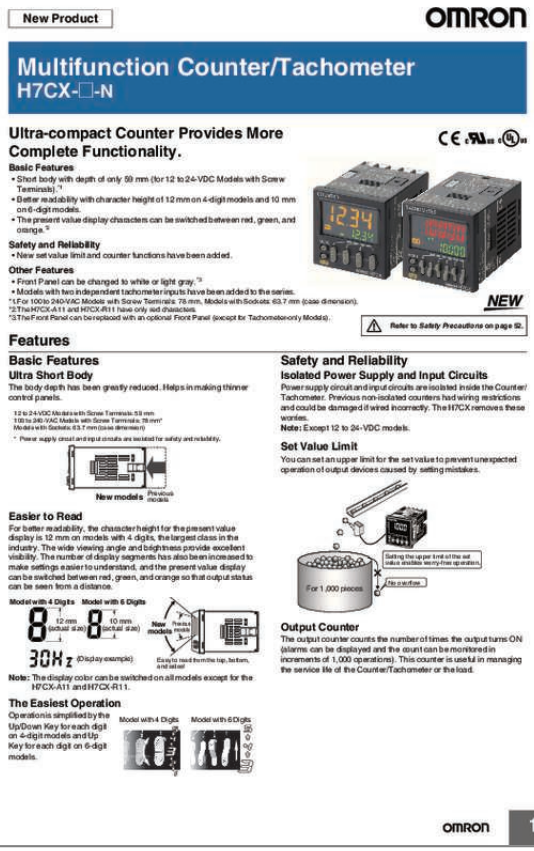

New Product

OMRON

Multifunction Counter/Tachometer
H7CX-□-N

Ultra-compact Counter Provides More Complete Functionality.

Basic Features
- Short body with depth of only 59 mm (for 12 to 24-VDC Models with Screw Terminals) *1
- Better readability with character height of 12 mm on 4-digit models and 10 mm on 6-digit models.
- The present value display characters can be switched between red, green, and orange. *2

Safety and Reliability
- New set value limit and counter functions have been added.

Other Features
- Front Panel can be changed to white or light gray. *3
- Models with two independent tachometer inputs have been added to the series.

*1.For 100 to 240-VAC Models with Screw Terminals: 78 mm. Models with Sockets: 63.7 mm (case dimension).
*2.The H7CX-A11 and H7CX-R11 have only red characters.
*3.The Front Panel can be replaced with an optional Front Panel (except for Tachometer-only Models).

NEW

Refer to Safety Precautions on page 52.

Features

Basic Features

Ultra Short Body
The body depth has been greatly reduced. Helps in making thinner control panels.

12 to 24-VDC Models with Screw Terminals: 59 mm
100 to 240-VAC Models with Screw Terminals: 78 mm*
Models with Sockets: 63.7 mm (case dimension)
* Power supply circuit and input circuits are isolated for safety and reliability.

New models / Previous models

Easier to Read
For better readability, the character height for the present value display is 12 mm on models with 4 digits, the largest class in the industry. The wide viewing angle and brightness provide excellent visibility. The number of display segments has also been increased to make settings easier to understand, and the present value display can be switched between red, green, and orange so that output status can be seen from a distance.

Model with 4 Digits: 12 mm (actual size)
Model with 6 Digits: 10 mm (actual size)
New models / Previous models
(Display example)
Easy to read from the top, bottom, and sides!

Note: The display color can be switched on all models except for the H7CX-A11 and H7CX-R11.

The Easiest Operation
Operation is simplified by the Up/Down Key for each digit on 4-digit models and Up Key for each digit on 6-digit models.
Model with 4 Digits
Model with 6 Digits

Safety and Reliability

Isolated Power Supply and Input Circuits
Power supply circuit and input circuits are isolated inside the Counter/Tachometer. Previous non-isolated counters had wiring restrictions and could be damaged if wired incorrectly. The H7CX removes these worries.
Note: Except 12 to 24-VDC models.

Set Value Limit
You can set an upper limit for the set value to prevent unexpected operation of output devices caused by setting mistakes.

Setting the upper limit of the set value enables worry-free operation.
No overflow
For 1,000 pieces

Output Counter
The output counter counts the number of times the output turns ON (alarms can be displayed and the count can be monitored in increments of 1,000 operations). This counter is useful in managing the service life of the Counter/Tachometer or the load.

OMRON 1

Manual abstract:

The H7CX-A11 and H7CX-R11 have only red characters. @@@@Helps in making thinner control panels. 12 to 24-VDC Models with Screw Terminals: 59 mm 100 to 240-VAC Models with Screw Terminals: 78 mm Models with Sockets: 63.7 mm (case dimension) * Power supply circuit and input circuits are isolated for safety and reliability. Safety and Reliability Isolated Power Supply and Input Circuits Power supply circuit and input circuits are isolated inside the Counter/ Tachometer. Previous non-isolated counters had wiring restrictions and could be damaged if wired incorrectly. The H7CX removes these worries. Note: Except 12 to 24-VDC models. Set Value Limit You can set an upper limit for the set value to prevent unexpected operation of output devices caused by setting mistakes. New models Previous models Easier to Read For better readability, the character height for the present value display is 12 mm on models with 4 digits, the largest class in the industry.*

The wide viewing angle and brightness provide excellent visibility. The number of display segments has also been increased to make settings easier to understand, and the present value display can be switched between red, green, and orange so that output status can be seen from a distance. Model with 4 Digits Model with 6 Digits 10 mm (actual size) New Previous models models Setting the upper limit of the set value enables worry-free operation. No overflow For 1,000 pieces 12 mm (actual size) Output Counter The output counter counts the number of times the output turns ON (alarms can be displayed and the count can be monitored in increments of 1,000 operations). This counter is useful in managing the service life of the Counter/Tachometer or the load. (Display example) Easy to read from the top, bottom, and sides! Note: The display color can be switched on all models except for the H7CX-A11 and H7CX-R11. The Easiest Operation Operation is simplified by the Up/Down Key for each digit on 4-digit models and Up Key for each digit on 6-digit models. Model with 4 Digits Model with 6 Digits 1 H7CX-@-N Other Features The front color can be changed simply by replacing the Front Panel. The Front Panel can be replaced with an optional Front Panel (sold separately) with a different color to match the installation site. Select from black, white, and light gray (except for models with tachometer function only).

*Key Protection Select from any of seven protection patterns. Use the best one for the application. New Functions Many useful functions have been added, including a Twin Counter Mode and many tachometer functions to handle even more applications. New Tachometer Functions • Control with two independent inputs (independent measurements, differential, absolute ratio, and error ratio) • Peak/bottom hold function • Output hysteresis setting • Output OFF delay • Switching the measurement method (pulse cycle/pulse width) • Startup time • Auto-zero time • Averaging method/Number of averaging times • AMD-compatible Mode Black (Standard) White Light gray Only the Front Panel can be replaced. Universal NPN/PNP Input DC 2-wire sensors can be connected for a wide range of input devices. Waterproof, Dust-proof Structure (UL508 Type 4X and IP66) Worry-free application is possible in locations subject to water. Note: When the Y92S-29 Waterproof Packing is used. Model Number Structure Model Configuration H7CX Series H7CX-A-series Multifunction Preset Counter H7CX-R-series Digital Tachometer Model Classification Model 1-stage preset counter 2-stage preset counter Function Total and preset counter Batch counter Dual counter Twin counter Tachometer Preset counter H7CX-A@-N Yes No Yes No No No No H7CX-A4W@-N Yes Yes Yes Yes Yes Yes No Preset counter/tachometer H7CX-AW@-N/-AU@-N Yes Yes Yes Yes Yes Yes Yes*1 Yes 1 input or 2 inputs (independent measurements, differential, absolute ratio value, and error ratio value) 2-stage Screw terminals Red, green, or orange 4 digits 6 digits Tachometer H7CX-R11@-N No No No No No No Yes H7CX-R11W@-N Tachometer input No No Yes 1 input Yes 2 inputs (independent measurement) only Settings External connections Display color of present value Display digits 1-stage 11-pin socket Red 4 or 6 digits 1-stage 11-pin socket Red 6 digits *1. Set the tachometer input mode from the function setting mode to switch to the tachometer function. 2 H7CX-@-N Model Number Legend (Not all possible combinations of functions are available.*

) H7CX-@@@@@@-N 1 2 3 4 5 6 1. Type Symbol A R Meaning Standard type Tachometer 2. External connections Symbol None 11 Meaning Screw terminals 11-pin socket 3. Digits Symbol None 4 Meaning 6 digits 4 digits 4. Settings Symbol None U W Meaning 1-stage setting Factory-set to 1-stage setting Factory-set to 2-stage setting 5. Output type Symbol None S Meaning Contact output or contact output + transistor output Transistor output 6. Supply voltage Symbol None D D1 Meaning 100 to 240 VAC at 50/60 Hz 12 to 24 VDC 12 to 24 VDC/24 VAC at 50/60 Hz * The H7CX-R11W@ is a 1-stage (2 inputs and outputs) rather than a 2-stage Counter. Ordering Information List of Models Type Classification Configuration External connections Settings Display digits Outputs Contact output (SPDT) 100 to 240 VAC 4 digits Transistor output (SPST) Contact output (SPDT) 11-pin socket 6 digits Contact output (SPDT) 12 to 24 VDC/24 VAC • 1-stage preset counter • Total and preset counter Transistor output (SPST) 1-stage 4 digits Contact output (SPDT) 12 to 24 VDC Preset counter Transistor output (SPST) Contact output (SPDT) 100 to 240 VAC Transistor output (SPST) 6 digits Contact output (SPDT) 12 to 24 VDC Transistor output (SPST) H7CX-A Series • 1-stage preset counter • 2-stage preset counter • Total and preset counter • Batch counter • Dual counter • Twin counter H7CX-ASD-N H7CX-AD-N H7CX-AS-N H7CX-A4SD-N H7CX-A-N H7CX-A4D-N Contact output (SPDT) 100 to 240 VAC Transistor output (SPST) H7CX-A4S-N H7CX-A11SD1-N H7CX-A4-N H7CX-A11D1-N Contact output (SPDT) 100 to 240 VAC Transistor output (SPST) H7CX-A11S-N H7CX-A114S-N 12 to 24 VDC/24 VAC H7CX-A114D1-N H7CX-A11-N Power supply voltage Model H7CX-A114-N Contact output (SPST + SPDT) 100 to 240 VAC 4 digits Transistor output (DPST) 12 to 24 VDC H7CX-A4W-N Screw terminals H7CX-A4WSD-N Contact output (SPST + SPDT) 100 to 240 VAC • 1-stage preset counter • 2-stage preset counter • Total and preset counter • Batch counter • Dual counter • Twin counter • Tachometer 2-stage Transistor output (DPST) Contact output (SPST + SPDT) 12 to 24 VDC/24 VAC Transistor output (DPST) 6 digits Contact output (SPDT) + Transistor output (SPST) Contact output (SPDT) + Transistor output (SPST) Transistor output (DPST) 1-stage (1 input and output) 1-stage (2 inputs and outputs) 100 to 240 VAC Contact output (SPDT) 6 digits 100 to 240 VAC Contact output (SPDT + SPST) 12 to 24 VDC 100 to 240 VAC H7CX-AW-N H7CX-AWS-N H7CX-AWD1-N H7CX-AWSD1-N H7CX-AWSD-N H7CX-AU-N H7CX-AUD1-N 12 to 24 VDC/24 VAC H7CX-AUSD1-N H7CX-R11-N Preset counter/ Tachometer H7CX-R Series 12 to 24 VDC/24 VAC H7CX-R11D1-N H7CX-R11W-N Tachometer • Tachometer 11-pin socket 12 to 24 VDC/24 VAC H7CX-R11WD1-N Note: 1.*

The functions that are provided depend on the model. Check detailed specifications before ordering.
2. Refer to page page 37 and later for information on H7CX-R Tachometers. 3 H7CX-@-N Accessories (Order Separately) Front Panels (Replacement Part) Model Y92P-CXC4G Y92P-CXC4S Y92P-CXC4B Y92P-CXC6G Y92P-CXC6S Y92P-CXC6B Color Light gray (5Y7/1) White (5Y9.2/0.5) Black (N1.
5) Light gray (5Y7/1) White (5Y9.2/0.5) Black (N1.5) 6-digit Counter 12 Applicable Counters 4-digit Counter Page Note: 1. You can change the color of the Front Panel when mounting the Counter.
The Counter is shipped with a black (N1.5) Front Panel. 2. "COUNTER" is printed on the front of Replacement Front Panels. Soft Cover Model Y92A-48F1 --Remarks Page 12 Hard Cover Model Y92A-48 --Remarks Page 12 Flush Mounting Adapter Model Y92F-30 Remarks Included with models with screw terminals. Use this Adapter to install the Counter/ Tachometer in a cutout previously made for a DIN 72 × 72 mm device (panel cutout: 68 × 68 mm). 12 Page Y92F-45 Waterproof Packing Model Y92S-29 Remarks Included with models with screw terminals. Page 12 Connection Sockets Model P2CF-11 P2CF-11-E Classification Front-connecting Socket Front-connecting Socket (Finger-safe Type) Connectable Counter/ Tachometers --Round crimp terminals cannot be used on Finger-safe Sockets. Use forked crimp terminals. A Y92A-48G Terminal Cover can be used with the Socket to create a finger-safe construction.

*Remarks Page H7CX-@11@-N 13 P3GA-11 Back-connecting Sockets Terminal Covers for P3GA-11 Back-connecting Socket Model Y92A-48G --Remarks Page 13 4 H7CX-A@-N H7CX-A@-N Multifunction Preset Counter • Easy to check the output status from a long distance with changing display colors*1 (red, green, and orange). • Includes total and preset counter, batch counter, dual counter, twin counter, and tachometer.*2 *1. Not supported by the H7CX-A11@-N. *2. The functions that can be selected depend on the model. Specifications Ratings Item Classification Models H7CX-A114@-N Preset counter 1-stage/2-stage preset counter, total and preset counter*1, batch counter, dual counter, and twin counter (selectable) H7CX-A11@-N H7CX-A4@-N H7CX-A@-N H7CX-A4W@-N H7CX-AW@-N/-AU@-N Preset counter/ tachometer 1-stage/2-stage preset counter, total and preset counter*1, batch counter, dual counter, twin counter, and tachometer (selectable) • 100 to 240 VAC at 50/ 60 Hz • 24 VAC at 50/60 Hz or 12 to 24 VDC • 12 to 24 VDC Configuration 1-stage preset counter, 1-stage preset counter with total counter (selectable)*1 Power supply voltage*2 Ratings Operating voltage fluctuation range Power consumption Mounting method External connections Degree of protection Input signals Maximum counting speed Input mode Counter Output mode One-shot output time Reset system Tachometer Prescaling function Decimal point adjustment Sensor waiting time • 100 to 240 VAC, 50/60 Hz • 24 VAC, 50/60 Hz or 12 to 24 VDC • 100 to 240 VAC, 50/60 Hz • 12 to 24 VDC 85% to 110% of rated supply voltage (12 to 24 VDC: 90% to 110%) Approx. 9.4 VA at 100 to 240 VAC, Approx. 7.*
*2 VA/4.7 W at 24 VAC/12 to 24 VDC, Approx. 3.7 W at 12 to 24 VDC Flush mounting or surface mounting 11-pin socket CP1, CP2, reset, and total reset 30 Hz or 5 kHz (switchable) (ON/OFF ratio 1:1)*3 *Common setting for CP1 and CP2 Increment, decrement, increment/decrement (UP/DOWN A (command input), UP/DOWN B (individual inputs), or UP/DOWN C (quadrature inputs)) N, F, C, R, K-1, P, Q, A, K-2, D, and L. 0.*
01 to 99.99 s External (minimum reset signal width: 1 ms or 20 ms, selectable), manual, and automatic reset (internal according to C, R, P, and Q mode operation) Refer to the separate table for tachometer function ratings. Yes (0.001 to 9.999) Yes (rightmost 3 digits) 290 ms max.
(Control output is turned OFF and no input is accepted during sensor waiting time.) No-voltage inputs: ON impedance: 1 kΩ max. (Leakage current: 12 mA at 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/voltage input (switchable) 12 VDC (±10%), 100 mA (except for H7CX-A@D models) Refer to Precautions for Correct Use on page page 53 for details. • Contact output: 3 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, Residual voltage: 1.5 VDC max.

(approx. 1 V), Leakage current: 0.1 mA max. 7-segment, VDC) between current-carrying terminals and exposed noncurrent-carrying metal parts, and between non-continuous contacts 2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and noncurrent-carrying metal parts 2,000 VAC, 50/60 Hz for 1 min between power supply and input circuit for all models except H7CX-@D@ (1,000 VAC for 24 VAC/12 to 24 VDC) 1,000 VAC (for H7CX-@SD@), 50/60 Hz for 1 min between control output, power supply, and input circuit (2,000 VAC for models other than H7CX-@SD@) 1,000 VAC, 50/60 Hz for 1 min between non-continuous contacts Life-test Curve (Reference Values) Resistive load No. of operations (×103) 1,000 700 500 Dielectric strength 3.0 kV between power terminals (1.0 kV for models with 24 VAC/12 to 24 VDC or 12 to 24 VDC) Impulse withstand voltage 4.5 kV between current-carrying terminals and exposed non-current-carrying metal parts (1.5 kV for models with 24 VAC/12 to 24 VDC or 12 to 24 VDC) Noise immunity Static immunity Vibration resistance Shock resistance Destruction Malfunction Destruction Malfunction ±1.5 kV between power terminals (±480 V for models with 12 to 24 VDC) ±600 V between input terminals Square-wave noise by noise simulator (pulse width: 100 ns/1 µs, 1-ns rise) Malfunction: 8 kV Destruction: 15 kV 10 to 55 Hz with 0.
75-mm single amplitude each in three directions for 2 h each 10 to 55 Hz with 0.35-mm single amplitude each in three directions for 10 min each 300 m/s2 each in three directions 100 m/s2 each in three directions Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load, ambient temperature condition: 23°C) Approx. 130 g (Counter only) 300 30 VDC (cosφ=1) 100 70 50 0 250 VAC (cosφ=1) 1 2 3 4 Load current (A) Inductive load No.*
*of operations (×103) 1,000 700 500 Life expectancy Weight * Refer to the Life-test Curve. Applicable Standards Approved safety standards cULus (or cURus): UL508/CSA C22.2 No. 14* EN 61010-1 (IEC 61010-1): Pollution degree 2/overvoltage category II B300 PILOT DUTY 1/4 HP 120 VAC, 1/3 HP, 240 VAC, 3 A resistive load VDE0106/P100 (finger protection) EN61326 EN 55011 Group 1 class A EN 55011 Group 1 class A EN61326 EN 61000-4-2: 4 kV contact discharge; 8 kV air discharge Immunity RF-interference: EN 61000-4-3: 10 V/m (Amplitude-modulated, 80 MHz to 1 GHz); 10 V/m (Pulse-modulated, 900 MHz ±5 MHz) Immunity Conducted Disturbance: EN 61000-4-6: 10 V (0.*

15 to 80 MHz) Immunity Burst: EN 61000-4-4: 2 kV power-line; 1 kV I/O signal-line Immunity Surge: EN 61000-4-5: 1 kV line to lines (power and output lines); 2 kV line to ground (power and output lines) Immunity Voltage Dip/Interruption: EN 61000-4-11: 0.

*5 cycle, 100% (rated voltage) (EMI) Emission Enclosure: Emission AC mains: (EMS) Immunity ESD: 300 30 VDC (L/R=7 ms) 100 70 50 0 250 VAC (cosφ=1) 1 2 3 4 Load current (A) EMC A current of 0.15 A max. can be switched at 125 VDC (cosφ=1) and current of 0.1 A max. can be switched if L/R=7 ms. In both cases, a life of 100,000 operations can be expected. * The following safety standards apply to models with sockets (H7CX-A11@ or H7CX-A114@). cUL (Listing): Applicable when an OMRON P2CF(-E) Socket is used. cUR (Recognition): Applicable when any other socket is used. 6 H7CX-A@-N I/O Functions Using as a Counter*1 (1) In general (except for Dual Counter Mode) • Reads counting signals.*

*• Increment, decrement, command, individual, and quadrature inputs accepted. (2) When used as a dual counter or twin counter • Reads CP1 count signals with CP1 input and CP2 count signals with CP2 input. • Increment signals can be input. (1) In general (except for Dual Counter Mode) • Resets present value and outputs (OUT2 when using the batch counter)*2. • Counting cannot be performed during reset/reset 1 input. • Reset indicator is lit while reset input is ON. (2) When used as a dual counter or twin counter. • Resets the CP1 present value (to 0). • Counting for CP1 input cannot be performed while the reset 1 input is ON. • The reset indicator is lit while the reset 1 input is ON.*

*The reset function depends on the selected configuration*3. Outputs signals according to the specified output mode when a set value is reached. CP1, CP2 Inputs Reset/reset 1 Total reset or reset 2 Outputs OUT1, OUT2 *1. For information on operation of I/O functions, refer to pages page 22 to page 25. *2. In increment mode or increment/decrement mode, the present value returns to 0; in decrement mode, the present value returns to the set value with 1-stage models, and returns to set value 2 with 2-stage models. *3. Reset operates as described in the following table. (The reset indicator will not be lit.) Configuration 1-stage/2-stage preset counter Total and preset counter Batch counter Dual counter Twin counter Does not operate (not used).*

• Resets the total count value. • The total count value is held at 0 while the total reset input is ON. • Resets the batch count value and batch output (OUT1). • The batch count value is held at 0 while the reset 2 input is ON. • Resets the CP2 present value. • Counting for CP2 input cannot be performed while the reset 2 input is ON. • Resets the CP2 present value. Reset operation • The following table shows the delay from when the reset signal is input until the output is turned OFF. (Reference values) Minimum reset signal width 1 ms 20 ms Output delay time 0.8 to 1.

*2 ms 15 to 25 ms Operating Procedures (Tachometer Function) CP1, CP2 Inputs Reset/reset 1 OUT1, OUT2 Reads counting signals. (The CP2 input can be used when the input mode is not 1-input mode.) • Holds the measurement value and outputs. (The reset 2 input can be used when the input mode is 2-input independent measurement.) • The reset indicator is lit when the value is being held. Outputs signals according to the specified output mode when a set value is reached. Outputs 7 H7CX-A@-N Connections Terminal Arrangement Confirm that the power supply meets specifications before use. H7CX-A-N/-A4-N 1-stage Contact Output Total reset H7CX-AD-N/-A4D-N 1-stage Contact Output Total reset Reset H7CX-AS-N/-A4S-N 1-stage Transistor Output Total reset 10 5 OUT1 5 OUT (−) (+) Reset Reset CP1 CP1 CP2 CP2 0V 6 7 8 9 0V (−) Sensor (+) 6 7 8 9 10 10 (−) Sensor (+) 0V 6 7 8 9 12 VDC External power supply 11 12 VDC External power supply 11 1 2 3 4 OUT 5 1 (−) 2 (+) 3 4 OUT 5 1 2 CP2 3 OUT Terminals 1 and 6 are connected internally. H7CX-ASD-N/-A4SD-N 1-stage Transistor Output Total reset Reset H7CX-AW-N/-A4W-N/-AWD1-N/-AU-N/-AUD1-N 2-stage Contact Output Reset 1 Reset 2 CP2 CP1 H7CX-AWS-N/-AWSD1-N/-AUSD1-N 2-stage Transistor Output Reset 1 Reset 2 10 13 0V 6 7 8 9 CP2 CP1 0V (−) Sensor (+) 6 7 8 9 10 0V (−) Sensor (+) 6 7 8 9 10 *1 11 12 13 OUT1 1 2 3 4 OUT2 5 12 VDC 12 VDC External power supply 11 12 External power supply 1 (−) 2 (+) 3 4 OUT 5 *1: "-AU@" Models 12 13 1 2 CP2 3 * OUT2 (−) (+) Terminals 1 and 6 are connected internally. (−) (+) H7CX-AWSD-N/-A4WSD-N 2-stage Transistor Output Reset 1 Reset 2 H7CX-A11-N/-A114-N/-A11D1-N/-A114D1-N 1-stage Contact Output H7CX-A11S-N/-A114S-N/-A11SD1-N 1-stage Transistor Output CP2 CP1 Reset CP1 CP2 Internal circuit 5 6 7 4 3 2 1 11 8 9 10 Reset CP1 CP2 Total reset 0V (−) Sensor (+) OUT (−) (+) 5 6 7 4 3 2 1 11 8 9 10 0V 6 CP1 4 7 8 9 10 Total reset 0V (−) Sensor (+) 12 13 OUT1 12 VDC External power supply 12 VDC 1 (−) 2 (+) 3 4 OUT2 5 External power supply Terminals 1 and 6 are connected internally.*

Transistor Output • The transistor output of the H7CX is isolated 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 H7CX. Counter Load + Power for load Load + Power for load + Power for load Inductive load 8 CP1 4 Internal circuit H7CX-A@-N Block Diagram (Basic insulation) Output circuit (Basic insulation) Power supply circuit (See note.) Display circuit Input circuits Internal control circuit Key switch circuit Input Circuits CP1, CP2, Reset/Reset 1, and Total Reset/Reset 2 Input No-voltage Inputs (NPN Inputs) +14V 1 kΩ IN Internal circuit Approx. 4.

7 kΩ IN Internal circuit Voltage Inputs (PNP Inputs) Note: All models except for H7CX-@D-N have basic insulation. Input Connections The inputs of the H7CX-@-N are no-voltage (short-circuit or open) inputs or voltage inputs. No-voltage Inputs (NPN Inputs) Open Collector PLC or sensor Voltage Output Sensor Contact Input DC Two-wire Sensor Total reset/reset 2 input Total reset/reset 2 input H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 H7CX-A@ H7CX-A11@ Total reset/reset 2 input 6 3 7 7 8 5 9 6 10 4 H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 Note: Operates with transistor ON. Note: Operates with transistor ON. Note: Operates with relay ON.

Note: Operates with transistor ON. No-voltage Input Signal Levels Short-circuit level (transistor ON) • Residual voltage: 3 V max. • Impedance when ON: 1 kΩ max. (The leakage current is approx. 12 mA when the impedance is 0 Ω.

) Applicable Two-wire Sensor • Leakage current: 1.5 mA max. • Switching capacity: 5 mA min. • Residual voltage: 3 VDC max. • Operating voltage: 10 VDC No-contact input Open level (transistor OFF) • Impedance when OFF: 100 kΩ min.

Contact input Use contacts 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) Sensor No-contact Input (PNP Transistor) Sensor Contact Input Total reset/reset 2 input Total reset/reset 2 input H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 H7CX-A@ H7CX-A11@ 6 3 7 7 8 5 9 6 10 4 Note: Operates with transistor OFF. Note: Operates with transistor ON. Note: Operates with relay ON. Voltage Input Signal Levels High level (input ON): 4.5 to 30 VDC Low level (input OFF): 0 to 2 VDC Note: 1. The DC voltage must be 30 VDC max. 2. Input resistance: Approx.
4.7 kΩ Total reset/reset 2 input CP2 input Reset/reset 1 input Reset/reset 1 input Reset/reset 1 input CP2 input CP1 input 0 V for inputs 0 V for inputs 0 V for inputs CP2 input CP1 input CP1 input Total reset/reset 2 input Reset/reset 1 input CP2 input Reset/reset 1 input Reset/reset 1 input 0 V for inputs Reset/reset 1 input 0 V for inputs 0 V for inputs 0 V for inputs CP2 input CP1 input CP2 input CP2 input CP1 input CP1 input CP1 input 9 H7CX-A@-N Nomenclature Display Section 1. Key Protect Indicator (orange) 2. Control Output Indicator (orange) OUT: (One-stage) OUT: 1 2 (Two-stage) 1 2 3 5 10 4 7 8 6 12 13 Operation Keys 10. Mode Key (Changes modes and setting items.
) 11. Reset Key (See note.) 12. Up Keys 1 to 4 (6-digit models: 1 to 6) 13. Down Keys 1 to 4 3.
Reset Indicator (orange) (Lit when the reset input (1) or Reset Key is ON.) Displayed only when the configuration selection mode is not tachometer mode. 11 4. Total Count Indicator (Lit when the total count value is displayed.) 4th digit 1st digit (Front view of 4-digit model) Switches 14. Key-protect Switch 7 4 5 8 6 12 (Default setting) OFF (Disable) ON (Enable) 5. Batch Indicator (Lit when the batch count value is displayed.) 6. Set Value 1, 2 Stage Indicator 7. Present Value (Main Display) (Character height: 12 mm (6-digit: 10 mm), red) * Characters on models with screw terminals (H7CX-A11@) can be switched between red, green, and orange.*

1 2 3 9 10 RST 8. Set value (Sub-display) (Character height: 6 mm, green) 11 15. DIP Switch ON 9. Hold Display (orange) Displayed only when the configuration selection mode is not tachometer mode. 6th digit 1st digit (Front view of 6-digit model) OFF 1 2 3 4 5 6 7 8 Note: The reset functions depends on the selected configuration. Model with 4 Digits Character Size for Main Display Character Size for Sub-display 14 15 Configuration 1-stage/2-stage preset counter Total and preset counter Batch counter Reset operation Resets the present value and outputs. • Resets the present value and outputs. • When the total count value is displayed, resets the present value, the total count value, and outputs. • Resets the present value and OUT2. • When the batch count value is displayed, resets the present value, the batch count value, and outputs.
Resets the CP1 present value, CP2 present value, dual count value, and outputs. Resets the CP1 present value and output 1 when the CP1 present value is displayed. Resets the CP2 present value and output 2 when the CP2 present value is displayed. Holds the measurement value and outputs (hold function). (When the input mode is 2-input independent measurement, the CP1 measurement value display will hold the CP1 measurement value and output 1 and the CP2 measurement value display will hold the CP2 measurement value and output 2.
) 12 mm 6 mm Model with 6 Digits Character Size for Main Display 10 mm Character Size for Sub-display 6 mm Dual counter Twin counter Tachometer Dimensions Counters H7CX-A-N/-AS-N/-AW-N/-AWS-N/-AWD1-N/-AWSD1-N/-A4-N/-A4S-N/-A4W-N/-AU-N/-AUD1-N/-AUSD1-N (Flush Mounting Models) 48 × 48 6 78 (Unit: mm) 44.8 × 44.8 Note: M3.5 terminal screw (effective length: 6 mm) 10 H7CX-A@-N H7CX-AD-N/-ASD-N/-AWSD-N/-A4D-N/-A4SD-N/-A4WSD-N (Flush Mounting Models) 48 × 48 6 59 44.8 × 44.
8 Note: M3.5 terminal screw (effective length: 6 mm) H7CX-A11-N/-A11S-N/-A11D1-N/-A11SD1-N/-A114-N/-A114S-N/-A114D1-N (Flush Mounting/Surface Mounting Models) 48 × 48 6 63.7 14.4 44.8 × 44.8 Dimensions with Flush Mounting Adapter H7CX-A-N/-AS-N/-AW-N/-AWS-N/-AWD1-N/-AWSD1-N/-A4-N/-A4S-N/-A4W-N (Provided with Adapter and Waterproof Packing) Y92S-29 (provided) Waterproof Packing Panel Y92F-30 (provided) Flush Mounting Adapter Panel Cutouts Panel cutouts are as shown below. (according to DIN43700). 60 min. 45+0.6 0 45+0.

6 0 58 (51) 15 min. 60 min. 48 7.5 76.5 H7CX-AD-N/-ASD-N/-AWSD-N/-A4D-N/-A4SD-N/-A4WSD-N (Provided with Adapter and Waterproof Packing) Y92S-29 (provided) Waterproof Packing Panel Y92F-30 (provided) Flush Mounting Adapter Note: 1. The mounting panel thickness should be 1 to 5 mm. 2. To allow easier operation, it is recommended that Adapters be mounted so that the gap between sides with hooks is at least 15 mm (i.e., with the panel cutouts separated by at least 60 mm).
3. It is possible to mount counters side by side, but only in the direction without the hooks. If they are mounted side-by-side, waterresistance will be lost. n Units mounted side by side A A=(48n−2.5) +1 −0 58 (51) 48 7.
5 57.5 H7CX-A11-N/-A11S-N/-A11D1-N/-A11SD1-N/-A114-N/-A114S-N/-A114D1-N (Adapter and Waterproof Packing Ordered Separately) Y92S-29 (order separately) Waterproof Packing Panel Y92F-30 (order separately) Flush Mounting Adapter With Y92A-48F1 attached. A={48n−2.5+(n−1)×4} +1 −0 With Y92A-48 attached. A=(51n−5.
5) +1 −0 Dimensions with Front Connecting Socket 58 (51) 103.2 H7CX -A11@ 100.9 48 7.5 89.9 P2CF-11(-E) Front Connecting Socket (order separately) * These dimensions depend on the kind of DIN Track. (Reference value) 11 H7CX-A@-N Accessories (Order Separately) Note: 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. Soft Cover Y92A-48F1 Hard Cover Y92A-48 Front Panel (Replacement Part) You can change the color of the Front Panel when mounting the Counter/Tachometer. The Counter/Tachometer is shipped with a black (N1.5) Front Panel.*

"COUNTER" is printed on the front of Replacement Front Panels. Protecting the Counter/Tachometer in Environments Subject to Oil The H7CX's panel surface is water-resistive (conforming to IP@6, UL Type 4X) 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 H7CX in locations where it would come in direct contact with oil. Y92P-CXC4G 4-digit Counter Light gray (5Y7/1) Y92P-CXC4S 4-digit Counter White (5Y9.2/0.5) Y92P-CXT4B 4-digit Counter Black (N1.5) Flush Mounting Adapter Y92F-30 Order the Flush Mounting Adapter with the following model number separately if it is lost or damaged. Y92F-45 Use this Adapter to install the Counter/ Tachometer in a cutout previously made for a DIN 72 × 72 mm device (panel cutout: 68 × 68 mm).

Y92P-CXT6G 6-digit Counter Light gray (5Y7/1) Y92P-CXT6S 6-digit Counter White (5Y9.2/0.5) Y92P-CXT6B 6-digit Counter Black (N1.5) Note: The Waterproof Packing is included with models with screw terminals. Waterproof Packing Y92S-29 The Front Panel is attached to the Counter/Tachometer with tabs in four locations.

To remove the Front Panel, open the tabs and pull the Front Panel forward. To attach the Front Panel, press it onto the Counter/Tachometer so that all four tabs lodge into the grooves on the body of the Counter/Tachometer. Note: The Waterproof Packing is included with models with screw terminals. Order the Waterproof Packing separately if it is lost or damaged. The Waterproof Packing can be used to achieve IP66 protection.

Replacement Method Tabs Grooves The Waterproof Packing will deteriorate, harden, and shrink depending on the application environment. To ensure maintaining the IP@6, UL Type 4X waterproof level, periodically replace the Waterproof Packing. The periodic replacement period will depend on the application environment. You must confirm the proper replacement period. Use 1 year or less as a guideline. If the Waterproof Packing is not replaced periodically, the waterproof level will not be maintained. It is not necessary to mount the Waterproof Packing if waterproof construction is not required. 12 H7CX-A@-N Connection Sockets Front Connecting Socket Model P2CF-11 Dimensions 50 max. 31.2 max.

Terminal arrangement and internal connections Mounting hole dimensions Two, 4.5-dia. holes 70 max. 4 8 7 6 5 4 Two, M4 or 4.5-dia. holes Eleven, M3.5 × 7.5 sems screws 7.8 3 31.2 max.

30 4 40±0.2 9 10 11 1 3 2 P2CF-11-E (Finger-safe Type) 8 7 50 max. 40±0.2 6 5 Two, 4.5-dia.

holes 3 P2CF-11-E (Top View) 35.4 Note: The Socket can also be mounted to DIN track. 4 70 max. 9 10A250VAC RESISTIVE 1.2 3 10 11 1 2 4 Eleven, M3. 5 × 7.5 set screws 7.8 5 4.5 Note: Round crimp terminals cannot be used on Finger-safe Sockets. Use forked crimp terminals. Back-connecting Sockets Model P3GA-11 27 dia. 5 4 6 7 8 Dimensions Terminal arrangement and internal connections 45 25.6 3 2 9 1 11 10 45 4.5 16.3 6.

2 (Bottom View) Note: A Y92A-48G Terminal Cover can be used with the Socket to create a finger-safe construction. Terminal Covers for P3GA-11 Back-connecting Socket Model Y92A-48G Dimensions Twelve, 6.4-dia. holes 34 Y92A-48G UP 47.7 × 47.7 48 × 48 P C 16.5 24.6 27.6 47.4 Note: The Terminal Cover can be used with a Back-mounting Socket (P3GA-11) to create a finger-safe construction.

13 H7CX-A@-N Optional Products for Track Mounting Mounting Track PFP-100N PFP-50N 7.3±0.15 4.5 35±0.3 27±0.

15 15 25 10 25 1,000 (500) 25 10 25 15 (5)* 1 * The values shown in parentheses are for the PFP-50N. Mounting Track PFP-100N2 4.5 35±0.3 27 24 16 29.2 15 25 10 25 1,000 25 10 25 15 1 1.*

5 End Plate PFP-M M4 × 8 pan head screw 50 11.5 10 M4 spring washer 10 6.2 1.8 1 35.5 35.3 1.8 1.3 4.8 16 12 Spacer PFP-S 5 44.3 34.

*8 16.5 Note: Order Spacers in increments of 10. 14 H7CX-A@-N Operating Procedures Setting Procedure Guide Setting for Counter Operation * Use the following settings. Counter Setting for Tachometer Operation * Refer to page page 27. * At the time of delivery, the H7CX is set to the 1-stage preset counter configuration. (2-stage models are set to the 2-stage preset counter configuration.) Refer to page page 35 for information on switching models. I/O Functions for Counter Operation Step1 Set the basic parameters. (If the desired I/O mode is not listed below or to set all parameters using the front panel keys, perform Step3 , below.) Key-protect switch Be sure to set pin 1 to ON.*

ON OFF 1 2 3 4 5 6 7 8 Item 1 2 3 4 5 6 7 8 DIP switch settings Counting speed Input mode Output mode Output time Minimum reset signal Input selection OFF Disabled 30 Hz UP ON Enabled 5 kHz DOWN Pin 4 OFF ON OFF ON Pin 5 OFF OFF ON ON Output mode N F C K-1 Refer to the table on the right. 0.5 s 20 ms NPN 0.05 s 1 ms PNP Note: All pins are factory-set to OFF. • When setting functions using the DIP switch, be sure to set pin 1 of the DIP switch to ON.

• DIP switch settings are effective when the power is turned ON again. (Perform DIP switch settings while the power is OFF.) Step2 The H7CX-A@-N is a Counter that contains more than one functional counter. When using the Counter in any mode other than the default mode, use the following chart to enter Configuration Selection Mode and set the functions that are suitable to the application. * The default mode is 1-stage preset counter configuration (2-stage preset counter configuration for 2-stage models).*

Note: Step2 can be performed first, followed by Step1 . Configuration selection mode 1 + Hold down for 1 s min. Power ON Run mode 1 + Hold down for 1 s min. Select the function from Table 1 using the U (D) Key. twn (1-stage preset counter) (2-stage preset counter) (Total and (Batch preset counter) counter) (Dual counter) (Twin counter) (Tachometer) Note: The configuration that can be selected depends on the model. After making DIP switch settings for basic operations, advanced functions can be added using the operation keys. For details, refer to page page 16. 15 H7CX-A@-N Counter Step3 Parameters that cannot be set with the DIP switch are set with the operation keys on the front panel. Change to Function Setting Mode. Power ON 3 s min.

**1 Run mode Function setting mode 3 s min.*2 For details on operations and display in run mode, refer to page page 20. The display depends on the selected configuration. *1 If the mode is switched to the function setting mode during operation, operation will continue. *2 Changes made to settings in function setting mode are enabled for the first time when the mode is changed to run mode. Also, when settings are changed, the counter is reset (present value initialized and output turned OFF) on returning to run mode. The characters displayed in reverse video are the default settings. When performing settings with operation keys only, set pin1 of the DIP switch to OFF (factory setting). If pin 1 of the DIP switch is set to ON, the setting items indicated by will not be displayed. For 6-digit models, only U Keys are provided.*

**3 When Using Dual Counter Operation Displays for 6-digit models are given in parentheses. *3 Input mode (CNTM) • Set the input mode using the U (D) Keys.*

*5 (UP) *5 up (DOWN) (UP/DOWN A) (UP/DOWN B) (UP/DOWN C) down ud-a ud-b ud-c Note: Displayed only when Twin Counter Mode is not selected. *5 Displayed for output modes other than K-2, D, L, and H only. Output mode (OUTM) Dual count calculating mode (ADD) • Set the dual count calculating mode using the UD Keys.
add *6 *6 *6 *6 *4 sub • Set the output mode using the U (D) Keys. (N) (Addition) (Subtraction) n (F) f (C) c (R) r (K-1) k-1 (P) p (Q) q (A) a (K-2) k-2 *4 Displayed only when the output mode is K-2, D, L, or H. (D) d (L) l (H) h *7 *6 Displayed only when the input mode is ud-a, ud-b, or ud-c. (Not displayed when the function is set to twn.) *7 Set each digit using the individual U (D) Keys.
When using as a 2-stage preset counter One-shot output 2 time (OTM2) Output time (OTIM) • Set each digit using the individual U (D) Keys. 0.01 0.50 99.99 (0.01 s) (0.50 s) (99.99 s) 0.01 0.50 99.

99 Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2. Counting speed (CNTS) (0.01 s) (0.50 s) (99.99 s) Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2. • Set the counting speed using the U (D) Keys. 30hz (30 Hz) (5 kHz) One-shot output 1 hold 0.01 99.99 time (Outputs held) (0.01 s) (99.
99 s) (OTM1) If the output time is 0.00, hold is displayed. Note: Displayed for output modes other than D, L, and H. HOLD cannot be set when the output mode is K-2. Function Setting Mode When using as a batch counter Reset input signal width (IFLT) • Set the Reset input signal width using the U (D) Keys. 20ms (20 ms) 1ms (1 ms) One-shot 0.01 0.50 99.99 output 2 (0.01 s) (0.
50 s) (99.99 s) time (OTM2) Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2. Decimal point position (DP) • Set the decimal point position using the U (D) Keys. (One digit after decimal point) (Two digits after decimal point) (Three digits after decimal point) (No decimal point) Prescale value (PSCL) • Set each digit using the individual U (D) Keys. 0.001 (0.001) *7 Set each digit using the individual U (D) Keys. Twin Counter Output 2 output time (OTM2) 1.000 (1.000) 9.

999 99.999 (9.999) (99.999) 0.01 0.50 99.99 (0.01 s) (0.50 s) (99.99 s) Note: Displayed only when the output mode is C, R, K-1, P, Q, or A. NPN/PNP input mode (IMOD) • Set the NPN/PNP input mode using the U (D) Keys. npn pnp (NPN input) (PNP input) Output 1 0.01 0.50 99.99 output (0.01 s) (0.50 s) (99.99 s) time (OTM1) Note: Displayed only when the output mode is C, R, K-1, P, Q, or A. Display color (COLR) • Set the display color using the U (D) Keys. red (Red) grn org r-g g-r r-o o-r g-o o-g (Green) (Orange) (Red-green) (Green-red) (Red-orange) (Orange-red) (Green-orange) (Orange-green) Note: Displayed for terminal-block models (except H7CX-A11@) only.
From next page To next page 16 H7CX-A@-N Counter To previous From previous page page Absolute value setting/forecast value setting (SETM) • Make the absolute value setting and forecast setting using the U (D) Keys. abs (ABS) ofst (OFST) Note: Displayed only when the configuration selection mode is set to the 2-stage function 2cnt. Set value upper limit (SL-H) • Set each digit using the individual U (D) Keys. 1 (1) 9999 (9999) Note: 1 to 999999 for 6-digit models Forecast setting upper limit (PL-H) • Set each digit using the individual U (D) Keys. 1 (1) Function Setting Mode 9999 (9999) Note: 1 to 999999 for 6-digit models. Note: Displayed only when the configuration selection mode is set to the 2-stage function 2cnt and a forecast value is set. Batch count upper limit (BL-H) • Set each digit using the individual U (D) Keys. 1 (1) 9999 (9999) Note: 1 to 999999 for 6-digit models. Note: Displayed only when the output mode is set to bcnt. Output allocation change off (OFF) on (ON) Note: Displayed only for "-AU@" models.

off: Output 1 = 12, 13, Output 2 = 3, 4, 5 on: Output 1 = 3, 4, 5, Output 2 = 12, 13 The numbers are the terminals numbers. Key protect level (KYPT) • Set the key protect level using the U (D) Keys. kp-1 (KP-1) kp-2 (KP-2) kp-3 (KP-3) kp-4 (KP-4) kp-5 (KP-5) kp-6 (KP-6) kp-7 (KP-7) *8 Output ON count alarm set value/monitor value *8 Set each digit using the individual U (D) Keys. Procedure for Models Other than "-@W@" Models Output ON count alarm set value (0 × 1000 times) (9999 × 1000 times) 0 9999 Output ON count monitor value Note: The monitor value is only displayed. It cannot be set. Procedure for "-@W@" Models Output 1 (OUT1) ON count alarm set value (0 × 1000 times) (9999 × 1000 times) 0 9999 Output 2 (OUT2) ON count alarm set value (0 × 1000 times) (9999 × 1000 times) 0 9999 Output 1 (OUT1) ON count monitor value Note: The monitor value is only displayed. It cannot be set. Output 2 (OUT2) ON count monitor value Note: The monitor value is only displayed. It cannot be set. 17 H7CX-A@-N Counter Explanation of Functions Items marked with stars can be set using the DIP switch.
Input Mode (cntm) Set increment mode (UP), decrement mode (DOWN), or one of the increment/decrement modes (UP/DOWN A, UP/DOWN B, or UP/DOWN C) as the input mode. Input modes other than UP or DOWN modes cannot be set using the DIP switch and so use the operation keys if other modes are required. (For details on the operation of the input modes, refer to Input Modes and Present Value on page page 21.) Prescale Value (pscl) Pulses input to the counter are converted according to the specified prescale value. (Setting range: 0.
001 to 99.999 for 6-digit models and 0.001 to 9.999 for 4-digit models.) Example: To display the feed distance for systems that output 25 pulses for a feed length of 0.
5 m in the form @@. m: 1. Set the decimal point position to 2 decimal places. 2. Set the prescale value to 0.02 (0.5 ÷ 25). 0.5 m Dual Count Calculating Mode (calm) When using as a dual counter, select either ADD (addition) or SUB (subtraction) as the calculation method for the dual count value. ADD: Dual count value = CP1 PV + CP2 PV SUB: Dual count value = CP1 PV − CP2 PV Output Mode (outm) Set the way that control output for the present value is output.

The possible settings are N, F, C, R, K-1, P, Q, A, K-2, D, L, and H. Output modes other than N, F, C, or K-1 cannot be set using the DIP switch and so use the operation keys if other modes are required. The output modes that can be set vary with the model. (For details on the operation of the output modes, refer to Input/ Output Mode Settings on page page 22.) 25 pulses Encoder One-shot Output Time (otim) Set the one-shot output time (0.01 to 99.99 s) for control output. One-shot output can be used only when C, R, K-1, P, Q, A, or K-2 is selected as the output mode. Output times other than 0.5 s or 0.
05 s cannot be set with the DIP switch and so use the operation keys if other settings are required. One-shot Output 2 Time (otm2) Set the one-shot output time (0.

01 to 99.99 s) for control output (OUT2). One-shot output can be used only when C, R, K-1, P, Q, A, or K-2 is selected as the output mode. Output times other than 0.5 s or 0.05 s cannot be set with the DIP switch and so use the operation keys if other settings are required. • Observe the following points when setting a prescale value. Set the set value to a value less than {Maximum countable value − Prescale value}. Example: If the prescale value is 1.25 and the counting range is 0.000 to 999.999, set the set value to a value less than 998.749 (= 999.999 − 1.25). If the set value is set to a value greater than this, output will not turn ON. • Output will turn ON, however, if a present value overflow occurs (FFFFFF or FFFF). Note: If the prescale value setting is incorrect, a counting error will occur.

Check that the settings are correct before using this function. NPN/PNP Input Mode (imod) Select either NPN input (no-voltage input) or PNP input (voltage input) as the input format. When using a two-wire sensor, select NPN input. The same setting is used for all external inputs. For details on input connections, refer to Input Connections on page page 9. One-shot Output 1 Time (otm1) Set the one-shot output time (0.01 to 99.99 s) for control output (OUT1). One-shot output can be used only when D, L, or H is selected as the output mode. If the output time is set to 0. 00, hold is displayed, and outputs are held. Display Color (colr) (Displayed for terminal block models (except H7CX-A11@) only.) Set the color used for the present value. Output OFF Output ON* Red (fixed) Green (fixed) Orange (fixed) Red Green Red Orange Green Orange Green Red Orange Red Orange Green Counting Speed (cnts) Set the maximum counting speed (30 Hz/5 kHz) for CP1 and CP2 inputs together. If contacts are used for input signals, set the counting speed to 30 Hz. Processing to eliminate chattering is performed for this setting. red grn org r-g g-r r-o o-r g-o o-g * Output 2 for 2-stage models. Reset Input Signal Width (iflt) Set the reset input signal width (20 ms/1 ms) for reset/reset 1 and total reset/reset 2 inputs together. If contacts are used for the input signal, set the input signal width to 20 ms. Processing to eliminate chattering is performed for this setting. Decimal Point Position (dp) Decide the decimal point position for the present value, CP1/CP2 present values, set value (SV1, SV2), total count value, and dual count set value. With the twin counter, output 1 and output 2 will both turn OFF when the output status is OFF. Either output 1 or output 2 will turn ON when the output status is ON. 18 H7CX-A@-N Counter Absolute Value Setting/Forecast Value Setting (setm) For the 2 count output mode, an absolute value setting (abs) or forecast value setting (ofst) can be set for set value 1. When a forecast value is set, specify the forecast value set value (i.e., the deviation for the set value). The forecast output (output 1) turns ON when the present value reaches the forecast value. If the forecast set value is greater than or equal to the set value, the forecast output (output 1) will turn ON as soon as counting starts. Example: F Mode Set value 2 Count value Output ON Count Alarm Set Value (on-a) Set the alarm value for the output ON count.*

The limit can be set to between 0 × 1000 (0 times) and 9999 × 1000 (9,999,000 times). Only the underlined values are set. The alarm will be disabled if 0 is set. If the total ON count of the output exceeds the alarm set value, e3 will be displayed on the Timer to indicate that the output ON count alarm value was exceeded. Refer to Self-diagnostic Function on page page 36 for information on the e3 display. ON Count Alarm Set Values for Outputs 1 and 2 (OUT1 and OUT2) (on1a and on2a) Set the ON count alarm values for the outputs 1 and 2. The limit can be set to between 0 × 1000 (0 times) and 9999 × 1000 (9,999,000 times). Only the underlined values are set. The alarm will be disabled if 0 is set. If the total ON count of instantaneous output 1 or 2 exceeds the alarm set value, e3 will be displayed on the Timer to indicate that the output ON count alarm value was exceeded. Refer to Self-diagnostic Function on page page 36 for information on the e3 display. Set value 1 0 Control output 1 (OUT1) Control output 2 (OUT2) If the forecast value setting is used, specify the set value 2 minus the forecast value setting for set value 1. Example: F Mode Set value Forecast set value Forecast value 0 Forecast output (OUT1) Control output (OUT 2) Count value Output ON Count Monitor Value (on-c) The monitor value is only displayed. It cannot be set. The output ON count will be 1,000 times the displayed value. ON Count Monitor Values for Outputs 1 and 2 (OUT1 and OUT2) (on1c and on2c) The monitor value for output 1 or 2 is only displayed. It cannot be set. The output ON count will be 1,000 times the displayed value. Set Value Upper Limit (sl-h) Set the upper limit for the set value when it is set in run mode. The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models. Forecast Set Upper Limit (pl-h) Set the upper limit for the forecast set value. The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models. Batch Count Upper Limit (bl-h) Set the upper limit for the batch count value. The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models. Output Allocation (otst) When using an H7CX-AU@-N model as a 2-stage counter, the output can be flexibly allocated to either stage 1 or 2. The transistor output can be allocated to SV1 and the contact output to SV2 or vice verse, as in the following tables. H7CX-AU-N/-AUD1-N Output 1 off on Transistor (12-13) Contact (3, 4, 5) Output 2 Contact (3, 4, 5) Transistor (12-13) H7CX-AUSD1-N Output 1 off on Transistor (12-13) Transistor with diode (3, 4, 5) Output 2 Transistor with diode (3, 4, 5) Transistor (12-13) Key Protect Level (kypt) Set the key protect level. Refer to Key Protect Level on page page 36. 19 H7CX-A@-N Counter Operation in Run Mode I/O Functions for Counter Operation • Set values for each digit as required using the U (D) Keys. (U Key only for 6-digit models.

) 1-stage Preset Counter Present value Set value Total and Preset Counter Dual Counter Present value Set value Dual count value Dual count set value 2-stage Preset Counter with Absolute Value Setting Total count value Present value Set value 1 CP1 present value CP2 present value • Present Value/Set Value Same as 1-stage preset counter. Present value Set value 2 • Total Count Value Shows the present total count value. • Dual Count Value Shows the sum of the CP1 present value and CP2 present value when the dual count calculating mode is ADD and shows the value obtained by subtracting the CP2 present value from the CP1 present value when the dual count calculating mode is SUB. • Dual Count Set Value Set the dual count set value.

When the dual count value reaches the dual count set value, signals are output according to the specified output mode. • Present Value Shows the present count value. • Set Values (Set Value 1 and Set Value 2) Set the set values. When the present value reaches the set value (set value 1 or set value 2), a signal is output according to the specified output mode. Batch Counter Present value Set value • CP1/CP2 Present Value Show the present count values for CP1 and CP2 present values respectively. 2-stage Preset Counter with Forecast Value Setting Batch count value Present value Set value Batch count set value Present value 1 Set value 1 Twin Counter • Present Value/Set Value Same as 1-stage preset counter.

Present value Forecast Set Value • Batch Count Value Shows the number of times the count has been completed for the present value. • Batch Count Set Value Set the batch count set value. When the batch count value reaches the batch count set value, batch output (OUT1) turns ON. Present value 2 Set value 2 • Present Value Shows the present count value. • Set Values Set the set values.

• Forecast Set Value Set the deviation for the set value. • Present Values 1 and 2 Shows the present count value 1 or 2. • Set Values 1 and 2 Setting for present value 1 or 2. 20 H7CX-A@-N Counter Input Modes and Present Value (See note 1.) I/O Functions for Counter Operation UP (Increment) Mode CP1: Count input; CP2: Prohibit (gate) input H CP1 L A A DOWN (Decrement) Mode CP1: Count input; CP2: Prohibit (gate) input H CP1 L A A H CP2 L Prohibit CP2 Prohibit H L n 5 4 n−1 n−2 Present value n−3 n−4 n−5 0 Present value 2 1 0 0 3 A must be greater than the minimum signal width.

*(See note 2.) CP1: Prohibit (gate) input; CP2: Count input H *CP1 L A A A must be greater than the minimum signal width. (See note 2.) CP1: Prohibit (gate) input; CP2: Count input H *CP1 L A A Prohibit H CP2 L 5 4 Present value 2 1 0 0 0 3 Present value CP2 L n n−1 H Prohibit n−2 n−3 n−4 n−5 A must be greater than the minimum signal width. (See note 2.) * Counting starts when the CP1 is turned ON after turning ON the power. A must be greater than the minimum signal width. (See note 2.) UP/DOWN A Command Input Mode H CP1 L A A UP/DOWN B Individual Input Mode H CP1 L H CP2 L H CP2 L 3 Present value 3 2 1 0 0 3 Present value 1 2 2 1 1 2 3 2 1 2 0 0 A must be greater than the minimum signal width. (See note 2.*

) UP/DOWN C Quadrature Input Mode H CP1 L B B B B H CP2 L 3 Present value 1 0 0 2 2 1 2 3 Note: 1. If the configuration selection is set to dual counter, CP1 and CP2 input will operate in the same way as the count input (CP1) of UP (increment) mode. 2. A must be greater than the minimum signal width and B must be at least 1/2 the minimum signal width. If they are less, a count error of ±1 may occur. Minimum signal width: 16.7 ms (when maximum counting speed = 30 Hz) 100 µs (when maximum counting speed = 5 kHz) 3. The meaning of the H and L symbols in the tables is explained below. Symbol Input method H L No-voltage input (NPN input) Short-circuit Open Voltage input (PNP input) 4.5 to 30 VDC 0 to 2 VDC B must be at least 1/2 the minimum signal width.

(See note 2.) 21 H7CX-A@-N Counter Input/Output Mode Settings I/O Functions for Counter Operation If a 1-stage model or 2-stage model is incorrectly used as twin counter, the operation for output 2 will be performed. When using a 2-stage model as a 1-stage preset counter, total and preset counter, or dual counter, OUT1 and OUT2 turn ON and OFF simultaneously. One-shot output from OUT1 (The one-shot output time can be set in the range 0.01 to 99. 99s.) Self-holding output Self-holding One-shot output output from OUT2 Input mode UP Reset/ reset 1 999999 Set value 2 DOWN UP/DOWN A, B, C Operation after count completion N Set value 1 0 The outputs and present value display are held until reset/reset 1 is input. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 F 0 The present value display continues to increase/decrease. The outputs are held until reset/reset 1 is input. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Output mode setting Set value 1 C 0 OUT1 OUT2 As soon as the count reaches SV, the present value display returns to the reset start status.

The present value display does not show the present value upon countup. The outputs repeat oneshot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2. Reset/ reset 1 999999 Set value 2 Set value 1 R 0 OUT1 OUT2 The present value display returns to the reset start status after the one-shot output time. The outputs repeat oneshot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2. Reset/ reset 1 999999 Set value 2 K-1 Set value 1 0 OUT1 The present value display continues to increase/decrease. OUT1 self-holding output turns OFF after the OUT2 one-shot output time.

The OUT1 one-shot output time is independent of OUT2. OUT2 22 H7CX-A@-N Counter One-shot output from OUT1 (The one-shot output time ca set in the range 0.01 to 99.9 Self-holding output Self-holding One-shot output output from OUT2 Input mode UP DOWN UP/DOWN A, B, C Operation after count completion The present value display does not change during the one-shot output time period, but the actual count returns to the reset start status. The output will return to one-shot mode. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2. The present value continues to increase/ decrease for the oneshot output time, but returns to the reset start status after the one-shot output time has elapsed. The outputs repeat one-shot operation.

OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2. Reset/ reset 1 999999 Set value 2 Set value 1 0 P OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Output mode setting Q Set value 1 0 OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 A 0 OUT1 The present value display and OUT1 self-holding output is held until reset/reset 1 is input. OUT1 and OUT2 are independent. OUT2 Note: 1.

2. 3. 4. 5. The full scale (FS) for H7CX 4-digit models is 9999.

When the present value reaches 999999, it returns to 0. Counting cannot be performed during reset/reset 1 input. If reset/reset 1 is input while one-shot output is ON, one-shot output turns OFF. If there is power failure while output is ON, output will turn ON again when the power supply has recovered. For one-shot output, output will turn ON again for the duration of the output time setting once the power supply has recovered. 6. Do not use the counter function in applications where the count may be completed (again) while one-shot output is ON.

7. The setting range is 0 to 999,999 (0 to 9,999 for 4-digit models). 23 H7CX-A@-N Counter (The one-shot output time can be set in the range 0.

01 to 99.99s.) Self-holding Instantaneous One-shot output (equals) output output Input mode UP/DOWN A, B, C Operation after count completion Reset/ reset 1 999999 Set value 2 Set value 1 K-2 0 −99999 The display continues to increase/ decrease until the overflow or underflow value is reached. One-shot output only. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 D 0 −99999 The display continues to increase/ decrease until the overflow or underflow value is reached. The outputs are ON while the count is equal. OUT1 OUT2 Output mode setting Reset/ reset 1 999999 Set value 2 Set value 1 L 0 −99999 The display continues to increase/ decrease until the overflow or underflow value is reached. OUT1 is held while the present value is less than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 H 0 −99999 The display continues to increase/ decrease until the overflow or underflow value is reached.

*OUT1 is held while the present value is greater than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2. * H mode is available only when using a 6digit model as a 2-stage counter. OUT1 OUT2 Note: 1. Counting cannot be performed during reset/reset 1 input.*

2. If reset/reset 1 is input while one-shot output is ON, one-shot output turns OFF. 3. If there is power failure while output is ON, output will turn ON again when the power supply has recovered. For one-shot output, output will turn ON again for the duration of the output time setting once the power supply has recovered.

4. Do not use the counter function in applications where the count may be completed (again) while one-shot output is ON. 5. The set value is from −99999 to 999999. 24 H7CX-A@-N Counter Total and Preset Counter Operation The H7CX has a total counter, separate from the 1-stage preset counter, for counting the total accumulated value. Reset/reset 1 Total Reset or Reset 2 Present value 0 999999 Total count value 0 Note: The full scale (FS) for H7CX 4-digit models is 9999. • The total counter continues to count the total accumulated value when the present value is reset using reset/reset 1 input (Reset Key). • The total count value is reset when the total reset/reset 2 input is turned ON. If the Reset Key is pressed while the total count value is displayed, the total count value is reset. The present value is also reset at this time.

• The counting range of the total counter is −99,999 to 999,999 (−999 to 9,999). The total count value returns to 0 when it reaches the full scale limit. Batch Counter Operation The H7CX has a batch counter, separate from the 1-stage preset counter, for counting the number of times the count has been completed. Reset 1 Reset 2 (batch counter reset) Set value Present value 0 OUT2 Batch count set value Sub-display Batch count value (Main display) 0 2 1 OUT1 (batch output) Note: The above is for when the output mode is C. • The batch counter continues after count completion. • Batch output is held until batch counter reset is input. • When the batch counter reset input is turned ON, the batch count value is reset, and batch output turns OFF. • If the Reset Key is pressed while the batch count value is displayed, the batch count value is reset and batch output turns OFF. The present value is also reset at this time. • The count value can be incremented and decremented.

The batch count is only incremented. • The maximum counting speed for batch counter operation is 5 kHz. The batch counter counts the number of times the count reaches the set value. Note: 1. 2.

3. 4. 5. 6. The batch count value is held at 0 during batch counter reset input.

If the batch count set value is 0, batch count will be performed but there will be no batch output. The batch count value returns to 0 when it reaches 999,999 (9,999 for 4-digit models). Once batch input has been turned ON, it will return to the ON state after power interruptions. If the batch count set value is changed from a value that is greater than the batch count value to one that is less, batch output will turn ON. After batch output turns ON, the ON state will be held even if the batch count set value is changed to a value greater than the batch count value. Dual Counter Operation Using the dual counter allows the count from 2 inputs to be added or subtracted and the result displayed. It is possible to specify a set value for which output turns ON when the set value matches the added or subtracted result. (1) Dual Count Calculating Mode = ADD Dual count value = CP1 PV + CP2 PV Reset 1 (CP1 reset) (2) Dual Count Calculating Mode = SUB Dual count value = CP1 PV − CP2 PV Reset 1 (CP1 reset) Reset 2 (CP2 reset) Dual count set value Reset 2 (CP2 reset) Dual count set value Dual count value Dual count value 0 CP1 present value 0 CP2 present value 0 0 CP1 present value • The operation after count completion for the dual counter value is determined by the output mode. • The CP1 present value is reset when reset 1 input is turned ON. The CP2 present value is reset when reset 2 input is turned ON.

• If the Reset Key is pressed while the dual count value, CP1 present value, or CP2 present value is displayed, all of the present values are reset and outputs turn OFF. At this time, counting is not possible for CP1 or CP2 inputs. 0 CP2 present value 0 OUT1, OUT2 OUT1, OUT2 Note: The above is for when the output mode is N. Note: The above is for when the output mode is K-2. SUB mode can be used only when K-2, D, L, or H is selected as the output mode with 6-digit models. Note: 1. Counting is not possible for CP1 during reset 1 input. CP2 will not be affected. The dual count value will be calculated based on a CP1 present value of 0. 2.

Counting is not possible for CP2 during reset 2 input. CP1 will not be affected. The dual count value will be calculated based on a CP2 present value of 0. 3. The counting range for the dual count value is −99,999 to 999,999 (0 to 9,999 for 4-digit models).

The counting ranges for the CP1 present value and CP2 present value are 0 to 999,999 (0 to 9,999 for 4-digit models). If a present value exceeds 999,999 (9,999 for 4-digit models), FFFFFF (FFFF for 4-digit models) will be displayed to indicate an overflow, and all counting will stop. 25 H7CX-A@-N Counter Twin Counter Operation Two independent counters are built in. Counter 1 Counter input Reset input CP1 Reset 1 Counter 2 CP2 Reset 2 Counter 1 display Counter 1 present value Present value display and setting Counter 2 display Counter 2 present value Switched with the Key. Counter 1 set value Reset Key Counter 2 set value Only counters appearing on the display will be reset.

Note: 1. Only 2-stage models 2.