting overall dimensions for M4 self tapping screw:

Bottom view

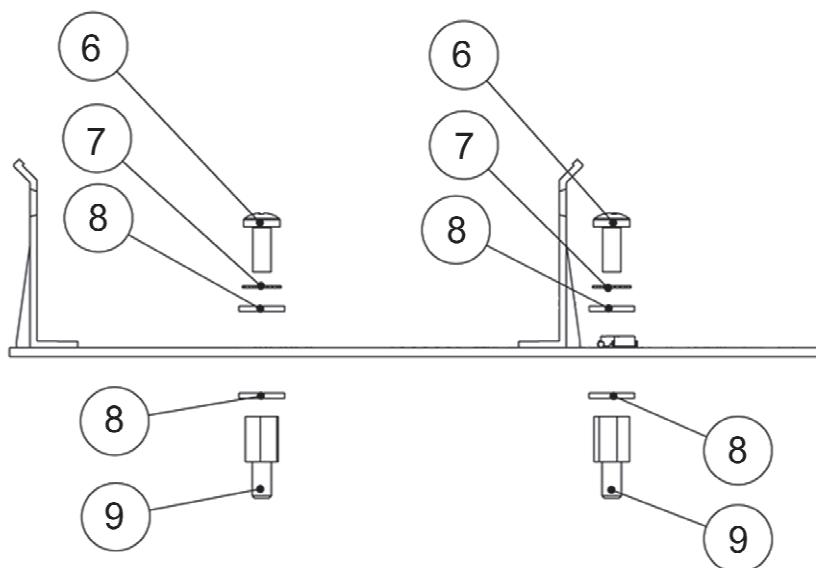
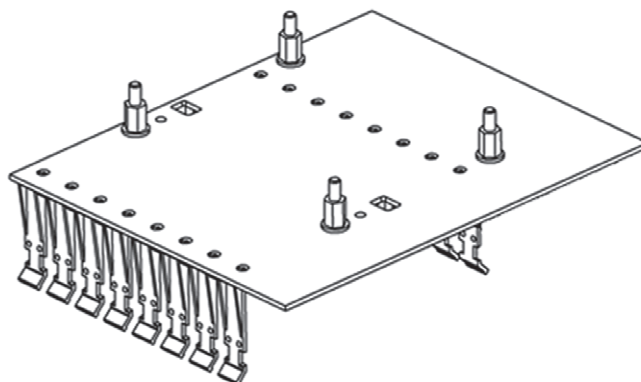


Side view



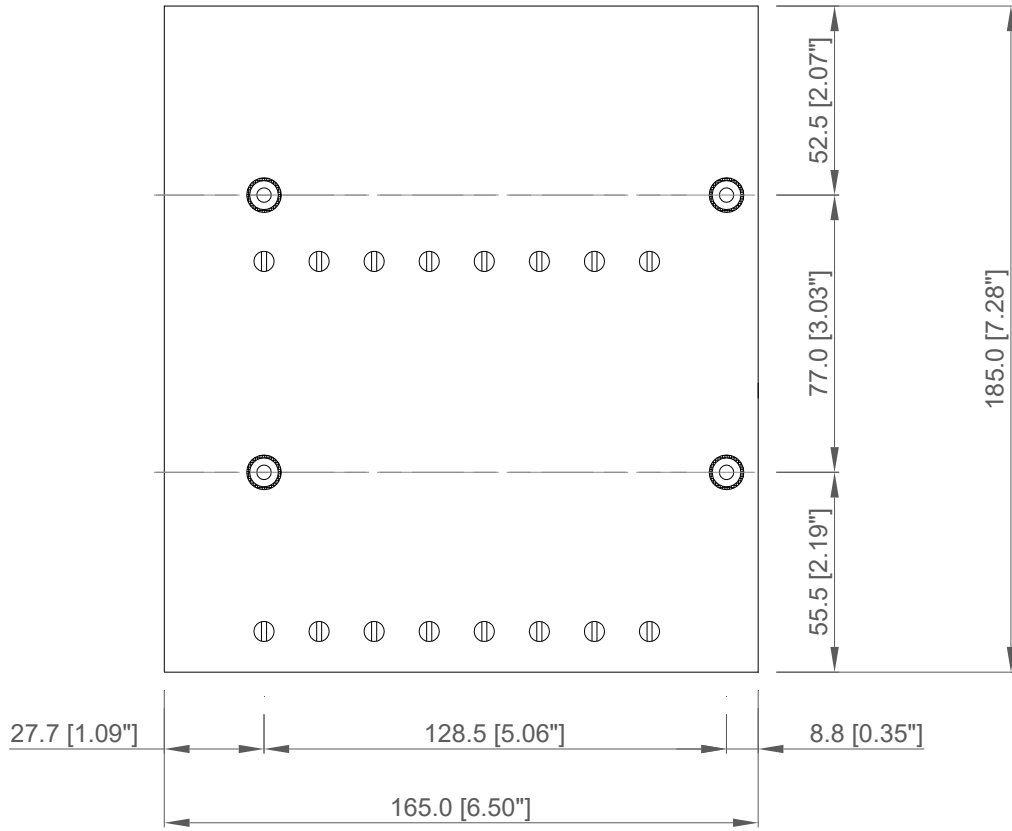
All dimensions are expressed in millimeters [inches]

Mounting features kit TB-OPT-001

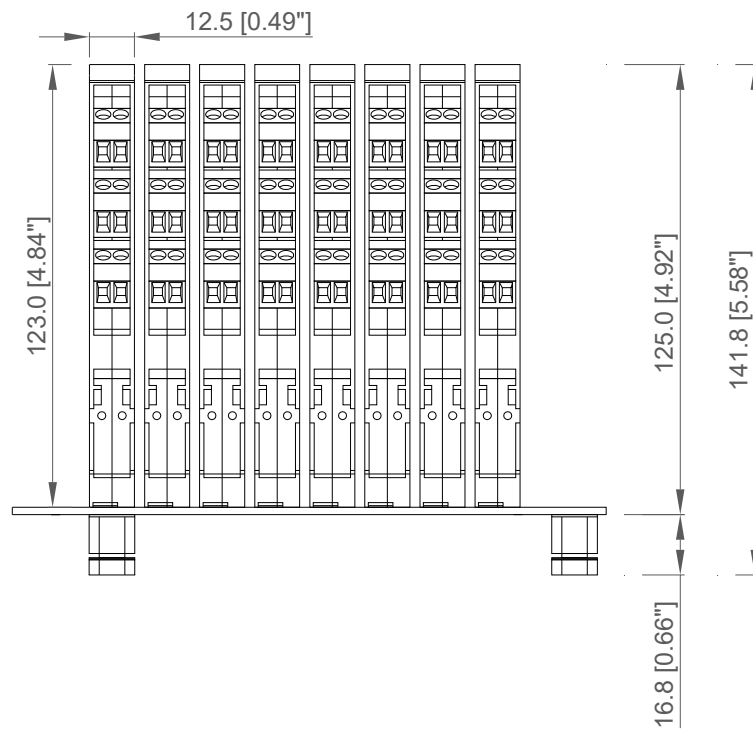


| Ref. Nr | Q.ty | Description | Material |
|---------|------|-------------------------------|-------------------|
| 6 | 4 | M4 x 8 Screw | Stainless Steel |
| 7 | 4 | M4 External Tooth lock Washer | Stainless Steel |
| 8 | 8 | M4 Washer | Stainless Steel |
| 9 | 4 | Self Tapping Spacer | NI - Plated Brass |

Bottom view

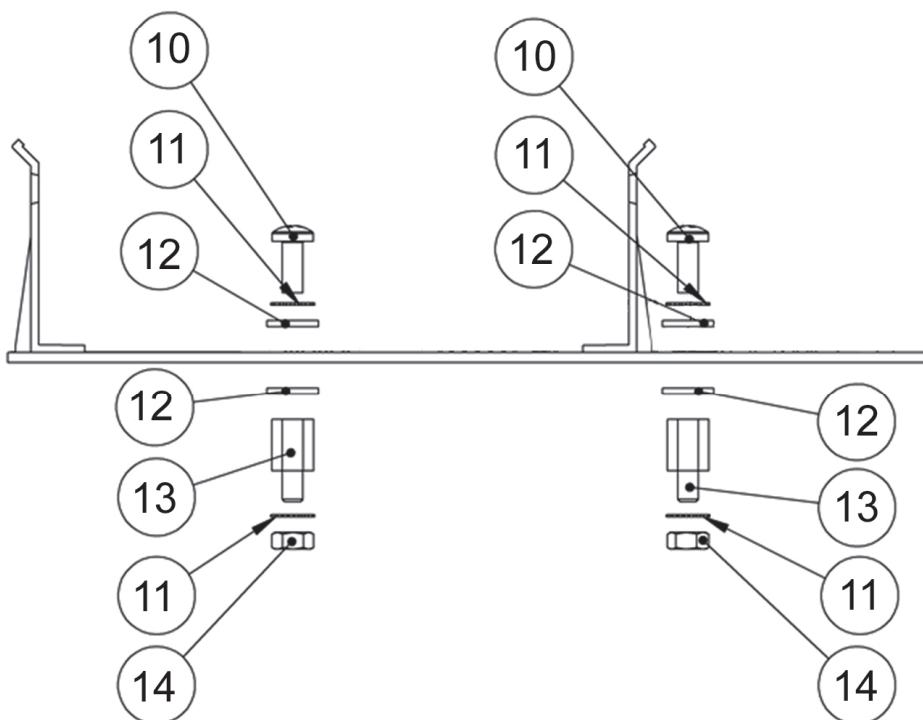
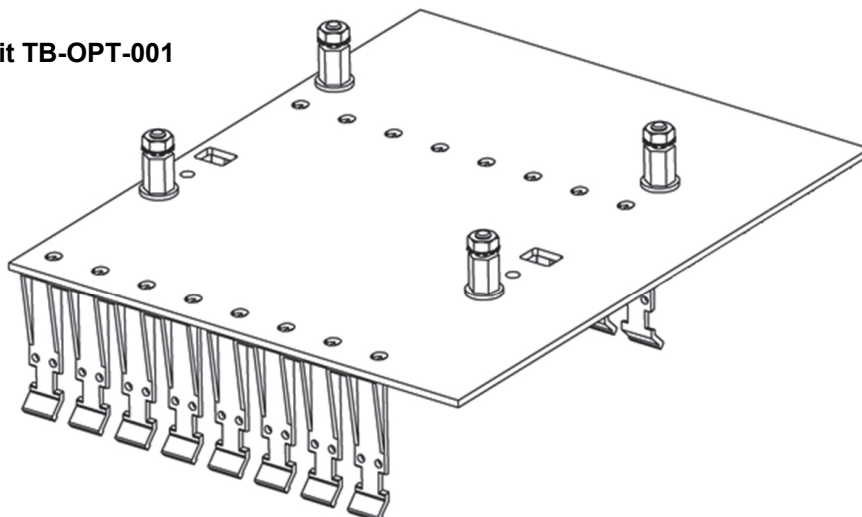


Side view



All dimensions are expressed in millimeters [inches]

Mounting features kit TB-OPT-001



| Ref. Nr | Q.ty | Description | Material |
|---------|------|-------------------------------|-------------------|
| 10 | 4 | M4 x 8 Screw | Stainless Steel |
| 11 | 8 | M4 External Tooth lock Washer | Stainless Steel |
| 12 | 8 | M4 Washer | Stainless Steel |
| 13 | 4 | Threaded Spacer | NI - Plated Brass |
| 14 | 4 | M4 Nut | Stainless Steel |