



How to program keyence sensor

How to set keyence sensor.

96129E Digital Laser Sensor LV-N10 Series User's Manual Read this manual before use. Keep this manual in a safe place for future reference. Introduction This manual describes the basic operations of the LV-N10 Series. Read this manual carefully to ensure safe performance and function of the LV-N10 Series. Keep this manual in a safe place for future reference. Ensure that the end user of this product receives this manual. Symbols are used in this manual to alert you to matters concerning the prevention of injury and product damage. Always read these sections. It indicates a hazardous situation which, if not avoided, will result in DANGER death or serious injury. It indicates a hazardous situation which, if not avoided, could result WARNING in death or serious injury. Failure to follow the instructions may lead to minor or moderate CAUTION injury. Failure to follow the instructions may lead to product damage as NOTICE well as property damage. Important Indicates cautions and limitations that must be followed during operation.



Point Indicates additional information on proper operation. Reference Indicates tips for better understanding or useful information. Indicates reference pages. General Precautions • This product is only intended to detect objects. Do not use this product for the purpose of protecting a human body or a part of the human body. • This product is not intended for use as an explosion-proof prod- WARNING uct. Do not use this product in a hazardous location and/or potentially explosive atmosphere. • This product uses DC power. The prod- uct may explode or burn if an AC voltage is applied. • Do not wire the amplifier line along with power lines or high-ten- sion lines, as the sensor may malfunction or be damaged due to noise.

• When using a commercially available switching regulator, ground the frame ground terminal and ground terminal. NOTICE • Do not use the LV-N10 Series outdoors, or in a place where extraneous light can enter the light-receiving element directly. • Due to individual dispersion characteristics and the difference in sensor head models, the maximum sensing distance or dis- played value may not be the same on all units. Safety Precautions on Laser Product • This product uses a semiconductor laser for the light source. • Use of controls or adjustments or performance or procedures other than those specified herein may result in hazardous radia- tion exposure. • Follow the instructions mentioned in this manual. Otherwise, WARNING injury to the human body (eyes and skin) may result. Precautions on Class 1 laser products •Do not stare into the beam. •Do not disassemble this product.



## Laser emission from this product is not automatically stopped when it is disassembled.

LV-NH32/NH35/NH37/LV-S31/S41/S41L/S61/ Model NH42/NH62/NH100/ LV-S62/S63 S71/S72 NH110/NH300 Wavelength 660 nm 655 nm IEC60825-1 in accordance with the requirements of Laser Transmission OFF input is set for external input, the laser transmission OFF input is set for external input on (2 ms or longer). The transmission of Laser transmission of the external input is one can be stopped by turning the external input is one can be stopped by turning the external input on (2 ms or longer). is turned OFF, the laser transmission will resume within 20 ms. Precautions on Regulations and Standards UL Certification This product is a UL/C-UL Listed product. (Contact KEYENCE for information on heads which support UL-certification.) •UL File No. E301717 •Category NRKH, NRKH7 •Enclosure Type 1 (Based on UL50) Be sure to consider the following requirements when using this product as a UL/C-UL Listed Product. • Use a power supply with Class 2 output defined in NFPA70 (NEC: National Electrical Code). • Power supply voltage is 10 - 30 VDC. • Power supply voltage is 10 - 30 VDC. device which is rated 30V or more and not more than 1A. •Use this product under pollution degree 2. CE Marking Keyence Corporation has confirmed that this product complies with the essential requirements of the applicable EC Directive, based on the following specifications. Be sure to consider the following specifications when using this product in a member state of the European Union. EMC Directive (2004/108/EC) • Applicable standard EMI : 60947-5-2, Class A EMS : 60947-5-2 When connecting with the NU-CL1, always install in a conductive enclosure (control panel, etc.), and wrap a ferrite core (E04SR401938 manufactured by Seiwa Electric Mfg. Co., Ltd.) one turn around the sensor head cable. These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of the EMC Directive. 2 - Digital Laser Sensor LV-N10 Series User's Manual - Manual Organization 1 2 3 4 5 6 Before Using Installation and Connection Basic Operation Settings for Advanced Functions. Provides procedures for installing sensor amplifiers and cables, as well as operating precautions. Explains basic instructions for operating and settings the sensor amplifiers. Describes settings for advanced functions, circuit diagrams and dimensions of the LV-N10 Series. Provides the troubleshooting instructions and initial settings (default values). • When you "Forgot the operation methods" or "Want to find the operation procedures" J Go to Pages 3-2, 4-2 • When you "Want to try out the LV-N10" JGo to Chapters 3 and 4 • When you "Want to troubleshoot the .. 1 Safety Precautions on Laser Product... LV-N10" JGo to Chapter 6 (Troubleshooting) - Digital Laser Sensor LV-N10 Series User's Manual - 3 Safety Precautions... ... 1 General Precautions . ... 1 Precautions on Regulations and Standards .. ... 2 Manual Organization .

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following agginment and accessories are included in the package. W	the have there used in such as the number of the second of the second se	However in the event of missing defective or broken ite	me contact your poprost KEVENCE office Sonse	a Laser Serisor LV-N10 Series Oser's Manual - 1-1	struction manual x 1 Sonsor Hoad LV NH32* LV NH35*
Eacus lock Plastic Mounting bracket set Mounting bracket set Trans	mitter scrow driver Mounting bracket × 1 Mounting bracket × 1 D	100000001, in the event of missing, detective of bloken he ato put x 1 Plato put x 1 M3 x 18 corow x 2 M3 x 18 cor	ans, contact your hearest RETENCE once. Sense	I Ampimer LV-N10 Series Sensor ampimer × 1 ms	black and Mounting bracket set Transmitter Transmitter
(Tocus lock reashed Mounting blacket set Mounting blacket set reash	te nut x 1 M3 x 18 screw x 2 Receiver M3 x 18 screw x 2 Receiver	r I V-NH62* I V-NH100/NH110* Reflector Mounting brack	$e_{W} \sim 2$ Focus fing Receiver framshifter/Receiver	() × 1 Mounting bracket × 1 Transmitter/ Plate nut	t x 1 Receiver M3 x 18 screw x 2 Grav cable Black cable
1-2 - Digital Laser Sensor I V-N10 Series User's Manual - 1-1 Checkin	ng the Package Contents I V-NH300* I V-S31 Transmitter (T) Received	ver (R) Operation Mounting bracket set indicator (red) Tra	$\alpha$ ansmitter FAR indicator Adjustment screwdriver	(red) F Receiver I F IUST (center) N N indicator (a	$\tau \sim 1$ Receiver M3 $\times$ 10 screw $\sim 2$ Oray cable black cable
ndicator (red) Grav cable Plate nut x 1 trimmer M3 x 15 screw x 2	IV-S41/S411 Receiver Operation indicator (red) Receiver Transmit	ter I.V-S61 Mounting Transmitter bracket x 1 Mounting I	Reflector bracket set (R-6) x 1 Operation Mountin	f(a) = f(a) +	$M_{\rm M}$ $M_{M$
Receiver LV-S62 LV-S63 Mounting Reflector Transmitter/ Reflector (	$(R-6L) \times 1$ bracket set $(R-9) \times 1$ Receiver Operation L-mounting bra	cket x 1 Spot selection switch Transmitter/indicator M4	nut x 3 (red) M4 x 30 screw x 3 Operation indic	ator Receiver (red) LV-S71/S72 Operation indicato	(red) Mounting bracket x 2 Beam axis alignment plate x
1 Nut $\times$ 4 Spacer $\times$ 2 Washer $\times$ 2 Transmitter Receiver Œ30 *There	is a bar LED monitor on the sensor head LV-NH32/NH35/NH37/NF	H42/ NH62/NH100/NH110/NH300. Bar LED Monitor (Seg	uenced with sensor amplifier) Stable light $\pm 10\%$	Turns ON according to reception and higher the re	eceived light intensity Setting with respect to the set value.
value The stability level of the Stable -10% blocking and higher curre	ent detection is displayed. If stable light reception or stable blocking	g is disabled because of the surrounding environment or o	changes in the workpiece, readjust the sensitivity	Bar LED monitor excess gain display With the 2-o	output type sensor amplifier, if the channel switch is set to
1, the output 1 excess gain is shown. If set to 2, the output 2 excess of	gain is shown Digital Laser Sensor LV-N10 Series User's Manual	1-3 Display/control unit Expansion connector*1 Hold loc	k lever Expansion connector*1*2 Hook Dust cove	r M8 connector (LV-N11C /N12C ) Connection cab	le (LV-N11 /N12 /N11MN) w/o cable (LV-N10) *1 When
shipped from the factory, the expansion cover is installed. *2 This is	not installed on the main unit (LV-N11N/N11P/N11CN/N11CP/N11?	MN). 1-4 - Digital Laser Sensor LV-N10 Series User's Mar	uual - 1-2 Part Names Display/control unit (1)-2 (1	)-1(10) (9) (8) (7) (2) (3) (4) (5) (6)-1* (6)-2* * Not a	available for the LV-N10. Item Description (1)-1 Operation
ndicator Indicates the current output (detection) status of chan- (2-o	output type) nels 1 and 2 separately. (1)-2 Operation indicator Indica	ates the current output (detection) status. (1-output type)	(2) [SET] button Used when setting sensitivity, e	tc. "Adjusting the Sensitivity" (page 3-5) (3) Setting	g value Displays a setting value or advanced setting item in
this (Displayed in green) area of 7-segment green indicators. Current	t value Displays the current value (received light intensity), or a (4)	selection from advanced settings, in this area of 7-seg- (I	Displayed in red) ment red indicators. (5) Manual	button Used to adjust the setting value or select a	n option. Channel select Toggles between channels 1 and 2
for configuring the (6)-1 switch received light intensity display or ser	asitivity setting. (2-output type) "2-output Settings ()" (page 4-33) C	Changes power modes. Power select switch SEL: Allows yo	ou to set a power mode using the "Chang- (6)-2 (1	-output type) ing Power Modes" function of basic s	setup. M: Fixes the power mode to "MEGA mode". "Locking
n MEGA Mode" (page 3-22) (7) [PRESET] button Used for presetting	g or setting values or parameters. "Adjusting the Sensitivity" (page 7	3-5) (8) [MODE] button Used for toggling L-on/D-on, proce	eeding to advanced settings, or confirming select	ions. Lights when a DATUM mode is in effect. (9) I	DTM indicator "DATUM1 mode" (page 4-9) "DATUM2
mode" (page 4-11) (10) PST indicator Lights when preset value is set	ί.				
'Adjusting the Sensitivity" (page 3-5) - Digital Laser Sensor LV-N10 S	Series User's Manual - 1-5 1-2 Part Names MEMO 1 Using Before 1-	-6 - Digital Laser Sensor LV-N10 Series User's Manual - 2	This chapter provides procedures for installing s	ensor amplifiers and cables, as well as operating p	precautions. 2-1 Installing Sensor
Amplifiers 2-2 2-2 Connecting the Sensor Amplif	fier to the Sensor Head 2-5 2-3 Mounting and Adjusting the Sens	or Head 2-6 - Digital Laser Sensor LV-N10 Series U	Jser's Manual - 2-1 2 Connection and Installation	1 Align the claw at the bottom of the main body wi	ith the DIN rail, as shown on the right. While pushing the
main body in the direction of the arrow (1), push down in the direction	on of arrow (2). 2 To release the amplifier, raise the amplifier body i	in the direction of arrow (3) while push- ing in the direction	on of arrow (1). (3) (2) (1) Installation on a wall R	eference This method applies only when using the	main unit independently.
If the main unit is connected with an expansion unit(s), use the meth	od of mount- ing on a DIN rail. 1 Mount the amplifier on the amplifi	er mount- ing bracket (OP-73880, sold separately), using	the same manner as "Mounting on a DIN rail". 2	Secure the unit with two M3 screws as OP-73880 s	shown in the illustration.
Connecting multiple amplifiers Up to 16 expansion units can be conn	lected to 1 main unit. Note, however, that the 2- output type is cons	idered as 2 expansion units. Mount on DIN rail and instal	I on metal surface when connecting WARNING m	ultiple amplifiers or mounting main units together	
2-2 - Digital Laser Sensor LV-N10 Series User's Manual - 2-1 Installin	ng Sensor Amplifiers Point • Contact your nearest KEYENCE office	when connecting a unit other than the N-bus (KEYENCE'	s wire-saving system) compatible sensor amplifie	r, including LV-N10 Series, or the NU Series comm	nunication module. • Turn the power off before connecting
multiple expansion units. • Do not touch the expansion connector wit.	h your bare hands. • When using the LV-N10 Series as a main unit, i	use the products within the expansion unit's power voltag	e range if the power voltage range of the expansion	on unit is narrower than the LV-N10 Series. I Ren	nove the protection covers from the main unit and
expansion unit(s). 2 Mount the main unit and expansion unit(s) on the	e DIN rall. (2) 3 (1) Slide the main unit and expansion unit(s) togeth	fer. Engage the 2 claws of the expansion unit with the rec	esses on the main unit side until you hear/ feel 4	a click. Attach the separately sold end units (OP-20	6/51: a set of 2 units) to the DIN rall in the same manner as
Step (2). 5 Secure the amplifiers between the end units. Fighten the s	screws at the top (2 screws × 2 units) with a Phillips screwariver to	TIX the end units.	o for Concor Amplifions Doint • Do sure to turn of	the newer before wiring . Inculate each input on	output apple that will not be used
DP-20/51 (a set of 2 units) 2 Connection and Installation - Digital Las	Ser Sensor LV-N10 Series User's Manual - 2-3 2 Connection and ins	stallation 2-1 installing Sensor Amplifiers wiring Diagram	S IOF Sensor Ampimers Point • Be sure to turn on External input (4) Output * LV N11CN/N11CD or	the power before wiring. • Insulate each input or	Output Capie that will not be used.
White color pin No. 1 Prown 2 White 2 Plus 4 Plack Manitor output to	1 WIIILE OULPUL 2 FIIK EXLETIAL IIIPUL * LV-NTTN/NTTP OILY MO COL	Infector type (LV-N11C /N12C ) (1)* (3)* 10 to 30 VDC (2)	external input (4) Output * LV-N11CN/N11CP of	IIY OF-75004 4 2 (Cable leligtii: 2 III) 5 1 OF-75005	5 5) for the input/output circuit diagrams
Mile color pill No. I brown 2 Wille 5 blue 4 black Moliitor Oulput by	ye (Ly-mining) brown to to bold lock lower down. 2 Lift the beek up	and insort the connect tor completely 3 Lower the beak t	a the position shown in the drawing, and null up t	the hold lock lover Doint • When connecting to a	liferent concer hard model the settings for the previously
2-4 - Digital Laser Selisur LV-INTO Series User's Manual - I Open the	tings "Initialization of Settings (Reset to Initial Values)" (page 2.21)	•When shortening the sensor head cable follow the instr	u the position shown in the "Sensor Head Connector Ass	ambly Procedures" included with the sensor head	2 Connection and Installation - Digital Laser Sonsor IV
V10 Series User's Manual - 2-5.2 Connection and Installation IV NH	(32/NH35/NH37/NH42/NH62/S63 Use the included mounting brack	et The tightening torgues are shown below IV NH22/NH	$135/NH37/NH/2/NH62.03 N.m IV_S63.06 N.m$	IV-NH32 shot diameter adjustment Turn the focu	a connection and instantation - Digital Laser Sellson LV-
adjusting tighten fix the focus lock screw	52/141155/141142/141162/505 USe the included moulding black	ct. The agritening torques are shown below. LV-MII32/MI	155/141157/141142/141102, 0.5 1V III EV-505; 0.0 IV II	The second shore a shore a second sec	is ring to adjust the size of the spot analieter. After
V NH100/NH110/NH200 Using the following entional brackets to m	nount the unit IV NH100/NH100. Vertical mounting bracket (IV B	101) or horizontal mounting bracket (IV P102) IV NH200	. Vortical mounting bracket (IV B201) or horizor	tal mounting bracket (IV B302) Vertical mounting	t bracket (IV B101/IV B301) Included, Mounting bracket 2

LV-NH100/NH110/NH300 Using the following optional brackets to mount the unit. LV-NH100/NH100: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B101) or horizontal mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV-B101) or horizontal mounting bracket (LV-B102) LV-NH300: Vertical mounting bracket (LV

pcs., plate nut 2 pcs., M3 × 18 screws 4 pcs. 1 Mount as shown on the right. Horizontal mounting bracket (LV-B102/LV-B302) Included: Mounting bracket 2 sets, plate nut 2 pcs., M3 × 18 screws 4 pcs. 1 Mount as shown on the right. Insert the plate nut\* between the sensor section and mounting bracket. \*When using LV-NH100/NH110, the long plate nut is used for the transmitter, and the short plate nut for the receiver. When using LV-NH300, the long plate nut is used for the transmitter. 2-6 - Digital Laser Sensor LV-N10 Series User's Manual - 2-3 Mounting and Adjusting the Sensor Head 2 Adjust the beam axis.

(a) (1)Adjust the beam axis upward by tightening the (a) screw, and downward by loosening the screw. Fix the angle setting with the (b) nut. (2)Adjust the horizontal angle by loosening the fixing section (c). LV-S31 1 Mount using the Included mounting bracket. JF F N N 2 Place a workpiece at the position to be set as the detection center. 3 Turn the trimmer with the Included adjustment screwdriver, and adjust so that the (2) JUS indi- F F cator lights in green. N N J (1) F F F I f the (1) FAR indicator is ON, turn the trimmer J (2) J N N N N clockwise until (2) turns ON. (3) If the (3) NEAR indicator is ON, turn the trimmer Trimmer counterclockwise until (2) turns ON.

When the LV-S31 is connected, the workpiece position is numerically displayed on the main screen (red display) using the center position as [5000]. If adjust the workpiece position as [5000]. If adjust the workpiece position as [5000]. The display changes as follows according to the workpiece position. Display Meaning Near ---- Out of detection range nEAr The detector is nearer to the sensor side than numerical dis- play range 5000 Centering on 5000, the value increases from the sensor fAr The workpiece is farther from the sensor than the numerical display range Far ---- Out of detection range 2 Connection and Installation 2-3 Mounting and Adjusting the Sensor Head LV-S41/S41L Always use the included mounting bracket. 1 Attach the mounting bracket. 1 Attach the mounting bracket. 1 Attach the mounting bracket (OP-84350), back surface mounting bracket (OP-84350), back surface mounting bracket (OP-84350) Included: Mounting bracket ×1 / plate nut × 1 / M3 × 7.3 screw × 1 1 Insert the plate nut into the mounting slot on the back of the head. 2 Align the protrusion with the hole on the top of bracket, and attach with the included mounting screws.

The tightening torque is 0.5 N m or less. 2-8 - Digital Laser Sensor LV-N10 Series User's Manual - 2-3 Mounting and Adjusting the Sensor Head Back surface mounting bracket (optional: OP-84349) Included: Mounting bracket  $\times 1 / M3 \times 18$  screw  $\times 21$  Attach as shown on the right. The tightening torque is 2 0.5 N m or less. Adjust the beam axis. (1)The beam axis angle can be adjusted sideways by loosening screws (a), (b), and (c) and moving the bracket left and right. Always tighten screw (b) first. (2)The beam axis can be adjusted in the downward direction by tightening the bottom screw as shown with the arrow. It can be adjusted in the upward direction by loosening the same screw. a (c) b To move the beam axis downward (c) ab To move the beam axis upward Point Always adjust the beam axis in the order of steps (1) and (2). The screws shown in (1) could be damaged if these steps are reversed. Horizontal mounting bracket (optional: OP-84351) Included: Mounting bracket  $\times 1 / M3 \times 18$  screw  $\times 21$  Attach as shown on the right. The tightening torque is 0.5 N m or less. Point When mounting the sensor head in the direction opposite of that shown above, set the spot selection switch before mounting. 2 Adjust the beam axis. The beam axis can be adjusted in the downward upward direction by tightening torque is 0.5 N m or less. Point When mounting the same screw.

2 Connection and Installation - Digital Laser Sensor LV-N10 Series User's Manual - 2-9 2 Connection and Installation 2-3 Mounting and Adjusting the Sensor Head LV-S71/S72 1 Attach so that the side on which the T (transmitter) and R (receiver) are printed faces upward. The operation indicator lights are on the printed side. 2 Adjust the beam axis. Fixing nut Axis beam adjustment screw The tightening torque is 1.2 N·m or less. The beam axis can be adjusted in the downward To move the beam axis downward direction by tightening the screw as shown with the arrow. It can be adjusted in the upward direction by loosening the same screw. Adjust so that the beam spot is centered on the receiver. When adjusting, attach the beam axis alignment plate, included with the sensor head, onto the end of the receiver to aid in alignment. Remove the beam axis alignment plate cap when finished adjusting. To move the beam axis alignment plate 2-10 - Digital Laser Sensor LV-N10 Series User's Manual - 3 This chapter explains basic instructions for operating and setting the sensor amplifier.

## Switch with the ( ) button.

Reflective model: Press the [PRESET] button 2 Set the current received light intensity when a workpiece is present. Thrubeam/Retro- 3-6 to "100.0". (Preset) reflective model: Press the [PRESET] button + 3 received light intensity ".0". 3-7 button in the state to be set as ".0". (Work-preset) Set the received light intensity slightly While the PST indicator is OFF, press and hold Adjusting the 4 higher than when the setting was the [PRESET] button. Reflective model: When 3-8 made, to "100.0". (Maximum sensitiv- no workpiece is present.

Thrubeam/Retro- sensitivity and ity preset) reflective model: When a workpiece is present. integrating the display to "100.0" Automatically register "100.0" and ".0" 5 when workpiece passes by. (Full Auto 3-9 PST indicator is OFF. preset) 6 Cancel the various preset functions. Press and hold the [PRESET] button. 3-6 Set the display for preset execution to 1. Press and hold the [MODE] button, but- ton and [SET] button simultaneously. "1000" (LV-NH100/NH110) or "3000" 7 2. Press the [MODE] button. 3-11 (LV-NH300). (Preset area display 3. Select "Pr-d ArEA" with () button, and mode) press and hold the [MODE] button. Set the setting value at the midpoint 1. Press the [SET] button once when a work- 8 between the received light intensity piece is present.

3-12 values when a workpiece is present 2. Press the [SET] button once when no work- and absent. (2-point calibration) piece is present. Set the setting value slightly higher Reflective model: Press and hold the [SET] but- 9 than the received light intensity value ton when no workpiece is present. Thrubeam/ 3-13 at which the setting was made. (Maxi-Retro-reflective model: Press and hold the Adjusting the mum sensitivity calibration) [SET] button when a workpiece is present. Set the setting value automatically sensitivity Press and hold the [SET] button when a workpiece is present. Set the setting value to the base point 1. Press the [SET] button once when no work-piece is present. 11 where the workpiece is positioned.

3-15 2. Press and hold the [SET] button at the posi- (Positioning calibration) tioning point. 12 Finely adjust the setting value directly. Press the () button. 1-5 Shifting the 13 Set the current display to ."0". (Zero Press the [PRESET] button + button when 3-17 received light shift) the PST indicator is OFF. intensity to ."0" 14 Cancel the zero shift function. Press and hold the [PRESET] button. 3-17 3-2 - Digital Laser Sensor LV-N10 Series User's Manual - 3-1 Quick Reference Purpose Description Operation procedures Reference page 1. Press and hold the [SET] button and [PRE- SET] button. Loading the Load the recommended settings. 2. Display the LoAd screen with the () recommended settings are presses the [MODE] button. 3-19 (Recipe function) tings 3. Select the recipe such as r-1 FALL with the () button. 4. Press the [MODE] button to execute. 1. Press and hold the [SET] button and [PRE- SET] button. Initializing (Restore to factory default 2. Press the [MODE] button while on the rSt 3-21 screen. tings settings) 3. Select init with the () button. 4. Press the [MODE] button to execute. Displaying the out- Set the channel switch to . put 2 display screen. 4-33 \* The output 2 sensitivity and advanced set- screen with the tings can be modified in this state. 2-output type Switching to the maximum received 18 Adjust the power mode to the MEGA Set the power select switch to . 3-22 light intensity mode. power mode 19 Activating the key lock Press and hold the [MODE] button and the 3-23 () button simultaneously. Preventing 1. Press the () button 10 times while incorrect 21 Activating the password-protected key holding down the [MODE] button to execute.

1. Press the () button 10 times while 22 Deactivating the password-protected holding down the [MODE] button. 3-24 2. Input the password with the () button. key lock 3. Press the [MODE] button to deactivate the key lock. 23 Setting the advanced functions Press and hold the [MODE] button. 4-1 1. Press and hold the [MODE] button, but- Setting to rescale at each preset exe- ton and [SET] button simultaneously. 24 cution so that analog output is "5 V" 2. Press the [MODE] button once or twice. 4-21 output in respect to "100.0". 3. Select "Pr-A PrST" with () button, and Others press the [MODE] button (Advanced Switching the display to extended dis- After setting the sub-display with the advanced function settings, 25 play or received light intensity hold function settings, press the [MODE] button 4-22 etc.) display, etc. (sub-display) twice. Resetting the following values \* Received light intensity hold value 4-24 \* Excess gain hold value Press and hold the [MODE] button and [SET] 26 \* Output when output 2 is in limit set- button. 4-34 ting detection mode 4-35 \* Count value when output 2 is in counter output mode 1. Press and hold the [SET] button and [PRE- SET] button. 27 Saving the settings (custom save) 2. Display the SAVE screen with the () 4-38 button, and press the [MODE] button. Saving and 3. Select yES with the () button. 4-39 3. Select USEr with the () button.

A Press the [MODE] button is execute. - Digital Laser Sensor LV-N10 Series User's Manual - 3-3 This function configures when the output turns ON. 1 When the current received light inten- sity is displayed, press the [MODE] button. Select "D-on" if you want to output the ON signal when the beam is blocked (a work-piece is present.) for a thrubeam or retro-reflective model. Select "L-on" if you want to output the ON signal when the beam is blocked (a work-piece is present.) for the reflective model. Select "L-on" if you want to output the ON signal when the beam is received light intensity displayed.\*2 \*1 If you do nothing for 3 seconds or more or press the [MODE] button, the received light intensity display is pressed. "Sub Display" (page 4-22) Point • When in area detection mode, failing edge detection mode, failing edge detection mode" (page 4-14) "Rising edge detection mode" (page 4-14) "Rising edge detection mode" (page 4-16) "Counter output mode" (page 4-35) • With the 2-output type, channels 1 and 2 can be configured separately. 3-4 - Digital Laser Sensor LV-N10 Series User's Manual - In this manual, the value at which the sensor amplifier's ON/OFF output switches is expressed as the "setting value". The process of adjusting the sensitivity. Its of Sensitivity. All sensitivity digusting the sensitivity is adjusting the sensitivity. Its of Sensitivity digusting the sensitivity. This section explains the methods of the received light intensity is not compensated. This method adjusting the sensitivity is not compensated. This method is useful for predictive maintenance. However, this is not suitable for when highly accurate detection is required. Calibration can be performed in the preset tate within the intensity adjusted just the preset with single operations. The received light intensity is not compensated. This method is useful for predictive maintenance. However, this is not suitable for when highly accurate detection is required. Calibration can be performed in the preset state. Basic method of selectin

Preset "100.0" and ".0" cannot be set The states at which to display regardless of whether a work- Work-preset "100.0" and ".0" can be set ran- 3-7 At times piece is present or absent. domly. like this The moving workpiece moves The sensitivity can be calibrated Full auto preset using a workpiece which moves at 3-9 quickly high speed. Two-point The setting can be established just Basic Using a thrubeam/retro-reflec- by pressing the [SET] button once 3-12 tive / reflective model calibration when a workpiece moves Full auto The sensitivity can be calibrated using a workpiece which moves at 3-9 quickly calibration high speed. Calibration Using in an easily contami- Maximum sensi- This setting prevents malfunctions At times even when using in an easily con- 3-8 nated environment tivity calibration like this taminated environment. Using with positioning cali- A setting suitable for positioning calibration like the sensitivity Preset Function Enabling the preset function Enabling the preset function When the PST indicator is not lit, press the [PRESET] button The PST indicator lights in green. The current value is set to "100.0" and the setting value is set to "50.0".

Green PST lights up Setting value Current value is Workpiece is "."". "Disabling the preset function When the PST indicator turns off, indicator turns off,

Enabling the work-preset function Impotant The work-preset function can be used with the preset function (when preset is enabled). While the preset function is enabled. While the preset function is enabled. The received light intensity at that point is set to ".0". The value set to "100.0" using the preset function does not change. Green PST lights up Current value is ". " Reference Even if the received light intensity is low during preset and is high during work-preset. When the actual received light intensity increases, the display will approach ".0". (The preset saturation level is decreased with respect to "100.0".) Disabling the work-preset function When the PST indicator is lit, press and hold the [PRESET] button. •The PST indicator turns off, indicating that the work-preset function has been disabled. - Digital Laser Sensor LV-N10 Series User's Manual - 3-7 3-3 Adjusting the Sensitivity Maximum Sensitivity Preset Function This function calibrates the reference state to ".0" and the state at which the received light intensity is slightly higher as "100.0".

This function is useful with the reflective model to detect while using the background as a reference. Enabling the maximum sensitivity preset function 1 When no workpiece is present for thrubeam model/retro- reflective model, press and hold the [PRESET] button for 3 seconds or more while the PST indicator is OFF. Release the button when "Auto" flashes. Calibration is complete after the setting value flashes momentarily, and then stops (lights up). The PST indicator lights in green, and the setting value is set to "50.0". Thrubeam Model/Retro-reflective Model Reflective Model Received light intensity Received light intensity No workpiece "100.0" Saturation point "50.0" Setting value ".0" With workpiece & Saturation point Setting ignores the background. Maximum sensitivity setting is not available if the background is more reflective than the workpiece. Point • The maximum sensitivity preset function cannot be executed when the received light intensity is saturated (higher than the value listed in the Extension display on page 4-30). ("-------" will appear during step 1.) • The maximum sensitivity preset function cannot be used when the LV-NH100, NH110 or NH300 is connected, but by holding down the [PRESET] button in the light ON state, the amount of light block at light intensity .0 and light block 100.0 is displayed.

Disabling the maximum sensitivity preset function When the PST indicator is lit, press and hold the [PRESET] button.

•The PST indicator turns off, indicating that the maximum sensitivity preset function has been disabled. 3-8 - Digital Laser Sensor LV-N10 Series User's Manual - 3-3 Adjusting the Sensitivity Full Auto Preset Function This function automatically judges 2 states (workpiece presence/absence, etc.), and calibrates the current value to "100.0" and ".0". This is useful when the detector is moving at high speed, etc. Enabling the full auto preset function 1 When the PST indicator is OFF, con- tinue pressing the [PRESET] button until "Auto" flashes while the workpiece passes through.

2 After the workpiece has completely passed through, release the [PRESET] button. Calibration is complete after the setting value flashes momentarily, and then stops (lights up). The PST indicator lights in green, and the setting value is set as ", and the area near the mainimum value of the received light intensity is saturated (higher than the value listed in Extension display). The PST indicator lights in green, and the setting value is set as ", and the area near the mainimum value of the received light intensity is saturated (higher than the value listed in Extension display). The PST indicator turns off, indicating that the full auto preset function cannot be used when the following functions are set. Disable the function or the setting value is set as ", and the event of the present function is pressed in a stable. Point of the present function is pressed in the value listed in Extension disabled. Point Each preset function cannot be used when the present function is not be used when the following functions are set. Disable the function or change the setting value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is not present value (page 6-4) "The present function is necesnal present value (page 6-4) "The present function for present present value (page 6-4) "The present function (page 6

Supplement (04:05) Additional tools for efficient usage of the MOR function. Case01:Trouble happened during debugging! (06:55) With MOR, commissioning! (07:49) You no longer need to wait hours for the reoccurence of a bug! Case03:Trouble happened during daily operation! (06:10) The production is halted but the machine builder cannot come until next week? Send the MOR replay data to them so that production can restart quickly! PROTOCOL STUDIO, which is a function that simplifies ethernet and serial communication. Preset equipment (08:56) This video explains how to communicate with a preset equipment comes pre-registered in KV STUDIO, so users can start communication by just selecting them. Manually setting equipment (11:34) Non-preset equipment can also be used by setting manually. This video explains the manual setting procedure in PROTOCOL STUDIO. An example of manual setting procedure in PROTOCOL STUDIO using the KEYENCE DL-EN1 as an example. EtherNet/IP® Overview (03:49) This video explains an overview of EtherNet/IP®, which is an industrial network. Communication with Keyence Products (11:42) This video explains how to communicate with KEYENCE products, you only need to select the device to communicate with. Communication with Third-Party Products (18:03) This video explains the setup procedure and programming method when communicating with robots manufactured by other companies.