Thank you for purchasing this Azbil Corporation product. This manual contains information for ensuring the safe and correct use of the product. Also, this manual provides necessary information for installation, maintenance, and troubleshooting. It should be read by those who design or maintain control panels or other equipment that uses this product. Be sure to keep this manual handy for ready reference.

Please read “Terms and Conditions” from the following URL before ordering and use.
http://www.azbil.com/products/factory/order.html

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This manual gives instructions for installation, wiring, settings, and operation. It also contains handling precautions and the main specifications of the product. For details on handling, settings, etc., refer to the following.


The following items should be included in your purchase.
- Manual for Communications, CP-SP-1154E
- Manual for Installation and configuration, CP-SP-1153E

The valve on this device cannot completely stop a flow. If complete shut-off is required, provide a separate shutoff valve. Also, if an external shutoff valve is closed, it is necessary also to close this device’s valve using either of the following methods:
- Set the flow rate to zero.
- Set the operation mode to fully closed.

If this valve remains in control mode when the external shutoff valve is closed (zero flow rate), there will be an excessively large momentary flow when the external shutoff valve is opened. Also, in control mode or with the valve forced fully open, if the external shutoff valve is closed continuously, the MPC’s over-heating prevention device (240°C) will be activated and the electrical current driving the valve will be forcibly limited.

If this device is mounted on a panel, make sure, while connecting the pipes and afterwards, that the controller case is not stressed. If metal pipes are directly connected to the pipe connection ports, this controller cannot be mounted on a panel. Doing so can deform and damage the case. There is no isolation between the power supply circuit of this device and the I/O circuit. Therefore, ensure that the power supply is isolated from the power supply of external devices. If this device and external devices share a common power supply, faulty operation or device failure might result.

For models with an analog I/O function, do not apply negative voltage or excessively large voltage (more than 5 V) to the analog setting input terminal. Doing so might cause malfunction or device failure.

If there is a risk of a power surge caused by lightning, use a built-in diode for coil surge absorption. Failure to do so might cause fire or device failure.

This device is a compact and lightweight mass flow controller for general industrial equipment. This panel-mount controller combines Azbil Corporation’s own ultra-high speed response pF (Micro Flow) flow sensor, an extremely compact proportional solenoid valve, an innovative flow path system, and advanced actuator control technology.

### Overview

#### Installation

### Installation location

Avoid installing the device where it will be subject to conditions such as the following:
- High or low temperature or high or low humidity
- Sudden changes in temperature and condensation
- Corrosive gas or flammable gas atmosphere
- Large amounts of dust, salt, iron powder or other conductive substances, water droplets, oil mist, or organic solvents
- Direct vibration or shock
- Direct sunlight, wind, or rain
- Splashing by fluids (e.g. oil, chemicals)
- Sources of electrical noise
- Strong magnetic or electrical fields

### Installation method

#### Installing the fittings

- When connecting a fittings, hold the MPC by putting a wrench on the hexagonal section of the pipe connection port.

#### Handling Precautions

- Do not hold the upper part of the flow controller when tightening the fitting. Doing so may cause deformation and damage.
- Tighten the fitting to the torque specified by the fitting manufacturer. Excessive torque can damage the connection port.
- Coat the pipe threads, except the one nearest the tip, with an appropriate amount of sealant. Remove dirt or foreign matters from the inside of the fitting.

### Handling Precautions

- Prevent foreign matter from entering the flow path of this device.
- If rust, water droplets, oil mist, or dust from the pipes enters the device, measurement or control error may occur, or the device may be damaged.
- If there is a possibility of foreign matter entering the device, install an upstream filter, strainer, or mist trap capable of eliminating foreign matter 0.1 μm or greater in diameter. Be sure to inspect and replace the filter at regular intervals.
- Do not allow wire clippings, metal shavings, water, etc. to enter the device’s case. Malfunction or device failure might result.

Use this device within the operating differential pressure range. Also, do not subject it to pressure beyond the rated pressure resistance range. Doing so might damage it.
**NAMES AND FUNCTIONS OF PARTS**

**Setting the Gas Type**

The flow controller is set at the factory for air/nitrogen use. If it is used for argon, carbon dioxide, or a mixture of these gases, change the gas type following the procedure below.

1. Power ON and the display will be illuminated.

2. Press and hold the [ENT] key for 3 seconds.

3. Function-C-2*8 will be shown on the upper display (this is function setup mode).

4. Press the [A] or [V] key to select the desired function code.

5. Set the desired gas type.

6. Press the [ENT] key to return to the main display.

**Note**

- *8: This display is shown only if multiple flow rate SPs (settings 1 to 3) are configured for air/nitrogen use. It can also be used for the gas type setting.

**Switching Displays**

- **Basic Operation**
  - Upper display: Shows the instantaneous flow rate (7-segment LED display). It also displays the totalized flow rate (last 4 digits), parameter current to the value, and parameter and function settings.
  - Lower display: Shows the preset flow rate (7-segment LED display). It also displays the operation modes, totalized flow rate (last 4 digits), parameter current to the value, and parameter and function settings.
- LED operation indicators:
  - L: Lit while the instant flow is indicated. Flashes when a totalized event occurs.
  - Th: Lit when the control flow rate is within the allowable range.
  - E: Flashed when the operating mode is “Value full open.”
  - EV1, EV2: Lit when the corresponding input is ON.
  - V1, V2: Lit when the preset flow rate is set.

- **Advanced Operation**
  - Upper display: Shows the instantaneous flow rate (7-segment LED display). It also displays the totalized flow rate (last 4 digits), parameter current to the value, and parameter and function settings.
  - Lower display: Shows the preset flow rate (7-segment LED display). It also displays the operation modes, totalized flow rate (last 4 digits), parameter current to the value, and parameter and function settings.
- LED operation indicators:
  - L: Lit while the instant flow is indicated. Flashes when a totalized event occurs.
  - Th: Lit when the control flow rate is within the allowable range.
  - E: Flashed when the operating mode is “Value full open.”
  - EV1, EV2: Lit when the corresponding input is ON.
  - V1, V2: Lit when the preset flow rate is set.

**BASIC OPERATION**

1. **Setting the Flow Rate**
   - Follow the procedure below to change the SP (preset flow rate).
   - Press the [DISP] key.
   - The [A] or [V] key will change the SP (preset flow rate) displayed (when the power is turned on).
   - Press the [A] or [V] key to change the SP.
   - When the desired value appears, press the [ENT] key. The SP value will be finalized and saved.

2. **Handling Precautions**
   - In step 3, if the [DISP] key is pressed before the [ENT] key is pressed, the newly entered SP will not be saved and the SP will revert to the previous value.

3. **Changing the Gas Type (fully-closed/control/openly-open)**
   - While the instantaneous flow rate is being displayed, the same display that is seen when the power is turned on, press the [DISP] key for less than 1 second.
   - The upper display will continue to show the instantaneous flow rate but the lower one will show the operation mode. In this state, the mode can be changed.
   - Follow the procedure below to change the operation mode.
   - Press the [DISP] key to display the operation mode.
   - Press the [A] or [V] key.
   - The display will change as shown below.

4. **Note**
   - In the case of a gas mixture, the combination factor (C. F.) must be set in parameter setup mode.

**Alarm Codes**

- **Alarm Code**
  - **Alarm Code**
  - **Alarm Code**
  - **Alarm Code**

**Troubleshooting**

- **Problem**
  - **Possible Causes**
  - **Countermeasures**

**Model Selection Table**

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  - **Model Selection Table**

**Notes**

- In the case of a gas mixture, the combination factor (C. F.) must be set in parameter setup mode.

**Chapter 5, "ADVANCED OPERATION" in CP-SP-1153E**

**Chapter 4-2, "Setting the flowrate" in CP-SP-1153E**

**Chapter 4-3, "Selecting the Operation Mode" in CP-SP-1153E**

**Chapter 5, "ADVANCED OPERATION" in CP-SP-1153E**

**Specifications**

- **Specifications**
  - **Specifications**
  - **Specifications**

**Notes**

- *1. Maximum negative differential pressure for obtaining full scale flow rate (flow rate minus 35 to 40 % of FS)....

- *2. Accurate measurement requires site-specific settings. However, the flow rate range varies depending on the gas type. See the table below.

**Reference**

- Azbil Corporation Advanced Automation Technology

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