Multifunction Digital Timer
H5CX

- Highly visible display with backlit negative transmissive LCD.
- Programmable PV color to visually alert when output status changes (screw terminal block models).
- Intuitive setting enabled using DIP switch (H5CX-A/-A11 models) and ergonomic up/down digit keys.
- Twin timer in one body to meet a broader range of cyclic control application requirements as well as ON/OFF duty adjustable flicker mode.
- PNP/NPN switchable DC-voltage input (H5CX-A/-A11 models).
- Finger-safe terminals (screw terminal block models).
- Meet a variety of mounting requirements:
  Screw terminal block models, and pin-style terminal models.
- NEMA4/IP66 compliance.
- Six-language instruction manual.

Contents

Model Number Structure

■ Model Number Legend:

H5CX-□□□□□
1 2 3 4 5

1. **Type classifier**
   A: Standard type
   L: Economy type
2. **External connection**
   None: Screw terminals
   8: 8-pin socket
   11: 11-pin socket
3. **Output type**
   None: Contact output
   S: Transistor output
4. **Supply voltage**
   None: 100 to 240 VAC 50/60 Hz
   D: 12 to 24 VDC/24 VAC 50/60 Hz
5. **Case color**
   None: Black
   G: Light gray (Munsell 5Y7/1): Produced upon request.

Ordering Information

■ List of Models

Output type	Supply voltage	Models		
		Standard type		Economy type
		Screw terminals	11-pin socket	8-pin socket
Contact output	100 to 240 VAC	H5CX-A	H5CX-A11	H5CX-L8
	12 to 24 VDC/24 VAC	H5CX-AD	H5CX-A11D	H5CX-L8D
Transistor output	100 to 240 VAC	H5CX-AS	H5CX-A11S	H5CX-L8S
	12 to 24 VDC/24 VAC	H5CX-ASD	H5CX-A11SD	H5CX-L8SD

Note: The power supply and input circuits for the H5CX-A11/A11S have basic insulation. Other models are not insulated.

■ Accessories (Order Separately)

Name		Models
Flush Mounting Adapter (See note 1.)		Y92F-30
Waterproof Packing (See note 1.)		Y92S-29
Track Mounting/ Front Connecting Socket	8-pin	P2CF-08
	8-pin, finger-safe type	P2CF-08-E
	11-pin	P2CF-11
	11-pin, finger-safe type	P2CF-11-E
Back Connecting Socket	8-pin	P3G-08
	8-pin, finger-safe type	P3G-08 with Y92A-48G (See note 2.)
	11-pin	P3GA-11
	11-pin, finger-safe type	P3GA-11 with Y92A-48G (See note 2.)
Hard Cover		Y92A-48
Soft Cover		Y92A-48F1
Mounting Track	50 cm (l) × 7.3 mm (t)	PFP-50N
	1 m (l) × 7.3 mm (t)	PFP-100N
	1 m (l) × 16 mm (t)	PFP-100N2
End Plate		PFP-M
Spacer		PFP-S

Note 1. Supplied with H5CX-A□ models (except for H5CX-A11□ and H5CX-L8□ models).
2. Y92A-48G is a finger-safe terminal cover attached to the P3G-08 or P3GA-11 Socket.

Specifications

■ Ratings

Item	H5CX-A□	H5CX-A11□	H5CX-L8□
Classification	Digital timer		
Rated supply voltage	100 to 240 VAC (50/60 Hz), 24 VAC (50/60 Hz)/12 to 24 VDC (permissible ripple: 20% (p-p) max.)		
Operating voltage range	85% to 110% rated supply voltage (12 to 24 VDC: 90% to 110%)		
Power consumption	Approx. 6.2 VA at 264 VAC Approx. 5.1 VA at 26.4 VAC Approx. 2.4 W at 12 VDC		
Mounting method	Flush mounting	Flush mounting, surface mounting, DIN track mounting	
External connections	Screw terminals	11-pin socket	8-pin socket
Terminal screw tightening torque	0.5 N·m max.	---	
Display	7-segment, negative transmissive LCD; Present value: 11.5-mm-high characters, red or green (programmable) Set value: 6-mm-high characters, green	7-segment, negative transmissive LCD Present value: 11.5-mm-high characters, red Set value: 6-mm-high characters, green	
Digits	4 digits		
Time ranges	9.999 s (0.001-s unit), 99.99 s (0.01-s unit), 999.9 s (0.1-s unit), 9999 s (1-s unit), 99 min 59 s (1-s unit) 999.9 min (0.1-min unit), 9999 min (1-min unit), 99 h 59 min (1-min unit), 999.9 h (0.1-h unit), 9999 h (1-h unit)		
Timer mode	Elapsed time (Up), remaining time (Down) (selectable)		
Input signals	Start, gate, reset		Start, reset
Input method	No-voltage input/voltage input (switchable) No-voltage Input 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. Voltage Input High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input resistance: approx. 4.7 kΩ)		No-voltage Input 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.
Start, reset, gate	Minimum input signal width: 1 or 20 ms (selectable, same for all input)		
Power reset	Minimum power-opening time: 0.5 s (except for A-3, b-1, and F mode)		
Reset system	Power resets (except for A-3, b-1, and F modes), external and manual reset		
Sensor waiting time	250 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)		
Output modes	A, A-1, A-2, A-3, b, b-1, d, E, F, Z, ton or toff		
One-shot output time	0.01 to 99.99 s		
Control output	SPDT contact output: 5 A at 250 VAC/30 VDC, resistive load (cosϕ=1) Minimum applied load: 10 mA at 5 VDC (failure level: P, reference value) Transistor output: NPN open collector, 100 mA at 30 VDC max. residual voltage: 1.5 VDC max. (Approx. 1 V)		
	Output category according to EN60947-5-1 for Timers with Contact Outputs (AC-15; 250 V 3 A/AC-13; 250 V 5 A/DC-13; 30 V 0.5 A) Output category according to EN60947-5-2 for Timers with Transistor Outputs (DC-13; 30 V 100 mA) NEMA B300 Pilot Duty, 1/4 HP 5-A resistive load at 120 VAC, 1/3 HP 5-A resistive load at 240 VAC		
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, label for DIP switch settings	Label for DIP switch settings	None

■ Characteristics

Item	H5CX-A□/-A11□/-L8□
Accuracy of operating time and setting error (including temperature and voltage influences) (See note 1.)	Power-ON start: ±0.01% ±50 ms max. Rated against set value Signal start: ±0.005 ±30 ms max. Rated against set value Signal start for transistor output model: ±0.005% ±3 ms max. (See note 2.) 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 MΩ min. (at 500 VDC) between current-carrying terminal and exposed non-current-carrying metal parts, and between non-continuous contacts
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min between current-carrying terminals and non-current-carrying metal parts 1,000 VAC (for H5CX-□SD), 50/60 Hz for 1 min between control output, power supply, and input circuit (2,000 VAC for models other than H5CX-□SD) 1,000 VAC, 50/60 Hz for 1 min between non-continuous contacts
Impulse withstand voltage	3 kV (between power terminals) for 100 to 240 VAC, 1 kV for 24 VAC/12 to 24 VDC 4.5 kV (between current-carrying terminal and exposed non-current-carrying metal parts) for 100 to 240 VAC 1.5 kV for 24 VAC/12 to 24 VDC
Noise immunity	±1.5 kV (between power terminals) and ±600 V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 ms, 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
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load) See *Life-test Curve* on page 165.
Approved safety standards (See note 3.)	UL508/Recognition (H5CX-L8□: Listing only with OMRON's P2CF-08□ or P3G-08 socket), CSA C22.2 No. 14, conforms to EN61010-1 (Pollution degree 2/overvoltage category II) Conforms to VDE0106/P100 (finger protection).
EMC	(EMI) EN61326 Emission Enclosure: EN55011 Group 1 class A Emission AC mains: EN55011 Group 1 class A (EMS) EN61326 Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2), 8 kV air discharge (level 3) Immunity RF-interference: EN61000-4-3: 10 V/m (Amplitude-modulated, 80 MHz to 1 GHz) (level 3); 10 V/m (Pulse-modulated, 900 MHz ±5 MHz) (level 3) Immunity Conducted Disturbance: EN61000-4-6: 10 V (0.15 to 80 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) Immunity Voltage Dip/Interruption EN61000-4-11: 0.5 cycle, 100% (rated voltage)
Degree of protection	Panel surface: IP66 and NEMA Type 4 (indoors) (See note 4.)
Weight	H5CX-A□: Approx. 135 g, H5CX-A11□/-L8□: Approx. 105 g

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

2. The value is applied for a minimum pulse width of 1 ms.

3. To meet UL listing requirements with the H5CX-L8□, an OMRON P2CF-08-□ or P3G-08 Socket must be mounted on the Timer.

4. A waterproof packing is necessary to ensure IP66 waterproofing between the H5CX and installation panel.

Period Meter
K3NP

An Ideal Interface for Easily Measuring the Time Interval

- 50-kHz input range and 0.08% accuracy for sophisticated control.
- A wide selection of outputs: relay, transistor, BCD, linear, or communications.
- Maximum/Minimum value hold, set value write protection, and more.
- Banks with four comparative output values and four prescale values.
- Set value teaching, linear output range teaching, and prescale teaching are available using actual measured values.
- Prescale function available, which displays in units of actual physical parameters (length, volume, etc.).
- Displays values in hours, minutes, and seconds in operating modes 2 to 4.
- Built-in sensor power supply (12 VDC, 80 mA).
- Compact 1/8 DIN size.
- Conforms to EMC standards, EN61010-1 (IEC1010-1).
- UL/CSA approved.

Model Number Structure

■ Model Number Legend

Base Units and Output Boards can be ordered individually or as sets. Refer to the *Output Board Combinations* table on page 196.

Base Units

K3NP - □ □ □ □
1 2 3 4

Output Boards

K31 - □ □ □ □
5 6 7 8

Base Units with Output Boards

K3NP - □ □ □ □ - □ □ □ □
1 2 3 4 5 6 7 8

1, 2. Input Sensors Codes

NB: NPN inputs/Voltage pulse inputs
PB: PNP inputs

3. Supply Voltage

1: 100 to 240 VAC
2: 12 to 24 VDC

4. Display

A: Basic
C: Set Value LED Display

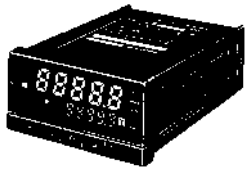
5, 6, 7, 8. Output Type Codes

C1: 3 comparative relay contact outputs (H, PASS, L: SPDT)
C2: 5 comparative relay contact outputs (HH, H, L, LL: SPST-NO; PASS: SPDT)
C5: 5 comparative relay contact outputs (HH, H, L, LL: SPST-NC; PASS: SPDT)
T1: 5 comparative transistor outputs (NPN open collector)
T2: 5 comparative transistor outputs (PNP open collector)
B2: BCD output (NPN open collector) (see note)
B4: BCD output + 5 transistor outputs (NPN open collector)
L1: Linear output (4 to 20 mA) (see note)
L2: Linear output (1 to 5 VDC) (see note)
L3: Linear output (1 mV/10 digits) (see note)
L4: Linear output, 4 to 20 mA + 5 transistor outputs (NPN open collector)
L5: Linear output, 1 to 5 V + 5 transistor outputs (NPN open collector)
L6: Linear output, 1 mV/10 digits+ 5 transistor outputs (NPN open collector)
L7: Linear output, 0 to 5 VDC (see note)
L8: Linear output, 0 to 10 VDC (see note)
L9: Linear output, 0 to 5 VDC + 5 transistor outputs (NPN open collector)
L10: Linear output, 0 to 10 VDC + 5 transistor outputs (NPN open collector)
FLK1: Communication RS-232C (see note)
FLK2: Communication RS-485 (see note)
FLK3: Communication RS-422 (see note)
FLK4: RS-232C + 5 transistor outputs (NPN open collector)
FLK5: RS-485 + 5 transistor outputs (NPN open collector)
FLK6: RS-422 + 5 transistor outputs (NPN open collector)

Note: These output types are available on Basic Models only.

Ordering Information

■ Base Unit

Input type		NPN/Voltage pulse		PNP	
Supply voltage		100 to 240 VAC	12 to 24 VDC	100 to 240 VAC	12 to 24 VDC
Basic Models These models provide a present value LED and front-panel control keys. Can be connected to any Output Board, or can be used for display only without an Output Board.		K3NP-NB1A	K3NP-NB2A	K3NP-PB1A	K3NP-PB2A
Set Value LED Models These models provide a present value LED, set value LED, and front-panel control keys. Can be connected to Relay, Transistor, or Combination Output Boards.		K3NP-NB1C	K3NP-NB2C	K3NP-PB1C	K3NP-PB2C

■ Available Output Board Combinations

Output type	Output configuration	Output boards	Base units	
			Basic	Set Value LED Display
Relay contact	3 outputs: H, PASS, L (SPDT)	K31-C1	Yes	Yes
	5 outputs: HH, H, L, LL (SPST-NO), and PASS (SPDT)	K31-C2	Yes	Yes
	5 outputs: HH, H, L, LL (SPST-NC), and PASS (SPDT)	K31-C5	Yes	Yes
Transistor	5 outputs (NPN open collector)	K31-T1	Yes	Yes
	5 outputs (PNP open collector)	K31-T2	Yes	Yes
BCD (see note)	5-digit output (NPN open collector)	K31-B2	Yes	---
Linear	4 to 20 mA DC	K31-L1	Yes	---
	1 to 5 VDC	K31-L2	Yes	---
	1 mV/10 digits	K31-L3	Yes	---
	0 to 5 VDC	K31-L7	Yes	---
	0 to 10 VDC	K31-L8	Yes	---
Communication boards (see note)	RS-232C	K31-FLK1	Yes	---
	RS-485	K31-FLK2	Yes	---
	RS-422	K31-FLK3	Yes	---
Combination output and communication boards	BCD output + 5 transistor outputs (NPN open collector)	K31-B4	Yes	Yes
	4 to 20 mA + 5 transistor outputs (NPN open collector)	K31-L4	Yes	Yes
	1 to 5 V + 5 transistor outputs (NPN open collector)	K31-L5	Yes	Yes
	1 mV/10 digits + 5 transistor outputs (NPN open collector)	K31-L6	Yes	Yes
	0 to 5 VDC + 5 transistor outputs (NPN open collector)	K31-L9	Yes	Yes
	0 to 10 VDC + 5 transistor outputs (NPN open collector)	K31-L10	Yes	Yes
	RS-232C + 5 transistor outputs (NPN open collector)	K31-FLK4	Yes	Yes
	RS-485 + 5 transistor outputs (NPN open collector)	K31-FLK5	Yes	Yes
	RS-422 + 5 transistor outputs (NPN open collector)	K31-FLK6	Yes	Yes

Note: For details, refer to the *Communication Operation Manual.*

Specifications

■ Ratings

Supply voltage	100 to 240 VAC (50/60 Hz); 12 to 24 VDC
Operating voltage range	85% to 110% of supply voltage
Power consumption (see note)	15 VA max. (max. AC load with all indicators lit) 10 W max. (max. DC load with all indicators lit)
Sensor power supply	80 mA at 12 VDC±10%
Insulation resistance	20 MΩ min. (at 500 VDC) between external terminal and case. Insulation provided between inputs, outputs, and power supply.
Dielectric strength	2,000 VAC for 1 min between external terminal and case. Insulation provided between inputs, outputs, and power supply.
Noise immunity	±1,500 V on power supply terminals in normal or common mode ±1 μs, 100 ns for square-wave noise with 1 ns
Vibration resistance	Malfunction: 10 to 55 Hz, 0.5-mm for 10 min each in X, Y, and Z directions Destruction: 10 to 55 Hz, 0.75-mm for 2 hrs each in X, Y, and Z directions
Shock resistance	Malfunction: 98 m/s^2 (10G) for 3 times each in X, Y, and Z directions Destruction: 294 m/s^2 (30G) for 3 times each in X, Y, and Z directions
Ambient temperature	Operating: −10°C to 55°C (with no icing) Storage: −20°C to 65°C (with no icing)
Ambient humidity	Operating: 25% to 85% (with no condensation)
EMC	(EMI) EN61326+A1 Industry Emission Enclosure: CISPR 11 Group 1 class A: CISRP16-1/-2 Emission AC Mains: CISPR 11 Group 1 class A: CISRP16-1/-2 (EMS) EN61326+A1 Industry Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference: EN61000-4-3: 10 V/m (amplitude-modulated, 80 MHz to 1 GHz) (level 3) Immunity Fast Transient Noise: EN61000-4-4: 2 kV (power line) (level 3) Immunity Burst Noise: 1 kV line to line (I/O signal line) Immunity Surge: EN61000-4-5: 1 kV line to line 2 kV line to ground (power line) Immunity Conducted Disturbance EN61000-4-6: 3 V (0.15 to 80 MHz) (level 2) Immunity Voltage Dip/Interrupting EN61000-4-11: 0.5 cycles, 0, 180°, 100% (rated voltage)
Approved standards	UL508, CSA22.2; Conforms to EN61326+A1, EN61010-1 (IEC61010-1) Conforms to VDE0106/P100 (finger protection) when the terminal cover is mounted.
Weight	Approx. 400 g

Note: A K3NP with DC supply voltage requires approximately 1 A DC as control power supply current the moment the K3NP is turned ON. Do not forget to take this into consideration when using several K3NP units. When the K3NP is not in measuring operation (e.g., the K3NP has been just turned ON or is operating for startup compensation time), the display will read "88888" and all outputs will be OFF.

■ Characteristics

Input signal	No-voltage contact (30 Hz max., ON/OFF pulse width: 15 ms min.) Voltage pulse (50 kHz max., ON/OFF pulse width: 9 μs min., ON voltage: 4.5 to 30 V/OFF voltage: −30 to 2 V) Open collector (50 kHz max., ON/OFF pulse width: 9 μs min.) **Connectable Sensors** ON residual voltage: 3 V max. OFF leakage current: 1.5 mA max. Load current: Must have switching capacity of 20 mA min. Must be able to dependably switch a load current of 5 mA max.
Measuring accuracy (at 23±5°C)	±0.08%rdg±1 digit
Measuring modes and ranges	Operating mode 1: Passing speed 10 ms to 3,200 seconds Operating mode 2: Cycle 20 ms to 3,200 seconds Operating mode 3: Time difference 10 ms to 3,200 seconds Operating mode 4: Elapsed time 10 ms to 3,200 seconds Operating mode 5: Length measurement 0 to 4G count (32-bit counter) Operating mode 6: Interval 0 to 4G count (32-bit counter)
Max. displayed digits	5 digits (0 to 99999)
Display	7-segment LED
Polarity display	Not available
Zero display	Leading zeros are not displayed.
Prescale function	Programming via front-panel key inputs. (0.0001×10^{-9} to 9.9999×10^{9}, decimal point can be set freely) Can be set using prescale value teaching.
HOLD functions	Max. value (peak) hold, Min. value (bottom) hold
External control	HOLD (Process value held) RESET (Maximum/minimum data reset) BANK (Selection of one bank out of 4 banks of set values) (Selection of one bank out of 4 banks of prescale values)
Other functions	Variable linear output range (for models with linear outputs only) (see note) Remote/Local processing (available for communications output models only) Maximum/Minimum value data reset with front panel keys Comparative output pattern selection Time unit display Security
Output configuration	Relay contact output (3 or 5 outputs) Transistor output (NPN and PNP open collector), BCD (NPN open collector) Parallel BCD (NPN open collector) + transistor output (NPN open collector) Linear output (4 to 20 mA, 1 to 5 V) + transistor output (NPN open collector) Communication functions (RS-232C, RS-485, RS-422) Communication functions (RS-232C, RS-485, RS-422) + transistor output (NPN open collector)
Delay in comparative outputs (at transistor output)	20 ms max.
Linear output response time	40 ms max.
Degree of protection	Front panel: NEMA4 for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP00
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)

Note: The linear output range cannot be set when connected to a 1 mV/10-digit Linear Output Board.