Case name	Shihlin SDE on turret equipment				
Department	FA engineering group	date	2016.11.03	page	3
Product	Shihlin SDE series				

1. Introduction

The turret is a device that provides lathe cutters storage and lathe cutters change in the automatic machining process. The turret provides the storage position, and the cutter is correctly selected for exchange which can be controlled by the program. In recent years, the development of the turret has surpassed its role as an accessory. With the improvement of the cutting speed of the lathe and the shortening of the cutting time, the demands for shorter cutter change time are gradually increasing; the speed of the cutter change has become an important indicator of a lathe.

Shihlin SDE series servo motor has a cutter magazine/division mode, which can be used with the upper control NC system and used in the turret, with excellent speed response greatly increases the cutter change speed of the turret.

2. Photo

3. Parameters

parameter	name	setting	description
PA01	Control mode option	1006h	Set to _ _ _6 to enter turret mode
PA06	Electronic gear numerator	48	Set by the gear ratio of the turret
PA07	Electronic gear denominator	1	
PA28	Absolute encoder settings	0	Incremental mode.
PC25	Inner torque limit 2	20%	Torque limit value = maximum torque *setting
PF88	cutter quantity of turret	8	Maximum:59

DI used:

DI code	sign	signal function
0x01	SON	servo on
0x0B	ORGP	original position
0x0C	SHOM	start home moving
0x13	POS1	position command 1
0x14	POS2	position command 2
0x15	POS3	position command 3
0x1A	POS4	position command 4
0x1B	POS5	position command 5
0x1C	POS6	position command 6
0x28	MD1	turret mode input 1
0x29	MD2	turret mode input 2
0x2A	MPD1	manual recurring
0x2B	MPD2	manual stepping
0x2C	SPS	second speed option

1. DI input terminal function can be customized according to user needs

2. The four terminal arrangement combinations of MPD1, MPD2, MD1 and MD2 determine the control functions in the turret mode.

Turret control mode

control mode	MPD1	MPD2	MD1	MD2	options	control mode
auto	OFF	OFF	OFF	OFF	torque decrease	trigger after choosing position
			OFF	ON	indexing positioning trigger	
			ON	OFF	origin return	
			ON	ON	emergency stop	
manual jog (stop on cutter position)	OFF	ON	-	-	-	MD1 or MD2 rotates one position per trigger (rising edge trigger)
			OFF	ON	manual rev run	
			ON	OFF	manual fwd run	
			-	-	-	
manual continuous (stop on cutter position)	ON	OFF	-	-	-	MD1 or MD2 keeps ON, the turret rotates continuously, and pauses on each position.
			OFF	ON	manual rev run	
			ON	OFF	manual fwd run	
			-	-	-	
stepless jog (stop anywhere)	ON	ON	-	-	-	MD1 or MD2 keeps ON, the turret rotates continuously
			OFF	ON	manual rev run	
			ON	OFF	manual fwd run	
			-	-	-	

Origin return: Perform the origin return, set the current position of the turret to No. 1 cutter, and output the No. 1 cutter position and positioning completion signal.

Indexing positioning trigger: The upper controller gives the target cutter number, and the nearest path is planned according to the current cutter position, and the turret is rotated to the required cutter position by the nearest path. When the positioning is completed, the completion signal and the new current cutter number are output.

Manual jog: MD1 or MD2 rotates one position per trigger (rising edge trigger).

Manual continuous: MD1 or MD2 keeps ON, the turret rotates continuously, and pauses on each position. The stop position must be on one of the cutter position.

Stepless jog: MD1 or MD2 keeps ON, the turret rotates continuously, it will not stop when passing the cutter position, and the stop position is any point (not necessarily in the cutter position.

The cutter position and other information can be obtained by the state of DO(POS1~POS6):

Item	POS6	POS5	POS4	POS3	POS2	POS1	function
1	0	0	0	0	0	0	ALARM
2	0	0	0	0	0	1	Ready
3	0	0	0	0	1	0	Origin return
4	0	0	0	0	1	1	Origin return complete
5	0	0	0	1	0	0	Indexing positioning -operating
6	0	0	0	1	0	1	position command 1
7	0	0	0	1	1	0	position command 2
8	0	0	0	1	1	1	position command 3
9	0	0	1	0	0	0	position command 4
10	0	0	1	0	0	1	position command 5
11	0	0	1	0	1	0	position command 6
12	0	0	1	0	1	1	position command 7
13	0	0	1	1	0	0	position command 8
14	0	0	1	1	0	1	position command 9
?	?	?	?	?	?	?	?
63	1	1	1	1	1	0	position command58
64	1	1	1	1	1	1	position command 59

4. Special features

- By using the PLC program to plan the DO output, and with the SDE servo system, you can simulate the control timing of SDE and standard CNC controller. Users can modify the DI/DO of SDE according to their own needs, and choose the wiring method of Sink or Source.
- Shihlin Servo SDE series can provide 59 cutter position output, and can provide the state of original point return and positioning, operating, etc.

- The excellent Auto-tuning function of the Shihlin Servo SDE series can accurately calculate the inertia in only one cycle and automatically optimize the operating parameters.

- Shihlin Servo SDE series is equipped with Japanese brand 22-bit high-resolution Encoder to effectively improve low-speed stability; the driver supports up to 4Mpps pulse input bandwidth.

- Shihlin Servo SDE series with absolute position servo motor can remember the position function when power is off, which meet the industrial application of mechanical arm, machine tool industry, etc.; it can directly correspond to the absolute position function of Shihlin (Mitsubishi) PLC.