

Digital Counter

H7CR

Compact 1/16 DIN Counters with Easy-to-Use Functions, Four- or Six-Digit LCD Displays

- Designed for easy operation
- High-speed response 5 K counts per second
- Prescale function displays in units of actual physical parameters — length, volume, etc. (except A/SA types)
- H7CR-C and -SC provide large/ small discrimination mode ideal for positioning and production control
- Easy-to-read backlit LCD display
- On-line change of set value
- 4-level key protect
- H7CR-S short 64 mm (2.52 in) body





Ordering Information

When placing your order, specify the supply voltage after the part number. For example, H7CR-B 100 to 240 VAC.

ECONOMY COUNTERS

Number of presets	One			
Display type	6 digit LCD, not backlit			
Input type	No-voltage Voltage			
Contact output	H7CR-A H7CR-AV			
Transistor output	H7CR-AS	H7CR-AVS		
Sensor power supply	Not available	Not available		
Counter supply voltages	100 to 240 VAC, 50/60 Hz or 24 VAC			

■ STANDARD COUNTERS

Number of presets		One Two (Non-independent)		dent)	
Display type		6 digit LCD, backlit		6 digit LCD, backlit	
Input type		No-voltage	Voltage No-voltage Voltage		Voltage
12 VDC sensor	Contact output	H7CR-B	H7CR-BV	H7CR-BW	H7CR-BWV
supply voltage	Transistor output	H7CR-BS	H7CR-BVS	H7CR-BWS	H7CR-BWVS
24 VDC sensor	Contact output	H7CR-BG	H7CR-BVG	H7CR-BWG	H7CR-BWVG
supply voltage	Transistor output	H7CR-BSG H7CR-BVSG		H7CR-BWSG	H7CR-BWVSG
Counter supply voltages		100 to 240 VAC, 50/60 Hz or 24 VAC/1		12 to 24 VDC	

Number of presets		One		Two (Non-independent)	
Display type		4-digit LCD, backlit		4-digit LCD backlit	
Input type		No-voltage		No-voltage	
Sensor supply voltage		12 VDC	12 VDC 24 VDC		24 VDC
Output type	Contact output	H7CR-B4 H7CR-B4G		H7CR-B4W	H7CR-B4WG
Counter supply voltage 10		100 to 240 VAC, 50/60 Hz			

■ REVERSIBLE +/- RANGE COUNTERS

Number of presets	nber of presets One Two (Non-inc		Two (Non-indeper	on-independent)	
Display type		6-digit LCD, backli	t	6-digit LCD, backli	t
Input type	e No-voltage Voltage Voltage Voltage		Voltage		
12 VDC sensor supply voltage	Contact output	H7CR-C	H7CR-CV	H7CR-CW	H7CR-CWV
	Transistor output	H7CR-CS	H7CR-CVS	H7CR-CWS	H7CR-CWVS
24 VDC sensor	Contact output	H7CR-CG	H7CR-CVG	H7CR-CWG	H7CR-CWVG
supply voltage	Transistor output	H7CR-CSG H7CR-CVSG		H7CR-CWSG	H7CR-CWVSG
Counter supply voltages		100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC			

SHORT BODY COUNTERS

Model	Economy	Standard			Reversible +/- F	Range
Number of presets	One	One		Two	One	Two
Display type	6-digit, not backlit	6-digit, backlit	4-digit, backlit	6-digit, backlit	6-digit backlit	
Input type	No-voltage					
Contact output	H7CR-SAL	H7CR-SBL	H7CR-SB4L	—	H7CR-SCL	—
Transistor	H7CR-SASL	H7CR-SBSL	—	H7CR-SBWSL	H7CR-SCSL	H7CR-SCWSL
Counter supply voltage	12 to 24 VDC					

SOCKET-MOUNT COUNTERS

Number of presets	One			
Display type	6-digit LCD, backlit	4-digit LCD, backlit	6-digit LCD, backlit	
Input type	Power supply reset type		Memory backup type	
Contact output	H7CR-8	H7CR-84*	H7CR-11	
Transistor	H7CR-8S	_	H7CR-11S	
Counter supply voltage	100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC			

* Available with 100 to 240 VAC supply voltage only.

■ ACCESSORIES

Descripti	on		Part number	
Sockets	For H7CR-8	Bottom surface or track mounting, top screws	P2CF-08	
	and H7CR-8S	Back mounting, for use with Y92F-30 mounting adapter, bottom screw terminals	P3G-08	
	For H7CR-11	Bottom surface or track mounting, top screws	P2CF-11	
	and H7CR-11S Back mounting, for use with Y92F-30 mounting adapter, bottom screw terminals			
Soft cove	er with two mounting	clips for front panel protection	Y92A-48F1	
Shock pr	evention terminal co	ver protects wiring connections	Y92A-48T	
Mounting	track	DIN rail, 50 cm (1.64 ft) length	PFP-50N	
for P2CF	for P2CF sockets DIN rail, 1 m (3.28 ft) length		PFP-100N	
End plate		PFP-M		
Panel mo	ounting adapter*	For use with H7CR-8/-11 digital counters	Y92F-30	

* Panel mounting adapter is included with H7CR-A/-B/-C digital counters. Order separately for use with H7CR-8/-11 counters.

REPLACEMENT PARTS

Description	Part number
Panel mounting adapter*	Y92F-30

* Panel mounting adapter is included with H7CR-A/-B/-C digital counters.

Specifications_____

■ GENERAL CAPABILITIES

Model	H7CR-A Series	H7CR-B Series	H7CR-C Series			
Classification	Propet counter (coonomy)	Propet counter (standard)	Propet counter (1/ range)			
Maximitation	Freser counter (economy)	Preset counter (standard)	Preset counter (+/- range)			
	Plush mounting					
External connections						
Degree of protection	IEC: IP54 (panel surface)					
Output modes	N, F	N, F, C, R, K, P, Q, A K, D, L, H				
Input modes	Up, down, reversible A (command input inputs), reversible C (phase difference i	ts), reversible B (individual inputs)	Reversible A (command inputs), reversible B (individual inputs), reversible C (phase difference inputs)			
Reset system	External and manual resets	External, manual, and auto- matic (internal according to C, R, P, and Q mode operation) resets	External and manual resets			
		External: closing contacts 6 & 7 Manual: pressing reset button (<i>certain models only</i>) Automatic: available only in modes C, R, P, and Q	External: closing contacts 6 & 7 Manual: pressing reset button (<i>certain models only</i>)			
Scaling function	None	0.001 to 99.999 or 9.999	0.001 to 99.999			
Decimal point adjustments	None	Rightmost 3 digits				
Sensor power supply	None	12 or 24 VDC				
Input signals	Count, reset	Count, reset, key protect				
Input method	No-voltage input: Via opening and closi Voltage input: Via high and low signal v Key protect (standard and +/-range co	ing of contact roltage unters): No-voltage inputs only				
Control output	SPST-NO contact or transistor (NPN open collector) output	Single preset types: One SPST-NO contact or trans	istor (NPN open collector) output			
		Double preset types: Two SPST-NO contacts or transistor (NPN open collector) output				
Displays	7-segment LCD present value and pres	set displays; LCD character indicate	ors for outputs, power, and modes			
Display type	LCD; 8mm (0.32 in.) H Present Value, 4 mm (0.16 in.) H Set Value	Backlit LCD; 8 mm (0.24 in.) H Present Value, 4 mm (0.16 in.) H Set Value				
Digits	6 digits, 0 to 999,999	6 or 4 digits; 0 to 999,999 6 digits positive/5 digits or 0 to 9,999 negative, -99,999 to 999,999				
Memory backup	Backup time for power interruption: Approx. 10 years at 20°C (68°F); non-replaceable lithium battery					

■ H7CR-S, -8, -11

Model	H7CR-SA	H7CR-SB□□	H7CR-SC	H7CR-8	H7CR-11		
Classification	Preset counter (economy)	Preset counterPreset counter(standard)(+/- range)		Preset counter (standard)	Preset counter (standard)		
Mounting	Flush mounting	1		Flush or surface mo	Flush or surface mounting		
External connections	Screw terminals			Socket			
Degree of protection	IEC: IP54 (panel su	urface)					
Output modes	N, F	N, F, C, R, K, P, Q, A	K, D, L, H	N, F, C, R, K, P, Q, J	A		
Input modes	Up, Down & Rever (command inputs), Reversible B (individual inputs), Reversible C (Phase difference i	sible A Reversible A (command inputs), Reversible B (individual inputs), Reversible C (phase difference inputs)		Up, Down & Reversible A (command inputs), Reversible B (individual inputs), Reversible C (phase difference inputs)			
Reset system	External and manual resets	External, manual, automatic (inter- nal according to C, R, P, and Q operation) resets	External and manual resets	External, manual, power supply, and automatic (internal according to C, R, P, and Q operation) resets	External, manual, automatic (internal according to C, R, P, and Q operation) resets		
Scaling function	None	0.001 to 99.999 fo	or 6-digit, 0.001 to 9.9	99 for 4-digit			
Decimal point adjustments	None	Rightmost 3 digits	3				
Input signals	Count, reset	Count, reset, key	protect	Count, reset	Count, reset, and key protect		
Input method	No-voltage input: V	ia opening and clo	sing of contact				
Control output	SPST-NO contact or transistor (NPN open collector) output	Single preset types: SPST-NO contact or transistor (NPN open collector) output Double preset types: DPST-NO contact or transistor (NPN open collector) output		SPST-NO contact or transistor (NPN open collector) output	SPDT-NO contact or transistor (NPN open collector) output		
Displays	7-segment LCD pro	esent value and pre	eset displays; LCD cha	aracter indicators for o	utputs, power, and modes		
Display type	Backlit LCD						
Digits	6 digits (0 to 999,999)	6 or 4 digits; 0 to 999,999 or 0 to 9,999	6 digits positive and 5 digits nega- tive (-99,999 to 999,999)	6 or 4 digits; 0 to 999,999 or 0 to 9,999	6 digits (0 to 999,999)		
Memory backup	Backup time for power interruption: Approx. 10 years at 20°C (68°F); non-replaceable lithium battery						

■ OUTPUT MODES SUMMARY

Output	Description		Applicable
mode	Single preset counter	Double preset counter	counter series
N	Sustained output	Sustained output 2, selectable sustained or one-shot output 1	H7CR-A, -B, -SA, -SB⊟, -8⊟, -11
F	Sustained output, overrun display	Sustained output 2, selectable sustained or one-shot output 1	
С	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	
R	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	
К	One-shot output, overrun display	e-shot output, overrun display One-shot output 2, selectable one-shot or sustained output 1	
Р	One-shot output One-shot output 2, selectable one-shot or sustained output		
Q	One-shot output, overrun display	One-shot output 2, selectable one-shot or sustained output 1	
А	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	
D	Instantaneous output, count value = preset	Instantaneous outputs when count value = preset	H7CR-C, -SC
L	Sustained output, count value ≥ preset	Sustained output 2, count value \geq preset, sustained output 1, count value \leq preset	
Н	Sustained output, count value ≥ preset	Sustained outputs when count values ≥ preset	
К	One-shot output, count value = preset	One-shot outputs, count value = preset	

■ RATINGS

Model	H7CR-A Series		H7C	R-B Series	H7CR-C Series	
Supply voltage	100 to 240 VAC, 50/60 Hz or 24 VAC, 50/60 Hz (permissible ripple: 20% max.)		100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC (permissible ripple: 20% max.)			
Operating voltage range	85% to 110% of rated	d voltage				
Power consumption	Approx. 1.7 VA at 50 240 VAC; 0.6 W at 24	Hz, 4 VDC	Арр	rox. 6.6 VA at 50 Hz, 24	40 VAC; 3.2 W at 24 VDC*	
Max. counting speed	30 cps, or 1 or 5 kcps (same setting CP1 and CP2)					
Reset	Min. pulse width for external reset: 20 ms	, manual reset	Min. rese	pulse width for externa	I reset: 1 or 20 ms, manual	
Key protect	Not applicable		Res	ponse time: 1 second		
One-shot durations	10, 50, 100, 200, or 500 ms		10, 50, 100, 200, or 500 ms (separate settings for presets 1 and 2)			
Inputs (count, reset)	No-voltage inputs	ON impedance: ON residual vol OFF impedance	tage e	1kΩ max. (approx. 2 r 2 V max.; 1 V max. fo 100 kΩ min.	nA when 0 kΩ) r H7CR-⊟4	
	Voltage inputs	High level: Low level: Input resistance	e:	4.5 to 30 VDC 0 to 2 VDC Approx. 4.7 kΩ		
Key protect input	Not applicable		No-	voltage input	ON impedance: 1 k Ω max. ON residual voltage: 1 V max. OFF impedance: 100 k Ω min.	
Control output	Contacts: 3 A, 250 V/ Transistor: Open col	AC; general use (p lector; 100 mA at 3	o.f. = 1 30 VD	l) C max. residual voltage	e 2 V max. (approx. 1 V)	
Sensor power supply	Not applicable			100 mA, 12 VDC±10 (5% ripple max.) 50 mA, 24 VDC±10 (5% ripple max.)		
Ambient operating temperature	-10° to 55°C with no icing (14° to 131°F)					
Storage temperature	-25° to 65°C (-13° to	149°F) with no icir	ng			
Ambient operating humidity	35% to 85% RH					

*Upon power application, a surge current of approx. 5 A at 240 VAC and 8 A at 24 VAC or 24 VDC flows for 2 ms.

H7CR-S, -8, -11

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Model	H7CR-SA	H7CR-SB□	H7CR-SC	H7CR-8□	H7CR-11
Туре	Economy	Standard	+/- range	Socket mount	Socket mount
Supply voltage	12 to 24 VDC (20% max. permissible ripple)		100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC (20% max. permissible ripple)		
Operating voltage range	85% to 110% of ra	ated voltage			
Power consumption	Approx. 1.3 W at 24 VDC		Approx. 2.8 VA at 50 Hz, 240 VAC (approx. 5 A (24 VDC/240 VAC) surge current for 2 ms upon power application) Approx. 1.3 W at 24 VDC (approx. 8 A (24 VDC/24 VAC) surge current for 2 ms upon power application)		
Max. counting speed	30 cps, or 1 or 5 k	cps (same setting	g CP1 and CP2)		
Reset	Min. pulse width for external reset: 20 ms	Min. pulse width 1 or 20 ms	for external reset:	Min. pulse width for external reset: 1 or 20 ms, power reset: 0.5 s	Min. pulse width for external reset: 1 or 20 ms
Key protect	Not applicable	Response time:	1 second		
One-shot durations	10, 50, 100, 200, and 500 ms	10, 50, 100, 200, and 500 ms (separate settings for presets 1 and 2)		10, 50, 100, 200, and 500 ms	
Inputs (count, reset)	No-voltage inputs	ON impedance: ON residual volt OFF impedance	ON impedance: 1kΩ max. (approx. 2 mA when 0 kΩ) ON residual voltage: 2 V max. OFF impedance: 100 kΩ min.		
Key protect input	Not applicable	No-voltage inpu ON impedance: (approx. 2 mA v ON residual volt OFF impedance	t 1 kΩ max. when 0 kΩ) tage: 1 V max. e: 100 kΩ min.	Not applicable	No voltage input ON impedance: $1 \text{k}\Omega \text{ max.}$ (approx. 2 mA when $0 \text{k}\Omega$) ON residual voltage: 1 V max. OFF impedance: $100 \text{k}\Omega \text{ min.}$
Control output	Contacts: 3 A, 250 VAC; general use (p.f. = 1) Transistor: Open collector; 100 mA at 30 VDC max. residual voltage 2 V max. (approx. 1 V)				
Ambient operating temperature	-10° to 55°C (14° t	0° to 55°C (14° to 131°F) with no icing			
Storage temperature	-25° to 65°C (-13°	5°C (-13° to 149°F) with no icing			
Ambient operating humidity	35% to 85% RH				

Approved by the following standards: UL

UL CSA SEV CE (EMC)

CHARACTERISTICS

1 1 1 1 1 1 1	
Insulation resistance	100 MΩ min. (at 500 VDC) (between current-carrying terminal and exposed non-current-carrying metal
	parts, and between non-commutous contacts)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min (between current-carrying terminal and exposed non-current-carrying metal parts)
Impulse voltage	Between power terminals: 1 kV for 24 or 12-24 VDC power supply, 3 kV for others
	Between current-carrying terminal and exposed non-current-carrying metal parts: 1.5kV for
	24 or 12-24 VDC power supply, 4.5 kV for others
Noise immunity	±2 kV between power terminals, ±600 V between input terminals (square-wave noise via
,	noise simulator; pulse width: 1µs; 1-ns rise)
Static immunity	Malfunction: 8 kV; destruction: 15 kV
Vibration	Mechanical durability: 10 to 55 Hz with 0.75-mm (0.03 in) single amplitude/55 to 150 Hz with 10 G 32 min each in three directions
	Malfunction durability: 10 to 55 Hz with 0.5-mm (0.02 in) single amplitude/55 to 150 Hz with 10 G 32 min each in three directions
Shock	Mechanical durability: 30 G
	Malfunction durability: 10 G
Life	Mechanical: 10 million operations min.
	Electrical: 100,000 operations min. (at 3 A, 250 VAC general in use (p.f. = 0.7 to 0.8)
Weight	Economical counters: AC types, approx. 230 g (8.1 oz.); DC types, approx. 150 g (5.3 oz.)
-	Standard and +/- range counters: Approx. 170 g (6 oz.)

Input/Output Functions____

■ INPUTS

CP1/CP2 (count inputs)	 Count signal inputs. Up, Down, and Reversible (command, individual, or phase difference) inputs accepted. Maximum counting speed: 5 kcps.
Reset	 Present value reset (to zero in Up or Up/Down modes, to preset with 1-stage models in Down mode and to preset 2 for 2-stage models in Down mode). Count inputs are not acknowledged while reset input is ON. Reset indicator lit while reset input is ON.
Key protect	 Reset, Right Shift and Up keys are inoperative while key protect input is ON. Although Display key remains effective, only monitoring of settings is possible. Keys protected indicator lit while key protect input is ON. Effective when power supply is turned off.

Count Input vs. Reset Input

When the RESET input is ON or the RESET key input is ON, the count input is prohibited and the present value is reset. However, when the key protect input is ON and the key protect level is KP-2 or KP-4, no RESET key input is accepted.

Reset Time

Set to 1 ms if high-speed resetting is necessary. Set the reset time to 20 ms if you need to prevent false signals caused by electrical noise from affecting the counter.

OUTPUTS

Outputs 1 and 2 Outputs made according to designated output mode when corresponding preset is reached.

Using Prescale Function

The prescale function converts the number of input counts into a user-selectable value. The example below shows a system that uses 250 encoder pulses to determine when an object has advanced 0.5 meters. Here is how to convert pulses into a unit of measure appropriate for your application:

- 1. Set the decimal point between the third and fourth digits.
- 2. Set a prescale value of 0.002. This is calculated by dividing the unit of measure (0.5) by the number of pulse counts (250).



Timing Charts_

■ INPUT MODES





A: Minimum signal width

B: Must be at least 1/2 of minimum signal width. Signals may not be counted if the minimums for A and B are not met.

■ H7CR-A AND H7CR-B COUNTER OUTPUT OPERATIONS

Bold line represents present value; Output 2 operation applies for single-preset models. H7CR-A models have only Mode N and F.



One-shot outputs can be set to 10, 50, 100, 200 or 500 ms.

Standard Counter Output Operation (Continued)

(Bold line represents present value; Output 2 operation applies for single-preset models.)

Output Mode R Present value display returns to reset start status after expiration of one-shot time period. Outputs are one-shot and operate repeatedly. Output 1 latches ON at preset 1, and goes OFF after expiration of the one-shot period for Output 2. One-shot time periods for Output 1 and 2 are independent.



One-shot outputs can be set to 10, 50, 100, 200 or 500 ms.

Standard Counter Output Operation (Continued)

(Bold line represents present value; Output 2 operation applies for single-preset models.)

Output Mode Q Present value runs continuously through one-shot time period and returns to reset start status immediately afterward. Outputs are one-shot and operate repeatedly. Output 1 latches ON at preset 2, and goes OFF after expiration of the one-shot period for Output 2. One-shot time periods for Output 1 and 2 are independent.



One-shot outputs can be set to 10, 50, 100, 200 or 500 ms.

■ H7CR-C REVERSIBLE +/- RANGE COUNTER OUTPUT OPERATION

(Bold line represents present value; Output 2 operation applies for single preset models.)

Output Mode K Present value increments and decrements within displayable range. Output 1 goes ON for one-shot whenever present value is equal to preset 1; Output 2 goes ON for one-shot whenever present value is equal to preset 2.



One-shot outputs can be set to 10, 50, 100, 200 or 500 ms.

+/- Range Counter Output Operation (Continued)

(Bold line represents present value; Output 2 operation applies for single preset models.)



One-shot outputs can be set to 10, 50, 100, 200 or 500 ms.

Notes

Counting inputs are not acknowledged while the reset input is ON.

The compensation input is valid only when the present value is being incremented.

Dimensions_

Unit: mm (inch)



when ON, are reset and the one-shot output is restarted if a preset designating the output is reached.

One-shot outputs, when ON, are turned OFF when the reset

input goes ON, but are left ON for the one-shot time period

when the compensation inputs goes ON. One-shot outputs,

H7CR-8□, H7CR-11 Socket-Mount Types



Track and surface mounting height





4.5

35.

SOCKETS

11-Pin Sockets for H7CR-11

P2CF-11 Bottom surface or track mounting socket













31.2

(1.23) max.

Terminal arrangement



Terminal arrangement



Mounting holes



8-Pin Sockets for H7CR-8

P2CF-08 Bottom surface or track mounting socket







Terminal arrangement



Mounting holes



SOCKETS (Continued)

P3G-08 Back mounting socket



MOUNTING TRACK AND ACCESSORIES

PFP-50N, PFP-100N DIN Rail Track



PFP-M End Plate



Y92A-48F1 Soft Plastic Cover

Two mounting clips help the soft plastic cover Y92A-48F1 fit snugly over the front of the timer to protect against dirt and water. Timer settings can be changed when the cover is on. The cover is intended for use in areas where unusual service conditions do not exist.



■ PANEL MOUNTING ADAPTER Y92F-30

Panel mounting adapter Y92F-30 is supplied with each counter. Installation instructions are on the next page.

H7CR-A, H7CR-B and H7CR-C



58 (2.28) ۵ -48 (1.89)











Y92A-48T Terminal Cover

The terminal cover protects wiring connections on the Standard and Short Body models.



Y92F-30



OMRON

Panel

Molded

tab

: H7CR

H7CR-80, H7CR-11



Molded

tab

Panel Mounting H7CR Counters

Insert the counter through the panel cutout. Push the Y92F-30 adapter from the rear of the counter as far forward toward the panel as possible. Then, tighten the two retaining screws. To release the adapter, lift the tab at the rear of the adapter.

Several counters may be mounted close together using Y92F-30 adapter as shown here. When mounting two or more counters in a vertical line, arrange the adapters so that their molded tabs are positioned on the right and left sides. When mounting two or more counters in a horizontal line, arrange the adapters so that their molded tabs are positioned on the top and bottom sides.

Connections

H7CR-A SERIES (ECONOMY)

Single Preset Contact Output



Single Preset Transistor (NPN) Output



Panel cutout for side-by-side mounting of two counters



■ H7CR-□B (STANDARD) AND H7CR□-C (REVERSIBLE +/-) SERIES

Single Preset Contact Output



H7CR-B	H7CR-BG	H7CR-SBL, -SB4L
H7CR-BV	H7CR-BVG	H7CR-SCL
H7CR-C	H7CR-CG	H7CR-B4
H7CR-CV	H7CR-CVG	H7CR-B4G

Single Preset Transistor (NPN) Output



Applicable models include the following:				
H7CR-BS	H7CR-BSG	H7CR-SBSL		
H7CR-BVS	H7CR-BVSG	H7CR-SCSL		
H7CR-CS	H7CR-CSG			
H7CR-CVS	H7CR-CVSG			

Double Preset Contact Output



H7CR-BW H7CR-B4W H7CR-BWV H7CR-B4WG H7CR-CW H7CR-CWG H7CR-CWV H7CR-CWVG

Double Preset Transistor (NPN) Output

H7CR-CWVS



■ H7CR-8, H7CR-11 SOCKET-MOUNT STANDARD TYPES

Single Preset H7CR-8, H7CR-84, H7CR-8S



Single Preset with Memory Backup H7CR-11, H7CR-11S

H7CR-CWVSG



■ CONNECTIONS

The inputs of the H7CR are non-voltage (short circuit or open) inputs and voltage inputs. (Non-voltage inputs only H7CR-S, -8 and -11.)

Non-voltage inputs



Solid-State Input (NPN output sensor powered by built-in DC power source)

Counter

12 or 24 VDC

O CP1, CP2

(reset), etc.

Input use 0 V

Ó

Sensor

1





Input signal	Ratings
Non-contact input	High level when transistor is ON Residual voltage: 2 V max. Impedance when ON: 1 k Ω max.
	Low level when transistor is OFF Impedance when OFF: $100 \text{ k}\Omega$ max.
Contact input	Use contacts capable of switching 2 mA at 5 VDC

+V

0 V

(30 V max

Voltage inputs

Solid-State Input (NPN transistor)



Solid-State Input (PNP transistor)



Input signal	Ratings		
Voltage input	High level when transistor is ON: 4.5 to 30 VDC		
	Low level when transistor is OFF: 0 to 2 VDC		
Contact input	Use contacts capable of switching 2 mA at 5 VDC		

Rotary encoder input



Contact Input



Operation



Key	Description
1	Power indicator
2	Key protection indicator
3	Control output indicator: displays "OUT" for single preset counters, displays "OUT1" or "OUT2" for double preset counters
4	Present value display, leading zeroes suppressed
5	Set value display indicates data in function setting mode
6	Set value indicator identifies preset 1 or preset 2
7	Increment keys 1 to 6 (1 to 4) change the corresponding digit of the set value when the counter is in the function setting mode. Increment key 6 on H7CR-C and H7CR-SC also can be used to designate + or – value.
8	Display key switches to the setting displays. For double preset counters, it switches between set values 1 and 2.
9	Mode key switches from run mode to function setting mode. Changes items in the function setting mode.
10	Reset key resets the present value and outputs.

■ OPERATIONAL INTERVIEW





■ FACTORY SETTINGS

The following settings are made at the factory. Be sure to change any settings before operating the counter. Settings and display are possible with or without power supplied, although power supply is required for inputs and outputs to operate. Outputs are not possible with the presets set to zero. The display and settings are powered by an internal battery so they are unaffected by external power interruptions.

H7CR-A, H7CR-B, H7CR-C

Model	H7CR-A (Economy type)	H7CR-B (Standard type)	H7CR-C (+/– Range type)
Present value	0	0	0
Presets	0	0	0
Input modes	Up	Up	Reversible C (phase difference)
Output mode	Ν	N (hold outputs on preset 1 for double preset)	к
Output 2 time	HOLD	HOLD	500 ms
Output 1 time	—	HOLD	500 ms
Counting speeds	30 cps	30 cps	30 cps
Min. reset time	20 ms (not adjustable)	20 ms	20 ms
Decimal point	Not applicable	Far right (no fractions)	Far right (no fractions)
Scale factor	1.000 (not adjustable)	1.000	1.000
Key protection level	—	KP-1	KP-1

H7CR-S, H7CR-8, H7CR-11

Model	H7CR-A (Economy type)	H7CR-B (Standard type)	H7CR-C (+/– Range type)	H7CR-8, -11 (Socket)
Present value	0	0	0	0
Presets	0	0	0	0
Input modes	Up	Up	Reversible C (phase difference)	Up
Output mode	Ν	N (hold outputs on preset 1 for double preset)	К	N
Output 2 time	HOLD	HOLD	500 ms	HOLD
Output 1 time	—	HOLD	500 ms	—
Counting speeds	30 cps	30 cps	30 cps	30 cps
Min. reset time	20 ms (not adjustable)	20 ms	20 ms	20 ms
Decimal point	Not applicable	Far right (no fractions)	Far right (no fractions)	Far right (no fractions)
Scale factor	1.000 (not adjustable)	1.000	1.000	1.000
Key protection level	—	KP-1	KP-1	KP-1 (H7CR-11 only)

SUMMARY OF SETTING PROCEDURES

Settings and operation are easily achieved as shown below. The settings that are possible for each model vary. After changing modes, the counter is ready to accept setting changes to default items.

Run Mode

ltem	Applicable Counters	Description	Setting values
Preset 1, Preset 2 set value	H7CR-B, H7CR-SB H7CR-C, H7CR-SC	Determine the timing of the outputs in comparison to the present count value according to the output mode. The DISPLAY key switches between set value 1 and 2 in double preset models. Use the increment keys (1 to 6) to change a digit.	Sequence when changing a digit using the increment keys (1 to 6). $\square \rightarrow 1 \rightarrow \dots \rightarrow B \rightarrow g \rightarrow []$ Minus sign displayed for leftmost digit of H7CR-C and H7CR-SC (+/- range counters) by using increment key 6.

Setting Mode

Item	Applicable Counters	Description	Setting values
Input mode (default)	H7CR-A, H7CR-SA H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Determines the input mode: Up, Down, Reversible A, Reversible B, Reversible C Press the Up key until the desired mode is displayed.	Increment keys 1 to 6 change the display.
Output mode and OUT 2 output time	H7CR-A, H7CR-SA H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Determines the operation of the control outputs. Refer to "Output Operations" tables for details. Also determines the output time for control output (OUT2) in single preset counters.	Increment keys 1 to 6 change output mode. H7CR-A, -SA (N) (F) H7CR-B, -SB, -8, -11 (N) (F) (C) (B) (K) (P) (Q) (A) H7CR-C, -SC (k) (D) (L) (H) Press keys 1 to 6 to change the Output 2 time. (Applicable to output modes C, R, K, P, Q, and A only. (I) (I) $(I$
OUT 1 output time	H7CR-B, H7CR-SB H7CR-C, H7CR-SC (double preset models only)	Designates the output time for output 1 (double preset models only). Press the increment keys to set the desired time for output 1.	Increment keys 1 to 6 change output time. HoLd→ HoLd→ *Hold mode is available only on H7CR-BW and H7CR-SBW counters. (Applicable to output modes C, R, K, P, Q, and A only.)
Counting speed	H7CR-A, H7CR-SA H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Changes the input filter for counting inputs. Used to prevent counting errors caused by input interference. Press the increment keys to set the desired speed. A "k" on the display indicates kilocycles (1000 cycles).	Increment keys 1 to 6 change count speed.
Minimum reset times	H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Determines the minimum time required for the reset input. Press any increment key to switch between 1 and 20 ms.	Increment keys 1 to 6 change reset time.

Note: Settings changed in the Setting mode are effective only after returning to the Run mode.

Setting Mode continued

Item	Applicable Counters	Description	Setting values
Decimal point	H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Determines the position of the decimal point on the display. Press the Increment keys 1 to 6 to move the decimal from left to right.	Increment keys 1 to 6 move decimal point.
Scale factor	H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-8, H7CR-11	Used to convert counts to other units, (e.g., to display millimeters when each input pulse represents 0.02 mm, input a scale factor of 0.02). Values from 0.001 to 99.999 are possible. Press the Increment keys to set the desired value.	Increment keys 1 to 5 change the scaling $ \begin{array}{c} & & & & \\ & & & & \\ & & & & \\ & & & &$
Key protection level	H7CR-B, H7CR-SB H7CR-C, H7CR-SC H7CR-11	Blocks certain keys to prevent accidental operation. The key protection level, kP-1 to kP-4, determines which keys are locked out when the key protection input is ON. The locked keys are crossed out in the diagrams at right.	Increment keys 1 to 4 change key protection level. $k P - j \rightarrow k P - 2 \rightarrow k P - 3 \rightarrow k P - 4$ (KP-1) (KP-2) (KP-3) (KP-3) (KP-4)

Note: Settings changed in the Setting mode are effective only after returning to the Run mode.

■ EXAMPLES

Run Mode

Changing the Set Value

When changing the set value while the counter is operating, an output will be produced if the set value ever equals the present value. To avoid triggering the output, begin by setting a higher digit to a larger number.

1. Press the DISPLAY key to change the displayed values for preset 1 and 2 during operation.





2. Change the set value from 250 to 1,250.

Pressing increment keys 1 to 6 advances the corresponding column value by 1.

Nonsignificant zeros are not normally shown on the set value display.



Output Delay

The following table shows the delay from when the present value passes the set value until the output is produced. The delay is the result of output control time, signal transmission time, relay switching time etc.

Actual measurements in N and K modes:

Control output	Max. counting speed	Output delay*
Contact	30 cps	18 to 24 ms
OUT1,	1 kcps	4.7 to 5.8 ms
OUT2	5 kcps	4.4 to 5.4 ms
Transistor	30 cps	13.5 to 20 ms
OUT1,	1 kcps	0.59 to 0.81 ms
OUT2	5 kcps	0.29 to 0.44 ms

* The variation in delays is due to different modes and conditions. For systems where the delay is a problem, take actual measurements under operating conditions.

Setting Mode

H7CR =

Changing Setting in the Function Setting Mode

1. Press the MODE key to switch from RUN mode to SETTING mode.

The counter will continue operation if switched from RUN mode to function setting mode during operation.

The MODE key will be locked if the key protection function is enabled.



Settings changed in the function setting mode are not effective until RUN mode is entered. As

the operating conditions will change in this case, always reset operation with the RESET key or a reset input.

Press the MODE key to scroll successively through the items that can be set. Release the MODE key to select the desired item.



Precautions

EXTERNAL POWER SUPPLY

The capacity of the counter's external power supply is 50 mA at 24 VDC or 100 mA at 12 VDC. For models with 24 VAC/12 to 24 VDC specifications, loads must be established between the following limits.

3. Changing the counting speed or another selected item:

Press the MODE key until the desired item appears.

Change the item setting by pressing increment keys 1 to 6.





Press the DISPLAY key to return to RUN mode from SETTING mode.





H7CR —

POWER SUPPLY

When the power turns OFF then ON, the input signal may or may not be received. The diagram below shows when the input signal will be received, will not be received or will be unstable. The unstable period will vary with power supply voltage, and the load conditions on external power supplies.



For 100 to 240 VAC and 24 VAC/12 to 24 VDC counters, be sure that the capacity of the external power supply is adequate, because the power supply may not provide a surge current sufficient to start the counter due to the switching regulator contained in the counter's internal circuitry.

Connect the power supply voltage through a relay or switch in such a way that the voltage reaches a fixed value immediately.

TRANSISTOR OUTPUT

The transistor output in H7CR counters is optically isolated from the internal circuitry by a photocoupler, so either NPN or PNP output is possible.

SELF DIAGNOSTIC FUNCTIONS

The displays at right appear when irregularities occur. When the problems causing these conditions have been cleared, the preset count value and all outputs will be reset in the same way as when the Reset key is pressed.

Display	Meaning	Outputs	Recovery
	Present value	Not	Press RESET key
	below minimum	changed.	for 1 second or
FFFFFF	Present value		reset input.
	above maximum		
E1	CPU error	OFF	Press RESET key
E2	Memory error		for 1 second.

 Displayed for +/- range counters H7CR-C and H7CR-SC when max. negative value is exceeded.
 Displayed for +/- range counters H7CR-C and H7CR-SC when max. positive value is exceeded.

OPERATING ENVIRONMENT

Although the front of the counter resists water and oils and can be used where subject to these, extended exposure to large amounts of either can adversely affect internal components.

The counter, input signal lines, and the input device must be separated as far as possible from any sources of electrical

OTHER

Always isolate the counter from external circuits or short all terminals before measuring dielectric strength between electric circuits and non-charged metal parts or performing similar testing with the counter mounted in a control panel. This is to prevent internal circuit damage that might occur if the test voltage enters the counter interior due to withstand-voltage or insulation failure in control panel devices. noise, such as high-voltage power lines. Shielded input signal lines can also be effective in suppressing noise.

To prevent damage, the exterior of the counter must not be exposed to organic solvents (e.g., paint thinner or benzene), strong alkalis, or strong acids.

The counter contains a lithium battery, and must never be incinerated. Dispose of the counter as a noncombustible item.

Applications of Operating Modes.

■ SINGLE OPERATING MODES

Single operating modes are basic modes, among which, Mode N is the most basic (input the RESET signal to restart).

Mode N

The displayed count-up value is on hold.

Example: Cutting Objects to Specified Size

The object is advanced for a specified distance measured by encoder pulses to determine correct length for cutting.



Mode A

Select Mode A for a one-shot output of the count-up signal used in Mode N. The displayed count-up value is on hold. Mode A can be used for a start signal for sequence control equipment.

Mode F

Go to Mode F to monitor the number of overrun objects. The process value is displayed normally. It is possible to monitor the number of overrun objects upon interruption of the operation after a specified number of objects are counted.

Mode K

Select Mode K for the one-shot output of the count-up signal used in Mode F. Mode K can be used as a start signal for sequence control equipment.

■ REPETITIVE OPERATING MODES

Modes R and C are typical of repetitive operating modes (the counter internally resets itself after each counting operation and then restarts). The counter begins the next counting operation after the present output is processed.

Mode R

The displayed count-up value is on hold.

Example: Portion Control of Material or Ingredients

The valve is closed when the supplied quantity of cookie batter or blended ingredient has reached a specified amount.



Mode Q

Choose Mode Q to view the process value continuously. There is no difference in operation between Mode R and Mode Q.

Mode C

The counting operation restarts upon counting up. The process value is displayed continuously.

Example: Marking Material at Regular Intervals

A roll of film being advanced is marked at regular intervals based on encoder input.



Mode P

Choose Mode P to put the count-up value on hold (display is on hold while the one-shot output is ON). There is no difference in operation between Mode C and Mode P.

NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches, divide by 25.4.

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Cat. No. GC CN4A



ООО "ЛайфЭлектроникс"

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 3010181090000000703 БИК 044030703

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