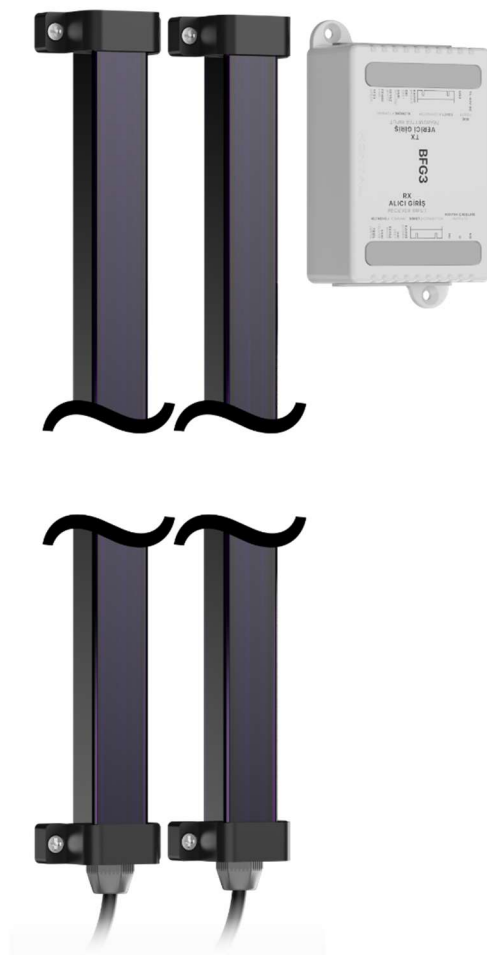


BF3

Light Curtain 3



KONTAL

CE

Before operating the device, be sure to read this user manual carefully. Follow the steps described in the installation, electrical connection, and initial startup sections with attention. After completing these steps, the product owner/user must keep this manual in a known and easily accessible location for the entire service life of the product.



- Store the product in a dry environment. Otherwise, malfunctions may occur.
- In battery- or accumulator-powered products, batteries and accumulators are not covered under warranty. Similarly, failures caused by battery discharge or leakage in products that have exceeded their shelf life are not covered under warranty.
- All service and repair operations must be carried out exclusively by Kontal Elektronik technical service. The product must not be tampered with by unauthorized personnel.
- The operating voltage of each product is indicated on the label. Do not supply the device with a voltage different from the specified value.



- ✓ Failure to comply with the above-mentioned conditions may result in fire, serious personal injury, or damage to the product or the structure in which it is installed. In such cases caused by user negligence or misuse, **Kontal Elektronik San. ve Tic. Ltd. Şti.** assumes no responsibility.
- ✓ This symbol will be used to highlight important notes in the following sections.



- ✓ Do not touch the power supply terminals of the device with bare hands.
- This symbol will be used to indicate warnings related to voltage in the following sections.



- This symbol on the label indicates that the device operates with a DC supply voltage.



- This symbol on the label indicates that the device is equipped with reinforced insulation.



- This symbol on the product or its packaging indicates that the product must not be disposed of as household waste. Instead, it should be delivered to designated collection points for the recycling of electrical and electronic equipment. Improper disposal or destruction of the product may have adverse effects on the environment and human health.



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- Ensure that the system is properly grounded for the device to operate reliably.

1. DEFINITION

BF3 Safety Light Curtain is a multi-purpose sensor designed for use in elevator doors, automatic doors, shutter systems, and similar automation applications. It provides an output signal when a person or object is detected within its sensing field. Developed to meet both safety and control requirements, the BF3 offers flexible operation with two distinct detection modes.

The BF3 is available in two different models, depending on the application and level of safety required:

- BF3-90: 90 cm height
- BF3-180: 180 cm height, also supports Linear (Shutter) Mode

Detection Modes:

- Linear (Shutter) Mode – *Available only on the 180 cm model.* One of the transmitter or receiver modules is mounted on the inner side of the door, and the other on the outer side. The system does not react to door movements but detects any object that interrupts the beam path.
- Cross Mode – *Available on both models.* Enables the detection of smaller objects through the use of diagonally aligned infrared beams.

With these features, the BF3 Safety Light Curtain is a modular safety solution that offers application-specific functionality for a wide range of automation systems.

1.1 BOX CONTENT

- 1x BF3/A – 90/180 Receiver Module
- 1x BF3/V – 90/180 Transmitter Module
- 1x BF3/G – Power Supply Board
- 1x BF3 User Manual
- 1x BF3 – 3m Transmitter Extension Cable with Connector
- 1x BF3 – 3m Receiver Extension Cable with Connector
- 10x BF3 – Mounting Brackets (*for 90 cm model*)
 - 1. 2x Type A mounting bracket
 - 2. 4x Type B mounting bracket
 - 3. 4x Type C mounting bracket
- 12x BF3 – Mounting Brackets (*for 180 cm model*)
 - 1. 4x Type A mounting bracket
 - 2. 4x Type B mounting bracket
 - 3. 4x Type C mounting bracket

**For special orders, the box contents may vary depending on the project or customer requirements.*

**Depending on the application or user preference, a 3-meter extension cable with connector for the BF3 can be ordered separately.*



The specified maximum operating distance of the photoelectric sensor is a nominal value obtained under standard test conditions. External factors such as ambient light level, optical alignment, target surface color and reflectivity, dust and contamination, and environmental temperature may reduce the detection performance and operating distance.

2. TECHNICAL SPECIFICATION

2.1 BF3 - 180 TECHNICAL SPECIFICATIONS

Model	BF3/A-180cm RX Module	BF3/V-180cm TX Module
Product Code	K221-01	K222-01
Operating Voltage	12V DC	12V DC
Operating Current	35mA @ 12V DC	50mA @ 12V DC
Operating Distance	1m(min.) / 8m(max.)	1m(min.) / 8m(max.)
Operating Modes	Linear(Shutter) / Cross	Linear(Shutter) / Cross
Operating Temperature	-20 °C +55 °C	-20 °C +55 °C
Beams / Pitch	18 pcs / 10cm	18 pcs / 10cm
IP Class	IP65	IP65
Weight	750gr	700gr
Dimensions (W x H x D)	3,6 x 182 x 1,3cm	3,6 x 182 x 1,3cm

2.2 BF3 – 90 TECHNICAL SPECIFICATIONS

Model	BF3/A-90cm RX Module	BF3/V-90cm TX Module
Product Code	K219-01	K220-01
Operating Voltage	12V DC	12V DC
Operating Current	35mA @ 12V DC	50mA @ 12V DC
Operating Distance	1m(min.) / 8m(max.)	1m(min.) / 8m(max.)
Operating Modes	Cross / Linear	Cross / Linear
Operating Temperature	-20 °C +55 °C	-20 °C +55 °C
Beams / Pitch	9 pcs / 10cm	9 pcs / 10cm
IP Class	IP65	IP65
Weight	375gr	350gr
Dimensions (W x H x D)	3,6 x 92 x 1,3cm	3,6 x 92 x 1,3cm

2.3 BF3 - G TECHNICAL SPECIFICATIONS

Model	BF3/G – Light Curtain Supply Board
Product Code	K223-01
Operating Voltage	15-40V DC
Operating Current	70mA @ 24V DC
Operating Temperature	-20 °C +55 °C
Contact Type	Dry Contact (NO / NC)
Contact Capacity	30V DC 1A / 125V AC 0.3A
IP Class	Not Resistant to Liquid Contact!
BF3-180 Typ. Resp. Time (Linear/Cross)	40ms / 105ms
BF3-180 Max. Resp. Time (Linear/Cross)	60ms / 155ms
BF3-90 Typ. Resp. Time (Linear/Cross)	20ms / 55ms
BF3-90 Max. Resp. Time (Linear/Cross)	30ms / 80ms
Weight	118,5gr
Dimensions (W x H x D)	67,10 x 115,59 x 34,60 mm

3. ADJUSTMENT COMPONENT

3.1 BF3-G Adjustment Component

POT1: This component allows you to adjust the detection range of the device.

(See also section 5.2.)

DIP Switch: This component allows you to configure the operating modes of the device. *(See also section 5.3)*

LED: This component allows you to monitor the contact status of the device.

(See also section 5.4)

BUZZER: This component provides an audible alert when an object interrupts the beam between the receiver and transmitter modules. *(See also section 5.3)*

3.2 BF3-A Adjustment Component

LED1: This component allows you to check whether the device is receiving power supply voltage. *(See also section 5.4)*

LED2: This component allows you to check whether an object is obstructing the path between the receiver and transmitter. *(See also section 5.4.)*

3.3 BF3-V Adjustment Component

LED1: This component allows you to verify whether the device is receiving supply voltage. *(See also section 5.4)*

LED2: Indicates the distance adjustment made via POT1, providing visual feedback. *(See also section 5.4)*

4. BF3 – OPERATING MODES

The BF3 offers two different operating modes. These modes can be selected via the DIP switch located on the device. Details of each operating mode are provided below.

4.1 BF3 – Linear Mode / Shutter Mode *(Only available on the 180 cm model)*

In this mode, each transmitter beam is paired with a corresponding receiver beam for linear scanning. When this mode is activated, Shutter Mode is automatically enabled. One of the transmitter or receiver modules should be mounted on the inner side of the door, and the other on the outer side. The system does not respond to door movements, but it detects any object that interrupts the beam path.

Shutter Mode is designed in accordance with the standard descent speeds of shutter and automatic PVC door systems. Therefore, the system does not generate an output signal during the shutter's descent; however, if an object or obstruction enters the detection area during this process, an output signal is generated. The following technical condition applies for shutter applications:

- Maximum shutter closing speed: **1.5 m/s**
- **Cable exit direction:** The cables of the receiver and transmitter modules must be routed either from the top or bottom. If a closing movement is

detected that exceeds the specified speed, the system will generate an output signal as if an obstacle is present.

4.2 BF3 – Cross Mode

In this mode, each transmitter beam is paired with three different receiver beams for scanning. The detection sensitivity of Cross Mode is approximately twice as high compared to Linear Mode.

For example, while Linear Mode can detect objects with a minimum diameter of 10 cm, switching to Cross Mode allows detection of objects as small as 5 cm in diameter. When operating in Cross Mode, the scanning speed will be slower than in Linear Mode; however, the detection sensitivity is significantly higher. The comparison table and illustrations related to the operating modes are provided below.

LINEAR MODE	CROSS MODE
The scanning speed is faster.	The scanning speed is slower.
The detection sensitivity is lower compared to Cross Mode.	The detection sensitivity is increased compared to Linear Mode.

Linear Mode / Shutter Mode

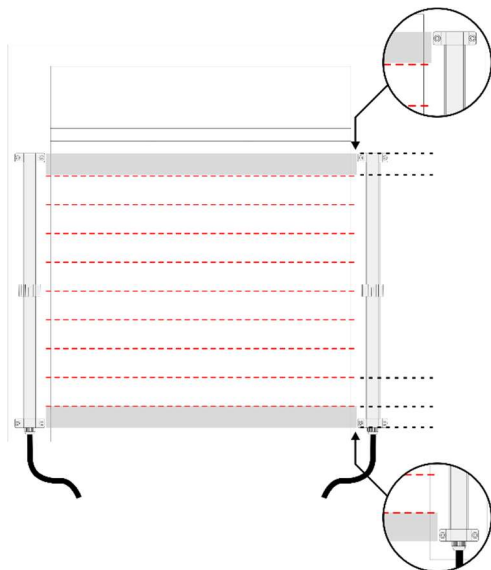


Figure 4.1 Linear Scan Mode Area Diagram

Cross Mode

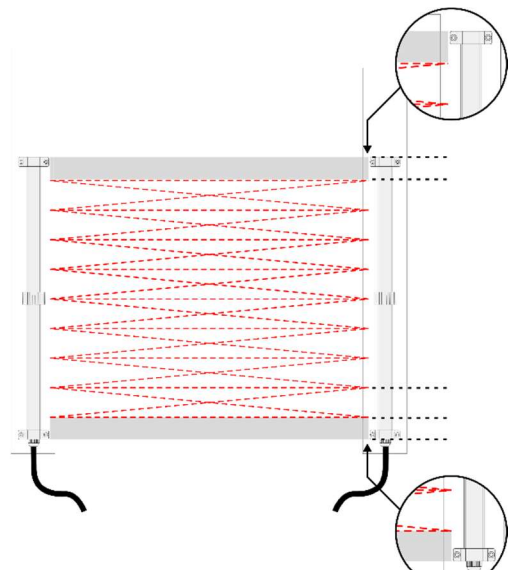


Figure 4.2 Cross Scan Mode Area Diagram

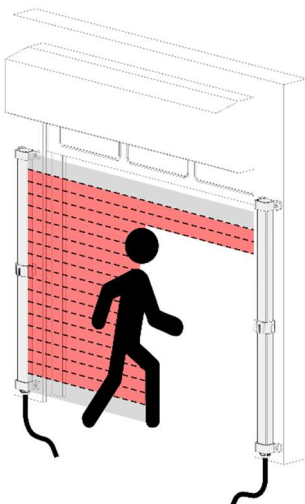


Figure 4.3 Linear Scan Mode Area Diagram 2

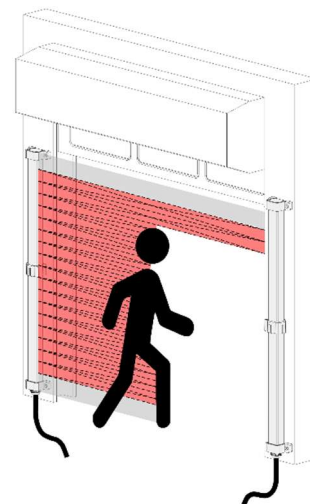


Figure 4.4 Cross Scan Mode Area Diagram 2

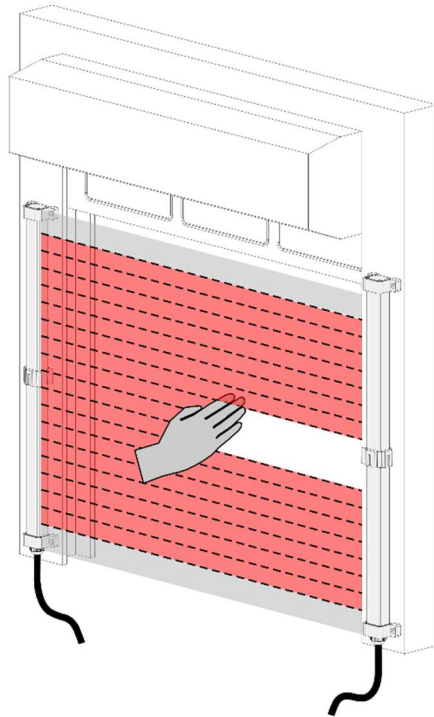


Figure 4.5 Linear Scan Mode Area Diagram 3

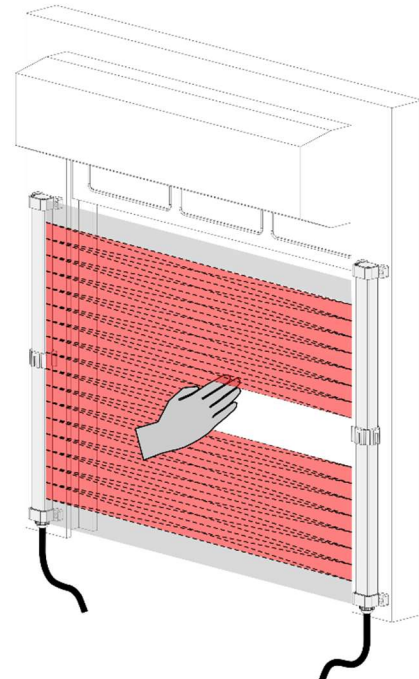


Figure 4.6 Cross Scan Mode Area Diagram 3

❖ Dead Zone and Beam Range

Cross Mode, light curtain have non-detecting (dead) zones of approximately 7.5 cm at the top and approximately 2.5 cm at the bottom (cable exit side). In Linear Mode, light curtain have dead zones of approximately 17.5 cm at the top and approximately 12.5 cm at the bottom (cable exit side). These areas are outside the active scanning range of the photocell. Any hand, arm, or object passing through these zones will not be detected by the system, and no output signal will be generated.

Additionally, the distance between each detection beam of the light curtain is 10 cm.

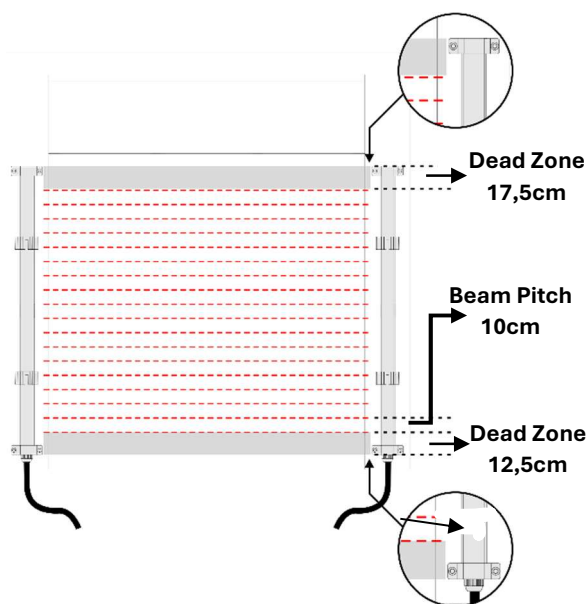


Figure 4.7 BF3 180 Linear Mode Blind Zone and Beam Pitch Diagram

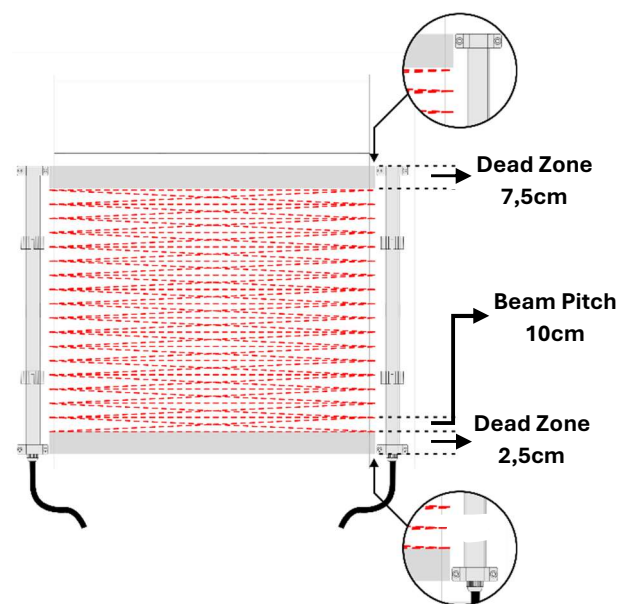


Figure 4.8 BF3 180 Cross Mode Blind Zone and Beam Pitch Diagram

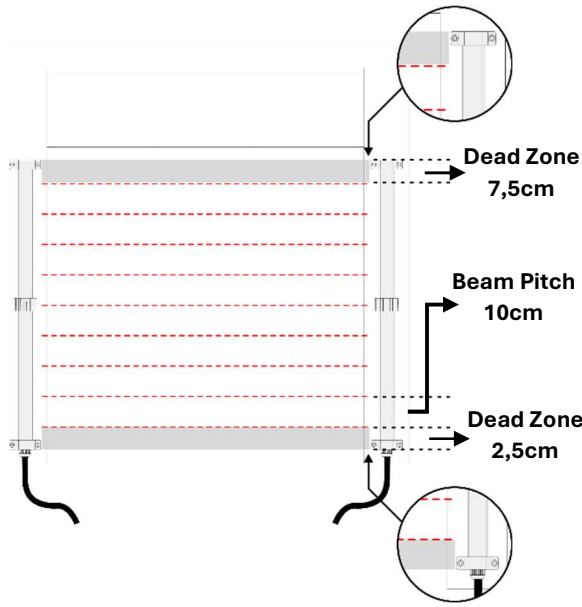


Figure 4.9 BF3 90 Linear Mode Blind Zone and Beam Pitch Diagram

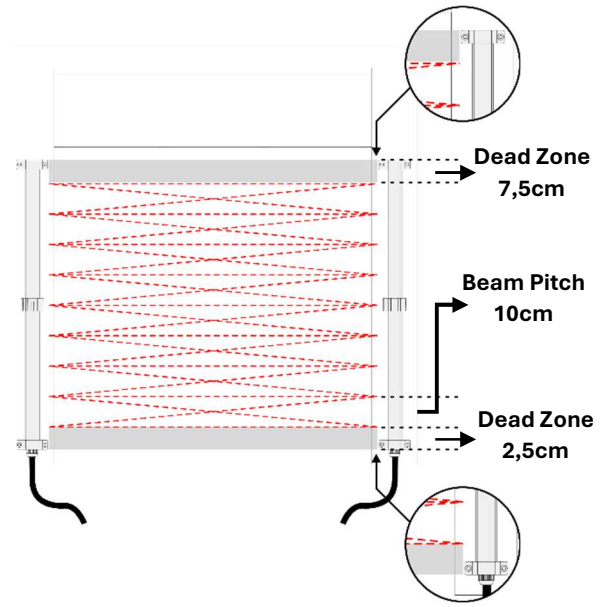


Figure 4.10 BF3 90 Cross Mode Blind Zone and Beam Pitch Diagram

5. BF3 - INSTALLATION AND INITIAL OPERATION

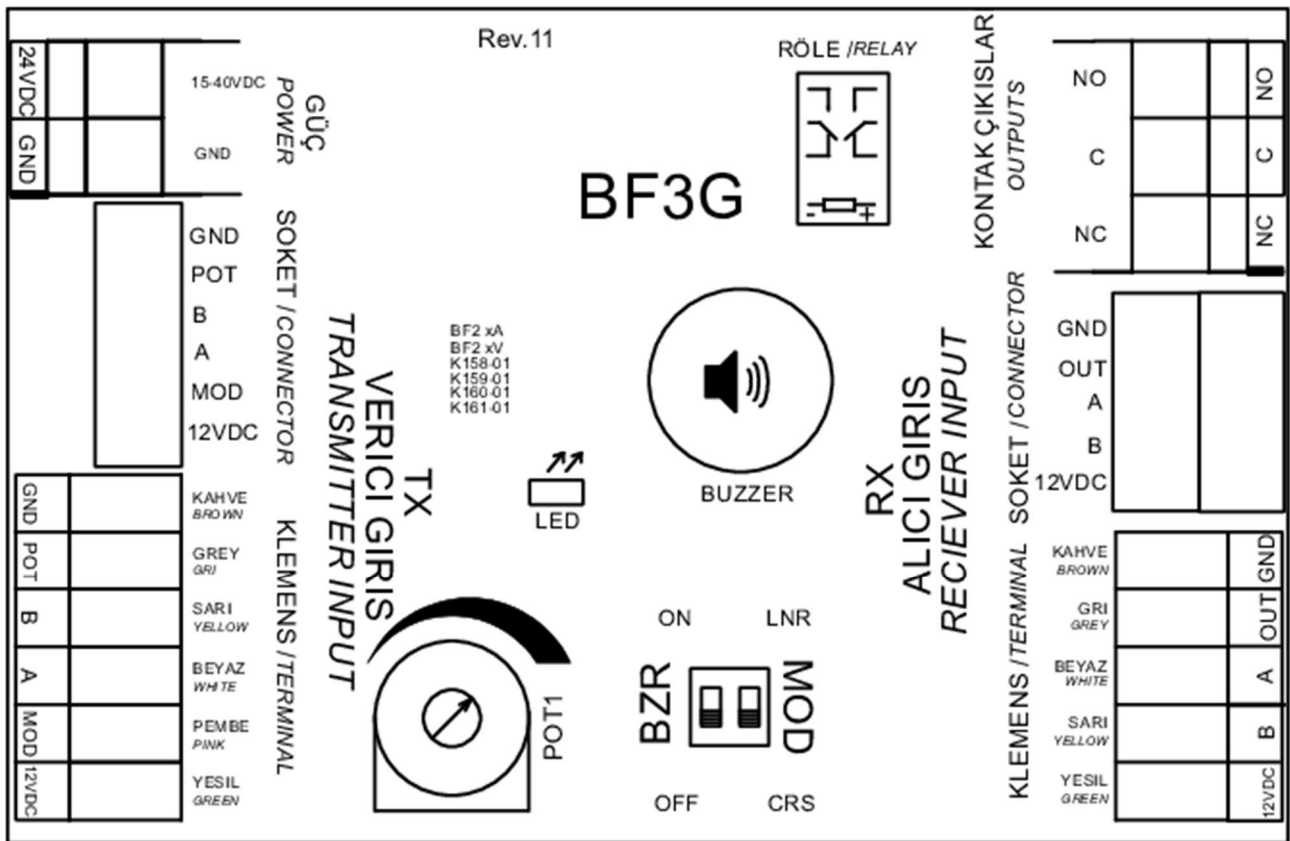


Figure 5.1 – BF3-G Control Board

5.1 BF3 – Installation

- o Connect the socket cable from your device's receiver module to the receiver extension cable (5-pin extension cable), then plug it into the receiver module socket on the BF3-G board.
(See also section 6: **Wiring Diagram.**)

- o Connect the socket cable from your device's transmitter module to the transmitter extension cable (6-pin extension cable), then plug it into the transmitter module socket on the BF3-G board.
(See also section 6: [Wiring Diagram.](#))
- o Adjust the operating distance of the device using POT1.
(See also section 5.2)
- o Set the operating mode and buzzer status of the device using the DIP switch.(See also section 5.3)

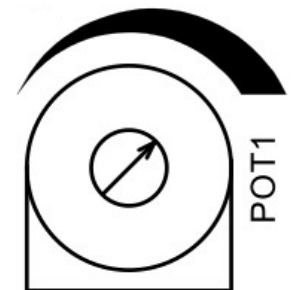
***If the length of the device's socket cable is insufficient, the socket can be cut off and the individual wires connected directly to the corresponding terminals on the BF3-G board to operate the device.**



In this case, ensure the cable colors match the terminal labels.

5.2 BF3 - Adjusting the Operating Distance

You can adjust the operating distance of your device using POT1. Turning POT1 clockwise will increase the operating distance, while turning it counterclockwise will decrease the distance. The device can be used at a minimum distance of 1 meter and a maximum distance of 8 meters.



If the device is used in an environment with reflective surfaces and the detection performance is insufficient, it is recommended to reduce the operating distance setting.

5.3 BF3 - DIP Switch Functions

DIPSWITCH STATE	FUNCTION	DIPSWITCH STATE	FUNCTION
	Buzzer: Off Operating Mode: Cross		Buzzer: On Operating Mode: Cross
	Buzzer: On Operating Mode: Linear		Buzzer: Off Operating Mode: Linear



To apply DIP switch changes, power off the device and then turn it back on after approximately 10 seconds.

5.4 BF3 – LED STATE

RX MODULE

LED2: Lights up when an object obstructs the path between the receiver and transmitter modules.

LED1: Indicates that the module is receiving supply voltage. If the module is powered, LED1 lights up. If the module is not powered, LED1 remains off.



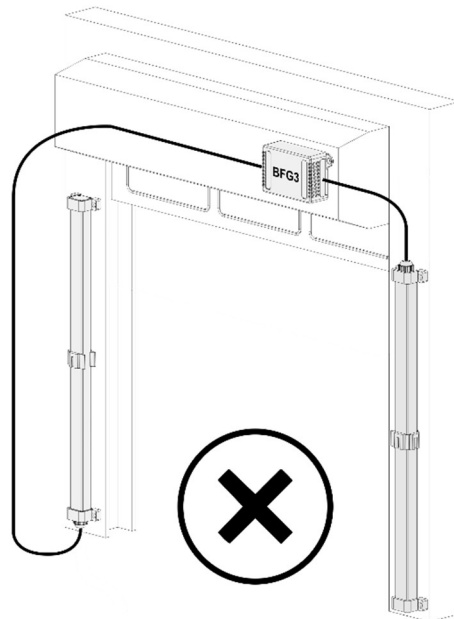
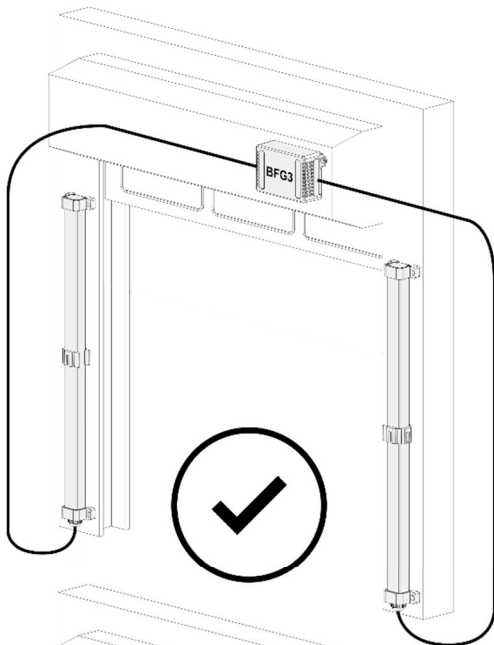
TX MODULE

LED2: Provides visual feedback of the distance adjustment made via POT1. As the setting increases, the brightness of LED2 increases; as it decreases, the brightness dims.

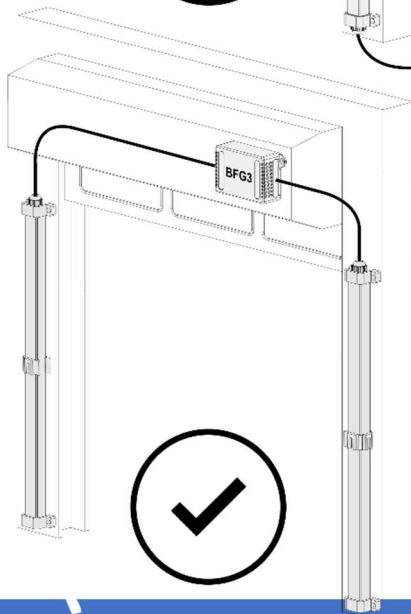
LED1: Indicates that the module is receiving supply voltage. When the module is powered, LED1 is lit. If the module is not powered, LED1 remains off.



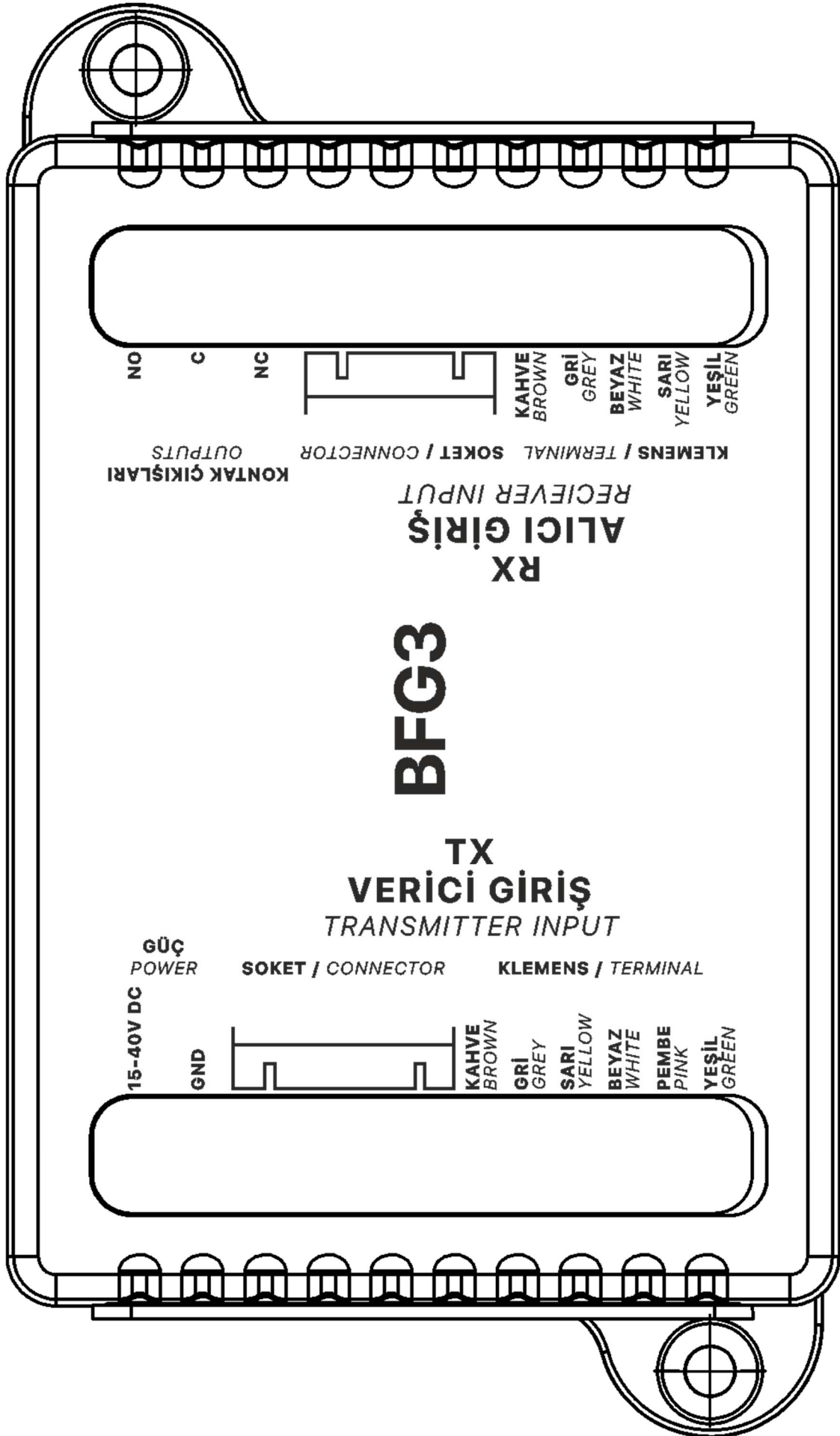
5.5 Correct Installation Practices for BF3

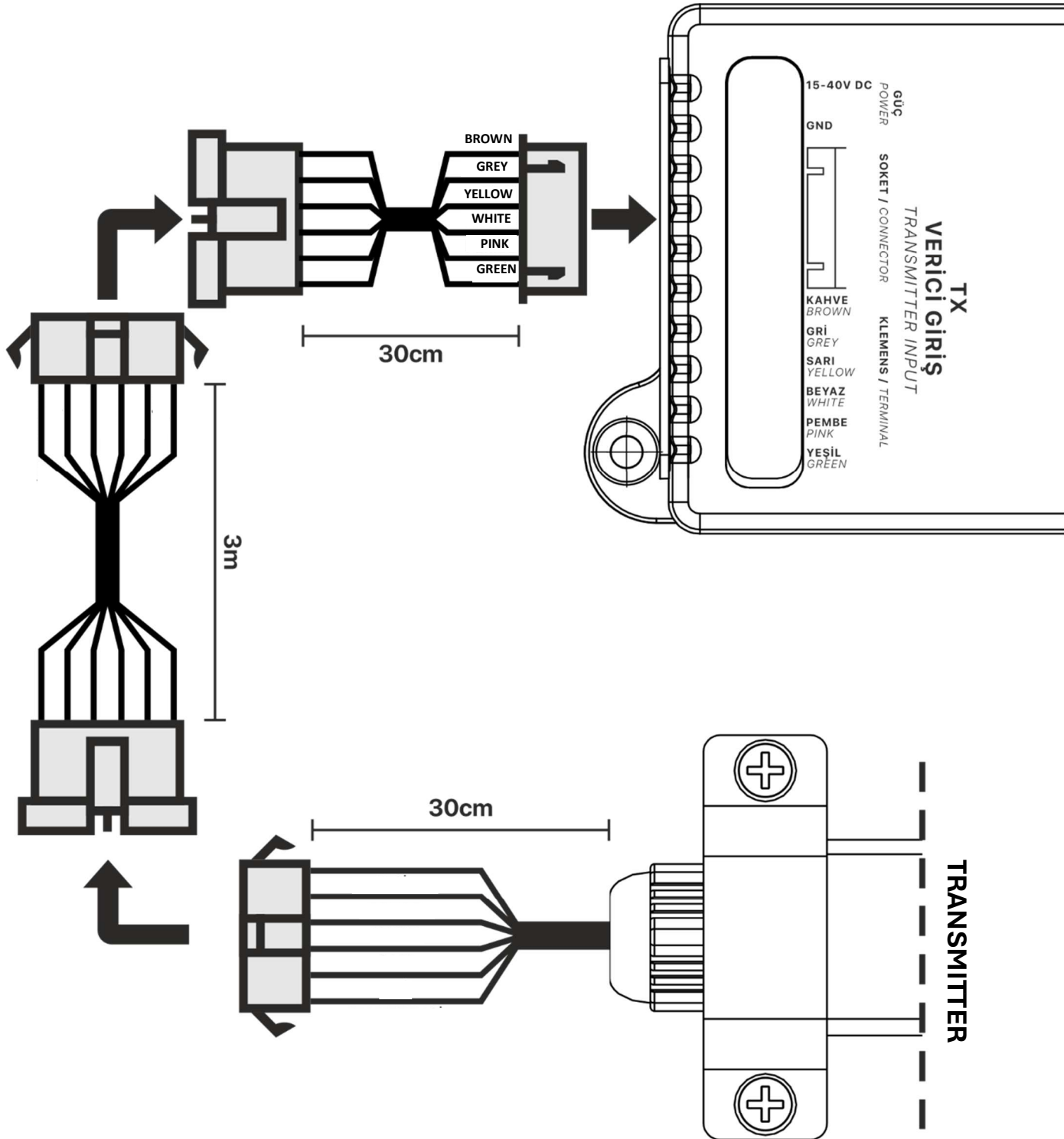


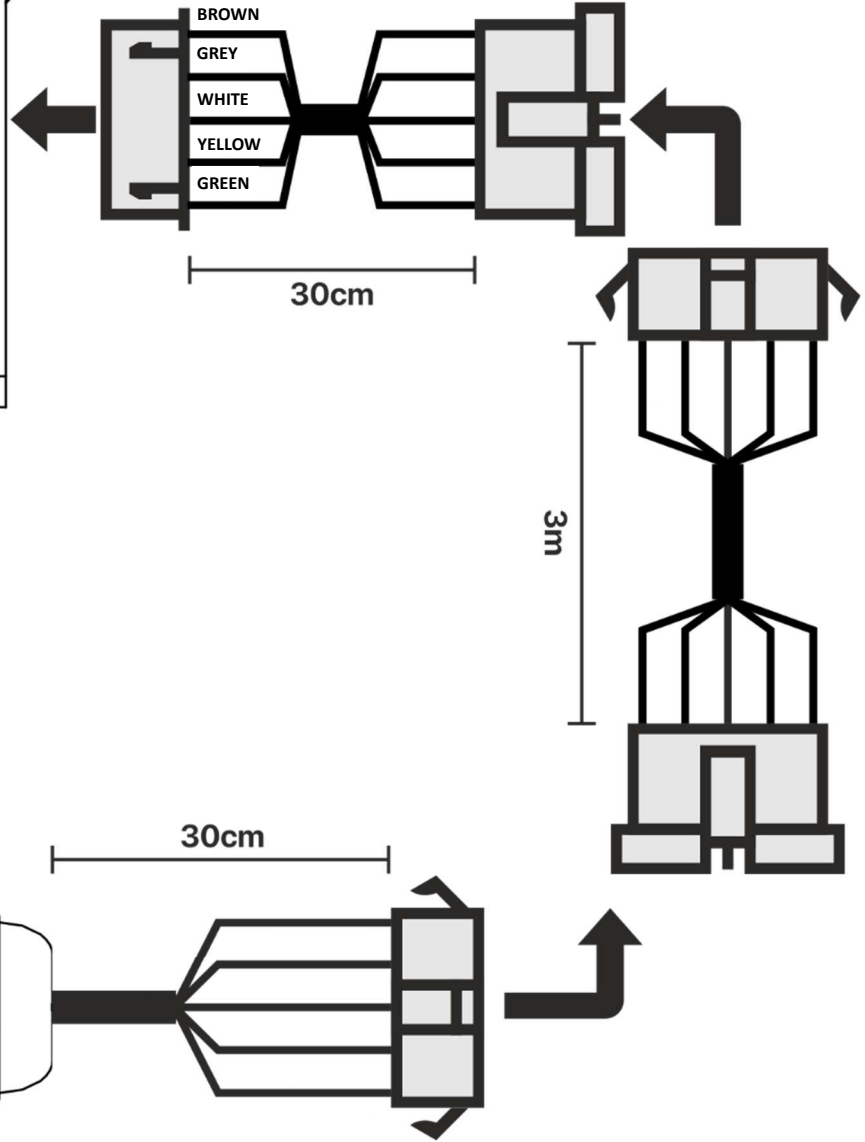
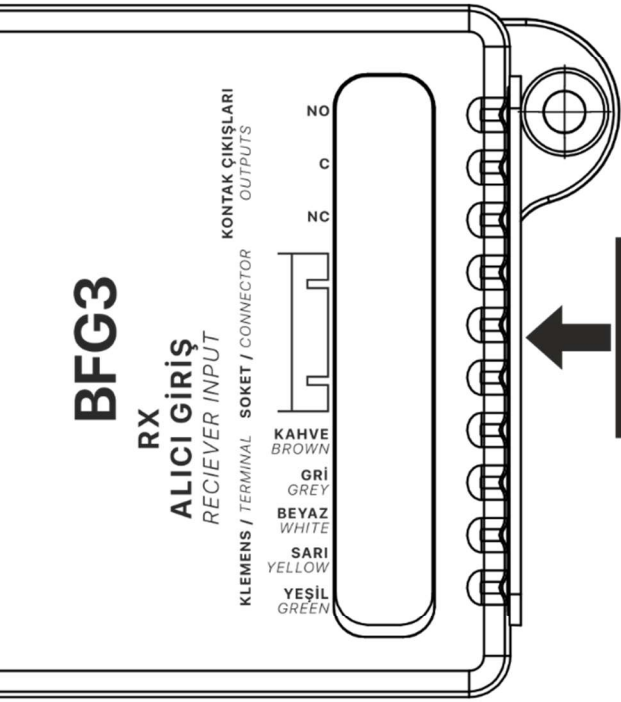
During installation of the product, care must be taken to ensure that the cables of the receiver and transmitter modules exit from the same direction, and that the modules are positioned so the arrows on the mounting label on the product point toward each other.



6.BF3 – CONNECTION SCHEMA







7.MOUNTING

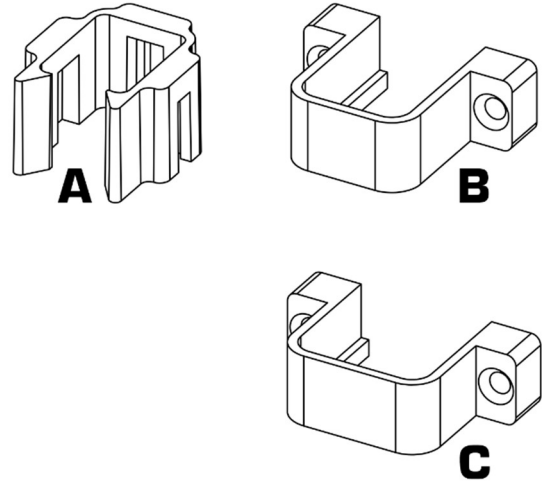
7.1 BF3 Mounting Brackets

BF3 Mounting Brackets

Three different mounting brackets (namely Type A, B, and C) are provided with the product. The utilization of these brackets varies depending on the installation angle:

- **90° Installation Angle**
- **180° Installation Angel**

Please follow the instructions below to select the correct bracket suitable for your installation angle.



7.2 90° Angle Installation

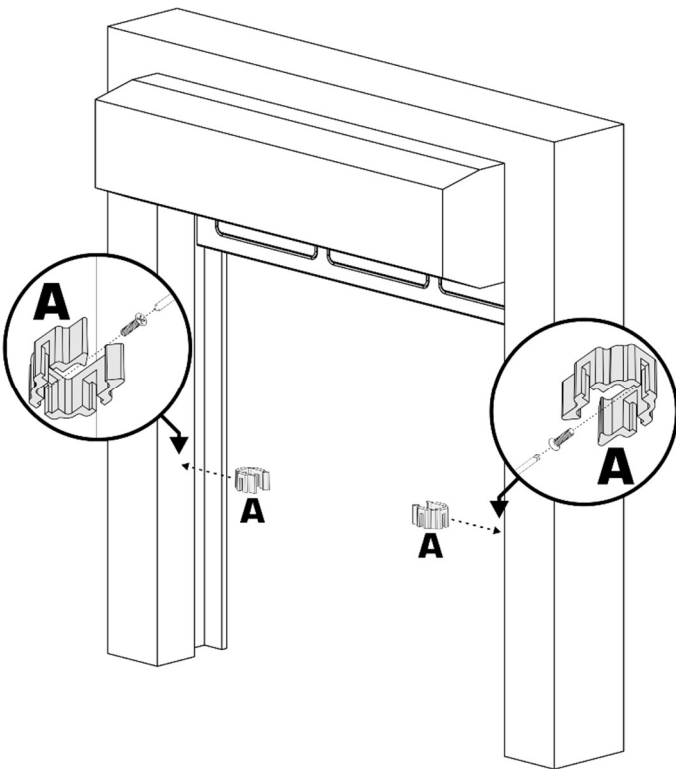


Figure 7.1 Fastening the BF3 Mounting Bracket A (1 unit must be used for the 90 cm model, and 2 units for the 180 cm model.)

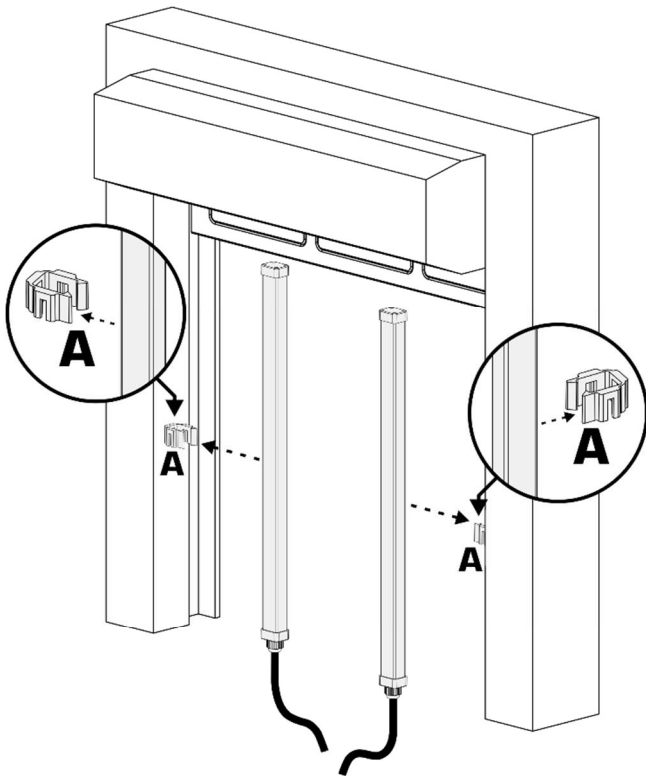


Figure 7.2 Attaching the BF3 Profile to Mounting Bracket A

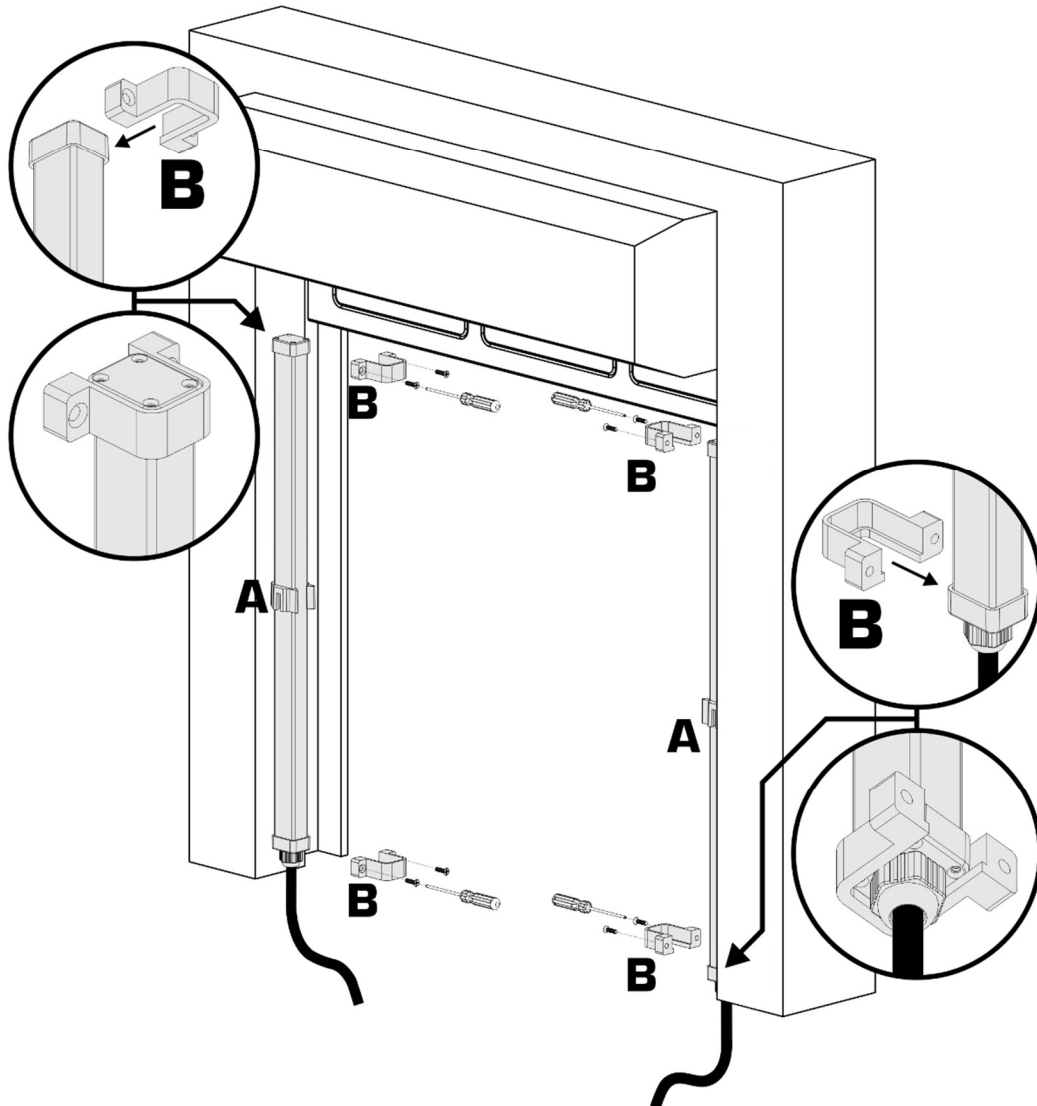


Figure 7.3 90° Angle Mounting of BF3 Profiles (For 90° angle mounting, Mounting Bracket Type B must be used. A total of 2 brackets must be installed, one at the top and one at the bottom, as shown in the figure.)

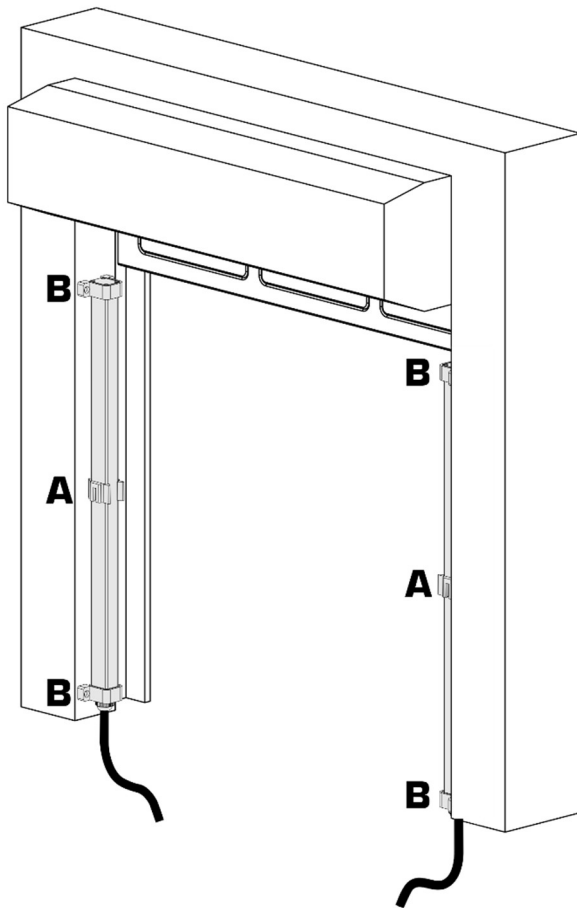


Figure 7.4 90° Angle Mounting of BF3
(For 90 cm model)

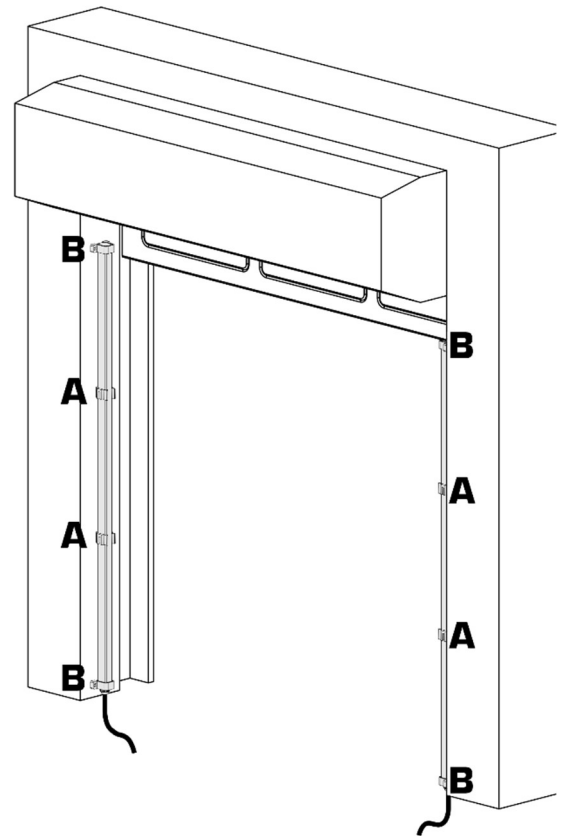


Figure 7.4.1 90° Angle Mounting of BF3
(For 180 cm model)

7.3 180° Angle Installation

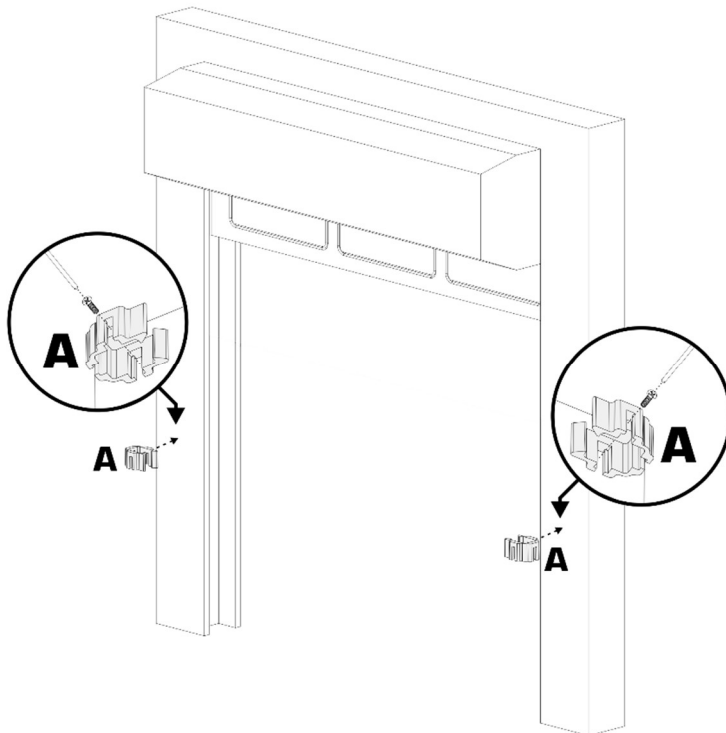


Figure 7.5 Fastening the BF3 Mounting Bracket A (1 unit must be used for the 90 cm model, and 2 units for the 180 cm model.)

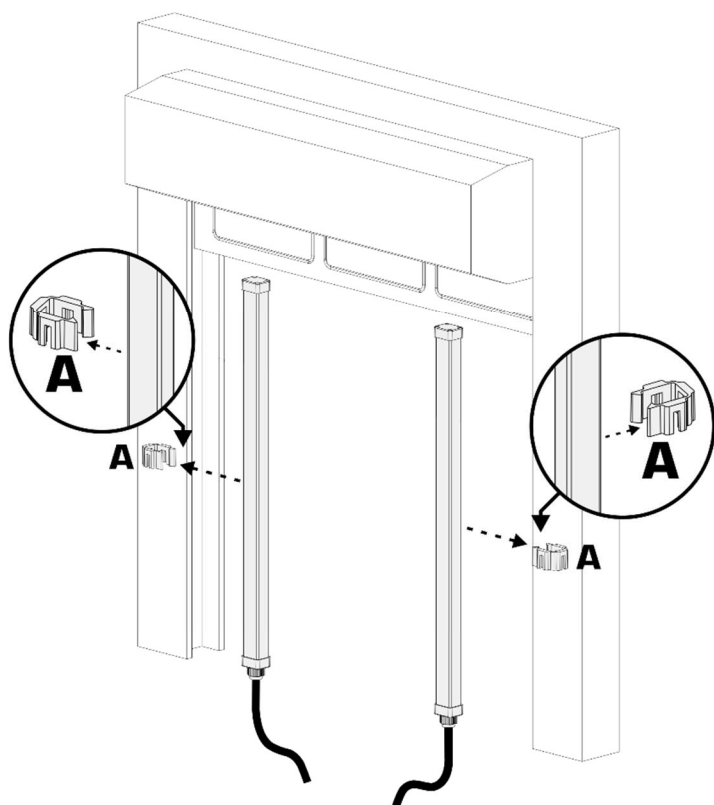


Figure 7.6 Mounting the BF3 Profile onto Mounting Bracket A

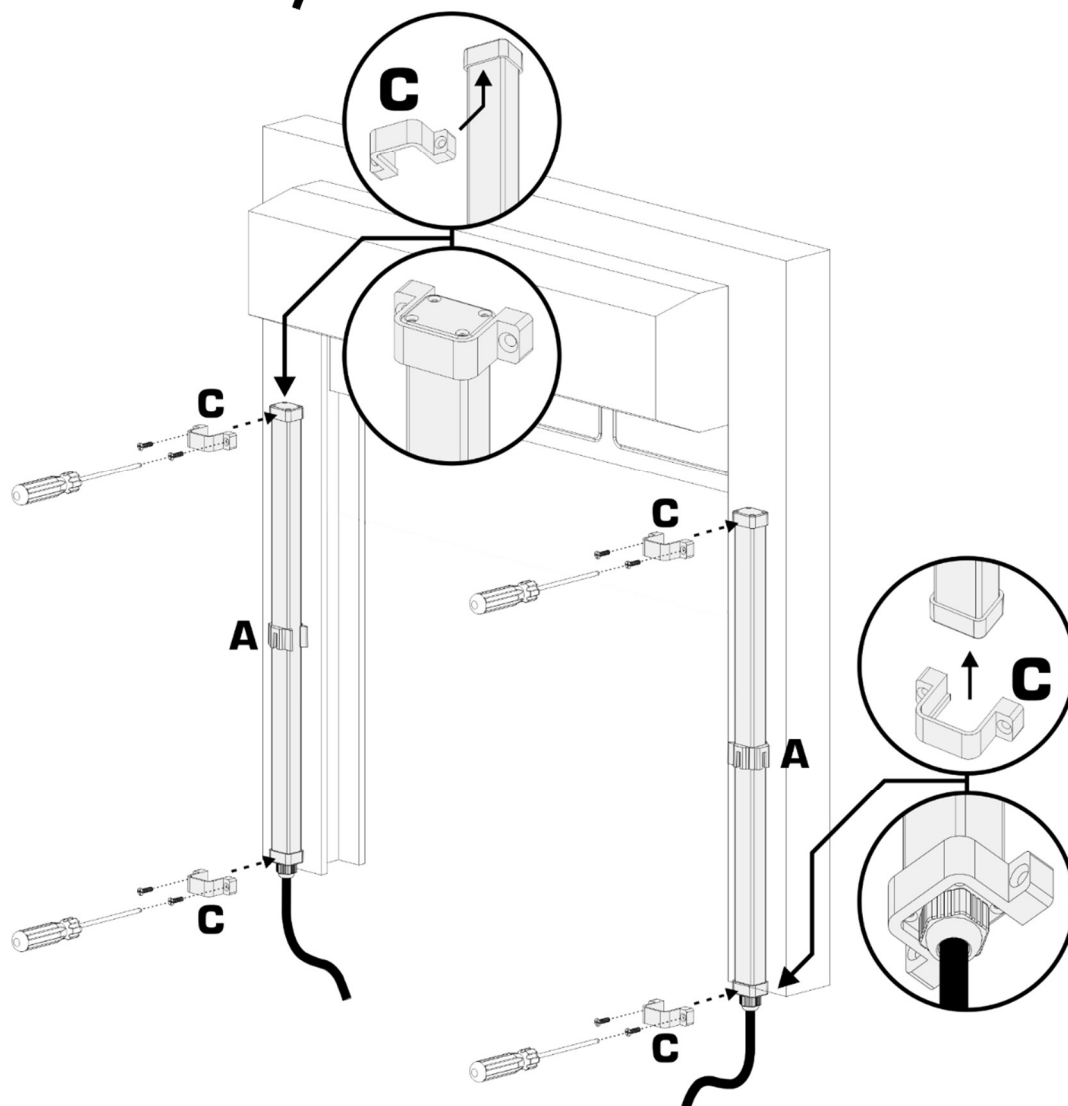


Figure 7.7 180° Angle Mounting of BF3 Profiles (For 180° angle mounting applications, Mounting Bracket Type C must be used. Two Type C mounting brackets must be installed, one at the top and one at the bottom, as shown in the figure.)

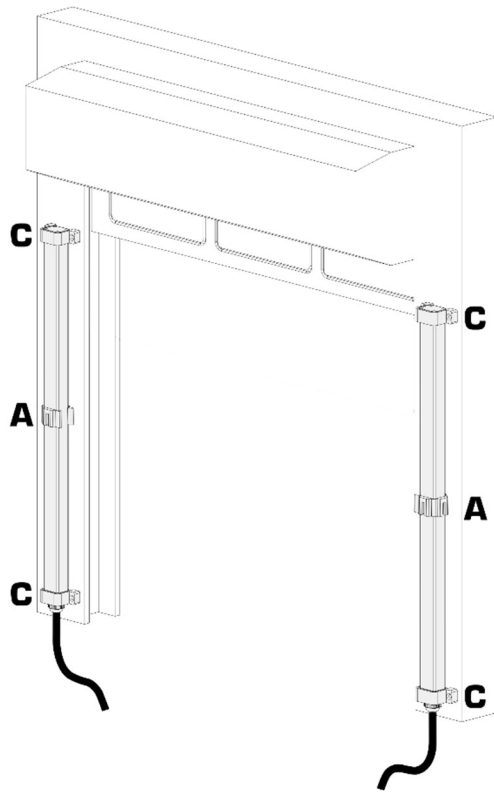


Figure 7.8 180° Angle Mounting of BF3 (For 90 cm model)

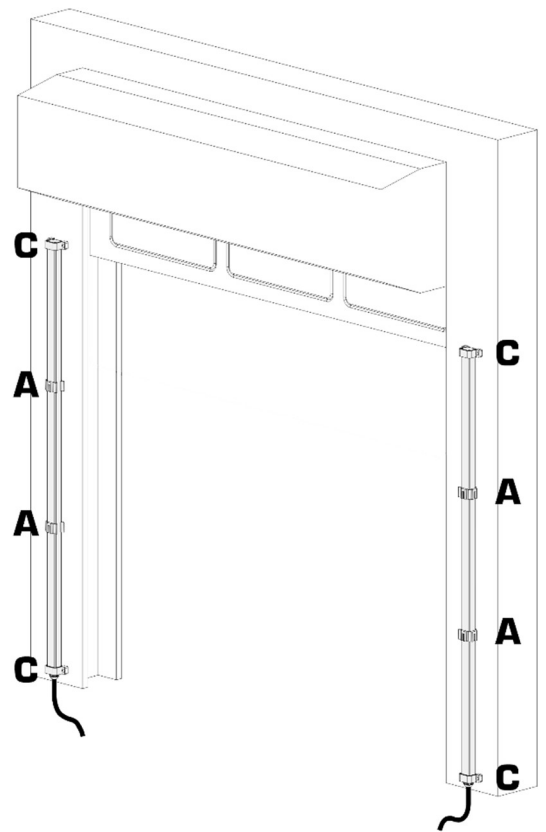


Figure 7.9 180° Angle Mounting of BF3 (For 180 cm model)

7.4 BF3 – Dimensions

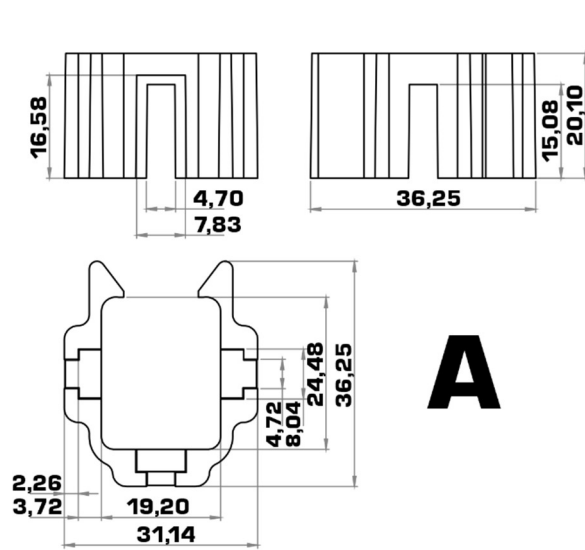


Figure 7.10 Dimensions of BF3 Mounting Bracket Type A (Unit: mm)

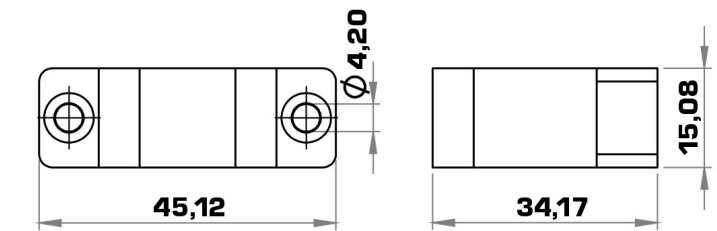
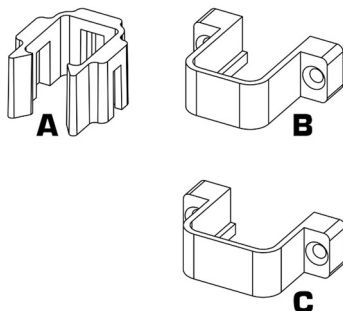


Figure 7.11 Dimensions of BF3 Mounting Bracket Type B (Unit: mm)

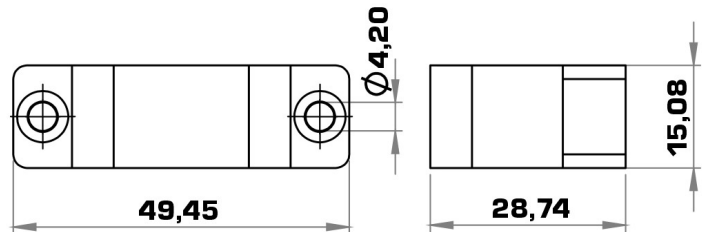


Figure 7.12 Dimensions of BF3 Mounting Bracket Type C (Unit: mm)

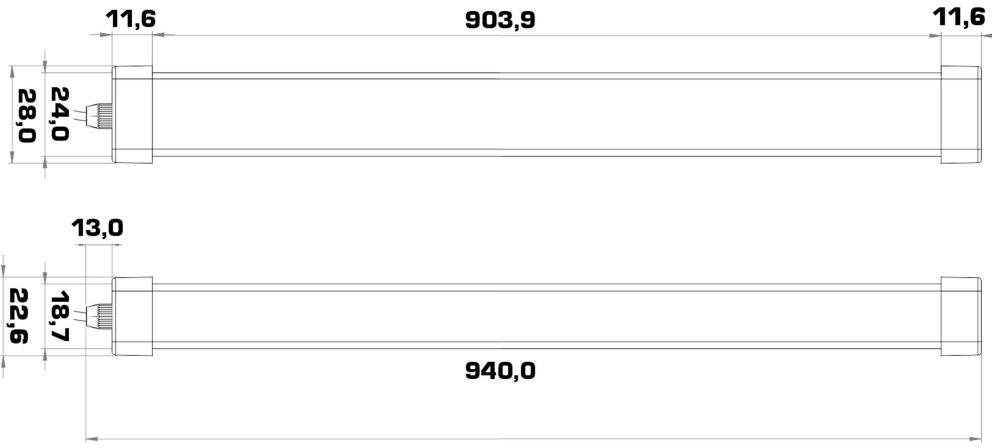


Figure 7.13 Dimensions of BF3 90 (Unit: mm)

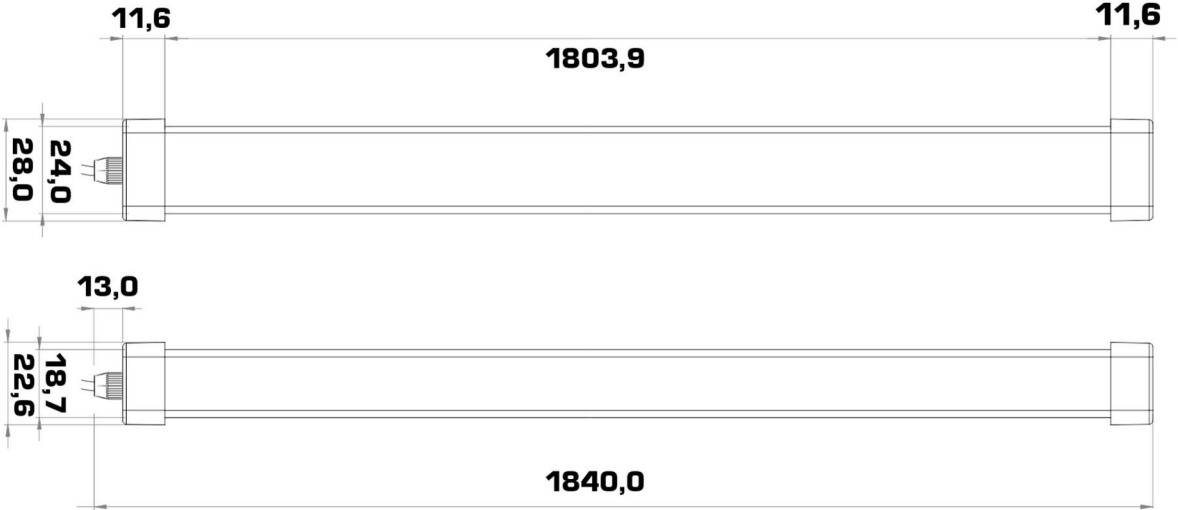


Figure 7.14 Dimensions of BF3 180 (Unit: mm)



During product installation, ensure the unit is mounted away from direct, perpendicular sunlight to prevent interference from solar infrared rays. If this is not feasible, install a suitable sunshade or canopy to block direct sunlight.



During product installation, care must be taken to ensure that the cables of the transmitter and receiver modules exit from the same direction, and that the arrows on the mounting labels on the device are positioned facing each other.



When installing near reflective/glossy surfaces, performance degradation may occur in the bottom detection optics.



Observe correct polarity ("+" and "-") when making the power connections to the device!



The BF3-G model has no IP rating or resistance against liquid ingress. The product must strictly be stored and operated in a dry environment!



Do not supply power outside the specified operating voltage range. Doing so may damage the device!



To ensure proper and stable operation of the device, it is recommended to use a power supply with an output power of at least 2 W on the supply line.

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