GSK980TDa TURNING MACHINE CNC SYSTEM

GSK980TDa is a new product, its display is 7" color wide-screen LCD, adds PLC axis control, Y-axis control, parabola/ellipse interpolation, statement macro command, automatic chamfer, tool life management, tool wear compensation and so on. The added G31/G36/G37 can execute the jump and automatic tool compensation. The system clock can display the alarm log. The system can be displayed in Chinese, English, Spanish and Russian.

Characteristics:

- Controlled axes(X,Y,Z), link axes (X, Z), 0.001 interpolation precision and max. rapid traverse speed 30 m/min, linear/arc interpolation, parabola/ellipse interpolation;

- Least command increment 0.001, electronic ratio (1~32767)/ (1~32767);

- Pitch error compensation, backlash compensation, tool length compensation, tool wear compensation and tool nose radius compensation;

- Embedded PLC, ladder edit in the PC to be downloaded to CNC;

- S, exponential acceleration/deceleration control to meet high speed and high precision machining;

- Tapping to machine metric/inch single/multiple straight, taper thread, end face thread, variable pitch thread, high speed thread run out with set retraction distance, angle and speed;

- Metric/inch programming, automatic chamfering, tool life management;

- Statement macro command programming, macro program call with parameters;

- Chinese and English display interface selected by parameters；

- Large memory capacity(6144KB,384 part programs) with full screen edit；

- Convenient management with multilevel operation password；

- Bidirectional communication between CNC and PC, CNC and CNC; communication upgrading CNC software and PLC programs;

Technical Specification

Motion control	Controllable axes: X, Z, Y; simultaneous controllable axes (interpolation axes): 2 (X, Z)
	Interpolation: X, Z linear, arc interpolation
	Maximum programmable dimensions: -9999.999 mm～9999.999mm, least command increment 0.001mm;
	Electronic gear：command multiply 1～32767 and command division 1～32767
	Rapid traverse speed: max. 30000mm/min
	Rapid override: F0，25%，50%，100%
	Cutting feedrate: max.15000mm/minor 500mm/rev(feedrate per rev)
	Feedrate override: 16 steps 0～150%
	Manual feedrate: 16 steps 0～1260mm/min
	MPG feedrate: 0.001mm，0.01mm，0.1mm
	Acceleration/deceleration: S acceleration/deceleration for rapid traverse, and exponential acceleration/deceleration for cutting feed
	Automatic chamfering function
G command	43 G commands: G00, G01, G02, G03, G04, G05, G6.2, G6.3, G7.2, G7.3, G10, G11, G20, G21, G28, G30, G31, G32, G33, G34, G36, G37, G40, G41, G42, G50, G65, G70, G66, G67, G71, G72, G73, G74, G75, G76, G90, G92, G94, G96, G97, G98, G99, macro command G65 to execute 27 kinds of calculation, logic operation and program skipping
Thread machining	Tapping: metric/inch, single/multiple, straight thread, taper thread, end face thread, variable pitch thread. Thread run out with set retraction distance, angel and speed; pitch: 0.001mm～500mm or 0.06～25400 tooth/ inch
	Spindle encoder: lines can be set （100 p/r～5000p/r）
	Drive ratio between encoder and spindle: （1～255）：（1～255）
Precision compensation	Backlash compensation: 0mm～2.000mm
	Pitch error compensation: 255 compensation points/axis, compensation value/point:±0.255mm×compensation override
	Tool compensation: 32 groups tool length compensation, tool nose radius compensation (tool compensation C) Toolsetting method: fixed-point, trial cutting Tool compensation executing methods: traversing tool or coordinate offset
M command	M commands(no repetition): M02, M30, M98, M99, M9000～M9999 Other M□□ commands are defined and executed by PLC programs
	M commands defined by standard PLC program: M00, M03, M04, M05, M08, M09, M10, M11, M12, M13, M32, M33, M41, M42, M43, M44
T command	Most 32 tool selections（T01□□～T32□□）, the time sequence of tool change is defined by PLC programs. The tool selection is set to 1 and the tool change is not executed by PLC when the line-up tool post is used; tool life management.
Spindle speed	Speed switching value control: S□□ command is defined and executed by PLC programs, S1, S2, S3 and S4 is specified by standard PLC programs directly output, and S0 closes S1, S2, S3, S4 output.
	Speed analog voltage control: S commands specifying the spindle speed per minute or the cutting surface speed (constant surface speed control)，0～10V voltage to spindle converter, 4 gears spindle speed with stepless shifting gear

PLC function	9 elementary commands, 23 functional commands, 2-level PLC program, max. 5000 steps, execution time 2μs for each step, refresh cycle 8ms for 1st level program; each axis specified to be PLC controlled axis; ladder diagram editing software, PLC program communication download
PLC function	Integrated machine control panel: 41 input points (press keys), 42 output points (LED) I/O interfaces: 16 input points /16 output points, up to 32 input signals/32 output signals
Displaying window	Display: 480×234 lattice, 7" color wide-screen liquid crystal display(LCD)
	Display method: Chinese or English or Spanish or Russian window is set by a parameter, displaying machining path of workpiece
Program edit	Program capacity: 6144KB, max. 384 programs, customer macro program cal and four-embedded subprogram
	Editing method: edit in full screen. Statement macro command programming; incremental coordinates, absolute coordinate and compound coordinates programming
Communication	Two-way communicating programs and parameters between CNC and PC, CNC and CNC; communication upgrade, PLC programs serial download upgrade
Optional drive unit	DA98 series digital AC servo drive unit or DY3 series stepper drive unit with input pulse and direction signal

G Commands

Commands	Functions	Commands	Functions
G00	Rapid traverse	G50	Coordinate system setting
G01	Linear interpolation	G65	Macro command
G02	CW arc interpolation	G70	Finishing cycle
G03	CCW arc interpolation	G71	Axial roughing cycle
G04	Dwell	G72	Radial roughing cycle
G10	Data input ON	G73	Closed cutting cycle
G11	Data input OFF	G74	Axial grooving cycle
G20	Input in inch	G75	Radial grooving cycle
G21	Input in metric	G76	Multiple thread cutting cycle
G28	Reference point return	G90	Axial cutting cycle
G30	Return to 2nd, 3rd, 4th reference point	G92	Thread cutting cycle
G32	Variable thread cutting	G94	Radial cutting cycle
G33	Z tapping cycle	G96	Constant surface speed control
G34	Thread cutting with variable lead	G97	Constant surface speed control cancel
G40	Canceling tool nose radius compensation	G98	Feed per minute
G41	Tool nose radius compensation left of contour	G99	Feed per rev
G42	Tool nose radius compensation right of contour		

Macro Command List GSK980TDa adds the statement macro command function with G65 macro command function of GSK980TD. The macro command format list of G65 statement is as follows:

Function	G65 macro command format	Statement macro command format
Assigned value	G65 H01 P#i Q#j;	#i=#j;
Decimal addition operation	G65 H02 P#i Q#j R#k;	#i=#j+#k;
Decimal subtraction operation	G65 H03 P#i Q#j R#k;	#i=#j-#k;
Decimal multiplication operation	G65 H04 P#i Q#j R#k;	#i=#j*#k;
Decimal division operation	G65 H05 P#i Q#j R#k;	#i=#j/#k;
Binary addition (operation)	G65 H11 P#i Q#j R#k;	#i=#j OR #k;
Binary multiplication (operation)	G65 H12 P#i Q#j R#k;	#i=#j AND #k;
Binary OR	G65 H13 P#i Q#j R#k;	#i=#j XOR #k;
Decimal square root	G65 H21 P#i Q#j;	#i=SQRT (#j) ;
Decimal absolute value	G65 H22 P#i Q#j;	#i=ABS (#j) ;
Decimal remainder	G65 H23 P#i Q#j R#k;	none
ROUND function	none	#i=ROUND (#j) ;
Rounding up to an integer	none	#i=FUP (#j) ;
Rounding down to an integer	none	#i=FIX (#j) ;
Natural logarithm	none	#i=LN (#j) ;
Exponential function	none	#i=EXP (#j) ;
Decimal to binary	G65 H24 P#i Q#j;	#i=BIN (#j) ;
Binary to decimal	G65 H25 P#i Q#j ;	#i=BCD (#j) ;
Decimal multiplication/division operation	G65 H26 P#i Q#j R#k;	none
Multiplex square root	G65 H27 P#i Q#j R#k;	none
Sine	G65 H31 P#i Q#j R#k;	#i=SIN (#j) ;
Inverse sine	none	#i=ASIN (#j) ;
Cosine	G65 H32 P#i Q#j R#k;	#i=COS (#j) ;
Inverse cosine	none	#i=ACOS (#j) ;
Tangent	G65 H33 P#i Q#j R#k;	#i=TAN (#j) ;
Inverse tangent	G65 H34 P#i Q#j R#k;	#i=ATAN (#i)/(#j) ;
Unconditional jump	G65 H80 Pn;	GOTO n;
Unconditional jump 1	G65 H81 P#i Q#j R#k;	IF (#j==#k) GOTO n; or IF (#j EQ #k) GOTO n;
Unconditional jump 2	G65 H82 P#i Q#j R#k;	IF (#j<>#k) GOTO n; or IF (#j NE #k) GOTO n;
Unconditional jump 3	G65 H83 P#i Q#j R#k;	IF (#j>#k) GOTO n; or IF (#j GT #k) GOTO n;
Unconditional jump 4	G65 H84 P#i Q#j R#k;	IF (#j<#k) GOTO n; or IF (#j LT #k) GOTO n;
Unconditional jump 5	G65 H85 P#i Q#j R#k;	IF (#j>=#k) GOTO n; or IF (#j GE #k) GOTO n;
Unconditional jump 6	G65 H86 Pn P#i R#k;	IF (#j<=#k) GOTO n; or IF (#j LE #k) GOTO n;
User alarm	G65 H99 Pn;	
Conditional control		IF (conditional expression) THEN macro program statement
		IF (conditional expression) GOTO n;

| Cycle control | none | WHILE (conditional expression) DO m; … END m; … |

CNCmakers Limited

Address: No.168, Xiadu Road, Haizhu District, Guangzhou, China 510300
Email: info@CNCmakers.com   Website: www.CNCmakers.com   Tel: +86-138-24444158   Fax: +86-20-84185336

PLC Command List

Name	Function	Name	Function
LD	Read normally-open contact	CODB	Binary conversion
LDI	Read normally-closed contact	ROTB	Binary rotation control
OUT	Output coil	MOVN	Data copy
AND	Normally-open contact in series	DECB	Binary decoding
ANI	Normally-closed contact in series	JMPB	Program jumping
OR	Parallel normally-open contact	SP	Subprogram label
ORI	Parallel normally-closed contact	SPE	End of subprogram
ORB	Parallel series circuit block	ADDB	Binary addition
ANB	Parallel circuit block in series	SUBB	Binary subtracting
END1	End of grade one program	ALT	Alternative output
END2	End of grade two program	DIFU	Rising edge detection
SET	Set	DIFD	Falling edge detection
RST	Reset	MOVE	Logical AND
CMP	Comparative set	PARI	Parity check
CTRC	Counter	LBL	Program jump label
TMRB	Timer processing	CALL	Subprogram call

Configuration Software and Communication Software

GSK980TDa uses the same configuration software GSKCC and communication software TDComm, which run in WINDDOWS98 /2000/XP. GSKCC can edit ladders, part programs, parameters, pitch error compensation data and tool compensation data, and complete the upload and download files and data between PC and GSKTDa. TDComm can bidirectionally transmit part programs, parameters, pitch error compensation data and tool compensation data between PC and CNC.
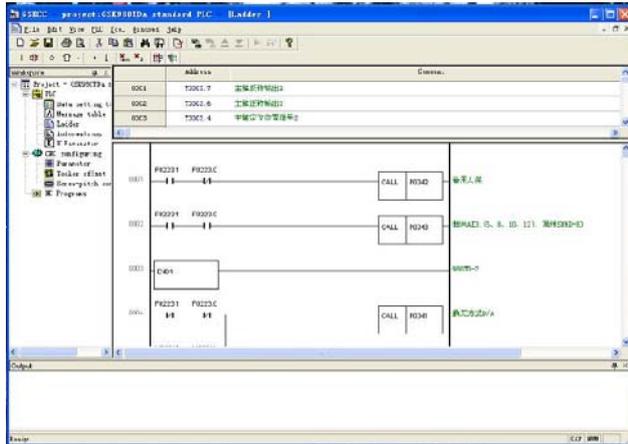
Configuration soft GSKCC window
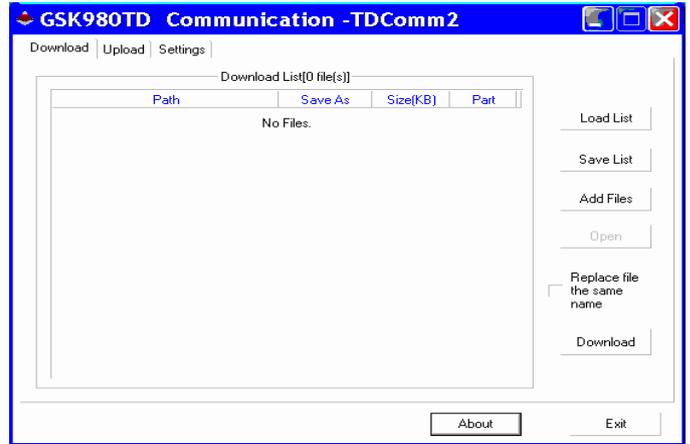
Communication software TDComm window

GSK980TDa CNC Type Configuration

Type Significations

GSK 980TDa—□

Assembly form：none：standard panel
B： boxed assembly

980TDa Turning Machine CNC

GSK series
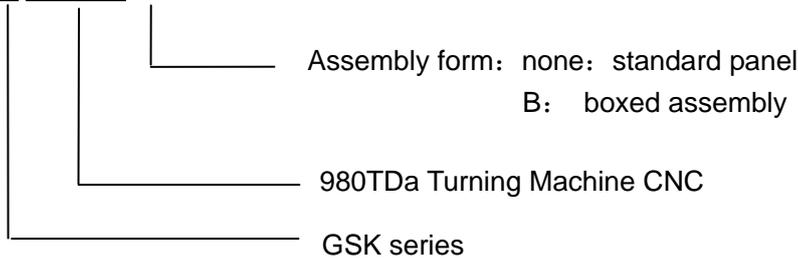
Type	Specification
GSK980TDa	420mm×260mm aluminum alloy solid operation panel
GSK980TDa-B	GSK980TDa matching with AP01（445mm×345mm×182mm）

Standard Functions

All optional functions without being remarked in the provided technical specifications are as follows: Max. rapid traverse speed 30m/min, max. feedrate 15m/min, pitch error compensation, tool nose radius compensation, tool life management, automatic chamfering, PLC axis control, spindle analog voltage control(converter spindle),communication, 32 input signals, 32 output signals. Standard PLC ladder supporting the electric tool post with 2~8 tool selections, Yantai AK31, Changzhou SWBD tool post, and 4-gear spindle automatic shifting gear(only test 1st and 2nd gear), hydraulic chuck, hydraulic tailstock, safeguard, three-color lamp, external MPG (adapted to GSG-100-05E/L,ZSSY2080) and so on.

CNCmakers Limited

Address: No.168, Xiadu Road, Haizhu District, Guangzhou, China 510300
Email: info@CNCmakers.com   Website: www.CNCmakers.com   Tel: +86-138-24444158   Fax: +86-20-84185336

Standard Accessories：

Switch power: GSK-PB2(assembled at the back of CNC)

Connector assembly: CNC interfaces are connected by one set of plug(DB9 female×2, DB15 male×3, DB25 female×1, DB25 male×1)

Note: Corresponding plugs along with cables are supplied when they along with other components including drive unit unit are delivered.

Accessory cables: 12m 10-core shield cable (3m for each X axis, Z axis, input interface XS40/ XS41, output interface XS39/ XS42);

9m 8-core shield cable (3m for each spindle encoder, input interface XS40/ XS41, output interface XS39/ XS42);

3m 4-core shield cable (inverter interface);

Note: The above-mentioned cables as wires are supplied. Signal cables with welded plugs are supplied when a whole set of drive unit and tool post controller is delivered. The requirements for cable length and welding should be remarked in the order list.

Anti-interference components: 1N4007×8, 0.1μF/630V×6

Technical documents: *GSK980 Turning Machine CNC System User Manual* (without *PLC User Manual*)

Optional Accessories

Communication cable A: serial communication cable 5m×1 between PC and GSK980TDa (for end user and machine tool manufacturer)

Communication cable B: serial communication cable 5mx1 between GSK980TDa and GSK980TDa (for machine tool manufacturer used for installing and debugging the system)

Communication disc: communication software TDComm installation disc ×1

Ladder programming software: GSKCC installation disc ×1

MPG: Dongxin RE45T1S05B1 (option: AP01) OR Changchun LGF-001-100(OPTION: AP02);

Additional panel：AP01（aluminum alloy 420mm×71mm） can be assembled under of GSK980TDa operation panel;

AP02（aluminum alloy 100mm×260mm） can be assembled at the side of GSK980TDa operation panel;

Emergent stop button: LAY3-02ZS/1 (it has been installed when GSK980TDa-B is delivered);

No self-locking button: KH-516-B11 (green or red);

Self-locking button: KH-516-B21 (green or red);

I/O transfer terminal block: MCT 03

Note: one set of I/O transfer cable (with 26-core shield cable, DB25 male/female socket) when MCT03 is matched

GSK980TD Series CNC PLC User Manual ×1

Note: Optional accessories as product ones (without being installed and connected) are supplied and it should be remarked in the order list when they are required to install and connect.

Order   Remarks in order：

1. Product type（GSK980TDa, GSK980TDa-B）, number
2. Type and number of assembly (drive unit, isolated transformer)
3. Length and connection of accessory cable
4. Name, type, quantity, installation & connection requirements of optional accessories
5. Whether PLC program(ladder) is provided according to special requirement

## GSK980TDa Turning Machine CNC Rear Interface Layout
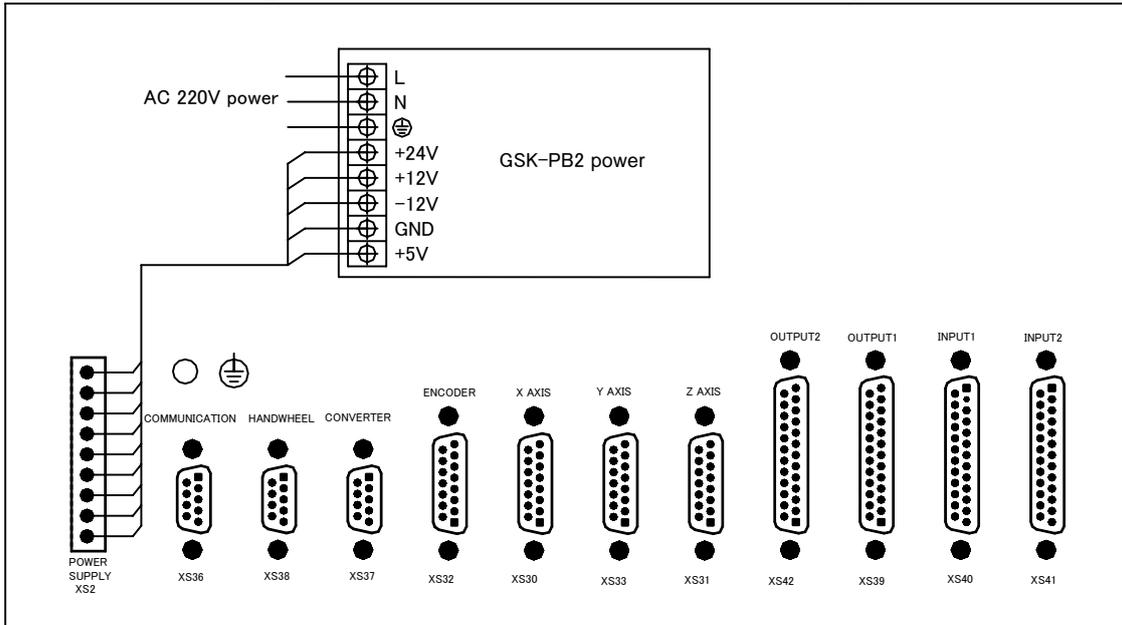
GSK980TDa Appearance Dimension
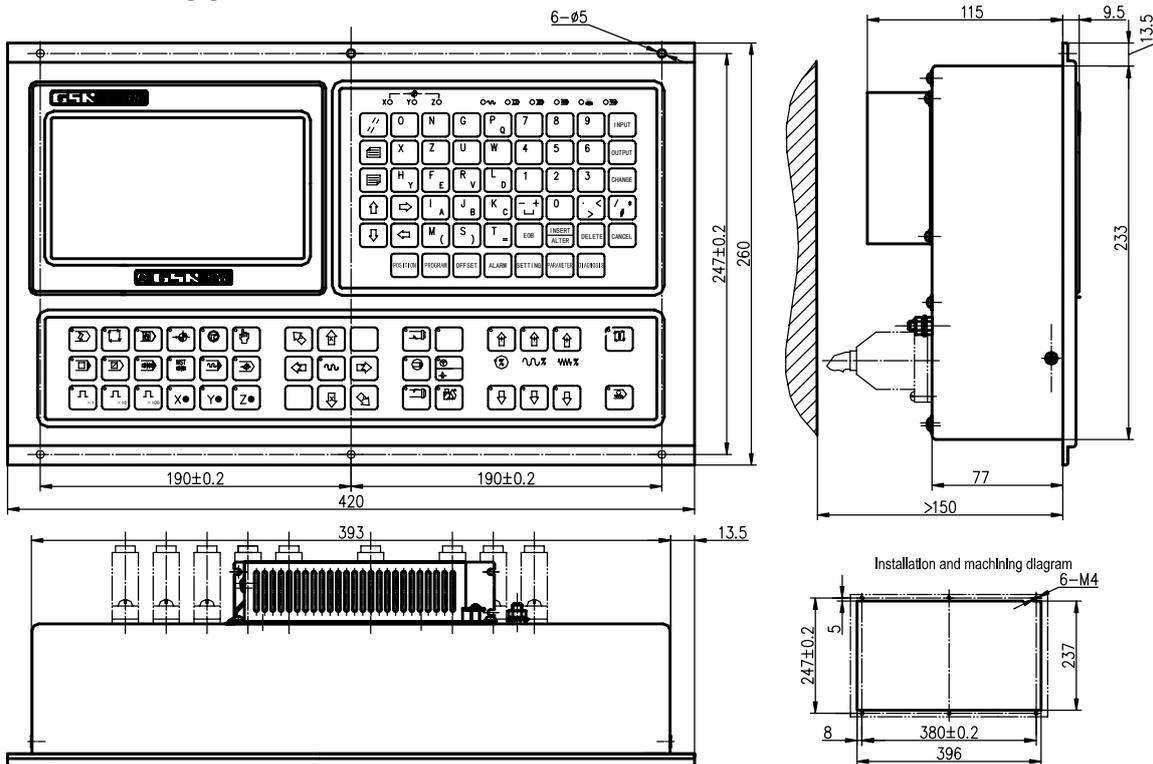
GSK980TDa-B Appearance Dimension

6−Ø16,reserved button hole
Ø22.5,reserved button hole
Ø46，reserved Dongxin handwheel installing hole
445
345
182

Ø130±0.2
Ø82
4−Ø7EQS
182
90
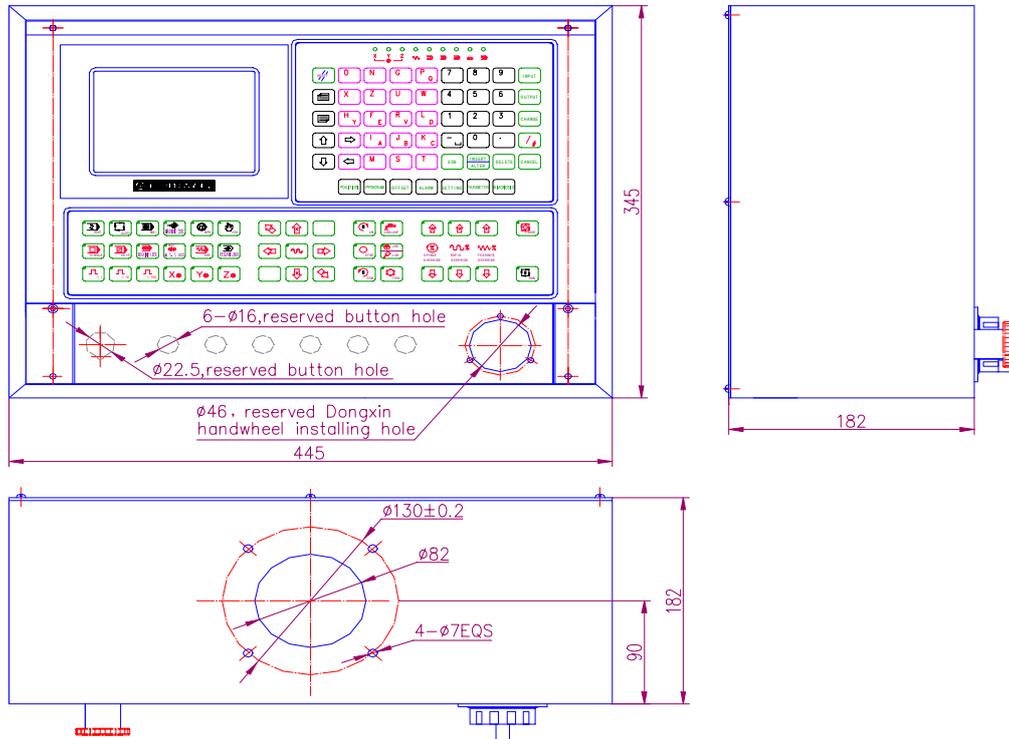
Optional Accessories
Additional Panel Ap01
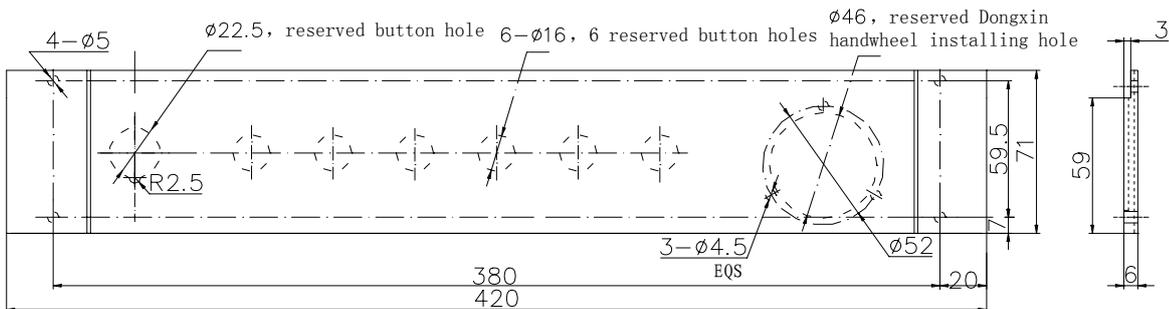
4−Ø5
Ø22.5，reserved button hole   6−Ø16, 6 reserved button holes
Ø46，reserved Dongxin handwheel installing hole
3
R2.5
3−Ø4.5 EQS
Ø52
380
420
20
59.5
71
7
59
6

Additional Panel Ap02

I/O Transfer Terminal Block MCT03