

**PRODUCTS AND TECHNOLOGY**

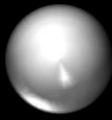


The core technology of our company is the advanced laser based measurement techniques for industrial applications.

**BE ORIGINAL.**



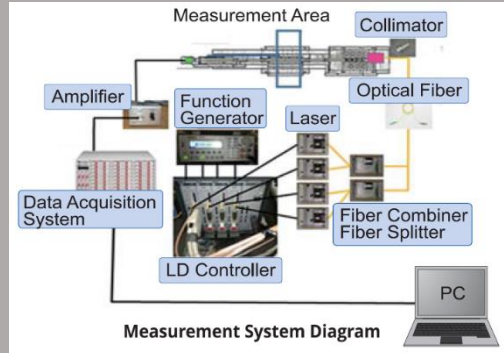
**Smart Laser & Plasma Systems Co.**



# CT-TDLAS-I

2D Time series Temperature and Concentration distributions measurement

CT-TDLAS-I is a revolutionary measurement system which can detect time-series 2D temperature and concentration distributions in combustion, reaction and flow fields. It utilizes the CT-TDLAS(Computed Tomography-Tunable Diode Laser Absorption Spectroscopy) technology developed by Tokushima University and it can be applied to engines(in-cylinder and exhausts), burners, boilers, gas turbines for time-series 2D temperature and concentration measurement. Multi-path laser beams are introduced to the measurement area and 2D temperature and concentration distributions are reconstructed by CT using multi-path absorption spectra.



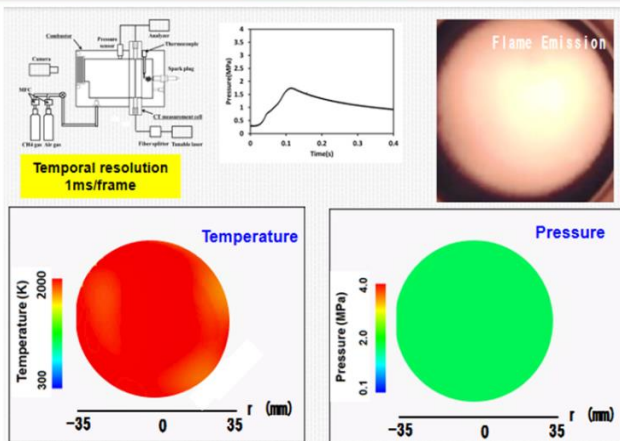
## 32-path CT-Cell



**Target: Engines, Burners, Boilers, Gas turbines, etc.**  
**Temperature (300-2000K), Concentration (CH<sub>4</sub>, NH<sub>3</sub>, CO<sub>2</sub>, H<sub>2</sub>O, and so on)**

## Applications

### High Temperature and Pressure Combustion



More applications : Visit the following URL  
<http://www.tokushima-u.ac.jp/ccr/event/ct-tdlas-en.html>

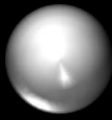
## Related Products

- 2D and 3D CT-TDLAS system
- 2D and 3D CT-Cell
- Collimator, Detector
- Acquisition system
- Custom Design System
- R&D



# Smart Laser & Plasma Systems Co.





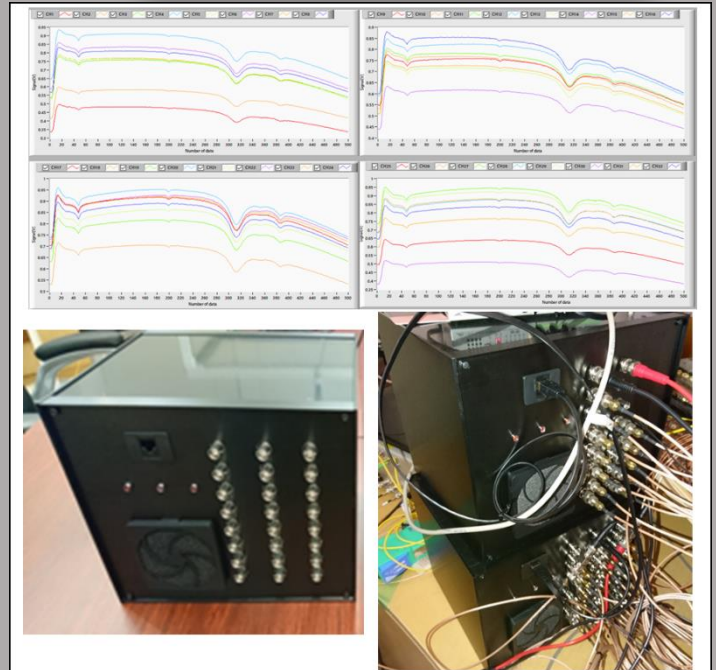
# AD unit

2D Time series Temperature and Concentration distributions measurement

## Specifications

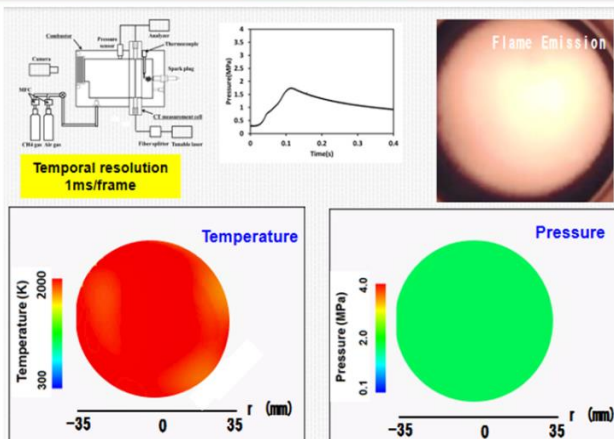
Part number	AD-32ch-10MHz-12bit-11M-BNC
size	H220×W520×L230 [mm]
Weight	10kg
Number of channel	32ch(Additional+3 ch)
Vertical resolution	12 bits
Maximum sampling rate	10MS/s
Bandwidth	20 MHz
Input impedance	1 MΩ
Connector type	BNC Input
Environment	Temperature : 10~40°C Humidity : 30~80%RH (No Condensation)

## 32ch AD unit



## Applications

### High Temperature and Pressure Combustion



More applications : Visit the following URL

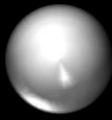
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## Related Products

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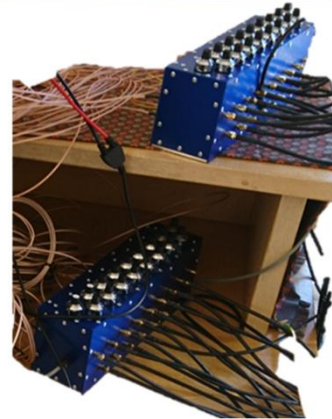
# Amplifier Unit

2D Time series Temperature and Concentration distributions measurement

## Specifications

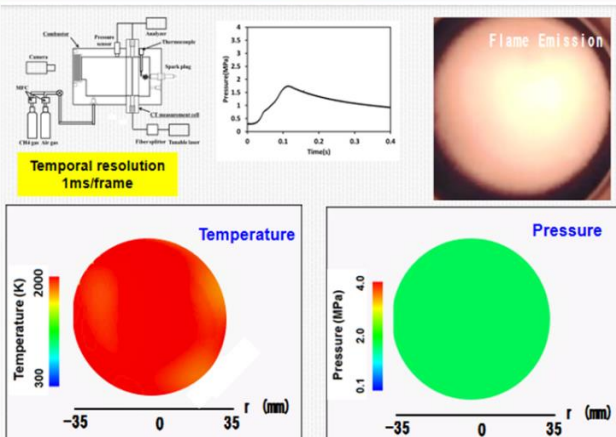
Part number	AP-32ch-10MHz -20db-IO1M50-SMAJ
size	H130×W320×L100[mm]
Weight	5.4kg
Number of channel	32ch(additional+2ch)
Frequency	10MHz
Voltage ratio of IN/OUT	20 dB
Input impedance	1 MΩ
Output impedance	50 Ω
Connector type	SMAJ(Input/output)
Operating voltage	+ 12(Red line) GND(Black line) - 12(White line)
Environment	Temperature : 10~40°C Humidity : 30~80%RH (No Condensation)

## 32ch Amplifier



## Applications

### High Temperature and Pressure Combustion



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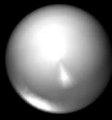
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## Related Products

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# Smart Laser & Plasma Systems Co.



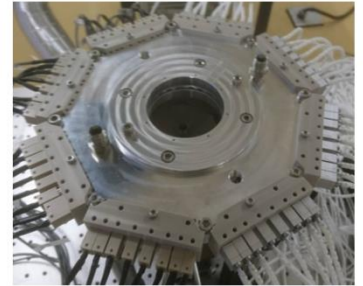
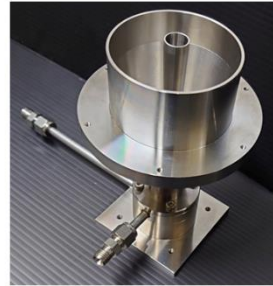
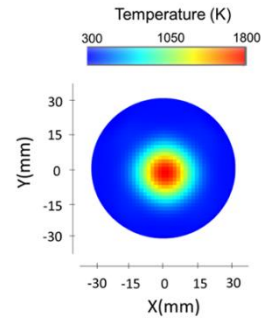
# Bunsen-type burner

2D Time series Temperature and Concentration distributions measurement

## Specifications

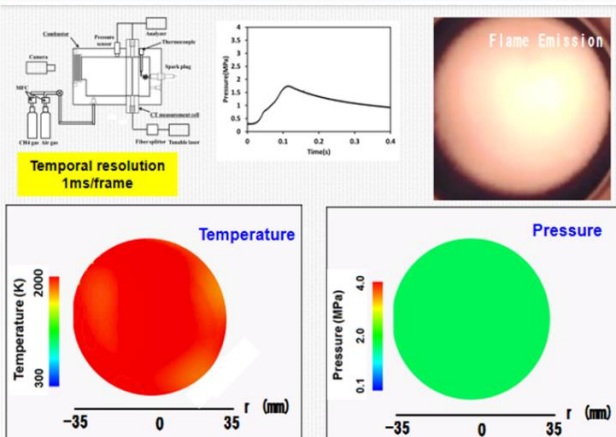
Part number	BB-12
Size	H130×W140×L140 [mm] (Burner size : IDΦ12, ODΦ14)
Weight	2kg
Measurement area conditions	Air+CH4 flame
	Temperature : Example 2D data measured by CT-TDLAS (Right Fig.) Pressure: Atmospheric
Materials	SUS303
Environment	Temperature : 10~40°C Humidity : 30~80%RH (No Condensation)

## Bunsen-type burner



## Applications

### High Temperature and Pressure Combustion



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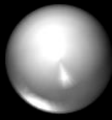
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## Related Products

- 2D and 3D CT-TDLAS system
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# Smart Laser & Plasma Systems Co.



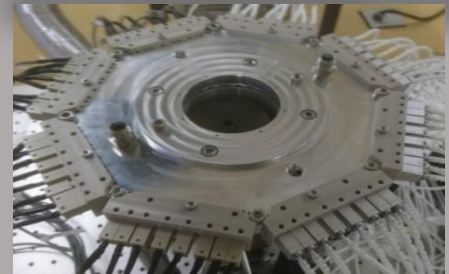
# CT Cell

2D Time series Temperature and Concentration distributions measurement

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**Target: Engines, Burners, Boilers, Gas turbines, etc.**  
**Temperature (300-2000K), Concentration (CH<sub>4</sub>, NH<sub>3</sub>, CO<sub>2</sub>, H<sub>2</sub>O, and so on)**

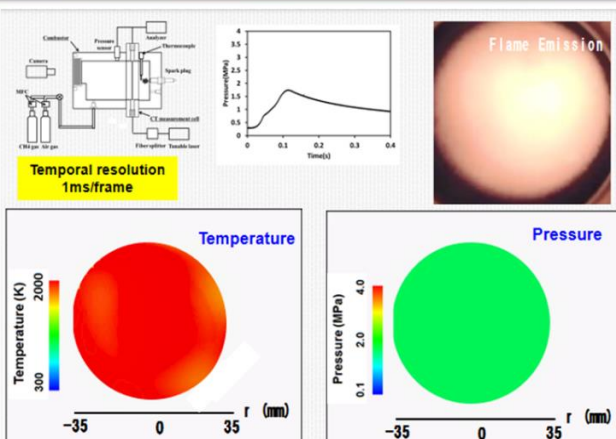
## 32-path CT-Cell



Part number	CT-TDLAS-32LP
Laser path alignment	32 Laser paths
Measurement area conditions	Gas
	Temperature: room~2000K
	Pressure:atmospheric
N2 purge into CT-Cell unit	5L/min (Connection:1/4 inch teflon-tube)
Materials	5mm Plate: SUS303 Sensor Adapter: Peek
Environment	Temperature : 10~50°C (heat-resistant sensor)
	Humidity : 30~80%RH
	(No Condensation)
Applications	Bunzen-type burner etc.

## Applications

### High Temperature and Pressure Combustion



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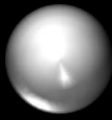
## Related Products

- 2D and 3D CT-TDLAS system
- 2D and 3D CT-Cell
- Collimator, Detector
- Acquisition system
- Custom Design System
- R&D



# Smart Laser & Plasma Systems Co.





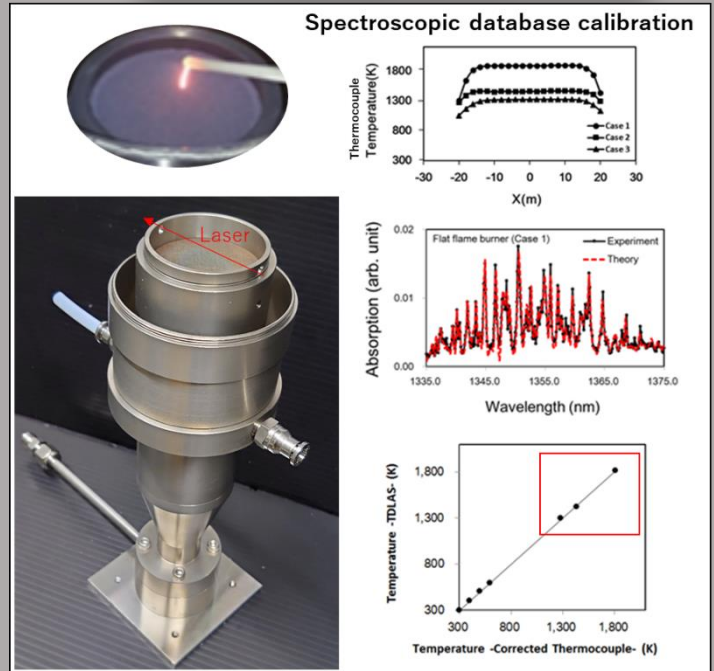
# Flat-type burner

2D Time series Temperature and Concentration distributions measurement

## Specifications

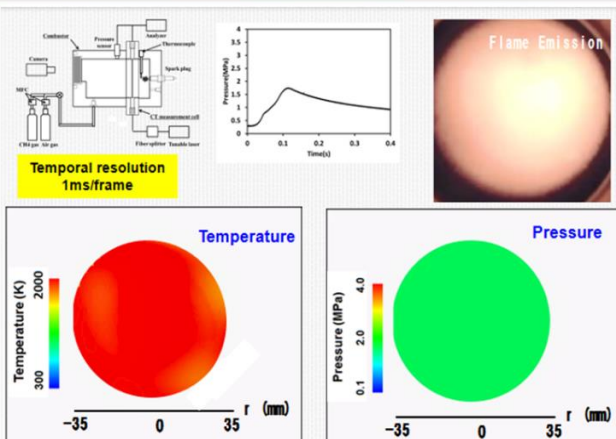
Part number	FB-40
Size	H210 × W120 × L120 [mm] (Burner size : Φ40)
Weight	2kg
Measurement area conditions	Air+CH4 Flat-flame
	Temperature : Example 1D data measured by TDLAS (Right Fig.) Pressure: Atmospheric
Materials	SUS303
Environment	Temperature : 10~40°C Humidity : 30~80%RH (No Condensation)

## Flat-type burner



## Applications

### High Temperature and Pressure Combustion



More applications : Visit the following URL

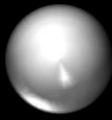
<http://www.tokushima-u.ac.jp/ccr/event/ct-tdlas-en.html>

## Related Products

- ☑ 2D and 3D CT-TDLAS system
- ☑ 2D and 3D CT-Cell
- ☑ Collimator, Detector
- ☑ Acquisition system
- ☑ Custom Design System
- ☑ R&D



# Smart Laser & Plasma Systems Co.



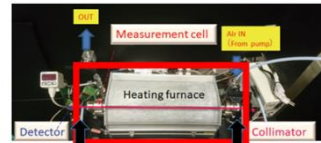
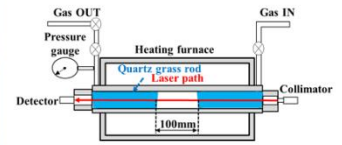
# High Pressure Cell

2D Time series Temperature and Concentration distributions measurement

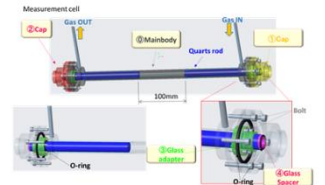
## Specifications

Part number	TDLAS-1LP-HTPC-L100T500
Size	H405mm × W177mm × L540mm (Laser path Length : 100mm)
Weight	20kg
Measurement area conditions	Gas
	Temperature : room~800K. Pressure:atmospheric~1MPa
Materials	SUS303
Environment	Temperature : 10~40°C Humidity : 30~80%RH (No Condensation)

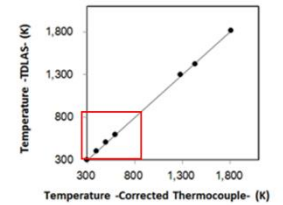
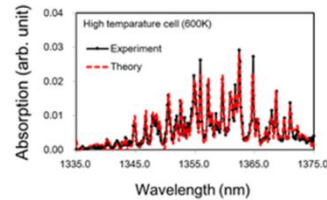
## High Pressure Cell



N2 gas purge N2 gas purge

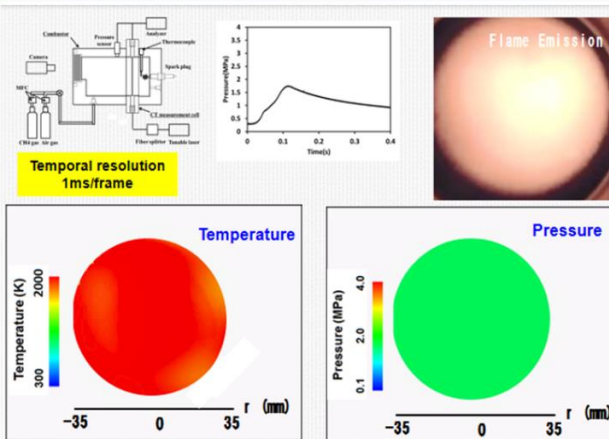


## Spectroscopic database calibration



## Applications

### High Temperature and Pressure Combustion



More applications : Visit the following URL

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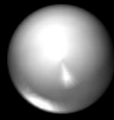
## Related Products

- ☑ 2D and 3D CT-TDLAS system
- ☑ 2D and 3D CT-Cell
- ☑ Collimator, Detector
- ☑ Acquisition system
- ☑ Custom Design System
- ☑ R&D



# Smart Laser & Plasma Systems Co.





# Long and Short DP-LIBS-I

Long and short DP-LIBS-I as a useful elemental composition determination method has been applied in various fields including solid, liquid and gas due to its advantages of fast response, high sensitivity, non-contact and multi-elemental detection. It utilizes the collinear long and short DP-LIBS (Long and Short Double-Pulse Laser Induced Breakdown Spectroscopy) technology developed by Tokushima University and Xi'an Jiaotong University. It can be applied to industrial processes, environment protection, and food safety for elemental measurement.

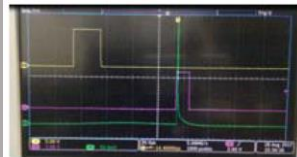
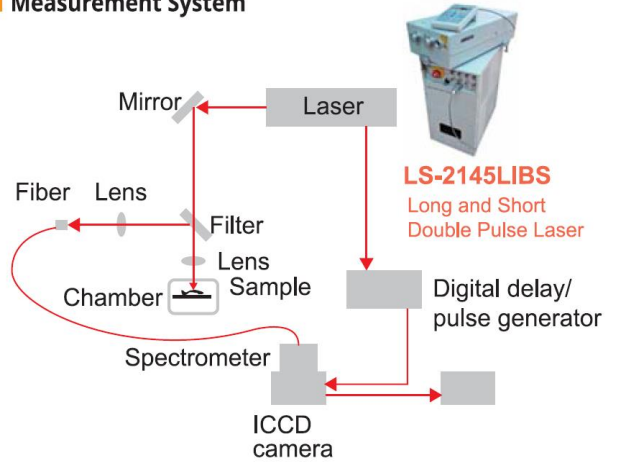
### Principle: Long and Short Double-Pulse Laser Induced Breakdown Spectroscopy

The laser-induced plasma is generated by the short pulse-width laser and the external energy is supplied by the long pulse-width laser operated under FR (free running) condition to sustain the plasma.

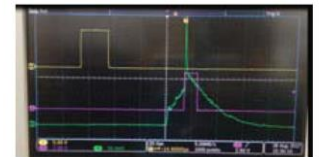
Target: metallurgy, power plant, ocean exploration, etc.

Elemental Analysis (Fe, Mn, C, H, Si, Al, Hg, Cd and so on)

### Measurement System



Single Pulse

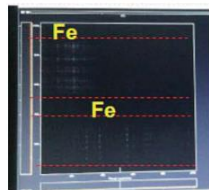
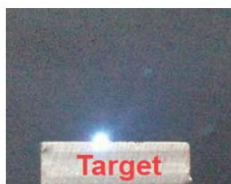


Long and short Double Pulse

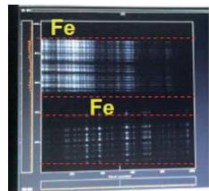
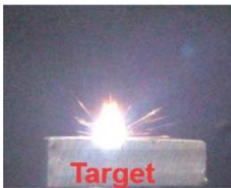
### Applications

#### Steel sample in air

##### SP-LIBS



##### DP-LIBS



### Related Products

- Long-Short DP-LIBS System
- LIBS System
- Laser, Optics, Detector
- Acquisition system
- Custom Design System
- R&D



## Smart Laser & Plasma Systems Co.

# LS-DP-LIBS-AF I

Smart Laser & Plasma Systems Co.



- ロング・ショートダブルパルスLIBSを用いた定量計測
- オートフォーカスによる自動焦点・自動計測
- 3軸雲台を用いた位置計測位置調整
- 濃度自動解析ソフト

(徳島大学との共同研究)

技術サポート



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徳島大学VBL2階  
TEL 088-656-7556 FAX 088-656-7556  
E-mail: [info@slps.co.jp](mailto:info@slps.co.jp)  
W E B: <http://slps.co.jp/index.html>



販売サポート



〒135-0042東京都江東区木場6丁目6-6-201  
TEL 03-6659-7540 FAX 03-6659-7541  
E-mail: [sales@msh-systems.com](mailto:sales@msh-systems.com)  
W E B: <http://www.msh-systems.com/>





分光ビックデータによる高精度解析  
Spectroscopic Intelligence

先見のレーザ・プラズマ計測  
Laser & Plasma Foresight-Sensor

1-3次元温度濃度高速マッピング  
Dynamic Fast Mapping of 1/2/3D Concentration & Temperature

産業技術革新の相乗効果へ  
Synergy of Industrial Technology Innovation



技術サポート

**SL&PS Smart Laser & Plasma Systems Co.**

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徳島大学VBL2階

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E-mail: info@slps.co.jp

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販売サポート

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MSH Systems, Inc.

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