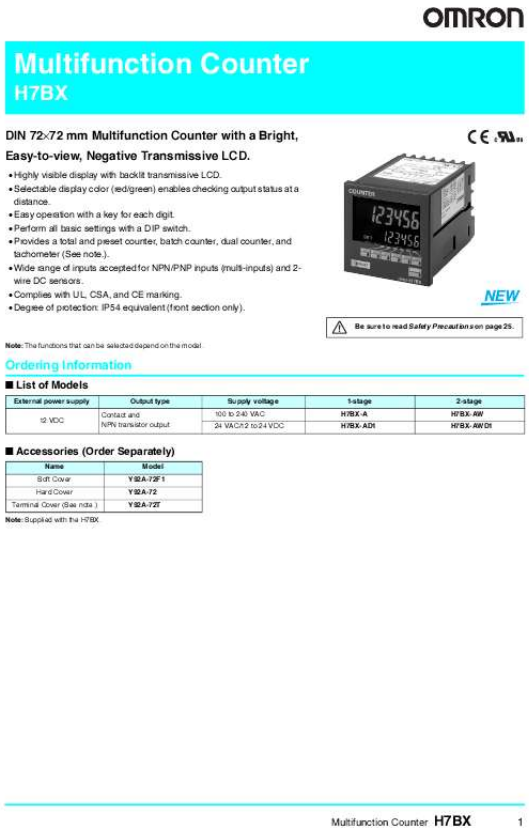

OMRON

Multifunction Counter
H7BX

DIN 72×72 mm Multifunction Counter with a Bright, Easy-to-view, Negative Transmissive LCD.

- Highly visible display with backlit transmissive LCD.
- Selectable display color (red/green) enables checking output status at a distance.
- Easy operation with a key for each digit.
- Perform all basic settings with a DIP switch.
- Provides a total and preset counter, batch counter, dual counter, and tachometer (See note.).
- Wide range of inputs accepted for NPN/PNP inputs (multi-inputs) and 2-wire DC sensors.
- Complies with UL, CSA, and CE marking.
- Degree of protection: IP54 equivalent (front section only).

NEW

⚠ Be sure to read *Safety Precautions* on page 25.

Note: The functions that can be selected depend on the model.

Ordering Information

■ List of Models

External power supply	Output type	Supply voltage	1-stage	2-stage
12 VDC	Contact and NPN transistor output	100 to 240 VAC	H7BX-A	H7BX-AW
		24 VAC/12 to 24 VDC	H7BX-AD1	H7BX-AWD1

■ Accessories (Order Separately)

Name	Model
Soft Cover	Y92A-72F1
Hard Cover	Y92A-72
Terminal Cover (See note.)	Y92A-72T

Note: Supplied with the H7BX.

Manual abstract:

· Perform all basic settings with a DIP switch. @@@@· Complies with UL, CSA, and CE marking. · Degree of protection: IP54 equivalent (front section only). Be sure to read Safety Precautions on page 25. Note: The functions that can be selected depend on the model. Ordering Information List of Models External power supply 12 VDC Output type Contact and NPN transistor output Supply voltage 100 to 240 VAC 24 VAC/12 to 24 VDC 1-stage H7BX-A H7BX-AD1 2-stage H7BX-AW H7BX-AWD1 Accessories (Order Separately) Name Soft Cover Hard Cover Terminal Cover (See note.) Note: Supplied with the H7BX. Model Y92A-72F1 Y92A-72 Y92A-72T Multifunction Counter H7BX 1 Specifications Ratings Item Type Supported configurations Power supply voltage (See note 2.) Ratings Model Preset counter 1-stage preset counter, total and preset counter (See note 1.) (selectable) · 100 to 240 VAC (50/60 Hz) · 24 VAC (50/60 Hz)/12 to 24 VDC (ripple 20% max.

) H7BX-A/AW: 9.6 VA max. (100 to 240 VAC) H7BX-AD1/AWD1: 8 VA max. (24 VAC), 5.3 W max.

(12 to 24 VDC) Flush mounting Screw terminals IP54 (front section only) CP1, CP2, reset 1, reset 2, key protection 30 Hz or 5 kHz (selectable, ON/OFF ratio 1:1), setting for both CP1 and CP2 Increment, decrement, command (UP/DOWN A), individual (UP/DOWN B), quadrature (UP/DOWN C) N, F, C, R, K-1, P, Q, A, K-2, D, L 0.01 to 99.99 s External reset (minimum reset input signal width: 1 ms or 20 ms selectable), manual reset, and automatic reset (internal according to C, R, P, and Q mode operation) ----------Yes (0.001 to 99.999) Yes (rightmost 3 digits) 290 ms max.

(Control output is turned OFF and no input is accepted during sensor waiting time.) Response speed: Approx. 1 s No-voltage NPN input (fixed) Short-circuit (ON) impedance: 1 k max. (Leakage current at 0 : Approx. 12 mA) Short-circuit (ON) residual voltage: 3 V max. Open (OFF) impedance: 100 k min. No-voltage NPN input or voltage PNP input (selectable) No-voltage input Short-circuit (ON) impedance: 1 k max. (Leakage current at 0 : Approx. 12 mA) Short-circuit (ON) residual voltage: 3 V max. Open (OFF) impedance: 100 k min.

Voltage input High level: 4.5 to 30 VDC Low level: 0 to 2 VDC Input resistance: Approx. 4.7 k 12 VDC (±10%), 100 mA (For details, refer to External Power Supply on page 26.) Contact output: 3 A at 250 VDC/30 VDC, resistive load (cos = 1) Minimum applied load: 10 mA at 5 VDC (Failure level: P, reference value) Transistor output: 100 mA max. at 30 VDC max. Residual voltage: 1.5 VDC max. (approx. 1 V) Leakage current: 0.

1 mA max. Backlit 7-segment negative transmissive LCD Character Heights PV: 13.5 mm (red/green) SV: 9 mm (green) 6 digits -99,999 to 999,999 (5 digits negative and 6 digits positive) 6 digits Counter: -99,999 to 999,999 (5 digits negative and 6 digits positive) Tachometer: 0 to 999,999 (6 digits) Periodic measurement (Sampling period: 200 ms) 30 Hz or 10 kHz (selectable) 30 Hz: 0.01 to 30.00 Hz 10 kHz: 0.

01 Hz to 10 kHz ±0.1% FS ±1 digit max. (at 23 ±5°C) Upper and lower limits, area, upper limit, lower limit 0.1 to 99.9 s 0.

0 to 99.9 s OFF/2/4/8 times N, F, C, R, K-1, P, Q, A, K-2, D, L, H H7BX-A/AD1 H7BX-AW/AWD1 Preset counter/tachometer 1-stage preset counter, 2-stage preset counter, total and preset counter (See note 1.), batch counter, dual counter, tachometer (selectable) Operating voltage range 85% to 110% of rated supply voltage (90% to 110% at 12 VDC) Power consumption Mounting method External connections Degree of protection Input signals Max. counting speed Input modes Counter Output modes One-shot output time Reset input Pulse measurement method Max. counting speed Measuring ranges Tachometer Measuring accuracy Output modes Auto-zero time Startup time Average processing Prescaling function Decimal point adjustment Sensor waiting time Key protection input Input method (except key protection input) External power supply Control output Display (See note 3.) Digits Memory backup Ambient operating temperature Ambient storage temperature Ambient operating humidity Case color Accessories EEPROM (Overwrites: 100,000 min.), Data storage: 10 years min. -10 to 55°C (with no icing) -25 to 65°C (with no icing) 25 to 85°C (with no condensation) Black (N1.5) Two flush-mounting adapters, terminal cover Two flush-mounting adapters, terminal cover, DIP switch setting stickers Note 1. The total and preset counter functions as a 1-stage preset counter and total counter.

2. Do not use an inverter output for the power supply. 3. Displayed only when the power is ON. Not displayed when the power is OFF. 2 Multifunction Counter H7BX Characteristics Insulation resis- 100 M min. (at 500 VDC) between current-carrying terminal and exposed nontance current-carrying metal parts, and between non-continuous contacts Between current-carrying metal parts and non-current-carrying metal parts: 2,000 VAC, 50/60 Hz for 1 min Between power supply and input circuit: 2,000 VAC, 50/60 Hz for 1 min (for models other than the H7BX-A@D1) 1,000 VAC, 50/60 Hz for 1 min (H7BX-A@D1) Between control output, power supply, and input circuit: 2,000 VAC, 50/60 Hz for 1 min Between non-continuous contacts: 1,000 VAC, 50/60 Hz for 1 min Between power terminals: 3.0 kV (1.0 kV for 24 VAC/12 to 24 VDC models) Between current-carrying terminal and exposed non-current-carrying metal parts: 4.5 kV (1.

5 kV for 24 VAC/12 to 24 VDC models) Between power terminals: ±1.5 kV Between input terminals: ±600 V Square-wave noise by noise simulator (Pulse width: 100 ns/1 µs, 1-ns rise) Malfunction: 8 kV Destruction: 15 kV Destruction: 10 to 55 Hz, 0.75-mm single amplitude for 4 cycles each in 3 directions (8 min/cycle) Malfunction: 10 to 55 Hz, 0.50-mm single amplitude for 4 cycles each in 3 directions (8 min/cycle) Destruction: 294 m/s2 3 times each in 6 directions Malfunction: 98 m/s2 3 times each in 6 directions Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min.

(3 A at 250 VAC/30 VDC, resistive load) (See note.) Approx. 250 g Electrical Life Expectancy (Reference Values) Resistive Load No. of operations (×103) 1,000 700 500 Dielectric strength 300 30 VDC (cos=1) Impulse withstand voltage Noise immunity 100 70 50 0 250 VAC (cos=1) Static immunity 1 2 3 4 Vibration resistance Shock resistance Life expectancy Weight Load current (A) Inductive Load No. of operations (×103) 1,000 700 500 300 30 VDC (L/R=7 ms) Note: Check the electrical life expectancy curve.

Applicable Standards Approved cURus: UL 508, CSA C22.2 No. 14 EN 61010-1 (IEC 61010-1): Pollution degree 2/overvoltage category II; safety standards EN 61326; VDE 0106 Part 100 EN 61326 EN 55011 Group 1 class A EN 55011 Group 1 class A EN 61326 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: 3 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 (relay outputs)); 2 kV line to ground (power and output lines (relay outputs)) Immunity Voltage Dip/Interruption: EN 61000-4-11: 0.5 cycle, 100% (rated voltage) (EMI) Emission Enclosure: Emission AC mains: (EMS) Immunity ESD: 100 70 50 0 250 VAC (cos=0.4) 1 2 3 4 Load current (A) A current of 0.15 A max. can be switched at 125 VDC (cos = 1) and current of 0.1 A max. can be switched with L/R = 7 m/s.

In both cases, a life of 100,000 operations can be expected. EMC Multifunction Counter H7BX 3 I/O Functions Using as a Counter (See note 1.) (1) All Modes Except for Dual Counter Mode · Reads count signals. · Increment, decrement, up/down (command, individual, or quadrature) inputs can be used. (2) Dual Counter Mode · Reads CP1 count signals on CP1 input and CP2 count signals on CP2 input. · Increment signals can be used. (1) All Modes Except for Dual Counter Mode · Resets present value and outputs (OUT2 when using the batch counter). (See note 2.) · Counting cannot be performed while resetting or when reset 1 input is ON. · The reset indicator is lit while the reset input is ON.
(2) Dual Counter Mode · Resets the CP1 present value to 0. · Counting the 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 operation depends on the selected function. (See note 3.
) When the corresponding set value is reached, signals are output according to the designated output mode. Using as a Tachometer CP1, CP2 Inputs Reset 1, Reset 2 Reads counting signals. (CP2 input is not available.) · Holds the measurement value and outputs. (Reset 2 input is not available.
) · The reset indicator is lit during hold. Outputs signals according to the specified output mode when a set value is reached. CP1, CP2 Inputs Reset or Reset 1 Outputs OUT1, 2 Total Reset or Reset 2 Outputs OUT1, 2 Using as a Counter or Tachometer Key protection input · Prohibits using the keys on the front panel. · Set the key protection level in function selection mode. Note 1. Refer to pages 14 to 17 for information on the operation of input and output functions. 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. The reset indicator will not be lit when the total reset or reset 2 input is ON.

Function Reset operation · Resets the total count value. · Holds the total count value at 0 while the total reset input is ON. · Resets the batch count value and batch output (OUT1). · Holds the batch count value at 0 while the reset 2 input is ON. · Resets the CP2 present value. · Counting for CP2 input is disabled while the reset 2 input is ON. Note: For details, refer to page 24. 1-stage/2-stage preset counter Does not operate (Not used). Total and preset counter Batch counter Dual counter 4 Multifunction Counter H7BX Connections Terminal Arrangement Confirm that the power supply meets specifications before using the H7BX. H7BX-A Output COM Reset 1 Reset 2 CP2 CP1 12 VDC H7BX-AW 12 VDC Output COM 17 18 7 Unused.
Output COM 17 18 7 Reset 1 Reset 2 5 Reset 2 5 CP2 CP1 0V 8 9 0V 8 9 10 11 12 13 14 10 11 12 13 14 (-) Unused. 15 External power supply (+) 17 Unused. Unused. 15 (-) External power supply (+) OUT1 OUT2 Key protection OUT 16 OUT 1 2 3 4 5 Unused. 6 Unused.
7 Unused. 18 Key protection 16 OUT2 1 2 3 4 OUT1 6 H7BX-AD1 Output COM Reset 1 Reset 2 CP1 CP2 12 VDC H7BX-AWD1 Reset 1 CP2 CP1 12 VDC 0V 8 9 0V 8 9 10 11 12 13 14 10 11 12 13 14 (-) Unused. 15 External power supply (+) 17 Unused. Unused. 15 (-) External power supply (+) OUT1 OUT2 Key protection OUT 16 OUT 1 2 3 4 5 Unused.
6 Unused. 7 Unused. 18 Key protection 16 OUT2 1 2 3 4 OUT1 6 Unused. (-) (+) (-) (+) Note: Do not use the unused terminals for relay connections. Block Diagram (Basic insulation) Output circuit (Basic insulation) Display circuit Input circuit Internal control circuit Key switch circuit Power supply circuit CP1, CP2, Reset/Reset 1, and Total Reset/Reset 2 Input +14 V 1 k IN Internal circuit Input Circuits Note: The circuit shown above is for no-voltage input (NPN input). Multifunction Counter H7BX 5 Input Connections A no-voltage input (short-circuit or open) or voltage input can be selected for each input. (The key protection input is always a no-voltage input (NPN input)). No-voltage Inputs (NPN Inputs) Open Collector PLC or sensor Voltage Output Sensor Contact Input DC Two-wire Sensor 0-V input CP2 input Reset/reset 1 input CP1 input Total reset/reset 2 input Key protection input 0-V input CP2 input Reset/reset 1 input CP1 input 0-V input CP2 input Key pro. Lot No. XX XX MADE X IN CHINA X E Set Value (Sub-display) Switches L DIP Switch 1 2 3 4 5 6 7 8 H7B X-A L OFF (Unit: mm) 67.

6 × 67.6 Note: M3.5 terminal screws (effective length: 6 mm). Panel Cutouts Panel cutouts are as shown below M3.5 terminal screw (according to DIN 43700). (effective length: 6 mm) 100 min. 68+0.7 -0 69 × 69 68+0.7 -0 82 min. Note: The mounting panel thickness must be 1 to 5 mm.
Hard Cover Y92A-72 Terminal Cover (See note.) Y92A-72T (VDE0106/T100) Note: Supplied with the H7BX. Multifunction Counter H7BX 7 Operating Procedures Setting Procedure Guide Settings for Counter Operation (1-stage/2-stage Counter, Total and Preset Counter, Batch Counter, Dual Counter) Using Basic Settings Only Basic Settings · Counting speed (30 Hz, 5 kHz) · Input mode (UP, DOWN) · Output mode (N, F, C, K-1) · One-shot output time (0.5 s, 0.05 s) · Reset input signal width (20 ms, 1 ms) · NPN/PNP input mode (NPN, PNP) The settings can be made easily with the DIP switch.
For details on the setting methods, refer to page 9. 1 ON 2 3 4 5 6 7 8 OFF Using Input Modes Not Given Above (Up/Down A, Up/Down B, Up/Down C) , Output Modes (R/P/Q/A/K-2/D/L/H), or (OUT2) Output Time Performing Advanced Settings: Dual Count Calculating Mode, Output 1 Time, Decimal Point Position, Prescale Value, Display Color, or Key Protect Level Set all functions with the operation keys. For details on the setting methods, refer to page 10. Settings other than the basic functions above can be performed with the operation keys. For details on the setting methods, refer to page 10.
Note: The default setting is for a 1-stage preset counter.

(For models with a 2-stage setting, the default is a 2-stage preset counter.) Setting for Tachometer Operation (H7BX-AW@ only) Using Basic Settings Only Basic Settings · Counting speed (30 Hz, 10 kHz) · Output mode (HI-LO, AREA, HI-HI, LO-LO) · Average processing (OFF, 2, 4, 8 times) · NPN/PNP input mode (NPN, PNP) The settings can be made easily with the DIP switch. For details on the setting methods, refer to page 19. 1 ON 2 3 4 5 6 7 8 OFF Performing Advanced Settings: Decimal Point Position, Prescale Value, Auto-zero Time, Startup Time, Display Color, or Key Protect Level Settings other than the basic functions above can be performed with the operation keys. For details on the setting methods, refer to page 20. Note: The default setting is for a 2-stage preset counter. 8 Multifunction Counter H7BX Operating Procedures (Counter Function) Settings for Basic Operations Settings for basic functions can be performed with just the DIP switch. Be sure to turn ON pin 1 when using the DIP switch. 1 ON 2 3 4 5 6 7 8 OMRO N Corpor ation Item 1 2 3 4 5 6 7 8 DIP switch settings enable/disable Counting speed Input mode Output mode One-shot output time (See note.

) Reset input signal width NPN/PNP input mode Note: All the pins are factory-set to OFF. The ON/OFF status of the DIP switch pins can be confirmed using the front display. For details, refer to page 23. Caution · Always turn OFF the power supply before changing the DIP switch settings. · Always turn ON pin 1 when performing settings with the DIP switch. Performing settings with the DIP switch is disabled when pin 1 is OFF. · DIP switch setting changes will be updated when the power is turned ON. Perform the settings before performing installation and supplying power. · Properly set the DIP switch to match the item being counted (or measured) and use the DIP switch monitor for confirmation. · Use the keys on the front panel to perform all settings for input modes, output modes, and output times that cannot be set with the DIP switch.

For details on the setting methods, refer to page 10. When performing these settings, always turn OFF pin 1(DIP switch setting) (disabled). Using the H7BX as a Total and Preset Counter, Batch Counter, or Dual Counter The default setting is for a 1-stage preset counter. (For models with a 2-stage setting, the default is for a 2-stage preset counter.) To make changes, use the procedure shown on the right.

For details, refer to page 23. Power ON Hold down the Key and press the Up 1 Key for at least 1 s. The mode will not change if the Up 1 Key is pressed first. Note: This includes using a model with a 2-stage setting as a 1-stage preset counter. After setting the DIP switch for basic operations, advanced functions (see note) can be added using the operation keys.

For details, refer to page 10. Note: Advanced functions consist of dual count calculating mode, output 1 time, decimal point position, prescale value, display color, and key protect level. COU NTE R Lot No. XX XX MADE X IN CHINA X H7B X-A OFF OFF Disabled 30 Hz UP (increment) ON Enabled 5 kHz DOWN (decrement) 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 (no-voltage) 0.05 s 1 ms PNP (voltage) nt enie onv ction Cn Fu Configuration selection mode Run mode Configuration selection Key + Up 1 Key for at least 1 s (See note.) Select the configuration using the Up Key. (The configurations that can be selected depend on the model.) (1-stage preset counter) (2-stage preset counter) (Total and (Batch counter) preset counter) (Dual counter) (Tachometer) Multifunction Counter H7BX 9 When using the H7BX as a Total and Preset Counter, Batch Counter, or Dual Counter, switch the configuration using the procedure on page 23.

Setting Advanced Functions Settings that cannot be performed with the DIP switch are performed with the operation keys. Power ON Run mode For details on operations and display in run mode, refer to page 12. The display depends on the configuration used. See note 1. 3 s min. See note 2. 3 s min. Note: 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, turn OFF pin 1 of the DIP switch (factory setting). If pin 1 of the DIP switch is ON, the setting items indicated by will not be displayed.

See note 3. Note 3: When using as a dual counter Input mode (CNTM) · Set the input mode with any of the See note 5. See note 5. Up Keys. Dual count calculating mode (ADD) · Set the dual count calculating mode the Up Key.

See note 4. (UP) (DOWN) (UP/DOWN A) (UP/DOWN B) (UP/DOWN C) Note 5: Displayed for output modes other than K-2, D, L, and H only. Output mode · Set the output mode with any of the (OUTM) (N) See note 7. (F) (C) (R) (K-1) (P) (Q) (A) Up Keys. See note 6. See note 6. See note 6. See note 6. (Addition)(Subtraction) Note 4: Displayed only when the output mode is K-2, D, L, or H. (K-2) (D) (L) (H) Up Note 6: For models with a 2-stage setting, the input mode is displayed only when an Up/Down Mode is selected.

Note 7: Set the number for each digit with the 2-stage Preset Counter Output 2 time (OTM2) Keys. Output time (OTIM) · Set the number for each digit with the Up Keys. (0.01 s) (0.50 s) (99.99 s) (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. Counting speed (CNTS) Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2.

Output 1 time (OTM1) · Set the counting speed with any of the Up Keys. (Outputs held) (0.01 s) (99.99 s) If the output time is 0.00, hold is displayed. (30 Hz) (5 kHz) Function setting mode Min. reset period (IFLT) · Set the min. reset input signal width with any of the Up Keys. Batch Counter Output 2 time (OTM2) Note 1: Displayed for output modes other than D, L, and H. Note 2: HOLD cannot be set when the output mode is K-2.

(20 ms) (1 ms) Decimal point · Set the decimal point position with any of the Up Keys. position (DP) No decimal point One digit after decimal point Two digits after decimal point Up (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. Three digits after decimal point Prescale value (PSCL) · Set the number for each digit with the Keys. (0.001) (1.

000) (99.999) NPN/PNP input mode (IMOD) · Set the NPN/PNP input mode with any of the Up Keys.

(NPN input) (PNP input) Up Display color (COLR) · Set the display color with any of the Keys. (Red) (Green) (Redgreen) (Greenred) Up Key Protection Level (KYPT) · Set the key protect level with any of the Keys. (KP-1) (KP-2) (KP-3) (KP-4) (KP-5) 10 Multifunction Counter H7BX Explanation of Functions Settings marked with a star can be performed with 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. 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 13.) · 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 input signals, set the counting speed 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 values (SV1, SV2), total count value, dual count value and dual count set value. · Dual Count Calculating Mode (calm) When the H7BX 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 · Prescale Value (pscl) Pulses input to the counter are converted according to the specified prescale value. Setting range: 0.001 to 99.
999 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 · 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. 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 14.

) · One-shot Output Time (otim) Set the one-shot output time (0.01 to 99.99 s) for the control output. A 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. Use the operation keys if other settings are required. 25 pulses Encoder · One-shot Output 2 Time (otm2) When the H7BX using as a 2-stage counter or batch counter, set the one-shot output time (0.01 to 99.
99 s) for control output (OUT2). A 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.
Use the operation keys if other settings are required. Note: Incorrectly setting the prescale value will result in counting errors. Check that the setting has been performed correctly before using the H7BX. · NPN/PNP Input Mode (imod) Select either NPN input (no-voltage input) or PNP input (voltage input) as the input format. For 2-wire sensors, set the format to NPN input.
The same format setting applies to all external inputs. For information on input connections, refer to page 6. · One-shot Output 1 Time (otm1) When the H7BX using as a 2-stage counter, set the one-shot output time (0.01 to 99.99 s) for control output (OUT1). A oneshot 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) Set the color used for the present value. Output OFF (See note.

) Output ON (See note.) red grn r-g g-r Red Green Red (fixed) Green (fixed) Green Red · 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. Note: When the H7BX using as a 2-stage counter, this is the status of output 2. · Key Protect Level (kypt) Set the key protect level. For details, refer to Key Protect Level on page 24. Multifunction Counter H7BX 11 Operation in Run Mode · Set the number for each digit with the Up Keys. 1-stage Counter Present value Set value 2-stage Counter Present value Set value 1 · Present Value Shows the present count value. · Set Value (Set Value 1, Set Value 2) Set the set value.
When the present value reaches the set value, signals are output according to the specified output mode. Present value Set value 2 Total and Preset Counter Present value Set value · Present Value/Set Value Same as 1-stage counter. · Total Count Value Shows the present total count value. Total count value Batch Counter Present value Set value Batch count value Batch count set value Dual Counter · Present Value/Set Value Same as 1-stage counter. · 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. · Dual Count Value Shows the sum of the CP1 present value and CP2 present value when the dual count Dual count set calculating mode is ADD and shows the value obtained by subtracting the CP2 present value 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 CP1 present value set value, signals are output according to the specified output mode.
CP2 present value · CP1/CP2 Present Value Show the present count values for CP1 and CP2 present values respectively. Dual count value 12 Multifunction Counter H7BX Input Modes and Present Value UP (Increment) Mode CP1: Count input; CP2: Prohibit input H CP1 L A (See note 1.) DOWN (Decrement) Mode CP1: Count input; CP2: Prohibit input H CP1 L A A A H CP2 L Prohibit CP2 H L n 5 4 n-1 n-2 Present value Prohibit Present value 2 1 0 0 3 n-3 n-4 n-5 0 A must be greater than the minimum signal width. (See note 2.) CP1: Prohibit input; CP2: Count input H CP1 L (See note 3.) H CP2 L 5 4 Present value 2 1 0 0 3 A A A must be greater than the minimum signal width. (See note 2.) CP1: Prohibit input; CP2: Present value H CP1 L (See note 3.

) H CP2 L n n-1 n-2 Present value n-3 n-4 n-5 0 A A Prohibit Prohibit A must be greater than the minimum signal width. (See note 2.

) UP/DOWN A: Command Input Mode H CP1 L A A A must be greater than the minimum signal width. (See note 2.) UP/DOWN B: Individual Input Mode H CP1 L H CP2 L H CP2 L 3 Present value 1 0 0 2 2 1 2 3 3 Present value 1 0 0 2 2 1 1 2 3 A must be greater than the minimum signal width. (See note 2.) UP/DOWN C: Quadrature Input Mode H CP1 L BBBB H CP2 L 3 Present value 1 0 0 2 2 1 2 3 Note 1. If the configuration is set to dual counter, CP1 and CP2 inputs 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. Input method Symbol 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.
) Multifunction Counter H7BX 13 Input/Output Mode Settings Operation for 1-stage models is the same as that for OUT2. When using a 2-stage model as a 1-stage counter, total and preset counter, or dual counter, OUT1 and OUT2 turn ON and OFF simultaneously. Input mode UP Reset/ reset 1 999999 Set value 2 Set value 1 0 One-shot output from OUT1 Self-holding output Self-holding output (The one-shot output time can be set in the range 0.01 to 99.99s.
) One-shot output from OUT2 DOWN UP/DOWN A, B, C Operation after count completion N The outputs and present value display are held until reset/reset 1 input turns ON. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 0 F The present value display continues to increase/decrease. The outputs are held until reset/reset 1 input turns ON. OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 0 Output mode setting C 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 count-up. 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. 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 Set value 1 0 R OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 0 K-1 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 14 Multifunction Counter H7BX One-shot output from OUT1 Self-holding output Self-holding output (The one-shot output time can be set in the range 0.01 to 99.99s.) One-shot 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 outputs return to the one-shot start state and 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 one-shot output time, but returns to the reset start status after the one-shot output time has elapsed. 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 0 P OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 0 Output mode setting Q OUT1 OUT2 Reset/ reset 1 999999 Set value 2 Set value 1 0 A The present value display and OUT1 self-holding output is held until reset/ reset 1 input turns ON. OUT1 and OUT2 are independent. OUT1 OUT2 Note 1. When the present value reaches 999999, it returns to 0. 2. Counting cannot be performed while the reset/reset 1 input is ON. 3. If reset/reset 1 input turns ON while the one-shot output is ON, one-shot output turns OFF. 4. If there is power failure while an output is ON, the output will turn ON again when the power supply has recovered. @@5. @@6. @@@@@@@@@@@@@@@@@@Counting cannot be performed while the reset/reset 1 input is ON. 2.

@@3. @@@@4. @@5. @@@@@@The present value is also reset at this time. @@@@@@@@@@@@@@The batch count value is held at 0 while the batch counter reset input is on. 2. If the batch count set value is 0, batch count will be performed but there will be no batch output. 3. The batch count value returns to 0 when it reaches 999,999. 4.
Once batch input has been turned ON, it will return to the ON state after power interruptions. 5. 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. 6. 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) Reset 2 (CP2 reset) Dual count set value Dual count value Dual count value 0 CP1 present value 0 0 CP2 present value 0 CP2 present value 0 CP1 present value 0 (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 · 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 and 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 the outputs turn OFF.
At this time, counting is not possible for CP1 or CP2 inputs. OUT1, 2 Note: The above is for when the output mode is N. OUT1, 2 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 while the reset 1 input is ON. CP2 is not affected. The dual count value will be calculated based on a CP1 present value of 0.

2. Counting is not possible for CP2 while the reset 2 input is ON.

CP1 is not 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. The counting ranges for the CP1 present value and CP2 present value are 0 to 999,999. If a present value exceeds 999,999, FFFFFF will be displayed to indicate an overflow, and all counting will stop. Multifunction Counter H7BX 17 Reset Function List Function Display in run mode Reset/reset 1 Total reset/reset 2 1-stage/2-stage counter Present value/set value (1, 2) Present value and output reset. No effect. Total and preset counter Present value/ set value Total count value Batch counter Present value/ set value Batch count value/batch count set value Dual counter Dual count value/dual count set value CP1 present value/CP2 present value Present value and output reset. Only the total count value is reset.
Present value, total count value, and output reset. Present value and output reset. Batch count value and batch output reset. Present value and output reset. Present value, batch count value, output and batch output reset.
Only the CP1 present value is reset. Only the CP2 present value is reset. CP1 present value, CP2 present value, dual count value, and output reset. Reset Key Present value and output reset. Present value and output reset.
18 Multifunction Counter H7BX Operating Procedures (Tachometer Function) (H7BX-AW@ only) Switching from Counter to Tachometer The H7BX is factory-set to the 2-stage counter configuration. To switch to the tachometer configuration, use the procedure shown on the right. For details, refer to page 23. Configuration selection mode Power ON Run mode Note: Hold down the Key and then press the Up 1 Key for at least 1 s. The mode will not change if the Up 1 Key is pressed first. Configuration selection Key + Up 1 Key for at least 1 s (See note.) Switch from 2cnt to taco (tachometer) with the Up Key. Settings for Basic Operations Settings for basic functions can be performed with just the DIP switch. Be sure to turn ON pin 1. 1 ON 2 3 4 5 6 7 8 OMRO N Corpor ation Item 1 2 3 4 5 6 7 8 DIP switch settings enable/disable Counting speed Tachometer output mode Average processing --NPN/PNP input mode Note: All pins are factory-set to OFF.

The ON/OFF status of the DIP switch pins can be confirmed using the front display. For details, refer to page 23. Caution · Always turn OFF the power supply before changing the DIP switch settings. · Always turn ON pin 1 when performing settings with the DIP switch. Performing settings with the DIP switch is disabled when pin 1 is OFF. · DIP switch setting changes will be updated when the power is turned ON. Perform the settings before performing installation and supplying power. · Properly set the DIP switch to match the item being counted (or measured) and use the DIP switch monitor for confirmation. After setting the DIP switch for basic operations, advanced functions (see note) can be added using the operation keys. For details, refer to page 20.
Note: Advanced functions consist of the decimal point position, prescale value, auto-zero time, startup time, display color, and key protect level. COU NTE R Lot No. XX XX MADE X IN CHINA X H7B X-A OFF OFF Disabled 30 Hz ON Enabled 10 kHz Pin 3 OFF ON OFF Pin 4 OFF OFF ON ON Pin 5 OFF OFF ON ON Tachometer output mode Upper and lower limit Area Upper limit Lower limit Average processing OFF (no average processing) 2 times 4 times 8 times Refer to the table on the right. ON Pin 4 OFF ON OFF ON Refer to the table on the right. --NPN --PNP t nien nve ion Co ct fun Multifunction Counter H7BX 19 When the H7BX using as a tachometer, switch to the tachometer configuration using the procedure given on page 23.
Settings for Advanced Functions Settings that cannot be performed with the DIP switch are performed with the operation keys. Power ON Run mode For details on operations in run mode, refer to page 22. (See note 1.) 3 s min. (See note 2.
) 3 s min. Note: 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 automatically reset (measured values initialized and outputs turned OFF) on returning to run mode. The characters displayed in reverse video are the initial values. When performing settings with operation keys only, turn ON pin 1 of the DIP switch to OFF (factory setting). If pin 1 of the DIP switch is ON, the setting items indicated by will not be displayed. Tachometer output mode (TOTM) · Set the tachometer output mode with any of the Up Keys.

(HI-LO) (AREA) (HI-HI) (LO-LO) Counting speed (CNTS) · Set the counting speed with any of the Up Keys. (30 Hz) (10 kHz) Decimal point position (DP) · Set the decimal point position with any of the Up Keys. (No decimal point) (One digit after decimal point) (Two digits after decimal point) Up (Three digits after decimal point) Prescale value (PSCL) · Set the number for each digit with the Keys. (0.001) (1.000) (99.999) Function setting mode Average processing (AVG) · Set the average processing with any of the Up Keys. (No average processing) (Average (Average (Average of 2 of 4 of 8 measurements) measurements) measurements) Up Auto-zero time (AUTZ) · Set the number for each digit with the Keys. (0.1 s) (99.
9 s) Startup time (STMR) · Set the number for each digit with the Up Keys. (0.0 s) (99.9 s) NPN/PNP input mode (IMOD) · Set the NPN/PNP input mode with any of the Up Keys. (NPN input) (PNP input) Up Display color (COLR) · Set the display color with any of the Keys.
(Red) (Green) (Red-green) (Green-red) Key protect level (KYPT) · Set the key protect level with any of the Up Keys. (KP-1) (KP-2) (KP-3) (KP-4) (KP-5) 20 Multifunction Counter H7BX Explanation of Functions Settings marked with a star can be performed with the DIP switch. · Tachometer Output Mode (totm) Set the output method for control output based on the OUT1/ OUT2 set value. Upper and lower limit (HI-LO), area (AREA), upper limit (HI-HI), and lower limit (LO-LO) can be set. (For details on the operation of the output modes, refer to Output Mode Settings on page 22.
) · Auto-zero Time (avt) It is possible to set the H7BX so that if there is no pulse for a certain time the display is force-set to 0. This time is called the auto-zero time. Set the auto-zero time to a time slightly longer than the estimated interval between input pulses.

It will not be possible to make accurate measurements if the auto-zero time is set to a time shorter than the input pulse cycle. Setting a time that is too long may also result in problems, such as a time-lag between rotation stopping and the alarm turning ON. · Counting Speed (cnts) Set the maximum counting speed (30 Hz/10 kHz) for CP1 input. If contacts are used for input signals, set the counting speed to 30 Hz. Processing to eliminate chattering is performed for this setting. · Startup Time (stmr) In order to prevent undesired output resulting from unstable input immediately after the power supply is turned ON, it is possible to prohibit measurement for a set time. This time is called the startup time.

It can also be used to stop measurement and disable output until the rotating body reaches the normal rate of rotation, after the power supply to the H7BX and rotating body are turned ON at the same time. Display Startup time · Decimal Point Position (dp) Decide the decimal point position for the measurement value, OUT1 set value, and OUT2 set value. · Prescale Value (pscl) It is possible to display the rate of rotation or the speed of a device or machine to which the H7BX is mounted by converting input pulses to a desired unit. If this prescaling function is not used, the input frequency (Hz) will be displayed. The relationship between display and input is determined by the following equation. Set the prescale value according to the unit to be displayed. Displayed value = f × f: Input pulse frequency (number of pulses in 1 second) : Prescale value 1. Displaying the Rotation Rate Display unit rpm rps Prescale value () 1/N × 60 1/N Comparison value (lower limit) Time Power supply Output (lower limit) · NPN/PNP Input Mode (imod) Select either NPN input (no-voltage input) or PNP input (voltage input) as the input format. Select an NPN input when using a 2wire sensor. The same setting is used for all external inputs.
For details on input connections, refer to Input Connections on page 6. N: Number of pulses per revolution Example: In order to display the rate of rotation for a machine that outputs 5 pulses per revolution in the form @@.@ rpm: 1. Set the decimal point position to 1 decimal place. 2.
Using the formula, set the prescale value to 1/N × 60 = 60/5 = 12. 2. Displaying the Speed Display unit m/min m/s Prescale value () d × 1/N × 60 d × 1/N · Display Color (colr) Set the color used for the measurement value. Control output OFF Control output ON Red (fixed) Green (fixed) Measured value displayed in red when both control outputs 1 and 2 are OFF. Measured value displayed in green when both control outputs 1 and 2 are OFF.
Measured value displayed in green when either control output 1 or control output 2 is ON. Measured value displayed in red when either control output 1 or control output 2 is ON. red grn r-g (See note 1.) N: Number of pulses per revolution d: Diameter of rotating body (m) d: Circumference (m) g-r d: Diameter of rotating body (See note 2.) Note: Incorrectly setting the prescale value will result in counting errors. Check that the setting has been performed correctly before using the H7BX. Note 1. If the tachometer output mode is set to AREA, however, the measured value is displayed in red when control output 1 is OFF and in green when control output 1 is ON. 2. If the tachometer output mode is set to AREA, however, the measured value is displayed in green when control output 1 is OFF and in red when control output 1 is ON.

· Average Processing (aug) Flickering display and output chattering can be prevented by using average processing (simple averaging). Average processing can be set to one of four levels: no average processing, 2 times (i.e., the average of 2 measurement values), 4 times, or 8 times. The measurement cycle will be equal to the sampling cycle (200 ms) multiplied by the average processing setting (i.e., the number of times). Average processing enables fluctuating input signals to be displayed stably. Set the optimum number of times for the application. · Key Protect Level (kypt) Set the key protect level.
For details, refer to Key Protect Level on page 24. Multifunction Counter H7BX 21 Operation in Run Mode · Set the number for each digit with the Up Keys. Measurement value · Measurement Value Displays the currently measured value. · OUT1/OUT2 Set Value Set OUT1 set value and OUT2 set value. The measurement value is compared to OUT1 set value and OUT2 set value and output is made according to the selected output mode.
Measurement value OUT1 set value Measurement value OUT2 set value Output Mode Settings (Upper-limit) OUT2 set value Measurement value Upper and lower limit (HI-LO) (Lower-limit) OUT1 set value ON condition for OUT1: Measurement value OUT1 set value ON condition for OUT2: Measurement value OUT2 set value OUT1 OUT2 OUT2 set value Measurement value Condition ON condition for OUT1 ON condition for OUT2 OUT1 set value OUT2 set value OUT1 set value Measurement value OUT2 set value Measurement value < OUT1 set value or Measurement value > OUT2 set value OUT1 set value > OUT2 set value OUT2 set value Measurement value OUT1 set value Measurement value < OUT2 set value or Measurement value > OUT1 set value Area (AREA) OUT1 set value OUT1 Output mode setting OUT2 (Upper-limit) OUT2 set value Measurement value Upper limit (HI-HI) (Upper-limit) OUT1 set value ON condition for OUT1: Measurement value OUT1 set value ON condition for OUT2: Measurement value OUT2 set value OUT1 OUT2 (Lower-limit) OUT2 set value Measurement value Lower limit (LO-LO) (Lower-limit) OUT1 set value ON condition for OUT1: Measurement value OUT1 set value ON condition for OUT2: Measurement value OUT2 set value OUT1 OUT2 22 Multifunction Counter H7BX Switching between Using a Preset Counter, Total and Preset Counter, Batch Counter, Dual Counter, and Tachometer Select which H7BX configuration to use (i.e., preset counter, total and preset counter, batch counter, dual counter, or tachometer) in the configuration selection mode. The H7BX is also equipped with a DIP switch monitor function, a convenient function that enables the settings of the DIP switch pins to be confirmed using the front display. Power ON Up 1 Key Run Mode Key Caution To change the mode to configuration selection mode, press the Up 1 Key for 1 s min.
with the key held down. The mode will not change if the Up 1 Key is pressed first. (See note 2.) Up 1 (See note 1.) 1 s min. Se l e c t t h e c o n f i g u r a t io n w it h a n y o f t h e Up Ke y s . Configuration Selection Mode Configuration selection (1-stage counter) (2-stage counter) (Total and preset (Batch counter) counter) (Dual counter) (Tachometer) nt enie onv tion C c fun DIP switch monitor (DIP) Note: 1.

The configuration that can be selected depend on the model. 2. The default setting is for a 1-stage preset counter.

(For models with a 2-stage setting, the default is for a 2-stage preset counter.) The status of the DIP switch pins (1 to 8) can be confirmed using the Up Keys. Note: This display is possible only if DIP switch pin 1 (DIP switch settings) is set to ON (i.e., enabled). Example 1 ON 2 3 4 5 6 7 8 OFF ···Indicates that DIP switch pin 8 is ON. ···Indicates that DIP switch pin 7 is OFF. ···Indicates that DIP switch pin 6 is ON. ···Indicates that DIP switch pin 5 is OFF. ···Indicates that DIP switch pin 4 is ON.

···Indicates that DIP switch pin 3 is OFF. ···Indicates that DIP switch pin 2 is ON. ···Indicates that DIP switch pin 1 is ON. Note: 1. When the mode is changed to configuration selection mode, the present value is reset, outputs turns OFF, and counting (measuring) stops.

2. Setting changes made in configuration selection mode are enabled when the mode is changed to run mode. If the configuration is changed, the set value (or set value 1 and set value 2), OUT1 set value or OUT2 set value are initialized. Multifunction Counter H7BX 23 Key Protect Level When the key-protect switch is set to ON, it is possible to prevent setting errors by prohibiting the use of certain operation keys by specifying the key protect level (KP-1 to KP-5). The key protect indicator is lit while the key-protect switch is set to ON.

Confirm the ON/ OFF status of the key protect switch after the H7BX is mounted to the panel. OMR ON Corp orati on Key protect indicator Level Meaning Changing mode (See note.) Switching display in run mode KP-1 (default setting) No Yes KP-2 No Yes KP-3 No Yes KP-4 No Yes KP-5 No Note: Changing to configuration selection mode and function selection mode. Self-diagnostic Function The following displays will appear if an error occurs. Main display Sub-display No change Error Present value underflow (See note 2.) Present value overflow (See note 3.) Output status No change Correction method Either press the Reset Key or turn ON reset input. Either press the Reset Key or turn ON reset input. (See note 4.) Either press the Reset Key or reset the power supply.

Reset the power supply. Reset to the factory settings using the Reset Key. Set value after reset No change ----(See note 1.) fffff (See note 1.) No change No change e1 e2 e2 Not lit Not lit CPU Memory error (RAM) Memory error (EEP) (See note 5.) OFF OFF OFF sum Note 1. Display flashes (1-second cycles). 2. Occurs when the present value or the total count value goes below -99,999 3. Occurs when the present value reaches 999,999 under the following conditions:

· The output mode is K-2, D, L, or H.

· The H7BX is set for dual counter operation. 4. Except when the H7BX is used as a tachometer. 5. Includes the case where the EEPROM has reached its overwrite lifetime.

24 Multifunction Counter H7BX COUN TER Lot No. XX XX MAD XX E IN CHIN A H7BX -A Details Reset Key Up/Down Keys (Up Keys for 6-digit models) Yes Yes No Yes Yes No No No No No No change No change No change 0 Safety Precautions Caution Minor injury due to electric shock may occasionally occur. Do not touch any of the terminals while power is being supplied. Fire may occasionally occur. Tighten the terminal screws to a torque of 0.

5 to 0.6 N·m (4.4 to 5.3 in-lb). supply capacity, operation may not start. Be sure to use a power supply with a sufficient capacity. · Use a commercial power supply as the AC power supply for the H7BX. Using an inverter output with an output frequency of 50/60 Hz as the power supply may cause the H7BX to produce smoke or become damaged by burning. · Use a switch, relay, or other device with contacts so that the rated power supply voltage will be reached within 2 s. If the power supply voltage is not reached quickly enough, the outputs may malfunction.

· Use a switch, relay, or other device with contacts so that the rated power supply voltage will be reached within 2 s. If the power supply voltage is not reached quickly enough, the outputs may malfunction. Minor injury due to explosion may occasionally occur. Do not use the H7BX where subject to flammable or explosive gas. If the output relay is used beyond its life expectancy, its contacts may become fused or there may be a risk of fire. Use the output relay within its rated load and electrical life expectancy. The life expectancy of the output relay varies considerably according to its usage. Minor electric shock, fire, or malfunction may occasionally occur. Never attempt to disassemble, modify, or repair the H7BX or touch any of the internal parts. Installation and Wiring · To mount the H7BX to a panel, attach the two supplied adapters to the left and right sides of the H7BX, and securely tighten the knurled screws on the adapters by hand, maintaining a balance between them.

Damage may result if the knurled screws are excessively tightened with pliers or other tools. · Be sure to wire the terminals correctly. · Up to two wires of the same size and type can be inserted into a single terminal. · Do not connect more than two crimp terminals to each H7BX terminal. · Use the specified wires for wiring.

Applicable wire: AWG 24 to AWG 18 (equal to a crosssectional area of 0.20 to 0.82 mm2) Solid wire or twisted wire (copper), operating temperature over 70°C. · Separate the H7BX, the devices that generate input signals, and input signal wires from any potential sources of noise, such as high-voltage lines. Precautions for Safe Use Operating Environment · The H7BX is intended for indoor use only.

Do not use the H7BX outdoors or in any of the following locations. ·Locations subject to sudden or extreme changes in temperature. ·Locations where high humidity may result in condensation. ·Locations subject to direct sunlight. ·Locations subject to corrosive gas. ·Locations subject to excessive dust or dirt. · This is a class A product (for industrial environments). In residential areas, it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference. · Use the H7BX within the specified ratings for operating temperature and humidity. Temperature rise may shorten the service life of H7BX if it is used near a power supply or other heat-generating objects.

· Use the H7BX within the specified ratings for vibration, shock, and splashing water. · The H7BX is not oil resistant. Do not use it in locations subject to oil. · Install the H7BX well away from any sources of excessive static electricity, such as pipes transporting molding materials, powder, or liquids.

· Store the H7BX within the specified ratings. If the H7BX has been stored at temperatures of -10°C or lower, let it stand for 3 hours or longer at room temperature before turning ON the power supply. Handling · Do not use organic solvents (such as paint thinner or benzine), strong alkaline, or strong acids because they will damage the external finish. · Approximately 14 V will be output to the input terminals when the H7BX is used with the key protection input terminals and no-voltage input (NPN input) is used. To prevent charging accidents, connect a diode to the power supply circuit of input devices if input devices are used with a power supply of less than 14 V. · Do not connect loads that exceed the rated output current.
The output elements may be destroyed, possibly resulting in short-circuit or open-circuit faults. · When using heaters, be sure to use a thermal switch for the load circuit. · Always connect a diode to protect against counter electromotive force when using an inductive load. H7BX electromotive force may destroy output elements, possibly resulting in short-circuit or open-circuit faults. · Install a switch or circuit breaker that allows the operator to immediately turn OFF the power, and label it to clearly indicate its function.
· Check that the display (backlight and LCD) is operating normally. Some operating environments may accelerate deterioration of the indicators, LCD, and resin components and cause display malfunctions. Periodically inspect and replace parts. Power Supply · Maintain voltage fluctuations in the power supply within the specified range. · Internal elements may be destroyed if a voltage beyond the rated voltage is applied.
· When the power is turned ON, an inrush current will flow for a short time (approx. 10 A for 2 ms). Depending on the power Multifunction Counter H7BX 25 Precautions for Correct Use · Inrush current generated by turning ON or OFF the power supply may deteriorate contacts in the power supply circuit. Turn ON or OFF using a device with a rated current of 10 A or higher. · Input signals may be accepted, not accepted, or unstable for the following time when the power supply is turned ON or OFF. Set the system to allow leeway in the timing of input signals. Power supply ON OFF 200 ms 0 to 90 ms 5 ms Possible 0 to 1 s Unstable Impossible Input Impossible Unstable · This H7BX always compares the count value with the set value. @@@@While resetting, however, the output stays OFF. · EEPROM is used as memory when the power is interrupted. The write life of the EEPROM is 100,000 writes.

@@@@Do not use the H7BX if the front sheet is missing or torn. · Abide by all local ordinances and regulations when disposing of the H7BX. · External Power Supply Reduce the load current as shown in the diagram on the right according to the power supply voltage if a DC power supply is used for models specified for 24 VAC/12 to 24 VDC. Load current (mA) 100 20 0 10.8 15 Power supply voltage (VDC) 26 Multifunction Counter H7BX Warranty and Application Considerations Read and Understand this Catalog Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments. Warranty and Limitations of Liability WARRANTY OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.
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M077-E1-01 In the interest of product improvement, specifications are subject to change without notice. OMRON Corporation Industrial Automation Company Control Devices Division H.Q. Analog Controller Division Shiokoji Horikawa, Shimogyo-ku, Kyoto, 600-8530 Japan Tel: (81)75-344-7080/Fax: (81)75-344-7189 0907 (0907) .