



iB Series

iB-Flow

PAT. PEND.

Koganei presents a new actuator controller!

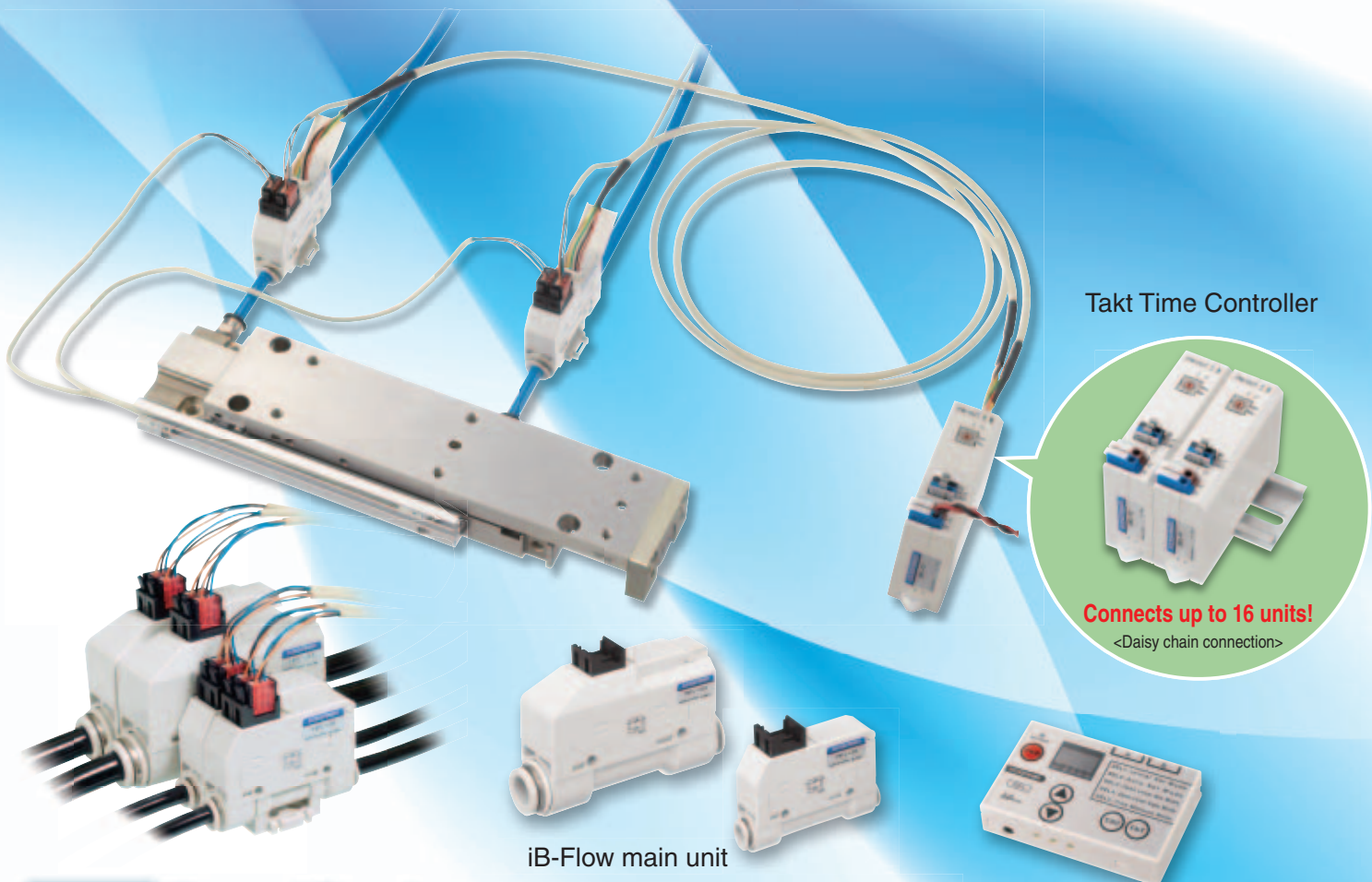
**First
in the
industry**

Takt Time Controller

Constantly monitors and corrects cylinder takt time automatically!

Takt Time Controller New release!

- Air cylinders can operate continuously at set takt time (operation time).
- Avoid equipment stoppage and eliminate adjustments due to variations in takt time.
- Monitoring errors helps predictive maintenance and quality stabilization.



Takt Time Controller

Connects up to 16 units!
<Daisy chain connection>

iB-Flow main unit

Setting device

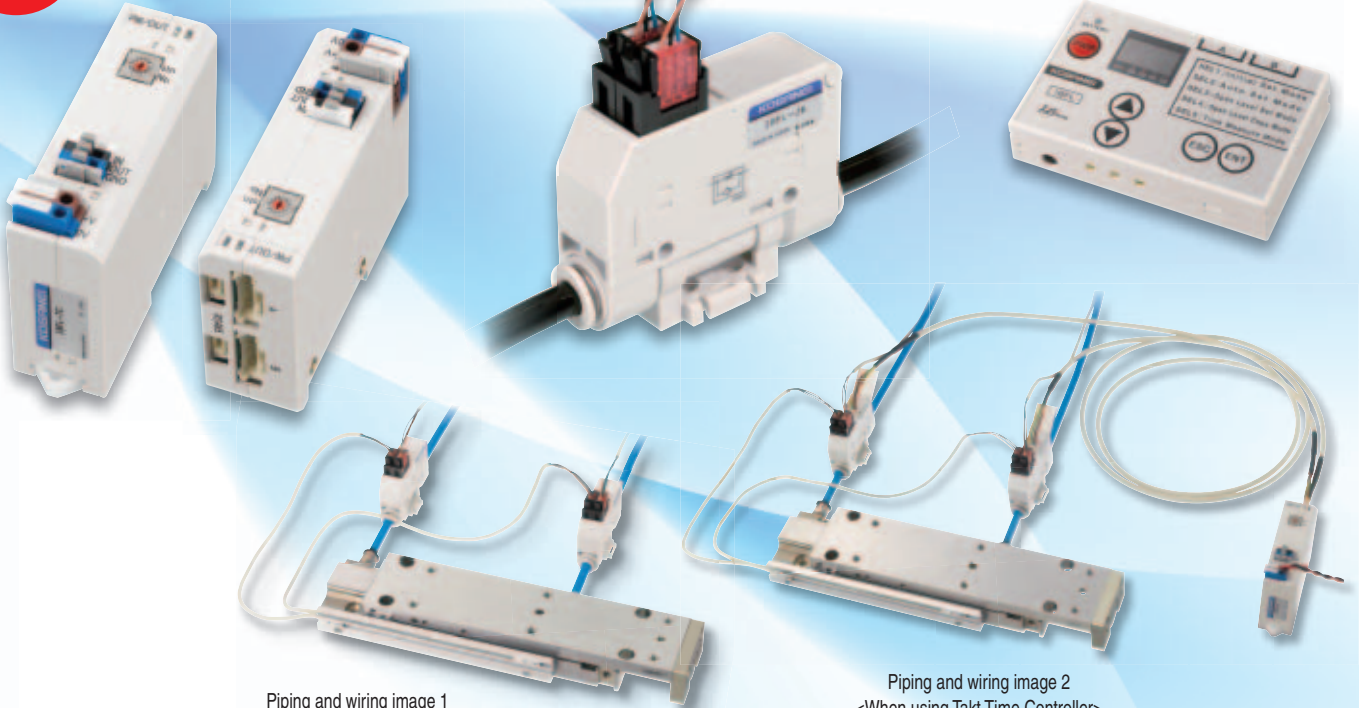


Koganei Brand

All products are **RoHS** compliant

First in the industry

Takt Time Controller



Piping and wiring image 1

Piping and wiring image 2
<When using Takt Time Controller>

Automatic takt time corrections

Takt Time Controller constantly monitors and makes corrections.
First step leading to full automation in production lines.

Operation time observable

Digital setting of cylinder takt time (operation time).
Troublesome cylinder operation time adjustment is done automatically.

Safe lock mechanism

Safety mechanism prevents needle from loosening.

Digital needle opening control

Numeric setting of needle opening (0 to 100%).
Change from analog to digital makes flow rate setting easier and accurate.

iB-Flow application example

- Stable and assured predictive maintenance of air cylinder takt time
- Monitor air cylinder operating conditions in real time
- Air cylinder takt time adjustment
- Synchronous operation of multiple cylinders
- Precision flow adjustment during vacuum breaking
- Precision flow adjustment of ionizer
- Precision flow adjustment during air blow
- Precision flow adjustment during pin hole inspection of PET bottles

iB-Flow main unit

Takt Time Controller

Setting device

Battery unit

IBFL-J4C, IBFL-J4 (φ 4 type)
IBFL-J6C, IBFL-J6 (φ 6 type)
IBFL-J8 (φ 8 type)

IBFL-J10 (φ 10 type)
IBFL-J12 (φ 12 type)



IBFL-TC



IBFL-S-□



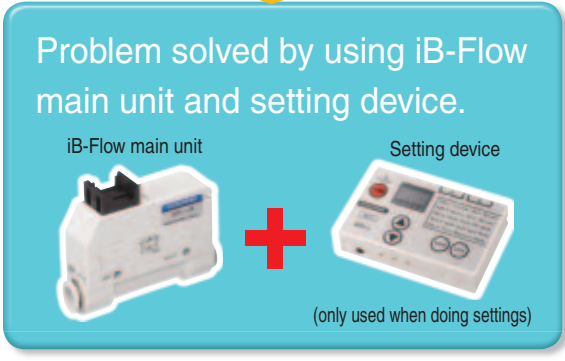
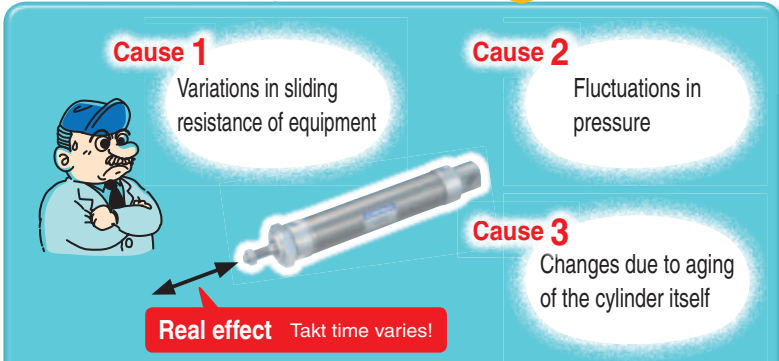
IBFL-BT-□



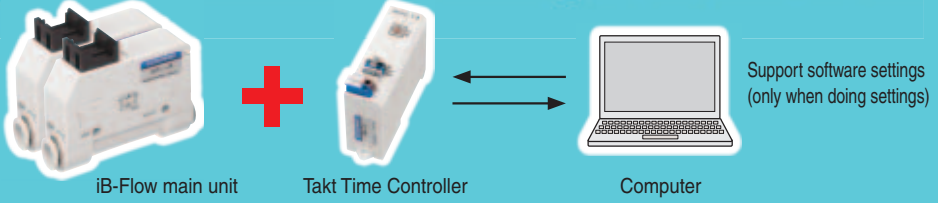
Setting device mounted on battery unit.

User issues

- Equipment stoppage because of takt time (operation time) variations
- Time and work required to adjust variations
- Manual speed (flow rate) adjustment takes time
- Loose needle problems due to human and external factors



Improve productivity and predictive maintenance by combining iB-Flow main unit and the Takt Time Controller.



Air cylinder takt time (operation time) control
Air cylinders can operate continuously at set takt time.
⇒ Takt Time Controller constantly monitors and makes corrections.

Real time monitoring
Cylinder operations can be monitored in real time by using the communication functions.
⇒ Air cylinder operation can be visualized through combination with touch panel.

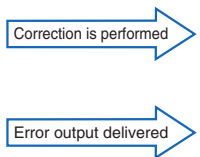
Predicting the service life of pneumatic equipment
Malfunctions in pneumatic equipment can be predicted by monitoring variations in cylinder takt time (operation time).
⇒ Pinpoint deterioration in pneumatic equipment by monitoring number of corrections and number of errors.

Centralized control
Possible to monitor multiple cylinders at one time.
⇒ Daisy chain of up to 16 units (RS485).

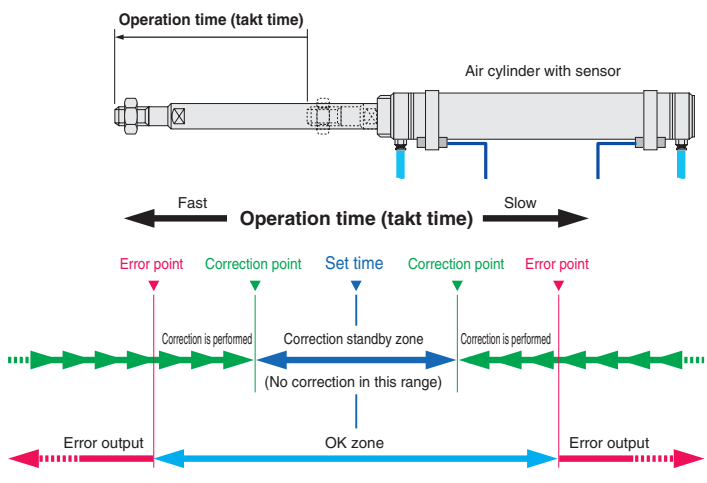
Works on all sensor equipped air cylinders!



- Setting items
 - Set time
 - Correction point
 - Error point



<Diagram of Takt Time Controller auto corrections>



See pages 3 and 4 for detailed connection examples and detailed explanations of the automatic corrections of the Takt Time Controller.

Takt Time Controller is used to control the cylinder takt time (operation time) automatically

In the past...



- Variations in pressure and cylinder's sliding resistance cause fluctuations in cylinder takt time that may stop equipment.
- Considering variations in cylinder takt time cannot improve the overall takt time of the equipment.
- Cylinder speed varies so an expensive electric robot had to be used.
- There was a lot of maintenance work because of the fluctuations in takt time.

Using the Takt Time Controller



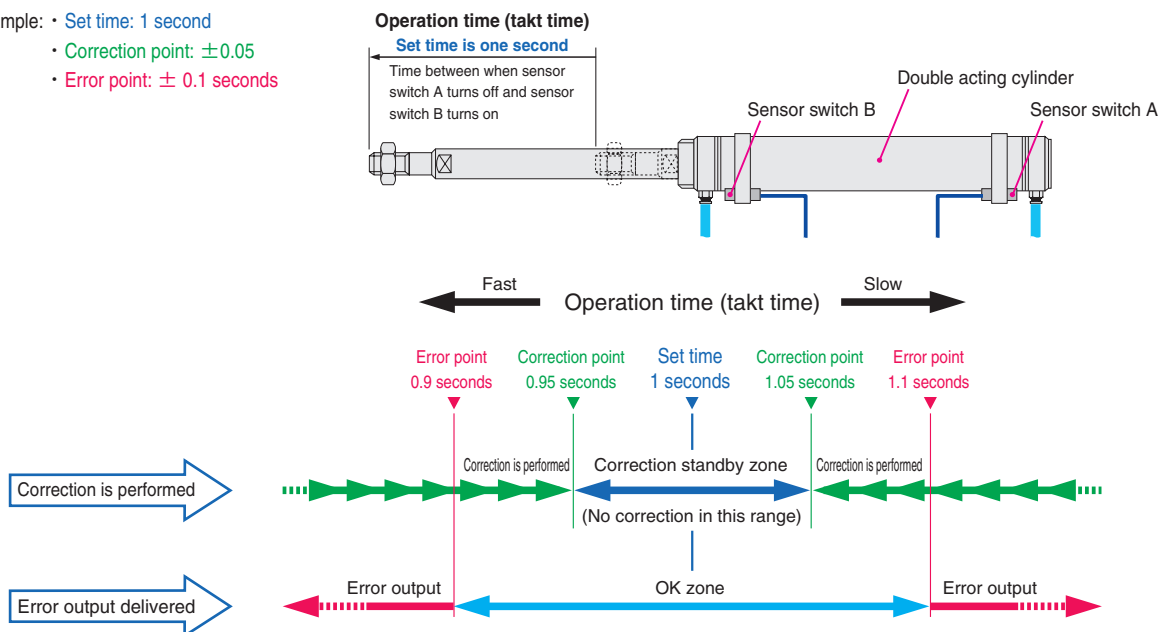
- Equipment operates smoothly because takt time is corrected automatically even if takt time varies due to variations of pressure and cylinder's sliding resistance.
- It is also possible to replace electric robots with air cylinders, depending on conditions, through monitoring and correcting takt time.
- It is possible to acquire information such as cylinder operating life, and other conditions by monitoring the takt time.
- It is possible to improve the overall takt time by stabilizing cylinder takt time.
- It is possible to reduce the number of equipment stops and greatly reduce maintenance by stabilizing takt time.
- It is possible to monitor takt time and error output on PLCs or computers by connecting multiple Takt Time Controllers (up to 16 units).

Theory of the Takt Time Controller's automatic correction

<Setting example> ※ In the following example, the operating time settings are in the push-side stroke, however, the same settings can be done in the pull-side stroke.

- Setting conditions in the operating time correction mode

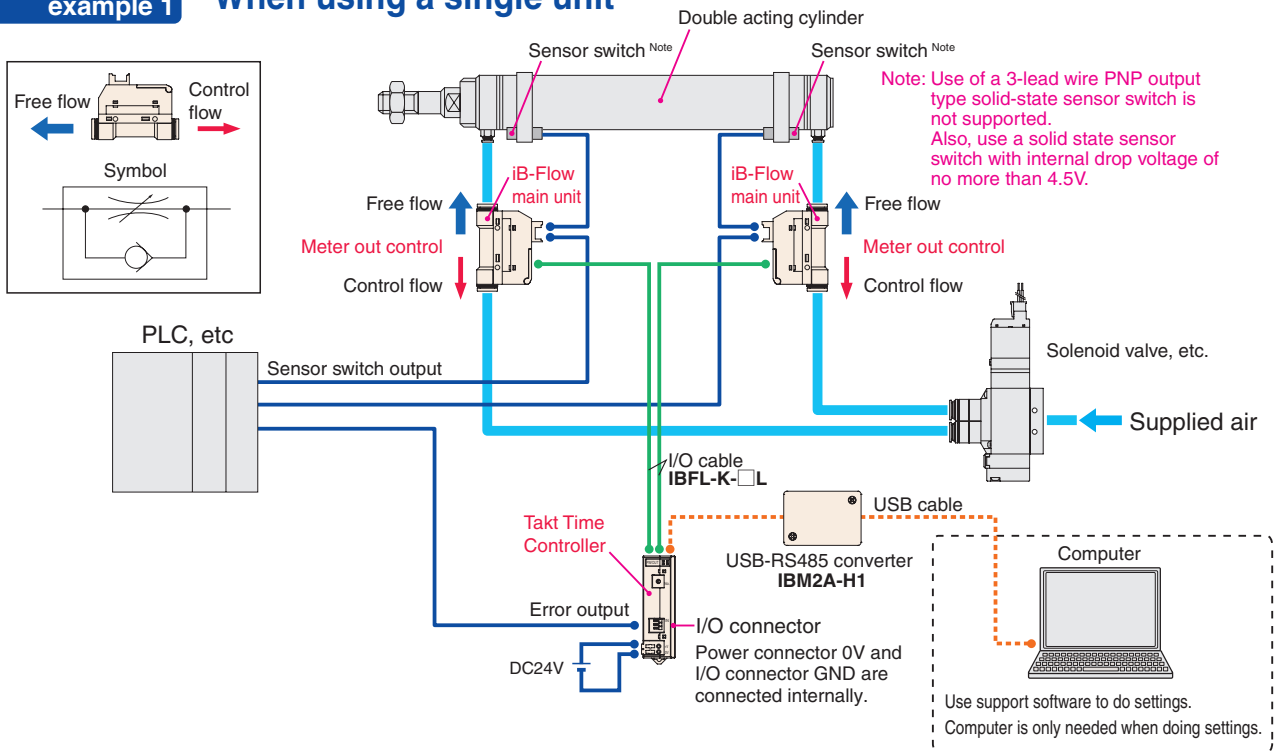
- Example:
- Set time: 1 second
 - Correction point: ± 0.05
 - Error point: ± 0.1 seconds



- The ON/OFF signals of the two sensor switches at either stroke end of the cylinder are sent via the iB-Flow main unit to the Takt Time Controller. The cylinder operating time is measured and monitoring is done constantly. If the operating time leaves the correction standby zone, the opening (throttling) of the iB-Flow main unit is adjusted a little at a time and continues correcting automatically until it returns to the correction standby zone.
- The operating time is measured at each stroke while correction is performed, if it is running fast, the iB-Flow main unit closes a little, or opens a little if it is slow. The number of corrections needed to return to correction standby mode depends on the operating conditions.
- Correction is not done while the operation time is within the correction point range (correction standby zone).
- Error output delivered when operation time exceeds error point, error output is cancelled when it returns to the OK zone.

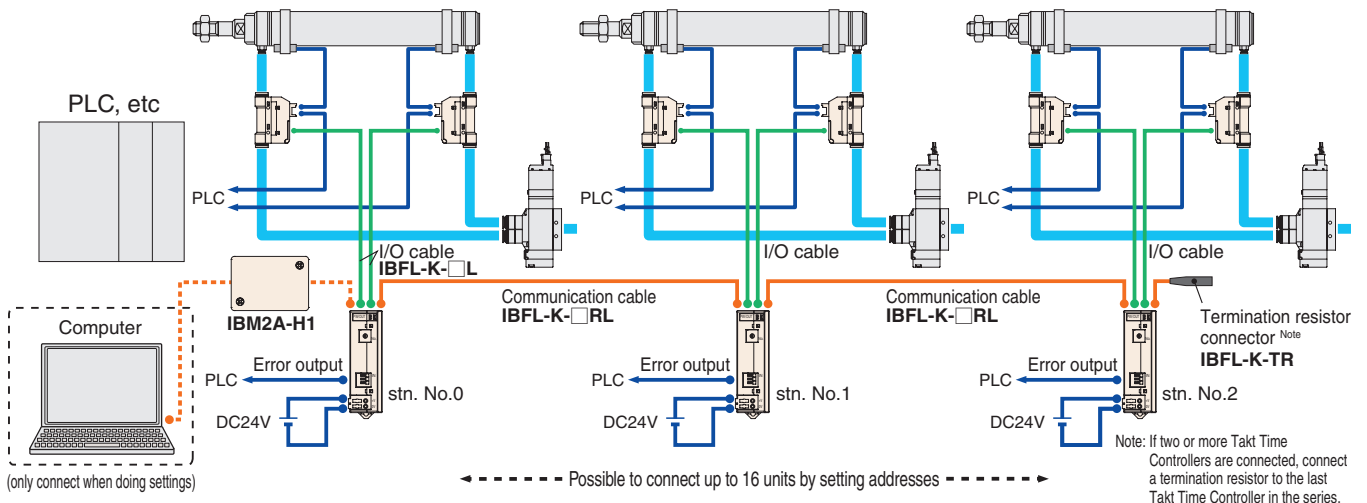
Application example 1

When using a single unit



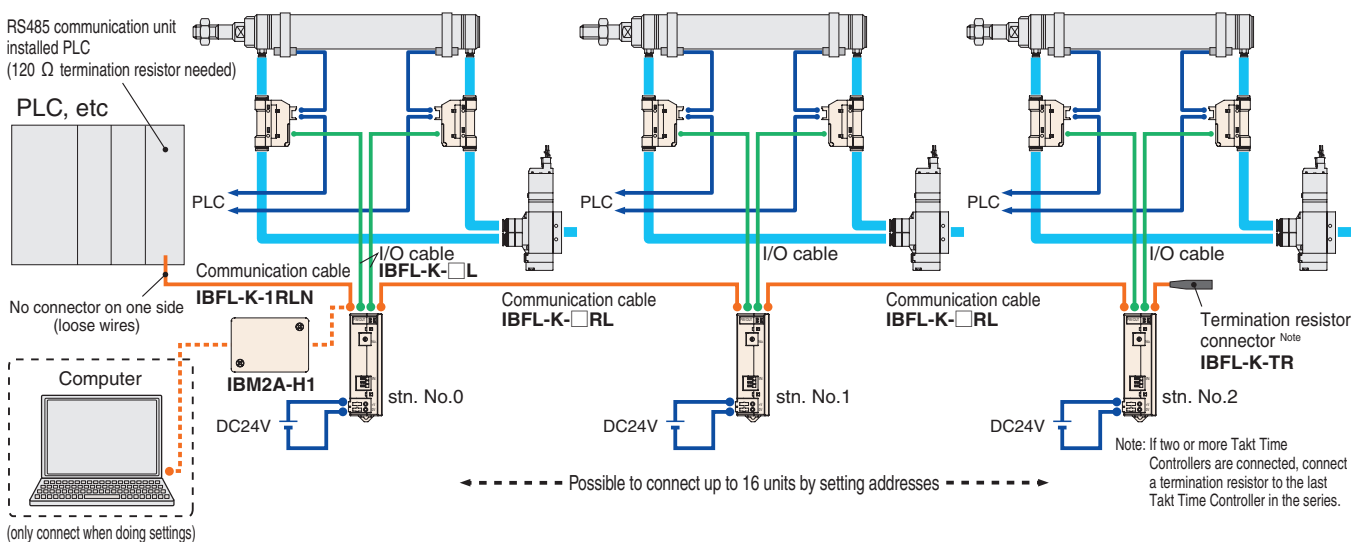
Application example 2

When using multiple units (setting up multiple units using the communication function)



Application example 3

When using multiple units (monitoring takt time, error output, etc with RS485 compatible PLC)



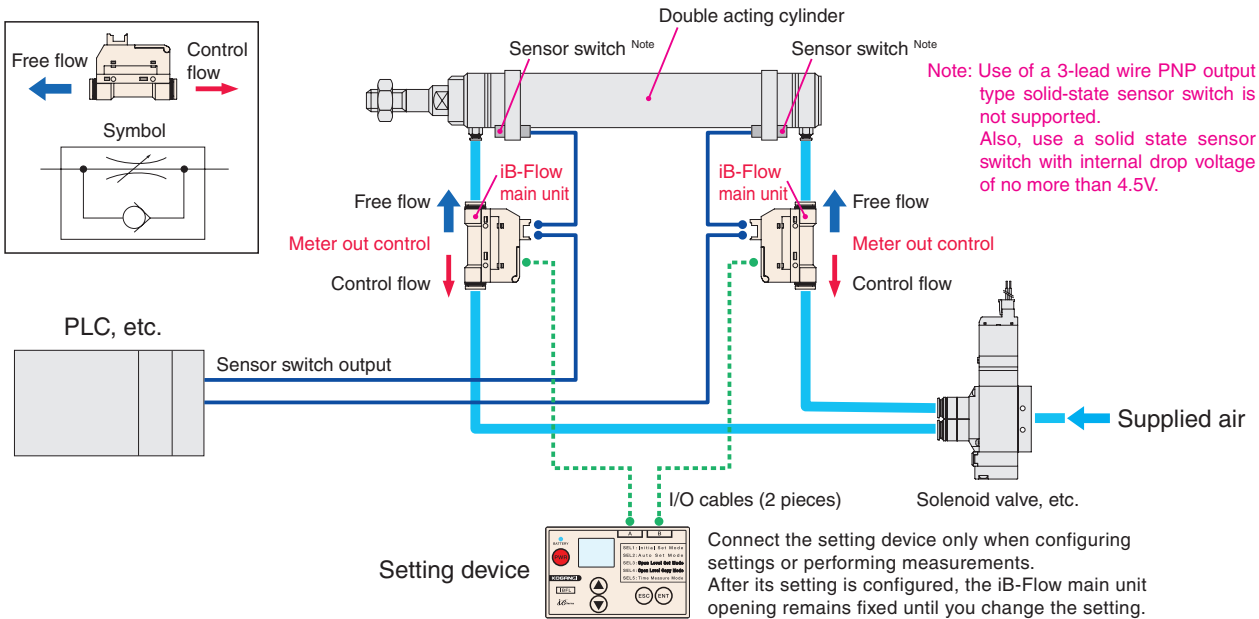
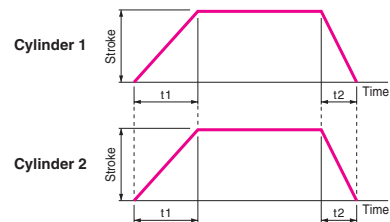
Application example 1

Auto adjustment of double acting cylinder operation time (cycle time) Auto Set Mode



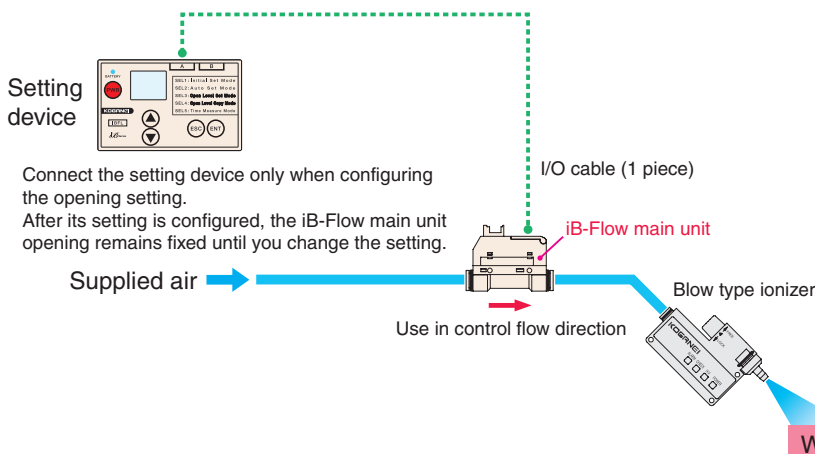
- The ON/OFF signals of the sensor switches at either stroke end of the cylinder are sent via the iB-Flow main unit to the setting device. The cylinder operation time is measured and the needle opening (throttling ratio) is adjusted accordingly.
 1. Use an I/O cable to connect the setting device and iB-Flow main unit.
 2. Set the target times for the extended (push) side and the retracted (pull) side.
 3. If you perform a number of reciprocal cylinder operation cycles by manually operating the solenoid valve, the cylinder operation time will be measured. At the same time, the setting device will automatically adjust the iB-Flow main unit opening (throttling ratio) upwards or downwards until it approaches the target time. "End" will appear on the display when setting is complete.
 4. After setting of both the extended (push) side and retracted (pull) side is complete, disconnect the setting device to complete the setting procedure.

※ The product is adjusted to be within $\pm 10\%$ of the target time before being shipped from the factory, but this setting can be changed later.
- Speed adjustment is performed by measuring actual operating time, so differences between individual cylinders, piping distances, and other issues are not factors.
- This mode also can be used to synchronize the operation of multiple cylinders, etc.



Application example 2

Flow rate adjustment for blow type ionizer Open Level Set Mode



Using the iB-Flow main unit opening adjustment function

Digitization of ionized air blow's flow rate adjustment. Easy flow rate adjustment for different workpieces. (Open Level Set Mode)

1. Use an I/O cable to connect the setting device and iB-Flow main unit.
2. Configure the target iB-Flow main unit opening. (Opening setting: 0 to 100%)
3. After adjusting the opening ("End" displayed), disconnect the setting device to complete the setting procedure.

● Auto adjustment of double acting cylinder operation time

To adjust the cylinder speed, each numeric target operation time (takt time) for extending and retracting side is input into the setting device, and the speed is adjusted automatically.

Takt time management of a device is simple, which greatly reduces adjustment work.

Speed adjustment is performed by measuring actual operation time, so differences between individual cylinders, piping distances, and other issues are not factors.

※ For details, see the application example on page 5.



Target time setting

Setting range: 0.05 to 30 seconds

(when using setting device)

● Digital setting of adjusting flow rate (throttling)

The needle rotation for flow rate setting of previous models can be easily configured with the setting device by entering a value representing 0 to 100% opening ratio.

This greatly reduces adjustment work and the chance of adjustment error.

It also provides a high degree of repeatability, for optimum flow rate precision adjustment.

※ For details, see the application example on page 5.



Opening setting

0 to 100%

(when using setting device)

● Cylinder operation time measurement

Connecting the setting device to the iB-Flow main unit enables measurement of the cylinder operation time. This ability comes in handy when performing cylinder maintenance or when checking the device takt time.



Operating time display

※ Operating time measurement is performed in accordance with the ON/OFF signals of two sensor switches at either stroke end of the cylinder.

(when using setting device)

● Safe lock mechanism

Even when the setting device is not connected to the iB-Flow main unit, the needle opening (throttling ratio) is mechanically stored internally by the iB-Flow main unit for worry-free operation.

There is no chance of inadvertent speed change (by flow rate) when the lock nut is tightened or of speed change by loosening nut as with previous models.



Once the needle opening is set, it is locked in place by an internal planetary gear. Power supply is not required after setting.

※ The setting device is required only for adjustment and operation time measurement. It does not normally need to be connected.

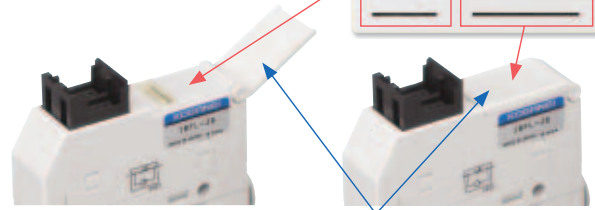
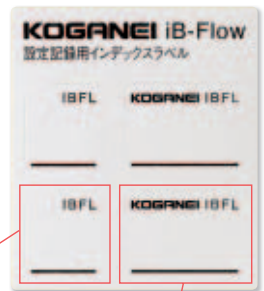
● Setting device copy function for reduced work

The copy function of the setting device makes it possible to adjust an iB-Flow main unit mounted on another machine by transferring the numeric opening value from another unit.

● Index labels, connector cover

The iB-Flow main unit comes with index labels.

The opening setting and operation time can be filled in on an index label, which is then affixed to the outside or inside of the body cover for reference during maintenance. Setting device connectors are also protected by a connector cover.



Connector cover protects connectors.

● Battery unit

Mounting a setting device onto a battery unit allows use even when a power supply is not available.



Battery unit

Setting device

※ A setting device can be used without a battery unit. In that case, use of an AC adapter is required.

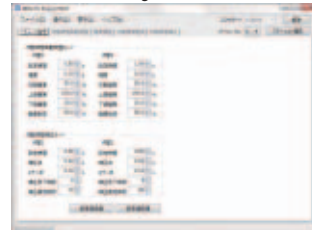
※ Charging of the battery unit is required. Use the AC adapter for charging.

● Support software for Takt Time Controller

Takt Time Controller parameters settings and operation time settings are done using the support software (free).

※ Download the support software from our home page.

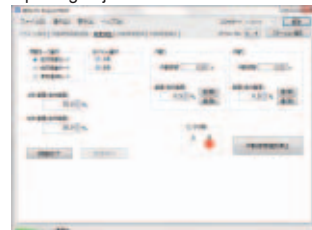
Parameter settings



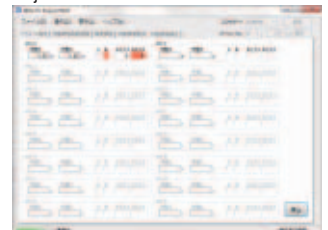
Automatic adjustment of takt time



Opening adjustment



Adjustment of takt time



● Supported OS: Windows XP SP3, Windows Vista SP1 and later, and Windows 7

● Hardware: CPU Pentium 1 GHz or better, RAM 512 MB or better, monitor resolution SVGA (800 x 600) or better





● Required software: Microsoft .NET Framework 4

※ Windows is a registered trademark of Microsoft in the USA.

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.

Always be sure to comply with the following safety regulations: ISO4414 (Pneumatic fluid power - 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.
- When selecting and handling equipment, the system designer or another person with sufficient knowledge and experience should always read the Safety Precautions, catalog, instruction manual, and other literature before commencing operation. Improper handling is dangerous.
- 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.
- The danger, warning and caution items listed under these Safety Precautions do not cover all possible contingencies. Read the catalog and instruction manual carefully, and always keep safety first.

 **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 one 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, electric shock, fire, etc.
- Never attempt inappropriate disassembly, assembly, or repair of the product relating to basic construction, or to 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, leading to injury, electric shock, fire, etc.
- 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 (disconnecting tubes or sealed plugs, adjustment of the product's mounting position, etc.) while the product is in operation. Falling, dropping, or abnormal operation of the product creates 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.
- Be sure to fully implement shielding measures whenever using the product in the locations described below. Failure to do so creates the risk of abnormal operation, damage to machinery, or personal injury.
 1. Locations subject to large electric currents or strong magnetic fields
 2. Locations where static electricity and other noise are generated
 3. Locations that may be subject to radiation from radioactive emissions
- 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 injury due to contact with moving parts.
- Do not touch terminals 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, resulting in product damage and abnormal, erratic or runaway operation.
- Before conducting maintenance, inspection, repair, replacement, or any other similar procedure, always completely cut off all air connections and confirm that residual pressure inside the product or in piping connected to the product is atmospheric pressure. 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.

- 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.
- Before performing any kind of wiring work, be sure to turn off power. Failure to do so creates the risk of electric shock.
- Do not allow lead wires and other cords to become damaged. Allowing a cord to become cut, 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 apply unnecessary force to connectors while power is supplied. 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 abnormal operation of the actuator, etc.
- Do not use the AC adapter cable, or the power or signal wires that come with the product in areas where moving portions are present. Doing so creates the risk of the wires being cut.
- Do not use any type of medium that is not specifically stipulated in the specifications. Using a non-specified medium could lead to short term loss of function, sudden degradation of performance, and a reduced operating life.
- 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.

CAUTION

- This product uses sensitive electronic components. When handling the product, take care to avoid hitting or dropping it, allowing it to come into contact with other objects, or otherwise subjecting it to excessive impact. Even if the product appears undamaged, damage to internal components can cause abnormal operation.
- Use only the setting device and Takt Time Controller specified for this product. Use of a non-specified device creates the risk of product breakdown and runaway operation.
- Locate this product, the setting device, and Takt Time Controller in an area where there is little dust and dirt. Locating them in a location that is dusty and/or dirty creates the risk of malfunction or abnormal operation.
- When mounting the product, leave room for adequate working space around it. Failure to do so will make it more difficult to conduct daily inspections or maintenance, which could eventually lead to system shutdown or damage to the product.
- Do not scratch, dent, or deform the product by climbing on it, using it as a scaffold, or placing objects on top of it. Doing so creates the risk of damage to or breakage of the product, resulting in operational shutdown or degraded performance.
- Always post an “operations in progress” sign for installations, adjustments, or other operations, to avoid unintentional supplying of air or electrical power, etc. Unintended power or air supply can cause electric shock and sudden operation, creating the risk of personal injury.
- Do not bring any magnetic media or memory within one meter [3.28 ft] of the product. Doing so creates the risk of damage to data on the magnetic media due to magnetism.
- Use in extremely dry air under temperatures that exceed 20 degrees below zero Celsius [-4 °F] may affect the quality of the lubricating oil used. This creates the risk of degraded performance, loss of function, or other problems.
- For the medium, use clean air that does not include any oil or water.
- Product specifications allow for internal leakage. Do not use this product when zero internal leakage is required.
- Do not conduct insulation resistance tests and dielectric strength tests on the setting device or the Takt Time Controller.

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.
- When handling the product, wear protective gloves, safety glasses, safety shoes, and other protective clothing.
- 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.

Other

- 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 prescribed methods and procedures.
 2. Never attempt inappropriate disassembly or assembly of the product relating to basic construction, or its performance or functions.

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

Warranty and General Disclaimer

1. **Warranty Period**
The warranty period for KOGANEI products is 180 days from the date of delivery.
2. **Scope of Warranty and General Disclaimer**
 - (1) The KOGANEI product warranty covers individual products. When a product purchased from KOGANEI or from an authorized KOGANEI distributor malfunctions during the warranty period in a way that is attributable to KOGANEI responsibility, KOGANEI will repair or replace the product free of charge. Even if a product is still within the warranty period, its durability is determined by its operation cycles and other factors. Contact your nearest KOGANEI sales office or the KOGANEI overseas department for details.
 - (2) KOGANEI shall not be held responsible for any losses or for any damage to other machinery caused by breakdown, loss of function, or loss of performance of KOGANEI products.
 - (3) KOGANEI shall not be held responsible for any losses due to use or storage of the product in a way that is outside of the product specifications prescribed in KOGANEI catalogs and the instruction manual, and/or due to actions that violate the mounting, installation, adjustment, maintenance and other safety precautions.
 - (4) KOGANEI shall not be held responsible for any losses caused by breakdown of the product due to factors outside the responsibility of KOGANEI, including but not limited to fire, natural disaster, the actions of third parties, and intentional actions or errors by you.

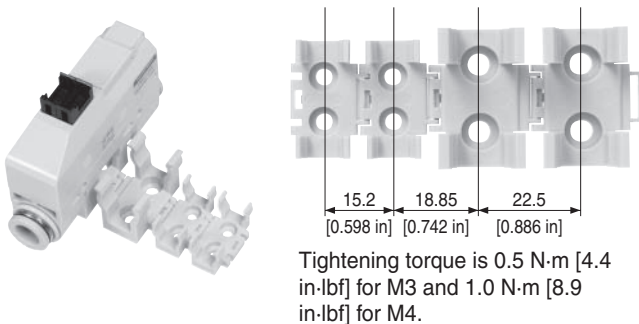
● Installation

1. Though there are no restrictions on the installation direction, the unit should be installed where it will not be directly subjected to strong impact and/or vibration.
2. Screw tightening torque when using the iB-Flow main unit mounting holes or a bracket are 0.5 N·m [4.4 in·lbf] for an M3 screw and 1.0 N·m [8.9 in·lbf] for an M4 screw. Exceeding the specified tightening torque may damage the iB-Flow main unit, the bracket, etc.
3. Use in a location or environment like those described below should be avoided because doing so can cause the product to malfunction. If the product must be used in such a location or environment, be sure to provide a cover and take other adequate protection countermeasures.
 - Locations where the product may be directly exposed to water droplets, oil droplets, etc.
 - Environments where condensation is generated
 - Locations where the product may be directly exposed to machining chips, dust, etc.
4. Before performing piping work on the iB-Flow main unit, be sure to thoroughly flush the inside of the pipes with compressed air. Machining chips, sealing tape, rust and other debris getting in during piping work may result in air leaks, etc.
5. This product cannot be used in application where zero leakage is required. Use a separately available stop valve in this case.

● Mounting bracket

Multiple iB-Flow mounting brackets can be connected in series. Even different size (**IBFL-MB**, **IBFL-LB**) brackets can be connected in series.

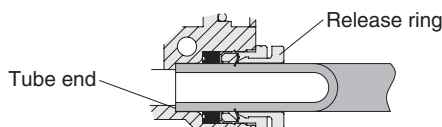
Note: There is looseness in a serial connection. When stable mounting is required, secure each bracket with screws.



● Attaching and detaching tubing

Tubing installation precautions

- ① Cut the tubing so the cut cross section is at a right angle. Take care not to damage the outside surface of the tubing and not to cause the tubing to become oval shaped.
- ② When installing tubing, failure to insert the tubing all the way up to the tube end can cause leakage.



- ③ Following installation, check to make sure that the tubing cannot be pulled out.

Tubing removal precautions

- ① Before removing tubing, be sure to check to make sure that pressure inside the tubing is atmospheric pressure.
- ② Uniformly press the release ring inwards as far as it will go and then pull out the tubing. If you do not fully press in on the release ring, the tube may not come out, or the tubing may become scratched causing debris to be left inside the fitting.

● Tube

Use of both nylon tubing and urethane tubing is supported. Nylon tube outside diameter precision should be within ± 0.1 mm [0.004 in] (nominal) for nylon tubing and within ± 0.15 mm [0.006 in] (nominal) for urethane tubing. Use tubing with ovality (difference between major axis and minor axis) within 0.2 mm [0.008 in]. Use of KOGANEI tubing is recommended. Use of tubing that is not a KOGANEI genuine product or a compatible (recommended) product may result in tube disconnection, air leakage, or other problems. Be sure to check on tubing before building a pneumatic system.

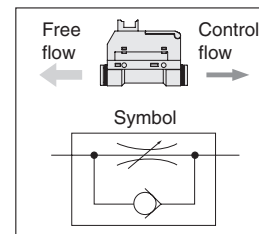


1. Use tubing whose exterior is undamaged. If tubing becomes damaged after repeated use, cut off the damaged portion.
2. Do not allow tubing to become severely bent or twisted in the vicinity of a fitting. Such a condition creates the risk of air leakage. The table below shows minimum radius guidelines for nylon tubes and urethane tubes.
3. Do not use extremely soft tubing, which causes a severe drop in pull-out strength.

| Tube size | Minimum bending radius | |
|--------------|------------------------|---------------|
| | Nylon tube | Urethane tube |
| φ 4 [0.157] | 20 [0.79] | 10 [0.39] |
| φ 6 [0.236] | 30 [1.18] | 15 [0.59] |
| φ 8 [0.315] | 50 [1.97] | 20 [0.79] |
| φ 10 [0.394] | 80 [3.15] | 27 [1.06] |
| φ 12 [0.472] | 150 [5.91] | 35 [1.38] |

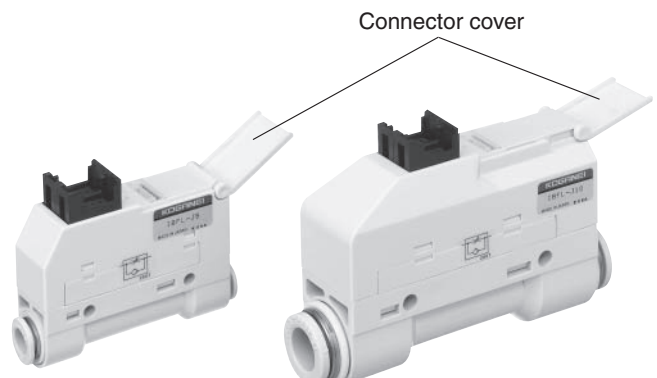
● Air control direction

The iB-Flow main unit has an air flow direction. Control flow direction and free flow direction are as shown in the diagram below. Be sure to perform piping while in accordance with the diagram below and the product's symbol. Orienting the control direction wrongly creates the risk of personal injury and machine damage.



● Opening and closing the connector cover

Setting device and Takt Time Controller connectors are protected by connector covers. When configuring settings, open the connector cover as shown in the photograph and then connect an I/O cable to the connector. Space is provided to affix one of the included index labels on the top surface of the connector cover or inside the connector cover. Index labels can be used for recording setting values or other information as required.



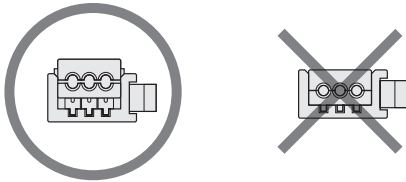
Handling Instructions and Precautions

● Connecting the sensor connector

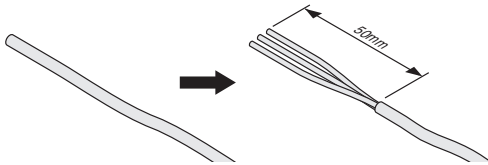
When adjusting and measuring of the double acting air cylinder operation time, the ON/OFF signals of the sensor switches at either stroke end of the cylinder must be sent to a setting device, Takt Time Controller, or PLC, etc. via the iB-Flow main unit.

Perform the following steps to connect the sensor switch lead wires and sensor connector mini clamp wire mount plugs (male).

1. Check to make sure that the connector cover (lead wire inlet) is sitting above the body of the connector. Note that a connector whose cover is even with the body of the connector cannot be used.



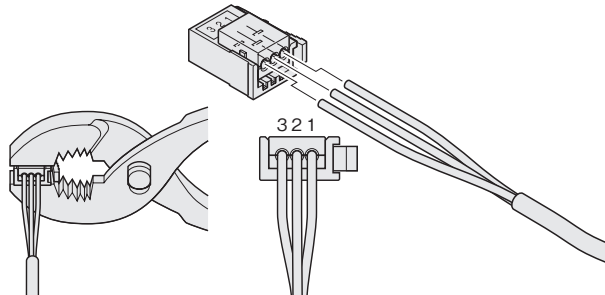
2. Cut the cable to the required length. Strip the outer covering of the cable, 50 mm [2 in] from the end, to expose the lead wires. Do not strip the insulation from the individual lead wires at this time.



3. Insert the lead wires into the connector cover holes in accordance with the information in the table below. Check to make sure the lead wires are fully inserted as far as they will go by viewing the semi-transparent top cover of the connector. (Wire goes in about 9 mm [0.35 in].) Note that supplying power while connections are incorrect will damage the control device and setting device you are using.

| Connector side Pin No. | 2-lead wire sensor switch | | 3-lead wire sensor switch | |
|---------------------------|---------------------------|------------|---------------------------|------------|
| | Signal name | Wire color | Signal name | Wire color |
| 1 | Not connected | — | +V | Brown |
| 2 | OUT | Brown | OUT | Black |
| 3 | 0V | Blue | 0V | Blue |

NOT Use of a 3-lead wire PNP output type solid-state sensor switch is not supported. Also, uses a solid state sensor switch with internal drop voltage of no more than 4.5V.



4. Taking care not to remove the lead wires from the connector, use pliers or some other type of hand tool to squeeze the cover and the connector body until the cover is pressed into the body.

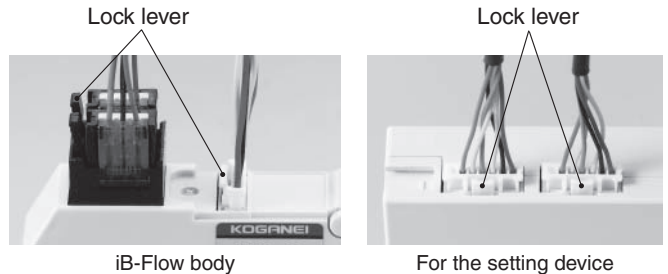
Do not apply force in excess of 980.7 N [220 lbf]. Connection is complete when the cover is even with the connector body.

5. Double check to make sure that wiring is correct.

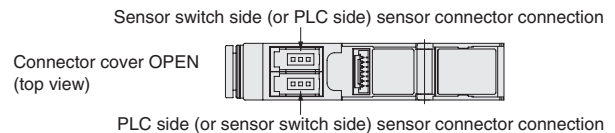
Note: Suitable wire diameter for mini clamp wire mount plug provided is AWG26-24, nominal cross section within 0.14 to 0.3 mm² [0.00022 to 0.00047 in²], insulation outside diameter 0.8 to 1.0 mm [0.031 to 0.039 in].

● Connecting and disconnecting a sensor connector and I/O cable

To attach the sensor connector and I/O cable, position the lock levers as shown in the photograph below, and then insert the iB-Flow main unit and setting device connectors until they lock into place. For disconnection, press down fully on the lock lever as you hold the connector and pull to disconnect. At this time, take care not to apply undue force to the lead wires. See page 11 regarding connecting and disconnecting the I/O cable to the Takt Time Controller.



Since the connectors that connect the sensor connector (mini clamp wire mount plug) are linked internally, it makes no difference whether sensor switch side or PLC side wiring is used.



● Mounting and removing a setting device on a battery unit

Mounting a setting device on a battery unit

- ① Release the stopper.
- ② Aligning the slit of the setting device with the battery unit guide, insert the setting device into the battery unit.
- ③ Press down on the setting device until it comes into contact with the stopper.

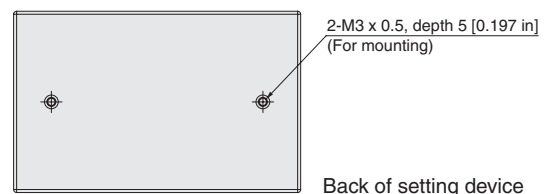


Removing a setting device from a battery unit

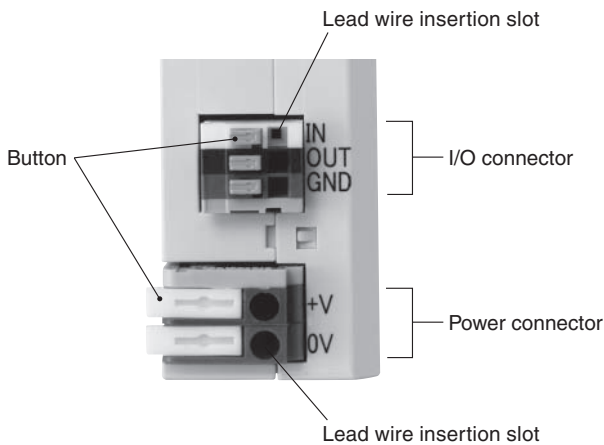
- ① Release the stopper and then remove the setting device from the battery unit.

● Setting device mounting

When mounting a setting devices, use M3 × 0.5 screws, tightened to a torque of 0.5 N·m [4.4 in·lbf]. Exceeding the specified tightening torque may damage the setting device.



● Takt Time Controller power and external I/O connections



Power connector

- Acceptable range of wire sizes
 - Single wire: $\phi 0.4 - \phi 1.2 \text{ mm}$ [$\phi 0.016 - \phi 0.047 \text{ in}$] (AWG26-16)
 - Twisted wire: $0.2 - 0.75 \text{ mm}^2$ [$0.00031 - 0.00116 \text{ in}^2$] (AWG24-20)
 - Wire diameter $\phi 0.18$ [$\phi 0.0071 \text{ in}$] or more
- Recommended tools
 - Flat head screwdriver is recommended

I/O connector

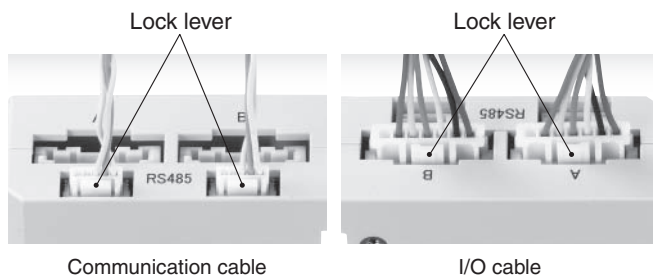
- Acceptable range of wire sizes
 - Single wire: $\phi 0.32 - \phi 0.65 \text{ mm}$ [$\phi 0.0126 - \phi 0.0256 \text{ in}$] (AWG28-22)
 - Twisted wire: $0.08 - 0.32 \text{ mm}^2$ [$0.00012 - 0.00050 \text{ in}^2$] (AWG28-22)
 - Wire diameter $\phi 0.12$ [$\phi 0.0047 \text{ in}$] or more
- Recommended tools
 - Flat head screwdriver is recommended



1. Note that only copper wire can be used for lead wire connections.
2. Turn off the power when connecting or disconnecting the lead wire.
3. Use only one lead wire for each insertion slot. Connecting two or more lead wires will cause malfunctions.
4. Press the button all the way down when connecting or disconnecting the lead wires.

● Connecting and disconnecting Takt Time Controller's I/O and communication cables

To attach the communication and I/O cables, position the lock levers as shown in the photograph below, and then insert the iB-Flow main unit and Takt Time Controller connectors until they lock into place. To disconnect, press down fully on the lock lever as you hold the connector and pull to disconnect. At this time, take care not to apply undue force to the lead wires.

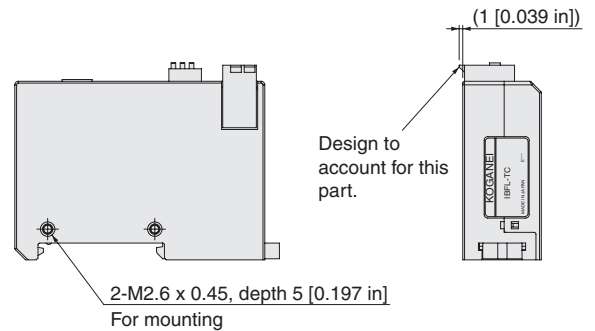


Communication cable

I/O cable

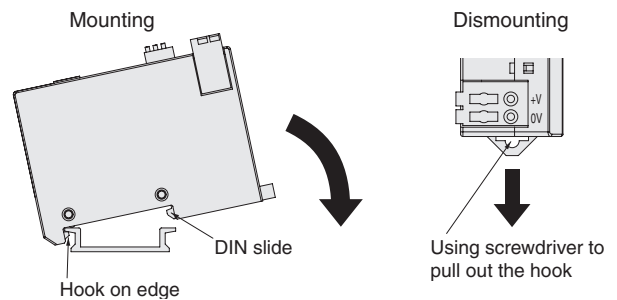
● Mounting Takt Time Controller

When mounting a Takt Time Controller directly or on a bracket, use M2.6 x 0.45 screws, tightened to a torque of 0.32 N·m [2.83 in·lbf]. Exceeding the specified tightening torque may damage the Takt Time Controller.



● DIN rail mounting

As shown in the diagram below, hook one side on the DIN rail, press the Takt Time Controller in the direction of the arrow until it clicks and locks on the DIN slide. To remove the Takt Time Controller from the DIN rail, insert a flat head screwdriver into the slot on the hook and pull the DIN slide hook.



● Takt Time Controller address setting (stn. No. 0 to F)

Do not replicate addresses (stn. No.) when using RS485 communications.

● About Takt Time Controller termination resistor

When using two or more Takt Time Controllers, set the termination resistor for the last end of the Takt Time Controller, and if necessary connect 120Ω (provided by customer) termination resistor to the RS485 communication unit of PLC etc.

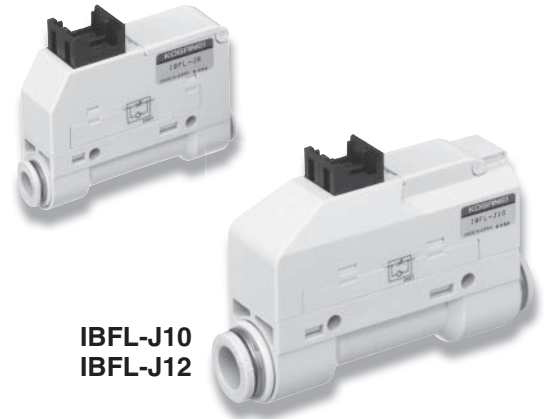
● Others

1. Incorrectly wiring the iB-Flow main unit, setting device, Takt Time Controller, and sensor switch cables will result in breakdown. Carefully check wiring before supplying power.
2. Setting values are written into and stored in flash memory built into the setting device and Takt Time Controller. Note that the number of flash memory rewrites is limited. The guaranteed number of rewrites is 10,000.
3. Never use a needle tip or any other sharp pointed object to perform key operations on the setting device.
4. The battery unit is not charged when shipped from the factory. Charge completely before use.
5. If the battery unit is not used for a long time, periodically charge it.
6. For speed adjustment, configure the setting within the actuator operating speed range. Use outside of the operating speed range creates the risk of actuator breakdown, loss of function, or damage. It could also drastically reduce operating life.

iB-Flow

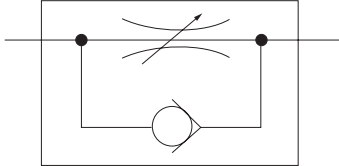
Main unit

IBFL-J4
 IBFL-J6
 IBFL-J8



IBFL-J10
 IBFL-J12

Symbol



Specifications

| Item | Model | IBFL-J4C | IBFL-J4 | IBFL-J6C | IBFL-J6 | IBFL-J8 | IBFL-J10 | IBFL-J12 |
|---------------------------------|--------------|---------------------------------|-----------|-------------|------------|-------------|-----------|----------|
| Tube outer diameter | mm | φ4 | | φ6 | | φ8 | φ10 | φ12 |
| Medium | | Air | | | | | | |
| Operating pressure range | MPa [psi] | 0.1 to 0.7 [14.5 to 102] | | | | | | |
| Proof pressure | MPa [psi] | 1.05 [152] | | | | | | |
| Operating temperature range | °C [°F] | 0 to 40 [32 to 104] | | | | | | |
| Dielectric strength | | 500VAC for one minute | | | | | | |
| Insulation resistance | | 100 MΩ minimum at 500VDC Megger | | | | | | |
| Mass | g [oz] | 31 [1.09] | | | 34 [1.20] | | 83 [2.93] | |
| Flow rate (at 0.5 MPa [73 psi]) | Free flow | 180 [6.35] | | 410 [14.47] | | 830 [29.30] | | |
| | Control flow | 24 [0.85] | 75 [2.65] | 24 [0.85] | 150 [5.30] | 530 [18.71] | | |

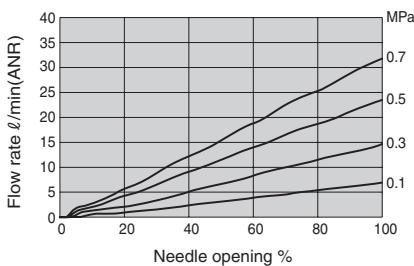
Note: Four index labels and two mini clamp wire mount plugs are included.

Supported wire diameter: AWG26-24, nominal cross section within 0.14 to 0.3 mm² [0.00022 to 0.00047 in²], insulation outside diameter 0.8 to 1.0 mm [0.031 to 0.039 in].

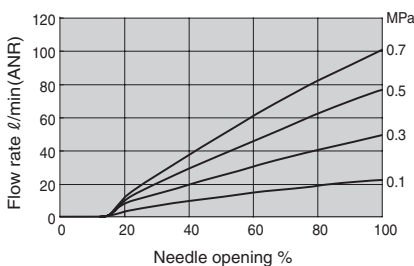
Note: Use a setting device that supports version 2.00 and later of the software when using IBFL-J4C or IBFL-J6C.

Flow rate characteristics

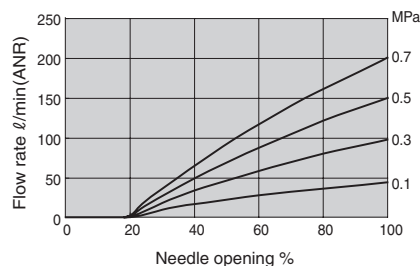
IBFL-J4C IBFL-J6C



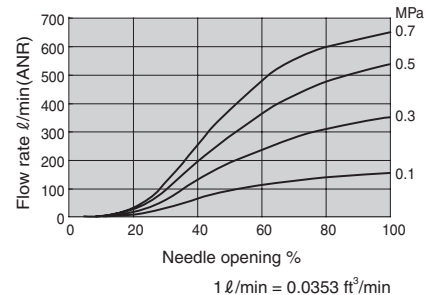
IBFL-J4



IBFL-J6 IBFL-J8



IBFL-J10 IBFL-J12



Note: Flow rate characteristics are in accordance with Koganei measurement conditions. Note that there are variations in flow rate characteristics due to individual product difference, as well as piping conditions and other usage conditions.

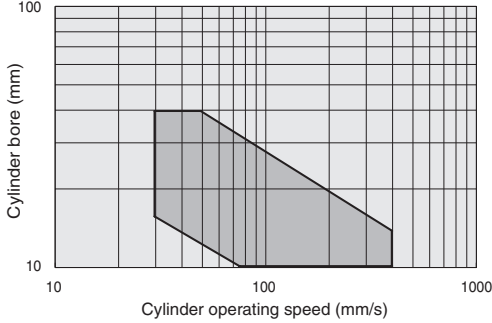
Range of adjustments to the cylinder's operation time in Auto Set Mode (for reference)

The range of possible automatic adjustment is indicated by the area inside the line.

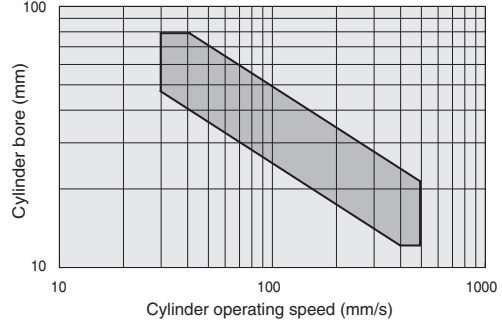
Use the following formula and the size of your cylinder to make your selection.

$$[\text{Cylinder operating speed (mm/s)} = \text{cylinder stroke (mm)} / \text{cylinder operation time (S)}]$$

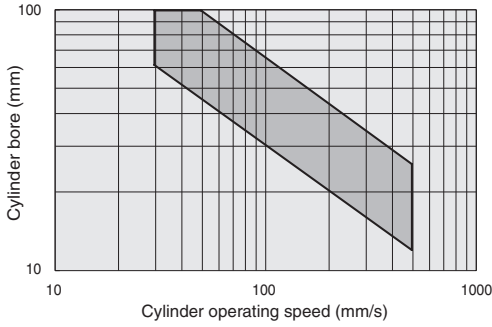
IBFL-J4C IBFL-J6C



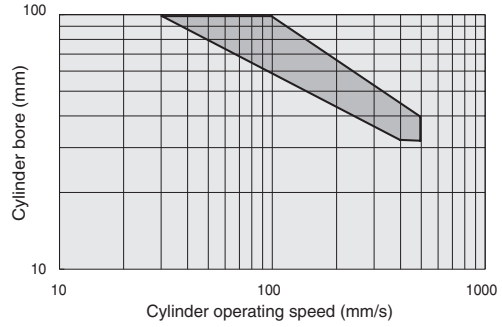
IBFL-J4



IBFL-J6 IBFL-J8



IBFL-J10 IBFL-J12



1 mm = 0.0394 in
1 mm/s = 0.0394 in/sec

Note: This selection graph was created based on results of measurements using Koganei Jig Cylinders C series.

Note that these may not be the limits depending on the operating conditions and the cylinder being used.

Setting device, battery unit



Specifications

● Setting device

| Item | Model | IBFL-S |
|-----------------------------|----------------------|---|
| Power supply | | Battery unit or special AC adapter (Input: 100 to 240VAC, 50/60 Hz Output: 15VDC 1.2 A) |
| Indicators | Setting display | LCD: 4 characters, 4 indicators 4-character display (letters or values: green) Operation indicator (indicator: red) |
| | BATTERY LED (red) | When using the battery unit, lights when battery capacity is low. Flashes when battery capacity is very low. |
| Setting input | | Unit key settings (PWR, ▲, ▼, ESC, ENT) |
| Applicable sensor switches | Note 1, Note 2 | 12 to 24VDC $^{+10\%}_{-5\%}$ Reed switch, solid-state sensor switch (2-lead wire, 3-lead wire: NPN output type) |
| I/O cable length | | -1L: 1m [3.28 ft], -3L: 3m [9.84 ft] |
| Operating temperature range | °C [°F] | 0 to 40 [32 to 104] |
| Storage temperature range | °C [°F] | -10 to 50 [14 to 122] |
| Operating humidity range | %RH | 35 to 85 (non-condensation) |
| Vibration resistance | m/s ² [G] | 49.0 [5] (When directly installed to a device or mounting surface. Excluding battery unit.) |
| Shock resistance | m/s ² [G] | 98.1 [10] (When directly installed to a device or mounting surface. Excluding battery unit.) |
| Dielectric strength | | 500VAC for one minute |
| Insulation resistance | | 100 MΩ minimum at 500VDC Megger |
| Mass | g [oz] | 70 [2.47] (Excluding cable) |
| Mounting methods | | Direct mounting (M3 x 0.5, depth 5 mm [0.197 in], 2 locations) |

Note 1: Use of a 3-lead wire PNP output type solid-state sensor switch is not supported.

2: Use a solid state sensor switch with internal drop voltage of no more than 4.5V.

● Battery unit

| Item | Model | IBFL-BT |
|-----------------------------|----------------------|--|
| Power supply | | Special AC adapter (Input: 100 to 240VAC, 50/60 Hz Output: 15VDC 1.2 A) |
| Indicator | CHARGE LED (red) | Charging: Lit Charging complete: Unlit |
| Operating temperature range | °C [°F] | 0 to 40 [32 to 104] |
| Storage temperature range | °C [°F] | -10 to 50 [14 to 122] (Store at a temperature of -10 to 30°C [14 to 86] when not charging for long periods.) |
| Operating humidity range | %RH | 35 to 85 (non-condensation) |
| Shock resistance | m/s ² [G] | 98.1 [10] |
| Dielectric strength | | 500VAC for one minute |
| Insulation resistance | | 100 MΩ minimum at 500VDC Megger |
| Mass | g [oz] | 350 [12.35] (Excluding setting device.) |

Note: The battery unit is not charged when shipped from the factory. Charge completely before use.

For the number of cylinder setting when using a battery unit, use a value of 100 cylinders after a full charge as a guideline.

If the battery unit is not used for a long time, periodically charge it.

Takt Time Controller



Specifications

Takt Time Controller

| Item | Model | IBFL-TC |
|--|---|--|
| Power supply | Voltage | 12VDC to 24VDC $\pm 10\%$ |
| | Current consumption (at 24VDC supplied) | 35 mA (no load) 140 mA max. (when 2 units of the main unit IBFL-J4 (C) , -J6 (C) , or -J8 are connected) 240 mA max. (when 2 units of the main unit IBFL-J10 , or -J12 are connected) |
| Display settings | PW (green LED) | While power is on: Lights |
| | OUT (red LED) | When operation time error is output: On When over current error occurs: Flashes ^{Note 1} |
| | str. No. | Address setting (0 to F) |
| External I/O | IN | Automatic correction ON Open Automatic correction OFF Shorted with GND (no voltage input) |
| | OUT | When operation time error is output: ON Load voltage: 30VDC max. Load current: 50 mA max. (over current protection function internally equipped) Output format: NPN open collector output |
| Communication | Connector a/b | Up to 16 RS485 communication units can be connected |
| Connection to iB-Flow main unit | Connector A/B | iB-Flow main unit connections (opening adjustment and sensor output acquisition) |
| Applicable sensor switches ^{Note 2, Note 3} | | 12 to 24VDC $\pm 10\%$ reed switch, solid state switch (2-lead wire, 3-lead wire: NPN output type) |
| I/O cable length | | 300 mm, 1000 mm, 3000 mm [0.98 ft, 3.28 ft, 9.84 ft] |
| Communication cable length | | 50 mm, 1000 mm, 3000 mm [0.16 ft, 3.28 ft, 9.84 ft], 1000 mm [3.28 ft] (no connector on one side, loose wires) ^{Note 4} |
| Operating temperature range | $^{\circ}\text{C}$ [$^{\circ}\text{F}$] | 0 to 40 [32 to 104] |
| Storage temperature range | $^{\circ}\text{C}$ [$^{\circ}\text{F}$] | -10 to 50 [14 to 122] |
| Operating humidity range | %RH | 35 to 85 (non-condensation) |
| Noise resistance | | IEC61000-4-4, power line 1 kV (level 2), signal line (radiation) 1 kV (level 3) |
| Vibration resistance | m/s^2 [G] | 49.0 [5] (at bracket mounted) |
| Shock resistance | m/s^2 [G] | 98.1 [10] (at bracket mounted) |
| Insulation resistance | | 100 M Ω minimum at 500VDC |
| Dielectric strength | | 500 VAC 1 minute |
| Mass | g [oz] | 48 [1.69] (controller only) |
| Mounting methods | | Direct mount (M2.6 x 0.45, 5 [0.20 in] deep, 2 locations), DIN rail mount, specialized bracket |

Notes 1: Turn the Takt Time Controller off and then on again to resolve over current errors.

2: Use of a 3-lead wire PNP output type solid-state sensor switch is not supported.

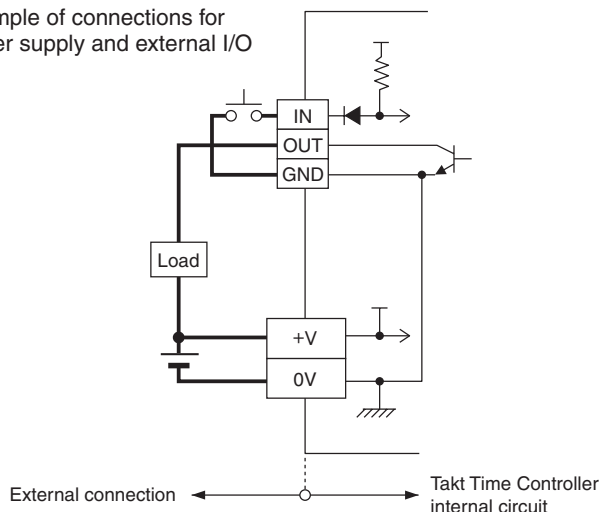
3: Use a solid state sensor switch with internal drop voltage of no more than 4.5V.

4: Use a 1000 mm [3.28 ft] cable with loose wires on one side to connect external devices (PLC etc.), that use RS485 communication, to the Takt Time Controller.

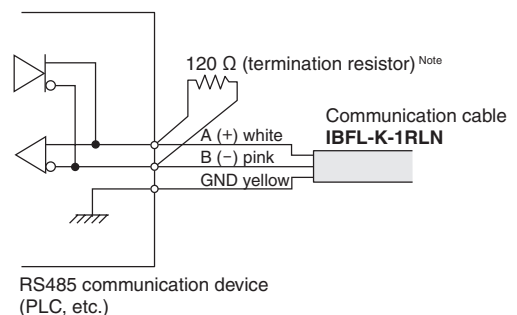
Note: Termination resistor connector (**IBFL-K-TR**) is needed to connect two or more Takt Time Controllers using RS485 communication.

Internal wiring diagrams and specifications (example of external connection)

Example of connections for power supply and external I/O



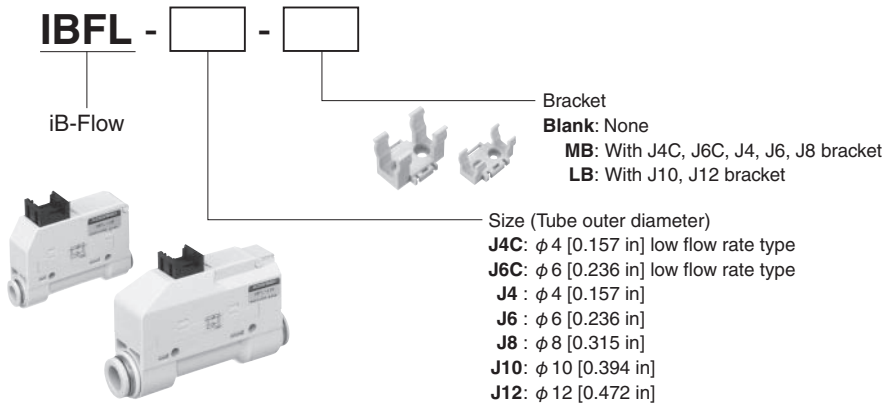
Example of connections for external device (RS485 compatible)



Note: Connect a 120 Ω termination resistor (provided by customer) to RS485 communication units of PLC etc.

Order Codes

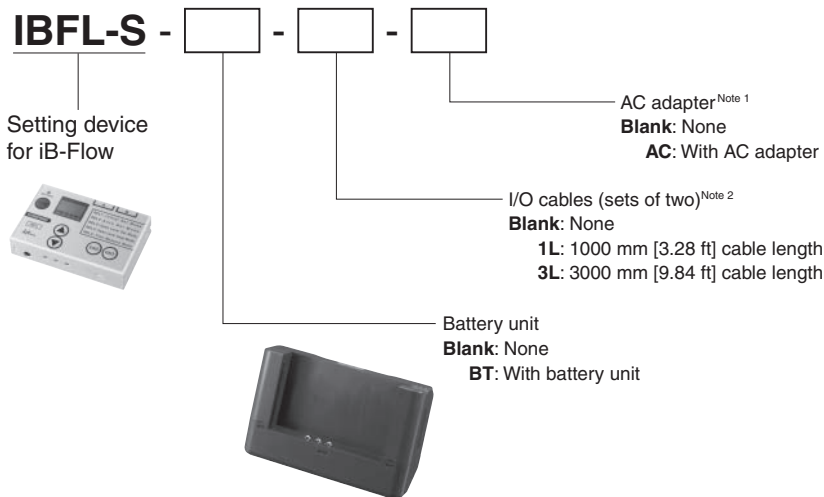
Main unit



※ Two mini clamp wire mount plugs and four index labels are included on the iB-Flow main unit.



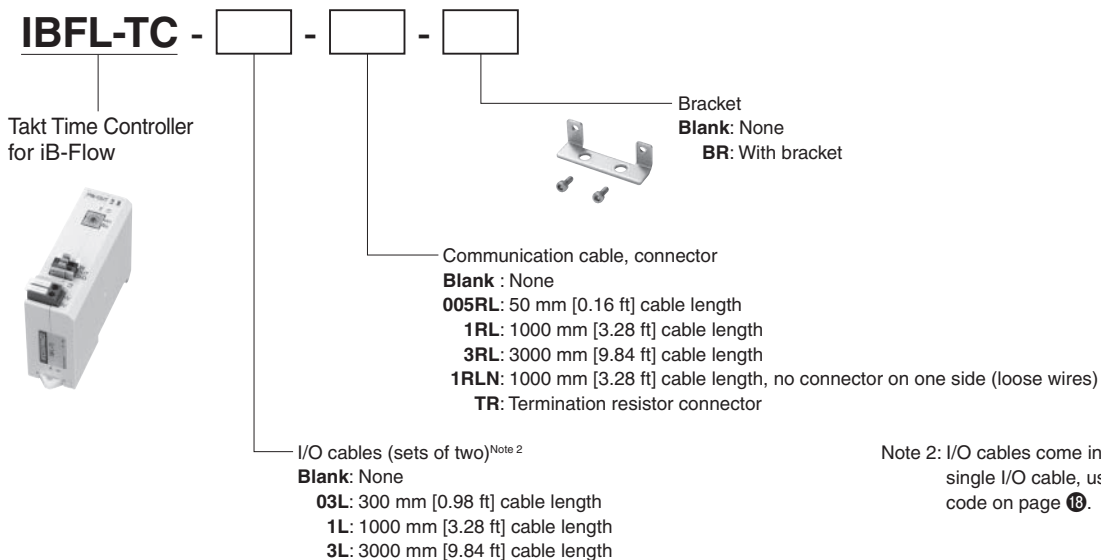
Setting device



Note 1: An AC adapter or battery unit is required when using a setting device. An AC adapter is also required for charging a battery unit.

2: I/O cables come in sets of two. To order a single I/O cable, use the additional parts order code on page 18.

Takt Time Controller



Note 2: I/O cables come in sets of two. To order a single I/O cable, use the additional parts order code on page 18.

Order Codes

Additional Parts (available separately)

AC adapter



● IBFL-AC

Rating
Input: 100 to 240VAC
50/60 Hz
Output: 15VDC 1.2 A

※ Can be used with a setting device and battery unit.

Battery unit

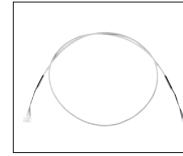


● IBFL-BT-□

AC adapter^{Note}
Blank: None
AC: With AC adapter

Note: The AC adapter is required for charging a battery unit.

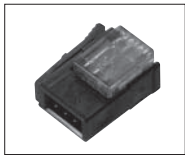
I/O cable (1 piece)



● IBFL-K-□

Cable length
03L: 300mm [0.98 ft]
1L: 1000 mm [3.28 ft]
3L: 3000 mm [9.84 ft]

Mini clamp wire mount plugs



● FS1U-3M

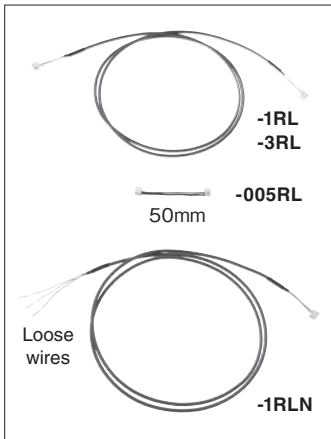
Bracket



● IBFL-□

Bracket
MB: For J4C (φ 4), J6C (φ 6), J4 (φ 4), J6 (φ 6), J8 (φ 8)
LB: For J10 (φ 10), J12 (φ 12)

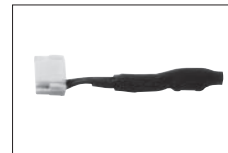
Communication cable (1 piece)



● IBFL-K-□

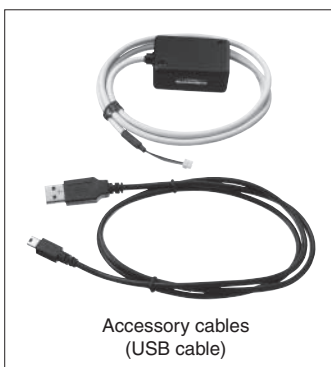
Cable length
005RL: 50 mm [0.16 ft]
1RL: 1000 mm [3.28 ft]
3RL: 3000 mm [9.84 ft]
1RLN: 1000 mm [3.28 ft], no connector on one side (loose wires)

Termination resistor connector



● IBFL-K-TR

USB-RS485 converter



● IBM2A-H1-□

Accessory cables
Blank: USB (mini-B) ⇔ USB (A) male
N: No accessory cable

Bracket (for Takt Time Controller)



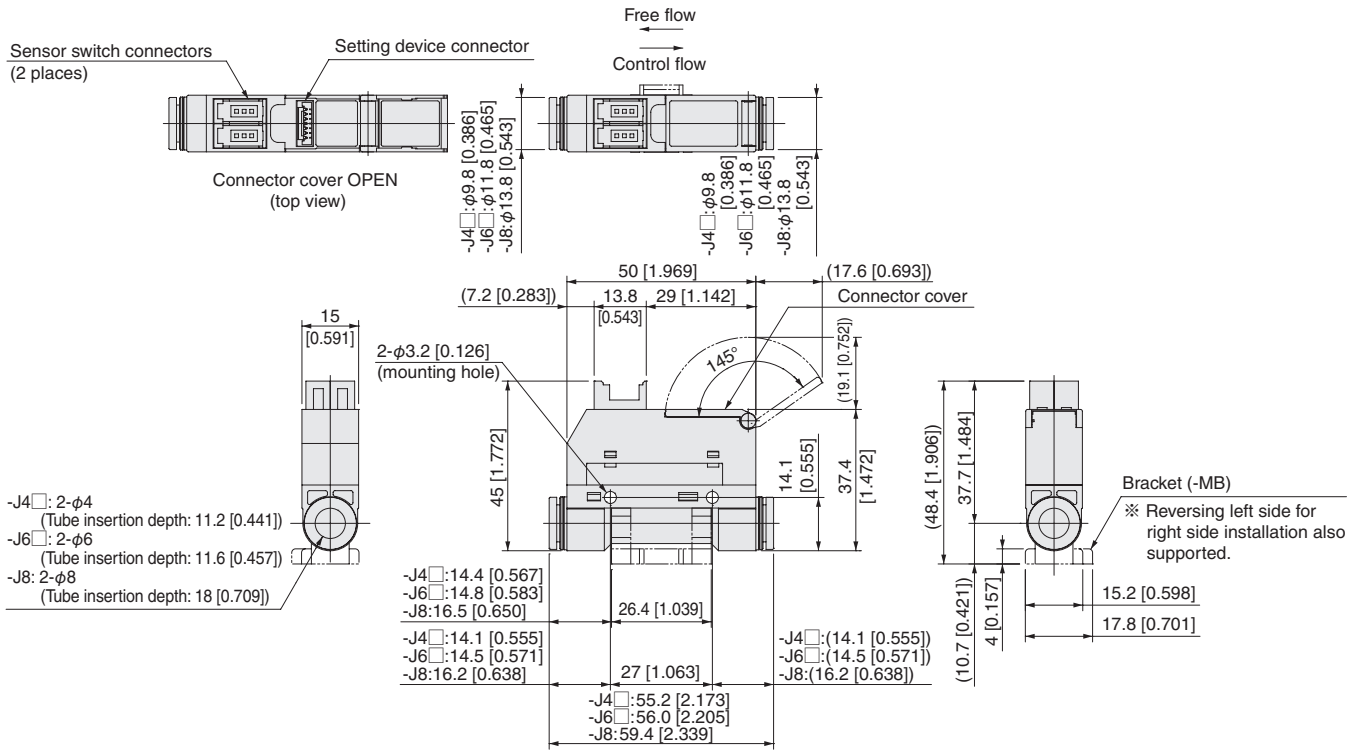
● PSU-BR

iB-Flow main unit

IBFL-J4

IBFL-J6

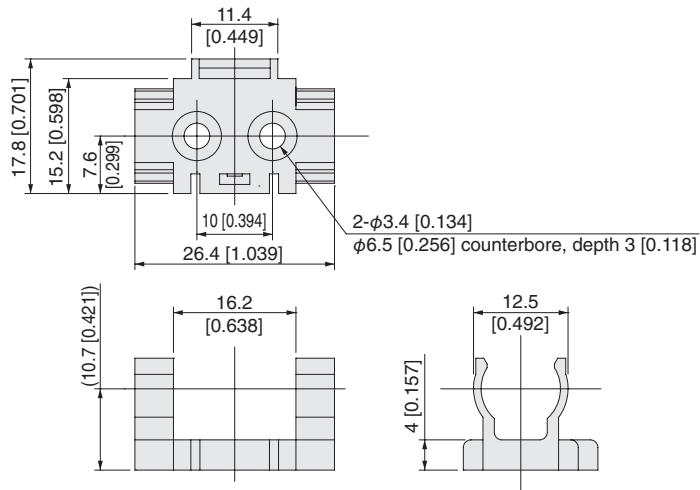
IBFL-J8



※ Two mini clamp wire mount plugs and four index labels are included on the iB-Flow main unit.

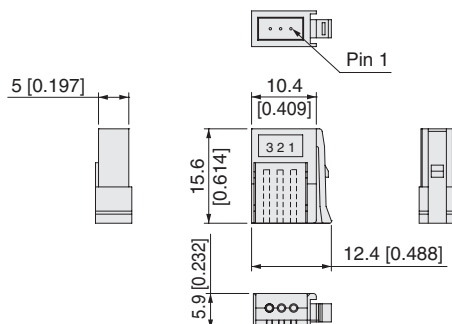
Bracket (for IBFL-J4C, -J6C, -J4, -J6, -J8)

IBFL-MB



Mini clamp wire mount plug

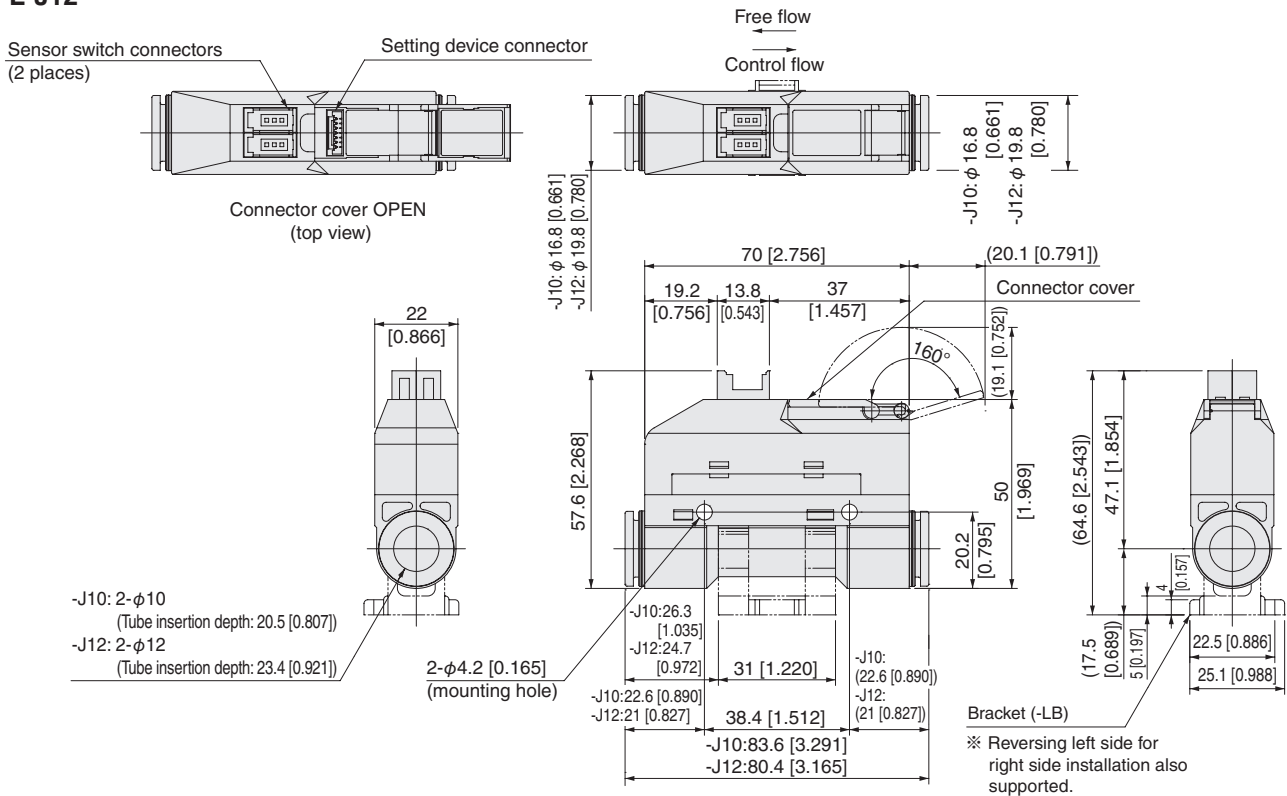
FS1U-3M



iB-Flow main unit

IBFL-J10

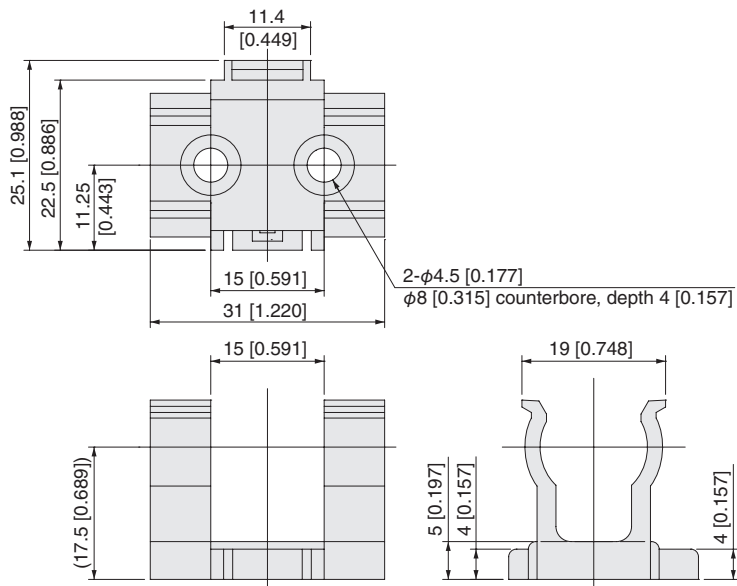
IBFL-J12



※ Two mini clamp wire mount plugs and four index labels are included on the iB-Flow main unit.

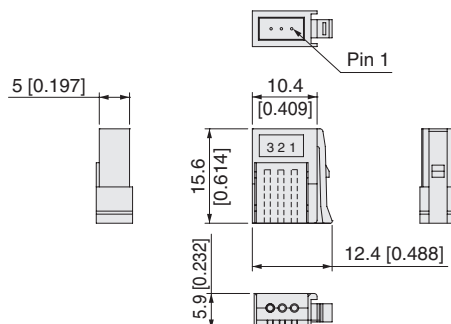
Bracket (For IBFL-J10,-J12)

IBFL-LB

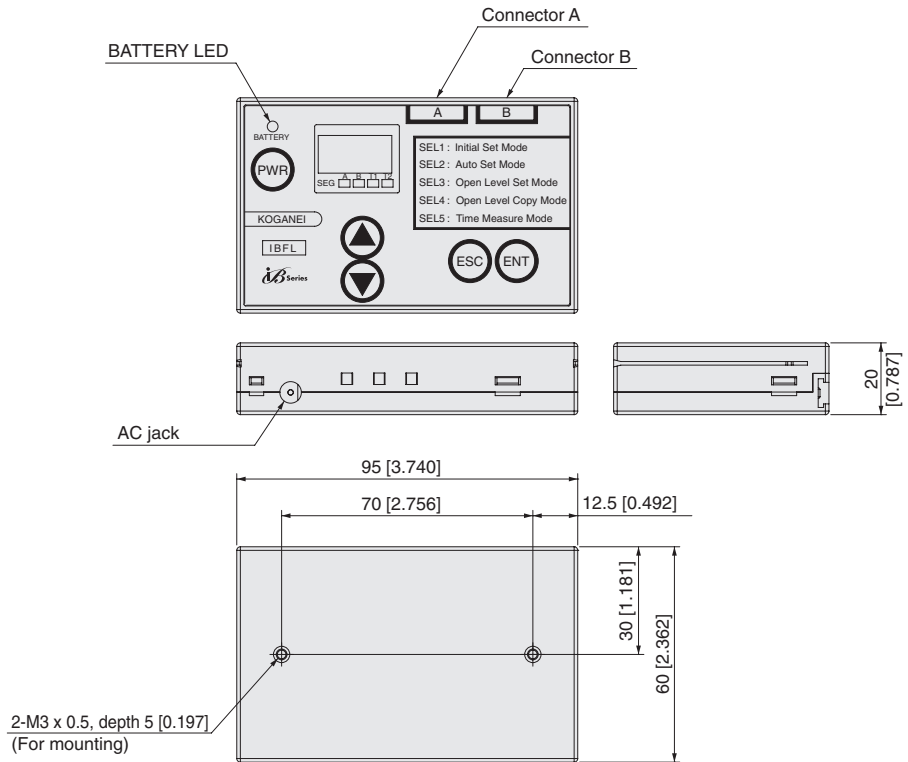


Mini clamp wire mount plug

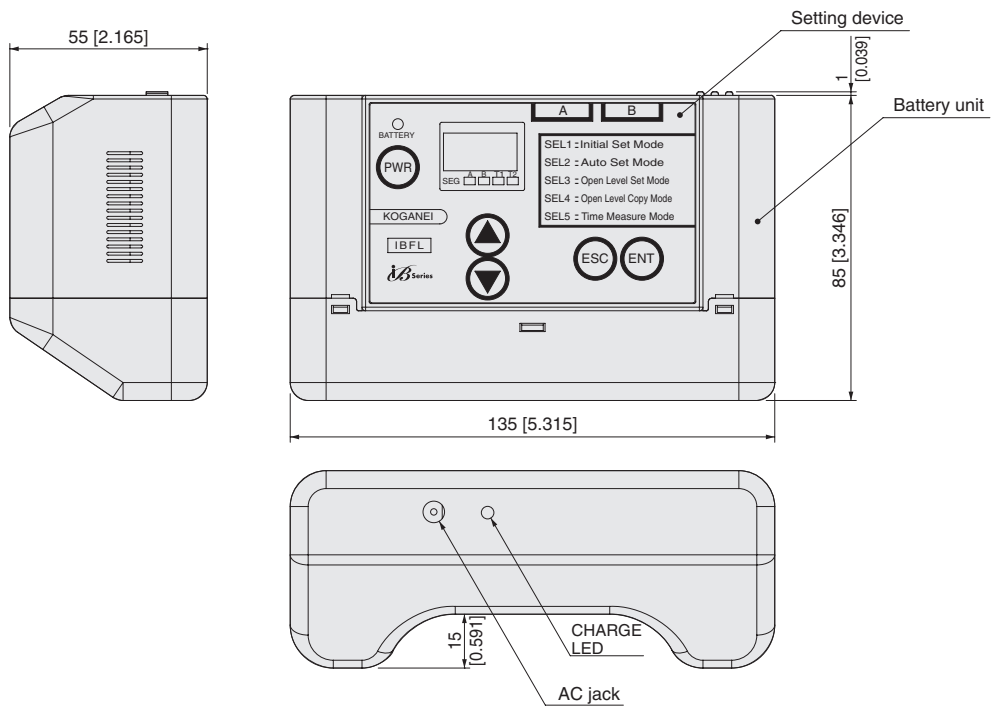
FS1U-3M



Setting device
IBFL-S



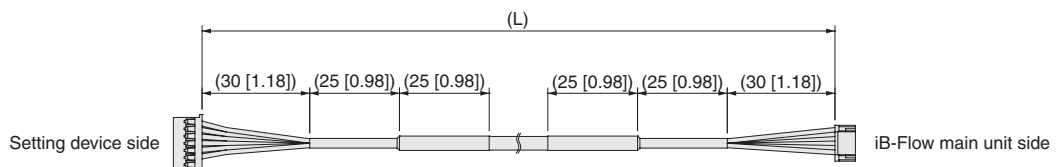
Battery unit (Drawing shows battery unit with setting device mounted.)
IBFL-BT



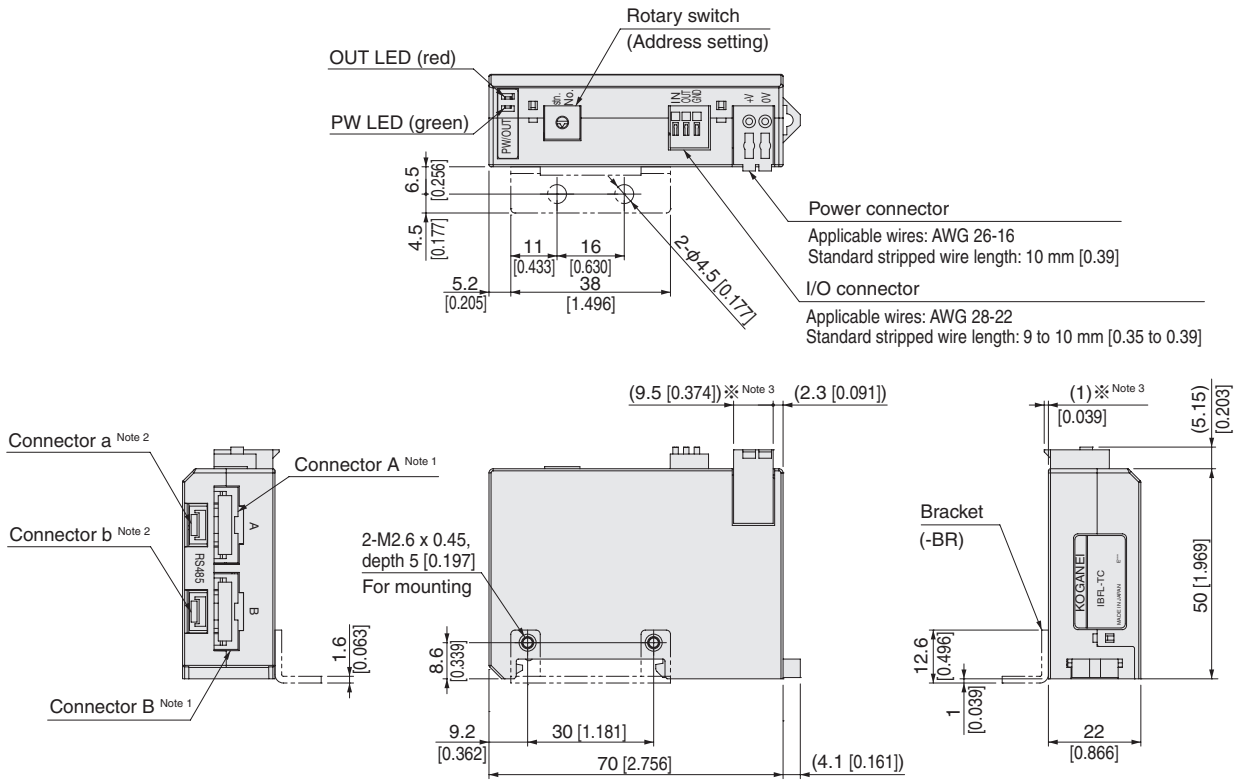
I/O cable (For iB-Flow main unit and setting device connection)

IBFL-K-□

| Model | L |
|-----------|--------------|
| IBFL-K-1L | 1000 [39.4] |
| IBFL-K-3L | 3000 [118.1] |

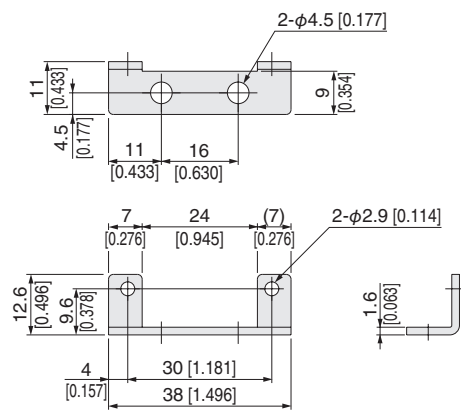


Takt Time Controller
IBFL-TC



- Note 1: Connector for connecting I/O cable to iB-Flow main unit.
- Note 2: Connectors to connect USB-RS485 converter, communication cable, and termination resistor. Using connector a or b is the same.
- Note 3: Design installation to account for power connector ※ portion dimension when doing a direct installation of the controller.

Bracket (bracket for Takt Time Controller)
PSU-BR

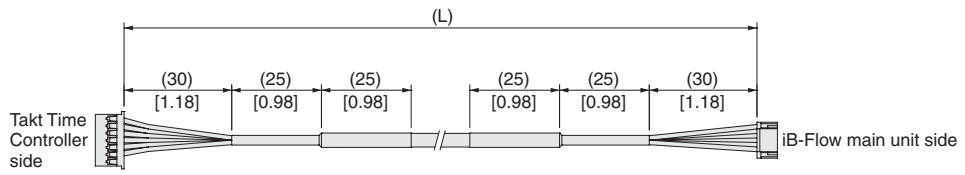


Hexagon socket head screw
M2.6 x 0.45, length 5 [0.20], 2 pcs. provided

I/O cable (For iB-Flow main unit and Takt Time Controller connection)

IBFL-K-□

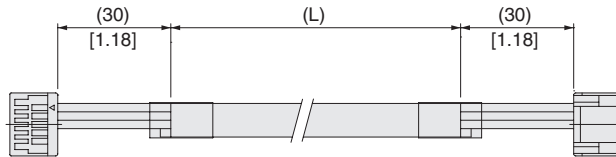
| Model | L |
|------------|-------------|
| IBFL-K-03L | 300 [11.8] |
| IBFL-K-1L | 1000 [39.4] |
| IBFL-K-3L | 3000 [118] |



Communication cable

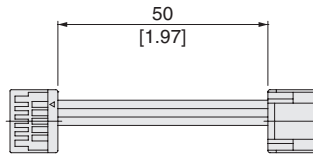
IBFL-K-□

| Model | L |
|------------|-------------|
| IBFL-K-1RL | 1000 [39.4] |
| IBFL-K-3RL | 3000 [118] |



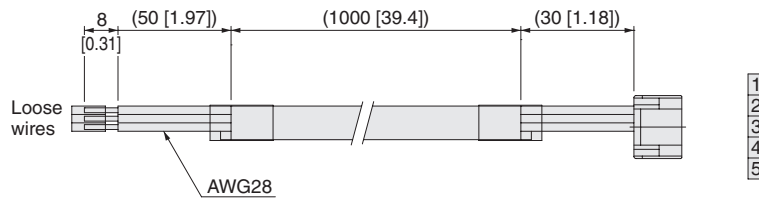
Communication cable

IBFL-K-005RL



Communication cable <no connector on one side (loose wires)>

IBFL-K-1RLN

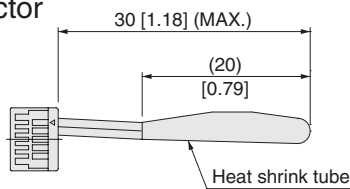


Connector terminal locations

| No. | Name | Color |
|-----|------|--------|
| 1 | A | White |
| 2 | B | Pink |
| 3 | GND | Yellow |
| 4 | | |
| 5 | | |

Termination resistor connector

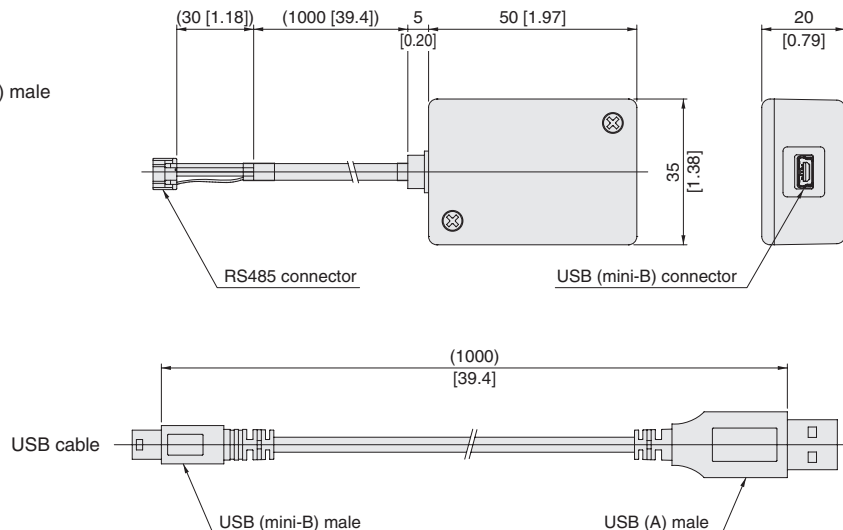
IBFL-K-TR



USB-RS485 converter

IBM2A-H1-□

Accessory cables
Blank: USB (mini-B) male ⇔ USB (A) male
N: No accessory cable



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 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.

- 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.

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