

\* For other details about specifications and precautions, see the catalog.  
\* For inquiries about the product, contact the Koganei overseas group at the number below.



Thank you for selecting this Koganei product.

Before using this product, be sure to read this manual and perform operations as described herein.

Carefully store this manual where it is available for future reference.

Note: Operation of the setting device is supported by version 2.00 or later of the IBFL-S software.

**Danger** Do not use this product for the purpose of accident prevention or other safety assurance application. Using the product in such an application creates the risk of loss of human life.

## 1 Specifications

### ● iB-Flow

Item	Model	IBFL-J4C	IBFL-J4	IBFL-J6C	IBFL-J6	IBFL-J8	IBFL-J10	IBFL-J12
Tube outer diameter	mm	φ 4		φ 6		φ 8	φ 10	φ 12
Medium		Air						
Operating pressure range	MPa	0.1 to 0.7 (0 to 0.7 when used for air blow.)						
Proof pressure	MPa	1.05						
Operating temperature range	°C	0 to 40						
Dielectric strength		500VAC for one minute						
Insulation resistance		100 MΩ minimum at 500VDC						
Mass	g	31		34		83		
Flow rate (at 0.5 MPa)	Free flow	180		410		830		
	Control flow	24	75	24	150	530		

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

Supported wire diameter: AWG No. 24-26, nominal cross section within 0.14 to 0.3 mm SQ., insulation outside diameter 0.8 to 1.0 mm

### ● 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)
Sensor switches <sup>1, 2</sup>		12 to 24VDC <sup>+10%</sup> <sub>-5%</sub> Reed switch, solid-state sensor switch (2-lead wire, 3-lead wire: NPN output type)
I/O cable length		-1L: 1 m, -3L: 3 m
Operating temperature range	°C	0 to 40
Storage temperature range	°C	-10 to 50
Operating humidity range	%RH	35 to 85 (non-condensation)
Vibration resistance	m/s <sup>2</sup>	49.0 (When directly installed to a device or mounting surface. Excluding battery unit.)
Shock resistance	m/s <sup>2</sup>	98.1 (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
Mass	g	70 (Excluding cable)
Mounting methods		Direct mounting (M3 x 0.5, depth 5 mm, 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	0 to 40
Storage temperature range	°C	-10 to 50 (Store at a temperature of -10 to 30°C when not charging for long periods.)
Operating humidity range	%RH	35 to 85 (non-condensation)
Shock resistance	m/s <sup>2</sup>	98.1
Dielectric strength		500VAC for one minute
Insulation resistance		100 MΩ minimum at 500VDC
Mass	g	350 (Excluding setting device.)

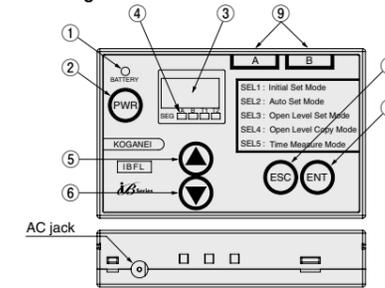
Note: The battery unit is not charged when shipped from the factory. Charge completely before use.

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

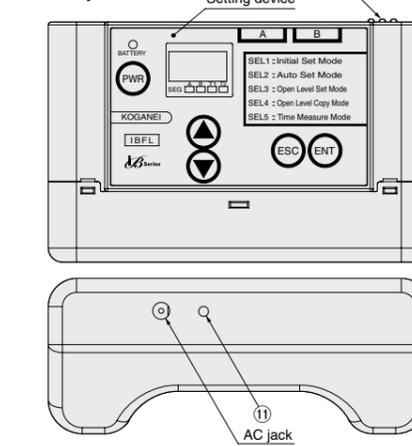
If the battery unit is not used for a long time, periodically charge it.

## 2 Names and functions

### ■ Setting device

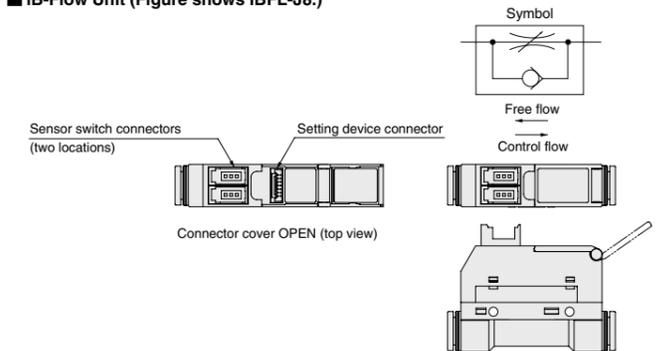


### ■ Battery unit



No.	Name	Description
①	BATTERY LED (red)	Lights when using a battery unit to indicate low battery power. Flashes when battery capacity is very low.
②	PWR Key (Power switch)	Hold down for at least one second to turn power on, and at least two seconds to turn power off.
③	7-segment LCD (green)	Displays settings, values, and error messages.
④	LCD segment indicators (red)	Lights and flashes to indicate sensor switch status and during iB-Flow unit adjustment.
⑤	UP key (▲)	Scrolls a setting upwards.
⑥	Down key (▼)	Scrolls a setting downwards.
⑦	ESC key	Cancels a setting.
⑧	ENT key	Applies a setting.
⑨	Connector A, Connector B	For connection of the I/O cable to the iB-Flow unit.
⑩	Stopper	Keeps the setting unit from detaching from the battery unit.
⑪	CHARGE LED (red)	Lights during battery unit charging and goes out after charging is complete.

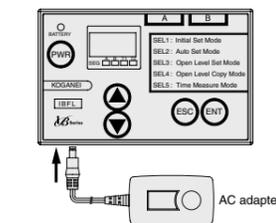
### ■ iB-Flow Unit (Figure shows IBFL-J8.)



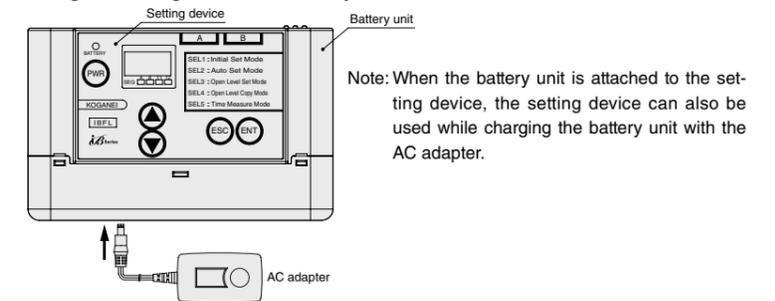
## 3 Power

### 1. Using an AC adapter.

#### ■ Using for setting device alone.

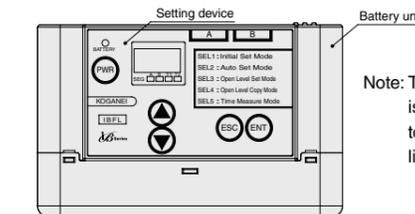


#### ■ Using for a setting device with a battery unit.



### 2. Using a battery unit

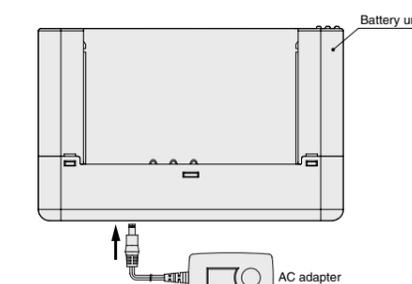
#### ■ Using for a setting device with a battery unit.



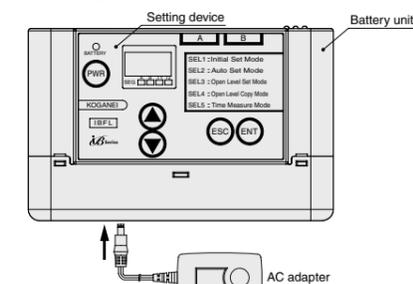
Note: The BATTERY LED (red) will light when remaining battery power is low. If battery power goes very low, the BATTERY LED will start to flash and then power will turn off. If the BATTERY LED (red) lights, charge the battery unit.

### 3. Charging the battery unit

#### ■ Charging battery unit by itself.



#### ■ Charging with battery unit attached to setting device.



Note 1: The CHARGE LED (red) on the bottom of the battery unit is lit while charging is in progress, and goes out when charging is complete.

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

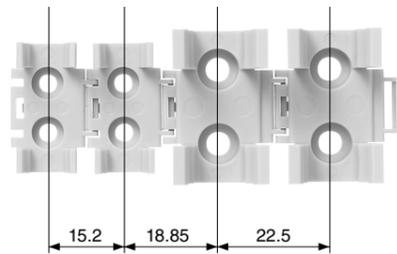
## 4 Installation and wiring

### ● Installation

- 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.
- Screw tightening torque when using the iB-Flow unit mounting holes or a bracket for mounting are 0.5 N·m for an M3 screw and 1.0 N·m for an M4 screw. Exceeding the specified tightening torque may damage the iB-Flow unit, the bracket, etc.
- 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.
- Before performing piping work on the iB-Flow 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.
- This product cannot be used in applications where zero leakage is required.  
Use a separately available stop valve.

### ● Mounting bracket

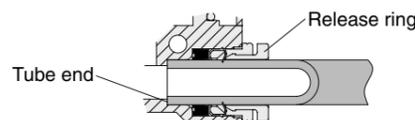
Multiple iB-Flow mounting brackets can be connected in series. Even different size (IBFL-MB, IBFL-LB) brackets can be connected in series.  
Note: There is looseness in a serial connection. When stable mounting is required, secure each bracket with screws.



### ● Attaching and detaching tubing

#### Tubing installation precautions

- Cut the tubing so the cut cross section is straight. Take care not to damage the outer surface of the tubing and not to cause the tubing to become oval shaped.
- When installing tubing, failure to insert the tubing all the way up to the tube end can cause leakage.



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

#### Tubing release precautions

- Before removing tubing, be sure to check to make sure that pressure inside the tubing is atmospheric pressure.
- 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

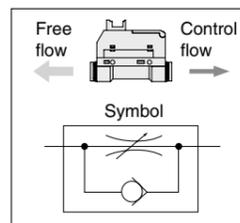
Use of both nylon tubing and urethane tubing is supported. Nylon tube outside diameter precision should be within  $\pm 0.1$  mm (nominal) for nylon tubing and within  $\pm 0.15$  mm (nominal) for urethane tubing. Use tubing with ovality (difference between major axis and minor axis) within 0.2 mm. Use 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.

- NOTE**
- Use tubing with an exterior that is undamaged. If tubing becomes damaged after repeated use, cut off the damaged portion.
  - 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 tubing.
  - Do not use extremely soft tubing, which causes a severe drop in pull-out strength.

Tube size	Minimum bending radius	
	Nylon tube	Urethane tube
$\phi 4$	20	10
$\phi 6$	30	15
$\phi 8$	50	20
$\phi 10$	80	27
$\phi 12$	150	35

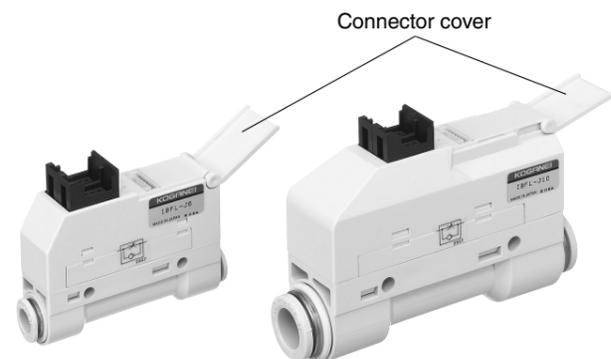
### ● Air control direction

The iB-Flow 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 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 connectors are protected by a connector cover. 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.

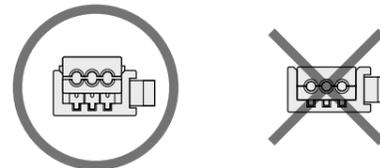


### ● Connecting the sensor connector

When adjusting and measuring 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, PLC, etc. via the iB-Flow unit.

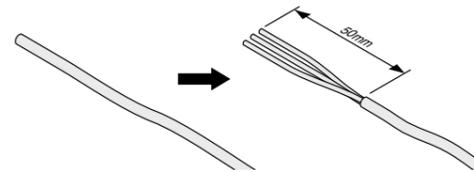
Perform the following steps to connect the sensor switch lead wires and sensor connector mini clamp wire mount plugs (male).

- 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.



- Cut the cable to the required length.

Strip the outer covering of the cable, 50 mm from the end, to expose the lead wires. Do not strip the insulation from the individual lead wires at this time.

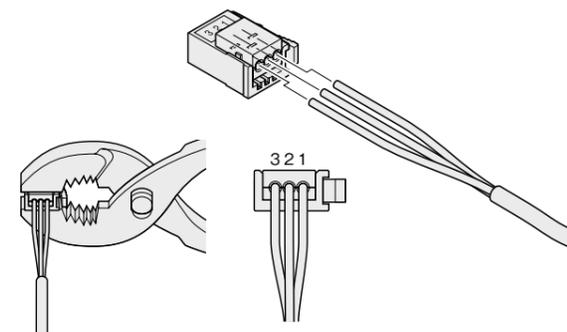


- Insert the lead wires into the connector cover holes in accordance with the information in the table below. Check to make sure the lead wires are fully inserted as far as they will go by viewing the semi-transparent top cover of the connector. (Wire goes in about 9 mm.)

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

**NOTE** Use of a 3-lead wire PNP output type solid-state switch is not supported.

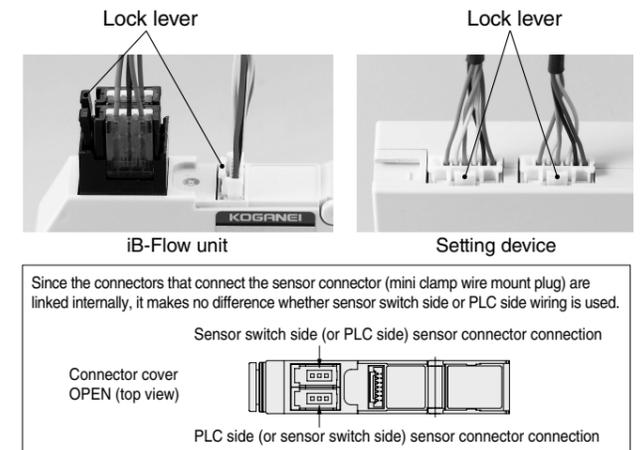


- Taking care not to remove the lead wires from the connector, use pliers or some other type of hand tool to squeeze the cover and the connector body until the cover is pressed into the body. Do not apply force in excess of 980.7 N. Connection is complete when the cover is even with the connector body.
- Double check to make sure that wiring is correct.

Note: The compatible wire diameter for the included mini clamp wire mount plugs is in accordance with specification AWG No.24-26, nominal cross section within 0.14 to 0.3 mm SQ., insulation outside diameter 0.8 to 1.0 mm.

### ● 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 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.



### ● Mounting and removing a setting device on a battery unit

Mounting a setting device on a battery unit

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

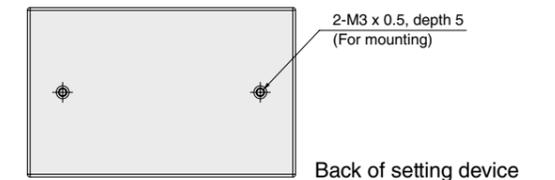


Removing a setting device from a battery unit

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

### ● Setting device mounting

When mounting a setting devices, use M3 x 0.5 screws, tightened to a torque of 0.5 N·m. Exceeding the specified tightening torque may damage the setting device.



### ● Others

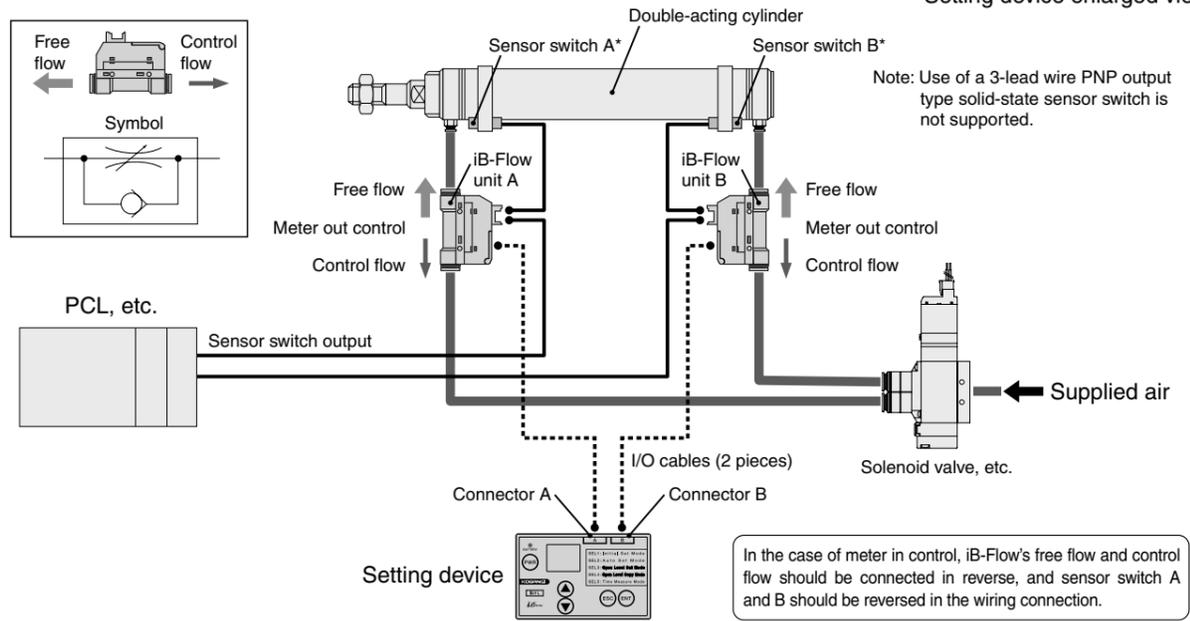
- Incorrectly wiring the iB-Flow unit, setting device, and sensor switch cable will result in breakdown. Carefully check wiring before supplying power.
- Setting values are written into and stored in flash memory built into the setting device. Note that the number of flash memory rewrites is limited. The guaranteed number of rewrites is 10,000.
- Never use a needle tip or any other sharp pointed object to perform key operations.
- The battery unit is not charged when shipped from the factory. Charge completely before use.
- If the battery unit is not used for a long time, periodically charge it.
- 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.

## 5 Operation and settings

### ● Connections

Connect as described below for auto adjustment of the double-acting air cylinder operation time.

Note: Connect the lead wire of the sensor switch installed on the cylinder rod side (head side) to an iB-Flow unit installed on the piping of the rod side (head side).



### ● Operation

Note: The following operations are supported by version 2.00 or later of the **IBFL-S** software.

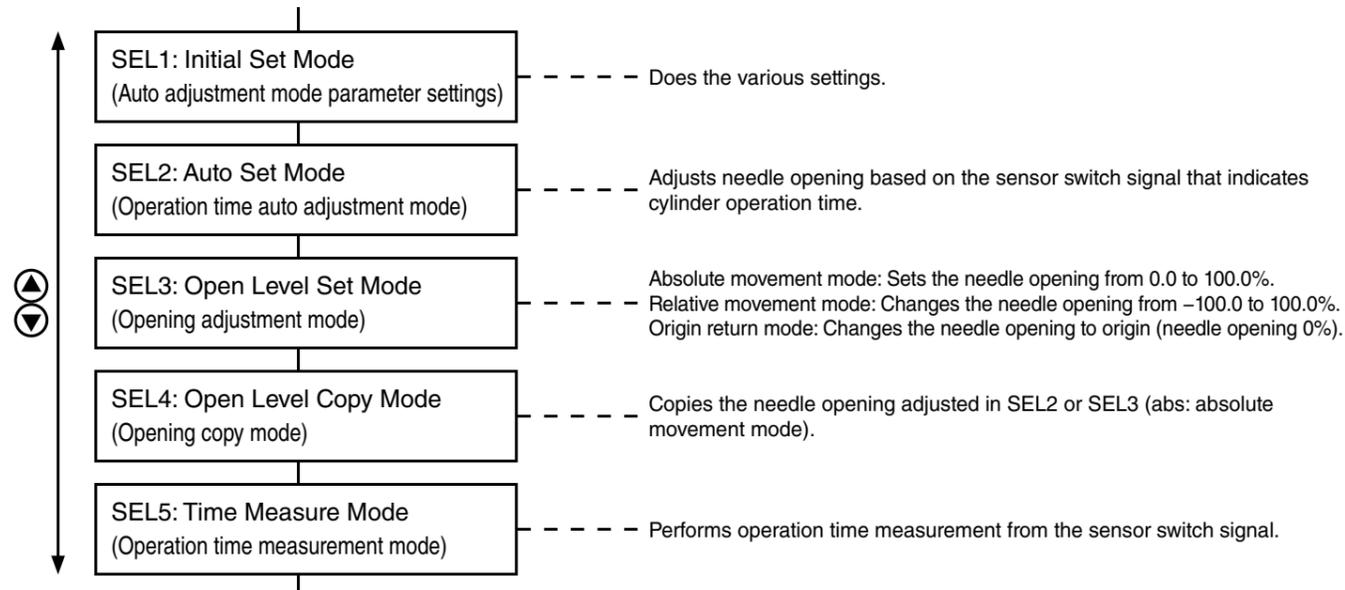
### ■ Turning power ON or OFF

Power ON : **PWR** key Hold down for at least one second.

Power OFF: **PWR** key Hold down for at least two seconds.

### ■ Selecting a mode

Use the **▲**/**▼** keys to select a mode (SEL1 through 5) and then press the **ENT** key. This enters the selected mode.



## ■ Auto adjustment mode parameter settings and software version display (SEL1: Initial Set Mode)

A side initial opening setting: Sets the A side needle opening at first operation during auto adjustment [Default: 50.0%]

B side initial opening setting: Sets the B side needle opening at first operation during auto adjustment [Default: 50.0%]

Upper limit opening setting: Sets the upper limit during auto adjustment [Default: 100.0%]

Lower limit opening setting: Sets the lower limit during auto adjustment [Default: 20.0%] <sup>Note</sup>

Note: Over 5.0% for low flow rate type (**IBFL-J□C**) and over 20.0% for other types is recommended.

The cylinder may not operate during adjustment because flow rate is too low if setting is lower than values given above.

If the cylinder does not operate, raise the value set for the lower limit opening and adjust it again.

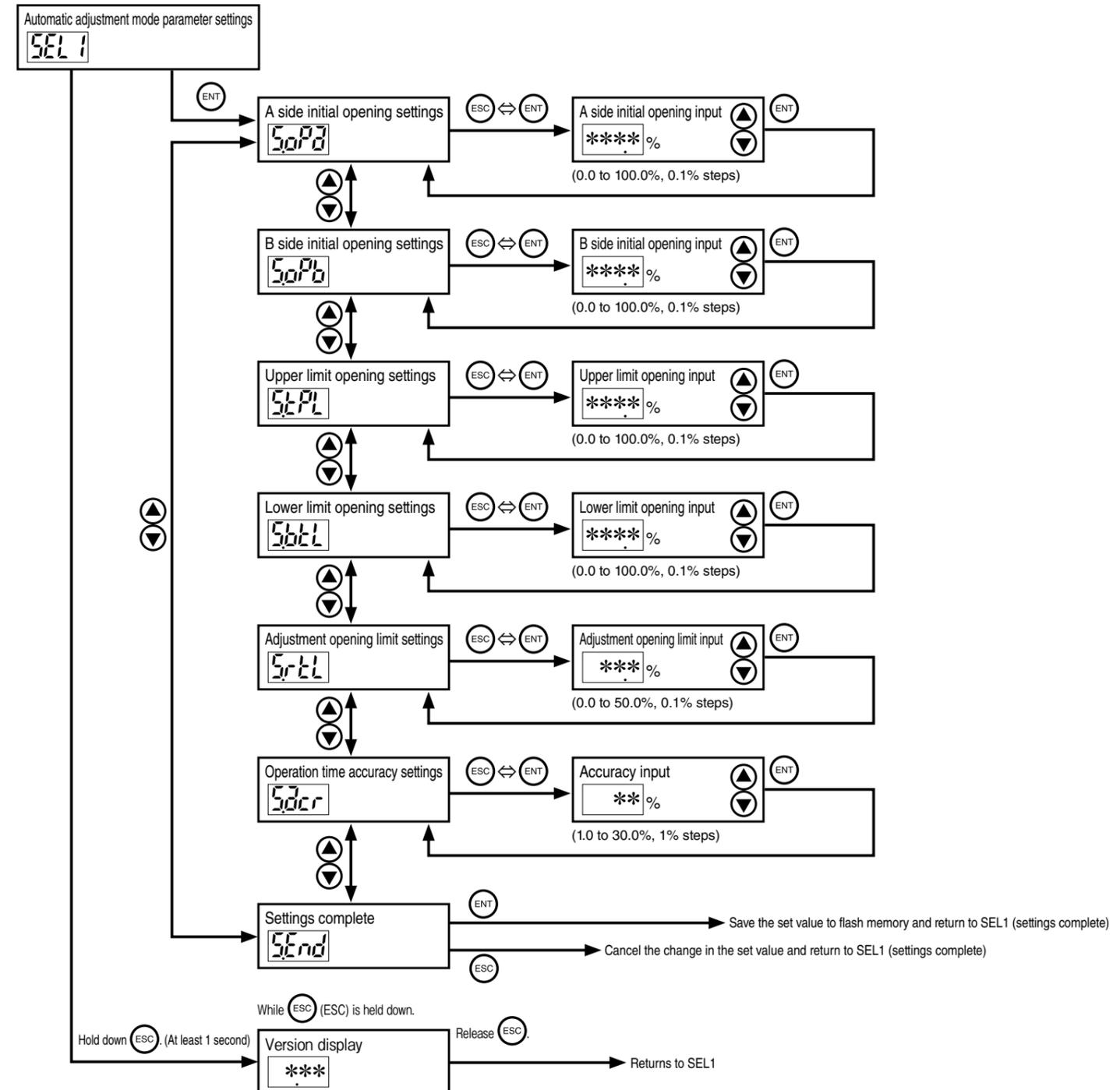
Adjustment needle opening limit setting: Sets the limit of the adjustment needle opening for one operation during auto adjustment [Default: 50.0%]

Operating time accuracy setting: Sets the accuracy (allowable error) used to determine the end of adjustment [Default: 10%]

Formula to determine the end of adjustment shown below.

$$\text{Setting Time} - \text{Setting Time} \times \text{Accuracy} \leq \text{Operation Time} \leq \text{Setting Time} + \text{Setting Time} \times \text{Accuracy}$$

Software version: Shows the current software version. (Displayed while **ESC** is held down.)

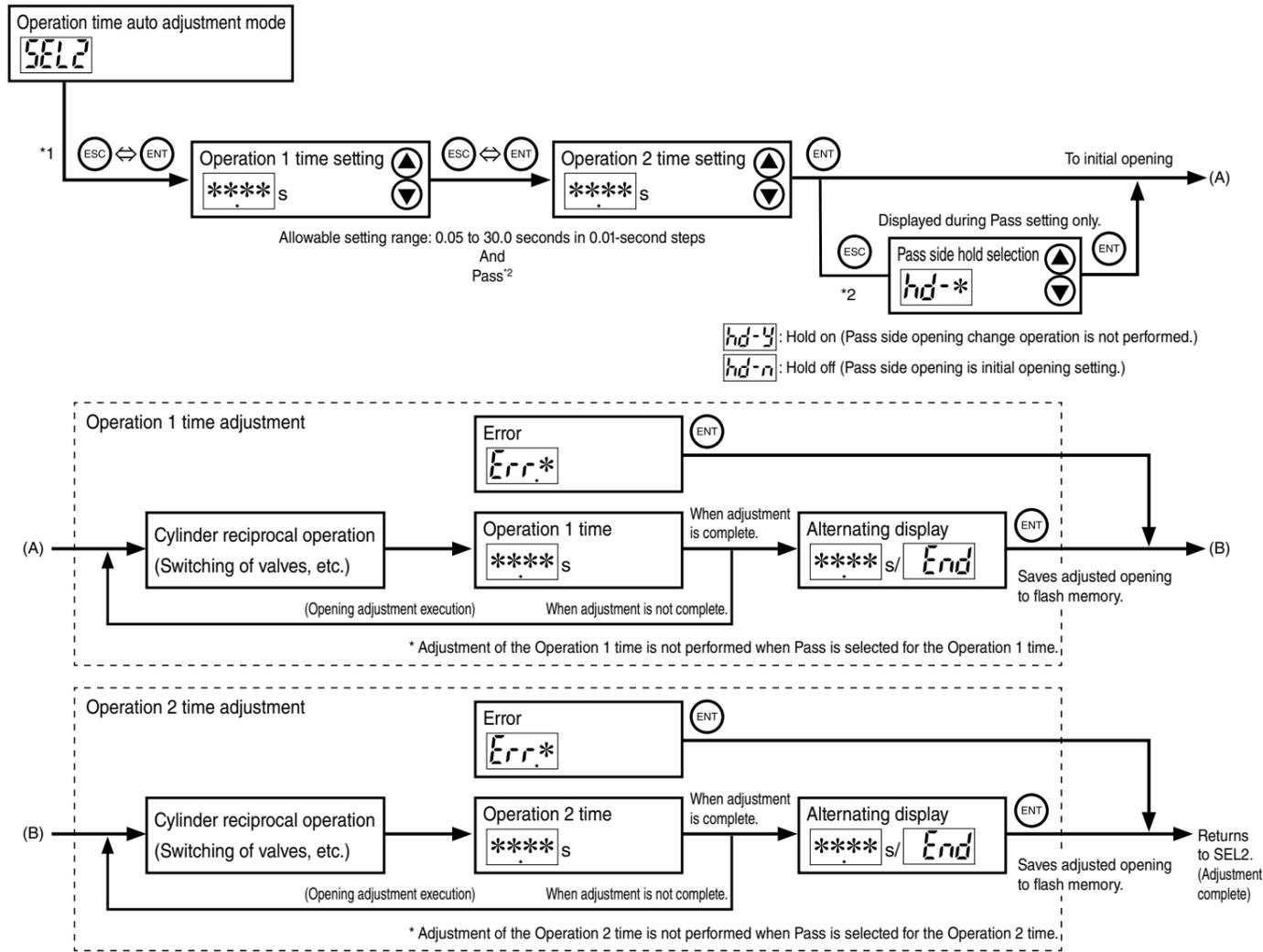


\* Settings are not stored in flash memory until you press the **ENT** key to exit the setting procedure.

## ■ Operation time auto adjustment mode (SEL2: Auto Set Mode)

The cylinder operation time setting is configured by inputting a value. Performing a number of reciprocal cylinder operation cycles causes the needle opening to be adjusted in accordance with the operation time measured from the sensor switch signal. Performing a number of reciprocal cylinder operation cycles causes the setting operation time to be approached, and adjustment is complete when it enters the range of the SEL1 accuracy setting value. After setting is complete, the display alternates between [End] and the operation time.

Operation 1 indicates the operation that starts from the initial position, while Operation 2 indicates the operation that returns to the initial position. An error is displayed when a flow rate that is outside the allowable opening adjustment range is required to complete the adjustment.



\*1: Pressing the ENT key while SEL2 is displayed will cause the sensor switch side that is ON when the key is pressed to become the initial position.

Operation 1 is operation from the initial position to the opposite end, while Operation 2 is operation from the opposite end to the initial position.

The auto adjustment mode will not be entered if both (A and B) sensor switches are OFF or ON.

If this happens, adjust the sensor switch position, and check the wiring, etc., and then try performing this operation again.

2: Using the ▼ key to scroll down to the bottom while configuring the operation time setting causes Pass to appear on the display.

Specifying Pass for a selecting side's operation time causes the side to be passed without adjusting the operation time. In that case, the opening is in accordance with the hold on setting described below.

hd-y: Hold on (Opening of the side configured with the Pass setting is not changed.)

Note that selecting hold on for the Pass side while the needle opening is small (fully closed, etc.) results in the cylinder not operating and adjustment not being performed.

hd-n: Hold off (Pass side set to its initial opening.)

### ◇ Segments

SEG.  A  B  T1  T2

A: Linked with sensor switch A  
B: Linked with sensor switch B  
T1: Lights during Operation 1 setting or adjustment  
T2: Lights during Operation 2 setting or adjustment  
T1, T2: Lights alternately during needle opening adjustment

### ◇ Error messages

Err.1: Auto adjustment operation was canceled by pressing the ESC key before it was complete.  
Err.2: Auto adjustment operation could not find an appropriate needle opening.  
Err.3: Displayed when time that is set requires needle opening larger than the upper limit opening (needle opening set to S.tpL).  
Err.4: Displayed when time that is set requires needle opening smaller than the lower limit opening (needle opening set to S.btL).  
Err.5: Timeout error. Displayed when the operation time exceeds 30 seconds.  
Err.6: Displayed when entering SEL2 when conditions do not satisfy: "lower limit opening < initial opening < upper limit opening".

\* Press the ENT key to cancel an error.

## ■ Opening adjustment mode (SEL3: Open Level Set Mode)

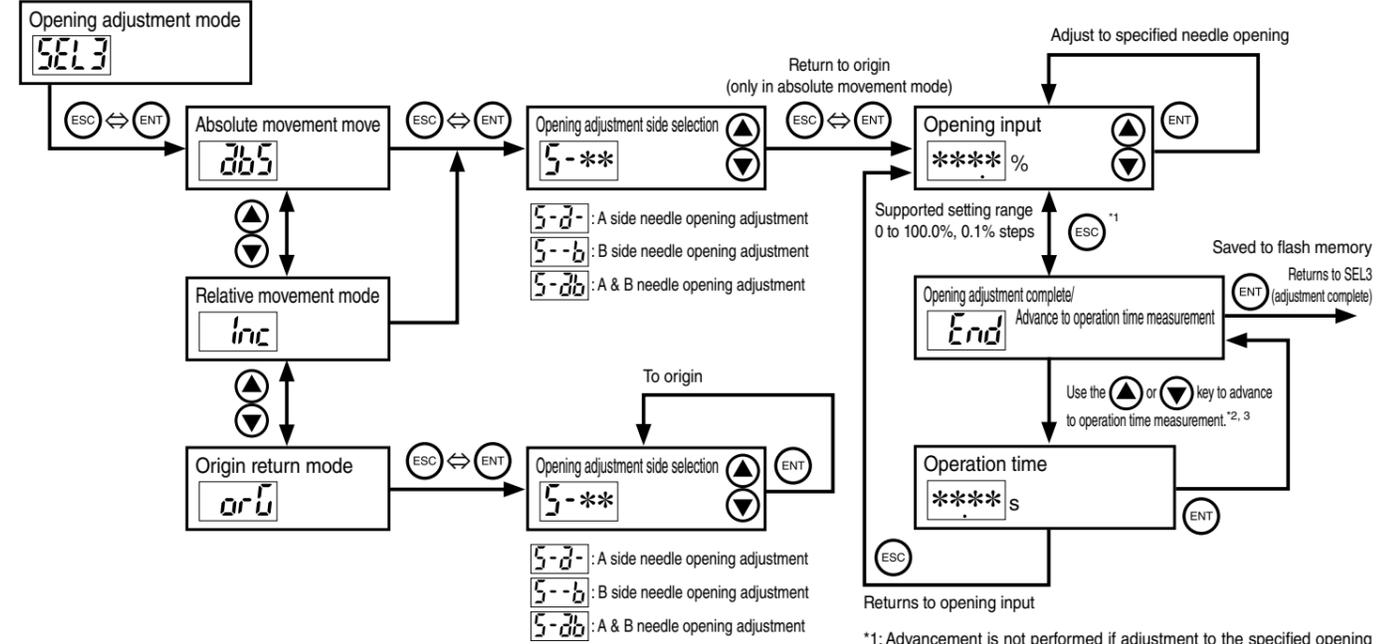
Adjusts to specified needle opening.

Absolute movement mode (abs): Adjusts needle opening to which was input as opening input (0.0 to 100.0%) using the origin as the reference.

Relative movement mode (rel): Adjusts needle opening from the current position the amount of opening input (-100.0 to 100.0%) in opening input operation. <sup>Note</sup>

Origin return mode (org): Adjusts needle opening to origin.

Note: If using relative movement mode, because needle opening may exceed 100% of the origin reference, so when using other modes to adjust the needle opening, execute origin return in origin return mode (org).



### ◇ Segments

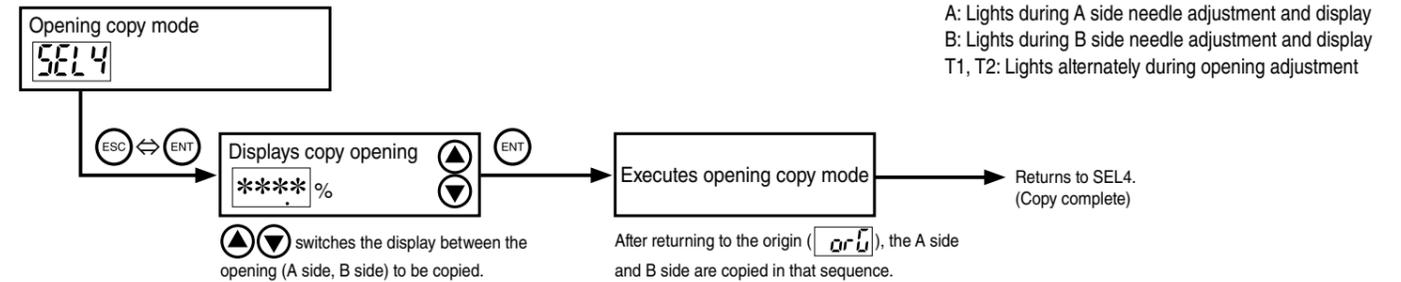
SEG.  A  B  T1  T2

A: Linked with sensor switch A  
B: Linked with sensor switch B  
T1: Lights during operation 1 display  
T2: Lights during operation 2 display  
T1, T2: Both lights when opening not adjusted.  
Lights alternately during opening adjustment.  
Both off when opening adjustment complete.

## ■ Opening copy mode (SEL4: Open Level Copy Mode)

Copies the final needle opening done in absolute movement mode in SEL2 or SEL3.

Note: Copying of side A only or side B only is not supported.



### ◇ Segments

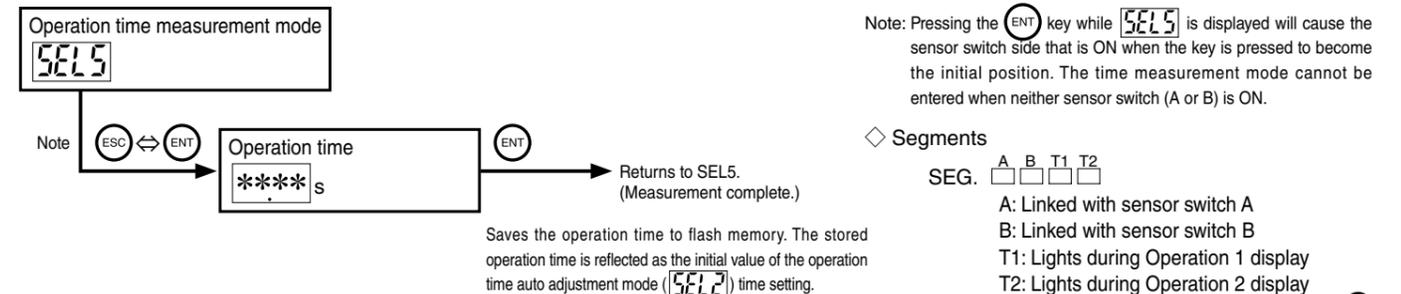
SEG.  A  B  T1  T2

A: Lights during A side needle adjustment and display  
B: Lights during B side needle adjustment and display  
T1, T2: Lights alternately during opening adjustment

## ■ Cylinder operation time measurement mode (SEL5: Time Measure Mode)

Performs operation time measurement from the sensor switch signal. The display shows the last measured cylinder operation time.

The measurable time is up to 30.00 seconds. An operation time of 30.00 or greater causes 30.00 to be displayed.



Note: Pressing the ENT key while SEL5 is displayed will cause the sensor switch side that is ON when the key is pressed to become the initial position. The time measurement mode cannot be entered when neither sensor switch (A or B) is ON.

### ◇ Segments

SEG.  A  B  T1  T2

A: Linked with sensor switch A  
B: Linked with sensor switch B  
T1: Lights during Operation 1 display  
T2: Lights during Operation 2 display