Micro Ejector
FME Series

KOGANEI Brand
All products are RoHS-Compliant

Energy Saving & Silent
20% reduction in air consumption and significant cut in exhaust sound are mutually compatible.
(Compared to our conventional GME series)
Highly reliable Solenoid valve F10 series is employed.

1 Silence-oriented design—Silent exhaust sound
- Conventional exhaust sound can be largely reduced.
- New and innovative design structure that replaces conventional ejectors with loud exhaust noise.

2 Energy saving specification
- 20% reduction of air consumption by new design construction
- Decrease in flow rate reduction of peripheral pneumatic device.

3 Lineup of low pressure specification
- Low-pressure specification of generating vacuum of -88 kPa [-26.0 in.Hg] under supply pressure of 0.36 MPa [52 psi.] is added.
- Responds to low pressure line for energy saving and pressure drop in line ends.

4 Lifting force with higher margin
- The maximum vacuum level is increased from -85 kPa [-25.1 in.Hg] to -90 kPa [-26.6 in.Hg]
  In the case of the same pad diameter as ever, lifting force is increased.
A new silent ejector inspiring the forest silence is born. Exhaust sound that has so far been regarded as noise is largely reduced!

**Silence of industry-leading level**
(When silent-type muffler is used)

20% reduction in air consumption

Energy-saving-based ejector is born.

### Indication of noise level range

<table>
<thead>
<tr>
<th>Noise severity</th>
<th>Noise level</th>
<th>Example of noise severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is impossible to have a conversation.</td>
<td>120 dB</td>
<td>Near the engine of aircraft Subway station under severe noisy environment</td>
</tr>
<tr>
<td>Difficult to have a conversation</td>
<td>80 dB</td>
<td>Street crossing, along a national road, pachinko parlor, etc.</td>
</tr>
<tr>
<td>Need to speak in a louder voice in conversation</td>
<td>70 dB</td>
<td>Theater, bank lobby, noisy office, swiftly flowing mountain stream, etc.</td>
</tr>
<tr>
<td>It is possible to have a conversation easily.</td>
<td>60 dB</td>
<td>Restaurant, hotel lobby, within an office, etc.</td>
</tr>
<tr>
<td>It is possible to have a conversation even in a small voice.</td>
<td>50 dB</td>
<td>Singing of birds and insects, rustle of the trees, buzz of audience in movie theater, etc.</td>
</tr>
<tr>
<td>Silent environment</td>
<td>40 dB or less</td>
<td>Midnight in residential areas in the heart of a city, drizzling rain, etc.</td>
</tr>
</tbody>
</table>

### Wide variation

Selection from five types according to your individual needs possible.

- **Stand-alone**
  - Non-plug-in type (without DIN rail)
  - Plug-in type (with DIN rail)
  - Serial transmission compatible (with DIN rail)

- **Option**
  - **Muffler**
    - Standard (in blank)
    - Silent type (-SH)
    - Fitting exhaust (-UR)

  - **Electronic vacuum switch**
    - Vacuum switch with digital display (One switch output variable hysteresis + analog output)
    - Vacuum switch with digital display (Compound pressure: Two switch outputs of variable hysteresis type)

- **In addition to manifold type, plug-in type and serial transmission compatible type are prepared.**

- **Separate-type multi-channel pressure sensor controller**
  - PSU vacuum sensor head
  - PSU compound pressure sensor head

Separate-type multi-channel pressure sensor controller PSU sensor head, most suitable for a very small workpiece adsorption detection, is also optionally selectable. The separate-type multi-channel pressure sensor controller PSU should be separately prepared. For details about the separate-type multi-channel pressure sensor controller, refer to the document contained in the CD-ROM or visit KOGANEI website.
Safety Precautions (Micro Ejector FME series)

Always read these precautions carefully before use.

Before selecting and using the products, please read all the Safety Precautions carefully to ensure proper product use. The Safety Precautions described below are to help you use the product safely and correctly, and to prevent injury or damage to you, other people, and assets.

Be sure to observe these safety precautions together with the following safety regulations of ISO4414 (General rules and safety requirements for systems and their components) and JIS B 8370 (General rules relating to systems).

The directions are ranked according to degree of potential danger or damage: "DANGER", "WARNING", "CAUTION", and "ATTENTION".

| **DANGER** | Indicates situations that can be clearly predicted as dangerous. Death or serious injury may result if the situation is not avoided. It could also result in damage or destruction of assets. |
| **WARNING** | Indicates situations that, while not immediately dangerous, could become dangerous. Death or serious injury may result if the situation is not avoided. It could also result in damage or destruction of assets. |
| **CAUTION** | Indicates situations that, while not immediately dangerous, could become dangerous. Failure to avoid the situation creates the risk of minor 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 for use in general industrial machinery.

Before selecting and using the relevant product, be sure to read "Safety Precautions", "Catalog", and "Instruction Manual".

After reading the instruction manual, catalog, and other documentation, always store them in a location that allows easy availability for reference to users of this product.

Whenever transferring or lending the product to another person, always attach the catalog, instruction manual, and other information to the product where they are easily visible in order to ensure that the new user can use the product safely and properly.

**DANGER**

- Do not use the product for the purposes listed below:
  1. Medical equipment related to maintenance or management of human lives or bodies.
  2. Machines 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 high levels of safety. Using the product in any of the ways described above creates the risk of loss of human life.
- Do not use the product in locations with or near dangerous substances such as flammable or ignitable substances. This product is not explosion-proof. Doing so creates the risk of ignition and fire.
- When mounting the product and workpiece, always make sure they are firmly supported and secured in place. Falling, dropping, or abnormal operation of the product creates the risk of personal injury.
- Persons using a pacemaker or other similar medical devices should maintain a distance of at least 1 meter [3.28 ft] away from the product. Getting too close to the product creates the risk of malfunction of a pacemaker due to the strong magnet built into the product.
- Never attempt to modify the product in any way. Doing so creates the risk of injury, etc due to abnormal operations.
- Never attempt inappropriate disassembly or assembly of the product relating to basic construction, or its performance or functions. Doing so creates the risk of injury, electric shock, fire, etc.
- Do not allow water to splash on the product. Water spraying on the product, washing the product, or using the product under water creates the risk of malfunction. Failure to avoid the situation creates the risk of loss of human life.
- While the product is in operation, avoid touching it with your hands or otherwise approaching too close. Also, do not attempt to make any adjustments to internal or attached mechanism, or to perform any type of adjustment (manual override, attachment/removal of wiring connectors, adjustment of pressure switch, disconnection pipes, or seal plugs, etc.) while the product is in operation.
- Product dropping, or abnormal operation of the product may create the risk of personal injury.

**WARNING**

- Because KOGANEI products are designed for use under a wide variety of conditions, decisions concerning conformance with a particular system should be made upon the careful evaluation of person in charge of system design. Assurances concerning expected system performance and safety are the responsibility of the designer who decides system conformity. Be sure to use the latest catalogs and technical materials to study and evaluate specification details, to consider the possibility of machine breakdown, and to configure a system that ensures fail-safe safety and reliability.
- Do not use the product in excess of its specification ranges. Doing so creates the risk of product breakdown, loss of function, or damage. It could also drastically reduce the product's operating life.
- Before supplying air or electricity to the device and before starting operation, always conduct a safety check of the area where the machine is operating.
- Unintentional supply of air or electricity creates the risk of electric shock or injury due to contact with moving parts.
- Do not touch terminals or switches while power is turned on.
- Doing so creates the risk of electric shock and abnormal operation.
- Do not allow the product to be thrown into fire. Doing so creates the risk of explosion, resulting in the release of toxic gasses.
- Do not sit on the product, place your foot on it, or place other objects on it. Doing so creates the risk of injury due to tripping or the product tipping over or dropping, results in product damage and abnormal, erratic or runaway operation.
- Before conducting maintenance, inspection, repair, attachment/removal or replacement of piping, or any other similar procedure, always completely cut off all air supply and confirm that residual pressure inside the product or in piping connected to the product becomes 0. In particular, be aware that residual air will still be in the compressor or storage tank. The actuator may move abruptly if residual air pressure remains inside the piping, causing injury.
- Lock-type manual override should be locked off before starting the normal operation. Failure to do so cause the machine to malfunction.
- Before performing any kind of wiring work, be sure to turn off power.
- Failure to do so creates the risk of electric shock.
- The solenoid must be properly applied the specified voltage. Application of incorrect voltage may prevent the functions from working properly and cause the product to be damaged or burned out.
- Do not allow lead wires and other cords to become damaged. Allowing a cord to become damaged, bent excessively, pulled, rolled up, or squeezed between two objects creates the risk of current leaks or defective continuity that can lead to fire, electric shock, or abnormal operation.
- Never insert or pull out the connectors while power is supplied. And, never apply unnecessary force to the connectors. Doing so creates the risk of personal injury, device damage, and electric shock due to abnormal machine operation.
- Always check the catalog and other reference materials for correct product wiring and piping. Improper wiring and piping creates the risk of damage to and abnormal operation of the product, etc.
- Use safety circuits or design a system that prevents damage to machinery and personal injury when the machine is shut down due to an emergency stop or electrical power failure.
- Be sure to perform heat radiation countermeasure so that ambient temperature of a solenoid valve (or temperature within the control box if it is used) is always within the specified temperature range.
- If the product has not been used for over 30 days, it is possible that the contacting parts may have stuck, leading to delay or sudden movement of
Safety Precautions

the machine operation, thereby causing injury. Be sure to perform trial operation once every 30 days in minimum to check whether the machine works properly.

Do not use the solenoid valves and the wiring for controlling them in a location near power lines with high current flowing and in a location where high magnetic field and surges are generating. This may cause unintentional operation of the machine.

Never use the product in direct sunshine-suffered location like beach, near mercury lamp, and near a product likely to produce ozone. Deterioration of rubber parts caused by ozone may reduce the performance and function or stop the function.

Do not use any type of medium that is not specifically stipulated in the specifications. Using a non-specified medium could lead to loss of function in a short period of time, sudden degradation of performance, and a reduced operating life.

When the machine has been idle for over 48 hours or is in first operation after storage, it is possible that the contacting parts may have become stuck, leading to operation delays or sudden movements. In initial operation, be sure to perform trial operation to check whether the machine works properly.

After completing wiring work, check to make sure that all connections are correct before turning on power.

Do not use in locations that are subject to direct sunlight (ultraviolet rays); locations with high humidity and temperature, dust, salt, or iron particles; or in locations with fluids and/or ambient atmosphere that include organic solvents, phosphate ester type hydraulic oil, sulfur dioxide, chlorine gas, acids, etc. It could lead to early shutdown of some functions, a sudden degradation of performance, and a reduced operating life. For details on part materials, refer to the materials in major parts.

If you perform continuous energizing for long time, consult us.

Never configure the control that may cause a work to drop when in power outage. Be sure to configure the work-drop prevention control for the case of power outage or emergency stop of the machine.

When handling the product, wear protective gloves, safety glasses, safety shoes, etc., as required.

When the product can no longer be used or is no longer necessary, dispose of it appropriately as industrial waste.

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.

For inquiries about the product, consult your nearest KOGANEI sales office or KOGANEI overseas department. The addresses and telephone numbers are shown on the back cover of this catalog.

Always observe the following items.

KOGANEI shall not be held responsible for any problems that occur as a result of these items not being properly observed.

1. When using this product in a pneumatic system, always use genuine KOGANEI parts or compatible products (recommended products).

When conducting maintenance and repairs, always use genuine KOGANEI parts or compatible products (recommended products). Such working should be performed by technicians who have a knowledge of pneumatic system.

Always observe the prescribed methods and procedures.

2. Never attempt inappropriate disassembly or assembly of the product relating to basic construction, or its performance or functions.

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ATTENTION

Whenever considering use of this product in situations or environments not specifically noted in the catalog or instruction manual, or in applications where safety is an important requirement such as in aircraft facilities, combustion equipment, leisure equipment, safety equipment, and other places where human life or assets may be greatly affected, take adequate safety precautions such as allowing plenty of margin for ratings and performance, or fail-safe measures.

Be sure to contact KOGANEI before use in such applications.

Always check the catalog and other reference materials for product wiring and piping.

Moving parts of machine and devices should be isolated with protection covers so as not to be directly contacted by human body.

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Handling Instructions and Precautions

General precautions

Installation

1. Any posture is available in installation, but be careful so that strong impact or vibration may not be directly applied to the machine.
2. Avoid using the product under the following locations and environment which may cause the failure in the valve. If you are compelled to use it, be sure to take a sufficient protection countermeasure using such as a cover.
   - Location where water drop and oil drop may directly fall on the valve
   - Environment which may cause dew to be formed in the valve
   - Location where machining chips and dust may directly fall on the valve
   - Location which contains salt content, corrosive gas, or conductive powder
3. Before piping into a micro ejector, be sure to fully perform flushing within the piping (blowing of compressed air). Entering of machining chips, seal tape, or rust produced during piping work may cause air leak in the valve or deteriorate the performance of a micro ejector.
4. For air used in the micro ejector, be sure to use clean air which does not contain degraded compressor oil. Install an air filter (nominal filtration rating is 40μm or less) near the micro ejector and remove sedimentation and dust. If the compressed air is especially oily, be sure to use a mist filter. And, perform draining the filter periodically.
5. The air supplied to the micro ejector should be pressure-adjusted by a regulator. If the piping to the micro ejector is long, be sure to set the pressure at higher level. When using an air supply valve, be sure to use a valve whose effective area is three or more times larger the nozzle area of micro ejector.
6. A single vacuum pad should be used for each micro ejector. Using two or more vacuum pads may cause lifting error and also cause the time to reach the set vacuum level to be prolonged.
7. Periodically replace a filter (order code: FME-F) included in the micro ejector unit as standard.
8. For pressure medium, do not use medium containing corrosive gasses and liquids.
9. Do not apply pressure exceeding the proof pressure to the vacuum switch and pressure sensor.
10. Do not pull or bend the lead wires excessively. And, when handling the product, be sure to hold the body and be careful not to apply excessive force to the power cord etc.
11. For installing a single micro ejector, an optional mounting bracket (PSU-BR) is available (tightening torque: 32 N·cm [2.83 in·lbf]).
   For installing the main unit directly, use M4 screws (tightening torque: 50 to 60 N·cm [4.43 to 5.31 in·lbf]).
12. The area surrounding the exhaust port should be kept enough space. Failure to do so, it may cause resonance in exhaust air, thereby increasing the noise or deteriorating the performance of micro ejector.
13. When increasing or decreasing the manifold or replacing parts for maintenance, be sure to perform the tightening with a specified tightening torque.

Wiring

After completing the wiring, be sure to check whether the wire is correctly connected.

Solenoid

Internal circuit

1. Do not perform a megger test between pins.
2. Leakage current in the circuit may cause a malfunction such as a failure to return the solenoid valve. Be sure to use the products within the allowable circuit leakage current described in the electric specifications on page 5. If leakage current exceeds the allowance due to circuit conditions or other reasons, consult your nearest KOGANEI sales office.
3. In the case of a double solenoid type, avoid simultaneous energizing to both solenoids.
4. The valve model FME-F-TA has one solenoid.

Wire connection method

1. Attachment/removal of plug connector

When attaching a connector, insert the connector onto the pin while pinching it with fingers and push it until the lever's claw catches. Remove the connector by pulling it. When removing the connector, pull it out after checking that the lever's claw is surely disengaged from the protruded section of the housing.

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2. Attachment/removal of plug connector and contacts

- **When attaching**
  When inserting the contact-attached lead wire into the hole of the plug connector, the contact's hook latches on the plug connector and is secured. At that time, be sure to check that the lead wire is not removed when pulling the wire lightly (see the figure below).

- **When removing**
  To remove the lead wire, insert a pointed tool (like a small screwdriver) into the rectangular hole on the side surface of the plug connector to push the hook, and then pull the lead wire. When re-using the contact, restore the hook back so that they spread outward.

3. Common terminal and short bar

A short bar is attached to the plug connector so that the wire connection of solenoid A (SA) and B (SB) are positive common. Do not remove the short bar.

### Manual override

**Manual override (used for both Lock and Non-lock)**

Use a small screwdriver to push lightly against the manual override button, and then turn it by 90 degrees in the clockwise direction to lock. When turning the manual override from the locked state by 90 degrees in counterclockwise direction, the manual override returns to original position by spring and the lock is released.

If the manual override is not turned, it is possible to perform the same operation as non-lock type.

1. The manual override should be locked off before starting the normal operation.
2. The manual override should not be operated with an extremely pointed tool like a needle. It may damage the override.
3. Turning the manual override too much may damage the override, so be careful in such operation.
4. When operating the manual override for solenoid valve in the maintenance etc., be sure to check that the manual override for solenoid valve is in original position and the main valve is in required switching position before restarting the operation.

### Adjustment of vacuum breaking flow rate

Turning the vacuum breaking flow rate adjusting needle (TA type only) in clockwise direction will reduce the breaking flow rate, and turning the needle in counterclockwise direction will increase the breaking flow rate.

### Piping

1. Connect air supply line to the compressed air supply port, and a vacuum pad, etc. to the vacuum generation port.
2. Use fittings and tubes that do not reduce inner diameter. A small inner diameter can result in degradation of performance, including flow rate and pressure shortages, insufficient vacuum, or longer periods of time before the vacuum level is reached.

   In the case of collective exhaust, increased exhaust resistance may cause insufficient performance due to vacuum performance degradation and exhaust air flowing into other stations. Refer to the following countermeasures.
   - Avoid a location that affects exhaust, such as a wall.
   - Enlarge the fitting size and the pipe diameter and shorten the length of the piping as possible.
   - If the above measures do not improve the performance, consult your nearest KOGANEI sales office.

3. Avoid use of coil tubing and other spiral tubing. Also, avoid use of elbow fittings, etc. between the micro ejector and vacuum pad, and use piping that is as straight as possible.

4. In manifolds with many stations, where a large number of micro ejectors are operating simultaneously, or where the operation frequency is very high, use the station with a supply port of quick fitting for \( \Phi 8 \) or \( \Phi 1 \) in. tube (AJ, 1AJ, AJ1/4, 1AJ1/4) and supply air using P ports.

### Tube

#### 1. Attaching and detaching tubes

When installing a tube, insert an applicable-sized tube all the way up to the tube stopper and check the installation by gently pulling the tube. When removing the tube, push the tube up to the tube stopper first, and then pull out the tube, pushing the release ring evenly at the same time.

#### 2. Both nylon tube and urethane tube are supported.

Tube outside diameter precision should be within \( \pm 0.1 \) mm \( [0.004 \text{ in.}] \) (nominal) for nylon tube and within \( \pm 0.15 \) mm \( [0.006 \text{ in.}] \) (nominal) for urethane tube. Use tube with ovality (difference between major axis and minor axis) within \( 0.2 \) mm \( [0.008 \text{ in.}] \). (KOGANEI tube is recommended.)

Use of tubing that is not a KOGANEI genuine product or a compatible product (recommended product) may result in tube disconnection, air leakage, or other problems. Be sure to check on tubing before building a pneumatic system.

1. Do not use extremely soft tubing, which causes a severe drop in pull-out strength.
2. Be sure to use tubing whose exterior is undamaged. If tubing becomes damaged after repeated use, cut off the damaged portion.
3. Do not allow tubing to become severely bent or twisted in the vicinity of fittings.

    Such a condition creates the risk of air leakage. The table below shows minimum bending radius guidelines for nylon tube and urethane tube.

#### Tube size

<table>
<thead>
<tr>
<th>Tube size</th>
<th>Minimum bending radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nylon tube</td>
<td>Urethane tube</td>
</tr>
<tr>
<td>( \Phi 4 ) ( [0.157] )</td>
<td>20 ( [0.8] )</td>
</tr>
<tr>
<td>( \Phi 6 ) ( [0.236] )</td>
<td>30 ( [1.2] )</td>
</tr>
<tr>
<td>( \Phi 8 ) ( [0.315] )</td>
<td>50 ( [2.0] )</td>
</tr>
</tbody>
</table>

When attaching or detaching tubing, be sure to stop the air supply. Also, make sure that air in the manifold has been completely exhausted before attaching or detaching tubing.
### Device configuration

**Micro ejector**

**Manifold assembly**

Screw the two connecting rods all the way into end block B, and then assemble the ejector bodies into the connecting rods in any order. Finally, place in end block A, and tighten hexagon socket screws to secure it in place. Be sure to place both end blocks on a flat surface not to twist the whole manifold when tightening rods and screws. (Tightening torque 100 N·cm [8.85 in·lbf])

**Maintenance parts**

If vacuum level decreases or air leakage from the valve happens, replacement of maintenance parts is recommended. For more information on maintenance, refer to the instruction manual.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Tightening torque</th>
<th>Order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Pilot solenoid valve</td>
<td>17.6 N·cm [1.558 in·lbf]</td>
<td>FME-F, FME-T0 : F10T0-A1-PN DC12 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.6 N·cm [1.558 in·lbf]</td>
<td>F10LT0-A1-PN DC24 V</td>
</tr>
<tr>
<td>(2)</td>
<td>Filter</td>
<td>17.6 N·cm [1.558 in·lbf]</td>
<td>FME-F, FME-TA : F10TA-A1-PN DC12 V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17.6 N·cm [1.558 in·lbf]</td>
<td>F10LTA-A1-PN DC24 V</td>
</tr>
<tr>
<td>(3)</td>
<td>Diffuser assembly</td>
<td>—</td>
<td>FME-F (5 pcs. per bag)</td>
</tr>
</tbody>
</table>
Additional stacking method (FMEC)

Loosen two hexagon socket screws, and remove end block A. Screw the two supplied stacking rods into the connecting rods. At this time, check to see whether the connecting rods attached to end block B are secured. Place the O-ring as shown above to install the ejector bodies and the end blocks. (Tightening torque 100 N·cm [8.85 in·lbf])

For adding units, assemble the additional stacking unit (FMEC) according to the illustration above. Note that the number of combined units cannot be reduced. Consult your nearest KOGANEI sales office when requiring unit reduction. (A special connecting rod is required.)
Specifications

- **Media:** Air
- **Operating pressure range:** MPa (psi.) 0.2 to 0.6 [29 to 87]
- **Proof pressure:** MPa (psi.) 0.9 [131]
- **Operating temperature range (ambient and media):** °C (°F) 5 to 50 [41 to 122]
- **Nozzle diameter:** mm (in.) 0.5 [0.020] 0.5 [0.020] 0.7 [0.028] 0.7 [0.028] 1.0 [0.039] 1.0 [0.039]
- **Vacuum flow rate:** l/min [ft³./min] (ANR) 5.5 [0.19] 5 [0.18] 10 [0.35] 8 [0.28] 19 [0.67] 17 [0.60]
- **Compressed air consumption:** l/min [ft³./min] (ANR) 10 [0.35] 14 [0.49] 18 [0.64] 19 [0.67] 38 [1.34] 36 [1.27]
- **Lubrication:** Prohibited
- **Filtration:** µm 30
- **Piping size:** Vacuum generation port Quick fitting for Φ 4, Φ 6, 1/8 in., 1/4 in. tube
  Compressed air supply port Quick fitting for Φ 8 or 1/4 in. tube
- **Mounting direction:** Any
- **Main valve specifications:**
  - **Response time:** A/B ms
    - 15/15
  - **Operation method:** Internal pilot type
  - **Valve function:** Normally closed (NC standard)
- **Shock resistance:** m/s² [G] 294.2 [3]

1. Assumes use of pure air from which oil mist and dust, etc. have been removed.
2. Take heat radiation measures to ensure that the ambient temperature (or when used in a control box, the inside temperature of the box) always remains within the specified temperature range.
3. Moreover, for long-term continuous energizing, consult us.
4. As for the standard products, the nominal value is when air pressure is 0.5 MPa [73 psi.]. As for L type (low pressure type), the nominal value is when air pressure is 0.36 MPa [52 psi.].
5. The value from when a solenoid valve for controlling air is energized until generation of negative pressure is A, while the period from when a solenoid valve for controlling vacuum breaking air is energized until a generation of vacuum breaking is B.
6. The value is shock resistance values in the valve stem axis direction. The shock resistance values are the values where breaking of vacuum occurs.

### Electric Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Mounted solenoid valve model</th>
<th>F10T0</th>
<th>F10LT0 (Low current type)</th>
<th>F10TA</th>
<th>F10LTA (Low current type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>12VDC</td>
<td>24VDC</td>
<td>12VDC</td>
<td>24VDC</td>
<td></td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>V</td>
<td>10.8–13.2 (12±10%)</td>
<td>21.6–26.4 (24±10%)</td>
<td>10.8–13.2 (12±10%)</td>
<td>21.6–26.4 (24±10%)</td>
</tr>
<tr>
<td>Current value (when rated voltage applied)</td>
<td>mA (r·m·s)</td>
<td>33</td>
<td>17/4.2 (on starting/holding)</td>
<td>33</td>
<td>17/4.2 (on starting/holding)</td>
</tr>
<tr>
<td>Consumption wattage</td>
<td>W</td>
<td>0.4</td>
<td>0.4/0.1</td>
<td>0.4</td>
<td>0.4/0.1</td>
</tr>
<tr>
<td>Allowable circuit leakage current</td>
<td>mA</td>
<td>2.0</td>
<td>1.0</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Period of starting conditions</td>
<td>ms</td>
<td>—</td>
<td>70</td>
<td>—</td>
<td>70</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>MΩ</td>
<td>100 minimum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color of lead wire</td>
<td>Red (+), black (−)</td>
<td>Red (+), black (−), white (−)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color of LED indicator</td>
<td>Red</td>
<td>14(SA) red, 12 (SB) green</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge suppression (standard)</td>
<td>Surge absorption transistor</td>
<td>Flywheel diode</td>
<td>Surge absorption transistor</td>
<td>Flywheel diode</td>
<td></td>
</tr>
</tbody>
</table>

### Mounted solenoid valve

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Mounted solenoid valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>FME-05-T0</td>
<td>12VDC</td>
<td>F10T0-A1-PN DC12 V</td>
</tr>
<tr>
<td>FME-05L-T0</td>
<td>24VDC</td>
<td>F10LT0-A1-PN DC24 V</td>
</tr>
<tr>
<td>FME-07-TA</td>
<td>12VDC</td>
<td>F10TA-A1-PN DC12 V</td>
</tr>
<tr>
<td>FME-07L-TA</td>
<td>24VDC</td>
<td>F10LTA-A1-PN DC24 V</td>
</tr>
</tbody>
</table>
## Electronic Vacuum Switch Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>-DR</th>
<th>-DR3 (MV-DR)</th>
<th>-DA (MV-DA)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>Two switch outputs (variable hysteresis)</td>
<td>One switch output (variable hysteresis with analog output)</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure range</strong></td>
<td>300 to −100 kPa [44 psi. to −29.5 in.Hg]</td>
<td>0 to −100 kPa [0 to −29.5 in.Hg]</td>
<td></td>
</tr>
<tr>
<td><strong>Pressure resistance</strong></td>
<td>600 kPa [87 psi.]</td>
<td>200 kPa [29 psi.]</td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>−10 to 60°C [14 to 140°F]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating ambient humidity</strong></td>
<td>35 to 85% RH</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td>Air or non-corrosive gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>100 MΩ MIN. (at 500VDC megger)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cable</strong></td>
<td>1500 mm [59 in.] lead wire with connector</td>
<td>3000 mm [118 in.] lead wire with connector</td>
<td>Shielded 4 leads × 1500 mm [59 in.]</td>
</tr>
<tr>
<td><strong>Power supply voltage</strong></td>
<td>±12 to 24VDC ±10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Consumption current</strong></td>
<td>35 mA MAX. (at 24V when output is ON)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of outputs</strong></td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Output type</strong></td>
<td>NPN open collector</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pressure setting method</strong></td>
<td>Variable with use of a trimmer</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pressure setting range</strong></td>
<td>0 to 100% of rated pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Output display</strong></td>
<td>When ON, operation indicator (LED) lights up</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±3% F.S. MAX. (0 to 50°C [32 to 122 °F], reference point of 25°C [77 °F])</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hysteresis</strong></td>
<td>0 to 30 counts variable</td>
<td>Approximately 0 to 15% F.S. variable</td>
<td></td>
</tr>
<tr>
<td><strong>Switching capacity</strong></td>
<td>30VDC, 80 mA MAX.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Analog output

<table>
<thead>
<tr>
<th>Item</th>
<th>-EA</th>
<th>-ER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output voltage</strong></td>
<td>±1 to 5 V</td>
<td>±0.1V</td>
</tr>
<tr>
<td><strong>Zero-point voltage</strong></td>
<td>±0.05V</td>
<td>3.75±0.05V</td>
</tr>
<tr>
<td><strong>Span voltage</strong></td>
<td>±4±0.1V</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature characteristics</strong></td>
<td>±1% F.S./°C [±0.05% F.S./°F]</td>
<td>±15% F.S./°C [±0.05% F.S./°F]</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>1 mA MAX. (Load resistance 5 kΩ or more)</td>
<td>1 mA MAX. (Load resistance 5 kΩ or more)</td>
</tr>
<tr>
<td><strong>Linearity/Hysteresis</strong></td>
<td>±0.5% F.S. MAX.</td>
<td></td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>98.1 m/s² [10 G]</td>
<td></td>
</tr>
<tr>
<td><strong>Shock resistance</strong></td>
<td>196 m/s² [20 G]</td>
<td></td>
</tr>
</tbody>
</table>

---

### Pressure sensor

#### Sensor head/Compound pressure sensor head

<table>
<thead>
<tr>
<th>Item</th>
<th>-EA</th>
<th>-ER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pressure range</strong></td>
<td>0 to −101.3 kPa [0 to −29.92 in.Hg]</td>
<td>−100 to 220 kPa [−29.5 in.Hg to 32 psi]</td>
</tr>
<tr>
<td><strong>Proof pressure</strong></td>
<td>900 kPa [131 psi.]</td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>0 to 50°C [32 to 122 °F]. Storage temperature: −20 to 80°C [−4 to 176 °F]. (Storage humidity: 65% RH maximum, at atmospheric pressure)</td>
<td></td>
</tr>
<tr>
<td><strong>Operating ambient humidity</strong></td>
<td>35 to 85% RH</td>
<td></td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td>Air or non-corrosive gas</td>
<td></td>
</tr>
<tr>
<td><strong>Insulation resistance</strong></td>
<td>100 MΩ MIN. (at 500VDC megger)</td>
<td></td>
</tr>
<tr>
<td><strong>Insulating dielectric strength</strong></td>
<td>500VAC for one minute</td>
<td></td>
</tr>
<tr>
<td><strong>Cable</strong></td>
<td>Oil and flex resistance PCCV 0.15 SQ×3-core 3000 mm [118 in.]</td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>24VDC ±10%</td>
<td></td>
</tr>
<tr>
<td><strong>Consumption current</strong></td>
<td>6 mA maximum</td>
<td></td>
</tr>
<tr>
<td><strong>Output voltage</strong></td>
<td>1 to 5V</td>
<td></td>
</tr>
<tr>
<td><strong>Zero-point voltage</strong></td>
<td>1±0.05V</td>
<td></td>
</tr>
<tr>
<td><strong>Span voltage</strong></td>
<td>4.00±0.07V (reference value)</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature characteristics</strong></td>
<td>Within ±30 mV (within 0 to 50°C [32 to 122 °F])</td>
<td>Within ±2% F.S. (within 0 to 50°C [32 to 122 °F])</td>
</tr>
<tr>
<td><strong>Output current</strong></td>
<td>1 mA MAX. (Load resistance 5 kΩ or more)</td>
<td>1 mA MAX. (Load resistance 5 kΩ or more)</td>
</tr>
</tbody>
</table>

*The pressure sensor is for analog output only. When switch output is necessary, a controller for the pressure sensor is required separately. Prepare our separate-type multi-channel pressure sensor controller (PSU-) separately.*
### Mass

#### Single unit

<table>
<thead>
<tr>
<th>Basic model</th>
<th>Body mass</th>
<th>Additional mass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-T0</td>
<td>-TA</td>
</tr>
<tr>
<td>FME</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FME1A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEA4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEC4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The valve connector is not included in the mass.
The lead wire of electronic pressure switch is included in the mass.

Calculation example
For FME05-TA-J4-SH-DA-PN DC24
130 + 6 + 55 = 191 g [6.74 oz.]

#### Manifold

<table>
<thead>
<tr>
<th>Basic model</th>
<th>End block mass</th>
<th>-DN</th>
<th>-F100N</th>
<th>-F101N</th>
<th>-F200N</th>
<th>-F201N</th>
<th>-F260N</th>
<th>-D250N</th>
<th>-D251N</th>
<th>Serial transmission</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMEM2A</td>
<td>78 [2.75]</td>
<td>85</td>
<td>164</td>
<td>166</td>
<td>170</td>
<td>138</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM3A</td>
<td>83 [2.93]</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM4A</td>
<td>88 [3.10]</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM5A</td>
<td>93 [3.28]</td>
<td>90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM6A</td>
<td>98 [3.46]</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM7A</td>
<td>103 [3.63]</td>
<td>95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FMEM8A</td>
<td>108 [3.81]</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Calculation example
FMEM4AN-DN stn.1 FME1A05-TA-J4-SH-DA-PN DC24
stn.2 - 4 For FMEA05-TA-J4-SH-DA-PN DC24
191 + (191 × 3) + 88 + 90 = 942 g [33.23 oz.]

### Symbol

#### FME-T0

![Symbol Diagram]

#### FME-TA

![Symbol Diagram]
### Single ejector order code

**FME**

<table>
<thead>
<tr>
<th>Exhaust method</th>
<th>Vacuum port fitting</th>
<th>Solenoid valve specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>J4</td>
<td>TA</td>
</tr>
<tr>
<td>Muffler exhaust</td>
<td>— With φ 4 quick fittings</td>
<td>— Supply air control valve (NC) &amp; vacuum breaking air control valve (NC)</td>
</tr>
<tr>
<td>SH</td>
<td>J1/8</td>
<td>05L</td>
</tr>
<tr>
<td>Silent type muffler exhaust</td>
<td>— With 1/8 in. quick fittings</td>
<td>— Low pressure type</td>
</tr>
<tr>
<td>UR</td>
<td>J1/4</td>
<td>07L</td>
</tr>
<tr>
<td>Port exhaust</td>
<td>— With 1/4 in. quick fittings</td>
<td>— Low pressure type</td>
</tr>
</tbody>
</table>

**Piping specifications**

- J1/4: Direct piping with a supply port 1/4 in. quick fitting for a single ejector use
- 8 quick fitting for a single ejector use

**Note:** 4 (Equivalent to 5/32 in.)

**Manifold order code**

**FMEM**

| A type manifold
| Number of units
| 2 — 2-station manifold
| 3 — 3-station manifold
| 8 — 8-station manifold

**Wiring specifications & Transmission block specifications**

- N: Non-plug-in type
- Plug-in type: P-F100N
- P-F101N
- P-F200N
- P-F201N
- P-F260N
- P-D250N
- P-D251N

**Serial transmission manifold**

- S-A1: OMRON Compo Bus/S (16 outputs) compatible
- S-B1: CC-Link (16 outputs) compatible
- S-B3: CC-Link (32 outputs) compatible
- S-D1: Device Net (16 outputs) compatible
- S-D3: Device Net (32 outputs) compatible
- S-H1: Compo Net (16 outputs) compatible

**Manifold modeling**

- Select **-N** when plug-in type or serial transmission manifold is selected for wiring specifications.

**Piping specifications**

- A: A type (for manifold piping, supply port plug)
- 1A: 1A type (for manifold piping, supply port plug, for str.n.1)
- AJ: AJ type (for manifold piping, supply port φ 8 quick fitting)

**Electronic vacuum switch**

- Blank: No vacuum switch
- DA: With digital display vacuum switch
- DR: With digital display vacuum switch, 1500 mm [59 in.] lead wire
- DR3: With digital display vacuum switch, 3000 mm [118 in.] lead wire
- EA: With sensor head for PSI
- ER: With sensor head for PSI

**Note:**

1. Be sure to select 1A, 1AJ or 1AJ1/4 for the station 1 (str.1).
2. Be sure to select one or more AJ, 1AJ or 1AJ1/4 with a supply port for a manifold. If not, air cannot be supplied to a manifold. Refer to "Manifold combination example" on the next page for your use.
3. The maximum number of manifold units is 8.
4. The maximum control numbers for P-F100N and P-F101N are 8. Select the manifold mounting type in combination of -T0 or -TA not to exceed the maximum control number.
Manifold order code

- Maximum number of valve units by wiring specifications (for plug-in type)

<table>
<thead>
<tr>
<th>Wiring specifications</th>
<th>Maximum number of units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Packed wiring</td>
</tr>
<tr>
<td>P-F100N Flat cable (10P)</td>
<td>8</td>
</tr>
<tr>
<td>P-F101N Flat cable (10P)</td>
<td>8</td>
</tr>
<tr>
<td>P-F200N Flat cable (20P)</td>
<td>16</td>
</tr>
<tr>
<td>P-F201N Flat cable (20P)</td>
<td>16</td>
</tr>
<tr>
<td>P-F260N Flat cable (26P)</td>
<td>20</td>
</tr>
<tr>
<td>P-D250N D-sub connector (25P)</td>
<td>16</td>
</tr>
<tr>
<td>P-D251N D-sub connector (25P)</td>
<td>20</td>
</tr>
</tbody>
</table>

The maximum number of units is 8. However, it varies according to the number of mounted single and double solenoids.

Specify the number of units so that the number of controlling solenoids is equal to the maximum control number or smaller.

Example of manifold combination

1. When the supply port is placed on Station 1 (Stn.1):

   FMEM4AN-DN
   stn.1  FME1AJ05-TA-J4-SH-DA-PS DC24
   stn.2 - 4  FMEA05-TA-J4-SH-DA-PS DC24

2. When different air pressure is supplied to each station (individual supply):

   FMEM4AN-DN
   stn.1 - 4  FME1AJ05-TA-J4-SH-DA-PS DC24

3. When supply ports are provided in 3 positions since vacuum is frequently generated simultaneously within the same manifold:

   In the case of the installation, provide air supply ports to the Stations 1, 3, and 5.

   FMEM5AN-DN
   stn.1  FME1AJ05-TA-J4-SH-DA-PS DC24
   stn.2  FMEA05-TA-J4-SH-DA-PS DC24
   stn.3  FMEA05-TA-J4-SH-DA-PS DC24
   stn.4  FMEA05-TA-J4-SH-DA-PS DC24
   stn.5  FMEA05-TA-J4-SH-DA-PS DC24

Manifold order code and detailed description of piping specification

<table>
<thead>
<tr>
<th>Piping specification</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Type A</td>
<td>Supply port plug attached (piping not allowed). For stn.2 to stn.8.</td>
</tr>
<tr>
<td>1A</td>
<td>Type 1A</td>
<td>Supply port plug attached (piping not allowed), one-side isolator on the left.</td>
</tr>
<tr>
<td>AJ</td>
<td>Type AJ</td>
<td>Φ 8 quick fitting attached on the supply port. For stn.2 to stn.8. One-side isolator on the left. For use with stn.1 and for individual supply.</td>
</tr>
<tr>
<td>1AJ</td>
<td>Type 1AJ</td>
<td>Φ 8 quick fitting attached on the supply port. Select 1AJ or 1AJ1/4 if supply port is required for stn.1. One-side isolator on the left. For use with stn.1 and for individual supply.</td>
</tr>
<tr>
<td>1AJ1/4</td>
<td>Type AJ</td>
<td>1/4 in. quick fitting attached on the supply port. For stn.2 to stn.8. For use to locate multiple supply ports on manifold to ensure flow rate. One-side isolator on the left. For use with stn.1 and for individual supply.</td>
</tr>
<tr>
<td>1AJ1/4</td>
<td>Type 1AJ</td>
<td>1/4 in. quick fitting attached on the supply port. One-side isolator on the left. For use with stn.1 and for individual supply.</td>
</tr>
</tbody>
</table>
Electronic vacuum switch order code mm [in.]

MV -

Switch specifications
DA : One output of variable hysteresis type (with analog output)
DR : Two output of variable hysteresis type

MV-DA

Switch output indicator 1 (Red LED)
Switch output indicator 2 (Green LED)
Pressure display
Display selector switch (ME/S1/S2)
Switch 2 setting trimmer
Switch 1 setting trimmer

MV-DR

Terminal No. 4 to 1

FME-F (5 pcs. per bag)

Mounting bracket order code (for single ejector)
PSU-BR

Replacement filter order code (element only)
FME

Additional stacking unit order code (for addition of 1 unit used with manifold)

Pressure introduction port M5

Note: The vacuum switch cannot be later installed to ejector body without vacuum switch.

Connector-related order code

JAZ -

Valve specifications
For TA CP : With connector and 300 mm [11.8 in.] lead wires (black, red and white, total 3 wires)
CP3 : With connector and 3000 mm [118 in.] lead wires (black, red and white, total 3 wires)
CPN : Connector without lead wire (1 short bar, 3 contacts included)

Valve specifications
For T0 CP : With connector and 300 mm [11.8 in.] lead wires (black and red, total 2 wires)
CP3 : With connector and 3000 mm [118 in.] lead wires (black and red, total 2 wires)
CPN : Connector without lead wire (1 short bar, 2 contacts included)

Valve specifications
For TA CC1.5 : Cabtyre cable length 1500 mm [59 in.]
CP3 : Cabtyre cable length 3000 mm [118 in.]

Cabtyre cable

Connector
When the solenoid valve (vacuum generation) 14 (SA) for controlling supply air is ON

When the solenoid valve 12 (SB) for controlling vacuum breaking air is ON

<table>
<thead>
<tr>
<th>Major Parts</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ejector body</td>
<td>Plastic</td>
</tr>
<tr>
<td>Filter</td>
<td>Plastic</td>
</tr>
<tr>
<td>Nozzle diffuser</td>
<td>Plastic</td>
</tr>
<tr>
<td>Muffler</td>
<td>Plastic</td>
</tr>
<tr>
<td>O-ring</td>
<td>Synthetic rubber</td>
</tr>
</tbody>
</table>
Plug-in Type: Pin (Terminal) Locations by Wiring Specifications (TOP VIEW)

Flat cable connector (10-pin)

- **P-F100N** (maximum number of control pins: 8)
  - 1 to 8: Control pins
  - 9 and 10: Common pins (short-circuited in the wiring block)

- **P-F101N** (maximum number of control pins: 8)
  - 1 to 8: Control pins
  - 9: NC (reserved pin)
  - 10: (+) pin

Flat cable connector (20-pin)

- **P-F200N** (maximum number of control pins: 16)
  - 1 to 16: Control pins
  - 17 and 18: NC (reserved pins)
  - 19 and 20: (+) pins (short-circuited in the wiring block)

- **P-F201N** (maximum number of control pins: 16)
  - 1 to 8: Control pins
  - 11 to 18: Control pins
  - 9 and 19: NC (reserved pins)
  - 10 and 20: (+) pins (short-circuited in the wiring block)

- **P-F260N** (maximum number of control pins: 20)
  - 1 to 20: Control pins
  - 23 and 24: NC (reserved pins)
  - 25 and 26: (+) pins (short-circuited in the wiring block)

- **P-D250N** (maximum number of control pins: 16)

- **P-D251N** JIS specification pin locations (maximum number of control pins: 20)

D-sub connector (25-pin)

- **P-D250N** (maximum number of control pins: 16)
  - 1 to 16: Control pins
  - 20, 21 and 22: NC (reserved pins)
  - 23, 24 and 25: (+) pins (short-circuited in the wiring block)

- **P-D251N** JIS specification pin locations (maximum number of control pins: 20)

Flat cable connector (26-pin)

- **P-F260N** (maximum number of control pins: 20)
  - 1 to 20: Control pins

Detailed wiring system diagram

Flat cable wiring and D-sub connector (12, 24 V DC)

- Positive common

Pin No.

- P-F100N: 9, 10
- P-F101N: 10
- P-F200N: 19, 20
- P-F201N: 10, 20
- P-F260N: 25, 26
- P-D250N: 23, 24, 25
- P-D251N: 24, 25

The above pin Nos. are assigned based on the order of connections to the solenoid valve for convenience. Be aware that they are different from locations and pin Nos. (engraved) specified in the data circuit-terminating equipment (DCE) (JIS-X5101).
Pin No. (terminal No.) and compatible solenoid (for plug-in type)

The example below shows the relationship between plug-in type manifold pin No. (terminal No.) and compatible solenoid.

**Flat cable connector (10-pin)**
- For wiring specifications P-F100N (maximum number of control pins: 8)

![Diagram of Flat cable connector (10-pin) P-F100N](image)

**Ex:**

<table>
<thead>
<tr>
<th>FMEM5AP-F100N</th>
<th>stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24</th>
<th>stn.2 FME05-T0-J4-SH-DA-PN DC24</th>
<th>stn.3 - 5 FME05-TA-J4-SH-DA-PN DC24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of units: 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring specifications: P-F100N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- For wiring specifications P-F101N (maximum number of control pins: 8)

**Ex:**

<table>
<thead>
<tr>
<th>FMEM5AP-F101N</th>
<th>stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24</th>
<th>stn.2 FME05-T0-J4-SH-DA-PN DC24</th>
<th>stn.3 - 5 FME05-TA-J4-SH-DA-PN DC24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of units: 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring specifications: P-F101N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- For wiring specifications P-F200N (maximum number of control pins: 16)

**Ex:**

<table>
<thead>
<tr>
<th>FMEM8AP-F200N</th>
<th>stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24</th>
<th>stn.2 FME05-T0-J4-SH-DA-PN DC24</th>
<th>stn.3 - 8 FME05-TA-J4-SH-DA-PN DC24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of units: 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring specifications: P-F200N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- For wiring specifications P-F201N (maximum number of control pins: 16)

**Ex:**

<table>
<thead>
<tr>
<th>FMEM8AP-F201N</th>
<th>stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24</th>
<th>stn.2 FME05-T0-J4-SH-DA-PN DC24</th>
<th>stn.3 - 8 FME05-TA-J4-SH-DA-PN DC24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of units: 8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiring specifications: P-F201N</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
1. The valve number in No.1A, 1B, 2A, and 2B, ... Arabic numerals represent the stn. numbers, and alphabets A and B represent the solenoid, A or B side.
2. Stn. No. is 1, 2... from the left as you see the valve in front and solenoid above.
3. The connector pin Nos. are assigned for convenience. Use the ▼ mark as a reference point.
Pin No. (terminal No.) and compatible solenoid (for plug-in type)

The example below shows the relationship between plug-in type manifold pin No. (terminal No.) and compatible solenoid.

Flat cable connector (26-pin)

For wiring specifications P-F260N (maximum number of control pins : 20)

Ex:  
FMEM8AP-F260N stn.1 FME1AJ05-TA-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

D-sub connector (25-pin)

For wiring specifications P-D250N (maximum number of control pins : 16)

Ex:  
FMEM8AP-D250N stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

D-sub connector (25-pin)

For wiring specifications P-D251N JIS specifications pin locations (maximum number of control pins : 20)

Ex:  
FMEM8AP-D251N stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

Note 1: The valve number in No.1A, 1B, 2A, and 2B... Arabic numerals represent the stn. numbers, and alphabets A and B represent the solenoid, A or B side.
2: Stn. No. is 1, 2... from the left as you see the valve in front and solenoid above.
3: The connector pin Nos. are assigned for convenience. Use the ◦ mark as a reference point.

For wiring specifications P-D250N

Ex:

FMEM8AP-D250N stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

Number of units: 8
Wiring specifications: P-D250N

(Wiring specifications:

P-D251N

Ex:

FMEM8AP-D251N stn.1 FME1AJ05-T0-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

Number of units: 8
Wiring specifications: P-D251N

(Wiring specifications:

P-F260N

Ex:

FMEM8AP-F260N stn.1 FME1AJ05-TA-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

Number of units: 8
Wiring specifications: P-F260N

For wiring specifications

P-F260N

Ex:

FMEM8AP-F260N stn.1 FME1AJ05-TA-J4-SH-DA-PN DC24
    stn.2 - 8 FMEA05-TA-J4-SH-DA-PN DC24

Number of units: 8
Wiring specifications: P-F260N
Serial Transmission Compatible Manifold Specifications

### General specifications

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>24VDC ±10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>5 to 50°C [41 to 122°F]</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>49.0 m/s² [5G]</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>98.1 m/s² [10G]</td>
</tr>
</tbody>
</table>

### Serial Transmission Block: Terminal Block Part Names (LED)

#### OMRON Corporation CompoBus/S compatible

Transmission block specifications: S-A1 (16 outputs)

Various setting dip switches

<table>
<thead>
<tr>
<th>LED Indicator</th>
<th>Status</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWR</td>
<td>Shut off</td>
<td>Green</td>
<td>Power supplied</td>
</tr>
<tr>
<td>COMM</td>
<td>Shut off</td>
<td>Yellow</td>
<td>Communication failure or warning</td>
</tr>
<tr>
<td>ERR</td>
<td>Shut off</td>
<td>Red</td>
<td>Communication failure or warning</td>
</tr>
</tbody>
</table>

Remarks
- For more information on CompoBus/S, refer to documents such as catalog and instruction manuals provided by OMRON Corporation.
- Number of outputs per block: 16 valve solenoids (transmission block specifications: S-A1)

#### CC-Link compatible

Transmission block specifications: S-B1 (16 outputs)

Various setting dip switches

Names of LEDs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW</td>
<td>Turned on by power ON</td>
</tr>
<tr>
<td>L RUN</td>
<td>Turned on by receiving normal data from master station</td>
</tr>
<tr>
<td>SD</td>
<td>Turned on by data transmission</td>
</tr>
<tr>
<td>RD</td>
<td>Turned on by receiving data</td>
</tr>
<tr>
<td>L ERR.</td>
<td>Turned on by transmission error and off by timeover</td>
</tr>
</tbody>
</table>

Remarks
- Compliant with CC-Link.
- Number of outputs per block: 16 valve solenoids (transmission block specifications: S-B1)
- As this block occupies 1 station, up to 64 units can be connected to 1 master station if remote I/O stations are configured all with this block.

#### CC-Link compatible

Transmission block specifications: S-B3 (32 outputs)

Various setting dip switches

Names of LEDs

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW</td>
<td>Turned on by power ON</td>
</tr>
<tr>
<td>L RUN</td>
<td>Turned on by receiving normal data from master station</td>
</tr>
<tr>
<td>SD</td>
<td>Turned on by data transmission</td>
</tr>
<tr>
<td>RD</td>
<td>Turned on by receiving data</td>
</tr>
<tr>
<td>L ERR.</td>
<td>Turned on by transmission error and off by timeover</td>
</tr>
</tbody>
</table>

Remarks
- Compliant with CC-Link.
- Number of outputs per block: 32 valve solenoids (transmission block specifications: S-B3)
- As this block occupies 1 station, up to 64 units can be connected to 1 master station if remote I/O stations are configured all with this block.

### Serial Transmission Block: Terminal Block Part Names (LED)

#### DeviceNet compatible

Transmission block specifications: S-D1 (16 outputs) S-D3 (32 outputs)

Various setting dip switches

<table>
<thead>
<tr>
<th>LED Indicator</th>
<th>Status</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>Shut off</td>
<td>Red</td>
<td>No power supply</td>
</tr>
<tr>
<td>Blink</td>
<td>Shut off</td>
<td>Red</td>
<td>No communication or communication failure</td>
</tr>
<tr>
<td>MS</td>
<td>Shut off</td>
<td>Red</td>
<td>No power supply</td>
</tr>
</tbody>
</table>

Remarks
- Compliant with DeviceNet.
- Number of outputs per block: 16 valve solenoids (transmission block specifications: S-D1 and up to 32 for S-D3)

#### CompoNet compatible

Transmission block specifications: S-H1 (16 outputs)

Node address setting switch (from left): X 10, X 1

<table>
<thead>
<tr>
<th>LED Indicator</th>
<th>Status</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MS</td>
<td>Shut off</td>
<td>Red</td>
<td>Power OFF/Preparing</td>
</tr>
<tr>
<td>Blink</td>
<td>Shut off</td>
<td>Red</td>
<td>Power OFF/Preparing</td>
</tr>
<tr>
<td>NS</td>
<td>Shut off</td>
<td>Red</td>
<td>Power OFF/Preparing</td>
</tr>
</tbody>
</table>

Remarks
- Compliant with CompoNet.
- Number of outputs per block: 16 valve solenoids (transmission block specifications: S-H1)
- Communication connectors are available from OMRON Corporation. For connectors, contact OMRON Corporation.
Dimensions for Stand-alone Unit mm [in.]

- **FME**-**T0-J**-**PN DC24
- **FMEJ1/4**-**T0-J**-**PN DC24

(Unit outer dimensions are the same for 05, 05L, 07, 07L, 10, and 10L)

- **FME**-**TA-J**-**PN DC24
- **FMEJ1/4**-**TA-J**-**PN DC24

(Unit outer dimensions are the same for 05, 05L, 07, 07L, 10, and 10L)

- **Option examples**

  - **FME**-**TA-J6-SH-PN DC24
  - **FME**-**TA-J4-UR-PN DC24
  - **FME**-**TA-J6-DR-PN DC24
Dimensions for Manifold mm [in.]

**FMEM4AN**

Configuration example
- FMEM4AN
- stn.1: FME1AJ -T0-J4 -PN DC24
- stn.2: FMEA -TA-J6 -SH-DR-PN DC24
- stn.3: FMEA -TA-J1/8-SH-DA-PN DC24
- stn.4: FMEA J1/4 -TA-J1/4-UR-EA-PN DC24

Electronic vacuum switch (-DR)
- 4-6 [0.197] thru hole
- φ 9 [0.354] counterbore depth 9 [0.354] (mounting hole)

Electronic vacuum switch (-DA)
- F10LT0-A1-PN
- F10LTA-A1-PN

Pressure sensor (-EA, -ER)
- View from A

Vacuum breaking flow control needle
- Vacuum breaking flow control needle
- Filter
- Plug
- Quick fitting for 1/4 in. tube (P: Positive pressure supply port)
- Quick fitting for 1/8 in. tube (V: Vacuum port)

**Dimensions by number of units**

<table>
<thead>
<tr>
<th>Number of units</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>58 [2.283]</td>
<td>74 [2.913]</td>
</tr>
<tr>
<td>3</td>
<td>79 [3.110]</td>
<td>95 [3.740]</td>
</tr>
<tr>
<td>5</td>
<td>121 [4.764]</td>
<td>137 [5.394]</td>
</tr>
<tr>
<td>8</td>
<td>184 [7.244]</td>
<td>200 [7.874]</td>
</tr>
</tbody>
</table>

**Dimensions for DIN rail**

<table>
<thead>
<tr>
<th>Manifold number of units</th>
<th>L dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>150 ± 2 [5.91 ± 0.08]</td>
</tr>
<tr>
<td>3</td>
<td>175 ± 2 [6.89 ± 0.08]</td>
</tr>
<tr>
<td>4</td>
<td>200 ± 2 [7.87 ± 0.08]</td>
</tr>
<tr>
<td>5</td>
<td>225 ± 2 [8.86 ± 0.08]</td>
</tr>
<tr>
<td>6</td>
<td>250 ± 2 [9.84 ± 0.08]</td>
</tr>
<tr>
<td>7, 8</td>
<td>275 ± 2 [10.83 ± 0.08]</td>
</tr>
</tbody>
</table>
**FMEM**AP-F200N-DN

(-F201N)

Configuration example

FMEMAP-F200N-DN

stn.1:FME1AJ -T0-J4 -PN DC24

stn.2:FMEA -TA-J6 -SH-DR-PN DC24

stn.3:FMEA -TA-J1/8-SH-DA-PN DC24

stn.4:FMEA1/A -TA-J1/4-UR-DA-PA-PN DC24

Dimensions for DIN rail

<table>
<thead>
<tr>
<th>Manifold number of units</th>
<th>L dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>150 ± 2 [5.91 ± 0.08]</td>
</tr>
<tr>
<td>3</td>
<td>175 ± 2 [6.89 ± 0.08]</td>
</tr>
<tr>
<td>4</td>
<td>200 ± 2 [7.87 ± 0.08]</td>
</tr>
<tr>
<td>5</td>
<td>225 ± 2 [8.84 ± 0.08]</td>
</tr>
<tr>
<td>6</td>
<td>250 ± 2 [9.84 ± 0.08]</td>
</tr>
<tr>
<td>7, 8</td>
<td>275 ± 2 [10.83 ± 0.08]</td>
</tr>
</tbody>
</table>

**FMEM**AS-B1-DN

(-A1, -B3, -D1, -D3, -H1)

Configuration example

FMEMAS-B1-DN

stn.1:FME1AJ -T0-J4 -PN DC24

stn.2:FMEA -TA-J6 -SH-DR-PN DC24

stn.3:FMEA -TA-J1/8-SH-DA-PN DC24

stn.4:FMEA1/A -TA-J1/4-UR-DA-PN DC24

Dimensions for DIN rail

<table>
<thead>
<tr>
<th>Manifold number of units</th>
<th>L dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>150 ± 2 [5.91 ± 0.08]</td>
</tr>
<tr>
<td>3</td>
<td>175 ± 2 [6.89 ± 0.08]</td>
</tr>
<tr>
<td>4</td>
<td>200 ± 2 [7.87 ± 0.08]</td>
</tr>
<tr>
<td>5</td>
<td>225 ± 2 [8.84 ± 0.08]</td>
</tr>
<tr>
<td>6</td>
<td>250 ± 2 [9.84 ± 0.08]</td>
</tr>
<tr>
<td>7, 8</td>
<td>275 ± 2 [10.83 ± 0.08]</td>
</tr>
</tbody>
</table>
Setting

Electronic vacuum switch

-DA (MV-DA)
  One switch output (variable hysteresis) + Analog output type

(1) Set the display selector switch (MODE) on "SW".
(2) Turn the pressure setting trimmer 1 (SET) to set switch operation pressure.
(3) Turn the hysteresis setting trimmer (HYS) to set hysteresis.
(4) Return the display selector switch (MODE) to "ME".

-DR, -DR3 (MV-DR)
  Two switch output (variable hysteresis) type

(1) Names of operation panel parts

(2) About error indication

  • Take the following actions in the event of any error.

<table>
<thead>
<tr>
<th>Error display</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 1</td>
<td>Overload current is flowing. (LED of overload-detected SW1 or SW2 is blinking.)</td>
<td>Turn off the power and check the load status.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error display</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 2</td>
<td>Pressure is applied when performing zero-point adjustment.</td>
<td>Press [UP] key to release from overload-detected condition, set the applied pressure to a pressure port to atmospheric pressure, and then perform zero-point adjustment again.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Error display</th>
<th>Description</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 3</td>
<td>The applied pressure exceeds the upper limit of the displayed pressure range.</td>
<td>Check the applied pressure.</td>
</tr>
</tbody>
</table>

(3) Functions

- Startup display check

  Turning on the power performs displaying of all indications once.

  Start the pressure detection processing in operation mode.

- Nondisplay mode (low heat generation)

  Non-display mode operation is expected to reduce the amount of heat generation.

  • Only when the 3-digit LED is set to hide in initial settings, it enters to the nondisplay mode and the 3-digit LED is turned off after about 10 seconds without key operations during operation.

  1. In the mode, the decimal point in the above figure blinks to show it is in operation.
  2. Even in the mode, SW output and SW output indicator operate normally.
  3. Even in the mode, SW overload is detected and an error is indicated.
  4. For setting of nondisplay mode, refer to the initial setting mode.

- Display range

  • Display range can be selected from the table below.

<table>
<thead>
<tr>
<th>Selected number</th>
<th>Pressure range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>−100~−300</td>
</tr>
<tr>
<td>2</td>
<td>−75~−225</td>
</tr>
<tr>
<td>3</td>
<td>−1.00~3.00</td>
</tr>
<tr>
<td>4</td>
<td>−14.5~43.5</td>
</tr>
<tr>
<td>5</td>
<td>29.5~0.0</td>
</tr>
</tbody>
</table>
Switch output

Switch output can be selected from the table below.

1. In the separate mode, Setting 1 and Setting 2 are correlated with SW1 and SW2, respectively.
2. In the wind comparator mode, the unit operates with the lower limit value (Setting 1) and upper limit value (Setting 2) those are common to SW1 and SW2.
3. For setting of switch output, refer to the initial setting mode.

Digital filter

2 types of digital filter (25 ms, 250 ms) can be selected. Use them when indication is illegible due to significant variation of pressure.

1. The selected digital filter is applied to the pressure display and switch output.
2. For setting of digital filter, refer to the pressure setting mode.

(4) Operation procedure

Press and at the same time
Press for over 1 second
Press and at the same time
Press for over 1 second
Press and at the same time
Press for over 1 second

(5) Initial setting mode

Set nondisplay mode, display range, and switch output.

Note: The selected digital filter is applied to the pressure display and switch output.

Note: For setting of digital filter, refer to the pressure setting mode.

Note: The selected digital filter is applied to the pressure display and switch output.

Note: For setting of digital filter, refer to the pressure setting mode.
(6) Pressure setting mode
• Set setting 1, setting 2, hysteresis, and digital filter.

Set the mode to pressure setting mode.

Press [ ] and [ ] keys at the same time for over 1 second in the operation mode. Once the operation enters the initial setting mode, P1 LED begins to blink and current setting is displayed in the LED display portion. Pressing [ ] key once (do not press the key for over 1 second) will move the setting to next item. However, if the key is pressed for over 1 second, the setting is fixed and the mode returns to the operation mode.

Set the pressure value.

Zero-point adjustment

The displayed pressure when opening the pressure port is adjusted to 0.

Zero reset

Press [ ] and [ ] keys at the same time in the operation mode. Once the operation enters the initial setting mode, the P1 LED begins to blink and current setting is displayed in the LED display portion. Pressing [ ] key once (do not press the key for over 1 second) will move the setting to next item. However, if the key is pressed for over 1 second, the setting is fixed and the mode returns to the operation mode.

Setting of digital filter

Setting of hysteresis

(7) Zero-point adjustment

Zero reset

The displayed pressure when opening the pressure port is adjusted to 0.

First, open the pressure port to atmosphere, and then set the applied pressure to 0. Press the [ ] and [ ] keys at the same time in the operation mode, and when [ ] begins to blink in the LED display portion, release the keys. This will detect the port pressure about 1 second later, and then perform zero-point adjustment.

When blinking of [ ] stops, the adjustment is completed.

The adjusted value remains valid until the next zero-point adjustment is performed.

(8) Setting protection

Panel lock

- Lock the key operation and protect the setting value. When continuing to press the [ ] key for over 3 seconds in the operation mode, [ ] begins to blink in the LED display portion and the operation gets in lock mode. Display in the lock mode and output operation correctly functions. When continuing to press the [ ] key for over 3 seconds in the operation mode, the [ ] begins to blink in the LED display portion and the lock mode is cleared.

As the panel lock status is stored, it remains valid even after restarting the operation.

Wire connection

Basic connection

- One switch output (variable hysteresis) + analog output type

- One switch output (variable hysteresis) + analog output type

Connection with programmable controller

- Two switch outputs (variable hysteresis) type

- Two switch outputs (variable hysteresis) type

- One switch output (variable hysteresis) + analog output type

1. Use stable DC power for power supply. When unit power supply such as switching power supply is used, ground the F.G. terminal.

2. Be aware with lead wire color for connection. Improper connection may lead to malfunction and damage.

3. Do not short circuit the switch output terminal with other terminals, or connect low resistance load (current over 80 mA). Failure to do so creates the internal circuit to be damaged.

4. For inductive load such as electromagnetic relay, etc., use protective diode for surge suppression.
Pressure sensor

- EA PSU vacuum sensor head
- ER PSU compound pressure sensor head

1. Pressure sensor circuit diagram

   ![Pressure sensor circuit diagram]

   - (Brown) + V
   - (Black) Analog voltage output
   - (Blue) 0 V
   - 24VDC±10%

2. Use the pressure sensor for equipment with input impedance over 10 kΩ.
3. Do not apply excessive pulling force etc. to the pressure sensor cable.
4. The pressure sensor is for analog output only. When switch output is necessary, a controller for the pressure sensor is required separately. Prepare our separate-type multi-channel pressure sensor controller (PSU-) separately.
Air consumption, vacuum, and vacuum flow rate

Flow rate characteristics

1 MPa = 145 psi. -100 kPa = -29.54 in.Hg 1 ℓ/min. = 0.0353 ft³/min.
Calculation method of micro ejector response time

Calculate the lifting time with the following equation and a constant shown in the table, and make selection allowing enough margin.

\[ T = \left( \frac{L}{C} \right)^a \]

L: Vacuum piping volume [ \( \ell \) ]
C: Constant made by vacuum
a: Index by nozzle diameter
T: Reach time [s]

<table>
<thead>
<tr>
<th>Basic model</th>
<th>C: Constant made by vacuum</th>
<th>a: Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-40 kPa [-11.82 in.Hg]</td>
<td></td>
</tr>
<tr>
<td>FME05 (L)</td>
<td>0.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-53.3 kPa [-15.74 in.Hg]</td>
<td></td>
</tr>
<tr>
<td>FME07 (L)</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-66.7 kPa [-19.70 in.Hg]</td>
<td></td>
</tr>
<tr>
<td>FME10 (L)</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-80 kPa [-23.63 in.Hg]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-85 kPa [-25.11 in.Hg]</td>
<td></td>
</tr>
</tbody>
</table>

Ex:

- Calculate the piping volume.
  - Calculate the piping volume from the vacuum generation port to the vacuum pad.

When the vacuum side piping is \( \phi \ 4 \ [0.157 \text{ in.}] \times \phi \ 2.5 \ [0.098 \text{ in.}] \) (outer diameter \( \times \) inner diameter), length of 50 cm [19.7 in.], and reached degree of vacuum \(-80 \text{ kPa} [-23.63 \text{ in.Hg}]\) for FME05

\[ L = 0.0025 \ [\ell] \left( \frac{\pi \times 0.25^2}{4} \right) \times 50 \div 1000 \ [0.15 \text{ in}^2] \]

C = 0.035

\[ a = 0.98 \]

\[ T = \left( \frac{0.0025}{0.035} \right)^{0.98} \]

T = 0.08 [s]
Limited Warranty

KOGEANEI 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, KOGEANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a 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.

KOGEANEI 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 KOGEANEI CORP., shall void this warranty.

This warranty covers only such items supplied by KOGEANEI 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.

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