Panasonic

Laser Marker

Operation Manual

LP-M SERIES
LP-S SERIES
LP-Z SERIES

ME-LPMSZ-OP-3 No.9000-0046-77V

2016.3 | panasonic.net/id/pidsx/global

Preface

Thank you for purchasing our product.
For full use of this product safely and properly, please read this manual carefully.
This product has been strictly checked and tested prior to its delivery. However, please make sure that this product operates properly before using it. In case that the product becomes damaged or does not operate as specified in this manual, contact the dealer you purchased from or our sales office.

■ General terms and conditions of this manual

1. Before using this product, or before every starting operation, please confirm the correct functioning and performance of this product.
2. Contents of this manual could be changed without notice.
3. This manual must not be partially or totally copied or revised.
4. All efforts have been made to ensure the accuracy of all information in this manual. If there are any questions, mistakes, or comments in this manual, please notify us.
5. Please remind that we assume no liability for any results arising out of operations regardless of the above clauses.

■ Disclaimer

The applications described in this manual are all intended for examples only. The purchase of our products described in this manual shall not be regarded as granting of a license to use our products in the described applications. We do NOT warrant that we have obtained some intellectual properties, such as patent rights, with respect to such applications, or that the described application may not infringe any intellectual property rights, such as patent rights, of a third party.

■ Trademark

- Windows is a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.
- QR Code is a registered trademarks of DENSO WAVE INCORPORATED.
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- All other product names and companies provided in this manual are trademarks or registered trademarks of their respective companies.

Cautions in Handling

ALWAYS FOLLOW THESE IMPORTANT SAFETY PRECAUTIONS!

To reduce the risk of injury, loss of life, electric shock, fire, malfunction, and damage to equipment or property, always observe the following safety precautions.

The following symbols are used to classify and describe the level of hazard, injury, and property damage caused when the denotation is disregarded and improper use is performed.

⚠ **DANGER**	Denotes a potential hazard that will result in serious injury or death.
⚠ **WARNING**	Denotes a potential hazard that could result in serious injury or death.
⚠ **CAUTION**	Denotes a hazard that could result in minor injury.

The following symbols are used to classify and describe the type of instructions to be observed.

	This symbol is used to alert users to a specific operating procedure that must not be performed.
	This symbols is used to alert users to a specific operating procedure that must be followed in order to operate the unit safely.
	This symbols is used to alert users to a specific operating procedure that must be performed carefully.

This laser marker falls into Class 4 laser (marking laser) and Class 2 laser (guide laser) based on the classifications of the Safety of laser products (JIS C 6802) / FDA standards 21 CFR 1040.10 and 1040.11/IEC60825-1. Perform the safety protection measure before using the system. Refer to Safety / Setup / Maintenance Guide for details.

⚠ DANGER	
	Never look at laser beam directly, through lens or through any other optical components. Laser beam radiation into the eye causes blindness or serious damage to the eye. Not only the direct beam of laser, but also diffused reflected beam is harmful.
	Never touch laser beam and avoid human skin, clothing and any other flammable object from laser beam exposure directly. Burning into deep skin might result and there is a risk of fire.

⚠WARNING	
	Never disassemble the product. Doing so may cause exposure to the laser beam or electric shock.
	Take laser protection measures required to use Class 4 laser products subject to the local laws and regulations of the country or region in which the laser marker is used. Refer to Safety / Setup / Maintenance Guide for details.
	Wear the specified laser protective goggles for operator's eyes. The goggles should be used against scattered beam, so avoid to direct beam or reflection beam.
	In order to prevent unexpected exposures from object to be marked or its peripherals, set protective enclosure with proper reflectance, durability and thermal resistance to enclose the laser radiation area.
	Construct an interlock systems such as a function to stop laser radiation for the maintenance door of the protective enclosure.
	Read all packaged guides and manuals thoroughly, and do not operate, install and connect the laser marker with any other methods except the instructions provided in the manuals. If the product is used in a manner not specified by the instruction, the safety protection and functions provided by the device may be impaired and it may cause injury, electrical shock or exposure of laser beam.
	Remove the dust and/or gas which may be generated during the laser radiation with dust collector or exhauster. Use an appropriate dust collector or exhauster for dust or gas generated. Depending on the material of the objects, harmful dust and/or gas to the human body and the laser marker may be generated.
	Prior to wiring, cable connecting and/or maintenance work, ensure that all the power switches are turned off. Otherwise, electrical shock may result.
	Connect ground wire before using. A failure or leak that occurs when the unit is not properly grounded may result in electric shock.

How to Read this Manual

■ Target Laser Marker

This manual is subject to the following Laser Marker models.
If the setting contents or specifications vary by models, the target models are specified in the text.
In the text, multiple models may be described collectively, as shown in the table below.
Note that the illustration and screen image may vary with model.

Target model	Description in the text				
LP-M200, LP-M200-CHN, LP-M200-S, LP-M200-S-CHN	LP-M200	LP-M2xx	LP-Mxx0	LP-Mxxx LP-Mxxx-S	LP-M Series
LP-M500, LP-M500-CHN, LP-M500-S, LP-M500-S-CHN	LP-M500	LP-M5xx			
LP-M205, LP-M205-CHN, LP-M205-S, LP-M205-S-CHN	LP-M205	LP-M2xx	LP-Mxx5		
LP-M505, LP-M505-CHN, LP-M505-S, LP-M505-S-CHN	LP-M505	LP-M5xx			
LP-MA05, LP-MA05-CHN, LP-MA05-S, LP-MA05-S-CHN	LP-MA05	LP-MAxx			
LP-MA06, LP-MA06-CHN, LP-MA06-S, LP-MA06-S-CHN	LP-MA06	LP-MAxx			
LP-S200, LP-S200-CHN, LP-S200-SF	LP-S200	LP-S2xx	LP-Sxx0	LP-Sxxx LP-Sxxx-SF	LP-S Sries LP-Sxxx(W)
LP-S500, LP-S500-CHN, LP-S500-SF	LP-S500	LP-S5xx			
LP-S202, LP-S202-CHN, LP-S202-SF	LP-S202	LP-S2xx	LP-Sxx2		
LP-S502, LP-S502-CHN, LP-S502-SF	LP-S502	LP-S5xx			
LP-S205, LP-S205-CHN, LP-S205-SF	LP-S205	LP-S2xx	LP-Sxx5		
LP-S505, LP-S505-CHN, LP-S505-SF	LP-S505	LP-S5xx			
LP-S500W, LP-S500W-CHN	LP-S500W		LP-Sxx0(W)	LP-SxxxW	
LP-S505W, LP-S505W-CHN	LP-S505W		LP-Sxx5(W)		
LP-Z130, LP-Z130-A, LP-Z130-C, LP-Z130-CHN	LP-Z130		LP-Zxx0	LP-Zxxx	LP-Z Series
LP-Z250, LP-Z250-A, LP-Z250-C, LP-Z250-CHN	LP-Z250				
LP-Z256, LP-Z256-A, LP-Z256-C, LP-Z256-CHN	LP-Z256		LP-Zxx6		

■ Setting ranges

This manual describes the setting ranges for LP-M500, LP-S500 and LP-Z130. Items where different setting ranges are specified for different models are marked with an asterisk (*).
For setting ranges for each model, refer to “Input Setting Value by Series” (P.294).

■ Symbol Indications

Notice	“Notice” denotes any instructions or precautions for using this product. To prevent the damage or malfunction of the product, observe these precautions fully.
Reference	“Reference” denotes any hints for operation, detail explanations, or references.

■ Type of manuals

For this product, the following manuals are prepared. Read each manuals and operate this product correctly and safely. Save the manuals for future use.

Safety / Setup / Maintenance Guide

This manual describes the safety precautions and the items required for the introduction, installation and maintenance of the laser marker.

- Precautions and safety measures: All users shall be required for reading this part.
- Specifications and outer dimensions
- Setup and connecting method
- I/O control method (signal layout, I/O rating, timing chart etc.)
- Maintenance
- Troubleshooting

Operation Manual (This Manual)

This manual describes how to operate the laser marker and set the marking data using touch panel console or monitor and mouse.

Laser Marker NAVI plus Operation Manual

This manual describes how to operate the laser marker and set the marking data using PC setting software "Laser Marker NAVI plus".

Serial Communication Guide

This manual describes the communication commands to control the laser marker externally using the serial communication (RS-232C/Ethernet). It describes the communication conditions, communication data formats, communication commands, and the control samples.
Mainly the machine builder and system integrator shall be required for reading this manual.

Reference

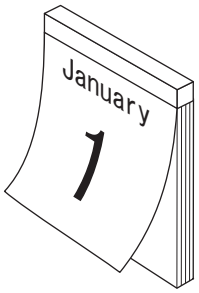
- PDF data of each manual are included on an attached CD-ROM “Laser Marker Utility”. The hardcopy versions of the manuals are available for pay. For details, please contact our sales office.
- To read the PDF manual, Adobe Reader (Version 7 or later) of Adobe Systems Incorporated is required.

"Let's Try" Contents

The user can refer to the corresponding pages in which the contents of what user "tries to do" are described using this "Let's Try" Contents.

Mark Current Date/Time

“1-3-1 Mark Current Date and Time” (P.25)

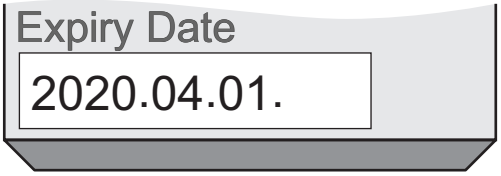


Mark Code Symbol

“1-3-5 Mark Code Symbol” (P.39)

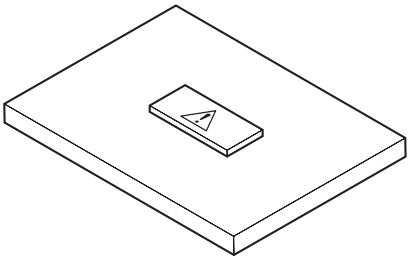
Mark Expiry Date/Time

“1-3-2 Mark Expiry Date and Time” (P.28)



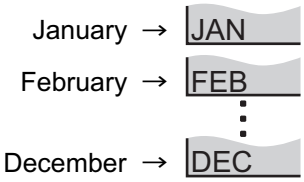
Mark Logo

“1-3-6 Mark Logo” (P.44)



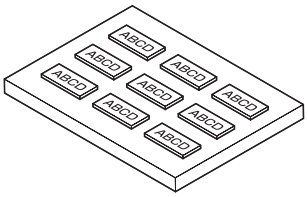
Mark Lot

“1-3-3 Mark Lot No.” (P.32)



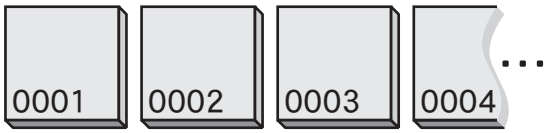
Mark Step & Repeat

“1-3-7 Mark Step & Repeat” (P.47)



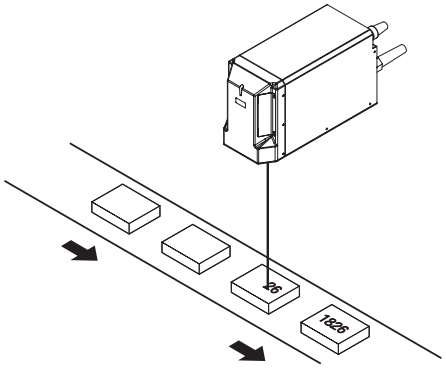
Mark Counter

“1-3-4 Mark Counter” (P.35)



Mark to Flying Object

“1-3-8 Mark to Flying Object” (P.51)

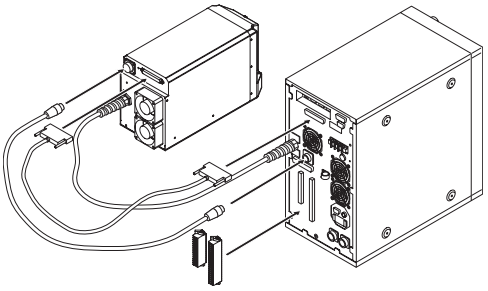


Mark on 3D Figure

“1-4 Basic Setting for Marking 3D Figure” (P.55)

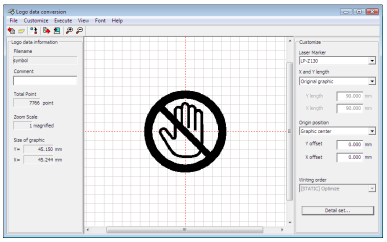
Install and Connect Laser Marker

Safety/Setup/Maintenance Guide



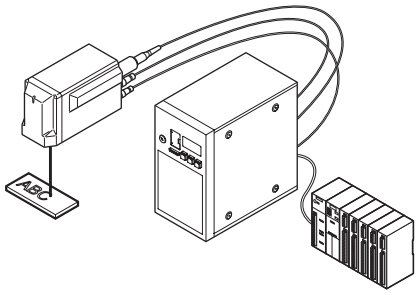
Convert or Edit Graphic Data

- Logo Data Conversion Software Operation Manual
- Logo Data Editing Software Operation Manual



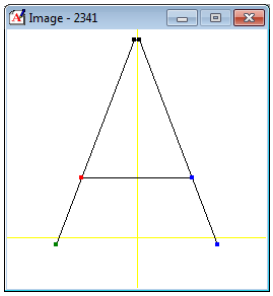
Control by I/O

Safety/Setup/Maintenance Guide



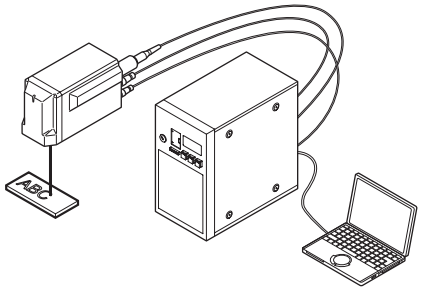
Create or Edit Making Font

Font Maker Operation Manual



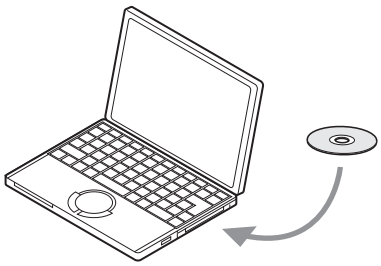
Control by RS-232C / Ethernet

Serial Communication Guide



Install Laser Marker NAVI plus

Laser Marker NAVI plus Operation Manual



When in Trouble...

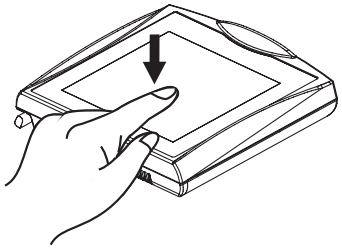
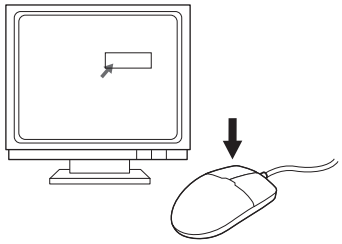
“Troubleshooting” (P.253)

Contents

1 Basic Operation Procedure

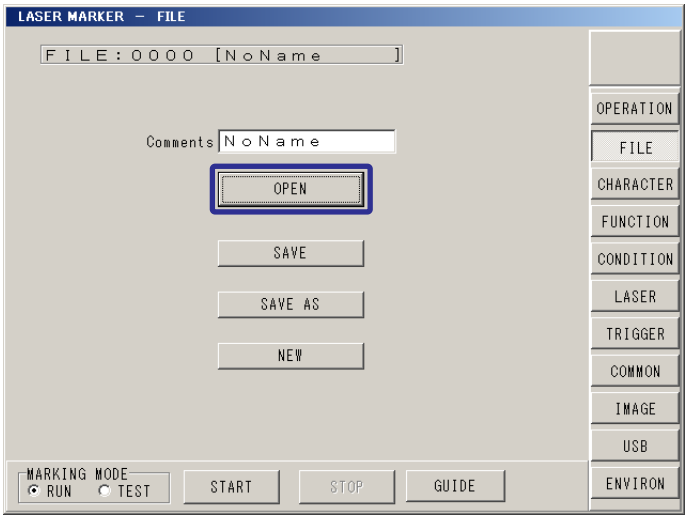
1-1 Display Operation

Here describes how to operate the screen of the touch panel or monitor.

For touch panel console	For monitor and mouse
Tap the items to be set with a finger or a rotundate object. 	Click on the items to be set with the left mouse button. 

■ General setting

Press the button.
According to the selected button, the screen will change.



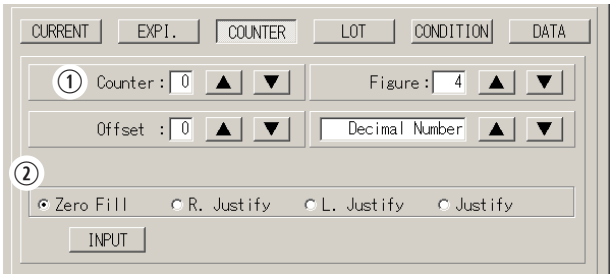
Reference

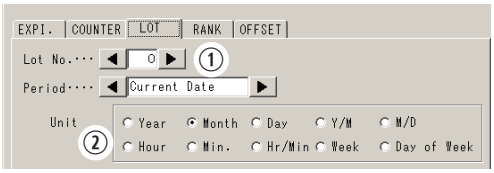
- If the touch panel responds out of the pointed position, adjust the touch panel referring to “2-16-7 Adjustment of Touch Panel” (P.249).

■ Selection of setting items

Select the setting items with the following methods.

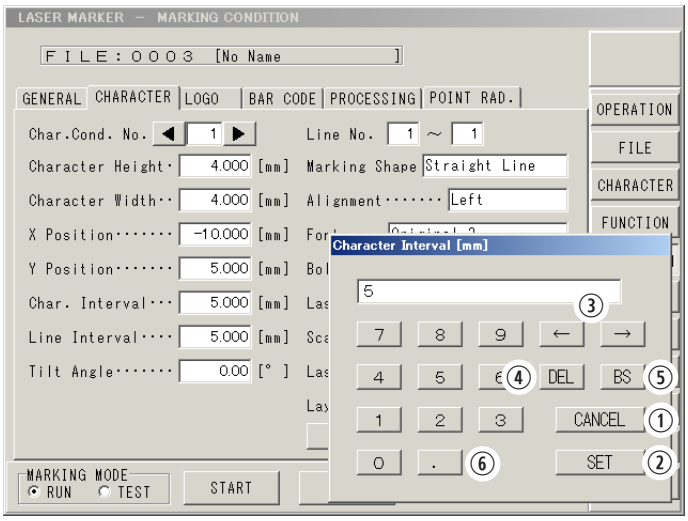
①	Press ▲▼ or ◀▶ button to switch the items.
②	Press the item to be set from the list. The item displayed with "・" is selected.
③	To activate the setting, press the item and check the box.





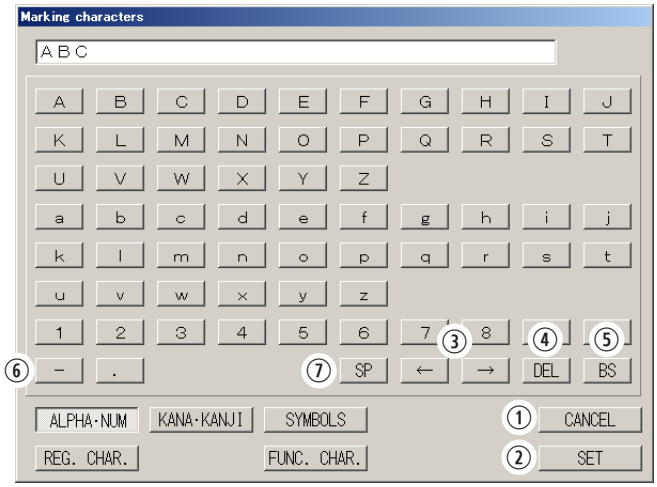
■ Input numbers

When press the entry field for numbers, input screen will appear.
Input the numbers and press [SET].



■ Input characters

When press the entry field for characters, character input screen will appear.
Input the characters and press [SET].



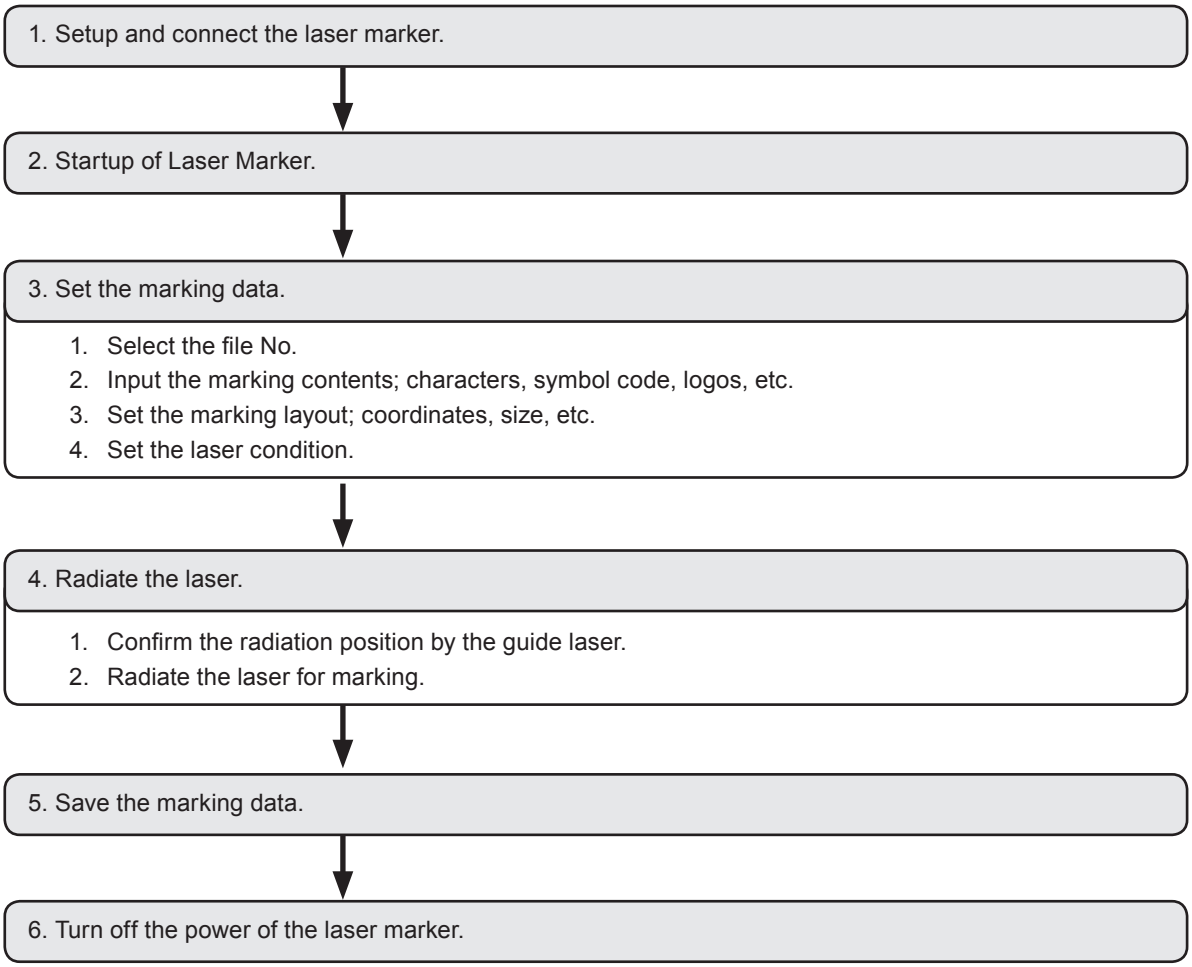
Function of the button on the entry field

①	[CANCEL] closes the entry field screen.
②	[SET] fixes the input and close the entry field screen.
③	Arrow key moves the input cursor position.
④	[DEL] deletes a character or number behind of the cursor.
⑤	[BS] removes a character or number in front of the cursor.
⑥	The symbols such as [.] or [-] are displayed depending on the setting data.
⑦	[SP] inserts the space for one character.

1-2 Operation Overview

This section describes the basic procedures to use laser marker from start-up to power off.

Flow:



1-2-1 Setup and connect the laser marker

Reference

- For the installation and connecting, refer to “Safety / Setup / Maintenance Guide”.

1. Install the laser marker ensuring the following points.

- Take laser protection measures required to use Class 4 laser products.
- Please avoid vibration and install in a place without any shocks.
- For the proper cooling performance, install not to bar the flow of air.

2. Connect the head and controller of the laser marker using these cables.

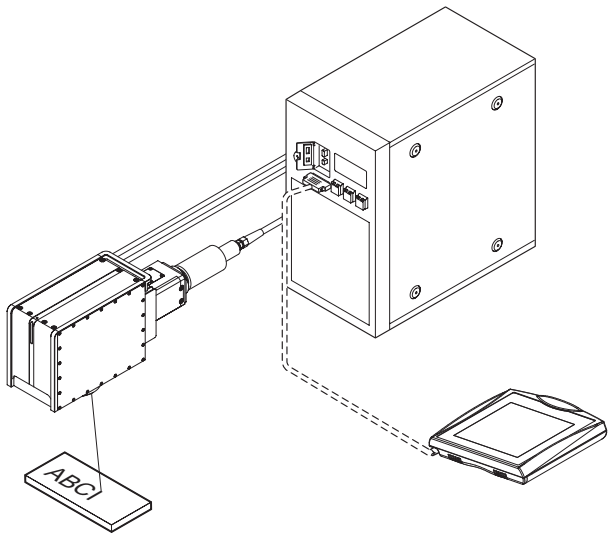
- Head control cable
- Head power cable
- Laser gate cable *1
- Fiber cable *2

3. Connect the following devices and cables to the controller.

- Touch panel console and return harness, or monitor and mouse, or PC
- Input / output terminal *3
- Interlock connector *3
- Laser gate terminal *1, *3
- Input connector for displacement sensor *4

4. Connect the controller power cable.

*1 : Only for LP-Mxxx-S type.
*2 : For LP-M and LP-Z series, the fiber cable cannot be detached from the device.
*3 : Wire the each terminals depending on the control method.
*4 : Only for LP-M series.



*Place a protective enclosure in the range of laser radiation for actual use.

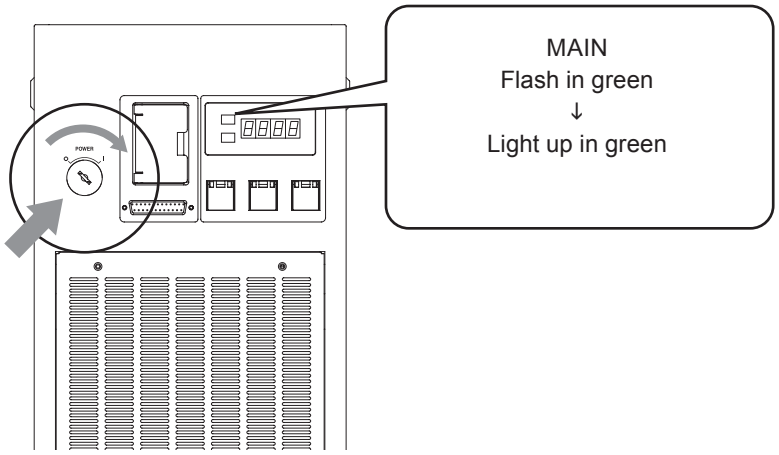
1-2-2 Startup of Laser Marker

1. Turn ON (|) the key switch of the controller.

(Insert the key and turn it toward ON (|) side.)

The main indicator flashes in green, and changes into lighted-up status after approx. 70 seconds.

Turn the key switch toward ON (|) side



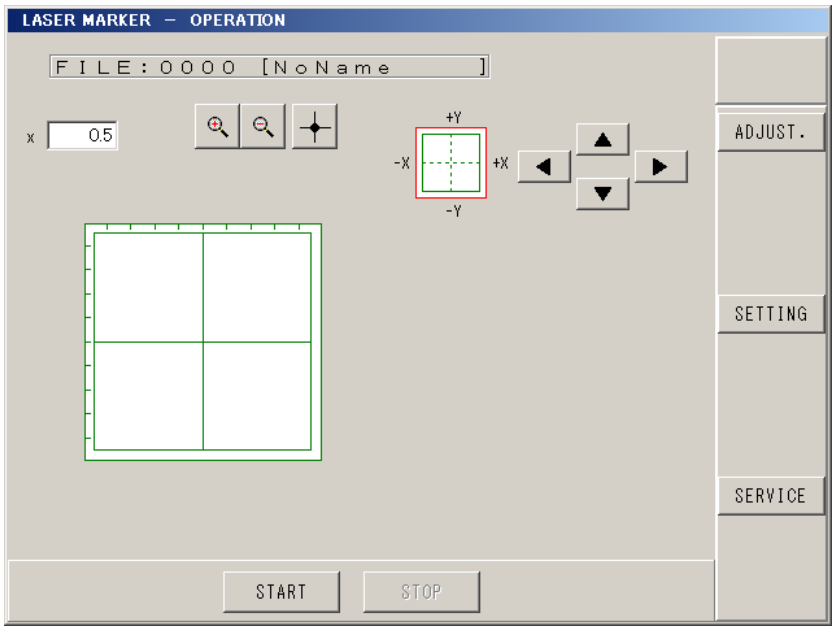
Notice

- Since the ON/OFF operation of the key switch puts load to laser marker, do not turn off the power supply until completing the system start.
- In case of turning ON the power supply after turning OFF, leave the interval at least 5 seconds between ON and OFF.

2. If the language selection screen appears at the start-up, select the language to be used for the display and press [SET].

To skip this screen from the next start-up, check “Don’t display this massage on next start-up”.

3. The operation screen is appeared after the system is started.

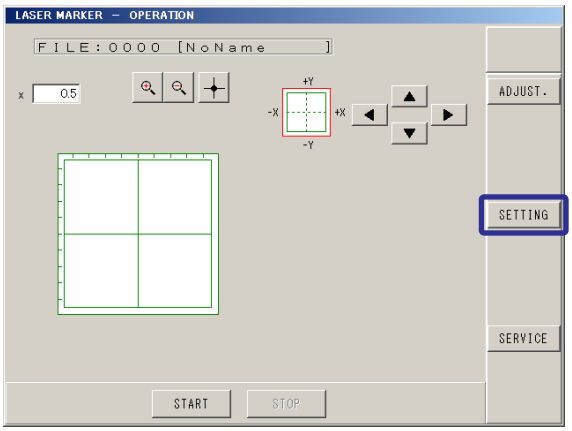


1-2-3 Set the marking data

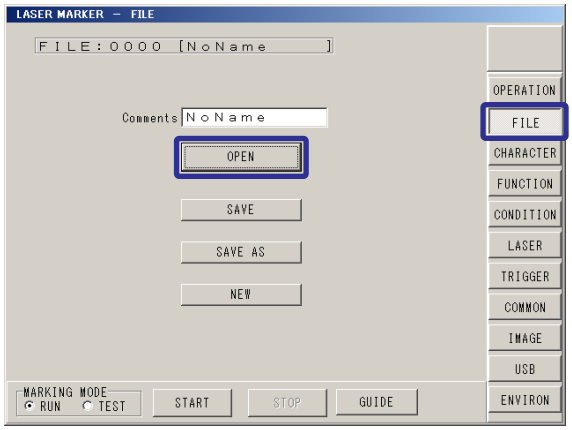
1. Select the File No.

The marking contents and layout data are stored in “file” format. Select the file No. at first to set the marking data.

1. Press [SETTING] to switch the screen mode from operation to setting mode.



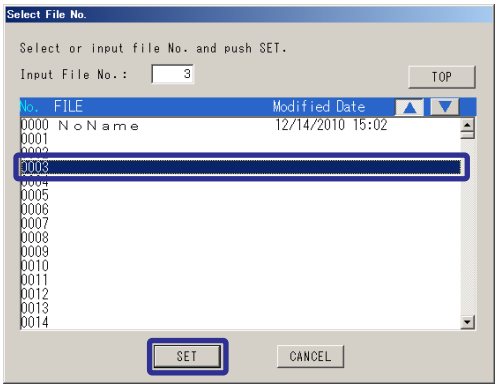
2. Press [FILE].



3. Press [OPEN].

The [Select File No.] window will appear.

4. Select File No. “0003” and press [SET].

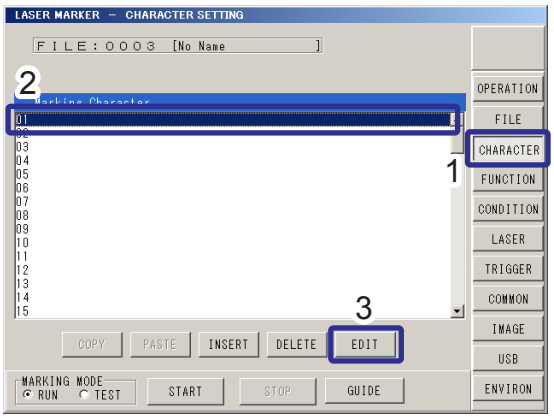


2. Input the marking contents.

Input the marking contents such as characters, code symbols, or logos. Here describes the procedure to input character data "ABCD".

1. Press [CHARACTER].

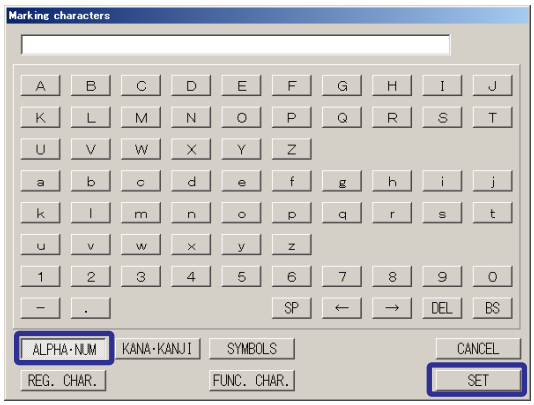
The screen is changed into the character setting one.



2. Place the cursor on the first line (01), and press [EDIT].

* Re-adjusting the cursor to the first line (01), and then pressing (double-clicking) the same cursor performs the same operation.

3. Press [ALPHA•NUM].

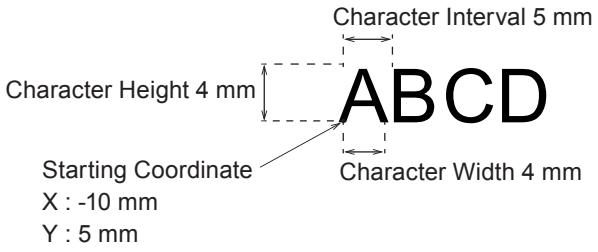


4. Input [ABCD].

5. Press [SET].

3. Set the marking layout

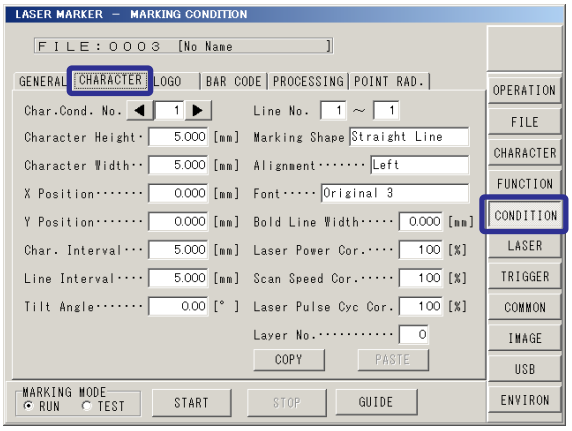
Set the size and coordinate for the marking contents. Here describes the procedures to set the following layout.



X Position (Starting Coordinate X)	:	-10 mm
Y Position (Starting Coordinate Y)	:	5 mm
Character Height	:	4 mm
Character Width	:	4 mm
Character Interval	:	5 mm

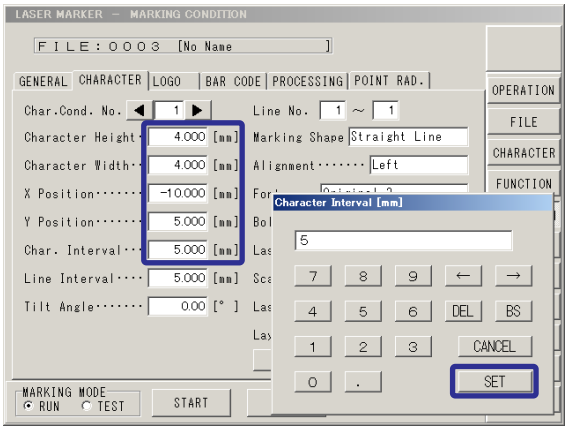
1. Press [CONDITION].

Then, press [CHARACTER].

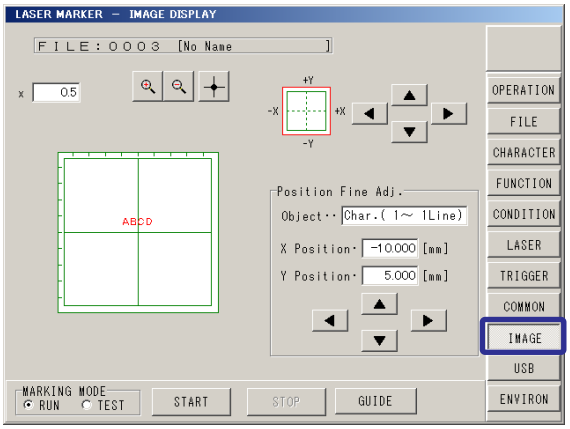


2. Set “4 mm” to [Character Height].

Set “4 mm” to [Character Width].
Set “-10 mm” to [X Position].
Set “5 mm” to [Y Position].
Set “5 mm” to [Char. Interval] (Character Interval).



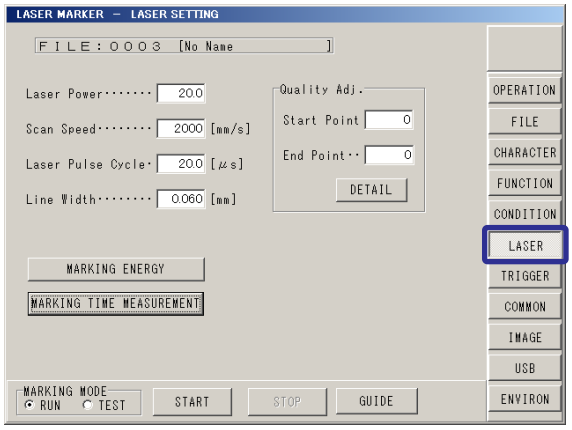
3. Press [IMAGE] to check the marking layout.



4. Set the laser condition

Set the laser power and scanning speed.

1. Press [LASER] (LASER SETTING).



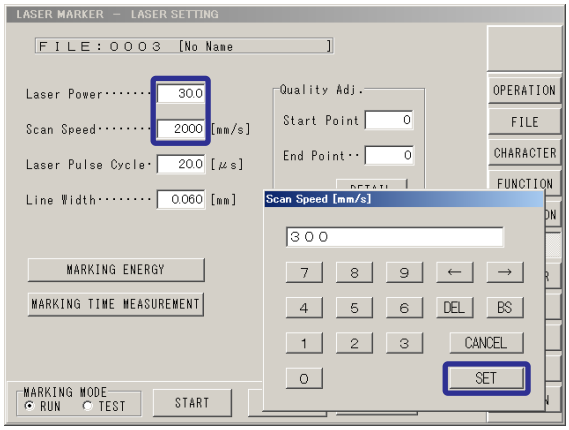
2. Set “30” to [Laser Power].

The larger value, the marking becomes darker or deeper.

To find the proper value, set here from small value and adjust it to larger value according to the marking quality.

3. Set “300 mm/s” to [Scan Speed].

The larger value, the marking becomes lighter and the marking time becomes shorter.



1-2-4 Radiate the laser

1. Confirm the radiation position by the guide laser.

1. Set the marking object, and adjust the work distance.

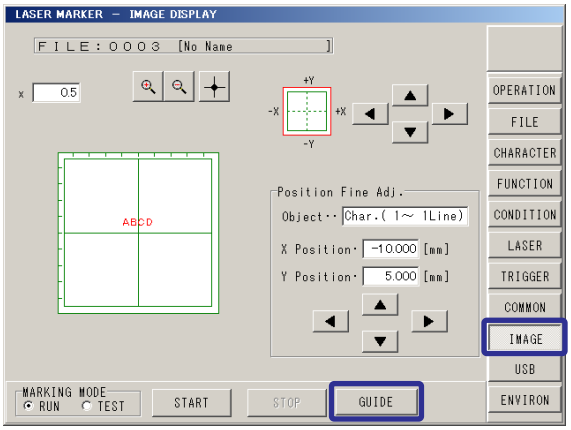
Set the distance between the laser emission port of the head and the work surface to the appropriate work distance position for each model.

For the appropriate work distance for each model, refer to “Input Setting Value by Series” (P.294).

Reference

- The work distance can visually be confirmed using the dual pointer described in “2-6-1 Dual pointer” (P.92).

2. Press [IMAGE] to check the marking layout.

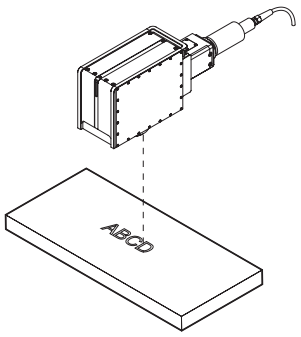


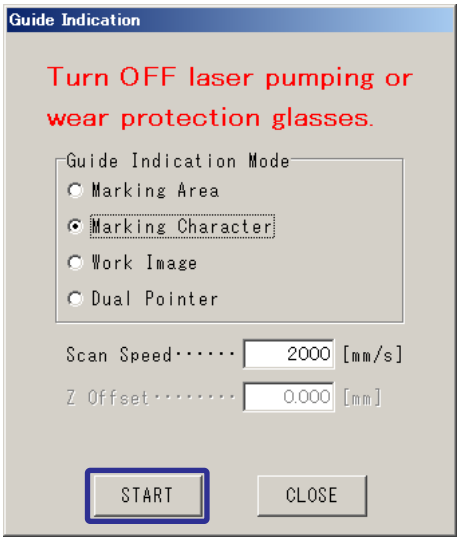
3. Press [GUIDE].

4. Select [Marking Character] and press [START].

The marking content is displayed with the red guide laser.

Adjust the position of the marking object.





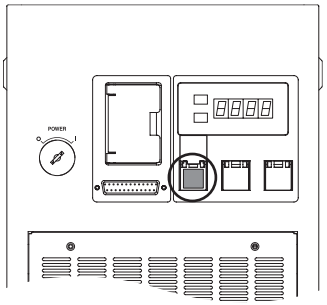
5. The guide laser is stopped by pressing [STOP].

2. Radiate the laser for marking

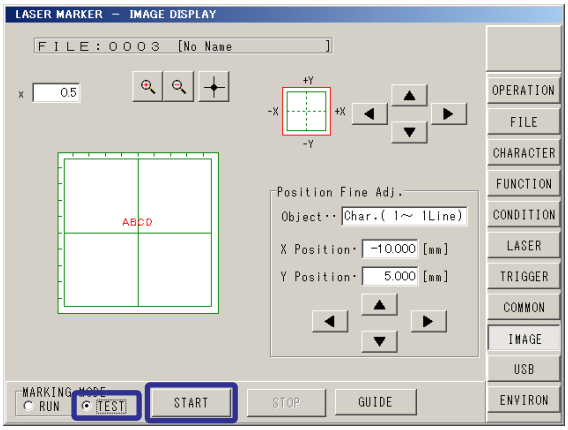
1. Press the laser pumping switch on the controller.

The laser pumping switch will be flashing in white. When the switch is changed from flashing to lightning up, the laser marker is ready for radiation.

(Flashing time: approx. 20 sec.)

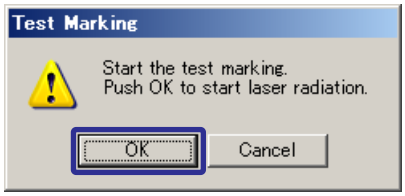


2. Select [TEST] of the marking mode.



3. The dialog box of the test marking is indicated by pressing [START].

The marking is started by pressing [OK].



⚠WARNING	The laser beam is emitted. Be sure to use the protective goggle and enclosure while dealing with the laser.

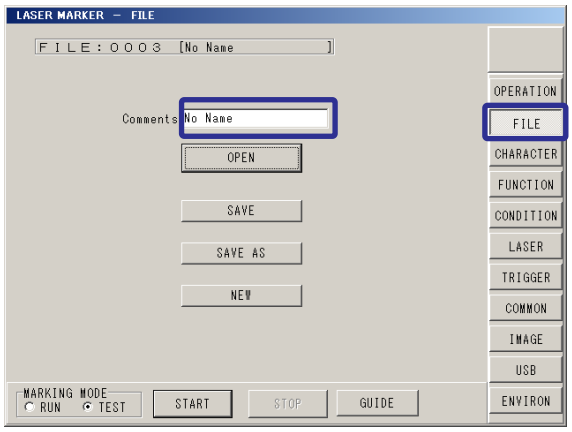
Reference

- For LP-Mxxx-S type, laser can not be emitted without opening the laser gate. After starting the test marking, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.

1-2-5 Save the marking data

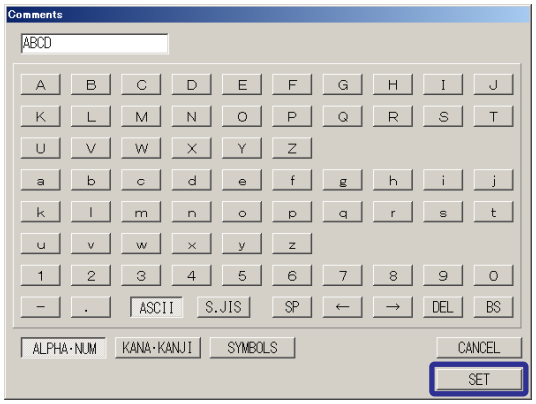
Save the marking data in laser marker. The data is stored in “file” format.

1. Press [FILE].



2. Press the character string of the Comments to set the file name.

3. Input the comment, and press [SET].

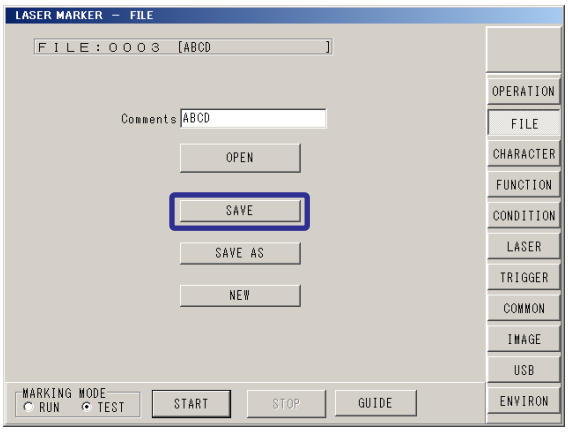


Reference

- For the file name, up to 20 characters can be input in case of inputting all single-byte letter.

4. Press [SAVE].

The file content is saved.

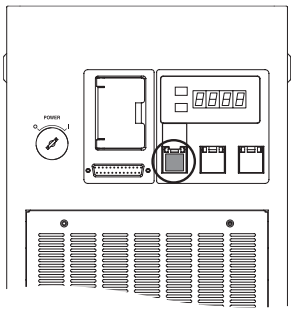


Notice

- The file is not saved only by inputting file name. For saving the file, be sure to overwrite the file.

1-2-6 Turn OFF Power of Laser Marker

1. Turn off the laser pumping switch.

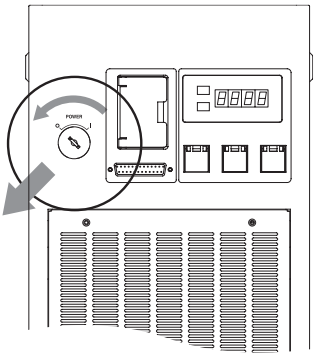


2. Turn OFF the key switch.

Turn the key to OFF (O) side (to the left), and pull it out.

The main indicator is off.

The system key should be in safekeeping by a laser safety manager.



Notice

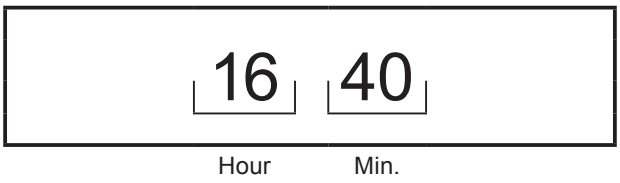
- If turning off the power of the laser marker without overwriting the file under dealing, the data is not saved. Be sure to check the file saving before turning off the power.
- Do not turn off the power during marking. Turning off the power during marking might cause the failure of the laser marker. If it needs to stop the laser radiation immediately, press the emergency stop button.

1-3 Setting Procedure for Basic Function

The setting method for function to be applied to the actual marking is described in this section using sample.

1-3-1 Mark Current Date and Time

Sample



Displayed number of digits (Figure)	:	2
Display format	:	Hour (24)/Minute
Display leading zeros(Zero Fill)	:	Enable

The procedure for marking current time is described below.

1. Input function character for the current date.

2. Set conditions for character and laser applied for the current date function.

Refer to “3. Set the marking layout” (P.19) and “4. Set the laser condition” (P.20) in “1-2-3 Set the marking data” (P.17).

Notice

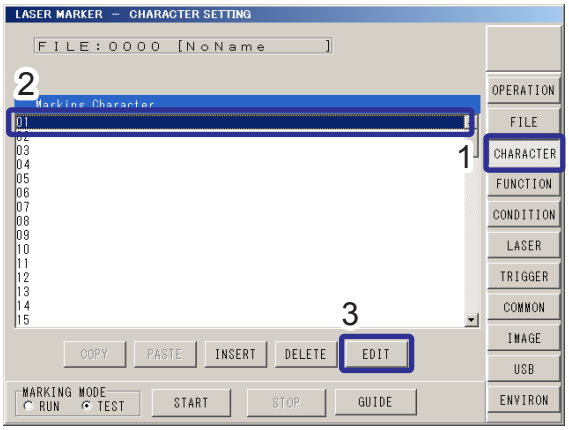
- The following items, Date, Lot, and Expiry date are marked based on the internal clock of the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

Reference

- For details on the current date function, refer to “Current Date and Expiry Date” (P.109).
- By using “Time hold” function, it is possible to mark as the same date even when the time has passed 0:00 A.M.
  <Time Hold function>
  The “Time Hold” function locks the marking time/date. (Refer to “Safety / Setup / Maintenance Guide”.)
  This function can be used only in “Current data marking”, “Expiry date”, and “Lot”.

1. Input the current date function character.

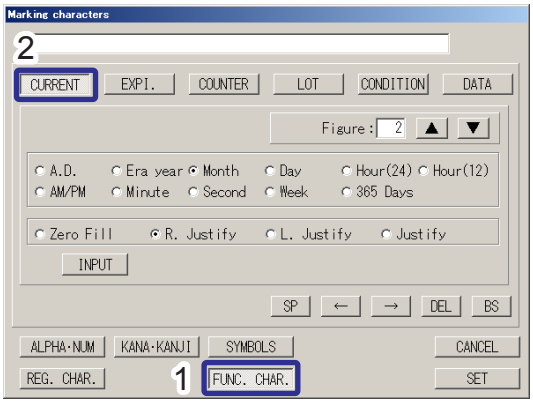
1. Press [CHARACTER].



2. Select the first line (01), and press [EDIT].

Or double-click the first line (01).

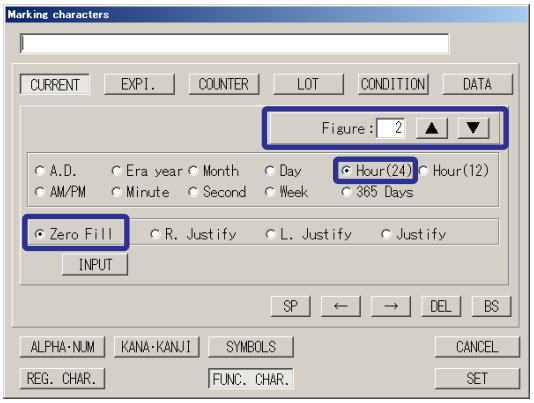
3. Press [FUNC. CHAR.] (FUNCTION CHARACTER) and press [CURRENT] (CURRENT DATE).



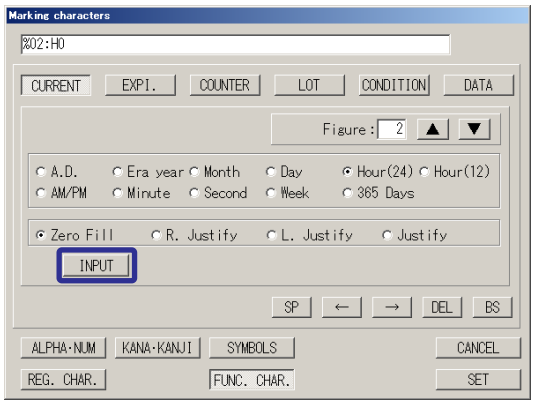
4. Set “2” to [Figure].

5. Select [Hour(24)].

6. Select [Zero Fill].



7. Press [INPUT].

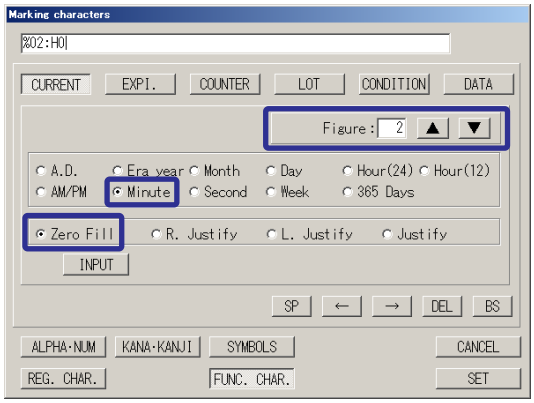


8. Set “2” to [Figure] continuously.

The figure can be set from 1 to 6.

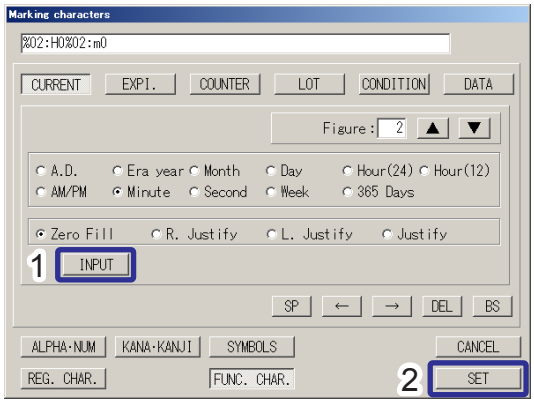
9. Select [Minute].

10. Select [Zero Fill].



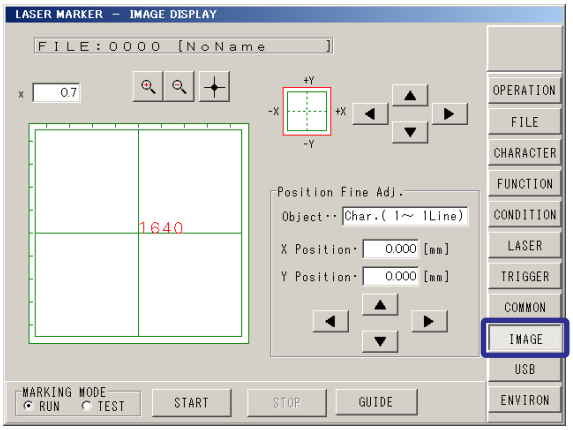
11. Press [INPUT], and then press [SET].

The “%02:H0%02:m0” is input into the first line of the marking character string.



12. Press [IMAGE] to check the marking layout.

The data to be marked (current time) is displayed.



1-3-2 Mark Expiry Date and Time

Sample

Time limit (Expi.)	:	30 days
Displayed number of digits (Figure)	:	2
Display format	:	Month/Date
Display leading zeros (Zero Fill)	:	Enable

The expiry date (30 days later) is marked.

1. Set the expiry date.

2. Input the function character of the expiry date.

3. Set the conditions of the function character for the expiry date and laser.

Refer to “3. Set the marking layout” (P.19) and “4. Set the laser condition” (P.20) in “1-2-3 Set the marking data” (P.17).

Notice

- The following items, Date, Lot, and Expiry date are marked based on the internal clock of the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

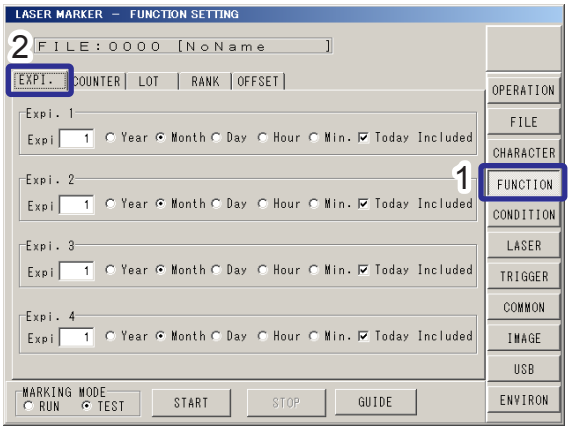
Reference

- For details on the expiry date function, refer to “2-9-1 Expiry Date” (P.118).
- By using “Time hold” function, it is possible to mark as the same date even when the time has passed 0:00 A.M.
  <Time Hold function>
  The “Time Hold” function locks the marking time/date.
  (Refer to “Safety / Setup / Maintenance Guide”.)
  This function can be used only in “Current data marking”, “Expiry date”, and “Lot”.

1. Set the expiry date.

1. Press [FUNCTION] , and then press [EXPI.] (Expiry Date).

Here the condition is set to expiry No. 1.



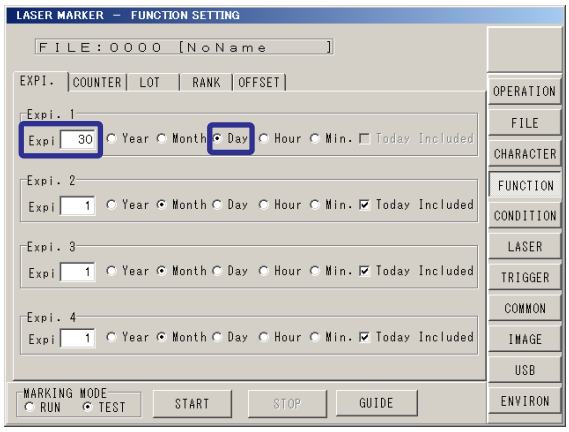
Reference

- The expiration is settable up to 4 per file (1 to 4). Other than this setting, the setting for “common counter” (5 to 8) that are common to all files are available. Refer to “2-13 Common Setting” (P.204).

2. Set “30” to [Expi] (Expiry Date).

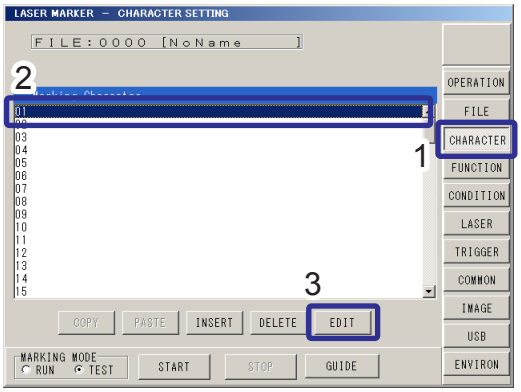
3. Set “Day” to Unit.

4. Un-check [Today Included].



2. Input the expiry date of the function character

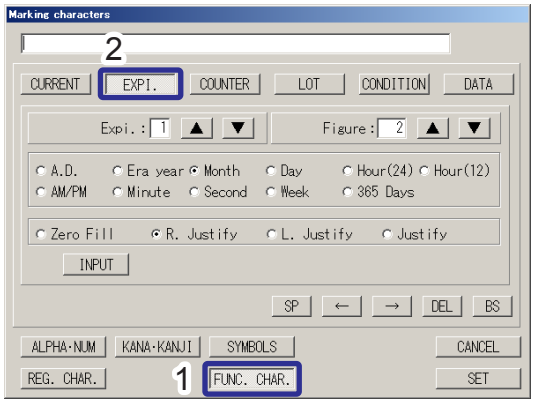
1. Press [CHARACTER].



2. Select the first line (01), and press [EDIT].

Or double-click the first line (01).

3. Press [FUNC. CHAR.] (FUNCTION CHARACTER), and then press [EXPI.] (Expiry Date).

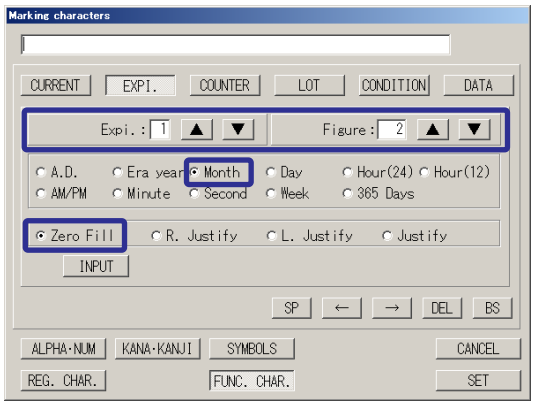


4. Enter “1” to the [EXPI.] (Expiry No.). field.
Set “2” to [Figure].

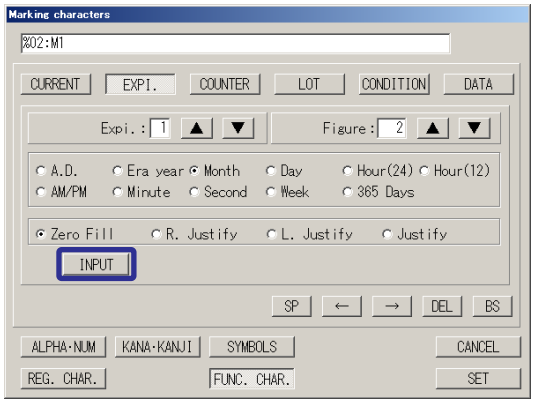
The figure can be set from 1 to 6.

5. Select [Month].

6. Select [Zero Fill].

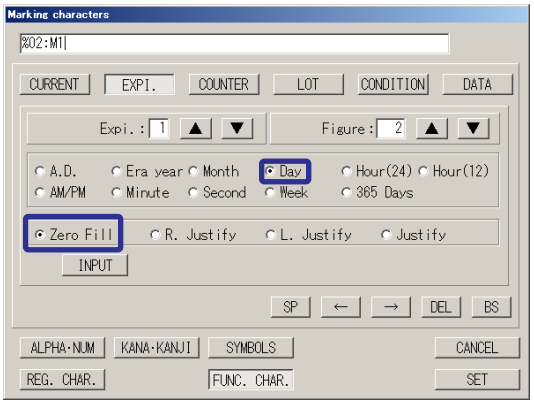


7. Press [INPUT].



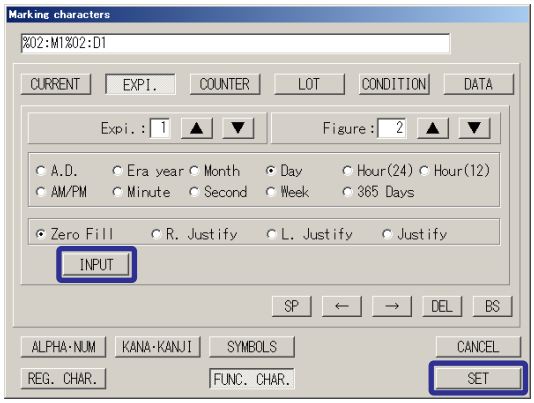
8. Select [Day] continuously.

9. Select [Zero Fill].



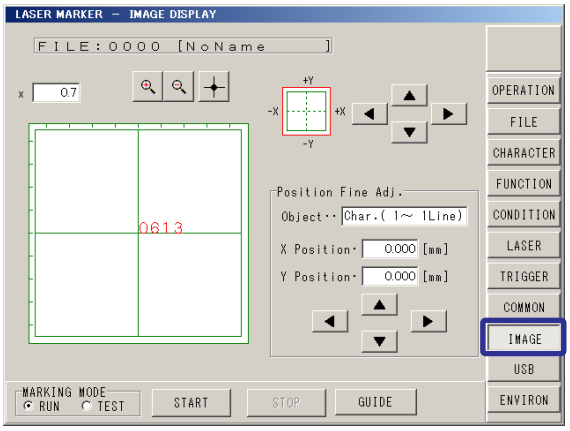
10. Press [INPUT], and then press [SET].

The “%02:M1%02:D1” is input into the 1st line of the marking character string.



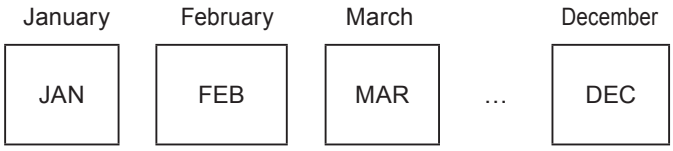
11. Press [IMAGE] to check the marking layout.

The date to be marked is displayed.



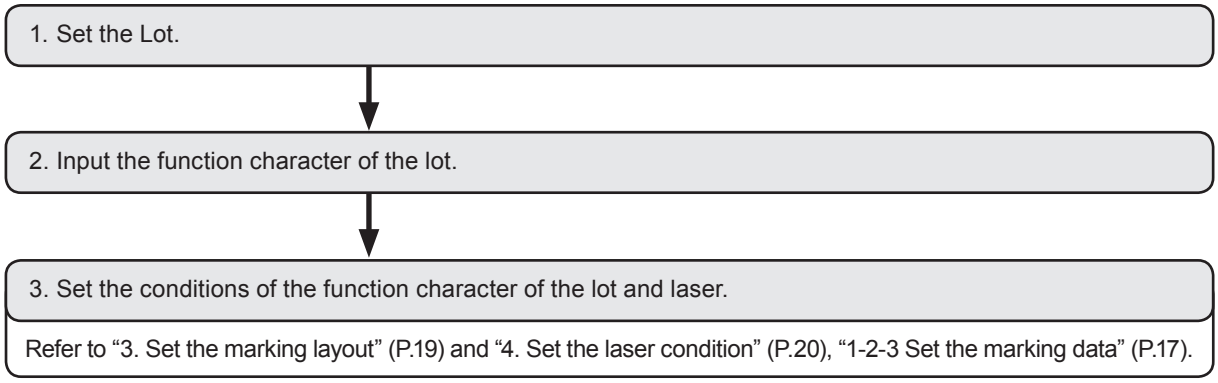
1-3-3 Mark Lot No.

Sample



Period	:	Current Date
Unit	:	Month

Set the lot No. to replace month data with the specified characters as above mentioned.



Notice

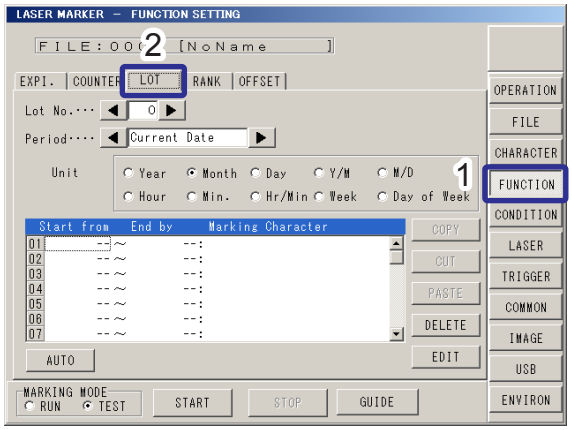
- The following items, Date, Lot, and Expiry date are marked based on the internal clock of the laser marker.
  The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

Reference

- For details on the lot function, refer to “2-9-3 Lot” (P.122).
- By using “Time hold” function, it is possible to mark as the same date even when the time has passed 0:00 A.M.
  <Time Hold function>
  The “Time Hold” function locks the marking time/date.
  (Refer to “Safety / Setup / Maintenance Guide”.)
  This function can be used only in “Current data marking”, “Expiry date”, and “Lot”.

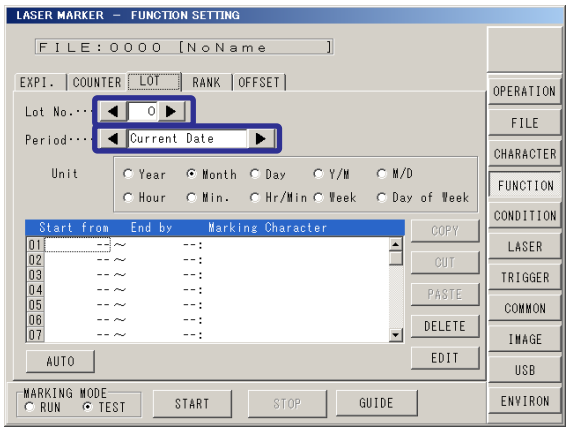
1. Set the lot.

1. Press [FUNCTION] , and press [LOT].



2. Set “0” to [Lot No.].

3. Set “Current Date” to [Period].



Reference

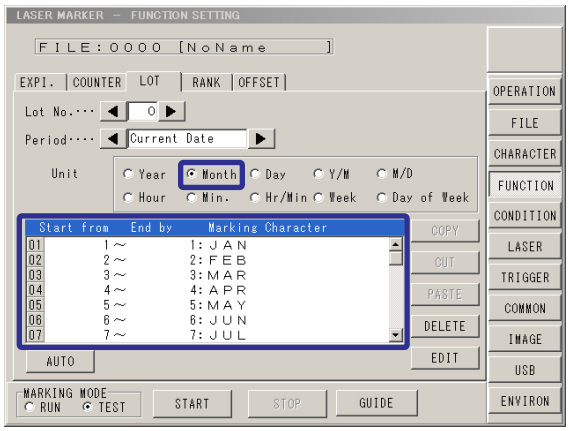
- The lot is settable up to 4 per file (0 to 3). Other than this setting, the setting for “common lot” (4 to 7) that are common to all files are available. Refer to “2-13 Common Setting” (P.204).
- The period of the lot is selectable among “Expiry 1” to “Expiry 8”, “Counter 0” to “Common Counter 7” other than “Current Date”. Refer to “2-9 Function Setting” (P.118).

4. Set “Month” to [Unit].

5. Define [Period] and [Marking Character].

Set the period and marking character as follows:

Period	Marking Character
1 to 1	JAN
2 to 2	FEB
3 to 3	MAR
4 to 4	APR
5 to 5	MAY
6 to 6	JUN
7 to 7	JUL
8 to 8	AUG
9 to 9	SEP
10 to 10	OCT
11 to 11	NOV
12 to 12	DEC

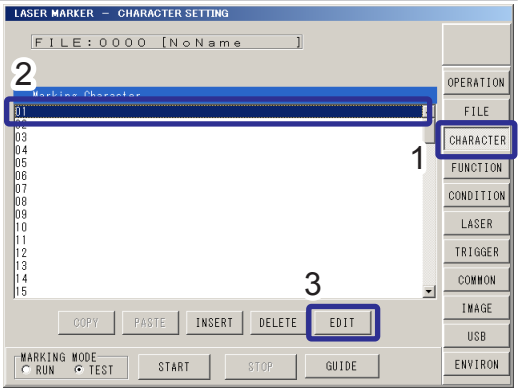


Reference

- Set the both period of start and end.

2. Input the function character of the lot.

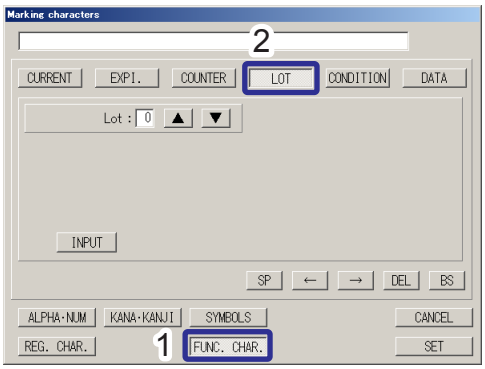
1. Press [CHARACTER].



2. Select the first line (01), and press [EDIT].

Or double-click the first line (01).

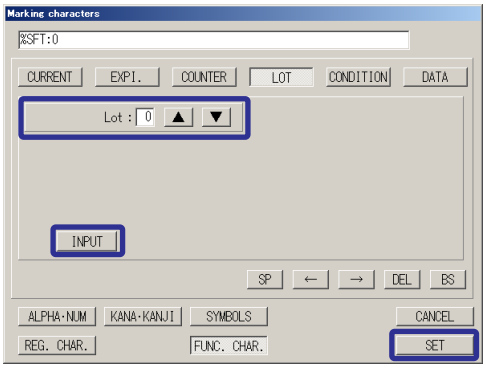
3. Press [FUNC. CHAR.] (FUNCTION CHARACTER), and press [LOT].



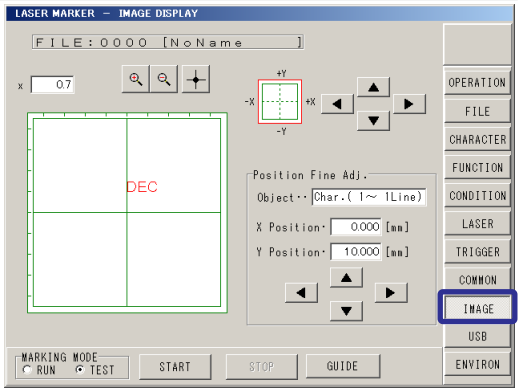
4. Set “0” to [Lot] (Lot No.).

5. Press [INPUT], and then press [SET].

The “%SFT:0” is input to first line of the marking character string.

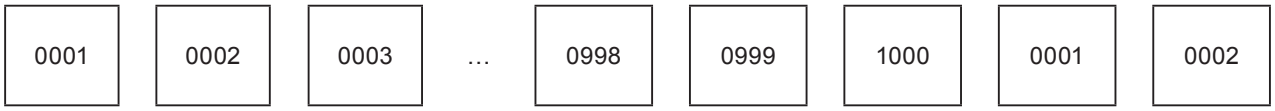


6. Press [IMAGE] to check the marking layout.



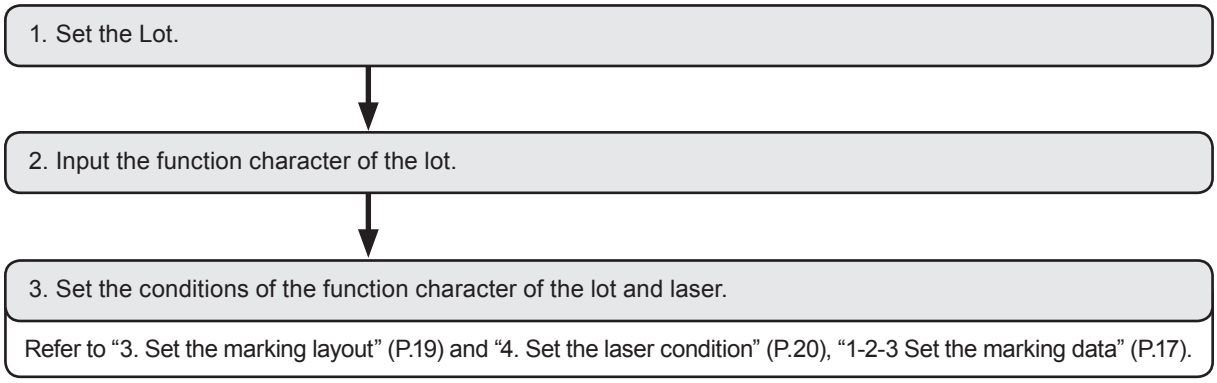
1-3-4 Mark Counter

Sample



Initial value (Init)	:	1
End value (End)	:	1000
Step	:	1
Counter source (Source)	:	Trigger signal
Displayed number of digits (Figure)	:	4
Display leading zeros (Zero Fill)	:	Enable
Type of base number	:	Base-10 (Decimal) number system

Set the counters shown above.



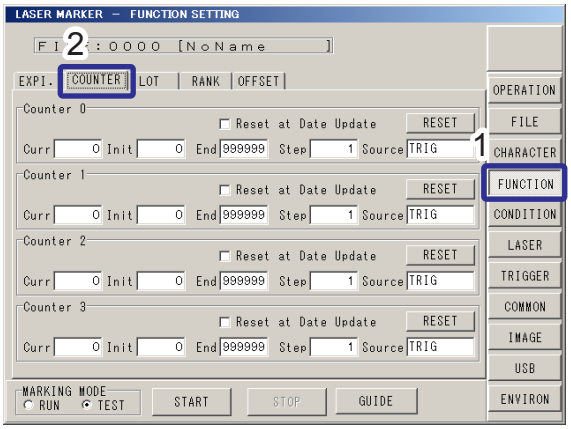
Reference

- For details on the counter function, refer to”2-9-2 Counter” (P.120).

1. Set the counter.

1. Press [FUNCTION], and press [COUNTER].

Here the condition is set to Counter No. 0.

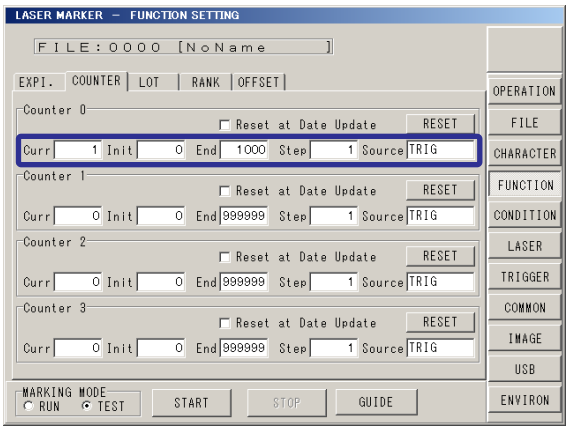


Reference

- The counter is settable up to 4 per file (0 to 3). Other than this setting, the setting for “common counter” (4 to 7) that are common to all files are available. For details, refer to “2-13-2 Common Counter” (P.206).

2. Set “1” to [Curr] (current value).

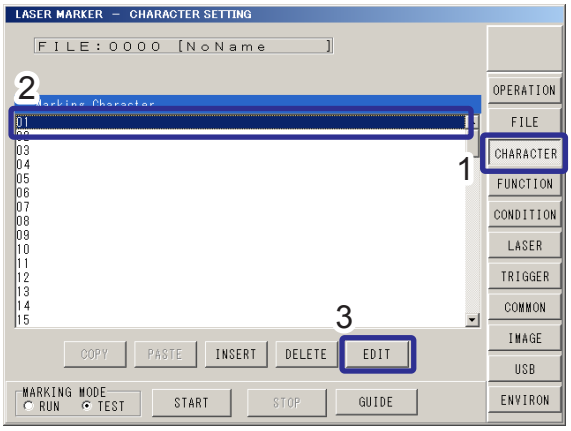
Set “1” to [Init] (initial value).
Set “1000” to [End] (end value).
Set “1” to [Step].
Select “TRIG” (TRIGGER) for [Source] (Count Source).



2. Input the counter function character.

1. Press [CHARACTER].

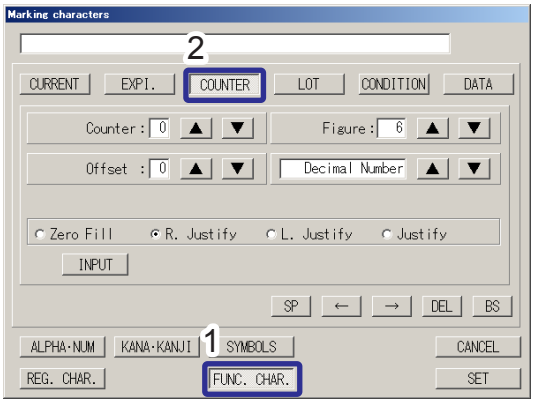
The screen changes to the character setting screen.



2. Select the first line (01), and press [EDIT].

Or double-click the first line (01).

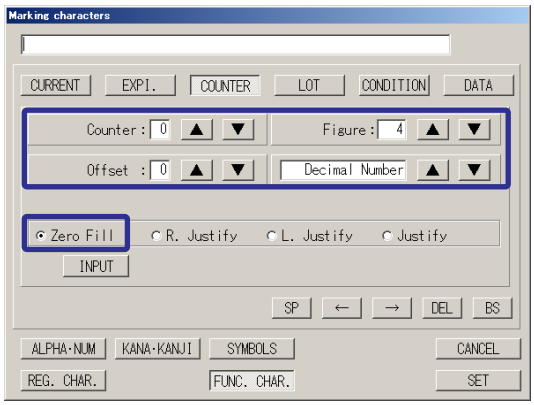
3. Press [FUNC. CHAR.] (FUNCTION CHARACTER) and press [COUNTER].



4. Set “0” to [Counter] (Counter Number).

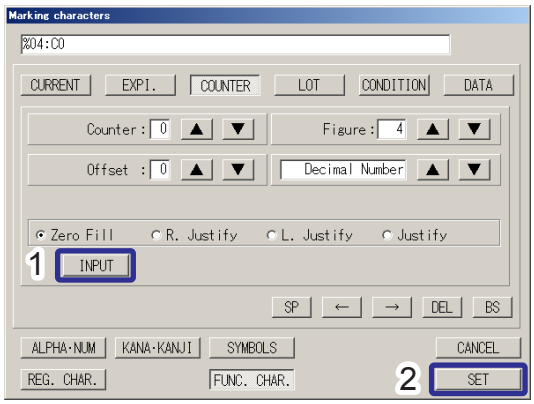
Set “4” to [Figure].
Set “0” to [Offset].
Set the number to “Decimal Number”.
Select [Zero Fill] (Zero indication).

The figure can be set from 1 to 6.
The offset can be set from 0 to 9.
The number can be set from 2 binary to 36.



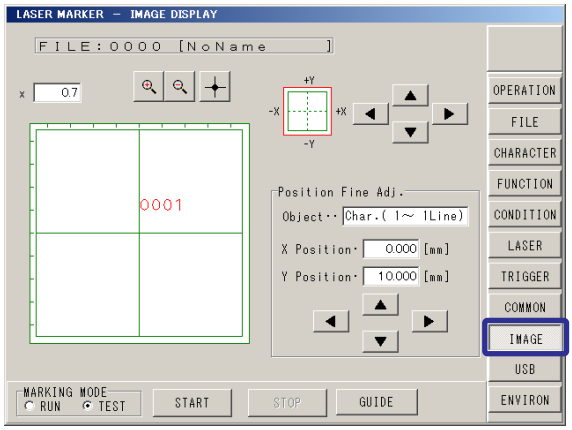
5. Press [INPUT], and then press [SET].

The “%04:C0” is input to 1st line of the marking character string.



6. Press [IMAGE] to check the marking layout.

“0001” is displayed.



1-3-5 Mark Code Symbol

Sample

Bar Code Type	:	QR Code Model 2
Version	:	0(Auto setting)
Mode	:	Alphanumerical
Error correction level	:	H
Module H.	:	0.500 mm
Module W.	:	0.500 mm
Data	:	ABCDEFGHIJKLMN12345

The procedures to mark the above QR code at a center point with X coordinate=0 and Y coordinate=0 are described below.

1. Set QR code condition.
2. Set the data to be converted into QR code.
3. Set the pattern.
4. Set the laser setting of QR code.

Refer to “4. Set the laser condition” (P.20) in “1-2-3 Set the marking data” (P.17).

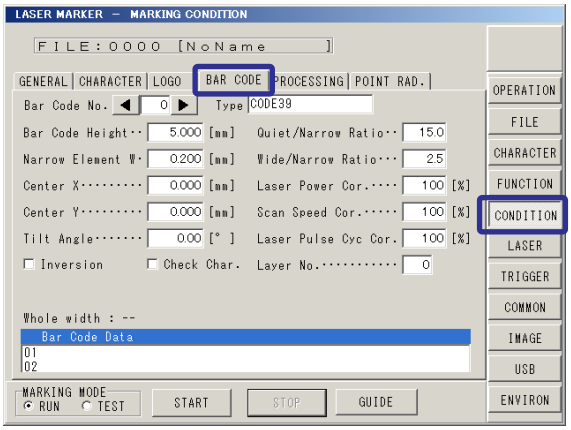
Reference

- For details on QR code marking, refer to “Setting for QR Code and Data Matrix Code” (P.167).

1. Set QR code condition.

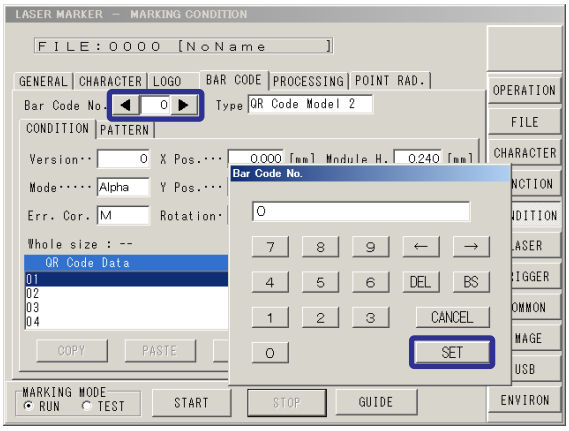
1. Press [CONDITION].

Then, press [BAR CODE].



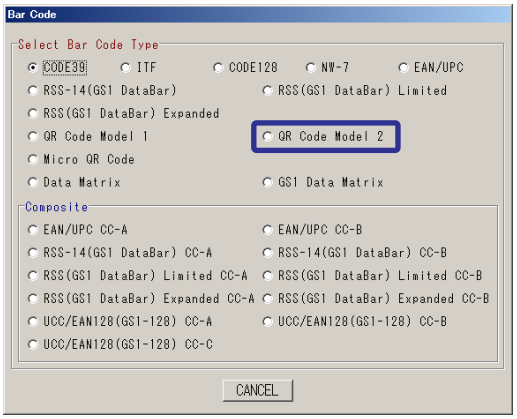
2. Set “0” to Bar Code No.

The bar code numbers 0 to 15 can be selected per file.

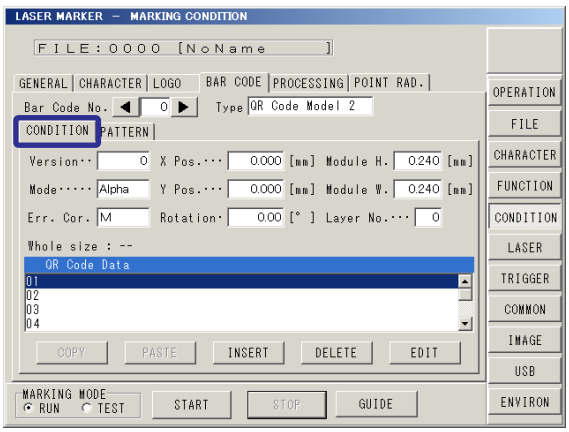


3. Set “QR Code Model 2“ to Bar Code Type.

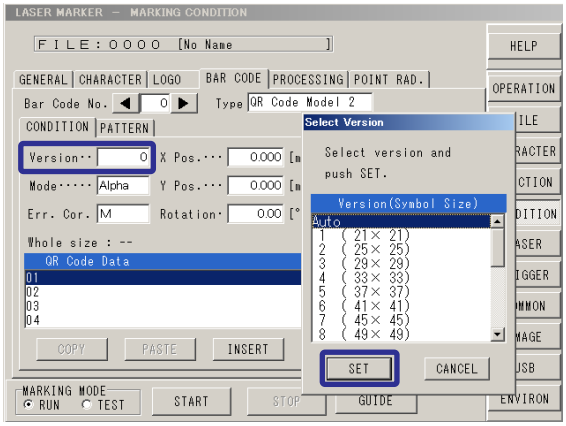
Set the bar code type from the bar code pop-up window after clicking “Type” column.



4. Press [CONDITION].



5. Set “0” (Auto) to [Version].



Reference

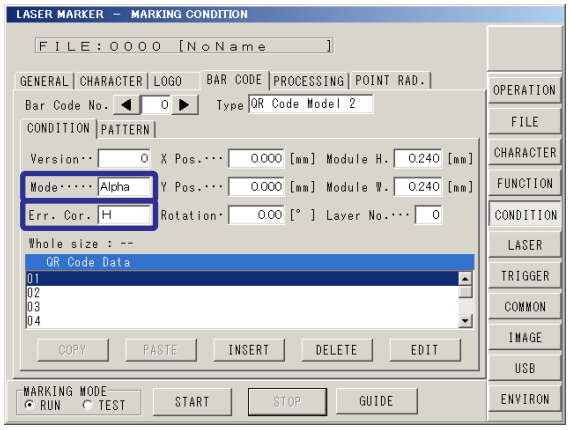
- For details on versions of QR codes, refer to “QR Code Version and Data Capacity” (P.284).

6. Set “Alpha” (Alphanumeric) to [Mode].

Press [Mode] to switch display in the order of “Alpha”, “Binary”, “Kanji”, and “Numeric”.

7. Set “H” to [Err.Cor.] (Error Correction).

Press [Err. Cor.] to switch display in the order of “M”, “Q”, “H”, and “L”.

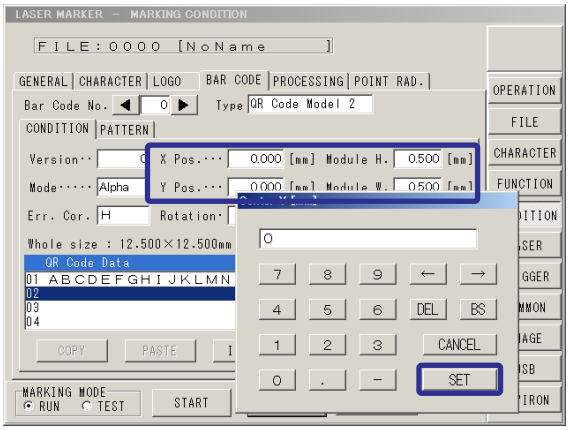


8. Set “0.500 mm” to [Module H.] (Module Height).

Set “0.500 mm” to [Module W.] (Module Width).

9. Set “0.000 mm” to [X Pos.] (X Position).

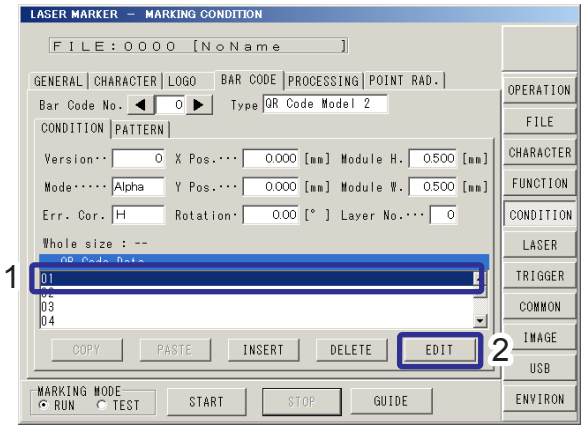
Set “0.000 mm” to [Y Pos.] (Y Position).



2. Set the data to be converted into QR code.

1. Select the first line (01) of the QR Code Data, and press [EDIT].

Or double-click the first line (01).

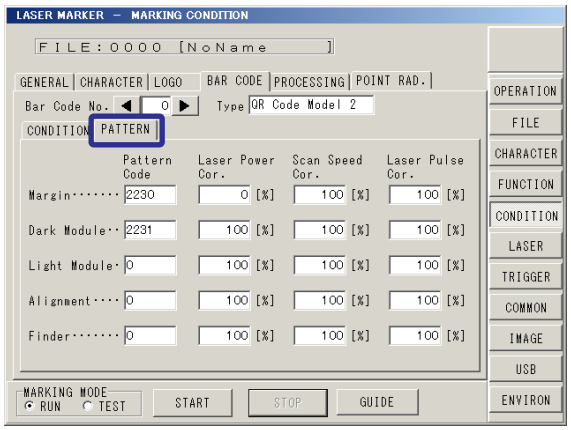


2. Press [ALPHA•NUM] and input [ABCDEFGHIJKLMN12345].

3. Press [SET].

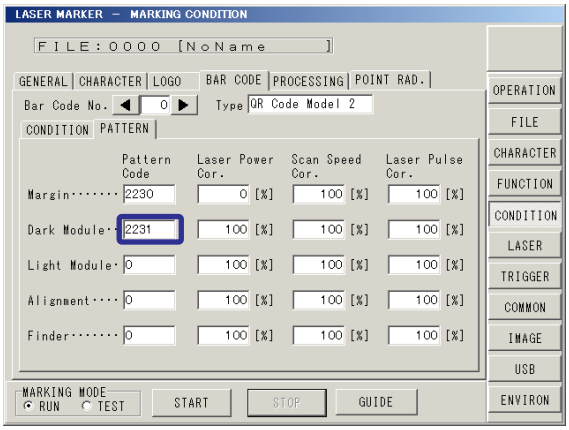
3. Set the pattern.

1. Press [PATTERN].



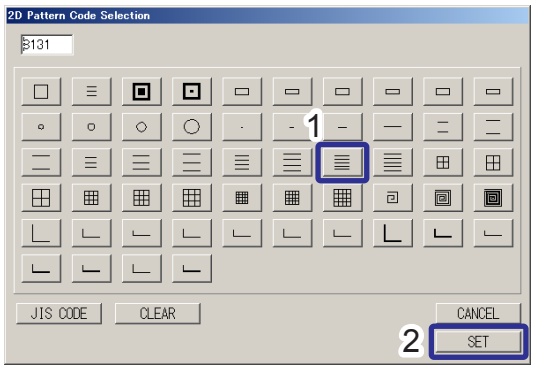
2. Set the code pattern of [Dark Module].

Press [Pattern Code] box for [Dark module].



3. Input screen of painting pattern for the modules in QR code is displayed.

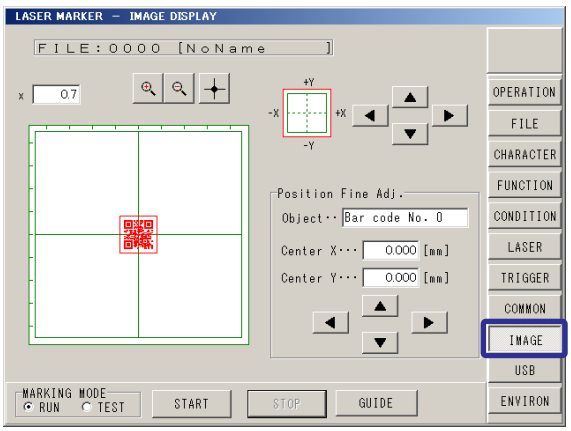
Select a pattern and press [SET].



Reference

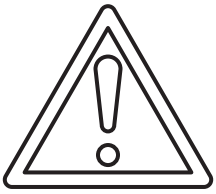
- If a reading failure occurs with the standard pattern, use the font maker provided to created the proper pattern. Refer to “Font Maker Operation Manual” for details.
- 2D code pattern can be also set using the character code. Press [JIS Code] to open the ten-key pad, and then input the character code.

4. Press [IMAGE] to check the marking layout.



1-3-6 Mark Logo

Sample



The marking procedure for the previously defined logo like shown above is described below.

1. Set the data to be converted into QR code.

2. Set the pattern.

3. Set the laser setting of QR code.

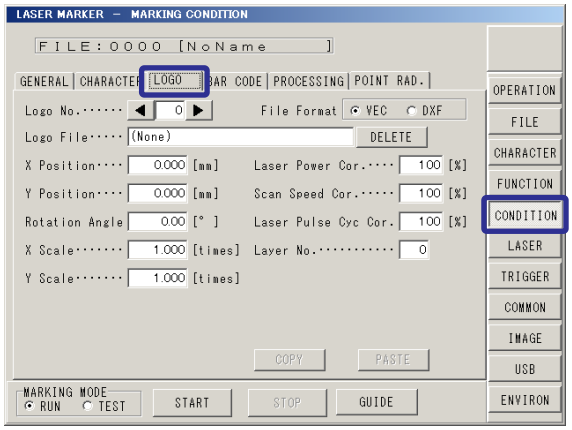
Refer to “4. Set the laser condition” (P.20) in “1-2-3 Set the marking data” (P.17).

Reference

- For details on logo marking, refer to “2-10-3 Logo Condition” (P.155).

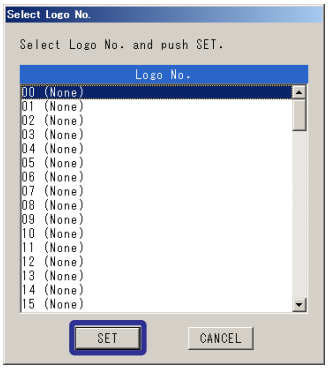
1. Select the logo data.

1. Press [CONDITION] and press [LOGO].

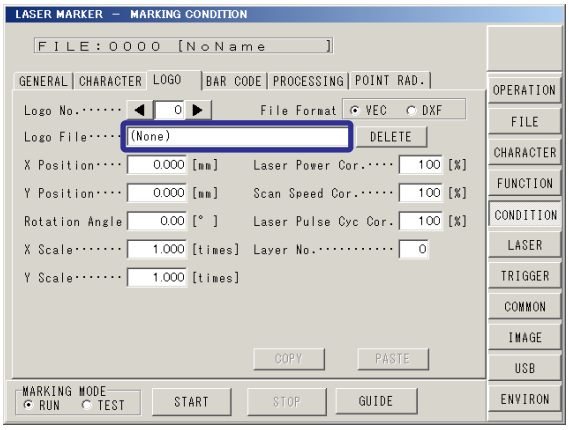


2. Select the logo No. 00, and then press [SET].

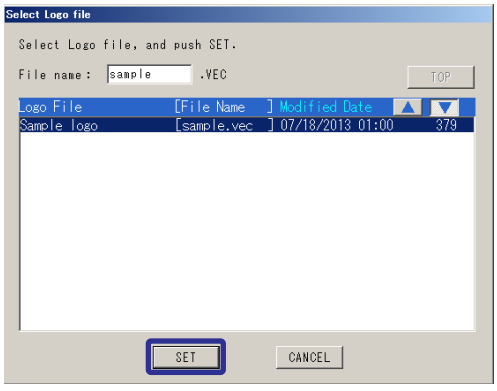
The logo No. is available to set from 0 to 99.



3. Press [Logo File].



4. Select the logo file from the list and press [SET].

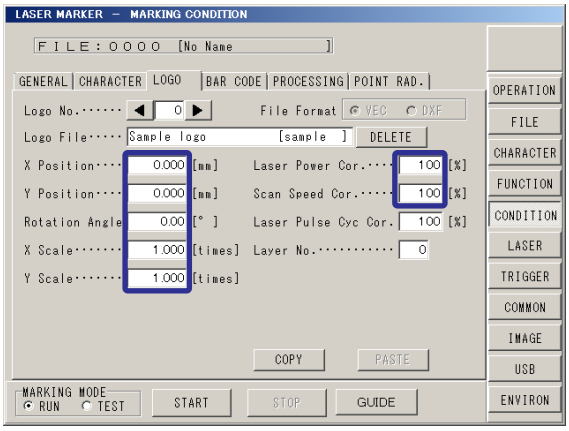


Reference

- The logo file created newly is required to register into the laser marker. Refer to “2-15 USB Media” (P.213) and “Logo Data Conversion Software Operation Manual”.
- As for the following file format data, BMP, DXF, JPEG, and HPGL, and art work made by Adobe® Illustrator® convert these data into the appropriate file format data using logo data conversion software or ExportVec, and then register the data into the laser marker. (DXF files are not required to be converted.) Refer to the “Logo Data Conversion Software Operation Manual”, “ExportVec Operation Manual” for details.

2. Set condition for logo.

1. Set “1” to both [X Scale] and [Y Scale].



2. Set “0.000 mm” to [X Position].

Set “0.000 mm” to [Y Position].
Set “0.00 degree” to [Rotation Angle].

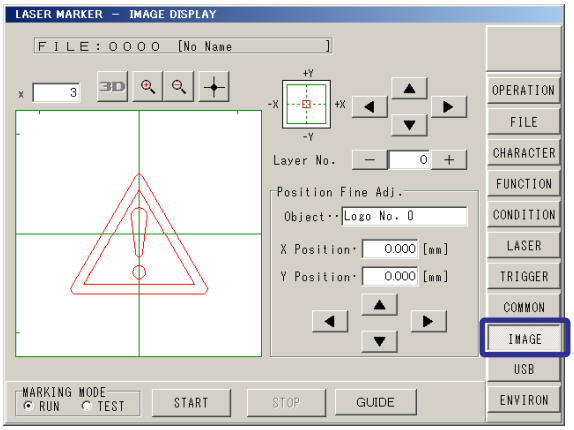
3. Set “100%” to [Laser Power Cor.] (Laser Power Correction).

Set “100%” to [Scan Speed Cor.] (Scan Speed Correction).

Reference

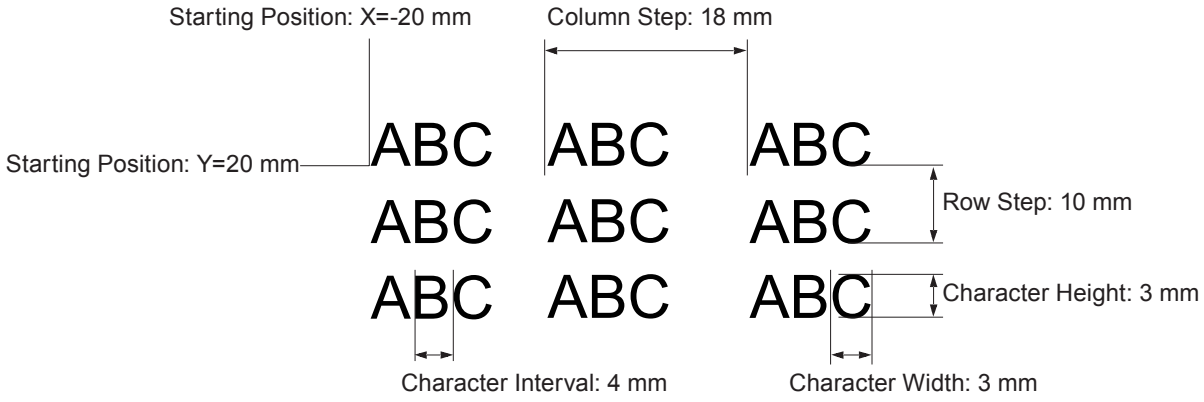
- To adjust the laser power and/or scan speed set in the laser setting screen only for the logo data, input the correction ratio in this screen. Refer to “2-10-3 Logo Condition” (P.155).

4. Press [IMAGE] to check the marking layout.



1-3-7 Mark Step & Repeat

Sample



Mark “ABC” in 3 columns and 3 rows.

1. Set the marking character.
2. Set the character condition.
3. Set the conditions for Step-Repeat.
4. Set the laser condition.

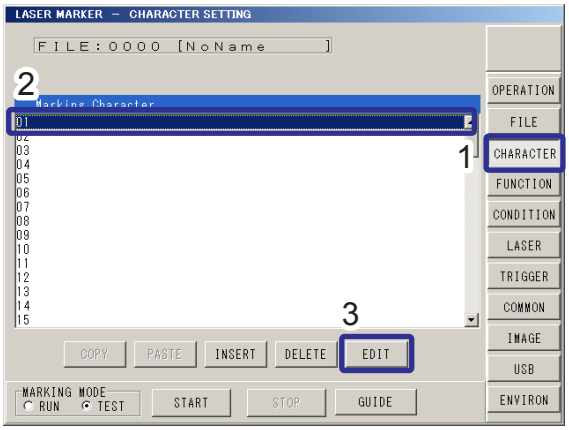
Refer to “4. Set the laser condition” (P.20) in “1-2-3 Set the marking data” (P.17).

Reference

- For details, refer to “Step & Repeat” (P.144).

1. Set the marking character.

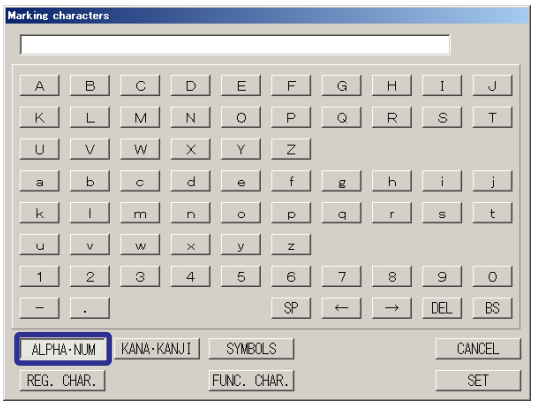
1. Press [CHARACTER].



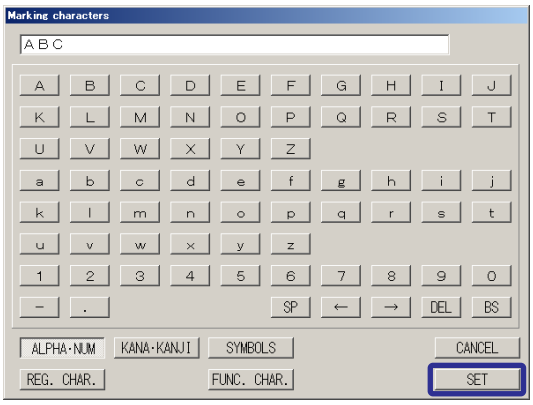
2. Select the first line (01), and press [EDIT].

Or double-click the first line (01).

3. Press [ALPHA•NUM].



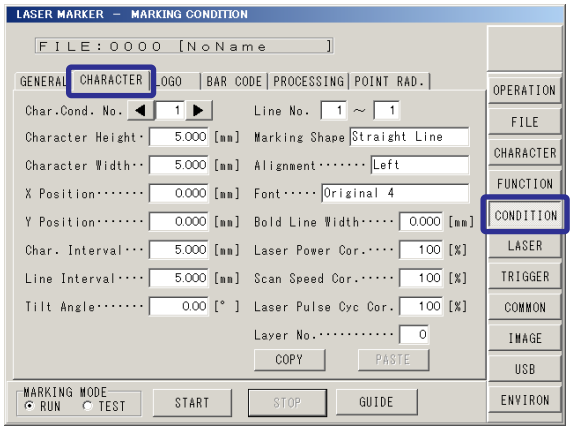
4. Input [ABC], and press [SET].



2. Set character condition.

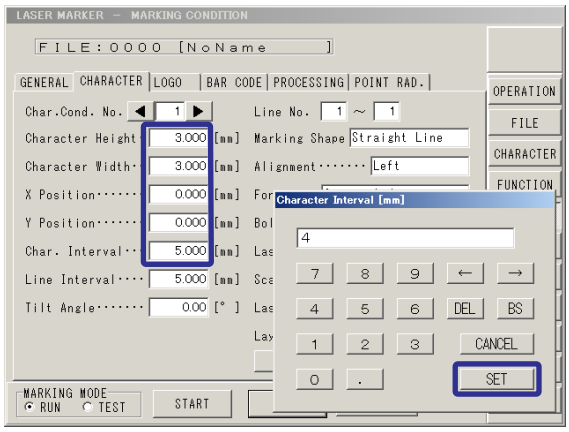
1. Press [CONDITION].

Then, press [CHARACTER].



2. Set “3.000 mm” to [Character Height].

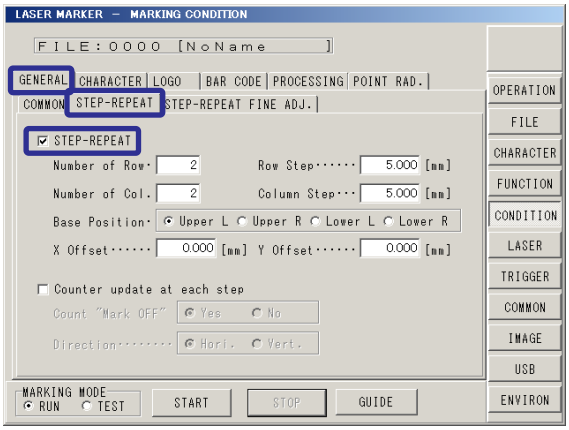
Set “3.000 mm” to [Character Width].
Set “0.000 mm” to [X Position].
Set “0.000 mm” to [Y Position].
Set “4.000 mm” to [Char. Interval] (Character Interval).



3. Set the conditions for Step & Repeat.

1. Press [GENERAL].

Then, press [STEP-REPEAT].



2. Check [STEP-REPEAT].

3. Set “3” to [Number of Row].

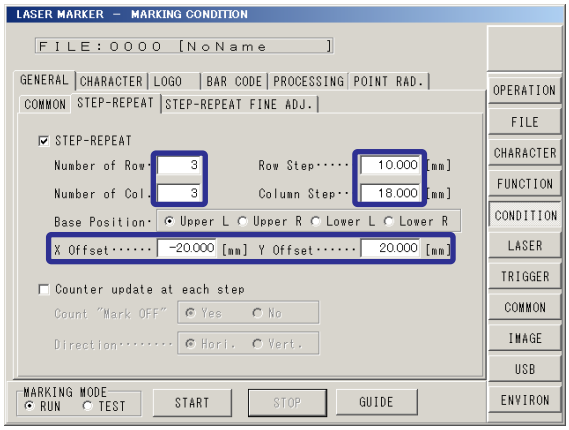
Set “3” to [Number of Col.] (Number of Column).

4. Set “10 mm” to [Row Step].

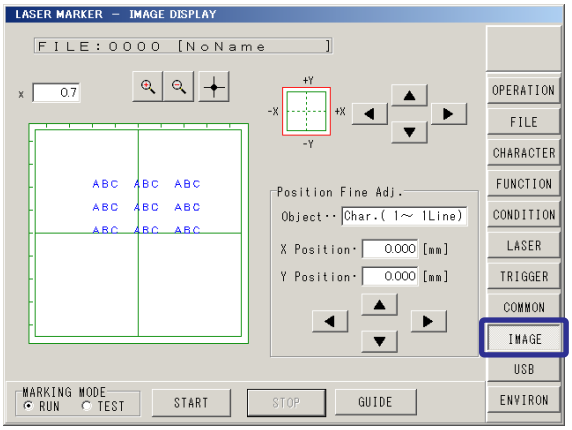
Set “18 mm” to [Col. Step] (Column Step).

5. Set “-20.000 mm” to [X Offset].

Set “20.000 mm” to [Y Offset].



6. Press [IMAGE] to check the marking layout.

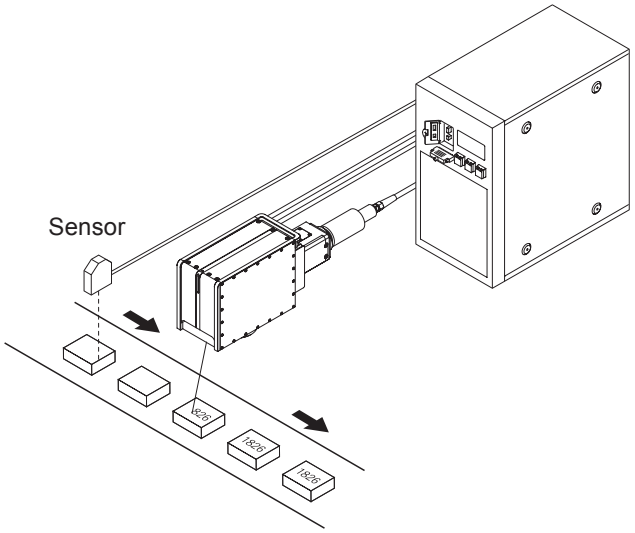


1-3-8 Mark to Flying Object

Reference

- No marking functions for mobile devices are implemented to LP-SxxxW type.

Sample



The following shows the procedure for marking to flying object.

1. Input character and set the marking conditions.

Refer to “1-2-3 Set the marking data” (P.17).

2. Set the conditions of the on-the-fly marking.

The detail is described in “1. Set the conditions of the on-the-fly marking.” (P.52).

3. Set the status of the laser marker into ready for receiving trigger.

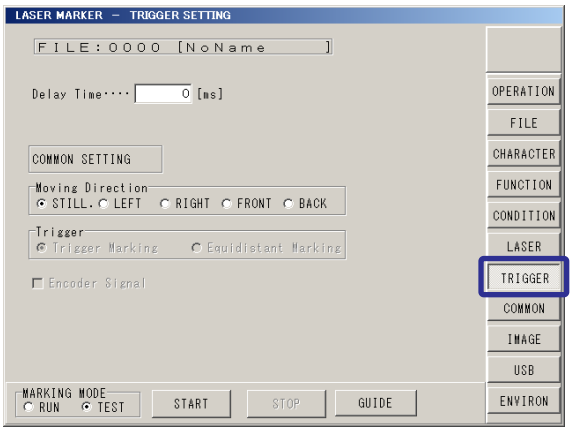
The detail is described in “2. Set the status of the laser marker into ready for receiving trigger.” (P.54).

Reference

- For details on marking on moving object, refer to “2-12-2 Marking to Flying Object” (P.193).

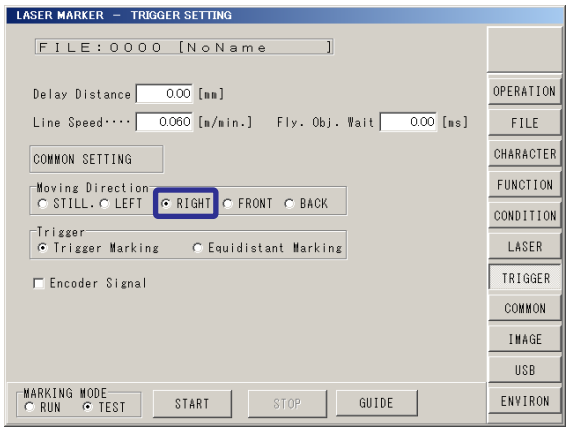
1. Set the conditions of the on-the-fly marking.

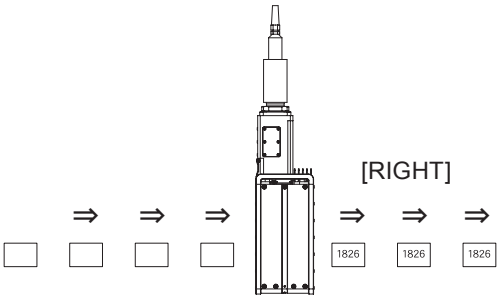
1. Press [TRIGGER].



2. Set “RIGHT” to [Moving Direction].

The work is marked to the direction shown in the following figure.





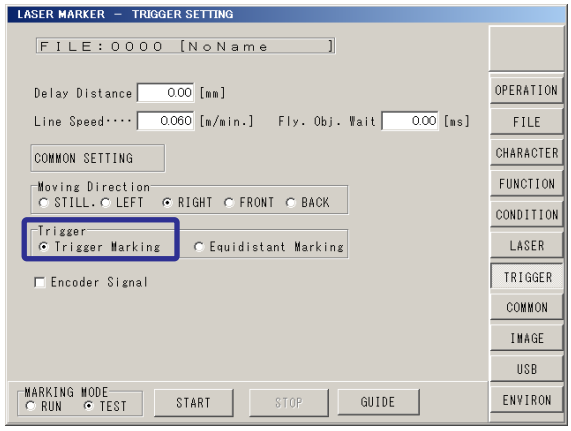
Notice

- Set the marker head in vertical against the work flow direction.

Reference

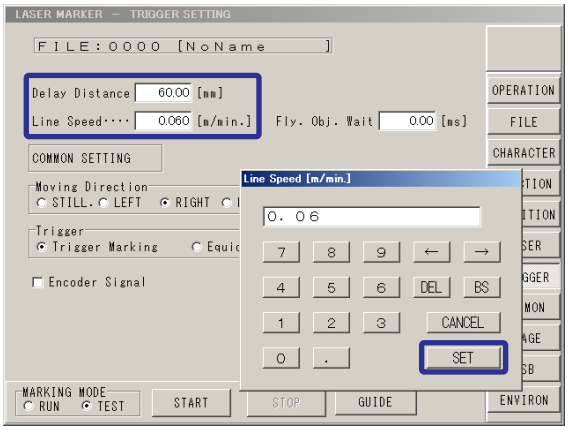
- Refer to “2-12 Trigger Setting” (P.192) for the work moving direction.

3. Set “Trigger Marking” to [Trigger].



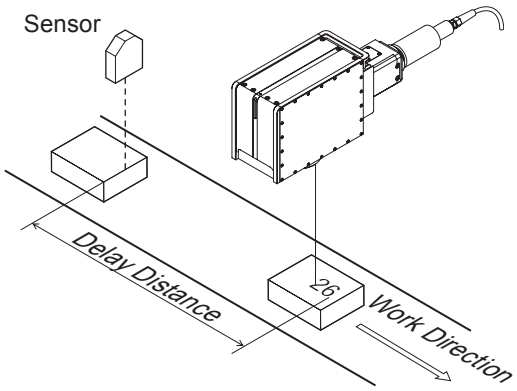
4. Set [Delay Distance].

Input the distance from sensor for trigger to the starting position of the marking using laser marker. Here, set the distance to 60 mm.



5. Set [Line Speed].

Here, set the speed to 0.060 m/min.



Notice

- Fine-adjust the delay distance by executing the test marking actually.

Reference

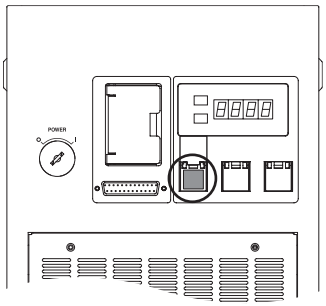
- When the line speed fluctuates, use [Encoder signal]. In such case, enter the number of encoder pulses. When the encoder is not used, marking on flying objects is executed by applying the calculation result based on the line speed already input.
  For the encoder signal, refer to “Trigger Selection” (P.194).

2. Set the status of the laser marker into ready for receiving trigger.

1. Press the laser pumping switch on the controller.

The laser pumping switch will be flashing in white. When the switch is changed from flashing to lightning up, the laser marker is ready for radiation.

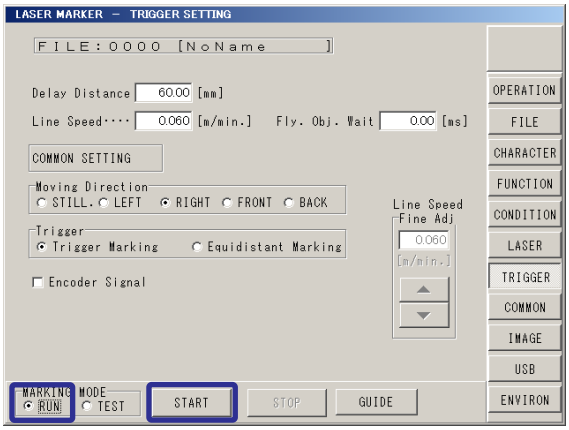
(Flashing time: approx. 20 sec.)



2. Set marking mode to [RUN].

3. Press [START].

The marking is started by inputting trigger.



Reference

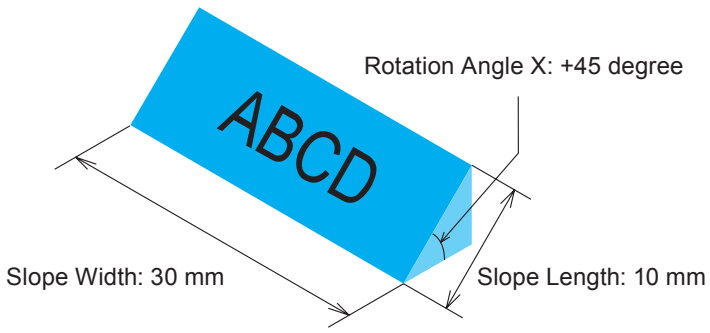
- Set the marking mode to “RUN” and press START. Then the internal shutter is opened and the laser marker is ready for receiving the trigger.
- For changing the status of the laser marker into the receivable status, set the marking mode to “REMOTE”, other than setting into “RUN” mode, and control the laser marker from the external. Refer to “Safety / Setup / Maintenance Guide” for details.

1-4 Basic Setting for Marking 3D Figure

[Function specific to LP-M /LP-Z series] * This function is not implemented in the LP-S series.

1-4-1 Mark on Slope

■ Sample



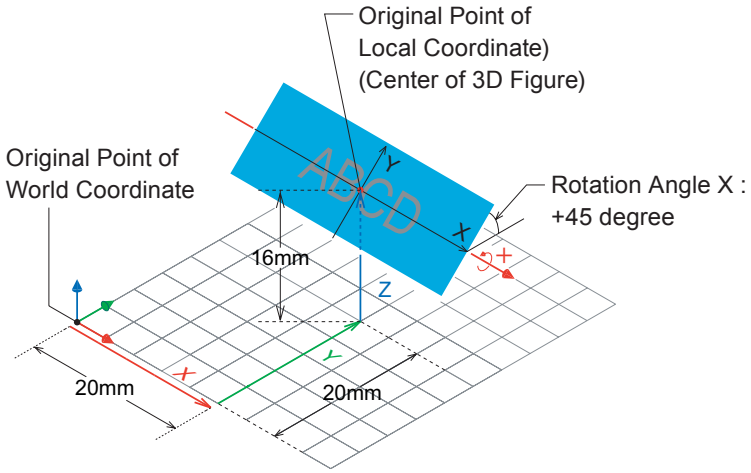
[Marking Image]

[Setting of figure]

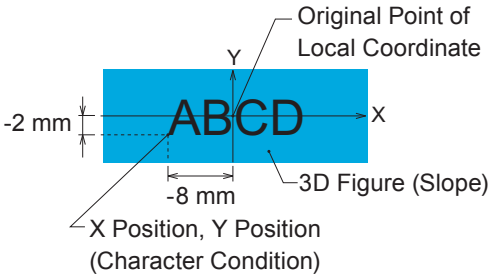
- Layer No. : 0
- Work Type : Slope
- (Slope) Length : 10 mm
- (Slope) Width : 30 mm
- Rotation Angle X : +45 degree
- Center Position X : 20 mm
- Center Position Y : 20 mm
- Center Position Z : 16 mm

[Character condition]

- Marking content : ABCD
- Starting Coordinate X : -8 mm
- Starting Coordinate Y : -2 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the slope.

Set the size, angle, and center position of the slope to be marked on.

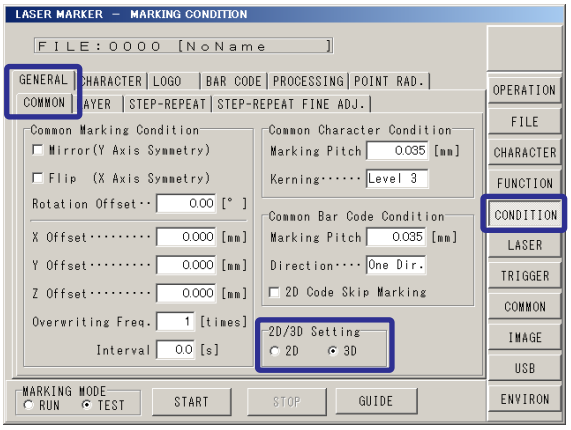
2. Set the marking conditions.

Set the character type and character position to be marked on the slope.

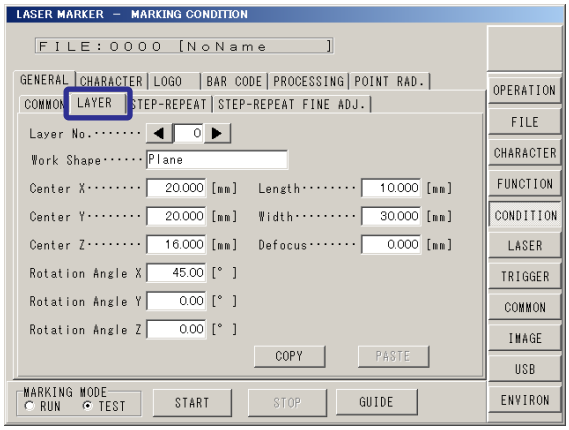
1. Set the slope.

1. Press [CONDITION] , and then press [General].

Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].



3. Set the shape, size and position of the marking object:

- Work shape: Plane
- Length: 10 mm
- Width: 30 mm
- Rotation angle: +45 degree
- Center X: 20 mm
- Center Y: 20 mm
- Center Z: 16 mm

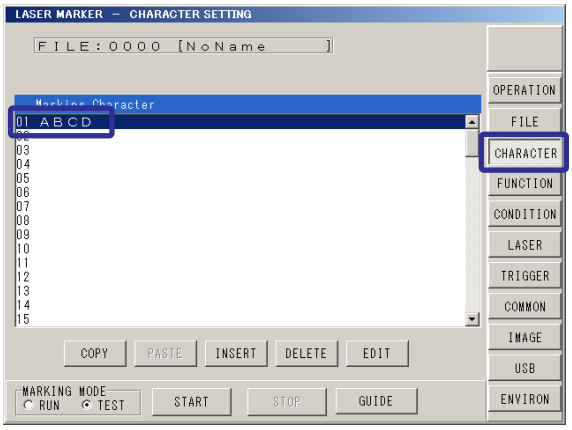
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

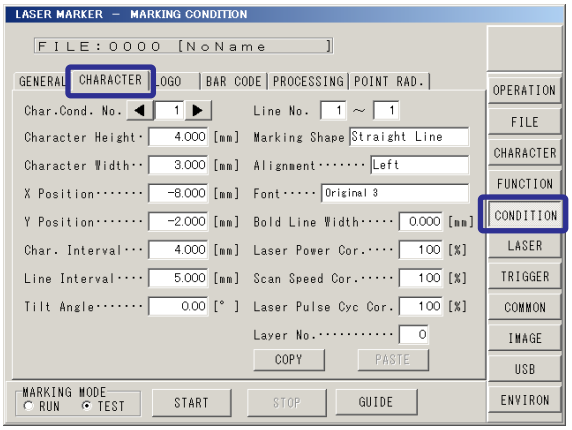
Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: -8 mm
- Y Position: -2 mm
- Character Interval: 4 mm

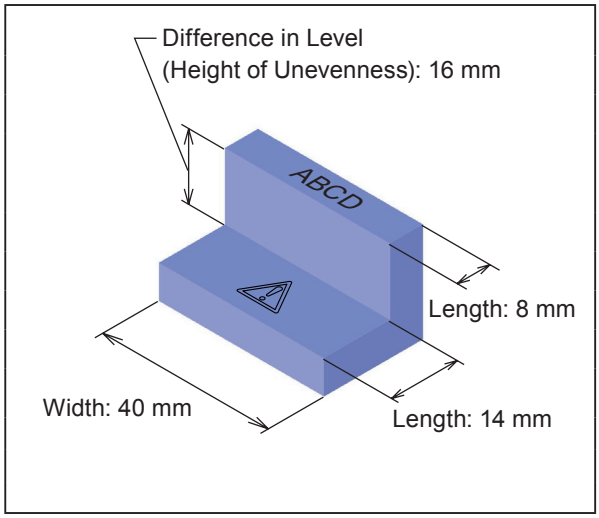


Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-2 Mark on Uneven Figure

■ Sample



[Marking Image]

Setting of figure

[First Layer]

- Layer No. : 0
- Work Type : Plane
- Length : 14 mm
- Width : 40 mm
- Center X : 24 mm
- Center Y : 24 mm
- Center Z : 0 mm

Logo condition (First Layer)

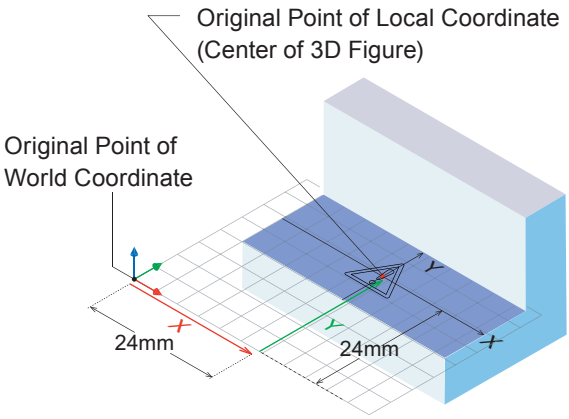
- X Position : 0 mm
- Y Position : 0 mm
- X Scale : 0.75
- Y Scale : 0.75

[Second Layer]

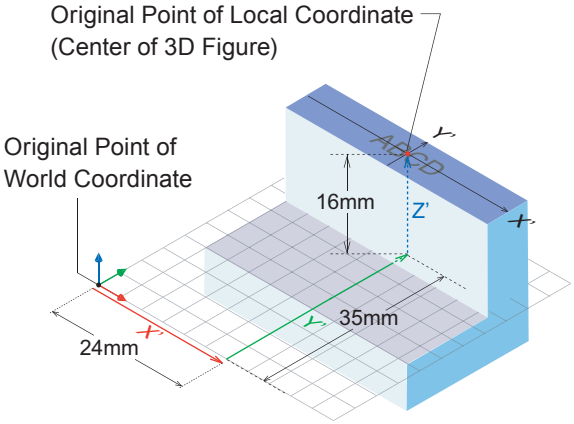
- Layer No. : 1
- Work Type : Plane
- Length : 8 mm
- Width : 40 mm
- Center X : 24 mm
- Center Y : 35 mm
- Center Z : 16 mm

Character Condition (Second Layer)

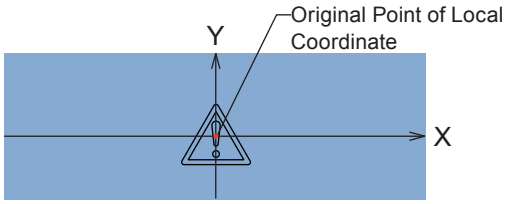
- Marking character : ABCD
- Starting Coordinate X : -8 mm
- Starting Coordinate Y : -2 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm



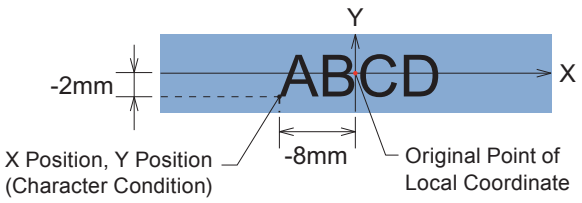
[Marking Figure]



[Marking Figure]



[Marking Logo File]



[Marking Character]

■ Setting Flow

1. Set the uneven figure.

Set the size, angle, and center position of the uneven figure.

2. Set the marking Conditions.

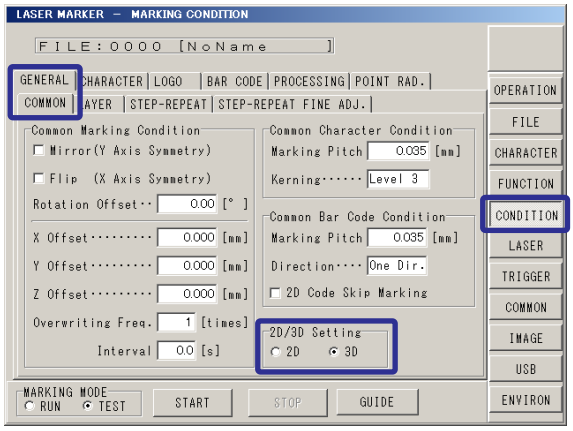
Set the character type, logo type, character position, and logo position to be marked on the uneven figure.

1. Set the uneven figure.

Setting of first layer of uneven figure

1. Press [CONDITION] , and then press [General].

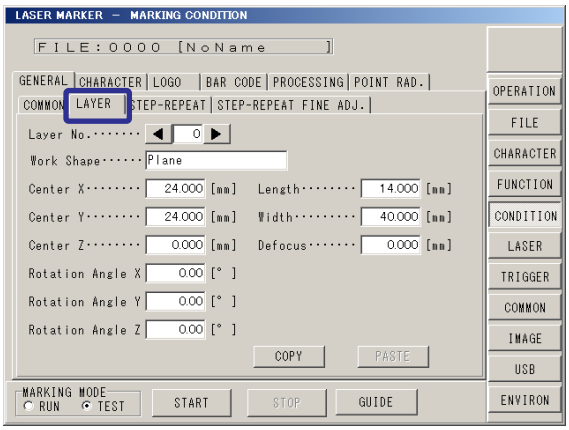
Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].

3. Set the shape, size and position of the marking object:

- Work shape: Plane
- Length: 14 mm
- Width: 40 mm
- Center X: 24 mm
- Center Y: 24 mm

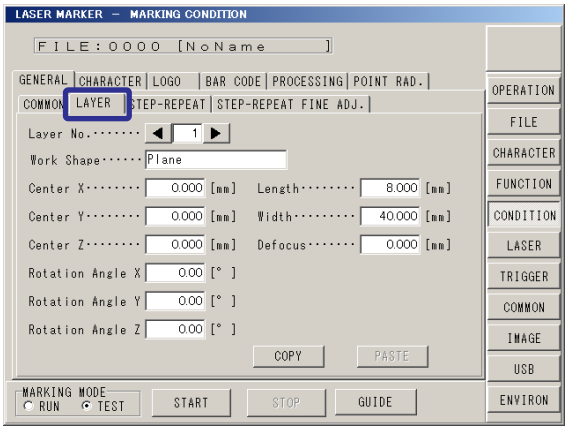


Setting of second layer of uneven figure

1. Press [Layer], and set “1“ to [Layer No.].

2. Set the shape, size and position of the marking object:

- Work shape: Plane
- Length: 8 mm
- Width: 40 mm
- Center X: 24 mm
- Center Y: 35 mm
- Center Z: 16 mm



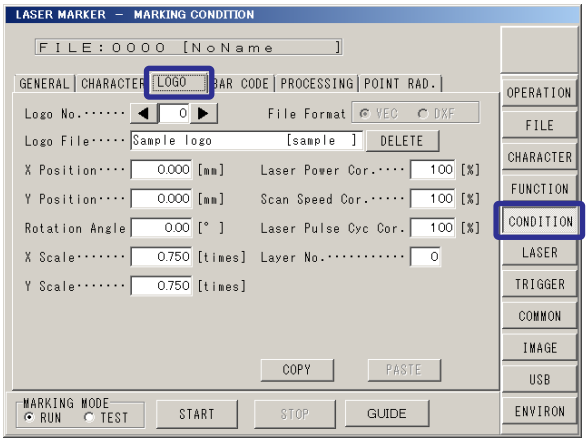
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

Setting of marking condition for first layer of uneven figure

1. Press [CONDITION], and then press [LOGO].



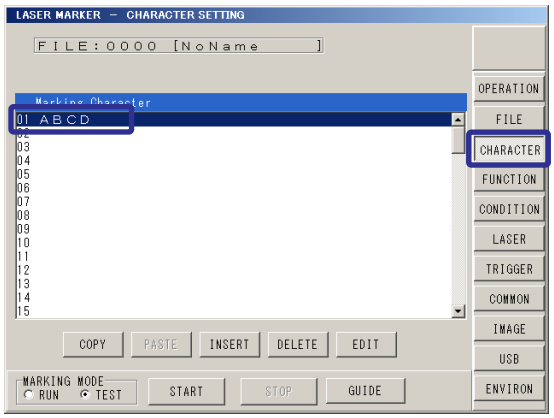
2. Set the size and coordinate (local coordinate) for the logo data to be marked on 3D object.

- Layer No.: 0
- Set "Sample logo" from the list.
- X Position: 0 mm
- Y Position: 0 mm
- X Scale: 0.75
- Y Scale: 0.75

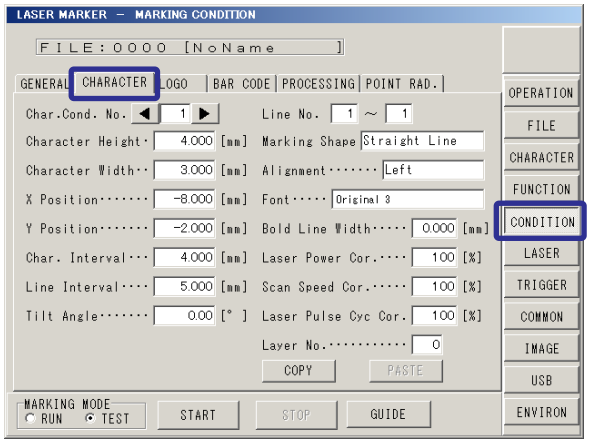
Setting of marking condition for second layer of uneven figure

1. Press [CHARACTER].

Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].



3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

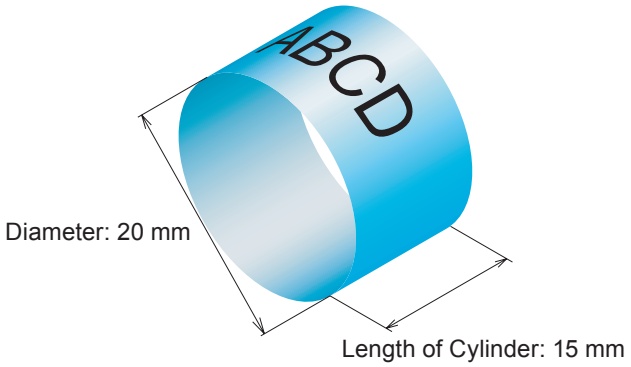
- Layer No.: 1
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: -8 mm
- Y Position: -2 mm
- Character Interval: 4 mm

Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-3 Mark on Cylinder

■ Sample



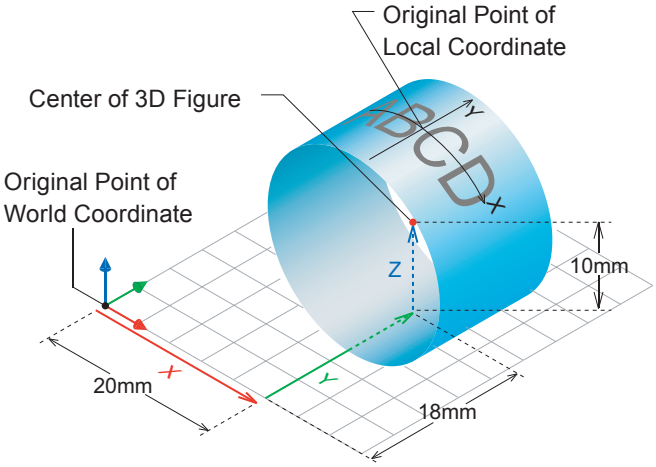
[Marking Image]

[Setting of figure]

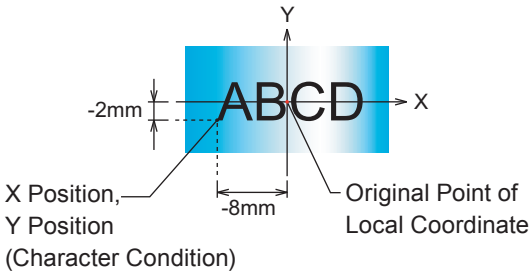
- Layer No. : 0
- Work Type : Cylinder (convex face)
- Diameter : 20 mm
- Diameter : 15 mm
- Center Position X : 20 mm
- Center Position Y : 18 mm
- Center Position Z : 10 mm

[Character condition]

- Marking content : ABCD
- Starting Coordinate X : -8 mm
- Starting Coordinate Y : -2 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the cylinder.

Set the size, angle, and center position of the cylinder.

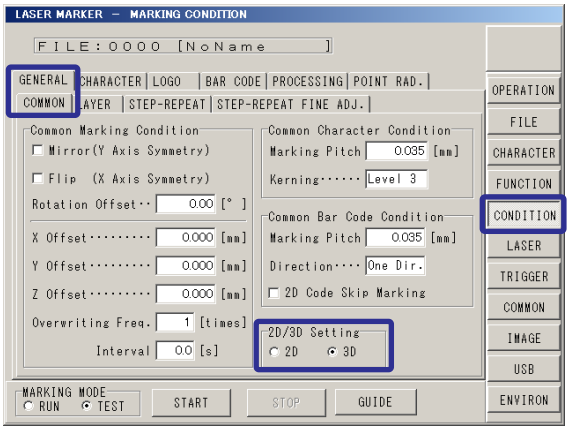
2. Set the marking condition.

Set the character type and character position to be marked on the cylinder.

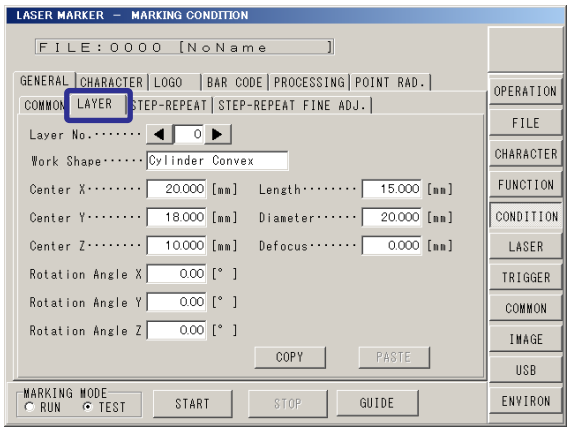
1. Set the cylinder.

1. Press [CONDITION] , and then press [General].

Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].



3. Set the shape, size and position of the marking object:

- Work shape: Cylinder Convex (Mark on convex face)
- Diameter: 20 mm
- Length: 15 mm
- Center X: 20 mm
- Center Y: 18 mm
- Center Z: 10 mm

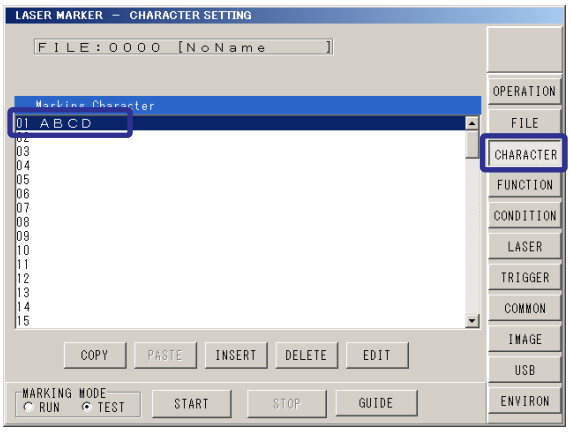
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

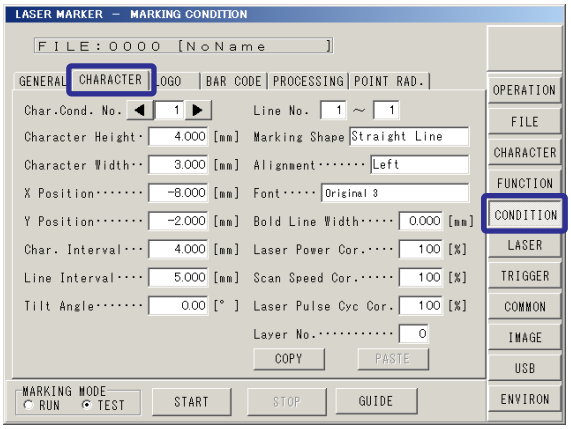
Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: -8 mm
- Y Position: -2 mm
- Character Interval: 4 mm

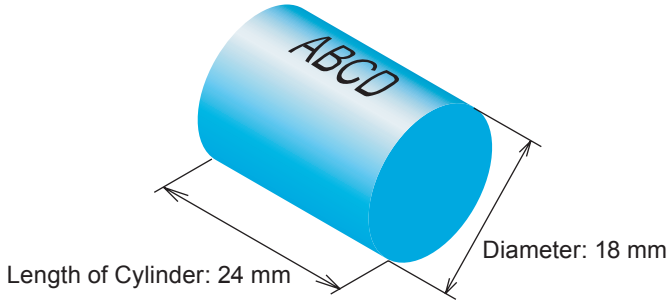


Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-4 Mark on Cylinder (2)

■ Sample



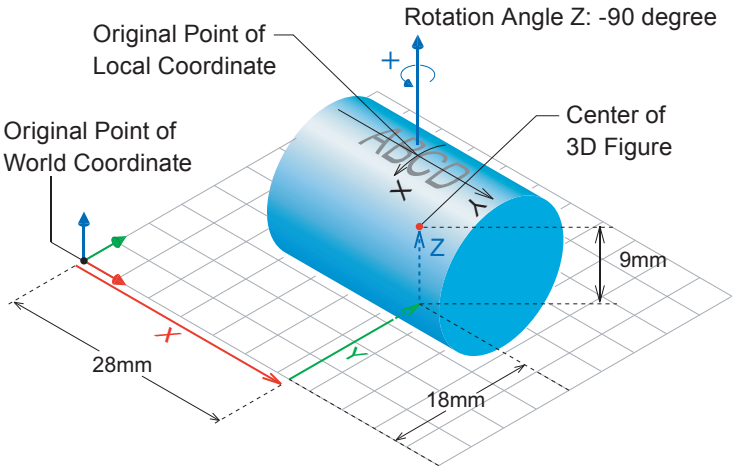
[Marking Image]

[Setting of figure]

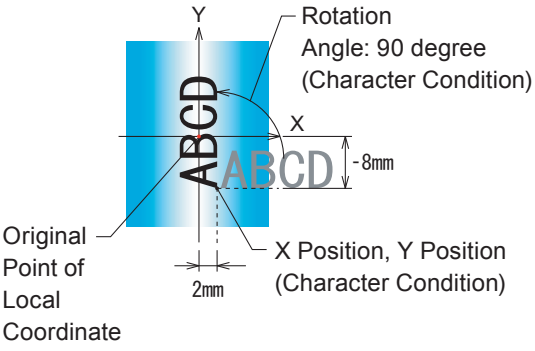
- Layer No. : 0
- Work Shape : Cylinder Convex
- Diameter : 18 mm
- Length : 24 mm
- Rotation Angle : -90 degree
- Center Position X : 28 mm
- Center Position Y : 18 mm
- Center Position Z : 9 mm

[Character condition]

- Marking content : ABCD
- Starting Coordinate X : 2 mm
- Starting Coordinate Y : -8 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm
- Rotation Angle : 90 degree



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the cylinder.

Set the size, angle, and center position of the cylinder.

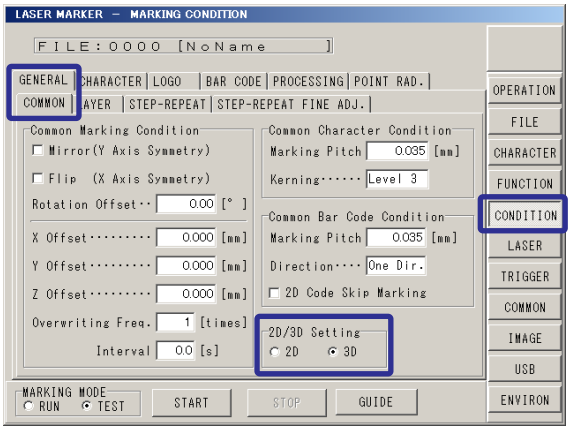
2. Set the marking condition.

Set the character type and character position to be marked on the cylinder.

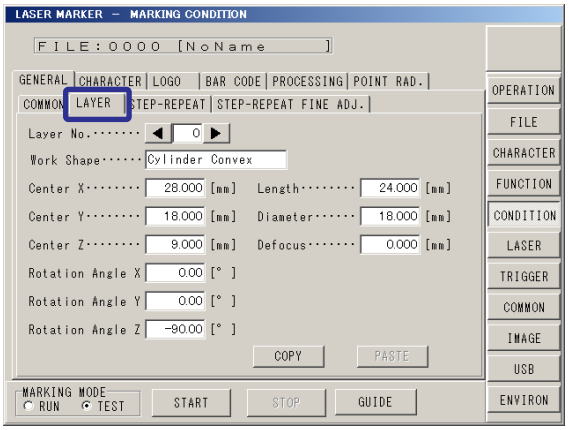
1. Set the cylinder.

1. Press [CONDITION] , and then press [General].

Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].



3. Set the shape, size and position of the marking object:

- Work shape: Cylinder Convex (Mark on convex face)
- Diameter: 18 mm
- Length: 24 mm
- Center X: 28 mm
- Center Y: 18 mm
- Center Z: 9 mm
- Rotation angle Z: -90 degree

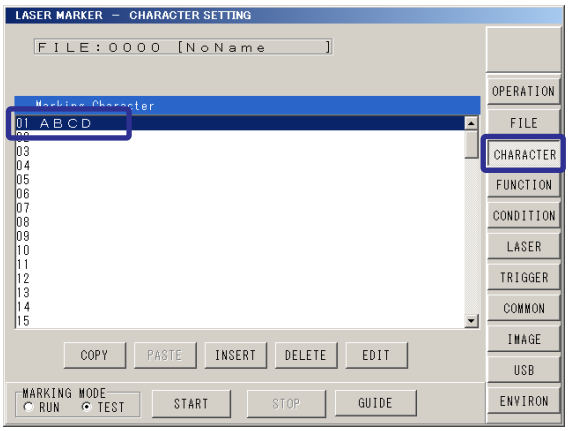
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

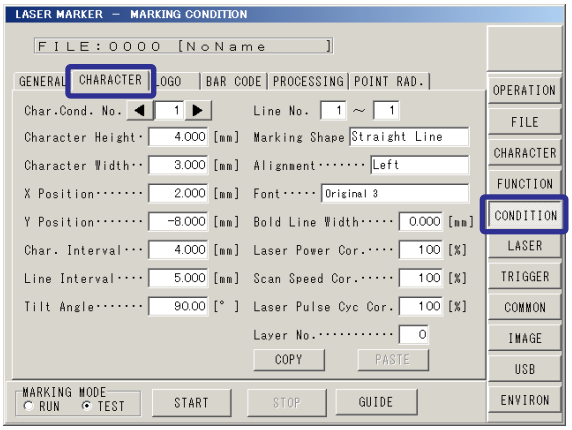
Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: 2 mm
- Y Position: -8 mm
- Character Interval: 4 mm
- Rotation Angle: 90 degree

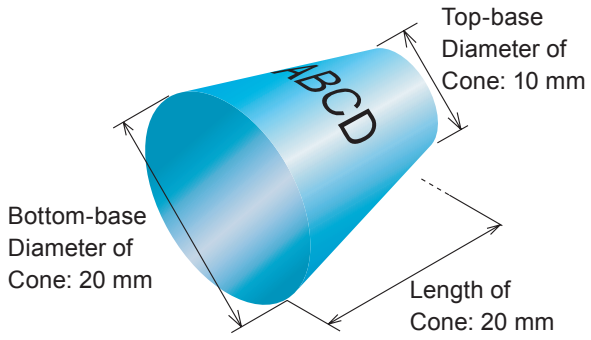


Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-5 Mark on Horizontal Cone

■ Sample



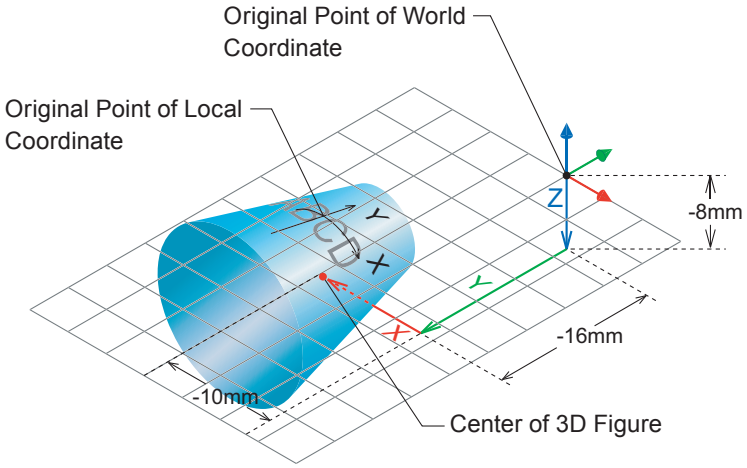
[Marking Image]

[Setting of figure]

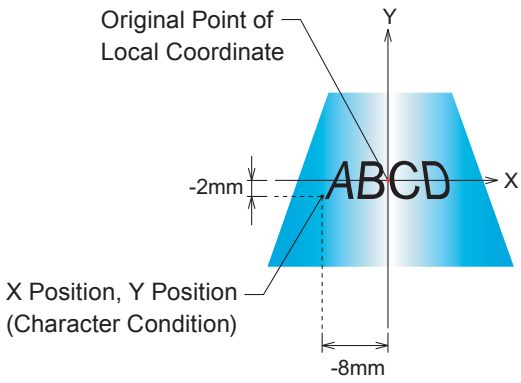
- Layer No. : 0
- Work Type : Hori. Cone Convex
- Top-base Diameter : 10 mm
- Bottom-base Diameter : 20 mm
- Length of Cone : 20 mm
- Center Position X : -10 mm
- Center Position Y : -16 mm
- Center Position Z : -8 mm

[Character Condition]

- Marking content : ABCD
- Starting Coordinate X : -8 mm
- Starting Coordinate Y : -2 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the cone (laid-down).

Set the size, angle, and center position of the cone.

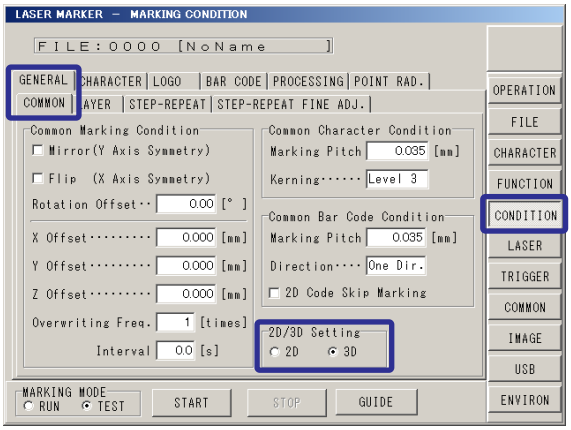
2. Set the marking condition.

Set the character type and character position to be marked on the cone (horizontal).

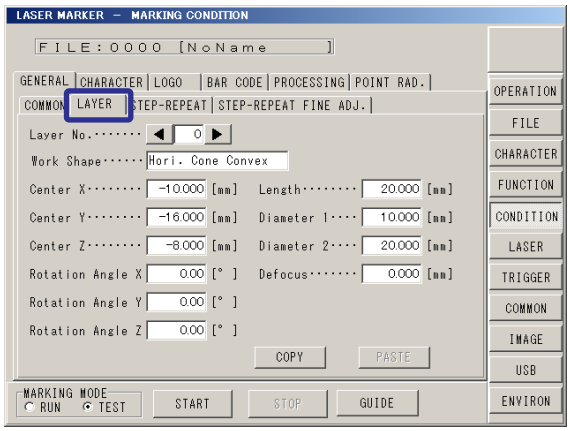
1. Set the cone (horizontal).

1. Press [CONDITION] , and then press [General].

Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].



3. Set the shape, size and position of the marking object:

- Work shape: Hori. Cone Convex
- Diameter 1 (Top-base): 10 mm
- Diameter 2 (Bottom-base): 20 mm
- Length: 20 mm
- Center X: -10 mm
- Center Y: -16 mm
- Center Z: -8 mm

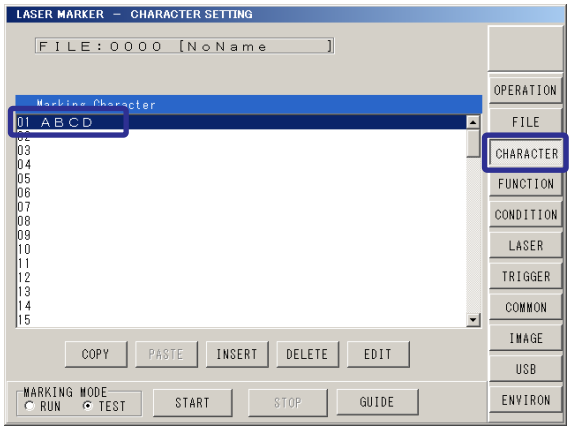
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

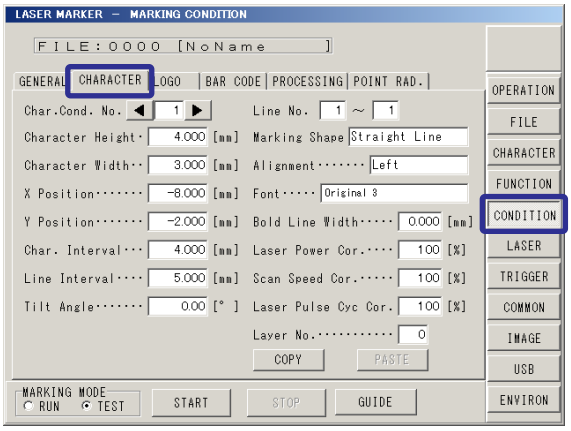
Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: -8 mm
- Y Position: -2 mm
- Character Interval: 4 mm

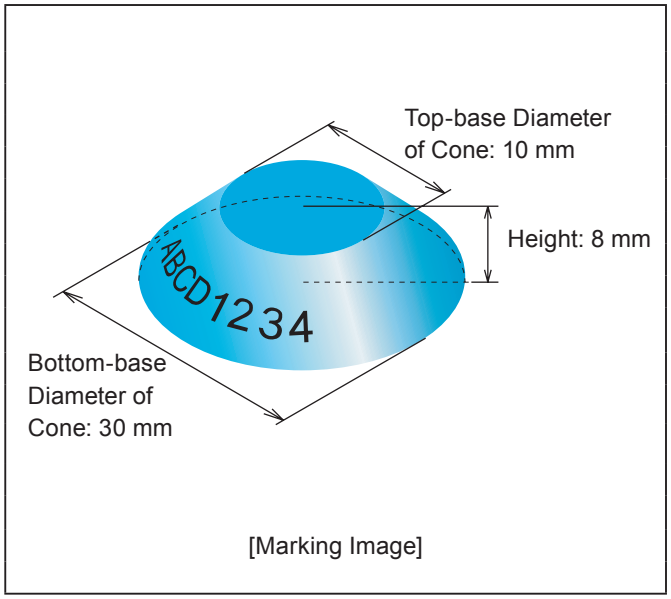


Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-6 Mark on Vertical Cone

■ Sample



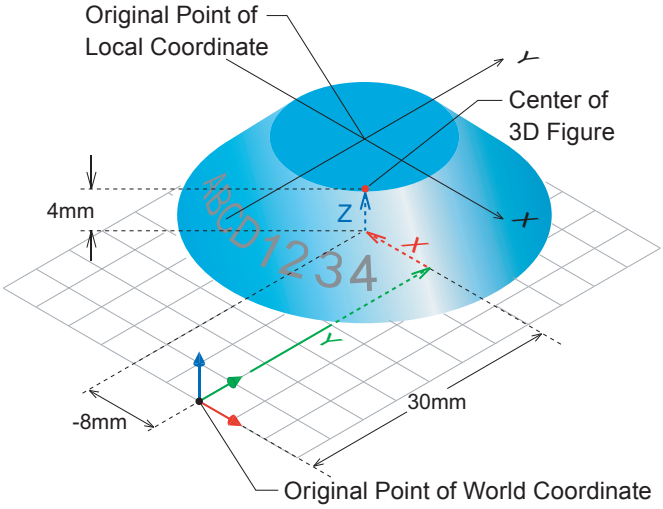
[Marking Image]

[Setting of figure]

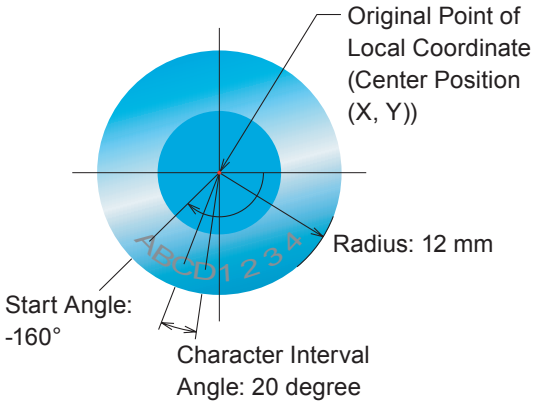
- Layer No. : 0
- Work Shape : Ver. Cone Convex
- Top-base Diameter : 10 mm
- Bottom-base Diameter : 30 mm
- Height : 8 mm
- Center X : -8 mm
- Center Y : 30 mm
- Center Z : 4 mm

[Character Condition]

- Marking content : ABCD1234
- Marking Shape : Arc inside (-)
- Center X : 0 mm
- Center Y : 0 mm
- Center Z : 12 mm
- Start Angle : -160 degree
- Character Interval Angle : 20 degree
- Character Height : 4 mm
- Character Width : 3 mm



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the cone (marking on cone with its heightwise set parallel to Z axis).

Set the size, angle, and center position of the cone (marking on cone with its heightwise set parallel to Z axis).

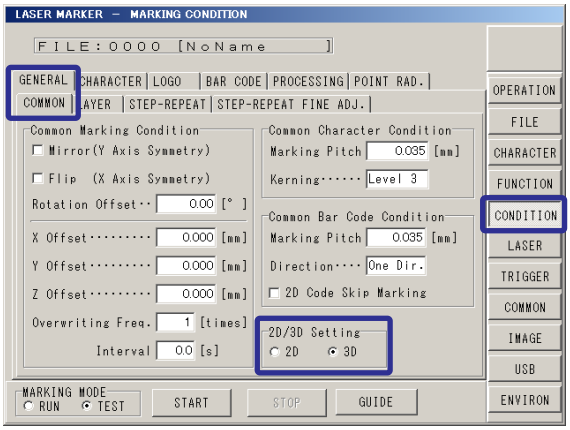
2. Set the marking condition.

Set the character type and character position to be marked on the cone (marking on cone with its heightwise set parallel to Z axis).

1. Set the cone (Vertical).

1. Press [CONDITION] , and then press [General].

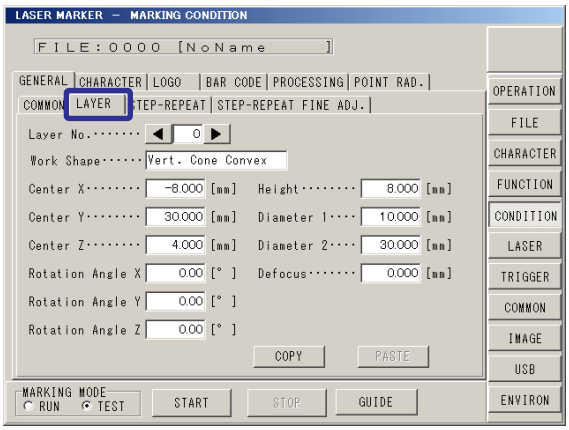
Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].

3. Set the shape, size and position of the marking object:

- Work shape: Vert. Cone Convex
- Diameter 1 (Top-base Diameter): 10 mm
- Diameter 2 (Bottom-base Diameter): 30 mm
- Height: 8 mm
- Center X: -8 mm
- Center Y: 30 mm
- Center Z: 4 mm



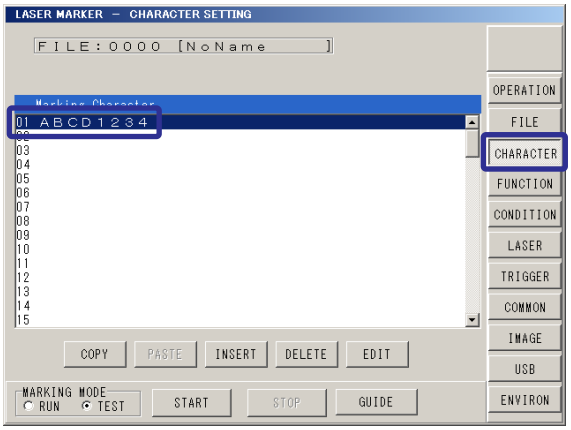
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

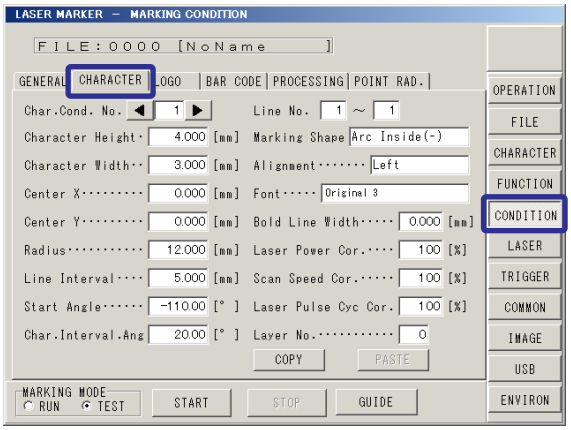
Select the first line and then input “ABCD1234”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Marking Shape: Arc Inside(-)
- Character Height: 4 mm
- Character Width: 3 mm
- Center X: 0 mm
- Center Y: 0 mm
- Radius: 12 mm
- Start Angle: -160 degree
- Character Interval Angle: 20 degree



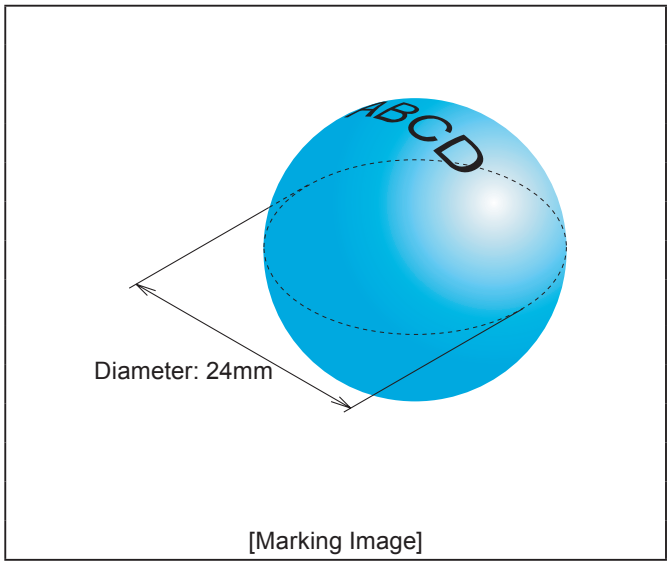
Reference

- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

1-4-7 Mark on Sphere

■ Sample

The character is marked on the sphere.



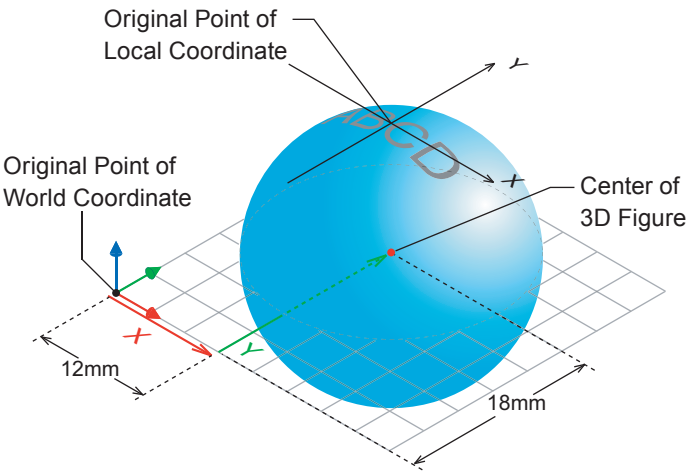
[Marking Image]

[Setting of figure]

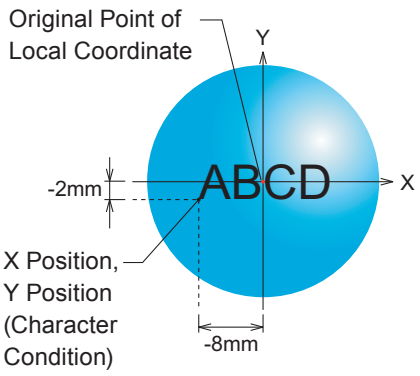
- Layer No. : 0
- Work Shape : Sphere Convex
- Diameter : 24 mm
- Center X : 12 mm
- Center Y : 18 mm
- Center Z : 0 mm

[Character Condition]

- Marking content : ABCD
- Starting Coordinate X : -8 mm
- Starting Coordinate Y : -2 mm
- Character Height : 4 mm
- Character Width : 3 mm
- Character Interval : 4 mm



[Marking Figure]



[Marking Character]

■ Setting Flow

1. Set the sphere.

Set the size, angle, and center position of the sphere.

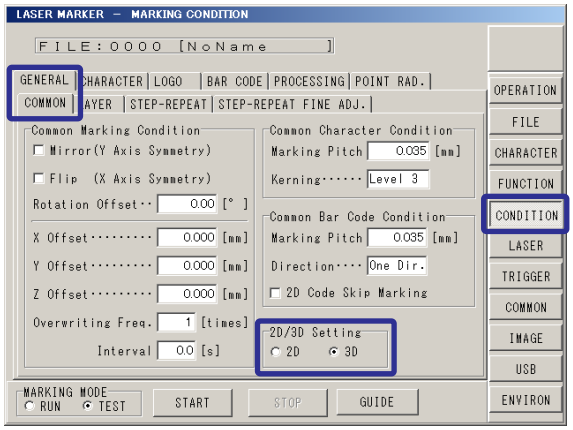
2. Set the marking condition.

Set the character type and character position to be marked on the sphere.

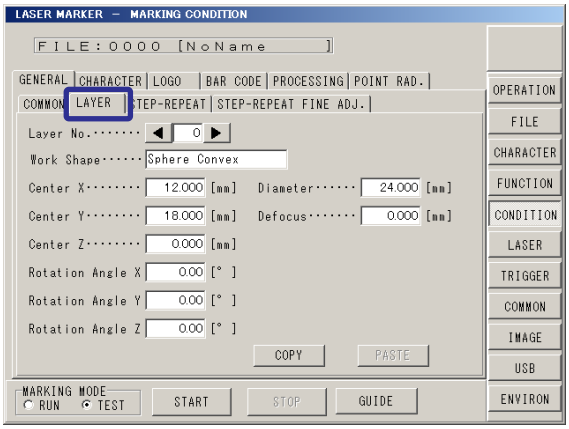
1. Set the sphere.

1. Press [CONDITION] , and then press [General].

Select [COMMON], and check [3D] of [2D/3D Setting].



2. Press [Layer], and set “0“ to [Layer No.].



3. Set the shape, size and position of the marking object:

- Work shape: Sphere Convex
- Diameter: 24 mm
- Center X: 12 mm
- Center Y: 18 mm
- Center Z: 0 mm

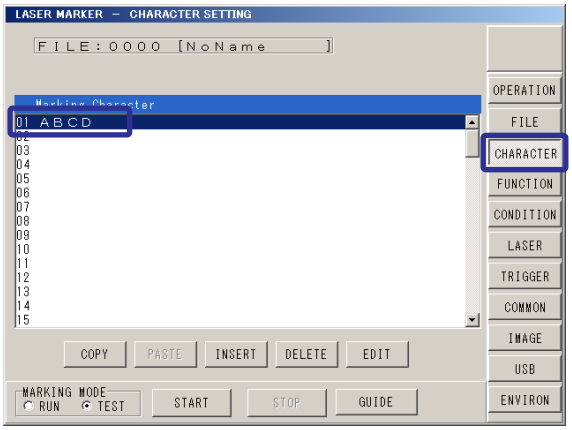
Reference

- Set the center position of the 3D figure on the world coordinate system (coordinate with its original point set on the center of the area). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

2. Set the marking condition.

1. Press [CHARACTER].

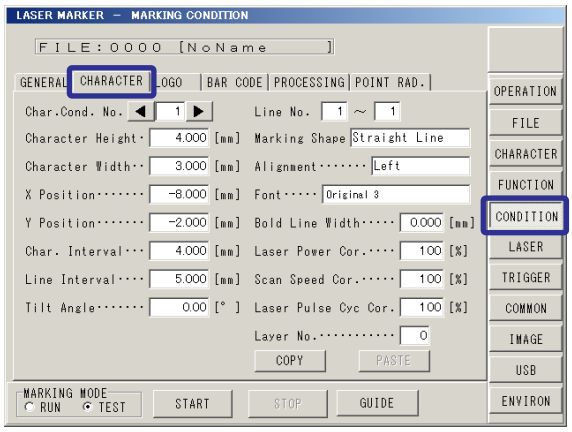
Select the first line and then input “ABCD”.



2. Press [CONDITION] , and press [CHARACTER].

3. Set the size and coordinate (local coordinate) for the characters to be marked on 3D object.

- Layer No.: 0
- Character Height: 4 mm
- Character Width: 3 mm
- X Position: -8 mm
- Y Position: -2 mm
- Character Interval: 4 mm



Reference

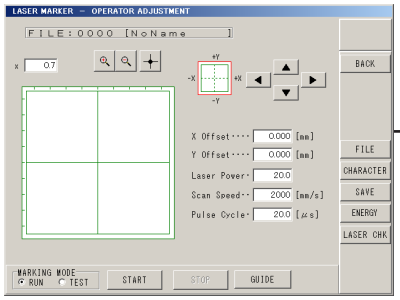
- When marking on the 3D figure, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure).
  Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
- The work type and marking content can be checked using the image screen “2-14-3 3D View Screen” (P.212). Before performing the actual marking, be sure to check whether the marking content is set within the 3D figure.

MEMO

2 Description of Operation Screen

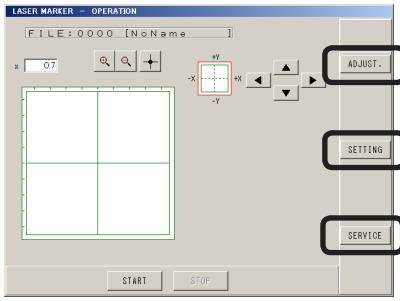
2-1 Screen Composition

Operator Adjustment Screen
P.85

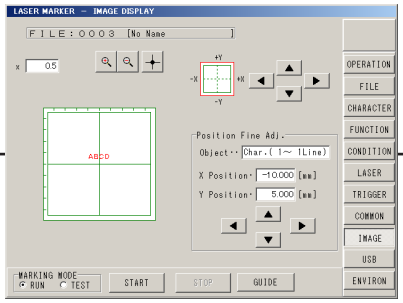


Operator Adjusting Screen	P.85
Operator Adjustable Items	P.86

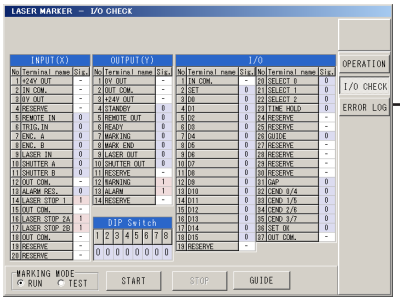
Operation Screen
P.82



Setting



Maintenance & Inspection
P.89

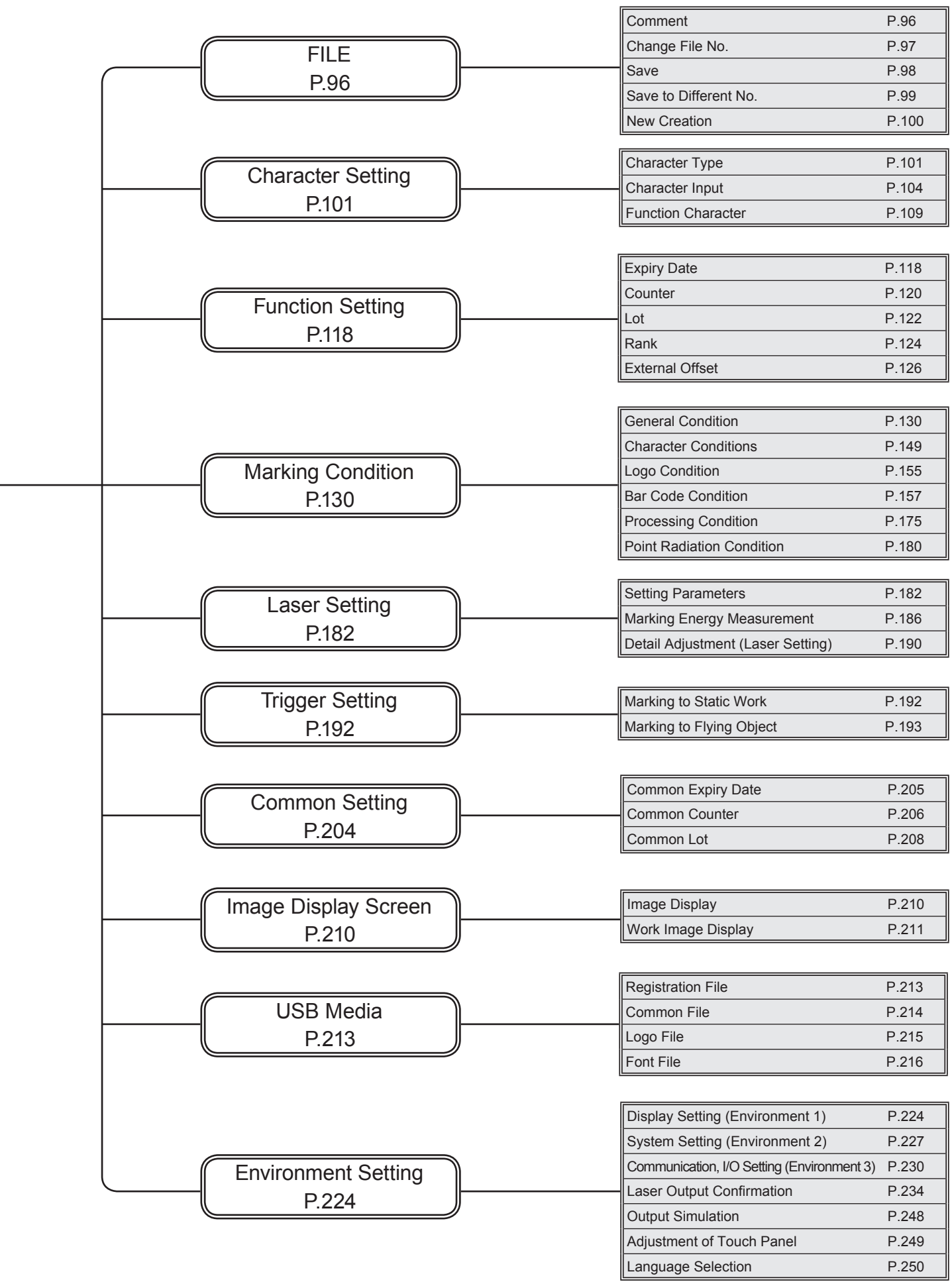


I/O Check Monitor	P.89
Error Log	P.90

Selecting Marking Mode
P.91

Dual pointer	P.92
Guide laser	P.93
Test Marking	P.94
RUN Mode	P.95

Each button for selecting marking mode is displayed at the bottom of each screen in common. Note that the button for selecting marking mode is not displayed on the following screens, “Operation Screen”, “USB media”, and “Environment Setting”.


FILE
P.96
Comment P.96
Change File No. P.97
Save P.98
Save to Different No. P.99
New Creation P.100
Character Setting
P.101
Character Type P.101
Character Input P.104
Function Character P.109
Function Setting
P.118
Expiry Date P.118
Counter P.120
Lot P.122
Rank P.124
External Offset P.126
Marking Condition
P.130
General Condition P.130
Character Conditions P.149
Logo Condition P.155
Bar Code Condition P.157
Processing Condition P.175
Point Radiation Condition P.180
Laser Setting
P.182
Setting Parameters P.182
Marking Energy Measurement P.186
Detail Adjustment (Laser Setting) P.190
Trigger Setting
P.192
Marking to Static Work P.192
Marking to Flying Object P.193
Common Setting
P.204
Common Expiry Date P.205
Common Counter P.206
Common Lot P.208
Image Display Screen
P.210
Image Display P.210
Work Image Display P.211
USB Media
P.213
Registration File P.213
Common File P.214
Logo File P.215
Font File P.216
Environment Setting
P.224
Display Setting (Environment 1) P.224
System Setting (Environment 2) P.227
Communication, I/O Setting (Environment 3) P.230
Laser Output Confirmation P.234
Output Simulation P.248
Adjustment of Touch Panel P.249
Language Selection P.250

2-2 Functional Description

Functions	Outline
3D Marking *3	The 3D marking function can set max.16 types per one file. Applicable 3D shapes: - Plane (slope/uneven) - Cylinder (convex/concave) - Horizontal Cone (convex/concave) - Vertical Cone (convex/concave) - Sphere (convex/concave) * Marking to flying object with 3D setting cannot be performed without using the encoder. * When performing marking to flying object with 3D setting, marking time cannot be measured regardless of using or not using the encoder.
Marking order optimizing	This allows rearranging of marking order of characters to shorten the time required for marking.
Intersection offset	This keeps the intersection points of characters from being engraved too deeply.
Counter marking	The marking is performed sequentially according to the counter conditions you set. (Count-up/Count-down)
Current date marking	This allows marking of current date or time.
Expiry date marking	This allows marking of date or time calculated by adding the specified period/time to the current date or hour.
Lot marking	This allows marking by replacing the current (expiry) date, time, and counter value with specified character string for marking.
Time hold input	The time hold signal equipped in I/O connector keeps the time and date at the timing of its ON input. By following the holding time, the functions based on the clock, such as current date, expiry date, lot and counter reset at updating operate.
Logo data marking	This allows marking of the drawing data in DXF/HPGL/BMP/JPEG/AI/EPS form. (DXF format data may be directly imported into the laser marker. Other data needs to be converted using the attached software in advance.)
Barcode marking	Marking of various bar codes, 2D codes and composite codes is possible. Inputting character data will automatically generate a bar code.
Processing Performance function	Specify the coordinates for "Straight Line", "Circle", or "Arc", and radiate the laser.
Arbitrary Point Irradiation Function	Specify the coordinates for "Point" and exposure time, and radiate the laser.
Flying Object marking function	Marking following the moving target object is possible according to the specified line speed and encoder signal.
Step & Repeat	This allows marking of character string in matrix state by specifying the numbers of Row/Column and the Intervals.
Over-marking	Overlapping marking is done according to the specified overwriting frequency and interval.
Rank marking	A number of character strings are registered in the data table, and marking is done by switching with the I/O signals.
External offset	A number of marking coordinates are registered in the data table, and marking is done by switching with the I/O signals.
Serial data marking	Marking is performed, changing the marking character string using communication command.
Bold character marking	Mark a character string in bold.
Marking shape setting	This allows for selection of marking shapes: "Straight Line", "Proportional", "Justify", "Arc outside (+)" and "Arc inside (-)."
Font selection	This allows for selection of registered fonts for marking character (alphanumeric). Fonts can be newly created and edited with the attached software.
Marking image display	This allows displaying of characters or graphic to be marked on the image screen.

Functions	Outline
Guide laser function*1	The marking position can be checked with the red guide laser. (Marking area, character string to be marked and work image)
Dual pointer function*1	The work distance can visually be confirmed using the guide laser and laser pointer.
Marking time measurement	Measures the period of marking. Marking laser is not irradiated during this operation.
Laser Setting	Laser power, scan speed and laser pulse cycle can be specified for each setting file. Corrections can be made on a marking condition basis such as characters, logos, bar codes, etc.
I/O check monitor	The I/O state of Input/Output terminal and I/O connector can be monitored.
Output simulation	Turn ON/OFF the output signals of laser marker on simulation. Check for proper connection to external device.
Compatible communication command	Communication command formats can be selected for the LP-F series (older model).
Error history display	For up to 64 errors, details of each error, and date and time of occurrence can be displayed.
Operator adjustment	Adjustment items available to operators can be specified.
Laser power measurement *1, *5	Measure the current value of laser power [W] and adjust the power setting value.
Marking Energy Measurement *1, *2, *4	Each marking energy [J] is measured and error occurs if the energy is beyond the preset threshold energy.
Power check *1, *6	Measure the current percentage of laser power in comparison with the default value.
Wire Breakage Detection function *2	Detects the broken fiber wire and shuts off the laser power.
Unintended-irradiation detection *2	Detects unexpected laser radiation and shuts off the laser power.
Uniform spot function	In order to ensure uniformity of the laser spot size in the marking area, marking is performed with the spot size according to the specified surface. Mark the space from N surface position to the specified surface height by the same spot size.
Work Distance Setting *7, *8	Work distance can be specified for each setting file. The size and marking position (X/Y coordinates) for character, logo and bar code are corrected according to the specified work distance.
Focus adjustment *9, *10	The focal length can be adjusted in the following range manually with the adjustment control in the head. LP-S200/S500: Approx. ±7 mm LP-S202/S502: Approx. ±3 mm LP-S205/S505: Approx. ±24 mm
Displacement input function *11	On connecting the displacement sensor to the laser marker, the work distance is controlled at input of the displacement sensor trigger according to the measured value.

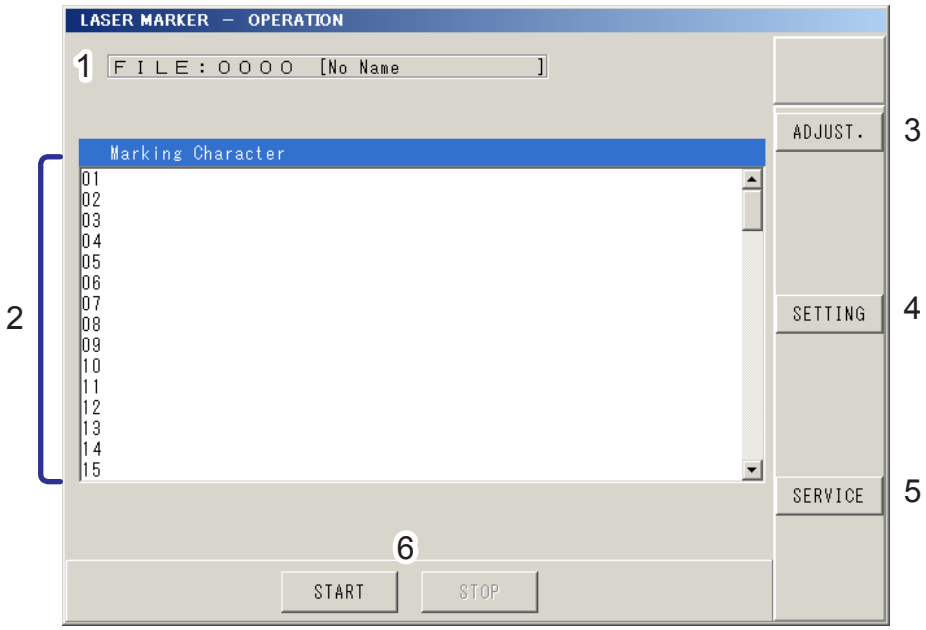
*1 : The function should be used as the guide. They are not the completely corrected values.
*2 : Detection cannot be performed in some marking conditions.
*3 : Only for LP-M/LP-Z series.
*4 : Only for LP-M/LP-S series.
*5 : Only for LP-M5xx/LP-M2xx/LP-Sxxx type.
*6 : Only for LP-SxxxW type/LP-Z series.
*7 : Only for LP-SxxxW type.
*8 : The marking size and position are calibrated based on the calculation. Depending on the required marking quality, adjustment of the marking conditions may be needed.
*9 : Only for LP-Sxxx type.
*10 : There are following precautions to use the focus adjustment function:
- Optimal marking conditions may vary depending on marking object materials and desired marking quality.
- Marking position may be deviated relative to the guide laser radiation position.
- Measurements of marking energy measurement and laser output measurement/correction may vary.

*11 : Only for LP-M series.

2-3 Operation Screen

On the operation screen marking contents can be confirmed under the remote control mode of run mode.

2-3-1 Character Display

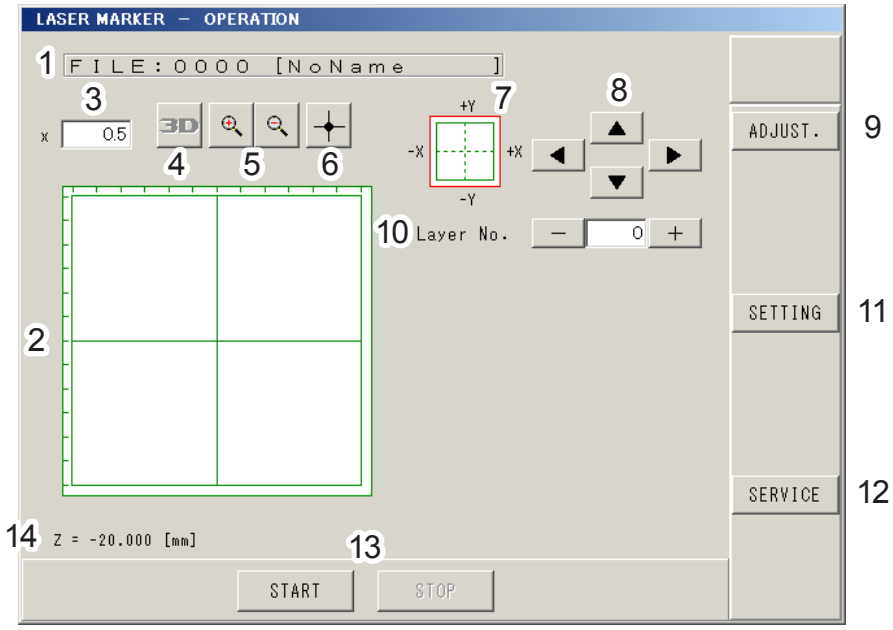


	Description
1	FILE: Displays selected file No. and file name.
2	Marking Character: Displays marking character string to be marked.
3	ADJUST. (Operator Adjustment): Shifts to operator adjustment screen.
4	SETTING: Shifts to each setting screen.
5	SERVICE: Shifts to Maintenance & Inspection screen.
6	START/STOP Starts or stops RUN mode. Under RUN mode, marking (laser emission) starts by setting ON the trigger input of the input terminal.

Reference

- The update status of the function character for date, lot, counter, etc. are possible to be displayed. Refer to “2-16-1 Display Setting (Environment 1)” (P.224). for the selection of display, character or image.

2-3-2 Image Display



	Description
1	FILE: Displays selected file No. and file name.
2	Image Display: Displays image to be marked.
3	Magnification: Sets the magnification ratio of the image display. The display magnification can be specified by pressing numeric.
4	3D Display (LP-M / LP-Z series only) : This button appears when the 3D marking mode is selected. By pressing this button, both the 3D figure and marking content are displayed with 3D view screen. Refer to “2-14-3 3D View Screen” (P.212).
5	Zoom-in / Zoom-out of Image Display : Zooms in/out image display. The image can be zoomed in and out by 18 steps.
6	Center of Image Display : Set the origin center to image display position.
7	Image Display Position : Enables to check where the current image is displayed in the marking field depending on the magnification set beforehand.
8	Shift Display Position : Shifts image display position up and down, left and right. Pressing arrow shifts the image display position.
9	ADJUST. (Operator Adjustment) : Shifts to operator adjustment screen.
10	Layer No.: The layer No. is displayed when the 3D marking mode is selected (only for LP-M and LP-Z series) or the marking mode “Mark on Flying Object” is selected for the trigger setting. Press [+] [-] for switching layer No., and then the image corresponding to layer No. is displayed.
11	SETTING : Shifts to each setting screen.
12	SERVICE : Shifts to Maintenance & Inspection screen.

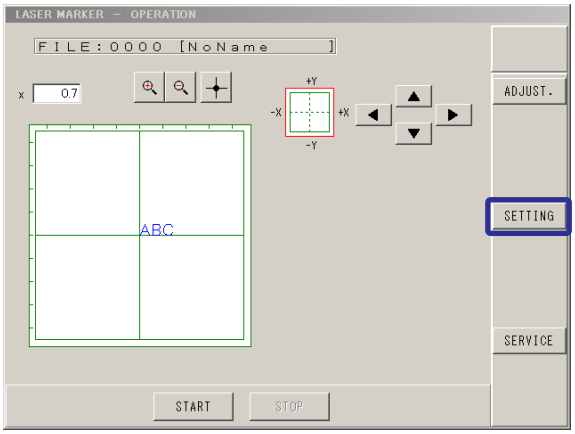
	Description
13	START/STOP : Starts or stops RUN mode. Under RUN mode, marking (laser emission) starts by setting ON the trigger input of the input terminal.
14	External Z Offset Value (LP-M / LP-Z series only) : Displays the External Z Offset Value of parallel input value.

2-3-3 Password to Open the Setting Screen

When the password is input on the environment setting screen, the password is required to open the setting screen from operation screen. This is a protection for operator not to change the marking conditions without permission. Refer to “2-16-1 Display Setting (Environment 1)” (P.224).

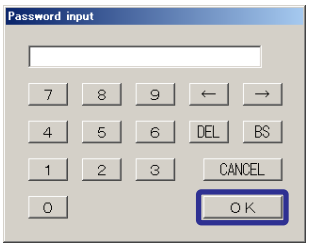
1. Press [SETTING].

The input window for password is appeared.



2. Input the password and press [OK].

The screen can be shifted to the setting screen.



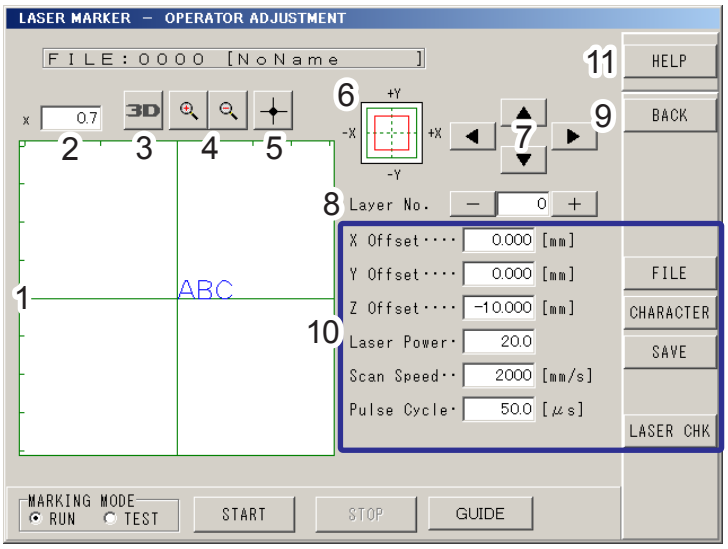
Reference

- If you forget the password, refer to “DIP Switch” in “Safety / Setup / Maintenance Guide”.

2-4 Operator Adjustment Screen

The operator adjustment screen is the screen that the operator can change or set only the permitted items.
Set the selecting item of the marking condition to be adjusted by operator following to the procedure described in “2-16-1 Display Setting (Environment 1)” (P.224).

2-4-1 Operator Adjusting Screen



	Description
1	Image Display: Image-displays the marking content set previously.
2	Magnification: Sets the magnification ratio of the image display.
3	3D Display (LP-M / LP-Z series only) : This button appears when the 3D marking mode is selected. By pressing this button, both the 3D figure and marking content are displayed with 3D view screen. Refer to “2-14-3 3D View Screen” (P.212).
4	Image Display Zoom-in/Zoom-out : Zooms in/out image display. The image can be zoomed in and out by 18 steps.
5	Center of Image Display: Set the origin center to image display position.
6	Image Display Position: Enables to check where the current image is displayed in the marking field depending on the magnification set beforehand.
7	Shift Display Position: Shifts image display position up and down, left and right. Pressing arrow shifts the image display position.
8	Layer No.: The layer No. is displayed when the 3D marking mode is selected (only for LP-M and LP-Z series) and the marking mode “Mark on Flying Object” is selected for the trigger setting. Press [+] [-] for switching layer No., and then the image corresponding to layer No. is displayed.
9	BACK: Returns to operation screen.
10	Changeable Items: The items that are permitted in “2-16-1 Display Setting (Environment 1)” (P.224) are displayed. For the setting items, refer to “2-4-2 Operator Adjustable Items” (P.86).

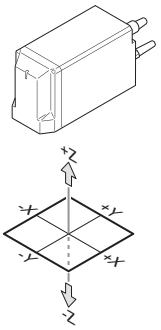
	Description
11	Help: Applicable pages of the operation manual is displayed according to the screen from which the [Help] button is pressed. [Help] button is located in the “Operator Adjustment Screen”, “Maintenance & Inspection Screen”, and each “Setting Screen”.

2-4-2 Operator Adjustable Items

Select the items to give the permission of setting change in the environment setting screen.

Description of Changeable Items

X/Y Offset:
Sets X and Y offset values.



Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

Z Offset (LP-M / LP-Z series only) :
Sets Z offset value.

Setting Range	-22.000 to +22.000[mm] (LP-M500)*
	-25.000 to +25.000[mm] (LP-Z130)*

Laser Power:
Sets the laser power.

Setting Range	12.0 to 100.0 (LP-M500 / LP-S500)*
	0.5 to 100.0 (LP-Z130)*

Scan Speed:
Marks value of scan speed.

Setting Range	1 to 12000 [mm/s] (LP-M500 / LP-S500 / LP-Z130)*

Pulse Cycle (Except LP-SxxxW type):
Sets the laser pulse cycle.

Setting Range	2.0 to 20.0 [μs] (LP-M500 / LP-S500)*
	10.0 to 50.0 [μs] (LP-Z130)*

Line Speed (Except LP-SxxxW type) :
Displayed with the setting of the marking to flying object without encoder.

Setting Range	0.060 to 170.000 [m/min.] (LP-M500 / LP-Z130)*
	0.060 to 240.000 [m/min.] (LP-S500)*

FILE:
Selects file No. Refer to “2-7-2 Change File No.” (P.97) for setting method.

CHARACTER :
Sets character. Refer to “2-8-2 Character Input” (P.104) for setting method.

SAVE:
Overwrites and registers the items changed on operator adjustment screen.
Refer to “2-7-3 Save” (P.98).

ENERGY (Marking Energy) (LP-M series and LP-Sxxx type only) :
Sets the warning threshold for the measurement result of the marking energy. Refer to “2-11-2 Marking Energy Measurement” (P.186) for setting method.

Laser Check :
Radiates the laser to the center of marking field by laser power set.
Refer to “Laser Check” (P.87).

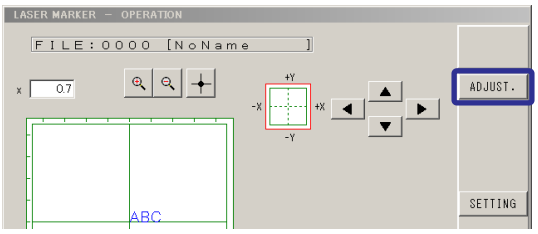
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Laser Check

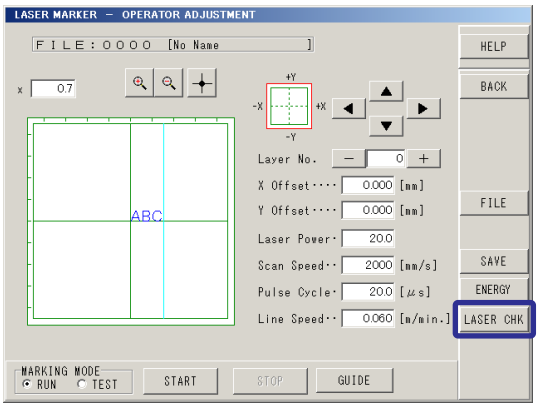
Execute the laser check when measuring the laser power to be applied for radiation using power meter.

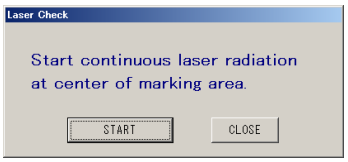
⚠WARNING	❗
	• Be sure to use the protective goggle and enclosure during radiating laser. • During the radiation, the laser energy is concentrated to one point. Use due caution with long period radiation, it may cause a fire or damage to the object. • Once the laser check is started, the radiation will not be interrupted until [Stop] is pressed.

1. Press [ADJUS.] in the operation screen.



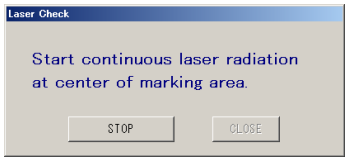
2. When [LASER CHK (Laser Check)] is pressed and then [Start] is pressed, the laser will be radiated mainly to the central part of marking field.





3. The laser radiation is stopped by pressing [STOP].

For LP-Z series, even without “stop” or “interrupt” command, the laser radiation automatically stops after about one minute and the shutter is closed.



Reference

- For LP-Mxxx-S type, laser can not be emitted without opening the laser gate. After starting the radiation, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.
- Use the laser check function when measuring the laser power output with the commercially available laser power meter.
- In laser check function, only the following settings are valid.
  - Laser power
  - Laser pulse cycle (Except LP-SxxxW type)
  - Power offset in system offset setting
- When the laser it needs to radiate the laser only to one point for the purpose of the laser marker being performed as the processing device, use the arbitrary point radiation function. Refer to “2-10-6 Point Radiation Condition” (P.180).

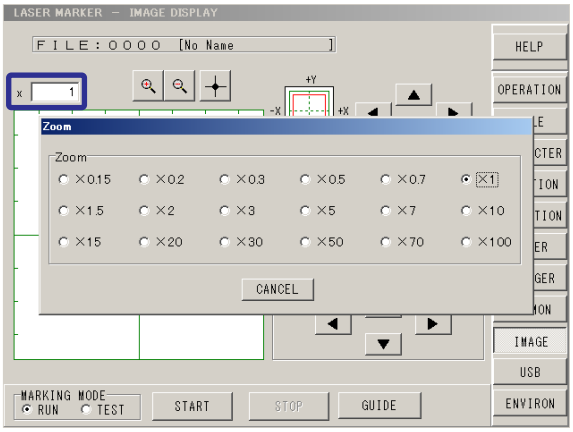
⚠CAUTION	❗
	• For the laser power measurement, use a laser power meter that has the damage threshold (max. power density) of more than 10 kW/cm2. • The laser detector diameter of the laser power meter should be more than 10 mm. • Do not place the power meter detector at the focal point (specified work distance) of the laser marker. It may cause damage to the power meter.

■ Magnification Specification of Image Screen

1. Press numeric of magnification.

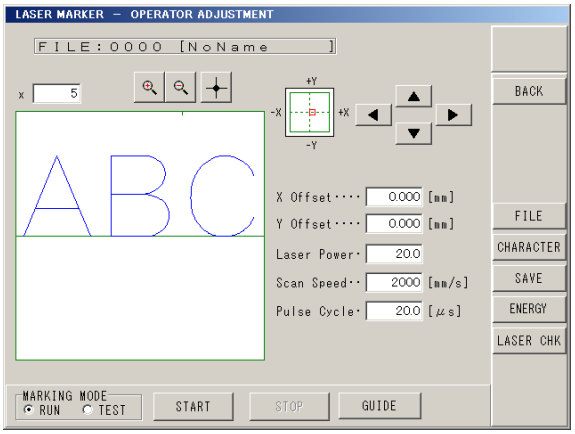
The list of magnification is appeared.

Select the desired magnification among them.



2. The image zoomed with the selected magnification is displayed.

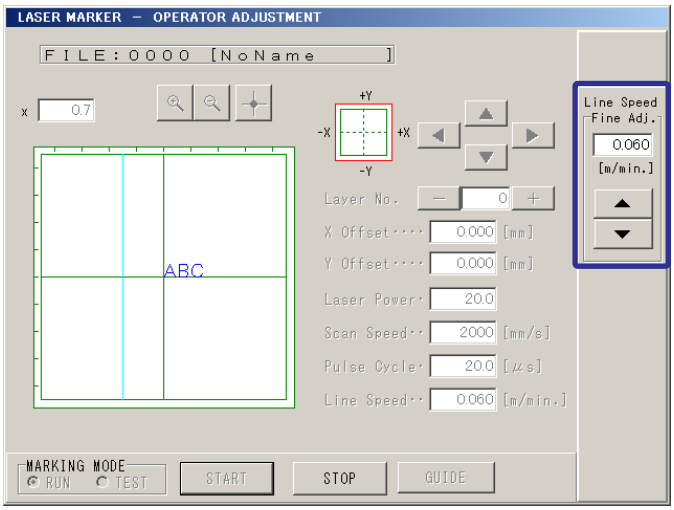
The image display is shifted by pressing arrow for shift display position.



■ Setting Method for Fine Adjustment of Line Speed

[Except for LP-SxxxW type]

The fine adjustment of the line speed can be set after starting the marking in run mode when selecting marking for flying object not using encoder under trigger setting (“2-12 Trigger Setting” (P.192)). With this setting, the fine adjustment of the line speed can be executed marking to flying object on the line in actual.



Description

Line Speed Fine Adj. (Fine Adjustment) :
Fine-adjusts the line speed by pressing ▼▲.

- When the character is extended, press ▲ for increasing the setting speed.
- When the character is shrunken, press ▼ for decreasing the setting speed.

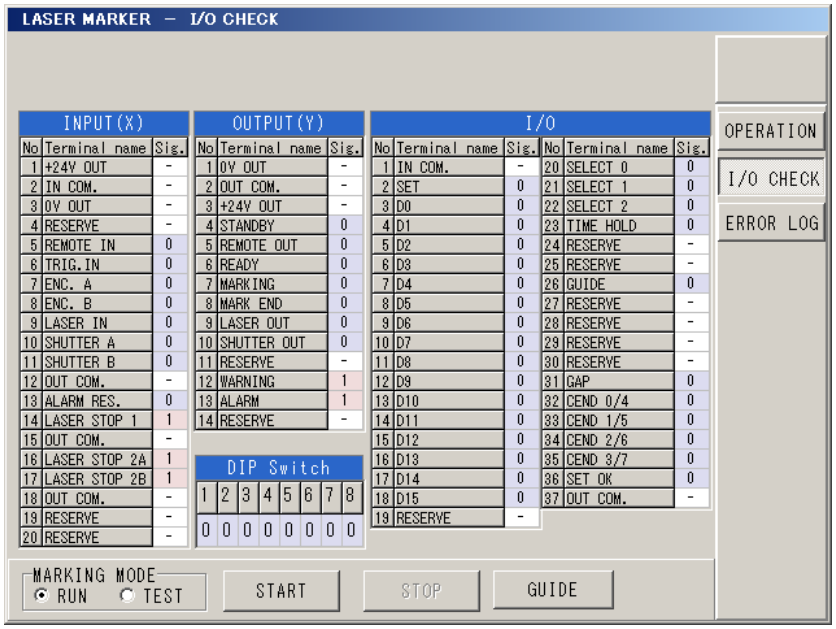
2-5 Maintenance & Inspection

In the “SERVICE” screen, the following status of the laser marker are displayed.

- On/off status of I/O terminals
- Error log of the laser marker

2-5-1 I/O Check Monitor

The ON / OFF status of the I/O signals and DIP switch can be confirmed on this screen.
When the signal is ON status: “1” is displayed.
When the signal is OFF status: “0” is displayed.



No	Terminal name	Sig.
1	+24V OUT	-
2	IN COM.	-
3	0V OUT	-
4	RESERVE	-
5	REMOTE IN	0
6	TRIG.IN	0
7	ENC. A	0
8	ENC. B	0
9	LASER IN	0
10	SHUTTER A	0
11	SHUTTER B	0
12	OUT COM.	-
13	ALARM RES.	0
14	LASER STOP 1	1
15	OUT COM.	-
16	LASER STOP 2A	1
17	LASER STOP 2B	1
18	OUT COM.	-
19	RESERVE	-
20	RESERVE	-

No	Terminal name	Sig.
1	0V OUT	-
2	OUT COM.	-
3	+24V OUT	-
4	STANDBY	0
5	REMOTE OUT	0
6	READY	0
7	MARKING	0
8	MARK END	0
9	LASER OUT	0
10	SHUTTER OUT	0
11	RESERVE	-
12	WARNING	1
13	ALARM	1
14	RESERVE	-

No	Terminal name	Sig.	No	Terminal name	Sig.
1	IN COM.	-	20	SELECT 0	0
2	SET	0	21	SELECT 1	0
3	D0	0	22	SELECT 2	0
4	D1	0	23	TIME HOLD	0
5	D2	0	24	RESERVE	-
6	D3	0	25	RESERVE	-
7	D4	0	26	GUIDE	0
8	D5	0	27	RESERVE	-
9	D6	0	28	RESERVE	-
10	D7	0	29	RESERVE	-
11	D8	0	30	RESERVE	-
12	D9	0	31	GAP	0
13	D10	0	32	CEND 0/4	0
14	D11	0	33	CEND 1/5	0
15	D12	0	34	CEND 2/6	0
16	D13	0	35	CEND 3/7	0
17	D14	0	36	SET OK	0
18	D15	0	37	OUT COM.	-
19	RESERVE	-			

Notice

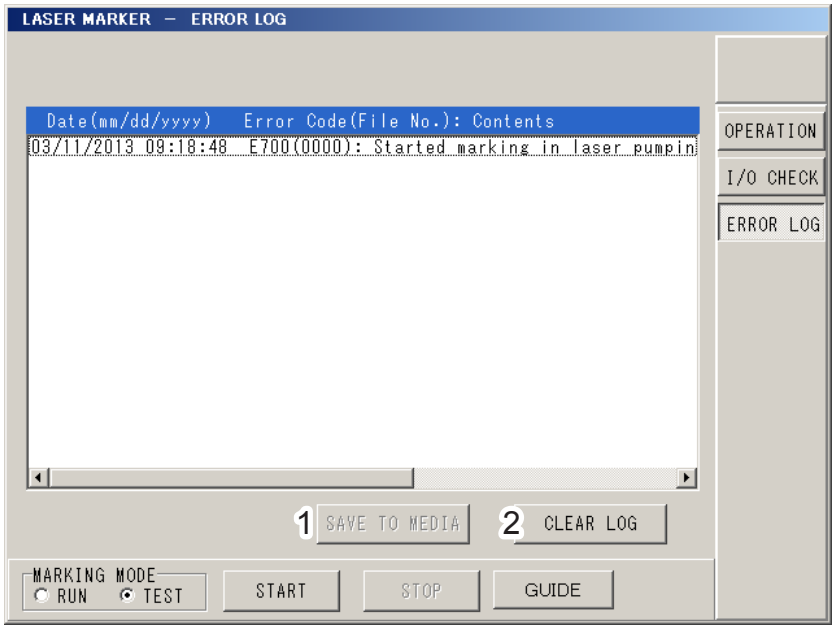
- INPUT(X) No. 7 [ENC. A], No. 8 [ENC. B] are not usable for LP-SxxxW type. Do not connect externally.
- The signals represented by “RESERVE” are prepared for “system reserved”. Do not connect anything. (The status is displayed with “-”.)

Reference

- The I/O monitor updates the I/O state every 20 ms. Note that the I/O monitor in remote status updates every 200 ms.
- For the name of each signal, refer to “Safety / Setup / Maintenance Guide”.
- When the one shot output is set with short output time, it might not update on I/O check monitor. In case that, if the user needs to check the update status of the one shot output on the I/O check monitor, set the one shot output with long time. Refer to “2-16-3 Communication, I/O Setting (Environment 3)” (P.230).

2-5-2 Error Log

The screen displays error log consisting of up to 64 latest errors and their details. The error log is displayed on that had occurred in the past (Maximum:64) .



	Description
1	SAVE TO MEDIA: Press [SAVE TO MEDIA] to save the recorded error log into the USB media. Insert the USB media into the controller, select directly and press [SAVE].
2	CLEAR LOG: Press [CLEAR LOG] to delete all error logs recorded.

Reference

- The oldest error logs is deleted sequentially to be replaced with the latest one after the log exceeds 64 records.
- Some warning errors such as E800, E811 and alarm errors caused by system problem cannot be recorded in this error log.

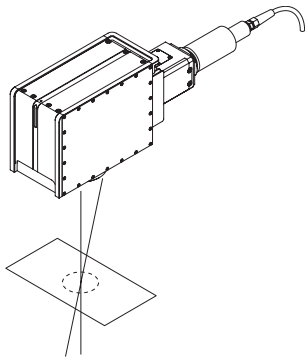
2-6 Selecting Marking Mode

The marking mode is set on the operation screen for the following cases; test marking mode, starting and stopping guide laser and dual pointer using.

	Description
1	MARKING MODE: Selects mode from either RUN or TEST.
2	START: Starts marking in the selected mode at “1”.
3	STOP: Stops marking.
4	GUIDE: Displays the operating status of dual pointer and guide laser.

2-6-1 Dual pointer

When installing the laser marker and adjusting the distance between the works, the dual pointer can be used to confirm the work distance visually. Dual pointer is the two-beams (circle and point) red LD pointer lit around the center of the marking field.
Adjust the work distance so that the point is in the circle inside.

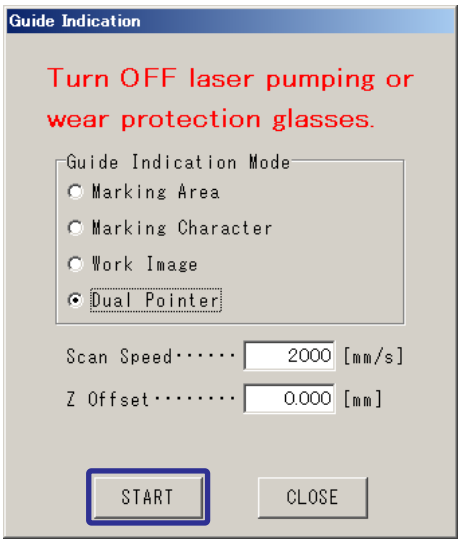


Notice

- Use the dual pointer only as the guideline. For obtaining the most appropriate marking quality, fine adjust the distance from the work after marking on an actual object and referring to its marking positions.

1. Press [GUIDE].

2. Select [Dual Pointer], and press [START].



3. The dual pointer is disappeared by pressing [STOP].

The guide indication is stopped automatically after 1 minute.

Reference

In case of LP-M/LP-Z Series:

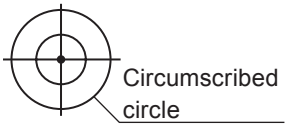
- The distance for adjusting the dual pointer can be specified within ±22 mm (LP-M series) or ±25 mm (LP-Z series) against the work distance (specified value). Press the numerical part of “Z Offset”, and specify the displacement value against the work distance (specified value).

In case of LP-Sxxx type:

- The dual pointer is adjusted according to the distance from the work defined at the factory. The adjustment of focus is not coupled with that of dual pointer.

In case of LP-SxxxW type:

- The dual pointer is pre-adjusted to the central point between the works. This is not coupled with the position of distance between the works that is arbitrarily set by the laser setting.
- The external circle of the guiding laser (circular display) shows the rough indication of upper/ lower limits for the distance between the works that can be set.
  When you change the distance between the works from the central point of distance between the works, make sure to adjust it so that the point of laser pointer stays inside the external circle of the guiding laser (circular display).



2-6-2 Guide laser

The red LD guide laser traces the marking content, marking image of the work, and marking field set previously.
The position of the marking object is easy to be adjusted using the guide laser function.

Reference

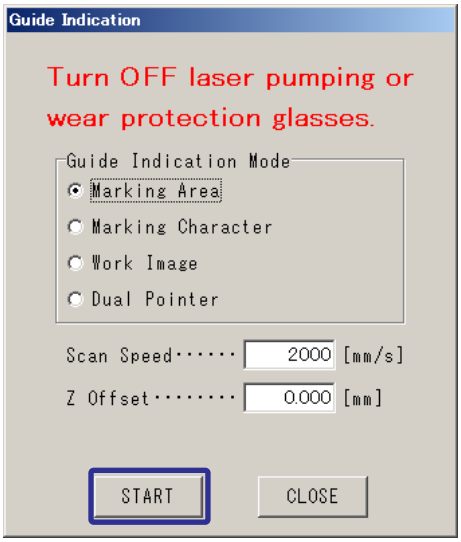
- Guide laser cannot trace the marking characters for the moving object. If the marking for moving object is set, the guide laser operates same as the static marking.
- Guide laser is enabled when “LASER STOP 1” is input from the terminal block.
- For LP-S (except LP-Sxxx-SF) / LP-Z series, guide laser cannot be used when the interlock connector is open.
- For LP-M series / LP-Sxxx-SF type, guide laser cannot be used when the interlock connector is open under the remote control mode.

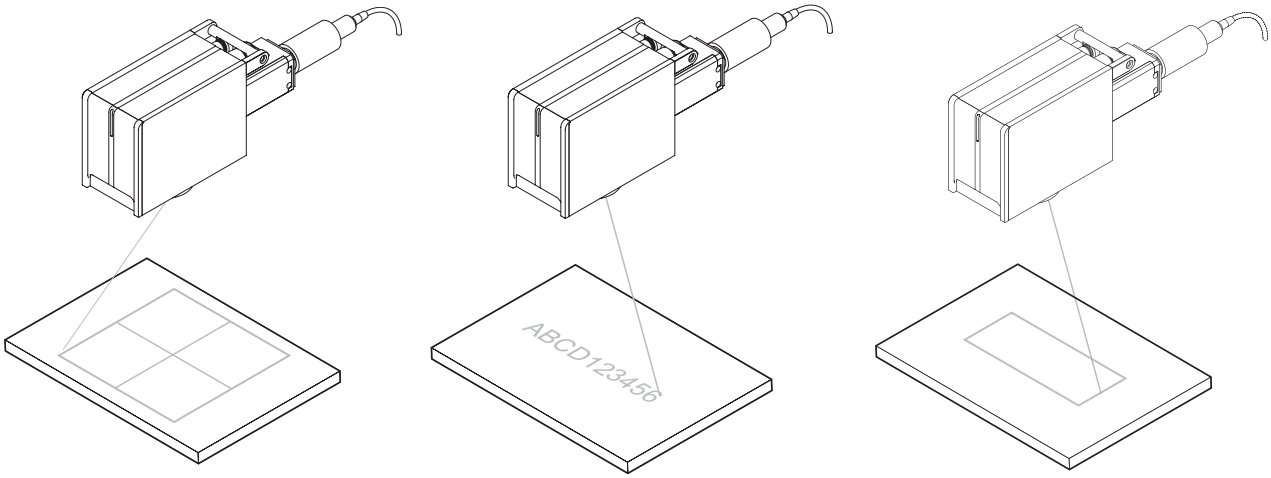
1. Press [GUIDE].

2. Select the display contents and press [START].

The scan speed (tracing speed) of guide laser can be changed by pressing the entry field of “Scan Speed”.

For LP-M/LP-Z series, specify the Z offset value within ±22 mm (LP-M series) or ±25 mm (LP-Z series) according to the work distance.





Marking area　Marking character　Work image

Reference

- The work image means the marking data set in "logo condition" or "processing condition" with laser power correction value "0".
- For LP-M/LP-Z series, marking area indication shows marking field in plane (with marker head parallel plane) regardless of 3D setting.

3. The guide laser is stopped by pressing [STOP].

The guide indication is stopped automatically after 1 minute.

2-6-3 Test Marking

The test marking is performed one time by pressing “TEST” starting button with the marking condition set previously.

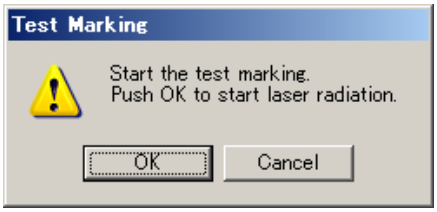
1. Press the laser pumping switch on the controller.

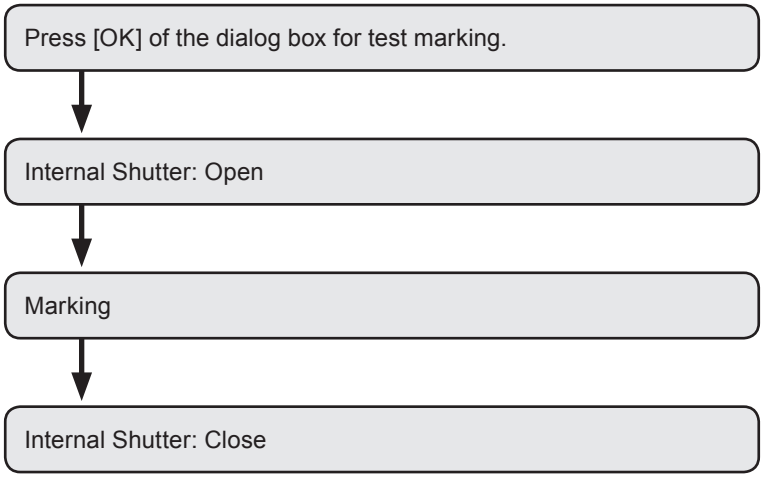
2. Set the marking mode into [TEST].

3. The test marking is displayed by pressing [START].

The marking is started by pressing [OK].

The laser marker is performed the following procedure.



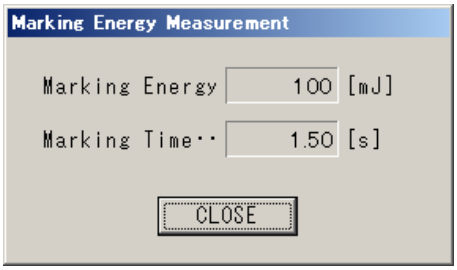


4. In case of LP-M series and LP-Sxxx type:

When the marking energy is enabled, the marking energy and time are displayed. Refer to “2-16-4 Laser Output Confirmation” (P.234)

If the marking energy lowers to the predetermined lower limit, alarm E710 occurs indicating the marking energy is out of order.

See “2-11-2 Marking Energy Measurement” (P.186) for how to set the upper and lower limits of the marking energy.



Reference

- The marking energy measurement function is not implemented to LP-Z series and LP-SxxxW type.
- The counter does not activate at test marking.
- For LP-Mxxx-S type, laser can not be emitted without opening the laser gate. After starting the test marking, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.

⚠WARNING	Once starting the test marking, the laser radiation cannot be stopped till the marking is finished. If the operator needs to stop the laser radiation immediately, press the emergency stop switch.

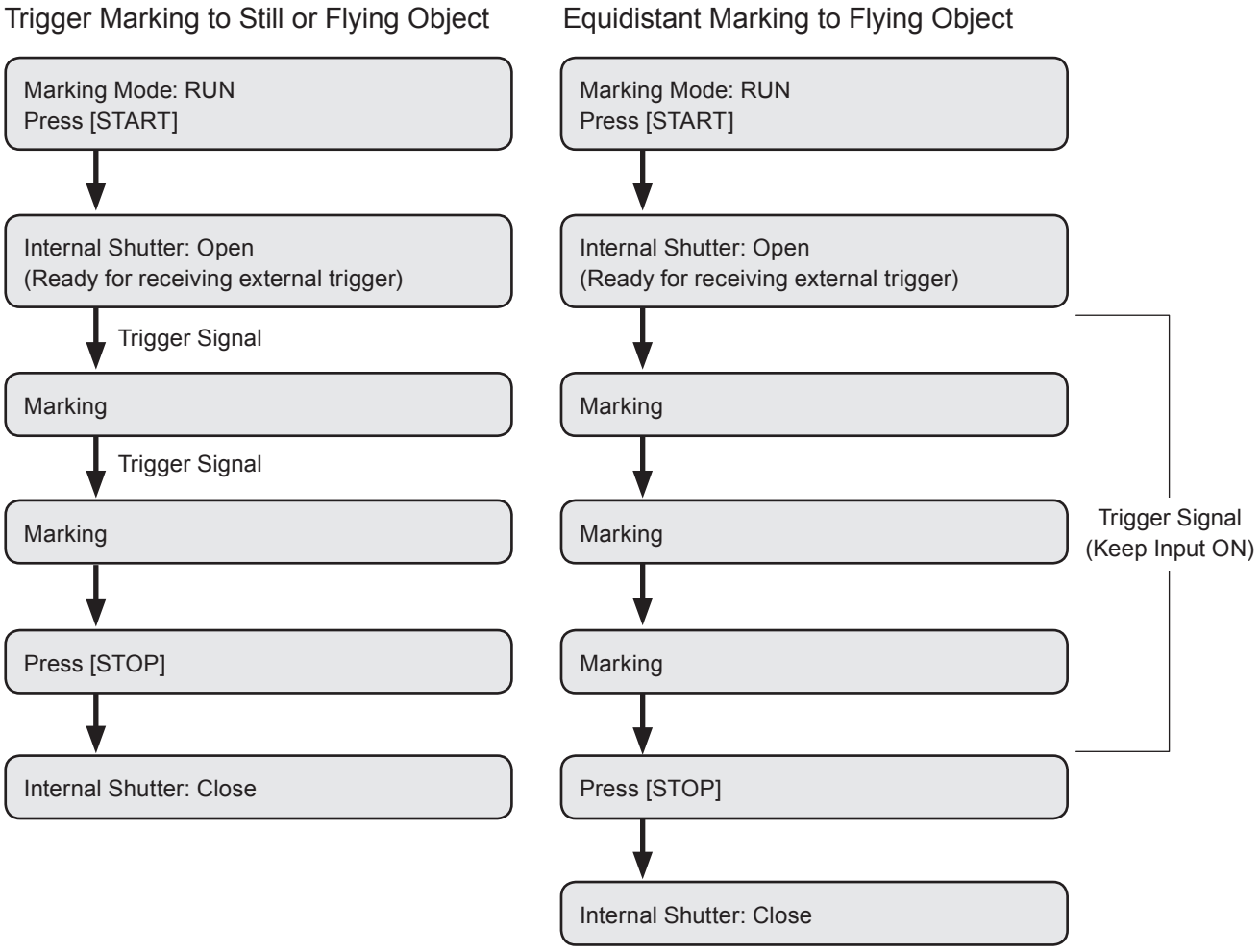
2-6-4 RUN Mode

When the laser marker is activated in RUN mode, the Internal shutter is opened, and the laser marker is ready for receiving trigger from external.
Before starting RUN mode, set the parameters in “2-12 Trigger Setting” (P.192).

1. Set the marking mode into [RUN].

2. The internal shutter of the laser marker is opened by pressing “START”, and the laser marker is ready for receiving trigger from external.

When pressing [STOP], the Internal shutter is closed, and the marking is finished.
The laser marker is performed the following procedure.



Reference

- Before starting the run mode, turn ON the laser pumping.
- When pressing [STOP] during marking, the internal shutter is closed after finishing marking all contents, and then RUN mode is finished.
- For LP-Mxxx-S type, laser can not be emitted without opening the laser gate. After starting the run mode, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.

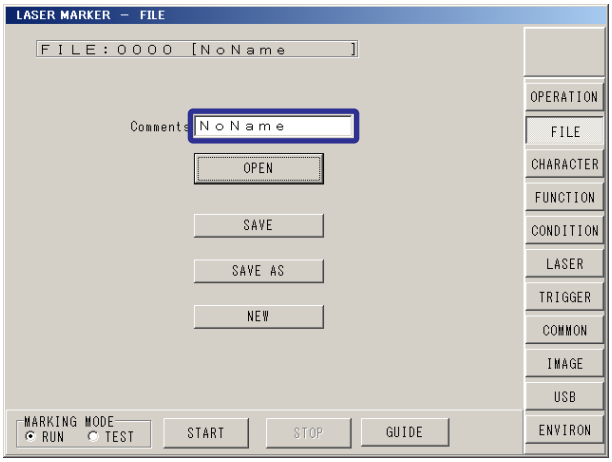
2-7 FILE

This screen is prepared for registering file into inner of laser marker and changing file No.
The file can be registered by two methods, overwriting and registering to other No. Registering in wrong method could delete the content already registered. Take care of the registering method.

2-7-1 Comment

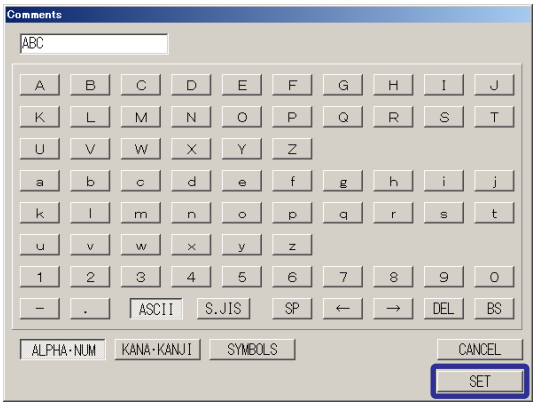
Register the file name into the laser marker with the following procedure. Each file can be registered the file name with the following procedure.

1. Press the character string of the Comments.



2. Input the comment, and press [SET].

Refer to “2-8-2 Character Input” (P.104) for setting method.



Reference

- Characters that can be used for input are as follows:
  Capital and small letters of alphabet, numerics, Katakana, Hiragana, Kanji (JIS level-1 and JIS level-2) symbols
- Up to 20 characters can be input in case of inputting all single-byte (ASCII) letter.

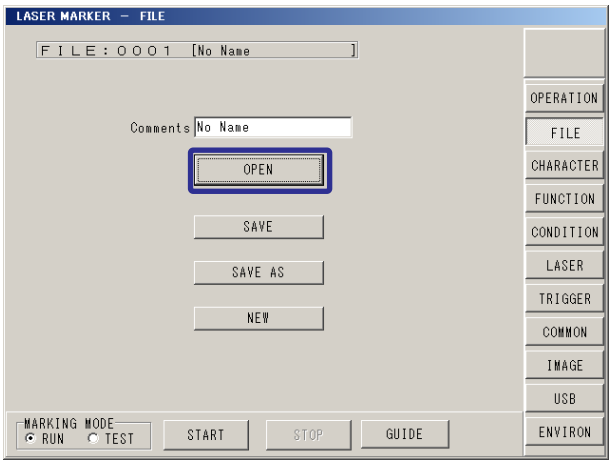
2-7-2 Change File No.

Change the file No. to be displayed with the following procedure.

1. Press [OPEN].

When the contents of the current opened file is changed, the check window whether to save/not save changed content is appeared. When selecting [Yes], the same procedure described in “2-7-3 Save” (P.98) is appeared.

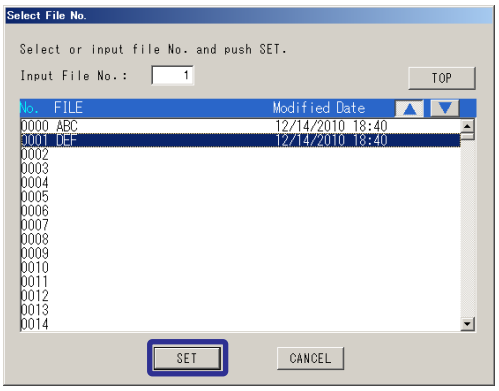
When selecting [No], the changed content is not saved.



■ When Selecting File From List

2. Pressing either “No.”, “FILE”, or “Modified Date”, and then pressing ▼▲ displays the list by selected item in ascending/descending order.

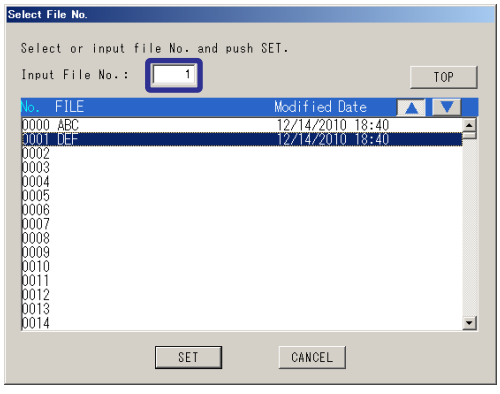
Select the file and press [SET].



■ When Selecting by Specifying File No.

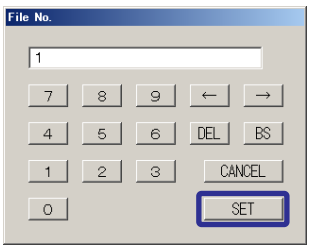
2. Press numeric column of Input File No.

Totally 2048 file No. can be registered from 0000 to 2047.



3. Input file No., press [SET].

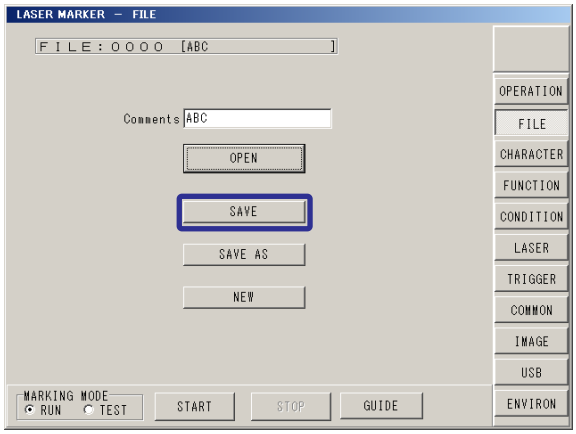
Then press [SET] in Select File No. screen.



2-7-3 Save

Save the changed content by deleting previous content of the current file with the same file No.
When the power of the laser marker is turned OFF without overwriting the file, the setting/changing content is not saved.

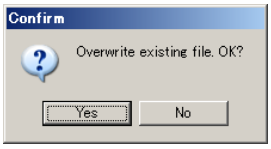
1. Press [SAVE].



2. When overwriting the file, press [Yes].

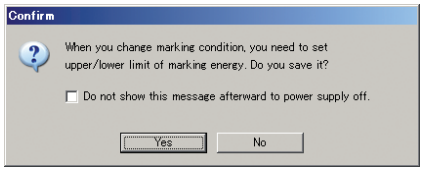
Yes: Execute overwriting.

No: Not execute overwriting. Returns to the procedure 1.



■ When “Measuring marking energy” is enabled: (LP-M series and LP-Sxxx type only)

When “Measuring marking energy” is enabled (see “2-11-2 Marking Energy Measurement” (P.186)), the following message appears after completion of step 2.

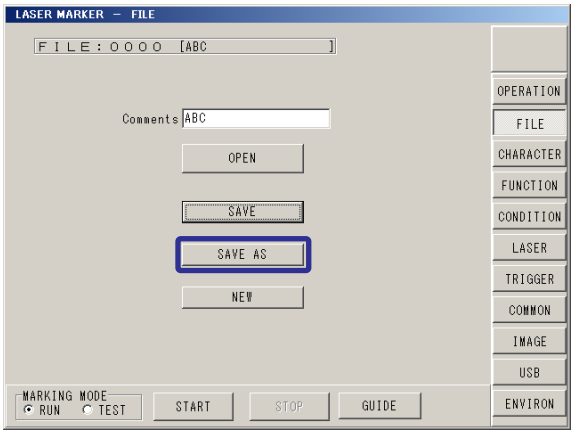


Description
Do not show this message afterward to power supply off.: If you check on the box, the message that is displayed every overwriting does not appear until the power is turned off and on again.
Yes: Overwriting is executed.
No: Overwriting is not executed. Screen returns to step 1.

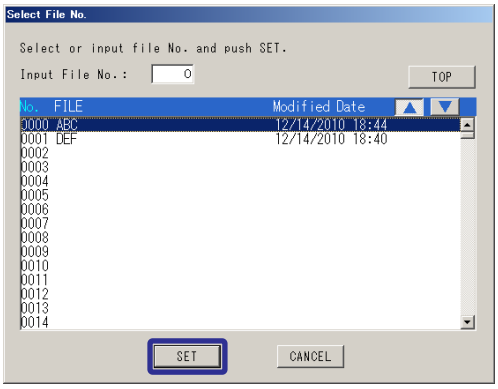
2-7-4 Save to Different No.

Save currently displayed content to the different file No.

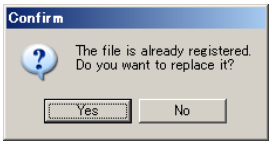
1. When pressing [SAVE AS], the selecting window for saving the file to different file No. is appeared.



2. Specify the file No. to be saved using ▼▲ keys or inputting file No., and press [SET].



3. When the file is already saved to a different file No., the confirm window is appeared.

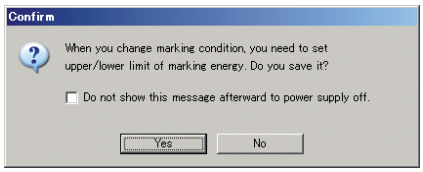


Yes: Execute overwriting.

No: Overwriting is not executed. Screen returns to step 1.

■ When “Measuring marking energy” is enabled: (LP-M series and LP-Sxxx type only)

When “Measuring marking energy” is enabled (see “2-11-2 Marking Energy Measurement” (P.186)), the following message appears after completion of step 3.



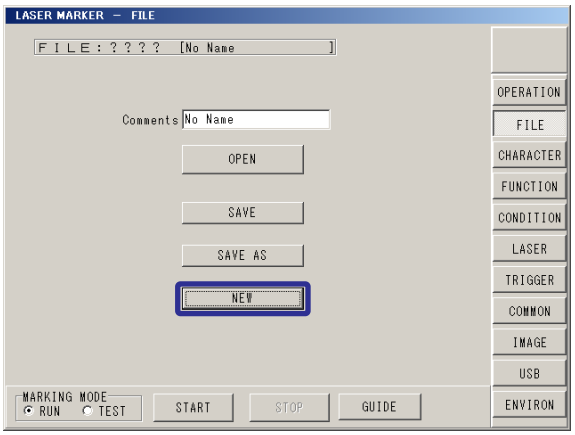
Description
Do not show this message afterward to power supply off.: If you check on the box, the message that is displayed every overwriting does not appear until the power is turned off and on again.
Yes: Overwriting is executed.
No: Overwriting is not executed. Screen returns to step 1.

2-7-5 New Creation

Create a new file.

1. Press [NEW].

The file No. is set with “????” and each setting of its screen becomes initial one.



Reference

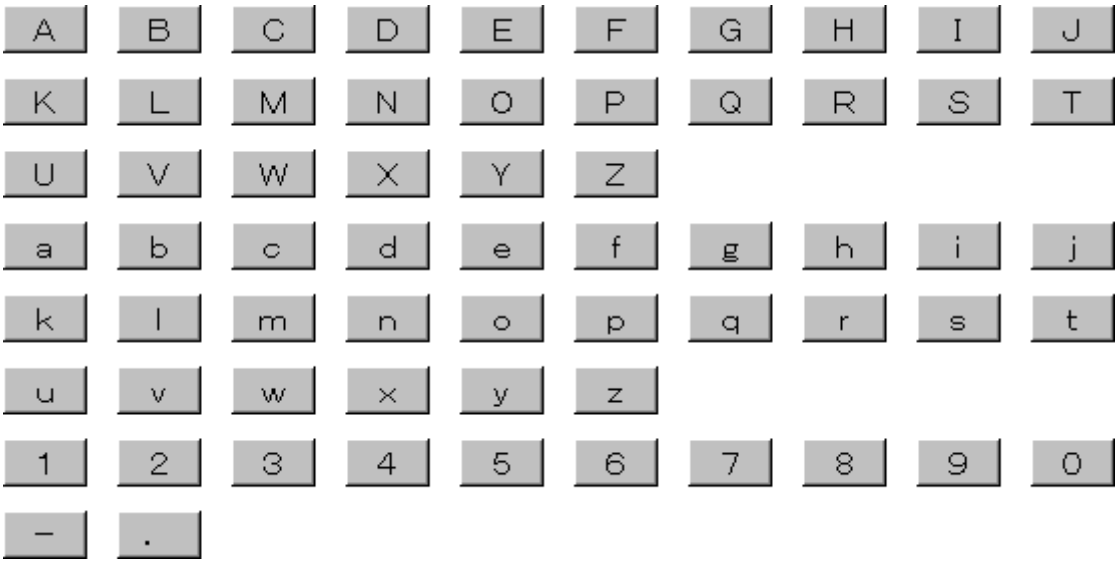
- In the case of overwriting the file at new creation with file No.”????”, the file is registered to other No. with the same operation of [Save to Different No.].
  Also, the comments is displayed with “No Name”.

2-8 Character Setting

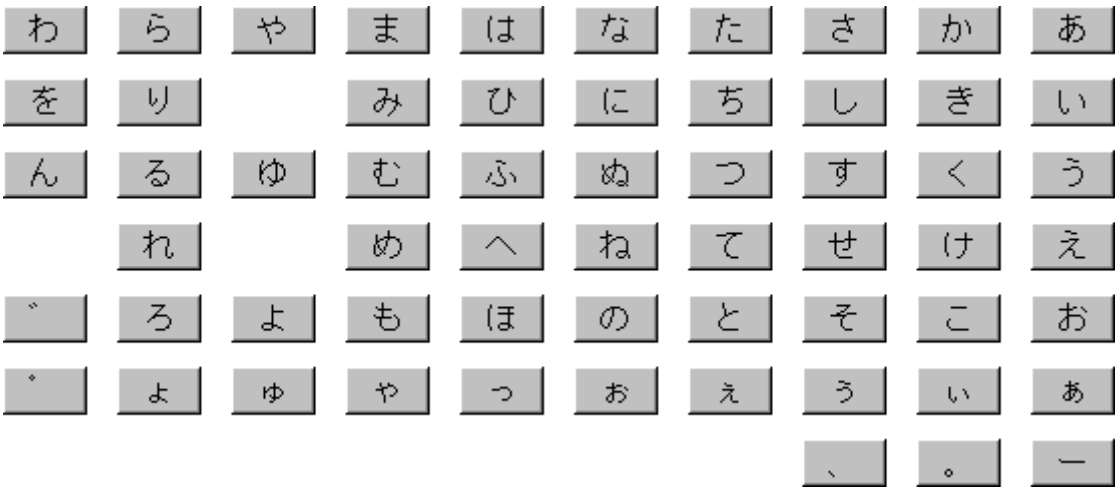
The character string to be marked is set in the following procedure. Set and input the function character on this screen.
Characters that can be used for input are as follows:
Capital and small letters of alphabet, numerics, Katakana, Hiragana, Kanji (JIS level-1 and JIS level-2), symbols, user registration characters.

2-8-1 Character Type

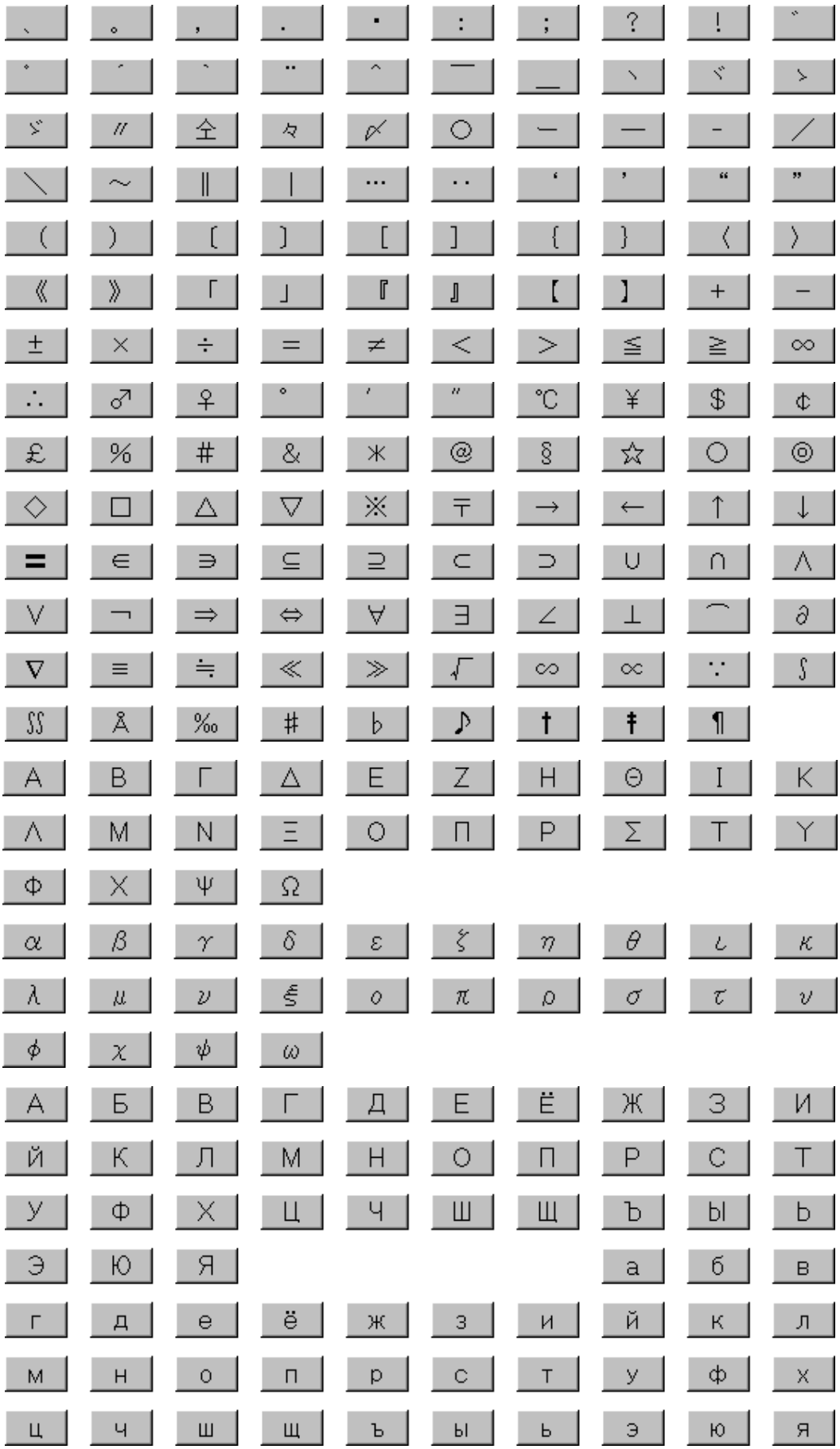
■ Alphanumerical



■ KANA, KANJI (Japanese character)



■ Symbol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£ ％ ＃ ＆ ＊ ＠ § ☆ ○ ◎
◇ □ △ ▽ ※ 〒 → ← ↑ ↓
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∨ ¬ ⇒ ⇔ ∀ ∃ ∠ ⊥ ⌒ ∂
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λ μ ν ξ ο π ρ σ τ υ
φ χ ψ ω
А Б В Г Д Е Ё Ж З И
Й К Л М Н О П Р С Т
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Э Ю Я а б в
г д е ё ж з и й к л
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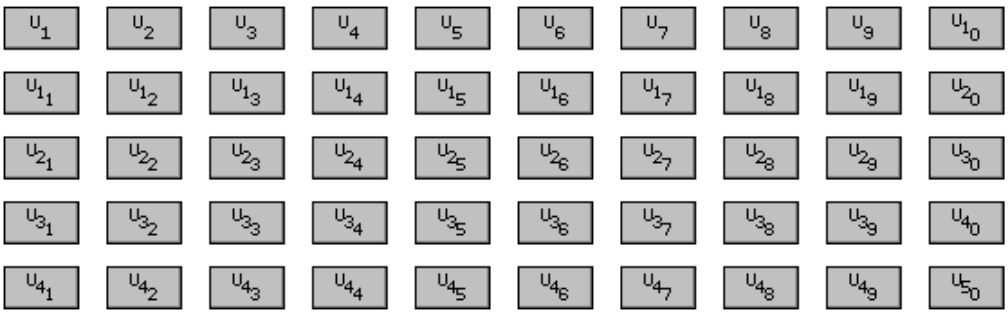
■ User Reg. Character



■ Function Character

Reference

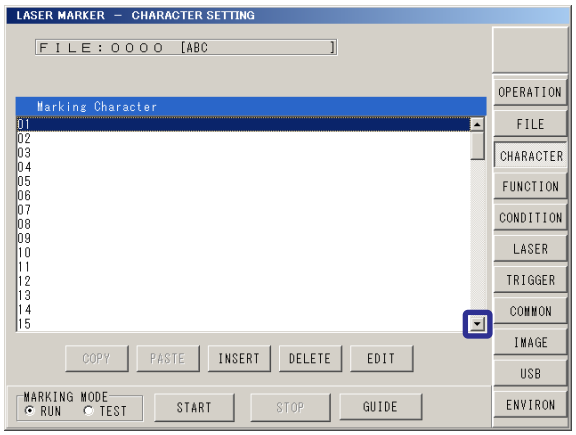
- For Kanji, refer to the Character Code Table of Serial Communication Guide.
- The following characters are registered as the user registration font “U1” to “U9” at factory shipment:

- On the button of U1 to U50 in the user registration character input screen, the registered character images are displayed together.

2-8-2 Character Input

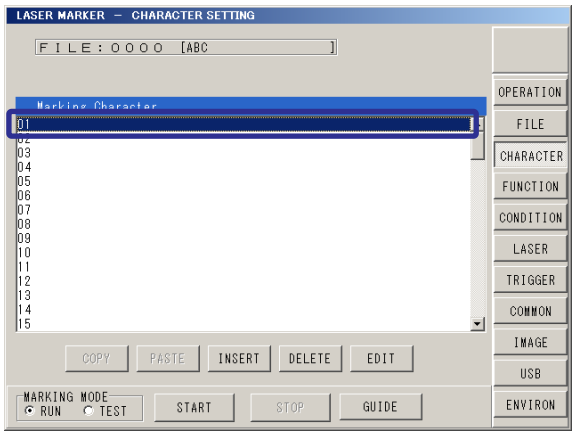
■ Display Method of Character Input Window

1. Display the line for input with the arrow on the right edge of the window.



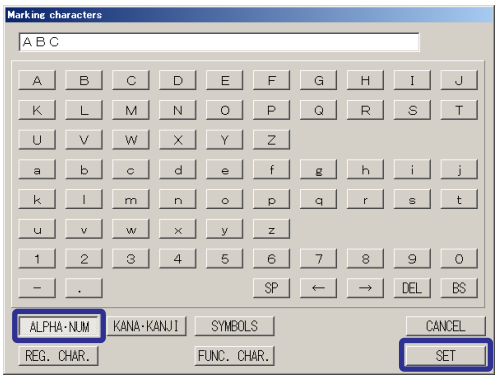
2. Press line for input.

The input window is appeared either by pressing [EDIT] at the cursor position or re-pressing that line.



■ Input Method of Alphanumerical

1. Press [ALPHA•NUM].

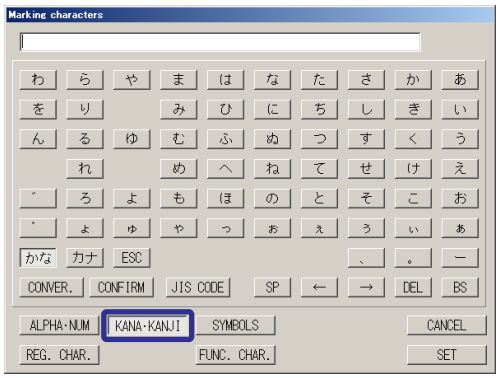


2. Press the character to be input directly for input.

The character is input by pressing [SET].

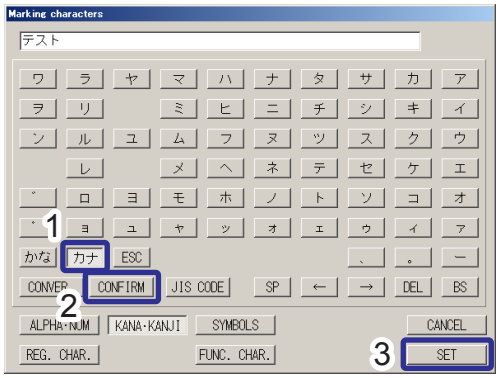
■ Input Method of Japanese, Katakana

1. Press [KANA•KANJI].



2. Press [カナ], Then press the character to be input, and press [CONFIRM].

The character is input by pressing [SET].

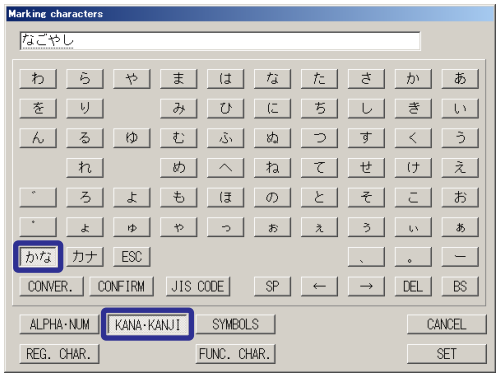


■ Input Method of Japanese, Hiragana and Kanji

1. Press [KANA•KANJI].

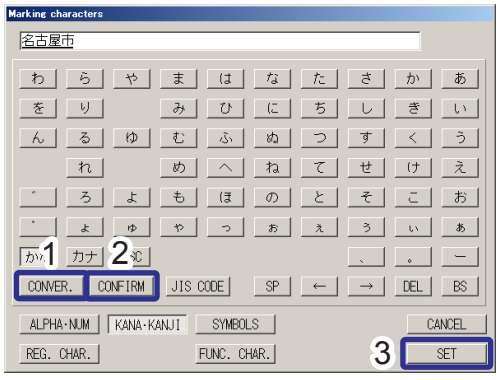
2. Press [かな], and select the desired character from the table to enter it.

When the desired character is Hiragana, press [CONFIRM].



3. When the desired character is Kanji, press [CONVER.] (CONVERT) until the desired Kanji is appeared, and press [CONFIRM].

The character is input by pressing [SET].

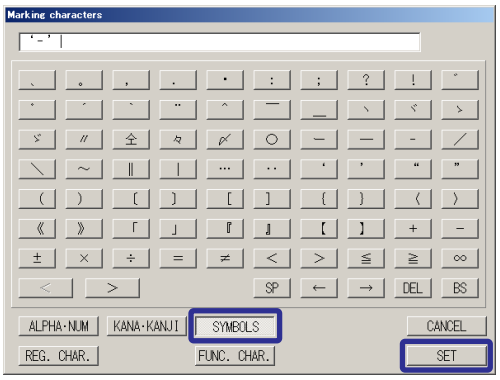


Reference

- For marking kanji, the setting of the JIS font is required. Refer to “2-15-4 Font File” (P.216).
- There are some characters that are impossible to be converted into Kanji. Check the “Character Code Table” in Serial Communication Guide.

■ Input Method of Symbols

1. Press [SYMBOLS].



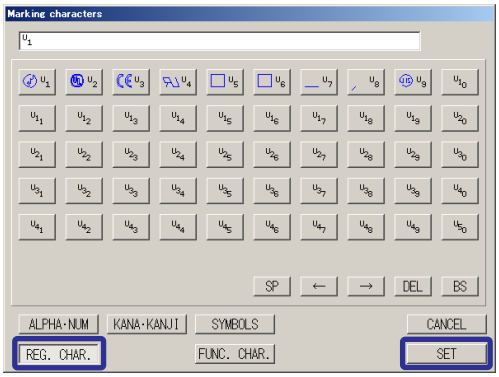
2. Press the symbol to be input directly for input.

The symbol table is changed by pressing [<] [>].

The character is input by pressing [SET].

■ Input Method of User Registration Character

1. Press [REG. CHAR.] (REGISTRATION CHARACTER).



2. Press the symbol No. to be input directly for input.

The character is input by pressing [SET].

Reference

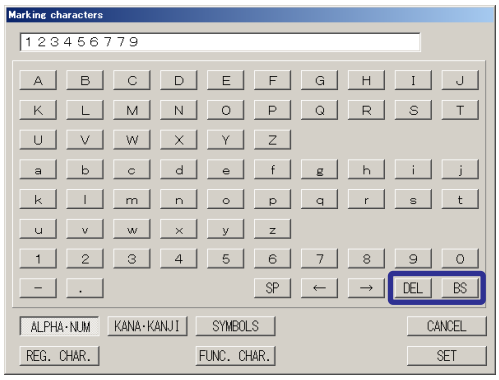
- It needs to register the font created by the user into the user registration font and, also register to laser marker. Refer to “2-15-4 Font File” (P.216).
- The following characters are registered as the user registration font "U1" to "U9" at factory shipment:
- On the button of U1 to U50 in the user registration character input screen, the registered character images are displayed together.

■ When inputting wrong character

1. Press [BS] or [DEL] to delete character.

[BS] (Back Space): Deletes one character before cursor and moves the cursor by one character simultaneously.

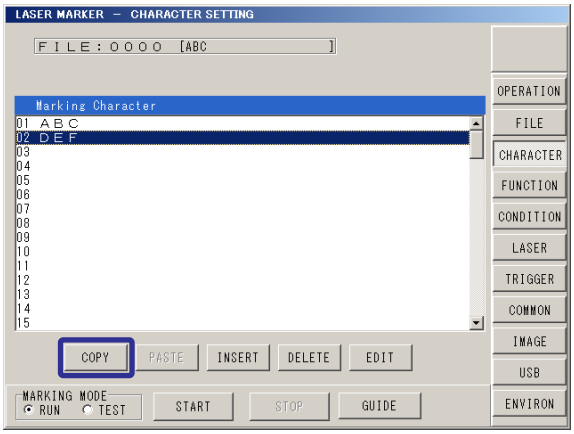
[DEL] (DELETE): Deletes one character behind the cursor.



2-8-3 Editing Character

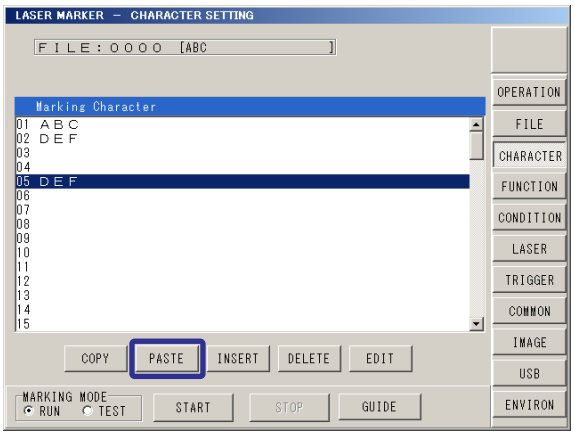
■ Copy and Paste

1. Select the character string to be copied, and press [COPY].



2. Move the cursor to the line to be pasted, and press [PASTE].

The character is pasted into the selected line.

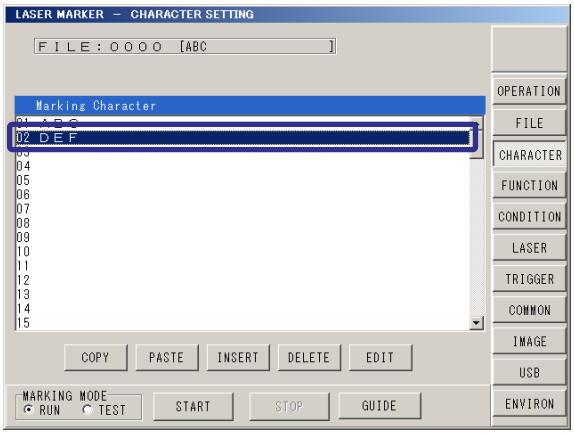


Reference

- When copying to the character string already inputted the character, the content is overwritten.
- The pasting is repeatable for any number of times.

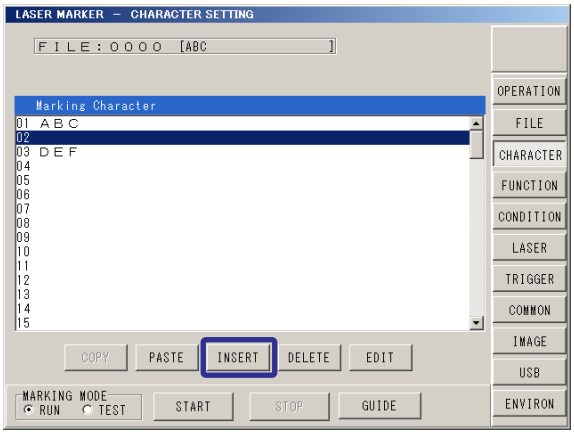
■ Insert One Line

1. Move the cursor to the line to be inserted.



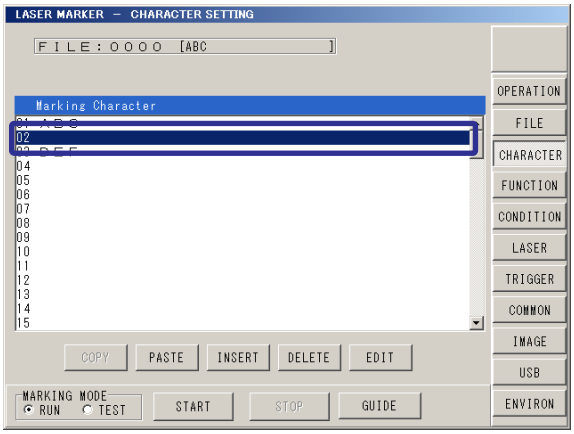
2. Press [INSERT].

After inserting one line, the line is shifted by one line.



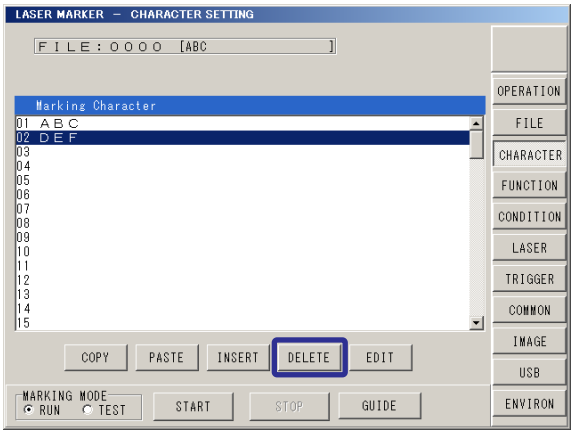
■ Delete One Line

1. Place the cursor on the line to be deleted.



2. Press [DELETE].

When a line is deleted, remaining lines are advanced by one position.



2-8-4 Function Character

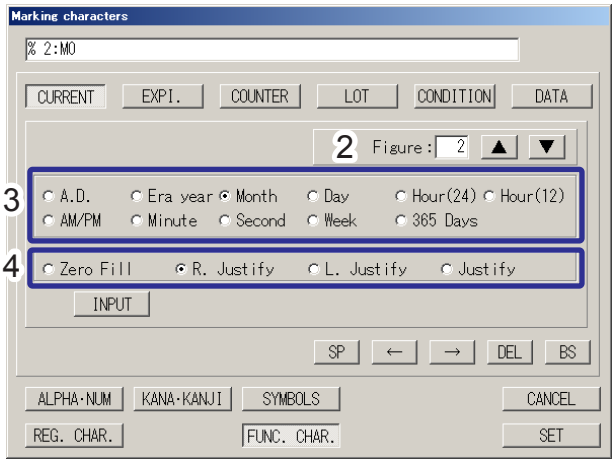
■ Current Date and Expiry Date

Marks automatically updated date and time referring to the internal clock of the laser marker set in the environment setting.

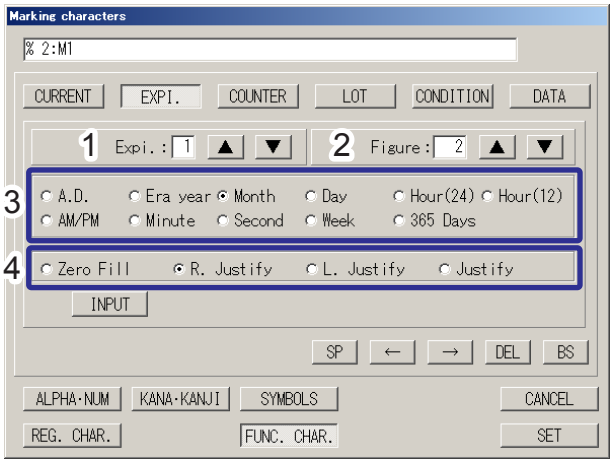
- Current date/time
- Expiry date/time: adds or subtracts specified period to the current date and time

Reference

- For the internal clock, refer to “2-16-2 System Setting (Environment 2)” (P.227).
- Set the expiry date function “2-9-1 Expiry Date” (P.118), and set the character.
- For the setting procedures, refer to “1-3-1 Mark Current Date and Time” (P.25) and “1-3-2 Mark Expiry Date and Time” (P.28).



Current date



Expiry date

	Description
1	Expiry No. : Select the No. of the expiry condition set in the function screen. Setting Range: Expiry No.: 1 to 4; Common Expiry No.: 5 to 8
2	Figure : Sets the digit number to show the date and time. When the number of figures of the value to be marked is larger than setting figure, the lower figure is marked as the number of figures set previously. Setting Range: 1 to 6 figures
3	Setting Date and Time:

Setting Items	Remarks
A.D.	Sets dominical year.
Era Year	
Month	
Day	
Hour (24)	Sets time in 24 hours. The “Hour (24)” is displayed with “0” to “23”.
Hour (12)	Sets time in 12 hours. The “Hour (12)” is displayed with “0” to “11”.
AM / PM	Sets forenoon and afternoon. From 0:00:00 A.M. to 11:59:59 A.M. are displayed with “AM”, and from 0:00:00 P.M. to 11:59:59 P.M. are displayed with “PM”.
Minute	The “minute” is displayed with “0” to “59”.
Second	The “second” is displayed with “0” to “59”.
Week	
365 Days	“1” indicates January 1, and “365” indicates December 31 (for normal year).

	Description

4 Zero Indication:

Setting Range	Zero Fill	:	Marks value in right-justified, and mark “0” to the left.
	R. Justify	:	Marks value in right-justified, and blanks (space) left column.
	L. Justify	:	Marks value in left-justified, and blanks (space) right column.
	Justify	:	Marks only value in left-justified.

Notice

- The following items, Date, Lot, and Expire Date are marked based on the internal clock integrated in the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

Reference

- By using “Time hold” function, it is possible to mark as the same date even when the time has passed 0:00 A.M.

<Time Hold function>

The “Time Hold” function locks the marking time/date. (Refer to “Safety / Setup / Maintenance Guide”.)

This function can be used only in “Current data marking”, “Expiry date”, and “Lot”.

- To update the function characters such as current date, expiry date, lot, counter, and etc. on the operation monitor, set the “Update Func. Char.” in the environment setting screen referring to “2-16-1 Display Setting (Environment 1)” (P.224).

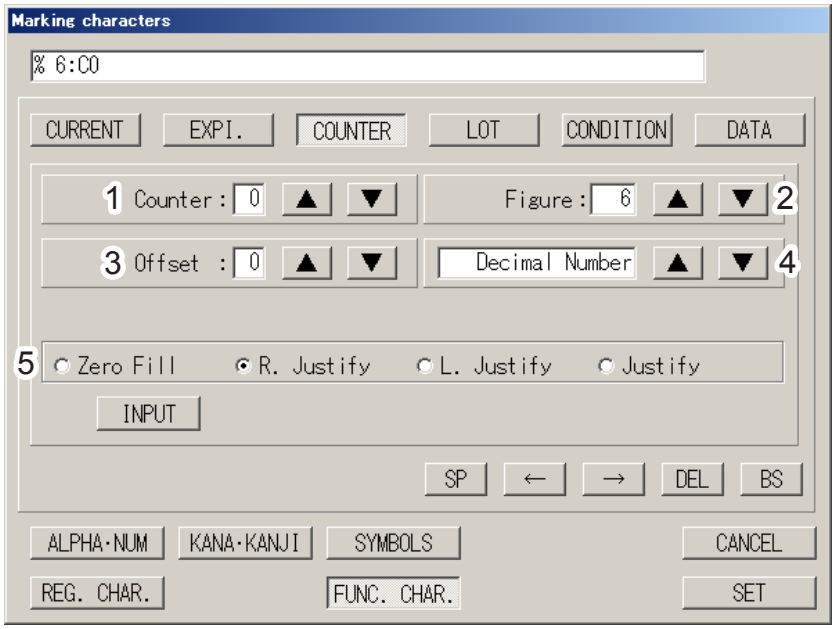
Display in the marking character field of the current date and expiry date function

%0N:Xn : Date and time with Zero Fill
%_N:Xn : Date and time without Zero Fill right stop (the underscore (_) represents a space.)
%N_:Xn : Date and time without Zero Fill left stop (the underscore (_) represents a space.)
%N-:Xn : Date and time without Zero Fill stop
%APM:n : Forenoon (AM)/Afternoon (PM)

Item	Display	Description
N	1 to 6	Represents the number of digits.
X	Represents the unit of date and time.	
	Y	A.D.
	y	Era year
	M	Month
	D	Date
	H	Hour (24-hour time)
	h	Hour (12-hour time)
	m	Minute
	s	Second
	w	Week
	J	365 Days
n	Represents the type of date and time.	
	0	Current date/time
	1 to 4	Expiry No. 1 to Expiry No. 4
	5 to 8	Common Expiry No. 5 to Common Expiry No. 8

■ Counter

When inputting counter character, the counter is marked with the condition set previously.
Set the expiry date function “2-9-2 Counter” (P.120), and set the character.
Refer to “1-3-4 Mark Counter” (P.35).



	Description

1 Counter (Counter No.):
Select the No. of the counter condition set in the function screen.

Setting Range	Counter No.: 0 to 3
	Common counter No.: 4 to 7

2 Figure:
Sets the digit number to show the counter. When the number of figures of the value to be marked is larger than setting figure, the lower figure is marked as the number of figures set previously.

Setting Range	1 to 6 figures

3 Offset:
Adds the setting value to the counter value, and marks its value.

Setting Range	0 to 9

4 Numbers:
Displays number.

Setting Range	Binary numbers to 36 numbers

5 Zero Indication:

Setting Range	Zero Fill	:	Marks value in right-justified, and mark “0” to the left.
	R. Justify	:	Marks value in right-justified, and blanks (space) left column.
	L. Justify	:	Marks value in left-justified, and blanks (space) right column.
	Justify	:	Marks only value in left-justified.

Display in the marking character field of the counter function

%0N:CnY/Z : Counter with Zero Fill
%_N:CnY/Z : Counter without Zero Fill right stop (the underscore (_) represents a space.)
%N_:CnY/Z : Counter without Zero Fill left stop (the underscore (_) represents a space.)
%N-:CnY/Z : Counter without Zero Fill stop

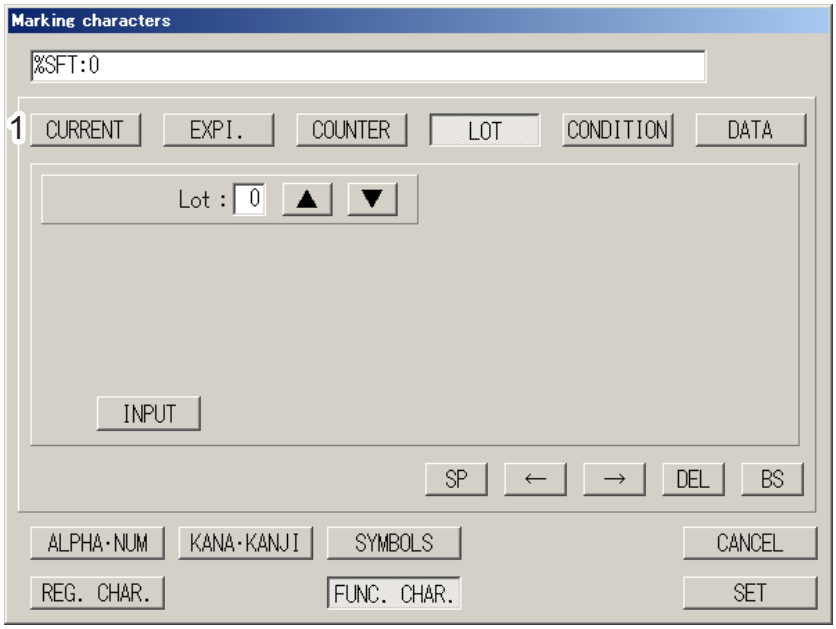
Item	Display	Description
N	1 to 6	Represents the number of digits.
n	Represents the counter number.	
	0 to 3	Counter No. 0 to Counter No. 3
	4 to 7	Common Counter No. 4 to Common Counter No. 7
Y	+1 to +9	Represents the counter offset. This character is used if the offset is not set.
Z	1 to 8, A to Z	Represents the counter numbering system. Input the (numbers -1) value. /Z portion is omitted for the decimal number.

Reference

- To update the function characters such as current date, expiry date, lot, counter, and etc. on the operation monitor, set the “Update Func. Char.” in the environment setting screen referring to “2-16-1 Display Setting (Environment 1)” (P.224).
- The counter does not operate at test marking mode.

■ Lot

When inputting lot character, the lot is marked with the condition set previously.
Set the expiry date function “2-9-3 Lot” (P.122), and set the character.
Refer to “1-3-3 Mark Lot No.” (P.32).



	Description
1	Lot (Lot No.): Select the No. of the lot condition set in the function screen. Setting Range: Lot No.: 0 to 3 / Common Lot No.: 4 to 7

Notice

- The following items, Date, Lot, and Expire Date are marked based on the internal clock integrated in the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

Reference

- By using “Time hold” function, it is possible to mark as the same date even when the time has passed 0:00 A.M.
  <Time Hold function>
  The “Time Hold” function locks the marking time/date. (Refer to “Safety / Setup / Maintenance Guide”.)
  This function can be used only in “Current data marking”, “Expiry date”, and “Lot”.

Display in the marking character field of the lot function

%SFT:n : Lot character

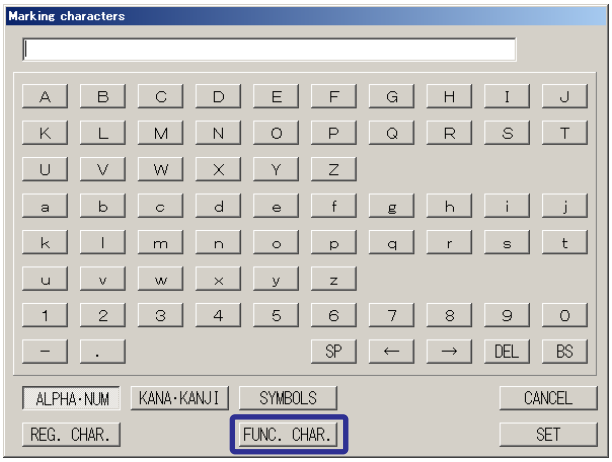
Item	Display	Description
n	Represents the lot function number.	
	0 to 3	Lot No. 0 to Lot No. 3
	4 to 7	Common Lot No. 4 to Common Lot No. 7

■ Marking Condition (Marking of Laser Settings)

When inputting the marking character, the setting values of laser marker, scan speed and laser pulse cycle are marked automatically.

Setting procedures

1. Press [FUNC. CHAR.] (FUNCTION CHARACTER).

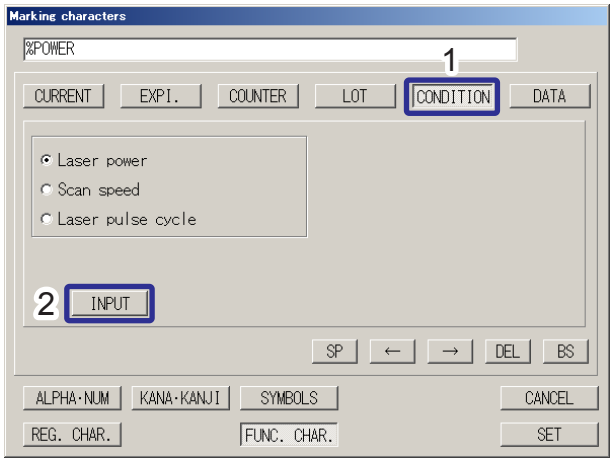


2. Press [CONDITION].

Select the marking contents from the following parameters.

- Laser power
- Scan speed
- Laser pulse cycle (Except LP-SxxxW type)

3. Press [INPUT] and then, press [SET].



Display of Marking Character Field		Description
%POWER	:	Setting value of Laser power
%SPEED	:	Setting value of Scan speed
%PULSE	:	Setting value of Laser pulse cycle (Except LP-SxxxW type)

Reference

- The marking condition function character is marked in 5 Digits including decimal with right-justified.
- When marking laser power, scan speed, and laser pulse cycle at the same time, perform function input for each item.

■ Rank

When inputting rank character, the rank is marked with the condition set previously.
(The character can be switched by inputting I/O.)
Set the expiry date function “2-9-4 Rank” (P.124), and set the character.

Reference

- Rank marking function cannot be used in combination with serial data marking and marking on the flying object.

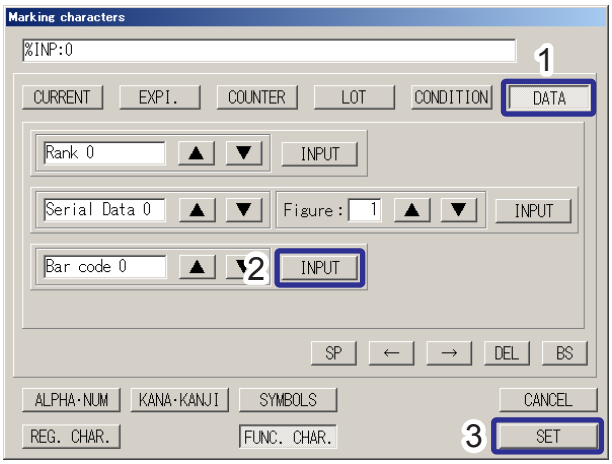
Setting procedures

1. Press [FUNC. CHAR.] (FUNCTION CHARACTER).

2. Press [DATA].

Select the rank No. and press [INPUT].

3. Set the character by pressing [SET].



Setting item

Rank No.:

Select the No. of the rank condition set in the function screen.

Setting Range	When parallel input condition is 8 bit x 2: 0 to 1
	When parallel input condition is 4 bit x 4: 0 to 3

Display in the marking character field of the rank function

%INP:n : Rank character

Item	Display	Description
n	Represents the rank function number.	
	0 to 3	Rank No. 0 to Rank No. 3

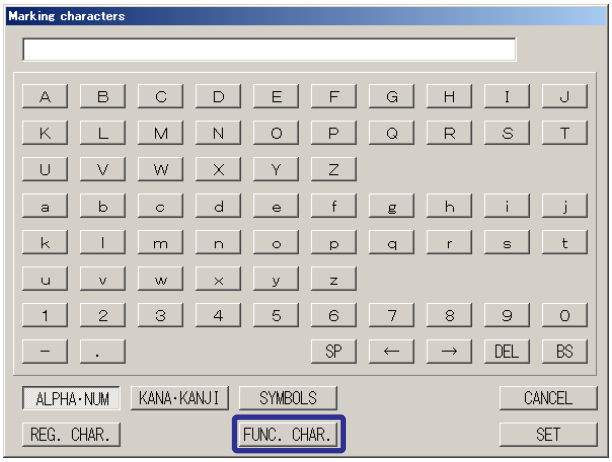
■ Serial Data

The serial data function is convenient for changing the marking character string at every marking by the communication command. Set the “Serial Data No.” and “Figure”.
For communication command for marking character string using the serial data function, refer to Serial Communication Guide.

Reference

- Serial data marking function cannot be used in combination with rank marking, external offset, and marking on the flying object.

1. Press [FUNC. CHAR.] (FUNCTION CHARACTER).

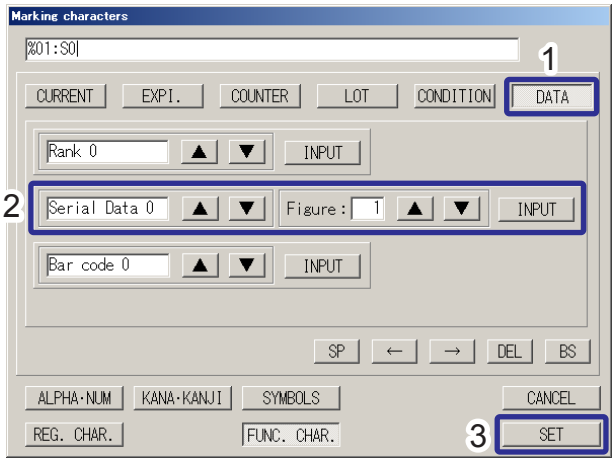


2. Press [DATA].

Select the serial data No.
Select the display figure.

3. Press [INPUT] and then, press [SET].

When setting the serial data function, the circle symbols with the specified number of digits appear on the image display. When it is set in the bar code or 2D code data, the code symbol is generated with the specified digits of “0” on the image display.



Setting item

Serial Data No.:

Setting Range	0 to 15

Number of Display Figure:
Set the max. number of the characters that will be input by the serial communication.
If the specified digit number and the character digits set by the communication command are different, the communication command setting is valid for the character digits.

Setting Range	0 to 30

Display in the marking character field of the serial data function

%MM:Sn : Serial data character

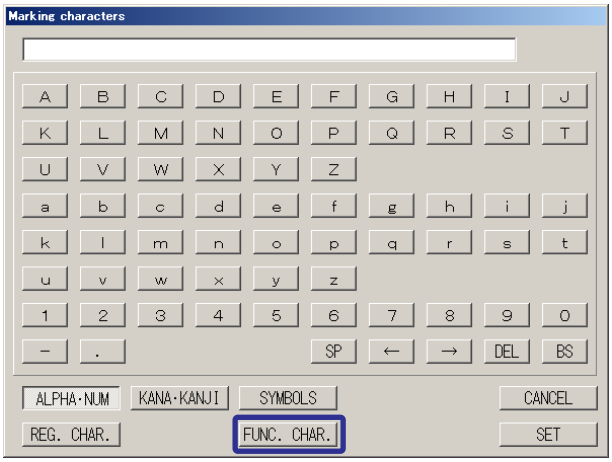
Item	Display	Description
MM	00 to 30	Represents the number of max. character digits to be input as serial data character.
n	Represents the serial data number.	
	0 to 9	Serial data No. 0 to Serial data No. 9
	A to F	Serial data No. 10 to Serial data No. 15

■ Check Digit

The check digit (check character) (one letter) such as CODE39, ITF, CODE128, EAN/UPC, NW-7, and RSS (GS1 DataBar) codes enables to be marked by inputting the check digit character. This function character is used for setting the human readable information of the bar code.

Setting procedures

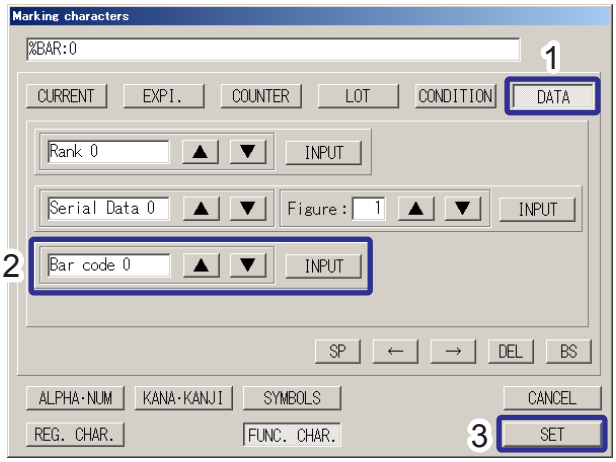
1. Press [FUNC. CHAR.] (FUNCTION CHARACTER).



2. Press [DATA].

Select the bar code No. and press [INPUT].

3. Set the character by pressing [SET].



Setting item

Bar Code No.:
Select the bar code No. set in the barcode condition.
The check digit in the selected barcode is marked by this function.

Setting Range	0 to 15

Display in the marking character field of the bar code check digit

%BAR:n : Check Digit for the bar code

Item	Display	Description
n	Represents the bar code number with the check digit.	
	0 to 9	Bar code No. 0 to Bar code No. 9
	A to F	Bar code No. 10 to Bar code No. 15

Reference

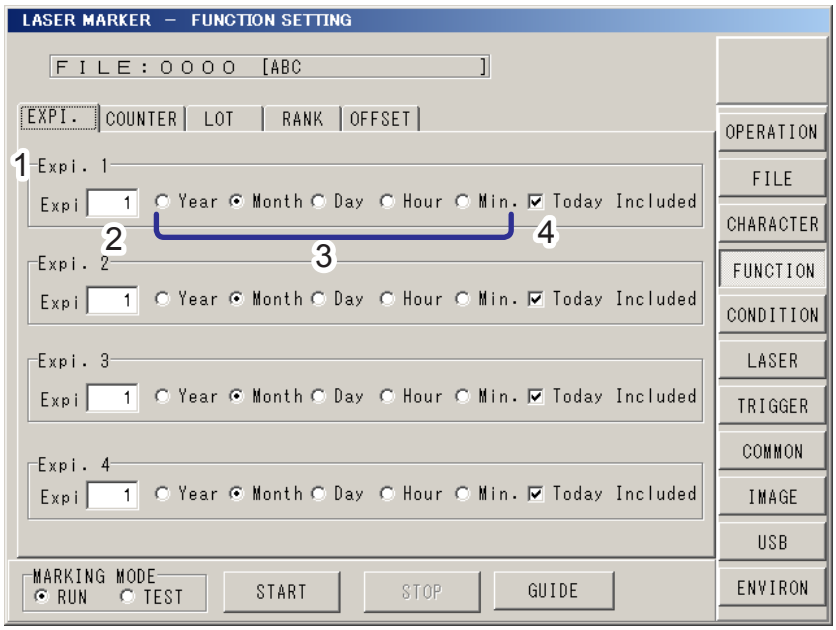
- The bar code No. is related to the bar code No. set using the “2-10-4 Bar Code Condition” (P.157).

2-9 Function Setting

With this screen, the updated character condition such as date-related marking and counter embedded in the laser marker is set.

2-9-1 Expiry Date

Marks the add-subtract time/date to current time set in environment setting screen.



	Description
1	Expiry No.: Enables to set four types of the expiry condition from 1 to 4 per file.

Reference

- The common expiry date (common expiry No. 5 to 8) are settable for all files in common. Refer to “2-13-1 Common Expiry Date” (P.205).

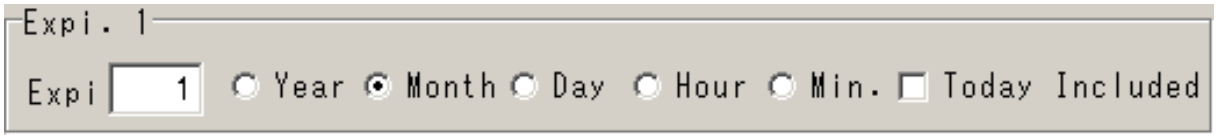
2	Expiry Value: Expiry values to be used for conditions described in 3. When the expiry number is set to negative value, it represents the past date. Setting Range: -999 to 999
3	Year / Month / Day / Hour / Min.: Sets unit of expiry.
4	Today Included : Enables to select “Today Included” or “Today Not Included” for expiry in the case of selected the expiry unit, Year or Month. When Year or Month is not selected for the unit, this setting cannot be used.

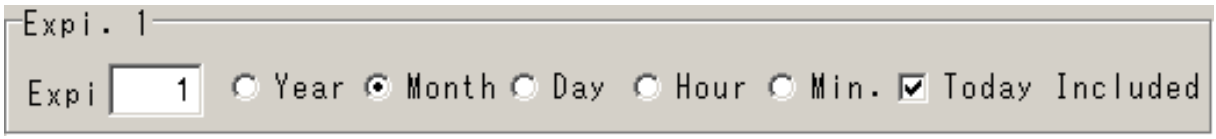
Reference

- Basically, the expiry date indicates the same year, same month, or same date. Selecting “Include today” indicates the previous day (the next day when inputting a negative value).
- Each function character already set function is input on the character setting screen. (Refer to “Current Date and Expiry Date” (P.109).)

Setting Sample

1. In the case of setting the expiry date after 1 month (today included/today not included):





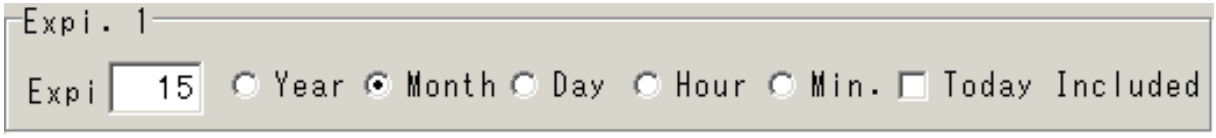
In the case of the setting pattern above (1 month after), the date to be marked as follows:

Today	Marking Result	
	Today included	Today not included
January 1st	February 1st	January 31st
January 31st	March 1st	February 28th *(February 29th)
February 1st	March 1st	February 28th *(February 29th)
February 28th	March 28th	March 27th
March 1st	April 1st	March 31st
March 31st	May 1st	April 30th
April 1st	May 1st	April 30th
April 30th	May 30th	May 29th
May 1st	June 1st	May 31st
May 31st	July 1st	June 30th
June 1st	July 1st	June 30th
June 30th	July 30th	July 29th

Today	Marking Result	
	Today included	Today not included
July 1st	August 1st	July 31st
July 31st	August 31st	August 30th
August 1st	September 1st	August 31st
August 31st	October 1st	September 30th
September 1st	October 1st	September 30th
September 30th	October 30th	October 29th
October 1st	November 1st	October 31st
October 31st	December 1st	November 30th
November 1st	December 1st	November 30th
November 30th	December 30h	December 29th
December 1st	January 1st	December 31st
December 31st	January 31st	January 30th

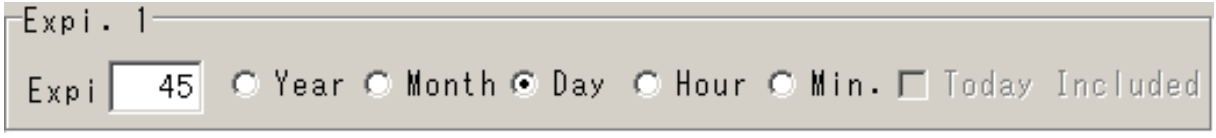
* The dates in parentheses are used in the case of leap years.

2. In the case of setting the expiry date after 1 year and 3 months (setting to 12 months + 3 months = after 15 months):



When the date of today is “January 1st” with the above setting pattern, the date to be marked is “April 1st”.

3. In the case of setting the expiry date after 1 month and 15 days (setting to 30 days + 15 days = after 45 days):



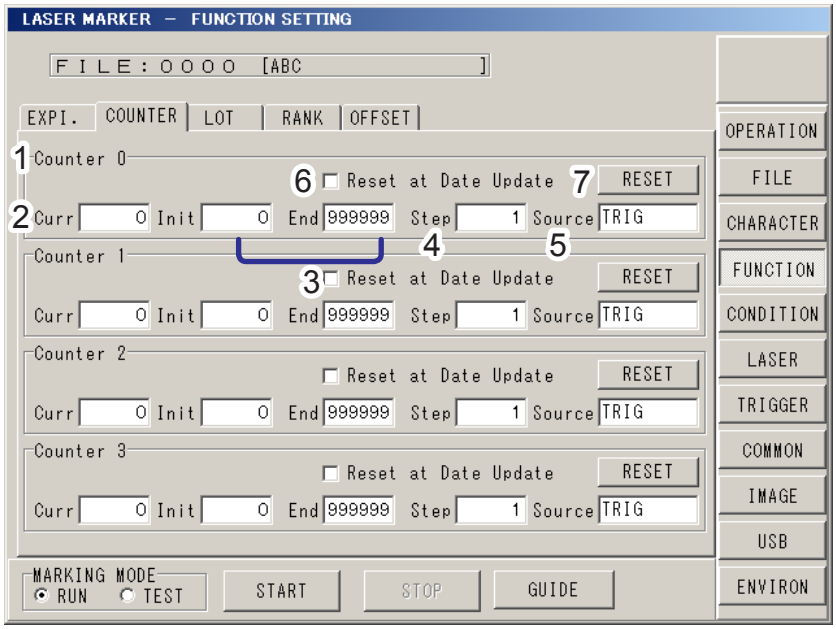
When the date of today is “January 1st” with the above setting pattern, the date to be marked is “February 15th”.

Notice

- The following items, Date, Lot, and Expiry date are marked based on the internal clock of the laser marker. The internal clock might be deviated due to the error in internal part or battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

2-9-2 Counter

With this function, the counter is increased or decreased per setting setup number from the initial value to end value for each counter source.



	Description
1	Counter No.: Enables to set 4 types of lot conditions from 0 to 3 per file.

Reference

- The common counter (common counters 4 to 7) are settable for all files in common. Refer to “2-13-2 Common Counter” (P.206).

2 Curr (Current Value):

Current counter value. The current value is subsequently marked. Set the current value within the initial value and end value.

Setting Range	0 to 999999

3 Init / End (Initial Value / End Value):

The initial value and the end value of the counter.
When the initial value is smaller than the end value: Counting up
When the initial value is larger than the end value: Counting down

Setting Range	0 to 999999

Reference

- Set the different value to the initial and the end value. If the same value is set to both, the counter value does not change.

4 Step (Step Value):

Sets the value to be changed per count.

Setting Range	0 to 999999

	Description

5 Source (Count Source) :

Target for timing of counting up and counting down. The count-up or count-down is started at the timing of count source end. The count source can be switched by pressing button.

Setting Range	TRIG (Trigger)	:	Counts up or counts down by trigger input.
	Counter 0	:	Ends Counter 0.
	Counter 1	:	Ends Counter 1.
	Counter 2	:	Ends Counter 2.
	Counter 3	:	Ends Counter 3.
	Counter 4	:	Ends Common Counter 4.
	Counter 5	:	Ends Common Counter 5.
	Counter 6	:	Ends Common Counter 6.
	Counter 7	:	Ends Common Counter 7.

6 Reset at Data Update:

With checking on this function, the counter value is reset at the internal clock becomes “0:00”.

Reference

- When the date changes during the Time Hold function is effective, the counter value is reset at the timing of releasing Time Hold (the time hold input is OFF).
- The counter reset at update cannot apply to the marking to fling object.

7 RESET:

Returns current value to initial value by pressing [RESET].

Notice

- When the counter is interrupted by alarm occurrence etc., check the counter value for the next marking.

Reference

- The counter does not operate at test marking.
- When the counter value reaches to the end value, the marking is started from initial value again.
- Only the counter input with the character string is available.
- The current value of the counter is saved without overwriting the file.
- Each function character already set function is input on the character setting screen. Refer to “Counter” (P.111).

Setting Example : When marking the same value in series

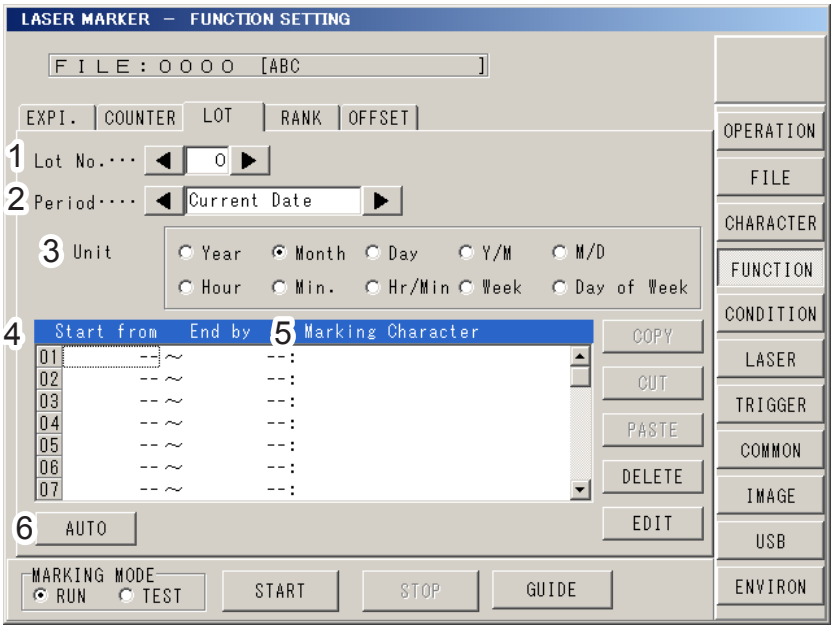
Sample

In case of marking the character like 000▶000▶000▶002▶002▶002▶004▶...

Character Setting	Function Setting Counter
01:% 03:CO 02: 03:	Counter 0: Initial=0, End=998, Step 2, Count Source=Counter 1 Counter 1: Initial=1, End=3, Step 1, Count Source=Trigger It is not specify character string for marking to Counter 1.

2-9-3 Lot

With this function, mark the character string set previously during the divided set period.



	Description

1 Lot No.:

Enables to set 4 types of lot conditions from 0 to 3 per file.

Setting Range	0 to 3

Reference

- The common lot (common counters 4 to 7) are settable for all files common. Refer to “2-13-3 Common Lot” (P.208).

2 Period:

Target period of the lot function.

Setting Range	Current	:	Specifies as target date set with current date.
	Expiry No. 1 to 8	:	Specifies as target date set with expiry No. 1 to 8.
	Counter 0 to 7	:	Specifies as target counter set with counter 0 to 7.

3 Unit:

Selects unit for period to be performed lot function among 10 types.

Period Condition	Description	Max. Divided Numbers
Year	Period defined by year (dominical year) unit.	Max. dividable No.: 60
Month	Period defined by month unit.	Max. dividable No.: 12
Day	Period defined by date unit.	Max. dividable No.: 31
Y/M	Period defined by year and month.	Max. dividable No.: 60
M/D	Period defined by month and date.	Max. dividable No.: 60
Hour	Period defined by hour unit.	Max. dividable No.: 24
Min.	Period defined by minute unit.	Max. dividable No.: 60
Hr/Min	Period defined by hour/minute unit.	Max. dividable No.: 60
Week	Period defined by week unit.	Max. dividable No.: 54
Day of Week	Period defined by day of week unit.	Max. dividable No.: 7

* When the period condition is "Y/M", do not input date. Never input the non-existent date.

	Description
4	Start from / End by: Set the both period of start and end.

Reference

- If the period is spanned, for example, when setting the period from 22 o'clock to 3 o'clock of the next day, it needs to set the period by diving into two, 22 to 23 o'clock and 0 to 3 o'clock.
- In the case of setting target lot to counter 0 to 7, the period condition is not needed to be set. The max. dividable numbers for this case is 60.

5 Marking Character:
Set the character string to be marked. Double-click on the marking character string area, or select the input line and press [EDIT] to open the character input window.

Setting Range	Up to 9 characters *

* Capital and small letters of alphabet, numerics, Katakana, Hiragana, Kanji (JIS level-1 and JIS level-2), symbols, user registration characters

6 AUTO:
This "AUTO" is available when the unit of the expiry date is selected among "Year", "Month", "Day", "Hour", "Min.", "Week", or "Day of Week". Pressing this button sets the start and end of the period with minimum unit automatically. Note that when the unit of the expiry date is set to "Year", the period is set automatically calculating from the current year.

Notice

- The following items, Date, Lot, and Expiry date are marked based on the internal clock of the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

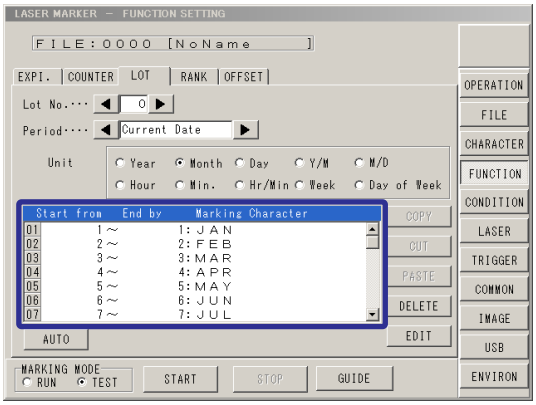
Reference

- Each function character already set function is input on the character setting screen. Refer to "Lot" (P.113).
- Saturday is defined as weekend day even whether the week renewal is set to either Monday or Sunday at "week" unit setting of "Lot" in "Function Setting" menu. For marking Monday through Friday as "Weekday" and Saturday and Sunday as "Holiday", you should set respectively at three times as following order; Sunday is set as "Holiday" (1), Monday through Friday is set as "Weekday" (2), and Saturday is set as "Holiday" (3).

Setting Sample

Setting for the lot of 3 digits character representing the month as shown in the table.

Date	Lot character
January	JAN
February	FEB
March	MAR
⋮	⋮
December	DEC



Set "Current Date" to [Period].
Set [Month] to [Unit].

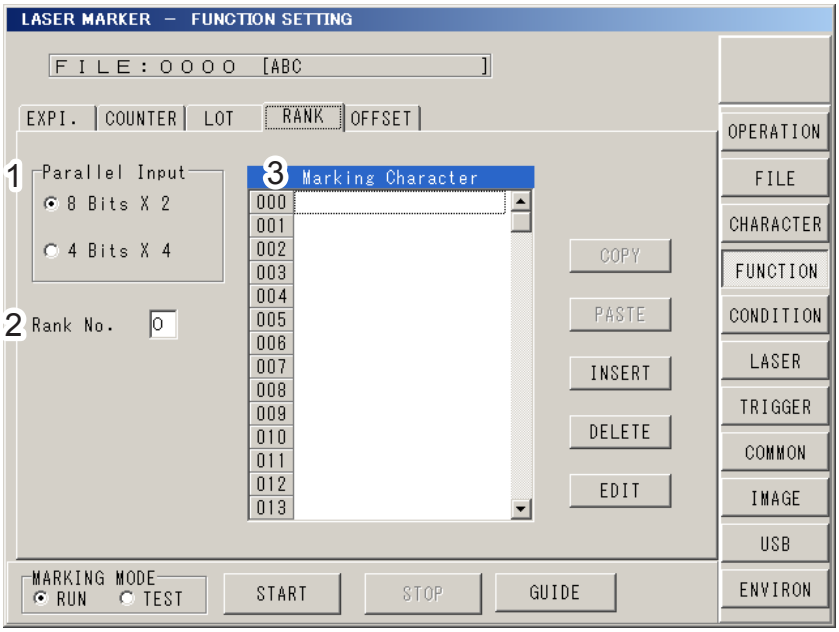
Set the "Period" and "Marking Character" as shown to the left.

2-9-4 Rank

The rank marking is the function for varying character string using I/O connector by inputting character string corresponding to I/O connector No, (D0 to D15) beforehand. Refer to “Rank Offset Marking” of “Safety / Setup / Maintenance Guide” for control method with I/O.

Reference

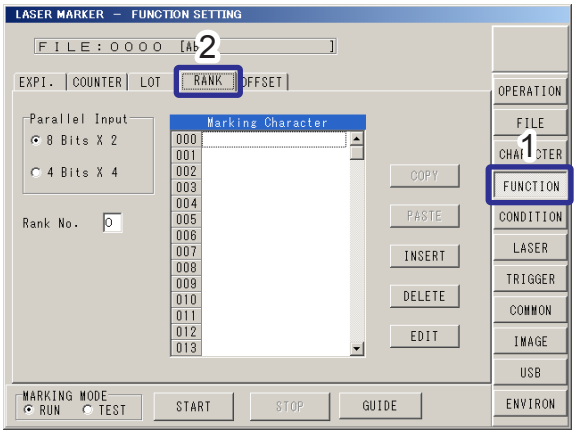
- Rank marking function cannot be used in combination with serial data marking and marking on the flying object.



	Description
1	Parallel Input : Sets the input condition for the I/O connector No. (D0 to D15). 8 Bits × 2: Enables to specify 16 bit (D0 to D15) to lower digit (D0 to D7) and higher digit (D8 to D15) as 8 bit data for each, and also set two types of the marking character tables including 256 patterns from 0 to 255. 4 Bits × 4: Enables to set 16 bit into four and specify as 4 bit data, and also set four types of the marking character tables including 16 patterns from 0 to 15.
2	Rank No.: Select rank No. In the case that the Parallel Input is 8 bit × 2: 0: Marking character table corresponding to lower 8 bit (D0 to D7) for number input. 1: Marking character table corresponding to higher 8 bit (D8 to D15) for number input. In the case that the Parallel Input is 4 bit × 4: 0: Marking character table corresponding to 4 bit (equal to 1/4) (D0 to D3) for number input. 1: Marking character table corresponding to 4 bit (equal to 2/4) (D4 to D7) for number input. 2: Marking character table corresponding to 4 bit (equal to 3/4) (D8 to D11) for number input. 3: Marking character table corresponding to 4 bit (equal to 4/4) (D12 to D15) for number input.
3	Marking Character: Set the character string to be marked. Double-click on the marking character string area, or select the input line and press [EDIT] to open the character input window. Setting Range: Up to 9 characters * * Capital and small letters of alphabet, numerics, Katakana, Hiragana, Kanji (JIS level-1 and JIS level-2), symbols, user registration characters

■ Setting procedure of Rank function

1. Press [RANK] after pressing [FUNCTION].

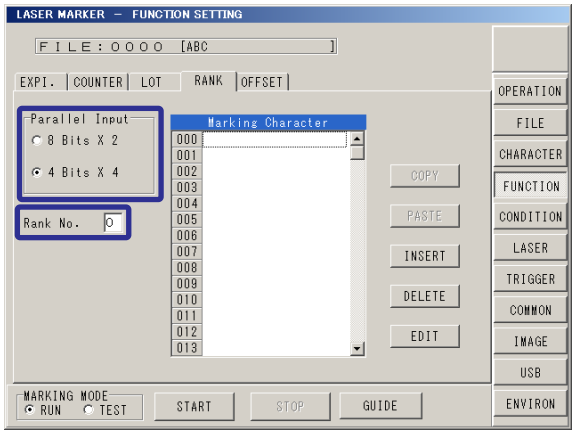


2. Select [Parallel Input] from either 8 bit × 2 or 4 bit × 4.

3. Select Rank No.

The number is changed by pressing numeral.

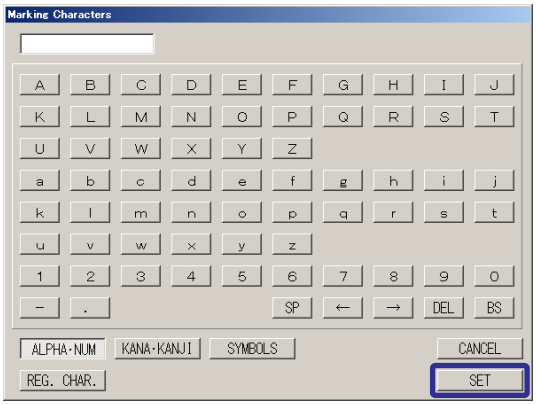
- When Parallel Input is 8 bit × 2: 0 to 1
- When Parallel Input is 4 bit × 4: 0 to 3



4. The character input window is appeared by selecting marking character corresponding to I/O connector No., and pressing [EDIT].

Input the character and press [SET].

- When Parallel Input is 8 bit × 2: 0 to 255
- When Parallel Input is 4 bit × 4: 0 to 15



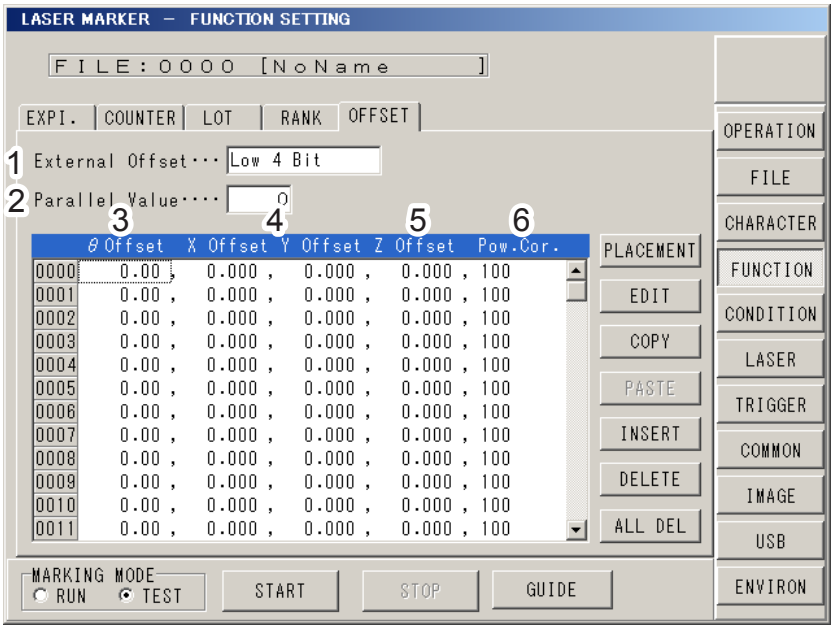
2-9-5 External Offset

The external offset is the function for varying character string using I/O control by inputting coordinate data corresponding to I/O connector No (D0 to D15) beforehand. Refer to “Rank Offset Marking” of “Safety / Setup / Maintenance Guide” for control method with I/O.

Reference

External offset function cannot be used in combination with the following functions.

- Serial Date Marking (Except when “Serial Data” is set to the external offset condition)
- Flying Object Marking
- 3D Marking (Only LP-M / LP-Z Series)



	Description

1 External Offset :

Sets the input condition for the I/O connector No. (D0 to D15).

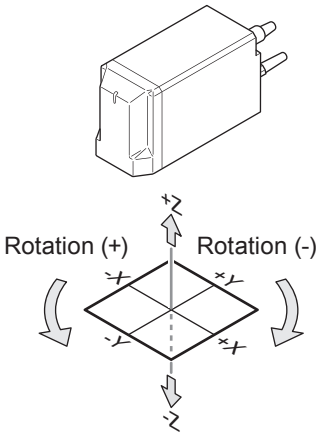
Setting Range	Not use	:	If you do not use the offset function, specify these values.
	Low 10 bit	:	Enables to set data for 1024 offset values from 0 to 1023 with the low 10 bit (D0 to D9) as the one marking coordinate table.
	Low 8 bit	:	Enables to set data for 256 offset values from 0 to 255 with the low 8 bit (D0 to D7) as the one marking coordinate table.
	Low 4 bit	:	Enables to set data for 256 offset values from 0 to 255 with the low 8 bit (D0 to D7) as the one marking coordinate table.
	Serial Data	:	The offset value is specified by the communication command “SEO”. For communication commands, refer to Serial Communication Guide.

2 Parallel Value (Parallel Input Value) :

Enables to check offset image of the parallel input value input beforehand. The coordinate with this parallel input value input here displays as the coordinate for check on the image display screen.

Setting Range	In the case that the external offset condition is Low 10 bit	:	0 to 1023
	In the case that the external offset condition is Low 8 bit	:	0 to 255
	In the case that the external offset condition is Low 4 bit	:	0 to 15

	Description
3	θ Offset : Rotates the object to the rotation direction around the original point. Setting Range: -180.00 to +180.00 degree (0.01 degree unit)
4	X/Y Offset : Shifts the marking position to the X/Y direction. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)* -45.000 to +45.000 [mm] (LP-S500)*
5	Z Offset (LP-M / LP-Z series only) : Shifts the object to Z direction. Setting Range: -22.000 to +22.000 [mm] (LP-M500)* -25.000 to +25.000 [mm] (LP-Z130)*
6	Power Correction : Correction of the laser power set at laser setting. Setting Range: 0 to 999%



* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

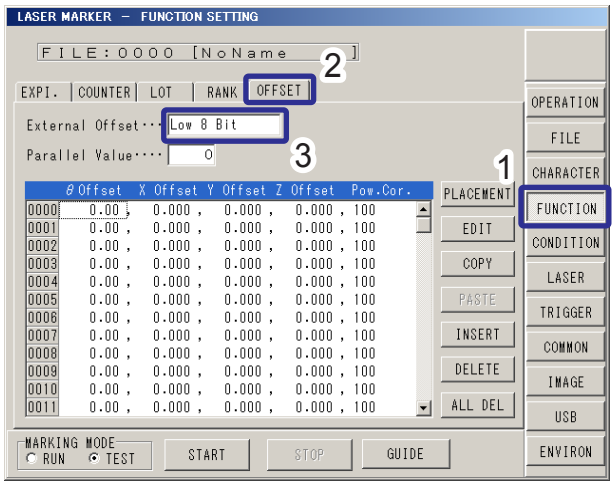
Reference

- When the rank is set beforehand, the character string with the rank setting is changed and marked.
- In the case of setting coordinate of the external offset, input the parallel input value with coordinate and display image for checking the offset. (Note that the power correction and Z offset values cannot be checked on the image display screen.) Before marking actually, it becomes convenient marking by checking offset.
- When “Serial Data” is set to the external offset condition, “rank marking” function is not available in the same file.

■ Setting procedure of External Offset function

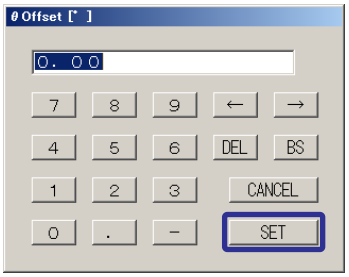
1. Press [OFFSET] (EXTERNAL OFFSET) after pressing [FUNCTION].

2. Select the external offset condition among “Low 10 bit”, “Low 8 bit”, “Low 4 bit”, and “Serial Data”.



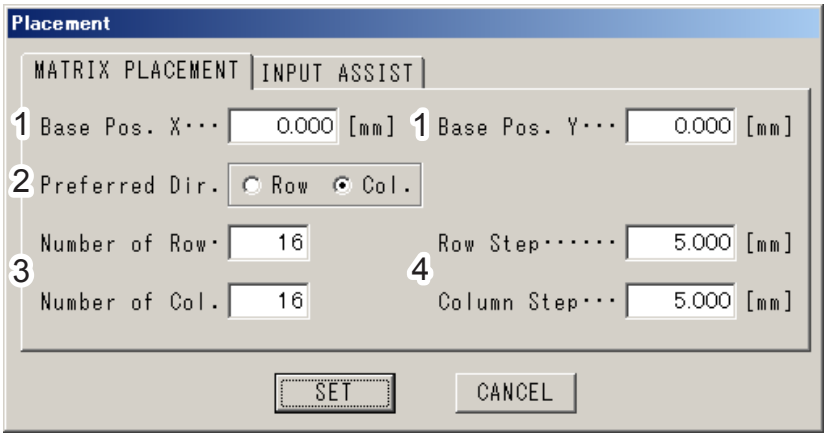
3. Since the ten-key is appeared by pressing numeral, input the value, and press [SET].

The following offsets, θ (theta) offset, X offset, Y offset, Z offset (only for LP-M / LP-Z series), and power correction corresponding to the parallel data No. can be set.



■ MATRIX PLACEMENT

With this placement function, the setting for constant offset becomes easy one.
Pressing “PLACEMENT” button displays the column and row array screen. By specifying number of column and number of row enables to set the external offset coordinate.



	Description
1	Base Position X / Base Position Y: Define the coordinates corresponding to No. 0000 input for the offset marking which becomes the reference position.
2	Preferred Direction: Define the preferred direction to number elements of a matrix.
3	Number of Row / Number of Columns: Define the number of rows and columns of a matrix.
4	Row Step / Column Step: Define the pitches along the row and column directions.

Setting Sample

Base Pos. X: 0 mm, Base Pos. Y: 0 mm, Preferred Dir.: Number of Row: 3, Number of Col.: 3, Row Step: 3 mm, Column Step: 3 mm

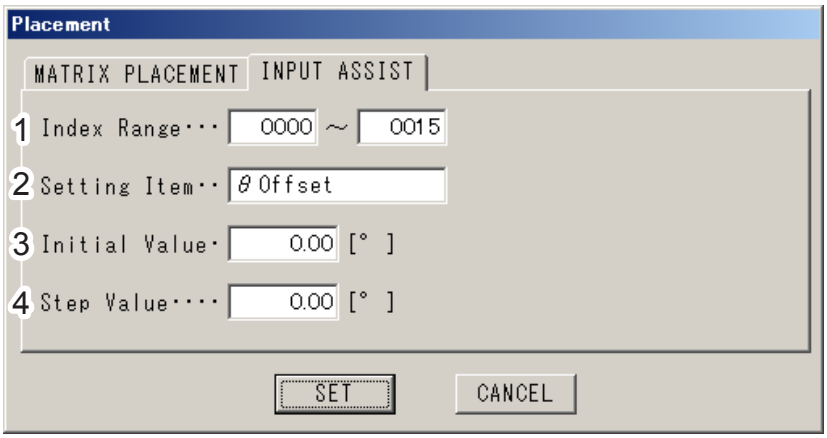
0000	0001	0002
0003	0004	0005
0006	0007	0008

	X Offset	Y Offset
0000	0 mm	0 mm
0001	3 mm	0 mm
0002	6 mm	0 mm
0003	0 mm	-3 mm
0004	3 mm	-3 mm

	X Offset	Y Offset
0005	6 mm	-3 mm
0006	0 mm	-6 mm
0007	3 mm	-6 mm
0008	6 mm	-6 mm

■ INPUT ASSIST

With this input assist function, the setting for constant offset within the arbitrary parallel data No. becomes easy one.



	Description
1	Index Range: Specifies the target starting parallel data No. and ending parallel data No. for setting.
2	Setting Item: Specifies the setting item. “q offset”, “X offset”, “Y offset”, “Z offset” (only for LP-M / LP-Z series), and “Laser Power Cor. (Laser Power Correction)”.
3	Initial Value: Specifies the setting value to be input to the starting parallel data No. specified in “1 Index Range” above.
4	Step Value: Specifies the step value. Specify the starting parallel data No. as the initial value, and reflect the setting value for each parallel data No. by step amount.

Setting Sample

Index Range: 0001 to 0004, Setting Item: X offset, Initial Value: 1.000 mm, Step Value: 1.000 mm

Parallel Data No. 0001	▶	X offset:	1.000 mm
Parallel Data No. 0002	▶	X offset:	2.000 mm
Parallel Data No. 0003	▶	X offset:	3.000 mm
Parallel Data No. 0004	▶	X offset:	4.000 mm

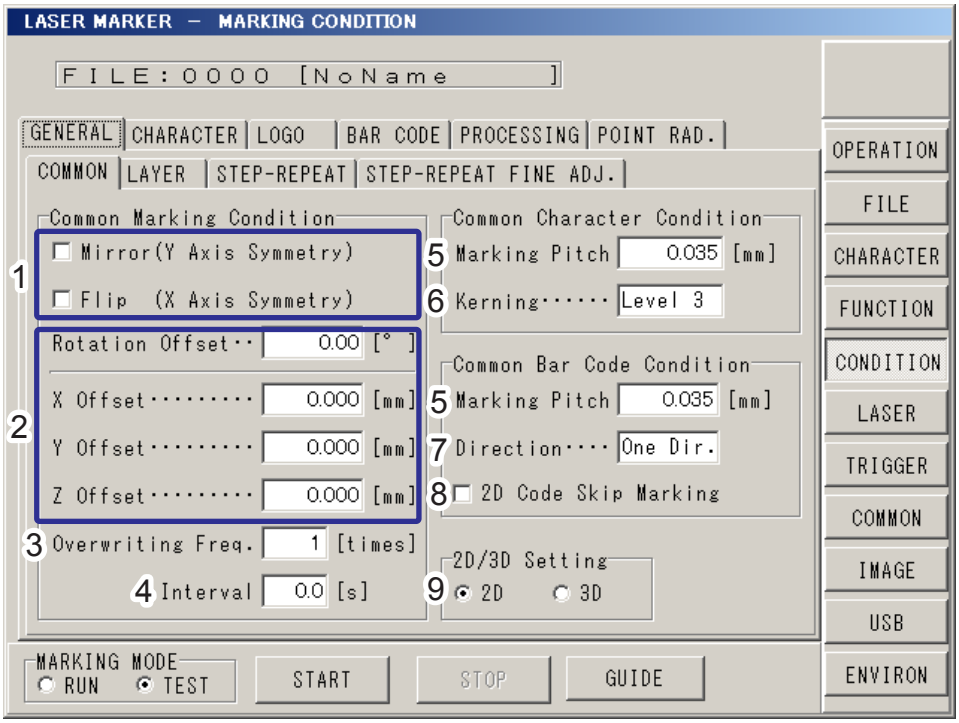
2-10 Marking Condition

This screen specifies the conditions of character to be marked. The position, size, font type of character, and laser power/ scan speed correction, can be specified per setting line. It also can specify the logo condition and condition for Step & Repeat.

2-10-1 General Condition

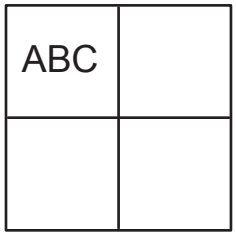
The general condition setting is applied to the all marking objects in a file.

■ Common Condition

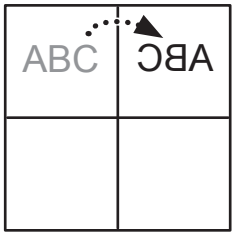


	Description

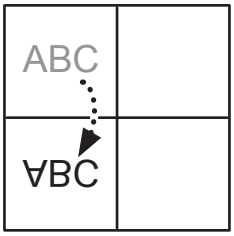
1 Mirror/Flip (Mirror Inversion/Flip Inversion) :
Inversion has two types, Mirror (vertical inversion) and Flip (horizontal inversion).
Mirror (Mirror Inversion) (Y Axis Symmetry): makes the character string symmetrical to Y axis.
Flip (Flip Inversion) (X Axis Symmetry): makes the character string symmetrical to X axis.



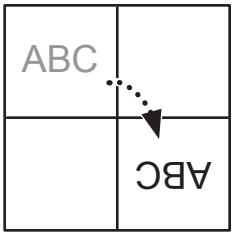
☐ Flip
☐ Mirror



☑ Flip
☐ Mirror



☐ Flip
☑ Mirror



☑ Flip
☑ Mirror

Reference

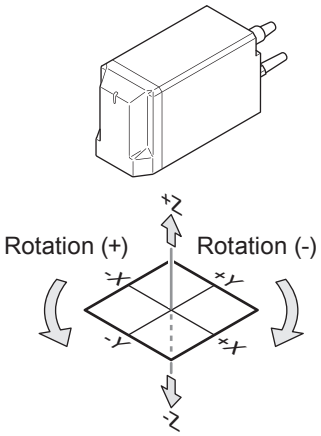
- Mirror (X Axis Symmetry) and Flip (Y Axis Symmetry) can be selected at the same time.

	Description

2 Offset:
The whole screen is offset for each file.

Rotation Offset:
Rotates the object to the rotation direction around the original point.

Setting Range	-180.00 to +180.00 degree (0.01 degree unit)



X/Y Offset :
Shifts the marking position to the X/Y direction.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

Z Offset (LP-M / LP-Z series only) :
Shifts the object to Z direction.

Setting Range	-22.000 to +22.000 [mm] (LP-M500)*
	-25.000 to +25.000 [mm] (LP-Z130)*

3 Overwriting Frequency :
Number of overwriting. The number of overwriting marking is specified by one trigger input.

Setting Range	1 to 9999 times

Notice

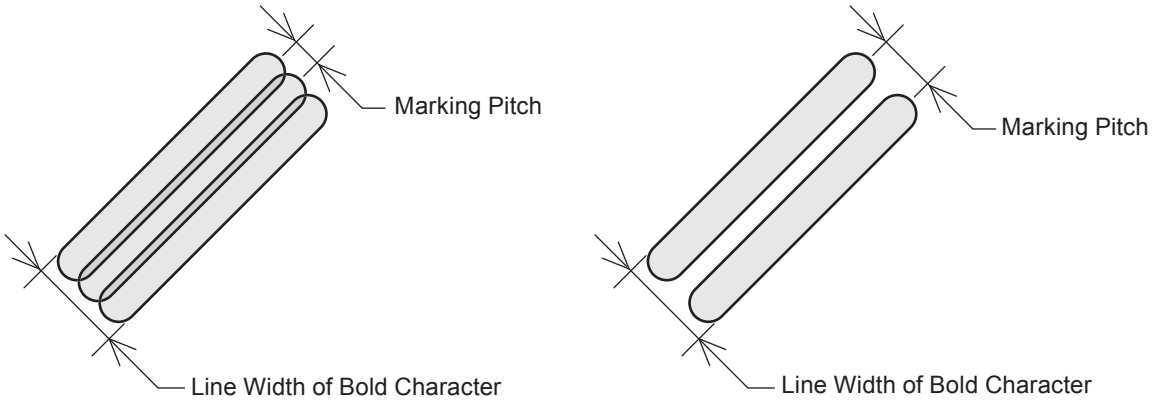
- Overwriting marking and marking of bold character may affect the quality of marking. Check it by a trial before using these functions.
- The function of overwriting is unavailable for the marking to flying object.

4 Overwriting Interval :
The interval period at overwriting is set.

Setting Range	0.0 to 9.9 seconds or 0 to 60 seconds

5 Marking Pitch :
Common marking condition: Specifies the pitch of the marking lines for the bold character.
Common bar code condition: Specifies the pitch of the marking lines for the bar code and composite code.

Setting Range	0.010 to 2.000 [mm]



Reference

- The width of the bold line changes when the setting value on the “Line Width” is different from that marked with laser.
- This correction is invalid for logo data.
- It is recommended that the marking pitch is specified so that it is an integral multiple of half of the marking line width.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

	Description
6	Kerning : Set the level of spacing between characters. The lower the value is, the smaller the spacing is. This feature is enabled when the “character spacing” is set to “proportional”.

Level 1	:	Minimize the origin point of the character interval with this condition. The letter-spacing of the letter “i” and “l” (small letter “L”) are recognized as “0”. 
Level 2	:	Set the origin point of the character with intermediate degree between the character interval set with Level 1 and Level 3. The character width such as “i” and “l” (small letter “L”) becomes 1/4 of character width. 
Level 3	:	Maximize the origin point of the character interval with this condition. The character width such as “i” and “l” (small letter “L”) becomes 5/8 of character width. 

Reference

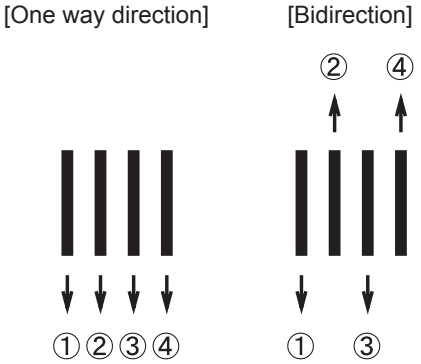
- Set the interval balance of the character by the setting of setting, and set the character interval of the character using the character condition.
- When not using the proportional function, the kerning setting is invalid.

	Description

7 Direction:

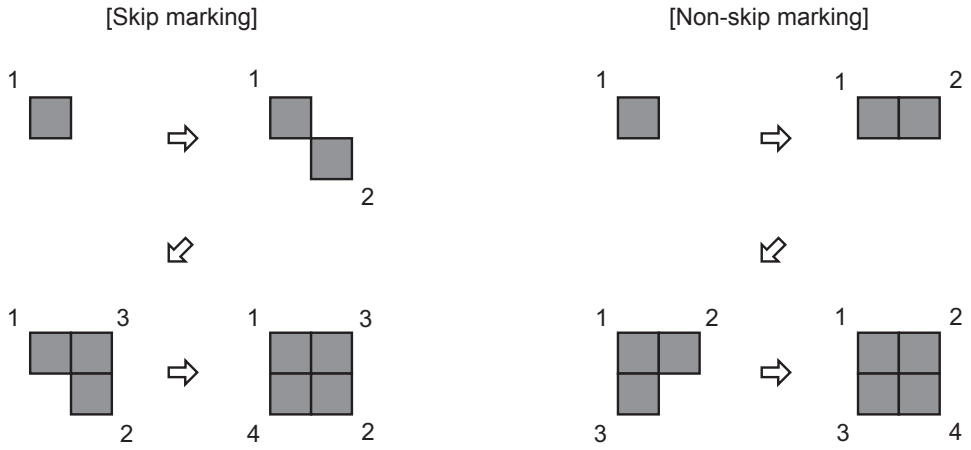
Specifies the marking order of the bar code and composite code marking.

- One Dir. (One way direction) : Marks the bar code and composite code marking from one way direction.
- Bidir. (Bidirection) : Specifies the marking order of the bar code and composite code marking.



8 2D Code Skip Marking :

Specifies the marking order of the 2D code and composite code marking.
To reduce the heat effect by laser in the drawing modules of the code, valid this function.



Reference

- In case of marking to flying object, set the 2D code skip mark to “Invalid”.

9 2D/3D Setting (LP-M / LP-Z series only) :

Check “3D” of the 2D/3D setting for marking to 3D figure work.
When checking “3D” of the 2D/3D setting, the layer condition can be set and marking setting for 3D figure work becomes available. Refer to “Layer Condition” (P.134).

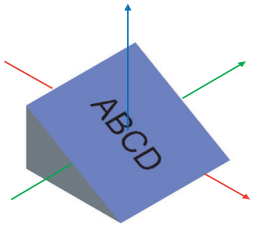
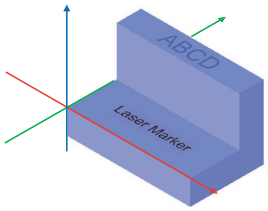
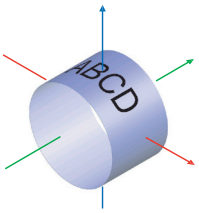
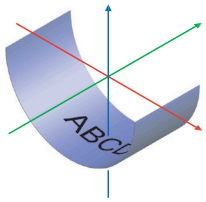
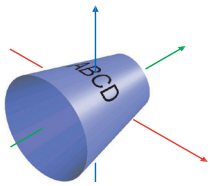
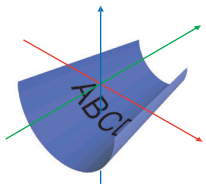
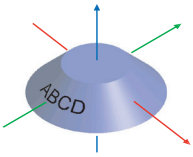
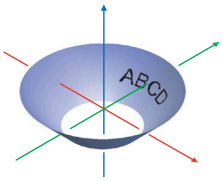
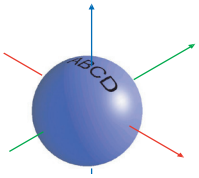
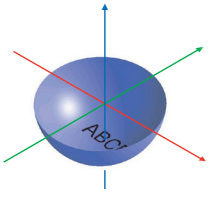
Reference

- “Step & Repeat”, “External Offset”, “Processing Condition”, “Fixed Point Radiation Condition”, “Concatenated Marking Setting”, and “Marking to Flying Object” (when encoder not used) can not be used in combination with 3D setting.

■ Layer Condition

[Function specific to LP-M /LP-Z series] * This function is not implemented in the LP-S series.

LP-M / LP-Z series can perform the marking to 3D figure by checking ON the “3D” of the “2D/3D setting” in “Common Condition” (P.130). Select the pattern of the 3D figure shown below and set the layer condition.

Plane	Mark on plane (slope)	Mark on plane (uneven)
		
Cylinder	Mark on convex face	Mark on concave face
		
Horizontal Cone	Mark on convex face	Mark on concave face
		
Vertical Cone	Mark on convex face	Mark on concave face
		
Sphere	Mark on convex face	Mark on concave face
		

Reference

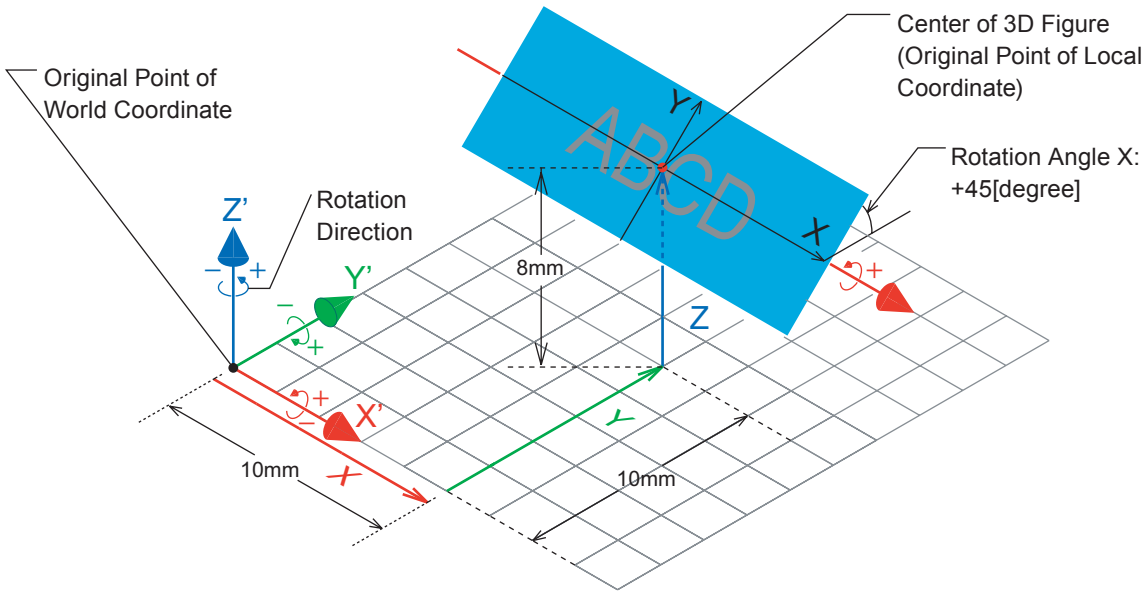
- The layer condition can be set by checking ON the “3D” of the “2D/3D setting” in the normal condition of the general condition. When selecting 2D marking, the display of the layer condition becomes disable and cannot be set.

■ Coordinate System (World Coordinate / Local Coordinate)

When marking to 3D figure (slope, cylinder, cone, sphere), the compatible coordinate is determined depending on the 3D figure (layer), and marking content (character, barcode, logo. etc.).

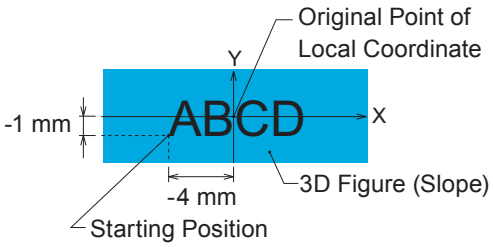
World coordinate	:	The coordinate system that sets the area center to the origin point and specifies the center position of the 3D work shape (layer).
Local coordinate	:	The coordinate system that sets the center of the 3D work shape to the origin point and specifies the marking position of characters, bar codes, and logos.

When setting each center position of the 3D figure (layer: slope), center position X: 10 mm, center position Y: 10 mm, and center position Z: 8 mm, these positions are set on the world coordinate shown as follows.



■ Coordinate setting for marking content : Local coordinate

When setting the starting position of the marking content, X position: -4 mm, Y position: -1 mm, each setting condition is set on the local coordinate as follows.



■ 3D Marking Method

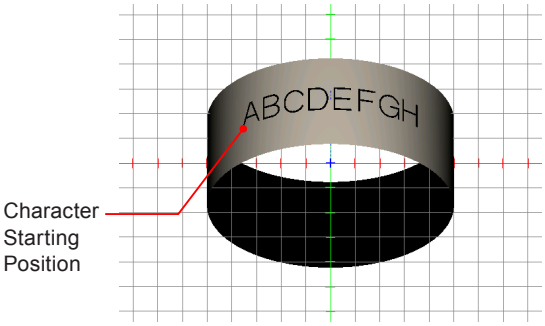
There are two methods for marking 3D figure, “Label Sticking Marking Method” and “Vertical Projection Marking Method”. The marking method is determined depending on the type of the 3D figure.

- Label sticking marking method: plane, cylinder (marking on convex /concave face), horizontal cone (marking on convex / concave face)
- Vertical projection marking method: vertical cone (marking on convex /concave face), sphere (marking on convex / concave face)

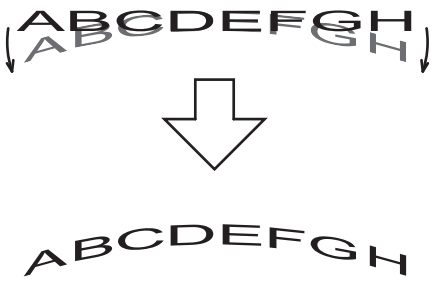
● Label sticking marking method

With this method, the laser marker performs the marking on the 3D figure like sticking label on the 3D figure.

Target type of 3D figure: plane, cylinder (marking on convex/concave face), sphere (marking on convex /concave face)



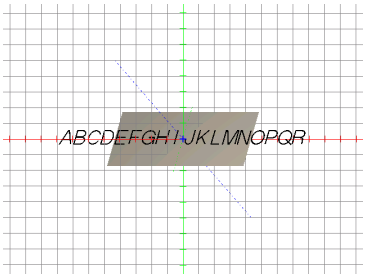
[Marking image on convex face of cylinder]



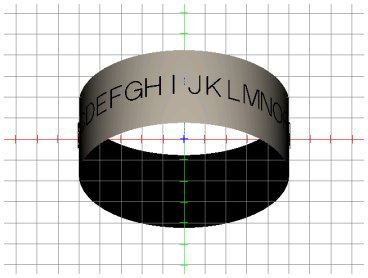
[Sticking-like image]

Reference

- When marking on cylinder and cone, set the starting position of marking content X and Y by measuring the length on curved face.
- When setting status of the marking content exceeds the figure area (see figure below) and starting marking, the marking error (E671/E672) is occurred and the laser marker cannot perform marking. Therefore, check the marking content using “3D View Screen” (“2-14-3 3D View Screen” (P.212)), and perform guide indication of the marking character before marking. When the marking content is displayed within the figure area, start the marking.



[Plane]



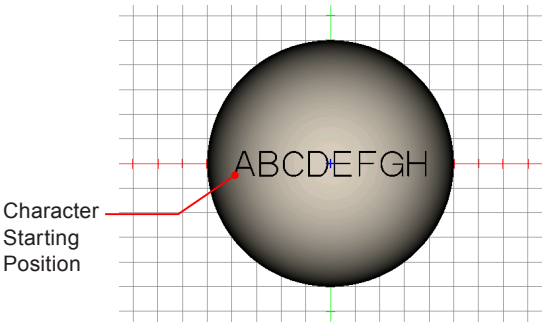
[Cylinder (marking on convex face)]

Marking Setting Character “ABCDEFGHIJKLMNOPQR”

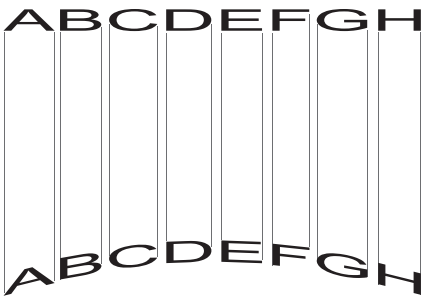
● Vertical projection marking method

With this method, the laser marker performs the marking on the 3D figure like vertical-projecting marking content onto the 3D figure.

Target type of 3D figure: vertical cone (marking on convex /concave face), sphere (marking on convex /concave face)



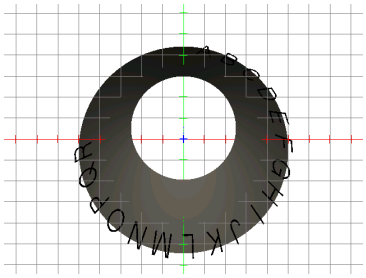
[Marking image on convex face of sphere viewing from top]



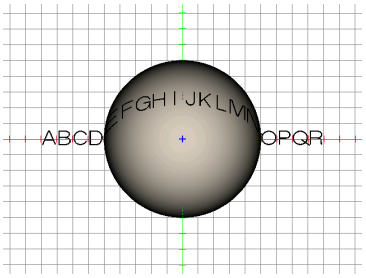
[Sticking-like image]

Reference

- When marking on cylinder and cone, set the starting position of marking content X and Y by measuring the length on curved face.
- When setting status of the marking content exceeds the figure area (see figure below) and starting marking, the marking error (E671/E672) is occurred and the laser marker cannot perform marking. Therefore, check the marking content using “3D View Screen” (“2-14-3 3D View Screen” (P.212), and perform guide indication of the marking character before marking. When the marking content is displayed within the figure area, start the marking.



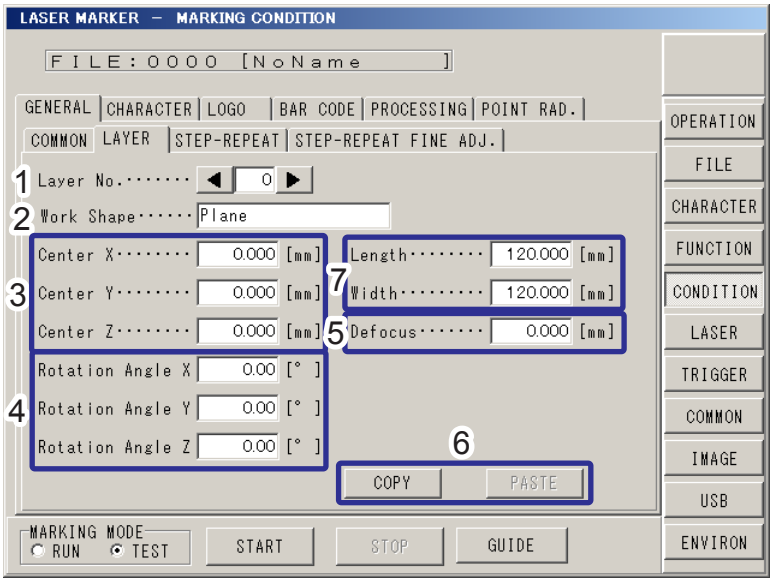
[Marking image cone with its heightwise set parallel to Z axis]



[Marking image on convex face of sphere]

Marking Setting Character “ABCDEFGHIJKLMNOPQR”

■ Screen Description of Layer Condition

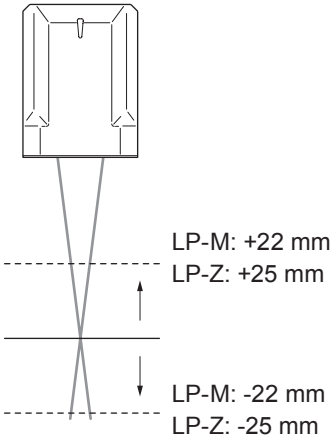


	Description
1	Layer No.: Specifies the layer No. to be edited. One marking face can be set per layer No. Setting Range: 0 to 15
2	Work Shape: Specifies the work type of the 3D figure to be marked.
3	Center X / Center Y / Center Z : Sets the coordinate of the center position of the 3D figure. Setting Range: -60.000 to +60.000 mm (LP-M500 / LP-Z130)*

Reference

- The compatible coordinate is world coordinate (coordinate system with the center of area set to as original point). Specify the center position of the 3D figure as the original point for marking. Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

4	Rotation Angle X / Rotation Angle Y / Rotation Angle Z : Sets the tilt angle (rotation angle) of the 3D figure to be marked. Each axis becomes the center of the rotation, and counter-clockwise direction becomes the “+ (plus) direction”. Setting Range of Rotation Angle X/Y: -90.00 to +90.00 degree Setting Range of Rotation Angle Z: -180.00 to +180.00 degree
5	Defocus : Sets this condition when performing defocus marking. Setting Range: -22.000 to +22.000 [mm] (LP-M500)* -25.000 to +25.000 [mm] (LP-Z130)*



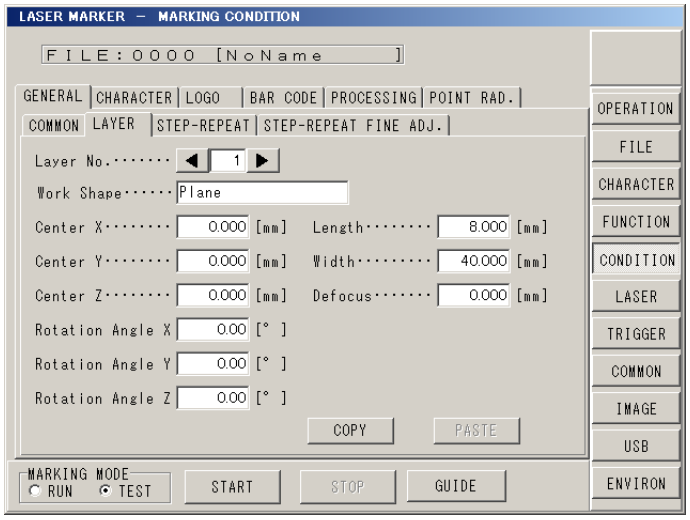
Reference

- The defocus is adjustable by ±22 mm (for LP-M series) or ±25 mm (for LP-Z series) from the specified work distance. In case of setting either Z offset or uniform spot mode, set the summed distance with those offset and defocus to be within ±22 mm (for LP-M series) or ±25 mm (for LP-Z series). If this summed distance exceeds the range and the user starts marking, the error might occur.
- When the uniform spot mode is set, only the minus value of the defocus is available. Setting the defocus between 0 mm to +22 mm (for LP-M series) or +25 mm (for LP-Z series) under the uniform spot mode set is invalid.

	Description
6	COPY/PASTE : Copies and pastes the layer condition.
7	Size of 3D figure : The setting items vary with the selected work shape.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

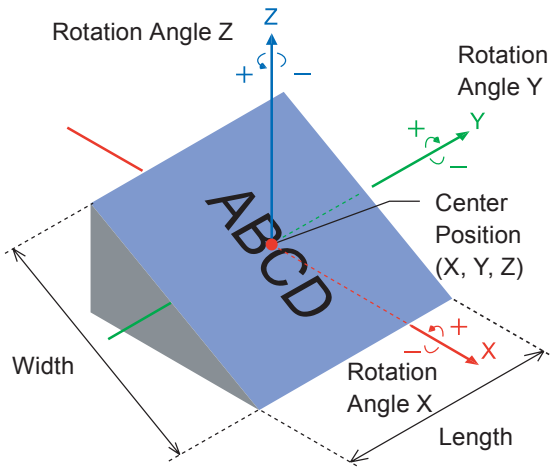
Setting for Plane



Description
Length, Width : Sets the length and width of the 3D figure.

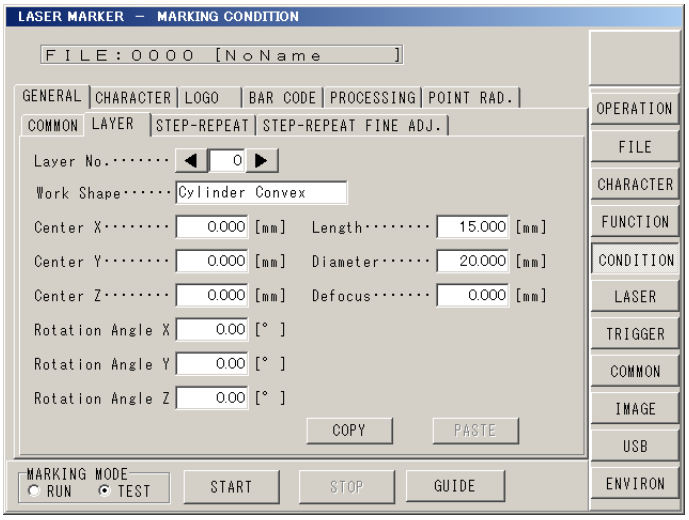
Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).



Setting items for plane

Setting for Cylinder



Description

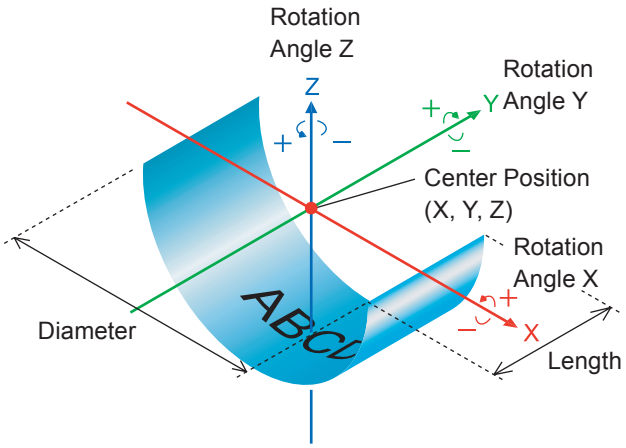
Length :
Sets the length of the cylinder.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

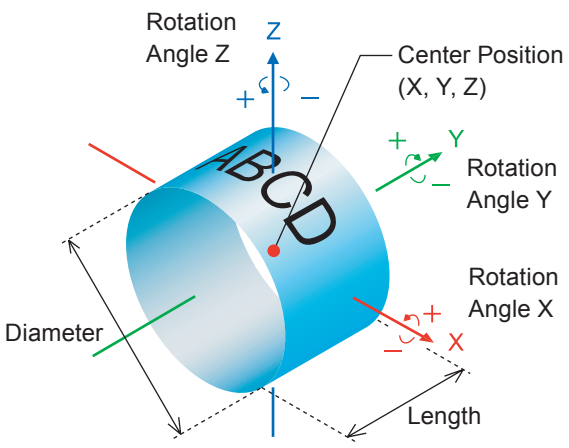
Diameter :
Sets the diameter of the cylinder.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

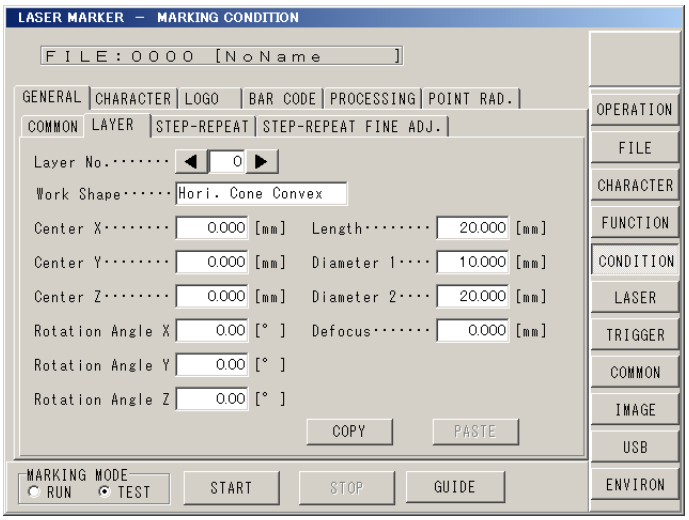


Setting items for concave face of cylinder



Setting items for convex face of cylinder

Setting for Horizontal Cone



Description

Height :
Sets the height of the horizontal cone.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

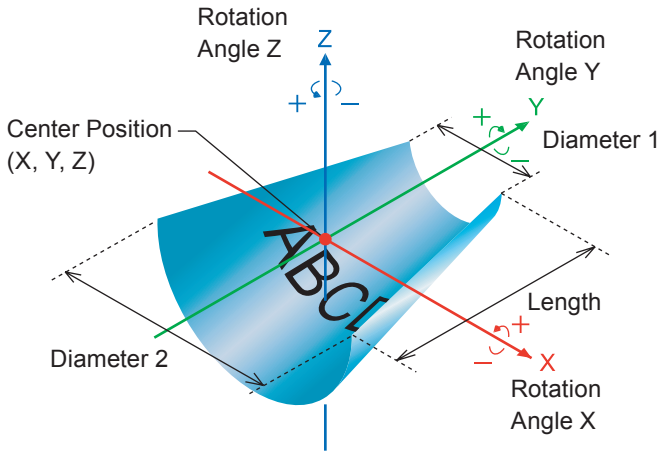
Diameter 1 :
Sets the diameter (+Y side) of the horizontal cone.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

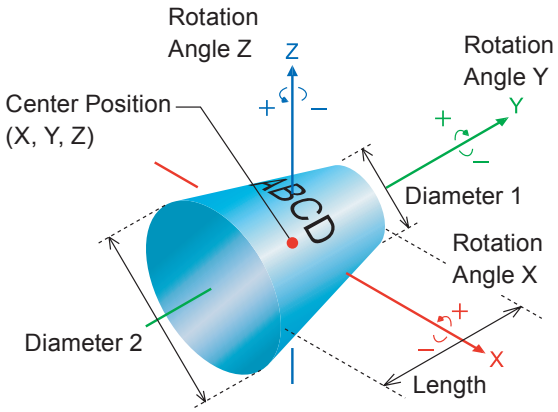
Diameter 2 :
Sets the diameter (-Y side) of the horizontal cone.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

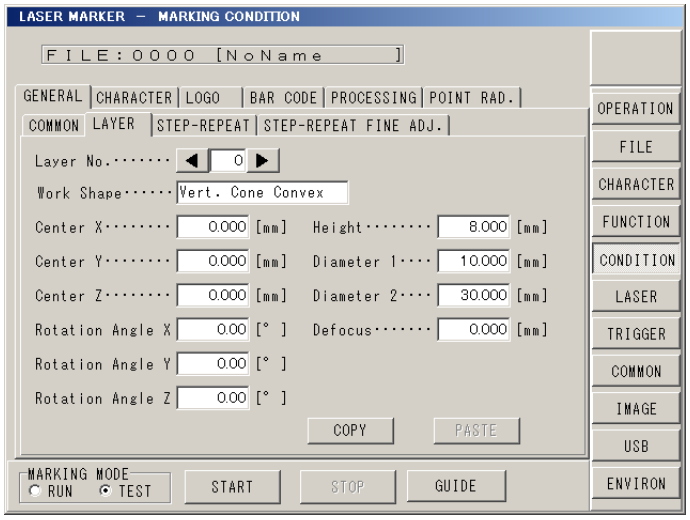


Setting items for concave face of horizontal cone



Setting items for convex face of horizontal cone

Setting for Vertical Cone



Description

Height :
Sets the height of the vertical cone.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

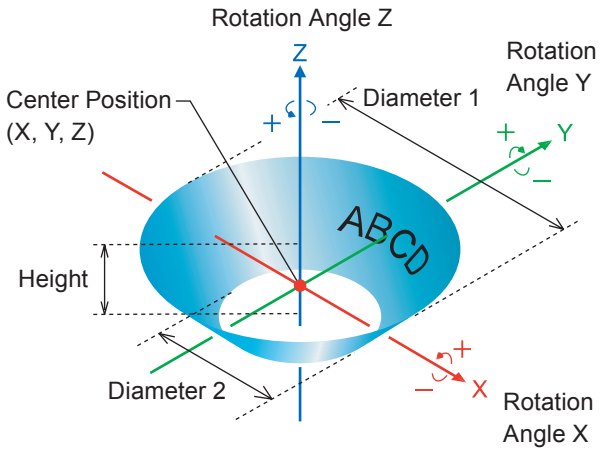
Diameter 1 :
Sets the diameter (+Z side) of the vertical cone.
When mark on convex face: Set smaller diameter as “Diameter 1” and larger diameter as “Diameter 2”.
When mark on concave face: Set larger diameter as “Diameter 1” and smaller diameter as “Diameter 2”.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

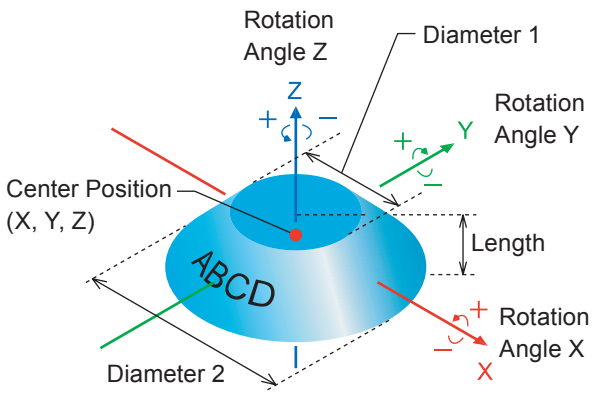
Diameter 2 :
Sets the diameter (-Z side) of the vertical cone.
When mark on convex face: Set smaller diameter as “Diameter 1” and larger diameter as “Diameter 2”.
When mark on concave face: Set larger diameter as “Diameter 1” and smaller diameter as “Diameter 2”.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

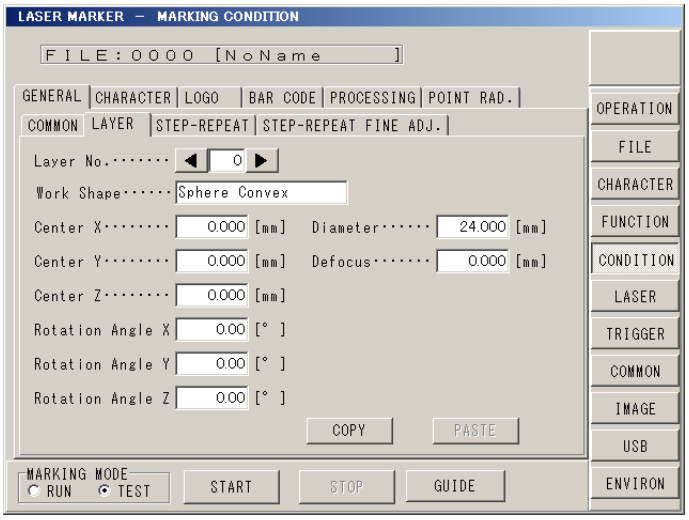


Setting items for concave face of vertical cone



Setting items for convex face of vertical cone

Setting for Sphere

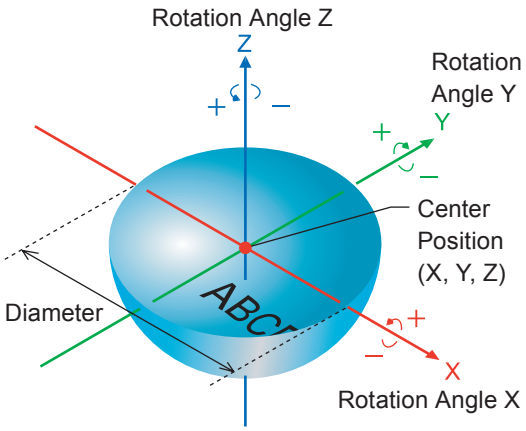


Description

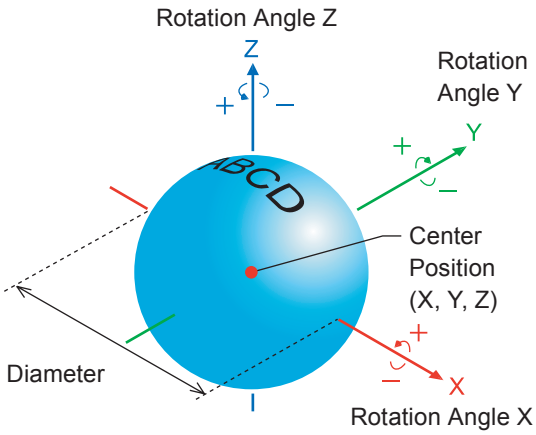
Diameter :
Sets the diameter of the sphere.

Setting Range	1.000 to 120.000 mm (LP-M500 / LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).



Setting items for concave face of sphere



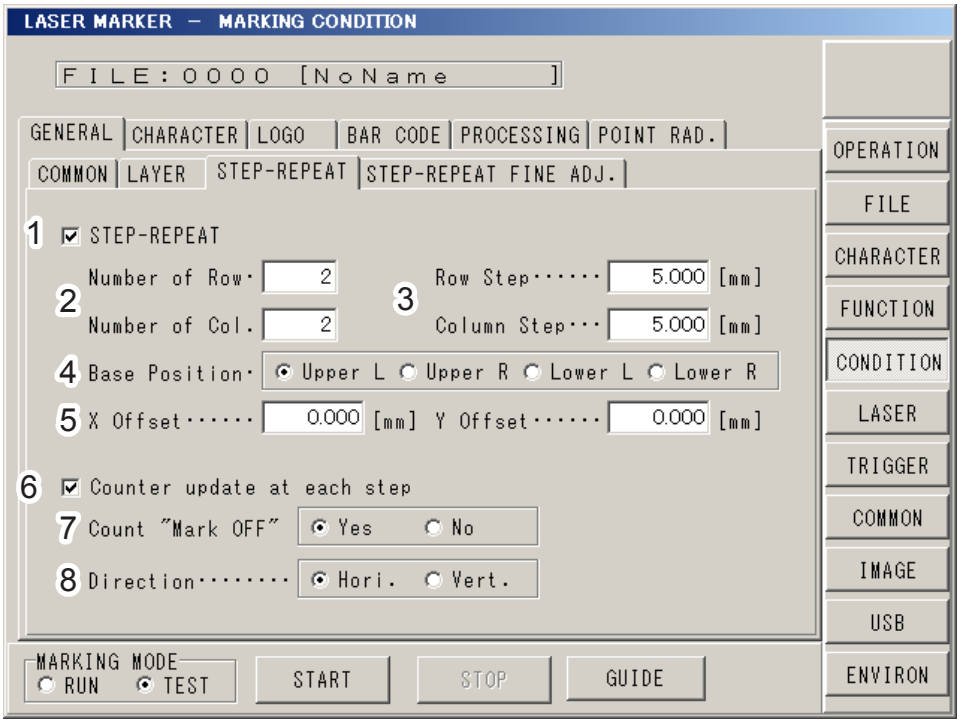
Setting items for convex face of sphere

■ Step & Repeat

This “Step & Repeat” applies for marking the same content repeatedly. It is usable for marking object laid side by side such a palletized object.

Reference

- For LP-M and LP-Z series, when the “3D” on the “2D/3D setting” of the common condition on for the general condition is checked ON, the Step & Repeat marking becomes invalid.



	Description
1	Step-Repeat (Step & Repeat Marking) : Check this box to validate the Step & Repeat marking function.
2	Number of Row : Number of Column : The the number of rows / columns where the pattern which has been set is to be marked. Setting Range: 1 to 400 Reference • The pattern is the unit of data created in Step & Repeat. • Max. number of settable patterns is 4000.
3	Row Step : Column Step : The pitch between patterns in row / column direction. Setting Range: 0.000 to 120.000 mm (LP-M500 / LP-Z130)*; 0.000 to 90.000 mm (LP-S500)*
4	Base Position : Specifies the position of reference pattern for step & Repeat marking. Select the position among [Upper L], [Upper R], [Lower L], [Lower R].
5	X/Y Offset : Shifts the object to X/Y direction. This coordinate is applied to the origin of the base object. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*; -45.000 to +45.000 [mm] (LP-S500)*

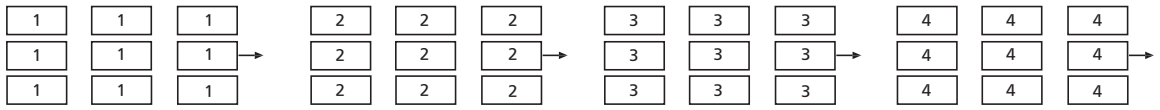
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

	Description

6 Counter update at each step :
Check this box to validate the counter updating at each marking of Step & Repeat.

Reference

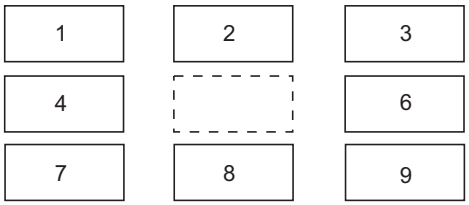
- Counter marking is impossible unless the functional character for counter has been input in the character string for marking.
- In case the counter is included in the marking character and the “Counter update at each step” is not selected, the all counter values are the same in one Step & Repeat marking as shown in the figure below.



7 Count “Mark OFF” :
When the Step & Repeat counter is used and set the mark off in the specified pattern, select here whether the counter value of the marking off part is counted or skipped.
Refer to “Step & Repeat Fine-Adjustment” (P.147)

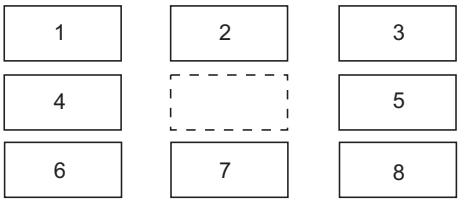
Yes : Skips the counter value on the column/row which "Mark OFF".

(ex) Step-Repeat with 3 rows × 3 columns
Marking OFF: marking on the 2nd row of 2nd line
Direction: Hori.
Base Position: Upper L



No : Not skip the counter value on the column/row which “Mark OFF”.

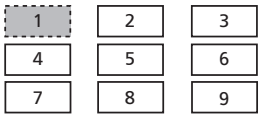
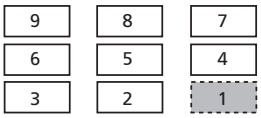
(ex) Step-Repeat with 3 rows × 3 columns
Marking OFF: marking on the 2nd row of 2nd line
Direction: Hori.
Base Position: Upper L



8 Direction:
When the Step & Repeat counter is used, select the direction of counting between horizontal and vertical.

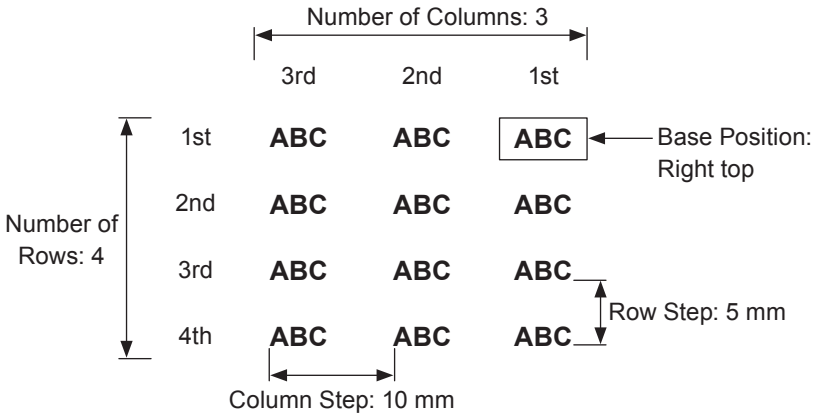
Reference

- If the counter function is set with Step & Repeat, the counting order becomes as follows.
  Ex. Step & Repeat of 3 rows and 3 columns with counter update at each step. (“1” is the base position.) :

			
Base Position: Upper L Marking Direction: horizontal	Base Position: Upper R Marking Direction: horizontal	Base Position: Lower L Marking Direction: horizontal	Base Position: Lower R Marking Direction: horizontal

Step & Repeat setting sample

Setting parameter:
- Character: ABC
- Number of Rows: 4
- Number of Columns: 3
- Row Step: 5 mm
- Column Step: 10 mm
- Base Position: Right top

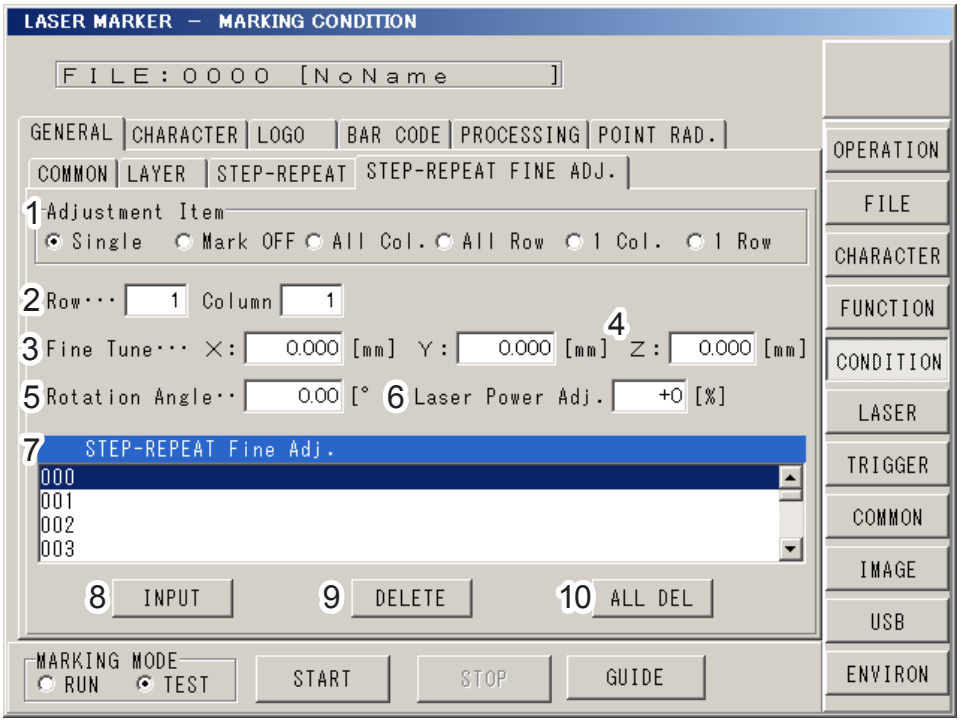


Reference

- The settings of “Common Condition” in “General Condition” are reflected after the settings in “Step & Repeat” are applied.

■ Step & Repeat Fine-Adjustment

In the Step & Repeat marking, when the marking position or power setting of some patterns are adjusted separately, set this fine-adjustment conditions.



	Description
1	Single: Provides adjustment to the marking position for a pattern specified by the target row and the target column.
	Mark OFF: Skips the marking of a pattern specified at “Row and Column”.
	All Col. (All Column Fine Adjustment): Provides adjustment to all marking positions for patterns included in the columns from that specified at “Column” to the last.
	All Row (All Row Fine Adjustment): Provides adjustment to all marking positions for patterns included in the rows from that specified at “Row” to the last.
	1 Col. (1 Column Fine Adjustment): Provides adjustment to all marking positions for patterns included in the column specified.
	1 Row (1 Row Fine Adjustment): Provides adjustment to all marking positions for patterns included in the row specified.

Reference

- The pattern to which “Marking OFF” is specified is not displayed on the operator adjustment screen and on the image display screen under the adjustment of character condition.

2 Row (Target Row) / Column (Target Column) :
Specifies the intended row / column for the fine adjustment for Step & Repeat.

Setting Range	1 to 400

Reference

- Max. number of settable patterns is 4000.
- The fine tuning is enabled only for the specified rows and columns.

3 Fine Tune X / Fine Tune Y:
Specifies the amount of adjustment for X/Y axis to the selected row or/and column.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

4 Fine Tune Z (LP-M / LP-Z series only):
Specifies the amount of adjustment for Z axis to the selected row or/and column.

Setting Range	-22.000 to +22.000 mm (LP-M500)*
	-25.000 to +25.000 mm (LP-Z130)*

5 Rotation Angle:
Specifies the rotation angle of the pattern which is specified in the above Fine Adjustment type selection, Row, and Column. Characters and logos which are selected to be fine-adjusted must be set to the origin of the pattern as the rotation center.

Setting Range	-180.00 to +180.00 degree

6 Laser Power Adj. (Laser Power Adjustment):
Specifies the laser power adjustment amount of the pattern which is specified in the above Fine Adj. Instruction, Row, and Column.

Setting Range	-50 to +50%

Reference

- For the marking pattern which more than one fine adjustment is set, the laser power adjustment value is the total amount of the each settings.
  In that case, the available range of the laser power adjustment is +/-50%.

  1st line : laser power adjustment +20%
  1st row : laser power adjustment 10%
  [Total amount of the laser power] 20%+10%=30%.

A	A	A	A	A	A	A	A	A	A
A									
A									
A									
A									

7 STEP-REPEAT Fine Adj. (STEP-REPEAT Fine Adjustment List):
List of fine adjustment instruction for each pattern.

Setting Range	0 to 399 (totally 400 instructions)

Reference

- When an instruction in this list is selected and the image display appears, the pattern conforming the row/column condition to the indication is indicated in green.
- When an instruction in this list in selected and the line selected is pressed, the content of setting for the line is read out.

8 INPUT:
Sets the instructing content to the selected line from the list of the fine adjustment for the Step & Repeat by pressing INPUT button. (Not pressing INPUT button does not activate the fine adjustment.)

Reference

- The original instruction is deleted by overwriting if any instruction is provided to the selected line from the list of the fine adjustment for the Step & Repeat.

9 DELETE:
Deletes the instruction for fine adjustment set to the list of the fine adjustment for the Step & Repeat.

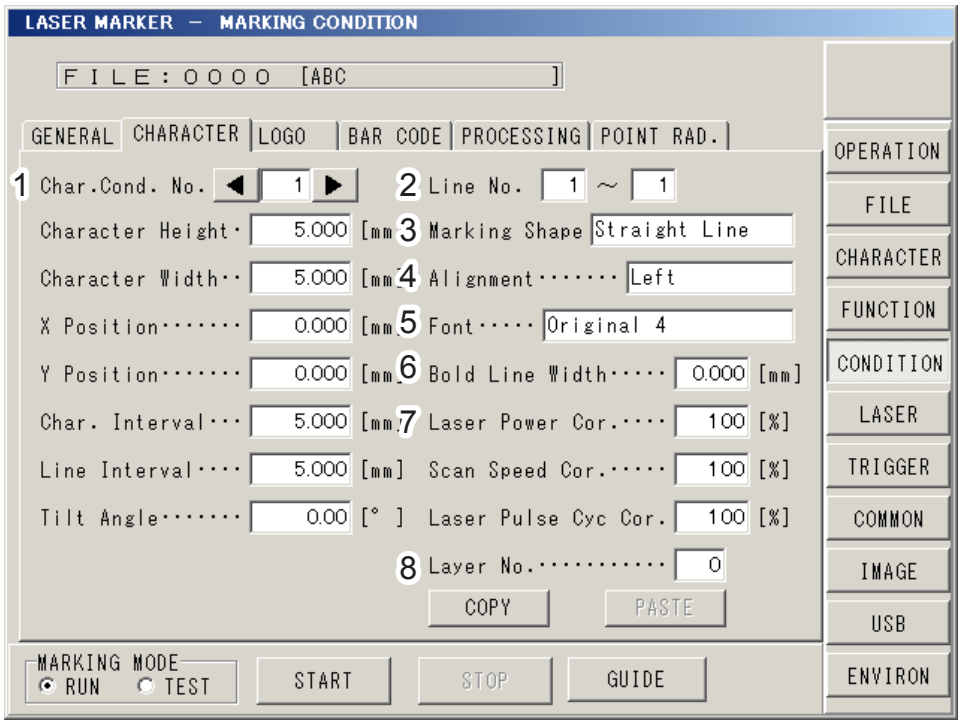
10 ALL DEL:
Deletes all instruction for fine adjustment set to the list of the fine adjustment for the Step & Repeat.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

Reference

- The settings of “Common Condition” in “General Condition” are reflected after the settings in “Step & Repeat”are applied.

2-10-2 Character Conditions



	Description
1	Char. Cond. No. (Character Condition No.) : Specifies the number of condition to be set. Setting Range: 1 to 99
2	Line No. : Specifies the line number of character strings to be marked corresponding to the condition number. Setting Range: 1 to 99
3	Marking Shape : Selects “Straight Line”, “Proportional”, “Justify”, “Arc Outside (+)”, and “Arc Outside(-)”. The setting varies by pressing this field.
4	Alignment : Selects Center, Right, or Left. The setting varies by pressing this field.
5	Font : Selects the fonts registered into the character font. Refer to “2-15-4 Font File” (P.216). The setting varies by pressing this field. Select the font to be used. The font can be selected for each condition number.
6	Bold Line Width : Specifies the width of bold character line. Setting Range: 0.000 to 2.000 mm (LP-M500 / LP-S500 / LP-Z130)*

Notice

- Marking of bold character may affect the quality of marking. Check it by a trial before using this function.

Reference

- At marking of bold characters, set the values so ratio of character height to character width be within 1/10 to 10.
- Set line width of bold character to half or below of either smaller one, character height or character width.
- When marking the bold character, set the marking pitch in the Common Character Condition together. Refer to “Common Condition” (P.130).
- The Original Font 4 may fail to mark the character in bold.

	Description
7	Laser Power Correction : Scan Speed Correction : Laser Pulse Cycle Correction (Except LP-SxxxW type) : Correction of each character condition No. for the laser power / scan speed / laser pulse cycle set at laser setting.

Setting Range of Laser Power Correction	0 to 999%
Setting Range of Scan Speed Correction	1 to 999%
Setting Range of Laser Pulse Cycle Correction	1 to 999%

Reference

- If the value of “Laser power correction” × “laser power” is equal to or larger than 100, the setting will be “100”.
- Marking is not available when the laser power correction value is “0”.
- If the value of scan speed correction × scan speed exceeds the upper limit, the upper limit is set.
- If the value of Laser pulse cycle correction × laser pulse cycle exceeds the setting range, the upper/lower limits are set.

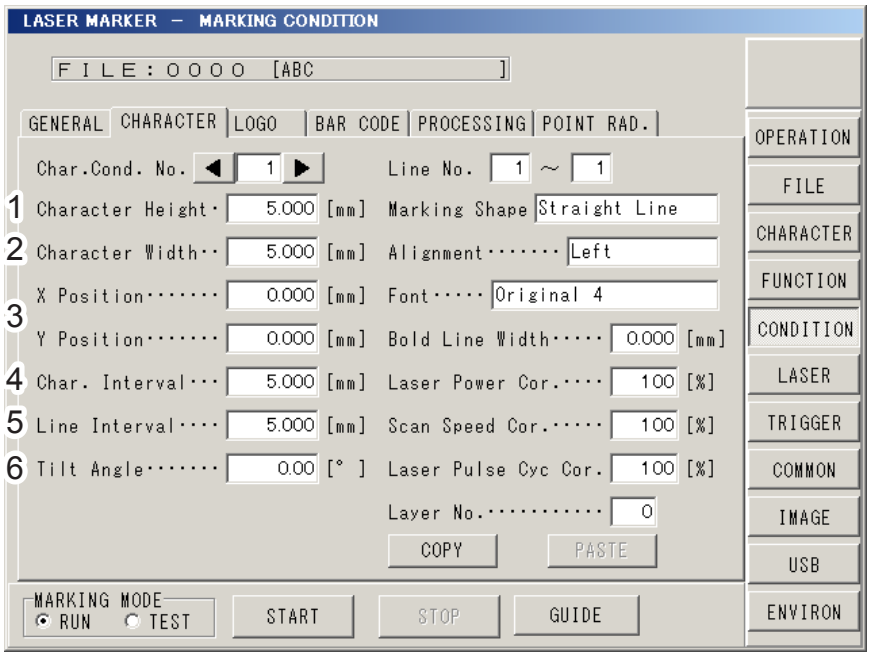
8 Layer No. :

- When more than one condition of the marking data is set, layer No. specifies the marking order. The laser marker performs the marking with the smaller order of the layer No. specified beforehand (Layer No. 0 is firstly marked, and Layer No. 15 is marked finally.). Note that it is not applicable for the Step & Repeat marking.
- In marking connecting character to flying object, layer No. indicates the order of the marking field.
- When the 3D marking mode is selected (only for LP-M and LP-Z series), layer No. indicates in which work shape is set the condition of the marking data.

Setting Range	0 to 15

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Marking Shape: “Straight Line”, “Proportional” and “Justify”.



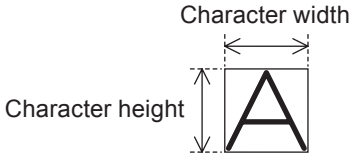
	Description

1 Character Height :

2 Character Width :

Specifies the height / width of character.

Setting Range	0.100 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.100 to 90.000 [mm] (LP-S500)*



3 X/Y Position :

Sets the X/Y position of the origin point of the reference character.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

Reference

- When marking on the 3D figure for LP-M / LP-Z series, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

4 Char. Interval (Straight line/Proportional) :

Character String Width (Justify) :

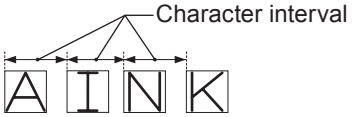
Specifies the pitch between a character and the adjacent character.

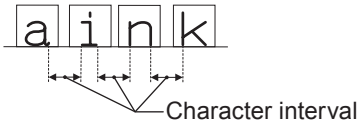
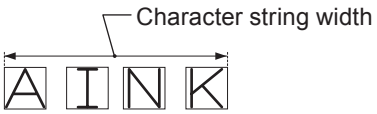
Setting Range	0.000 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.000 to 90.000 [mm] (LP-S500)*

According to the marking shape(Straight line/Proportional/Justify), the meaning of character interval is different as follows.

[Straight Line]

Character interval indicates the distance between origins of the characters.

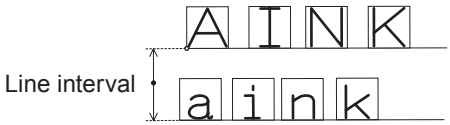


	Description
	[Proportional] Character interval indicates the distance between the character edge line. When “Proportional” setting, set Kerning in “2-10-1 General Condition” (P.130) to adjust the balance of the character interval. 
	[Justify] The characters are arranged in the specified string width equally. 

5 Line Interval :

Specifies the pitch between the lines.

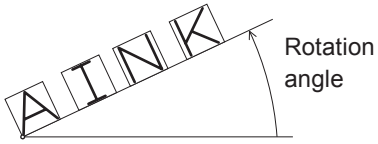
Setting Range	0.100 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.100 to 90.000 [mm] (LP-S500)*



6 Tilt Angle :

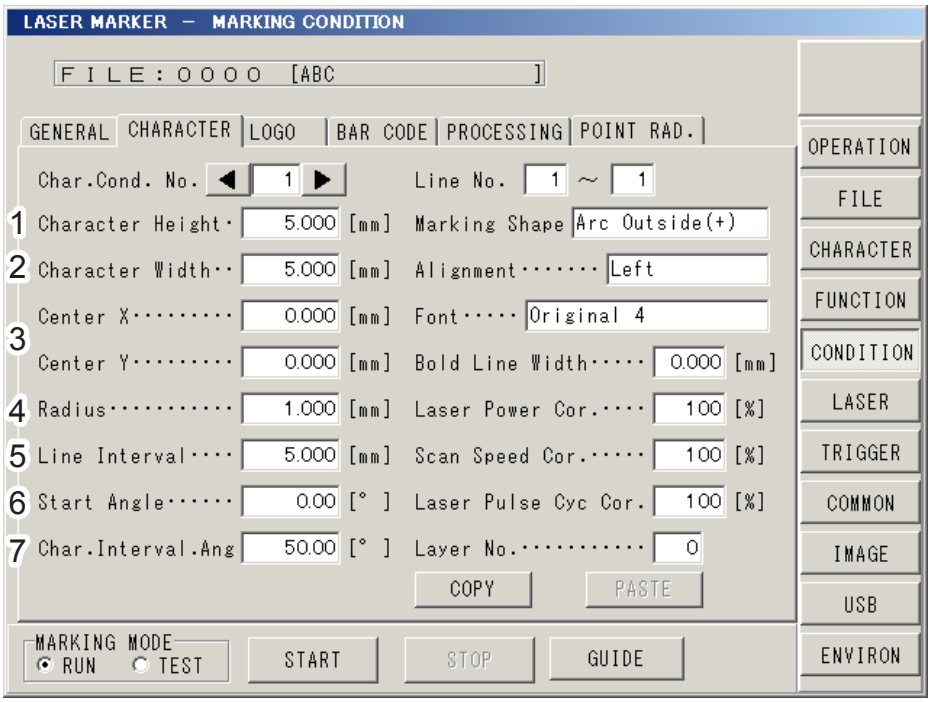
Angle to X axis.

Setting Range	-180.00 to +180.00 degree



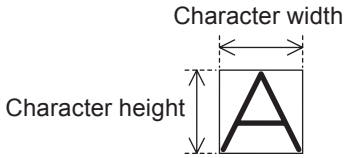
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Marking Shape: Arc Outside / Arc Inside



	Description
1 2	Character Height : Character Width : Specifies the height / width of character.

Setting Range	0.100 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.100 to 90.000 [mm] (LP-S500)*



3 Center X/Y (Center Position X/Y) :
Sets the center position of the arc.

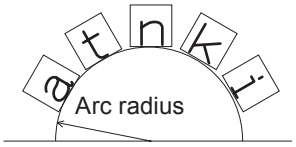
Setting Range	-999.999 to +999.999 mm

Reference

- When marking on the 3D figure for LP-M / LP-Z series, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

4 Radius :
Sets the radius of arc.

Setting Range	0 to 999.999 mm

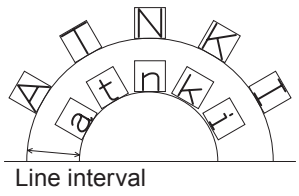


	Description

5 Line Interval :

Specifies the radius between the lines.

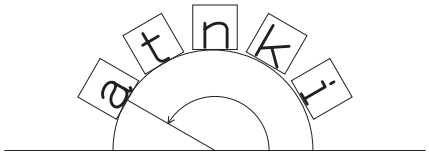
Setting Range	0.100 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.100 to 90.000 [mm] (LP-S500)*



6 Start Angle :

The start position of the first marking character on the first line.

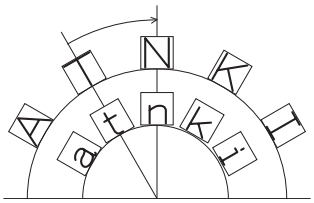
Setting Range	-180.00 to +180.00 degree



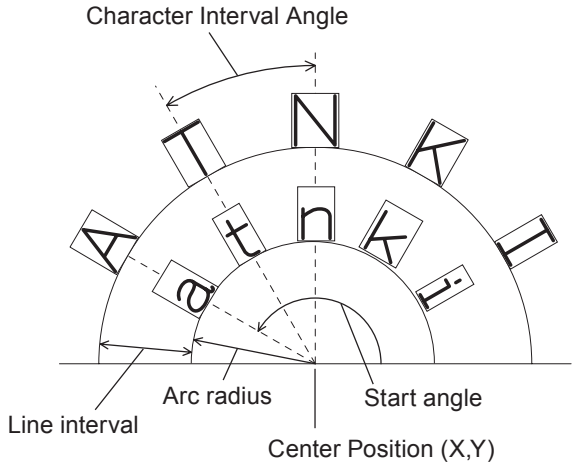
7 Character Interval Angle :

Angle between two adjacent characters.

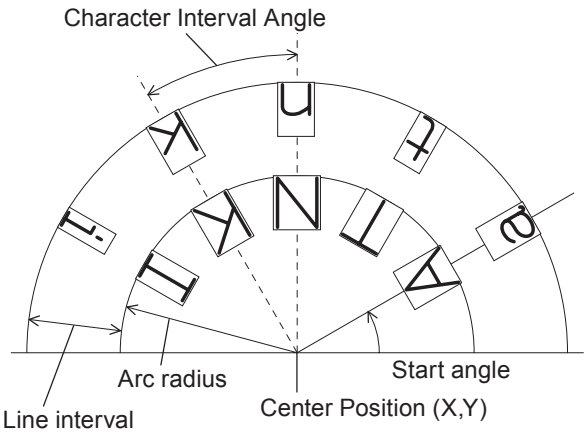
Setting Range	-180.00 to +180.00 degree



* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).



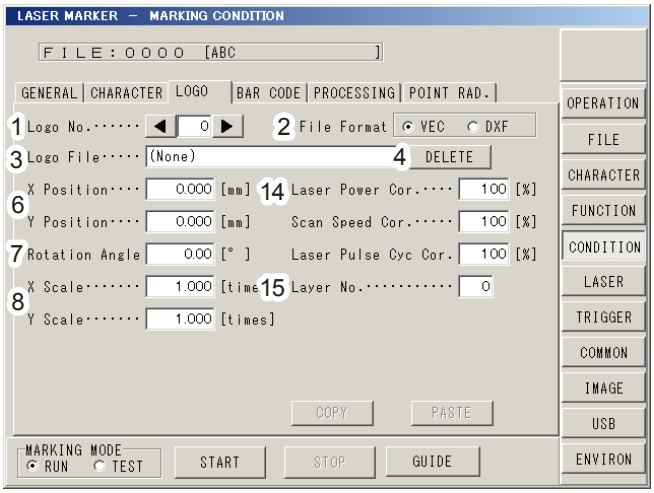
Arc/Outside (+)
(Origin of character string for left justification)



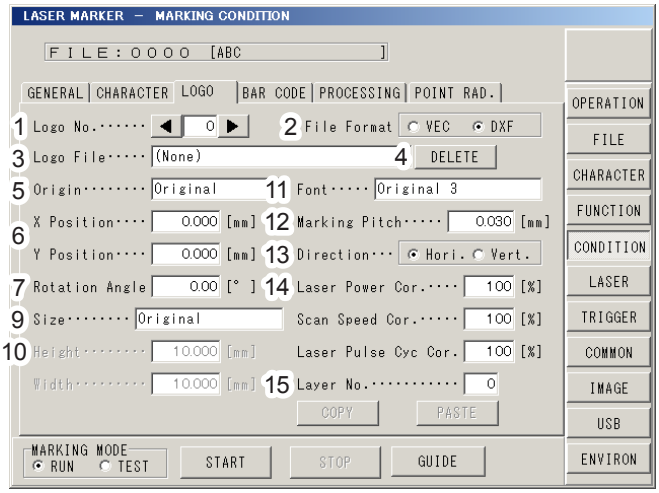
Arc/inside (-)
(Origin of character string for left justification)

2-10-3 Logo Condition

■ VEC File Format



■ DXF File Format



	Description

1 Logo No. :

Registered No. of logo data to be marked. Max. 100 logo files are settable for per file.

Setting Range	0 to 99

2 File Format :

Selects file format from “VEC” or “DXF”.

3 Logo File :

Displays the logo file set to the specified logo No. The selecting window for logo file is appeared by pressing logo file name. Select the logo file to be marked, and press [SET].

Reference

- The max. loadable coordinate is 131,072 points.
  The number of coordinate points can be checked in “Logo Data Conversion Software”.
- Compared to the VEC file, the data amount of the DXF file becomes heavier and its time to be in READY for marking will be longer.
  In case of registering much logo data or shortening the time for file change, convert the DXF data into the VEC data using the attached software “Logo Data Conversion Software”.

4 DELETE :

Press [DELETE] to delete the setting of the logo file.
If there is no logo file setting, the logo condition is not saved at file saving.

5 Origin (only for DXF file format) :

Specifies the coordinate of the origin point for DXF file data.
Select from center, lower left, lower right, upper left, upper right or as original graphic.

6 X/Y Position :

X/Y position of the reference point of the logo file data.

Setting Range	-330.000 mm to +330.000 mm

Reference

- When marking on the 3D figure for LP-M / LP-Z series, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.

7 Rotation Angle :

Sets the rotation direction of the logo file data.

Setting Range	-180.00 to +180.00 degree

	Description
8	X/Y Scale (only for VEC file format) : Specifies the magnification of X/Y of the VEC file data. Setting Range: 0.100 to 10.000 times
9	Size (only for DXF file format) : Specifies size specification method of DXF file data. • Height/Width : Sets height and width respectively. • Width (Keep Ratio) : Sets width with height ratio fixed. • Height (Keep Ratio) : Sets height with width ratio fixed. • Original : Sets DXF file size as original size.
10	Height, Width (only for DXF file format) : Sets height / width of DXF file data. Setting Range: 0.100 to 120.000 [mm] (LP-M500 / LP-Z130)* 0.100 to 90.000 [mm] (LP-S500)*
11	Font (only for DXF file format): Specifies font type to be used for the text character in DXF file data. The setting varies by pressing this field. The font can be selected for each logo file.
12	Marking Pitch (only for DXF file format): Sets marking pitch of the solid hatching drawing in DXF file data. Setting Range: 0.010 to 2.000 mm
13	Marking Direction (only for DXF file format) : Sets marking direction of the solid hatching drawing in DXF file data. Both vertical and horizontal directions are settable.
14	Laser Power Correction : Scan Speed Correction : Laser Pulse Cycle Correction (Except LP-SxxxW type) : Correction of each logo No. for the laser power / scan speed / laser pulse cycle set at laser setting. Setting Range of Laser Power Correction: 0 to 999% Setting Range of Scan Speed Correction: 1 to 999% Setting Range of Laser Pulse Cycle Correction: 1 to 999%
15	Layer No. : • When more than one condition of the marking data is set, layer No. specifies the marking order. The laser marker performs the marking with the smaller order of the layer No. specified beforehand (Layer No. 0 is firstly marked, and Layer No. 15 is marked finally.). Note that it is not applicable for the Step & Repeat marking. • In marking connecting character to flying object, layer No. indicates the order of the marking field. • When the 3D marking mode is selected (only for LP-M and LP-Z series), layer No. indicates in which work shape is set the condition of the marking data. Setting Range: 0 to 15

Reference

- If the value of “Laser power correction” × “laser power” is equal to or larger than 100, the setting will be “100”.
- Marking is not available when the laser power correction value is “0”.
- If the value of scan speed correction × scan speed exceeds the upper limit, the upper limit is set.
- If the value of Laser pulse cycle correction × laser pulse cycle exceeds the setting range, the upper/lower limits are set.

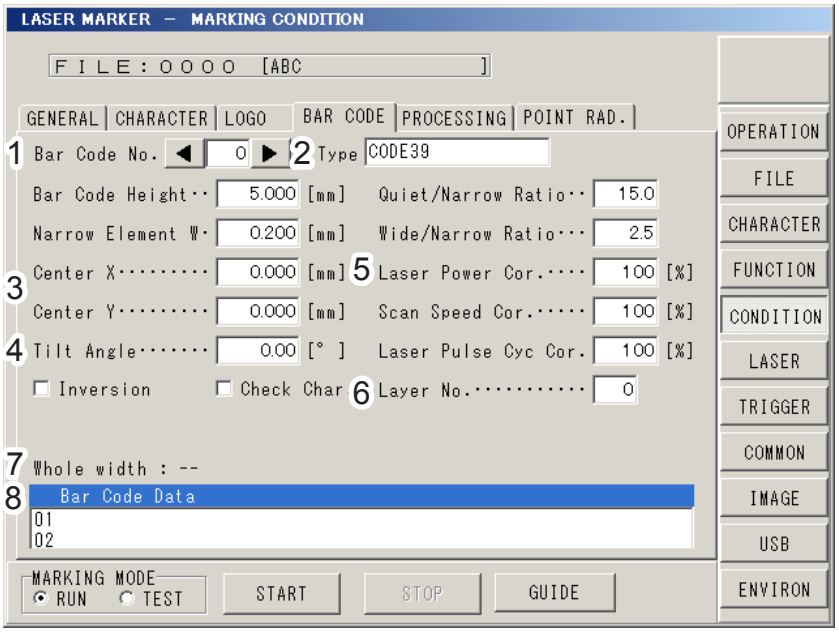
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

2-10-4 Bar Code Condition

Notice

- When marking bar code or 2D code, read the laser-marked code with the code reader, and check the content of the marked code that is output from the code reader is coincident with the original bar code or 2D code without fail.
- Since the marking to the flying object is affected by vibration or line speed easily, marking and reading 2D code or bar code to the flying object might become unstable. Therefore, when marking 2D code or bar code to the flying object, check the marking and reading state of the marked code on the flying object sufficiently.

■ Common setting for bar code and 2D code



	Description
1	Bar Code No. : Specifies up to 16 codes per one registered file. Setting Range: 0 to 15
2	Type : Select the code type. Press code name to display the Bar Code selecting screen.
3	Center Position X/Y or X/Y Position: Specifies the center position of the code. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)* -45.000 to +45.000 [mm] (LP-S500)*
	Reference • When marking on the 3D figure for LP-M / LP-Z series, the starting point of the character is set on the local coordinate system (coordinate with its original point set to the center of the figure). Refer to “Coordinate System (World Coordinate / Local Coordinate)” (P.135) for details.
4	Tilt Angle or Rotation Angle: Sets the angle of the code. Setting Range: -180.00 to +180.00 degree

	Description
5	Laser Power Correction : Scan Speed Correction : Laser Pulse Cycle Correction (Except LP-SxxxW type) : Correction of each bar code No. for the laser power / scan speed / laser pulse cycle set at laser setting.

Setting Range of Laser Power Correction	0 to 999%
Setting Range of Scan Speed Correction	1 to 999%
Setting Range of Laser Pulse Cycle Correction	1 to 999%

Reference

- If the value of “Laser power correction” × “laser power” is equal to or larger than 100, the setting will be “100”.
- Marking is not available when the laser power correction value is “0”.
- If the value of scan speed correction × scan speed exceeds the upper limit, the upper limit is set.
- If the value of Laser pulse cycle correction × laser pulse cycle exceeds the setting range, the upper/lower limits are set.

6 Layer No. :

- When more than one condition of the marking data is set, layer No. specifies the marking order. The laser marker performs the marking with the smaller order of the layer No. specified beforehand (Layer No. 0 is firstly marked, and Layer No. 15 is marked finally.). Note that it is not applicable for the Step & Repeat marking.
- In marking connecting character to flying object, layer No. indicates the order of the marking field.
- When the 3D marking mode is selected (only for LP-M and LP-Z series), layer No. indicates in which work shape is set the condition of the marking data.

Setting Range	0 to 15

7 Whole width or Whole size:

Displays the entire size of the code, including the quiet zone corresponding to the data specified.
For the 2D code, the size with the margin or quiet zone is indicated in ( ).

8 Code Data :

Specifies the data to encode. Press the target line and press [EDIT] to display the data input screen.
Set the data character specified in “Code Type and Code Data” (P.159).

Reference

- Check the digit number of function characters before inputting the current date, expiry date, counter, lot, rank, and serial data function characters in the code data.
- When two or more character strings are input to the code data, they are connected as one string at the coding.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

Reference

- The marking pitch of the bar code is set at “Common Condition” (P.130).

■ Code Type and Code Data

Code Type	Constituent characters	number of characters
CODE39	Alphanumeric 0 to 9, A to Z symbol - + / $ % . space	Max. 60 characters
ITF	numeric 0 to 9	
CODE128	• ASCII Code within 00 (HEX) to 7F (HEX): alphanumeric, symbols and control codes • Function character (FNC1)	
NW-7	numeric 0 to 9 Symbols - $: / . +	
EAN/UPC	numeric 0 to 9 The bar code to be generated is determined based on the number of character inputted as shown below: • EAN-13: Input by 12 figures without check digit. • EAN-8: Input by 7 figures without check digit. • UPC-A: Input by 11 figures without check digit. • UPC-E: Input by 6 figures without check digit.	6, 7, 11, or 12 digits
RSS-14 (GS1 DataBar)	numeric 0 to 9	13 digits
RSS (GS1 DataBar) Limited		
RSS (GS1 DataBar) Expanded	ISO646 (English capital/small characters, numerics, space, 20 kinds of symbols), function key character (FNC1)	Max. 60 characters
2D side of composite code		CC-A: Max. 56 characters CC-B: Max. 255 characters CC-C: Max. 255 characters
QR code (Model 1) QR code (Model 2) Micro QR	Number mode (1 byte character): 0 to 9 Alphanumerical mode (1 byte character): 0 to 9, A to Z, space, $ % * + - . / : Binary mode: ASCII Code within 00 (HEX) to 7F (HEX), consisting of alphanumeric, symbols and control codes. Kanji mode (2 byte character): JIS level-1 and JIS level/2 within JIS code 2121 to 7426 (HEX)	Max. 255 characters
Data Matrix (ECC200)	Binary mode: ASCII Code within 00 (HEX) to 7F(HEX), consisting of alphanumeric, symbols and control codes. Kanji mode :JIS level-1 and JIS level-2 within JIS code 2121 to 7426(HEX)	
GS1 Data Matrix	ISO646 (capital/small letter, numerical, 20 types of symbols), function key character (GS)	

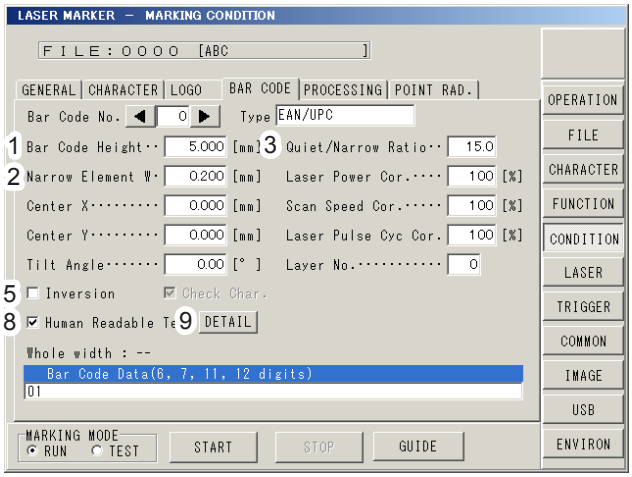
Reference

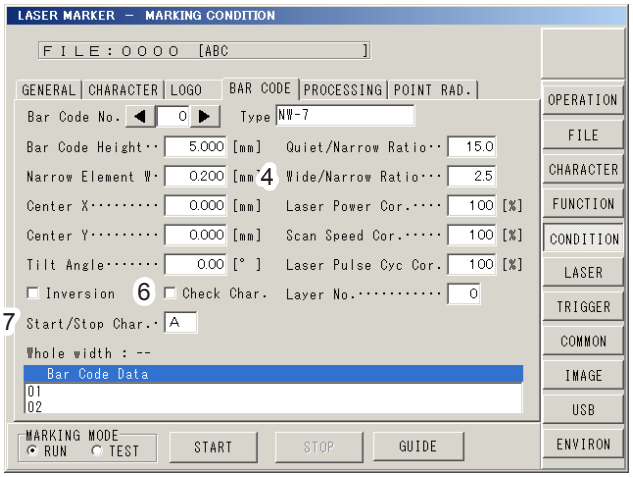
[CODE128]
- Inputting the control code “FNC1” to the head of the barcode data, CODE128 changes to UCC/EAN128(GS1-128).
- In the case that “FNC1” is set at the head in CODE128 and 13-digit characters are inputted after “01”, a check digit is added at 14th digit automatically.
- The start code A, B, C for CODE128 is selected automatically depending on the content of the data.

[ITF]
- Add “0” at the head of data if the number of characters inputted including the check characters is odd.

[RSS code]
- RSS code and GS1 DataBar code are the same code. In this product, it is represented as RSS code.
- The supported standard of RSS (GS1DataBar) Limited is 2006 version of ISO/IEC 24724.
- For RSS-14(GS1 DataBar), RSS(GS1 DataBar) Limited and those composite codes, input 13-figure numbers as the code data. In those human readable text, “01” as AI in the head of the text and the check digit (modulus10/weight 3-1) in the end of the text are indicated automatically.

■ CODE39, ITF, CODE128, NW-7, EAN/UPC





	Description
1	Bar Code Height : Specifies the height of bar code. The bar code height does not include the height of the human readable character. Setting Range: 1.000 to 120.000 [mm] (LP-M500 / LP-Z130)* 1.000 to 90.000 [mm] (LP-S500)*
2	Narrow Element Width : Specifies narrow element width of the bar code. Set the larger value than ‘Line width’ in laser setting screen. Setting Range: 0.050 to 1.000 mm
3	Quiet Zone / Narrow Element Ratio : Ratio of the quiet zone to narrow element width. Specifying the number other than “0” here makes it possible to view the image of the quiet zone if the inversion marking is not performed. Setting Range: 0.0 to 20.0
4	Wide Element / Narrow Element Ratio (only for CODE39 / ITF / NW-7) : Ratio of wide element to narrow element. Setting Range: 1.8 to 3.4
5	Inversion : Insert a checkmark to mark the bar code inverted. When a checkmark is not inserted, only the bars are marked. When a checkmark is inserted, the quiet zone and space in the symbol section are marked.
6	Check Character : Mark the check box to include check character in the bar code. Setting this check character function inputs the following check character automatically. • CODE 39: modulus 43 • ITF: modulus 10/weight 3-1 • NW-7: modulus 16
7	Start / Stop Character (NW-7 only) : Specifies the start/stop character. Select from "A", "B", "C" or "D".

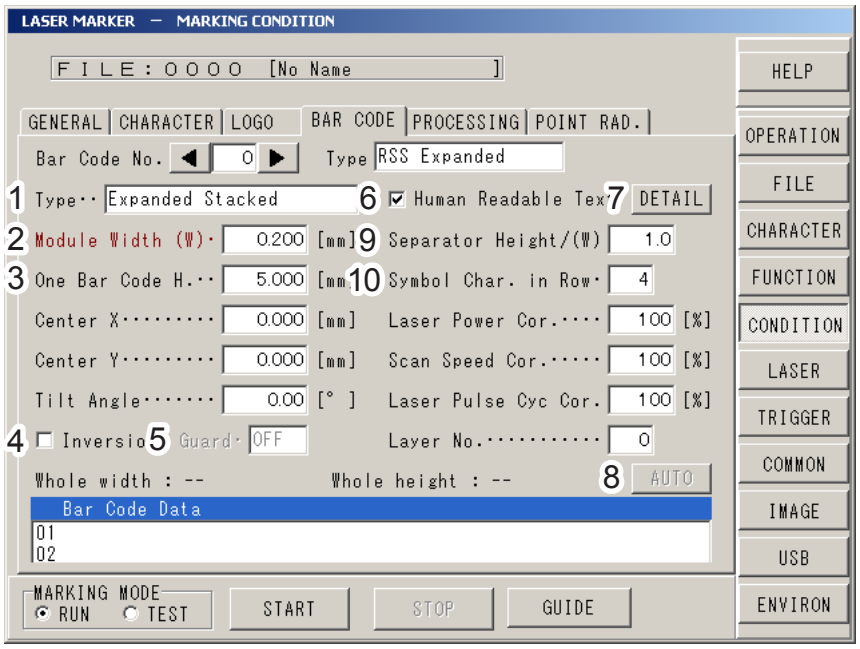
Reference

- For CODE 128, inputting "FNC1" and “01” at the head of the bar code data followed by 13-figure numeric automatically input one check digit (modulus10/weight 3-1).
- For 1D of Composite whose lower bar code consists of UCC/EAN128, inputting “01” at the head of the bar code data followed by 13-figure numeric automatically input one check digit (modulus10/weight 3-1).

	Description
8	Human Readable Text (only for CODE128 / EAN / UPC) : Sets “Human Readable Text” marking for EAN / UPC, CODE 128 and UCC/EAN128. Check the box to enable the function.
9	Show Detail (only for CODE128 / EAN / UPC) : Click this button to display the Human Readable Text Setting screen. For details of the setting, refer to “Human Readable Text” (P.172).

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Condition setting of GS1 DataBar (RSS code)



	Description
1	Type (RSS-14) (Except RSS(GS1 DataBar) Limited) : Specifies RSS-14 (GS1 DataBar)/RSS (GS1 DataBar) Expanded type. RSS-14 (GS1 DataBar): Select Standard & Truncated, Stacked, or Stacked Omnidirectional. RSS (GS1 DataBar) Expanded: Expanded or Expanded Stacked.
2	Module width (W) : Specifies the minimum width of bar or space. Set the larger value than “Line Width” set in laser setting screen. Setting Range: 0.050 to 1.000 mm
3	Bar Code Height *1 : Lower Bar Code Height *2 : One Bar Code Height *3 : Specifies the height of bar code / lower bar code / respective tiers on a multi-tiered bar code. *1: RSS-14 (GS1 DataBar) Standard&Truncated, RSS(GS1 DataBar) Limited, or RSS (GS1 DataBar) Expanded only *2: RSS-14 (GS1 DataBar) Stacked only *3: RSS (GS1 DataBar) Expanded Stacked or RSS (GS1 DataBar) Stacked Omnidirectional only Setting Range: 1.000 to 120.000 [mm] (LP-M500 / LP-Z130)*; 1.000 to 90.000 [mm] (LP-S500)*
4	Inversion : Mark the check box to mark the bar code inverted. In this case the quiet zone and space in the symbol section are marked. Clearing the check box marks the bar only.
5	Guard : Selects whether the boundary line of quiet zone is marked at inversion marking. If inversion marking is not selected, this function is disabled.
6	Human Readable Text : Sets “Human Readable Text” marking for RSS-14 (GS1 DataBar) Limited and Composite whose lower bar code consists of RSS-14 (GS1 DataBar) Limited. Check the box to enable the function.
7	Detail : Click this button to display the Human Readable Text Setting screen. Refer to “Human Readable Text” (P.172).

	Description
8	Auto : This function button sub serves the code configuration By inputting the “Module Width” and “Bar Code Data”, this function is available. Pressing AUTO button displays the confirmation dialog box. On this screen, clicking “Yes” sets both the bar code condition and laser condition automatically, and clicking “No” sets only the bar code condition automatically. This AUTO setting becomes invalid by pressing "Cancel". Refer to “Setting Value for AUTO Set” (P.290) for detail.
9	Separator Height/(W) : Specifies the height of the separator between a multi-tiered bar code. Usually it is the same as the width of a module. Setting Range: 0.0 to 10.0
10	Symbol Character in Row (RSS (GS1 DataBar) Expanded Stacked only) : Specifies the number of column for overlapping the bar code. Setting Range: 2 to 20 (For primary composite : 4 to 20.)

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

Reference

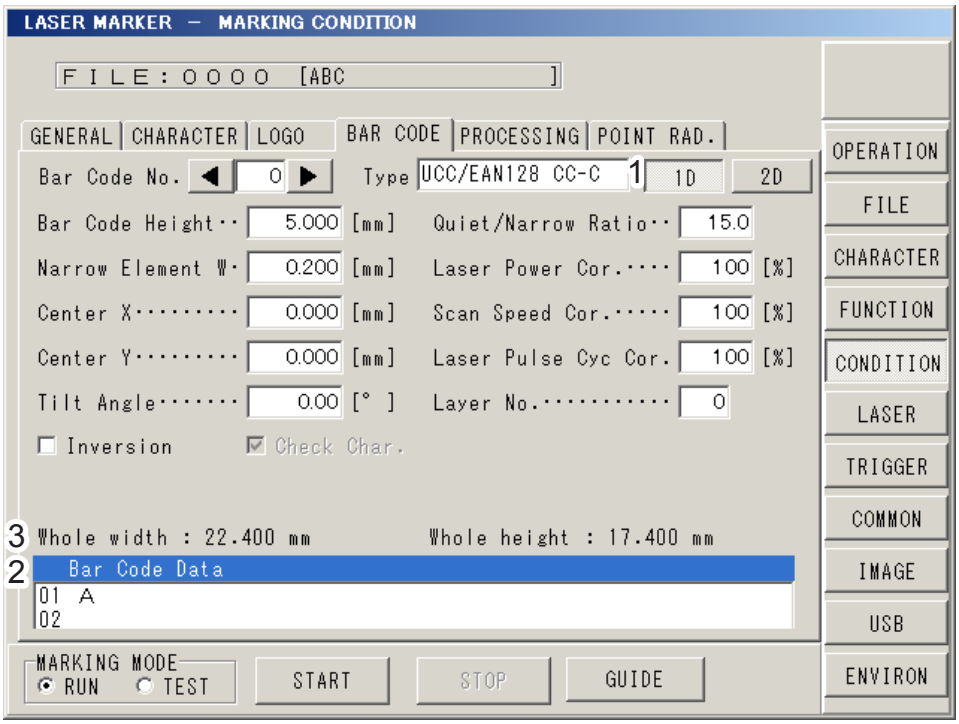
- For RSS-14(GS1 DataBar), RSS(GS1 DataBar) Limited and those composite codes, input 13-figure numbers as the code data. In those human readable text, “01” as AI in the head of the text and the check digit (modulus10/weight 3-1) in the end of the text are indicated automatically.

■ Settings for Composite Codes

The composite code is a code symbol that combines bar code (EAN/UPC/EAN128/GS1 DataBar) and 2D code (CC-A, CC-B, CC-C). For composite code, set 1D side code and 2D side code respectively.

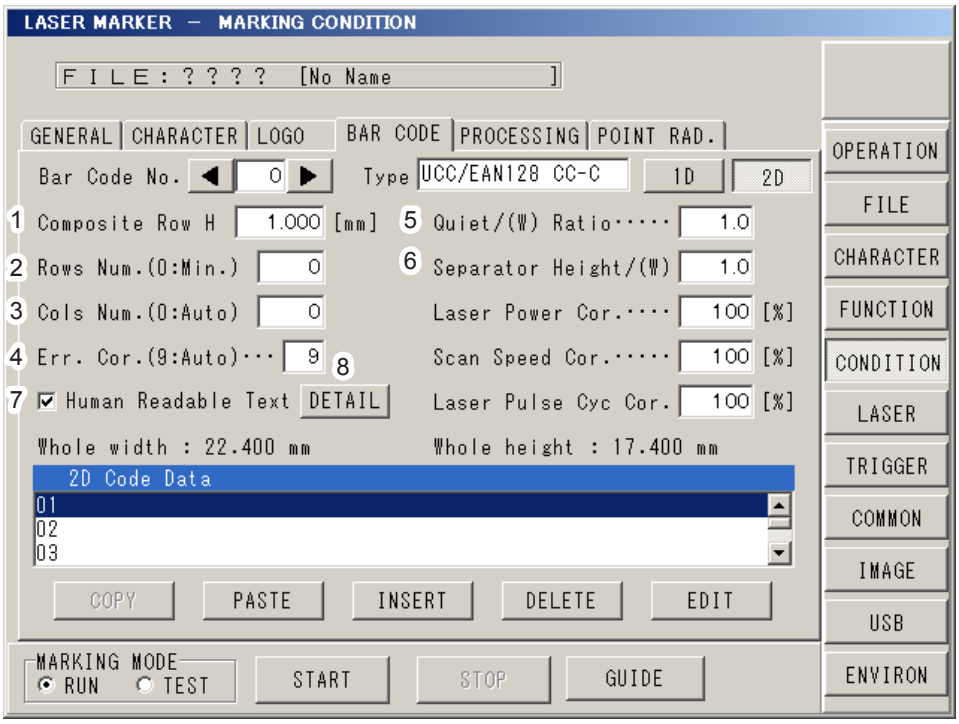
1D Condition Setting Screen

The above screen is used for 1D setting for the composite. Set items are basically the same in the case for bar code to be used alone. Please refer to the corresponding of the bar code for details on bar code setting screen. Please refer to the screen of CODE128 for UCC/EAN128 (GS1-128).



	Description
1	1D/2D Selection: Selects the setting object. (2D button become effective when any characters are input in the bar code data column.)
2	Bar Code Data: Data to be encoded in bar code. The data that can be input are the same as the case for bar code to be used alone. However, the setting range of UCC/EAN128 (GS1-128) is ISO646, function key character (FNC1).
3	Whole Width/Height: Whole size of bar code including 1D and 2D. (Quiet Zone is included.)

2D Condition Setting Screen



	Description
1	Composite Row Height : Specifies the height of one column of 2D code. Input larger value than “line width” specified by laser setting. Setting Range: 0.050 to 9.999 mm
2	Rows Number : Specifies the number of row of 2D code. The minimum number of row is generated in case of setting 0. The value that can be input is different according to the combination of 1D and 2D codes. If an invalid combination is input, it becomes a generation error.
3	Columns Number (CC-C only) : Specifies the number of column (width in horizontal). Adjusts the width as close as that of linear bar code by the automatic operation in case of setting 0. Note that the maximum number of column × rows is 928. Setting Range: 0 to 30
4	Error Correction Level (CC-C only) : Specifies the error correction level. There are 9 levels (0 to 8) for the error correction level. When “9” is selected, the recommended value specified in the specification is selected. Setting Range: 0 to 9
5	Quiet / (W) Ratio : Sets the size of 2D Quiet zone in the ratio to width of a basic module*. * Basic module: fine element width (basic module width) set on the condition setting screen of 1D. Setting Range: 0.0 to 20.0
6	Separator Height/(W) : Specifies the height of the separation pattern between 1D and 2D symbols in the ratio to width of a basic module. Setting Range: 0.0 to 10.0
7	Human Readable Text : Check the box to enable the function.

	Description
8	DETAIL : Click this button to display the Human Readable Text Setting screen. Refer to “Human Readable Text” (P.172) for the detail.

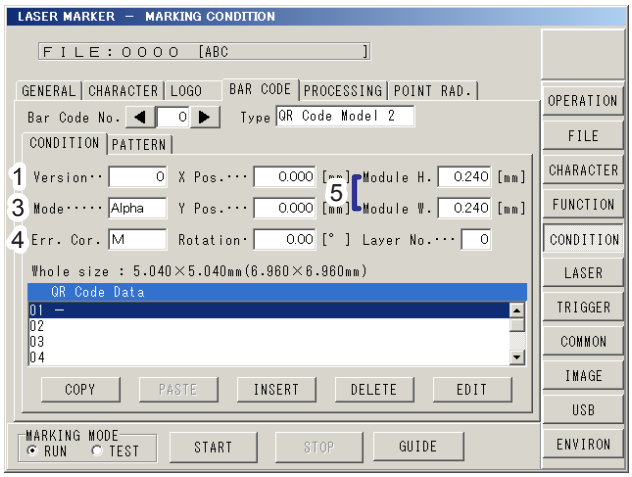
Relationship between combination of 1D and 2D codes and the number of row

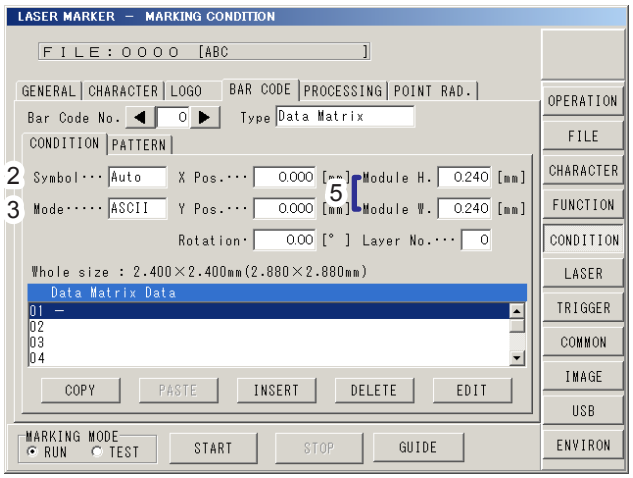
Bar Code Type	The Rows Number Available in CC-A	The Rows Number Available in CC-B
UPC-E RSS-14 (GS1 DataBar) Stacked (Omnidirectional)	5, 6, 7, 8, 9, 10, 12 [column]	8, 11, 14, 17, 20, 23, 26 [column]
EAN-8 RSS (GS1 DataBar) Limited	4, 5, 6, 7, 8 [column]	6, 8, 10, 12, 15, 20, 26, 32, 38, 44 [column]
EAN-13/UPC-A/EAN128 RSS-14 (GS1 DataBar) (Standard/Truncated) RSS (GS1 DataBar) Expanded Standard/Stacked	3, 4, 5, 6, 7 [column]	4, 6, 8, 10, 12, 15, 20, 26, 32, 38, 44 [column]

Reference

- In the code data, the number of character to be input is 30 on nine lines which are connected when coded. The number of characters that can be bar-coded differs by the type and combination of data of the numerics, the alphabet, and the symbol, etc.
- For the composite code, correction of the laser power, scan speed and laser pulse cycle are set separately in 1D and 2D symbols.

■ Setting for QR Code and Data Matrix Code





	Description

1 Version (QR code only):

Specifies the symbol size of QR code and micro QR code.
When “0” is selected, the size is specified to be the minimum automatically. In this case, the symbol size may change depending on the input code data.
Refer to “QR Code Version and Data Capacity” (P.284) for detail.

Setting Range	When QR code model 1 is set: 0 to 14
	When QR code model 2 is set: 0 to 22
	When micro QR code is set: 0 to 4

2 Symbol (Data Matrix code only):

Specifies the symbol size (module unit) of data matrix code. Select “Auto” or “Manual”. When “Auto” is selected, the size is specified to be the minimum.
Refer to “Symbol Size and Data Capacity” (P.287) for detail.

Square : 10×10, 12×12, 14×14, 16×16, 18×18, 20×20, 22×22, 24×24, 26×26, 32×32, 36×36, 40×40, 44×44, 48×48, 52×52, 64×64, 72×72, 80×80, 88×88
Rectangle : 8×18, 8×32, 12×26, 12×36, 16×36, 16×48

3 Mode :

Input mode for the code data.
- For QR code, select the mode from “Number”, “Alpha”, “Binary” or “Kanji”.
- For Data Matrix code, select the mode from “ASCII” (00H to 7FH) or “Kanji”.
- For GS1 Data Matrix code, data input mode is fixed to binary mode.

4 Err. Cor. (Error Correction) (QR code only):

Specifies the error correction level of QR code.
The display changes L(7%) → M(15%) → Q(25%) → H(30%) in this order.

5 Module H/W (Module Height/Width) :

Specifies the height and width of module which compose a symbol.

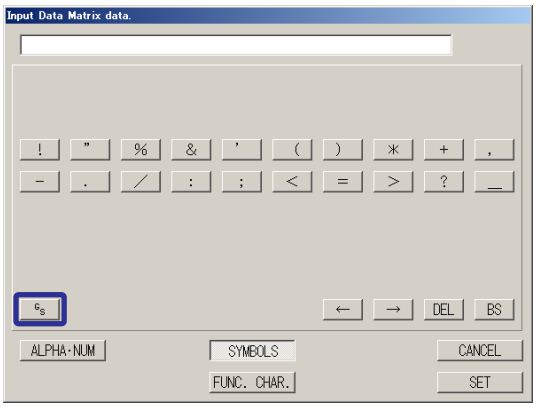
Setting Range	0.001 to 9.999 mm

Reference

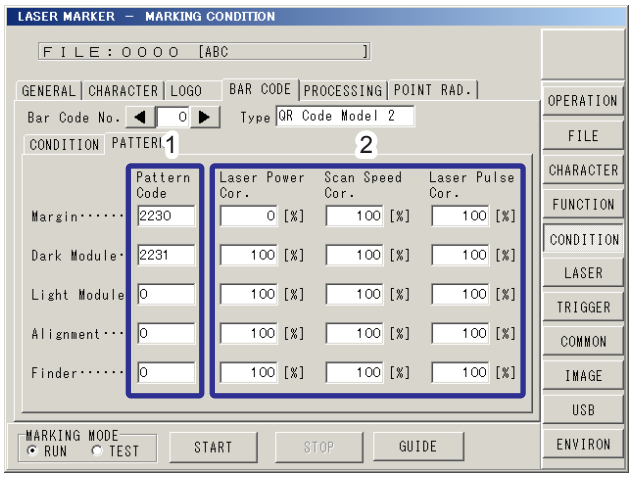
- If the size of module is same as or very smaller than that specified at “2-6 Selecting Marking Mode” (P.91), the module inside the encode area may not be marked uniformly. In this case, enlarge the size of the module or narrow the line.

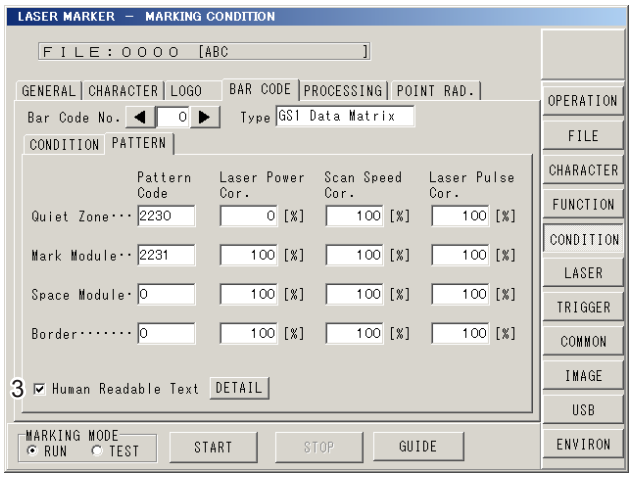
Reference

- For GS1 Data Matrix, the control code “FNC1” is automatically inputted at the head of the code data. When inputting AI “01” followed by 13-digit numerical character, the check digit (modulus10/weight 3-1) is inputted automatically at the next digit.
- For Data Matrix, group separator (GS) of variable length AI data is not inputted automatically.
  Press the Symbol button on the Data Input screen and then press “GS”.



■ Pattern Setting for QR code and Data Matrix code





Specify the drawing pattern of the 2D code for the each code component.

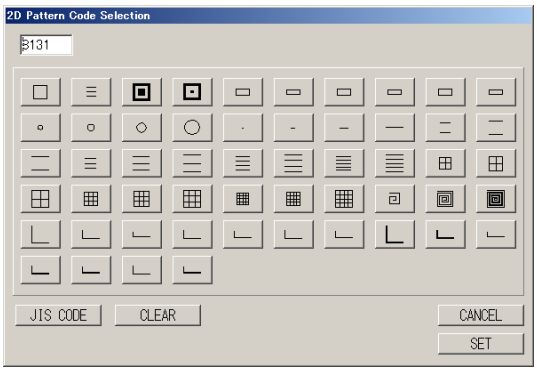
	Description

1 Pattern code:

Specify the drawing pattern of the 2D code for the each code component.
Press the pattern code field and select the drawing pattern.

For setting a inverted (Black/White) code, set the pattern code as follows;

- For QR code, select the drawing pattern to the light module. Specify "0" to margin, finder, alignment and dark module.
- For Data Matrix code, select the drawing pattern to the space module. Specify "0" to quiet zone, mark module and border.



Reference

- For QR code, when the pattern code is set to "0" in finder or alignment, these patterns are marked using the settings for dark or light module.
- For Data Matrix code, when the pattern code is set to "0" in border, these patterns are marked using the settings for mark or space module.
- On the pattern code input screen, the pattern image registered into 2D code font (2230(HEX) to 2239(HEX) and 8121(HEX) to 8152(HEX)) is displayed.

2 Laser Power Correction :
Scan Speed Correction :
Laser Pulse Cycle Correction (Except LP-SxxxW type) :
Correction of each code pattern for the laser power / scan speed / laser pulse cycle set at laser setting.

Setting Range of Laser Power Correction	0 to 999%
Setting Range of Scan Speed Correction	1 to 999%
Setting Range of Laser Pulse Cycle Correction	1 to 999%

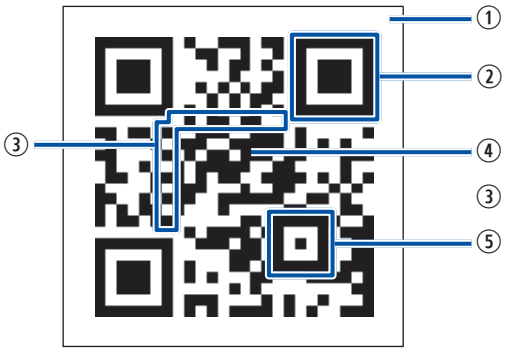
Reference

- If the value of “Laser power correction” × “laser power” is equal to or larger than 100, the setting will be “100”.
- Marking is not available when the laser power correction value is “0”.
- If the value of scan speed correction × scan speed exceeds the upper limit, the upper limit is set.
- If the value of Laser pulse cycle correction × laser pulse cycle exceeds the setting range, the upper/lower limits are set.

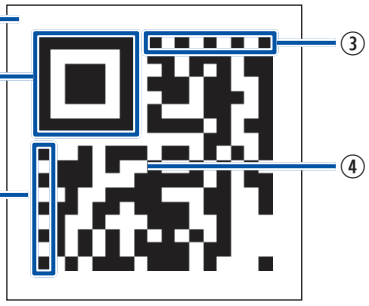
3 Human Readable Text (GS1 Data Matrix) :
Specifies whether marking of “Human Readable Text” is enabled or not. Insert a checkmark in the box to enable the function.

Composition of QR code and Data Matrix

QR Code

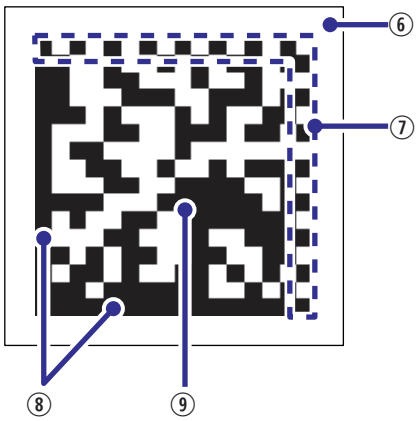


Micro QR Code



No.	Name	Remarks
①	Margin	• QR code: More than 4 modules around • Micro QR code: More than 2 modules around
②	Finder Pattern	
③	Timing Pattern	
④	Black: Dark module White: Light module	Data Area
⑤	Alignment Pattern	

Data Matrix code



No.	Name	Remarks
⑥	Quiet Zone	More than 1 module around
⑦	Timing Module	
⑧	Border	
⑨	Black: Mark module White: Space module	Data Area

■ 2D Code Pattern Font

The 2D code pattern font shown below have been previously registered to the font installed in the CD-ROM.
Refer to “2-15-4 Font File” (P.216) to register the pattern fonts on the laser marker.

Font image								
Character code	2230(HEX)	2231(HEX)	2232(HEX)	2233(HEX)	2234(HEX)	2235(HEX)	2236(HEX)	2237(HEX)
Pattern type	Quiet zone	Module	Finder	Alignment	Quiet zone	Quiet zone	Quiet zone	Quiet zone

Font image								
Character code	2238(HEX)	2239(HEX)	8121(HEX)	8122(HEX)	8123(HEX)	8124(HEX)	8125(HEX)	8126(HEX)
Pattern type	Quiet zone	Quiet zone	Module	Module	Module	Module	Module	Module

Font image								
Character code	8127(HEX)	8128(HEX)	8129(HEX)	812A(HEX)	812B(HEX)	812C(HEX)	812D(HEX)	812E(HEX)
Pattern type	Module	Module	Module	Module	Module	Module	Module	Module

Font image								
Character code	812F(HEX)	8130(HEX)	8131(HEX)	8132(HEX)	8133(HEX)	8134(HEX)	8135(HEX)	8136(HEX)
Pattern type	Module	Module	Module	Module	Module	Module	Module	Module

Font image								
Character code	8137(HEX)	8138(HEX)	8139(HEX)	813A(HEX)	813B(HEX)	813C(HEX)	813D(HEX)	813E(HEX)
Pattern type	Module	Module	Module	Module	Module	Module	Module	Module

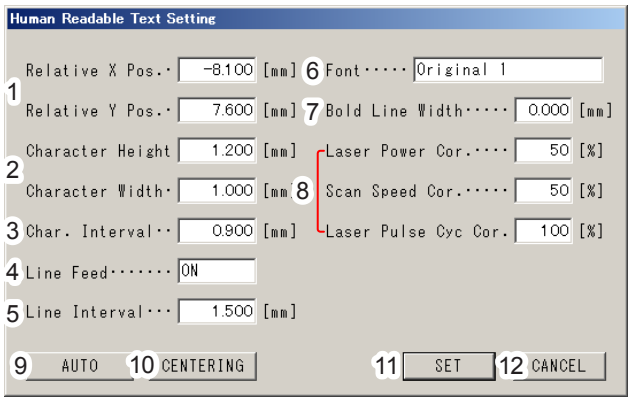
Font image								
Character code	813F(HEX)	8140(HEX)	8141(HEX)	8142(HEX)	8143(HEX)	8144(HEX)	8145(HEX)	8146(HEX)
Pattern type	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern

Font image						
Character code	8147(HEX)	8148(HEX)	8149(HEX)	814A(HEX)	814B(HEX)	814C(HEX)
Pattern type	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern	Border pattern

Reference

- For 2D pattern font, a total of 60 fonts can be registered in any code from 2230(HEX) to 2239(HEX), or from 8121(HEX) to 8152(HEX). When a new pattern font is created and registered, overwrite the font pattern registered in any code from 2230(HEX) to 2239(HEX), or from 8121(HEX) to 814C(HEX), or register it on any code from 814D(HEX) to 8152(HEX). Do not use other character code.
- If a reading failure occurs with the standard pattern shown above (2DCODE.FON), use the font maker provided to create the proper pattern. Refer to “Font Maker Operation Manual” for details.

■ Human Readable Text



	Description
1	Relative X Position, Relative Y Position (except EAN/UPC code) : Specifies relative coordinate of X/Y position of Human Readable Text when the center of the code is defined as the origin point.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

2	Character Height, Character Width (except EAN/UPC code) : Specifies the character height / width of Human Readable Text.

Setting Range	0.100 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.100 to 90.000 [mm] (LP-S500)*

3	Character Interval (except EAN/UPC code) : Specifies the character interval of Human Readable Text.

Setting Range	0.000 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.000 to 90.000 [mm] (LP-S500)*

4	Line Feed (Only for 2D side of composite code / GS1 data matrix code) : Selects “ON” for marking Human Readable Text per 2D code data with line feed. If marking one character string without line feed, select “OFF”.
5	Line Interval : When “line feed” is set ON, specifies the line interval of Human Readable Text.

Setting Range	0.000 to 120.000 [mm] (LP-M500 / LP-Z130)*
	0.000 to 90.000 [mm] (LP-S500)*

6	Font : Select font type of Human Readable Text from the registered font. The setting varies by pressing this field. Select the font to be used.
7	Bold Line Width : Specifies the line width of bold character.

Setting Range	0.000 to 2.000 mm (LP-M500 / LP-S500 / LP-Z130)*

	Description
8	Laser Power Correction : Scan Speed Correction : Laser Pulse Cycle Correction (Except LP-SxxxW type) : Correction of each human readable characters for the laser power / scan speed / laser pulse cycle set at laser setting. Reference • If the value of “Laser power correction” × “laser power” is equal to or larger than 100, the setting will be “100”. • Marking is not available when the laser power correction value is “0”. • If the value of scan speed correction × scan speed exceeds the upper limit, the upper limit is set. • If the value of Laser pulse cycle correction × laser pulse cycle exceeds the setting range, the upper/lower limits are set.
9	AUTO (except EAN/UPC code) : Pressing AUTO button automatically aligns the Human Readable Text at its optimal position. Reference • When “X” is set to the narrow element width, the marking characters are automatically aligned at its center position on the center of the code 3X distance from the top of the code, character width: 5X, character height 6X, character interval 4.5X.
10	CENTERING (except EAN/UPC code) : Pressing CENTERING button aligns the Human Readable Text to the center of the code.
11	SET: Sets and conform the setting condition of Human Readable Text.
12	CANCEL: Cancel the setting condition and close the Human Readable Text Setting screen.

Setting Range of Laser Power Correction	0 to 999%
Setting Range of Scan Speed Correction	1 to 999%
Setting Range of Laser Pulse Cycle Correction	1 to 999%

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Description of AI (Application Identifier)

For the following codes, inputting the below AI and specified code data, AI in the human readable text is input automatically in bracket ( ).

- CODE128 and UCC/EAN128(GS1-128)(CODE128 with the control code "FNC1" at the head of the barcode data)
- RSS (GS1 DataBar) Expanded
- GS1 Data Matrix
- 2D of Composite code
- 1D of Composite code whose lower barcode consists of RSS (GS1 DataBar) Expanded, CODE128, RSS(GS1 DataBar) Limited or UCC/EAN128(GS1-128)

AI (Application Identifier)	Setting Data Set After AI	Indication of AI
01 *1	14-figure numeric *4	Product Code
10	20-figure or less alphanumeric +FNC1 *3	Batch/lot No.
11	6-figure numeric	Manufactured Date
13	6-figure numeric	Packed Date
15	6-figure numeric	Guarantee Date
17	6-figure numeric	Expiry Date
21	20-figure or less alphanumeric +FNC1(GS) *3	Serial No.
30	Number (max. 8 digits) + FNC1 *3	Quantity
310X *2	6-figure numeric	Net. Weight/kg
320X *2	6-figure numeric	Net. Weight/kg
392X *2	Variable length alphanumeric + FNC1 *3	
393X *2	Variable length alphanumeric + FNC1 *3	
7003	10-figure numeric	Expiry Date

*1 : When “01” is used, set it to the head of the code data. (In the case of UCC/EAN128 (GS1-128), set “01” right after “FNC1” at the head.)

*2 : ‘X’ means one figure numeric.

*3 : When input setting data for AI “10”, AI “30”, AI “392X”, or AI “393X”, input of “FNC1” at the end of the setting data is not necessary. (If you select GS1 DataMatrix, you are not required to enter “GS”.

*4 : In the case of GS1 Data Matrix and UCC/EAN128(GS1-128) (the code for which “FNC1” is set at the head in CODE128), a check digit is added at 14th digit automatically by this laser marker. Therefore, 13-digit characters are inputted after “01”.

Example:

- 2D of UCC/EAN128 (GS1-128) CC-A
  In case that the code setting data is “F1 17201231300010”, Human Readable Text is “(17) 201231 (30) 0010”.
- RSS (GS1 DataBar) Limited CC-A on 2D side
  In case that the code setting data is “01912345678912331032012 31”, Human Readable Text is “(01) 91234567891234 (3103) 201231”.
- 2D of UCC/EAN128 (GS1-128) CC-A
  In case that the code setting data is “F1 17201231300010”, Human Readable Text is “(17) 201231 (30) 0010”.
- RSS (GS1 DataBar) Limited CC-A on 2D side
  In case that the code setting data is “1712345630123456 10123456”, Human Readable Text is “(17) 123456 (30) 123456 (10) 123456”.

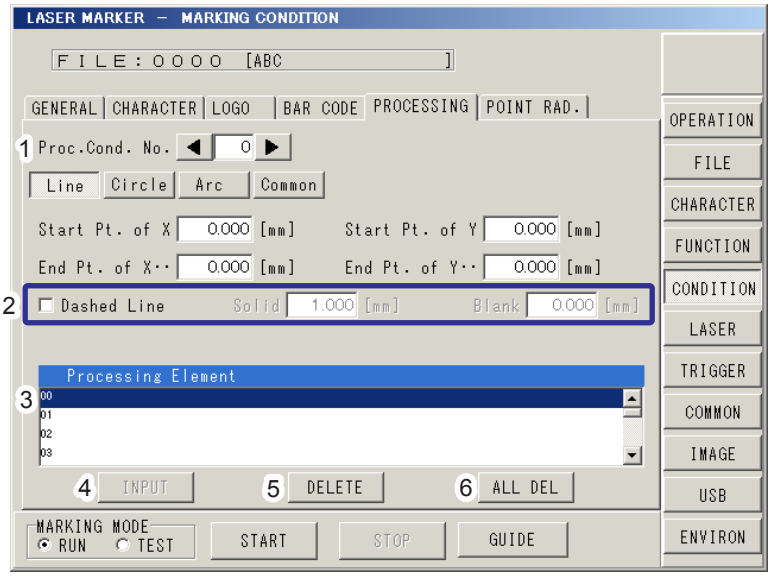
Reference

- To set the code data in more than two lines using AI (Application Identifier), set AI at the head of the bar code data.

2-10-5 Processing Condition

Reference

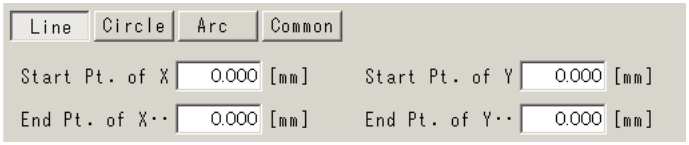
- For LP-M and LP-Z series, when the “3D” on the “2D/3D setting” of the common condition on for the general condition is checked ON, the processing function becomes invalid.



	Description
1	Proc. Cond. No. (Processing Condition No.) : Specifies up to 16 processing condition per one registered file. Setting Range: 0 to 15
2	Dashed Line : To input the dashed line, enable this function. Clearing the check box marks the setting data with solid line. Solid (part of dashed line) : When dashed line is set, input the length of the solid part of the dashed line. Setting Range: 0.010 to 120.000 [mm] (LP-M500 / LP-Z130)*; 0.010 to 90.000 [mm] (LP-S500)* Blank (of dashed line) : When dashed line is set, input the length of the blank of the dashed line. Setting Range: 0.000 to 120.000 [mm] (LP-M500 / LP-Z130)*; 0.000 to 90.000 [mm] (LP-S500)* Solid part of dashed line / Blank of dashed line
3	Processing Element : Indicates the processing condition set at the laser setting. Up to 32 processing elements can be set per one number of processing condition.
4	INPUT : Pressing INPUT button establishes the specified conditions.
5	DELETE : Pressing DELETE button deletes the selected processing condition.
6	ALL DEL : Pressing ALL DEL button deletes processing condition.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

■ Straight line

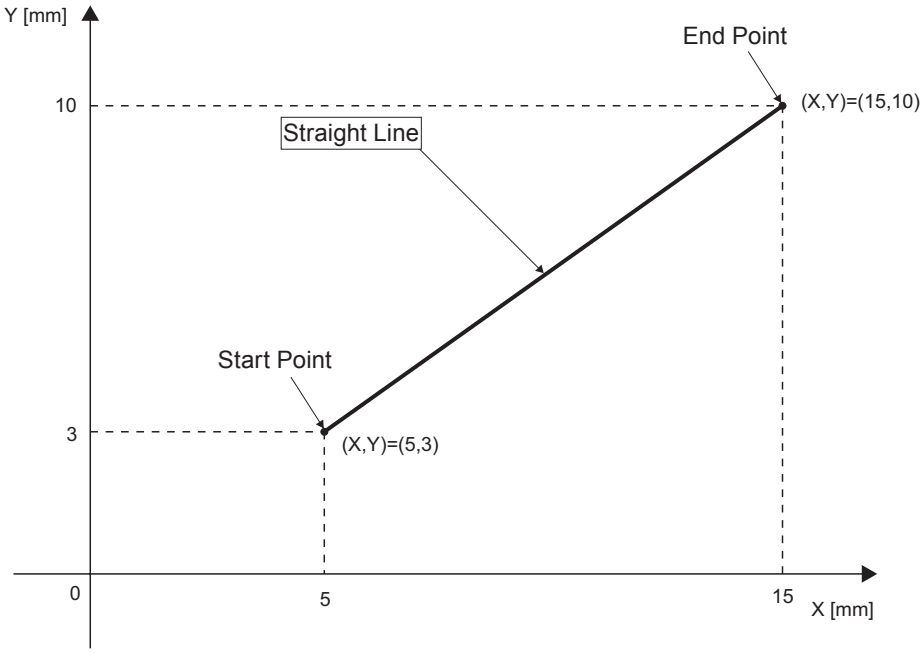


Description

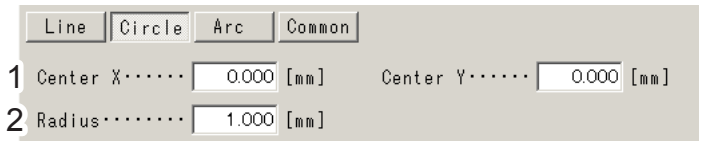
Start Point of X/Y :
End Point of X/Y :
Specifies the starting / ending point of the straight line.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

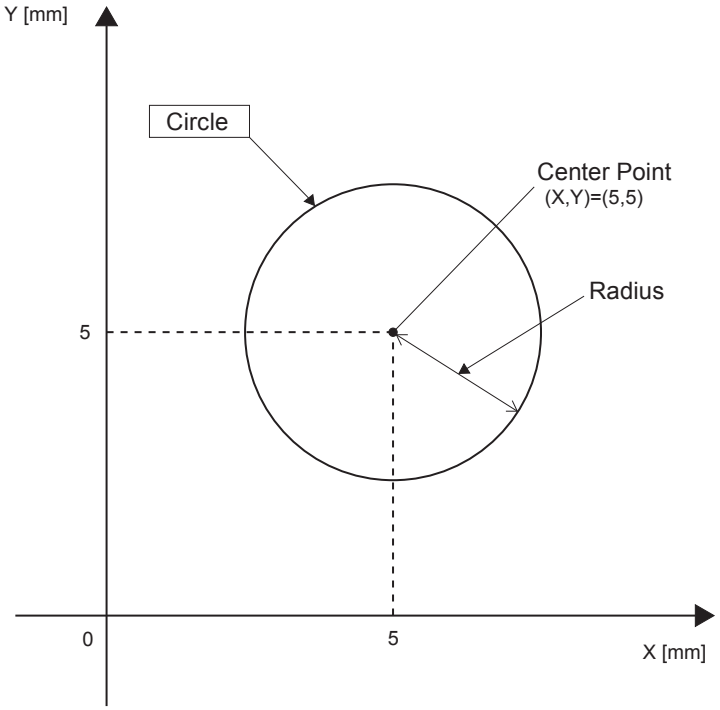


■ Circle

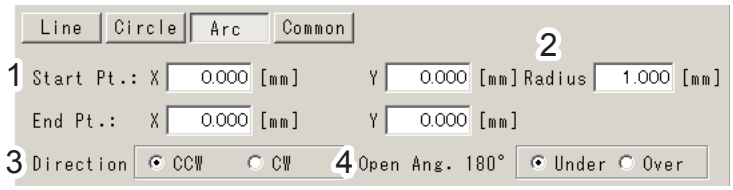


	Description
1	Center X/Y (Center Point X/Y): Specifies the Center point of the circle. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*; -45.000 to +45.000 [mm] (LP-S500)*
2	Radius Specifies the radius of the circle. Setting Range: 0.010 to 60.000 [mm] (LP-M500 / LP-Z130)*; 0.010 to 45.000 [mm] (LP-S500)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).



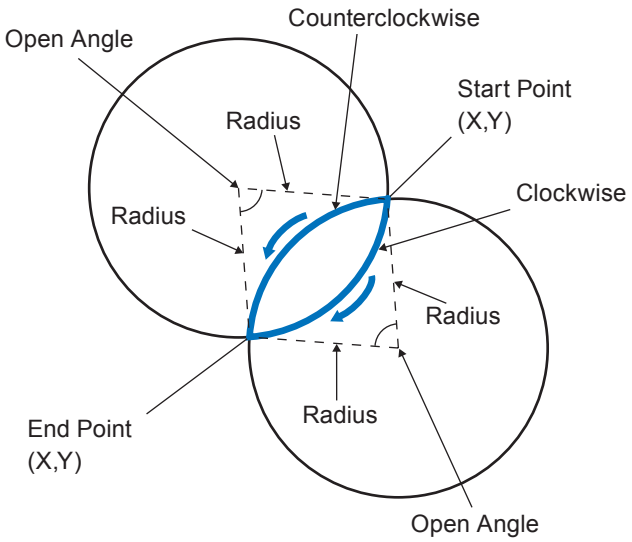
■ Arc



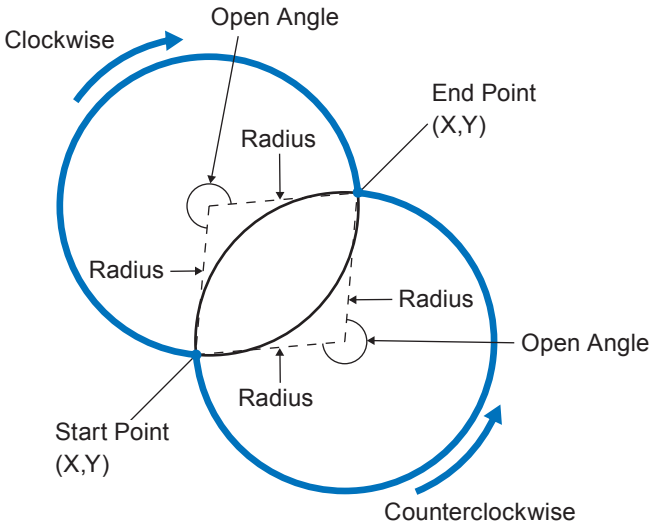
	Description
1	Start Point X/Y : End Point X/Y : Specifies the starting / ending point of arc. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)* Setting Range: -45.000 to +45.000 [mm] (LP-S500)*
2	Radius: Inputs the radius of arc. Setting Range: +0.010 to +330.000 [mm]
3	Direction: For the arc in counterclockwise direction, select [CCW] and in clockwise direction, select [CW].
4	Open Ang. (Open Angle): Select the open angle of the arc from "under" or "over" 180 degree.

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

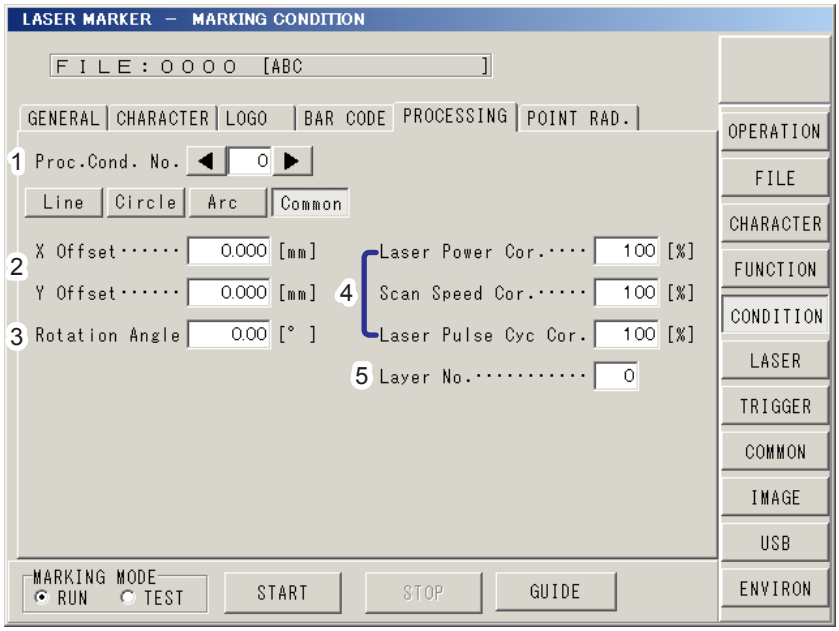
- Open Angle: under 180 degree



- Open Angle: 180 degree or more



■ Common



	Common Setting Item

1 Proc. Cond. No. (Processing Condition No.) :
Specifies up to 16 processing condition per one registered file.

Setting Range	0 to 15

2 X/Y Offset :
Shifts the marking position to the X or Y direction.

Setting Range	-60.000 to +60.000 [mm] (LP-M500 / LP-Z130)*
	-45.000 to +45.000 [mm] (LP-S500)*

3 Rotation Angle :
Rotates the object to the rotation direction around the origin.

Setting Range	-180.00 to +180.00 degree

4 Laser Power Correction :
Scan Speed Correction :
Laser Pulse Cycle Correction (Except LP-SxxxW type) :
Correction of the processing elements in the selected processing condition No. for the laser power / scan speed / laser pulse cycle set at laser setting.
If the correction rate is set to 0%, the marking image is displayed in gray and marking is not executed.

Setting Range of Laser Power Correction	0 to 999%
Setting Range of Scan Speed Correction	1 to 999%
Setting Range of Laser Pulse Cycle Correction	1 to 999%

5 Layer No. :
When more than one condition of the marking data is set, layer No. specifies the marking order. The laser marker performs the marking with the smaller order of the layer No. specified beforehand (Layer No. 0 is firstly marked, and Layer No. 15 is marked finally.). Note that it is not applicable for the Step & Repeat marking.

Setting Range	0 to 15

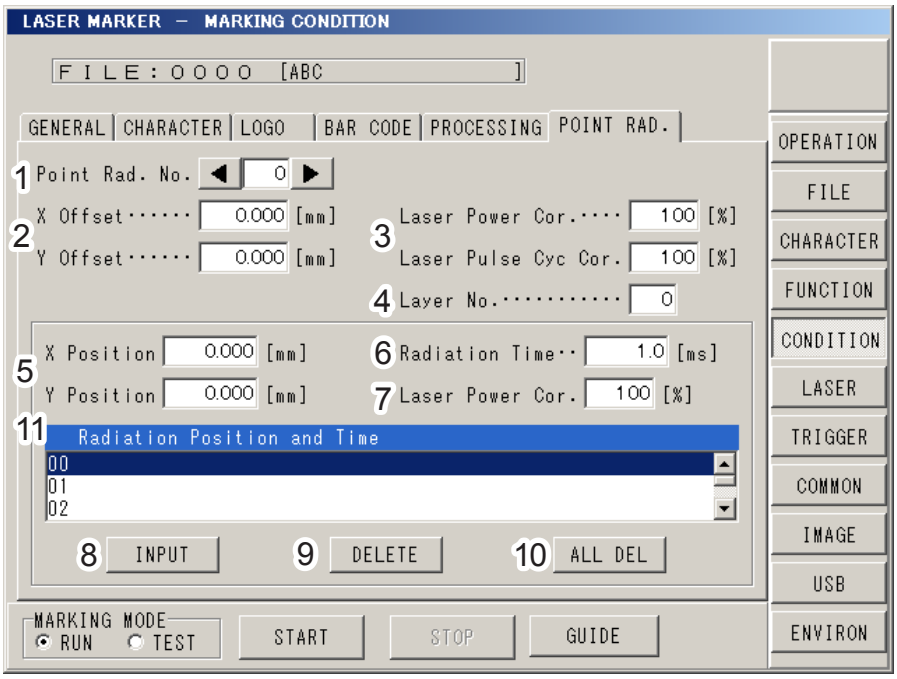
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

2-10-6 Point Radiation Condition

Laser radiates in the specified coordinate for the setting time.

Reference

- Point radiation function can not be used in combination with the function of marking to flying object.
- For LP-M and LP-Z series, when the “3D” on the “2D/3D setting” of the common condition on for the general condition is checked ON, the point radiation function becomes invalid.



	Description
1	Point Rad. No. (Point Radiation No.) : Specifies up to 16 point radiation condition per one registered file. Setting Range: 0 to 15
2	X/Y Offset : Shifts the object to X/Y direction for all radiation points in the selected point radiation No. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)* -45.000 to +45.000 [mm] (LP-S500)*
3	Laser Power Correction : Laser Pulse Cycle Correction (Except LP-SxxxW type) : Correction of all radiation points in the selected condition No. for the laser power / laser pulse cycle set at laser setting. If the correction rate is set to 0%, the marking image is displayed in gray and marking is not executed. Setting Range of Laser Power Correction: 0 to 999% Setting Range of Laser Pulse Cycle Correction: 1 to 999%
4	Layer No. : When more than one condition of the marking data is set, layer No. specifies the marking order. The laser marker performs the marking with the smaller order of the layer No. specified beforehand (Layer No. 0 is firstly marked, and Layer No. 15 is marked finally.). Note that it is not applicable for the Step & Repeat marking. Setting Range: 0 to 15

	Description
5	X/Y Position : Shifts the object to X/Y direction for each radiation point. Setting Range: -60.000 to +60.000 [mm] (LP-M500 / LP-Z130)* -45.000 to +45.000 [mm] (LP-S500)*
6	Radiation Time : Specifies the laser radiation time. Setting Range: 0.1 to 99999.9 ms
7	Laser Power Correction : Correction of each radiation point for the laser power set at laser setting. If the correction rate is set to 0%, the marking image is displayed in gray and marking is not executed. Setting Range: 0 to 999%
8	INPUT : Pressing INPUT button establishes the specified radiation position and time.
9	DELETE : Pressing DELETE button deletes the selected radiation position and time.
10	ALL DEL : Pressing ALL DEL button deletes all radiation position and time in the table.
11	List of Point Radiation Conditions : Displays the setting condition radiation position and time. Up to 50 radiation points can be set in one condition list.

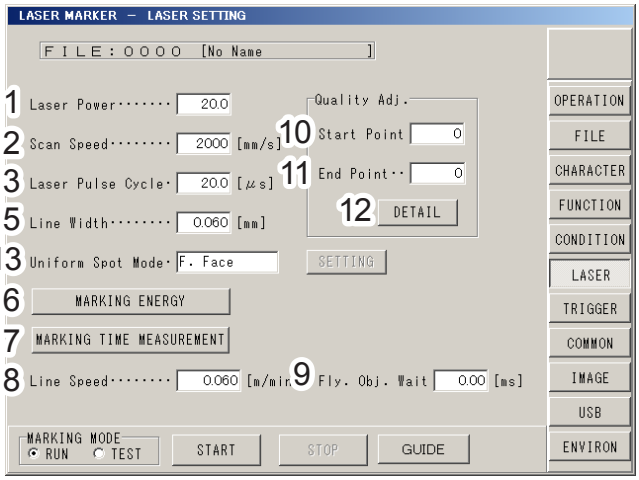
* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

⚠WARNING	⚠ Since the arbitrary point radiation function carries on radiating the laser onto the one point, it will provide high energy density. It may flame up or burn depending on the material to be used for processing or processing condition.

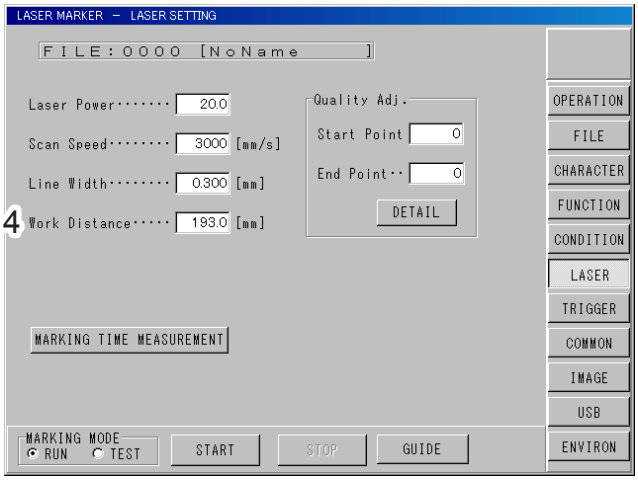
2-11 Laser Setting

The laser setting screen specifies the adjustment for laser marker, such as the setting of laser power and scan speed, and marking quality control.

2-11-1 Setting Parameters



LP-M / LP-Z series / LP-Sxxx type



LP-SxxxW type

	Description

1 Laser Power :

Sets the output level of laser power.

Setting Range	12.0 to 100.0 (LP-M500 / LP-S500)*
	0.5 to 100.0 (LP-Z130)*

Reference

- Set the laser power in increments of 0.5.
- The laser power gradually decreases due to the degradation of laser. Do not use it with the initial value of 100.

2 Scan Speed :

Specifies the traveling speed of laser on the marking surface.

Setting Range	1 to 12000 mm/s (LP-M500 / LP-S500 / LP-Z130)*

⚠CAUTION

- If too high laser power is set or too slow scan speed is set, it may flame up or burn depending on the material to be used for the marking. At test marking, radiate the laser by setting rather low laser power and rather fast scan speed, check the marking quality, and adjust the setting value gradually.

3 Laser Pulse Cycle (Except LP-SxxxW type) :

Adjusts the interval of laser pulse cycle.

The larger the value set, the higher the peak power becomes. Note that when setting larger value for the pulse cycle, the line tends to be marked in dot line after scanning with high speed.

Setting Range	2.0 to 20.0 μs (LP-M500 / LP-S500)*
	10.0 to 50.0 μs (LP-Z130)*

4 Work Distance (LP-SxxxW type only) :

Marking coordinates and marking field can be corrected without moving the optical system even when the work distance was changed from the center position of work distance. Enter the value of work distance that is actually set.

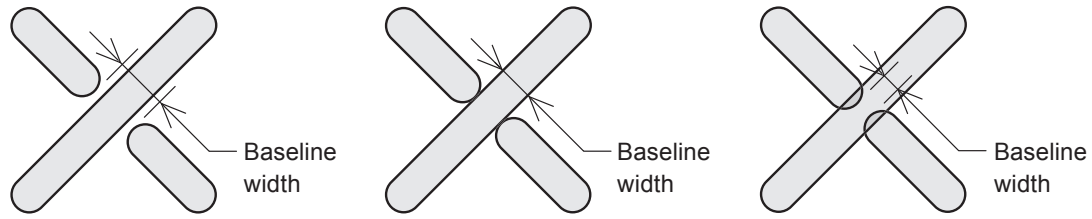
Setting Range	173 to 213 mm (LP-S500W)*

	Description

5 Line Width :

Specifies the interval between lines at the intersection point in a character when they are crossed.
The initial value of this line width is set to the calculated value of the spot size for each model.
However, in the actual marking, the character strokes may be overlapped each other so that the character is engraved too deeply or characters strokes are so apart that clearance is created.
In the cases above, overlay at the intersection can be adjusted finely by changing the setting of the line width.

Setting Range	0.010 to 2.000 mm with the increment of 0.001 mm.



Reference

- This correction is invalid for some user-registration characters.
- This correction is not effective for the logo data.
- When requiring the thicken the actual marking width, set the line width for bold character at character condition. Refer to “2-10-2 Character Conditions” (P.149).
- The time for marking may be long if the setting value of the line width is smaller.
- The initial value of the line width is set depending on the model as follows;

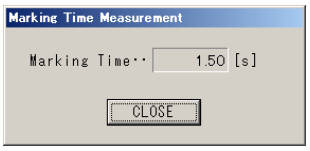
LP-M200/M500 : 0.06 mm	LP-S200/S500 : 0.06 mm	LP-Z130/Z250 : 0.07 mm
LP-M205/M505/MA05 : 0.08 mm	LP-S202/S502 : 0.04 mm	LP-Z256 : 0.14 mm
LP-MA06 : 0.1 mm	LP-S205/S505 : 0.1 mm	

6 Marking Energy (LP-M series /LP-Sxxx type only) :

Sets the laser energy.
For details of laser energy, refer to “2-11-2 Marking Energy Measurement” (P.186).

7 Marking Time Measurement :

Indicates the period of marking.
Press [MARKING TIME MEASUREMENT].



Reference

- If a variable character such as counter is included in the character marked, the measurement of period is performed with the current value.
- In case the actual marking period is shorter than the one-shot time of output, the result of measurement is same as the output of one-shot time. Refer to “2-16-3 Communication, I/O Setting (Environment 3)” (P.230) for the detail of the one-shot time setting.
- When performing marking to flying object with 3D setting, marking time cannot be measured regardless of using or not using the encoder.

8 Line Speed (Except LP-SxxxW type) :

Used at measurement of marking period.
It is indicated when the traveling direction in the trigger setting is set to other than “still”.
Measure the line speed in consideration of the line speed of the flying object.

Setting Range	0.060 to 170.000 m/minutes (LP-M500 / LP-Z130)*
	0.060 to 240.000 m/minutes (LP-S500)*

	Description

9 Fly. Obj. Wait (Flying Object Wait) (Except LP-SxxxW type) :

Used at measurement of marking period.

Waiting period for marking corresponding to the line speed for flying object marking.

Setting Range	0.00 to 500.00 ms

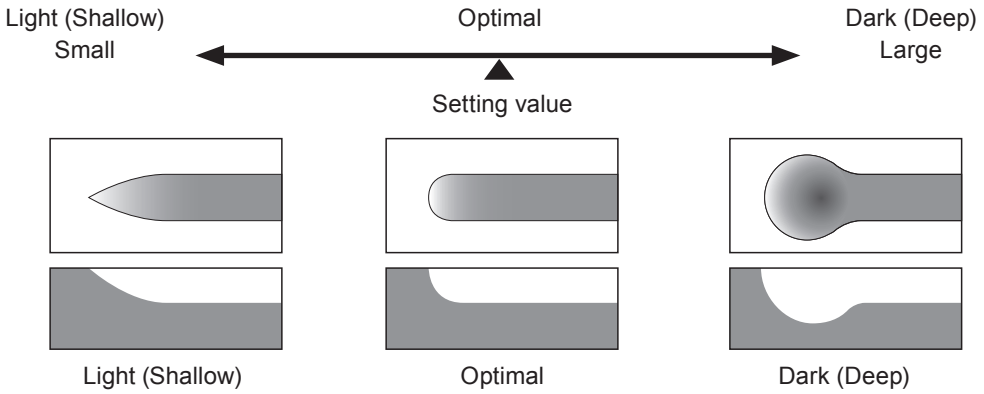
10 Start Point :

11 End Point :

With this function, the timing for turning on the laser at the starting or ending point is adjusted.

The smaller the value is, the darker (deeper) the marked character at the starting or ending point is.

Setting Range	-100 to 100
Initial Value of Start Point	0 (LP-S series/LP-Z series) -10 (LP-M series)
Initial Value of End Point	0



Notice

- Too small value for the adjustment of start/end point may be the cause of chipped character.

12 DETAIL :

They will provide fine adjustment of marking quality.

For details of setting item, refer to “2-11-3 Detail Adjustment (Laser Setting)” (P.190).

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

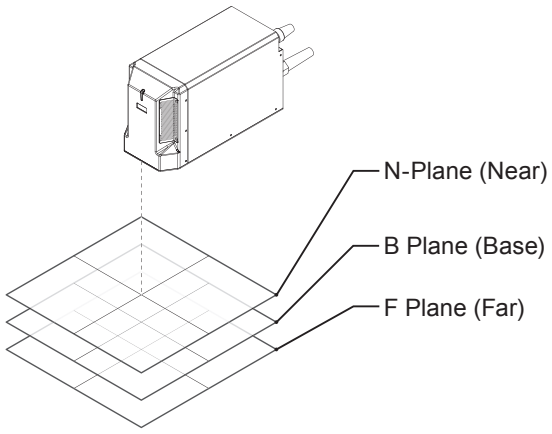
	Description

13 Uniform Spot Mode (only LP-M / LP-Z series) :
To keep a uniform diameter of the laser spot within the marking field, specify this mode. The spot size is adjusted to the selected plane. The laser spot will have the same diameter in the area between N plane and the selected plane. This condition is required for setting when the line width is differed due to the marking place. “F plane” (Far plane) is selected as the default setting mode.

Setting Mode	Description
OFF	Sets when not using the uniform mode. The spot size will be adjusted according to the each coordinate.
N-Plane (Near)	By selecting this mode, the spot diameter becomes uniform within the marking field on N Plane (the shortest work distance).
B Plane (Base)	By selecting this mode, the spot diameter will be adjusted to B plane (the specification value of the work distance). The laser spot will have the same diameter in the area between N plane and the B plane.
F Plane (Far)	By selecting this mode, the spot diameter will be adjusted to F plane (the longest work distance). The laser spot will have the same diameter in the area between N plane and the F plane.
Custom (LP-M Series Only)	Specify the marking field (X/Y field and Z position), where the laser spot size is kept to be uniform. The laser spot will have the same diameter in the specified XY field between N plane and the specified Z position.
XY Field	Specify the length of X and Y axis for the marking field, in which the laser spot size is kept to be uniform. The center position of the XY field is always the center of the original marking field. Setting Range: 0 to 120 mm (LP-M200/M500); 0 to 220 mm (LP-M205/M505/MA05); 0 to 330 mm (LP-MA06)
Z Position	Specify the Z position to which spot diameter the laser spot size in the specified XY field is adjusted. The laser spot will have the same diameter in the area between N plane and the selected Z position. To specify the N plane direction from B plane, input 0 mm to +22 mm. To specify the F plane direction from B plane, input 0 mm to -22 mm. Setting Range: -22 to +22 mm

Work distance of the each plane

Model	N Plane	B Plane	F Plane
LP-M200/M500	168 mm	190 mm	212 mm
LP-M205/M505/MA05	198 mm	220 mm	242 mm
LP-MA06	308 mm	330 mm	352 mm
LP-Z130/Z250	165 mm	190 mm	215 mm
LP-Z256	305 mm	330 mm	355 mm



Reference

- In case of not setting the Uniform Spot mode, the spot diameter on the outer of the center of the coordinate becomes larger.
- In case of setting the Uniform Spot mode, the spot diameter becomes thicker because the spot diameter is uniformed based on the thickest spot diameter on each marking plane.
  (The spot diameter becomes larger from N plane, B plane, and F plane in sequence.)

2-11-2 Marking Energy Measurement

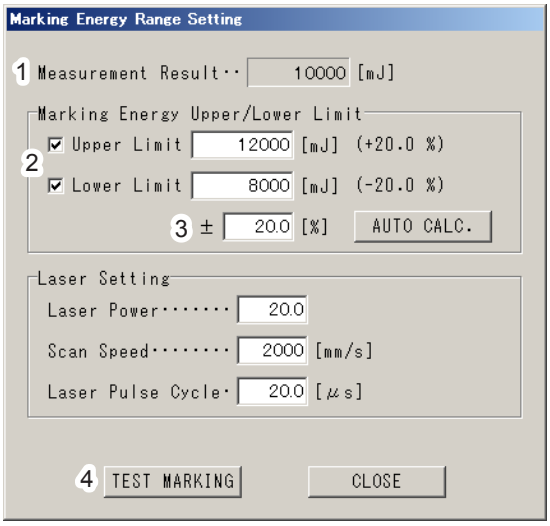
[Function specific to LP-M series / LP-Sxxx type]

* This function is not implemented in the LP-Z series / LP-SxxxW type.

This window allows you to measure the marking energy per trigger. This window also allows you to set the upper and lower limits of the marking energy (mJ) per trigger. A deviation from these limits will cause an alarm to occur. You can detect erroneous markings due to output power fluctuation by using this feature.

■ To use this function

- The marking energy must be 100 mJ or more in order to set the upper/lower limits.
- When moving the laser marker, changing the marking object or marking conditions, confirm the marking energy results and readjust the upper and lower limits of marking energy.
- After the installation, replacement or moving laser marker, the marking energy measurement results may change.
- In case of LP-Sxxx type, after the fiber unit is installed or removed, or focus is adjusted (see the “Safety / Setup / Maintenance Guide”), the marking energy measurement results may change.
- This function cannot detect the marking errors due to the change of target works or the unit condition.



	Description
1	Measurement Result : After the test marking, displays the laser energy. If the marking energy measurement exceeds the preset upper limit, an error message appears.
2	Upper Limit : Lower Limit : Sets the upper / lower limit of the marking energy. If the measurement results is out of this limit, warning message appears. Setting Range: 100 to 999999999 [mJ]
3	AUTO CALC. (Automatic Calculation) : Automatically calculates the upper/lower limits based on the measurements and set upper/lower limit ratio [%]. Setting Range: 0 to 99.9 [%] Reference • Automatic calculation cannot be performed when the marking energy was not measured at test marking. • Auto calculation is applied only to the enabled upper / lower limit.
4	TEST MARKING : Starts the test marking and measures marking energy.

Setting procedure for measuring the marking energy

1. Test Marking

Measure the current marking energy (mJ) at test marking.
Refer to “Marking energy measurement” (P.188) for detail.

2. Determining the upper and lower limits

Gradually increase or decrease the laser power on the basis of the marking energy measured at step 1 until appropriate upper and lower limits are reached.

Reference

- Temporarily determine the limits, perform test marking and check the marking result. Repeat this cycle until the optimal marking result is obtained, i.e., appropriate limits are reached.
- The required marking energy varies depending on the specifications of the marking. If the marking specifications such as counters, current date and lot detail vary, set the upper and the lower limits in consideration of the difference between the maximum and the minimum marking energy caused by the combination of marking specifications. Assume the measured marking energy may have an error of approx. +/-5% when finally determining the upper and lower limits.

3. Determining the upper and lower limits

Enter the appropriate upper and lower limits determined in step 2.
Refer to “Setting of the marking energy upper/lower limits” (P.189).

Reference

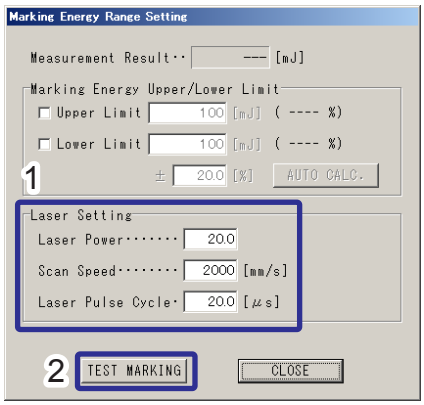
- Verify the upper and lower limits for appropriateness under actual working and marking conditions. If the limits seem to be inappropriate, adjust them.
- When moving the laser marker, changing the marking object or marking conditions, confirm the marking energy results and readjust the upper and lower limits.

Marking energy measurement

Notice

- If the marking energy falls below 1000 mJ or the marking time falls short of 0.4 second, the measurement may be unstable.

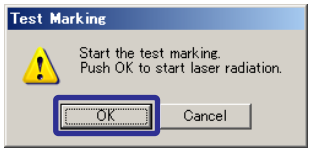
1. Set the [Laser Power], [Scan Speed] and [Laser Pulse Cycle] when measuring the marking energy, and then press [TEST MARKING].



2. Confirmation dialog box appears.

Press [OK].

The screen returns to the procedure 1 by pressing [Cancel].

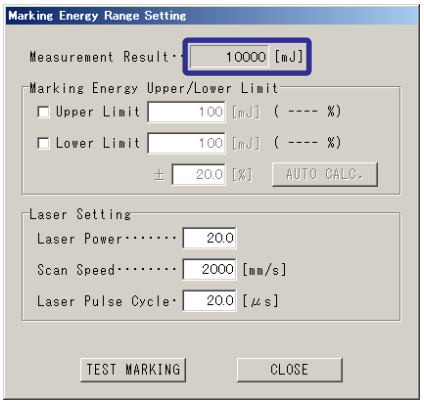


⚠WARNING	• The laser beam radiates. Be sure to use the protective goggle and enclosure while dealing with the laser. • Once starting the test marking, the laser radiation cannot be stopped till the marking is finished. If the operator needs to stop the laser radiation immediately, press the emergency stop switch.

Reference

- For LP-Mxxx-S type, laser can not be emitted without opening the laser gate. After starting the test marking, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.

3. The marking energy measurement result appears.



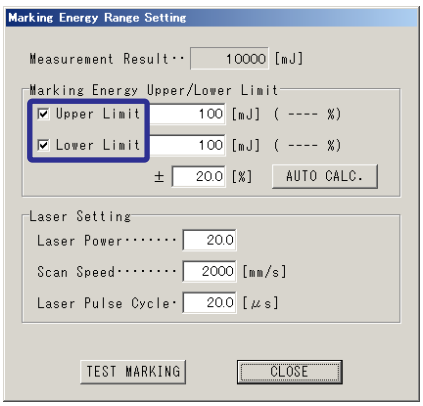
Setting of the marking energy upper/lower limits

To confirm the stability of the marking energy, set the upper and lower limits.
If the measurement results is out of this limit, warning message appears.

Reference

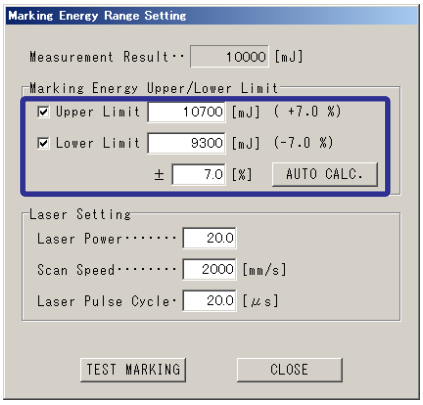
- Confirm the marking energy with the actual test marking.
  Based on this measurement, first set rather lower laser power to radiate the laser, change the setting value gradually while check the marking quality to set the upper/lower limits.

1. Enable the upper/lower limit setting.

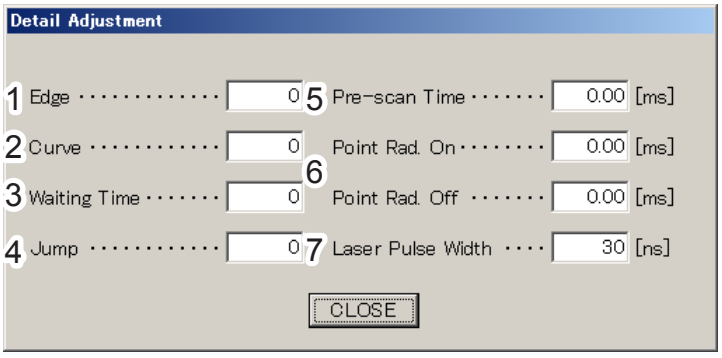


2. Input the tolerance [%] of the marking energy and press [AUTO CALC.]. (auto setting)

Or input any value for upper and lower limits. (manual setting)



2-11-3 Detail Adjustment (Laser Setting)



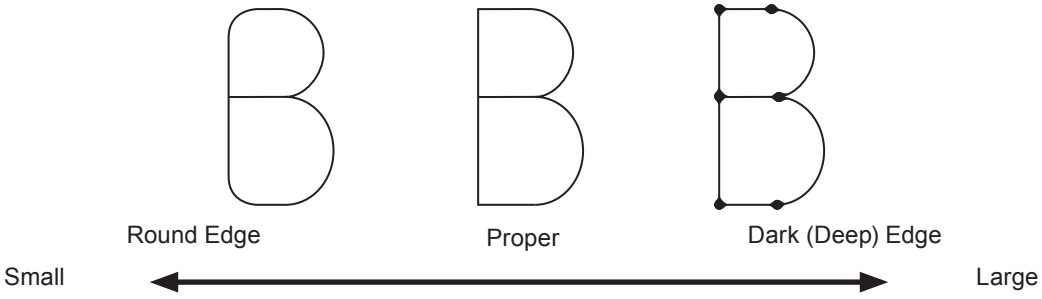
The following fine adjustments are allowed.

	Description

1 Edge (Edge Adjustment) :

Adjust the edge of line in the character to be marked.
Though setting a small value here can shorten the marking time, the line edge becomes dull.
Setting large value makes the edge thick.

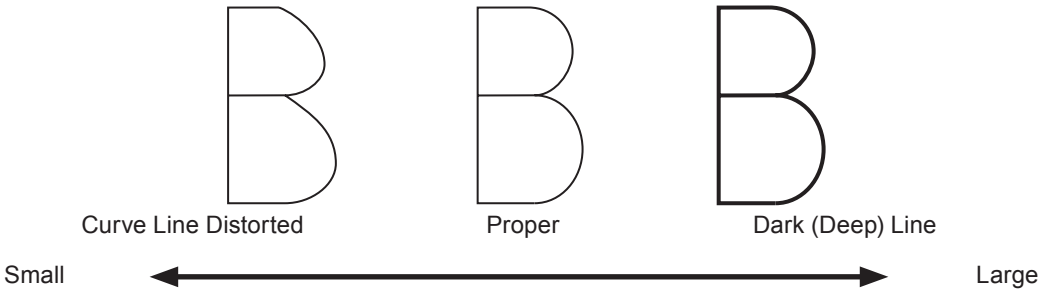
Setting Range	0 to 100
Initial Value	0



2 Curve (Curve Adjustment) :

The shape of curve line in the character to be marked is adjusted.
Though setting a small value here can shorten the marking time, the curve line is distorted.
Setting large value makes the edge thick.

Setting Range	0 to 100
Initial Value	0



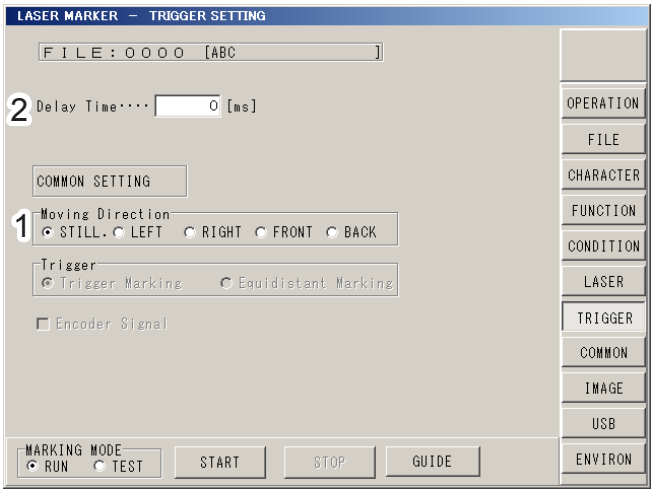
	Description
3	Waiting Time (Waiting Time Adjustment) : Adjusts the waiting time until laser beam is set in the start point at the line. Apply to all line segment. Setting a large value improves the marking disorder. Too large value, however, makes the marking time longer. Setting large value makes the edge thick. Setting Range: 0 to 100 Initial Value: 0 (LP-SxxxW type/LP-Z series) 10 (LP-M series/LP-Sxxx type)
4	Jump (Jump adjustment) : Adjusts the waiting time for starting radiation at the start point of the line. It is applied only to the lines which distance to the next line is long. Setting a large value improves the disordered lines at the start points. Setting a larger value makes the marking time longer. Setting Range: 0 to 100 Initial Value: 0
5	Pre-scan Time : The pre-scan time adjusts the start-up and fall times of the laser beam at the start/end points. Setting the scanning period improves the too thick marking at the start/end points. Setting larger value makes the marking time longer. Setting Range: 0.00 to 10.00 ms Initial Value: 0.00 ms
6	Point Rad. On/Off (Point Radiation ON/OFF Adjustment) : Adjusts the on/off timing of the radiation for “2-10-6 Point Radiation Condition” (P.180). The waiting time for the point radiation operation. On time specifies the waiting time for starting radiation. Off time specifies the waiting time for moving to the next radiation points. Setting a larger value makes the marking time longer. Setting Range: 0.00 to 9.99 ms Initial Value: 0.00 ms
7	Laser Pulse Width (LP-Z series only) : Specifies the laser pulse width. The narrower the pulse width sets, the higher the peak power of the laser raises, and the device can perform the marking more sharply. Setting Range: 30 ns, 100 ns, 200 ns (LP-Z130)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

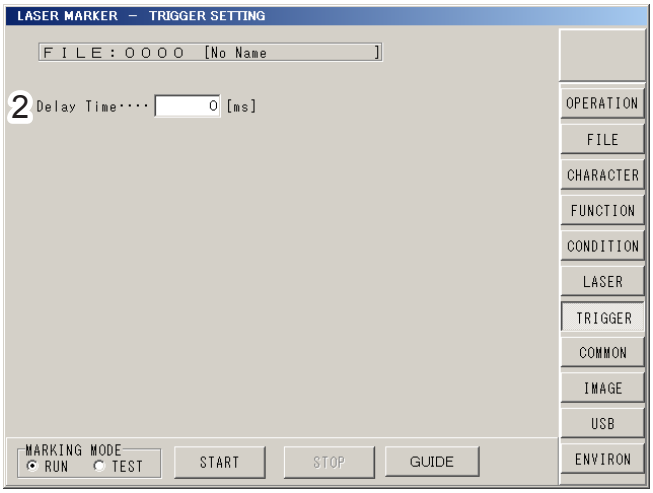
2-12 Trigger Setting

This function is used for setting of marking for the moving object (on-the-fly marking) and marking timing.
The trigger setting is specified on this screen, depending on the status of work to be marked (flying or still).
The screen also sets the timing of starting marking after input of trigger signal.

2-12-1 Marking to Static Work



LP-M/LP-Z series/LP-Sxxx type



LP-SxxxW series

	Description
1	Moving Direction (Except LP-SxxxW type) : Selects “STILL.” for the moving direction.
2	Delay Time : Sets the time difference from the input of trigger signal to marking start. Setting Range: 0 to 5000 ms

Reference

- Set a delay time shorter than a input interval of trigger signal.
- When the next trigger signal is inputted during delay, warning (E800) occurs. (Only if “Detect TRIG. Warning during Marking” in Environment Setting is valid.)

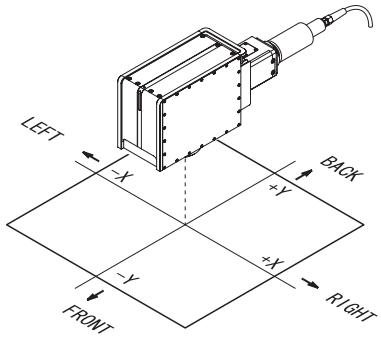
2-12-2 Marking to Flying Object

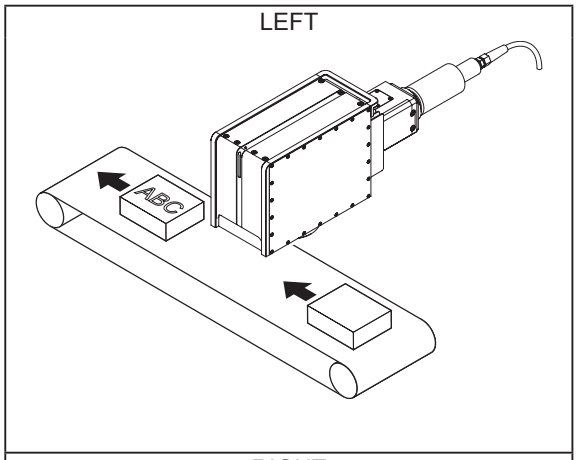
* This function is not implemented in the LP-SxxxW type

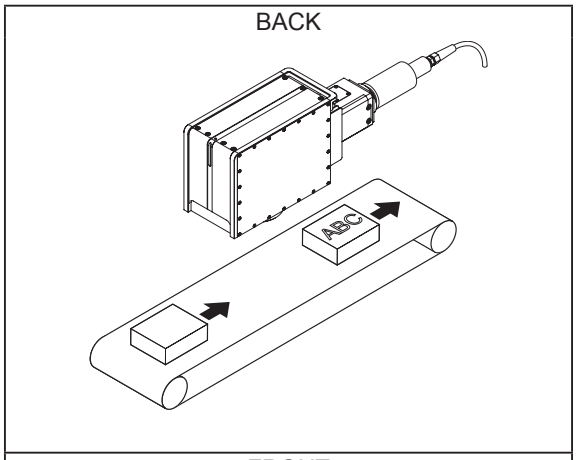
The trigger conditions at marking to flying object are set.

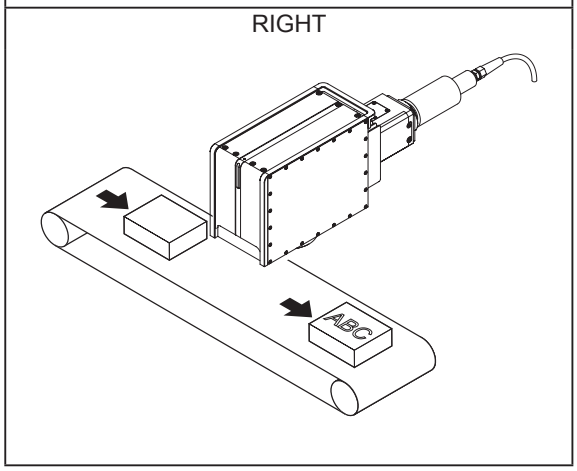
■ Moving Direction

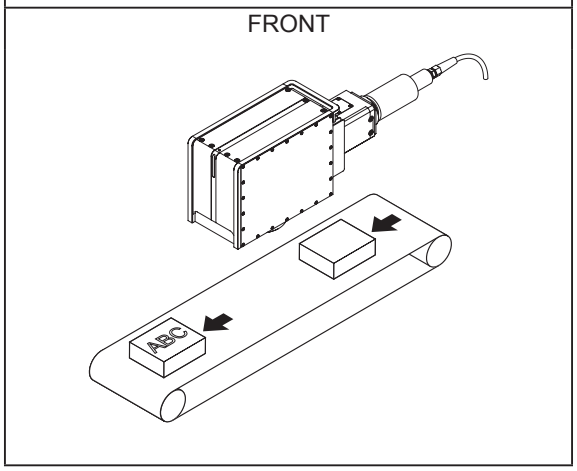
The moving direction of line at marking to flying object is set.











Notice

- Overlapping marking, Step & Repeat marking, Rank Offset marking, Serial Data marking, point radiation, or Reset at date update functions cannot be used with the marking to flying object.
- In the case of using the function of marking bold character, there might be the possibility that the marking quality is affected. Therefore, operate the laser marker after performing the marking test using the function of marking bold character.
- Since the marking to the flying object is affected by vibration or line speed easily, marking and reading 2D code or bar code to the flying object might become unstable. Therefore, when marking 2D code or bar code to the flying object, check the marking and reading state of the marked code on the flying object sufficiently.
- In case of LP-M / LP-Z series, the function of Concatenated Marking to Flying Object can not be used in combination with 3D setting.
- In case of LP-M / LP-Z series, to use the function of Marking to Flying Object in combination with 3D setting, use the encoder. The marking to flying object without encoder is not available.

■ Trigger Selection

Trigger Marking : Starts the marking per marking trigger.

Equidistant Marking : Repeats marking with the interval specified while the marking trigger is turned to ON.

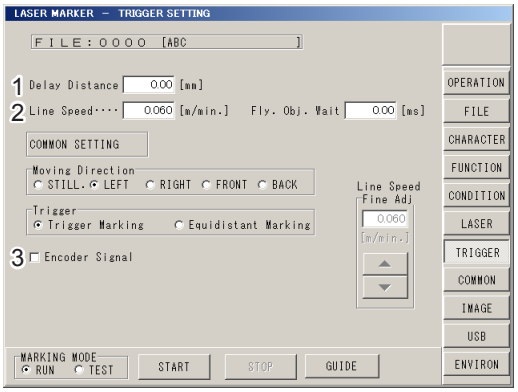
Reference

- The moving direction is commonly set with the total file number.

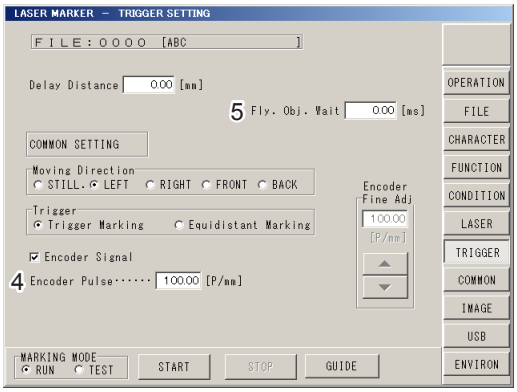
Trigger Marking

Starts marking to flying object per marking trigger. Setting parameters vary depending on whether the encoder is used or not.

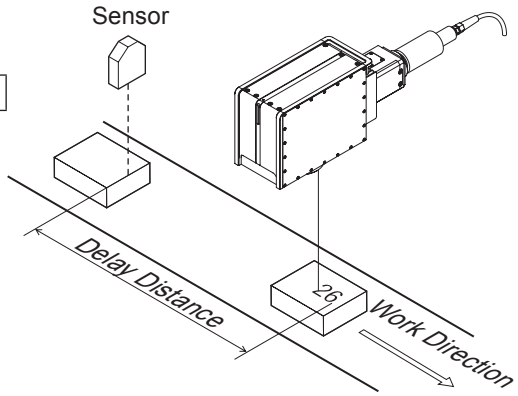
When the encoder is not used
(Encoder signal: invalid)



When the encoder is used
(Encoder signal: valid)



	Item		Description
1	Delay Distance	:	Inputs the moving distance of line from trigger input to the start of marking. Setting Range: 0 to 500.00 mm



Reference

- Set a delay distance shorter than the distance between the workpieces.
- When the next trigger signal is inputted during delay, warning (E800) occurs. (Only if “Detect TRIG. Warning during Marking” in Environment Setting is valid.)

2	Line Speed	:	Inputs the line speed. Setting Range: 0.060 to 170.000 m/minutes (LP-M500 / LP-Z130)* 0.060 to 240.000 m/minutes (LP-S500)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

3	Encoder Signal	:	Enable this function when using the encoder. The setting parameter for the line speed is disappeared from the screen and the parameter for encoder pulse number appears instead when pressing the box.

Item	Description
	When the encoder is not used : Performs marking to flying object by applying the calculated line speed already input. When the encoder is used : Performs marking to flying object by applying the calculated line speed which is derived from the pulse sent from the encoder input to the input terminal.

Reference

- In case of LP-M / LP-Z series, to use the function of Marking to Flying Object in combination with 3D setting, use the encoder. The marking to flying object without encoder is not available.

4 Encoder Pulse : Inputs the resolution of encoder provided in the line.

Setting Range	5.00 to 600.00 P/mm

Calculation of encoder pulse number (5.00 to 600.00 P/mm)

Encoder Pulse	=	Pulse number of one rotation of encoder	÷	Line distance advanced during one rotation of encoder	×	4 or 2 *

* When using A and B phase: 4
* When using either A or B phase: 2

Reference

- Up to 100kHz per one phase is possible to be input to the encoder input on the input terminal block.
- Use only “A” phase (ENC(A)) of the input terminal block input and connect “B” phase (ENC(B)) to input common if either of these encoders is used.
- If the setting value for the encoder pulse is too small, the marking quality might be deteriorate. (Depending on the marking condition, the recommendation setting value for the encoder pulse is 25.00 P/mm or more.)

5 Fly. Obj. Wait. (Flying Object Wait) : Waiting period for marking corresponding to the line speed for flying object marking.

Setting Range	0.00 to 500.00 ms

Adjust the waiting time of the marking for flying object so that the width of the character string is as shorten as possible shown below when performing the test marking remaining the setting of the marking for flying object.

Too Narrow	Proper	Too Wide
		

If the error occurs during the marking to flying object, adjust the following settings.

ERROR CODE	Description	Setting Position	Scan Speed	Line Speed	Flying Object Wait
E620	The marking is performed after the work is moved to outside of marking field.	Shift to moving direction	Up	Down	Down
E621	The marking is performed before the work is entered into the marking field.	Shift to opposite direction of moving direction	Down	Up	Up
E622	The marking is not finished until the work is passed through the marking field.	—	Up	Down	Down

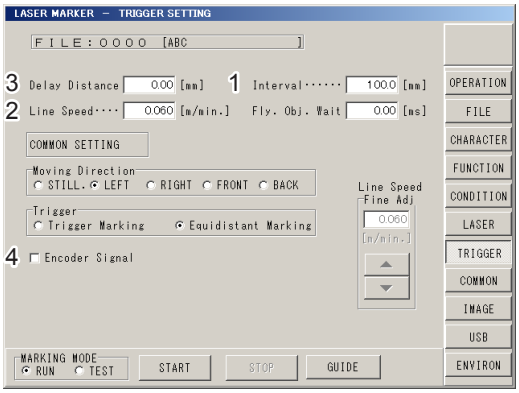
Reference

- There might be the case that the marking is impossible even though adjusting the waiting time of the marking of the flying object if there are a lot of marking data.
- When the pulse output from the encoder and actual motion of the line is not matched, the marking may not performed properly.

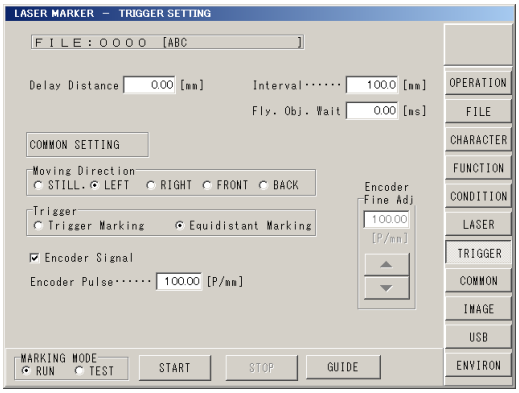
Equidistant Marking

Marking is repeated every time the line moves with the interval set in equidistant marking.
Equidistant marking is performed while the marking trigger is turned to ON.

When the encoder is not used
(Encoder signal: invalid)



When the encoder is used
(Encoder signal: valid)



1	Interval (Marking Interval)	:	Inputs the moving distance of the line for marking start.

Setting Range	0 to 3000.0 mm

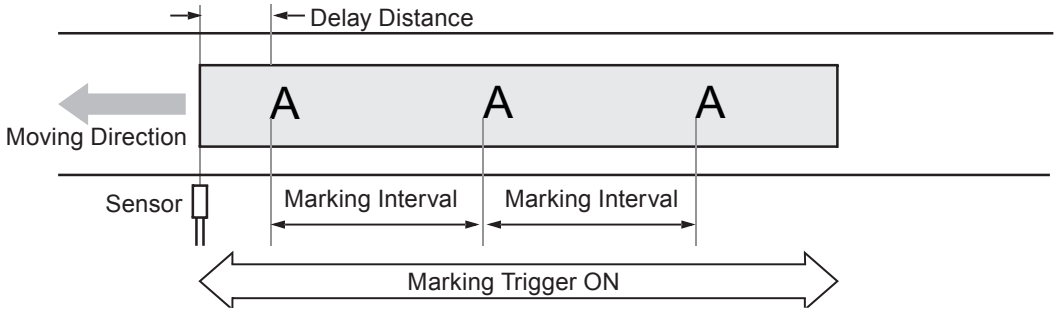
2	Line Speed	:	Inputs the line speed.

Setting Range	0.060 to 170.000 m/minutes (LP-M500 / LP-Z130)*
	0.060 to 240.000 m/minutes (LP-S500)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

3	Delay Distance	:	Inputs the moving distance of line from trigger input to the start of marking.

Setting Range	0 to 500.00 mm



4	Encoder Signal	:	Enable this function when using the encoder. The setting parameter for the line speed is disappeared from the screen and the parameter for encoder pulse number appears instead when pressing the box.

When the encoder is not used : Performs marking to flying object by applying the calculated line speed already input.

When the encoder is used : Performs marking to flying object by applying the calculated line speed which is derived from the pulse sent from the encoder input to the input terminal.

Reference

- In case of LP-M / LP-Z series, to use the function of Marking to Flying Object in combination with 3D setting, use the encoder. The marking to flying object without encoder is not available.

5 Encoder Pulse : Inputs the resolution of encoder provided in the line.

Setting Range	5.00 to 600.00 P/mm

Calculation of encoder pulse number (5.00 to 600.00 P/mm)

Encoder Pulse	=	Pulse number of one rotation of encoder	÷	Line distance advanced during one rotation of encoder	×	4 or 2 *

* When using A and B phase: 4
* When using either A or B phase: 2

Reference

- Up to 100 kHz per one phase is possible to be input to the encoder input on the input terminal block.
- Use only “A” phase (ENC(A)) of the input terminal block input and connect “B” phase (ENC(B)) to input common if either of these encoders is used.
- If the setting value for the encoder pulse is too small, the marking quality might be deteriorate. (Depending on the marking condition, the recommendation setting value for the encoder pulse is 25.00 P/mm or more.)

6 Fly. Obj. Wait. (Flying Object Wait) : Waiting period for marking corresponding to the line speed for flying object marking.

Setting Range	0.00 to 500.00 ms

Adjust the waiting time of the marking for flying object so that the width of the character string is as shorten as possible shown below when performing the test marking remaining the setting of the marking for flying object.

Too Narrow	Proper	Too Wide
		

If the error occurs during the marking to flying object, adjust the following settings.

ERROR CODE	Description	Setting Position	Scan Speed	Line Speed	Flying Object Wait
E620	The marking is performed after the work is moved to outside of marking field.	Shift to moving direction	Up	Down	Down
E621	The marking is performed before the work is entered into the marking field.	Shift to opposite direction of moving direction	Down	Up	Up
E622	The marking is not finished until the work is passed through the marking field.	—	Up	Down	Down

Reference

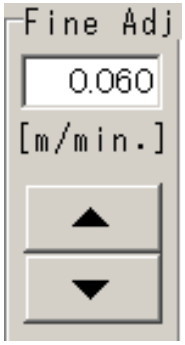
- There might be the case that the marking is impossible even though adjusting the waiting time of the marking of the flying object if there are a lot of marking data.
- The [Delay Distance] setting value should be smaller than the [Marking Interval] value. Otherwise, “E623 Too narrow marking interval for proportioned flying object” is generated.
- When the pulse output from the encoder and actual motion of the line is not matched, the marking may not performed properly.

Fine Adjustment for Line Speed, Encode

Performs fine adjustment for line speed and encoder is possible to be performed while marking to the flying object in RUN mode.

Fine Adj. (Line Speed Fine Adjustment) :

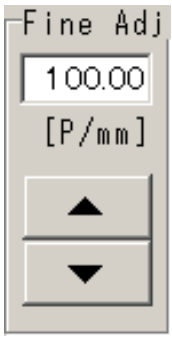
Performs fine adjustment when the encoder is not used.



- When the character is extended, press ▲ for increasing the setting speed.
- When the character is shrunken, press ▼ for decreasing the setting speed.

Fine Adj. (Encoder Fine Adjustment) :

Performs fine adjustment when the encoder is used.



■ Concatenated Marking Setting

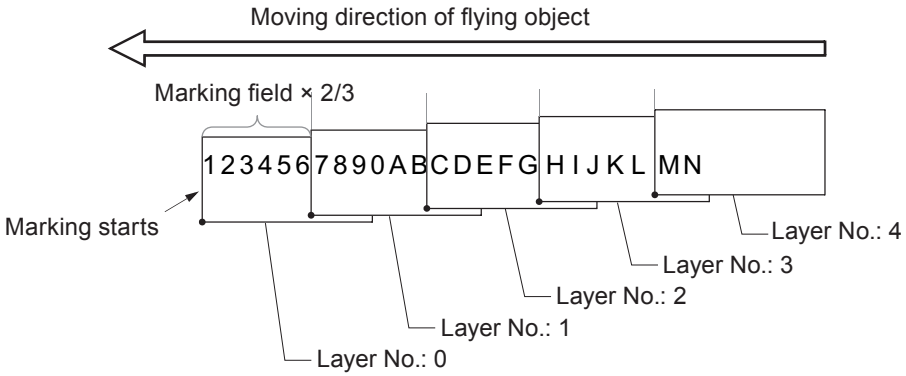
The setting method for marking the character to the work whose length exceeds the marking field is described here.

Reference

- In case of LP-M / LP-Z series, the function of Concatenated Marking to Flying Object can not be used in combination with 3D setting.
- For 3D marking, "Layer No." is used for the 3D object setting, and not for the concatenated marking order.

Setting Method

If the length of the character string to be marked to a flying object exceeds the marking field, divide the characters into the length “marking field × 2/3”, and allocate them to each marking field as shown in the figure below.



Character Setting	• Set the characters “1 to 6” to the first line.
	• Set the characters “7 to B” to the second line.
	• Set the characters “C to G” to the third line.
	• Set the characters “H to L” to the fourth line.
	• Set the characters “M and N” to the fifth line.
Marking condition	• Condition No. 1: Layer No. 0. Set the marking condition of “1 to 6”.
	• Condition No. 2: Layer No. 1. Set the marking condition of “7 to B”.
	• Condition No. 3: Layer No. 2. Set the marking condition of “C to G”.
	• Condition No. 4: Layer No. 3. Set the marking condition of “H to L”.
	• Condition No. 5: Layer No. 4. Set the marking condition of “M and N”.

Reference

- At the marking to flying object with an encoder, the marking stops for each area when the line stops and then enters the wait state of the encoder pulse input.
- 16 marking fields (layer No. 0 to 15) can be used.
- Specify the character setting so that the last character in the character string should match with or go over the projection line on the marking image screen. The projection line on the marking image screen indicates × 2/3 of marking field (starting of the next marking field). (There may be the cases that the characters set outside of the guide line (the characters in the upstream of moving direction) cannot be marked during low-speed operation.)

■ In case of marking continuous character string:

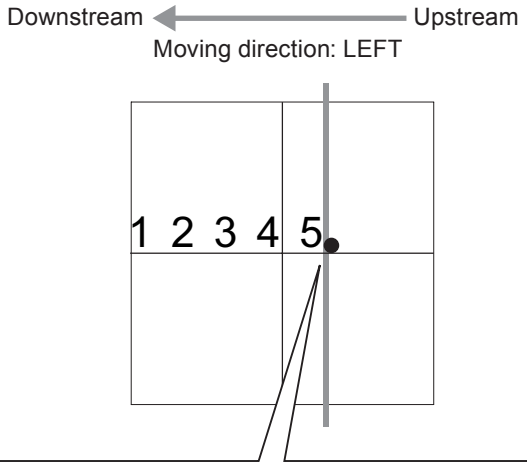
The sample here explains the procedures for the concatenated marking of the character string as shown below to a flying object on the condition of the character height: 12 mm, character width: 12 mm, and character interval: 14 mm.
(In this example, Y position is stable. The origin of the character string is set to be “Left”, and the flying direction is set to be “LEFT”.)

● In case of marking “1234567890” with LP-S200/S500 (Marking field: 90 mm×90 mm)

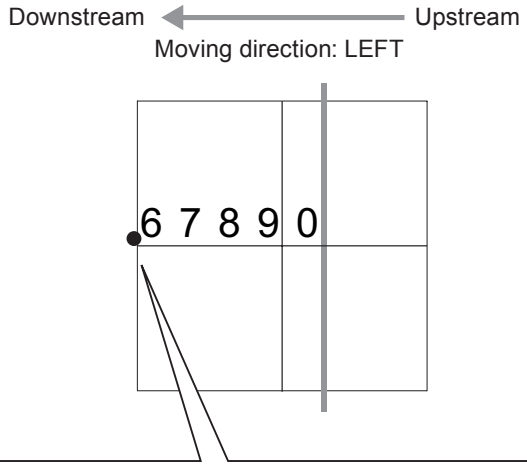
At first, set the character string to be marked on the character setting screen.
Set the character string with its width of the character string per one line should be around 60 mm, except the last layer number

1st line: 12345 (character string width: 60 mm)
2nd line: 67890 (character string width: 60 mm)

Next, set the marking condition of each line on the marking condition setting screen. Next,
set the character string on the 1st line as “Condition No. 1, Layer No. 0”,
set the character string on the 2nd line as “Condition No. 2, Layer No. 1”.



Make sure that the width of the character string should match with or go over the projection line on the marking image screen.



Calculate the start position of “6”, which is the head character of Layer No. 0 on the X coordinate using the following formula:
Formula: -45 + (character string width on the 1st line -90 mm×2/3)
In this sample, the formula below is established because the character string width on the 1st line is 60 mm.
Starting position of the head character on the X coordinate = -45+(60-90×2/3) = -45

Character condition of “12345” on the 1st line

Character condition No. 1			
Character Height	: 12	X Position	: -45
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 0

Character condition of “67890” on the 2nd line

Character condition No. 2			
Character Height	: 12	X Position	: -45
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 1

Reference

- Specify the character setting so that the last character in the character string should match with or go over the projection line on the marking image screen. The projection line on the marking image screen indicates × 2/3 of marking field (starting of the next marking field). (There may be the cases that the characters set outside of the guide line the characters in the upstream of moving direction) cannot be marked during low-speed operation.)

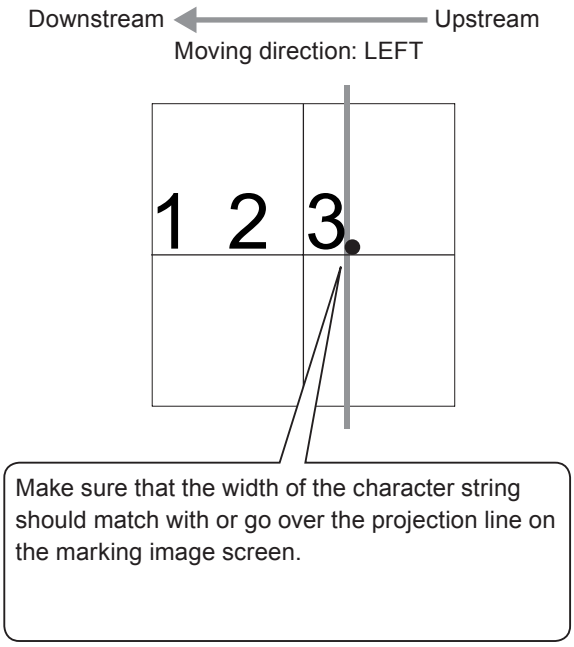
● In case of marking "123456" with LP-S202/S502 (Marking field: 55 mm x 55 mm)

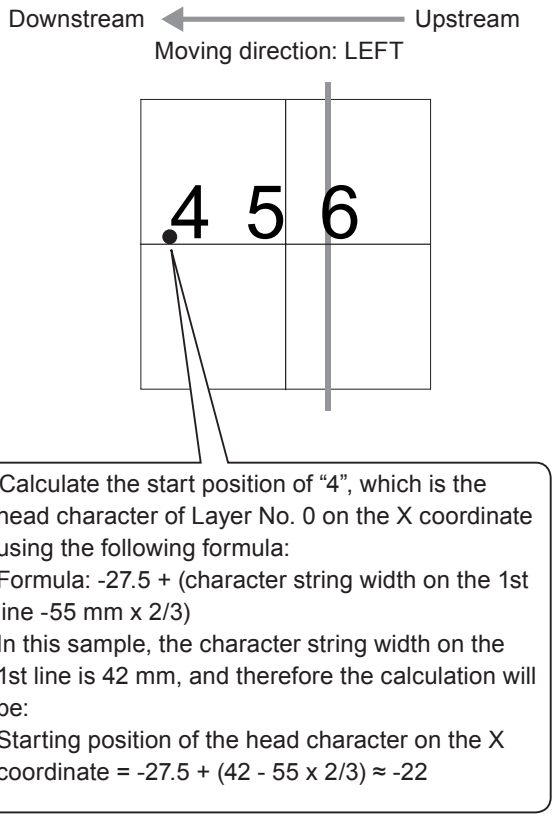
First, set the character string to be marked on the character setting screen.
Set the character string with its width of the character string per one line should be around 36 mm. (except the last layer number)

1st line: 123 (character string width: 42 mm)
2nd line: 456 (character string width: 42 mm)

Next, set the marking condition of each line on the marking condition setting screen. The setting should be:

“Condition No. 1, Layer No. 0” for the 1st line
“Condition No. 2, Layer No. 1” for the 2nd line





Character condition of "123" on the 1st line

Character condition No. 1			
Character Height	: 12	X Position	: -27.5
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 0

Character condition of "456" on the 2nd line

Character condition No. 2			
Character Height	: 12	X Position	: -22
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 1

Reference

- Specify the character setting so that the last character in the character string should match with or go over the projection line on the marking image screen. The projection line on the marking image screen indicates x 2/3 of marking field (starting of the next marking field). (There may be the cases that the characters set outside of the guide line the characters in the upstream of moving direction) cannot be marked during low-speed operation.)

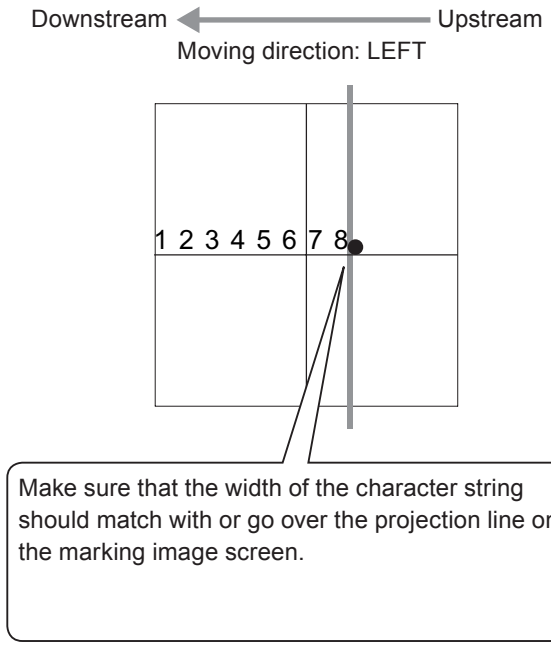
● In case of marking “1234567890ABCDEF” with LP-S205/S505 (Marking field: 160 mm x 160 mm)

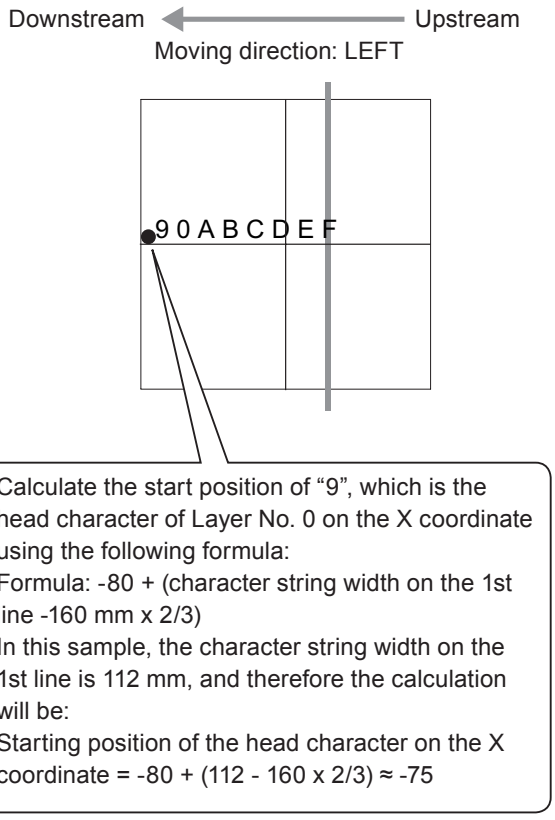
First, set the character string to be marked on the character setting screen.
Set the character string with its width of the character string per one line should be around 106 mm. (except the last layer number)

1st line: 12345678 (character string width: 112 mm)
2nd line: 90ABCDEF (character string width: 112 mm)

Next, set the marking condition of each line on the marking condition setting screen. The setting should be:

“Condition No. 1, Layer No. 0” for the 1st line
“Condition No. 2, Layer No. 1” for the 2nd line





Character condition of “12345” on the 1st line

Character condition No. 1			
Character Height	: 12	X Position	: -80
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 0

Character condition of “67890” on the 2nd line

Character condition No. 2			
Character Height	: 12	X Position	: -75
Character Width	: 12	Y Position	: 0
Character Interval	: 14	Layer No.	: 1

Reference

- Specify the character setting so that the last character in the character string should match with or go over the projection line on the marking image screen. The projection line on the marking image screen indicates x 2/3 of marking field (starting of the next marking field). (There may be the cases that the characters set outside of the guide line (the characters in the upstream of moving direction) cannot be marked during low-speed operation.)

■ In case of marking studded character string:

The sample here explains the procedures for concatenated marking of the character string shown below to a flying object on the condition of the character height: 10 mm, character width: 10 mm, character interval: 12 mm and character string interval: 100 mm.
(In this example, Y position is stable. The origin of the character string is set to be “Left”, and the flying direction is set to be “LEFT”.)

1. Set the character string to be marked on the character setting screen.

Set the number of the character string to each line.
The below formula is used to specify the number of character string for setting the 2nd and consecutive characters.

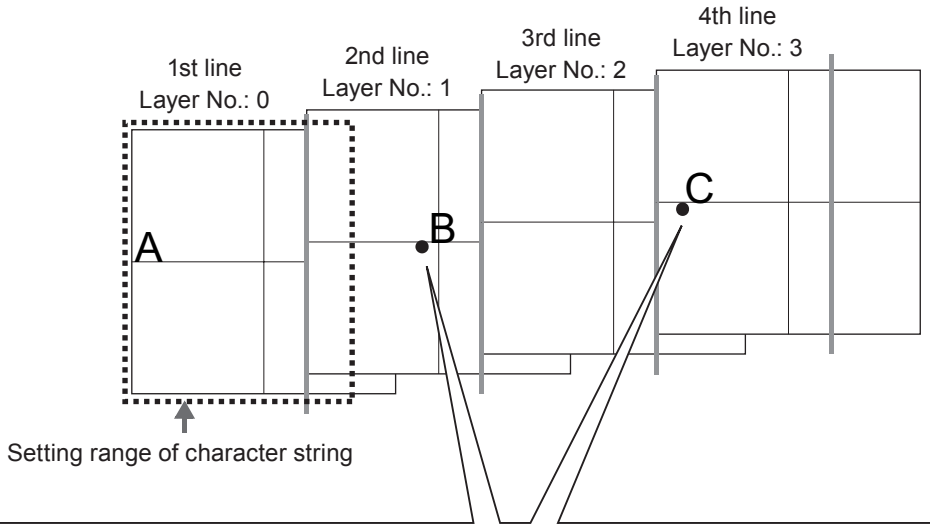
$$n\ \text{Line} = \left(\frac{(m-1) \times \text{character string interval}}{\text{Marking field} \times 2/3} \right) - 1$$

- “m” means the character number.
- “n” is an integer. Discard all digits to the right of the decimal point.

e.g.) According to the above formula, in case of LP-S200/S500 (Marking field: 90 mm x 90 mm), set “B” to the 2nd line and “C” to the 4th line.

2. Specify the marking condition of each line on the marking condition setting screen.

On LP-S200/S500, the character string on the 1st line is specified as “Condition No. 1, Layer No. 0” and that on the 2nd line is specified as “Condition No. 2, Layer No. 1”, and that on the 4th line is specified as “Condition No. 3, Layer No. 2”.



Calculate the starting position of the head character for Layer No. 1 and subsequent numbers on the X coordinate using the following formula:
Starting position on X coordinate = -marking field × 1/2 + {(m-1) × (character string interval - marking field × 2/3 × (n-1)}
Ex) In case of LP-S200/S500 (Marking field: 90 mm x 90 mm)

2nd line (Layer No. 1): Starting position on X coordinate = -45 + {100 - 90 × 2/3 × (2-1)} = -5
3rd line (Layer No. 3): Starting position on X coordinate = -45 + {200 - 90 × 2/3 × (3-1)} = -25

Character condition on 1st line

Character condition No. 1			
Character Height	: 10	X Position	: -45
Character Width	: 10	Y Position	: 0
Character Interval	: 12	Layer No.	: 0

Character condition on 2nd line

Character condition No. 2			
Character Height	: 10	X Position	: -5
Character Width	: 10	Y Position	: 0
Character Interval	: 12	Layer No.	: 1

Setting Condition on 3rd line

Character condition No. 3			
No character input		Layer No.	: 2

Setting Condition on 4th line

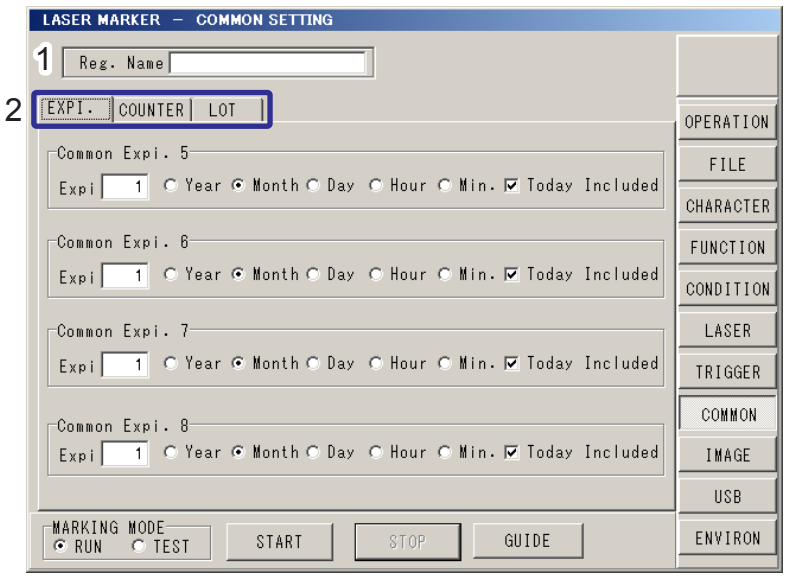
Character condition No. 4			
Character Height	: 10	X Position	: -25
Character Width	: 10	Y Position	: 0
Character Interval	: 12	Layer No.	: 3

2-13 Common Setting

Marking condition set on common setting screen can be used reflecting to respective file number. This section describes the common counter setting, common lot setting, and common export date setting which can be set on the common setting screen.

Reference

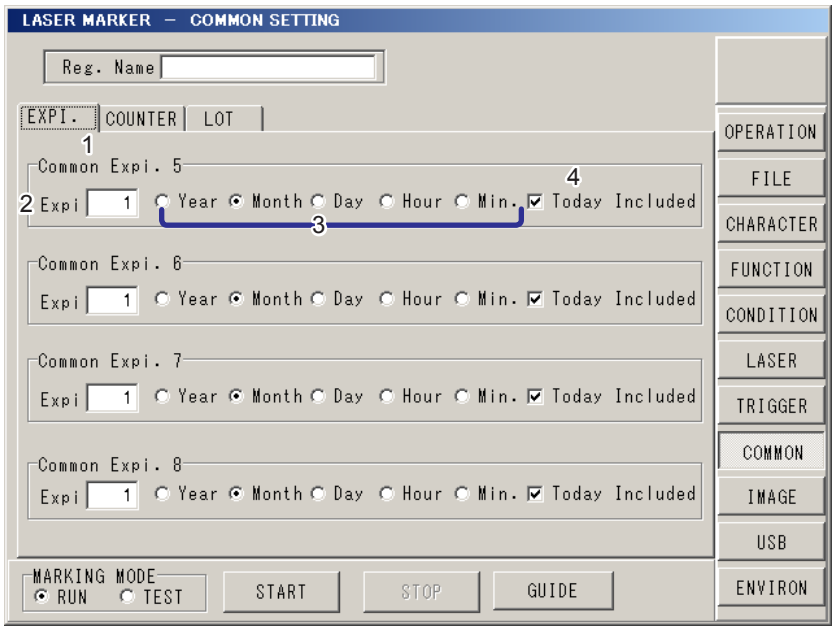
- The contents set on the common setting screen are simultaneously saved when a file is saved on the file screen.



	Description
1	Registration name: Input the common file name. Only one common file can be registered in the laser marker. As a file name, both alphabet including capital and small letters and numeric can switch between single- and double byte. Up to 20 characters can be input in case of inputting all single byte letter.
2	Common setting of functions: Set the following functions used commonly in several files. • Common expiry date • Common counter • Common lot

2-13-1 Common Expiry Date

This paragraph explains the setting of common expiry date which can be used for all files.
This is a function which performs marking by adding the expiry date set to the current date and time set in the internal clock of the environment setting.



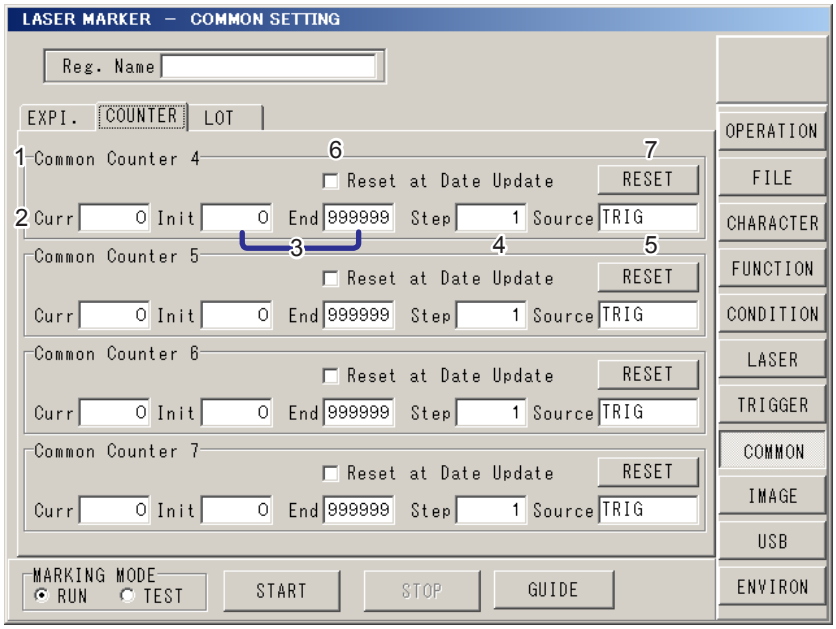
	Description
1	Common Expi No. (Common Expiry No.) : 4 expiry conditions can be set in 5 to 8 for all files.
2	Expi (Expiry Value) : Expiry values to be used for conditions described in “3” as unit. When the expiry number is set to negative value, it represents the past date. Setting Range: -999 to 999
3	Year/Month/Day/Hour/Min. : Sets unit of expiry. Ex) Mark the expiry date of 3 months. Set 3 to “Expi” and select Month for “Expiry unit”.
4	Today Included : Enables to select “Today Included” or “Today Not Included” for expiry in the case of selected the expiry unit, Year or Month. When Year or Month is not selected for the unit, this setting cannot be used.

Reference

- Basically, the expiry date indicates the same year, same month, or same date. When setting “Today”, the expiry is displayed with the previous date (when the expiry value is set with negative value, the expiry is displayed with the next date).

2-13-2 Common Counter

Common counter is a counter which can be set in common for all files. This counter can be counted up/down by sequential number even if the file No. is changed.



	Description
1	Common Counter No.: 4 counter conditions can be set in 4 to 7 for all files.
2	Curr (Current Value): Current counter value. The current value is subsequently marked. Set the current value within the initial value and end value. Setting Range: 0 to 999999
3	Init / End (Initial Value / End Value): The initial value and the end value of the counter. When the initial value is smaller than the end value: Counting up When the initial value is larger than the end value: Counting down Setting Range: 0 to 999999 Reference • Set the different value to the initial and the end value. If the same value is set to both, the counter value does not change.
4	Step (Step Value): Sets the value to be changed per count. Setting Range: 0 to 999999

	Description

5 Source (Count Source) :

Target for timing of counting up and counting down. The count-up or count-down is started at the timing of count source end. The count source can be switched by pressing button.

Setting Range	TRIG (Trigger)	:	Counts up or counts down by trigger input.
	Counter 0	:	Ends Counter 0.
	Counter 1	:	Ends Counter 1.
	Counter 2	:	Ends Counter 2.
	Counter 3	:	Ends Counter 3.
	Counter 4	:	Ends Common Counter 4.
	Counter 5	:	Ends Common Counter 5.
	Counter 6	:	Ends Common Counter 6.
	Counter 7	:	Ends Common Counter 7.

6 Reset at Data Update:

With checking on this function, the counter value is reset at the internal clock becomes “0:00”.

Reference

- When the date changes during the Time Hold function is effective, the counter value is reset at the timing of releasing Time Hold (the time hold input is OFF).
- The counter reset at update cannot apply to the marking to fling object.

7 RESET:

Returns current value to initial value by pressing [RESET].

Notice

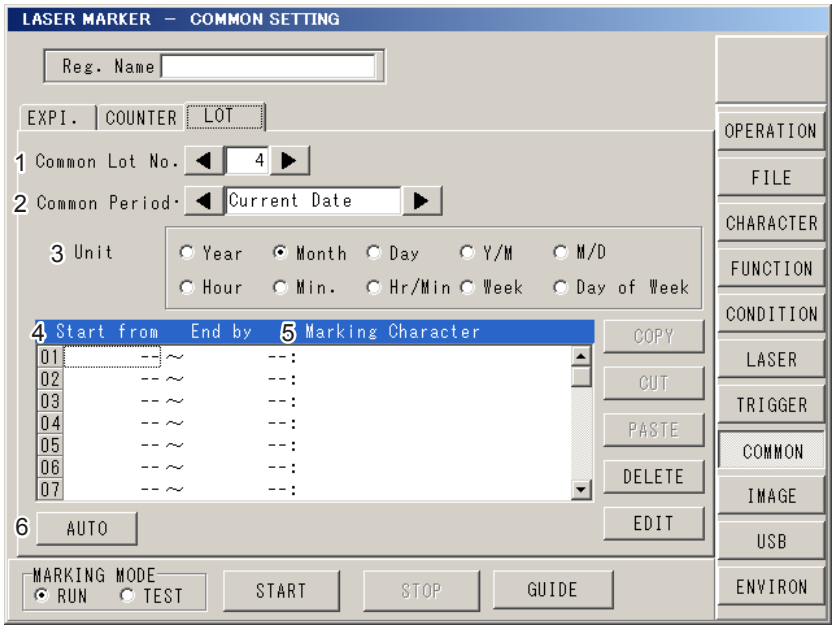
- When the counter is interrupted by alarm occurrence etc., check the counter value for the next marking.

Reference

- The counter does not operate at test marking.
- When the counter value reaches to the end value, the marking is started from initial value again.
- Only the counter input with the character string is available.
- The current value of the counter is saved without overwriting the file.
- Each function character already set function is input on the character setting screen. Refer to “Counter” (P.111).

2-13-3 Common Lot

This clause explaining the setting of lot function which can be used in common for all files.
This function divides the subject set in term by each term, and marks each term in the set character string.



	Description

1 Common Lot No.:
4 lot conditions can be set in 4 to 7 for all files.

Setting Range	4 to 7

2 Period:
Target period of the lot function.

Setting Range	Current	:	Specifies as target date set with current date.
	Expiry No. 1 to 8	:	Specifies as target date set with expiry No. 1 to 8.
	Counter 0 to 7	:	Specifies as target counter set with counter 0 to 7.

3 Unit:
Selects unit for period to be performed lot function among 10 types.

Period Condition	Description	Max. Divided Numbers
Year	Period defined by year (dominical year) unit.	Max. dividable No.: 60
Month	Period defined by month unit.	Max. dividable No.: 12
Day	Period defined by date unit.	Max. dividable No.: 31
Y/M	Period defined by year and month.	Max. dividable No.: 60
M/D	Period defined by month and date.	Max. dividable No.: 60
Hour	Period defined by hour unit.	Max. dividable No.: 24
Min.	Period defined by minute unit.	Max. dividable No.: 60
Hr/Min	Period defined by hour/minute unit.	Max. dividable No.: 60
Week	Period defined by week unit.	Max. dividable No.: 54
Day of Week	Period defined by day of week unit.	Max. dividable No.: 7

* When the period condition is "Y/M", do not input date. Never input the non-existent date.

Reference

- When a lot subject is set to counter 0 to 7, setting of term condition is not necessary. In this case, max. dividing number is set to 60.

	Description
4	Start from / End by: Set the both period of start and end.

Reference

- If the period is spanned, for example, when setting the period from 22 o'clock to 3 o'clock of the next day, it needs to set the period by diving into two, 22 to 23 o'clock and 0 to 3 o'clock.
- In the case of setting target lot to counter 0 to 7, the period condition is not needed to be set. The max. dividable numbers for this case is 60.

5 Marking Character:
Set the character string to be marked. Double-click on the marking character string area, or select the input line and press [EDIT] to open the character input window.

Setting Range	Up to 9 characters *

* Capital and small letters of alphabet, numerics, Katakana, Hiragana, Kanji (JIS level-1 and JIS level-2), symbols, user registration characters

6 AUTO:
This "AUTO" is available when the unit of the expiry date is selected among "Year", "Month", "Day", "Hour", "Min.", "Week", or "Day of Week". Pressing this button sets the start and end of the period with minimum unit automatically. Note that when the unit of the expiry date is set to "Year", the period is set automatically calculating from the current year.

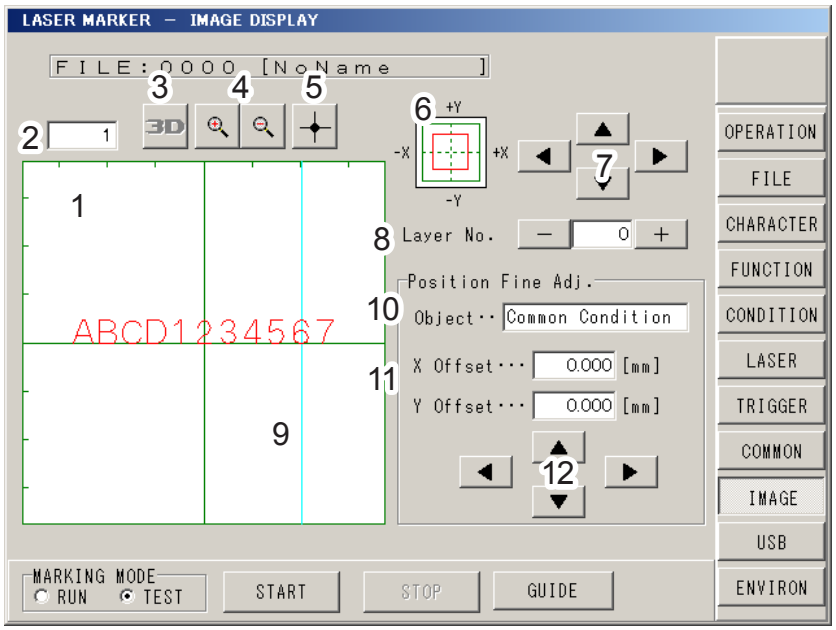
Reference

- Each function character already set function is input on the character setting screen. Refer to "Lot" (P.113).

2-14 Image Display Screen

This is a screen for checking the image of character string/logo set in the character setting or condition setting.
Image checking before marking is effective to reduce any errors.
Position adjustment is also possible on this screen. Adequate position can be set by checking the image.

2-14-1 Image Display



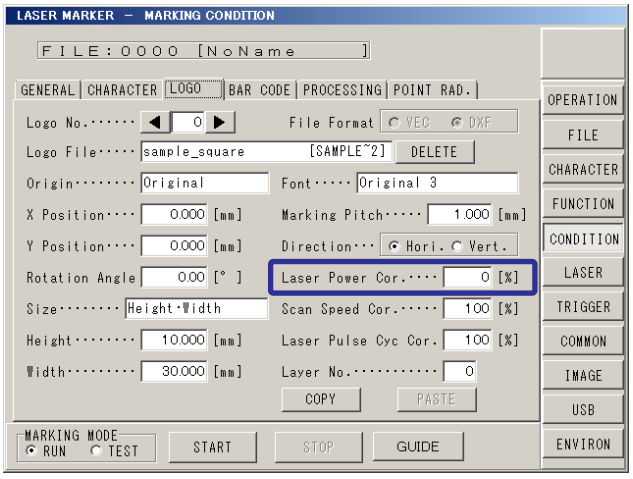
	Description
1	Image Screen : Image-displays the marking content set previously.
2	Magnification : Sets the magnification ratio of the image display. Press the numeric part of the magnification to set the arbitrary magnification on the screen.
3	3D Display (LP-M / LP-Z series only) : This button appears when the 3D marking mode is selected. By pressing this button, both the 3D figure and marking content are displayed with 3D view screen. Refer to “2-14-3 3D View Screen” (P.212).
4	Image Display Zoom-in/Zoom-out : The image can be zoomed in and out by 18 steps.
5	Center of Image Display : Set the origin center to image display position.
6	Image Display Position : The focal position of the above can be confirmed according to the set magnification of the marking field.
7	Shift Display Position : Shifts image display part up and down, left and right. Pressing arrow shifts the image display part.

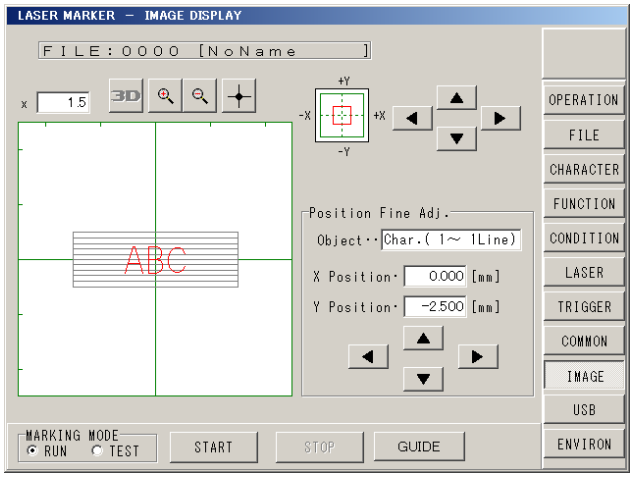
	Description
8	Layer No. *1: The layer No. is displayed when the 3D marking mode is selected (only for LP-M and LP-Z series) or the marking mode “Mark on Flying Object” is selected for the trigger setting. Press [+] or [-] to select the desired layer number. The image corresponding to the selected layer No. is displayed.
9	Auxiliary Line *1: Auxiliary line used for setting marking to flying object. Refer to “Concatenated Marking Setting” (P.199).
10	Object (Adjustment Object) : Select the object to be fine adjusted. The data which shows in red character or image on the window is the selected object.
11	X/Y Position : Inputs the coordinate value of X or Y axis. Press the numerical value to display a ten-key pad.
12	X/Y Position Fine Adjustment : Fine-adjusts the target marking contents to up/down or right/left direction. (in 0.001 mm pitch)

*1 : Displayed only with the setting for marking of flying object.

2-14-2 Work Image Display

In case there are data which you will see on the image display, but not be marked, such as the outline data of the marking object or characters, setting 0% to “Laser Power Correction”. Then, the data are showed with gray figure on the image display.
The marking data which are set to 0% for “Laser Power Correction” are not marked. They do not affected the marking time etc. as well.





Reference

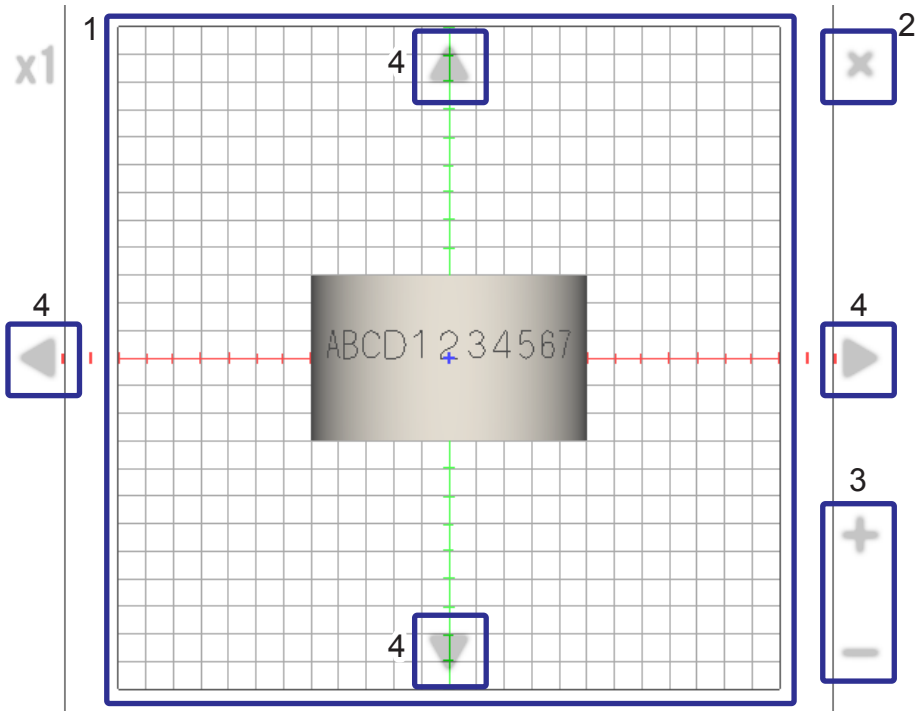
- When “Laser Power Cor.” is set to 0%, these character, logo, barcode or processing data are not traced with the guide laser “Marking Character” mode. Only the marking content with the setting value of the laser power correction for logo condition or on processing condition set to “0” is traced with the guide laser “Work Image” mode. Refer to “2-6-2 Guide laser” (P.93).

2-14-3 3D View Screen

[Function specific to LP-M /LP-Z series]

* This function is not implemented in the LP-S series.

The 3D view screen is displayed by pressing 3D display button on the image display screen.
Both the image of the 2D figure and marking content set with the layer condition (“Layer Condition” (P.134)) can be confirmed with this 3D View screen.



	Description
1	3D View Display: Displays both 3D figure image and marking content specified with layer condition.
2	Close: Closes the 3D view screen by pressing this button, and the image is shifted to the image display screen.
3	Zoom IN/OUT: Zooms IN/OUT the 3D view display screen by 18 stages. The current magnification ratio is displayed on the upper left of the 3D view screen.
4	Moving Button for Display Position: Shifts the 3D display part to up, down, left, and right by pressing this button.

Reference

- Using both screen of this 3D View and image display, confirm if the marking data is not outside of the marking field.
- Pressing the empty space of the 3D view screen disappears the buttons “2” to “4” in the figure above. Re-pressing the empty space of the 3D view screen appears the buttons “2” to “4”.

2-15 USB Media

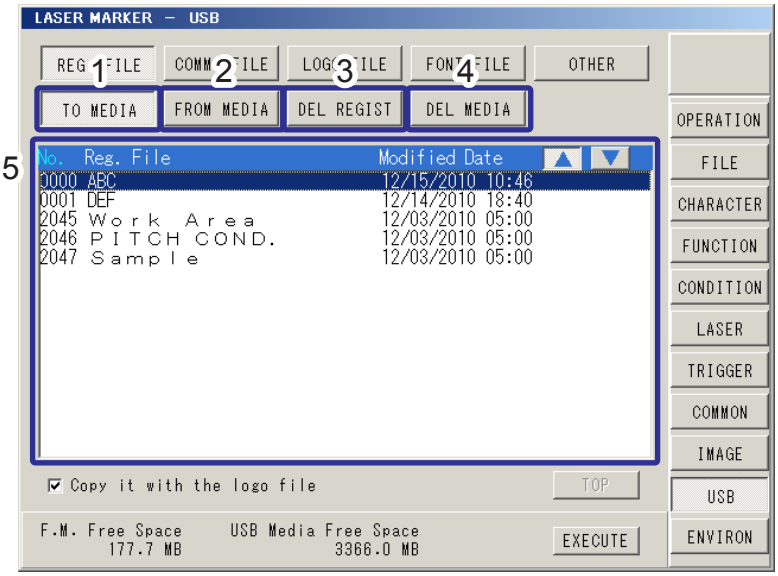
On this screen, data saved in the laser marker such as setting files, log and font files can be exported and deleted. It is also possible to import externally saved data to the laser marker.
To import and export the data, use a USB media.

Notice

- Do not remove the USB media from USB connector during data write/read.
  In addition, do not turn off the power supply of the main unit of laser marker during data write/read.
  Any losses or failures of data might be caused. Please note that we shall not be liable for any losses incurred due to loss or failure of data arising from use of this product.
- Do not insert/remove the USB media into/from the USB connector during marking, guide laser scanning or remote control. The laser marker may get unstable or stop.
- Do not start the laser marker with the USB media being connected into the USB connector. The laser marker may not start normally. Connect the USB media to the connector after the start-up is completed.
- Do not connect any other USB products for the purpose of data writing or reading than USB media to USB connector. Performance of the laser marker might be failed. Before using a USB media, check it for compatibility with the laser marker. We shall not be responsible for performance of all kinds of USB media.
- USB media with security features cannot be used.
- USB hub cannot be used for this product. Use USB media directly connecting to the laser marker.

2-15-1 Registration File

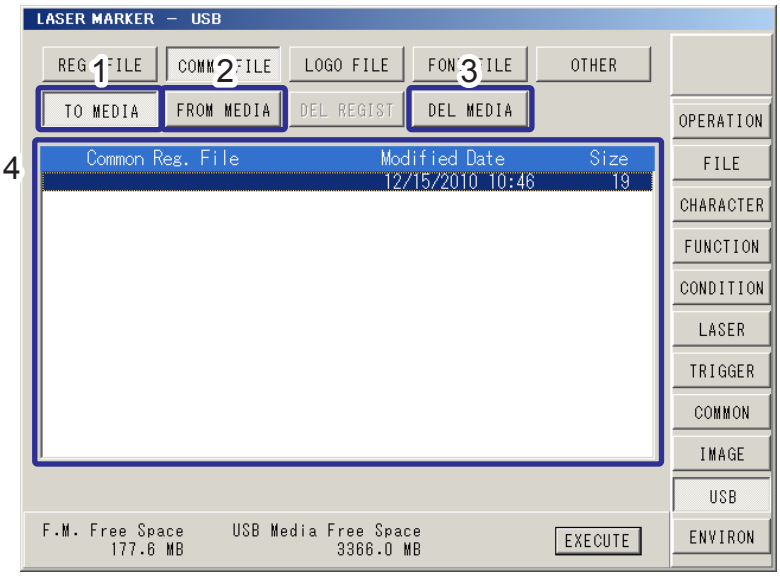
Registration files contain the marking data and conditions in one file number.
Up to 2048 registration files can be saved in a laser marker.



	Item	Description
1	TO MEDIA	Copies the selected file stored in the laser marker to the USB media.
2	FROM MEDIA	Registers the selected file stored in the USB media to the laser marker. Files in the backup data can also registered individually to the laser marker.
3	DEL REGIST	Deletes the selected file from the laser marker. Select the file to delete and click "EXECUTE".
4	DEL MEDIA	Deletes the selected file from the USB media. Select the file to delete and click "EXECUTE".
5	File list	Displays the all files stored in the laser marker. Clicking the title line of the list, the files are sorted in ascending or descending order by the following categories. • File No. • File name • Modified date

2-15-2 Common File

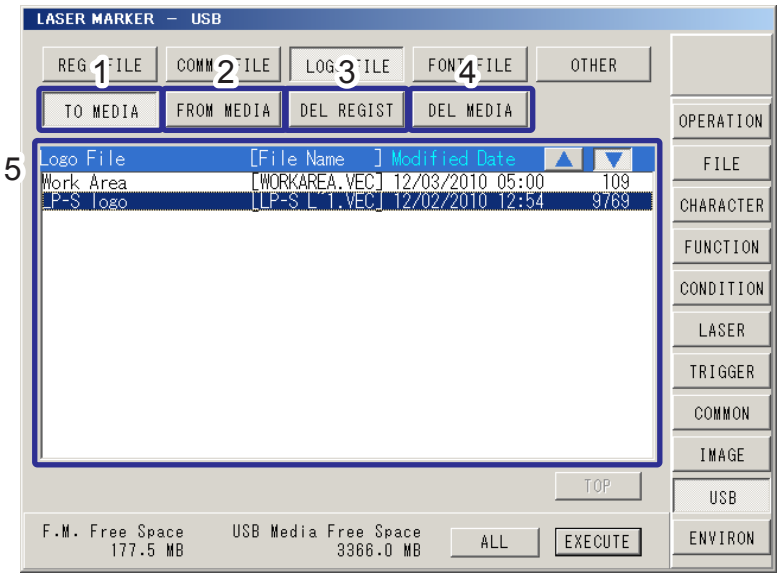
Common file contains the setting data for the functions such as expiry date, counter or lot using in several files.
One common file can be saved in a laser marker.



	Item	Description
1	TO MEDIA	Copies the selected common file stored in the laser marker to the USB media.
2	FROM MEDIA	Registers the selected common file stored in the USB media to the laser marker.
3	DEL MEDIA	Deletes the selected common file from the USB media. Select the file to delete and click "EXECUTE".
4	Common file list	Displays the common file stored in the laser marker.

2-15-3 Logo File

Logo files contain the graphic data for the marking in VEC or DXF format.



	Item	Description
1	TO MEDIA	Copies the selected logo file stored in the laser marker to the USB media.
2	FROM MEDIA	Registers the selected logo file stored in the USB media to the laser marker.
3	DEL REGIST	Deletes the selected logo file from the laser marker. Select the file to delete and click "EXECUTE".
4	DEL MEDIA	Deletes the selected logo file from the USB media. Select the file to delete and click "EXECUTE".
5	Logo file list	Displays the all logo files stored in the laser marker. Clicking the title line of the list, the files are sorted in ascending or descending order by the following categories. • Logo file name • File name • File format • Modified date

Reference

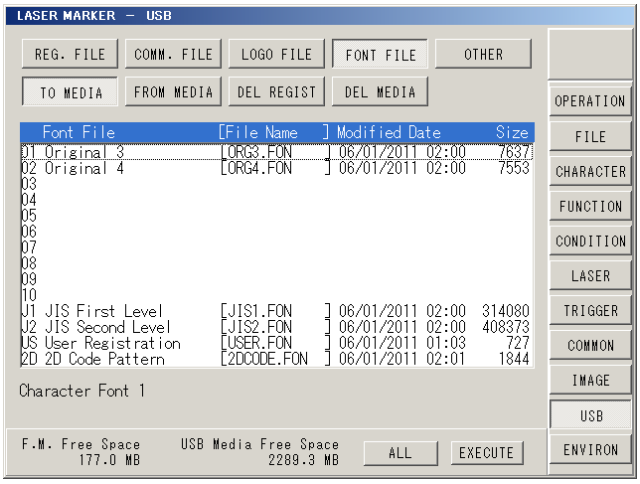
- Up to 2048 logo file can be registered into the laser marker.
- Up to 1,445,376 byte logo file can be registered into the laser marker.

2-15-4 Font File

Font files contain the font data for marking.

Font File Registration

Registration of the font file to the laser marker is necessary when marking is executed with the laser marker.



Register the fonts to the suitable font no. as follows.
In case the font type does not match the font no., some characters cannot be input properly.

Font No.	Initial registered file (.FON)	Font Type
01 to 10	01: ORG3 02: ORG4	Font for the alphanumeric and symbols (called Original font in the laser marker): 0 to 9, A to Z, a to z and some symbols
J1	JIS1	JIS Level 1 font: Hiragana, Katakana and Kanji characters for Japanese, special characters for Grecian and Russian
J2	JIS2	JIS Level 2 font: Kanji characters for Japanese
US	USER	User Registration Character Font (newly created character by user)
2D	2DCODE	Drawing pattern font for 2D code modules

Installed Font

The attached “Laser Marker Utility (CD-ROM)” contains the following font files.
(For Font: [CD-ROM]\Font)
Save the files into a USB media when registering it to the laser marker.

Character font

Alphanumeric and signal font of original for laser marker. (Original Font)
(Refer to the Character Code Table of Serial Communication Guide for the character kind and character code.)

Original 1 (ORG1.FON) : font suitable for multipurpose letter marking.
Original 2 (ORG2.FON) : font suitable for lower-case letter marking.
Original 3 (ORG3.FON) : font suitable for nameplate marking etc.
Original 4 (ORG4.FON) : font for high-speed marking.
Original 5 (ORG5.FON) : font suitable for micro lower-case letter.
OCR1 (OCR1.FON) : font suitable for confirming the processed image.
Original1 (small) (ORG1S.FON) : 80% reduced-size font of Original1.
Original2 (small) (ORG2S.FON) : 80% reduced-size font of Original2.
Original3 (small) (ORG3S.FON) : 80% reduced-size font of Original3.

Reference

- Original 4 font contains some characters that can not be bold.
- By using reduced size font, arrange a proper balance of character line when Kanji and alphanumeric characters are used in the same character line.

JIS font

Font file of Hiragana, Katakana, Grecian, Russian, and Kanji.
(Refer to the Character Code Table of Serial Communication Guide for the character kind and character code.)

JIS First Level (JIS1.FON)
JIS Second Level (JIS2.FON)

User Registration Character Font

The font file in which the user registers the font newly created with the font maker (refer to Font Maker Operation Manual.)
* The following character fonts are previously registered at 8121(HEX) to 8129(HEX) in the character font by user registration installed in the CD-ROM.

	Shift JIS	JIS	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
User Registration Character	F13F	8120																
	F14F	8130																
	F15F	8140																
	F16F	8150																

User Registration (USER.FON)

2D Code Pattern Font

Pattern font for 2D code allocated to codes 2230(HEX) to 2239(HEX) and 8121(HEX) to 8152(HEX).
* The pattern font for 2D code installed into CD-ROM is already registered the pattern font for 2D code allocated to codes 2230(HEX) to 2239(HEX) and 8121(HEX) to 8152(HEX).
(Refer to “2D Code Pattern Font” (P.171) for the kind and code of character.)

2D Code Pattern (2DCODE.FON)

2-15-5 File Management

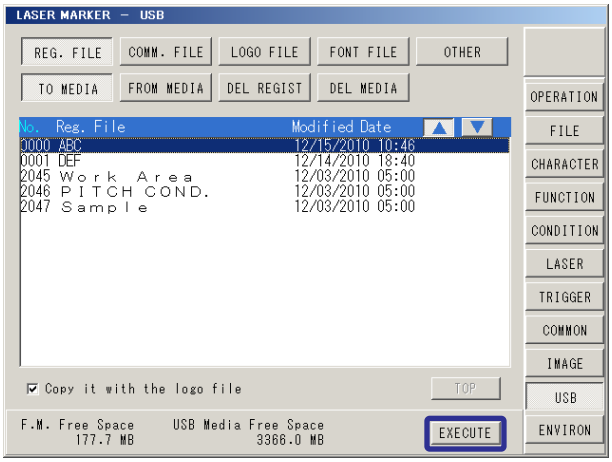
■ Copy to Media

The file data registered in the laser marker is copied to USB media.

1. Select the file from the list and press [EXECUTE].

For registration files, check the box of “Copy it with the logo file” to copy the logo files in the selected files.

For logo files and font files, when pressing [ALL], the all files in the list are selected.



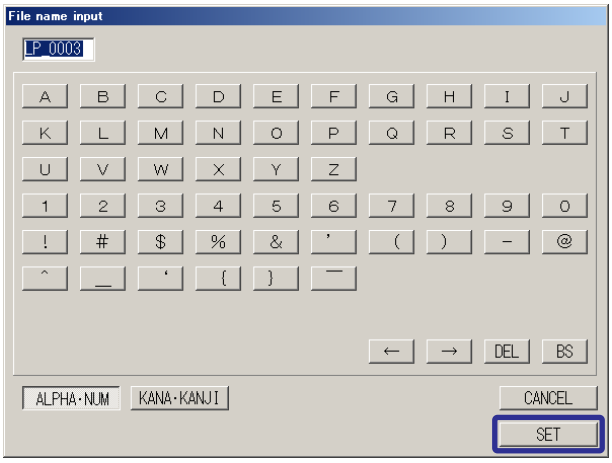
Reference

- For registration files and logo files, selecting the category title in the list and pressing [▲] [▼] displays the list by selected item in ascending/descending order.

2. Select the copy destination directory, and press [Copy].

For the registration file and common file, input the file name to be saved on USB media. Then press [SET] and [COPY].

Input possible with 8 characters of English capital letters or numeric letters, or 4 characters of Hiragana, Katakana, and Kanji.



Reference

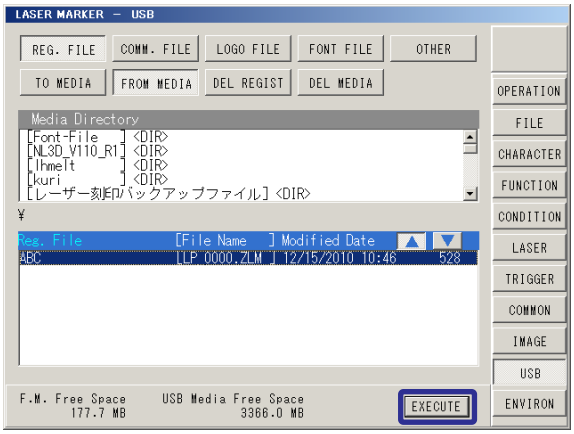
- For the registration file and common file, following names can not be used as a file name.
  CLOCK$, CON, AUX, NUL, PRNCOM1 to COM9, LPT1 to LPT9

■ Register to Inside

The file data saved in USB media is registered to laser marker.

1. Select the file in the USB media after selecting directory, and press [EXECUTE].

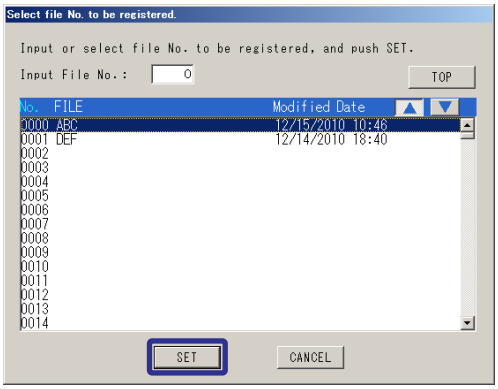
For logo files, when pressing [ALL], the all logo files are selected.



Reference

- Selecting the category title in the list and pressing [▲] [▼] displays the list by selected item in ascending/descending order.

2. For registration files and font files, select the file number to be registered, and press [SET].



Reference

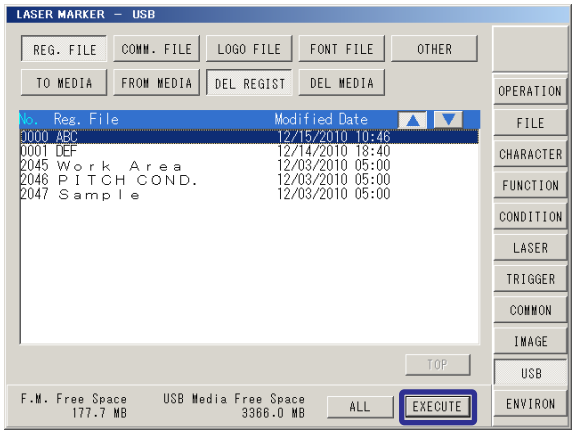
- When copying the registration file in that a logo file is used, register the logo file to the laser marker, too.

■ Delete Registration

The selected file data registered in the laser marker is deleted.

1. Select the file to be delete from the file list and then press [EXECUTE].

When pressing [ALL], the all files are selected.

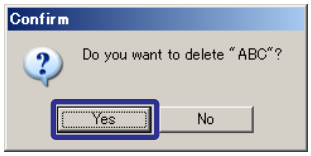


Reference

- For registration files and logo files, selecting the category title in the list and pressing [▲] [▼] displays the list by selected item in ascending/descending order.

2. Check the file and press [Yes].

Pressing [No] does not delete the file and returns to Step 1.



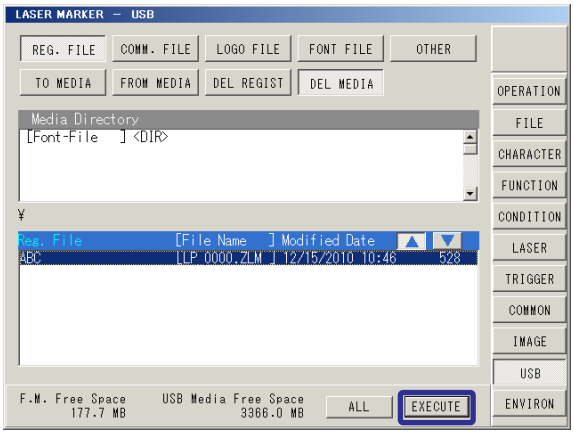
3. The file is deleted from the laser marker.

■ Delete Media

The file data saved in USB media is deleted.

1. Select the file to be deleted from the file list after selecting directory, and then press [EXECUTE].

When pressing [ALL], the all files are selected.

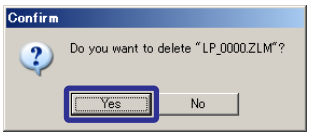


Reference

- Selecting the category title in the list and pressing [▲] [▼] displays the list by selected item in ascending/descending order.

2. Check the file and press [Yes].

Pressing [No] does not delete the file and returns to Step 1.



3. The file is deleted from the USB media.

2-15-6 Backup

In the menu of “OTHER”, the marking data stored in the laser marker can be saved as a backup file or a text file.

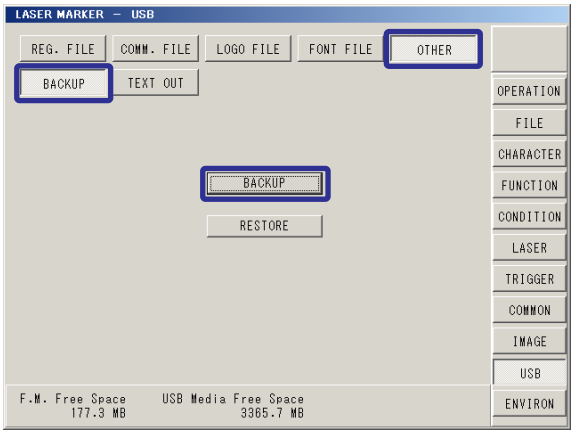
■ Backup

The all marking data stored in the laser marker is saved to USB media as a backup file.
The backup file consists of the registered file, logo file, font file and some environment setting.

1. Insert the USB media into the USB port of the controller.

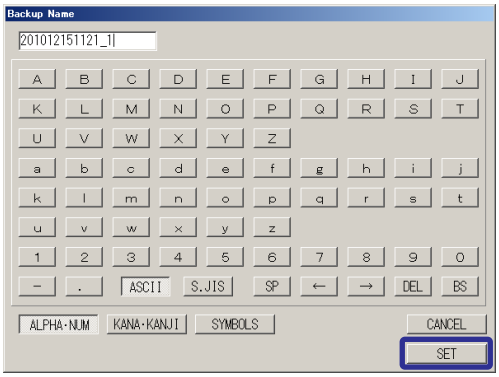
2. Press [OTHER] and select [BACKUP].

3. Press [BACKUP].



4. Input the file name and press [SET].

Pressing [CANCEL] does not backup the file and returns to Step 1.



5. The data are backed up to USB media.

Reference

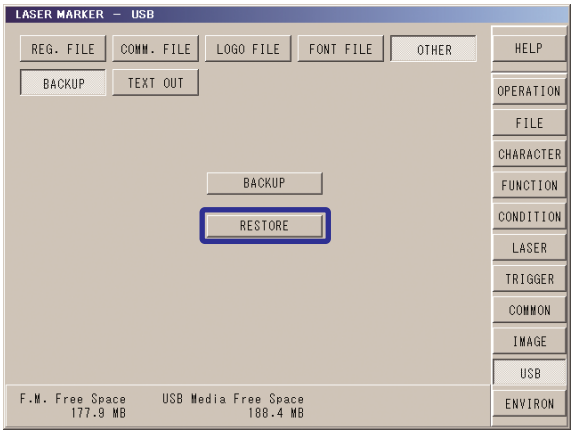
- The environment setting such as system setting, communication setting and I/O setting are also backed up. The setting shown below are not backed up.
  - Current Counter Value
  - Present Date and Time
  - Adjustment of Touch Panel
  - Display Language

■ Restore

Restore (Overwrite) the file data (setting files, logo files, font files and environment settings) in the laser marker with the externally saved backup data by the following procedures.

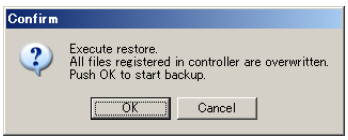
1. Insert the USB media with the back up data into the USB port of the controller.

2. Press [RESTORE]. Select the file name to be restored, and press [CONFIRM].



3. Confirm screen is displayed. To execute restore press [OK].

Pressing [Cancel] does not restore the bulk backup and returns to Step 1.



4. Restore is conducted.

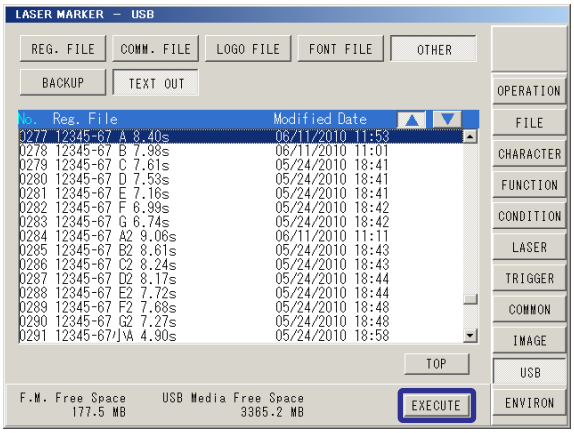
Reference

- All data currently registered in laser marker are overwritten over the bulk backup data.
- In the case of restoring backup data from the other model, setting value beyond the upper limit indicated in red. Laser marker operates at its upper limit. Correct those value within the setting range according to the model.

■ Text Output

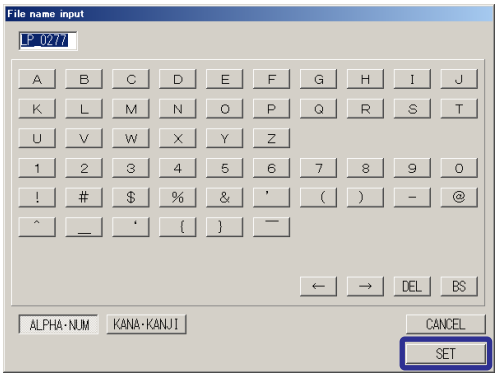
The selected file data is copied to USB media with text format.

1. Select the file to be text outputted from the file list, and press [EXECUTE].



2. Select the directory to be copied the file, and press the file name input column. After that, input the file name to be saved into USB media, and press [SET]. and then press [Save].

Input possible with 8 characters of English capital letters or numeric letters, or 4 characters of Hiragana, Katakana, and Kanji.



3. The file data will be output to USB media in the text format.

Reference

- The data output into text format can be opened and read with “Notepad”, etc. of “Windows”.
- The following names have been already reserved by system and can not be used as a file name.
  CLOCK$, CON, AUX, NUL, PRN
  COM1 to COM9, LPT1 to LPT9

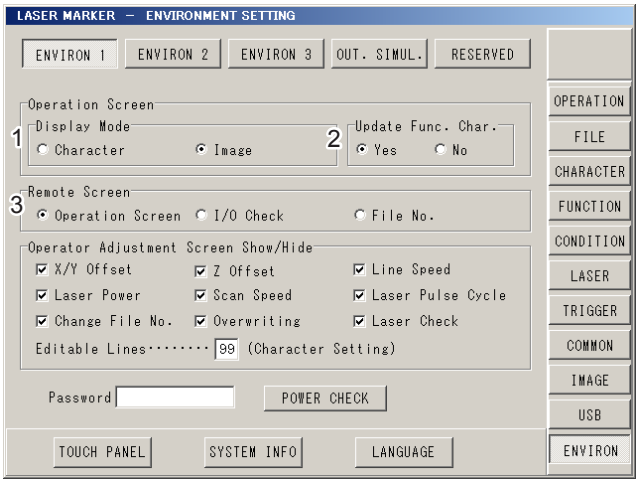
2-16 Environment Setting

This function is used for environment setting of laser marker and checks the status of system.
The setting parameters on this screen affect the settings on the other screens, operation or marking of character.
The settings here should be previously checked, or changed if necessary.

2-16-1 Display Setting (Environment 1)

Reference

- Setting of Environment 1 is saved without overwriting.



■ Operation Screen and Remote Screen

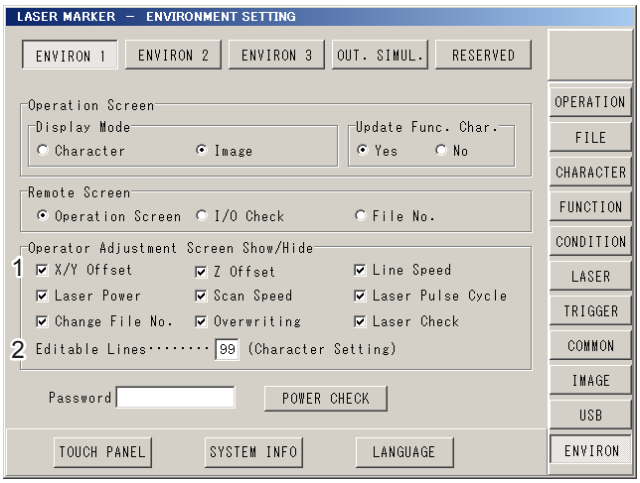
	Description
1	Display mode : Select the display of the operation screen between marking characters and marking image. • Character: Refer to “2-3-1 Character Display” (P.82). • Image: Refer to “2-3-2 Image Display” (P.83).
2	Update Function Character : Select the updating on (Yes) / off (No) in the operation screen for the function character such as date, lot, counter.
3	Remote Screen : Select the display of the operation screen under the remote control mode. • Operation Screen: Refer to “2-3 Operation Screen” (P.82). • I/O Check Monitor: Refer to “2-5-1 I/O Check Monitor” (P.89). • File No. and File name

Reference

- When selecting “Image” for the operation screen and displaying the operation screen in the remote control mode, the waiting time for the turning on the marking ready might become longer after editing the marking data or changing file No.
- When selecting “Yes” for the update of the function character, the idling time from the ending of the marking after inputting trigger until the timing of the starting of the next marking might become longer.

■ Operator Adjustment Screen/Adjustment Accepted Parameters

The setting parameters that can be set on the operator's adjustment screen are selected.



	Description
1	Setting permission: Check the respective boxes to make the adjustment on the operator's adjustment screen possible. • X/Y Offset • Z Offset (LP-M/Z series only) • Line Speed (Except LP-SxxxW type) • Laser Power • Scan Speed • Laser Pulse Cycle (Except LP-SxxxW type) • Change File No. • Overwriting • Marking Energy (LP-M series /LP-Sxxx type only) • Laser Check
2	Editable Lines: Sets the number of line possible to be edited at the edition of character setting on the operator's adjustment screen. Setting Range: 0 to 99 lines

Reference

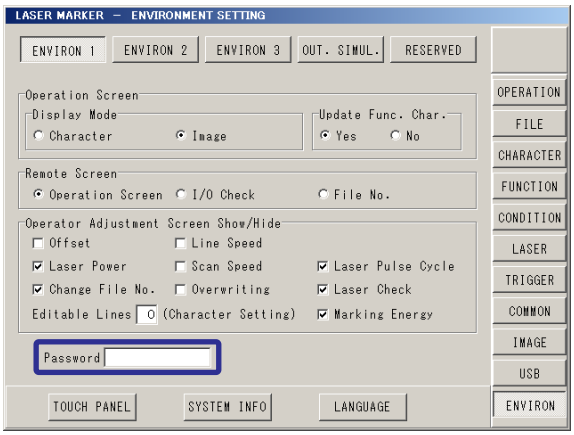
- Setting of password is useful to avoid unintentional change of setting by operator. Setting of parameters only the specified operators can change is possible, too. Refer to "2-16-1 Display Setting (Environment 1)" (P.224) or "2-3-3 Password to Open the Setting Screen" (P.84) for the setting of password.

■ Password

The function of password is used to avoid the unintentional change to the setting screens from operation screen.

Setting procedures

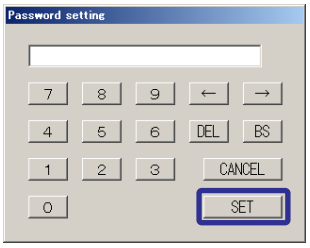
1. Press the password.



2. Input the password, and press [SET].

A password consists of figures of maximum fifteen digits.

To disable the password protection, delete all characters and press [SET].



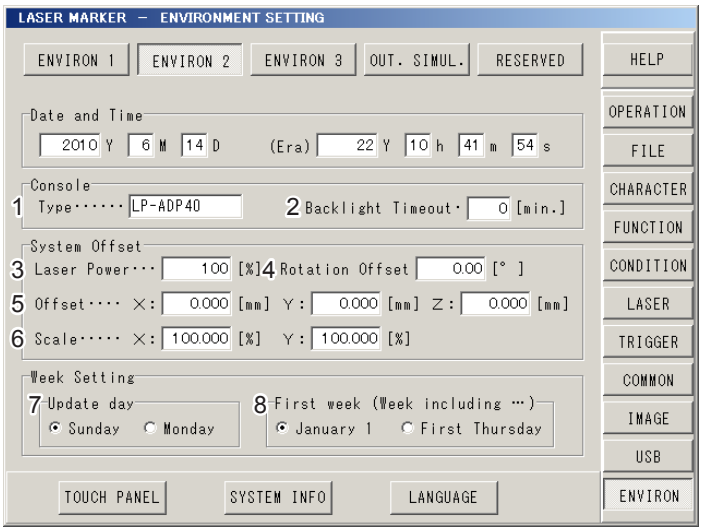
Reference

- The password is required to change the screen from operation screen to the other setting screens.

2-16-2 System Setting (Environment 2)

Reference

- Setting of Environment 2 is saved without overwriting.



■ Date and Time

The setting of internal clock provided to the laser marker. The dominical year, month, date, era year, hour, minute and second can be set. The internal clock is used to mark the current date and expiry date set as the function character.

Notice

- The following items, Date, Lot, and Expire Date are marked based on the internal clock integrated in the laser marker. The internal clock might be deviated caused by the error of the internal parts or degree of the battery drain. Therefore, be sure to check the time of the internal clock before the operation without fail.

■ Console

The console connected to the laser marker is specified.

	Item		Description
1	Type	:	Specifies the type of console connected to the laser marker. LP-ADP20 → LP-ADP40 → 15” Monitor → 17” Monitor The setting varies by pressing the setting field.
2	Backlight Timeout	:	Sets the period till the automatic back light OFF. The light is always turned on when “0” is specified here. The setting is possible for the specified console. (“LP-ADP20” or “LP-ADP40”) Setting Range: 0 to 60 min.

■ System Offset

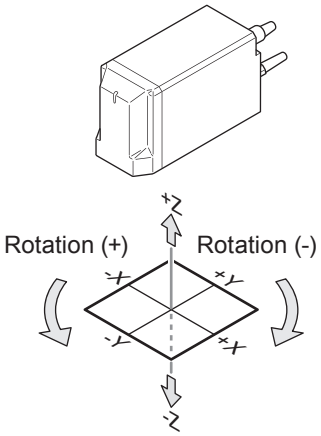
This screen specifies the offset of marking position and laser power to the all registered files.
The functions are applicable to adjust the difference of laser power or displacement between laser marker and works in case multiple production lines are used.

	Item		Description
3	Laser Power	:	Laser power offset. Offset the value of laser power set in each file. Setting Range: 50 to 200%

Reference

- “100” is specified if the value of “laser power (system offset)” × “laser power (laser setting)” is 100 or more.

4	Rotation Offset	:	Rotates the object to the rotation direction around the original point. Setting Range: -180.00 to +180.00 degree
5	X/Y Offset	:	Shifts the marking position to the X/Y direction. Setting Range: -30.000 to +30.000 mm (LP-M500/LP-S500)*
	Z Offset (LP-M/LP-Z series only)	:	Shifts the marking position to the Z direction. Setting Range: -22.000 to +22.000 mm (LP-M500)* -25.000 to +25.000 mm (LP-Z130)*
6	X/Y Scale	:	Sets the offset scale of marking field (X and Y). Area is corrected by inputting magnification. Setting Range: 70.000 to 130.000%



* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).

Reference

- System offset is not offset on the image display.
- When marking data is inside of marking field on image display screen and the error “Existed marking data outside of marking field” is displayed. Check the setting value in system offset.

■ Week Setting

To use the current date, expiry date or lot function in “week” period, the counting rule of the week is set in this screen. The-first-day-of-the-week setting and the-first-week-of-the-year can be specified.

	Item	Description
7	Update day	Specifies the week renewal timing “the-first-day-of-the-week”. • Sunday : Renews at 0:00 a.m. of Sunday. • Monday : Renews at 0:00 a.m. of Monday.
8	First Week	Specifies the-first-week-of-the-year. • January 1 : Specifies the first week which contains January 1. The week which contains December 31 is the last week of the year. • First Thursday : Specifies the first week which contains the first Thursday of the year. This may cause that the date December 31 is in the first week of the year and the date January 1 is in the last week of the year.

Example: When January 1 is Sunday, week setting is as follows:

Setting	The first week	Remarks
• Update Day : Monday • First week : January 1	January 1. (Sun.) only	The second week is from January 2. (Mon.) to January 8. (Sun.)
• Update Day : Monday • First week : First Thursday	From January 2. (Mon.) to January 8. (Sun.) which includes the first Thursday of January 5.	January 1. (Sun.) is in the last week of the last year.

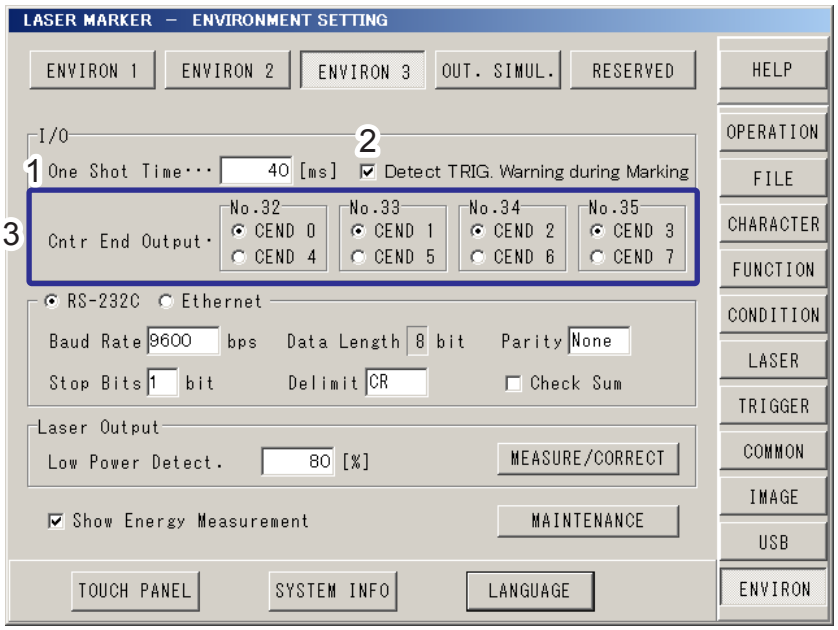
Reference

- Saturday is defined as weekend day even whether the week renewal is set to either Monday or Sunday at “week” unit setting of “Lot” in “Function Setting” menu. For marking Monday through Friday as “Weekday” and Saturday and Sunday as “Holiday”, you should set respectively at three times as following order; Sunday is set as “Holiday” (1), Monday through Friday is set as “Weekday” (2), and Saturday is set as “Holiday” (3).

2-16-3 Communication, I/O Setting (Environment 3)

Reference

- Setting of Environment 3 is saved without overwriting.



■ Input/Output

This screen specifies the settings related to the signals on the output terminal and I/O connector.

	Item		Description
1	One-shot time	:	Sets the pulse length of signal which is output with one shot on the terminal block (MARK END and TRIG Warning during Marking) and I/O connector (SETOK). Setting Range: 2 to 510 ms (including a tolerance to the setting value)

Reference

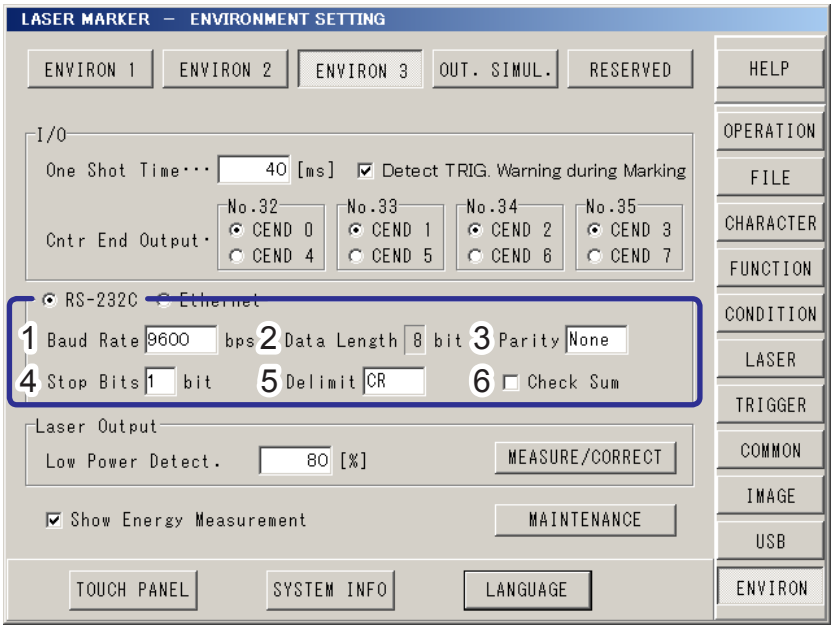
- The minimum period of MARKING on the output block of controller is the time which has been set with the one-shot time.
  The marking period indicated in the measurement will be the one-shot time if the actual marking period is shorter than the one-shot time at the measurement of marking period.
- “E623 Too narrow marking interval for proportioned flying object” is generated at equidistant marking to flying object when the setting of one-shot time is longer than the period in which the line moves the distance specified at “Interval”.

2	Detect TRIG. Warning during Marking	:	Enable this function to output the warning signal when the trigger is input during marking. The warning output will be the one-shot output which has been set in the one-shot time. When this function is disabled, the warning does not occur if there is an invalid trigger input.

3	Counter End Output: No. 32, No. 33, No. 34, No. 35 Selects assignation of I/O Connector No. 32 to 35.		
	No. 32	:	Selects either “Counter 0 end” or “Counter 4 end”.
	No. 33	:	Selects either “Counter 1 end” or “Counter 5 end”.
	No. 34	:	Selects either “Counter 2 end” or “Counter 6 end”.
	No. 35	:	Selects either “Counter 3 end” or “Counter 7 end”.

■ RS-232C

This screen specifies the environmental setting of the RS-232C. To perform RS-232C communication, use the [RS-232C] tab and set the following items:



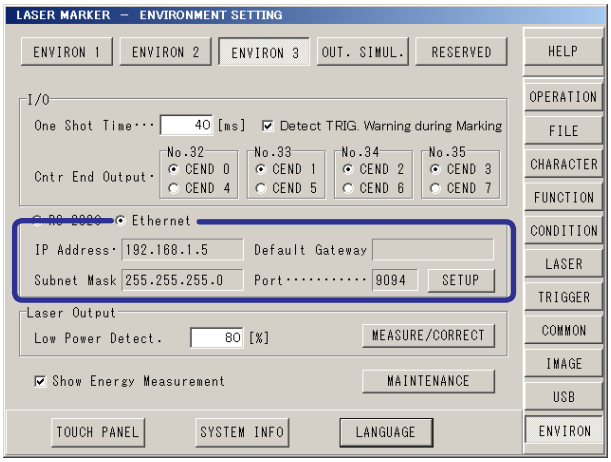
	Item		Description
1	Baud Rate	:	Specifies the baud rate. Setting entry: 1200, 2400, 4800, 9600, 19200, 38400 [bps] Initial setting: 9600 bps
2	Data Length	:	Indicates the data length. 8-bit fixed.
3	Parity	:	Specifies the parity. Setting entry: None, Odd, Even Initial setting: None
4	Stop Bits	:	Specifies the stop bit. Setting entry: 1bit, 2bit Initial setting: 1 bit
5	Delimit	:	Sets the delimiter (code to identify the end of telegraphic message). Setting entry: CR, CR+LF Initial setting: CR
6	Check Sum	:	Specify ON/OFF of check sum (error detection information). Enable this function when using the check sum. Check Sum indicates the lower 1-byte of adding result of value (binary) from the start code to the last data by converting it to two characters for ASCII code.

Reference

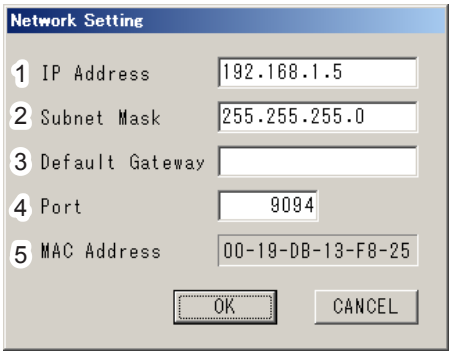
- For communication with external devices, select either RS-232C or Ethernet port. (They cannot be used at the same time, or switched.) The tab selected in [Environment 3] in the environment setting screen indicates the valid communication port.

■ Ethernet

This screen specifies the Ethernet communication setting. Set this to perform Ethernet communication.
Select the [Ethernet] and press [Change] button to show the Network Setting Screen.
Press [OK] to save the settings. (Press [Cancel] to discard the changes.)



Environment 3 Screen



Network Setting Screen

	Item		Description
1	IP Address	:	Sets the IP address.

Setting Range	1.0.0.0 to 223.255.255.255 (except 127 in the 1st octet)
Initial Value	192.168.1.5

2	Subnet Mask	:	Sets the subnet mask.

Setting Range	128.0.0.0 to 255.255.255.254
Initial Value	255.255.255.0

3	Default Gateway	:	Sets the default gateway.

Setting Range	1.0.0.0 to 223.255.255.255(except 127 in the 1st octet)
Initial Value	None (blank)

4	Port	:	Sets the port.

Setting Range	1025 to 65534 [except 9090]
Initial Value	9094

5	MAC Address	:	Displays currently set MAC Address.

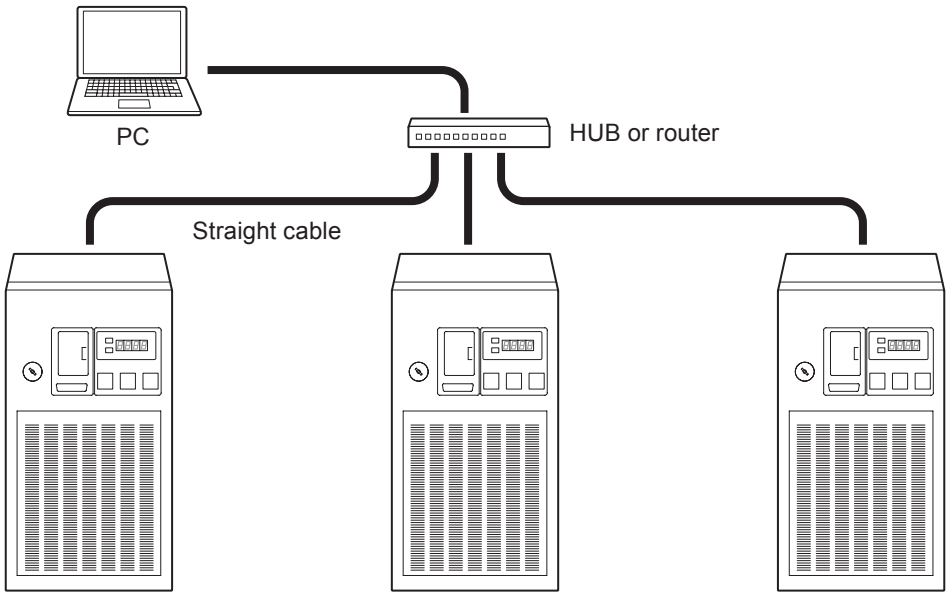
Notice

- The communication control of the laser marker through the Ethernet should be performed in a secure network environment.

Reference

- “Octet” is a 3-figure value delimited by dots. From the beginning, it is called the “1st octet”, “2nd octet”, and so forth.
- Depending on the combination, there are cases where IP Address and Subnet Mask values cannot be set even if they are within the setting range.
- Make sure that the IP address for the laser marker on the network is not overlapping the IP address for the PC.
- When the backup data is restored to the laser marker, communication parameter settings are overwritten with the backup data. After restoring, confirm the IP address and other parameters.

<Example of Ethernet connection>



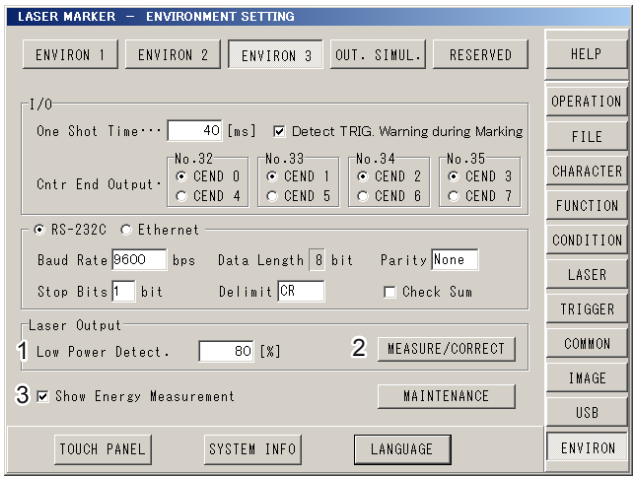
Laser marker controllers
(connected more than one unit)

Example of communication environment setting:

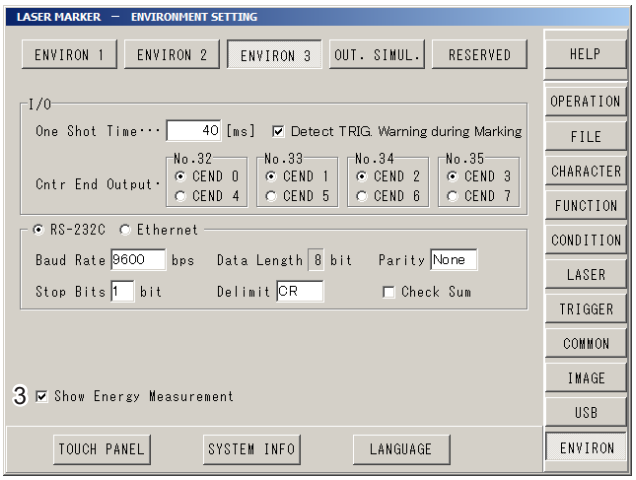
Make sure that the IP address for the laser marker on the network is not overlapping the IP address for the PC.

	PC	Laser Marker A	Laser Marker B	Laser Marker C	Laser Marker D
IP Address	192.168.1.10	192.168.1.5	192.168.1.6	192.168.1.7	192.168.1.8
Subnet Mask	255.255.255.0				
Default Gateway	None				
Port	-	9094	9094	9094	9094

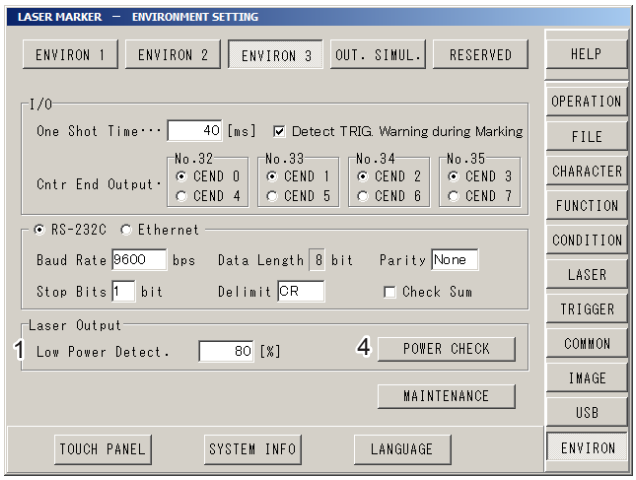
2-16-4 Laser Output Confirmation



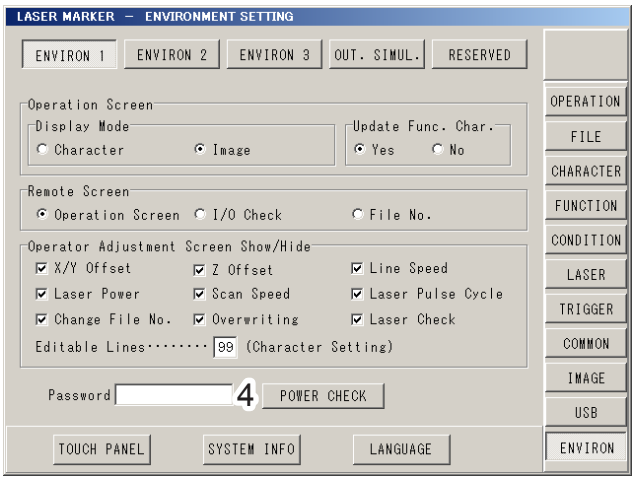
LP-M5xx / LP-M2xx / LP-Sxxx type



LP-MAxx type



LP-SxxxW type



LP-Z series

	Item		Description
1	Low Power Detect (LP-M5xx / LP-M2xx / LP-Sxxx type only)	:	Set the decay percentage relative to the initial output of the laser oscillator. If the measurement falls below the preset limit during the laser power measurement, an error message appears. Refer to “Step & Repeat” (P.144) “ for details.
2	Measure/Correct (LP-M5xx / LP-M2xx / LP-Sxxx type only)	:	The current power of the laser marker against the output of the laser marker at shipping is possible to be checked. Besides, the current output can be corrected automatically or arbitrarily. Refer to “Step & Repeat” (P.144) “ for details.
3	Show Energy Measurement (LP-M series / LP-Sxxx type only)	:	When setting this function, the marking energy and period are displayed after the test marking is finished. Refer to “2-11-2 Marking Energy Measurement” (P.186) for the marking energy.
4	Power Check (LP-Z series / LP-SxxxW type only)	:	The current power of the laser marker against the output of the laser marker at shipping is possible to be checked. Besides, the current output can be corrected automatically or arbitrarily. Refer to “2-9-1 Expiry Date” (P.118) for the detail.

■ Laser Output Optimize

[Function specific to LP-M5xx / LP-M2xx / LP-Sxxx type]

* This function is not implemented in the LP-Z series / LP-MAxx / LP-SxxxW type.

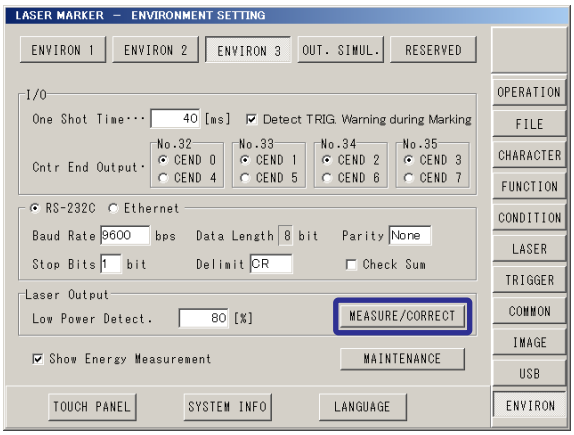
Using "Laser Output Optimize" function improves the accuracy of "Laser output measurement/correction" results.
After the installation, replacement or moving of laser marker, use this "Laser Output Optimize" function by following the procedures as described below.

To use this function

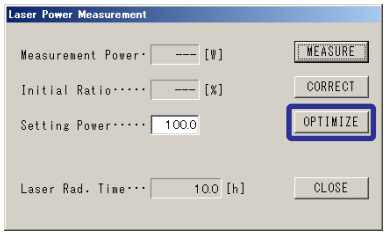
- This function requires the commercially available laser power meter.
- Use a calibrated laser power meter.
- Use a laser power meter that has the damage threshold (max. power density) of more than 10kW/cm^2.
- The laser detector diameter of the laser power meter should be more than 10 mm.
- Adjust the power correction rate using this function every time when the laser marker installation condition is changed.
- The measurement results might have +/-5% difference with normal temperature (20 to 30 Celsius degree).
- The +/-10% difference might occur under the high/low temperature. Correcting power under normal temperature is recommended.
- Before using this function, confirm the laser emission port is clean. The contamination or scratch on the laser emission port might be a cause of inaccurate results of the laser power measurement.
- Laser Output Optimize function is available when laser pumping is completed, and the internal shutter is closed.
- For LP-M5xx / LP-M2xx type, laser output optimize function is available when the laser gate is opened.
- After using the function, the marking energy measurement results may change.
  Confirm the measurement result of the marking energy and adjust "Marking Energy Upper/Lower Limit" value, especially in case "Marking Energy Upper/Lower Limit" is set with small value.

Optimization procedure

1. Press [MEASURE/CORRECT] on the "Environment" - "Environment 3" screen.

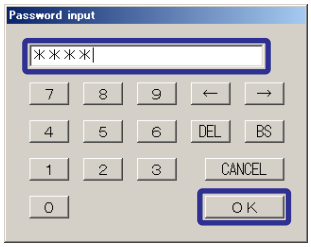


2. "Laser Power Measurement" screen is displayed.
Press [OPTIMIZE].



3. "Password input" screen is displayed.

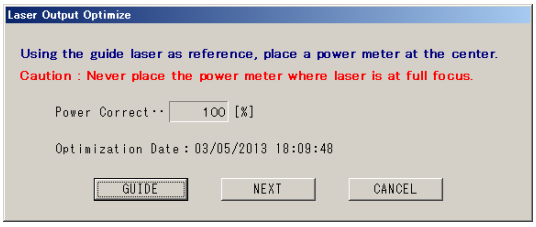
Input [1973] and press [OK].



* The password for the Laser Output Optimize screen is fixed with "1973".
* It cannot change to other password.

Inputting the password opens "Laser Output Optimize" screen.

In the "Laser Output Optimize" screen, current power correction rate and latest optimization date are indicated.

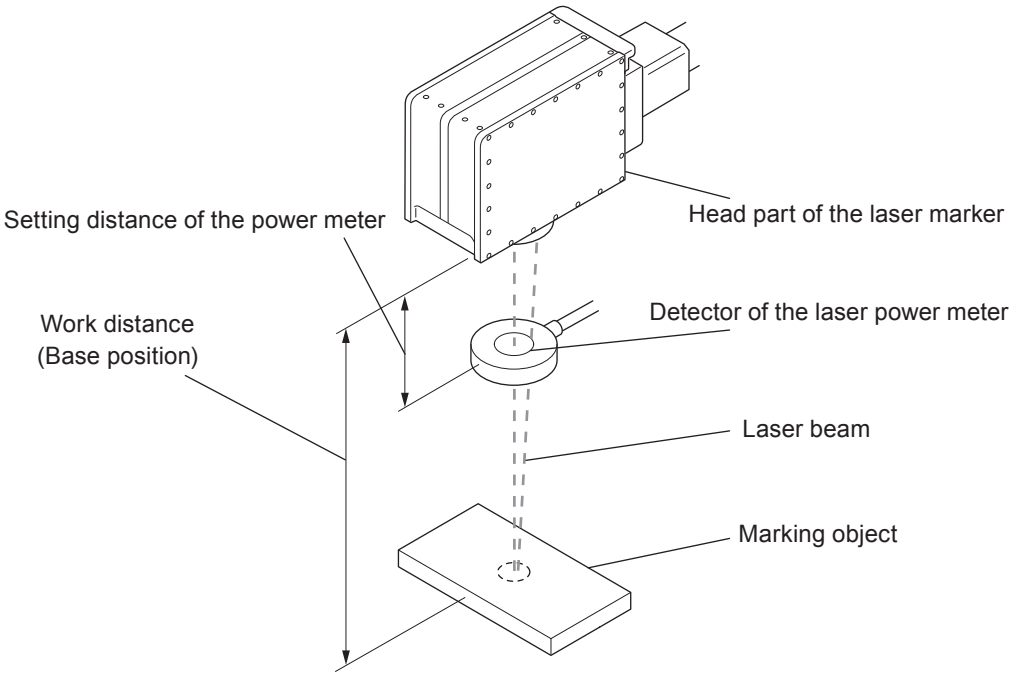


4. Install the laser power meter to measure the laser power.

Place the detector of the laser power meter at the 1/3 to half distance of the focal length (specified work distance) of the laser marker as shown below.

Laser marker model name	Setting distance of the power meter
LP-M500, LP-M200	Approx. 90 mm
LP-M505, LP-M205	Approx. 110 mm
LP-S502, LP-S202	Approx. 45 mm
LP-S500, LP-S200	Approx. 65 mm
LP-S505, LP-S205	Approx. 120 mm

* The setting distance shown above is the recommended value for the laser power meter with the damage threshold (max. power density) of more than 10kW/cm^2.

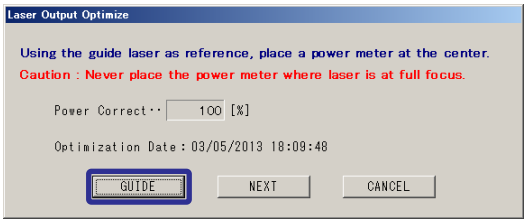


⚠CAUTION	⃠	Do not place the power meter detector at the focal point (specified work distance) of the laser marker. It may cause damage to the power meter.

5. Press [GUIDE].

Select [Dual Pointer], and press [START].

The dual pointer is will deactivate by pressing [STOP].

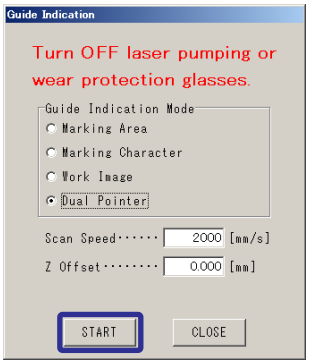


For LP-M5xx / LP-M2xx type:

Set "0mm" to the Z offset of the guide indication.

Place the power meter detector overlapping with the cross indicator of the dual pointer.

Never place the detector where the point indicator is overlapping with the point indicator, that indicates the focal point of the laser.

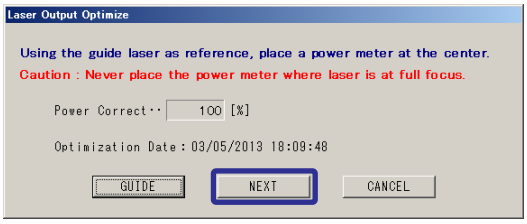


For LP-Sxxx type:

Place the power meter detector overlapping with the circle indicator of the dual pointer.

Never place the detector where the point indicator is overlapping with the circle indicator, that indicates the focal point of the laser.

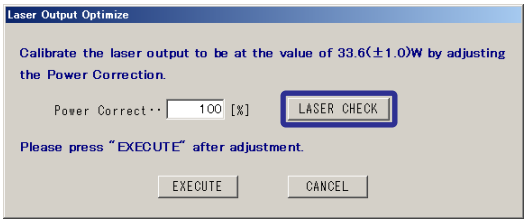
6. After setting the laser power meter, press [NEXT].

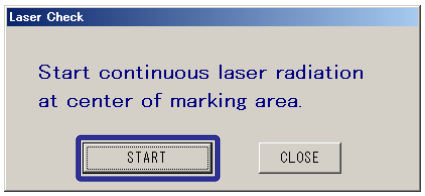


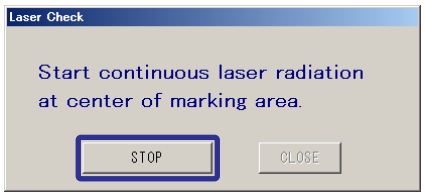
7. Press [LASER CHECK].

Press [START] to radiate the laser and measure the output power with the laser power meter.

Laser radiation is terminated by pressing [STOP].







⚠WARNING	• Be sure to wear protective goggles. • During the radiation, the laser energy is concentrated to one point. Use due caution with long period radiation, it may cause a fire or damage to the object.

Reference

- For LP-M5xx-S / M2xx-S type, laser can not be emitted without opening the laser gate. After starting the radiation, open the laser gate by external control signals. Refer to the “Safety / Setup / Maintenance Guide” for detail.

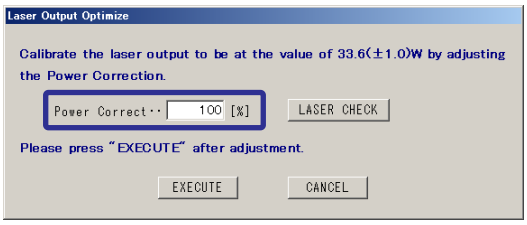
8. Confirm if the measurement results are within the following range.

Laser marker model name	Optimum value of the measurement results
LP-M500, LP-M505	31.0W to 33.0W
LP-M200, LP-M205	12.4W to 13.2W
LP-S500, LP-S502, LP-S505	32.6W to 34.6W
LP-S200, LP-S202, LP-S205	13.2W to 14.0W

* "Laser Check" in this function outputs the laser power corresponding to 80% of the full power.
If the measurement results are within the optimum value, "Power Correct" described from the next procedure is not necessary and press [CANCEL] to close the window.
If the measurement results are out of the optimum value, adjust the power correction rate.

9. Adjust the "Power Correction Rate" so that the measurement results by the power meter fall within the optimum value.

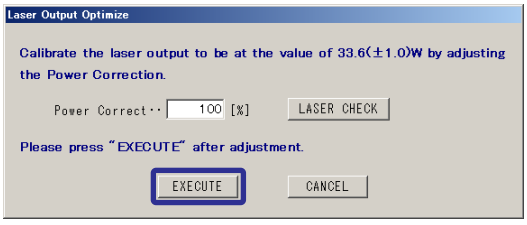
Input range: 50 to 200 [%]]



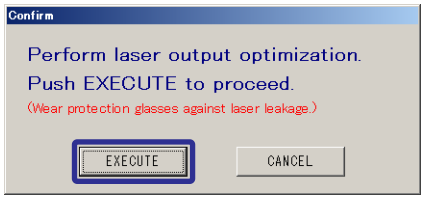
Notice

- In case when the measurement results cannot be in the optimum range even after changing the power correction rate, the laser marker may have a problem with the laser output performance. Contact our sales office.

10. Press [EXECUTE] after changing the power correction rate.



11. Laser output optimization will start and it should take about 10 seconds.

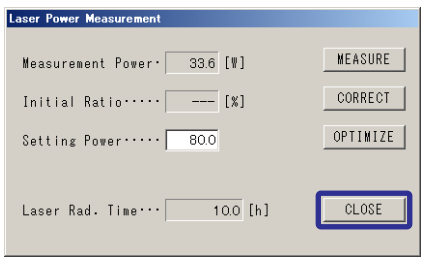


Reference

- For LP-M5xx-S / M2xx-S type, laser output optimization can not be performed without opening the laser gate. After starting the optimization, open the laser gate by external control signals.
Refer to the "Safety / Setup / Maintenance Guide" for detail.

12. When the optimization is complete, the screen shown right is will appears.

Press [CLOSE] to close the window.



■ Laser output measurement/correction

[Function specific to LP-M5xx / LP-M2xx / LP-Sxxx type]

* This function is not implemented in the LP-Z series / LP-MAxx / LP-SxxxW type.

⚠WARNING	• Laser is radiated with the internal shutter closed. Be sure to use the protective goggle and enclosure in case of laser leakage. Also, do not place any objects around the radiating area.

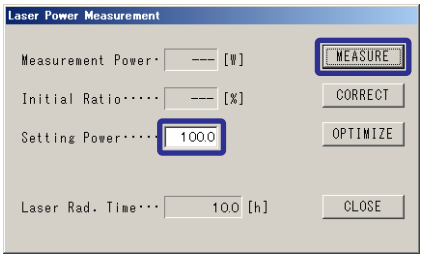
The current power of the laser marker against the output of the laser marker at shipping is possible to be checked. Besides, the current output can be corrected automatically or arbitrarily.

Laser power measurement

1. Enter a value in the “Setting Power” (Laser Power Setting) field and press [MEASURE].

Setting Range: 12.0 to 100.0 (LP-M500/LP-S500)*

* For the setting range of the other model, refer to “Input Setting Value by Series” (P.294).



2. The starting check screen is displayed.

Press [START].

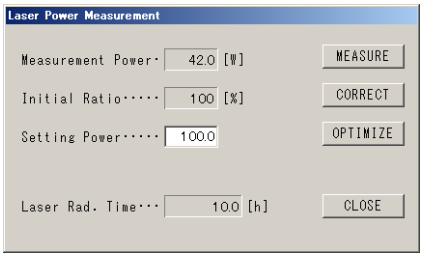
The current laser power is measured.

The screen returns to the procedure 1 by pressing [CANCEL].

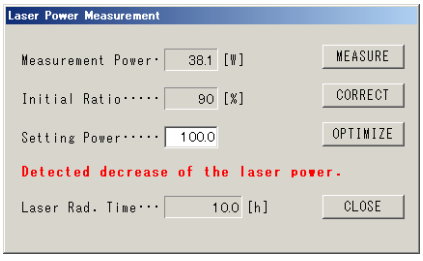
Reference

- For LP-M5xx-S / M2xx-S type, laser power measurement can not start without opening the laser gate. After starting the measurement, open the laser gate by external control signals.
  Refer to the “Safety / Setup / Maintenance Guide” for detail.

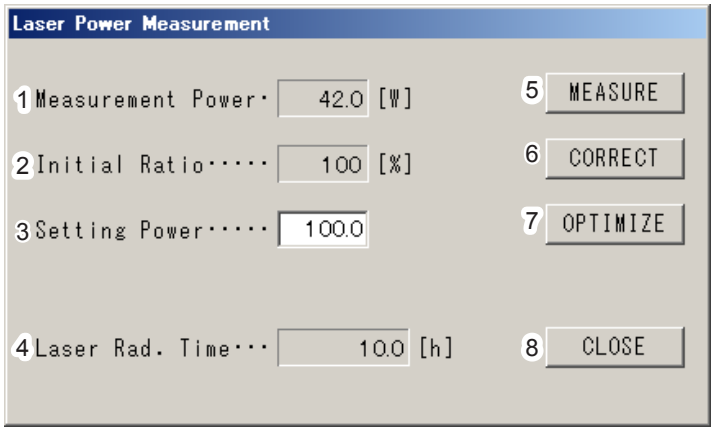
3. The measurement result is indicated.



If the measured laser power is not higher than the preset low alarm limit, an alarm message “Detected decrease of the laser power” will appear.



Measurement result window



	Item		Description
1	Measurement Power	:	Measurement result in Watt.
2	Initial Ratio (of Laser Power)	:	The current power percentage relative to initial power.

Reference

- The “Current-to-initial power ratio” field shows the relative value expressed as a percentage of the initial power of the laser oscillator.
- The value of the “Current-to-initial power ratio” is indicated only when the measurement has been made with the “Laser power setting” being “100”.
  Otherwise, the “Current-to-initial power ratio” field shows “---”.

3	Setting Power	:	Set the output level [%] of laser power.
4	Laser Rad. Time (Laser Radiation Time)	:	Displays the total time of the laser radiation.
5	MEASURE	:	Press to measure the laser power. For details, refer to “Laser power measurement” (P.239).
6	CORRECT	:	Press to correct the laser power. Refer to “2-9-3 Lot” (P.122) for details.
7	OPTIMIZE	:	Press to optimize the laser output power according to the installation condition of the laser marker. Refer to “Laser Output Optimize” (P.235) for details.
8	CLOSE	:	Returns to the environment setting screen.

To use this function

- The laser output from the fiber laser oscillator in this system declines over time.
- After the installation, replacement or moving laser marker, the marking energy measurement results may change.
- In case of LP-Sxxx type, after the fiber unit is removed/attached, or focus is adjusted (Refer to “Safety / Setup / Maintenance Guide”.), the marking energy measurement results may change.
- Use “Laser Output Optimize” (P.235) function to improves the accuracy of “Laser output measurement/correction” results after the installation, replacement or moving of laser marker.
- Measurement / correction function is available when laser pumping is completed, and the internal shutter is closed.
- For LP-M5xx-S / M2xx-S type, laser power measurement is available when the laser gate is opened.
- The measurement results might have +/-5% difference with normal temperature (20 to 30 Celsius degree).
- The +/-10% difference might occur under the high/low temperature. Correcting power under normal temperature is recommended.

Laser power correction

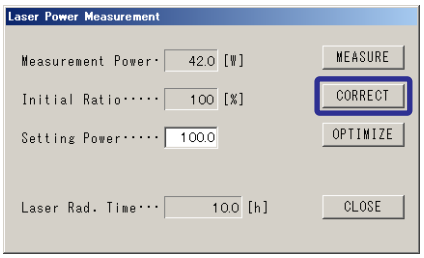
After the laser power measurement if the power decays lower than the delivery status, correct the laser power setting value. Select the correction mode from "Auto" or "Manual".

- Auto: Sets the power correction ratio with the auto-calculated value so as to set the power to the power output at shipping.
- Manual: Corrects the power setting with the given value [%].

Notice

- Power correction refers to the function to correct not the max. laser power [W] value but the laser power setting value. Power correction does not change the actual max. output power relative to initial power.
- Use “Laser Output Optimize” (P.235) function to improves the accuracy of “Laser power auto correction” after the installation, replacement or moving of laser marker.

1. Press [CORRECT].



2. The starting check screen is displayed.

Press [START].

The current laser power is measured.

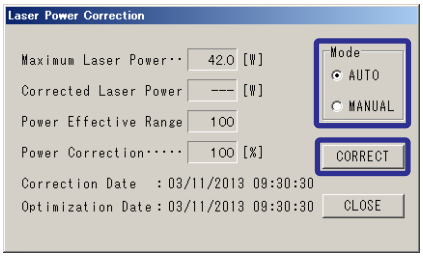
Reference

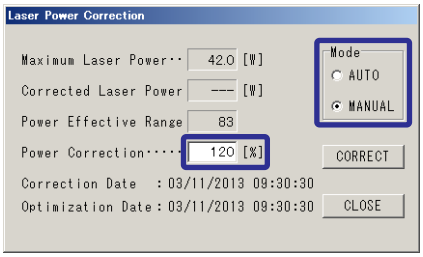
- Step 2 is skipped directory after the laser power is measured with the laser power setting being 100.
- For LP-M5xx-S / M2xx-S type, laser power measurement / correction function is available when the laser gate is opened.

3. For the auto correction, select “AUTO” mode and press “Correct”.

For the manual correction, select “MANUAL” mode and input power correction value, then press [CORRECT].

Setting range: 50 to 200[%].

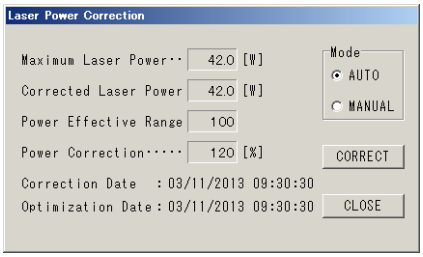




4. The starting check screen is displayed.

Press [START].

5. Corrected Laser Power, Power Correction Ratio and Correction Date are updated.

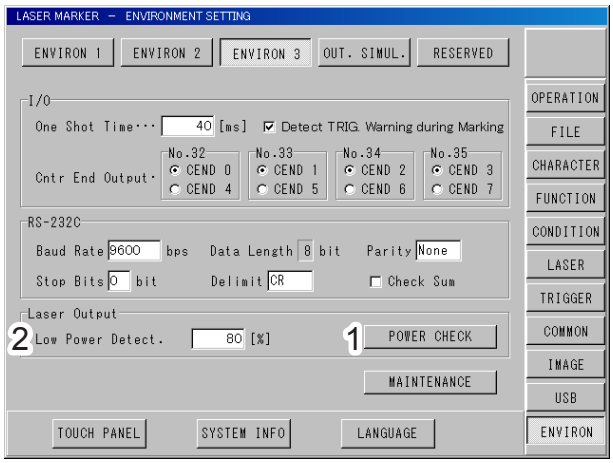


■ Power check

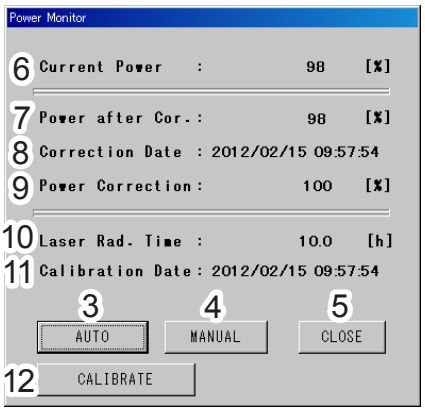
[Function specific to LP-Z series / LP-SxxxW type]

* This function is not implemented in the LP-M series /LP-Sxxx type.

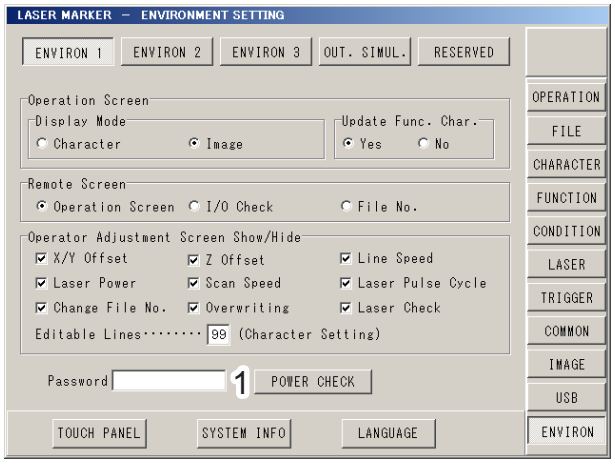
The current power of the laser marker against the output of the laser marker at shipping is possible to be checked. If the laser power decreases from the delivery state, the power setting value can be adjusted.



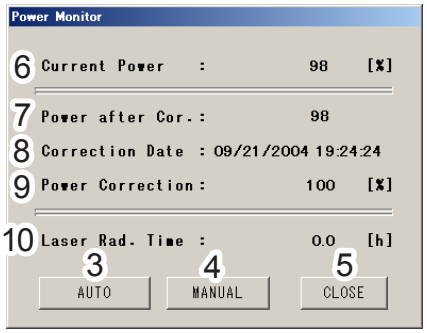
LP-SxxxW type



Measurement result window



LP-Z series



Measurement result window

	Item		Description
1	Power Check	:	By pressing the button, Power Check Start screen will appear, and after executing the power check, the measurement result screen above will be displayed.
2	Low alarm limit (LP-SxxxW type only)	:	Set the decay percentage relative to the initial output of the laser oscillator. If the measurement falls below the preset limit during the Power check, an error message appears.
3	Auto Correction	:	If the laser power decreases from the delivery state, adjust the power setting value based on the auto calculated ratio.
4	Manual Correction	:	The power correction rate can be set arbitrarily.
5	Close	:	Returns to the environment setting screen.
6	Current Power	:	The current laser power ratio [%] relative to initial power is displayed. If this value is less than 100, correct the laser power.
7	Corrected Power	:	The laser power ratio [%] after power correction is displayed. Make correction so that the value is as close to 100 as possible.

	Item		Description
8	Correction Date	:	It denotes the date and time when the power is corrected.
9	Power Correction Ratio	:	It shows power correction ratio. Set the ratio so that the current power × power correction ratio = 100.
10	Laser Rad. Time (Laser Radiation Time)	:	Displays the total time of the laser radiation.
11	Correction Date and Time (LP-SxxxW Type only)	:	It denotes the date and time when the power monitor is corrected.
12	Power Monitor Correction (LP-SxxxW Type only)	:	In case of LP-SxxxW type, after fiber unit is removed or attached (refer to “Safety / Setup / Maintenance Guide”), the accuracy of the measurement result may decrease. In that case, perform a power monitor correction. When the power monitor correction is performed, the measurement is shown assuming the power at that point to be 100%. Refer to “Safety / Setup / Maintenance Guide” for the details of how to use it.

To use this function

- Power correction refers to the function to correct not the max. laser power [W] value but the laser power setting value. Power correction does not change the actual max. output power relative to initial power.
- The measurement results might have +/-5% difference with normal temperature (20 to 30 Celsius degree).
- The +/-10% difference might occur under the high/low temperature. Correcting power under normal temperature (20 to 30 Celsius degree) is recommended.
- The values shown in “Current Rower” and “Corrected Power” fields are the relative value expressed as a percentage to the initial power of the laser oscillator.
- Power check function is available when laser pumping is completed and the internal shutter is closed.
- Power monitor correction cannot be initiated from “Laser Marker NAVI plus”.

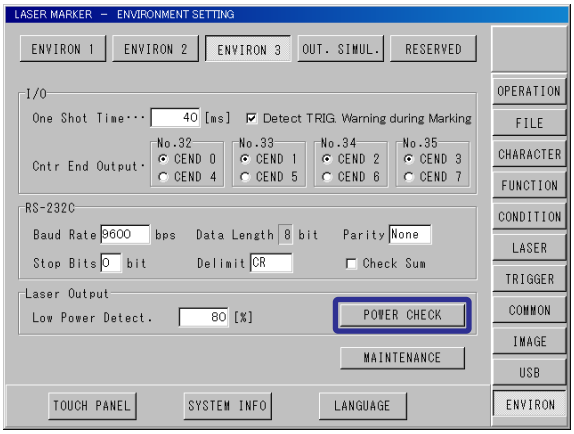
Laser Power Correction

After the power check if the power decays lower than the delivery status, correct the laser power setting value.
Select the correction mode from "Auto" or "Manual".

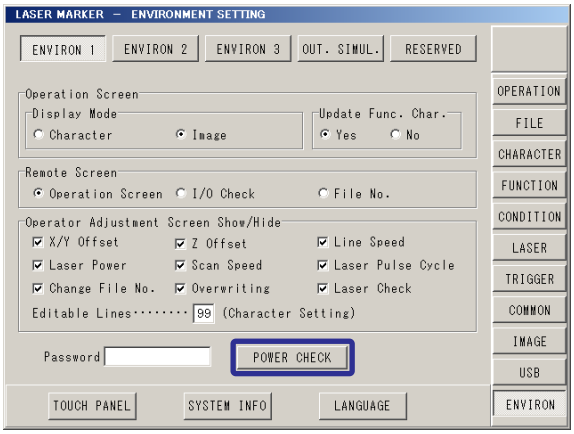
- Auto: Sets the power correction ratio with the auto-calculated value so as to set the power to the power output at shipping.
- Manual: Corrects the power setting with the given value [%].

⚠WARNING	Laser is radiated with the internal shutter closed. Be sure to use the protective goggle and enclosure in case of laser leakage. Also, do not place any objects around the radiating area.

1. Press [POWER CHECK].



LP-SxxxW type



LP-Z series

2. The Confirm screen is displayed.

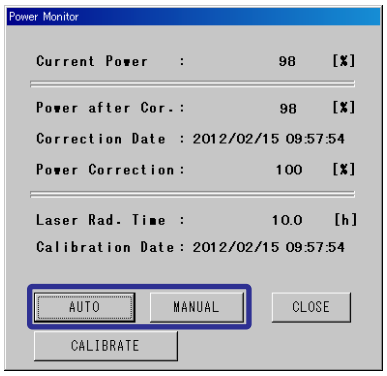
Press [START].

The current laser marker power is measured.

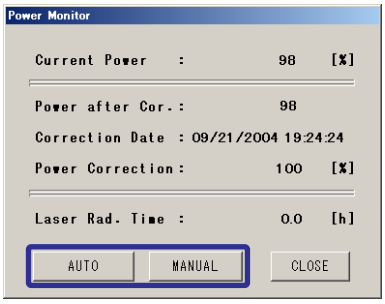
3. For the auto correction, Press “AUTO”.

For the manual correction, press “MANUAL” and input power correction value, then press [SET].

Setting range: 50 to 200[%]



LP-SxxxW type



LP-Z series

4. Press [START].

The correction ratio after power correction and correction date are updated.

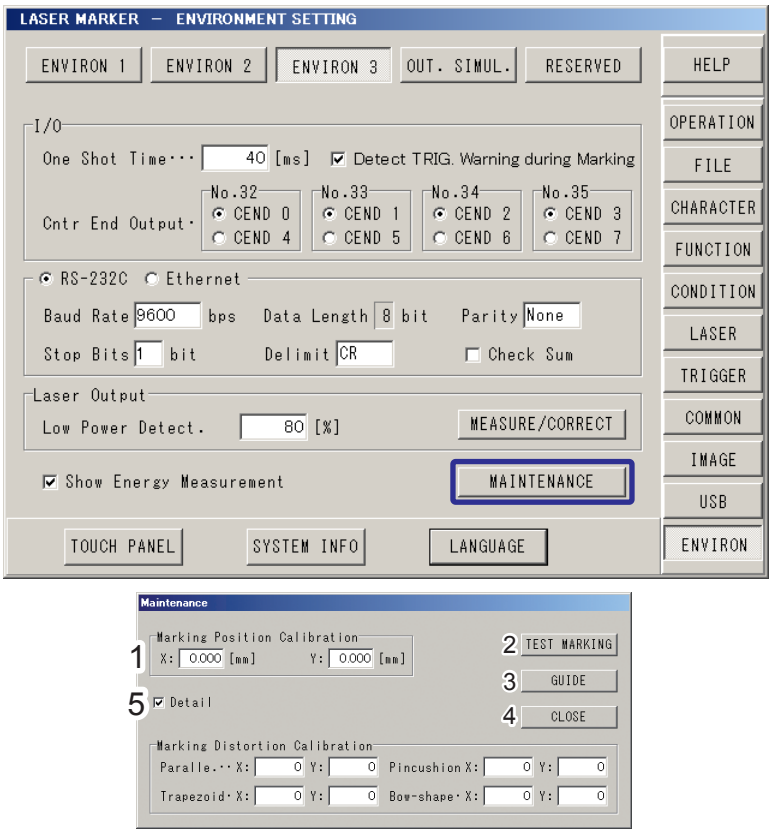
2-16-5 Maintenance (Environment 3)

[Function specific to LP-S series]

* This function is not implemented in the LP-M/LP-Z series.

After the fiber unit is removed/attached, or focus is adjusted (Refer to the “Safety / Setup / Maintenance Guide”.), the marking position or guide display position may change. This function allows to correct the marketing position.

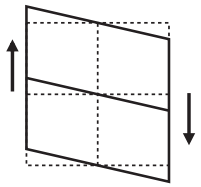
■ Setting



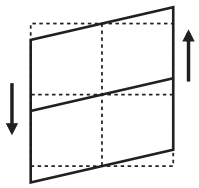
	Description
1	Marking Position Calibration X/Y: Corrects the marking position. Setting Range: -2.000 to +2.000 mm
2	TEST MARKING : Starts the test marking. Adjust the marking position while checking the actual marking status.
3	GUIDE: Executes guide display. Adjust the guide position while checking the actual marking status. For details, refer to “2-6-2 Guide laser” (P.93).
4	CLOSE: Returns to the environment setting screen.
5	Detail : Checking the “Detailed setting” check box allows to calibrate the marking distortion. • Paralle. X/Y (Parallelogram X/Y) • Pincushion X/Y • Trapezoid X/Y • Bow-shape X/Y Setting Range: -10000 to +10000

■ Marking Distortion Calibration Image

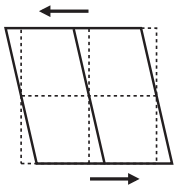
Parallelogram



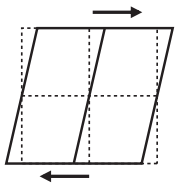
When making the X value smaller



When making the X value bigger

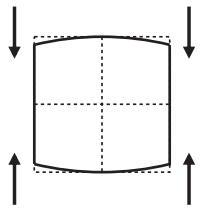


When making the Y value smaller

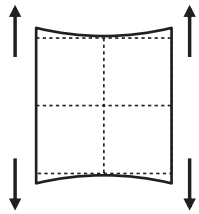


When making the Y value bigger

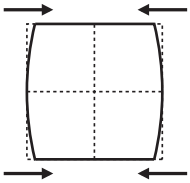
Pincushion



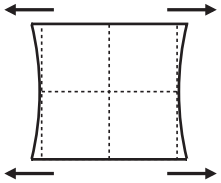
When making the X value smaller



When making the X value bigger

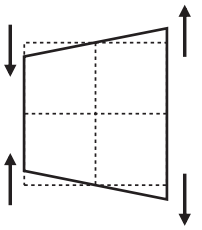


When making the Y value smaller

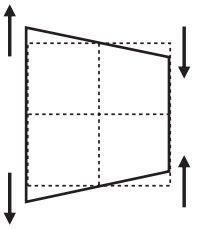


When making the Y value bigger

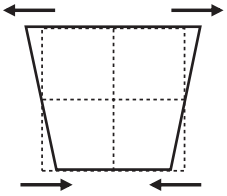
Trapezoid



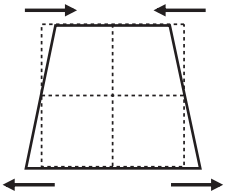
When making the X value smaller



When making the X value bigger

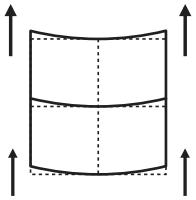


When making the Y value smaller

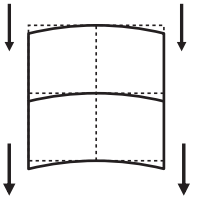


When making the Y value bigger

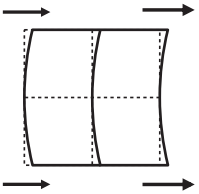
Bow-shape



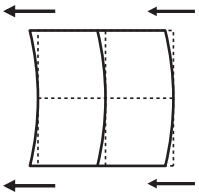
When making the X value smaller



When making the X value bigger



When making the Y value smaller

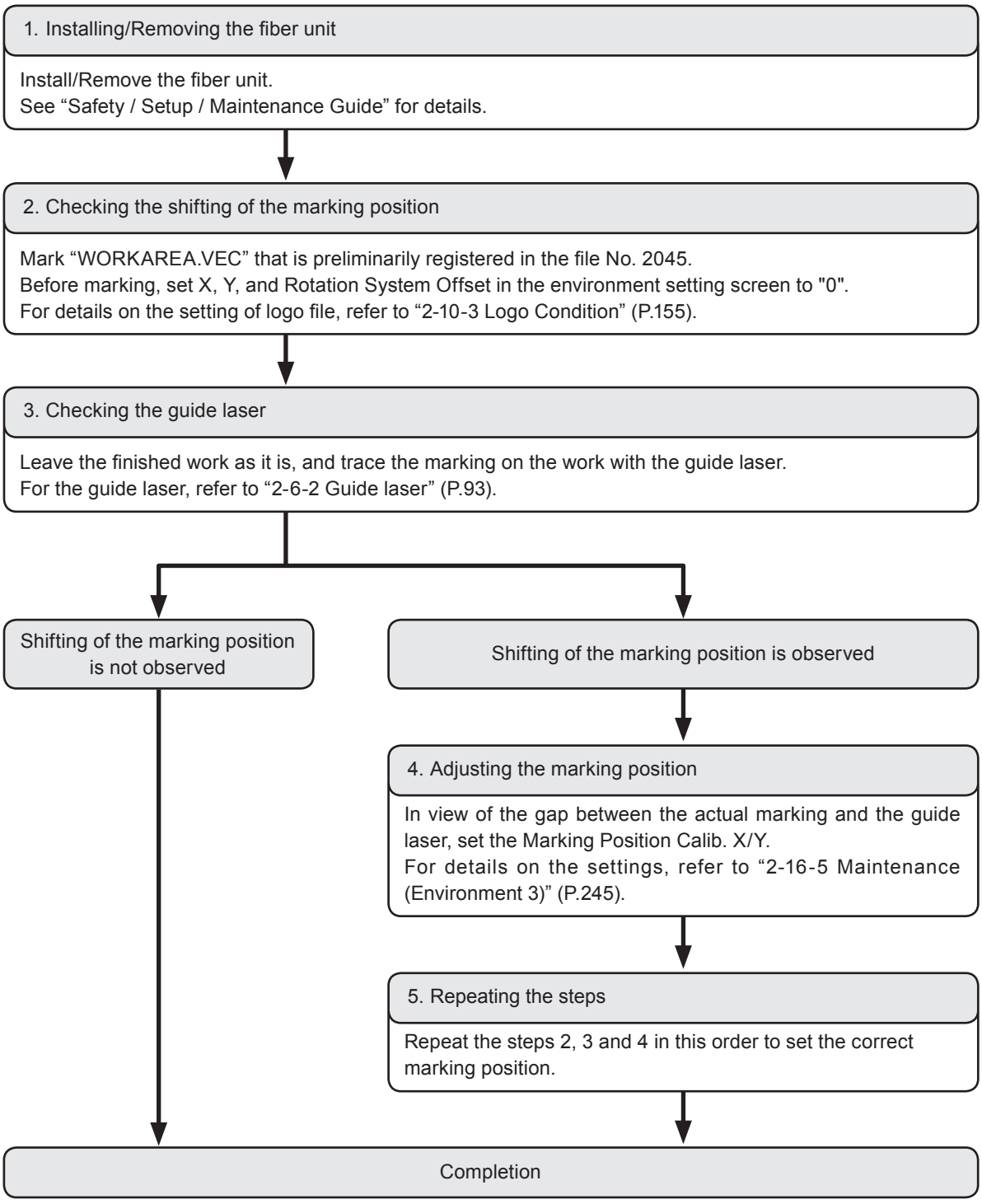


When making the Y value bigger

Shows the original marking field.

Shows the change of the marking position when each value is input.

■ Flow Chart

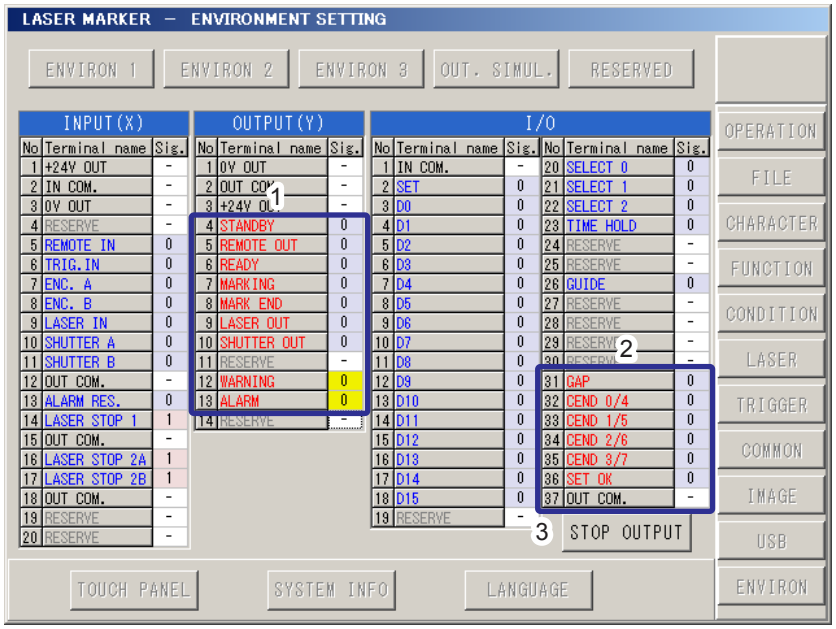


Reference

- The above procedure is to correct the marking position at the time of delivery.
- Perform the above procedure by setting the work at the center position of the work distance, and setting the “Work Distance” in “Laser Setting” to the value of the center position of the work distance.

2-16-6 Output Simulation

With the output simulation you can check the output signals of the laser marker without an actual operation.
Use this function to confirm the operation of the external devices connected with the laser marker.



	Item		Description
1 2	OUTPUT(Y) I/O	:	Click the output terminal name to simulate, then the output status of the laser marker changes. In the table, the status “0” indicates output OFF and “1” indicates output ON. During the output simulation, the status display of the terminal changes to yellow.
3	STOP OUTPUT	:	Terminates the simulation mode and reset the ON/OFF status of the output signals. This button appears when output simulation is started. During the output simulation, other operation and settings are disabled.

Reference

- For the name of each signal, refer to “Safety / Setup / Maintenance Guide”.

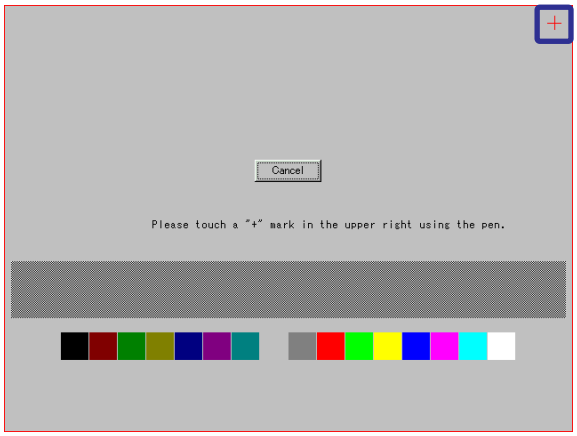
2-16-7 Adjustment of Touch Panel

Long time use of the touch panel may cause misalignment (of touch panel buttons) due to stress. This section describes how to calibrate the touch panel.

1. Use a pen to touch the center of the cross at the lower left corner.

2. Use a pen to touch the center of the cross at the upper right corner.

A message will appear asking you if you want to save the calibration result.

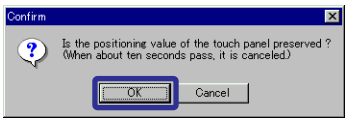


Notice

- Lightly touch the center of the cross with a pen whose tip radius is approx. 0.5. An excessive force applied to the touch panel may damage the panel.

3. Press [OK].

Pressing [Cancel] or doing nothing for 10 seconds will cancel the calibration result.



Reference

- Out of synchronous on console is considered if the displacement of display position on the screen or bleeding of display occurs.
  Adjust the synchronous in accordance with the method described in the instruction manual of console.

2-16-8 Language Selection

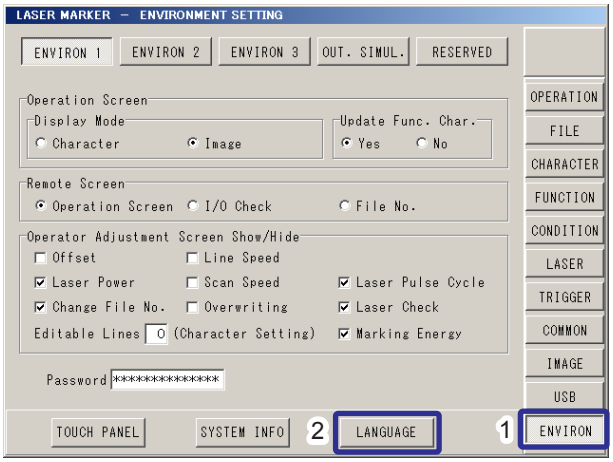
Display language can be selected among English / Japanese / simplified Chinese / Korean / German.

Notice

- When the display language is changed, the unregistered setting data under editing is cleared. Save the file data before changing the language.

1. Press [ENVIRON] and press [LANGUAGE] on the bottom edge of the screen.

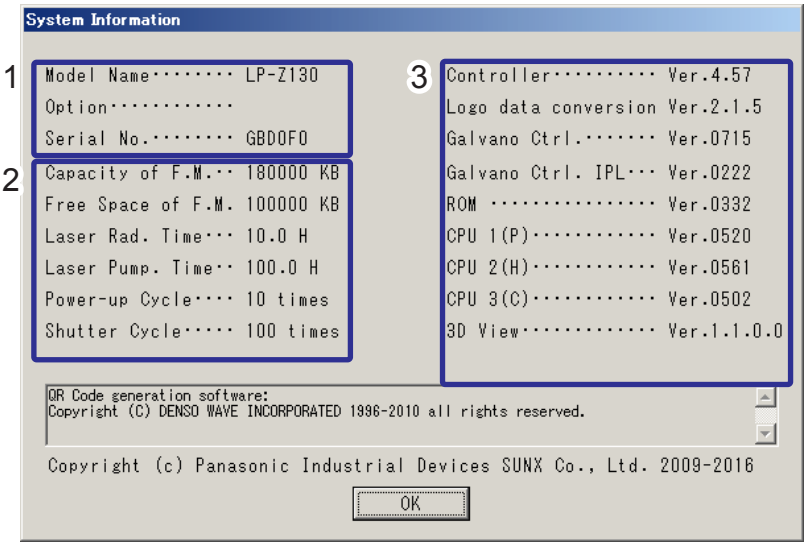
Language selection screen will appear.



2. Select the language and press [SET].

2-16-9 System Information

Displays the identification and operating information about the laser marker. Confirm them for the maintenance.



	Description
1	Laser marker model information : • Model Name • Option (If customized specifications are installed, the custom software name is displayed.) • Serial No.
2	Running information : • Capacity of Flash Memory • Free Space of Flash Memory • Total Laser Radiation Time • Total Laser Pumping Time • Power-up Times • Shutter Open/Close Times
3	Version information of the internal software : • Controller • Logo data conversion • Galvano Controller • Galvano Controller IPL • ROM • CPU1 to CPU3 • 3D View (LP-M / LP-Z series only)

Troubleshooting

Troubleshooting

If any operation errors occur, check items below.
When the problems cannot be resolved by following the below measures, please contact our sales office.

■ Start-up

Troubles	Causes	Measures
Power supply is not turned on. The unit does not start up.	Power cable is not connected.	Connect the power supply cable.
	Key switch is not turned on.	Turn on the key switch.
	Power is not supplied.	Check the power supply.
	Fuse is blown.	Replace the fuse by following the “Safety / Setup / Maintenance Guide”.

■ Laser Pumping

Troubles	Causes	Measures
Laser is not pumped.	[IN COM.] [OUT COM.] of terminal block is not connected to the power supply.	Connect [IN COM.] and [OUT COM.] in Input/ Output Terminal to internal power supply or supply power from outside.
	The interlock connector is not connected, or the safety equipment such as door and switch connected to the interlock connector is in OPEN status.	• Check the interlock connector connection. • Restore the original condition of the safety equipment connected to the interlock connector.
	Laser stop 2 on input terminal is in OPEN status, or safety equipment such as door and switch connected to the laser stop 2 on input terminal is in OPEN status.	• Check the connection of [LASER STOP2A], [LASER STOP2B] and [OUT COM] of input terminal. • Restore the original condition of the safety equipment connected to the laser stop 2.
	Emergency stop switch is pressed.	Reset emergency stop switches located on the controller.
Laser is not pumped in remote mode.	Laser pumping ON signals from the external control equipment are not input or not accepted in remote mode.	• Check connections with external equipment for mis-connection, disconnection or contact failure due to any loose connector. • When controlling the laser pumping by I/O signal, turn off DIP switch No. 2 and turn on [LASER IN]. • When controlling the laser pumping by serial communication, turn on DIP switch No. 2 and transmit the laser pumping command (LSR). • To change the DIP setting, the switch of the laser marker should be set at power OFF state.

■ Display

Troubles	Causes	Measures
Touch panel shows nothing.	Laser marker has not be started.	See remedial action against “Laser marker fails to start up”.
	Power cable of console is not connected.	Check that console cable is securely connected to connector [CONSOLE] on front of controller.
	Return harness is not connected.	Connect return harness ([RETURN OUT] [VGA OUT] [(VGA+RETURN) IN]) on the rear of the controller.
Touch panel does not respond to screen tap.	Return harness is not connected.	Connect return harness ([RETURN OUT] [VGA OUT] [(VGA+RETURN) IN]) on the rear of the controller.
Monitor shows nothing.	Monitor is not turned on.	Check power to monitor.
	Monitor cable is not connected.	Check that monitor cable is securely connected to connector [VGA OUT] on back of controller.
	VGA-compatible monitor is not connected.	Connect a VGA-compatible monitor.
Mouse does not work. (When the controller is the PS/2 mouse supported type)	Mouse relay cable is not connected. (A mouse is plugged directly into mouse connector on back of controller.)	Use mouse adaptor cable for the PS/2 type mouse.
Mouse does not work. (When the controller is the USB mouse supported type)	The mouse is connected to the USB hub.	Connect the USB mouse to the laser marker controller directly without USB hub.
	The mouse type is not supported by the laser marker.	Use the USB mouse with Human interface device (HID) class.

■ Marking

Troubles	Causes	Measures
Marking cannot be done. (Even though the laser radiation indicator changes to the marking status, nothing marked on the object.)	Obstacle hinders laser beam.	Remove obstacle between head of laser marker and object.
	For LP-S series: Lens cap has not been removed.	Remove lens cap.
	Distance to object is not appropriate.	Adjust distance between bottom surface of laser maker and target surface of object as specified.
	For LP-M series: The displacement sensor input does not match the height of the actual target object.	Confirm the displacement sensor and laser marker input specifications and adjust the displacement sensor output (analog current value) to a suitable value.
		Input the displacement sensor trigger when the displacement sensor measurement value is steady.
		Match the displacement sensor measurement position to the marking position.
	Object is not in place.	Correct position of object. Guide indication feature may be helpful for this purpose.
	The laser marker is set for the marking on flying objects despite the static object.	Set “Moving direction” to “STILL.” on the Trigger Setting screen.
	Laser power is insufficient.	• Increase laser power (including correction factor). • Decrease scan speed (including correction factor).
	Laser wavelength is not appropriate for material of objects.	Materials on which can be marked differ depending on wavelength and output power of laser marker. Applicable marking object for FAYb laser marker (LP-M / LP-S / LP-Z series): Metal, resin (excluding transparent and translucent types)
Marking cannot be done. (The laser radiation indicator does not change to the marking status.)	When the marking mode is TEST: The marking mode is “RUN”.	Select [TEST] of the marking mode.
	When the marking mode is RUN: The run mode is not started or the marking trigger is not input.	Set the marking mode into [RUN] and press [Start]. Then, input the marking trigger from [TRIG. IN] signal on the input terminal.

Troubles	Causes	Measures
Marking cannot be done. (The laser radiation indicator does not change to the marking status.)	When the laser marker is under the remote mode or run mode: Marking trigger signal is not input.	Check connections with external equipment for mis-connection, disconnection or contact failure due to any loose connector.
		When the marking trigger is input from the input terminal, check if marking trigger signal meets write conditions. • For Trigger Marking: Check if one-shot signal of 10 ms or longer is provided per marking cycle. • For Equidistant Marking: Check if status of the signal remains on during marking.
	When the laser marker is under the remote mode or run mode: Next marking trigger signal is entered before completion of current marking cycle. (E800 occurs.)	Enter next marking trigger signal after making sure that READY output is on.
	When the laser marker is under the remote mode: Marking trigger is input when the READY output is OFF status.	Refer to “READY signal is not turned to ON” in the External Control Troubleshooting.

■ Marking Quality

Troubles	Causes	Measures
Marking fades entirely/ partially.	Laser emission port is not clean.	Refer to the “Safety / Setup / Maintenance Guide” “Maintenance” and clean contaminants off the laser emission port. If contaminants persist, replace lens and/or laser emission port protection cover (glass). Contact our sales office.
	Fumes occurring during marking hinder laser beam.	Install dust collector.
		Check that dust collector works well.
	Distance to object is not appropriate.	Adjust distance between bottom surface of laser maker and target surface of object.
	For LP-M series: The displacement sensor input does not match the distance to the actual marking surface.	Confirm the displacement sensor and laser marker input specifications and adjust the displacement sensor output (analog current value) to a suitable value.
		Input the displacement sensor trigger when the displacement sensor measurement value is steady.
		Match the displacement sensor measurement position to the marking position.
	Target surface of object is inclined.	Make adjustment so that bottom surface of laser marker head and target surface of object are parallel with each other.
	For LP-M / LP-Z series: Setting of Uniform Spot Mode is not appropriate.	Set the Uniform Spot mode within the required range. If the setting of Uniform Spot mode is changed, adjust the laser power as the density of marking may change.
	There are variations in properties of objects. Object thickness • Distance to object • Object surface condition (including roughness, gloss level, etc.) • Object material (including chemical composition ratio)	Adjust marking conditions according to variations found.
	Object feeder is not stable.	Adjust object feeder so that position of objects become stable.
	Performance of laser oscillator deteriorates due to aging.	• Increase laser power setting. • Decrease scan speed. If initial marking quality cannot be reached even if laser power is set to the upper limit, laser oscillator must be replaced. Contact our sales office.
Character is partially chipped.	Obstacle hinders laser beam.	Remove obstacle between head of laser marker and object.
	Laser emission port is not clean.	Refer to the “Safety / Setup / Maintenance Guide” “Maintenance” and clean contaminants off the laser emission port. If contaminants persist, replace lens and/or protection glass of laser emission port. Contact our sales office.

Troubles	Causes	Measures
Marking is dotted.	For LP-Mxxx / LP-Sxxx / LP-Zxxx: Setting of laser pulse cycle and scan speed are inadequate.	Decrease scan speed or marking pulse interval.
Marking line runs over the intended start or end points.	The setting in marking quality adjustment parameter does not match the other marking conditions.	Input the suitable adjustment value in marking quality parameters such as start point, end point, or wait value in laser setting screen.
Marking disorder (Characters crushed, unreadable)	The Fixing strength of the laser marker head is insufficient.	• Fix the head part tightly with the specified torque value. • Improve the strength of the stand on that the head is installed.
	There are continuous vibrations coming from surrounding equipment such as motor and press.	Perform vibration prevention measures.
	There are irregular vibrations coming from surrounding equipment such as air cylinder and forklift.	
	Start and/or stop timing of feeder does not match with marking operation. (Marking is disturbed at beginning/end of marking.)	• When disturbed at the beginning of marking: Marking trigger signal is likely to be entered before object is fully stopped. Marking may disturbed due to remaining vibration even if object is in full stop. Use delay timer etc. so that marking trigger signal turns on after vibrations are completely damped. • When disturbed at the end of marking: Object is likely to start moving before completion of marking. Delay start timing of feeder or decrease scan speed so that marking is finished before object starts moving.
	• There are noises coming from surrounding equipment.	Protect laser marker against noises as follows: • Securely ground frame ground terminal of laser marker or surrounding equipment. • Isolate power and signal lines from each other if they have been routed in parallel. • Shield signal line. • Isolate power supply for laser marker from other equipment. • Use noise cut transformer to absorb noises from power supply.

■ Moving objects

Troubles	Causes	Measures
Marking cannot be done.	Encoder signal is off.	Check for proper connection to encoder.
Marking is sometimes skipped. (E800 occurs.)	Marking trigger signal is entered before current marking is finished.	• Increase scan speed setting of laser marker. • Decrease delay distance setting of laser marker. • Reduce feeder speed. • Increase marking interval (interval between objects on feeder).
Characters unreadable	Feed direction is not correct.	Match feed direction with laser marker operation.
	Speed changes at conveyor junction.	If conveyors are coupled, avoid marking near conveyor junction.
	Actual speed and preset speed for feeding objects are different due to slippage of objects.	Remove cause of object slippage.
	Pulse setting of encoder is not correct.	Measure the number of encoder pulses and adjust “Number of encoder pulses”.
	Encoder is out of order.	Check encoder for proper function.
Marking position is unstable.	Positional misalignment is likely to occur due to meandering motion of conveyor.	Secure objects to prevent misalignment.
Marking character pitch is unstable.	The line speed at the marking position is different from the speed at the installation site of the encoder.	Place the encoder as close as possible to the marking position.
		Decrease the encoder resolution to block the effect of the line speed fluctuation. Note that the minimum value of the encoder pulse should be 10 P/mm.
Character is partially chipped.	Obstacle hinders laser beam.	Remove obstacle between head of laser marker and object.
	For LP-M series: The marking target object movement timing is not synchronized with the displacement sensor trigger output timing.	Confirm the displacement sensor detection position and the displacement sensor trigger timing.
		Confirm the displacement sensor specifications and match the signal output timing to the marking trigger signal timing.
	For LP-M series: Output signal of the displacement sensor is not stable.	Confirm the installation status and check if the displacement sensor is receiving the impact of vibration or the like.
		Confirm the output signal of the displacement sensor to check if it is being affected by noise.

Troubles	Causes	Measures
Actual spacing between characters is larger or small than setting.	Pulse setting of encoder is not correct.	Check setting to be sure that: • When using A phase only: Number encoder pulses = Number of pulses/mm x 2 • When using A and B phases: Number encoder pulses = Number of pulses/mm x 4
	Either A or B phase signal is refused. (A and B phase used)	Check that signal is applied to A and B phase terminals of encoder.
	Measured number of encoder pulses differs from calculated one.	Increase or decrease values in “Encoder fine adjustment” field as appropriate. • When the character interval is wide: Increase the setting. • When the character interval is narrow: Decrease the setting.

■ External control

Troubles	Causes	Measures
Laser marker cannot be controlled by the external signal.	Laser marker is not in remote mode.	Press Remote switch on front of controller or enter remote mode in a manner described in “Safety / Setup / Maintenance Guide”.
	The wiring between the laser marker and the external control devices is incorrect.	Check connections with external equipment for mis-connection, disconnection or contact failure due to any loose connector.
		Check for continuity using tester or the like.
	There are noises coming from surrounding equipment.	Protect laser marker against noises as follows: • Securely ground frame ground terminal of laser marker or surrounding equipment. • Isolate power and signal lines from each other if they have been routed in parallel. • Shield signal line. • Isolate power supply for laser marker from other equipment. • Use noise cut transformer to absorb noises from power supply.
Serial communication control fails	Selected communication port is inappropriate.	For communication with external devices, select either RS-232C or Ethernet port. (They cannot be used at the same time, or switched.) The port selected in the environment setting screen indicates the valid communication port. RS-232C is selected at factory shipment.
	Type of connection cable used is in appropriate.	For RS-232C, use a commercially available cross cable. (A straight cable cannot be used.) Laser marker has three-wire connection. (Only pins Nos. 2, 3 and 5 of RS-232C connector are used.)
		For Ethernet, check the followings: • To use an external device and the laser marker one to one, connect them with a commercially available cross cable (STP cross cable of the Category 5e or higher is recommended). • To use an external device and the laser markers one to many, prepare a hub or router compliant to 1000BASE-T, 100BASE-TX, or 10BASE-T and connect them with a commercially available straight cable (STP cross cable of the Category 5e or higher is recommended).

Troubles	Causes	Measures
Serial communication control fails	Communication parameter settings are incorrect.	Match communication parameter settings to external equipment. Communication parameter settings of laser marker can be checked in the environment setting screen. Default settings are as follows: • RS-232C: [Baud Rate=9600 bps] [Data Length=8 bit] [Parity=None] [Stop Bits=1 bit] [Delimit=CR] [Check Sum: None] • Ethernet: [IP Address=192.168.1.5] [Subnet Mask=255.255.255.0] [Default Gateway=None (blank)] [Port=9094]
	Communication parameter settings are changed when the backup data is restored to the laser marker.	Check the communication parameter settings. If Ethernet is used, confirm the IP address and other parameters. When the backup data is restored to the laser marker, communication parameter settings are overwritten with the backup data.
	Command data is not received from external equipment.	Using commercially available line monitor or protocol analyzer, check if external equipment transmits data.
	Communication data format is incorrect.	Check if format of communication data command transmitted from external equipment is correct. • Check if start code STX (02: HEX) is placed at beginning of transmitted data. • Check if the delimiter is added to the end of the transmission data. ([CR] (0D:HEX) or [CR+LF] (0D:HEX 0A:HEX) for RS-232C, [CR] (0D:HEX) for Ethernet)
READY signal is not turned to ON.	Alarm or error occurs.	Release the alarm or warning referring to the measures for the corresponding error code.
	Laser has not been pumped.	Refer to “The laser is not pumped”.
	Internal shutter is closed.	Open the internal shutter. • When controlling the shutter by I/O signal, turn off DIP switch No. 2 and turn on terminal SHUTTER in terminal block. • When controlling the shutter by serial communication, turn on DIP switch No. 2 and send shutter command (SHT). • To change the DIP setting, the switch of the laser marker should be set at power OFF state.
	LP-Mxxx-S type: Since the returning to the original position of the laser gate is not performed correctly, the laser gate cannot be opened.	Input the laser gate control signals for the returning to the original position after start-up of the laser marker.
	LP-Mxxx-S type: The laser gate is closed.	Input the control signal to [L-GATE OP IN] on the laser gate terminal from the external control device.

Troubles	Causes	Measures
READY signal is not turned to ON.	The changing operation of the file data is unfinished.	It takes from tens of msec. to several seconds to complete the changing file data. During that time, READY output is in OFF status. Enter marking trigger signal after making sure that [READY] output is on if you want to change file to another one.
	Marking data is not sent to the laser marker from the external devices, in case of using Rank Function, External Offset Function, or Serial Data Input Function.	If rank, external offset and serial data functions are enabled while marking conditions are not yet specified, enter respective data per marking cycle. Enter marking trigger signal after making sure that [READY] output is on or checking status of READY using status request command.
	Under serial communication control: Mark trigger signal is ON while the command reception permission (MKM command) is set to “Reception mode ON”.	Set “reception mode OFF” for command reception permission (MKM command). Before entering marking trigger signal, use status request command [STS] to make sure that READY is on.
The sending command is not accepted by the laser marker. (NAK response)	DIP switch No. 2 on back of laser marker is off.	To control the following commands with the serial communication, turn ON DIP switch No. 2. • Laser Control (LSR) • Shutter Control (SHT) • Laser Check Radiation (SPT) • Test Marking (TST) • Guide LD Indication (GID) • Laser Power Measurement (PWM) • Power Check (PWR)
	“Reception mode ON” is not set for command reception permission (MKM command)	The laser marker does not accept commands except the following unless it is in the “reception mode ON” status. For command transmission, set “reception mode ON” for “command reception permission (MKM command)”. • File Change (No. Specified) (FNO) • File Change (Comment Specified) (FNN) • Shutter Control (SHT) • Command Reception Permission (MKM) • Laser Control (LSR) • Counter Reset (CTR) • Status Request (STS) • Marking Trigger (MRK) • Serial Data Input (SIN) • Serial Offset (SEO)
	Alarm or error occurs.	All commands except the following are refused while alarm or error is active. When alarm occurred: • Status Request (STS) When warning occurred: • Status Request (STS) • Shutter control (SHT) (Only for closing request, and readout) • Command Reception Permission (MKM) (Only for reception mode ON and reception mode readout)
	Two or more command data are transmitted at the same time.	After sending the command, confirm the response data from the laser marker. Do not send the next command before receiving the response.

■ Others

Troubles	Causes	Measures
Laser is emitted at unintended timing.	Photoelectric sensor for marking trigger signal malfunctions.	Fumes may cause malfunction of photoelectric sensor for marking trigger signal. • Install dust collector. • Check that dust collector works well.
Date is reset.	Internal battery has run out.	Contact failure may also be a cause of this symptom. When laser marker have been in use for five years or more, internal battery is easy to run out. Contact our sales office for replacement of internal battery.

Error Indication

When an error occurs, an error code appears on the front panel of the laser marker controller.
Errors are categorized into alarm and warning depending on their details.
This chapter describes the details and measures of errors.

Alarm

Errors that occur when highly emergent safety function is activated or there is any abnormality in laser marker are output as alarm.
When an alarm occurs, the laser pumping is turned OFF, and the laser radiation is stopped if during marking operation.

Release Method of Alarm

1. Remove a cause of alarm. Note that any alarms due to hardware's problem cannot be released.
2. If the error E002, E004, E011 or E260 occurs, push the alarm reset switch on the front of the controller, or input the alarm reset signal on the input terminal.
   For other errors, reboot the laser marker.
3. If the alarm occurs during the marking operation of the files in which the counter function is set, check if the counter value is correct before restart the marking operation.

ERROR CODE	Error description	Measures
E002	Emergency stop button of controller is pushed.	Release emergency stop button of controller by turning it in arrow direction.
E004	Laser Stop 2 of the input terminal is opened.	• Connect the LASER STOP terminal of the I/O terminal. • Check the status of the safety equipment connected to the LASER STOP terminal. • Confirm operation logic of the connected devices. • Connect the internal or external power supply to IN COM. and OUT COM. in the I/O terminal respectively.
E011	Laser Stop 1 of the input terminal is opened.	
E020 *1	Cover of scanning section is opened.	Contact to our sales office.
E021 *2	Cover of scanning section or fiber unit is detached.	• Connect the fiber unit properly referring to "Fiber Unit Installation Method" of the "Safety / Setup / Maintenance Guide" of LP-S series. • Contact to our sales office.
E210 to E213	Galvanometer error.	• Connect head control cable or head power cable properly, and restart with key switch. • Check and correct the power status. • Check the noise influence to the AC power supply from the other devices. • If there is a marking line scanned for 1 minute or more at once, decrease the scan speed. • When not recovered, contact our sales office.

ERROR CODE	Error description	Measures
E220	Internal shutter error.	• Connect head control cable properly, and restart with key switch. • Contact to our sales office.
E233	Laser error. • The internal temperature of the laser oscillator exceeds the limit. • Instantaneous interruption of laser power supply is detected. • Head control cable is not connected properly. • Fiber is broken. • The abnormality of the laser oscillator is confirmed. • There might be occurred the malfunction of the internal shutter.	• Check that the ambient temperature is in the specified operating temperature. • Check the air filter, the air intake / exhaust port and the fan of the cooling part for clogging. • Check and correct the power status. • Check the noise influence to the AC power supply from the other devices. • Connect the head power cable and the head control cable properly, and restart with key switch. • When not recovered, contact our sales office.
E234	Detected unintended- irradiation.	Contact to our sales office.
E236 *4	Laser gate is not open, or laser error has occurred.	• Check the control signal for opening/closing the laser gate from the safety PLC or other such device. • Check the wiring and signal timing of [L-GATE CL IN] of the laser gate terminal. • Refer to the measure of E233 “Laser error”.
E240 E241	The temperature of the laser has reached its upper limit.	• Check that the ambient temperature is in the specified operating temperature. • Make sure cooling fan operates. • When not recovered, contact our sales office.
E250 *3	Detected a decrease in power supply voltage.	• Check and correct the power status. • Check the noise influence to the AC power supply from the other devices. • Connect head power cable properly, and restart with key switch. • When not recovered, contact our sales office.
E260	Interlock connector is opened. Test marking starts while interlock connector on controller is in OPEN status. Interlock on controller is in OPEN status. (in remote status)	• Check wiring of the interlock input on the controller and contact of the switch. • Confirm operation logic of connection device. • Connect the interlock connector with the non-voltage contact.
E280 *1	System error. • Z control module error.	Restart the laser marker. When not recovered, contact to our sales office.
E300	A head is not connected. Shut off a power and connect a head.	Connect head control cable properly, and restart with key switch.
E310	Unsupported head. Change either head or controller.	• Connect head control cable properly, and restart with key switch. • Check if head with correct model has been connected. If it is wrong, replace head or controller with correct one.
E311	System error. • Head control cable is not connected properly. • Wrong head has been connected to controller.	
E312	System error.	Restart the laser marker. When not recovered, contact to our sales office.

ERROR CODE	Error description	Measures
E320	Unit combination is incorrect.	• Connect head control cable properly, and restart with key switch. • Check if head with correct model has been connected. If it is wrong, replace head or controller with correct one.
E410 to E443 E990 to E999	System error.	Restart the laser marker. When not recovered,contact to our sales office.
E450 to E456	Memory error.	
E700	The laser pumping turned OFF while marking.	• Change timing so that the marking trigger is input after the laser pumping has completed. • Check wiring and control procedure for the I/O terminal block, wiring to communication port, and the procedure of the communication command.

*1 : Error that may occur for LP-M / LP-Z series only.
*2 : Error that may occur for LP-S series only.
*3 : Error that may occur for LP-M / LP-S series only.
*4 : Error that may occur for LP-Mxxx-S type only.

Reference

- When other error not listed in this section was occurred, restart the laser marker.
- If the symptom persists after restart, contact our sales office.

Warning

Errors that notify of that the setting data are incorrect or laser radiation conditions are not met are output as warnings. Marking operation cannot be started while any warning is active. Laser pumping maintains the state before the warning.

Release Method of Warning

1. Remove a cause of warning. If the warning cause is the wrong setting, correct the file data.
2. When the laser marker is under the remote mode, close the shutter by I/O or serial communication control.
   In case of the following warning, the shutter control is unnecessary.
   - E800: the warning occurs only while the specified one-shot output time and it is released automatically.
   - E811: the warning occurs only during the laser stop1 and OUTCOM. is opened, and then it is released automatically when the laser stop1 and OUTCOM. is closed.
3. If the warning occurs during the marking operation of the files in which the counter function is set, check if the counter value is correct before restart the marking operation.
4. In case that marking is executed again, make sure that the warning output is turned on, and then open the internal shutter.

ERROR CODE	Error description	Measures
E227 *4	Laser gate is not open. • Since the returning to the original position of the laser gate is not performed correctly, the laser gate cannot be opened. • The laser gate is not opened when the test marking, laser check radiation, or laser power measurement is started.	• Input the laser gate control signals for the returning to the original position after start-up of the laser marker. • Before starting the test marking, laser check radiation, or laser power measurement , input the control signal to [L-GATE OP IN] on the laser gate terminal from the external control device.
E251	Detected a decrease in clock battery voltage. Reset date and time.	Contact to our sales office. While laser Marker power is on, reset “Date and Time” in Environment Setting. When the power is off, reset “Date and Time”.
E500	There is not enough free space. The file cannot be registered.	Delete registered file and logo file.
E501	Cannot register setting because of memory error.	• Restart with key switch. • When not recovered, contact our sales office.
E502 E503	Invalid file format in font file and logo file.	• Register the logo or font file again on the USB screen. • For the logo file, convert the logo data to VEC format again with Logo data conversion software.
E600	No setting file.	Set the marking data such as character, barcode and logo.
E601	No font file.	• Register font file. • Set a registered font to the font in character condition.
E602	Lack of font memory.	Make font file smaller, or delete unnecessary font file.
E603	No logo file.	Register logo file.
E604	Included character not registered into font file.	Change characters. Or set the font file containing the setting characters.

ERROR CODE	Error description	Measures
E605	Exceed valid number of characters. (Max. 30 characters/line.)	Make numbers of characters smaller.
E606	Existed marking data outside of marking area.	Contain marking data within marking area. • Change marking position. • Make characters smaller. • Narrow character interval. * If there is no data out of the marking area in the image display, check the “system offset” in the environment setting. “System offset” value is not shown in the image display.
E607	Existed invalid character for bolding with setting font.	• Set any standard font without original 4 font. • Use Font Maker provided to create the proper pattern font.
E608	Incorrect bold line width setting or character height/width ratio.	• Set line width of bold character to half or below of character height. • When marking the bold character, set the comparison ratio between character height and width become 1/10 to 10.
E610 E612	Lack of marking memory. • Marking data is too large. • The line length is too long. (spiral, etc.)	• Reduce numbers of characters and logo data. • Reduce numbers of step & repeat. • Reduce numbers of a start point and a end point of characters or logo data. • Separate the long segment into short data.
E620 to E622	Cannot follow line speed of flying object marking.	Shorten marking time with the following methods. • Speed up scan speed. • Narrow character interval. • Make characters smaller. • Reduce numbers of characters. • Change setting of curve/edge. • Reduce numbers of character lines. • Displace a start point of marking, etc.
		Adjust the line speed of the flying object.
		Adjust the waiting time of the flying object.
		Set the coordinate of the marking data close to the center of the marking field.
E623	Too narrow marking interval for proportioned flying object.	Increase setting value of marking spacing. Shorten marking time with the following methods. • Speed up scan speed. • Narrow character interval. • Make characters smaller. • Reduce numbers of characters. • Change setting of curve/edge. • Reduce numbers of character lines. • Set smaller value to the one-shot output time, etc.

ERROR CODE	Error description	Measures
E630	Too much quantity of Step and Repeat marking.	Reduce numbers of characters to be marked. (Max.: 4000)
E640	Invalid function for combining with flying object.	With the marking to the moving object, do not use the following functions. • Step & Repeat • Rank • External offset • Serial data marking • Reset at date update function • Arbitrary point radiation • Overwrite function
		Release flying object marking function with trigger setting.
E650	Invalid setting of processing element.	Set the distance between start and end points of the arc smaller than double of radius.
E651	Too short line segment of processing element.	Set the larger value to the length of the line than width of the line.
E660	Cannot convert dxf file.	Delete the DXF elements which is not available in laser marker and re-create the DXF file.
E670 *1	Existed 3D marking data outside of marking area.	• Adjust the setting of 3D work with overall (layer) condition. • Adjust the setting of character, logo, and bar code, etc. for 3D work.
E672 *1	Existed invalid 3D marking data.	
E674 *1	Existed marking data with its Z position outside of marking area.	• Adjust the setting of Z offset value with following overall (general) condition. • Adjust the setting of Z offset value with following system offset.
E675 *1	Invalid setting of layer condition.	Adjust the setting of 3D work with overall (layer) condition.
E676 *1	Invalid function for combining with 3D marking.	With the 3D marking, do not use the following functions. • Step & Repeat • External offset • Processing conditions • Arbitrary point radiation
		Release check of 3D check box with overall (general) condition.
E677 *1	Invalid encoder setting of flying object for combining with 3D marking.	Release check of 3D check box with overall (general) condition. Or, set the encoder signal with the trigger condition.

ERROR CODE	Error description	Measures
E680 *1	The marking time cannot be measured with Marking to Flying Object set in combination with 3D marking.	• Set the moving direction to “still” in the trigger setting. • Select 2D setting with overall (general) condition.
E681 *5	Displacement sensor error signal was detected.	When not using the displacement sensor: Connect the attached displacement sensor input connector to the back of the controller. The connector must be connected even when the displacement sensor is not being used.
		When using the displacement sensor: • Confirm the displacement sensor and measurement status and eliminate the cause of the error. • Confirm the displacement sensor specifications and adjust to output the correct error signal. • Check the displacement sensor power supply. • Check the displacement sensor error signal terminal wiring. • If the error signal is not used, short circuit the displacement sensor input connectors 1 and 2.
E690	Cannot finish measurement during specified time.	• Reduce marking contents and measure marking time. • Speed up scan speed.
E700	Started marking in laser pumping OFF state.	Turn ON the laser pumping and check that the laser pumping has completed, and then start marking.
E701	Started laser power check in laser pumping OFF state.	Turn on laser pumping switch, and start power check.
E710 *3	Marking energy error.	Check the thresholds (upper and lower limit) of the marking energy.
E800	Trigger input occurred while marking ready output is set to off.	• Change marking timing so that trigger input is performed after marking ready output is turned on. • Check wiring and control procedure for input terminal, wiring to communication port, and the procedure of the communication command.
E811	Laser Stop 1 of the input terminal is opened.	• Check the wiring of the laser stop 1 input terminal and contact of the switch. • Confirm operation logic of connection device.
E900	Existed invalid function character for simultaneous use.	Set either rank function character or serial data function character.
E901	Existed invalid character for converting into 2D code.	Set the character that can be converted into 2D code.

ERROR CODE	Error description	Measures
E902	Cannot create 2D code.	Use the condition where 2D code can be created.
E903	No specified 2D code pattern.	Specify 2D pattern code which has been already registered.
E910	Existed invalid character for converting into bar code.	Set the character that can be bar coded.
E911	Cannot create bar code.	Use the condition where a barcode can be created.
E912	Too small dimension of narrow element/basic module width for bar code.	Specify the setting value for the width of the narrow element/basic module larger than that of the line width of the laser.
E913	No quiet zone in bar code.	Set the proper value for “Quiet/Narrow Ratio”. With the inversion setting, set always quiet zone.
E914	Too small separate pattern or composite row height.	• Adjust the height of one step bar code. • Specify the proper value for “Separation Ptrn H/W” so that the “Separation Pattern Height” becomes “0” or “Marking Width” is larger than “Separation Pattern Width”.
E915	Cannot create bar code.	Digit number of characters for EAN/ UPC code or RSS (GS1 DataBar) code is incorrect. Enter the prescribed number of characters according to the code type.
E916 *1	Cannot mark bar code with sphere or vertical cone.	• With 3D setting of sphere or vertical cone, do not use the barcode setting. • Set the work shape other than sphere and vertical cone.

*1 : Error that may occur for LP-M / LP-Z series only.
*2 : Error that may occur for LP-S series only.
*3 : Error that may occur for LP-M / LP-S series only.
*4 : Error that may occur for LP-Mxxx-S type only.
*5 : Error that may occur for LP-M series only.

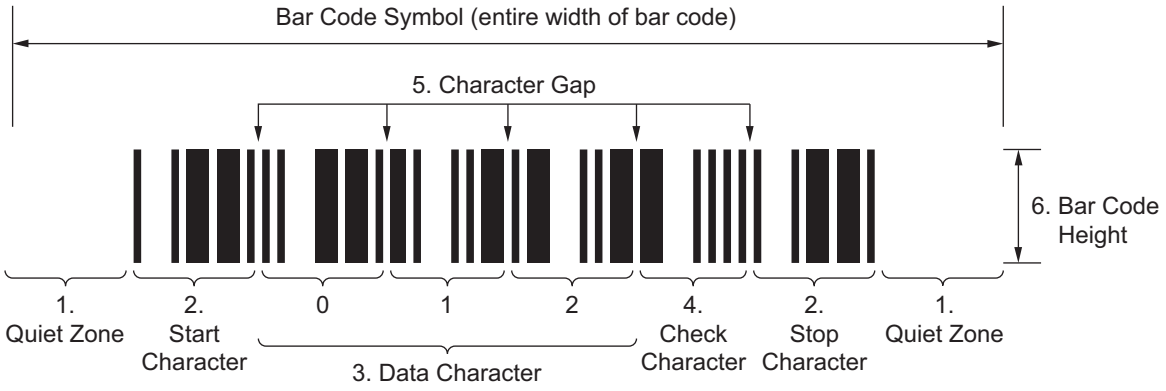
Reference

- When other error not listed in this section was occurred, restart the laser marker.
- If the symptom persists after restart, contact our sales office.

Appendix

Description of Code Symbols

■ CODE39

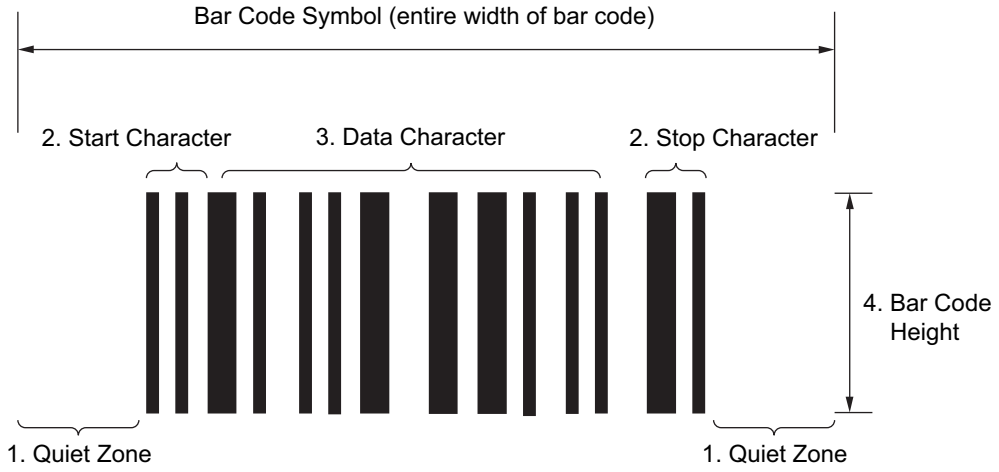


	Name	Description
1	Quiet Zone	Quiet zone for one character is necessary for the back and forth to scan the barcode.
2	Start/Stop Character	The particular characters to indicate the start and end of the bar code.
3	Data Character	A bar or space on a bar code is called an “element”. On CODE39, a character consists of nine elements; five bars and four spaces (thee wide elements and six narrow elements).
4	Check Character	Used to check if the read data is correct or not by putting the value calculated with the certain formula (modulus 43) on just before the stop character for re-calculation.
5	Character Gap	The space between two adjacent characters. Generally it has the same width as that of narrow element or wide element. In this laser marker, it has the same width as the narrow element.
6	Bar Code Height	Usually 5 mm or 15% of bar code entire width, whichever is greater.

Content of code data

- The CODE39 bar code can indicate all 36 alphanumerical characters (A to Z and 0 to 9) and fixed characters (-, ., , $, /, +, %).
- The start and stop characters are indicated by “*”.

■ ITF



	Name	Description
1	Quiet Zone	Quiet zone for one character is necessary for the back and forth to scan the barcode.
2	Start/Stop Character	The particular characters to indicate the start and end of the bar code.
3	Data Character	On ITF, a character consists of five bars and five spaces. (two wide elements in five elements) The first character is indicated by bars and the second character by spaces. In case the number of data character is odd, “0” is added at the head to make it even number.

Data contents of Standard ITF (14-digit)

Digit	1	2	5	5	1
Description	PD identification Code	Country Code	Manufacture Code	Product Code	Check Digit

Data contents of Extension ITF (16-digit)

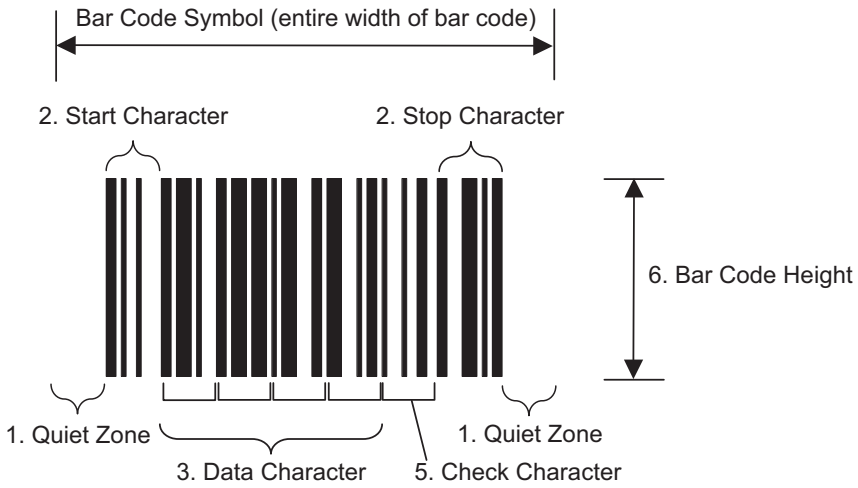
Digit	1	2	5	5	5	1
Description	Spare code	PD identification Code	Country Code	Manufacture Code	Product Code	Check Digit

4	Bar Code Height	Usually 5 mm or 15% of bar code entire width, whichever is greater.
	Check Character	Used to check if the read data is correct or not by putting the value calculated with the certain formula (modulus 10/ weight 3-1) on just before the stop character for re-calculation.

Content of code data

- The ITF bar code can indicate only numerical characters (0 to 9).
- The start character is “0000” and stop character is “1000”. “0” is indicated with narrow bars or spaces. “1” is indicated with wide bars or spaces.

■ CODE128

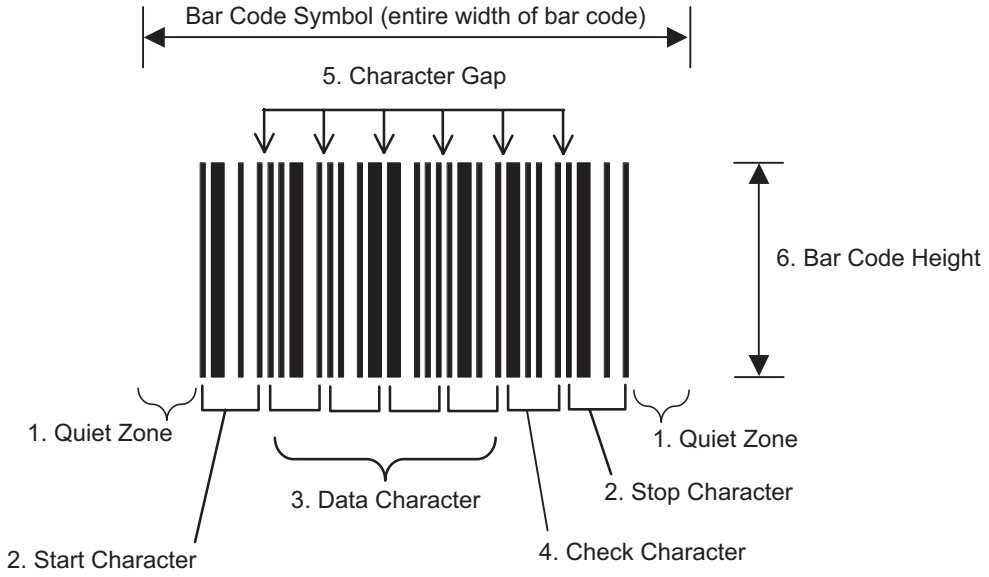


	Name	Description
1	Quiet Zone	Quiet zone for one character is necessary for the back and forth to scan the barcode.
2	Start/Stop Character	The particular characters to indicate the start and end of the bar code. CODE128 has three types of start code (A, B, and C) and one stop code. Depending on the start character, the character code set is defined as “Code A”, “Code B” or “Code C”. The code set is determined by data character contents. The laser marker automatically selects the code set according to the input data.
3	Data Character	On CODE128 bar code, a character consists of 11 modules (minimum unit consisting of bars and spaces). It has four types of element width from 1 to 4 modules.
	Function Character	Entering “FNC1” just before the data characters indicates that the code is UCC/EAN-128.
5	Check Character	Used to check if the read data is correct or not by putting the value calculated with the certain formula (modulus 103) on just before the stop character for re-calculation.
6	Bar Code Height	Usually 5 mm or 15% of bar code entire width, whichever is greater.

Content of code data

- The CODE128 bar code can indicate 128 characters of ASCII code consisting of numerical characters, alphanumerical characters (capitals and small letters), symbols and control code.

■ NW-7



	Name	Description
1	Quiet Zone	Quiet zone for one character is necessary for the back and forth to scan the barcode.
2	Start/Stop Character	The particular characters to indicate the start and end of the bar code. It has four types of start/stop characters (A, B, C, D). This product uses the same character for both start and stop characters.
3	Data Character	On NW-7 bar code, a character consists of seven “Narrow” and “Wide” elements; four bars and three spaces.
4	Check Character	Used to check if the read data is correct or not by putting the value calculated with the certain formula (modulus 16) on just before the stop character for re-calculation.
5	Character Gap	The space between two adjacent characters. Generally it has the same width as that of narrow element or wide element. In this laser marker, it has the same width as the narrow element.
6	Bar Code Height	Usually 5 mm or 15% of bar code entire width, whichever is greater.

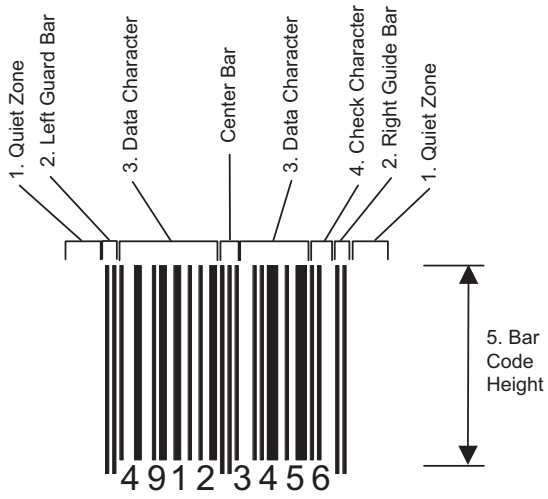
Content of code data

- The NW-7 bar code can indicate numerical characters (0 to 9) and symbols (-, $, :, /, . , +).

■ EAN

EAN-13

EAN-8

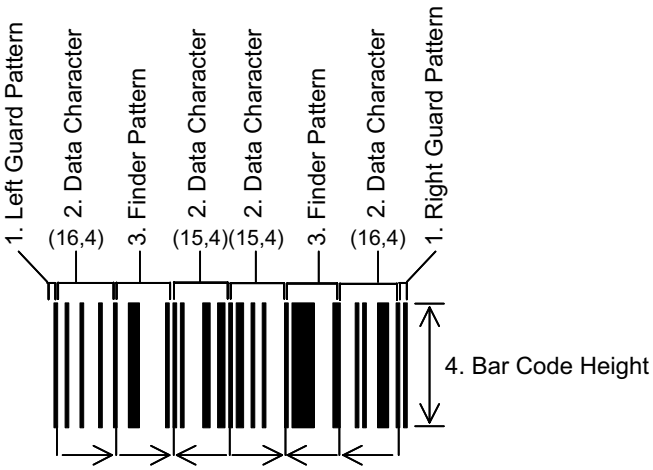


	Name	Description
1	Quiet Zone	Quiet zone for one character is necessary for the back and forth to scan the barcode.
2	Left/Right Guard Bar	Identify the start and end of a bar code.
3	Data Character	On EAN code, a character consists of 7 modules (minimum unit consisting of bars and spaces). A data character consists of two bars and two spaces. It has four types of element width from 1 to 4 modules. The data characters are displayed on either side of center bar.
4	Check Character	Used to check if the read data is correct or not by putting the value calculated with the certain formula (modulus 10 / weight 3-1) on just before the stop character for re-calculation.
5	Bar Code Height	Usually 5mm or 15% of bar code entire width, whichever is greater.

Contents of EAN

	Standard version (EAN-13)	Abbreviated version (EAN-8)
Usable Data Characters	Numerical characters 0 to 9	
Digit number of Data Character, (including Check Character)	13-figure (6 digits for left/5 digits for right)	8-figure (4 digits for left/3 digits for right)
Quiet Zone	11 modules or more on the left side	7 modules or more on respective sides
	7 modules or more on the right side	
Left/Right Guard Bar	“101”	
Center Bar	“01010”	

■ RSS-14 (GS1 DataBar)



	Name	Description
1	Left/Right Guard Pattern	Provides the bar code area. It consists of bars and spaces of one module (minimum unit consisting on bars and spaces).
2	Data Character	Has the (n, k) structure. “n” indicates the number of modules and “k” indicates that of bars and spaces that make up the character. As shown in the figure above, the data character is arranged so as to facing to the adjacent finder pattern (toward the arrow direction).
3	Finder Pattern	Functions as a check character or segment identifier, too, which makes symbols to be easily recognized. It consists of five elements having 15 modules.
4	Bar Code Height	In the standard case, the minimum value of bar code height is 33 times as high as the module width. For Truncated, Stacked, and Stacked Omnidirectional, it is 13, 13 and 69 times respectively.

The RSS-14 (GS1 DataBar) symbols has the three type of version as shown below, in addition standard.

RSS-14 (GS1 DataBar) Truncated

The RSS-14 (GS1 DataBar) Truncated lowers the bar code height of RSS-14 (GS1 DataBar) to meet the elongated marking field. The minimum value of bar code height is 13 times as high as the module width.

RSS-14 (GS1 DataBar) Stacked

The RSS-14 (GS1 DataBar) Stacked is the two-tiered symbol consisting of halves of RSS-14 (GS1 DataBar) Truncated divided into two to meet the products with extremely narrow marking field. The upper tier consists of left half of RSS-14 (GS1 DataBar) Truncated. A guard pattern is added at its right end. The bottom tier consists of right half of RSS-14 (GS1 DataBar) Truncated. A guard pattern is added at its left end. The separator of one module height is inserted between tiers. The minimum value of bar code height is 13 times as high as the module width.

RSS-14 (GS1 DataBar) Stacked Omnidirectional

The RSS-14 (GS1 DataBar) Stacked Omnidirectional is the two-tiered symbol consisting of halves of RSS-14 divided into two. The three-tiered separator of one module high or more is inserted between tiers. The minimum value of bar code height is 69 times as high as the module width.

Content of code data

- On RSS-14 (GS1 DataBar) bar code, one-digit package indicator is added before the 13-digit common product code “EAN”. The 14-digit product code is called as “GTIN (Global Trade Item Number)”.
- It can indicate numerical characters (0 to 9).
- The data consists of application identifier “01” and 13-figure numerical characters.
- The application identifier indicates the content of data and automatically added.

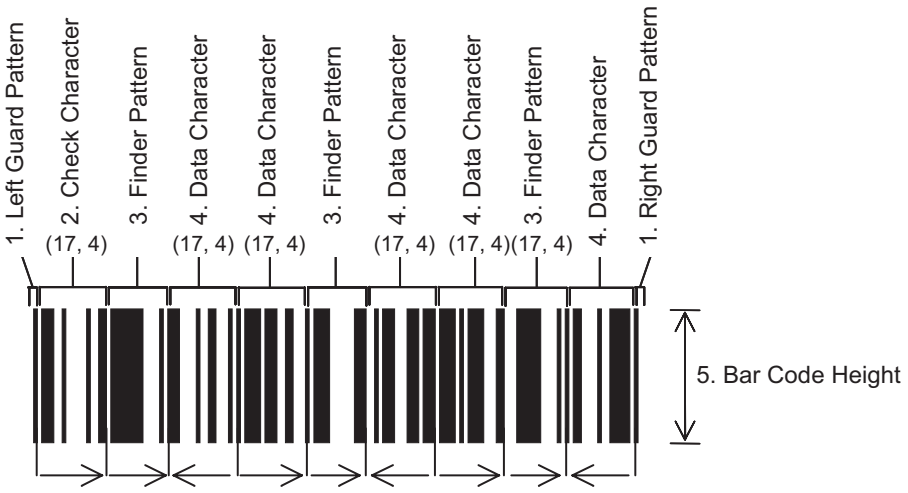
■ RSS (GS1 DataBar) Limited

	Name	Description
1	Left/Right Guard Pattern	Provides the bar code area. It consists of bars and spaces of one module (minimum unit consisting of bars and spaces).
2	Data Character	Has the (n, k) structure. “n” indicates the number of modules and “k” indicates that of bars and spaces that make up the character. This data character is composed with 7 bars and spaces consisting with 26 modules. The element is arranged from left to right as shown in the figure above.
3	Check Character	This check character is composed with 7 bars and spaces consisting with 18 modules, and it is set between 2 data characters. It is used to check if the read data is correct or not by putting the value calculated with the certain formula on just before the stop character for re-calculation.
4	Bar Code Height	The minimum value of bar code height is 10 times as high as the module width.

Content of code data

- The RSS Limited indicates the numerical (0 to 9).
- The data consists of application identifier “01” and 13-figure numerical characters.
- The application identifier indicates the content of data and automatically added.
- The data that can be bar-coded is “0000000000000” to “1999999999999”. The data “2000000000000” or more cannot be bar-coded.

■ RSS (GS1 DataBar) Expanded



	Name	Description
1	Left/Right Guard Pattern	Provides the bar code area. It consists of bars and spaces of one module (minimum unit consisting on bars and spaces).
2	Check Character	This check character is composed with 7 bars and spaces consisting with 18 modules, and it is set between 2 data characters. It is used to check if the read data is correct or not by putting the value calculated with the certain formula on just before the stop character for re-calculation.
3	Finder Pattern	Functions as a check character or segment identifier, too, which makes symbols to be easily recognized. It consists of five elements having 15 modules.
4	Data Character	Has the (n, k) structure. “n” indicates the number of modules and “k” indicates that of bars and spaces that make up the character. As shown in the figure above, the data character is arranged so as to facing to the adjacent finder pattern (toward the arrow direction).
5	Bar Code Height	The minimum value of bar code height is 34 times as high as the module width. For RSS Expanded Stacked, the minimum value of one step of bar code is 34 times as high as the module width.

The RSS (GS1 DataBar) Expanded barcode has the additional version show below.

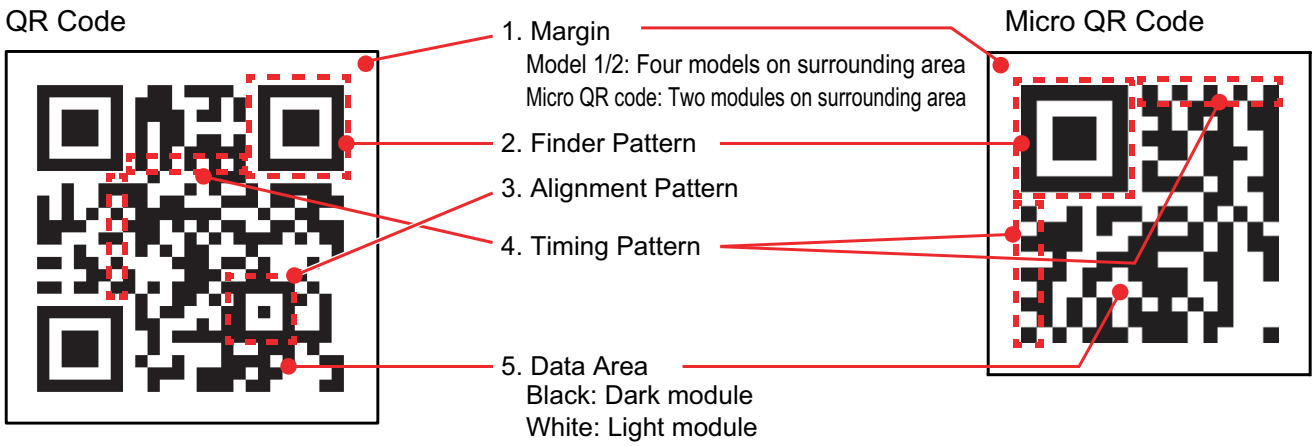
RSS (GS1 DataBar) Expanded Stacked

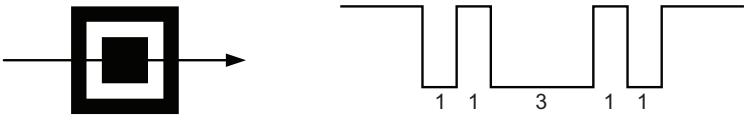
The RSS (GS1 DataBar) Expanded Stacked is the multi-tier symbol consisting of RSS (GS1 DataBar) Expanded content to meet the products with the narrow marking field. Up to 11 tiers can be piled up.

Content of code data

- The RSS (GS1 DataBar) Expanded bar code can indicate ISO646 (capitals, numerical characters, spaces and 20 symbols) and function character (FNC1). Up to 60-figure of numerical characters or 40 alphabetical characters can be bar-coded.

■ QR Code



	Name	Description
1	Margin (Quiet Zone)	The space necessary to read the code. For QR code, four modules on surrounding area are needed and two modules are needed for Micro QR code.
2	Finder Pattern	The pattern to detect the location of symbol. It allows high-speed scanning of code. It allows high-speed scanning of code. It has the size of 7 × 7 modules. The ratio of module width is 1:1:3:1:1 (see the figure below). When a finder pattern in created with the Font Maker, the entire character image is the finder pattern area of QR code. 
3	Alignment Pattern	The pattern to correct the strain of symbol.
4	Timing Pattern	The pattern used to acquire the data density.
5	Data Area	The area where data are coded. The black unit module (the minimum unit of code) is called as “dark module” and white as “light module”. When creating dark/light module patters with the Font Maker, the entire character image is the module pattern area of QR code.

Content of code data

- It can include alphanumerical character, Kanji, Katakana, Hiragana, symbol, binary and control code.

QR Code Version and Data Capacity

The relation versions and data capacity (the maximum number of character) is shown below.

- Model 1 : Primary specification of QR code.
- Model 2 : Enhanced version which improves the function of location correction, possible to deal with large volume data.
- Error Correction : Performs detection and recovery when the code gets dirty or damaged partially. For example, on Level H, the data can be recovered even if about 30% of code area is corrupted.
  L (approx. 7%), M (15%), Q (25%) or H (30%) is selectable for QR code.
  For Micro QR code, only error correction can be performed on Version M1. The rate of corruption recoverable can be selected from 7% or 15% for M2 and M3, and 7%, 15%, or 25% for M4.

Micro QR Code

Version	Numerical mode				Alphanumerical mode				Binary mode				Kanji mode			
	L	M	Q	H	L	M	Q	H	L	M	Q	H	L	M	Q	H
M1 (11 × 11)	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M2 (13 × 13)	10	8	—	—	6	5	—	—	—	—	—	—	—	—	—	—
M3 (15 × 15)	23	18	—	—	14	11	—	—	9	7	—	—	6	4	—	—
M4 (17 × 17)	35	30	21	—	21	18	13	—	15	13	9	—	9	8	5	—

QR Code Model 1

Version	Error Correction Level	Maximum data amount				Version	Error Correction Level	Maximum data amount			
		Numerical	Alphanumerical	Binary	Kanji			Numerical	Alphanumerical	Binary	Kanji
1 (21 × 21)	L	40	24	17	10	8 (49 × 49)	L	—	299	206	126
	M	33	20	14	8		M	—	229	158	97
	Q	25	15	11	6		Q	301	183	126	77
	H	16	10	7	4		H	203	123	85	52
2 (25 × 25)	L	81	49	34	20	9 (53 × 53)	L	—	—	244	150
	M	66	40	28	17		M	—	267	184	113
	Q	52	31	22	13		Q	—	223	154	94
	H	33	20	14	8		H	239	145	100	61
3 (29 × 29)	L	131	79	55	33	10 (57 × 57)	L	—	—	287	177
	M	100	60	42	25		M	—	—	219	135
	Q	81	49	34	20		Q	—	262	180	111
	H	52	31	22	13		H	291	176	121	74
4 (33 × 33)	L	186	113	78	48	11 (61 × 61)	L	—	—	—	205
	M	138	84	58	35		M	—	—	253	156
	Q	114	69	48	29		Q	—	—	205	126
	H	76	46	32	19		H	—	—	142	87
5 (37 × 37)	L	253	154	106	65	12 (65 × 65)	L	—	—	—	234
	M	191	116	80	49		M	—	—	289	178
	Q	157	95	66	40		Q	—	—	241	148
	H	105	63	44	27		H	—	—	162	100
6 (41 × 41)	L	321	194	134	82	13 (69 × 69)	L	—	—	—	264
	M	249	151	104	64		M	—	—	—	202
	Q	201	122	84	51		Q	—	—	273	168
	H	133	81	56	34		H	—	—	189	116
7 (45 × 45)	L	—	244	168	103	14 (73 × 73)	L	—	—	—	—
	M	311	188	130	80		M	—	—	—	225
	Q	253	154	106	65		Q	—	—	—	189
	H	167	101	70	43		H	—	—	207	127

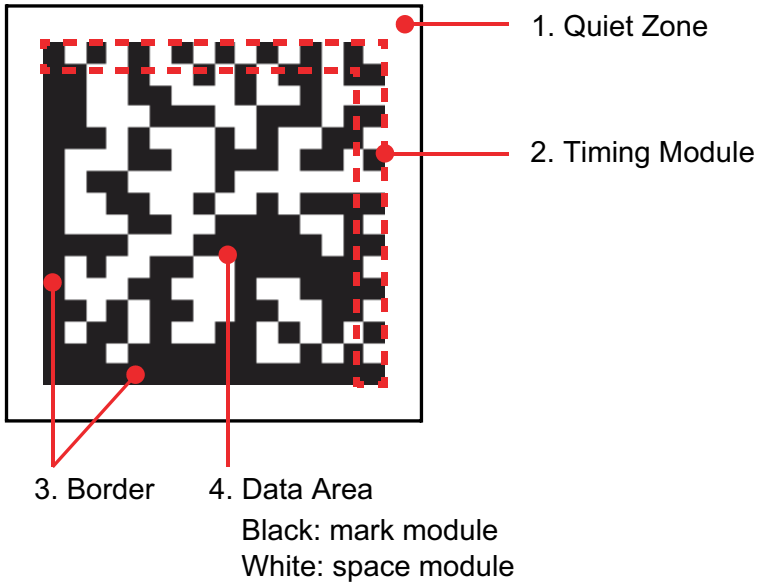
* The system can support up to 255 characters. The maximum data amount of the area indicated with "-" is 255 characters or more.

QR Code Model 2

Version	Error Correction Level	Maximum data amount				Version	Error Correction Level	Maximum data amount			
		Numerical	Alphanumerical	Binary	Kanji			Numerical	Alphanumerical	Binary	Kanji
1 (21 × 21)	L	41	25	17	10	12 (65 × 65)	L	—	—	—	226
	M	34	20	14	8		M	—	—	287	177
	Q	27	16	11	7		Q	—	—	203	125
	H	17	10	7	4		H	—	227	155	96
2 (25 × 25)	L	77	47	32	20	13 (69 × 69)	L	—	—	—	262
	M	63	38	26	16		M	—	—	—	204
	Q	48	29	20	12		Q	—	—	241	149
	H	34	20	14	8		H	—	259	177	109
3 (29 × 29)	L	127	77	53	32	14 (73 × 73)	L	—	—	—	—
	M	101	61	42	26		M	—	—	—	223
	Q	77	47	32	20		Q	—	—	258	159
	H	58	35	24	15		H	—	—	194	120
4 (33 × 33)	L	187	114	78	48	15 (77 × 77)	L	—	—	—	—
	M	149	90	62	38		M	—	—	—	254
	Q	111	67	46	28		Q	—	—	—	180
	H	82	50	34	21		H	—	—	220	136
5 (37 × 37)	L	255	154	106	65	16 (81 × 81)	L	—	—	—	—
	M	202	122	84	52		M	—	—	—	277
	Q	144	87	60	37		Q	—	—	—	198
	H	106	64	44	27		H	—	—	250	154
6 (41 × 41)	L	—	195	134	82	17 (85 × 85)	L	—	—	—	—
	M	255	154	106	65		M	—	—	—	—
	Q	178	108	74	45		Q	—	—	—	224
	H	139	84	58	36		H	—	—	280	173
7 (45 × 45)	L	—	224	154	95	18 (89 × 89)	L	—	—	—	—
	M	—	178	122	75		M	—	—	—	—
	Q	207	125	86	53		Q	—	—	—	243
	H	154	93	64	39		H	—	—	—	191
8 (49 × 49)	L	—	279	192	118	19 (93 × 93)	L	—	—	—	—
	M	—	221	152	93		M	—	—	—	—
	Q	259	157	108	66		Q	—	—	—	272
	H	202	122	84	52		H	—	—	—	208
9 (53 × 53)	L	—	—	230	141	20 (97 × 97)	L	—	—	—	—
	M	—	262	180	111		M	—	—	—	—
	Q	—	189	130	80		Q	—	—	—	—
	H	235	143	98	60		H	—	—	—	235
10 (57 × 57)	L	—	—	271	167	21 (101 × 101)	L	—	—	—	—
	M	—	—	213	131		M	—	—	—	—
	Q	—	221	151	93		Q	—	—	—	—
	H	288	174	119	74		H	—	—	—	248
11 (61 × 61)	L	—	—	—	198	22 (105 × 105)	L	—	—	—	—
	M	—	—	251	155		M	—	—	—	—
	Q	—	259	177	109		Q	—	—	—	—
	H	—	200	137	85		H	—	—	—	270

* The system can support up to 255 characters. The maximum data amount of the area indicated with "-" is 255 characters or more.

■ Data Matrix Code



	Name	Description
1	Quiet Zone	Quiet zone is necessary to scan the code. The data matrix needs one module surrounding the code.
2	Timing Module	Has the alignment pattern with black and white modules. It provides easy recognition of data modules.
3	Border	The orientation of data matrix can be detected by the alignment pattern with L-shaped lines.
4	Data Area	The area where data are coded. The black unit module (the minimum unit of code) is called as “mark module” and white as “space module”. When creating mark/space module patterns with the Font Maker, the entire character image is the module pattern area of data matrix code.

Symbol Size and Data Capacity

The relation between symbol size and data capacity (the maximum number of character) is shown below.
This system can support up to 255 characters. The maximum data amount of the area indicated with “-” is 255 characters or more.

Symbol Size	Numeric (single byte)	Alphanumeric * (single byte)	Kanji
10 × 10	6	3	—
12 × 12	10	6	1
14 × 14	16	10	3
16 × 16	24	16	5
18 × 18	36	25	8
20 × 20	44	31	10
22 × 22	60	43	14
24 × 24	72	52	17
26 × 26	88	64	21
32 × 32	124	91	30
36 × 36	172	127	42
40 × 40	228	169	56
44 × 44	288	214	71
48 × 48	—	259	86
52 × 52	—	—	101
64 × 64	—	—	139
72 × 72	—	—	183
80 × 80	—	—	227
88 × 88	—	—	287
8 × 18	10	6	1
8 × 32	20	13	4
12 × 26	32	22	7
12 × 36	44	31	10
16 × 36	64	46	15
16 × 48	98	72	23

* “Alphanumeric” includes blank characters, numerical characters and capitals.
* In Alphanumeric, according to the number and alphabet combination, there is a case that the character numbers to be encoded exceed the number shown above list.

■ Composite

Composite is a symbol that combines a linear bar code with 2D code as its meaning.
[EAN-13, EAN-8, UPC-A, UPC-E, RSS (GS1 DataBar) series, and UCC/EAN-128 (GS1-128)] can be used for a linear bar code, and it's the composition shall be conformed to each standard. Three kinds [CC-A, CC-B, and CC-C] can be used for 2D code, and there is a difference in the volume of data etc. that can be encoded. CC-C is combined only with UCC/EAN-128 (GS1-128) though the combination of a linear bar code and 2D code is basically free.
The following figure shows the typical example of [RSS-14 (GS1 DataBar) CC-A] to explain the configuration of the symbol.

	Name	Description
1	Quiet Zone	Blank area necessary when reading bar code. Quiet zone for one module is necessary for the back and forth. (It is also necessary for the upper side in addition for CC-C.)
2	Start/Stop Pattern	This pattern shows the start and end of the bar code.
3	Data Pattern	This pattern has the characters contained in bar code and data for error correction.
4	Separator	Pattern between a linear bar code and 2D code.
5	Linear Bar Code	Size of quiet zone and the number of characters to be encoded, etc. are the same in case of using each bar code alone.

Content of code data

- Subset and function character FNC1 of ISO646 can be encoded. It differs according to the encoded character. It differs according to the encoded character. Examples of numeric, CC-A: Max. 56 characters, CC-B: Max. 338 characters, and CC-C: Max. 2361 characters.
- The directions for encoding the basic information like the commodity identification number for the linear bar code, and directions for encoding supplementary information like the expiration date and the lot number, etc. are designed. Please refer to EAN.UCC Composite Symbology of International Symbology Specification for details of the standard.

MEMO

■ Setting Value for AUTO Set

When pressing “AUTO” button after setting bar code and referential module width for the following code symbols, RSS-14 (GS1 DataBar), RSS-14 (GS1 DataBar) Truncated, RSS-14 (GS1 DataBar) Stacked, RSS-14 (GS1 DataBar) Stacked Omnidirectional, RSS (GS1 DataBar) Limited, RSS (GS1 DataBar) Expanded, RSS (GS1 DataBar) Expanded Stacked, the following setting value is set automatically with each “W” (Width) be used as the reference for calculating the setting value.

Setting Screen	Setting Item	RSS-14 (GS1 DataBar)/RSS-14 (GS1 DataBar) Truncated
Bar Code Condition	Bar Code Height	33W
	Separator Pattern Height/(W) Ratio *	1
	Quiet/(W) Ratio *	1
	Inversion	Inversion
	Guard	Available
	Human Readable Text	Available (Character Height: 6W, Character Width: 5W, Character Interval: 4.5W, Line Feed: None *, Line Interval: 7.5W *)
	Composite Row Height *	2W
	Rows Number *	0 (minimization)
Laser Setting	Line Width	half of the “line width” initial value
	Marking Quality Adjustment-Wait Adjustment	10
Bar Code Common Condition	Marking Pitch	same value with the “line width” initial value

* This setting item is set automatically when selecting RSS-14 (GS1 DataBar) CC-A, CC-B.

Setting Screen	Setting Item	RSS-14 (GS1 DataBar) Stacked	RSS-14 (GS1 DataBar) Stacked Omnidirectional
Bar Code Condition	Bar Code Height	7W	—
	Separator Pattern Height/(W) Ratio *	—	33W
	Quiet/(W) Ratio *	1	
	Inversion	Inversion	
	Guard	Available	
	Human Readable Text	Available (Character Height: 6W, Character Width: 5W, Character Interval: 4.5W, Line Feed: None *, Line Interval: 7.5W *)	
	Composite Row Height *	2W	
	Rows Number *	0 (minimization)	
Laser Setting	Line Width	half of the “line width” initial value	
	Marking Quality Adjustment-Wait Adjustment	10	
Bar Code Common Condition	Marking Pitch	same value with the “line width” initial value	

* This setting item is set automatically when selecting RSS-14 (GS1 DataBar) CC-A, CC-B.

Setting Screen	Setting Item	RSS (GS1 DataBar) Limited
Bar Code Condition	Bar Code Height	10W
	Separator Pattern Height/(W) Ratio *	1
	Quiet/(W) Ratio *	1
	Inversion	Inversion
	Guard	Available
	Human Readable Text	Available (Character Height: 6W, Character Width: 5W, Character Interval: 4.5W, Line Feed: None *, Line Interval: 7.5W *)
	Composite Row Height *	2W
	Rows Number *	0 (minimization)
Laser Setting	Line Width	half of the “line width” initial value
	Marking Quality Adjustment-Wait Adjustment	10
Bar Code Common Condition	Marking Pitch	same value with the “line width” initial value

* This setting item is set automatically when selecting RSS-14 (GS1 DataBar) Limited CC-A, CC-B.

Setting Screen	Setting Item	RSS (GS1 DataBar) Expanded	RSS (GS1 DataBar) Expanded Stacked
Bar Code Condition	Bar Code Height	34W	
	Separator Pattern Height/(W) Ratio *	1	
	Quiet/(W) Ratio *	1	
	Inversion	Inversion	
	Symbol Character Quantity	—	4
	Guard	Available	
	Human Readable Text	Available (Character Height: 6W, Character Width: 5W, Character Interval: 4.5W, Line Feed: None *, Line Interval: 7.5W *)	
	Composite Row Height *	2W	
	Rows Number *	0 (minimization)	
Laser Setting	Line Width	half of the “line width” initial value	
	Marking Quality Adjustment-Wait Adjustment	10	
Bar Code Common Condition	Marking Pitch	same value with the “line width” initial value	

* This setting item is set automatically when selecting RSS-14 (GS1 DataBar) Expanded CC-A, CC-B.
* This setting item is set automatically when selecting RSS-14 (GS1 DataBar) Expanded Stacked CC-A, CC-B.

Readable DXF File

This laser marker can read the DXF format file described below.

- DXF-R12J, R13, R14 format

The data created either by AutoCADLT (AutoCAD are produced by Autodesk, Inc.) is recommended to apply as the DXF format file data to be read. Followings are how to create DXF format file using AutoCADLT.

- DXF-R12J, R13, R14 format

The DXF-R12J, R13J, R14J format file to be created by AutoCADLT can be prepared using the “Writing” function in “File” menu of AutoCADLT.

At this time, select “AutoCADLT R2/R12J/R13J/R14DXF” from “File Format” in “Data Writing” dialog, and then click [Save] button.

Refer to “Operation Method” that is appeared on the screen by searching the reference pages on the online help of AutoCADLT using the keyword such as “Writing”.

■ Graphic Applied on AutoCADLT and Corresponding Table for Marking Object using Laser Marker

DXF Version	Entity Name	Graphic Name	Applica-bility*	Remarks
R12J	3DFACE	3D face	N	
	3DLINE	3D line	N	
	ARC	Arc	Y	Converted into segment and output.
	ATTDEF	Attribute definition	N	
	ATTRIB	Attribute	N	
	CIRCLE	Circle	Y	Converted into segment and output.
	DIMENSION	Dimension	N	
	INSERT	Insert graphic	Y	Converted into each graphic element and output.
	LINE	Segment	Y	Output with segment.
	POINT	Point	N	
	POLYLINE	2D Polyline	Y	Converted arc into segment and output. Bold line is not supported.
		3D Polyline	N	
	SEQEND	Close	Y	Applicable only for reproducing polyline.
	SHAPE	Shape	N	
	SOLID	2D paint	Y	Output outline into segment and output internal into horizontal/vertical segment.
	TEXT	Character	Y	Converted character with specified font into segment and output.
	TRACE	Bold line	N	
	VERTEX	Top	Y	Applicable only for reproducing polyline.
	VIEWPORT	View port	N	

DXF Version	Entity Name	Graphic Name	Applica-bility*	Remarks
R13J, R14	3DSOLID	3D paint	N	
	ACAD_PROXY_ENTITY	Proxy graphic	N	
	BODY	body	N	
	ELLIPSE	Ellipse	Y	Converted into segment and output.
	HATCH	Hatching	Y	Target graphic: segment, arc, ellipse only. Hatching pattern is reproduced for all painting.
	IMAGE	Image	N	
	LEADER	Lead line	N	
	LWPOLYLINE	Light Weight polyline	Y	Converted arc into segment and output. Bold line is not correspondable.
	MLINE	Multi-line	N	
	MTEXT	Multi-text	Y	Converted character with specified font into segment and output.
	OLEFRAME	OLE frame	N	
	OLE2FRAME	OLE2 frame	N	
	RAY	Radiation (half line)	Y	Output with segment.
	REGION	Region	N	
	SPLINE	Free curve	Y	Converted into segment and output.
	TOLERANCE	Geometric tolerance	N	
	XLINE	Line (straight line)	Y	Output with segment.
R14 (Used Express Tools)	ARCALIGNEDTEXT	Character string on arc	N	
	RTEXT	Reference character string	N	
	WIPEOUT	Masking graphic	N	

* For the applicability of the function, "Y" means "applicable" and "N" means "not applicable for this laser marker".

Reference

- The DXF file including entity not applicable to the laser marker cannot mark.
- In the case of setting CAD marking magnification for laser marker to “under 1X”, the graphic including curve is not marked as just the preset marking image.
- In the case of marking the CAD data created/output by AutoCADLT after converting by the logo data conversion software, all graphics might not be marked as just the preset marking images.

Input Setting Value by Series

Input Range of LP-M series

Setting Screen	Item	Unit	Model					
			LP-M200	LP-M500	LP-M205	LP-M505	LP-MA05	LP-MA06
			Standard area type		Wide area type			
—	Work Distance (±Variable length)	mm	190 (±22)		220 (±22)			330 (±22)
—	Marking Field	mm	120 × 120		220 × 220			330 × 330
Operation Screen - Operator Adjustment Screen	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Z Offset	mm	-22.000 to +22.000					
	Laser Power	—	12.0 to 100.0 by increment of 0.5					
	Laser Pulse Cycle	μs	02.0 to 50.0	2.0 to 20.0	2.0 to 50.0	2.0 to 20.0	5.0 to 10.0	
	Scan Speed	mm/s	1 to 12000					1 to 8000
	Line Speed	m/min.	0.060 to 170.000					0.060 to 120.000
Guide Indication	Scan Speed	mm/s	1 to 6000					1 to 4000
Function Setting - External Offset	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Z Offset	mm	-22.000 to +22.000					
	θ Offset	°	-180.00 to +180.00					
Marking Condition- General Condition - Common	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Z Offset	mm	-22.000 to +22.000					
	Rotation Offset	°	-180.00 to +180.00					
	Marking Pitch	mm	0.010 to 2.000					
Marking Condition - General Condition - Layer	Center X/Y/Z	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Height / Length / Width	mm	001.000 to 120.000		001.000 to 220.000			001.000 to 330.000
	Diameter							
Marking Condition - General Condition - Step & Repeat	Row/Column Step	mm	000.000 to 120.000		000.000 to 220.000			001.000 to 330.000
	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Fine Tune X/Y							
	Fine Tune Z	mm	-22.000 to +22.000					
	Rotation Angle	°	-180.00 to +180.00					
Marking Condition - Character Condition	Character Height/ Width	mm	000.100 to 120.000		000.100 to 220.000			001.000 to 330.000
	X/Y Position	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Character Interval/ Line Interval/ Radius of Line Interval	mm	000.000 to 120.000		000.000 to 220.000			000.000 to 330.000
	Character String Width							
	Tilt Angle	°	-180.00 to +180.00					
	Center X/Y	mm	-999.999 to +999.999					
	Radius	mm	000.000 to 999.999					
	Bold Line Width	mm	0.000 to 2.000		0.000 to 4.000			

Setting Screen	Item	Unit	Model					
			LP-M200	LP-M500	LP-M205	LP-M505	LP-MA05	LP-MA06
			Standard area type		Wide area type			
Marking Condition - Logo Condition	X/Y Position	mm	-330.000 to +330.000					
	Rotation Angle	°	-180.00 to +180.00					
	Height/Width	mm	000.100 to 120.000		000.100 to 220.000			000.100 to 330.000
	X/Y Scale	time	0.100 to 10.000					
Marking Condition - Bar Code Condition	Narrow Element (W)	mm	0.050 to 1.000					
	Bar Code Height / Lower Bar Code Height / One Bar Code Height	mm	001.000 to 120.000		001.000 to 220.000			001.000 to 330.000
	Module Height / Width	mm	0.001 to 9.999					
	Center X/Y	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Tilt Angle	°	-180.00 to +180.00					
Marking Condition - Bar Code Condition (Human Readable Text)	Relative X/Y Position	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Character Height / Width	mm	000.100 to 120.000		000.100 to 220.000			000.100 to 330.000
	Character Interval/ Line Interval	mm	000.000 to 120.000		000.000 to 220.000			000.000 to 330.000
	Bold Line Width	mm	0.000 to 2.000		0.000 to 4.000			
Marking Condition - Processing Condition	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Rotation Angle	°	-180.00 to +180.00					
	Start Pt. of X/Y End Pt. of X/Y	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	Center Pt. of X/Y							
	Radius (Circle)	mm	0.010 to 60.000		0.010 to 110.000			0.010 to +165.000
	Radius (Arc)	mm	0.010 to 330.000					
	Solid part of dashed line	mm	000.010 to 120.000		000.010 to 220.000			000.010 to 330.000
	Blank of dashed line	mm	000.000 to 120.000		000.000 to 220.000			000.000 to 330.000
Marking Condition - Point Radiation	X/Y Offset	mm	-060.000 to +060.000		-110.000 to +110.000			-165.000 to +165.000
	X/Y Point							
Laser Setting	Laser Power	-	12.0 to 100.0 by increment of 0.5					
	Scan Speed	mm/s	1 to 12000					1 to 8000
	Laser Pulse Cycle	µs	02.0 to 50.0	2.0 to 20.0	2.0 to 50.0	2.0 to 20.0	5.0 to 10.0	
	Line Width	mm	0.010 to 2.000					
	Line Speed	m/min.	0.060 to 170.000					0.060 to 120.000
	Flying Object Wait	ms	000.00 to 500.00					
Trigger Setting	Line Speed	m/min.	000.060 to 170.000					0.060 to 120.000
	Delay Time (Still)	ms	000000 to 005000					
	Delay Distance (Flying Object)	mm	000.00 to 500.00					
	Flying Object Wait	ms	000.00 to 500.00					
Environment Setting- System offset	X/Y Offset	mm	-30.000 to +30.000					
	Z Offset	mm	-22.000 to +22.000					
	Rotation Offset	°	-180.00 to +180.00					
	X/Y Scale	%	070.000 to 130.000					

Input Range of LP-Sxxx type

Setting Screen	Item	Unit	Model					
			LP-S200	LP-S500	LP-S202	LP-S502	LP-S205	LP-S505
			Standard area type		Small spot type		Wide area type	
—	Work Distance	mm	190		130		350	
—	Marking Field	mm	90×90		55×55		160×160	
Operation Screen - Operator Adjustment Screen	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Laser Power	—	012.0 to 100.0 by increment of 0.5					
	Laser Pulse Cycle	μs	02.0 to 50.0	02.0 to 20.0	02.0 to 50.0	02.0 to 20.0	02.0 to 50.0	02.0 to 20.0
	Scan Speed	mm/s	00001 to 12000		00001 to 06000		00001 to 12000	
	Line Speed	m/min.	000.060 to 240.000		000.060 to 120.000		000.060 to 240.000	
Guide indication	Scan Speed	mm/s	0001 to 6000		0001 to 3000		0001 to 6000	
Function Setting - External Offset	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	θ Offset	°	-180.00 to +180.00					
Marking Condition- General Condition - Common	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Rotation Offset	°	-180.00 to +180.00					
	Marking Pitch	mm	0.010 to 2.000					
Marking Condition - General Condition - Step & Repeat	Row/Column Step	mm	000.000 to 090.000		000.000 to 055.000		000.000 to 160.000	
	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Fine Tune X/Y							
	Rotation Angle	°	-180.00 to +180.00					
Marking Condition - Character Condition	Character Height / Width	mm	000.100 to 090.000		000.100 to 055.000		000.100 to 160.000	
	X/Y Position	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Character Interval	mm	000.000 to 090.000		000.000 to 055.000		000.000 to 160.000	
	Line Interval/ Radius of Line Interval							
	Character String Width							
	Tilt Angle	°	-180.00 to +180.00					
	Center X/Y	mm	-999.999 to +999.999					
	Radius	mm	000.000 to 999.999					
	Bold Line Width	mm	0.000 to 2.000		0.000 to 2.000		0.000 to 4.000	
Marking Condition - Logo Condition	X/Y Position	mm	-330.000 to +330.000					
	Rotation Angle	°	-180.00 to +180.00					
	Height/Width	mm	000.100 to 090.000		000.100 to 055.000		000.100 to 160.000	
	X/Y Scale	time	0.100 to 10.000					
Marking Condition - Bar Code Condition	Narrow Element (W)	mm	0.050 to 1.000					
	Bar Code Height Lower Bar Code Height One Bar Code Height	mm	001.000 to 090.000		001.000 to 055.000		001.000 to 160.000	
	Module Height/ Width	mm	0.001 to 9.999					
	Center X/Y	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Tilt Angle	°	-180.00 to +180.00					

Setting Screen	Item	Unit	Model					
			LP-S200	LP-S500	LP-S202	LP-S502	LP-S205	LP-S505
			Standard area type		Small spot type		Wide area type	
Marking Condition - Bar Code Condition (Human Readable Text)	Relative X/Y Position	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Character Height / Width	mm	000.100 to 090.000		000.100 to 055.000		000.100 to 160.000	
	Character Interval, Line Interval	mm	000.000 to 090.000		000.000 to 055.000		000.000 to 160.000	
	Bold Line Width	mm	0.000 to 2.000		0.000 to 2.000		0.000 to 4.000	
Marking Condition - Processing Condition	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Rotation Angle	°	-180.00 to +180.00					
	Start Pt. of X/Y End Pt. of X/Y	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	Center Pt. of X/Y							
	Radius (Circle)	mm	0.010 to 45.000		0.010 to 27.500		0.010 to 80.000	
	Radius (Arc)	mm	0.010 to 330.000					
	Solid part of dashed line	mm	000.010 to 090.000		000.010 to 055.000		000.010 to 160.000	
	Blank of dashed line	mm	000.000 to 090.000		000.000 to 055.000		000.000 to 160.000	
Marking Condition - Point Radiation	X/Y Offset	mm	-045.000 to +045.000		-027.500 to +027.500		-080.000 to +080.000	
	X/Y Point							
Laser Setting	Laser Power	-	012.0 to 100.0 by increment of 0.5					
	Scan Speed	mm/s	00001 to 12000		00001 to 06000		00001 to 12000	
	Laser Pulse Cycle	µs	02.0 to 50.0	02.0 to 20.0	02.0 to 50.0	02.0 to 20.0	02.0 to 50.0	02.0 to 20.0
	Line Width	mm	0.010 to 2.000					
	Line Speed	m/min.	000.060 to 240.000		000.060 to 120.000		000.060 to 240.000	
	Flying Object Wait	ms	000.00 to 500.00					
Trigger Setting	Line Speed	m/min.	000.060 to 240.000		000.060 to 120.000		000.060 to 240.000	
	Delay Time (Still)	ms	000000 to 005000					
	Delay Distance (Flying Object)	mm	000.00 to 500.00					
	Flying Object Wait	ms	000.00 to 500.00					
Environment Setting- System offset	X/Y Offset	mm	-30.000 to +30.000		-27.500 to +27.500		-30.000 to +30.000	
	Rotation Offset	°	-180.00 to +180.00					
	X/Y Scale	%	070.000 to 130.000					

Input Range of LP-SxxxW type

Setting Screen	Item	Unit	Model	
			LP-S500W	LP-S505W
			Standard area type	Wide area type
—	Work Distance Center Position*	mm	193	357
—	Marking Field	mm	90×90	160×160
Operation Screen - Operator Adjustment Screen	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	Laser Power	—	020.0 to 100.0 by increment of 0.5	
	Scan Speed	mm/s	00001 to 03000	
Guide indication	Scan Speed	mm/s	0001 to 3000	
Function Setting - External Offset	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	θ Offset	°	-180.00 to +180.00	
Marking Condition- General Condition - Common	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	Rotation Offset	°	-180.00 to +180.00	
	Marking Pitch	mm	0.010 to 2.000	
Marking Condition - General Condition - Step & Repeat	Row/Column Step	mm	000.000 to 090.000	000.000 to 160.000
	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	Fine Tune X/Y			
	Rotation Angle	°	-180.00 to +180.00	
Marking Condition - Character Condition	Character Height/Width	mm	000.100 to 090.000	000.100 to 160.000
	X/Y Position	mm	-045.000 to +045.000	-080.000 to +080.000
	Character Interval	mm	000.000 to 090.000	000.000 to 160.000
	Line Interval/Radius of Line Interval			
	Character String Width			
	Tilt Angle	°	-180.00 to +180.00	
	Center X/Y	mm	-999.999 to +999.999	
	Radius	mm	000.000 to 999.999	
	Bold Line Width	mm	0.000 to 2.000	0.000 to 4.000
Character Condition - Logo Condition	X/Y Position	mm	-330.000 to +330.000	
	Rotation Angle	°	-180.00 to +180.00	
	Height/Width	mm	000.100 to 090.000	000.100 to 160.000
	X/Y Scale	times	0.100 to 10.000	
Marking Condition - Bar Code Condition	Narrow Element (W)	mm	0.050 to 1.000	
	Bar code Height Lower bar Code Height One Bar Code Height	mm	001.000 to 090.000	001.000 to 160.000
	Module Height/Width	mm	0.001 to 9.999	
	Center X/Y	mm	-045.000 to +045.000	-080.000 to +080.000
	Tilt Angle	°	-180.00 to +180.00	
Marking Condition - Bar Code Condition (Human Readable Text)	Relative X/Y Position	mm	-045.000 to +045.000	-080.000 to +080.000
	Character Height / Width	mm	000.100 to 090.000	000.100 to 160.000
	Character Interval / Line Interval	mm	000.000 to 090.000	000.000 to 160.000
	Bold Line Width	mm	0.000 to 2.000	0.000 to 4.000

Setting Screen	Item	Unit	Model	
			LP-S500W	LP-S505W
			Standard area type	Wide area type
Marking Condition - Processing Condition	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	Rotation Angle	°	-180.00 to +180.00	
	Start Pt. of X/Y End Pt. of X/Y	mm	-045.000 to +045.000	-080.000 to +080.000
	Center Pt. of X/Y			
	Radius (Circle)	mm	0.010 to 45.000	0.010 to 80.000
	Radius (Arc)	mm	0.010 to 330.000	
	Solid (part of dashed line)	mm	000.010 to 090.000	000.010 to 160.000
	Blank of dashed line	mm	000.000 to 090.000	000.000 to 160.000
Marking Condition - Point Radiation	X/Y Offset	mm	-045.000 to +045.000	-080.000 to +080.000
	X/Y Point			
Laser Setting	Laser Power	—	020.0 to 100.0 by increment of 0.5	
	Work Distance	mm	173 to 213	327 to 387
	Scan Speed	mm/s	00001 to 03000	
	Line Width	mm	0.010 to 2.000	
Trigger Setting	Delay Time (Still)	ms	000000 to 005000	
Environment Setting - System Offset	X/Y Offset	mm	-30.000 to +30.000	
	Rotation Offset	°	-180.00 to +180.00	
	X/Y Scale	%	070.000 to 130.000	

* The work distance can arbitrarily be set by laser setting,
provided that the center position is within the range of 193 mm +/- 20 mm (173 to 213 mm) for LP-S500W, and 357 mm +/- 30 mm (327 to 387 mm) for LP-S505W.

Input Range of LP-Z series

Setting Screen	Item	Unit	Model		
			LP-Z130	LP-Z250	LP-Z256
			Standard area type		Wide area type
—	Work Distance (±Variable length)	mm	190 (±25)		330 (±25)
—	Marking Field	mm	120 × 120		330 × 330
Operation Screen - Operator Adjustment Screen	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	Z Offset	mm	-25.000 to +25.000		
	Laser Power	—	0.5 to 100.0 by increment of 0.5		
	Laser Pulse Cycle	μs	10.0 to 50.0	10.0 to 40.0	
	Scan Speed	mm/s	00001 to 12000		00001 to 8000
	Line Speed	m/min.	000.060 to 170.000		000.060 to 120.000
Guide Indication	Scan Speed	mm/s	0001 to 6000		0001 to 4000
Function Setting - External Offset	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	Z Offset	mm	-25.000 to +25.000		
	θ Offset	°	-180.00 to +180.00		
Marking Condition- General Condition - Common	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	Z Offset	mm	-25.000 to +25.000		
	Rotation Offset	°	-180.00 to +180.00		
	Marking Pitch	mm	0.010 to 2.000		
Marking Condition - General Condition - Layer	Center X/Y/Z	mm	-060.000 to +060.000		-165.000 to +165.000
	Height / Length / Width	mm	001.000 to 120.000		001.000 to 330.000
	Diameter				
Marking Condition - General Condition - Step & Repeat	Row/Column Step	mm	000.000 to 120.000		000.000 to 330.000
	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	Fine Tune X/Y				
	Fine Tune Z	mm	-25.000 to +25.000		
	Rotation Angle	°	-180.00 to +180.00		
Marking Condition - Character Condition	Character Height/ Width	mm	000.100 to 120.000		000.100 to 330.000
	X/Y Position	mm	-060.000 to +060.000		-165.000 to +165.000
	Character Interval/ Line Interval/ Radius of Line Interval	mm	000.000 to 120.000		000.000 to 330.000
	Character String Width				
	Tilt Angle	°	-180.00 to +180.00		
	Center X/Y	mm	-999.999 to +999.999		
	Radius	mm	000.000 to 999.999		
	Bold Line Width	mm	0.000 to 2.000		0.000 to 4.000
Marking Condition - Logo Condition	X/Y Position	mm	-330.000 to +330.000		
	Rotation Angle	°	-180.00 to +180.00		
	Height/Width	mm	000.100 to 120.000		000.100 to 330.000
	X/Y Scale	time	0.100 to 10.000		
Marking Condition - Bar Code Condition	Narrow Element (W)	mm	0.050 to 1.000		
	Bar Code Height / Lower Bar Code Height / One Bar Code Height	mm	001.000 to 120.000		001.000 to 330.000
	Module Height / Width	mm	0.001 to 9.999		
	Center X/Y	mm	-060.000 to +060.000		-165.000 to +165.000
	Tilt Angle	°	-180.00 to +180.00		

Setting Screen	Item	Unit	Model		
			LP-Z130	LP-Z250	LP-Z256
			Standard area type		Wide area type
Marking Condition - Bar Code Condition (Human Readable Text)	Relative X/Y Position	mm	-060.000 to +060.000		-165.000 to +165.000
	Character Height / Width	mm	000.100 to 120.000		000.100 to 330.000
	Character Interval/ Line Interval	mm	000.000 to 120.000		000.000 to 330.000
	Bold Line Width	mm	0.000 to 2.000		0.000 to 4.000
Marking Condition - Processing Condition	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	Rotation Angle	°	-180.00 to +180.00		
	Start Pt. of X/Y End Pt. of X/Y	mm	-060.000 to +060.000		-165.000 to +165.000
	Center Pt. of X/Y				
	Radius (Circle)	mm	0.010 to 60.000		0.010 to 165.000
	Radius (Arc)	mm	0.010 to 330.000		
	Solid part of dashed line	mm	000.010 to 120.000		000.010 to 330.000
	Blank of dashed line	mm	000.000 to 120.000		000.000 to 330.000
Marking Condition - Point Radiation	X/Y Offset	mm	-060.000 to +060.000		-165.000 to +165.000
	X/Y Point				
Laser Setting	Laser Power	-	0.5 to 100.0 by increment of 0.5		
	Scan Speed	mm/s	00001 to 12000		00001 to 8000
	Laser Pulse Cycle	µs	10.0 to 50.0	10.0 to 40.0	
	Pulse Duration	ns	30, 100, 200	50, 100, 200	
	Line Width	mm	0.010 to 2.000		
	Line Speed	m/min.	000.060 to 170.000		000.060 to 120.000
	Flying Object Wait	ms	000.00 to 500.00		
Trigger Setting	Line Speed	m/min.	000.060 to 170.000		000.060 to 120.000
	Delay Time (Still)	ms	000000 to 005000		
	Delay Distance (Flying Object)	mm	000.00 to 500.00		
	Flying Object Wait	ms	000.00 to 500.00		
Environment Setting- System offset	X/Y Offset	mm	-30.000 to +30.000		
	Z Offset	mm	-25.000 to +25.000		
	Rotation Offset	°	-180.00 to +180.00		
	X/Y Scale	%	070.000 to 130.000		

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