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GSK980TDb TURNING MACHINE CNC SYSTEM

GSK980TDb is a new upgraded software, hardware product based of GSK980TDa, with 5 feed axes(including C axis), 2 analog spindles, 2ms high-speed interpolation, 0.1 μ m control precision, which can obviously improve the machining efficiency, precision and surface quality. It adds the USB interface, U sic file operation and program run. As the upgrade product of GSK980TDa, GSK980TDb is the best choice of economic CNC turning machine.



Characteristics:

- X, Z, Y, 4th, 5th; axis name and axis type of Y, 4th, 5th can be defined
- 2ms interpolation period, control precision 1 μ m, 0.1 μ m
- Max. speed 60m/min (up to 24m/min in 0.1 μ m)
- Adapting to the servo spindle to realize the spindle continuously positioning, rigid tapping, and the rigid thread machining
- Built-in multi PLC programs, and the PLC program currently running can be selected
- G71 supporting flute contour cycle cutting
- Statement macro command programming, macro program call with parameter
- Metric/inch programming, automatic tool setting, automatic chamfer, tool life management function
- Chinese, English, Spanish, Russian display can be selected by parameters.
- USB interface, U disc file operation, system configuration and software
- 2-channel 0V~10V analog voltage output, two-spindle control
- 1-channel MPG input, MPG function
- 41 input signals and 36 output signals
- Appearance installation dimension, and command system are compatible with GSK980TDb

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Technical specification

■ Controllable axes

- ◆ Controllable axes: 5 (X, Z, Y, 4th, 5th)
- ◆ Link axes: 3
- ◆ PLC controllable axes: 3 (X, Z, Y)

■ Feed axis function

- ◆ Least command unit: 0.001mm, 0.0001mm
- ◆ Position command range: $\pm 99999999 \times$ least command unit
- ◆ Rapid traverse speed: max. speed 60m/min in 0.001mm command unit, max. speed 24mm/min in 0.0001mm command unit
- ◆ Rapid override: F0, 25%, 50%, 100%
- ◆ Feedrate override: 0~150% 16 grades to tune
- ◆ Interpolation mode: linear interpolation, arc interpolation(three-point arc interpolation), thread interpolation, ellipse interpolation, parabola interpolation and rigid tapping
- ◆ Automatic chamfer function

■ Thread function

- ◆ General thread(following spindle)/rigid thread
- ◆ Single/multi metric, inch straight thread, taper thread, end face thread, constant pitch thread and variable pitch thread
- ◆ Thread run-out length, angle, speed characteristics can be set
- ◆ Thread pitch: 0.01mm~500mm or 0.06 tooth/inch~25400 tooth/inch

■ Acceleration/deceleration function

- ◆ Cutting feed: linear
- ◆ Rapid traverse: linear, S
- ◆ Thread cutting: linear, exponential
- ◆ Initial speed, termination speed, time of acceleration/deceleration can be set by parameters.

■ Spindle function

- ◆ 2-channel 0V~10V analog voltage output, two-spindle control
- ◆ 1-channel spindle encoder feedback, spindle encoder line can be set (100p/r~5000p/r)
- ◆ Transmission ratio between encoder and spindle: (1~255) : (1~255)
- ◆ Spindle speed: it is set by S or PLC, and speed range: 0r/min~9999r/min
- ◆ Spindel override: 50%~120% 8 grades tune
- ◆ Spindle constant surface speed control
- ◆ Rigid tapping

■ Tool function

- ◆ Tool length compensation
- ◆ Tool nose radius compensation (C)
- ◆ Tool wear compensation
- ◆ Tool life management
- ◆ Toolsetting mode: fixed-point toolsetting, trial-cut toolsetting, reference point return toolsetting, automatic toolsetting
- ◆ Tool offset execution mode: modifying coordinate mode, tool traverse mode

■ Precision compensation

- ◆ Backlash compensation
- ◆ Memory pitch error compensation

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■ PLC function

- ◆ Two-level PLC program, up to 5000 steps, the 1st program refresh period 8ms
- ◆ PLC program communication download
- ◆ PLC warning and PLC alarm
- ◆ Many PLC programs (up to 16PCS), the PLC program currently running can be selected
- ◆ Basic I/O: 40 input signals /32 output signals

■ Man-machine interface

- ◆ 7.4" wide screen LCD, resolution: 234×480
- ◆ Chinese, English, Spanish, Russian display
- ◆ Planar tool path display
- ◆ Real-time clock

■ Operation management

- ◆ Operation mode: edit, auto, MDI, machine zero return, MPG/single, manual, program zero return
- ◆ Multi-level operation privilege management
- ◆ Alarm record

■ Program edit

- ◆ Program capacity: 40MB, 10000 programs (including subprograms and macro programs)
- ◆ Edit function: program/block word search, modification, deletion
- ◆ Program format: ISO command, statement macro command programming, relative coordinate, absolute coordinate and compound coordinate programming
- ◆ Program call: macro program call with parameter, 4-level program built-in

■ Communication function

- ◆ RS232: two-way transmitting part programs and parameters, PLC program, system software serial upgrade
- ◆ USB: U file operation, U file directly machining, PLC program, system software U upgrade

■ Safety function

- ◆ Emergency stop
- ◆ Hardware travel limit
- ◆ Software travel check
- ◆ Data backup and recovery

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■ G command table

| Command | Function | Command | Function | Command | Function |
|---------|--|---------|--------------------------------------|---------|--|
| G00 | Rapid traverse (positioning) | G31 | Skip function | G72 | Radial roughing cycle |
| G01 | Linear interpolation | G32 | Constant pitch thread cutting | G73 | Closed cutting cycle |
| G02 | CW arc interpolation | G32.1 | Rigid thread cutting | G74 | Axial grooving cycle |
| G03 | CCW arc interpolation | G33 | Z tapping cycle | G75 | Radial grooving cycle |
| G04 | Dwell, exact stop | G34 | Thread cutting with variable lead | G76 | Multiple thread cutting cycle |
| G05 | Three-point arc interpolation | G36 | Automatic tool compensation X | G80 | Rigid tapping state cancel |
| G6.2 | Ellipse interpolation (CW) | G37 | Automatic tool compensation Z | G84 | Axial rigid tapping |
| G6.3 | Ellipse interpolation (CCW) | G40 | Tool nose radius compensation cancel | G88 | Radial rigid tapping |
| G7.2 | Parabola interpolation (CW) | G41 | Tool nose radius compensation left | G90 | Axial cutting cycle |
| G7.3 | Parabola interpolation (CCW) | G42 | Tool nose radius compensation right | G92 | Thread cutting cycle |
| G10 | Data input ON | G50 | Workpiece coordinate system setting | G94 | Radial cutting cycle |
| G11 | Data input OFF | G65 | Macro command non-modal call | G96 | <i>Constant surface speed control</i> |
| G20 | Input in inch | G66 | Macro program modal call | G97 | <i>Constant surface speed control cancel</i> |
| G21 | Input in metric | G67 | Macro program modal call cancel | G98 | Feed per minute |
| G28 | Reference point return | G70 | Finishing cycle | G99 | Feed per rev |
| G30 | 2 nd , 3 rd , 4 th reference point return | G71 | Axial roughing cycle (flute cycle) | | |

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Macro command list

| Command format | Functions | Definitions |
|----------------------|---|--|
| G65 H01 P#i Q#j | Assignment | # i = # j assign value of j to i |
| G65 H02 P#i Q#j R#k; | Decimal add operation | # i = # j + # k |
| G65 H03 P#i Q#j R#k; | Decimal subtract operation | # i = # j - # k |
| G65 H04 P#i Q#j R#k; | Decimal multiplication operation | # i = # j×# k |
| G65 H05 P#i Q#j R#k; | Decimal division operation | # i = # j÷# k |
| G65 H11 P#i Q#j R#k; | Binary addition | # i = # j OR # k |
| G65 H12 P#i Q#j R#k; | Binary multiplication(operation) | # i = # j AND # k |
| G65 H13 P#i Q#j R#k; | Binary exclusive or | # i = # j XOR # k |
| G65 H21 P#i Q#j; | Decimal square root | # i = $\sqrt{\# j}$ |
| G65 H22 P#i Q#j; | Decimal absolute value | # i = # j |
| G65 H23 P#i Q#j R#k; | Decimal remainder | Remainder of # i = (#j÷# k) |
| G65 H24 P#i Q#j; | Decimal into binary | # i = BIN(# j) |
| G65 H25 P#i Q#j; | Binary into decimal | # i = DEC(# j) |
| G65 H26 P#i Q#j R#k; | Decimal multiplication/division operation | # i = # i×# j÷# k |
| G65 H27 P#i Q#j R#k; | Compound square root | # i = $\sqrt{\# j^2 + \# k^2}$ |
| G65 H31 P#i Q#j R#k; | Sine | # i = # j×sin(# k) |
| G65 H32 P#i Q#j R#k; | Cosine | # i = # j×cos(# k) |
| G65 H33 P#i Q#j R#k; | Tangent | # i = # j×tan(# k) |
| G65 H34 P#i Q#j R#k; | Arc tangent | # i = ATAN(# j / # k) |
| G65 H80 Pn; | Unconditional jump | Jump to block n |
| G65 H81 Pn Q#j R#k; | Conditional jump 1 | Jump to block n if # j = # k, otherwise the system executes in order |
| G65 H82 Pn Q#j R#k; | Conditional jump 2 | Jump to block n if # j ≠ # k, otherwise the system executes in order |
| G65 H83 Pn Q#j R#k; | Conditional jump 3 | Jump to block n if # j > # k, otherwise the system executes in order |
| G65 H84 Pn Q#j R#k; | Conditional jump 4 | Jump to block n if # j < # k, otherwise the system executes in order |
| G65 H85 Pn Q#j R#k; | Conditional jump 5 | Jump to block n if # j ≥ # k, otherwise the system executes in order |
| G65 H86 Pn Q#j R#k; | Conditional jump 6 | Jump to block n if # j ≤ # k, otherwise the system executes in order |
| G65 H99 Pn; | P/S alarm | (500+n) alarms |

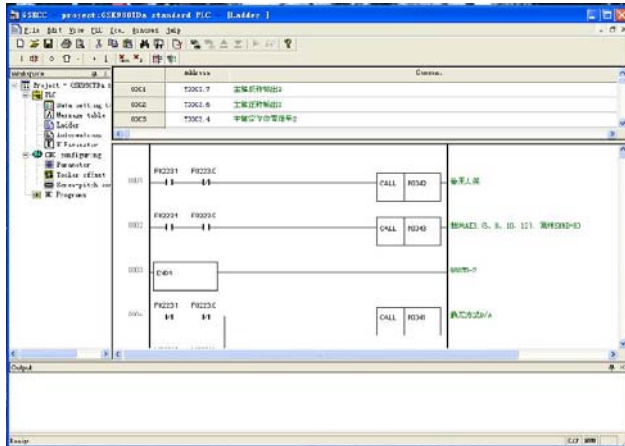
Configuration Software and Communication Software

GSK980TDb uses the same configuration software GSKCC and communication software TDComm2, 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 GSK980TDb. TDComm can bidirectionally transmit part programs, parameters, pitch error compensation data and tool compensation data between PC and CNC.

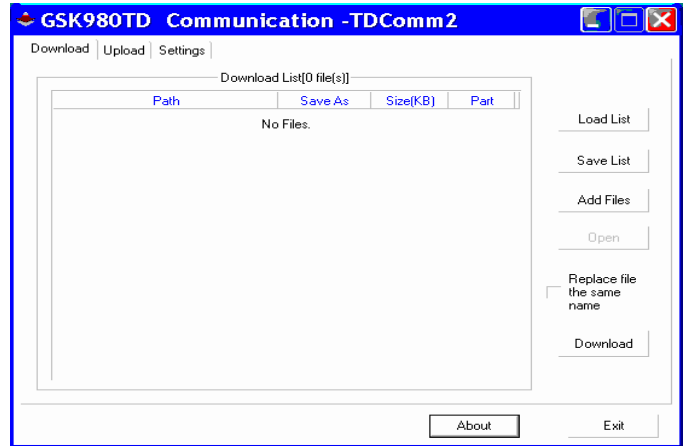
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Configuration soft GSKCC window

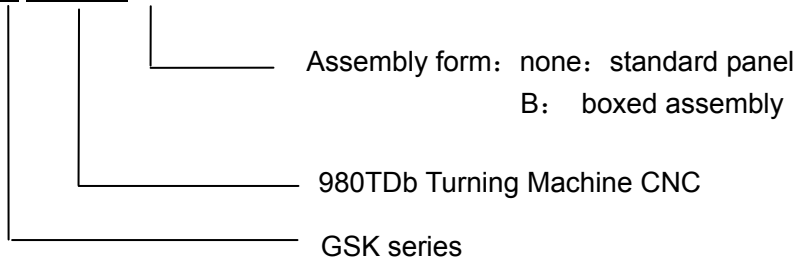


Communication software TDCComm2 window

GSK980TDb CNC Type Configuration

Type Significations

GSK 980TDb □



| Type | Specification |
|-------------|--|
| GSK980TDb | 420mm×260mm aluminum alloy solid operation panel |
| GSK980TDb-B | GSK980TDa matching with AP01 (445mm×345mm×182mm) |

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.

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Anti-interference components: 1N4007×8, 0.1 μ F/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 GSK980TDb (for end user and machine tool manufacturer)

Communication cable B: serial communication cable 5mx1 between GSK980TDb and PC (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 GSK980TDb 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 (GSK980TDb, GSK980TDb-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

GSK980TDb back cover interface layout

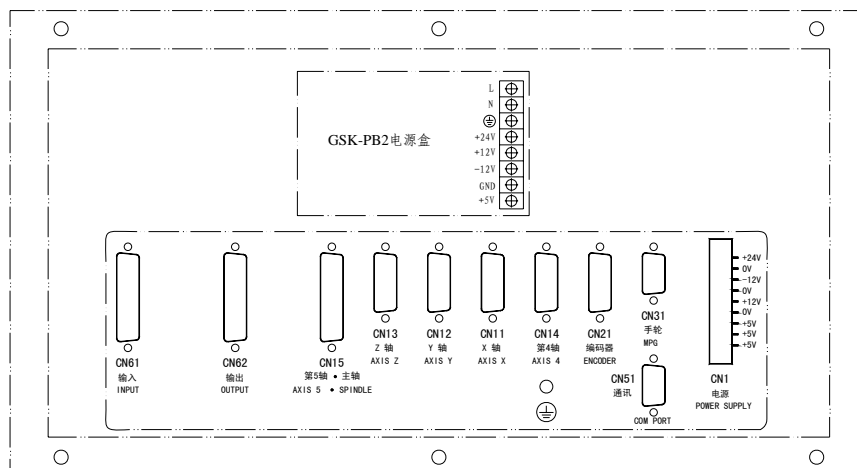


Fig. 1-1 GSK980TDb back cover interface layout

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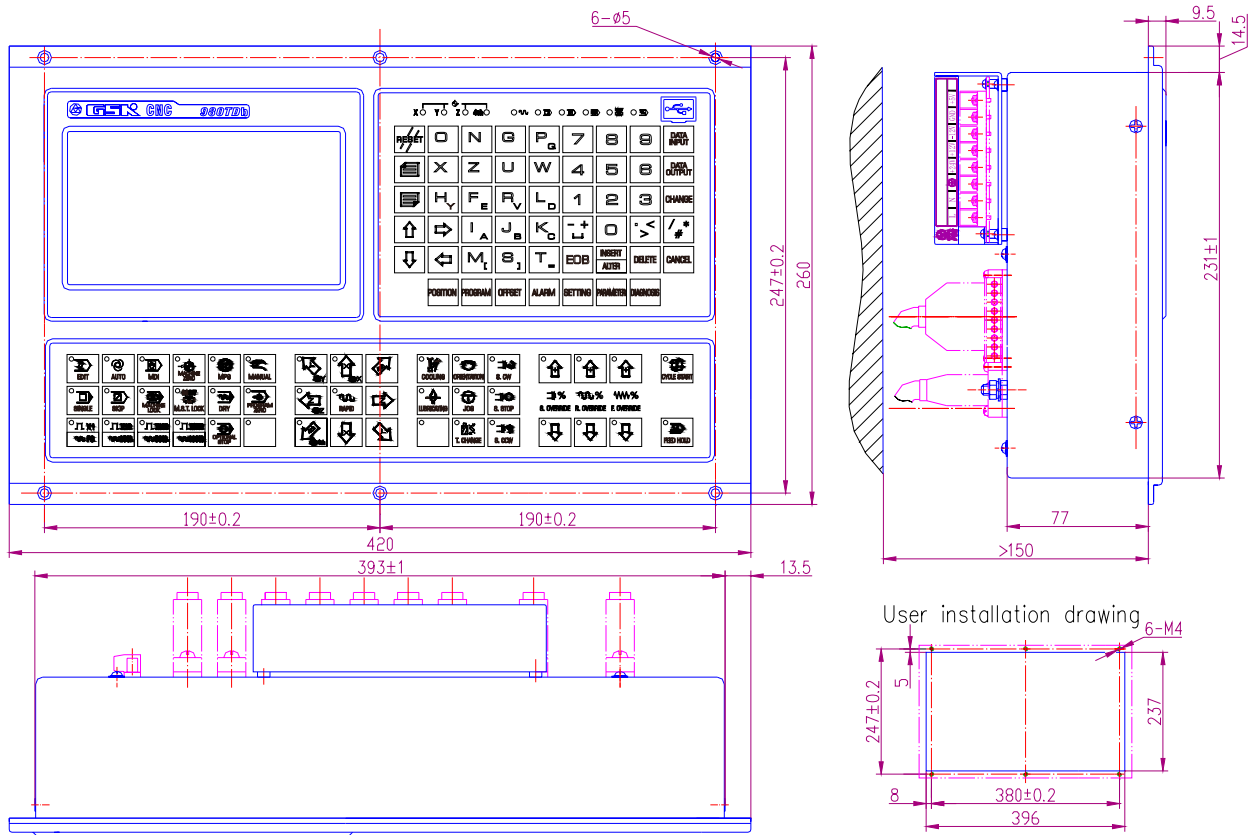
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GSK980TDb external dimensions



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ig. 1-2 GSK980TDb external dimensions GSK980TDb-B contour dimension

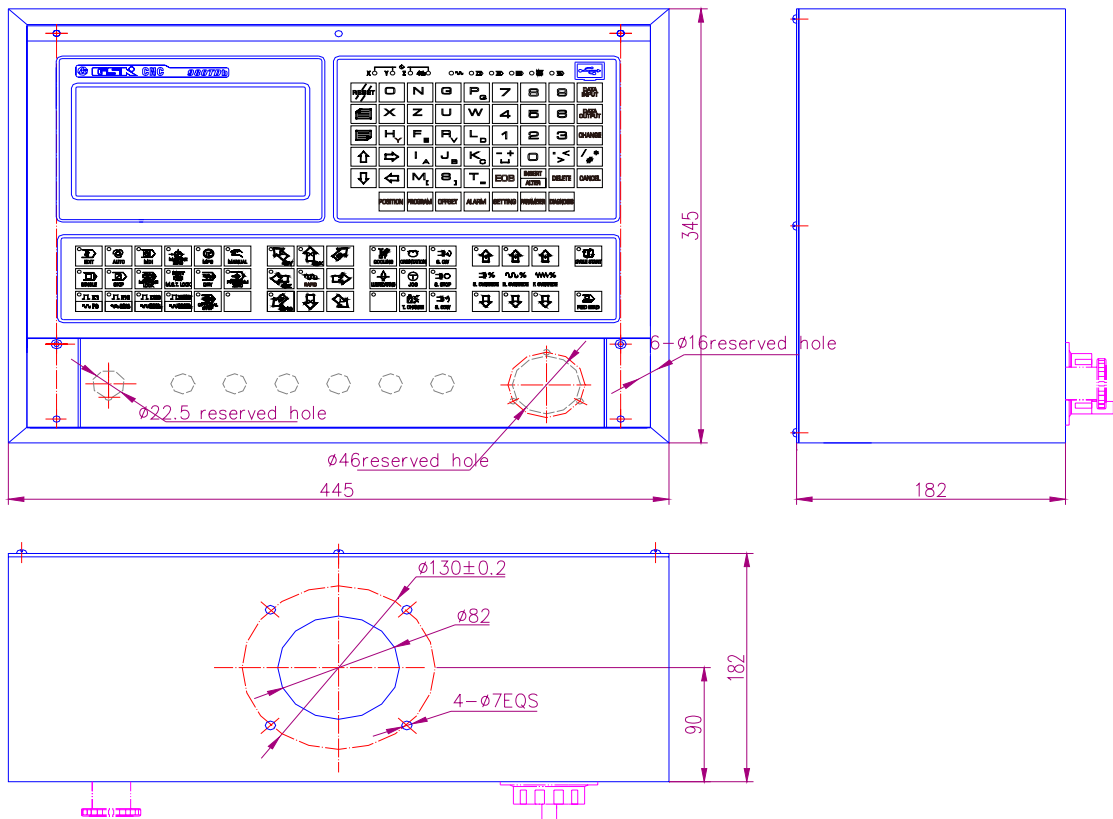


Fig.1-3 GSK980TDb-B contour dimension

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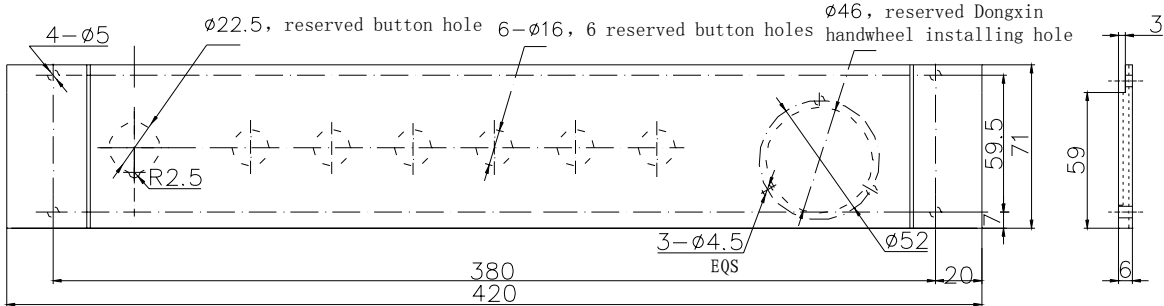
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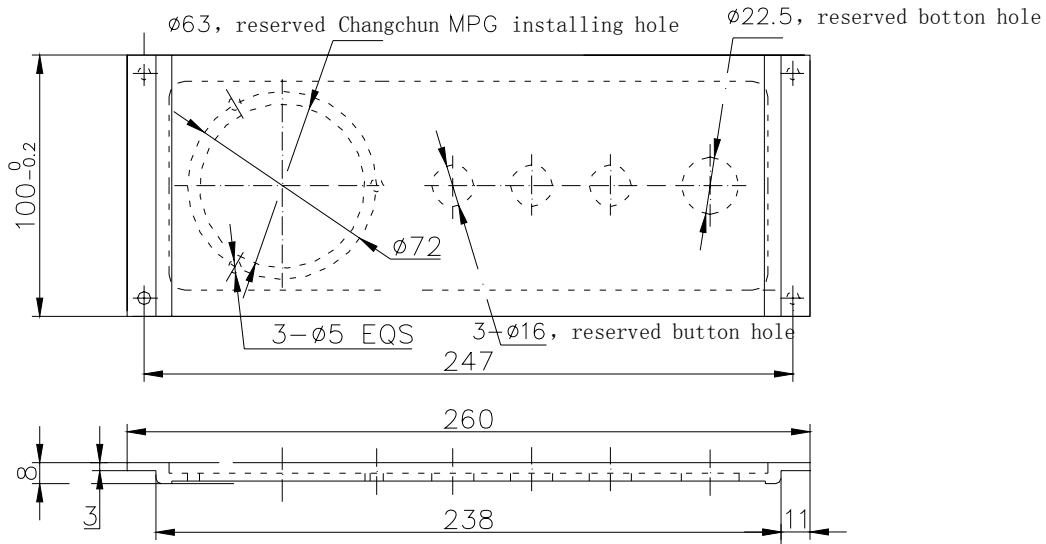
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Optional Accessories Additional Panel Ap01



Additional Panel Ap02



Outline

Dimension of I/O deconcentrator MCT01A

