

# QZ105A/D Position control valve instruction manual



大同市欧特讯动力控制有限公司  
电话：0352-5099489 传真：0352-5376158  
地址：山西省大同市锦久辰工业园区  
E-mail: sxdtyzd@163.com 网址：www.yzd2000.com

## — overview

The engine intake control valve is a combination of a rotary motor and a disc valve of corresponding diameter, referred to as a position control valve, which is often used for gas engine speed regulation or air-fuel ratio control.

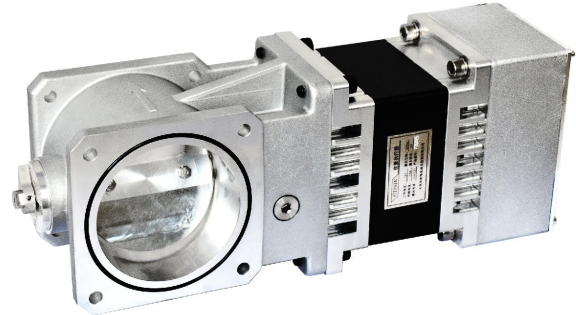
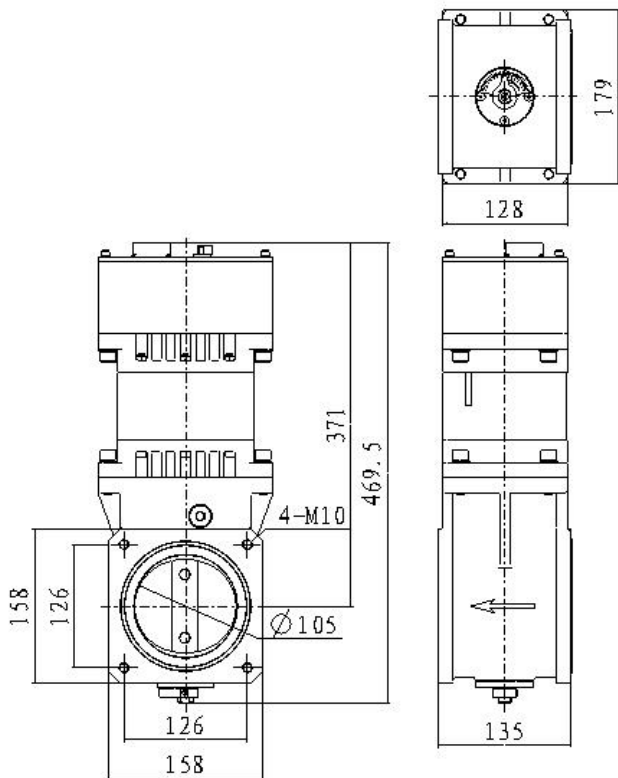
The main function of the position control valve is to convert the analog/digital input signal into the specified angular position output. The amount of mechanical rotation (rotation angle) is proportional to the input signal.

QZ105A Input analog signal 4~20mA.

QZ105D Input digital signal PWM(4-10V, 1000-3000 Hz).

It is the controller, not the position control valve, that controls the stability and dynamic response of the engine. Therefore, the engine should be matched and adjusted according to the instructions of the controller.

QZ105A/D external dimensions and installation structure dimensions of the position control valve are as follows:



Rotation direction of the position control valve: Looking at the direction of the pointer, the counterclockwise rotation direction is consistent with the direction of increasing fuel in the engine fuel supply system, that is: counterclockwise rotation increases the engine fuel supply, and clockwise rotation decreases the engine fuel supply.

## 二 Principle description

### 2.1 Introduction

The position valve controller sends a pulse width modulation PWM signal to the angle motor to drive to the corresponding angle position through the input analog/digital signal.

### 2.2 Angle motor

The rotation angle range of the angle motor design is 75° (DEG), within which the fuel supply mechanism of the engine is controlled. Angle motors can output torque in both directions (forward and reverse). Torque is directly proportional to the current supplied by the drive.

Angle motors use sealed bearings and are therefore maintenance free. The rotation angle position sensor is installed at the end of the rotor shaft, which is electrically isolated from the drive current loop and the machine body.

The valve plate is installed on the output shaft, and the valve plate opens and closes with the action of the angle motor.

### 2.3 Angle position sensor

The angle position sensor is coaxially installed with the rotor of the angle motor. The sensor is a linear, non-contact angular position sensor. Its power supply voltage is 5VDC. The feedback voltage is about: 0.5VDC when the rotation angle is 0° ; 4.25VDC when the rotation angle is 75° (refer to the 0V voltage measurement).

### 三 Install

Care should be taken when unpacking the position control valve. If you find that the shell is deformed, scratched or parts are damaged, please contact the supplier immediately.

#### 3.1 power supply

The output of the power supply should be low resistance (for example, directly from the battery). The power connection wire adopts two-core insulated sheathed wire, and the ground wire adopts single-core insulated sheathed wire. Neither power nor ground wires need shielding.

If the power source is batteries, make sure the system has an alternator or other battery charging device.

When the engine is stopped, the electric control system will control the position valve to keep the minimum position. At this time, if the battery charging system is turned off, it may cause the battery to be depleted of energy. To prevent this, the control system should be shut down using a switch or relay. The switch or relay should be interlocked with the engine start switch to prevent the engine from starting when the power supply of the ESC system is cut off.

#### 3.2 WARNING – OVER SPEEDING

Do not use the method of turning off the position valve power supply to stop the engine from running. Do not turn off the power to the position valve during shutdown operation. Because the valve plate will be in a free state after the position valve power is turned off, it may cause the engine to overspeed.

#### 3.3 Position control valve installation

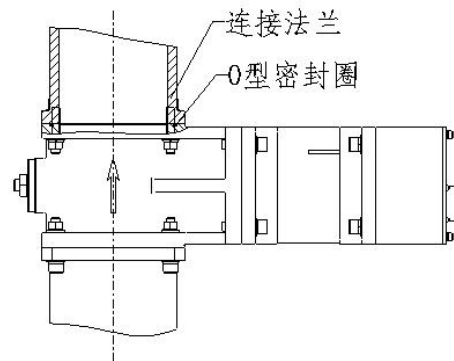
QZ105A/D The position valve is adapted to be installed on the gas pipeline or intake pipeline to control the intake volume of gas or mixer. When the position valve works normally, the current is  $\leq 3A$ , and the heat generated is very small. Only when the rotor is blocked or other conditions that require the maximum torque output, will it generate a large amount of heat. The main heat of the position valve comes from the heat transferred by the engine.

The installer should consider the thermal conductivity of the mounting bracket and the temperature of the engine body at the installation location. If the temperature of the engine body at the installation location is too high, appropriate heat insulation measures should be taken. Normally, aluminum and low-carbon steel materials with high thermal conductivity should be selected as the installation bracket, and the installation location should be selected in a location with good air circulation.

If there is indeed a working temperature problem, please contact the manufacturer's engineer.

The installation method is shown in Figure below. The connecting flanges are installed on both sides of the valve body, the contact surface is sealed with rubber rings, and the connecting pipeline can be connected to the flanges.

Manual detection: The scale corresponding to the pointer of the position control valve is the opening angle of the valve plate. Before starting the machine, pull the handle to confirm that the valve plate is not stuck.

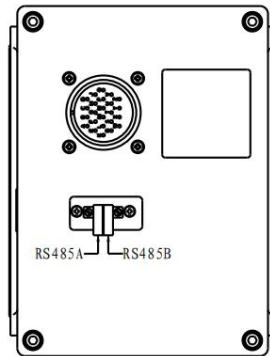


#### 3.4 Electrical connections

##### Requirement:

To connect the position control valve, just connect the aviation plug of the corresponding wiring harness with the aviation socket on the position control valve.

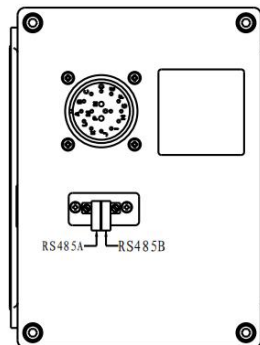
航空插头MS3102A 24-28P



引脚	定义
Z	电源+
Q	电源-
N	4-20mA输入+
P	4-20mA输入-
H	4-20mA输出+
D	4-20mA输出-
Y	RS485-A
T	RS485-B
J	屏蔽
W	屏蔽

QZ105A: Z--Power + Q--Power - N--4-20mA input +  
P--4-20mA input - H--4-20mA output +  
D--4-20mA output - Y--RS485-A T--RS485-B  
J&W--Shield

航空插头MS3102A 24-7P



引脚	定义
P	电源+
N	电源-
C	PWM+
D	PWM-
J	4-20mA输出+
K	4-20mA输出-

QZ105D: P-- Power + N-- Power -  
C-- PWM + D-- PWM -  
J-- 4-20mA output +  
K-- 4-20mA output -

## 四 Troubleshooting Guide

### 4.1 Introduction

Before making adjustments to the position control valve, carefully check all electrical connections, power and valve flexibility. Manually pull the handle on the dial side of the position control valve, from 0° to 75° without stagnation. If a sticking occurs at a certain point, it will cause the engine speed to be unstable when it is near this air supply position.

## 五 QZ105A/D Position Control Valve Parameters

power supply	20 VDC to 32 VDC (24 VDC nominal)
output torque	MAX 20Nm
Output current	5A continuous; 10A peak, continuous 30 seconds
QZ105A control method	4~20mA、RS485
QZ105D control method	PWM、RS485
control precision	$\leq 0.2^\circ$
Opening range	0~75°
opening feedback	4~20mA
range of working temperature	-30°C ~ +90°C
storage temperature range	-40°C ~ +90°C
humidity	38°C, 95%
degree of protection	IP65

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