

Design-In Guide P2F

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1 1 Why Push-to-Fix fasteners?

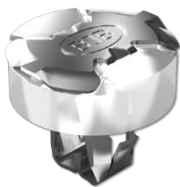
By using Push-to-Fix fasteners (P2F), PCBs, COBs, and optics can be mounted quickly and easily on luminaire sheets, profiles, and heat sinks.

Since washers, locking elements, and nuts can be dispensed with during mounting, the P2F is a good counterpart to the screw. Another decisive advantage is the constant contact pressure, which is difficult to achieve with a screw. In addition, the contact pressure creates the basis for optimal heat management.

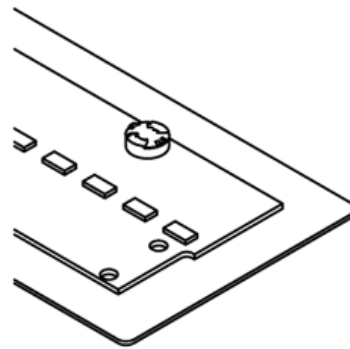
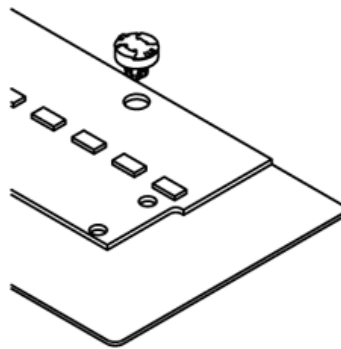
Benefits

- Permanent contact pressure
- Fast assembly
- Compensation of thermally induced tolerances
- Shock and vibration resistant
- No safety measure against loosening required. The P2F fulfils this requirement alone
- Only one P2F is needed for assembly

2 28.901 P2F for luminaire sheet



Push-to-Fix with silicone ring for mounting PCBs on luminaire sheets. The Push-to-Fix connects the PCB to the luminaire sheet with a permanently even contact pressure and thus creates an optimal connection. This makes the P2F a good alternative to screws.

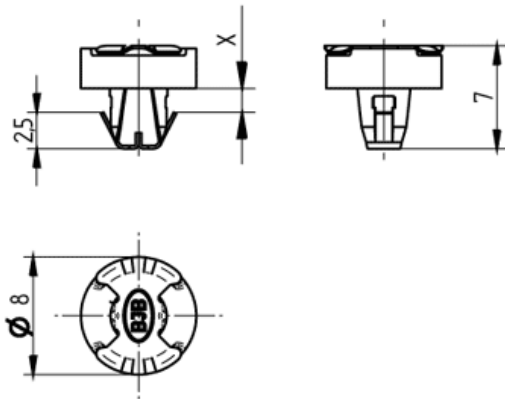


2.1 Customer benefits and advantages

- Plug-in mounting, thus quick and safe installation
- Reliable heat dissipation due to permanent and constant contact pressure
- Compensation of heat-induced expansion of the PCBs through CrNi/silicone material combination. Screws do not allow this expansion
- Shock and vibration resistant
- No safety measure against loosening is required. The P2F fulfills this requirement alone.
- Only one component needed for mounting
- Electrically insulating connection to the PCB
- The long service life of the silicone ring, as silicone has a high compression set.

2.2 Technical properties

Dimensions of the P2F:



Materials:

- Spring clamp CrNi
- Silicone ring

Temperature resistance:

- -40°C to $+80^{\circ}\text{C}$

Physical properties:

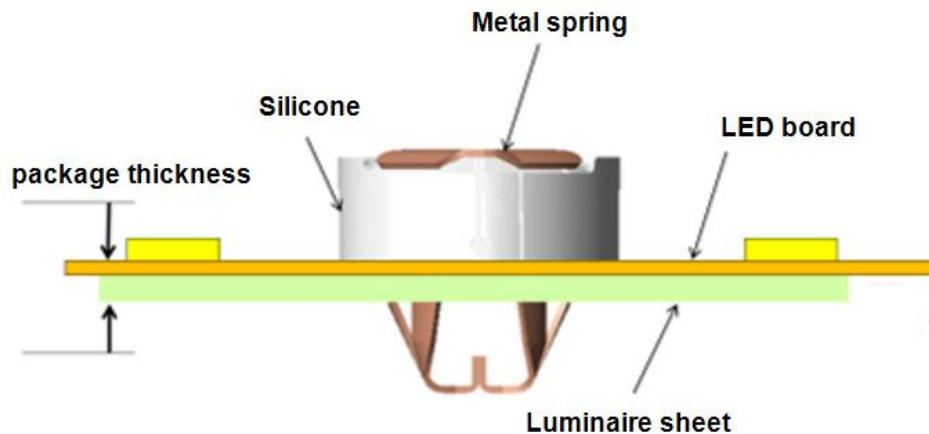
- Minimum contact pressure of 5 N
- Holding force of 50 N

2.3 Mode of operation and assembly

By inserting the P2F, the two hooks reach under the luminaire sheet and thus hold the P2F. The silicone ring is pressed onto the LED board and pressed together. The elastic silicone ring ensures a constant minimum contact pressure of 5 N. This constant contact pressure ensures reliable heat dissipation. In addition, the heat-related expansion of the PCB can be absorbed by the CrNi spring and the silicone ring.

Due to the silicone ring, there is an insulating connection to the PCB. This means that the position of the conductor tracks around the hole can be freely selected, as the silicone ring can touch it without any problem. Clearance and creepage distances do not have to be taken into account.

By changing the silicone ring, different package thicknesses can be mounted. The package thickness results from the height of the PCB and the height of the luminaire sheet.



The color of the silicone ring indicates the thickness of the package.

Article no.	package thickness	Color
28.901.U162-0	1,5 - 2,0 mm	transparent colorless
28.901.U163-0	2,0 - 2,4 mm	transparent yellow
28.901.U164-0	2,4 - 2,7 mm	grey
28.901.U165-0	2,7 - 3,2 mm	white
28.901.U166-0	3,2 - 3,6 mm	blue
28.901.U169-0	4,0 mm	transparent white

It must be ensured that the package thickness of the respective P2F is adhered to. A smaller package thickness would mean that the necessary contact pressure would not be given. This means that the heat dissipation would not be given either. A package that is too thick would result in the silicone ring being squeezed too much, possibly destroying it and causing it to lose its effect.

Before mounting, the following points must be observed:

- The package thickness of the respective P2F must be strictly observed.
- The hole diameter in the luminaire sheet must be $\varnothing 4.2 \pm 0.1$ mm
- The hole diameter in the PCB must be $\varnothing 4.3 - \varnothing 4.8$ mm

Mounting can be done by hand or with a mounting aid. In this case, the P2F is first inserted into the mounting holes and then snapped into place by pressing.

A bit and bit holder is available as a mounting aid with which the P2F can be mounted. The advantage of the bit is that it is magnetic and thus attracts the P2F. This makes mounting much easier.

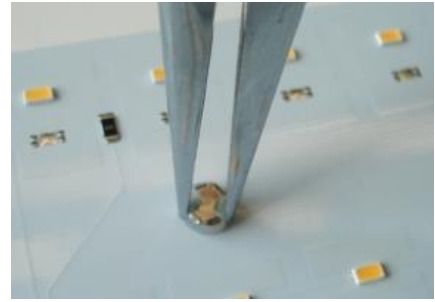


Bit holder
28.901.U801-0

Bit
28.901.U811-0

2.4 Disassembly

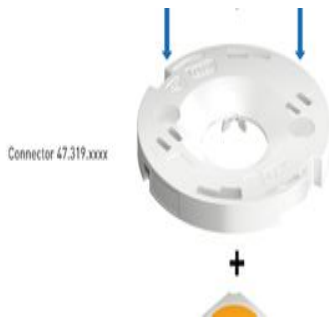
Disassembly is done by squeezing the head in the waist area. The P2F can then be pulled out. This process destroys the P2F, which is why it cannot be reused.



3 28.902 P2F for blind holes



Push-to-Fix for mounting COBs with BJB connection elements on aluminum heat sinks with cylindrical holes. The P2F makes mounting the retaining elements quick and easy, as only one component is required. In addition, the retaining element is mounted with an even contact pressure. The contact pressure is 20 N per P2F.

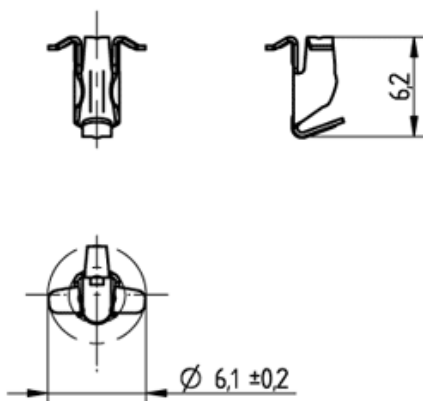


3.1 Customer benefits and advantages

- Plug-in mounting, thus quick and safe installation
- Reliable heat dissipation due to permanent and constant contact pressure
- Shock and vibration resistant
- No safety measure against loosening required. The P2F fulfils this requirement alone
- Only one component required for fastening

3.2 Technical properties

Dimensions:



Material:

- Spring clip CrNi

Physical properties:

- Contact pressure of 20 N

3.3 Mode of operation and assembly

When the P2F is inserted, it tilts in the outer wall of the bore and thus ensures a permanent connection. The connection between the P2F and the bore of the heat sink is based on the principle of frictional connection.

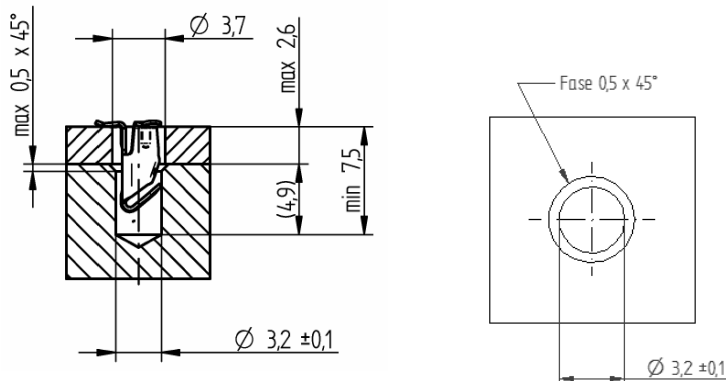
Since the P2F is made of metal, it is in principle conductive. When using our connection elements, this property is negligible, as the connection elements are made of plastic and therefore insulate.

However, if used for other purposes, this property must be taken into account and attention must be paid to clearances and creepage distances. The creepage and clearance distances must be observed according to the luminaire class.

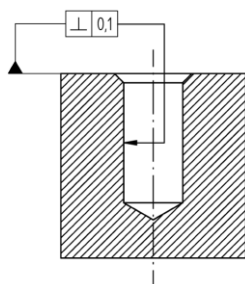
There are a few points to note before mounting. Firstly, the diameter of the hole must be $\varnothing 3.2 \pm 0.1$ mm. The hole can be either a through hole or a blind hole. In addition, the hole must not contain a thread, must be cylindrical and have a depth of at least 4.9 mm. A circumferential chamfer of $0.5 \times 45^\circ$ facilitates the insertion of the P2F into the hole.

The hole diameter in the mounting bracket is $\varnothing 3.7$ mm. The thickness of the retaining element must not exceed 2.6 mm.

The material of the heat sink/hole wall must be aluminum. If the material is stronger, e.g. steel, a secure hold of the P2F cannot be guaranteed.



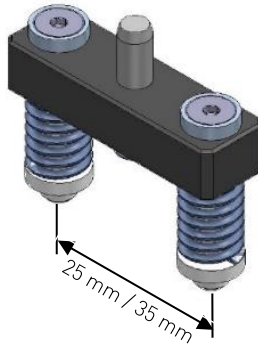
In addition, a concentricity of 0.1 mm must be ensured for the hole.



A mounting force of 200 N is required for mounting the P2F. Especially for our mounting brackets with pre-assembled P2F, we offer a press-in tool with which both P2F of a mounting bracket can be pressed in at the same time.

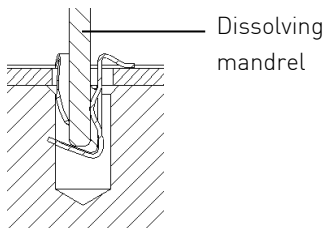
The press-in tool is equipped with pressure or spiral springs, which ensure that the P2F is always mounted in the heat sink with the correct assembly force.

The insertion tool is available with two different distances (25 mm and 35 mm) and can be used with standard knee or hand lever presses.

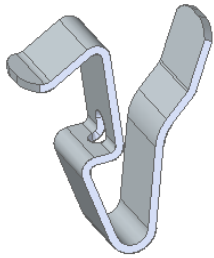


3.4 Disassembly

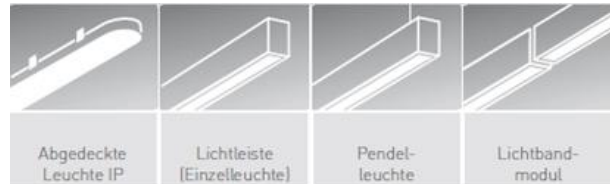
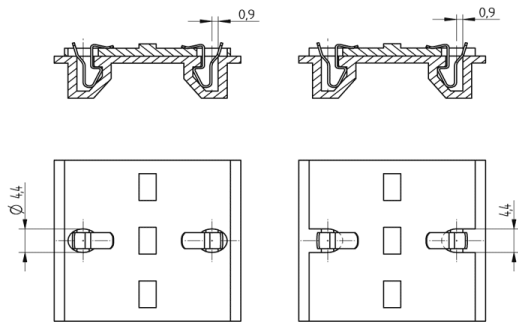
Disassembly can be done with the help of a $\varnothing 1.6$ mm release mandrel. To do this, the release mandrel is pressed into the hole and the clamping leg of the P2F is deformed with a blow. The P2F is destroyed and cannot be reused.



4 28.903 P2F for screw and profile grooves



Push-to-Fix for mounting PCBs on aluminum profiles. The P2F serves as a replacement for the screw, as it can be mounted easily. In addition, the structure above the PCB is significantly smaller than with a screw connection, which is why the P2F has no influence on the light cone and does not cause any shadowing. The P2F is primarily used in linear applications, i.e. where aluminum profiles are used. These include the following:

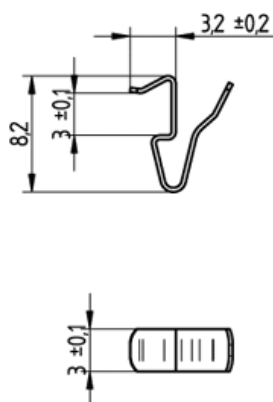


4.1 Customer benefits and advantages

- Plug-in mounting, thus quick and safe installation
- Reliable heat dissipation due to permanent and constant contact pressure.
- Compensation of heat-related expansion of the PCBs by CrNi spring. Screws do not allow this
- Shock and vibration resistant
- No safety measure against loosening required. The P2F fulfils this requirement alone
- Only one component needed for mounting
- Mounting of LED modules with closed holes and open slotted holes
- Detachable connection

4.2 Technical properties

Dimensions:



Material:

- Spring clamp CrNi

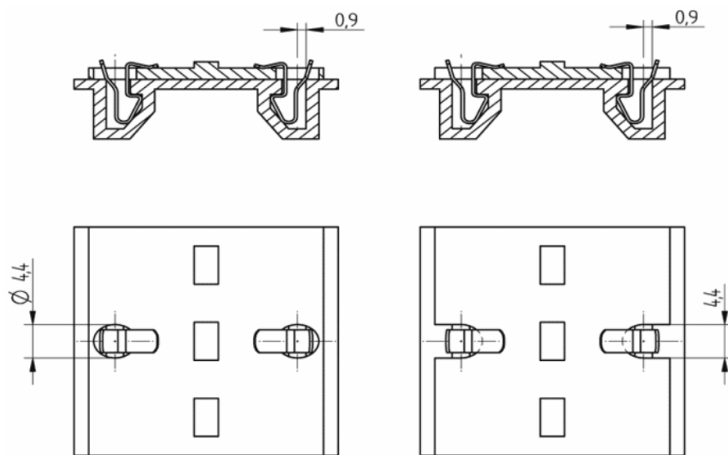
Physical properties:

- Contact pressure of 10 N

4.3 Mode of operation and assembly

By positive locking of the P2F in the profile groove, the PCB is fixed and clamped to the profile. The contact pressure is 10 N.

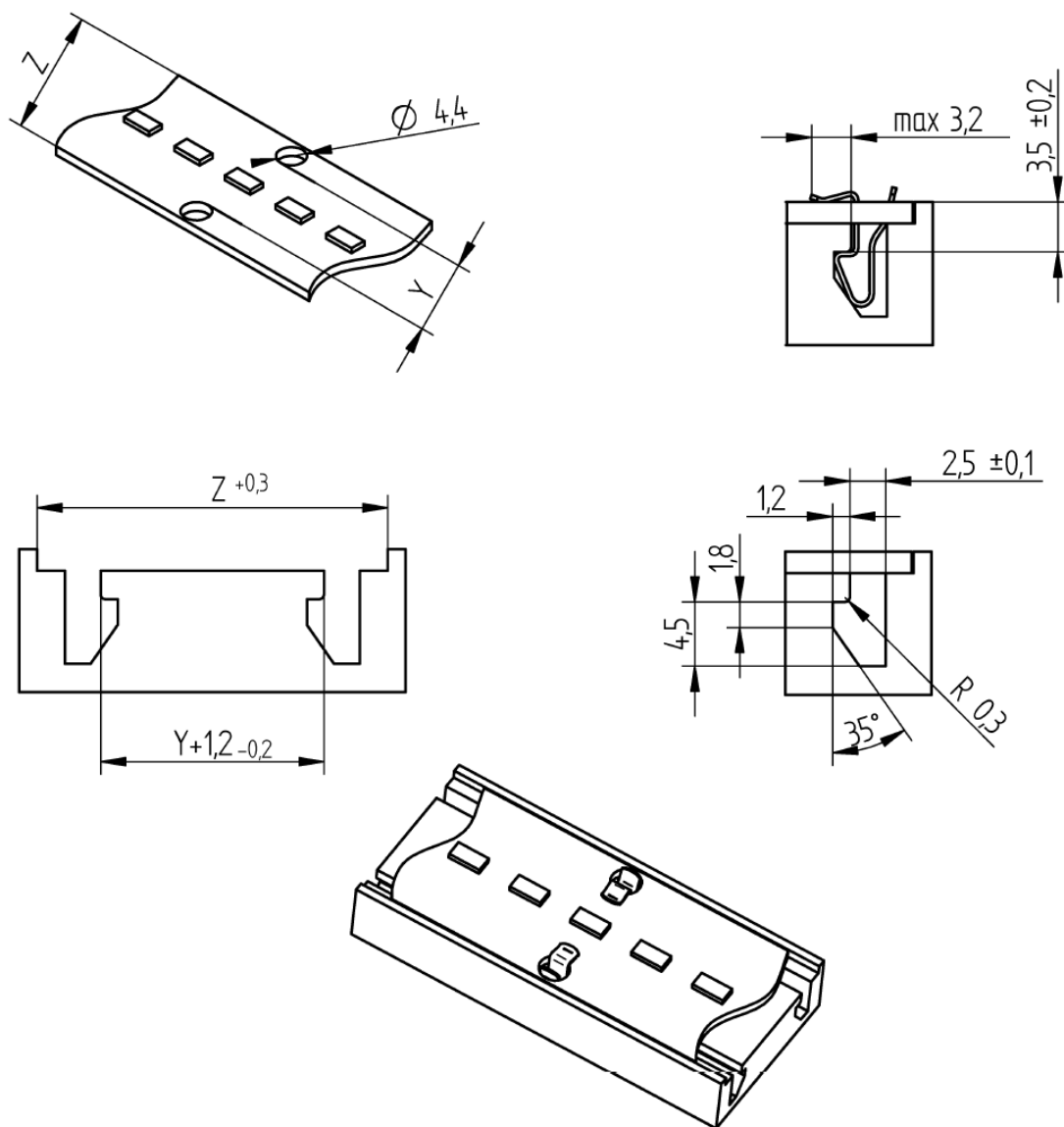
The P2F can be used for PCBs with closed holes as well as for open slotted holes.



The maximum package thickness of the P2F is 3.5 +/-0.2 mm. The package thickness is made up of the height of the PCB and the step in the profile.

Since the P2F is made of a conductive material, the overlap of the P2F above the PCB must be taken into account. The dimension 3.2 mm indicates the maximum overlap and is relevant for the design of the PCB layout with regard to the air and creepage distances to be maintained on the PCB. The distance is determined by the respective luminaire class.

To ensure a permanent connection between the PCB and the profile, the specified dimensions must be adhered to.



With the help of the bit holder and a bit, the P2F can be mounted quickly and safely. For this, the P2F is attached to the bit (the bit is magnetic and attracts the P2F) and then pressed through the overlapping openings of the PCB and profile.



Bit-holder
28.901.U801-0



Bit
28.903.U811-0

4.4 Disassembly

To loosen the P2F, a standard slotted screwdriver is required. This is applied to the head of the P2F.



The P2F is then levered out, thus separating the PCB from the profile. The dismantled P2F can also be used again.

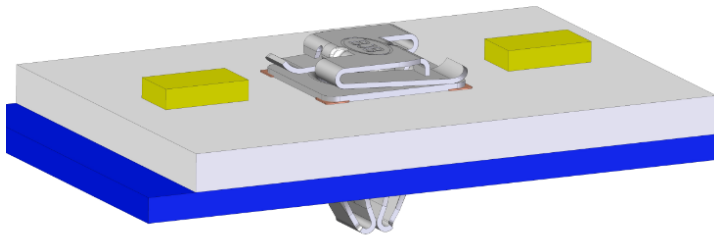
5 28.904 SMD-P2F solderable



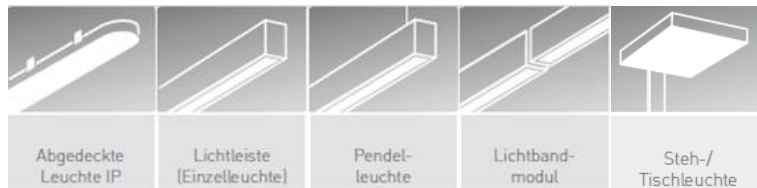
SMD Push-to-Fix for mounting PCBs on luminaire sheets and in aluminum profiles. A special feature of the SMD-P2F is that it can be pre-fixed to the PCBs. For this purpose, the SMD-P2F are assembled on the PCB during the SMD process and soldered in the reflow oven. This means that the SMD-P2F are pre-fixed and only have to be connected to the luminaire sheet by pressing them down.

only have to be connected to the luminaire sheet by pressing it down.

In addition, the structure above the PCB is significantly smaller, which, in contrast to the screw, has a positive effect on the light cone and prevents shadowing.



Possible applications include linear and planar luminaire applications.

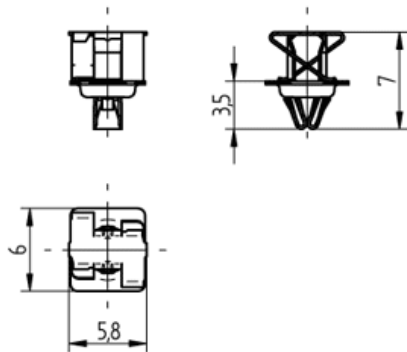


5.1 Customer benefits and advantages

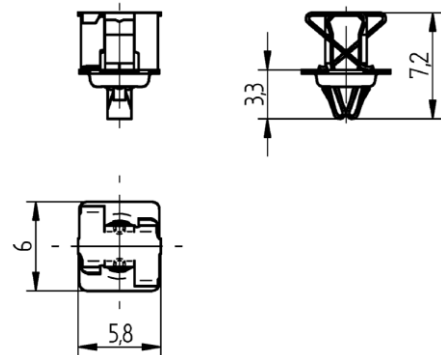
- Plug-in mounting, thus quick and safe installation
- Reliable heat dissipation due to permanent and constant contact pressure.
- Compensation of heat-related expansion of the blanks by CrNi spring. Screws do not allow this
- Shock and vibration resistant
- No safety measure against loosening required. The P2F fulfils this requirement alone
- Only one component needed for fastening
- Storage effort is reduced because the SMD P2F is pre-fixed
- Detachable connection

5.2 Technical properties

Dimensions 28.904.U101 in relaxed condition:



28.904.U102 in relaxed condition:



Material:

- Spring clamp CrNi
- Solder plate CuSn - vz

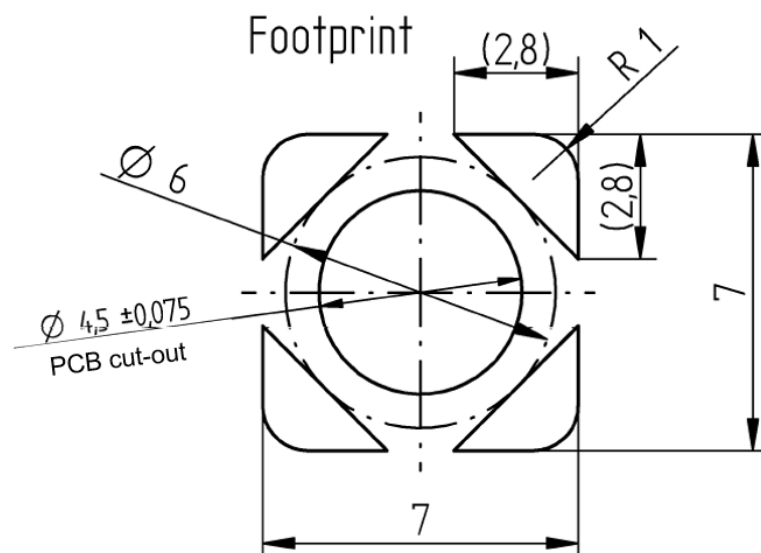
Physical properties:

- Contact pressure 5 N

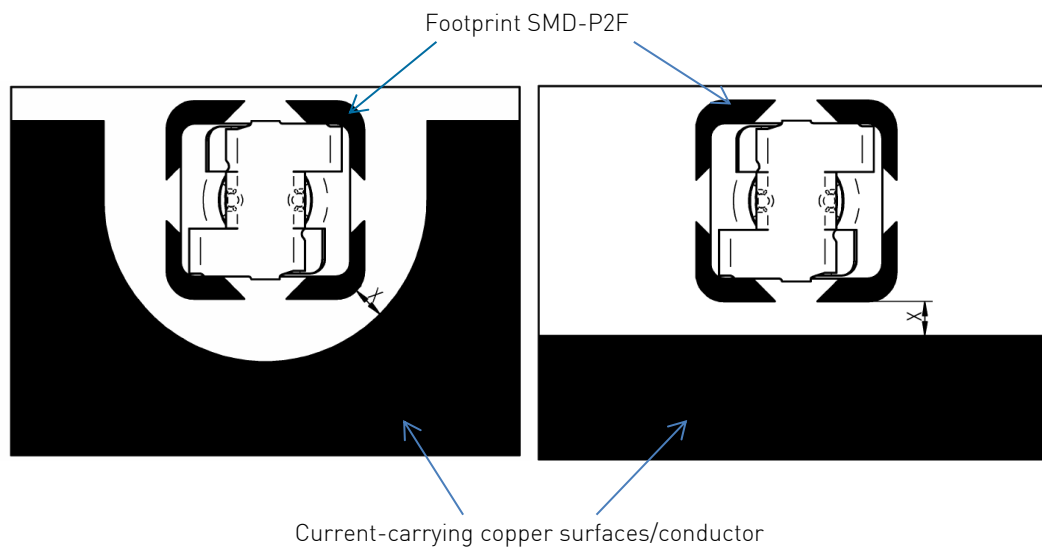
5.3 Mode of operation and assembly

By pressing down the SMD-P2F, it snaps into place behind the luminaire sheet and thus fixes the PCB to the luminaire sheet. This ensures a permanent contact pressure of 5 N.

The following points must be observed when soldering the SMD-P2F. A cut-out of $\varnothing 4.5 \pm 0.075$ mm must be provided in the PCB, as well as four solder pads.

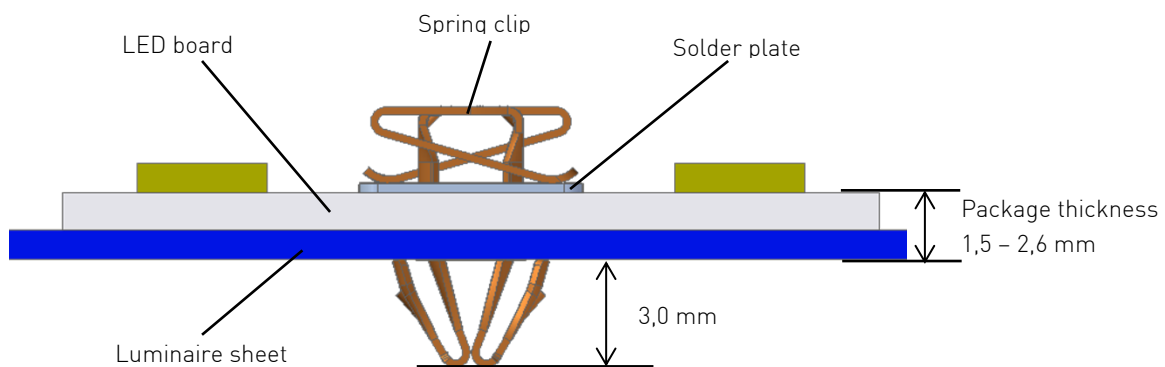


As the SMD-P2F has direct contact with the luminaire sheet via the spring, the clearances and creepage distances must be taken into account. The dimension "X" is the distance for the clearance and creepage distance and must be observed according to the luminaire class.



A cut-out $\varnothing 3.0 \pm 0.2$ mm is to be provided in the luminaire sheet itself.

In addition, the minimum and maximum package thickness of the SMD-P2F must be observed. The package thickness results from the height of the PCB and the height of the luminaire sheet. For the SMD-P2F, the package thickness must be 1.5 - 2.6 mm.



Pushing down the SMD-P2F can be done with the help of a bit holder and bit. Since the assembly bit limits the travel of the spring when it is pressed down, there are three different bits for the respective package thickness ranges. This subdivision is necessary so that the spring is not overstretched and the pressure force of 5 N is guaranteed. The package thicknesses for the respective SMD P2F versions should also be taken into account here. This also influences the correct choice of bit inserts.

Zubehör:
Magnet-Bit für 28.904.U101.10



28.904.U811.10	Paketdicke: 2.4 - 2.6 mm	A = 1.0 mm
28.904.U812.10	Paketdicke: 1.8 - 2.3 mm	A = 1.5 mm
28.904.U813.10	Paketdicke: 1.5 - 1.7 mm	A = 2.0 mm



Magnet-Bit für 28.904.U102.10

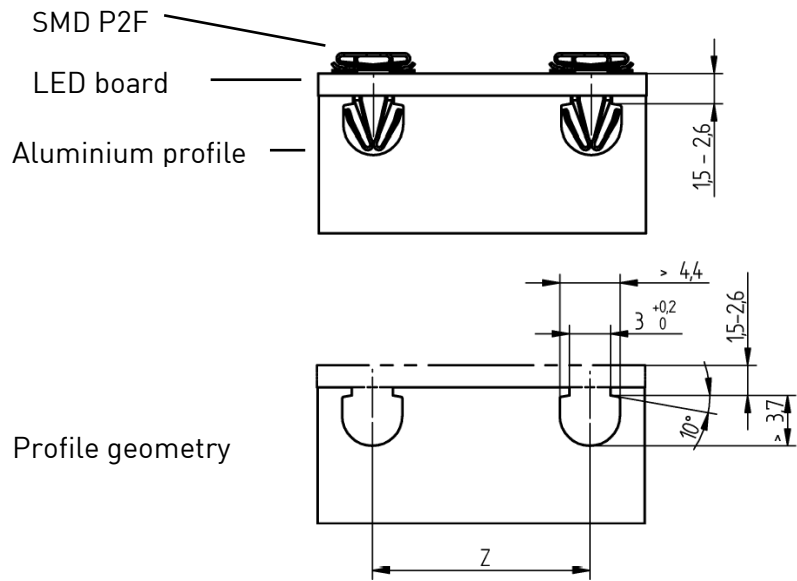


28.904.U811.10	Paketdicke: 2.7 - 2.9 mm	A = 1.0 mm
28.904.U812.10	Paketdicke: 2.1 - 2.6 mm	A = 1.5 mm
28.904.U813.10	Paketdicke: 1.8 - 2.0 mm	A = 2.0 mm

Bithalter 28.901.U801.89

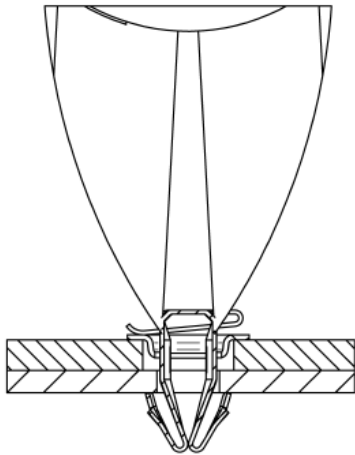


For mounting on an aluminum profile, the profile geometry and the package thickness must be observed. The package thickness may also be 1.5 - 2.6 mm.

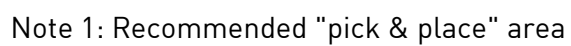


5.4 Disassembly

For disassembly, the head of the spring is pressed together. This relaxes the spring underneath the board and it can be pulled out upwards. The spring is destroyed in the process. Since the soldering plate is not loosened, a new spring can be inserted without the soldering plate.



The SMD-P2F is packaged using tape and reel.



5.6 FAQ

Is there a predefined soldering profile for soldering the SMD-P2F?

As the temperature-critical component is always the LED, we cannot recommend a soldering profile for the SMD-P2F. Due to the different component-related parameters, the assembler must select the optimal overall soldering profile individually for the respective board.

Can it happen that the SMD-P2F, in large numbers on a board, act as heat sinks in the reflow process?

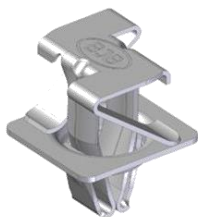
The carrier material made of FR4 material acts thermally as the greatest insulator. Therefore, we do not expect any influence on the soldering profile in the form of heat flowing away from the LEDs through the SMD-P2F or an increase in the cycle time of the reflow process.

Can it happen that the SMD-P2F rotates on the board during the reflow process?

Due to the adhesion forces of the solder on all 4 corners of the footprint, twisting of the SMD-P2F is unlikely.

Are the spring clips available without solder plate?

Yes, these are available under the following item number.



28.904.U101-0

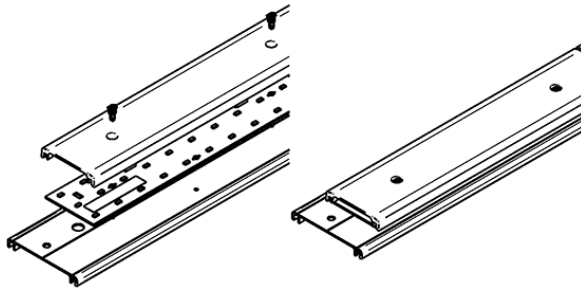


28.904.-101-0

6 28.905 P2F for optics



Push-to-Fix for mounting optics and PCBs on a luminaire sheet. The P2F allows optics and PCBs to be fixed in one step. This reduces logistics because the P2F is pre-assembled in the optic.

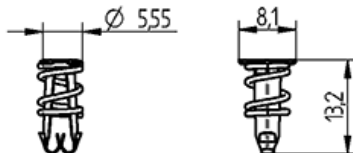


6.1 Customer benefits and advantages

- Plug-in mounting, thus quick and safe installation
- Reliable heat dissipation due to permanent and constant contact pressure.
- Compensation of heat-related expansion of the PCBs by CrNi spring. Screws do not allow this
- Shock and vibration resistant
- No safety measure against loosening required. The P2F fulfils this requirement alone
- Only one component required for fastening
- Storage costs are reduced because the P2F is pre-assembled in the optics
- Mounting of PCBs and optics in one step
-

6.2 Technical properties

Dimensions:



Material:

- Spring clip CrNi
- Spring CrNi

Physical properties:

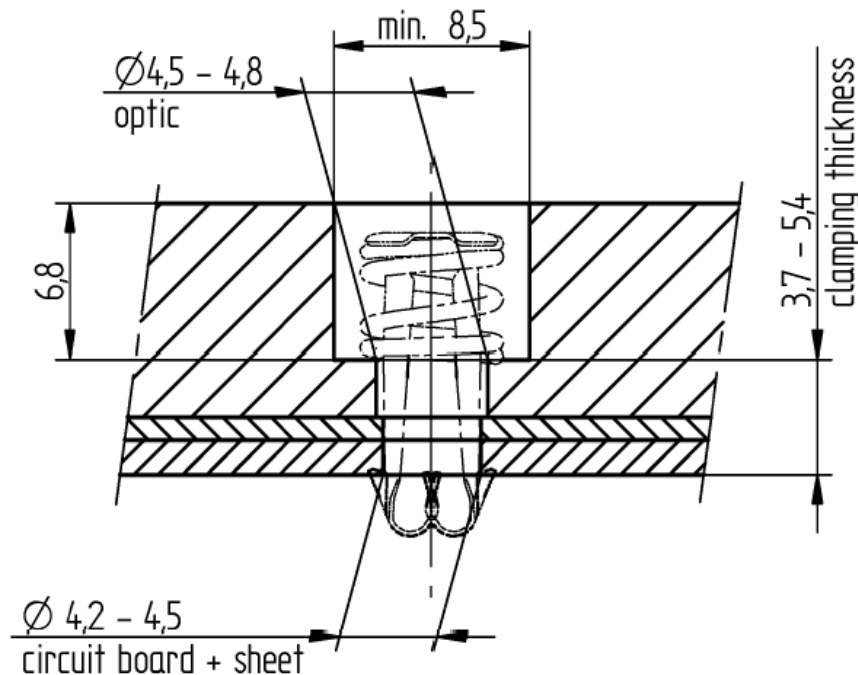
- Contact pressure of 10 N

6.3 Mode of operation and assembly

By pressing the P2F down into the lamp cover, it locks into place behind the lamp cover. This fixes the three components and guarantees a contact pressure of 10 N.

To ensure the contact pressure, the package thickness must be observed. This may be between 3.7 mm and 5.4 mm. The package thickness is made up of the optics, PCB and luminaire sheet.

A cut-out of $\varnothing 8.5$ mm and a height of 6.8 mm must be provided for the head of the P2F. The hole diameter for the P2F in the optic must be $\varnothing 4.5 - 4.8$ mm. The cut-out in the luminaire sheet and the PCB must be $\varnothing 4.2 - 4.5$ mm.



For mounting, the optic with pre-assembled P2F must be pressed onto the PCB and the luminaire sheet.



Bit-holder
28.901.U801-0



Bit
28.901.U812-0

As the P2F is made of metal, it is in principle conductive. Therefore, the clearances and creepage distances between P2F and conductive components and tracks must be observed. The creepage and clearance distances must be maintained according to the luminaire class.

6.4 Disassembly

For disassembly, the P2F is pressed together at the lower end and the optic is lifted off the PCB. The P2F is destroyed in the process and cannot be reused.