Original instructions

YAG LASER WELDER

ML-2350AF/2351AF-CE EU

OPERATION MANUAL

AMADA

Z06OM1173717-10

Thank you for purchasing our YAG Laser Welder **ML-2350AF/2351AF**.
ML-2350AF-CE and **ML-2351AF-CE** are the air-cooled versions of the standard **ML-2350A-CE** and **ML-2351A-CE**, respectively. This operation manual describes only the difference of the air-cooled versions from the standard ones.
See the operation manual of the standard version for how to use, such as operation method.

ATTENTION

In this manual, **ML-2350AF** denotes **ML-2350AF-CE**;
ML-2351AF, **ML-2351AF-CE**.

Contents

1. Difference from the Standard Specifications

The **ML-2350AF/2351AF** eliminates city water to improve the factory environment.

- The laser power supply, oscillator head and cooler are accommodated in one body. Transportation and installation are easy because the piping for city water is not necessary.
- The air-cooled system does not waste water resources.

How to operate is just the same as the standard **ML-2350A-CE** and **ML-2351A-CE**.

2. Specifications

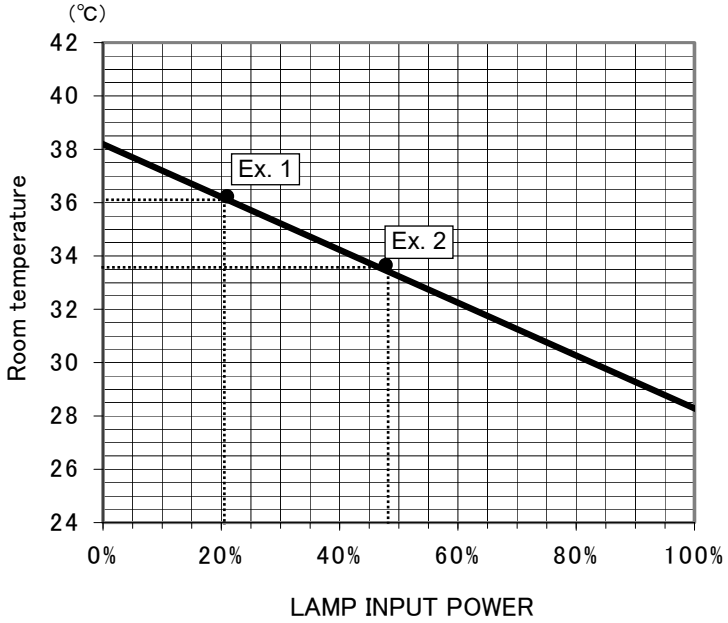
① Specifications List

		ML-2350AF	ML-2351AF
Oscillator	Maximum rated output	70W	50W
	Maximum output energy	70J/P (10ms Pulse width)	50J/P (10ms Pulse width)
	Maximum peak power	7kW	5kW
	Pulse width	Standard: 0.3–30.0ms (0.1ms steps) Fine setting: 0.25–5.00ms (0.05ms steps)	
	Pulse Repetition	1–200pps	
	Oscillation wavelength	1.064μm	
	Resonator shutter	With open/close sensor	
	Positioning guide beam	Built-in visible laser (Red)	
	Output stability *1	±3%	
	Power supply	3-phase, 400V AC±10%, 50/60Hz	
	Max. input current	6.5A	
	Max. apparent power	4.5kVA	
	Power consumption	Maximum: 3.5kW / Stand-by: 0.49kW	
	Breaker rated current (to be supplied by customers)	For the power supply side, we earnestly recommend using a leakage breaker with the rated current of 10 A or more, which is applicable to harmonics and surges.	
	Ground	Class C (ground resistance: 10 Ω max.)	
Cooler	Heat exchange method	Forced air-cooled	
	Operating room temperature	5°–30°C (40°C max. cooling water temp.) The temperature may varies depending on LAMP INPUT POWER (%) of 80% or higher and installation conditions. Refer to the Cooling Capability Chart below. (Provide the provision to measure the difference between room and coolant temperatures.)	
	NOTE: Heat of 2.5 kW (2150 kcal/h) is discharged for the maximum rating.		

Laser Controller MLE-118A	Schedule setting	Up to 32 schedules can be set by combining ・Laser output waveform ・Laser energy for upper/lower limit judgment ・Number of outputs per second ・Number of repeated outputs
	Measurement function	Laser energy (J) Average power (W) } are measured and displayed.
	Counter	Displays total number of outputs (9 digits) Displays the number of acceptable outputs (9 digits)
	Length of cable	Standard 3m cable
Others	Mass	Approx. 250 kg
	Dimensions	990 (H) x 521.1 (W) x 995 (D) mm

*1) Under the condition that laser output energy is at least 5 J per pulse and peak power is at least 1 kW.

② Cooling Capability



The chart at left depicts the cooling capability at 100% duty cycle. Do not use in room temperature exceeding the line shown.

See the examples below for less than 100% duty cycle:

[Example 1]

Letting LAMP INPUT POWER be 60%, and "1-s laser output—2-s pause" be repeated.

60 x 1/3 = 20

LAMP INPUT POWER of 20% gives the room temperature of about 36°C.
Keep room temperature 36°C or less.

[Example 2]

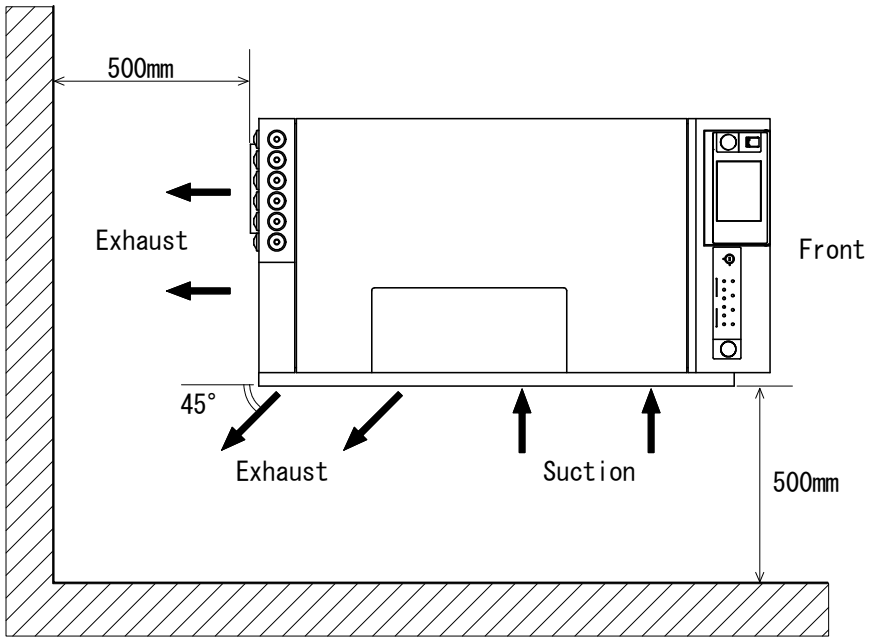
Letting LAMP INPUT POWER be 80%, and "3-s laser output—2-s pause" be repeated.

80 x 3/5 = 48

LAMP INPUT POWER of 48% gives the room temperature of about 33.5°C.
Keep room temperature 33.5°C or less.

③ Clearances between the Laser and Surrounding Wall

ML-2350AF/2351AF are provided with vents on its left and rear sides for heat radiation. Install the Laser to secure the minimum clearances of 500 mm as shown; otherwise, full performance cannot be expected.



If you cannot provide clearances specified above, consult us.

3. Maintenance

(1) Maintenance Parts and Standard Intervals of Inspection/Replacement

In addition to maintenance parts for the standard model, perform inspection periodically referring to the following table.

Part name	Model No.	Item No.	Operation interval (standard) (*1)	Contents of operation (*2)
Air filter (side)	Z-01641-001	1018369	Every week	Clean
			1 year	Replace

*1: The operation interval means the maintenance time or expected life of the part, and is different from the guarantee period.
*2: Part replacement is performed when any damage or defect is found or the usable period ends.

(2) Maintenance of the Air Filter (Side)

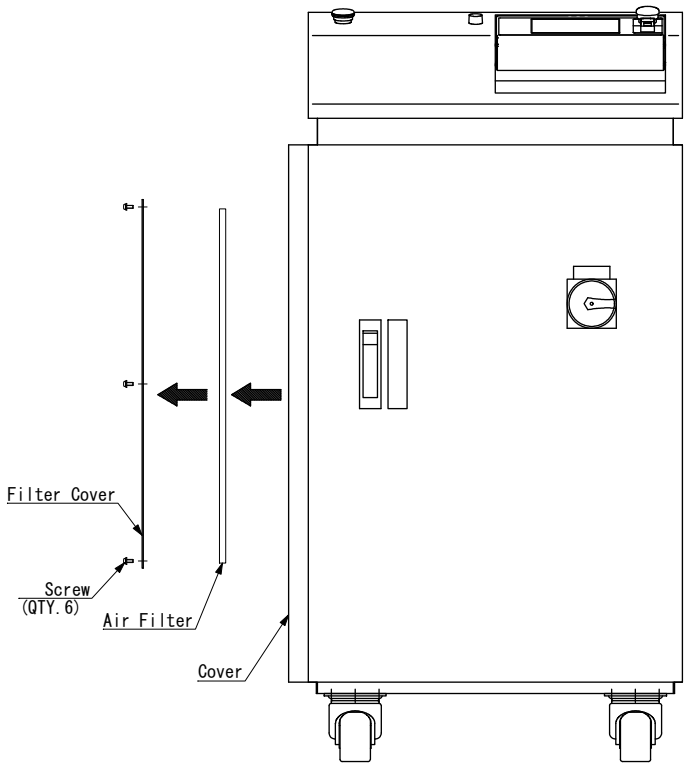
The air filter at the side of the main unit is provided at the air inlet of the radiator. Perform cleaning for this air filter at this portion every week.

Item required

Phillips screwdriver

Operating Procedure

(1) Remove screws of the filter cover at the side of the main unit.



(2) Take out the filter and wash it in tap water. Then, dry the air filter completely. When the air filter is very dirty, use a neutral cleaner.

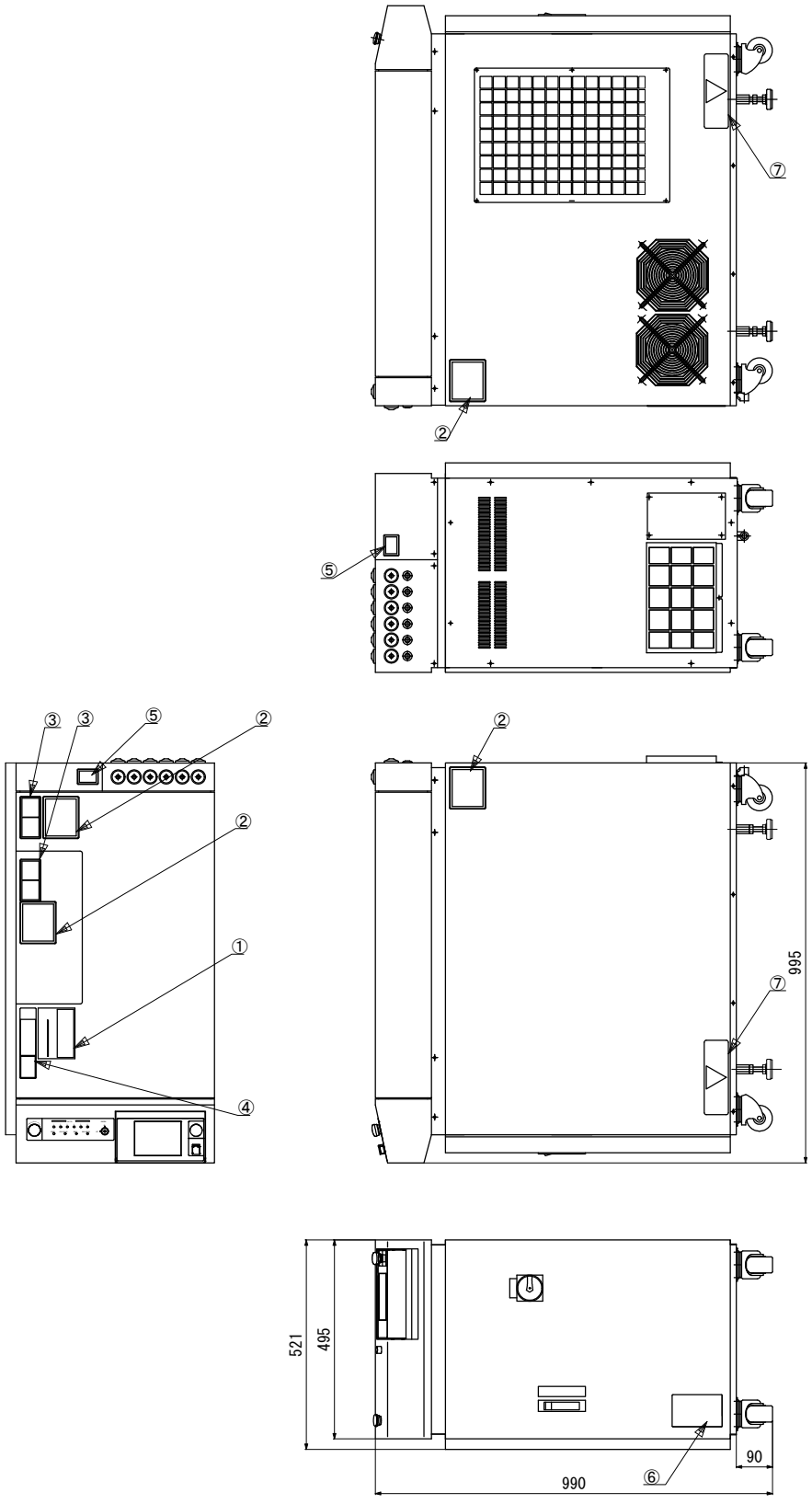
(3) Install the air filter by using the filter cover.

4. Outline Drawing

The Laser Outline and Location of Warning/Caution Label

See the next page for details of warning labels.

(Dimensions in mm)



①


DANGER
VISIBLE AND/OR INVISIBLE LASER RADIATION
AVOID EYE OR SKIN EXPOSURE TO
DIRECT OR SCATTERED RADIATION
MAX OUTPUT
PULSE DURATION
WAVELENGTH(S)
CLASS IV LASER PRODUCT

②


DANGER
HIGH VOLTAGE
IF INTERLOCK IS DEFEATED PERSONNEL MAY BE
EXPOSED TO ELECTRICAL SHOCK HAZARD
DISCONNECT POWER AND WAIT 5MIN.
BEFORE SERVICING
高圧危険
セーフティインタロックを解除すると
感電するおそれがあります。
また、電源切替後５分以内は
内部に絶対に触れないでください。

③


危 険
ここを開き、そしてｲﾝﾀﾛｯｸを解除するとｸﾗｽ4のﾚｰｻﾞ放射が出る。ﾋﾞｰﾑや散乱光の目又は皮膚への被ばくを避けること
DANGER
CLASS 4 LASER RADIATION
WHEN OPEN AND INTERLOCKS
DEFEATED AVOID EYE OR
SKIN EXPOSURE TO DIRECT
OR SCATTERED RADIATION.

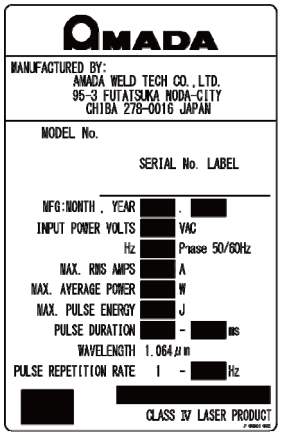
④


危険 － 可視及び/又は不可視レーザ光
DANGER － VISIBLE AND/OR INVISIBLE LASER RADIATION
ビームや散乱光の目又は皮膚の被ばくをさけること
AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION
最大出力 / MAX
媒 質 / MEDIUM
パルス幅 / PULSE WIDTH
波 長 / WAVE LENGTH
Nd : YAG
パルス波 / PULSE
1.064μm
半導体レーザ / LD
連続波 / CW
0.650μm
クラス4レーザ製品 CLASS 4 LASER PRODUCT
危険
ここを開き、そしてインタロックを解除するとクラス4のレーザ放射が出る。
DANGER
VISIBLE AND/OR INVISIBLE LASER RADIATION WHEN
OPEN AND INTERLOCKS DEFEATED AVOID EYE OR SKIN
EXPOSURE TO DIRECT OR SCATTERED RADIATION

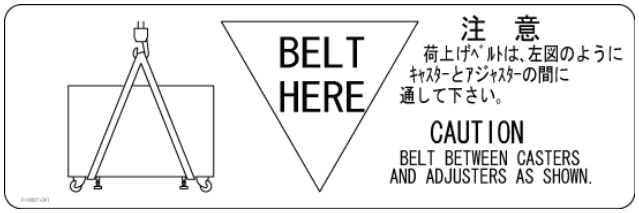
⑤


AVOID EXPOSURE-LASER
RADIATION IS EMITTED
FROM THIS APERTURE
被ばくを回避のこと - この
開口からレーザ放射が出る。

⑥


AMADA
MANUFACTURED BY:
AMADA WELD TECH CO.,LTD.
95-3 FUTATSUKA MODA-CITY
CHIBA 278-0016 JAPAN
MODEL No.
SERIAL No. LABEL
MFG:MONTH , YEAR
INPUT POWER VOLTS
VAC
Hz
P-base 50/60Hz
MAX. RMS AMPS
A
MAX. AVERAGE POWER
W
MAX. PULSE ENERGY
J
PULSE DURATION
ms
WAVELENGTH 1.064μm
PULSE REPETITION RATE 1 -
Hz
CLASS IV LASER PRODUCT

⑦


BELT
HERE
注 意
荷上げﾍﾞﾙﾄは、左図のように
ｷｬｽﾀｰとｱｼﾞｬｽﾀｰの間に
通して下さい。
CAUTION
BELT BETWEEN CASTERS
AND ADJUSTERS AS SHOWN.