

CIS-KD Series

KD6R309AX4

KD6R617AX4

KD6R926AX4

KD6R335AX4

KD6R309AX4-NL

KD6R617AX4-NL

KD6R926AX4-NL

Data Sheet

Mitsubishi Electric Corporation
Electronics and Communication Systems Center

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* Camera Link is a trademark or a registered trademark of AIA (Automated Imaging Association).

1. Applied Mode

This document explains about Contact Image Sensor (hereinafter called “CIS”) manufactured by Mitsubishi Electric Corporation and is applied for below products. (Hereinafter called “This Product”)

KD6R309AX4
 KD6R617AX4
 KD6R926AX4
 KD6R335AX4
 KD6R309AX4-NL
 KD6R617AX4-NL
 KD6R926AX4-NL

KD6R309AX4, KD6R617AX4, KD6R926AX4 and KD6R335AX4 are built-in illumination models which equip with illumination consisted of white LED arrays and KD6R309AX4-NL, KD6R617AX4-NL, and KD6R926AX4-NL are Non-illumination models which should be combined with external illuminations.

2. Related Documents

The document related to this product are shown in below.

Table.1 List of the Related Documents

Document ID	Name	Contents
TM-XL499	Data Sheet	This document. Specification and condition of outgoing inspection etc. are described.
TM-XL550	User's Manual	Precautions for using this product and guarantee is described. Please read User's Manual before using this product and use this product according to User's Manual.
TM-XL551	Function Specification	Detailed functions of this product are described. When use the functions do not described on User's Manual, please refer to Function Specification.

3. Product Specifications

Table.2 Specifications

Items			Specification				Remarks
			309AX4, 309AX4-NL	617AX4, 617AX4-NL	926AX4, 926AX4-NL	335AX4	
Imaging element			CMOS Line sensor				304 pixels ×RGB3colors per chip
Valid scanning width (mm)			309.7	619.7	929.6	335.6	
Pixel density (dpi)			600				Between chips are 300dpi
Total pixels (pixel)	Pixel interpolation OFF		7,296	14,592	21,888	7,904	
	Pixel interpolation ON		7,319	14,639	21,959	7,929	
Storing time (μs/line)	Medium -24bit	600dpi	min 44 (45)			Min 48 (48)	@84MHz (Pixel interpolation ON)
		300dpi					
		150dpi	min 31 (32)			Min 37 (37)	
	Base -24bit Medium -30bit	600dpi	min 88 (88)			Min 96 (96)	
		300dpi	min 44 (45)			Min 48 (48)	
		150dpi	min 31 (32)			Min 37 (37)	
Focal position(mm)	AX4 model		52.0				Distance from the datum hole (designed value)
	AX4-NL model		51.4				
Sensor IC Clock (MHz)			34.3				
Output clock frequency (LVDS transfer rate) (MHz)			Max. 84				LVDS output: 48MHz~84MHz ANSI/TIA/EIA-644 Standard
SSCG			Modulation width:±0.25%, Modulation frequency:32KHz				
RoHS			RoHS2(10substances RoHS) comply (note:1)				Not applicable for samples
CE Marking	AX4 model		Compliant		-	Compliant	Models that compliant CE Marking are manufactured after April 2023 and have a CE label. Refer to Fig.3, Fig.4 ,Fig.6, Fig.8 and Fig.9 for the position of the CE label. "-" indicates no compliant.
	AX4-NL model		Compliant		-		
Functions			-Pixel rearrangement, -Dark correction, White correction, Gamma correction -PGA (Programmable Gain Amp) -Illumination(LED) control -Pixel interpolation -Resolution switching -Serial communication -Camera Link™ Configuration Select -Status LED				LED control is not equipped to the Non-illumination models (AX4-NL)
			-Register Control AX3 Compatibility Mode				Applicable from Aug 2023manufactured
Optical system			Rod lens array				2 rows, TC=54 [mm]
Illumination			LED array				Both sides, White LED
Power supply	Sensor		DC 5V x1 (3A Max.)	DC 5V x2 (6A Max.)	DC 5V x3 (9A Max.)	DC 5V x1 (3A Max.)	
	Illumination		DC 24V x1 (0.8A Max.)	DC 24V x2 (1.6A Max.)	DC 24V x3 (2.4A Max.)	DC 24V x1 (0.8 A Max.)	Not required for the Non-illumination models (AX4-NL)
LED Lighting control			Pulse duty adjustment				Not equipped for the Non-illumination models (AX4-NL)
Communication format			Camera Link™ Ver2.1 compliant Serial communication (UART)				Baud rate(kbps):9.6, 19.2, 115.2 Data bit:8bit Parity bit: None Stop bit: 1bit Flow control: None
Timing diagram			Fig. 1, 2				
Outline drawing			Fig. 3~11				

(note1: The exclusive items on AnnexIII 6(a),6(c),7(a),7(c)-I,34 are contained in component parts.)

4. Standard Operation Condition and Measurement Conditions

Table.3 Specifications

Item	Symbol	Specifications		Unit	Refer to
Dark output	DVd	8bit	2~54	digit	A
Maximum white output	DVpmax	8bit	123~244	digit	B
White output uniformity *note 2	UEp	50 MAX		%	C
MTF	MTF	30 MIN		%	D

*note 2: KD6R335AX4 installs the illumination that originally designed for KD6R309AX4, the white output on both 300 pixels on 1st and End side tend to be lower than white output of center part.

A : Dark output (DVd)

(dark correction :OFF, white correction :OFF, illuminations :OFF)

DVd is an output value before dark correction when the illuminations are off.

B : Maximum white output (DVpmax)

(dark correction:OFF, white correction :OFF, illuminations :ON)

DVpmax is a maximum output value when scanning white-reference document, before black and White correction.

DVpmax is defined by a maximum value among R,G,B output.

C : White output uniformity (UEp)

(dark correction:ON, white correction :OFF, illuminations :ON)

The symbols are defined as follows to calculate the White output uniformity.

$$DVEp(n) = DVp(n) - DVd(n)$$

DVEp(n) : nth pixel valid output

DVp(n) : nth pixel output value scanning white-reference document before white correction when the illuminations are on. (Original data of white output)

DVd(n) : nth pixel output value before white correction when the illuminations are off.

$$UEp = \frac{DVEp_{\max} - DVEp_{\min}}{DVEp_{\max}} \times 100 \%$$

DVEpmax : the maximum values of DVEp(n) respectively.

DVEpmin : the minimum values of DVEp(n) respectively.

D : MTF(MTF)

(dark correction: ON, white correction: ON, illuminations: ON)

$$MTF = \frac{IE_{\max} - IE_{\min}}{IE_{\max} + IE_{\min}} \times 100 \%$$

IEmax : The maximum values of DVEp, respectively, obtained every sensor ICs when scanning the MTF test document.

IEmin : The minimum values of DVEp, respectively, obtained every sensor ICs when scanning the MTF test document.

Table.4 Measurement Conditions (Standard Condition of Outgoing Inspection)

Item	Symbol	Specifications	Unit	Remarks
Supply voltage for sensor unit	VDD	+5.0±0.1	V	
Supply voltage for illuminations	VLED	+24.0±0.5	V	Not integrated into Non-illumination models (AX4-NL)
White Chart	—	0.05~0.09	O.D.	Mitsubishi Electric standard (white-basis-chart)
MTF Chart	—	5.68	lp/mm	Mitsubishi Electric standard MTF chart
Position of document	—	52±0.2	mm	AX4: distance from datum hole (nominal focal position)
		51.4±0.2	mm	AX4-NL: distance from datum hole (nominal focal position) * Non-illumination models are tested with Mitsubishi standard LED illuminations.
Storing time	trep	44	μsec	KD6R309AX4/617AX4/926AX4 Medium-24bit RGB
		48	μsec	KD6R335AX4 Medium-24bit RGB
Output clock frequency	—	84	MHz	
LED lighting period	—	37.5	μsec	
Temperature	Ta	23±4	°C	
Resolution	—	600	dpi	
Standard illumination	—	See Section 12	—	Used for inspecting Non-illumination models (AX4-NL Series)

5. Absolute Maximum Ratings

Table.5 Absolute Maximum Ratings

Item	Symbol	Specifications	Unit	Remarks
Supply voltage	VDD	-0.3 ~ 7	V	
	VLED	-0.3 ~ 30	V	
Input voltage 1	VI	-0.3 ~ VDD+0.3	V	LED_CONT
Input voltage 2	VI±	-0.3 ~ 3.5	V	SERTC±, CC1±
Output voltage	VO±	-0.3 ~ 3.5	V	SERTCG±, X0-3±, XCLK±, Y0-3±, YCLK±
Environmental temperature	Ta	+5 ~ +50	°C	In operating temperature
		-5 ~ +55	°C	In storage temperature
Frame temperature	Tw	+5 ~ +70	°C	In operating temperature
Environmental humidity	Rh	10 ~ 90	%(RH)	No dew condensation

6. Operating Conditions (Ta=25°C)

6.1 Standard Operating Conditions (Recommended Operating Conditions)

Table.6 Standard Operating Conditions (Recommended Operating Conditions)

Item	Symbol	Conditions		Specification			Unit	Remarks
				MIN.	TYP.	MAX.		
Supply voltage	VDD	GND basis		4.75	5.25	5.50	V	
	VLED	GND-LED basis		22.8	24.0	25.2	V	Non-illumination models do not have a power supply for light source
Current consumption	IDD	VDD =5.0V	KD6R309AX4, KD6R309AX4-NL	—	2.6	3.00	A	
			KD6R617AX4, KD6R617AX4-NL	—	5.2	6.00		
			KD6R926AX4, KD6R926AX4-NL	—	7.8	9.00		
			KD6R335AX4	—	2.7	3.00		
	ILED	VLED =24V	KD6R309AX4, KD6R335AX4	—	0.4	0.8	A	Non-illumination models do not have a power supply for light source
			KD6R617AX4	—	0.8	1.6		
			KD6R926AX4	—	1.2	2.4		
Input voltage 1	-	LED_CONT		—	GND	—	—	GND : lightning up OPEN : Non-lightning up
Input voltage 2	VIH	ERTC± CC1±	VCM = +1.2V	—	—	+100	mV	ANSI/TIA/EIA-644 Standard
	VIL			-100	—	—	mV	
Input current	IIN		—	-20	—	+20	μA	
Output voltage	VOD	SERTCG±		250	290	450	mV	
	VOS	X0-3±, XCLK± Y0-3±, YCLK±		1.125	1.25	1.375	V	

*1 In case of unstable operation, please increase the voltage within the above specification values.

6.2 Timing Conditions

Table.7 Timing Conditions

Item				symbol	Specification			Unit	Remarks		
					MIN	TYP	MAX				
Scanning cycle	model	output	Resolution	Trep	—	—	—	μsec	fc=84MHz *values for the pixel interpolation process are mentioned in parentheses		
	309AX4	Medium-24bit	600dpi		44(45)						
	309AX4-NL		300dpi		31(32)						
	617AX4		150dpi		31(32)						
	617AX4-NL	Base-24bit	600dpi		88(88)						
	926AX4	Medium-	300dpi		44(45)						
	926AX4-NL	30bit	150dpi		31(32)						
	335AX4	Medium-24bit	600dpi		48(48)						
			300dpi		37(37)						
			150dpi		37(37)						
		Base-24bit Medium-30bit	600dpi		96(96)						
			300dpi		48(48)						
			150dpi		37(37)						
			TyCLK / TxCLK frequency				fc			48	-
LVDS-data setup time(bit0)			Tp0	typ-0.25	3.4	typ+0.25	ns	fc=84MHz			
LVDS-data setup time (bit1)			Tp1	typ-0.25	5.1	typ+0.25	ns				
LVDS-data setup time (bit2)			Tp2	typ-0.25	6.8	typ+0.25	ns				
LVDS-data setup time (bit3)			Tp3	typ-0.25	8.5	typ+0.25	ns				
LVDS-data setup time (bit4)			Tp4	typ-0.25	10.2	typ+0.25	ns				
LVDS-data setup time (bit5)			Tp5	typ-0.25	11.9	typ+0.25	ns				
LVDS-data setup time (bit6)			Tp6	typ-0.25	13.6	typ+0.25	ns				

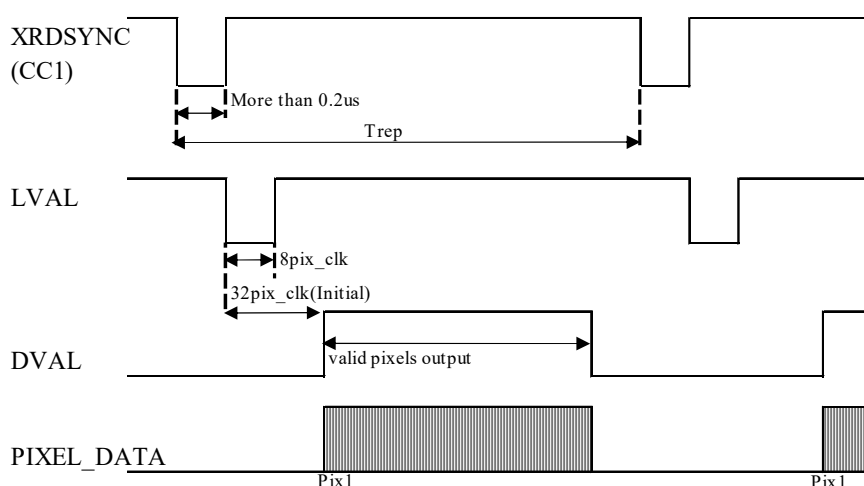
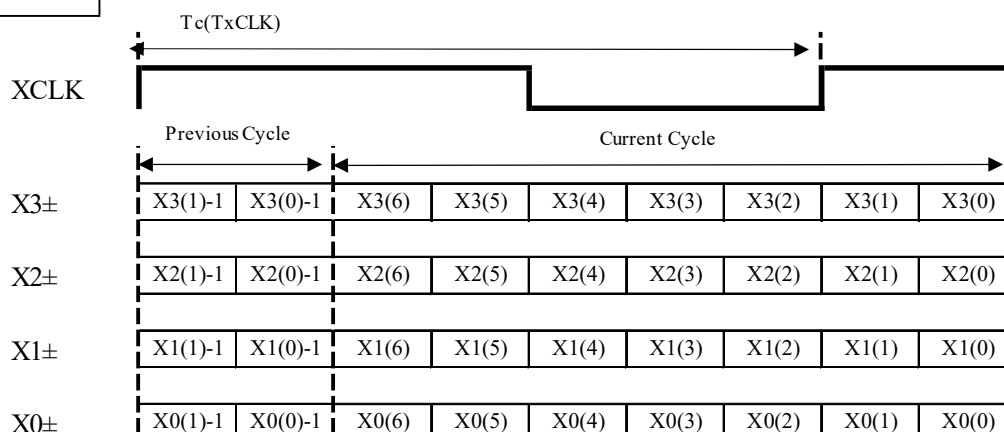


Fig.1 Timing Chart of Horizontal Data Output

In case that LVAL is imported, 24pix offset is generated in comparison with DVAL.

CN12/CN22/CN32



CN12/CN22/CN32

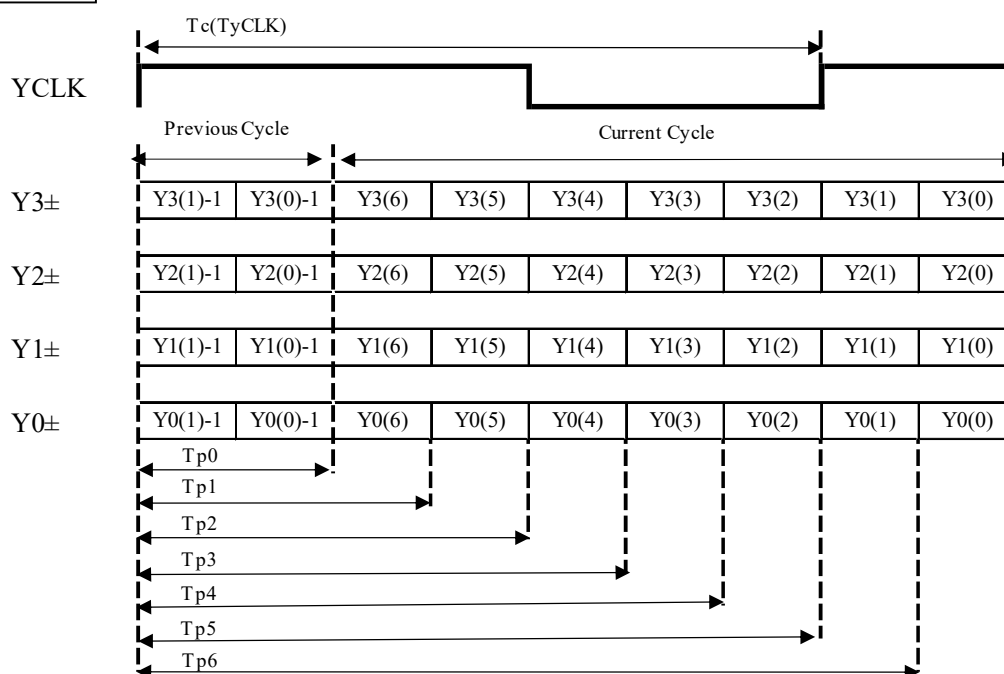


Fig.2 Timing Chart of LVDS Output

Table.8 LVDS Bit Position

Output Format		Base Configuration 24bit-RGB	Base Configuration 2ch 24bit-RGB	Medium Configuration 24bit-RGB・ODD/EVEN	Medium Configuration 30bit-RGB
X Signal	Port/bit	Data	Data	Data	Data
X0(0)	Port A0	R(0)	R(0)	RA(0)	R(0)
X0(1)	Port A1	R(1)	R(1)	RA(1)	R(1)
X0(2)	Port A2	R(2)	R(2)	RA(2)	R(2)
X0(3)	Port A3	R(3)	R(3)	RA(3)	R(3)
X0(4)	Port A4	R(4)	R(4)	RA(4)	R(4)
X0(5)	Port A5	R(5)	R(5)	RA(5)	R(5)
X0(6)	Port B0	G(0)	G(0)	GA(0)	R(8)
X1(0)	Port B1	G(1)	G(1)	GA(1)	R(9)
X1(1)	Port B2	G(2)	G(2)	GA(2)	0
X1(2)	Port B3	G(3)	G(3)	GA(3)	0
X1(3)	Port B4	G(4)	G(4)	GA(4)	B(8)
X1(4)	Port B5	G(5)	G(5)	GA(5)	B(9)
X1(5)	Port C0	B(0)	B(0)	BA(0)	B(0)
X1(6)	Port C1	B(1)	B(1)	BA(1)	B(1)
X2(0)	Port C2	B(2)	B(2)	BA(2)	B(2)
X2(1)	Port C3	B(3)	B(3)	BA(3)	B(3)
X2(2)	Port C4	B(4)	B(4)	BA(4)	B(4)
X2(3)	Port C5	B(5)	B(5)	BA(5)	B(5)
X2(4)	LVAL	LVAL	LVAL	LVAL	LVAL
X2(5)	FVAL	FVAL	FVAL	FVAL	FVAL
X2(6)	DVAL	DVAL	DVAL	DVAL	DVAL
X3(0)	Port A6	R(6)	R(6)	RA(6)	R(6)
X3(1)	Port A7	R(7)	R(7)	RA(7)	R(7)
X3(2)	Port B6	G(6)	G(6)	GA(6)	0
X3(3)	Port B7	G(7)	G(7)	GA(7)	0
X3(4)	Port C6	B(6)	B(6)	BA(6)	B(6)
X3(5)	Port C7	B(7)	B(7)	BA(7)	B(7)
X3(6)	0	0	0	0	0
Y Signal	Port	Data	Data	Data	Data
Y0(0)	Port D0	-	R(0)	RB(0)	0
Y0(1)	Port D1	-	R(1)	RB(1)	0
Y0(2)	Port D2	-	R(2)	RB(2)	0
Y0(3)	Port D3	-	R(3)	RB(3)	0
Y0(4)	Port D4	-	R(4)	RB(4)	0
Y0(5)	Port D5	-	R(5)	RB(5)	0
Y0(6)	Port E0	-	G(0)	GB(0)	G(0)
Y1(0)	Port E1	-	G(1)	GB(1)	G(1)
Y1(1)	Port E2	-	G(2)	GB(2)	G(2)
Y1(2)	Port E3	-	G(3)	GB(3)	G(3)
Y1(3)	Port E4	-	G(4)	GB(4)	G(4)
Y1(4)	Port E5	-	G(5)	GB(5)	G(5)
Y1(5)	Port F0	-	B(0)	BB(0)	G(8)
Y1(6)	Port F1	-	B(1)	BB(1)	G(9)
Y2(0)	Port F2	-	B(2)	BB(2)	0
Y2(1)	Port F3	-	B(3)	BB(3)	0
Y2(2)	Port F4	-	B(4)	BB(4)	0
Y2(3)	Port F5	-	B(5)	BB(5)	0
Y2(4)	LVAL	-	LVAL	LVAL	LVAL
Y2(5)	FVAL	-	FVAL	FVAL	FVAL
Y2(6)	DVAL	-	DVAL	DVAL	DVAL
Y3(0)	Port D6	-	R(6)	RB(6)	0
Y3(1)	Port D7	-	R(7)	RB(7)	0
Y3(2)	Port E6	-	G(6)	GB(6)	G(6)
Y3(3)	Port E7	-	G(7)	GB(7)	G(7)
Y3(4)	Port F6	-	B(6)	BB(6)	0
Y3(5)	Port F7	-	B(7)	BB(7)	0
Y3(6)	0	-	0	0	0

Table.9 Definition of Symbols

Signal	logical	IN/OUT	Function
R<7:0>	Positive	OUT	Red output data (R<0>:LSB、FF=Red)8bit
G<7:0>	Positive	OUT	Green output data (G<0>:LSB、FF=Green) 8bit
B<7:0>	Positive	OUT	Blue output data (B<0>:LSB、FF=Blue) 8bit
RA<7:0>	Positive	OUT	Red Odd-numbers output data (R<0>:LSB、FF=Red)8bit
GA<7:0>	Positive	OUT	Green Odd-numbers output data (G<0>:LSB、FF=Green) 8bit
BA<7:0>	Positive	OUT	Blue Odd-numbers output data (B<0>:LSB、FF=Blue) 8bit
RB<7:0>	Positive	OUT	Red Even-numbers output data (R<0>:LSB、FF=Red)8bit
GB<7:0>	Positive	OUT	Green Even-numbers output data (G<0>:LSB、FF=Green) 8bit
BB<7:0>	Positive	OUT	Blue Even-numbers output data (B<0>:LSB、FF=Blue) 8bit
R<9:0>	Positive	OUT	Red output data (R<0>:LSB、3FF=Red)10bit
G<9:0>	Positive	OUT	Green output data (G<0>:LSB、3FF=Green)10bit
B<9:0>	Positive	OUT	Blue output data (B<0>:LSB、3FF=Blue) 10bit
LVAL	Positive	OUT	Line valid signal (valid line)
FVAL	Positive	OUT	Frame Valid Signal (Valid Frame)
DVAL	Positive	OUT	Data Valid Signal

Table.10 List of Output Pixels by Connectors

Size	Connector	Base Cofigration 24bit-RGB		Base Cofigration 2ch 24bit-RGB	
		Interpolation		Interpolation	
		OFF	ON	OFF	ON
A3	CN12(X singal)	1,2...7296	1,2...7319	1,2...7296	1,2...7319
	CN13(Y singal)	-	-	1,2...7296	1,2...7319
A1	CN12(X singal)	1,2...7296	1,2...7320	1,2...7296	1,2...7320
	CN13(Y singal)	-	-	1,2...7296	1,2...7320
	CN21(X singal)	7297,7298...14592	7321,7320...14639	7297,7298...14592	7321,7320...14639
	CN23(Y singal)	-	-	7297,7298...14592	7321,7320...14639
A0	CN12(X singal)	1,2...7296	1,2...7320	1,2...7296	1,2...7320
	CN13(Y singal)	-	-	1,2...7296	1,2...7320
	CN21(X singal)	7297,7298...14592	7321,7320...14640	7297,7298...14592	7321,7320...14640
	CN23(Y singal)	-	-	7297,7298...14592	7321,7320...14640
	CN31(X singal)	14593,14594...21888	14641,14642...21959	14593, 14594...21888	14641,14642...21959
	CN33(Y singal)	-	-	14593, 14594...21888	14641,14642...21959
A3+	CN12(X singal)	1,2...7904	1,2...7929	1,2...7904	1,2...7929
	CN13(Y singal)	-	-	1,2...7904	1,2...7929
Size	Connector	Medium Cofigration 24bit-RGB ODD/EVEN		Medium Cofigration 30bit-RGB	
		Interpolation		Interpolation	
		OFF	ON	OFF	ON
A3	CN12(X singal)	1,3...7295	1,3...7319	1,2...7296	1,2...7319
	CN13(Y singal)	2,4...7296	2,4...7318		
A1	CN12(X singal)	1,3...7295	1,3...7319	1,2...7296	1,2...7320
	CN13(Y singal)	2,4...7296	2,4...7320		
	CN21(X singal)	7,297,7299...14591	7321,7323...14639	7297,7298...14592	7321,7320...14639
	CN23(Y singal)	7,298,7290...14592	7322,7324...14638		
A0	CN12(X singal)	1,3...7295	1,3...7319	1,2...7296	1,2...7320
	CN13(Y singal)	2,4...7296	2,4...7320		
	CN21(X singal)	7,297,7299...14591	7321,7323...14639	7297,7298...14592	7321,7320...14639
	CN23(Y singal)	7,298,7290...14592	7322,7324...14640		
	CN31(X singal)	14593,14595...21887	14641,14643...21959	14593, 14594...21888	14641,14642...21959
	CN33(Y singal)	14594,14596...21888	14642,14644...21958		
A3+	CN12(X singal)	1,3...7903	1,3...7929	1,2...7904	1,2...7929
	CN13(Y singal)	2,4...7904	2,4...7928		

7. Serial Communication

This product has a serial communication (UART). Users can access to this Product from their PCs through the serial interface of the Camera Link™ connector.

8. Connector Pin Assignments

8.1 List of Connectors

Each model is equipped with the connectors shown in the following list. Refer to outline drawings in this document, for the located position of the connectors.

Table.11 List of Connectors

Model	Power supply connector for sensor driving			Camera Link™ Connector			Power supply connector for Illuminations	
Connector model number	B2P-VH			12226-1150-00PL			DF33C-3P-3.3DSA	
Manufacturers	JST			3M			HIROSE Electric	
Connector name	CN11	CN21	CN31	CN12, CN13	CN22, CN23	CN32, CN33	CN91	CN92
KD6R309AX4	○	—	—	○	—	—	○	—
KD6R617AX4	○	○	—	○	○	—	○	○
KD6R926AX4	○	○	○	○	○	○	○	○
KD6R335AX4	○	—	—	○	—	—	○	—
KD6R309AX4-NL	○	—	—	○	—	—	—	—
KD6R617AX4-NL	○	○	—	○	○	—	—	—
KD6R926AX4-NL	○	○	○	○	○	○	—	—

8.2 Power Cable Connectors for Sensors

CN11、CN21、CN31: B2P-VH [JST]

Table.12 Pin Assignment (CN11、CN21、CN31)

No	Name	Symbol	I/O	Signal
1	GND	GND	—	
2	+5V	VDD	—	

8.3 Camera Link™ Connectors 1

CN12、CN22、CN32: 12226-1150-00PL [3M]

Table.13 Pin Assignment (CN12、CN22、CN32)

No	Name	Symbol	I/O	Signal
1	GND	GND	—	
2	Data Signal	X0-	O	
3	Data Signal	X1-	O	
4	Data Signal	X2-	O	
5	Clock for Data	XCLK-	O	
6	Data Signal	X3-	O	
7	Control Signal	SERTC+	I	Serial communication
8	Control Signal	SERTFG-	O	Serial communication
9	Data Signal	CC1-	I	XRDSYNC : for sync signal
10	Data Signal	CC2+	I	Non-Connected
11	Data Signal	CC3-	I	Non-Connected
12	Data Signal	CC4+	I	Non-Connected
13	GND	GND	—	
14	GND	GND	—	
15	Data Signal	X0+	O	
16	Data Signal	X1+	O	
17	Data Signal	X2+	O	
18	Clock for Data	XCLK+	O	
19	Data Signal	X3	O	
20	Control Signal	SERTC-	I	Serial Communication
21	Control Signal	SERTFG+	O	Serial Communication
22	Data Signal	CC1+	I	XRDSYNC : for sync signal
23	Data Signal	CC2-	I	Non-Connected
24	Data Signal	CC3+	I	Non-Connected
25	Data Signal	CC4-	I	Non-Connected
26	GND	GND	—	

8.4 Camera Link™ Connectors 2

CN13、CN23、CN33: 12226-1150-00PL [3M]

Table.14 Pin Assignment (CN13、CN23、CN33)

No	Name	Symbol	I/O	Signal
1	GND	GND	—	
2	Data Signal	Y0-	O	
3	Data Signal	Y1-	O	
4	Data Signal	Y2-	O	
5	Clock for Data	YCLK-	O	
6	Data Signal	Y3-	O	
7	100ohm Terminated	TERM	O	Inside a board, 100Ω resister is connected between No.7 and No.20pin.
8	Data Signal	Z0-	O	Non-Connected
9	Data Signal	Z1-	O	Non-Connected
10	Data Signal	Z2-	O	Non-Connected
11	Clock for Data	ZCLK-	O	Non-Connected
12	Data Signal	Z3-	O	Non-Connected
13	GND	GND	—	
14	GND	GND	—	
15	Data Signal	Y0+	O	
16	Data Signal	Y1+	O	
17	Data Signal	Y2+	O	
18	Clock for Data	YCLK+	O	
19	Data Signal	Y3+	O	
20	100ohm Terminated	TERM	O	Inside a board, 100Ω resister is connected between No.7 and No.20pin.
21	Data Signal	Z0+	O	Non-Connected
22	Data Signal	Z1+	O	Non-Connected
23	Data Signal	Z2+	O	Non-Connected
24	Clock for Data	ZCLK+	O	Non-Connected
25	Data Signal	Z3+	O	Non-Connected
26	GND	GND	—	

8.5 Power Cable Connectors for Illuminations ※ This is NOT for Non-illumination models

CN91、CN92: DF33C-3P-3.3DSA [HIROSE] (I/F for LED array Illumination control)

Table.15 Pin Assignment (CN91、CN92)

No.	Name	Symbol	I/O	Signal
1	LED control	CONT	I	OPEN : illuminations OFF GND : illuminations OFF
2	LEDGND	GND-LED	—	GND of illuminations
3	+24V	VLED	—	+24V Power

9. Precautions

This Product is designed for the purpose of being used in general industries. If you plan to use this product for special applications (aerospace applications, combustion equipment, transportation equipment, life-support systems, safety devices, etc.) where specially high quality and reliability are required and failure or malfunction could directly threaten people's lives, or do harm to the human body, or if you plan to use this product for applications other than the standard application intended by Mitsubishi Electric (the "Company"), please consult our sales department personnel before implementation.

If you have used it for applications other than the general industries intended by the Company without consulting our sales department personnel, the Company SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT.

The Company will analyze a defective Product on request basis. And if the defect is attributable to the Company and within 1 year from the Product shipment, company will conduct repair service free of charge or deliver an alternative product.

The Company's quality assurance responsibility is limited to the above and the Company does not assume responsibility for any indirect damages, etc.

- (1) Be careful with the glass of the Product in case of carrying or replacing.
- (2) Keep the glass surface always clean. Do not touch the surface directly with fingers or use it in a dusty environment. When it is contaminated, wipe it lightly with a cloth soaked with alcohol. Upon doing cleaning, handle with care not to form any streak on the glass. Do not blow off dust with air guns.
- (3) To prevent foreign objects from entering the Product, do not remove the side plates (bracket), etc.
- (4) The Product can be damaged by ESD. Handle the Product with care as shown below.
 - 1) Do not handle the Product on the insulating sheet or wooden desk.
 - 2) In case of touching the Product, do not use gloves made of chemical fiber (example: nylon). Use gloves and fingerstalls preventing from static electricity.
 - 3) Do not wrap the Product with paper or polyethylene or other electrical chargeable sheet.
 - 4) To prevent an electrostatic breakdown occurring in the IC etc. take great care not to touch the terminal, other electrical parts and boards directly by fingers or keep it away from electrical chargeable objects.
- (5) To get the stable behavior of IC, take care on handling the Product as follows
 - 1) Applying a voltage exceeding the absolute maximum rating of IC, even if it is a surge, will cause a latch-up, resulting damage to the sensor. Take the great care not to allow the voltage to each terminal to exceed the absolute maximum rating at rapid changes in the current passing through the external circuits or at power-ON/OFF.
 - 2) To scan the stable image, it is recommended to refresh the dark and white correction data before each scan.
- (6) Precautions when installing the product.
 - 1) Keep this Product's boards away from sources of electrical noise, such as boards, cables, and so on. (For information on boards' position, refer to Fig. 3 to 6, Fig.8 to 10).
- (7) Storage environment and usage environment
 - 1) If the light source unit of this product is exposed to corrosive gas such as hydrogen sulfide, the amount of light may decrease due to the sulfur component. Do not store or use this product in an environment exposed to corrosive gas.
 - 2) Because corrugated cardboard contains sulfur components, corrosive gas may be generated. When storing this product for a long period of time, please take care not to place cardboard boxes around it after unpacking it from the packing box in which it was shipped from our company.
- (8) For detail, please refer to the User's Manual (TM-XL271)
- (9) **Models complying with CE Marking have a CE label attached.**

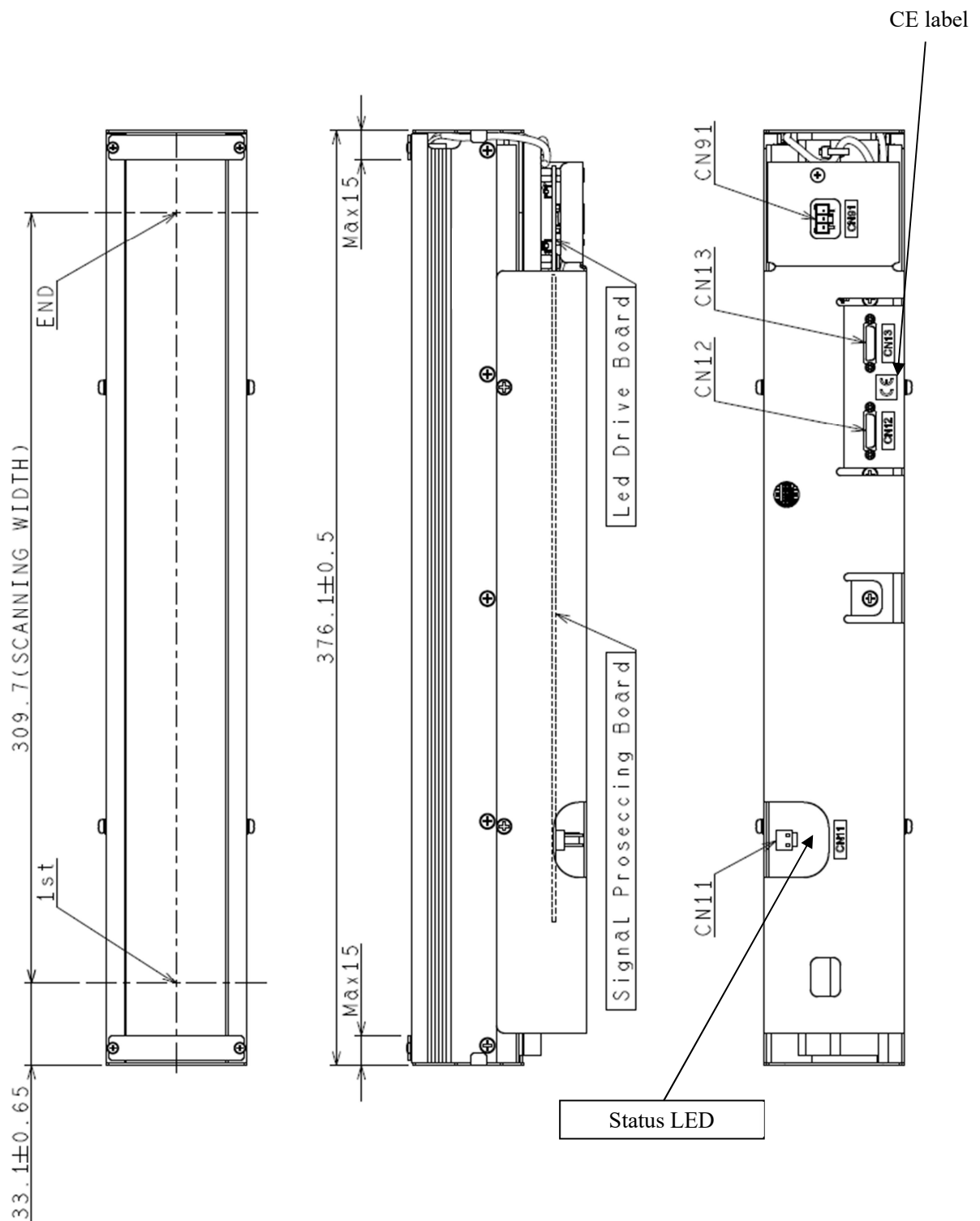


Fig.3 KD6R309AX4 Outline drawing (at 24°C)

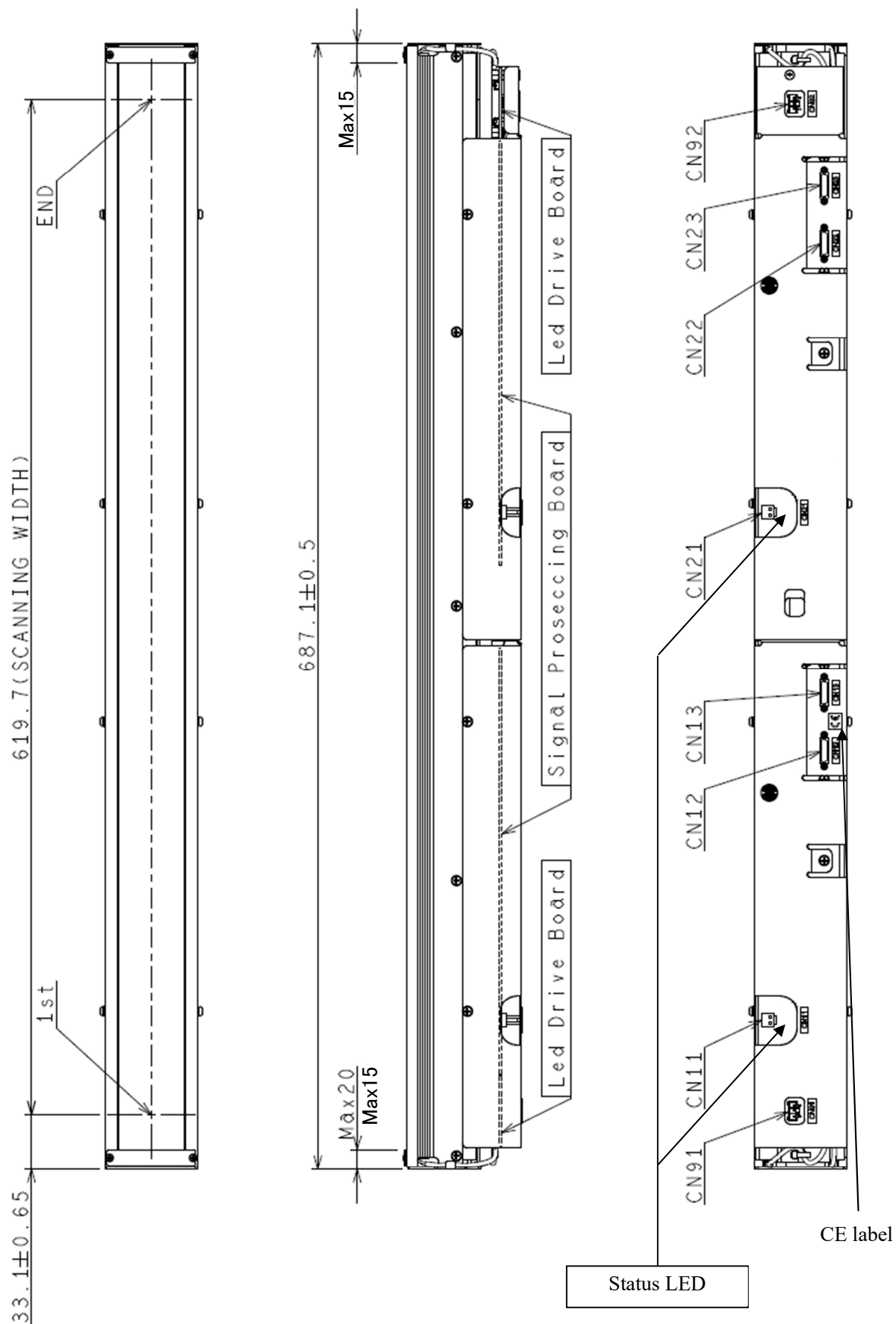


Fig.4 KD6R617AX4 Outline drawing (at 24°C)

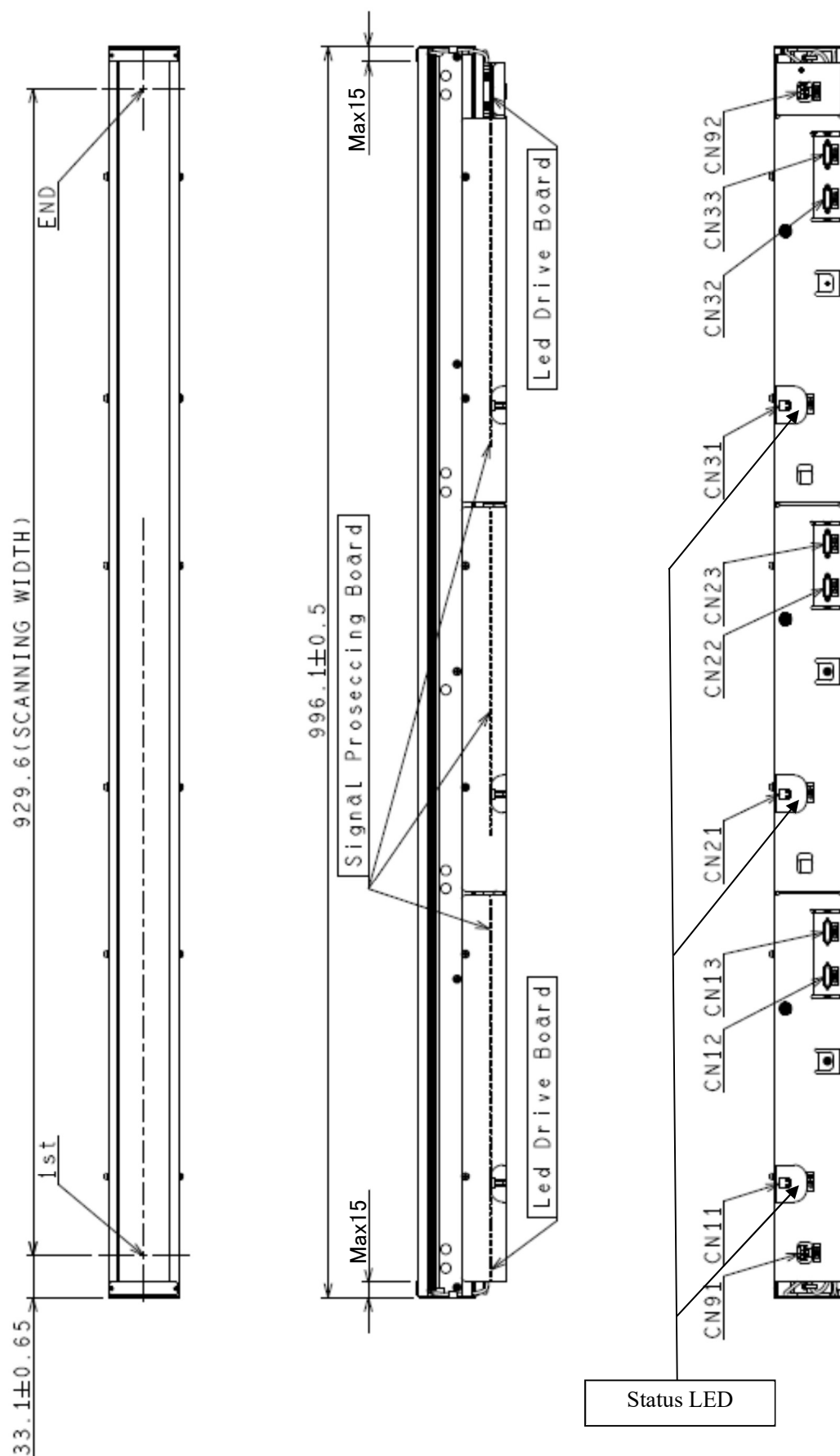


Fig.5 KD6R926AX4 Outline drawing (at 24°C)

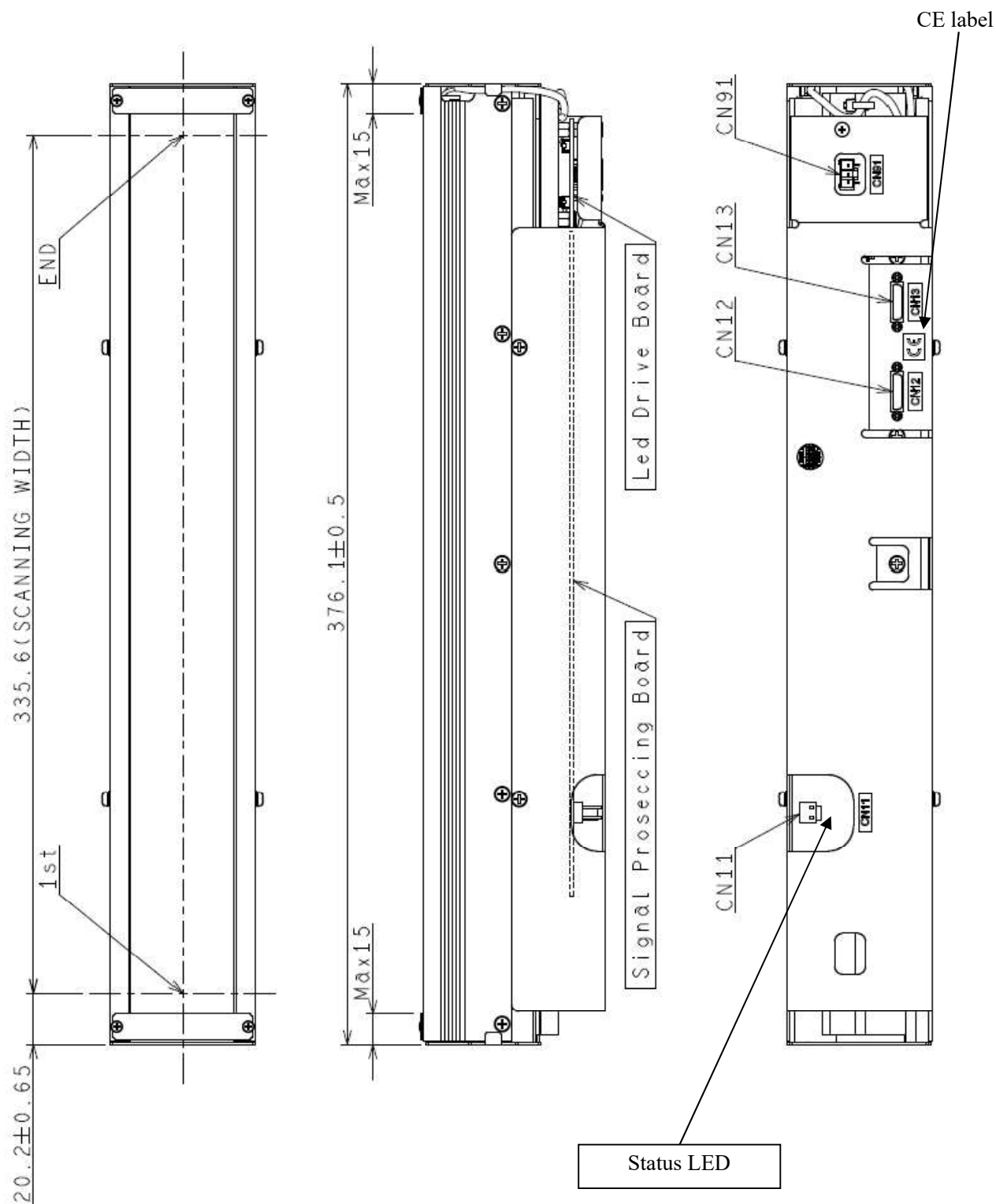


Fig.6 KD6R335AX4 Outline drawing (at 24°C)

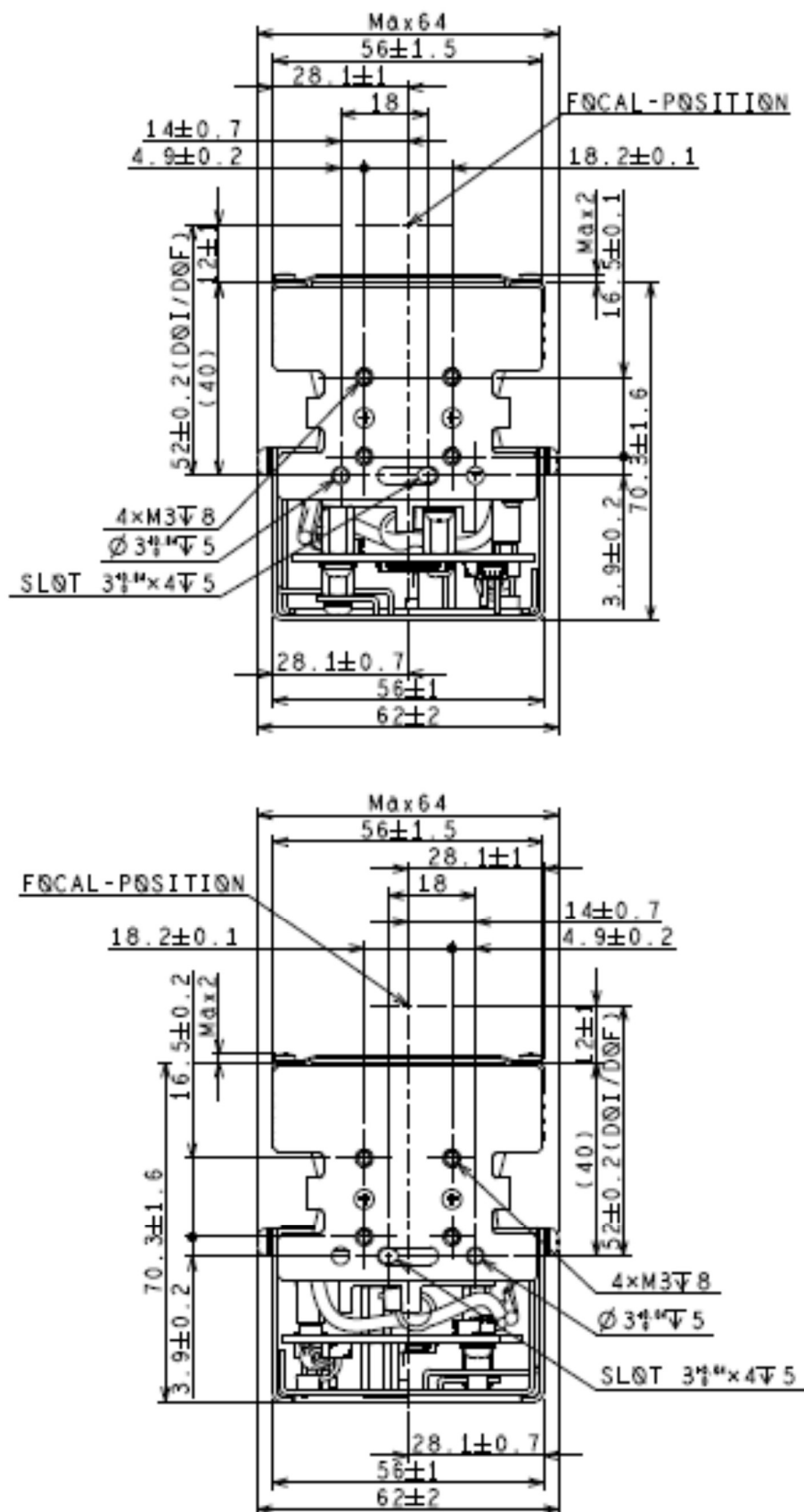


Fig.7 Side view (common mechanism to the illumination models) (at 24°C)

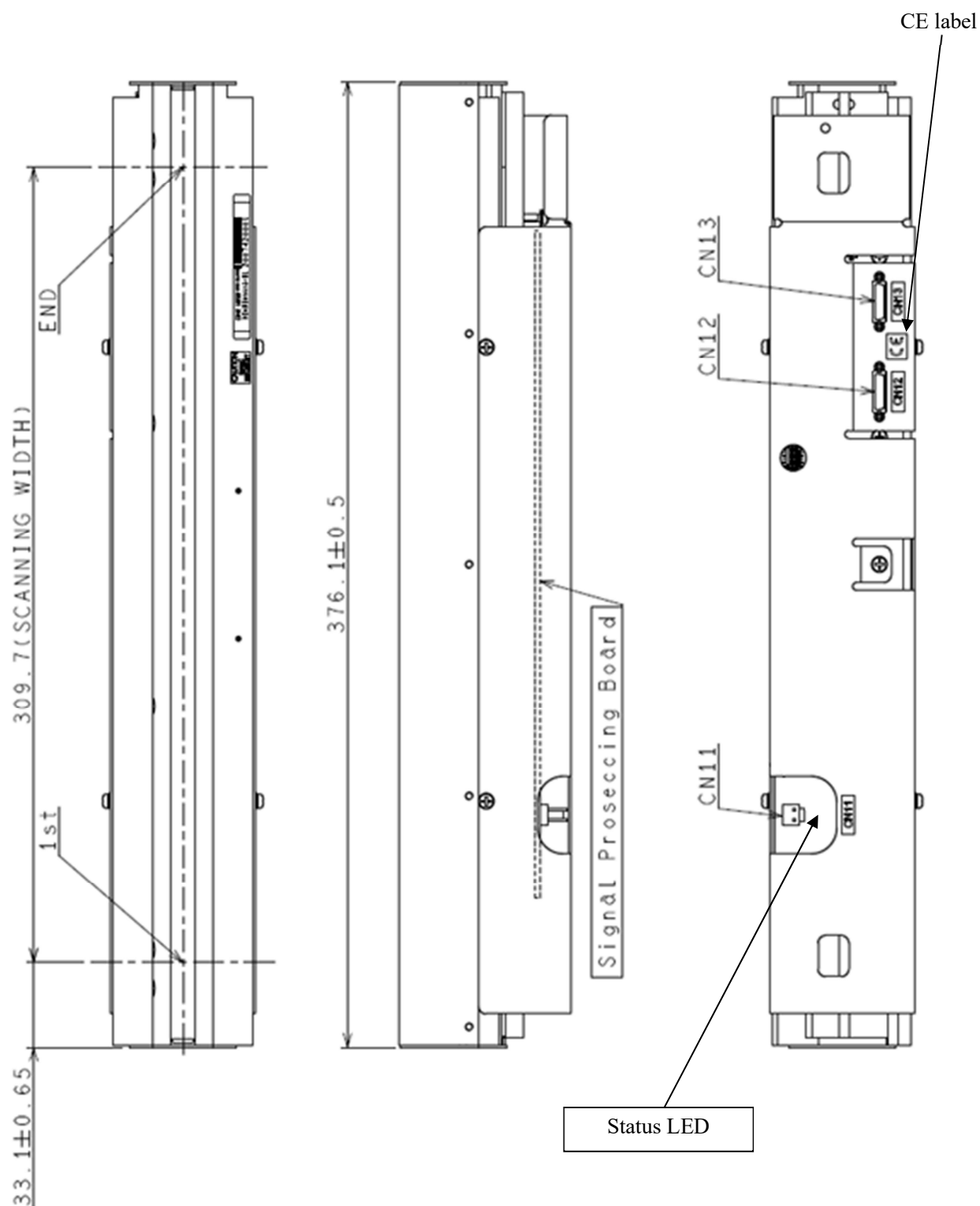


Fig.8 KD6R309AX4-NL Outline drawing (at 24°C)

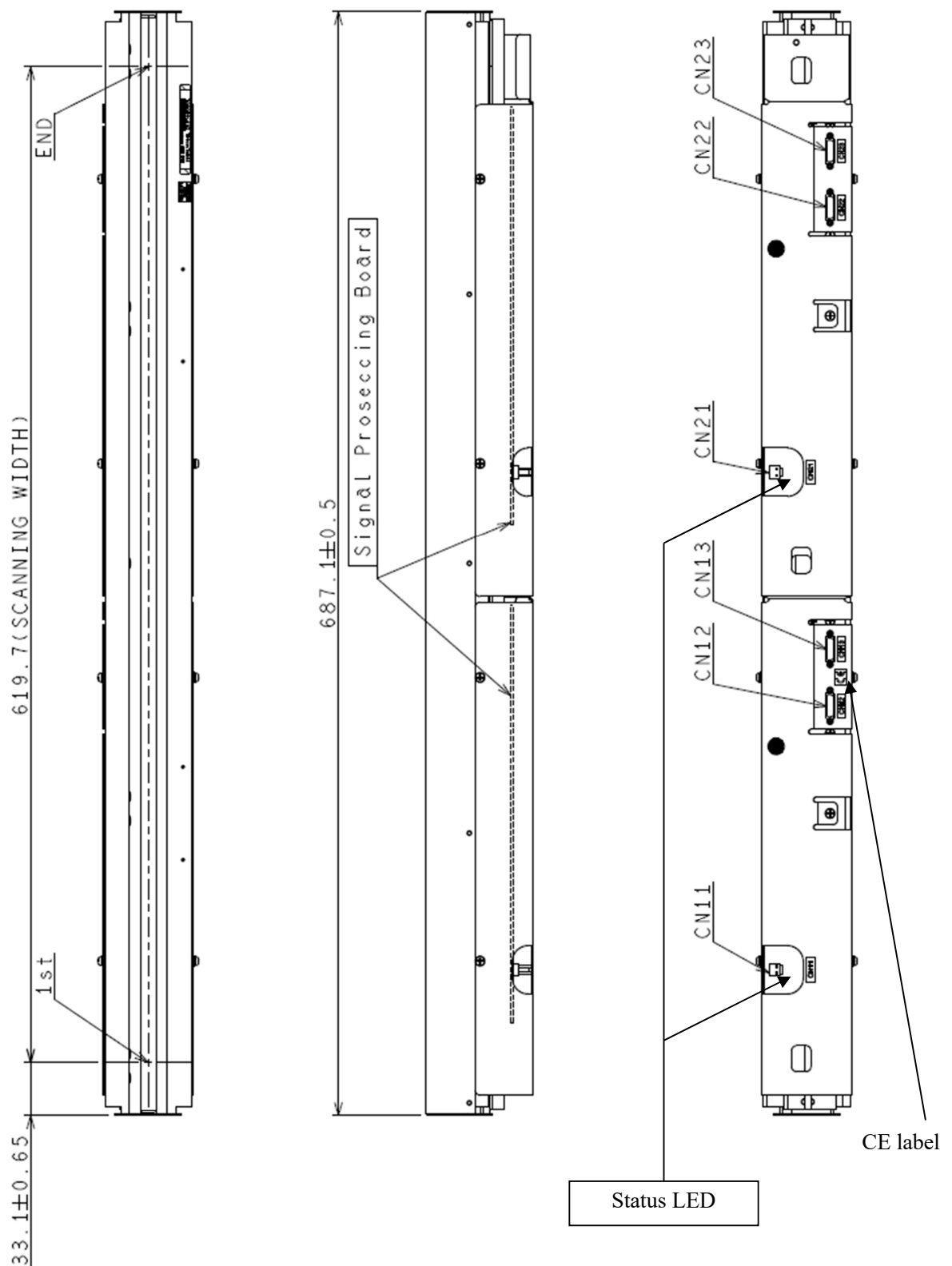


Fig.9 KD6R617AX4-NL Outline drawing (at 24°C)

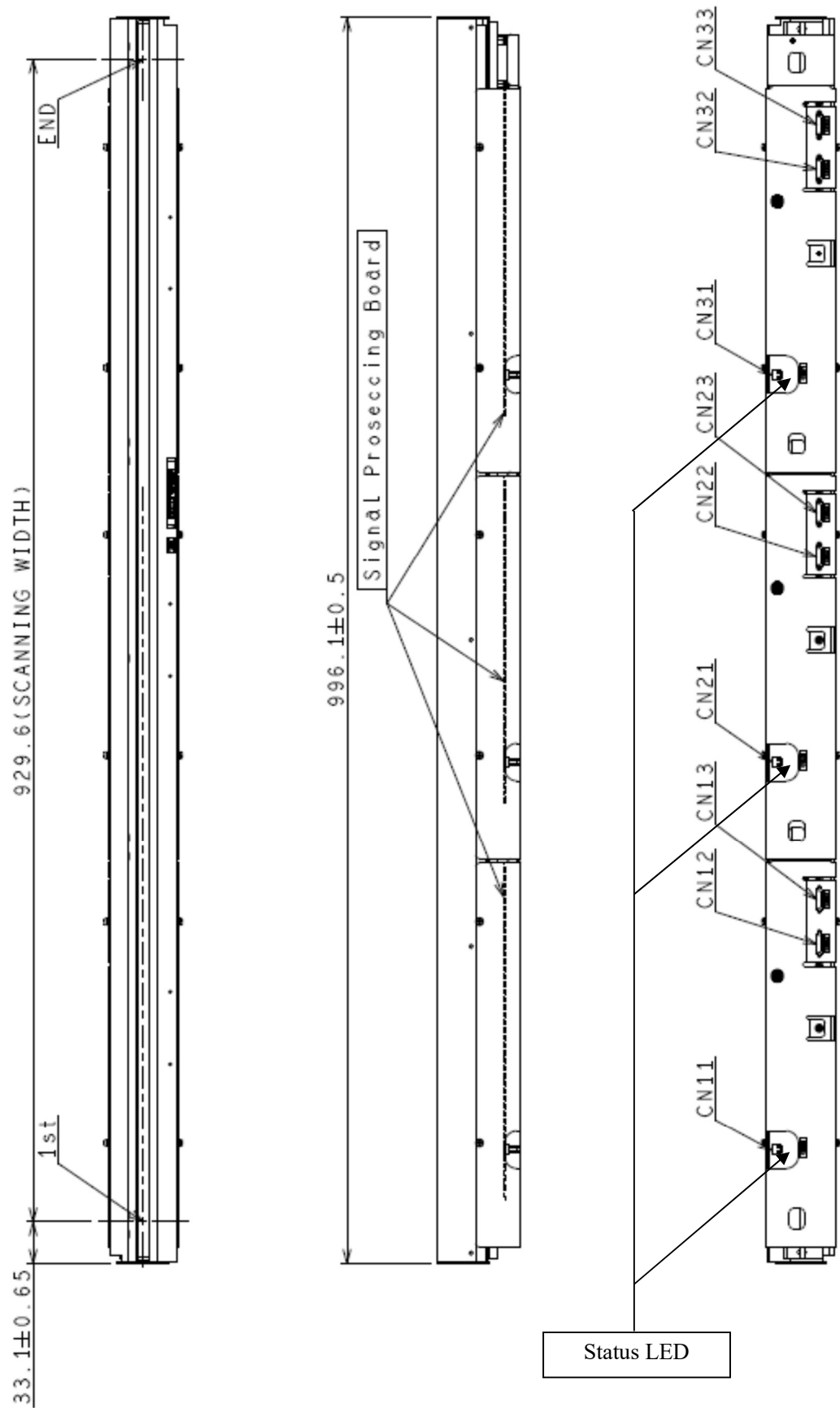
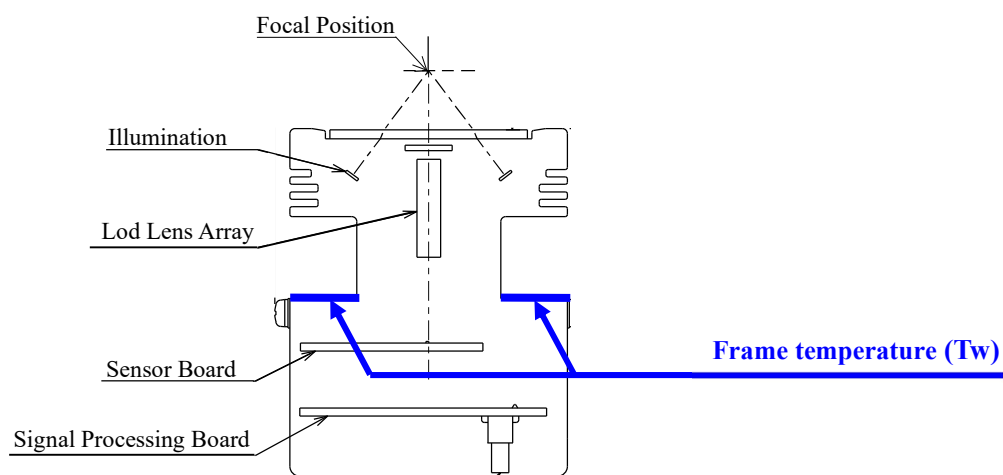


Fig.10 KD6R926AX4-NL Outline drawing (at 24°C)

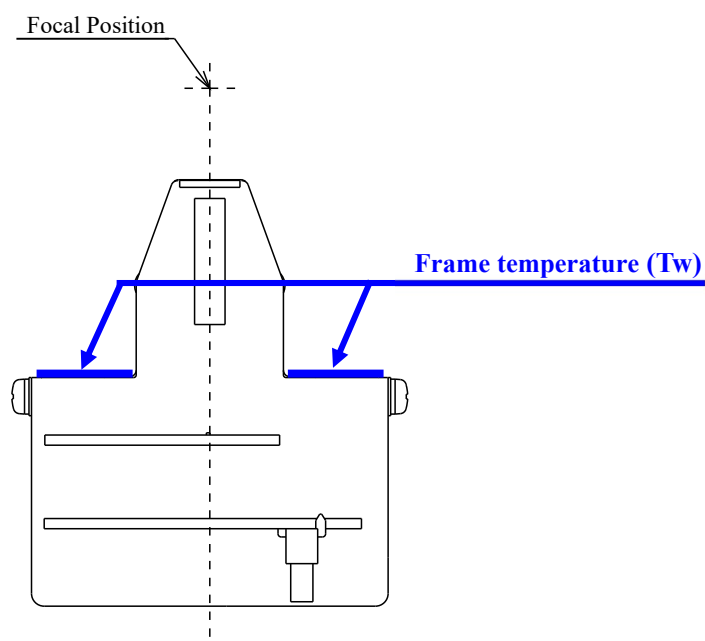
11. Definition of Frame Temperature (T_w)

Temperature of the case is described as T_w in the Fig.13.

The guaranteed temperature of it is $T_w < 70^\circ\text{C}$ (343.15K) . A temperature gradient might occur due to a position of the cooling fan. Please check the highest temperature of longitudinal direction of the case and be aware of not using this product out of guaranteed condition. Refer to the User's Manual for the guideline on design.



(a) Illumination integrated models. Frame temperature definition part



(b) Non-illumination models Frame temperature definition part

Fig.12 Sectional view (common mechanism for all models)

12. Standard Illumination(LED) of Products

The following is for reference only. When using a illumination integrated model, please use it after fully evaluating it in advance with the combination of the external light sources used.

We use Mitsubishi standard white LED illumination, which is the same as the one used in our illumination integrated model, in our factory shipment inspection. The inspection measures a diffused light reflected from Mitsubishi standard white-basis-chart. We use an illuminometer T-10MA manufactured by Konica Minolta.

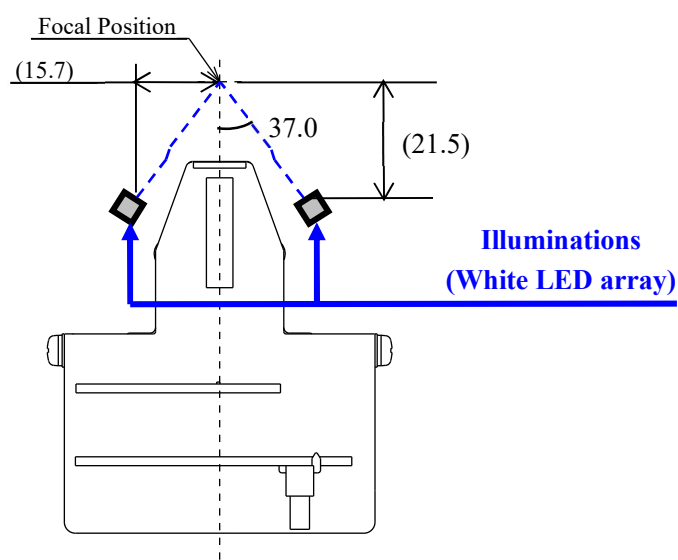


Fig.13 Standard illumination mounting position of Non-illumination models

Table.16 Mitsubishi standard white LED illumination

Item	Specifications	Unit	Remarks
Average intensity	52,000±10%	lx	Average value at the focal position when lit with a storing time of 44 μsec and a lighting period of 37.5 μsec.
Uniformity	20	%	(max-min)/max
Chromaticity (Reference value)	Range enclosed by (x,y)=(0.2740, 0.2364),(0.2740, 0.2584), (0.2910, 0.2860),(0.2910, 0.2640)	-	Catalog spec for single LED chip

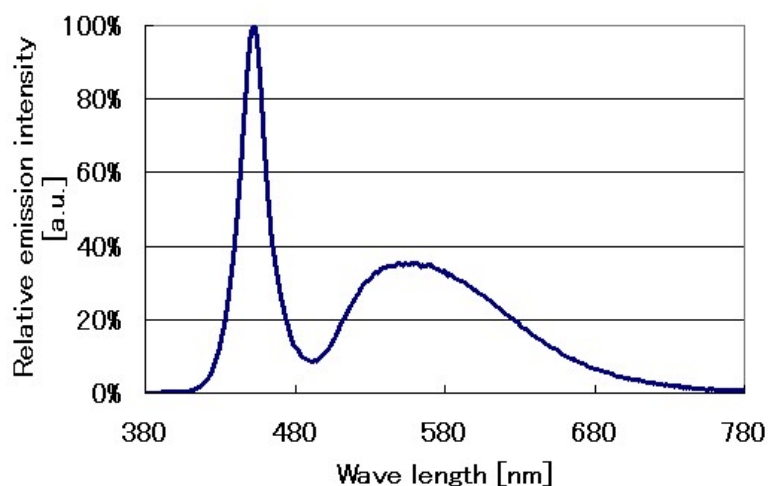


Fig.14 Spectrum example of Mitsubishi standard white LED illumination