

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

2.0mm pitch IP67 compliant waterproof connector



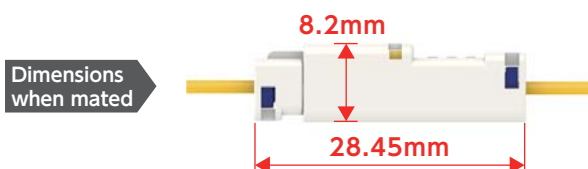
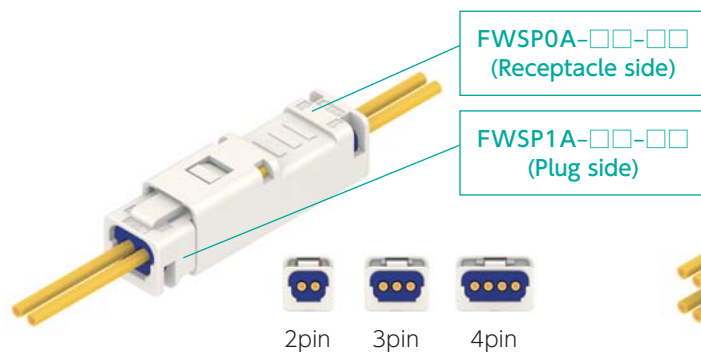
Features

1

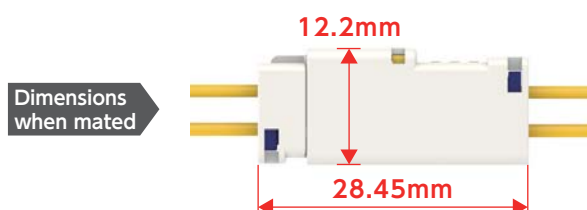
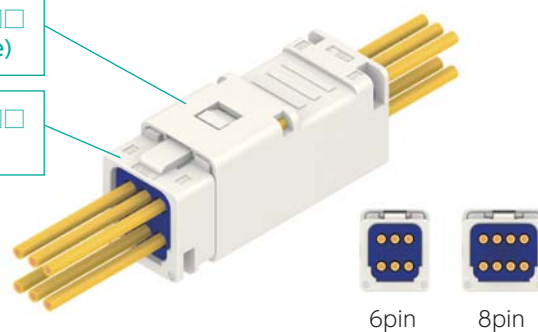
Industry's smallest class dimensions with a 2.0 mm pitch waterproof connector.

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

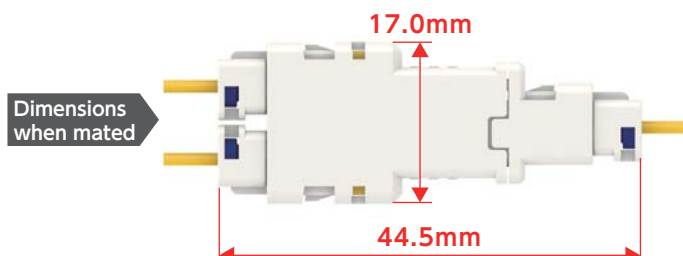
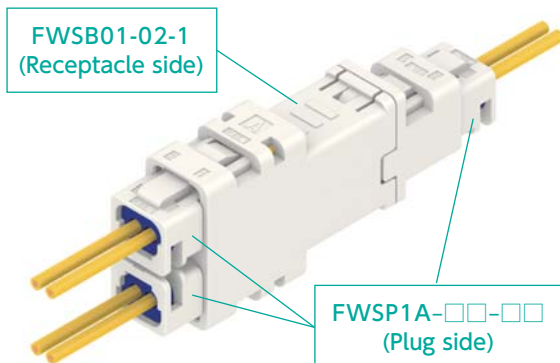
FWSP0A/1A (1 row type: 2, 3, 4 pins) Mated state



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



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

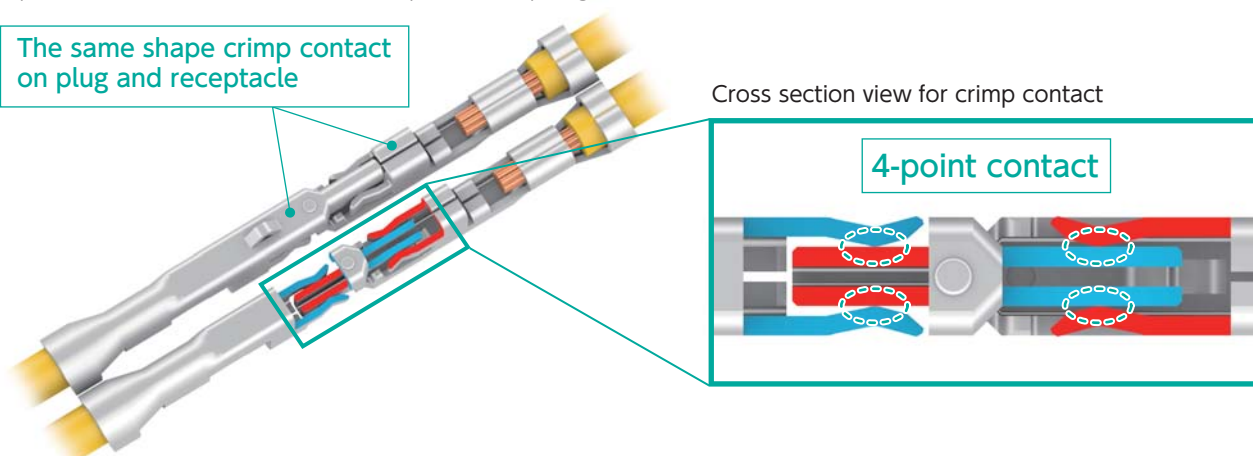


2

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

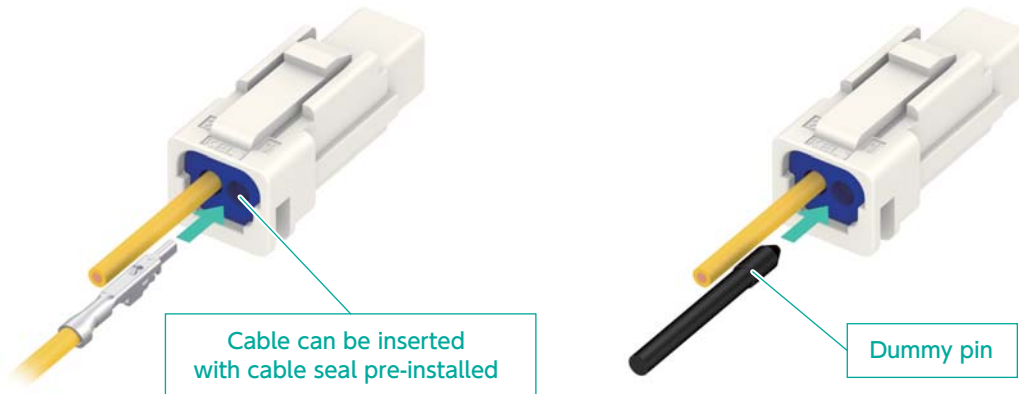
- 4-point contact structure and independent spring mechanism realize stable connection.

The same shape crimp contact on plug and receptacle



3 Connector structure considering assembly workability

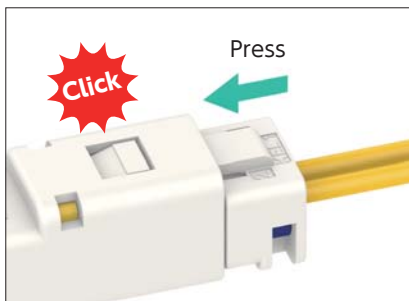
- The crimp contacts on the plug side and the receptacle side have the same shape, so the crimping applicator and crimping hand tool can be used in common.
- The cable seal and the sealing ring are pre-installed in the housing.
- For repairs, the cable can be pulled out with a precision screwdriver.



4 Lock mechanism for secure mating

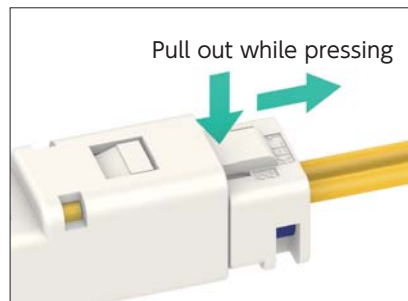
- Robust locking mechanism has tactile click feeling.

Lock / Insert



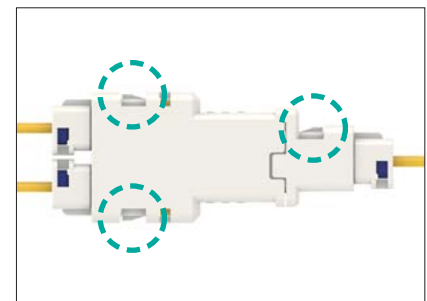
Push the plug until it clicks

Unlock / Lock release



Unplug while pressing the lock on the top

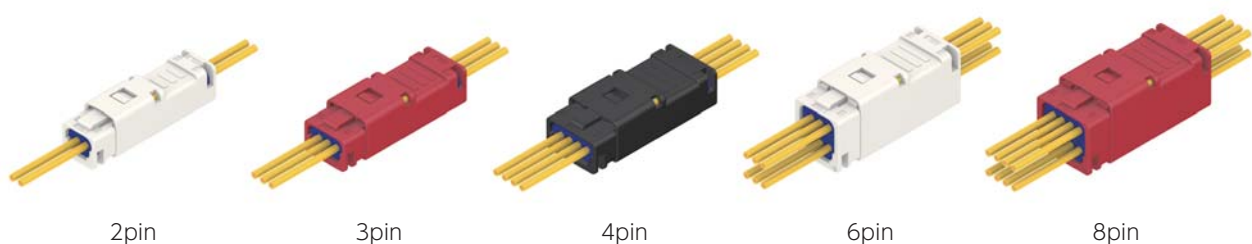
Lock part of the branch/relay type



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

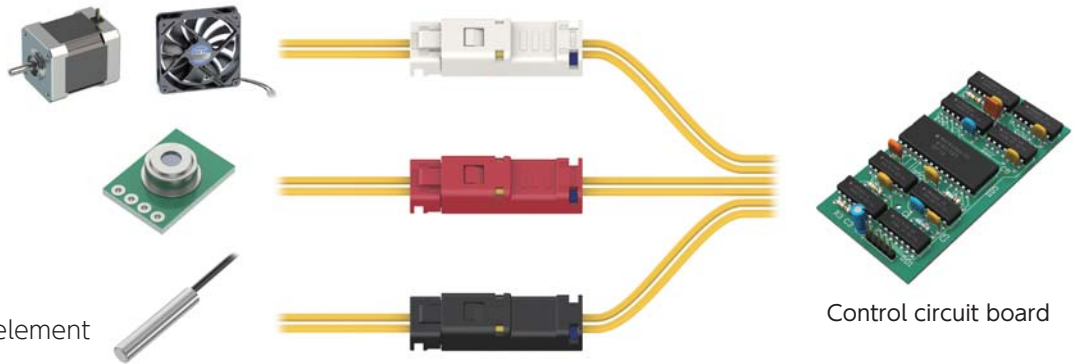
Application example 1

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

- Motor unit
- Fan unit

- Sensor unit

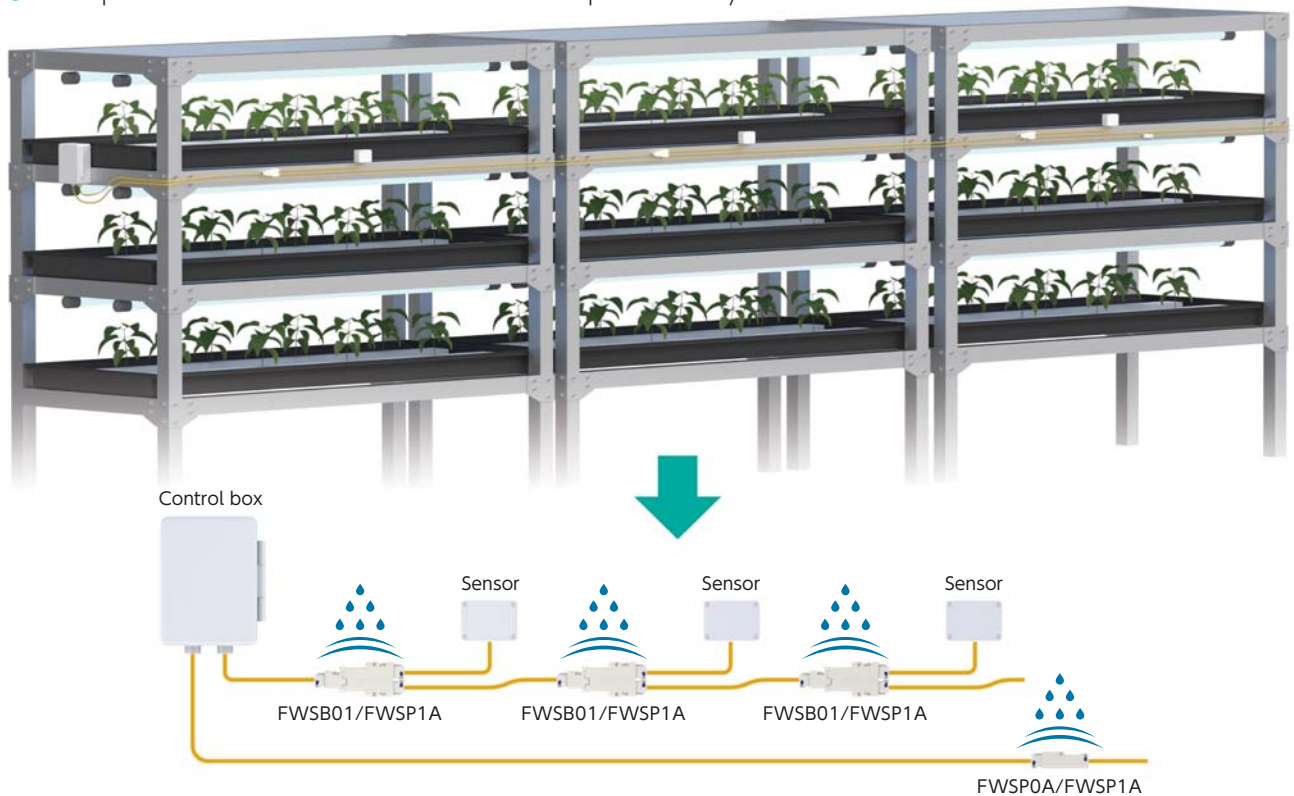
- Thermistor element



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



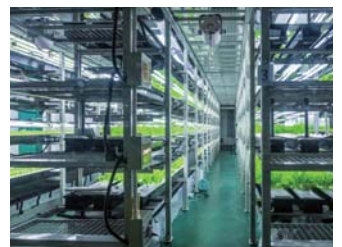
Convenience store
Commercial drink server



Street light
Expressway sign board

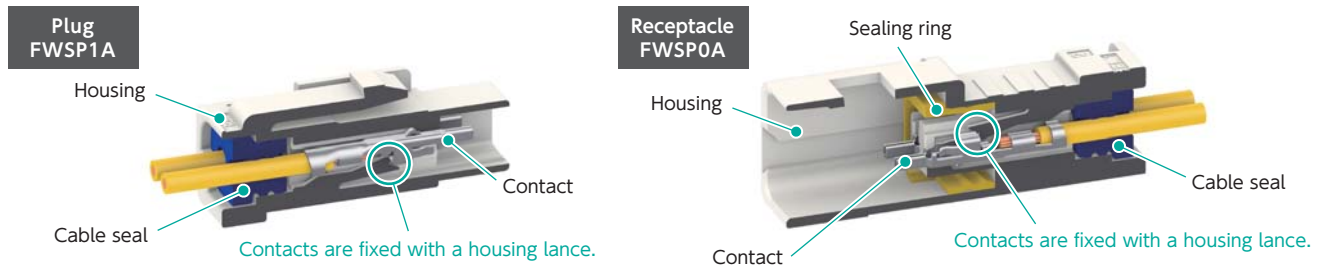


Decorative stage set
LED lighting



Plant factory
Temperature sensor

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 ϕ 1.3 to 1.7mm) 4 : Orange (Cable outer diameter ϕ 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 ϕ 1.3 to 1.7mm) 4 : Orange (Cable outer diameter ϕ 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) (FWSP) Color: White, Red, Black (FWSB) Color: White	Rated current	3A max. per contact
Cable seal material	Silicone rubber Color: Blue, Orange	Protection grade	IP67
Sealing ring material	Silicone rubber	Contact resistance	(FWSP) 10m Ω max. (FWSB) 20m Ω max.
Contact material	Copper alloy	Dielectric withstanding voltage	1,000V AC for 1 minute
Contact plating	(FWSP)Reflow tin over Copper (FWSB)Tin over Nickel	Insulation resistance	1,000M Ω 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) (Cable outer diameter: ϕ 1.0 to 1.7mm) Discrete wire cables

Crimp contact / Dummy pin

Crimp contact for FWSP0A/1A



Order code

#668-□ ① ②	① Contact name / Applicable cable size #668 : FWSP0A/1A common crimp contact AWG#22 to 28 (0.08 to 0.3sq) (Cable outer diameter ϕ 1.0 to 1.7mm) ② Type No Code : Chain shape(Reel) B : In pieces(Plastic bag)
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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
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Assembly tool



Crimping hand tool

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

Crimping machine

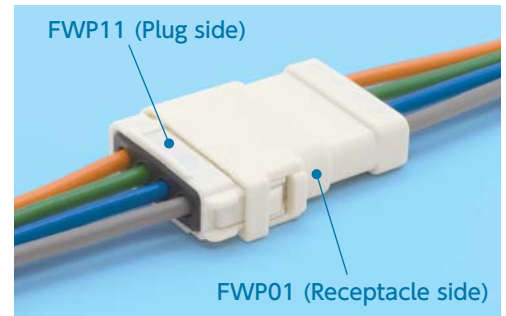
Crimp contact	#668-□
Manufacturer	Japan Automatic Machine Co., Ltd.
Crimping machine	LPC220S
Applicator	EFX075900K-UP

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)



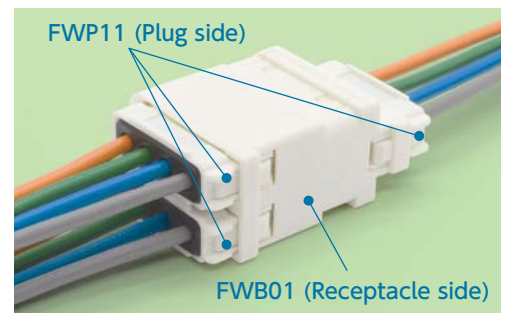
Compliant with the revised RoHS Directive (EU) 2015/863

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

Factories

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

Global Network



www.kel.jp

KEL provides the products from a connector to a rack.

KEL CORPORATION

More Information
https://www.kel.jp/feature/fw_s_lp

