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1 Function

1.1 Input voltage range

■The range is from 85VAC to 264VAC.

In cases that conform with safety standard, input voltage range is 100VAC to 240VAC (50/60Hz).

When DC input is required, Please contact us.

- ■If input value doesn't fall within above range, a unit may not operate in accordance with specifications and/or start hunting or fail. If you need to apply a square waveform input voltage, which is commonly used in UPS and inverters, please contact us.
- ■When the input voltage changes suddenly, the output voltage accuracy might exceed the specification. Please contact us. If the restart time of the short interruption power failure is less than 3 seconds, perform a thorough evaluation.
- ■A unit can operate under the input voltage dip with derating. Table 1.1 shows the load factors that can be output.

Table 1.1 Load factor

Model	Input Voltage			
iviodei	100VAC→50VAC *	200VAC→100VAC		
LHA30F	50%	100%		
LHA50F	50%	100%		
LHA75F	-	100%		
LHA100F	-	100%		
LHA150F	-	100%		
LHA300F	-	100%		

^{*}Please avoid using continuously for more than 1 second under above conditions. Doing so may cause a failure (Duty 1s/30s).

LHA30F, LHA50F

■A power factor improvement circuit (active filter) is not built-in. If you use multiple units for a single system, standards for input harmonic current may not be satisfied. Please contact us for details.

1.2 Inrush current limiting

- ■An inrush current limiting circuit is built-in.
- ■If you need to use a switch on the input side, please select one that can withstand an input inrush current.
- ■Thermistor is used in the inrush current limiting circuit. When you turn the power ON/OFF repeatedly within a short period of time, please have enough intervals so that a power supply cools down before being turned on.

1.3 Overcurrent protection

■An overcurrent protection circuit is built-in and activated over 105% of the rated current. A unit automatically recovers when a fault condition is removed.

Please do not use a unit in short circuit and/or under an overcurrent condition.

■Hiccup Operation Mode

When the output voltage drops at overcurrent, the average output current is reduced by hiccup operation of power supply.

Please contact us for details.

1.4 Overvoltage protection

■An overvoltage protection circuit is built-in. If the overvoltage protection circuit is activated, shut down the input voltage, wait more than 3 minutes and turn on the AC input again to recover the output voltage. Recovery time varies depending on such factors as input voltage value at the time of the operation.

Remarks:

Please avoid applying a voltage exceeding the rated voltage to an output terminal. Doing so may cause a power supply to malfunction or fail. If you cannot avoid doing so, for example, if you need to operate a motor, etc., please install an external diode on the output terminal to protect the unit.

LHA150F, LHA300F

■In option -R2, overvoltage protection is deactivated by toggling ON/ OFF signal of remote control.

1.5 Output voltage adjustment range

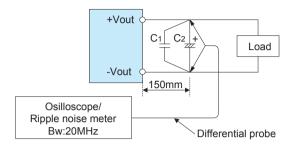
■Adjustment of output voltage is possible by using option "-Y". Please refer to instruction manual 6.1.

LHA-20 August 21, 2020



1.6 Output ripple and ripple noise

■Output ripple noise may be influenced by measurement environment, measuring method fig.1.1 is recommended.



C1: Film capacitor 0.1µF

C2: Aluminum electrolytic capacitor 22µF

Fig.1.1 Measuring method of Ripple and Ripple Noise

Remarks:

When GND cable of probe with flux of magnetic force from power supply are crossing, ripple and ripple noise might not measure correctly.

Please note the measuring environment.

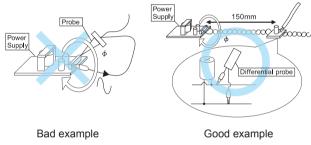


Fig.1.2. Example of measuring output ripple and ripple noise

1.7 Isolation

current.

- ■For a receiving inspection, such as Hi-Pot test, gradually increase (decrease) the voltage for the start (shut down). Avoid using Hi-Pot tester with the timer because it may generate voltage a few times higher than the applied voltage, at ON/OFF of a timer.
- ■When you test units for isolation between the input and output, or between output and terminal FG, short-circuit between output and remote ON/OFF connector.

1.8 Reducing standby power

■Burst operation at light loading, the internal switch element is intermittent operated, and the switching loss is decreased. The specification of the Ripple/Ripple Noise changes by this intermittent operation. The value of the Ripple / Ripple Noise when intermittent operates changes in the input voltage and the output

LHA100F, LHA150F, LHA300F

■In option -R2, standby power with remote OFF is lower than the one with no load.

Please refer to instruction manual 6.1.

2 Series Operation and **Parallel Operation**

2.1 Series Operation

■You can use a power supply in series operation. The output current in series operation should be lower than the rated current of a power supply with the lowest rated current among power supplies that are serially connected. Please make sure that no current exceeding the rated current flows into a power supply.

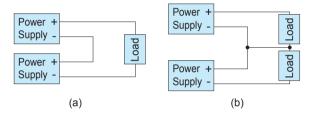


Fig.2.1 Examples of connecting in series operation

2.2 Parallel Operation

- ■Parallel operation is not possible.
- ■Redundancy operation is available by wiring as shown below.

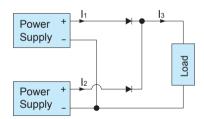


Fig.2.2 Example of redundancy operation

■Even a slight difference in output voltage can affect the balance between the values of I₁ and I₂.

Please make sure that the value of I₃ does not exceed the rated current of a power supply.

 $I_3 \le$ the rated current value



3 Temperature Measurement Point

■Installation environment

When using it, it is necessary to radiate heat by the heat of the power supply.

Table 3.1 - 3.6 shows the relation between the upper limit temperature (Point 1) and Point 2) and load factors.

Please consider the ventilation so that the convection which is enough for the whole power supply is provided.

Temperature of Point ① and Point ② become lower than upper limit temperature.

The life expectancy in the upper bound temperature (Point (1) and Point (2) is three years or more.

Please refer to External View for the position of Point (1) and Point 2).

Remarks:

*Please be careful of electric shock or earth leakage in case of temperature measurement, because Point 1) and Point 2) is live potential.

*Please contact us for details.

■Maximum temperature of measurement points

Table 3.1 Maximum temperature of measurement points (LHA30F-3R3-Y, LHA30F-)

Cooling	Voltage	Mounting	Load factor	Maximum ten	nperature [℃]	
Method	voitage	Method	Load factor	①:Capacitor	2:Capacitor	
		Α	60% <lo≦100%< td=""><td>81</td><td>85</td></lo≦100%<>	81	85	
		_ ^	lo≦60%	85	87	
		В	60% <lo≤100%< td=""><td>81</td><td>83</td></lo≤100%<>	81	83	
		В	lo≦60%	85	85	
	3.3 - 24V	С	60% <lo≦100%< td=""><td>81</td><td>85</td></lo≦100%<>	81	85	
Convection		_	lo≦60%	85	87	
Convection		D	60% <lo≦100%< td=""><td>86</td><td>84</td></lo≦100%<>	86	84	
			lo≦60%	86	82	
		Е	60% <lo≦100%< td=""><td>83</td><td>87</td></lo≦100%<>	83	87	
			lo≦60%	83	83	
		F	60% <lo≦100%< td=""><td>83</td><td>85</td></lo≦100%<>	83	85	
		F	lo≦60%	87	87	
Forced air	3.3 - 24V	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75	
Forced air	3.3 - 240	3.3 - 24V D	D,E,F	lo≦70%	75	75

Table 3.2 Maximum temperature of measurement points (LHA50F-3R3-Y, LHA50F-)

Cooling	Voltage	Mounting	Load factor	Maximum ten	nperature [°C]
Method	vollage	Method	LUAU IACIUI	①:Capacitor	②:Capacitor
		Α	50% <lo≦100%< td=""><td>81</td><td>87</td></lo≦100%<>	81	87
		^	lo≦50%	85	86
		В	50% <lo≦100%< td=""><td>78</td><td>84</td></lo≦100%<>	78	84
		ь	lo≦50%	84	86
	00 5	С	50% <lo≦100%< td=""><td>79</td><td>84</td></lo≦100%<>	79	84
	3.3, 5, 24, 36,		lo≦50%	84	84
	24, 36, 48V	D	50% <lo≦100%< td=""><td>85</td><td>81</td></lo≦100%<>	85	81
	40 V	ט	lo≦50%	88	85
		Е	50% <lo≦100%< td=""><td>80</td><td>83</td></lo≦100%<>	80	83
			lo≦50%	87	87
		F	50% <lo≦100%< td=""><td>81</td><td>86</td></lo≦100%<>	81	86
Convection			lo≦50%	86	87
Convection		А	50% <lo≦100%< td=""><td>82</td><td>83</td></lo≦100%<>	82	83
			lo≦50%	84	84
		В	50% <lo≦100%< td=""><td>80</td><td>81*</td></lo≦100%<>	80	81*
			lo≦50%	85	85
		С	50% <lo≦100%< td=""><td>81</td><td>75</td></lo≦100%<>	81	75
	12, 15V		lo≦50%	85	82
	12, 130	D	50% <lo≦100%< td=""><td>84</td><td>74</td></lo≦100%<>	84	74
		ט	lo≦50%	88	82
		Е	50% <lo≦100%< td=""><td>82</td><td>80</td></lo≦100%<>	82	80
			lo≦50%	88	87
		F	50% <lo≦100%< td=""><td>81</td><td>80</td></lo≦100%<>	81	80
		-	lo≦50%	86	85
Earged air	3.3 - 48V	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	3.3 - 46V	D,E,F	lo≦70%	75	75

^{*}The maximum temperature of the LHA50F-15-S is 76°C.

Table 3.3 Maximum temperature of measurement points (LHA75F-3R3-Y, LHA75F-)

Cooling	Voltage Mounting Load factor Maximum temperatu				
Method	Voltage	Method	Load factor	①:Capacitor	2:Capacitor
		Α	20% <lo≦100%< td=""><td>76</td><td>78</td></lo≦100%<>	76	78
		A	lo≦20%	85	77
		В	20% <lo≦100%< td=""><td>76</td><td>72</td></lo≦100%<>	76	72
		В	lo≦20%	88	76
		С	20% <lo≦100%< td=""><td>74</td><td>81</td></lo≦100%<>	74	81
	3.3, 5V		lo≦20%	84	80
		D	lo≦100%	75	71
		Е	10% <lo≦100%< td=""><td>76</td><td>84</td></lo≦100%<>	76	84
		-	lo≦10%	87	77
		F	10% <lo≦100%< td=""><td>75</td><td>78</td></lo≦100%<>	75	78
Convection			lo≦10%	85	81
CONVECTION		A	20% <lo≦100%< td=""><td>83</td><td>73</td></lo≦100%<>	83	73
			lo≦20%	88	76
		В	20% <lo≦100%< td=""><td>83</td><td>70</td></lo≦100%<>	83	70
			lo≦20%	88	76
		С	20% <lo≦100%< td=""><td>81</td><td>72</td></lo≦100%<>	81	72
	12 - 48V		lo≦20%	86	77
		D	75% <lo≦100%< td=""><td>73</td><td>68</td></lo≦100%<>	73	68
		"	lo≦75%	79	71
		E	lo≦100%	85	74
		F	75% <lo≦100%< td=""><td>80</td><td>66</td></lo≦100%<>	80	66
		-	lo≦75%	80	73
Forced air	3.3 - 48V	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
roiced all	3.3 - 48V	D,E,F	lo≦70%	75	75



Table 3.4 Maximum temperature of measurement points (LHA100F-

Table 5.4 Maximum temperature of measurement points (LFA 100F-L)						
Cooling	Voltage	Mounting	Load factor		nperature [℃]	
Method	Tonago	Method		①:Capacitor	②:Capacitor	
		Α	20% <lo≦100%< td=""><td>76</td><td>84</td></lo≦100%<>	76	84	
			lo≦20%	87	80	
		В	20% <lo≦100%< td=""><td>72</td><td>77</td></lo≦100%<>	72	77	
		Ь	lo≦20%	82	76	
		С	20% <lo≦100%< td=""><td>73</td><td>85</td></lo≦100%<>	73	85	
	5V		lo≦20%	84	80	
		D	lo≦100%	75	73	
		Е	75% <lo≦100%< td=""><td>66</td><td>88</td></lo≦100%<>	66	88	
			lo≦75%	81	80	
		F	20% <lo≦100%< td=""><td>75</td><td>85</td></lo≦100%<>	75	85	
			lo≦20%	85	81	
Convection		А	25% <lo≦100%< td=""><td>82</td><td>78</td></lo≦100%<>	82	78	
			lo≦25%	85	78	
		В	25% <lo≦100%< td=""><td>79</td><td>73</td></lo≦100%<>	79	73	
			lo≦25%	88	76	
		С	25% <lo≦100%< td=""><td>79</td><td>76</td></lo≦100%<>	79	76	
	12 - 48V		lo≦25%	86	77	
	12 - 40 V	D	10% <lo≦100%< td=""><td>80</td><td>70</td></lo≦100%<>	80	70	
		D	lo≦10%	86	74	
		Е	20% <lo≦100%< td=""><td>81</td><td>80</td></lo≦100%<>	81	80	
			lo≦20%	88	83	
		Г	20% <lo≦100%< td=""><td>80</td><td>72</td></lo≦100%<>	80	72	
		F	lo≦20%	86	76	
Farand air	F 40\/	A,B,C, D,E,F	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75	
Forced air	5 - 48V		lo≦70%	75	75	

Table 3.5 Maximum temperature of measurement points (LHA150F-

Cooling		Mounting Load factor		Maximum temperature [℃]	
Method	Voltage	Method	Load factor	(1):Capacitor	2:Capacitor
Wethou			75% <lo≦100%< td=""><td>83</td><td>83</td></lo≦100%<>	83	83
		Α	25% <lo≦75%< td=""><td>89</td><td>83</td></lo≦75%<>	89	83
			lo≦25%	94	87
			75% <lo≦100%< td=""><td>71</td><td>73</td></lo≦100%<>	71	73
		В	25% <lo≦75%< td=""><td>82</td><td>81</td></lo≦75%<>	82	81
			lo≦25%	88	86
			75% <lo≦100%< td=""><td>89</td><td>86</td></lo≦100%<>	89	86
		С	25% <lo≦75%< td=""><td>94</td><td>86</td></lo≦75%<>	94	86
	40) (lo≦25%	95	84
	12V		75% <lo≦100%< td=""><td>67</td><td>67</td></lo≦100%<>	67	67
		D	25% <lo≤75%< td=""><td>83</td><td>77</td></lo≤75%<>	83	77
			lo≦25%	89	78
			75% <lo≦100%< td=""><td>71</td><td>91</td></lo≦100%<>	71	91
		Е	25% <lo≦75%< td=""><td>76</td><td>90</td></lo≦75%<>	76	90
			lo≦25%	81	90
		F	75% <lo≦100%< td=""><td>73</td><td>72</td></lo≦100%<>	73	72
			25% <lo≦75%< td=""><td>86</td><td>80</td></lo≦75%<>	86	80
0			lo≦25%	85	81
Convection		А	75% <lo≤100%< td=""><td>87</td><td>72</td></lo≤100%<>	87	72
			25% <lo≦75%< td=""><td>94</td><td>81</td></lo≦75%<>	94	81
			lo≦25%	94	86
		В	75% <lo≦100%< td=""><td>83</td><td>74</td></lo≦100%<>	83	74
			25% <lo≦75%< td=""><td>91</td><td>84</td></lo≦75%<>	91	84
			lo≦25%	93	87
			75% <lo≦100%< td=""><td>88</td><td>74</td></lo≦100%<>	88	74
		С	25% <lo≦75%< td=""><td>94</td><td>83</td></lo≦75%<>	94	83
	24 - 48V		lo≦25%	92	83
	24 - 48V		75% <lo≦100%< td=""><td>73</td><td>58</td></lo≦100%<>	73	58
		D	25% <lo≦75%< td=""><td>93</td><td>80</td></lo≦75%<>	93	80
			lo≦25%	91	80
			75% <lo≦100%< td=""><td>83</td><td>80</td></lo≦100%<>	83	80
		Е	25% <lo≦75%< td=""><td>86</td><td>83</td></lo≦75%<>	86	83
			lo≦25%	90	89
			75% <lo≦100%< td=""><td>76</td><td>62</td></lo≦100%<>	76	62
		F	25% <lo≦75%< td=""><td>88</td><td>71</td></lo≦75%<>	88	71
			lo≦25%	89	83
Formed siz	10 40\/	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	12 - 48V	D,E,F	lo≦70%	75	75



Table 3.6 Maximum temperature of measurement points (LHA300F-□-Y)

Cooling		Mounting	Lood footor		nperature [℃]
Method	Voltage	Method	Load factor	1):Capacitor	2):Capacitor
			75% <lo≤100%< td=""><td>85</td><td>87</td></lo≤100%<>	85	87
		Α	25% <lo≦75%< td=""><td>91</td><td>84</td></lo≦75%<>	91	84
			lo≦25%	90	81
			75% <lo≤100%< td=""><td>76</td><td>78</td></lo≤100%<>	76	78
		В	25% <lo≦75%< td=""><td>88</td><td>83</td></lo≦75%<>	88	83
			lo≦25%	91	83
			75% <lo≦100%< td=""><td>85</td><td>77</td></lo≦100%<>	85	77
		С	25% <lo≦75%< td=""><td>91</td><td>79</td></lo≦75%<>	91	79
	40) (lo≦25%	91	79
	12V		75% <lo≦100%< td=""><td>71</td><td>65</td></lo≦100%<>	71	65
		D	25% <lo≦75%< td=""><td>89</td><td>79</td></lo≦75%<>	89	79
			lo≦25%	90	79
			75% <lo≦100%< td=""><td>81</td><td>83</td></lo≦100%<>	81	83
		Е	25% <lo≦75%< td=""><td>90</td><td>86</td></lo≦75%<>	90	86
		_	lo≦25%	91	85
		F	75% <lo≦100%< td=""><td>83</td><td>80</td></lo≦100%<>	83	80
			25% <lo≦75%< td=""><td>89</td><td>81</td></lo≦75%<>	89	81
			lo≦25%	91	81
Convection		А	75% <lo≦100%< td=""><td>88</td><td>76</td></lo≦100%<>	88	76
			25% <lo≦75%< td=""><td>91</td><td>78</td></lo≦75%<>	91	78
			lo≦25%	91	80
		В	75% <lo≦100%< td=""><td>82</td><td>72</td></lo≦100%<>	82	72
			25% <lo≦75%< td=""><td>89</td><td>79</td></lo≦75%<>	89	79
			lo≦25%	90	81
			75% <lo≦100%< td=""><td>87</td><td>68</td></lo≦100%<>	87	68
		С	25% <lo≦75%< td=""><td>90</td><td>75</td></lo≦75%<>	90	75
			lo≦25%	91	79
	24,48V		75% <lo≦100%< td=""><td>77</td><td>65</td></lo≦100%<>	77	65
		D	25% <lo≦75%< td=""><td>85</td><td>73</td></lo≦75%<>	85	73
			lo≦25%	88	78
			75% <lo≦100%< td=""><td>65</td><td>67</td></lo≦100%<>	65	67
		Е	25% <lo≦75%< td=""><td>73</td><td>73</td></lo≦75%<>	73	73
		_	lo≦25%	88	85
			75% <lo≦100%< td=""><td>76</td><td>67</td></lo≦100%<>	76	67
		F	25% <lo≦75%< td=""><td>83</td><td>73</td></lo≦75%<>	83	73
		F	lo≦25%	91	82
		A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	12 - 48V	D,E,F	lo≦70%	75	75
	L	٠, ـ,٠	10=10/0	70	10

4 Life expectancy and warranty

■Life Expectancy

Table 4.1 Life Expectancy (LHA30F-3R3-Y, LHA30F-□)

Cooling	Voltage	Mounting	Average ambient	Life Expectancy	
Method	vollage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
Convection	3.3 - 12V		Ta=40°C or less	10years or more	6years
		A,B,C,	Ta=50°C	8years	3years
	15 - 24V	D,E,F	Ta=40°C or less	10years or more	10years or more
			Ta=50°C	9years	5years
Forced air	3.3 - 24V	A,B,C,	Ta=50°C or less	5years	5years
		D,E,F	Ta=60°C	5years	3years

Table 4.2 Life Expectancy (LHA50F-3R3-Y, LHA50F-□)

Cooling	Voltago	Mounting	Average ambient	Life Exp	ectancy
Method	Voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,C,	Ta=40°C or less	10years or more	6years
		A,C,	Ta=50℃	7years	3years
	3.3, 5, 24,	B,D,F	Ta=35°C or less	10years or more	6years
	36, 48V	ם,ט,ר	Ta=45℃	8years	3years
		Е	Ta=30°C or less	10years or more	9years
Convection			Ta=40℃	10years or more	4years
Convection	12, 15V	A B,C,D,F	Ta=40°C or less	10years or more	6years
			Ta=50°C	8years	3years
			Ta=35°C or less	10years or more	6years
	12, 150	Б,С,Д,Г	Ta=45℃	9years	3years
		Е	Ta=30°C or less	10years or more	10years or more
			Ta=40°C	10years or more	5years
Forced air	3.3 - 48V	A,B,C,	Ta=50°C or less	5years	5years
Forced all	J.J - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.3 Life Expectancy (LHA75F-3R3-Y, LHA75F-□)

		•	• •		,	
Cooling	Voltage	Mounting	Average ambient	Life Exp	ectancy	
Method	voitage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>	
		A,B,C	Ta=30°C or less	10years or more	8years	
	3.3, 5V	A,b,C	Ta=40°C	10years or more	4years	
	3.3, 5V	D,E,F	Ta=25°C or less	10years or more	6years	
			Ta=35°C	9years	3years	
Convection	12 - 48V	A,B,C	Ta=40°C or less	10years or more	7years	
Convection			Ta=50°C	5years	3years	
		/ D	Ta=25°C or less	10years or more	10years or more	
		ט	Ta=35°C	10years or more	5years	
		E,F	Ta=35°C or less	10years or more	6years	
		⊏,୮	Ta=45°C	6years	3years	
Forced air	3.3 - 48V	A,B,C,	Ta=50°C or less	5years	5years	
rorced air	3.3 - 480	3.3 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.4 Life Expectancy (LHA100F-□)

	(2. ii 1. iii 2. ii 2. ii 1. ii 2. ii 1. ii 2. ii 2. ii 1. ii 2. i						
Cooling	Voltage	Mounting	Average ambient	Life Exp	ectancy		
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>		
		A D C	Ta=30°C or less	10years or more	6years		
		A,B,C	Ta=40°C	7years	3years		
	5V	D	Ta=25°C or less	10years or more	10years or more		
		0	Ta=35℃	10years or more	10years or more		
Convection		E,F	Ta=25°C or less	10years or more	8years		
Convection			Ta=35℃	8years	4years		
		A,B,C	Ta=40°C or less	10years or more	5years		
	12 - 48V	A,b,C	Ta=50°C	5years	3years		
	12 - 40 V	D,E,F	Ta=35°C or less	10years or more	8years		
		□,⊑,г	Ta=45℃	8years	4years		
Forced air	E 40\/	A,B,C,	Ta=50°C or less	5years	5years		
Forced air	5 - 48V	D,E,F	Ta=60°C	5years	3years		



Table 4.5 Life Expectancy (LHA150F-□)

Cooling	Voltage	Mounting	Average ambient	Life Exp	ectancy
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=30°C or less	10years or more	9years
		A,B,C	Ta=40°C	10years or more	4years
	12V	D	Ta=20°C or less	10years or more	10years or more
	120	D	Ta=30°C	10years or more	10years or more
		E,F	Ta=15°C or less	10years or more	10years or more
Convection			Ta=25℃	10years or more	7years
Convection		A,B,C	Ta=40°C or less	10years or more	6years
	04 401/		Ta=50°C	6years	3years
		D.F.	Ta=30°C or less	10years or more	10years or more
	24 - 48V	D,E	Ta=40°C	10years or more	6years
		F	Ta=20°C or less	10years or more	10years or more
			Ta=30°C	10years or more	10years or more
Forced oir	10 40\/	A,B,C,	Ta=50°C or less	5years	5years
Forced air	12 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.6 Life Expectancy (LHA300F-□-Y)

, , , , , , , , , , , , , , , , , , , ,					
Voltage	Mounting	Average ambient	Life Exp	ectancy	
voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>	
	A D C	Ta=25°C or less	10years or more	7years	
	A,b,C	Ta=35℃	10years or more	3years	
101/	ר	Ta=20°C or less	10years or more	10years or more	
IZV	υ,⊑	Ta=30°C	10years or more	5years	
	Е	Ta=10°C or less	10years or more	10years or more	
	F	Ta=20°C	10years or more	10years or more	
24 - 48V	A,B,C	Ta=40°C or less	10years or more	7years	
		Ta=50°C	5years	3years	
	D	Ta=35°C or less	10years or more	10years or more	
		Ta=45℃	8years	5years	
		Ta=20°C or less	10years or more	10years or more	
	E,F	Ta=30°C	10years or more	10years or more	
12 /0\/	A,B,C,	Ta=50°C or less	5years	5years	
12 - 48V	D,E,F	Ta=60°C	5years	3years	
	12V 24 - 48V	Voltage Method A,B,C 12V D,E F A,B,C 24 - 48V D E,F	Voltage Method temperature (year) 12V A,B,C Ta=25°C or less Ta=35°C 12V D,E Ta=20°C or less Ta=30°C F Ta=10°C or less Ta=20°C Ta=50°C Ta=50°C Ta=45°C or less Ta=45°C Ta=20°C or less Ta=30°C Ta=30°C Ta=50°C or less Ta=30°C Ta=30°C Ta=50°C or less Ta=30°C	Voltage Method temperature (year) Io≤75% A,B,C Ta=25°C or less 10years or more Ta=35°C 10years or more Ta=30°C 10years or more Ta=30°C 10years or more Ta=20°C 10years or more Ta=20°C 10years or more Ta=20°C 10years or more Ta=50°C 5years Ta=45°C 8years Ta=30°C 10years or more Ta=50°C or less 5years	

■Warranty

Table 4.7 Warranty (LHA30F-3R3-Y, LHA30F-□)

rable in training (Entropy entering)						
Cooling	Voltage	Mounting	Average ambient	Warı	ranty	
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>	
Convection 3.3 - 24V	A,B,C,	Ta=40°C or less	5years	5years		
Convection	3.3 - 24 V	D,E,F	Ta=50°C	5years	3years	
Forced air	3.3 - 24V	A,B,C,	Ta=50°C or less	5years	5years	
Forced all	3.3 - 24V	D,E,F	Ta=60°C	5years	3years	

Table 4.8 Warranty (LHA50F-3R3-Y, LHA50F-□)

		·			
Cooling	Voltage	Mounting	Average ambient	Warı	ranty
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,C	Ta=40°C or less	5years	5years
		A,C	Ta=50°C	5years	3years
	3.3, 5, 24,	B,D,F	Ta=35°C or less	5years	5years
	36, 48V	Б,D,F	Ta=45°C	5years	3years
		Е	Ta=30°C or less	5years	5years
Convection		-	Ta=40°C	5years	3years
Convection	12, 15V	А	Ta=40°C or less	5years	5years
			Ta=50°C	5years	3years
		B,C,D,F	Ta=35°C or less	5years	5years
	12, 150		Ta=45°C	5years	3years
		Е	Ta=30°C or less	5years	5years
		E	Ta=40°C	5years	3years
Forced air	3.3 - 48V	A,B,C,	Ta=50°C or less	5years	5years
i orceu all	3.3 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.9 Warranty (LHA75F-3R3-Y, LHA75F-□)

Cooling	Voltage	Mounting	Average ambient	War	ranty
Method	voitage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=30°C or less	5years	5years
	3.3, 5V	A,b,C	Ta=40°C	5years	3years
	3.3, 3V	D,E,F	Ta=25°C or less	5years	5years
		D,E,F	Ta=35°C	5years	3years
Convection		A,B,C	Ta=40°C or less	5years	5years
Convection			Ta=50°C	5years	3years
	12 - 48V	D	Ta=25°C or less	5years	5years
			Ta=35°C	5years	3years
		E,F	Ta=35°C or less	5years	5years
			Ta=45°C	5years	3years
Forced air	2.2 40\/	A,B,C,	Ta=50°C or less	5years	5years
Forceu all	3.3 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.10 Warranty (LHA100F-□)

Cooling	Voltage	Mounting	Average ambient	War	ranty
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=30°C or less	5years	5years
	5V	A,b,C	Ta=40°C	5years	3years
	50	D,E,F	Ta=25°C or less	5years	5years
Convection			Ta=35℃	5years	3years
CONVECTION		12 - 48V A,B,C	Ta=40°C or less	5years	5years
	10 40\/		Ta=50°C	5years	3years
	12 - 40 V		Ta=35°C or less	5years	5years
		□,⊑,г	Ta=45°C	5years	3years
Forced air	d -i-	A,B,C,	Ta=50°C or less	5years	5years
Forceu all	5 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.11 Warranty (LHA150F-□)

, , , , , , , , , , , , , , , , , , ,					
Cooling	Voltago	Mounting	Average ambient	Warranty	
Method	Voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=30°C or less	5years	5years
		A,b,C	Ta=40°C	5years	3years
	12V	D	Ta=20°C or less	5years	5years
	120	D	Ta=30°C	5years	3years
		E,F	Ta=15°C or less	5years	5years
Convection			Ta=25℃	5years	3years
	24 - 48V	A,B,C	Ta=40°C or less	5years	5years
			Ta=50°C	5years	3years
		D,E	Ta=30°C or less	5years	5years
	24 - 40 V		Ta=40°C	5years	3years
		F	Ta=20°C or less	5years	5years
		Г	Ta=30°C	5years	3years
Forced air	12 - 48V	A,B,C,	Ta=50°C or less	5years	5years
Forced air	12 - 48V	D,E,F	Ta=60°C	5years	3years

Table 4.12 Warranty (LHA300F-□-Y)

Cooling	Valtage	Mounting	Average ambient	War	ranty
Method	Voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=25°C or less	5years	5years
		A,b,C	Ta=35℃	5years	3years
	12V	D,E	Ta=20°C or less	5years	5years
	120	□,⊏	Ta=30°C	5years	3years
		F	Ta=10°C or less	5years	5years
Convection		_ F	Ta=20°C	5years	3years
Convection		A,B,C	Ta=40°C or less	5years	5years
	04 40\/		Ta=50°C	5years	3years
		D	Ta=35°C or less	5years	5years
	24, 48V		Ta=45°C	5years	3years
		E,F	Ta=20°C or less	5years	5years
		_ E,F	Ta=30°C	5years	3years
Forced air	12 - 48V	A,B,C,	Ta=50°C or less	5years	5years
Forceu all	12 - 48V	D,E,F	Ta=60°C	5years	3years



Ground

■When installing the power supply with your unit, ensure that the input FG terminal of CN1 or mounting hole FG is connected to safety ground of the unit.

*It is recommended to electrically connect terminal FG and mounting hole FG to metal chassis for reducing noise.

Option and Others

6.1 Outline of options



· Option -C units have coated internal PCB for better moisture resistance.

) -G

- · Option -G units are low leakage current type.
- · Differences from standard versions are summarized in Table 6.1.

Table 6.1 Low leakage current type

Leakage Current (ACIN 240V 60Hz)	0.15mA max	
Conducted Noise	N/A	
Output Ripple Noise	Please contact us for details about Ripple Noise	

J4

· Option -J4 units come with EP connectors (Mfr. Tyco Electronics) instead of VH conectors (Mfr. J.S.T.).

Please contact us for detils about external view.

-J5 (LHA300F)

- · Option -J5 units come with 8 pin connector instead of a 10 pin connector.(24V,48V)
- · Keep the drawing current less than 5A per pin.

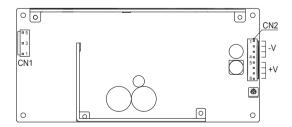


Fig.6.1 Example of option -J5

Table 6.2 Pin assignments of CN2

Pin No.	Output
1 to 4	-V
5 to 8	+V

Connector		Mating connector	Terminal
CN2	B8P-VH	VHR-8N	Chain: SVH-21T-P1.1
CINZ	B8P-VH	VUK-ON	Loose: BVH-21T-P1.1

(Mfr. J.S.T.)

-R2 (LHA100F, LHA150F, LHA300F)

- · You can control output ON/OFF remotely in Option -R2 units. To do so, connect an external DC power supply and apply a voltage to a remote ON/OFF connector, which is available as op-
- · Standby power with remote OFF is lower than the one with no load.

Model	Standby power[W]		
iviodei	ACIN 100V	ACIN 230V	
LHA100F	0.50typ	1.80typ *	
LHA150F	0.15typ	0.70typ	
LHA300F	0.20typ	0.80typ	

- * It is the same as standard model.
- · Start up time by ON signal in remote control is 700 ms (typ). (LHA100F:70ms typ)
- · Overvoltage protection is reactivated by toggling ON/OFF signal of remote control. (Only LHA150F, LHA300F)

	Built-in	Voltage bety	Voltage between RC (+)		
Model	Resistor	and RC (-) [V]		Current	
	Ri [Ω]	Output ON	Output OFF	[mA]	
LHA100F, LHA150F, LHA300F	1500	4.5 - 12.5	0 - 0.5	10max	

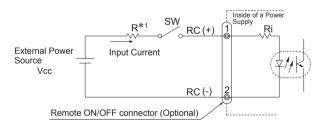


Fig.6.2 Example of using a remote ON/OFF circuit

- · Dedicated harnesses are available for purchase. Please see Optional Parts for details.
- *1 If the output of an external power source (Vcc) is within the range of 4.5 - 12.5V, you do not need a current limiting resistor R. If the output exceeds 12.5V, however, please connect the current limiting resistor R.

To calculate a current limiting resistance value, please use the following equation.

$$R[\Omega] = \frac{Vcc - (1.1 + Ri \times 0.005)}{0.005}$$

*Please wire carefully. If the wire incorrect, the internal components may be damaged.



■Remote ON/OFF circuits (RC(+) and RC(-)) are isolated from input, output and FG.

● -S, -SN

- · -S indicates a type with chassis, and -SN indicates a type with chassis and cover (Refer to external view).
- · In optional -S case, "Derating", "Maximum temperature of measurement points", "Life Expectancy" and "Warranty" is same as
- · In optional -SN case, please refer to "Derating". Also "Maximum temperature of measurement points", "Life expectancy" and "Warranty" is different from standard models.

Please refer to Table 6.3 to Table 6.20.

Table 6.3 Maximum temperature of measurement points (LHA30F-3R3-SNY, LHA30F-□-SN)

Cooling	Voltage	Mounting	Load factor	Maximum ter	nperature [℃]
Method	voitage	Method	LUAU IACIUI	1:Capacitor	②:Capacitor
			75% <lo≦100%< td=""><td>77</td><td>69</td></lo≦100%<>	77	69
		Α	40% <lo≦75%< td=""><td>83</td><td>79</td></lo≦75%<>	83	79
			lo≦40%	86	85
			75% <lo≦100%< td=""><td>79</td><td>66</td></lo≦100%<>	79	66
		В	40% <lo≦75%< td=""><td>83</td><td>78</td></lo≦75%<>	83	78
			lo≦40%	88	84
	2 2 42		75% <lo≦100%< td=""><td>70</td><td>70</td></lo≦100%<>	70	70
	3.3, 12, 15, 24V	С	40% <lo≦75%< td=""><td>81</td><td>81</td></lo≦75%<>	81	81
	15, 24 0		lo≦40%	85	86
			75% <lo≦100%< td=""><td>74</td><td>61</td></lo≦100%<>	74	61
		D	40% <lo≦75%< td=""><td>83</td><td>76</td></lo≦75%<>	83	76
			lo≦40%	87	82
			75% <lo≦100%< td=""><td>76</td><td>78</td></lo≦100%<>	76	78
		E	40% <lo≦75%< td=""><td>81</td><td>81</td></lo≦75%<>	81	81
Convection			lo≦40%	84	87
Convection		А	75% <lo≦100%< td=""><td>85</td><td>80</td></lo≦100%<>	85	80
			40% <lo≦75%< td=""><td>87</td><td>83</td></lo≦75%<>	87	83
			lo≦40%	86	83
			75% <lo≦100%< td=""><td>85</td><td>74</td></lo≦100%<>	85	74
		В	40% <lo≦75%< td=""><td>87</td><td>81</td></lo≦75%<>	87	81
			lo≦40%	88	83
			75% <lo≦100%< td=""><td>75</td><td>81</td></lo≦100%<>	75	81
	5V	С	40% <lo≦75%< td=""><td>83</td><td>84</td></lo≦75%<>	83	84
			lo≦40%	85	85
			75% <lo≦100%< td=""><td>84</td><td>70</td></lo≦100%<>	84	70
		D	40% <lo≦75%< td=""><td>87</td><td>79</td></lo≦75%<>	87	79
			lo≦40%	87	81
			75% <lo≦100%< td=""><td>79</td><td>85</td></lo≦100%<>	79	85
		E	40% <lo≦75%< td=""><td>82</td><td>85</td></lo≦75%<>	82	85
			lo≦40%	84	87
Forced air	22 241/	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
FUICEU all	3.3 - 24V	D,E,F	lo≦70%	75	75

Table 6.4 Maximum temperature of measurement points (LHA50F-3R3-SNY, LHA50F-□-SN)

Cooling	Voltage	Mounting	Load factor		nperature [℃]
Method	voitage	Method	Load lactor	1):Capacitor	2:Capacitor
			75% <lo≦100%< td=""><td>77</td><td>72</td></lo≦100%<>	77	72
		Α	40% <lo≦75%< td=""><td>86</td><td>84</td></lo≦75%<>	86	84
			lo≦40%	89	87
			75% <lo≦100%< td=""><td>73</td><td>71</td></lo≦100%<>	73	71
		В	40% <lo≦75%< td=""><td>84</td><td>82</td></lo≦75%<>	84	82
			lo≦40%	88	86
	3.3, 12,		75% <lo≦100%< td=""><td>77</td><td>73</td></lo≦100%<>	77	73
	15, 24,	С	40% <lo≦75%< td=""><td>85</td><td>83</td></lo≦75%<>	85	83
	36, 48V		lo≦40%	88	86
			75% <lo≦100%< td=""><td>82</td><td>64</td></lo≦100%<>	82	64
		D	40% <lo≦75%< td=""><td>87</td><td>80</td></lo≦75%<>	87	80
			lo≦40%	90	83
		Е	75% <lo≦100%< td=""><td>70</td><td>73</td></lo≦100%<>	70	73
			25% <lo≦75%< td=""><td>80</td><td>82</td></lo≦75%<>	80	82
Convection			lo≦25%	84	87
Convection		A	75% <lo≦100%< td=""><td>69</td><td>87</td></lo≦100%<>	69	87
			40% <lo≦75%< td=""><td>82</td><td>86</td></lo≦75%<>	82	86
			lo≦40%	86	87
			75% <lo≦100%< td=""><td>68</td><td>87</td></lo≦100%<>	68	87
		В	40% <lo≦75%< td=""><td>81</td><td>85</td></lo≦75%<>	81	85
			lo≦40%	85	87
			75% <lo≦100%< td=""><td>73</td><td>84</td></lo≦100%<>	73	84
	5V	С	40% <lo≦75%< td=""><td>82</td><td>83</td></lo≦75%<>	82	83
			lo≦40%	84	86
			75% <lo≦100%< td=""><td>81</td><td>80</td></lo≦100%<>	81	80
		D	40% <lo≦75%< td=""><td>85</td><td>81</td></lo≦75%<>	85	81
			lo≦40%	89	85
			75% <lo≦100%< td=""><td>66</td><td>87</td></lo≦100%<>	66	87
		Е	25% <lo≦75%< td=""><td>77</td><td>83</td></lo≦75%<>	77	83
			lo≦25%	83	87
Farmed	0.0 4017	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	3.3 - 48V	D,E,F	lo≦70%	75	75



Table 6.5 Maximum temperature of measurement points (LHA75F-3R3-SNY, LHA75F-□-SN)

(LIA/5F-3K3-SN1, LIA/5F-L-SN)							
	Cooling Method Voltage	Mounting	Load factor		nperature [℃]		
Method		Method		①:Capacitor	②:Capacitor		
			75% <lo≦100%< td=""><td>81</td><td>72</td></lo≦100%<>	81	72		
		Α	25% <lo≦75%< td=""><td>86</td><td>74</td></lo≦75%<>	86	74		
			lo≦25%	88	74		
			75% <lo≦100%< td=""><td>80</td><td>61</td></lo≦100%<>	80	61		
		В	25% <lo≦75%< td=""><td>82</td><td>64</td></lo≦75%<>	82	64		
			lo≦25%	89	71		
			75% <lo≦100%< td=""><td>75</td><td>65</td></lo≦100%<>	75	65		
	3.3, 5V	С	25% <lo≦75%< td=""><td>81</td><td>70</td></lo≦75%<>	81	70		
			lo≦25%	84	72		
			75% <lo≦100%< td=""><td>79</td><td>53</td></lo≦100%<>	79	53		
		D	20% <lo≦75%< td=""><td>80</td><td>60</td></lo≦75%<>	80	60		
			lo≦20%	83	68		
		E	75% <lo≦100%< td=""><td>77</td><td>70</td></lo≦100%<>	77	70		
			20% <lo≦75%< td=""><td>82</td><td>75</td></lo≦75%<>	82	75		
0			lo≦20%	86	76		
Convection		А	75% <lo≦100%< td=""><td>87</td><td>66</td></lo≦100%<>	87	66		
			25% <lo≦75%< td=""><td>86</td><td>70</td></lo≦75%<>	86	70		
			lo≦25%	88	74		
			75% <lo≦100%< td=""><td>86</td><td>61</td></lo≦100%<>	86	61		
		В	25% <lo≦75%< td=""><td>87</td><td>67</td></lo≦75%<>	87	67		
			lo≦25%	91	73		
			75% <lo≦100%< td=""><td>76</td><td>60</td></lo≦100%<>	76	60		
	12 - 48V	С	25% <lo≦75%< td=""><td>79</td><td>67</td></lo≦75%<>	79	67		
			lo≦25%	84	73		
			75% <lo≦100%< td=""><td>71</td><td>46</td></lo≦100%<>	71	46		
		D	20% <lo≦75%< td=""><td>78</td><td>61</td></lo≦75%<>	78	61		
			lo≦20%	82	67		
			75% <lo≦100%< td=""><td>87</td><td>74</td></lo≦100%<>	87	74		
		E	20% <lo≦75%< td=""><td>84</td><td>76</td></lo≦75%<>	84	76		
		_	lo≦20%	88	79		
		A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75		
Forced air	3.3 - 48V	D,E,F	lo≦70%	75	75		
		IJ,E,F	10 = 10/0	13	13		

Table 6.6 Maximum temperature of measurement points (LHA100F-□-SN)

Cooling	Voltage	Mounting	Load factor	Maximum ten	nperature [℃]
Method	voltage	Method	Luau iaciui	1):Capacitor	②:Capacitor
			75% <lo≦100%< td=""><td>76</td><td>85</td></lo≦100%<>	76	85
		Α	25% <lo≦75%< td=""><td>82</td><td>80</td></lo≦75%<>	82	80
			lo≦25%	85	74
			75% <lo≦100%< td=""><td>70</td><td>74</td></lo≦100%<>	70	74
		В	25% <lo≦75%< td=""><td>78</td><td>74</td></lo≦75%<>	78	74
			lo≦25%	83	72
			75% <lo≦100%< td=""><td>76</td><td>79</td></lo≦100%<>	76	79
	5V	С	25% <lo≦75%< td=""><td>80</td><td>76</td></lo≦75%<>	80	76
			lo≦25%	82	73
			75% <lo≦100%< td=""><td>80</td><td>74</td></lo≦100%<>	80	74
		D	25% <lo≦75%< td=""><td>81</td><td>70</td></lo≦75%<>	81	70
			lo≦25%	83	70
		Е	75% <lo≦100%< td=""><td>73</td><td>86</td></lo≦100%<>	73	86
			25% <lo≦75%< td=""><td>80</td><td>82</td></lo≦75%<>	80	82
0			lo≦25%	83	78
Convection		A	75% <lo≦100%< td=""><td>82</td><td>64</td></lo≦100%<>	82	64
			25% <lo≦75%< td=""><td>84</td><td>70</td></lo≦75%<>	84	70
			lo≦25%	86	73
			75% <lo≦100%< td=""><td>75</td><td>60</td></lo≦100%<>	75	60
			25% <lo≦75%< td=""><td>80</td><td>68</td></lo≦75%<>	80	68
			lo≦25%	82	70
			75% <lo≦100%< td=""><td>76</td><td>63</td></lo≦100%<>	76	63
	12 - 48V	С	25% <lo≦75%< td=""><td>80</td><td>70</td></lo≦75%<>	80	70
			lo≦25%	82	72
			75% <lo≤100%< td=""><td>70</td><td>49</td></lo≤100%<>	70	49
		D	25% <lo≦75%< td=""><td>75</td><td>59</td></lo≦75%<>	75	59
			lo≦25%	81	68
			75% <lo≦100%< td=""><td>82</td><td>75</td></lo≦100%<>	82	75
		E	25% <lo≦75%< td=""><td>81</td><td>77</td></lo≦75%<>	81	77
			lo≦25%	84	78
	5 40V	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	5 - 48V	D,E,F	lo≦70%	75	75

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Table 6.7 Maximum temperature of measurement points (LHA150F-U-SN)

Cooling		Mounting	l l f t		nperature [°C]
Method	Voltage	Method	Load factor	1):Capacitor	2:Capacitor
		Α	75% <lo≦100%< td=""><td>82</td><td>69</td></lo≦100%<>	82	69
			25% <lo≦75%< td=""><td>92</td><td>81</td></lo≦75%<>	92	81
			lo≦25%	95	86
			75% <lo≦100%< td=""><td>69</td><td>67</td></lo≦100%<>	69	67
		В	25% <lo≦75%< td=""><td>84</td><td>81</td></lo≦75%<>	84	81
			lo≦25%	94	89
			75% <lo≦100%< td=""><td>90</td><td>78</td></lo≦100%<>	90	78
	12V	С	25% <lo≦75%< td=""><td>96</td><td>82</td></lo≦75%<>	96	82
			lo≦25%	96	86
			75% <lo≦100%< td=""><td>64</td><td>53</td></lo≦100%<>	64	53
		D	25% <lo≦75%< td=""><td>87</td><td>75</td></lo≦75%<>	87	75
			lo≦25%	96	86
		Е	75% <lo≦100%< td=""><td>79</td><td>86</td></lo≦100%<>	79	86
			25% <lo≦75%< td=""><td>83</td><td>90</td></lo≦75%<>	83	90
Convection			lo≦25%	90	90
Convection		А	75% <lo≦100%< td=""><td>85</td><td>62</td></lo≦100%<>	85	62
			25% <lo≦75%< td=""><td>92</td><td>75</td></lo≦75%<>	92	75
			lo≦25%	95	83
			75% <lo≦100%< td=""><td>77</td><td>64</td></lo≦100%<>	77	64
		В	25% <lo≦75%< td=""><td>84</td><td>75</td></lo≦75%<>	84	75
			lo≦25%	91	85
			75% <lo≦100%< td=""><td>90</td><td>63</td></lo≦100%<>	90	63
	24 - 48V	С	25% <lo≦75%< td=""><td>96</td><td>76</td></lo≦75%<>	96	76
			lo≦25%	96	83
			75% <lo≦100%< td=""><td>63</td><td>42</td></lo≦100%<>	63	42
		D	25% <lo≦75%< td=""><td>81</td><td>68</td></lo≦75%<>	81	68
			lo≦25%	92	81
			75% <lo≦100%< td=""><td>83</td><td>80</td></lo≦100%<>	83	80
		E	25% <lo≦75%< td=""><td>89</td><td>89</td></lo≦75%<>	89	89
			lo≦25%	91	90
Forced air	12 - 48V	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
i orceu all	12 - 40V	D,E,F	lo≦70%	75	75

Table 6.8 Maximum temperature of measurement points (LHA300F-□-SNY)

Cooling	Voltage	Mounting	Load factor	Maximum ten	nperature [℃
Method	vollago	Method	Load lactor	1):Capacitor	2:Capacitor
			75% <lo≦100%< td=""><td>84</td><td>84</td></lo≦100%<>	84	84
		Α	25% <lo≦75%< td=""><td>90</td><td>84</td></lo≦75%<>	90	84
			lo≦25%	90	80
			75% <lo≦100%< td=""><td>73</td><td>75</td></lo≦100%<>	73	75
		В	25% <lo≦75%< td=""><td>89</td><td>82</td></lo≦75%<>	89	82
			lo≦25%	90	81
			75% <lo≦100%< td=""><td>86</td><td>75</td></lo≦100%<>	86	75
	12V	С	25% <lo≦75%< td=""><td>90</td><td>74</td></lo≦75%<>	90	74
			lo≦25%	90	76
			75% <lo≦100%< td=""><td>69</td><td>64</td></lo≦100%<>	69	64
		D	25% <lo≦75%< td=""><td>79</td><td>68</td></lo≦75%<>	79	68
			lo≦25%	88	77
		E	75% <lo≦100%< td=""><td>79</td><td>84</td></lo≦100%<>	79	84
			25% <lo≦75%< td=""><td>90</td><td>86</td></lo≦75%<>	90	86
0			lo≦25%	90	85
Convection		А	75% <lo≦100%< td=""><td>90</td><td>73</td></lo≦100%<>	90	73
			25% <lo≦75%< td=""><td>90</td><td>74</td></lo≦75%<>	90	74
			lo≦25%	90	76
			75% <lo≦100%< td=""><td>83</td><td>69</td></lo≦100%<>	83	69
		В	25% <lo≦75%< td=""><td>86</td><td>72</td></lo≦75%<>	86	72
			lo≦25%	90	78
			75% <lo≦100%< td=""><td>89</td><td>63</td></lo≦100%<>	89	63
	24, 48V	С	25% <lo≦75%< td=""><td>90</td><td>71</td></lo≦75%<>	90	71
			lo≦25%	83	73
			75% <lo≦100%< td=""><td>71</td><td>53</td></lo≦100%<>	71	53
		D	25% <lo≦75%< td=""><td>77</td><td>66</td></lo≦75%<>	77	66
			lo≦25%	88	75
			75% <lo≦100%< td=""><td>90</td><td>83</td></lo≦100%<>	90	83
		Е	25% <lo≦75%< td=""><td>90</td><td>84</td></lo≦75%<>	90	84
		_	lo≦25%	90	83
Farmed at	40 4017	A,B,C,	70% <lo≦100%< td=""><td>75</td><td>75</td></lo≦100%<>	75	75
Forced air	12 - 48V	D,E,F	lo≦70%	75	75

■Life expectancy

Table 6.9 Life expectancy (LHA30F-3R3-SNY, LHA30F-□-SN)

145.5 6.6 2.16 6.49 66.4.6 6.16 6.11, 2.11.66. 2.11,								
Cooling	Voltage	Mounting	Average ambient	Life exp	ectancy			
Method	voitage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>			
	3.3 - 12V		Ta=30°C or less	10years or more	7years			
Convection	3.3 - 12V	A,B,C,	Ta=40°C	10years or more	3years			
Convection	15, 24V	D,E	Ta=30°C or less	10years or more	10years or more			
			Ta=40°C	10years or more	7years			
Forced air	3.3 - 24V	A,B,C,	Ta=40°C or less	5years	5years			
roiceu ali	3.3 - 240	D,E,F	Ta=50°C	5years	3years			

Table 6.10 Life expectancy (LHA50F-3R3-SNY, LHA50F-□-SN)

Cooling	Voltage	Mounting	Average ambient	Life exp	ectancy
Method	voitage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,C,D	Ta=30°C or less	10years or more	10years or more
	3.3, 12,	A,C,D	Ta=40°C	10years or more	6years
	24, 36,	В	Ta=25°C or less	10years or more	10years or more
	48V	Ь	Ta=35℃	10years or more	10years or more
	40V	F	Ta=20°C or less	10years or more	10years or more
Convection	Convection	_	Ta=30°C	10years or more	8years
Convection		A,B,D	Ta=25°C or less	10years or more	10years or more
			Ta=35°C	10years or more	5years
	5, 15V		Ta=30°C or less	10years or more	10years or more
	5, 15V	C	Ta=40°C	10years or more	6years
		E	Ta=20°C or less	10years or more	10years or more
		_	Ta=30°C	10years or more	10years or more
Forced air	3.3 /8//	A,B,C,	Ta=40°C or less	5years	5years
i orceu all	3.3 - 48V	D,E,F	Ta=50°C	5years	3years



Table 6.11 Life expectancy (LHA75F-3R3-SNY, LHA75F-□-SN)

Cooling	Voltage	Mounting	Average ambient	Life exp	ectancy
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=20°C or less	10years or more	10years or more
	3.3, 5V	A,b,C	Ta=30°C	10years or more	6years
	3.3, 50	D,E	Ta=15°C or less	10years or more	10years or more
		□,⊑	Ta=25°C	10years or more	6years
Convection		A,B 2 - 48V C,E	Ta=30°C or less	10years or more	6years
Convection			Ta=40°C	5years	3years
	10 40\/		Ta=25°C or less	10years or more	6years
	12 - 40 V		Ta=35°C	6years	3years
		D	Ta=15°C or less	10years or more	10years or more
		D	Ta=25°C	10years or more	9years
Forced air	3.3 - 48V	A,B,C,	Ta=40°C or less	5years	5years
Forced air	3.3 - 48V	D,E,F	Ta=50°C	5years	3years

Table 6.12 Life expectancy (LHA100F-□-SN)

Cooling	Valtage	Mounting	Average ambient	Life exp	ectancy
Method	Voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
	5V	A,B,C,	Ta=20°C or less	10years or more	7years
	υ	D,E	Ta=30°C	8years	3years
Convection		A,B,	Ta=25°C or less	10years or more	10years or more
Convection	12 - 48V	C,E	Ta=35°C	9years	5years
	12 - 40 V	D	Ta=15°C or less	10years or more	10years or more
			Ta=25°C	10years or more	10years or more
Forced air	E 40\/	A,B,C,	Ta=40°C or less	5years	5years
Forced all	5 - 48V	D,E,F	Ta=50°C	5years	3years

Table 6.13 Life expectancy (LHA150F-□-SN)

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Cooling	Voltage	Mounting	Average ambient	Life exp	ectancy		
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>		
		A,B,C	Ta=20°C or less	10years or more	10years or more		
		A,b,C	Ta=30℃	10years or more	3years		
	12V	D	Ta=10°C or less	10years or more	10years or more		
	120	0	Ta=20°C	10years or more	10years or more		
		Е	Ta=15°C or less	10years or more	9years		
Convention	nucetion	-	Ta=25℃	9years	4years		
Convection		A,B,C	Ta=25°C or less	10years or more	9years		
			Ta=35℃	9years	4years		
	24 - 48V		Ta=10°C or less	10years or more	10years or more		
	24 - 40V	D	Ta=20℃	10years or more	10years or more		
		Е	Ta=20°C or less	10years or more	10years or more		
			Ta=30°C	10years or more	7years		
Forced air	12 40\/	A,B,C,	Ta=40°C or less	5years	5years		
Forced all	12 - 48V	D,E,F	Ta=50℃	5years	3years		

Table 6.14 Life expectancy (LHA300F-□-SNY)

Cooling	Voltage	Mounting	Average ambient	Life exp	ectancy
Method	vollage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		ABCD	Ta=10°C or less	10years or more	9years
	12V	A,B,C,D	Ta=20℃	10years or more	4years
0	120	E	Ta=5°C or less	10years or more	9years
			Ta=15℃	10years or more	4years
Convection	24, 48V	A,B,C D,E	Ta=25°C or less	10years or more	6years
			Ta=35℃	6years	3years
			Ta=15°C or less	10years or more	10years or more
			Ta=25℃	10years or more	5years
Forced oir	12 40\/	A,B,C,	Ta=40°C or less	5years	5years
Forced air	12 - 48V	D,E,F	Ta=50℃	5years	3years

■Warranty

Table 6.15 Warranty (LHA30F-3R3-SNY, LHA30F-□-SN)

Cooling	Voltage	Mounting	Average ambient	Warranty	
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
Convection	3.3 - 48V	A,B,C,	Ta=30°C or less	5years	5years
Convection	3.3 - 40V	D,E	Ta=40°C	5years	3years
Forced air	3.3 - 48V	A,B,C,	Ta=40°C or less	5years	5years
Forced all	3.3 - 48V	D,E,F	Ta=50°C	5years	3years

Table 6.16 Warranty (LHA50F-3R3-SNY, LHA50F-□-SN)

Cooling	Voltage	Mounting	Average ambient	Warranty	
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,C,D	Ta=30°C or less	5years	5years
	3.3, 12,	A,C,D	Ta=40°C	5years	3years
	l ' '	В	Ta=25°C or less	5years	5years
	24, 36, 48V	В	Ta=35℃	5years	3years
	48V	Е	Ta=20°C or less	5years	5years
Convection		-	Ta=30°C	5years	3years
Convection	F 15\/	A,B,D C	Ta=25°C or less	5years	5years
			Ta=35℃	5years	3years
			Ta=30°C or less	5years	5years
	5, 15V		Ta=40°C	5years	3years
		Е	Ta=20°C or less	5years	5years
		=	Ta=30°C	5years	3years
Forced air	3.3 - 48V	A,B,C,	Ta=40°C or less	5years	5years
i orceu all	3.3 - 48V	D,E,F	Ta=50℃	5years	3years

Table 6.17 Warranty (LHA75F-3R3-SNY, LHA75F-□-SN)

Cooling	Voltage	Mounting	Average ambient	War	ranty
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=20°C or less	5years	5years
	3.3, 5V	A,b,C	Ta=30°C	5years	3years
	3.3, 34	D,E	Ta=15°C or less	5years	5years
		D,E	Ta=25°C	5years	3years
Convection	12 - 48V	A,B C,E D	Ta=30°C or less	5years	5years
Convection			Ta=40°C	5years	3years
			Ta=25°C or less	5years	5years
			Ta=35°C	5years	3years
			Ta=15°C or less	5years	5years
			Ta=25°C	5years	3years
Forced air	3.3 - 48V	A,B,C,	Ta=40°C or less	5years	5years
Forceu all	3.3 - 46V	D,E,F	Ta=50°C	5years	3years

Table 6.18 Warranty (LHA100F-□-SN)

			, ,	,	
Cooling	Voltage	Mounting Average ambient		Warranty	
Method	vollage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
Convection	5V	A,B,C,	Ta=20°C or less	5years	5years
	ον	D,E	Ta=30°C	5years	3years
	12 - 48V	A,B,	Ta=25°C or less	5years	5years
		C,E	Ta=35°C	5years	3years
		D	Ta=15°C or less	5years	5years
		0	Ta=25°C	5years	3years
Forced air	5 - 48V	A,B,C,	Ta=40°C or less	5years	5years
Forced air	5 - 48V	D,E,F	Ta=50°C	5years	3years

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Table 6.19 Warranty (LHA150F-□-SN)

Cooling	Voltage	Mounting	Average ambient	Warı	ranty
Method	voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C	Ta=20°C or less	5years	5years
		A,B,C	Ta=30°C	5years	3years
	12V	D	Ta=10°C or less	5years	5years
	120		Ta=20°C	5years	3years
		Е	Ta=15°C or less	5years	5years
Convection			Ta=25℃	5years	3years
Convection	24 - 48V	A,B,C	Ta=25°C or less	5years	5years
			Ta=35℃	5years	3years
		D	Ta=10°C or less	5years	5years
			Ta=20°C	5years	3years
		Е	Ta=20°C or less	5years	5years
		E	Ta=30°C	5years	3years
Forced air	10 40\/	A,B,C,	Ta=40°C or less	5years	5years
Forced air	12 - 48V	D,E,F	Ta=50°C	5years	3years

Table 6.20 Warranty (LHA300F-□-SNY)

Cooling	Valtaga	Mounting	Average ambient	War	ranty
Method	Voltage	Method	temperature (year)	lo≦75%	75% <lo≦100%< td=""></lo≦100%<>
		A,B,C,D	Ta=10°C or less	5years	5years
	12V	A,b,C,D	Ta=20℃	5years	3years
	120	Е	Ta=5 [°] C or less	5years	5years
Convection			Ta=15℃	5years	3years
Convection	24, 48V		Ta=25°C or less	5years	5years
			Ta=35℃	5years	3years
			Ta=15°C or less	5years	5years
		D,E	Ta=25℃	5years	3years
Forced air	12 - 48V	A,B,C,	Ta=40°C or less	5years	5years
i orođu ali	12 - 48V	D,E,F	Ta=50°C	5years	3years

T (LHA300F)

- · Option -T units has changed the I /O interface from the connector to the terminal block (M3.5) Type.
- · Refer to fig.6.3 for terminal arrangement.
- · The size specification is different from standard model. Please contact us for details.

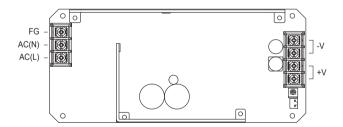


Fig.6.3 Example of option -T

-U1 (LHA150F,LHA300F)

· By connecting the external capacitor unit CR-HUT (optional parts) to CN4, Hold-up time is extendable.

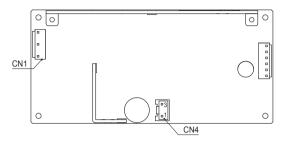


Fig.6.4 CN4 location (LHA150F-□-U1)

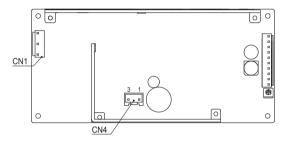


Fig.6.5 CN4 location (LHA300F- U1Y)

Table 6.21 Pin assignments of CN4 (LHA150F-□-U1, LHA300F-□-U1Y)

CN4	
Pin No.	Function
1	VC(-)
2	
3	VC(+)

C	Connector		Terminal
CN4	BH2P3-VH-1	VHR-3N	Chain: SVH-21T-P1.1
	BH2P3-VH-1		Loose: BVH-21T-P1.1

(Mfr. J.S.T.)

■Connection method

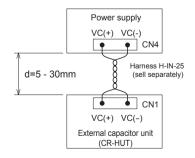


Fig.6.6 Conection method

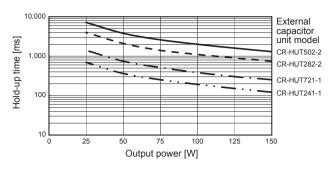


Fig. 6.7 Hold-up time by LHA150F- -- U1 (Reference data)

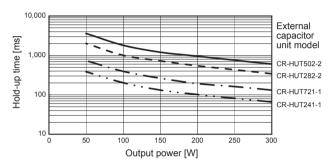


Fig. 6.8 Hold-up time by LHA300F-_-U1Y (Reference data)

Caution

- Distance between the external capacitor unit and power supply unit must be secured more than 5mm.
- · It must be 30mm or less, since the noise is generated from the wire which connects the external capacitor unit and power supply. It is necessary to twist the wire as short as possible.
- · It is necessary to use wires which are rated for voltage of 600V or more
- It must be used with the external capacitor unit (CR-HUT).
- · For more information about the external capacitor unit and harness (H-IN-25), please refer to the optional parts page.



- · Option -Y units can adjust the output voltage by attached poten-
- · Refer to the adjustable range to the table 6.22 and table 6.23.

■LHA30F, LHA50F, LHA75F, LHA100F

Table 6.22 Output voltage adjustment range

Output voltage	Output voltage adjustment range[V]
3.3V *	2.85 to 3.63
5V	4.5 to 5.5
12V	10.8 to 13.2
15V	13.5 to 16.5
24V	21.6 to 26.4
36V	32.4 to 39.6
48V	43.2 to 52.8

*For some products, -Y is standard equipment. (LHA30F-3R3-Y, LHA50F-3R3-Y, LHA75F-3R3-Y)

■LHA150F, LHA300F

Table 6.23 Output voltage adjustment range

Output voltage	Output voltage adjustment range[V]
12V	11.4 to 13.2
24V	22.8 to 26.4
36V	34.2 to 39.6
48V	45.6 to 52.8

- *LHA300F, -Y is standard equipment.
 - · To increase output voltage, turn a built-in potentiometer clockwise. To decrease the output voltage, turn it counterclockwise.
 - · Please take care when you adjust output voltage by potentiometer, because there is possibility of electric shock and breakdown when contacting to other internal circuit by electrically conductive tool.

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6.2 Output side attaching external capacitor

- ■Depending on the capacitance of the external capacitor, resonance may occur due to ESR, ESL, and wiring inductance, so please be careful of ripple increase.
- ■If the external capacitor is too large, the power supply might not start up.

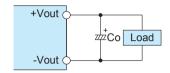


Fig.6.9 Output side external capacitor connection method

Table 6.24 Connectable External capacitor on the output side [µF]

					•	
Model Output voltage	LHA30F	LHA50F	LHA75F	LHA100F	LHA150F	LHA300F
3.3V	0 to 2800	0 to 6100	0 to 9200	-	-	-
5V	0 to 1300	0 to 2800	0 to 9200	0 to 24000	-	-
12V	0 to 1300	0 to 2800	0 to 4200	0 to 8700	0 to 6300	0 to 5600
15V	0 to 1300	0 to 2800	0 to 4200	0 to 8700	-	-
24V	0 to 920	0 to 1900	0 to 2800	0 to 6300	0 to 2800	0 to 4900
36V	-	0 to 1100	0 to 1600	0 to 3500	0 to 1600	-
48V	-	0 to 920	0 to 1200	0 to 2800	0 to 1000	0 to 1400

6.3 Others

- ■This power supply is the rugged PCB type. Do not drop conductive objects in the power supply.
- ■At light load, there remains high voltage inside the power supply for a few minutes after power OFF.
- Be careful of electric shock during maintenance.
- ■This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.
 - · Please tighten screws in all mounting holes.

Model	Mounting holes
LHA30F	2 positions
LHA50F, LHA75F, LHA100F,	4 positions
LHA150F, LHA300F	4 positions

- · Install it so that PCB may become parallel to the clamp face.
- · Avoid dropping unit.
- ■While turning on the electricity, and for a while after turning off, please don't touch the inside of power supply because some components could be hot.