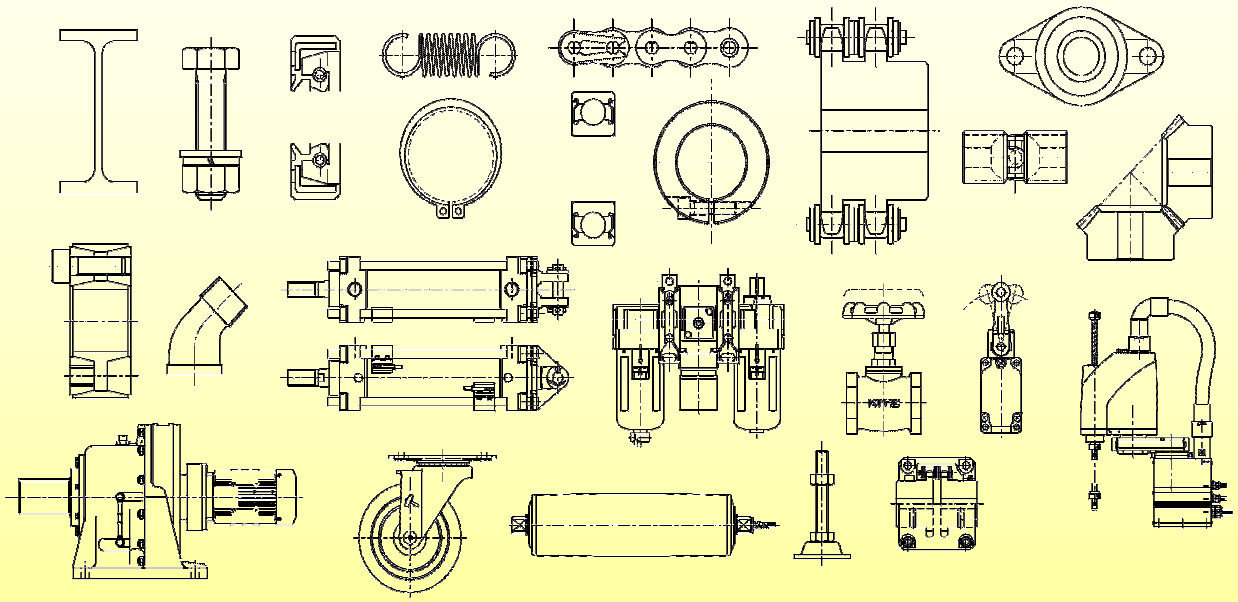
# *UNION PARTS MANUAL*



**Technote Co., Ltd**

# Table of contents

# □ Introduction

**[Union Parts] is a collection of standard parts and commercially available parts that are indispensable for mechanical design in an easy-to-use parts management system. Its major feature is that it can call up the necessary parts at high speed.**
**We are confident that [Union Part] is a unique parametric program developed from the perspective of a mechanical designer, and once used, it can be useful as a designer's partner for the rest of your**

1. [Union Parts] has been edited so that anyone can easily use it by pasting mechanical parts on the assembly drawing being created by CAD. The electronic drawing data posted on Union Parts is a parametric database, unlike the well-known electronic catalog data (DXF and CAD data). Despite the huge amount of data with more than 61.3 million parts model numbers generated, the total capacity is within a very small desk capacity of 1.6GB, so it is a system with maximum speed and response.

   [Union Parts] incorporates the information contained in the manufacturer's catalog as much as possible into the data list in order to minimize troublesome catalog browsing by the designer during the actual drawing work. Then, if you click the maker link button, you can refer to the contents of the displayed parts in the maker site catalog. In addition, you can use the machine design handbook and calculation formula functions, and we provide the calculation formula and other machine materials free of charge.

2. The ratio of purchased parts and standard parts among the parts that make up the machine is increasing year by year.
   [Union Part] was planned and developed by a mechanical design engineer who has been involved in mechanical design for many years. As a result of thorough pursuit of how to shorten the design time, we came to the conclusion that there is no choice but to abolish the drawing of standard parts and purchased parts and save labor in browsing the catalogs of each manufacturer.
   [Union Part] has been examined from all angles and incorporates various ideas so that the designer can concentrate on the actual design work without wasting effort. We hope that all the development staff will be able to do more creative work using this system.

**Please be aware of the following when using the data of [Union Parts].**

3. The data of [Union Parts] has been edited so that it can be used by directly pasting it on the assembly drawing being created by CAD.

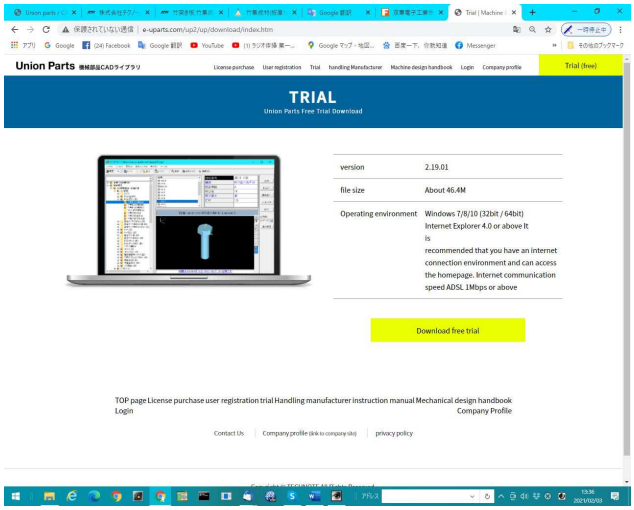
The electronic drawing data posted on this site has been reprinted by extracting the necessary parts from the electronic data provided by each manufacturer.
For parts that do not have electronic data from the manufacturer, we have created electronic drawing data from the bookbinding catalog of each manufacturer and posted it.
The data has been edited with the utmost care to ensure that there are no mistakes, but we do not guarantee its integrity.
Before using the product, please be sure to compare it with the bookbinding catalog of each manufacturer and check the dimensions.
In addition, please note that the dimensions and shapes of each part other than the dimensions listed in the bookbinding catalog of each manufacturer may differ from the actual product due to the reduction of CAD data capacity.
Please note that we are not responsible for any damage caused by the use of the electronic drawing data posted on this site.
In the unlikely event that the electronic data provided by each manufacturer is incorrect, the responsibility for reprinting this data lies with [Technote Co., Ltd.]
For inquiries regarding the electronic drawing data posted on this site, please contact [Technote Co., Ltd.] and do not contact the manufacturer directly.

If you find any incorrect data, please contact [Technote Co., Ltd.].

364-5, Toyooka-cho, Kita-ku, Hamamatsu-city,Shizuoka, JAPAN Postal code 433-8103
TEL +81 053-488-8188  FAX +81 053-488-8189
Technote Co., Ltd.

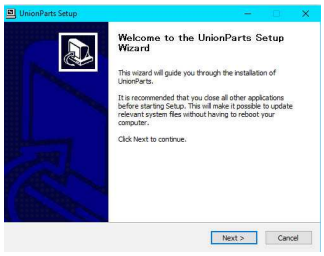
# 【1】 Union parts　installation and initial setup

* User registration is required to use [Union Parts] for the first time.
* If you register as a user, your user ID and 20-day free license key will be automatically sent to your email address. If you use Union Parts after 20 days, you will need to obtain a new paid license key.

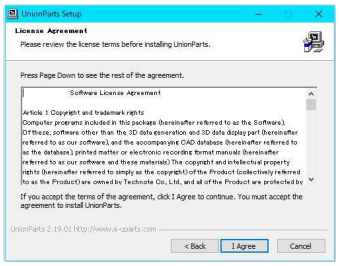



Union Parts Homepage
https://www.e-uparts.com/up/index.htm
Click **[Download]** from the menu to display the union parts download page shown on the left. Click the download link. [Up3dsetup.exe] will be downloaded, so save it in any location.

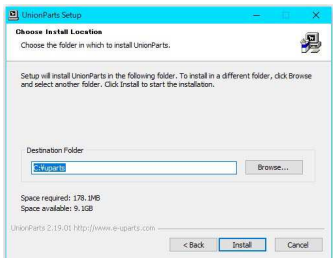
Double-click the downloaded [up3dsetup.exe] to start the installation program.




Installation initial screen




License agreement

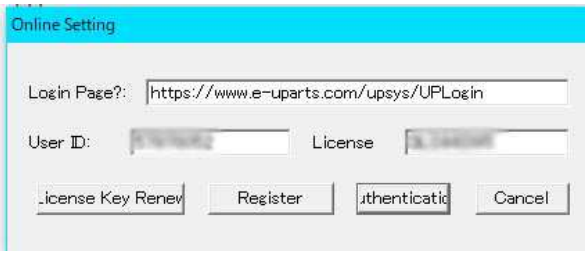



Select installation folder

The installer program will start as described above. Follow the instructions as shown above to complete the installation,
When the installation is completed, the union parts icon wil created on the desktop, so double-click the icon to start the union parts.

## ■ Online settings

When you start it for the first time, the following online setting dialog will be displayed.
When registering as a user or purchasing a license key, enter the user ID and license key notified by e-mail and click the authentication button.
You can also copy and paste from the email.
If the authentication is successful, the authentication dialog box will be displayed. Click the [OK] button.



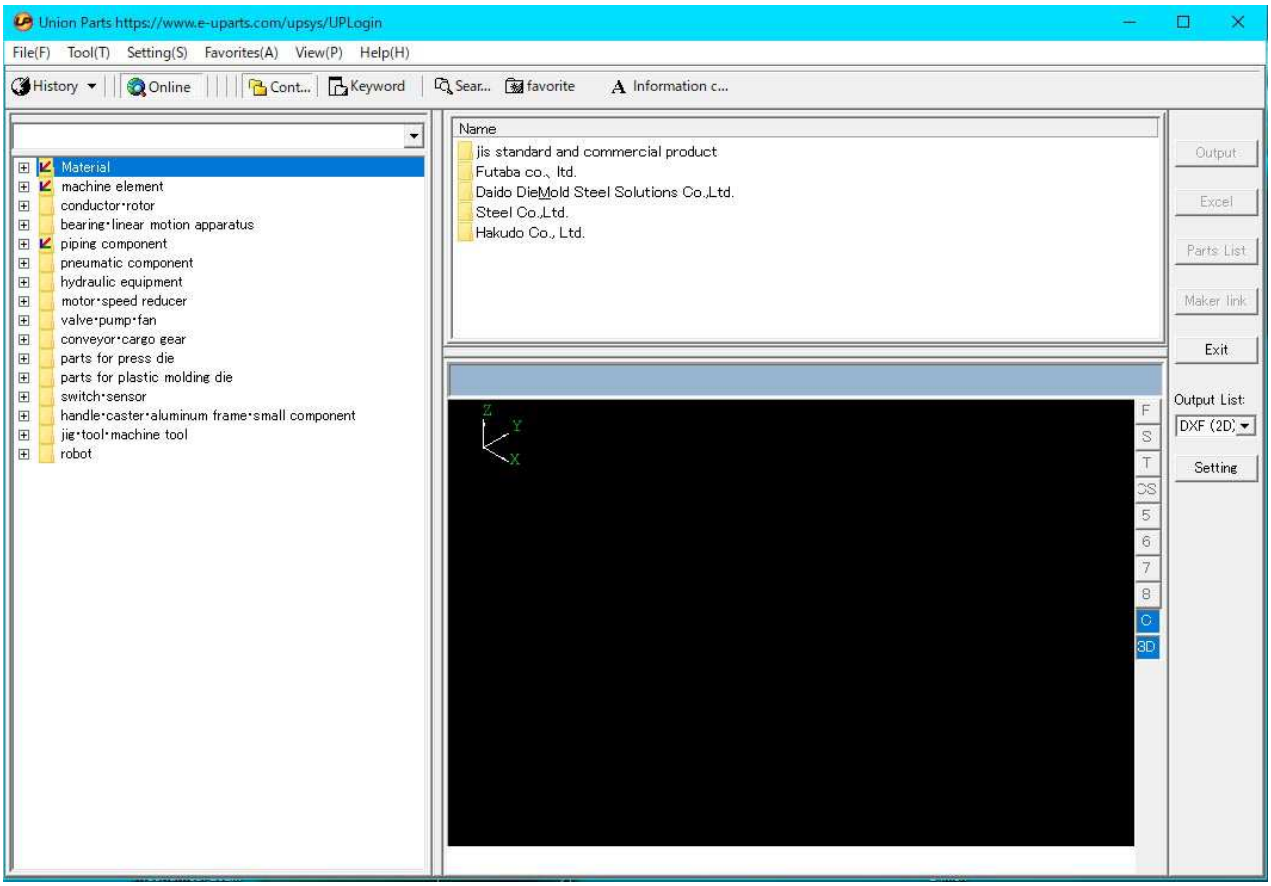

Note:

If you cancel the authentication at this time, the parts data list will be displayed as shown in the figure below.　You can see all the parts recorded in Union Parts, but please note that you cannot output the data.

If you have an environment connected to the Internet, our machine parts database server will be automatically accessed as shown in the figure below, and a major classification parts list divided into 16 categories from metal materials to robots will be displayed.

By opening the folders of each category, you can specify the part data with the shortest operation, and you can output the drawing data while checking the part drawing.

Online settings can also be made from File (F) / Online Settings (S) on the menu bar.

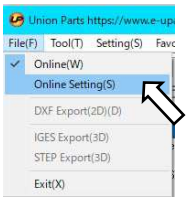



**If you re-acquired the license key on another computer and authenticated,　license key of the computer you have been using will be invalid.**

## 【2】Re-acquisition of license key

When you make a new computer or use union parts on a different computer,
Please re-acquire the license key.
If you reacquire the license key, you will not be able to use the old license key.
By entering the re-acquired new license key and authenticating it, you can use it on another computer.
You can re-acquire the license key as many times as you like for free.
The method is described below.

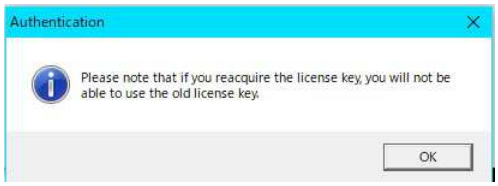
1. Start Union Parts from a computer with a valid license key, and select the Union Parts menu.
Click the [File]/ [Online] setting to display the online setting screen.1.

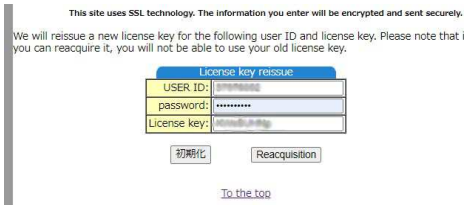




Your user ID and current license key are entered on the online settings screen above.

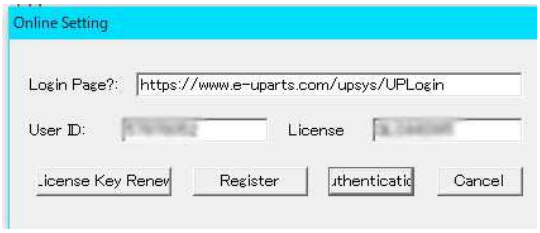
2. Click the [License Key Renew] button and the following BOX will be displayed.



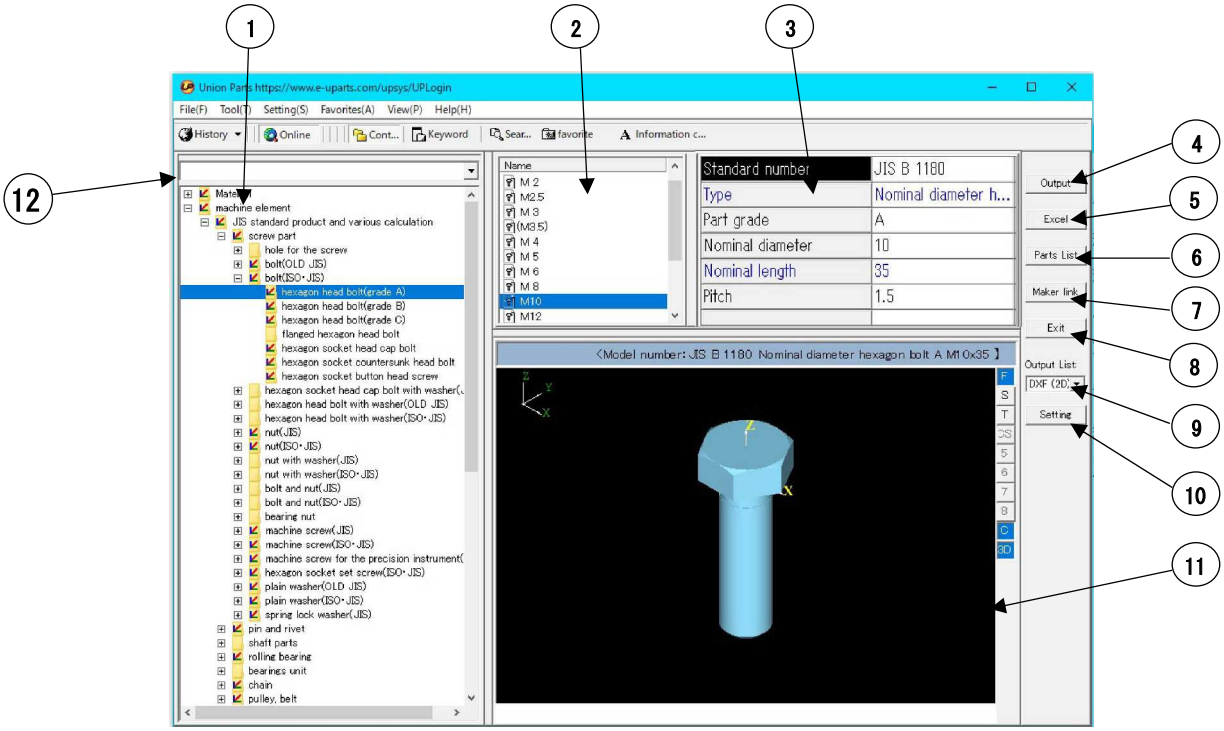

Click the OK button to link to the license key reacquisition homepage.
The password field is blank. Enter your password and then click the [Regain] button
Click to regain your license key.
If you do not know your password, display the user information login page
https://www.e-uparts.com/upsys/Login on the Union Parts homepage and display it.
● If you have forgotten your user ID or password, click here. Click to reset.

3. Please install and start Union Parts on another computer.
Click [File / Online] in the Union Parts menu to display the online setting screen. Enter the new license key issued and your user ID, then click the [Authenticate] button.
Authentication was successful. If the screen appears, the process is complete.




## 【3】Overview of union parts

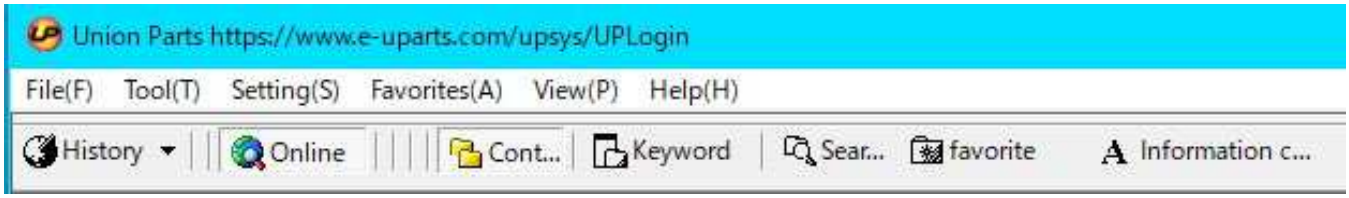
**When you start Union Parts, a window like the one below will be displayed.**




| ① 1st parts list column |
|---|
| You can speedily select parts by dividing into 16 major categories from metal materials to robots.<br>The operation method conforms to Windows Explorer. |
| ② Second parts list column |
| The parts category and below selected in the 1st parts list column are displayed, and the selection method is the same as in the 1st BOM column, and it conforms to Windows Explorer. |
| ③ Parts specification field, user-specified dimension input, selection field |
| Specification display column for selected parts<br>Enter dimensional values that the user determines during design, such as the standard stroke of the air cylinder and the length of the bolt, in this field. Where the characters are blue, the user can select and specify. |
| ④ [Output] button |
| Collects the projected planes of the selected drawing at once and outputs them directly to DXF format.<br>In the case of 3D drawings, it can be output in SAT or IGES format. |
| ⑤ [To EXCEL] |
| The specification data of the selected parts can be output to the user's parts list(Excel). |
| ⑥ [To Parts List] |

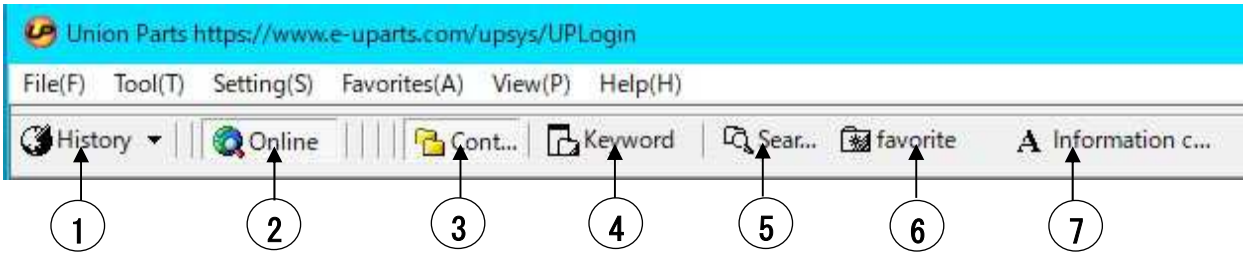
| |
|---|
| The selected parts are output to the Parts List of [Union Parts]. |
| ⑦ [Manufacturer link] |
| Directly links to the website of the manufacturer corresponding to the part selected in the 1st parts list column.<br>If the [Manufacturer Link] button is not active (when the text color is not highlighted), it is not linked. |
| ⑧ [Finish] button |
| Exit [Union Parts]. |
| ⑨ Output destination: List Box |
| Outputs 2D (DXF) and 3D (IGES, STEP) data. |
| ⑩ [Output settings] |
| 出力する時の線色、線種を設定します。 |
| ⑪ Drawing display column |
| The drawing display column has various functions such as enlargement, reduction, dimensional measurement, change of placement origin, and switching of projection plane. Also, the model number of the selected part is displayed in the title column. |
| ⑫ Search column |
| Enter the search string. |

# 1. Pull-down menu




| | | |
|---|---|---|
| [File] | Online (W) | Connects to the database via the Internet. |
| | Online settings (S) | Enter the user ID and license key to authenticate. |
| | DXF output (2D) (D) | Outputs the selected parts in DXF format. |
| | IGES output (3D) | When 3D data is displayed in the drawing display field, 3D data in IGES format is output. |
| | STEP output (3D) | When 3D data is displayed in the drawing display field, 3D data in STEP format is output. |
| | END (X) | Exit the union parts. |
| [Tool] | Calculator (C) | Simple calculator |
| [Configuration] | Display setting (S) | Setting the line color to be displayed in the drawing display field of the union parts |
| | Key setting (K) | You can assign an access key to the selected part.<br>After setting the key, you can display the assigned parts by entering the set key in the search colum. |
| | Expand only the items selected in the table of contents (A) | * Initial value is not checked<br>≪If checked≫<br>The selected parts folder is expanded.<br>At this time, the other parts folder will be closed automatically.<br>≪If not checked≫<br>The selected parts folder is expanded.<br>At this time, unless the other parts folder is closed manually<br>It remains unfolded. |
| [Favorite] | Add to Favorites (A) | Add selected parts to Favorites |
| | Favorite setting (O) | Settings of parts registered in favorites |
| [Display] | Properties | Displays the data information of the selected part. |
| | Renewal (F5) | Screen refresh |
| [Help] | Design Reference (D) | Display the mechanical design handbook |
| | version information (V) | Displaying "Union Parts" version information |

## 2. About the menu bar

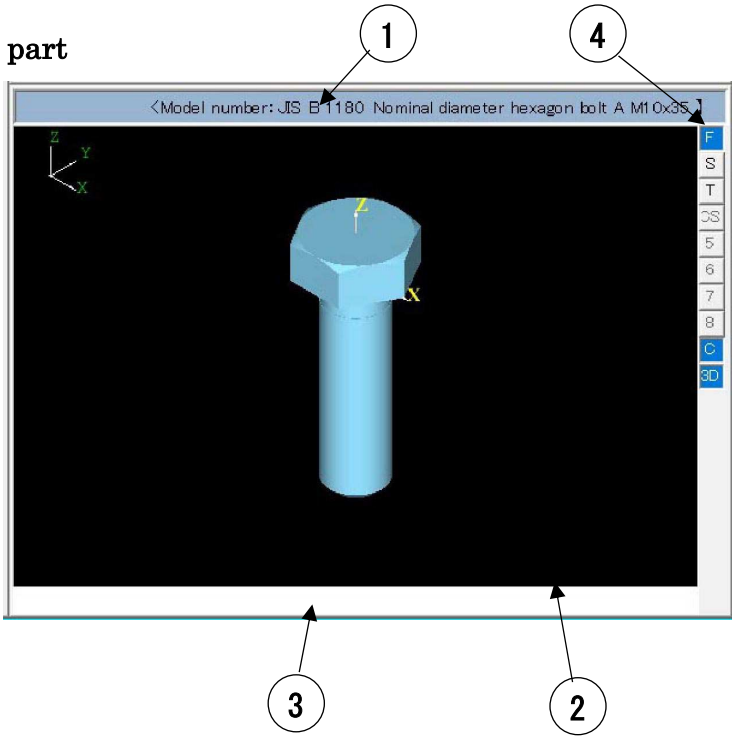



| | | |
|---|---|---|
| ① | History | When the part data is output, the list of parts is stored as a history. |
| ② | Online | Online ON / OFF switching button.<br>The WEB version can only be used on the ON line. If it is turned off, the data cannot be displayed. Local data is also unavailable |
| ③ | Index | A mode in which parts can be selected in a folder format. The specifications are based on Windows Explorer. |
| ④ | Keyword | When you enter the character string you want to search in the search field, the character string is searched from the beginning and displayed in real time. |
| ⑤ | Search | By entering the character string you want to search in the search field and pressing the "Enter" key,The parts list including the keyed character string is searched and displayed. |
| ⑥ | Favorite | All the parts list registered by [Add to Favorites] in the menu is displayed. |
| ⑦ | Information copy | Copy the information in the specification column of the part |

## 【4】How to operate the drawing display field

Actual drawing data is displayed in the drawing display column instead of image data, and you can easily enlarge the drawing, change the display position, measure the dimensions, change the placement origin, etc.
You can also switch the display surface with the display surface switching button.

## 1 Drawing display column Name of each part




### ① Model number name display

The model number of the selected part is displayed.

### ② Drawing display column

The actual drawing data is displayed.

### ③ Message column

The license period is displayed, or the distance between two points is displayed in mm in the X and Y directions when measuring the dimensions of the drawing.

### ④ Display surface switching button

Drawings are included where the text color is dark
This is the projection plane. Turn off this button
The display projection plane can be changed by changing. It means positive (front view), top (top view), and cut (cross section). If there are other projection planes, some drawings include 5 to 8 planes.
When you select the color button
Select the 3D button to display the 3D drawing.

## 2 Change the size and position of the display

If you move the mouse while pressing the left mouse button in the drawing display field, a purple "rubber box" will be displayed. When you release the left mouse button, the area surrounded by the "rubber box" will be enlarged. If you press the right mouse button, the drawing will be redisplayed around the specified position, so you can change the display position of the drawing.

## 3 Reference display

By double-clicking the right mouse button, the drawing becomes the standard display in the initial state. The model number of the selected part is displayed in the model number display field of ①.

### 4 Change the placement origin

The white dot in the display drawing is the placement origin.
The placement origin can be changed by double-clicking the line segment of the display drawing with the left mouse button. The detection point of the origin is as described in "Position of detection point".

### 5 Detection point position

You can detect each line segment of the displayed drawing by left-clicking the mouse when detecting the placement origin or measuring the dimensions. The location of the detection station is as follows.
End point, midpoint, intersection of line segment
Each point at the center of 0 ° 90 ° 180 ° 270 ° of the circle
End points of the arc 0 ° 90 ° 180 ° 270 ° Each point in the center
The intersection of a line segment and a circle (arc)
The intersection of a circle (arc) and a circle (arc)

### 6 Drawing dimensions

You can measure the dimensions of the displayed drawing with the mouse.
When you click the line segment of the drawing displayed with the left mouse button, the line segment is detected, a yellow detection point is displayed at the detection position, and a gray horizontal line passing through the detection point is displayed at the same time.
Next, click the line segment with the left mouse button in the same way, and a red detection point will be displayed and a gray vertical line will be displayed at the same time.
In the message field, the X and Y directions between the two yellow and red points and the distance between the two points are displayed in mm.
The intersections of gray horizontal lines and vertical lines are also detected.
The detection location is as described in "Position of detection point".。

### 7 Switching the display surface

In the "display surface switching button", F is the front view, S is the side view, T is the top view, and CS is the cross-sectional view. The 5-8 numeric dimension buttons are a spare when you have other projections.
Drawings are registered separately for each projection plane. Drawings are registered in areas where the text color of the button is dark. Drawings are not registered where the text color is light.
Click each button to display the drawing of that side.

## 【5】Drawing display color settings.

### ◆ Color display switching

The drawing display color of the union parts is acquired according to the display color of the manufacturer's DXF data.

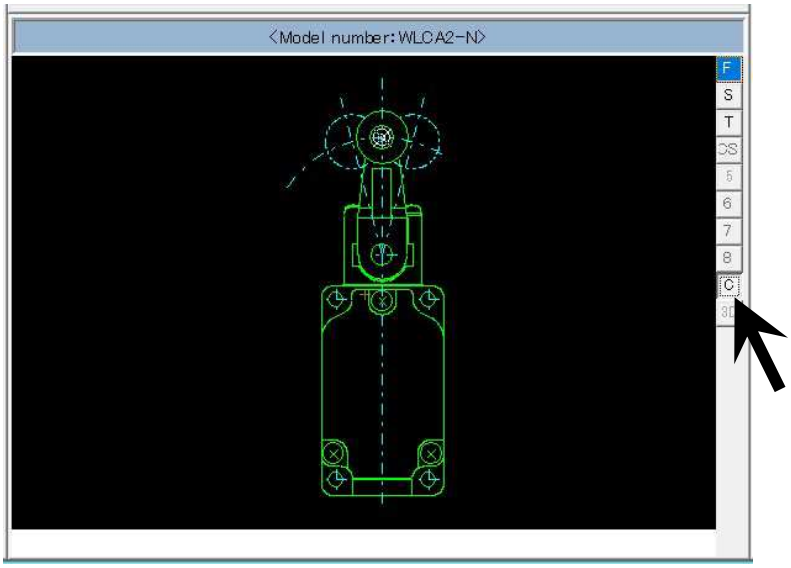



FIG5-1

By default, the "color display switching button" is ON for union parts.
As shown in Fig. 5-2, when the "color display switching button" is OFF, it is displayed in the default color of the CAD drawing of each manufacturer.
Therefore, even if the display color is changed, it will be displayed in the default color of each manufacturer.
When changing the display color, make sure that the "color display switching button" is in the ON state.　Please check.

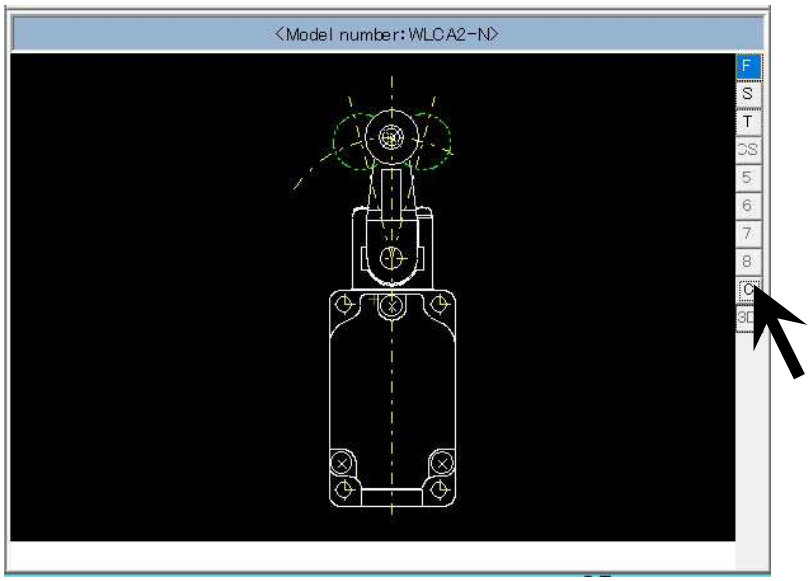


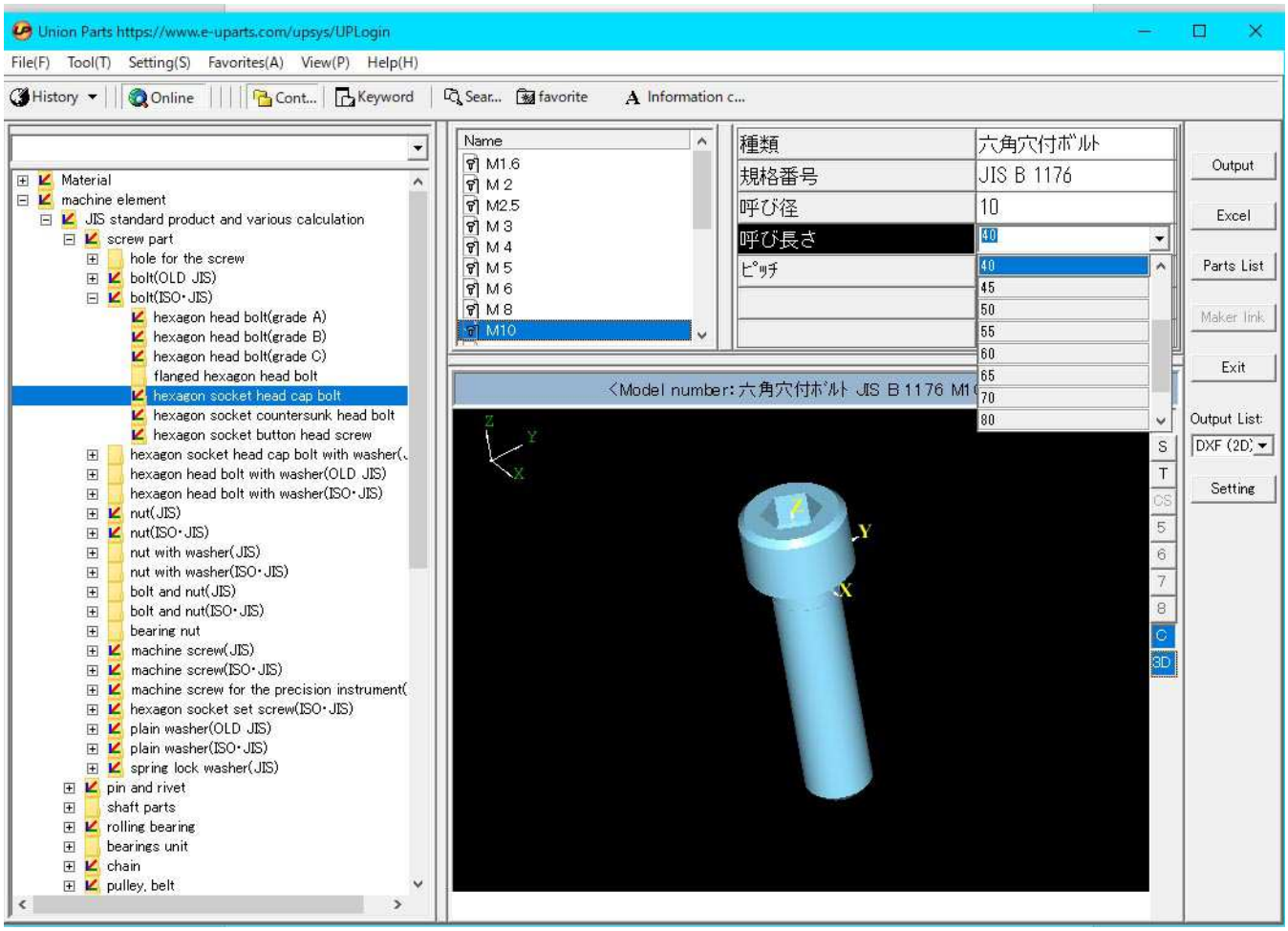

FIG5-2

# 【6】DXF drawing output and output settings

## DXF output parts of any length

Since the Union Parts Database is a parametric database, drawing data for each item is not prepared in advance.
Union Parts software provides the required drawing data when the user finishes selecting parts.
It is automatically generated and the drawing is displayed.
The Union Parts system can create parts of user-specified length.

For example, in the case of a hexagon socket head cap screw, if you enter a length value in the dimension input box (display color is blue), the hexagon socket head cap screw of that length will be drawn automatically.
For parts with a fixed standard length, a "standard length list" has been created, so you can select from it.



The Output button in the upper right is activated while the drawing is displayed.
Click the [Output] button to display the following window (Fig. 6-2).
DXF output of selected parts data can be performed with free line color, line type, angle, etc.
Drawings are divided into front view, side view, top view, and cross-sectional view, but when outputting DXF drawings, the registered planes are output as one drawing at a time.

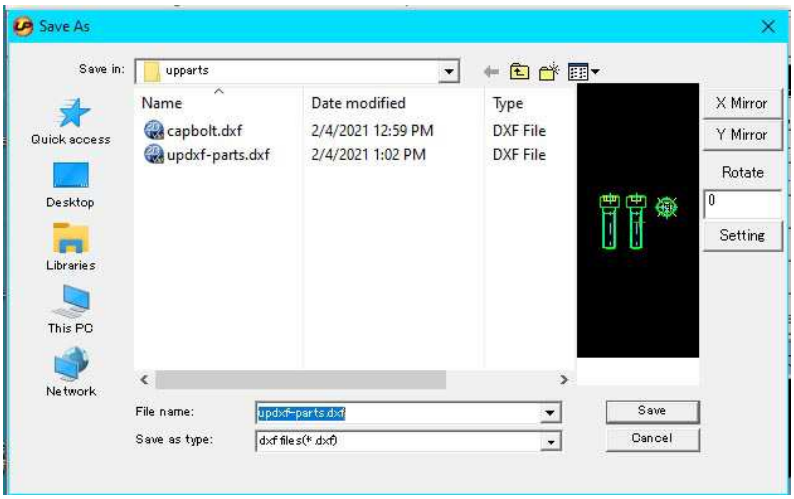



Fig6-2

◆ When you enter the angle, the preview window display changes in real time. DXF is output with the display contents of the preview window.
However, if the line color and line type are changed and output, they will not be reflected in the preview window.

◆ Specify the file name and click the [Save] button. From the next time, it will be output with the file name specified last time.
When importing DXF data into CAD, you can always specify the same file name, which saves you the trouble of handing over drawings.
When performing "DXF output", the angle, line color, and line type can be changed by the user.

Click the [DXF Output] button to display the window as shown in Fig. 6-3.
At this time, if you enter an angle in the "Angle input box", the preview window display will change in real time, and DXF will be output with the contents displayed in the preview window.

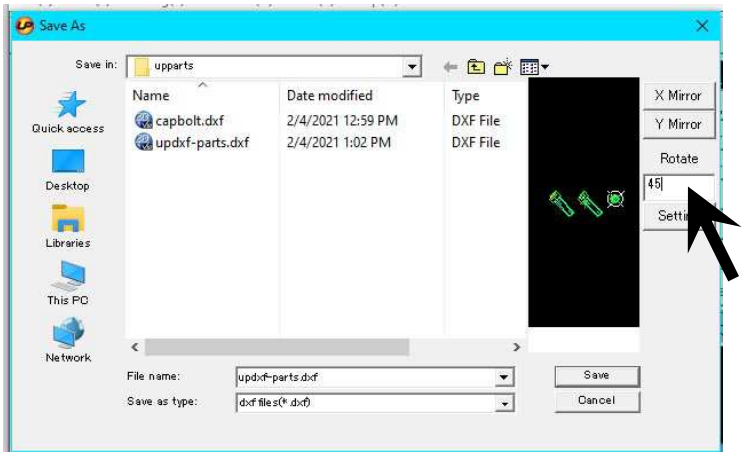



Fig6-3

**How to change the line color and line type**

When [DXF Output]-[Settings] is specified, the setting screen shown in Fig. 6-5 is displayed.You can enter it in the input box of "Line color setting" and "Line type setting" and select it freely.

If you want to change the line color, enter the color code number in the input box of ② and the "DXF color value" of ① will be changed automatically.

For the line type, click the part ▼ ③ with the mouse to display the "DXF line type list", and you can select the line type from it.

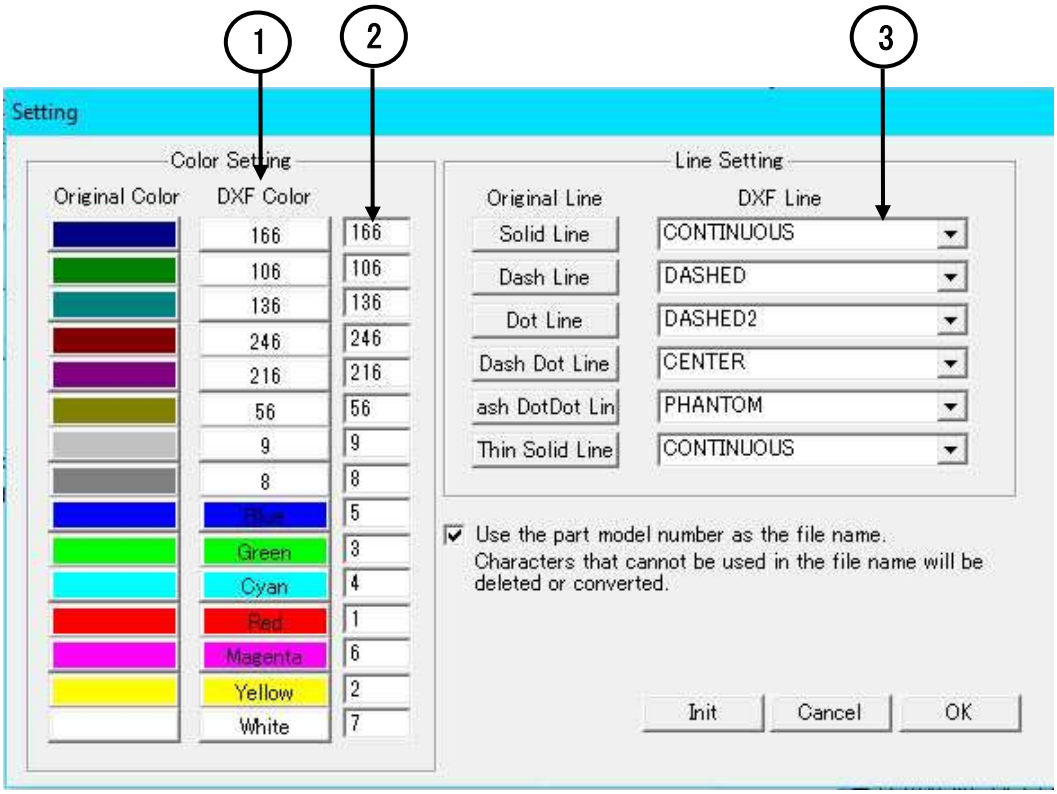


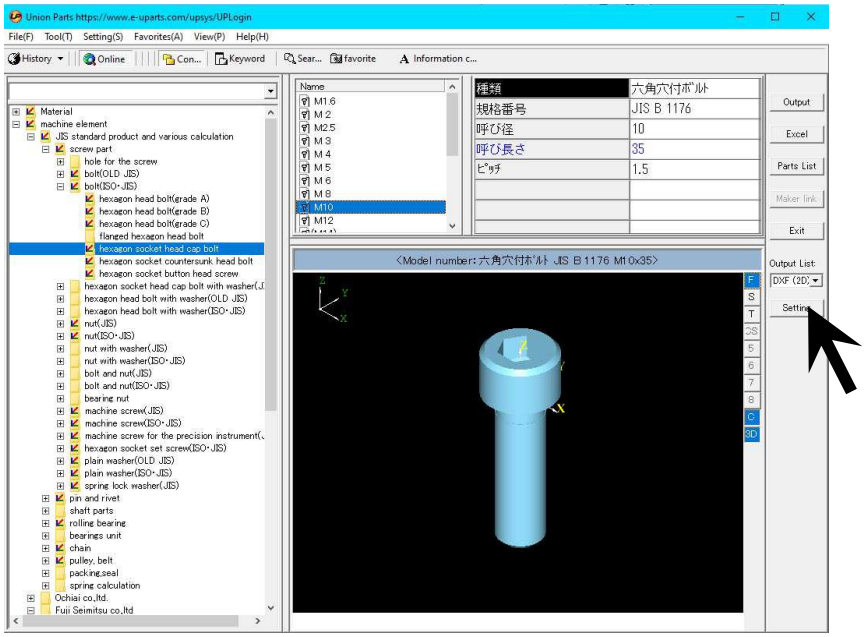

Fig6-4

After selecting the line color and line type, click the [OK] button to return to the preview window screen shown above (Fig. 6-3, Fig. 6-4).
However, even if the line color / line type is changed, it will not be reflected in the preview window screen, but when DXF data is imported to CAD after [Save], it will be displayed with the changed line color / line type.

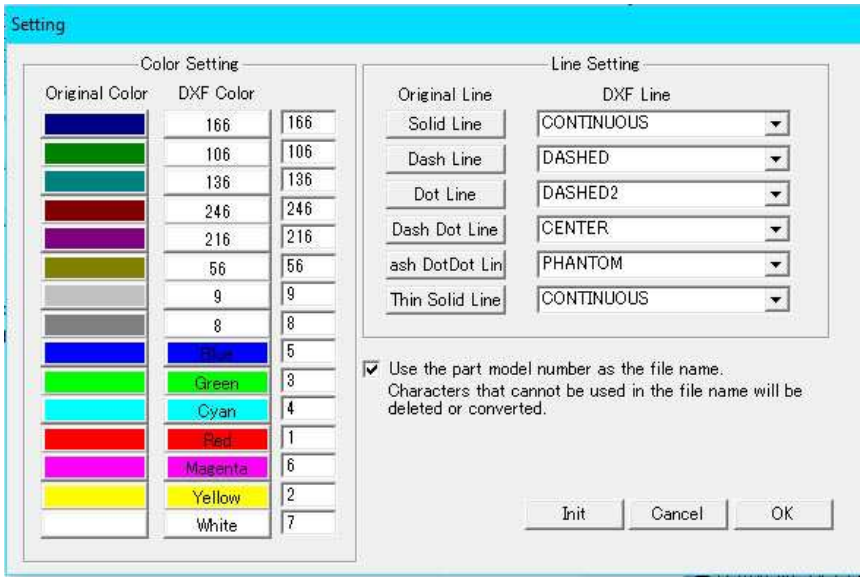
Unless the line color / line type is set again or initialized, the drawing will be displayed with the line color / line type set last time.

If you check the place ☑ Use the part model number as the file name. ,the DXF output file name will be set to the model number of the part.

## Output settings

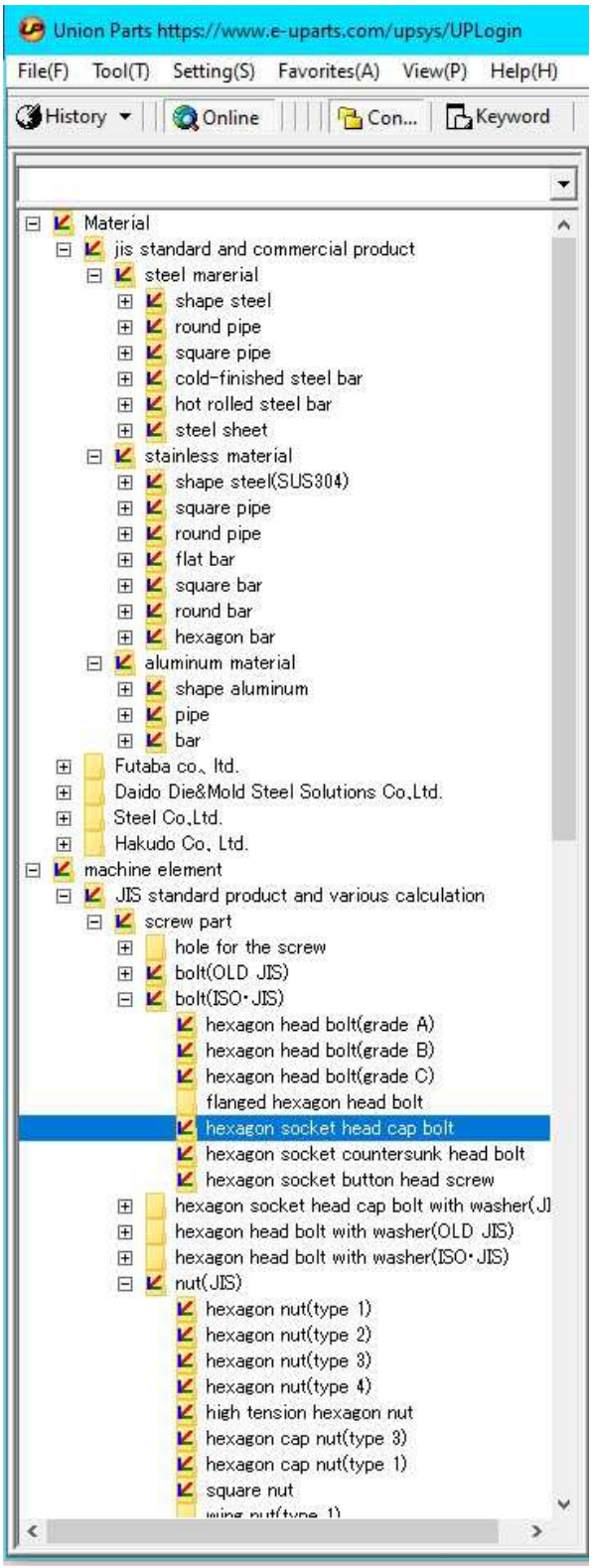


Click the [Output Settings] button to display the following setting screen.
You can enter it in the input box of "Line color setting" and "Line type setting" and select it freely.
If you want to change the line color, enter the color code number in the input box and the "DXF color value" will be displayed.
It will be changed automatically.
When you click the mouse on the line type, the "DXF line type list" is displayed, and you can select the line type from it.




The line color / line type changed here will not be reflected on the preview screen of the union parts, but when outputting to DXF after clicking the [OK] button, the changed line color / line type will be output. Unless the line color / line type is set again or initialized, the drawing will be output with the line color / line type set last time.

## 【7】3D drawing output

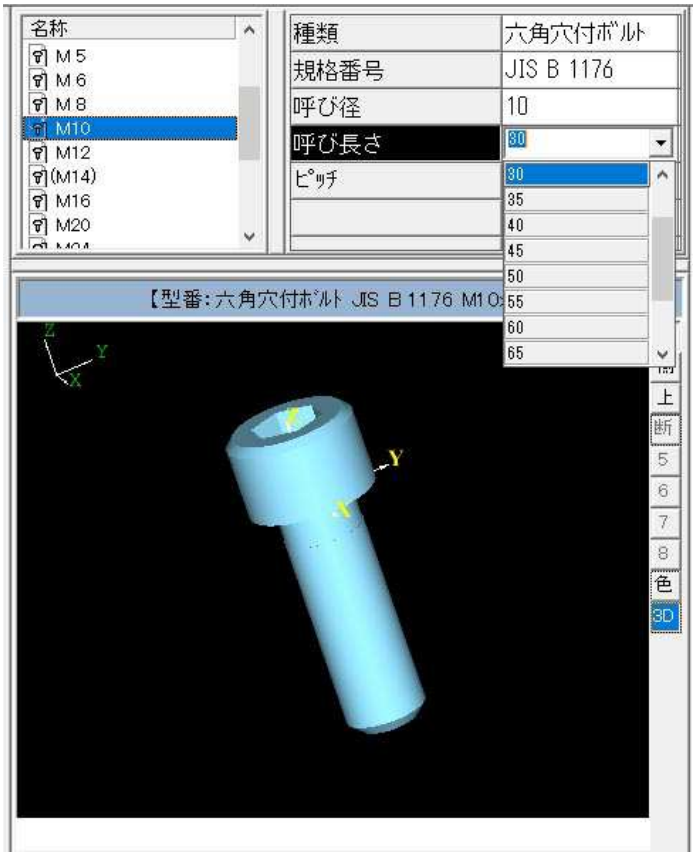



3D data can now be displayed and output for some metallic and non-metallic materials and machine element parts.

3D data is recorded in the part selection folder on the left where this sign  (XYZ bar display) is located.

There is a "3D" button at the bottom of each side button, so

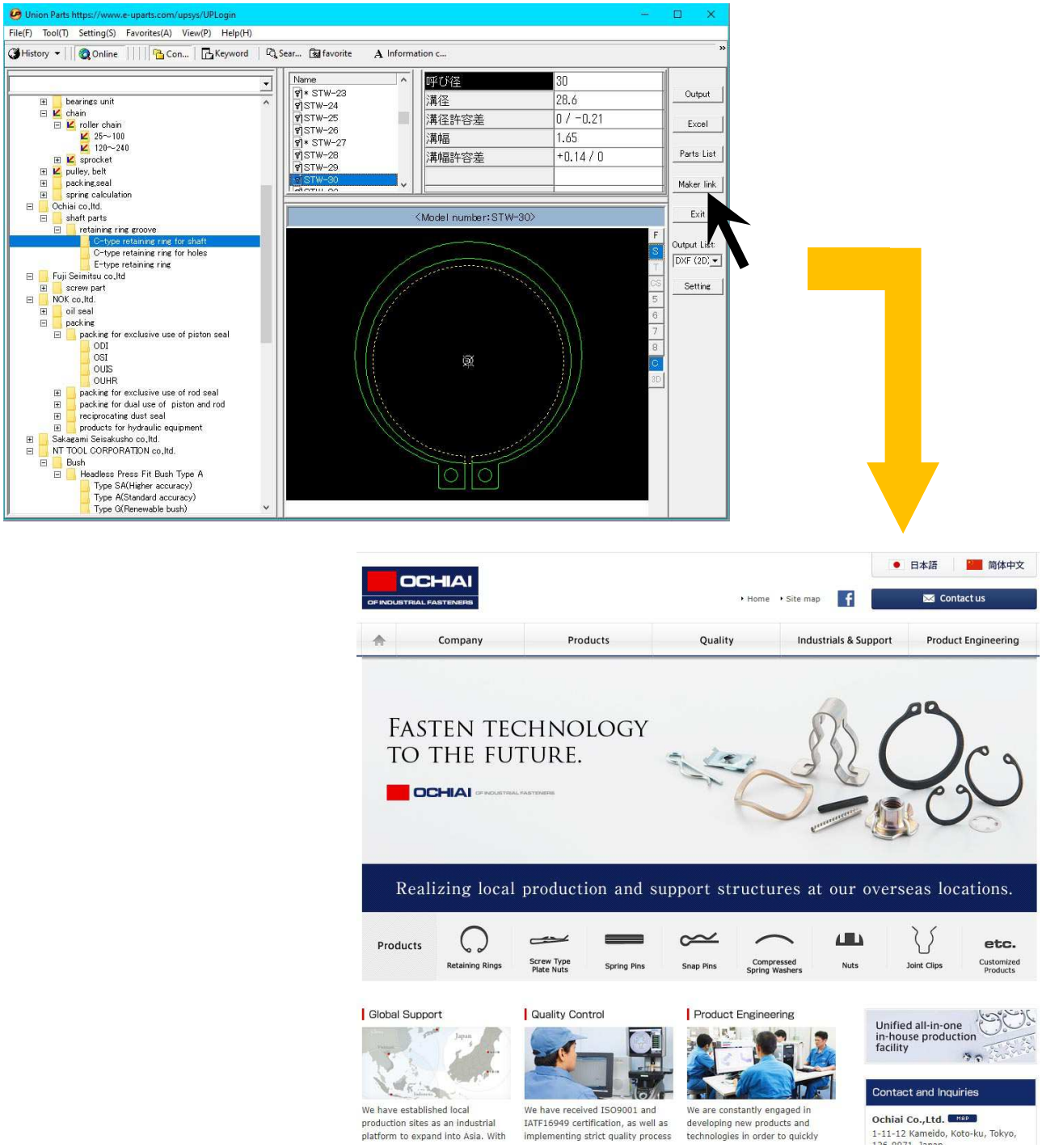
By clicking on it, 3D will be displayed in the drawing display field. 3D data can be output in sat and iges formats.



## 【8】Recording parts maker and maker link function

The selection folder for each part is linked to the manufacturer's website for that part. You can access various information such as the catalog of required parts, detailed specifications of the parts, and the model number description method specified by the manufacturer by accessing the manufacturer's site and knowing it with a simple operation.

Labor saving in mechanical design requires speedy browsing of the manufacturer's catalog. When selecting a union part, you can browse the catalog of that part at the same time.

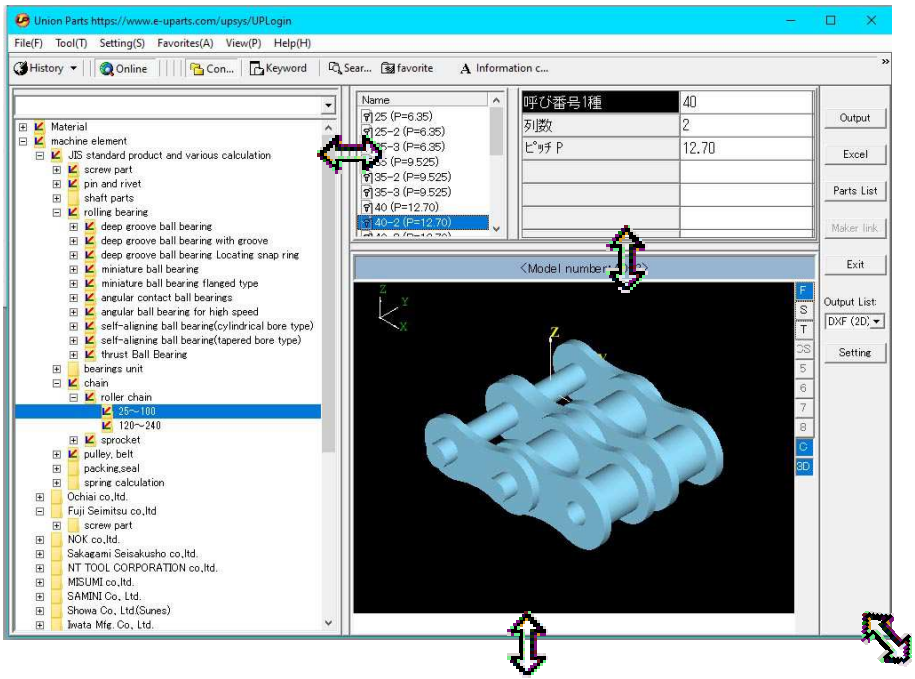


## 【9】Change the layout of the part selection window

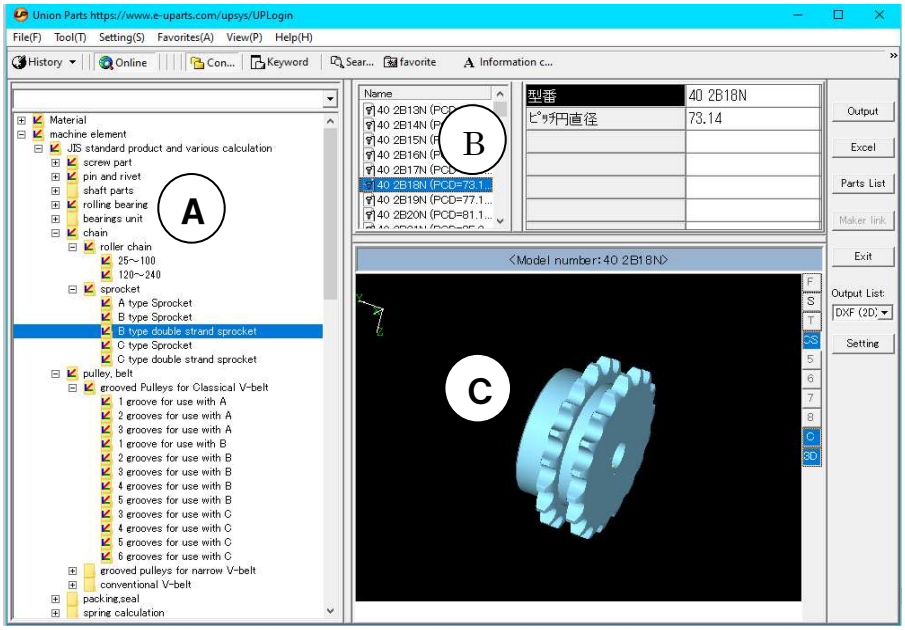
The layout of the parts selection screen can be changed by the user.
For example, you can enlarge the drawing display field or change the display position.

### ① Change the layout of each display field

When you place the mouse cursor on the partition line of each display column as shown in Fig. 7-1, an arrow ⇔ ⇕ will be displayed. You can change the position of the partition line by dragging the mouse in that state.



### ② Change the layout of each display field.

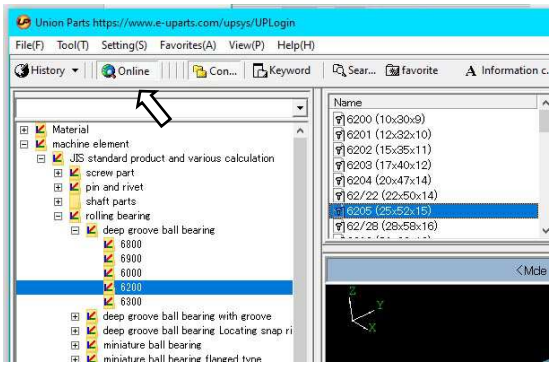



A ⇒ 1st parts list column

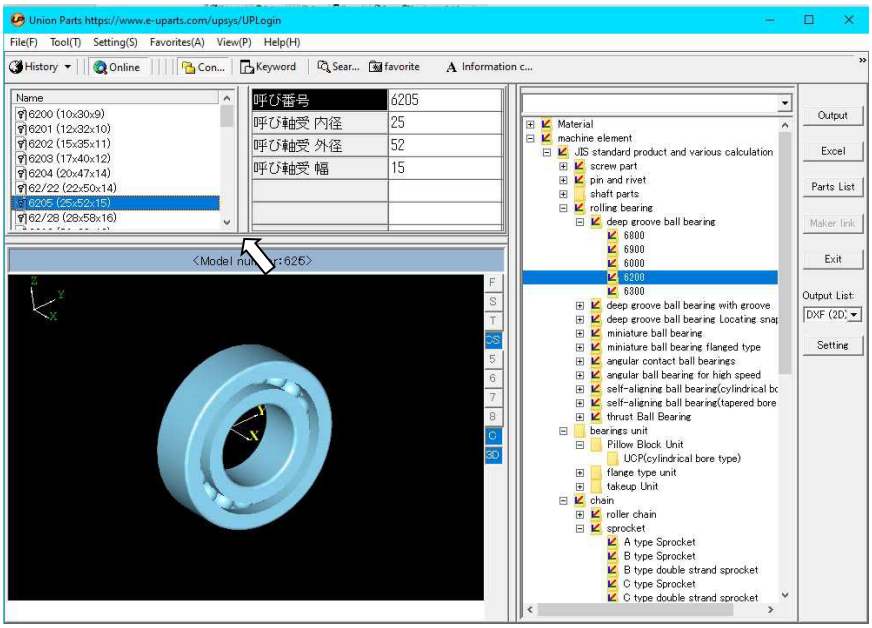
B ⇒ 2nd parts list column

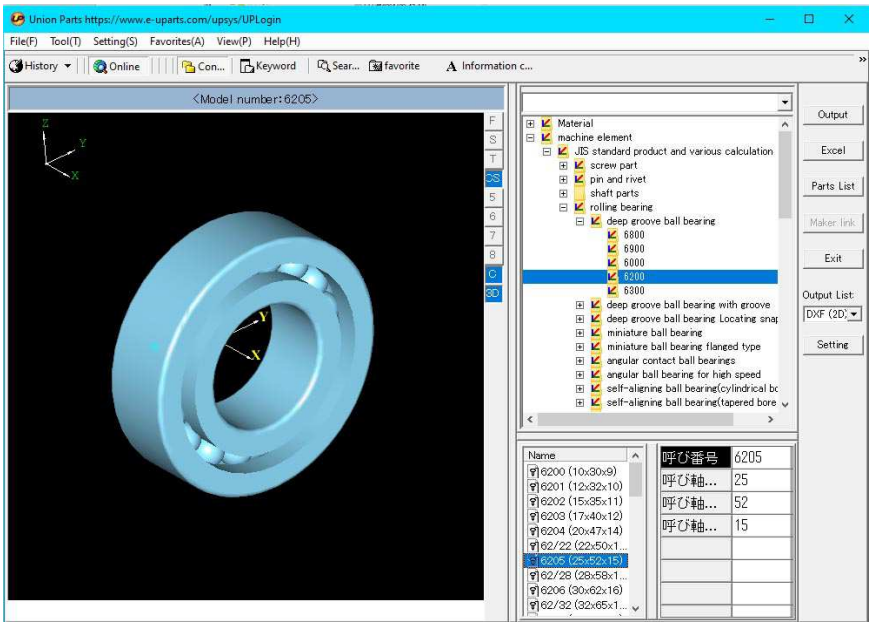
C ⇒ Drawing display Column

① At the top of the key entry field in the parts list (A)
Double-click as shown belowThe layout is switched with the first BOM on the right and the second BOM and the drawing display column on the left.



② If you double-click the model number display field (shown below) at the top of the drawing display field, the second BOM will move to the bottom of the first BOM, and the drawing display field will become larger as shown in Fig. 7-6. Double-click again to return to the original size。





## 【10】How to use a simple calculator

The simple calculator has a function that can execute the calculation according to the input calculation formula, and you can memorize any number of calculation formulas once entered and recall them at any time to recalculate. Various functions such as trigonometric functions such as SIN, COS and TAN and inverse trigonometric functions such as ASIN and ACOS are available.

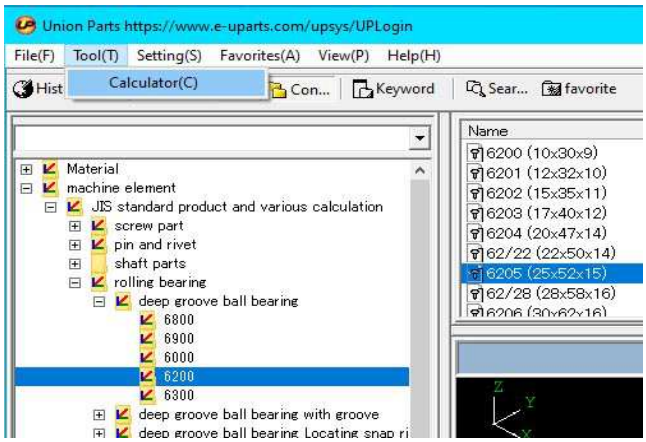



Fig10-1

If you specify [Tools]-[Simple Calculator] from the menu as shown in Fig. 10-1 above, the calculator shown in Fig. 10-2 will be displayed.

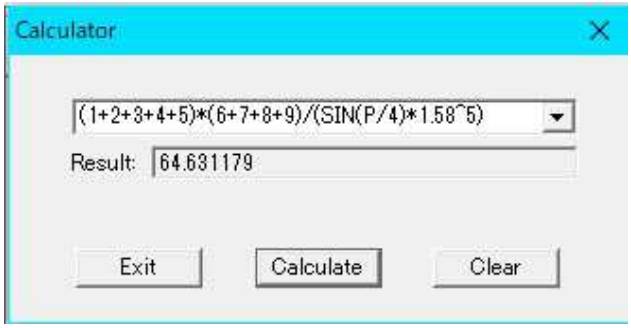



Fig10-2

Enter the calculation formula in the character input field of the calculator.。

**Calculation formula entry example**

(1 + 2 + 3 + 4 + 5) * (6 + 7 + 8 + 9) / (SIN (P / 4) * 1.58 ^ 5)

For example, if you enter the [ENTER] key or click the [Calculate] button after entering the key as described above,

The calculation result 64.631179 is displayed at the bottom as shown in Fig. 8-2.

In addition, the calculation formula entered at the same time as the calculation is stored in the memory. To recall the memorized formula, click to the right of the formula entry field. A list that is currently stored will be displayed, so specify it with the mouse.

## ◆ Operators and functions that can be used

The functions and operators that can be used in the simple calculator are explained below.
A function performs a fixed operation on a given argument and returns the result of the operation as a value.。

| 演算子 | 演算 | 例 | 実行順序 |
|---|---|---|---|
| ^ | Exponential operation | X ^ Y | 1 |
| ＊ | Multiplication operation | X ＊ Y | 2 |
| ／ | Division operation | X ／ Y | 2 |
| ＋ | Addition operation | X ＋ Y | 3 |
| － | Subtraction operation | X － Y | 3 |

Use parentheses () to change the order in which operations are performed.
Operators in parentheses are executed before other operators.
In parentheses, follow the normal execution order.

Also, PI and P contain pi, so if you need to use pi during calculation,
Please use PI or P in half-width characters.

| Functions that can be used | |
|---|---|
| SIN | Used as a sine unit radian |
| DSIN | Used as a sine unit degree |
| COS | Used as a cosine unit radian |
| DCOS | Used as a sine unit degree |
| TAN | Used as a tangent unit radian |
| DTAN | Used as a tangent unit degree |
| ASN | Used as an arc sign unit radian |
| ASIN | Used as an arc sign unit degree |
| ACS | Used as an arc cosine unit radian |
| ACOS | Used as an arc cosine unit degree |
| ATN | Used as an arctangent unit radian |
| ATAN | Used as an arctangent unit degree |
| ABS | Used as absolute |
| SQR | Used as a square root |
| INT | Round down to the nearest whole number |

## 【11】Mechanical design handbook

The Mechanical Design Handbook provides various information necessary for design.
It is recorded separately in [Numerical Data Material] and [Machine Design Official Collection].

◆ Numerical data data
Material-related (type of steel and its strength, etc.)
Axis related materials (key grooves, retaining rings, etc.)
Screw-related materials (bolts materials)
We will provide various information such as.

◆ Official collection of mechanical design
Various calculation formulas necessary for mechanical design are recorded so that you can actually enter numerical values and calculate.
It has been edited so that beam calculation and spring calculation can be performed with simple operations.
This mechanical design handbook was edited mainly by mechanical design engineers who have been involved in labor-saving mechanical design for many years.
We will continue to enhance the content in the future, so please use it to save labor in mechanical design.

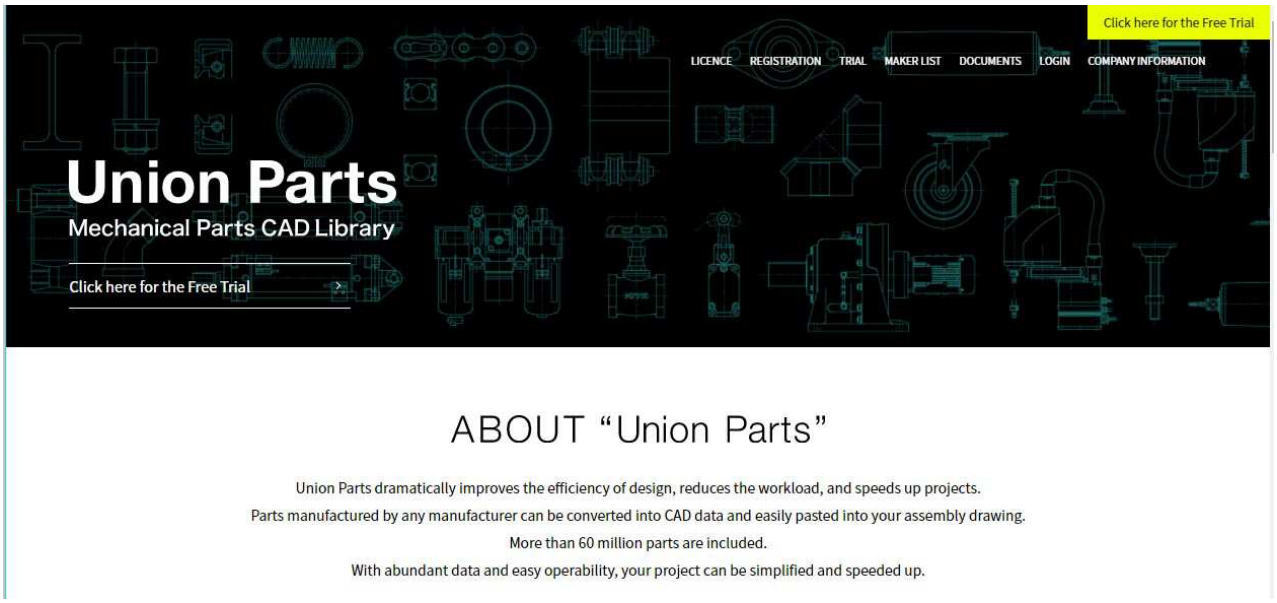



Fig 11-1

As shown in Fig 11-1, click [Mechanical Design Handbook / Calculation Formula] on the menu bar.The [Mechanical Design Handbook] on the Web is displayed.
Since the table of contents is arranged, the page opens by clicking the mouse.

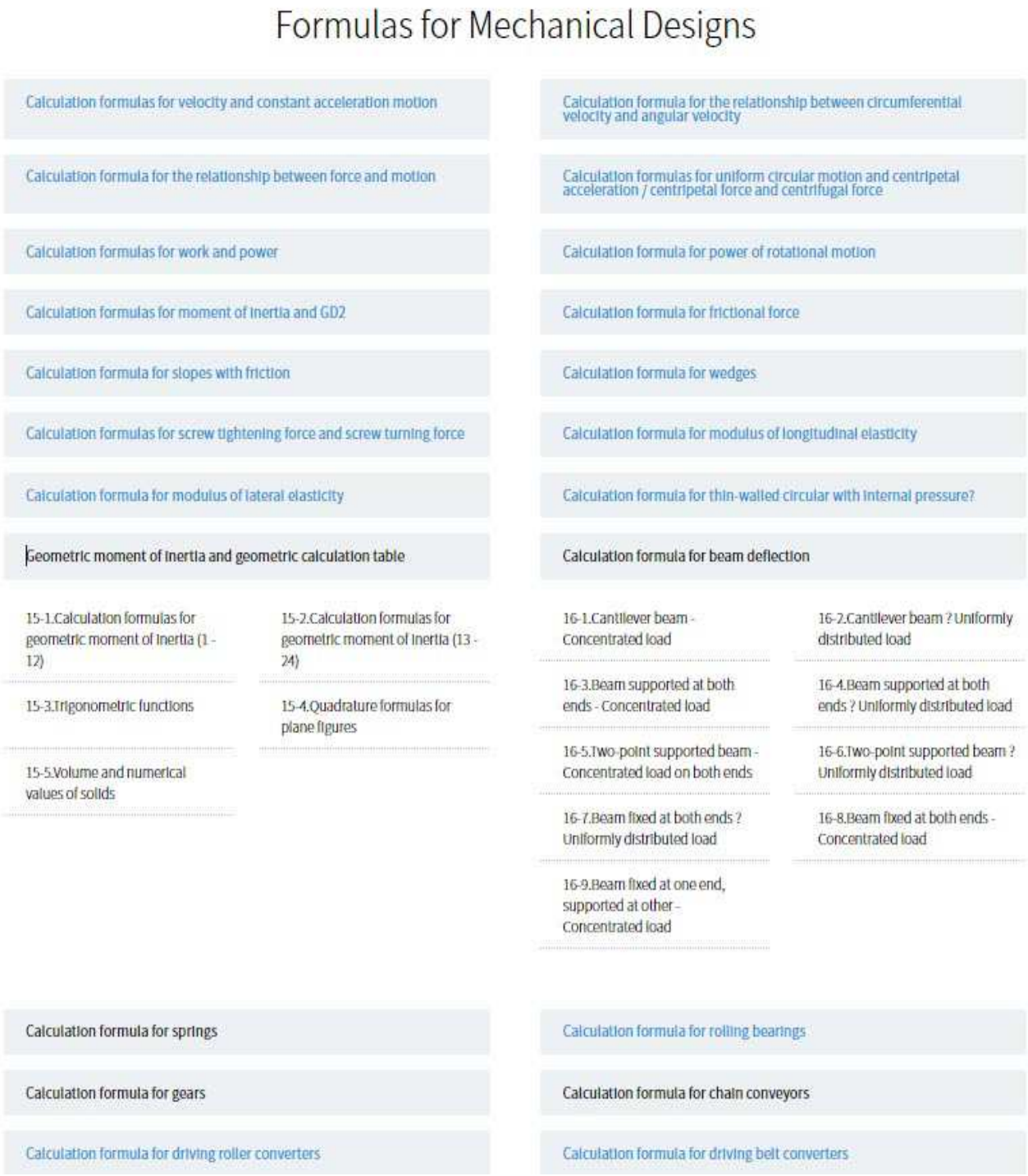



FIG11-2

If you open the "Mechanical Design Formula Collection" page, for example, [16-1. Cantilever Beam Concentrated Load] in [Calculation formula for beam deflection], Figure 11-2 will be displayed.

## 16-1. Cantilever Beam Concentrated Load

| 16-1. Cantilever Beam Concentrated Load | Symbol description and unit<br>Calculation クリア | |
|---|---|---|
| Maximum deflection : (mm)<br>δmax =1/3 * (W*L$^3$) /(E*I)<br>δmax =<br>3.890445066915655<br><br>Maximum deflection angle : (degree)<br>I max =1/2 * (W*L$^2$)*180 /(E*I*π)<br>I max =<br>0.3343591241426373<br><br>Maximum stress : (Kg/mm$^2$)<br>σmax =Mmax/Z=W*L/Z<br>σmax=<br>0.6127450980392157 | E : Young's modulus (Kg/mm$^2$)<br>Steel:21000、Stainless steel:19000 アルミ:7000、cast iron:10000 | 21000 |
| | I : Moment of inertia of area (mm$^4$) | 204000 |
| | Z : Section modulus (mm$^3$) | 81600 |
| | W : Load (Kg) | 50 |
| | L : Beam length (mm) | 1000 |

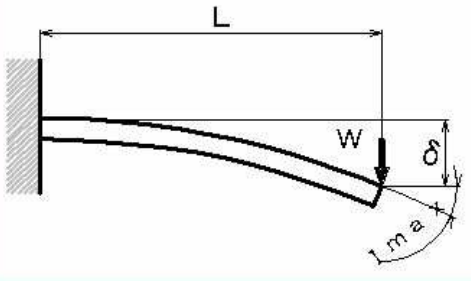



FIG11-2

Here, the amount of deflection when a 50 x 50 x 3.2 t square pipe is supported by a cantilever and a load of 50 kg is applied 1 meter ahead is calculated.

First, obtain the moment of inertia of area 20.4 cm4 and the section modulus 8.16 cm3 from [3] Dimensions and weight of metal material 3-6. General square steel pipe (square) in the numerical data data.

Since Young's modulus is steel, enter 21000.

The moment of inertia of area is 204000 mm4 when converted to millimeters, so enter the key.

The section modulus is 81600 mm3 when converted to millimeters, and is keyed in.

Enter 50Kg for the load and 1m for the beam length, so enter 1000mm and the result will be calculated.

The maximum deflection amount is about 3.89 mm, the maximum deflection angle is about 0.334 degrees, and the maximum stress is about 6.127 Kg / mm2. In this way, it is possible to easily calculate the Cantilever beam.