Direct Acting 2-port Solenoid Valve

# FFB-FP2 Series

- NC (energized open) type
- Port size : Rc1/8 to 1/2

Materials compliant with the Food Sanitation Act
Notification No. 370 of 1959 PL

CE Note) UKCA RoHS

For applicable model number details, please refer to our website.

Note) Not compliant with the EU Drinking Water Directive 2020 / 2184 or the Regulation on Materials and Articles Intended to Come into Contact with Food (Regulation (EC) No. 1935 / 2004).

## Model No. Notation

FFB - 4 1 08 A 4 T 3 C 3 -FP2

- Model No.
- ❶ Valve size
- Operating method : NC (energized open) type
- ❷ Port size
- ❸ Thread type and pressure unit shown on nameplate
- ❹ Orifice diameter
- ❺ Body / Seal material combination
- ❻ Coil heat resistance class
- ❼ Coil option
- ❽ Rated voltage

### ❶ Valve size

| Code | Description |
|---|---|
| 2 | Width 24 mm |
| 3 | Width 30 mm |
| 4 | Width 35 mm |
| 5 | Width 40 mm |

### ❷ Port size

| Code | Description | ❶ Valve size 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 06 | 1/8 | ● | ● | | |
| 08 | 1/4 | | ● | ● | ● |
| 10 | 3/8 | | | ● | ● |
| 15 | 1/2 | | | | ● |

### ❸ Thread type and pressure unit shown on nameplate

| Code | Description | |
|---|---|---|
| | Thread type | Pressure display unit |
| A | Rc thread | MPa |

### ❹ Orifice diameter

| Code | Description | ❶ Valve size 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| S | ø1.5 | ● | | | |
| 2 | ø2 | ● | ● | | |
| 3 | ø3 | | ● | | |
| 4 | ø4 | | | ● | |
| 5 | ø5 | | ● | | ●*1 |
| 7 | ø7 | | | ● | ● |
| X | ø10 | | | | ●*2 |

*1 : ❷ Cannot be selected when port size is "15".
*2 : ❷ Cannot be selected when port size is "08".

### ❺ Body / Seal material combination

| Body | Seal | Treatment | Code | Working fluid: Compressed air | Dry air, Inert gas | Water (up to 60°C) | Oil | Low vacuum (*1) | Medium vacuum |
|---|---|---|---|---|---|---|---|---|---|
| Stainless steel | Fluororubber | Vacuum inspection (*2) | M | ● | ● | | | | ● |
| | | Oil-free treatment | T | ● | ● | ● | ● | ● | |

*1 : Can be used in low vacuum [1.33x10² Pa (abs)], but seat leakage will be 0.2 cm³/min (ANR) or less. (Seat leakage at positive pressure)
When used in low vacuum, the lower limit of operating pressure becomes 1.33x10² Pa (abs), so the upper limit is reduced by 0.1 MPa.
*2 : ❹ Cannot be selected when orifice diameter is "X".

### ❻ Coil heat resistance class

| Code | Description |
|---|---|
| 3 | Class 130 (B) |





### ❼ Coil option

| Code | Description | | ❶ Valve size 2 | 3 | 4 | 5 | Voltage DC | AC |
|---|---|---|---|---|---|---|---|---|
| A | Lead wire (300 mm) | | ● | ● | ● | ● | ● | ● |
| B | With DIN terminal box (G1/2) | | *1 | ● | ● | ● | ● | ● |
| C | With DIN terminal box (Pg11) | | ●*2 | ● | ● | ● | ● | ● |
| D | DIN terminal box with lamp (Pg11) | | ●*2 | ● | ● | ● | *3 | ● |
| G | With HP terminal box (G1/2) | | | ● | ● | ● | ● | ● |
| H | HP terminal box with lamp (G1/2) | | | ● | ● | ● | ● | ●*5 |
| J | Lead wire (300 mm) | With surge suppressor | ● | ● | ● | ● | ●*4 | |
| K | With DIN terminal box (Pg11) | | ●*2 | ● | ● | ● | ● | |
| L | DIN terminal box with lamp (Pg11) | | ●*2 | ● | ● | ● | ● | *6 |
| Q | With HP terminal box (G1/2) | | | ● | ● | ● | ● | |
| R | HP terminal box with lamp (G1/2) | | | ● | ● | ● | ● | |

*1 : ❶When valve size is "2", coil option "B" cannot be selected.
*2 : ❶When valve size is "2", the thread size of the DIN terminal box is Pg 9.
*3 : Please use "L" DIN terminal box with lamp/surge suppressor.
*4 : For DC voltage coil option "J", the surge suppressor is attached to the product.
*5 : When coil option is "H", ❽ rated voltage "K" (230 VAC) cannot be selected.
*6 : All AC voltages include a full-wave rectifier circuit, and the action of this diode virtually eliminates significant surges generated in the coil. For this reason, there is no setting with a surge suppressor.

Coil option code

| | | |
|---|---|---|
|  | A(DC) | Grommet lead wire 300 mm |
| | J | Grommet lead wire 300 mm with surge suppressor |
|  | A(AC) | Grommet lead wire 300 mm |
|  | B<br>C | DIN terminal box |
| | K | DIN terminal box with surge suppressor |
|  | D | DIN terminal box with lamp |
| | L | DIN terminal box with lamp and surge suppressor |
|  | G | HP terminal box |
| | Q | HP terminal box with surge suppressor |
|  | H | HP terminal box with lamp |
| | R | HP terminal box with lamp and surge suppressor |

### ❽ Rated voltage

| Code | Description |
|---|---|
| 1 | 100 VAC 50/60 Hz |
| 2 | 200 VAC 50/60 Hz |
| 3 | 24 VDC |
| 4 | 12 VDC |
| 5 | 110 VAC 50/60 Hz |
| 6 | 220 VAC 50/60 Hz |
| K | 230 VAC 50/60 Hz |

**For details** Click!

Refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".

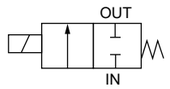
## Common specifications

| Item | FFB |
|---|---|
| Working fluid | Compressed air, Dry air, Inert gas, Water, Oil (50 mm²/s or less), Medium vacuum *1, *2 |
| Maximum operating pressure MPa | 1.4 (however, this varies by type ; refer to the operating pressure in the model-specific specifications) |
| Withstand pressure (water pressure) MPa | 2.1(NC) |
| Fluid temperature °C | -10 to 60 (no freezing) |
| Ambient temperature °C | −10 to 60(DC), −10 to 55(AC) |
| Heat resistance class | Class 130 (B) |
| Atmosphere | Location free of corrosive or explosive gases |
| Valve structure | Direct Acting poppet structure |
| Seat leakage cm³/min (ANR) | 0.2 or less (in air) |
| Seat leakage *3 Pa·m³/s He | 1.33 x $10^{-6}$ or less |
| Mounting orientation | Free |
| Protection structure | IP65 |

*1 : When used in vacuum, vacuum the OUT port side.
*2 : When used in medium vacuum, select material option "M".
*3 : Leakage amount in medium vacuum.

## Schematic symbol

●FFB-☐1 : NC (energized open) type




## Electrical specifications

| Item | FFB-2 | | | | | | | FFB-3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | | ±10 % | | | | | | |
| Power consumption W | 3.5 | 3.5 | – | – | – | – | – | 4.5 | 4.5 | – | – | – | – | – |
| Apparent power VA | – | – | 5.1 | 5.7 | 6.0 | 5.3 | 5.7 | – | – | 6.2 | 6.1 | 6.2 | 6.2 | 6.5 |
| **Item** | **FFB-4** | | | | | | | **FFB-5** | | | | | | |
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | | ±10 % | | | | | | |
| Power consumption W | 7 | 7 | – | – | – | – | – | 10.5 | 10.5 | – | – | – | – | – |
| Apparent power VA | – | – | 8.6 | 10 | 9.6 | 9.5 | 9.4 | – | – | 13 | 13 | 14 | 14 | 13 |

Use with leakage current at or below the values shown below.

| Voltage | AC | | | | | DC | |
|---|---|---|---|---|---|---|---|
| | 100 V | 110 V | 200 V | 220 V | 230 V | 12 V | 24 V |
| Leakage current | 2 mA or less | | 1 mA or less | | | 5 mA or less | |





## Model-specific specifications

| Item / Model No. | | | | Port size | Orifice diameter (mm) | Operating pressure (MPa) *1 | Operating pressure Pa (abs) *2, *3 | Flow characteristics C [dm³/(s·bar)] | Flow characteristics b | Flow characteristics Cv value | Flow characteristics Kv value *4 | Weight (kg) *5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NC (energized open) type** | | | | | | | | | | | | |
| FFB-21 | 06 | ☐ | S | Rc 1/8 | 1.5 | 0 to 1.0 | 1.3 x $10^{-2}$ to 1 x $10^{6}$ | 0.31 | 0.42 | 0.085 | 0.074 | 0.21 |
| | | | 2 | | 2 | 0 to 0.6 | 1.3 x $10^{-2}$ to 0.6 x $10^{6}$ | 0.53 | 0.34 | 0.13 | 0.11 | |
| FFB-31 | 06 08 | ☐ | 2 | Rc 1/8 Rc 1/4 | 2 | 0 to 1.4 | 1.3 x $10^{-2}$ to 1.4 x $10^{6}$ | 0.56 | 0.50 | 0.15 | 0.13 | 0.36 |
| | | | 3 | | 3 | 0 to 0.6 | 1.3 x $10^{-2}$ to 0.6 x $10^{6}$ | 1.2 | 0.45 | 0.31 | 0.27 | |
| | | | 5 | | 5 | 0 to 0.2 | 1.3 x $10^{-2}$ to 0.2 x $10^{6}$ | 2.4 | 0.43 | 0.63 | 0.55 | |
| FFB-41 | 08 10 | ☐ | 4 | Rc 1/4 Rc 3/8 | 4 | 0 to 1.0 | 1.3 x $10^{-2}$ to 1 x $10^{6}$ | 1.8 | 0.52 | 0.43 | 0.37 | 0.55 |
| | | | 7 | | 7 | 0 to 0.15 | 1.3 x $10^{-2}$ to 0.15 x $10^{6}$ | 4.7 | 0.43 | 1.15 | 1.00 | |
| FFB-51 | 08 10 15 | ☐ | 5 | Rc 1/4 Rc 3/8 Rc 1/2 | 5 | 0 to 0.8 | 1.3 x $10^{-2}$ to 0.8 x $10^{6}$ | 2.7 | 0.45 | 0.72 | 0.62 | 0.85 |
| | | | 7 | | 7 | 0 to 0.3 | 1.3 x $10^{-2}$ to 0.3 x $10^{6}$ | 4.7 | 0.38 | 1.2 | 1.04 | |
| | | | X | | 10 | 0 to 0.1 | | 6.9 | 0.41 | 2.0 | 1.74 | |

*1 : Can be used in low vacuum [1.33 x $10^{2}$ Pa (abs)], but seat leakage will be 0.2 cm³/min (ANR) or less. (Seat leakage at positive pressure) When used in low vacuum, the lower limit of operating pressure becomes 1.33 x $10^{2}$ Pa (abs), so the upper limit is reduced by 0.1 MPa.
*2 : Operating pressure in medium vacuum.
*3 : When used in vacuum, vacuum the OUT port side.
*4 : For Kv values, refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".
*5 : Weight of the DC lead wire type.

Direct Acting 2-port Solenoid Valve

# FFB-FP2 Series

For high-temperature fluids

- NC (energized open) type
- Port size:Rc1/8 to 1/2

Materials compliant with the Food Sanitation Act Notification No. 370 of 1959 PL

CE Note) UKCA RoHS

For applicable model number details, please refer to our website.

Note) Not compliant with the EU Drinking Water Directive 2020 / 2184 or the Regulation on Materials and Articles Intended to Come into Contact with Food (Regulation (EC) No. 1935 / 2004).

## Model No. Notation For high-temperature fluid

FFB - 4 1 08 A 4 T 4 A 3 -FP2

- Model No.
- ❶ Valve size
- Operating method : NC (energized open) type
- ❷ Port size
- ❸ Thread type and pressure unit shown on nameplate
- ❹ Orifice diameter
- ❺ Body / Seal material combination
- ❻ Coil heat resistance class
- ❼ Coil option
- ❽ Rated voltage

### ❶ Valve size

| Code | Description |
|---|---|
| 3 | Width 30 mm |
| 4 | Width 35 mm |
| 5 | Width 40 mm |

### ❷ Port size

| Code | Description | ❶ Valve size 3 | 4 | 5 |
|---|---|---|---|---|
| 06 | 1/8 | ● | | |
| 08 | 1/4 | ● | ● | ● |
| 10 | 3/8 | | ● | ● |
| 15 | 1/2 | | | ● |

### ❸ Thread type and pressure unit shown on nameplate

| Code | Description | |
|---|---|---|
| | Thread type | Pressure display unit |
| A | Rc thread | MPa |

### ❹ Orifice diameter

| Code | Description | ❶ Valve size 3 | 4 | 5 |
|---|---|---|---|---|
| 3 | ø3 | ● | | |
| 4 | ø4 | | ● | |
| 5 | ø5 | ● | | ●*1 |
| 7 | ø7 | | ● | ● |
| X | ø10 | | | ●*2 |

*1 : ❷ Cannot be selected when port size is "15".
*2 : ❷ Cannot be selected when port size is "08".

### ❺ Body / Seal material combination

| Code | Body | Seal | Treatment | Working fluid: Compressed air | Dry air, Inert gas | Water / Hot water (up to 90 °C) | Oil | Low vacuum (*1) | Steam (up to 143 °C) |
|---|---|---|---|---|---|---|---|---|---|
| T | Stainless steel | Fluororubber | Oil-free treatment | ● | ● | ● | ● | ● | ● |

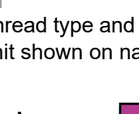
*1 : Can be used in low vacuum [1.33 x 10² Pa (abs)], but seat leakage will be 0.2 cm³/min (ANR) or less. (Seat leakage at positive pressure)
When used in low vacuum, the lower limit of operating pressure becomes 1.33 x 10² Pa (abs), so the upper limit is reduced by 0.1 MPa.

### ❻ Coil heat resistance class

| Code | Description |
|---|---|
| 4 | Class 180 (H) |

### ❼ Coil option

| Code | Description | | ❶ Valve size 3 | 4 | 5 | Voltage DC | AC |
|---|---|---|---|---|---|---|---|
| A | Lead wire (300 mm) | | ● | ● | ● | ● | ● |
| J | Lead wire (300 mm) | With surge suppressor | ● | ● | ● | ●*1 | *2 |



*1 : The surge suppressor for DC voltage coil option "J" is included with the product.
*2 : All AC voltage versions are equipped with a full-wave rectification circuit, and the action of this diode virtually eliminates the significant surges generated by the coil. For this reason, there is no setting with a surge suppressor.

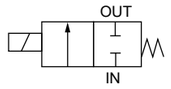
### ❽ Rated voltage

| Code | Description |
|---|---|
| 1 | 100 VAC 50/60 Hz |
| 2 | 200 VAC 50/60 Hz |
| 3 | 24 VDC |
| 4 | 12 VDC |
| 5 | 110 VAC 50/60 Hz |
| 6 | 220 VAC 50/60 Hz |
| K | 230 VAC 50/60 Hz |





## Schematic symbol




## Common specifications

| Item | FFB |
|---|---|
| Working fluid | Compressed air, Dry air, Inert gas, Steam, Water/Hot water, Oil (50 mm²/s or less) |
| Maximum operating pressure MPa | 0.8 (however, this varies by type ; refer to the operating pressure in the model-specific specifications) |
| Withstand pressure (water pressure) MPa | 1.2 |
| Fluid temperature °C | Other than steam : -10 to 90<br>Steam : -10 to 143 |
| Ambient temperature °C | −10 to 60 |
| Heat resistance class | Class 180 (H) |
| Atmosphere | Location free of corrosive or explosive gases |
| Valve structure | Direct Acting poppet structure |
| Seat leakagecm³/min (ANR) | 0.2 or less (in air) |
| Mounting orientation | Free |
| Protection structure | IP 65 |

## Electrical specifications

| Item | FFB-3 | | | | | | | FFB-4 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | | ±10 % | | | | | | |
| Power consumption W | 9 | 9 | – | – | – | – | – | 7 | 7 | – | – | – | – | – |
| Apparent power VA | – | – | 10.2 | 10.2 | 10.7 | 10.3 | 11.2 | – | – | 8.6 | 10 | 9.6 | 9.5 | 9.4 |

| Item | FFB-5 | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | |
| Power consumption W | 10.5 | 10.5 | – | – | – | – | – |
| Apparent power VA | – | – | 13 | 13 | 14 | 14 | 13 |

Use with leakage current at or below the values shown below.

| Voltage | AC | | | | | DC | |
|---|---|---|---|---|---|---|---|
| | 100 V | 110 V | 200 V | 220 V | 230 V | 12 V | 24 V |
| Leakage current | 2 mA or less | | 1 mA or less | | | 5 mA or less | |

## Model-specific specifications

| Item / Model No. | | | Port size | Orifice diameter (mm) | Operating pressure (MPa) *1 Fluid : Other than steam | Operating pressure (MPa) *1 Fluid : Steam | Flow characteristics C [dm³/(s·bar)] | b | Cv value | Kv value *2 | Weight (kg) *3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **NC (energized open) type** | | | | | | | | | | | |
| FFB-31 | 06 08 | □ 3 | Rc 1/8 Rc 1/4 | 3 | 0 to 0.45 | 0 to 0.3 | 1.2 | 0.45 | 0.31 | 0.27 | 0.36 |
| | | 5 | | 5 | 0 to 0.3 | 0 to 0.3 | 2.4 | 0.43 | 0.63 | 0.55 | |
| FFB-41 | 08 10 | □ 4 | Rc 1/4 Rc 3/8 | 4 | 0 to 0.8 | 0 to 0.3 | 1.8 | 0.52 | 0.43 | 0.37 | 0.55 |
| | | 7 | | 7 | 0 to 0.1 | | 4.7 | 0.43 | 1.15 | 1.00 | |
| FFB-51 | 08 10 15 | □ 5 | Rc 1/4 Rc 3/8 Rc 1/2 | 5 | 0 to 0.65 | 0 to 0.3 | 2.7 | 0.45 | 0.72 | 0.62 | 0.85 |
| | | 7 | | 7 | 0 to 0.25 | 0 to 0.15 | 4.7 | 0.38 | 1.2 | 1.04 | |
| | | X | | 10 | 0 to 0.07 | | 6.9 | 0.41 | 2.0 | 1.74 | |

*1 : Can be used in low vacuum [1.33 x 10² Pa (abs)], but seat leakage will be 0.2 cm³/min (ANR) or less. (Seat leakage at positive pressure)
When used in low vacuum, the lower limit of operating pressure becomes 1.33 x 10² Pa (abs), so the upper limit is reduced by 0.1 MPa.
*2 : For Kv values, refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".
*3 : Weight of the DC lead wire type.

## For details

Click!

Refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".

Direct Acting 3-port Solenoid Valve

# FFG-FP2 Series

- Universal type, NC pressurized type
- Port size:Rc1/8 to 3/8

Materials compliant with the Food Sanitation Act
Notification No. 370 of 1959

CE Note) UKCA RoHS

For applicable model number details, please refer to our website.

Note) Not compliant with the EU Drinking Water Directive 2020 / 2184 or the Regulation on Materials and Articles Intended to Come into Contact with Food (Regulation (EC) No. 1935 / 2004).

## Model No. Notation

FFG - 4 1 08 A 4 T 3 C 3 -FP2

- Model No.
- ❶ Valve size
- ❷ Operating method
- ❸ Port size
- ❹ Thread type and pressure unit shown on nameplate
- ❺ Orifice diameter
- ❻ Body / Seal material combination
- ❼ Coil heat resistance class
- ❽ Coil option
- ❾ Rated voltage

### ❶ Valve size

| Code | Description |
|---|---|
| 2 | Width 24 mm |
| 3 | Width 30 mm |
| 4 | Width 35 mm |
| 5 | Width 40 mm |

### ❷ Operating method

| Code | Description | ❶ Valve size 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 | Universal type | ● | ● | ● | ● |
| 3 | NC pressurized type | | ● | ● | |

### ❸ Port size

| Code | Description | ❶ Valve size 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 06 | 1/8 | ● | ● | | |
| 08 | 1/4 | | ● | ● | ● |
| 10 | 3/8 | | | ● | ● |

### ❹ Thread type and pressure unit shown on nameplate

| Code | Description | |
|---|---|---|
| | Thread type | Pressure display unit |
| A | Rc thread | MPa |

### ❺ Orifice diameter

| Code | Description | ❶ Valve size 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1 | ø1 | ● | | | |
| S | ø1.5 | | ● | | |
| 2 | ø2 | ● | ● | ● | ● |
| 3 | ø3 | | ● | ● | ● |
| 4 | ø4 | | | ● | ● |

### ❻ Body / Seal material combination

| Body | Seal | Treatment | Code | Working fluid: Compressed air | Dry air, Inert gas | Water | Oil | Low vacuum*1 |
|---|---|---|---|---|---|---|---|---|
| Stainless steel | Fluororubber | Oil-free treatment | T | ● | ● | ● | ● | ● |

*1 : Can be used at low vacuum [1.33 × 10² Pa (abs)], but valve seat leakage will be 0.2 cm³/min (ANR) or less. (Valve seat leakage at positive pressure.) When used at low vacuum, the lower limit of operating pressure is 1.33 × 10² Pa (abs), so the upper limit is reduced by 0.1 MPa.

### ❼ Coil heat resistance class

| Code | Description |
|---|---|
| 3 | Class 130 (B) |





### ❽ Coil option

| Code | Description | | ❶ Valve size 2 | 3 | 4 | 5 | Voltage DC | AC |
|---|---|---|---|---|---|---|---|---|
| A | Lead wire (300 mm) | | ● | ● | ● | ● | ● | ● |
| B | With DIN terminal box (G1/2) | | *1 | ● | ● | ● | ● | ● |
| C | With DIN terminal box (Pg11) | | ●*2 | ● | ● | ● | ● | ● |
| D | DIN terminal box with lamp (Pg11) | | ●*2 | ● | ● | ● | *3 | ● |
| G | With HP terminal box (G1/2) | | | ● | ● | ● | ● | ● |
| H | HP terminal box with lamp (G1/2) | | | ● | ● | ● | ● | ●*5 |
| J | Lead wire (300 mm) | With surge suppressor | ● | ● | ● | ● | ●*4 | *6 |
| K | With DIN terminal box (Pg11) | With surge suppressor | ●*2 | ● | ● | ● | ● | |
| L | DIN terminal box with lamp (Pg11) | With surge suppressor | ●*2 | ● | ● | ● | ● | |
| Q | With HP terminal box (G1/2) | With surge suppressor | | ● | ● | ● | ● | |
| R | HP terminal box with lamp (G1/2) | With surge suppressor | | ● | ● | ● | ● | |

*1 : When valve size is "2", coil option "B" cannot be selected.
*2 : ❶When valve size is "2", the thread size of the DIN terminal box is Pg 9.
*3 : Please use "L" DIN terminal box with lamp/surge suppressor.
*4 : For DC voltage coil option "J", the surge suppressor is attached to the product.
*5 : When coil option is "H", ❾ rated voltage "K" (230 VAC) cannot be selected.
*6 : All AC voltages include a full-wave rectifier circuit, and the action of this diode virtually eliminates significant surges generated in the coil. For this reason, there is no setting with a surge suppressor.

Coil option code

| | | |
|---|---|---|
|  | A(DC) | Grommet lead wire 300 mm |
| | J | Grommet lead wire 300 mm with surge suppressor |
|  | A(AC) | Grommet lead wire 300 mm |
|  | B<br>C | DIN terminal box |
| | K | DIN terminal box with surge suppressor |
|  | D | DIN terminal box with lamp |
| | L | DIN terminal box with lamp and surge suppressor |
|  | G | HP terminal box |
| | Q | HP terminal box with surge suppressor |
|  | H | HP terminal box with lamp |
| | R | HP terminal box with lamp and surge suppressor |

### ❾ Rated voltage

| Code | Description |
|---|---|
| 1 | 100 VAC 50/60 Hz |
| 2 | 200 VAC 50/60 Hz |
| 3 | 24 VDC |
| 4 | 12 VDC |
| 5 | 110 VAC 50/60 Hz |
| 6 | 220 VAC 50/60 Hz |
| K | 230 VAC 50/60 Hz |

## For details

Click!

Refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".

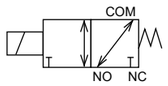
## Common specifications

| Item | FFG |
|---|---|
| Working fluid | Compressed air, Dry air, Inert gas, Water, Oil (50 mm²/s or less), Low vacuum [1.33 x 10² Pa (abs)] *1 |
| Maximum operating pressure MPa | 1.2 (however, this varies by type ; refer to the operating pressure in the model-specific specifications) |
| Withstand pressure (water pressure) MPa | 1.8 |
| Fluid temperature °C | -10 to 60 (no freezing) |
| Ambient temperature °C | −10 to 60(DC), −10 to 55(AC) |
| Heat resistance class | Class 130 (B) |
| Atmosphere | Location free of corrosive or explosive gases |
| Valve structure | Direct Acting poppet structure |
| Seat leakage cm³/min (ANR) | 0.2 or less (in air) |
| Mounting orientation | Free |
| Protection structure | IP65 |

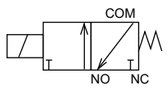
*1 : When used in low vacuum, vacuum the NC/NO port side for the Universal type, and the NO port for the NC pressurized type.

## Schematic symbol

●FFG-☐1 : Universal type




●FFG-☐3 : NC pressurized type




## Electrical specifications

| Item | FFG-2 | | | | | | | FFG-3 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | | ±10 % | | | | | | |
| Power consumption W | 3.5 | 3.5 | – | – | – | – | – | 4.5 | 4.5 | – | – | – | – | – |
| Apparent power VA | – | – | 5.1 | 5.7 | 6.0 | 5.3 | 5.7 | – | – | 6.2 | 6.1 | 6.2 | 6.2 | 6.5 |
| **Item** | **FFG-4** | | | | | | | **FFG-5** | | | | | | |
| Rated voltage V | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz | 24 DC | 12 DC | 100 AC 50/60 Hz | 110 AC 50/60 Hz | 200 AC 50/60 Hz | 220 AC 50/60 Hz | 230 AC 50/60 Hz |
| Voltage fluctuation range | ±10 % | | | | | | | ±10 % | | | | | | |
| Power consumption W | 7 | 7 | – | – | – | – | – | 10.5 | 10.5 | – | – | – | – | – |
| Apparent power VA | – | – | 8.6 | 10 | 9.6 | 9.5 | 9.4 | – | – | 13 | 13 | 14 | 14 | 13 |

Use with leakage current at or below the values shown below.

| Voltage | AC | | | | | DC | |
|---|---|---|---|---|---|---|---|
| | 100 V | 110 V | 200 V | 220 V | 230 V | 12 V | 24 V |
| Leakage current | 2 mA or less | | 1 mA or less | | | 5 mA or less | |



## Model-specific specifications

| Item / Model No. | Port size | Orifice diameter (mm) | Operating pressure (MPa) *1, *2 | Flow characteristics | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | COM→NC | | | | COM→NO | | | | NC→COM | | | | NO→COM | | | |
| | | | | C [dm³/(s·bar)] | b | Cv value | Kv value*3 | C [dm³/(s·bar)] | b | Cv value | Kv value*3 | C [dm³/(s·bar)] | b | Cv value | Kv value*3 | C [dm³/(s·bar)] | b | Cv value | Kv value*3 |
| Universal type | | | | | | | | | | | | | | | | | | | |
| FFG-21 06 ☐ 1 | Rc 1/8 | 1 | 0 to 0.7 | 0.12 | 0.47 | 0.036 | 0.031 | 0.11 | 0.54 | 0.030 | 0.026 | 0.12 | 0.50 | 0.032 | 0.028 | 0.11 | 0.37 | 0.028 | 0.024 |
| 2 | | 2 | 0 to 0.15 | 0.53 | 0.49 | 0.13 | 0.11 | 0.35 | 0.64 | 0.10 | 0.087 | 0.48 | 0.27 | 0.10 | 0.087 | 0.32 | 0.24 | 0.085 | 0.074 |
| FFG-31 06 08 ☐ S | Rc 1/8 Rc 1/4 | 1.5 | 0 to 0.7 | 0.30 | 0.49 | 0.080 | 0.069 | 0.30 | 0.48 | 0.080 | 0.069 | 0.27 | 0.46 | 0.080 | 0.069 | 0.27 | 0.42 | 0.075 | 0.065 |
| 2 | | 2 | 0 to 0.4 | 0.55 | 0.46 | 0.15 | 0.13 | 0.49 | 0.47 | 0.13 | 0.11 | 0.49 | 0.38 | 0.13 | 0.11 | 0.49 | 0.30 | 0.10 | 0.087 |
| 3 | | 3 | 0 to 0.15 | 1.1 | 0.37 | 0.27 | 0.23 | 0.95 | 0.46 | 0.20 | 0.17 | 1.1 | 0.14 | 0.24 | 0.21 | 0.9 | 0.17 | 0.17 | 0.15 |
| FFG-41 08 10 ☐ 2 | Rc 1/4 Rc 3/8 | 2 | 0 to 0.7 (0.6) | 0.55 | 0.49 | 0.16 | 0.14 | 0.55 | 0.49 | 0.15 | 0.13 | 0.49 | 0.44 | 0.14 | 0.12 | 0.49 | 0.45 | 0.13 | 0.11 |
| 3 | | 3 | 0 to 0.3 | 1.2 | 0.40 | 0.32 | 0.28 | 1.2 | 0.39 | 0.30 | 0.26 | 1.1 | 0.29 | 0.30 | 0.26 | 1.1 | 0.22 | 0.25 | 0.22 |
| 4 | | 4 | 0 to 0.15 | 1.9 | 0.40 | 0.47 | 0.41 | 1.8 | 0.37 | 0.41 | 0.36 | 1.9 | 0.21 | 0.41 | 0.36 | 1.8 | 0.19 | 0.32 | 0.28 |
| FFG-51 08 10 ☐ 2 | Rc 1/4 Rc 3/8 | 2 | 0 to 1.2 (0.6) | 0.55 | 0.49 | 0.16 | 0.14 | 0.55 | 0.49 | 0.15 | 0.13 | 0.49 | 0.44 | 0.14 | 0.12 | 0.49 | 0.45 | 0.13 | 0.11 |
| 3 | | 3 | 0 to 0.6 (0.3) | 1.2 | 0.40 | 0.32 | 0.28 | 1.2 | 0.39 | 0.30 | 0.26 | 1.1 | 0.29 | 0.30 | 0.26 | 1.1 | 0.22 | 0.25 | 0.22 |
| 4 | | 4 | 0 to 0.3 (0.15) | 1.9 | 0.40 | 0.47 | 0.41 | 1.8 | 0.37 | 0.41 | 0.36 | 1.9 | 0.21 | 0.41 | 0.36 | 1.8 | 0.19 | 0.32 | 0.28 |
| NC pressurized type | | | | | | | | | | | | | | | | | | | |
| FFG-33 06 08 ☐ S | Rc 1/8 Rc 1/4 | 1.5 | 0 to 1.0 | | | | | 0.30 | 0.48 | 0.080 | 0.069 | 0.27 | 0.46 | 0.080 | 0.069 | | | | |
| 2 | | 2 | 0 to 0.7 | | | | | 0.49 | 0.47 | 0.13 | 0.11 | 0.49 | 0.38 | 0.13 | 0.11 | | | | |
| 3 | | 3 | 0 to 0.3 | | | | | 0.95 | 0.46 | 0.20 | 0.17 | 1.1 | 0.14 | 0.24 | 0.21 | | | | |
| FFG-43 08 10 ☐ 2 | Rc 1/4 Rc 3/8 | 2 | 0 to 1.2 | | | | | 0.55 | 0.49 | 0.15 | 0.13 | 0.49 | 0.44 | 0.14 | 0.12 | | | | |
| 3 | | 3 | 0 to 0.6 | | | | | 1.2 | 0.39 | 0.30 | 0.26 | 1.1 | 0.29 | 0.30 | 0.26 | | | | |
| 4 | | 4 | 0 to 0.3 | | | | | 1.8 | 0.37 | 0.41 | 0.36 | 1.9 | 0.21 | 0.41 | 0.35 | | | | |

*1 : Values in ( ) are for NO pressurization.
*2 : When used in low vacuum, the lower limit of operating pressure becomes 1.33 x 10² Pa (abs), so the upper limit is reduced by 0.1 MPa.
*3 : For Kv values, refer to the CKD Components Site (https://www.ckd.co.jp/kiki/en/) → "Model No.".

## Weight

●Universal type

| Model No. | Weight (kg) |
|---|---|
| FFG-21 | 0.27 |
| FFG-31 | 0.48 |
| FFG-41 | 0.74 |
| FFG-51 | 0.93 |

Note) Weight of the DC lead wire type.

●NC pressurized type

| Model No. | Weight (kg) |
|---|---|
| FFG-33 | 0.48 |
| FFG-43 | 0.74 |

Note) Weight of the DC lead wire type.