

ZW3D

Mold Standard Parts Library

Customization

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ZW3D[™] V2018 Mold Standard Parts Library Customization

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Contents

1	General	Introduction
	1.1	Insert MoldBase
	1.2	Modify MoldBase
	1.3	Insert General Standard Parts2
	1.4	Modify Standard Parts
	1.5	Customize Standard Parts
2	Standar	d Part Customization
	2.1	Associated File Location
	2.2	Custom Process of Standard Part
3	Case	
	3.1	Analyze the Standard Part
	3.2	Build up Variables for the Part
	3.3	Parametric Design
	3.4	Input Data
	3.5	Part Validation41

This tutorial aims to show how to customize mold standard part. So users can build up their own part library following this tutorial.

With ZW3D library tools, users can easily insert or modify mold bases and standard parts.



Figure1 Tools of Mold Standard Part Library

1 General Introduction

1.1 Insert MoldBase

Users can quickly insert a MoldBase from the MoldBase library. The library includes standard parts from various supplier, such as DME, FCPK, FUTABA, HASCO, etc.

V		7		0													
		•			🦉 Image 🛛 💡 🕮												
Supplier	upplier LKM		×	DD													
Туре		DME			FF												
Datum Mould series		FCPK FUTABA HASCO	D														
	_	RABOURDIN	ĸ	สา													
2025		ACT I	101														
2035 2040		Class	DA	•													
2045											Туре	I	•	Type: 1			
2325 2327														A	25	-	
2330														В	25	•	
2335 2340 2525		с	70	•													
2527 2530		SP	130	•													
				P !													

Figure2 Mold Base

1.2 Modify MoldBase

Users can modify an inserted MoldBase by "MoldBase Modify" command. For instance, users can easily change thickness of any plates.





ase Modify			
/ 🗙 🖸			
Component	MoldBase.	1	₫
List	Normal	Advanced	BOM
156x156	Item	Value	
156x246	TC	17	•
190x246 196x196	А	17	
196x296 196x346	В	17	
246x246 246x296	U	27	-
246x346 246x396	с	46	-
296x296		10	

Figure3 Mold Base Modify

1.3 Insert General Standard Parts

Use "General" command to add general standard parts, including cooling, screw, spring, ejector pin, guide, etc. from different suppliers.



Figure4 General Standard Parts

1.4 Modify Standard Parts

By this command, users can modify inserted standard parts to another size of the same series.





Modi	fy		Σ3	
5	✓ X		0	
1	Component M_8x20_0	01_1	₫	
Τ́-□	Normal Advanced	BOM		
-	Item	Value		
	Embed	Yes	-	
7	d	8	•	
	L	20	•	
	РВ	0		
2	Flip Direction	No	•	8

Figure 5 Standard Part Modification

1.5 Customize Standard Parts

In the library tab, user can use "Customize" command customize MoldBases and standard parts.

How to customize them? See the details below.

2 **Standard Part Customization**

This chapter will introduce how to customize standard parts. There are five steps to follow.

2.1 Associated File Location

There are three key files for standard part definition, model (Z3 file), data (Par file) and legend (png file). All these files are located in "ZWMold" folder of ZW3D installation directory.





C:\Program Files\ZWSOFT\ZW3D 2018 Eng (x64)\ZWMold					
Organize Include in library Share with New folder					
🔆 Favorites	Name	Date modified	Туре		
🧮 Desktop	퉬 Bin	7/5/2017 3:05 PM	File folder		
鷆 Downloads	鷆 Config	7/5/2017 3:05 PM	File folder		
🔚 Recent Places	鷆 Gate	7/5/2017 3:05 PM	File folder		
	鷆 Model	7/26/2017 4:42 PM	File folder		
ز Libraries	鷆 MoldBase	7/5/2017 3:04 PM	File folder		
Documents	퉬 Resource	7/5/2017 3:06 PM	File folder		

Figure6 ZW3D Installation Folder

All the models files (.Z3) are supposed to be in the "Model" folder. while the location of database files (.par files) and legend (.png file) are depended on different units, suppliers and types.



Figure 7 Structure Tree of the Files Location

2.2 Custom Process of Standard Part

Let's use a screw case to introduce the steps to customize standard part.

2.2.1 Preparation

Analyze the standard part before modeling, extract key parameters, and set different status for location and orientation of the model. Create a "pocket" shape for the standard part.

When we get the catalog of the screw, we get all main parameters of the screw. Experience tells us that the parameter "M" and "L" are the most important driven factors for the screw, so we select them as the key parameters.







Figure8 Legend of the Screw

We can set different location points for the screw according to different assemble methods.



Figure9 Embedding Types of the Screw

2.2.2 Variables Creation

Create Variables to drive dimensions of the standard part so that we can change the geometric shape and size of the model by changing value of variables.

Filter All		•		B20 B20	×I
Name			Expression		
📇 Part0	02				
•					
Variable Inp	ut				
Туре	Number *	Length	* Min	Max	
	1		mm *	Enlist	Dimensi
Name	L.				

The equation manager will help us to create variables for the screw.

Figure10 Create Variables in Equation Manager





Variable types : Variables are classified as four types (Number, String, Point, Vector)

1. Number: Number is a normal-used type. It provides many different kinds of sub-types. Each of them has different default unit.

Number	-	Length 🔹	Constant	no unit
		Constant	Length	mm
		Length	Angle	deg
		Mass	Mass	kg
		Density	Density	kg/mm^3
		Volume	Area	mm^2
		Mass Moment	Volume	mm^3
			Mass Moment	kg*m^2

Figure11 Variable Number Type

2. String/Point/Vector Variable

Туре	String *	Туре	Point *	Туре	Vector *
Name	Supplier	Name	Insert point mm 🔻	Name	SpecifiedVector
Expression	"ZW3D"	Expression	Point(0,0,0)	Expression	Vector(0,0,1)

Figure12 String/Point/Vector Variable

All variables will be listed in the equation manager.

Filter	All	•				😕 🐚 🗐 🔇
Nam	e	Expression	Value	Unit	Туре	
4 📇	Part002					
	π_ZMD_L	60	60	mm	Number	
	π_ Supplier	"ZW3D"	"ZW3D"		String	
	π Insert point	Point(0,0,0)	P(0,0,0)	mm	Point	
	<u>π</u> SpecifiedVe	Vector(0,0,1)	V(0,0,1)		Vector	

Figure13 Examples of Variable Types

Rules of Equations

1. Common Operators

"+"(Plus), "-"(Minus), "*"(Multiply), "/"(Divide), "^" (Power) E.g. A = -3 + 30 B = A/2





2. Common Functions

cos(), sin(), tan() ,abs(), sqrt(), ln(), log() E.g. C = 3*sin(30)

3. Logical Operation

"!"(logical negation), "&"(logical conjunction), "|"(logical disjunction) E.g. D=(!(C&1)=0) then 0 else 1

4. Conditional Operators

"<"(less than), ">"(greater than), "="(equal to) E = (D>0) then 15 else 5

5. Conditional Statement

(condition expression) then (expression1) else (expression2) E.g. F = ((C=1) & (D=1)) then 50 else 100

6. Others

"()"(bracket), used to change the calculation order. Equation in bracket will be run first. E.g. G=3, H=2, Formula1: I= G+H*2, Result: I=7 Formula2: I= (G+H)*2, Result: I=10

2.2.3 Parametric Modeling

During parametric design, we need to ensure that sketches are well-defined and all dimensions are driven by the variables.



Figure14 Well-defined Sketch

Refer to the followin g image to call variables in Sketch Level.



ZW 3D

	😵 Input Dimension Value	2 🖻 🕱
	Sketch1_d3 = [M_8x20_001:ZMD_L] ‡	π f(x)
• • • • • • • • • • • • • • • • • • •	Apply to This configuration 🔹	
	Solve manually	ОК
Double click on dimensions	Listed in Variable	Cancel
	🥸 Variable Browser 🗢 🖂	
20.00	Browsing this file	
//1	Part002.Z3 🔹	
4.00	Browsing this object	
- +	EquationSet1	
	Part Config -ACTIVE-	
- 6.50 - ·	Objects and variables	
, 0.00	ZMD M = 8	
	3 ZMD P = 1.25 ZMD L = 20	

Figure15 Call Variables in Sketch Level

How to call variables in part level, as shown in the image below.



Figure16 Call Variables in Part Level





Generally, the final part includes two solid shapes. One is the standard part model. Another is named "pocket", which is used for creating a pocket in intersected entities when inserting the standard part into an assembly.



Figure17 Final Modeling Result

Conditional Suppress

Sometimes, models are a little bit different even among standard parts of the same series.

Take the position locking block as an example, if the length is changed, the number of the thread holes will be changed. So how to achieve these different status in the same model?

We can use "Conditional Suppress" to manage some features. Firstly,define an expression for the specified features. When the expression is true, the specified features will be suppressed. Otherwise, features are not suppressed.





When the variable value (ZMd_A) is 26, the model result as shown in the image below.







Figure19 Suppressed Status

Skip To

"Skip to" also is used to suppress features. Users can skip continuous features to suppress them. Take this screw model as an example, we could use "Skip to" command to suppress the continuous features from "Sketch2" to "Chamfer1" by a conditional expression such as A=1. Once the condition is achieved, the defined features will be suppressed, as shown in the right image.



Figure20 Skip to Function

2.2.4 Input data

After finishing parametric design, users need to create a par file to record data for the standard part. The *.par file can be opened in notepad.

Step1: Create Par File



Launch ZW3D then create a new file. Click on "Customize" command in mold module. It will pop up a "Data Input" dialog. The folder path should keep the same as the files' location folder (Please refer to <u>chapter 2.1</u>)

Data Input		
Parameter File	Parameter Data	
Fold Path	File_Bom Components Parame	eters DataList
Bin Config Gate Model MoldBase Resource Runner Slider		
Reset Folder Path	1	
Add New File	D:\R2200\ZWMold	Save Close

Figure21 Data Input Interface

Double click on "Standard" listed in Folder path, then choose unit, supplier and type step by step. The whole path will be shown at the bottom of the window.

Click "Add new file" button, then a dialog will pop up for creating a new file.

	Add File
	New File Name 2 User_Screw
	OK Cancel
1 Reset Folder Path	The whole path is shown here
Add New File	C:\Program Files\ZWSOFT\ZW3D 2017 Eng (x64)\ZWMold\Standard\Metric\DME\User_Defined

Figure22 Create a New Par File

Click OK. A *.par file will be created in the specified folder.





C:\Program	Files\ZWSOFT\ZW3D 20)17 Eng (x64)\ZWMold\	Standard\Metric\DME\	User_Defined 🔻
Organize 🔻 Include ir	n library 🔻 🛛 Share wi	th 🔻 New folder		
☆ Favorites	Name	Date modified	Туре	Size
📰 Desktop ᠾ Downloads 🗐 Recent Places	User_Screw	11/10/2017 9:46 AM	PAR File	0 KB



Step2: Define Parameter Date

Here are four tabs in the data input dialog.

🔳 Data Input				
Parameter File	Parameter Data			
Fold Path	File_Bom	Components	Parameters [DataList
	File_Para	Value	Bom_Para	Value
	NormalImage		Name	
	AdvancedImage		Number	
	FileName		Class	
	PartName		Supplier	
	LanguageFile		Description	
	ТҮРЕ		Material	
User_Screw				
Reset Folder Path		4		4
Add New File	C:\Program Files\Z	WSOFT\ZW3D 20	17 Eng (x64)	Save Close

Figure24 Parameter Data Tab

1) File_Bom

A. File Parameters

This tab records part attribute likes file path, part name, standard type and so on.

Manually input file parameters in the specified format, as shown in the following image.





File_Bom	Components	Parameters		DataList			
File_Para	Value		Τ	Bom_Para		Value	
NormalImage	Image\M.p	ng		Name		M_ <zmd_m>x<zmd_l></zmd_l></zmd_m>	
AdvancedImage	Image\M.p	Image\M.png		Number		M <zmd_m>x<zmd_l></zmd_l></zmd_m>	
FileName	\\\Md	odel\ZWMScrew.Z	3	Class			
PartName	СВ			Supplier		DME	
LanguageFile				Description			
ТҮРЕ	STD_Screw			Material		DIN 912-12.9	

Figure25 File & Bom Parameters

Normal Image:

This image will be shown in the normal tab when inserting the part.

It supports short path and its whole path, please refer to the figure 6.



Figure26 Normal Image

Advanced Image: It could be the same as the normal image.



Figure27 Advanced Image





File name: z3 file name

Z3 file should be stored in "Model" folder. (Please refer to <u>chapter 2.1</u>.) It supports short path.

Part name: standard part name

In ZW3D, the part name could be different with the file name.

Man	ager					o X3	+ LKM_PP.Z3 ×
Filter	All		•	Preview	v Off	-	
Find				in	Name	•	file name
	Name		Т	ype	Last Modifie	d 🔺	
Supp	portPin		Part		1/19/2015 2:26	i	
Supp	portBush_S	itg	Part		1/7/2015 2:37:	2	
Supp	portBush_S	Shd	Part		1/7/2015 2:35:	5	
Scre	w_EC_E		Part		1/7/2015 2:51:	1	
Scre	w_BC_C	L	Part n	ame	1/7/2015 2:55:	D	
Scre	w_BC_B	Ľ	art fi	ame	1/7/2015 2:57:	3	
Retu	ırnPin		Part		1/7/2015 2:49:4	4	

Figure28 File Name and Part Name

Language File :

Support the short path, use the way "%ID" to specify string of the "ID" from the language file. You can set them with "config" command.

🐲 Mold Config	X 🖵
General Library	
Default Supplier	LKM
Path for Library's file	
D:\R2200\ZWMold	
Record state pocket	Autointersection
Use multi-lang in BOM	Edit Multi-Lang BOM
Standard Design Mode	Whole Assembly *
	OK Cancel Apply

Figure29 Multi-language in BOM





Type: standard part type in ZW3D

Such as: there are 16 types of Misumi standard part.

퉬 Cooling	鷆 Open
퉬 EjectorComp	퉬 PinGateBush
퉬 EjectorPin	퉬 Position
퉬 EjectorSleeve	퉬 RunnerLockPin
퉬 Guide	퉬 Screw
퉬 Insulation	퉬 Slider
퉬 Lifter	퉬 Spring
퉬 LocateRing	퉬 SprueBush

Figure30 Standard Part Types

To distinguish customized standard part from others, you could add the prefix "STD_" for type name. Such as: STD_Ejector/ STD_Guide/STD_Screw/ STD_EjectorPin/ STD_Cooling / STD_Sprue/ STD_Open/STD_Slide/STD_Lift

It easier to hide or show components based on this kind of type name. You can use the visibility command to decide which type should be hidden or shown.

Mold	V Component Visibility
Split Face Visibility Multi-Insert Stock Tools	

Figure31 Component Visibility

B. BOM Parameters

Name: the name of instance

The name consisted of the model number and part size is better. Take the screw for example, name it as M_<ZMD_M>x<ZMD_L>. ZMD_M and ZMD_L are the variables of the screw, when ZMD_M=4, ZMD_L=10, the name is M_4x10.

Note: The name doesn't support the "space" between the words.





Number: Number of order.

Class: It is Stand-by.

Supplier: Supplier of the standard part

Description: Description of the standard part

Material: Material of the standard part.

2) Component

ZWMold library includes standard parts and standard assemblies. The standard components include assembly and part file, assembly data and part data.

Let's take the MoldBase as an example.

🔳 Data Input			
Parameter double click to go for Fold Path checking the component data	Components P;	arameters DataList	
Components PartName	PartParName	The Other Parameters	assembly variable
GuidePin	Components\R02.par	ZMD_D1=ZMD_GP_Dia;ZMD_L<=ZMD_GP_	LeLI=ZMD_PLT_A_Thk;
Gui Bush_Sl	nd Components 4.par	ZMD_D1=ZMD_GP_DiaZMD_L=ZMD_PLT_	B_Thk;
Component name	g Component data fil	e MD_D=ZMD_GP_Dia D_L<=ZMD_GB_S	õtg_Len;
Barren Barr	Components (mipar	ZMD component variable 1D_L<=ZMI	D_SC_BC_B_Len;
Screw_TC_A	Components\M.par	ZMD/ID_L<=ZMI	D_SC_TC_A_Len;
Screw_EC_E	Components\M.par	ZMD_M=ZMD_SC_EC_E_Dia;ZMD_L<=ZMD	D_SC_EC_E_Len;
2A2B H PlateTC	Components\L30.par	ZMD_L=ZMD_MB_SZ_Len;ZMD_W=ZMD_N	//B_SZ_Wid;ZMD_T=ZMD_PLT_TC_Thk;
2A2B_I PlateBC	Components\L31.par	ZMD_L=ZMD_MB_SZ_Len;ZMD_W=ZMD_N	MB_SZ_Wid;ZMD_T=ZMD_PLT_BC_Thk;
PlateA	Components\L35.par	ZMD_L=ZMD_MB_SZ_Len;ZMD_W=ZMD_N	//B_SZ_Wid;ZMD_T=ZMD_PLT_A_Thk;
PlateB	Components\L41.par	ZMD_L=ZMD_MB_SZ_Len;ZMD_W=ZMD_N	MB_SZ_Wid;ZMD_T=ZMD_PLT_B_Thk;

Figure32 Components Tab

Note:

In the field of "The other parameter", there is at least but only one editable parameter on the left side of the equation. For example, "ZMD_L+ZMD_E>=ZMD_SC_EC_E_Len", if "ZMD_L" is an editable variable, "ZMD_E" can only be the "only-read" variable.

In this tutorial, the standard component is not the key point, so it is simply introduced here.

3) Parameters

In Z3 file, a lot of parameters created to drive the model. In this parameter tab, we need to create the same variables as those in Z3 file.





File_Bom	Components	Paramet	Parameters DataList					
Name	Title	Description	OnlyRe	ad	Advanced	Class	Options	Units
ZMD_R	R					0	1/8:1,1/4:2,3/8	-
ZMD_M	М		 Image: A start of the start of			0		-
ZMD_D	D		 Image: A start of the start of			0		-
ZMD_P	Р		 Image: A start of the start of			0		-
ZMD_L	L		 Image: A start of the start of			0		•
ZMD_SW	SW					0		•
ZMD_PK_On	Create Pocket				✓	0	Yes:1,No:0	-
ZMD_PK_Thd	PD				✓	0		-

Figure33 Parameters Tab

Name: the variable name

Title: displayed item name when inserting the part. If it is empty, it will keep the same as the variable name.

Description: Description of parameters

Only Read: If it is checked, the related parameters will be only read.

Advanced: If it is checked, the related parameters will exist in "Advanced" tab.

Class: It is Stand-by.

Options: You can define a simple "select statement",

For example, "Yes:1, No:0" which means, when inserting the part, if the users use "Yes", the variable equals to 1; on the other hand, if users use "No", the variable equals to 0.

Unit: variable unit

If it is empty, the unit is following the default unit, which is decided in system configuration.

🖗 Configuration		Σ3
General	General	
Part	One object per file (new files) Automatic file locking	
2D	Show hints Auto open error window	
Color	Save file without display data Confirm File/Save	
Background	Default layer name Layer0000	
Display	Max undo steps 75 🔽 Compact undo/redo Max undo memory (MB) 300 Direction key rotate speed	
Files	Default linear units mm 🔻	
CAM	Object tolerance (mm) 0.01	

Figure34 Default Units in Configuration





4) Data list

The tab shows all detail size values of part shape and pocket shape, as shown in figure 36.

File_l	File_Bom Compone		nts	Parameters		DataList			
Name	ZMD_R	ZMD_M	ZMD_D	ZMD_P	ZMD_L	ZMD_SW	ZMD_PK_On	ZMD_PK_Th	ZMD_PK_Th
8	1,	1	9.728	0.907	8	5	1	8.6	2.5
4	2,	1	13.157	1.337	10	7	1	11.4	2.5
3	З,	1	16.662	1.337	10	8	1	15	2.5
10	4,	10	1	1	8	5	1	8.5	2.5
2	5,	1	20.995	1.814	10	10	1	18.6	2.5

The titles of the data list are inherited from the "parameters" tab, as shown in figure 34.

Figure35 Data List

Rules to data input

• According to different formats, the variables can be classified into five types: main parameter, selectable parameter, editable parameter, "only read" parameter and advanced parameter.

Fil	Main Dat	a	nents	Parame	ters	DataLis	t	
Name		ZMD	L		ZMD_H	ZMD_H	D	pocket
SC 1	4	10,11	,12,13,14,	,15,	5~100	D+4		1
SC 2	5	10,11	,12,13,14,	,15,	5~100	D+5		1
SC 3	6	10,11	,12,13,14,	,15,	5~100	12+6		1
SC Sol	octable D		,12,13,14,	,15,	5~100	16		1
sc			,12,13,14	Editable	Data	20		1
SC 6	12	10,11	,12,13,14		Jala	24		1
SC 7	16	10,11	,12,13,14,	,15,	5~100	30		1
SC 8	20	10,11	,12,13,14,	,15,	5~100	36		1

Figure36 Main/Selectable/Editable Paramater

Main parameter:

Select the different main parameter value to get the different standard part. So normally, there is only one parameter as main parameter.

Selectable parameter:

Use comma to separate the values. All available values are listed in the drop-down box.

Editable parameter:

Users can directly edit the value when inserting the standard part. In the data table, you can



use "~" to define a range of the input data. For example, if you define the ZMD_N ("40~140"), the input value should be between 40 and 140. Otherwise it will hint that the value is invalid.

File_Bor	n Com	ponents	Parameters	DataList		
Name	Title	Description	OnlyRead	Advanced	Class	Options
ZMD_D	Dia				0	
ZMD_L	Length				0	
ZMD_H	Head H				0	
ZMD HD	Head Dia				0	
pocket	Pocket			✓	0	Yes:1,No:0

Figure37 "Only Read" and "Advanced"

"Only read" parameter:

The "only read" parameter allows us to use equation to replace the single value.

Name	Title	Description	OnlyRead		
D	Dia			ZMD_HD	
L	Length			ZMD_D+4	
н	Head H			ZMD_D+5	
HD	Head Dia		I	ZMD_D+6	

Figure38 "Only read" Parameter

Advanced Parameter:

The default value of the advanced parameters could be the same.

Name	Title	Description	OnlyRead	Advanced	pocket
ZMD_D	Dia				1
ZMD_L	Length				1
ZMD_H	Head H		~		1
ZMD_HD	Head Dia		~		1
pocket	Pocket			~	 1

Figure 39 Advanced Parameter

2.2.5 Verify

Finally, we should check if all inputted data are correct.

The normal way to verify data is to insert the standard part in different sizes for checking.





Normal	Advanced	BOM	
1	tem	Value	
ZMD_H		Yes	-
ZMD_P		0.4	-
ZMD_W		8	-
ZMD_D		3 4	
ZMD_L		5 6	
ZMD_N		8 10	
		12 16 20	

Figure40 Verify Data

Check if other options like "pocket" and "embed" work or not.



Figure41 Check Special Options





3 <u>Case</u>

Next, we will learn how to customize a standard part from the position locking block "LBCS" of MISUMI.

Here are legends for the position locking block.



Figure42 Legend for the Position Locking Block

And its standard parameters

■Inlay part H=4mm

н	a	l	l1	dı	d2	t	Part Nur Type	nber	Т										Α								G" 1 increments	
									10	13	15	18	23	28	33	38	48										5~33	
	6	6	13	9.5	5.5	6		20	15	12	15	10	22	20	22	20	40	50									5~24	
									20	13	10	10	23	20	33	30	40	30									5~18	
							,			10			18	23	28	33	38	48	58	68	78	88	98					5~33
	7	10	17	44	65	7		25	15			18	23	28	33	38	48	58	68	78	88	98	108				5~33	
	'	10	"		0.5	'		23	20				23	28	33	38	48	58	68	78	88	98	108				5~26	
									25																		5~21	
									15																		5~33	
	8	13	21	14	9	9		30	20						33	38	48	58	68	78	88	98	108	118	128		5~31	
									25																		5~26	
4							LBCS		30																		5~22	
									25							38	48	58	68	78	88	98	108	118	128		5~28	
	10	15	24	17	11	11		35	30																		5~24	
									35								48	58	68	78	88	98	108	118	128		5~21	
								<u> </u>	40																		5~18	
									30									58	68	78	88	98	108	118	128	138	5~26	
	13	17	27	19	14	13		40	35																		5~24	
									40										68	78	88	98	108	118	128	138	5~21	
								<u> </u>	40																		5~19	
									30																		5~28	
	16	23	33	25	18	16		50	30											78	88	98	108	118	128	138 148	5~24	
									40																		5~21	
									40																		5~19	

Figure 43 Standard Parameters





3.1 Analyze the Standard Part

Firstly, we should analyze the model, how it is assembled with other components. Then set the location face and location point.



Figure44 Location Face and Point

The Location plane is an inclined plane. So, the plane's negative normal should be the same as the Z axis, and the original point should be the center point of the contact face.

When variable "A" is in different range, the number of threaded holes could be changed. To fulfill this requirement, we need to create a model with maximum number of the screw, then we can easily switch it to another mode by using "Conditional Suppress".



Figure 45 Number of Threaded Holes

3.2 Build up Variables for the Part

Step 1. Create a new file

Launch ZW3D, click on "New" command to create a new file named "LBCS".





Step 2. Create variables

Tool ribbon tab -> Equation Manager

According to the "LBCS" parameter list, we should create corresponding variables. The results are listed below. After finishing defining variables, click "OK" to close the equation manager.

💱 Equation Manag	er				Π Σ
Expression List					
Filter All	•				
Name	Expression	Value	Unit	Туре	
🔺 🚣 LBCS					
<u> </u>	108	108	mm	Number	
T_ZMD_G	18	18	deg	Number	
T_ZMD_T	20	20	mm	Number	
<u> </u>	30	30	mm	Number	
<u>π</u> ZMD_t	9	9	mm	Number	
T_ZMD_d2	9	9	mm	Number	
<u>π</u> ZMD_d1	14	14	mm	Number	
<u>π</u> ZMD_l1	21	21	mm	Number	
<u>π</u> ZMD_I	13	13	mm	Number	
<u>π</u> ZMD_a	8	8	mm	Number	
π_ZMD_H	4	4	mm	Number	

Figure46 Variable List

3.3 Parametric Design

Step 3. Create the main shape of position locking block

Use the "Sketch" command to create a sketch. Define negative X axis as the UP direction and set the YZ datum as the plane to align the sketch. The sketch result is shown in the image below.



Figure47 Basic Sketch





Add dimensions and constraints to make sure every dimension is driven by the parameter.



Figure 48 Define the Dimension by the Parameter

Use the same way to define other dimensions, the final sketch should be well-defined.



Figure49 Final Sketch





Back to the part level. Open equation manager, then you will find all sketch dimensions are listed in the equation manger.

Expression List					
ilter All	•			D2 D2	M 🗘
Name	Expression	Value	Unit	Туре	4
_π_ZMD_d2	9	9	mm	Number	
<u>π</u> ZMD_d1	14	14	mm	Number	
_π_ZMD_I1	21	21	mm	Number	
T_ZMD_I	13	13	mm	Number	
π ZMD_a	8	8	mm	Number	
<u>π</u> ZMD_H	4	4	mm	Number	
4 🧭 Sketch1					
💾 Sketch1	_d0 ZMD_G	18	deg	Number	
💾 Sketch1	_d1 ZMD_T	20	mm	Number	
💾 Sketch1	_d2 ZMD_I	13	mm	Number	
💾 Sketch1	_d4 ZMD_L	30	mm	Number	
📥 Sketchi	_d5 ZMD_H	4	mm	Number	

Figure 50 Sketch Dimension in Equation Manager

Extrude the sketch to get the main body, set the parameter as shown in the image below.



Figure51 Extrude Sketch

Step 4. Create center hole

Shape Ribbon Tab->Engineering Feature -> Hole command

Refer to the following image to define this center hole.





▼ Required	Smart Point Ref
Type General hole	K Dynamic Pick
	Middle Alaka
▼ Hole Alignment	Between
Face F4 🚺 💆	U Offset
Direction 🛛 🕹 🝷	Coffset Distance
▶ Boolean	Along
▼ Hole Specification	Angle
Hole shape Counter-Bore	
	✓ Offset Distance
* Specification	
	▼ Required 4
D1	
	Direction).30902,-0,0.95106 🛠 💆 👻
	Distance ZMD_l1 mm 🗘 💆 🔹
D2 ZMD_d1 mm ‡ # *	
H2 ZMD_t mm ‡ π +	
Dia (D1) 8.75 mm 🗘 👲 🔻	
End Thru-All 🔻	



Firstly, pick the bottom face as the base of hole feature. And then define the location point by "Offset-Distance" method which is driven by the variable (ZMD_l1).

The hole type is Counter-Bore. It is also driven by the variables (ZMD_d1 and ZMD_t). The result is shown in the figure below.



Figure53 Center Hole

Step 5. Create side holes

With the similar way to create one side hole. Refer to the image below to set the parameters.

Then mirror the hole feature by XZ datum.







Figure 54 Create the Side Hole

The following image shows the result.



Figure 55 Result of the Side Holes

Step6. Add fillet and chamfer

Pick one edge to add the fillet (R=2mm), then pick four edges to create the chamfer (C=0.5mm).

The result is shown as the following image.







Figure 56 Add Fillet and Chamfer

Step7. Save the file

Save the file into the "Model" folder in "ZWMold" directory. The default path is as below



Step 8. Suppress center hole

Firstly, let's review the standard part parameters and find that the model is changed with one variable A. (variable name is ZMD_A.) It can be achieved by "Conditional Suppress" function.



Figure 58 Standard Part with Different Status



Figure 59 Conditional Suppress



ZW BD

Generally, select the feature and then define the expression. When the expression is true, the feature will be suppressed.

Check the hole1, input expression "(ZMD_A>27)&(ZMD_A<99)", which means that when the value of ZMD_A is from 28 to 98, "Hole1" will be suppressed.

The current value of ZMD_A is 108, so the expression is False, the hole1 is not suppressed.

😨 Conditional Suppression 🗢 🗴				23		9	$\overline{\nabla}$	23		
Filter	All	*		\bigcirc]	Filter	All	•		\bigcirc
	Feature	Expression	State				Feature	Expression	State	
	YZ						YZ			
	Sketch1						Sketch1			
	Extrude1_Base			=			Extrude1_Base			
\checkmark	Hole1	1	_			1	Hole1	(ZMD_A>27)&(ZMD_A<99)	False	
	Hole3						Hole3			
	Hole2			Ŧ			Hole2			•
P	ick with depende	ncy				P	ick with depende	ency		
🗆 P	ick with same exp	pression				P	ick with same ex	pression		
Appl	y to This confi	guration 🔹				Appl	y to This conf	iguration 🔹		
Expre	ession (ZMD_A>	27)&(ZMD_A<99) 2	Apply 3	Α]	Expr	ession (ZMD_A>	27)&(ZMD_A<99)	Apply	Α
		OK Cancel						OK Cancel		

Figure60 Conditional Suppression of Center Hole

Check the history manger. The feature with conditional suppression has the different marker.

Expression(13)
<u>π</u> ZMD_A = 108 mm
π ZMD_G = 18 deg
π ZMD_T = 20 mm
π ZMD_L = 30 mm
π ZMD_t = 9 mm
π ZMD_d2 = 9 mm
π ZMD d1 = 14 mm
₩_72 \= 22
🗹 🎯 Sketch1
Sketch1
Sketch1 Extrude1 Base Hole1
Sketch1 Sketch1 Strude1 Base Hole1
Sketch1 Sketch1 Sketch1 Hole1 Hole3 Hole2
 Sketch1 Extrude1 Base Hole1 Hole3 Hole2 Mirror1
Sketch1 Extrude1 Base Hole1 Hole3 Hole2 Mirror1 Fillet1







Step 9. Suppress side holes

In the same way, we can quick set "Conditional Suppress" for the "Hole2" and "Mirror1". The expressions are shown as below.

😨 Conditional Suppression 🗢 😒										
Filter	All	•		0						
	Feature	Expression	State							
	Sketch1									
	Extrude1_Base									
	Hole1	(ZMD_A>27)&(ZMD_A<99)	False							
	Hole2	ZMD_A<28	False							
	Mirror1	ZMD_A<28	False	≡						
	Fillet1									
	Chamfer1			•						
			•	,						

Figure62 Conditional Suppress for Side Holes

The current value of ZMD_A is 108, so the expressions are false. "Hole1" and "Mirroe1" features arebe marked as the "Conditional Suppress" features, but not in the suppress state.

🗹 🗄 XY	
🗹 🔚 XZ	
🗹 🚼 YZ	
🗹 🎯 Sketch1	
🗹 🧊 Extrude1_Base	
🛃 🚺 Hole1	
🛃 🚺 Hole2	
🛃 🧼 Mirror1	
🗹 🌍 Fillet1	
🗹 🌭 Chamfer1	
🖛 MODEL STOP HERE	

Figure 63 Hole2 and Mirror with Conditional Suppression

Step 10. Check the availability of the "Conditional Suppress"

Double click on "ZMD_A=108" equation and change the value to 60.

Then click "Regen" command on the top left corner of the software. The "Hold1" is suppressed, and the model has been updated. The "Conditional Suppress" works.





🔺 🛅 History	
🗹 🔚 XY	
🗹 🚼 XZ	
VZ	
🗹 🥯 Sketch1	
🗹 🧊 Extrude1_Base	
🖪 🛄 Hole1	X
Hole2	
Mirror1 Now the "Hole1"	
S suppressed	
🗹 🍥 Chamfer1	
MODEL STOP HERE	

Figure64 Standard Part with ZMD_A=60

In the same way, change the value of ZMD_A to 20, then regen the model.

The "Hold2" and "Mirror1" suppressed. The "Conditional Suppress" works. Save the file.



Figure65 Standard Part with ZMD_A=20

Step 11. Create variables for pocket

Open "Equation Manager".

Create a variable of the constant type, named "ZMD_PK_On", set its value as "1". Add some description: "1" means pocket is on, "0" means pocket is off". It is used for switching pocket states.

-Variable Input										
Туре	Number Constant Min	Max								
Name	ZMD_PK_On	Enlist Dimension								
Expression	1	AX 🗄 🛅 fw								
Descriptior	"1" means pocket is on, "0" means pocket is off	✓ X								

Figure66 Variable ZMD_PK_On





Create a variable "ZMD_PK_R", set its value as "3". Describe it as "angle-clearing radius".

Variable Input									
Туре	Number 🔻 Length 💌 Min	Max							
Name	ZMD_PK_R mm *		Enlist Dimension						
Expression	3	K	🗄 📶 f(x)						
Descriptior	angle-clearing radius	~	×						

Figure67 Variable ZMD_PK_R

Step 12. Create the main shape of the pocket

Draw the sketch2. Select YZ datum to align the sketch and set -X axis as the UP direction.

Refer to the standard part to draw the pocket sketch, as shown in the image below.



Figure68 Well-defined Sketch for Pocket

Extrude the sketch with symmetrical type. Extruded value is ZMD_A/2+1.5(mm).



Figure69 Pock Model





Step 13. Change the display attribute of the pocket

Right click on the pocket shape then select the "Face Attributes".

Change face color and transparency.



Figure 70 Change Face Attribute for the Pocket

Step 14. Create pocket for insert-portion

Pick the top face of standard part as the plane of new sketch.



Figure71 New Sketch Plane





Select "Reference" command, then define the reference curves by picking four edges, as shown in the image below.



Figure 72 Define the Reference Curves

Pick them all, then right click.

Use "Toggle Type" to change the reference curve (construction geometry) to 2D geometry.



Figure73 Toggle Reference Curve Type

Next, create the clear corners.

Firstly, create two construction lines, as shown in the image below. The angle of horizontal line and construction line is 45°. And length is dirven by the expression (ZMD_PK_R- Gap value). Generally, Gap value is from 0.5 to 1mm.







Figure74 Constrction Lines

Create the circles on the end point of the construction lines, which radius both are ZMD_PK_R.



Figure75 Circles

Then, mirror these two circles with X axis. At last, create a trace profile by picking outside geometry with "Trace Profile" command.







Figure76 Trace Profile

After finishing the sketch, extrude the sketch and combine it with pocket shape. Set parameters as below.



Figure 77 Extrude the Sketch and Combine with Main Pocket Shape

Step 15. Specify the tag for pocket

Right click on the pocket shape, then click "Attach Name Tag to Entity" command.

Name "Pocket" to created pocket shape.

At last, blank the pocket shape and save the file.







Figure 78 Name Pocket to Pocket Solid

3.4 Input Data

Before inputting data, we need to create a new folder to save the files.

■Inlay part H=4mm d2 t Part Number G H a l l1 d1 Т A f increments 13 15 18 23 28 33 38 48 10 5~33 20 15 ·24 5 6 6 13 9.5 5.5 6 13 15 18 23 28 33 38 48 58 20 5 -18 10 18 23 28 33 38 48 58 68 78 88 98 5~33 18 23 28 33 38 48 58 68 78 88 98 108 15 5 -33 7 10 17 11 25 7 6.5 20 File_Bom Components Parameters Datalist 25 15 Title Name Description OnlyRead Advanced Clas: 20 8 13 21 14 ~ 9 9 30 ZMD_H н Г 0 25 30 ~ ZMD_a Г 0 a 4 LBCS ~ r. Г 25 ZMD_I 0 ~ Г 30 ZMD_l1 11 0 10 15 24 17 11 11 35 35 ~ ZMD_d1 d1 0 40 ~ ZMD_d2 d2 0 30 ~ ZMD_t Г 0 t 35 13 17 27 19 14 13 40 Г Г 40 ZMD_L 0 L 45 т ZMD_T 0 30 Г ZMD_A А 0 35 16 23 33 25 50 18 16 Г Г ZMD_G G 0 40 ~ ZMD_PK_On Create Pocket 0 45 ZMD_PK_R PR ~

Review the parameter table.

Figure 79 Parameter Table

"L", "T" and "A" are the selectable parameters, "G" is the editable one, the others are the "only-read" parameters. So, the order of them is as below.



Let's follow the below steps to input data.

Step 1. Create the whole file path for the component

Create a folder named "ZW Standard", then create a folder named "Slider" inner it to settle down the par file. Create a folder named "Image" inner the "Slider" to save the image file.

The final path is as below shown.



Figure80 Path of Slider and Image

Step 2. Create a new par file for inputting data

Launch ZW3D, create a new file. Use "Customize" command ^{Customize} in the mold module to input data. Find the "Slider" file path, as shown in the figure below.



Figure81 Access to Right Folder Path

Step 3. Click "Add New File" button to create a new file named "LBCS"

	Add File
	New File Name 2 LBCS
	OK Cancel
Reset Folder Path	
Add New File	D:\Program Files\ZWSOFT\ZW3D 2018 Eng (x64)\ZWMold\Standard\Metric\ZW Standard\Slider

Figure82 Create a New Par File





Click "OK", the result is as below. And the *.par file has been created in the "Slider" folder.

Data Input Parameter File	Parameter Data				Standard Metric ZW Standard Slider
	File_Bom	Components	Parameters DataLis	st 🛛	library ▼ Share with ▼ New folder
Image	File_Para	Value	Bom_Para	Value	Name
	NormalImage		Name		👔 👔 Image
	AdvancedImage		Number		IBCS
	FileName		Class		
	PartName		Supplier		
I BCS	LanguageFile		Description		
LDCJ	ТҮРЕ		Material		
Reset Folder Path Add New File	C:\Program Files\ZV	VSOFT\ZW3D 2018	Eng (x64)\ZWMold\Standar	‴► d\Metric\ZW Standard\Slide	er

Figure83 Created Par File

Step 4. Manually input parameter data

Assign the image, file name and part name, set the type of standard part and fill BOM information, as shown in the figure below.

-	Parameter Data								
Γ	File_Bom	Components Paramete	en	s Data	List				
			1 6						
	File_Para	Value		Bom_Para	Value				
	NormalImage	Image\LBCS.png		Name	LBCS_ <zmd_a>x<zmd_l>x<zmd_t></zmd_t></zmd_l></zmd_a>				
	AdvancedImage	Image\LBCS.png \\\Model\LBCS.Z3 LBCS		Number	LBCS_ <zmd_l>-<zmd_t>-A<zmd_t>-G<zmd_g></zmd_g></zmd_t></zmd_t></zmd_l>				
	FileName			Class					
	PartName			Supplier	MISUMI				
	LanguageFile			Description					
	ТҮРЕ	STD_Slide		Material	SKS3				

Figure84 Parameter Data

"Name" is the instance name of the part.

"Number" can refer to the booking method of MISUMI, like the below image shown.



Figure85 Name Format Sample

Step 5. Create parameters for variables

In parameter tab, create the same parameters with variable name defined in standard part.





💱 E	quation Manager											
Expression List					File_Bom	Con	nponents	Parameters	Data	aList		
Filter	All	•		1	Name	Title	Description	OnlyRead	Advanced	Class	Options	Units
Nan	ne	Expression	Value	L	ZMD_T	Т				0		•
4	LBCS			1	ZMD_L	L				0		-
	<u>π</u> ZMD_A	20	20	I.	ZMD_t	t				0		-
	<u>π</u> ZMD_G	18	18	I.	ZMD_d2	d2		~		0		-
	_π_ZMD_T	20	20	ŧ.	ZMD d1	d1		V		0		-
	<u>π</u> ZMD_L	30	30	J.						•		
	<u>π</u> ZMD_t	9	9		ZMD_II	11				0		
	_π_ZMD_d2	9	9	L	ZMD_I	I				0		-
	<u>π</u> ZMD_d1	14	14	I.	ZMD_a	а				0		-
	_π_ZMD_l1	21	21	I.		Δ				0		-
	<u>π</u> ZMD_I	13	13			-				•		
	<u>π</u> ZMD_a	8	8	I.	ZMD_G	G				0		-
	<u>π</u> ZMD_H	4	4	L	ZMD_H	Н				0		<u> </u>
	工 ZMD_PK_On	1	1		ZMD_PK_On	Pocket				0	Yes:1,No:0	-
	<u>π</u> ZMD_PK_R	3	3	ų	ZMD_PK_R	PR				0		-

Figure86 Variables VS Parameters

The "ZMD_L", "ZMD_T", "ZMD_A" and "ZMD_G" are not the "Only Read" parameters, the "ZMD_PK_On" and "ZMD_PK_R" are the advanced parameters.

Step 6. Fill the data list

In DataList tab, input parameter value according to the data from MISUMI. Then save it.



Figure87 Input Parameter Value in Data List





3.5 Part Validation

Use "General" command to insert the standard part into the model for checking.

Select "ZW Standard" as the supplier, "Slider" as the category, and "LBCS" as the type. Then, define the insertion face & insertion point and other parameters.

🧨 General		23	👰 Image 🛛 💡 🐹
🗸 🗶 🖪		0	
Supplier	ZW Standard	*	(inlay part)
Category	Slider	-	
Туре	LBCS	•	0.0
Insert face	F43@PlateA		
Insert point	1 picked	՝ 🖉 י	
Intersect entity	2 picked	×	
Direction		V 👲 -	
Pocket color	from part		
		1	
Normal Adv	anced BOM		
Item	N	alue	
Т	10	•	insertion
L	20	-	face & point
A	13	•	
G	5		

Figure88 Insert the Slider

Define the normal parameters and advanced parameters.

Normal	Advanced	BOM		Normal	Advanced	BON
ŀ	tem		Value	It	em	
т		10	-	Pocket		Yes
L		20	-	PR		3
А		40	-			
G		18				

Value

Figure89 Parameters





Click ok to get the result, as shown in the figure below. The pocket is automatically created.



Figure90 Result of the Insertion

Summary:

Through this detailed case, detail process of mold standard part customization is introduced. File management, model design and data input are three key parts. By this tutorial, more standard parts can be customized to meet different demands and speed up the mold design.

