

### Easy-to-Use Multifunction Counters with Backlit LCD Display

- Compact, 72 mm (2.83 in) square — includes single and double preset, and +/- range
- Both contact and transistor outputs available
- Prescale function displays in units of actual physical parameters (length, volume, etc.)
- H7BR-C provides large/small discrimination mode — ideal for positioning and production control
- Batch counter in H7BR-B lets you count in dozens, hundreds, or any count preset
- On-line change of set value possible



## Ordering Information

When placing your order, add the supply voltage to the part number from those listed below. For example, **H7BR-BV 100 to 240 VAC**.

### ■ STANDARD COUNTERS

Number of presets	One		Two (Non-independent)	
	No voltage	Voltage	No voltage	Voltage
Contact and sink (NPN) transistor outputs	<b>H7BR-B</b>	<b>H7BR-BV</b>	<b>H7BR-BW</b>	<b>H7BR-BWV</b>
Contact and source (PNP) transistor outputs	<b>H7BR-BP</b>	<b>H7BR-BVP</b>	<b>H7BR-BWP</b>	<b>H7BR-BWVP</b>
Supply voltages	100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC			

### ■ REVERSIBLE +/- RANGE COUNTERS

Number of presets	One		Two (Non-independent)	
	No voltage	Voltage	No voltage	Voltage
Contact and sink (NPN) transistor outputs	<b>H7BR-C</b>	<b>H7BR-CV</b>	<b>H7BR-CW</b>	<b>H7BR-CWV</b>
Contact and source (PNP) transistor outputs	<b>H7BR-CP</b>	<b>H7BR-CVP</b>	<b>H7BR-CWP</b>	<b>H7BR-CWVP</b>
Supply voltages	100 to 240 VAC, 50/60 Hz or 24 VAC/12 to 24 VDC			

### ■ ACCESSORIES

Description	Part number
Soft cover with two mounting clips for front panel protection	<b>Y92A-72F1</b>
Shock prevention terminal cover protects wiring connections	<b>Y92A-72T</b>

<b>Model Legend</b>		H7BR- <u>   </u> <u>   </u> <u>   </u> <u>   </u> <u>   </u>				
		1	2	3	4	5
1.	H7BR: DIN-sized, 72 x 72 mm Digital Counter			3. Classification Blank: single preset counter W: double preset counter		5. Solid-state output Blank: NPN output S: PNP output
2.	Function B: Standard C: +/- range			4. Input Blank: No-voltage input V: Voltage input		

## Specifications

### ■ GENERAL CAPABILITIES

Model	H7BR-B Series	H7BR-C Series
Classification	Preset counter (standard)	Preset counter (+/- range)
Mounting	Flush mounting	
External connections	Screw terminals	
Degree of protection	IEC: IP54 (Panel surface)	
Output modes	Sustained and one-shot; N, F, C, R, K, P, Q, A	Sustained, one-shot and instantaneous; K, D, L, H
Input modes	Up, Down, Reversible A (command inputs), Reversible B (individual inputs), Reversible C (phase difference inputs)	Reversible A (command inputs), Reversible B (individual inputs), Reversible C (phase difference inputs)
Reset system	External, manual, and automatic (internal according to C, R, P, and Q operation) resets External: closing contact 8 and 9 Manual: pressing reset button ( <i>certain models only</i> ) Automatic: available only in modes C, R, P, and Q	External and manual resets External: closing contact 8 and 9 Manual: pressing reset button ( <i>certain models only</i> )
Decimal point adjustment	Rightmost 3 digits	
Teaching function	—	Yes
Batch counting function	Yes	—
Set compensation	—	Yes
Gate input	Yes	
Scaling function	0.001 to 99.999	
Sensor power supply	12 or 24 VDC, selectable	
Input signals	Batch count, reset, key protect, gate	Compensation, reset, key protect, gate
Input method	No-voltage input: Via opening and closing of contact Voltage input: Via high and low signal voltage (key protection is no-voltage input)	
Control outputs	Single-preset models: One SPST-NO contact and transistor (NPN or PNP open collector) output Double-preset models: Two SPST-NO contacts and transistor (NPN or PNP open collector) output Non-contact outputs can be set for NO or NC (except for batch counter)	
Batch outputs	Transistor output (NPN or PNP open collector)	
Display	LCD backlit; 12 mm (0.47 in) H Present Value, 8 mm (0.32 in) H Set Value	
Digits	6 digits (0 to 999,999)	6 digits (-999,999 to 999,999)
Memory backup	Backup time for power interruption: Approx. 10 years at 20°C, non-replaceable lithium battery	

## ■ OUTPUT MODES SUMMARY

Output mode	Description		Applicable counter series
	Single preset counter	Double preset counter	
N	Sustained output	Sustained output 2, selectable sustained or one-shot output 1	H7BR-B
F	Sustained output, overrun display	Sustained output 2, selectable sustained or one-shot output 1	H7BR-B
C	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
R	One-shot output, overrun display	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
K	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
P	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
Q	One-shot output, overrun display	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
A	One-shot output	One-shot output 2, selectable one-shot or sustained output 1	H7BR-B
D	Instantaneous output, count value = preset	Instantaneous outputs when count value = preset	H7BR-C
L	Sustained output, count value $\geq$ preset	Sustained output 2, count value $\geq$ preset, Sustained output 1, count value $\leq$ preset	H7BR-C
H	Sustained output, count value $\geq$ preset	Sustained outputs when count values $\geq$ preset	H7BR-C
K	One-shot output, count value = preset	One-shot outputs, count value = preset	H7BR-C

## ■ RATINGS

Supply voltage	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 voltage		
Power consumption	Approx. 10 VA at 50 Hz, 240 VAC, 6 W at 24 VDC (approx. 8 A surge current for 2 ms upon power application)		
Max. counting speeds (CP1, CP2)	30 cps, or 1, 5, or 10 kcps (separate setting for CP1 and CP2)		
Compensation and gate inputs	Set to the faster of the CP1 or CP2 max. counting speed		
Reset	Min. pulse width for external reset: 1 or 20 ms, also manual reset		
Batch count reset	Min. pulse width: 20 ms		
Key protect	Response time: 1 second		
One-shot output	10, 50, 100, 200, 500, or 1,000 ms (separate settings for presets 1 and 2)		
Inputs (count, compensation, reset, batch count reset, gate)	No-voltage inputs	ON impedance:	1k $\Omega$ max. (approx. 2 mA when 0 k $\Omega$ )
		ON residual voltage:	2 V max.
		OFF impedance:	100 k $\Omega$ min.
	Voltage inputs	High level:	4.5 to 30 VDC
		Low level:	0 to 2 VDC
		Input resistant:	Approx. 4.7 k $\Omega$
Key protect input	No-voltage input	ON impedance:	1 k $\Omega$ max. (approx. 2 mA when 0 k $\Omega$ )
		ON residual voltage:	1 V max.
		OFF impedance:	100 k $\Omega$ min.
Control outputs	Contacts: 3 A, 250 VAC, resistive load (p.f. = 1) Transistor: Open collector; 100 mA at 30 VDC max. residual voltage 2 V max. (approx. 1 V)		
Power supply for externally	12 VDC 160 mA, $\pm$ 10% (5% ripple max.) 24 VDC 80 mA, $\pm$ 10% (5% ripple max.)		
Ambient operating temperature	-10° to 55°C (14° to 131°F) (with no icing)		
Storage temperature	-25° to 65°C (-13° to 149°F) (with no icing)		
Ambient operating humidity	35% to 85% RH		

### Approved by the following standards:

UL  
CSA  
SEV  
CE (EMC)

## ■ CHARACTERISTICS

Insulation resistance	100 M $\Omega$ min. at 500 VDC between current-carrying terminal and exposed non-current-carrying metal parts, and between non-continuous contacts
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min. between current-carrying terminal and exposed non-current-carrying metal parts for 100 to 240 VAC type 1,000 VAC for 24 VAC/12 to 24 VDC type
Impulse voltage	Between power terminals: 1 kV for 24 VAC/12 to 24 VDC power supply, 3 kV for others Between current-carrying terminal and exposed non-current-carrying metal parts: 1.5 kV for 24 VAC/12 to 24 VDC power supply, 4.5 kV for others
Noise immunity	$\pm 2$ kV between power terminals, $\pm 600$ V between input terminals (square-wave noise via noise simulator; pulse width: 100ns/1 $\mu$ s; 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 minutes 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 minutes each in three directions
Shock	Mechanical durability: Approx. 30 G Malfunction durability: Approx. 10 G
Service life	Mechanical: 10 million operations min. Electrical: 100,000 operations min. at 5 A, 250 VAC (resistive load)
Weight	Approx. 270 g (9.5 oz.)

## Input/Output Functions

### ■ INPUT

CP1/CP2 (count inputs)	<ul style="list-style-type: none"> <li>Count signal inputs</li> <li>Up, Down, and Reversible (command, individual, or phase difference) inputs accepted</li> <li>Maximum counting speed: 10 kcps</li> </ul>
Reset	<ul style="list-style-type: none"> <li>Present value reset (to zero in Up modes, to preset with single preset models in Down mode, and to preset for double preset models)</li> <li>Count inputs are not acknowledged while reset input is ON</li> <li>Reset indicator lit while reset input is ON</li> </ul>
Compensation	On leading edge of up count signal, present count is reset to compensation value; not effective for down count signals
Batch count reset	<ul style="list-style-type: none"> <li>Batch counter is reset to zero and batch output turns OFF on leading edge</li> <li>Batch count signals are not acknowledged while batch count reset input is ON</li> </ul>
Key protect	<ul style="list-style-type: none"> <li>Reset, Mode, Teach and Increment keys are disabled according to key protect level</li> <li>Although Display key remains effective, only monitoring of settings is possible</li> <li>Key protect indicator is lit while key protect input is ON</li> <li>Effective when power supply is turned off and when key protection terminals are shorted</li> </ul>
Gate	Input signal that interrupts the count function without resetting the counter; counting resumes once the signal is removed

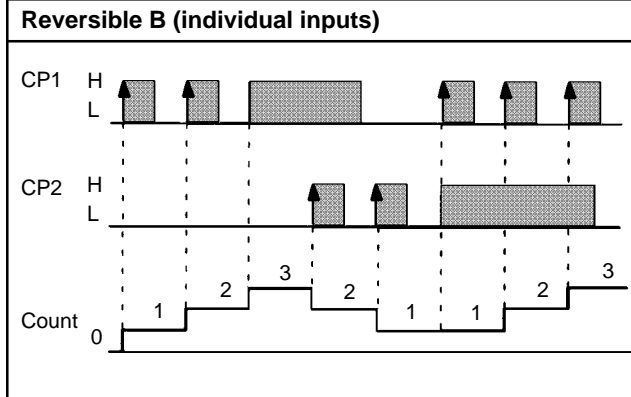
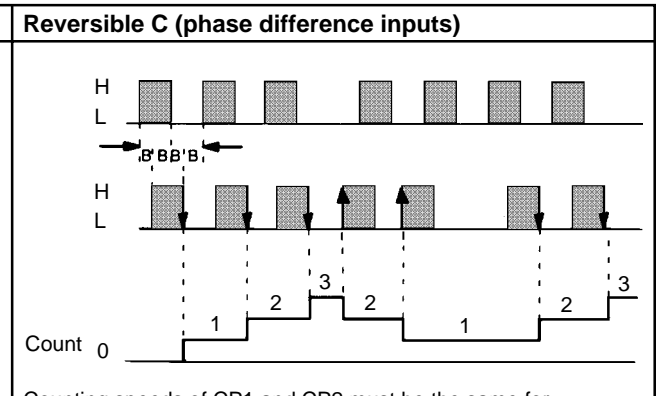
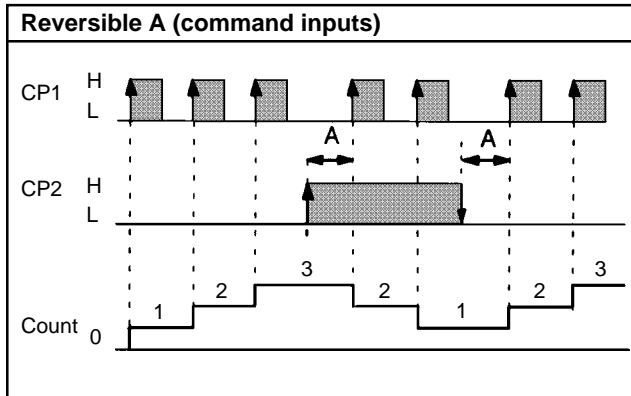
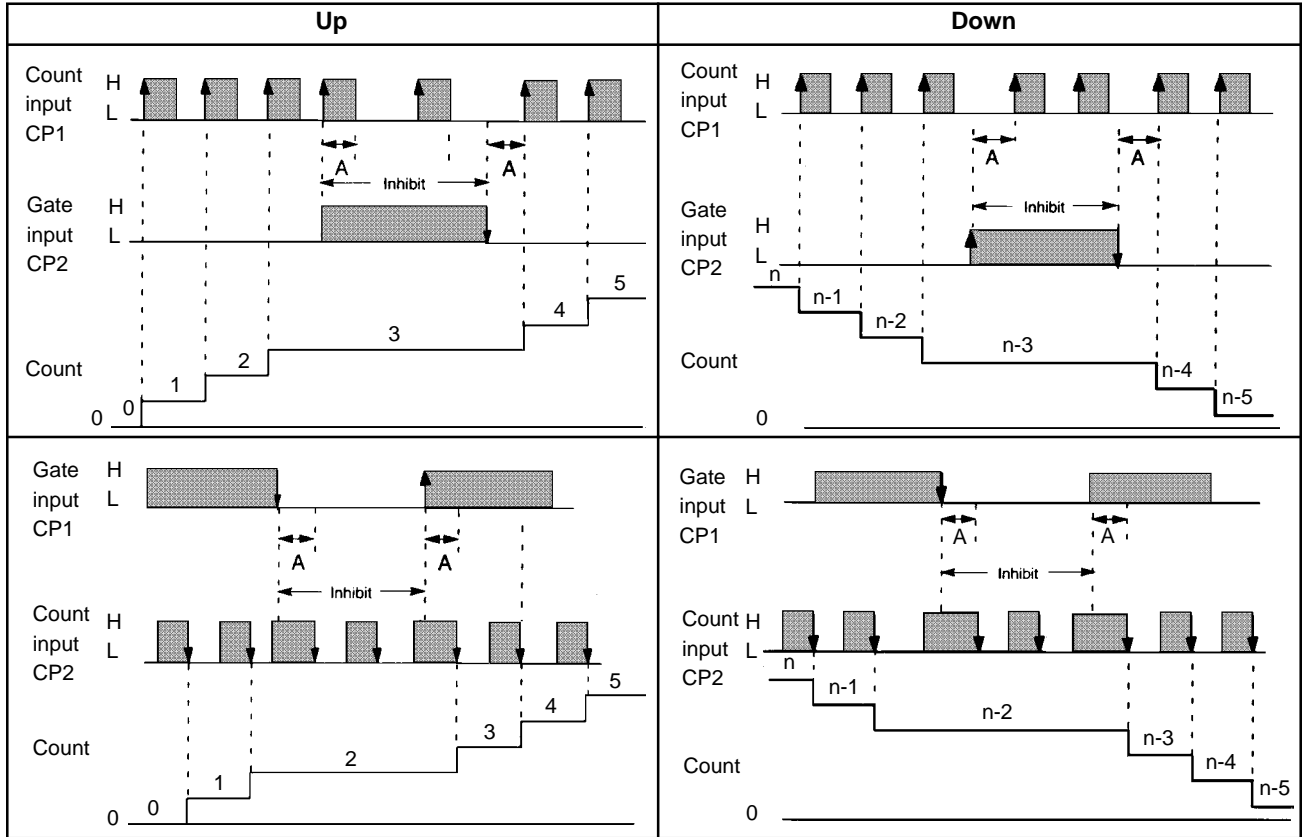
### ■ OUTPUTS

Outputs 1 and 2	<ul style="list-style-type: none"> <li>Outputs made according to designated output mode when corresponding preset is reached</li> <li>Outputs are not made during Teaching mode</li> </ul>
Batch output (H7BR-B models)	<ul style="list-style-type: none"> <li>Output made when batch counter has reached preset number of batches</li> <li>Batch output remains ON until batch count reset goes ON</li> <li>Batch counting is accepted but batch output is not made if the number of batches is set to zero</li> </ul>

(The batch counter counts the number of completed counts to the preset for single preset models and to preset 2 for double preset models.)

# Timing Charts

## INPUT MODES



Counting speeds of CP1 and CP2 must be the same for Reversible C.

Signal	No-voltage input	Voltage input
H	Short circuit	4.5 to 30 VDC
L	Open circuit	0 to 2 VDC

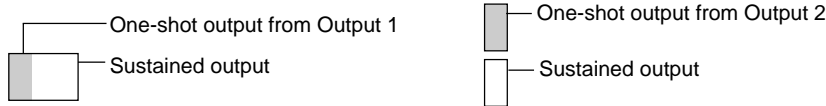
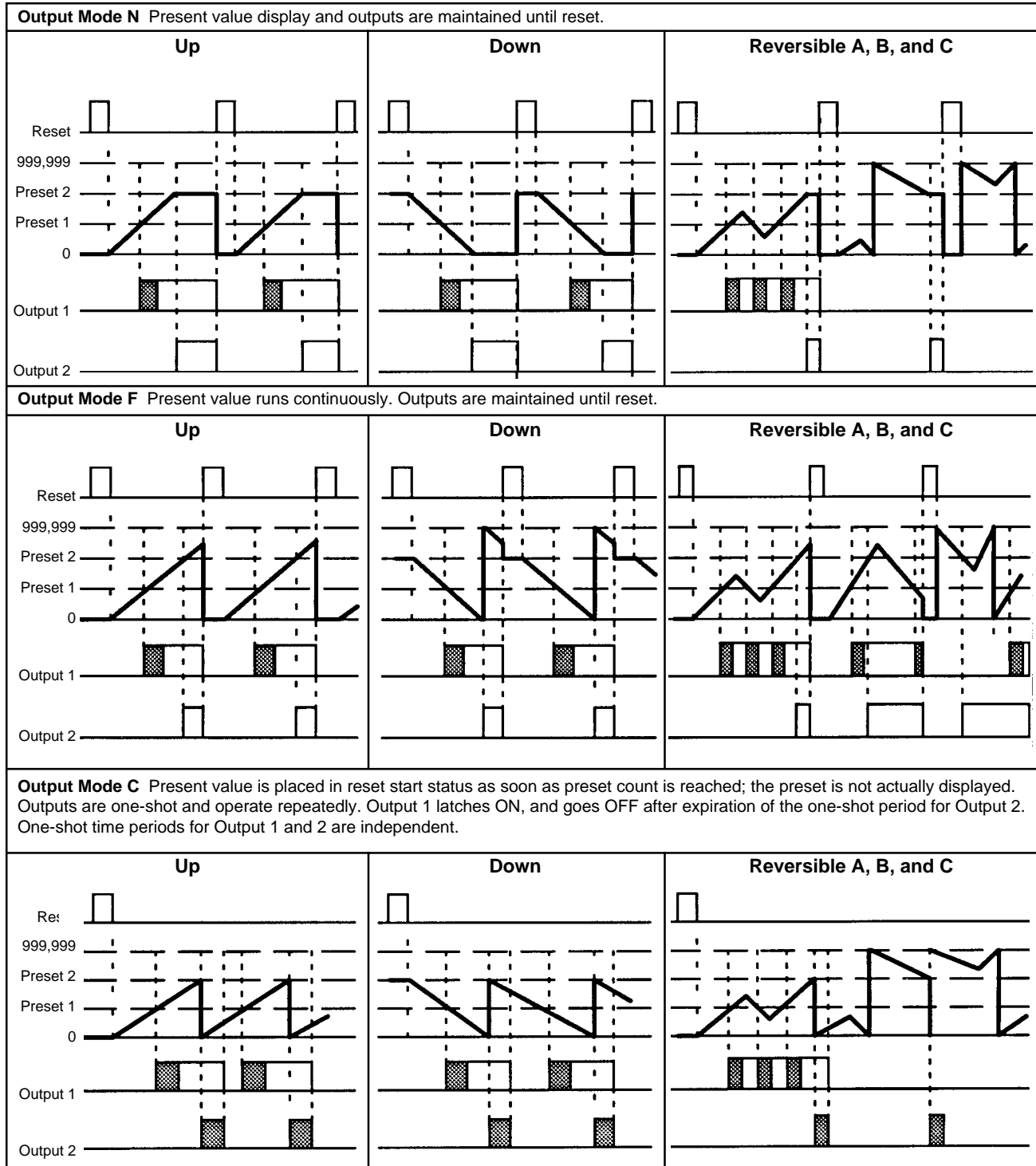
A: Minimum signal width

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.

■ STANDARD COUNTER OUTPUT OPERATIONS

H7BR-B

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

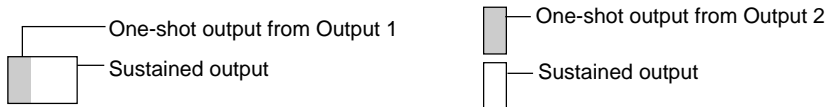
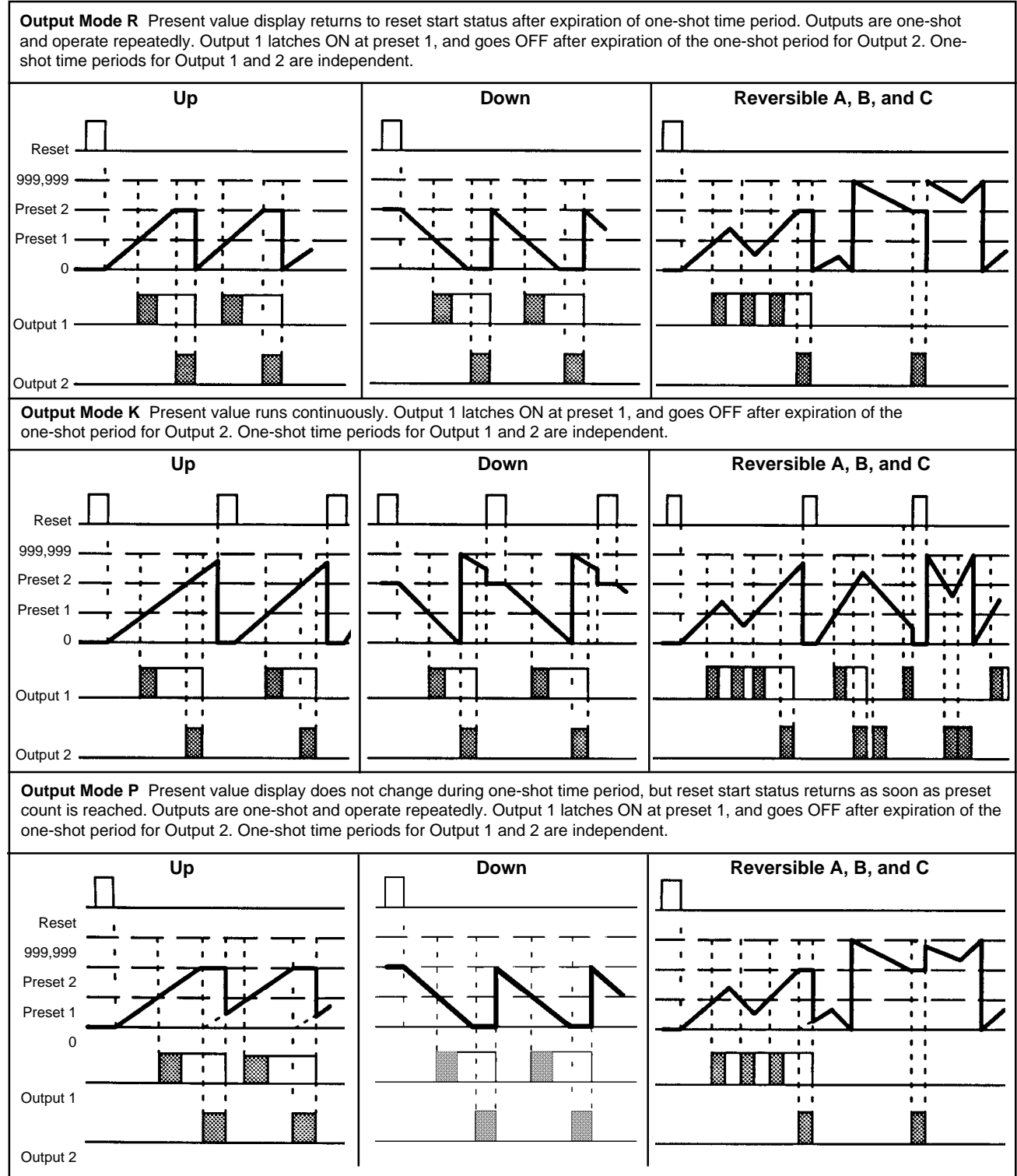


One-shot outputs can be set to 10, 50, 100, 200, 500 or 1,000 ms.

**Standard Counter Output Operation (Continued)**

**H7BR-B**

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



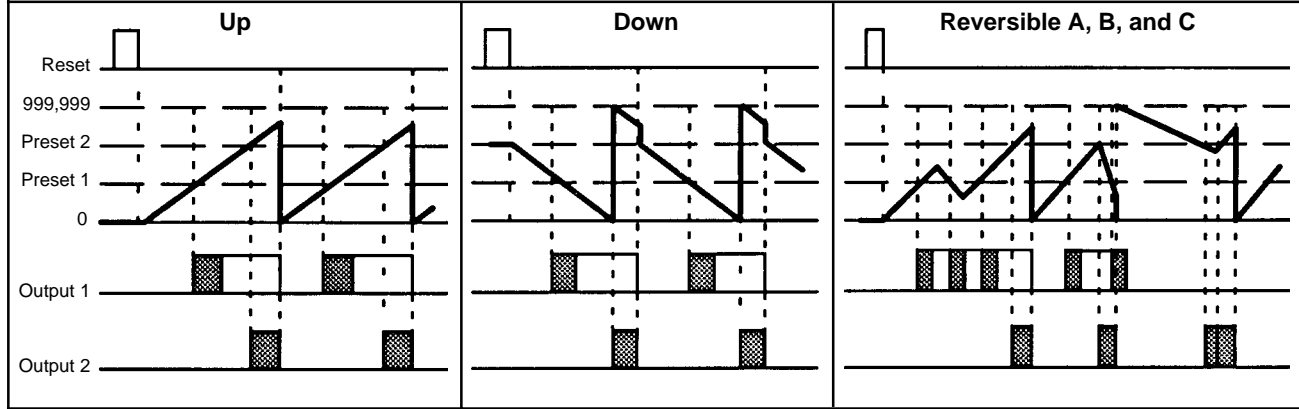
One-shot outputs can be set to 10, 50, 100, 200, 500 or 1,000 ms.

**Standard Counter Output Operation (Continued)**

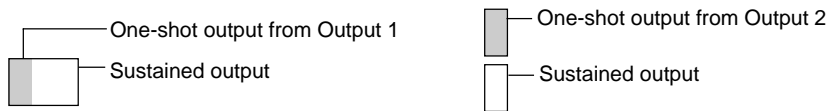
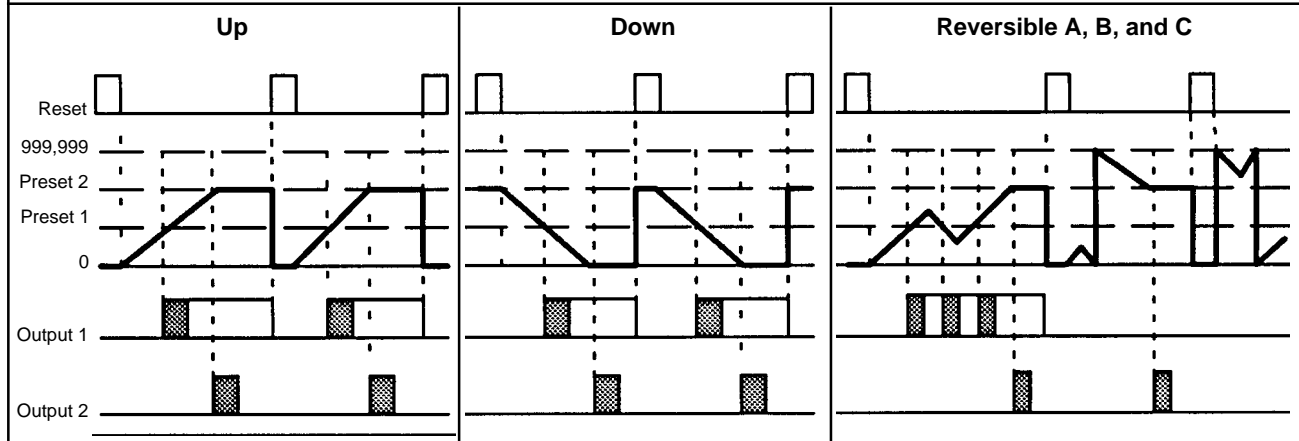
**H7BR-B**

(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.



**Output Mode A** Present value and Output 1 maintain status until reset. Output 1 and 2 operate independently.



One-shot outputs can be set to 10, 50, 100, 200, 500 or 1,000 ms.

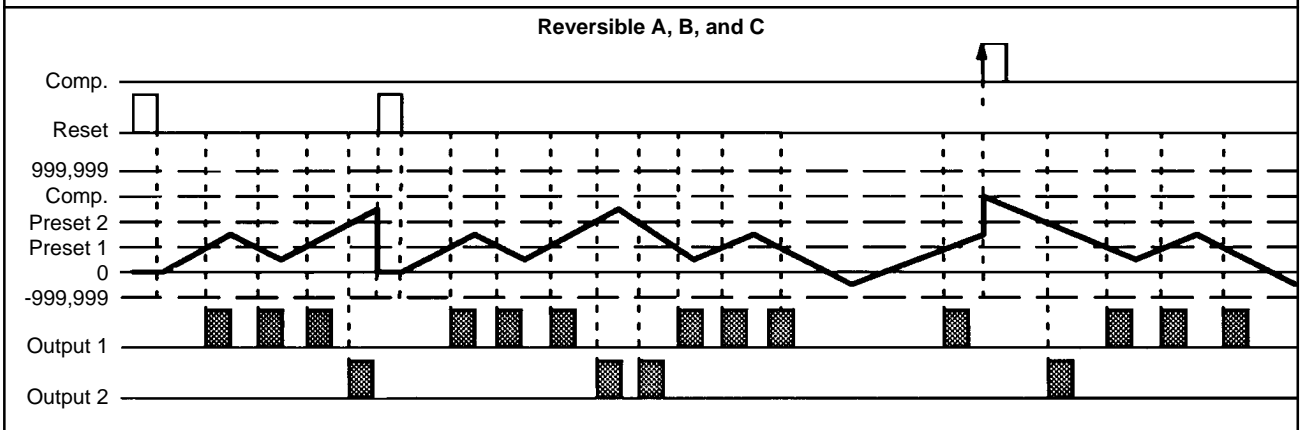


■ REVERSIBLE +/- RANGE COUNTER OUTPUT OPERATION

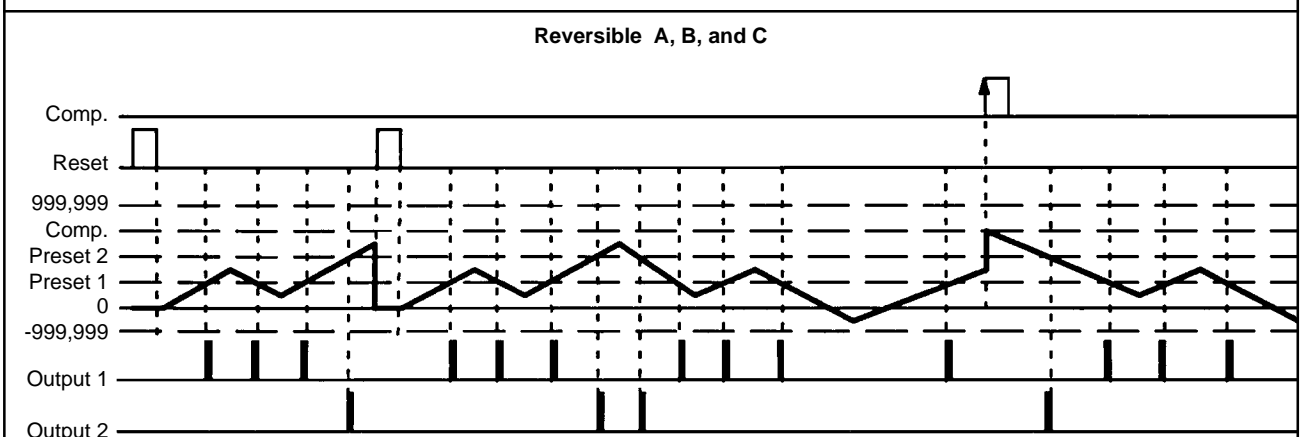
H7BR-C

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

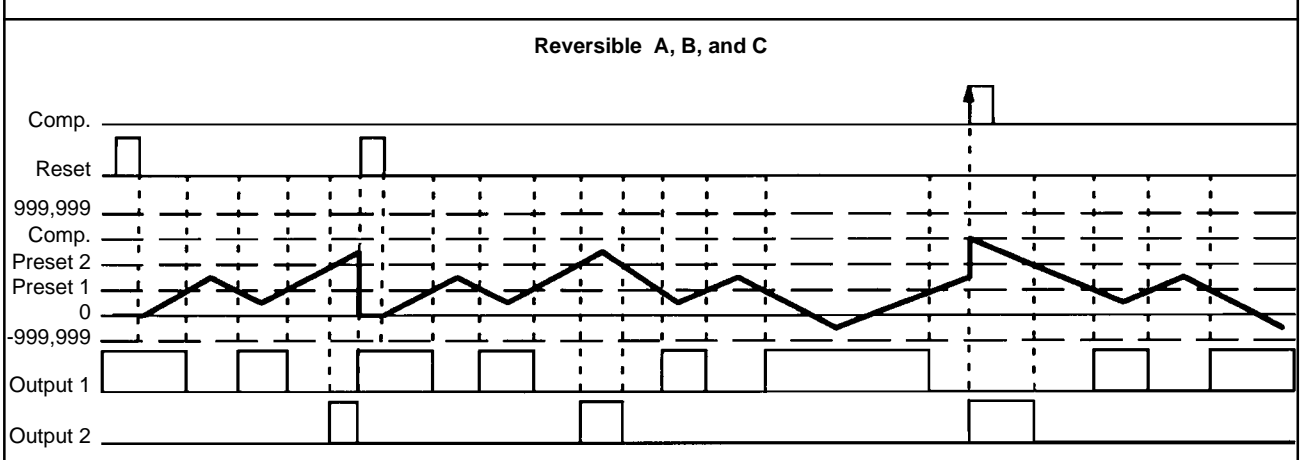
**Output Mode K** Present value increments and decrements within the display's range. Output 1 goes ON for one-shot whenever present value is equal to preset 1; Output 2 goes ON for one-shot whenever present value is equal to preset 2.



**Output Mode D** Present value increments and decrements within the display's range. Output 1 is ON whenever present value is equal to preset 1; Output 2 is ON whenever present value is equal to preset 2.



**Output Mode L** Present value increments and decrements within the display's range. Output 1 is ON whenever present value is less than or equal to preset 1; Output 2 is ON whenever present value is greater than or equal to preset 2.



▬ One-shot output  
One-shot outputs can be set to 10, 50, 100, 200, 500 or 1,000 ms.

┆ Instantaneous (equals) output

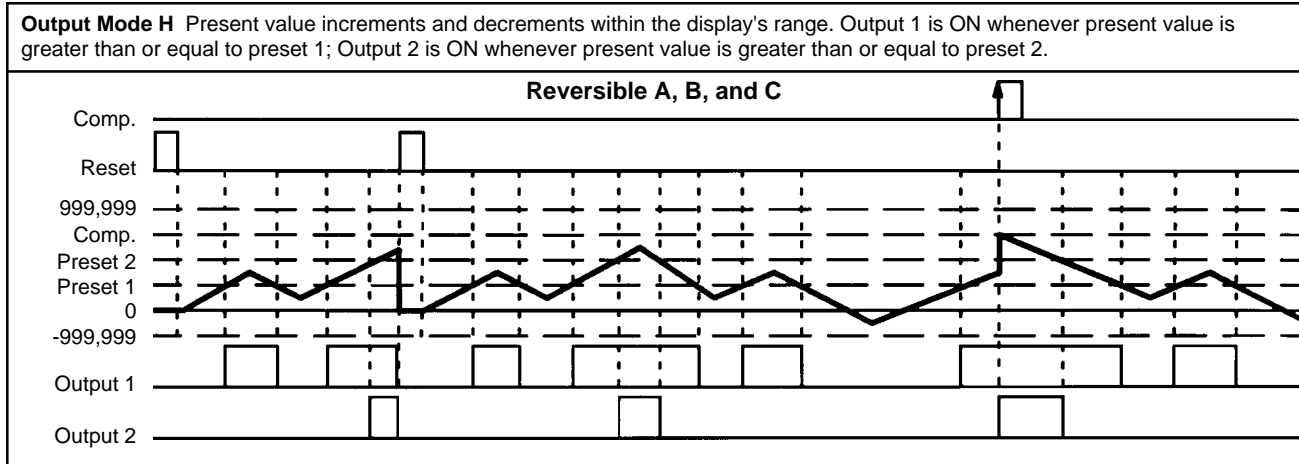
▬ Edge input

▬ Sustained output/level input

**+/- Range Counter Output Operation (Continued)**

**H7BR-C**

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



- One-shot output
  - Edge input
  - Sustained output/level input
  - Instantaneous (equals) output
- One-shot outputs can be set to 10, 50, 100, 200, 500 or 1,000 ms.

**Notes**

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

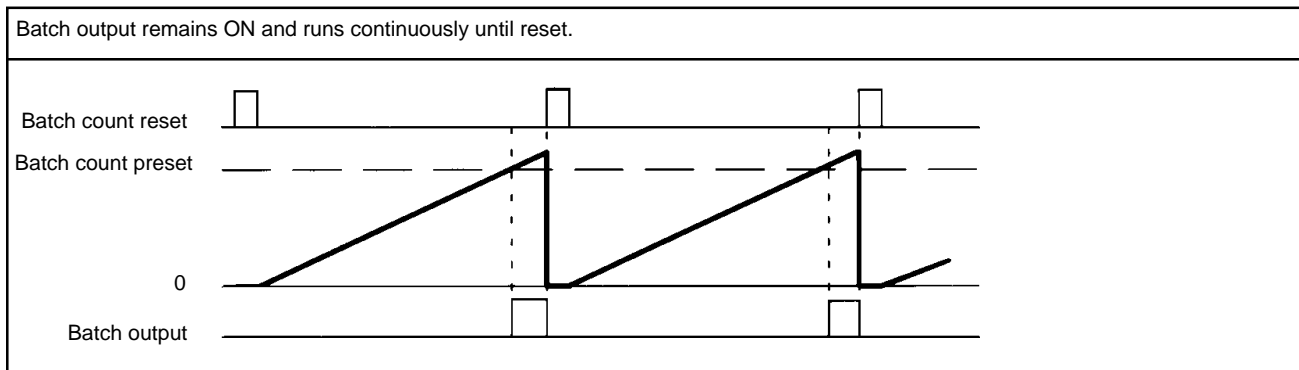
The compensation input is valid only when the present value is being incremented.

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

**■ BATCH COUNTER OPERATION (H7BR-B models)**

The bold line indicates the batch count.

The batch counter counts the number of times the preset is reached for single preset models, and the number of times preset 2 is reached for double preset models.



**Notes**

The batch count will remain zero while the reset input is ON. Batches are counted, but no batch outputs are made when the batch preset is set to zero. The batch count will return to zero if 999,999 is exceeded.

The batch count and the batch output is not reset by any method other than the batch count reset (i.e., it is not affected by the reset key or by other reset inputs).

If the batch output is ON when power is interrupted, it will go ON when power is restored.

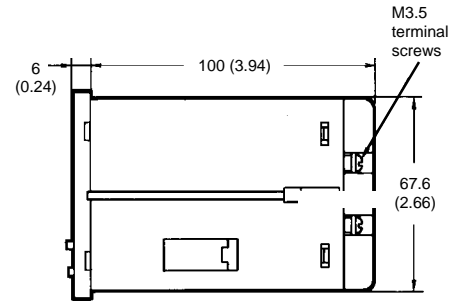
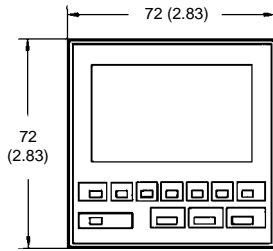
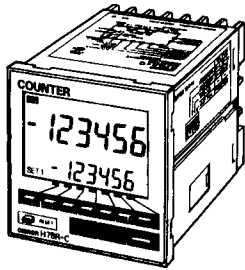
The batch output will be turned ON if the batch preset is changed from a value greater than the present batch count to a value less than the present batch count.

The batch output will remain ON if the batch preset is changed from a value less than the present batch count to a value greater than the present batch count.

# Dimensions

Unit: mm (inch)

## ■ COUNTERS

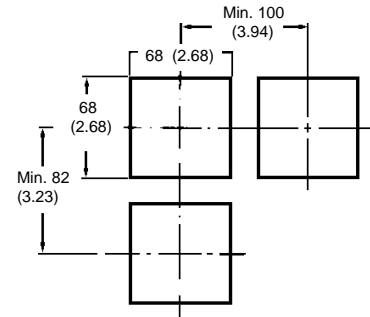
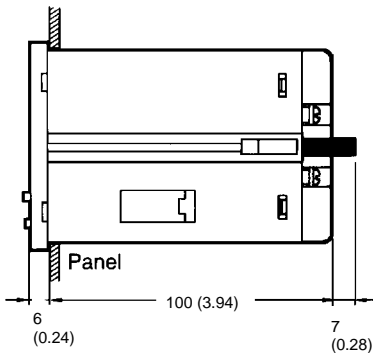
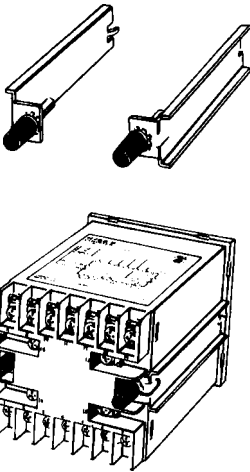


## ■ PANEL MOUNTING ADAPTERS

A pair of panel mounting adapters is included with each counter. The adapters are installed in the slots on the right and left sides of the case, as shown below.

### Panel Cutouts

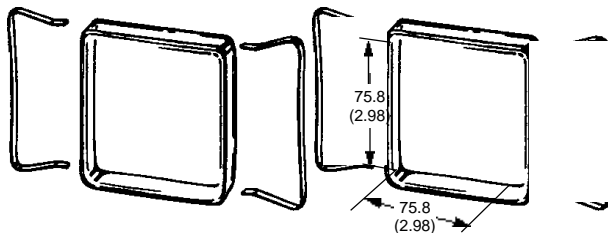
Panel cutouts are as shown below (according to DIN 43700). Panel thickness is from 1 to 5 mm (0.039 to 0.197 in).



## ■ ACCESSORIES

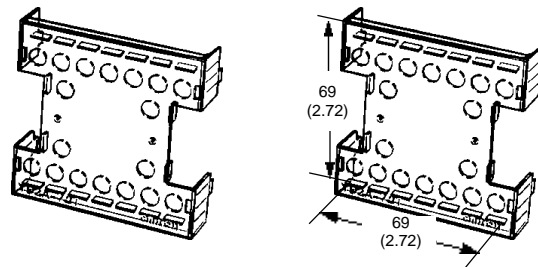
### Y92A-72F1 Soft Plastic Cover

Two mounting clips help the soft plastic cover Y92A-72F1 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.



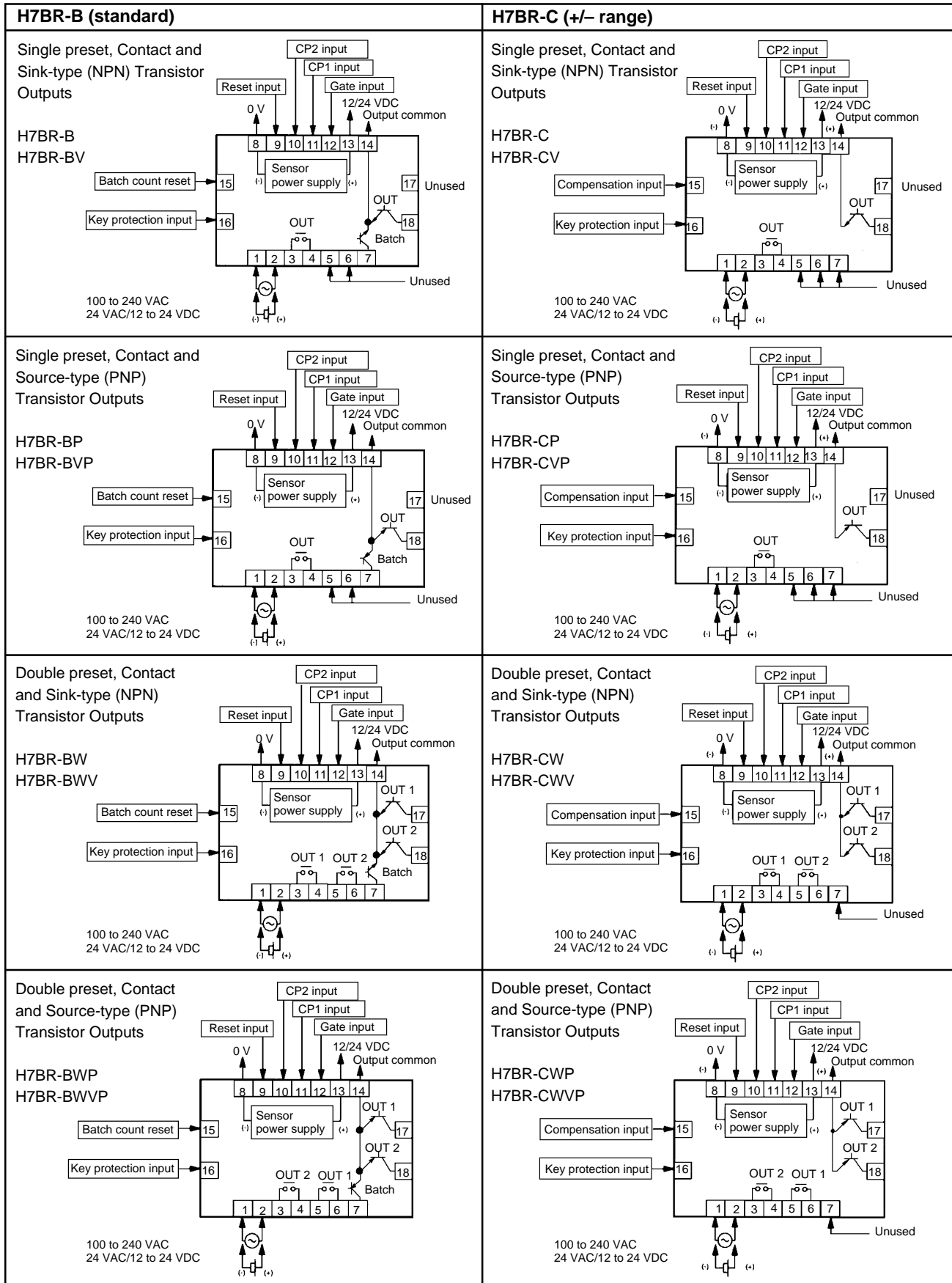
### Y92A-72T Terminal Cover

The terminal cover protects the wiring connections.



# Connections

■ **TERMINAL ARRANGEMENT** (Do not connect unused terminals.)

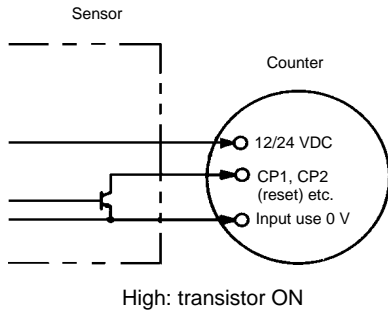


**CONNECTIONS**

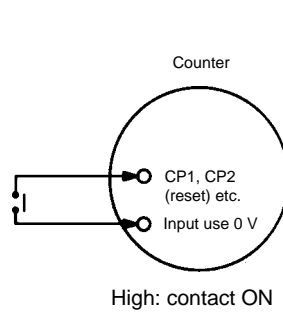
The inputs of the H7BR are no-voltage (short circuit or open) inputs and voltage inputs. (No-voltage inputs only for key protection.)

**No-voltage inputs**

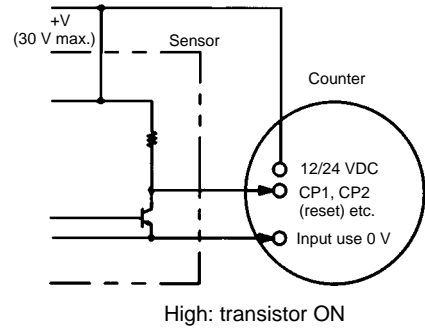
**Solid-state Input (NPN Transistor)**



**Contact Input**



**Non-contact Input**

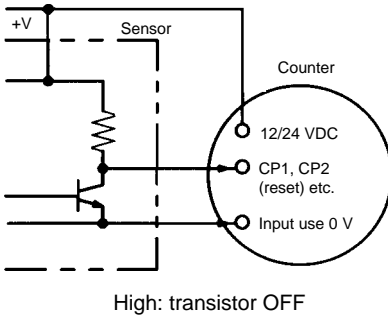


**Solid-state Input Signal Levels**

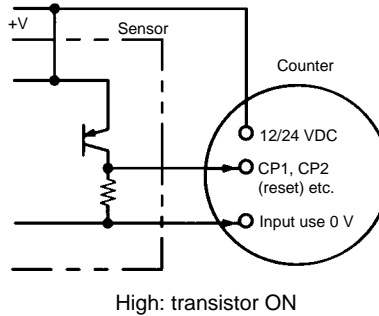
Non-contact input	1. High level Transistor ON Residual voltage: 2 V max. Impedance when ON: 1 kΩ max.
	2. Low level Transistor OFF Impedance when OFF: 100 kΩ max.
Contact input	Use contacts that can adequately switch 2 mA at 5 V

**Voltage inputs**

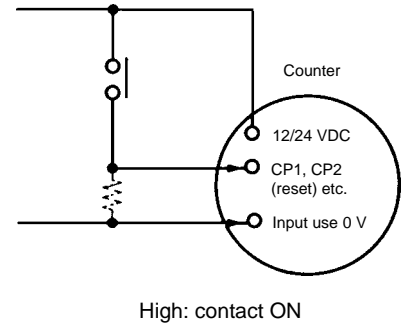
**Solid-state Input (NPN Transistor)**



**(PNP Transistor)**



**Contact Input**

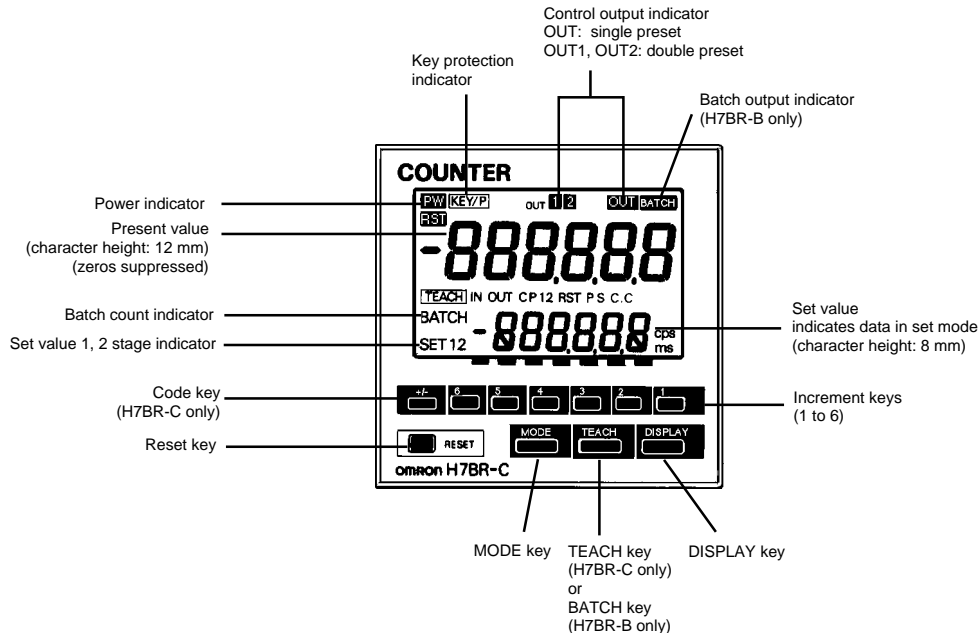


**Voltage Input Signal Levels**

1. High level 4.5 to 30 VDC
2. Low level 0 to 2 VDC

# Operation

## ■ NOMENCLATURE

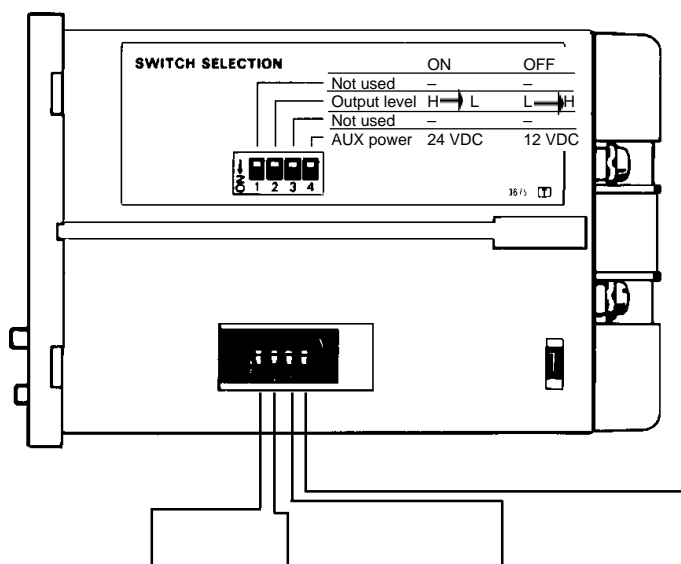


## ■ KEY OPERATIONS

Key name	Operation
Increment keys (1–6)	Used to change the corresponding digit of the set value; also used to change data in the set mode
Code key	Changes $\pm$ code of set value (On H7BR-C type only)
Display key	Switches to the batch count, teaching mode, setting displays: For double preset model, changes the displayed preset value 1 and 2 during operation
Batch key	Switches to the batch display (On H7BR-B type only)
Teaching key	Switches to the teaching mode (On H7BR-C type only)
Mode key	Switches from run mode to set mode; changes items in the set mode
Reset key	Resets present value and outputs

## ■ SIDE VIEW

All DIP switches are set to OFF at the factory.



Model	Switch no.	1	2	3	4
		Operation of each transistor output when count up		Invalid	External power supply
Single preset	OFF	—	Output OFF to ON	—	12 VDC
	ON	—	Output ON to OFF	—	24 VDC
Double preset	OFF	Output 1 OFF to ON	Output 2 OFF to ON	—	12 VDC
	ON	Output 1 ON to OFF	Output 2 ON to OFF	—	24 VDC

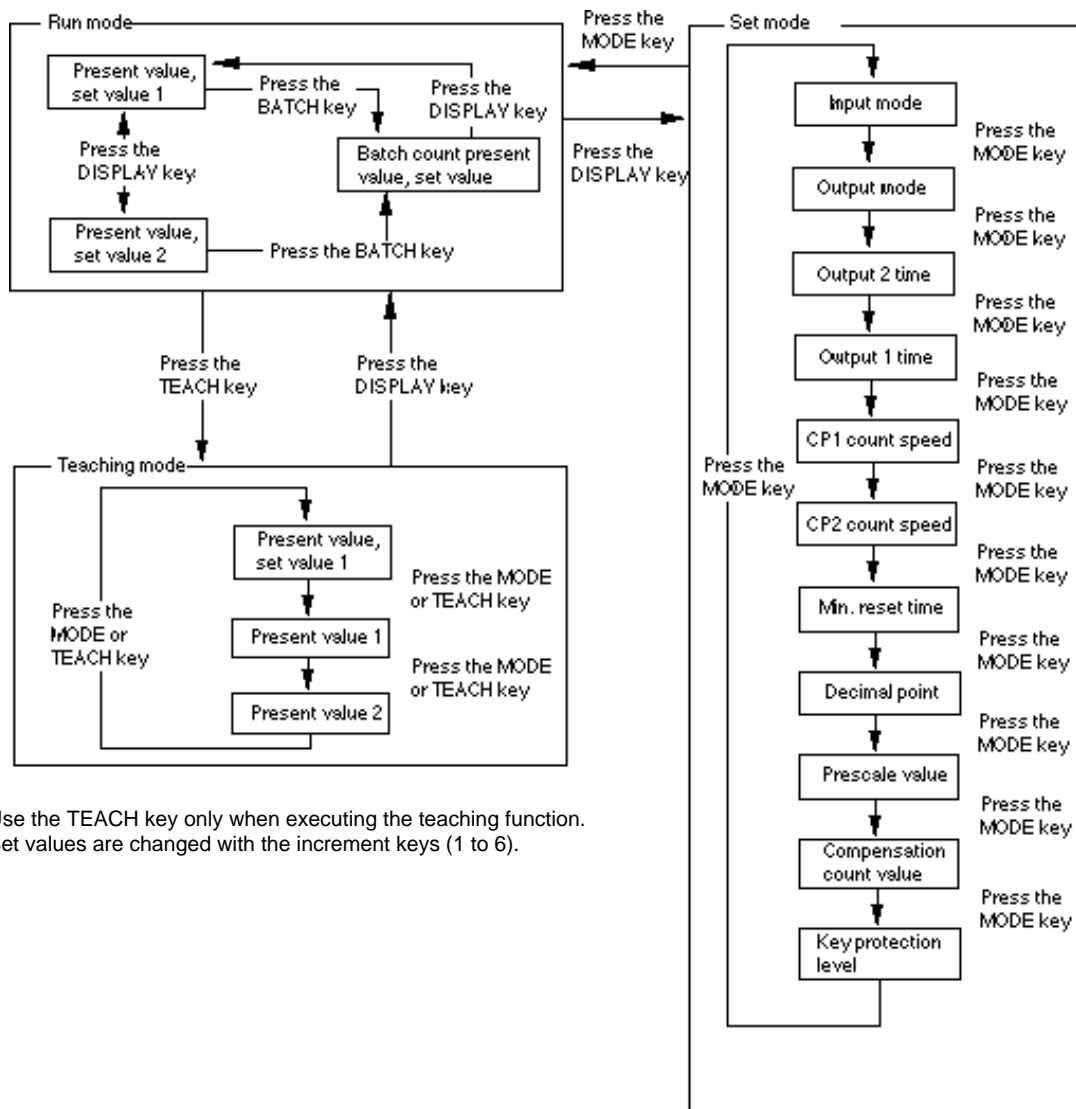
## ■ FACTORY SETTINGS

The following data is set at the factory. Be sure to make any setting changes before operating the counter. Setting and display changes 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.

Model	H7BR-B (standard)	H7BR-C (+/- range)
Present count	0	0
Presets	0	0
Batch count	0	Not applicable
Batch count preset	0	Not applicable
Input mode	Up	Reversible C (phase difference)
Output mode	N	K
Output 2 time	Hold	1,000 ms
Output 1 time (2-stage only)	Hold	1,000 ms
CP1 and CP2 counting speeds	30 cps	30 cps
Min. reset time	20 ms	20 ms
Decimal point	Far right (no fractions)	Far right (no fractions)
Scale factor	1,000	1,000
Compensation	Not applicable	0
Key protection level	KP-1	KP-1

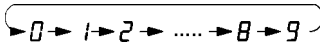
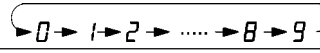
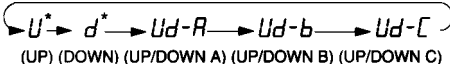
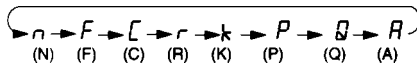
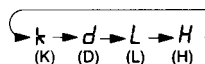
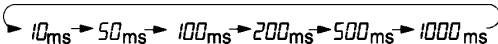
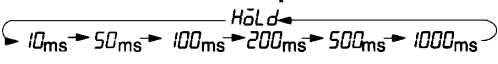
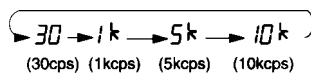
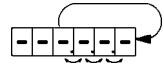
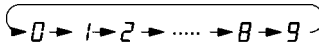
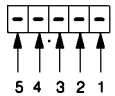
OPERATIONAL OVERVIEW

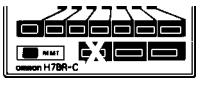
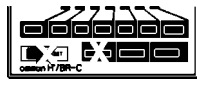




Note: 1. Use the TEACH key only when executing the teaching function.  
 2. Set values are changed with the increment keys (1 to 6).



## SETTING ITEM TABLE

Mode	Setting item	Applicable model		Description	Setting procedure
		H7BR-B	H7BR-C		
Run mode	Set value 1, 2	Yes	Yes	Compared to the present value. Determines the timing of the control output according to the output mode. The DISPLAY key switches between set value 1 and 2. (Double preset model only.)	Sequence when changing a digit using the increment keys (1 to 6).  The +/- key changes the set value mark. (H7BR-C only.) (+) ← → (-)
	Batch count set value	Yes	No	Turns ON the batch output when the preset number of cycles have been completed.	Sequence when changing a digit using the increment keys (1 to 6). 
Set mode	Input mode	Yes	Yes	Determines the input mode selecting from UP, DOWN and REVERSIBLE modes.	Press keys 1 to 6 to change the displayed mode.  (UP) (DOWN) (UP/DOWN A) (UP/DOWN B) (UP/DOWN C) *H7BR-B only.
	Output mode	Yes	Yes	Determines the control output type. (Refer to the <i>Standard Counter Output Operations</i> and <i>Reversible +/- Range Counter Output Operation</i> sections.) Determines the output time for control output (Output 2).	Press keys 1 to 6 to change the displayed mode. H7BR-B  (N) (F) (C) (R) (K) (P) (Q) (A) H7BR-C  (K) (D) (L) (H) Double preset model only. Press keys 1 to 6 to change the Output 2 time. (Applicable to output modes C, R, K, P, Q and A only.) 
	Output time 1 (double preset model only)	Yes	Yes	Determines the output time of the control output (OUT 1) for double preset model counters.	Press keys 1 to 6 to change the displayed mode.  *H7BR-BW only. Applicable to output modes C, R, K, P, Q and A only.
	CP1, CP2 count speed	Yes	Yes	Switches the count input filter to protect against errant counts due to interference.	Press keys 1 to 6 to change the displayed mode.  (30cps) (1kcps) (5kcps) (10kcps) The counting speed of CP1 or CP2, whichever is faster, is set by the response speed of the gate and compensation inputs, when the input mode is set to REVERSIBLE C, make the counting speeds of CP1 and CP2 equal.
Min. reset time	Yes	Yes	Determines the initial signal width of the external reset.	Press keys 1 to 6 to change the displayed mode. (1 ms) ! ← → 20 (20 ms)	
Decimal point	Yes	Yes	Determines the decimal point position of the present and set values.	Move the decimal point position from left to right with keys 1 to 6. 	
Prescale value	Yes	Yes	Can calculate and display a physical parameter (volume, length, etc.) from the present value. For example, if one count input represented a movement of 0.02 mm, the prescale value would be 0.02. Values from 0.001 to 99.999 are possible.	Change the value of the digits with the corresponding keys, 1 to 5.  	

Mode	Setting item	Applicable model		Description	Setting procedure
		H7BR-B	H7BR-C		
Set mode (cont'd.)	Compensation count value	No	Yes	The present value is changed to the set value on receipt of the compensation input.	<p>Change the value of the digits with the corresponding keys, 1 to 6.</p> <p><math>0 \rightarrow 1 \rightarrow 2 \rightarrow \dots \rightarrow 8 \rightarrow 9</math></p> <p>The +/- key changes the set value mark. (+) <math>\leftrightarrow</math> (-)</p>
	Key protection level	Yes	Yes	Blocks certain keys to prevent accidental operation. The key protection level, kP-1 to kP-4, determines which keys are locked when the key protection input is ON. The locked keys are crossed out in the diagram on the right.	<p>Sequence when changing the key protection level using the increment keys (1 to 6).</p> <p><math>kP-1 \rightarrow kP-2 \rightarrow kP-3 \rightarrow kP-4</math></p> <p>&lt;KP-1&gt;</p>  <p>H7BR-C <del>TEACH</del></p> <p>&lt;KP-2&gt;</p>  <p>H7BR-C <del>TEACH</del></p> <p>&lt;KP-3&gt;</p>  <p>H7BR-C <del>TEACH</del></p> <p>&lt;KP-4&gt;</p>  <p>H7BR-C <del>TEACH</del></p>
Teaching mode	Prescale value	No	Yes	—	Press TEACH key to set prescale value automatically.
	Set value 1 (double pre-set model only)	No	Yes	—	Press TEACH key to set present value as the set value.
	Set value 2	No	Yes	—	

- Note:
- Changes made in set mode become effective when run mode is entered.
  - The control output is inhibited in the teaching mode.
  - The TEACH key and the teaching function do not operate during power interruptions, but other functions are not affected.

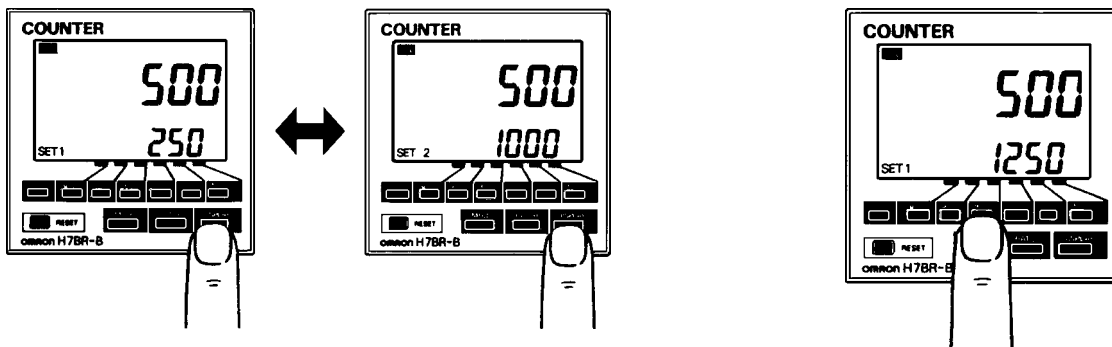
■ EXAMPLES

Run Mode

Changing the Set Value

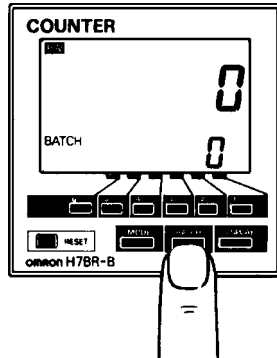
- Press the DISPLAY key to change the displayed preset value 1 and 2 during operation

- Change the set value from 250 to 1,250.
  - Press keys 1 through 6 to increment the corresponding column by 1.
  - Nonsignificant zeros are normally not shown on the set value display.



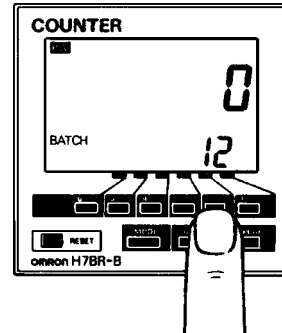
### Changing the Batch Count Set Value

1. Press the BATCH key to switch from the present value display to the batch count display.



2. Change the set value when the counter is set to the batch count display.

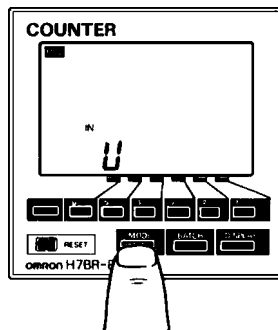
- Nonsignificant zeros are normally not shown on the batch count set value display.
- Press the DISPLAY key to switch back from the batch count display to the present value display.



## Set Mode

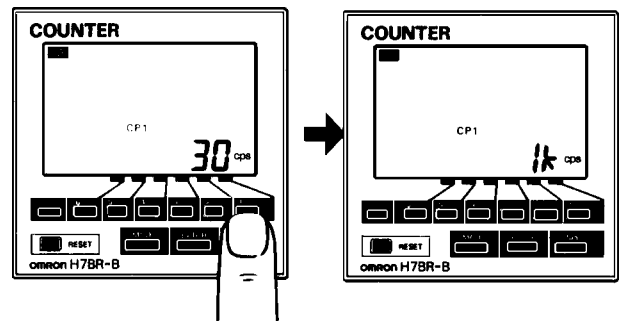
### Changing Settings in the Set Mode

1. Press the MODE key to switch from run mode to set mode.
  - The counter will continue operation if switched from run mode to set mode during operation.
  - The MODE key will be locked if the key protect function is enabled.
  - Settings changed in the set mode do not become effective until the run mode is entered. Because the operating conditions change once this occurs, always use the RESET key or a reset input to reset operation.



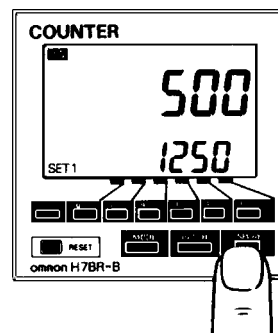
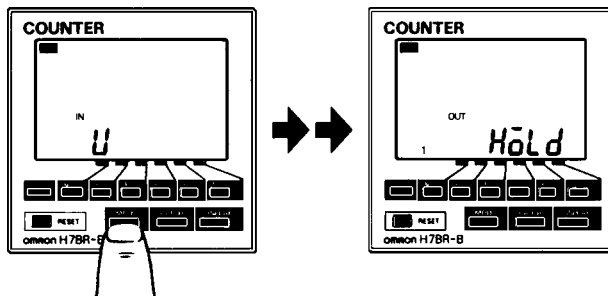
3. Changing the selected item:

- Press the MODE key until the desired item appears.
- Change the item setting by pressing keys 1 through 6. (Press the DISPLAY key to switch back from set mode to run mode.)



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

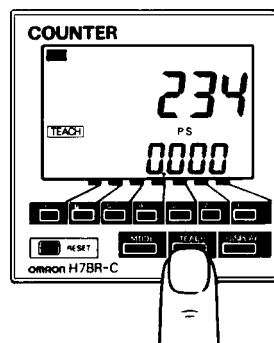
- Press the DISPLAY key to return to run mode from set mode.



## Teaching Mode

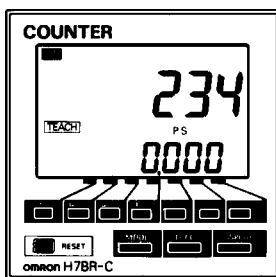
### Changing to the Teaching Mode

1. Press the TEACH key to switch from run mode to teaching mode.
2. When prescale teaching is not used, press MODE key to continue *teaching for the set value 1* (see next page).

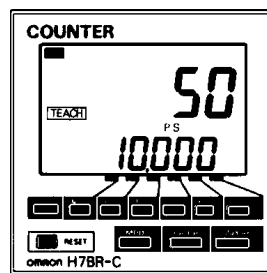


### Teaching for the Prescale Value

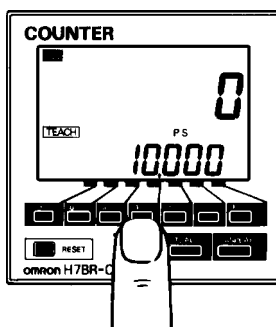
1. Set value can be set in the teaching mode.
  - 0.000 is displayed on the setting position.



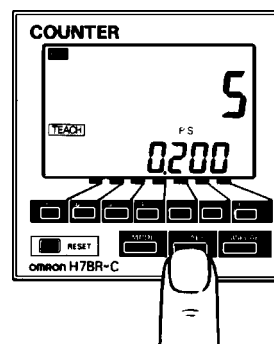
3. Input the count signal of the converted value from external sensor.
  - The display to the right indicates that the controlled object has been moved 10 cm, causing 50 counts to be input from an external sensor.



2. Sequence when changing a digit using the increment keys (1 to 6).
  - Displays 0 when pressing one key from the increment keys.



4. Press TEACH key to set the set value. (Set value  $0.2 = 10\text{cm}/50$ ).
  - If the value input in example 3 is negative, the prescale value will be calculated using the absolute value.
  - The prescale value is rounded off to four significant digits.
  - Prescale value is displayed by teaching while pressing the TEACH key.

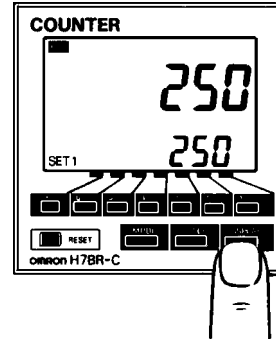
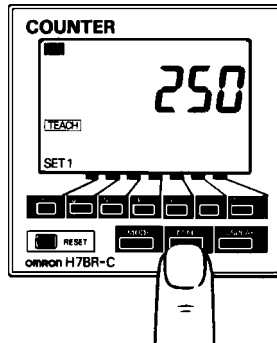


**Teaching for the Set Value 1**

1. Press the MODE key to teach for set value 2 (on double preset model only).
2. Input the count signal from external sensor.
3. Press the TEACH key to register the present count value as the set value.
  - The set value is displayed by teaching while pressing the TEACH key.

Teaching for the Set Value 2 (double preset model only)

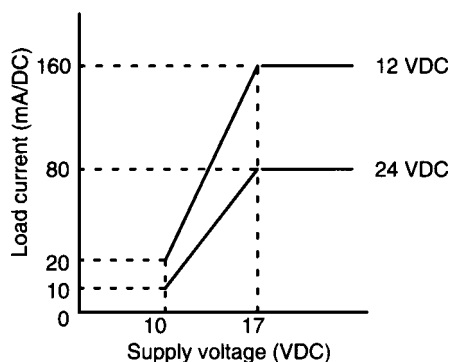
- Set the same operation as before. (Press the DISPLAY key to return from teaching mode to run mode.)

**REPLACING AN H7AN WITH AN H7BR**

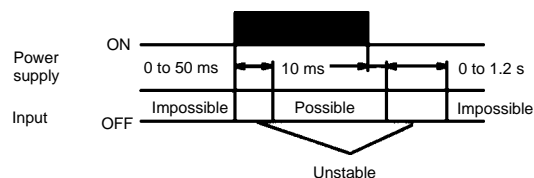
Difference	H7AN	H7BR
First and second outputs of double preset model	H7AN-WE executes the first output followed by the second output. The order of first and second outputs executed by H7AN-W depends on the first and second output set values; whichever is closer to the primary counting value takes precedence, and the corresponding output is executed first.	First and second outputs are executed in no particular order by H7BR.
Reset operation at SET = 0	Outputs when reset input is OFF.	No output is made when reset input is OFF.
Reversible D, E, and F input modes	Yes	No. (Possible to compensate the count value with compensation input.)
Permissible limits of count speed	Up to 505 over setting, e.g., 50 cps for 30 cps counting speed	Limited to 10% max. over setting
One-shot output time	Approximately 0.1 to 1 s	10 to 1,000 ms
Contact form of single preset models	SPDT	SPST-NO

**Precautions****EXTERNAL POWER SUPPLY**

The capacity of the power supply from the counter is 160 mA at 12 V or 80 mA at 24 V. For models with 24 VAC/12 to 24 VDC specifications, loads must be established between the following limits.

**POWER SUPPLIES**

An unstable region is generated whenever the power supply is turned on or off. Although these regions vary depending on the power supply voltage and load conditions, they will fall within the limits shown below.



A switching regulator is used in the counter's internal circuits, causing rush current to flow when power is turned on. If the capacity of the power supply to the counter is insufficient, the counter may not start operation. Be sure the power source meets the current consumption requirements of the counter. Connect the power supply voltage through a relay or switch in such a way that the voltage reaches a fixed value immediately.

## ■ 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 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 organize solvents (e.g., paint thinner or benzene),

## ■ SELF-DIAGNOSTIC FUNCTIONS

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

Display	Error	Output status	Correction	Function setting
-----*	Present value below min.	No change	Press RESET key or reset input	No change
FFFFFF **	Present value above max.			
E1	CPU	OFF	Press RESET key	Set at the factory
E2	Memory			

\*Displayed when the present value has fallen below the minimum value in the H7BR-C  $\pm$ (range type).

\*\*Displayed when the present value has exceeded the maximum value in the H7BR-C  $\pm$ (range type)

## ■ USING THE SCALING FUNCTION

When setting the scale value, be sure that the set value satisfies this equation: set value "max. value – scale value." (If the scale value is 1,250, then  $999.999 - 1,250 = 998,749$  max.)

## ■ CHANGING SET VALUES

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 incrementing a higher digit to a large number.

## ■ 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 output 1, 2	30 cps	18 to 24 ms
	1 kcps	4.7 to 5.8 ms
	5 kcps	4.4 to 5.4 ms
	10 kcps	4.3 to 5.3 ms
Transistor output 1, 2	30 cps	13.5 to 20 ms
	1 kcps	0.59 to 0.81 ms
	5 kcps	0.29 to 0.44 ms
	10 kcps	0.24 to 0.36 ms
Batch output	30 cps	13.6 to 20.2 ms
	1 kcps	0.72 to 0.94 ms
	5 kcps	0.42 to 0.57 ms
	10 kcps	0.37 to 0.49 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.

## ■ BATCH COUNTER MAXIMUM COUNTING SPEED

The maximum counting speed of the batch counter is 1 kcps. The batch counter counts the number of completed counts to the set value for single preset models and to the set 2 value for double preset models. Operate with a count taking at least 1 ms.

## ■ 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.

The counter contains a non-replaceable lithium battery, and must not be incinerated. Dispose of the counter as a non-combustible item.

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

# OMRON

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