Diffuse sensor

NPN type - light/dark-ON output

**Part number**

DFT-AN-1F

**Sensing range (on mat white paper)** 200 mm

**Dimensions:**

These proximity switches must not be used in applications where the safety of people is dependent on their functioning. Terms of delivery and rights to change design reserved.

**Wiring**

- **Uₘₙ** 10...30VDC
- **Iₘₙ** 200 mA max.

**Pin assignment (view of the device):**

1. **schwarz**
2. **noir**
3. **black**
4. **blue**
5. **blau**
6. **bleu**
7. **39 V**
8. **braun**
9. **brun**
10. **brown**
11. **39 V**
12. **weiss**
13. **blanc**
14. **white**

**Device mounting**

- Mounting of the device is most easily effected by snapping 1 / 2 onto a top-hat rail (according to DIN / EN 50022).
- Alternatively, fixing can be effected using M3 screws through the fixing holes 3 provided.
- To remove the device from the rail, push towards the optical fiber 4, and lift 5.

**Fixing the optical fibers**

- Lift catch 5.
- Insert the optical fibers through the two holes 7 provided into the device.
- Lower catch 5.

**Important:**

- When inserting the optical fibers, the resistance of the device’s internal O-ring seal must be overcome.
- The optical fibers must be fed right to the stop without fail.
- The optical fibers must not be crushed.
- The sequence (emitter / receiver) is usually immaterial, however:
- With coaxial optical fibers, the optical fiber bundle 8 must be connected on the receiver side 9. The emitter and receiver openings are marked with arrows on the housing.

**Max. distance / sensitivity**

- Remove target and background. Execute Teach 1.
- Place emitter and receiver so that no light is transmitted. Execute Teach 1.

**Min. distance / sensitivity**

- Place fiber-optic head about 5 mm from white paper. Execute Teach 1.
- Place emitter and receiver in direct contact so that a maximum of light is transmitted. Execute Teach 1.

**Remote teach launching**

Launch by L signals or by closing a contact at the “Teach” input.

- **Teach 1**
  1. Remove target.
  2. Position target.
  3. Send pulse T1 and T3.
  4. Timing: T1, T3 = 0.5 ... 2 sec  
  5. T2 = 1.5 ... 2 sec

- **Teach 2**
  1. Position target and background.
  2. Remove target.
  3. Send pulse T1, then
  4. Remove target, leave background in position.
  5. Position target.
  6. Send pulse T3.
  7. Timing: T1, T3 = 0.5 ... 2 sec  
  8. T2 ≥ 3 sec
### Teach 1

Setting of the sensing range (teach) is carried out in one cycle, and can be manually fine adjusted at any time (using the Adjust function, see below).

- **Diffuse sensors**: Teach only takes place on the background. The target is not taken into consideration. The device adjusts itself automatically to approximately 80% of the background distance.
- **Through-beam sensors**: Teach is effected with a target located in the beam. The device automatically adjusts itself so that approximately 80% of the darkening created by the target triggers the switching process.

1. **Diffuse sensors**: Remove target, leave or place background in position.
2. **Through-beam sensors**: Leave or place target in position.
3. **Activate Teach 1 mode by pressing the Mode key twice.**
4. **Press / Enter key. Teach successful: The Status LED blinks green for 5 seconds. The device is ready for use.**

### Teach 2

Setting of the sensing range (teach) is carried out in two cycles, and can be manually fine adjusted at any time (using the Adjust function, see below).

- **Diffuse sensors**: Teach is effected firstly on the target, then on the background. The device automatically adjusts itself to a distance between that of the target and that of the background.
- **Through-beam sensors**: Teach takes place firstly without the target, then with the target located in the beam. The device automatically adjusts itself to part of the darkening created by the target.

1. **Diffuse sensors**: Position (or leave) target and background.
2. **Through-beam sensors**: Remove target.
3. **Activate Teach 2 mode by pressing the Mode key 3 times.**
4. **Press / Enter key, the first cycle begins. Teach successful: The Status LED lights up green. The device is ready for the second cycle.**
5. **Diffuse sensors**: Remove target, leave background in position.
7. **Press / Enter key, the second cycle begins. Teach successful: The Status LED blinks green for 5 seconds. The device is ready for use.**

### Adjust

The detection zone can be set manually, or when set by the teach function, can be manually fine adjusted. All activated functions (except delay and stretch) are in operation, and the output switched.

1. **Activate Adjust mode by pressing the Mode key 4 times.**
2. **For each press on the / Time key, the current detection zone is increased by 1 increment.**
3. **For each press on the / Enter key, the current detection zone is reduced by 1 increment.**
4. **Return to working mode by pressing the Mode key.**

### Delay

Switching of the output is delayed by the set time. In this way, short-term disturbances can be suppressed. All activated functions (except delay and stretch) are in operation, and the output switches.

1. **Activate Delay mode by pressing the Mode key 5 times.**
2. **Pressing the / Enter key switches the delay (factory setting: 10 msec) on or off. The current status is shown by the Status LED (green = Delay switched on).**
3. **Each time the / Time key is pressed, the delay time is increased by 10 msec, up to a maximum of 150 msec.**
4. **Return to working mode by pressing the Mode key.**

### Stretch

Switching of the output is stretched by the set time. In this way, even short pulses can be detected. All activated functions (except delay and stretch) are in operation, and the output switches.

1. **Activate Stretch mode by pressing the Mode key 6 times.**
2. **Pressing the / Enter key switches the stretching (factory setting: 10 msec) on or off. The current status is shown by the Status LED (green = Stretch switched on).**
3. **Each time the / Time key is pressed, the stretch time is increased by 10 msec, up to a maximum of 150 msec.**
4. **Return to working mode by pressing the Mode key.**

### Light/Dark-ON

Setting of the output function (factory setting Light-ON, i.e. light switching in operation as diffuse sensor, dark switching as through-beam sensor).

1. **Activate Light-ON mode by pressing the Mode key 7 times. The current status is shown by the Status LED (Light-ON = LED off / Dark-ON = LED on).**
2. **Pressing the / Enter key changes the output function.**
3. **Return to working mode by pressing the Mode key.**

### Cutting the optical fibers

- Cut synthetic optical fibers to the desired length. Use only the cutting tool delivered with the optical fibers.
- A maximum of 3 cuts should be made per cutting-tool hole.

### Separating the optical fibers

- Grasp the optical fiber ends with both hands and pull both strands apart to a length of about 50 mm.
- According to the type (above all for thin-fiber executions), prior twisting helps.

### Optimal fiber mounting (All diameters refer to the optical diameter.)

- No bending should occur in zone “A”.
  - Fiber Ø 1 mm: ≥ 20 mm
  - Fiber Ø 0.5 mm: ≥ 10 mm
  - Fiber Ø 1.5 mm: ≥ 30 mm
  - High-flexibility fiber: ≥ 5 mm
- The bending radius should not be less than “R”.
  - Fiber Ø 1 mm: R ≥ 25 mm
  - Fiber Ø 0.5 mm: R ≥ 10 mm
  - Fiber Ø 1.5 mm: R ≥ 40 mm
  - High-flexibility fiber: R ≥ 2 mm
- Bendable light-outlet tubes should be bent as little as possible; best bent around a cylindrical object.
- Maximum 3 bends.

- Tube Ø 2.5 mm: r ≥ 20 mm
- Tube Ø 1.2 mm: r ≥ 10 mm

This product is protected by one or several of the following US patents: 5,182,612, 5,767,444, 5,675,143, 5,764,351, 6,031,430, 6,130,489, 6,133,654, 6,133,988. Further patents pending.