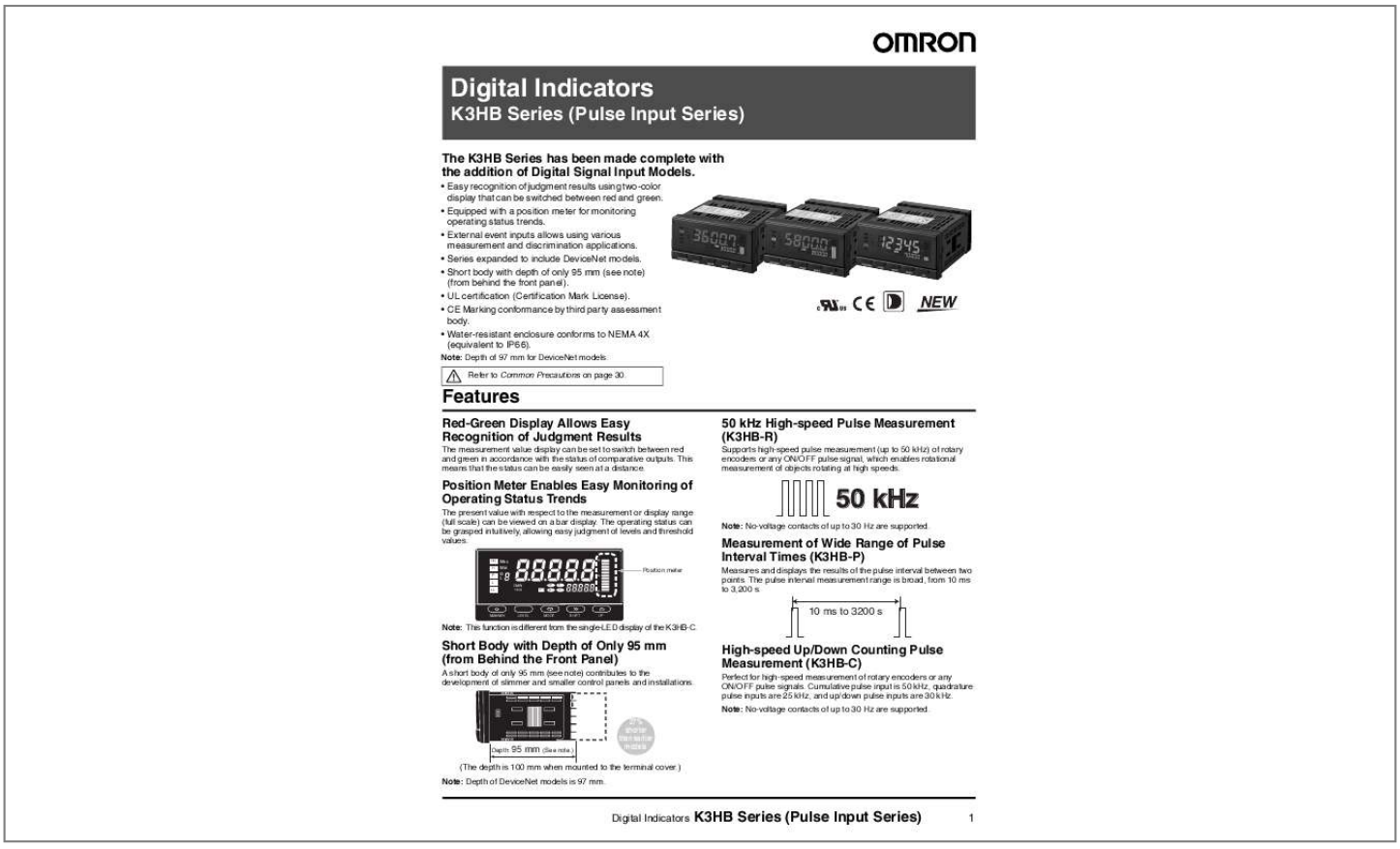

OMRON

Digital Indicators
K3HB Series (Pulse Input Series)

The K3HB Series has been made complete with the addition of Digital Signal Input Models.

- Easy recognition of judgment results using two-color display that can be switched between red and green.
- Equipped with a position meter for monitoring operating status trends.
- External event inputs allows using various measurement and discrimination applications.
- Series expanded to include DeviceNet models.
- Short body with depth of only 95 mm (see note) (from behind the front panel).
- UL certification (Certification Mark License).
- CE Marking conformance by third party assessment body.
- Water-resistant enclosure conforms to NEMA 4X (equivalent to IP66).

Note: Depth of 97 mm for DeviceNet models.

Refer to *Common Precautions* on page 30.

NEW

Features

Red-Green Display Allows Easy Recognition of Judgment Results

The measurement value display can be set to switch between red and green in accordance with the status of comparative outputs. This means that the status can be easily seen at a distance.

Position Meter Enables Easy Monitoring of Operating Status Trends

The present value with respect to the measurement or display range (full scale) can be viewed on a bar display. The operating status can be grasped intuitively, allowing easy judgment of levels and threshold values.

Note: This function is different from the single-LED display of the K3HB-C.

Short Body with Depth of Only 95 mm (from Behind the Front Panel)

A short body of only 95 mm (see note) contributes to the development of slimmer and smaller control panels and installations.

(The depth is 100 mm when mounted to the terminal cover.)

Note: Depth of DeviceNet models is 97 mm.

50 kHz High-speed Pulse Measurement (K3HB-R)

Supports high-speed pulse measurement (up to 50 kHz) of rotary encoders or any ON/OFF pulse signal, which enables rotational measurement of objects rotating at high speeds.

Note: No-voltage contacts of up to 30 Hz are supported.

Measurement of Wide Range of Pulse Interval Times (K3HB-P)

Measures and displays the results of the pulse interval between two points. The pulse interval measurement range is broad, from 10 ms to 3,200 s.

High-speed Up/Down Counting Pulse Measurement (K3HB-C)

Perfect for high-speed measurement of rotary encoders or any ON/OFF pulse signals. Cumulative pulse input is 50 kHz, quadrature pulse inputs are 25 kHz, and up/down pulse inputs are 30 kHz.

Note: No-voltage contacts of up to 30 Hz are supported.

Manual abstract:

@@· UL certification (Certification Mark License). · CE Marking conformance by third party assessment body. · Water-resistant enclosure conforms to NEMA 4X (equivalent to IP66). Note: Depth of 97 mm for DeviceNet models. Refer to Common Precautions on page 30. Features Red-Green Display Allows Easy Recognition of Judgment Results The measurement value display can be set to switch between red and green in accordance with the status of comparative outputs. This means that the status can be easily seen at a distance. 50 kHz High-speed Pulse Measurement (K3HB-R) Supports high-speed pulse measurement (up to 50 kHz) of rotary encoders or any ON/OFF pulse signal, which enables rotational measurement of objects rotating at high speeds. Position Meter Enables Easy Monitoring of Operating Status Trends The present value with respect to the measurement or display range (full scale) can be viewed on a bar display. The operating status can be grasped intuitively, allowing easy judgment of levels and threshold values.

HH H P L LL 50 kHz Note: No-voltage contacts of up to 30 Hz are supported. Max Min B L CMW Hold HH T LL H L Measurement of Wide Range of Pulse Interval Times (K3HB-P) Measures and displays the results of the pulse interval between two points. The pulse interval measurement range is broad, from 10 ms to 3,200 s. Position meter MAX/MIN LEVEL MODE SHIFT UP 10 ms to 3200 s Note: This function is different from the single-LED display of the K3HB-C. Short Body with Depth of Only 95 mm (from Behind the Front Panel) A short body of only 95 mm (see note) contributes to the development of slimmer and smaller control panels and installations.

High-speed Up/Down Counting Pulse Measurement (K3HB-C) Perfect for high-speed measurement of rotary encoders or any ON/OFF pulse signals. Cumulative pulse input is 50 kHz, quadrature pulse inputs are 25 kHz, and up/down pulse inputs are 30 kHz. Note: No-voltage contacts of up to 30 Hz are supported. Depth: 95 mm (See note.) 27% shorter than earlier models (The depth is 100 mm when mounted to the terminal cover.

) Note: Depth of DeviceNet models is 97 mm. Digital Indicators K3HB Series (Pulse Input Series) 1 Features Many I/O Variations for Discrimination, Control, and Information Applications Digital Indicators are used in a wide variety of applications, from an electronic measurement value display or equipment/device operating status display to a host communications interface in monitoring and control systems. OMRON provides a complete lineup for a variety of input and control output applications to meet all your application requirements. Relay Outputs Transistor Outputs H and L: SPDT C1 H/OUT4 C2 C3 C4 L/OUT2 C5 C6 HH, H, L, and LL: SPST-NO HH/OUT5 C1 H/OUT4 C2 COM C3 L/OUT2 C4 LL/OUT1 C5 COM C6 PASS: SPDT B1 PASS/OUT3 B2 B3 N/C B4 (CPB) 10 VDC 100 mA NPN or PNP HH/OUT5 C1 H/OUT4 C2 PASS/OUT3 C3 L/OUT2 C4 LL/OUT1 C5 COM C6 NPN PNP + - (CPA) 12 VDC 80 mA B5 Sensor power B6 supply Communications Output RS-232 or RS-485 RS-232C or RS-485 Linear Output Voltage Output or Current Output DeviceNet BCD Output NPN Open Collector Computer 0 to 20 mA DC/ 4 to 20 mA DC or 0 to 5 VDC/ 1 to 5 VDC/ 0 to 10 VDC Select a Comparative Output Pattern to Suit the Discrimination or Control Application · The output pattern for comparative outputs can be selected. In addition to high/low comparison with set values, output based on level changes is also possible. (Use the type of output pattern appropriate for the application.) Comparative set value HH Comparative set value H Comparative set value L Comparative set value LL Lineup Includes DeviceNet Models Enabling High-speed Data Communications with PLCs without Special Programming · DeviceNet compliance enables high-speed data transmission by allocating setting and monitoring parameters in the I/O memory of the PLC. This capability greatly reduces labor spent in developing communications programs. Standard Outputs Measurement Comparative value set value HH Higher Comparative Lower Comparative set value LL set value H Comparative set value L Level Outputs Measurement value Higher Lower Output HH Output H Output PASS Output L Output LL ON OFF Output HH Output H Output PASS Output L Output LL ON OFF Ethernet DeviceNet Master Comparative set value HH Comparative set value H Comparative set value L Comparative set value LL Zone Outputs Measurement value Higher Lower Output HH Output H Output PASS Output L Output LL ON OFF P H Zero K3HB Digital Indicators Note: The HH, H, L or LL outputs must be set in that order for the zone outputs to output correctly. (This is because the comparative set values and outputs for standard and level outputs are in a 1-to-1 relationship, whereas the meaning of zone outputs depends on the settings of all the comparative set values.

) P H Zero DeviceNet Configurator 2 Digital Indicators K3HB Series (Pulse Input Series) Note: The applications provided in this catalog are intended as reference only. Do not attempt to use any of them in real systems without first confirming machine and device functions and safety. For applications that require safety, ensure that there is sufficient leeway in ratings and performances, install fail-safe measures, and take any other safety measures required by the application. In addition, contact your nearest OMRON representative and confirm specifications. K3HB-series Product Lineup K3HB-R Rotary Pulse Indicator (Page 4) Performs High-speed Rotation Measurement and Passing Time Measurement Displaying Bread Baking Time Oven Bread E6B Rotary Pulse Input Model: K3HB-R K3HB-RNB: NPN input/voltage pulse input K3HB-RPB: PNP input · Input types: rpm/circumferential speed, absolute ratio, error ratio, error, concentration, and passing time · Measurement range: 0.5 mHz to 50 kHz K3HB-R (F6: Passing time mode) K3HB-P Time Interval Indicator (Page 10) Measuring Passing Speed between Two Points and Providing Time Judgments Measuring Shot Speed Proximity sensor Pulse Input Model: K3HB-P K3HB-PNB: NPN input/voltage pulse input K3HB-PPB: PNP input · Inputs: Passing speed, cycle, time difference, time band, measuring length, interval · Measurement ranges: Functions F1, F3, and F4: 10 ms to 3200 s Function F2: 20 ms to 3200 s Functions F5 and F6: 0 to 4 gigacounts K3HB-P K3HB-C Up/Down Counting Pulse Indicator (Page 15) Measuring and Monitoring High-speed Up/Down Pulses Counting Workpieces BCD Up/down Counting Pulse Input Model: K3HB-C K3HB-CNB: NPN input/voltage pulse input · Inputs: Individual inputs (up/down), quadrature inputs (up/down), cumulative input · Response frequency: Individual inputs: 30 kHz, quadrature inputs: 25 kHz, cumulative input: 50 kHz Note: No-voltage contacts of up to 30 Hz are supported.

· Measurement ranges: Functions F1 and F2: ±2 gigacounts Function F3: 0 to 4 gigacounts K3HB-C (F3: Cumulative mode) To Programmable Controller To large display unit Digital Indicators K3HB Series (Pulse Input Series) 3 Rotary Pulse Indicator K3HB-R Digital Rotary Pulse Meter Capable of 50 kHz Measurements · Measures High-speed Pulses at 50 kHz. Provides high-speed pulse measurements up to 50 kHz of rotary encoder or ON/OFF pulse signals and can perform rotating measurement of high-speed rotating objects. Note: No-voltage contacts of up to 30 Hz are supported. · Six Measurement Operations Including Rotation (rpm)/ Circumferential Speed, Ratio, and Cumulative One Rotary Pulse Meter has 6 rotary pulse measurement functions to support a variety of pulse measurement applications.

Select the best function for your application from the following: rotation (rpm)/ circumferential speed, absolute ratio, error ratio, error, flow rate ratio, and passing time. Refer to Common Precautions on page 30. Model Number Structure Model Number Legend Base Units and Optional Boards can be ordered individually or as sets. Base Units K3HB-R @ 1 5 1. Input Sensor Codes NB: NPN input/voltage pulse input PB: PNP input 5.

Supply Voltage 100-240 VAC:100 to 240 VAC 24 VAC/VDC: 24 VAC/VDC Base Units with Optional Boards K3HB-R@-@@@ 1 234 5 2. Sensor Power Supply/Output Type Codes None: None CPA: Relay output (PASS: SPDT) + Sensor power supply (12 VDC±10%, 80 mA) (See note 1.) L1A: Linear current output (DC0(4)-20 mA) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) L2A: Linear voltage output (DC0(1)-5 V, 0 to 10 V) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) A: Sensor power supply (12 VDC ±10%, 80 mA) FLK1A: Communications (RS-232C) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.

) FLK3A: Communications (RS-485) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) 3. Relay/Transistor Output Type Codes None: None C1: Relay contact (H/L: SPDT each) C2: Relay contact (HH/H/LL/L: SPST-NO each) T1: Transistor (NPN open collector: HH/H/PASS/L/LL) T2: Transistor (PNP open collector: HH/H/PASS/L/LL) BCD: BCD output + transistor output (NPN open collector: HH/H/PASS/L/LL) DRT: DeviceNet (See note 2.) 4. Event input Type Codes None: None 1: 5 points (M3 terminal blocks) NPN open collector 2: 8 points (10-pin MIL connector) NPN open collector 3: 5 points (M3 terminal blocks) PNP open collector 4: 8 points (10-pin MIL connector) PNP open collector Optional Board Sensor Power Supply/Output Boards K33-@ 2 Relay/Transistor Output Boards K34-@ 3 Event Input Boards K35-@ 4 Note: 1. CPA can be combined with relay outputs only. 2. Only one of the following can be used by each Digital Indicator: RS-232C/RS-485 communications, BCD communications, or DeviceNet communications. Accessories (Sold Separately) K32-DICN: Special Cable (for event inputs with 8-pin connector) K32-BCD: Special BCD Output Cable 4 Rotary Pulse Indicator K3HB-R Specifications Ratings Supply voltage Allowable power supply voltage range Power consumption (See note 1.) Current consumption Input External power supply Event inputs (See note 2.

) Startup compensation timer input Hold input Reset input Bank input Output ratings Relay output (depends on the model) Transistor output Linear output 250 VAC, 30 VDC, 5 A (resistive load) Mechanical life expectancy: 5,000,000 operations, Electrical life expectancy: 100,000 operations Maximum load voltage: 24 VDC, Maximum load current: 50 mA, Leakage current: 100 μA max. Linear output 0 to 20 mA DC, 4 to 20 mA: Load: 500 max, Resolution: Approx. 10,000, Output error: ±0.5% FS Linear output 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC: Load: 5 k max, Resolution: Approx. 10,000, Output error: ±0.5% FS (1 V or less: ±0.15 V; not output for 0 V or less) Negative LCD (backlit LED) display 7-segment digital display (Character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green)) Scaling function, measurement operation selection, averaging, previous average value comparison, output hysteresis, output OFF delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset 100 to 240 VAC, 24 VAC/VDC, DeviceNet power supply: 24 VDC 85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC 100 to 240 VAC: 18 VA max. (max.

load) 24 VAC/DC: 11 VA/7 W max. (max. load) DeviceNet power supply: 50 mA max. (24 VDC) No-voltage contact, voltage pulse, open collector 12 VDC ±10%, 80 mA (models with external power supply only) NPN open collector or no-voltage contact signal ON residual voltage: 2 V max. ON current at 0 : 4 mA max.

Max. applied voltage: 30 VDC max. OFF leakage current: 0.1 mA max. Display method Main functions Ambient operating temperature Ambient operating humidity Storage temperature Altitude Accessories -10 to 55°C (with no icing or condensation) 25% to 85% -25 to 65°C (with no icing or condensation) 2,000 m max.

Watertight packing, 2 fixtures, terminal cover, unit stickers, instruction manual. DeviceNet models also include a DeviceNe to F6 provide rpm/circumferential speed and other calculation displays by measuring continuous pulses (frequencies). Example Length of processing stage F1: F6: Displays rotation (rpm) or circumferential speed for one input. Displays the passing time calculated from the circumferential speed and the length of the processing stage for one input. F2 to F5: Displays the calculation result for two rotation (rpm) speeds. Function name Rpm/circumferential speed Absolute ratio Error ratio Rotational difference Flow rate ratio Passing time Function No. f1 f2 f3 f4 f5 f6 The basic principle used by the Digital Indicator to calculate the rotation speed (rpm) display is to count the ON/OFF time (T) for input sensor or other device inputs using the internal system clock, and then automatically calculate the frequency. This frequency (f) is multiplied by 60 and displayed as the rotation (rpm) speed. 1 T Input sensor or other input pulse ON/OFF time (T) = T Frequency (f) = · Rotation speed (rpm) = f × 60 · Circumferential speed = Roll circumference × Rotation speed (rpm) · Passing time= Length of processing stage Circumferential speed These calculations are automatically made internally and displayed whenever any input pulse is received. Function F1 Rpm/circumferential speed/ Instantaneous flowrate Operation Measures frequency for input A and displays the rotation (rpm) or circumferential speed proportional to the input frequency.

Calculation Rotation speed Frequency (of input pulse) Circumferenti al speed Display unit rpm rps Hz kHz mm/s cm/s m/s m/min km/h Instantaneous flowrate l/min l/h Prescale value () Operation image (application) Measuring roller winding speed Measuring motor speed (for product testing) H PASS 1/N 1/60 N 1/60 1/60000 1000 d/60 N 100 d/60 N L OK/NG judgment d/60 N d/N 0.

06 d/N Check the output specifications of the input device and calculate the prescale value from the following equation: Display value D = a × 60 × N = Pulses per rotation d = Circumferential length per rotation Rotary Pulse Indicator K3HB-R 7 Function F2 Absolute ratio Operation Multiples input B divided by input A (B) by 100 and A displays the ratio as a percentage (%). Display unit: % Operation image (application) Measuring the speed ratio between two rollers HH H PASS L LL Warning F3 Error ratio Multiplies the error between input A and input B (B -1) by 100 and displays the ratio as a percentage A (%). Display unit: % Measuring the line speed error ratio between two conveyors Communications output To computer (remote monitoring) F4 Rotational difference Displays the difference between input A and input B (B - A) as the rotation (rpm) speed error or circumferential speed error. Measuring the rotation (rpm)/circumferential speed error (absolute error) between two conveyors HH H PASS L LL Warning æ Display unit: ç rpm, rps, rph, ç ç Hz, kHz, mm/s, m/s ç m/min, km/h è l/min, l/h, etc. ö ÷ ÷ ÷ ÷ ø F5 Flow rate ratio Displays the flow rate ratio of B from inputs A and B (B) as a ratio (%). A+B Display unit: % Monitoring liquid mixture flow rate ratio Linear output Recording meter F6 Passing time Displaying the passing time for a conveyor line Passing time (s) = 1/a × a: Input frequency (Hz) Set the prescale value for the desired display unit using the following table for reference. Calculation Passing time Display unit Prescale value () s L/(d/N) Distance H PASS L Warning output N = Pulses per rotation d = Circumferential length per rotation (m) L = Length of process (m) 8 Rotary Pulse Indicator K3HB-R What Is Prescaling? To make calculations using the input pulse to display rotation (rpm) or circumferential speed, the number of pulses per rotation or the length of the circumference must be multiplied by a certain coefficient. This coefficient is called the prescale value. What Is the Auto-zero Function? (Set this function before using the Digital Indicator.

) If a function f1 to f6 is set, the frequency can be force-set to zero if there is no input pulse for a set period. This period is called the autozero time. Set the auto-zero time to slightly longer than the longest input pulse interval. (The display will not easily return to zero if the auto-zero time is too long or left at the default setting.) K3HB-R Proximity sensor Time Unit Settings Setting scal min h.

mm.ss mm.ss.d Minute display h.mm.

ss display mm.ss.d display (d = tenths of a second) Meaning Prescale value menu setting Rotation speed (rpm) = f × 60 × a f: Input pulse frequency (No. of pulses per second) a: Prescale value If there are 5 pulses per rotation, then a = 1/5 (= 0.2 = 2 × 10-1) and an accurate rotation speed (rpm) can be calculated. The actual setting is X = 2.0000 (mantissa) and Y = 10-1 (exponent). Note: Time unit can be set only when passing time (F6) is selected. Input Type Setting NO: Voltage pulse high NC: Voltage pulse low No-contact or voltage pulse input Contact 00 01 10 11 Note: Set to 10 or 11 when there is a large variation in the display. The largest measurement range is 30 Hz.

Rotary Pulse Indicator K3HB-R 9 Timer Interval Indicator K3HB-P Digital Time Interval Meter for Measuring Passing Speed, Time, or Cycle between Two Points. · Measures Wide Range of Pulse Interval Times Measures, calculates, and displays pulse intervals between two points. Wide range for pulse interval measurements, from 10 ms to 3,200 s, max. · Six Measurement Operations, Including Passing Speed, Time, and Cycle Measurement between Two Points One Digital Time Interval Meter has six measurement functions, to support a variety of pulse interval measurement applications. Select the best function for your application from the following: Passing speed, cycle, time difference, time band, measuring length, and interval. Refer to Common Precautions on page 30. Model Number Structure Model Number Legend Base Units and Optional Boards can be ordered individually or as sets. Base Units K3HB-P @ 1 5 1. Input Sensor Codes NB: NPN input/voltage pulse input PB: PNP input 5. Supply Voltage 100-240 VAC: 100 to 240 VAC 24 VAC/VDC: 24 VAC/VDC Base Units with Optional Boards K3HB-P@-@@@ 1 234 5 2.

Sensor Power Supply/Output Type Codes None: None CPA: Relay output (PASS: SPDT) + Sensor power supply (12 VDC±10%, 80 mA) (See note 1.) L1A: Linear current output (DC0(4)-20 mA) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) L2A: Linear voltage output (DC0(1)-5 V, 0 to 10 V) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) A: Sensor power supply (12 VDC ±10%, 80 mA) FLK1A: Communications (RS-232C) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) FLK3A: Communications (RS-485) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.

) 3. Relay/Transistor Output Type Codes None: None C1: Relay contact (H/L: SPDT each) C2: Relay contact (HH/H/LL/L: SPST-NO each) T1: Transistor (NPN open collector: HH/H/PASS/L/LL) T2: Transistor (PNP open collector: HH/H/PASS/L/LL) BCD: BCD output + transistor output (NPN open collector: HH/H/PASS/L/LL) DRT: DeviceNet (See note 2.) 4. Event input Type Codes None: None 1: 5 points (M3 terminal blocks) NPN open collector 2: 8 points (10-pin MIL connector) NPN open collector 3: 5 points (M3 terminal blocks) PNP open collector 4: 8 points (10-pin MIL connector) PNP open collector Optional Board Sensor Power Supply/Output Boards K33-@ 2 Relay/Transistor Output Boards K34-@ 3 Event Input Boards K35-@ 4 Note: 1. CPA can be combined with relay outputs only.

2. Only one of the following can be used by each Digital Indicator: RS-232C/RS-485 communications, a linear output, or DeviceNet communications. Accessories (Sold Separately) K32-DICN: Special Cable (for event inputs with 8-pin connector) K32-BCD: Special BCD Output Cable 10 Timer Interval Indicator K3HB-P Specifications Ratings Supply voltage Allowable power supply voltage range Power consumption (See note 1.) Current consumption Input External power supply Event inputs (See note 2.) Hold input Reset input Bank input Output ratings Relay output (depends on the model) Transistor output Linear output 100 to 240 VAC, 24 VAC/VDC, DeviceNet power supply: 24 VDC 85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC 100 to 240 VAC: 18 VA max. (max. load) 24 VAC/DC: 11 VA/7 W max. (max. load) DeviceNet power supply: 50 mA max. (24 VDC) No-voltage, voltage pulse, open collector 12 VDC 10%, 80 mA (for models with external power supplies only) NPN open collector or no-voltage contact signal ON residual voltage: 2 V max.

ON current at 0 : 4 mA max. Max. applied voltage: 30 VDC max. OFF leakage current: 0.1 mA max. 250 VAC, 30 VDC, 5 A (resistive load) Mechanical life expectancy: 5,000,000 operations, Electrical life expectancy: 100,000 operations Maximum load voltage: 24 VDC, Maximum load current: 50 mA, Leakage current: 100 µA max. Linear output 0 to 20 mA DC, 4 to 20 mA: Load: 500 max, Resolution: Approx. 10,000, Output error: ±0.5% FS Linear output 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC: Load: 5 k max, Resolution: Approx. 10,000, Output error: ±0.

5% FS (1 V or less: ±0.15 V; not output for 0 V or less) Negative LCD (backlit LED) display 7-segment digital display (Character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green)) Scaling function, measurement operation selection, output hysteresis, output OFF delay, output test, teaching, display value selection, display color selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset Display method Main functions Ambient operating temperature Ambient operating humidity Storage temperature Altitude Accessories -10 to 55°C (with no icing or condensation) 25% to 85% -25 to 65°C (with no icing or condensation) 2,000 m max. Watertight packing, 2 fixtures, terminal cover, unit stickers, instruction manual. DeviceNet models also include a DeviceNet connector (Hirose HR31-5.08P-5SC(01)) and crimp terminals (Hirose HR31-SC-121) (See note 3.) Note: 1. DC power supply models require a control power supply capacity of approximately 1 A per Unit when power is turned ON. Particular attention is required when using two or more DC power supply models.

The OMRON S8VS-series DC Power Supply Unit is recommended. 2. PNP input types are also available. 3. For K3HB-series DeviceNet models, use only the DeviceNet Connector included with the product. The crimp terminals provided are for Thin Cables. Timer Interval Indicator K3HB-P 11 Characteristics Display range Measurement accuracy (at 23±5°C) Measurement range -19,999 to 99,999 ±0.08% rgd ±1 digit (for voltage pulse/open collector sensors) Functions F1, F3, and F4:10 ms to 3,200 s Function F2: 20 ms to 3,200 s Functions F5 and F6: 0 to 4 gigacounts · No-voltage contact (30 Hz max. with ON/OFF pulse width of 15 ms min.) Mode Input frequency ON/OFF range pulse width 9 µs min.

16 µs min. ON/OFF pulse width 9 µs min. 16 µs min. Note: The Digital Time Interval Meter will malfunction if a pulse greater than the input frequency range is input. SYSERR may appear on the display. ·Opencollector 0 to 30 kHz Input frequency range 0 to 30 kHz ON voltage 4.5 to 30 V OFF voltage Input impedance 10 k ·Voltage pulse Input signals F1 to F4 0 to 50 kHz F5, F6 Mode -30 to 2 V F1 to F4 0 to 50 kHz F5, F6 Connectable sensors ON residual voltage: 3 V max. OFF leakage current: 1.5 mA max. Load current: Must have a switching capacity of 20 mA or higher.

Must be able to properly switch load currents of 5 mA or less. 2 ms max. (time until the comparative output is made when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%) 10 ms max. (time until the final analog output value is reached when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%) 20 M min. (at 500 VDC) 2,300 VAC for 1 min between external terminals and case 100 to 240 VAC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns) 24 VAC/VDC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns) Frequency: 10 to 55 Hz; Acceleration: 50 m/s2, 10 sweeps of 5 min each in X, Y, and Z directions 150 m/s2 (100 m/s2 for relay outputs) 3 times each in 3 axes, 6 directions Approx. 300 g (Base Unit only) Comparative output response time (transistor output) Linear output response time Insulation resistance Dielectric strength Noise immunity Vibration resistance Shock resistance Weight Degree of protection Rear case Terminals Memory protection Applicable standards Front panel Conforms to NEMA 4X for indoor use (equivalent to IP66) IP20 IP00 + finger protection (VDE0106/100) EEPROM (non-volatile memory) Number of rewrites: 100,000 UL61010C-1, CSA C22.2 No. 1010.1 (evaluated by UL) EN61010-1 (IEC61010-1): Pollution degree 2/Overvoltage category II EN61326: 1997, A1: 1998, A2: 2001 EMI: EN61326+A1 industrial applications Electromagnetic radiation interference CISPR 11 Group 1, Class A: CISPRL16-1/-2 Terminal interference voltage CISPR 11 Group 1, Class A: CISPRL16-1/-2 EMS: EN61326+A1 industrial applications Electrostatic Discharge Immunity EN61000-4-2: 4 kV (contact), 8 kV (in air) Radiated Electromagnetic Field Immunity EN61000-4-3: 10 V/m 1 kHz sine wave amplitude modulation (80 MHz to 1 GHz, 1.4GHz to 2 GHz) Electrical Fast Transient/Burst Immunity EN61000-4-4: 2 kV (power line), 1 kV (I/O signal line) Surge Immunity EN61000-4-5: 1 kV with line (power line), 2 kV with ground (power line) Conducted Disturbance Immunity EN61000-4-6: 3 V (0.

15 to 80 MHz) Power Frequency Magnetic Immunity EN61000-4-8: 30 A/m (50 Hz) continuous time Voltage Dips and Interruptions Immunity EN61000-4-11: 0.5 cycle, 0°/180°, 100% (rated voltage) EMC 12 Timer Interval Indicator K3HB-P Operation Functions (Operating Modes) F1 to F6 These functions use the internal system clock to measure the time between pulses or the pulse ON time and then display time measurements or a variety of other calculations. Example: F1 Passing Speed The time (T) between input A pulse and input B pulse is measured by the internal system clock. If, for Function name Function No. example, the system clock measures 100,000 counts during time T, then Passing speed f1 Cycle Time difference Time band Measuring length Interval f2 f3 f4 f5 f6 Internal system clock 1 1 Input A Input B T T = 1 system clock count (0.5 µs) × 100,000 T = 0.05 s F1 (the passing speed) is calculated internally 1 using the formula × 60 (m/min), and the T 1 × 60= display, in this example, would be 0.05 s 1200 (m/min). Function F1 Passing speed Operation The reciprocal of the time (T) from input A ON to input B ON is multiplied by 60 and displayed. Input A B Input B T1 HOLD input Display 1 × 60 T1 1 × 60 T2 1 × 60 T4 TR T2 TR T3 TR T4 Operation image (application) Measuring workpiece passing speed between A and B A · Recovery time (TR) of 20 ms is required before starting the next measurement.

æ Display unit: ö ç mm/s, m/s ÷ ç ÷ m/min, km/h, etc. ø è F2 Cycle Measures and displays input A cycle (T). Input A HOLD input Display T1 T2 T5 T1 T2 T3 T4 T5 Measuring feed cycles for parts F3 Time difference Measurement range: 20 ms to 3,200 s æ Display unit: ö ç ms, s, min.

, ÷ ç ÷ è min.s.1/10 s ø Displays the time (T) from input A ON to input B ON. Input A Input B T1 HOLD input TR T2 TR T3 TR T4 Measuring workpiece passing time between A and B Measuring the length of a workpiece step by changing prescale values. A B Display T1 T3 T4 Measurement range: 10 ms to 3,200 s · Recovery time (TR) of 20 ms is required before starting the next measurement. æ Display unit: ö ç ms, s, min., ÷ ç ÷ è min. s.1/10 s ø Timer Interval Indicator K3HB-P 13 Function Operation Operation image (application) Monitoring the ON time of a printing press Managing the valve release time Communications output F4 Displays input A ON time (T). Time band Input A HOLD input Display T1 TR T2 TR T3 T1 T3 Measurement range: 10 ms to 3,200 s · Recovery time (TR) of 20 ms is required before starting the next measurement. æ Display unit: ö ç ms, s, min., ÷ ç ÷ è min. s.1/10 s ø F5 Measuring length Displays the number of input A pulses while input B is ON. 123456 Input A Input B HOLD input 12345 BCD To Programmable Controller Measuring workpiece length Display 6 5 · Recovery time (TR) of 20 ms is required before starting the next measurement. æ Display unit: ö ç ÷ è mm, cm, m, etc. ø F6 Interval Displays the number of input A pulses from when input B turns ON until input B turns ON again. Measurement is made every other time input B turns ON. 1234 Input A Input B TR HOLD input TR 1234 12 1 Measuring slit intervals H PASS L OK judgment Display 3 4 123 12 TR TR 12 · Recovery time (TR) of 20 ms is required before starting the next measurement. æ Display unit: ö ç mm, cm, m, etc. ÷ è ø INA INB Display 3 2 What Is Prescaling? To make calculations using the input pulse to display the passing speed between two points, the distance between the two points and the display unit must be set and the internally measured time multiplied by a certain coefficient. This coefficient is called the prescale value. (For information on settings details, refer to the User's Manual.) Time Unit Settings Setting scal min h.mm.ss mm.ss.

d Minute display h.mm.ss display mm.ss.d display (d = tenths of a second) Meaning Prescale value menu setting Input Type Setting NO: Voltage pulse high NC: Voltage pulse low No-contact or voltage pulse input Contact 00 01 10 11 Note: Set to 10 or 11 when there is a large variation in the display. The largest measurement range is 30 Hz. 14 Timer Interval Indicator K3HB-P Up/Down Counting Pulse Indicator K3HB-C Measure High-speed Up/down Pulses with this Up/down Pulse Meter. · Perfect for Measuring Rotary Encoder and ON/OFF Pulse Signals at High Speed Cumulative pulse input is 50 kHz, quadrature pulse inputs are 25 kHz, and up/down pulse inputs are 30 kHz. Note: No-voltage contacts of up to 30 Hz are supported. · The count value can be converted to any value.

The length equivalent for any pulse can be set to any desired value. This is effective for feed amount and position monitor displays. Refer to Common Precautions on page 30. Model Number Structure Model Number Legend Base Units and Optional Boards can be ordered individually or as sets. Base Units K3HB-C @ 1 5 1.

Input Sensor Codes NB: NPN input/voltage pulse input PB: PNP input 5. Supply Voltage 100-240 VAC: 100 to 240 VAC 24 VAC/VDC: 24 VAC/VDC Base Units with Optional Boards K3HB-C@-@@@ 1 234 5 2. Sensor Power Supply/Output Type Codes None: None CPA: Relay output (PASS: SPDT) + Sensor power supply (12 VDC±10%, 80 mA) (See note 1.) L1A: Linear current output (DC0(4)-20 mA) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) L2A: Linear voltage output (DC0(1)-5 V, 0 to 10 V) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.

) A: Sensor power supply (12 VDC ±10%, 80 mA) FLK1A: Communications (RS-232C) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) FLK3A: Communications (RS-485) + Sensor power supply (12 VDC±10%, 80 mA) (See note 2.) 3. Relay/Transistor Output Type Codes None: None C1: Relay contact (H/L: SPDT each) C2: Relay contact (HH/H/LL/L: SPST-NO each) T1: Transistor (NPN open collector: HH/H/PASS/L/LL) T2: Transistor (PNP open collector: HH/H/PASS/L/LL) BCD: BCD output + transistor output (NPN open collector: HH/H/PASS/L/LL) DRT: DeviceNet (See note 2.) 4. Event input Type Codes None: None 1: 5 points (M3 terminal blocks) NPN open collector 2: 8 points (10-pin MIL connector) NPN open collector 3: 5 points (M3 terminal blocks) PNP open collector 4: 8 points (10-pin MIL connector) PNP open collector Optional Board Sensor Power Supply/Output Boards K33-@ 2 Relay/Transistor Output Boards K34-@ 3 Event Input Boards K35-@ 4 Note: 1. CPA can be combined with relay outputs only. 2. Only one of the following can be used by each Digital Indicator: RS-232C/RS-485 communications, a linear output, or DeviceNet communications. Accessories (Sold Separately) K32-DICN: Special Cable (for event inputs with 8-pin connector) K32-BCD: Special BCD Output Cable Up/Down Counting Pulse Indicator K3HB-C 15 Specifications Ratings Supply voltage Allowable power supply voltage range Power consumption (See note 1.

) Current consumption Input External power supply Event inputs Hold input Reset input Bank input Output ratings Relay output (depends on the model) Transistor output Linear output 100 to 240 VAC, 24 VAC/VDC, DeviceNet power supply: 24 VDC 85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC 100 to 240 VAC: 18 VA max. (max. load) 24 VAC/DC: 11 VA/7 W max. (max. load) DeviceNet power supply: 50 mA max. (24 VDC) No-voltage, voltage pulse, open collector 12 VDC±10% 80 mA NPN open collector or no-voltage contact signal ON residual voltage: 2 V max. ON current at 0 : 4 mA max. Max. applied voltage: 30 VDC max. OFF leakage current: 0.

1 mA max. 250 VAC, 30 VDC, 5 A (resistive load) Mechanical life expectancy: 5,000,000 operations, Electrical life expectancy: 100,000 operations Maximum load voltage: 24 VDC, Maximum load current: 50 mA, Leakage current: 100 µA max. Linear output 0 to 20 mA DC, 4 to 20 mA: Load: 500 max, Resolution: Approx. 10,000, Output error: ±0.5% FS Linear output 0 to 5 VDC, 1 to 5 VDC, 0 to 10 VDC: Load: 5 k max, Resolution: Approx.

10,000, Output error: ±0.5% FS (1 V or less: ±0.15 V; not output for 0 V or less) Negative LCD (backlit LED) display 7-segment digital display (Character height: PV: 14.2 mm (green/red); SV: 4.9 mm (green)) Scaling function, measurement operation selection, output hysteresis, output OFF delay, output test, display value selection, display color selection, key protection, bank selection, display refresh period, maximum/minimum hold, reset Display method Main functions Ambient operating temperature Ambient operating humidity Storage temperature Altitude Accessories -10 to 55°C (with no icing or condensation) 25% to 85% -25 to 65°C (with no icing or condensation) 2,000 m max.

Watertight packing, 2 fixtures, terminal cover, unit stickers, instruction manual. DeviceNet models also include a DeviceNet connector (Hirose HR31-5.08P-5SC(01)) and crimp terminals (Hirose HR31-SC-121) (See note 3.) Note: 1. DC power supply models require a control power supply capacity of approximately 1 A per Unit when power is turned ON. Particular attention is required when using two or more DC power supply models. The OMRON S8VS-series DC Power Supply Unit is recommended. 2. For K3HB-series DeviceNet models, use only the DeviceNet Connector included with the product. The crimp terminals provided are for Thin Cables.

16 Up/Down Counting Pulse Indicator K3HB-C Characteristics Display range Measurement range Input signals -19,999 to 99,999 Functions F1, F2: ±2 gigacounts Functions F3 : 0 to 4 gigacounts · No-voltage contact (30 Hz max. with ON/OFF pulse width of 15 ms min.) · Voltage pulse Mode Input frequency ON/OFF ON voltage OFF voltage Input range pulse width impedance F1 0 to 30 kHz 16 µs min. 4.5 to 30 V -30 to 2 V 10 k F2 0 to 25 kHz 20 µs min. F3 0 to 50 kHz 9 µs min. · Open collector Mode Input frequency ON/OFF Note: The Up/Down Counting Pulse range pulse width Meter will malfunction if a pulse F1 0 to 30 kHz 16 µs min. greater than the input frequency F2 0 to 25 kHz 20 µs min. range is input. SYSERR may F3 0 to 50 kHz 9 µs min.
appear on the display. ON residual voltage: 3 V max. OFF leakage current: 1.5 mA max. Load current: Must have a switching capacity of 20 mA or higher. Must be able to properly switch load currents of 5 mA or less. 5 (-19999 to 99999) 1 ms max.: Transistor output; 10 ms max.: Relay contact output (time until the comparative output is made when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%) 10 ms max. (time until the final analog output value is reached when there is a forced sudden change in the input signal from 15% to 95% or 95% to 15%) 20 M min.
(at 500 VDC) 2,300 VAC for 1 min between external terminals and case 100 to 240 VAC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns) 24 VAC/VDC models: ±1,500 V at power supply terminals in normal or common mode (waveform with 1-ns rising edge and pulse width of 1 µs/100 ns) Frequency: 10 to 55 Hz; Acceleration: 50 m/s2, 10 sweeps of 5 min each in X, Y, and Z directions 150 m/s 2 (100 m/s2 for relay outputs) 3 times each in 3 axes, 6 directions Approx. 300 g (Base Unit only) Front panel Conforms to NEMA 4X for indoor use (equivalent to IP66) Rear case Terminals IP20 IP00 + finger protection (VDE0106/100) EEPROM (non-volatile memory) Number of rewrites: 100,000 UL61010C-1, CSA C22.2 No. 1010.1 (evaluated by UL) EN61010-1 (IEC61010-1): Pollution degree 2/Overvoltage category II EN61326: 1997, A1: 1998, A2: 2001 EMI: EN61326+A1 industrial applications Electromagnetic radiation interference CISPR 11 Group 1, Class A: CISPRL16-1/-2 Terminal interference voltage CISPR 11 Group 1, Class A: CISPRL16-1/-2 EMS: EN61326+A1 industrial applications Electrostatic Discharge Immunity EN61000-4-2: 4 kV (contact), 8 kV (in air) Radiated Electromagnetic Field Immunity EN61000-4-3: 10 V/m 1 kHz sine wave amplitude modulation (80 MHz to 1 GHz, 1.4 to 2 GHz) Electrical Fast Transient/Burst Immunity EN61000-4-4: 2 kV (power line), 1 kV (I/O signal line) Surge Immunity EN61000-4-5: 1 kV with line (power line), 2 kV with ground (power line) Conducted Disturbance Immunity EN61000-4-6: 3 V (0.15 to 80 MHz) Power Frequency Magnetic Immunity EN61000-4-8: 30 A/m (50 Hz) continuous time Voltage Dips and Interruptions Immunity EN61000-4-11: 0.5 cycle, 0°/180°, 100% (rated voltage) Connectable sensors Max. No. of display digits Comparative output response time Linear output response time Insulation resistance Dielectric strength Noise immunity Vibration resistance Shock resistance Weight Degree of protection Memory protection Applicable standards EMC Up/Down Counting Pulse Indicator K3HB-C 17 Operation Functions (Operating Modes) F1 to F3 Function name Individual inputs Pulse counting input Function F1 Individual inputs Function No.

f1 f3 Operation Operation image (application) Phase differential inputs f2 Counting the number of people entering an area Counts input A as incremental pulses and input B as decremental pulses. The count is incremented on the rising edge of input A and decremented on the rising edge of input B. If both inputs rise at the same time, the Photoelectric count is not changed. @@@@@@@@Requires at least half the minimum signal width. @@To display @@@@@@1. @@2. @@OFF leakage current: 0.1 mA max. Load current: 4 mA max. @@Approx.
@@@@level OFF voltage 3 V min. @@@@No. @@Allocate any I/O data using the Configurator. @@Input area: 2 blocks, 60 words max. Output area: 1 block, 29 words max.
@@(100 m max.) 100 m max. (250 m max.) 100 m max. (500 m max.
) Drop line length (max.) 6 m max. 6 m max. 6 m max. Total drop line length (max.) 39 m max. 78 m max. @@@@@@@@@@@@connected. E3, E6 D Event Inputs Models with Terminal Blocks <1> <3> N/C S-TMR HOLD Models with Connectors <2> <4> 2: S-TMR 4: RESET 6: COM 8: BANK2 10 10: COM 2 1: N/C 1 3: HOLD 5: COMPENSATION 7: BANK4 9 9: BANK1 · Use terminal pin D6 as the common terminal. · Use NPN open collector or no-voltage contacts for event input.

PNP types are also available. 12 V S-TMR : D2 HOLD : D3 RESET : D4 · Applicable Connector (Sold separately) XG4M-1030 (OMRON) · Special Cable (Sold separately) COMPENSATION K32-DICN (OMRON) (XG4M-1030 with 3-m cable) COM The following signals depend on the model: S-TMR: Used by the K3HB-R only. COMPENSATION: Used by the K3HB-C only. RESET 4.7 k 3.9 k D6 COM BCD Output Cable Model K32-BCD K3HB end Shape Connected device end (PLC, display device, etc.) Pin arrangement COMMON 100 1 101 38 mm Cover: 300 mm 102 46.5 mm D-sub connector (37-pin female) Cover: 17JE-37H-1A (manufactured by DDK) Connector: Equivalent to 17JE-13370-02 (manufactured by DDK) Stand: 17L-002A (manufactured by DDK) 103 104 HDR-E50LPA5 (manufactured by Honda Tsushin Co., Ltd) Connector: HDR-E50MAG1 (manufactured by Honda Tsushin Co., Ltd) 1 2 4 8 1 2 4 8 1 2 4 8 1 2 4 8 1 2 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 4 104 8 OVER DATA VALID RUN COMMON REQUEST MAX REQ.
MIN REQ. HOLD RESET POLARITY HH H PASS L LL COMMON Note: The BCD Output Cable has a D-sub plug. Cover: 17JE-37H-1A (manufactured by DDK); Connector: equivalent to 17JE-23370-02 (D1) (manufactured by DDK) Special Cable (for Event Inputs with 8-pin Connector) Model K32-DICN 9 1 10 2 Cable marking Appearance Pin No. 1 2 3 4 5 6 7 8 9 10 Wiring Signal name N/C S-TMR HOLD RESET N/C COM BANK4 BANK2 BANK1 COM 3,000 mm (3 m) Digital Indicators K3HB-R/-P/-C 23 Derating Curve for Sensor Power Supply (Reference Values) For 12V Maximum current (mA) 140 1 120 100 80 60 40 20 0 -20 -10 0 10 20 30 40 50 60 Ambient temperature (°C) Note: 1.

The above values were obtained under test conditions with the standard mounting.
The derating curve will vary with the mounting conditions, so be sure to adjust accordingly. 2. Internal components may be deteriorated or damaged. Do not use the Digital Indicator outside of the derating range (i.e.
, do not use it in the area labeled (1), above). Internal Block Diagram Pulse input Pulse input circuit Waveform shaping circuit Keys EEPROM BCD BCD I/O · Input circuit · Output circuit · Transistor output circuit Indications Drive circuit Microcomputer Drive circuit Transistor output Event input Digital input circuit Waveform shaping circuit Drive circuit X Relay output Linear output Linear output circuit Drive circuit Drive circuit DeviceNet circuit DeviceNet Sensor power supply Filter Drive circuit Communications driver Communications VO VDD Power supply circuit (isolated) VO VCOM DC-DC Converter (isolated) Power supply 24 Digital Indicators K3HB-R/-P/-C BCD Output Timing Chart A REQUEST signal from a Programmable Controller or other external device is required to read BCD data. Single Sampling Data Output 20-ms pulse min. (50 ms max.) REQ. MAX.MIN. DATA All data "High" Data All data "High" Continuous Data Output REQ. MAX.MIN.

DATA All data "High" Data 1 Data 2 DATA VALID Approx. 30 ms 40 ms 16 ms DATA VALID Approx. 30 ms 40 ms 64 ms 24 ms 40 ms 64 ms 24 ms The data is set in approximately 30 ms from the rising edge of the REQUEST signal and the DATA VALID signal is output. When reading the data from a Programmable Controller, start reading the data when the DATA VALID signal turns ON. The DATA VALID signal will turn OFF 40 ms later, and the data will turn OFF 16 ms after that. Measurement data is output every 64 ms while the REQUEST signal remains ON. Note: If HOLD is executed when switching between data 1 and data 2, either data 1 or data 2 is output depending on the timing of the hold signal. The data will not go LOW. · The K3HB BCD output model has an open collector output, so wired OR connection is possible REQ. (1) K3HB (1) Programmable Controller K3HB (2) REQ.
(2) REQ. (3) DATA (including POL and OVER) and DATA VALID can be used in a wired OR. RUN, HH, H, PASS, L, and LL are always output, with or without a REQUEST signal. Do not used a wired OR connect for these signals. DATA (1) (2) (3) K3HB (3) DATA VALID (See note.
) (See note.) (See note.) Note: Leave 20 ms min. between DATA VALID turning OFF and the REQUEST signal. Programmable Controller Connection Example Digital Indicator Connector pin No.
(See note.) 1.COMMON 2.1 3.2 4.4 5.8 10° IN IN COM IN IN Internal circuit SYSMAC Programmable Controller DC Input Unit Display Unit Connection Example Digital Indicator Connector pin No. (See note.) 1.COMMON 2.

1 3.2 4.4 5.8 10° 23.DATA VALID 24.RUN IN IN 23.DATA VALID 24.RUN To 101 To 102 25.COMMON 26.REQUEST +5 V 240 240 30. RESET 240 240 31.POLARITY (+/- polarity) Transistor Output Unit OUT Internal circuit Internal circuit +5 V 240 240 25.COMMON Short26.REQUEST circuit OUT COM (0 V) 24 VDC +24 V 0V 30.RESET 240 31.
POLARITY (+/- polarity) V O D C B A DP LE V O D C B A DP LE V O D C B A DP LE V O 240 8 8 8 SEC M7E-01D@N2, 01H@N2 <M7E Digital Display Unit> DC power supply Note: The BCD output connector pin number is the D-sub connector pin number when the BCD Output Cable (sold separately) is connected. This number differs from the pin number for the Digital Indicator narrow pitch connector (manufactured by Honda Tsushin Kogyo Co., Ltd.). Refer to the following User's Manual for application precautions and other information required when using the Digital Indicator: K3HB-R/P/C Digital Indicator User's Manual (Cat.
No. N136) The manual can be downloaded from the following site in PDF format: OMRON Industrial Web http://www.fa.omron.co.jp Digital Indicators K3HB-R/-P/-C 25 Component Names and Functions Max./Min. status indicator Turns ON when the maximum value or minimum value is displayed in the RUN level. PV display Displays PVs, maximum values, minimum values, parameter names, and error names. Level/bank display In RUN level, displays the bank if the bank function is ON.

(Turns OFF if the bank function is OFF.) In other levels, displays the current level. Position meter Displays the position of the PV with respect to a desired scale. Comparative output status indicators Display the status of comparative outputs. HH H P L LL SV display Max Min B L CMW Hold HH T LL H L Displays SV and monitor values. Status indicators Display CMW Hold Function Lit when communications writing is ON (enabled) and not lit when OFF (prohibited). Turns ON/OFF when hold input turns ON/OFF. HH T LL H L MAX/MIN LEVEL MODE SHIFT UP SV display status indicators K3HB-R Indicator T HH, H, L, LL Indicator HH, H, L, LL Indicator 5 T 4 1 3 2 Function Turns ON when parameters for which teaching can be performed are displayed. In RUN level, turn ON when the comparative set value HH, H, L, or LL is displayed. K3HB-P Function In RUN level, turn ON when the comparative set value HH, H, L, or LL is displayed.
HH LL H L K3HB-C Function Turns ON when parameters for which teaching can be performed are displayed. In RUN level, turn ON when the comparative set value 1, 2, 3, 4, or 5 is displayed. T 5, 4, 3, 2, 1 MAX/MIN Key Used to switch the display between the PV, maximum value, and minimum value and to reset the maximum and minimum values. LEVEL Key Used to switch level. MODE Key Used to switch the parameters displayed.
SHIFT Key Used to change parameter settings. When changing a set value, this key is used to move along the digits. UP Key When changing a set value, this key is used to change the actual value. When a measurement value is displayed, this key is used to execute or clear the forced-zero function or to execute teaching. 26 Digital Indicators K3HB-R/-P/-C Dimensions 101.
*2 91 Terminal cover (included) Character Size for Main Display (mm) PV display SV display 14.2 100 (112) 7.6 4.9 Panel Cutout Dimensions 120 min. 3.5 75 min. 92+0.8 0 12 1.3 96 2 95 * 45+0.6 0 48 44.*

*8 *DeviceNet models: 97 mm Terminal: M3, Terminal Cover: Accessory Wiring Precautions · For terminal blocks, use the crimp terminals suitable for M3 screws. · Tighten the terminal screws to the recommended tightening torque of approx. 0.5 N·m. · To prevent inductive noise, separate the wiring for signal lines from that for power lines. Mounting Method 1. Insert the K3HB into the mounting cutout in the panel. 2. Insert watertight packing around the Unit to make the mounting watertight. Watertight packing Wiring · Use the crimp terminals suitable for M3 screws shown below.*
5.8 mm max.

5.8 mm max. Unit Stickers (included) · No unit stickers are attached to the Digital Indicator.
· Select the appropriate units from the unit sticker sheets provided. 3. Insert the adapter into the grooves on the left and right sides of the rear case and push until it reaches the panel and is fixed in place. Adaptor LCD Field of Vision The K3HB is designed to have the best visibility at the angles shown in the following diagram. Note: For measurements for commercial purposes, be sure to use the unit required by any applicable laws or regulations.
10° 30° Waterproof Packing The waterproof packing ensures a level of waterproofing that conforms to NEMA 4X. Depending on the operating environment, deterioration, contraction, or hardening may occur and replacement may be necessary. In this case, consult your OMRON representative. Digital Indicators K3HB-R/-P/-C 27 Main Functions Main Functions and Features Measurement Function Input Compensation func RPC Auto-zero Times at.za, at.zb R The K3HB-R has the following six functions for receiving and displaying input pulses. F1: Rotation (rpm)/circumferential speed F2: Absolute ratio F3: Error ratio F4: Rotational difference F5: Flow rate ratio F6: Passing time The K3HB-P has the following six functions for receiving and displaying input pulses. F1: Passing speed F2: Cycle F3: Time difference F4: Time band F5: Measuring length F6: Interval The K3HB-C has the following three functions for receiving and displaying input pulses. F1: Individual inputs F2: Phase differential inputs F3: Pulse counting input The frequency is forced to zero if there is no pulse input for a set period. Input Compensation compn, com-p C The display can be changed to a preset compensation value using the compensation input.

Key Operations Teaching RC The present measurement value can be used as a scaling value. Key Protection RPC Key protection restricts level or parameter changes using the keys to prevent unintentional key operations and malfunctions. Filters Average Processing avg-t, avg-n R Average processing of input signals with extreme changes or noise smooths out the display and makes control stable. Input Types in-ta, in-tb in-ta C RP Specify the types of sensor connected to input A and input B. 28 Digital Indicators K3HB-R/-P/-C Outputs Comparative Output Pattern Display out-p RPC Display Value Selection disp RPC Standard, zone, and level comparative output patterns can be selected for comparative outputs. The display value can be set to the present value, the maximum value, or the minimum value. Hysteresis hys R Display Color Selection color RPC Prevents comparative outputs from chattering when the measurement value fluctuates slightly near the set value. The present value display color can be set to green or red. The color of the present value can also be switched according to the comparative output. Output Refresh Stop o-stp RP Holds the output status when a comparative result output other than PASS turns ON.
Display Refresh Period d.ref RPC When the input changes rapidly, the display refresh period can be lengthened to control flickering and make the display easier to read. PASS Output Change pass RP Comparative results other than PASS and error signals can be output from the PASS output terminal. Position Meter pos-t, pos-h, pos-l RPC The present measurement value can be displayed as a position in relation to the scaling width on a 20-gradation position meter. Output OFF Delay off-d RPC Delays turning OFF comparatives for a set period.
This can be used to provide sufficient time to read the comparative output ON status when the comparative result changes at short intervals. Prescale ps.ax, ps.ay, ps.bx, ps.
by RPC The input signal can be converted and displayed as any value. Shot Output shot RPC Turns ON the comparative output for a specific time. Comparative Set Value Display sv.dsp RPC Output Logic out-n RPC Select whether or not to display the comparative value during operation. Reverses the output logic of comparative results. Display auto-return Startup Compensation Timer ret s-tmr R RPC Measurements can be stopped for a set time using an external input. Automatically returns the display to RUN level when there are no key operations (e.g., max./min.

switching, bank settings using keys). Output Test test RPC Other Max./Min. Hold Output operation can be checked without using actual input signals by using the keys to set a test measurement value. RP Holds the maximum and minimum measurement values. Linear Outputs lset.c, lset.v, lset.h, lset.l Bank Selection bnk-c RPC RPC A current or voltage proportional to the change in the measurement value can be output.
Switch between 8 comparative value banks using the keys on the front panel or external inputs. A set of set comparative values can be selected as a group. Standby Sequence stdby RP Bank Copy copy RPC The comparison outputs can be kept OFF until the measurement value enters the PASS range. Any bank settings can be copied to all banks. Interruption Memory memo C The measured value can be recorded when the power supply is interrupted.
User Calibration RPC The K3HB can be calibrated by the user. Digital Indicators K3HB-R/-P/-C 29 Common Precautions Precautions !WARNING Do not touch the terminals while power is being supplied. Doing so may possibly result in electric shock. Make sure that the terminal cover is installed before using the product. Always provide protective circuits in the network.
Without protective circuits, malfunctions may possibly result in accidents that cause serious injury or significant property damage. Provide double or triple safety measures in external control circuits, such as emergency stop circuits, interlock circuits, or limit circuits, to ensure safety in the system if an abnormality occurs due to malfunction of the product or another external factor affecting the product's operation. Precautions for Safe Use 1. Do not use the product in the following locations. · Locations subject to direct radiant heat from heating equipment · Locations where the product may come into contact with water or oil · Locations subject to direct sunlight · Locations where dust or corrosive gases (in particular, sulfuric or ammonia gas) are present · Locations subject to extreme temperature changes · Locations where icing or condensation may occur · Locations subject to excessive shocks or vibration 2. Do not use the product in locations subject to temperatures or humidity levels outside the specified ranges or in locations prone to condensation. If the product is installed in a panel, ensure that the temperature around the product (not the temperature around the panel) does not go outside the specified range.

3. Provide sufficient space around the product for heat dissipation. 4.

Use and store the product within the specified temperature and humidity ranges. If several products are mounted side-by-side or arranged in a vertical line, the heat dissipation will cause the internal temperature of the products to rise, shortening the service life. If necessary, cool the products using a fan or other cooling method. 5. The service life of the output relays depends on the switching capacity and switching conditions. Consider the actual application conditions and use the product within the rated load and electrical service life. Using the product beyond its service life may result in contact welding or burning. 6. Install the product horizontally. 7.
Mount to a panel between 1 and 8-mm thick. 8. Use the specified size of crimp terminals (M3, width: 5.8 mm max.) for wiring.
To connect bare wires, AWG22 (cross section: 0.326 mm2) to AWG14 (cross section: 2.081 mm2) to wire the power supply terminals and AWG28 (cross section: 0.081 mm2) to AWG16 (cross section: 1.309 mm2) for other terminals.
(Length of exposed wire: 6 to 8 mm) 9. In order to prevent inductive noise, wire the lines connected to the product separately from power lines carrying high voltages or currents. Do not wire in parallel with or in the same cable as power lines. Other measures for reducing noise include running lines along separate ducts and using shield lines. 10.Ensure that the rated voltage is achieved no longer than 2 s after turning the power ON. 11.Allow the product to operate without load for at least 15 minutes after the power is turned ON. 12.Do not install the product near devices generating strong highfrequency waves or surges.

When using a noise filter, check the voltage and current and install it as close to the product as possible. 13.Do not use thinner to clean the product. Use commercially available alcohol. 14.Be sure to confirm the name and polarity for each terminal before wiring the terminal block and connectors. 15.Use the product within the noted supply voltage and rated load. 16.Do not connect anything to unused terminals.
17.Output turns OFF when the mode is changed or settings are initialized. Take this into consideration when setting up the control system. 18.Install an external switch or circuit breaker that complies with applicable IEC60947-1 and IEC60947-3 requirements and label them clearly so that the operator can quickly turn OFF the power.
19.Use the specified cables for the communications lines and stay within the specified DeviceNet communications distances. Refer to the User's Manual (Cat. No. N129) for details on communications distance specifications and cables.
!CAUTION Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in minor electric shock, fire, or malfunction. Do not use the product in locations where flammable or explosive gases are present. Doing so may occasionally result in minor or moderate explosion, causing minor or moderate injury, or property damage. Do not attempt to disassemble, repair, or modify the product. Doing so may occasionally result in minor or moderate injury due to electric shock. Do not use the equipment for measurements within Measurement Categories II, III or IV (according to IEC61010-1). Doing so may occasionally cause unexpected operation, resulting in minor or moderate injury, or damage to the equipment. Use the equipment for measurements only within the Measurement Category for which the product is designed. Perform correct setting of the product according to the application.

Failure to do so may occasionally cause unexpected operation, resulting in minor or moderate injury, or damage to the equipment. Ensure safety in the event of product failure by taking safety measures, such as installing a separate monitoring system. Product failure may occasionally prevent operation of comparative outputs, resulting in damage to the connected facilities and equipment. Tighten the screws on the terminal block and the connector locking screws securely using a tightening torque within the following ranges. Loose screws may occasionally cause fire, resulting in minor or moderate injury, or damage to the equipment. Terminal block screws: 0.43 to 0.58 N·m Connector locking screws: 0.18 to 0.22 N·m Make sure that the product will not be adversely affected if the DeviceNet cycle time is lengthened as a result of changing the program with online editing.
Extending the cycle time may cause unexpected operation, occasionally resulting in minor or moderate injury, or damage to the equipment. Before transferring programs to other nodes or changing I/O memory of other nodes, check the nodes to confirm safety. Changing the program or I/O memory of other nodes may occasionally cause unexpected operation, resulting in minor or moderate injury, or damage to the equipment. 30 Digital Indicators K3HB-R/-P/-C 20.Do not pull the DeviceNet communications cables with excessive force or bend them past their natural bending radius.
@@Doing so will cause product failure or malfunction. @@@@2. @@In order to prevent inductive noise, wire the lines connected to the terminal block separately from power lines carrying high voltages or currents. Do not wire in parallel with or in the same cable as power lines. Other measures for reducing noise include running lines along separate ducts and using shield lines.
Example of Countermeasures for Inductive Noise on Input Lines + Signal input - 2 conductors with shield Digital Indicator 4. If a noise filter is used for the power supply, check the voltage and current, and install the noise filter as close to the product as possible. 5. Reception interference may occur if the product is used close to a radio, television, or wireless. Digital Indicators K3HB-R/-P/-C 31 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. LIMITATIONS OF LIABILITY OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS, OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

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