



KOGANEI

INSTRUCTION MANUAL

Solenoid valves

F 1 0 • 1 5 • 1 8 Series



Before selecting and using products, please read all the Safety Precautions carefully to ensure proper product use. The Safety Precautions shown below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets beforehand. Follow the Safety Precautions for: ISO4414 (Pneumatic fluid power—Recommendations for the application of equipment to transmission and control systems), JIS B 8370 (Pneumatic system regulations)

The directions are ranked according to degree of potential danger or damage: “DANGER!” “WARNING!” “CAUTION!” and “ATTENTION!”

 DANGER	Expresses situations that can be clearly predicted as dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 WARNING	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in death or serious injury. It could also result in damage or destruction of assets.
 CAUTION	Expresses situations that, while not immediately dangerous, could become dangerous. If the noted danger is not avoided, it could result in light or semi-serious injury. It could also result in damage or destruction of assets.
 ATTENTION	While there is little chance of injury, this content refers to points that should be observed for appropriate use of the product.

■ This product was designed and manufactured as parts for use in General Industrial Machinery.

- In the selection and handling of equipment, the system designer or other person with fully adequate knowledge and experience should always read the Safety Precautions, Catalog, Owner’s Manual and other literature before commencing operation. Making mistakes in handling is dangerous.
- After reading the Owner’s Manual, Catalog, etc., always place it where it can be easily available for reference to users of this product.
- If transferring or lending the product to another person, always attach the Owner’s Manual, Catalog, etc., to the product where it is easily visible, to ensure that the new user can use the product safely and properly.
- The danger, warning, and caution items listed under these “Safety Precautions” do not cover all possible cases. Read the catalog and Owner’s manual carefully, and always keep safety first.

 **DANGER**

- Do not use for the purposes listed below:
 1. Medical equipment related to maintenance or management of human lives or bodies.
 2. Mechanical devices or equipment designed for the purpose of moving or transporting people.
 3. Critical safety components in mechanical devices. This product has not been planned or designed for purposes that require advanced stages of safety. It could cause injury to human life.
- Do not use in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. It could ignite or burst into flames.
- When attaching the product, always firmly support and secure them (including workpieces) in place. Dropping or falling of the product or improper operation could result in injury.
- Persons who use a pacemaker, etc., should keep a distance of at least 1 meter [3.28ft.] away from the product. There is a possibility that the pacemaker will malfunction due to the strong magnet built into the product.
- Never attempt to remodel the product. It could result in abnormal operation leading to injury, etc.
- Never attempt inappropriate disassembly, assembly or repair of the product’s basic construction, or of its performance or functions. This could result in injury, electric shock, fire, etc.
- Do not splash water on the product. Spraying it with water, washing it, or using it underwater could result in malfunction of the product leading to injury, electric shock, fire, etc.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. In addition, do not make any adjustments to the interior or to the attached mechanisms (manual override, connecting and disconnecting of wiring connectors, adjustment of pressure switches, or release or connection of piping tubes or plugs) while in operation. The actuator can move suddenly, possibly resulting in injury.

 **WARNING**

- Do not use the product in excess of its specification range. Such use could result in product breakdowns, function stop, damage or drastically reduce the operating life.
- Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area of machine operation. Unintentional supply of air or electricity could possibly result in electric shock, or in injury caused by contact with moving parts.

- Do not touch the terminal and the miscellaneous switches, etc., while the device is powered on. There is a possibility of electric shock and abnormal operation.
- Do not throw the product into fire. The product could explode and/or release toxic gases.
- Do not sit on the product, place your foot on it, or place other objects on it. Accidents such as falling or tripping over the product could result in injury. Dropping the product could result in injury, or also damage or break it resulting in abnormal or erratic operation, or runaway, etc.
- When conducting any kind of operation for the product, such as maintenance, inspection, repair, or connection/disconnection or replacement of piping, always turn off the air supply completely and confirm that residual pressure inside the product or in piping connected to the product is zero before proceeding. In particular, be aware that residual air will still be in the air compressor, vacuum pump or air storage tank. The actuator could abruptly move if residual air pressure remains inside the piping, causing injury.
- Before commencing normal operation, always release the lock of the locking type manual override, and confirm that the manual override is in the normal position and that the main valve is in the proper switching position, and only then commence the operation. Failure to do so could lead to erroneous operation.
- Always shut OFF the power before wiring operations. Wiring with the power ON could result in electric shock.
- Always apply the stipulated amount of voltage to the solenoid. Applying the wrong voltage could result in failure to perform the intended function, and could damage or burn the product itself.
- Avoid scratching the cords of lead wires, etc. Letting the cords be subject to scratching, excessive bending, pulling, rolling up, or being placed under heavy objects or squeezed between two objects, may result in current leaks or defective continuity that lead to fire, electric shock, or abnormal operation.
- Do not pull out the connectors while the power is ON. Also, do not apply unnecessary stress on the connector. It could result in erratic equipment operation that could lead to personal injury, equipment breakdown, or electrical shock, etc.
- Always check the Catalog to ensure that the product wiring and piping is done correctly. Errors in wiring and piping could lead to abnormal operation of the actuators, etc.
- In the first operation after the equipment has been idle for 48 hours or more, or has been in storage, there is a possibility that contacting parts have got stuck, resulting in equipment operation delays or sudden movements. For these first operations, always run a test operation before use to check that operating performance is normal.

- In low frequency use (more than 30 days between uses), there is a possibility that contacting parts may have stuck together, resulting in equipment operation delays or sudden movements that could lead to personal injury. Run a test operation at least once every 30 days to confirm that movement is normal.
- For double solenoid type (excluding the Tandem 3-port valve), do not apply current through both solenoids simultaneously. It is impossible in such a situation to maintain the correct valve position, and the equipment may operate in an unintended direction, leading to the possibility of equipment breakdown or personal injury.
- Do not use the solenoid valves or the wiring that controls them, near power lines where large electrical currents are flowing, or in locations subject to high magnetic fields or power surges. Such application could lead to unintended operation.
- The solenoid valve can generate surge voltage and electromagnetic waves when the switch is turned OFF, affecting the operations of surrounding equipment. Use solenoids with surge suppression, or take countermeasures in the electrical circuits for surges or electromagnetic waves.
- Do not use the product where ozone may be generated, such as near ocean beaches or other places subject to direct sunlight or mercury lamps. Ozone can cause rubber parts to deteriorate, which can lead to degraded performance and functions, or to equipment stoppages. (Excludes items where measures against ozone have been taken.)
- Do not use any media other than shown on the specifications. Use of non-specified media could lead to functional shutdown after a short period, to sudden performance drops, or to shorter operating life.
- If mounting the solenoid valve inside a control panel, or if energizing it for long periods, provide heat radiation measures to ensure that temperatures surrounding the solenoid valve always remain within the specified temperature range. In addition, if energizing continuously over long periods, rising temperatures due to generation of heat in the coil can lead to a decline in solenoid valve performance and operating life, and have adverse effects on nearby equipment. As a result, when the solenoid valve is continuously energized over long periods of time, or when the solenoid valve is energized for longer periods than it is non-energized on any day, a good suggestion is to keep the solenoid valve in a normally open (NO) specification as one possible method of reducing the amount of time the valve is energized. For details, consult us.
- After wiring operations, always check to ensure that no wiring connection errors exist before turning ON the power.
- Do not collect the exhaust lines for air cylinders, etc. with pilot exhaust lines for solenoid valves into the same piping, etc. Interference in the exhaust could result in erratic operation.
- When using the valve in a manifold, be aware when driving an air cylinder or performing air blowing operations that back pressure could cause erratic operations of the cylinder or erroneous air delivery from the air blow port. Caution is particularly needed when using valves with 3-position exhaust center specification, when operating single acting cylinders, or when operating a cylinder and blowing air using the same manifold. If there are concerns in this area, take such countermeasures as using individual exhaust spacers or back pressure prevention valves.

CAUTION

- When mounting the product, leave room for adequate working space around it. Failure to ensure adequate working space will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- For mounting or transport of heavy products, use a lift, supporting tool, or several people, to provide firm support, and proceed with due caution to ensure personal safety.
- Do not bring magnetic media, within 1 meter [3.28 ft.] of the product. There is the possibility that the data on the magnetic media will be destroyed due to the magnetism of the magnet.
- If leakage current is flowing in the control circuit, there is a possibility of the product performing an unintended operation. Take measures against current leaking in the control circuit, to ensure that the leakage current value does not exceed the allowed range in the product specifications.
- Do not block the product's breathing holes. Pressure changes occur due to changes in volume during operation. Blocking the breathing holes destroys the pressure balance, and could cause failure of the intentional operation, equipment damage, or personal injury.

- Do not use the solenoid valve in locations subject to large electrical currents or magnetic fields. It could result in erratic operation.
- Oily materials from the compressor (excluding the oil-free compressor) can cause drastic deterioration in product performance, and even a functional shutdown. Always install a mist filter before pneumatic equipment to remove the oily component.
- The properties of the lubrication oil can change when used in dry air where dew point temperatures is lower than -20°C [-4°F]. It could result in degraded performance or in functional shutdown.
- Do not use the product in locations that are subjected to direct sunlight (ultraviolet ray), to dust, salt, or iron powder, high temperature, high humidity or in media or ambient atmospheres that include organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, acids, etc. It could lead to an early shutdown of some functions or a sudden degradation of performance, and result in reduced operating life. For materials used, see Major Parts and Materials.
- Always carefully wash your hands after touching oil or grease used in the valves. If you smoke a cigarette while there is oil or grease remains on your hands, oil or grease transferred to the cigarette could catch fire and emit toxic gases.

ATTENTION

- When considering the possibility of using this product in situations or environments not specifically noted in the Catalog or Owner's Manual, or in applications where safety is an important requirement, such as in an airplane facility, combustion equipment, leisure equipment, safety equipment and other places where human life or assets may be greatly affected, take adequate safety precautions such as application with enough margins for ratings and performance or fail-safe measures. Be sure to consult us with such applications.
- Always check the Catalog and other reference materials for product wiring and plumbing setup.
- Install a muffler, etc. on the exhaust port. It is effective in reducing exhaust noise.
- When handling the product, wear protective gloves, safety glasses, safety shoes, etc. to keep safety.
- When the product can no longer be used or is no longer needed, dispose of it appropriately as industrial waste in accordance with the Waste Disposal and Public Cleaning Law, and other ordinances and regulations imposed by local government authorities. As incineration disposal of oil or grease used in the valves will generate corrosive, toxic hydrofluoric acid (HF), dispose of these compounds in an acid-resistant incinerator with toxic removal facilities. For large volumes, use a registered industrial waste disposer.
- Pneumatic equipment can exhibit degraded performance and function over its operating life. Always conduct daily inspections of the pneumatic equipment, and confirm that all requisite system functions are satisfied, to prevent accidents from happening.
- Air leaks from the valve are not zero. For application of requiring holding pressure (including vacuum) inside the pressure vessel, consider adequate margin of capacity and holding time in design of the system.
- When using a valve for air blowing, use an external pilot specification. With the internal pilot specification, air blowing can cause a pressure drop that could affect valve operations.
- For inquiries about the product, consult your nearest Koganei sales office, or Koganei overseas department. The address and telephone number is shown on the back cover of this catalog.

OTHERS

- Always observe the following items.
 1. When using this product in pneumatic systems, always use genuine KOGANEI parts or compatible parts (recommended parts).
When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible parts (recommended parts). Always observe the required methods and procedure.
 2. Do not attempt inappropriate disassembly or assembly of the product relating to basic configurations, or its performance or functions.

Koganei cannot be responsible if these items are not properly observed.



General Precautions

Mounting

1. While any mounting direction is allowed, be sure to avoid strong shocks or vibrations applied directly to the body.
2. Avoid using in the locations and environment listed below, as it could result in malfunction of the valve. If use in such conditions is unavoidable, always provide a cover or other adequate protective measures.
 - Location directly exposed to water drops or oil drops
 - Environment where a valve body is subject to dew condensation
 - Location directly exposed to machining chips, dust, etc
3. In piping connection with valves, flush the tube completely (by blowing compressed air) before piping. Intrusion of machining chips or sealing tape, rust, etc., generated during plumbing could result in air leaks and other defective operations.
4. Never use the valve with the 4(A) and 2(B) ports vented to the atmosphere.
5. When mounting a valve inside a control panel, or when energizing time is long, make adequate consideration for ventilation and other heat dissipation measures.
6. When adding or subtracting units in the manifold, or replacing a fitting block, be sure to tighten to within the specified tightening torque range.

Media

1. Use air for the media. For the use of any other media, consult us.
2. Air used for the cylinder should be clean air that contains no deteriorated compressor oil, etc. Install an air filter (filtration of 40 µm or less) near the valve to remove collected liquid or dust. In addition, drain the air filter periodically.
3. When supply pressure is low, use piping for the 1(P) port with sufficient tube size.

Lubrication

Can be used without lubrication due to the factory lubricant (grease). When the pneumatic products require lubrication, use Turbine Oil Class 1 (ISO VG32) or the equivalent. In addition, cutting off oil feed while an operation is in progress could lead to malfunction due to the dissipation of the factory lubricant (grease). As a result, always keep the oil feed running continuously. However, use caution since excessive oil feed can also be a cause of malfunction. Avoid using spindle oil or machine oil.

Atmosphere

The product cannot be used when the media or ambient atmosphere contains any of the substances listed below. Organic solvents, phosphate ester type hydraulic oil, sulphur dioxide, chlorine gas, or acids, etc.

Wiring

After wiring, check that there is no error in the wiring connections.

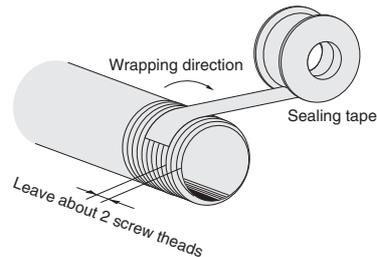
Piping

Since the 1(P), 3(R2), and 5(R1) ports are on both ends of the manifold, piping direction can be selected depending on the application (in monoblock manifolds).

At shipping, plugs are temporarily screwed in ports at one end, but are not firmly tightened. Regardless of which end piping is connected, always remove the plugs, use sealing tape or apply other sealing agent, and securely tighten the plugs into the unused ports.

1. Sealing tape wrapping method

- ① Before piping, perform air blowing (flushing) or cleaning to eliminate any machining chips, cutting oil, or dust, etc., remaining inside the pipes.
- ② When screwing in piping or fittings, caution should be taken to avoid letting machining chips or sealing materials from entering into the valves. When using sealing tape, wrap it so that 1.5~2 screw threads remain.



Prevention of erratic operation in the manifold type

When using a manifold-type valve to operate an air cylinder, or to perform air blowing or similar operations, erratic operation due to exhaust interference or malfunction due to insufficient flow rate could occur. When using the manifold type valves, be sure to take the following measures beforehand.

1. Erratic operation due to large exhaust flow rate

Cause: When a large-bore cylinder is operating, or multiple cylinders are operating at the same time, the exhaust air in the collective exhaust can flow backward through the exhaust ports of other solenoid valves. This could lead to an obstruction of the operations of other cylinders and may cause erratic operation in single acting cylinders or an Air Hand module due to inflow of air into them. The erratic operation is caused by insufficient manifold exhaust (large exhaust resistance).

Countermeasure: To reduce the exhaust resistance, for the base monoblock manifold, vent the exhaust ports at both ends. For the split manifold, attach piping blocks to both ends to exhaust from both sides. If still affected even after exhausting from both ends, consider splitting the manifold, or if using a split manifold, either install a port isolator to separate the exhaust, or use a back pressure prevention valve.

2. Malfunctions due to insufficient pressure or flow rate

Cause: When operating a large-bore cylinder, operating multiple cylinders at the same time, or using circuits to perform air blowing, etc., sudden consumption of air with the manifold type can result in insufficient flow rate to nearby cylinders, causing a reduction in speed or a shortage of thrust. In addition, in the pilot-type valve, this sudden consumption can lead to a pressure shortage for the pilot signals, and it causes erratic operations in the main stem.

Countermeasure: Because it causes insufficient air delivery to the manifold, supply air from both ends of the manifold, or from the piping block 1(P) port mounted on both sides. For air blowing, consider either dividing the air lines for independent use, or use of an external pilot valve.

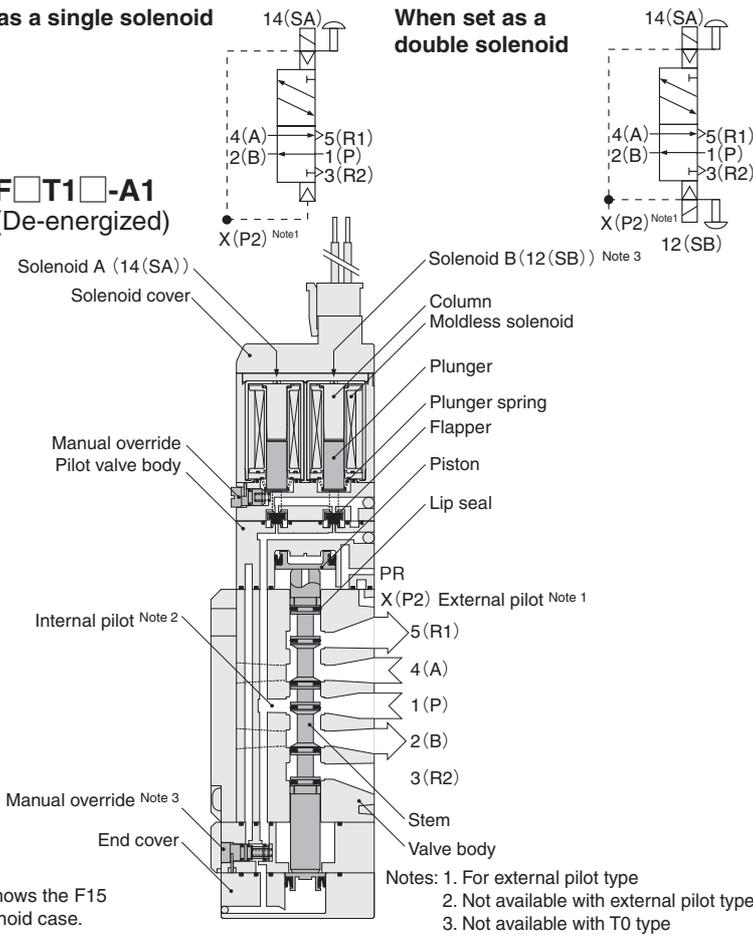
Operating Principles and Symbols

5-port, 2-position

When set as a single solenoid or T0 type

When set as a double solenoid

F□T1□-A1
(De-energized)



※ Diagram shows the F15 single solenoid case.

Remark: 1. When using a 5-port valve as a 3-port valve, see p.22.
2. For the F18 series, some of the shapes differ from the diagram. In addition, the F18 series is a molded solenoid.

Major Parts and Materials

Parts		Materials
Valve	Body	Aluminum die-casting
	Stem	Aluminum alloy
	Lip seal	Synthetic rubber
	Flapper	
	Sub-base	Aluminum alloy (anodized)
	Plunger	Magnetic stainless steel
	Column	Plastic
End cover		
Manifold	Body	Monoblock Aluminum alloy (anodized)
	Split type	Plastic
	Block-off plate	Mild steel (nickel plated)
	Seal	Synthetic rubber

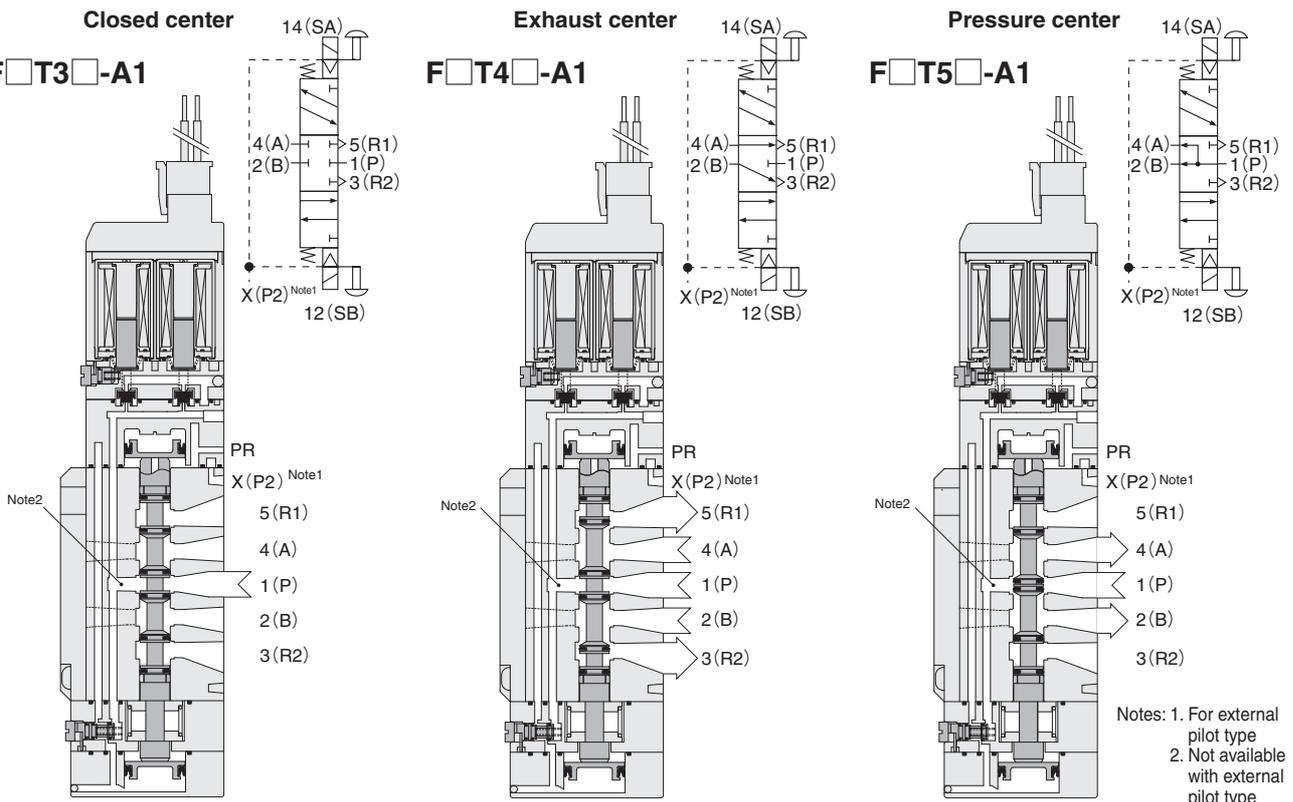
5-port, 3-position

(Both 14 (SA) and 12 (SB) are de-energized)

F□T3□-A1

F□T4□-A1

F□T5□-A1

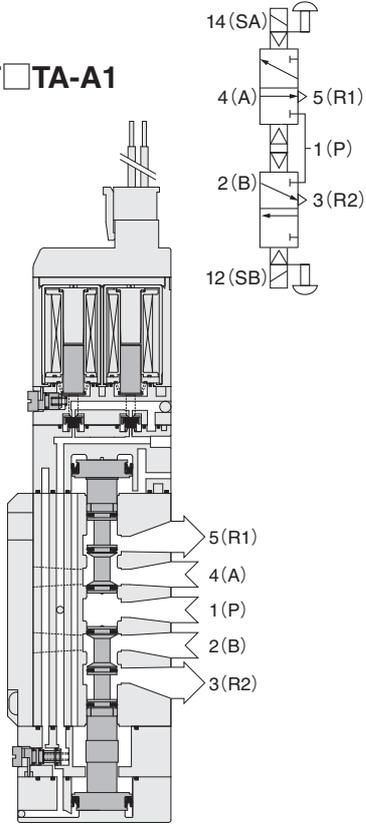


Tandem 3-port, 4-position (F10, F15 series only)

(Both 14 (SA) and 12 (SB) are de-energized)

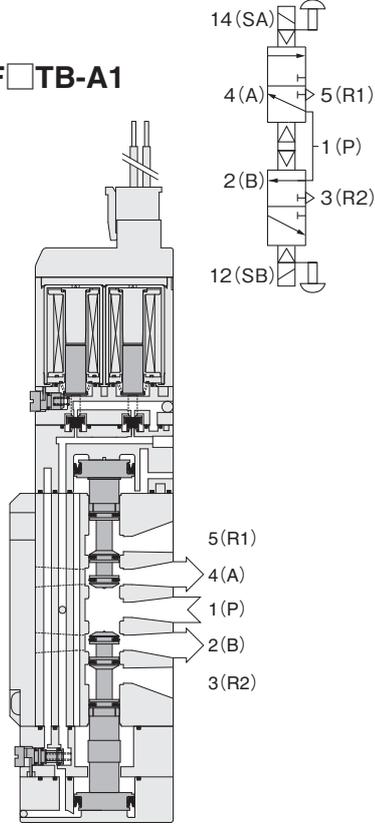
Normally closed (NC) & normally closed (NC)

F□TA-A1



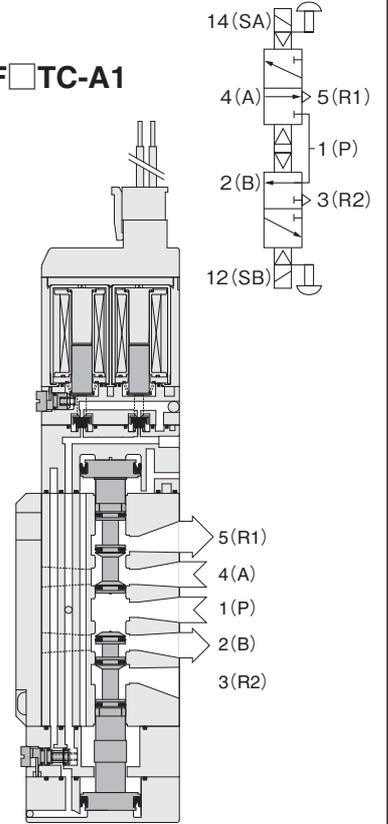
Normally open (NO) & normally open (NO)

F□TB-A1



Normally closed (NC) & normally open (NO)

F□TC-A1





Solenoid

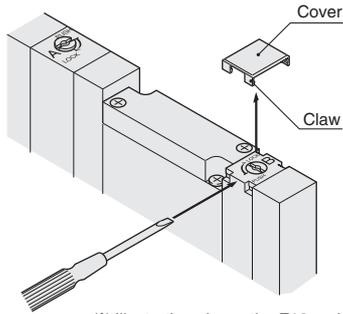
Single and double solenoid switching procedure

By switching the manual override, model F□T1 (2-position valve) can be used as either a single solenoid valve or a double solenoid valve (switching not possible with a 3-position valve and a tandem 3-port valve). Note that the F□T1 is set to the single solenoid specification at shipping.

Switching from a single solenoid valve to a double solenoid valve

1. As shown in Fig.1, insert the flatblade edge of a small screwdriver into the gap between the valve and the cover, and then peel it off and remove the cover.

Caution: As shown in Fig.1, make sure to insert a small screwdriver from the side of the valve cover. The cover claw may be damaged when the cover is removed from the direction of the valve stem. Never remove the cover for any reason other than valve function switching.



※ Illustration shows the F10 series.

Figure 1

2. As shown in Fig.2, use a small screwdriver, etc. to turn the manual override on the B side by 90 degrees in the counterclockwise direction, so that the manual override button's slit is horizontal, as shown on the right side of the figure. Then the unit can be used as a double solenoid valve. When using it as a double solenoid valve, the button is used as the manual override button for the B side.

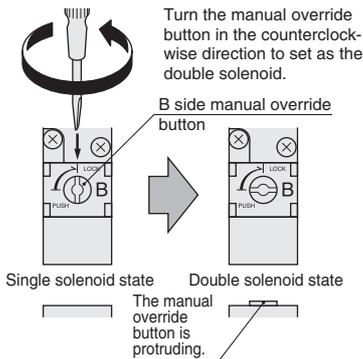


Figure 2

Caution: When using it as a double solenoid valve, do not attach the cover that was removed in Fig. 1.

Switching from a double solenoid valve to a single solenoid valve

As shown in Fig.3, use a small screwdriver, etc. to push lightly against the manual override button, and then turn it by 90 degrees in the clockwise direction, so that the manual override button's slit is in the vertical direction, and then attach the cover.

Caution: The cover has directionality (F15 and F18 series only). When attaching, always align the detent on the back of the cover with the manual override button's slit, as shown in Fig.4.

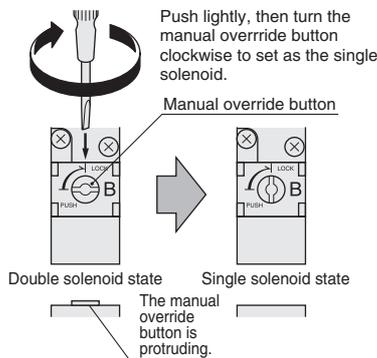


Figure 3

Note about the wiring for the above switching
See the "Wiring instructions" to the right.

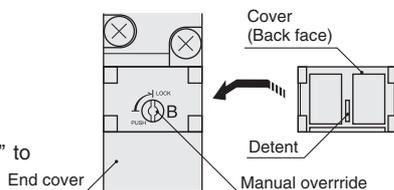


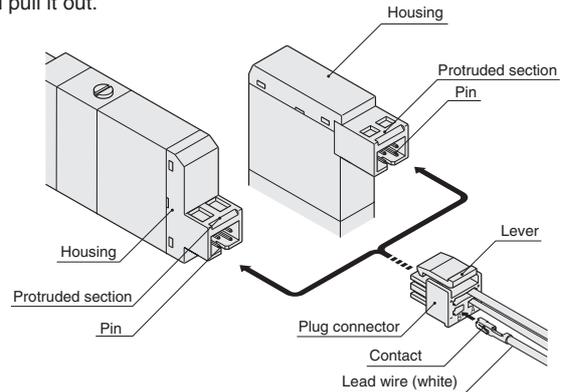
Figure 4

Wiring instructions (When used as a single unit, non-plug-in type manifold)

1. Attaching and removing plug connector

Use fingers to insert the connector into the pin, push it in until the lever claw latches onto the protruded section of the connector housing, and complete the connection.

To remove the connector, squeeze the lever along with the connector, lift the lever claw up from the protruded section of the housing, and pull it out.



Cautions: 1. When removing the connector, confirm that the lever claw is positively disengaged from the protruded section before pulling out. The housing may be damaged if it is pulled out while engaged with the protruded section.

2. The plug connector lead wires for model F □ T1 (2-position valve) are set to the single solenoid specification at shipping (for plug connector types). When switching from a single solenoid to a double solenoid specification for use, disconnect the plug connector from the valve, check the hook directions on the lead wire (white) with the contacts, and then insert the lead wire into the plug connector's B side □ hole (see the illustration above). Use the same procedure to switch the manifold type single solenoid to a double solenoid specification.

3. When using the plug-in type manifold, caution should be exercised that even if the valve has been switched to a double solenoid, no power will be supplied to the B side solenoid unless the valve base wiring is set to the double wiring.

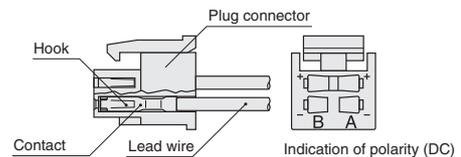
2. Attaching and removing plug connector and contact

● Attaching

Insert the contact with a lead wire into a plug connector □ hole until the contact hook latches on the connector and is secured to the plug connector. Confirm that the lead wire cannot be easily pulled out (see the diagram below).

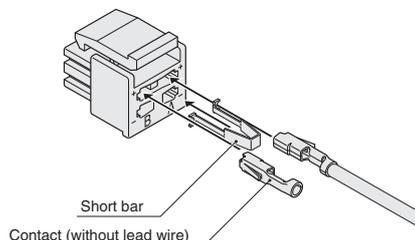
● Removing

To remove it, insert a tool with a fine tip (such as a small screwdriver) into the rectangular hole on the side of the plug connector to push down on the hook, and then pull out the lead wire. When re-using the contacts, restore the hook back so that they spread outward.



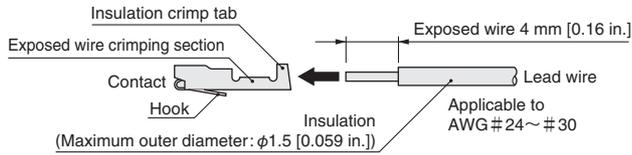
3. Common terminal and short bar

A short bar is attached to the plug connector to ensure that the solenoid A and B wiring are positive common. Do not remove the short bar.



4. Crimping of lead wire and contact

To crimp lead wires into contacts, strip off 4 mm [0.16 in.] of the insulation from the end of the lead wire, insert it into the contact, and crimp it. Be sure to avoid catching the insulation on the exposed wire crimping section.



- Cautions:**
1. Do not pull hard on the lead wire.
 2. For crimping of lead wire and contact, always use a dedicated tool.
Contact: Model 706312-2MK Manufactured by Sumiko Tech, Inc.
Crimping tool: Model F1 (for 706312-2MK) Manufactured by Sumiko Tech, Inc.

5. F10, F15 Common connector assembly

Using a common connector assembly for solenoid valves for a manifold provides common wiring for all the solenoid valves and greatly reduces wiring work.

The common connector assembly types are determined by looking at them from the lead wire side; the right end one is A type, the left end one is C type, and all the others are B type (see Fig. 5). (see figure below).

● For positive common

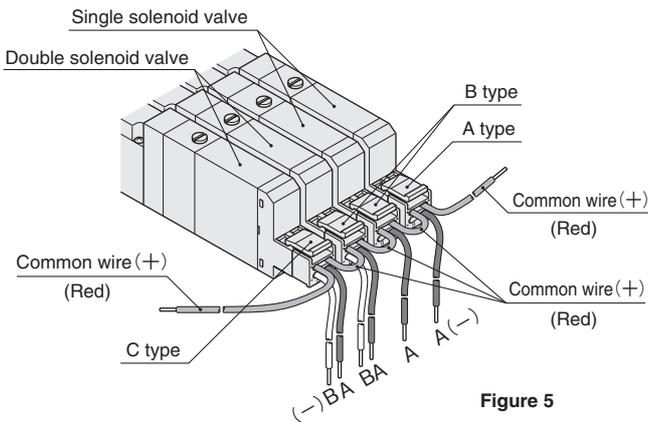


Figure 5

● For negative common (F10, F15 series only) ^{Note}

In the new F10, F15 series, you can order the separately sold common connector assembly for use with negative common specification.

Note: Cannot be used with the conventional F10, F15 series.

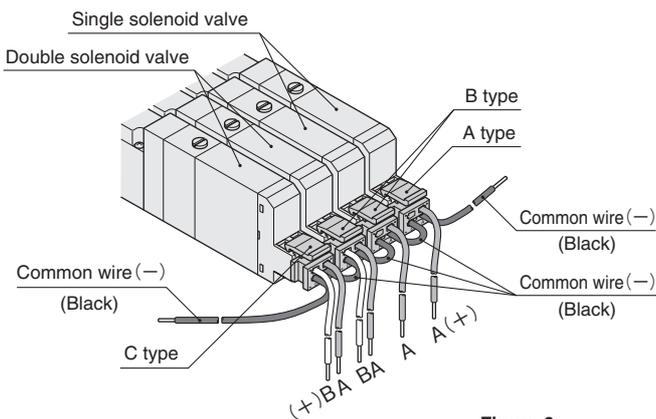


Figure 6

If ordering the common connector assembly, order from the common connector assemblies listed below.

● For positive common (F10 and F15 series)

A type Model: JAZ-PA□※



Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)

B type Model: JAZ-PB□※



Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)

C type Model: JAZ-PC□※



Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)
Red Common wire (+)

Note: White lead wire is not available for JAZO-P□□.
※ Lead wire length **Blank:** 300 mm [11.8 in.]
3: 3000 mm [118 in.]

● For negative common (F10 and F15 series)

A type Model: JAZ-MA□※



Black Common wire (-)
Red A side (+)
White B side (+) (Insert when using as a double solenoid)

B type Model: JAZ-MB□※



Black Common wire (-)
Red A side (+)
White B side (+) (Insert when using as a double solenoid)

C type Model: JAZ-MC□※



Black Common wire (-)
Red A side (+)
White B side (+) (Insert when using as a double solenoid)
Black Common wire (-)

※ Lead wire length **Blank:** 300 mm [11.8 in.]
3: 3000 mm [118 in.]

6. Common connector assembly for F18 (positive common specification only)

For adding units after mounting the connector assembly for the manifold, order the appropriate common connector assembly shown below.

A type Model: FZ-PA□※



Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)

B type Model: FZ-PB□※



Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)

C type Model: FZ-PC□※

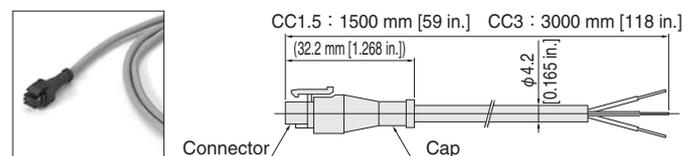


Red Common wire (+)
Black A side (-)
White B side (-) (Insert when using as a double solenoid)
Red Common wire (+)

Note: White lead wire is not available for FZO-P□□.
※ Lead wire length **Blank:** 300 mm [11.8 in.]
3: 3000 mm [118 in.]

The common connector assembly types are determined by looking at them from the lead wire side; the right end one is A type, the left end one is C type, and all the others are B type (see Fig. 5).

7. Cabtyre cable



Caution: Exercise caution that this is not dust-proof and drip-proof specification.

Handling Instructions and Precautions

Internal circuit

●For F10, F15 Series

Voltage specification	Internal circuit
24VDC 12VDC	<p>(Inside the connector)</p>
Low-current type 24VDC	<p>(Inside the connector)</p>
100VAC	<p>(Inside the connector)</p>

●For F18 Series

Voltage specification	Internal circuit
24VDC 12VDC	<p>(Inside the connector)</p>
100VAC	<p>(Inside the connector)</p>

- Cautions:**
- Do not apply megger between the pins.
 - Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use at less than the allowable leakage current shown in the solenoid specifications on p.104, 110, and 118. If circuit conditions etc. cause the leakage current to exceed the allowable leakage current, consult us.
 - For the double solenoid specification, avoid energizing both solenoids at the same time (except for tandem 3-port valve).
 - For the housing color, standard type is blue and low-current type is light blue (F18 is black).
 - The low-current type will not operate if the power voltage is gradually increasing. Always apply a suitable voltage.
 - For the T0 type, there is one solenoid.

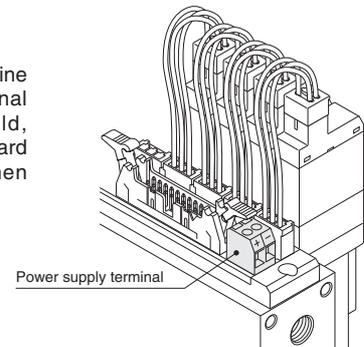
●For F15, 18 Series DIN connector type

Voltage specification	Internal circuit
24VDC 12VDC	<p>DIN connector type with indicator Order code:-39L</p> <p>(Inside of the DIN connector)</p>
120VAC 240VAC	<p>DIN connector type with indicator Order code:-39L</p> <p>(Inside of the DIN connector)</p>

- Cautions:**
- Do not apply megger between the pins.
 - Leakage current inside the circuit could result in failure of the solenoid valve to return, or in other erratic operation. Always use at less than the allowable leakage current shown in the solenoid specifications on p.111, and 119. If circuit conditions etc. cause the leakage current to exceed the allowable leakage current, consult us.
 - For the double solenoid specification, avoid energizing both solenoids at the same time.

PC board manifold

When connecting a power line to the power supply terminal on the PC board manifold, care should be taken in regard to the following points when connecting.



Terminal screw tightening torque: 0.4 N·m [3.5 in·lbf]
 Stripped wire length: 7 mm [0.28 in.]
 Connecting wire size: 0.13~2.5 mm² [0.00020~0.00388 in.²]
 AWG: No.26...14

When planning to use crimp-style terminals, use bar terminals.
 Recommended crimp-style terminals (bar terminals):
 Manufactured by Nichifu, Inc.
 Model BT1.25-9-1 (for 0.25~1.65 mm² [0.00039~0.00256 in.²])

Wiring of the terminal block



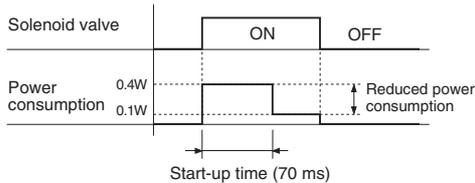
Care should be taken with the terminal screw tightening torque. Overtightening beyond the tightening torque could result in breakage.

Terminal screw tightening torque: Max. 49.0 N·cm [4.3 in·lbf].

Operating principles for the low-current type

The low-current type uses a timer circuit, as shown on the previous page, that achieves power consumption savings by switching to a holding operations mode after a certain period of time to operate at about 1/4 of the starting power consumption.

● Power waveform



Precautions for use of the double solenoid

When using models F□T1 or F□T2 (2-position valve) as double solenoid valves, caution should be exercised as energizing the A side solenoid or pushing the manual override button on the A side, while pushing the B side manual override button or in a locked state, or energizing the solenoid on the B side, will cause the valve to switch over the position. (At that time, the valve will operate in the same state as the single solenoid valve.)



Manual override

Manual override button (locking and non-locking dual-use type)

To lock the manual override, use a small screwdriver to push down the manual override button all the way down and turn it clockwise 90 degrees. To release the manual override, turn the button 90 degrees counterclockwise, which will release the manual override lock by spring action and return it to its normal position. To operate the unit in the same way as the non-locking type, leave the manual override button unturned.

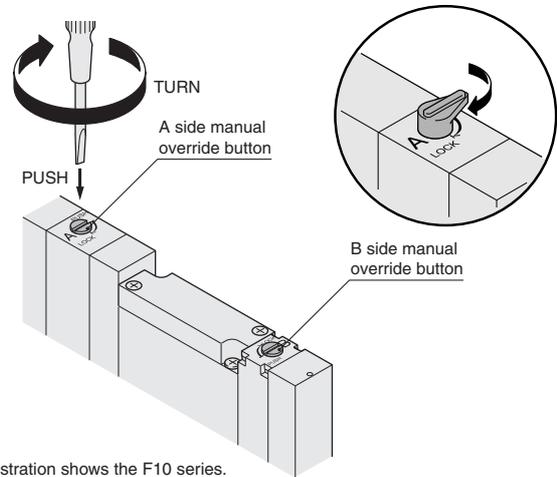
- Cautions:**
1. The F series valves are pilot type solenoid valves. As a result, the manual override cannot switch the main valve without air supplied from the 1(P) port (X(P2) port for external pilot type).
 2. Always release the lock of the manual overrides before commencing normal operation. Caution should be exercised to release the lock of the manual override on the B side that also works as the switching button between the single solenoid and double solenoid (excluding the 3-position valve and tandem 3-port valve). For details, see "Switching from a double solenoid valve to a single solenoid valve" on p.18.
 3. Do not attempt to operate the manual override button with a pin or other object having an extremely fine tip. It could damage the manual override button.
 4. Take care to avoid excessive turning of the manual override button, it could damage the override.
 5. When operating the solenoid valve's manual override button for maintenance etc. always confirm that the solenoid valve's override button has been restored to its normal position, and that the main valve is in the required switching position before restarting operations.

Manual override lever (locking and non-locking dual-use type)

To lock the manual override lever, use fingers to push the lever all the way down and turn it clockwise 90 degrees. To release the manual override, turn the lever 90 degrees counterclockwise, which will release the manual override lock by spring action and return it to its normal position. To operate the unit in the same way as the non-locking type, leave the lever unturned.

Caution: Model F□T1 (2-position valve) has a manual override lever on the A side, and a manual override button with cover on the B side. Model F□T2 has a manual override lever on the A side only, and a manual override button on the B side. The 3-position valve has manual override lever on both the A and B sides.

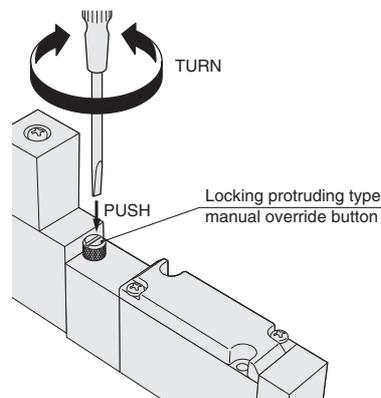
Manual override lever



※ Illustration shows the F10 series.

Locking protruding type -83

Use a small screwdriver or the fingers to press down and rotate the manual override button by at least 45 degrees, to lock in place. Either rotation direction is acceptable. In the locked position, rotate further the manual override which will release the manual override lock by spring action and return it to its normal position. If the manual override is not rotated, the unit can be operated in the same way as the non-locking type.



Handling Instructions and Precautions

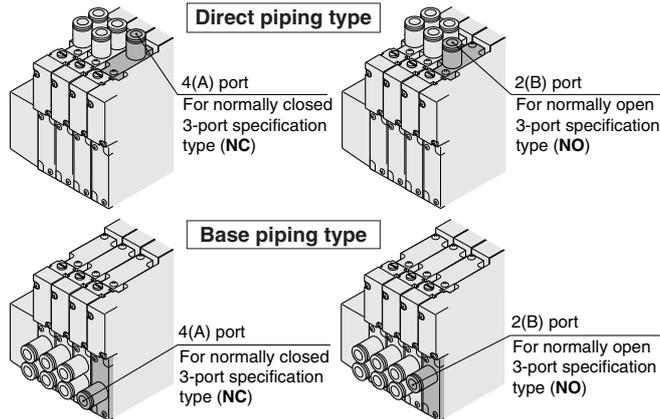


3-port valves

While the F series is a 5-port valve (excluding tandem 3-port valve), it can be used as a normally closed (NC) or normally open (NO) 3-port valve by plugging one of either outlet port 4(A) or 2(B). In this case, leave the exhaust ports 3(R2) and 5(R1) open for use. It can also be used as a double solenoid type 3-port valve.

When using a single size fitting block or female thread block for 3-port

In the F10 and F15 series, a single size fitting block and female thread block for 3-port with one plugged port can be selected at the time of order. (Note: Not available for F18 series.)

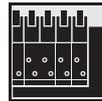


Fitting type	- ※ A	- ※ B
Switching type	Normally closed (NC)	Normally open (NO)
For single solenoid setting		
For double solenoid setting		

When using a plug

The F10, F15, and F18 series can be used as either a normally closed (NC) or normally open (NO) 3-port valve by plugging either outlet port of 4(A) or 2(B).

Plug position	When the 2(B) port is plugged	When the 4(A) port is plugged
Switching type	Normally closed (NC)	Normally open (NO)
For single solenoid setting		
For double solenoid setting		

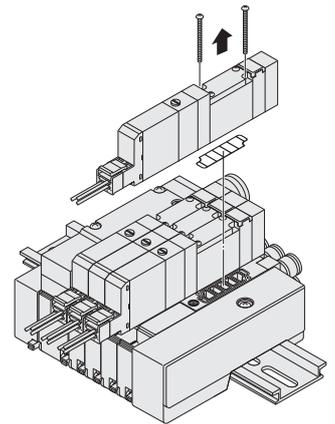


Manifold

Attaching and removing valves

To remove the valve body from the sub-base or manifold, loosen the valve mounting screws (2 places), and lift it up in the direction of the arrow (see the illustration at right). To install it, reverse the above procedure. The recommended tightening torques for the valve mounting screws are as shown below.

※ Illustration shows the F10 series (split manifold).



N · cm [in · lbf]

Series	Recommended tightening torque
F10	17.6 [1.6]
F15	49.0 [4.3]
F18	49.0 [4.3]

Precautions for using manifold

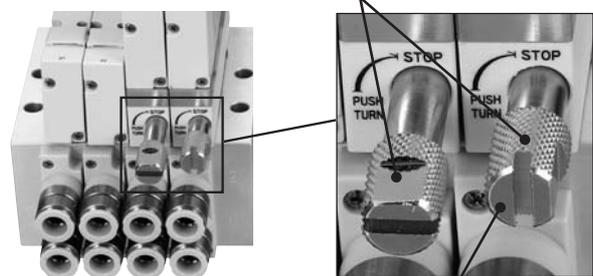
Observe the following precautions when using the split type and serial transmission compatible manifold (except for the monoblock manifold and PC board manifold).

- When using the direct piping type manifold
Avoid using valves at an operating frequency exceeding 2 Hz, as such use can result in heat-related breakdowns.
- When using the base piping type manifold
When plugs have been attached on the 4(A) and/or 2(B) ports, avoid using valves at an operating frequency exceeding 2 Hz, as such use can result in heat-related breakdowns.

Stop valve usage procedure (F10, F15 series)

Mount a stop valve on a manifold to stop the air supply to valves on the individual station. For the operation procedure, use a small screwdriver or the hand to press down and rotate the stop valve manual knob clockwise 90 degrees to lock in place, shutting off the air supply. In the locked position, rotate the stop valve manual knob counterclockwise 90 degrees, and air pressure returns the stop valve manual knob to its original position, releasing the lock. Note that use of the stop valve reduces the flow rate volume by about 30%.

Stop valve manual knob



Stop valve manual knob is locked, and air supply shut off.

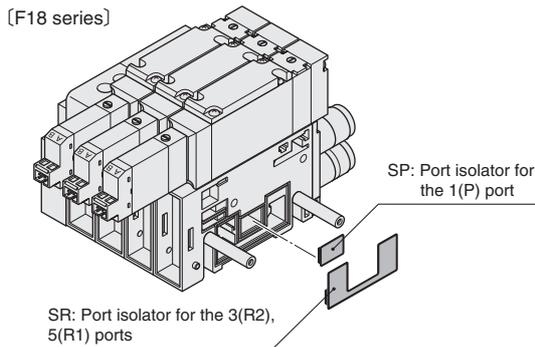
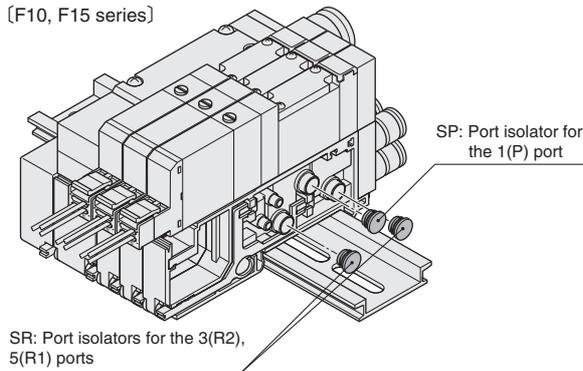
- Cautions:**
1. Do not disassemble the stop valve.
 2. When using a stop valve to remove the valve, be careful of residual pressure in the affected station.
 3. When using a stop valve to remove the valve, be aware that exhaust from other stations can be exhausted through the stop valve's exhaust hole. If this will cause a problem during use, when ordering the manifold, select the back pressure prevention valve (-E1).
 4. To use a stop valve in combination with a back pressure prevention valve, select the combination when ordering the manifold. The back pressure prevention valve (F1□Z-E1) in additional parts cannot be installed after purchase.
 5. Do not release the locked stop valve manual knob when valves have been removed by using the stop valve.

Port isolator

In the split manifold, installing port isolators to the 1(P), 3(R2) and 5(R1) ports between each station isolates the air path between stations equipped with port isolators and stations with smaller station numbers. However, a piping block must be placed on both ends.

- Port isolator for the 1(P) port (Model : F□Z-SP) — Can supply two different pressures
- Port isolators for the 3(R2), 5(R1) ports (Model : F□Z-SR) — Can isolate exhaust air (prevents exhaust interference)
- Port isolators for the 1(P), 3(R2), 5(R1) ports (Model : F□Z-SA) — Can supply two different pressures, and can isolate exhaust air (prevents exhaust interference)

※□ denotes valve size.



Caution: Installing port isolators requires the disassembly and re-assembly of manifolds. See the disassembly illustration, unit adding procedure, and cautions on p.28-33. However, since the F18 series serial transmission compatible manifold cannot be disassembled, port isolators cannot be installed on it after purchase.

Handling Instructions and Precautions

Precautions for the use of individual air supply and exhaust spacers

By mounting an individual air supply or exhaust spacer on the manifold, the air supply or exhaust can be operated individually on the unit. It is also effective in preventing erratic operation due to back pressure. Caution should be exercised when spacers are used, as the effective area is reduced by about 30%. If mounting additional spacers to an existing unit, observe the following items:

● Spacer mounting procedure (F10 series)

- ① Loosen the valve mounting screws where the individual air supply or exhaust spacer will be installed, and remove the valve.
- ② Install the gaskets and exhaust valve provided with the individual air supply or exhaust spacer, and use the mounting screws provided to secure the valve on the manifold (see Fig. 7).

Remark: When attaching fittings to the F10 spacer, use the recommended fittings shown below:

TSH4-M5M, TSH4-M5, TSH6-M5M, TS4-M50, TS4-M5M

● Spacer mounting procedure (F 15 and F18 series)

- ① Loosen the valve mounting screws where the individual air supply or exhaust spacer will be installed, and remove the valve.
- ② Open the cover of the manifold, and pull out the plug-in connector in the rear side direction (for the plug-in type) (see Fig. 8).
- ③ Insert the plug-in connector firmly into the connector attaching section of the individual air supply or exhaust spacer, and then close the cover, while watching to ensure that the lead wires are not caught by the cover (for the plug-in type) (see Fig. 9).
- ④ Attach the gasket and exhaust valve provided with the individual air supply or exhaust spacer, and use the mounting screws provided to mount the valve on the manifold.

Cautions: Locations where the spacers are mounted make the valve height higher by the height of the spacer (see the dimensions below).

● Muffler for the individual exhaust spacer

A muffler for the individual exhaust spacer is available.

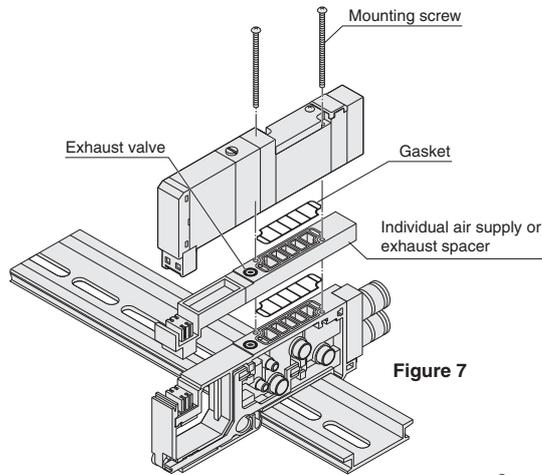
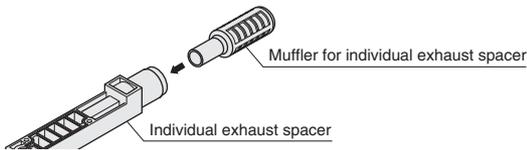


Figure 7

F10 series

(Illustration shows the split manifold plug-in type)

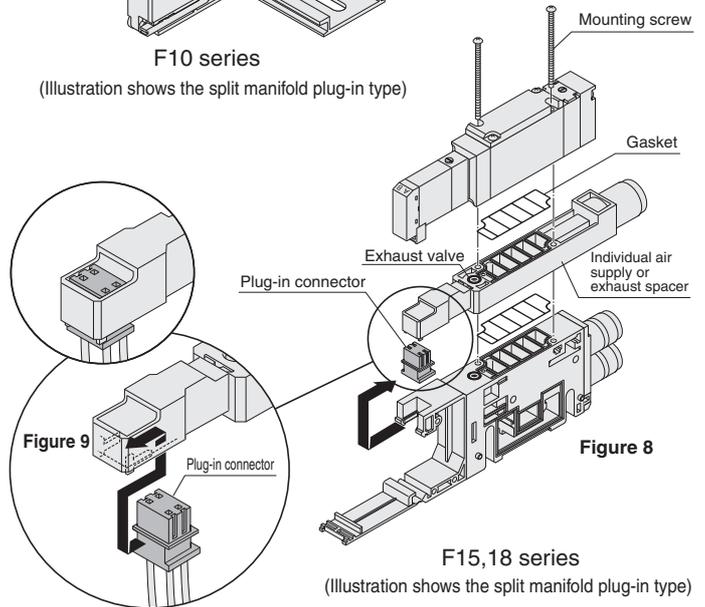


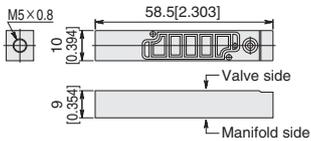
Figure 8

F15,18 series

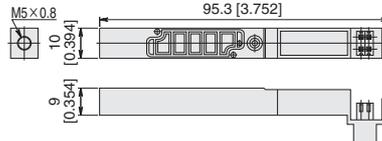
(Illustration shows the split manifold plug-in type)

● Dimensions Unit: mm [in.]

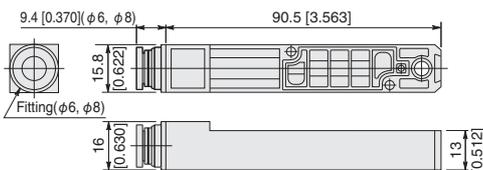
F10Z-N□□ (For F10 series) Mass 7 g [0.25 oz.]



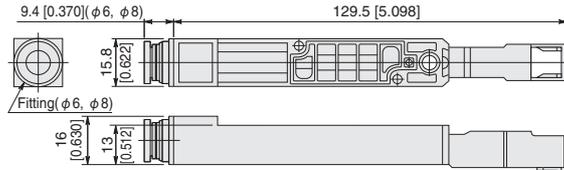
F10Z-P□□ (For F10 series) Mass 9 g [0.32 oz.]



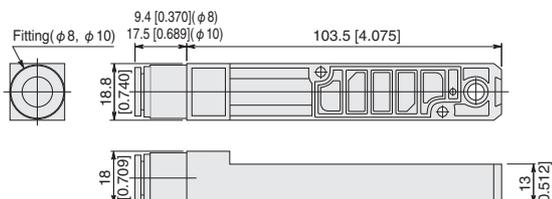
F15Z-N□□ (For F15 series) Mass 26 g [0.92 oz.]



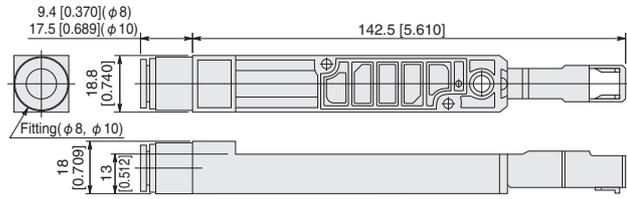
F15Z-P□□ (For F15 series) Mass 29 g [1.02 oz.]



F18Z-N□□ (For F18 series) Mass 41 g [1.45 oz.]



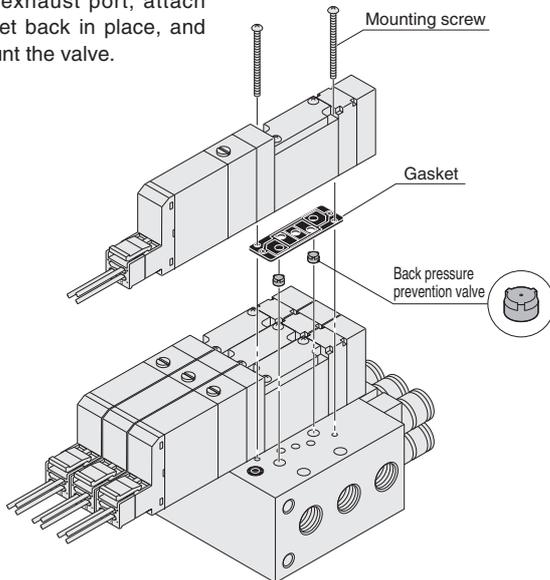
F18Z-P□□ (For F18 series) Mass 44 g [1.55 oz.]



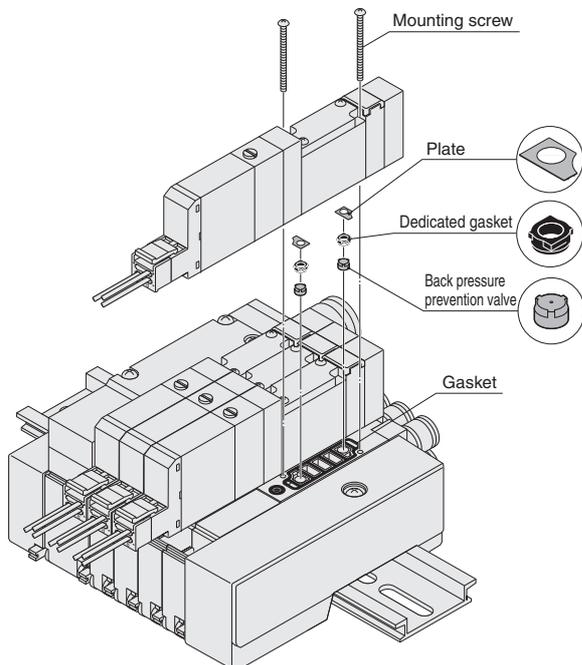
Precautions for use of the back pressure prevention valve (F10, F15 series)

A back pressure prevention valve can be mounted on the manifold to prevent erratic operation of the cylinder due to exhaust from other valves. It is particularly effective when using a single acting cylinder or when using an exhaust center valve. Note that when a back pressure prevention valve is used, the OUT-EXH flow rate volume is reduced by as much as 30%. In addition, since the back pressure prevention valve allows back pressure leaks, be careful to avoid letting the manifold exhaust port throttle the exhaust air. When mounting the back pressure prevention valve on an existing system, observe the following points.

- ① Loosen the valve screws mounting the back pressure prevention valve, and remove the valve.
- ② For a monoblock manifold, temporarily remove the gasket between the valve and manifold, insert the back pressure prevention valve into the exhaust port, attach the gasket back in place, and then mount the valve.



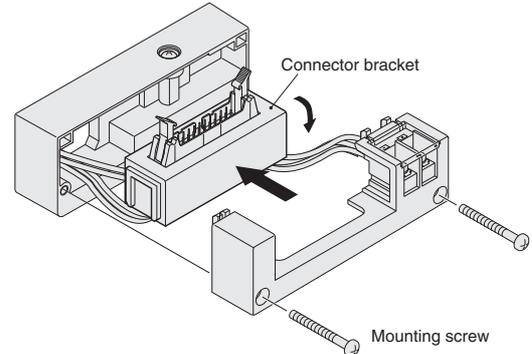
For a split type manifold, insert the back pressure prevention valve into the exhaust port, attach the dedicated gasket and plate provided, and then mount the valve.



Mounting screw tightening torque: F10 series 17.6 N · cm [1.6 in·lbf]
F15 series 49.0 N · cm [4.3 in·lbf]

Changing the connector bracket direction (F10, F15 series)

Remove the wiring block mounting screws, position the connector bracket as shown in the illustration, and rotate the connector 90 degrees so that it faces outward. The connector can be changed to either the vertical lead or side lead positions.



Mounting screw tightening torque: 49 N·cm [4.3 in·lbf]

Securing the manifold in place

When securing a DIN rail mounting type manifold to the installation surface, use the number of screws table below as a guide, depending on the installation direction and with or without vibration, to secure the DIN rail in place using screws. If not secured in place, be aware that there is a possibility of air leaks or other problems occurring.

Mounting condition	Number of screws			
Horizontal mounting	2 screws or more			
Vertical mounting or vibration area	2 to 5 units	6 to 10 units	11 to 15 units	16 to 20 units
	2 screws or more	3 screws or more	4 screws or more	5 screws or more



Fitting

Piping

1. Procedure for switching between the base piping type and the direct piping type

Base piping and direct piping can be switched by replacing the plate with a fitting block or a female thread block (see Fig. 10).

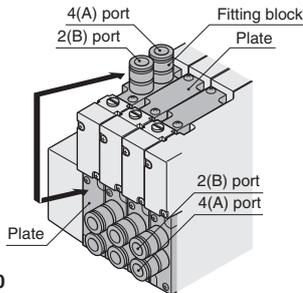


Figure 10

※ Illustration shows the F10 series.

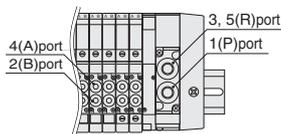
- Cautions:**
1. Firmly tighten the screws after completing a re-combination. Recommended tightening torques are shown below.
 2. Perform piping carefully in regards to the locations of each connection port (see Figs. 11, 12).
 3. Care should be taken not to lose the gaskets while changing plates.

Series	Recommended tightening torque
F10	17.6 [1.6]
F15	49.0 [4.3]
F18	49.0 [4.3]

N · cm [in · lbf]

● Direct piping type

For F10, F15 series



※ Diagram shows the F10 series.

For F18 series

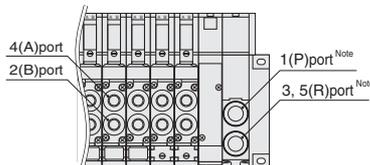


Figure 11 Note: Caution should be exercised that the positions of the 1(P) and 3, 5(R) ports are reversed from their positions in the F10 and F15 series.

● Base piping type

Port locations for F10, F15, F18 series are as shown in Fig. 12.

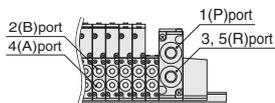


Figure 12

※ Diagram shows the F10 series.

2. Attaching fittings to female thread blocks

When attaching fittings to female thread blocks, fasten with the tightening torques shown below or less.

Screw size	Tightening torque N · cm [in · lbf]
Rc 1/8, NPT1/8	686 [60.7]
Rc 1/4, NPT1/4	882 [78.1]

※ For M5 and -10-32UNF, tighten at the recommended torques for the fittings used.

3. Attaching fittings to piping blocks (F18Z(G)-PM(P))

To attach fittings to the female thread type piping block of the F18 series, remove the piping block portion (the triangular-shaped block portion), screw the fittings into the 1(P) and 3, 5(R) ports while holding the piping block by applying a wrench to its metal portion. The tightening torque for the mounting (two M3 screws) of the piping block after the fittings have been attached should be 49.0 N · cm [4.3 in · lbf].

Dual-use different size fittings (With dual-use different size fitting blocks)

The F series dual-use different size fitting blocks employ dual-use fittings for different tube sizes, which can connect tubes of 2 different outer diameters.

● Attaching and removing tubes

When connecting tubes, insert an appropriate size tube until it contacts the tube stopper, and then lightly pull it to check the connection.

For tube removal, push the tube against the tube stopper, then for large tube sizes, push on the release ring and at the same time pull the tube out. For small tube sizes, push on the outer ring by pressing the release ring and simultaneously pull the tube out (see Fig. 13).

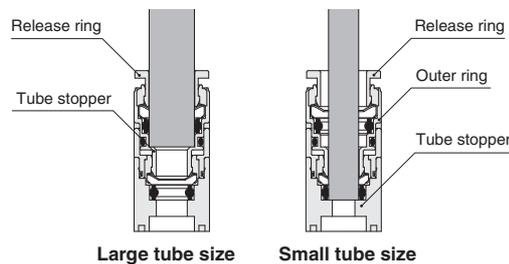


Figure 13

Usable tubes

Either a nylon or urethane tube can be used.

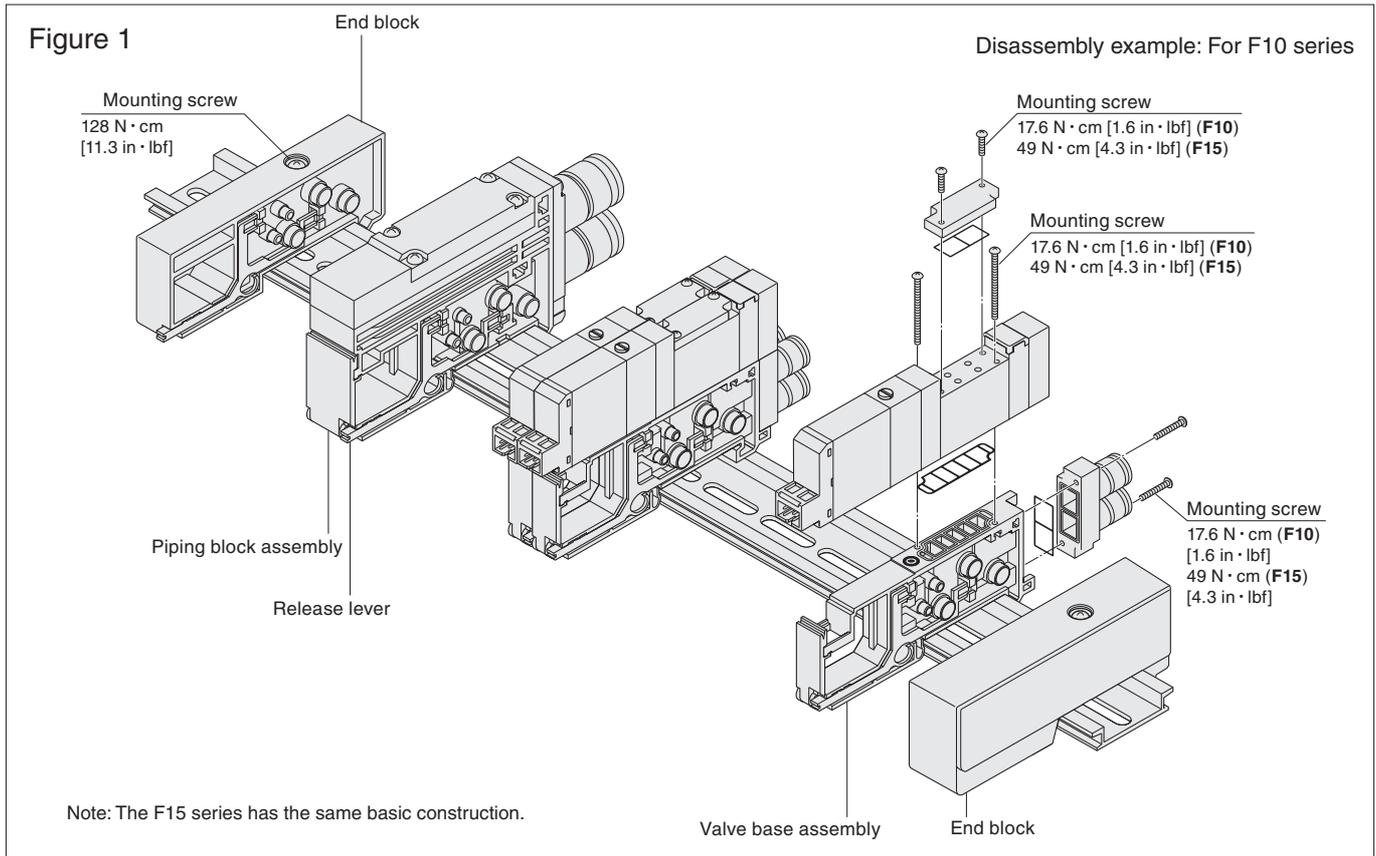
Use tubes with an outer diameter tolerance within ± 0.1 mm [0.004 in.] of the nominal diameter, and ensure the ovalness (difference between the large diameter and small diameter) is 0.2 mm [0.008 in.] or less. (Using a Koganei tube is recommended.)

- Cautions:**
1. Do not use extra-soft tubes since their pull-out strength is significantly reduced.
 2. Only use tubes without scratches on their outer surfaces. If a scratch occurs during repeated use, cut off the scratched portion.
 3. Do not bend the tube excessively near the fittings. The minimum bending radii for nylon tubes are shown in the table below.
 4. When attaching or removing tubes, always stop the air supply. In addition, always confirm that air has been completely exhausted from the manifold.

Tube size	Minimum bending radius
ϕ 4	20 [0.8]
ϕ 6	30 [1.2]
ϕ 8	50 [2.0]
ϕ 10	80 [3.1]

mm [in.]

F10 and F15 Series Disassembly Diagram of Split Manifold Non-Plug-in Type



Manifold Unit Adding Procedure (F10 and F15 Series Non-Plug-in Type)

■ Adding a valve base unit

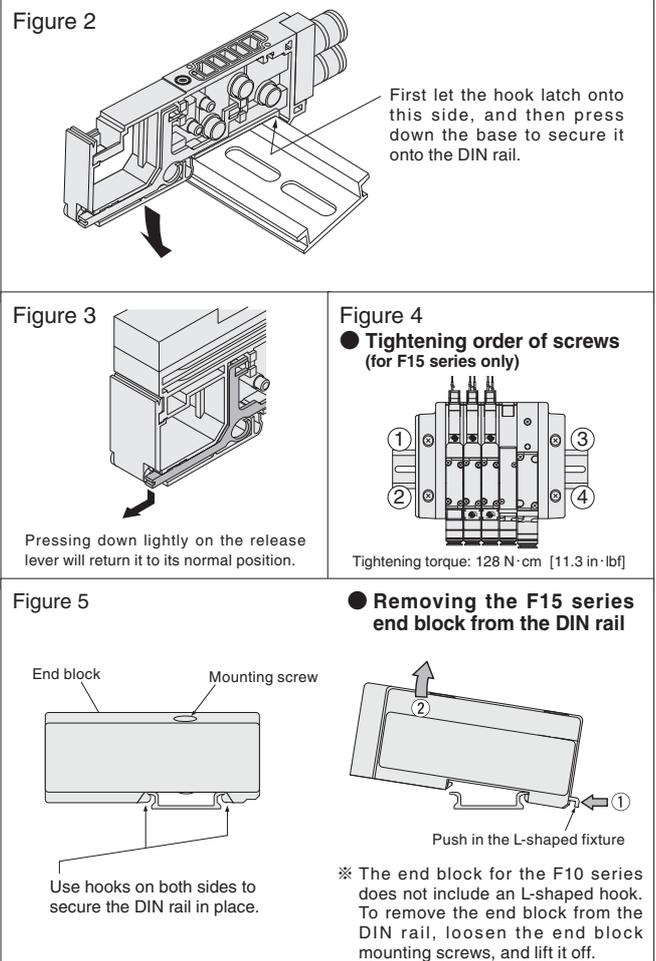
Use the valve base assembly for adding valve base units.

- ① Loosen the mounting screw on the end block until it can slide (see Fig. 1).
Note: For the F15 series, loosen the screws on both the left and right end blocks (2 screws each).
- ② Press the release lever on the valve base assembly where the new unit is to be added, and disconnect the link between the bases.
- ③ Mount the valve base assembly to be added on the DIN rail as shown in Fig. 2.
- ④ Return the release lever of the valve base assembly disassembled in step ② to its normal position, as shown in Fig. 3. In addition, set the release lever for the valve assembly being added to the same position, then press the bases together until they connect and click into place.
- ⑤ Press the bases together from both sides to ensure that there is no gap between them, and then tighten the end block mounting screws, and install the units in place on the DIN rail (see Fig. 5).
Tightening torque: 128 N·cm [11.3 in·lbf]
Notes: 1. Always follow the steps shown in Fig. 4 when tightening the end block mounting screws for the F15 series.
2. Confirm that the DIN rail mounting hooks secure the DIN rail (see Fig. 5).

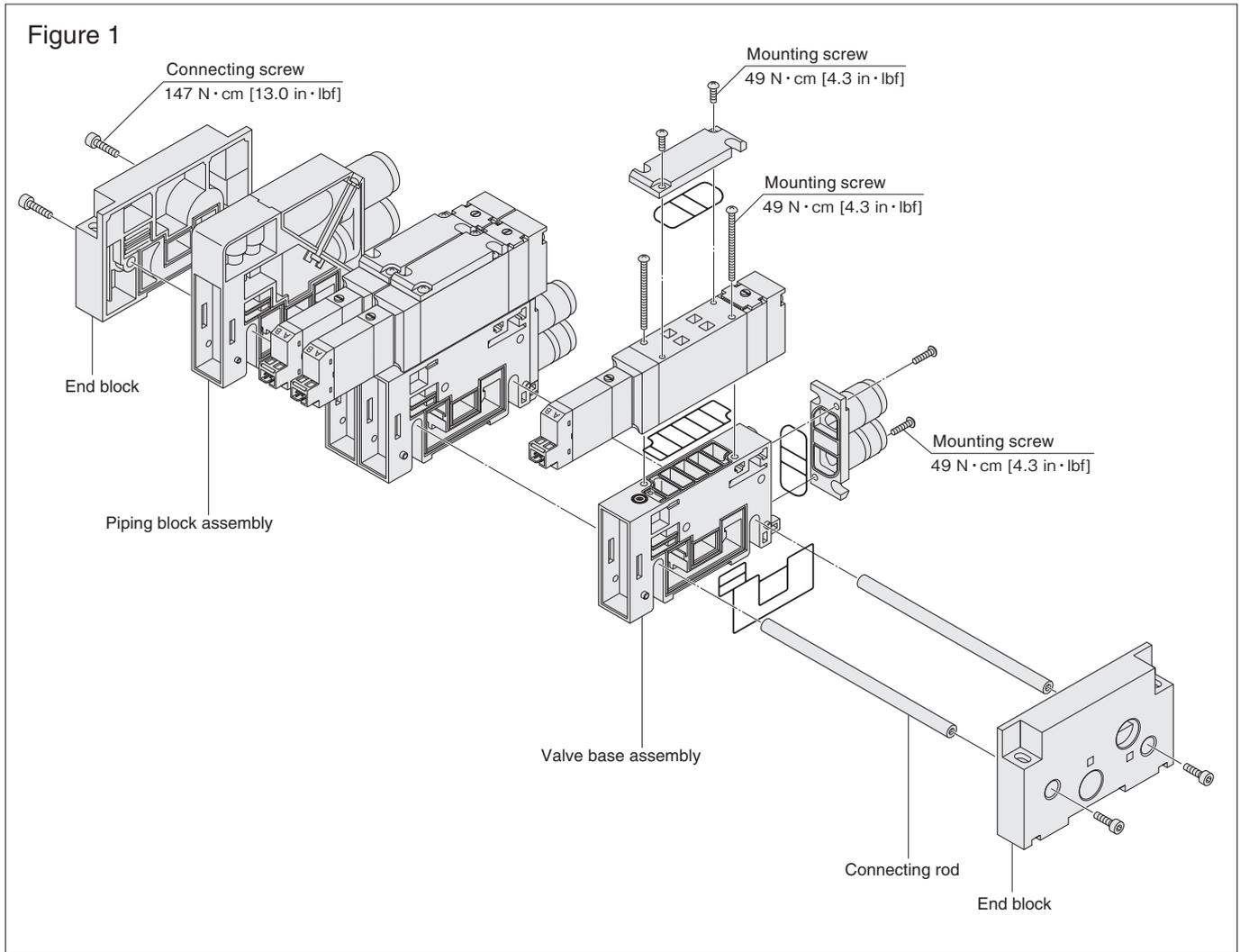
[Caution]

- Always cut off the power and air supply before working. In addition, always confirm that air has been completely exhausted from the manifold.
- Care should be exercised to prevent the gasket from becoming caught or lost.
- Before supplying air to the manifold, always confirm that the bases are connected, the end block mounting screws are tightened, etc. Supplying air when either of the end blocks is not secured to the DIN rail could result in air leaks or in separation of manifold bases.
- When there are a large number of valves simultaneously delivering air to the secondary side, or when there are a large number of valves overall, we recommend using 2 air supplies and exhausts (on each side).

Adding units to the piping block assembly should be performed in the same way as adding units of the valve base assembly.



F18 Series Disassembly Diagram of Split Manifold Non-Plug-in Type



Manifold Unit Adding Procedure (F18 Series Non-Plug-in Type)

■ Adding a valve base unit

Use the valve base assembly and unit-adding connecting rod to add valve base units.

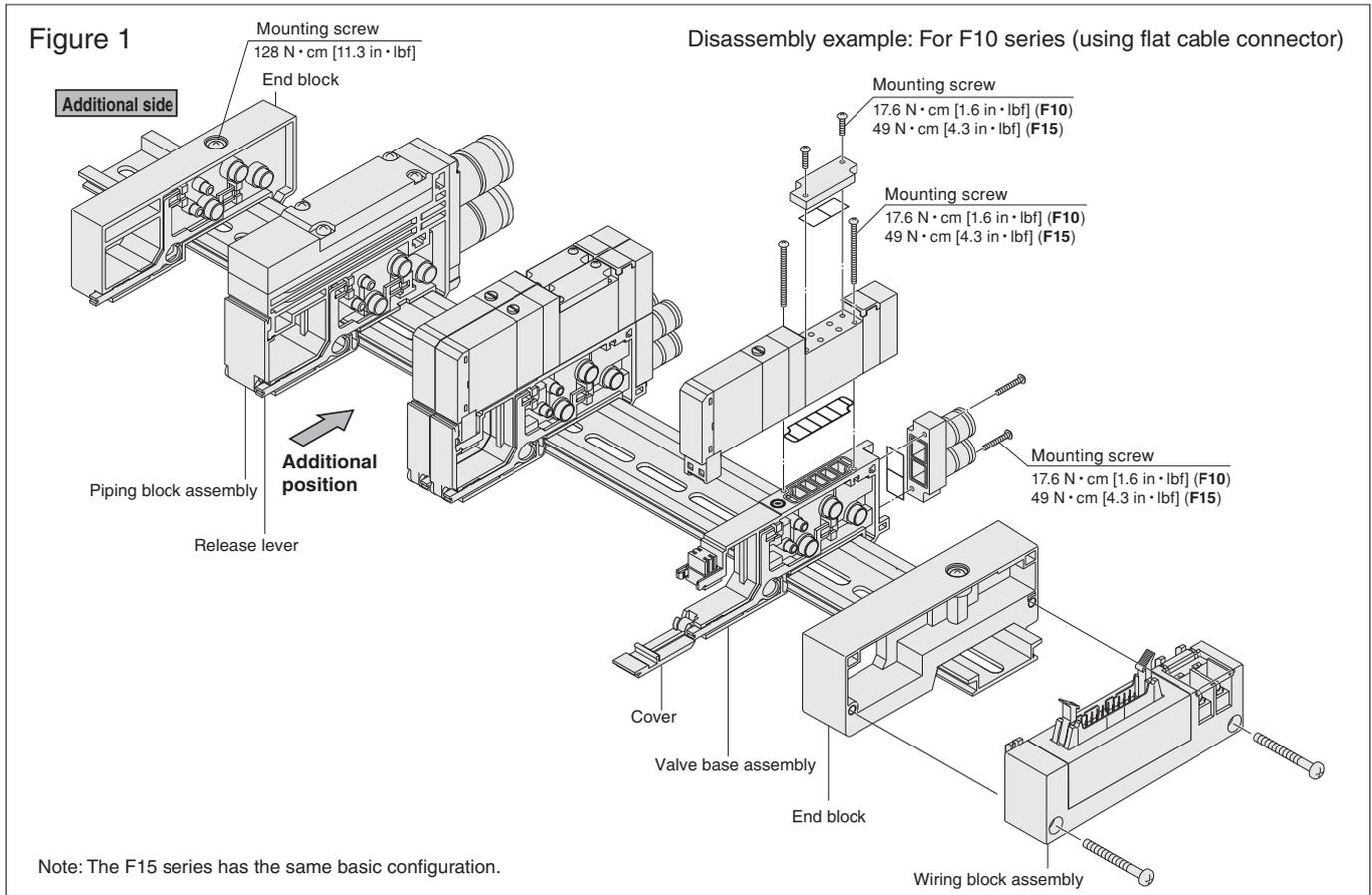
- ① Remove the connecting screws on the end block and separate the end block from the manifold (see Fig. 1).
- ② Install the connecting rods to be added, open up the spaces where the units are being added, position the gaskets onto the valve base assemblies being added, and fit the units on the connecting rods from above. At this time, securely mount the units so that no gap is left between the added valve base assemblies and the upper surface of the connecting rods.
- ③ Install gaskets onto the end blocks removed in step ①, and retighten the connecting screws. At this time, use a hexagon bar wrench to hold the connecting screws on the opposite side in place so as to prevent the screws from slipping while securing them into place. Tightening torque: 147 N·cm [13.0 in·lbf]

【Caution】

- Always cut off power and air supply before working. In addition, always confirm that air has been completely exhausted from the manifold.
- Care should be exercised to prevent the gasket from becoming caught or lost.
- Before supplying air to the manifold, always confirm that the bases are securely connected, the end block connecting screws on both sides are tightened, etc. Supplying air when either of the end blocks is not secured to the DIN rail could result in air leaks or in separation of manifold bases.
- When there are a large number of valves simultaneously delivering air to the secondary side, or when there are a large number of valves overall, we recommend using 2 air supplies and exhausts (on each side).

Adding units to the piping block assembly should be performed in the same way as adding units to the valve base assembly.

F10 and F15 Series Disassembly Diagram of Split Manifold Plug-in Type



Manifold Unit Adding Procedure (F10 and F15 Series Plug-in Type)

■ Adding a valve base unit

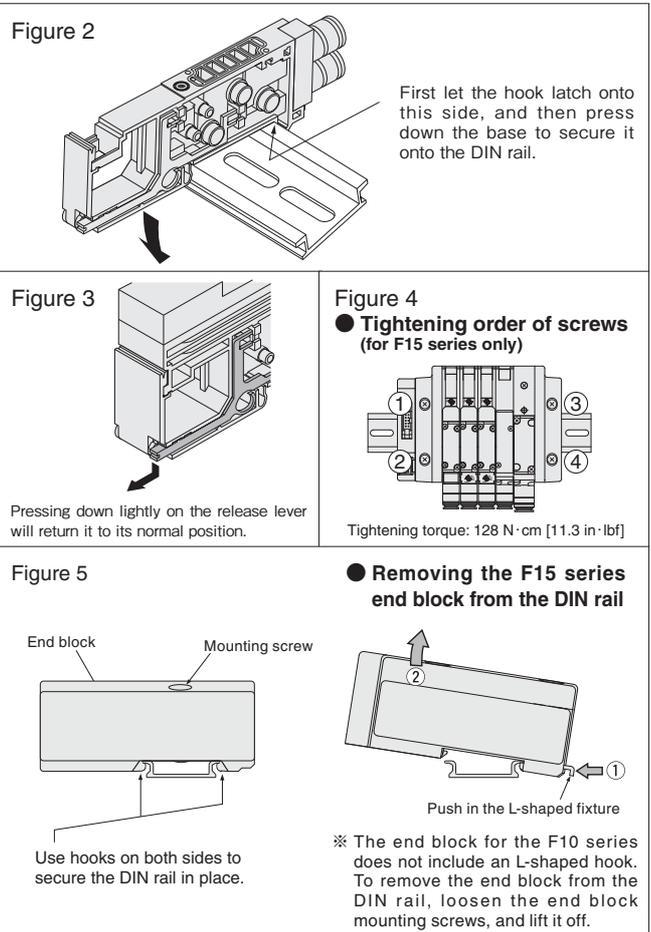
Use the valve base assembly for adding valve base units.

- Loosen the mounting screw on the end block until it can slide (see Fig. 1).

Note: For the F15 series, loosen the mounting screws on both the left and right end blocks (2 screws each).

- Add units on the additional side (with the solenoid on top and its right) shown in Fig. 1. To split up at additional unit locations, push the piping base assembly's release lever, and release the connections between the bases.
- Mount the valve base assembly to be added on the DIN rail as shown in Fig. 2.
- Return the release lever of the piping block assembly disassembled in step ② to its normal position, as shown in Fig. 3. Set the release levers on the additional valve bases in the same position, and press all the bases together until they click into place, while watching to ensure that the lead wires are not caught by the cover.
- Press the bases together from both sides to ensure that there is no gap between them, and then tighten the end block mounting screws, and install the units in place on the DIN rail (see Fig. 5). Tightening torque: 128 N·cm [11.3 in·lbf]

Notes: 1. Always follow the steps shown in Fig. 4 when tightening the end block mounting screws for the F15 series.
2. Confirm that the DIN rail mounting hooks secure the DIN rail (see Fig. 5).



■ Wiring Procedure

- ① Use a flatblade screwdriver to open all of the covers (see Fig. 1). Loosen the mounting screws of the valve next to the valve base to be added, remove the valve, and remove the plug-in connector (see Fig. 6).
 - ② The end terminal lead wire (short red wire) is inserted into the pin insert section (No.3) of the plug-in connector that was removed in step ① (see Fig. 7).
(When shipping, end terminal lead wire is inserted into the plug-in connector of the end unit valve.) Remove this end terminal lead wire, and insert it into the insert section (No.3) of the plug-in connector for the valve base assembly to be added. Next, insert the common wire (red) of this plug-in connector into the insert section (No.3) of the removed plug-in connector.
- Note: When inserting the lead wire, confirm that the short bar of the plug-in connector's common wire insert section has been attached.
- ③ Install each of the wired plug-in connectors in step ② to the valve base, and mount the valve.
 - ④ Remove the wiring block mounting screws and place the connector bracket in the position shown in Fig. 8, then connect the lead wire (white) of the added valve base after confirming the pin locations. (For details, see the "Detailed diagram of wiring block internal connections" on p.34, 35)
 - ⑤ Return the connector bracket to its original position, tighten the wiring block mounting screws in place, and then install the cover while exercising caution that the lead wires are not trapped by the cover.

[Caution]

- Always cut off the power and air supply before working. In addition, always confirm that air has been completely exhausted from the manifold.
- When removing lead wires from the plug-in connector, use a tool with a fine tip (such as a small screwdriver) to press lightly on the contact hook from a hole on the side of the plug-in connector, and pull out the lead wire. When re-inserting the lead wire to the connector, spread the contact hooks so that they face outward, and then insert the lead wire into the plug-in connector. At this time, pull the lead wire lightly to confirm that it is securely inserted.
- Always connect the end terminal lead wires (see Fig. 7).
- Care should be exercised to prevent the gasket from becoming caught or lost.
- Before supplying air to the manifold, always confirm that the bases are connected, the end block mounting screws are tightened, etc. Supplying air when either of the end blocks is not securing the DIN rail could result in air leaks or in separation of manifold bases.
- Caution should be exercised as the number of valve units that can be added is limited in the manifold, by the wiring specifications and wiring connection types, etc. For details, see the "Table for maximum number of valve units by wiring specification," on p.66.
- When there are a large number of valves simultaneously delivering air to the secondary side, or when there are a large number of valves overall, we recommend using 2 air supplies and exhausts (on each side).

Adding units to the piping block assembly should be performed in the same way as adding units to the valve base assembly. In addition, when the wiring block and piping block are mounted side-by-side, always mount the wiring block on the outside of the piping block, for structural reasons.

Valve tightening torque		N · cm [in · lbf]
Series	Torque	
F10	17.6 [1.6]	
F15	49.0 [4.3]	

Figure 6

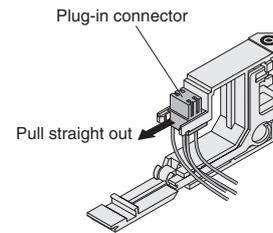
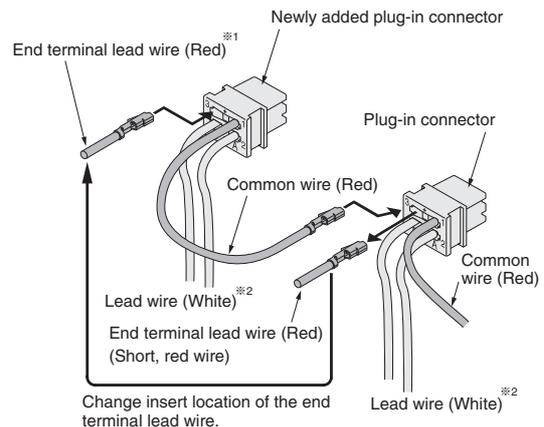
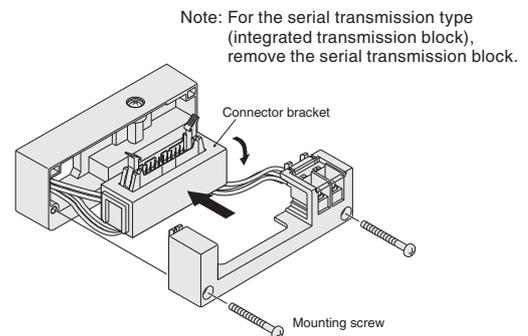


Figure 7



- ※ 1: Always insert end terminal lead wire.
- ※ 2: Shows when both A and B are used.

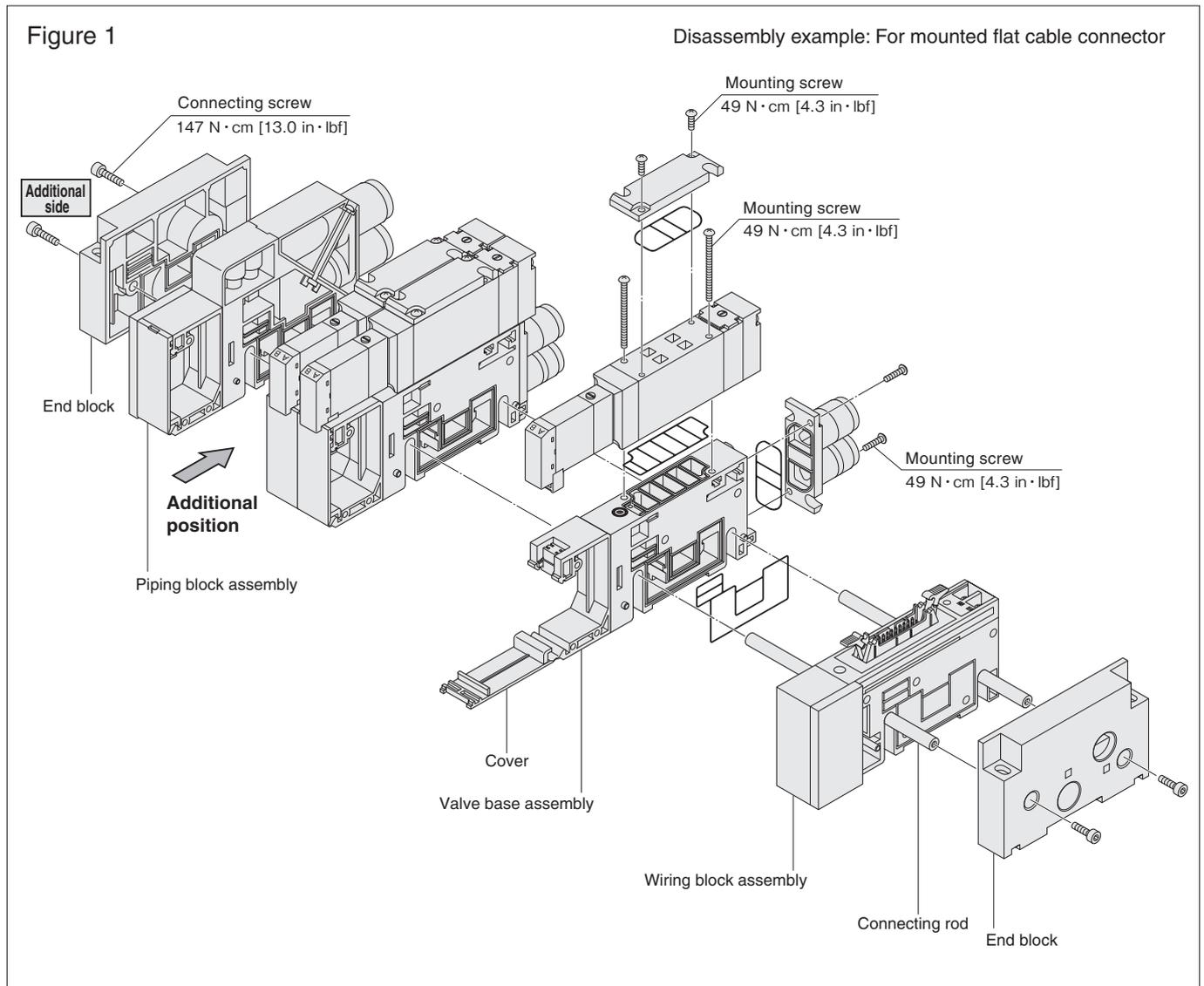
Figure 8



Mounting screw tightening torque: 49 N · cm [4.3 in · lbf]

See "F10, F15 Series Detailed Diagram of Wiring Block Internal Connections" on p.34, 35.

F18 Series Disassembly Diagram of Split Manifold Plug-in Type



Manifold Unit Adding Procedure (F18 Series Plug-in Type)

■ Adding a valve base unit

Use the valve base assembly for adding valve base units.

- ① Remove the connecting screws on the additional side end block and separate the end block from the manifold (see Fig. 1).
- ② Install the connecting rods to be added, open up spaces where the units are being added, position the gaskets onto the valve base assemblies being added, and fit the units on the connecting rods from above. At this time, securely mount the units so that no gap is left between the added valve base assemblies and the upper surface of the connecting rods.
- ③ Install gaskets onto the end blocks removed in step ①, and retighten the connecting screws. At this time, use a hexagon bar wrench to hold the connecting screws on the opposite side in place so as to prevent the screws from slipping while securing them into place. Tightening torque: 147 N · cm [13.0 in · lbf]

■ Wiring Procedure

- ① Use a flatblade screwdriver to open all of the covers (see Fig. 1). Loosen the mounting screws of the valve next to the valve base to be added, remove the valve, and remove the plug-in connector (see Fig. 2).
 - ② The end terminal lead wire (short red wire) is inserted into the pin insert section (No.3) of the removed plug-in connector that was removed in step ① (see Fig. 3).
(When shipping, end terminal lead wire is inserted into the plug-in connector of the end unit valve.) Remove this end terminal lead wire, and insert it into the insert section (No.3) of the plug-in connector for the valve base assembly to be added. Next, insert the common wire (red) of this plug-in connector into the insert section (No.3) of the removed plug-in connector.
- Note: When inserting the lead wire, confirm that the short bar of the plug-in connector's common wire insert section has been attached.
- ③ Install each of the wired plug-in connectors in step ② to the valve base, and mount the valve.
 - ④ Remove the wiring block mounting screws and place the connector bracket in the position shown in Fig. 4, then connect the lead wire (white) of the added valve base after confirming the pin locations (For details, see the "Detailed diagram of wiring block internal connections" on p.36, 37).
 - ⑤ Return the connector bracket to its original position, tighten the wiring block mounting screws in place, and then install the cover while exercising caution that the lead wires are not trapped by the cover.

[Caution]

- Always cut off the power and air supply before working. In addition, always confirm that air has been completely exhausted from the manifold.
 - When removing lead wires from the plug-in connector, use a tool with a fine tip (such as a small screwdriver) to press lightly on the contact hook from a hole on the side of the plug-in connector, and pull out the lead wire. When re-inserting the lead wire to the connector, spread the contact hooks so that they face outward, and then insert the lead wire into the plug-in connector. At this time, pull the lead wire lightly to confirm that it is securely inserted.
 - Always connect the end terminal lead wire (see Fig. 3).
 - Care should be exercised to prevent the gasket from becoming caught or lost.
 - Before supplying air to the manifold, always confirm that the bases are connected, the end block connecting screws on both sides are tightened, etc.
- Supplying air when either of the end blocks is not securing the DIN rail could result in air leaks or in separation of manifold bases.
- Caution should be exercised as the number of valve units that can be added is limited in the manifold, by the wiring specifications and wiring connection types, etc. For details, see the "Table for maximum number of valve units by wiring specification," on p.84.
 - When there are a large number of valves simultaneously delivering air to the secondary side, or when there are a large number of valves overall, we recommend using 2 air supplies and exhausts (on each side).

Adding units to the piping block assembly should be performed in the same way as adding units to the valve base assembly. In addition, when the wiring block and piping block are mounted side-by-side, always mount the wiring block on the outside of the piping block, for structural reasons.

Valve tightening torque N · cm [in · lbf]

Series	torque
F18	49.0 [4.3]

Figure 2

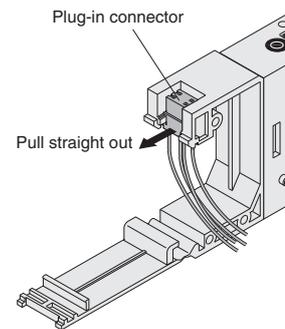
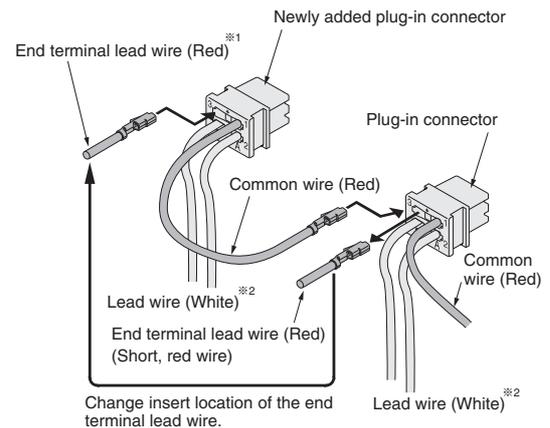
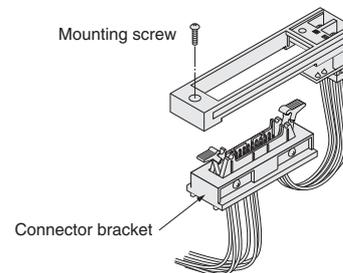


Figure 3



- ※ 1: Always insert end terminal lead wire.
- ※ 2: Shows when both A and B are used.

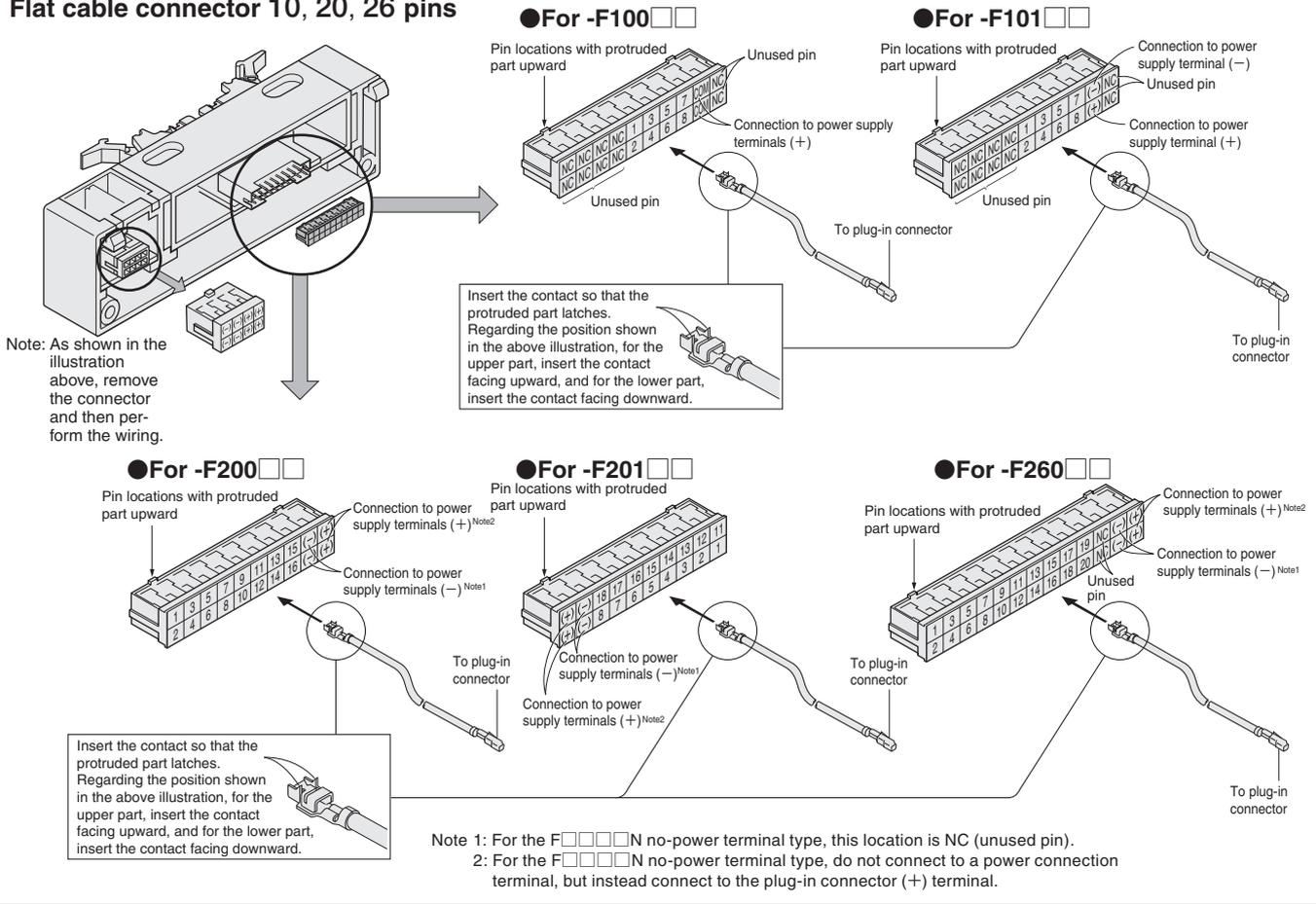
Figure 4



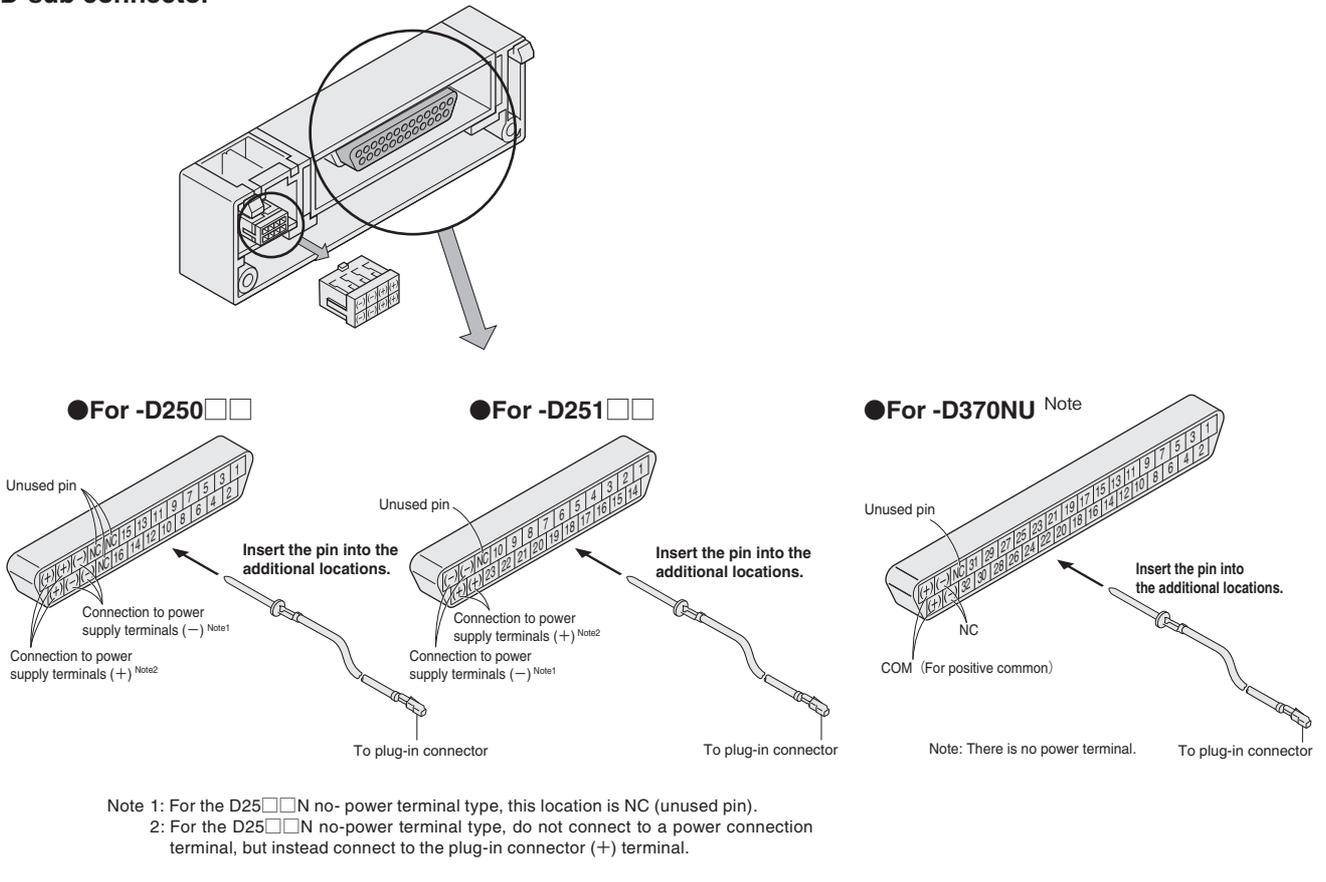
See "F18 Series Detailed Diagram of Wiring Block Internal Connections" on p.36, 37.

F10, F15 Series Detailed Diagram of Wiring Block Internal Connections

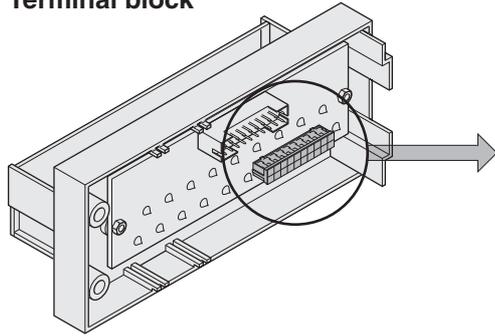
Flat cable connector 10, 20, 26 pins



D-sub connector



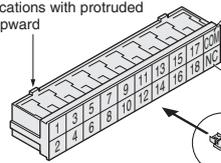
Terminal block



Note: As shown in the illustration above, remove the connector and then perform the wiring.

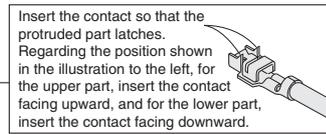
● For -T200

Pin locations with protruded part upward



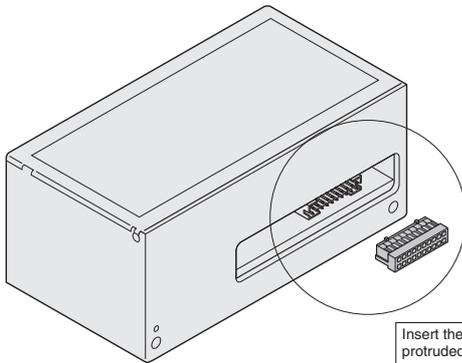
Manifold common wire

Unused pin



To plug-in connector

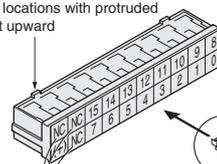
Serial transmission block



Note: As shown in the illustration above, remove the connector and then perform the wiring.

● For 16 outputs

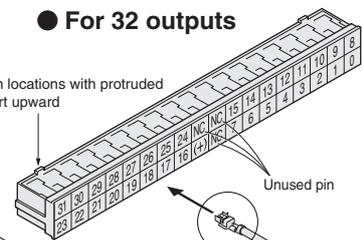
Pin locations with protruded part upward



Unused pin

● For 32 outputs

Pin locations with protruded part upward



Unused pin

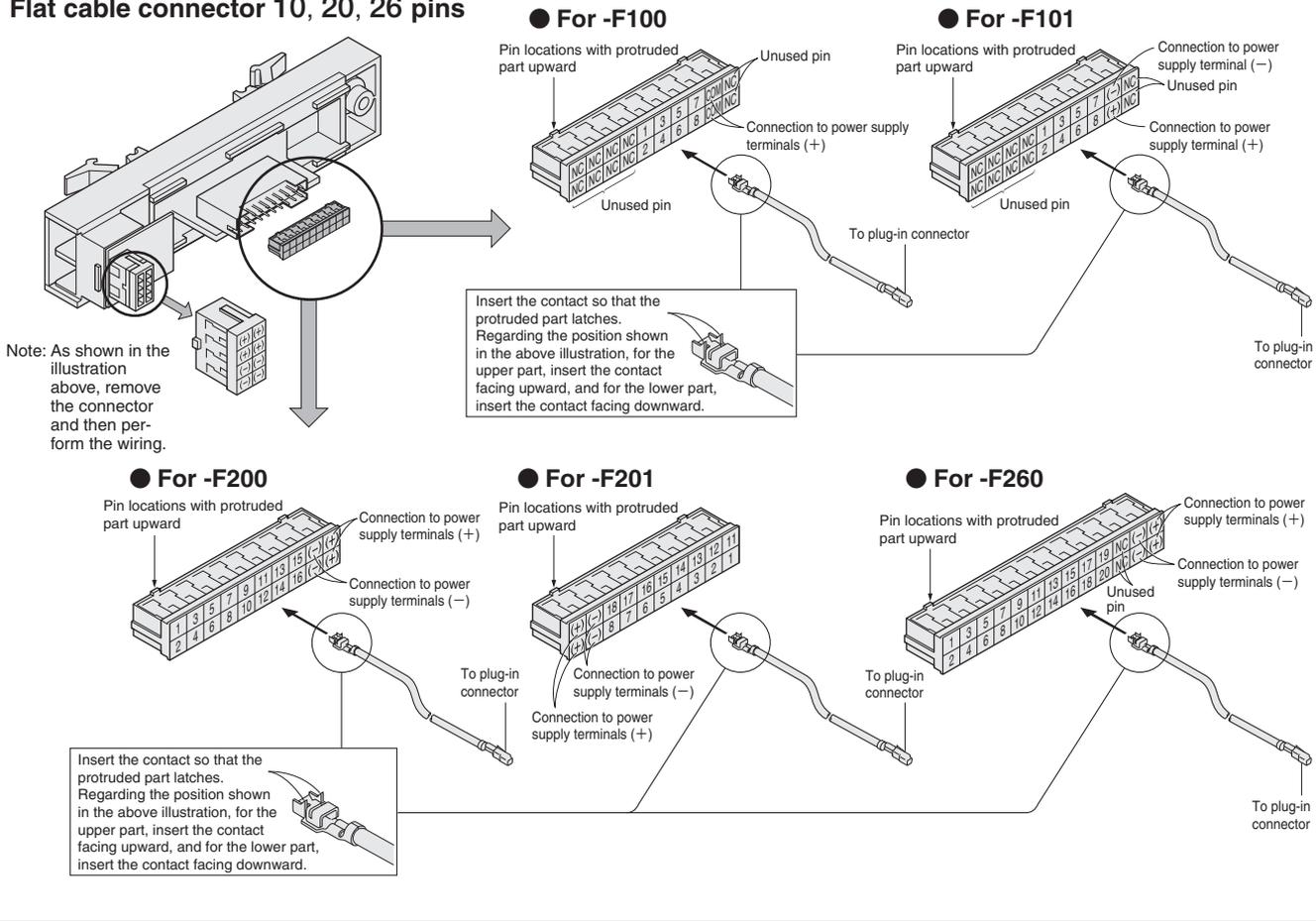
To plug-in connector

To plug-in connector

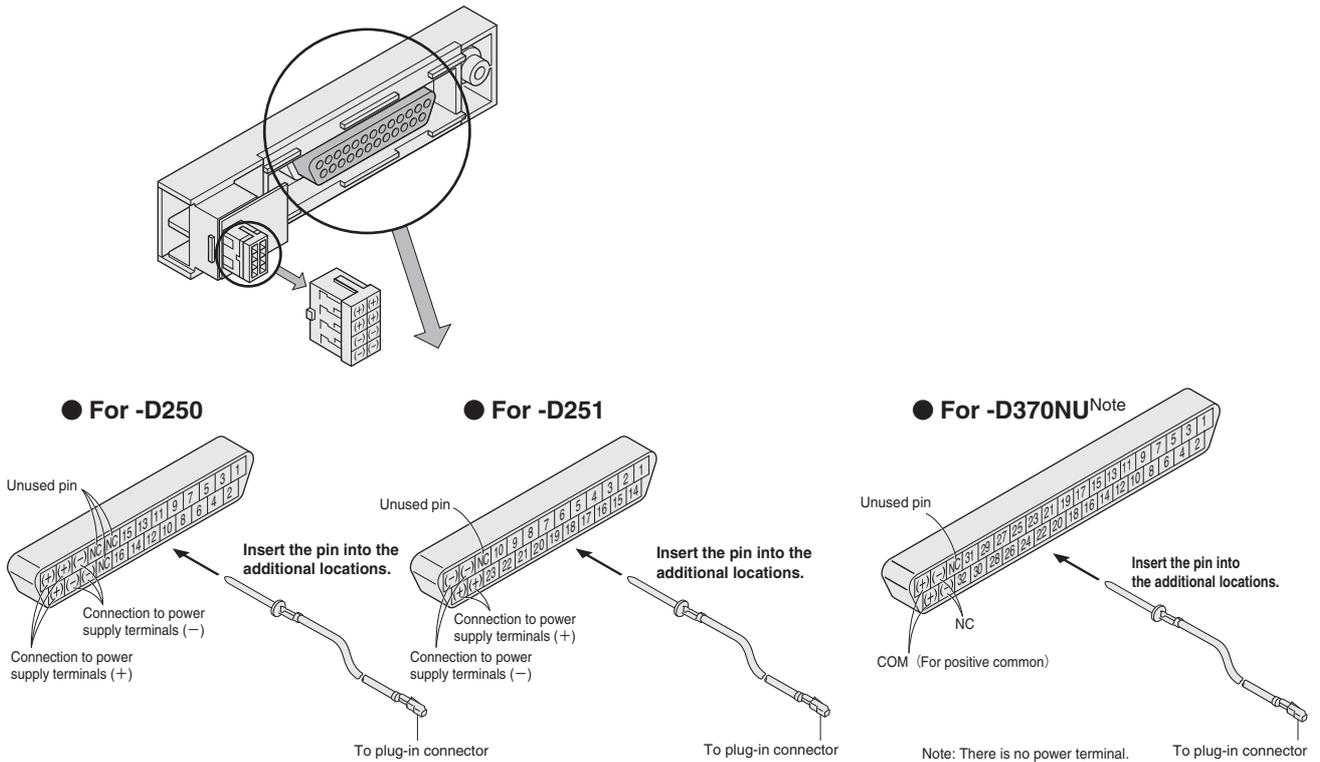
Insert the contact so that the protruded part latches. Regarding the position shown in the above illustration, for the upper part, insert the contact facing upward, and for the lower part, insert the contact facing downward.

F18 Series Detailed Diagram of Wiring Block Internal Connections

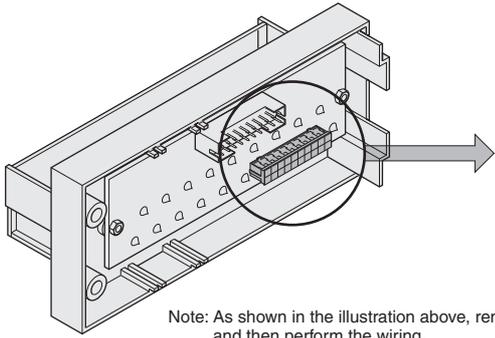
Flat cable connector 10, 20, 26 pins



D-sub connector

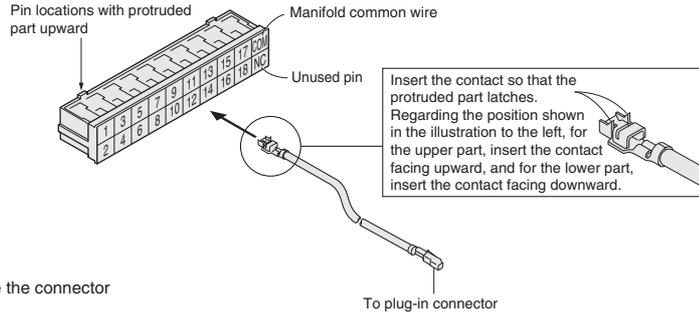


Terminal block



Note: As shown in the illustration above, remove the connector and then perform the wiring.

● For -T200



Product Configurations for the F Series Serial Transmission Compatible Manifolds

When ordering the serial transmission compatible manifold, note that the product configurations vary between the F10 and F15 series, and the F18 series.

■ For F10 and F15 series

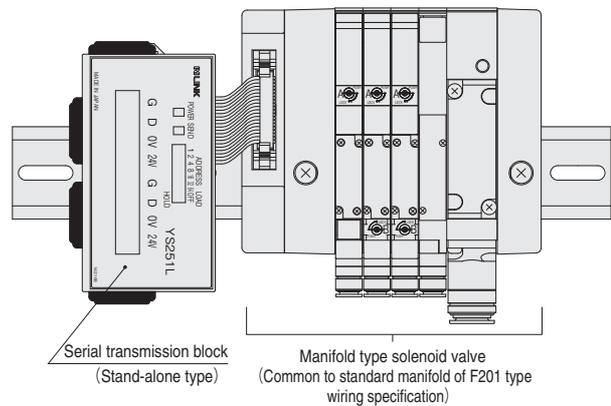
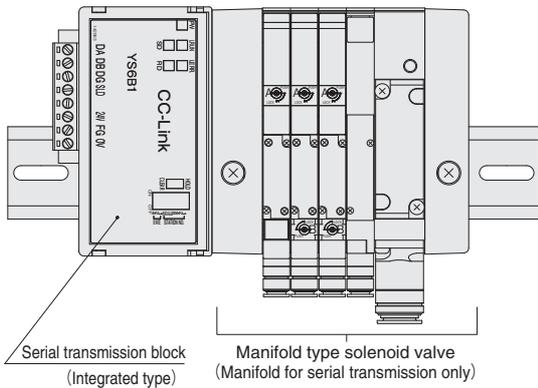
● Models compatible with integrated transmission block

- For Omron CompoBus/S
- For CC-Link
- For DeviceNet
- For CompoNet

● Models for stand-alone transmission block

The manifold body and serial transmission block are connected with a flat cable.

- For UNILINE
- For Omron B7A Link Terminal
- For SUNX S-LINK



■ For F18 series

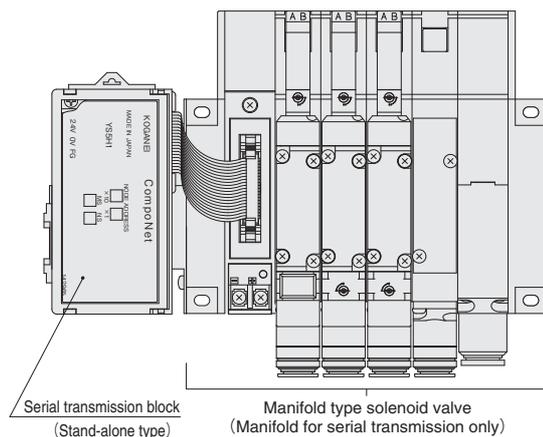
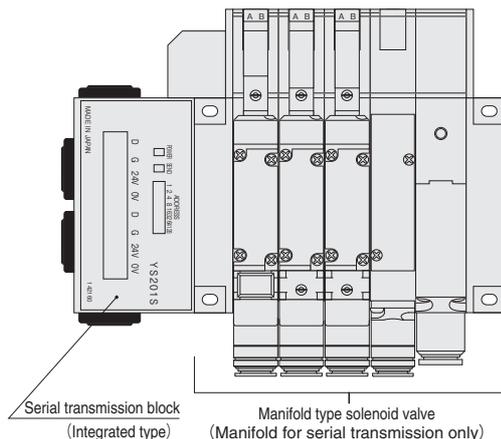
● Models compatible with integrated transmission block

- For UNILINE
- For Omron B7A Link Terminal
- For SUNX S-LINK
- For CC-Link

● Models for stand-alone transmission block

The manifold body and serial transmission block are connected with a flat cable.

- For CompoNet



F10, F15 Series Specifications of Serial Transmission Compatible Manifolds

General Specifications

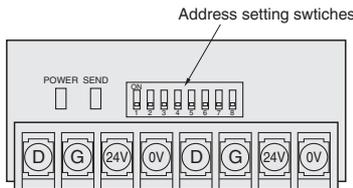
Voltage	24VDC ±10%
Operating temperature range	5~50°C [41~122°F]
Vibration resistance	49.0 m/s ² [5G]
Shock resistance	98.1 m/s ² [10G]

● For details about specifications, see each user's manual (see below).

F10, F15 Series Serial Transmission Block, Terminal Block (LED) Part Names

● For UNILINE

Transmission block specification: -01 (16 outputs), -02 (8 outputs)



LED indicator

Indicator	Description
POWER	<ul style="list-style-type: none"> Lights up when power is turned on Flashes during voltage drops or when over current (a short circuit)
SEND	<ul style="list-style-type: none"> Flashes during normal transmission Lights up or shuts off during faulty transmission

Remarks

※ For details of UNILINE, see the NKE catalog, user's manual, etc.

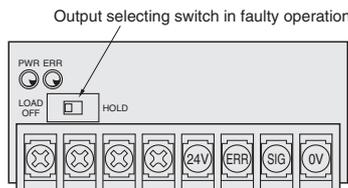
● Number of outputs per block

16 solenoids (transmission block specification: -01)
8 solenoids (transmission block specification: -02)

● **Related materials:** User's manual, document No. HV037

● For OMRON B7A Link Terminal

Transmission block specification: -31 (standard type), -32 (high-speed type)



LED indicator

Indicator	Description
PWR	Lights up when power is turned on
ERR	Lights up during faulty transmission

Remarks

● Connection method: 1 to 1

(Transmission block spec.)	Standard type (-31)	High-speed type (-32)
Transmission delay time	Max. 31 ms	Max. 5 ms
Transmission distance	Max. 500 m [1640 ft]	Max. 100 m [328 ft]

※ For details of B7A Link Terminal, see the OMRON catalog, user's manual, etc.

● Number of outputs per block

Maximum of 16 solenoids

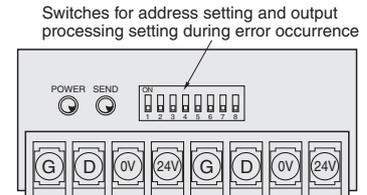
● Error output specifications

Output type: NPN open collector
Rated load voltage: 24VDC
Output current: Sink current MAX. 40 mA

● **Related materials:** User's manual, document No. HV038

● For SUNX S-LINK

Transmission block specification: -51 (16 outputs), -52 (8 outputs)



LED indicator

Indicator	Description
POWER	Lights up when power is turned on
SEND	Flashes during normal transmission Lights up or shuts off during faulty transmission

Remarks

※ For details of S-LINK system, see the SUNX catalog, user's manual, etc.

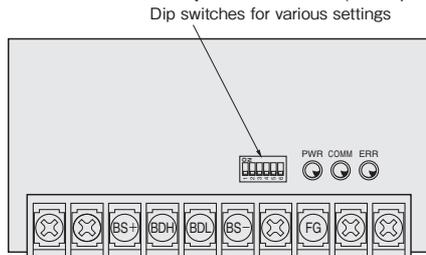
● Number of outputs per block

16 solenoids (transmission block specification: -51)
8 solenoids (transmission block specification: -52)

● **Related materials:** User's manual, document No. HV039

● For OMRON CompoBus/S

Transmission block specification: -A1 (16 outputs)



LED indicator

Indicator	State	Color	Description
PWR	Lights up	Green	During power supply
	Shuts off		Power not supplied
COMM	Lights up	Yellow	During normal communication
	Shuts off		Communication fault, or standby
ERR	Lights up	Red	Communication fault occurred
	Shuts off		During normal communication, or standby

Remarks

※ For details of CompoBus/S, see the OMRON catalog, user's manual, etc.

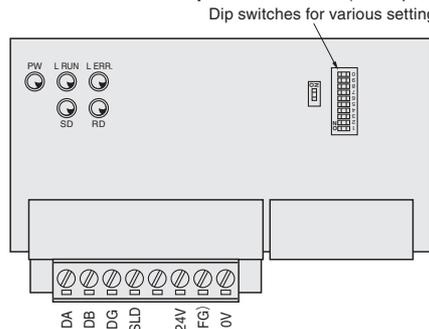
● Number of outputs per block

16 solenoids (transmission block specification: -A1)

● **Related materials:** User's manual, document No. HV040

● For CC-Link

Transmission block specification: -B1 (16 outputs)



LED indicator

Indicator	Description
PW	Lights up when power is turned on
L RUN	Lights up when normal data is received from master station
SD	Lights up during sending data
RD	Lights up during receiving data
L ERR.	Lights up during transmission errors, and shuts off when time is over Lights up due to station number setting error or transmission speed setting error

Remarks

※ Conforms to CC-Link.

● Number of outputs per block

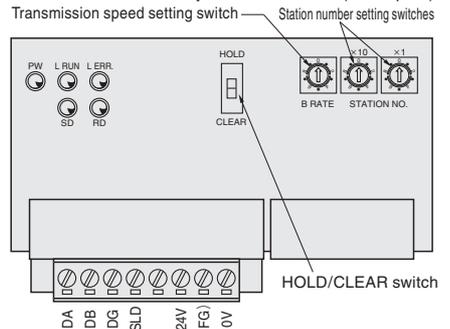
16 solenoids (transmission block specification: -B1)

※ Since the block occupies 1 station, if remote I/O stations are entirely composed of the blocks, a maximum of 64 units can be connected to 1 master station.

● **Related materials:** User's manual, document No. HV041

● For CC-Link

Transmission block specification: -B3 (32 outputs)



LED indicator

Indicator	Description
PW	Lights up when power is turned on
L RUN	Lights up when normal data is received from master station
SD	Lights up during sending data
RD	Lights up during receiving data
L ERR.	Lights up during transmission errors, and shuts off when time is over Lights up due to station number setting error or transmission speed setting error

Remarks

※ Conforms to CC-Link.

● Number of outputs per block

32 solenoids (transmission block specification: -B3)

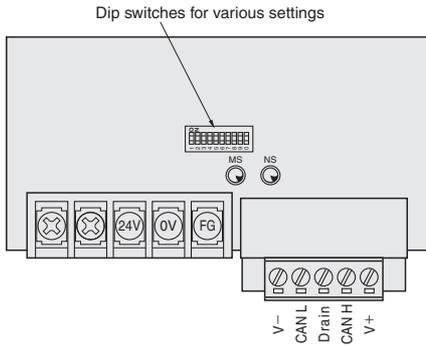
※ Since the block occupies 1 station, if remote I/O stations are entirely composed of the blocks, a maximum of 64 units can be connected to 1 master station.

● **Related materials:** User's manual, document No. HV041

F10, F15 Series Serial Transmission Block, Terminal Block (LED) Part Names

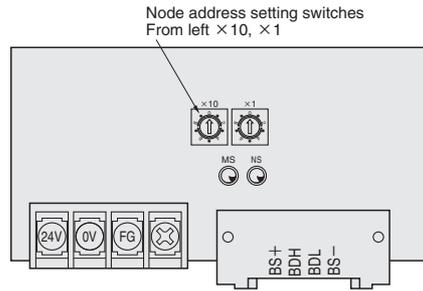
● For DeviceNet

Transmission block specification: **-D1** (16 outputs)
-D3 (32 outputs)



● For CompoNet

Transmission block specification: **-H1** (16 outputs)



LED indicator

Indicator	State	Color	Description
MS	Lights up	Green	• Normal state
	Flashing		• No setting state
	Lights up	Red	• Serious breakdown
	Flashing		• Minor breakdown
	Shuts off	—	• No power supply
NS	Lights up	Green	• Communication connection completed
	Flashing		• No communication connection
	Lights up	Red	• Serious communication fault
	Flashing		• Minor communication fault
	Shuts off	—	• No power supply

LED indicator

Indicator	State	Color	Description
MS	Lights up	Green	• Normal state
	Lights up	Red	• Serious breakdown
	Flashing	Red	• Minor breakdown
	Shuts off	—	• Power OFF/In preparation
NS	Lights up	Green	• Online/Access state
	Flashing	Green	• Online/No-access state
	Lights up	Red	• Serious communication fault
	Flashing	Red	• Minor communication fault
	Shuts off	—	• Power OFF/In preparation

Remarks

※Conforms to DeviceNet.

●Number of outputs per block

A maximum of 16 solenoids
 (transmission block specification: **-D1**)
 A maximum of 32 solenoids
 (transmission block specification: **-D3**)

●Related materials: User's manual, document
No. HV042

Remarks

※Conforms to CompoNet.

●Number of outputs per block

16 solenoids (transmission block specification: **-H1**)

●Related materials: User's manual, document
No. HV043

※The communication connector is sold by Omron Corporation. Direct your inquiries to Omron.

■For specifications and handling details, see the above-listed user's manuals (Document Nos. HV037 - HV043).

F18 Series Specifications of Serial Transmission Compatible Manifolds

General Specifications

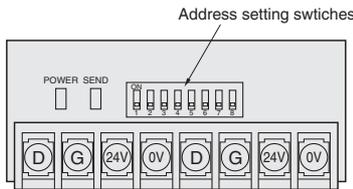
Voltage	24VDC ±10%
Operating temperature range	5~50°C [41~122°F]
Vibration resistance	49.0 m/s ² [5G]
Shock resistance	98.1 m/s ² [10G]

● For details about specifications, see each user's manual (see below).

F18 Series Serial Transmission Block, Terminal Block (LED) Part Names

● For UNILINE

Transmission block specification: -01 (16 outputs), -02 (8 outputs)



LED indicator

Indicator	Description
POWER	<ul style="list-style-type: none"> Lights up when power is turned on Flashes during voltage drops or when over current (a short circuit)
SEND	<ul style="list-style-type: none"> Flashes during normal transmission Lights up or shuts off during faulty transmission

Remarks

※ For details of UNILINE, see the NKE catalog, user's manual, etc.

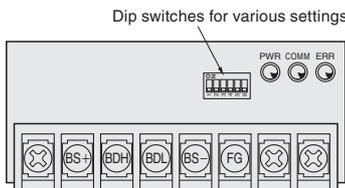
● Number of outputs per block

16 solenoids (transmission block specification: -01)
8 solenoids (transmission block specification: -02)

● **Related materials:** User's manual, document No. HV037

● For OMRON CompoBus/S

Transmission block specification: -A1 (16 outputs)



LED indicator

Indicator	State	Color	Description
PWR	Lights up	Green	• During power supply
	Shuts off		• Power not supplied
COMM	Lights up	Yellow	• During normal communication
	Shuts off		• Communication fault, or standby
ERR	Lights up	Red	• Communication fault occurred
	Shuts off		• During normal communication, or standby

Remarks

※ For details of CompoBus/S, see the OMRON catalog, user's manual, etc.

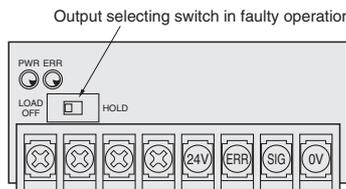
● Number of outputs per block

16 solenoids (transmission block specification: -A1)

● **Related materials:** User's manual, document No. HV040

● For OMRON B7A Link Terminal

Transmission block specification: -31 (standard type), -32 (high-speed type)



LED indicator

Indicator	Description
PWR	• Lights up when power is turned on
ERR	• Lights up during faulty transmission

Remarks

● Connection method: 1 to 1

(Transmission block spec.)	Standard type (-31)	High-speed type (-32)
Transmission delay time	Max. 31 ms	Max. 5 ms
Transmission distance	Max. 500 m [1640 ft.]	Max. 100 m [328 ft.]

※ For details of B7A Link Terminal, see the OMRON catalog, user's manual, etc.

● Number of outputs per block

Maximum of 16 solenoids

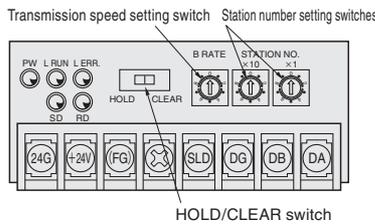
● Error output specifications

Output type: NPN open collector
Rated load voltage: 24VDC
Output current: Sink current MAX. 40 mA

● **Related materials:** User's manual, document No. HV038

● For CC-Link

Transmission block specification: -B1 (16 outputs)



LED indicator

Indicator	Description
PW	• Lights up when power is turned on
L RUN	• Lights up when normal data is received from master station
SD	• Lights up during sending data
RD	• Lights up during receiving data
L ERR.	• Lights up during transmission errors, and shuts off when time is over Lights up due to station number setting error or transmission speed setting error

Remarks

※ Conforms to CC-Link.

● Number of outputs per block

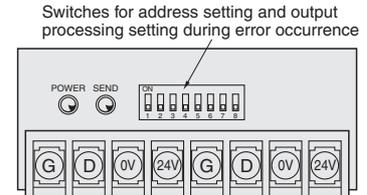
16 solenoids (transmission block specification: -B1)

※ Since the block occupies 1 station, if remote I/O stations are entirely composed of the blocks, a maximum of 64 units can be connected to 1 master station.

● **Related materials:** User's manual, document No. HV041

● For SUNX S-LINK

Transmission block specification: -51 (16 outputs), -52 (8 outputs)



LED indicator

Indicator	Description
POWER	• Lights up when power is turned on
SEND	• Flashes during normal transmission • Lights up or shuts off during faulty transmission

Remarks

※ For details of S-LINK, see the SUNX catalog, user's manual, etc.

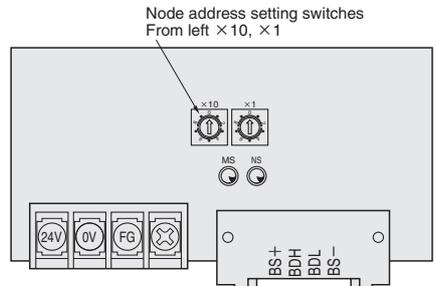
● Number of outputs per block

16 solenoids (transmission block specification: -51)
8 solenoids (transmission block specification: -52)

● **Related materials:** User's manual, document No. HV039

● For CompoNet

Transmission block specification: -H1 (16 outputs)



LED indicator

Indicator	State	Color	Description
MS	Lights up	Green	• Normal state
	Lights up	Red	• Serious breakdown
	Flashing	Red	• Minor breakdown
	Shuts off	—	• Power OFF/In preparation
NS	Lights up	Green	• Online/Access state
	Flashing	Green	• Online/No-access state
	Lights up	Red	• Serious communication fault
	Flashing	Red	• Minor communication fault
Shuts off	—	• Power OFF/In preparation	

Remarks

※ Conforms to CompoNet.

● Number of outputs per block

16 solenoids (transmission block specification: -H1)

● **Related materials:** User's manual, document No. HV043

※ The communication connector is sold by Omron Corporation. Direct your inquiries to Omron.

■ For specifications and handling details, see the above-listed user's manuals (Document Nos. HV037 - HV043).

Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

Warranty Period The warranty period is 180 days from the date of delivery.

Koganei Responsibility If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such part.

Limitations ● This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.

● KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.

● This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.

● Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.

● This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.