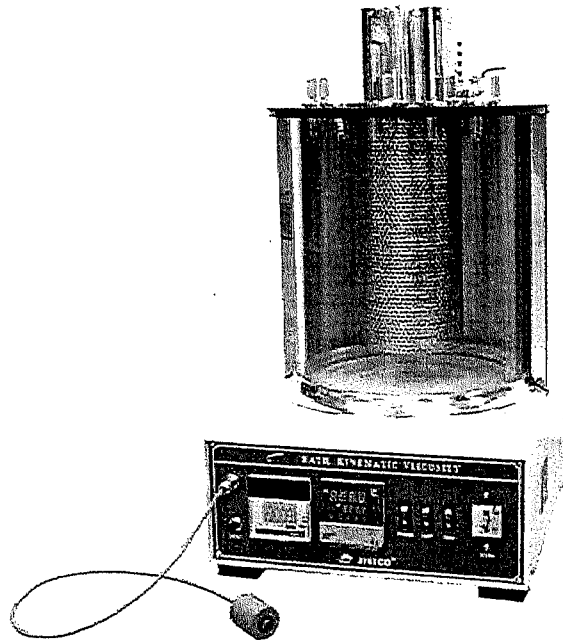


Manual No.: J-BV08-M-E-14-001(REV.02)  
2014. 05

# **Bath. Kinematic viscosity Operation Manual**



Model : J-BV08

Please read this Operation Manual carefully before use.

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## Use of Operation Manual

- Please read through and understand this Operation Manual before operating the product.  
After reading, always keep the manual nearby so that you may refer to it as needed.  
When moving the product to another location, be sure to bring the manual as well.
- If you find any incorrectly arranged or missing pages in this manual, they will be replaced.  
If the manual it gets lost or soiled, a new Operation Manual can be purchased.  
In either case, please contact your JISICO agent, and provide the "Model No." given on cover.
- This manual has been prepared with the utmost care; however, if you have any questions, or note any errors or omissions, please contact your JISICO distributor or agent.

Reproduction and reprinting of this operation manual, whole or partially, without our permission is prohibited.  
Both unit specifications and manual contents are subject to change without notice.





To SUPERVISOR in charge of this equipment.

- If the operator does not read the language used in this manual, translate the manual into appropriate language.
- Help the operator in understanding this manual before use in operation.
- Keep this manual near the tester for easy access by the operator.

## **NOTE** SAFETY SYMBOLS

This operation manual and this product use the following safety symbols.

Please keep in mind the meaning of each of the symbols to ensure safe use of the product and to prevent any damages, accidents, or problems resulting from negligence of these safety symbols. (As using symbols may depend on the product, not all of the symbols may be used.)

SAFETY SYMBOLS	
 <b>DANGER</b>	<ul style="list-style-type: none"><li>● Indicates the possibility of personal injury or death. Never fail to follow the operating procedure.</li><li>● Do not proceed beyond a WARNING sign until the noted conditions are fully met to satisfactory and understood.</li></ul>
 <b>WARNING</b>	<ul style="list-style-type: none"><li>● Indicates the existence of possibility of damage to the product or to the operator in operation.</li><li>● Never fail to follow the operating procedure.</li></ul>
 <b>CAUTION</b>	<ul style="list-style-type: none"><li>● Indicates the existence of possibility of damage to the product or to the operator in operation when cautions are not observed and followed properly.</li></ul>
 <b>NOTE</b>	<ul style="list-style-type: none"><li>● Indicates additional information such as general warning, caution, risk of danger, and operating procedure.</li><li>● When this mark is indicated on the product, refer the relevant section of the Operation Manual.</li></ul>

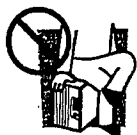
## Safety Precautions

The following safety precautions must be observed and followed to avoid fire hazard, electrical shock, accidents, and other failures. Keep them in mind and make sure that all the precautions are observed and followed properly. JISICO Co., Ltd. assumes no liability nor any responsibility against any damages, accidents, or problems resulting from negligence of the precautions.



### Users

- This product must be used only by qualified personnel who understand the contents of this operation manual.
- If it is handled by disqualified personnel, personal injury may result. Be sure to handle it under supervision of qualified personnel.



### Purpose of use

- If the product is to be used for purposes not described in this manual, contact your JISICO agent in advance.



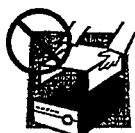
### Input Power

- Use the product with the specified input power voltage.
- For applying power, use the AC power cable provided. The shape of the plug differs according to the power voltage and areas. Use the cable which is suitable for the line voltage used.



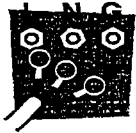
### Fuse

- With products with a fuse holder on the exterior surface, the fuse can be replaced with a new one.
- When replacing a fuse, use the one which has appropriate shape, ratings, and specifications.



### Cover

- There are parts inside the product which may cause physical hazards. Do not remove the external cover. If the cover must be removed, contact your JISICO agent in advance.



### Installation

- When installing products be sure to observe Installation Precaution described in this manual.
- To avoid electrical shock, connect the protective ground terminal to electrical ground (safety ground).
- When applying power to the products from a switchboard, be sure work is performed by a qualified and licensed electrician or is conducted under the direction of such a person.
- Be sure to use the AC power cable provided.



### Relocation

- Turn off the power switch and then disconnect all cables when relocating the product.
- Use two or more persons when relocating the product which weights more than 20 kg. The weight of the products can be found on the rear panel of the product and/or in this operation manual.
- Use extra precautions such as using more people when relocating into or out of present locations including inclines or steps. Also handle carefully when relocating tall products as they can fall over easily.
- Be sure the operation manual be included when the product is relocate



### Maintenance

- To avoid electrical shock, be absolutely sure to unplug the AC power cable or stop applying power before performing maintenance or checking.
- Do not remove the cover when performing maintenance or checking. If the cover must be removed, contact your JISICO agent in advance.
- To maintain performance and safe operation of the product, it is recommended that periodic maintenance, checking, cleaning, and calibration be performed.



### SERVICE

- Internal service is to be done by JISICO service engineers.
- If the product must be adjusted or repaired, contact your JISICO agent.

## 1. Intended use of the apparatus.

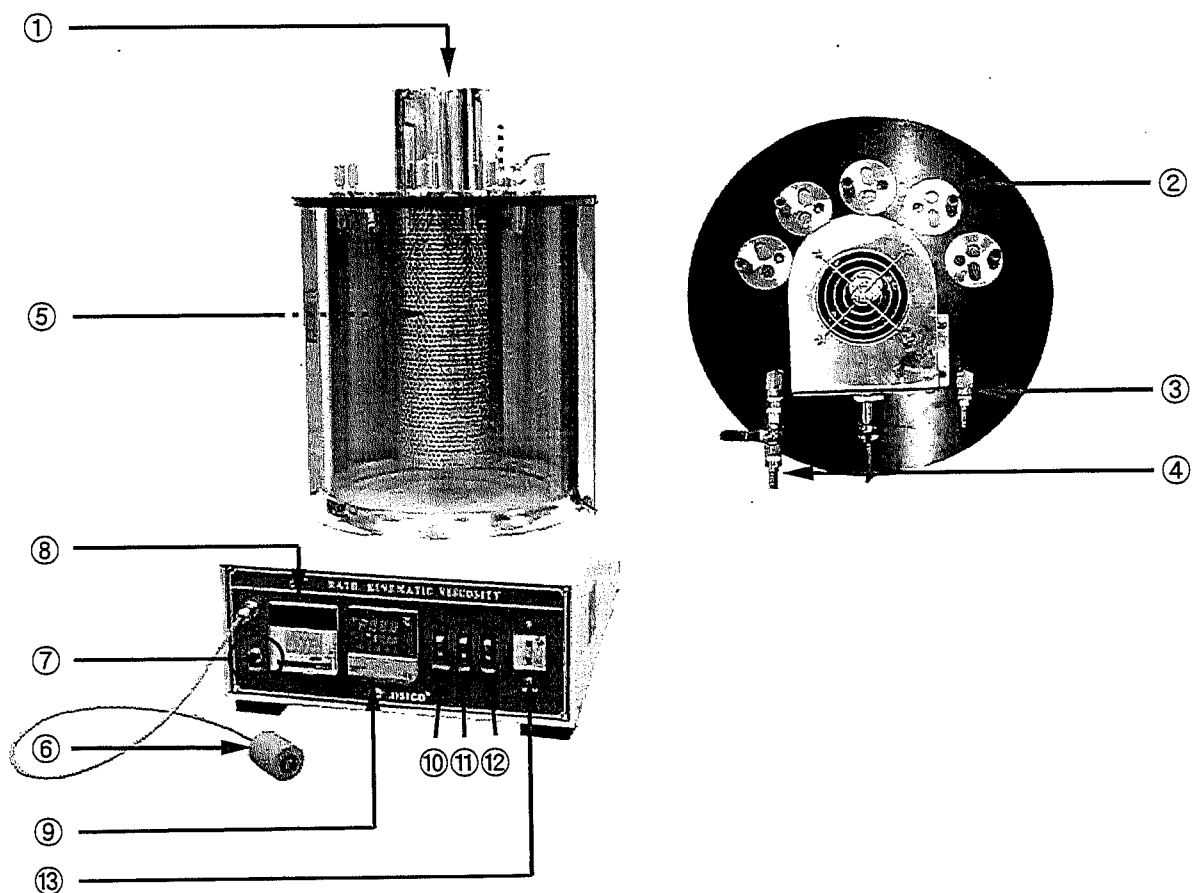
The Bath. Kinematic viscosity is of primary importance in the design and selection of a wide range of petroleum products. Calibrated capillary viscometers are used to measure flow under gravity at precisely controlled temperatures.

## 2. Feature of product.

- It has been installed an automatic controller to control stirrer & heater at the bottom of super-hard glass bath.
- By installing water cooling system, it's capable of testing in short time at various temp. (reducing temp. drop time)
- It's produced to survey viscosity conveniently by attaching timer(sec.) in bath.
- It is aimed for getting uniform distribution of temp. in bath by attaching stirrer with good efficiency.
- It can be accommodated five capillary viscometers.



### 3. Appearance



- ① Motor (Stirring rod and impeller)
- ② Viscometer holder
- ③ Cooling line output
- ④ Cooling line input and control valve
- ⑤ Cooling line
- ⑥ Time counter switch
- ⑦ Reset push switch
- ⑧ Timer
- ⑨ Temp. controller
- ⑩ Stirrer switch
- ⑪ Lamp switch
- ⑫ Timer switch
- ⑬ Main switch(E.L.B)

## 4. Installation.

### 4.1 Precautions for Installation

- This equipment is designed and manufactured to operate properly only in use of rated voltage. Refer to specification section of this manual for rated voltage before installation.
- Use AC power cable that comes with (or installed to) the product.
- Do not touch the Power Cord wet handed.
- Avoid locations where the equipment is exposed to direct sunshine.
- Do not place the equipment in a corrosive atmosphere.
- Do not use the equipment in a flammable atmosphere.
- Do not use the equipment where ventilation is poor.
- Do not locate the equipment in a dusty location.
- Do not use in an unstable place that are subject to vibrations.
- Avoid locations of high humidity.
- Avoid locations where the equipment is exposed to high temperature.
- Recommended temperature range : 20°C to 30 °C
- Use the equipment indoors only.
- Secure adequate space around the power plug.

### 4.2 How to install

- Use with a minimum distance all around of 20cm from walls of other items.
- Locate in a flat place.
- Connect the power cord to an outlet with earthing point.
- In case of connecting to an outlet without earthing point, connect lead wire to the earth after connecting grounding adapter.

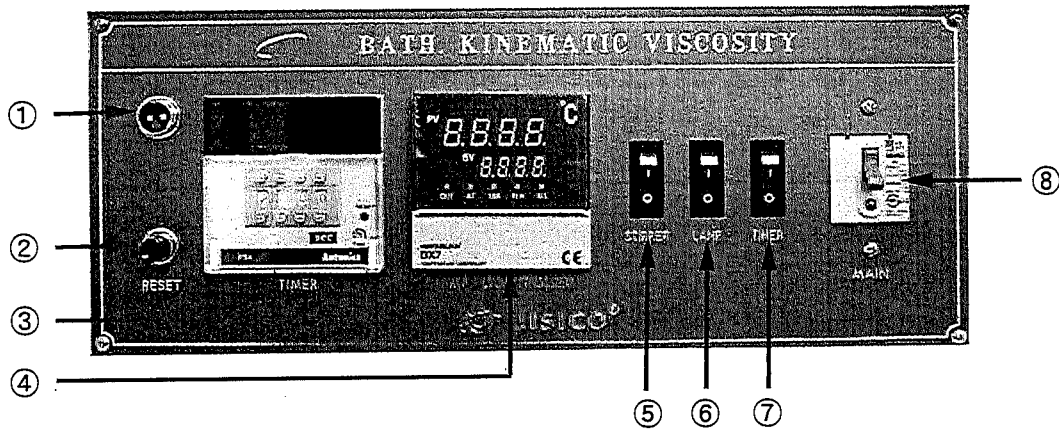
### 4.3 How to ground Earth wire



- Earth wire must be grounded to prevent any electrical accidents.
- Improper or no grounding may cause electrical shock.
- Grounding terminal is included in the power plug.
- Therefore, there is no need to earth if plug in connected to a consent with grounding terminal.
- If grounding terminal with consent is not available, install adapter to plug to ground earth wire from green terminal or install earth wire to the grounding terminal of the equipment.

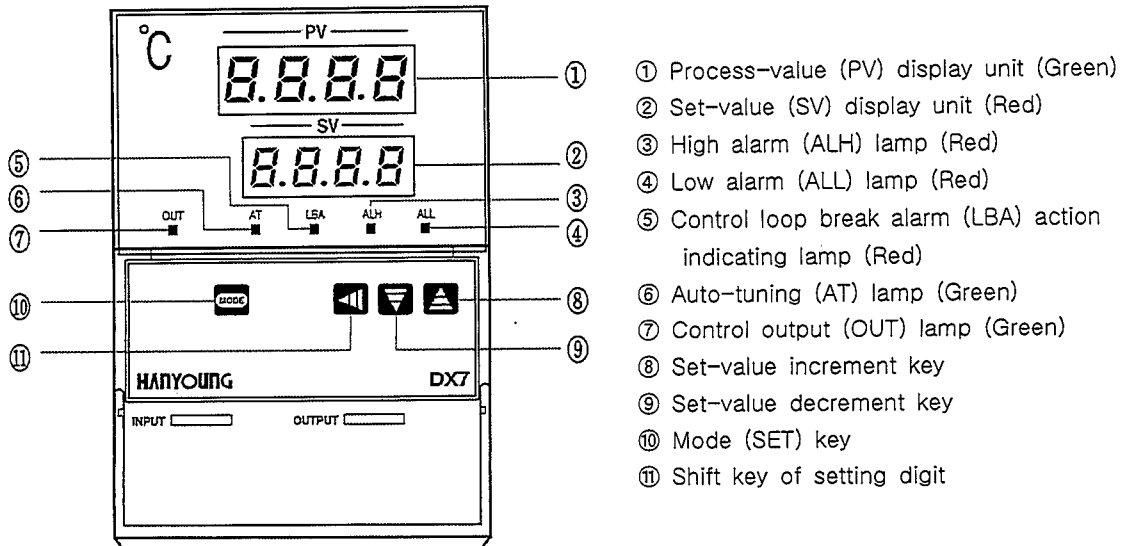
## 5. Name and functions of controller

### 5.1 Name of the controller



- ① Timer counter switch
- ② Reset switch
- ③ Timer (FX series)
- ④ Temp. controller (DX series)
- ⑤ Stirrer switch
- ⑥ Lamp switch
- ⑦ Timer switch
- ⑧ Main switch(E.L.B)

### 5.2 Temperature controller



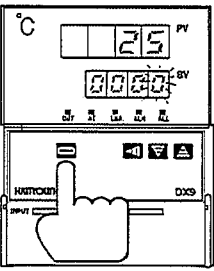
- ① Process-value (PV) display unit (Green)
- ② Set-value (SV) display unit (Red)
- ③ High alarm (ALH) lamp (Red)
- ④ Low alarm (ALL) lamp (Red)
- ⑤ Control loop break alarm (LBA) action indicating lamp (Red)
- ⑥ Auto-tuning (AT) lamp (Green)
- ⑦ Control output (OUT) lamp (Green)
- ⑧ Set-value increment key
- ⑨ Set-value decrement key
- ⑩ Mode (SET) key
- ⑪ Shift key of setting digit

### 5.3 How to set up the controller

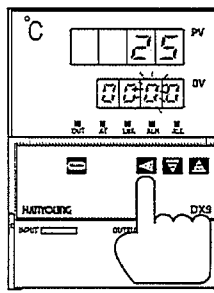
## ⚠ NOTE

\* For setting the set-values of temperature, humidity Controller (Model : DX series). Please refer to the PID Temperature Controller Manual attached for details.

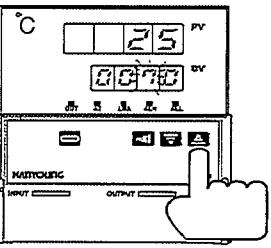
- Example of setting the temperature set value(SV) to 70°C.  
( Process Value : PV : 25°C )



① Press the **MODE** key to enter the SV setting mode. The last digit of the set-value (SV) display unit starts to flicker. The digit which flickers is settable.



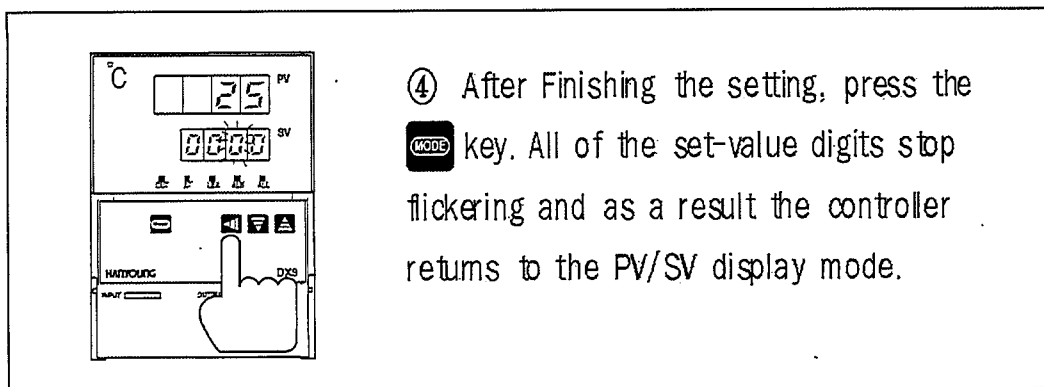
② Press the **←** key to shift the digit which flickers up to the two digits. The digit which flickers shifts as follows every time the **←** key is pressed.



③ Press the **▲** key to set "7"  
Pressing the **▲** key digit goes up and pressing the **▼** key digit comes down.

● Setting range: Within input range When minus ( - ) sign is set.

**Example :**  
When 70 is changed to -70, shift the digit flickering to the two digits, then press the **▼** key to for the digit coming down in due order of 1→0→-1.



④ After Finishing the setting, press the **0000** key. All of the set-value digits stop flickering and as a result the controller returns to the PV/SV display mode.

#### 5.4 How to operate

- Check rated voltage of the apparatus as well as check the specification.
- Connect the power plug to the power outlet.
- Fill water in the bath. (open the viscometer holder)
- Connect the cooling line with tap water or cold water.
- Turn on the Power switch.
- Set the temperature by 5.3 How to set temperature.
- When temperature rises and reaches the setting temperature, test with viscometer.
- After the operation is completed, turn OFF the Main Power switch.

## 6. Maintenance and service.

### 6.1 In case of cleaning inside of the bath



- Ensure that the apparatus has cooled down to a safe temperature to touch.
- Disconnect the power plug from power outlet.
- Clean the inside part of the bath with sponge or soft clothes getting wet by neutral cleaner.
- Clean the inside part of the bath again with sponge or soft clothes getting wet by water.
- Clean with dry clothes.
- Do not use organic solvent.
- Do not use flammable or volatile chemicals such as benzene, alcohol to clean.

### 6.2 In case of cleaning exterior of the equipment

- Disconnect the power plug from power outlet.
- Ensure that the apparatus has cooled down to a safe temperature to touch.
- Clean the exterior of the equipment with sponge or soft clothes getting wet by neutral cleaner.
- Clean with dry clothes.
- Do not use organic solvent.
- Do not use flammable or volatile chemicals such as benzene, alcohol to clean.



- Do not use flammable or volatile chemicals such as benzene, alcohol to clean the equipment.
- This equipment is not designed nor manufactured Explosion-proof, so never place highly flammable material or explosive material inside the bath which may cause an explosion or a fire.

### 6.3 When the equipment is not used for long time.

- Remove power plug from power outlet.
- Clean with soft clothes.
- Pack the equipment in a appropriate way and store in a safe place for storage.

## 7. Trouble shooting.

① In case apparatus fails to work at all :-

- Control unit switched off :-  
=> Ensure unit is on.
- Power supply shortage :-  
=> Refer to specification and check whether sufficient power is being supplied.  
=> Is the breaker on the side of outer part open?
- Check if lamp is turned down.  
=> Check unit in a power outlet that is known to work.  
If still does not work, contact your local JISICO agent/distributor & have it repaired.

② In the machine inclined?

install the machine horizontally all the time.

③ In case general failure :-

- => Check unit in a power outlet that is known to work.  
If still does not work, contact your local JISICO agent/distributor & have it repaired.

## 8. After-sales service.

### 8.1 Free repair

Faults which is responsible for manufacture in normal condition can be repaired with free for 1 year from purchase date (only, pressure vessel is zero year), and it is desirous to check following items when requesting A/S.

- . Part and condition generated fault  
( It is necessary to explain in detail within limit of possibility )
- . Model name
- . Serial Number
- . Purchase date (year, month, date)

### 8.2 Onerous repair

In following case, it is required to repair with compensation in spite of guarantee period.

- Fault by user mistake, unsuitable repair or modification
- Fault by negligence for carrying and handling during use
- Fault due to natural disasters such as fire, flood disaster and abnormal voltage
- Fault by using against direction for use.

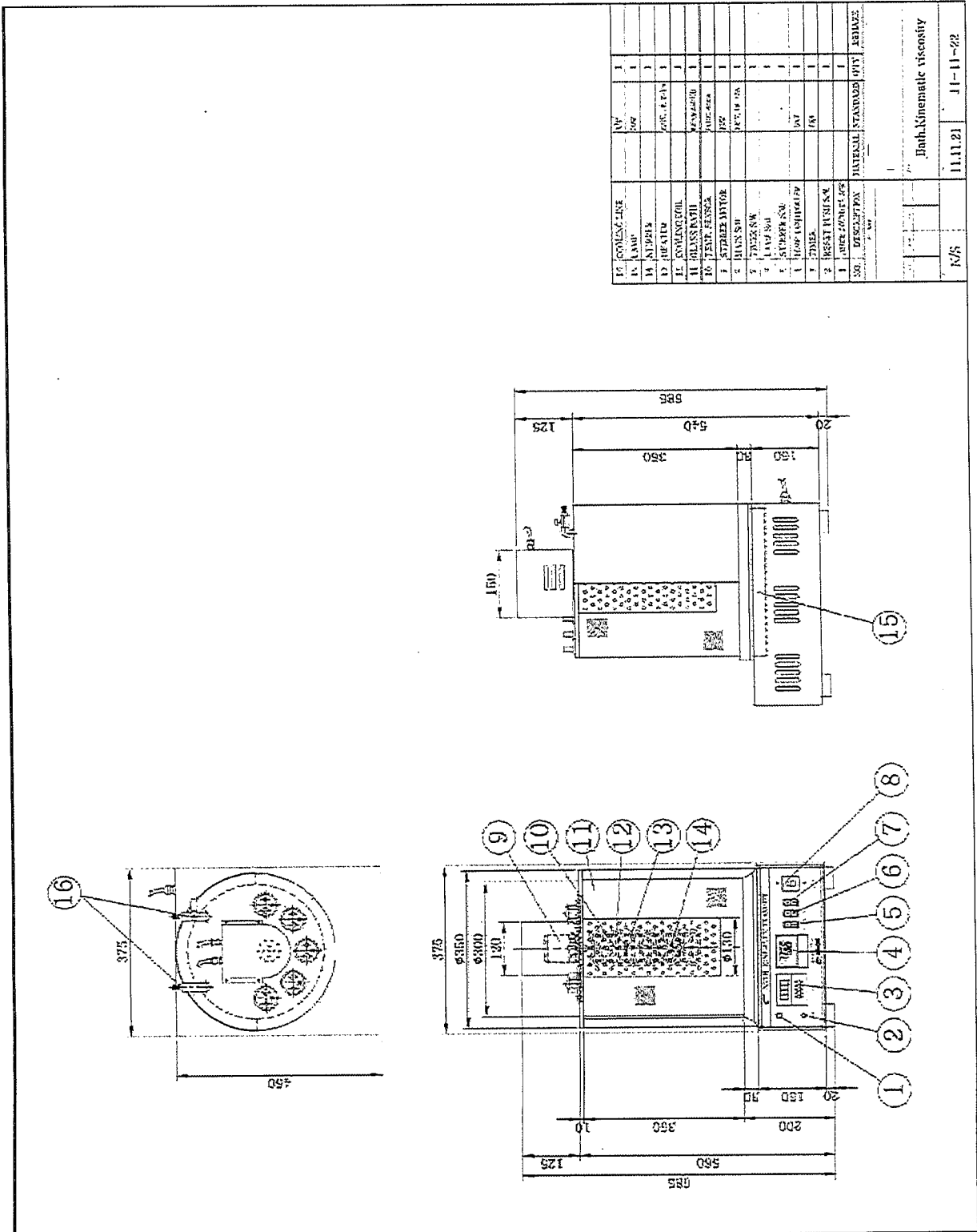
## 9. Specification.

### 9.1 Technical Specification

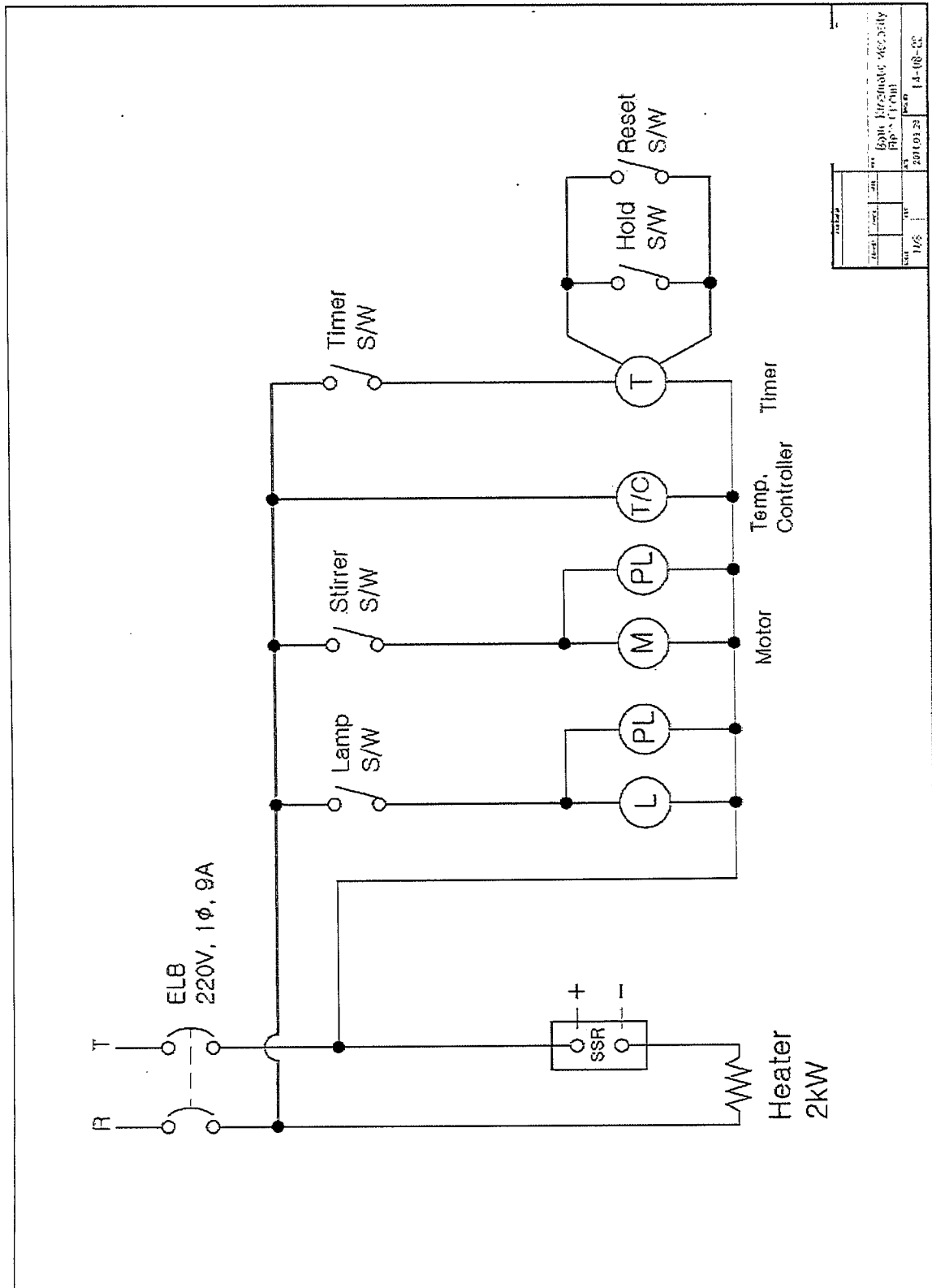
Model		J-BV08
Type		Kinematic viscosity measuring bath
Environmental temp range		+5°C ~ 35°C
Overall size (W×D×H)	mm	370 x 450 x 675
Glass bath size(Ø x H)	mm	300 x 350
Temperature	range	Ambient+5°C to 95°C
	accuracy	±0.5°C at 50°C
	uniformity	±1.0°C at 50°C
	controller	digital setting/display
	regulator	SSR type
Thermocouple		Pt 100 ohms
Stirrer	W	25
Heater(sheath type)	W	2,000
Light		Fluorescent lamp, 20W x 1ea
Safety device		ELB
Timer	type	Sec(digital display)
	capacity	9999 sec
Cooling function		Water cooling coil
Material	interior(bath)	Reinforced glass & stainless steel plate
	body	Steel plate with powder coated finish
Power source & consumption		AC 220V, 50/60Hz, 1phase 9A
Net weight	kg	20



9.2 Assembly Drawing



### 9.3 Circuit Diagram



# - ANNEX -

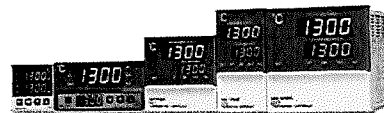
1. DX series

2. FX series

Digital Temperature Controller

**DX series****INSTRUCTION MANUAL**

Thank you for purchasing HANYOUNG product.  
Please check whether the product is the exactly same as you ordered.  
Before using the product, please read this instruction manual carefully.  
Please keep this manual where you can view at any time



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PT. HANYOUNG ELECTRONIC INDONESIA  
Jl. cempaka blok F16, No.02 Delta Silicon II Cikarang Bekasi Indonesia  
INDONESIA FACTORY TEL : 62-21-8911-8120~4 FAX : 62-21-8911-8126

**Safety information**

Alerts declared in the manual are classified to Danger, Warning and Caution by their criticality

	<b>DANGER</b>	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	<b>WARNING</b>	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	<b>CAUTION</b>	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

**DANGER**

Do not touch or contact the input/output terminals because they may cause electric shock.

**WARNING**

- If the product is used with methods other than specified by the manufacturer, then it may lead to injury or property damage.
- Please install an appropriate protective circuit on the outside if malfunction or an incorrect operation may be a cause of leading to a serious accident.
- Since this product does not have the power switch or a fuse, please install those separately on the outside. (Fuse rating: 250V 0.5A)
- To prevent damage or failure of this product, please supply the rated power voltage.
- To prevent electric shock or equipment failure, please do not turn on the power until completing wiring.
- Since this is not explosion-proof structure, please do not use in a place where combustible or explosive gas is around.
- Never disassemble, modify, or repair the product. There is a possibility of malfunction, electric shock, or a risk of fire.
- Please turn off the power when mounting/dismounting of the product. This is a cause of electric shock, malfunction, or failure.
- Since there is a possibility of electric shock, please use the product as mounted on a panel while the power is being supplied.

**CAUTION**

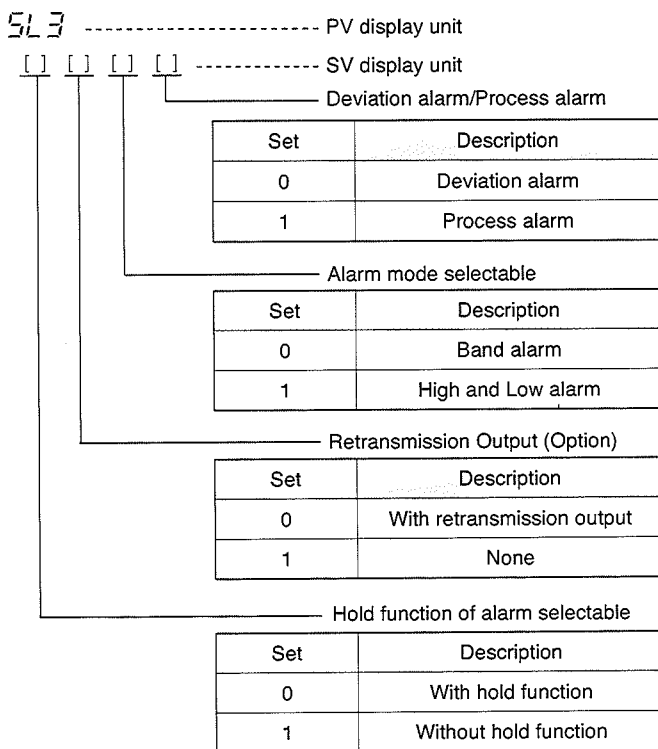
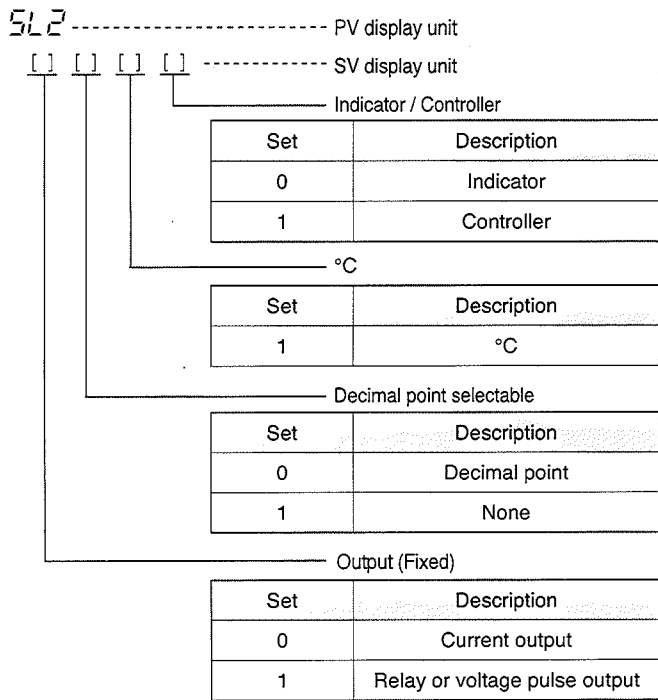
- The contents of the instruction manual are subjective to change without prior notice.
- Please make sure that the specification is the same as what you have ordered.
- Please make sure that the product is not damaged during shipping.
- Please use this product in a place where the ambient operating temperature is 0 ~ 50 °C (40 °C max, closely installed) and the ambient operating humidity is 35 ~ 85 % R.H (without condensation).
- Please use this product in a place where corrosive gas (such as harmful gas, ammonia, etc.) and flammable gas do not occur.
- Please use this product in a place where there is no direct vibration and a large physical impact to the product.
- Please use this product in a place where there is no water, oil, chemicals, steam, dust, salt, iron or others.
- Please do not wipe this product with organic solvents such as alcohol, benzene and others. (Please use mild detergent)
- Please avoid places where excessive amounts of inductive interference and electrostatic and magnetic noise occur.
- Please avoid places where heat accumulation occurs due to direct sunlight or radiant heat.
- Please use this product in a place where the elevation is below 2,000 m.
- Please make sure to inspect the product if exposed to water since there is a possibility of electric leakage or a risk of fire.
- For thermocouple (TC) input, please use a prescribed compensation lead wire. (There is a temperature error if a general lead is used.)
- For resistance temperature detector (RTD) input, please use a small resistance of lead wire and the 3 lead wires should have the same resistance. (There is a temperature error if the 3 lead wires do not have the same resistance.)
- Please put the input signal wire away from the power lines and load lines to avoid the effect of inductive noise.
- The input signal wires and output signal wires should be separated from each other. If it is not possible, please use shielded wires for the input signal wires.
- For thermocouple (TC), please use ungrounded sensors. (There is a possibility of malfunction of product by electric leakage if a grounded sensor is used.)
- If there is a lot of noise from the power line, installing an insulated transformer or a noise filter is recommended. The noise filter should be grounded on the panel and the lead wire between the output of the noise filter and the power terminal of the instrument should be as short as possible.

- It is effective against noise if making the power lines of the product the twisted pair wiring.
- Please make sure the operation of the product before using since the product may not operate as it intends if the alarm function is not properly set.
- When replacing the sensor, please turn off the power.
- In case of the high frequent operation such as proportional operation, please use an auxiliary relay since the life span of the output relay will be shortened if it connects to the load without the rated margin. In this case, SSR output is recommended.
  - \* Electromagnetic switch: proportion cycle: set 20 sec min.
  - \* SSR: proportion cycle: set min.1 sec
  - \* Contact output life expectancy:
    - Mechanical - 1 million times min. (without load)
    - Electrical - 100 thousand times min. (250 V a.c 3A: with rated load)
- Please do not connect anything to the unused terminals.
- Please connect wires properly after making sure the polarity of terminal.
- Please use a switch or breaker (IEC60947-1 or IEC60947-3 approved) when the product is mounted on a panel.
- Please install a switch or break near the operator to facilitate its operation.
- If a switch or breaker is installed, please put a name plate that the power is off when the switch or breaker is activated.
- In order to use this product properly and safely, we recommend periodic maintenance.
- Some parts of this product have limited expected life span and aged deterioration.
- The warranty of this product (including accessories) is 1 year only when it is used for the purpose it was intended under normal condition.
- When the power is being supplied there should be a preparation time for the contact output. Please use a delay relay together when it is used as a signal on the outside of interlock circuit or others.
- When the user replaces with a spare unit due to product failure or other reason, please check the compatibility since the operation can be varied by the difference of setting parameters even though the model name and code are the same.
- Before using a temperature controller, please check if there is a temperature difference between PV of the temperature controller and the actual temperature. If there is a temperature difference, please correct the temperature difference with using the input correct parameter "SL-5".

**Suffix code**

Model	Code	Description
DX	□ □ □ □ □ □ □ □	Digital temperature controller
Dimension	2	48(W) × 96(H) mm
	3	96(W) × 48(H) mm
	4	48(W) × 48(H) mm
	7	72(W) × 72(H) mm
	9	96(W) × 96(H) mm
Input	K	K thermocouple
	J	J thermocouple
	R	R thermocouple
	D	RTD: KPt 100 Ω
	P	RTD: Pt 100 Ω
	V	1 - 5 V d.c
	C	4 - 20 mA d.c
Control output	M	Relay contact output
	C	Current output (4 - 20 mA d.c)
	S	S.S.R (voltage pulse output, 12 V d.c)
Alarm output	S	Alarm output: 1 contact (model: DX4)
	W	Alarm output: 2 contacts(all model except DX4)
Option	A	Retransmission output (4 - 20 mA d.c)
	N	None (no retransmission output for DX4, DX7)
Control operation *1	R	Reverse operation control(heating control)
	D	Direct operation control(cooling control)
Power supply	•	100 - 240 V a.c
	C	24 V d.c/a.c

\*1 : The control operation can be changed in the parameter, SL9, and the default is "reverse operation control (R)".



※ ALH & ALL will be initialized if you change the deviation alarm or process alarm at the SL3

PV display unit	Description	SV display unit (Setting range)	Remark
SL4	Decimal point position selection	0 ~ 4	If you want 000.0, set 0002 on SV display unit.
SL5	Input correction	-100 ~ 100 % of FS	
SL6	Hysteresis of high alarm (ALH)	0 ~ 10 % of FS	
SL7	Max. value of temperature setting range	Within input range	Refer to input type table
SL8	Min. value of temperature setting range	Within input range	Refer to input type table
SL9	Control operation direction	0, 1	0 : Reverse operation 1 : Direct operation
SL10	Hysteresis of low alarm (ALL)	0 ~ 10 % of FS	
SL11	Input filter	0 ~ 100 second	
SL12	Max. input scale setting	9999	Only for voltage input
SL13	Min. input scale setting	-1999	Only for voltage input
SL14	Delay time of high alarm (ALH)	0 ~ 100 second	
SL15	Delay time of low alarm (ALL)	0 ~ 100 second	

※ For DCV input, if SL12 and SL13 are changed, the parameters related to temperature are initialized.

## Main functions

### ■ Control loop break alarm (LBA) function

#### ● Setting procedure

Usually set the set-value of the LBA to a value of twice the integral time (I). The LBA can also be set by the auto-tuning (AT) function. In this case, the set-value is automatically set to a value of twice the integral time (I).

#### ● Description of operation

LBA function starts to measure the time from the moment when the control output becomes 0% or 100%, and it detects the variation of the process value in LBA setting time and then it determines that LBA is ON or OFF by the variation.

- The LBA is ON if the process value is not increasing more than 2 °C within the LBA set-value when the control output is 100%.  
(In direct operation, the LBA is ON if the process value is not decreasing more than 2 °C.)
- The LBA is ON if the process value is not decreasing more than 2 °C within the LBA set-value when the control output is 0%.  
(In direct operation, the LBA is ON if the process value is not increasing more than 2 °C.)

#### ● Causes of action

The LBA is activated under the following conditions.

- Controlled object trouble : Heater break, no power supply, incorrect wiring, etc.
- Sensor trouble : Sensor disconnected, shorted, etc.
- Actuator trouble : Burnt relay contact, incorrect wiring, relay contact not closed, etc.
- Output circuit trouble : Burnt internal relay contact, relay contact not open or closed, etc.
- Input circuit trouble : The process-value does not change even if input changes, etc.

※ If causes of the above trouble cannot be identified, check the control system.

#### ● Cautions for control loop break alarm (LBA) function

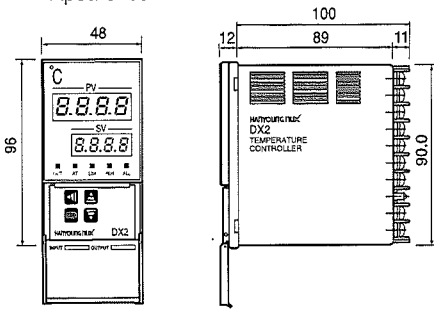
- The LBA function is activated only when the control output is 0 % or 100 %. Therefore, the time from trouble occurrence till the activation of the LBA function equals the time of when the control output becomes 0 % or 100 % plus the LBA setting time.
- No LBA function is activated while the auto-tuning (AT) function is activated.
- The LBA function is influenced by disturbances (heat sources, etc) and as a result may be activated even if there is no trouble in the control system.
- If LBA setting time is too short or does not match the controlled object, the LBA may be turned ON/OFF or not be turned ON. In such case, set the setting time of LBA to be slightly longer.

# Dimension & Panel cutout & Connections

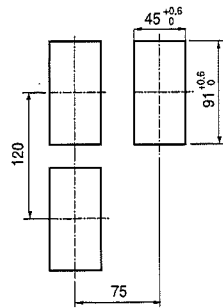
Unit : mm

## DX2

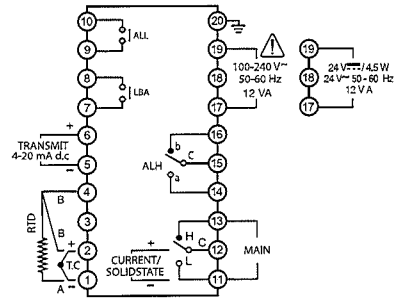
● Appearance



● Panel cutout

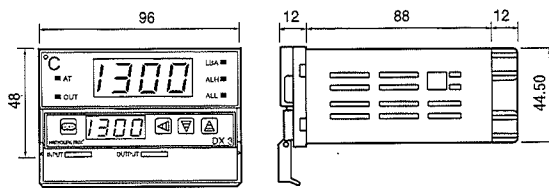


● Connection diagram

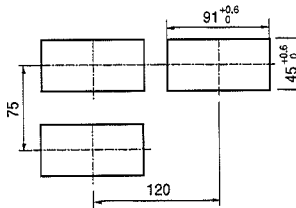


## DX3

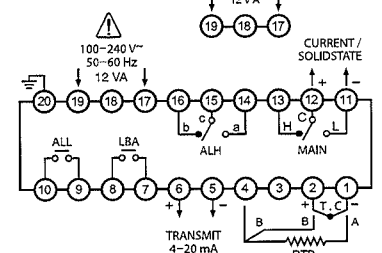
● Appearance



● Panel cutout

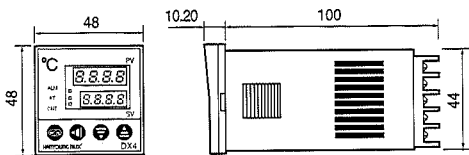


● Connection diagram

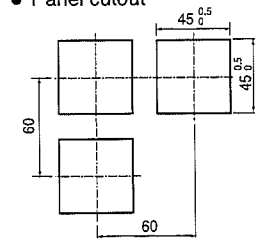


## DX4

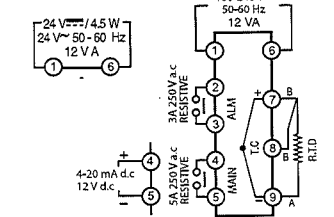
● Appearance



● Panel cutout

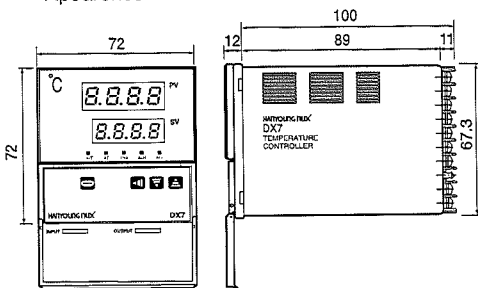


● Connection diagram

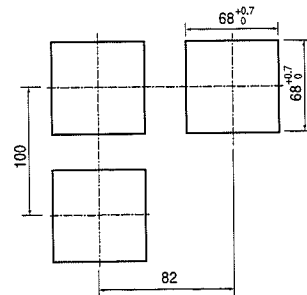


## DX7

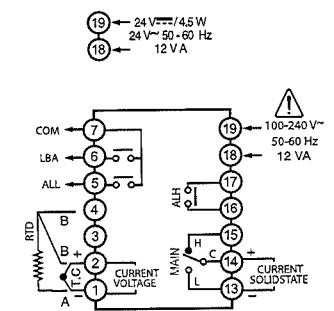
● Appearance



● Panel cutout

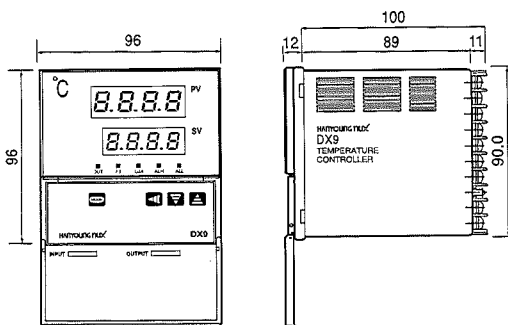


● Connection diagram

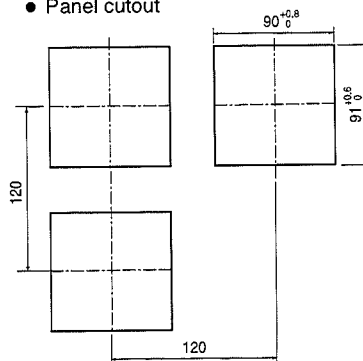


## DX9

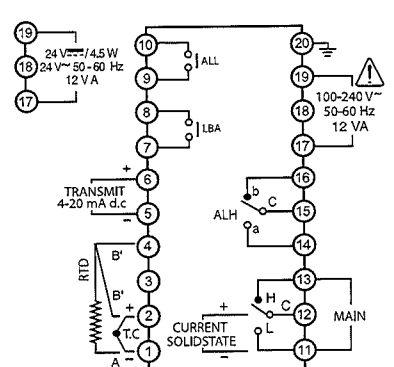
● Appearance



● Panel cutout



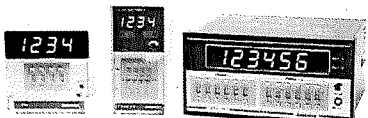
● Connection diagram



※ Reference : CURRENT : 4 - 20 mA d.c, SOLID STATE : 12 Vd.c Min.  
 ※ There is no earth terminal for DX4 and DX7.  
 Be careful this matter when you use.

# Autonics COUNTER/TIMER FX/FXH/FXL SERIES

MANUAL



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

### Caution for your safety

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow:
  - Warning** Serious injury may result if instructions are not followed.
  - Caution** Product may be damaged, or injury may result if instructions are not followed.
- The following is an explanation of the symbols used in the operation manual.
  - Warning** Injury or danger may occur under special conditions.

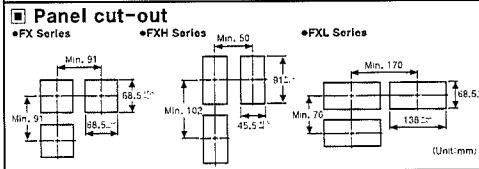
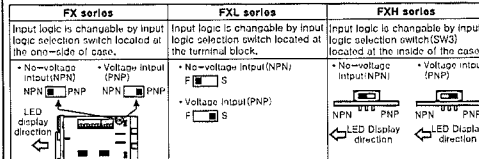
- In case of using this unit with machineries (Nuclear power control, medical equipment, vehicle, train, crane, combustion apparatus, entertainment or safety device etc.), it requires installing fail-safe device, or contact us for information required.
- This unit must be mounted on panel.
- Do not connect terminals when it is power on.
- Do not disassemble and modify this unit, when it requires.

### Caution

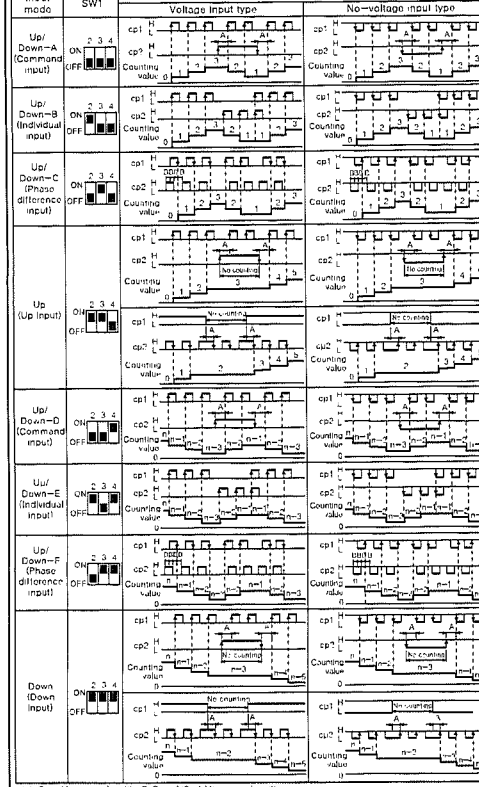
- This unit shall not be used outdoors.
- When wire connection, AWG 20(0.50mm<sup>2</sup>) should be used and screw bolt on terminal block with 0.74N-m to 0.90N-m strength.
- Please observe specification rating.
- Do not use the load beyond rated switching capacity of Relay contact.
- In cleaning the unit, do not use water or an organic solvent.
- Do not use this unit at place where there are flammable or explosive gas, humidity, direct ray of the sun, radiant heat, vibration, impact etc.
- Do not infuse dust or wire dregs into inside of this unit.

### Input logic selection

Please be sure to turn power OFF before changing input logic.



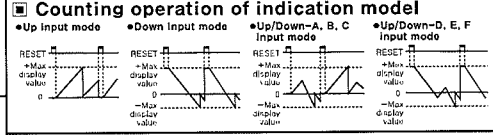
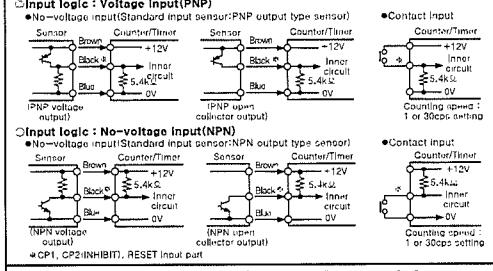
### Input operation mode (Counter)



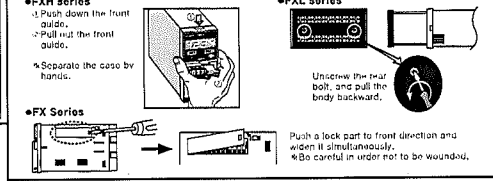
### Specifications

Series	4	6	4	4	6
Output	FX	FXH	FXH	FXL	FXL
Model	Single preset	FX4-2P	FXH-2P	FXL-2P	FXL-2P
Indication	FX4-1	FXH-1	FXH-1	FXL-1	FXL-1
Power supply	AC power	100-240VAC 50/60Hz	100-240VAC 50/60Hz	100-240VAC 50/60Hz	100-240VAC 50/60Hz
AC/DC power	12-24VAC 50/60Hz, 12-24VDC				
Allowable voltage range	90 to 110% of rated voltage				
Power consumption	AC power	Induction Approx. 6VA, Single preset Approx. 7VA, Dual preset Approx. 8VA (20VAC 50/60Hz)	Induction Approx. 5.8VA, Single preset Approx. 6.8VA, Dual preset Approx. 7.8VA (24VAC 50/60Hz)	Induction Approx. 5.8VA, Single preset Approx. 6.8VA, Dual preset Approx. 7.8VA (24VAC 50/60Hz)	Induction Approx. 5.8VA, Single preset Approx. 6.8VA, Dual preset Approx. 7.8VA (24VAC 50/60Hz)
AC/DC power		Induction Approx. 2.7W, Single preset Approx. 3.3W, Dual preset Approx. 3.3W (24VDC)			
Max. counting speed	cp1, CP2	Selectable 1cpa/3cpa/2cpa/5cpa by Inner DIP switch			
Min. input signal width	RESET input, INHIBIT input	Approx. 20ms			
Input method	CP1, CP2 (INHIBIT)	Input logic is selectable. Voltage input: Input impedance is 5kΩ. "L" level: 1.5-30VDC. "H" level: 0-2VDC. No-voltage input: Sharp-circuit impedance: Max. 1kΩ. Residual voltage: Max. 2VDC. Open-circuit impedance: Min. 100kΩ.			
Reset input	RESET input	1st output: 0.5sec, 2nd output: 0.05 to 5sec.			
One-shot output time					
Control output	Type	Single preset type: NPN open collector. Dual preset type: 1st output: SPDT(1C), 2nd output: SPDT(1C).			
Capacity	250VAC 3A resistive load				
Relay rating	30VDC Max. 100mA Max.				
Memory retention	10 years (EEPROM)				
External power supply	12VDC ± 10% 50mA Max.				
Operating temperature	-10 to 55°C. Storage temperature: -25 to 85°C				
Relative humidity	35 to 85%RH. Storage humidity: 35 to 85%RH				

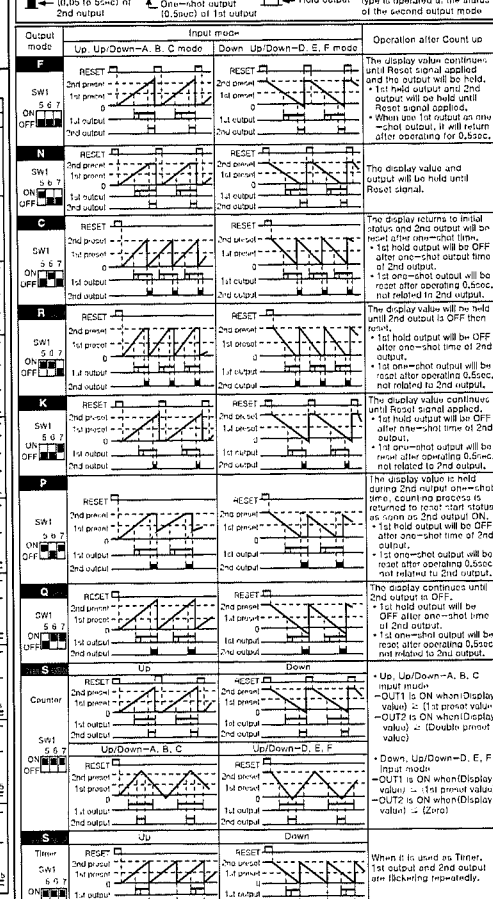
### Input connection



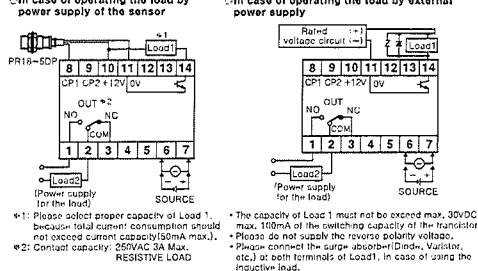
### Case & DIP switch detachment



### Output operation mode

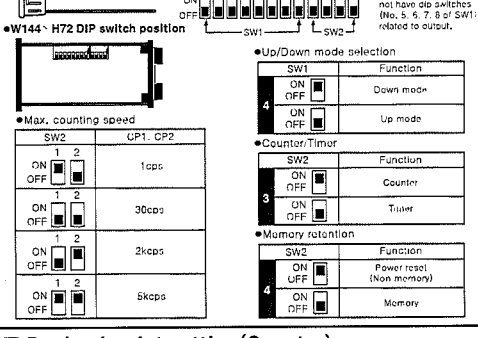


### Input · output connection

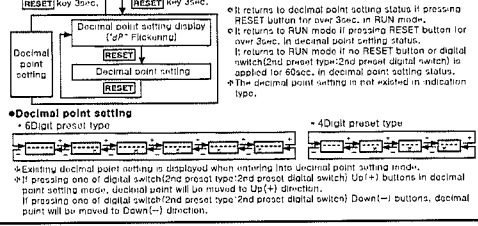


① Please select proper capacity of Load 1.  
 ② Contact capacity: 250VAC 3A Max., RESISTIVE LOAD.

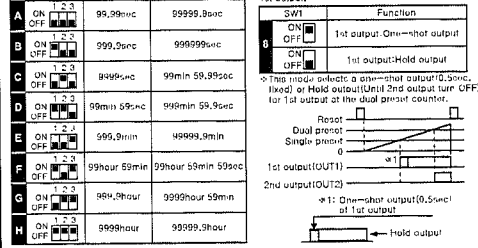
### Selection by DIP switches



### Decimal point setting (Counter)



### Time setting mode (Timer)



### Caution for using

- DIP switch setting**  
 Please be sure to turn power OFF before changing Counter/Timer DIP switches setting. If DIP switches setting is changed in power OFF, Counter/Timer must be reset by manual reset or external reset after power ON.
- Error display**  
 Error display: Zero setting value status. Return method: Change setting value which is not zero.
- Unit setting**  
 The unit meter is found at the inner box of FX/FXL series. According to the usage, the unit sticker can be used.
- Power**  
 The inner circuit voltage starts to rise up for the first 100ms after power on, the input may not work at this time. And also the inner circuit voltage drops down for the last 50ms after power off, the input may not work at this time. Please use the power within rating power and apply or cut the power at once to prevent from chattering.
- Input signal line**  
 Shorten the cable distance between the sensor and the product.  
 Please shield wire for input signal needed to be long.  
 Please wire input signal line separated from power line.  
 Please use the electrical voltage and insulation resistance of the control panel with this unit installed.  
 Please isolate this unit from the circuit of control panel.
- Do not use this unit at below places.**  
 Please place where there are severe vibration or impact.  
 Please place where there are direct ray of the sun.  
 Please place where strong magnetic field or electric noise are generated.
- Installation environment**  
 It shall be used indoor. Altitude Max. 2000m. Installation Degree 2. Installation Category II.  
 It may cause malfunction if above instructions are not followed.

### Main products

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Rotary encoders
- Power controllers
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Display units
- Sensor controllers

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 Satisfiable Partner For Factory Automation

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 E-mail: sales@autonics.com

The proposal of a product improvement and development : product@autonics.com  
 EP-KE-01-008L