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Content

Chapter 1 Introduction of KEDM(KCUT)

1.1 Brief introduction

KEDM CNC wire cut EDM control system (or named KCUT) was developed based on Windows 7. When use the software, user doesn't need to know detailed programming editing, just needs to draw drawing in CAD software or load relative DXF or DWG file into KEDM, then postprocess the drawing in KEDM to create cutting program. User can set or select relative cutting parameters from database and adjust to get satisfied result. During cutting process, KEDM can also adjust feed speed by itself according to different requirement of cutting speed. This kind graph display of machining status is easy to use.

Cutting feed speed, finished percent of task, cutting efficiency, working time, remaining time, and monitoring of working status are all shown in the main interface of KEDM. Meanwhile, various malfunction (such as power breakdown, hang of computer etc.) would be record and handled to protect and reduce loss of malfunction.



1.2 System composition

image 1-1 WEDM composition of KEDM

image 1-1 shows complete control solution of KEDM, we offer multiple solutions for different customers' needs. Solution 1: three sets stepping drivers and three sets servo

drivers, this solution can satisfy general requirement of the market with relatively low cost; solution 2: all 6 sets servo drivers for X, Y, U, V, Z and wire drum, it's designed for developing trend with better performance and stability.

1.3 Main functions of KEDM

1) It supports graph-based automatic programming, operator does not need to know programming codes, in practical operation, operator needs to load DXF file created by other software then postprocess in KEDM to create cutting track according to instructions in software.

2) Multiple machining modes, flexible for different purposes, for example, single segment cutting, continuous cutting, forward cutting and backward cutting.

3)XYUVZ can realize 5-axis simultaneous control, drive type could be stepping drive or servo drive, all 5 axes can be monitored in real-time in main interface of cutting.

4) KEDM shows present machining position, coordinate, finished percent of task and left time to go in real-time. Operator can judge actual cutting status according information in GUI, which could be zoomed according to operator.

5) Standard taper control system to realize cutting of equal-degrees taper, variable-degrees taper and abnormity (up-down different profile taper). Multiple axes simultaneous control makes complicated taper cutting much easier and efficient.

6) Standard with multiple cuts capacity to get better surface finish and cut accuracy.

7) With capacity of corner clearing to improve performance of corner cutting.

8) Support compensation of screw pitch, capable of segmental compensation of pitch error of the machine.

9) With automatic alarm function, when machining is done or malfunction appears (such as short circuit), dialogue of alarm pops out and KEDM records information of alarm automatically.

10) Remote control for motion of machine, wire feed, pump, HF power etc., which makes operation more efficient.

11) Remote has tool setting function (wire straightness setting) to simplify straightness of wire to workpiece, easy to switch parameters for tool setting.

12) Power off recovery function, repositioning start point, pause point, end point, moving track selection function.

13) Cutting program setting includes jump holes setting, mirror, rotation, lead-in line setting and so on.

14) Short circuit detection & feed-back, short circuit alarm. When short circuit happens, wire would move back and feed forward again to get suitable gap between

wire and workpiece.

15) Manual function includes move axis, centering, touch edge etc.

16) Setting includes factory default setting, user setting. Factory default setting is not allowed to change unless permission and guidance from manufacturer.

17) IO monitoring could keep monitoring data of input and output and to enable operator know control system better.

18) Debugging system record information of alarms.

19) File management could do setting of graphs in system, it also can read files from hard driver or USB memory, file should be DXF.

20) length measure function to check distance between two points, to make sure graph is correct.

21) Simulation function simulates actual procedure of cutting, to check if programming is correct.

1.4 Main features of KEDM system

1) KEDM adopts graph drive technology, generate cutting track automatically with simple setting, reduce time of programming, increase manufacturing efficiency, reduce possibility of mistakes by operator, and save producing cost.

2) Operation is easy, and easy to learn.

3) multiple axes simultaneous control to simplify programming of complicated taper cutting task.

4) Fully support complete servo control, to satisfy trend of market of high accuracy cutting.

5) Internet communication available, swift, and stable. 4G module is available to connect internet, sim card is required

6) Real-time monitoring, ERP system.

7) PLC control, no more PCBs are used, simplified wiring system, less malfunction. And PLC is very power and has good scalability

8) Real-time IO monitoring

9) Standard network cable connection, fast, stable, and efficient

1.5 System running environment

OS: Windows 7 or latter OS from Microsoft

Basic hardware requirement: 2 Internet connection socket, 4G memory, 32G hard drive

Chapter 2 Main Interface

After installation of system, enter main interface as

image 2-1 shows	Program coordinate
M. K-cut EDM_MoWire_Servo-v1.7.21-E_20191024002 — GA11111.dvf Manual DM_100 DL_20 DL_20 Hote GA1111 Terres 111	
Machine: X 0155.089 Y 0200.091 U -011.775 V 0044.092 Z 0388.350 G1 : X 0155.089 Y 0200.091 G2 : X 0400.369 Y 0018.943	Y -012.378 U -011.775 V 0044.092
Mechanical coordinate Cutting paran	Z 0000,000 RunTime 00 : 00 : 00 : 00 00 Remain 00 : 00 : 00 : 00 00 Run Speed 0 um/s um/s Run Effect 0 mm2/min num 20/min Run Ffect 0 % 40
Graph of task Functions	bar MotorFi WireF2 PumpF3 H-Q F4 ForwF5 SeriesF6 DemoF7 Airf8 StartF10 ² auseF1: StopF12 Air Max 2000 um/s pStart pPause pEnd
File Run Manual Settings Monitor Diagno	Move Pos Run Set
image 2-1 main interface Menu bar	

2.1 Program coordinate of task

Display graph of task in coordinate of XYUV and height of Z axis.

2.2 Menu bar

File management: files management, add or delete graph.

Manual function: move axis, auto center, touch edge centering, hypotenuse and etc.

Setting: Factory settings, user settings and so on.

Monitor (I/O monitoring): shows status of present task.

Diagnosis: shows alarm messages

Graph information: show information of present task in graph.

2.3 Function bar

2.3.1 Introduction of functions

Runtime: cut time of present task.

Remain: remaining time of cutting present task.

Run speed: feeding speed of present task um/s.

Run Effect: cutting efficiency of present task mm²/min.

Run Pro: finished percent of present task.

Thickness: Thickness of present job.

2.3.2 Indication of button color: take "Wire F2" for instance

Wire F2: left click to turn it on, or press F2, when button at green color **E22**, it

means the button is activated; and not activated when it's blue color $\frac{1}{12}$; Gray

color means it's not operated; when wire feeding is in working, color is grevish-green F2.

greyish-green.

Motor F1: on and off the motors, usually it is always on.

Pump F3: on and off flushing pump

H-Q F4: High frequency power on and off.

Forw/Bacw F5: forward/backward, default is forward, left click to change to

backward, and color changed to Green 反向 F5

Forward: actual cutting direction is same as track in the graph of task;

Backward: actual cutting direction is opposite to track in the graph of task.

Series F6: continuous machining, default is continuous machining without stop. Left

click to change to single segment machining, color in green

Continuous: stop until complete track is finished.

Single segment: cutting track is usually divided to many different segments, for example an arc or a line, single segment means machine stops after finish one segment and waiting for operator to do next operation.

Demo F7: simulation, left click to enter simulation page, no actual cutting and movement of all axes.

Air F8: it is dry rum, machine moves according to track of cutting program, but no HF power discharging. HF power is off.

Start F10: cutting start, left click, or press "F10" of keyboard.

Pause F11 : pause present task, left click, or press "F11".

Stop F12 stop present task, to avoid wrong operation by operator, it requires confirmation. left click, or press F12

Tra: trace, it indicates tracing distance between wire and workpiece, decrease the value, wire feeds tightly to workpiece, usually for short workpiece; increase the value, wire feeds less tightly, keeps bigger distance to workpiece, usually for high workpiece. + and – of keyboard can change it, or by mouse.

Tra <-> 40 <+> (1~200)

Run Max: Max speed of actual cutting.

Air Max: Max speed of dry rum, no actual cutting, but machine is moving.

Run Max	100	um/s
Air Max	5000	um/s

pStart: reselect start point, could be any point of track of graph, mechanical

coordinate keeps same, program coordinate changes.

pPause: select any point of track of graph to pause, when cut to this point, machining pauses, Max 20 pause points.

pEnd: select any point of track of graph, cutting completely stops when cut to this point.

2.3.3 Move position

Select position to move: click "Move position" to enter its interface, there are serval options, such as "temporarily move", "move to start position", "move to end position" etc.

Temporarily move

In the processing mode, under the pause state, you can choose to manually shift the axis temporarily. Enter the temporary shift axis interface, you can temporarily shift the axis. Before temporarily shifting the axis, the temporary coordinate system is (0,0). When exiting the temporary shift coordinate system, the coordinate system must be (0,0). If forced to exit, the graphics coordinates will not change, but the machine coordinates will change.

There are two modes for returning to the temporary origin, dry run back to the origin,

servo dry run, no discharging, and dry run speed is adjustable. Cutting back to the origin, high-frequency discharging is on, the cutting parameters are processed by the manual axis interface parameters, and the tracking and discharge parameters can be changed during the cutting back to the origin.

fei Dialog
Return
Temporarily Move Position
PW: 40.0 PI: 5.0 PA: 8 • WS: 1 • Update
System (Encoder): X: 0.000 Y: 0.000
Start Position:
X: -1.909 X Machine: 307.443
Y: -4.865 Y Machine: 236.914
Velocity(Air): 10 um/s
Velocity: 0 um/s Trace: <-> 30 <+>
Exit(Encoder Back To Back To Stop must be 0) Origin(Air) Origin

Image 2-4 temporarily move axis

Move to start position of the graph, to end position, to segment number N, etc.

For example, move to start point of segment number N: click the button to move to the starting point of the segment N, then confirm to enter the target segment index, enter the segment number you want to move, after confirmation, enter the moving track interface. After confirmation, start to move the axes.

Move Position	15 Move Position
Temporarily Move	
Move To Start Position	
Move To End Position	
Move To Seg-N Start Pos	
Move To Group-N Start Pos	
Move To Next Group	
Exit	

Image 2-5 Move posiiton

2.3.4 Machining setting (work setting)

Work setting: left click to enter the setting interface, there are jump line setting (wire resetting), rotate/mirror, set lead-in line(add wire) and etc. please check image 2-6.

Work Setting		×
Work	ing Setting Selecti	on
	Wire setting	
	Rotate/Mirror	
	Add wire	
	Stop Selection	
	Auto tight-wire	
	One-Way Discharge	

image 2-6 machining setting (work setting)

Graphs jumper setting (wire setting): three options, they are always air-run, jump mode, and working mode.

Jumper mode means there are more than one single graph to cut, i.e. multiple graphics cutting, how to move from one to another is the choice operator needs to decide.

Always air-run: dry drum all the paths of all graphs.

Jump mode: dry run the path between graphs.

Working mode: cut the path between graphs

Tick always air-run: execute dry run all the paths

Tick jump mode: execute jumper mode with dry run of path between graphs

Tick working mode: execute cutting the path between graphs.

If tick nothing, for multiple graphs machining, pause at start point of jumper, and default jumper line as dry run, and waiting for operator to do next steps.



image 2-7 setting of jumper line

Rotate/mirror:

Mirror L-R: tick it and click OK, mirror image of processing track in left-right opposite direction.

Mirror U-D: tick it and click OK, mirror image of processing track in up-down opposite direction.

Rotate degrees: input degrees to rotate, click OK to rotate the graph.

Note: this function can only be used for straight cutting, can't be used for cone(taper) cutting.



image 2-8 rotate/mirror setting

Add wire(set lead-in line):

X-length: the length of lead-in in X axis, unit in mm.

Y-length: the length of lead-in in Y-axis, unit in mm.

Undo: You can undo the added lead-in line.

Add: add the current lead-in length, and then click the OK button

the work setting			
Return			
Wire Length			
X-Length:	0	mm	
Y-Length:	0	mm	
X:left is posi Y:down is po	tive,right i ositive,up i	s negative s negative	
Current Wire	e Counts:		
Preview	Undo	Add	
Cancle		ок	

Image 2-9 add wire (add lead-in line)

Stop selection(select the timing to stop wire feed-wire drum stops):

After entering the setting page, there are numbers of selections: multi-group cut, single graph end; current task is over; stop at pause-point; trajectory selection, L Commutate(stop at left direction change position), R Commutate(stop at right direction change position)

Operator just need to tick stop type and stop position, if don't need to use the function, just leave all not ticked.



image 2-10 stop selection(select where to stop wire feed)

Auto tight-wire(automatic wire tension control):

For the model with automatic wire tension control, operator select different tightening strength actual to practical cutting.



image 2-11 automatic wire tension(set level of auto tight-wire)

One-way discharge:

There are two options, positive and negative direction, that's the direction of wire drum feed.



Image 2-12 one-way discharge

2.4 Machining parameters (electrical discharge parameters)

Click "parameters" at the top of main screen to enter parameters setting interface, if the parameters are in practical working, they are in yellow color. If not in practical working, they are in wight color.

Modify parameters:

Select the row of parameters, take 2nd row of 2nd cut for instance. First click 2nd row of parameters, input the value of specified parameter, such as PW, click update and then click OK to complete modification.

Batch modify processing parameters:

Select the row of parameters, take 2nd row of 2nd cut for instance. First click 2nd row of parameters, input all the values of specified parameters to modify, then click All Update and OK.



Image 2-13 machining parameters

Note: the cut the path back to start point default as parameters of first cut. Tool setting parameters of remote are same as manual cutting parameters.

2.5 Coordinate setting

Mechanical coordinate: show mechanical movement of X, Y, U, V, Z in coordinate. X and Y mechanical coordinate can't be set 0/cleared.

When there is no actual cutting, right click UVZ mechanical coordinate, a dialog box pops up, operator can clear the UV axis coordinates, or operator can set the current Z axis coordinates as the fixed height.

The G1 and G2 coordinate systems are for the coordinate system established after manual find center or other similar setting. In the unprocessed cutting program, double-click to enter the G1 and G2 coordinate system. As shown below, take G1 as an example.

Click "X center", to find center of X axis of G1 coordinate system. Click "X reset", to clear X axis of G1 coordinate system.

Move of "Absolute coordinate", move axis to position that reference to (0,0) of G1 coordinate.

Move of "Relative coordinate", move axis to position that reference to present position.

Input X-translation distance, click "start" to move X axis

Input Y-translation distance, click "start" to move Y axis

GoOrigin: go to home of G1 coordinate

si K-cut EDM_MoWire_Servo-v1.7.25-E_20200507003 —— C:\Users\Administrator\Desktop\999999.dxf	
ManualPW:40.0 P1:5.0 PA:8 WS:1 Voltage:High Velocity:111 Trace:111 Parameter English Machine: X 0307.443 Y 0236.914 0043.193 V -006.205 Z 0234.885 G1 · X 0307.443 Y 0236 914 G2 · X 0552 753 Y -010 118	X -001.909 Y -004.865 U 0000.000
1st Hand Centering	Z 0000.000
Manual centring - G1	RunTime 00 : 00 : 02 Velocity 0 um/s Thickness 0 mm
X-Translation (mm)· Y-Translation (mm)· X Center X Reset Y Center Y Reset	MotorF1 WireF2 PumpF3 H-Q F4 ForwF5 SeriesF6 DemoE7 DB E8 AirE0
Relative X-Translation	
Y-Translation (mm)· Velocity	Start+10 Pause+1. Stop+12 Trac <-> 30 <+> (1~255) Run Max 100 um/s
(um/s)· [1]	Air Max 3000 um/s pStart pPause pEnd Marco Desition Desition
Exit Start GoOrigin Stop	Kingred 400-099-0619
File Manual Settings IO Diagnos	is Graph

Image 2-14 manual centering

Chapter 3 Manual control

Manual control includes move axis, auto center, touch edge, centering, hypotenuse **3.1manual move axis**

fel Hand Process			
X Translation Y Translation	: 0.000 : 0.000		Mechanical Coordinates X 0155.089 Y 0200.091 U -011.775 V 0044.092 Z 0388.350
U Translation V Translation	: 0.000 : 1.000] mm] mm	Graphics Coordinate X -144.911 Y -012.378
Z Translation	. 0.000	mm	U -011.775 V 0044.092 Z 0388.350
Speed:	10	um/s	Move Axis
Alarm:Wi	re touch with work	piece	AutoCenter
Start Stor	o GoOrigin	Reset	Centring
			Hypotenuse

image 3-1 manual move axis

input the distance that XYUVZ axis need to move, and input feed speed, and click start.

3.2 Auto center

The system can do automatic find center in X directly separately, Y direction separately, X and Y axis both together.

Tick the X axis, that is, the X axis is independently centered.

Tick the Y axis, that is, the Y axis is independently centered.

Tick both the X and Y axis, that is, the X and Y axis are centered at the same time.

First speed: the fast feed speed of first-time finding center

Second speed: the slow feed speed of second-time finding center,

■ X Centragecentrer ■ Y Centragecentrer	Mechanical Coordinates X 0155.089 Y 0200.091 U -011.775 V 0044.092 Z 0388.350
First Speed: 10 um/s Second Speed: 10 um/s	Graphics Coordinate X -144.911 Y -012.378 U -011.775 V 0044.092 Z 0388.350
Alarm:Wire touch with workpiece	Move Axis AutoCenter Touch Edge Centring Hypotenuse

image 3-2 Auto Center

3.3 Touch edge

Can do touch edge in directions of 0 degrees, 45 degrees, 90 degrees, 135 degrees, 180 degrees, 225 degrees, 270 degrees, 315 degrees.

Once touch speed: first time touch edge with fast speed

Twice touch speed: second time touch edge with slow speed.

156 Hand Process			- • • 🗙
Once Touch: 10 Twice Touch: 10	um/s	90 45 V V Z	anical Coordinates 0155.089 0200.091 -011.775 0044.092 0388.350
	180	XY 0 Graph X 270 315 U V Z	nics Coordinate -144.911 -012.378 -011.775 0044.092 0388.350
Alarm:Wire to	ouch with workpiece Stop Re	set	Move Axis AutoCenter Touch Edge Centring Hypotenuse

image 3-3 touch edge

3.4 Centering (find center of circle)

Ratio (Offset coefficient): 0.01-1. L= offset ratio * r + r

Diameter: input diameter of the circle, must be accurate.

Back distance: the return distance after finding point 1, 2, 3 is done

Speed-1: fast feed of first finding

Speed-2: after fast speed of firs finding, slow goes back and find again with slow speed.

Circle direction: the directions sequence to find center.

Go Center: after find center is done, click it to move to center of circle.

🜃 Hand Process		
	No Touch Edge	Mechanical Coordinates X 0155.089 Y 0200.091
	Ratio 0.00 (0.01 - 1)	U -011.775 V 0044.092 7 0388 350
	BackDis 0.000 mm	Graphics Coordinate X -144.911
L 3	Speed-1 10 um/s	Y -012.378 U -011.775
	Speed-2 10 um/s	V 0044.092 Z 0388.350
Circle Direction	first: (0.000 , 0.000) Second (0.000 , 0.000)	Move Axis
90	Third: (0.000 , 0.000) Center: (0.000 , 0.000)	AutoCenter
180 0	Radius: 0.000	Touch Edge
	Alarm:Wire touch with workpiece	Centring
270	Start Stop GoCenter Reset	Hypotenuse

Image 3-4 centering

3.5 Hypotenuse

Width: $\triangle X$ distance, set the distance as bigger as possible, the accuracy will be better.

Back distance: return distance after confirm first point, set value should be bigger than $\triangle Y$.

1 speed: find edge first time with fast speed.

2 speed: find edge second time with slow speed after first finding done.

Bevel edge direction: select direction to start to measure bevel edge.

Rotate: after measure the bevel edge, it shows degrees of it, and system can rotate the graph with clicking rotate button.

🕼 Hand Process				
0	Width H: 0.000 mm	Mechanical Coordinates X 0155.089 Y 0200.091		
<u>ه</u> <u>م</u>	BackDis: 0.000 mm	V 0044.092 Z 0388.350		
Ъу	2 Speed: 10 um/s	Graphics Coordinate X -144.911		
	Slope: 0.000 degree	Y -012.378 U -011.775 V 0044.092		
Paul Edus Divertion	first: (0.000 , 0.000)	Z 0388.350		
Bevel Edge Direction	Second: (0.000 , 0.000)	Move Axis		
90	Alarm:Wire touch with workpiece	AutoCenter		
180 0	Start Stop Rotate Reset	Touch Edge		
270		Centring		
		Hypotenuse		

image 3-5 hypotenuse

Chapter 4 System setting

4.1 Screw pitch compensation

156 Syste	em Setting						- • ×
Nurr	Encode	X+	X-	Y+	Y-	Machine Coord:	PitchCom
000	000	000.0000	000.0000	000.0000	000.0000	U -117750 V 44.0920 Z 388.3500	Fiteficom
001	020	020.0000	020.0000	020.0000	020.0000		
002	040	040.0000	040.0000	040.0000	040.0000	1) Target D(mm) 0.000 Start	Database
003	060	060.0000	060.0000	060.0000	060.0000	2) Speed (um/s) 10 Stop	
004	080	080.0000	080.0000	080.0000	080.0000		Factory
005	100	100.0000	100.0000	100.0000	100.0000	Remain D(mm) X 0.000 Y 0.000	······
006	120	120.0000	120.0000	120.0000	120.0000	EXForwarc 🖬 XBackwarc 🖬 YForwarc 🗏 YBackwarc	
007	140	140.0000	140.0000	140.0000	140.0000		User
008	160	160.0000	160.0000	160.0000	160.0000	2) Speed1(um/s) 500 Go Origin	
009	180	180.0000	180.0000	180.0000	180.0000	2) Speed2(um/s) 500 Stop	Regard
010	200	200.0000	200.0000	200.0000	200,0000		
011	220	220.0000	220.0000 Mechar	.220,0000 nical hor	.220.0000 ning		
012	240	240.0000	240.0000	240.0000	240.0000	Pitch/mm) 0.000	
013	260	260.0000	260.0000	260.0000	260.0000		lodify PW
014	280	280.0000	280.0000	280.0000	280.0000	X Y U V Z	, , , , , , , , , , , , , , , , , , ,
015	300	300.0000	300.0000	300.0000	300.0000	Limit Zero 0.000 0.000 0.000 0.000 0.000	
016	320	320.0000	320.0000	320.0000	320.0000	EncoderZerc 0.000 0.000 0.000 0.000 0.000	Taper Calc
017	340	340.0000	340.0000	340.0000	340.0000	Offset Dis 0.000 0.000 0.000 0.000 0.000	
018	360	360.0000	360.0000	360.0000	360.0000		
019	380	380.0000	380.0000	380.0000	380.0000	Seg 22 Dis(mm) 20 Set Clean	
020	400	400.0000	400.0000	400.0000	400.0000	Num X+ X- Y+ <u>Y-</u>	
021	420	420.0000	420.0000	420.0000	420.0000	0 0.0000 0.0000 0.0000 0.0000	
L	Pit	ch com	pensatio	n input		Open Save Save As	

image 4-1 pitch compensation

4.1.1 Pitch compensation step setting

Target D(target steps): steps required to go for pitch compensation

Speed (feed rate): speed of moving axis

Start: start to feed steps

Stop: stop feeding steps

Remain D: remained steps to go

X forward: X positive direction feed

X backward: X negative direction feed

Y forward: Y positive direction feed

Y backward: Y negative direction feed

4.1.2 Mechanical homing

Speed 1: fast speed feed to mechanical origin.

Speed 2: go back to origin more accurately with slow speed, recommend speed is less

than 100 um/s.
Pitch: pitch of ball screw
Go origin: execute mechanical homing
Reset: set zero of limit coordinate, encoder zero coordinate, offset distance
X: X axis homing
Y: Y axis homing
U: U axis homing
V: V axis homing
Z: Z axis homing
Attention: UVZ mechanical origin shall be set as usable according to factory setting

4.1.3 Pitch compensation input

Seg: number of segments of pitch compensation

Dis: pitch compensation distance.

Set: Set pitch compensation data

Clean: Clear the pitch compensation data

Save: save present pitch compensation data

Open: open previously saved pitch compensation data

Save as: save and backup current pitch compensation data to somewhere else

4.2 Database

The machining parameters database is divided into factory parameters and user parameters. The factory parameters are the processing parameters set before leaving the factory, which can be loaded by the operator.



Image 4-2 database

4.3 Factory parameters

Parameters can only be used for factory or professionals

4.4 User parameters

Parameters can be set by operators, please seek guidance from the manufacturer.

4.5 About

Shows information of manufacturer

4.6 Password motidification

User parameter initial password is 111111, operators can modify parameters by themselves

Note: Remember the modified parameters to avoid unnecessary trouble



4.7 Cone(taper) calculator

For taper cutting, as the measurement of some distance data is not accurate, so the actual cutting is not accurate too. KEDM provides a solution to solve this problem, shown in image 4-7-1.



image 4-7-1 taper calculator

First measure the data of distance that needed for taper cutting, for example "the distance between upper and lower wheel (wire guide) and input these measured data in the dialog in image 4-7-2. Then use these data to make cone cutting program for first job of taper cutting. Then measure the actual dimension of first cut job. Or use "calculate the distance from lower wheel to working plane" or other options.

🕼 Taper Calculator	×						
Return							
Cal the dis between the upper wheel and lower	r wheel						
A cone is used to calculate the distance between the upper guide wheel and the lower guide wheel.Determine the distance from the lower regulating wheel to the working plane Taper > 0; Upper Small Lower Big Taper < 0:Upper big Lower Small							
The distance between upper and lower wheel(mm):	98.00000						
Distance between lower wheel and working plane(mm):	19.00000						
Angle α:	4.00000						
Diameter of the lower circle(mm):	0.00000						
Diameter of lower circle in Y direction (mm):	0.00000						
	Calculate						
Result							
The dis between upper and lower wheel (mm):	0.00000						
	Export						

image 4-7-2 calculate the distance between upper and lower wire guide

🕼 Taper Calculator	— ×				
Return Cal distance from lower wheel to working plane					
A cone is used to calculate the distance between the upper guide wheel and tl The distance between the upper regulating wheel and the lower regulating wheel is determinedTaper > 0;Upper Small Lower Big Taper < 0: Upper big Lower Small					
The distance between lower wheel and plane(mm):	19.00000				
Angle α:	4.00000				
Diameter of the lower circle(mm):	0.00000				
Diameter of lower circle in Y direction (mm):	0.00000 Calculate				
Result					
The Dis from the lower wheel to the workbench (mm):	0.00000				
	Export				

image 4-7-3 calculate the distance from lower wheel to working plane

🕼 Taper Calculator	— ———————————————————————————————————					
Return						
Cal the dis between upper and lower wheels and						
dis from the lower guide wheel to the workbo	ench					
A cone is used to calculate the distance between the lower guide wheel and the lower guide wheel to the working plane. * cone thickness is determined Taper > 0;Upper small Lower large Taper < 0: Upper large Lower small						
The distance between upper and lower wheel(mm):	98.00000					
The distance between lower wheel and plane(mm):	19.00000					
Works Thickness h (mm):	40.50000					
Angle α:	4.00000					
Lower Circle D2 (mm):	0.00000					
Top Diameter D1 (mm):	0.00000					
Diameter of lower circle in Y direction d2 (mm):	0.00000					
Upper circle in Y d1 (mm):	0.00000					
	Calculate					
Result						
The dis between upper and lower wheel (mm):	0.00000					
The Dis from the lower wheel to the workbench (mm):	0.00000					
	Export					



📢 Taper Calculator			×				
Return Cal dis between upper and lower wheel, and the dis between lower wheel and the working plane							
Two cones which thickness are diferent are used to calculate the distance betv and the lower guide wheel to the working plane. * Cone thickness is determined Taper > 0;Upper small Lower large Taper < 0: Upper large Lower small							
The distance between upp	er and lowe	er wheel(mm):	98.00000				
The distance between low	er wheel an	d plane(mm):	19.00000				
The Cone 1		The Cone 2					
Works Thickness h (mm):	40.50000	Works Thickness h (mi	n): 40.50000				
Angle α:	4.00000	Angle α:	4.00000				
Lower Circle D2 (mm):	0.00000	Lower Circle D2 (mm): 0.00					
Top Diameter D1 (mm):	0.00000	0 Top Diameter D1 (mm): 0.0000					
Upper circle in Y d1 (mm):		Upper circle in Y d1 (m	m):				
	0.00000		0.00000				
			Calculate				
Result							
The dis between upper and lower wheel (mm): 0.00000							
The Dis from the lower wheel to the workbench (mm): 0.00000							
			Export				

Image 4-7-5

After cut first job of angle cutting with measured data, then measure the dimension of cut part, and then input in the dialog and then click Calculate, then system shows result. Use new calculated data to make new cutting program of taper, the result would be more accurate.

Chapter 5 I/O interface

ISE IO N	Aonitor								
Num	Designation	ST	Num	Designation	ST	Num	Designation	ST	Input
1	Servo pulse X			Wire enable					Output
2	Servo pulse Y			Wire servo					Carpar
3	Servo pulse U		17	Wire direction					SC1
4	Servo pulse V			Tension motor pulse					
5	Servo pulse Z			Tension motor direction					SC2
6	Servo directon X			PLC HF-Pulse 1					
7	Servo directon Y								Data
8	Servo directon U								
9	Servo directon V								
10	Servo directon Z								
11	Power amplifier 1								
12	Power amplifier 2								
13	Power amplifier 3								
14	Power amplifier 4								

It is monitoring working status of each device.

Chapter 6 Debugging interface

Record alarm information, there are real-time alarm and historical alarm information



Chapter 7 Graph information

The graphl information interface displays the parameters of the current cutting path. Machine origin coordinates, encoder origin coordinates, encoder coordinates, encoder feedback coordinates.

Graphic information, molybdenum wire compensation, cut allowance, etc.



image 7-1 graph information

0.0000 0.0000

Cout distance

Change Graphic

Cut-4: Cut-5: