

Fantastic **Waterproof** **Small**  
**FWS SERIES**

**2.0mm pitch IP67 compliant waterproof connector**



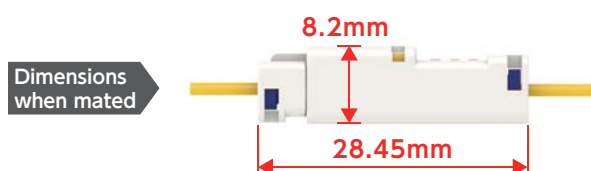
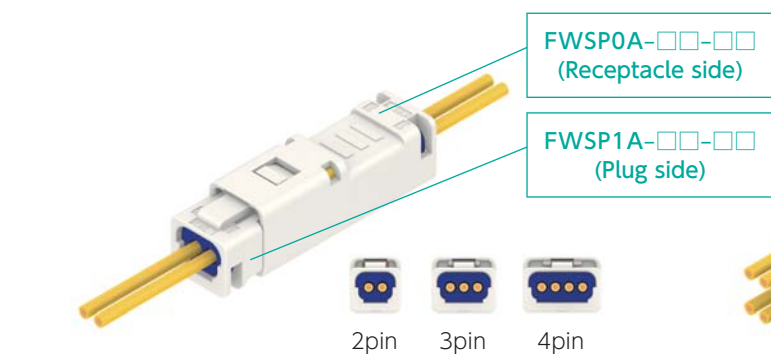
## Features

1

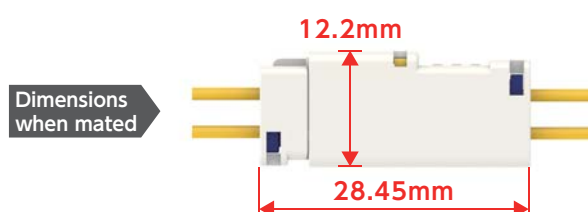
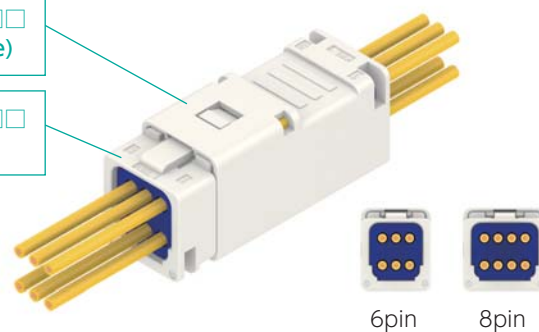
### Industry's smallest class dimensions with a 2.0 mm pitch waterproof connector.

- 2.0 mm pitch waterproof connector achieves the industry's smallest class height and length.

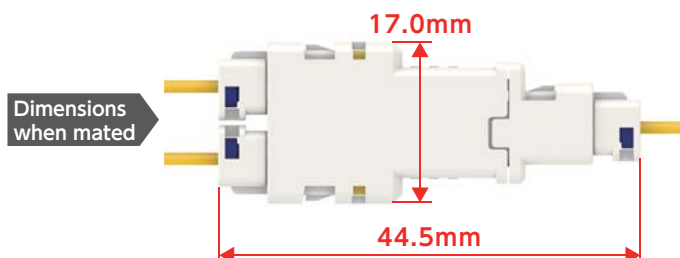
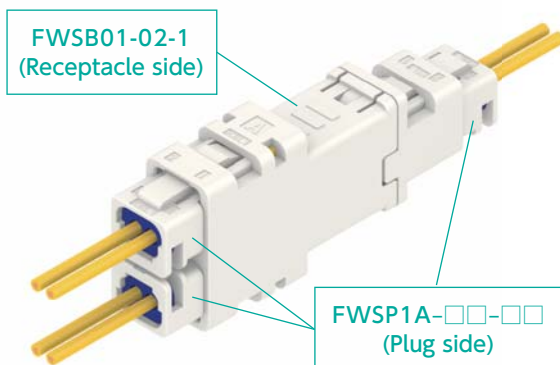
FWSP0A/1A (1 row type: 2, 3, 4 pins) Mated state



FWSP0A/1A (2 rows type: 6, 8 pins) Mated state



FWSB0A/FWSP1A (branch/relay type : 2 pins) Mated state

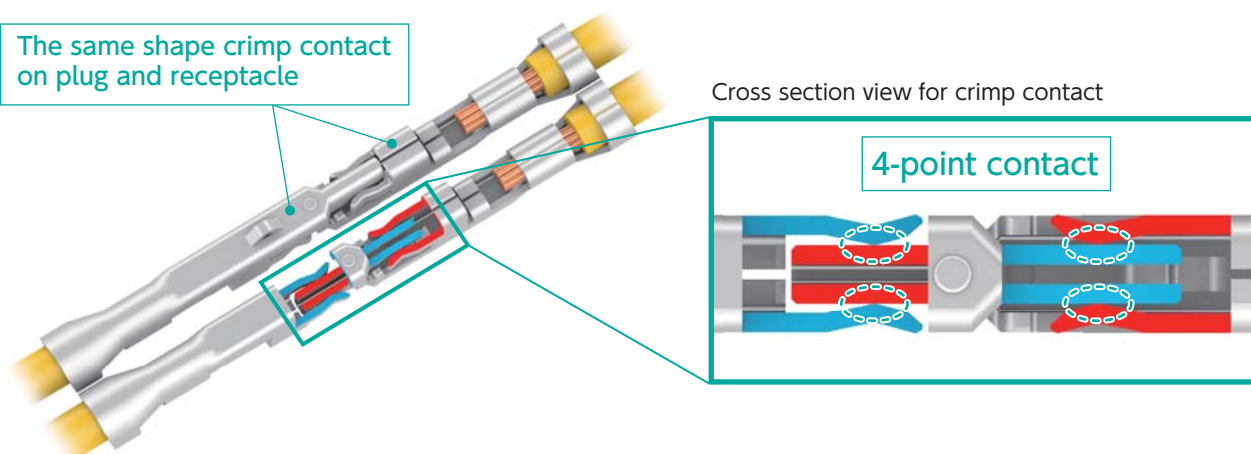


2

### 4-point contact of crimp contact with the same shape on plug and receptacle

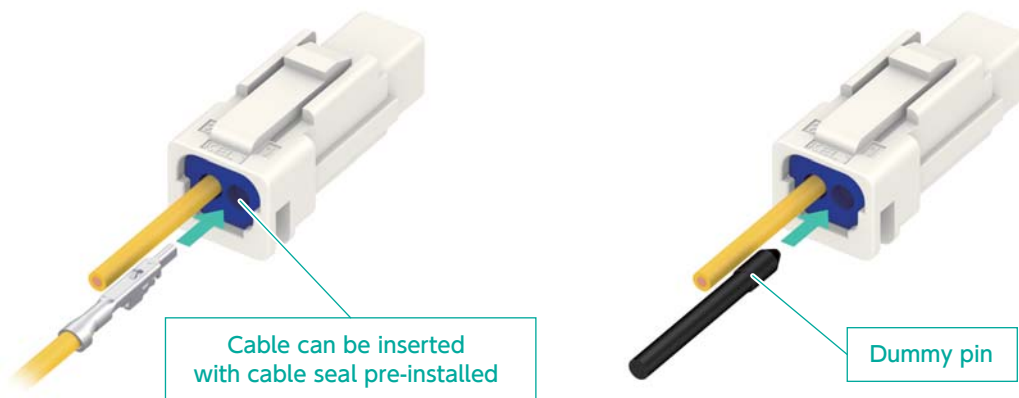
- 4-point contact structure and independent spring mechanism realize stable connection.

The same shape crimp contact on plug and receptacle



### 3 Connector structure considering assembly workability

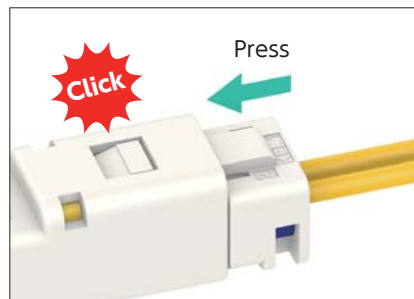
- The crimp contacts on the plug side and the receptacle side have the same shape, so the crimping applicator and crimping hand tool can be used in common.
- The cable seal and the sealing ring are pre-installed in the housing.
- For repairs, the cable can be pulled out with a precision screwdriver.



### 4 Lock mechanism for secure mating

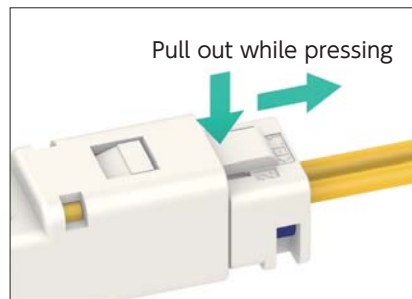
- Robust locking mechanism has tactile click feeling.

Lock / Insert



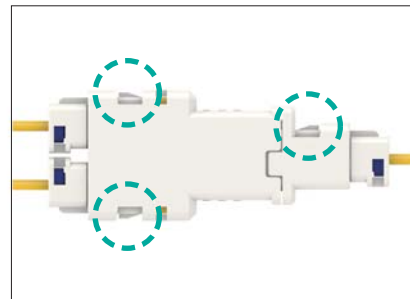
Push the plug until it clicks

Unlock / Lock release



Unplug while pressing the lock on the top

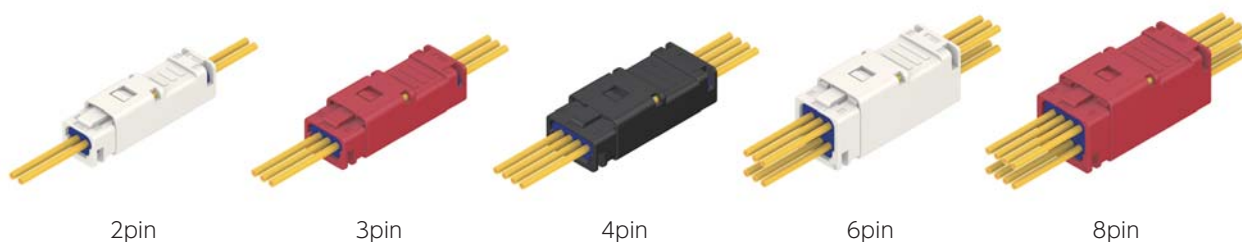
Lock part of the branch/relay type



The branch / relay type has three locks surrounded by the above dotted line.

### 5 Product variations with 3-color housing and 5 types of contacts

- The housing is available in three colors, white, red, and black, and the number of contacts is 2, 3, 4, 6, and 8 pin.
- The applicable cable is AWG #22/24/26/28, and the outer diameter of the cable coating can be from  $\Phi 1.0$  to 1.7mm.





## Advantages of using FWS

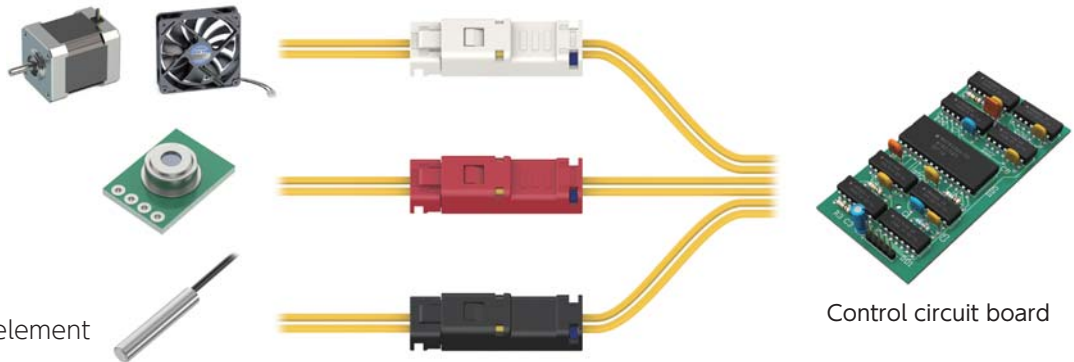
### Application example 1

**Improved visibility with 3-color housing.  
It leads to improvement of work efficiency.**

- Motor unit
- Fan unit

- Sensor unit

- Thermistor element

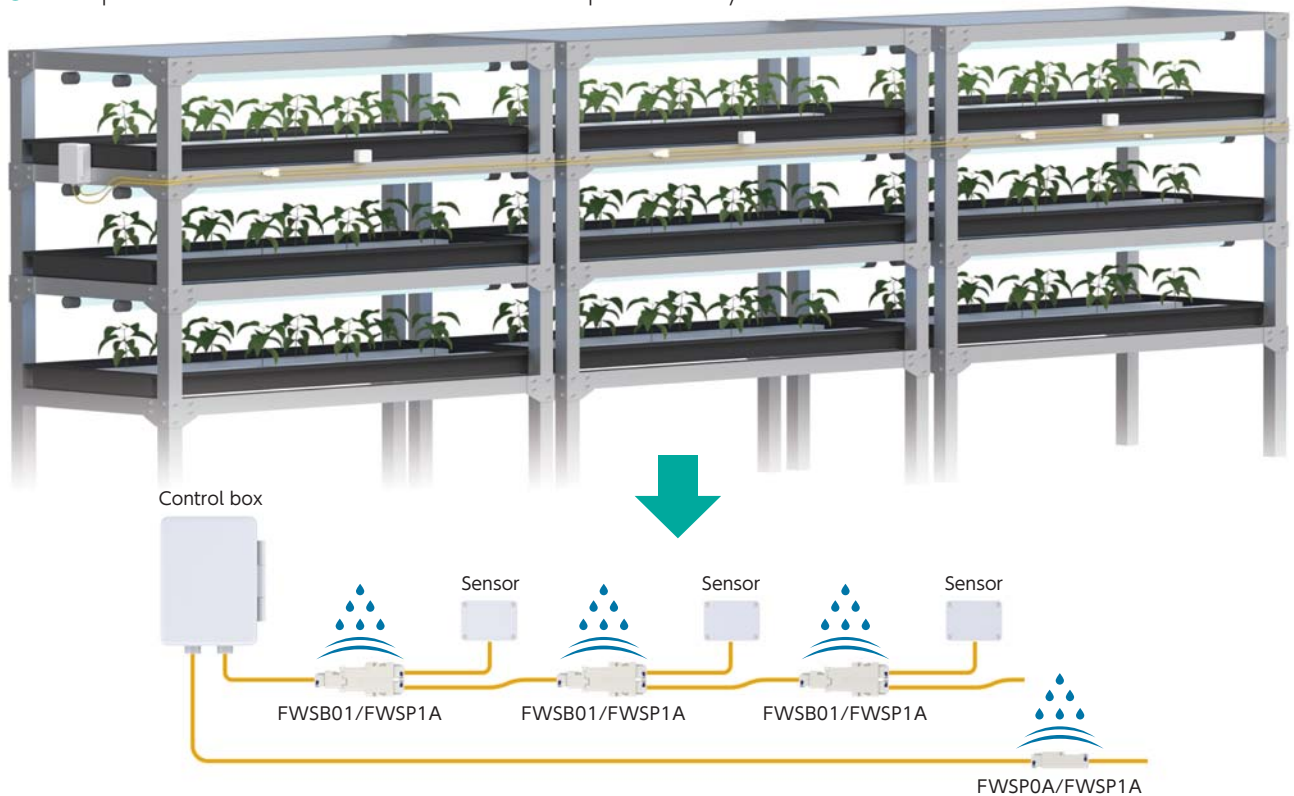


Control circuit board

### Application example 2

**Active in situations where waterproofness and space saving are required**

- Example of use inside a module installed in a plant factory



## Application



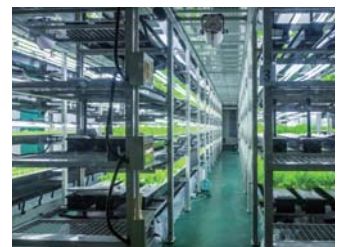
Convenience store  
Commercial drink server



Street light  
Expressway sign board



Decorative stage set  
LED lighting



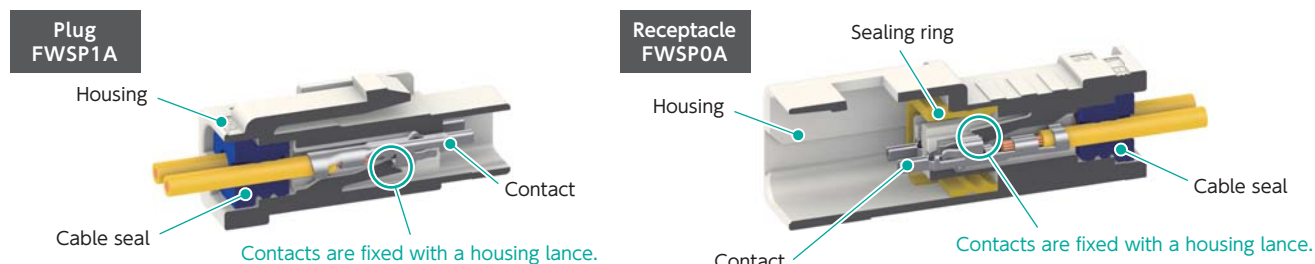
Plant factory  
Temperature sensor

**B.C.E. S.r.l.**

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## Internal structure



## Order code

**FWSP0A**-□□-□□  
① ② ③ ④

- ① Type **FWSP0A** : Receptacle (Cable-relay connector)  
② Number of contacts **02** : 2pin **03** : 3pin **04** : 4pin **06** : 6pin **08** : 8pin  
③ Housing color **1** : White **2** : Red **3** : Black  
④ Cable seal color **3** : Blue (Cable outer diameter  $\phi$  1.3 to 1.7mm) **4** : Orange (Cable outer diameter  $\phi$  1.0 to 1.3mm)

**FWSB01**-**02**-**1**  
① ② ③

- ① Type **FWSB01** : Receptacle (Cable-branch / relay connector)  
② Number of contacts **02** : 2pin  
③ Housing color **1** : White

**FWSP1A**-□□-□□  
① ② ③ ④

- ① Type **FWSP1A** : Plug (Cable-relay connector)  
② Number of contacts **02** : 2pin **03** : 3pin **04** : 4pin **06** : 6pin **08** : 8pin  
③ Housing color **1** : White **2** : Red **3** : Black  
④ Cable seal color **3** : Blue (Cable outer diameter  $\phi$  1.3 to 1.7mm) **4** : Orange (Cable outer diameter  $\phi$  1.0 to 1.3mm)

\*FWSP0A/1A-□□-□□ is sold for housing only and crimp contacts are sold separately. For the order code of the crimp contact, please refer to the following "Crimp contact / Dummy pin".

## Specifications

| Material and plating  |  | Electrical characteristics             |   |
|-----------------------|--|--|---|
| Housing material      | Glass filled PBT (UL94V-0)<br>(FWSP) Color: White, Red, Black<br>(FWSB) Color: White | Rated current                          | 3A max. per contact   |
| Cable seal material   | Silicone rubber<br>Color: Blue, Orange   | Protection grade                       | IP67  |
| Sealing ring material | Silicone rubber  | Contact resistance                     | (FWSP) 10m $\Omega$ max. (FWSB) 20m $\Omega$ max.   |
| Contact material      | Copper alloy   | Dielectric withstanding voltage        | 1,000V AC for 1 minute  |
| Contact plating       | (FWSP)Reflow tin over Copper<br>(FWSB)Tin over Nickel                                | Insulation resistance                  | 1,000M $\Omega$ min. at 500V DC   |
|                       |  | Operating temperature                  | -55°C to +105°C   |
|                       |  | Durability of insertion and withdrawal | 50 times  |
|                       |  | Recommended cable                      | #22/24/26/28 AWG (0.08 to 0.3sq)<br>(Cable outer diameter: $\phi$ 1.0 to 1.7mm)<br>Discrete wire cables |

## Crimp contact / Dummy pin

### Crimp contact for FWSP0A/1A



#### Order code

**#668**  
①

- ① Contact name / Applicable cable size  
**#668** : FWSP0A/1A common crimp contact  
AWG#22 to 28 (0.08 to 0.3sq)  
(Cable outer diameter  $\phi$  1.0 to 1.7mm)

### Dummy pin for FWSP0A/1A



#### Order code

**FWSP-1**  
① ②

- ① Type **FWSP** : Dummy pin for FWSP0A/1A  
② Dummy pin color **1** : Black

## Assembly tool



#### Crimping hand tool

|                       |                 |
|-----------------------|-----------------|
| Part number           | CH-20           |
| Applicable cable size | AWG#22/24/26/28 |
| Crimp contact         | #668            |

#### Crimping machine

|                  |                                   |
|------------------|-----------------------------------|
| Crimp contact    | #668                              |
| Manufacturer     | Japan Automatic Machine Co., Ltd. |
| Crimping machine | LPC220S                           |
| Applicator       | EFX075900K-UP                     |

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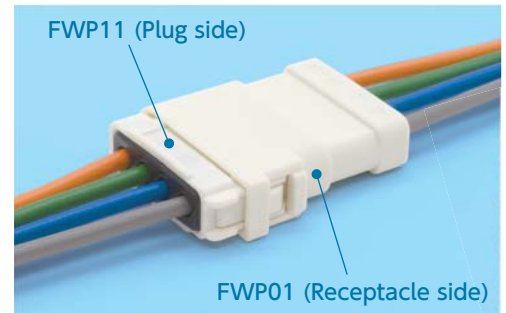
e-mail: [bce@bce.it](mailto:bce@bce.it) - Website: [www.bce.it](http://www.bce.it)

# Product list for KEL waterproof connectors

## FW SERIES P TYPE

### Features

- Industry's smallest-class waterproof connector with 5.0 mm pitch.
- The size is small and thin, but it has excellent waterproof and dustproof conforming to IP67 class.
- 3-point contact structure with independent springs always ensures stable contact.
- Crimp connectors have the same shape, the crimp applicator can be shared.
- Highly reliable design with the effective mating length 1.5 mm.
- Built-in cable sealing and seal ring.
- Robust lock mechanism with a tactile click feel.
- The housing color can be selected from 4 colors, white, red, blue and black.
- The cable seal color is 3 colors of black, light blue, pink, according to the cable covering diameter.
- Dummy pins for plugging cable insertion holes are available.  
(Available in two colors, white and black, according to the outer diameter of the cable coating)
- Can be mated with branch relay type (FWB01)



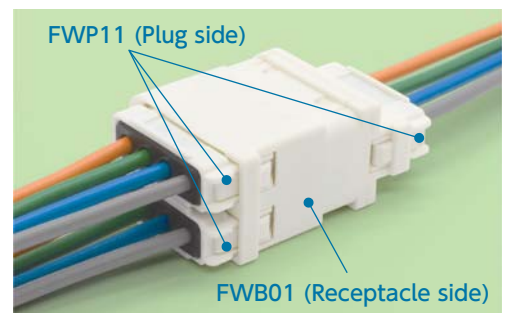
Compliant with the revised RoHS Directive (EU) 2015/863

Compliance with Electrical Appliance and Material Safety Law  
(Clearance distance and creepage distance of insulator)

## FW SERIES B TYPE

### Features

- Industry's smallest-class waterproof connector with 5.0 mm pitch.
- Although it is small, it has excellent waterproof and dustproof conforming to IP67 class.
- FWP11 (plug side connector) branch relay type can reduce the number of cables by mating with FWB01 (receptacle side connector).
- 3-point contact structure with independent always ensures stable contact.
- Robust lock mechanism with a tactile click feeling.
- The housing color can be selected from 2 colors, white and black.



Compliant with the revised RoHS Directive (EU) 2015/863

Compliance with Electrical Appliance and Material Safety Law  
(Clearance distance and creepage distance of insulator)

### KEL Company Profile

Trade Name: KEL CORPORATION  
Established : July 23, 1962  
Total Capital: 1,617 Million Yen  
President : Akira Kasuga  
Head Office : 6-17-7 Nagayama, Tama,  
Address Tokyo 206-0025, Japan  
URL : [www.kel.jp](http://www.kel.jp)

#### Factories

- Yamanashi Factory (Nishi-Yatsushiro, Yamanashi)
- Nagano Factory (Kita-azumi, Nagano)
- Minami-Alps Factory (Minami-Alps, Yamanashi)



[www.kel.jp](http://www.kel.jp)

KEL provides the products from a connector to a rack.

**KEL CORPORATION**

### Global Network



More Information  
[https://www.kel.jp/feature/fw\\_lp](https://www.kel.jp/feature/fw_lp)

