

2-stage Digital Timer

H5CX-B

2-Stage Digital Timer with 6-digit Display and Forecast Output

- Wide time setting range from 0.01 s to 99,999.9 h (over 4 time ranges).
- 6-digit display enables cumulative or on-delay timing functions.
- NPN/PNP switchable DC-voltage input.
- Forecast output and 2-stage settings are ideal for maintenance applications.
- Programmable display color to alert any output status change.
- Supply voltage only available in 12-24 VDC.
- NEMA4/IP66 front.



Model Number Structure

■ Model Number Legend

H5CX-BWSD
1 2 3 4

1. Type classifier
B: 6-digit display type
2. Stage setting
W: 2-stage setting

3. Output type
S: Transistor output
4. Supply voltage
D: 12 to 24 VDC

Ordering Information

■ List of Models

Stock Note: Shaded models are normally stocked.

Output type	Supply voltage	6-digit display
		Screw terminals
Transistor	12 to 24 VDC	H5CX-BWSD

■ Accessories (Order Separately)

Stock Note: Shaded models are normally stocked.

Item	Model
Flush Mounting Adapter (See note.)	Y92F-30
Waterproof Packing (See note.)	Y92S-29
Hard Cover	Y92A-48
Soft Cover	Y92A-48F1

Note: Supplied with H5CX-BWSD.

Specifications

■ Ratings

Item	H5CX-BWSD
Classification	Digital timer
Rated supply voltage	12 to 24 VDC (permissible ripple: 20% (p-p) max.)
Operating voltage range	90% to 110% rated supply voltage
Power consumption (See note 1.)	Approx. 2.3 W at 12 VDC
Mounting method	Flush mounting
External connections	Screw terminals
Terminal screw tightening torque	0.5 N·m max.
Display (See note 2.)	7-segment, negative transmissive LCD; Present value: 9-mm-high characters, red Set value: 6-mm-high characters, green
Digits	6 digits
Time ranges	9999.99 s (0.01-s unit), 99 h 59 min 59 s (1-s unit), 99999.9 min (0.1-min unit), 99999.9 h (0.1-h unit)
Timer mode	Elapsed time (Up)
Input signals	Signal, reset, gate
Input method	No-voltage input/voltage input (switchable) <u>No-voltage Input</u> ON impedance: 1 kΩ max. (Leakage current: 5 to 20 mA when 0 Ω) ON residual voltage: 3 V max. OFF impedance: 100 kΩ min. <u>Voltage Input</u> High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input resistance: approx. 4.7 kΩ)
Signal, reset, gate	Minimum input signal width: 1 or 20 ms (selectable, same for all input)
Reset system	Power resets (only for A mode), external and manual reset
Power reset	Minimum power-opening time: 0.5 s (except for F-1 mode)
Sensor waiting time	250 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)
Output modes	A, F-1
Control output	Transistor output: NPN open collector, 100 mA at 30 VDC max. residual voltage: 1.5 VDC max. (Approx. 1 V) Leakage current: 0.1 mA max. Output category according to EN60947-5-2 (DC-13; 30 V 100 mA)
Key protection	Yes
Memory backup	EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.
Ambient temperature	Operating: -10 to 55°C (-10 to 50°C if timers are mounted side by side) (with no icing or condensation) Storage: -25 to 65°C (with no icing or condensation)
Ambient humidity	25% to 85%
Case color	Black (N1.5)
Attachments	Waterproof packing, flush mounting adapter, unit label

Note: 1. Inrush current will flow for a short time when the power supply is turned ON. Refer to *Inrush Current (Reference Values)* on page 3.
2. The display is lit only when the power is ON.

■ Characteristics

Item	H5CX-BWSD
Accuracy of operating time and setting error (including temperature and voltage influences) (See note 1.)	Power-ON start: $\pm 0.02\% \pm 0.05$ s max. Rated against set value Signal start (minimum pulse width of 20 ms): $\pm 0.01\% \pm 0.03$ s max. Rated against set value Signal start (minimum pulse width of 1 ms): $\pm 0.01\% \pm 3$ ms max. If the set value is within the sensor waiting time at startup the control output of the H5CX will not turn ON until the sensor waiting time passes.
Insulation resistance	100 M Ω min. (at 500 VDC) between current-carrying terminal and exposed non-current-carrying metal parts
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and non-current-carrying metal parts 1,000 VAC, 50/60 Hz for 1 min between control output, power supply, and input circuit
Impulse withstand voltage	1.0 kV (between power terminals) 1.5 kV (between current-carrying terminal and exposed non-current-carrying metal parts)
Noise immunity	± 480 V (between power terminals) and ± 600 V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 μ s, 1-ns rise)
Static immunity	Destruction: 15 kV Malfunction: 8 kV
Vibration resistance	Destruction: 10 to 55 Hz with 0.75-mm single amplitude each in three directions, four cycles each (8 min per cycle) Malfunction: 10 to 55 Hz with 0.35-mm single amplitude each in three directions, four cycles each (8 min per cycle)
Shock resistance	Destruction: 294 m/s ² each in three directions Malfunction: 98 m/s ² each in three directions
Approved safety standards (See note 2.)	UL508/Listing, UL50 Type 4X for indoor use (enclosure rating), CSA C22.2 No. 14, conforms to EN61010-1 (Pollution degree 2/overvoltage category II) Conforms to VDE0106/P100 (finger protection).
EMC	(EMI) Emission Enclosure: EN61326 (EMS) Immunity ESD: EN61326 Immunity RF-interference: EN61000-4-2: 4 kV contact discharge (level 2) EN61000-4-3: 8 kV air discharge (level 3) Immunity Conducted Disturbance: EN61000-4-6: 10 V/m (Amplitude-modulated, 80 MHz to 1 GHz) (level 3); 10 V/m (Pulse-modulated, 900 MHz \pm 5 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power-line (level 3); 1 kV I/O signal-line (level 4) Immunity Surge: EN61000-4-5: 1 kV line to lines (power and output lines) (level 3); 2 kV line to ground (power and output lines) (level 3)
Degree of protection	Panel surface: IP66 and NEMA4 (indoors), and UL Type 4X (indoors) (See note 2.)
Weight	Approx. 140 g

Note: 1. The values are based on the set value.

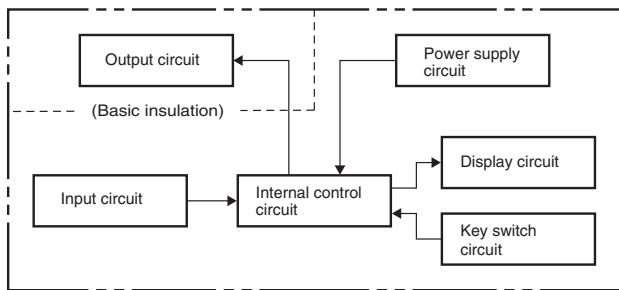
2. The Y92S-29 Waterproof Packing and Y92F-30 Flush Mounting Adapter are necessary to ensure IP66, NEMA4, and UL Type 4X waterproofing between the H5CX and installation panel.

■ Inrush Current (Reference Values)

Voltage	Applied voltage	Inrush current (peak value)	Time
12 to 24 VDC	26.4 VDC	6 A	1.2 ms

Connections

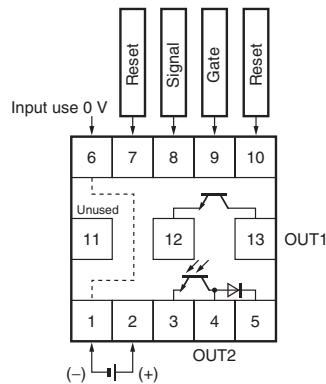
■ Block Diagram



■ I/O Functions

Inputs	Start signal		Starts timing.
	Reset		Resets present value. (The present value returns to 0.) Timing stops and control output turns OFF while reset input is ON. Reset indicator is lit while reset input is ON.
	Gate		Inhibits timer operation.
	Forecast value setting	Control output (OUT2)	Turns ON when the present value reaches the set value.
	Forecast output (OUT1)	Forecast output (OUT1)	Turns ON when the present value reaches the forecast value. The forecast value = set value – forecast set value
		Absolute value setting	Turns ON when the present value reaches set value 2.
	Control output 2 (OUT2)	Control output 1 (OUT1)	Turns ON when the present value reaches set value 1.

■ Terminal Arrangement



Note: 1. Do not connect unused terminals as relay terminals.

2. The power supply and input circuit are not isolated.

3. Terminals 1 and 6 are connected internally.

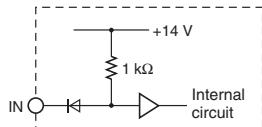
4. Terminals 7 and 10 have the same reset function. The same function will be performed whichever terminal is connected. Terminals 7 and 10 are not connected internally, however, so do not use them for cross-over wiring.

5. Recommended lead wires: AWG18 to AWG24 (cross-sectional area: 0.205 to 0.823 mm²), single line or twisted-pair cable, made of copper or aluminum.

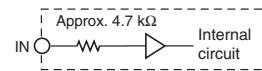
■ Input Circuits

Signal, Reset, and Gate Input

No-voltage Input (NPN Inputs)



Voltage Inputs (PNP Inputs)



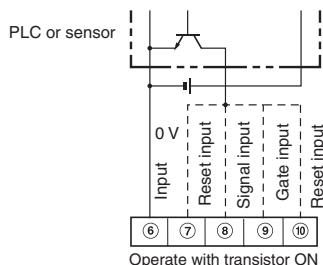
■ Input Connections

The inputs of the H5CX-B are no-voltage (short-circuit or open) inputs or voltage inputs.

No-voltage Inputs (NPN Inputs)

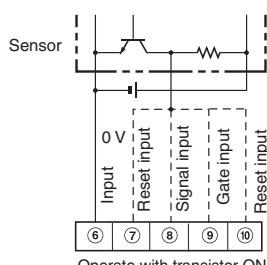
Open Collector

(Connection to NPN open collector output sensor)

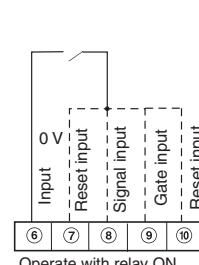


Voltage Output

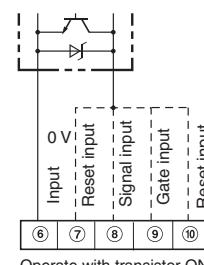
(Connection to a voltage output sensor)



Contact Input



DC Two-wire Sensor



Applicable Two-wire Sensor

Leakage current: 1.5 mA max.
Switching capacity: 5 mA min.
Residual voltage: 3.0 VDC max.
Operating voltage: 10 VDC

No-voltage Input Signal Levels

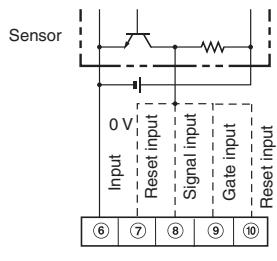
No-contact input	Short-circuit level Transistor ON Residual voltage: 3 V max. Impedance when ON: 1 kΩ max. (the leakage current is 5 to 20 mA when the impedance is 0 Ω)
	Open level Transistor OFF Impedance when OFF: 100 kΩ min.
Contact input	Use contact which can adequately switch 5 mA at 10 V

Note: The DC voltage must be 30 VDC max.

Voltage Inputs (PNP Inputs)

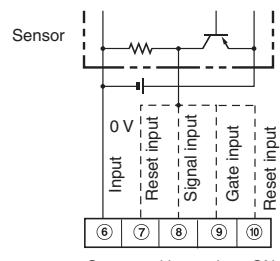
No-contact Input (NPN Transistor)

(Connection to NPN open collector output sensor)

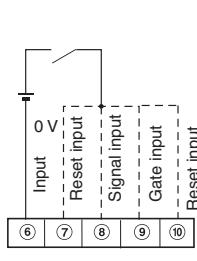


No-contact Input (PNP Transistor)

(Connection to PNP open collector output sensor)



Contact Input



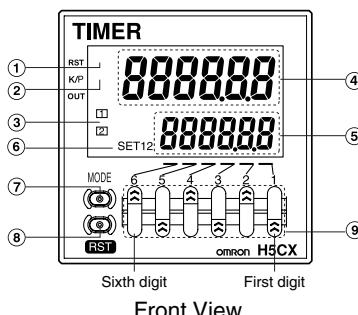
Voltage Input Signal Levels

High level (Input ON): 4.5 to 30 VDC
Low level (Input OFF): 0 to 2 VDC
Input resistance: Approx. 4.7 kΩ

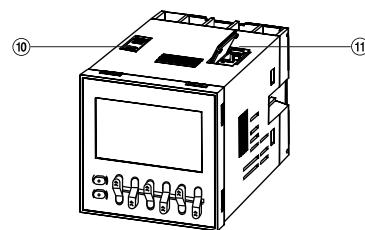
Note: The DC voltage must be 30 VDC max.

Nomenclature

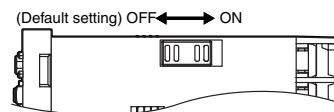
Indicator	
①	Reset Indicator (orange) Lit when the reset input or Reset Key is ON.
②	Key Protection Indicator (orange) Lit when the Key-protect Switch is ON.
③	Control Output Indicator (orange) Forecast value setting: Forecast output ON: ① is lit Control output ON: ② is lit Absolute value setting: Control output 1 ON: ① is lit Control output 2 ON: ② is lit
④ Present Value (red) Character height: 9 mm If the time range is 0.0 min or 0.0 h, the decimal point flashes to indicate timing operation.	
⑤	Set Value (green) Character height: 6 mm
⑥	Set Value 1, 2 Display (green)



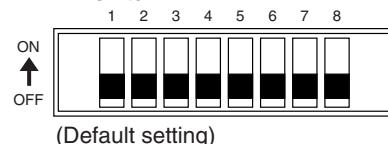
Operation Key	
⑦	Mode Key (Changes setting items)
⑧	Reset Key (Resets present value and output)
⑨	Up Keys 1 to 6



Switches	
⑩	Key-protect Switch When the Key-protect Switch is ON, key operations are prohibited according to the settings for DIP switch pins 6 to 8, thus preventing setting errors. The Key-protect Switch can be turned ON and OFF while the power is ON. The Key Protection Indicator is lit orange when the Key-protect Switch is ON.

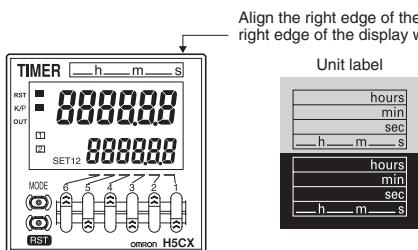


(11) DIP Switch	
	Refer to <i>D/P Switch Settings</i> on page 45 for details on setting the DIP switch.



■ Unit Label

The unit label is included with the Unit. Affix the unit label in the position shown in the following diagram to match the time range to be used.

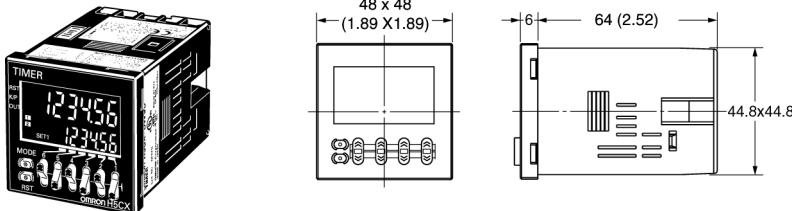


Dimensions

Unit: mm (inch)

■ Dimensions without Flush Mounting Adapter

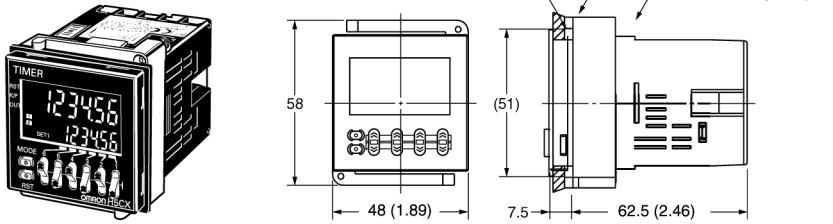
H5CX-BWSD (Flush Mounting Models)



Note: M3.5 terminal screw (effective length: 6mm)

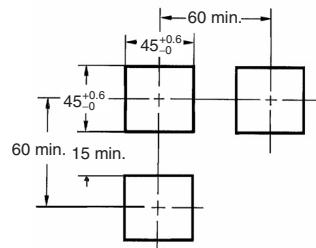
■ Dimensions with Flush Mounting Adapter

H5CX-BWSD (Provided with Adapter and Waterproof Packing)



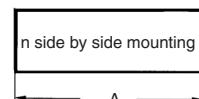
Panel Cutouts

Panel cutouts areas shown below.
(according to DIN43700).



Note

1. The mounting panel thickness should be 1 to 5 mm.
2. To allow easier operability, it is recommended that Adapters are mounted so that the gap between sides with hooks is at least 15 mm.
3. It is possible to mount timers side by side, but only in the direction without the hooks.



$$A = (48n - 2.5) \stackrel{+1}{_0}$$

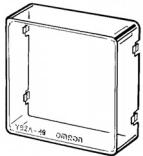
With Y92A-48F1 attached.
 $A = \{48n - 2.5 + (n-1) \times 4\} \stackrel{+1}{_0}$

With Y92A-48 attached.
 $A = (51n - 5.5) \stackrel{+1}{_0}$

■ Accessories (Order Separately)

Hard Cover

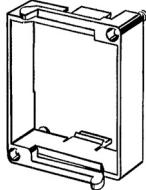
Y92A-48



Note: 1. Depending on the operating environment, the condition of resin products may deteriorate, and may shrink or become harder. Therefore, it is recommended that resin products are replaced regularly.

Flush Mounting Adapter (provided with H5CX-BWSD)

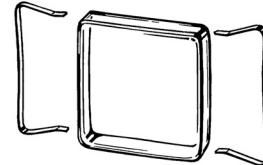
Y92F-30



Note: Order the Flush Mounting Adapter separately if it is lost or damaged.

Soft Cover

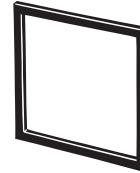
Y92A-48F1



2. The H5CX's panel surface is water-resistive (conforming to IP66) and so even if drops of water penetrate the gaps between the keys, there will be no adverse effect on internal circuits. If, however, there is a possibility of oil being present on the operator's hands, use the Soft Cover. The Soft Cover ensures protection equivalent to IP54F against oil. Do not, however, use the H5CX in locations where it would come in direct contact with oil.

Waterproof Packing (provided with H5CX-BWSD)

Y92S-29

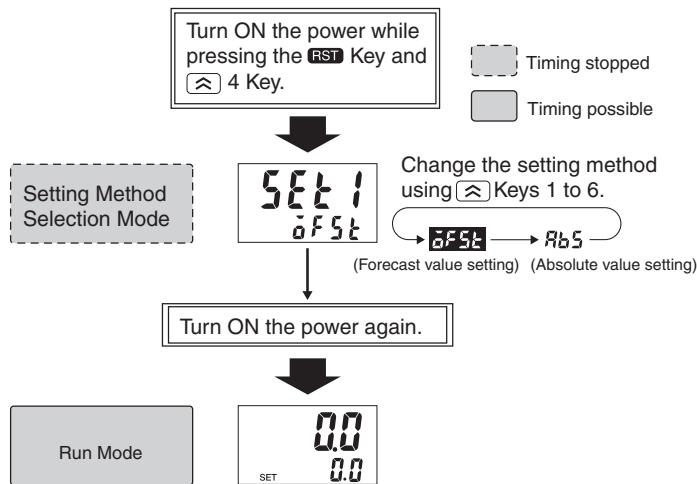


Note: Use waterproof packing to provide a level of water protection that complies with NEMA4, UL Type 4X, or IP66 standards. Order the waterproof packing separately if it is lost or damaged. Depending on the operating environment, the waterproof packing may deteriorate, contract, or harden and so regular replacement is recommended.

Operating Procedures

■ Setting Set Values

Set values can be set either as offset values (forecast value setting) or absolute values. Set values are factory-set to forecast value setting.

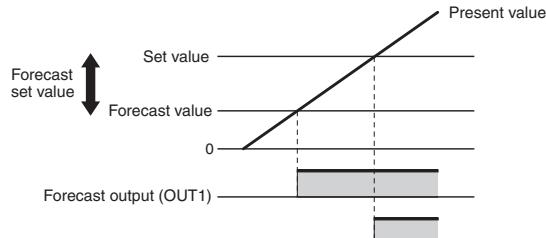


- Move to Setting Method Selection Mode by turning ON the power while pressing both the **RST** Key and **4** Key at the same time.
- Select forecast value setting (**aF5t**) or absolute value setting (**Abs**) using the **a** Keys.
- When the power is turned ON again, the Timer will start with the selected setting method.

Note: 1. In Setting Method Selection Mode, outputs are OFF and the timer is stopped.
2. When the setting method is changed, the set values and present value are reset to 0, and outputs are OFF.

Forecast Value Setting

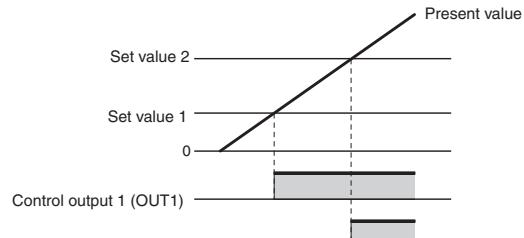
Example: F-1 Mode



- OUT1 (forecast output) turns ON when the present value reaches the forecast value.
The forecast value = set value – forecast set value
The forecast set value is used to set the deviation for the set value.
- OUT2 (control output) turns ON when the present value reaches the set value.
- If the forecast set value ≥ set value, OUT1 (forecast output) will turn ON as soon as timing starts.

Absolute Value Setting

Example: F-1 Mode



- OUT1 (control output 1) turns ON when the present value reaches set value 1.
- OUT2 (control output 2) turns ON when the present value reaches set value 2.

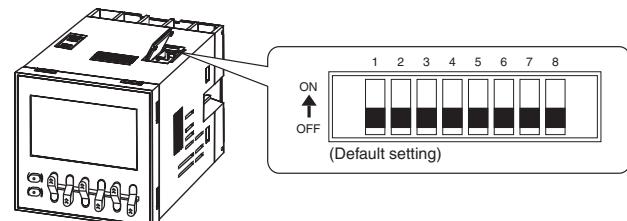
■ DIP Switch Settings

All functions are set using the DIP switch.

	Item	OFF	ON
1	Time range	Refer to the table on the right.	
2			
3	Output mode	F-1 mode	A mode
4	Input signal width	20 ms	1 ms
5	NPN/PNP input mode	NPN	PNP
6	Reset Key protection	Disabled	Enabled
7	Up Key protection	Disabled	Enabled
8	Mode Key protection	Disabled	Enabled



Pin 1	Pin 2	Time range
OFF	OFF	0.1 h to 99999.9 h
ON	OFF	0.01 s to 9999.99 s
OFF	ON	0 h 00 min 01 s to 99 h 59 min 59 s
ON	ON	0.1 min to 9999.9 min



Note: 1. All the pins are factory-set to OFF.

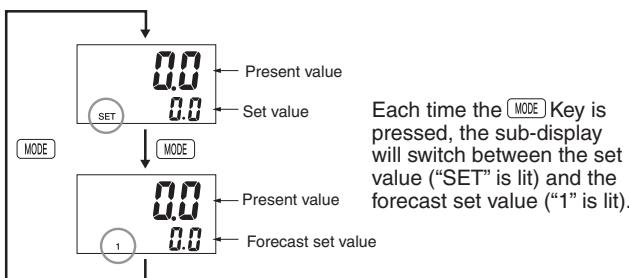
2. DIP switch settings are effective when the power is turned ON again. (Set the DIP switch before installation and power-up.)
3. The shaded characters are the default settings.

■ Operation in Run Mode

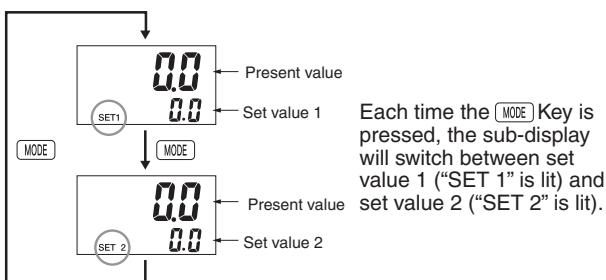
Set each digit for the set value using the corresponding Keys.

→ 0 → 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 9 →

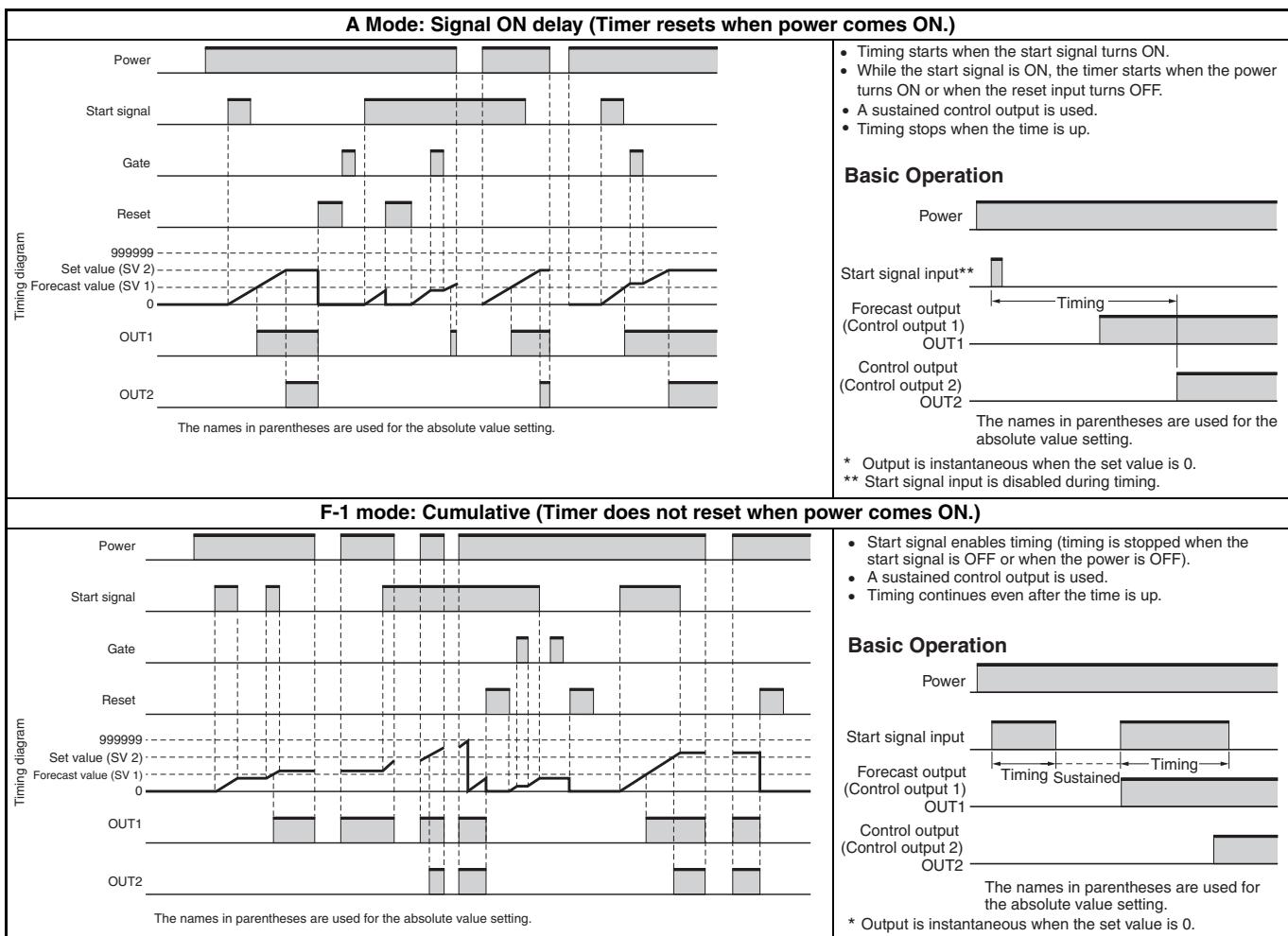
Forecast Value Setting



Absolute Value Setting



■ Timing Charts



Note: Forecast Value = Set Value – Forecast Set Value

The forecast set value is used to set the deviation for the set value.

■ Self-diagnostic Function

The following displays will appear if an error occurs.

Main display	Sub-display	Error	Output status	Correction method	Set value after reset
E1	Not lit	CPU	OFF	Either press the reset key or reset the power supply.	No change
E2	Not lit	Memory error (RAM)	OFF	Reset the power supply.	No change
E2	5Uñ	Memory error (EEP) (See note)	OFF	Reset to the factory settings using the reset key.	0

Note: This includes times when the life of the EEPROM has expired.

Safety Precautions (Common)

Note: The following precautions are common for all H5CX models.

— ! Caution

This may occasionally cause electric shock, fire or malfunction. Do not allow metal fragments or lead wire scraps to fall inside this product.

— ! Caution

Loose screws may occasionally result in fire or malfunction. Tighten the terminal screws securely. The recommended tightening torque is 0.5 N·m.

— ! Caution

There may occasionally be a risk of explosion. Do not use the product where flammable or combustion gases are present.

— ! Caution

This may occasionally cause electric shock, fire or malfunction.

— ! Caution

Never disassemble, repair or modify the product.

— ! Caution

This may occasionally cause electric shock, fire or malfunction. Do not allow metal fragments or lead wire scraps to fall inside this product.

— ! Caution

If both the power supply for the input device and that for the timer are not insulated, unwanted current from the AC power supply may occasionally burn out or damage the internal parts. Always use an insulated power supply for the timer.

■ Precautions for Safe Use

The following precautions must be observed to ensure safety.

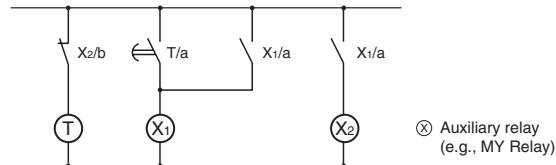
Operating and Storage Conditions

- Do not use in locations affected by excessive vibration or shock, or in locations subject to exposure to water or oil.
- Do not use the product in locations subject to dust, corrosive gases, or direct sunlight.
- Separate the input signal devices, input signal cables, and the product from the source of noise or high-tension cables producing noise.
- Separate the product from the source of static electricity when using the product in an environment where a large amount of static electricity is produced (e.g., forming compounds, powders, or fluid materials being transported by pipe).
- Organic solvents (such as paint thinner), as well as very acidic or basic solutions might damage the outer casing of the H5CX.
- Use the product within the ratings specified for temperature and humidity.
- Do not use the product in locations where condensation may occur due to high humidity or where temperature changes are severe.
- Store at the specified temperature. If the H5CX has been stored at a temperature of less than -10°C , allow the H5CX to stand at room temperature for at least 3 hours before use.

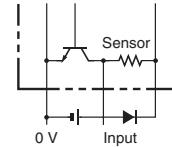
Usage Precautions

- Make sure that the voltage applied is within the specified range, otherwise the internal elements of the counter may be damaged.
- The load current must be within the rated current.

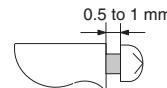
- Ensure that the power is turned OFF before changing DIP switch settings. Changing DIP switch settings with the power turned ON may result in electric shock due to contact with terminals subject to high voltages.
- Pay attention to terminal polarity to ensure correct wiring.
- Make sure that the fluctuation of the supply voltage is within the permissible range.
- Apply the power supply voltage through a relay or switch in such a way that the voltage reaches the rated value within 2 s. If the voltage is applied gradually, the power may not be reset or unstable output operations may result.
- Leaving the H5CX with outputs ON at a high temperature for a long time may hasten the degradation of internal parts (such as electrolytic capacitors). Therefore, use the product in combination with relays and avoid leaving the product as long as more than 1 month with the output turned ON.



- When the product is operated with no-voltage input (NPN input), approximately 14 V is output from the input terminals, so connect a diode if the external power supply is less than 14 V.



- Install a switch or circuit-breaker that allows the operator to immediately turn OFF the power, and make sure it is labeled clearly.
- The H5CX's panel surface is water-resistive (conforming to NEMA 4, UL Type 4X, and IP66). In order to prevent the internal circuit from water penetration through the space between the H5CX and operating panel, attach a waterproof packing (Y92S-29) between the H5CX and installation panel and secure the waterproof packing with the Y92F-30 Flush-mounting Adapter.



It is recommended that the space between the screw head and the adapter should be 0.5 to 1 mm.

- Tighten the two mounting screws on the Adapter. Tighten them alternately, a little at a time, so as to keep them at an equal tightness. If the panel screws are tightened unequally, water may ingress inside the panel.

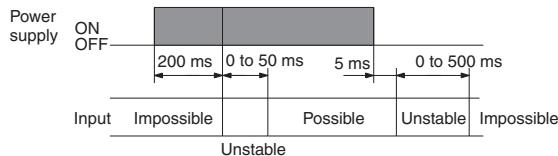
■ Precautions for Correct Use

Power Supplies

Turn the power ON and OFF using a relay with a rated capacity of 10 A minimum to prevent contact deterioration due to inrush current caused by turning the power ON and OFF.

Be sure that the capacity of the power supply is large enough, otherwise the Timer may not start due to inrush current that may flow for an instant when the Timer is turned on.

When turning the power ON and OFF, input signal reception is possible, unstable, or impossible as shown in the diagram below.



Timer Control with Power Start

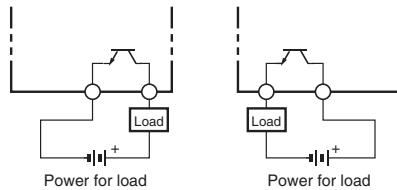
To allow for the startup time of peripheral devices (sensors, etc.), the H5CX starts timing operation between 200 ms to 250 ms after power is turned ON. For this reason, in operations where timing starts from power ON, the time display will actually start from 250 ms. If the set value is 249 ms or less, the time until output turns ON will be a fixed value between 200 and 250. (Normal operation is possible for set value of 250 ms or more.) In applications where a set value of 249 ms or less is required, use start timing with signal input.

When the H5CX is used with power start in F-1 mode (i.e., accumulative operation with output on hold), there will be a timer error (approximately 100 ms each time the H5CX is turned ON) due to the characteristics of the internal circuitry. Use the H5CX with signal start if timer accuracy is required.

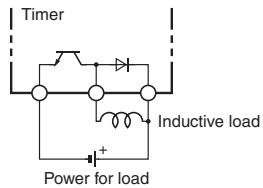
Transistor Output

The transistor output of the H5CX is insulated from the internal circuitry by a photocoupler, so the transistor output can be used as both NPN and PNP output.

NPN Output PNP Output



The diode connected to the collector of the output transistor is used to absorb inverted voltage that is generated when an inductive load is connected to the H5CX.



Response Delay Time When Resetting (Transistor Output)

The following table shows the delay from when the reset signal is input until the output is turned OFF.

(Reference value)

Minimum reset signal width	Output delay time
1 ms	0.8 to 1.2 ms
20 ms	15 to 25 ms

Power Failure Backup

All data is stored in the EEPROM when there is a power failure. The EEPROM can be overwritten more than 100,000 times.

Operating mode	Overwriting timing
F-1 mode	When power is turned OFF.
A mode	When settings are changed.

■ Conformance to EN/IEC Standards

There is no insulation between power supply and input terminals.

Basic insulation between power supply and output terminals, and between input terminals and output terminals.

Input and output terminals are connected to devices without exposed charged parts.

Input and output terminals are connected to devices with basic insulation that is suitable for the maximum operating voltage.

Safety Precautions (H5CX-B)

■ Precautions for Safe Use

Changing the Set Value

When changing the set value during a timing operation, the output will turn ON if the set value is changed as follows because of the use of a constant read-in system:

Forecast Value Setting

When the present value \geq the set value, OUT2 (control output) turns ON. When the present value \geq the forecast value (forecast value = set value – forecast set value) OUT1 (forecast output) turns ON.

Absolute Value Setting

When the present value \geq set value 2, OUT2 (control output 2) turns ON. When the present value \geq set value 1, OUT1 (control output 1) turns ON.

■ Precautions for Correct Use

Operation with a Set Value of 0

When the set value is 0, the output turns ON the moment the signal is input. The reset operation turns OFF the output.

Certain Terms and Conditions of Sale

1. **Offer; Acceptance.** These terms and conditions (these "Terms") are deemed part of all catalogs, manuals or other documents, whether electronic or in writing, relating to the sale of goods or services (collectively, the "Goods") by Omron Electronics LLC and its subsidiary companies ("Seller"). Seller hereby objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms. Please contact your Omron representative to confirm any additional terms for sales from your Omron company.
2. **Prices.** All prices stated are current, subject to change without notice by Seller. Buyer agrees to pay the price in effect at time of shipment.
3. **Discounts.** Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Seller's payment terms and (ii) Buyer has no past due amounts owing to Seller.
4. **Orders.** Seller will accept no order less than \$200 net billing.
5. **Governmental Approvals.** Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Goods.
6. **Taxes.** All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Seller or required to be collected directly or indirectly by Seller for the manufacture, production, sale, delivery, importation, consumption or use of the Goods sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Seller.
7. **Financial.** If the financial position of Buyer at any time becomes unsatisfactory to Seller, Seller reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Seller may (without liability and in addition to other remedies) cancel any unshipped portion of Goods sold hereunder and stop any Goods in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
8. **Cancellation; Etc.** Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Seller fully against all costs or expenses arising in connection therewith.
9. **Force Majeure.** Seller shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortages of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
10. **Shipping; Delivery.** Unless otherwise expressly agreed in writing by Seller:
 - a. Shipments shall be by a carrier selected by Seller;
 - b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
 - c. All sales and shipments of Goods shall be FOB shipping point (unless otherwise stated in writing by Seller), at which point title to and all risk of loss of the Goods shall pass from Seller to Buyer, provided that Seller shall retain a security interest in the Goods until the full purchase price is paid by Buyer;
 - d. Delivery and shipping dates are estimates only.
 - e. Seller will package Goods as it deems proper for protection against normal handling and extra charges apply to special conditions.
11. **Claims.** Any claim by Buyer against Seller for shortage or damage to the Goods occurring before delivery to the carrier must be presented in writing to Seller within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Goods from Seller in the condition claimed.
12. **Warranties.** (a) **Exclusive Warranty.** Seller's exclusive warranty is that the Goods will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Seller (or such other period expressed in writing by Seller). Seller disclaims all other warranties, express or implied. (b) **Limitations.** SELLER MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE GOODS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE GOODS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Seller further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Goods or otherwise of any intellectual property right. (c) **Buyer Remedy.** Seller's sole obligation hereunder shall be to replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Good or, at Seller's election, to repay or credit Buyer an amount equal to the purchase price of the Good; provided that in no event shall Seller be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Goods unless Seller's analysis confirms that the Goods were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any goods by Buyer must be approved in writing by Seller before shipment. Seller shall not be liable for the suitability or unsuitability or the results from the use of Goods in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.
13. **Damage Limits; Etc.** SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE GOODS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Seller exceed the individual price of the Good on which liability is asserted.
14. **Indemnities.** Buyer shall indemnify and hold harmless Seller, its affiliates and its employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Seller is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Goods. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Seller and defend or settle any action brought against Seller to the extent that it is based on a claim that any Good made to Buyer specifications infringed intellectual property rights of another party.
15. **Property; Confidentiality.** The intellectual property embodied in the Goods is the exclusive property of Seller and its affiliates and Buyer shall not attempt to duplicate it in any way without the written permission of Seller. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Seller. All information and materials supplied by Seller to Buyer relating to the Goods are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
16. **Miscellaneous.** (a) **Waiver.** No failure or delay by Seller in exercising any right and no course of dealing between Buyer and Seller shall operate as a waiver of rights by Seller. (b) **Assignment.** Buyer may not assign its rights hereunder without Seller's written consent. (c) **Amendment.** These Terms constitute the entire agreement between Buyer and Seller relating to the Goods, and no provision may be changed or waived unless in writing signed by the parties. (d) **Severability.** If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (e) **Setoff.** Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (f) As used herein, "including" means "including without limitation".

Certain Precautions on Specifications and Use

1. **Suitability of Use.** Seller shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Good in the Buyer's application or use of the Good. At Buyer's request, Seller will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Good. This information by itself is not sufficient for a complete determination of the suitability of the Good in combination with the end product, machine, system, or other application or use. The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of this Good, nor is it intended to imply that the uses listed may be suitable for this Good:
 - (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
 - (ii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
 - (iii) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Good.
2. **Programmable Products.** Seller shall not be responsible for the user's programming of a programmable Good, or any consequence thereof.
3. **Performance Data.** Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Seller's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Seller's Warranty and Limitations of Liability.
4. **Change in Specifications.** Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Good may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Seller's representative at any time to confirm actual specifications of purchased Good.
5. **Errors and Omissions.** The information in this catalog has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors, or omissions.

NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE SELLER'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Complete "Terms and Conditions of Sale" for product purchase and use are on Omron's website at www.omron.com/oei – under the "About Us" tab, in the Legal Matters section.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.



OMRON ELECTRONICS LLC

One Commerce Drive
Schaumburg, IL 60173

847-843-7900

For US technical support or other inquiries:

800-556-6766

Cat. No. L101-E3-01

10/03

OMRON CANADA, INC.

885 Milner Avenue
Toronto, Ontario M1B 5V8

416-286-6465

Specifications subject to change without notice

OMRON ON-LINE

Global - <http://www.omron.com>
USA - <http://www.omron.com/oei>
Canada - <http://www.omron.ca>

Printed in USA