# HYM 系列液压伺服马达（摆动油缸）

# HYM series hydraulic servo motor (swing cylinder)

## 产品简介

## Product overview

液压伺服马达作为电液伺服系统中的一个独立的、重要的执行元件。它是将液压能转换成机械能，主要由轴、键、壳体、支架、端盖及插头座等组成。其品质优劣直接决定了伺服系统的动态响应能力、静态控制精度和系统稳定性。

The hydraulic servo motor is an independent and important actuating element in the electrohydraulic servo system. It converts hydraulic energy into mechanical energy and consists of shaft, key, shell, bracket, end cover and socket. Its quality directly decides dynamic response capability, static control accuracy and system stability of the servo system.

## 产品特点

## Product features

- 结构紧凑，外形尺寸小
- Compact structure, small boundary dimension
- 摩擦力小、启动电流小
- Small friction, small starting current
- 运动平稳，噪声小
- Smooth movement, small noise
- 负载转矩较小
- Small load torque
- 高动态响应
- High dynamic response
- 旋转直驱，降低系统结构复杂度
- Rotating drive lowers the complexity of system structure

## 选型指南

## Model selection guidance

1、 输出轴连接形式分为：平键式、花键式。

1. Connection form of output shaft: flat key, spline

2、 连接支承形式分为：支座式、法兰盘式。

2. Connection and supporting forms: bearing, flange plate.

3、 伺服阀安装形式分为：直接安装、转接座安装、集成块安装。

3. Servo valve installation form: direct installation, adaptor, integrated package.

4、 输出轴直径 d 应按设计要求在图纸中明示。

4. The diameter d of output shaft shall be clearly indicated on the drawing according to the design requirements.

## 性能指标

## Performance indicators

1、 额定工作压力

1. Rated working pressure

液压伺服马达的工作压力为（1~31.5）MPa。

The working pressure of hydraulic servo motor is (1-31.5) MPa.

2、 最低启动压力

2. Minimum starting pressure

液压伺服马达在空载条件下，驱动液压伺服马达动片运动的最小工作压力。航宇智星设计制造的伺服马达的最低启动压力△Pf≤0.02MPa。

Minimum working pressure of the hydraulic servo motor driving the moving plate of the motor under no-load conditions. The minimum starting pressure of the hydraulic servo motor designed and manufactured by Hangyu WitStar is: △Pf≤0.02MPa.

3、 排量：马达轴每旋转一转所需输入的液体体积。

3. Displacement: liquid volume required for each rotation of the motor shaft.

4、 额定转速：在额定压力下，能连续长时间正常运转的最高转速。

4. Rated speed: maximum speed for long-time continuous normal operation at rated pressure.

5、 理论流量：在单位时间内为形成指定转速，液压马达封闭腔容积变化所需要的流量。

5. Theoretical flow: flow required to change closed chamber volume of hydraulic motor in order to form a specified speed in unit time.

$$q_0 = V \times n \times 10^{-3} \ (L/min)$$

式中： V 排量（mL/r）

Wherein, V displacement (mL/r)

n 转速（r/min）

n speed (r/min)

6、实际流量：马达进口处流量。

6. Actual flow: flow of motor at the inlet.

$$q = \frac{V \times n}{\eta_v} \times 10^{-3} \ (L/min)$$

式中： V——排量（mL/r）

Wherein, V - displacement (mL/r)

n——转速（r/min）

n - speed (r/min)

$\eta_v$——容积效率（%）

$\eta_v$ - volume efficiency (%)

7、额定转矩：在额定压力作用下马达输出的转矩。

7. Rated torque: torque output by the motor under rated pressure.

$$T=\frac{\Delta p\times V}{6.28}\times\eta_m\ (N\cdot m)$$

式中： ρp——进出口压力差（MPa）

Wherein, ρp - Pressure difference between inlet and outlet (MPa)

V——排量（mL/r）

V - displacement (mL/r)

$\eta_m$——机械效率（%）

$\eta_m$ - mechanical efficiency (%)

8、 全行程和工作行程

8. Full stroke and working stroke

动片在壳体中运动的最大角位移（即输出轴最大摆角）称液压伺服马达的全行程，以º表示。

The maximum displacement of the moving plate moving in the cylinder (i.e. the maximum pendulum angle of the output shaft) is called the full stroke of the hydraulic servo motor, expressed with º.

液压伺服马达工作所需要的行程叫工作行程，工作行程≤全行程。

The stroke required by the hydraulic servo motor is called the working stroke, working stroke≤ full stroke.

液压伺服马达一般为双向工作的，其工作行程可用±工作行程表示，±工作行程≤全行程/2。

The hydraulic servo motor usually works in two directions, and its working stroke can be expressed with ± working stroke, ±working stroke≤ 1/2 of full stroke.

9、 内漏

9. Internal leakage

在空载额定压力条件下，液压伺服马达两工作腔间油液的内部泄漏量称内漏，用 L/min 表示。航宇智星设计制造的液压伺服马达的最低内漏≤0.5mL/min。

Internal leakage (expressed with L/min) refers to the internal oil leakage between the two working chambers of the hydraulic servo motor at the no-load rated pressure. The minimum internal leakage of the hydraulic servo motor designed and manufactured by Hangyu WitStar is: ≤0.5mL/min.

10、 静压密封性

10. Static-pressure sealing

液压伺服马达两工作腔在 2 米高液柱的静压作用下，静置 24 小时后，不得有明显的外部泄漏（允许湿润，不允许滴下）。

After the two working chambers of the hydraulic servo motor are placed still for 24h under the static pressure of 2m high liquid column, obvious external leakage is not allowed (wetting is allowed, but dripping is not allowed).

11、 超压密封性

11. Over-pressure sealing

液压伺服马达在 1.5 倍（额定压力≤16MPa）或 1.25 倍（额定压力≥16MPa）额定压力作用下保持 3 分钟后，不得出现永久变形和明显的外部泄漏（允许湿润，不允许滴下）。

After the hydraulic servo motor keeps 1.5 (rated pressure ≤16MPa) or 1.25 (rated pressure ≥16MPa) times of rated pressure for 3min, there shall be no permanent deformation and obvious

external leakage (wetting is allowed, but dripping is not allowed).

12、 外部密封

12. External sealing

在使用条件下，液压伺服马达工作时不得有明显的外部泄漏（允许湿润，不允许滴下）。

The hydraulic servo motor shall have no obvious external leakage under use conditions (wetting is allowed, but dripping is not allowed).

13、 液压固有频率

13. Hydraulic natural frequency

液压伺服马达的液压固有频率可用下式简化计算：

The hydraulic natural frequency of the hydraulic servo motor can be calculated according to the following formula:

$$\omega = \sqrt{\frac{4ED^2}{VJ}}$$ （rad/s）

式中： D——马达排量（$m^3$/rad）

Wherein, D - motor displacement ($m^3$/rad)

E——油液弹性模量（$N/m^2$）

E - elasticity modulus of oil ($N/m^2$)

V——马达两油腔的总容积（$m^3$）

V - total volume of two oil chambers of the motor ($m^3$)

J——转动惯量（N• m• $s^2$）

J - rotational inertia (N• m• $s^2$)

14、使用环境要求

14. Requirements for service environment

环境温度：-10°C~40°C

Ambient temperature: -10°C~40°C

相对湿度：≤80%

Relative humidity: ≤80%

油液温度：-10°C~60°C

Oil temperature: -10°C~60°C

工作液清洁度：ISO440615/12,NAS16386 级。工作液清洁度直接影响液压伺服马达的使用寿命和性能，系统工作液越清洁液压伺服马达的使用寿命越长，性能越好。

Cleanliness of working fluid: ISO440615/12, NAS16386. The cleanliness of working fluid directly affects the service life and performance of a hydraulic servo motor. The cleaner the working fluid is, the longer the service life of and the better the performance of the hydraulic servo motor is.

振动：不产生振动。

Vibration: no vibration.

无线电干扰和磁场干扰：没有强无线电干扰环境和强磁场干扰环境。

Radio interference and magnetic field interference: no strong radio interference environment and

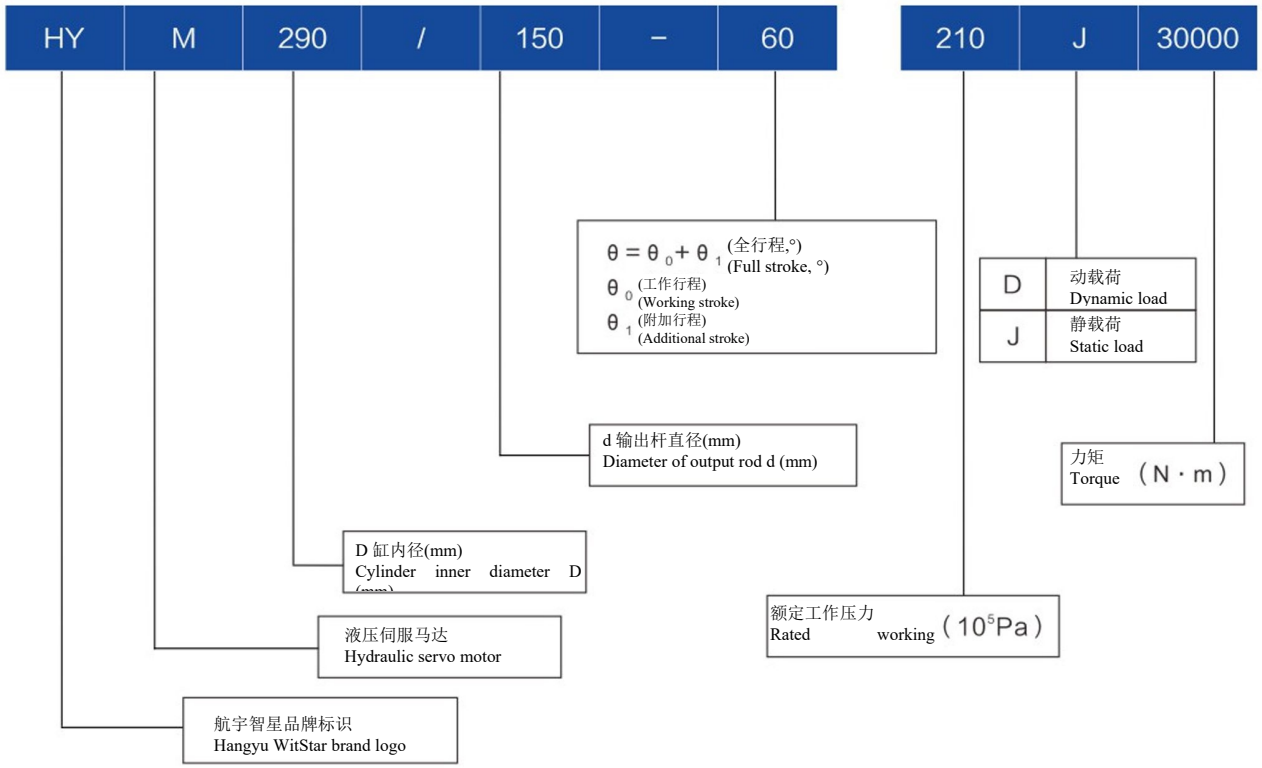
strong magnetic interference environment.

接地：要求配装电液伺服阀、伺服放大器时与传器良好接地，接地电阻≤4Ω。

Grounding: good grounding with sensors when the electrohydraulic servo valve and the servo amplifier is equipped, with an earth resistance not more than 4Ω.

## HYM 系列液压伺服马达系列号

## Serial No. of HYM series hydraulic servo motors




注：航宇智星可按用户的特殊要求定制各种液压伺服马达

Note: Hangyu WitStar can customize various kinds of hydraulic servo motors as required by users.