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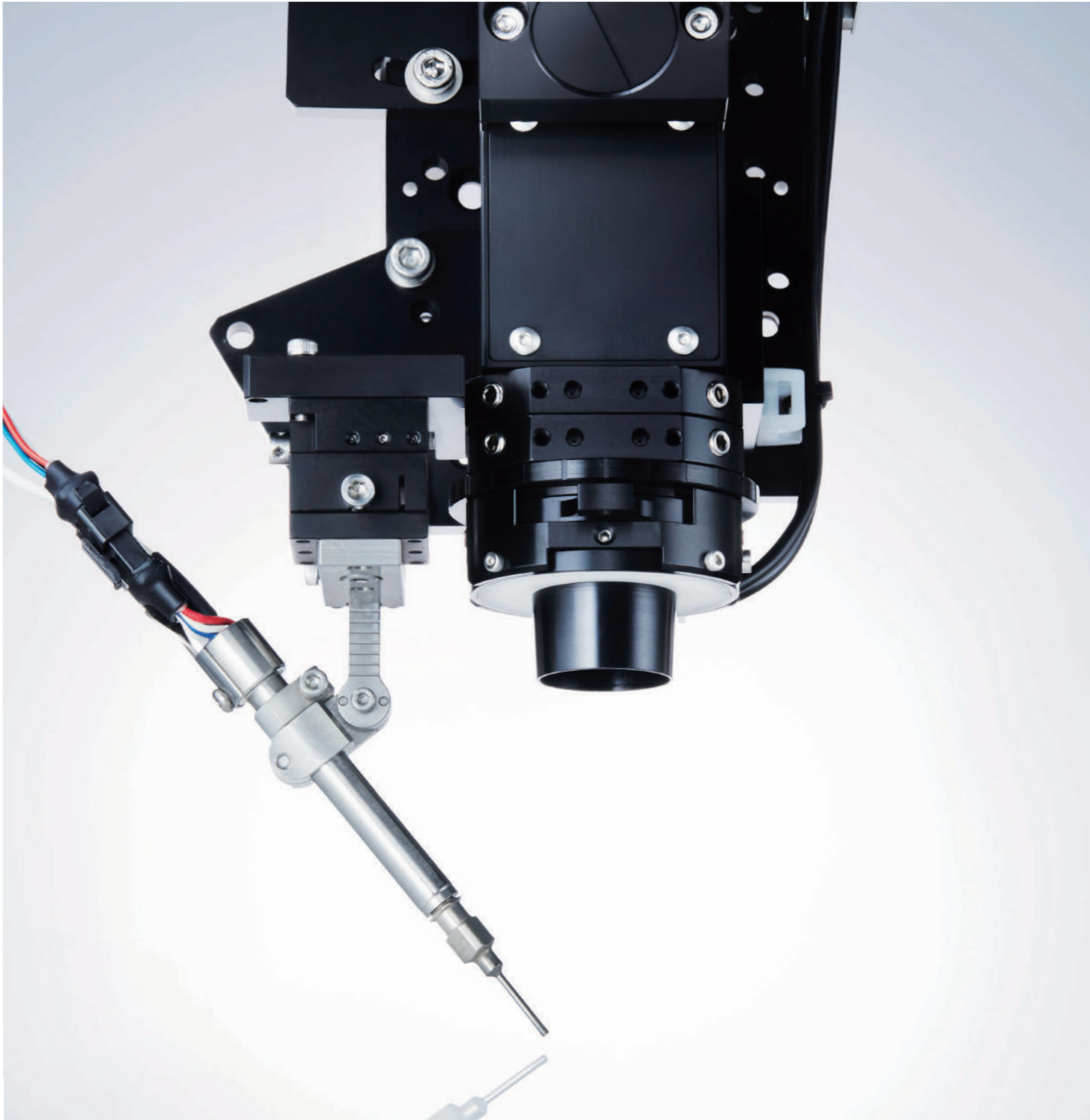
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• This catalog reflect the products as of June 2022. The product appearance and specifications can change without notice.
• Be sure to carefully read the operating instructions included with the product before use.

LASER SOLDERING SYSTEM
vol.5



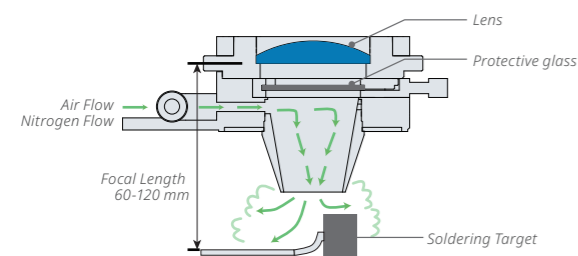
1 Standard Functions

Laser Systems Specialized for Soldering

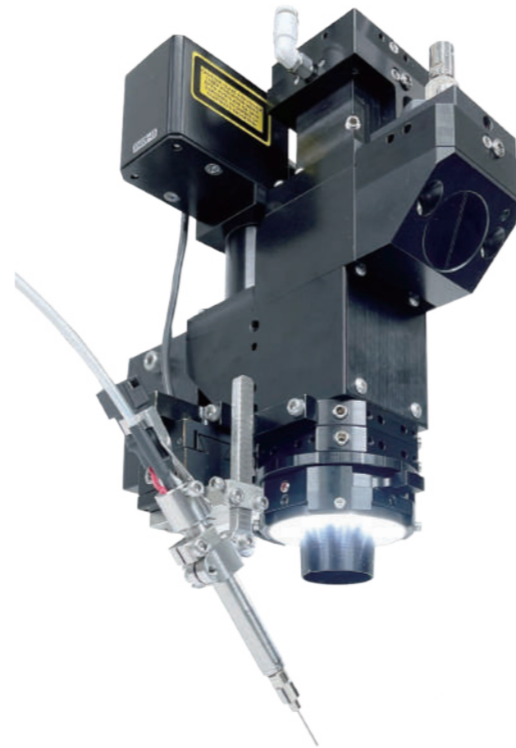
Laser Head

The laser head irradiates the selected area with the laser beam focused in the proper spot size transmitted through an optical fiber from the laser. The coaxial CCD camera is built in the laser head as standard, and many other features come along to make daily production more efficient.

[Internal Structure of Laser Head]



The laser head is protected from flux fume by the air jet feature, and the inside optical component is sealed off. The CCD camera is coaxially aligned with the laser optics.



Laser Controller / Generator

Controlling the laser output value is the key to laser soldering. Fiber coupled LD is used to transmit the laser beam to the laser head through an optical fiber.

ULD-02 consists of the controller (control unit), the touch panel operation box, the laser, and the power supply unit. Our laser equipment is compliant with the International Electrotechnical Commission IEC60825-1:2014 and the Japan Industrial Standards, JIS C 6802:2018. The laser class is Class 4. The export to the United States is approved by the FDA.



- Qualified product: ULD-02.

Easy and Correct Parameter Setup for Your Work

127 Patterns of Waveform in Program and Power Usage Set at 10 Levels

Waveform Patterns

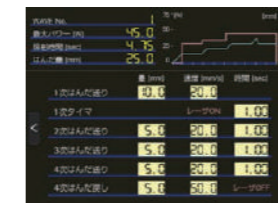
Waveforms can be selected from up to 127 patterns. You can easily set 10 levels of power output and the time for each waveform.



Centralized Solder Feeding

Solder Feeder

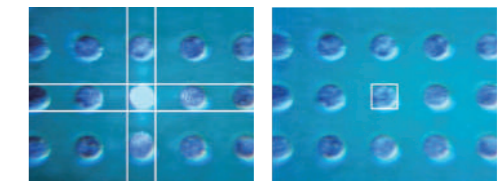
Solder feed setting will be available with an optional feature.



Selectable Laser Irradiation Location Mark

Irradiation Location Mark

Laser irradiation location can be viewed on a monitor in multiple modes.



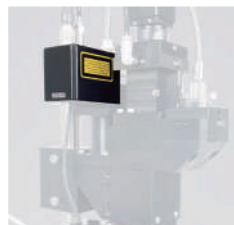
LINE mode

□ (square) mode

Compliant with the safety standard of Laser Class 4

Mechanical Shutter *Option

A device that blocks laser transmission within the head.



Blocks fume and provides stable focused beam.

Sliding Protective Glass

This glass protects the focusing lens from flux fumes coming into the soldering head. The sliding structure allows one-touch detachment and easy maintenance.



Easy to check laser irradiation locations and soldering results.

Coaxial CCD Camera built in.

A coaxial camera allows you to facilitate settings and teaching of the laser irradiation locations according to your work as you can view the implemented area on a monitor.



Solder Feeder

Patented

The required amount of solder is provided to target points with high precision. A built-in solder encoder detects solder feed issues.

(The solder feeder varies according to the solder diameter. $\phi 0.2\text{mm}$ - $\phi 1.2\text{mm}$)



UPM-052D
 $\phi 0.2\text{mm}$ - $\phi 0.8\text{mm}$



UPM-057
 $\phi 0.3\text{mm}$ - $\phi 1.2\text{mm}$

2 How to Get Started

How to Get Started According to Your Needs

1 Integration

Laser head
Laser Controller
Laser

Solder Feeder

Robot

Safety Cover

Transportation
Systems

Our laser soldering system optimizes for a production line according to your requirements and provide comprehensive services from design to construction/adoption in compliance with international safety standards for lasers. Our expert engineers provides strong technical support (e.g., parameter settings) so that customers can save time and effort and focus on the comprehensive management of the production line. We can offer various ideas on the production line such as in-line, indexing, two slider, etc.



In-line specifications



Slider type off-line specifications

2 Standard Safety Cover for Laser

Laser head
Laser Controller
Laser

Solder Feeder

Robot

Safety Cover

By preliminarily preparing the product in a fixed size, its delivery will be three times faster than made-to-order products.



Standard safety cover for laser

3 Optional

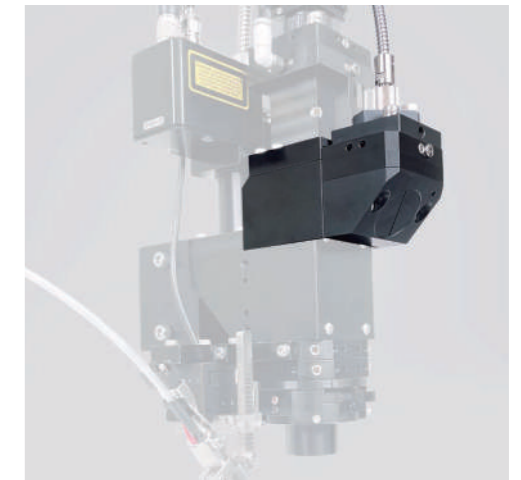
Thermo Pro™

Thermo Pro™

Patented

Laser Soldering Temperature Management and Control System

Thermo Pro™ is the laser that uses a built-in pyrometer to control the temperature. In addition to conventional control items in laser soldering (e.g., output, time, etc.), Thermo Pro™ enables temperature control and management during soldering.



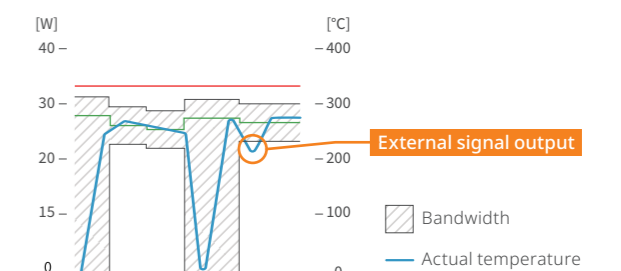
Visualization

Together with Soldering Manager Pro for ULD-02, measured temperatures are shown in the graph. All the temperatures and laser outputs in control can also be saved as video files.



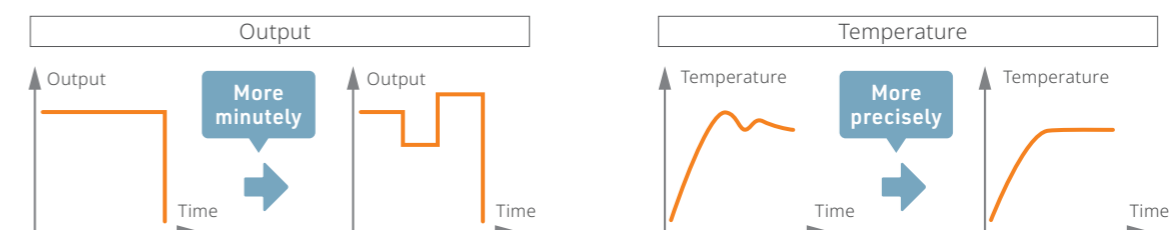
Feature: Temperature Band Checker

This function allows transferring data to external devices when the temperature is out of a set temperature range. It can be set to work with laser conditions and used as an alarm when irregularities occur.



Support for optimizing laser conditions

Thermo Pro™ can optimize laser conditions based on the laser output when it controls the temperature. It can also be leveraged not only for process control in mass production but also for optimizing evaluations.



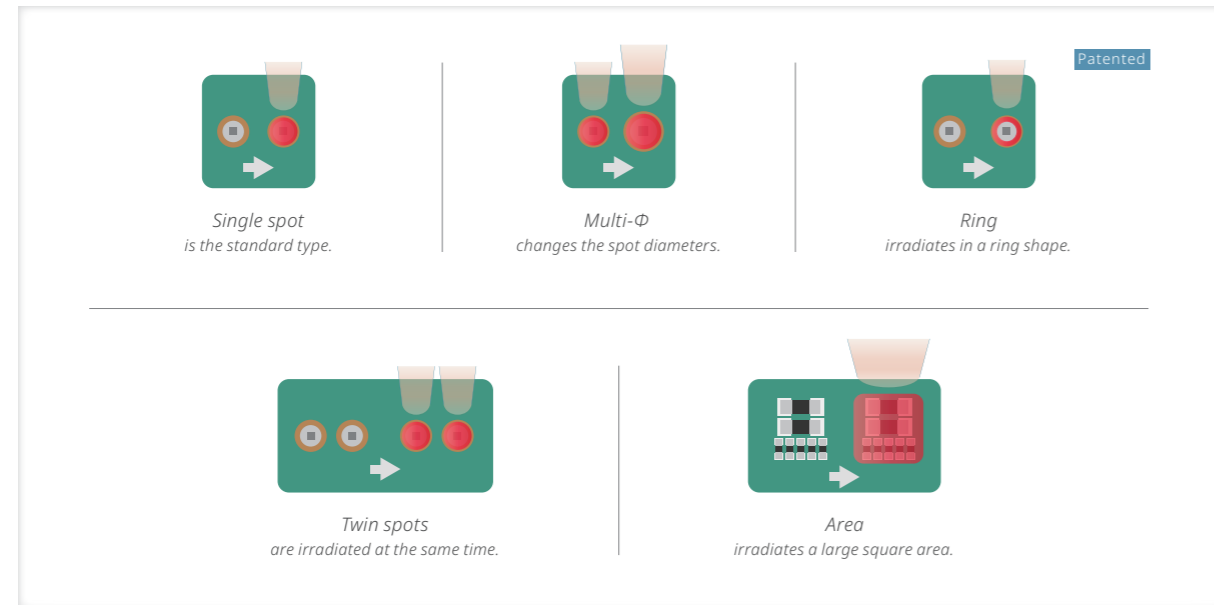
3 Optional

A Variety of Functions for Strong Quality Assurance

Laser Output Variations

* Some options may not be available depending on the type of robot is used.
* Some options are still available if you purchase only the unit.

Our laser systems can change the shape of the laser beam that allows to adapt to irregular shapes of boards/components.



The Soldering Robot Management Software “Soldering Manager Pro for ULD-02”

Soldering Manager visualizes the status of the robot soldering in real time by showing various data.

IoT for Soldering to Optimize Production Site

Soldering manager visualizes the operational status of the soldering unit in real time. Recording videos and data during soldering makes on-site process control more efficient.



- Visualizes and records information at each point such as laser output, output time, solder amount *(for internal control feature only)
- Fully traceable with videos and various data during soldering
- Enables easier process control globally by sharing acquired data
- Using Thermo Pro™ (temperature control feature) together, it can manage the information on:
 - Soldering temperature
 - Control of target temperature Over-heat function to alarm/stop in case of anomaly detected
 - Initial check OK/Failed by the temperature band feature

Image Position Adjustment (Vision Sensor)

It detects the positions of laser irradiation and solder feed to automatically adjust the discrepancy in the XY coordinates. It enables image processing such as the simple OK/Failed detection.

*The simple detection function may not be available depending on your workpiece. Our company offers a simple detection test upon your request.
*Full integration - We offer proposals to the customers who use our robots.

Clean-cut Feeder

CCF cuts notches in solder during feeding which drastically prevents flux explosions. Patented two blade mechanism stabilizes rewind operation and prevents slippage.



Precision Needles

They make the most out of our precision solder feeder. They are used for ultra-fine solder, which requires more careful control of solder amount.

*For the details of the model numbers, please refer to the parts list in this catalog.
*used for φ0.3 or smaller



Air Curtain

Creating an air curtain at the tip of the laser/solder feeder prevents the laser head from flux adhesion.



Nitrogen Generator

It creates a nitrogen gas ambient to improve the workability using lead-free solder. Preventing oxidation of workpieces can improve spreading and wettability of the solder as well as protection of the laser optics.



Height Adjustment

A Z-axis sensor corrects for irregularity in the height and the orientation of the solder position.

Precision Solder Feeder

It is the best solder feeder for laser soldering to a minute fraction with the feed of ultra-fine solder φ0.2 in diameter. The encoder detects clogging/shortage of solder.



UPM-052D
φ0.2mm-φ0.8mm



UPM-057
φ0.3mm-φ1.2mm

Lock-on Mechanism

The angle block with memory fixes a solder supply position and prevents position misalignment. Along with an adjustment mechanism for XY coordinates, it allows fine adjustment both in the horizontal and in the vertical directions. Re-positioning after maintenance is also easy.



Solder Feed Position Checker

It is a checking mechanism to see if the solder supply position is correctly set.



Power Meter

It measures and controls the actual laser output values, which are key to stabilizing soldering quality.

Specifications


Laser Soldering Unit Specifications

			
Model Number		ULD-02	
Rated Output of Laser		940nm(B Wavelength)	
Wavelength		45W	
Fiber Diameter (mm)		Φ0.2~Φ0.6 mm	
Laser Focal Length (mm)		Standard 60, 80, 100 or 120 mm can be selected as an option	
The number of laser waveforms		63	
Shutter		Software operated shutter (Mechanical: Option)	
Fiber length ^{*1}		3 ~ 5m (Φ0.2 is 5m only)	
Laser positioning method		Coaxial measurement using a CCD camera	
Cooling method		Forced-air cooled	
Operating conditions		Environmental temperature: 20-30°C Humidity: 20~80% (no condensation)	
Power supply voltage		Single phase 230V 50/60Hz AC200-230V 50/60Hz 4.9-4.2A	
Outer dimensions ^{*2}	Driver	400(W)×140(H)×310(D) mm	
	Controller	400(W)×144(H)×310(D) mm	
	Laser	250 (W)×215 (H)×292 (D) mm	250(W)×250(H)×292(D) mm
	Touch Pane Box	244(W)×150(H)×62.5 (D) mm	
Weight	Driver	8.4kg	
	Controller	7.5kg	
	Laser	10.8kg	11.5kg
	Touch Pane Box	1.2kg	
	Laser Head	0.9kg	
	Optional	Lock-on mechanism 0.3kg	Mechanical shutter 0.3kg
		Thermo Pro™ *Coaxial pyrometer 0.3Kg	Thermo Pro™ *External pyrometer 0.6Kg
		Twin spots / Ring laser 0.3Kg	Area laser 0.2Kg
Safety standards and specifications		Laser class: Class 4 Laser safety standard: IEC60825-1 JISC6802	

^{*1} 5m specification is available by special order.
^{*2} Connectors are not included.


Product List

Laser Soldering Robot

Product Photo	Name	Model Number
	Desktop Laser Soldering Robot	UNIX-DF203L
	Desktop Laser Soldering Robot	UNIX-DF303L
	Desktop Laser Soldering Robot	UNIX-DF403L
	Horizontal Multiple-Joint Robot ^{*3}	UNIX-FR

• Please contact us for more details (e.g., specifications, delivery dates). Safety cover will be custom-made.
• Laser soldering unit is not included. Please select one(s) from the products listed below.
^{*3} The laser heads vary due to custom-made specifications (ULD-746H). Actual products may differ from the photo.


Laser Unit

Product Photo	Model Number	SPEC CODE
	ULD-02 (45W Specification)	ULD-02-B45-①-②③④
	ULD-02 (75W Specification)	ULD-02-B75-①-②③④
	ULD-02 (φ0.2 Specification)	ULD-02-B45-02-②③④
	ULD-02 (Blue laser specification)	ULD-02-C25-①-②③④
	Remarks	
Description of Specification Symbols		
1. Fiber diameter: [04] / [06]		
2. I / O type: NPN [N] / PNP [P]		
3. Feeder: Internal control [I] / External control [E] / Unused [L] (Select [E] when connected to UNIX-DF/GF/FR.)		
4. Multi-Φ / Thermo Pro™: Unused [D] / Multi- Φ [C] / Thermo Pro™ [R]		


•Please contact us for more details (e.g., specifications, delivery dates).

Laser Controller Section / Laser Section

TEC Elements

Product Photo	Model Number	Remarks
	ULD-PT30	For 45W (Parts replacement requires travel expenses.)


Fiber

Product Photo	Model Number	Remarks
	ULD-FBI-02D	Fiber for φ0.2 (user-replaceable) for B-wavelength, 5 m long
	ULD-FBI-04	Fiber for φ0.4 (user-replaceable) for B-wavelength, 3 m long
	ULD-FBI-06	Fiber for φ0.6 (user-replaceable) for B-wavelength, 3 m long
	ULD-H3-EUF	Fiber for area laser, B-wavelength, 5m long

*5m specification is available on special order.
*Minimum fiber bending radius 200mm


Laser Head

Protective Glass

Product Photo	Model Number	Remarks
	ULDS-PG-SET-B	Protective glass for wavelength B + fall-proof holder
	ULDS-PG	Protective glass for B-wavelength (without fall-proof holder)
	ULD-HLD-SET	Fall-proof holder only

Optional

Shutter

Product Photo	Name	Model Number	Remarks
	Shutter unit	ULD-STR	Mechanical Shutter set
	Connection cable	ULD-CB-ST	Length 5m

*Standard specification is software shutter.

Optional

Protective Goggles for Laser

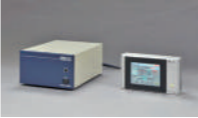
Model Number	Remarks
ULD-EPC	For B wavelength

Power Meter


Model Number	Remarks
ULD-PM-150S	For 45W or higher

Solder Feeder Control Unit

Soldering Controller


Product Photo	Name	Model Number	Remarks
 USC-881SR	Solder King V	USC-881SR	Touch panel separated (with additional PC software) *The laser controller can control one solder feeder. Use it when two solder feeders are used.

Wire Solder Preheating Mechanism

Product Photo	Model Number	Contents (available for individual purchase)
	SHN-10-**	Temperature controller (UHC-015) AC100V Heater (HN-S30 - **) Heater clamp (HN-CLP) Heater cable (QN-MP4B)

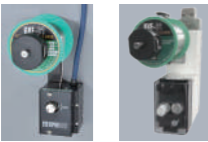
*Note that it cannot be used with the cleancut feeder . ** = Solder diameter *The laser controller cannot control the solder preheating mechanism.

Nitrogen Generator

Product Photo	Model Number	Specifications
	UNX-200	Nitrogen concentration up to 99.9% 2L/min Dry air 0.7MPa Power Input

Solder Feeder Control Unit

Solder Feeder

Product Photo	Name	Model Number	Remarks
 UPM-052D UPM-057	Precision Solder feeder (φ0.2-0.8)	UPM-052D	With U-lock, Wire diameter specification: φ0.2/φ0.3/φ0.4/φ0.5/φ0.6/φ0.8 (Wire diameter cannot be changed after purchase.)
	Solder feeder (φ0.3-1.2)	UPM-057RF	With U-lock, Wire diameter specification: φ0.3/φ0.4/φ0.5/φ0.6/φ0.8/φ1.0/φ1.2
	Solder feeder, Clean-cut specification (φ0.5-1.0)	UPM-057CC	With U-lock, Wire diameter specification: φ0.5/φ0.6/φ0.8/φ1.0


*UPM-052D Weight approx. 0.6Kg (not including solder)
*UPM-057 Weight approx. 1.4Kg (not including solder)

Spare Parts for Solder Feeder

Solder Feeder	Name	Model Number	Remarks
UPM-052D	Internozzle	UPM-052-INZ**	** = wire diameter specified: 02 (for φ0.2) φ0.2/φ0.3/φ0.4/φ0.5/φ0.6/φ0.8 *1 (Wire diameter cannot be changed after purchase.)
	Center nozzle	UPM-052-CNZ**	
	Outer nozzle	UPM-052-ONZ**	
UPM-057RF	Roller unit	UPM-023RF-RU**	** = wire diameter specified: 03 (for φ0.3) φ0.3/φ0.4/φ0.5/φ0.6/φ0.8/φ1.0/φ1.2 * = Size specified: SS, S, M, L, LL
	Internozzle	UPM-023RF-INZ**	
	Center nozzle	UPM-023RF-CNZ**	
	Outer nozzle	UPM-023-ONZ*	
UPM-055CC UPM-057CC	Roller unit	UPM-023CC-RU**	** = wire diameter specified: 06 (for φ0.6) φ0.5/φ0.6/φ0.8/φ1.0 * = Size specified: SS, S, M, L, LL
	Internozzle	UPM-023CC-INZ**	
	Center nozzle	UPM-023CC-CNZ**	
	Outer nozzle	UPM-023-ONZ*	

*1. Special specifications


Solder Supply Unit (Standard)

Product Image	Wire Diameter	Needle ^{*2,3}	Needle Holder	Tube Set ^{*3}	Tube Set Length
	φ1.2	ND-15GP	CL-S-3	PT12S-***	***=040...400mm ***=050...500mm ***=070...700mm ***=100...1000mm
	φ1.0	ND-16GP	CL-S-2	PT10S-***	
	φ0.8	ND-17GP		PT08S-***	
	φ0.6	ND-18GP		PT06S-***	
	φ0.5	ND-19GP		PT05S-***	
	φ0.4	ND-20GP		PT04S-***	

*2 5 pcs/pair
*3 Model number is different for clean-cut specifications. Contact us if you have any questions or need more information.

Fill the length in ***


Solder Supply Unit (Precision)

Product Photo	Wire Diameter	Precision Needle ^{*4}	Nozzle Adapter	Precision Nozzle Holders	Precision Tube Set	Total Length of Tube Set
	φ0.4	HND-0.5	NA-04	CL-D-2	ST04-*****	***** = 15022...150mm
	φ0.3	HND-0.4	NA-03	CL-D-1	ST03-*****	*****= 20022...200mm
	φ0.2	HND-0.3	NA-02		ST02-*****	

*4 One needle included

Please include the full length in *****

Solder Supply Unit


Product Photo	Wire Diameter	Precision Needle ^{*4,5}	Needle Holder	Tube Set ^{*5}	Total Length of Tube Set
	φ0.8	SND-10	CL-S-2	PT08S-***	***=040...400mm ***=050...500mm ***=070...700mm ***=100...1000mm
	φ0.6	SND-08		PT06S-***	
	φ0.5	SND-07		PT05S-***	

*4 1pc per pack

*5 Model number is different for clean-cut specifications. Contact us if you have any questions or need more information.

Fill the length in ***

Lock-on Mechanism for Laser

Product Photo	Name	Solder Preheated (✓ = Yes)	Solder Feed Angle
	LOLP00-9020-XY		20°
	LOLP00-9020H-XY	○	
	LOLP00-9025-XY		25°
	LOLP00-9025H-XY	○	
	LOLP00-9030-XY		30°
	LOLP00-9030H-XY	○	
	LOLP00-9035-XY		35°
	LOLP00-9035H-XY	○	
	LOLP00-9040-XY		40°
	LOLP00-9040H-XY	○	
	LOLP00-9045-XY		45°
	LOLP00-9045H-XY	○	
	LOLP00-9050-XY		50°
	LOLP00-9050H-XY	○	

*XY adjustment mechanism is included in all the lockon mechanisms. The standard mounting angle of the heads is 90°.

Patented Products

Name	Page	Name	Page
Solder Feeder	p.02	Clean Cut Feeder (CCF)	p.06
Thermo Pro™	p.04	Precision Solder Feeder	p.06
Ring Laser	p.05	Lock-on Mechanism	p.06

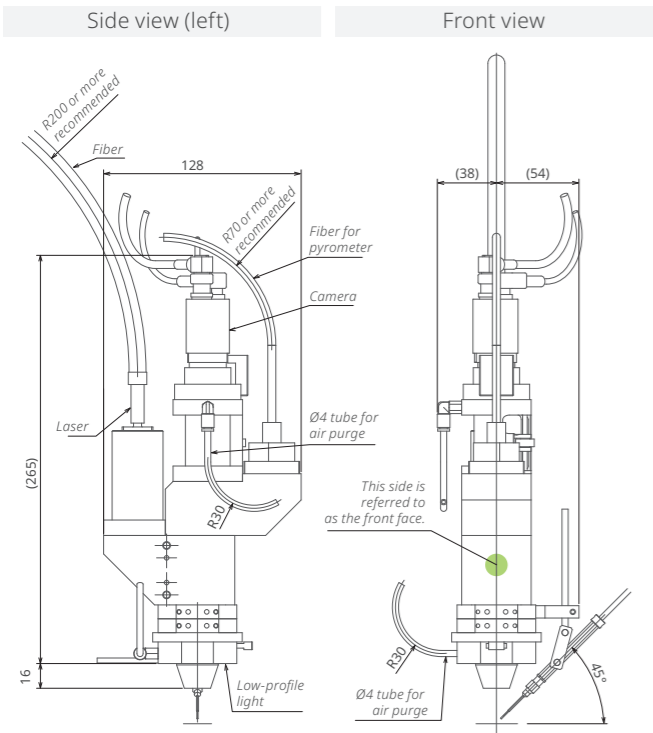
Dimensions

Laser Soldering System

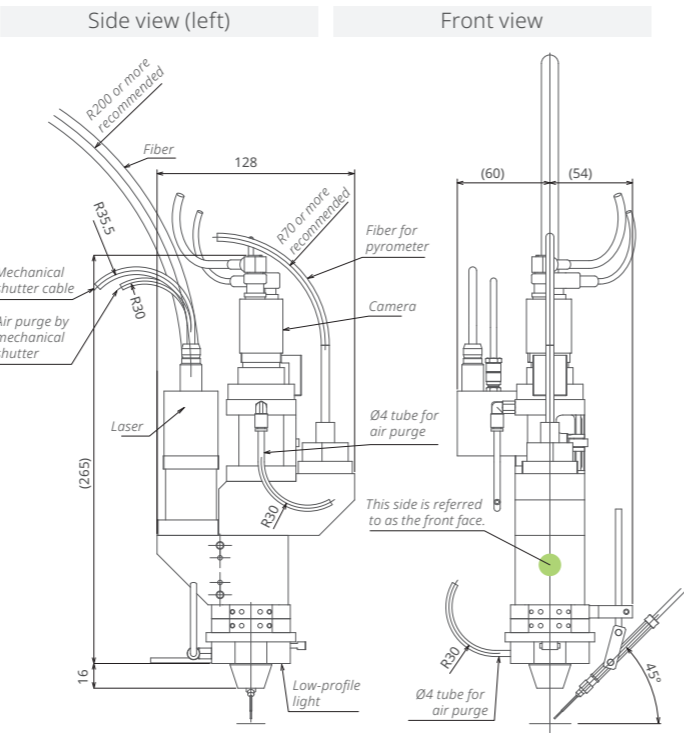
Unit : mm

Laser Head (F60)

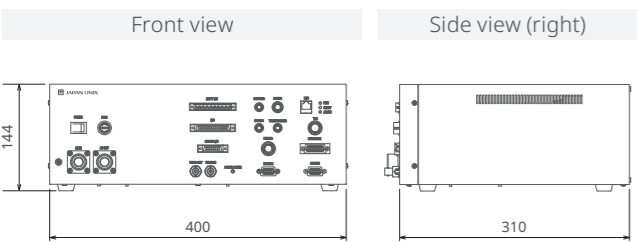
Software Shutter



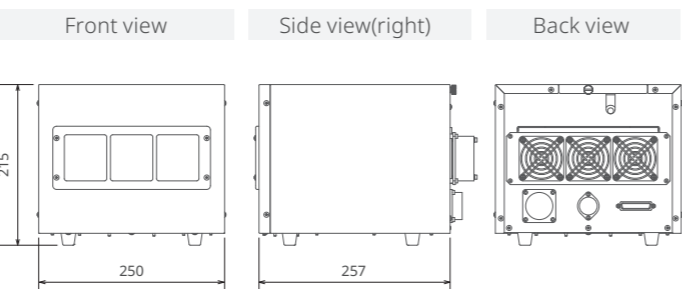
Mechanical Shutter



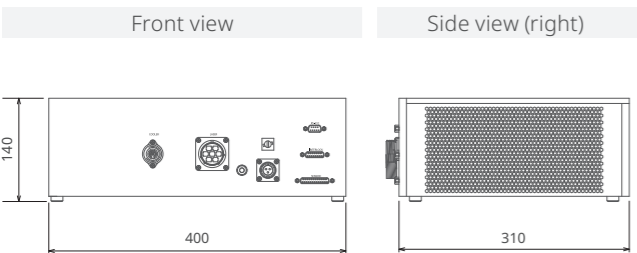
Controller ULD-02E



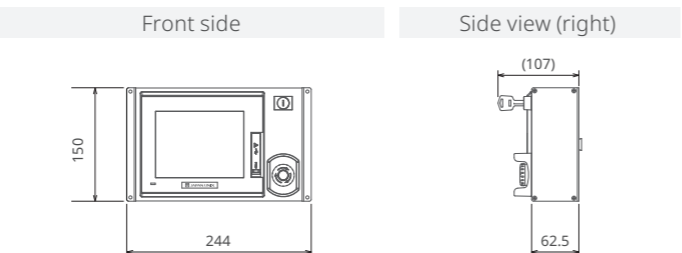
Laser ULD-02G



Driver ULD-02D



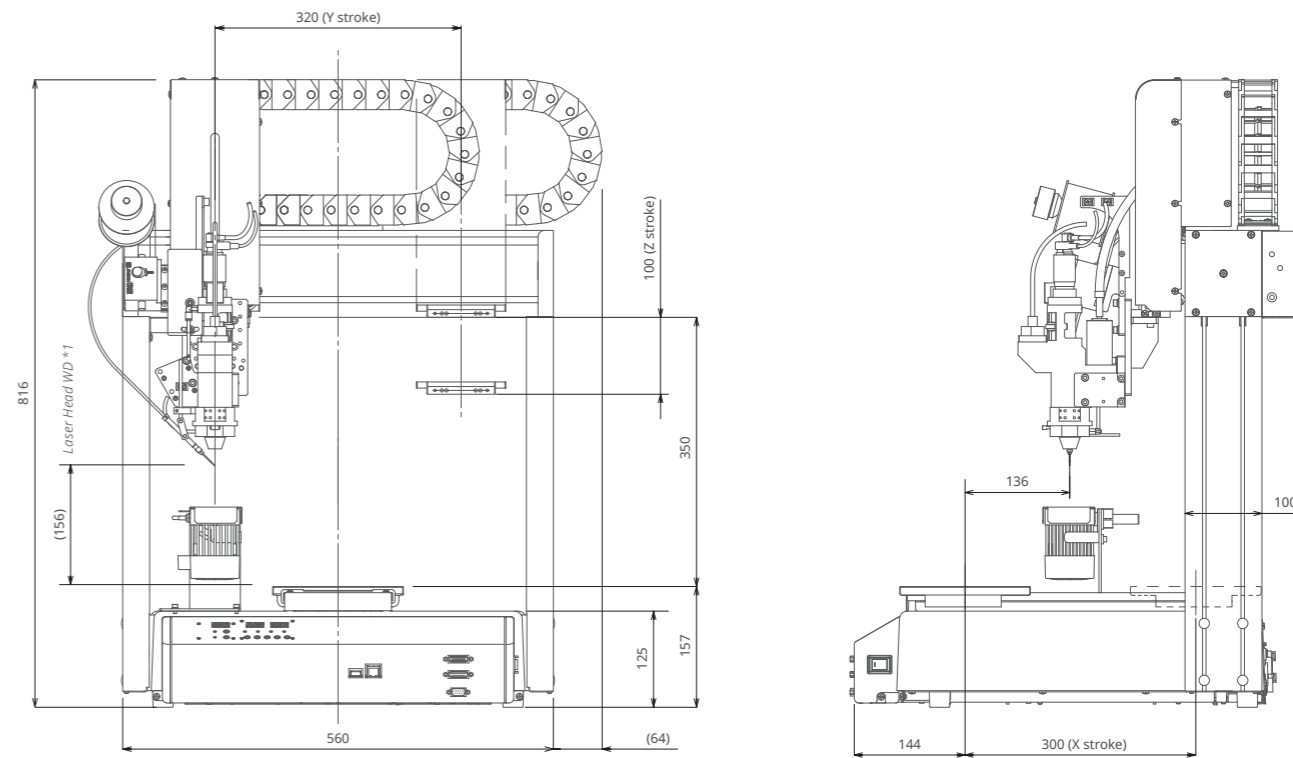
Touch Panel Box ULD-TPU



Laser Soldering Robot UNIX-DF303L

Unit : mm

Front view Side view (right)



*1 Laser head WD has the same ratio at all the f-numbers on the right. (F60-F80-F100-F120)
The laser head mounting position will be changed.

Top view

