



精诚致远机电设备

Jingchengzhiyuan Electrical & Mechanical Equipment

# QC16002 Punching and Drilling Machine

## User Manual

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## Contents

User manual for punching and drilling machine .....	4
1. Overview .....	4
2. Functional features .....	4
2.1 Functional features of QC16002 drilling machine .....	4
2.2 Interface display features .....	5
3. Reference standards .....	5
3.1 National reference standards .....	5
3.2 Industry reference standards .....	5
4. Technical parameters .....	6
4.1 Specifications, models and technical parameters .....	6
4.2 Technical parameters of display instrument .....	6
5. Model description .....	7
5.1 Description of equipment model .....	7
5.2 Oil-water separator .....	8
5.3 Description of throttle valve model .....	8
6. Installation and debugging .....	8
6.1 Control system wiring .....	8
Input: Output: .....	9
7. Instructions .....	10
7.1 Introduction to overall functions of punching machine .....	10
7.2 Introduction to functions of electric cabinet panel .....	11
7.3 Operating instructions for accessories .....	12
7.4 Operating procedures for start-up work .....	13
Schematic diagram of punching and drilling machine .....	14
8. Precautions and troubleshooting .....	15
8.1 Precautions .....	15
8.2 Troubleshooting .....	17

# User manual for punching and drilling machine

## 1 Overview

Qingdao Jingchengzhiyuan Electrical & Mechanical Equipment Co., Ltd. is a company integrating the design, production and sales of drilling machine, riveter, eyeletting machine, beading machine, punching machine and other automation equipment. Non-standard automation equipment can be customized according to customer needs. The Company has established a good reputation during its development through continuous product design, R&D, reform and innovation, with products exported to overseas. The Company highlights the corporate culture of excellence, honesty, exploration and foresight and adheres to the business philosophy of prioritizing quality, credit, and customers, striving to offer better mechanical and electrical equipment.

## 2 Functional features

### 2.1 Functional features of QC16002 drilling machine

The equipment, designed with a touch control panel, features simple operation and fast system response, and can be expanded into a working system like assembly lines.

The equipment is provided with a quick troubleshooting device. In order to prevent the troubleshooting difficulties caused by faults during operation, a troubleshooting device supporting quick resetting is set up in the system, which will help the whole structure eliminate the faults quickly and return to the working state.

Processing parameters can be set according to the type and specifications of the objects to be processed, ensuring the yield of processed products.

With the recording function, the equipment can count the processed products, which guarantees the number of products processed by operators.

## 2.2 Interface display features

The QC16002 punching and drilling machine is equipped with an F1001A touch screen interface, which supports multiple communication protocol structures RS232/RS485/RS422.

The use of LCD ensures the resolution of the interface, the clarity and performance of the display, and the operating sensitivity.

Various operation interfaces, such as USB SLAVE/USB HOST, ensure the diversified operation modes.

## 3 Reference standards

### 3.1 National reference standards

GB/T 36211.2-2018 *Intelligent Measuring and Control Device in Full-distributed Industrial Control System -- Part 2: Communication Interoperability Test Specification*

GB/T 35673-2017 *Industrial Communication Networks -- Network and System Security -- System Security Requirements and Security Levels*, GB/T 4830-2015 *Industrial Process Measurement and Control Instruments -- Pressure Range and Quality of Air Supply*

GB 30439.8-2014 *Safety Requirements for Industrial Automation Products -- Part 8: Safety Requirements for Electrical Actuator*

GB/T 19582.1-2008 *Modbus Industrial Automation Network Specification -- Part 1: Modbus Application Protocol*

### 3.2 Industry reference standards

JJF 1610-2017 *Calibration Specification for Electric and Pneumatic Torque Wrenches*

JB/T 7056-1993 *General Specification for Pneumatic Pipe Joints*

JB/T 5923-2013 *Rules of Pneumatic Fluid Power Cylinders*

## 4 Technical parameters

### 4.1 Specifications, models and technical parameters

Technical parameters of QC16002 punching and drilling machine

Specification and parameters	Name	Punching-drilling AIO
	Model	QC16002
Working stroke range	Inner diameter of air hole (mm)	5-20
	Maximum throat depth (mm)	130
	Riveting stroke (mm)	45
Gas-electric parameters	Air pressure (MPa)	0.6-0.8
	Voltage (V)	220
Basic parameters	Equipment dimension (mm)	675×675×1535
	Gross weight of equipment (kg)	190
	Net weight of equipment (kg)	160

### 4.2 Technical parameters of display instrument

Table 2 Technical Parameters of Control Display Screen

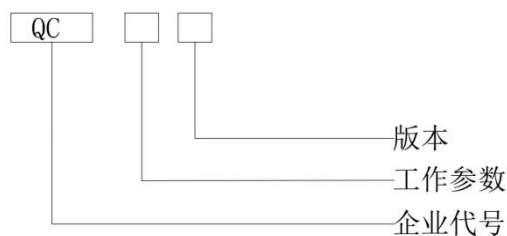
Performance	Model	MM24MR-4MT-500-FX-B
	LCD size	5.0TFT
	Resolution	480*272
	Luminance (cd/m)	250
	Backlight	LED
	Touch screen	4-wire precision resistance network
	LCD service life	50000h
	CPU	A8 800MHz RISC
	RIC & formula memory	Real time clock + 512KB

specifications	Scalable memory	Not support
	Program download	USB SLAVE B interface
	Communication port	Internal TTL
	USB HOST	Support mouse
Electrical specifications	Rated power	4.8W
	Rated voltage	DC24V
	Input range	DC15-DC28V
	Permissible power loss	<3MS
	Insulation resistance	Over 50MΩ@500vdc
	High-voltage insulation testing	500V AC 1 min
Structural specifications	Enclosure color	Gray
	Enclosure material	Fireproof ABS plastic
	Overall dimension (mm)	180×104×52.7
	Mounting hole dimension (mm)	154×94

## 5 Model description

### 5.1 Description of equipment model

Description of the drilling machine model



版本	Version
工作参数	Working parameters
企业代号	Enterprise code

For example: QC16002

"QC" represents Qingdao Jingchengzhiyuan Electrical &Mechanical Equipment Co., Ltd.

"16" indicates the time

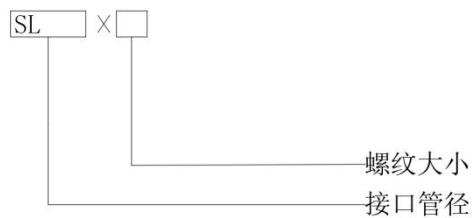
"002" represents the second generation

## 5.2 Oil-water separator

During the use of the equipment, special oil for lubricator shall be added regularly for maintenance, to prolong the service life. (Add special oil for lubricator)

## 5.3 Description of throttle valve model

Description of the throttle valve model is shown below



螺纹大小	Thread size
接口管径	Joint pipe diameter

For example, SL6-01

"SL" represents an L-type

"6" indicates the outer diameter of the joint is 6mm

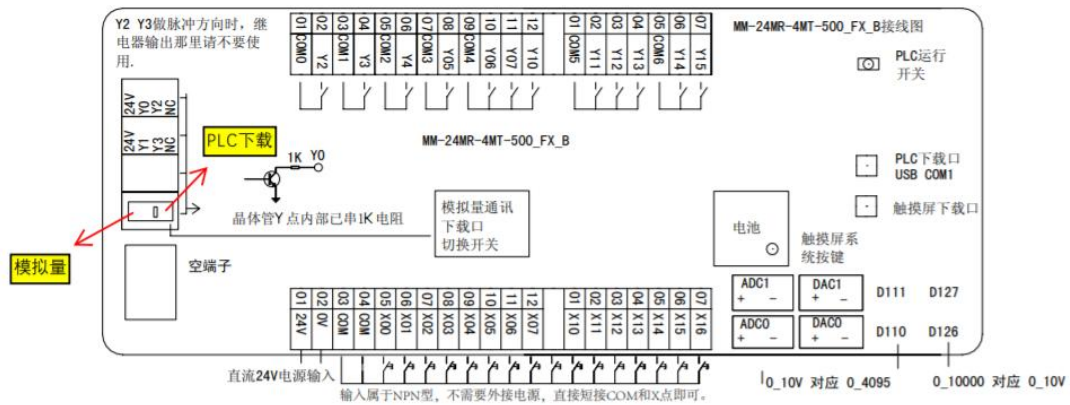
"01" means the thread is 1/8 inch connector

# 6 Installation and debugging

## 6.1 Control system wiring

The control system wiring diagram is shown as below:





Y2 Y3 做脉冲方向时，继电器输出那里请不要使用	When Y2 Y3 is the pulse direction, please do not use the relay output
PLC 下载	PLC download
晶体管 Y 点内部已串 IK 电阻	An IK resistor has been connected in series at the Y point of the transistor
模拟量	Analog
空端子	Null terminal
模拟量通讯下载口切换开关	Analog communication download port switch
直流 24V 电源输入	DC 24V power input
输入属于 NPN 型，不需要外接电源，直接短接 COM 和 X 点即可。	The input is NPN type, so no external power supply is needed. Just shorten COM and X point.
M-24MR-4MT-500_FX_B 接线图	M-24MR-4MT-500_FX_B Wiring Diagram
PLC 运行开关.	PLC operation switch
PLC 下载口	PLC download port
触摸屏下载口	Touch screen download port
电池	Battery
触摸屏系统按键	Touch screen system buttons
o_10V 对应 0_4095	O_10V corresponds to 0_4095
o_10000 对应 0_10V	O_10000 corresponds to 0_10V

### Input:

- x0 Automatic operation
- x1 Punching in place
- x2 Pressing in place

### Output:

- Y4 Punching down
- Y5 Punching up
- Y6 Pressing

x3     Punching position  
x4     Pressing position  
x5     Reset

Y7     Mold change  
Y10    Down discharging  
Y11    Side discharging

## 7 Instructions

### 7.1 Introduction to overall functions of punching machine

The picture shows QC16002 punching-drilling AIO of Qingdao Jingchengzhiyuan Electrical &Mechanical Equipment Co., Ltd., which is a mechanical structure equipment integrating punching and drilling. It is mainly for the punching and drilling of various fabrics, suitable for processing materials with high hardness and density. The equipment can achieve continuous and stable operation. The special motor used for power supply not only ensures the power stability and service life, but also reduces failure frequency of the equipment. The structure and function of the drilling machine are introduced below:

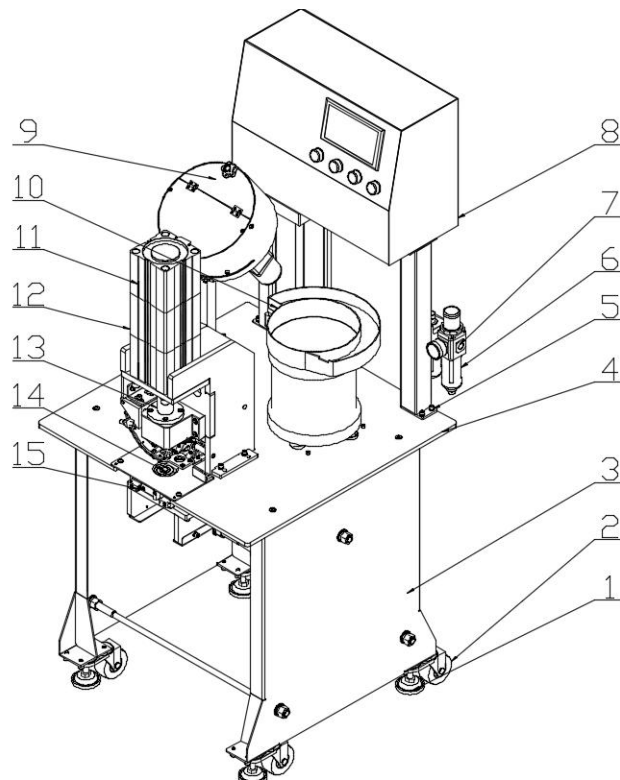


Figure 7.1 Schematic Structure Diagram of the Whole Machine

1 Adjusting foot cup, 2 Universal wheel, 3 Mounting rack, 4 Mounting workbench, 5 Distribution box bracket, 6 Oil-water separator, 7 Inlet slide valve interface, 8 Control panel distribution box, 9 Material selection disk, 10 Vibration disk, 11 Pressure sensor, 12 Main cylinder, 13 Swing arm, 14 Mold, 15 Stroke proximity switch

## 7.2 Introduction to functions of electric cabinet panel

Electric cabinet panel is the control and adjustment part of the main structure of the equipment. There are the structural parts of the display and the control switch on the surface of the panel, and the structural part of the control circuit inside the cabinet, as shown below:

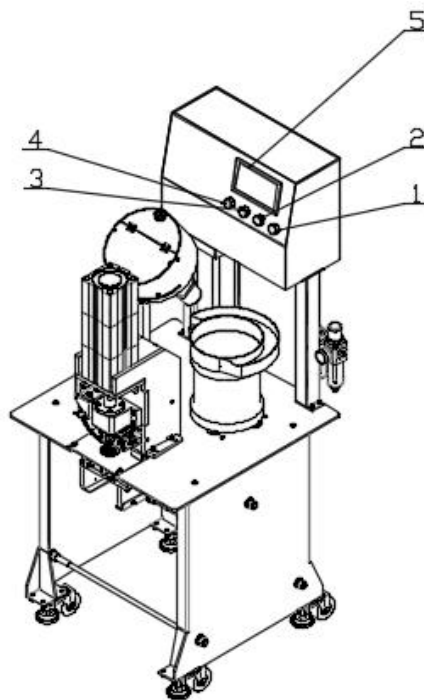


Figure 7.2 Control Chart of the Operation Panel

1 Power switch, 2 Reset switch, 3 Vibration disk switch, 4 Material selection disk switch, 5 Touch screen

Power switch: after the equipment is powered on, switch on/off the electric parts

Reset switch: in case of a failure, the equipment can be restored to its original state by adjusting the reset switch

Vibration disk switch: the starting switch of the vibration disk, control the operation of the vibration disk

Material selection disk switch: the switch of the material selection disk, select the required workpieces for processing according to the processing requirements

Touch screen: display and set the working parameters during the operation of the equipment

### 7.3 Operating instructions for accessories

#### 7.3.1 Throttle valve regulation

The working principle of the throttle valve is to control the gas flow by changing the throttling section or length. Due to the structural setting, the throttle valve can't support negative feedback or compensate for the speed instability caused by the load change, so it is generally used in cases with small load change or low speed stability requirements.

#### 7.3.2 Air supply processor

The air supply processor is a component that works through the pressure or expansion force of the air, that is, the elastic energy of compressed air is converted into kinetic energy. **During the use of the equipment, special oil for lubricator shall be added regularly for maintenance, to prolong the service life. (Add special oil for lubricator)**

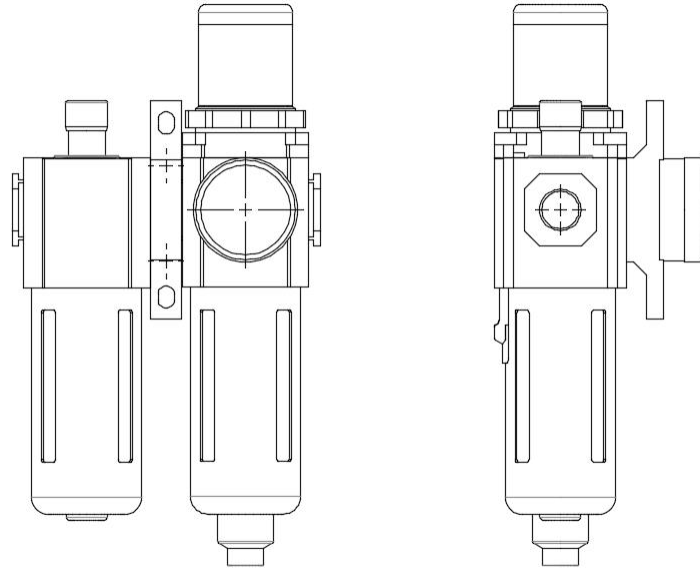
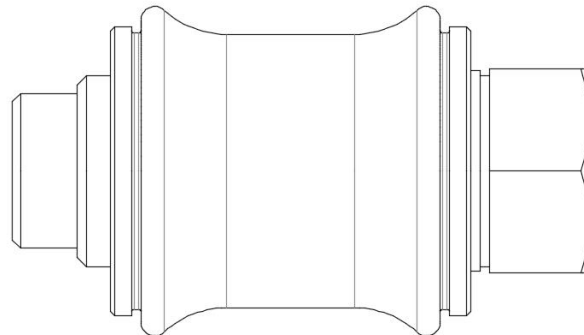


Figure 7.4 Schematic Diagram of Filter

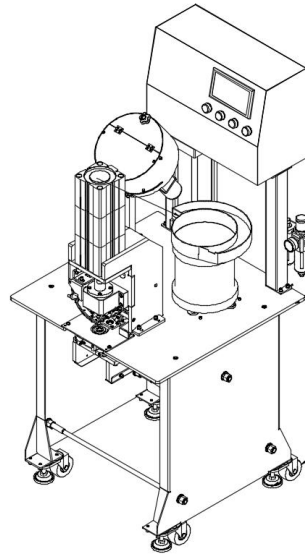
### 7.3.3 Manual slide valve adjustment



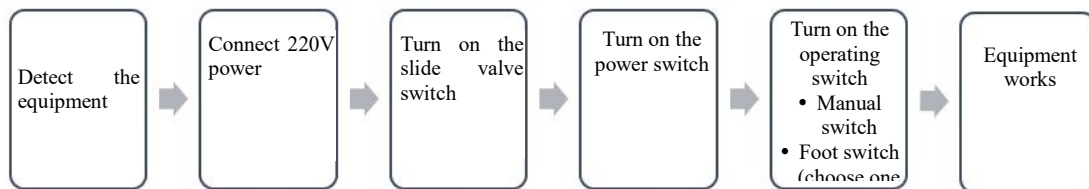
The inlet and outlet of the compressed air is controlled by the left and right movement of the slide valve. When the equipment is in use, press the reset button on the electric meter box first, and then open the slide valve; after use, turn off the power supply, shut off the slide valve and release the compressed air.

### 7.4 Operating procedures for start-up work

This is the QC16002 punching and drilling machine, and the operating procedures are as below:

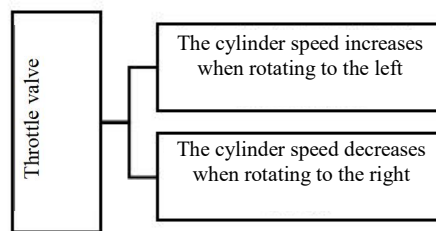


Schematic Diagram of Punching and Drilling Machine

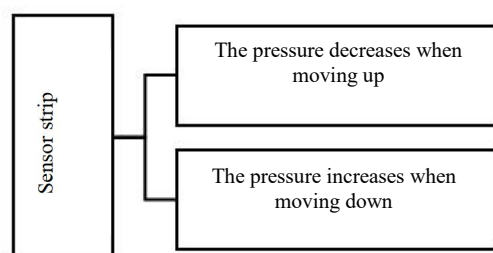


#### 7.4.1 Adjustment of related working parts

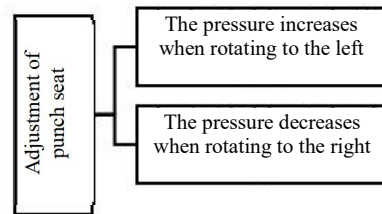
##### 1. Adjustment of cylinder pushing speed



##### 2. Adjustment of cylinder punching pressure



### 3. Adjustment of cylinder riveting pressure



## 8 Precautions and troubleshooting

### 8.1 Precautions

#### 8.1.1 Precautions for equipment use

1. Before using the equipment, check the surrounding environment and ensure that all working parts are in normal working condition.

2. The equipment shall be used reasonably according to the processing requirements and selection principles, and shall not be used under overload.

3. Before using the equipment, operators shall understand the operation procedures and master the operation methods and the equipment performance.

4. According to the lubrication requirements, add lubricating oil to the oil holes and the sliding parts.

5. Safety operation requirements shall be met.

6. Before use, the equipment should be idled once to check for any abnormality.

7. The power supply of air supply shall be cut off when installing the mold.

8. After operation, the workbench should be cleaned, the leftovers and sundries should be removed, and the power supply of air supply should be disconnected.

9. During the use of the equipment, it is forbidden to put hands or other body parts into the riveting positions such as the mold. For sundries cleaning, please use hook or other tools.

Notes: 10. Three-core power socket must be used and reliably grounded

11. After power on, press the reset switch and then turn on the power
12. The air supply should be connected to the filter in the water filtering device from the air pump end
13. Power adapter can be used for this machine, to realize stable input voltage of 220V, suitable for different countries and regions

#### 8.1.2 Precautions for touch screen

1. The film surface (the front) is the touch surface; the glass surface (the back) is not for touch
2. The touch screen is made of glass with sharp edges. Please wear gloves / fingertips when assembling
3. The touch screen consists of fragile glass, do not exert strong forces on it during assembly.
4. Avoid taking the screen by the outgoing wire, and avoid pulling the outgoing wire.
5. The reinforcing plate of the outgoing wire shall not be bent.
6. Any part of the outgoing wire shall not be folded.
7. When assembling, the outgoing wire must be inserted horizontally, and shall not be folded at the root of the reinforcing plate.
8. Take or place one screen gently at a time, and avoid scratches due to any collision.
9. When cleaning the surface, please use a soft cloth (deerskin) dipped in petroleum ether to wipe it.
10. Do not use corrosive organic solvent (such as industrial alcohol) to wipe the surface film.

#### 8.1.2 Precautions for cylinder use

Any worn or damaged gasket ring and sealing ring shall be replaced in time. Any impurities in the cylinder shall be removed in time. Any scratched piston rod shall be



replaced.

### 8.1.3 Precautions for throttle valve

1. The valve will be operated frequently, so it should be installed in a position easy to operate.
2. During installation, make sure that the medium direction is consistent with the arrow direction marked on the valve body.

## 8.2 Troubleshooting

8.2.1 In some applications, due to poor grounding performance, the enclosure of the control box is covered with static electricity, which will affect the working electric field inside the control box, leading to touch failure gradually. In this case, use a wire to ground the enclosure of the control box and restart the equipment.

8.2.2 As the surface acoustic wave touch screen system generates waves over the surface of the touch screen. If the touch screen is not cleaned for a long time, the accumulated dust will block the reflection fringes of the waves, and the touch screen system will not work normally. For the touch display, use a clean business card or banknote to remove the dust on the surrounding reflection fringes through the gap between the front display cover and the touch screen, and then restart the equipment. For touch AIO whose front display cover can be opened, remove the dust on the reflection fringes around with a clean towel, and then restart the equipment.

8.2.3 The touch screen system is powered by the AIO power supply rather than the primary machine. Therefore, it is necessary to check whether the output of the 24V power supply of the AIO is correct.

### 8.2.4 Cylinder troubleshooting

The following are the troubleshooting methods for the cylinder (working part) of the equipment during use:

Fault		Reason analysis	Troubleshooting methods
External leakage	Air leakage at piston rod end	Eccentric installation of piston rod	Remount or adjust the piston rod to ensure it is not subject to any eccentric or lateral load. Check whether the lubricator fails. Replace the gasket ring. Clean and remove impurities, install or replace the dust cover. Replace the piston rod.
	Air leakage between cylinder barrel and cylinder head	Insufficient lubricating oil supply Worn gasket ring of piston	
	Air leakage at buffer adjustment	Impurities on the mating surface of piston rod bearing Scratched piston rod	
Internal leakage		Damaged piston gasket ring Poor lubrication Stuck piston and defective piston mating surface. Impurities on the sealing surface	Replace the sealing Check whether the lubricator fails Remount or adjust the piston rod to ensure it is not subject to any eccentric or lateral load. Remove impurities and use purified compressed air.
Insufficient output power Unstable movement		Poor lubrication Stuck piston or piston rod Insufficient air supply flow Condensate impurities	Check whether the lubricator fails Remount or adjust the piston rod to eliminate the eccentric or lateral load. Increase the diameter of connection or pipe joint

			Use clean and dry compressed air to prevent water condensation.
Poor buffering effect		Worn buffer gasket ring Damaged adjusting screw Cylinder too fast	Replace the gasket ring Replace the adjusting screw Check whether the buffer mechanism is suitable
Damage	Damaged piston rod	Eccentric or lateral load Piston rod under impact load Cylinder too fast	Eliminate the eccentric or lateral load Do not apply any impact to the piston rod Set the buffer device
	Damaged cylinder head	The buffer mechanism does not work	Set the buffer mechanism externally or in a loop

Notes: if there is any abnormal action during working, check whether the sensor is on for a long time. If so, it must be damaged. Replace it.

For more information, please consult the Company.

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