Panasonic ideas for life

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S P E C   F I L E

Product Number : PT-**ST10**

Product Name : Short-Throw LCD Projector

SFL10M003

Short-Throw LCD Projector

PT-**ST10**

Specifications

Power supply		100–240 V AC, 50/60 Hz
Power consumption		300 W (approx. 0.4 W with standby mode set to ECO*[1]. 15 W with standby mode set to NORMAL. 18 W in normal standby mode when set to audio monitor out and with fan stopped.)
Optical system		Dichroic mirror separation/prism synthesis system
LCD panel	Panel size	16 mm (0.63″) diagonal (4:3 aspect ratio)
	Display method	Transparent LCD panel ($\times$ 3, R/G/B)
	Drive method	Active matrix
	Pixels	786,432 (1,024 $\times$ 768) $\times$ 3, total of 2,359,296 pixels
	Pixel configuration	Stripe
Lens		Manual zoom (1:1–1:1.2), manual focus
		F 1.80, f 6.74 mm
Lamp		220 W UHM lamp
Projection size		1,524–2,794 mm (60–110 inches) diagonally, 4:3 aspect ratio
Colors		Full color (16,777,216 colors)
Brightness*[2]		2,800 lumens
Center-to-corner uniformity ratio*[2]		85%
Contrast ratio*[2]		500:1 (full on/full off)
Resolution RGB		1,024 $\times$ 768 pixels (Input signals that exceed this resolution will be converted to 1,024 $\times$ 768 pixels.)
Scanning frequency	RGB	Horizontal: 15.00–91.00 kHz, Vertical: 50–85 Hz
	YP_BP_R	480i (525i): f_H 15.75 kHz; f_V 60 Hz
		576i (625i): f_H 15.63 kHz; f_V 50 Hz
		480p (525p): f_H 31.50 kHz; f_V 60 Hz
		576p (625p): f_H 31.25 kHz; f_V 50 Hz
		720/60p (750p): f_H 45.00 kHz; f_V 60 Hz
		720/50p (750p): f_H 37.50 kHz; f_V 50 Hz
		1080/60i (1125i): f_H 33.75 kHz; f_V 60 Hz
		1080/50i (1125i): f_H 28.13 kHz; f_V 50 Hz
		1080/60p (1125i): f_H 67.50 kHz; f_V 60 Hz
		1080/50p (1125i): f_H 56.25 kHz; f_V 50 Hz
	S-Video/Video	NTSC, NTSC4.43, PAL-M, PAL60: f_H 15.75 kHz; f_V 60 Hz
		PAL, SECAM, PAL-N: f_H 15.63 kHz; f_V 50 Hz
Optical axis shift		10:-0.5 (fixed)
Keystone correction range		Approx. ±10° vertically
On-screen menu		17 languages: English, French, German, Spanish, Italian, Korean, Russian, Chinese, Japanese, Swedish, Norwegian, Danish, Portuguese, Polish, Hungarian, Czech, and Thai
Installation		Front/rear, ceiling/desk (menu selection)
Built-in speakers	Size	4 $\times$ 2 cm (oval) $\times$ 1
	Output power	1.0 W (monaural)
Terminals	COMPUTER (RGB) IN	D-sub HD 15-pin (female) $\times$ 2
	RGB	G: 0.7 V [p-p] (1.0 V [p-p] for sync on green signals), 75 ohms, R, B: 0.7 V [p-p], 75 ohms, HD/SYNC, VD: TTL (positive/negative polarity compatible)
	YP_BP_R (YC_BC_R)	Y: 1.0 V [p-p] (including sync signal), 75 ohms, P_BP_R/C_BC_R: 0.7 V [p-p], 75 ohms
	VIDEO IN	RCA pin $\times$ 1, 1.0 V [p-p], 75 ohms
	S-VIDEO IN	Mini DIN 4-pin $\times$ 1, Y: 1.0 V [p-p], C: 0.286 V [p-p], 75 ohms
	AUDIO IN	M3 (L, R) $\times$ 2, 0.5 V [rms]
	AUDIO OUT	M3 (L, R) $\times$ 1, 0–2.0 V [rms] (variable)
	SERIAL	D-sub 9-pin $\times$ 1, for external control (RS-232C compliant)
	LAN	RJ-45 $\times$ 1 for network connection, compliant with PJLink™, 100Base-TX/10Base-T
Power cord length		4.4 m (14.4 ft)
Cabinet material		Molded plastic (PC+ABS)

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Dimensions (W × H × D)		327 × 135 × 307 mm (12-7/8″ × 5-11/32″ × 12-3/32″)*³
Weight		Approx. 3.1 kg (6.8 lbs.)*⁴
Operating environment	Temperature	0°–40°C (32°–104°F)*⁵
	Humidity	20%–80% (no condensation)
Remote control unit	Power supply	3 V DC (R03/AAA type battery × 2)
	Operation range	Approx. 7 m (23 ft) when operated from directly in front of the signal receptor
	Dimensions (W × H × D)	46 × 115 × 21 mm (1-13/16″ × 4-17/32″ × 27/32″)
	Weight	Approx. 64 g (2.3 oz) (including batteries)
Supplied accessories		Power cord (× 1)
		Power cord secure lock (× 1)
		Wireless remote control (× 1)
		Batteries for remote control (R03/LR03/AAA type × 2)
		VGA cable for RGB signals (1.8 m (5 ft 11 in) × 1)
		Software CD-ROM (Logo Transfer Software, Multi Projector Monitoring and Control Software) (× 1)
		Wire rope (× 1)
Optional accessories		Ceiling mount bracket: ET-PKB2
		Highly durable filter unit: ET-KFB2
		Replacement lamp unit: ET-LAB2
		Replacement air filter for ET-KFB2: ET-RFB2

*1: When the standby mode is set to ECO, LAN-based network functions such as the standby ON function will not operate and only certain commands can be received from RS-232C control.

*2: Measurement, measuring conditions, and method of notation all comply with ISO 21118 international standards.

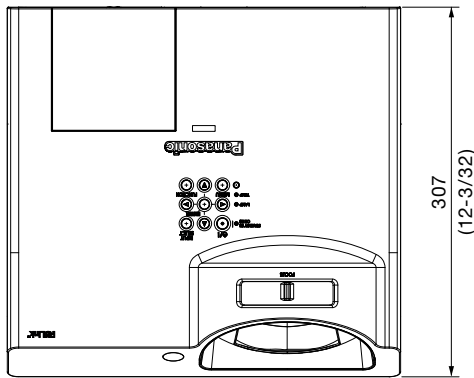*3: Protruding parts not included.

*4: Average value (excluding lens cap). May differ depending on models.

*5: The operating temperature range is 0°C (32°F) to 35°C (95°F) when used in High-Altitude mode (1,400 m (4,593 ft) to 2,700 m (8,858 ft)). Also, if the ambient temperature exceeds 35°C (95°F) (30°C (86°F) in High-Altitude mode) when the lamp power mode is set to NORMAL, the light output may be reduced approximately 30% to protect the projector.
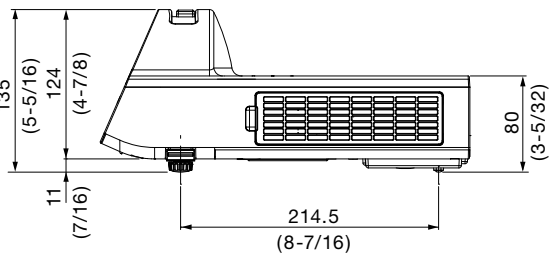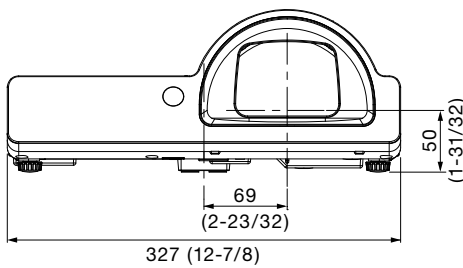
Dimensions

unit : mm (inch)
NOTE: This illustration is not drawn to scale.

307
(12-3/32)

135
(5-5/16)

124
(4-7/8)

50
(1-31/32)

11
(7/16)

80
(3-5/32)

69
(2-23/32)

327 (12-7/8)

214.5
(8-7/16)

Terminals

1 2 3 4 5

6 7 8 9
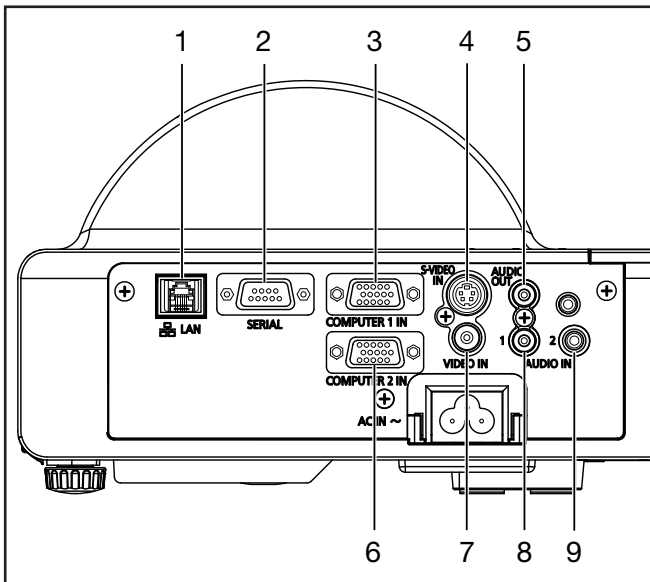
1 LAN connector
2 Serial input
3 Computer 1 input
4 S-Video input
5 Audio output
6 Computer 1 input
7 Video input
8 Audio 1 input
9 Audio 2 input
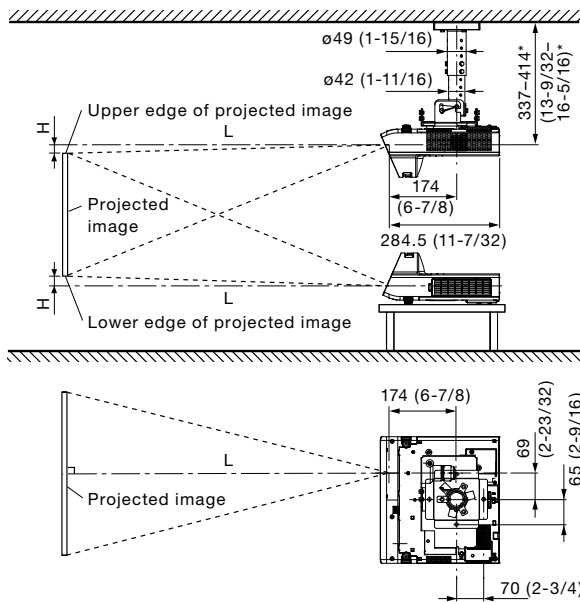
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Standard setting-up positions

unit : mm (inch)

L: Distance to screen
H: Height from the edge of screen to center of lens

* Adjustable in 20-mm (15/32-inch) step.

NOTE:

Illustrations show the projector installed using optional ceiling bracket.

This illustration is not drawn to scale.

Projection distance for 4:3 aspect ratio screen

		Unit: meters
Screen size (inch, diagonal)	Distance to screen (L)	Height from the edge of screen to center of lens (H)
60	0.60	-0.05
70	0.71	-0.05
80	0.82	-0.06
90	0.92	-0.07
100	1.03	-0.08
110	1.14	-0.08

		Unit: feet
Screen size (inch, diagonal)	Distance to screen (L)	Height from the edge of screen to center of lens (H)
60	2.0	-0.5
70	2.3	-0.6
80	2.7	-0.7
90	3.0	-0.8
100	3.4	-0.8
110	3.7	-0.9

Projection distance for 16:9 aspect ratio screen

		Unit: meters
Screen size (inch, diagonal)	Distance to screen (L)	Height from the edge of screen to center of lens (H)
60	0.66	-0.17
70	0.78	-0.20
80	0.90	-0.23
90	1.01	-0.26
100	1.13	-0.29

		Unit: feet
Screen size (inch, diagonal)	Distance to screen (L)	Height from the edge of screen to center of lens (H)
60	2.2	-0.6
70	2.6	-0.7
80	2.9	-0.8
90	3.3	-0.9
100	3.7	-1.0

Calculation of the projection distance

For a screen size different from the above, use the equation below to calculate the projection distance.

Aspect ratio 4 : 3
L (m) = (diagonal screen size in inches) × 0.0107 − 0.0389

Aspect ratio 16 : 9
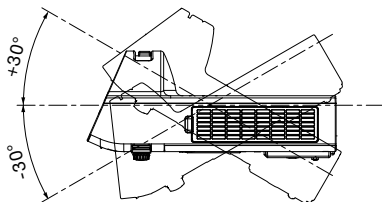L (m) = (diagonal screen size in inches) × 0.0117 − 0.0395

NOTE: Distances calculated with the above equations will include a slight error.

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Installable angle
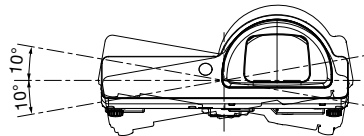
Install the projector at an angle within the range shown below.   < 6 >

• Vertical direction
The projector
may be installed
at a vertical
angle of ±30°.

• Horizontal direction
The projector may be installed at a horizontal angle of ±10°.

Note: **Vertical keystone correction is effective only when the projector is
installed at a vertical angle of ±10° or less.**

Computer data compatibility

This projector accepts up to 91 kHz horizontal scanning frequency and 193 MHz dot clock.

NOTE: Pixel thinning is applied to signals that exceed a dot clock frequency of 110 MHz. The display resolution of this projector is 1,024 × 768 pixels. Input signals that exceed this resolution will be converted to 1,024 × 768 pixels.

List of compatible signals

Display mode	Display resolution (dots)[1]	Scanning frequency H (kHz)	V (kHz)	Dot clock frequency (MHz)	Picture quality[2]	Input terminal
NTSC/NTSC4.43/PAL-M/PAL60	720 × 480i	15.7	59.9	–	A	VIDEO/S-VIDEO
PAL/PAL-N/SECAM	720 × 576i	15.6	50.0	–	A	
525i (480i)	720 × 480i	15.7	59.9	13.5	A	COMPUTER (RGB/YPBPR)
625i (576i)	720 × 576i	15.6	50.0	13.5	A	
525p (480p)	720 × 483	31.5	59.9	27.0	A	
625p (576p)	720 × 576	31.3	50.0	27.0	A	
750 (720)/60p	1280 × 720	45.0	60.0	74.3	A	
750 (720)/50p		37.5	50.0	74.3	A	
1125 (1080)/60i	1920 × 1080i	33.8	60.0	74.3	A	
1125 (1080)/50i		28.1	50.0	74.3	A	
VESA70	640 × 400	31.5	70.1	25.2	A	COMPUTER (RGB only)
VESA85		37.9	85.1	31.5	A	
VGA60	640 × 480	31.5	59.9	25.2	A	
VGA65		35.0	66.7	30.2	A	
VGA72		37.9	72.8	31.5	A	
VGA75		37.5	75.0	31.5	A	
VGA85		43.3	85.0	36.0	A	
SVGA55	800 × 600	35.2	56.3	36.0	A	
SVGA60		37.9	60.3	40.0	A	
SVGA70		48.1	72.2	50.0	A	
SVGA75		46.9	75.0	49.5	A	
SVGA85		53.7	85.1	56.3	A	
MAC16	832 × 624	49.7	74.6	57.3	A	
XGA50	1024 × 768	39.6	50.1	51.9	AA	
XGA60		48.4	60.0	65.0	AA	
XGA70		56.5	70.1	75.0	AA	
XGA75		60.0	75.0	78.8	AA	
XGA85		68.7	85.0	94.5	AA	
WIDE750 (720)	1280 × 720	44.8	59.9	74.5	A	
		37.1	49.8	60.5	A	
WXGA768	1280 × 768	39.6	49.9	65.3	A	
		47.8	59.9	79.5	A	
WXGA800	1280 × 800	41.3	50.0	68.0	A	
		49.1	60.2	69.1	A	
		49.7	59.8	83.5	A	
MXGA70	1152 × 864	64.0	71.2	94.2	A	
MXGA75		67.5	74.9	108.0	A	
MXGA85		76.7	85.0	121.5	A	
MAC21	1152 × 870	68.7	75.1	100.0	A	
MSXGA60	1280 × 960	60.0	60.0	108.0	A	
SXGA60	1280 × 1024	64.0	60.0	108.0	A	
SXGA75		80.0	75.0	135.0	A	
SXGA85		91.1	85.0	157.5	A	
SXGA60+	1400 × 1050	64.0	60.0	108.0	A	
		65.1	59.9	122.4	A	
WXGA+	1440 × 900	55.9	59.9	106.5	A	
UXGA60	1600 × 1200	75.0	60.0	162.0	A	
WSXGA+	1680 × 1050	65.3	60.0	146.3	A	
WUXGA	1920 × 1200	74.6	59.9	193.3	B	

1. The "i" appearing after the resolution indicates an interlaced signal.
2. The following symbols are used to indicate picture quality.
   - **AA**   Maximum picture quality can be obtained.
   - **A**   Signals are converted by the image processing circuit before picture is projected.
   - **B**   Signals are compressed by the image processing circuit before picture is projected.

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Serial connector

The serial connector complies with RS-232C. To control the projector from a personal computer, commands must be input through communication software, based on the format and satisfying the communication conditions shown below.

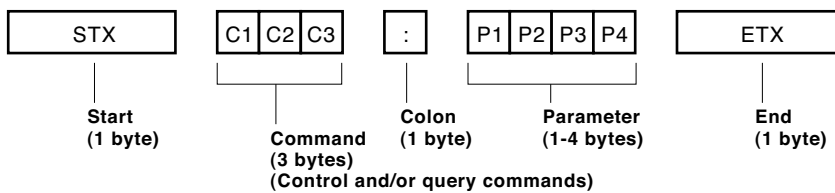## Pin assignments and signal names
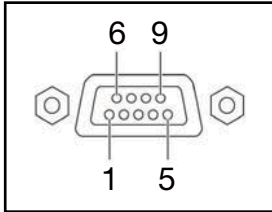
D-sub HD 9-pin, female

No.	Signal name	Description	No.	Signal name	Signal name
1	–	NC	6	–	Connected internally
2	TXD	Send data	7	CTS	Connected internally
3	RXD	Receive data	8	RTS	Connected internally
4	–	NC	9	–	NC
5	GND	Ground			

Communication conditions (factory setting)

Signal level	RS-232C-compliant
Synchronization method	Start-stop synchronization
Baud rate	9,600 bps
Parity	None
Character length	8 bits
Stop bit	1 bit
X parameter	None
S parameter	None

Basic format

Transmission from the computer begins with STX, then the ID, command, parameter, and ETX are sent in this order. Add parameters according to the details of control.

STX	C1 C2 C3	:	P1 P2 P3 P4	ETX

**Start
(1 byte)**

**Command
(3 bytes)
(Control and/or query commands)**

**Colon
(1 byte)**

**Parameter
(1-4 bytes)**

**End
(1 byte)**

CAUTION
- It may not be possible to send or receive commands for about 10 to 60 seconds when the lamp is first turned on. If this occurs, wait for 60 seconds, then try sending or receiving again.
- When sending multiple commands, be sure to wait for at least 0.5 second after receiving a response from the projector before sending the next command.
- Additional time is sometimes required for response due to processing inside the projector. Set the time-out period for command response to 10 seconds or more.

Cable specifications

Projector			PC (DTE)
1	NC	NC	1
2			2
3			3
4	NC	NC	4
5			5
6	NC	NC	6
7			7
8			8
9	NC	NC	9

Control commands

Command: <Parameter>	Function	Callback: <Parameter>	Parameter value Min	Max
`PON`*[1]/*[2]	Power on (standby mode on)	`PON`	–	–
`POF`*[1]/*[2]	Power off (standby mode off)	`POF`	–	–
`AVL:<pl>`	Volume control	`AVL:<pl>`	0	63
`IIS:<input signal>`	Input signal selection	`IIS:<input signal>`	–	–
`OST`	The same function as "default" button	`OST`	–	–
`OFZ:<off on>`	Freeze	`OFZ:<off on>`	0	1
`OEN`	Enter	`OEN`	–	–
`OXG:0`	Wide mode: Off	`OXG:0`	–	–
`OXG:1`	Wide mode: On	`OXG:1`	–	–
`OXG:2`	Wide mode: Auto	`OXG:2`	–	–
`VPM:<NAT>`	Picture mode: Natural	`VPM:<NAT>`	–	–
`VPM:<STD>`	Picture mode: Standard	`VPM:<STD>`	–	–
`VPM:<DYN>`	Picture mode: Dynamic	`VPM:<DYN>`	–	–
`VPM:<BBD>`	Picture mode: Blackboard	`VPM:<BBD>`	–	–
`VPM:<WBD>`	Picture mode: Whiteboard	`VPM:<WBD>`	–	–
`VXX:DLVI0=<+00000>`	Daylight View: Off	`VXX:DLVI0=<+00000>`	–	–
`VXX:DLVI0=<+00001>`	Daylight View: Auto	`VXX:DLVI0=<+00001>`	–	–
`VXX:DLVI0=<+00002>`	Daylight View: On	`VXX:DLVI0=<+00002>`	–	–
`AUU`	Volume up	`AUU`	–	–
`AUD`	Volume down	`AUD`	–	–
`OMN`	Menu	`OMN`	–	–
`OCU`	Cursor up	`OCU`	–	–
`OCD`	Cursor down	`OCD`	–	–
`OCL`	Cursor left	`OCL`	–	–
`OCR`	Cursor right	`OCR`	–	–
`OAS`	Auto setup	`OAS`	–	–
`OSH`*[1]	AV mute	`OSH`	–	–
`OIX`	Index window	`OIX`	–	–
`DZU`	Digital zoom: Enlargement	`DZU`	–	–
`DZD`	Digital zoom: Reduction	`DZD`	–	–

*1 Do not send PON, POF, or OSH commands continuously in a short period of time. Doing so may burst the lamp or shorten the lamp replacement cycle.

*2 These commands are effective when the standby mode is set to ECO. (Other commands are not effective.)

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Status asking commands

Command	Description		Callback <Parameter>
`QPW`	Standby power status		`<power condition>`
`Q$S`	Lamp status		`<lamp condition>`
`QIN`	Input signal status		`<input signal>`
`QAV`	Volume adjustment value		`<pl>`
`QVC`	Color adjustment value		`<pl>`
`QVT`	Tint adjustent value		`<pl>`
`QVB`	Brightness adjustment value		`<pl>`
`QVR`	Contrast adjustment value		`<pl>`
`QVS`	Sharpness adjustment value		`<pl>`
`QWR`	White balance: R adjustment value		`<pl>`
`QWG`	White balance: G adjustment value		`<pl>`
`QWB`	White balance: B adjustment value		`<pl>`
`QHP`	Horizontal position adjustment value		`<pl>`
`QVP`	Vertical position adjustment value		`<pl>`
`QCP`	Clock phase adjustment value		`<pl>`
`QDC`	Dot clock adjustment value		`<pl>`
`QSP`	Projection method status		`<pl>`
`QLG`	On-screen menu language		`<pl>`
`QXG`	Wide mode status	Off	`<0>`
		On	`<1>`
		Auto	`<2>`
`QVX:DLVI0`	Daylight View status	Off	`<+00000>`
		Auto	`<+00001>`
		On	`<+00002>`
`QPM`	Picture mode status	Natural	`<NAT>`
		Standard	`<STD>`
		Dynamic	`<DYN>`
		Blackboard	`<BBD>`
		Whiteboard	`<WBD>`
`QFZ`	Freeze status		`<off_on>`
`Q$L`	Lamp run time		`<acctch>`
`QSH`	AV mute		`<off_on>`
`QKS`	Keystone correction status		`<pl>`
`QTE`	Color temperature adjustment status		`<color temp>`

Parameter format

Parameter format	Size (Byte)	Definition
<pl>	3 (1 or 2 bytes also possible when under control)	Decimal without signs: 0 to 999 (000, 001, 002...999) Decimal with signs: -99 to +99 (-99...-01, +00, +01, +02...+99) Callback from the projector is 3 Byte.
<off on>	1	0 = off, 1 = on
<input signal>	3	RG1 = computer 1, RG2 = computer 2, VID = video, SVD = S-Video
<installation>	1	0 = front, 1 = rear, 2 = ceiling and front, 3 = ceiling and rear
<language>	3	ENG = English, DEU = German, FRA = French, ESP = Spanish, ITL = Italian, JPN = Japanese, CHI = Chinese, POR = Portuguese, SVE = Swedish, NOR = Norwegian, DAN = Danish, POL = Polish, CES = Czech, MAG = Hungarian, RUS = Russian, THA = Thai, KOR = Korean
<power condition>	3	000 = power off (standby mode off), 001 = power on (standby mode on)
<lamp condition>	1	0 = standby, 1 = lamp on under control, 2 = lamp off, 3 = lamp off under control
<acctch>	4	Decimal without signs: 0000-9999 hours
<color temp>	1	0 = low, 1 = standart, 2 = high
<date>	8	y1y2y3y4m1m2d1d2w = year (y) month (m) day (d) day of week (w) Day of week: Monday = 1, Tuesday = 2, ... Sunday = 7
<time>	6	h1h2m1m2s1s2 = hour (h) minute (m) second (s)

NOTE: If a wrong command is received, the projector will send an ER401 command to the computer.

Command example

To set the volume to +30, send the command as shown right.

NOTE: When sending commands without parameters, a colon (:) is not necessary.

| STX	AVL	:	30	ETX
Start	Command		Parameter	End

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Notes on projector placement and operation

The projector uses a high-wattage lamp that becomes very hot during operation. Please observe the following precautions.

1. Never place objects on top of the projector while it is operating.
2. Make sure there is an unobstructed space of 500 mm (19-11/16˝) or more around the projector's exhaust openings.
3. Make sure that nothing blocks the projector's air intake and exhaust openings. Also, install the projector so that cool or hot air from other air conditioning equipment does not flow directly toward the projector's air intake or exhaust openings.
4. Do not install the projector in an enclosed space. If it is necessary to install it in an enclosed space, add a separate ventilation system. If ventilation is insufficient, hot air will accumulate at the intake opening. This may cause the projector's protective circuit to interrupt projector operation.
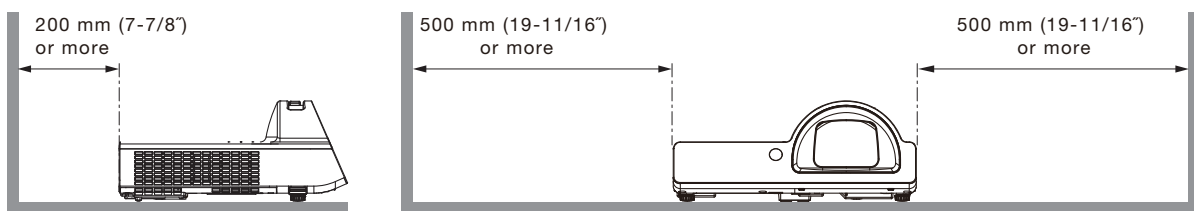
Direction of air intake and exhaust
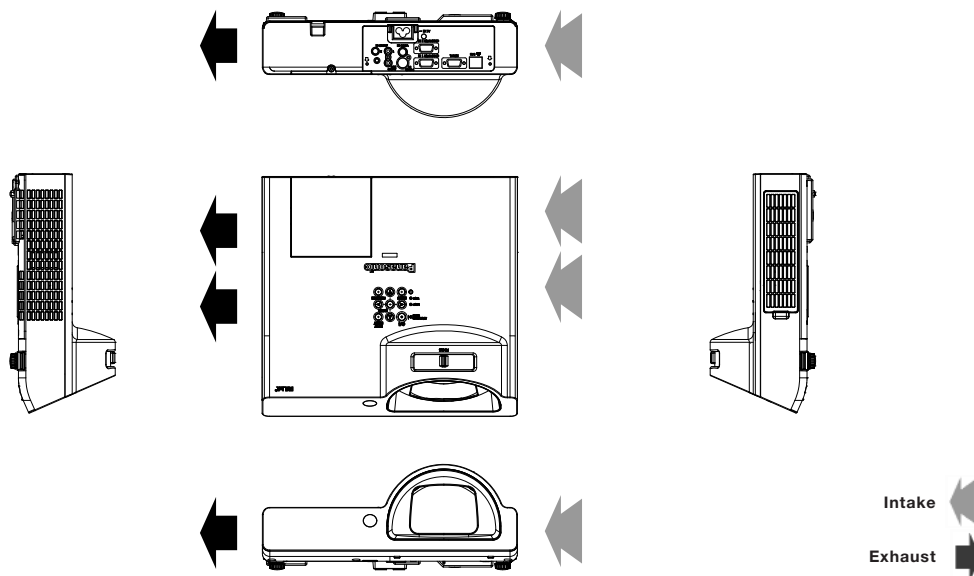
Operating the projector continuously

1. If the projector is to be operated continuously 10 hours or more, lamp replacement cycle duration becomes shorter.
2. The lamp replacement cycle duration becomes shorter if the projector is operated repeatedly for short periods (one hour or less).