

FLAME SWITCH
BC1000 SERIES

PRODUCT HANDBOOK



1. APPLICATION

The BC1000A/B series is a flame switch for intermittent operation to indicate presence or absence of a flame and to be applied in commercial or industrial burner installations. The BC1000A can also be used as a primary control for manually operated burner systems using a start/stop station.

In addition to the flame sensing functions, the BC1000A/B provides a “Safe Start” function which checks if a flame signal is present when applying power to the device. If so, the BC1000A/B holds its operation until the flame signal disappears.

The BC1000A/B can be used with a recifying flame rod or all existing non-selfcheck Honeywell “PowerTube” type UV sensors (for intermittent operation only).

The BC1000 (FR models) will operate also with the ex-Satronic IRD810/1010 range of infrared sensors. Note that this combination is NOT CE approved for use on installations that fall under the GAD (Gas Appliances Directive).

2. FEATURES

- 1) Compact design.
- 2) Plug-in wiring sub base for direct panel or DIN RAIL mounting.
- 3) Safe-start check (SSC) feature prevents operation when abnormal flame condition exists at start-up.
- 4) LED indication (Power, Flame, SSC) on the front to show operation status (SSC hidden behind the front cover).
- 5) Screw terminals on the front provide continuous 0~6VDC flame signal strength monitoring.

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3. SPECIFICATIONS

Table 1: Model Selection Guide

| Model | Rated voltage | Power consumption | Flame Response time | Flame sensor | Safety-start check output | Flame output |
|--------------|---------------|-------------------|---------------------|-----------------------|---------------------------|---------------|
| BC1000A0110F | 115V 50/60Hz | 5W | 2 ± 1 sec. | Flame rod or C7012A/G | SPST (T3-4) | SPST (T2-3) |
| BC1000A0110U | 115V 50/60Hz | 8W | 2 ± 1 sec. | C7027/35/44 | SPST (T3-4) | SPST (T2-3) |
| BC1000A0220F | 230V 50/60Hz | 5W | 2 ± 1 sec. | Flame rod or C7012A/G | SPST (T3-4) | SPST (T2-3) |
| BC1000A0220U | 230V 50/60Hz | 8W | 2 ± 1 sec. | C7027/35/44 | SPST (T3-4) | SPST (T2-3) |
| BC1000B1000 | 115V 50/60Hz | 5W | Max. 1 sec. | Flame rod or C7012A/G | None | SPDT (T2...4) |
| BC1000B1018 | 230V 50/60Hz | 5W | Max. 1 sec. | Flame rod or C7012A/G | None | SPDT (T2...4) |
| BC1000B2001 | 115V 50/60Hz | 8W | Max. 1 sec. | C7027/35/44 | None | SPDT (T2...4) |
| BC1000B2019 | 230V 50/60Hz | 8W | Max. 1 sec. | C7027/35/44 | None | SPDT (T2...4) |

Table 2: Electrical and Environmental Ratings

| Item | Specification |
|-------------------------------|---|
| Rated voltage | 110..115Vac or 220..230Vac, 50/60Hz -15 ~ +10% |
| Allowable ambient temperature | Stand-alone mounting: -20 ~ +60°C Parallel mounting (2 or more sets) : -20 ~ +45°C |
| Protection Class | IP00 (mount inside cabinet) |
| Allowable ambient humidity | Max. 90% RH non condensing |
| Vibration resistance | 0.5G (10 to 150Hz for 1h each in x,y and z directions) |
| Insulation resistance | More than 50MΩ at DC500V between terminals and ground |
| Life expectancy | Designed for 10 years of operation or 250.000 cycles under nominal conditions |
| Terminal ratings | Relay output max 1A @ cosφ=1,0 per terminal |
| Flame strength | Flame On : > 1V Flame Off : < 0.2V |
| Size (WxHxD) | 42.5 x 90.0 x 95.5 mm (including sub-base) |
| Weight | Approx. 334g (including sub-base) |

* Keep min. 50mm distance from the top and min. 20mm left/right/bottom around the device.

4. APPEARANCE AND DIMENSIONS

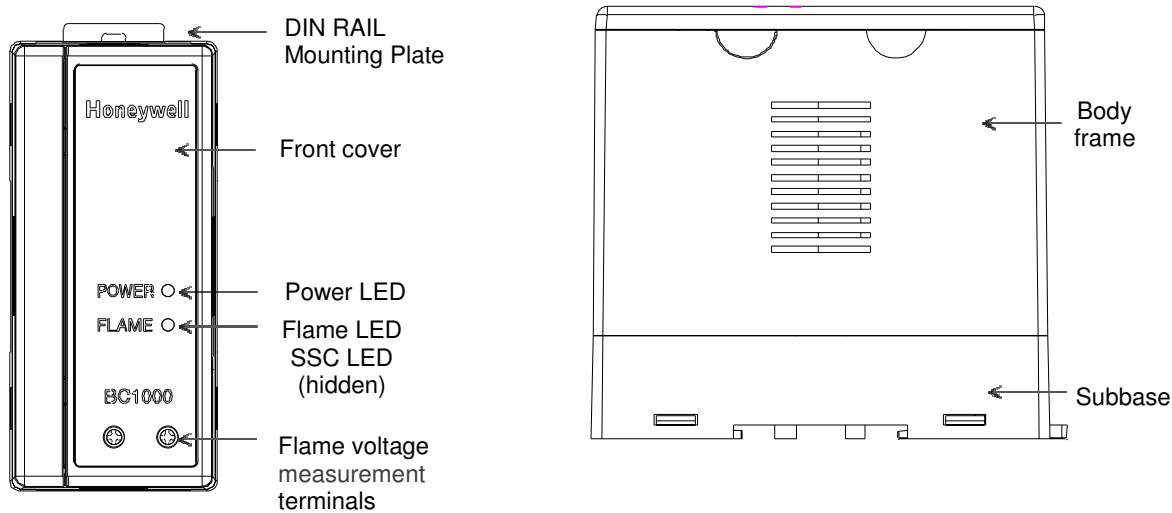


Fig. 1: Appearance

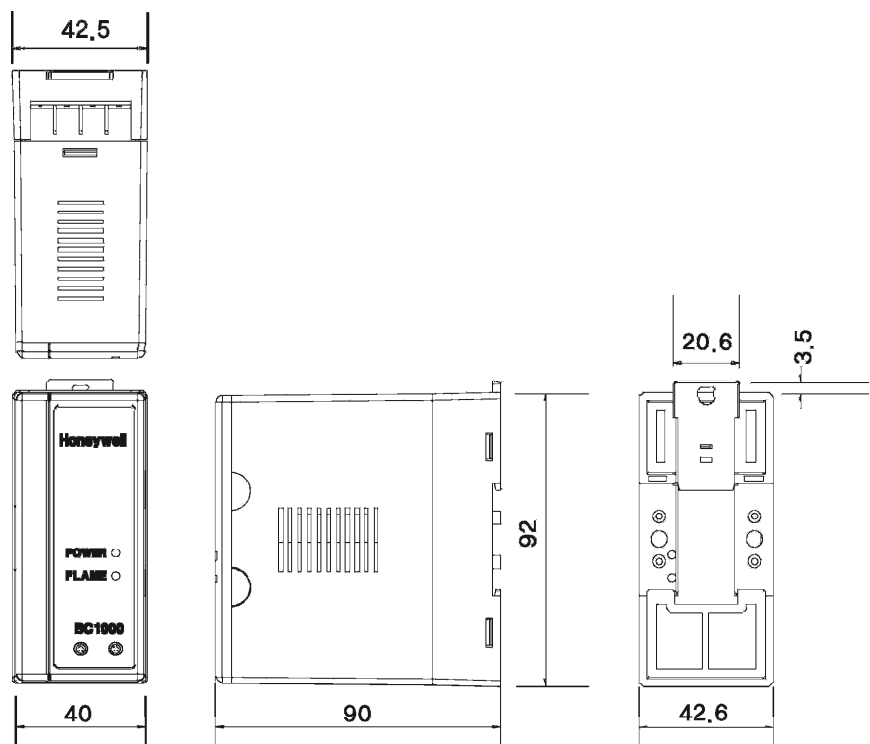


Fig. 2: External Dimensions (in mm)

5. INSTALLATION AND WIRING

CAUTION

INSTALLATION

When Installing this Product...

- 1) Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
- 2) Check the ratings given in the instructions and marked on the product to make sure the product is suitable for the application.
- 3) Installer must be a trained, experienced, flame safeguard service technician.
- 4) After installation is completed, check out the product operation as provided in these instructions.



WARNING

Fire or Explosion Hazard.

Can cause property damage, severe injury, or death.

Carefully follow safety requirements when installing a burner control.



CAUTION

Electrical Shock Hazard or Equipment Damage.

Disconnect power supply before beginning installation to avoid an electrical shock or equipment damage.



IMPORTANT

- 1) Do not install the Flame Switch under any circumstances in the following locations:
 - a. Where chemicals or corrosive gases are present, such as ammonia, sulfur, chlorine, ethylene compounds, acids, etc.
 - b. Where the relative humidity reaches the saturation point. The relay module is designed to operate in a maximum 85% relative humidity continuous, noncondensing, moisture environment. Condensing moisture can cause a safety shutdown or damage the device.
 - c. Where vibration exceeds 0,5G continuous vibration or temperatures exceed the maximum specification for this device.
- 2) Disconnect the power supply from the main disconnect before beginning installation to prevent electrical shock and equipment damage. Supply power to BC1000 after finishing all wiring and completing proper checks.
- 3) Do not overload the BC1000 terminal rating.
- 4) Do not bundle the lead wires for mains, ignition transformer's HIGH-VOLTAGE and flame detector. The min. distance between the BC1000 and the HV ignition cable is 10cm.
- 5) Use proper grounding work in accordance with the engineering standards for electrical equipment.
- 6) After deenergizing the BC1000, residual charge may be present on terminal 5 (F lead of the flame detector).
- 7) BC1000 verifies that a flame or flame simulating condition exists at start-up. BC1000 can be used in intermittent operation only, i.e a controlled stop/start must occur at least once every 24 hours of operation.

SEPARATION AND INSTALLATION OF RELAY MODULE AND THE SUB BASE

- 1) Remove the front cover as shown in Fig. 1 and unscrew the Phillips head fixing screw by about 8 turns CCW.
- 2) Gently pull the relay module from its socket. Don't use excessive force to avoid damage to the device.
- 3) Position the sub base and mount by fastening screws.



IMPORTANT

Do not over-tighten the central fixation screw to avoid damage to the (Phillips) head of the screw. So called "hand-tight" is good enough to fixate the BC1000 properly onto its sub base.

* If using the DIN RAIL mounting option, refer to Fig. 4.

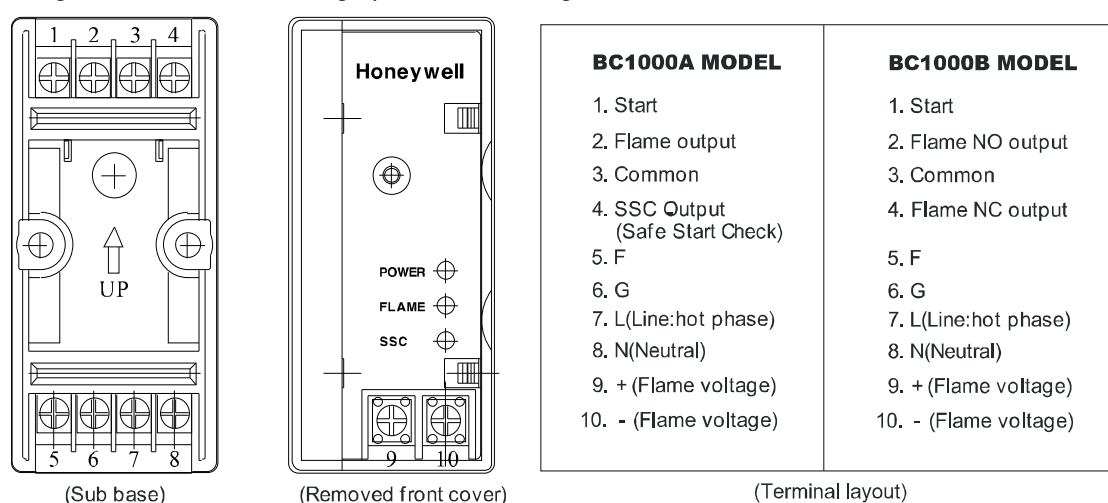


Fig. 3: Sub base terminals and front terminals



CAUTION

Although the voltage on front terminals are of low voltage, it is not considered to be safe when touching these wires, in case of a malfunction of the device. Therefore avoid touching these terminals and its connected lead wires to avoid an electrical shock.

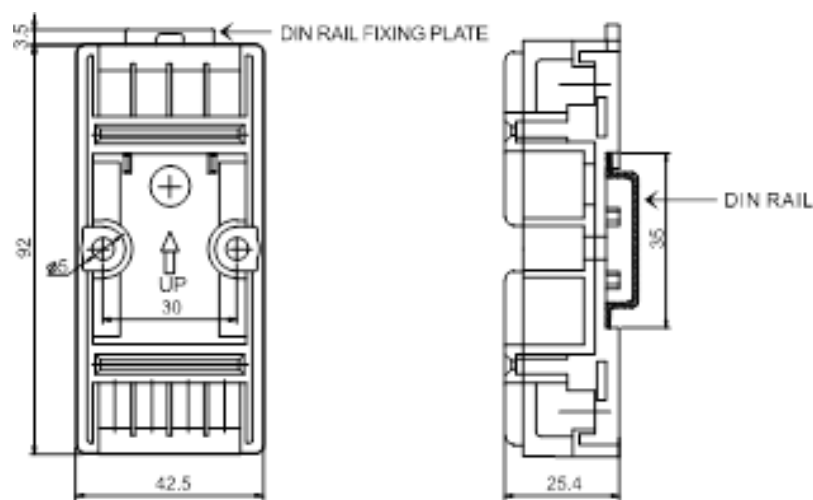


Fig. 4: Dimensions (DIN RAIL mount)

HOW TO INSTALL THE FLAME DETECTOR

To check the correct installation location of the flame detector, the flame signal strength can be measured using a multimeter. Connect the multimeter to the (+) and (-) terminals located at the front.

The minimum recommended voltage is 2VDC, while the maximum value is limited to 6VDC. Adjust the optimal position of the flame detector. For instructions to install Honeywell UV flame detector, refer to the instruction sheet of C7027/C7035/C7044 flame detectors.

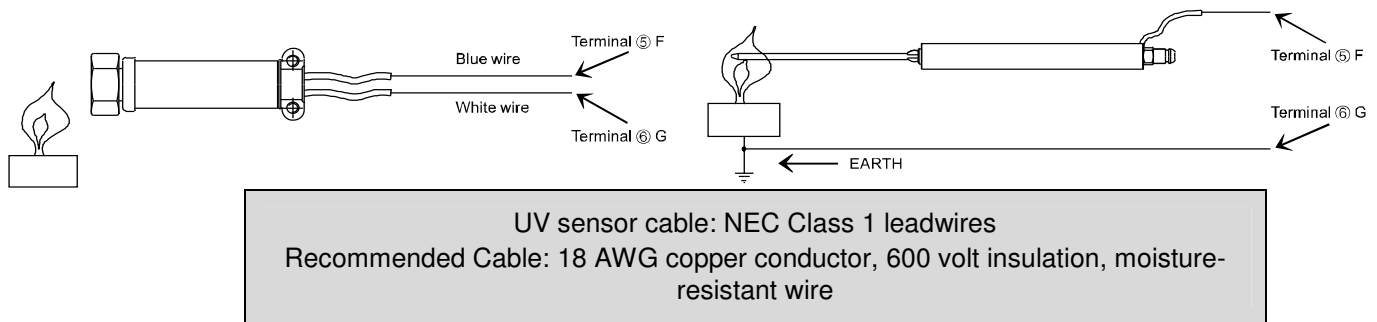


Fig. 6: Flame detector wiring



Always use cable lugs to attach the wires to the sub base

See Fig 6-1 for dos and don'ts about wiring.

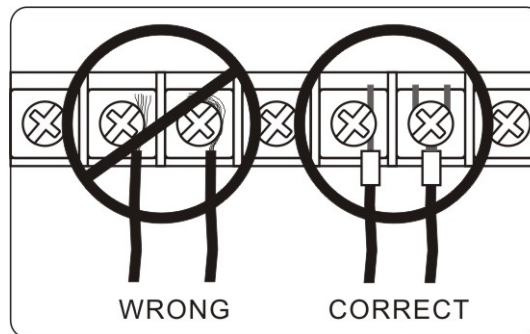


Fig. 6-1: Wiring the sub base terminals

6. OPERATION AND SEQUENCE

a. Manual Ignition System with Intermittent Pilot (refer to Fig. 5 ①Manual Ignition)

| LED DISPLAY | | STANDBY | SAFE-START | PFEP④ | RUN | STANDBY |
|-------------------|-------|---------|--------------------------|----------------------|--------------|---------|
| | POWER | ● POWER | ● POWER | ● POWER | ● POWER | ● POWER |
| | FLAME | ○ | ○ | ● FLAME | ● FLAME | ○ |
| | SSC | ○ | ● SSC | ● SSC | ● SSC | ○ |
| Ignition switch | | | | Ignition switch | | |
| Pilot | | | | Intermittent pilot ③ | | |
| Main Valve | | | | | Main valve ② | |
| limit / interlock | | | limit / interlock closed | | | |
| Flame signal | | | Safe-start check ① | Flame proving | | |

1. If flame is detected before safe-start check is completed, operation is put on hold until the flame signal disappears. (① in upper table)
2. If flame is lost during RUN, the flame relays are de-energized. (②③ in upper table)
3. Pilot flame establishing period(PFEP) should comply with the application standards. (④ in upper table)

b. Flame Monitoring System (normal operation, refer to Fig. 5 ②Flame Monitoring)

| LED DISPLAY | | STANDBY | SAFE-START | FLAME MONITORING | | | | STANDBY |
|--------------|-------|---------|--|------------------|---------|----------|---------|---------|
| | POWER | ● POWER | ● POWER | ● POWER | ● POWER | ● POWER | ● POWER | ● POWER |
| | FLAME | ○ | ○ | ○ | ● FLAME | ○ | ● FLAME | ○ |
| | SSC | ○ | ● SSC | ● SSC | ● SSC | ● SSC | ● SSC | ○ |
| Flame on | | | | ② | ③ | ② | ③ | |
| Start | | | Start input (Safe-start check operation) | | | | | |
| Flame signal | | | Safe-start check ① | No flame | Flame | No flame | Flame | |

1. If flame is detected before safe-start check is completed, output relays are operated as below until the flame signal disappears. (① in upper table)
BC1000A Model: 1K1 relay open and 2K1 relay close (T2-T4 closed)
BC1000B Model: 1K1 relay open and 2K1 relay NO (T3-T2 & T3-T4 opened)
2. If flame is lost during operation, output relays are operated as below. (② in upper table)
BC1000A: 1K1 relay close (T3-T4 closed) and 2K1 relay open (T2-T3 opened)
BC1000B: 1K1 relay close and 2K1 relay NC (T3-T2 opened, T3-T4 closed)
3. If flame is detected during operation, output relays are operated as below. (③ in upper table)
BC1000A: 1K1 relay close (T3-T4 closed) and 2K1 relay close (T2-T3 closed)
BC1000B: 1K1 relay close and 2K1 relay NO (T3-T2 closed, T3-T4 opened)

7. Approvals

Honeywell Technologies Sàrl
Z.A. La Pièce 16
1180 Rolle
Switzerland

declares under its sole responsibility that the following product family of **flame switches**:

BC1000 A xxxx, BC1000 B xxxx

to which this statement relates, is:

- in conformity with the essential requirements of the **Gas Appliance Directive 2009/142/EC**

based on EN 298

and in conformity with the type as described in the EC type-examination certificate issued by TÜV Rheinland InterCert Kft with pin numbers:

- BC1000A0220F: 1009BU1560
- BC1000A0220U: 1009BU1561
- BC1000A0110U, BC1000A0110F and BC1000Bxxxx: 1008CM2504

- in conformity with the essential requirements of the **Low Voltage Directive 2006/95/EC**

based on EN 60730-2-5

- in conformity with the essential requirements of the **EMC Directive 2004/108/EC** on immunity

based on EN 298 immunity requirements

Conformity with the essential requirements of the **EMC Directive 2004/108/EC** on emission can only be determined in the application.

This product is under surveillance at KIWA Nederland BV.

Emmen, August 2011

Signed for and on behalf of Honeywell Technologies Sàrl,

A.Veld

Manager Standards & Approvals